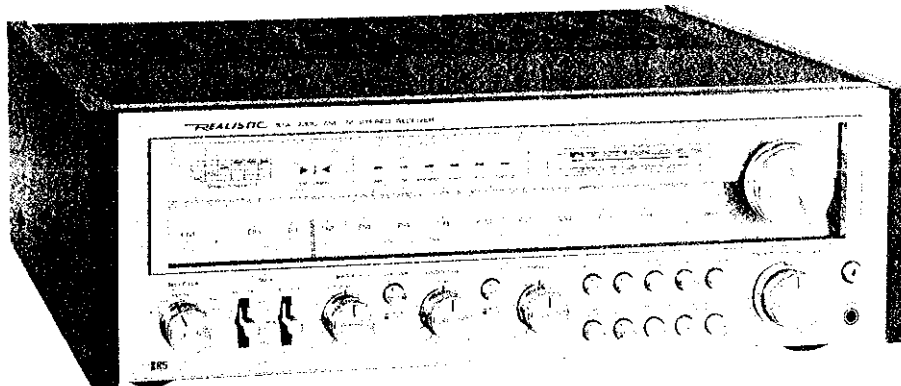


REALISTIC[®]

Service Manual

STA-2300
AM/FM STEREO RECEIVER
Catalog Number : 31-3010



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

CONTENTS

	Page
1) ELECTRICAL PERFORMANCE SPECIFICATIONS	3 - 7
2) DISASSEMBLY INSTRUCTIONS	8 - 9
3) BLOCK DIAGRAM	10
4) DIAL STRINGING DIAGRAM	11
5) LEVEL DIAGRAM	11
6) OPERATION CHECK FOR CIRCUITS	12 - 22
7) ALIGNMENT INSTRUCTIONS	22 - 28
8) CIRCUIT DESCRIPTION	28 - 34
9) TROUBLESHOOTING	34 - 39
10) IC & TRANSISTOR LEAD IDENTIFICATION	40
11) TUNER P.C.B. (TOP & BOTTOM VIEWS)	41
12) TONE AMP, MUTING, TAPE SWITCH P.C.B. (TOP & BOTTOM VIEWS) ..	42 - 43
13) PRE AMP with SELECTOR SWITCH P.C.B. (TOP & BOTTOM VIEWS)	44
14) MAIN AMP P.C.B. (LEFT) (TOP & BOTTOM VIEWS)	45
15) MAIN AMP P.C.B. (RIGHT) (TOP & BOTTOM VIEWS)	46
16) IF & MPX P.C.B. (TOP & BOTTOM VIEWS)	47
17) PROTECTOR P.C.B. (TOP & BOTTOM VIEWS)	48
18) MODE SWITCH P.C.B. (TOP & BOTTOM VIEWS)	48
19) POWER SUPPLY P.C.B. (TOP & BOTTOM VIEWS)	49
20) POWER METER P.C.B. (TOP & BOTTOM VIEWS)	50
21) SPEAKER SWITCH P.C.B. (TOP & BOTTOM VIEWS)	50
22) SIGNAL & TUNING METER P.C.B. (TOP & BOTTOM VIEWS)	51
23) VOLUME P.C.B. (TOP & BOTTOM VIEWS)	51
24) RELAY P.C.B. (UL, EUROPEAN, AUSTRALIAN models) (TOP & BOTTOM VIEWS)	52
25) MAIN SUB P.C.B. (LEFT & RIGHT) (TOP & BOTTOM VIEWS)	52
26) LED WITH POWER SWITCH P.C.B. (TOP & BOTTOM VIEWS)	52
27) ELECTRICAL PARTS LIST	53 - 62
28) EXPLODED VIEW PARTS LIST	62 - 65
29) MISCELLANEOUS PARTS LIST	66
30) IC INTERNAL DIAGRAM	67 - 71
31) EXPLODED VIEW	72 - 73
32) SCHEMATIC DIAGRAM (TUNER SECTION)	SEPARATE SHEET
33) SCHEMATIC DIAGRAM (AMP SECTION)	SEPARATE SHEET

1) ELECTRICAL PERFORMANCE SPECIFICATIONS

AM SECTION

- NOTES: 1. Output readings are taken across a non-reactive 47K load termination.
 2. Output is measured at TAPE OUT terminals.
 3. The Generator output shall terminate in an IRE loop antenna.
 4. Standard modulation : 400 Hz, 30% modulation.

ITEM	Measured at (kHz)	UNIT	NOMINAL	LIMIT
Frequency Coverage		kHz	515-1650	-----
Intermediate Frequency		kHz	455	-----
20 dB Quieting Sensitivity	600	$\mu\text{V}/\text{m}$	200	400
	1000	$\mu\text{V}/\text{m}$	200	400
	1400	$\mu\text{V}/\text{m}$	200	400
S/N Ratio at 5 mV/m input	1000	dB	45	40
Selectivity at S/N 20 dB input, ± 10 kHz	1000	dB	± 40	± 28
Bandwidth at 6 dB down	1000	kHz	6.0	4.5-8.0
AGC Figure of Merit	1000	dB	48	40
IF Rejection Ratio	600	dB	56	48
Image Rejection Ratio	1400	dB	60	52
T.H.D. at 5 mV/m input, 30 % mod.	1000	%	1.0	3.0
at 5 mV/m input, 80 % mod.	1000	%	-----	-----
Overload Distortion at 100 mV/m input, 80 % mod.	1000	%	1.5	4.0
Overload Capacity at 80 % mod.	1000	mV/m	200	100
at 30 % mod.	1000	mV/m	200	100
Electrical Audio Fidelity				
Ref. Frequency at 1 kHz, -6 dB down, 5 mV/m input	1000	Hz	40-3 k	60-2.5 k
Whistle Modulation (2nd)				
at 1 mV/m input	910	%	3	10
at 5 mV/m input	910	%	3	10
at 50 mV/m input	910	%	3	10
at 100 mV/m input	910	%	3	10
Whistle Modulation (3rd)				
at 1 mV/m input	1365	%	2	8
at 5 mV/m input	1365	%	2	8
at 50 mV/m input	1365	%	2	8
at 100 mV/m input	1365	%	2	8
Frequency Calibration	600	kHz	-----	± 25
	1000	kHz	-----	± 50
	1400	kHz	-----	± 50
Spurious Response from 1650 to 30000 kHz	1000	dB	60	50
Tape Out Level at 1 kHz				
at 5 mV/m input, RCA Jack	1000	mV	140	140 ± 2.5 dB
at 5 mV/m input, DIN Jack (3.3 K Ω terminated)	1000	mV	3.3	3.3 ± 2.5 dB

The Oscillator shall not drift more than 10 kHz starting at 25°C and through a temperature range up to 50°C at 1000 kHz.

FM SECTION

- NOTES:** 1. Output readings are taken across a non-reactive 47K load termination.
 2. Output is measured at TAPE OUT terminals.
 3. The signal voltage in this specification appearing across the tuner input terminals (IHF).
 4. Standard modulation : 1000 Hz, 75 kHz deviation.

ITEM	Measured at (MHz)	UNIT	NOMINAL	LIMIT
Frequency Coverage		MHz	*86.5-108.5	88-108
Intermediate Frequency		MHz	10.7	-----
IHF (Usable) Sensitivity	90	μ V	1.8	2.4
	90	dBf	10.33	13.19
	98	μ V	1.8	2.5
	98	dBf	10.33	13.19
	106	μ V	1.8	2.5
	106	dBf	10.33	13.19
50 dB Quieting Sensitivity	90	μ V	3.0	4.5
	90	dBf	14.77	18.29
	98	μ V	3.0	4.5
	98	dBf	14.77	18.29
	106	μ V	3.0	4.5
	106	dBf	14.77	18.29
Limiting Sensitivity (-3 dB)	98	μ V	1.5	2.5
S/N Ratio at 1 mV input	98	dB	73	68
Signal/Hum and Noise Ratio at 1 mV input	98	dB	70	65
Muting Threshold	98	μ V	3.0	2-6
Frequency Response \pm 1.5 dB range at 1 mV input	98	Hz	30-12 k	40-10 k
Distortion at Quieting Sens.				
at 100 Hz	98	%	0.4	-----
at 1000 Hz	98	%	0.4	-----
at 6000 Hz	98	%	0.8	-----
Distortion at 1 mV input				
at 100 Hz	98	%	0.25	0.5
at 1000 Hz	98	%	0.15	0.3
at 6000 Hz	98	%	0.3	0.6
Capture Ratio	98	dB	1.5	2.5
Alternate Channel Selectivity at 100 μ V input	98	dB	75	60
Spurious Response Ratio	98	dB	110	75
Image Response Ratio	106	dB	80	70
IF Response Ratio	90	dB	100	85
AM Suppression at 1 mV input	98	dB	60	48
AFC Holding Range at 100 μ V input	98	kHz	\pm 250	\pm 300
Calibration Accuracy	90	kHz	-----	\pm 300
	98	kHz	-----	\pm 300
	106	kHz	-----	\pm 300
Tape Out Level at 1 mV input				
at RCA Jack, 75 kHz dev.	98	mV	500	500 ± 2.5 dB
at DIN Jack, 22.5 kHz dev. (3.3K Ω terminated)	98	mV	3.3	3.3 ± 2.5 dB
Meter Sensitivity				
at 1st LED	98	μ V	3	-----
at 3rd LED	98	μ V	50	-----
at 5th, and 6th LED	98	mV	1	-----

ITEM	Measured at (MHz)	UNIT	NOMINAL	LIMIT
Max. Signal Handling Capacity	98	mV	200	-----
Temperature Range for Satisfactory Operation		$^{\circ}$ C	0-45	-----
Tape Out Level at 1 mV input at RCA Jack; 22.5 kHz dev.	98	mV	140	140 ± 2.5 dB

All sets must meet the requirements of FCC/FTZ.
 All measurements shall be taken under IHF Measurement unless otherwise specified.
 *European models must not be able to tune below 87.5 MHz.

FM STEREO SECTION

- NOTES:** 1. Output readings are taken across a non-reactive 47 K load termination.
 2. Output is measured at TAPE OUT terminals.
 3. Signal Voltage in this specification is the voltage appearing across the tuner input terminals (IHF).
 4. Standard modulation : Main carrier (L + R) - 33.75 kHz (45%) dev.
 Sub carrier (L - R) - 33.75 kHz (45%) dev.
 Pilot (19 kHz) - 6.75 kHz (9%) dev.
 Modulation Frequency - 1000 Hz

ITEM	Measured at (MHz)	UNIT	NOMINAL	LIMIT
Stereo Switch/Beacon (Muting) Threshold	98	μ V	3	2-6
	98	dBf	14.77	11.25-20.79
Stereo 50 dB Quieting Sensitivity	90	μ V	40	-----
	90	dBf	37.3	-----
	98	μ V	40	-----
	98	dBf	37.3	-----
	106	μ V	40	-----
	106	dBf	37.3	-----
S/N Ratio at 1 mV input	98	dB	65	58
Frequency Response at 1 mV input				
50 - 10000 Hz	98	dB	0	\pm 2
30 - 15000 Hz	98	dB	0	\pm 3
Stereo Distortion at 1 mV input				
at 100 Hz	98	%	0.4	-----
at 1 kHz	98	%	0.2	0.5
at 6 kHz	98	%	0.5	-----
Stereo Separation at 1 mV input				
at 100 Hz	98	dB	45	33
at 1 kHz	98	dB	50	35
at 10 kHz	98	dB	40	30
Sub Carrier Product Rejection	98	dB	60	54
SCA Rejection	98	dB	80	70
Tape Out Level at 1 mV, 1 kHz input				
RCA Jack	98	mV	440	440 ± 2.5 dB
DIN Jack (3.3 K Ω terminated)	98	mV	3.3	3.3 ± 2.5 dB
FM MPX Filter (Separation at 10 kHz)	98	dB	10	10 ± 2.5 dB

AUDIO SECTION

NOTE: All units are measured at SPEAKER Terminals with non-reactive rated load (8 ohms) unless otherwise indicated.

Rated Power : 120 W Rated THD : 0.05 %

ITEM	UNIT	NOMINAL	LIMIT
Power Output, from 20 Hz to 20 kHz under rated THD Both Channels Driven at 8 ohms load	W	135	120
Input Impedance at 1 kHz	KΩ	50	-----
PHONO 1	KΩ	50	-----
PHONO 2	KΩ	50	-----
AUX	KΩ	60	-----
TAPE IN 1	KΩ	60	-----
TAPE IN 2	KΩ	60	-----
Sensitivity for rated power	mV	2.2	2.2 ± 2 dB
PHONO 1	mV	2.2	2.2 ± 2 dB
PHONO 2	mV	2.2	2.2 ± 2 dB
AUX	mV	140	140 ± 2 dB
TAPE IN 1	mV	140	140 ± 2 dB
TAPE IN 2	mV	140	140 ± 2 dB
Total Harmonic Distortion at rated power	%	0.03	0.05
at 20 Hz	%	0.03	0.05
at 1 kHz	%	0.025	0.05
at 20 kHz	%	0.03	0.05
Max. Input Signal at rated THD (measured at Tape Out)	mV	230	200
PHONO 1, 2	mV	230	200
AUX	mV	Infinitive	-----
TAPE IN 1, 2	mV	Infinitive	-----
Frequency Response from 20 Hz to 20 kHz	dB	± 0.5	± 2.0
S/N Ratio			
"A" weighted at 1 W Reference (IHF)			
NOTE : Use IHF Dummy for PHONO 1 and PHONO 2.			
1 KΩ Termination for AUX and Tape In 1, 2.			
PHONO 1	dB	70	-----
PHONO 2	dB	70	-----
AUX	dB	75	-----
TAPE IN 1	dB	75	-----
TAPE IN 2	dB	75	-----
S/N Ratio			
"A" weighted at Rated Power Reference			
PHONO 1 (10 mV Input & shorted)	dB	85	78
PHONO 2 (10 mV Input & shorted)	dB	85	78
AUX (Input shorted)	dB	90	83
TAPE IN 1 (Input shorted)	dB	90	83
TAPE IN 2 (Input shorted)	dB	90	83
Dynamic Headroom	dB	3.0	-----
Clipping Headroom	dB	0.5	-----
Loudness Contour Ch.			
at 100 Hz	dB	6.0	6.0 ± 1.5 dB
at 10 kHz	dB	4.5	4.5 ± 1.5 dB
Tone Control Response			
Bass Control Action at 50 Hz	dB	± 10	± 10 ± 2
Bass Control Action at 100 Hz	dB	± 10	± 10 ± 2
Midrange Control Action at 1.5 kHz	dB	± 6	± 6 ± 2
Treble Control Action at 10 kHz	dB	± 10	± 10 ± 2
Treble Control Action at 20 kHz	dB	± 10	± 10 ± 2

ITEM	UNIT	NOMINAL	LIMIT
Filter Cut-off Frequency at -3 dB point			
Low Filter	Hz	50	50 ± 10
High Filter	Hz	5 k	5 k ± 1 k
Filter Slope			
Low Filter	dB/oct	12	-----
High Filter	dB/oct	6	-----
Crosstalk at AUX (Input shorted)			
at 100 Hz	dB	60	50
at 1 kHz	dB	60	50
at 10 kHz	dB	46	35
"A" weighted Crosstalk at AUX			
at 100 Hz	dB	70	-----
at 1 kHz	dB	60	-----
at 10 kHz	dB	46	-----
IM Distortion (SMPTE)			
at rated power	%	0.05	0.2
at ½ rated power	%	0.05	0.2
Transient Overload Recovery Time	m sec	1.5	-----
Slew Factor		2.5	-----
Channel Balance at Volume max.	dB	0	± 1 dB
DC Balance at No Signal and Output	mV	0	± 30 mV
Tape Out Level at RCA Jacks (47 KΩ terminated)			
PHONO 1, 2 (2.5 mV Input)	mV	140	140 ± 2 dB
AUX (160 mV Input)	mV	140	140 ± 2 dB
Tape Out Level at DIN Jacks (3.3 KΩ terminated)			
PHONO 1, 2 (3.6 mV Input)	mV	3.3	3.3 ± 2.5 dB
AUX (230 mV Input)	mV	3.3	3.3 ± 2.5 dB
Hum and Noise at VR min.	mV	0.8	1.5
PHONO Eq. (RIAA) ch. from 20 Hz to 20 kHz (measured at Tape Out)	dB	RIAA	RIAA ± 1.5 dB

- NOTES :
- The supply voltage is 120 volts (UL, C.S.A.), (220/240 volts AC, 50 Hz for European and 240 volts AC, 50 Hz for Australian models) from a regulated power supply.
 - All measurements shall be taken under IHF measurement method unless otherwise specified.
 - The power source must be insulated from other equipment, connected to antenna or output.
 - The room temperature is 25 degrees C.
 - Nominal Specs represent the design specs; all units should be able to approximate these — some will exceed and some may drop slightly below these specs. Limit Specs represent the absolute worst condition which still might be considered acceptable; in no case should a unit perform to less than within any Limit Spec.

2) DIASSEMBLY INSTRUCTIONS

1. Remove the Bottom Cover (Metal plate) as follows:

Turn the Receiver upside down and remove sixteen screws from the bottom as shown in Figure A. Lift the Bottom Cover off.

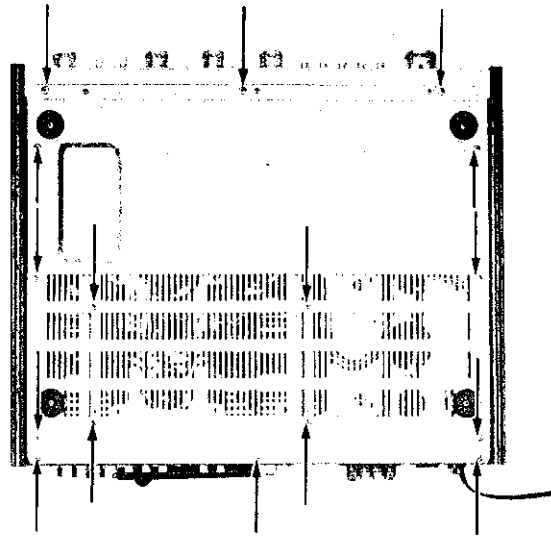


Figure A

2. To remove the Cabinet

- a) Remove two screws from the upper Back Panel as shown in Figure B1.
- b) Remove two screws from each side of the Cabinet (Figure B2) and pull off Cabinet toward rear of unit. Be careful not to lose the screw inserts when the screws are removed.

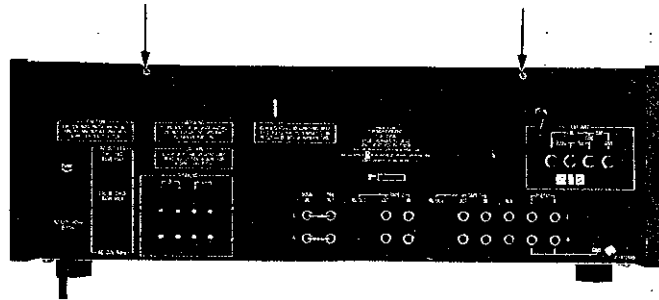


Figure B1

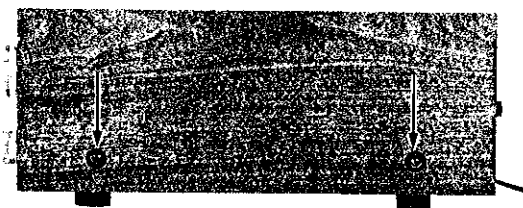


Figure B2

3. To remove the Front Panel (Aluminum Panel)

- a) Remove the Bottom Cover and Cabinet as described in 1. and 2.
- b) Remove four screws from the Front Panel — two screws from the left side and two screws from the right side. (Figure C1, C2)
- c) Remove three screws from bottom of Front Panel. (Figure C3)
- d) Loosen the Tuning Knob screw with an Allen wrench and remove Tuning Knob. All other knobs can simply be pulled off. (Figure C4)

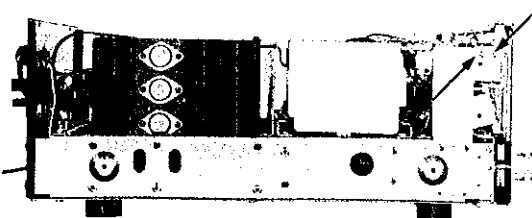


Figure C1

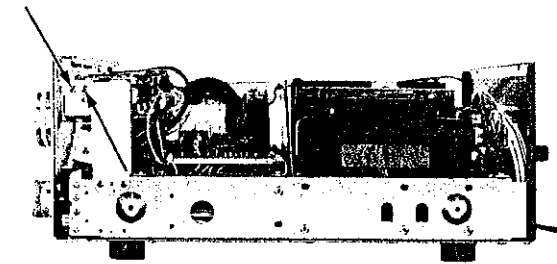


Figure C2

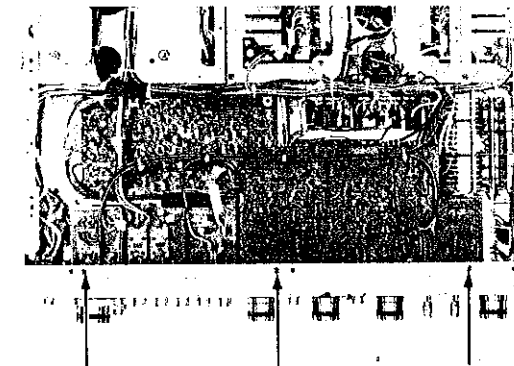


Figure C3

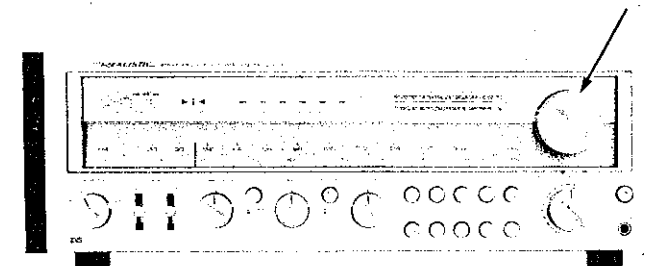


Figure C4

4. To remove Rear Panel from Chassis.

Remove five screws from Rear Panel. (Figure D)

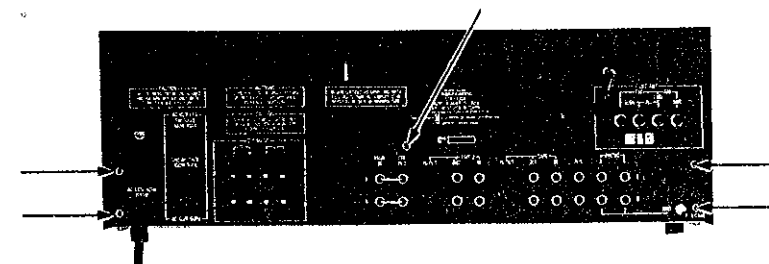
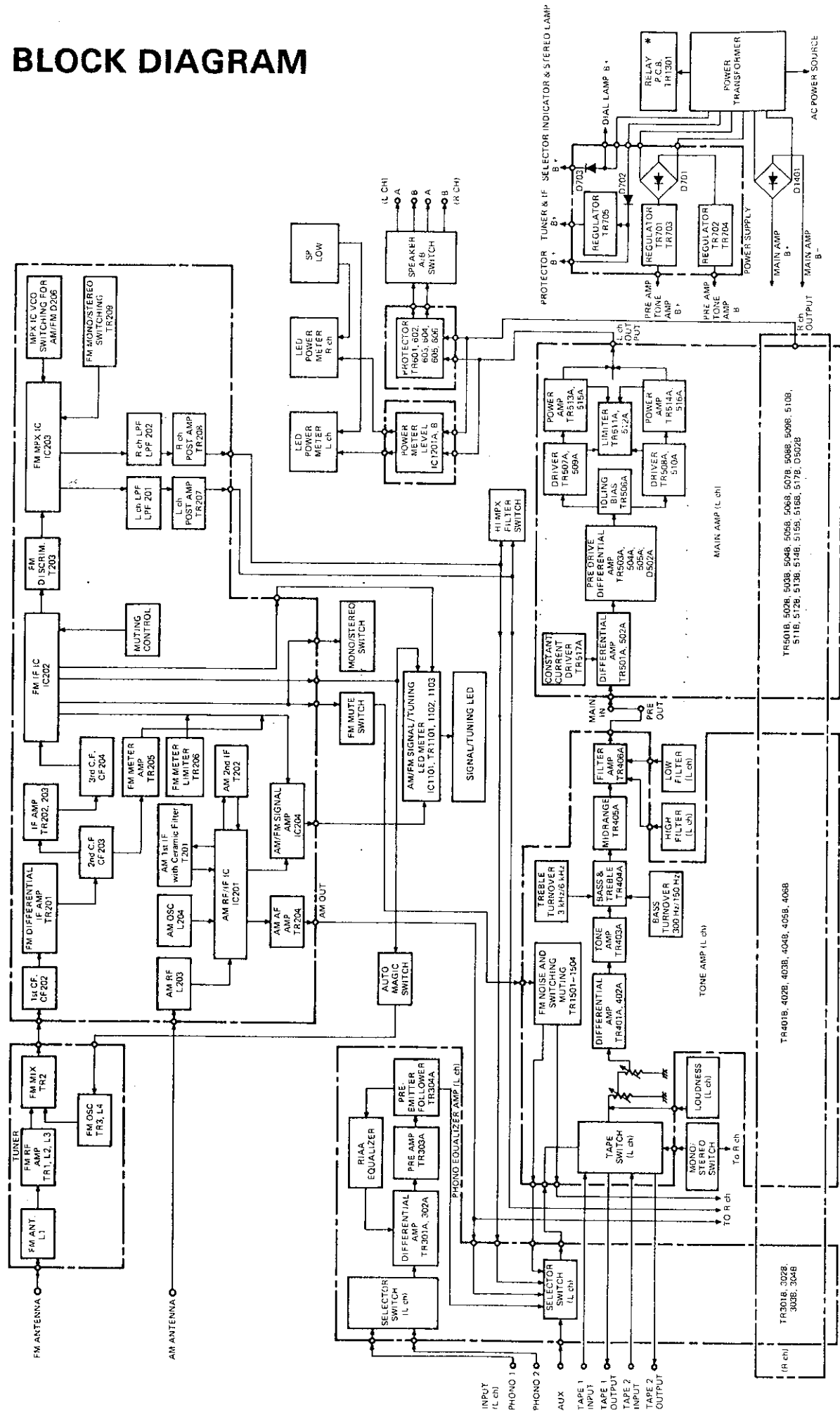
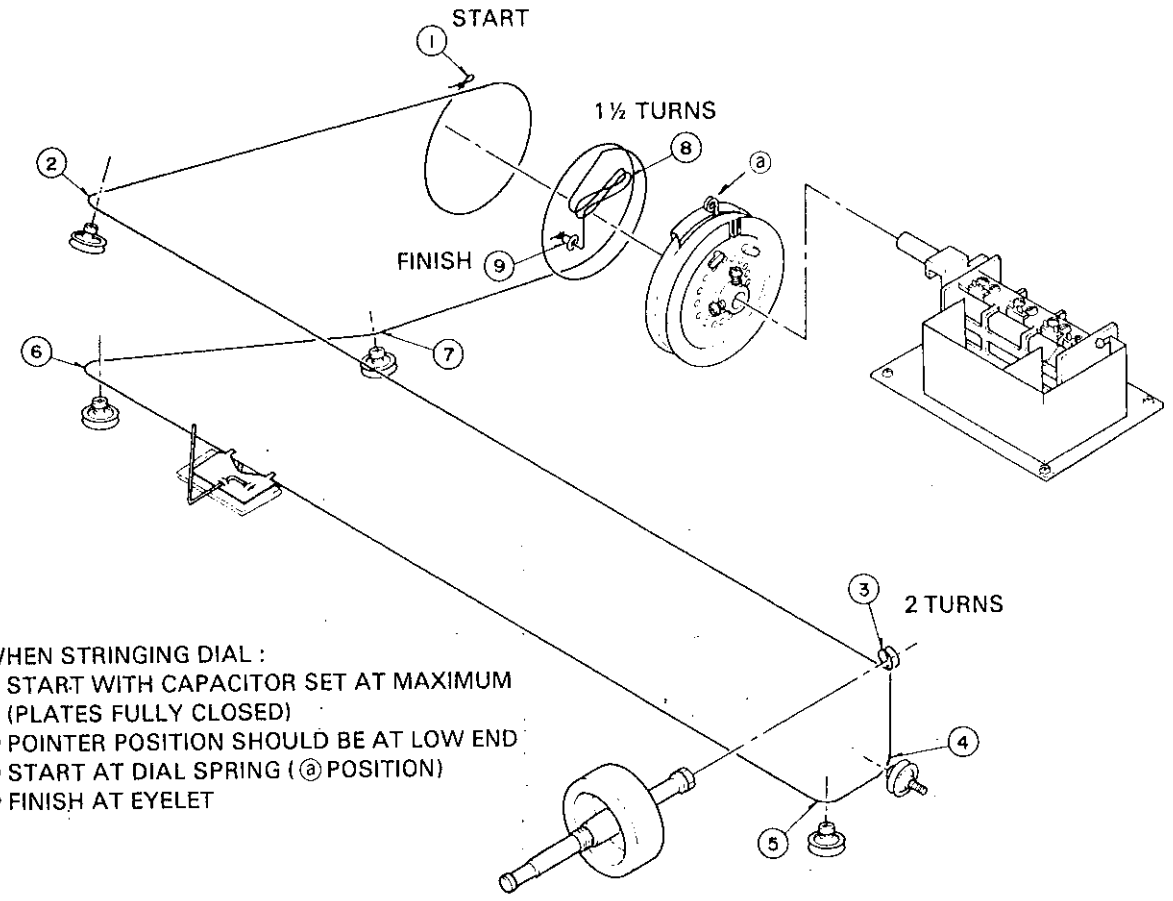


Figure D

3) BLOCK DIAGRAM



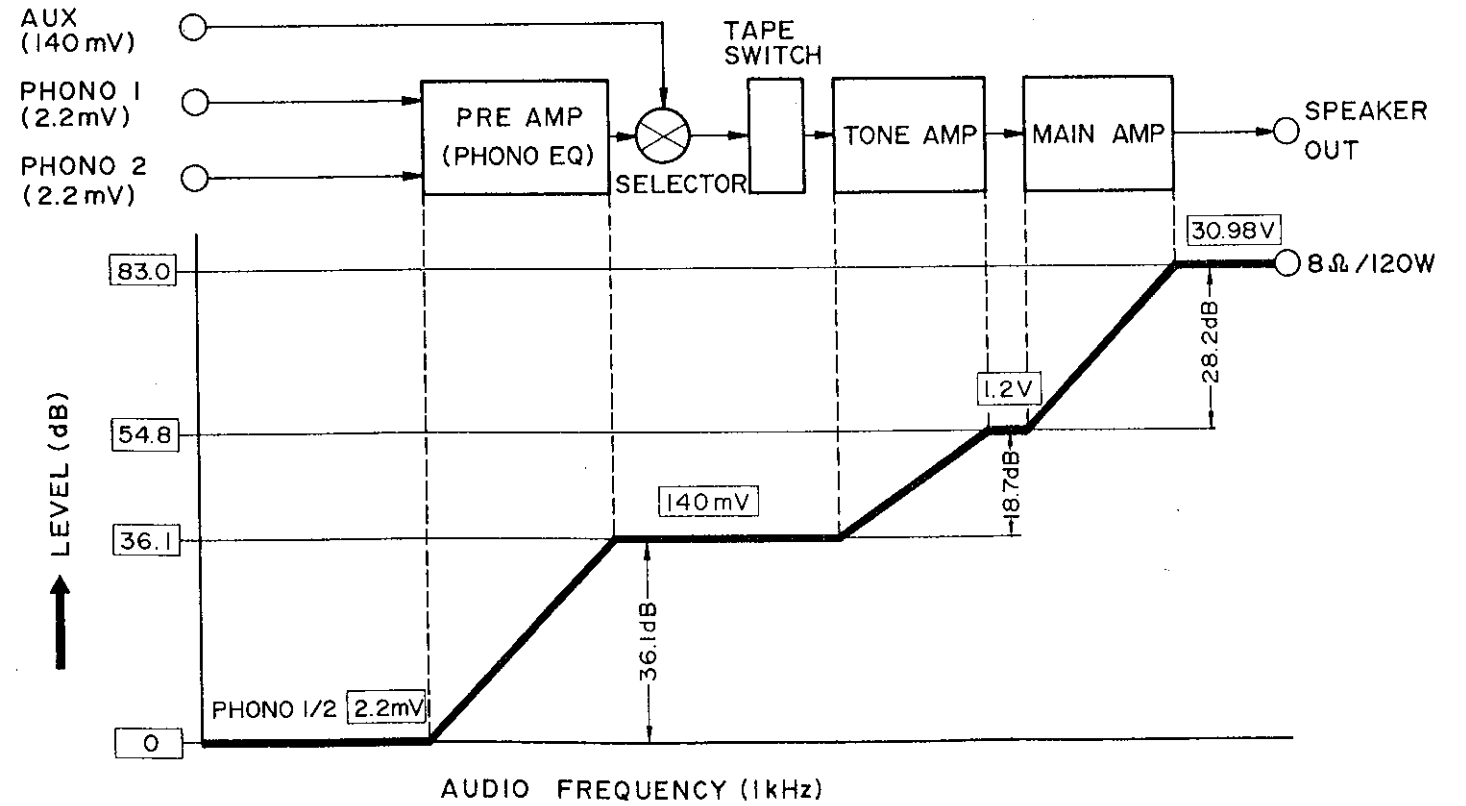
4) DIAL STRINGING DIAGRAM



- WHEN STRINGING DIAL :
- START WITH CAPACITOR SET AT MAXIMUM (PLATES FULLY CLOSED)
 - POINTER POSITION SHOULD BE AT LOW END
 - START AT DIAL SPRING (ⓐ POSITION)
 - FINISH AT EYELET

*C.S.A. models have no Relay P.C.B.

