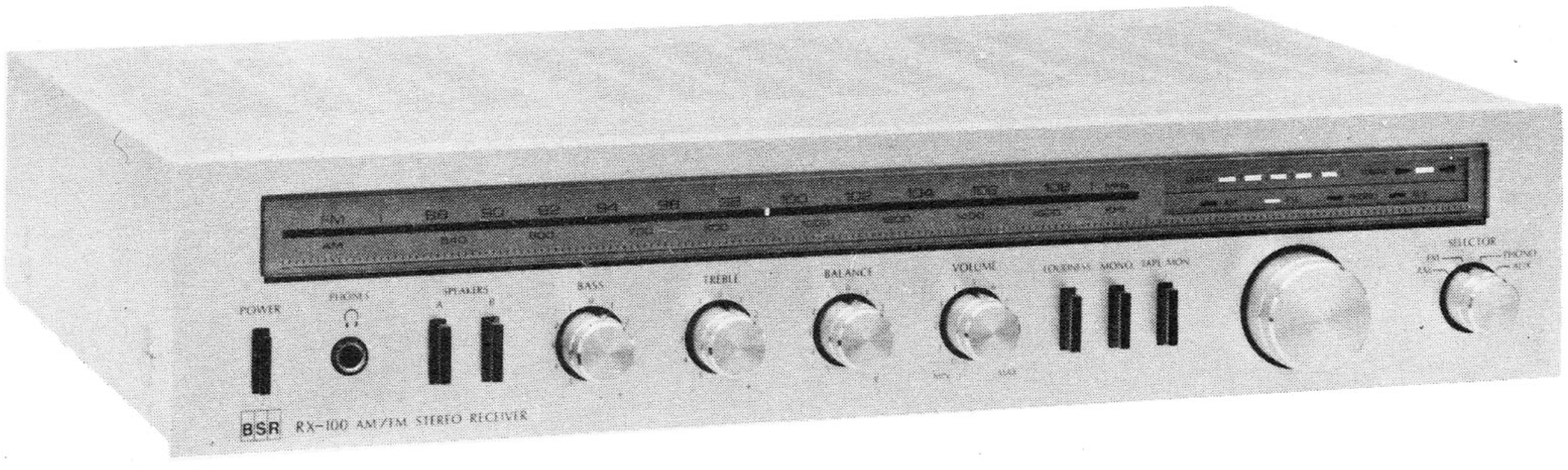
RX-100

Service Manual



SOLID STATE AM/FM stereo receiver

CONTENTS

1. ELECTRICAL PERFORMANCE SPECIFICATIONS

AM SECTION

NOTE: 1) All items are measured at Tapeout terminals, terminated with 47 K ohms.
2) The generator output shall terminate in an IRE loop.
3) Standard Modulation: 400 Hz, 30% mod.

	Measured at (KHz)	Unit	Nominal	Limit
Frequency cover range		KHz	510–1650	520–1620
Intermediate Frequency		KHz	455	
20 dB Quieting sensitivity at 600/1000/1400 KHz		μV/m	200	500
S/N Ratio at 5 mV/m input	1000	dB	43	37
Selectivity at S/N 20 dB input, ±10 KHz	1000	dB	30	22
Band width at 6 dB down	1000	KHz	6	4.5–9
A.G.C. Figure of merit	1000	dB	60	42
IF rejection ratio	600	dB	35	28
Image rejection ratio	1400	dB	45	38
T.H.D. at 5 mV/m input 30% mod.	1000	%	0.8	2
Overload Distortion at 100 mV/m input 80% mod.	1000	%	4	8
Overload Capacity at 80% mod.	1000	mV/m	1,000	
Electrical Audio Fidelity,				
Ref. Freq. = 1 KHz, –6 dB down, 5 mV/m input	1000	Hz	50 – 3 K	80 – 2.5 K
Whistle modulation				
(2nd) at 1 mV/m, 5 mV/m, 50 mV/m	910	%	5	10
100 mV/m	910	%	5	15
(3rd) at 1 mV/m, 5 mV/m, 50 mV/m, 100 mV/m	1365	%	5	10
Frequency Calibration	600	KHz	0	±15
	1400	KHz	0	±50
Spurious response from 16.50–30,000 KHz	1000	dB	50	45
Tapeout level, at 1 KHz 5 mV/m RCA Jack	1000	mV	200	200 ± 2.5 dB

The oscillator shall not drift more than 10 KHz starting at 25 degrees C and through range up to 50 degrees C, at 1000 KHz.

	Measured at (KHz)	Unit	Nominal	Limit
Meter sensitivity at 1st LED	1000	μV/m	200	–
at 3rd LED	1000	μV/m	800	–
at 5th LED	1000	μV/m	10 K	–

NOTE: 1) All measurements shall be taken under IHF measurement method for TUNER, unless otherwise specified.

FM SECTION

NOTE: 1) All items are measured at Tapeout terminals with 47 K ohms terminated.
2) The signal voltage in this specification is the voltage appearing across the tuner input terminals.
3) Standard Modulation: 1000 Hz, 75 KHz deviation.

	Measured at (MHz)	Unit	Nominal	Limit
Frequency cover range		MHz	86.5–108.5	87.5–108.2
Intermediate Frequency		MHz	10.7	–
IHF (Useable) Sensitivity at 90 MHz/98 MHz/106 MHz		μV	1.9	3.8
		dBf	10.8	16.8
50 dB Quieting Sensitivity at 90 MHz/98 MHz/106 MHz		μV	2.5	4.5
		dBf	13.5	18.3
Limiting Sensitivity (–3 dB)	98	μV	1.8	3.5
S/N Ratio at 1 mV input "A"	98	dB	78	66
S/Hum, Noise ratio at 1 mV	98	dB	70	60
Frequency response ±2.5 dB range, at 1 mV input	98	Hz	20–13 K	30–10 K
Distortion at Quieting sens. at 1000 Hz	98	%	0.5	
Distortion at 1 mV input at 100 Hz	98	%	0.1	
at 1000 Hz	98	%	0.1	0.5
at 6000 Hz	98	%	0.2	
Capture ratio	98	dB	1.5	3.0
Alternate channel Selectivity at input 100 μV	98	dB	60	45
Spurious response ratio	98	dB	80	65
Image response ratio	106	dB	58	48
IF response ratio	90	dB	85	70
AM suppression at 1 mV input	98	dB	65	52
AFC hold range at 100 μV input	98	KHz	±250	±230
Calibration accuracy at 90 MHz, 98 MHz, 106 MHz		KHz		±250
Tapeout level, 1 mV input at RCA, 75 K dev.	98	mV	650	650 ± 2.5 dB
Meter sensitivity at 1st LED	98	μV	4.5	–
at 3rd LED	98	μV	56.0	–
at 5th LED	98	μV	500	–
Max. signal handling	98	μV	200 K	1,000 K
Temperature range for Satisfactory operation		°C		0–45
Frequency Range for Europe and Australia		MHz	87.4–109	87.4±0.2 –108
Frequency Range for Japan		MHz	75.5–91	76–90

NOTE: 1) All sets must meet the requirements of the radiation regulation (FCC).
2) All measurements shall be taken under IHF measurement unless otherwise specified.

FM STEREO SECTION

NOTE: 1) All items are measured at Tapeout terminals with 47 K ohms terminated.
2) The signal voltage in this specification is the voltage appearing across the tuner input terminals (IHF).

Standard Modulation:
Main carrier (L + R) .... 33.75 KHz (45%) dev.
Sub carrier (L – R) .... 33.75 KHz (45%) dev.
Pilot .... 6.75 KHz (9%) dev.
Mod. Frequency .... 1000 KHz

		Measured at (MHz)	Unit	Nominal	Limit
		98	dBf	20.03	16.1–24.3
Stereo 50 dB quieting sensitivity			μV	42	65
at 90 MHz, 98 MHz, 106 MHz			dBf	37.3	41.5
S/N ratio, at 1 mV input "A"		98	dB	65	58
Freq. response at 1 mV input 50–10000 Hz		98	dB	±0	±2.5
Stereo distortion at 50 dB quieting sens.					
	at 100 Hz	98	%	0.4	–
	at 1 KHz	98	%	0.3	–
	at 6 KHz	98	%	0.8	–
Stereo distortion at 1 mV input	at 100 Hz	98	%	0.3	–
	at 1 KHz	98	%	0.2	1.5
	at 6 KHz	98	%	0.6	–
Stereo separation at 1 mV input	at 100 Hz	98	dB	38	28
	at 1 KHz	98	dB	48	33
	at 10 KHz	98	dB	35	28
Sub carrier product rejection		98	dB	60	55
SCA rejection		98	dB	65	55
Tapeout level, at 1 KHz, at 1 mV input RCA Jack		98	mV	600	600 ± 2.5 dB

NOTE: 1) All measurements shall be taken under IHF measurement unless otherwise specified.

AUDIO SECTION

NOTE: 1) All items are measured at Speaker terminals with non-reactive rated load (8 ohms) unless otherwise indicated.
* Rated Power 50 W * Rated T.H.D. 0.08%

		Unit	Nominal	Limit
Power Output, from 20 Hz to 20 KHz under rated THD. Both channels driven 8 Ω load.		W	24	20
Input Impedance at 1 KHz	Phono 1	KΩ	50	–
	AUX	KΩ	50	–
	Tape In 1	KΩ	50	–
Sensitivity for rated power	Phono 1	mV	2.2	2.2 ± 2.5 dB
	AUX	mV	160	160 ± 2.5 dB
	Tape In 1	mV	160	160 ± 2.5 dB
Total Harmonic Distortion from 20 Hz to 20 KHz, at rated power	at 20 Hz	%	0.06	0.1
	at 1 KHz	%	0.01	0.1
	at 20 KHz	%	0.06	0.1
Max. Input Signal at 0.5% T.H.D. (measured at Tape out)	Phono	mV	130	100
	AUX	mV	Infinitive	–
	Tape	mV	Infinitive	–

Frequency Response from 20 Hz to 20 KHz		±dB	0	±1.5
S/N Ratio				
7-1. A-weighted 1 W Reference (IHF)	Phono 1	dB	75	65
	AUX	dB	80	70
	Tape 1	dB	80	70
7-2. A-weighted, Rated Power Ref.				
	Phono 1 (10 mV Input & shorted)	dB	88	75
	AUX (Input shorted)	dB	85	75
	Tape 1 (Input shorted)	dB	85	75
Dynamic Headroom		dB	3.0	–
Clipping Headroom		dB	1.5	–
Damping Factor			60	–
Loudness Contour ch.	at 100 Hz	dB	+8	+8 ± 2.5 dB
	at 10 KHz	dB	+4.5	+4.5 ± 2.5 dB
Tone-control Response				
12-1. Bass Control Action	at 100 Hz	dB	±10	±10 ± 2.5 dB
12-2. Treble Control Action	at 10 KHz	dB	±10	±10 ± 2.5 dB
Crosstalk at A	at 1 KHz	dB	62	45
	at 10 KHz	dB	45	–
A-weighted Crosstalk at AUX		dB	70	–
PINK NOISE 3 W REFERENCE				
IM Distortion (SMPTE) at rated power		%	0.08	0.2
at 1/2 rated power		%	0.05	0.15
Transient Overload Recovery Time		mSec	15	–
Slew Factor			2.5	–
Channel Balance at VR max.		dB	0	1.0
DC Balance at No Signal and Output		mV	0	50
Tape out level at RCA Jacks (47 KΩ terminated)				
	Phono (Input 2.2 mV)	mV	150	150 ± 2.5 dB
	AUX (Input 160 mV)	mV	150	150 ± 2.5 dB
Hum and Noise at VR min.		mV	0.8	2.0
Phono Eq. (RIAA) ch. from 20 Hz to 20 KHz (measured at Tape out)		dB	±0.5	±2.0

NOTE: 1) All measurements shall be taken under IHF measurement method unless otherwise specified.
2) AC 120 volts, 60 Hz, for USA and Canada.
3) AC 220 volts, 240 volts, 50 Hz for Europe.
4) AC 100 volts, 120 volts, 220 volts, and 240 volts, 50 Hz, 60 Hz multi-voltage for P.X.

2. DISASSEMBLY INSTRUCTIONS

1) To remove chassis from metal cabinet

(1) Remove three screws that fasten the rear panel to the metal cabinet. (See Figure A)
(2) Remove four screws — two from each side of cabinet as shown in Figure B.

2) To remove bottom plate from chassis

Remove twelve screws from the bottom as shown in Figure C.

3) To remove bottom plate from chassis

(1) Remove chassis from metal cabinet as described in 1).
(2) Remove bottom plate from chassis as described in 2).
(3) Remove three screws from the top (see Figure D) and three screws from the bottom (see Figure E) of the Front Panel.
(4) Remove knobs and pull panel off.

4) To remove the Rear Panel from chassis

Remove ten screws from the Rear Panel. (See Figure F)

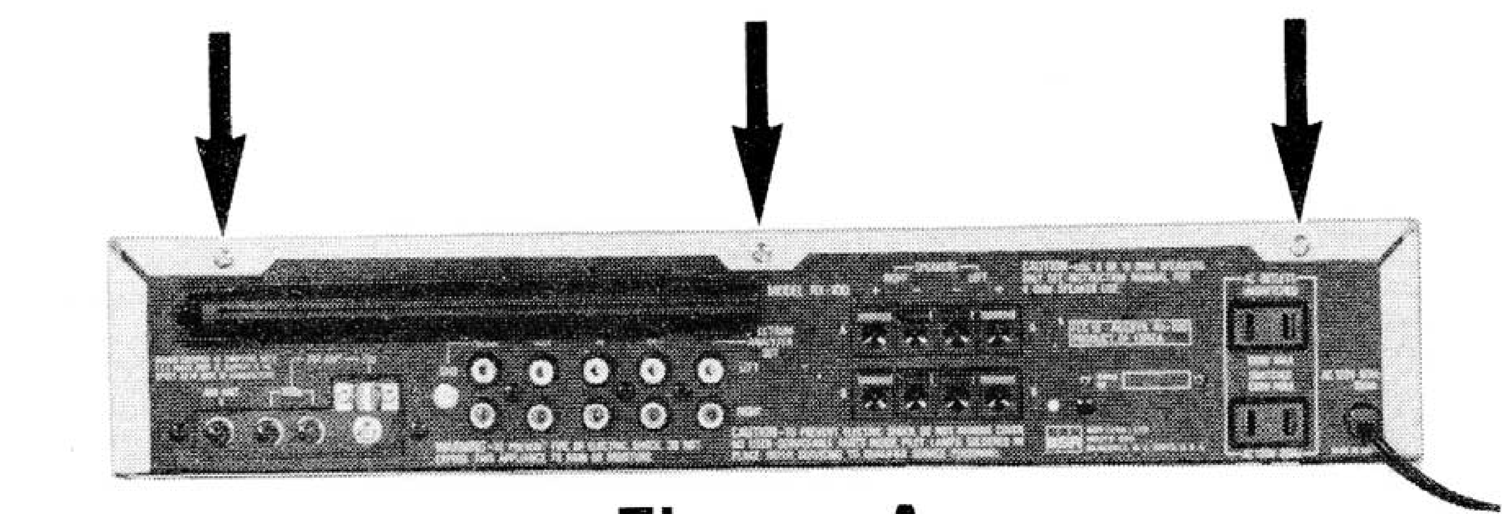


Figure A

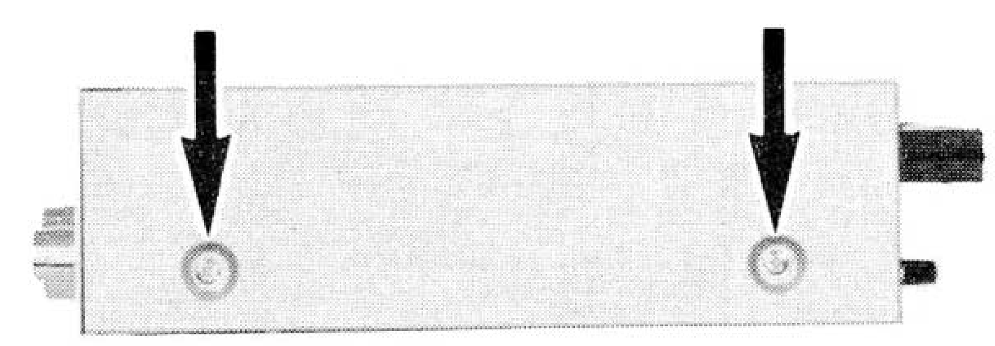


Figure B

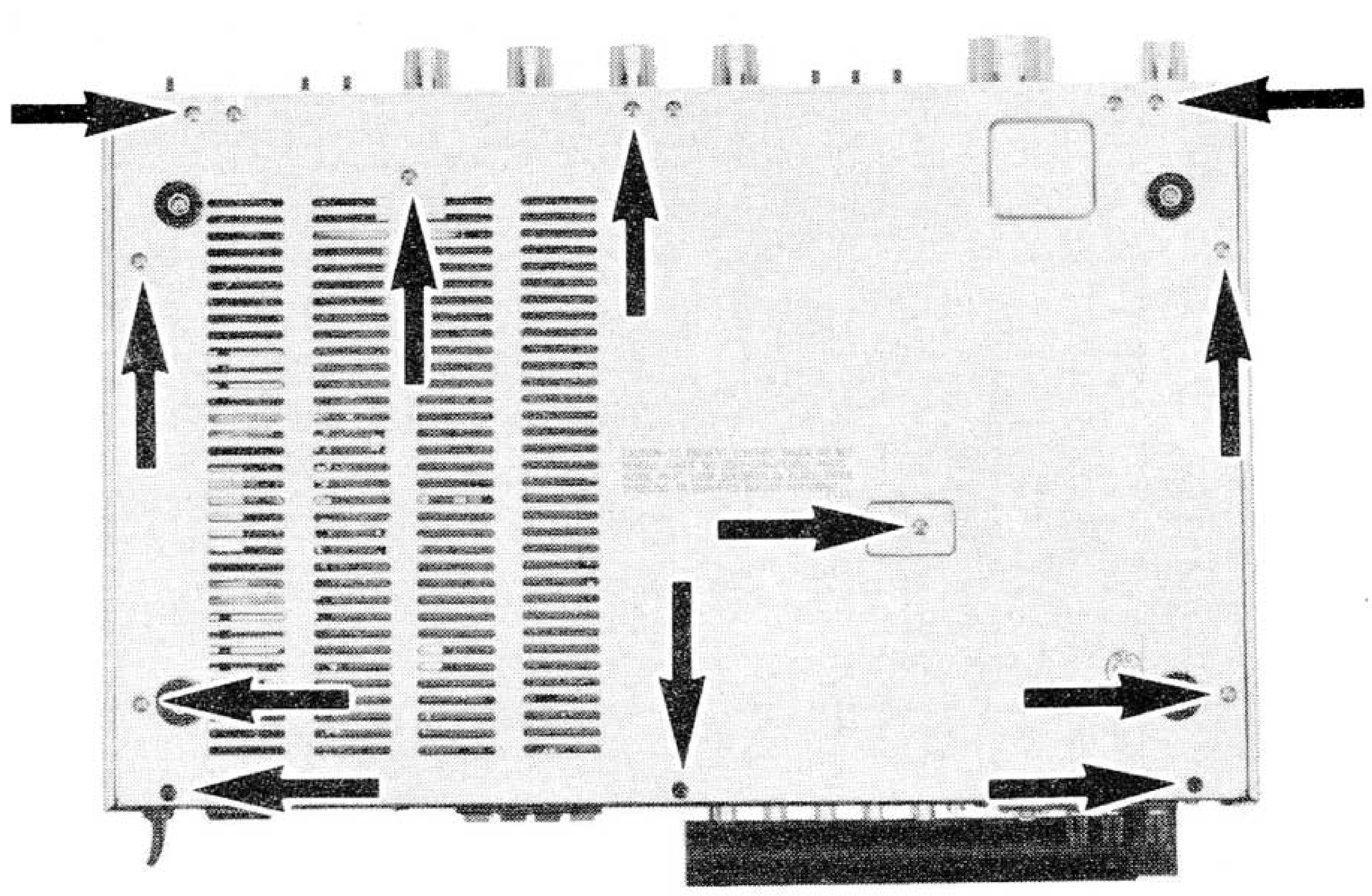


Figure C

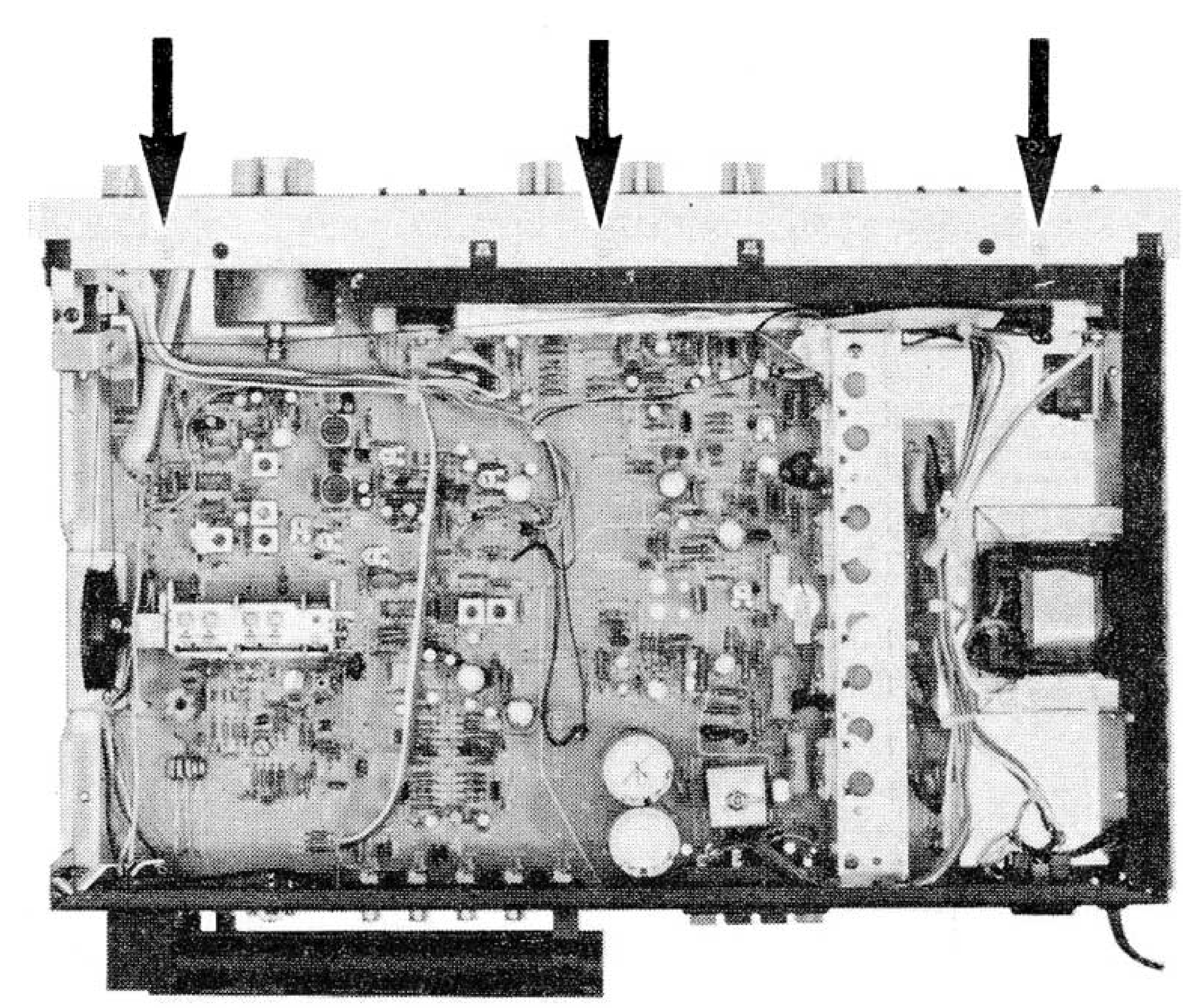


Figure D

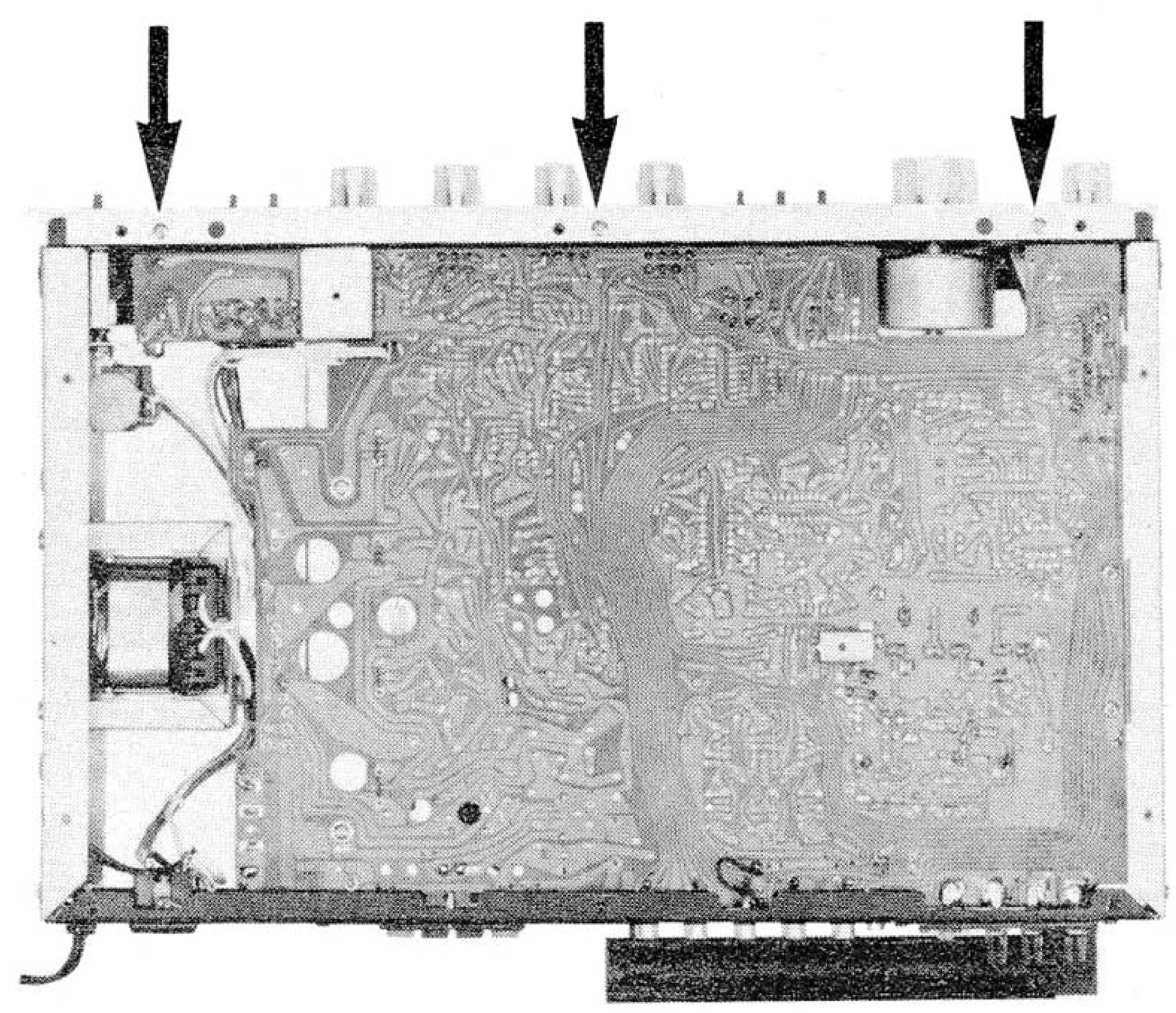


Figure E

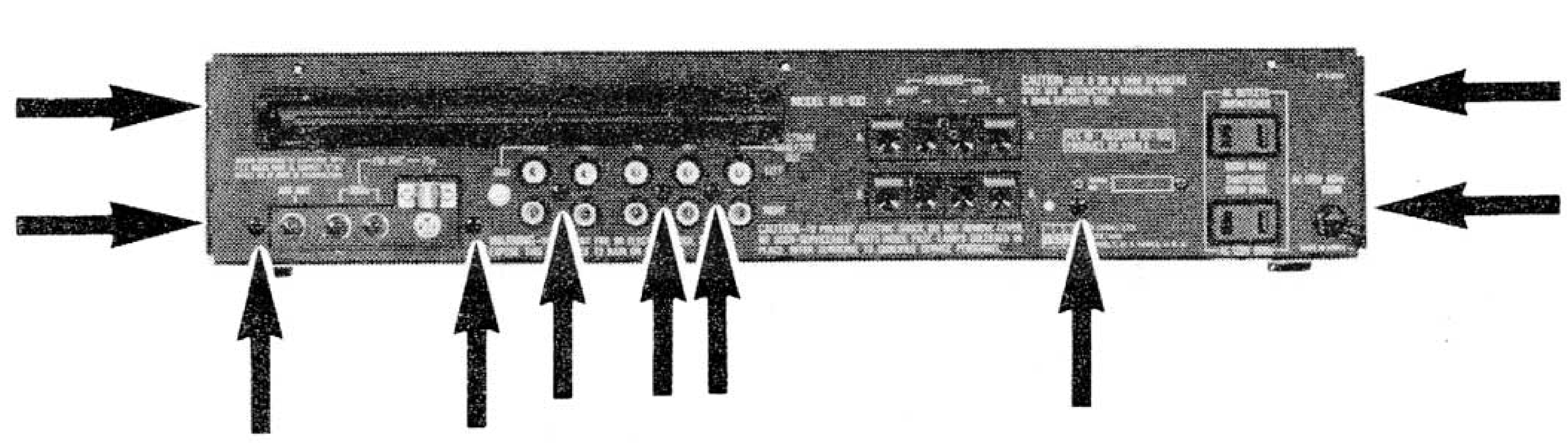
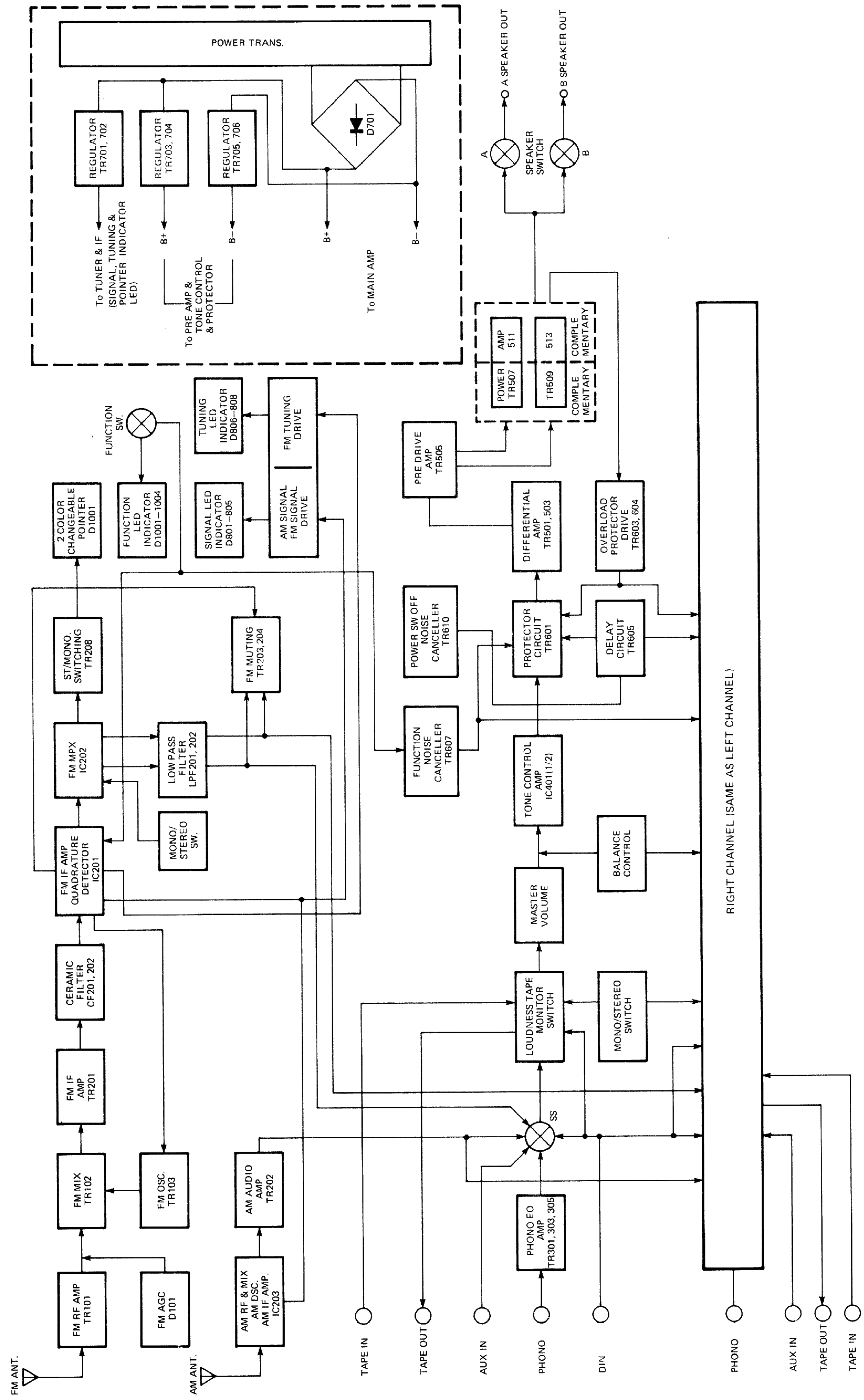
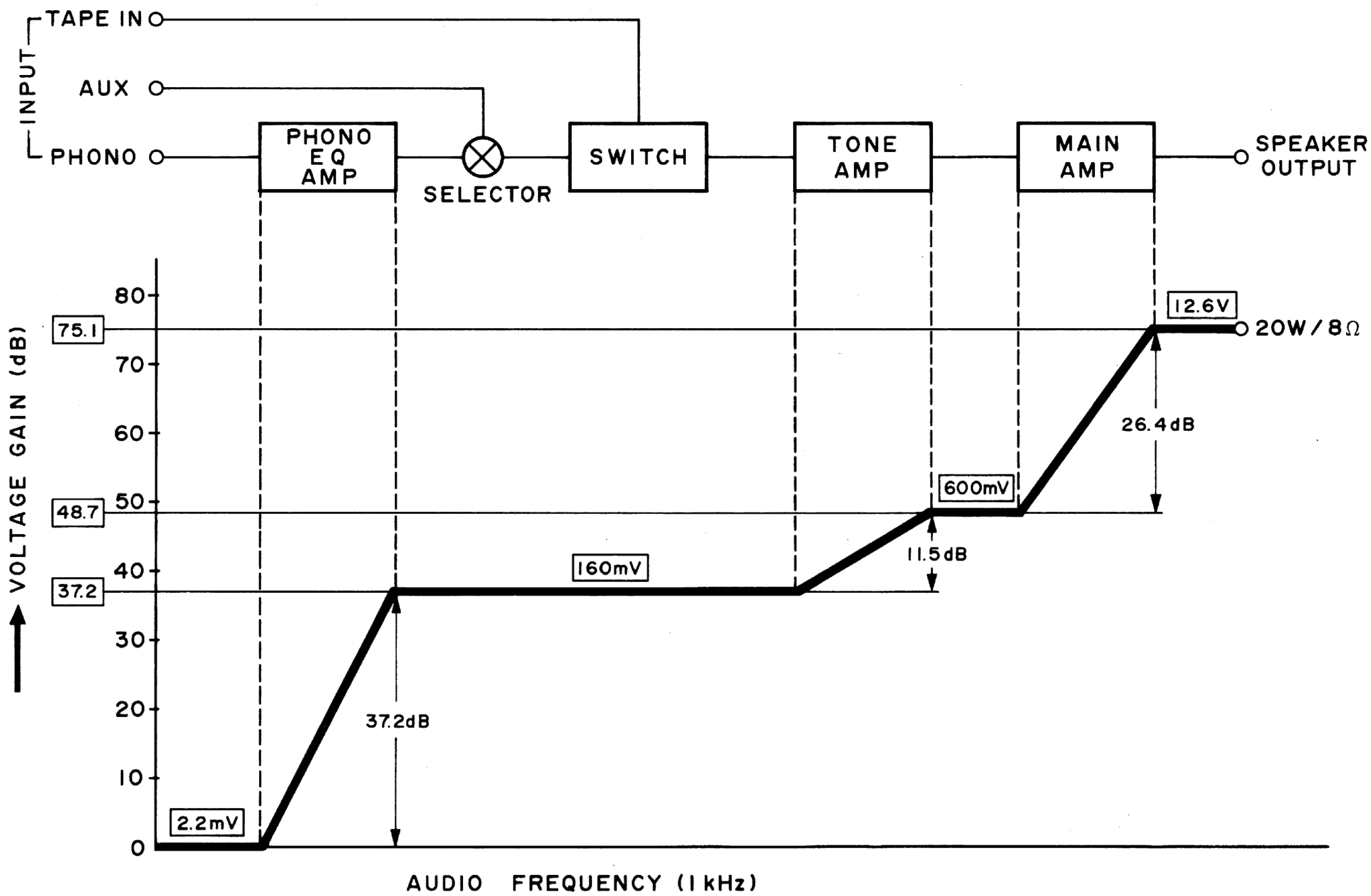


