

REALISTIC[®]

Service Manual

31-1968

STA-7 AM/FM STEREO RECEIVER Catalog Number: 31-1968



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

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1. ELECTRICAL PERFORMANCE SPECIFICATIONS

AM BAND

	UNIT	NOMINAL	LIMIT
Frequency Coverage	(kHz)	510-1650	520-1620
IF	(kHz)	455	-
Antenna Sensitivity for S/N 20 dB at 600 kHz	(μ V/m)	200	500
at 1000 kHz	(μ V/m)	200	500
at 1400 kHz	(μ V/m)	200	500
Terminal Sensitivity (20 dB S/N)	(μ V)	10	-
ACA at S/N 6 dB Sensitivity at 1000 kHz	(dB)	28	20
S/N Ratio at 5 mV Input	(dB)	40	34
AGC Distortion at 1000 kHz, 100 mV/m Input, 80 % mod.	(%)	4	10
AGC Figure-of-Merit	(dB)	45	38
IF Rejection at 600 kHz	(dB)	32	27
Image Rejection at 1400 kHz	(dB)	45	35
Distortion at 5 mV/m, 30 % mod.	(%)	1.5	3.5
Tape Out Level 5 mV/m Input, 30 % 400 Hz	(mV)	210	210 \pm 2.5 dB
Fidelity 5 mV/m Input, -6 dB down (1 kHz = 0 dB)	(Hz)	20-3000	50-2500
Whistle Modulation of 2nd and 3rd Harmonic at 1000 μ V/m and 5000 μ V/m	(%)	8	15
Calibration at 600 kHz	(kHz)	-	\pm 25
at 1000 kHz	(kHz)	-	\pm 50

FM BAND

	UNIT	NOMINAL	LIMIT
Frequency Coverage	(MHz)	86.5-108.5	88-108
IF	(MHz)	10.7	-
IHF Sensitivity at 90, 98 and 106 MHz	(μ V)	2.8	5.0
	(dBf)	14.2	19.2
FM S/N Ratio at 98 MHz, 1 mV Input	(dB)	60	55
FM Limiting Sensitivity (-3 dB)	(μ V)	3.2	7.1
IF Rejection Ratio at 90 MHz	(dB)	80	70
Image Rejection Ratio at 106 MHz	(dB)	50	45
Capture Ratio at 90 MHz, 1 mV Input	(dB)	3	6
ACA \pm 400 kHz, 100 μ V Input	(dB)	45	30
Audio THD 400 Hz, 75 kHz dev.	(%)	0.5	1.0
Calibration Accuracy at 90 MHz	(kHz)	-	\pm 500
at 106 MHz	(kHz)	-	\pm 500
AFC Holding Range with 1 mV Input	(kHz)	\pm 250	\pm 330
AM Suppression, AM - 30 %, FM - 100 %	(dB)	38	30
Maximum Signal Handling Capacity	(mV)	200	100
Tape Out Level, 75 kHz dev. 1 mV Input	(mV)	630	630 \pm 2.5 dB

All sets must meet the requirements of FCC.

Frequency response must meet the 75 μ sec de-emphasis (UL, C.S.A.)
(50 μ sec de-emphasis for Australian models).

FM MPX SECTION

	UNIT	NOMINAL	LIMIT
Stereo Indicator Sensitivity	(μ V)	10	20
Separation at 1 mV Input at 100 Hz	(dB)	29	22
at 1 kHz	(dB)	34	27
at 10 kHz	(dB)	26	20
Stereo Distortion at 1 mV 1 kHz	(%)	0.6	2.0
38 kHz Rejection	(dB)	55	48
SCA Rejection	(dB)	80	-
Stereo Output Level	(mV)	560	560 \pm 2.5 dB

NOTE: Set Equalizer Switch to "FLAT" position unless otherwise specified.

AUDIO SECTION

	UNIT	NOMINAL	LIMIT
Input Impedance PHONO Mag.	(K Ω)	50	—
AUX	(K Ω)	100	—
Output Power THD 1%, 8 Ω , Both Channels Driven at 1 kHz	(W)	14	12
Power Bandwidth, 8 Ω , Both Channels Driven, under THD 0.5% 20 Hz to 20 kHz (THD 0.7% for 4 Ω load)	(W)	12	10
Sensitivity for Rated Power (10 W) PHONO Mag.	(mV)	2.2	2.2 \pm 2 dB
AUX	(mV)	160	160 \pm 2 dB
Tape In	(mV)	160	160 \pm 2 dB
Frequency Response at AUX, Output Power 1 W, \pm 2 dB	(Hz)	15–30 k	20–20 k
Bass Action at 100 Hz	(dB)	\pm 10	\pm 10 \pm 2.5 dB
Treble Action at 10 kHz	(dB)	\pm 10	\pm 10 \pm 2.5 dB
Min. Volume Hum and Noise	(mV)	1	3
Max. Volume Hum and Noise at AUX (Tone Max.)	(mV)	6	15
Signal-to-Noise Ratio PHONO Mag.(Input shorted)	(dB)	60	55
AUX (Input terminated with 4.7 K Ω)	(dB)	65	55
Cross Talk at 1 kHz, AUX position	(dB)	46	40
Bass Compensation at 100 Hz			
–30 dB VOLUME Position	(dB)	+6	+6 \pm 2.5 dB
Treble Compensation at 10 kHz			
–30 dB VOLUME Position	(dB)	+4.5	+4.5 \pm 2.5 dB
Tape Out Level			
PHONO Mag. (2.2 mV Input, 1 kHz)	(mV)	150	150 \pm 2 dB
AUX (160 mV Input, 1 kHz)	(mV)	150	150 \pm 2 dB
PHONO Mag. Equalizer Response at 100 Hz	(dB)	+13.11	+13.11 \pm 2 dB
at 10 kHz	(dB)	–13.75	–13.75 \pm 2 dB
PHONO Mag. Overload at 1 kHz	(mV)	100	80
Tape Out Level (DIN) (3.3 K Ω Terminated)			
AM 5 mV/m Input 30% mod.	(mV)	3.3	3.3 \pm 3 dB
FM 1 mV Input, 22.5 kHz dev. 400 Hz	(mV)	3.3	3.3 \pm 3 dB
AUX 220 mV Input	(mV)	3.3	3.3 \pm 3 dB
Frequency Equalization Response in "SYSTEM" position			
at 100 Hz, Input AUX	(dB)	+6.5	+6.5 \pm 2.5 dB
Music Power at THD 0.9%, 1 kHz (Australian models)	(W)	18	15

NOTE: The supply voltage is 120 volts AC (for UL & C.S.A.) and 240 volts AC for Australian models, from a regulated power supply.

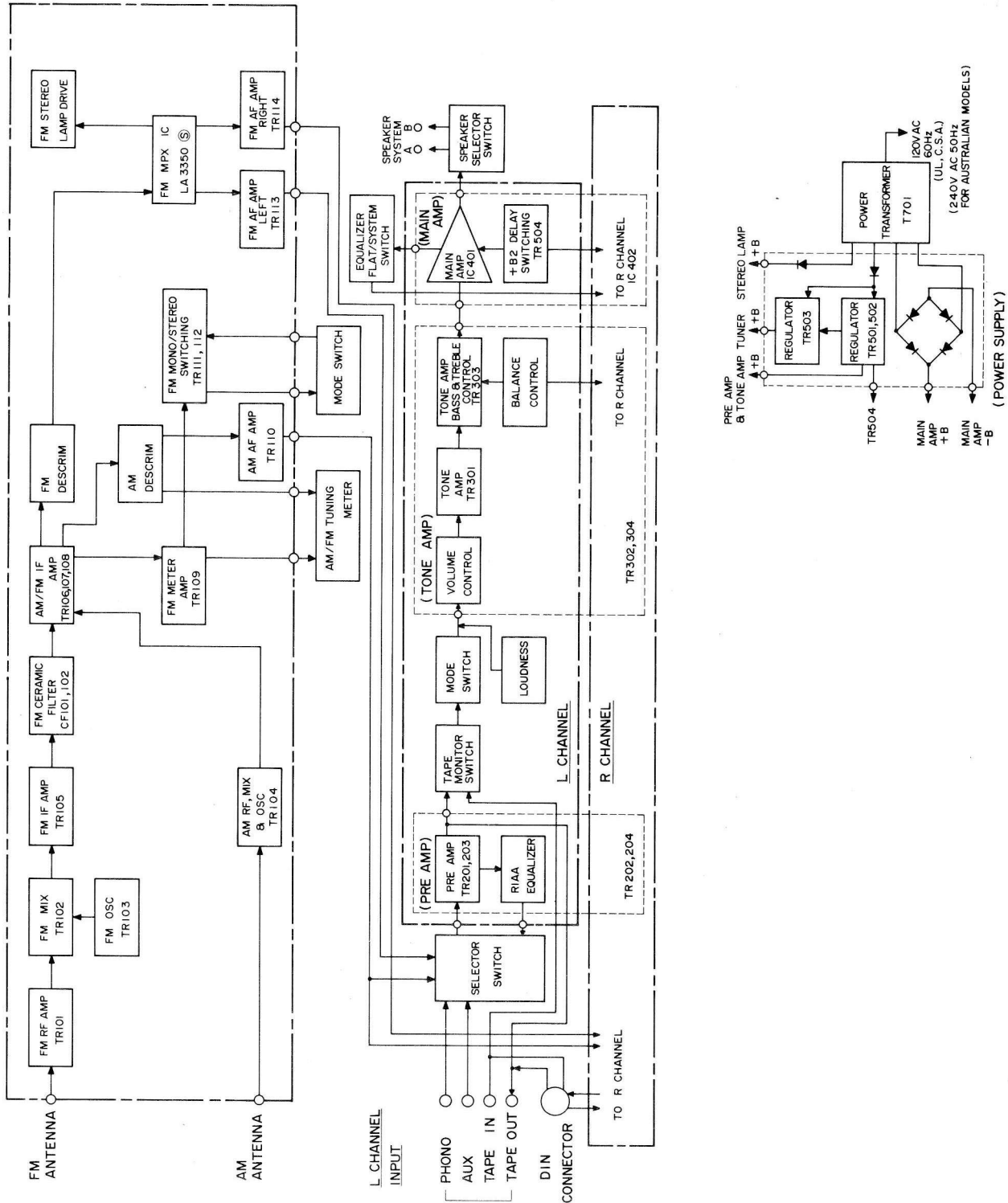
The power source must be isolated from other equipment connected to antenna or output.

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. BLOCK DIAGRAM



3. DISASSEMBLY INSTRUCTIONS

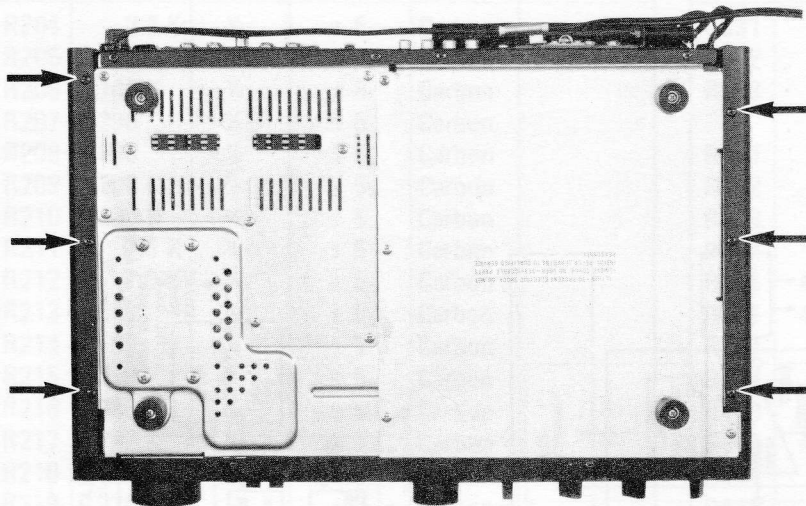


Figure A

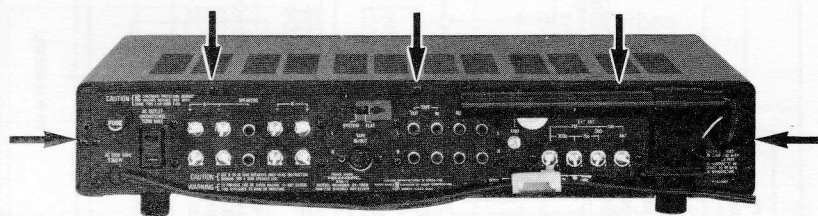


Figure B

1) To remove chassis from Metal Cabinet

- a) Turn the Cabinet upside down and remove the six screws from the Cabinet bottom. (Figure A)
- b) Remove the five screws from the Rear Panel. (Figure B)

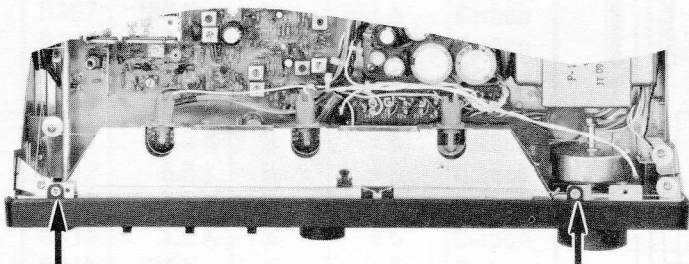


Figure C1

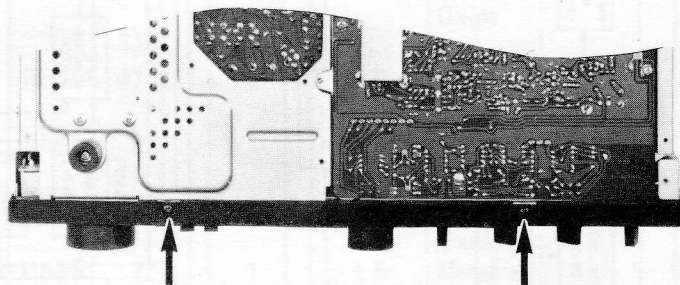


Figure C2

2) Removal of Front Panel

- a) Remove the chassis from Metal Cabinet as described in 1).
- b) Pull off the Metal Cabinet.
- c) Remove two screws each from the top and bottom of the Front Panel. (Figure C1, C2)
- d) Remove the two screws from the back of Front Panel. (Figure D)
- e) Remove Knobs and pull off Panel.

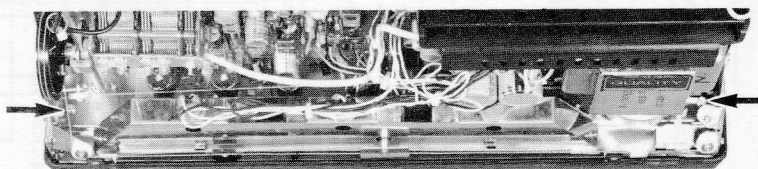


Figure D

3) To remove two bottom covers

- i) Removal of Bottom Cover **A**
Remove the six (A) screws from bottom cover **A** as shown in Figure E.
- ii) Removal of Bottom Cover **B**
Remove the six (B) screws from bottom cover **B** as shown in Figure E.

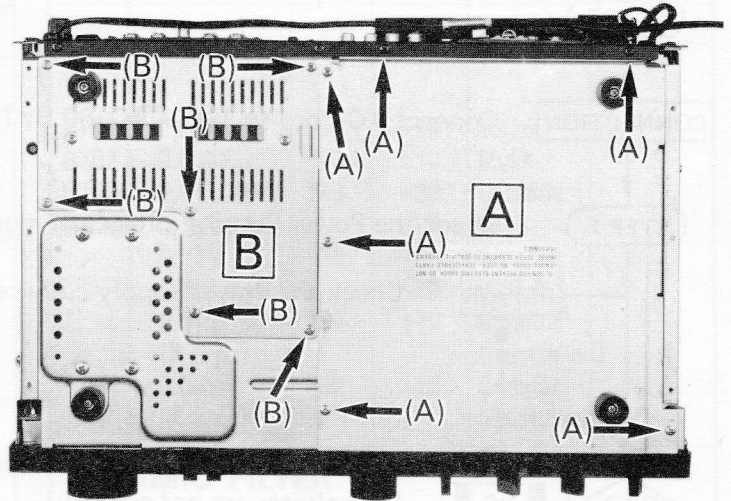


Figure E

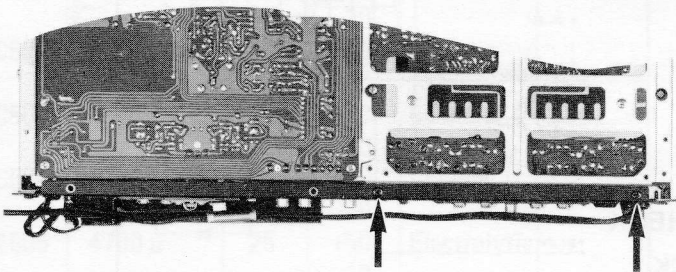


Figure F

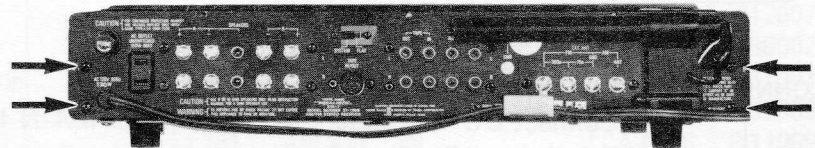


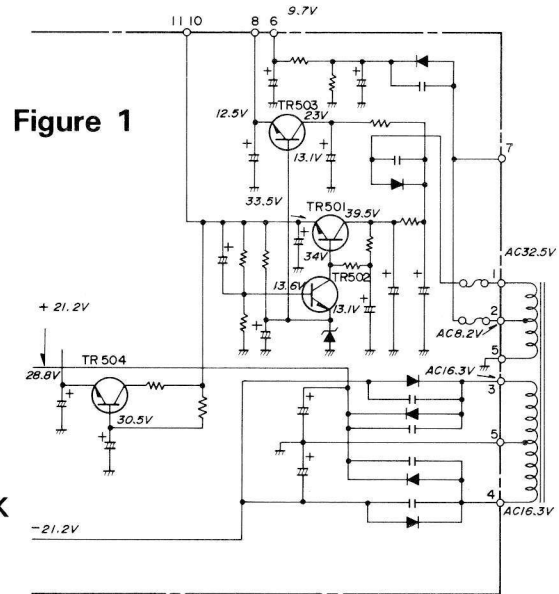
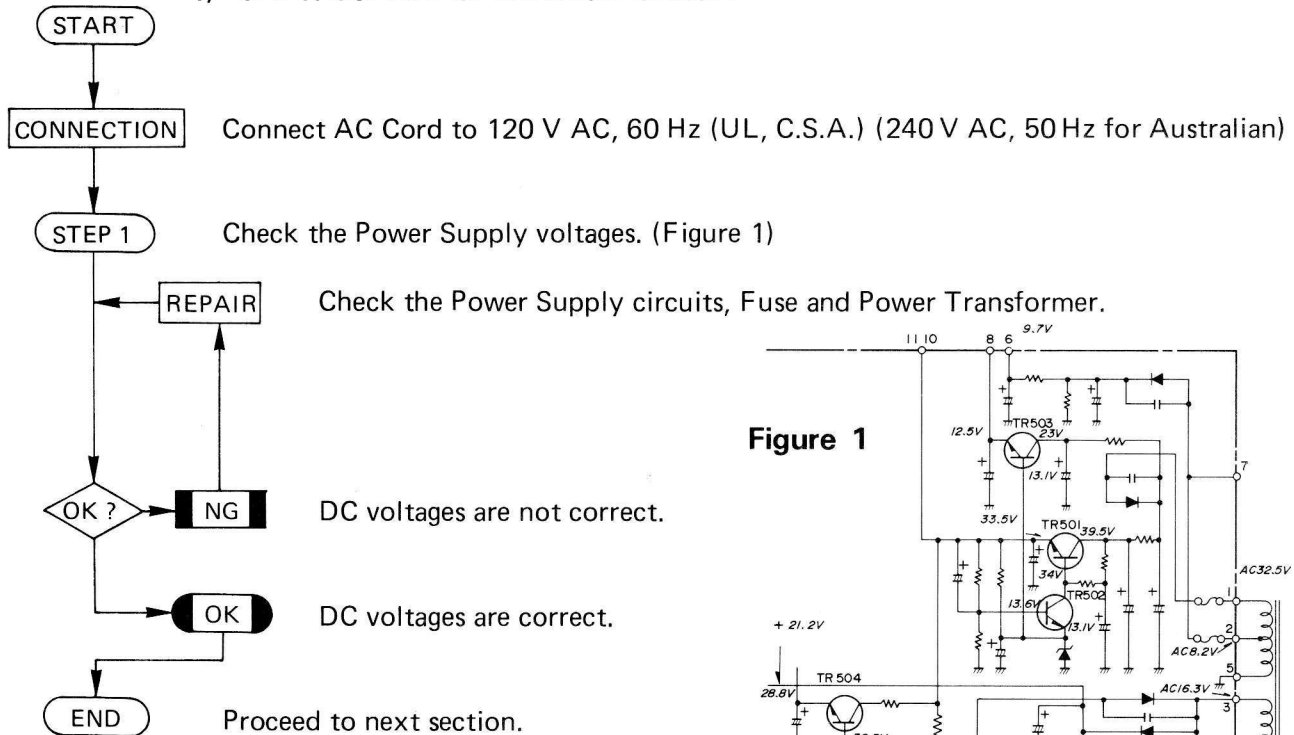
Figure G

