REALISTIC®

Service Manual

31-2097

STA-860
AM/FM STEREO RECEIVER
Catalog Number: 31-2097

CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION

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PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by a ⚠ in the schematic diagram and the parts list.

Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

ELECTRICAL PERFORMANCE SPECIFICATIONS

Whole Specs are measured under the following conditions:

1. The supply voltage is 120 volts (U.S.A., Canada), (220 volts AC, 50 Hz for Continental European and 240 volts AC, 50 Hz for U.K. and Australian models) from a regulated power supply.
2. All measurements shall be taken under IHF measurement method unless otherwise specified.
3. The power source must be insulated from other equipment, connected to antenna or output.
4. The room temperature is 25 degrees C (77 degrees F).
5. 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.

AM Section

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

Item	Measured at (kHz)	Unit	Nominal	Limit
Frequency coverage		kHz	510—1650	520—1620
Intermediate frequency		kHz	455	
20 dB Quieting sensitivity	600	μV/m	250	500
	1000	μV/m	250	500
	1400	μV/m	250	500
Sensitivity at antenna terminal	1000	μV	20	—
S/N Ratio at 5 mV/m input	1000	dB	43	37
Selectivity at S/N 20 dB input ±10 kHz	1000	dB	28	22
Band width at 6 dB down	1000	kHz	6	4.5—9
A.G.C. Figure of merit	1000	dB	50	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	200	100
at 30% mod.	1000	mV/m	200	100
Electrical audio fidelity Ref. freq. = 1 kHz, −6 dB down, 5 mV/m input	1000	Hz	50—3 k	80—2.5 k

Item	Measured at (kHz)	Unit	Nominal	Limit
Whistle modulation at 1 mV/m	910	%	5	10
(2nd) at 5 mV/m	910	%	5	10
at 50 mV/m	910	%	5	15
at 100 mV/m	910	%	5	15
Whistle modulation at 1 mV/m	1365	%	5	10
(3rd) at 5 mV/m	1365	%	5	10
at 50 mV/m	1365	%	5	10
at 100 mV/m	1365	%	5	10
Frequency Calibration	600	kHz	0	±25
	1400	kHz	0	±50
Spurious response from 1650–30000 kHz	1000	dB	50	44
Tapeout level, at 1 kHz 5 mV/m, RCA Jack	1000	mV	175	175±2.5 dB
**5 mV/m, DIN Jack (3.3 kΩ terminated)	1000	mV	3.3	3.3±2.5 dB
The oscillator shall not drift more than 10 kHz starting at 25 degrees C (77 degrees F) and through range up to 50 degrees C (122 degrees F), at 1000 kHz.				
Meter Sensitivity at 1st LED	1000	mV/m	0.225	
at 3rd LED	1000	mV/m	1.14	
at 5th LED	1000	mV/m	31.6	

**European and Australian models only.

FM Section

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

Item	Measured at (MHz)	Unit	Nominal	Limit
Frequency coverage (U.S.A., Canada, Australia)		MHz	87.4–108.3	87.4±0.5–108+0.9/–0
Frequency coverage (UK, Continental Europe)		MHz	87.5–109	87.5±0.2–108
Intermediate frequency		MHz	10.7	–
IHF (Useable) sensitivity	90/98/106	μV	1.9	3.8
	90/98/106	dBf	10.8	16.82
50 dB Quieting sensitivity (U.S.A., Canada)	90/98/106	μV	3.0	4.5
	90/98/106	dBf	14.77	18.29
Limiting sensitivity (–3 dB)	98	μV	1.5	3.0

Item	Measured at (MHz)	Unit	Nominal	Limit
S/N ratio at 1 mV input "A"	98	dB	72	66
S/Hum noise ratio at 1 mV	98	dB	70	64
Muting threshold	98	μV	5.5	3.5 – 9.0
Frequency response ±2.5 dB range, at 1 mV input	98	Hz	30 – 12 k	40 – 10 k
Distortion at Quieting sens. at 1000 Hz	98	%	0.5	
Distortion at 1 mV input at 100 Hz	98	%	0.25	0.4
at 1000 Hz	98	%	0.1	
at 6000 Hz	98	%	0.3	
Capture ratio	98	dB	1.5	3.0
Alternate channel selectivity at input 100 μV	98	dB	53	45
Spurious response ratio	98	dB	65	55
Image response ratio	106	dB	60	50
IF response ratio	90	dB	90	70
AM suppression at 100μV input	98	dB	58	52
AFC holding range at 100μV input	98	kHz	±250	±330
Calibration accuracy	90/98/106	kHz		±250
Tapeout level, 1 mV input at RCA, 75 k dev.	98	mV	600	600±2.5 dB
**at DIN, 22.5 k dev. (3.3 kΩ terminated)	98	mV	3.3	3.3±2.5 dB
Meter sensitivity at 1st LED	98	μV	4.5	
at 3rd LED	98	μV	56.0	
at 5th LED	98	μV	280	
Temperature range for satisfactory operation		°C	0 – 45	
		°F	32 – 113	
Max. signal handling capacity	98	μV	200 k	
Auto-M range at 1 mV input	98	MHz	±1.2	±0.8
I.M.R. ratio	98	dB	60	50
50 dB Quieting sensitivity for	90/98/106	μV	3.5	5.6
European and Australian models	90/98/106	dBf	16.1	20.2

FM Stereo Section

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

Item		Measured at (MHz)	Unit	Nominal	Limit
Stereo beacon switching and		98	μV	5.5	3.5−9.0
muting threshold		98	dBf	20.0	16.1−24.3
Stereo 50 dB quieting sensitivity		90/98/106	μV	42	
		90/98/106	dBf	37.7	
S/N ratio at 1mV input "A"		98	dB	65	55
Freq. response at 1 mV input 50−10000Hz		98	dB	0	±2.5
Stereo distortion at 50 dB	at 100 Hz	98	%	0.4	
Quieting sensitivity	at 1 kHz	98	%	0.3	
	at 6 kHz	98	%	0.8	
Stereo distortion at	at 100 Hz	98	%	0.3	
1 mV input	at 1 kHz	98	%	0.2	1.5
	at 6 kHz	98	%	0.6	
Stereo separation at	at 100 Hz	98	dB	38	28
1 mV input	at 1 kHz	98	dB	48	33
	at 10 kHz	98	dB	35	28
Sub carrier product rejection		98	dB	59	45
SCA rejection		98	dB	50	45
Tapeout level at 1 kHz, 1 mV input		98	mV	550	550±2.5 dB

Audio Section

Note: 1. All units are measured at SPEAKER Terminals with non-reactive rated load (8 ohms) unless otherwise indicated.
Rated Power: 60 W (RMS) Rated THD: 0.08%

Item		Unit	Nominal	Limit
Power output from 20 Hz to 20 kHz under rated THD. Both channels driven 8 Ω load (RMS).		W	64	60
Input impedance at 1 kHz	PHONO	kΩ	50	
	AUX/TV	kΩ	50	
	TAPE IN	kΩ	50	
Sensitivity for rated power	PHONO	mV	2.2	2.2±2.5 dB
	AUX/TV	mV	160	160±2.5 dB
	TAPE IN	mV	160	160±2.5 dB
Total harmonic distortion from 20 Hz to 20 kHz at rated power	at 20 Hz	%	0.05	0.08
	at 1 kHz	%	0.04	0.08
	at 20 kHz	%	0.05	0.08
Max. input signal at rated THD (0.5%) (measured at tape out)	PHONO	mV	160	130
	AUX/TV	mV	Infinitive	
	TAPE	mV	Infinitive	
Frequency Response from 20 Hz to 20 kHz		±dB	0	2
S/N ratio A-weighted 1 W reference (IHF)	PHONO	dB	70	
	AUX/TV	dB	75	
	TAPE	dB	75	
A-weighted rated power reference	PHONO(10mV input & shorted)	dB	86	74
	AUX/TV(Input shorted)	dB	92	80
	TAPE(Input shorted)	dB	92	80
Dynamic headroom		dB	1.0	
Clipping headroom		dB	2.5	
Damping Factor			45	
Loudness Contour ch.	at 100 Hz	dB	+6	+6 ±2.5 dB
	at 10 kHz	dB	+4.5	+4.5±2.5 dB
Tone control response				
Bass control action	at 100 Hz	dB	±10	±10±2.5 dB
Treble control action	at 10 kHz	dB	±10	±10±2.5 dB
Filter cutoff freq. (−3 dB point)	**30 Hz cut filter	Hz	–	–
	High filter	Hz	6 k	±1.5k
Filter slope	**30 Hz cut filter	dB/oct	–	
	High filter	dB/oct	6	

** See "FILTER CURVE" on page 12.

Item		Unit	Nominal	Limit
Crosstalk at AUX/TV	at 100 Hz	dB	68	
	at 1 kHz	dB	62	45
	at 10 kHz	dB	45	
A-weight crosstalk at AUX/TV	at 100 Hz	dB	55	
	at 1 kHz	dB	55	
	at 10 kHz	dB	45	
IM distortion (SMPTE)	at rated power	%	0.12	0.2
	at 1/2 rated power	%	0.08	0.15
Transient overload recovery time		mSec	5	
Slew factor			3.5	
Channel balance at VR max.		dB	0	±1.5
DC balance at no signal and output		mV	0	±50
Tape out level at RCA jacks (47 kΩ terminated)	PHONO (Input=2.35 mV)	mV	140	140±3 dB
	AUX/TV (Input=160 mV)	mV	140	140±3 dB
**at DIN jacks (3.3 kΩ terminated)	PHONO (Input=2.8 mV)	mV	3.3	3.3±2.5 dB
	AUX/TV (Input=200 mV)	mV	3.3	3.3±2.5 dB
Hum and Noise at VR min.		mV	0.8	1.5
Phono Eq. RIAA ch. from 20 Hz to 20 kHz (measured at Tape out)		dB	±0.5	±2.0
Power meter LED	at 1st LED	W	0.5	
	at 3rd LED	W	7.0	
	at 5th LED	W	80	
Power output, from 20 Hz to 20 kHz, under 0.15% T.H.D (Both channels driven 4Ω load)		W	65	60
Music power, at rated THD (0.08%), 1 kHz, 8Ω (European models only)		W	80	75
Resonant frequency of band pass filter at Expander VR Max. position. (Measure opposite channel applying signal to main channel)		kHz	4.5	4.5±1.5
Level ratio between main ch. and opposite ch. at resonant freq. at expander VR Max. position (Ref. 1 kHz=0 dB at main ch.)		dB	18	14
Expander noise level Expander VR Max./main VR. Min.		mV	2	

*European and Australian models only.