Figure F

3. BLOCK DIAGRAM

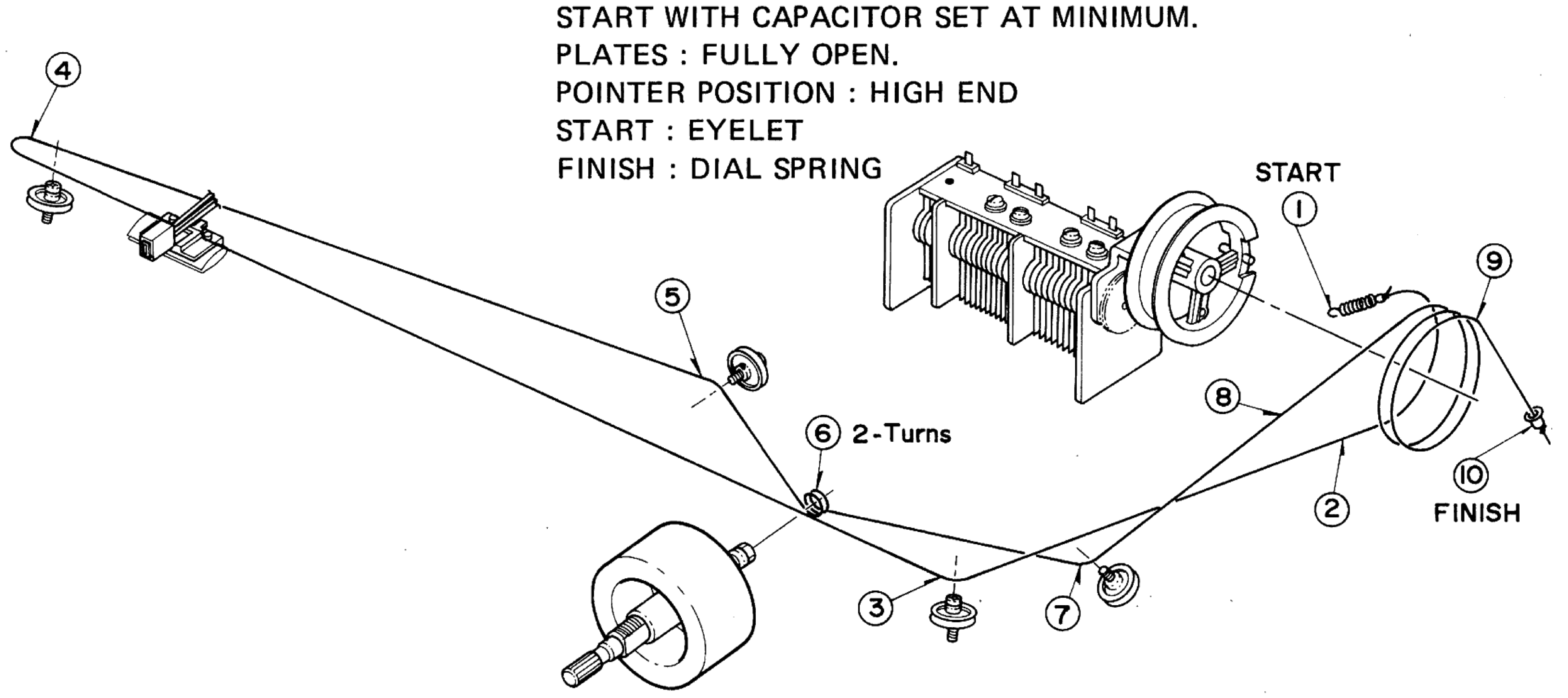


4. LEVEL DIAGRAM

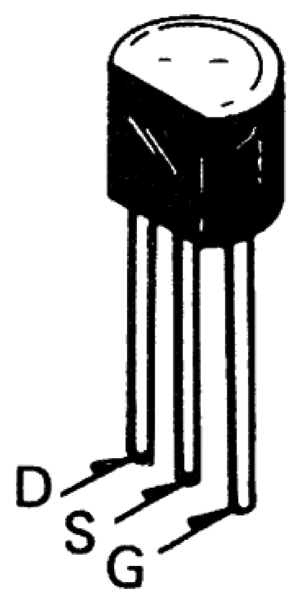


5. DIAL STRINGING DIAGRAM

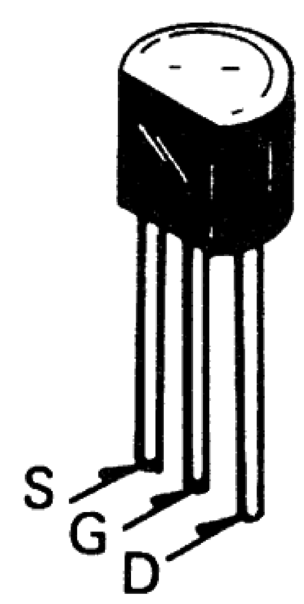
START WITH CAPACITOR SET AT MINIMUM.
PLATES : FULLY OPEN.
POINTER POSITION : HIGH END
START : EYELET
FINISH : DIAL SPRING



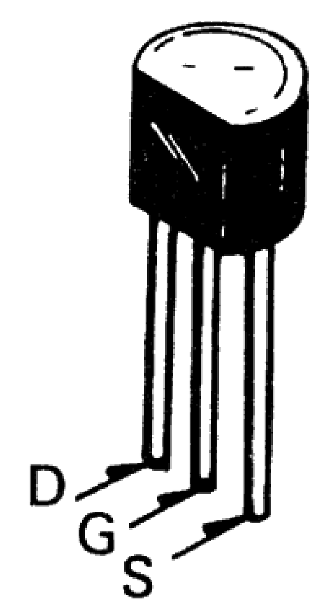
6. IC & TRANSISTOR LEAD IDENTIFICATION



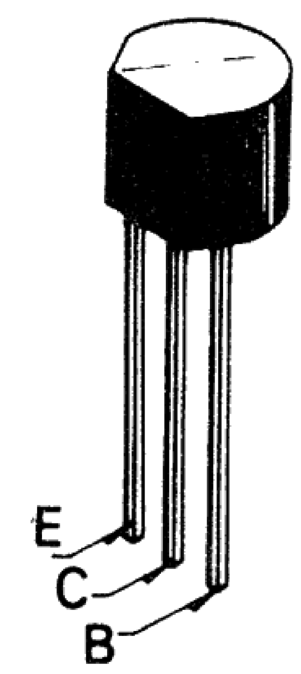
2SK41



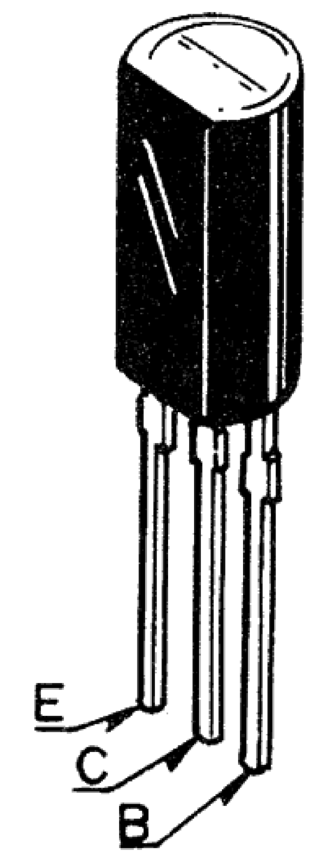
2SK30ATM
2SK246



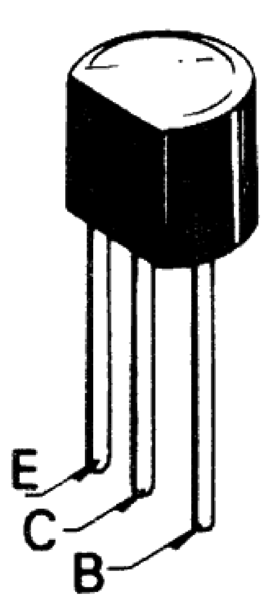
2SK105



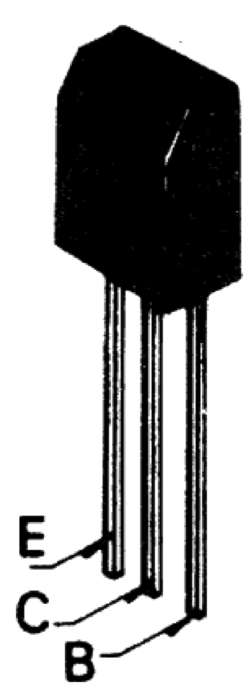
2SC536 2SA1016
2SC930 2SA984
2SC2362



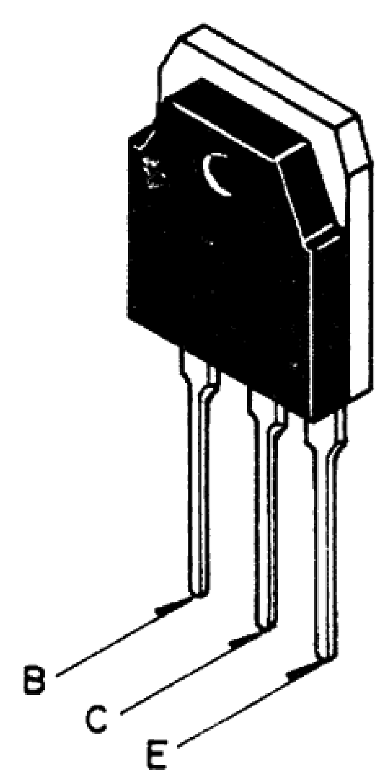
2SD438 2SA965
2SC2235
2SB560



2SC1674 2SC1845
2SC1815 2SC900
2SC1840 2SC2240
2SC1842 2SC945
2SC1675 2SA992
2SA970



2SD571
2SB605



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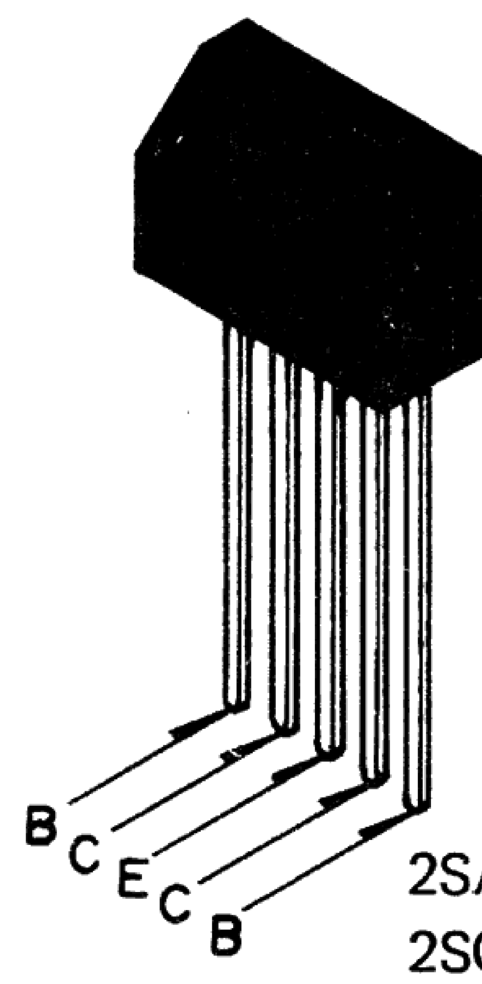
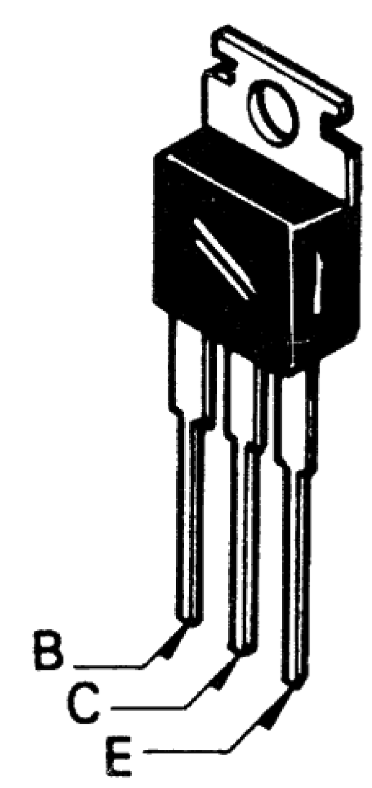
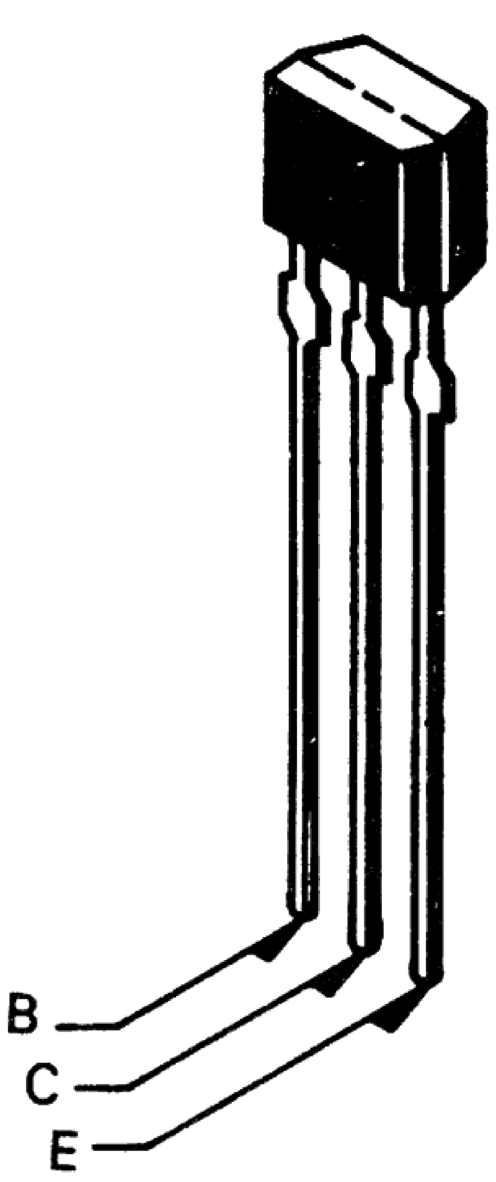


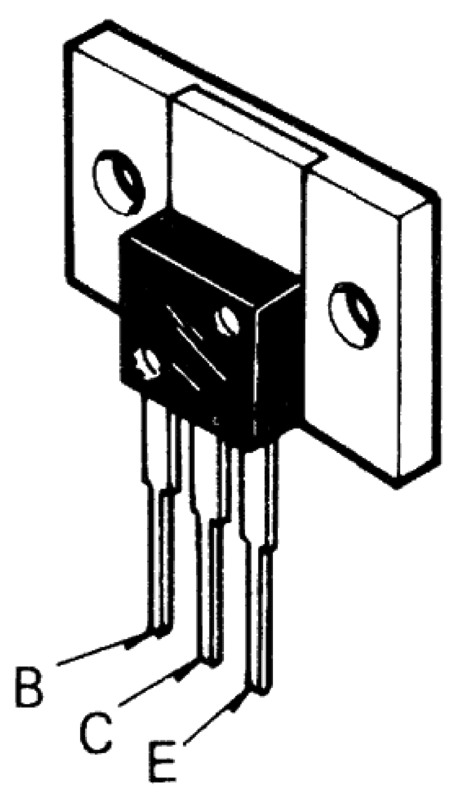
2SA979
2SC2259



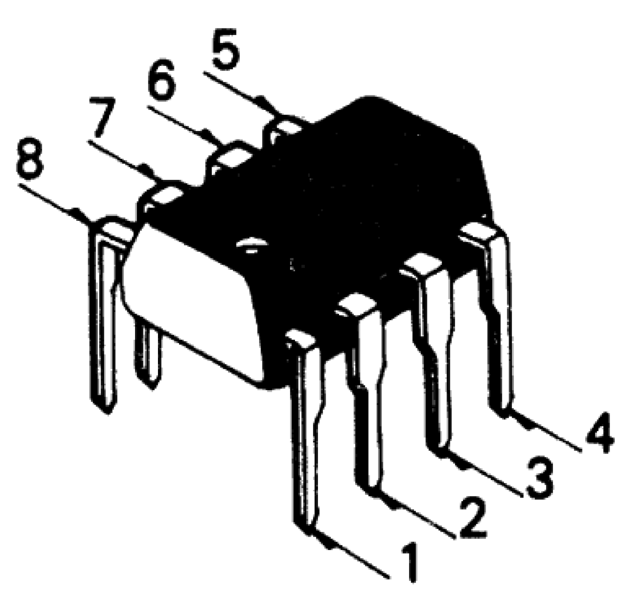
2SD325



2SC2785
2SC2786
2SC2787
2SA1175



2SD613P
2SB633P



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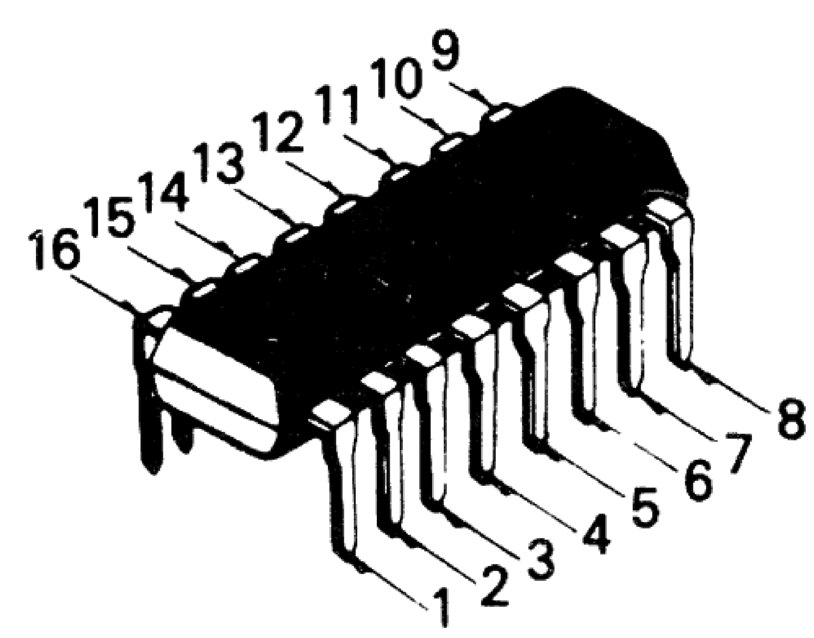

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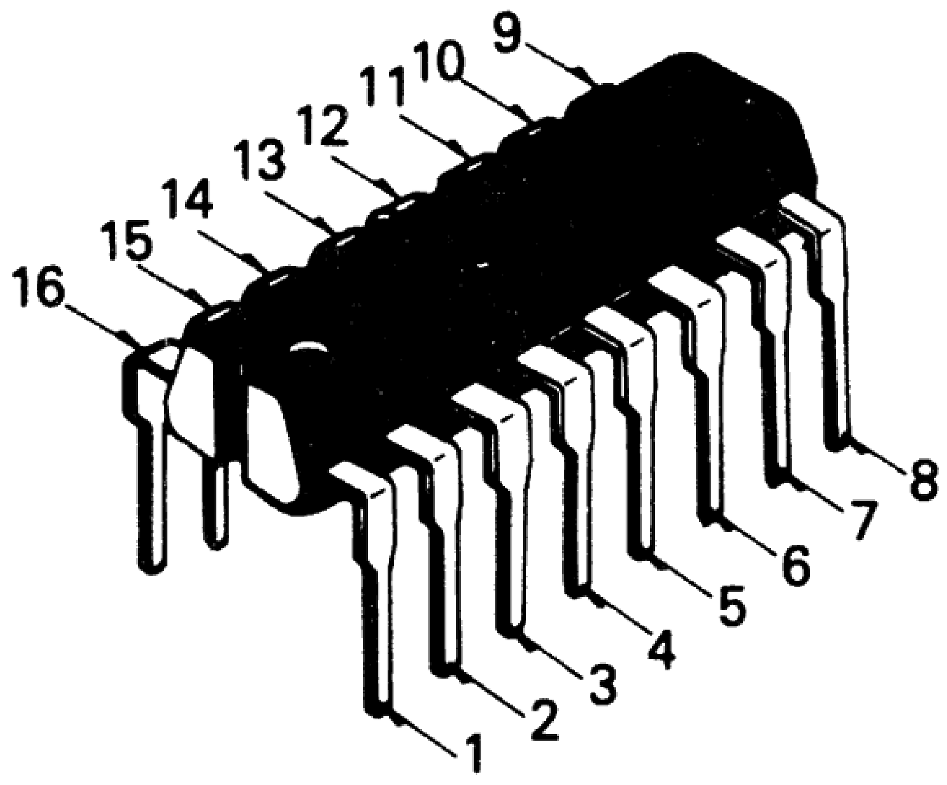

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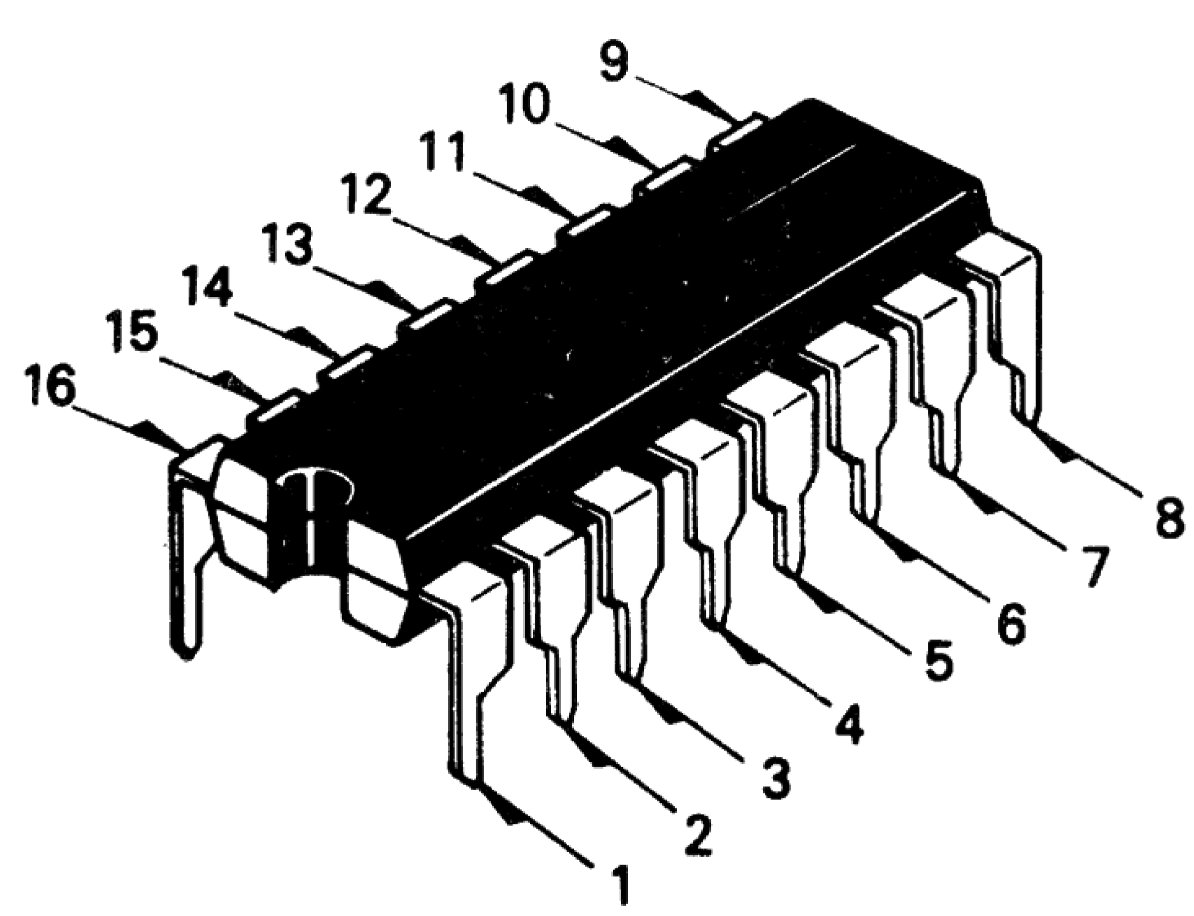


μPC1161C
LA1240

7. OPERATION CHECK FOR CIRCUITS

1). POWER SUPPLY OPERATION CHECK

START

CONNECTION — Connect AC Cord to 120 V AC, 60 Hz. (UL and C.S.A. models) (220/240 V AC, 50 Hz for European and 240 V AC, 50 Hz for Australian models)

STEP 1 — Power Switch "ON" and Dial Lamps light.
Check the Power Supply Voltages (Figure 1).

REPAIR — 1. Check Power Supply Circuit, Fuse and Power Transformer.
2. See TROUBLESHOOTING.

OK ?

NG — DC Voltage is not correct.

OK — DC Voltage is correct.

END — Proceed to the next section.

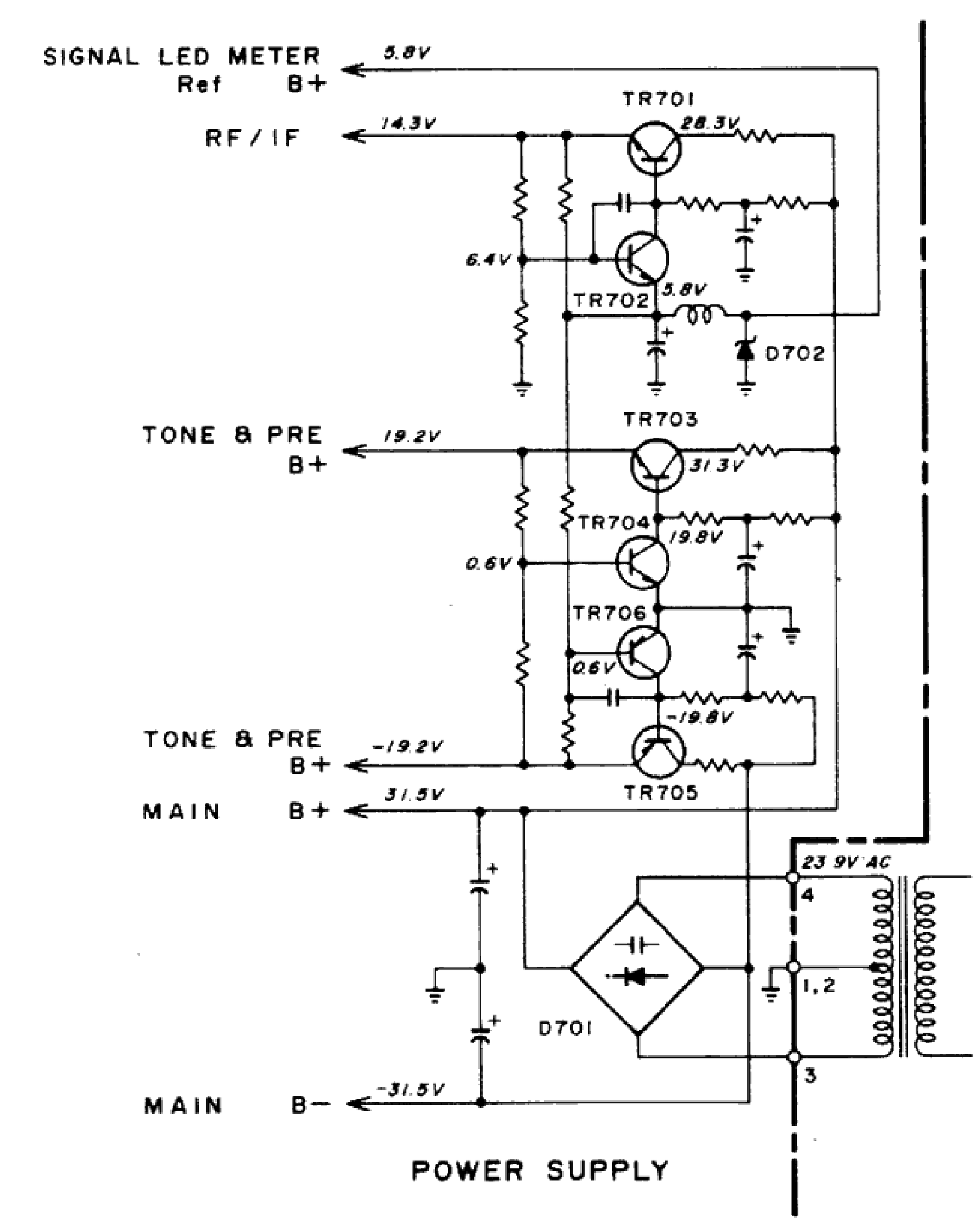


Figure 1

2). AUDIO SECTION OPERATION CHECK

START

(1) MAIN AMP. OPERATION CHECK

CONNECTION — Connect 8 Ω Load to Speaker Output.
Connect DC Voltmeters to Main Amp Circuit; +B and Pin No. 1 Ground (Minus −), Ground (Plus +) and −B (see Figure 2).