4) To remove Rear Panel from chassis

- a) Remove bottom covers as described in 3).
- b) Remove the two screws from bottom of Rear Panel. (Figure F)
- c) Remove the four screws from the Rear Panel. (Figure G)

4. CIRCUIT OPERATION CHECK

1) POWER SUPPLY OPERATION CHECK



2) AUDIO SECTION OPERATION CHECK

(1) MAIN AMP. OPERATION CHECK

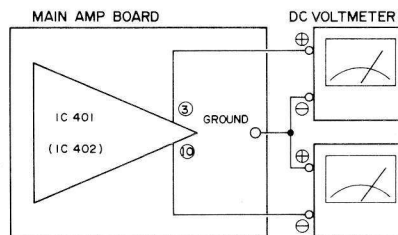
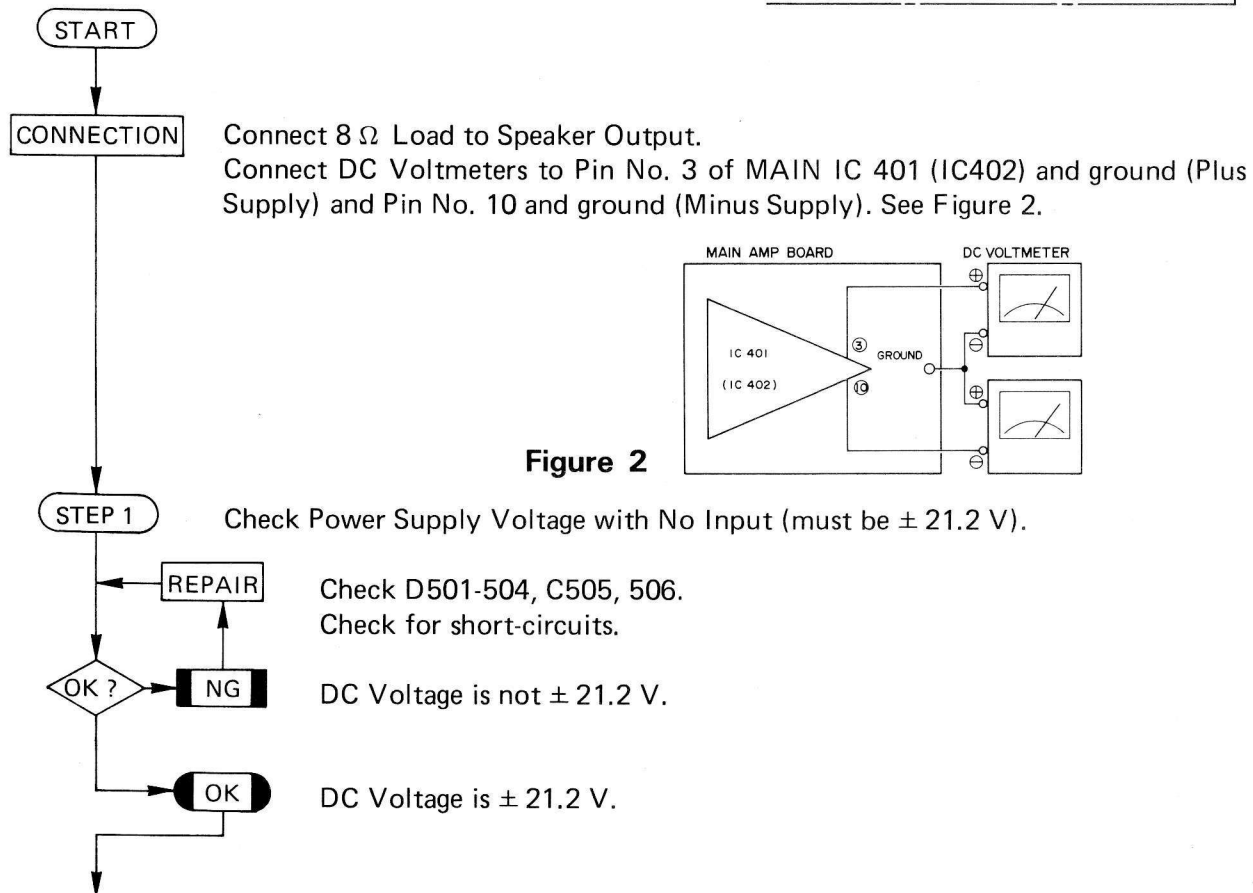
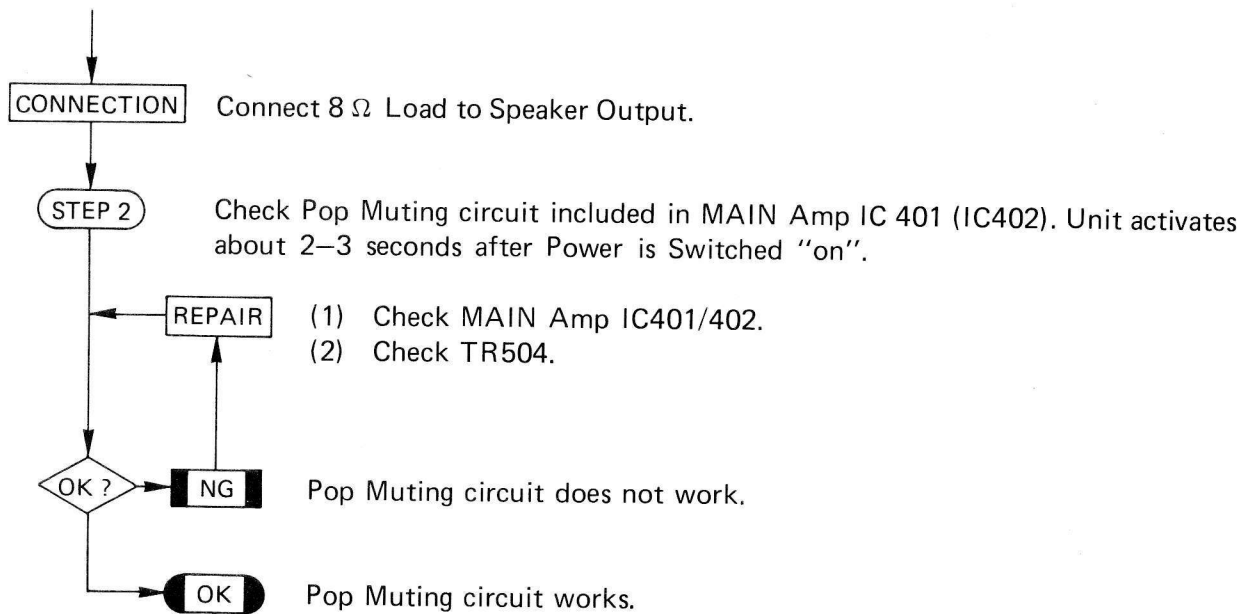


Figure 2



CONNECTION Connect 8 Ω Load to Speaker Output.
Connect Audio Osc. to AUX input.
Connect V.T.V.M. to Speaker terminals. (Figure 3)

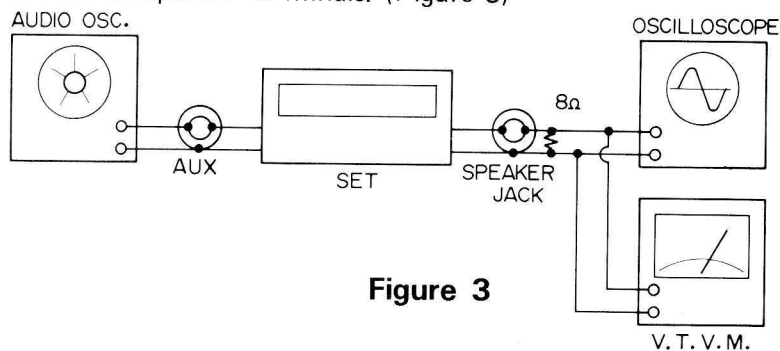


Figure 3

STEP 3 Check Equalization Response in "SYSTEM" position at 100 Hz input. (FLAT position = 0 dB). (Figure 4)

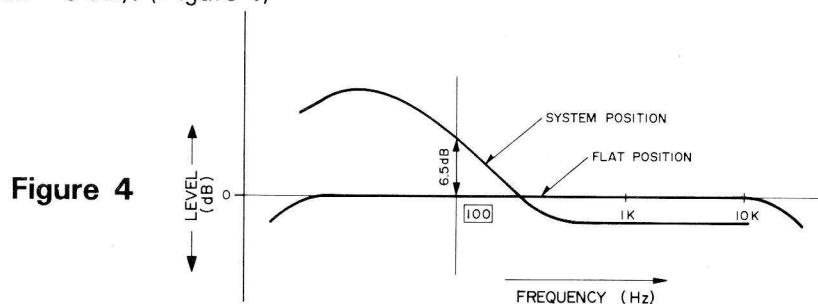
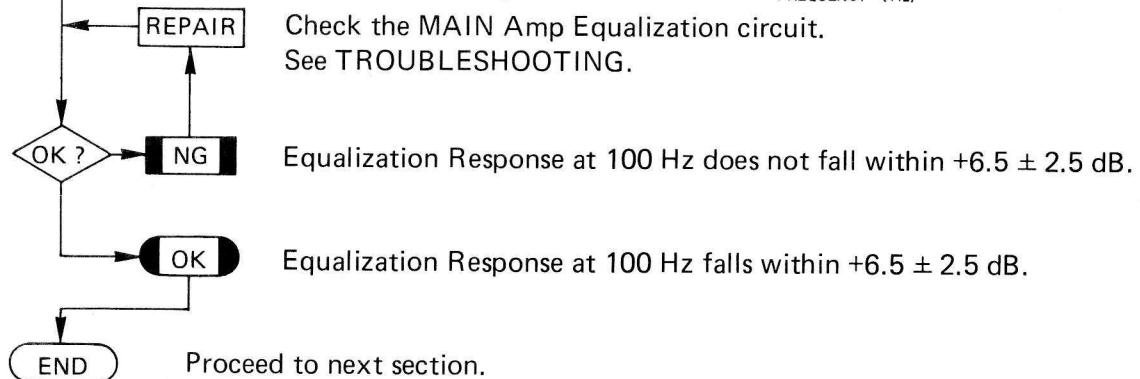
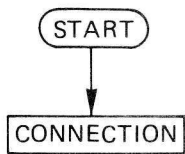


Figure 4



(2) PRE-AMP OPERATION CHECK



Set SELECTOR Switch to PHONO.
 Connect Audio Osc. to PHONO Input.
 Connect Oscilloscope and V.T.V.M. to TAPE OUT Jack. (See Figure 5.)

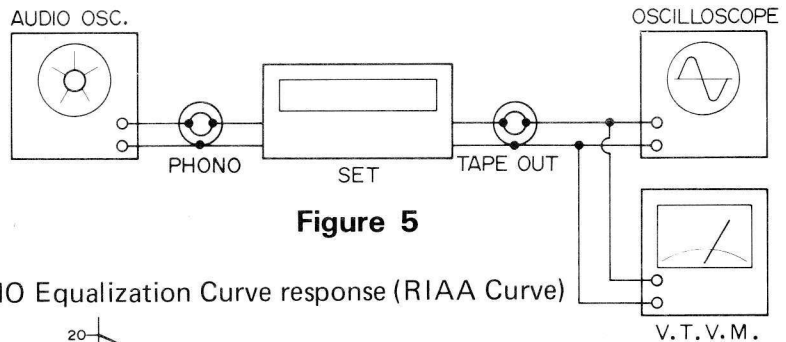
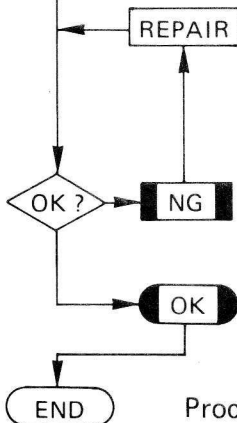
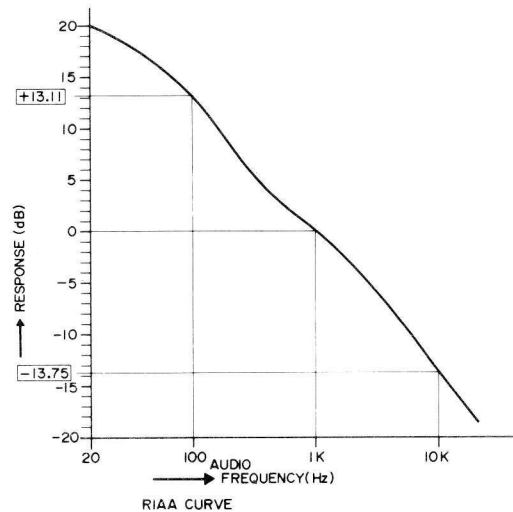


Figure 5

STEP 1

Check for proper PHONO Equalization Curve response (RIAA Curve)
 (See Figure 6).

Figure 6



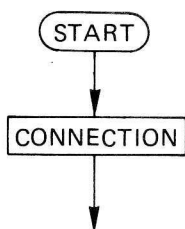
- (1) Check TR201, 203 (TR202, 204).
- (2) Check C209, C211, R219, R217 (L ch) and C210, C212, R220, R218 (R ch).
- (3) Check Pre-Amp circuit.

Equalization Response at 100 Hz does not fall within $+13.11 \pm 2$ dB and at 10 kHz does not fall within -13.75 ± 2 dB.

Equalization Response falls within $+13.11 \pm 2$ dB at 100 Hz and -13.75 ± 2 dB at 10 kHz.

Proceed to next section.

(3) TONE CONTROL OPERATION CHECK



Same Equipment Connection as Figure 3.

STEP 1

Check BASS Action at 100 Hz.
(Figure 7)

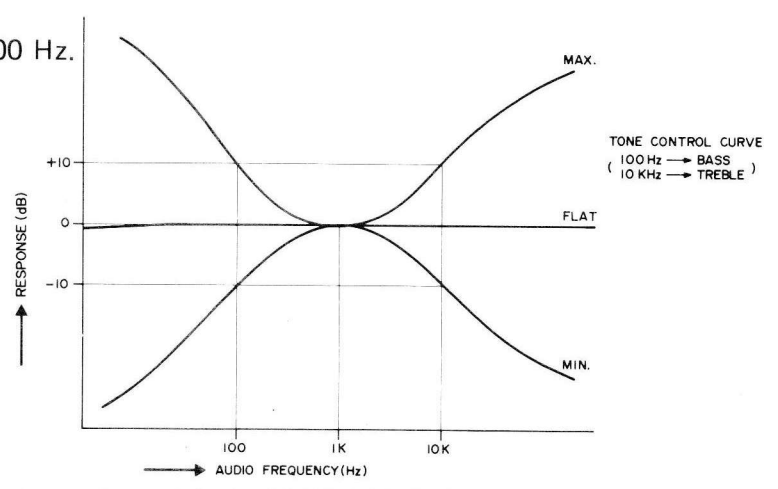


Figure 7

REPAIR

Check Bass Control circuit on TONE CONTROL P.C.B.

OK ?

NG

Frequency Response does not fall within $\pm 10 \pm 2.5$ dB.

OK

Frequency Response falls within $\pm 10 \pm 2.5$ dB.

STEP 2

Check TREBLE Action at 10 kHz. (Figure 7)

REPAIR

Check Treble Control circuit on TONE CONTROL P.C.B.

OK ?

NG

Frequency Response does not fall within $\pm 10 \pm 2.5$ dB.

OK

Frequency Response falls within $\pm 10 \pm 2.5$ dB.

STEP 3

Check LOUDNESS compensation with Volume set for -30 dB from rated power.
(Figure 8)

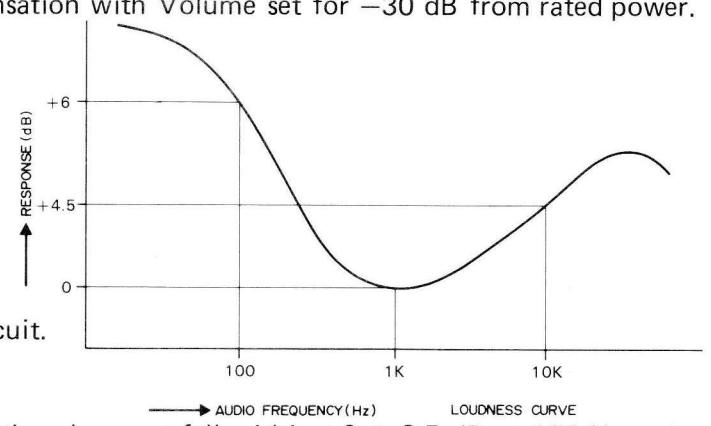


Figure 8

REPAIR

Check Loudness circuit.

OK ?

NG

Loudness compensation does not fall within $+6 \pm 2.5$ dB at 100 Hz and $+4.5 \pm 2.5$ dB at 10 kHz.

OK

Loudness compensation falls within $+6 \pm 2.5$ dB at 100 Hz and $+4.5 \pm 2.5$ dB at 10 kHz.

END

Proceed to the next section.

3) AM RF/IF OPERATION CHECK

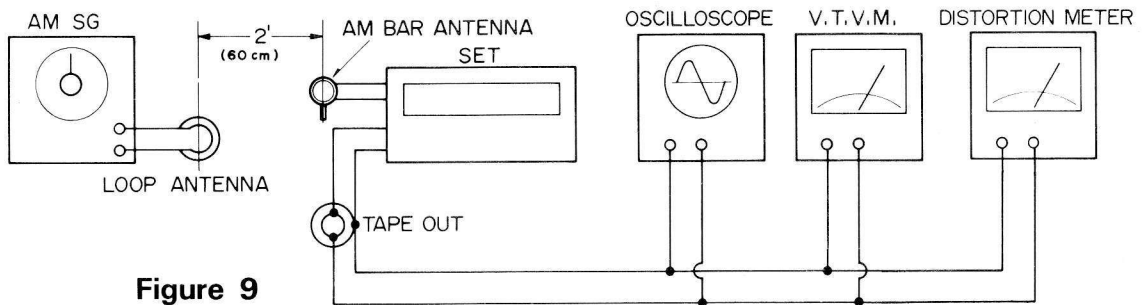
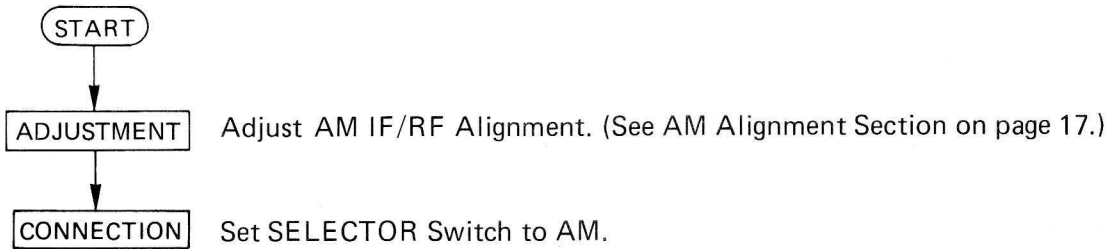
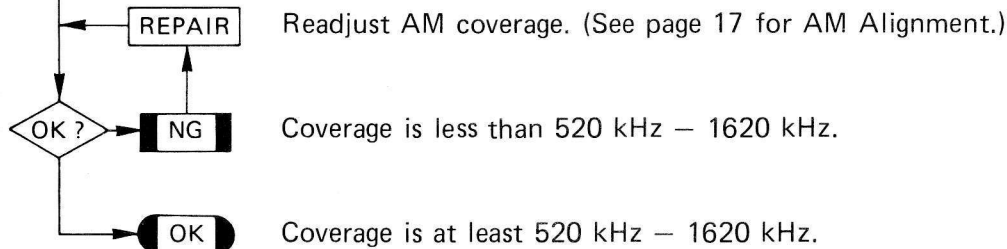
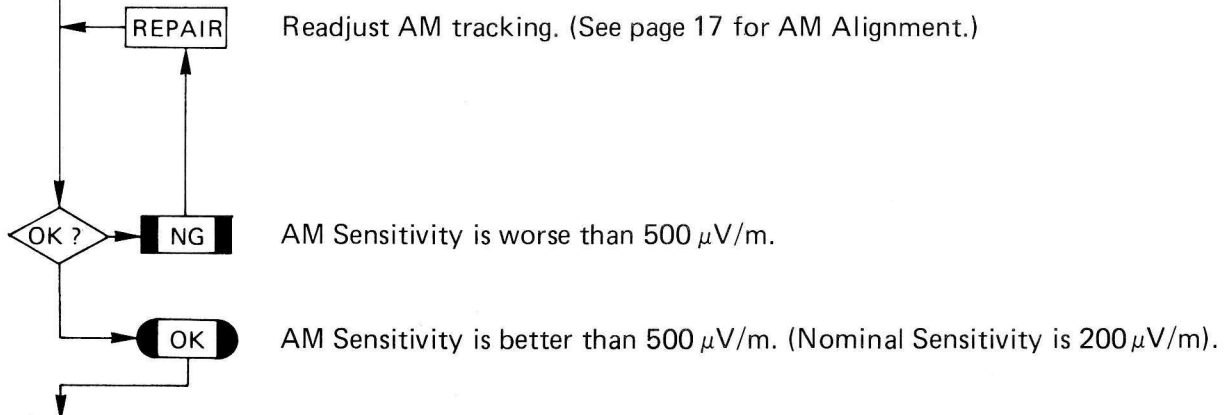


Figure 9

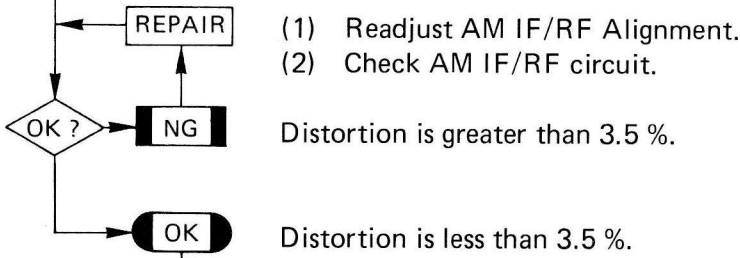
STEP 1 Check AM coverage: lowest Dial pointer position should be under 520 kHz and highest position should be over 1620 kHz.



