SERVICE MANUAL

PARTS LIST

MODEL AA-1015/PL

AKAI

ALSO APPLICABLE TO BLACK MODEL

Published in Heiloo Holland

AA-1015

AA-1015L

AKAI STEREO RECEIVER

MODEL AA-1015/PL

ALSO APPLICABLE TO BLACK MODEL

SECTION 1

SERVICE MANUAL

TABLE OF CONTENTS

I. TECHNICAL DATA

1. MODEL AA-1015

AMPLIFIER SECTION

CONTINUOUS POWER OUTPUT 2 CHANNELS DRIVEN		15 watts per channel, minimum RMS, at 8 ohms from 40 to 20,000 Hz with no more than 0.8% T.H.D.
POWER BANDWIDTH (IHF)		15 Hz to 40 kHz/8 ohms (T.H.D.: 0.8%)
SIGNAL TO NOISE RATIO (IHF)	PHONO	Better than 75 dB
	AUX	Better than 90 dB
RESIDUAL NOISE		Less than 0.8 mV at 8 ohms
CHANNEL SEPARATION (IHF)	PHONO	Better than 50 dB at 1,000 Hz
DAMPING FACTOR		More than 30 (1 kHz, 8 ohms)
OUTPUT	SPEAKERS	A, B (4 to 16 ohms)/A+B (8 to 16 ohms)
	HEADPHONES	4 to 16 ohms
INPUT SENSITIVITY/IMPEDANCE		
	PHONO	3 mV/47 kohms
	AUX	150 mV/100 kohms
TAPE MONITOR	INPUT	PIN: 150 mV/100 kohms DIN: 150 mv/100 kohms
	OUTPUT	PIN: 150 mV/2 kohms DIN: 30 mV/30 kohms
FREQUENCY RESPONSE	PHONO (RIAA)	30 Hz to 15 kHz +1 dB, −1 dB
	TUNER/AUX/TAPE MONITOR	10 Hz to 70 kHz +0 dB, −2 dB
TONE CONTROL	BASS	±10 dB at 100 Hz
	TREBLE	±10 dB at 10 kHz
LOUDNESS CONTROL		+10 dB at 100 Hz, +5 dB at 10 kHz (Volume control set at −30 dB position)

TUNER SECTION

FM

FREQUENCY RANGE		88 MHz to 108 MHz
SENSITIVITY (IHF)		2.0 μV
CAPTURE RATIO		1.5 dB
SELECTIVITY (IHF)		More than 60 dB
IMAGE REJECTION		More than 55 dB (at 98 MHz)
IF REJECTION		More than 70 dB (at 98 MHz)
SPURIOUS REJECTION		More than 70 dB (at 98 MHz)
AM SUPPRESSION		50 dB
SIGNAL TO NOISE RATIO		65 dB
HARMONIC DISTORTION	MONO	Less than 0.3% (100% modulation)
	STEREO	Less than 0.6% (100% modulation)
STEREO SEPARATION		More than 40 dB (1 kHz)
SUB CARRIER SUPPRESSION		More than 50 dB

AM

FREQUENCY RANGE	520 kHz to 1,605 kHz
SENSITIVITY (IHF)	200 μV/m (bar antenna), 8 μV (external antenna)
SELECTIVITY (IHF)	More than 30 dB
IMAGE REJECTION	More than 55 dB (1 MHz)
IF REJECTION	More than 45 dB
SIGNAL TO NOISE RATIO	More than 45 dB
ANTENNA INPUT IMPEDANCE	300 ohms balanced, 75 ohms unbalanced

MISCELLANEOUS

SEMICONDUCTORS	Transistors: 19, Diodes: 5, FET: 1, ICs: 4
POWER REQUIREMENTS	120V, 60 Hz for Canada 220V, 50 Hz for European Countries except U.K. 240V, 50 Hz for U.K. & Australia 110V/220V/240V (Switchable), 50/60 Hz for the other countries.
DIMENSIONS	440 (W) x 125 (H) x 265 (D)mm (17.3 x 4.9 x 10.4 inches)
WEIGHT	6.2 kg (13.7 lbs)

* For improvement purposes, specifications and design are subject to change without notice.

2. MODEL AA-1015PL

AMPLIFIER SECTION

CONTINUOUS POWER OUTPUT 2 CHANNELS DRIVEN		15 watts per channel, minimum RMS, at 8 ohms from 40 to 20,000 Hz with no more than 0.8% T.H.D.
POWER BANDWIDTH (IHF)		15 Hz to 40 kHz/8 ohms (T.H.D.: 0.8%)
SIGNAL TO NOISE RATIO (IHF)	PHONO	Better than 75 dB
	AUX	Better than 90 dB
RESIDUAL NOISE		Less than 0.8 mV at 8 ohms
CHANNEL SEPARATION (IHF)	PHONO	Better than 50 dB at 1,000 Hz
DAMPING FACTOR		More than 30 (1 kHz, 8 ohms)
OUTPUT	SPEAKERS	A, B (4 to 16 ohms)/A+B (8 to 16 ohms)
	HEADPHONES	4 to 16 ohms
INPUT SENSITIVITY/IMPEDANCE		
	PHONO	3 mV/47 kohms
	AUX	150 mV/100 kohms
TAPE MONITOR	INPUT	PIN: 150 mV/100 kohms DIN: 150 mV/100 kohms
	OUTPUT	PIN: 150 mV/2 kohms DIN: 30 mV/30 kohms
FREQUENCY RESPONSE	PHONO (RIAA)	30 Hz to 15 kHz +1 dB, −1 dB
	TUNER/AUX/TAPE MONITOR	10 Hz to 70 kHz +0 dB, −2 dB
TONE CONTROL	BASS	±10 dB at 100 Hz
	TREBLE	±10 dB at 10 kHz
LOUDNESS CONTROL		+10 dB at 100 Hz, +5 dB at 10 kHz (Volume control set at −30 dB position)

TUNER SECTION

FM

FREQUENCY RANGE		88 MHz to 108 MHz
SENSITIVITY (IHF)		2.0 μV
CAPTURE RATIO		1.5 dB
SELECTIVITY (IHF)		More than 60 dB
IMAGE REJECTION		More than 55 dB (at 98 MHz)
IF REJECTION		More than 70 dB (at 98 MHz)
SPURIOUS REJECTION		More than 70 dB (at 98 MHz)
AM SUPPRESSION		50 dB
SIGNAL TO NOISE RATIO		60 dB
HARMONIC DISTORTION	MONO	Less than 0.3% (100% modulation)
	STEREO	Less than 0.6% (100% modulation)
STEREO SEPARATION		More than 40 dB (1 kHz)
SUB CARRIER SUPPRESSION		More than 50 dB

AM

		MW Section	LW Section
FREQUENCY RANGE		520 kHz to 1,605 kHz	150 kHz to 350 kHz
SENSITIVITY (IHF)	MW	200 μV/m (bar antenna)	20 μV (external antenna)
	LW	300 μV/m (bar antenna)	30 μV (external antenna)
SELECTIVITY (IHF)		More than 30 dB	More than 30 dB
IMAGE REJECTION		More than 55 dB (1 MHz)	More than 35 dB (240 kHz)
IF REJECTION		More than 45 dB	More than 40 dB
SIGNAL TO NOISE RATIO		More than 45 dB	More than 50 dB
ANTENNA INPUT IMPEDANCE		300 ohms balanced, 75 ohms unbalanced	

MISCELLANEOUS

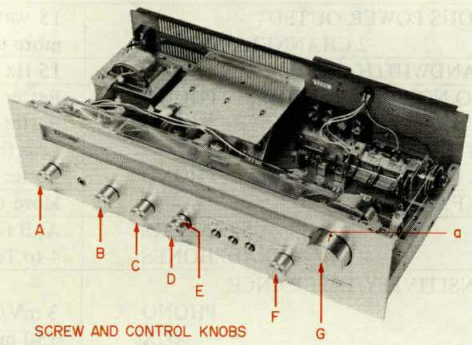
SEMICONDUCTORS	Transistors: 26, Diodes: 16, FETs: 2, ICs: 7
POWER REQUIREMENTS	120V, 60 Hz for Canada 220V, 50 Hz for European Countries except U.K. and Australia 110V/220V/240V (Switchable), 50/60 Hz for the other countries
DIMENSIONS	440 (W) x 125 (H) x 265 (D)mm (17.3 x 4.9 x 10.4 inches)
WEIGHT	6.2 kg (13.7 lbs)

*For improvement purposes, specifications and design are subject to change without notice.

II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in photographs. Re-assemble in reverse order.

4

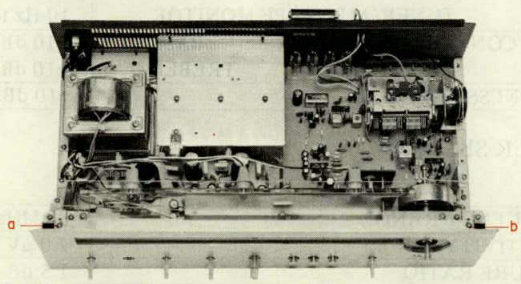


SCREW AND CONTROL KNOBS

1

SCREWS

5



SCREWS

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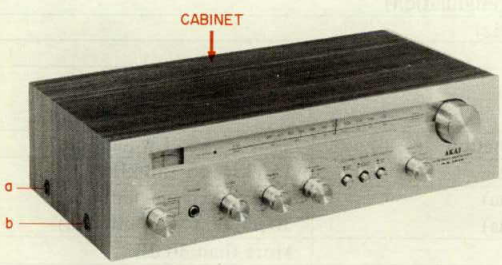

SCREWS

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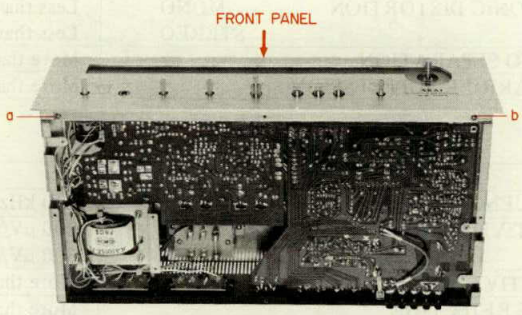

SCREWS

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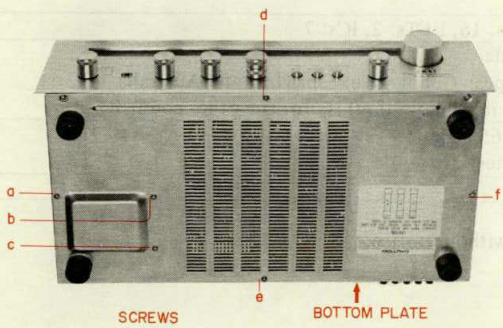
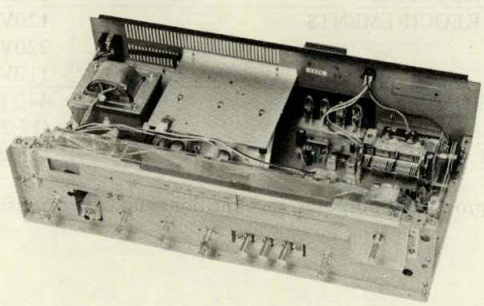


SCREWS

BOTTOM PLATE

7



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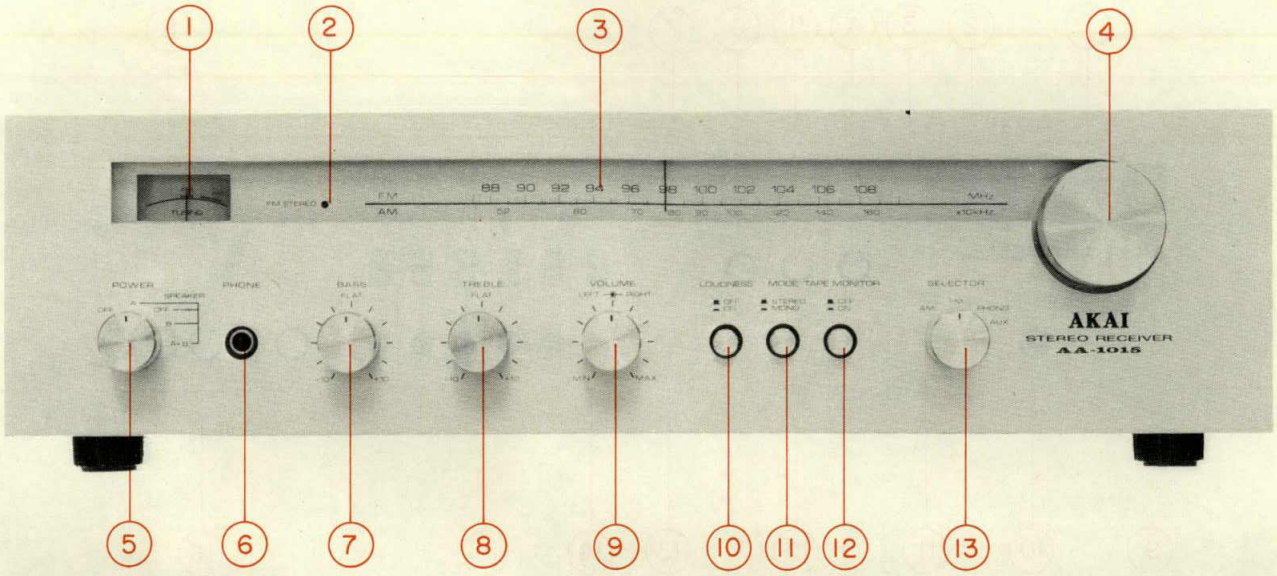
III. CONTROLS

1. MODEL AA-1015



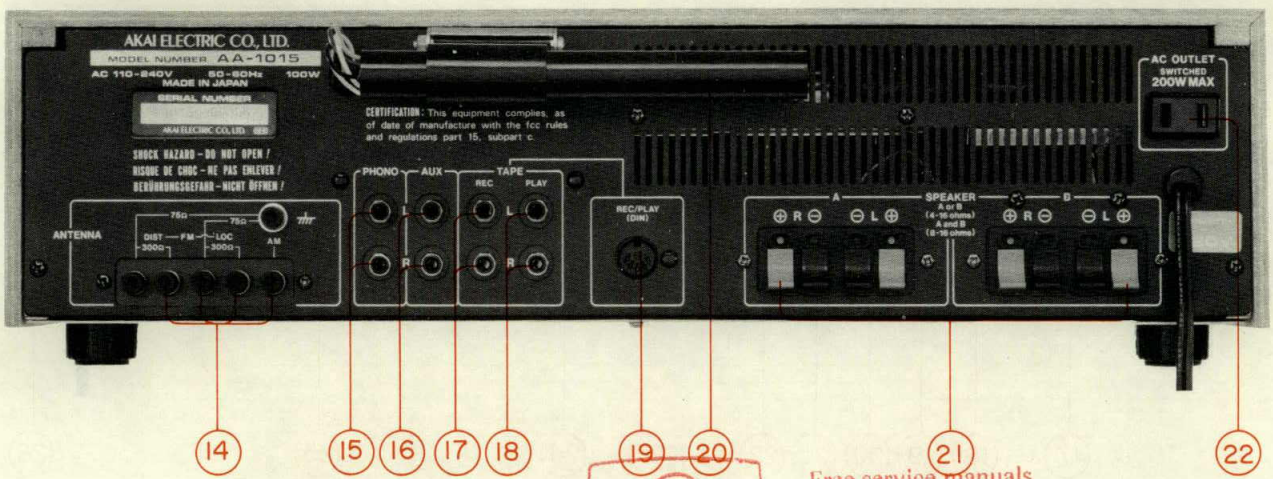


Fig. 1 Controls

1. FM/AM TUNING METER
2. FM STEREO INDICATOR LAMP
3. DIAL SCALES
4. TUNING KNOB
5. POWER SWITCH/SPEAKER SYSTEM SELECTOR
6. HEADPHONE JACK
7. BASS CONTROL
8. TREBLE CONTROL
9. VOLUME CONTROLS (Left/right)
10. LOUDNESS SWITCH
11. MODE SELECTOR
12. TAPE MONITOR SWITCH
13. SOURCE SELECTOR
14. ANTENNA TERMINALS
15. PHONO JACKS
16. AUX JACKS
17. TAPE REC JACKS
18. TAPE PB (PLAY) JACKS
19. DIN JACK
20. AM FERRITE BAR ANTENNA
21. A AND B SYSTEM SPEAKER TERMINALS
22. AC OUTLET (CEE Models not equipped with this facility)

2. MODEL AA-1015PL

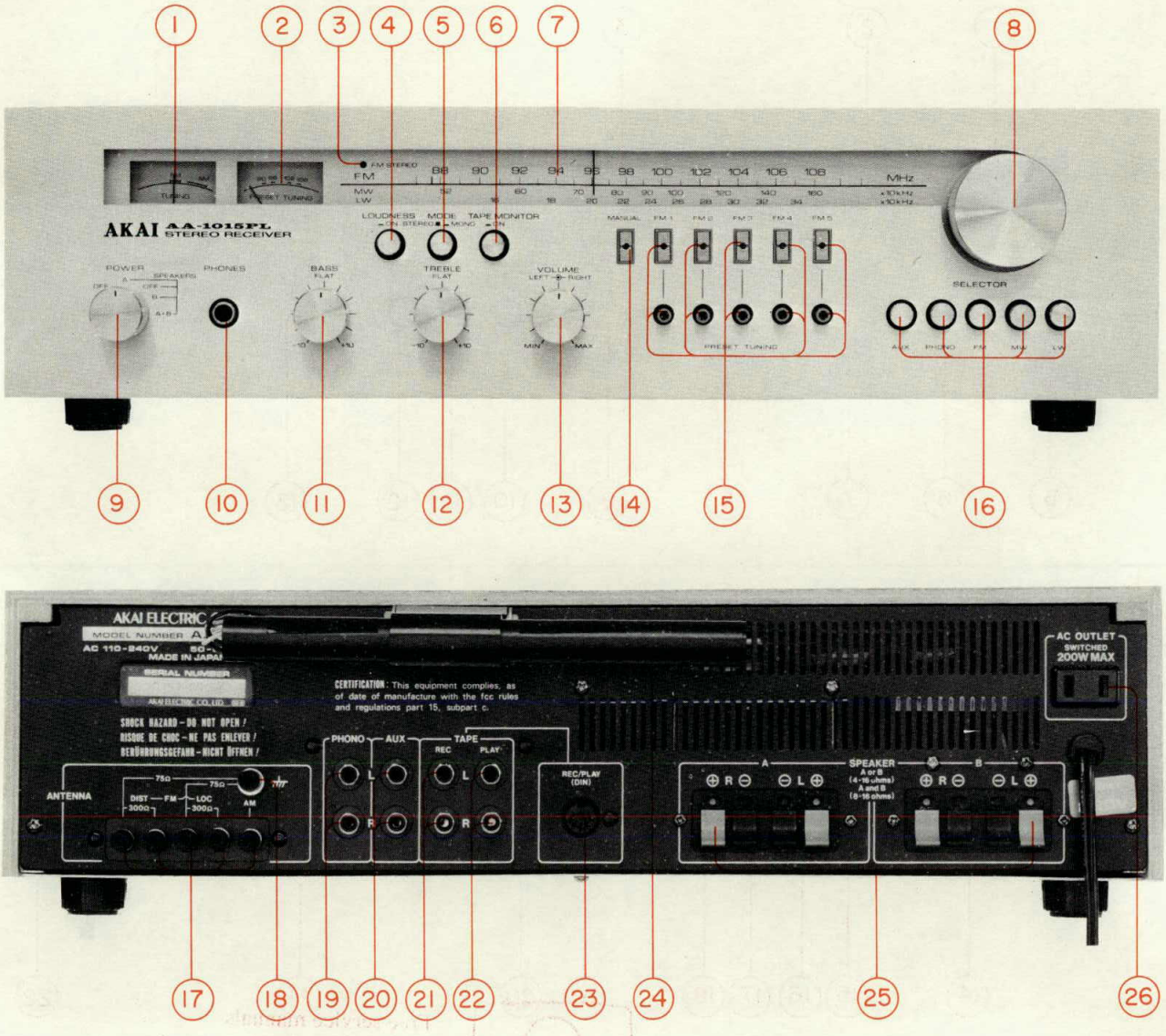


Fig. 2 Controls

1. FM/AM TUNING METER
2. PRESET TUNING METER
3. FM STEREO LAMP
4. LOUDNESS SWITCH
5. MODE SWITCH
6. TAPE MONITOR SWITCH
7. DIAL SCALES
8. TUNING KNOB
9. POWER SWITCH/SPEAKER SYSTEM SELECTOR
10. HEADPHONE JACK
11. BASS CONTROL KNOB
12. TREBLE CONTROL KNOB
13. VOLUME CONTROLS (left/right)
14. MANUAL FM SELECTOR
15. FM PRESET TUNING KNOB AND PROGRAM SELECTORS
16. SOURCE SELECTOR
17. FM AND AM (MW, LW) ANTENNA TERMINALS
18. GROUND TERMINAL
19. PHONO JACKS
20. AUX JACKS
21. TAPE SYSTEM REC JACKS
22. TAPE SYSTEM PLAY JACKS
23. TAPE SYSTEM DIN JACK
24. AM (LW, MW) FERRITE BAR ANTENNA
25. A AND B SYSTEM SPEAKER TERMINALS
26. AC OUTLET (CEE Models not equipped with this facility)