DISASSEMBLY INSTRUCTIONS

1) **To remove the Cabinet**

(A) Remove four screws from each side of Cabinet (Figure 1).
Be careful not to lose the screw inserts when the screws are removed.

Figure 1

(B) Remove three screws from upper Back Panel (Figure 2).

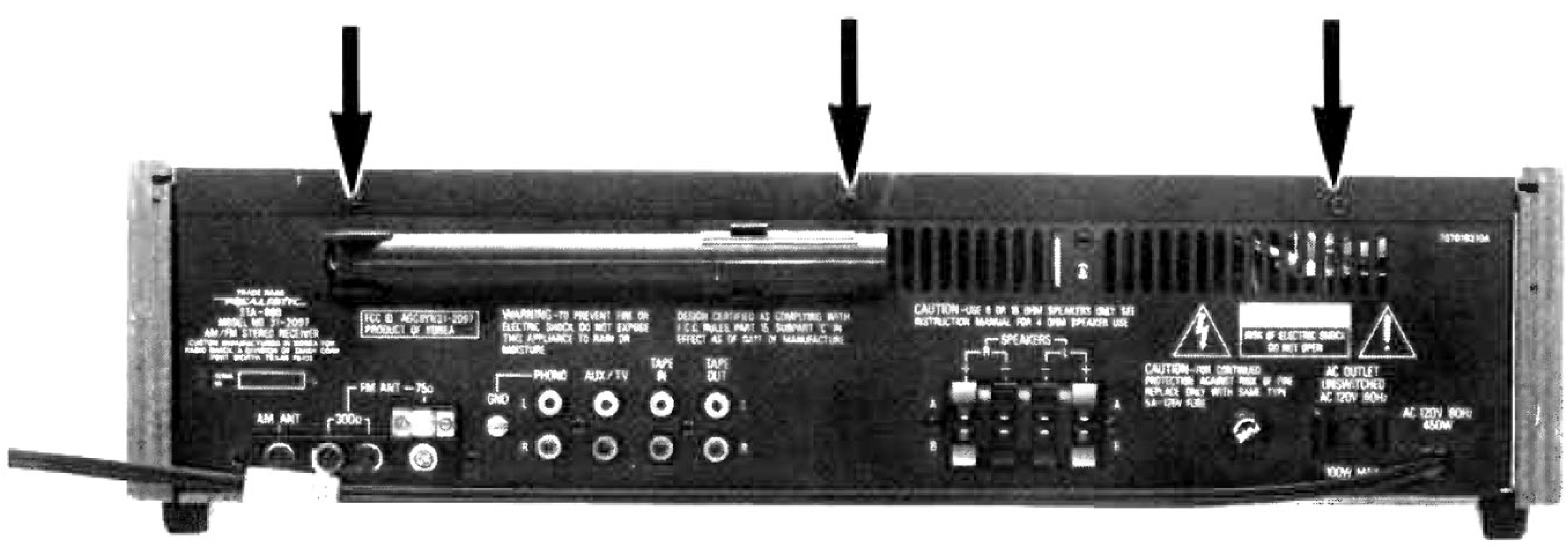


Figure 2

2) **To remove the Bottom Cover**

Turn the Receiver upside down and remove six screws from the bottom cabinet; and five screws from the bottom chassis (Figure 3).
Lift the Bottom Cover off.

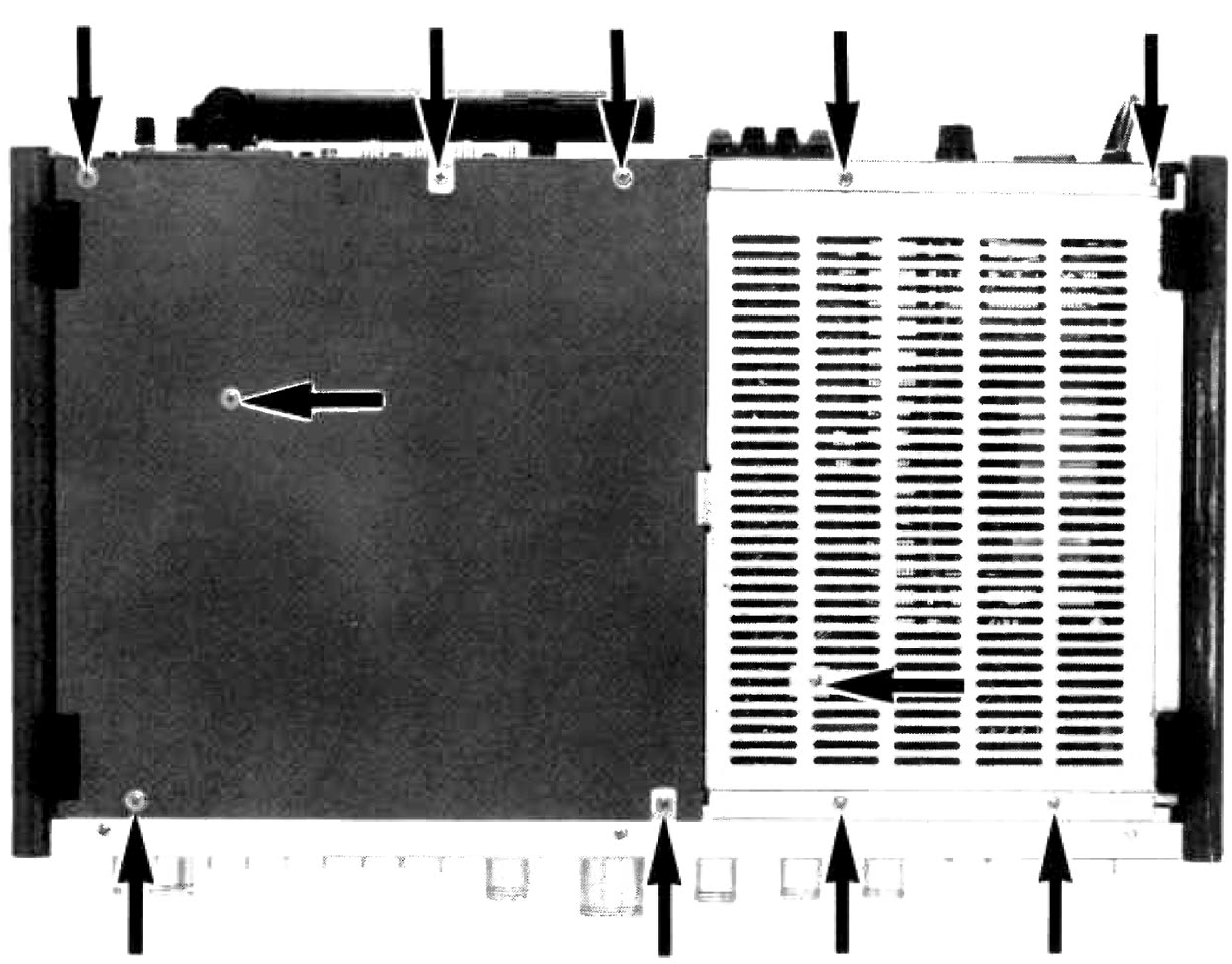


Figure 3

3) To remove the Front Panel (Aluminum Panel)

(A) Remove the Cabinet and Bottom Cover as described in 1. and 2.

(B) Remove three screws from top of Front Panel (Figure 4).