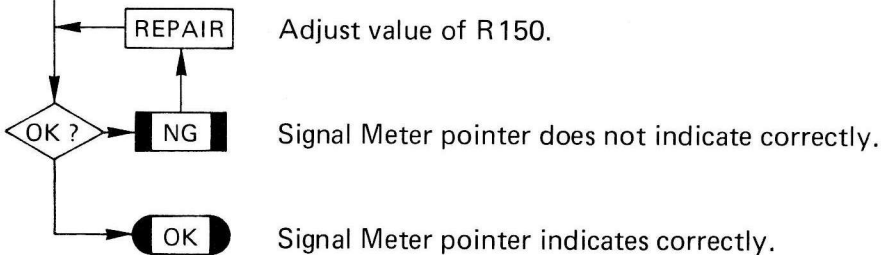
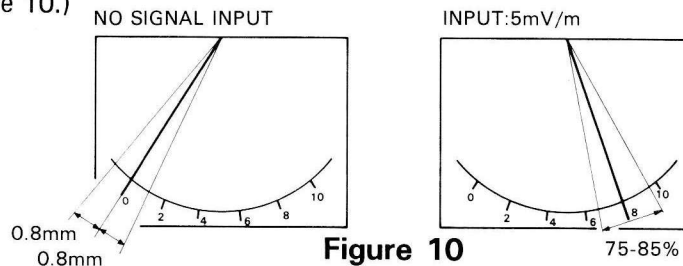
STEP 2 Check Antenna Sensitivity for S + N/N 20 dB at 600, 1000 and 1400 kHz.



STEP 3 Check AM Distortion (Input level to 5 mV/m).

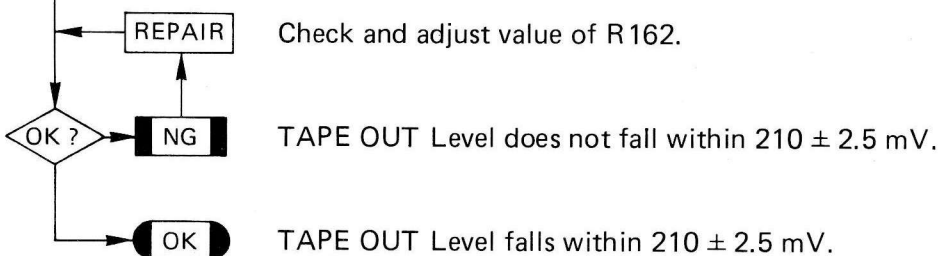


STEP 4 Check the AM Signal Meter Pointer.
(1) No signal – 0 point ± 0.8 m/m
(2) 5 mV/m Input – 75–85 %
(See Figure 10.)



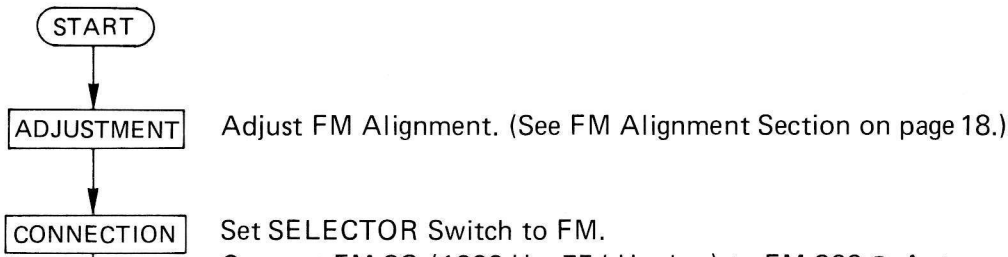
CONNECTION Same equipment connection as Figure 9 and set Input level to 5 mV/m.

STEP 5 Check AM TAPE OUT Level.



END Proceed to next section.

4) FM RF, IF & MPX OPERATION CHECK



Adjust FM Alignment. (See FM Alignment Section on page 18.)

Set SELECTOR Switch to FM.
 Connect FM SG (1000 Hz, 75 kHz dev.) to FM 300 Ω Antenna Terminal.
 Connect Oscilloscope, Distortion meter and V.T.V.M. to TAPE OUT Jack. (See Figure 11.)

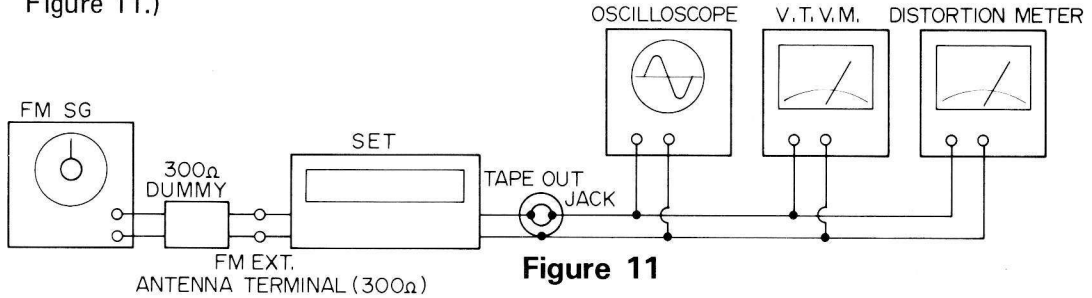
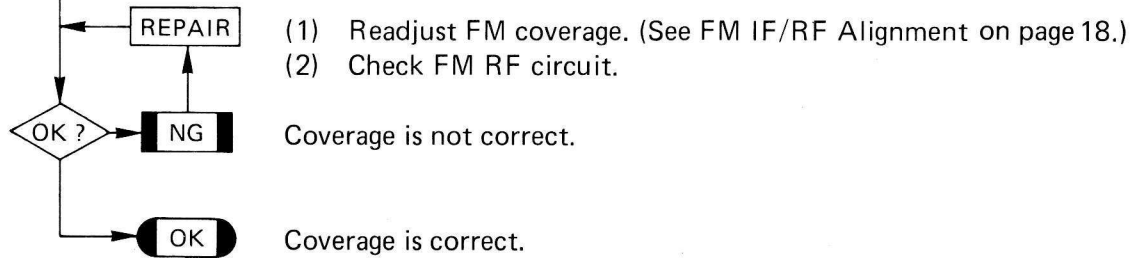


Figure 11

STEP 1 Check FM coverage: Lowest pointer position should be under 88 MHz and high end should be over 108 MHz.

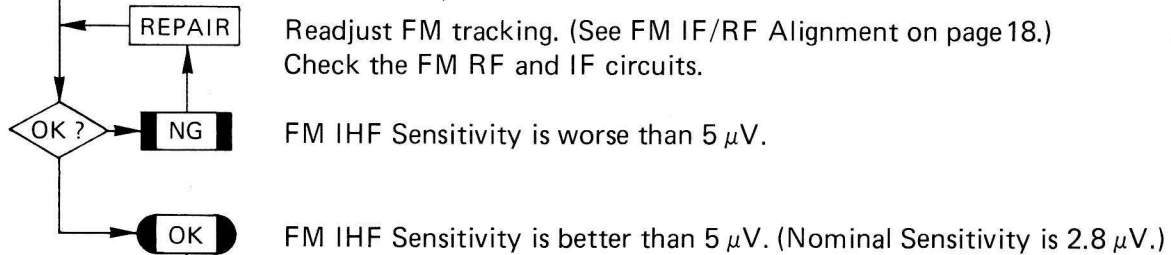


(1) Readjust FM coverage. (See FM IF/RF Alignment on page 18.)
 (2) Check FM RF circuit.

Coverage is not correct.

Coverage is correct.

STEP 2 Check IHF Sensitivity at 90, 98 and 106 MHz.



Readjust FM tracking. (See FM IF/RF Alignment on page 18.)
 Check the FM RF and IF circuits.

FM IHF Sensitivity is worse than 5 μV.

FM IHF Sensitivity is better than 5 μV. (Nominal Sensitivity is 2.8 μV.)

CONNECTION Same equipment connection as Figure 11.
 Set Dial Pointer to 98 MHz (Minimum Distortion point).

STEP 3

Check the Signal Meter Pointer.

- (1) No signal – 0 point ± 0.8 m/m.
- (2) 1 mV Input (Mod. – OFF)
Adjust T110 for maximum reading on set's meter.
- (3) 100 mV Input – 90–95 % of full scale
Adjust VR101 so the Meter Pointer on set is 90–95 % of full scale.
- (4) Check to be sure that the max. Meter reading point is also the point of minimum distortion. (See Figure 12.)

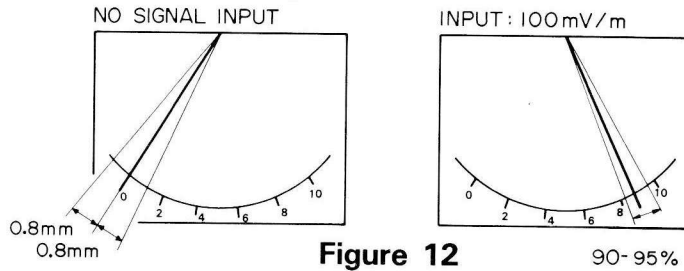


Figure 12

Readjust T110 and VR101.

OK ?

REPAIR

NG

Meter Pointer indicates incorrectly.

OK

Meter Pointer indicates correctly.

CONNECTION

Same equipment connection as Figure 11.
Set FM SG to 98 MHz, 1 mV Input.
MODE Switch to STEREO.

STEP 5

Check FM TAPE OUT Level.

REPAIR

Adjust value of R189 (L ch) and/or R190 (R ch).

OK ?

NG

TAPE OUT Level is not $630 \text{ mV} \pm 2.5 \text{ dB}$.

OK

TAPE OUT Level is $630 \text{ mV} \pm 2.5 \text{ dB}$.

STEP 6

Check TH. Distortion for Mono. signal.

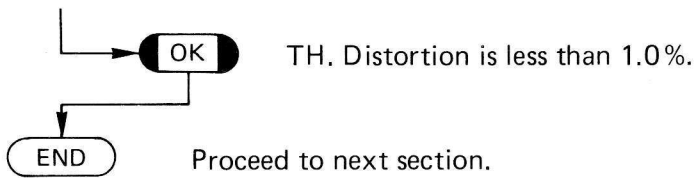
REPAIR

Readjust RF/IF Alignment on page 18.

OK ?

NG

TH. Distortion is greater than 1.0%.



(3) FM MPX OPERATION CHECK

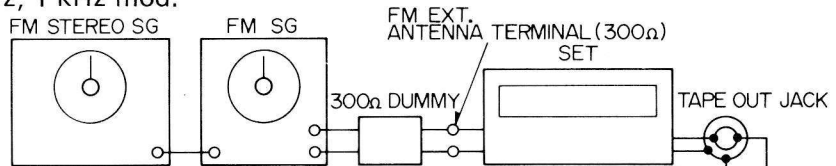
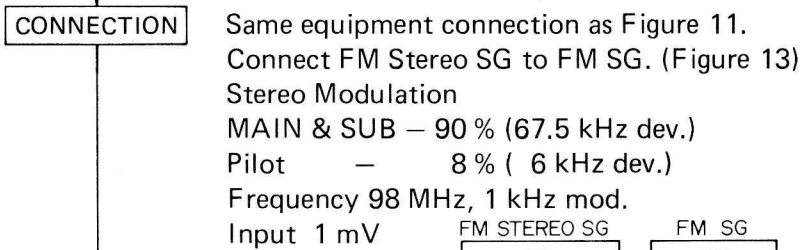
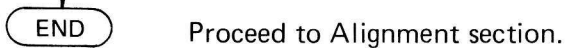
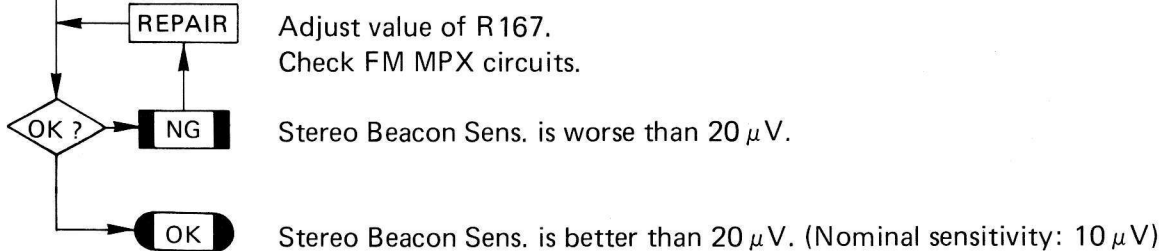
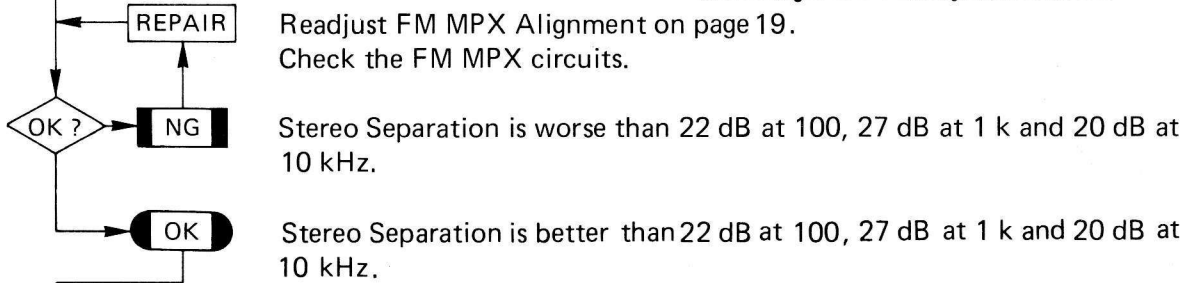


Figure 13

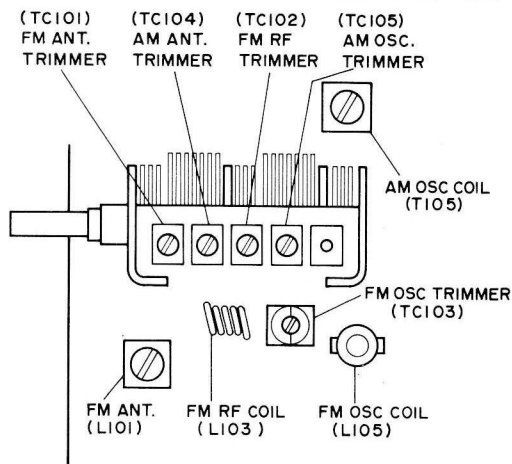


5. ALIGNMENT INSTRUCTIONS

EQUIPMENT REQUIRED

1. AM Signal Generator
2. AC Voltmeter
3. Oscilloscope

TUNER COIL & TRIMMER LOCATIONS



AM IF & RF ALIGNMENT

- NOTE:**
- Signal generator output should be no higher than necessary to obtain an output reading.
 - Maintain line voltage at 120 volts. (UL, C.S.A.) (Use 240 V for Australian models.)
 - Set SELECTOR Switch to AM.
 - See P.C.B. illustrations for alignment points/adjustments.

STEP	SIGNAL GENERATOR COUPLING	SIGNAL 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. 14.	455 kHz (400 Hz, 30% MOD)	Point of non-interference (near 600 kHz)	AC Voltmeter to TAPE OUT JACK	T106 T107 T108 T109	Adjust for maximum reading.
2	Same as above	600 kHz (400 Hz, 30% MOD)	600 kHz	Same as above	T105 (OSC Coil) L701 (AM ANT Coil)	Adjust for maximum reading.
3	Same as above	1400 kHz (400 Hz, 30% MOD)	1400 kHz	Same as above	TC105 (OSC Trimmer) TC104 (ANT Trimmer)	Adjust for maximum reading.
4	Repeat STEP 1 and then STEPs 2 and 3 until no further change is noticed.					
5	Same as step 1	1000 kHz (400 Hz, 30% MOD) Output level to 5 mV/m	Point of non-interference and no signal	AM Strength Meter	Select value of R150	Meter pointer on Receiver should indicate between 75% and 85% on the Meter.

AM ALIGNMENT SET-UP

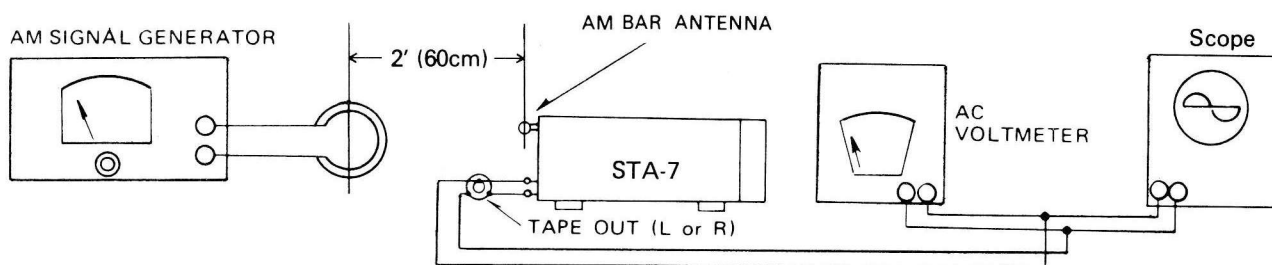


Figure 14

FM RF & IF ALIGNMENT

EQUIPMENT REQUIRED

1. FM Signal Generator Output Level: 1 mV
2. Sweep Generator
3. AC Voltmeter
4. Oscilloscope
5. Distortion Meter

- NOTE:**
- Signal Generator output should be no higher than necessary to obtain an output reading.
 - Set SELECTOR Switch to FM.
 - Maintain line voltage at 120 volts. (UL, C.S.A.) (240 V for Australian models.)
 - Refer to P.C.B. illustrations for test points/adjustments.

STEP	GENERATOR COUPLING	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Sweep Generator to "FM ANT" terminal on FM Front end board	10.7 MHz (1400 kHz Sweep)	Any dial setting where no noise or interference exists	Scope to TP1 at R144 (MPX input) AM/FM/MPX Board	T101, 102, 103 T104 (Primary) FM IFT	Adjust for maximum amplitude and proper linearity between ± 150 kHz markers. Refer to Fig.15.
2	Sweep Generator to FM Antenna Terminal thru FM Dummy antenna (300 ohm)	"	"	"	T101, 102 FM IFT	"
3	Same as above	"	"	"	T104 FM IFT. (Primary and Secondary)	Adjust for symmetrical "S" curve as shown in Fig. 15.
4	Signal Generator to FM Antenna Terminal thru FM Dummy antenna (300 ohm)	98 MHz (400 Hz, 100% MOD)	Tune for Maximum reading on meter.	Distortion Meter to TAPE OUT Jack	T104 FM Discrim. (Secondary)	Adjust for minimum distortion.
5	Same as above	86.5 MHz	Tuning gang fully closed	AC Voltmeter and Scope to TAPE OUT Jack	L105 (FM OSC)	Adjust for maximum reading on meter.
6	Same as above	108.5 MHz	Tuning gang fully opened	"	TC103 (FM OSC Trimmer)	"
7	Repeat STEPs (5) and (6) until Tuning Range Covers exactly from 86.5 MHz to 108.5 MHz.					
8	Signal Generator to FM Dummy antenna (300 ohm)	90 MHz	90 MHz Tune to Signal	AC Voltmeter and Scope to TAPE OUT Jack	L101 (FM ANT Coil) L103 (FM RF Coil; stretch or squeeze)	Adjust for maximum reading on AC Voltmeter.
9	Same as above	106 MHz	106 MHz Tune to Signal	"	TC101 (FM ANT Trimmer) TC102 (FM RF Trimmer)	"
10	Repeat STEPs (8) and (9) until no further improvement is noticed.					
11	Same as STEP (8) ANT. input: 1 mV	98 MHz	98 MHz Tune to Signal	—	T110	Adjust for maximum reading on the Receiver's meter.
12	Same as STEP (8) ANT. input: 100 mV	"	"	—	VR101	Adjust so the Meter Pointer on Receiver is 90–95% of full scale.