IV. PRINCIPAL PARTS LOCATION

1. MODEL AA-1015

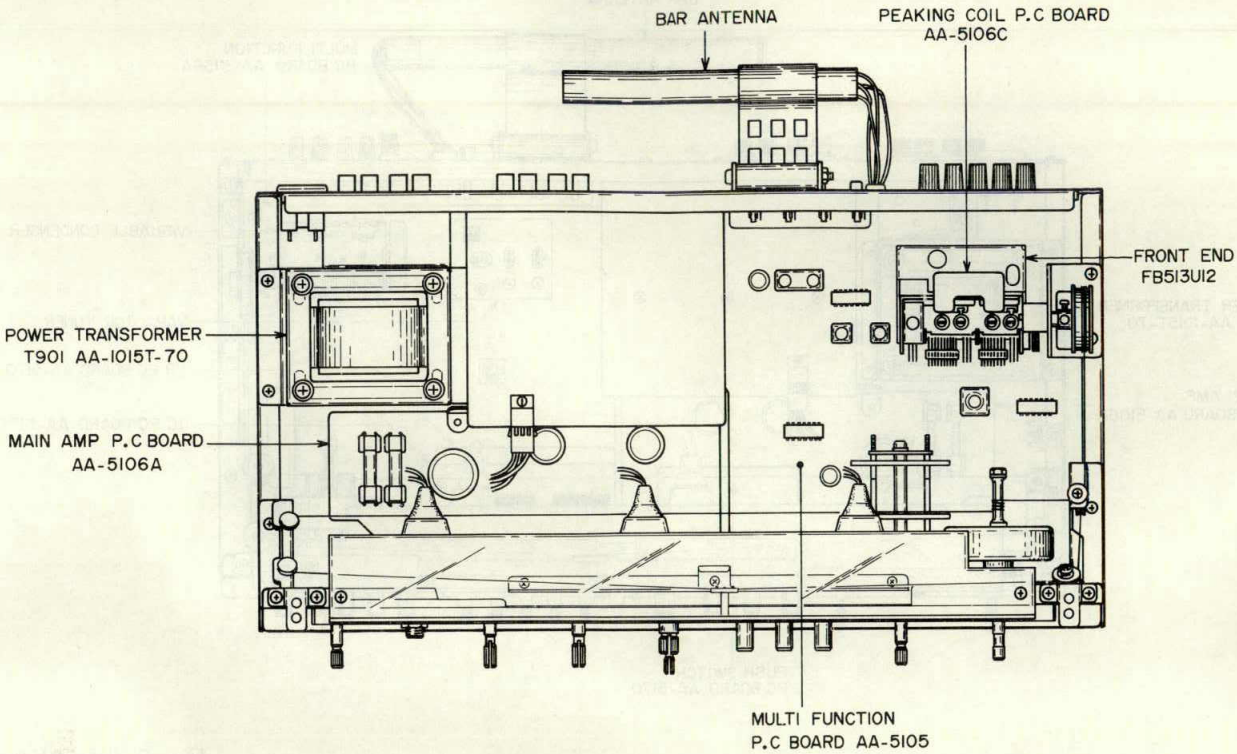


Fig. 3 Top View

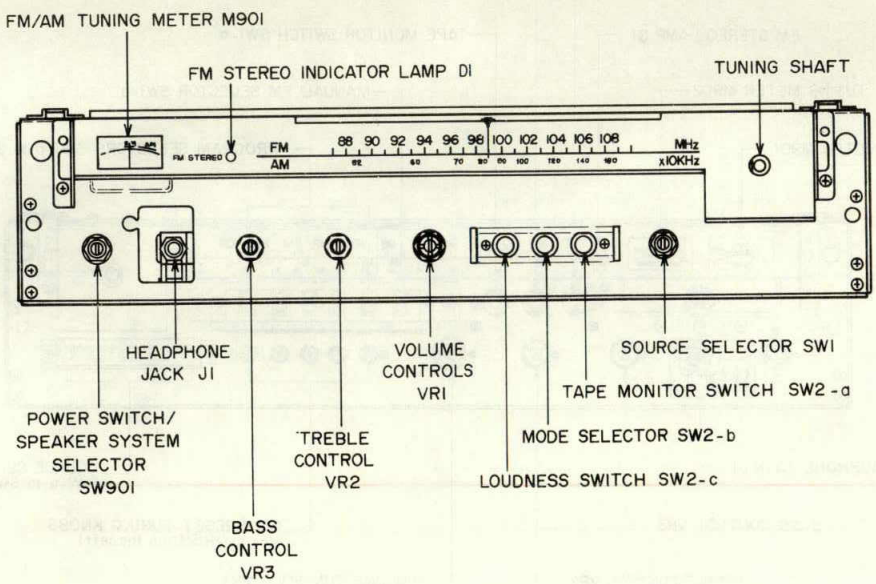


Fig. 4 Front View

2. MODEL AA-1015PL

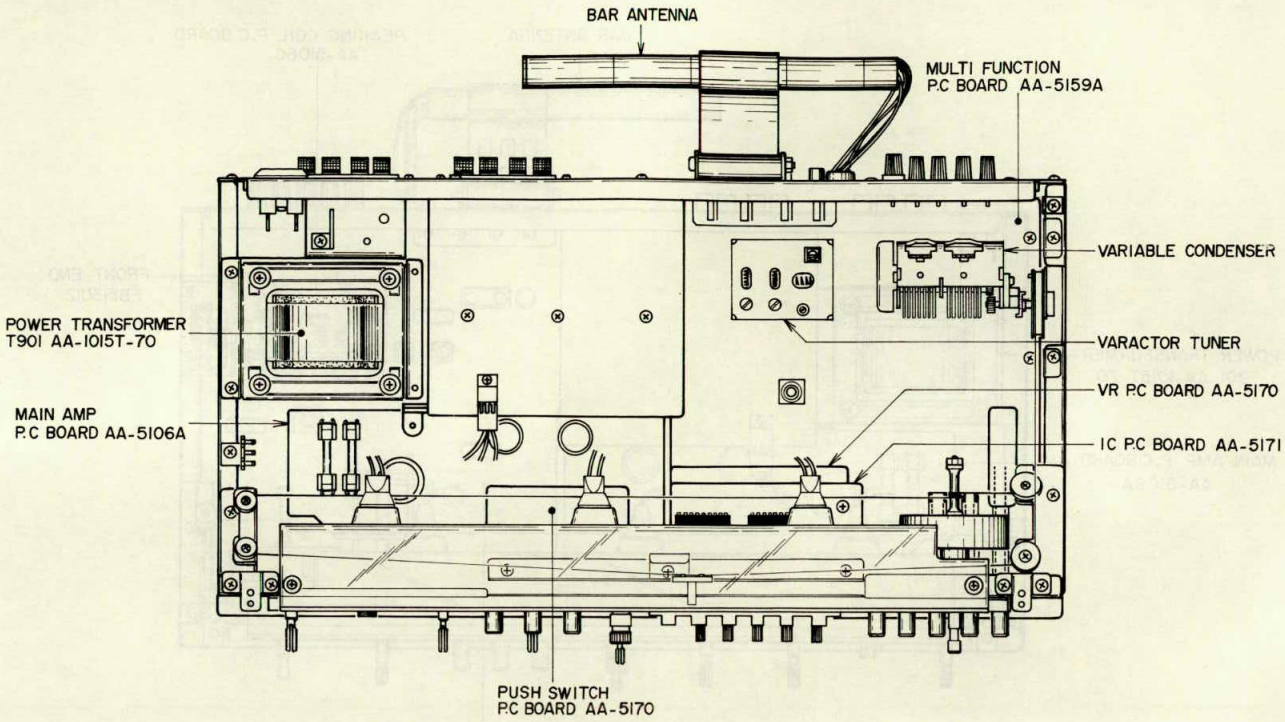


Fig. 5 Top View

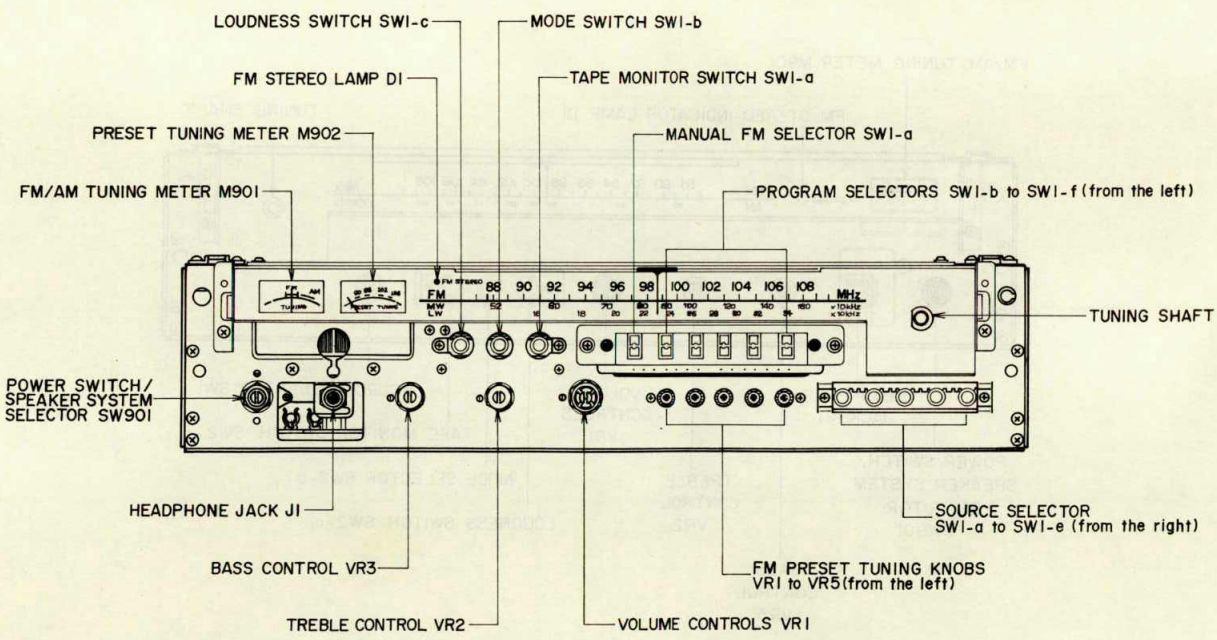


Fig. 6 Front View

V. OPERATING PRINCIPLES OF QUADRATURE DETECTION SYSTEM

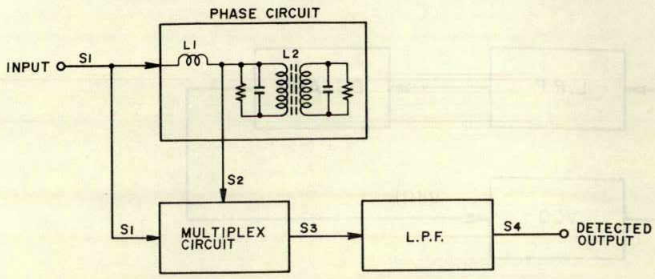


Fig. 7 Quadrature Detection Block Diagram

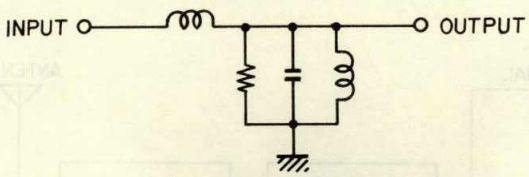


Fig. 8 Single Tuning Type

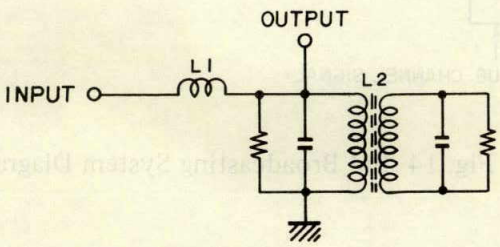


Fig. 9 Double Tuning Type

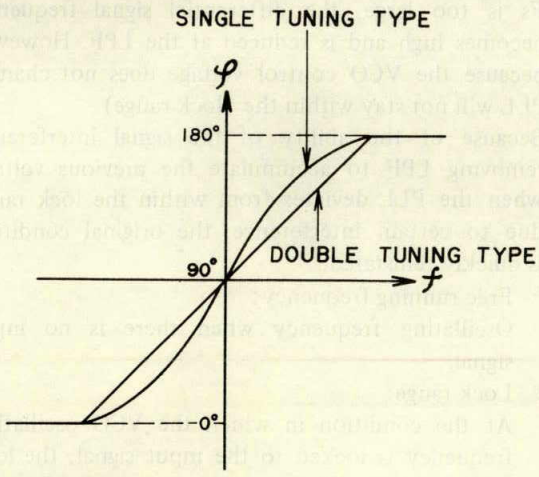


Fig. 10 Tuning Curve

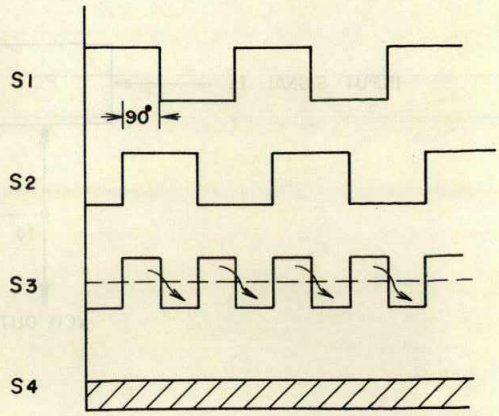


Fig. 11 Output at Non-modulation

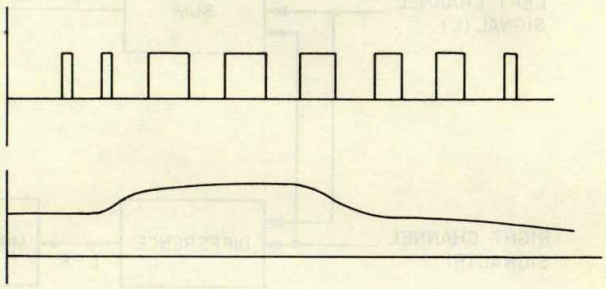


Fig. 12 Output at Modulation Time

The Quadrature Detection Circuit is comprised of a Phase Circuit, a Multiplier Circuit and a Low Pass Filter (L.P.F.) as shown in Fig. 7.

There are two types of Phase Circuits, the Single tuning type shown in Fig. 8 and the Double tuning type shown in Fig. 9. However, because with the double tuning type there is less frequency deviation in relation to carrier frequency, linearity is improved as shown in Fig. 10 and phase distortion is reduced, this type of phase circuit is employed in the AA-1015 and AA-1015PL.

Input signal S1 is divided into the part which enters the direct multiplier circuit and the part which passes the phase circuit and enters the multiplier circuit. The signal supplied to the phase circuit is always 90° phase delayed at L1. Also because at Non-modulation time, L2 is tuned to 10.7 MHz, if modulation is applied and S1 is changed from 10.7 MHz, phase deviation at L2 will take place proportionately in relation to this changed part and this becomes S2 signal which is delayed in relation to S1.

At Non-modulation, because as shown in Fig. 11, the input signal S1 and 90° phase delayed (by means of L1) signal S2 are switched by means of the multiplier circuit, the output signal becomes S3.

Because this S3 passes the pass filter and becomes S4 fixed direct current, the detector output is zero. Then, when modulation is applied, because the switched output is varied according to the degree of modulation, and the output which passed the low pass filter becomes the pulsating current part as shown in Fig. 12, detector output is obtained.

VI. OPERATING PRINCIPLES OF PLL CIRCUIT EMPLOYED IN STEREO DEMODULATION CIRCUIT

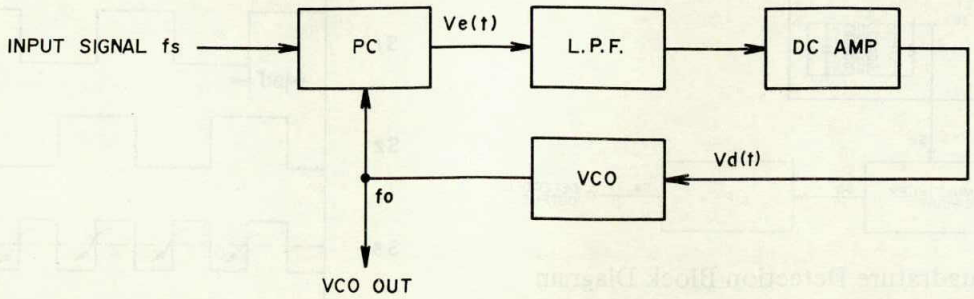


Fig. 13 PLL Circuit

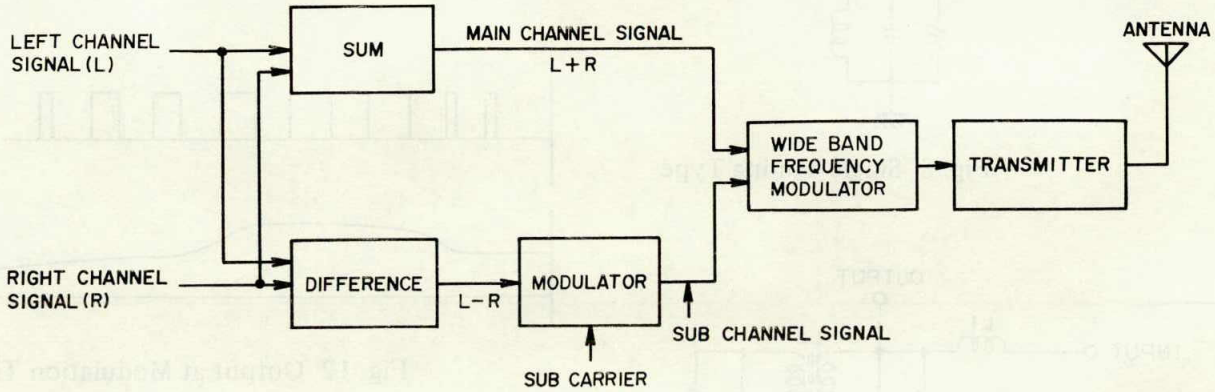


Fig. 14 FM Broadcasting System Diagram

To separate the FM stereo broadcast signal received to date into left and right signals, a 19 kHz pilot signal was successively multiplier to form a 38 kHz signal and stereo separation was effected from this. However, with this multiplier system, change in coils due to wear occurred and adjustment points were numerous, etc. Therefore, this model employs a newly developed PLL circuit which produces an exceedingly accurate 38 kHz switching signal.

1. PLL CIRCUIT OPERATION

PLL circuit is a kind of feedback circuit and is comprised of a Phase Comparator (PC), a Low Pass Filter (LPF), a Direct Current Amplifier (DC Amp) and a Voltage Control Oscillator (VCO) as shown in Fig. 13. The PC compares input signal Fs and VCO oscillator output and generates the difference in signal voltage Ve(t) proportionately to this phase deviation. This Ve(t) passes LPF and the DC Amp and becomes control voltage. This control voltage supplied to VCO and VCO oscillation frequency is DC controlled. When there is no input signal Fs, because there is also no Ve(t), control voltage Vd(t) becomes zero, and VCO maintains a *Free-running oscillation frequency. When a signal enters, VCO oscillation frequency Fo is controlled to narrow the difference between Fs by means of feedback as described above, and the PLL circuit assumes a synchronous condition. This is referred to as input signal lock. (When the difference between Fo and Fs is too large, the differential signal frequency becomes high and is reduced at the LPF. However, because the VCO control voltage does not change, PLL will not stay within the *lock range).

Because of the ability of the signal interference removing LPF to accumulate the previous voltage when the PLL deviates from within the lock range due to certain interference, the original condition is quickly reinstated.

* Free running frequency:
  Oscillating frequency when there is no input signal.
* Lock range:
  At the condition in which the VCO oscillation frequency is locked to the input signal, the lock range is the oscillating frequency in which when the input signal changes, the PLL maintains its input signal lock condition.
  Accordingly, in case Fs is changed inside the PLL lock range, VCO oscillation frequency always follows this, and a no frequency deviation and no phase difference signal is obtained. In other words, VCO oscillation frequency can be locked to Fs.

2. STEREO DEMODULATION CIRCUIT

As shown in Fig. 14 for FM broadcasts, the sum signal (L+R) consists of left signal (L) and right signal (R) and the audio frequency band of this signal in its original form is frequency modulated.

On the other hand, the difference signal of both (L–R) is changed to high frequency through the use of the sub carrier, and is referred to as the sub channel signal. The carrier is further frequency modulated and sent to the FM stereo transmitter. Accordingly, for composite stereo signal demodulation, the sub carrier used for demodulation at the transmitter must be the same uniform 38 kHz signal as the frequency and phase. If the 38 kHz waveform is asymmetrical, channel separation will become poor. At the PLL employed MPX stereo demodulator circuit, as shown in Fig. 13 first a 76 kHz signal is oscillated and when this passes the divider, a symmetrical 38 kHz signal is obtained.

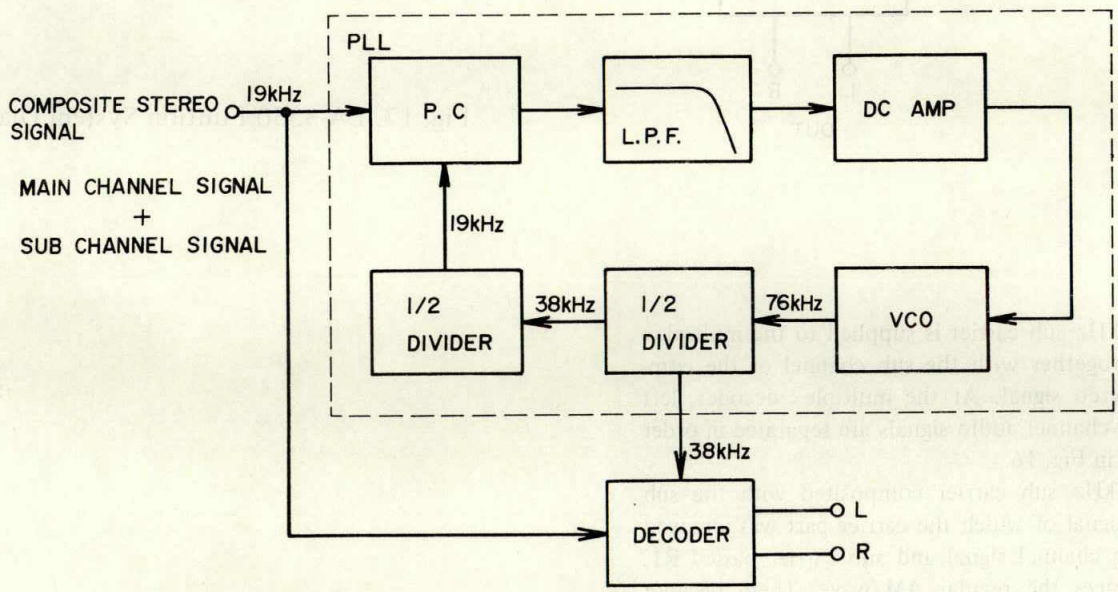


Fig. 15 MPX IC Function

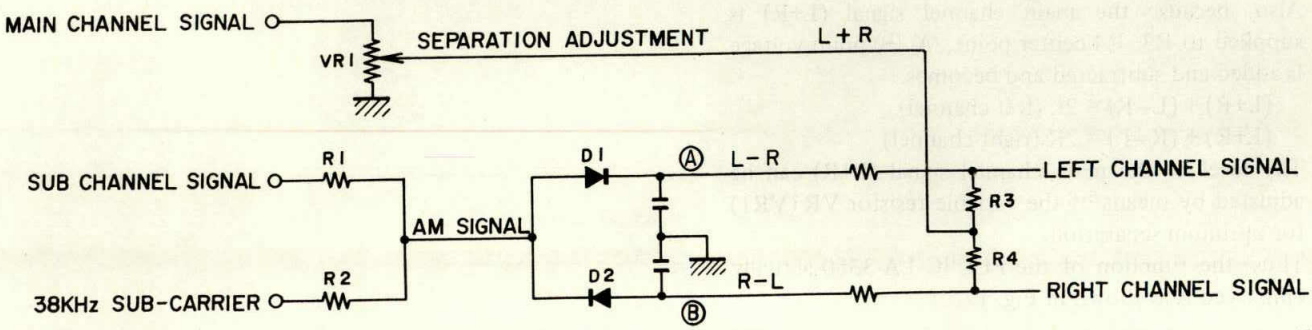


Fig. 16. Multiplex Decoder

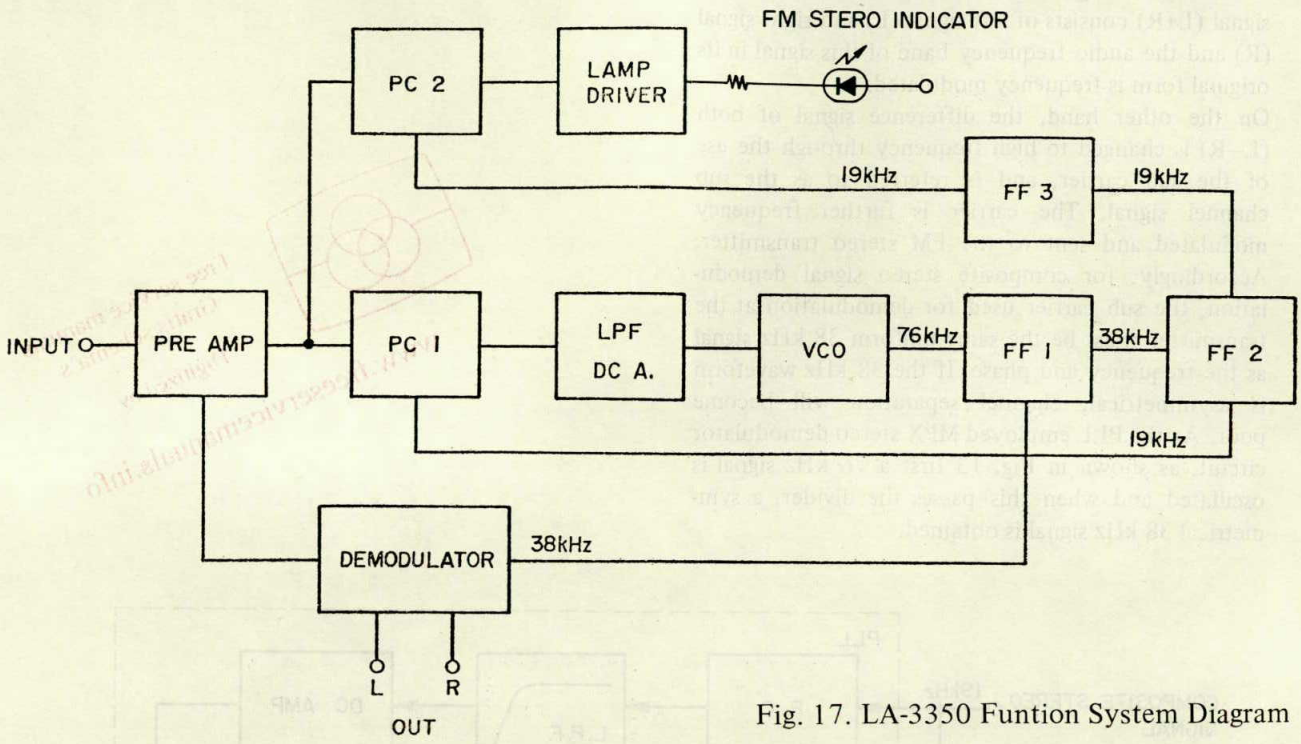


Fig. 17. LA-3350 Funtion System Diagram

This 38 kHz sub carrier is supplied to the multiplex decoder together with the sub channel of the composite stereo signal. At the multiplex decoder, left and right channel audio signals are separated in order as shown in Fig. 16.