5) LEVEL DIAGRAM



6) OPERATION CHECK FOR CIRCUITS

1 POWER SUPPLY OPERATION CHECK

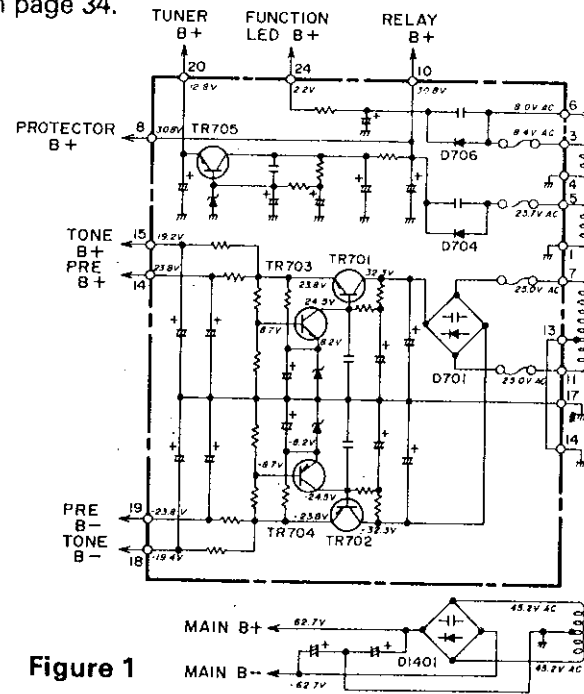
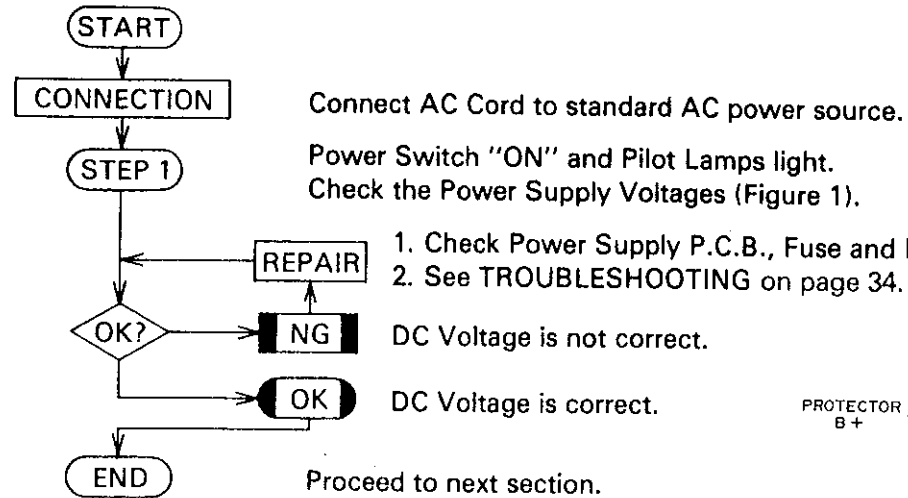


Figure 1

2 AUDIO SECTION OPERATION CHECK

(1) MAIN AMP. OPERATION CHECK

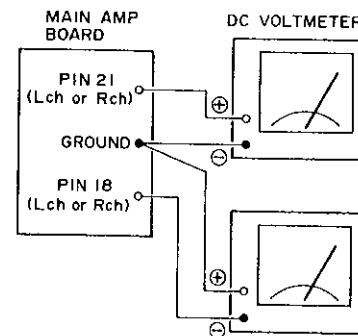
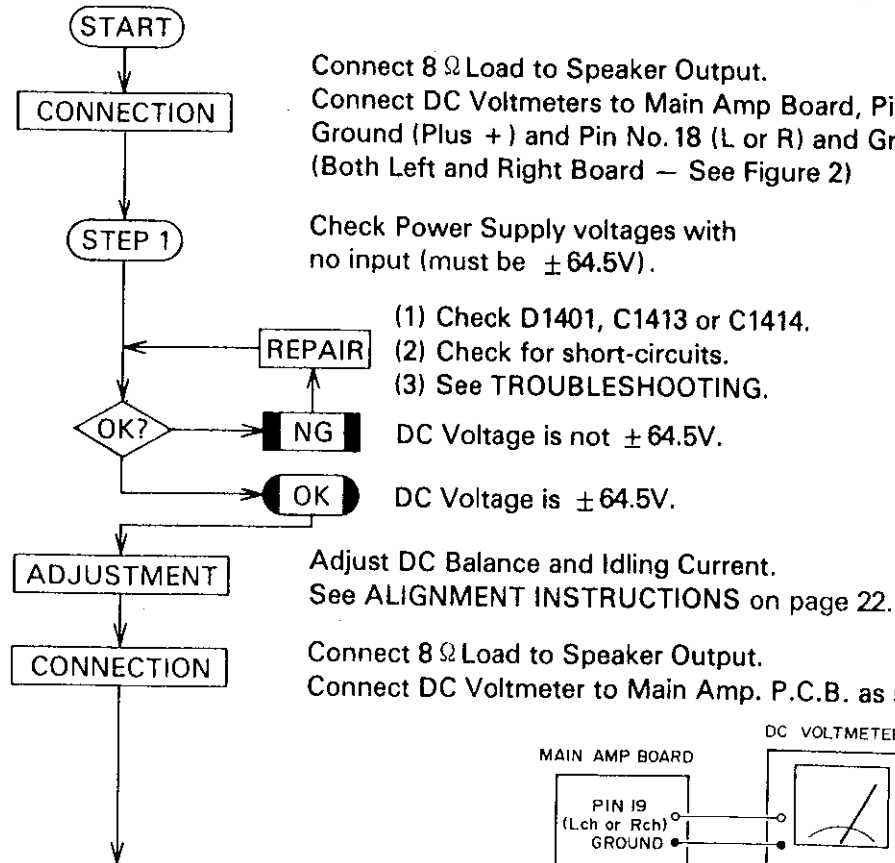


Figure 2

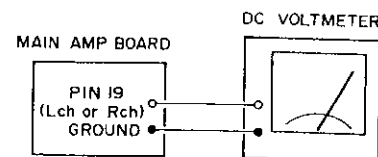
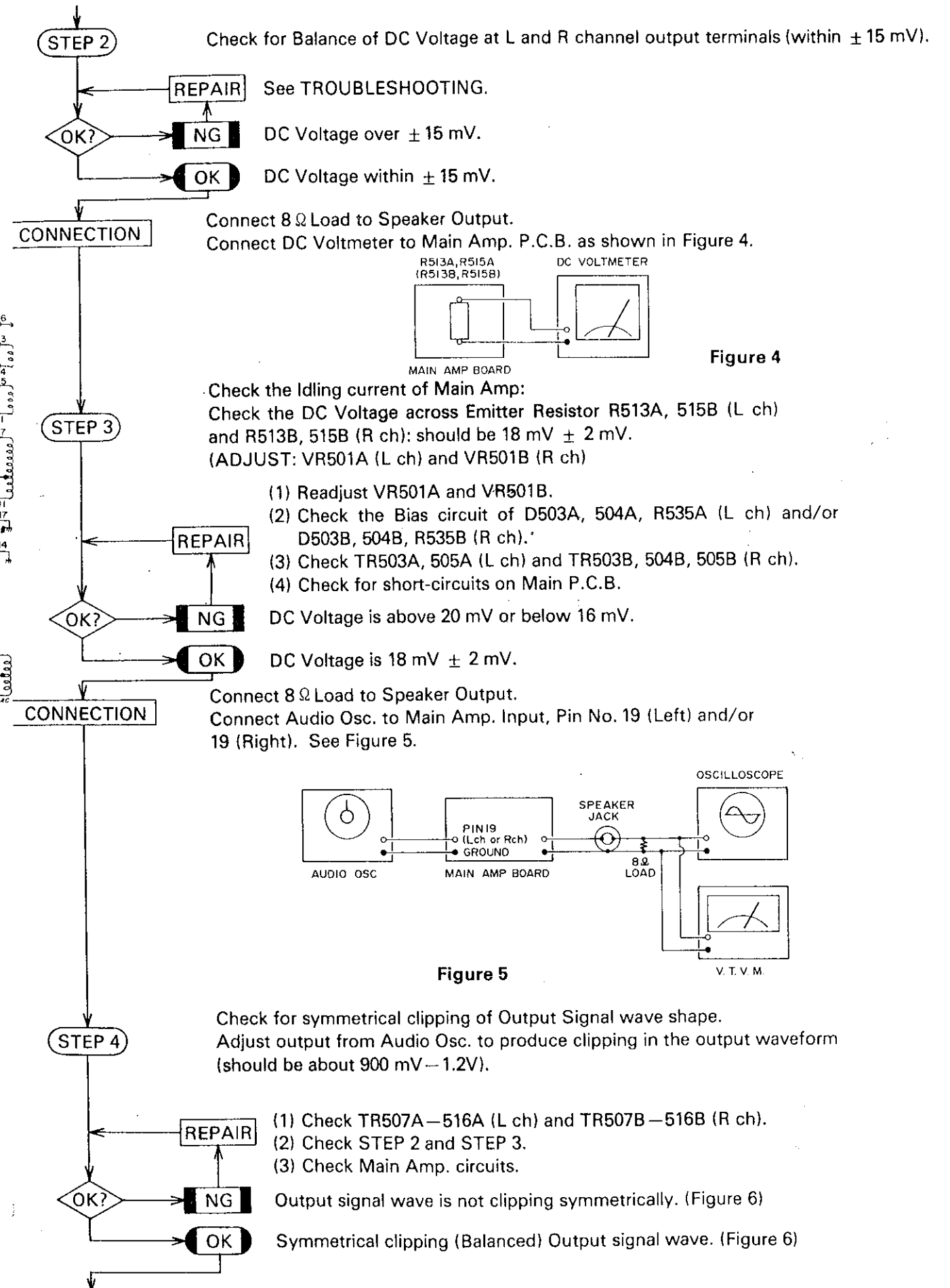


Figure 3



STEP 5 Check the Main Amp. Gain (designed level for Main Amp. is about 28 dB). Adjust output from Audio Osc. to produce 120 watts rated output power. (Both channel driven — Figure 5)

REPAIR (1) Check Main Amp. circuits.
(2) Check STEPS 1, 2, 3 and 4.

NG Input level is not $1.2V \pm 2$ dB.

OK Input level is at least $1.2V \pm 2$ dB for rated output power

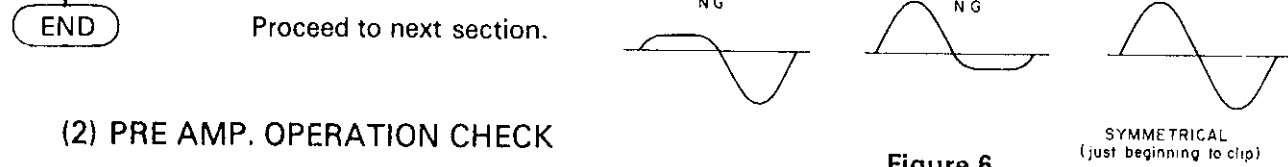


Figure 6

(2) PRE AMP. OPERATION CHECK

START
CONNECTION

Set SELECTOR Switch to PHONO 1 or 2.
Connect Audio Osc. to PHONO 1 or 2 Input.
Connect Oscilloscope and V.T.V.M. to TAPE OUT 1 Jack. (See Figure 7)

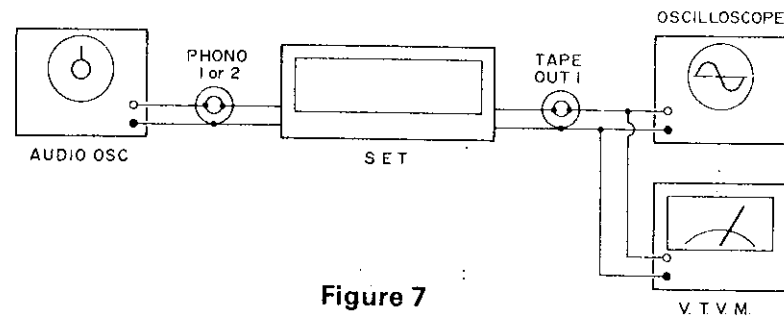


Figure 7

STEP 1 Check the PHONO Equalization Response. (See Figure 8, RIAA Curve.)

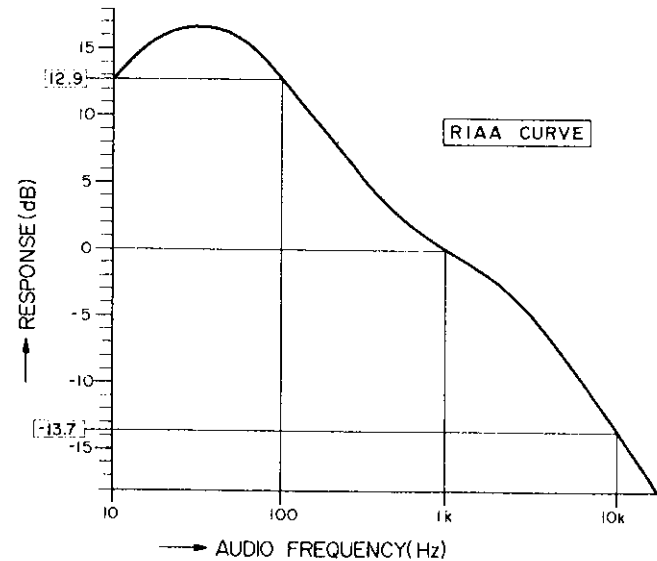


Figure 8

(1) Check TR301A, 302A, 303A, 304A (L ch) and TR301B, 302B, 303B, 304B (R ch).
(2) Check C306A, 307A, R308A, 309A (L ch) and C306B, 307B, R308B, 309B (R ch).
(3) Check Preamp circuits.

REPAIR

NG Equalization Response at 100 Hz does not fall within $+12.9$ (RIAA) ± 1.5 dB and 10 kHz does not fall within -13.75 (RIAA) ± 1.5 dB.

OK Equalization Response falls within $+12.9$ (RIAA) ± 1.5 dB at 100 Hz and -13.75 (RIAA) ± 1.5 dB at 10 kHz.

END Proceed to next section.

(3) TONE CONTROL OPERATION CHECK

START
CONNECTION

Set SELECTOR Switch to AUX position.
Connect Audio Osc. to AUX input jack.
Connect Oscilloscope and V.T.V.M. to Speaker Jack on Set.
Speaker impedance = 8 ohms (OUTPUT: about 5 watts)
TAPE DUBBING: SOURCE, TAPE MONITOR: SOURCE, MODE Switch: STEREO, LOUDNESS: OFF. (See Figure 9)

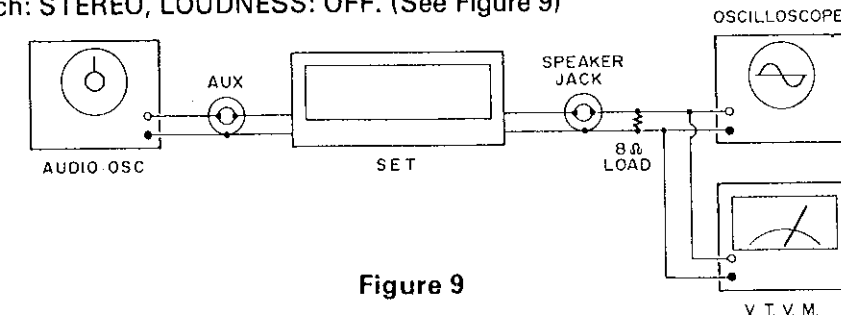


Figure 9

STEP 1 Check BASS Action at 100 Hz and 50 Hz. (Figure 10) (Turnover switch: 100 Hz — 300 Hz, 50 Hz — 150 Hz)

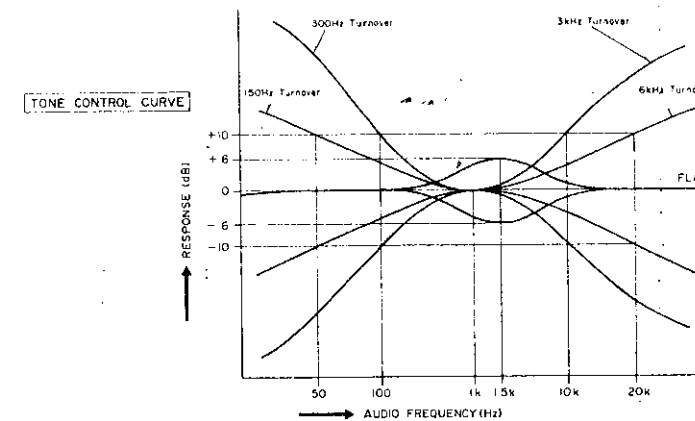


Figure 10

REPAIR Check BASS Control circuit on TONE CONTROL P.C.B. and see TROUBLESHOOTING.

NG Frequency Response does not fall within $\pm 10 \pm 2$ dB.

OK Frequency Response falls within $\pm 10 \pm 2$ dB.

STEP 2 Check TREBLE Action at 10 kHz. (Figure 10) (Turnover switch: 10 kHz — 3 kHz, 20 kHz — 6 kHz)

REPAIR Check TREBLE Control circuits on TONE CONTROL P.C.B. and see TROUBLESHOOTING.

NG Frequency Response does not fall within $\pm 10 \pm 2$ dB.

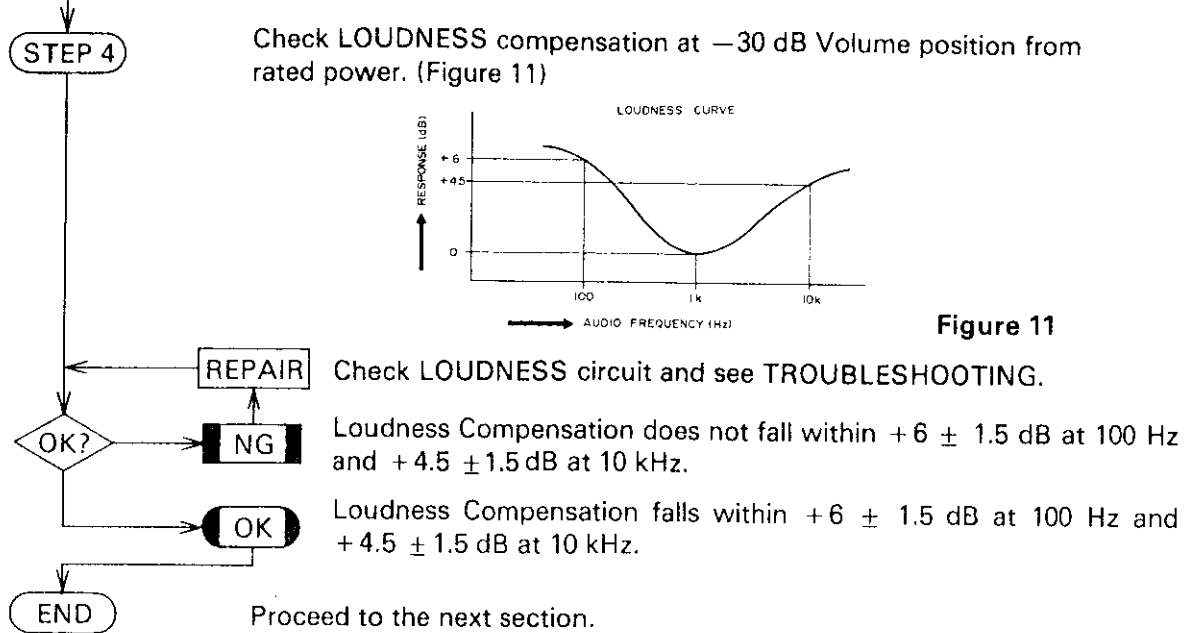
OK Frequency Response falls within $\pm 10 \pm 2$ dB.

STEP 3 Check MIDRANGE Action at 1.5 kHz. (Figure 10)

REPAIR Check MIDRANGE control circuit on TONE CONTROL P.C.B.

NG Frequency Response does not fall within $\pm 6 \pm 2$ dB.

OK Frequency Response falls within $\pm 6 \pm 2$ dB.



(4) PROTECTOR CIRCUITS OPERATION CHECK

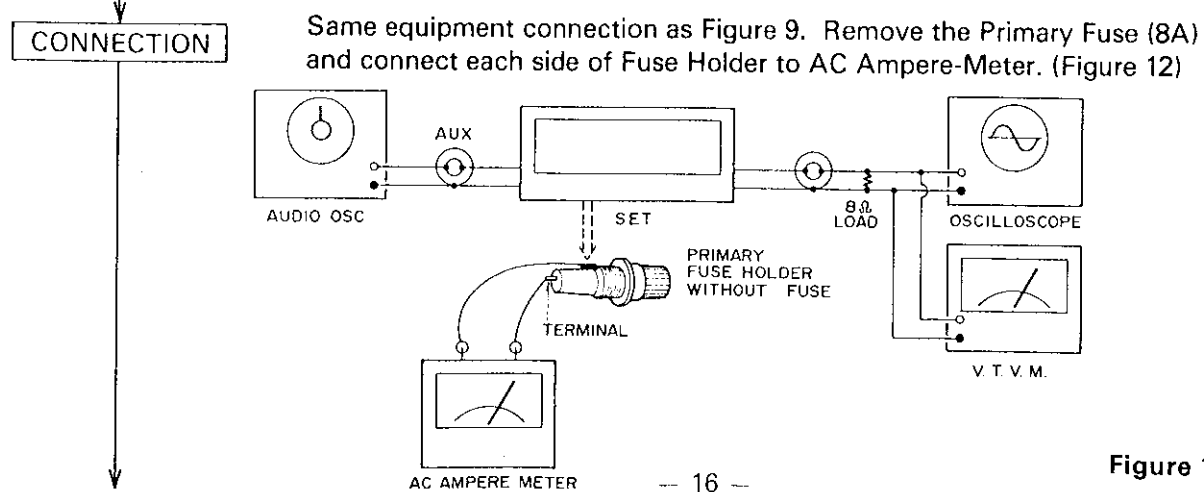
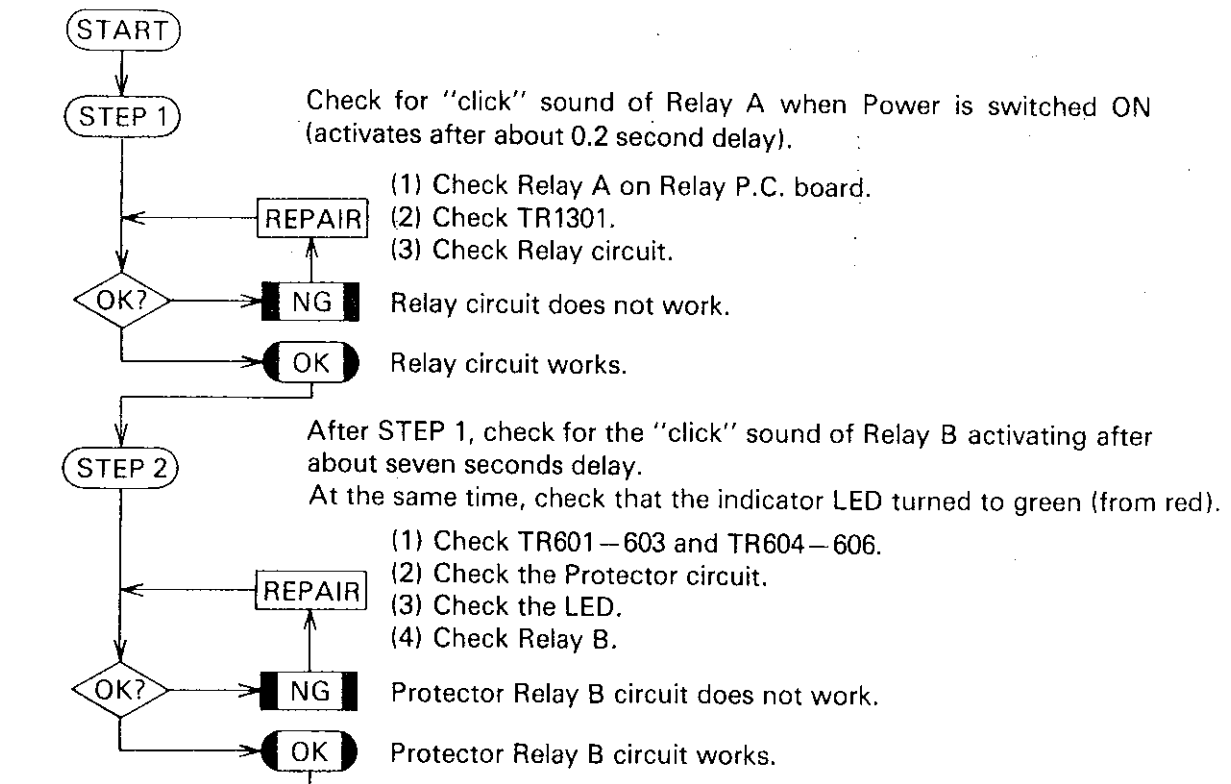
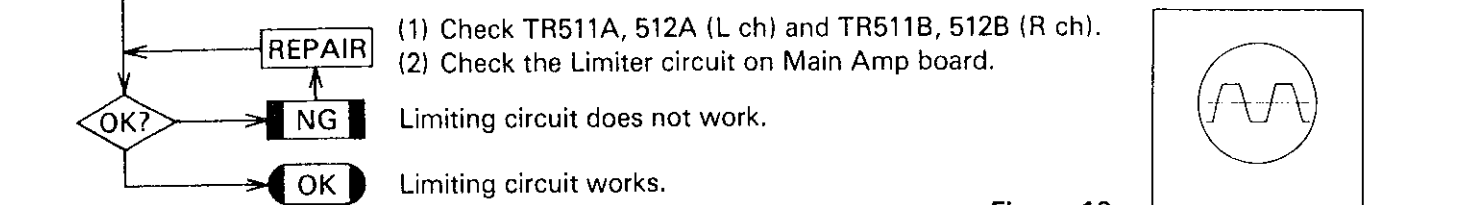


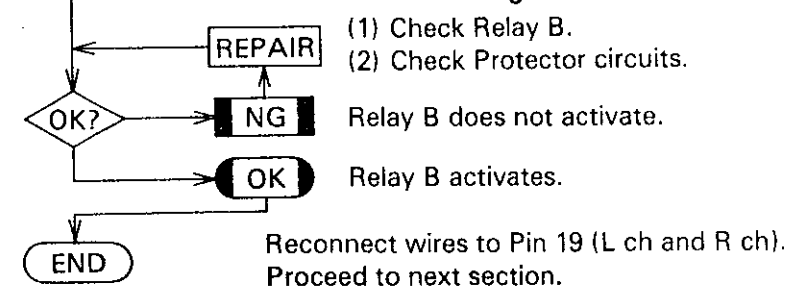
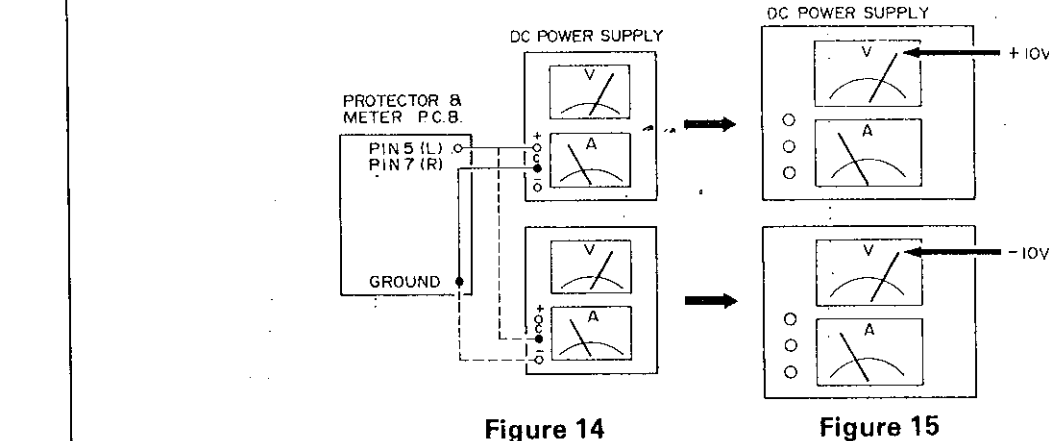
Figure 12

Check the Limiting circuit of Main Amp board per following procedure:
 (1) Set the input level for clipping output (square wave - Figure 13) and note the current reading (about 5A).
 (2) Short Output terminal of Left or Right channel, and note the current reading.
 (3) Check for decrease of current when output terminals are shorted (about 2A decrease).

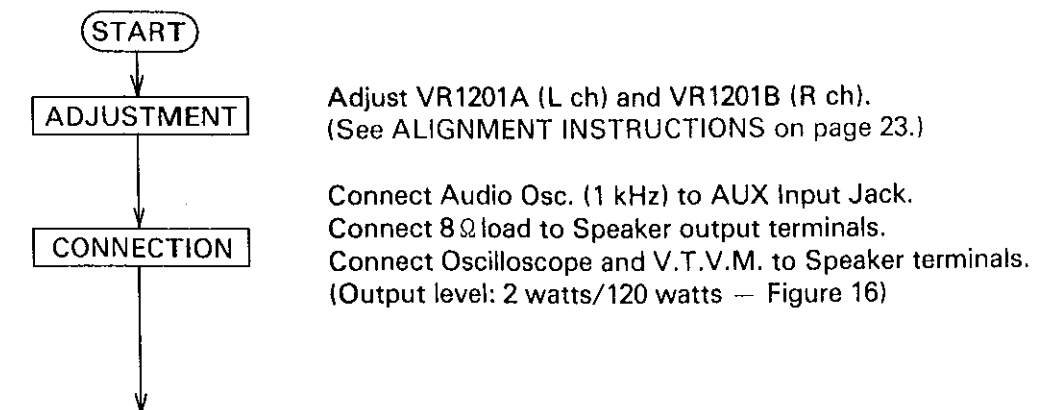


Replace fuse and disconnect AC Ammeter. Same equipment connection as Figure 9. Disconnect wires from Pin No. 19 (L ch and R ch) on Main Amp board. Connect regulated DC power supply to Pins No. 5 and 7 on Protector & Meter board as shown in Figure 14.

Check Relay B action when DC voltage is applied to either Pin No. 5 or 7 on Protector board (+10V and -10V as shown in Figure 15).



(5) OUTPUT POWER LED METER OPERATION CHECK



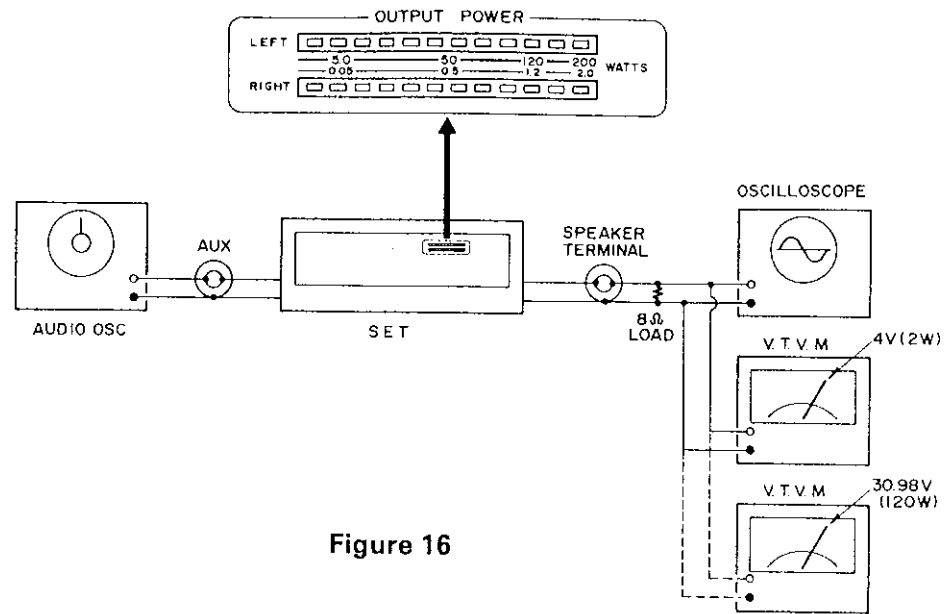
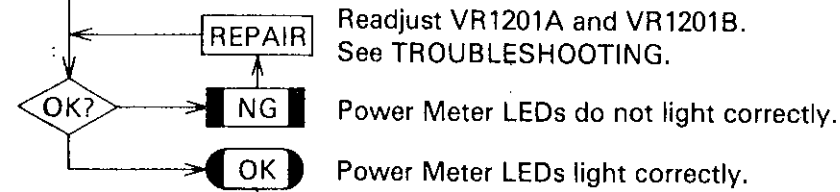


Figure 16

Check LED Power Meters (L ch and R ch) per following procedure:

- (1) Check that all LEDs glow green when POWER METER LOW Switch is pressed in and output level is set to 4 V (2 W) on V.T.V.M. (8Ω load).
- (2) Check that ten LEDs (from left) glow green when POWER METER LOW Switch is pressed out and output level is set to 30.98 V (120 W) on V.T.V.M. (8Ω load).
- (3) Check that all LEDs light up — 1st-10th: green, 11th & 12th: red—when POWER METER LOW Switch is out and output level is set to more than 33.47 V (140 W) on V.T.V.M. (8Ω load).

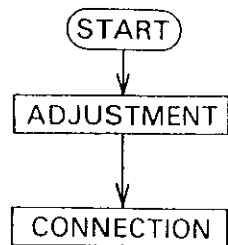
STEP 1



Proceed to next section.

3 RF AND IF OPERATION CHECK

(1) AM OPERATION CHECK



Adjust for AM IF/RF Alignment (See AM ALIGNMENT Section on page 24).

Set SELECTOR Switch to AM position. Connect standard loop antenna to AM Standard signal generator and radiate signal into AM Ferrite Antenna L1401. Connect Oscilloscope, Distortion Meter and V.T.V.M. to TAPE OUT 1 jack on Set. AM Standard SG : 400 Hz, 30 % modulation.

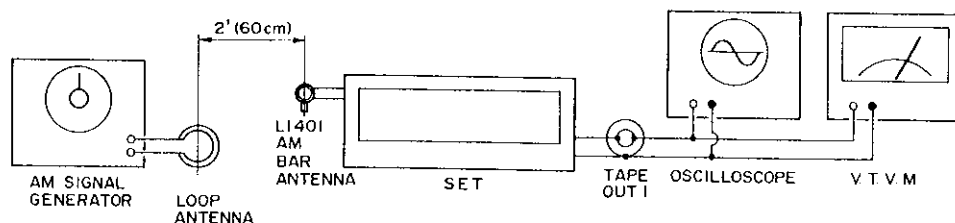
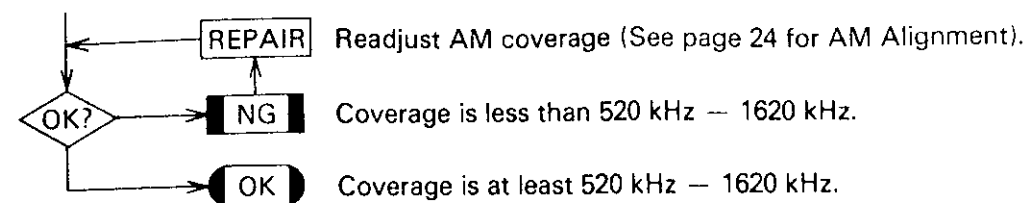


Figure 17

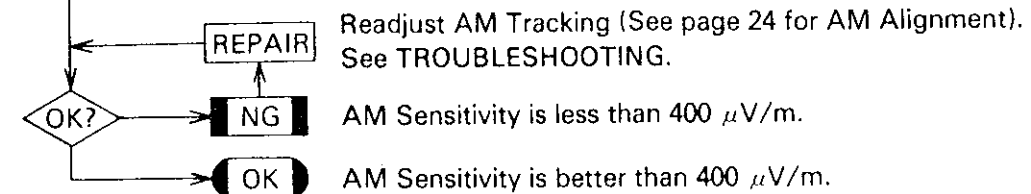
Check AM coverage : that the lowest dial pointer setting is under 520 kHz and the highest position is over 1620 kHz.

STEP 1



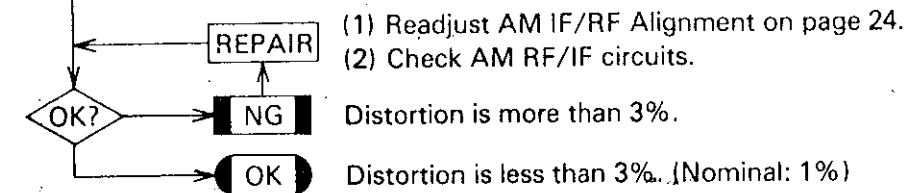
STEP 2

Check the Antenna Sensitivity for S + N/N 20 dB point at 600, 1000 and 1400 kHz.



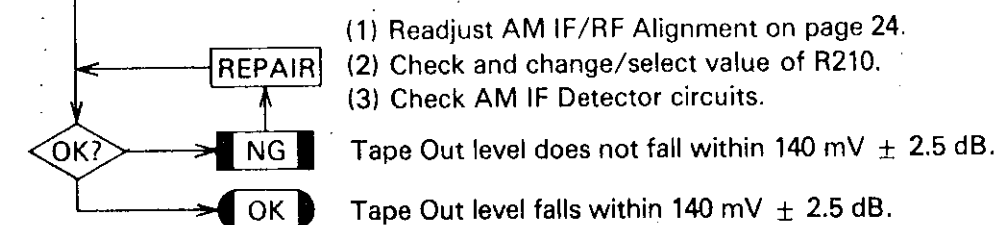
STEP 3

Check AM Distortion (Input level set to 5 mV/m).



STEP 4

Check AM Tape Out level (Input level set to 5 mV/m).



STEP 5

Check the AM Signal LED Meter. (Input level for check points : (1) no signal : no LED lights (2) 100 mV/m : all LEDs light)

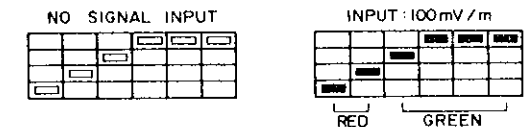
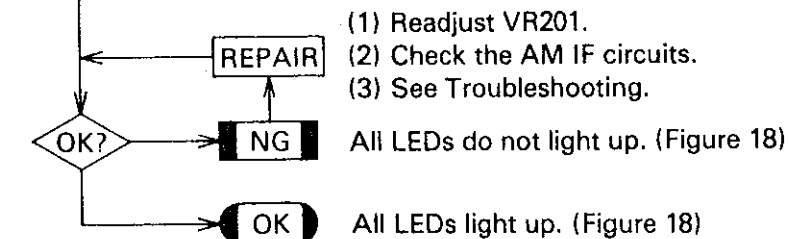
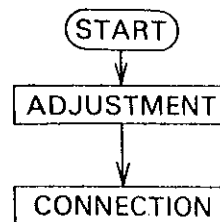


Figure 18

Proceed to next section.