FM ALIGNMENT SET-UP

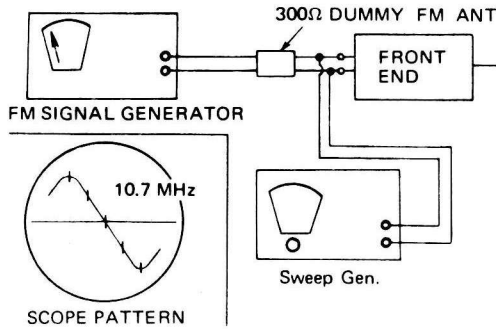


Figure 15

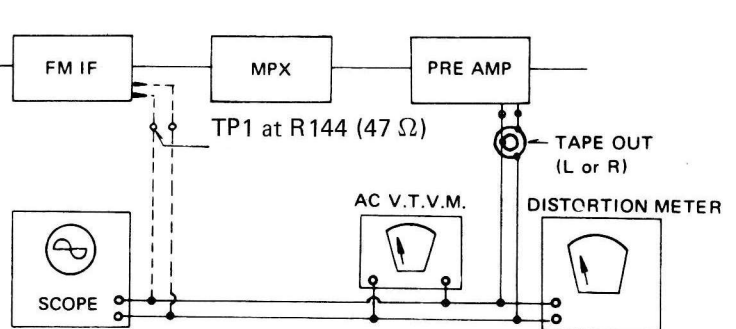


Figure 16

FM STEREO ALIGNMENT

Equipment Required

1. Stereo Modulator Connect Stereo Modulator to EXT. Mod. terminal on FM signal generator.
Modulation Level of 19 kHz Pilot Signal 8–10%
2. FM Signal Generator .. Output Level 1 mV
Frequency Approximately 98 MHz
Deviation 75 kHz 100% modulation of composite signal
3. AC Voltmeter
4. Oscilloscope
5. Distortion Meter
6. Frequency Counter

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

Preliminaries

Set SELECTOR switch to FM STEREO.

MULTIPLEX & SEPARATION ALIGNMENT

STEP	SIGNAL GENERATOR COUPLING	STEREO MODULATION	INDICATOR	ADJUSTMENT	REMARKS
1	Connect to FM Antenna terminal thru FM dummy antenna (300 Ω).	Mono. 1 kHz (1000 Hz, No Mod) Input 1 mV	Counter connected to TP2 at Pin 12 of IC	VR103	Adjust for 19 kHz ±50 Hz on Counter. Refer to Fig. 17.
2	Same as above	Composite MPX Signal 1 kHz on Left channel ONLY	AC Voltmeter connected for TAPE OUT jack of Right channel	VR102 (Separation)	Adjust for minimum reading. Refer to Fig. 18.
3	Same as above	Composite MPX Signal 1 kHz on Right channel ONLY	AC Voltmeter connected for TAPE OUT jack of Left channel	Same as above	Same as above
4	Repeat STEPs 2 and 3 until AC Voltmeter reading is at least -30 dB re same channel out (i.e. 30 dB separation).				
5	Same as step 1	Composite Signal 1 kHz	AC Voltmeter connected to TAPE OUT jack	Select value of R167.	With 10 μV antenna input signal, stereo indicator lamp should come on.

FM STEREO ALIGNMENT SET-UP

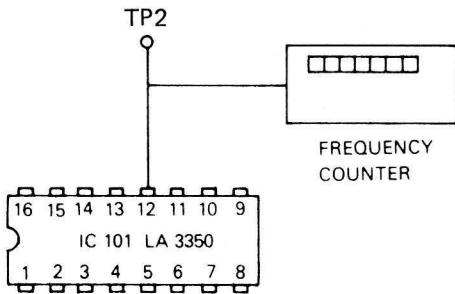


Figure 17

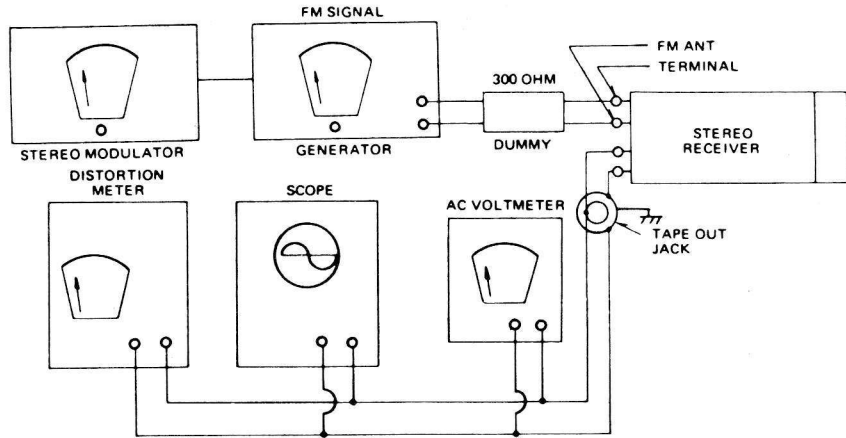


Figure 18

6. BUILT-IN PROTECTOR CIRCUITS DESCRIPTION (MAIN AMP IC HA-1350)

1) Current Limiter

If speaker terminals are shorted, the output line is grounded and excessively high current flows through the Output stage in the IC. This high current is sensed by the Current Limiter circuit in the IC and decreases the output current (because of output current limiting). If this should occur, turn off Receiver. When problem is corrected, turn the Receiver on again.

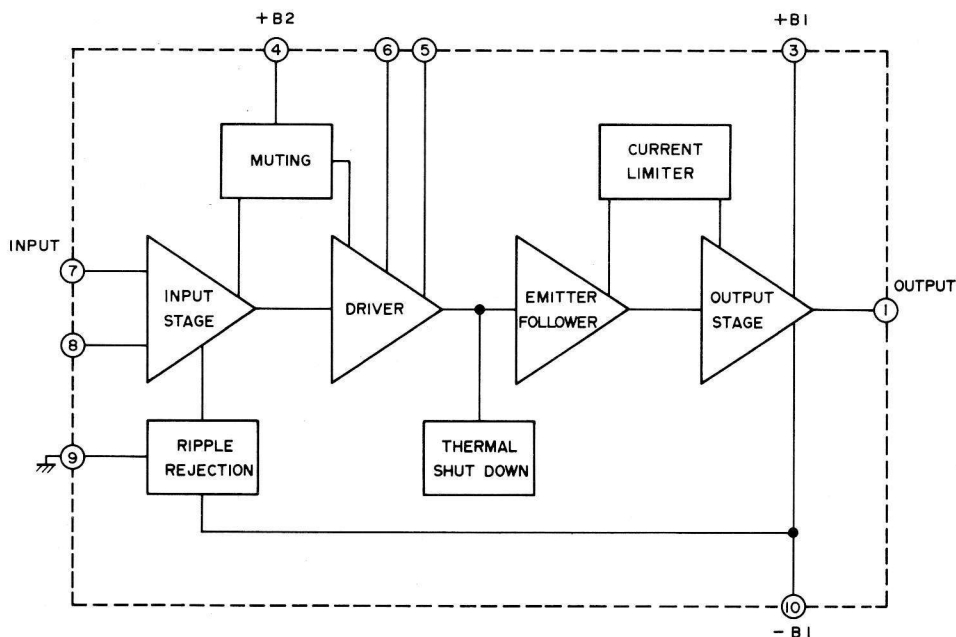
2) Thermal shut-down circuit

If the chip temperature reaches approximately 150°C, the output power and current drain are automatically reduced to protect the device.

3) Muting circuit

Shock or "pop" noise occurring during power "on" is reduced by a built-in muting system.

NOTE: +B₂ is a regulated power supply, whose rise time constant is maintained at approx. 2 seconds to achieve muting for this clip.



7. TROUBLESHOOTING

Symptom	Cause/Remedy
1) No output	1) Faulty AC power cord *Replace the cord. 2) Defective power switch *Replace the switch. 3) Broken wire in the power transformer *Replace the transformer.
2) Pilot lamps do not light.	1) Broken lamp(s) (PL702-705) *Replace the lamp(s). 2) Open in the power transformer tertiary winding *Replace the transformer. 3) Blown fuse in tertiary winding (1.5 A) (F3) *Replace fuse.
3) Pilot lamps light but no speaker output	1) Defective capacitor C505 or 506 *Replace the defective capacitor(s). 2) Defective diode D501-504 *Replace the defective diode(s). 3) Defect in the power transformer secondary winding *Replace the power transformer.
4) Blows fuse.	1) Defective diode D501-504 in the rectifier circuit *Replace the defective diode. 2) Short-circuit in the rectifier circuit. *Remove the short. 3) Short-circuit in power IC circuitry IC401 or 402 *Replace circuit and/or replace the defective transistor(s).
5-1) No output 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 VR302.	1) Defective transistor TR301-304 or IC401, 402 *Replace the defective transistor(s) or IC. 2) Defective resistor or capacitor of TONE or MAIN AMP circuit *Replace the defective part(s).
5-2) No output when a test signal is applied to the input terminals.	1) Defective transistor, resistor or capacitor of PRE AMP circuit *Replace the defective part(s). 2) Defective MONO/Stereo or TAPE MONitor switch *Replace or repair the switch(es). 3) Defective Selector switch *Replace the Selector switch.
6) Speaker works normally but headphone does not work.	1) Defective R423 (left) or R424 (right) *Change it.
7) All the inputs work normally except "AUX" input.	1) Poor contact in "AUX" input jack *Repair or replace it. 2) Poor contact in selector switch *Repair or replace the switch.
8) "PHONO" input not operative	1) Poor contact in "PHONO" input jack *Repair or replace it. 2) Faulty selector switch *Repair or replace the switch.

Symptom	Cause/Remedy
9) "TAPE OUT" inoperative	1) Poor contact in "TAPE OUT" output jack *Repair or replace the jack. 2) Defective R227 or R228 *Replace the resistor(s).
10) No AM or FM (Tuner B+ voltage is not 11–12 V.)	1) Blown fuse 1 A (F2) in tertiary circuit *Replace fuse. 2) Defective diode D506 *Change the defective diode(s). 3) Faulty capacitor C515 or 516 *Change the defective capacitor(s). 4) Defective resistor R503 *Replace the resistor(s). 5) Defective transistor TR503 *Replace the transistor. 6) Broken tertiary winding in the power transformer *Replace the transformer. 7) Short-circuit in Tuner +B circuit *Repair the short. 8) Poor contact in selector switch *Repair or replace the switch.
11) No FM	1) Poor contact in Selector switch *Repair or replace it. 2) Defective resistor or capacitor of FM front-end circuit *Replace the defective part(s). 3) Transistor, diode, IFT, resistor or capacitor of FM IF circuit defective *Replace the defective part(s). 4) Faulty FM Antenna lead-in/circuitry *Repair or replace the Antenna lead-in/circuitry.
12) No AM	1) Poor contact in selector switch *Repair or replace switch. 2) Transistor, diode, IFT, resistor or capacitor of AM IF ^a defective *Replace the defective part(s). 3) Bar-Antenna coil defective *Repair or replace it.
13) No MPX separation	1) Improper adjustment *Readjust it. 2) IC of MPX board defective (IC101) *Replace the IC. 3) VR102 or 103 (Trimmer resistor) defective *Replace it.
14) No stereo light	1) Broken ST. Indicator lamp (PL701) *Replace the lamp. 2) Defective IC of MPX board (IC101) *Change the defective IC.

Symptom	Cause/Remedy
15) FM stereo does not work.	1) Defective IC (LA3350) (IC101) *Replace. 2) Defective VR102 or 103 *Replace. 3) Defective transistor, diode, resistor or capacitor of FM MPX circuit *Replace the defective part(s). 4) Defective Pilot lamp PL701 *Replace.
16) "LOUDNESS" has no effect.	1) Defective "LOUDNESS" switch *Replace the switch. 2) Defective C301-304, R301-302 *Replace the defective part(s).
17) "BASS" has no effect.	1) VR304 (100 K ohm control) defective *Replace it. 2) Defective R315-322 or C315-318 of Tone Control board *Replace the defective part(s).
18) "TREBLE" has no effect.	1) Faulty VR303 (100 K ohm control) *Replace it. 2) Defective C311-314 of Tone Control board *Replace the defective part(s).
19) "TAPE IN" inoperative	1) Poor contact in "TAPE IN" input jack *Repair or replace it. 2) Faulty "TAPE MONitor" switch *Repair or replace the faulty switch.

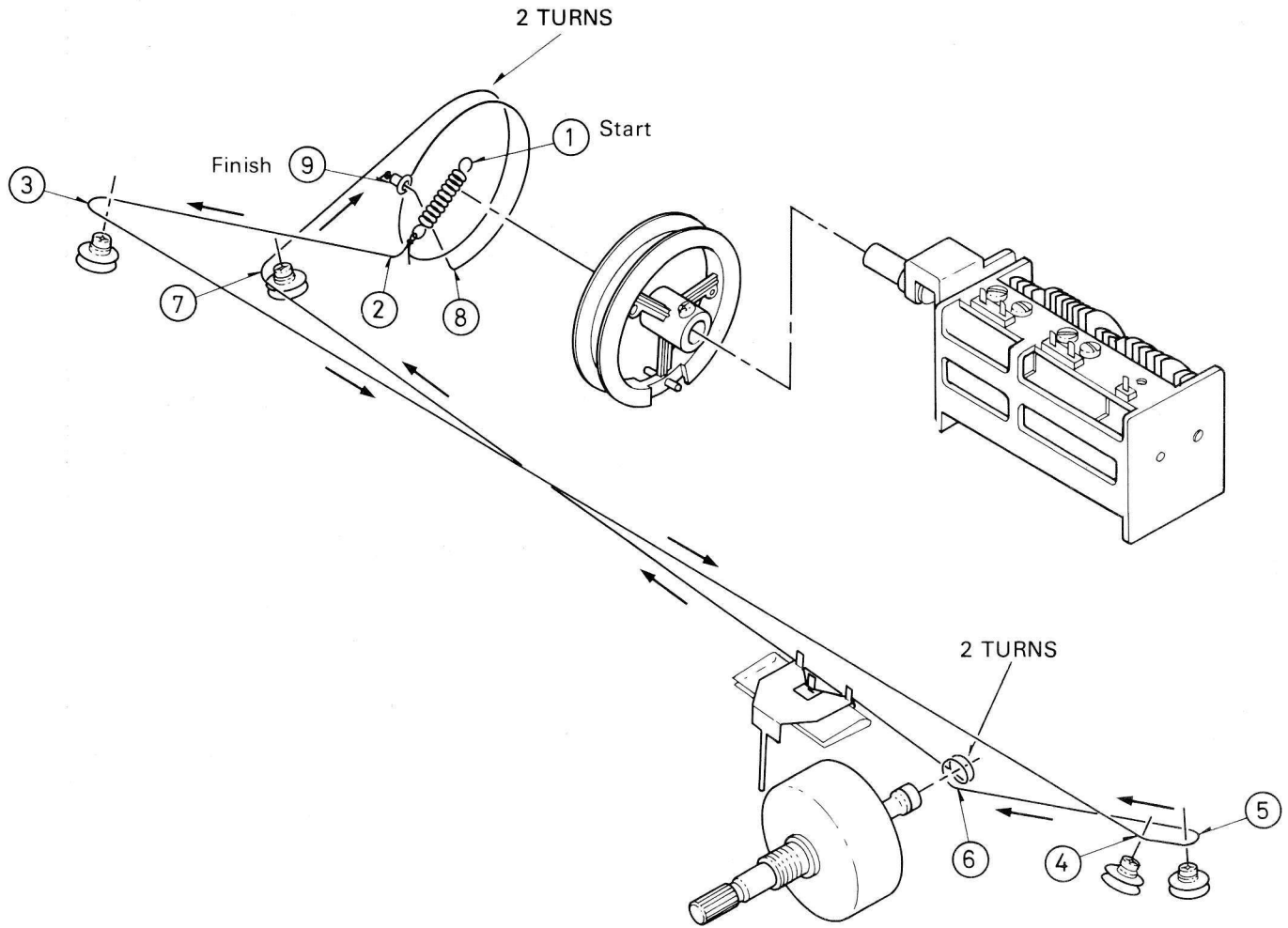
8. VALUE SELECTED PARTS

The value of some parts is selected at the factory for optimum operation. If the circuitry does not operate properly, you can change these values.

R167 – This is to control FM Stereo Indicator Sensitivity.

Use larger value to increase FM Stereo Indicator Sensitivity.

9. DIAL STRINGING DIAGRAM



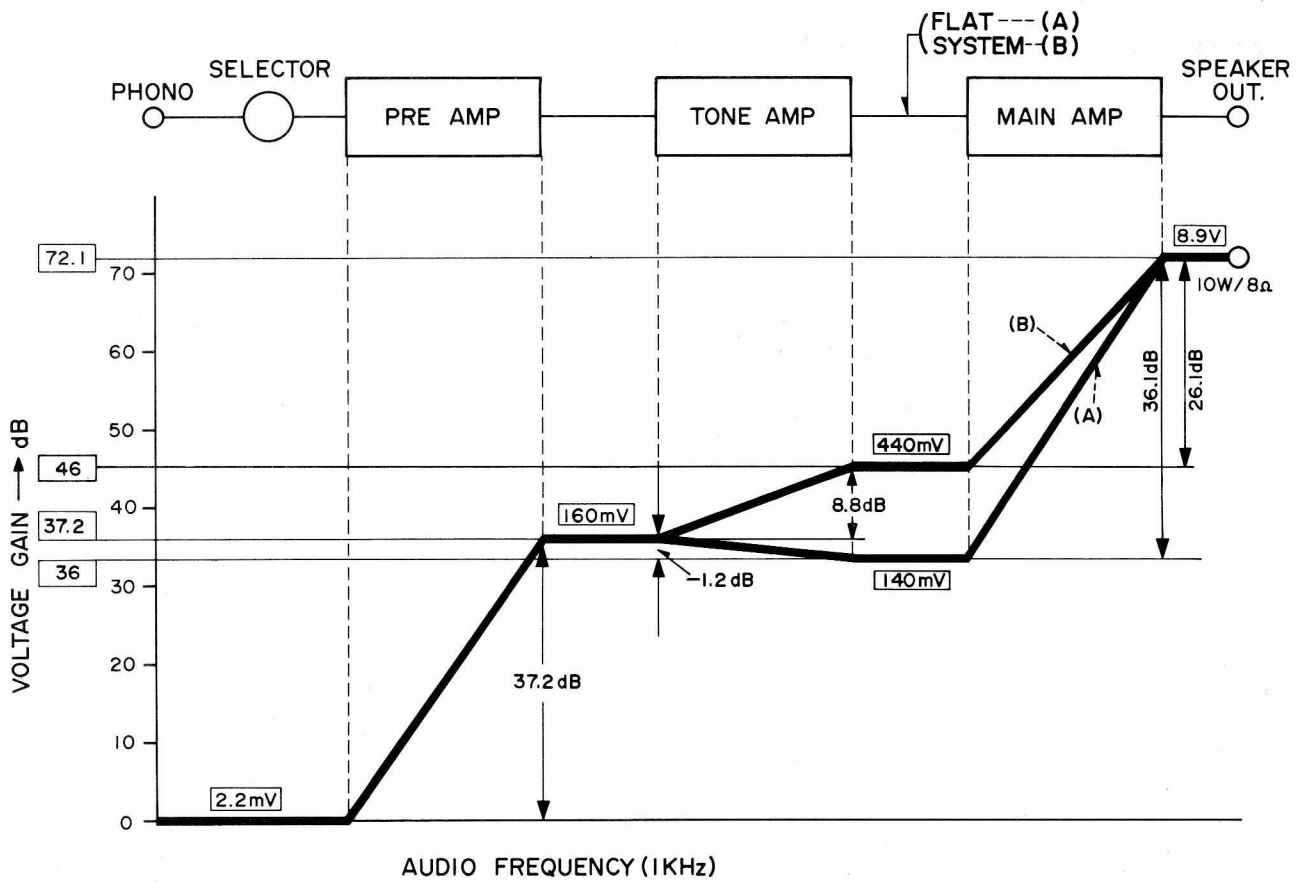
START WITH CAPACITOR SET AT MINIMUM.
[PLATES FULLY OPEN (UNMESHED)].