The 38 kHz sub carrier composited with the sub channel signal of which the carrier part was removed when sub channel signal and sub carrier passed R1, R2 produces the regular AM wave. Then, because this envelop is detected by mutually reverse polarity connected diodes D1 and D2, L–R signal is emitted at point Ⓐ and R–L signal at point Ⓑ.

Also, because the main channel signal (L+R) is supplied to R3, R4 center point, Ⓐ Ⓑ point voltage is added and subtracted and becomes

(L+R) + (L–R) = 2L (left channel)

(L+R) + (R–L) = 2R (right channel)

The level of the main channel signal (L+R) can be adjusted by means of the variable resistor VR (VR1) for optimum separation.

Thus, the function of the PLL IC LA-3350 actually employed is as shown in Fig. 17.

VII. VARACTOR TUNER AND PRESET TUNING SYSTEM

1. VARACTOR TUNER

A varactor tuner is the tuner system in which varactor diode junction capacitance is varied by means of the inverse bias value applied to the diode for station selection. By employing a varactor diode, tuning, which is the same as for on ordinary variable condenser system, can be made without using a variable condenser, by changing control voltage only.

1) Features

a) When used in an FM tuner, the front end can be made smaller than in one with a variable condenser.

b) Station selector button positioning is not limited.

c) Station selection by remote control is possible.

d) Ideal voltage can be set for a certain reception frequency beforehand, and preset tuning can be effected by successively switching the control voltage.

e) If the control voltage sweep is at an ideal speed, automatic tuning (search tuning) is possible.

f) Power consumption is about the same as that of a variabl condenser system.

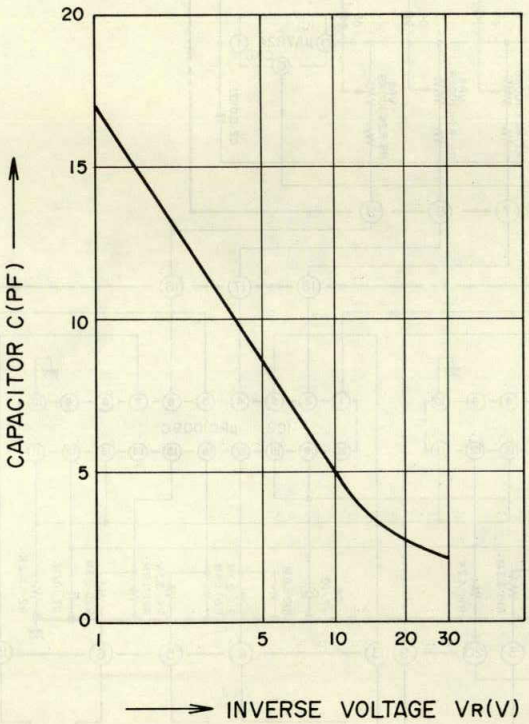


Fig. 18

2) Varactor Diode Characteristics

As for varactor diode characteristics, as shown in Fig. 18, capacitance C is changed by change in inverse voltage VR. Further, if this varactor diode is used in a tuning circuit, the following conditions are necessary:

$$\frac{C\,max + C_D}{C\,min + C_D} = \left(\frac{fmax}{fmin}\right)^2 = K$$

C max, C min are the maximum and minimum values of varactor diode capacitance change. CD is the sum of stray capacitance and trimmer capacitance. K is over 1.5 because the FM broadcast frequency range is 88 to 108 MHz. Figs. 19(a) and 19(b) show the actual usage method.

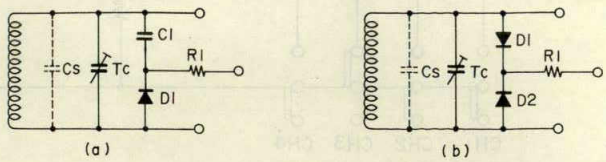


Fig. 19 Tuning circuit employing a varactor diode

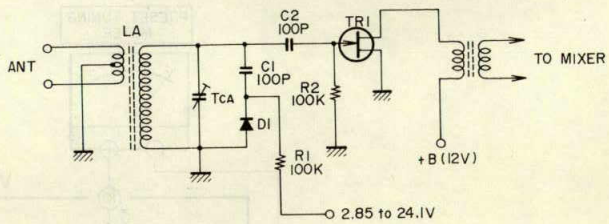


Fig. 20 Example of High Frequency Amplifier Stage Circuit

3) Actual Operation

Fig. 20 is a circuit diagram of the high frequency amplifier stage only of a circuit which is actually used. Condenser C1 and varactor diode D1 in the diagram are equivalent to the variable condenser of an ordinary FM front end. As can be understood from Fig. 18, D1 varies the capacitance in a 4 to 16PF range by means of inverse bias voltage. This capacitance and condenser C1 combined capacitance forms the resonance circuit with coil LA. Consequently, it is satisfactory if at low resonance frequency, the voltage supplied to the varactor diode declines, and at high resonance frequency, the voltage supplied to the varactor diode increases. This voltage variation method with variable resistor, etc., operates in the same way as a regular variable condenser. This method uses a local oscillator circuit and frequency mixer circuit, and bias voltage is applied to the varactor diode for station selection and is called a varactor tuner. Please refer to the schematic diagram for actual circuit drawing.

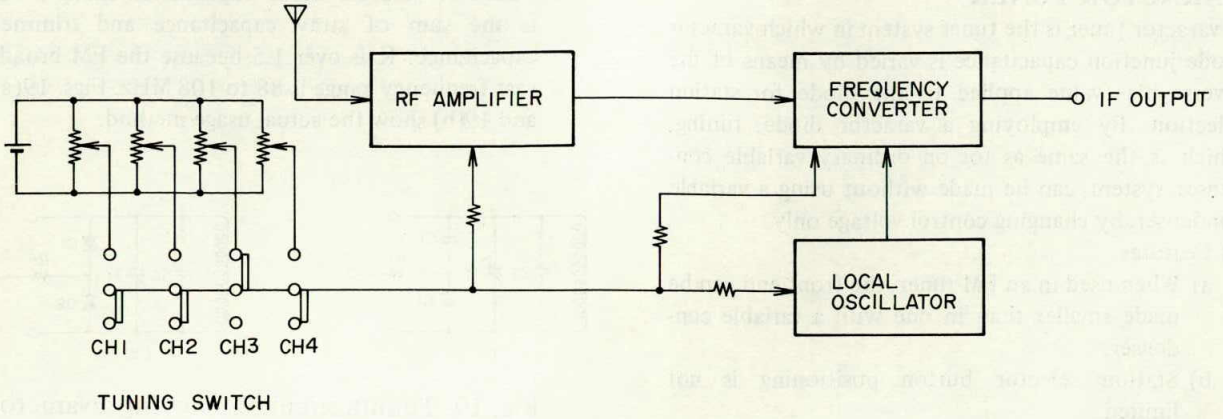


Fig. 21 Block Diagram

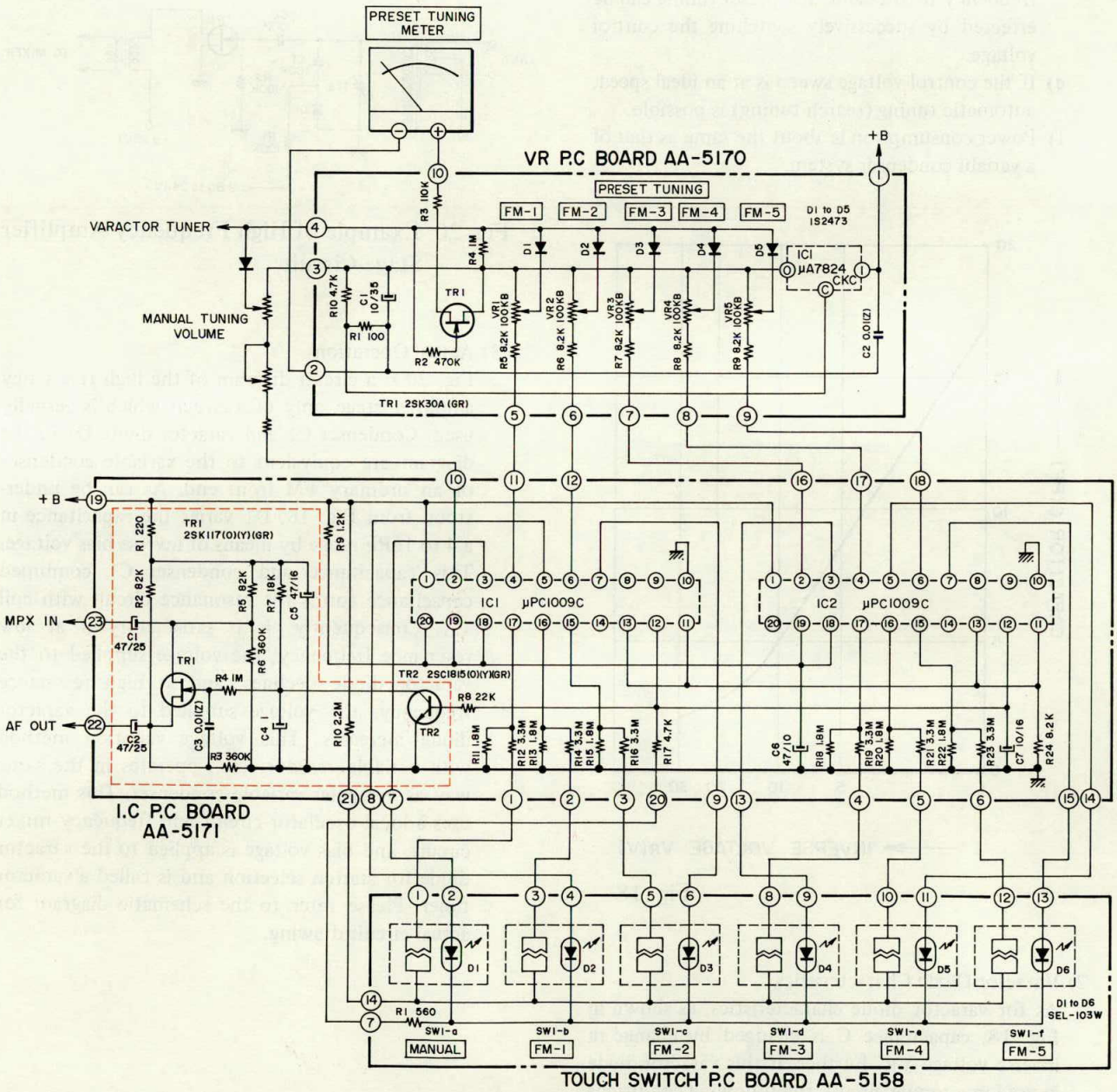


Fig. 22

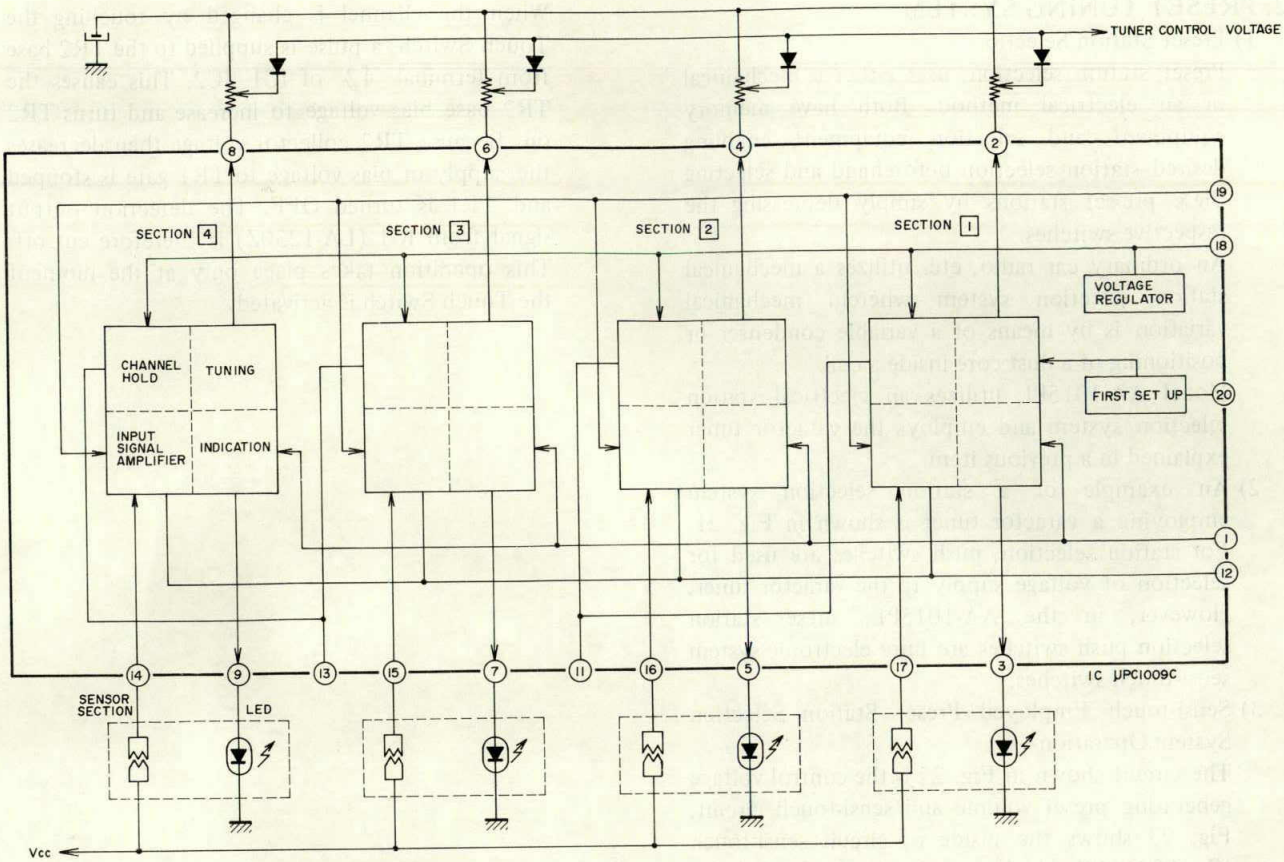


Fig. 23

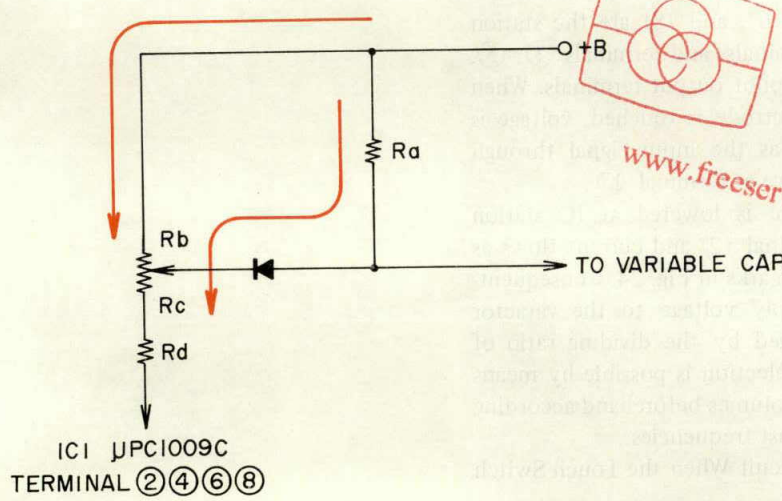


Fig. 24

2. PRESET TUNING SYSTEM

1) Preset Station Selection

Preset station selection, uses either a mechanical or an electrical method. Both have memory equipment and selection equipment enabling desired station selection beforehand and selecting these pre-set stations by simply depressing the respective switches.

An ordinary car radio, etc. utilizes a mechanical station selection system wherein mechanical variation is by means of a variable condenser or positioning of a dust core inside a coil.

Model AA-1015PL utilizes an electrical station selection system and employs the varactor tuner explained in a previous item.

2) An example of a station selection system employing a varactor tuner is shown in Fig. 21. For station selection, push switches are used for selection of voltage supply to the varactor tuner. However, in the AA-1015PL, these station selection push switches are pure electronic system sensi-touch switches.

3) Sensi-touch Employed Preset Station Selection System Operation

The circuit shown in Fig. 22 is the control voltage generating preset volume and sensi-touch circuit. Fig. 23 shows the inside of circuit sensi-touch IC μPC1009C which include the 4 channel circuitry.

Terminals ⑭ through ⑰ are the input terminals; terminals ②, ④, ⑥, and ⑧ are the station selection output terminals; and terminals ③, ⑤, ⑦, and ⑨ are the pilot output terminals. When channel 1 sensor electrode is touched, voltage is supplied to the IC as the input signal through finger (body) resistance at terminal ⑰.

Then, the impedance is lowered at IC station selector output terminal ② and current flows as shown by the arrow marks in Fig. 24. Consequently, because the supply voltage to the varactor tuner diode is changed by the dividing ratio of Rb and Rc, station selection is possible by means of setting the preset volumes beforehand according to the desired broadcast frequencies.

4) Noise Elimination Circuit When the Touch Switch is Activated

The circuit within the dotted lines eliminates noise when the Touch Switch is activated by the touch of a finger to change channels.

During the reception, terminal ⑫ of IC1, 2 is at zero voltage (ground potential) so that TR2 base is not supplied with bias and TR2 is OFF. Consequently, TR2 collector voltage is high and bias is supplied to TR1 gate. TR1 is therefore ON. This allows the detection output signal from IC1 (LA-1230Z) to pass through TR1 for supply to MPX IC IC4 (LA-3350S).

When the channel is changed by touching the Touch Switch, a pulse is supplied to the TR2 base from terminal ⑫ of IC1, IC2. This causes the TR2 base bias voltage to increase and turns TR2 on. Because TR2 collector voltage then decreases the supply of bias voltage to TR1 gate is stopped and TR1 is turned OFF. The detection output signal from IC1 (LA-1230Z) is therefore cut off. This operation takes place only at the moment the Touch Switch is activated.