STEP 1 — Check Power Supply voltage with no input (must be ±45 V).

REPAIR — (1) Check D701, C707, C708, C709 or C710.
(2) Check the short-circuits.
(3) See TROUBLESHOOTING.

OK ?

NG — DC Voltage is not ±31.5 V.

OK — DC Voltage is ±31.5 V.

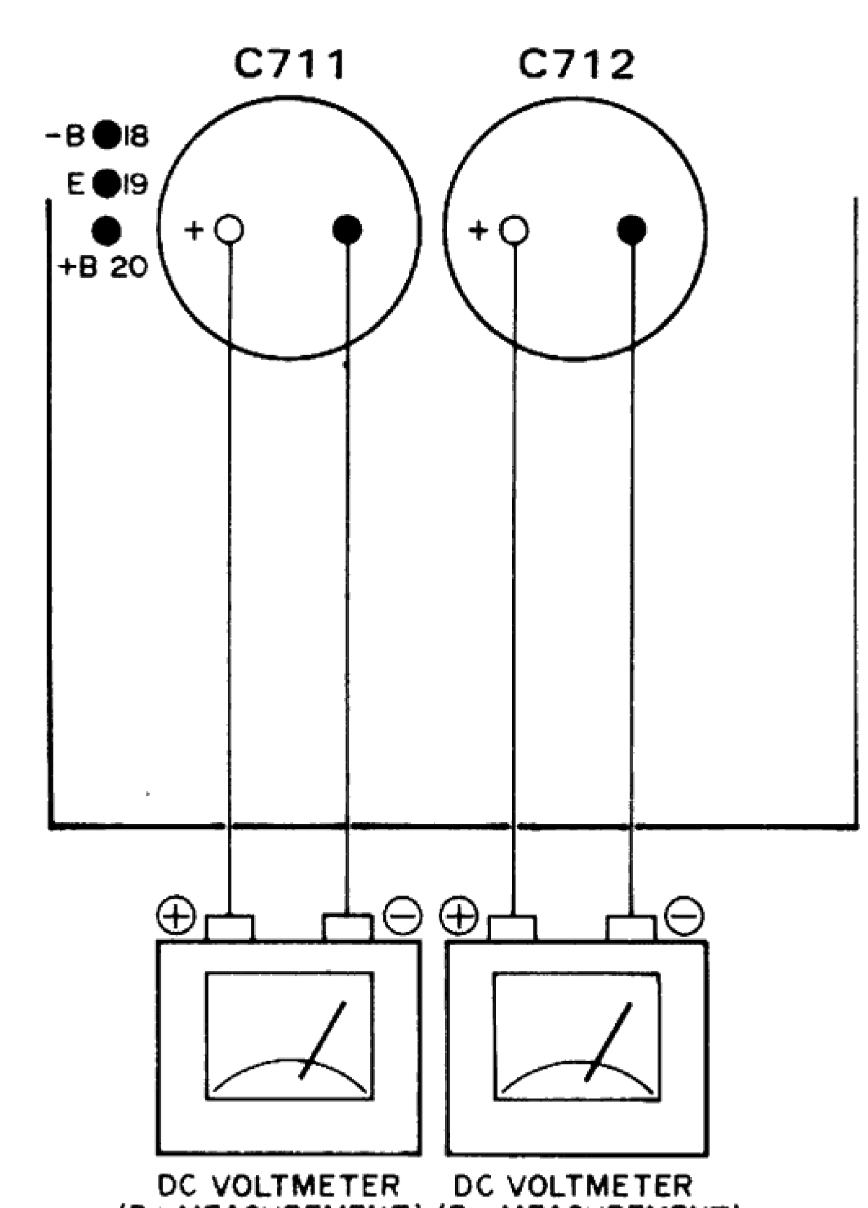


Figure 2

ADJUSTMENT — Adjust DC Balance and Idling Current.
See ALIGNMENT INSTRUCTIONS on page 22.

CONNECTION — Connect 8 Ω Load to Speaker Output.
Connect DC Voltmeter to Main Amp. Circuit as shown in Figure 3.

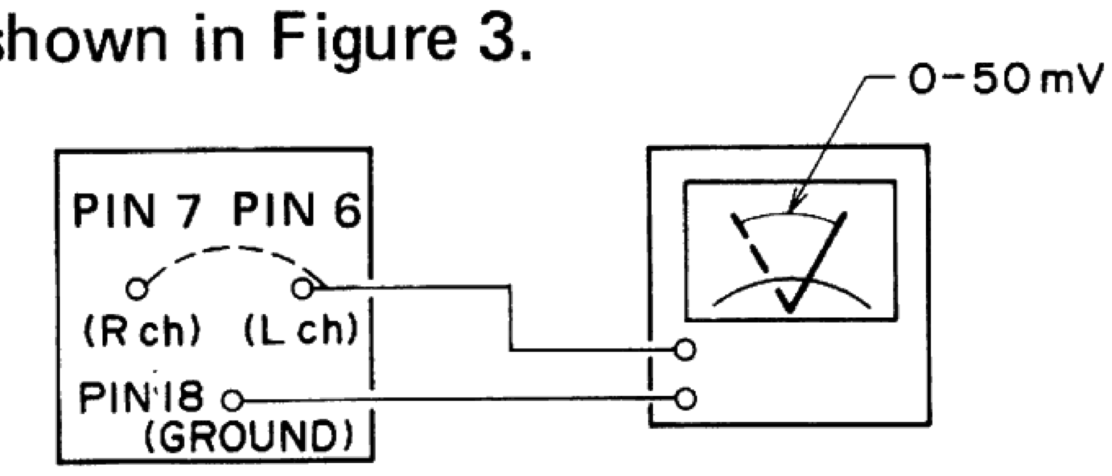


Figure 3 TUNER AUDIO P.C.B. DC VOLTMETER (−50mV to +50mV)

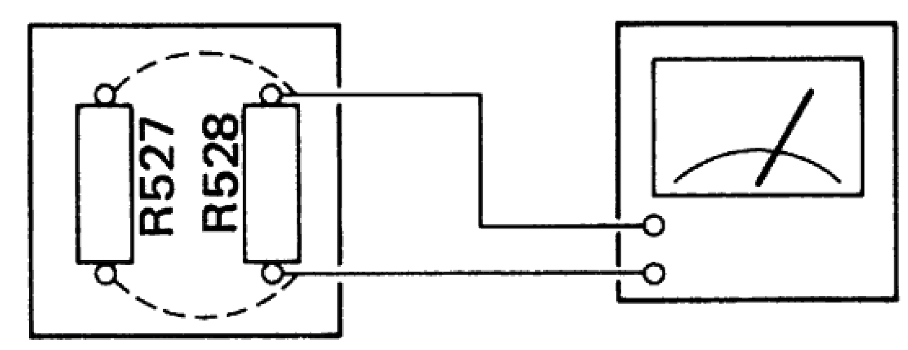
STEP 2 — Check for Balance of DC Voltage at L and R channel output terminals (within ± 25 mV).

REPAIR — See TROUBLESHOOTING.

OK ? → NG — DC Voltage over ± 50 mV.

OK — DC Voltage within ± 50 mV.

CONNECTION — Connect 8 Ω Load to Speaker Output.
Connect DC Voltmeter to Main Amp. Circuit as shown in Figure 4.



MAIN AMP CIRCUIT DC VOLTMETER

Figure 4

STEP 3 — Check the Idling current of Main Amp:
Check the DC Voltage across Emitter Resistor R527 (L ch) and R528 (R ch): should l be 10 mV ± 1 mV.
[Adjust: VR501 (L ch) and VR502 (R ch)]

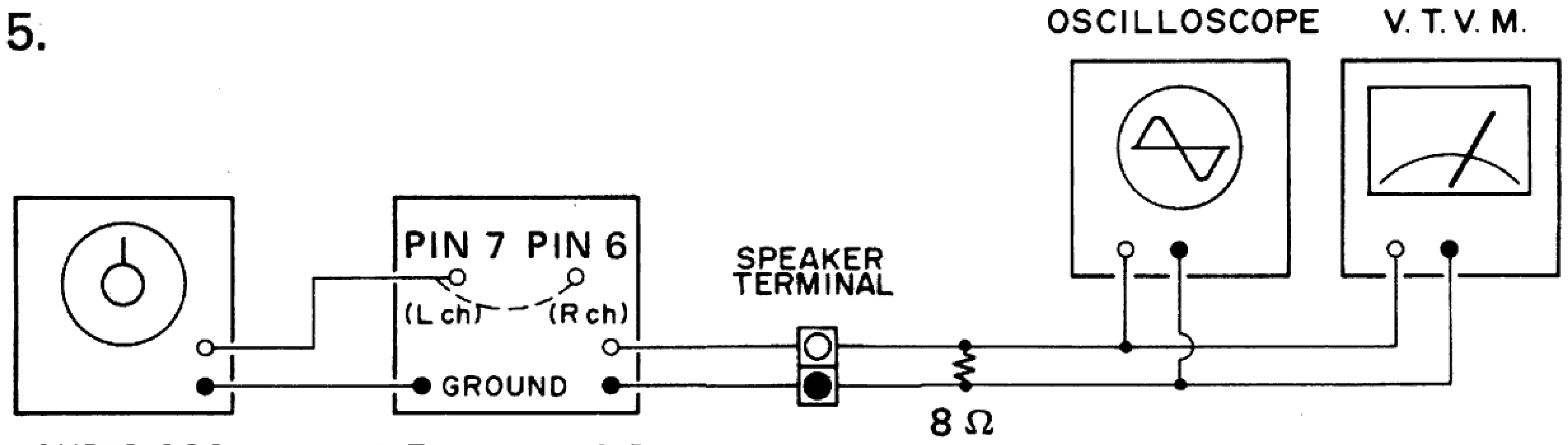
REPAIR
(1) Readjust VR501 and VR502.
(2) Check the Bias circuit of D501, 503 (L ch) and/or D502, 504 (R ch).
(3) Check TR505 (L ch) and TR506 (R ch).
(4) Check TR501, 503 (L ch) and TR502, 504 (R ch).
(5) Check for short-circuits in Main circuit.

OK ? → NG — DC Voltage is above 12 mV or below 8 mV.

OK — DC Voltage is 10 mV ± 2 mV.

CONNECTION — Connect 8 Ω Load to Speaker Output.
Connect Audio Osc. to Main Amp. Input, C501 (+)(L) and C502 (+)(R).
See Figure 5.

OSCILLOSCOPE V. T. V. M.



AUDIO OSC. TUNER, AUDIO P.C.B. LOAD

Figure 5

STEP 4 — Check for symmetrical clipping of Output Signal wave shape.
Adjust output from Audio Osc. to produce clipping in the output waveform (should be about 600 mV—1000 mV).

REPAIR

(1) Check TR507, 509, 511, 513 (L ch) and TR508, 510, 512, 514 (R ch).
(2) Check STEP 2 and STEP 3.
(3) Check Main Amp circuits.

OK ? → NG

Output signal wave is not clipping symmetrically. (Figure 6)

OK

Symmetrical clipping (Balanced) Output signal wave. (Figure 6)

STEP 5

Check the Main Amp. Gain (designed level for Main Amp. is about 29 dB).
Adjust output from Audio Osc. (1 KHz) to produce 20 watts rated output power.
(Both channels driven — Figure 5)

REPAIR

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

OK ? → NG

Input level is not 600 mV ± 2 dB.

OK

Input level is at least 600 mV ± 2 dB for rated output power.

END

Proceed to next section.

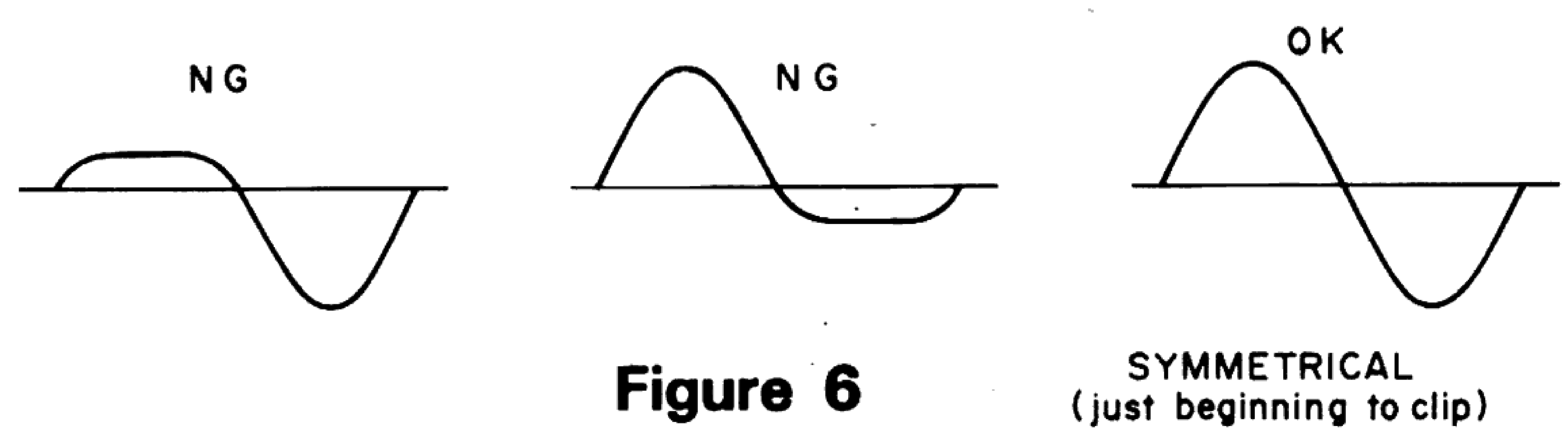


Figure 6

START

(2) PREAMP. OPERATION CHECK

CONNECTION

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

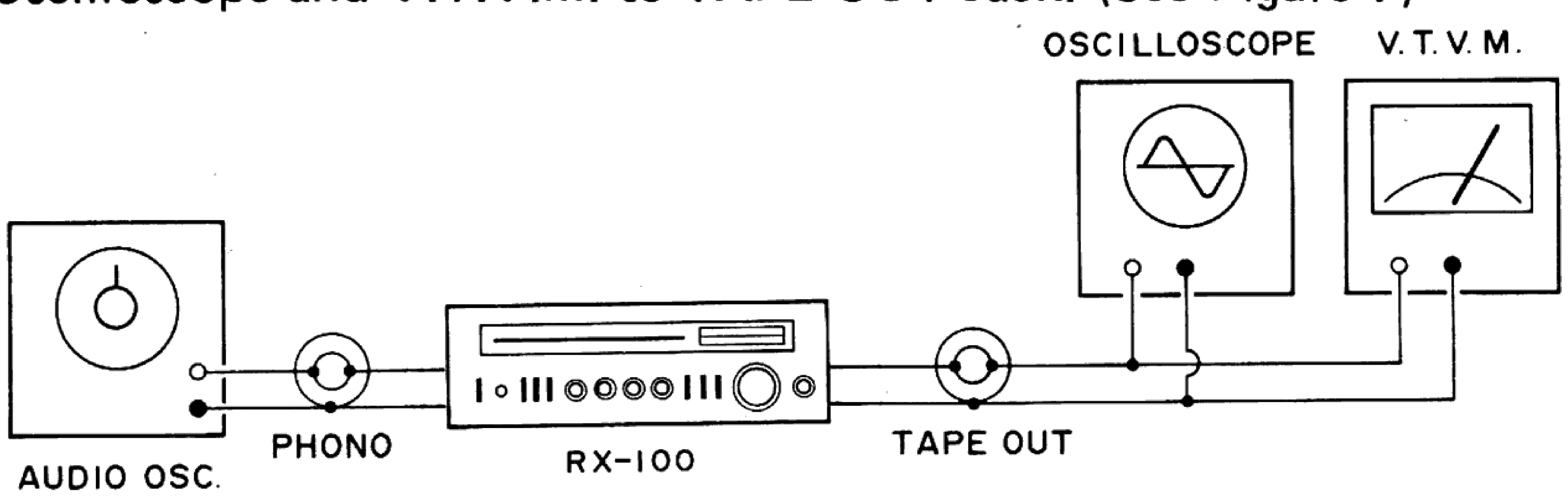


Figure 7

STEP 1

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

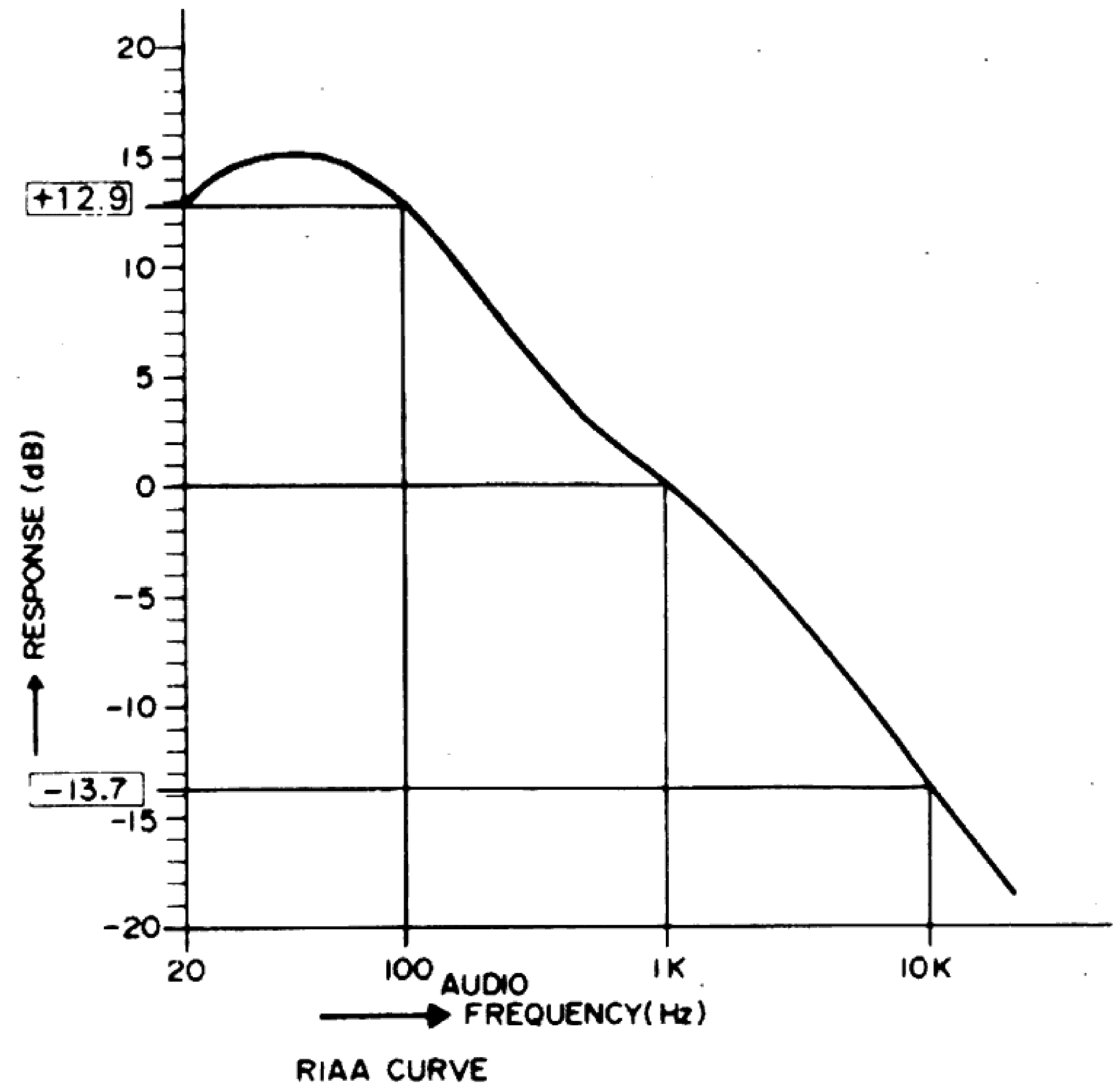


Figure 8

REPAIR

(1) Check TR301–306.
(2) Check C309, 311, R313, 315 (L ch) and C310, 312, R314, 316 (R ch).
(3) Check PRE Amp. circuits.

OK ? — NG

Equalization Response at 100 Hz does not fall within +12.9 (RIAA) ± 2 dB and 10 kHz does not fall within –13.7 (RIAA) ± 2 dB.

OK

Equalization Response falls within +12.9 (RIAA) ± 2 dB at 100 Hz and –13.7 (RIAA) ± 2 dB at 10 kHz.

END

Proceed to next section.

START

(3) TONE CONTROL OPERATION CHECK

CONNECTION

Set SELECTOR Switch to AUX position.
Connect Audio Osc. to AUX input jack.
Connect Oscilloscope and V.T.V.M. to Speaker terminal on Set.
Speaker Impedance = 8 ohms (Output: about 0.5 watt)
Tape Monitor: Off, Mode Switch: Stereo, Loudness: Off (See Figure 9.)

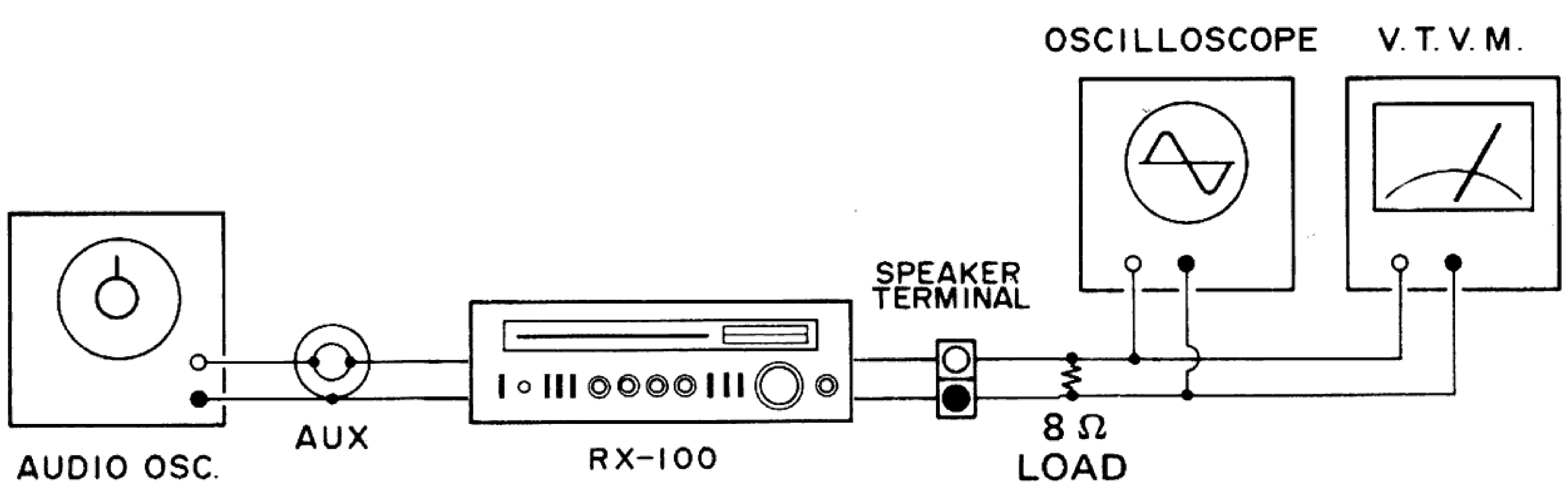


Figure 9

STEP 1 — Check BASS Action at 100 Hz. (Figure 10)

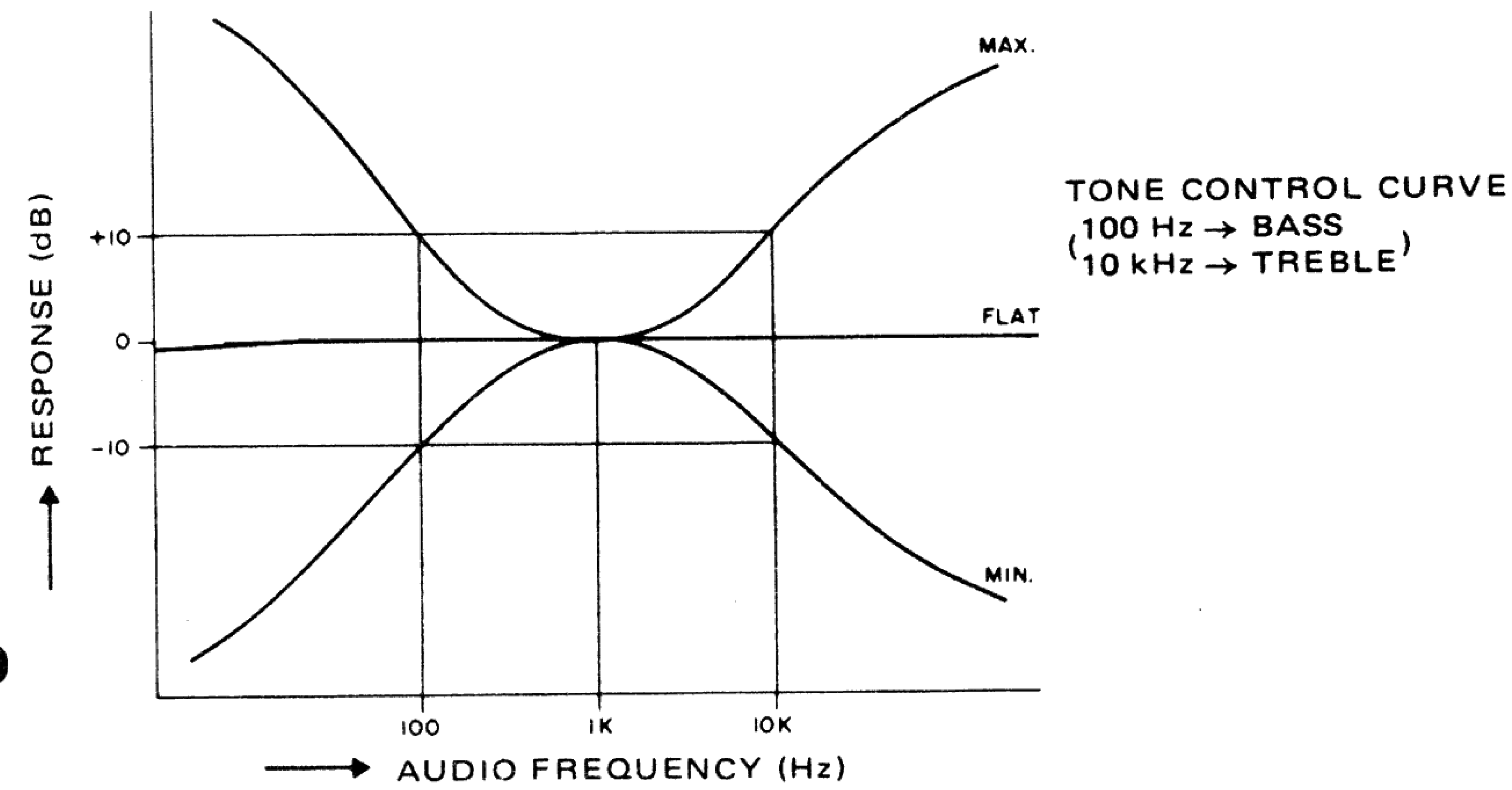


Figure 10

REPAIR — Check Bass Control circuit on TUNER AUDIO P.C.B.

OK ? → NG — Frequency Response does not fall within ±10 ± 2.5 dB.

OK — Frequency Response falls within ±10 ± 2.5 dB.

STEP 2 — Check TREBLE Action at 10 kHz. (Figure 10)

REPAIR — Check Treble Control circuits on TUNER AUDIO P.C.B.

OK ? → NG — Frequency Response does not fall within ±10 ± 2.5 dB.

OK — Frequency Response falls within ±10 ± 2.5 dB.

STEP 3 — Check LOUDNESS compensation at –30 dB Volume position from rated power. (Figure 11)

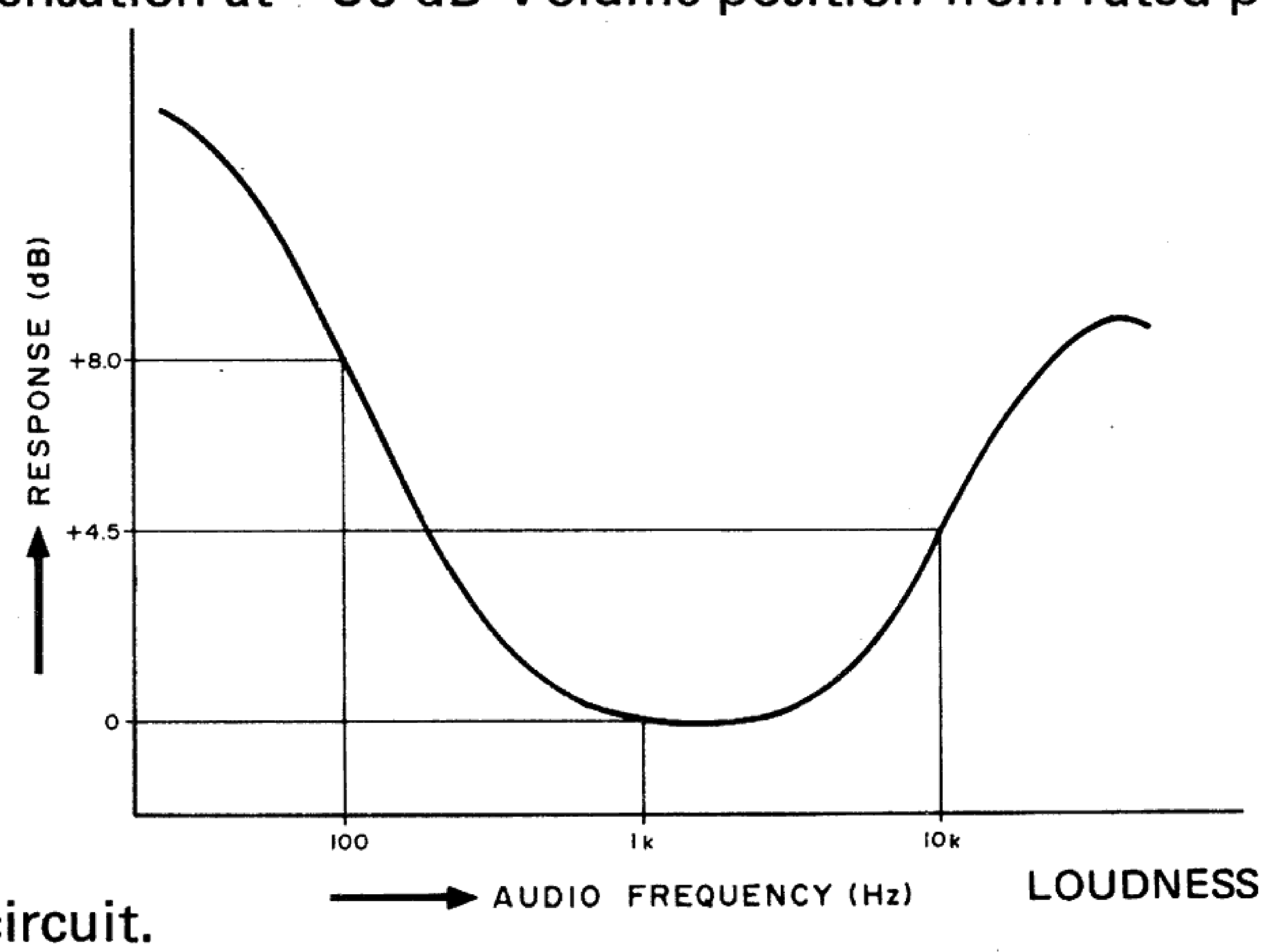


Figure 11

LOUDNESS CURVE

REPAIR — Check Loudness circuit.

OK ? → NG — Loudness Compensation does not fall within +8 ± 2.5 dB at 100 Hz and +4.5 ± 2.5 dB at 10 kHz.

OK — Loudness Compensation falls within +8 ± 2.5 dB (100 Hz) and +4.5 ± 2.5 dB (10 kHz).

END — Proceed to the next section.

START — (4) PROTECTOR CIRCUIT OPERATION CHECK

CONNECTION — Connect Audio Osc. (1 kHz) to AUX Input Jack.
Connect Audio Oscilloscope and V.T.V.M. to Speaker terminals.
Connect 2–8 Ω Load to Speaker Output terminal.

STEP 1 — Check the reset circuits as follows. (See Figure 12.)