END

(2) FM RF/IF OPERATION CHECK



Adjust for FM Alignment (See FM Alignment Section on page 25). (FM RF/IF and FM MPX sections)

Set SELECTOR Switch to FM position. Connect FM Standard SG (1000 Hz, 75 kHz dev.) to FM 300Ω Antenna Terminal. Connect Oscilloscope, Distortion Meter and V.T.V.M. to TAPE OUT 1 Jack. (Figure 19)

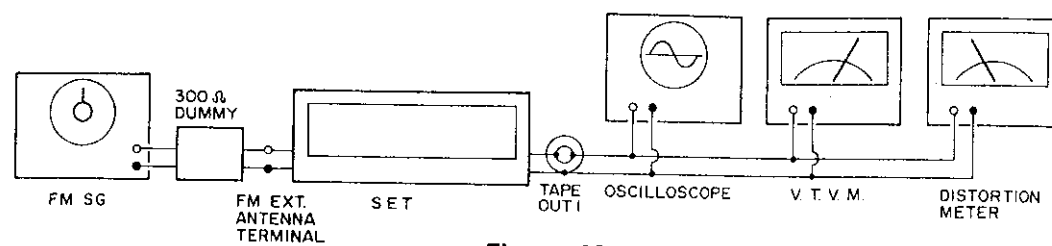


Figure 19

Check FM coverage: the lowest dial pointer setting on unit is 87.4 ± 0.25 MHz and the highest pointer setting is 109 ± 0.3 MHz. (*European models must not be able to tune below 87.5 MHz).

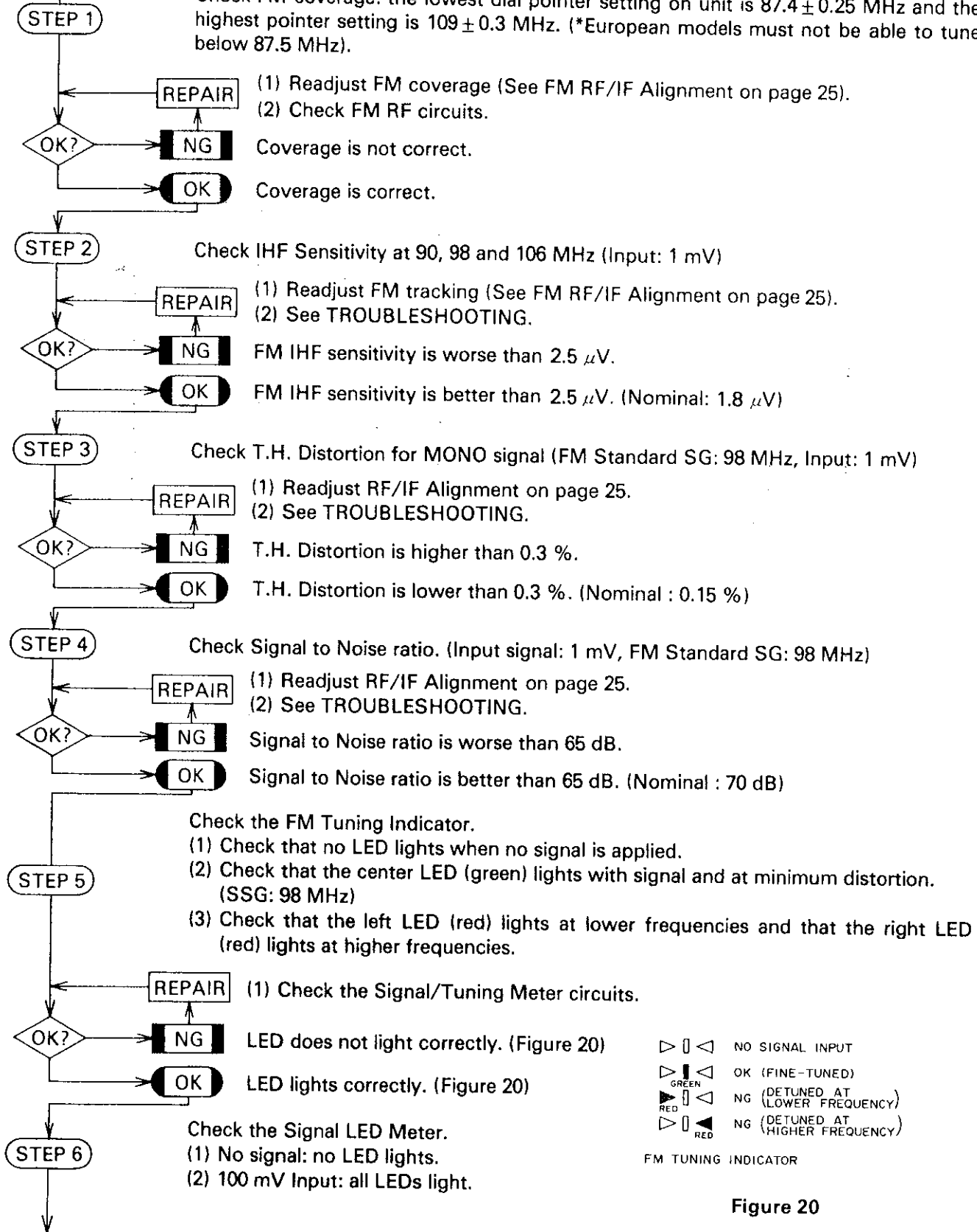


Figure 20

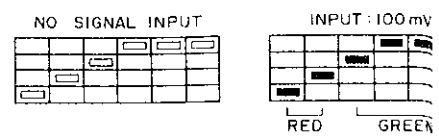
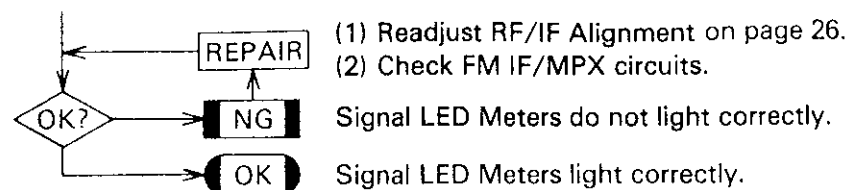
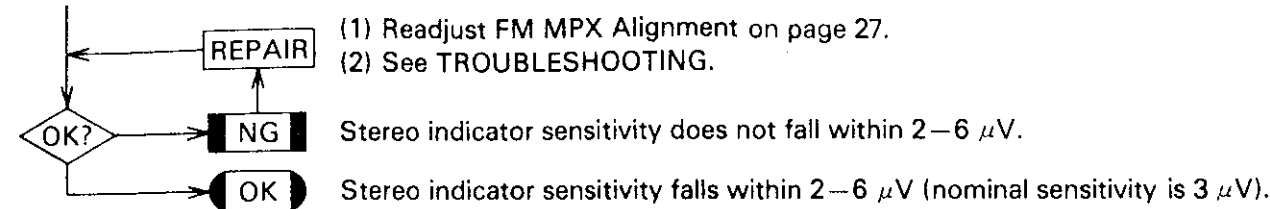


Figure 21



STEP 7 Check Auto-Magic Tuning with Auto-M switched ON. (FM SSG: 98 MHz Input: 1 mV)

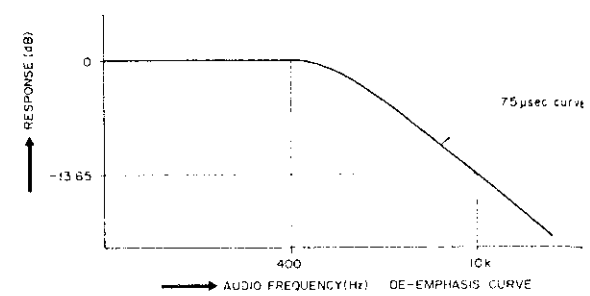
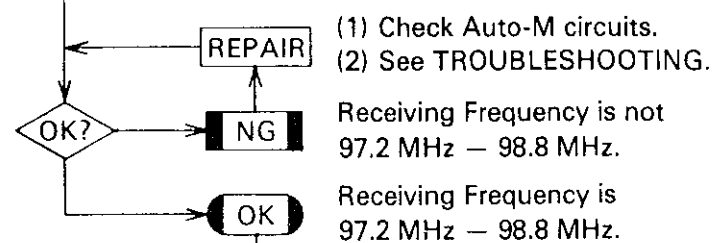
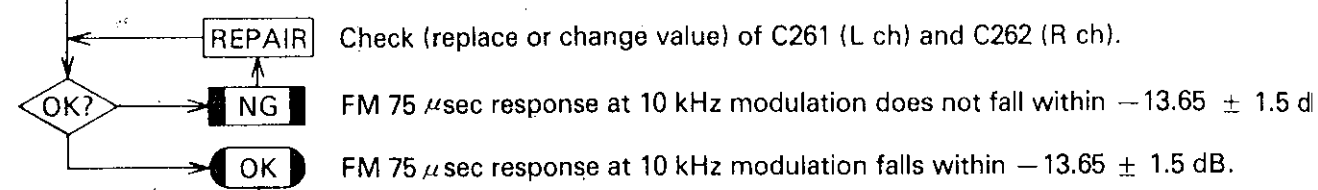
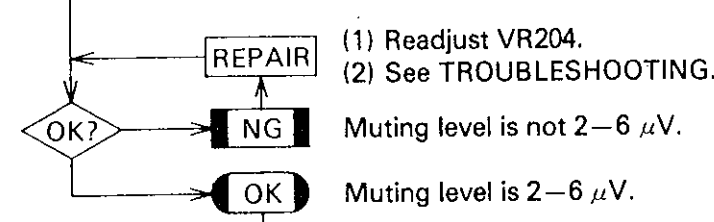


Figure 22

STEP 8 Check FM 75 μsec de-emphasis response curve.

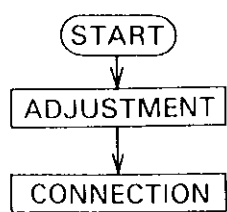


STEP 9 Check the Muting by applying an input of 3 μV at 98 MHz, with MUTE switched ON.



END Proceed to next section.

(3) FM MPX OPERATION CHECK



Adjust for FM MPX Alignment on page 27.
Same equipment connection as Figure 19. Connect FM Stereo SG to FM standard SG.
Stereo Modulation - 67.5 kHz dev. 8% Pilot.
Frequency - 98 MHz, 1 kHz modulation (Figure 23)

Check Stereo indicator sensitivity (Figure 23) (Input: near 2.5 μV).

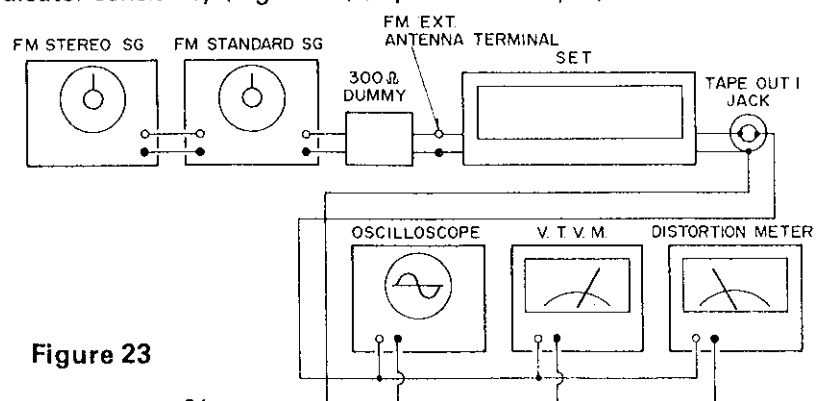
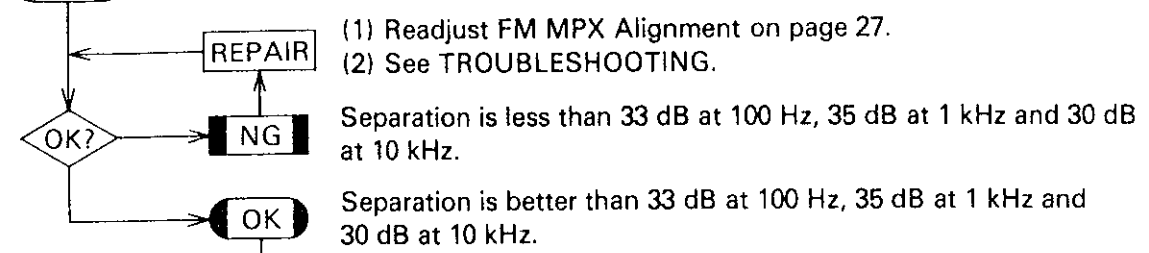
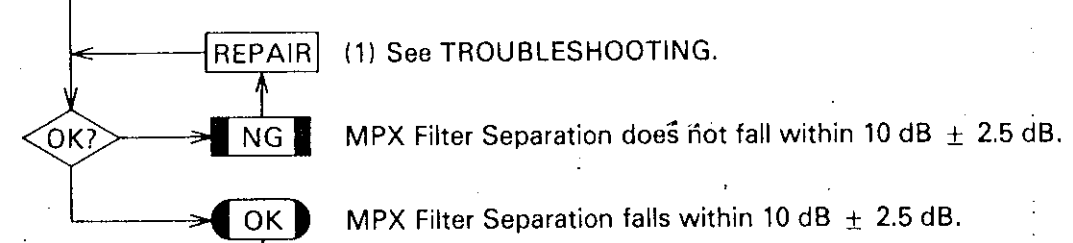


Figure 23

STEP 2 Check Stereo Separation at 100 Hz, 1 kHz and 10 kHz (input: 1 mV)



STEP 3 Check FM MPX Filter (with HI MPX FILTER Switched ON, check the Separation at 10 kHz modulation).



END Proceed to Alignment section.

7) ALIGNMENT INSTRUCTIONS

AUDIO CIRCUIT ADJUSTMENT/CHECK

EQUIPMENT REQUIRED

1. DC Voltmeter
2. Audio Oscillator
3. Oscilloscope
4. AC Voltmeter

Notes:

- Maintain voltage at 120 volts AC, 60 Hz (UL, C.S.A.) (Use 220/240 volts AC, 50 Hz for European & 240 volts AC, 50 Hz for Australian models).
- Set SELECTOR Switch to AUX.
- Set MODE Switch to STEREO.
- See P.C.B. illustration for alignment points/adjustments.

For location of connection points and trimmer resistors, see P.C.B. view.

MAIN AMP ADJUSTMENT

STEP	ADJUSTMENT	EQUIPMENT	CONNECTION	AUDIO FREQ.	LEVEL	ADJUSTMENT
1	Check Balance by measuring DC voltage across OUTPUT TERMINAL of L and R channel.	DC Volt Meter	See Fig. 24.	No signal	DC voltage should be less than 15 mV.	-
2	Idling current adjustment	DC Volt Meter	See Fig. 25.	No signal	Adjust voltage across Emitter resistors R513A, 515A (L ch) and R513B, 515B (R ch) to 18 mV (8 ohm load).	VR501A (L ch) VR501B (R ch) See Fig. 26.

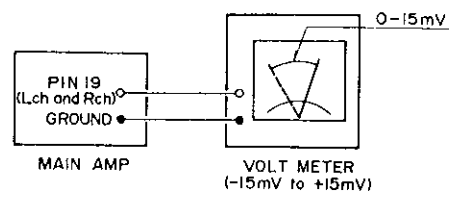


Figure 24

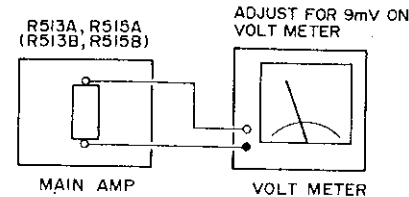


Figure 25

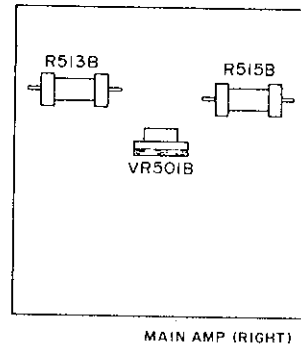
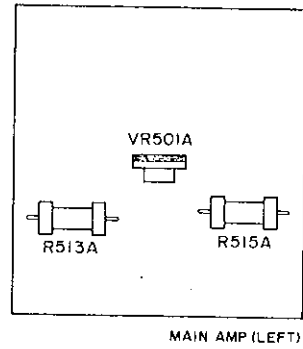


Figure 26

For location of connection points and trimmer resistors, see P.C.B. view.

POWER LED METER ADJUSTMENT

STEP	ADJUSTMENT	EQUIPMENT	CONNECTION	AUDIO FREQ.	SETTING	LEVEL	ADJUSTMENT
1	Power Meter level adjustment Power Meter SW: LOW position	Audio Osc. VTVM Oscilloscope	See Fig. 27.	1000 Hz	VOLUME: max. BASS, MID, TREBLE & BALANCE: center	Adjust input to AUX to get output level of 4 V (2 W) (8 Ω load).	VR1201A, VR1201B so the power Meters indicate 2 W and all LEDs glow green.
2	Check the Power Meter level Power Meter SW: High position	Same as above	See Fig. 27.	1000 Hz	Same as above	Adjust input to AUX to get output level of 30.98 V (120 W) (8 Ω load)	Check to see if Power Meters indicate 120 W and if 10 LEDs (from left) glow green.
3	Same as Step 2	Same as above	See Fig. 27.	1000 Hz	Same as above	Adjust input to AUX to get output level of 33.47 V (140 W) (8 Ω load)	Check to see if Power Meters indicate 140 W and if all LEDs light up (1st-10th: green, 11th & 12th: red).

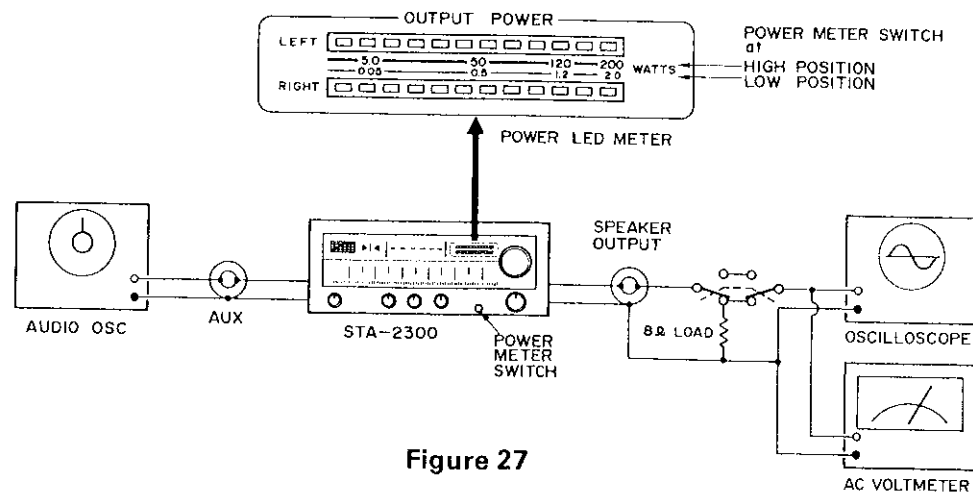


Figure 27

AM IF & RF ALIGNMENT

EQUIPMENT REQUIRED

1. AM Standard Signal Generator
2. AC Voltmeter
3. Oscilloscope
4. Standard Loop Antenna
5. Distortion Meter

- Notes:**
- Signal Generator output should be no higher than necessary to obtain an output reading.
 - Maintain voltage at 120 volts AC, 60 Hz (UL, C.S.A.) (Use 220/240 volts AC, 50 Hz for European & 240 volts AC, 50 Hz for Australian models).
 - Set SELECTOR Switch to AM.
 - Set BASS, MID, TREBLE and BALANCE to Center, VOLUME to MIN.
 - See P.C.B. illustrations for alignment points/adjustments.

STEP	GENERATOR COUPLING	GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Connect standard loop antenna to Signal Generator and radiate signal into the AM Ferrite antenna. See Fig. 29	455 kHz (400 Hz, 30% Mod.)	Point of non-interference (near 600 kHz)	AC Voltmeter to TAPE OUT 1 Jack	T201 (Both sections) T202	Adjust for maximum reading on meter. Refer to Fig. 28 & 29.
2	Same as STEP 1	515 kHz (400 Hz, 30% Mod.)	Tuning Gang fully closed.	Same as STEP 1	L204	Adjust for maximum reading on meter. Refer to Fig. 28 & 29.
3	Same as STEP 1	1650 kHz (400 Hz, 30% Mod.)	Tuning Gang fully opened.	Same as STEP 1	AM2	Adjust for maximum reading on meter. Refer to Fig. 28 & 29.
4	Repeat STEPs 2 & 3 until no further change is noticed.					
5	Same as STEP 1	600 kHz (400 Hz, 30% Mod.)	600 kHz	Same as STEP 1	L203 AM ANT Coil	Adjust for maximum reading on meter. Refer to Fig. 28 & 29.
6	Same as STEP 1	1400 kHz (400 Hz, 30% Mod.)	1400 kHz	Same as STEP 1	AM1 AM3	Adjust for maximum reading on meter. Refer to Fig. 28 & 29.
7	Repeat STEPs 5 & 6 until no further change is noticed.					
8	Same as STEP 1	1000 kHz (400 kHz, 30% Mod.) Output level to 50 mV/m	1000 kHz	Meter on set	VR201	Adjust so that all LEDs light up. Refer to Fig. 28 & 29.

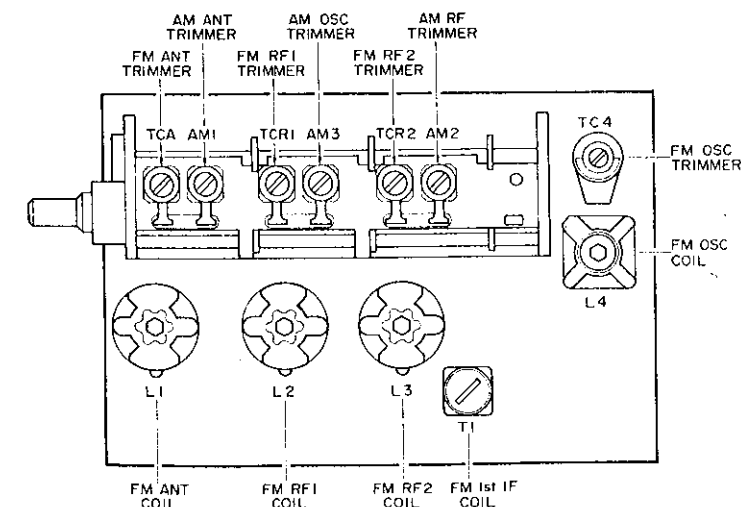


Figure 28A

TUNER P.C.B

STEP	GENERATOR COUPLING	GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
4	Same as STEP 1	90 MHz (1 kHz, 75 kHz dev.) Input: about 2 – 3 μ V	90 MHz	Same as STEP 2	L4	Adjust for maximum reading on meter. Refer to Fig. 28 and 33.
5	Same as STEP 1	106 MHz (1 kHz, 75 kHz dev.) Input: about 2 – 3 μ V	106 MHz	Same as STEP 2	TC4	Adjust for maximum reading on meter. Refer to Fig. 28 and 33.
6	Repeat STEPs 4 and 5 until no further improvement is noticed.					
7	Same as STEP 1	90 MHz (1 kHz, 75 kHz dev.) Input: 2 - 3 μ V	90 MHz	Same as STEP 2	L1, L2, L3	Adjust for maximum reading on meter. Refer to Fig. 28 and 33.
8	Same as STEP 1	106 MHz (1 kHz, 75 kHz dev.) Input: 2-3 μ V	106 MHz	Same as STEP 2	TCA TCR 1 TCR 2	Adjust for maximum reading on meter. Refer to Fig. 28 and 33.
9	Repeat STEP 7 until no further improvement is obtained. Go back and check STEPs 1 and 2 and realign if necessary.					
10	Same as STEP 1	98 MHz (1 kHz, 75 kHz dev.) Input: 3 μ V	98 MHz	Same as STEP 2	VR204	"MUTE" switched "ON" and adjust VR204 for no signal output.
11	Signal Generator to FM Ant. terminal thru FM Dummy Ant. (300 Ω)	98 MHz (1000 Hz, 75 kHz dev.) Input: 5 μ V	98 MHz	Signal LED Meter	VR203 on IF/MPX P.C.B.	Adjust so the first LED (red) lights. Refer to Fig. 33.
12	Same as above	98 MHz (1000 Hz, 75 kHz dev.) Input: 50 μ V	98 MHz	Signal LED Meter	VR202 on IF/MPX P.C.B.	Adjust so the third LED (green) lights while 1st & 2nd LEDs glow red. Refer to Fig. 33.
13	Repeat STEPs 11 and 12 until no further improvement is obtained.					

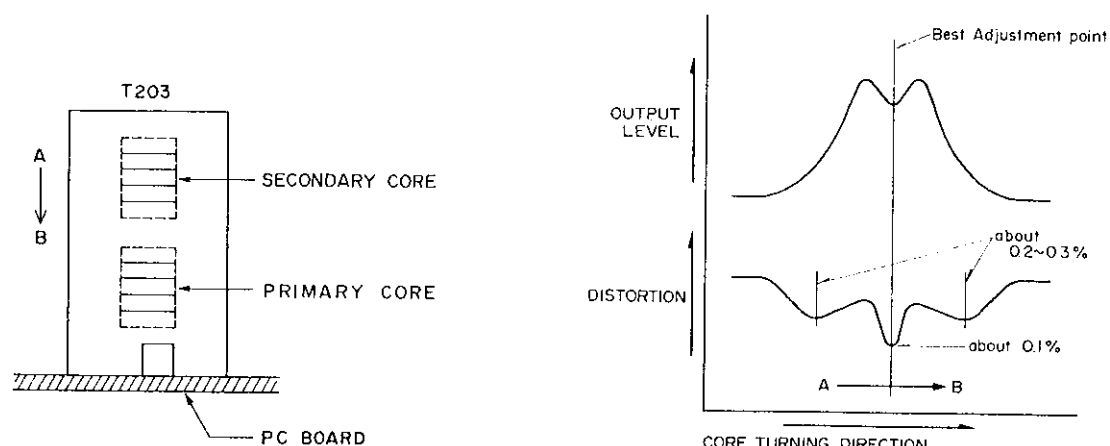


Figure 30

Figure 31

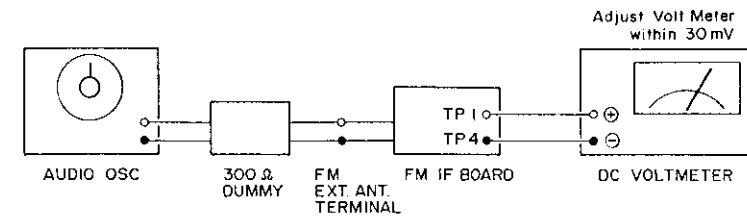


Figure 32

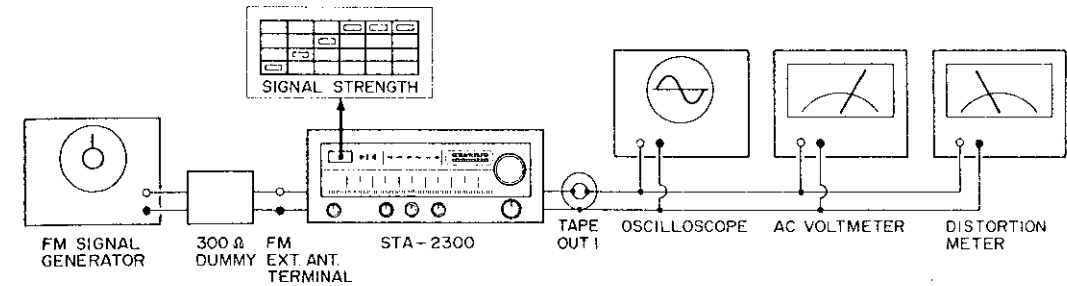


Figure 33

FM STEREO ALIGNMENT

EQUIPMENT REQUIRED

- Stereo Modulator:** Connect Stereo Modulator to EXT. Mod. terminal FM Signal Generator. Modulation level of 19 kHz Pilot Signal 8% (6 kHz dev.)
- FM Signal Generator:** Output Level 1 mV
Frequency Approximately 98 MHz
Deviation 67.5 kHz, 90% modulation composite signal
- Audio Generator**
- AC Voltmeter**
- Oscilloscope**
- Distortion Meter**
- Frequency Counter**

Notes: • See P.C.B. illustration for alignment/test points.

• Set SELECTOR switch to FM, MODE switch to STEREO and MUTE switch to OFF position.

MULTIPLEX & SEPARATION ALIGNMENT

STEP	SIGNAL GENERATOR COUPLING	STEREO MODULATION	INDICATOR	ADJUSTMENT	REMARKS
1	Connect to FM Antenna terminal thru FM dummy antenna (300 ohm)	Mono. 1 kHz (1000 Hz, No Mod.) Input: 1 mV	Counter connected to TP3 of FM IF & MPX Board (Pin 12 of IC203)	VR206	Adjust for 19 kHz \pm 50 Hz on Counter. Refer to Fig. 34.
2	Same as above	Composite MPX Signal 1 kHz on Left channel ONLY	AC Voltmeter connector for TAPE OUT 1 Jack of Right channel	VR205 (Separation)	Adjust for minimum reading on Meter. Refer to Fig. 35.
3	Same as above	Composite MPX Signal 1 kHz on Right channel ONLY	AC Voltmeter connector for TAPE OUT 1 Jack of Left channel	Same as above	Same as above
4	Repeat STEPs 2 and 3 until AC Voltmeter reading is at least -45 dB re-same channel output. (i.e. 45 dB separation)				

STEP	SIGNAL GENERATOR COUPLING	STEREO MODULATION	INDICATOR	ADJUSTMENT	REMARKS
5	Same as STEP 1	Composite MPX Signal 1 kHz	AC Voltmeter connected to TAPE OUT 1 Jack	—	With 5 μ V antenna input signal, Stereo indicator lamp should come on.
6	Same as STEP 1	Composite MPX Signal 1 kHz	Distortion Meter Connected to TAPE OUT 1 Jack	—	With 1 mV antenna input signal, Stereo Distortion should be less than 0.1%.

FM STEREO ALIGNMENT SET-UP

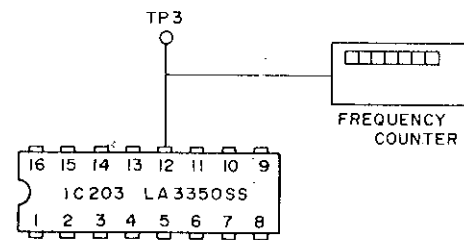


Figure 34

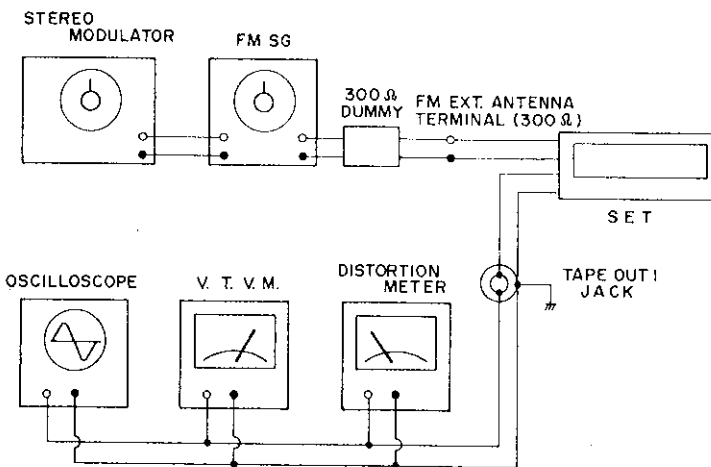


Figure 35

3. Main Amp Protective Circuit

If center voltage of Main Amp goes to ± 5 V DC (Normal Condition: within ± 15 mV) TR603, 602 and 601 will be turned on, and TR606, 605 and 604 will be turned off. If this should occur, Relay B will shut off output to the Speaker terminals and output will drop to zero and thus protect Main Amp and Speakers. In this case, indicator LED will turn to red. (Figure 38)

Note: To prevent AC voltages from upsetting these circuits, capacitors C601 and 602 have been incorporated. If AC voltage is applied to the base of TR603 and 602, it will be grounded through C601 and 602. Thus TR603 and 602 are immune to AC voltages.

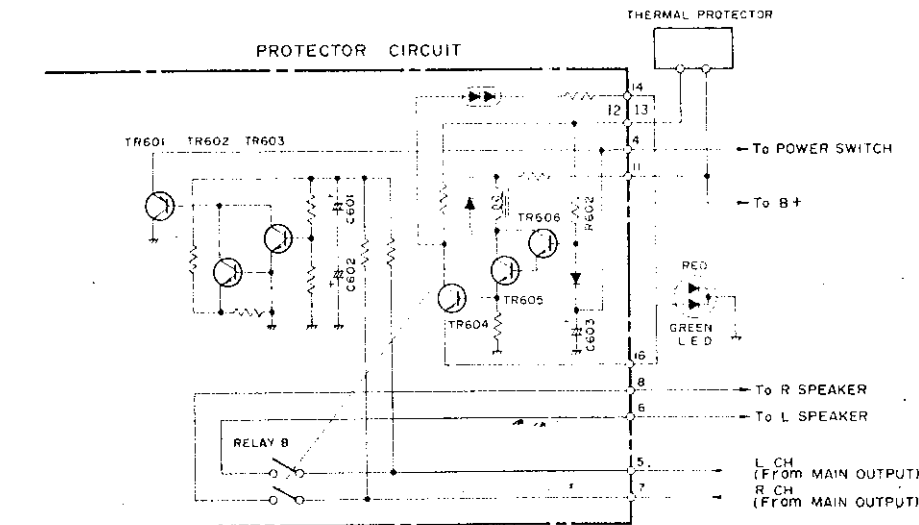


Figure 37

8) CIRCUIT DESCRIPTION

(1) PROTECTOR CIRCUITS DESCRIPTION

1. Inrush Current Protective Circuit

When you switch Power "ON", the indicator LED will turn red. At first, AC voltage is provided to Power Transformer through R1305, and after about 0.2 second, TR1301 will turn on, and thus AC voltage is provide through Relay A.

This is to protect the Power Transformer T1401 from inrush current. This circuit is made up of Time Constant circuit R1302 and C1302. (Figure 36)

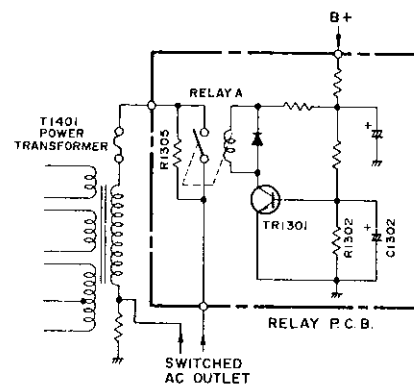


Figure 36

2. Speaker Protective Circuit

With Power Switch "ON", about seven-second signal delay is provided to the Speaker Output terminals by Relay B.

This is to protect Speakers from switching transients.

With Power Switch "ON", TR606, 605 and 604 will turn on through Time Constant circuit R602 and C603. The indicator LED will change to green.

4. Main Amp Limiting Circuit

If Speaker terminals are shorted, the output line (ⓐ point of Figure 38) is grounded and excessively high current flows from collector to emitter of TR513A (TR513B) and TR514A (TR514B), and a high voltage will appear across R526A (R526B) and R527A (R527B). This high voltage goes to base of TR511A (TR511B) and TR512A (TR512B). When the voltage between base and emitter increases to about 0.6V, TR511A (TR511B) and TR512A (TR512B) will be turned on.

When high current (input signal of TR507A (TR507B) and TR508A (TR508B) flows from collector to emitter of TR511A (TR511B) and TR512A (TR512B) through D505A (D505B) and D506A (D506B), collector-to-emitter current of TR509A (TR509B) and TR510A (TR510B) will drop. Consequently, collector-to-emitter current of TR513A (TR513B) and TR514A (TR514B) will drop as Figure 39 (from ⓐ to ⓐ', from ⓑ to ⓑ') because of the output current limiting. This protects Power Transistors TR513A (TR513B), TR514A (TR514B) and TR515A (TR515B), TR516A (TR516B).