VIII. LEVEL DIAGRAM

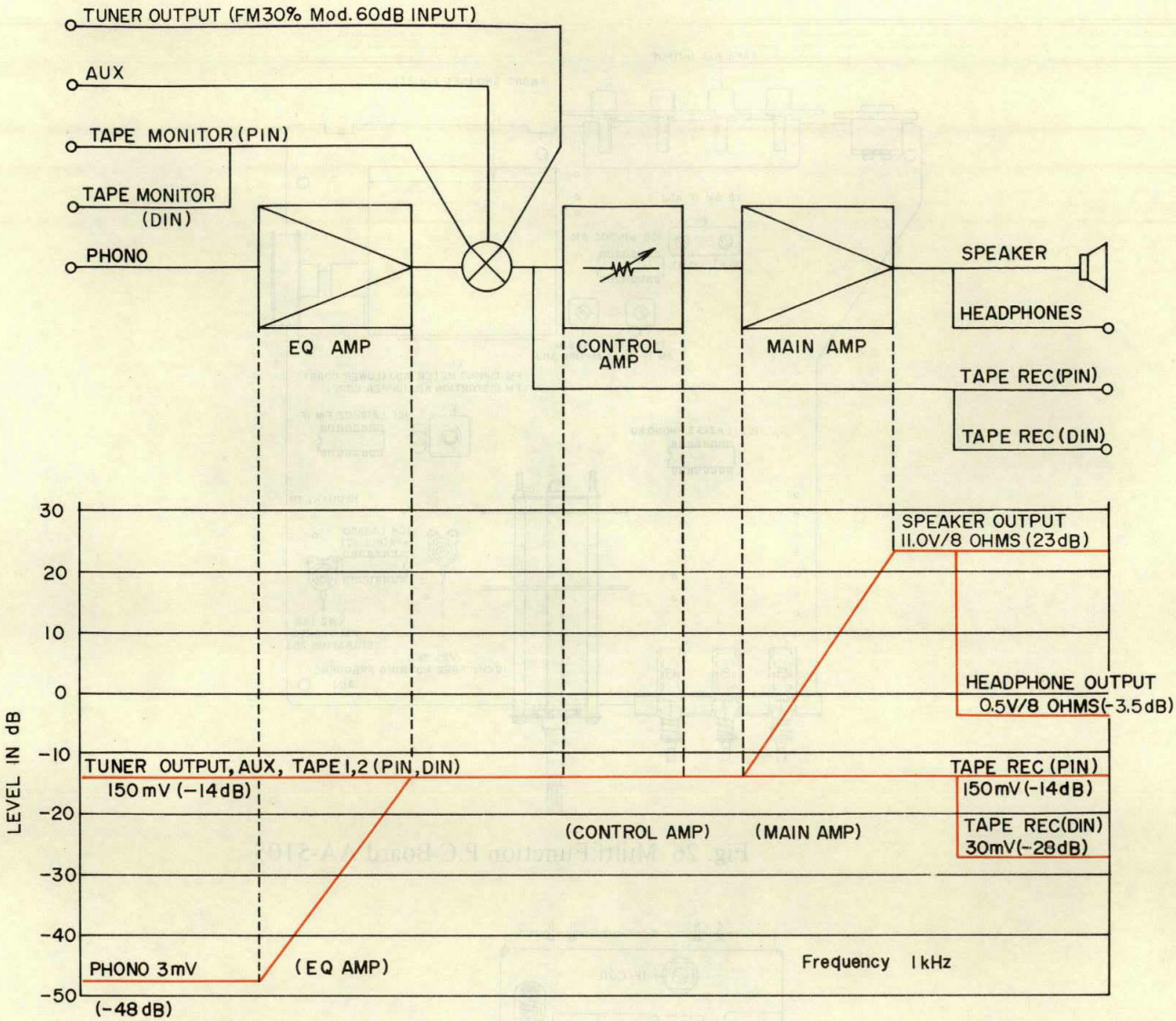


Fig. 25 Model AA-1015/PL Level Diagram

IX. TUNER ADJUSTMENT

1. MODEL AA-1015

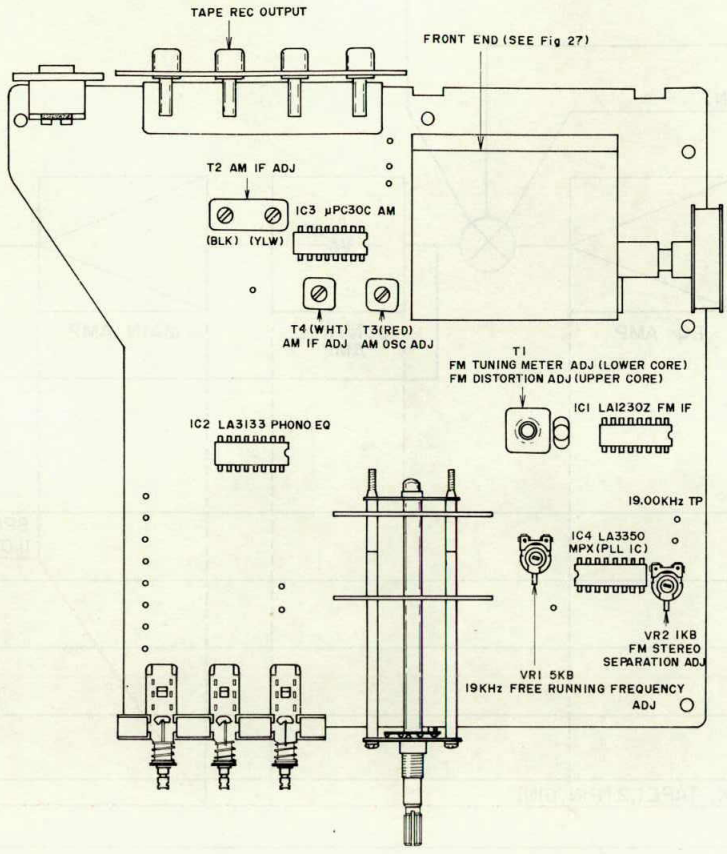


Fig. 26 Multi Function P.C Board AA-5105

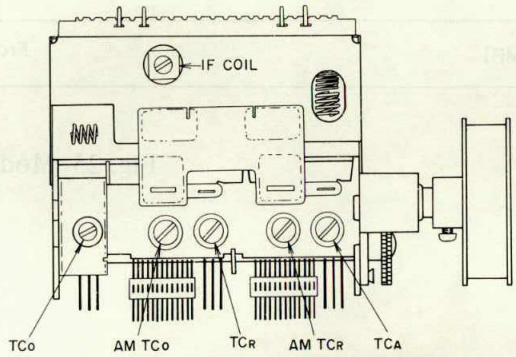


Fig. 27 Front End

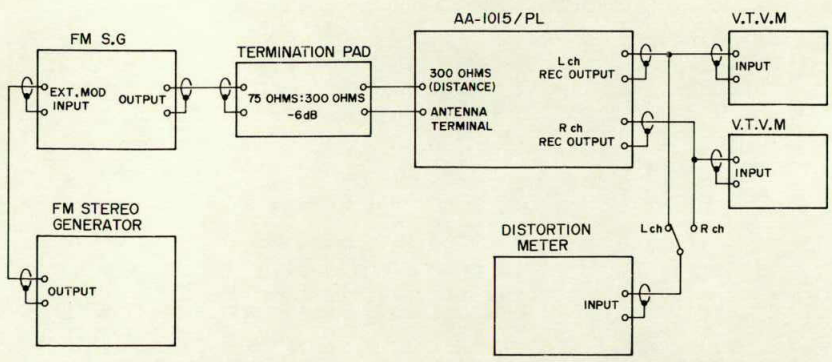


Fig. 28 Instrument Connections

a. FM Tuner Section Adjustment (Refer to Figs. 26, 27, 28)

Step	Adjustment Item	Adjustment Point	Result	Remarks
1	Front End IF Coil	IF Coil (Front End)	Maximum Noise Level	SELECTOR to FM. Tunes only noise without interference from broadcasting.
2	Tuning Meter Centering	T1 Lower Side core (MFC P.C Board AA-5105)	Centered Tuning Meter Indication	Same as above.
3	Distortion Factor	T1 Upper Side core (MFC P.C Board AA-5105)	Less than 0.3% Distortion Factor	98 MHz, 60 dB (mono) input. Less than 0.3% on both channels.
4	Confirmation of Tuning Meter Indication			If Tuning Meter Indication is not centered re-adjust Step 2 and 3 above.
5	High Range Scale Indication	TCo (Front End)	Maximum Output	108 MHz, 60 dB (mono) input. TUNING INDICATOR to 108MHz Error: Within ±250 kHz.
6	Confirmation of Low Range Scale Indication		Maximum Output	88 MHz, 60 dB (mono) input. TUNING INDICATOR to 88MHz. Error: Within ±250 kHz.
7	High Range Sensitivity	TCR, TCA (Front End)	Less than 3% Distortion Factor	108 MHz, Less than 12 dB (mono) input.
8	Low Range Sensitivity Confirmation		Less than 3% Distortion Factor	88 MHz, Less than 12 dB (mono) input. See NOTE 1, 2.
9	PLL IC Free Running Frequency	VR1 5 kB (MFC P.C Board AA-5105)	19.00 kHz	Frequency Counter to Test Point. (MFC P.C Board AA-5105) See NOTE 3.
10	Stereo Indicator Lighting Confirmation			98 MHz, 60 dB (stereo) input. Unlit stereo indicator indicates no stereo separation.
11	Stereo Separation (Left→Right)	VR2 1 kB (MFC P.C Board AA-5105)	More than 40 dB	98 MHz, 60 dB (stereo), L ch input. Minimum output of R ch.
12	Stereo Separation (Right→Left)	VR2 1 kB (MFC P.C Board AA-5105)	More than 40 dB	98 MHz, 60 dB (stereo), R ch input. Minimum output of L ch.

Chart 1

NOTES:
1. When the specified sensitivity of 12 dB cannot be obtained at the two frequency points, 88 MHz and 108 MHz repeat adjustment as in Step 7.
2. When the distortion factor of the sensitivity still does not comply with the data specifications, adjust by turning the Front End FM IF coil core but not by more than 1/2 turn.
3. The free Running Frequency of the PLL IC must be exactly 19.00 kHz.

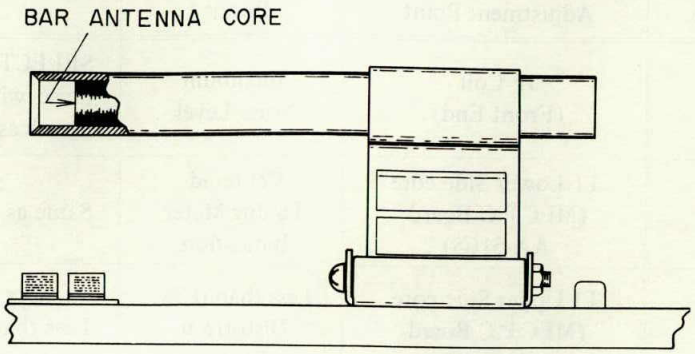


Fig. 29 Bar Antenna

b. AM Tuner Section Adjustment (Refer to Figs. 26, 27, 29)

Step	Adjustment Item	Adjustment Point	Result	Remarks
1	Low Range Scale Indication	T3 (RED) (MFC P.C Board AA-5105)	Maximum Output	SELECTOR to AM 520 kHz 50 dB input. TUNING INDICATOR to 520 kHz. Error: Within 2%.
2	High Range Scale Indication	AM TCo (Front End)	Maximum Output	1,400 kHz 50 dB input. TUNING INDICATOR to 1,400 kHz Error: Within 2%.
3	Low Range Sensitivity	Bar Antenna core T2 (YLW, BLK) T4 (WHT) (MFC P.C Board AA-5105)	Maximum Output Minimum Distortion Factor	520 kHz 50 dB input. Less than 10% Distortion Factor.
4	High Range Sensitivity	AM TCR (Front End)	Maximum Output Minimum Distortion Factor	1,400 kHz 50 dB input. Less than 10% Distortion Factor.

Chart 2

NOTE: For best results, repeat Steps 1 through 4 two or three times.

2. MODEL AA-1015PL

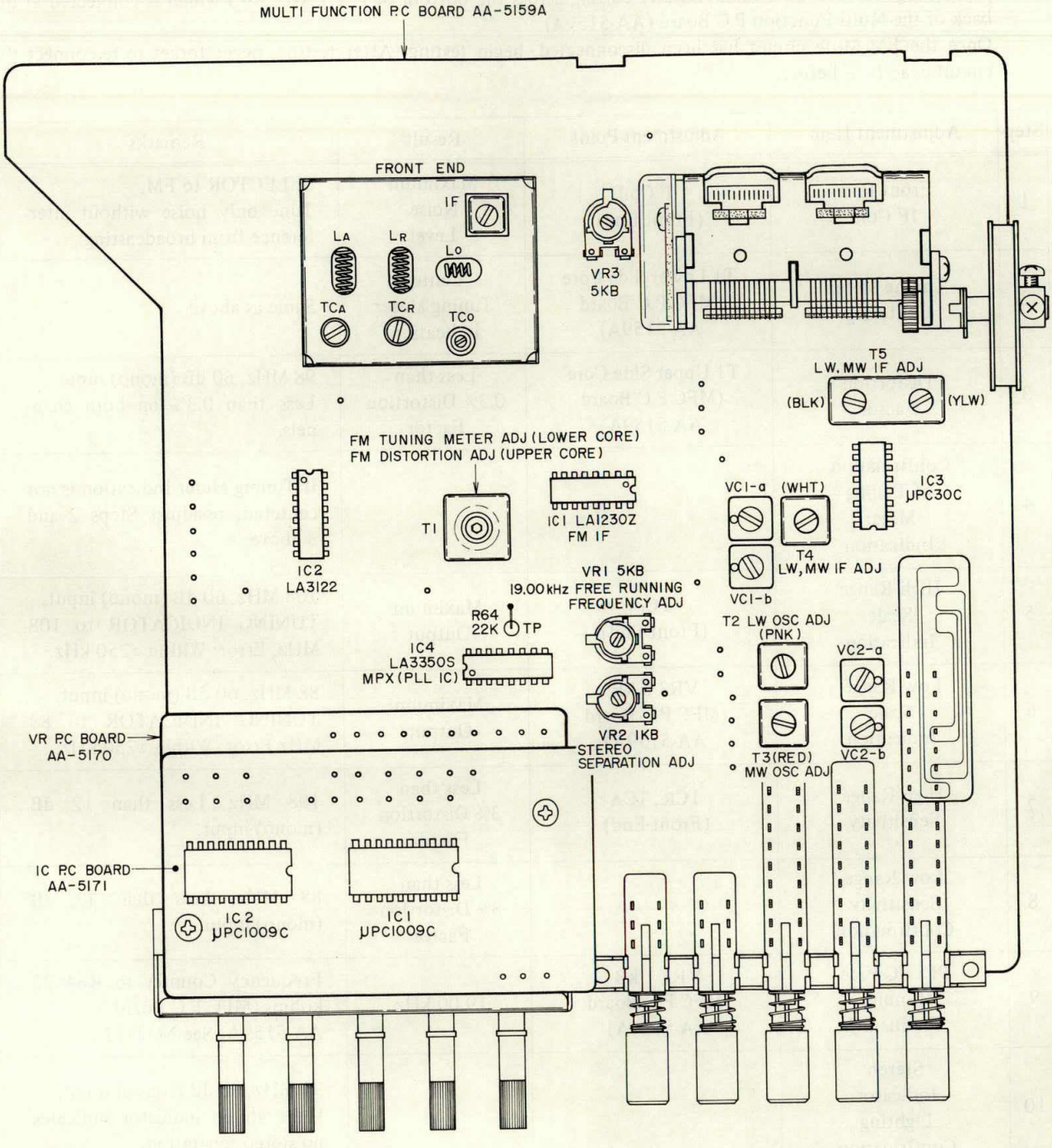


Fig. 30 Multi Function P.C Board AA-5159A

a. FM Tuner Section Adjustment (Refer to Figs. 28, 30)

* In the AA-1015PL, the FM Mute circuit operates automatically so servicing cannot be carried out without disconnecting the R83 22 kohms (register cutting across the bottom of IC1 LA-1230Z) which is connected at the back of the Multi Function P.C Board (AA-5159A).
Once the FM Mute circuit has been disconnected, begin testing. After testing, never forget to re-connect the circuit exactly as before.

Step	Adjustment Item	Adjustment Point	Result	Remarks
1	Front End IF Coil	IF Coil (Front End)	Maximum Noise Level	SELECTOR to FM. Tune only noise without interference from broadcasting.
2	Tuning Meter Centering	T1 Lower Side Core (MFC P.C Board AA-5159A)	Center Tuning Meter Indication	Same as above.
3	Distortion Factor	T1 Upper Side Core (MFC P.C Board AA-5159A)	Less than 0.3% Distortion Factor	98 MHz, 60 dB (mono) input. Less than 0.3% on both channels.
4	Confirmation of Tuning Meter Indication			If Tuning Meter Indication is not centered, re-adjust Steps 2 and 3 above.
5	High Range Scale Indication	TCo (Front End)	Maximum Output	108 MHz, 60 dB (mono) input. TUNING INDICATOR to 108 MHz. Error: Within ±250 kHz.
6	Low Range Scale Indication	VR3 5 kB (MFC P.C Board AA-5159A)	Maximum Output	88 MHz, 60 dB (mono) input. TUNING INDICATOR to 88 MHz Error: Within ±250 kHz.
7	High Range Sensitivity	TCR, TCA (Front End)	Less than 3% Distortion Factor	108 MHz, Less than 12 dB (mono) input.
8	Low Range Sensitivity Confirmation		Less than 3% Distortion Factor	88 MHz, Less than 12 dB (mono) input.
9	PLL IC Free Running Frequency	VR1 1 kB (MFC P.C Board AA-5159A)	19.00 kHz	Frequency Counter to R64 22 kohms (MFC P.C Board AA-5159A) See NOTE 3.
10	Stereo Indicator Lighting Confirmation			98 MHz, 60 dB (stereo) input. Unlit stereo indicator indicates no stereo separation.
11	Stereo Separation (Left→Right)	VR2 1 kB (MFC P.C Board AA-5159A)	More than 40 dB	98 MHz, 60 dB (stereo), L ch input. Minimum output of R ch.
12	Stereo Separation (Right→Left)	VR2 1 kB (MFC P.C Board AA-5159A)	More than 40 dB	98 MHz, 60 dB (stereo), R ch input. Minimum output of L ch.

Chart 3

NOTES: 1. When the specified sensitivity of 12 dB cannot be obtained at the two frequency points, 88 MHz and 108 MHz, repeat adjustment as in Step 7.
2. When the distortion factor of the sensitivity still does not comply with the data specifications, adjust by turning the Front End FM IF coil core, but not by more than 1/2 turn.

b. LW and MW Tuner Section Adjustment (Refer to Figs. 30, 31)

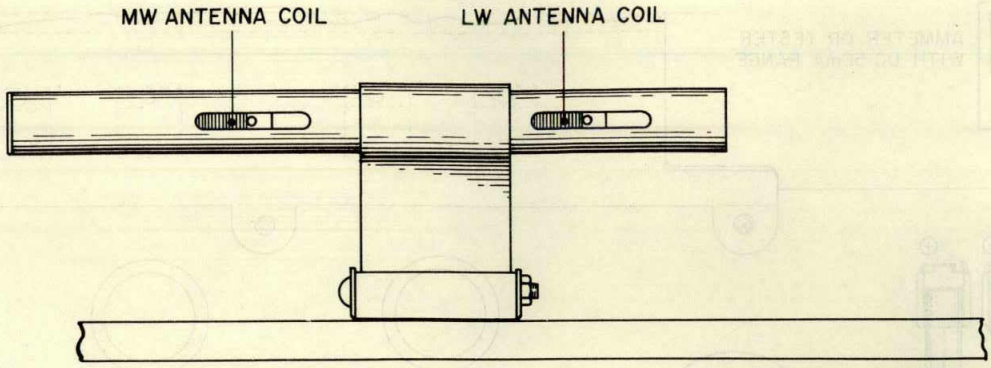


Fig. 31 Bar Antenna

Step	Adjustment Item	Adjustment Point	Result	Remarks
1	LW Low Range Scale Indication	T2 (PNK) (MFC P.C Board AA-5159A)	Maximum Output	SELECTOR to LW. 160 kHz, 50 dB input. TUNING INDICATOR to 160 kHz. Error: Within 2%
2	LW High Range Scale Indication	VC2a (MFC P.C Board AA-5159A)	Maximum Output	340 kHz, 50 dB input. TUNING INDICATOR to 340 kHz. Error: Within 2%
3	LW Low Range Sensitivity	T5 (YLW, BLK) T4 (WHT) (MFC P.C Board AA-5159A) Bar Antenna Coil	Maximum Output Minimum Distortion Factor	160 kHz, 50 dB input. Less than 10% Distortion Factor. See NOTE 1.
4	LW High Range Sensitivity	VC1a (MFC P.C Board AA-5159A)	Maximum Output Minimum Distortion Factor	340 kHz, 50 dB input. Less than 10% Distortion Factor.
5	MW Low Range Scale Indication	T3 (RED) (MFC P.C Board AA-5159A)	Maximum Output	SELECTOR to MW. 520 kHz 50 dB input. TUNING INDICATOR to 520 kHz. Error: Within 2%.
6	MW High Range Scale Indication	VC2b (MFC P.C Board AA-5159A)	Maximum Output	1,400 kHz, 50 dB input. TUNING INDICATOR to 1,400 kHz. Error: Within 2%.
7	MW Low Range Sensitivity	Bar Antenna Coil	Maximum Output Minimum Distortion Factor	520 kHz, 50 dB input. Less than 10% Distortion Factor. See NOTE 1.
8	MW High Range Sensitivity	VC1b (MFC P.C Board AA-5159A)	Maximum Output Minimum Distortion Factor	1,400 kHz, 50 dB input. Less than 10% Distortion Factor.

Chart 4

NOTE: Usually, it is not necessary to adjust the Bar Antenna coil.
Adjust the Bar Antenna coil, when a distortion factor of less than 10% cannot be obtained during Step 3.

X. MAIN AMPLIFIER ADJUSTMENT

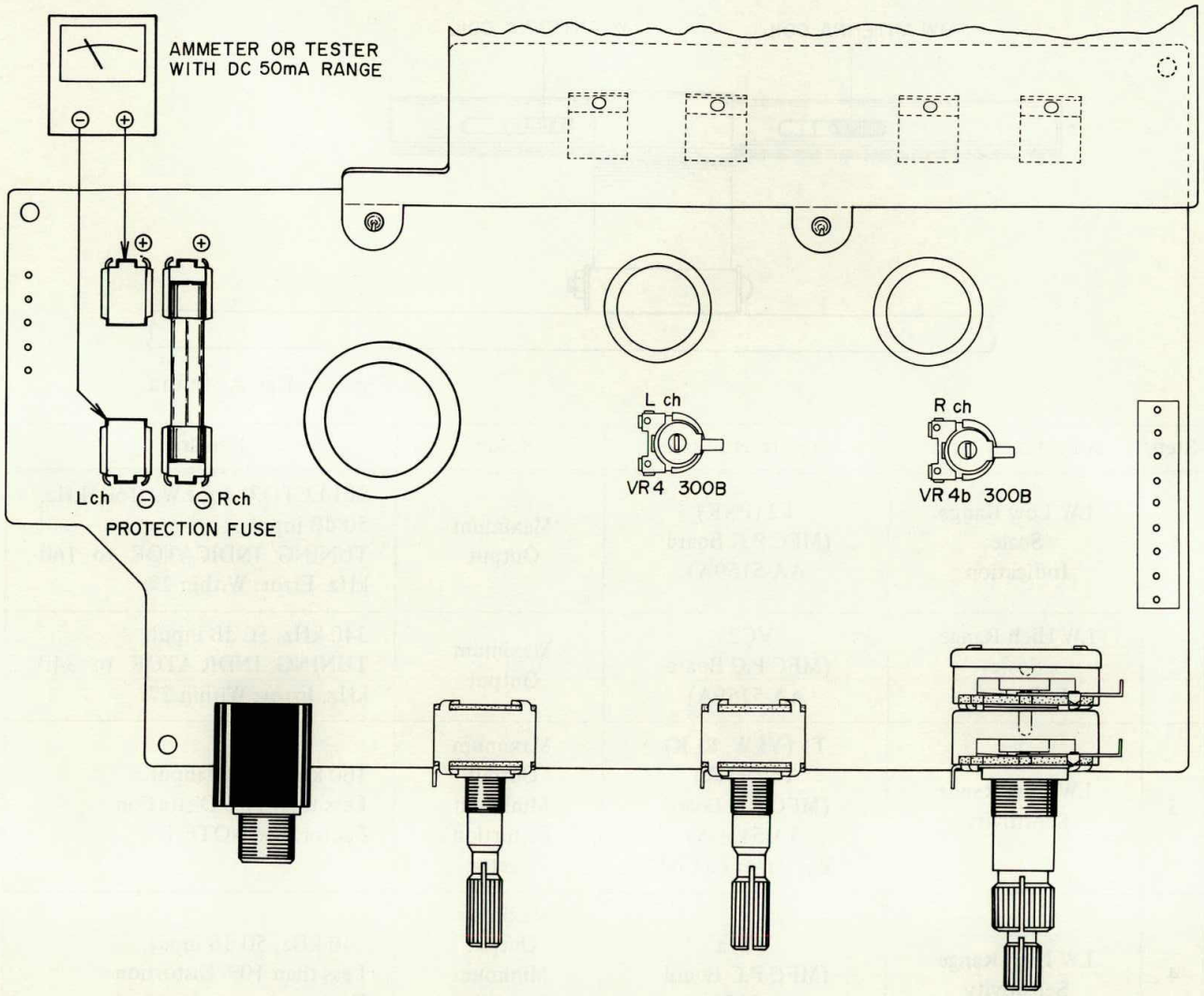


Fig. 32 Main Amp P.C Board AA-5106A

Idling Current Adjustment (Refer to Fig. 32)

1. Remove Protection Fuse F3 2A (L ch) and F4 2A (R ch) and connect an ammeter or tester to these terminals.
2. At non-signal input, adjust semi-fixed resistors VR4 300B ohms (L ch) and VR4b 300B ohms (R ch) to obtain a 20 mA idling current.