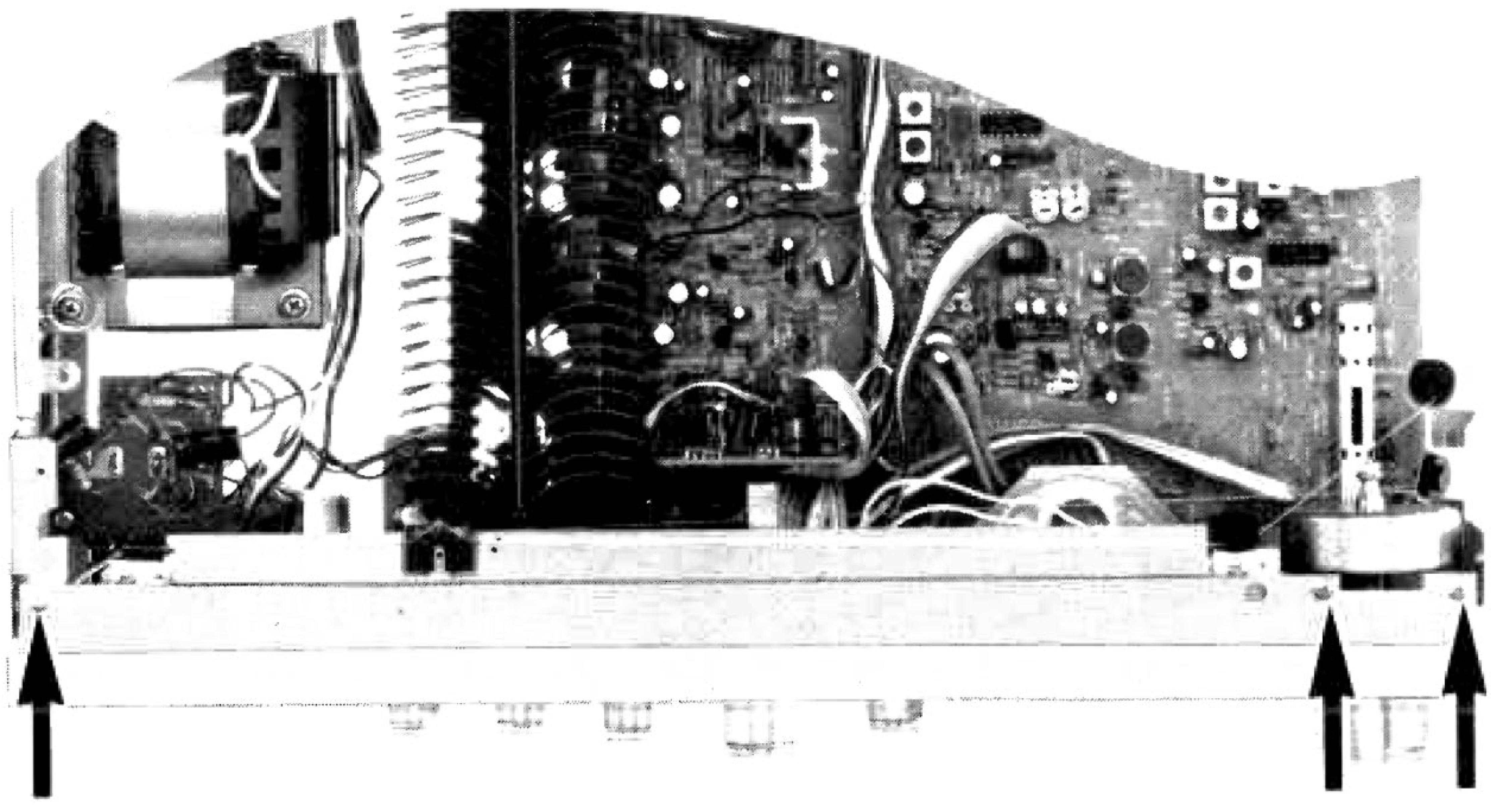


Figure 4

(C) Remove three screws from bottom of Front Panel (Figure 5).

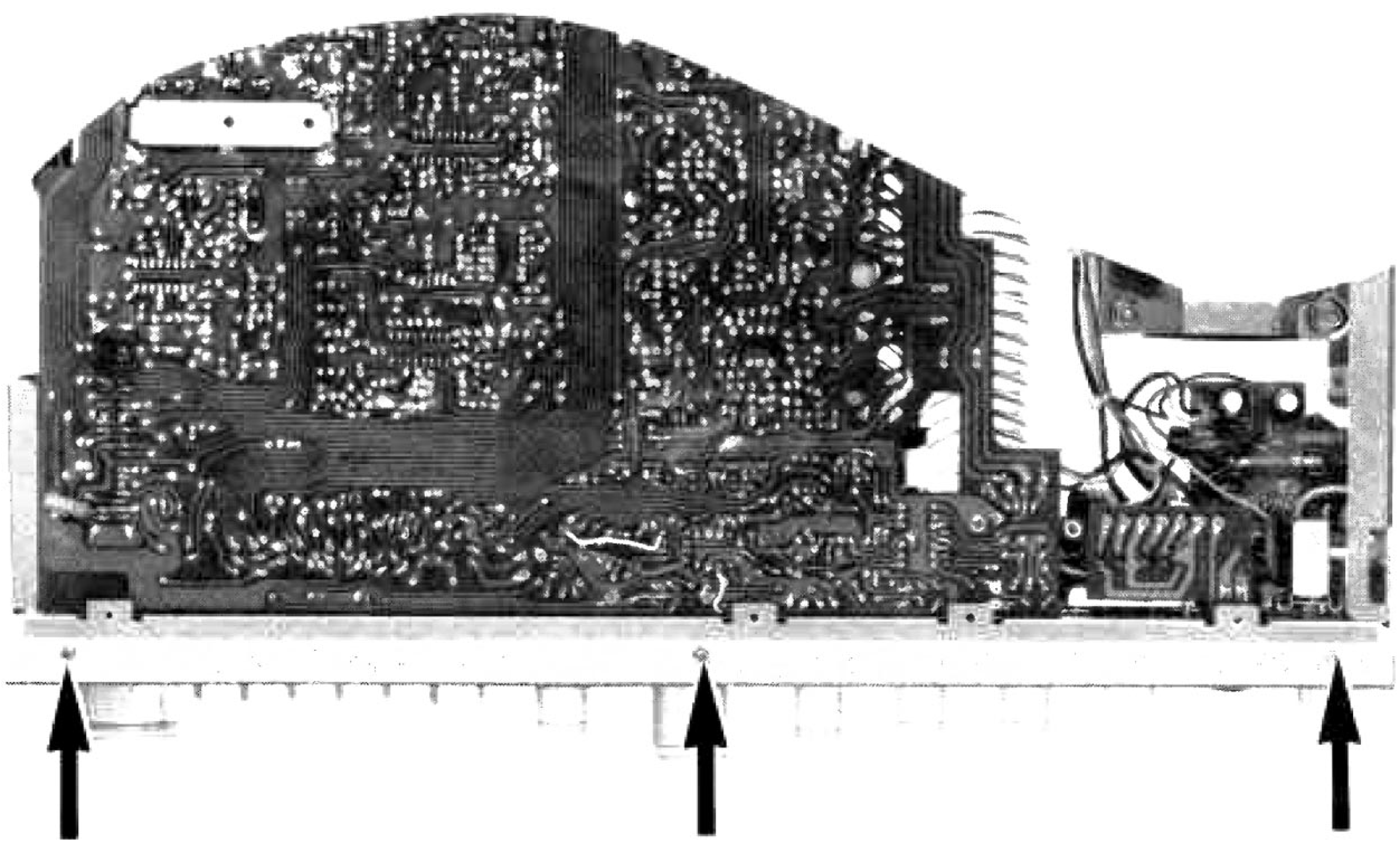
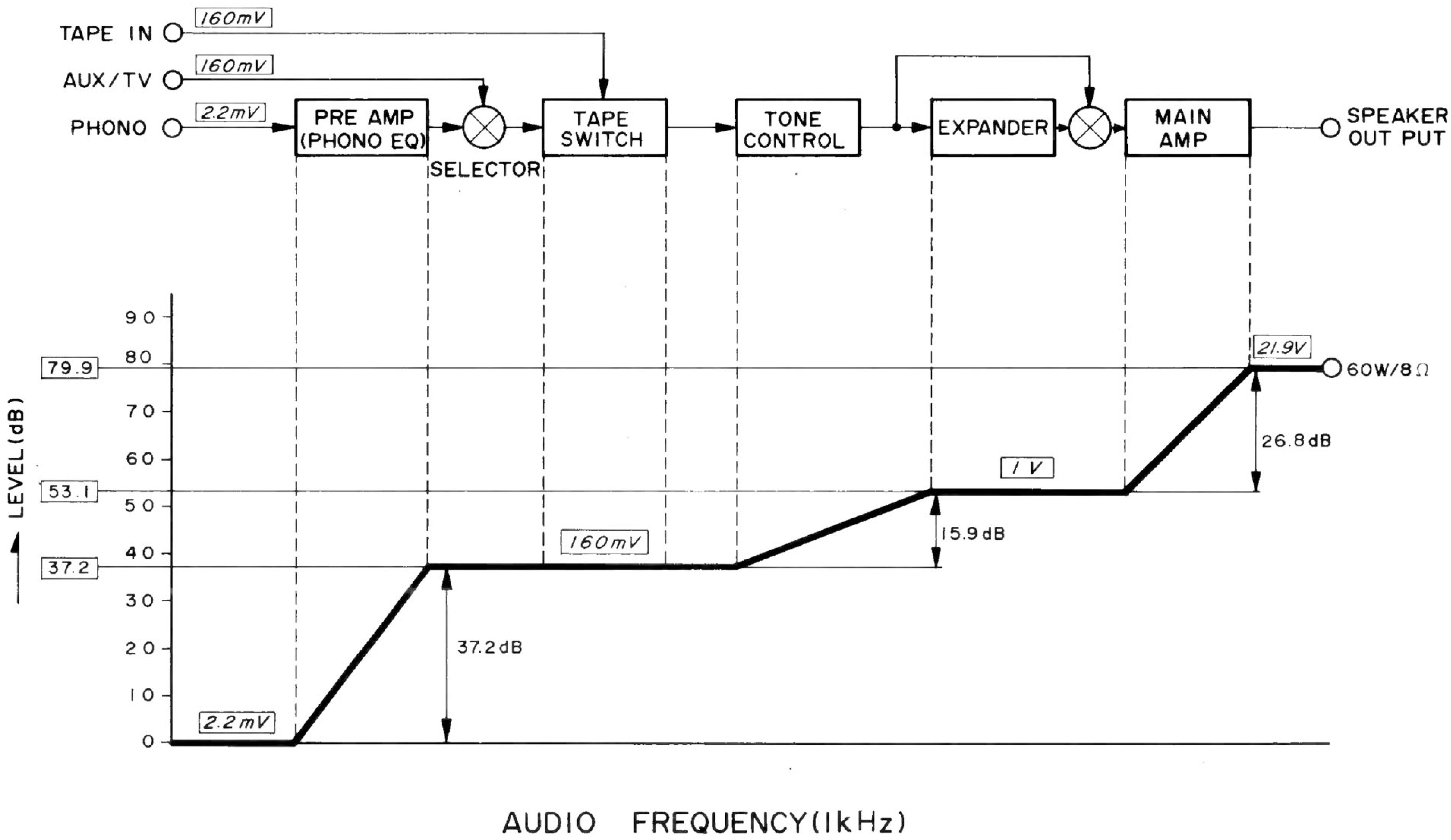