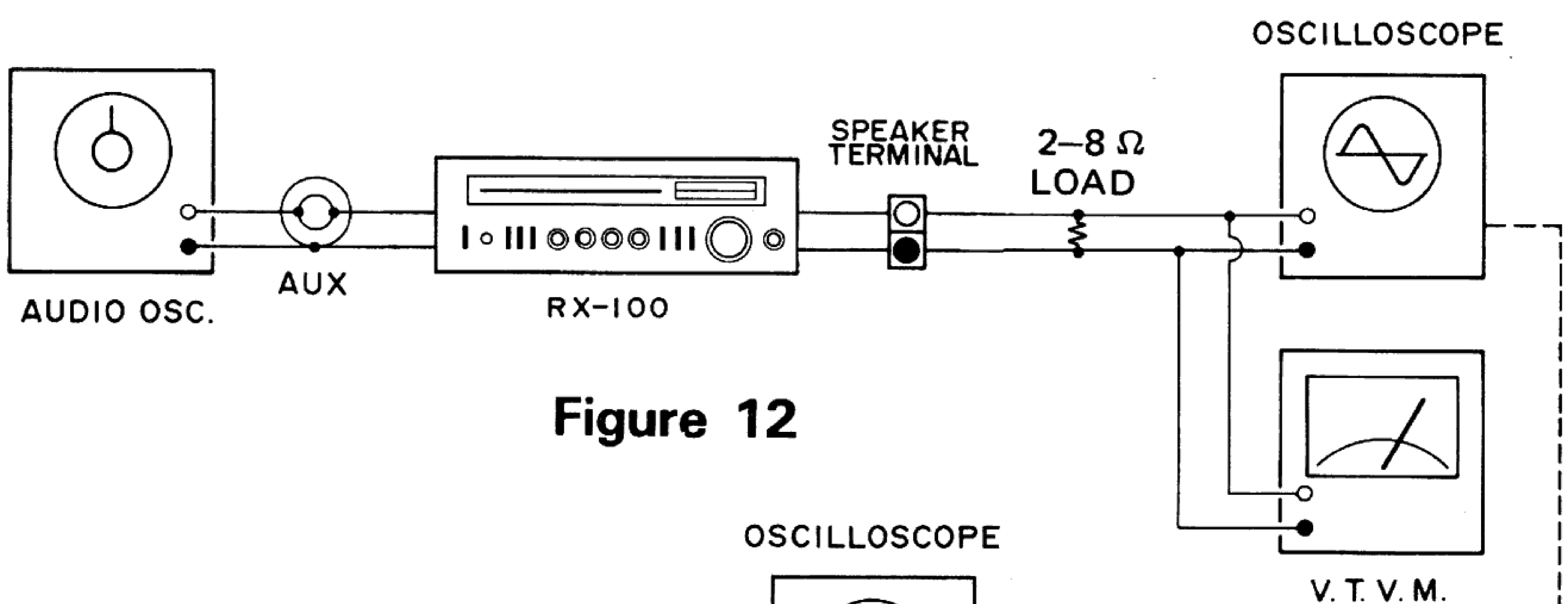
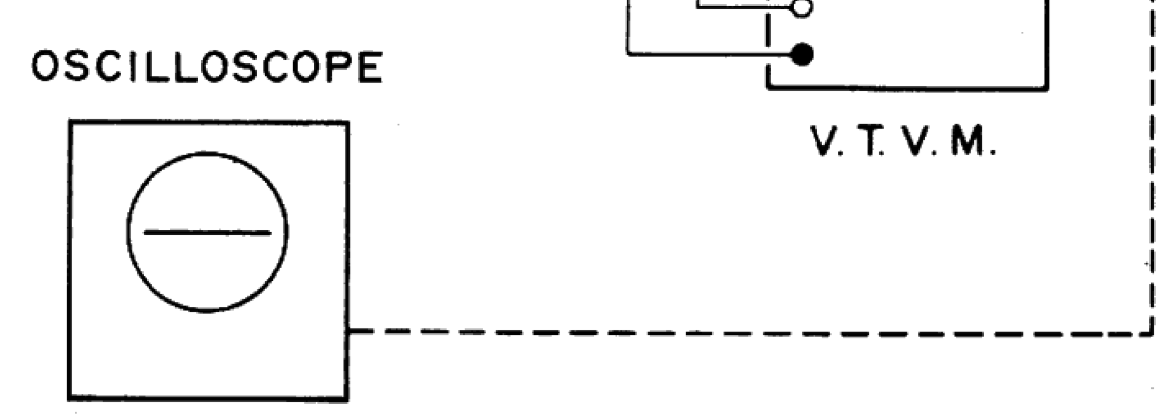


Figure 12



(When protector circuit is activated)

Figure 13

(1) Connect 2 Ω load to Speaker output terminal.
Check for no output after output signal is driven past clipping.
(2) Connect 8 Ω load to Speaker output terminal.
Check for no output after output is shorted. (Figure 13)
(3) Connect 4 Ω load to Speaker output terminal.
Check for normal output after output signal is driven into clipping.

REPAIR — Check reset circuit (See TROUBLESHOOTING).

OK ? NG — Reset circuit does not work.

OK — Reset circuit works.

END — Proceed to the next section.

3). RF and IF OPERATION CHECT

START (1) AM OPERATION CHECK

ADJUSTMENT — Adjust for AM IF/RF Alignment (See AM ALIGNMENT Section on page 23).

CONNECTION — Set SELECTOR Switch to AM position. Connect standard loop antenna to AM SG and radiate signal into AM Ferrite Antenna.
Connect Oscilloscope, Distortion Meter and V.T.V.M. to TAPE OUT jack on Set.
AM SG: 400 Hz, 30% modulation (Figure 14)

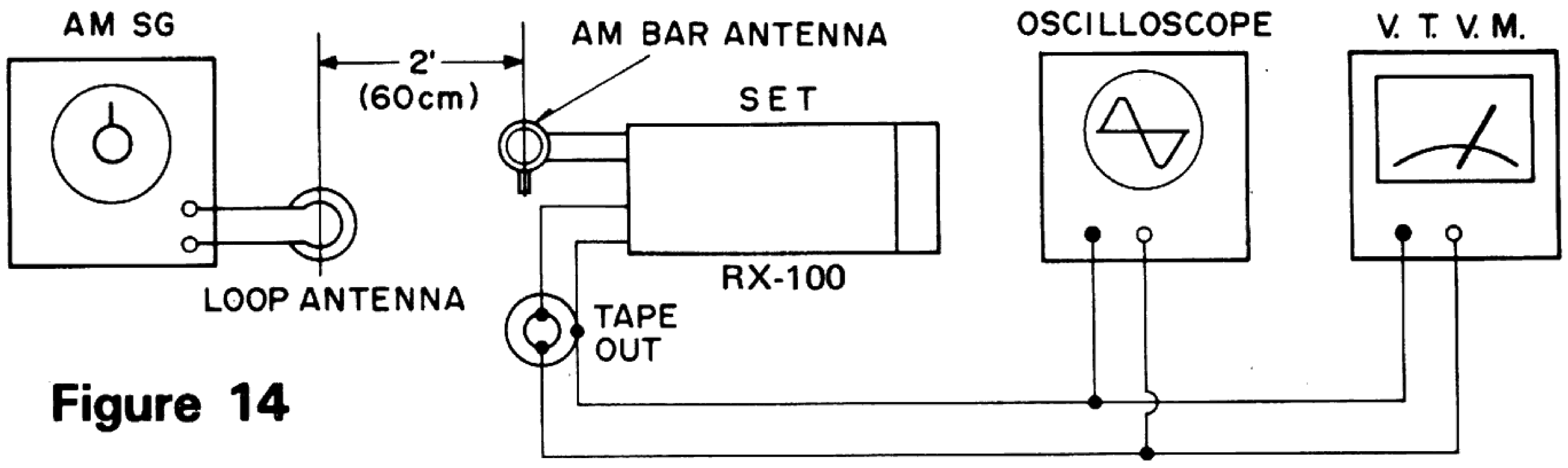


Figure 14

STEP 1 — Check AM coverage: that the lowest dial pointer setting is under 520 kHz and highest position is over 1620 kHz.

REPAIR — Readjust AM coverage (See page 23 for AM Alignment).

OK ? → NG — Coverage is less than 520 kHz – 1620 kHz.

OK — Coverage is at least 520 kHz – 1620 kHz.

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

REPAIR — Readjust AM Tracking (See page 23 for AM Alignment).
See TROUBLESHOOTING.

OK ? → NG — AM Sensitivity is less than 500 μV/m.

OK — AM Sensitivity is better than 500 μV/m.

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

REPAIR —
(1) Readjust AM IF/RF Alignment on page 23.
(2) Check AM RF/IF circuits.

OK ? → NG — Distortion is more than 2%.

OK — Distortion is less than 2%.

STEP 4 — Check AM Tape Out level (Input level set to 5 mV/m).

REPAIR
(1) Readjust AM IF/RF Alignment on page 23.
(2) Check and change/select value of R245.
(3) Check AM IF Detector circuits.

OK ? → NG — Tape Out level does not fall within 200 mV ± 2.5 dB.

OK — Tape Out level falls within 200 mV ± 2.5 dB.

STEP 5 — Check the AM Signal Meter pointer. (Input level for check points: (1) no signal – LED does not light. (2) 100 mV/m – ALL LEDs light.)

REPAIR
(1) Check the AM IF circuits.

OK ? → NG — Signal LED Meter does not indicate correctly. (Figure 15)

OK — Signal LED Meter indicates correctly. (Figure 15)

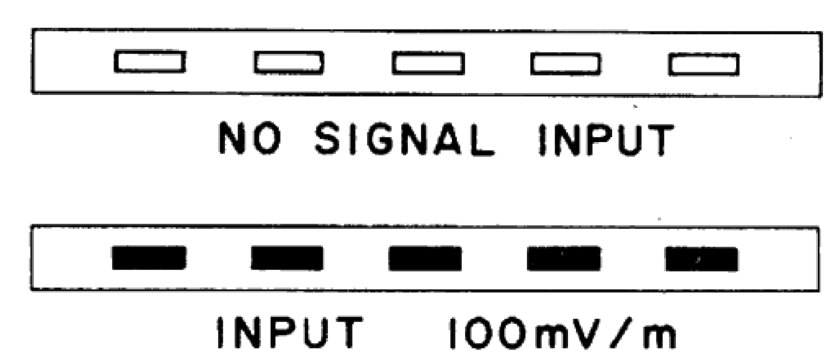


Figure 15

END — Proceed to next section.

START — (2) FM RF/IF OPERATION CHECK

ADJUSTMENT — Check FM Alignment (See FM Alignment Section on page 24). (FM IF/RF and FM MPX sections).

CONNECTION — Set SELECTOR Switch to FM position.
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. (Figure 16)

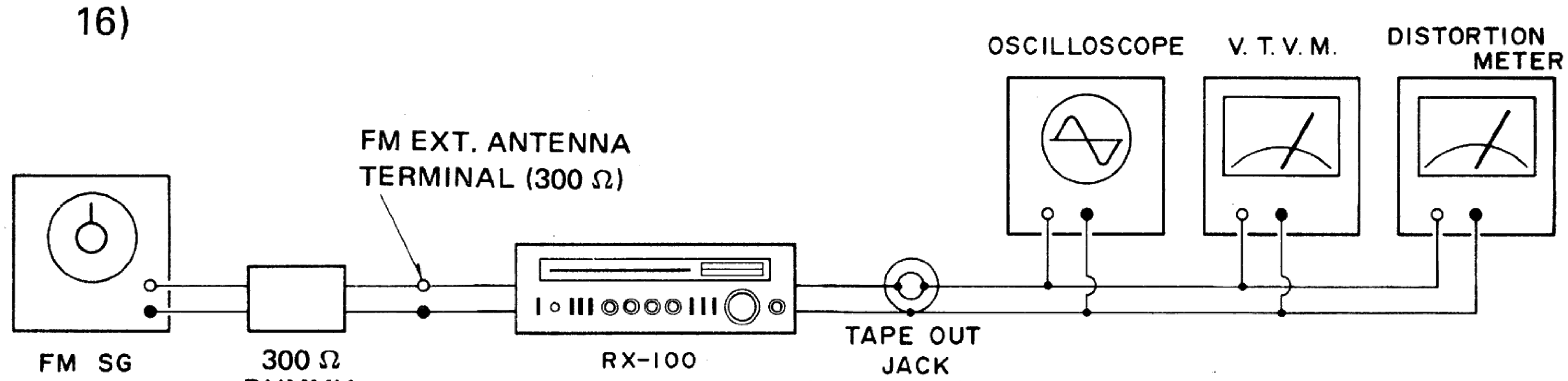


Figure 16

STEP 1 Check coverage: lowest dial pointer position should be under 87 MHz and highest pointer position should be over 108 MHz.
(* European models must not be able to tune below 87.5 MHz.)

REPAIR
(1) Readjust FM coverage (See FM RF/IF Alignment on page 24).
(2) Check FM RF circuits.

OK ? NG Coverage is not correct.

OK Coverage is correct.

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

REPAIR
(1) Readjust FM tracking (See FM RF/IF Alignment on page 24).
(2) See TROUBLESHOOTING.

OK ? — NG: FM IHF sensitivity is worse than 3.8 μV.

OK: FM IHF sensitivity is better than 3.8 μV. (FM SG: 98 MHz)

STEP 3 Check T.H. Distortion for Mono signal. (Input: 1 mV, FM SG: 98 MHz)

REPAIR
(1) Readjust RF/IF Alignment on page 24.
(2) See TROUBLESHOOTING.

OK ? — NG: T.H. Distortion is higher than 0.5%.

OK: T.H. Distortion is lower than 0.5%.

STEP 4 Check Signal-to-Noise ratio. (Input signal: 1 mV, FM SG: 98 MHz)

REPAIR
(1) Readjust RF/IF Alignment on page 24.
(2) See TROUBLESHOOTING.

OK ? — NG: Signal-to-Noise ratio is worse than 66 dB (with IHF "A" weighted).

OK: Signal-to-Noise ratio is better than 66 dB.

STEP 5 Check the Tuning LED Meter per following procedure:
(1) Check that the LED Meter is in center (GREEN) position with no signal.
(2) Check that "tune to center" is also the point of minimum distortion (SG: 98 MHz).

REPAIR
(1) Readjust RF/IF Alignment on page 24.
(2) Check FM circuits.

OK ? → NG
LED Meter does not indicate correctly. (Figure 17)

OK
LED Meter indicates correctly. (Figure 17)

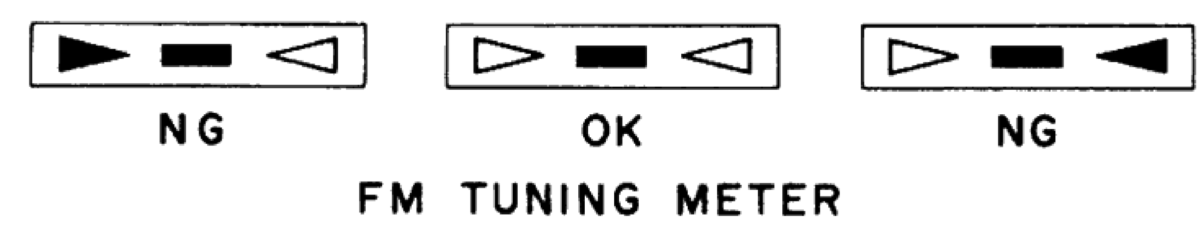


Figure 17

STEP 6
Check the Signal LED Meter.
(1) No signal – LED does not light.
(2) 600 μV input – Adjust for VR203 as the 5th LED lights.
5 μV input – Adjust for VR202 as the 1st LED lights.
(3) Check to be sure that the max. Meter reading point is also the point of minimum distortion. (Figure 18)

REPAIR
(1) Readjust VR203.
(2) Check FM IF circuit.

OK ? → NG
Signal LED Meter does not indicate correctly.

OK
Signal LED Meter indicates correctly.

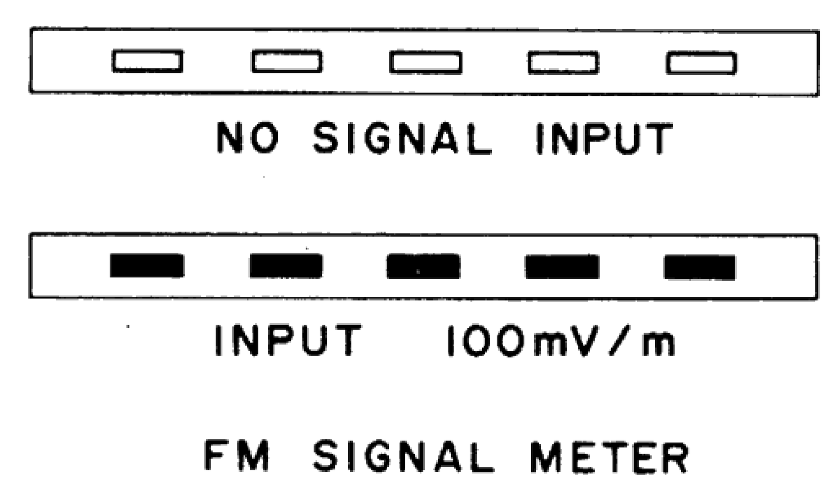
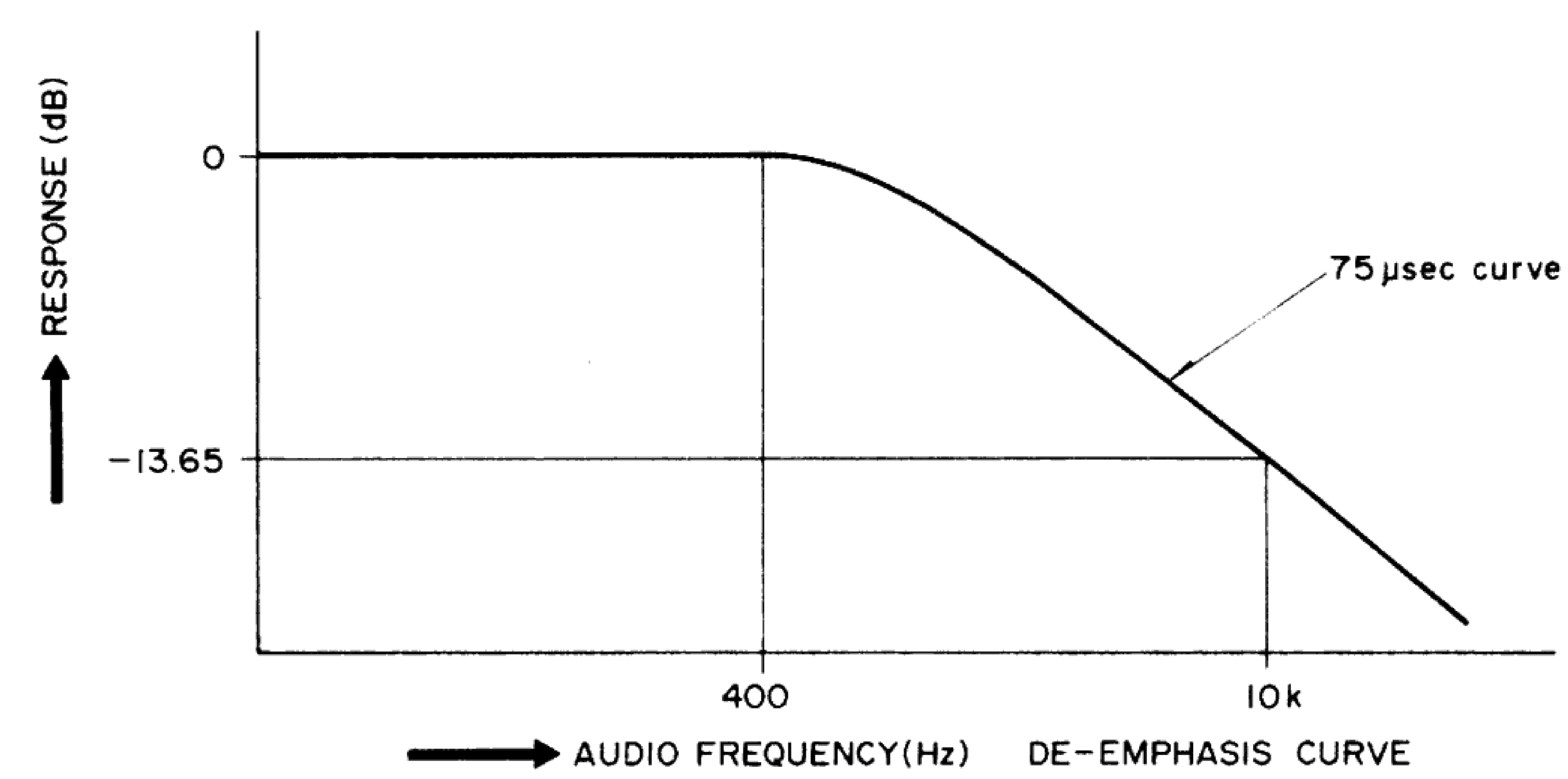


Figure 18

STEP 7
Check FM 75 μsec de-emphasis response curves.

Figure 19



REPAIR
Check (replace or change value) of C403 (L ch) and/or C404 (R ch).

OK ? → NG
FM 75 μsec response at 10 kHz modulation does not fall within −13.65 + 1 dB or −13.65 − 3 dB.

OK
FM 75 μsec at 10 kHz modulation falls within -13.65^{+1}_{-3} dB.

END
Proceed to the next section.

(3) FM MPX OPERATION CHECK

START

ADJUSTMENT — Adjust for FM MPX Alignment on page 25.

CONNECTION — Same equipment connection as Figure 16. Connect FM Stereo SG to FM SG.
Stereo Modulation — 67.5 kHz dev. 9% Pilot.
Frequency — 98 MHz, 1 kHz modulation (Figure 20)

STEP 1 — Check Stereo indicator sensitivity (Figure 20) (Input: near 5.5 μV).
Adjust for VR201 as Stereo indicator (pointer color) turns Green to red (at 3.5–9 μV).

REPAIR
(1) Readjust FM MPX Alignment on page 25.
(2) See TROUBLESHOOTING.

OK ?

NG — Stereo indicator sensitivity does not fall within 3.5–9 μV.

OK — Stereo indicator sensitivity falls within 3.5–9 μV.
(nominal sensitivity is 5.5 μV.)

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

REPAIR
(1) Readjust FM MPX Alignment on page 25.
(2) See TROUBLESHOOTING.

OK ?

NG — Separation is less than 28 dB at 100 Hz, 33 dB at 1 kHz and 28 dB at 10 kHz.

OK — Separation is better than 28 dB at 100 Hz, 33 dB at 1 kHz and 28 dB at 10 kHz.

END — Proceed to alignment.

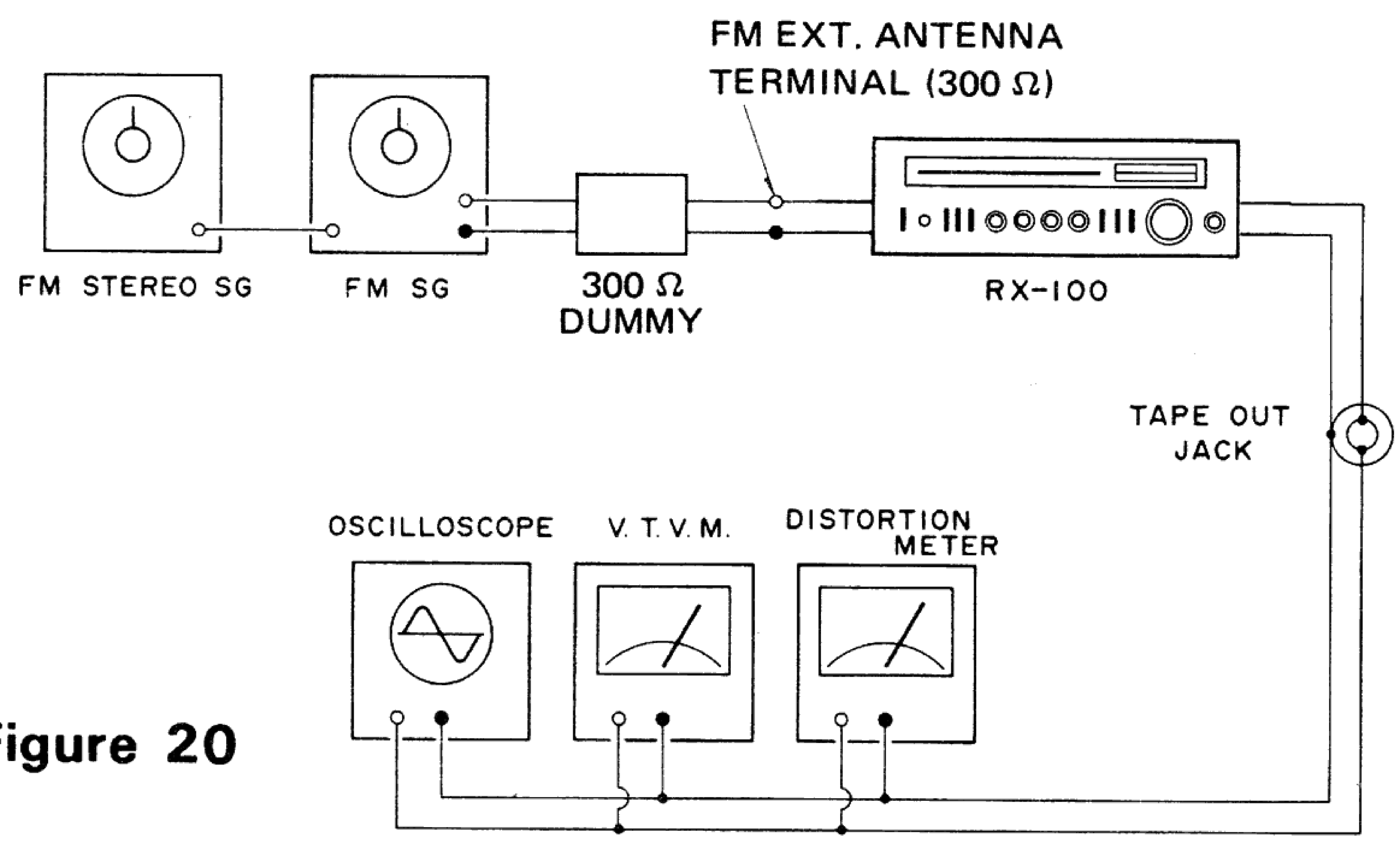


Figure 20

8. ALIGNMENT INSTRUCTIONS

1). AUDIO CIRCUIT ADJUSTMENT

NOTE:
- Maintain line voltage at 120 volts. (UL, C.S.A.) (220/240 volts for European & 240 V AC for Australian models)
- Set SELECTOR Switch to AUX.
- Set Mode Switch to Stereo.
- See P.C.B. illustrations for alignment points/adjustments.

MAIN AMPLIFIER 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. 21.	No signal	DC voltage should be less than ±50 mV.	Select value of R509(L), R510(R). See Figure 23.
2	Idling current adjustment	DC Volt Meter	See Fig. 22.	No signal	Adjust voltage across Emitter resistors R527 and R528 to 10 mV. (8 Ω Load)	VR501(L), VR502(R) See Figure 23.

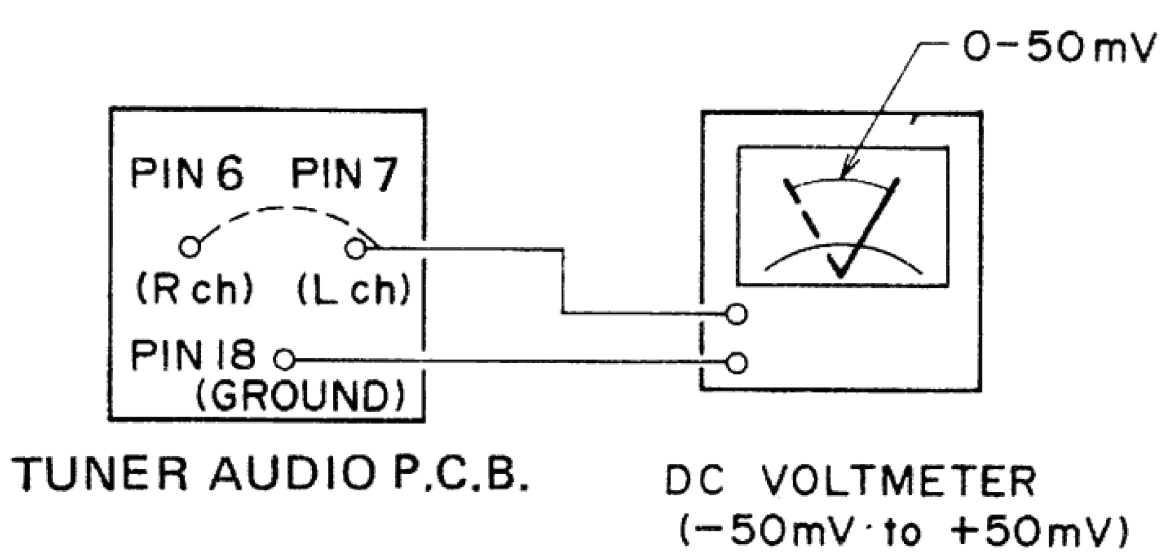


Figure 21

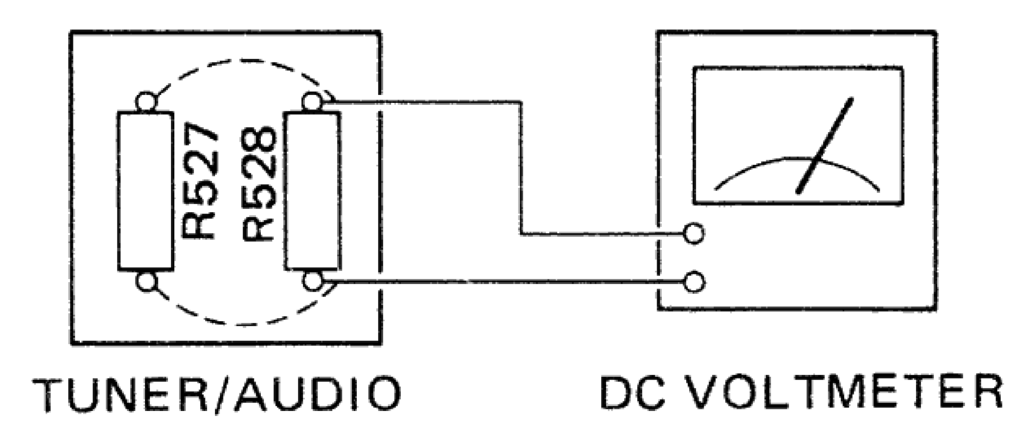


Figure 22

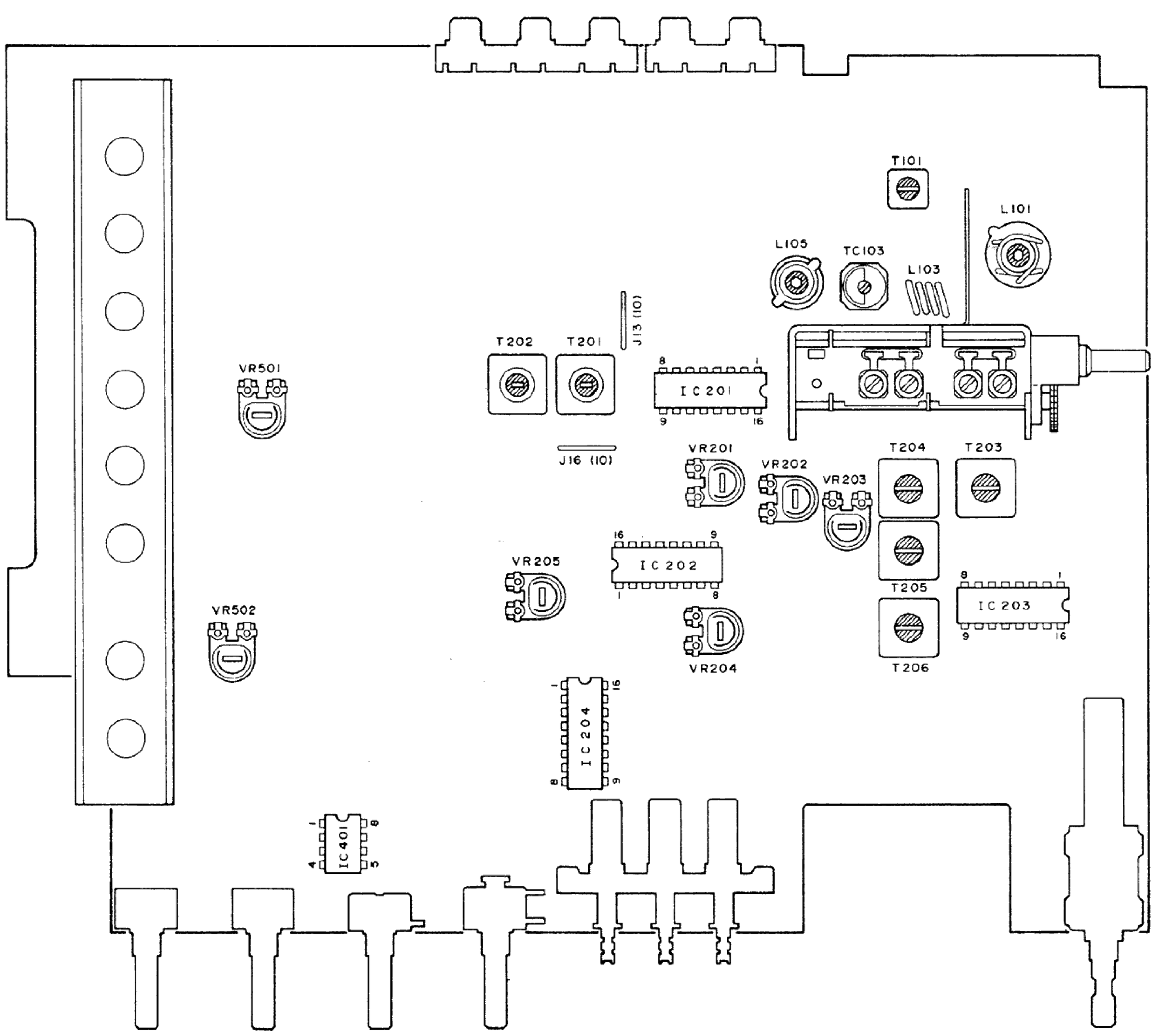


Figure 23

2). AM RF & IF ALIGNMENT

EQUIPMENT REQUIRED

1. AM Signal Generator
2. AC Voltmeter
3. Oscilloscope
4. Distortion Meter

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 220/240 V AC for European models.)
- Set SELECTOR Switch 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 Figure 24.	455 kHz (400 Hz, 30% mod.)	Point of non-interference (near 600 kHz)	Scope and AC Volt-meter to TAPE OUT Jack.	T204, T205, T206 (AM IFT)	Adjust for maximum reading on meter.
2	Same as STEP 1.	510 kHz (400 Hz, 30% mod.)	Tuning Gang fully closed.	Same as STEP 1.	T203 (AM OSC Coil)	Adjust for maximum reading on meter. Refer to Figures 23 and 24.
3	Same as STEP 1.	1650 kHz (400 Hz, 30% mod.)	Tuning Gang fully opened.	Same as STEP 1.	TC202 (AM OSC Trimmer)	Adjust for maximum reading on meter. Refer to Figures 23 and 24.
4	Same as STEP 1.	600 kHz (400 Hz, 30% mod.)	600 kHz	Same as STEP 1.	AM ANT. Coil	Adjust for maximum reading on meter. Refer to Figures 23 and 24.
5	Same as STEP 1.	1400 kHz (400 Hz, 30% mod.)	1400 kHz	Same as STEP 1.	TC201 (AM ANT. Trimmer)	Adjust for maximum reading on meter. Refer to Figures 23 and 24.
6	Repeat STEPs 4 and 5 until no further change is noticed.					