XI. TUNING CORD THREADING

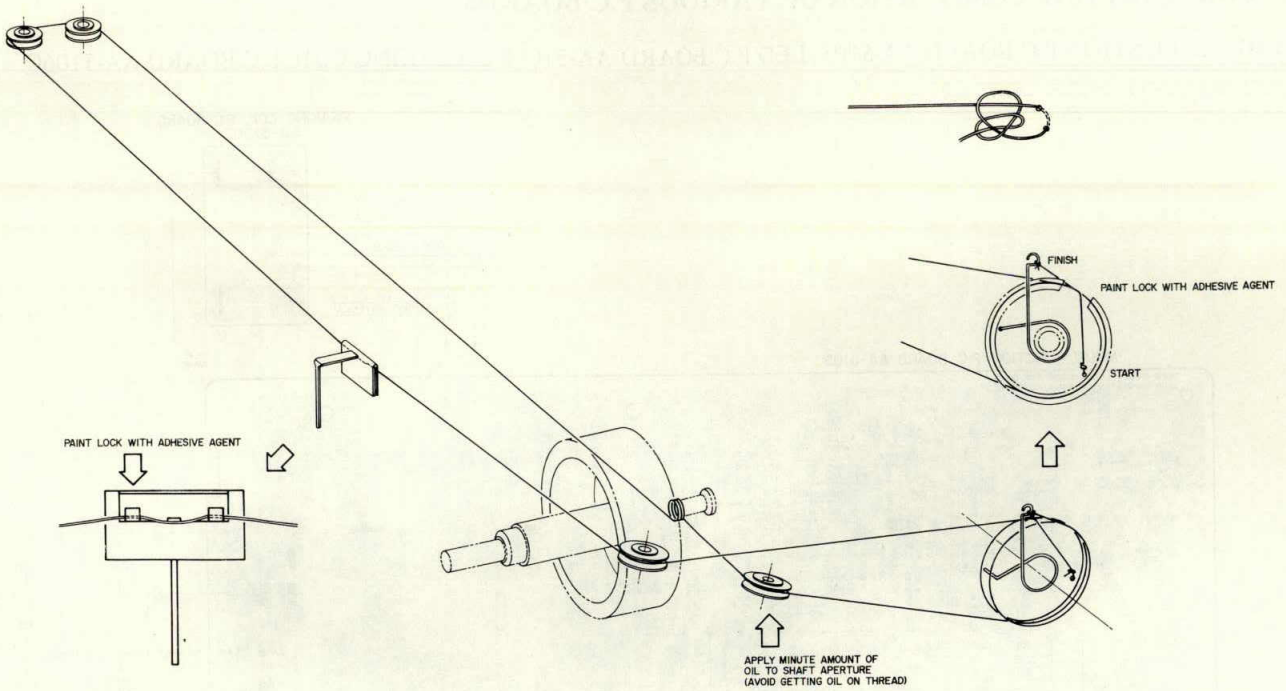


Fig. 33 Tuning Cord Threading

XII. CLASSIFICATION OF VARIOUS P.C BOARDS

1. RELATION OF P.C BOARD TITLE AND IDENTIFICATION NUMBER

1) Model AA-1015

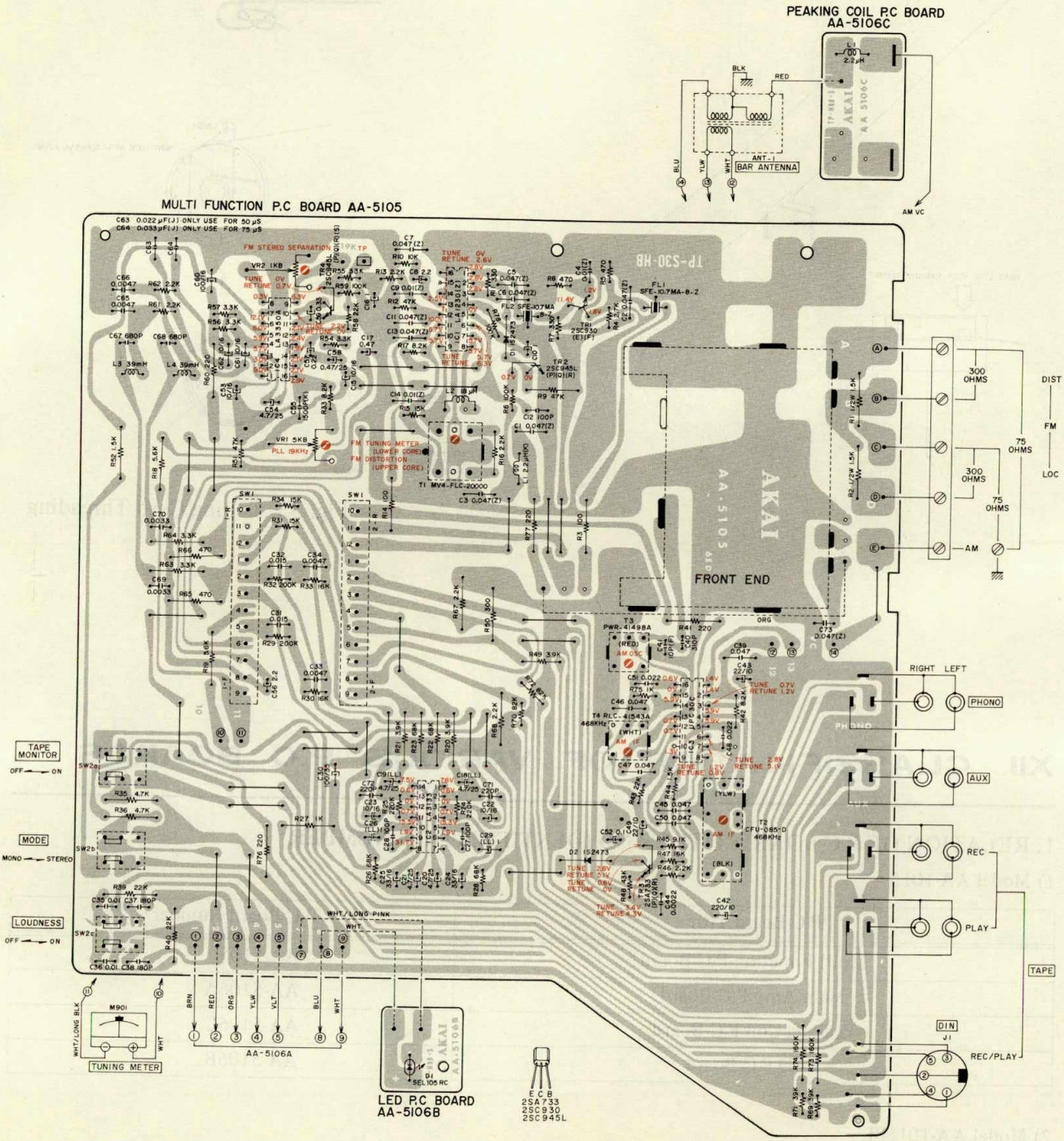
P.C Board Title	P.C Board Number
Multi Function P.C Board	AA-5105
Main Amp P.C Board	AA-5106A
Peaking Coil P.C Board	AA-5106C
LED P.C Board	AA-5106B

2) Model AA-1015PL

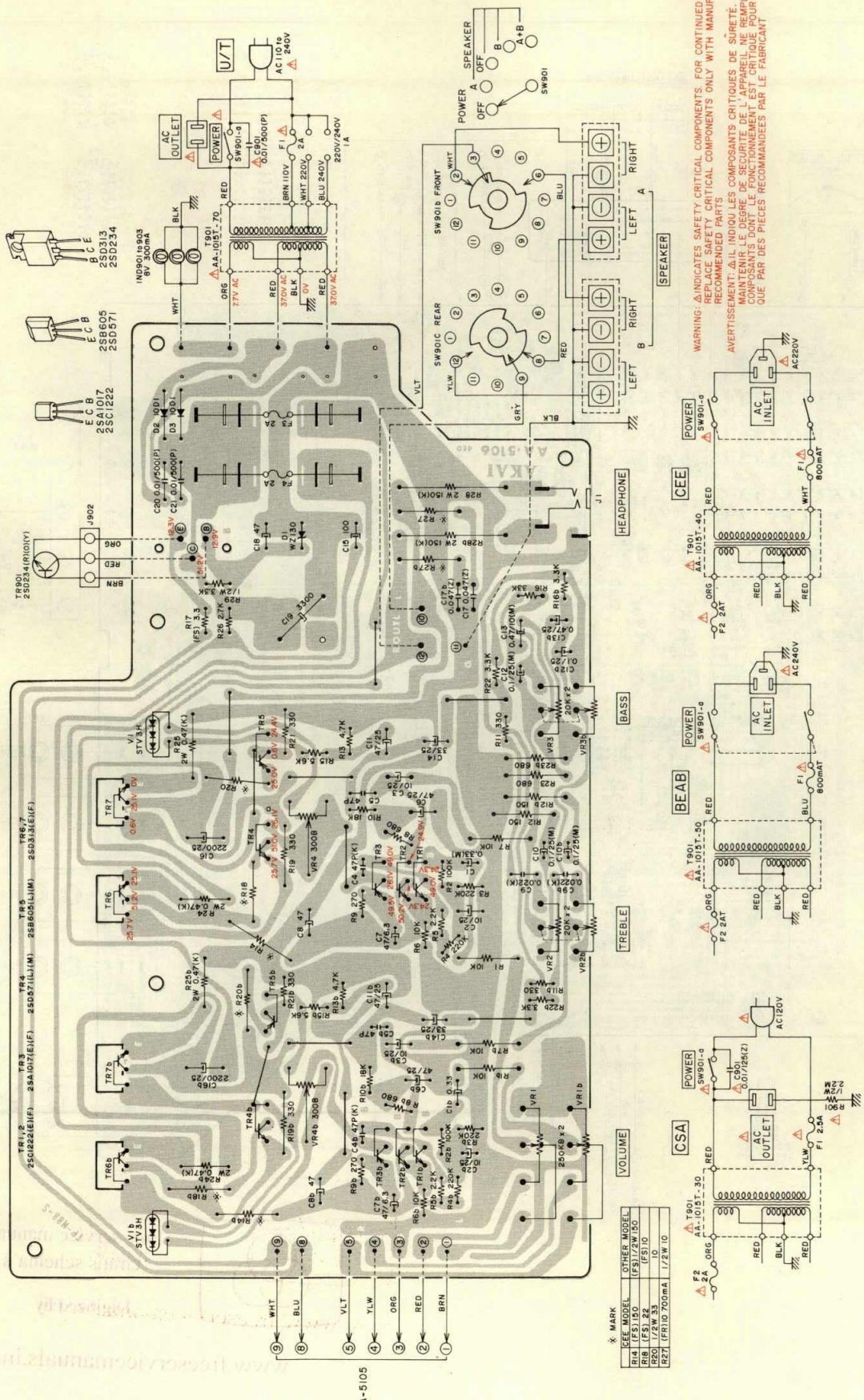
P.C Board Title	P.C Board Number
Multi Funtion P.C Board	AA-5159A
Main Amp P.C Board	AA-5106A
IC P.C Board	AA-5171
Push Switch P.C Board	AA-5155
VR P.C Board	AA-5170
Touch Switch P.C Board	AA-5158
LED P.C Board	AA-5159C
Jumper P.C Board	AA-5159B

2. MODEL AA-1015 COMPOSITION OF VARIOUS P.C BOARDS

1) MULTI FUNTION P.C BOARD AA-5105, LED P.C BOARD AA-5106B & PEAKING COIL P.C BOARD AA-5106C.



2) MAIN AMP P.C BOARD AA-5106A



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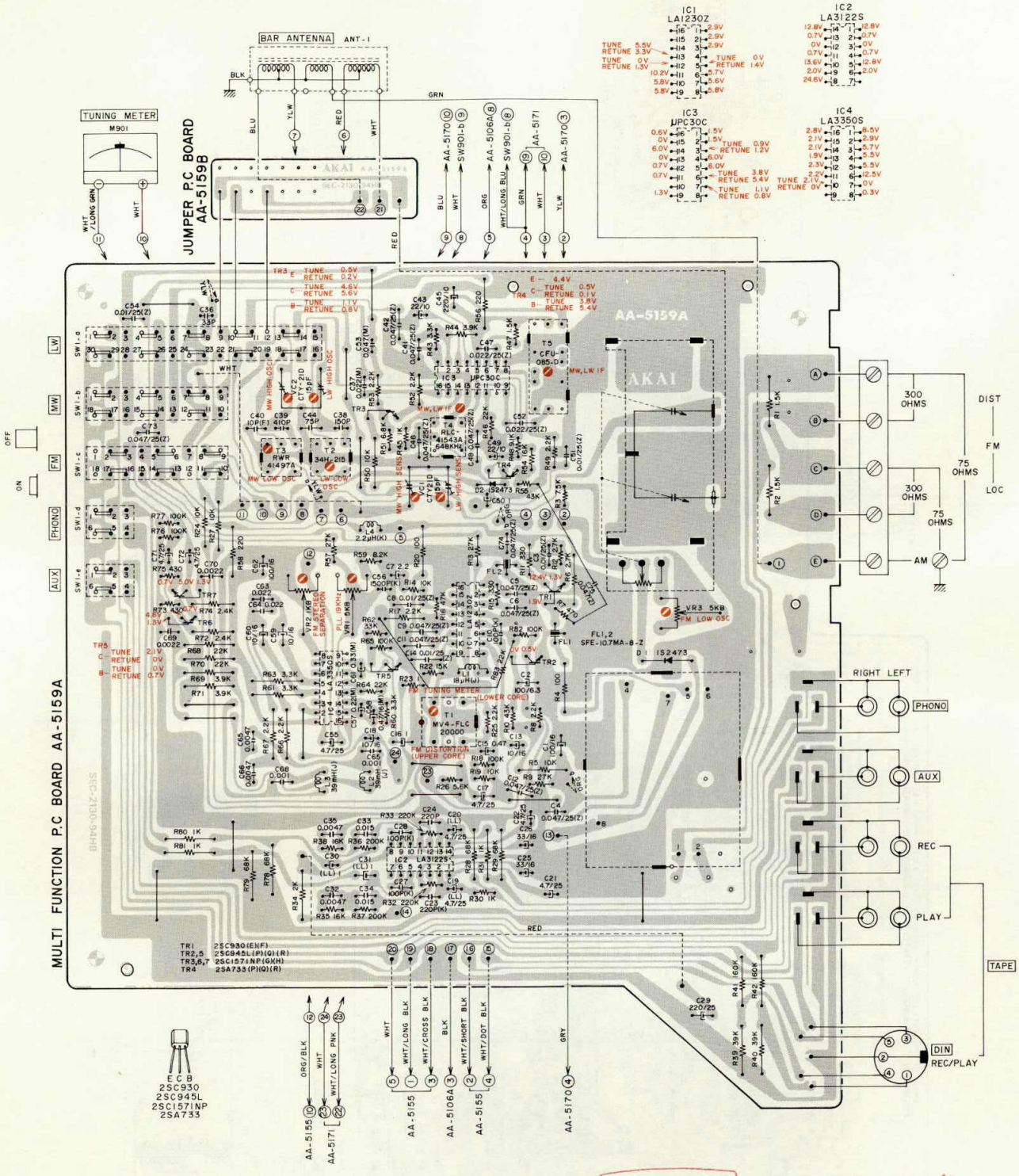
3. MODEL AA-1015PL COMPOSITION OF VARIOUS P.C BOARDS

1) MULTI FUNCTION P.C BOARD AA-5159A & JUMPER P.C BOARD AA-5159B



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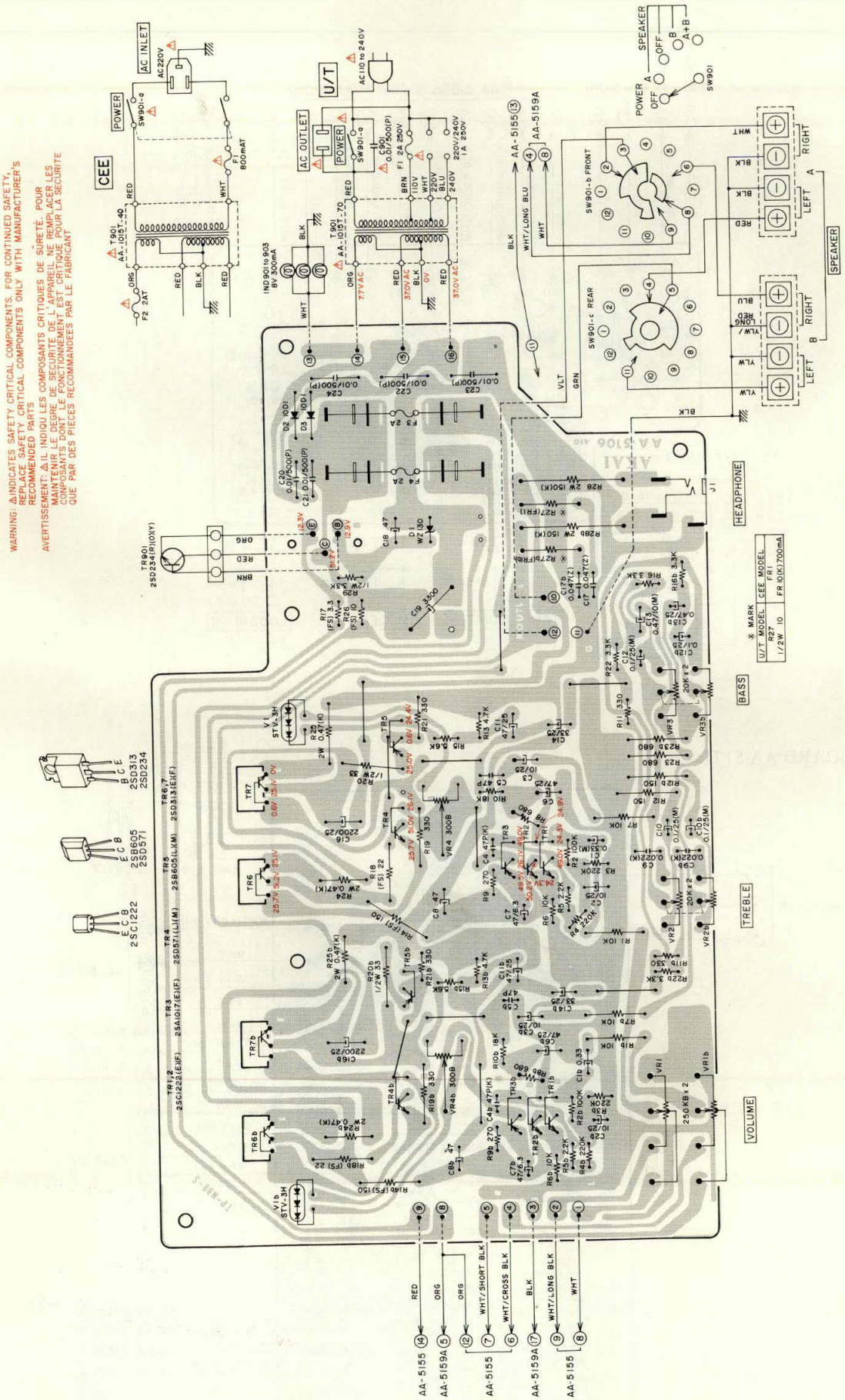
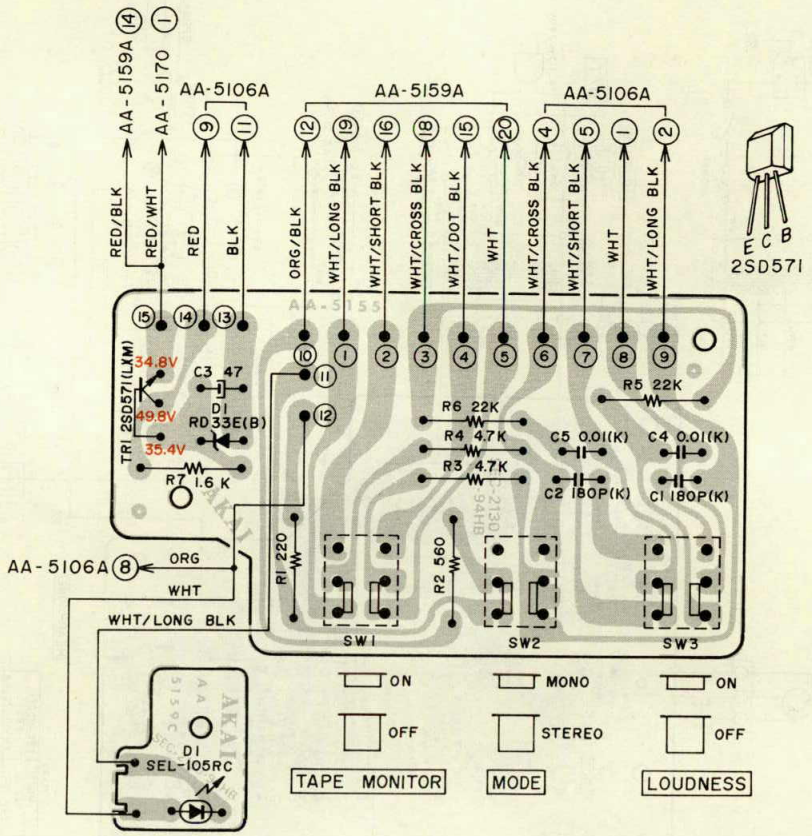
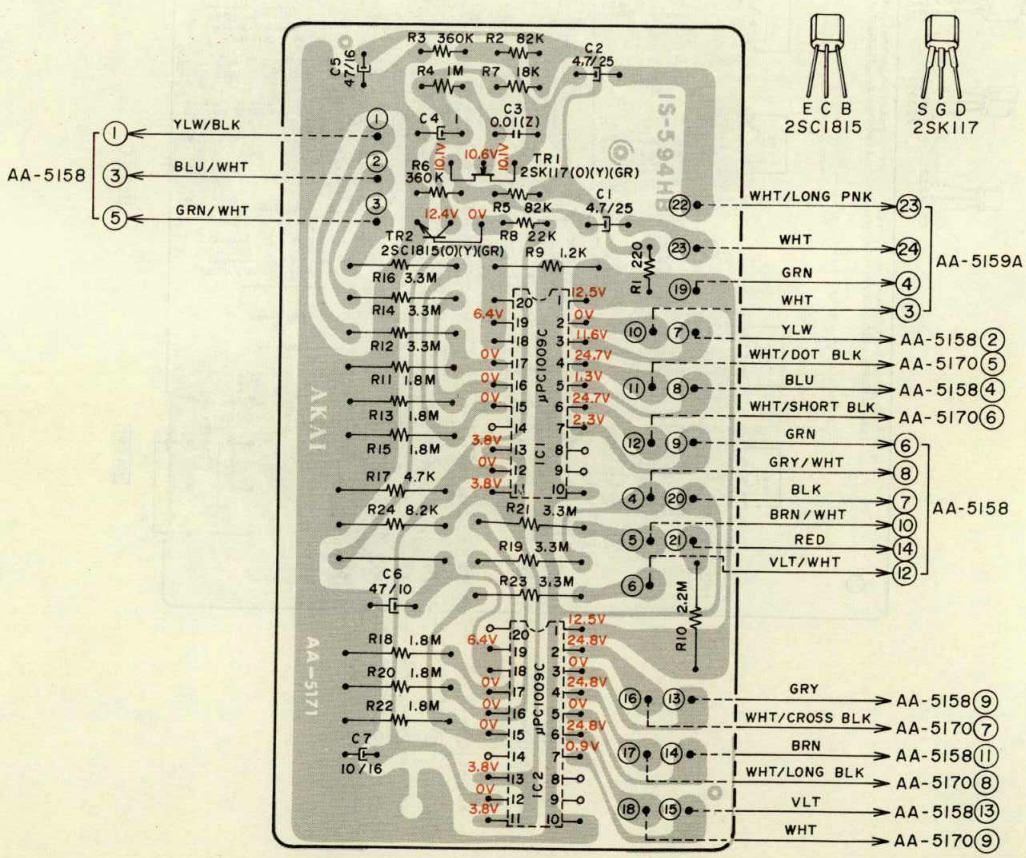
2) MAIN AMP P.C BOARD AA-5106A