Figure 5

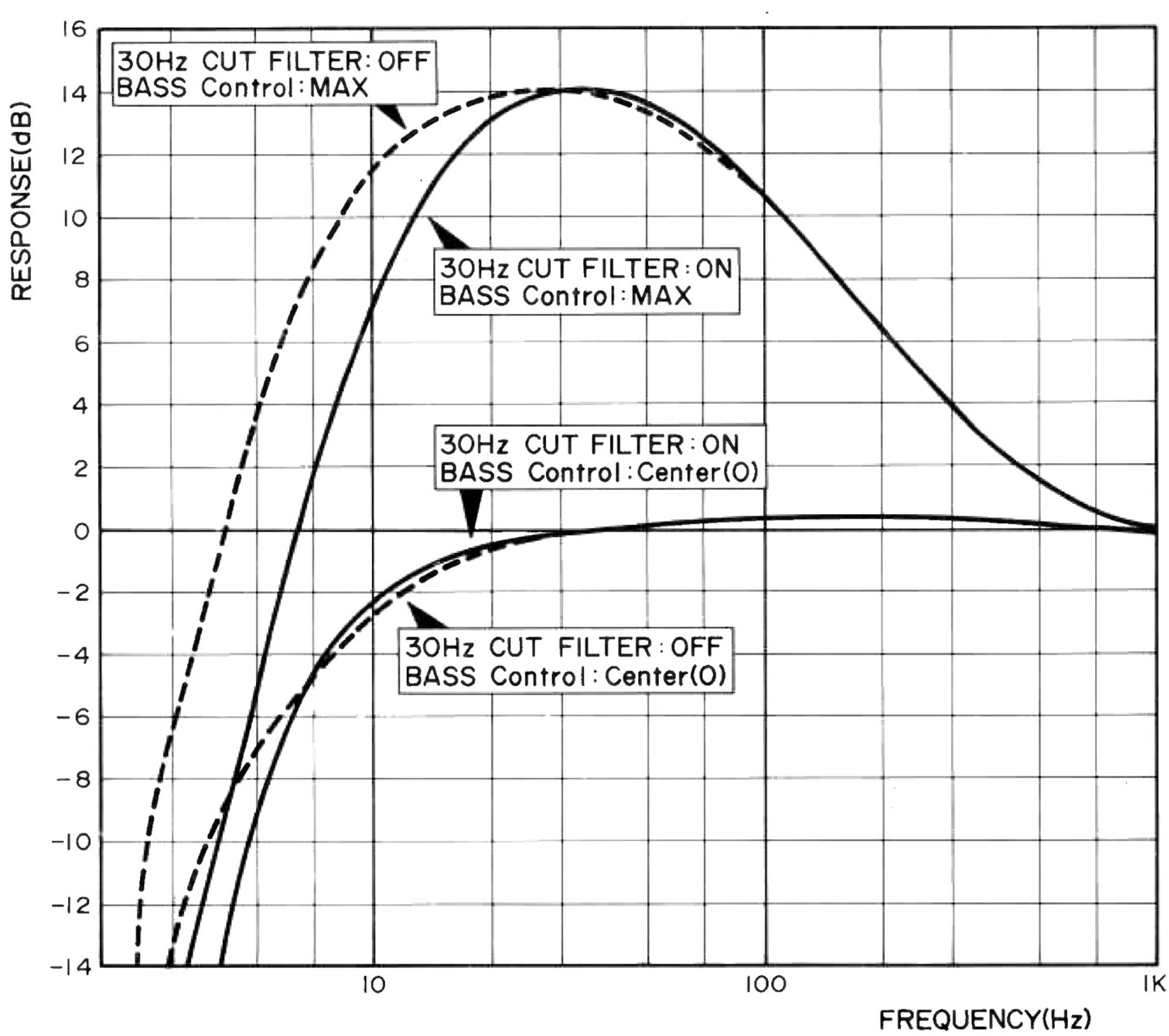
BLOCK DIAGRAM

※ AVAIRABLE ON EUROPEAN AND AUSTRALIAN MODELES ONLY.

LEVEL DIAGRAM



FILTER CURVE



CIRCUIT DESCRIPTIONS

Protector Circuit Description

Speaker Protective Circuit

The Speaker Protective Circuit is to protect the Speakers from switching transients.

- The signal is provided to the Speaker Output Terminals by the functioning FET TR607 (Left), and TR608 (right) after a five-second delay when the power switch is turned on.
  With **POWER** Switch on, Transistor TR609 and FET TR607, TR608 will turn on through a Time Constant circuit consisting of R622 and C620. (Refer to Figure 6.)
- When **POWER** Switch is off, C620 will be discharged by TR610 as it turns on; then TR609, TR607 and TR608 will turn off. (Refer to Figure 7.)