Pointer Position : HIGH END

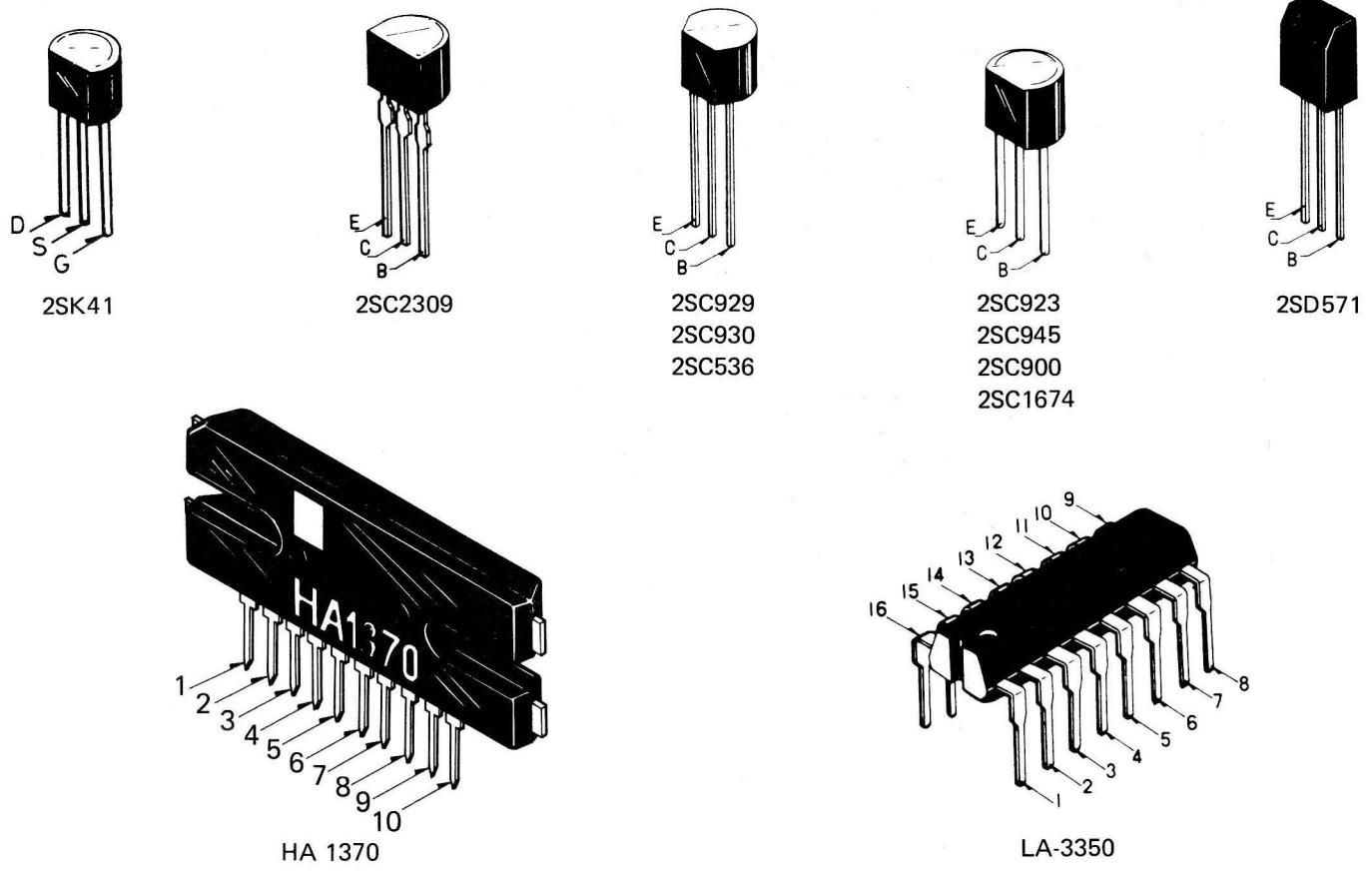
Start : SPRING

Finish : Hook

10. LEVEL DIAGRAM

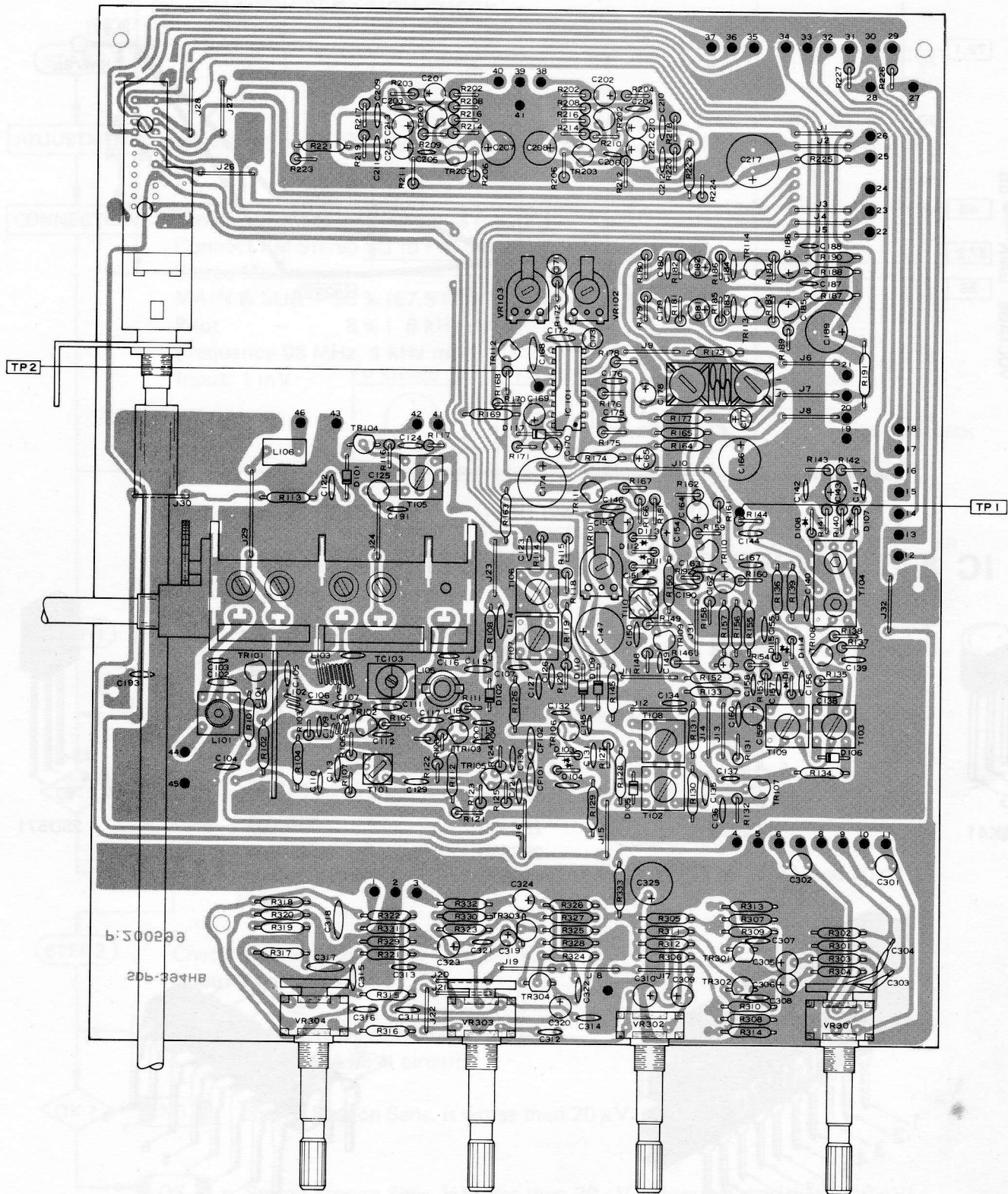


11. IC & TRANSISTOR LEAD IDENTIFICATION

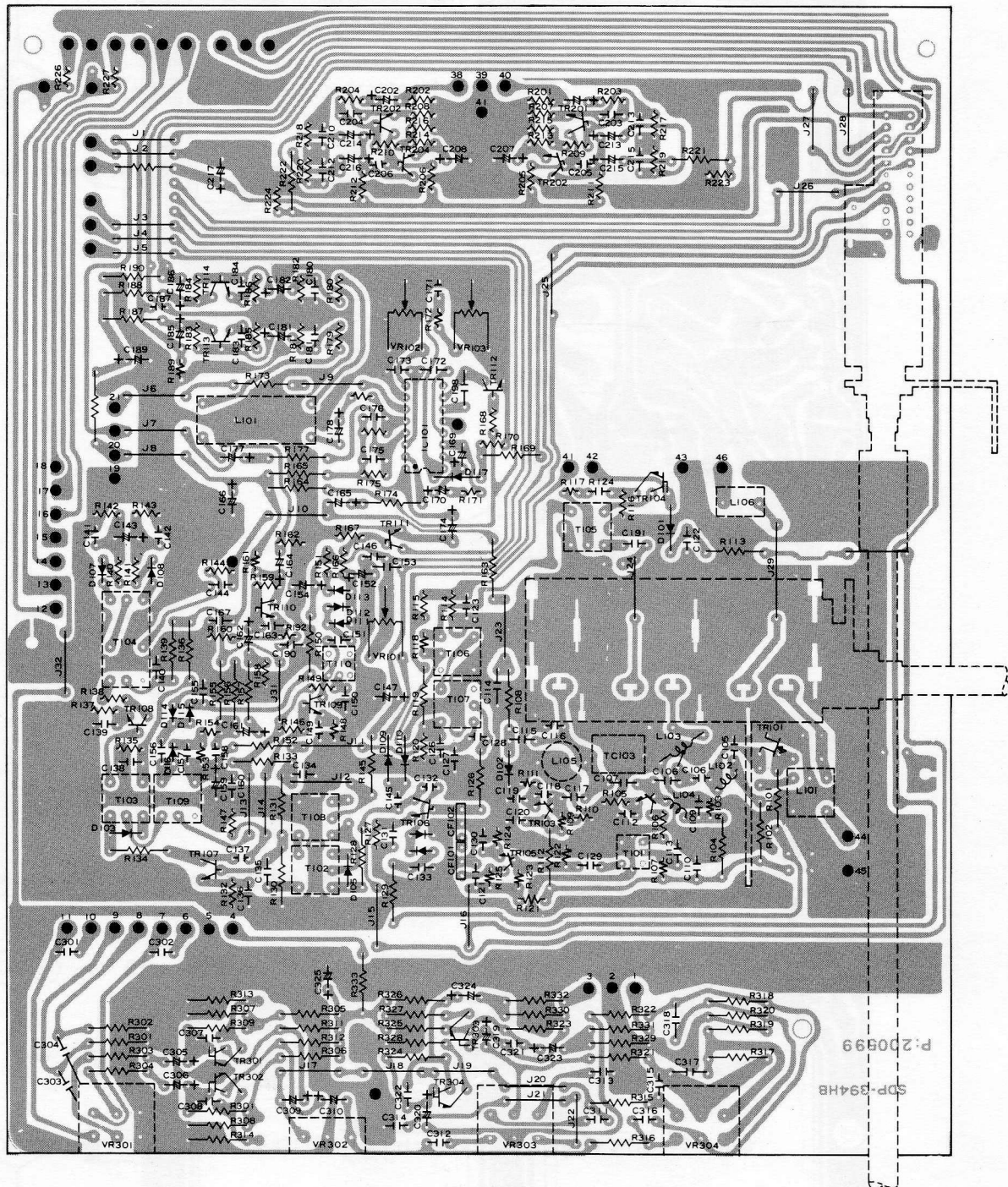


12.AM/FM RF,IF,MPX & PRE,TONE AMP P.C.B. (TOP & BOTTOM VIEWS)

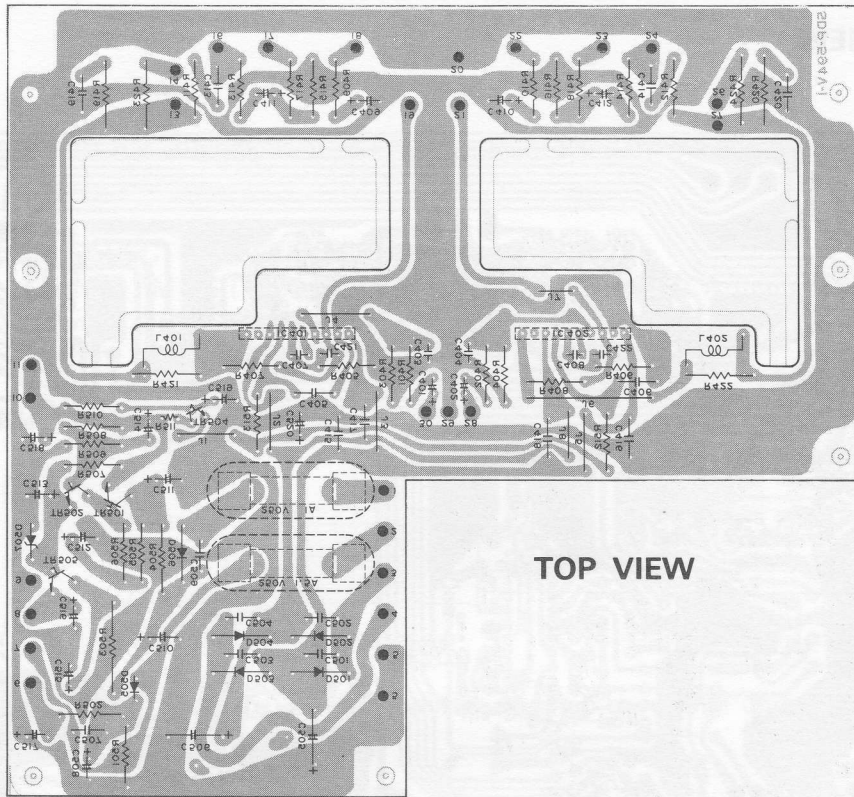
TOP VIEW



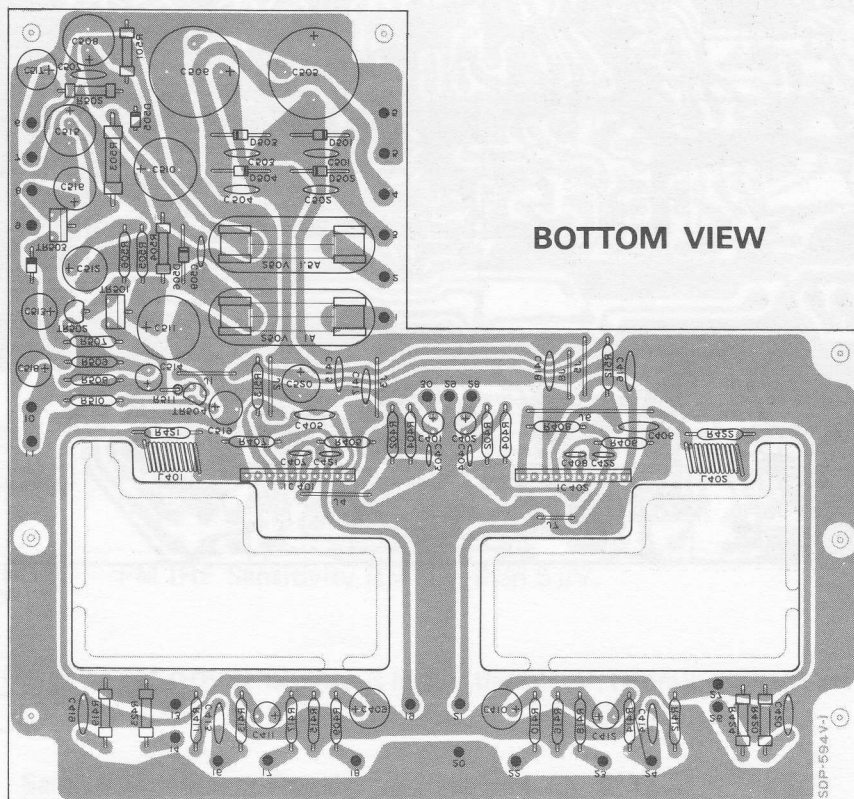
BOTTOM VIEW



13.MAIN AMP & POWER SUPPLY P.C.B (TOP & BOTTOM VIEWS)