If this should occur, turn off the Receiver.

When the problem is corrected, turn the Receiver on again.

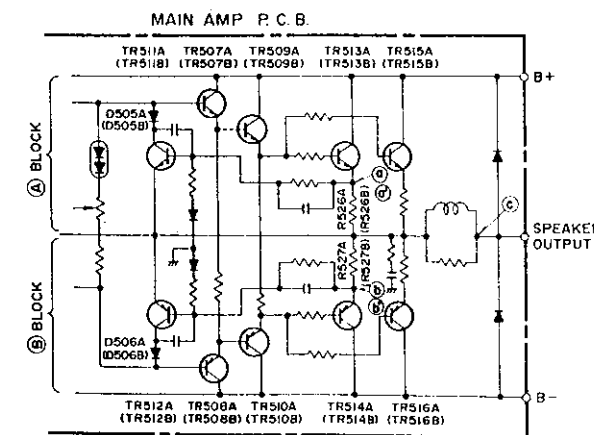


Figure 38

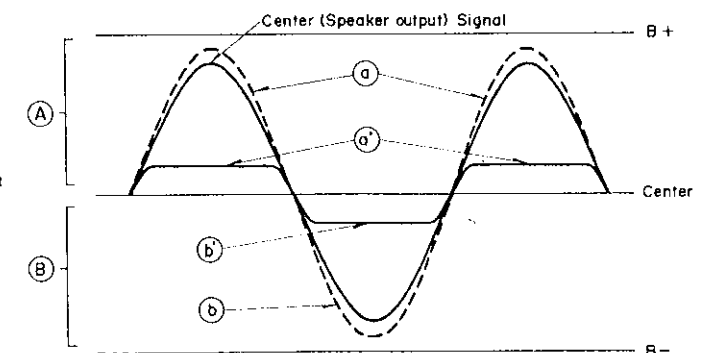


Figure 39

5. Abnormal Temperature Rise Protection

The STA-2300 has three thermal protectors.

If the temperature of Main Amp Heat Sink rises to 100°C or Power Transformer rises to 95°C , the thermal protector switch is shut off and TR604, 605 and 606 will be turned off, and Relay B will shut off.

In this case, the Amplifier automatically shuts down and output will drop to zero. Indicator LED will turn to red.

If this should occur, turn the Receiver "OFF". When the temperature of the Main Amp Heat Sink falls to within the operating limits of the Receiver, the Thermal Protector switch will reset itself. When the problem is corrected, turn the Receiver on again. (Figure 37)

6. FM Noise and Switching/Muting Circuit

This circuit performs two functions.

- a) To eliminate the interstation hiss-noise sometimes noted just on either side of a station you are tuning in, with FM muting "ON".

With no signal received, the voltage applied to the base of TR1503 is 3V and both TR1503 and TR1504 are kept on, which activates the relay (REED Relay) and output is cut off. When a weak noise signal is received, the voltage drops to around 1.2V and both TR1503 and TR1504 remain on, keeping the relay activated and output cut off. When tuned to a station, the voltage drops further (to less than 1V) and TR1503/4 are turned off and the REED Relay is deactivated.

- b) To eliminate the clicking noise when function switch is turned from AM to FM (or FM to PHONO 1, PHONO 1 to PHONO 2, etc.).

The switch Ss-8 is a shorting type, goes through a short-circuit condition when turning from 1 (AM) to 2 (FM), etc. (it is momentarily grounded). This turns TR1501 off and TR1502 on. Thus, REED Relay is activated and output is cut off. The time constant of R1504 and C1502 allows the cut off condition to last for about one second (before C1502 charges up to a point where TR1501 turns on again, etc.). (Figure 40)

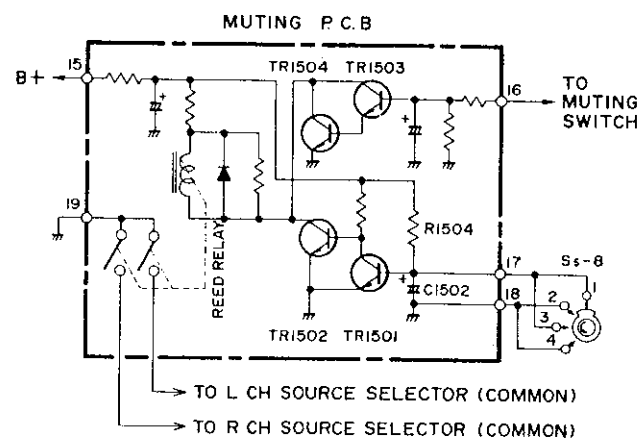


Figure 40

(2) FM AUTO-Magic Tuning CIRCUIT DESCRIPTION

FM AUTO-Magic circuit is a simplified fine-tune for FM stations, widening the bandwidth of the built-in AFC circuitry.

AFC (Automatic Frequency Control) circuit consists of an oscillator circuit and a controlled DC voltage from the discriminator circuit.

A varicap diode is included in the resonant circuit of the Front-End oscillator and controlled by the direct voltage derived from the audio frequency output of the FM discriminator, and this voltage automatically controls the frequency.

In "FM" position, the 5 V DC voltage at Pin 10 in IC202 is provided to the AFC circuit of Front-End via R245 and AUTO-M Switch. (Figure 41)

The voltage at Pin 10 is held constant due to a built-in regulator circuit in IC202, a constant voltage is provided to the AFC circuitry and the IF bandwidth is fixed ($10.7\text{ MHz} \pm 300\text{ kHz}$). (See Figures 41 and 42.)

In "FM AUTO-M" position, the $5\text{ V} \pm 0.5\text{ V}$ DC voltage of Pin 7 is provided to the AFC circuitry via R238 and R237.

Since the voltage at Pin 7 varies from 4.5 to 5.5 V, the 10.7 MHz IF bandwidth will vary $\pm 1.2\text{ MHz}$ as shown in Figure 42.

As a result, AUTO-Magic automatically fine-tunes the station and locks it in for drift-free listening.

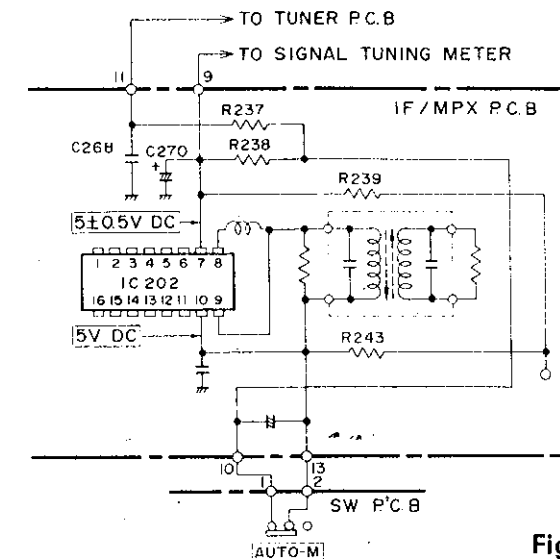
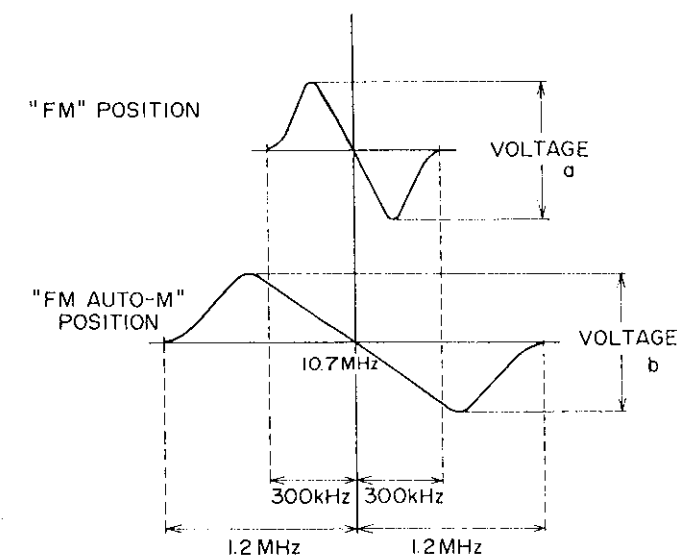


Figure 41

IF BAND "S" CURVE



NOTE: Voltage at "a" is equal to "b".

Figure 42

(3) SIGNAL LEVEL METER CIRCUIT DESCRIPTION

AM/FM Signal Meter circuit consists of Comparator IC IC1101 and LEDs D1106 through D1111 and OP AMP IC204.

(A) AM SIGNAL METER

Signal Meter output voltage from Pin 15 of IC201 (approx. 0–0.3 V) is applied to the Pin 5 of IC204. The output voltage from Pin 7 of IC204 (approx. 0–1.3 V) is applied to the Pin 1 of IC1101 after being set by VR201. It is applied to internal comparator.

On the other hand, a reference voltage is inputted from Pin 2, divided by resistors (internally to IC1101) and fed to another input of each comparator. (Figure 43)

LED METER INDICATION LEVEL

Signal Meter LED	Antenna Input Level	Input Voltage at Pin 1 of IC1101
D1106	250 μ V/m	0.26 V
D1107	500 μ V/m	0.52 V
D1108	1 mV/m	0.78 V
D1109	5 mV/m	1.04 V
D1110/D1111	40 mV/m	1.3 V

Reference Voltage : 1.3 V (at Pin 2 of IC1101)

(B) FM SIGNAL METER

Basically, Signal Meter circuit functions the same as in AM mode, but several additional components are added to smooth out the operation.

Output from Pin 13 of IC202 is used to apply to the input of IC IC1101, but this output is non-linear to antenna input. So, TR205 and TR206 have been added to improve the linearity between the Meter output and the antenna input.

When TR206 turns on and limits the output from Pin 13 of IC202, TR205 amplifies the output signal from 2nd IF. This signal is further rectified by D202/203. The output applied to Pin 5 of IC204 (1.7 V) is amplified at Pin 7 of IC204 (0 – 3.6 V) and fed to Pin 1 of IC1101.

Also, VR203 is provided to turn the first LED on at 2.5 μ V antenna input and VR202 is provided to turn the third LED on at 50 μ V antenna input.

LED METER INDICATION LEVEL

Signal Meter LED	Antenna Input Level	Input Voltage at Pin 1 of IC1101
D1106	3 μ V	0.72 V
D1107	20 μ V	1.44 V
D1108	50 μ V	2.16 V
D1109	500 μ V	2.88 V
D1110/D1111	1 mV	3.6 V

Reference Voltage : 3.6 V (at Pin 2 of IC1101)

(4) TUNING LED METER CIRCUIT DESCRIPTION

Tuning LED Meter circuit consists of Comparator IC IC1101, LEDs D1112 through D1114 and TR1101 through TR1103.

S curve output from Pin 7 (Pin 10) of IC202 is respectively applied to Pin 6 (Pin 4) of IC1101 and outputted from Pin 10 (Low Out) and Pin 11 (High Out) of IC1101.

A reference voltage from Pin 4 of IC1101 divided by R1104 and R1105 for bandwidth limit is fed to Pin 5 of IC1101.

The range of LED lighting at detuning depends upon the potential difference between the reference voltage at Pin 4 and Pin 5 of IC1101 (i.e. $\Delta V = V_{\text{Pin 4}} - V_{\text{Pin 5}}$).

TR1102 affects Tuning LED lighting. When the first LED of Signal Meter lights, TR1102 turns on and B+ voltage is provided to D1112, D1113 and D1114. When D1112 (D1114) lights at detuning, TR1103 turns on and D1113 will fail.

Also, TR1101 which acts with FM MUTE "ON" position functions so that LEDs will not light with spurious interference or other signal disturbances. (Figure 43)

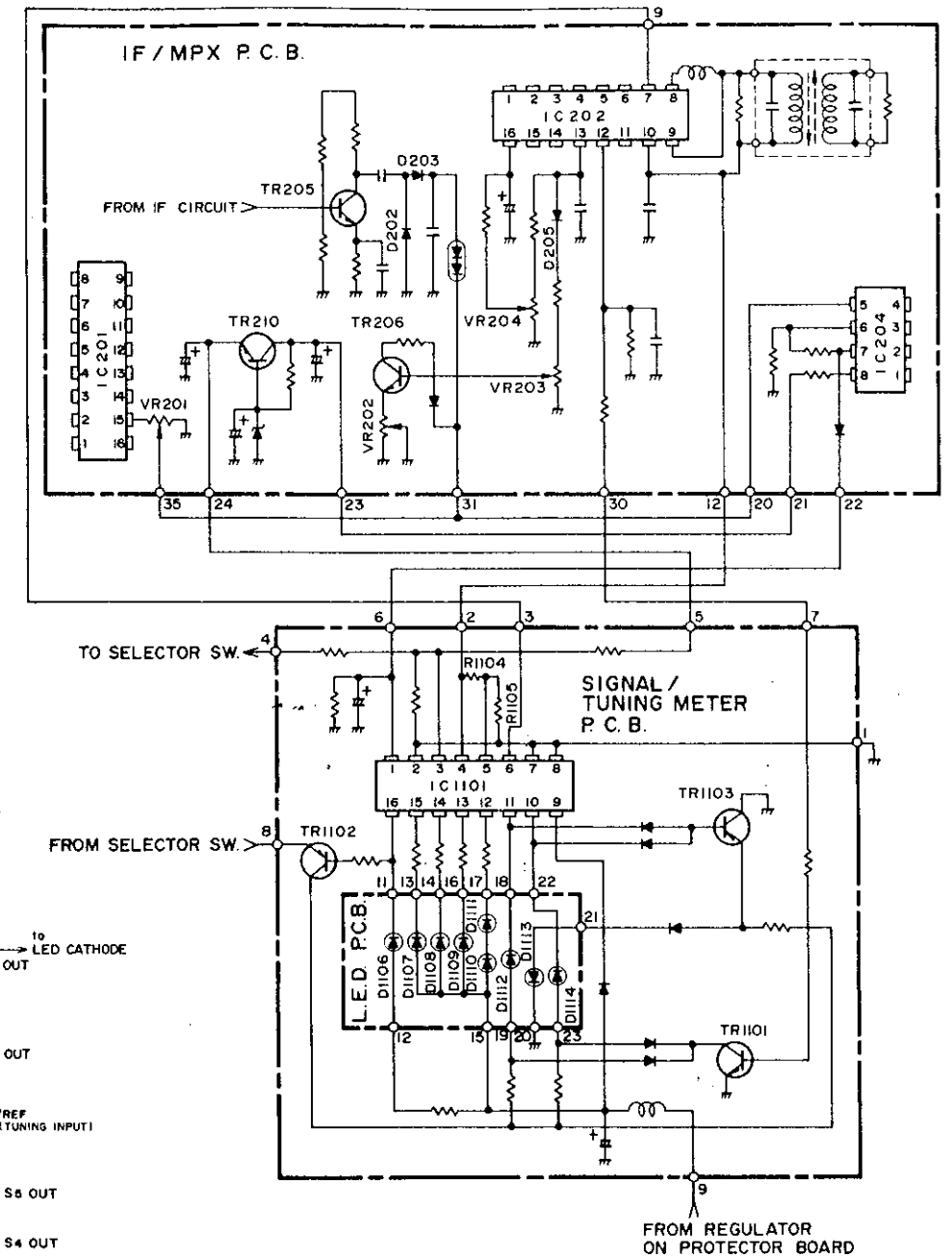
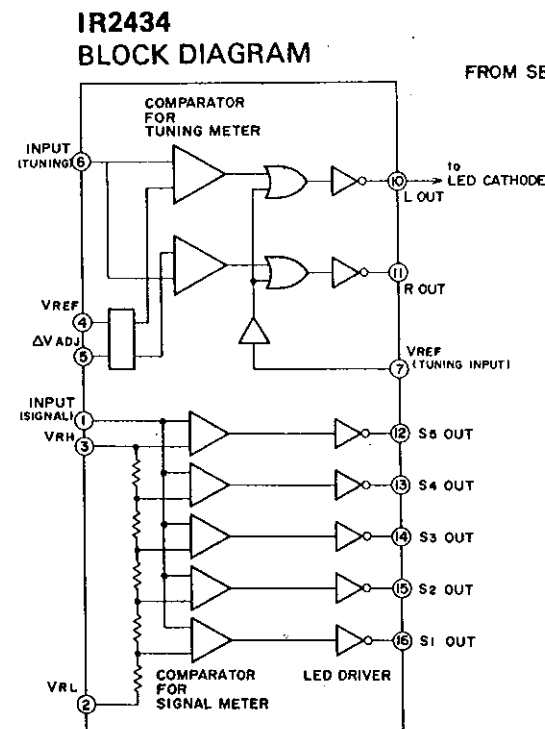


Figure 43

(5) POWER LED METER CIRCUIT DESCRIPTION

Power LED Meter circuit consists of Comparator IC IC1201A/IC1201B, LEDs D1203A through D1214A (D1203B through D1214B) and TR1001A/TR1002A (TR1001B/TR1002B).

Output of Main Amp is provided to D1201A (1201B). A DC voltage rectified by D1201A (D1201B) is provided to Pin 21 of IC1201A (1201B) after being set by VR1201A (VR1201B).

Via internal comparator of IC1201A (IC1201B), each LED is lit in order from D1203A to D1214A (D1203B to D1214B).

TR1001A and TR1002A (TR1001B and TR1002B) function as delay circuits, so that red LEDs D1213A/D1214A (D1213B/D1214B) will not light unexpectedly during unsaturated condition (where LEDs glow green) while switching over from Low to High position. (Figure 44)

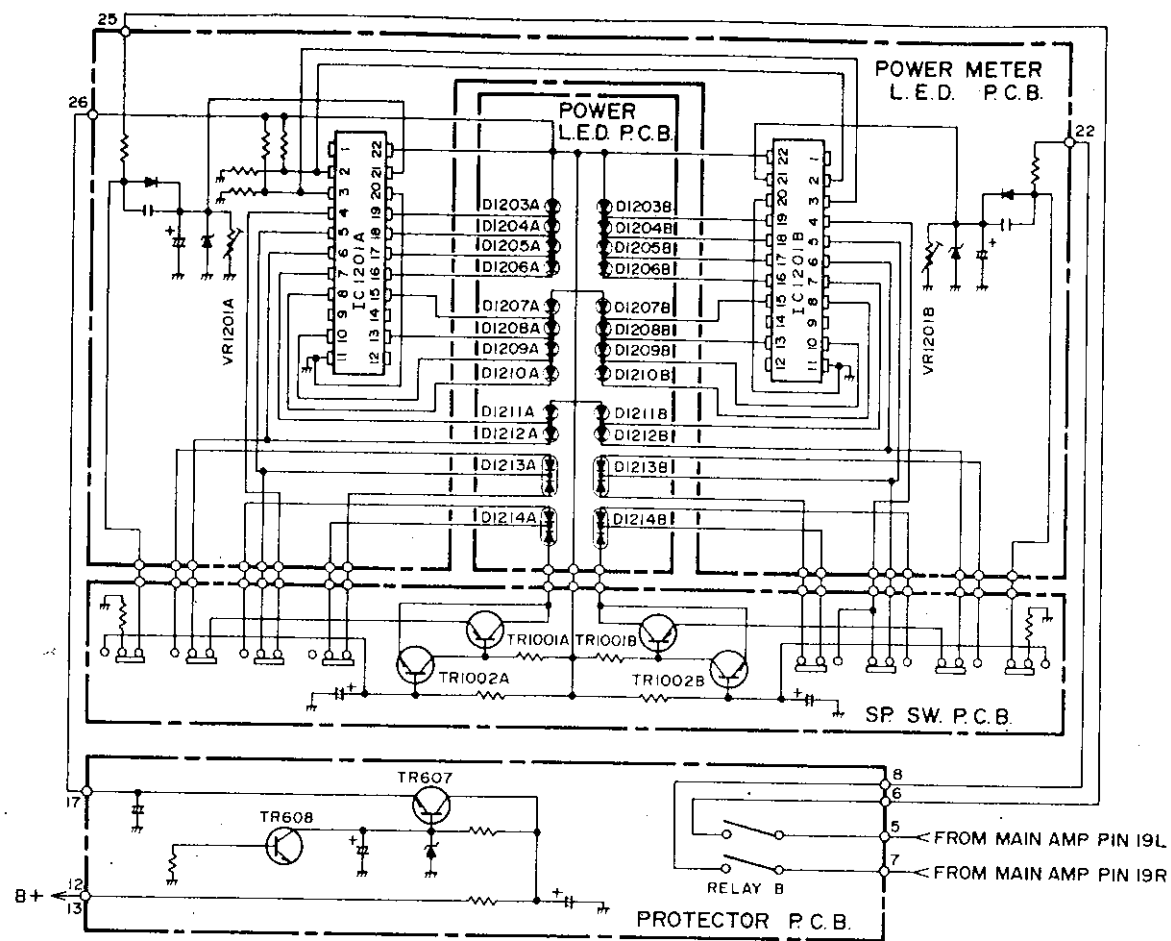


Figure 44

9) TROUBLESHOOTING

SYMPTOM	CAUSE/REMEDY
1) No output	<ol style="list-style-type: none"> Faulty AC power cord. *Replace the cord. Defective POWER switch. *Replace the switch. Blown Primary Fuse. *Replace the fuse. Open circuit in the Power Transformer. *Replace the Transformer. Defective D1401 or diodes, transistors on Power Supply board. *Replace the defective part(s). Defective Relay A and RELAY Board (except C.S.A. models). *Replace the Relay.
2) Pilot LED does not light for SELECTOR. (AM, FM, PHONO 1, PHONO 2 or AUX)	<ol style="list-style-type: none"> Defective LED. *Replace the LED. Open circuit in the Power Transformer tertiary winding. *Replace the Transformer. Defective diode D706. *Replace the diode. Blown Fuse (F2). *Replace the fuse.

SYMPTOM	CAUSE/REMEDY
3) Pilot LED lights but no Speaker output.	<ol style="list-style-type: none"> Defective capacitor C1413 or C1414. *Replace the defective capacitor(s). Defective Rectifier D1401. *Replace the defective Rectifier. Defect in the Power Transformer secondary winding. *Replace the Power Transformer. Defective Relay B on Protector Board. *Replace the Relay.
4) Blows Fuse (F1401)	<ol style="list-style-type: none"> Defective Rectifier D1401. *Replace the Rectifier. Short circuit in the rectifier circuit. *Remove the short. Short circuit in the Power Transistor circuitry TR507A-516A or TR507B-TR516B. *Repair circuit and/or replace the defective Transistor. Defective Relay B or Transistors on Protector board. *Replace the part(s).
5) "A" Speakers do not work.	<ol style="list-style-type: none"> Speaker switch A defective. *Replace the switch.
6) "B" Speakers do not work.	<ol style="list-style-type: none"> Speaker switch B defective. *Replace the switch.
7) No output from one channel with VOLUME at maximum and BALANCE at center, when a test signal is applied to the terminal of non-operating channel of the BALANCE control.	<ol style="list-style-type: none"> Defective Transistor TR401A-406A, 501A-516A or TR401B-405B, 501B-516B or TR601-606. *Replace the defective Transistor(s). Defective resistor or capacitor or TONE, MAIN AMP or PROTECTOR circuit. *Replace the defective part(s).
8) No output when a test signal is applied to the input terminals except PHONO 1 or 2.	<ol style="list-style-type: none"> Defective MONO-Stereo or TAPE switch. *Replace or repair the switch. Defective Selector switch. *Replace the switch.
9) No output when a test signal is applied to the PHONO 1 input terminals.	<ol style="list-style-type: none"> Defective transistor, resistor or capacitor of PRE AMP circuit. *Replace the part(s). Defective MONO-Stereo or TAPE switch. *Replace or repair the switch. Defective Selector switch. *Replace the Selector switch.
10) No output when a test signal is applied to the PHONO 2 input terminals.	<ol style="list-style-type: none"> Defective transistor, resistor or capacitor of PRE AMP circuit. *Replace the part(s). Defective MONO-Stereo or TAPE switch. *Replace or repair the switch. Defective Selector switch. *Replace the Selector switch.
11) No output when a test signal is applied to the desired input.	<ol style="list-style-type: none"> Defective transistors or diodes on Power Supply board. *Replace the defective part(s). Defective transistor, resistor or capacitor on Tone Control board. *Replace the defective part(s). Defective transistor, capacitor or resistor on Main Amp board. *Replace the defective part(s).
12) DC not balanced within ± 15 mV at output of L/R channel.	<ol style="list-style-type: none"> Defective TR501A, 502A, 517A or TR501B, 502B, 517B. *Replace the defective transistor(s). Defective diode D501A or D501B. *Replace the defective diode(s).

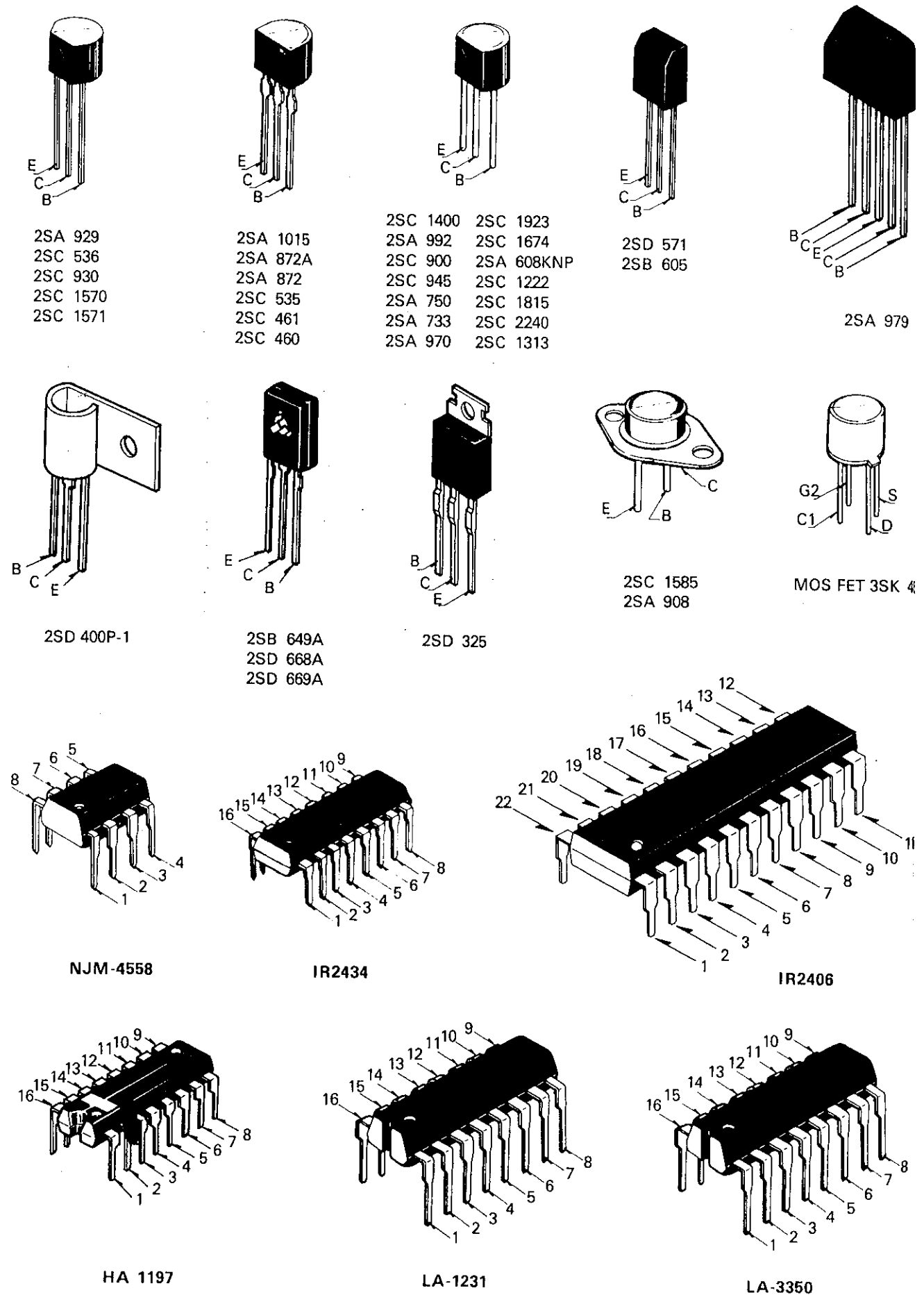
SYMPTOM	CAUSE/REMEDY
13) Speaker works normally but Headphone does not work.	<ol style="list-style-type: none"> Defective R611 (Left) or R612 (Right). *Change it. Headphone plug does not mate with jack. *Replace the plug.
14) All the inputs work normally except "AUX" input.	<ol style="list-style-type: none"> Poor contact in "AUX" input jack. *Repair or replace it. Poor contact in Selector switch. *Repair or replace the switch.
15) "PHONO 1" input inoperative.	<ol style="list-style-type: none"> Poor contact in "PHONO 1" input jack. *Repair or replace it. Faulty Selector switch. *Repair or replace it.
16) "PHONO 2" input inoperative.	<ol style="list-style-type: none"> Poor contact in "PHONO 2" input jack. *Repair or replace it. Faulty Selector switch. *Repair or replace it.
17) "TAPE OUT 1" inoperative.	<ol style="list-style-type: none"> Poor contact in "TAPE OUT 1" output jack. *Repair or replace the jack.
18) "TAPE IN 1" inoperative.	<ol style="list-style-type: none"> Poor contact in "TAPE IN 1" input jack. *Repair or replace the jack.
19) "TAPE OUT 2" inoperative.	<ol style="list-style-type: none"> Poor contact in "TAPE OUT 2" output jack. *Repair or replace the jack.
20) "TAPE IN 2" inoperative.	<ol style="list-style-type: none"> Poor contact in "TAPE IN 2" input jack. *Repair or replace the jack.
21) No AM or FM (Tuner B+ voltage is not 11-12V.)	<ol style="list-style-type: none"> Broken tertiary winding in the Power Transformer. *Replace the Transformer. Defective Diode D704. *Change the defective Diode. Faulty capacitor C716-C720 or 727. *Change the defective capacitor(s). Defective resistor R721, 722 or 723. *Replace the resistor(s). Zener Diode D705 defective. *Replace the Diode. Short-circuit in Tuner B+ circuit. *Repair the short. Poor contact in Selector switch. *Repair or replace it. Defective Transistor TR705. *Replace the Transistor. Blown Fuse (F1). *Replace the fuse.
22) No FM	<ol style="list-style-type: none"> Poor contact in Selector switch. *Repair or replace it. IC, Transistor, Diode, resistor, capacitor, Inductor or IFT of FM IF board or FM Front End defective. *Replace the defective part(s). Faulty FM Antenna lead-in/circuitry. *Replace or repair the Antenna lead-in/circuitry.

SYMPTOM	CAUSE/REMEDY
23) No AM	<ol style="list-style-type: none"> Poor contact in Selector switch. *Repair or replace switch. IC, Transistor, Diode, IFT, resistor or capacitor of AM IF defective. *Replace the defective part(s). Bar-Antenna coil defective. *Repair or replace it.
24) Poor FM sensitivity.	<ol style="list-style-type: none"> Defective TR1-3 or TR201, 202, 203. *Replace the defective Transistor(s). Defective IC IC202. *Replace the defective IC. Defective ceramic filter CF202, 203 or 204. *Replace the defective ceramic filter(s). Defective L1-4, T1 or T203. *Replace the defective coil(s).
25) Distorted FM	<ol style="list-style-type: none"> Defective T203. *Replace the defective detector coil. Defective ceramic filter CF202, 203 or 204. *Replace the defective filter(s). Defective IC IC202 or 203. *Replace the defective IC(s). Defective L205 or 206. *Change the defective part(s).
26) Poor AM sensitivity.	<ol style="list-style-type: none"> Defective L1401, L203, 204 or T201, 202. *Replace the defective part(s). Defective IC201. *Replace the defective IC.
27) No FM MPX Separation.	<ol style="list-style-type: none"> Improper adjustment. *Readjust VR205 and VR206. IC203 of MPX board defective. *Replace the IC. VR205, 206 (Trimmer resistor) defective. *Replace the Trimmer resistor(s). Defective Transistor TR207, 208. *Replace the defective Transistor(s).
28) No STEREO light or FM Stereo does not work.	<ol style="list-style-type: none"> Broken STEREO indicator LED. *Replace the LED. Defective IC203 of MPX board. *Change the defective IC. Defective Transistor TR209 or diode D206. *Replace the defective Transistor or diode. VR206 defective. *Replace the defective Trimmer resistor(s).
29) "LOUDNESS" has no effect.	<ol style="list-style-type: none"> Defective "LOUDNESS" switch. *Replace the switch. Defective C901-904, R901, 902. *Replace the defective part(s).
30) "Stereo-MONO" not effective.	<ol style="list-style-type: none"> Defective Stereo-MON "MODE" switch. *Repair or replace the switch.