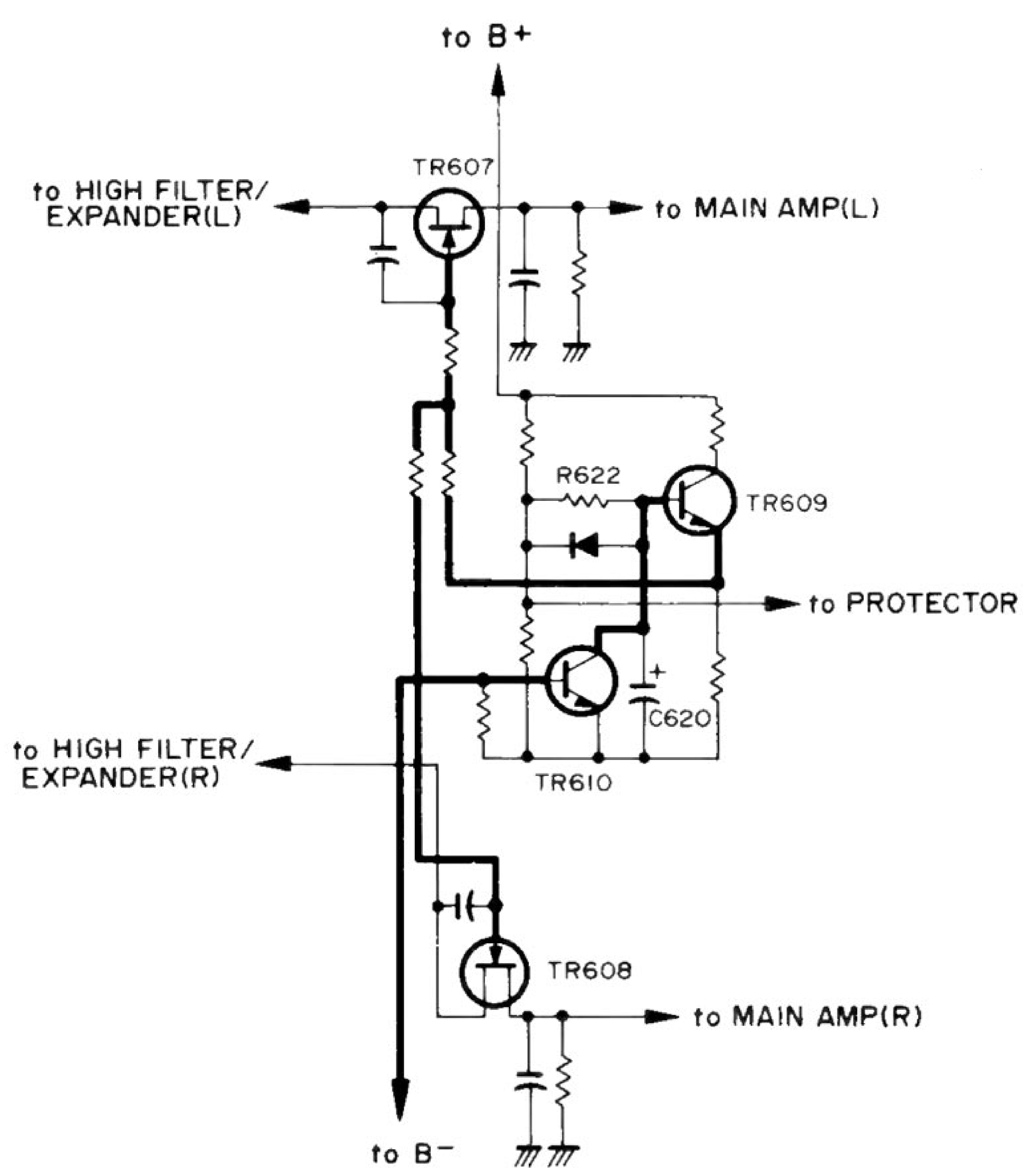


Figure 6

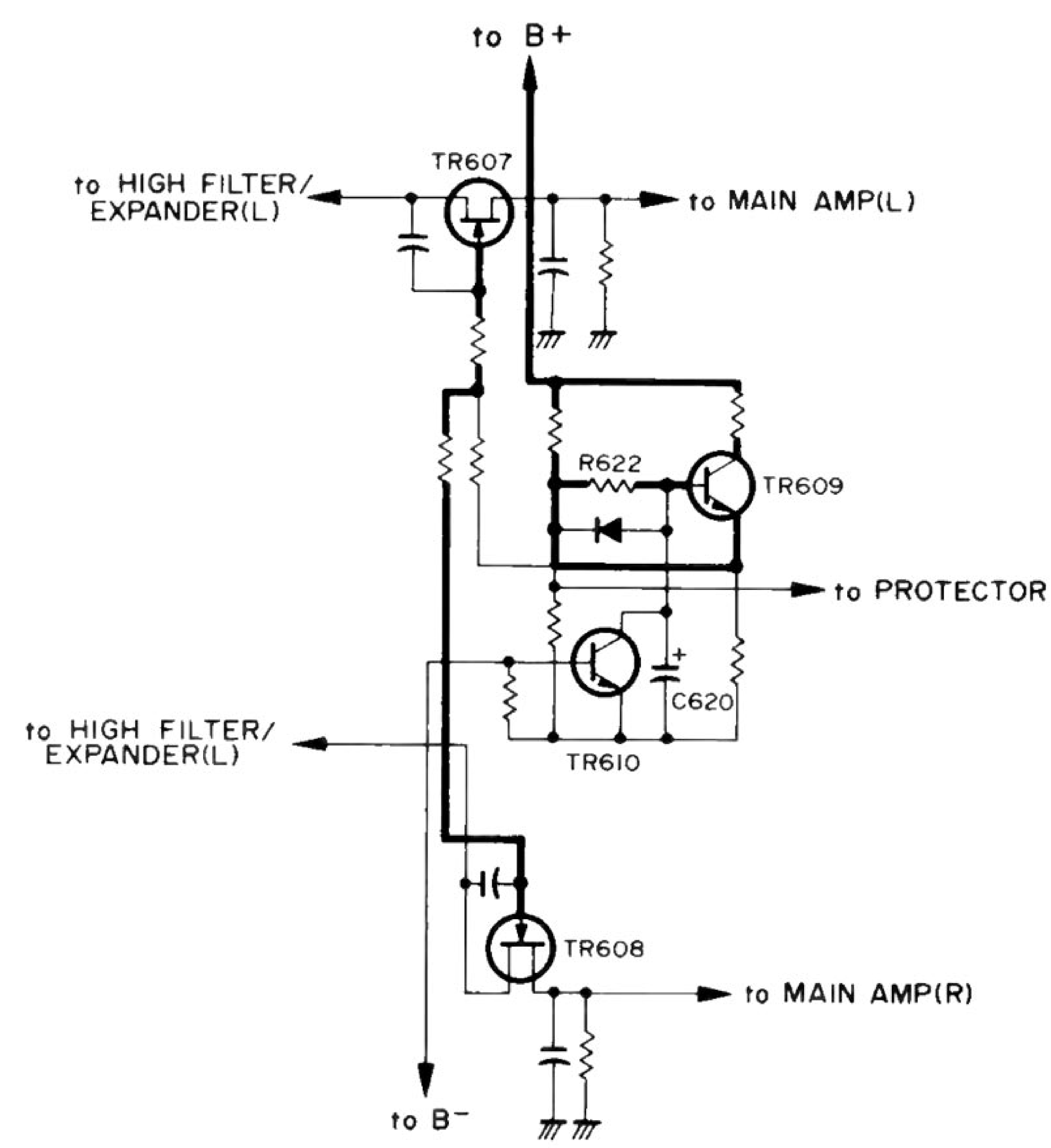


Figure 7

Muting Circuit

A Muting Circuit is built-in to eliminate any switching noise, when the SELECTOR Switch is turned from AM to FM (or FM to PHONO, PHONO to AUX/TV etc.). The Selector Switch is a shorting type. When the Selector Switch is turned from AM (or FM, PHONO, AUX/TV) to FM (or AM, PHONO, AUX/TV), the switch contact will make a momentary "short circuit" to ground. During this moment, TR611 will be turned off and then TR607 (left) and TR608 (right) will be turned off.

In this case, the signal source from EQ AMP is shut off and eliminates any switching noise. The Time Constant circuit (consisting of R629, C622 and R630) allows the cut-off condition to last for about 0.2—0.5 seconds, and then C622 charges and turns TR611 on again. (Refer to Figure 8.)

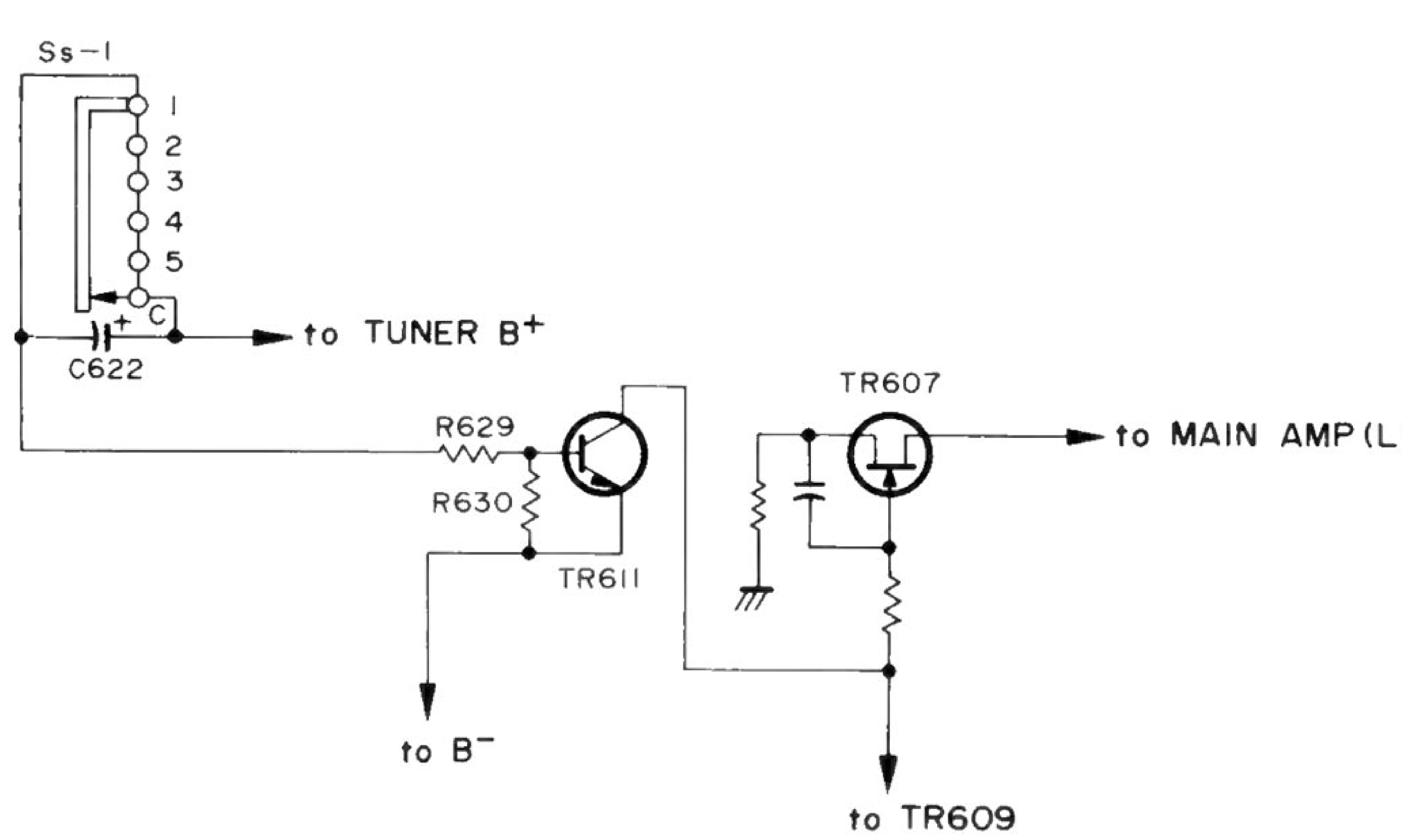


Figure 8

Main Amp Protective Circuit

The Main Amp Protective Circuit is to protect the Main Amp Transistor circuit from excessively high current.

- If the speaker terminals are shorted, or the load impedance of one channel (Left or Right) is less than 4 Ω, an excessively high current flows from the emitter to the collector of TR513 (L) (and TR514, R) and a voltage appears across R533 (L) (and R534, R). This voltage goes to the gate of SCR501 after being rectified by D505 (L) (and D506, R). When the voltage between gate and cathode increases to about 0.7 V, SCR501 will be turned on. Then transistor TR609 and FETs TR607 (L), TR608 (R) will turn off and the signal will be shut off.
- Turn the Receiver off to reset the Protective Circuit and wait approximately 30 seconds. After the problem is corrected turn the Receiver on again. (Refer to Figure 9.)