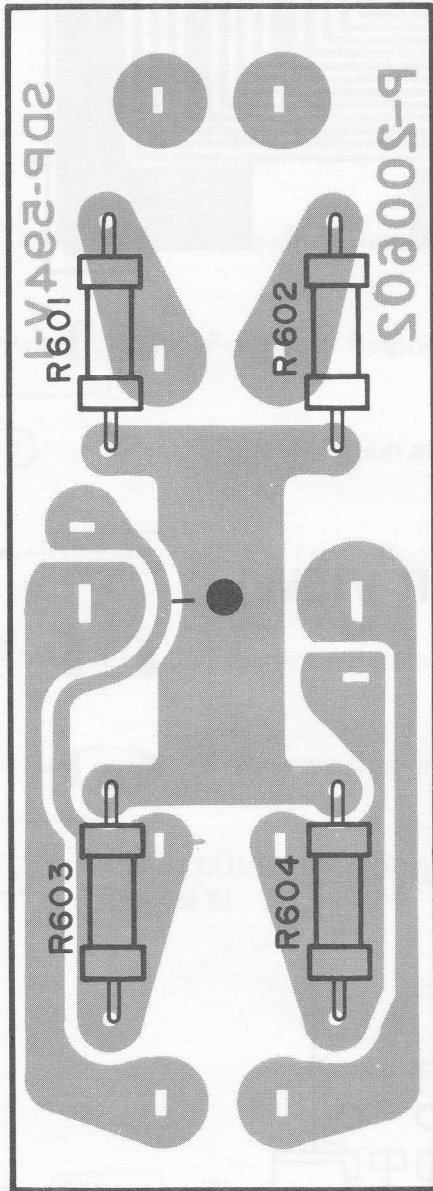
TOP VIEW



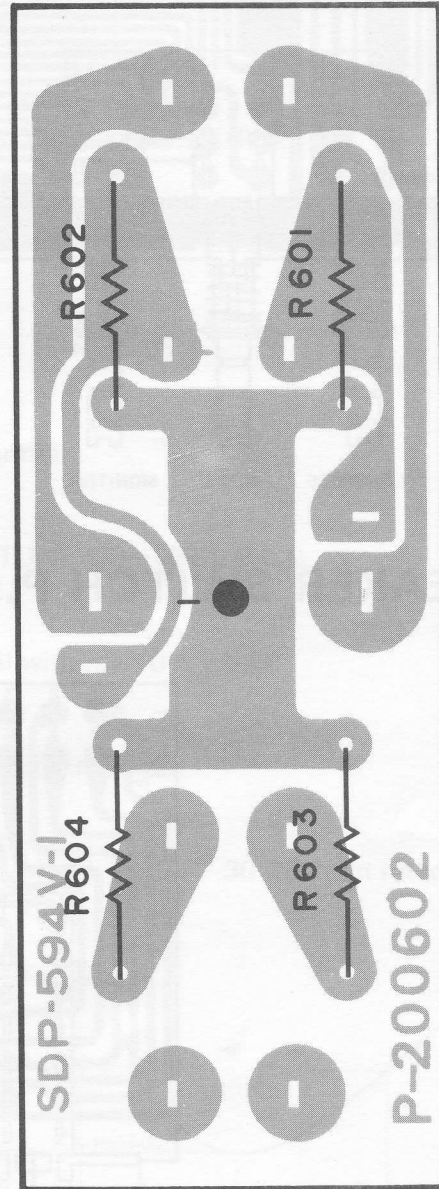
BOTTOM VIEW

14. SPEAKER JACKS & SYSTEM/FLAT EQUALIZATION P.C.B. (TOP & BOTTOM VIEWS)

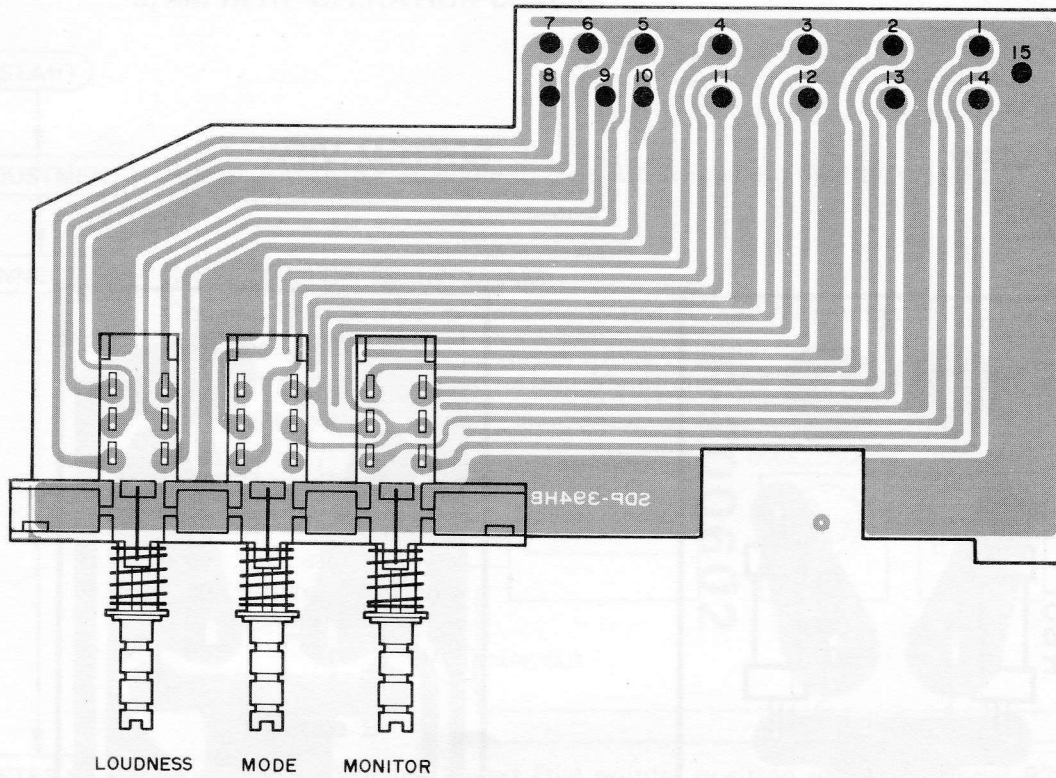
TOP VIEW



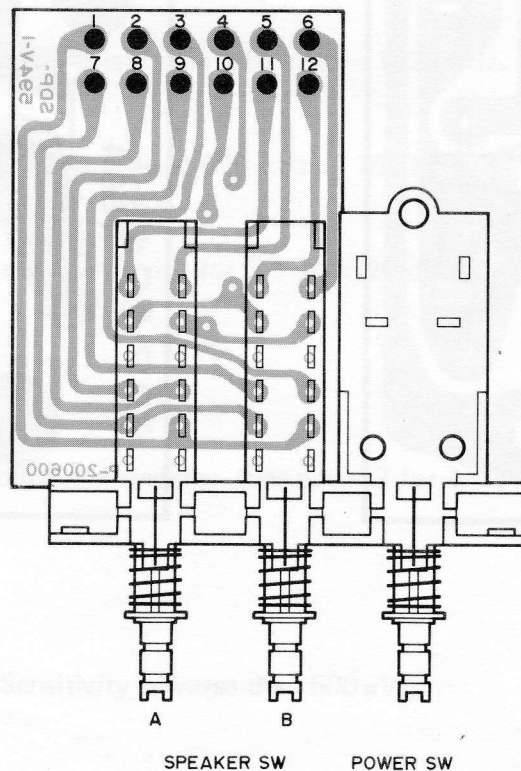
BOTTOM VIEW



15. MONITOR SWITCH P.C.B. (TOP VIEW)



16. SPEAKER SWITCH P.C.B. (TOP VIEW)



17. ELECTRICAL PARTS LIST

CAPACITORS					
Ref. No.	Value (F)	Voltage(V)	Tolerance(%)	Material	R/S Part No.
C101	1 P (NPO)	50	±0.25	Ceramic	CF-1010
C102	30 P	50	±5	Ceramic	
C103	18 P (NPO)	50	±5	Ceramic	CF-1853
C104	0.01 μ	50	+80 -20	Ceramic	
C105	0.01 μ	50	+80 -20	Ceramic	
C106	30 P	50	±5	Ceramic	
C107	10 P	50	±5	Ceramic	
C108	18 P (NPO)	50	±5	Ceramic	CF-1853
C109	150 P	50	±5	Ceramic	
C110	0.01 μ	50	+80 -20	Ceramic	
C111	1 P (NPO)	50	±0.25	Ceramic	CF-1010
C112	0.01 μ	50	+80 -20	Ceramic	
C113	0.01 μ	50	+80 -20	Ceramic	
C114	0.1 μ	50	±10	Mylar	
C115	3 P (NPO)	50	±0.25	Ceramic	
C116	18 P (N330)	50	±5	Ceramic	CF-1916
C117	7 P (NPO)	50	±0.25	Ceramic	CF-1905
C118	15 P (NPO)	50	±5	Ceramic	CF-1188
C119	25 P (NPO)	50	±5	Ceramic	CF-1915
C120	0.0047 μ(YP)	50	±5	Ceramic	CF-1670
C121	0.02 μ	50	+80 -20	Ceramic	
C122	0.04 μ	50	+80 -20	Ceramic	
C123	0.04 μ	50	+80 -20	Ceramic	
C124	0.012 μ	50	±10	Mylar	
C125	330 P	50	±5	Polystyrene	
C126	0.04 μ	50	+80 -20	Ceramic	
C127	0.04 μ	50	+80 -20	Ceramic	
C128	0.0047 μ	50	±10	Mylar	
C129	0.01 μ	50	+80 -20	Ceramic	
C130	0.01 μ	50	+80 -20	Ceramic	
C131	0.02 μ	50	+80 -20	Ceramic	
C132	10 P	50	±5	Ceramic	
C133	0.01 μ	50	+80 -20	Ceramic	
C134	0.02 μ	50	+80 -20	Ceramic	
C135	0.01 μ	50	+80 -20	Ceramic	
C136	0.04 μ	50	+80 -20	Ceramic	

Ref. No.	Value (F)	Voltage(V)	Tolerance(%)	Material	R/S Part No.
C137	7 P	50	±0.25	Ceramic	
C138	0.01 μ	50	+80 -20	Ceramic	
C139	0.02 μ	50	+80 -20	Ceramic	
C140	0.02 μ	50	+80 -20	Ceramic	
C141	100 P	50	±5	Ceramic	
C142	100 P	50	±5	Ceramic	
C143	10 μ	16	+50 -10	Electrolytic	
C144	220 P	50	±5	Ceramic	
C145	30 P	50	±5	Ceramic	
C146	0.02 μ	50	+80 -20	Ceramic	
C147	470 μ	16	+50 -10	Electrolytic	
C148	0.02 μ	50	+80 -20	Ceramic	
C149	0.01 μ	50	+80 -20	Ceramic	
C150	0.01 μ	50	+80 -20	Ceramic	
C151	100 P	50	±5	Ceramic	
C152	4.7 μ	25	+75 -10	Electrolytic	
C153	0.02 μ	50	+80 -20	Ceramic	
C154	100 μ	10	+50 -10	Electrolytic	
C155	0.02 μ	50	+80 -20	Ceramic	
C156	220 P	50	±5	Ceramic	
C157	0.0056 μ	50	±10	Mylar	
C158	0.0047 μ	50	±10	Mylar	
C159	4.7 μ	25	+75 -10	Electrolytic	
C160	0.04 μ	50	+80 -20	Ceramic	
C161	0.1 μ	25/35	±20	Aluminum or Tantalum	
C162	0.47 μ	50	+75 -10	Electrolytic	
C163	220 P	50	±5	Ceramic	
C164	1 μ	50	+75 -10	Electrolytic	
C165	3.3 μ	16	+75 ±10	Electrolytic	
C166	220 μ	16	+50 -10	Electrolytic	
C167	0.04 μ	50	+80 -20	Ceramic	
C168	0.1 μ	50	±10	Mylar	
C169	0.22 μ	25/35	±20	Aluminum or Tantalum	

Ref. No.	Value (F)	Voltage(V)	Tolerance(%)	Material	R/S Part No.
C170	0.47 μ	25/35	± 20	Aluminum or Tantalum	CF-1188
C171	1500 P	50	± 5	Polystyrene	
C172	0.047 μ	50	± 10	Mylar	
C173	680 P	50	± 5	Polystyrene	
C174	330 μ	16	+50	Electrolytic	
C175	0.0068 μ	50	± 10	Mylar	
C176	0.0068 μ	50	± 10	Mylar	
C177	0.22 μ	25/35	± 20	Aluminum or Tantalum	
C178	0.22 μ	25/35	± 20	Aluminum or Tantalum	
C179	0.0082 μ	50	± 10	Mylar (UL & C.S.A.)	
	0.0056 μ	50	± 10	Mylar (Australian)	
C180	0.0082 μ	50	± 10	Mylar (UL & C.S.A.)	
	0.0056 μ	50	± 10	Mylar (Australian)	
C181	0.47 μ	50	+75 -10	Electrolytic	
C182	0.47 μ	50	+75 -10	Electrolytic	
C183	220 P	50	± 5	Ceramic	
C184	220 P	50	± 5	Ceramic	
C185	0.47 μ	50	+75 -10	Electrolytic	
C186	0.47 μ	50	+75 -10	Electrolytic	
C187	0.0022 μ	50	± 10	Mylar	
C188	0.0022 μ	50	± 10	Mylar	
C189	220 μ	16	+50 -10	Electrolytic	
C190	0.047 μ	50	± 10	Mylar	
C191	15 P (NPO)	50	± 5	Ceramic	
C192	Not used				
C193	100 P	50	± 5	Ceramic	
C201	1 μ	16	± 20	Tantalum	
C202	1 μ	16	± 20	Tantalum	
C203	100 P	50	± 5	Ceramic	
C204	100 P	50	± 5	Ceramic	
C205	100 P	50	± 5	Ceramic	
C206	100 P	50	± 5	Ceramic	
C207	33 μ	10	+50 -10	Electrolytic	
C208	33 μ	10	+50 -10	Electrolytic	
C209	0.0033 μ	50	± 10	Mylar	
C210	0.0033 μ	50	± 10	Mylar	
C211	0.01 μ	50	± 10	Mylar	
C212	0.01 μ	50	± 10	Mylar	
C213	4.7 μ	25	+75 -10	Electrolytic	

Ref. No.	Value (F)	Voltage(V)	Tolerance(%)	Material	R/S Part No.
C214	4.7 μ	25	+75 -10	Electrolytic	
C215	0.22 μ	25/35	± 20	Aluminum or Tantalum	
C216	0.22 μ	25/35	± 20	Aluminum or Tantalum	
C217	220 μ	35	+50 -10	Electrolytic	
C301	360 P	50	± 5	Polystyrene	
C302	360 P	50	± 5	Polystyrene	
C303	0.1 μ	50	± 10	Mylar	
C304	0.1 μ	50	± 10	Mylar	
C305	0.47 μ	50	+75 -10	Electrolytic	
C306	0.47 μ	50	+75 -10	Electrolytic	
C307	220 P	50	± 5	Ceramic	
C308	220 P	50	± 5	Ceramic	
C309	1 μ	50	+75 -10	Electrolytic	
C310	1 μ	50	+75 -10	Electrolytic	
C311	0.0012 μ	50	± 10	Mylar	
C312	0.0012 μ	50	± 10	Mylar	
C313	0.01 μ	50	± 10	Mylar	
C314	0.01 μ	50	± 10	Mylar	
C315	0.01 μ	50	± 10	Mylar	
C316	0.01 μ	50	± 10	Mylar	
C317	0.1 μ	50	± 10	Mylar	
C318	0.1 μ	50	± 10	Mylar	
C319	1 μ	50	+75 -10	Electrolytic	
C320	1 μ	50	+75 -10	Electrolytic	
C321	25 P	50	± 5	Ceramic	
C322	25 P	50	± 5	Ceramic	
C323	1 μ	50	+75 -10	Electrolytic	
C324	1 μ	50	+75 -10	Electrolytic	
C325	220 μ	25	+50 -10	Electrolytic	
C401	1 μ	50	+75 -10	Electrolytic	
C402	1 μ	50	+75 -10	Electrolytic	
C403	560 P	50	± 5	Ceramic	
C404	560 P	50	± 5	Ceramic	
C405	0.1 μ	50	± 10	Mylar	
C406	0.1 μ	50	± 10	Mylar	
C407	27 P	50	± 5	Ceramic	
C408	27 P	50	± 5	Ceramic	
C409	220 μ	16	+50 -10	Electrolytic	

Ref. No.	Value (F)	Voltage(V)	Tolerance(%)	Material	R/S Part No.
C410	220 μ	16	+50 -10	Electrolytic	
C411	33 μ	16	+50 -10	Electrolytic	
C412	33 μ	16	+50 -10	Electrolytic	
C413	0.1 μ	50	\pm 10	Mylar	
C414	Not used				
C415	Not used				
C416	0.1 μ	50	\pm 10	Mylar	
C417	0.1 μ	50	\pm 10	Mylar	
C418	0.1 μ	50	\pm 10	Mylar	
C419	0.1 μ	50	\pm 10	Mylar	
C420	0.1 μ	50	\pm 10	Mylar	
C421	15 P	50	\pm 5	Ceramic	
C422	15 P	50	\pm 5	Ceramic	
C501	0.04 μ	50	+80 -20	Ceramic	
C502	0.04 μ	50	+80 -20	Ceramic	
C503	0.04 μ	50	+80 -20	Ceramic	
C504	0.04 μ	50	+80 -20	Ceramic	
C505	4700 μ	25	+50 -10	Electrolytic	
C506	4700 μ	25	+50 -10	Electrolytic	
C507	0.04 μ	50	+80 -20	Ceramic	
C508	470 μ	16	+50 -10	Electrolytic	
C509	0.04 μ	50	+80 -20	Ceramic	
C510	470 μ	50	+50 -10	Electrolytic	
C511	220 μ	50	+50 -10	Electrolytic	
C512	220 μ	50	+50 -10	Electrolytic	
C513	47 μ	16	+50 -10	Electrolytic	
C514	10 μ	25	+50 -10	Electrolytic	
C515	220 μ	35	+50 -10	Electrolytic	
C516	100 μ	16	+50 -10	Electrolytic	
C517	220 μ	10	+50 -10	Electrolytic	
C518	100 μ	35	+50 -10	Electrolytic	
C519	22 μ	35	+50 -10	Electrolytic	

Ref. No.	Value (F)	Voltage(V)	Tolerance(%)	Material	R/S Part No.
C520	100 μ	35	+50 -10	Electrolytic	
C701	0.0047 μ	50	\pm 10	Mylar	
C702	0.0047 μ	50	\pm 10	Mylar	
C703	0.01 μ (UK or LB type)	125	+80 -20	Ceramic (UL)	
	0.01 μ (MS type)	125	+80 -20	Ceramic (C.S.A.)	
	0.01 μ (X type)	250	\pm 10	Ceramic (Australian)	
C704	0.01 μ (X type)	250	\pm 10	Ceramic (Australian)	

CERAMIC FILTER

Ref. No.	Description	R/S Part No.	Mfr's Part No.
CF101	SEF-10.7MA-8	CA-7536	P-140030
CF102	SEF-10.7MA-8	CA-7536	P-140030

COILS & TRANSFORMERS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
L101	FM Ant. Coil	CA-3594	P-110050
L102	FM Trap Coil	CB-2172	P-360003
L103	FM RF Coil	CA-3371	P-340033
L104	FM Trap Coil	CB-2171	P-360003
L105	FM OSC Coil	CA-4977	P-120078
L106	Inductor (2.2 μ)	CA-7873	P-360021
L401	Choke Coil (1 μ)	CB-2415	P-370031
L402	Choke Coil (1 μ)	CB-2415	P-370031
L701	AM Ant. Coil	CA-0296	P-110094
L702	Balun Coil	CA-2948	P-110012
T101	FM IFT (7F-007)	CA-7265	P-140007
T102	FM IFT (10F-011)	CA-7254	P-140011
T103	FM IFT (10F-011)	CA-7254	P-140011
T104	FM IFT (10F-014)	CA-7286	P-140014
T105	AM OSC Coil (OC-077)	CA-4978	P-120077
T106	AM IFT (OA-011)	CA-7281	P-130011
T107	AM IFT (OA-010)	CA-7428	P-130010
T108	AM IFT (OA-005)	CA-7112	P-130005
T109	AM IFT (OA-022)	CA-7537	P-130022
T110	FM IFT (7F-022)	CA-7284	P-140008
T701	Power Transformer (UL & C.S.A.) Power Transformer (Australian)	TA-0686	P-100525 P-100527

DIODES			
Ref. No.	Description	R/S Part No.	Manufacturer
D101	1N60 or 1S188AM	DX-0161	UNIZON
D102	Varicap ITT-410	DX-0240	SANYO
D103	1N60 or 1S188AM	DX-0307	ITT
		DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D104	1N60 or 1S188AM	DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D105	ITT-73N	DX-1008	ITT
D106	ITT-73N	DX-1008	ITT
D107	1N60P or 1S188FM	DX-0162	UNIZON
		DX-0241	SANYO
			HITACHI
D108	1N60P or 1S188FM	DX-0162	UNIZON
		DX-0241	SANYO
			HITACHI
D109	1N60 or 1S188AM	DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D110	1N60 or 1S188AM	DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D111	1N60 or 1S188AM	DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D112	1N60 or 1S188AM	DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D113	ITT-73N	DX-1008	ITT
D114	1N60 or 1S188AM	DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D115	1N60 or 1S188AM	DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D116	1N60 or 1S188AM	DX-0161	UNIZON
		DX-0240	SANYO
			HITACHI
D117	ITT-73N	DX-1008	ITT
D501	SR-1K-2	DX-0475	UNIZON
D502	SR-1K-2	DX-0475	UNIZON
D503	SR-1K-2	DX-0475	UNIZON
D504	SR-1K-2	DX-0475	UNIZON
D505	SR-1K-2	DX-0475	UNIZON
D506	SR-1K-2	DX-0475	UNIZON
D507	WZ-130 or HZ-12B3	DX-0537	JRC
		DX-1154	HITACHI

FILTER			
Ref. No.	Description	R/S Part No.	Mfr's Part No.
LPF101	19 kHz Filter	CA-3373	P-510006
FUSES			
Ref. No.	Description	R/S Part No.	Mfr's Part No.
F1	2.5 A/250 V (Quick) (UL & C.S.A.)	HF-0021	P-250008
	1.25 A/250 V (Australian)		P-250090
F2	1 A/250 V (Quick)	HF-0036	P-250013
F3	1.5 A/250 V (Quick)	HF-0004	P-250007
INTEGRATED CIRCUIT			
Ref. No.	Description	R/S Part No.	Manufacturer
IC101	LA-3350(S)	MX-3215	SANYO
IC401	HA-1370	MX-3669	HITACHI
IC402	HA-1370	MX-3669	HITACHI
JUMPER WIRES			
Ref. No.	Description	R/S Part No.	Mfr's Part No.
(RF/IF & PRE, TONE AMP Board)			
J1-21	Jumper Wire (L = 12.5 m/m)		P-320128
J22	Jumper Wire (L = 10 m/m)		P-320127
J23-31	Jumper Wire (L = 12.5 m/m)		P-320128
J32	Jumper Wire (L = 20 m/m)		P-320213
J33/34	Jumper Wire (L = 12.5 m/m)		P-320128
(MAIN AMP & POWER SUPPLY Board)			
J1/2/3	Jumper Wire (L = 12.5 m/m)		P-320128
J4	Jumper Wire (L = 15 m/m)		P-320129
J5	Jumper Wire (L = 12.5 m/m)		P-320128
J6	Jumper Wire (L = 27.5 m/m)		P-320222
J7	Jumper Wire (L = 7.5 m/m)		P-320126
J8	Jumper Wire (L = 10 m/m)		P-320127
(SPEAKER SWITCH Board)			
J1/2	Jumper Wire (L = 12.5 m/m)		P-320128
LAMPS			
Ref. No.	Description	R/S Part No.	Mfr's Part No.
PL701	Stereo Lamp (6 V/60 mA)	L-0799	P-240080
PL702	Pilot Lamp (8 V/0.3 A) L = 240 m/m	L-0950	P-240102
PL703	Pilot Lamp (8 V/0.3 A) L = 240 m/m	L-0950	P-240102
PL704	Pilot Lamp (8 V/0.3 A) L = 320 m/m	L-0951	P-240103

Ref. No.	Description	R/S Part No.	Mfr's Part No.		
PL705	Meter Lamp (8 V/0.3 A) Fuse type	L-0952	P-240045		
METER					
Ref. No.	Description	R/S Part No.	Mfr's Part No.		
	AM/FM Signal Meter (300 μ A, 1.2 k Ω)	M-0400	P-230078		
RESISTORS					
Ref. No.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R101	100 K	1/4	± 5	Carbon	
R102	330	1/4	± 5	Carbon	
R103	5.6 K	1/4	± 5	Carbon	
R104	33 K	1/4	± 5	Carbon	
R105	1.5 K	1/4	± 5	Carbon	
R106	330	1/4	± 5	Carbon	
R107	330	1/4	± 5	Carbon	
R108	100 K	1/4	± 5	Carbon	
R109	22 K	1/4	± 5	Carbon	
R110	10 K	1/4	± 5	Carbon	
R111	3.3 K	1/4	± 5	Carbon	
R112	330	1/4	± 5	Carbon	
R113	4.7 K	1/4	± 5	Carbon	
R114	1.5 K	1/4	± 5	Carbon	
R115	10 K	1/4	± 5	Carbon	
R116	1.5 K	1/4	± 5	Carbon	
R117	47	1/4	± 5	Carbon	
R118	27 K	1/4	± 5	Carbon	
R119	4.7 K	1/4	± 5	Carbon	
R120	3.3 K	1/4	± 5	Carbon	
R121	22	1/4	± 5	Carbon	
R122	3.3 K	1/4	± 5	Carbon	
R123	10 K	1/4	± 5	Carbon	
R124	2.2 K	1/4	± 5	Carbon	
R125	330	1/4	± 5	Carbon	
R126	1.5 K	1/4	± 5	Carbon	
R127	1 K	1/4	± 5	Carbon	
R128	330	1/4	± 5	Carbon	
R129	10 K	1/4	± 5	Carbon	
R130	3.3 K	1/4	± 5	Carbon	
R131	18 K	1/4	± 5	Carbon	
R132	560	1/4	± 5	Carbon	
R133	22	1/4	± 5	Carbon	
R134	1 K	1/4	± 5	Carbon	
R135	3.3 K	1/4	± 5	Carbon	
R136	2.7 K	1/4	± 5	Carbon	
R137	2.2 K	1/4	± 5	Carbon	
R138	1 K	1/4	± 5	Carbon	
R139	330	1/4	± 5	Carbon	
R140	1 K	1/4	± 5	Carbon	
R141	1 K	1/4	± 5	Carbon	