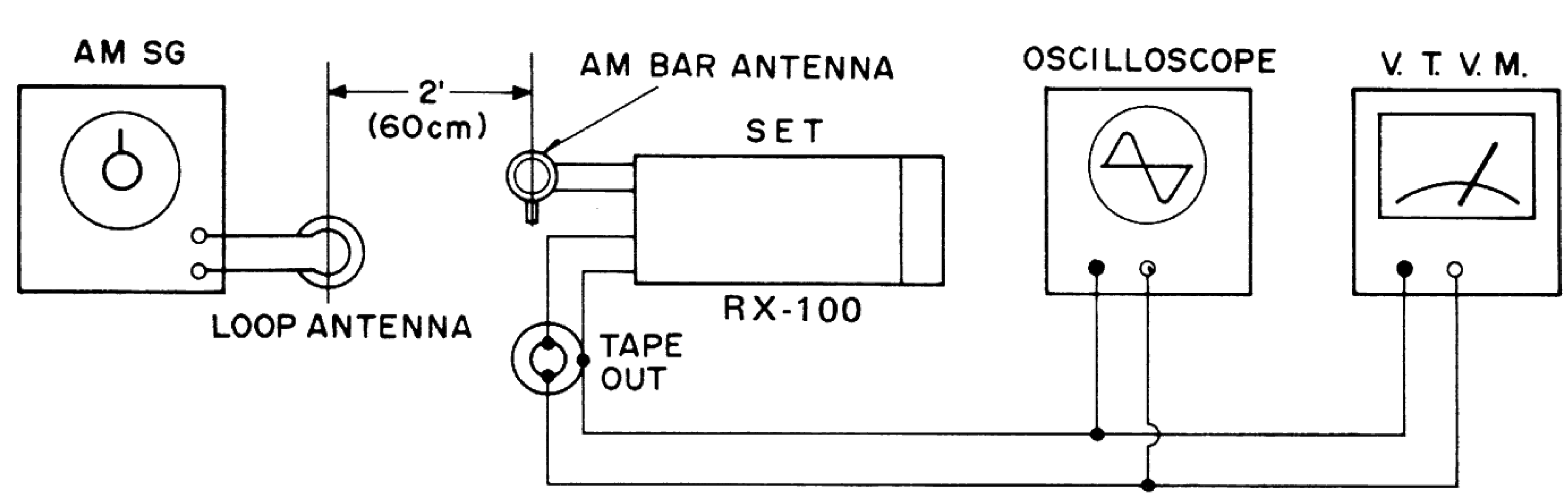


Figure 24

3). FM RF & ALIGNMENT

EQUIPMENT REQUIRED

1. FM Signal Generator
2. AC Voltmeter
3. Oscilloscope
4. Distortion Meter

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.) (220/240 V AC for European)
- Set SELECTOR Switch to FM.
- Refer to P.C.B. illustration and Figure 24 for test points/adjustments.

STEP	GENERATOR COUPLING	GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Signal Generator to FM Antenna Terminal thru FM Dummy Antenna (300 ohm)	98 MHz (400 Hz, 75 kHz dev.) Input: about 3–4 μV	Near 98 MHz	AC Voltmeter, Scope and Distortion meter to TAPE OUT Jack (L or R).	T101	Adjust for maximum reading on meter. Refer to Figure 27.
2	Same as STEP 1.	98 MHz (400 Hz, 75 kHz dev.) Input: no input (unit off)	Near 98 MHz	TUNING Meter or connect DC Voltmeter to Jumper 13, 16 on P.C.B.	T201 (Primary)	Adjust for Center point on Center Tuning Meter. Refer to Figure 25, 26 and 27.
3	Same as STEP 1.	98 MHz (400 Hz, 75 kHz dev.) Input: 1 mV	Same as STEP 1.	AC Voltmeter, Scope and Distortion Meter to TAPE OUT Jack (L or R).	T202 (Secondary)	Adjust for minimum Distortion (about 0.1%). Refer to Figure 25, 26 and 27.
4	Repeat STEPs 1, 2 and 3 until no further improvement is noticed.					
5	Same as STEP 1.	90 MHz (400 Hz, 75 kHz dev.) Input: about 3–4 μV	90 MHz	Same as STEP 1.	L101 (FM Antenna Coil) L103 (FM RF Coil–stretch or squeeze) L105 (FM OSC Coil)	Adjust for maximum reading on meter. Refer to Figure 23 and 27.
6	Same as STEP 1.	106 MHz (400 Hz, 75 kHz dev.) Input: about 3–4 μV	106 MHz	Same as STEP 1.	TC101 (FM Antenna Trimmer) TC102 (FM RF Trimmer) TC103 (FM OSC Trimmer)	Adjust for maximum reading on meter. Refer to Figure 23 and 27.
7	Repeat STEPs 5 and 6 until no further improvement is noticed.					
8	Same as STEP 1.	98 MHz (400 Hz, 75 kHz dev.) Input: 100 mV	98 MHz	Signal Meter on Set.	VR203	Adjust so the Meter Pointer on Receiver is about 90% of full-scale.

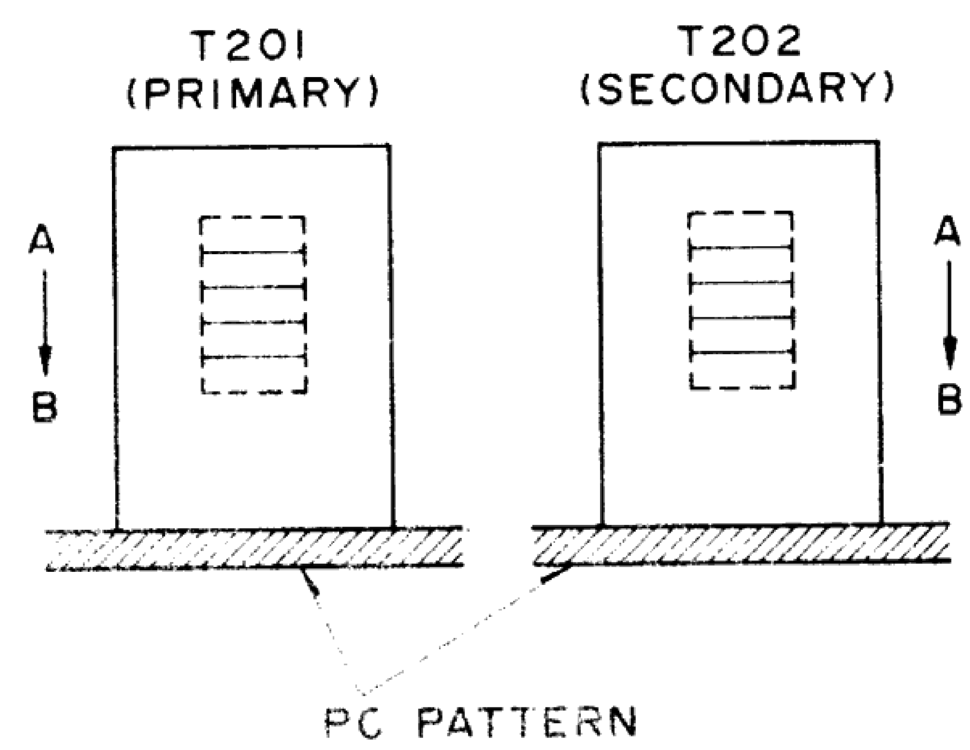


Figure 25

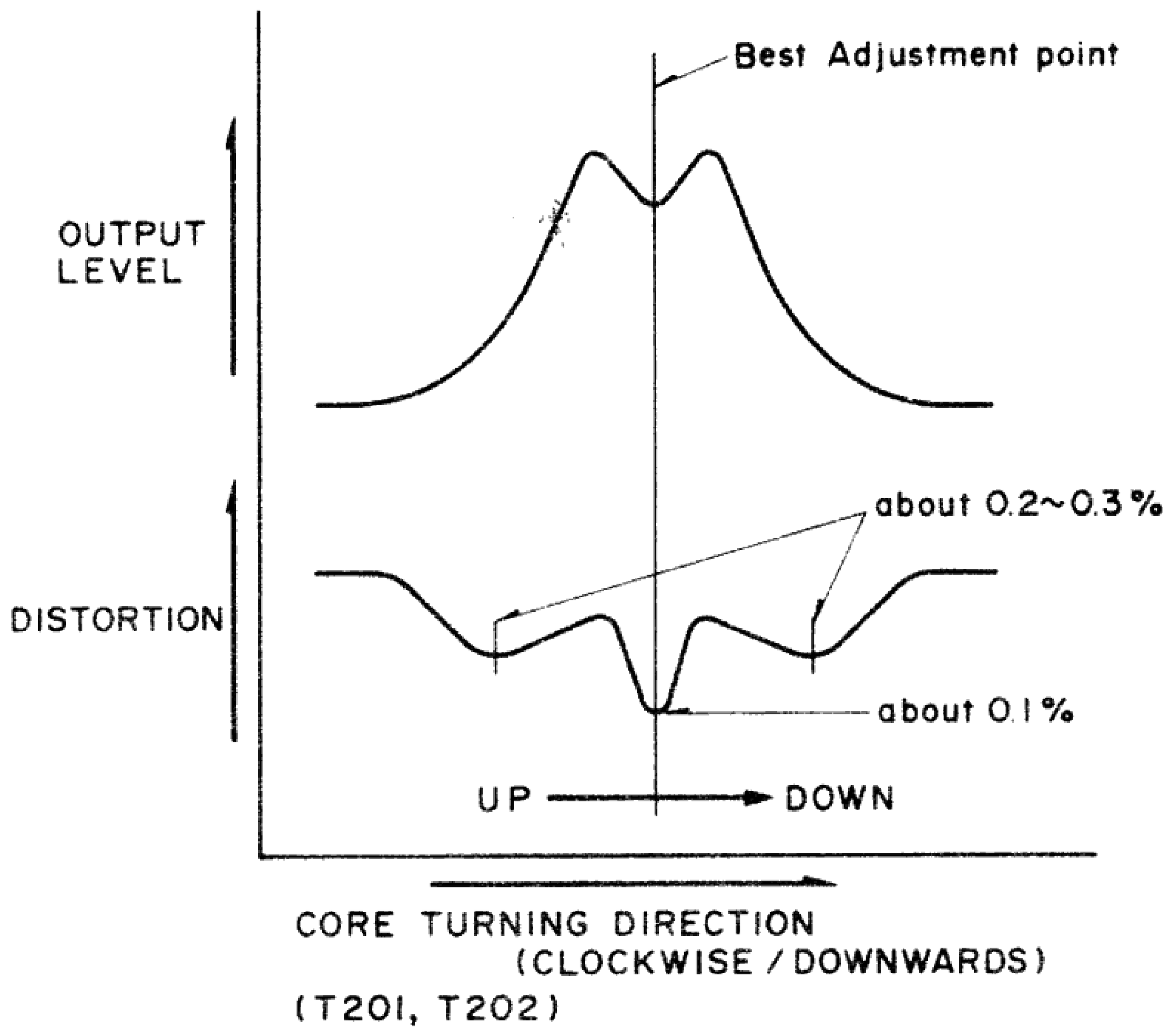


Figure 26

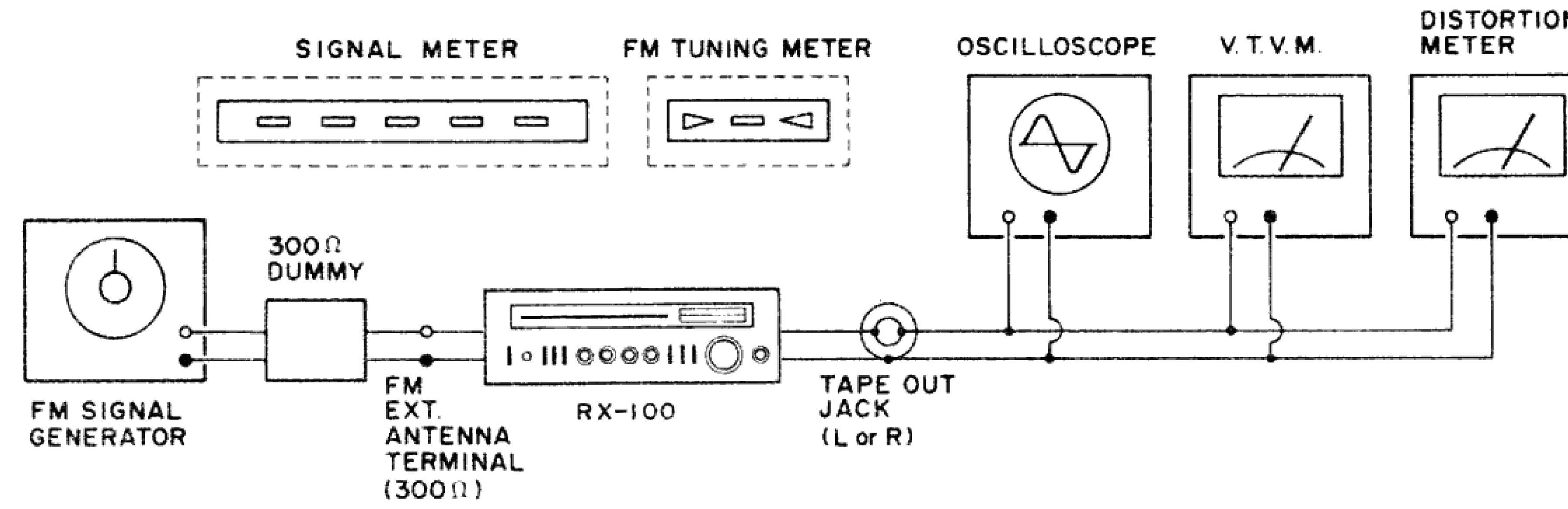


Figure 27

4). FM STEREO ALIGNMENT

EQUIPMENT REQUIRED

1. Stereo Modulation: Connect Stereo Modulator to EXT. Mod. terminal FM Signal Generator.
   Modulation Level of 19 KHz Pilot Signal ..... 9% (6.75 KHz dev.)
2. FM Signal Generator: Output Level ..... 1 mV
   Frequency .... Approximately 98 MHz
   Deviation .... 67.5 KHz, 90% modulation composite signal
3. Audio Generator
4. AC Voltmeter
5. Oscilloscope
6. Distortion Meter
7. 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 TP17 of IC202.	VR205	Adjust for 76 kHz +20/–50 Hz on Counter. Refer to Figure 28.
2	Same as above	Composite MPX Signal 1 kHz on Left channel ONLY	AC Voltmeter connector for TAPE OUT Jack of Right channel	VR204 (Separation)	Adjust for minimum reading on meter. Refer to Figure 29.
3	Same as above	Composite MPX Signal 1 kHz on Right channel ONLY	AC Voltmeter connector 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 –40 dB at same channel output. (i.e. 40 dB separation)				
5	Same as STEP 1.	Composite MPX Signal 1 kHz	AC Voltmeter connected to TAPE OUT Jack	–	With 5.5 μV antenna input signal, Stereo indicator lamp should come on.
	Same as STEP 1.	Composite MPX Signal 1 kHz	Distortion Meter connected to TAPE OUT Jack	–	With 1 mV antenna input signal, Stereo Distortion should be less than 0.5%.

FM STEREO ALIGNMENT SET-UP

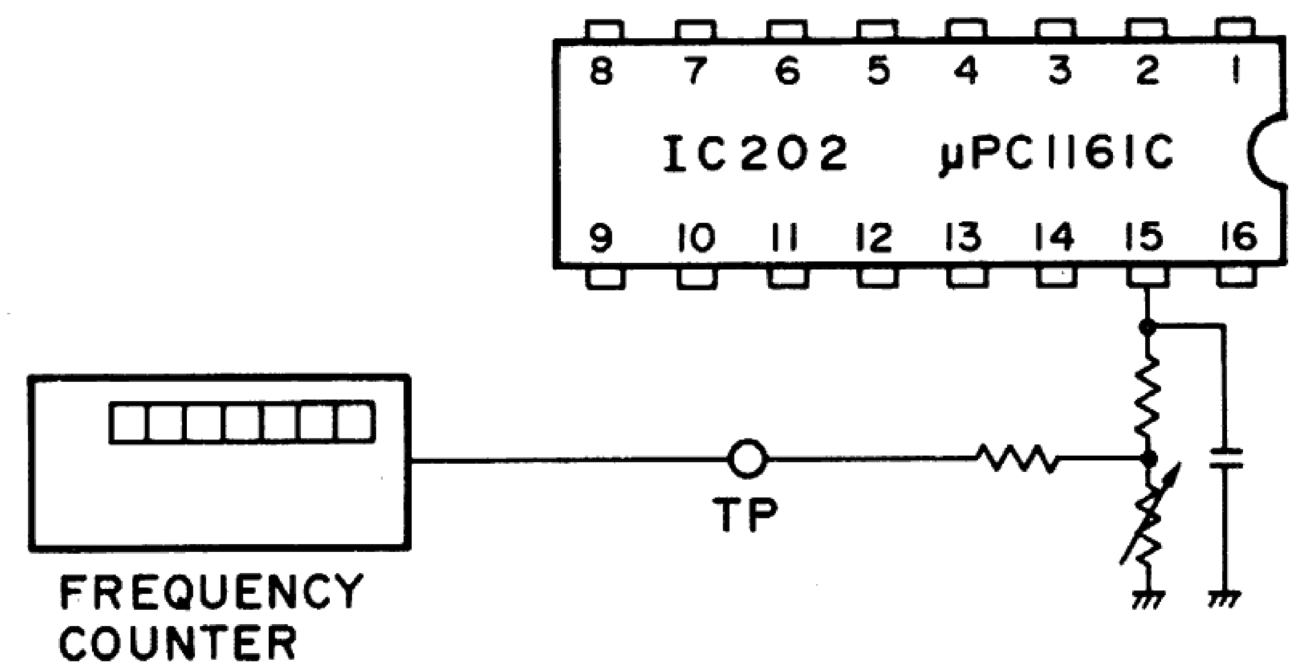


Figure 28

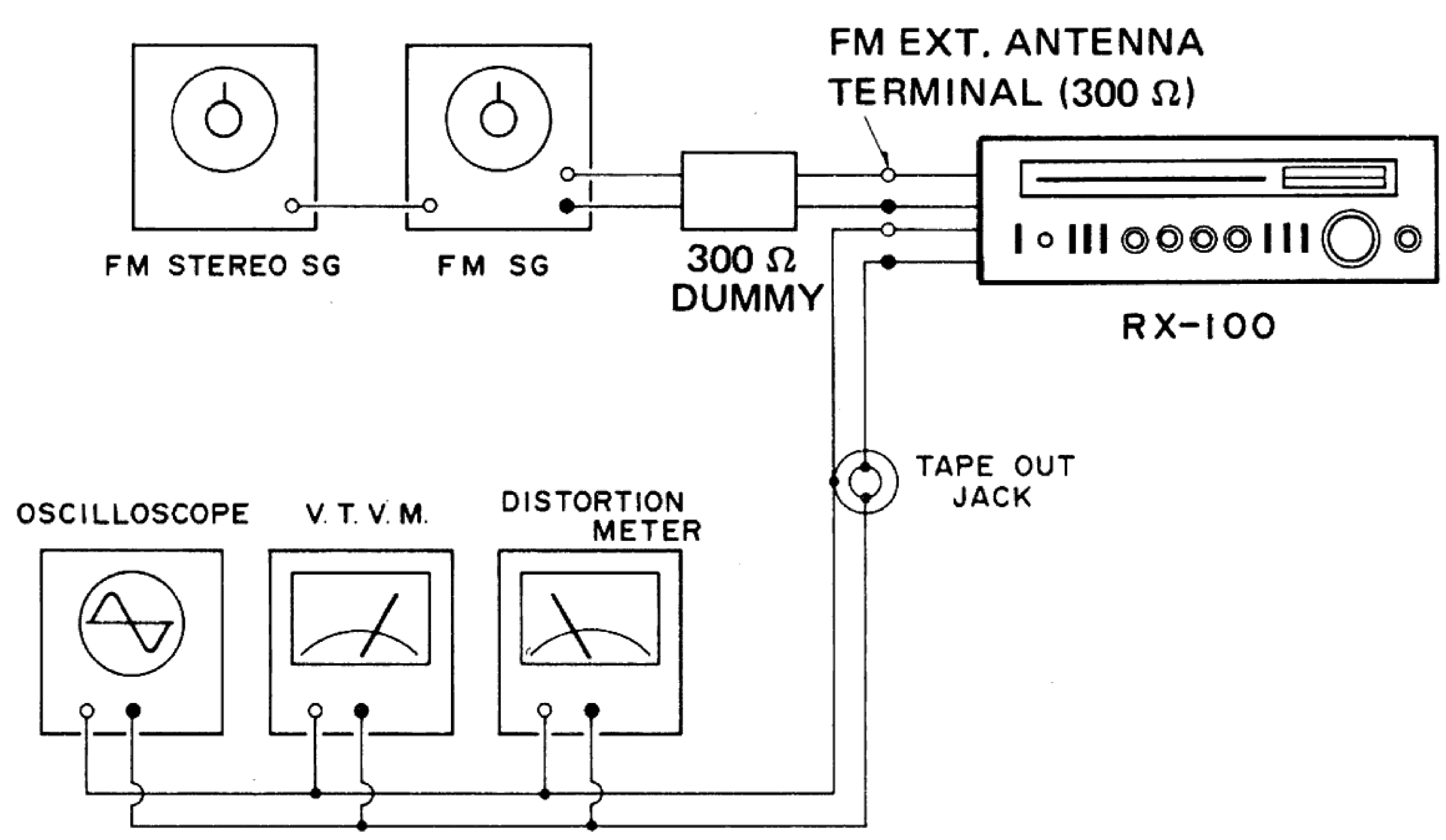


Figure 29

9. BRIEF DESCRIPTION OF THE PROTECTOR CIRCUITS

1) Speaker Protective Circuit

When the Power Switch is "ON", after a five-second delay, a signal is provided to the Speaker Output terminals.
Thus this circuit protects speakers from switching transients.
When the Power Switch is "ON", TR601, TR602, and TR605 will turn on through Time Constant circuit consisting of R612 and C609.
When the Power Switch is "OFF", C609 will be discharged by TR606 turned on, then TR601, 602 and TR605 will turn off. (See Figure 30.)

2) Main Amplifier Protective Circuit

If the speaker terminals are shorted, or the Load impedance of one channel (Left or Right) is less than 4 ohms, excessively high current flows from the emitter to the collector of TR513 (or 514) and a high voltage appears across R531 (or 532). This high voltage goes to the Base of TR603, 604 after being rectified by D601 (or D602).
When the voltage between the base and the emitter of TR603 increases to about 0.7 V, a signal will be shut off.
Thus this circuit will protect the Main Amp. and Speaker.
Turn the Receiver off to reset the protective circuit and wait approximately 30 seconds.
If the problem is corrected, turn the Receiver on again. (See Figure 30.)

3) Audio Muting Circuit

In order to eliminate the clicking noise, the Selector switch (Ss-4) which is a shorting type is used. When the Selector Switch is turned from AM (or FM, PHONO, AUX) to FM (or AM, PHONO, AUX), the contact of the switch will make a momentary short circuit to ground.

With this turning, TR607 will be turned off and then TR601, 602 will be turned off. In this case, the signal source from the Tone Amp. is shut off and eliminates clicking noises. (See Figure 30.)

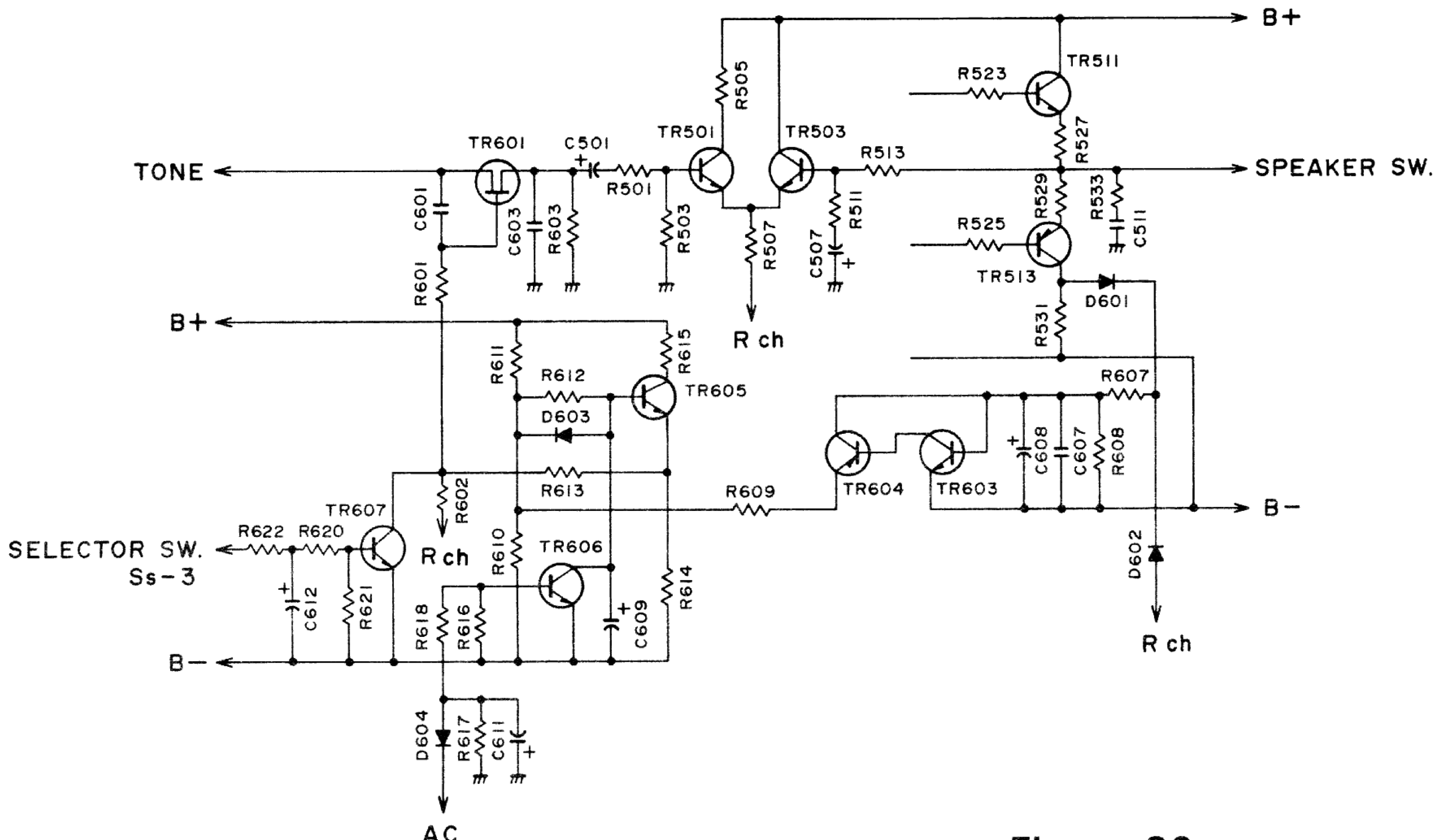


Figure 30

4) Abnormal Temperature Rise Protection

The RX-100 has two thermal Protectors.

If the temperature of the Main Amplifier Heat Sink rises to 110°C or the Power Transformer rises to 95°C, the thermal Protector switch causes an open circuit and 120 V AC will be cut off.

In this case, the voltage supplied for the Amplifier shuts down automatically and the output will drop to 0 V.

Thus the Main Amplifier and Power Transformer are protected.

If this occurs, turn the Receiver "OFF".

When the temperature of the Main Amplifier Heat Sink falls to within the operating limits of the Receiver, the thermal protector Switch will reset itself.

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

10. TROUBLESHOOTING CHART

SYMPTOM	CAUSE AND 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. (4) Blown Primary Fuse * Replace the Fuse. (5) Defective D701 or diodes, transistors on Power Supply board * Replace the defective part(s).
2) Blown Fuse	(1) Defective Rectifier D701 * Replace the Rectifier. (2) Short circuit in the rectifier circuit * Remove the short. (3) Short circuit in Power Transistor Circuitry TR507–514 * Repair circuit and/or replace the defective Transistor. (4) Defective Relay B or Transistors on Protector board * Replace the part(s).
3) "A" Speakers do not work.	(1) Speaker switch A defective * Replace the switch.
4) "B" Speakers do not work.	(1) Speaker switch B defective. * Replace the switch.
5) 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 VR402.	(1) Defective Transistor TR501–514 * Replace the defective Transistor(s). (2) Defective resistor or capacitor of TONE or MAIN AMP circuit * Replace the defective part(s).
6) No output when a test signal is applied to the input terminals except PHONO	(1) Defective MONO-Stereo or TAPE switch * Replace or repair the switch. (2) Defective Selector switch * Replace the switch.
7) No output when a test signal is applied to the PHONO input terminals.	(1) Defective transistor, resistor or capacitor of PRE AMP circuit * Replace the part(s). (2) Defective MONO-Stereo or TAPE switch * Replace or repair the switch. (3) Defective Selector switch * Replace the Selector switch. (4) Defective TR301–306 * Replace the defective Transistor(s).
8) No output when a test signal is applied to the desired input.	(1) Defective transistors or diodes on Power Supply circuit * Replace the defective part(s). (2) Defective transistor, resistor or capacitor on Tone Control circuit * Replace the defective part(s). (3) Defective transistor, capacitor or resistor on Main Amp circuit * Replace the defective part(s).