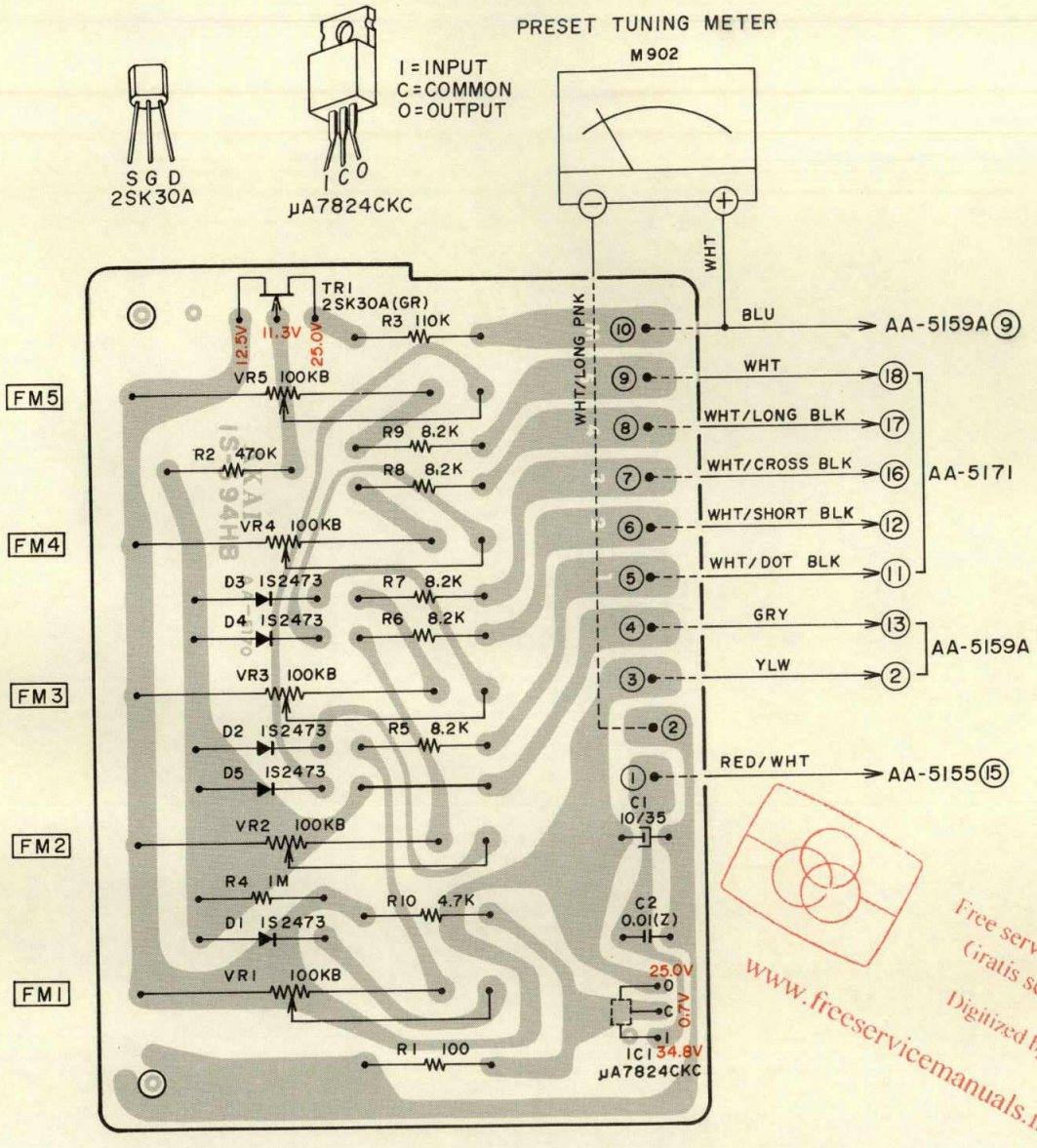
3) PUSH SWITCH P.C BOARD AA-5155 & LED P.C BOARD AA-5159C



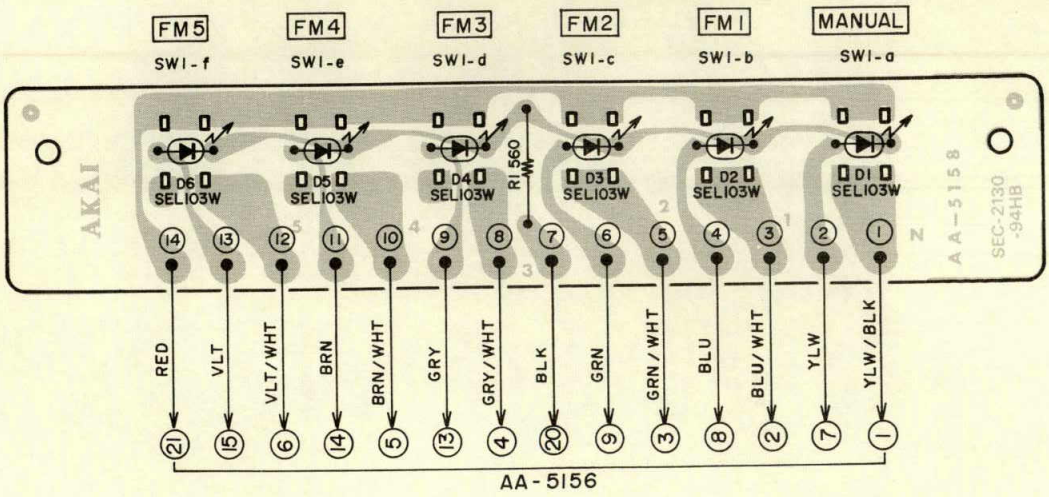
4) IC P.C BOARD AA-5171



5) VR P.C BOARD AA-5170



6) TOUCH SWITCH P.C BOARD AA-5158



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SECTION 2

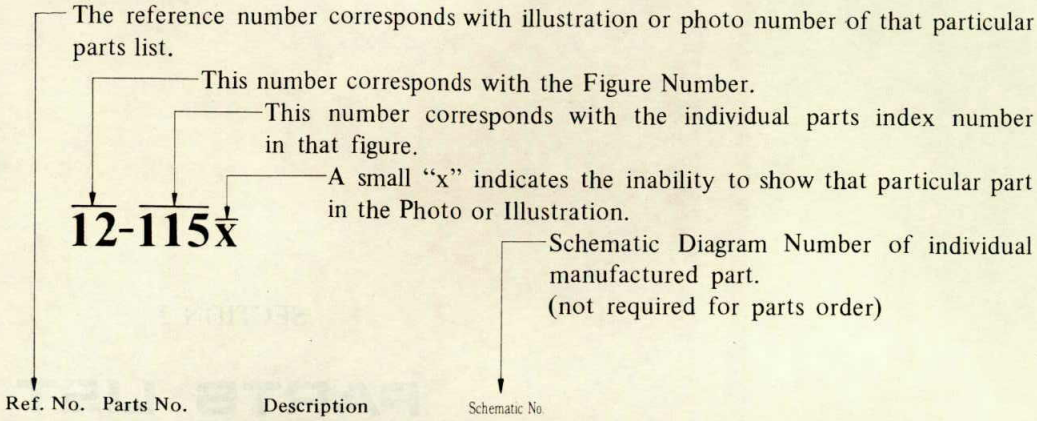
PARTS LIST

TABLE OF CONTENTS

Resistor and Capacitor which is not listed in this parts list, please refer to COMMON LIST FOR SERVICE PARTS.

HOW TO USE THIS PARTS LIST

1. This parts list is compiled by various individual blocks based on assembly process.
2. When ordering parts, please describe parts number, serial number, and model number in detail.
3. How to read list.



FLYWHEEL BLOCK #13

12-115x	800425	Flywheel Block Assy. Comp.	RDG #13
12-116	244506	Flywheel Only	RD-233
12-117x	244754	Felt, Flywheel	RD-275
12-118	251324	Main Metal Case	RD-236
12-119	253080	Main Metal	RD-237

4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of components of the Schematic Diagram or Service Manual.
5. The indications of Resistors and Capacitors in the photos of P.C. Board are being eliminated.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.
   It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).
8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

CAUTION:

1. When placing an order for parts, be sure to list the parts no. model no., and description. There are instances in which if any of this information is omitted, parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because parts number and parts unit supply in the Preliminary Service Manual (Basic Parts List) may be partially changed, please use this parts list for all future reference.

WARNING: ⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMEMNDED PARTS.

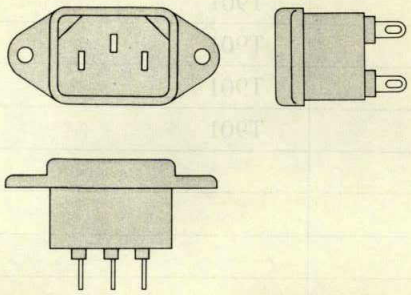
AVERTISSEMENT: ⚠ IL INDIQU LES COMPOSANTS CRITIQUES DE SURETE. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

AC INLET SYSTEM

This model is equipped with an AC INLET SYSTEM. Please refer to the AC INLET SYSTEM CHART below for the specific type. By the AC INLET SYSTEM, AC (mains) cord can be connected to and disconnected from the model because the model is provided with socket exclusively for AC (mains) cord on its main body.
Please note, however, that certain models are not equipped with this system and has a built-in AC (mains) cord as before.

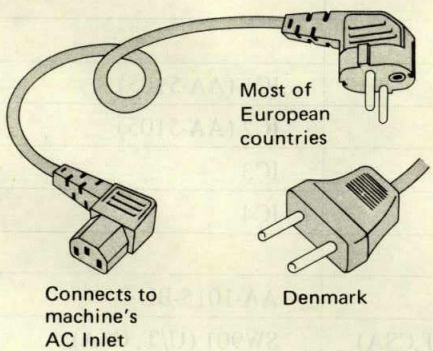
AC INLET SYSTEM CHART

CLASS I



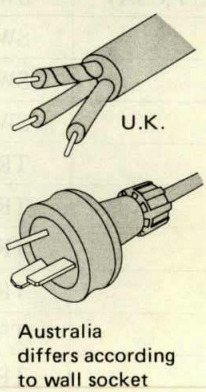
Picture 1

AC INLET to be installed on machines



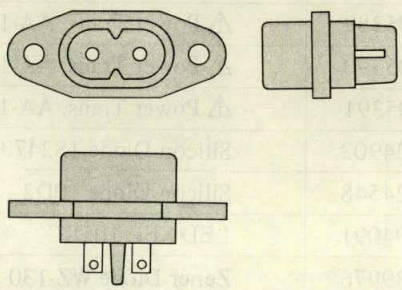
Picture 2

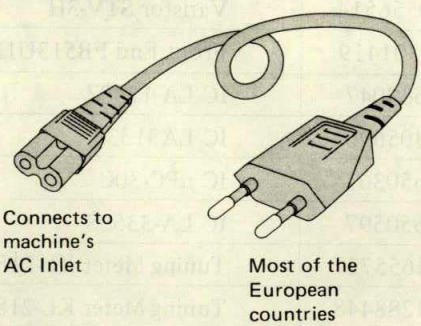
AC (mains) cord

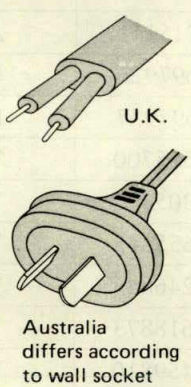


CLASS II

▣ This mark indicating double insulation will be attached to machine's rear panel







Parts List for AC (mains) Cord Set

Standard		Description	Type of AC Inlet	Parts No.
Class I	CEE	Cord Set CEE (3 cores)	3P	EW302993
	BEAB	Cord Set BEAB (3 cores)	3P	EW302994
	SAA	Cord Set SAA (3 cores)	3P	EW302996
	U/T	Cord Set U/T (3 cores)	3P	EW302646
Class II	CEE	Cord Set CEE (2 cores)	2P	EW638144
	BEAB	Cord Set BEAB (2 cores)	2P	EW302995
	SAA	Cord Set SAA (2 cores)	2P	EW302991
	U/T	Cord Set U/T (2 cores)	2P	EW302899

1. RECOMMENDED SPARE PARTS LIST

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

MODEL: AA-1015

Parts No.	Description	Note
BA305988	Multi Function P.C Board Comp. AA-1015	
BA305917	Main Amp Block Comp. AA-0115 (U/T)(CSA)	
BA305918	Main Amp Block Comp. AA-1015 (CEE)(BEAB)	
BT305388	⚠ Power Trans. AA-1015T-70 (U/T)	T901
BT305389	⚠ Power Trans. AA-1015T-30 (CSA)	T901
BT305390	⚠ Power Trans. AA-1015T-40 (CEE)	T901
BT305391	⚠ Power Trans. AA-1015T-50 (BEAB)	T901
ED624903	Silicon Diode 1S2473	
ED224548	Silicon Diode 10D2	
ED694091	LED SEL-105RC	
ED539976	Zener Diode WZ-130	
ED556514	Varistor STV-3H	
EE301419	Front End FB513U12	
EI669047	IC LA-1230Z	IC1 (AA-5105)
EI305696	IC LA3133	IC2 (AA-5105)
EI650362	IC μPC-30C	IC3
EI650597	IC LA-3350S	IC4
EM655727	Tuning Meter KL-218D-94	
EM288448	Tuning Meter KL-218D-103 (BL)	AA-1015-BL
ES306313	⚠ Rotary SW. SR-26N 1-2-5 30KH U9SF-C (U/T,CSA)	SW901 (U/T, CSA)
ES215111	⚠ Rotary SW. SR26S 30KC (CEE, BEAB)	SW901 (CEE, BEAB)
ES697926	Rotary SW. SR26N 2-7-4 30KC	SW1
ES697937	Push SW. 3FT-0001FF3220	SW2
ET515700	Transistor 2SA628 (D) (E) (F)	TR3 (AA-5105)
ET305392	Transistor 2SA1017 (E) (F)	TR3 (AA-5106A)
ET655345	Transistor 2SB605 (L) (M)	TR5 (AA-5106A)
ET246846	Transistor 2SC536 (E) (F) (G) (H)	TR2, 4 (AA-5105)
ET618873	Transistor 2SC930 (E) (F)	TR1 (AA-5105)
ET459810	Transistor 2SC1222 (E) (F)	TR1, 2 (AA-5106A)
ET307261	Transistor 2SD234 (R) (O) (Y) 2-10-B	TR901
ET452531	Transistor 2SD313 (E) (F)	TR6, 7 (AA-5106A)
ET655356	Transistor 2SD571 (L) (M)	TR4 (AA-5106A)
EV499364	Semi-fixed/Vol. V10K8-4-2 5 kB	VR1 (AA-5105)
EV484863	Semi-fixed/Vol. V10K8-4-2 1 kB	VR2 (AA-5015)
EV604484	Semi-fixed/Vol. V10K8-4-2 300 ohms (B)	VR4 (AA-5106A)
EV698264	Double axial 2 throw Vol. (FR) V24L5DGPHN-3BM 250kx2	VR1 (AA-5106A)
EV698275	Single axial 2 throw Vol. V16L GPHN-15C 20kx2	VR2, 3 (AA-5106A)

MODEL: AA-1015PL

Parts No.	Description	Note
BA305949	Multi Function P.C Board Comp. AA-1015PL	
BA305960	Main Amp Block Comp. AA-1015PL (U/T)	
BA305962	Main Amp Block Comp. AA-1015PL (CEE)	
BA305940	IC P.C Board Comp. AA-1015PL	
BA235170	Touch SW. P.C Board Comp. AA-1010L (U)	
BA267491	Touch SW. P.C Board Comp. AA-1010L-BL	AA-1015PL-BL
BA305937	Vol. P.C Board Comp. AA-1015PL	
BA305939	Vol. P.C Board Comp. AA-1015PL-BL	AA-1015PL-BL
BA305947	Push SW. P.C Board Comp. AA-1015PL	
BT305388	⚠ Power Trans. AA-1015T-70 (U/T)	T901 (U/T)
BT305390	⚠ Power Trans. AA-1015T-40 (CEE)	T901 (CEE)
ED624903	Silicon Diode 1S2473	
ED224548	Silicon Diode 10D2	
ED539976	Zener Diode WZ-130	
ED305465	Zener Diode RD-33E (B)	
ED653624	LED SEL-103W	
ED694091	LED SEL-105RC	
ED556514	Varistor STV-3H	
EE240298	Vari. Con C626W113	
EI669047	IC LA-1230Z	IC1 (AA-5159A)
EI697871	IC LA-3122S	IC2 (AA-5159A)
EI650362	IC μPC-30C	IC3 (AA-5159A)
EI650597	IC LA-3350S	IC4 (AA-5159A)
EI229443	IC μPC1009C	IC1, 2 (AA-5171)
EI304174	IC μA7824CKC	IC1 (AA-5170)
EM655727	Tuning Meter KL-218D-94	
EM288448	Tuning Meter KL-218D-103 (BL)	AA-1015PL-BL
EM240311	Pre-Set Tuning Meter KL-218D-100	
EM288426	Pre-Set Tuning Meter KL-218D-105 (BL)	AA-1015PL-BL
ES240096	Push SW. 3FT-0001FF2120	SW1 (AA-5155)
ES240276	Push SW. 5FT-0001DF3620	
ES240355	⚠ Rotary SW. SR26N 1-3-5 30KC (U/T)	SW901 (U/T)
ES240287	⚠ Rotary SW. SR26N 30KC (CEE)	SW901 (CEE)
ET515700	Transistor 2SA628 (D) (E) (F)	
ET305392	Transistor 2SA1017 (E) (F)	
ET655345	Transistor 2SB605 (L) (M)	
ET246846	Transistor 2SC536 (E) (F) (G) (H)	
ET618873	Transistor 2SC930 (E) (F)	
ET459810	Transistor 2SC1222 (E) (F)	
ET223446	Transistor 2SC1571NP (G) (H)	
ET305221	Transistor 2SC1815 (O) (Y) (GR)	
ET307261	Transistor 2SD234 (R) (O) (Y) 2-10-B	
ET452531	Transistor 2SD313 (E) (F)	

Parts No.	Description	Note
ET655356	Transistor 2SD571 (L) (M)	
ET491051	FET 2SK30A (GR)	
ET305393	FET 2SK117 (O) (Y) (GR)	
EV499364	Semi-fixed/Vol. V10K8-4-2 5 kB	VR1, 3 (AA-5159A)
EV484863	Semi-fixed/Vol. V10K8-4-2 1 kB	VR2 (AA-5159A)
EV604484	Semi-fixed/Vol. V10K8-4-2 300 ohms (B)	VR4 (AA-5106A)
EV240434	Double axial 2 throw Vol. (FR) DJ80D B250kx2	VR1 (AA-5106A)
EV240445	Single axial 2 throw Vol. GM70R 20KCx2	VR2, 3 (AA-5106A)
EV229915	Pre-Set Vol. (w/knob) LFQDR504 100kB	
EV288437	Pre-Set Vol. (w/knob) LFQDR002 100kB (BL)	AA-1015PL-BL
TA240300	Varactor Tuner VFT-22UH-22	

(1) MODEL AA-1015

2. MULTI FUNCTION P.C BOARD (AA-5105) BLOCK

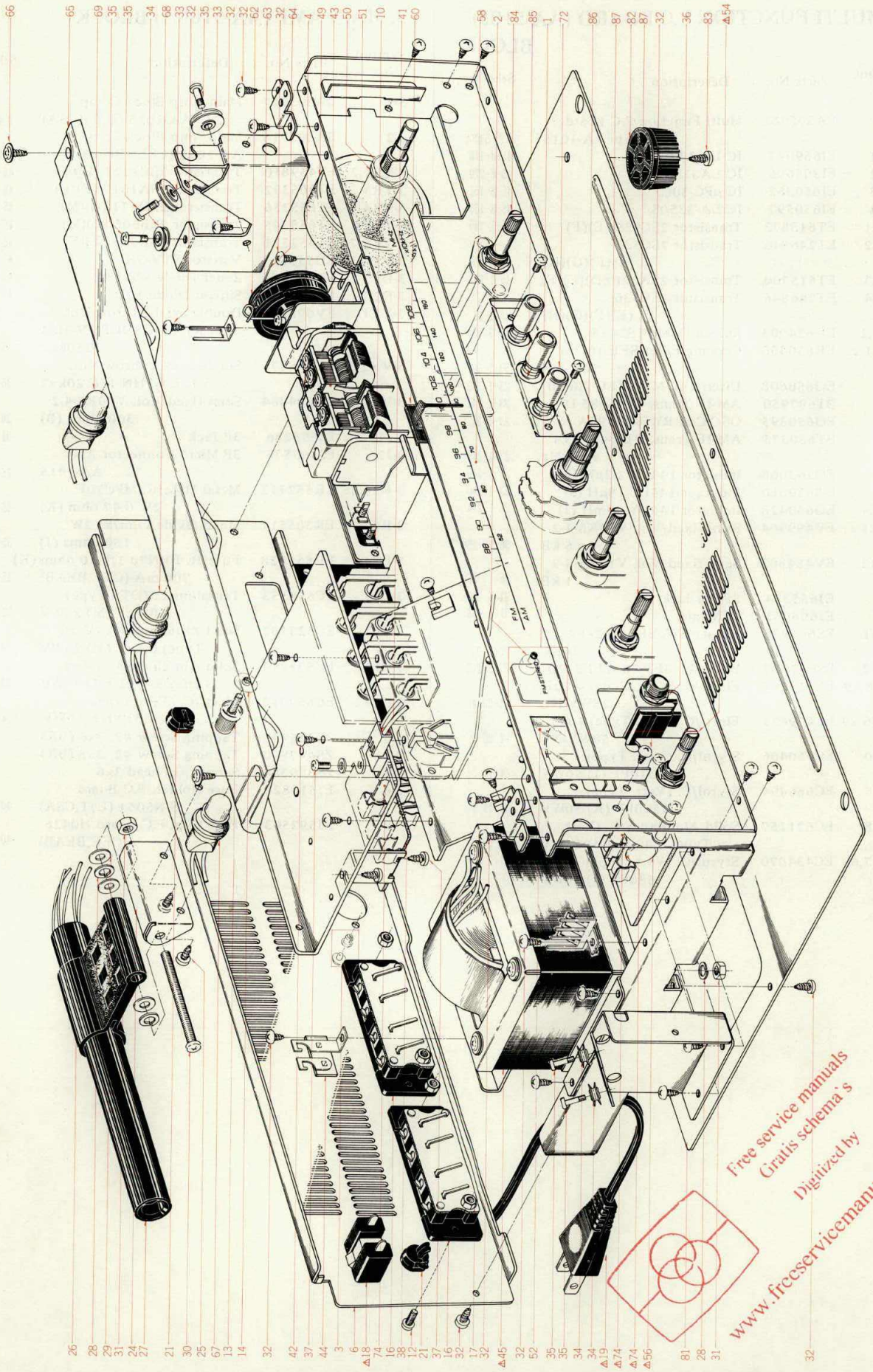
Symbol No.	Parts No.	Description	Schematic No.
2-1	BA305988	Multi Function P.C Board Comp. AA-1015	AA-51008
2-IC1	EI669047	IC LA-1230Z	45-8-176
2-IC2	EI305696	IC LA3133	45-8-270
2-IC3	EI650362	IC μPC-30C	45-8-151
2-IC4	EI650597	IC LA-3350S	45-8-153
2-TR1	ET618873	Transistor 2SC930 (E)(F)	45-1-185
2-TR2	ET246846	Transistor 2SC536 (E)(F)(G)(H)	45-1-55
2-TR3	ET515700	Transistor 2SA628 (D)(E)(F)	45-1-94
2-TR4	ET246846	Transistor 2SC536 (E)(F)(G)(H)	45-1-55
2-D1,2	ED624903	Silicon Diode 1S2473	45-3-28
2-FL1,2	ER650430	Ceramic Filter SFE-10.7 MA-8-Z	53-1-102
2-T1	EO650608	Discri Coil MV4-FLC-20000	23-1-243
2-T2	BT697950	AM-IF Trans. CFU-085-D	23-1-241
2-T3	EO650395	OSC Coil RWR-41498A	23-4-34
2-T4	BT650373	AM-IF Trans. RLC-41543A 468 kHz	23-1-242
2-L1	EO263068	Inductor 144LZ 2.2μH (K)	23-1-240
2-L2	EO650610	Inductor 144LZ 18μH (J)	23-1-240
2-L3,4	EO650428	Inductor 146LY 39mH (J)	23-1-214
2-VR1	EV499364	Semi-fixed/Vol. V10K8-4-2 5 kB	36-10-250
2-VR2	EV484863	Semi-fixed/Vol. V10K8-4-2 1 kB	36-10-250
2-J1	EJ655334	8P Pin Jack	31-1-149
2-J2	EJ698051	DIN Jack	31-1-158
2-SW1	ES697926	Rotary SW. SR26N 2-7-4 30KC	25-6-93
2-SW2	ES697937	Push SW. 3FT-0001FF3220	25-5-213
2-C18,19	EC514708	Elect./C. (Vert. Type) 4.7μF 25WV NL	24-20-4
2-V26,29	EC479621	Elect./C. (Vert. Type) 1μF 50WV NL	24-20-4
2-C40	EC650406	Styrol/C. (Vert. Type) 310PF (J) 50WV	24-11-3
2-C55	EC666494	Styrol/C. (Vert. Type) 1500PF (K) 50WV	24-11-3
2-C58	EC621257	Solid Aluminum/C. (Vert. Type) 0.47μF (M) 25WV	24-19-2
2-C67,68	EC434070	Styrol/C. (Vert. Type) 680PF (J) 50WV	