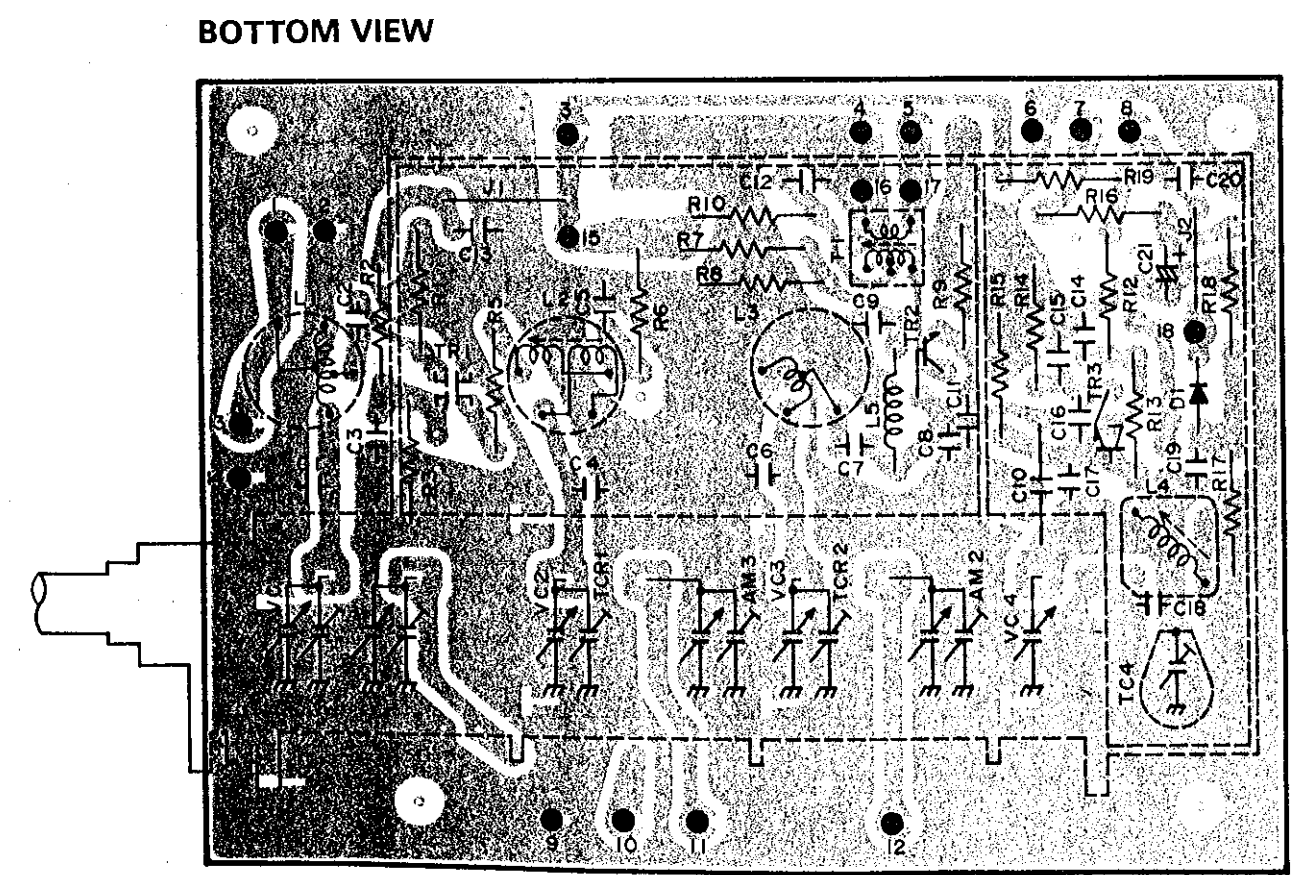
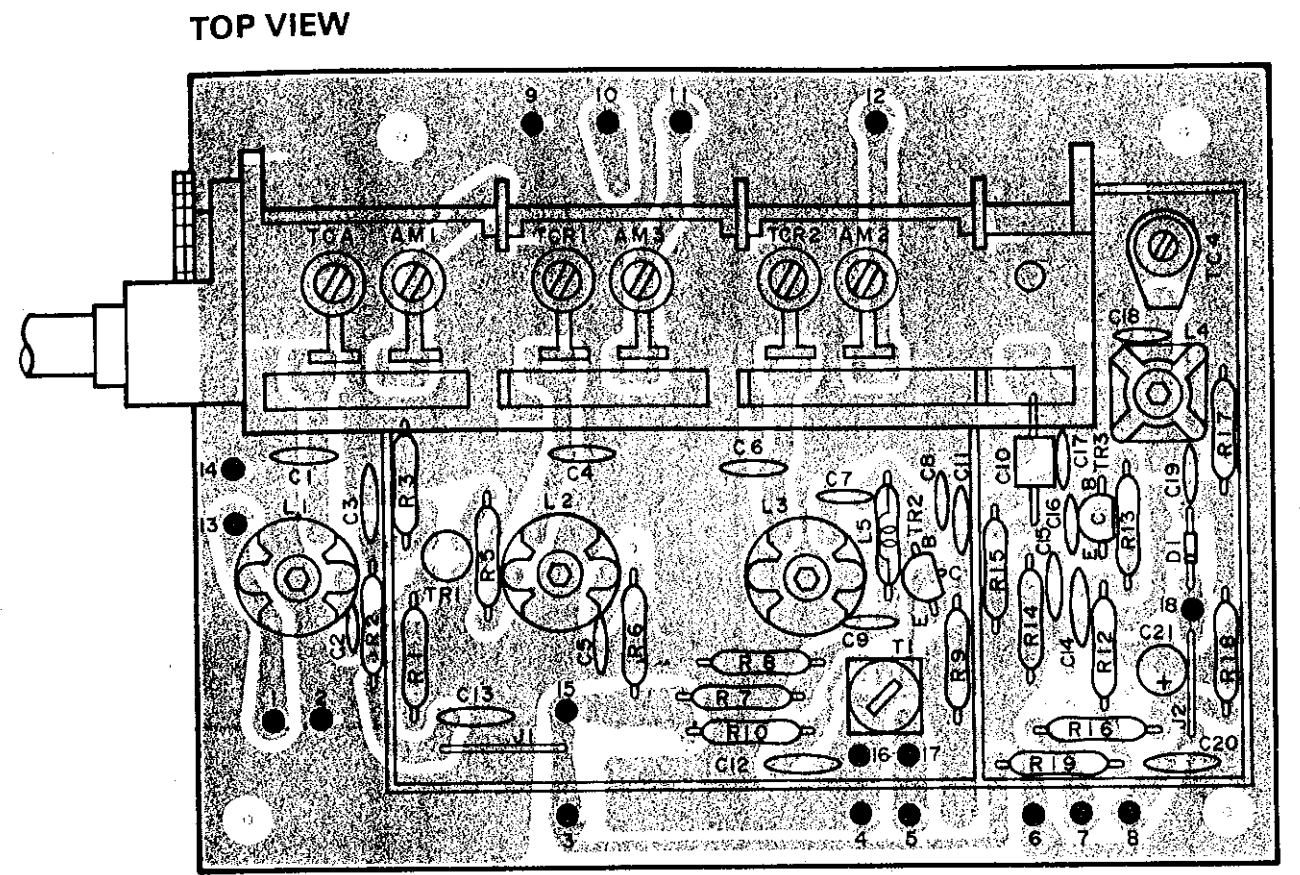
SYMPTOM	CAUSE/REMEDY
31) "MUTING" not effective.	<ol style="list-style-type: none"> 1. Defective MUTE switch. *Repair or replace the switch. 2. Defective Transistor TR1501-1504. *Replace the defective Transistor(s). 3. Defective Trimmer resistor VR204. Replace the Trimmer resistor. 4. Defective the part(s) or MUTING board. *Replace the part(s).
32) "HI MPX FILTER" not effective.	<ol style="list-style-type: none"> 1. Defective HI MPX FILTER switch. *Repair or replace the switch. 2. Defective C905 or R903. *Replace the defective part(s).
33) "AUTO-M" not effective.	<ol style="list-style-type: none"> 1. Defective AUTO-M switch. *Repair or replace the switch. 2. Defective C247, 268, 270, R237-239, 243, 245. *Replace the resistor(s). 3. Faulty AUTO-Magic circuitry. *Repair or replace the circuitry. 4. Defective D605, R617, C604 on Protector Board. *Replace the defective part(s).
34) "TAPE DUBBING 1 - 2" does not operate.	<ol style="list-style-type: none"> 1. Defective TAPE DUBBING switch. *Replace it.
35) "TAPE DUBBING 2 - 1" does not operate.	<ol style="list-style-type: none"> 1. Defective TAPE DUBBING switch. *Replace it.
36) "TAPE MONITOR 1" does not operate.	<ol style="list-style-type: none"> 1. Defective TAPE MONITOR switch. *Replace it.
37) "TAPE MONITOR 2" does not operate.	<ol style="list-style-type: none"> 1. Defective TAPE MONITOR switch. *Replace it.
38) "BASS" has no effect. (TURNOVER Switch to 300 Hz)	<ol style="list-style-type: none"> 1. VR403 (100 K ohm control) defective. *Replace it. 2. Defective R409A, 412A, 413A, 417A, C409A or R409B, 412B, 413B, 417B, C409B. *Replace the defective part(s).
39) "BASS" has no effect. (TURNOVER Switch to 150 Hz)	<ol style="list-style-type: none"> 1. VR403 (100 K ohm control) defective. *Replace it. 2. Defective R409A, 412A, 413A, 417A, C408A or R409B, 412B, 413B, 417B, C408B. *Replace the defective part(s).
40) "TREBLE" has no effect. (TURNOVER Switch to 3 kHz)	<ol style="list-style-type: none"> 1. Faulty VR401 (100 K ohm control). *Replace it. 2. Defective R408A, 410A, 411A, C404A, 405A or R408B, 410B, 411B, C404B, 405B. *Replace the defective part(s).
41) "TREBLE" has no effect. (TURNOVER Switch to 6 kHz)	<ol style="list-style-type: none"> 1. Faulty VR401 (100 K ohm control). *Replace it. 2. Defective R408A, 410A, 411A, C403A, 405A or R408B, 410B, 411B, C403B, 405B. *Replace the defective part(s).

SYMPTOM	CAUSE/REMEDY
42) POWER LED Meter does not work.	<ol style="list-style-type: none"> 1. Defective POWER LED Meter L or/and R. *Repair or replace the LED(s). 2. Defective Diode, capacitor or resistor of Meter circuit. *Replace the defective part(s). 3. Defective Trimmer resistor VR1201A or 1201B. *Replace the defective Trimmer resistor. 4. Defective IC IC1201A, 1201B. *Replace the defective IC(s).
43) PROTECTOR circuit does not work.	<ol style="list-style-type: none"> 1. Defective resistor or capacitor of PROTECTOR circuit. *Replace the defective part(s). 2. Defective Diode D601, 602 or 603. *Replace the defective Diode(s). 3. Defective Transistor TR601-606. *Replace the defective Transistor(s). 4. Defective Relay B. *Replace it.
44) "SIGNAL" LED Meter not functioning.	<ol style="list-style-type: none"> 1. Defective SIGNAL LED Meter. *Replace the LED(s). 2. Defective IC204 or D208. *Replace the defective part(s). 3. Defective resistor(s), capacitor(s), IC1101 in Signal Meter, circuit. *Replace the defective part(s). 4. In case of FM reception, D201-205, TR205, 206 or VR202, 203 defective. *Replace the defective part(s). 5. In case of AM reception, VR201 or R280 defective. *Replace the defective part(s).
45) "TUNING" LED Meter not functioning.	<ol style="list-style-type: none"> 1. Defective TUNING LED Meter. *Replace the LED(s). 2. Defective R220 or C217. *Replace the defective part(s). 3. Defective IC1101, TR1101-1103, D1101-1105, D1115, resistor(s), capacitor(s) in Tuning Meter Circuit. *Replace the defective part(s).
46) "LOW FILTER" has no effect.	<ol style="list-style-type: none"> 1. Defective "LOW FILTER" switch. *Replace the switch. 2. Defective TR406A, 406B, capacitor(s), resistor(s) in LOW FILTER circuit. *Replace the defective parts.
47) "HIGH FILTER" has no effect.	<ol style="list-style-type: none"> 1. Defective "HIGH FILTER" switch. *Replace the switch. 2. Defective C1002A or C1002B. *Replace the defective part(s).
48) POWER METER LOW has no effect.	<ol style="list-style-type: none"> 1. Defective POWER METER LOW switch. *Replace the switch. 2. Defective IC1201A, 1201B or TR1001A, 1002A, 1001B, 1002B. *Replace the defective IC(s) or transistor(s): 3. Defective diode, resistor or capacitor on Power Meter LED board. *Replace the defective part(s). 4. Defective LED D1213A, 1214A, 1213B, 1214B. *Replace the defective LED(s).

10) IC & TRANSISTOR LEAD IDENTIFICATION

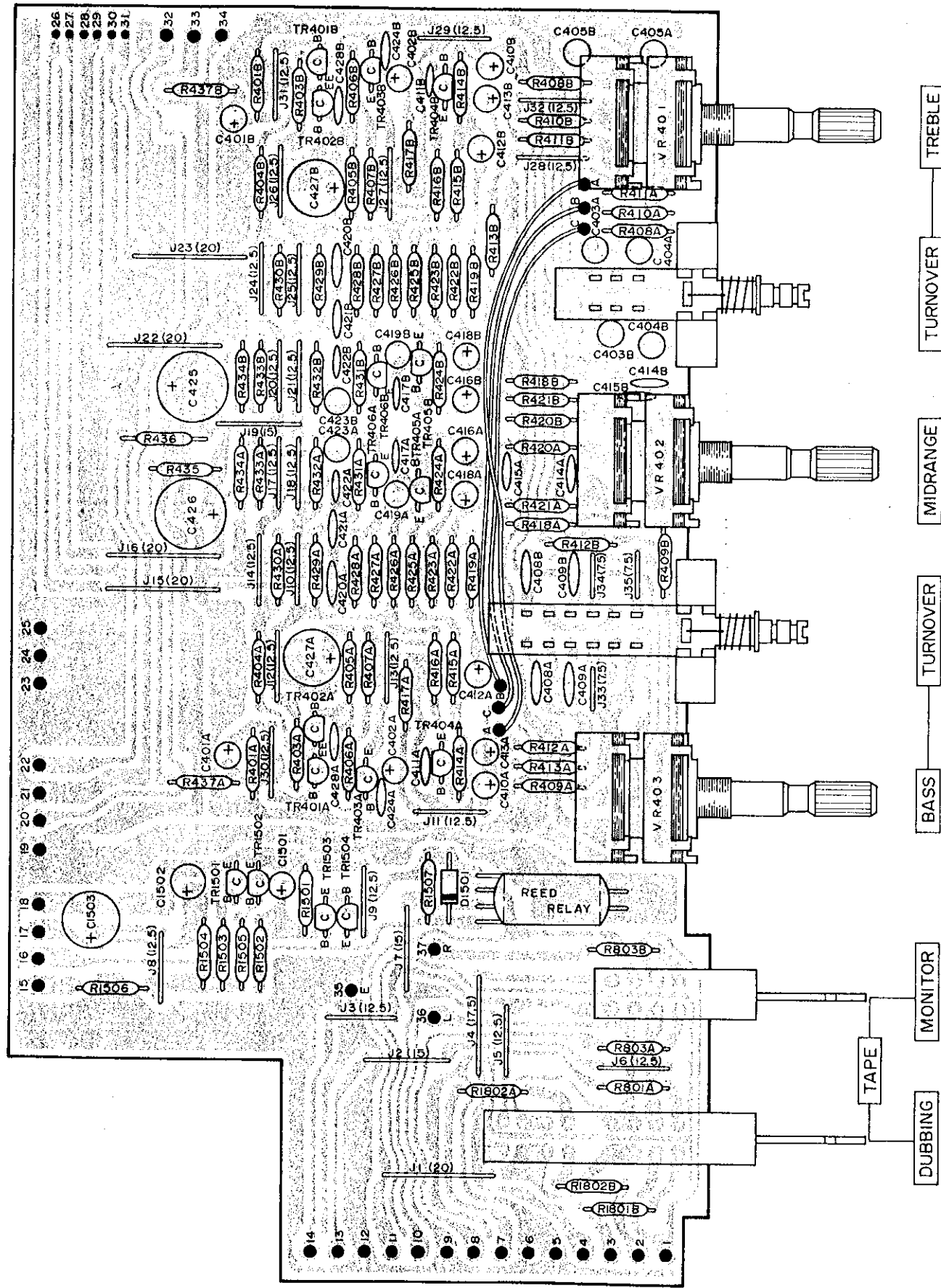


11) TUNER P.C.B. (TOP & BOTTOM VIEWS)

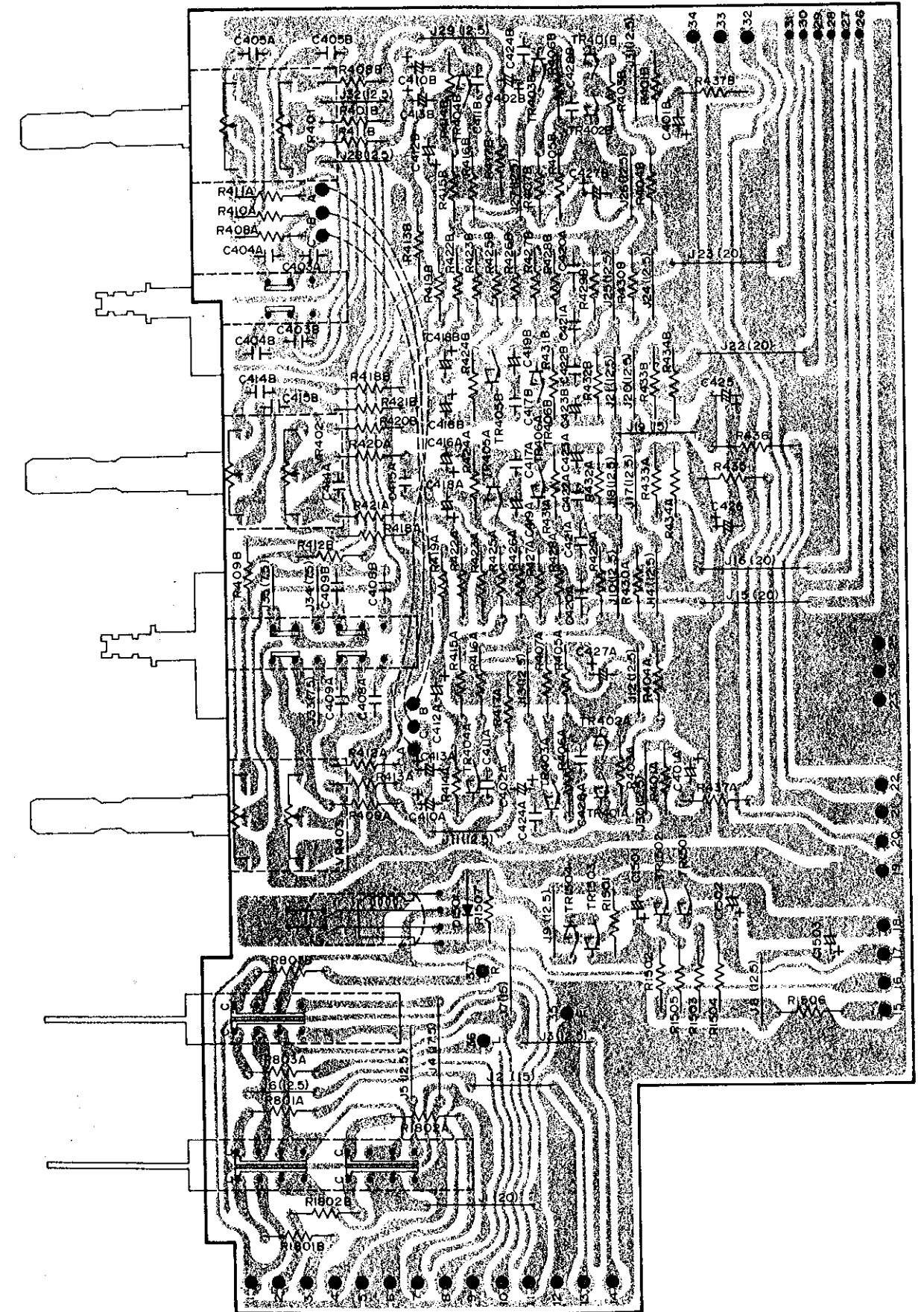


12) TONE AMP, MUTING, TAPE SWITCH P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

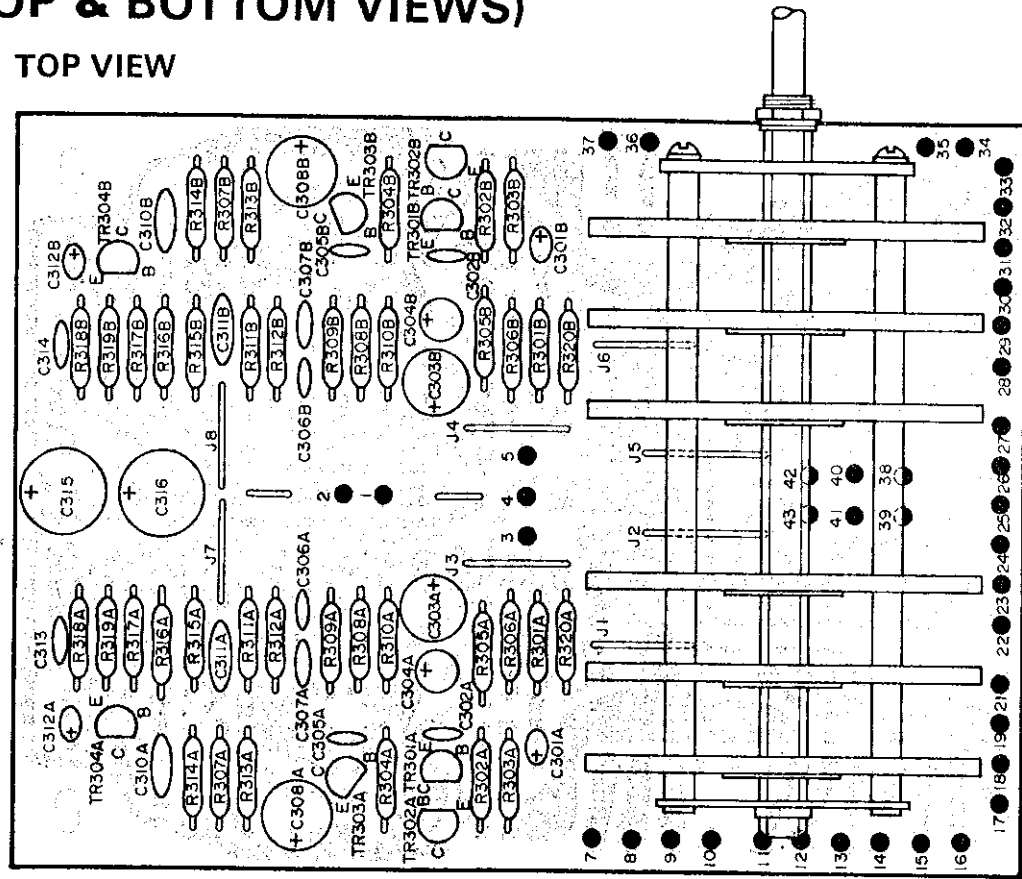


BOTTOM VIEW

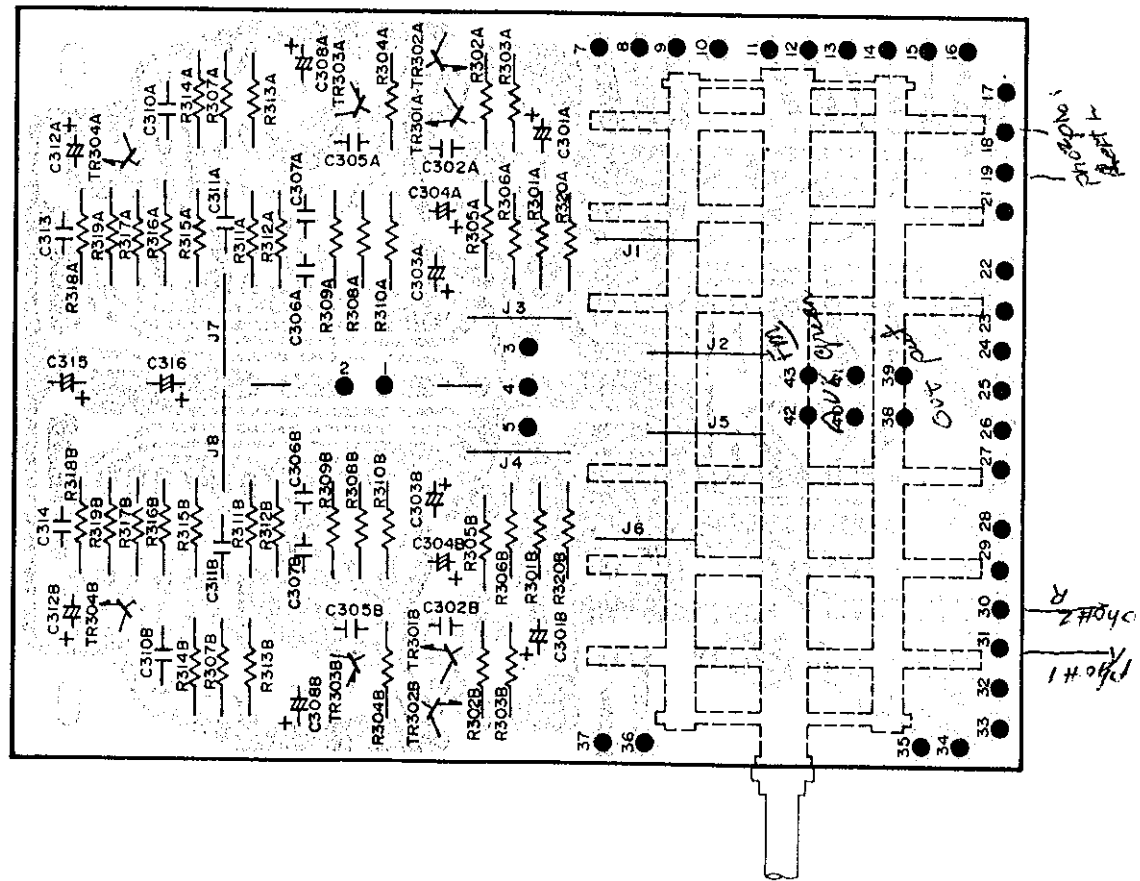


13) PRE AMP with SELECTOR SWITCH P.C.B.
(TOP & BOTTOM VIEWS)

TOP VIEW

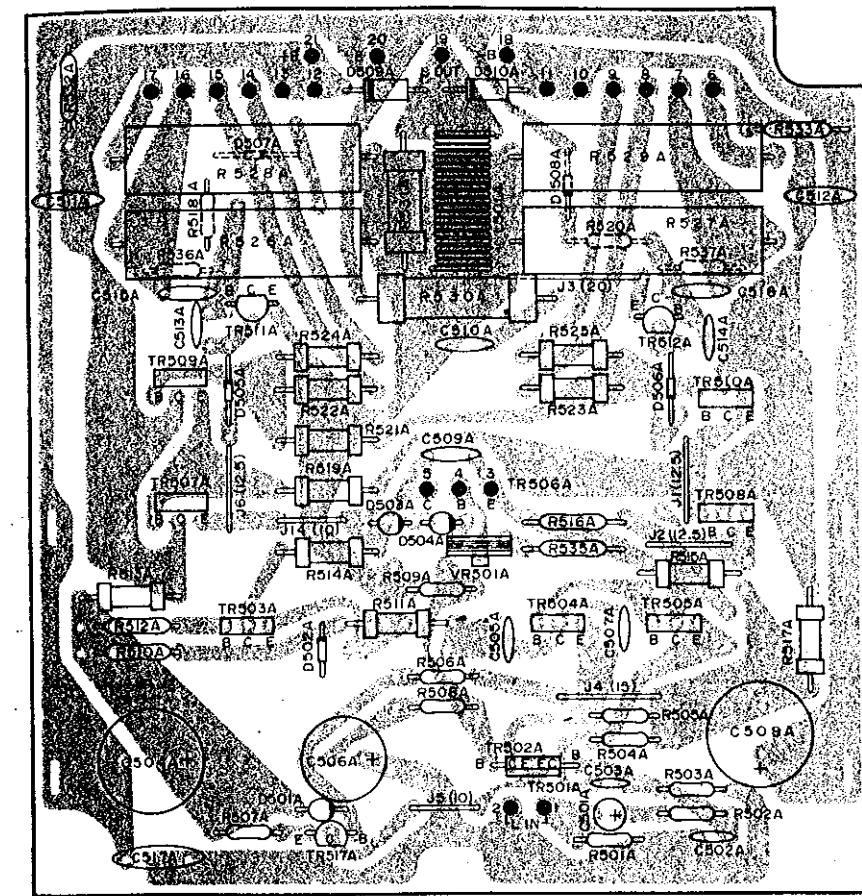


BOTTOM VIEW

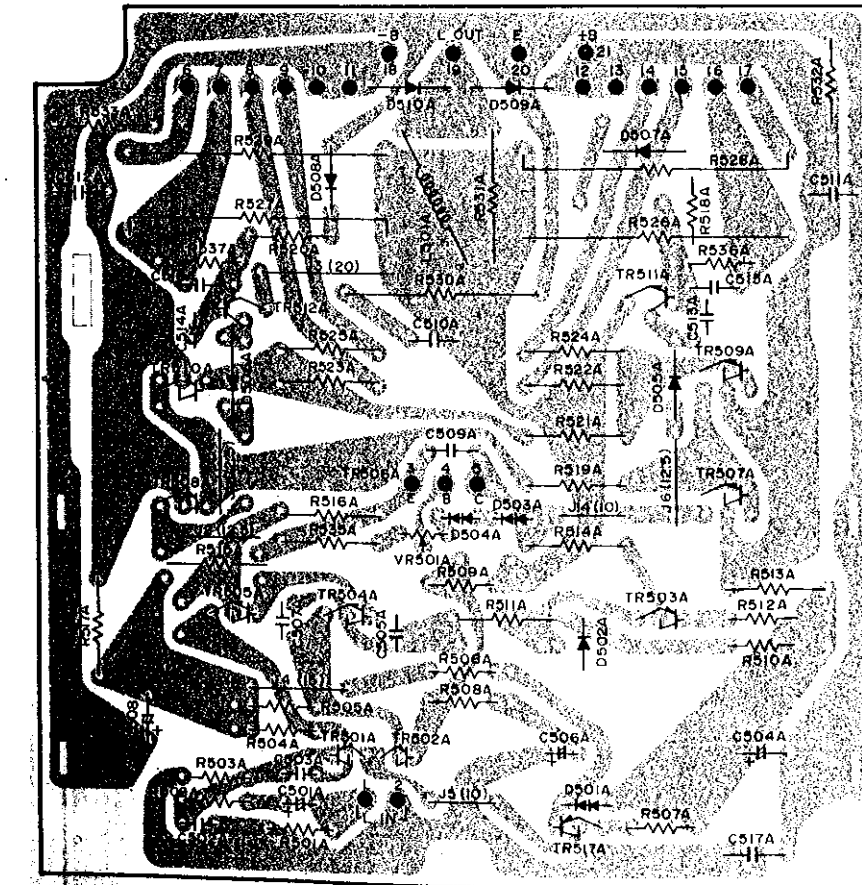


14) MAIN AMP P.C.B. (LEFT) (TOP & BOTTOM VIEWS)

TOP VIEW

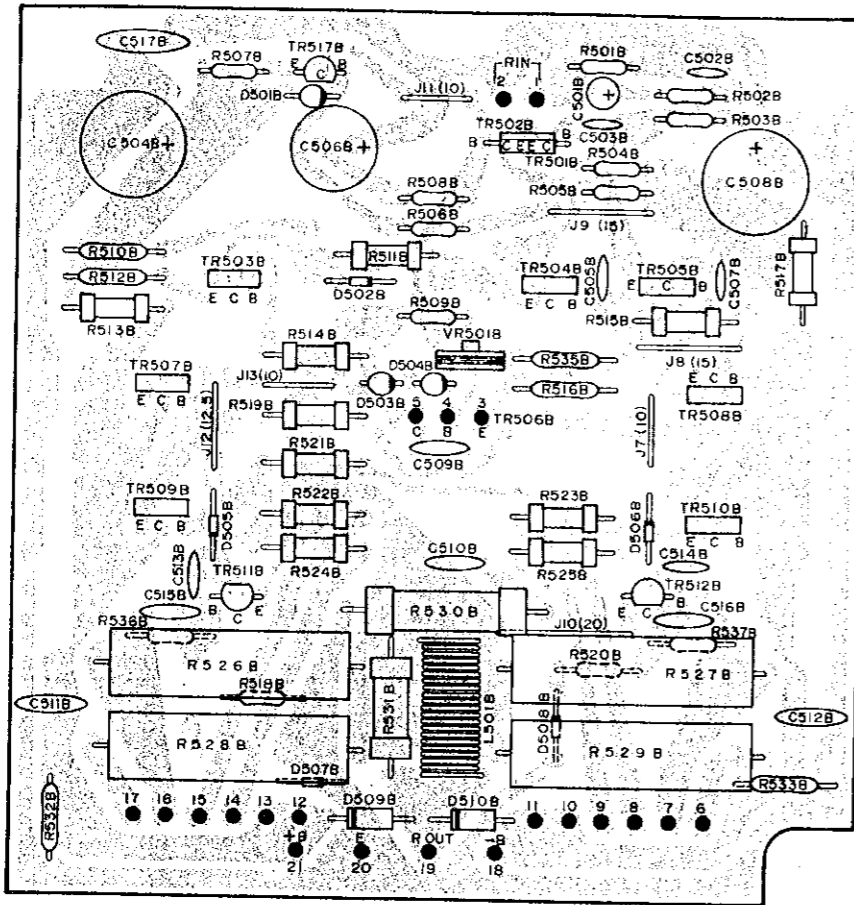


BOTTOM VIEW

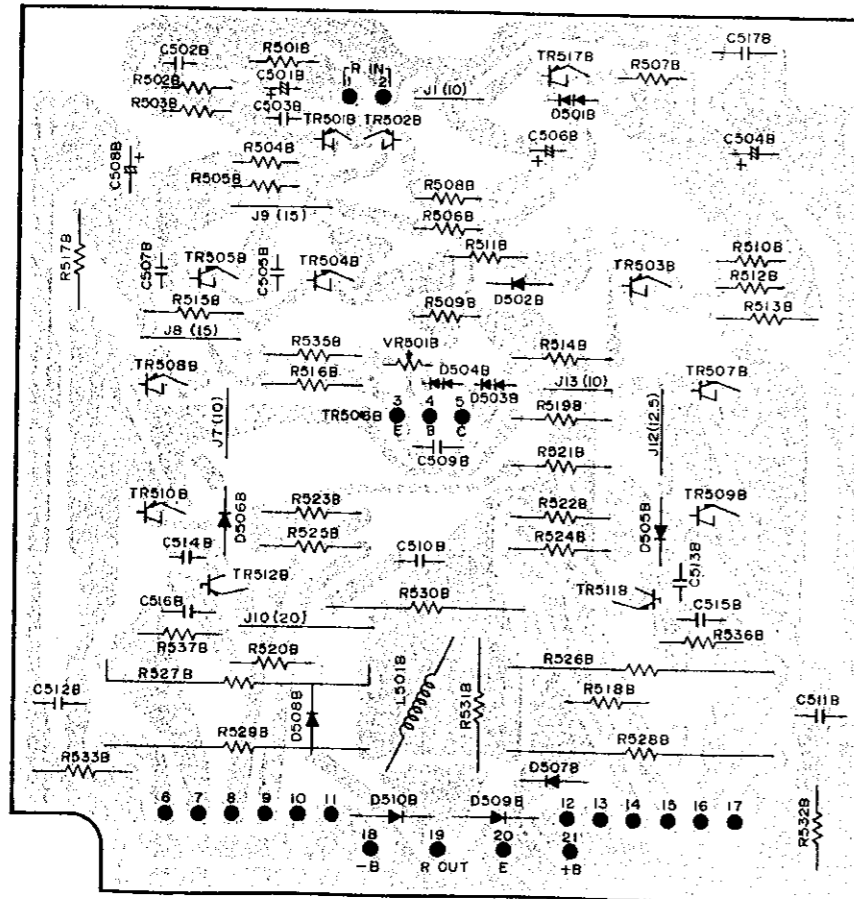


15) MAIN AMP P.C.B. (RIGHT) (TOP & BOTTOM VIEWS)