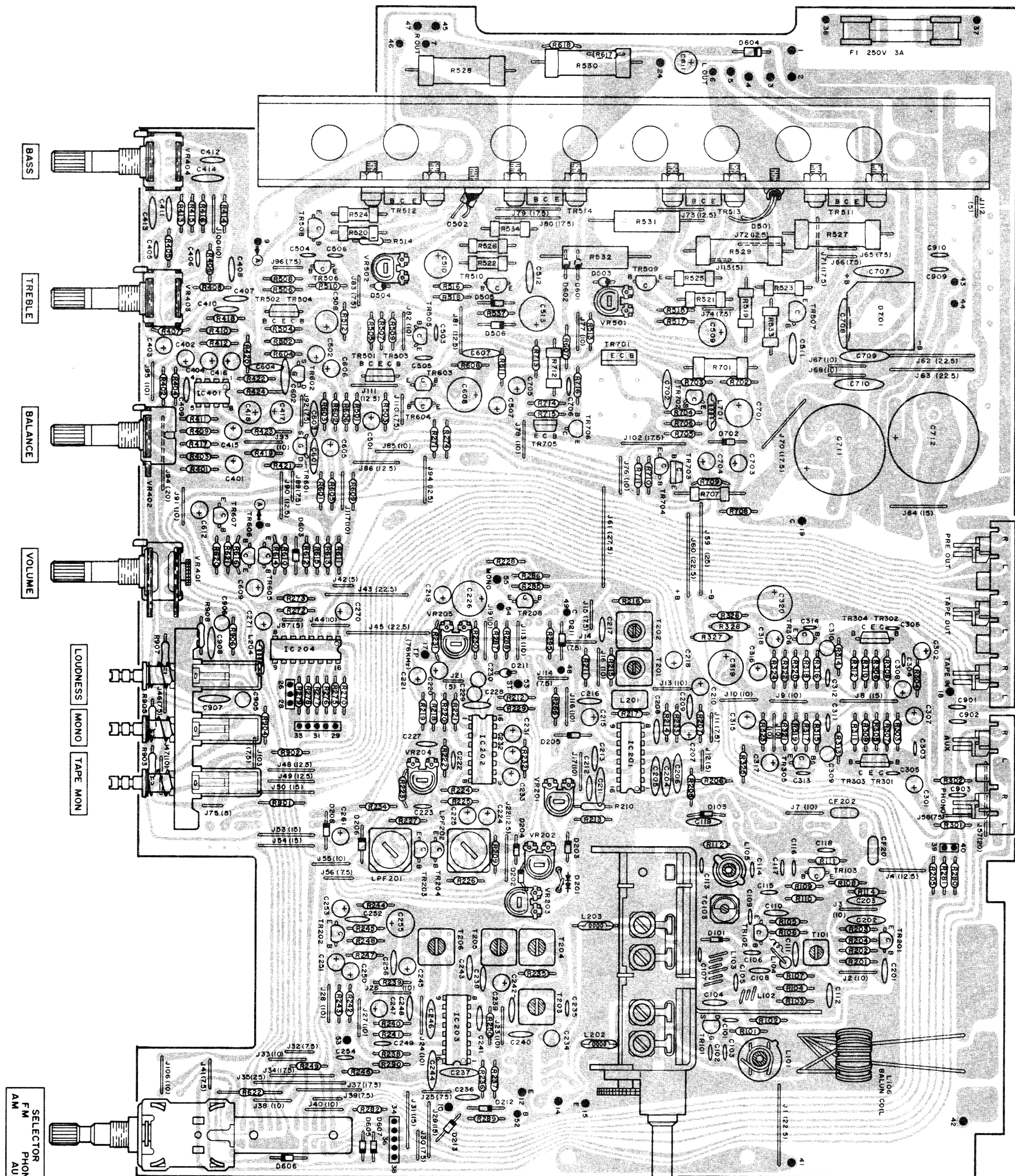
SYMPTOM	CAUSE AND REMEDY
9) DC not balanced within ±50 mV at output of L/R channel.	(1) Defective TR501, 503, 505 (L) or TR502, 504, 506 (R) * Replace the defective transistor(s). (2) Improper value for R501, 509 (L) or R502, 510 (R) * Select suitable value resistor.
10) Speaker works normally but Headphone does not work.	(1) Defective R535 (Left) or R536 (Right) * Change it. (2) Headphone plug does not mate with jack. * Replace the plug.
11) 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.
12) "PHONO" input not operative.	(1) Poor contact in "PHONO" input jack * Repair or replace it. (2) Faulty Selector switch * Repair or replace it.
13) "TAPE IN" inoperative	(1) Poor contact in "TAPE IN" input jack * Repair or replace the jack.
14) "TAPE OUT" inoperative	(1) Poor contact in "TAPE IN" input jack * Repair or replace the jack.
15) No AM or FM (Tuner +B voltage is not 12–14 V.)	(1) Broken tertiary winding in the Power Transformer * Replace the Transformer. (2) Defective Diode D702 * Change the defective Diode. (3) Faulty capacitor C701, 703 * Change the defective capacitor(s). (4) Defective resistor R701 * Replace the resistor. (5) Short-circuit in Tuner +B circuit * Repair the short. (6) Poor contact in Selector switch * Repair or replace it. (7) Defective Transistor TR605, 606 * Replace the Transistor.
16) No FM	(1) Poor contact in Selector switch * Repair or replace it. (2) IC, Transistor, Diode, resistor, capacitor, Inductor or IFT of FM IF board defective * Replace the defective part(s). (3) FM Front End defective * Replace the Front End (This board comes assembled). (4) Faulty FM Antenna lead-in/circuitry * Replace or repair the Antenna lead-in/circuitry.

SYMPTOM	CAUSE AND REMEDY
17) No AM	(1) Poor contact in Selector switch * Repair or replace switch. (2) IC, Transistor, Diode, IFT, resistor or capacitor of AM IF defective * Replace the defective part(s). (3) Bar-Antenna coil defective * Repair or replace it.
18) No FM MPX Separation	(1) Improper adjustment * Readjust VR204 and VR205. (2) IC202 of MPX board defective * Replace the IC. (3) VR204, 205 (Trimmer resistor) defective * Replace the Trimmer resistor.
19) No STEREO light or FM Stereo does not work.	(1) Broken STEREO Indicator lamp * Replace the lamp. (2) Defective IC202 of MPX board * Change the defective IC. (3) VR204, 205 defective * Replace the defective Trimmer resistor(s).
20) "LOUDNESS" has no effect.	(1) Defective "LOUDNESS" switch * Replace the switch. (2) Defective C905, 907, R905, 907 or C906, 908, R906, 908 * Replace the defective part(s).
21) "Stereo-MONO" not effective	(1) Defective Stereo-MONO "MODE" switch * Repair or replace the switch.
22) "BASS" has no effect. (TURNOVER Switch to 300 Hz)	(1) VR403 (100 K ohm control) defective * Replace it. (2) Defective R413, 415, C411, 413 or R414, 416, C412, 414 * Replace the defective part(s).
23) "TREBLE" has no effect.	(1) VR404 (100 K ohm control) defective * Replace it. (2) Defective R405, 407, C405, 407 or R406, 408, C406, 408 * Replace the defective part(s).
24) "SIGNAL" LED Meter not functioning	(1) Defective SIGNAL TUNING LED circuit * Replace it. (2) In case of FM reception, D201, 202 or VR202, 203 * Replace the defective part(s). (3) In case of AM reception, R238, R290 defective * Replace the defective part(s).
25) "TUNING" LED Meter not functioning	(1) Defective SIGNAL TUNING LED Meter * Replace it. (2) Improper adjustment * Readjust T201, 202.

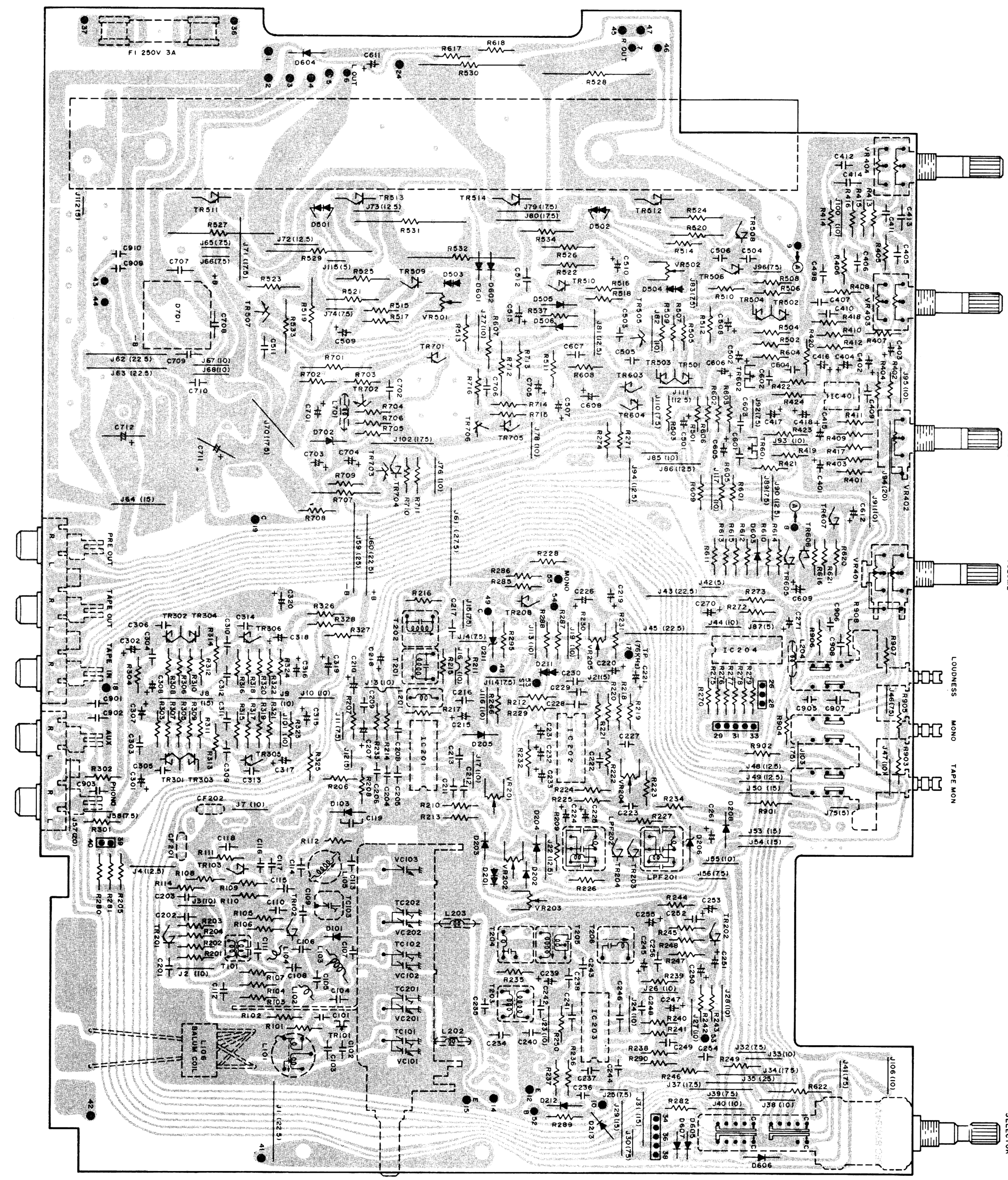
SYMPTOM	CAUSE AND REMEDY
26). Protector circuit does not work.	(1) Defective TR601, TR602, TR603, TR604, TR605, TR606, TR607 (2) Defective resistor(s), capacitor(s), Diode in Protector circuit * Replace the defective part(s).

11. TUNER AUDIO P.C.B.

TOP VIEW

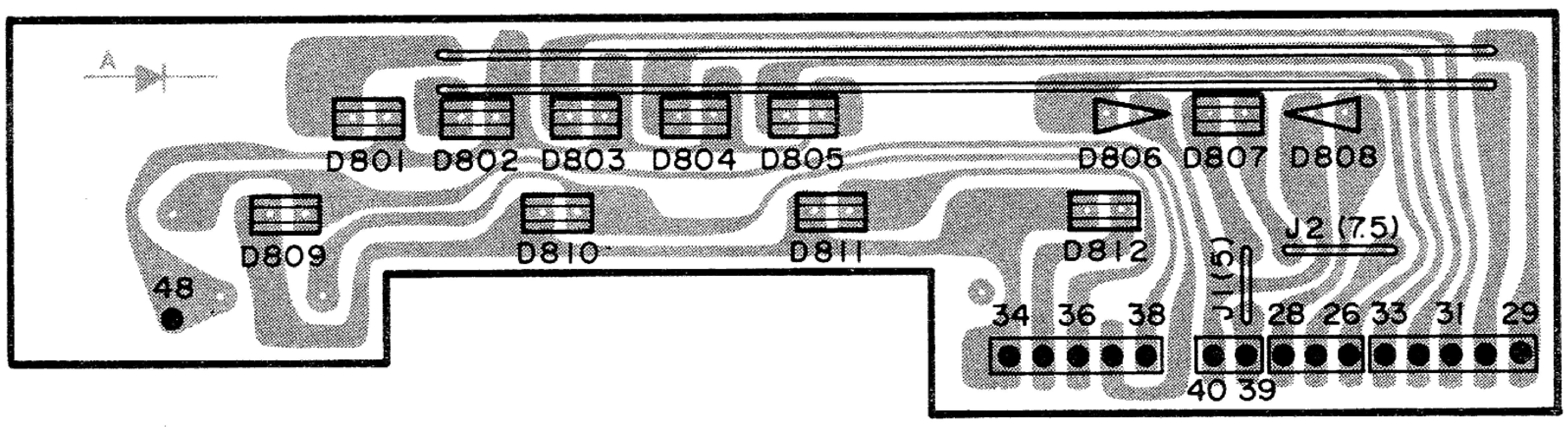


BOTTOM VIEW

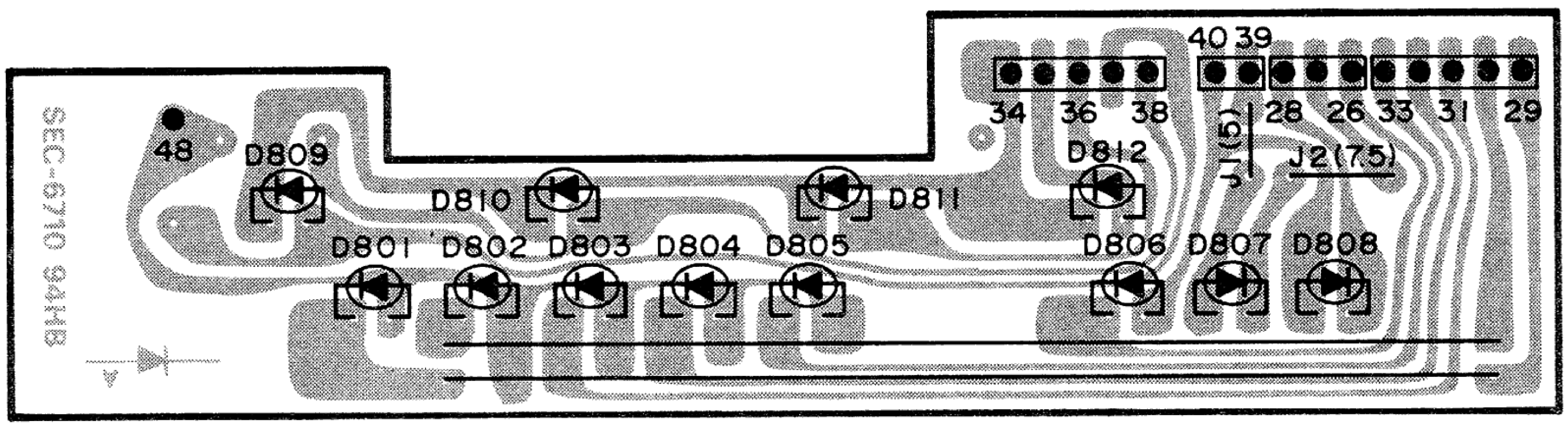


12. L.E.D. P.C.B.

TOP VIEW

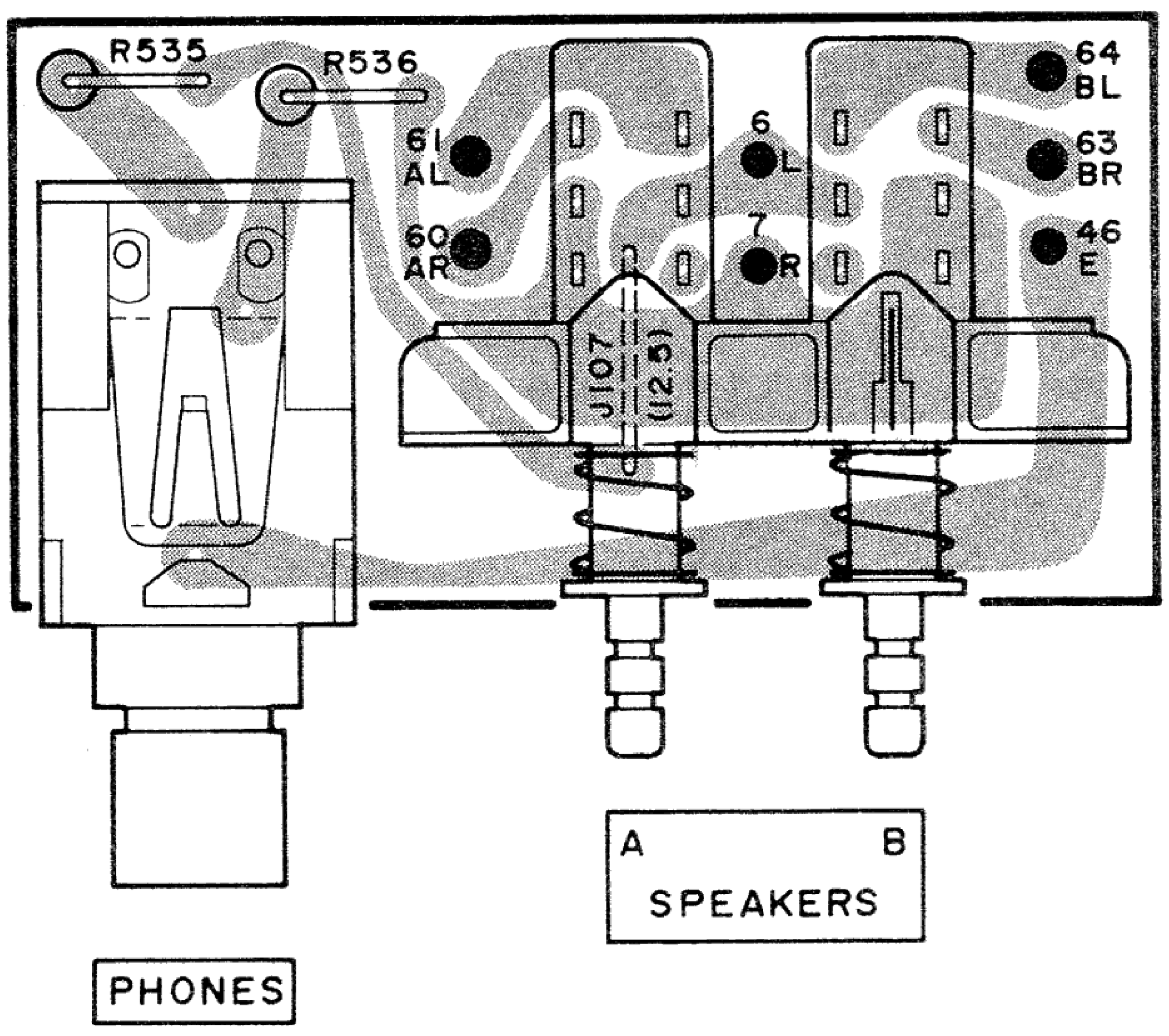


BOTTOM VIEW

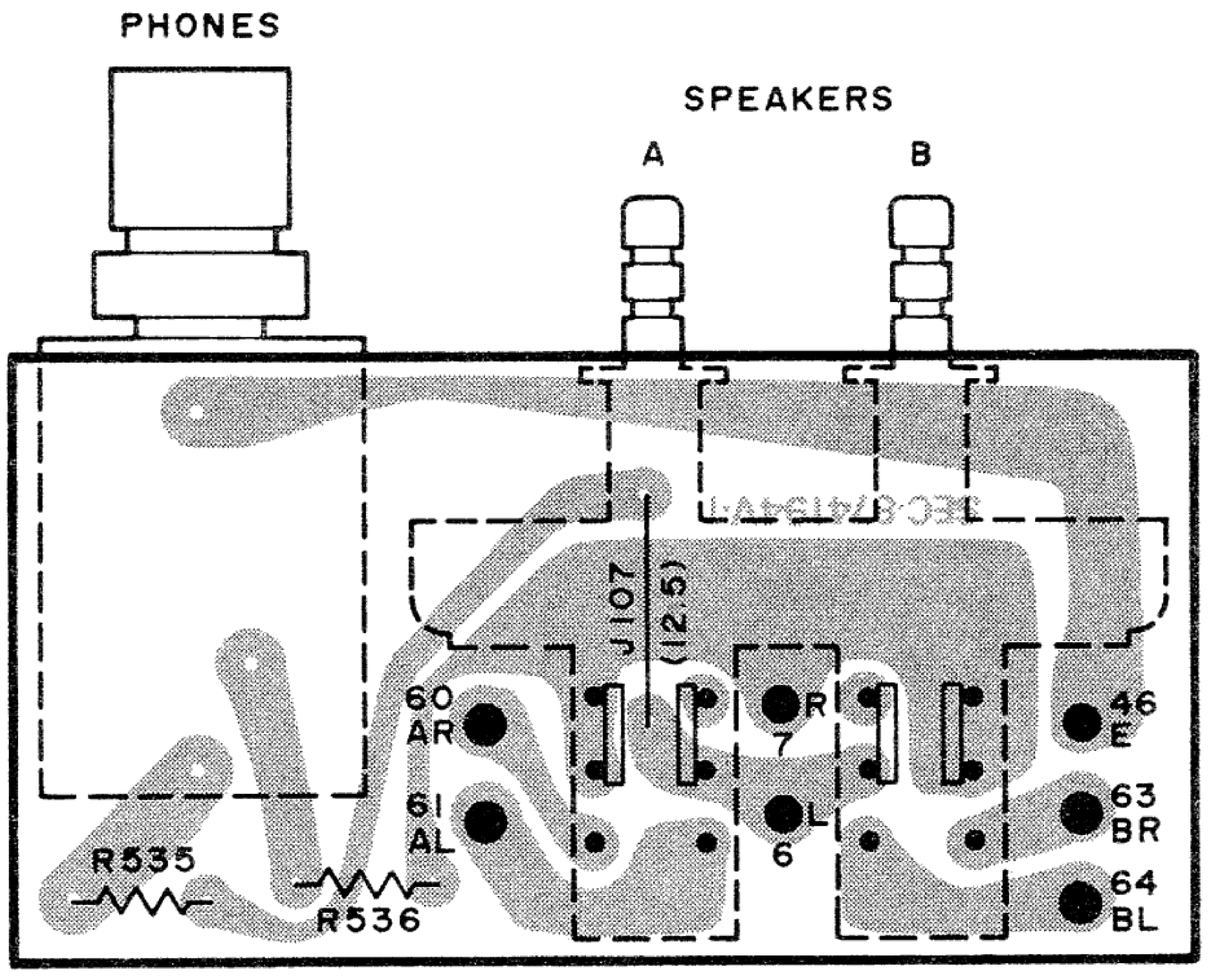


13. SPEAKER SWITCH P.C.B.

TOP VIEW



BOTTOM VIEW



14. ELECTRICAL PARTS LIST

CAPACITORS

REF. NO.	Value (F)	Voltage (V)	Tolerance (%)	Material	PART NO.
C101	1 p	50	±0.25 pF	Ceramic	125E1C00016H
C102	18 p	50	± 5	Ceramic	125E1C00186A
C103	30 p	50	± 5	Ceramic	125E1C00306A
C104	0.01 μ	50	+80/−20	Ceramic	125E1C00012C
C105	30 p	50	± 5	Ceramic	125E1C00306A
C106	10 p	50	± 5	Ceramic	125E1C00106A
C107	18 p	50	± 5	Ceramic	125E1C00186A
C108	150 p	50	± 5	Ceramic	125E1C01506A
C109	1 p	50	±0.25 pF	Ceramic	125E1C00016H
C110	0.01 μ	50	+80/−20	Ceramic	125E1C00012C
C111	0.01 μ	50	+80/−20	Ceramic	125E1C00012C
C112	0.01 μ	50	+80/−20	Ceramic	125E1C00012C
C113	22 p	50	± 5	Ceramic	125E1C00226A
C114	3 p	50	±0.25 pF	Ceramic	125E1C00026H
C115	10 p	50	±0.5 pF	Ceramic	125E1C00166D
C116	15 p	50	± 5	Ceramic	125E1C00156A
C117	15 p	50	± 5	Ceramic	125E1C00156A
C118	0.0047 μ	50	+80/−20	Ceramic	125E1C00474C
C119	0.068 μ	50	± 5	Mylar	125E1M00683A
C201	0.01 μ	50	+80/−20	Ceramic	125E1C00012C
C202	0.047 μ	50	+80/−20	Ceramic	125E1C00473C
C203	0.047 μ	50	+80/−20	Ceramic	125E1C00473C
C204	0.047 μ	50	+80/−20	Ceramic	125E1C00473C
C205	0.047 μ	50	+80/−20	Ceramic	125E1C00473C
C206	0.047 μ	50	+80/−20	Ceramic	125E1C00473C
C207	0.47 μ	50	+75/−10	Electrolytic	125E2E00472I
C208	100 p	50	± 5	Ceramic	125E1C01006A
C209	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C210	0.47 μ	50	+75/−10	Electrolytic	125E2C00472I
C211	0.047 μ	50	+80/−20	Ceramic	125E1C00473C
C212	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C213	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C214	Not used				
C215	10 μ	16	+50/−10	Electrolytic	125B2E00100J
C216	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C217	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C218	10 μ	16	+50/−10	Electrolytic	125B2E00100J
C219	10 μ	16	+50/−10	Electrolytic	125B2E00100J
C220	10 μ	16	+50/−10	Electrolytic	125B2E00100J
C221	10 μ	16	+50/−10	Electrolytic	125B2E00100J
C222	0.0022 μ (U.S.A., Canadian, PX)	50	± 5	Mylar	125E1M00224A
C222	0.0015 μ (European)	50	± 5	Mylar	125E1M00154A
C223	0.0022 μ (U.S.A., Canadian, PX)	50	± 5	Mylar	125E1M00224A
C223	0.0015 μ (European)	50	± 5	Mylar	125E1M00154A
C224	2.2 μ	50	+75/−10	Electrolytic	125E2E00221I
C225	2.2 μ	50	+75/−10	Electrolytic	125E2E0022I

REF. NO.	Value (F)	Voltage (V)	Tolerance (%)	Material	PART NO.
C226	470 μ	16	+50/−10	Electrolytic	125B2E04700J
C227	100 p	50	±5	Ceramic	125E1C01806A
C228	0.047 μ	50	±10	Mylar	125E1M00473B
C229	470 p	50	±5	Polystyrene	125E1P04706A
C230	470 p	50	±5	Polystyrene	125E1P04706A
C231	1.5 μ	50	+75/−10	Electrolytic	125E2E00151I
C231	1.5 μ	25 or 35	±20	Tantalum	125C2T00151F
C231	1.5 μ	25 or 35	±20	Aluminum	125C2A00151F
C232	3.3 μ	50	+75/−10	Electrolytic	125C2E00331I
C232	3.3 μ	25 or 35	±20	Tantalum	125C2T00331F
C232	3.3 μ	25 or 35	±20	Aluminum	125C2A00331F
C233	0.22 μ	50	+75/−10	Electrolytic	125E2E00222I
C233	0.22 μ	25 or 35	±20	Tantalum	125C2T00222F
C233	0.22 μ	25 or 35	±20	Aluminum	125C2A00222F
C234	340 p	50	±5	Polystyrene	125E1P03406A
C235	15 p	50	±5	Ceramic	125E1C00156A
C236	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C237	0.001 μ	50	±10	Ceramic	125E1C00013B
C238	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C239	10 μ	16	+50/−10	Electrolytic	125B2E00100J
C240	27 p	50	±5	Ceramic	125E1C00276A
C241	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C242	0.022 μ	50	±10	Mylar	125E1M00223B
C243	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C244	0.047 μ	50	+80/−20	Ceramic	125E1C00473C
C245	4.7 μ	25	+50/−10	Electrolytic	125C2E00471J
C246	0.001 μ	50	±10	Ceramic	125E1C00013B
C247	3.3 μ	50	+75/−10	Electrolytic	125E2E00331I
C248	0.01 μ	50	+80/−20	Ceramic	125E1C00012C
C249	0.01 μ	50	±10	Mylar	125E1M00012B
C250	0.22 μ	50	+75/−10	Electrolytic	125E2E00222I
C251	0.47 μ	50	+75/−10	Electrolytic	125E2E00472I
C252	220 p	50	±5	Ceramic	125E1C02206A
C253	0.47 μ	50	+75/−10	Electrolytic	125E2E00472I
C254	0.01 μ	50	±10	Mylar	125E1M00012B
C255	100 μ	16	+50/−10	Electrolytic	125B2E01000J
C256	0.022 μ	50	+80/−20	Ceramic	125E1C00223C
C261	2.2 μ	50	+75/−10	Electrolytic	125E2E00221I
C270	1 μ	50	+75/−10	Electrolytic	125E2E00010I
C271	10 μ	16	+50/−10	Electrolytic	125B2E00100J
C301	2.2 μ	35	+75/−10	Electrolytic	125D2E00221I
C302	2.2 μ	35	+75/−10	Electrolytic	125D2E00221I
C303	47 μ	50	±5	Ceramic	125E1C00476A
C304	47 μ	50	±5	Ceramic	125E1C00476A
C305	47 μ	50	±5	Ceramic	125E1C00476A
C306	47 μ	50	±5	Ceramic	125E1C00476A
C307	22 μ	10 or 16	+50/−10	Electrolytic	125A2E00220J
C308	22 μ	10 or 16	+50/−10	Electrolytic	125A2E00220J
C309	2500 p	50	±10	Polystyrene	125E1P25006B
C310	2500 p	50	±10	Polystyrene	125E1P25006B

REF. NO.	Value (F)	Voltage (V)	Tolerance (%)	Material	PART NO.
C311	0.0082 μ	50	±10	Mylar	125E1M00824B
C312	0.0082 μ	50	±10	Mylar	125E1M00824B
C313	6 p	50	±0.5 pF	Ceramic	125E1C00066D
C314	6 p	50	±0.5 pF	Ceramic	125E1C00066D
C315	47 μ	10 or 16	+50/−10	Electrolytic	125A2E00470J
C316	47 μ	10 or 16	+50/−10	Electrolytic	125A2E00470J
C317	0.47 μ	50	+75/−10	Electrolytic	125E2E00472I
C318	0.47 μ	50	+75/−10	Electrolytic	125E2E00472I
C319	220 μ	25	+50/−10	Electrolytic	125C2E02200J
C320	220 μ	25	+50/−10	Electrolytic	125C2E02200J
C401	1 μ	50	+75/−10	Electrolytic	125E2E00010I
C402	1 μ	50	+75/−10	Electrolytic	125E2E00010I
C403	0.47 μ	50	+75/−10	Electrolytic	125E2E00470I
C404	0.47 μ	50	+75/−10	Electrolytic	125E2E00470I
C405	0.0047 μ	50	±10	Mylar	125E1M00474B
C406	0.0047 μ	50	±10	Mylar	125E1M00474B
C407	0.022 μ	50	±10	Mylar	125E1M00223B
C408	0.022 μ	50	±10	Mylar	125E1M00223B
C409	150 p	50	±5	Ceramic	125E1C01506A
C410	150 p	50	±5	Ceramic	125E1C01506A
C411	0.022 μ	50	±10	Mylar	125E1M00223B
C412	0.022 μ	50	±10	Mylar	125E1M00223B
C413	0.12 μ	50	±10	Mylar	125E1M00122B
C414	0.12 μ	50	±10	Mylar	125E1M00122B
C415	10 μ	25	+50/−10	Electrolytic	125C2E00100J
C416	10 μ	25	+50/−10	Electrolytic	125C2E00100J
C417	47 μ	25	+50/−10	Electrolytic	125C2E00470J
C418	47 μ	25	+50/−10	Electrolytic	125C2E00470J
C501	3.3 μ	35	+75/−10	Electrolytic	125D2E00331I
C502	3.3 μ	35	+75/−10	Electrolytic	125D2E00331I
C503	33 p	50	±5	Ceramic	125E1C00226A
C504	33 p	50	±5	Ceramic	125E1C00226A
C505	5 p	50	±0.5 pF	Ceramic	125E1C00056D
C506	5 p	50	±0.5 pF	Ceramic	125E1C00056D
C507	47 μ	25	+50/−10	Electrolytic	125C2E00470J
C508	47 μ	25	+50/−10	Electrolytic	125C2E00470J
C509	100 μ	25	+50/−10	Electrolytic	125C2E01000J
C510	100 μ	25	+50/−10	Electrolytic	125C2E01000J
C511	0.056 μ	50	±10	Mylar	125E1M00563B
C512	0.056 μ	50	±10	Mylar	125E1M00563B
C513	220 μ	35	+50/−10	Electrolytic	125D2E02200J
C601	100 p	50	±5	Ceramic	125E1C01006A
C602	100 p	50	±5	Ceramic	125E1C01006A
C603	0.001 μ	50	±10	Ceramic	125E1C00013B
C604	0.001 μ	50	±10	Ceramic	125E1C00013B
C605	Not used				
C606	Not used				
C607	0.047 μ	50	+80/−20	Ceramic	125E1C00473C
C608	220 μ	25	+50/−10	Electrolytic	125C2E02200J
C609	10 μ	50	+50/−10	Electrolytic	125E2E00100J