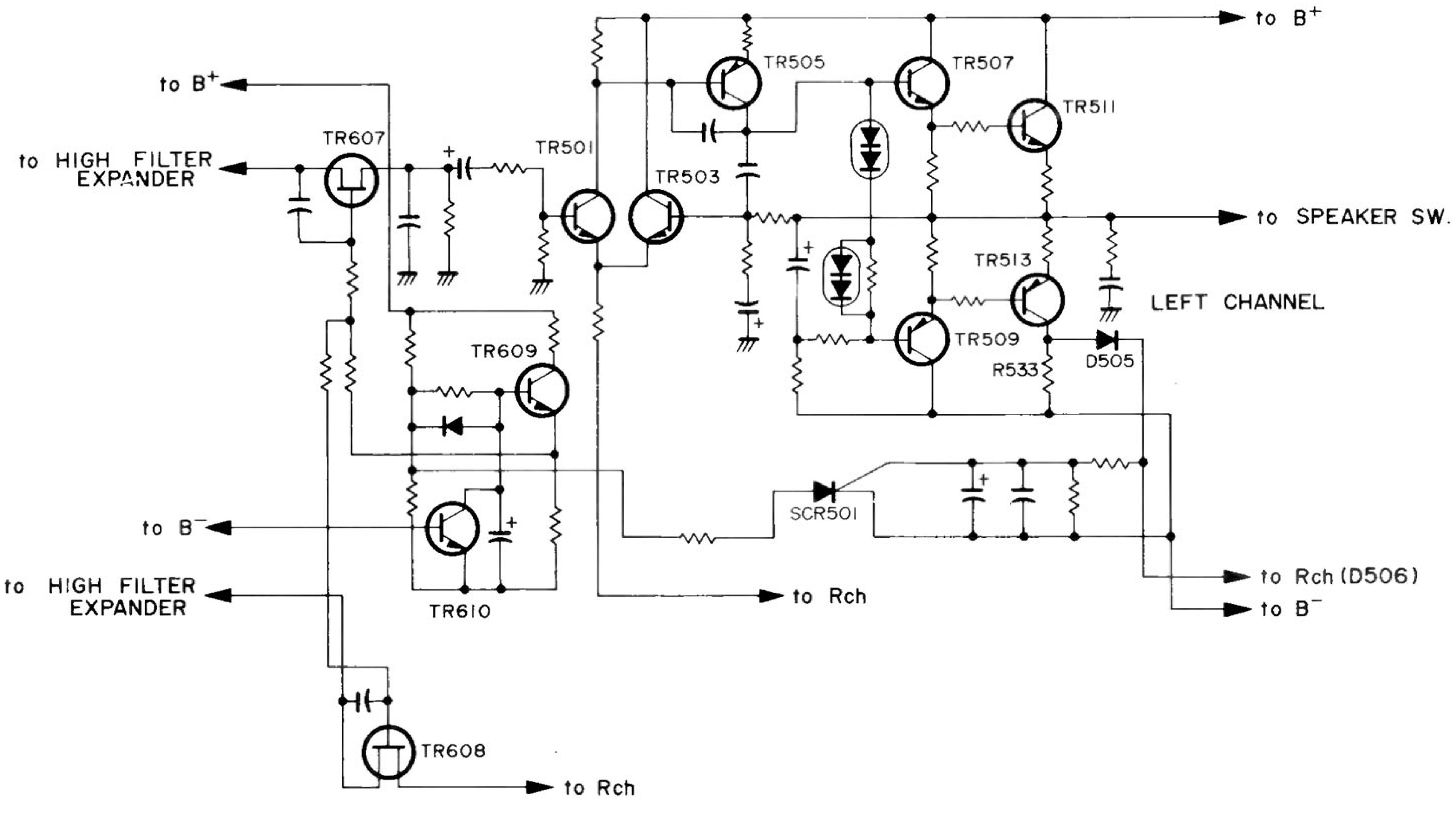


Figure 9

Abnormal Temperature Rise Protection

The STA-860 has two thermal protectors.

If the temperature of the Main Amp Heat Sink rises to 115°C/239°F, or Power Transformer temperature rises to 95°C/203°F, the thermal protector switch makes an open circuit and the POWER SUPPLY will be cut off. This protects the Main Amp and Power Transformer. In this case, the amplifier automatically shuts down and output will drop to 0 V. If this should occur, turn the Receiver off. When the temperature of the Main Amp Heat Sink falls to within the operating limits of the Receiver, the Thermal Protector switch will reset itself. When the problem cause is corrected, turn the Receiver on again. (Refer to Figure 10.)

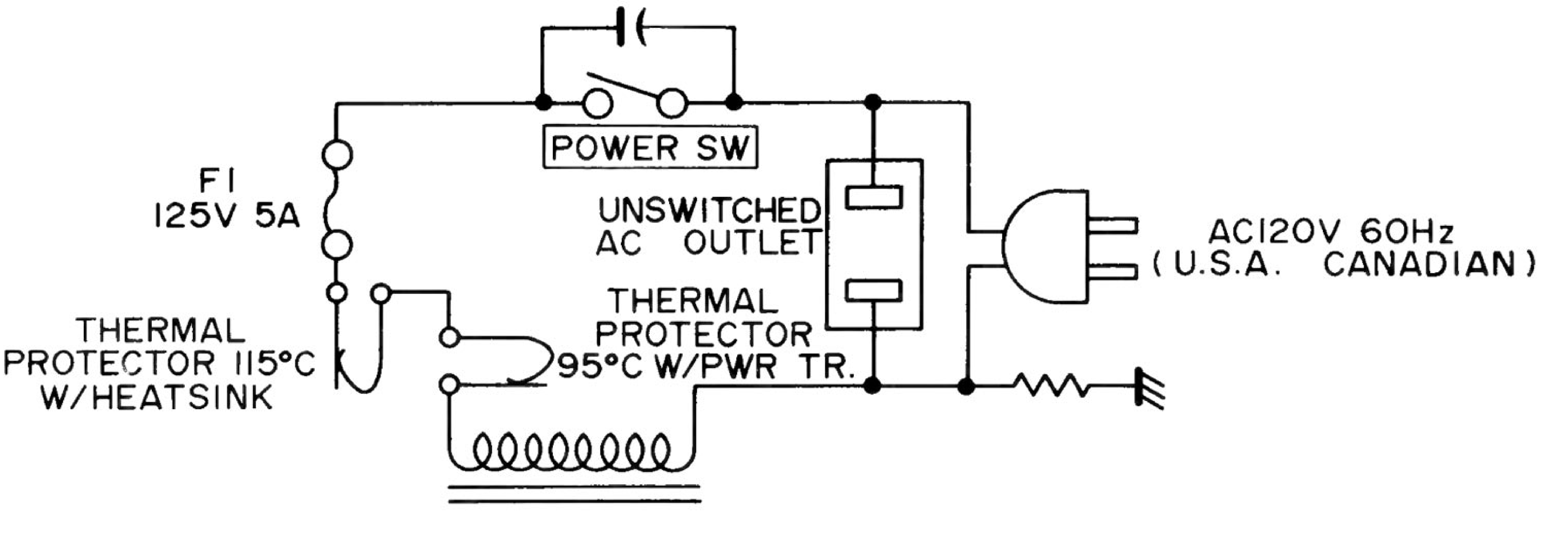


Figure 10

Expander Circuit

When the Expander Switch is turned on, the source signal from TR401(L) [TR402(R)] will be provided to Pin No. 3(L) [Pin No. 5(R)] of IC901.

At IC901, the signal will be compensated by C903/905/907, R905/907/909/911(L) [C904/906/908, R906/908/910/912(R)] and will go out from Pin 1(L) [Pin 7(R)]. Then they will be provided to the base of TR901(L) [TR902(R)] through R917(R) [R918(R)]-signal L_1 & signal R_1.

At the same time a part of output signal from IC901 will flow to Pin 2(L) [Pin3(R)] of IC902, (L Channel signal will be phase reversed here), and will be compensated by Band Pass Filter consists of IC903 (2/2), R921 and C910; and flow to Pin 5 of IC902 (2/2).

Output signal at Pin 7 of IC902 (2/2) which has been compensated again by VR901, R924/925 and C912 will be provided to TR902 through R928-Signal-L^1 & signal R_2.

Some of the output signal at IC902 (2/2) will flow to the Differential Amp IC903 (1/2), where L channel input signal will be phase reversed again and R channel input signal will be phase reversed at the first time. The signal will go to TR901 through R929-signal L_2 and $-R_1$.

As noted above, three different signal will be gathered to L and R channel output transistors TR901(L) and TR902(R) (Refer to Figure 11).