Ref. No.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R142	10 K	1/4	± 5	Carbon	
R143	10 K	1/4	± 5	Carbon	
R144	47	1/4	± 5	Carbon	
R145	100	1/4	± 5	Carbon	
R146	22 K	1/4	± 5	Carbon	
R147	3.3 K	1/4	± 5	Carbon	
R148	1 K	1/4	± 5	Carbon	
R149	1.8 K	1/4	± 5	Carbon	
R150	8.2 K	1/4	± 5	Carbon	
R151	10 K	1/4	± 5	Carbon	
R152	4.7 K	1/4	± 5	Carbon	
R153	10 K	1/4	± 5	Carbon	
R154	4.7 K	1/4	± 5	Carbon	
R155	100 K	1/4	± 5	Carbon	
R156	33 K	1/4	± 5	Carbon	
R157	15 K	1/4	± 5	Carbon	
R158	10 K	1/4	± 5	Carbon	
R159	1.5 M	1/4	± 5	Carbon	
R160	820	1/4	± 5	Carbon	
R161	4.7 K	1/4	± 5	Carbon	
R162	39 K	1/4	± 5	Carbon	
R163	470 K	1/4	± 5	Carbon	
R164	10 K	1/4	± 5	Carbon	
R165	150	1/4	± 5	Carbon	
R166	10 K	1/4	± 5	Carbon	
R167	68K-150K	1/4	± 5	Carbon	
R168	4.7 K	1/4	± 5	Carbon	
R169	1.8 K	1/4	± 5	Carbon	
R170	4.7 K	1/4	± 5	Carbon	
R171	1 K	1/4	± 5	Carbon	
R172	8.2 K	1/4	± 5	Carbon	
R173	12	1/4	± 5	Carbon	
R174	1 K	1/4	± 5	Carbon	
R175	3.3 K	1/4	± 5	Carbon	
R176	3.3 K	1/4	± 5	Carbon	
R177	1 K	1/4	± 5	Carbon	
R178	1 K	1/4	± 5	Carbon	
R179	3.3 K	1/4	± 5	Carbon	
R180	3.3 K	1/4	± 5	Carbon	
R181	100 K	1/4	± 5	Carbon	
R182	100 K	1/4	± 5	Carbon	
R183	1.5 M	1/4	± 5	Carbon	
R184	1.5 M	1/4	± 5	Carbon	
R185	470	1/4	± 5	Carbon	
R186	470	1/4	± 5	Carbon	
R187	4.7 K	1/4	± 5	Carbon	
R188	4.7 K	1/4	± 5	Carbon	
R189	39 K	1/4	± 5	Carbon	
R190	39 K	1/4	± 5	Carbon	
R191	47	1/4	± 5	Carbon	
R192	2.2 K	1/4	± 5	Carbon	
R201	100 K	1/4	± 5	Carbon	
R202	100 K	1/4	± 5	Carbon	
R203	2.2 K	1/4	± 5	Carbon	

Ref. No.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R204	2.2 K	¼	± 5	Carbon	
R205	100 K	¼	± 5	Carbon	
R206	100 K	¼	± 5	Carbon	
R207	390	¼	± 5	Carbon	
R208	390	¼	± 5	Carbon	
R209	100 K	¼	± 5	Carbon	
R210	100 K	¼	± 5	Carbon	
R211	7.5 K	¼	± 5	Carbon	
R212	7.5 K	¼	± 5	Carbon	
R213	560	¼	± 5	Carbon	
R214	560	¼	± 5	Carbon	
R215	330	¼	± 5	Carbon	
R216	330	¼	± 5	Carbon	
R217	22 K	¼	± 5	Carbon	
R218	22 K	¼	± 5	Carbon	
R219	220 K	¼	± 5	Carbon	
R220	220 K	¼	± 5	Carbon	
R221	1 K	¼	± 5	Carbon	
R222	1 K	¼	± 5	Carbon	
R223	100 K	¼	± 5	Carbon	
R224	100 K	¼	± 5	Carbon	
R225	470	¼	± 5	Carbon	
R226	4.7 K	¼	± 5	Carbon	
R227	4.7 K	¼	± 5	Carbon	
R301	8.2 K	¼	± 5	Carbon	
R302	8.2 K	¼	± 5	Carbon	
R303	1 K	¼	± 5	Carbon	
R304	1 K	¼	± 5	Carbon	
R305	820 K	¼	± 5	Carbon	
R306	820 K	¼	± 5	Carbon	
R307	180 K	¼	± 5	Carbon	
R308	180 K	¼	± 5	Carbon	
R309	220 K	¼	± 5	Carbon	
R310	220 K	¼	± 5	Carbon	
R311	6.8 K	¼	± 5	Carbon	
R312	6.8 K	¼	± 5	Carbon	
R313	1.5 K	¼	± 5	Carbon	
R314	1.5 K	¼	± 5	Carbon	
R315	22 K	¼	± 5	Carbon	
R316	22 K	¼	± 5	Carbon	
R317	33 K	¼	± 5	Carbon	
R318	33 K	¼	± 5	Carbon	
R319	2.7 K	¼	± 5	Carbon	
R320	2.7 K	¼	± 5	Carbon	
R321	5.6 K	¼	± 5	Carbon	
R322	5.6 K	¼	± 5	Carbon	
R323	1.2 M	¼	± 5	Carbon	
R324	1.2 M	¼	± 5	Carbon	
R325	5.6 K	¼	± 5	Carbon	
R326	5.6 K	¼	± 5	Carbon	
R327	1.8 K	¼	± 5	Carbon	
R328	1.8 K	¼	± 5	Carbon	
R329	220 K	¼	± 5	Carbon	
R330	220 K	¼	± 5	Carbon	

Ref. No.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R331	1 K	¼	± 5	Carbon	
R332	1 K	¼	± 5	Carbon	
R333	1 K	¼	± 5	Carbon	
R401	2.2 K	¼	± 5	Carbon	
R402	2.2 K	¼	± 5	Carbon	
R403	56 K	¼	± 5	Carbon	
R404	56 K	¼	± 5	Carbon	
R405	470 K	¼	± 5	Carbon	
R406	470 K	¼	± 5	Carbon	
R407	33 K	¼	± 5	Carbon	
R408	33 K	¼	± 5	Carbon	
R409	470	¼	± 5	Carbon	
R410	470	¼	± 5	Carbon	
R411	6.8 K	¼	± 5	Carbon	
R412	6.8 K	¼	± 5	Carbon	
R413	220	¼	± 5	Carbon	
R414	220	¼	± 5	Carbon	
R415	4.7	¼	± 5	Carbon	
R416	4.7	¼	± 5	Carbon	
R417	15	¼	± 5	Carbon	
R418	15	¼	± 5	Carbon	
R419	10	1	± 5	Metal Oxide	
R420	10	1	± 5	Metal Oxide	
R421	10	½	± 5	Carbon	
R422	10	½	± 5	Carbon	
R423	180	1	± 5	Metal Oxide	
R424	180	1	± 5	Metal Oxide	
R501	470	1	± 5	Metal Oxide	
R502	22	1	± 5	Metal Oxide	
R503	470	2	± 5	Metal Oxide	
R504	22	1	± 5	Metal Oxide	
R505	4.7 K	¼	± 5	Carbon	
R506	1 K	¼	± 5	Carbon	
R507	2.7 K	¼	± 5	Carbon	
R508	56 K	¼	± 5	Carbon	
R509	39 K	¼	± 5	Carbon	
R510	47 K	¼	± 5	Carbon	
R511	22	¼	± 5	Carbon	
R512	470	½	± 5	Carbon	
R513	470	½	± 5	Carbon	
R601	0.22	1	± 5	Metal Oxide	
R602	0.22	1	± 5	Metal Oxide	

Ref. No.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R603	0.22	1	± 5	Metal Oxide	
R604	0.22	1	± 5	Metal Oxide	
R701	220 K	$\frac{1}{4}$	± 5	Carbon	
R702	220 K	$\frac{1}{4}$	± 5	Carbon	
*R703	2.2 M	$\frac{1}{2}$	± 5	Carbon	

SWITCHES

Ref. No.	Description	R/S Part No.	Mfr's Part No.
SA1-SA3	Selector Switch TAPE MON/MONO/ LOUDNESS	S-2473	P-180326
PS1	POWER/SPEAKER A/B (UL & C.S.A.) POWER/SPEAKER A/B (Australian) FLAT/SYSTEM	S-7393 S-2474	P-180328 P-180335 P-180329

TRANSISTORS

Ref. No.	Type No.	Manufacturer
TR101	FET 2SK41F	SANYO
TR102	2SC1674(L, K)	NEC
TR103	2SC1674(L, K)	NEC
TR104	2SC929(D, E)	SANYO
TR105	2SC930(D, E)	SANYO
TR106	2SC930(D, E)	SANYO
TR107	2SC930(D, E)	SANYO
TR108	2SC930(D, E)	SANYO
TR109	2SC930(D, E)	SANYO
TR110	2SC536(H)	SANYO
TR111	2SC923(E, U)	NEC
TR112	2SC923(E, U)	NEC
TR113	2SC900(E, U) or 2SC2309(E, F)	NEC HITACHI
TR114	2SC900(E, U) or 2SC2309(E, F)	NEC HITACHI
TR201	2SC900(E, U) or 2SC2309(E, F)	NEC HITACHI
TR202	2SC900(E, U) or 2SC2309(E, F)	NEC HITACHI
TR203	2SC923(E, U)	NEC
TR204	2SC923(E, U)	NEC
TR301	2SC923(E, U)	NEC
TR302	2SC923(E, U)	NEC
TR303	2SC900(E, U) or 2SC2309(E, F)	NEC HITACHI
TR304	2SC900(E, U) or 2SC2309(E, F)	NEC HITACHI

Ref. No.	Type No.	Manufacturer
TR501	2SD571(L, K)	NEC
TR502	2SC945A(L)	NEC
TR503	2SD571(L, K)	NEC
TR504	2SC945A(L)	NEC

VARIABLE CAPACITORS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
VC101- VC105	Tuning Gang (Includes TC101, 102, 104, 105)	C-4567	P-150019
TC103	Trimmer ECV-1ZW10 x 32		P-160016

VARIABLE RESISTORS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
VR101	Trimmer 47 K Ω B	P-6467	P-170252
VR102	Trimmer 1 K Ω B	P-6469	P-170245
VR103	Trimmer 4.7 K Ω	P-6465	P-170248
VR301	Potentiometer 100 K Ω 2 BL x 2 (VOLUME)	P-1909	P-170335
VR302	Potentiometer 100 K Ω 3 BM(W) (BALANCE)	P-3099	P-170337
VR303	Potentiometer 100 K Ω A x 2 (TREBLE)	P-2095	P-170336
VR304	Potentiometer 100 K Ω A x 2 (BASS)	P-2095	P-170336

* Not used on Australian models

18. EXPLODED VIEW PARTS LIST

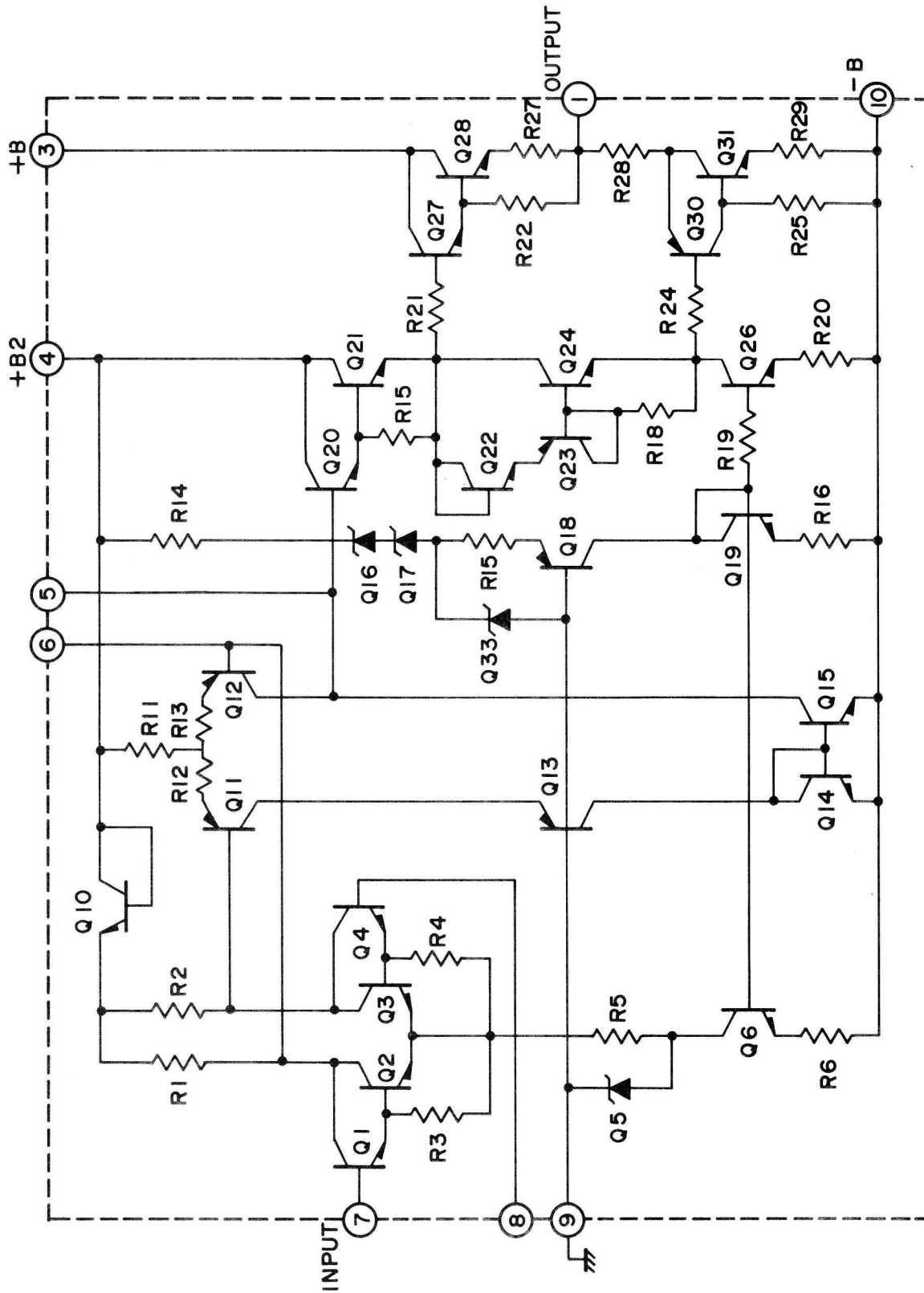
Ref. No.	Description	R/S Part No.	Mfr's Part No.	Ref. No.	Description	R/S Part No.	Mfr's Part No.
1	AM/FM RF, IF, MPX & PRE, TONE Amp P.C.B.	X-7862	U-25109	34	Hook		
2	MAIN Amp & Power Supply P.C.B.	X-7841	U-16082	35	Antenna Cord Stopper	HB-0598	P-480010
3	Speaker Terminal & FLAT/ SYSTEM P.C.B.	X-7863	U-25112	36	Cushion (B)	HB-8084	P-820521
4	Mode Switch P.C.B.	X-7864	U-25111	37	Dial Bracket Board	HB-8085	P-411584
5	Speaker Switch P.C.B.	X-7865	U-25110	38	Tuning Shaft Ass'y	D-3260	P-420302
6	Power Transformer (UL & C.S.A.)	TA-0686	P-100525	39	Sub-Pulley (small)	D-0280	P-610049
	Power Transformer (Australian)		P-100527	40	Dial Pulley	D-0281	P-430016
7	Headphone Jack	J-0985	P-190129	41	Dial Spring	RB-5300	P-440028
8	Chassis Ass'y		P-400212	42	Dial String		
9	Front Chassis		P-400213	43	Stereo Lamp Cover	HB-2881	P-680091
10	Front Chassis Bracket		P-411577	44	Stereo Lamp with lead	L-0799	P-240080
11	Side Bracket (R)	HB-8078	P-411579	45	Line Pass Capacitor		
12	Side Bracket (L)	HB-8079	P-411586	46	Cover for Capacitor (UL)	HB-6379	P-610466
13	Sub-Pulley Bracket (A)	HB-8080	P-411580	47	Pilot Lamp Cover	HB-8086	P-411585
14	Sub-Pulley Bracket (B)	HB-8081	P-411581	48	Pilot Lamp (L = 240 m/m)	L-0950	P-240102
15	Switch Bracket	HB-8082	P-411589	49	Pilot Lamp (L = 320 m/m)	L-0951	P-240103
16	Back Panel (UL)	Z-4253	P-411587	50	Meter Lamp Cover	HB-8087	P-411578
	Back Panel (C.S.A.)		P-411569	51	Meter Lamp (Fuse type)	L-0952	P-240045
	Back Panel (Australian)		P-411615	52	Meter Lamp Holder	F-1013	P-260012
17	AM Bar Antenna Coil	CA-0296	P-110094	53	Tuning Shaft (Selector)	RT-1476	P-420301
18	AM Bar Antenna Holder	HB-2890	P-410856	54	Joint for Tuning Shaft	HB-1331	P-610091
19	8P RCA Pin Jack	J-6619	P-320226	55	Bearing for Tuning Shaft	HB-1344	P-610094
20	Number Plate (B)	HB-6879	P-730184	56	E type Ring		
21	Ground Screw	HD-7099	P-420300	57	Pointer Ass'y	D-1256	P-450069
22	Antenna Bracket (UL & C.S.A.)	HB-7982	P-411297	58	Tuning Meter	M-0400	P-230078
	Antenna Bracket (Australian)		P-411369	59	Cushion (A)	HB-8088	P-820517
23	Insulation Sheet (UL & C.S.A.)	HB-6963	P-690214	60	Dial Scale	D-5324	P-630194
	Insulation Sheet (Australian)		P-690226	61	Front Panel Guide	HB-8089	P-411654
24	Antenna Terminal	J-4527	P-320190	62	Spacer	HB-8090	P-430035
25	Balun Coil	CA-2948	P-110012	63	Insulation Sheet (A)		P-480221
26	Balun Coil P.C.B.		P-200244	64	Insulation Sheet (B)		P-480222
27	5P DIN Jack	J-0747	P-190036	65	Wire Stay		P-450059
			or P-190117	66	Front Panel Ass'y	Z-4254	P-700340
28	Slide Switch (FLAT/ SYSTEM)	S-2474	P-180329	67	Metal Cabinet	Z-4255	P-600136
29	Switch Transfer Board	HB-8083	P-610598	68	Net		P-660172
30	AC Outlet		P-190098	69	Bottom Plate (A)	Z-4256	P-411582
31	AC Cord (UL & C.S.A.)		P-310093	70	Foot (D)	F-0223	P-610494
	AC Cord (Australian)		P-310041	71	Push Knob (305)	K-3148	P-650305
32	AC Cord Stopper (UL & C.S.A.)	HB-0598	P-480010	72	Power Knob (304)	K-3149	P-650304
	AC Cord Stopper (Australian)		P-480037	73	Control Knob (308)	K-3150	P-650308
33	Fuse Holder (UL)	F-1017	P-260011	74	Tuning Knob (306)	K-3151	P-650306
	Fuse Holder (C.S.A.)		P-260013	75	Tone Control Knob (307)	K-3152	P-650307
	Fuse Holder (Australian)		P-260015	76	Switch Cover	HB-8091	P-660175
				77	Bottom Plate (B)	Z-4257	P-411599
				78	Shield Plate (B)	HB-7048	P-411296
				79	IF Shield Plate	HB-8077	P-411595
				80	Guide Board for Control Volume	HB-8076	P-411588
				81	Heat Sink	HH-0297	P-411583
				82	Power and Speaker Switch (UL & C.S.A.)	S-7393	P-180328
					Power and Speaker Switch (Australian)		P-180335