REF. NO.	Value (F)	Voltage (V)	Tolerance (%)	Material	PART NO.
C610	Not used				
C611	22 μ	35	+50/−10	Electrolytic	125D2E00220J
C612	2.2 μ	50	+75/−10	Electrolytic	125E2E00221 I
C701	100 μ	25	+50/−10	Electrolytic	125C2E01000J
C702	0.001 μ	50	±10	Ceramic	125E1C00013B
C703	10 μ	25 or 16	+50/−10	Electrolytic	125B2E00100J
C704	10 μ	25 or 16	+50/−10	Electrolytic	125B2E00100J
C705	10 μ	25 or 16	+50/−10	Electrolytic	125B2E00100J
C706	22 p	50	±5	Ceramic	125E1C00220B
C707	0.047 μ	100	+80/−20	Ceramic	125F1C00473C
C708	0.047 μ	100	+80/−20	Ceramic	125F1C00473C
C709	0.047 μ	100	+80/−20	Ceramic	125F1C00473C
C710	0.047 μ	100	+80/−20	Ceramic	125F1C00473C
C711	5800 μ	35	+50/−10	Electrolytic	125D2E58000J
C712	5800 μ	35	+50/−10	Electrolytic	125D2E58000J
C901	0.0047 μ	50	±10	Ceramic	125E1C00474B
C902	0.0047 μ	50	±10	Ceramic	125E1C00474B
C903	0.0047 μ	50	±10	Ceramic	125E1C00474B
C904	Not used				
C905	200 p	50	±5	Polystyrene	125E1P02006A
C906	200 p	50	±5	Polystyrene	125E1P02006A
C907	0.056 μ	50	±10	Mylar	125E1M00563B
C908	0.056 μ	50	±10	Mylar	125E1M00563B
C909	0.0047 μ	50	±5	Mylar	125E1M00474A
C910	0.0047 μ	50	±5	Mylar	125E1M00474A
C1001	0.01 μ (U.S.A., PX)	125		Ceramic for Line Pass	125F1C00012G
C1001	0.01 μ (Canadian)	125		Ceramic for Line Pass	TCEP-220044
C601	0.01 μ (European)	250		Ceramic for Line Pass	TCEP-220022
C602	0.01 μ (European)	250		Ceramic for Line Pass	TCEP-220022

CERAMIC FILTER

REF. NO.	DESCRIPTION	PART NO.
CF201	FM Ceramic Filter SFE10.7MA-8	TCEP-140030
CF202	FM Ceramic Filter SFE10.7MA-8	TCEP-140030

DIODES

REF. NO.	DESCRIPTION	PART NO.	MANUFACTURER
D101	Si-Diode ITT-73N	153-1057	ITT
D102	Not used		
D103	Vari-Cap Diode ITT-410	153-1137	ITT

REF. NO.	DESCRIPTION	PART NO.	MANUFACTURER
D201	Varistor VD1221	153-1138	
D202	Si-Diode ITT73N	153-1057	ITT
D203	Si-Diode ITT73N	153-1057	ITT
D204	Si-Diode ITT73N	153-1057	ITT
D205	Si-Diode ITT73N	153-1057	ITT
D206	Zener Diode RD5.6E(B_2) or WZ-056	153-1064	NEC or JRC
D207	Not used		
D208	Si-Diode ITT73N	153-1057	ITT
D209	Not used		
D210	Not used		
D211	Varistor VD1221	153-1138	NEC
D212	Si-Diode ITT73N	153-1057	ITT
D213	Si-Diode ITT73N	153-1057	ITT
D214	Zener Diode RD8.2E(B_2) or WZ082	153-1145	NEC or JRC
D501	Varistor MV-11Y	153-1139	OHISUMI
D502	Varistor MV-11Y	153-1139	OHISUMI
D503	Varistor VD1221	153-1138	NEC
D504	Varistor VD1221	153-1138	NEC
D505	Si-Diode ITT73N	153-1057	ITT
D506	Zener Diode WZ-130 or RD-13E(B_2, B_3)	153-1144	JRC or NEC
D601	Si-Diode KB162C5	153-1143	ITT
D602	Si-Diode KB162C5	153-1143	ITT
D603	Si-Diode ITT73N	153-1057	ITT
D604	Si-Diode 10D-1	153-1053	I. R.
D605	Si-Diode ITT73N	153-1057	ITT
D606	Si-Diode ITT73N	153-1057	ITT
D607	Si-Diode ITT73N	153-1057	ITT
D701	Bridge Diode KBPC802	153-1146	GI
D702	Zener Diode RD5.6E(B_2) or WZ056	153-1064	NEC or JRC

LED'S

REF. NO.	DESCRIPTION	PART NO.	MANUFACTURER
D801	LED SLP-151B	153-1156	SANYO
D802	LED SLP-151B	153-1156	SANYO
D803	LED SLP-151B	153-1156	SANYO
D804	LED SLP-151B	153-1156	SANYO
D805	LED SLP-151B	153-1156	SANYO
D806	LED PR5532T	153-1157	STANLEY
D807	LED SLP-261B	153-1155	SANYO
D808	LED PR5532T	153-1157	STANLEY
D809	LED SLP-251B	153-1155	SANYO
D810	LED SLP-251B	153-1155	SANYO
D811	LED SLP-251B	153-1155	SANYO
D812	LED SLP-251B	153-1155	SANYO
D1001	LED SLP-532D	153-1158	SANYO

FUSES

REF. NO.	DESCRIPTION	PART NO.
F1	Fuse 250 V - 3 A (U.S.A., Canadian, PX)	TCEP-250038
F1	Fuse 250 V - 1.6 A (European)	TCEP-250091

IC'S

REF. NO.	DESCRIPTION	PART NO.	MANUFACTURER
IC201	IC LA-1231N	154-1478	SANYO
IC202	IC μPC1161C-3	154-1479	NEC
IC203	IC LA-1240	154-1480	SANYO
IC204	IC IR2434	154-1481	SHARP
IC401	IC TL4558PB or NJM4558DX	154-1455	TI or JRC

LOW-PASS FILTER

REF. NO.	DESCRIPTION	PART NO.
LPF201	Low Pass Filter 19 kHz, 38 kHz	TCEP-510041
LPF202	Low Pass Filter 19 kHz, 38 kHz	TCEP-510041

INDUCTORS

REF. NO.	DESCRIPTION	PART NO.
L101	FM Ant. Coil	TCEP-110118 or TCEP-110142
L102	IF Trap Coil	TCEP-360003
L103	FM RF Coil	TCEP-340033
L104	IF Trap Coil	TCEP-360003
L105	FM OSC Coil	TCEP-120086 or TCEP-120114
L106	Balun Coil	TCEP-110102
L201	Micro Inductor 18 μH ±5%	TCEP-360029 or TCEP-360043
L202	Micro Inductor 2.2 μH ±10%	TCEP-360034
L203	Micro Inductor 2.2 μH ±10%	TCEP-360034
L204	Micro Inductor 2.2 μH ±10%	TCEP-360034
L701	Micro Inductor 18 μH ±10%	TCEP-360071
L1001	AM Ant. Coil	TCEP-110143

RESISTORS

REF. NO.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	PART NO.
R101	100 K	¼	±5	Carbon	123-1001-104
R102	330	¼	±5	Carbon	123-1001-331
R103	5.6 K	¼	±5	Carbon	123-1001-562

REF. NO.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	PART NO.
R104	33 K	¼	± 5	Carbon	123-1001-333
R105	1.5 K	¼	± 5	Carbon	123-1001-152
R106	330	¼	± 5	Carbon	123-1001-331
R107	330	¼	± 5	Carbon	123-1001-331
R108	330	¼	± 5	Carbon	123-1001-331
R109	22 K	¼	± 5	Carbon	123-1001-223
R110	10 K	¼	± 5	Carbon	123-1001-103
R111	4.7 K	¼	± 5	Carbon	123-1001-332
R112	100 K	¼	± 5	Carbon	123-1001-104
R113	150 K	¼	± 5	Carbon	123-1001-224
R114	100	¼	± 5	Carbon	123-1001-101
R201	470	¼	± 5	Carbon	123-1001-471
R202	3.3 K	¼	± 5	Carbon	123-1001-332
R203	330	¼	± 5	Carbon	123-1001-331
R204	330	¼	± 5	Carbon	123-1001-331
R205	150	¼	± 5	Carbon	123-1001-151
R206	330	¼	± 5	Carbon	123-1001-331
R207	68 K	¼	± 5	Carbon	123-1001-683
R208	470 K	¼	± 5	Carbon	123-1001-474
R209	18	¼	± 5	Carbon	123-1001-180
R210	10 K	¼	± 5	Carbon	123-1001-103
R211	100	¼	± 5	Carbon	123-1001-101
R212	22 K	¼	± 5	Carbon	123-1001-223
R213	15 K	¼	± 5	Carbon	123-1001-153
R214	56 K	¼	± 5	Carbon	123-1001-563
R215	15 K	¼	± 5	Carbon	123-1001-153
R216	3.3 K	¼	± 5	Carbon	123-1001-332
R217	6.8 K	¼	± 5	Carbon	123-1001-682
R218	3.9 K	¼	± 5	Carbon	123-1001-392
R219	3.9 K	¼	± 5	Carbon	123-1001-392
R220	22 K	¼	± 5	Carbon	123-1001-223
R221	22 K	¼	± 5	Carbon	123-1001-223
R222	39 K	¼	± 5	Carbon	123-1001-393
R223	39 K	¼	± 5	Carbon	123-1001-393
R224	3.3 K	¼	± 5	Carbon	123-1001-332
R225	3.3 K	¼	± 5	Carbon	123-1001-332
R226	3.3 K	¼	± 5	Carbon	123-1001-332
R227	3.3 K	¼	± 5	Carbon	123-1001-332
R228	82	¼	± 5	Carbon	123-1001-820
R229	12 K	¼	± 5	Carbon	123-1001-123
R230	15 K	¼	± 5	Carbon	123-1001-153
R231	220 K	¼	± 5	Carbon	123-1001-224
R232	1 K	¼	± 5	Carbon	123-1001-102
R233	68 K	¼	± 5	Carbon	123-1001-683
R234	1 K	¼	± 5	Carbon	123-1001-102
R235	220 K	¼	± 5	Carbon	123-1001-224
R236	22	¼	± 5	Carbon	123-1001-220
R237	270	¼	± 5	Carbon	123-1001-271
R238	10 K	¼	± 5	Carbon	123-1001-103
R239	10 K	¼	± 5	Carbon	123-1001-103
R240	10 K	¼	± 5	Carbon	123-1001-103
R241	1 K	¼	± 5	Carbon	123-1001-102

REF. NO.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	PART NO.
R242	3.3 K	¼	±5	Carbon	123-1001-332
R243	10 K	¼	±5	Carbon	123-1001-103
R244	33 K	¼	±5	Carbon	123-1001-333
R245	1.2 K	¼	±5	Carbon	123-1001-122
R246	10 K	¼	±5	Carbon	123-1001-103
R247	180 K	¼	±5	Carbon	123-1001-184
R248	4.7 K	¼	±5	Carbon	123-1001-472
R249	220	¼	±5	Carbon	123-1001-221
R250	3 K	¼	±5	Carbon	123-1001-302
R266	100 K	¼	±5	Carbon	123-1001-104
R270	100 K	¼	±5	Carbon	123-1001-104
R271	1.8 K	¼	±5	Carbon	123-1001-182
R272	330	¼	±5	Carbon	123-1001-331
R273	10 K	¼	±5	Carbon	123-1001-103
R274	39 K	¼	±5	Carbon	123-1001-393
R275	3.3 K	¼	±5	Carbon	123-1001-332
R276	3.3 K	¼	±5	Carbon	123-1001-332
R277	3.3 K	¼	±5	Carbon	123-1001-332
R278	3.3 K	¼	±5	Carbon	123-1001-332
R279	3.3 K	¼	±5	Carbon	123-1001-332
R280	3.3 K	¼	±5	Carbon	123-1001-332
R281	680	¼	±5	Carbon	123-1001-681
R282	820	¼	±5	Carbon	123-1001-820
R283	Not used				
R284	Not used				
R285	12 K	¼	±5	Carbon	123-1001-123
R286	1 K	¼	±5	Carbon	123-1001-102
R287	1.5 K	¼	±5	Carbon	123-1001-152
R288	47 K	¼	±5	Carbon	123-1001-473
R289	1 K	¼	±5	Carbon	123-1001-102
R290	560	¼	±5	Carbon	123-1001-561
R295	390	¼	±5	Carbon	123-1001-391
R296–298	Not used				
R299	680	¼	±5	Carbon	123-1001-681
R301	330	¼	±5	Carbon	123-1001-331
R302	330	¼	±5	Carbon	123-1001-331
R303	56 K	¼	±5	Carbon	123-1001-563
R304	56 K	¼	±5	Carbon	123-1001-563
R305	100 K	¼	±5	Carbon	123-1001-104
R306	100 K	¼	±5	Carbon	123-1001-104
R307	100 K	¼	±5	Carbon	123-1001-104
R308	100 K	¼	±5	Carbon	123-1001-104
R309	100 K	¼	±5	Carbon	123-1001-104
R310	100 K	¼	±5	Carbon	123-1001-104
R311	560	¼	±5	Carbon	123-1001-561
R312	560	¼	±5	Carbon	123-1001-561
R313	33 K	¼	±5	Carbon	123-1001-333
R314	33 K	¼	±5	Carbon	123-1001-333
R315	680 K	¼	±5	Carbon	123-1001-684
R316	680 K	¼	±5	Carbon	123-1001-684
R317	560	¼	±5	Carbon	123-1001-560
R318	560	¼	±5	Carbon	123-1001-560

REF. NO.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	PART NO.
R319	5.6 K	¼	± 5	Carbon	123-1001-562
R320	5.6 K	¼	± 5	Carbon	123-1001-562
R321	560	¼	± 5	Carbon	123-1001-561
R322	560	¼	± 5	Carbon	123-1001-561
R323	220 K	¼	± 5	Carbon	123-1001-224
R324	220 K	¼	± 5	Carbon	123-1001-224
R325	100	¼	± 5	Carbon	123-1001-101
R326	100	¼	± 5	Carbon	123-1001-101
R327	220	½	± 5	Carbon	123-1002-221
R328	220	½	± 5	Carbon	123-1002-221
R401	1 K	¼	± 5	Carbon	123-1001-102
R402	1 K	¼	± 5	Carbon	123-1001-102
R403	220 K	¼	± 5	Carbon	123-1001-224
R404	220 K	¼	± 5	Carbon	123-1001-224
R405	330	¼	± 5	Carbon	123-1001-331
R406	330	¼	± 5	Carbon	123-1001-331
R407	560	¼	± 5	Carbon	123-1001-561
R408	560	¼	± 5	Carbon	123-1001-561
R409	1 M	¼	± 5	Carbon	123-1001-105
R410	1 M	¼	± 5	Carbon	123-1001-105
R411	470	¼	± 5	Carbon	123-1001-471
R412	470	¼	± 5	Carbon	123-1001-471
R413	15 K	¼	± 5	Carbon	123-1001-153
R414	15 K	¼	± 5	Carbon	123-1001-153
R415	3.3 K	¼	± 5	Carbon	123-1001-332
R416	3.3 K	¼	± 5	Carbon	123-1001-332
R417	100 K	¼	± 5	Carbon	123-1001-104
R418	100 K	¼	± 5	Carbon	123-1001-104
R419	100 K	¼	± 5	Carbon	123-1001-104
R420	100 K	¼	± 5	Carbon	123-1001-104
R421	1 K	¼	± 5	Carbon	123-1001-102
R422	1 K	¼	± 5	Carbon	123-1001-102
R423	1 K	½	± 5	Carbon	123-1001-102
R424	1 K	½	± 5	Carbon	123-1001-102
R501	1 K	¼	± 5	Carbon	123-1001-102
R502	1 K	¼	± 5	Carbon	123-1001-102
R503	33 K	¼	± 5	Carbon	123-1001-333
R504	33 K	¼	± 5	Carbon	123-1001-333
R505	2.2 K	¼	± 5	Carbon	123-1001-222
R506	2.2 K	¼	± 5	Carbon	123-1001-222
R507	15 K	¼	± 5	Carbon	123-1001-153
R508	15 K	¼	± 5	Carbon	123-1001-153
R509	56	¼	± 5	Carbon	123-1001-560
R510	56	¼	± 5	Carbon	123-1001-560
R511	2.2 K	¼	± 5	Carbon	123-1001-222
R512	2.2 K	¼	± 5	Carbon	123-1001-222
R513	33 K	¼	± 5	Carbon	123-1001-333
R514	33 K	¼	± 5	Carbon	123-1001-333
R515	3.3 K	¼	± 5	Carbon	123-1001-332
R516	3.3 K	¼	± 5	Carbon	123-1001-332
R517	2.2 K	¼	± 5	Carbon	123-1001-222

REF. NO.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	PART NO.
R518	2.2 K	¼	± 5	Carbon	123-1001-222
R519	100	1	± 5	Metal Oxide	123-1003-101
R520	100	1	± 5	Metal Oxide	123-1003-101
R521	100	1	± 5	Metal Oxide	123-1003-101
R522	100	1	± 5	Metal Oxide	123-1003-101
R523	4.7	1	± 5	Metal Oxide	123-1003-047
R524	4.7	1	± 5	Metal Oxide	123-1003-047
R525	4.7	1	± 5	Metal Oxide	123-1003-047
R526	4.7	1	± 5	Metal Oxide	123-1003-047
R527	0.47	3	± 5	Metal Oxide	123-1005-0047
R528	0.47	3	± 5	Metal Oxide	123-1005-0047
R529	0.47	3	± 5	Metal Oxide	123-1005-0047
R530	0.47	3	± 5	Metal Oxide	123-1005-0047
R531	0.22	2	± 5	Cement	123-1004-0022
R532	0.22	2	± 5	Cement	123-1004-0022
R533	10	1	± 5	Metal Oxide	123-1003-100
R534	10	1	± 5	Metal Oxide	123-1003-100
R535	270	2	± 5	Metal Oxide	123-1004-271
R536	270	2	± 5	Metal Oxide	123-1004-271
R537	5.6 K	¼	± 5	Carbon	123-1001-562
R601	3.3 M	¼	± 5	Carbon	123-1001-335
R602	3.3 M	¼	± 5	Carbon	123-1001-335
R603	220 K	¼	± 5	Carbon	123-1001-224
R604	220 K	¼	± 5	Carbon	123-1001-224
R605	4.7 K	¼	± 5	Carbon	123-1001-472
R606	4.7 K	¼	± 5	Carbon	123-1001-472
R607	470	¼	± 5	Carbon	123-1001-821
R608	1 K	¼	± 5	Carbon	123-1001-102
R609	4.7 K	¼	± 5	Carbon	123-1001-472
R610	56 K	¼	± 5	Carbon	123-1001-563
R611	15 K	¼	± 5	Carbon	123-1001-153
R612	330 K	¼	± 5	Carbon	123-1001-334
R613	3.3 M	¼	± 5	Carbon	123-1001-335
R614	47 K	¼	± 5	Carbon	123-1001-473
R615	4.7 K	¼	± 5	Carbon	123-1001-472
R616	10 K	¼	± 5	Carbon	123-1001-103
R617	2.2 K	¼	± 5	Carbon	123-1001-222
R618	220 K	¼	± 5	Carbon	123-1001-224
R619	Not used				
R620	100 K	¼	± 5	Carbon	123-1001-104
R621	47 K	¼	± 5	Carbon	123-1001-473
R622	10 K	¼	± 5	Carbon	123-1001-103
R701	39	2	± 5	Metal Oxide	123-1004-390
R702	8.2 K	¼	± 5	Carbon	123-1001-822
R703	4.7 K	¼	± 5	Carbon	123-1001-472
R704	1.8 K	¼	± 5	Carbon	123-1001-182
R705	18 K	¼	± 5	Carbon	123-1001-183
R706	15 K	¼	± 5	Carbon	123-1001-153
R707	10	1	± 5	Metal Oxide	123-1003-100
R708	18 K	¼	± 5	Carbon	123-1001-183
R709	4.7 K	¼	± 5	Carbon	123-1001-472

REF. NO.	Value (Ω)	Wattage (W)	Tolerance (%)	Material	PART NO.
R710	15 K	¼	±5	Carbon	123-1001-153
R711	16 K	¼	±5	Carbon	123-1001-163
R712	10	1	±5	Metal Oxide	123-1003-100
R713	18 K	¼	±5	Carbon	123-1001-183
R714	4.7 K	¼	±5	Carbon	123-1001-472
R715	18 K	¼	±5	Carbon	123-1001-183
R716	6.2 K	¼	±5	Carbon	123-1001-622
R901	4.7 K	¼	±5	Carbon	123-1001-472
R902	4.7 K	¼	±5	Carbon	123-1001-472
R903	4.7 K	¼	±5	Carbon	123-1001-472
R904	4.7 K	¼	±5	Carbon	123-1001-472
R905	18 K	¼	±5	Carbon	123-1001-183
R906	18 K	¼	±5	Carbon	123-1001-183
R907	11 K	¼	±5	Carbon	123-1001-113
R908	11 K	¼	±5	Carbon	123-1001-113
R1001	2.2 M	½	±5	Carbon	123-1001-225

SWITCHES

REF. NO.	DESCRIPTION	PART NO.
S1-1~4	Rotary Slide Switch	TCEP-180583
S2, 3, 4	Push Switch	TCEP-180584
	Push Switch	TCEP-180585
	Voltage Selector Switch	TCEP-180586
	Push Switch (Canadian, U.S.A., PX)	TCEP-180579
	Push Switch (European)	TCEP-180580

TRANSFORMERS

REF. NO.	DESCRIPTION	PART NO.
T101	FM IFT 7F-007 or 7F-065	TCEP-140007 or TCEP-140065
T201	FM IFT 10F-068 or 10F-066	TCEP-140068 or TCEP-140066
T202	FM IFT 10F-069 or 10F-067	TCEP-140069 or TCEP-140067
T203	AM OSC Coil 0C-077 or 0C-112	TCEP-120077 or TCEP-120112
T204	AM IFT 0A-064 or 0A-098	TCEP-130064 or TCEP-130098
T205	AM IFT 0A-065 or 0A-099	TCEP-130065 or TCEP-130099
T206	AM IFT 0A-048 or 0A-097	TCEP-130048 or TCEP-130097
	Power Transformer 120 V 60 Hz E173 (U.S.A.)	TCEP-100910
	Power Transformer 120 V 60 Hz E185 (Canadian)	TCEP-100911
	Power Transformer 100/120/230/240 V (PX)	TCEP-100912
	Power Transformer 230 V 50/60 Hz (European)	TCEP-100913

TRIMMER CAPACITORS

REF. NO.	DESCRIPTION	PART NO.
TC103	Trimmer Capacitor IT-MP6	TCEP-160020

THERMAL PROTECTOR

REF. NO.	DESCRIPTION	PART NO.
TH1001	Thermal Protector 95°C UI-2 125 V 6 A	TCEP-290018
TH1002	Thermal Protector 110°C UI-2 125 V 6 A	TCEP-290049

TRANSISTORS

REF. NO.	TYPE NO.	PART NO.	MANUFACTURER
TR101	FET 2SK41F	153-1147	SANYO
TR102	2SC1674(L,K) or 2SC2786(L)	153-1148	NEC
TR103	2SC1674(L,K) or 2SC2786(L)	153-1148	NEC
TR201	2SC1675(L,K) or 2SC2787(L) or 2SC930(E,D)	153-1149	NEC or SANYO
TR202	2SC536(G,H) or 2SC1815(GR,BL) or 2SC1842(E,F)	153-1100	SANYO or TOSHIBA or NEC
TR203	2SC536(G,H) or 2SC1815(BL) or 2SC1840(E,F)	153-1084	SANYO or TOSHIBA or NEC
TR204	2SC536(G,H) or 2SC1815(BL) or 2SC1840(E,F)	153-1084	SANYO or TOSHIBA or NEC
TR205	Not used		
TR206	Not used		
TR207	Not used		
TR208	2SC900(E,U) or 2SC536(G,H)	153-1099	NEC or SANYO
TR301	2SA798(F,G), 2SA979(F,G) or 2SA992(E)	153-1150	MITSUBISHI or NEC
TR302	2SA798(F,G), 2SA979(F,G) or 2SA992(E)	153-1150	MITSUBISHI or NEC
TR303	2SA798(F,G), 2SA979(F,G) or 2SA992(E)	153-1150	MITSUBISHI or NEC
TR304	2SA798(F,G), 2SA979(F,G) or 2SA992(E)	153-1150	MITSUBISHI or NEC
TR305	2SC1845(E,U) or 2SC2362(H) or 2SC2240(BL)	153-1159	NEC or SANYO or TOSHIBA
TR306	2SC1845(E,U) or 2SC2362(H) or 2SC2240IBL)	153-1159	NEC or SANYO or TOSHIBA
TR501	2SC2259(F,G)	153-1160	MITSUBISHI
TR502	2SC2259(F,G)	153-1160	MITSUBISHI
TR503	2SC2259(F,G)	153-1160	MITSUBISHI
TR504	2SC2259(F,G)	153-1160	MITSUBISHI
TR505	2SA984(E,F)	153-1161	SANYO
TR506	2SA984(E,F)	153-1161	SANYO
TR507	2SD438(E)	153-1166	SANYO
TR508	2SD438(E)	153-1166	SANYO
TR509	2SB560(E)	153-1163	SANYO
TR510	2SB560(E)	153-1163	SANYO
TR511	2SD613P(D,E) or 2SD895(D,E)	153-1167	SANYO
TR512	2SD613P(D,E) or 2SD895(D,E)	153-1167	SANYO

REF. NO.	TYPE NO.	PART NO.	MANUFACTURER
TR513	2SB633P(D,E) or 2SB775(D,E)	153-1164	SANYO
TR514	2SB633P(D,E) or 2SB775(D,E)	153-1164	SANYO
TR601	FET 2SK246(Y,GR) or 2SK30ATM(Y,GR)	153-1091	TOSHIBA
TR602	FET 2SK246(Y,GR) or 2SK30ATM(Y,GR)	153-1091	TOSHIBA
TR603	2SC1845(E) or 2SC2362(H) or 2SC2240(BL)	153-1091	NEC or SANYO or TOSHIBA
TR604	2SA992(E) or 2SA1016(H) or 2SA970(BL)	153-1150	NEC or SANYO or TOSHIBA
TR605	2SC1845(E) or 2SC2362(H) or 2SC2240(BL)	153-1159	NEC or SANYO or TOSHIBA
TR607	2SC2362(G,H) or 2SC2240(GR, BL) or 2SC1845(E,F)	153-1159	SANYO or TOSHIBA or NEC
TR701	2SD325(E)	153-1165	SANYO
TR702	2SC945(P,K) or 2SC2785(K)	153-1163	NEC
TR703	2SD571(L,K) or 2SD438(F,G) or 2SC2235(Y)	153-1166	NEC or SANYO or TOSHIBA
TR704	2SC945(P,K) or 2SC2785(K)	153-1104	NEC
TR705	2SB605(L,K) or 2SB560(F,G) or 2SA965(Y)	153-1163	NEC or SANYO or TOSHIBA
TR706	2SA733(P,K) or 2SA1175(K)	153-1162	NEC

VARIABLE CAPACITORS

REF. NO.	DESCRIPTION	PART NO.
TC101	Variable Capacitor	TCEP-150019
TC102	Variable Capacitor	TCEP-150019

VARIABLE RESISTORS

REF. NO.	DESCRIPTION	PART NO.
VR201	Trimmer Resistor 50 KΩ B	TCEP-170515 or TCEP-170621 or TCEP-170654
VR202	Semi Fixed Resistor	TCEP-170655
VR203	Trimmer Resistor 50 KΩ B	TCEP-170515 or TCEP-170621 or TCEP-170654
VR204	Trimmer Resistor 500 KΩ B	TCEP-170518 or TCEP-170624 or TCEP-170657
VR205	Trimmer Resistor 5 KΩ B	TCEP-170512 or TCEP-170618 or TCEP-170651
VR401	Variable Resistor 200 KΩ B x 2	TCEP-171489
VR402	Variable Resistor 250 KΩ W	TCEP-171490
VR403	Variable Resistor 100 KΩ C	TCEP-171491
VR404	Variable Resistor 100 KΩ C	TCEP-171491

REF. NO.	DESCRIPTION	PART NO.
VR501	Trimmer Resistor 470 Ω B	TCEP-170509 or TCEP-170615 or TCEP-170648
VR502	Trimmer Resistor 470 Ω B	TCEP-170509 or TCEP-170615 or TCEP-170648

15. EXPLODED VIEW PARTS LIST

REF. NO.	DESCRIPTION	PART NO.
	TUNER & AUDIO Assembled P.C.B.	TCEU-22048
1A	Consisting of Main P.C.B.	
1B	Speaker Switch P.C.B.	
2	LED INDICATOR Assembled P.C.B.	TCEU-23205
3	Front Chassis	TCEP-400363
4	Reinforce Holder	TCEP-412525
5	Blind Plate	TCEP-412524
6	Sheet	TCEP-480399
7	Pointer Rail	TCEP-412522
8	Side Chassis (L)	TCEP-400364
9	Side Chassis (R)	TCEP-400365
10	Side Holder	TCEP-412528
11	Tuning Shaft Assembly	TCEP-420425
12	Pulley Holder	TCEP-412531
13	Pointer Assembly	TCEP-450102
	Consisting of LED SLP-532D	
	Pointer Holder	TCEP-610912
	Pointer Base	TCEP-610630
	Pointer Sheet	TCEP-480249
14	Dial Pulley	TCEP-610239
15	Dial Spring	TCEP-440017
16	Eyelet 2 x 3	
17	Dial String (Super 434 Black)	
18	Sub-Pulley (middle)	TCEP-610471
19	Sub-Pulley (small)	TCEP-6110049
20	Wire Stay	TCEP-440233
21	Switch Holder	TCEP-412530
22	Protector Holder for Heat Sink	TCEP-412428
23	Protector Holder for Power Transformer	TCEP-412445
24	Back Panel (U.S.A.)	TCEP-412517
24	Back Panel (Canadian)	TCEP-412518
24	Back Panel (European)	TCEP-412520
24	Back Panel (PX)	TCEP-412519
25	AM ANT Coil	TCEP-110143
26	Speaker Terminal	TCEP-320416
27	AC Outlet (U.S.A., PX)	TCEP-190157 or TCEP-190098
27	AC Outlet (Canadian)	TCEP-190157 or TCEP-190324
28	Antenna Terminal	TCEP-320391
29	AC Cord (U.S.A., Canadian, PX)	TCEP-310115
29	AC Cord (European)	TCEP-310105
30	AC Cord Strain Relief (U.S.A., Canadian, PX)	TCEP-480010
30	AC Cord Strain Relief (European)	TCEP-480080
31	Joint for Power Switch	TCEP-610868
32	Reinforce Holder	TCEP-422839
33	Ground Screw	TCEP-420300
34	Protector for Heat Sink (110°C)	TCEP-290049
35	Protector for Power Transformer (95°C)	TCEP-290018
36	Solderless Terminal	
37	Push Switch for Power (U.S.A., Canadian, PX)	TCEP-180579
37	Push Switch for Power (European)	TCEP-180580
38	Power Transformer (U.S.A.)	TCEP-100910

REF. NO.	DESCRIPTION	PART NO.
38	Power Transformer (Canadian)	TCEP-100911
38	Power Transformer (European)	TCEP-100913
38	Power Transformer (PX)	TCEP-100911
39	Front Panel	TCEP-700566
40	Dial Scale	TCEP-640292
41	Knob Guide for Push Switch	TCEP-610898
42	Knob for Push Switch (561)	TCEP-650561
43	Knob for Tuning (571)	TCEP-650571
44	Knob for VR, SELECTOR	TCEP-650570
45	Blind Sheet	TCEP-480394
46	Cabinet	TCEP-600242
47	Net	TCEP-660261
48	Bottom Plate	TCEP-412521
49	Foot (B)	TCEP-610492
50	Sheet	TCEP-480181
51	Number Plate (B)	TCEP-730184
52	Blind Sheet	TCEP-480423
53	Heat Sink for Power Output TR.	TCEP-412523
54	Spacer Heat Sink	TCEP-480401
55	Heat Sink Holder (A)	TCEP-412526
56	Heat Sink Holder (B)	TCEP-412527
57	Bridge Holder	TCEP-412432
58	LED Holder	TCEP-610911
59	Sheet (A)	TCEP-690315
60	Headphone Jack	TCEP-190446
61	Wire Stay	TCEP-450006
62	Panel Spacer	TCEP-690277