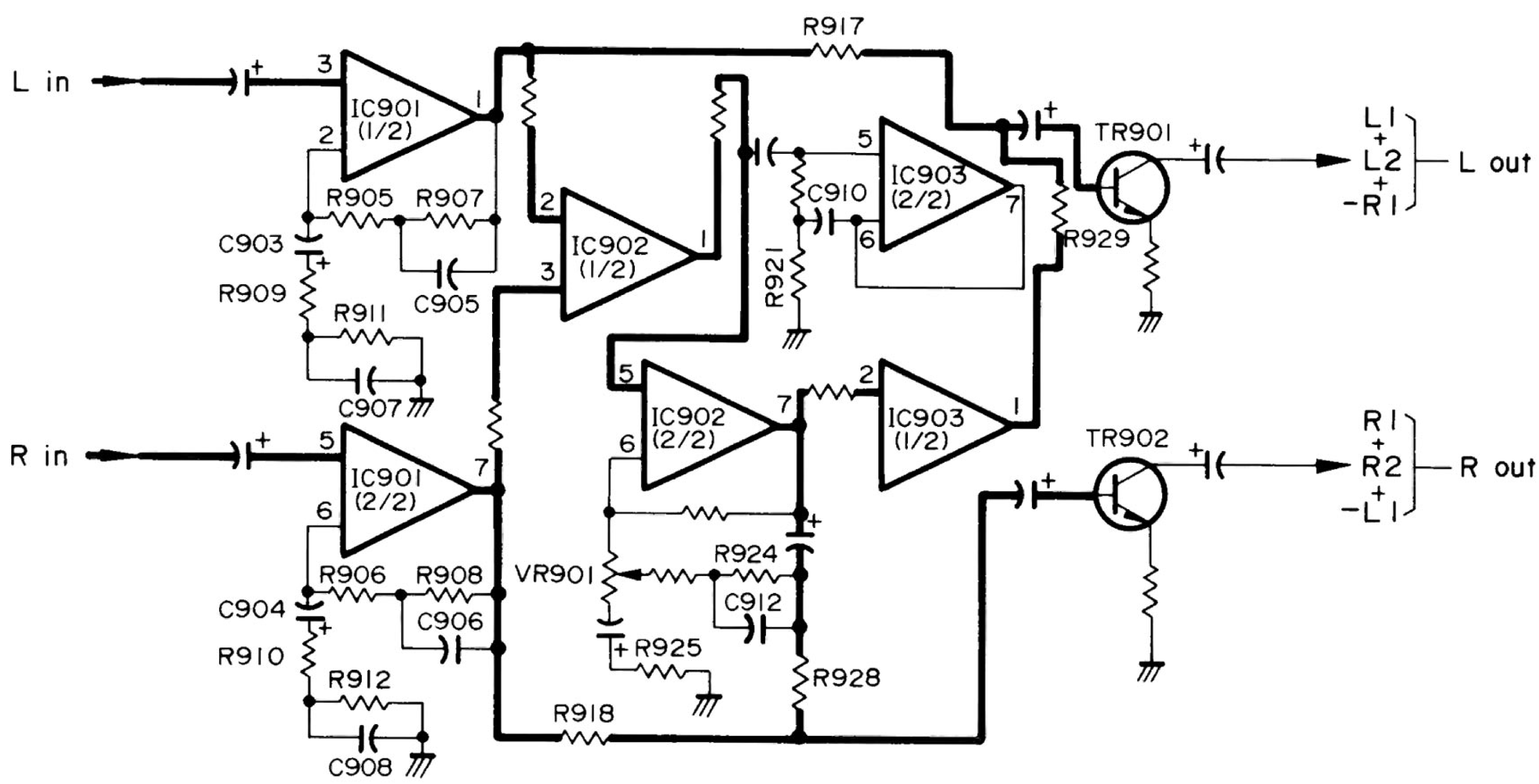
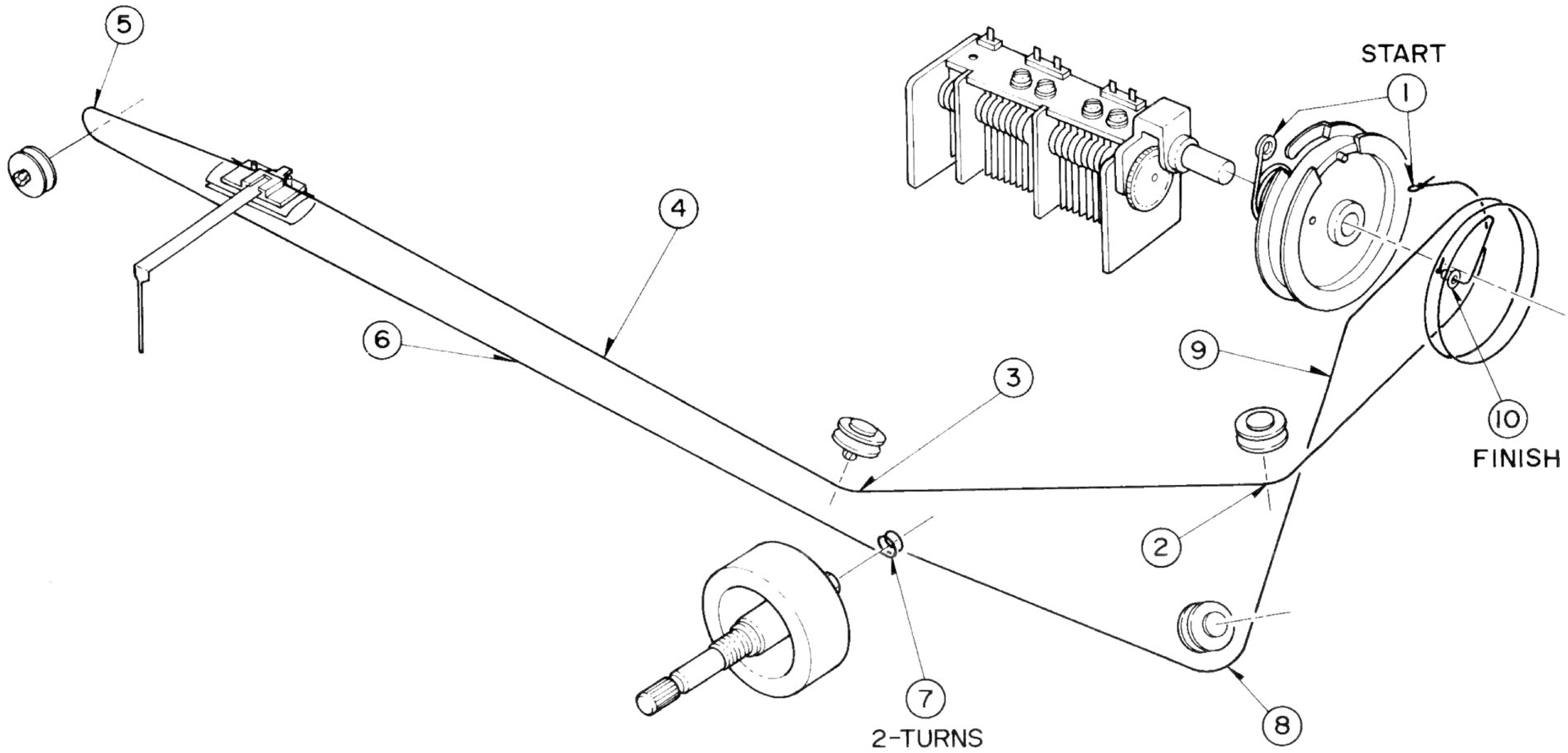


Figure 11

DIAL STRINGING DIAGRAM

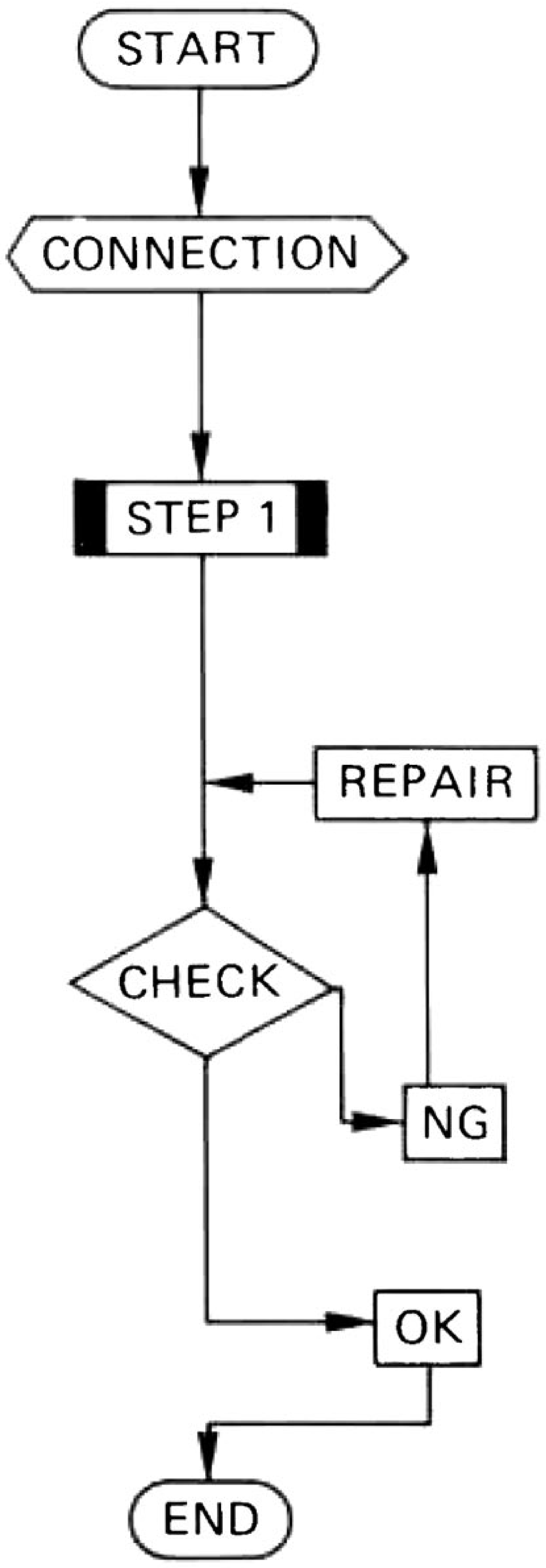


When Stringing Dial:

- Start with capacitor set at maximum (plates fully closed).
- Pointer positions should be at low end.
- Start at dial pulley spring (Position 1).
- Finish at dial pulley eyelet (Position 10).

OPERATIONAL CHECK

Power Supply Operation Check



- Connect AC Cord to standard AC power source.
- Power Switch ON and Dial lamp should light.

Check the Power Supply voltages.
** Figure 12 **

(1) Check Power Supply circuit on TUNER AUDIO P.C.B., Fuses, and Power Transformer.
(2) See TROUBLESHOOTING on Page 38.
DC Voltages are not correct.

DC Voltages are correct.

Proceed to next section.