3. MAIN AMP (AA-5106A) BLOCK

Symbol No.	Parts No.	Description	Schematic No.
3-1	BA305917	Main Amp Block Comp. AA-1015 (U/T)(CSA)	AA-51005
3-2	BA305918	Main Amp Block Comp. AA-1015 (CEE)(BEAB)	AA-51005
3-TR1,2	ET459810	Transistor 2SC1222 (E)(F)	45-1-110
3-TR3	ET305392	Transistor 2SA1017 (E)(F)	45-1-301
3-TR4	ET655356	Transistor 2SD571 (L)(M)	45-1-218
3-TR5	ET655345	Transistor 2SB605 (L)(M)	45-1-225
3-TR6,7	ET452531	Transistor 2SD313 (E)(F)	45-1-105
3-V1	ED556514	Varistor STV-3H	45-10-11
3-D1	ED539976	Zener Diode WZ-130	45-6-67
3-D2,3	ED224548	Silicon Diode 10D2	45-2-14
3-VR1	EV698264	Double axial 2 throw Vol. (FR) V24L5DGPHN-3BM 250kx2	36-3-70
3-VR2,3	EV698275	Single axial 2 throw Vol. V16L GPHN-15C 20kx2	36-22-16
3-VR4	EV604484	Semi-fixed/Vol. V10K8-4-2 300 ohms (B)	36-10-250
3-J1	EJ698286	3P Jack	31-2-72
3-J2	EJ305576	3P Micro Connector Assy AA-1015	26-6-284
3-R24,25	ER552712	Metal Plate/R. MPC70F 2W 0.47 ohm (K)	35-16-38
3-R27	ER305511	Metal Oxide Film/R. 2W 150 ohms (J)	35-15-8
3-FR1	ER565828	Fuse/R. FRN70 1/4 10 ohms(K) 700 mA (CEE,BEAB)	35-14-11
3-C10	EC654153	Tantalum/C. (DTS Type) 0.1μF (M) 25WV	24-15-8
3-C12	EC523282	Solid Aluminum/C. (Vert. Type) 0.1μF (M) 25WV	24-19-2
3-C13	EC538244	Solid Aluminum/C. (Vert. Type) 0.47μF (M) 10WV	24-19-2
3-C19	EC654917	Elect./C. (Vert. type) 3300μF 50WV	24-12-17
3-3	ZS325495	Tapping Screw #2, 3x6 (BR)	
3-4	ZS447840	Tapping Screw #2, 3x8 (BR)	
3-5	ZS379350	Screw, pan head 3x6	
3-6	EJ514822	Fuse Holder, P.C Board S-N5051 (U/T,CSA)	40-1-28
3-7	EJ592503	Fuse Clip, P.C Board H0426 (CEE,BEAB)	40-1-37

When ordering parts, please describe Parts Number, Description, and Model Number in detail.

4. ILLUSTRATION OF ASSEMBLY BLOCK



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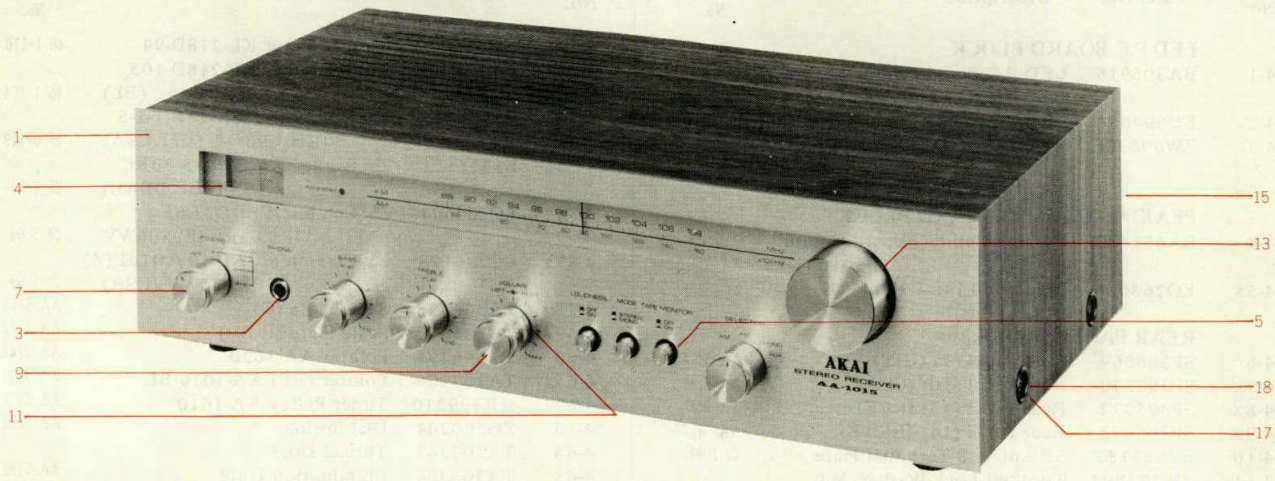
4) ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.
		LED P.C BOARD BLOCK	
4-1	BA305915	LED P.C Board Comp. AA-1015	AA-51009
4-2	ED694091	LED SEL-105RC	45-15-12
4-3	ZW698308	Nylon Rivet (FNRP) 3x5.5 Black	2-7-54
		PEAKING COIL P.C BOARD BLOCK	
4-4	BA681682	Peaking Coil P.C Board Comp. AA-1010 (U)	AA-51010
4-5x	EO263068	Inductor 144LZ 2.2μH (K)	23-1-240
		REAR PANEL BLOCK	
4-6	SP305369	Rear Panel (9) (U/T)	AA-5184
4-7x	SP305370	Rear Panel (10) (CSA)	AA-5184
4-8x	SP305372	Rear Panel (13) (CEE)	AA-5187
4-9x	SP305373	Rear Panel (14) (BEAB)	AA-5187
4-10	EZ655187	5P Antenna Terminal Plate	32-1-69
4-11x	ZW273802	Toothed Lock Washer, M3	
4-12	ZS421740	Screw, pan head 3x8 (Black)	
4-13	SK652397	Knob 0512-2	34-1-4
4-14	ZW652408	Washer (SPC) D3.2x10x0.5t	
4-15x	ZS608275	Screw, pan head 3x5, w/washer	
4-16	EJ655683	4P Speaker Jack (C)	32-1-68
4-17	ZW273756	Nut M3, #1	
4-18	EJ650261	⚠ AC Consent U/L S-16432	31-1-147
4-19	EW374894	⚠ AC Cord U/T	26-3-19
4-20x	EW207742	⚠ AC Cord CUL (CSA)	26-3-45
4-21	EZ631945	Strain Relief SR-4N-4	2-7-49
4-22x	EJ296853	⚠ 3P In-let CM-3 (CEE,BEAB)	31-1-199
4-23x	ZS463353	Tapping Screw #2, 3x8 (BR) (Black)	
4-24	TA530910	Antenna Channel	91-5029
4-25	ZS447761	Tapping Screw #2, 3x6 (BR) (Black)	
4-26	TA378268	Antenna Holder	2-7-13
4-27	EE699816	Bar Antenna	55-1-32
4-28	ZW273914	Spring Washer, M4	
4-29	ZW420682	Wahser (NYLON) D4.2x9x0.5t	
4-30	ZS552600	Screw, pan head 4x50	
4-31	ZW413188	Nut M4, #1	
		ASSEMBLY BLOCK	
4-32	ZS325495	Tapping Screw #2, 3x6 (BR)	
4-33	MR530651	Roller (A)	91-5008
4-34	MR530662	Roller (B)	91-5009
4-35	ZS530673	Roller Screw (A)	91-5010
4-36	ZW270191	E Jack Nut	
4-37	ZS379350	Screw, pan head 3x6	
4-38	EJ305385	Fuse Holder 3P (Large) AA-1015L1 (U/T)	40-1-162
4-39x	EJ305386	Fuse Holder 2P (Large) AA-1015L2 (CSA)	40-1-163
4-40x	EJ305387	Fuse Holder 2P (Small) AA-1015S (CEE, BEAB)	40-1-164
4-41	ET307261	Transistor 2SD234 (R)(O)(Y) 2-10-B	45-1-81
4-42	ZS447840	Tapping Screw #2, 3x8 (BR)	
4-43	EE301419	Front End FB513U12	57-2-44
4-44	EJ254957	Lug Plate KP1L	33-3-2
4-45	BT305388	⚠ Power Trans. AA-1015T-70 (U/T)	38-4-579
4-46x	BT305389	⚠ Power Trans. AA-1015T-30 (CSA)	38-4-577
4-47x	BT305390	⚠ Power Trans. AA-1015T-40 (CEE)	38-4-578
4-48x	BT305391	⚠ Power Trans. AA-1015T-50 (BEAB)	38-4-590
4-49	MI698310	Tuning Wheel	13-2-4
4-50	ZW610503	Washer D11	36-13-2
4-51	ZW610492	Nut M11	36-13-3
4-52	EM655727	Tuning Meter KL-218D-94	46-1-110
4-53x	EM288448	Tuning Meter KL-218D-103 (BL)	46-1-154
4-54	ES306313	⚠ Rotary SW. SR-26N 1-2-5 30KH U9SF-C (U/T,CSA)	25-6-119
4-55x	ES215111	⚠ Rotary SW. SR26S 30KC (CEE,BEAB)	25-6-94
4-56	EC204671	⚠ Ceramic/C. DD31-6E 0.01μF (P) 500WV	24-5-66
4-57x	EC286198	⚠ Ceramic/C. AL-10 0.01μF(Z) 125WV (CSA)	24-5-69
4-58	TA305376	Scale Plate (C)	AA-5178
4-59x	TA305377	Scale Plate (C-BL)	AA-5178
4-60	TA646795	Pointer AA-1020	AA-5242
4-61x	TA287706	Pointer (BL) AA-1010-BL	AA-5242
4-62	MR699210	Tuner Pulley AA-1010	AA-5127
4-63	ZG200204	Dial Spring	AA-5133
4-64	TA207347	Thread D0.5	
4-65	TA305384	Illumination Plate	AA-5182
4-66	ZS462194	Tapping Screw #2, 3x8 (Pan) W=8	
4-67	EL267197	Lamp (Cord Type) 8V 300 mA (200mmx2)	28-2-60
4-68	EL267063	Lamp (Cord Type) 8V 300 mA (300mmx2)	28-2-60
4-69	EL267208	Lamp (Cord Type) 8V 300 mA (400mmx2)	28-2-60
4-70x	ZW273892	Toothed Lock Washer, M4 (CEE,BEAB)	
4-71x	ZS417150	Screw, pan head 4x6 (CEE,BEAB)	
4-72	SK634410	Push Button Knob (J) TE	91-5051
4-73x	SK607127	Push Knob (A) (BL)	A5-5022
4-74	EF563681	⚠ Fuse 1A 250V	39-1-50
4-75x	EF563703	⚠ Fuse 2A 250V	39-1-50
4-76x	EF424811	⚠ Fuse ST-2 2.5A (CSA)	39-1-63
4-77x	EF277413	⚠ Fuse ST-6 2A (CSA)	39-1-63
4-78x	EF258344	⚠ Fuse (SEMKO T Type) 800 mAT (CEE,BEAB)	39-1-53
4-79x	EF601301	⚠ Fuse (SEMKO T Type) 2AT (CEE,BEAB)	39-1-53
4-80x	EF623103	⚠ Fuse (SEMKO T Type) 1AT (CEE,BEAB)	39-1-53
4-81	SP697116	Bottom Plate	AA-5122
4-82	SA645243	Circular Foot (A) CA	CA-6014
4-83	ZS565942	Tapping Screw #2, 4x8 (Pan)	
4-84	ES697926	Rotary SW. SR26N 2-7-4 30KC	25-6-93
4-85	ES697937	Push SW. 3FT-0001FF3220	25-5-213
4-86	EV698264	Double axial 2 throw Vol. (FR) V24L5DGPHN 3BM250kx2	36-3-70
4-87	EV698275	Single axial 2 throw Vol. V16L GPHN-15C 20kx2	36-22-16

When ordering parts, please describe Parts Number, Description, and Model Number in detail.

5. PHOTO OF FINAL ASSEMBLY BLOCK



5) FINAL ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.
		FRONT PANEL BLOCK	
5-1	BD305904	Front Panel Block Comp. AA-1015	AA-5195
5-2x	BD305905	Front Panel Block Comp. AA-1015-BL	AA-5195
5-3	ZW526577	Collar (B), jack	MC-5006
5-4	SP645715	Front Plate	AA-5245
5-5	SE613888	Button Escutcheon (A)	CW-6021
		FINAL ASSEMBLY BLOCK	
5-6x	ZS325495	Tapping Screw #2, 3x6 (BR)	
5-7	SK646817	Single Knob	AA-5250
5-8x	SK281564	Single Knob (BL)	AA-5250
5-9	SK644670	Double Knob (Upper)	AA-5355
5-10x	SK287662	Double Knob (Upper) (BL)	AA-5355
5-11	SK645208	Double Knob (Lower)	AA-5353
5-12x	SK287673	Double Knob (Lower) (BL)	AA-5353
5-13	SK646828	Tuning Knob (Small)	AA-5252
5-14x	SK288393	Tuning Knob (Small) (BL)	AA-5252
5-15	BC699783	Cabinet	AA-5123
5-16x	BC287684	Cabinet (BL)	AA-5123
5-17	ZW548010	Spot Facing Washer	MU-6028
5-18	ZS510344	Screw, binding head 4x12 (Black)	

[2] MODEL AA-1015PL/BL

6. MULTI FUNCTION P.C BOARD (AA-5159A) BLOCK

Symbol No.	Parts No.	Description	Schematic No.
6-1	BA305949	Multi Function P.C Board Comp. AA-1015PL	AA-51019
6-IC1	EI669047	IC LA-1230Z	45-8-176
6-IC2	EI697871	IC LA-3122S	45-8-185
6-IC3	EI650362	IC μPC30C	45-8-151
6-IC4	EI650597	IC LA-3350S	45-8-153
6-TR1	ET618873	Transistor 2SC930 (E)(F)	45-1-185
6-TR2	ET246846	Transistor 2SC536 (E)(F)(G)(H)	45-1-55
6-TR3	ET223446	Transistor 2SC1571NP (G)(H)	45-1-238
6-TR4	ET515700	Transistor 2SA628 (D)(E)(F)	45-1-94
6-TR5	ET246846	Transistor 2SC536 (E)(F)(G)(H)	45-1-55
6-TR6,7	ET223446	Transistor 2SC1571NP (G)(H)	45-1-238
6-D1,2	ED624903	Silicon Diode 1S2473	45-3-28
6-FL1,2	ER650430	Ceramic Filter SFE-10.7 MA-8-Z	53-1-102
6-T1	EO650608	Discri Coil MV4-FLC-20000	23-1-243
6-T2	BT633025	LW OSC Trans. 34H-215	23-1-235
6-T3	EO645838	OSC Coil RWR41497A	23-4-35
6-T4	BT650373	AM-IF Trans. RLC-41543A 468 kHz	23-1-242
6-T5	BT697950	AM-IF Trans. CFU-085-D	23-1-241
6-L1	EO650610	Inductor 144LZ 18μH (J)	23-1-240
6-L2,3	EO650428	Inductor 146LY 39mH (J)	23-1-214
6-L4	EO539820	Peaking Coil 2.2μH (K)	23-1-187
6-VR1	EV499364	Semi-fixed/Vol. V10K8-4-2 5 kB	36-10-250
6-VR2	EV484863	Semi-fixed/Vol. V10K8-4-2 1 kB	36-10-250
6-VR3	EV499364	Semi-fixed/Vol. V10K8-4-2 5 kB	36-10-250
6-VC1,2	EC675742	Trimmer/C. CTY-21D 15PF	24-2-35
6-J1	EJ655334	8P PIN Jack	31-1-149
6-J2	EJ698051	DIN Jack	31-1-158
6-SW1	ES240276	Push SW. 5FT-0001DF3620	25-5-235
6-C19,20	EC514708	Elect./C. (Vert. Type) 4.7μF 25WV NL	24-20-4
6-C30,31	EC479621	Elect./C. (Vert. Type) 1μF 50WV NL	24-20-4
6-C39	EC658001	Styrol/C. (Vert. Type) 410PF (J) 50WV	24-11-3
6-C56	EC666494	Styrol/C. (Vert. Type) 1500PF (K) 50WV	24-11-3
6-C58	EC215065	Solid Aluminum/C. (Vert. Type) 0.47μF 16WV	24-19-2
6-2	TA240300	Varactor Tuner VFT-22UH-22	57-2-41

7. MAIN AMP (AA-5106A) BLOCK

Symbol No.	Parts No.	Description	Schematic No.
7-1	BA305960	Main Amp Block Comp. AA-1015PL (U/T)	AA-51005
7-2	BA305962	Main Amp Block Comp. AA-1015PL (CEE)	AA-51005
7-TR1,2	ET459810	Transistor 2SC1222 (E)(F)	45-1-110
7-TR3	ET305392	Transistor 2SA1017 (E)(F)	45-1-301
7-TR4	ET655356	Transistor 2SD571 (L)(M)	45-1-218
7-TR5	ET655345	Transistor 2SB605 (L)(M)	45-1-225
7-TR6,7	ET452531	Transistor 2SD313 (E)(F)	45-1-105
7-V1	ED556514	Varistor STV-3H	45-10-11
7-D1	ED539976	Zener Diode WZ-130	45-6-67
7-D2,3	ED224548	Silicon Diode 10D2	45-2-14
7-VR1	EV240434	Double axial 2 throw Vol. (FR) DJ80D B250k×2	36-3-75
7-VR2,3	EV240445	Single axial 2 throw Vol. GM70R 20KC×2	36-22-22
7-VR4	EV604484	Semi-fixed/Vol. V10K8-4-2 300 ohms (B)	36-10-250
7-J1	EJ698286	3P Jack	31-2-72
7-J2	EJ305576	3P Micro Connector Assy AA-1015	26-6-284
7-R24,25	ER552712	Metal Plate/R. MPC70F 2W 0.47 ohm (K)	35-16-38
7-R27	ER305511	Metal Oxide Film/R. 2W 150 ohms (J)	35-15-8
7-FR1	ER565828	Fuse/R. FRN70 1/4 10 ohms(K) 700 mA (CEE)	35-14-11
7-C10	EC654153	Tantalum/C. (DTS Type) 0.1μF (M) 25WV	24-15-8
7-C12	EC523282	Solid Aluminum/C. (Vert. Type) 0.1μF (M) 25WV	24-19-2
7-C13	EC538244	Solid Aluminum/C. (Vert. Type) 0.47μF (M) 10WV	24-19-2
7-C19	EC654917	Elect./C. (Vert. Type) 3300μF 50WV	24-12-17
7-3	ZS325495	Tapping Screw #2, 3×6 (BR)	
7-4	ZS447840	Tapping Screw #2, 3×8 (BR)	
7-5	ZS379350	Screw, pan head 3×6	
7-6	EJ514822	Fuse Holder, P.C Board S-N5051 (U/T)	40-1-28
7-7	EJ592503	Fuse Clip, P.C Board H0426 (CEE)	40-1-37

8. IC P.C BOARD (AA-5171) BLOCK

Symbol No.	Parts No.	Description	Schematic No.
8-1	BA305940	IC P.C Board Comp. AA-1015PL	AA-51024
8-IC1,2	EI229443	IC μPC 1009C	45-8-202
8-TR1	ET305393	FET 2SK117 (O)(Y)(GR)	45-12-15
8-TR2	ET305221	Transistor 2SC1815 (O)(Y)(GR)	45-1-299

9. TOUCH SW. P.C BOARD (AA-5158) BLOCK

Symbol No.	Parts No.	Description	Schematic No.
9-1	BA235170	Touch SW. P.C Board Comp. AA-1010L (U)	AA-51023
9-2	BA267491	Touch SW. P.C Board Comp. AA-1010L-BL	AA-51023
9-D1to6	ED653624	LED SEL-103W	45-15-9
9-3	ZW281463	Nylon Rivet (FNRP) 3x6.5 (Black)	2-7-54

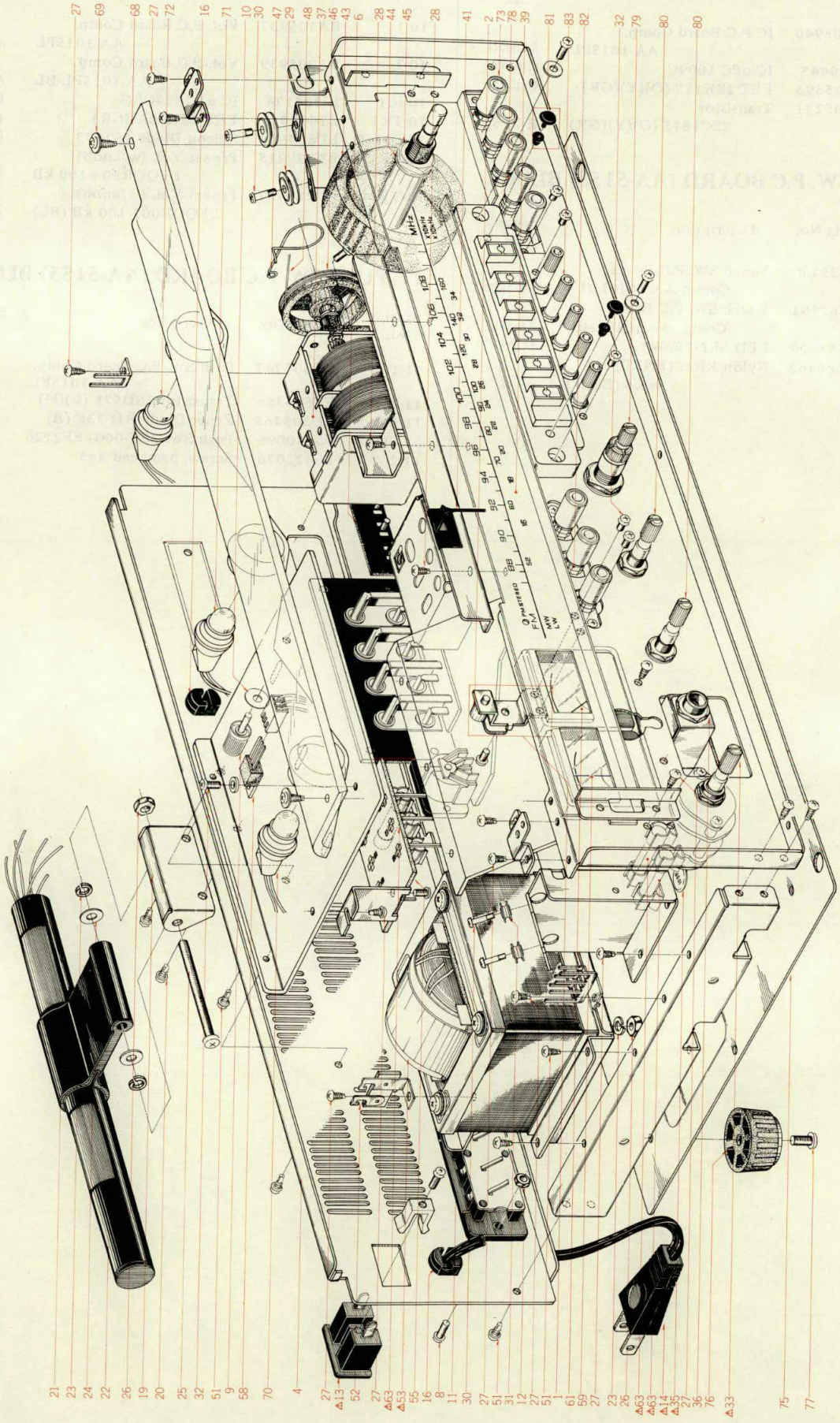
10. VOL. P.C BOARD (AA-5170) BLOCK

Symbol No.	Parts No.	Description	Schematic No.
10-1	BA305937	Vol. P.C Board Comp. AA-1015PL	AA-51022
10-2	BA305939	Vol. P.C Board Comp. AA-1015PL-BL	AA-51022
10-IC1	EI304174	IC μA7824CKC	45-8-231
10-TR1	ET491051	FET 2SK30A (GR)	45-12-4
10-D1to5	ED624903	Silicon Diode 1S2473	45-3-28
10-VR1to5	EV229915	Pre-set Vol. (w/knob) LFQDR504 100 kB	36-37-1
10-VR1to5	EV288437	Pre-set Vol. (w/knob) LFQDR002 100 kB (BL)	36-37-2