TOP VIEW

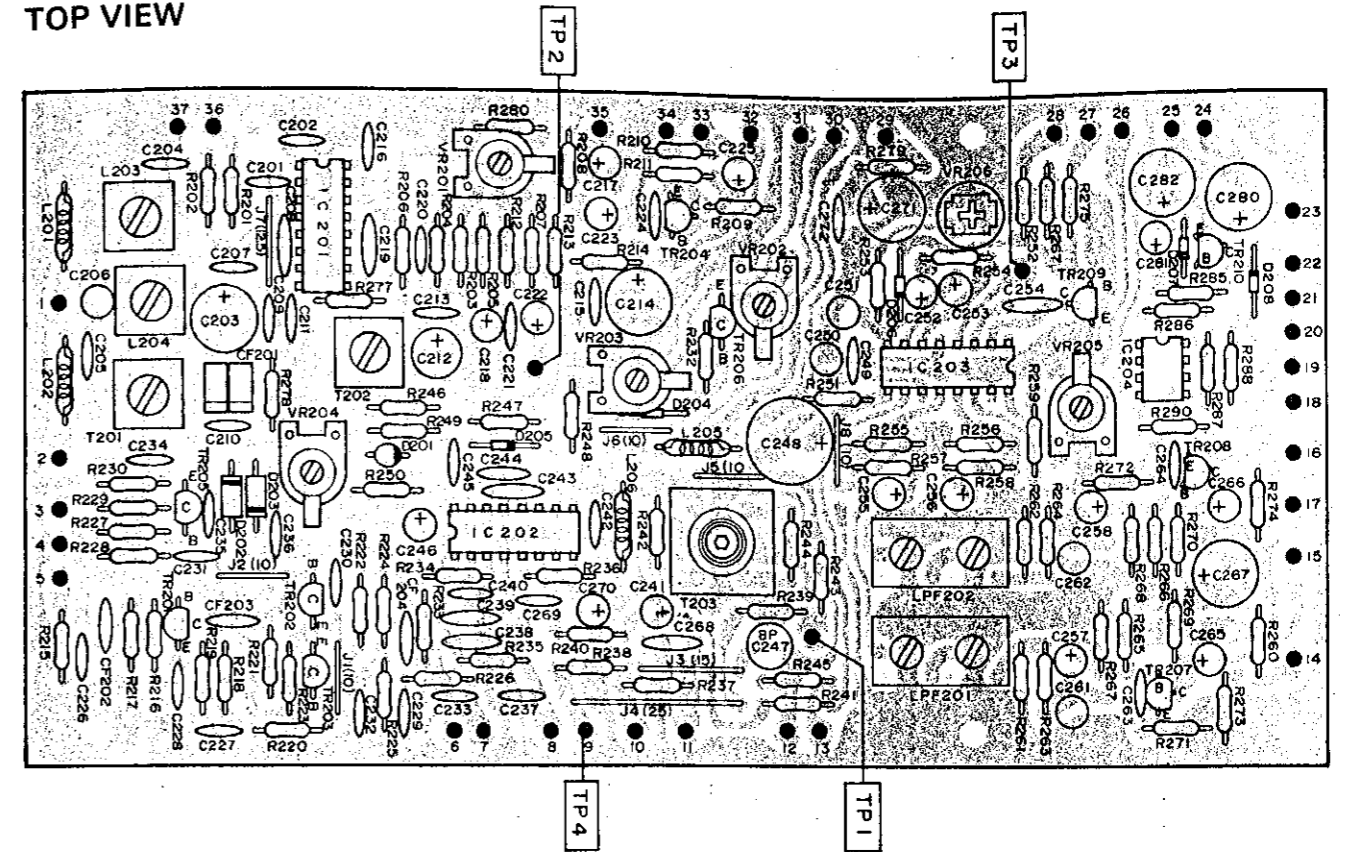


BOTTOM VIEW

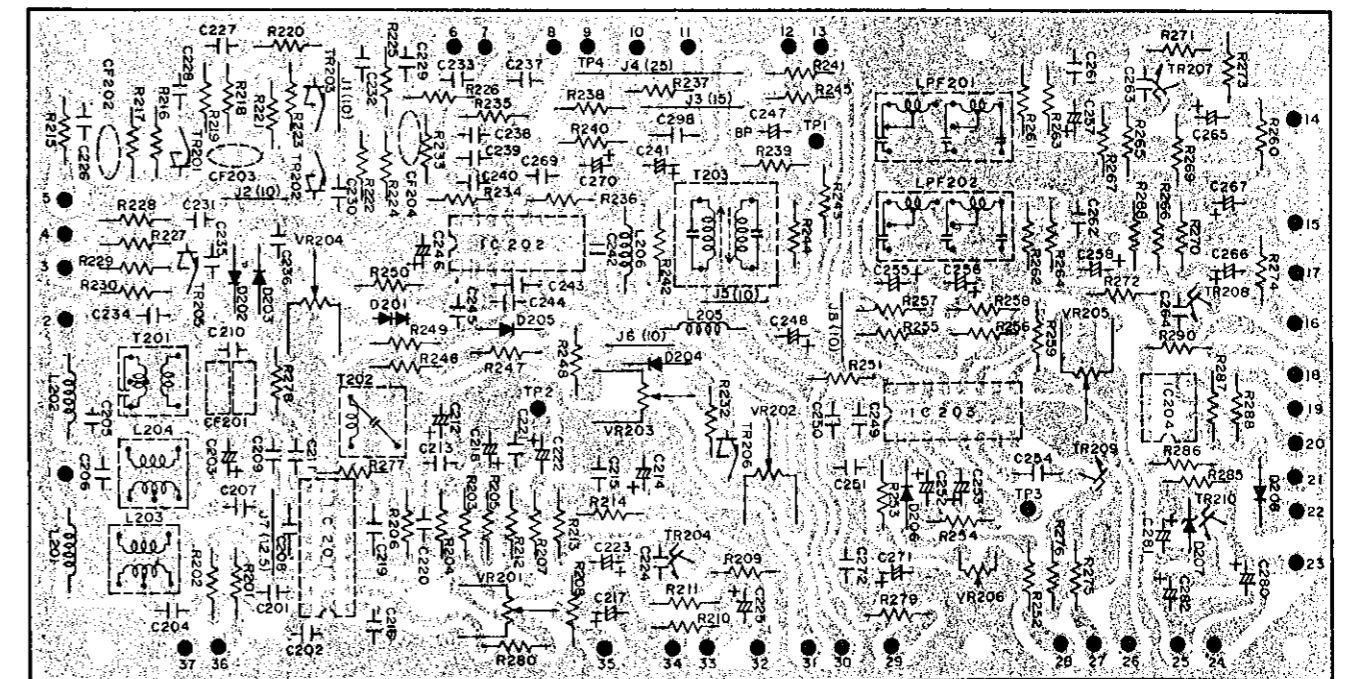


16) IF & MPX P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

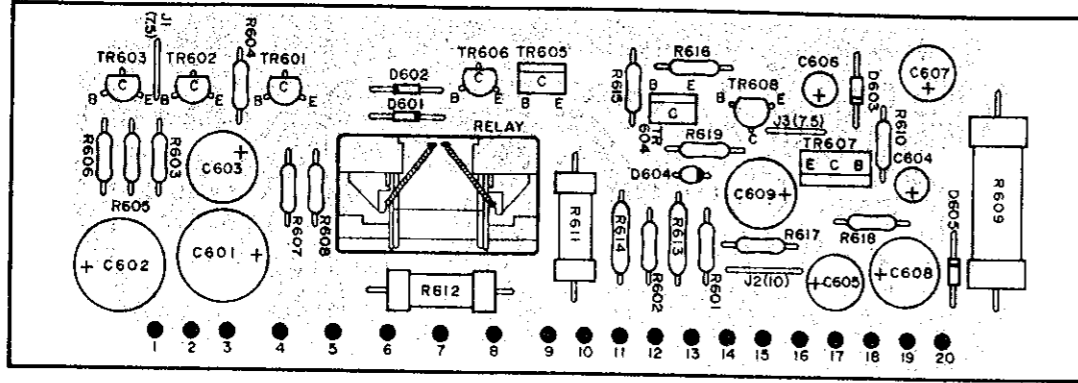


BOTTOM VIEW

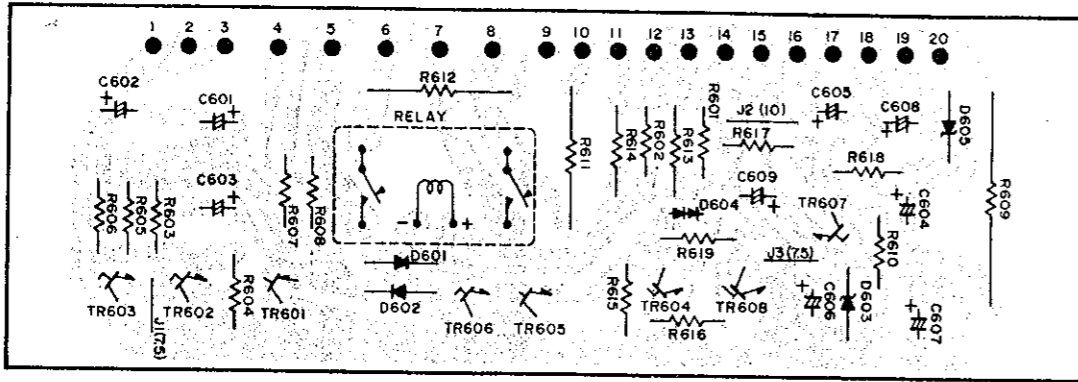


17) PROTECTOR P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

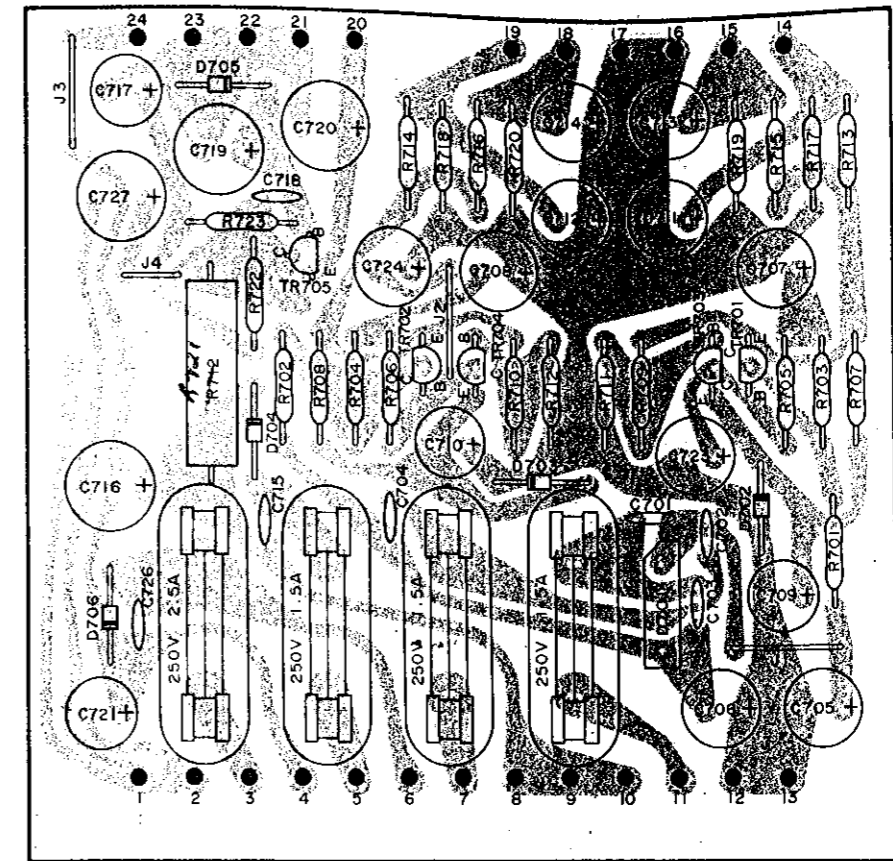


BOTTOM VIEW

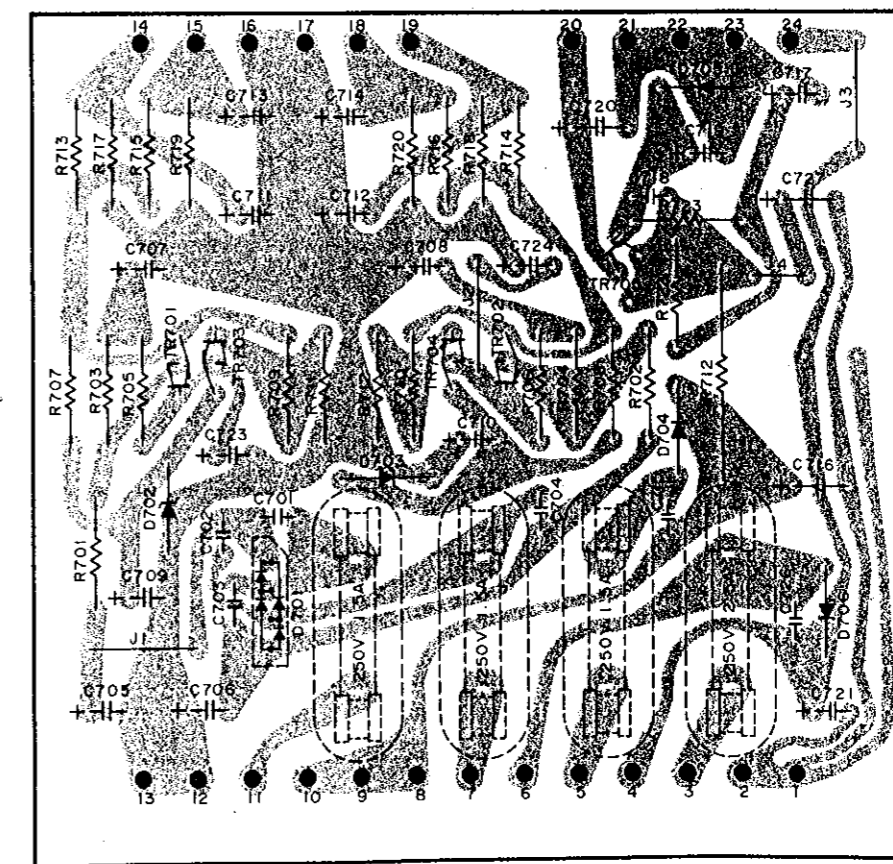


19) POWER SUPPLY P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

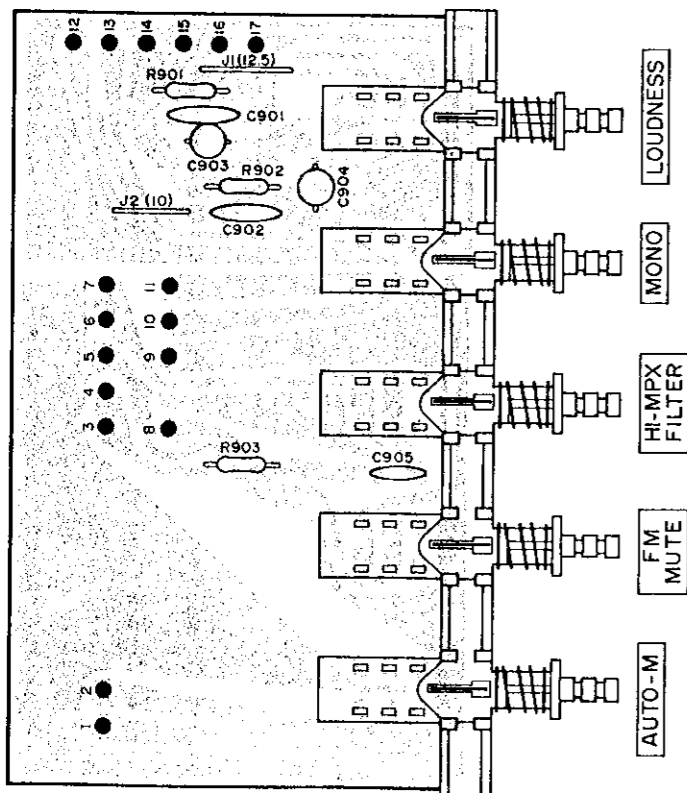


BOTTOM VIEW

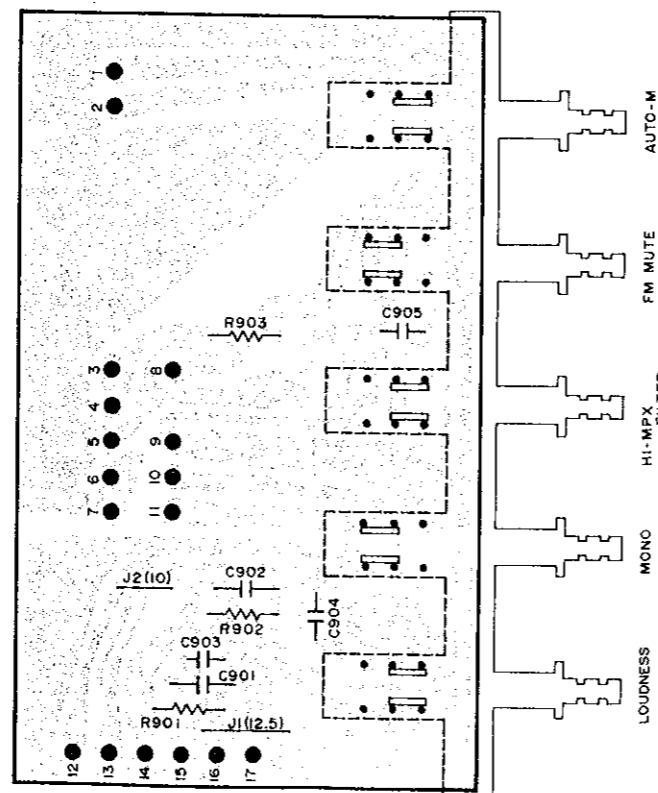


18) MODE SWITCH P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

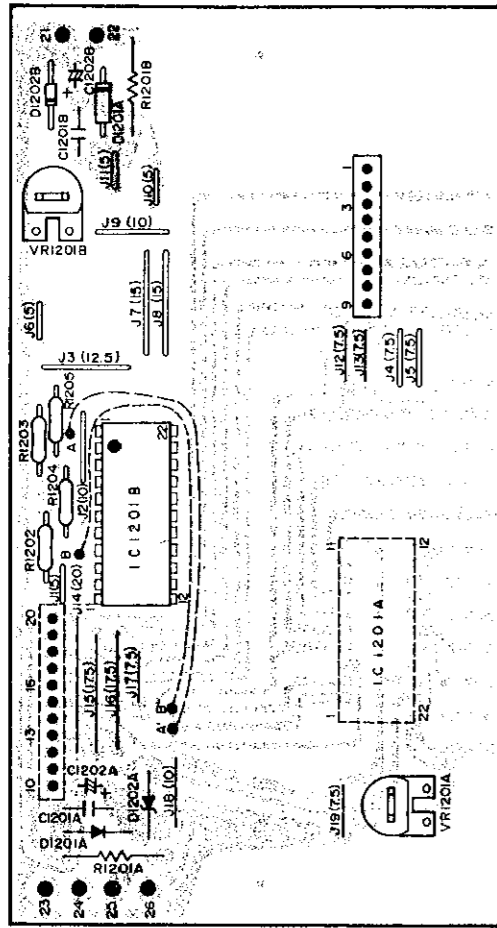


BOTTOM VIEW

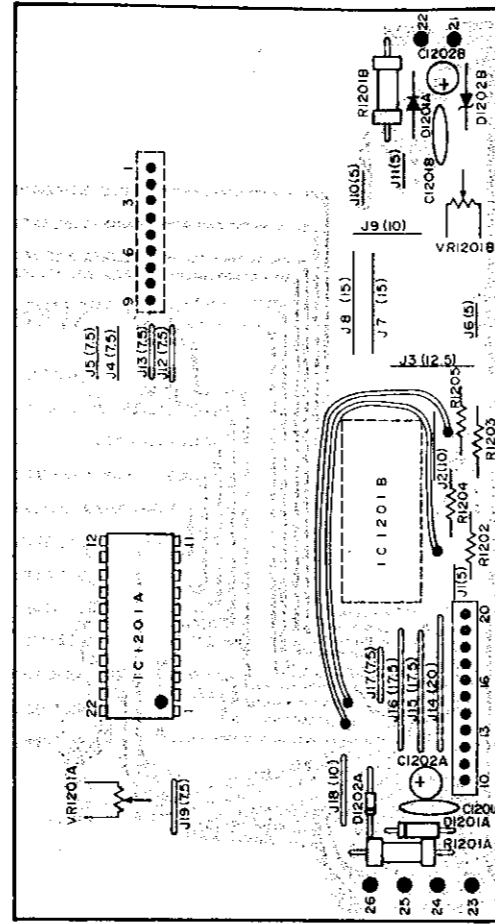


20) POWER METER P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

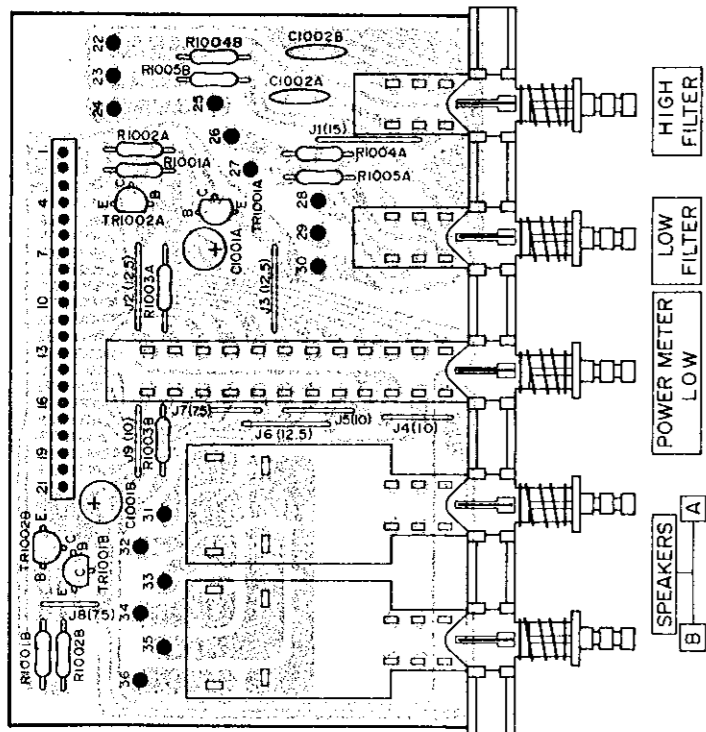


BOTTOM VIEW

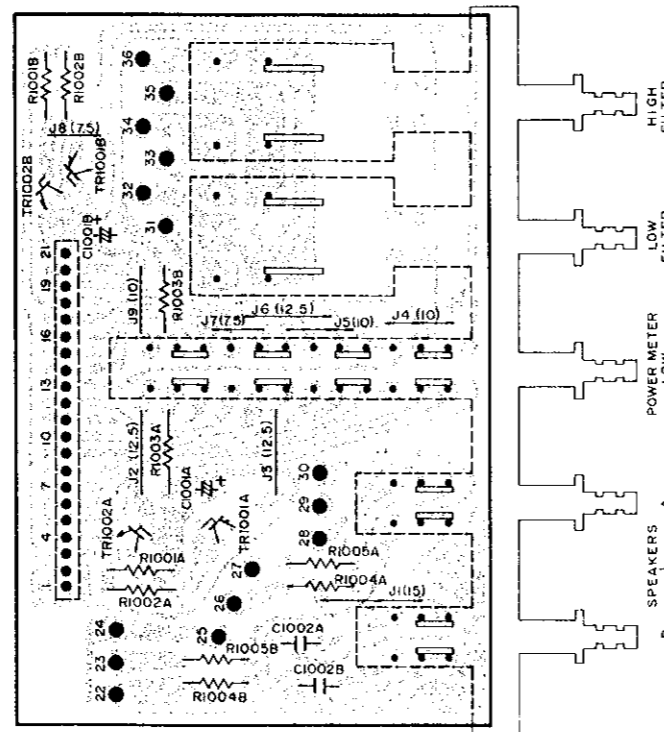


21) SPEAKER SWITCH P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

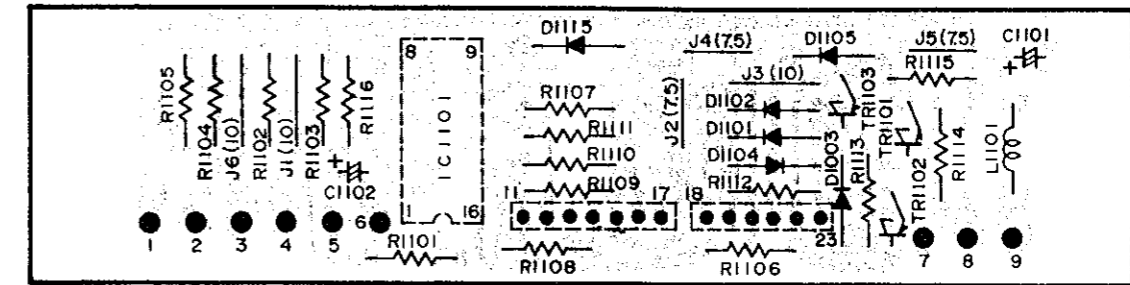
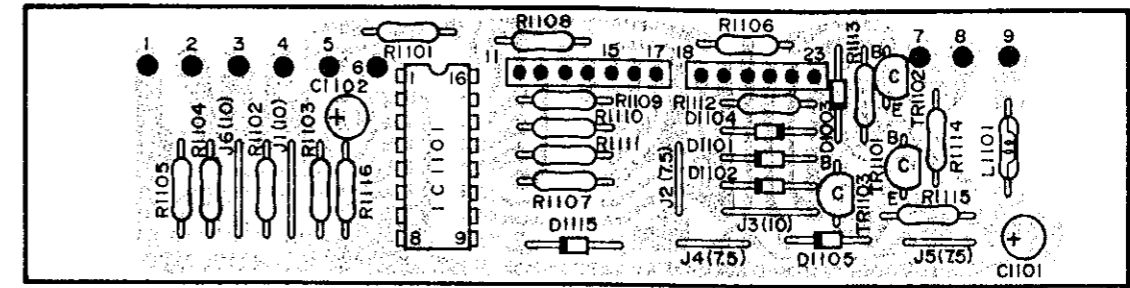


BOTTOM VIEW



22) SIGNAL & TUNING METER P.C.B. (TOP & BOTTOM VIEWS)

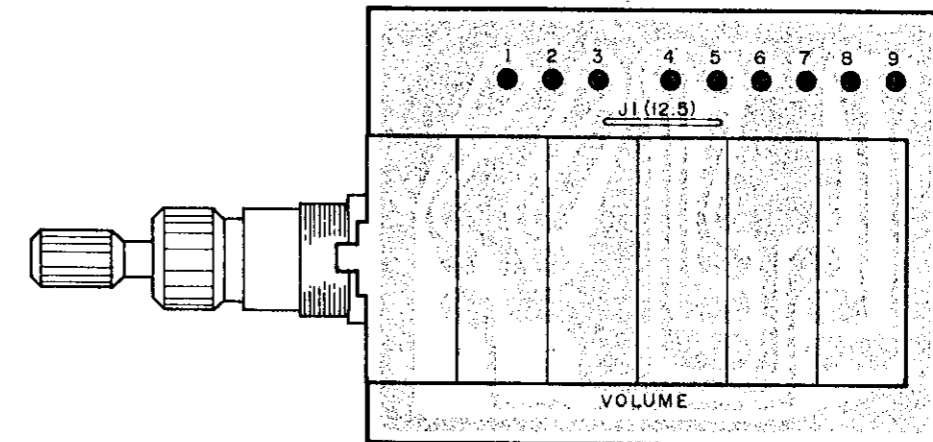
TOP VIEW



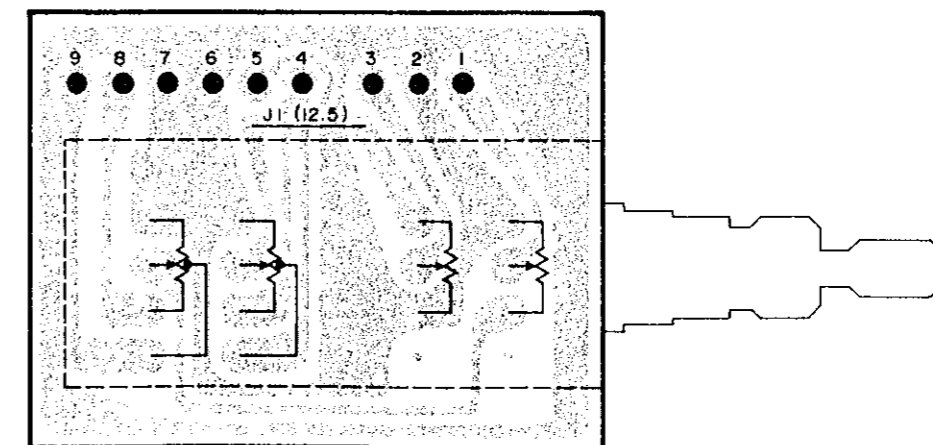
STA-2300

23) VOLUME P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

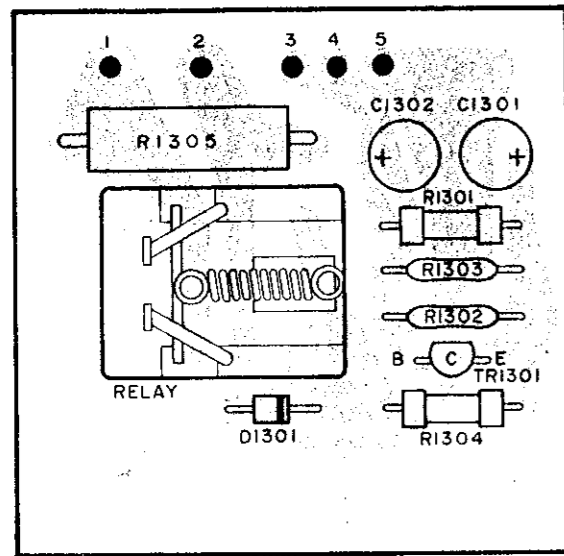


BOTTOM VIEW

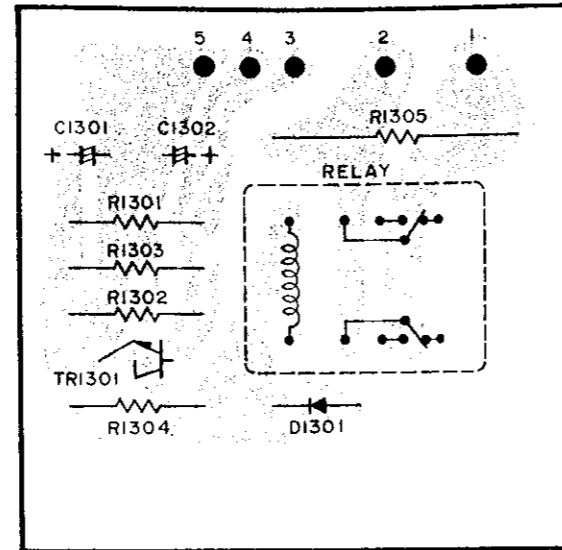


24) RELAY P.C.B. (UL, EUROPEAN, AUSTRALIAN models) (TOP & BOTTOM VIEWS)

TOP VIEW

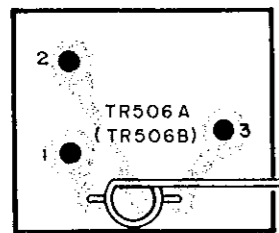


BOTTOM VIEW

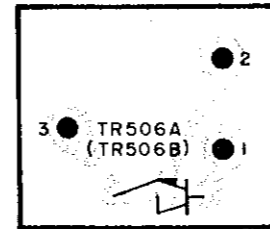


25) SUB P.C.B. FOR MAIN AMP. (LEFT & RIGHT) (TOP & BOTTOM VIEWS)

TOP VIEW

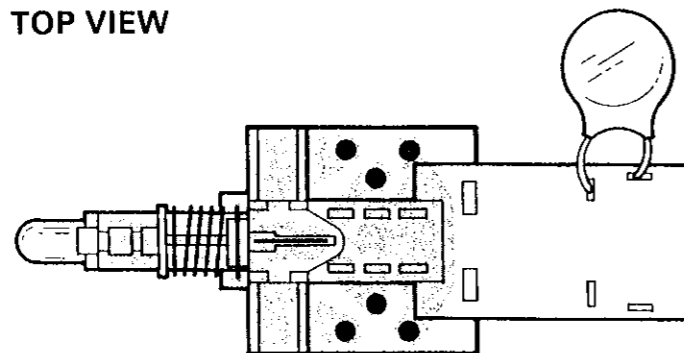


BOTTOM VIEW



26) LED WITH POWER SWITCH P.C.B. (TOP VIEW)

TOP VIEW



27) ELECTRICAL PARTS LIST

CAPACITORS						Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material	R/S Part No.
C1	7p (NPO)	50	± 0.5 pF	Ceramic	CF-1115	C234	0.022 μ	50	+80/-20	Ceramic	
C2	47p	50	± 5	Ceramic	CF-1873	C235	0.001 μ	50	+80/-20	Ceramic	
C3	0.0047 μ	50	+80/-20	Ceramic		C236	0.01 μ	50	+80/-20	Ceramic	
C4	15p (NPO)	50	± 5	Ceramic	CF-1188	C237	0.022 μ	50	+80/-20	Ceramic	
C5	0.0047 μ	50	+80/-20	Ceramic		C238	0.047 μ	50	+80/-20	Ceramic	
C6	15p (NPO)	50	± 5	Ceramic	CF-1188	C239	0.047 μ	50	+80/-20	Ceramic	
C7	7p (NPO)	50	± 0.5pF	Ceramic	CF-1115	C240	0.047 μ	50	+80/-20	Ceramic	
C8	7p	50	± 0.5pF	Ceramic	CF-1120	C241	10 μ	16	+50/-10	Electrolytic	
C9	100p	50	± 5	Ceramic		C242	0.047 μ	50	+80/-20	Ceramic	
C10	0.47p	500	± 5	G-Capacitor		C243	0.047 μ	50	+80/-20	Ceramic	
C11	0.0047 μ	50	+80/-20	Ceramic		C244	0.022 μ	50	+80/-20	Ceramic	
C12	0.022 μ	50	+80/-20	Ceramic		C245	0.022 μ	50	+80/-20	Ceramic	
C13	0.022 μ	50	+80/-20	Ceramic		C246	1 μ	50	+75/-10	Electrolytic	
C14	0.022 μ	50	+80/-20	Ceramic		C247	22 μ	16	+50/-10	Electrolytic (non-polar)	
C15	10p (NPO)	50	± 0.5 pF	Ceramic	CF-1141	C248	470 μ	16	+50/-10	Electrolytic	
C16	33p (NPO)	50	± 0.5pF	Ceramic	CF-1300	C249	0.047 μ	50	± 10	Mylar	
C17	10p (N750)	50	± 0.5pF	Ceramic	CF-1852	C250	680p	50	± 5	Polystyrene	
C18	10p (N750)	50	± 0.5pF	Ceramic	CF-1852	C251	1500p	50	± 5	Polystyrene	
C19	12p (N220)	50	± 5	Ceramic	CF-1181	C252	0.47 μ	25	± 20	Tantalum/Aluminium	
C20	0.022 μ	50	+80/-20	Ceramic			or 0.47 μ	50	+75/-10	Electrolytic	
C21	47 μ	10	+50/-10	Electrolytic		C253	0.22 μ	25	± 20	Tantalum/Aluminium	
C201	0.01 μ	50	+80/-20	Ceramic			or 0.22 μ	50	+75/-10	Electrolytic	
C202	0.001 μ	50	± 10	Mylar			0.1 μ	50	± 10	Mylar	
C203	100 μ	16	+50/-10	Electrolytic		C254	10 μ	16	+50/-10	Electrolytic	
C204	0.01 μ	50	+80/-20	Ceramic		C255	10 μ	16	+50/-10	Electrolytic	
C205	12p (NPO)	50	± 5	Ceramic	CF-1180	C256	10 μ	16	+50/-10	Electrolytic	
C206	340p	50	± 5	Polystyrene		C257	0.47 μ	50	+75/-10	Electrolytic	
C207	0.01 μ	50	+80/-20	Ceramic		C258	0.47 μ	50	+75/-10	Electrolytic	
C208	0.01 μ	50	+80/-20	Ceramic		C259	Not used				
C209	0.022 μ	50	+80/-20	Ceramic		C260	Not used				
C210	56p	50	± 5	Ceramic	CF-1873	C261	6600p	50	± 5	Polystyrene (UL, C.S.A.)	
C211	0.01 μ	50	+80/-20	Ceramic			3900p	50	± 5	Polystyrene (European, Australian)	
C212	47 μ	16	+50/-10	Electrolytic		C261	3900p	50	± 5	Polystyrene (European, Australian)	
C213	0.022 μ	50	+80/-20	Ceramic		C262	6600p	50	± 5	Polystyrene (UL, C.S.A.)	
C214	220 μ	16	+50/-10	Electrolytic			3900p	50	± 5	Polystyrene (European, Australian)	
C215	0.022 μ	50	+80/-20	Ceramic		C262	3900p	50	± 5	Polystyrene (European, Australian)	
C216	0.047 μ	50	+80/-20	Ceramic			220p	50	± 5	Ceramic	
C217	4.7 μ	25	+50/-10	Electrolytic		C263	220p	50	± 5	Ceramic	
C218	3.3 μ	50	+75/-10	Electrolytic		C264	220p	50	± 5	Ceramic	
C219	0.001 μ	50	± 10	Mylar		C265	1 μ	50	+80/-20	Electrolytic	
C220	0.01 μ	50	+80/-20	Ceramic		C266	1 μ	50	+80/-20	Electrolytic	
C221	0.01 μ	50	± 10	Mylar		C267	220 μ	16	+50/-10	Electrolytic	
C222	0.1 μ	50	+75/-10	Electrolytic		C268	0.047 μ	50	+80/-20	Ceramic	
C223	0.47 μ	50	+75/-10	Electrolytic		C269	220p	50	± 5	Ceramic	
C224	220p	50	± 5	Ceramic		C270	4.7 μ	25	+50/-10	Electrolytic	
C225	0.47 μ	50	+75/-10	Electrolytic		C271	220 μ	16	+50/-10	Electrolytic	
C226	0.01 μ	50	+80/-20	Ceramic		C272	0.022 μ	50	+80/-20	Ceramic	
C227	0.022 μ	50	+80/-20	Ceramic		C280	220 μ	25	+50/-10	Electrolytic	
C228	0.022 μ	50	+80/-20	Ceramic		C281	1 μ	50	+75/-10	Electrolytic	
C229	0.022 μ	50	+80/-20	Ceramic		C282	220 μ	16	+50/-10	Electrolytic	
C230	0.047 μ	50	+80/-20	Ceramic		C283	Not Used				
C231	10p	50	± 0.5pF	Ceramic	CF-1883	C284	0.022 μ	50	+80/-20	Ceramic	
C232	0.047 μ	50	+80/-20	Ceramic							
C233	0.022 μ	50	+80/-20	Ceramic							

Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material	R/S Part No.
C301AB	2.2 μ or 2.2 μ	25	± 20	Tantalum	CF-1373
C302AB	100p	50	+75/-10	Electrolytic	
C303AB	47 μ	25	± 10	Ceramic	
C304AB	22 μ	16	+50/-10	Electrolytic	
C305AB	56p	50	+50/-10	Electrolytic	
C306AB	1800p	50	± 10	Ceramic	
C307AB	6800p	50	± 5	Polystyrene	
C308AB	100 μ	25	+50/-10	Electrolytic	
C309AB	Not used				
C310AB	0.15 μ	50	± 5	Mylar	
C311AB	0.15 μ	50	± 5	Mylar	
C312AB	1 μ	50	+75/-10	Electrolytic	
C313	0.047 μ	50	+80/-20	Ceramic	
C314	0.047 μ	50	+80/-20	Ceramic	
C315	220 μ	25	+50/-10	Electrolytic	
C316	220 μ	25	+50/-10	Electrolytic	
C401AB	4.7 μ	25	+50/-10	Electrolytic	
C402AB	4.7 μ	25	+50/-10	Electrolytic (low-noise)	
C403AB	440p	50	± 5	Polystyrene	
C404AB	900p	50	± 5	Polystyrene	
C405AB	100p	50	± 5	Polystyrene	
C406AB	Not used				
C407AB	Not used				
C408AB	0.056 μ	50	± 10	Mylar	
C409AB	0.027 μ	50	± 10	Mylar	
C410AB	4.7 μ	25	+50/-10	Electrolytic (low-noise)	CF-1174
C411AB	10p	50	± 5	Ceramic	
C412AB	4.7 μ	25	+50/-10	Electrolytic (low-noise)	
C413AB	1 μ	50	+75/-10	Electrolytic (low-noise)	
C414AB	0.0068 μ	50	± 10	Mylar	
C415AB	0.0039 μ	50	± 10	Mylar	
C416AB	4.7 μ	25	+50/-10	Electrolytic (low-noise)	
C417AB	10p	50	± 5	Ceramic	
C418AB	4.7 μ	25	+50/-10	Electrolytic (low-noise)	
C419AB	1 μ	50	+75/-10	Electrolytic (non-polar)	
C420AB	0.056 μ	50	± 10	Mylar	
C421AB	0.039 μ	50	± 10	Mylar	
C422AB	33p	50	± 5	Ceramic	CF-1999
C423AB	4.7 μ	25	+50/-10	Electrolytic (non-polar)	
C424AB	22p	50	± 5	Ceramic	CF-1878
C425	330 μ	25	+50/-10	Electrolytic	
C426	330 μ	25	+50/-10	Electrolytic	
C427AB	100 μ	25	+50/-10	Electrolytic	
C428AB	68p	50	± 5	Ceramic	
C501AB	4.7 μ	50	+50/-10	Electrolytic (low-noise)	(After Serial No. 1001)
C502AB	470p	50	± 5	Ceramic	CF-1828
C503AB	22p	50	± 5	Ceramic	
C504AB	100 μ	80	+50/-10	Electrolytic	
C505AB	220p	50	± 5	Ceramic	CF-1874
C506AB	47 μ	50	+50/-10	Electrolytic	
C507AB	22p	50	± 5	Ceramic	CF-1878
C508AB	100 μ	80	+50/-10	Electrolytic	
C509AB	0.047 μ	50	± 10	Mylar	
C510AB	0.082 μ	50	± 10	Mylar	
C511AB	0.1 μ	50	± 10	Mylar	
C512AB	0.1 μ	50	± 10	Mylar	
C513AB	3.3 μ	50	+75/-10	Electrolytic	
C514AB	3.3 μ	50	+75/-10	Electrolytic	
C515AB	0.022 μ (UL)	50	± 10	Mylar	
C516AB	0.022 μ (UL)	50	± 10	Mylar	
C517AB	0.1 μ	50	± 10	Mylar	
C601	330 μ	16	+50/-10	Electrolytic	
C602	330 μ	16	+50/-10	Electrolytic	
C603	220 μ	16	+50/-10	Electrolytic	
C604	10 μ	16	+50/-10	Electrolytic	
C605	100 μ	10	+50/-10	Electrolytic	
C606	10 μ	16	+50/-10	Electrolytic	
C607	100 μ	25	+50/-10	Electrolytic	
C608	220 μ	10	+50/-10	Electrolytic	
C609	220 μ	16	+50/-10	Electrolytic	
C701	0.047 μ	50	+80/-20	Ceramic	
C702	0.047 μ	50	+80/-20	Ceramic	
C703	0.047 μ	50	+80/-20	Ceramic	
C704	0.047 μ	50	+80/-20	Ceramic	
C705	220 μ	35	+50/-10	Electrolytic	
C706	220 μ	35	+50/-10	Electrolytic	
C707	100 μ	35	+50/-10	Electrolytic	
C708	100 μ	35	+50/-10	Electrolytic	
C709	100 μ	10	+50/-10	Electrolytic	
C710	100 μ	10	+50/-10	Electrolytic	
C711	220 μ	25	+50/-10	Electrolytic	
C712	220 μ	25	+50/-10	Electrolytic	
C713	220 μ	25	+50/-10	Electrolytic	
C714	220 μ	25	+50/-10	Electrolytic	
C715	0.047 μ	150	+80/-20	Ceramic	
C716	470 μ	35	+50/-10	Electrolytic	
C717	100 μ	25	+50/-10	Electrolytic	
C718	100p	50	± 5	Ceramic	CF-1858
C719	330 μ	16	+50/-10	Electrolytic	
C720	220 μ	16	+50/-10	Electrolytic	
C721	1000 μ	16	+50/-10	Electrolytic	
C722	Not used				
C723	Not used				
C724	0.047 μ	50	+80/-20	Ceramic	
C725	0.047 μ	50	+80/-20	Ceramic	
C726	0.047 μ	50	+80/-20	Ceramic	
C727	470 μ	25	+50/-10	Electrolytic	
C901	0.1 μ	50	± 10	Mylar	
C902	0.1 μ	50	± 10	Mylar	
C903	150p	50	± 5	Polystyrene	
C904	150p	50	± 5	Polystyrene	
C905	0.0018 μ	50	± 5	Mylar	

Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material	R/S Part No.
C1001AB	6.8 μ	25	+50/-10	Electrolytic	
C1002AB	0.027 μ	50	± 10	Mylar	
C1101	10 μ	16	+50/-10	Electrolytic	
C1102	0.1 μ	50	+75/-10	Electrolytic	
C1201AB	0.047 μ	50	± 10	Mylar	
C1202AB	4.7 μ	25	+50/-10	Electrolytic	
C1301	100 μ	35	+50/-10	Electrolytic	
C1302	100 μ	16	+50/-10	Electrolytic	
C1401	0.022 μ	50	+80/-20	Ceramic	
C1402	0.022 μ	50	+80/-20	Ceramic	
C1403	0.022 μ	50	+80/-20	Ceramic	
C1404	0.01 μ	125	+80/-20	Ceramic	
C1404	0.01 μ	125	+80/-20	Ceramic	
C1404	0.01 μ	250	+80/-20	Ceramic	
C1405	0.022 μ	50	+80/-20	Ceramic	
C1406	0.022 μ	50	+80/-20	Ceramic	
C1407	0.022 μ	50	+80/-20	Ceramic	
C1408	0.022 μ	50	+80/-20	Ceramic	
C1409	0.047 μ	150	+80/-20	Ceramic	
C1410	0.047 μ	150	+80/-20	Ceramic	
C1411	0.047 μ	150	+80/-20	Ceramic	
C1412	0.047 μ	150	+80/-20	Ceramic	
C1413	15000 μ	71	+50/-10	Electrolytic (Lug)	CF-7207
C1414	15000 μ	71	+50/-10	Electrolytic (Lug)	CF-7207
C1415	0.01 μ	250	+80/-20	Ceramic	
C1501	0.1 μ	50	+75/-10	Electrolytic	
C1502	47 μ	10	+50/-10	Electrolytic	
C1503	100 μ	35	+50/-10	Electrolytic	

CERAMIC FILTERS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
CF201	AM Ceramic Filter SFZ455F	C-1027	P-130094
CF202	FM Ceramic Filter SFE-10.7MA-8-M	CA-7536	P-140030
CF203	FM Ceramic Filter SFE-10.7MA-8-M	CA-7536	P-140030
CF204	FM Ceramic Filter SFE-10.7MA-8-M	CA-7536	P-140030

COILS & TRANSFORMERS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
L1	FM Antenna Coil	CA-0680	P-110109
L2	FM RF Coil	CA-5103	P-110110
L3	FM RF Coil	CA-5104	P-110111

Ref. No.	Description	R/S Part No.	Mfr's Part No.
L4	FM OSC Coil	CA-5028	P-120086
L5	Micro Inductor (2.2 μH)	CA-5072	P-360034
L201	Micro Inductor (2.2 μH ± 10%)	CA-7873	P-360021, P-360034 or P-360096
L202	Micro Inductor (2.2 μH ± 10%)	CA-7873	P-360021, P-360034 or P-360096
L203	AM RF Coil (OR-115 or OR-092)	CA-5105	P-340115 or P-340092
L204	AM OSC Coil (OC-108 or OC-091)	CA-5106	P-120108 or P-120091
L205	Micro Inductor (2.2 μH ± 10%)	CA-7873	P-360021, P-360034 or P-360096
L206	Micro Inductor (18 μH ± 5%)	CA-7872	P-360029, P-360043 or P-360047
L501A	Choke Coil (2 μH)	CB-2298	P-370009
L501B	Choke Coil (2 μH)	CA-7987	P-370032
L1101	Micro Inductor (180 μH ± 10%)	CA-5521	P-360083
L1401	AM Antenna Coil (260 μH)		P-110140
L1402	Balun Coil (75Ω:300Ω)		P-110107
L1403	Micro Inductor (2.2 μH ± 10%)	CA-7873	P-360021
T1	FM IFT (7F-007)	CA-7970	P-140007
T201	AM IFT (OA-096 or OA-095)	CA-8061	P-130096 or P-130095
T202	AM IFT (OA-097 or OA-048)	CA-7882	P-130097 or P-130048
T203	FM IFT (3F-063)	CA-8060	P-140063
PT1	Power Transformer (UL) 120VAC, 60 Hz	TA-0877	P-100823
PT1	Power Transformer (C.S.A.) 120VAC, 60 Hz		P-100822
PT1	Power Transformer 230V/240V AC, 50 HZ (European, Australian)		P-100682

DIODES

Ref. No.	Description	R/S Part No.	Mfr's Part No.
D1	Varicap ITT-410	C-4304	ITT
D201	Varistor VD-1221	DX-0513	NEC
D202	1S-188FM	DX-0241	SANYO
D203	1S-188FM	DX-0241	SANYO
D204	ITT-73N	DX-1008	ITT

Ref. No.	Description	R/S Part No.	Manufacturer	FUSES			
				Ref. No.	Description	R/S Part No.	Mfr's Part No.
D205	ITT-73N	DX-1008	ITT	F1	Fuse 1.5A, 250V	HF-0004	P-250007 or P-250123
D206	ITT-73N	DX-1008	ITT				
D207	Zener RD13E, WZ-130 or HZ12B	DX-0405 DX-0537	NEC, JRC or HITACHI				
D208	ITT-73N	DX-1008	ITT				
D501AB	Varistor VD-1221	DX-0517	NEC	F2	Fuse 2.5A, 250V	HF-0021	P-250008 or P-250125
D502AB	ITT-73N	DX-1008	ITT				
D503AB	Varistor VD-1221	DX-0517	NEC				
D504AB	Varistor VD-1221	DX-0517	NEC				
D505AB	ITT-73N	DX-1008	ITT	F3	Fuse 1.5A, 250V	HF-0004	P-250007 or P-250123
D506AB	ITT-73N	DX-1008	ITT				
D507AB	ITT-73N	DX-1008	ITT				
D508AB	ITT-73N	DX-1008	ITT				
D509AB	SR-1K-8	DX-1052	UNIZON	F4	Fuse 1.5A, 250V	H-U33	P-250102 or P-250120
D510AB	SR-1K-8	DX-1052	UNIZON				
D601	ITT-73N	DX-1008	ITT				
D602	ITT-73N	DX-1008	ITT				
D603	Zener RD13E, WZ-130 or HZ12B	DX-1335 DX-0537	NEC, JRC or HITACHI	F1401	Fuse 8A, 125V (UL, C.S.A.)	H-U33	P-250102 or P-250120
D604	Varistor VD-1221	DX-0517	NEC				
D605	Zener RD9.1E, WZ-088 or HZ9B	DX-0153 DX-1115	UNIZON or INTER-RECTIFIER				
D701	Bridge SVB10-200	DX-1115	UNIZON				
D702	Zener RD8.2E, WZ-081 or HZ9A	DX-1440 DX-0532 DX-1447	NEC, JRC or HITACHI	F1401	Fuse 4A, 250V (European, Australian)	H-U33	P-250095
D703	Zener RD8.2E, WZ-081 or HZ9A	DX-1440 DX-0532	NEC, JRC or HITACHI				
D704	SR-1K-2 or 10E-1	DX-0475 DX-1039	UNIZON or INTER-RECTIFIER				
D705	Zener RD13E, WZ-130 or HZ12B	DX-1335 DX-0537 DX-1154	NEC, JRC or HITACHI				
D706	SR-1K-2 or 10E-1	DX-0475 DX-1039	UNIZON or INTER-RECTIFIER	IC201	HA-1197	MX-3467	HITACHI
D1101	ITT-73N	DX-1008	ITT				
D1102	ITT-73N	DX-1008	ITT				
D1103	ITT-73N	DX-1008	ITT				
D1104	ITT-73N	DX-1008	ITT	IC202	LA-1231	MX-4368	SANYO
D1105	ITT-73N	DX-1008	ITT				
D1115	ITT-73N	DX-1008	ITT				
D1201AB	1K-100-350	DX-0033	UNIZON				
D1202AB	Zener RD11E, WZ-110 or HZ11B	DX-0976	NEC, JRC or HITACHI	IC203	LA-3350 SS	MX-3768	SANYO
D1301	SR-1K-2 or 10E-1	DX-0475 DX-1039	UNIZON or INTER-RECTIFIER				
D1401	Bridge S15VB-20	DX-1117	SHIN-DENGEN				
D1501	SR-1K-2 or 10E-1	DX-0475 DX-1039	UNIZON or INTER-RECTIFIER				
				INTEGRATED CIRCUITS (IC's)			
				Ref. No.	Description	R/S Part No.	Manufacturer
				IC201	HA-1197	MX-3467	HITACHI
				IC202	LA-1231	MX-4368	SANYO
				IC203	LA-3350 SS	MX-3768	SANYO
IC204	NJM-4558 DD	MX-3449	JRC				
IC1101	1R-2434	MX-4674	SHARP				
IC1201A	1R-2406G	MX-4362	SHARP				
IC1201B	1R-2406G	MX-4362	SHARP				
				LAMPS			
				Ref. No.	Description	R/S Part No.	Mfr's Part No.
				PL1401	Dial Lamp 0.3A, 8V (L: 320mm)		P-240108
				PL1402	Dial Lamp 0.3A, 8V (L: 320mm)		P-240108
				PL1403	Dial Lamp 0.3A, 8V (L: 160mm)		P-240109
PL1404	Dial Lamp 0.3A, 8V (L: 160mm)		P-240109				
				LIGHT EMITTING DIODES (LED's)			
				Ref. No.	Description	R/S Part No.	Manufacturer
				D1106	LED SLP-151B (red)	L-1185	SANYO
				D1107	LED SLP-151B (red)	L-1185	SANYO
				D1108	LED SLP-251B (green)	L-1268	SANYO
D1109	LED SLP-251B (green)	L-1268	SANYO				
D1110	LED SLP-251B (green)	L-1268	SANYO				
D1111	LED SLP-251B (green)	L-1268	SANYO				
D1112	LED SLP-139B (red)	L-1267	SANYO				
D1113	LED SLP-251B (green)	L-1268	SANYO				
D1114	LED SLP-139B (red)	L-1267	SANYO				

Ref. No.	Description	R/S Part No.	Manufacturer	Ref. No.	Value (ohm)	Wattage (W)	Tolerance (%)	Material	R/S Part No.		
										D1203AB	LED SLP-251D (green)
D1204AB	LED SLP-251D (green)	L-1269	SANYO	R13	15K	¼	±5	Carbon	NEE-0297		
D1205AB	LED SLP-251D (green)	L-1269	SANYO	R14	2.2K	¼	±5	Carbon	NEE-0216		
D1206AB	LED SLP-251D (green)	L-1269	SANYO	R15	10K	¼	±5	Carbon	NEE-0281		
D1207AB	LED SLP-251D (green)	L-1269	SANYO	R16	10K	¼	±5	Carbon	NEE-0281		
D1208AB	LED SLP-251D (green)	L-1269	SANYO	R17	220K	¼	±5	Carbon	NEE-0396		
D1209AB	LED SLP-251D (green)	L-1269	SANYO	R18	240K	¼	±5	Carbon	NEE-0396		
D1210AB	LED SLP-251D (green)	L-1269	SANYO	R19	22	¼	±5	Carbon	NEE-0078		
D1211AB	LED SLP-251D (green)	L-1269	SANYO	R201	220	¼	±5	Carbon	NEE-0149		
D1212AB	LED SLP-251D (green)	L-1269	SANYO	R202	2.2K	¼	±5	Carbon	NEE-0216		
D1213AB	LED SLP-532D (green & red)	L-1270	SANYO	R203	10K	¼	±5	Carbon	NEE-0281		
D1214AB	LED SLP-532D (green & red)	L-1270	SANYO	R204	10K	¼	±5	Carbon	NEE-0281		
D1601	LED SLP-251B (green)	L-1271	SANYO	R205	3.3K	¼	±5	Carbon	NEE-0230		
D1602	LED SLP-251B (green)	L-1271	SANYO	R206	82	¼	±5	Carbon	NEE-0122		
D1603	LED SLP-251B (green)	L-1271	SANYO	R207	10K	¼	±5	Carbon	NEE-0281		
D1604	LED SLP-251B (green)	L-1271	SANYO	R208	4.7K	¼	±5	Carbon	NEE-0247		
D1605	LED SLP-251B (green)	L-1271	SANYO	R209	1K	¼	±5	Carbon	NEE-0196		
D1606	LED SLP-151B (red) LED SLP-530D or GL-53RG (green & red)	L-1271	SANYO	R210	39K	¼	±5	Carbon	NEE-0330		
LOW PASS FILTERS	LPF201 LPF202	C-0997	P-510014	R211	1.5M	¼	±5	Carbon	NEE-0450		
				R212	100	¼	±5	Carbon	NEE-0132		
				R213	5.6K	¼	±5	Carbon	NEE-0257		
				R214	22	¼	±5	Carbon	NEE-0078		
				R215	100	¼	±5	Carbon	NEE-0132		
				R216	3.3K	¼	±5	Carbon	NEE-0230		
				R217	560	¼	±5	Carbon	NEE-0176		
				R218	390	¼	±5	Carbon	NEE-0162		
				R219	1K	¼	±5	Carbon	NEE-0196		
				R220	100	¼	±5	Carbon	NEE-0132		
				R221	470	¼	±5	Carbon	NEE-0169		
				R222	330	¼	±5	Carbon	NEE-0159		
				R223	330	¼	±5	Carbon	NEE-0159		
				R224	12K	¼	±5	Carbon	NEE-0288		
				R225	1.8K	¼	±5	Carbon	NEE-0210		
R226	100	¼	±5	Carbon	NEE-0132						
R227	15K	¼	±5	Carbon	NEE-0297						
R228	2.2K	¼	±5	Carbon	NEE-0216						
R229	2.7K	¼	±5	Carbon	NEE-0224						
R230	820	¼	±5	Carbon	NEE-0187						
R231	Not used										
R232	15K	¼	±5	Carbon	NEE-0297						
R233	100	¼	±5	Carbon	NEE-0132						
R234	220	¼	±5	Carbon	NEE-0149						
R235	100K	¼	±5	Carbon	NEE-0371						
R236	56K	¼	±5	Carbon	NEE-0345						
R237	100K	¼	±5	Carbon	NEE-0371						
R238	470K	¼	±5	Carbon	NEE-0423						
R239	1.5K	¼	±5	Carbon	NEE-0206						
R240	1K	¼	±5	Carbon	NEE-0196						
R241	100	¼	±5	Carbon	NEE-0132						
R242	3.9K	¼	±5	Carbon	NEE-0237						
R243	8.2K	¼	±5	Carbon	NEE-0271						
R244	2.7K	¼	±5	Carbon	NEE-0224						
R245	18K	¼	±5	Carbon	NEE-0303						
R246	47K	¼	±5	Carbon	NEE-0340						
R247	2.2K	¼	±5	Carbon	NEE-0216						
R248	10K	¼	±5	Carbon	NEE-0281						
RELAYS											
Ref. No.	Description	R/S Part No.	Mfr's Part No.	RY601	Reed Relay (L-24) Speaker Relay (G2Z-222P) Power Relay (MS24D2-D) (UL) Power Relay G2W-11129-V) (European, Australian)	R-8135 R-8100	P-290007 P-290037 P-290016 P-290034				
R1	100K	¼	±5							Carbon	NEE-0371
R2	100K	¼	±5							Carbon	NEE-0371
R3	82K	¼	±5							Carbon	NEE-0360
R4	Not used										
R5	22	¼	±5	Carbon	NEE-0078						
R6	47	¼	±5	Carbon	NEE-0099						
R7	22K	¼	±5	Carbon	NEE-0311						
R8	4.7K	¼	±5	Carbon	NEE-0247						
R9	1K	¼	±5	Carbon	NEE-0196						
R10	100	¼	±5	Carbon	NEE-0132						
R11	Not used										

Ref. No.	Value (ohm)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R1401	150K	¼	± 5	Carbon	NEE-0396
R1402	150K	¼	± 5	Carbon	NEE-0396
R1403	150K	¼	± 5	Carbon	NEE-0396
R1404	150K	¼	± 5	Carbon	NEE-0396
R1405	2.2M	½	± 5	Carbon	NEF-0454
(UL, C.S.A. models only)					
R1501	100K	¼	± 5	Carbon	NEE-0371
R1502	39K	¼	± 5	Carbon	NEE-0330
R1503	330	½	± 5	Carbon	NEF-0159
R1504	390K	¼	± 5	Carbon	NEE-0414
R1505	39K	¼	± 5	Carbon	NEE-0330
R1506	100	¼	± 5	Carbon	NEE-0132
R1507	3.3K	¼	± 5	Carbon	NEE-0230
R1601AB	150K	¼	± 5	Carbon	NEE-0396
(After Serial No. 1001)					

SWITCHES

Ref. No.	Description	R/S Part No.	Mfr's Part No.
Ss1-Ss12	SELECTOR Switch TURNOVER (150 Hz/300 Hz) Switch TURNOVER (3 kHz/6 kHz) Switch TAPE MONITOR Switch TAPE DUBBING Switch AUTO-M/FM MUTE/HI-MPX FILTER/MONO/LOUDNESS Switch HIGH FILTER/LOW FILTER/ POWER METER LOW/SPEAKERS A/SPEAKERS B Switch	S-1314 S-7377 S-7378 S-5038 S-5039 S-7379	P-180305 P-180313 P-130314 P-180209 P-180210 P-180299
PS1 - PS3	Power Switch (TV-5) (UL)	S-0856	P-180239
PS1 - PS3	Power Switch (TV-10) (C.S.A.)		P-180430
PS1 - PS4	Power Switch (SDU-3P) (European, Australian)		P-180349

THERMAL PROTECTORS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
PR1401	Thermal Protector (100°C)	HB-8443	P-290028
PR1402	Thermal Protector (100°C)	HH-0329 HB-8443	or P-290025 P-290028
PR1403	Thermal Protector (95°C ± 5°C) (UL, C.S.A.)	HH-0329 HB-6880	or P-290025 P-290018, P-290042 or P-290033
PR1403	Thermal Protector (110°C) (European, Australian)	HB-8669	P-290031 or P-290043

TRANSISTORS		
Ref. No.	Type No.	Manufacturer
TR1	MOS FET 3SK 45(B)	HITACHI
TR2	2SC535 (B, C) or 2SC1674 (L, K)	HITACHI or NEC
TR3	2SC461 (B, C) or 2SC1674 (L, K)	HITACHI or NEC
TR201	2SC1674 (L, K), 2SC460 (B, C) or 2SC930 (D, E)	NEC, HITACHI or SANYO
TR202	2SC1674 (L), 2SC460 (B) or 2SC1923 (O)	NEC, HITACHI or TOSHIBA
TR203	2SC1674 (L), 2SC460 (B), or 2SC1923 (O)	NEC, HITACHI or TOSHIBA
TR204	2SC900 (E, U) or 2SC1571 (G, H)	NEC or SANYO
TR205	2SC1674 (L, K), 2SC460 (B, C) or 2SC930 (D, E)	NEC, HITACHI or SANYO
TR206	2SC945 (P, K), 2SC536 (G, H) or 2SC1815 (GR, BL)	NEC, SANYO or TOSHIBA
TR207	2SC900 (E, U) or 2SC1571 (G, H)	NEC or SANYO
TR208	2SC900 (E, U) or 2SC1571 (G, H)	NEC or SANYO
TR209	2SC945 (P, K), 2SC536 (G, H) or 2SC1815 (GR, BL)	NEC, SANYO or TOSHIBA
TR210	2SC945 (P, K), 2SC536 (G, H) or 2SC1815 (GR, BL)	NEC, SANYO or TOSHIBA
TR301AB	2SC1222(2) (E, U) or 2SC2240 (GR, BL)	NEC or TOSHIBA
TR302AB	2SC1222(2) (E, U) or 2SC2240 (GR, BL)	NEC or TOSHIBA
TR303AB	2SA750 (E) or 2SA970 (BL)	NEC or TOSHIBA
TR304AB	2SC1222(2) (E, U) or 2SC2240 (GR, BL)	NEC or TOSHIBA
TR401AB	2SA750 (E) or 2SA970 (BL)	NEC or TOSHIBA
TR402AB	2SA750 (E) or 2SA970 (BL)	NEC or TOSHIBA
TR403AB	2SC1222 (U), 2SC1313 (H) or 2SC1400 (U)	NEC or MITSUBISHI
TR404AB	2SC1222 (U), 2SC1313 (H) or 2SC1400 (U)	NEC or MITSUBISHI
TR405AB	2SC1222 (U), 2SC1313 (H) or 2SC1400 (U)	NEC or MITSUBISHI
TR406AB	2SC1222 (U), 2SC1313 (H) or 2SC1400 (U)	NEC or MITSUBISHI

Ref. No.	Type No.	Manufacturer
TR501AB	2SA979 (G, F) or 2SA872 (D, E)	MITSUBISHI or HITACHI
TR502AB	2SA979 (G, F) or 2SA872 (D, E)	MITSUBISHI or HITACHI
TR503AB	2SB649A (B, C)	HITACHI
TR504AB	2SD668A (B, C)	HITACHI
TR505AB	2SD668A (B, C)	HITACHI
TR506AB	2SD400P-I (E)	SANYO
TR507AB	2SD669A (B, C)	HITACHI
TR508AB	2SB649A (B, C)	HITACHI
TR509AB	2SD669A (B, C)	HITACHI
TR510AB	2SB649A (B, C)	HITACHI
TR511AB	2SC1222 (E, U) or 2SC1570 (G, H)	NEC or SANYO
TR512AB	2SA750 (E, U) or 2SA929 (G, H)	NEC or SANYO
TR513AB	2SC1585 (D, Y) or 2SD287C (Q, R)	SANKEN or NEC
TR514AB	2SA908 (O, Y) or 2SB539C (Q, R)	SANKEN or NEC
TR515AB	2SC1585 (D, Y) or 2SD287C (Q, R)	SANKEN or NEC
TR516AB	2SA908 (O, Y) or 2SB539C (Q, R)	SANKEN or NEC
TR517AB	2SA872A (D, E) or 2SA992 (F, E)	HITACHI or NEC
TR601	2SA750 (E, U) or 2SA929 (G, H)	NEC or SANYO
TR602	2SC945 (P, K) or 2SC536 (G, H)	NEC or SANYO
TR603	2SC945 (P, K) or 2SC536 (G, H)	NEC or SANYO
TR604	2SD571 (L, K)	NEC
TR605	2SD571 (L, K)	NEC
TR606	2SC945 (P, K) or 2SC536 (G, H)	NEC or SANYO
TR607	2SD325 (E, F)	SANYO
TR608	2SC945 (P, K) or 2SC536 (G, H)	NEC or SANYO
TR701	2SD571 (L, K)	NEC
TR702	2SB605 (L, K)	NEC
TR703	2SC1222 (E, U)	NEC
TR704	2SA750 (E, U)	NEC
TR705	2SD325 (E, F)	SANYO
TR1001AB	2SA733 (P, K), 2SA1015 (GR) or 2SA608KNP (G)	NEC, TOSHIBA or SANYO
TR1002AB	2SC945 (P, K), 2SC1815 (GR, BL) or 2SC536 (G, H)	NEC, TOSHIBA or SANYO
TR1101	2SC945 (P, K), 2SC1815 (GR, BL) or 2SC536 (G, H)	NEC, TOSHIBA or SANYO

Ref. No.	Type No.	Manufacturer
TR1102	2SA733 (P, K), 2SA1015 (GR) or 2SA608KNP (G)	NEC, TOSHIBA or SANYO
TR1103	2SA733 (P, K), 2SA1015 (GR) or 2SA608KNP (G)	NEC, TOSHIBA or SANYO
TR1301	2SC945 (P, K), 2SC536 (G, H) or 2SC1815 (GR, BL)	NEC, SANYO or TOSHIBA
TR1501	2SC945 (P, K), 2SC536 (G, H) or 2SC1815 (GR, BL)	NEC, SANYO TOSHIBA
TR1502	2SC945 (P, K), 2SC536 (G, H) or 2SC1815 (GR, BL)	NEC, SANYO or TOSHIBA
TR1503	2SC945 (P, K), 2SC536 (G, H) or 2SC1815 (GR, BL)	NEC, SANYO or TOSHIBA
TR1504	2SC945 (P, K), 2SC536 (G, H) or 2SC1815 (GR, BL)	NEC, SANYO or TOSHIBA

VARIABLE CAPACITORS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
VC1 - VC7	Tuning Gang (includes TCA, TCR1, TCR2, AM1, AM2 and AM3)	C-4684	P-150039
TC4	Trimmer ECV-12W10 x 32	C-0943	P-160016

VARIABLE RESISTORS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
VR201	Trimmer 47KΩ/50KΩ	P-6603	P-170443, P-170475 or P-170696
VR202	Trimmer 4.7KΩ/5KΩ	P-6648	P-170437, P-170472 or P-170693
VR203	Trimmer 20KΩ/22KΩ	P-6604	P-170440, P-170474 or P-170695
VR204	Trimmer 47KΩ/50KΩ	P-6603	P-170443, P-170475 or P-170696
VR205	Trimmer 1KΩ	P-6579 P-6569	P-170367, P-170433 or P-170691
VR206	Trimmer 4.7KΩ	P-6542	P-170301

Ref. No.	Description	R/S Part No.	Mfr's Part No.
VR401	Potentiometer TREBLE 100KΩ 1B x 2	P-7171	P-171439
VR402	Potentiometer MIDRANGE 100KΩ 1B x 2		P-171439
VR403	Potentiometer BASS 100KΩ 1B x 2		P-171439
VR501AB	Trimmer 5KΩ	P-4670	P-170393, P-170489 or P-170663
VR1201AB	Trimmer 50KΩ	P-6671	P-170621, P-170515 or P-170654
	Potentiometer VOLUME & BALANCE 250KΩ 3BL/250KΩ Z	P-7172	P-171421

28) EXPLODED VIEW PARTS LIST

Ref. No.	Description	R/S Part No.	Mfr's Part No.
1	Tuner Assembly P.C.B.		U-11034
2	IF & MPX Assembly P.C.B.		U-12056
3	Tone Amp Assembly P.C.B.		U-14138
4	Pre Amp Assembly P.C.B.	X-8187	U-14114
5	Main Amp Assembly P.C.B.		U-16110
6	Power Supply Assembly P.C.B.		U-17085
7	Protector Assembly P.C.B.		U-23176
8	Relay Assembly P.C.B. (UL, C.S.A., Australian)		U-23183
9	Speaker Switch Assembly P.C.B.		U-23180
10	Power Switch Assembly P.C.B.		U-23182
11	Signal Tuning LED Meter Assembly P.C.B.		U-23117
12	Switch Assembly P.C.B.		U-23179
13	Power LED Meter Assembly P.C.B.		U-23178
14	Main Volume Assembly P.C.B.		U-23185
15	Function LED Assembly P.C.B.		U-23181
16	Front Chassis Ass'y Consisting of Front Chassis Headphone Bracket	Z-6000	P-400202
17	Dial Scale Plate	D-5273	P-411084
18	Headphone Jack	J-0919	P-190125
19	Cushion for P.C.B.		P-680187
20	Side Bracket for Panel (R)	HB-7802	P-411503
21	Side Bracket for Panel (L)	HB-7803	P-411504
22	Reflector Holder		P-412341
23	Dial Reflector	Z-4115	P-610575
24	Main Chassis		P-400244
25	Panel for Selector	Z-6008	P-700495
26	Dial Lamp with Lead (L = 320 m/m)	L-0915	P-240108
27	Dial Lamp with Lead (L = 160 m/m)	L-0916	P-240109
28	P.C.B. Bracket for Signal Tuning Meter		P-412352
29	P.C.B. Bracket for Power Meter (R)		P-412353
30	P.C.B. Bracket for Power Meter (L)		P-412354
31	Tuning Shaft Holder	HB-7808	P-411509
32	Tuning Shaft Ass'y	D-3273	P-470026

Ref. No.	Description	R/S Part No.	Mfr's Part No.
33	Collar for Tuning Shaft	HB-7809	P-610577
34	Pointer Ass'y Consisting of Pointer Pointer Base Mylar Sheet	D-1243	P-450062 P-450063 P-450064 P-4800205
35	Sub-Pulley Bracket (B)	HB-7811	P-411511
36	Sub-Pulley Bracket (C)	HB-5084	P-410946
37	Sub-Pulley Bracket (D)	HB-5085	P-410947
38	Sub-Pulley Bracket (E)	HB-8785	P-411794
39	Sub-Pulley (middle)	D-0385	P-610471
40	Sub-Pulley (small)	D-0280	P-610049
41	Dial Pulley	D-0411	P-610623
42	Dial Spring	RB-6486	P-440156
43	CS type Stop Ring		
44	Dial String		
45	Dial Scale (UL, C.S.A.)		P-700496
45	Dial Scale (European, Australian)		P-700497
46	Dial Side Bracket (R)	D-5363	P-610644
47	Dial Side Bracket (L)	D-5364	P-610645
48	Cushion for Light Intercept		P-660178
49	IF Bracket (A)	HB-8786	P-411795
50	IF Bracket (B)	HB-8787	P-411796
51	P.C.B. Bracket for IF & MPX		P-412357
52	Shield Plate	HB-7826	P-411539
53	P.C.B. Bracket for Tuner	HB-8788	P-411881
54	P.C.B. Holder for Power Supply (A)	HB-7816	P-411162Y
55	P.C.B. Holder for Power Supply (B)	HB-7817	P-411163Y
56	P.C.B. Holder for Pre Amp	HB-7820	P-620070
57	P.C.B. Holder for Pre Amp	HB-7818	P-411514
58	Shaft Holder Bracket for Selector	HB-7819	P-411169Y
59	Shaft Holder Bracket for Selector	HB-1344	P-610094
60	Shield Case for Pre Amp	HB-7821	P-411515
61	Shield Plate (B)	HB-8789	P-411605
62	Fiber Sheet (B)		P-480360
63	Power Transformer (UL)	TA-0877	P-100823
63	Power Transformer (European, Australian)		P-100682
63	Power Transformer (C.S.A.)		P-100822
64	Power Transformer Label	HB-7680	P-810487
65	Lug type Electrolytic Capacitor	C-4685	P-220037
66	Spacer		P-660173
67	Supporter Bracket	HB-8840	P-411261Y
68	Bracket for Protector P.C.B.	RT-2216	P-411171Y
69	Bracket for Bridge Diode	HB-7825	P-411167
70	Bridge Diode (S15VB-20)	DX-1117	
71	Micro Inductor	CA-7873	P-360034
72	P.C.B. Bracket for Relay P.C.B. (UL, European, Australian)	HB-8791	P-410609Y
73	Spacer (B) (UL, European, Australian)		P-660193
74	Thermal Protector Bracket	HB-7836	P-411265
75	Thermal Protector (95°C) (UL, C.S.A.)	HB-6880	P-290042, P-290018 or P-290033
75	Thermal Protector (110°C) (European, Australian)	HB-8669	P-290043 or P-290031
76	Thermal Protector (100°C)	HB-8443 or HH-0329	P-290028 or P-290025
77	Side Chassis (R)	Z-4116	P-400204