HARDWARE

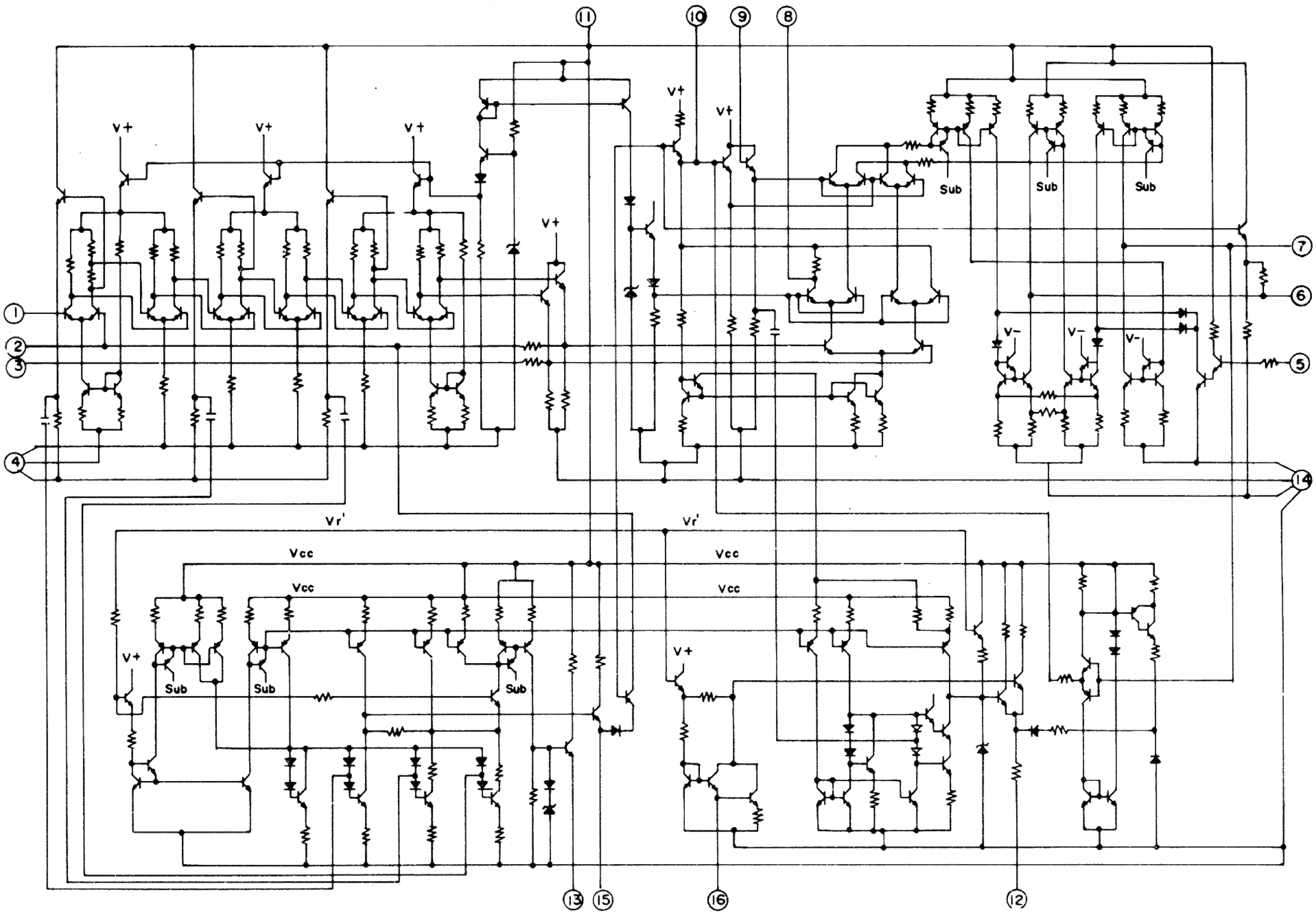
REF. NO.	DESCRIPTION		PART NO.
S1	Tapping Screw	3 x 10PLT-II	
S2	F-Lock Screw	3 x 6FL	
S3	Plax Screw (Black)	3 x 8PT	
S4	Del-tite Screw	3 x 8BT-III	
S5	Tapping Screw	3 x 8TNL-II	
S6	Screw	3 x 6B	
S7	Tapping Screw	3 x 8BT-II	
S8	Del-tite Screw	4 x 10BT-III	
S9	Stop Screw	3 x 9 x 3	
S10	Tapping Screw (Black)	3 x 8BT-II	
S11	Screw	3 x 4P	
S12	Tapping Screw	3 x 8FT-II	
S13	Tapping Screw	3 x 6BT-II	
S14	Del-tite Screw	3 x 12BT-III	
S15	Tapping Screw	3 x 5BT-II	
N1	Flange Nut	3FN	
N2	Flange Nut	4FN	
R1	Blind Rivet	YB-320 (Black)	
R2	Nylon Rivet	3 x 3.5 (Black)	
W1	Toothed Washer	7TW-A	
W2	Toothed Washer	4TW-B	
W3	Washer	3W	
W4	Toothed Washer	3TW-A	
W5	Washer	4W	

16. MISCELLANEOUS PARTS LIST

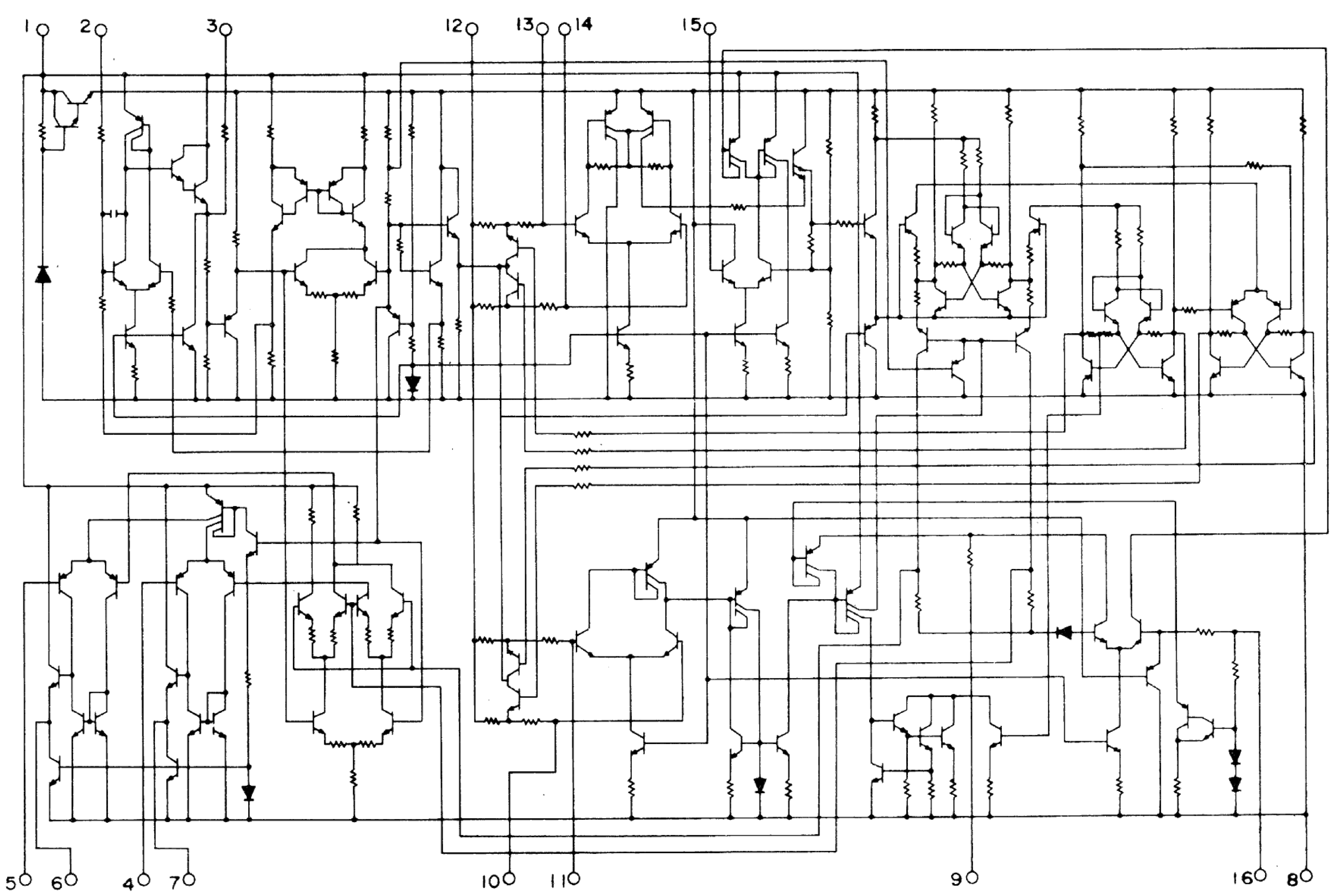
DESCRIPTION	PART NO.
Fuse Caution Label (U.S.A., European, PX)	TCEP-810585
Fuse Caution Label (Canadian)	TCEP-810516
Voltage Selector (PX)	TCEP-180586
Block Terminal (European)	TCEP-320251
Insulation Sheet (European)	TCEP-690251
Insulation Cap (European)	TCEP-480379
Insulation Sleeve (European)	TCEP-480332
Master Carton (U.S.A., Canadian, European)	TCEP-801169
Master Carton (PX)	TCEP-801170
Double Master Carton (PX)	TCEP-801171
Gift Box (U.S.A., European, PX)	TCEP-801172
Gift Box (Canadian)	TCEP-801173
Sheet (A)	TCEP-801174
Sheet (B)	TCEP-801175
Snow Box	TCEP-820767
Poly Bag for Set	TCEP-820169
Poly Bag for AC Cord	TCEP-820418
Curl Stopper	TCEP-610365
FM Dipole Antenna	TCEP-330013
Warranty Card (U.S.A.) 2 years	TCEP-811295 or TCEP-811296
Warranty Card (Canadian)	TCEP-811174
Warranty Card (European, PX)	TCEP-811263
Caution Label (U.S.A., European, PX)	TCEP-811301
Caution Label (Canadian)	TCEP-811038
QC Label	TCEP-810019
Label 121 (U.S.A.)	TCEP-811121
CSA Label (Canadian)	TCEP-810024
Pass Label	TCEP-810183
〶Mark Label (PX)	TCEP-810902
Cord Tag (European)	TCEP-810698
Owner's Manual	TCEP-811271
Service Manual	
Shield Plate	P-412608
Shield Plate	P-411705
(TUNER AUDIO UNIT)	
Fuse Terminal (U.S.A., Canadian, PX)	TCEP-190308
Fuse Terminal (European)	TCEP-320249
4P RCA Pin Jack	TCEP-320414
6P RCA Pin Jack	TCEP-320415
Pin Terminal (314)	TCEP-320314
Pin Terminal (245)	TCEP-320245

20. IC INTERNAL DIAGRAMS

LA1231 SCHEMATIC DIAGRAM

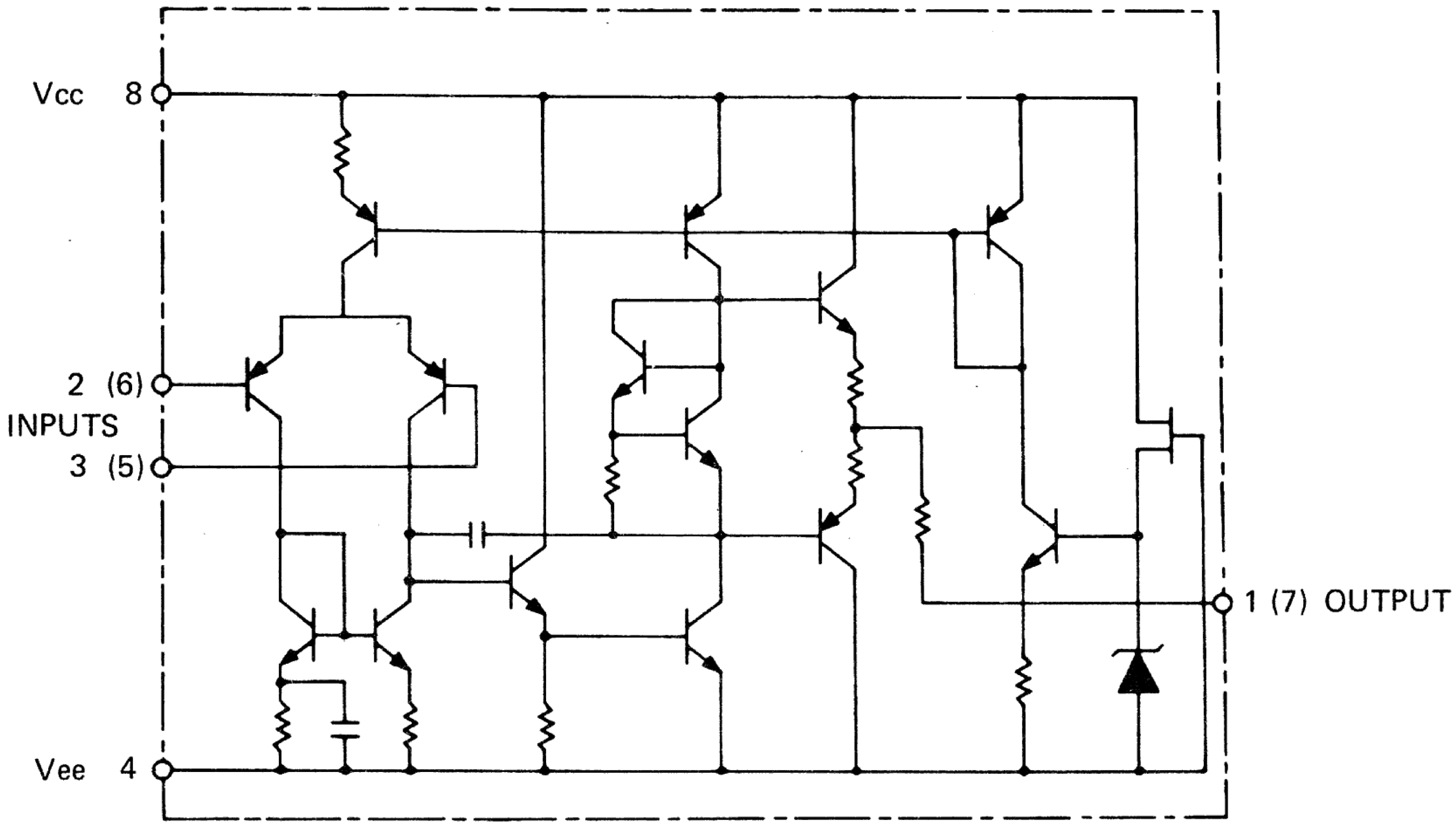


μPC1161C EQUIVALENT CIRCUIT SCHEMATIC DIAGRAM

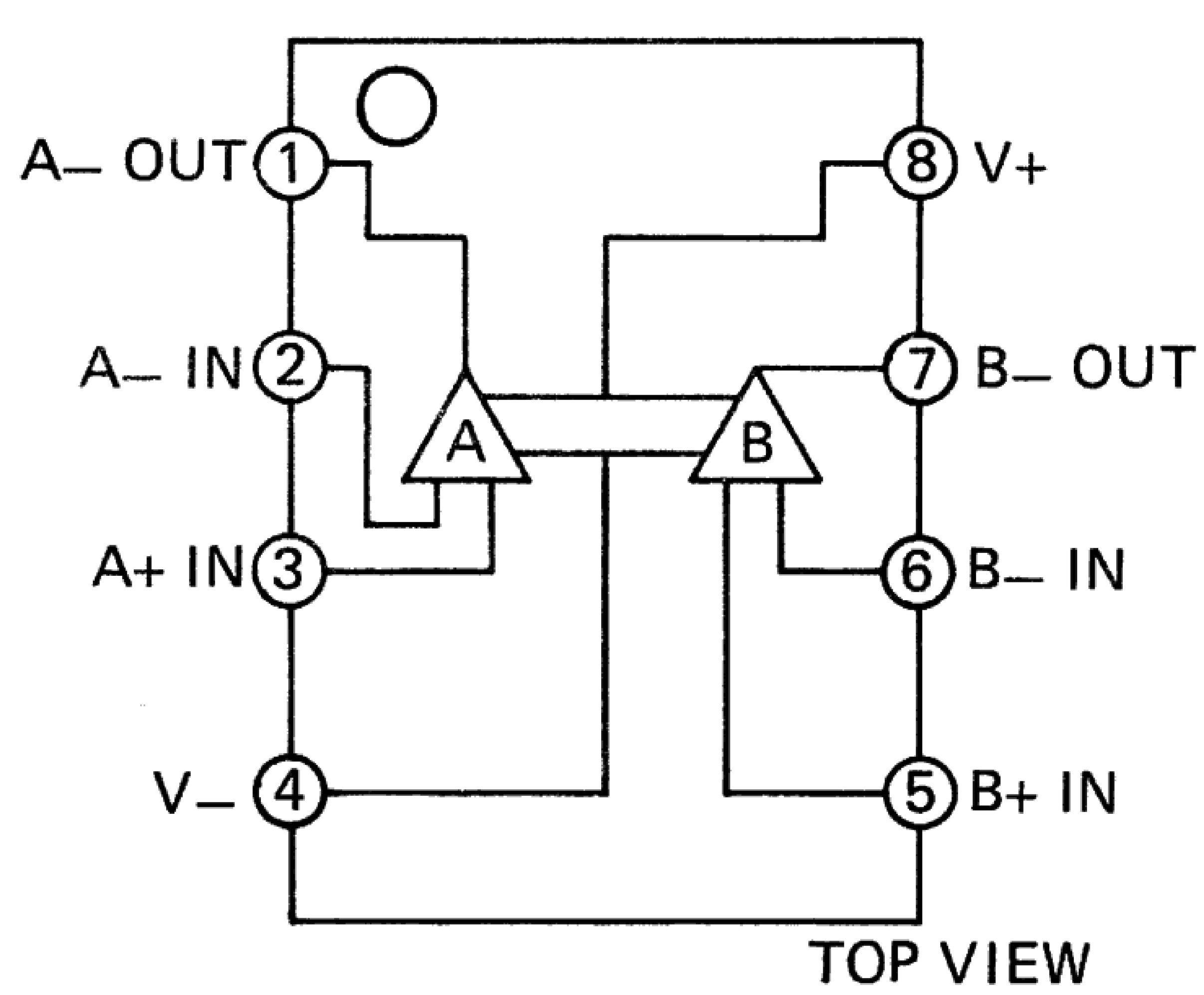


NJM-4558
TL-4558

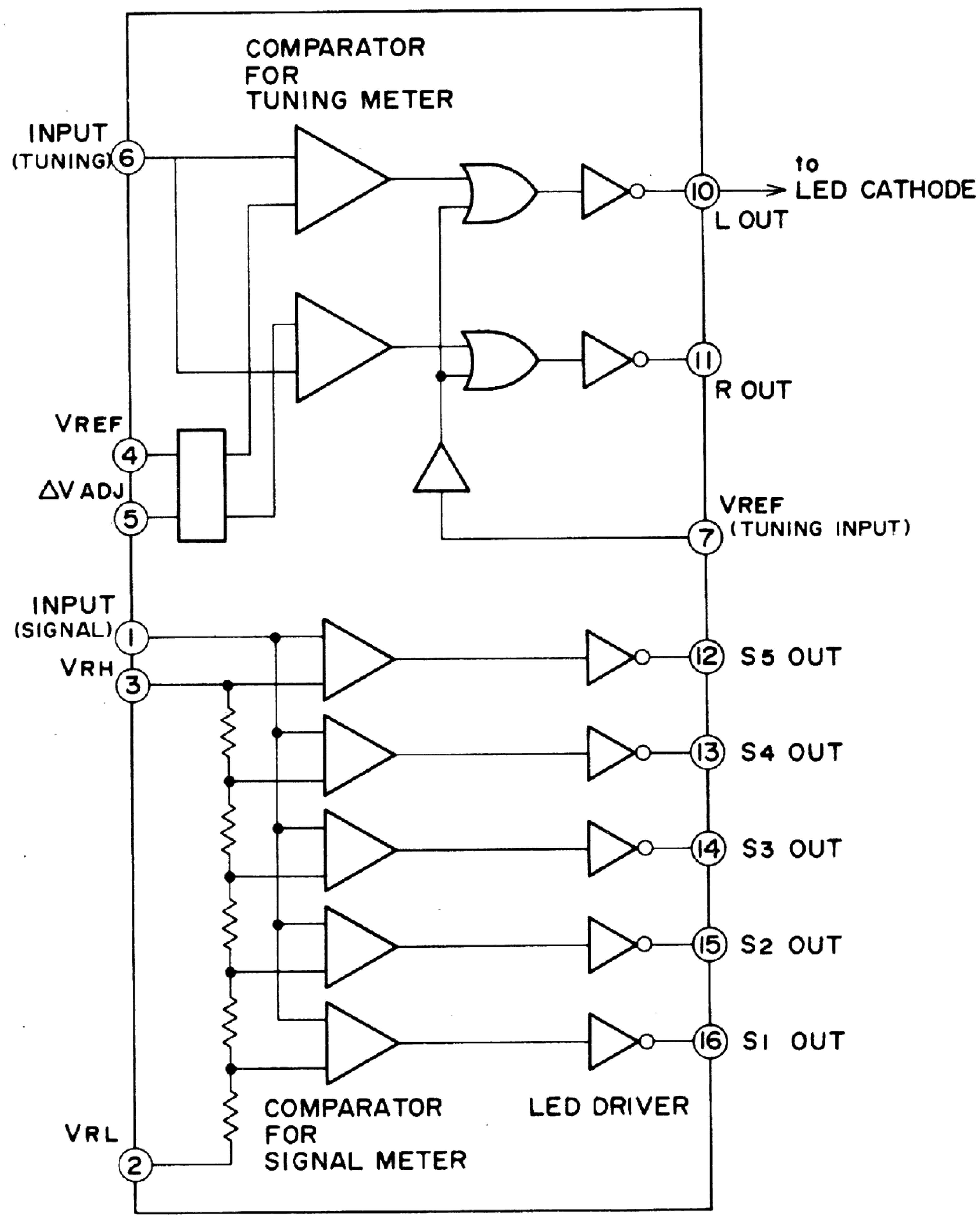
SCHEMATIC DIAGRAM



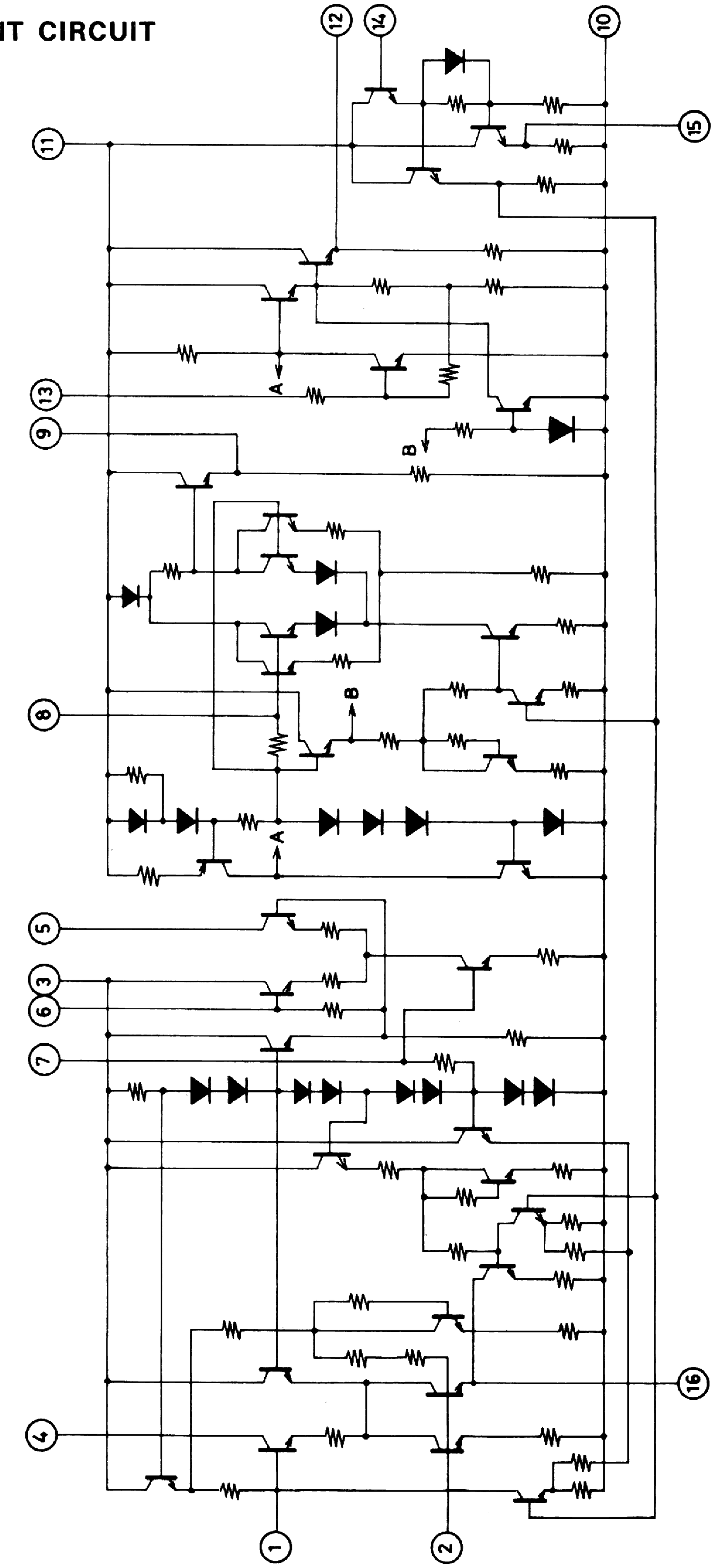
BLOCK DIAGRAM



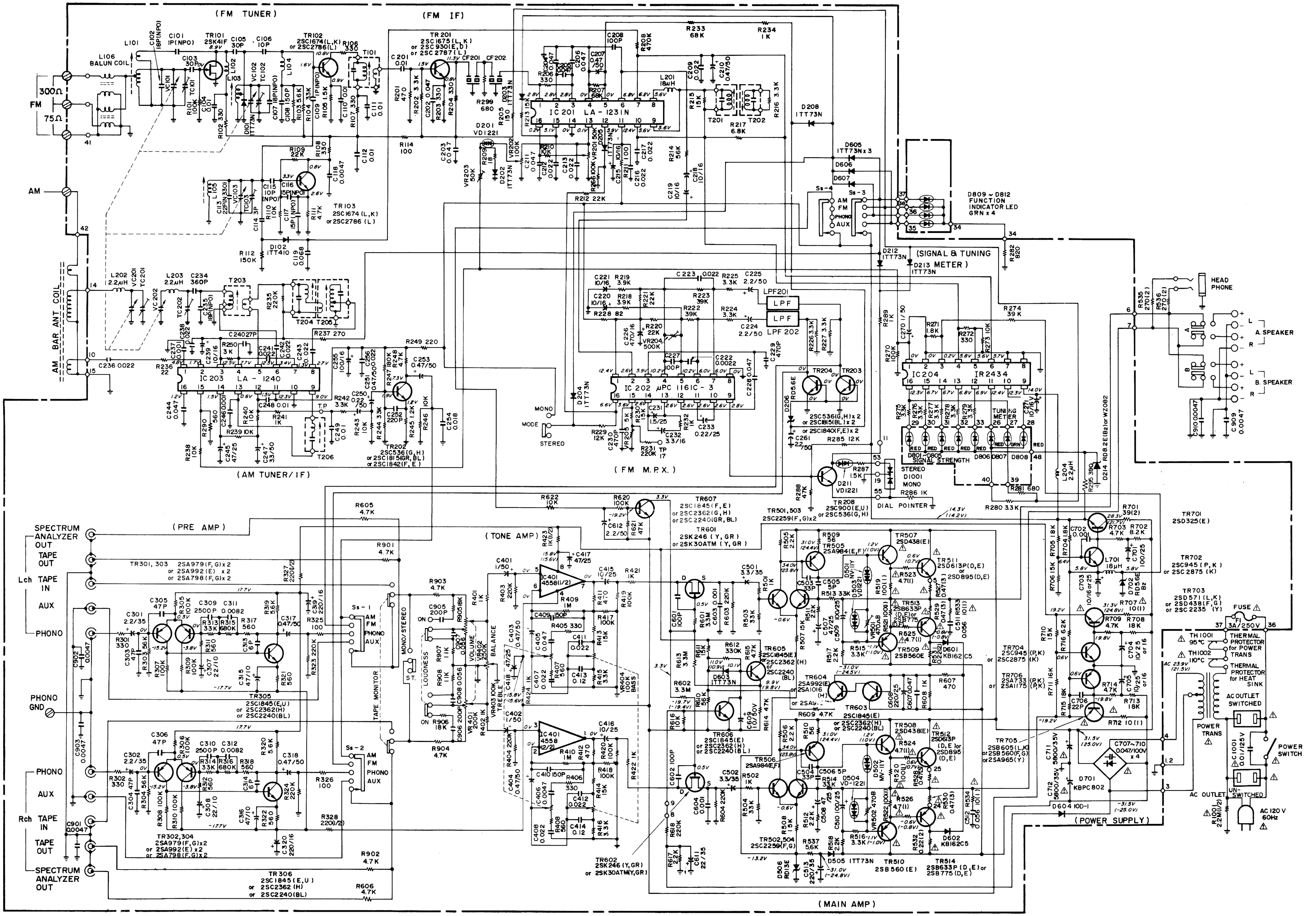
IR2434 BLOCK DIAGRAM



LA1240
EQUIVALENT CIRCUIT



18. SCHEMATIC DIAGRAM



NOTE:

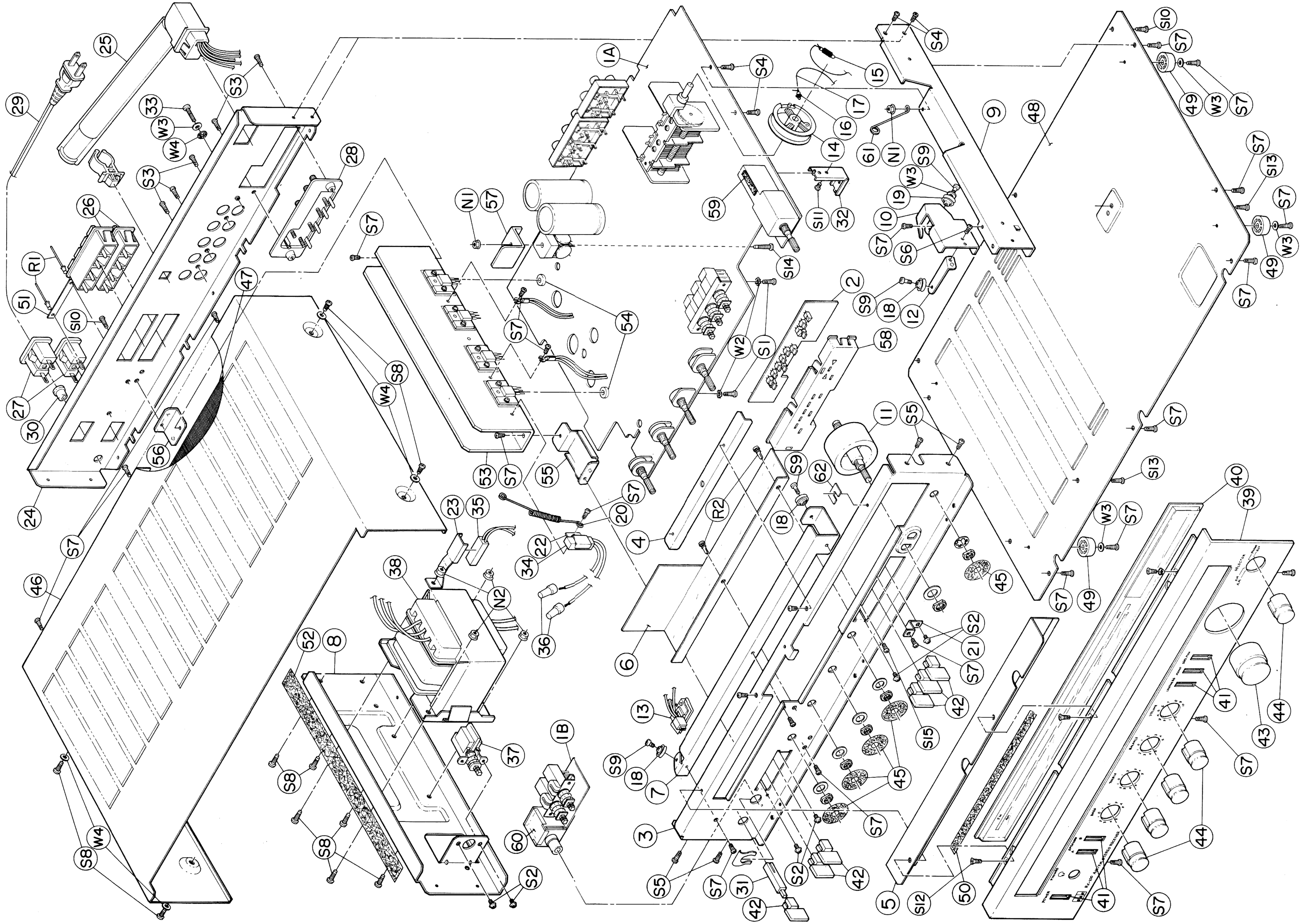
1) Ss-1 ~ Ss-4 : FUNCTION SELECTOR SWITCH
POSITION : 1 - AM 2 - FM 3 - PHONO 4 - AUX

2) ALL RESISTANCE VALUES ARE INDICATED IN "OHM" (K = 10^3 OHM, M = 10^6 OHM).

3) ALL CAPACITANCE VALUES ARE INDICATED IN "μF" (P = 10^{-6} μF).

4) The parts with exclamation mark ⚠ in the circuit diagram are key parts for Safety Regulation.

19. EXPLODED VIEW



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