Ref. No.	Description	Mfr's Part No.
S1	Tapping Screw	3 x 8BT-2
S2	Tapping Tite Screw	3 x 6B
S3	Tapping Screw	3 x 6BT-2
S4	Screw with Spring	3 x 6P
S5	Tapping Tite Screw	4 x 8B
S6	Tooth Tapping Screw (Black)	3 x 8BT-2
S7	Tapping Screw (Black)	3 x 8BT-2
S8	Screw (Black)	4 x 37P
S9	Screw (Black)	2.6 x 4P
S10	Screw with Stopper	3 x 9 x 3
S11	Frange Locked Screw	3 x 6P
S12	Tapping Screw (Black)	3 x 6BT-2
S13	Tapping Screw (Black)	3 x 10BT-2
S14	Bind Screw	3 x 8B
S15	Flat Screw	3 x 4F
S16	Screw with Toothed Washer	3 x 10P

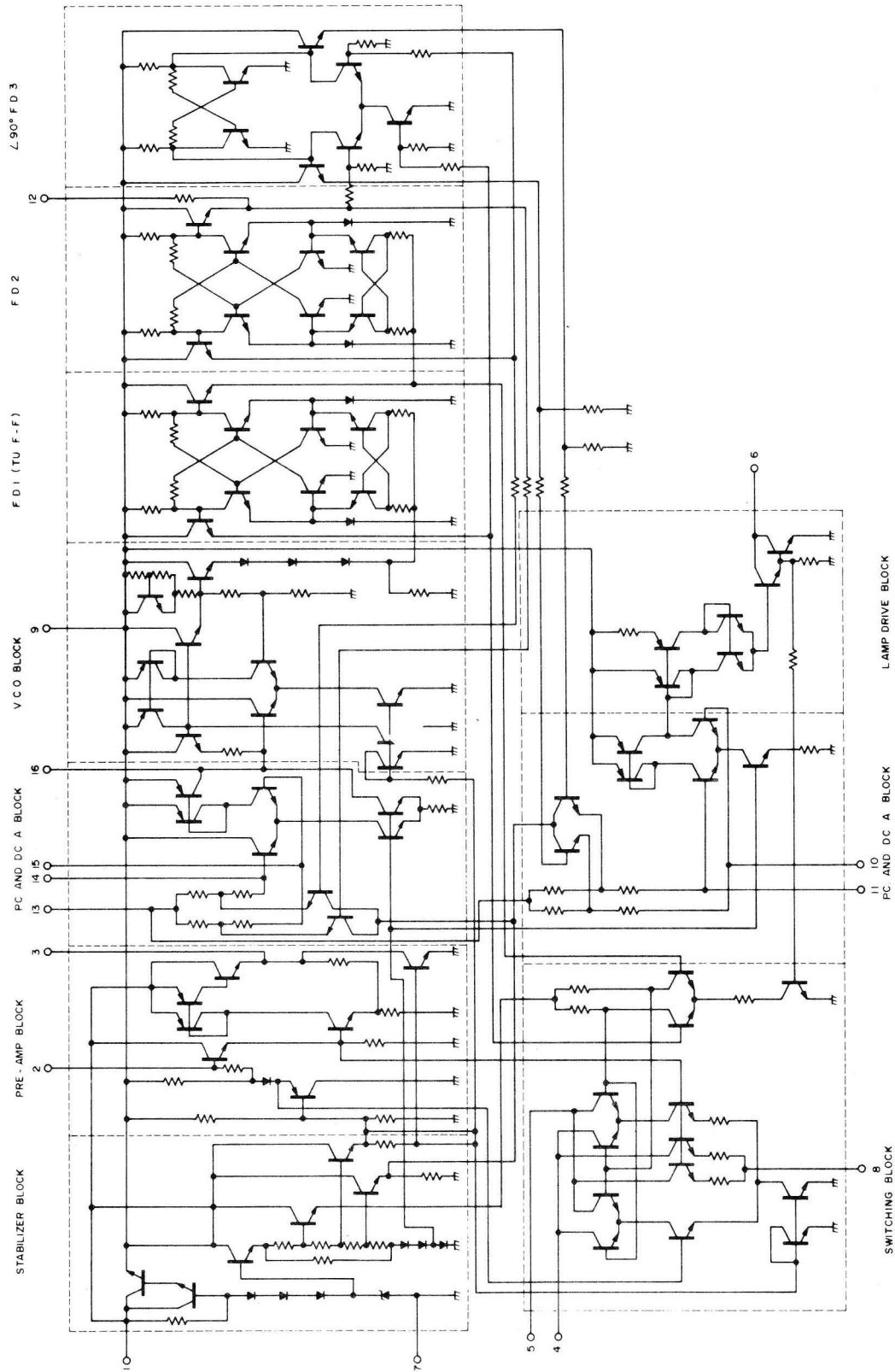
Ref. No.	Description	Mfr's Part No.
R1	Blind Rivet (Black)	YB-423
R2	Blind Rivet (Black)	YB-429
R3	Blind Rivet (Black)	YB-320
R4	Nylon Rivet	3 x 5.5
W1	Washer	4 W
W2	Washer (Black)	4 W
W3	Washer	3 W
W4	Inner Toothed Washer	3 W
SW1	Spring Washer	4 SW
SW2	Spring Washer	4 SW
N1	Nut	4 N
N2	Cover Nut (Black)	4 N

19. IC INTERNAL DIAGRAM (LA-3350 & HA-1370)

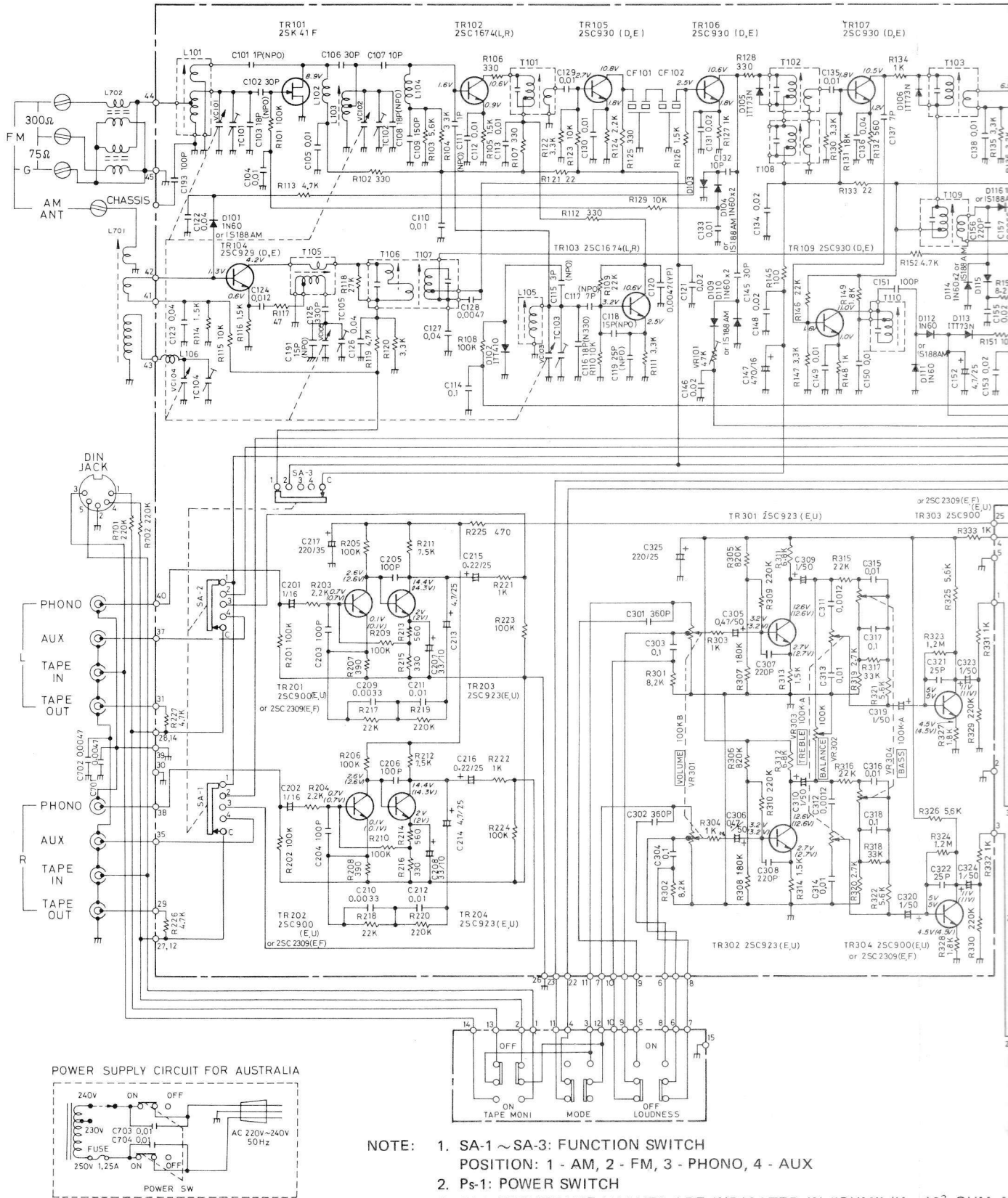
(HA-1370)

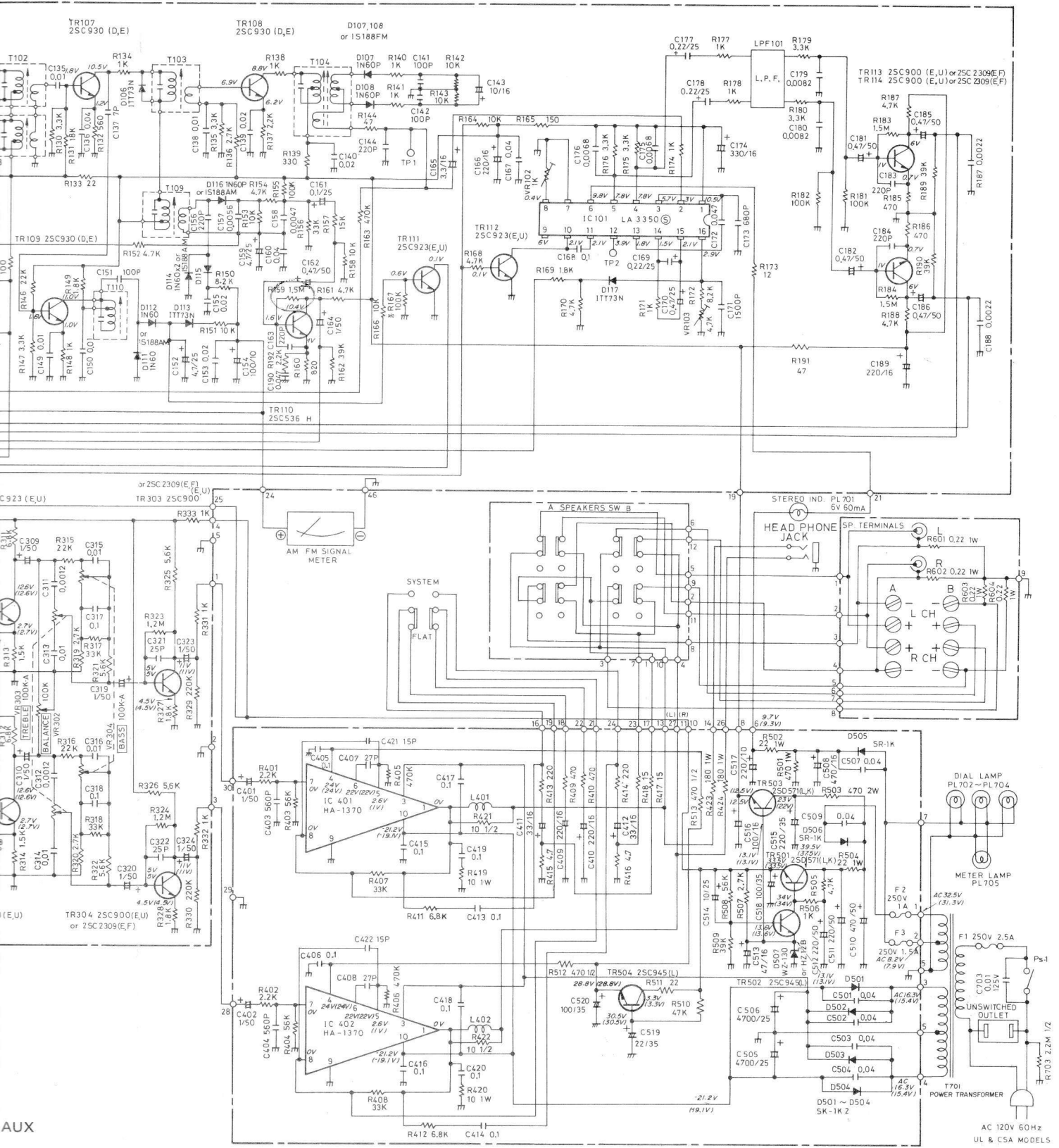


(LA-3350)



20. SCHEMATIC DIAGRAM





AUX

ED IN "OHM" (K = 10³ OHM, M = 10⁶ OHM).

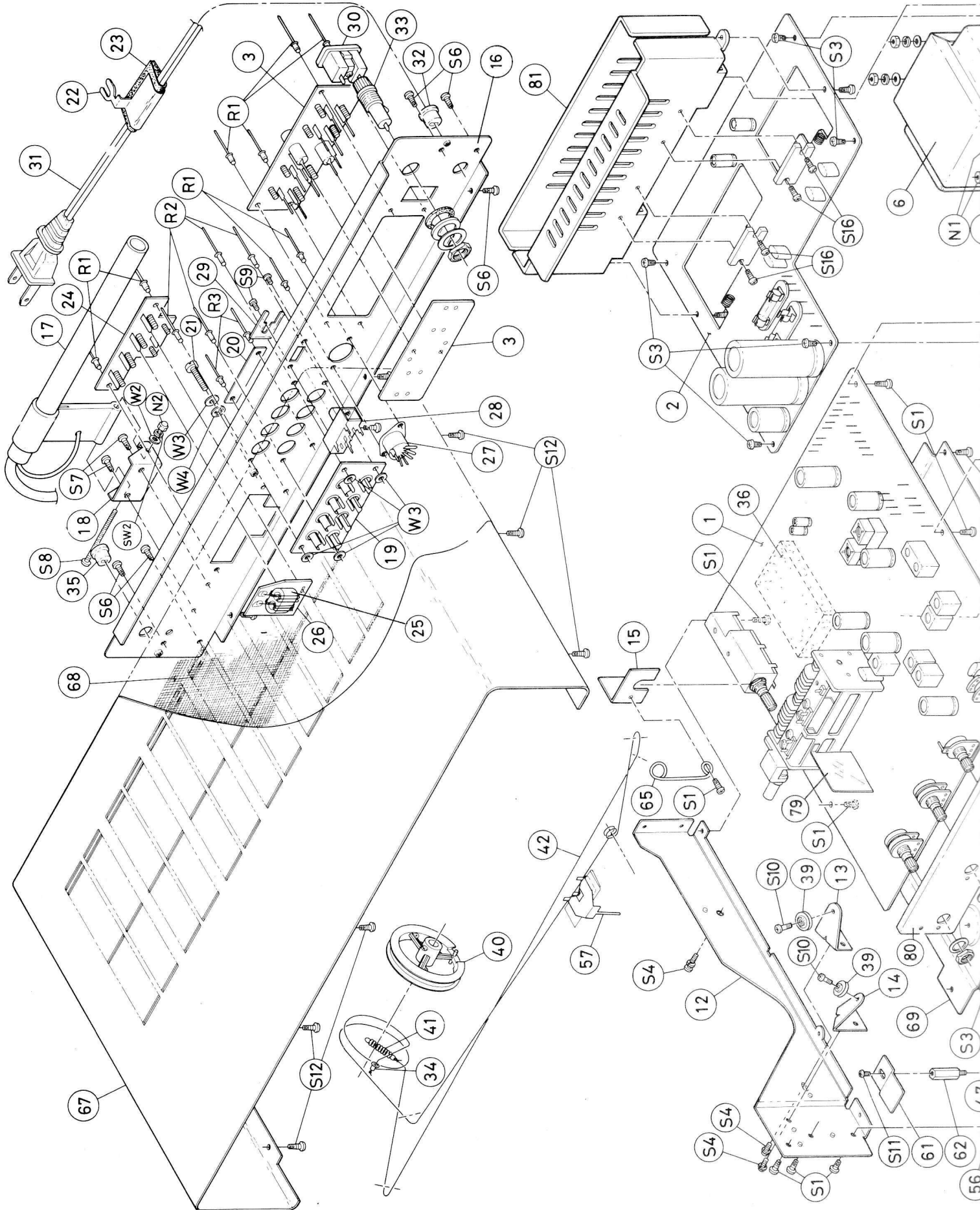
ATED IN "μF" (P = 10⁻⁶μF).

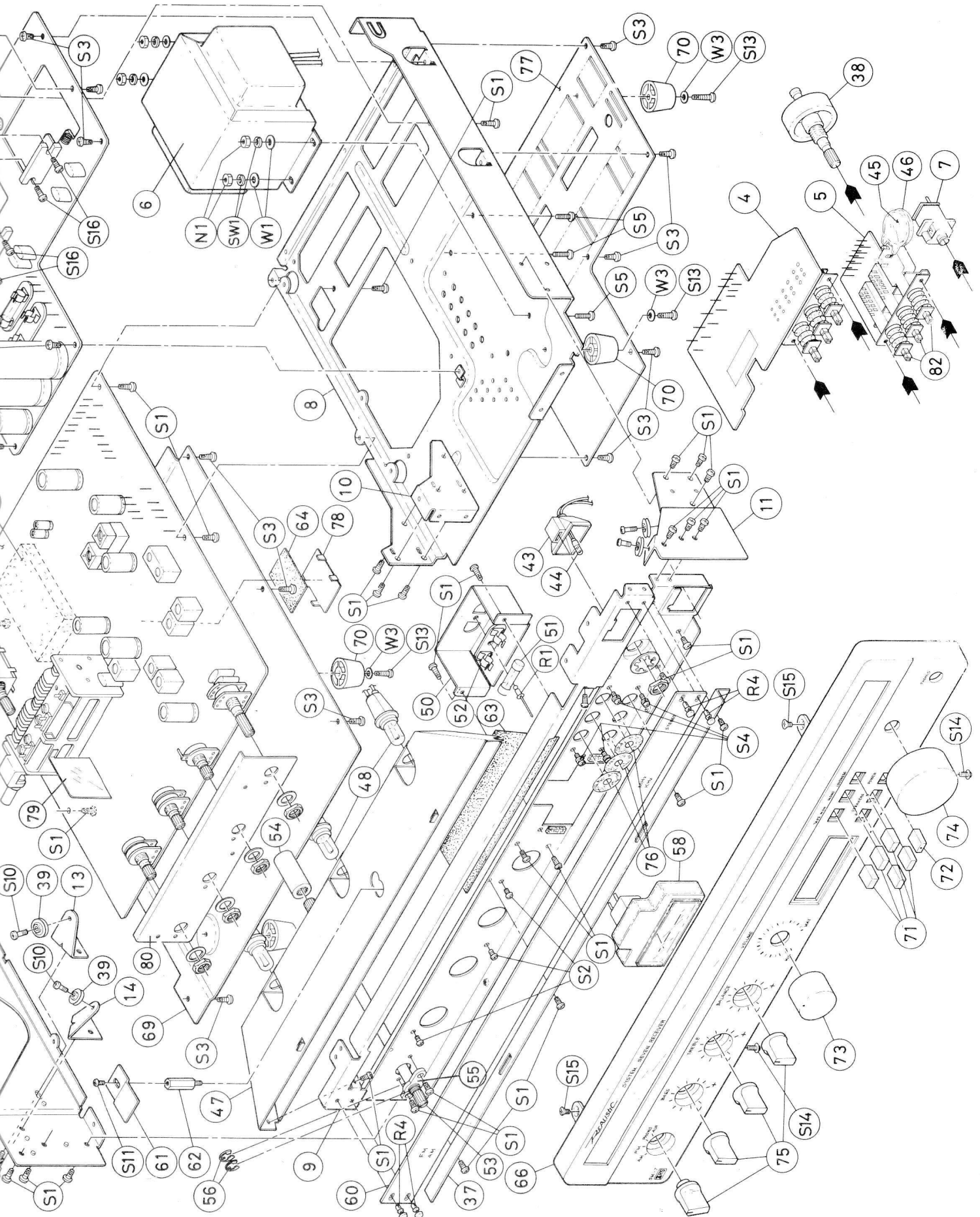
ASSIS GROUND WITH A VOLTMETER (10 kΩ/V).

ND CONDITIONS: WITH NO INPUT AND AT 10 W (1 kHz) OUTPUT POWER (INSIDE PARENTHESIS).

IT FOR OPTIMUM PERFORMANCE (Refer to "VALUE SELECTED PARTS" section).

21. EXPLODED VIEW





RADIO SHACK  A DIVISION OF TANDY CORPORATION

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CANADA: BARRIE, ONTARIO L4M 4W5

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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