Ref. No.	Description	R/S Part No.	Mfr's Part No.
78	Side Chassis (L)		P-400205
79	Protector Holder (UL, C.S.A.)	RT-2217	P-411932
79	Protector Holder (European, Australian)		P-412118
80	Back Panel (UL)		P-412348
80	Back Panel (C.S.A.)		P-412349
80	Back Panel (European)		P-412350
80	Back Panel (Australian)		P-412351
81	Bracket for Back Panel	HB-7827	P-410821Y
82	Speaker Terminal	J-4604	P-320257
83	AC Cord (UL, C.S.A.)		P-310128 or P-310092
83	AC Cord (European)		P-310091
83	AC Cord (Australian)		P-310041
84	AC Cord Strain Relief (UL, C.S.A.)	HB-6881	P-480080
84	AC Cord Strain Relief (European)	HB-0705	P-480010
84	AC Cord Strain Relief (Australian)		P-480165
85	AC Outlet (UL, European, Australian)	J-1100	P-190098 or P-190157
85	AC Outlet (C.S.A.)		P-190324 or P-190157
86	Fuse Holder (UL)	F-1017	P-260011
86	Fuse Holder (C.S.A.)		P-260013
86	Fuse Holder (European, Australian)		P-260015
87	Antenna Terminal	HC-0535	P-320370
88	Ground Screw	HD-1305	P-420284
89	4P Pin Jack	J-0969	P-320137
90	6P Pin Jack	J-0970	P-320151
91	Joint Pin for PRE OUT/MAIN IN	HB-7828	P-190120
92	Balun Coil	CA-5107	P-110107
93	Balun Coil P.C.B.	X-4972	P-200244
94	AM Bar Antenna Coil		P-110140
95	Sheet		P-480254
96	5P Din Jack	J-0747	P-190126 or P-190036
97	Wire Stay		P-450073
98	Front Panel (UL, C.S.A., Australian)		P-700499
98	Front Panel (European)		P-700500
99	Knob Guide	HB-7875	P-610603
100	Window Frame	HB-7829	P-610578
101	Dial Window	G-0344	P-610579
102	Switch Cover	HB-7830	P-610416
103	Knob Guide	HB-7835	P-610586
104	TURNOVER Push Knob	K-3016	P-650299
105	Push Knob Spring	RB-6204	P-440140
106	Tuning Knob	K-2301	P-650199
107	Selector and Control Knob	K-2297	P-650196
108	Volume Knob (Inner of Double)	K-3015	P-650288
109	Balance Knob (Outer of Double)	K-3014	P-650289
109	Balance Knob (Outer of Double) (After Serial No. 10051)		P-650519
110	Lever Switch Knob	K-2300	P-650201
111	Power Push Knob	K-3532	P-650361
112	Front Panel Bracket (R)	HB-7831	P-411518
113	Front Panel Bracket (L)	HB-7832	P-411519
114	Fiber Sheet for Selector		P-690018
115	Bottom Plate	Z-4122	P-411521
116	LED Holder (C)	HC-0533	P-610823

Ref. No.	Description	R/S Part No.	Mfr's Part No.
117	Cabinet Ass'y	Z-6010	P-600196
118	Consisting of Side Board		P-630146
119	Top Cover		P-600195
120	Net	HB-7833	P-660166
121	Name Plate	HB-7834	P-730229
122	Screw Cover	HB-5105	P-610397
123	Foot	F-0240	P-610485
124	Number Plate	HB-6879	P-730184
125	LED Holder (A)		P-610820
126	LED Holder (B)	HC-0534	P-610821
126	Power Switch (UL)	S-0856	P-180239
126	Power Switch (C.S.A.)		P-180430
126	Power Switch (European, Australian)		P-180349
127	Power Indicator LED (gree or red)	L-0914	
128	Fiber Washer		P-690373
129	Main Amp Bracket (R)	HB-5061	P-410957
130	Main Amp Bracket (L)	HB-5059	P-410953
131	Heat Sink	HH-0284	P-411143
132	Eyelet		
133	Sheet for P.C.B. Bracket		P-480365
HARDWARE			
Ref. No.	Description		
S1	Tapping Screw	3 x 8BT-2	
S2	Screw	3 x 6-FL	
S3	Tapping Screw	3 x 12BT-2	
S4	Tapping Screw	3 x 6BT-3-DEL	
S5	Screw	3 x 8B	
S6	Tapping Screw	3 x 5PT-2	
S7	Tapping Screw	4 x 8BT-3-C-TITE	
S8	Stop Screw	3 x 9 x 3	
S9	Screw	3 x 6P	
S10	Tapping Screw	4 x 8BT-3-DEL	
S11	Tapping Screw	3 x 8BT-3-DEL	
S12	Tapping Screw	3 x 5BT-2	
S13	Tapping Screw	5 x 12BT-3-DEL	
S14	Tapping Screw	4 x 20BT-3-DEL	
S15	Toothed Tapping Screw (Black)	3 x 8BT-2	
S16	Tapping Screw (Black)	3 x 8BT-2	
S17	Tapping Screw (Black)	3 x 8PT-PLAX	
S18	Wood Screw	3.1 x 13PW	
S19	Tapping Screw (Black)	3 x 8BT-3-DEL	
S20	Tapping Screw (Black)	4 x 20BT-3-DEL	
S21	Tapping Screw	4 x 18BT-2	
S22	Tapping Screw	3 x 6BT-2	
S23	Tapping Screw (Black)	3 x 10BT-2	
S24	Tapping Screw	3 x 8P-PLAX	
S25	Tapping Screw	3 x 8PT-2	
N1	Flange Nut	5N	
W1	Toothed Washer	3W	
W2	Washer	3W	
W3	Washer	5W	
R1	Rivet (Black) YB-420		
R2	Rivet (Black) YB-320		

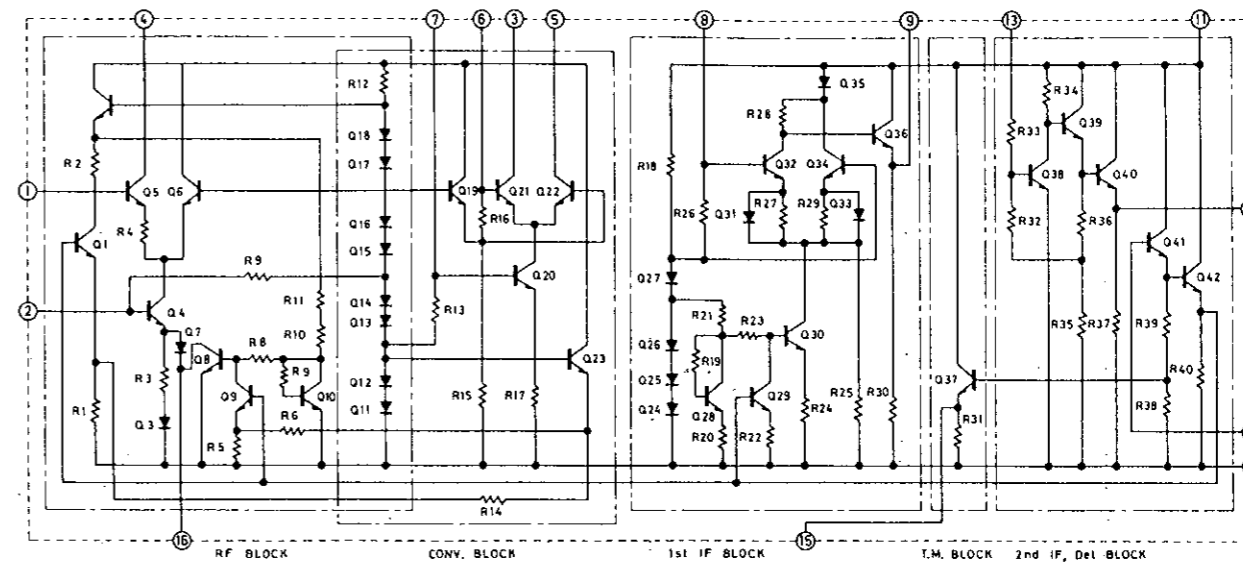
29) MISCELLANEOUS PARTS LIST

Description	R/S Part No.	Mfr's Part No.	Description	R/S Part No.	Mfr's Part No.
Fiber Sheet (D) (C.S.A.)		P-480359	4P (U) Mold Wire Connection Terminal	J-1021	P-320166 or P-320110
Fuse Caution Label (UL, European, Australian)	HB-7046	P-810308	2P (L) Mold Wire Connector Plug		P-190215
Fuse Caution Label (C.S.A.)		P-810516	4P (L) Mold Wire Connector Plug		P-190188
Ground Bar for Lug type Capacitor	HB-7822	P-411433	[Tuner Assembly P.C.B.]		
Solderless Terminal	H-3305	P-320006	Shield Case (A)	HB-8841	P-411912
Ground Lug	HB-6878	P-320152	Shield Case (B)	HB-8842	P-411913
Block Terminal (Australian)		P-320251	Shield Case (C)	HB-8843	P-411914
Tapping Screw 3 x 16BT-2 (Australian) (for Block Terminal)		P-660167	[Power Supply Assembly P.C.B.]		
Blind Sheet (Front Panel)		P-690297	Fuse Holder		P-260017
Spacer		P-480248	4P (L) Mold Wire Connection Terminal	HB-7797	P-320176 or P-320118
VR Spacer (Brown)		P-690355	5P (L) Mold Wire Connection Terminal	HB-7800	P-320177
Spacer (B) (Black or Red)			[Signal & Tuning LED Assembly P.C.B.]		
[Main Amp Assembly P.C.B.]			3P (L) Mold Wire Connection Terminal	HB-7801	P-320163 or P-320105
Shield Plate		P-412117	6P (L) Mold Wire Connection Terminal	HB-7051	P-320163 or P-320107
Sheet (A)		P-480300	[Speaker Switch Assembly P.C.B.]		
2P (I) Mold Wire Connection Terminal		P-320271	20P (R) Flat Cable Connector		P-190375
Insulation Collar for Transistor		P-420401	[Function LED Assembly P.C.B.]		
Tapping Screw 3.5 x 5 x 12BT-2			4P (L) Mold Wire Connection Terminal		P-320106
Tapping Screw 3.5 x 6BT-2			[Pre Amp Assembly P.C.B.]		
Transistor Socket	J-6433	P-190099	4P (I) Mold Wire Connection Terminal	HB-7794	P-320158
Insulator Sheet			6P (I) Mold Wire Connection Terminal	HB-7795	P-320160
Screw 3 x 16P			2P (I) Mold Wire Connection Terminal	HB-7793	P-320156
Heat Sink for Pre Drive Transistor	HB-0285	P-411144	2P (I) Mold Wire Connection Terminal	HB-6862	P-320100
Screw 3 x 8P			3P (I) Mold Wire Connection Terminal		P-320157
2P (I) Mold Wire Connector Plug		P-190216	5P (I) Mold Wire Connection Terminal		P-320159
[Pre Amp Assembly P.C.B.]			2P (I) Mold Wire Connector Plug		P-190216
4P (I) Mold Wire Connection Terminal	HB-7794	P-320158	3P (I) Mold Wire Connector Plug		P-190196
6P (I) Mold Wire Connection Terminal	HB-7795	P-320160	2P (L) Mold Wire Connector Plug		P-190215
2P (I) Mold Wire Connection Terminal	HB-7793	P-320156	3P (L) Mold Wire Connector Plug		P-190187
2P (I) Mold Wire Connection Terminal	HB-6862	P-320100	[Relay Assembly P.C.B.]		
3P (I) Mold Wire Connection Terminal		P-320157	3P (L) Mold Wire Connection Terminal	HB-7801	P-320162 or P-320105
5P (I) Mold Wire Connection Terminal		P-320159	[Power Meter LED Assembly P.C.B.]		
2P (I) Mold Wire Connector Plug		P-190216	2P (U) Mold Wire Connection Terminal	J-4567	P-320164 or P-320108
3P (I) Mold Wire Connector Plug		P-190196	4P (U) Mold Wire Connection Terminal	J-1021	P-320166 or P-320110
2P (L) Mold Wire Connector Plug		P-190215			
3P (L) Mold Wire Connector Plug		P-190187			
[Tone Amp Assembly P.C.B.]					
3P (U) Mold Wire Connection Terminal	J-1022	P-320165 or P-320109			
2P (L) Mold Wire Connection Terminal		P-320161 or P-320104			
4P (L) Mold Wire Connection Terminal	HB-7796	P-320080 or P-320106			

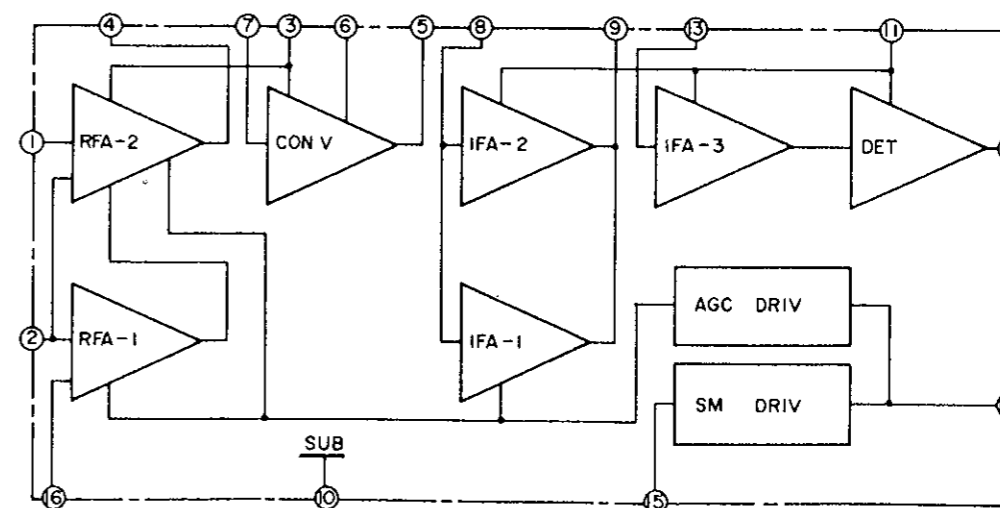
30) IC INTERNAL DIAGRAM

HA-1197

SCHEMATIC DIAGRAM

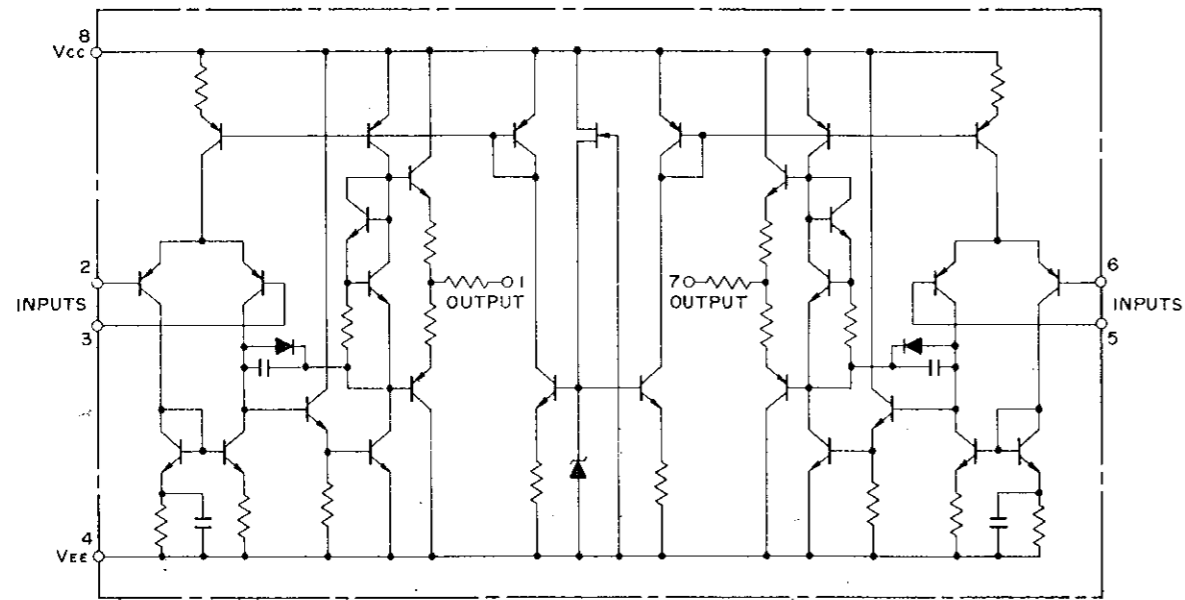


BLOCK DIAGRAM

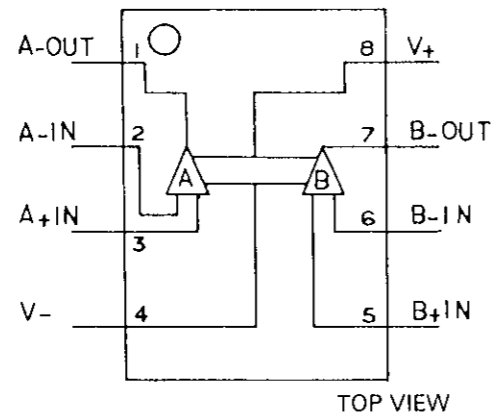


NJM-4558

SCHEMATIC DIAGRAM

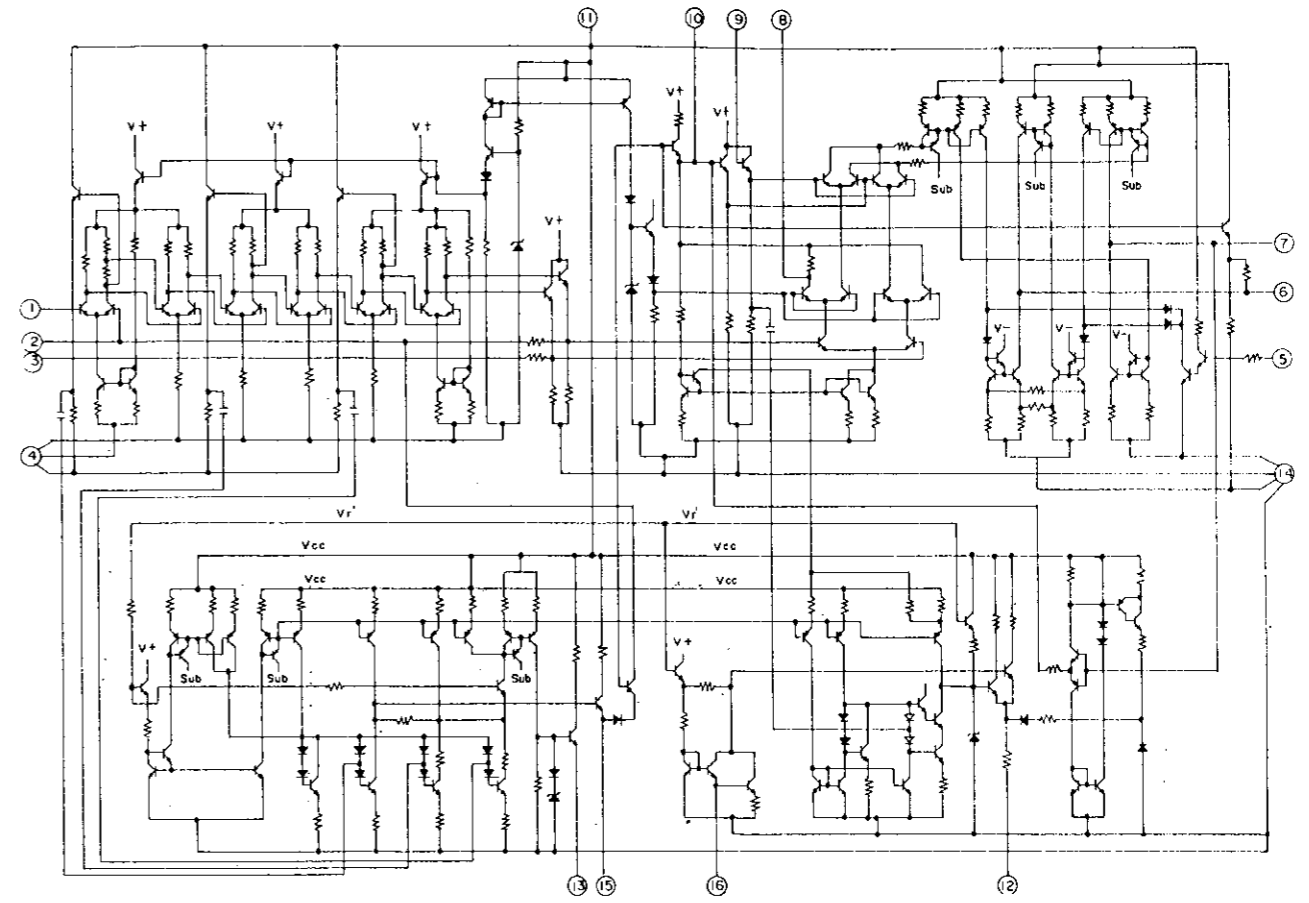


BLOCK DIAGRAM



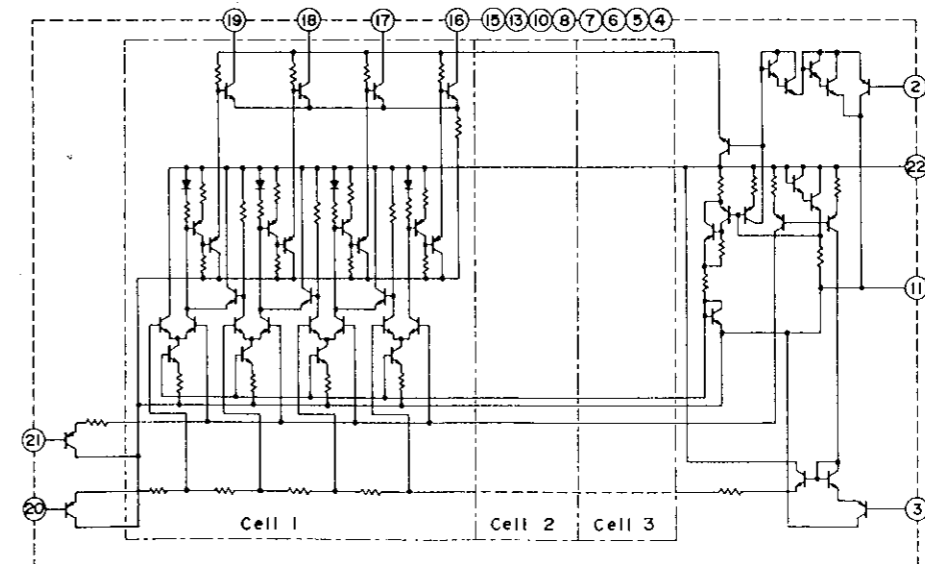
LA-1231

SCHEMATIC DIAGRAM

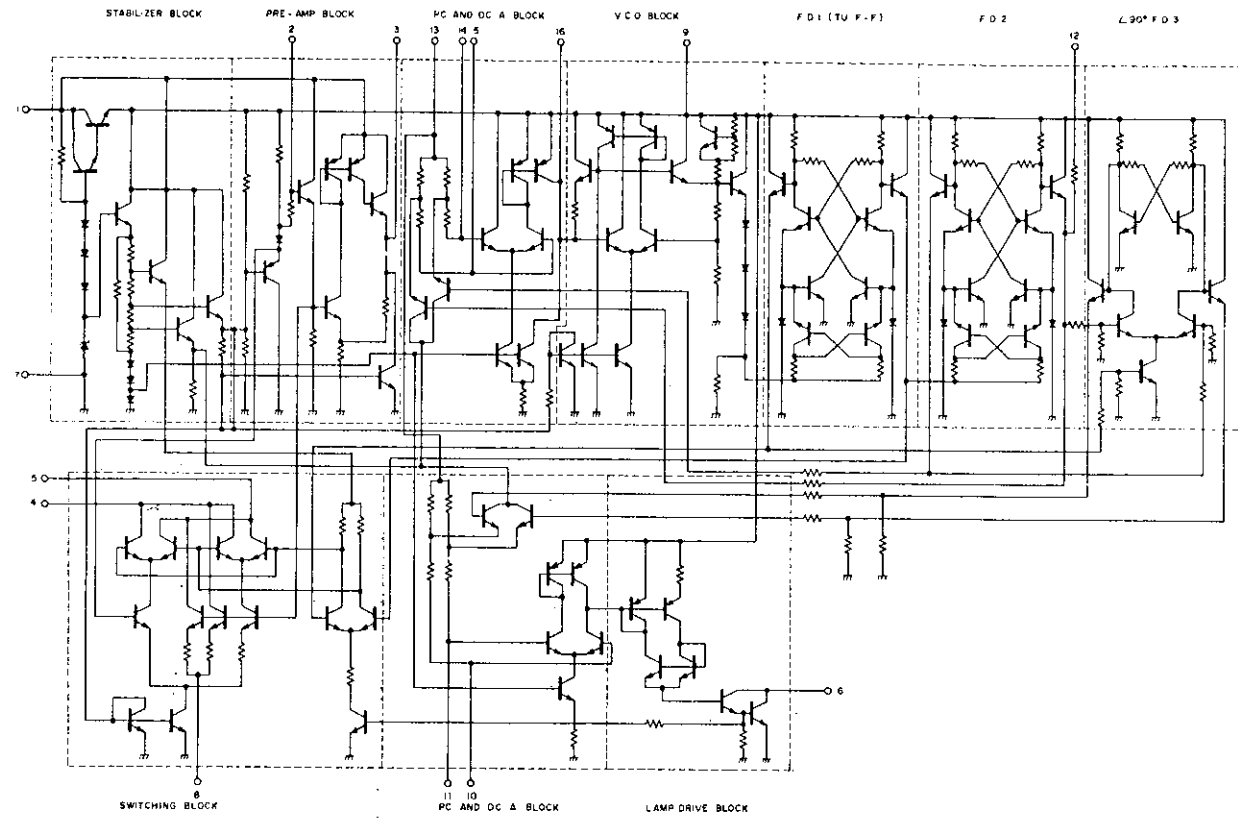


IR2406G

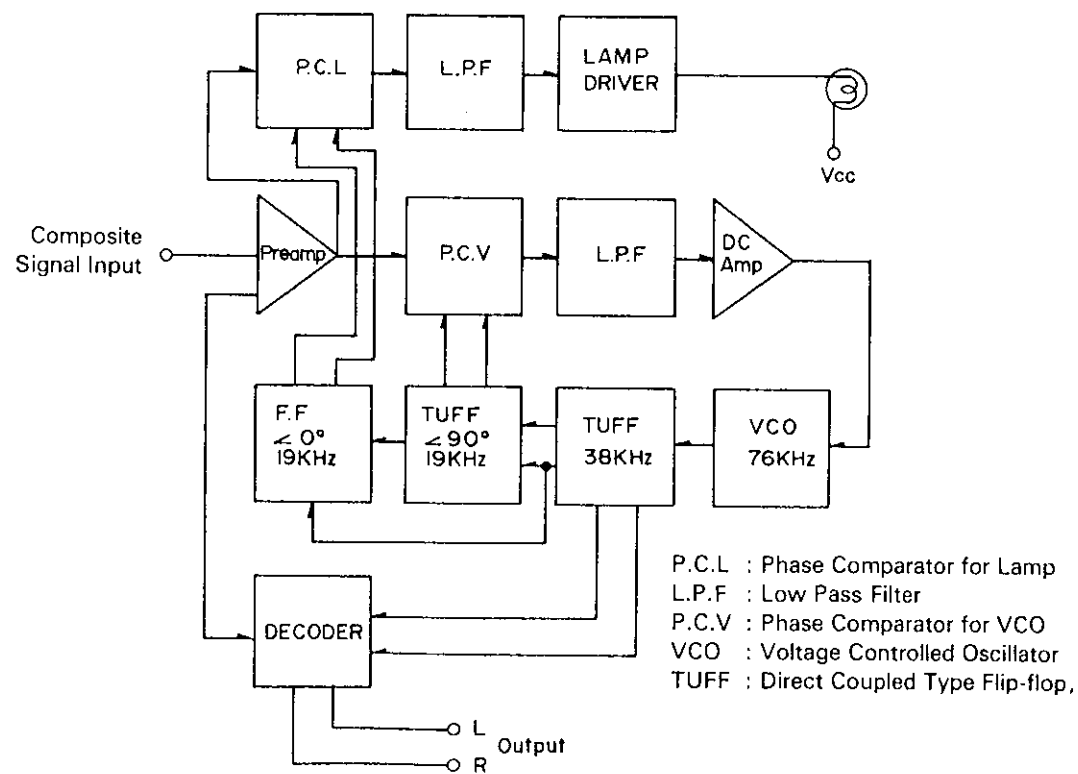
SCHEMATIC DIAGRAM



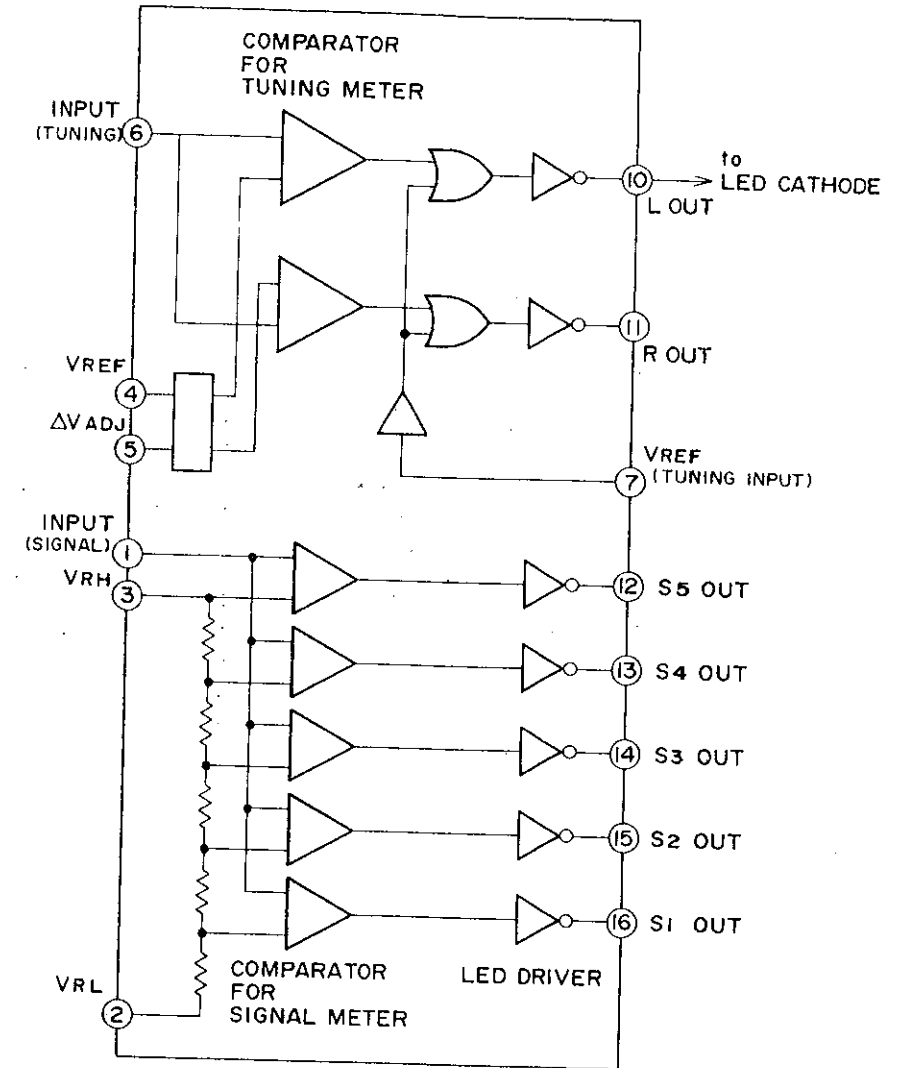
SCHMATIC DIAGRAM



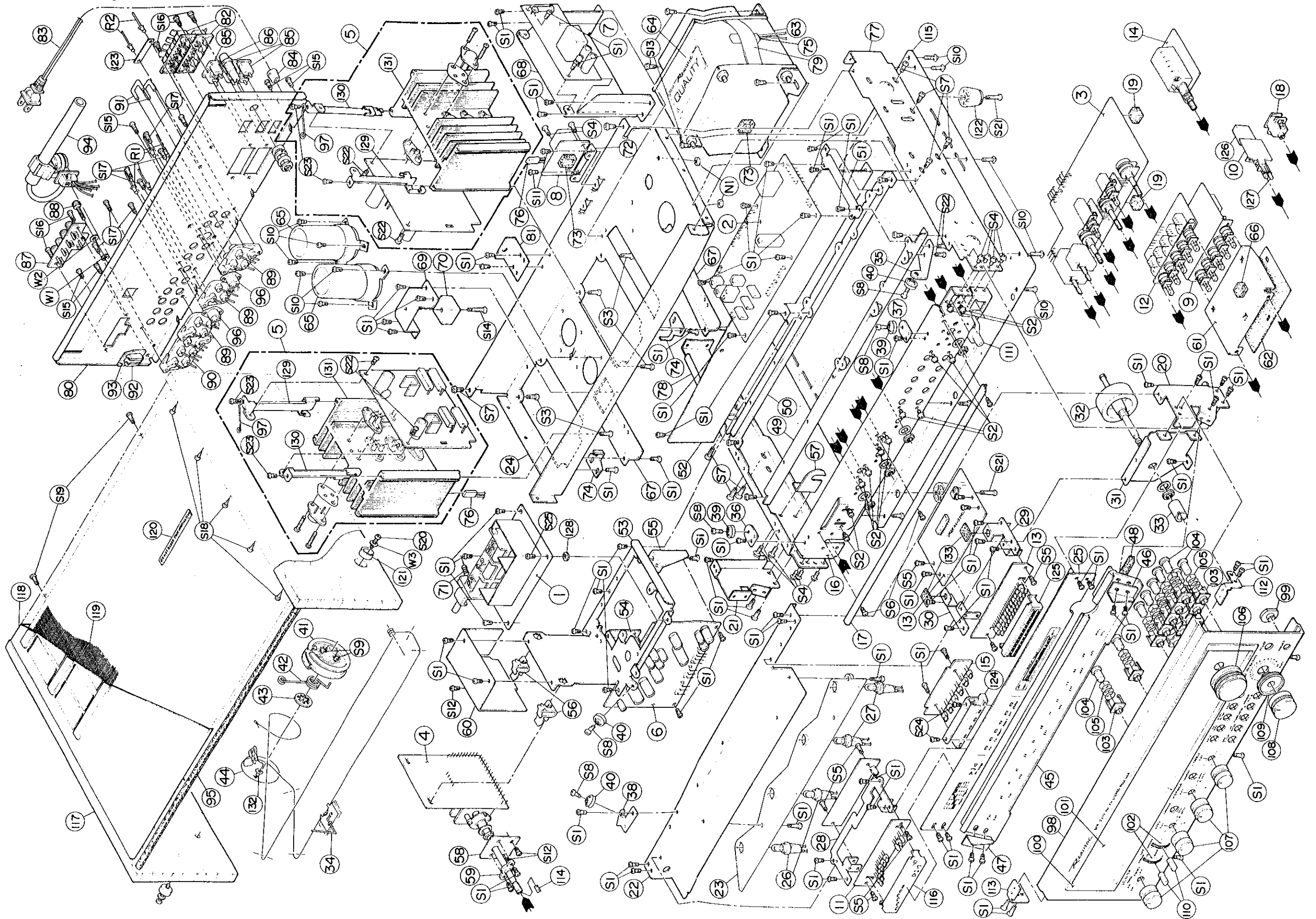
BLOCK DIAGRAM



BLOCK DIAGRAM



31) EXPLODED VIEW



RADIO SHACK  A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

AUSTRALIA

280-316 VICTORIA ROAD
RYDALMERE, N.S.W. 2116

BELGIUM

PARC INDUSTRIEL DE NANINNE
5140 NANINNE

U. K.

BILSTON ROAD, WEDNESBURY
WEST MIDLANDS WS10 7JN