11. PUSH SW. P.C BOARD (AA-5155) BLOCK

Symbol No.	Parts No.	Description	Schematic No.
11-1	BA305947	Push SW. P.C Board Comp. AA-1015PL	AA-51021
11-TR1	ET655356	Transistor 2SD571 (L)(M)	45-1-218
11-D1	ED305465	Zener Diode RD-33E (B)	45-6-72
11-SW1	ES240096	Push SW. 3FT-0001FF2120	25-5-234
11-2	ZS422076	Screw, pan head 3x5	

12. ILLUSTRATION OF ASSEMBLY BLOCK

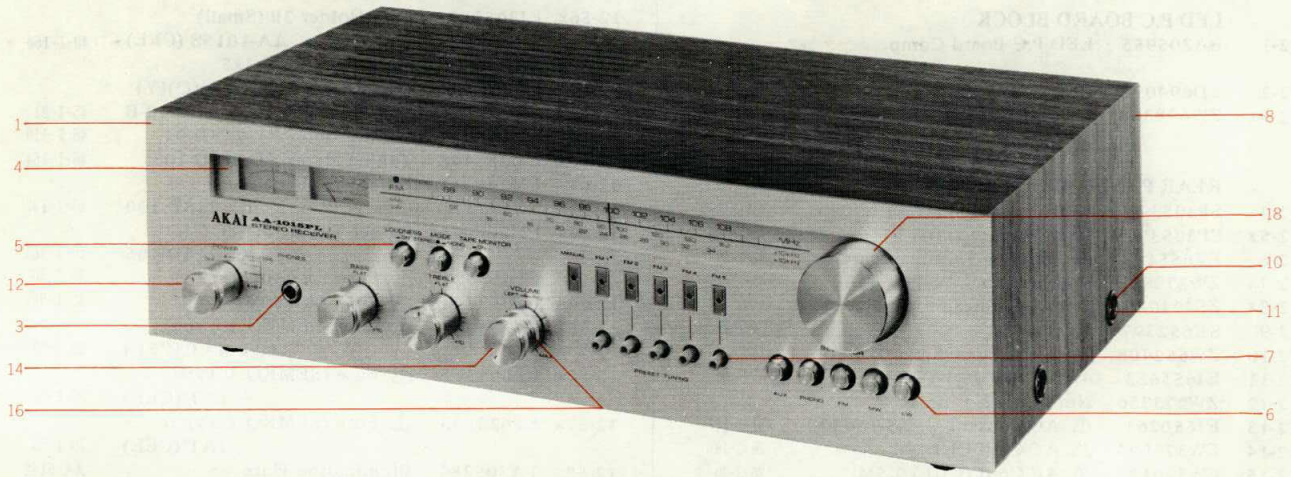


12) ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.
	LED P.C BOARD BLOCK		
12-1	BA305955	LED P.C Board Comp. AA-1015PL	AA-51020
12-2	ED694091	LED SEL-105RC	45-15-12
12-3x	ZW698308	Nylon Rivet (FNRP) 3x5.5 (Black)	2-7-54
	REAR PANEL BLOCK		
12-4	SP305371	Rear Panel (11) (U/T)	AA-5185
12-5x	SP305374	Rear Panel (15) (CEE)	AA-5188
12-6	EZ655187	5P Antenna Terminal Plate	32-1-69
12-7x	ZW273802	Toothed Lock Washer, M3	
12-8x	ZS421740	Screw, pan head 3x8 (Black)	
12-9	SK652397	Knob 0512-2	34-1-4
12-10	ZW652408	Washer (SPC) D3.2x10x0.5t	
12-11	EJ655683	4P Speaker Jack (C)	32-1-68
12-12	ZW273756	Nut M3, #1	
12-13	EJ650261	⚠ AC Consent U/L S-16432	31-1-147
12-14	EW374894	⚠ AC Cord CUL 3M	26-3-19
12-15x	EW540123	⚠ AC Cord (CUL) 2.5M	26-3-20
12-16	EZ631945	Strain Relief SR-4N-4	2-7-49
12-17x	EJ296853	⚠ 3P In-let CM-3 (CEE)	31-1-199
12-18x	ZS463353	Tapping Screw #2, 3x8 (BR) (Black) (CEE)	
12-19	TA530910	Antenna Channel	91-5029
12-20	ZS447761	Tapping Screw #2, 3x6 (BR) (Black)	
12-21	TA625847	Antenna Holder	2-7-46
12-22	EE240041	Bar Antenna 2 Band	55-1-36
12-23	ZW273914	Spring Washer, M4	
12-24	ZW420682	Washer (Nylon) D4.2x9x0.5t	
12-25	ZS552600	Screw, pan head 4x50	
12-26	ZW413188	Nut M4, #1	
	ASSEMBLY BLOCK		
12-27	ZS325495	Tapping Screw #2, 3x6 (BR)	
12-28	ZS447840	Tapping Screw #2, 3x8 (BR)	
12-29	MR530651	Roller (A)	91-5008
12-30	ZS530673	Roller Screw (A)	91-5010
12-31	MR530662	Roller (B)	91-5009
12-32	ZS379350	Screw, pan head 3x6	
12-33	ES240355	⚠ Rotary SW. SR26N 1-3-5 30KC (U/T)	25-6-102
12-34x	ES240287	⚠ Rotary SW. SR26N 30KC (CEE)	25-6-103
12-35	EC204671	⚠ Ceramic/C. DD31-6E 0.01μF (P) 500WV	24-5-66
12-36	ZW270191	E Jack Nut	
12-37	EE240298	Vari. Con C626W113	24-2-40
12-38x	ZS421806	Screw, pan head 3x8	
12-39	TA305378	Scale Plate (D)	AA-5181
12-40x	TA305382	Scale Plate (D-BL)	AA-5181
12-41	TA646795	Pointer AA-1020	AA-5242
12-42x	TA287706	Pointer (BL) AA-1010-BL	AA-5242
12-43	MI698310	Tuning Wheel	13-2-4
12-44	ZW610503	Washer D11	36-13-2
12-45	ZW610492	Nut M11	36-13-3
12-46	MI240388	Dial Wheel	2-15-14
12-47	ZG241086	Dial Spring	AA-5147
12-48	TA207347	Thread D0.5	
12-49x	ZW273892	Toothed Lock Washer, M4 (CEE)	
12-50x	ZS417150	Screw, pan head 4x6 (CEE)	
12-51	ZS447761	Tapping Screw #2, 3x6 (BR) (Black)	
12-52	EJ254957	Lug Plate KP1L	33-3-2
12-53	BT305388	⚠ Power Trans. AA-1015T-70 (U/T)	38-4-579
12-54x	BT305390	⚠ Power Trans. AA-1015T-40 (CEE)	38-4-578
12-55	EJ305385	Fuse Holder 3P (Large) AA-1015L1	40-1-162
12-56x	EJ305387	Fuse Holder 2P (Small) AA-1015S (CEE)	40-1-164
12-57x	ZS422076	Screw, pan head 3x5	
12-58	ET307261	Transistor 2SD234 (R)(O)(Y) 2-10-B	45-1-81
12-59	EM655727	Tuning Meter KL-218D-94	46-1-110
12-60x	EM288448	Tuning Meter KL-218D-103	46-1-154
12-61	EM240311	Pre-set Tuning Meter KL-218D-100	46-1-143
12-62x	EM288426	Pre-set Tuning Meter KL-218D-105	46-1-161
12-63	EF563681	⚠ Fuse 1A 250V	39-1-50
12-64x	EF563703	⚠ Fuse 2A 250V	39-1-50
12-65x	EF258344	⚠ Fuse (SEMKO T Type) 800 mAT (CEE)	39-1-53
12-66x	EF601301	⚠ Fuse (SEMKO T Type) 2AT (CEE)	39-1-53
12-67x	EF623103	⚠ Fuse (SEMKO T Type) 1AT (CEE)	39-1-53
12-68	TA305384	Illumination Plate	AA-5182
12-69	ZS462194	Tapping Screw #2, 3x8 (Pan) W=8	
12-70	EL267197	Lamp (Cord Type) 8V 300 mA (200mmx2)	28-2-60
12-71	EL267063	Lamp (Cord Type) 8V 300 mA (300mmx2)	28-2-60
12-72	EL267208	Lamp (Cord Type) 8V 300 mA (400mmx2)	28-2-60
12-73	SK634410	Push Button Knob (J) TE	91-5051
12-74x	SK607127	Push Knob (A) (Black)	A5-5022
12-75	SP697116	Bottom Plate	AA-5122
12-76	SA645243	Circular Foot (A) CA	CA-6014
12-77	ZS565942	Tapping Screw #2, 4x8 (Pan)	
12-78	ES240276	Push SW. 5FT-0001DF3620	25-5-235
12-79	EV240434	Double axial 2 throw Vol. (FR) DJ80D 250kBx2	36-3-75
12-80	EV240445	Single axial 2 throw Vol. GM70R 20KCx2	36-22-22
12-81	ZW281463	Nylon Rivet (FNRP) 3x6.5 (Black)	2-7-54
12-82	ES240096	Push SW. 3FT-0001FF2120	25-5-234
12-83	EV229915	Pre-set Vol. (w/knob) LFQDR504 100 kB	36-37-1

When ordering parts, please describe Parts Number, Description, and Model Number in detail.

13. PHOTO OF FINAL ASSEMBLY BLOCK



13) FINAL ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.
		FRONT PANEL BLOCK	
13-1	BD305945	Front Panel Block Comp. AA-1015PL	AA-5196
13-2x	BD305946	Front Panel Block Comp. AA-1015PL-BL	AA-5196
13-3	ZW526577	Collar (B), jack	MC-5006
13-4	SP645715	Front Plate	AA-5245
13-5	SE613888	Button Escutcheon (A)	CW-6021
13-6	SE675606	Button Escutcheon	CB-6004
13-7	SE631585	Button Escutcheon (D)	CG-6814
		FINAL ASSEMBLY BLOCK	
13-8	BC699783	Cabinet	AA-5123
13-9x	BC287684	Cabinet (BL)	AA-5123
13-10	ZW548010	Spot Facing Washer	MU-6028
13-11	ZS510344	Screw, binding head 4x12 (Black)	
13-12	SK646817	Single Knob	AA-5250
13-13x	SK281564	Single Knob (BL)	AA-5250
13-14	SK644670	Double Knob (Upper)	AA-5355
13-15x	SK287662	Double Knob (Upper) (BL)	AA-5355
13-16	SK645208	Double Knob (Lower)	AA-5353
13-17x	SK287673	Double Knob (Lower) (BL)	AA-5353
13-18	SK646828	Tuning Knob (Small)	AA-5252
13-19x	SK288393	Tuning Knob (Small) (BL)	AA-5252

INDEX

Parts No.	Ref. No. & Symbol No.	Parts No.	Ref. No. & Symbol No.	Parts No.	Ref. No. & Symbol No.	Parts No.	Ref. No. & Symbol No.	Parts No.	Ref. No. & Symbol No.
BA235170	9-1	EF563703	4-75x	ES697926	2-SW1	SK634410	4-72	ZW273756	12-12
BA267491	9-2	EF563703	12-64x	ES697926	4-84	SK634410	12-73	ZW273802	4-11x
BA305915	4-1	EF601301	4-79x	ES697937	2-SW2	SK644670	5-9	ZW273802	12-7x
BA305917	3-1	EF601301	12-66x	ES697937	4-85	SK644670	13-14	ZW273892	4-70x
BA305918	3-2	EF623103	4-80x	ET223446	6-TR3	SK645208	5-11	ZW273892	12-49x
BA305937	10-1	EF623103	12-67x	ET223446	6-TR6,7	SK645208	13-16	ZW273914	4-28
BA305939	10-2	EI229443	8-IC1,2	ET246846	2-TR2	SK646817	5-7	ZW273914	12-23
BA305940	8-1	EI304174	10-IC1	ET246846	2-TR4	SK646817	13-12	ZW281463	9-3
BA305947	11-1	EI305696	2-IC2	ET246846	6-TR2	SK646828	5-13	ZW281463	12-81
BA305949	6-1	EI650362	2-IC3	ET246846	6-TR5	SK646828	13-18	ZW413188	4-31
BA305955	12-1	EI650362	6-IC3	ET305221	8-TR2	SK652397	4-13	ZW413188	12-26
BA305960	7-1	EI650597	2-IC4	ET305392	3-TR3	SK652397	12-9	ZW420682	4-29
BA305962	7-2	EI650597	6-IC4	ET305392	7-TR3	SP305369	4-6	ZW420682	12-24
BA305988	2-1	EI669047	2-IC1	ET305393	8-TR1	SP305370	4-7x	ZW526577	5-3
BA681682	4-4	EI669047	6-IC1	ET307261	4-41	SP305371	12-4	ZW526577	13-3
BC287684	5-16x	EI697871	6-IC2	ET307261	12-58	SP305372	4-8x	ZW548010	5-17
BC287684	13-9x	EJ254957	4-44	ET452531	3-TR6,7	SP305373	4-9x	ZW548010	13-10
BC699783	5-15	EJ254957	12-52	ET452531	7-TR6,7	SP305374	12-5x	ZW610492	4-51
BC699783	13-8	EJ296853	4-22x	ET459810	3-TR1,2	SP645715	5-4	ZW610492	12-45
BD305904	5-1	EJ296853	12-17x	ET459810	7-TR1,2	SP645715	13-4	ZW610503	4-50
BD305905	5-2x	EJ305385	4-38	ET491051	10-TR1	SP697116	4-81	ZW610503	12-44
BD305945	13-1	EJ305385	12-55	ET515700	2-TR3	SP697116	12-75	ZW652408	4-14
BD305946	13-2x	EJ305386	4-39x	ET515700	6-TR4	TA207347	4-64	ZW652408	12-10
BT305388	4-45	EJ305387	4-40x	ET618873	2-TR1	TA207347	12-48	ZW698308	4-3
BT305388	12-53	EJ305387	12-56x	ET618873	6-TR1	TA240300	6-2	ZW698308	12-3x
BT305389	4-46x	EJ305576	3-J2	ET655345	3-TR5	TA287706	4-61x		
BT305390	4-47x	EJ305576	7-J2	ET655345	7-TR5	TA287706	12-42x		
BT305390	12-54x	EJ514822	3-6	ET655356	3-TR4	TA305376	4-58		
BT305391	4-48x	EJ514822	7-6	ET655356	7-TR4	TA305377	4-59x		
BT633025	6-T2	EJ592503	3-7	ET655356	11-TR1	TA305378	12-39		
BT650373	2-T4	EJ592503	7-7	EV229915	10-VR1to5	TA305382	12-40x		
BT650373	6-T4	EJ650261	4-18	EV229915	12-83	TA305384	4-65		
BT697950	2-T2	EJ650261	12-13	EV240434	7-VR1	TA305384	12-68		
BT697950	6-T5	EJ655334	2-J1	EV240434	12-79	TA378268	4-26		
EC204671	4-56	EJ655334	6-J1	EV240445	7-VR2,3	TA530910	4-24		
EC204671	12-35	EJ655683	4-16	EV240445	12-80	TA530910	12-19		
EC215065	6-C58	EJ655683	12-11	EV288437	10-VR1to5	TA625847	12-21		
EC286198	4-57x	EJ698051	2-J2	EV484863	2-VR2	TA646795	4-60		
EC434070	2-C67,68	EJ698051	6-J2	EV484863	6-VR2	TA646795	12-41		
EC479621	2-C26,29	EJ698286	3-J1	EV499364	2-VR1	ZG200204	4-63		
EC479621	6-C30,31	EJ698286	7-J1	EV499364	6-VR1	ZG241086	12-47		
EC514708	2-C18,19	EL267063	4-68	EV499364	6-VR3	ZS325495	3-3		
EC514708	6-C19,20	EL267063	12-71	EV604484	3-VR4	ZS325495	4-32		
EC523282	3-C12	EL267197	4-67	EV604484	7-VR4	ZS325495	5-6x		
EC523282	7-C12	EL267197	12-70	EV698264	3-VR1	ZS325495	7-3		
EC538244	3-C13	EL267208	4-69	EV698264	4-86	ZS325495	12-27		
EC538244	7-C13	EL267208	12-72	EV698275	3-VR2,3	ZS379350	3-5		
EC621257	2-C58	EM240311	12-61	EV698275	4-87	ZS379350	4-37		
EC650406	2-C40	EM288426	12-62x	EW207742	4-20x	ZS379350	7-5		
EC654153	3-C10	EM288448	4-53x	EW374894	4-19	ZS379350	12-32		
EC654153	7-C10	EM288448	12-60x	EW374894	12-14	ZS417150	4-71x		
EC654917	3-C19	EM655727	4-52	EW540123	12-15x	ZS417150	12-50x		
EC654917	7-C19	EM655727	12-59	EZ631945	4-21	ZS421740	4-12		
EC658001	6-C39	EO263068	2-L1	EZ631945	12-16	ZS421740	12-8x		
EC666494	2-C55	EO263068	4-5x	EZ655187	4-10	ZS421806	12-38x		
EC666494	6-C56	EO539820	6-L4	EZ655187	12-6	ZS422076	11-2		
EC675742	6-VC1,2	EO645838	6-T3	MI240388	12-46	ZS422076	12-57x		
ED224548	3-D2,3	EO650395	2-T3	MI698310	4-49	ZS447761	4-25		
ED224548	7-D2,3	EO650428	2-L3,4	MI698310	12-43	ZS447761	12-20		
ED305465	11-D1	EO650428	6-L2,3	MR530651	4-33	ZS447761	12-51		
ED539976	3-D1	EO650608	2-T1	MR530651	12-29	ZS447840	3-4		
ED539976	7-D1	EO650608	6-T1	MR530662	4-34	ZS447840	4-42		
ED556514	3-V1	EO650610	2-L2	MR530662	12-31	ZS447840	7-4		
ED556514	7-V1	EO650610	6-L1	MR699210	4-62	ZS447840	12-28		
ED624903	2-D1,2	ER305511	3-R27	SA645243	4-82	ZS462194	4-66		
ED624903	6-D1,2	ER305511	7-R27	SA645243	12-76	ZS462194	12-69		
ED624903	10-D1to5	ER552712	3-R24,25	SE613888	5-5	ZS463353	4-23x		
ED653624	9-D1to6	ER552712	7-R24,25	SE613888	13-5	ZS463353	12-18x		
ED694091	4-2	ER565828	3-FR1	SE631585	13-7	ZS510344	5-18		
ED694091	12-2	ER565828	7-FR1	SE675606	13-6	ZS510344	13-11		
EE240041	12-22	ER650430	2-FL1,2	SK281564	5-8x	ZS530673	4-35		
EE240298	12-37	ER650430	6-FL1,2	SK281564	13-13x	ZS530673	12-30		
EE301419	4-43	ES215111	4-55x	SK287662	5-10x	ZS552600	4-30		
EE699816	4-27	ES240096	11-SW1	SK287662	13-15x	ZS552600	12-25		
EF258344	4-78x	ES240096	12-82	SK287673	5-12x	ZS565942	4-83		
EF258344	12-65x	ES240276	6-SW1	SK287673	13-17x	ZS565942	12-77		
EF277413	4-77x	ES240276	12-78	SK288393	5-14x	ZS608275	4-15x		
EF424811	4-76x	ES240287	12-34x	SK288393	13-19x	ZW270191	4-36		
EF563681	4-74	ES240355	12-33	SK607127	4-73x	ZW270191	12-36		
EF563681	12-63	ES306313	4-54	SK607127	12-74x	ZW273756	4-17		

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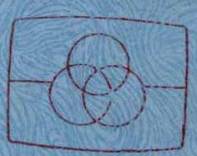
14. LIST OF INTERCHANGEABLE SEMICONDUCTORS

If, while servicing, the original parts cannot be obtained, the interchangeable parts litsed below can be substituted.

Original Parts			Interchangeable Parts	
Description	Parts No.	Utilizing P.C Board	Description	Parts No.
2SA733(P)(Q)(R)	ET539122	AA-5105 AA-5159A	2SA628(D)(E)(F) 2SA564(Q)(R)	ET515700 ET538154
2SA1017(E)(F)	ET305392	AA-5106A	2SA970(GR)(BL)	ET305463
2SB605(L)(M)	ET655345	AA-5106A	2SA720(Q)(R)	ET554736
2SC930(E)(F)	ET618873	AA-5105 AA-5159A	2SC454(B)(C)	ET519366
2SC945L(P)(Q)(R)	ET515733	AA-5105 AA-5159A	2SC536(E)(F)(G)(H)	ET246846
2SD234(R)(O)(Y)2-10-B	ET307261	Heat-sink		
2SC1222(E)(F)	ET459810	AA-5106A	2SC1313(F)(G)	ET602460
2SC1571NP(G)(H)	ET223446	AA-5159A	2SC1222(E)(F)	ET459810
2SC1815(O)(Y)(GR)	ET305221	AA-5171	2SC945L(P)(Q)(R)	ET515733
2SD313 (E)(F)	ET452531	AA-5106A		
2SD571(L)(M)	ET655356	AA-5106A AA-5155	2SD313(E)(F)	ET452531
2SK30A(GR)	ET491051	AA-5170	2SK30A(D)	ET645917
[illegible]K117(O)(Y)(GR)	ET305393	AA-5171		
WZ-130	ED539976	AA-5106A		
10D2	ED224548	AA-5106A	1N4003 GP15D	ED570295 ED219903
RD-33E(B)	ED305465	AA-5155		
1S2473	ED624903	AA-5105 AA-5159A AA-5170	1S1588 S2473VE	ED557447 ED560913
SEL-105RC	ED694091	AA-5159C AA-5106B		
STV-3H	ED556514	Heat-sink		



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Printed No. 1561222K1 1ED. Printed Date August 8, 1978
Printed in Japan