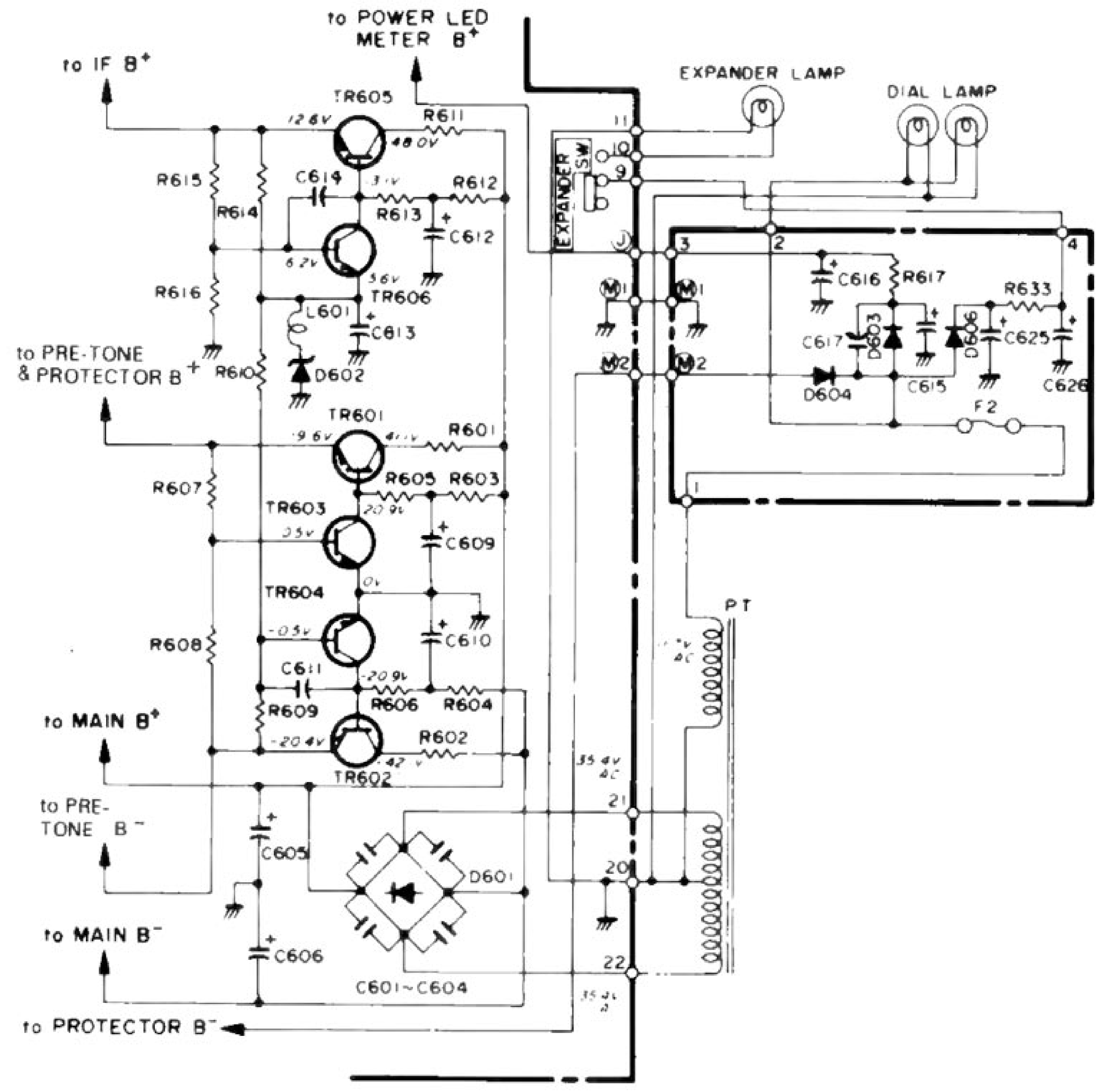
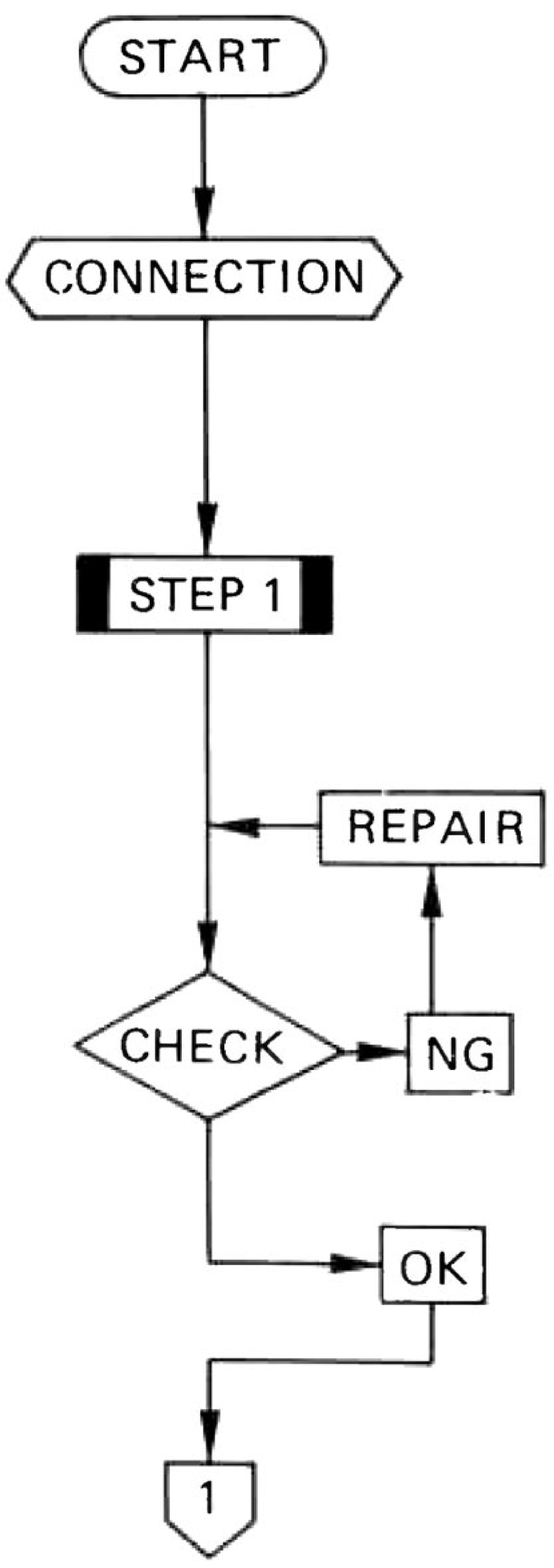


Figure 12

Audio Section Operation Check

Main Amp Operation Check



- Connect 8Ω Load to Speaker Output.
- Connect DC Voltmeter to C605 (Minus [−] to Ground) and C606 (Plus [+] to Ground) of Main Amp circuits on TUNER AUDIO P.C.B.

Check Power Supply Voltage with No Input.
** Must be ±48.5V ±0.5V.

(1) Check D601, C605, C606.
(2) Check for short-circuits.
(3) See TROUBLESHOOTING on Page 38

DC Voltage is not ±48.5V ±0.5V.

DC Voltage is ±48.5V ±0.5V.

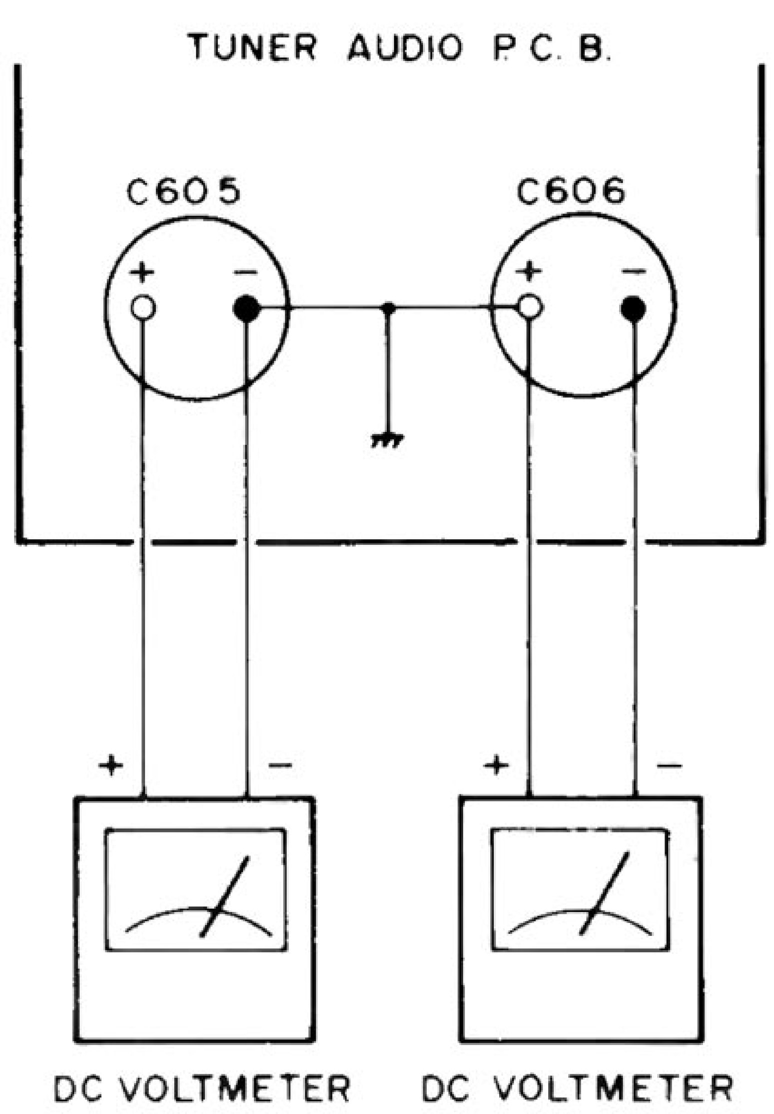


Figure 13

1

ADJUSTMENT

Adjust DC Balance and idling Current.
See ALIGNMENT INSTRUCTIONS on Page 32.

CONNECTION

- Connect DC Voltmeter to Pin 16 (L) or Pin 18 (R) and GROUND of TUNER AUDIO P.C.B.

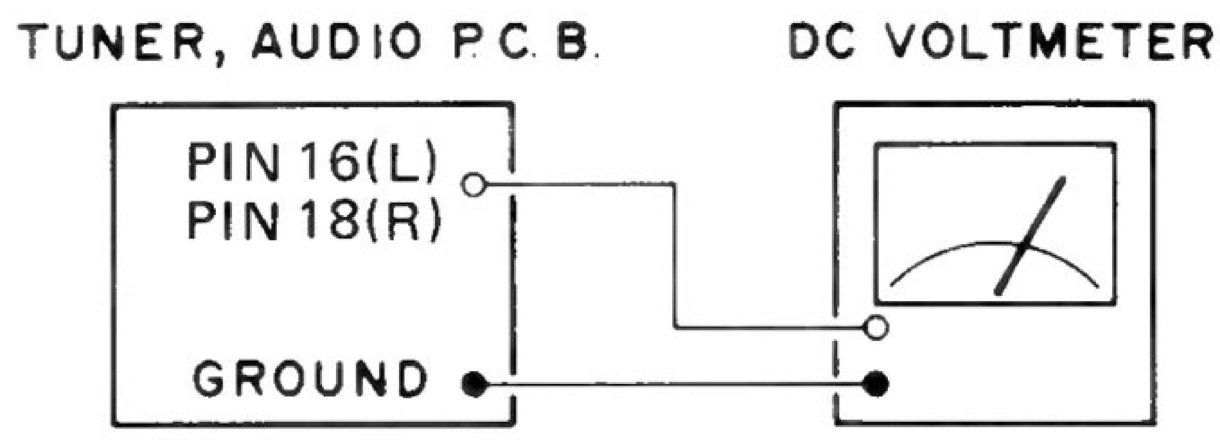


Figure 14

STEP 2

Check for balance of DC voltage at L and R channel output terminals.
** within ±50 mV.**

REPAIR — (1) Check TR501, 503 (L) or TR502, 504 (R).

CHECK

NG — DC Voltage over ±50 mV.

OK — DC Voltage within ±50 mV.

CONNECTION

- Connect DC Voltmeter to R531 (L ch) or R532 (R ch).

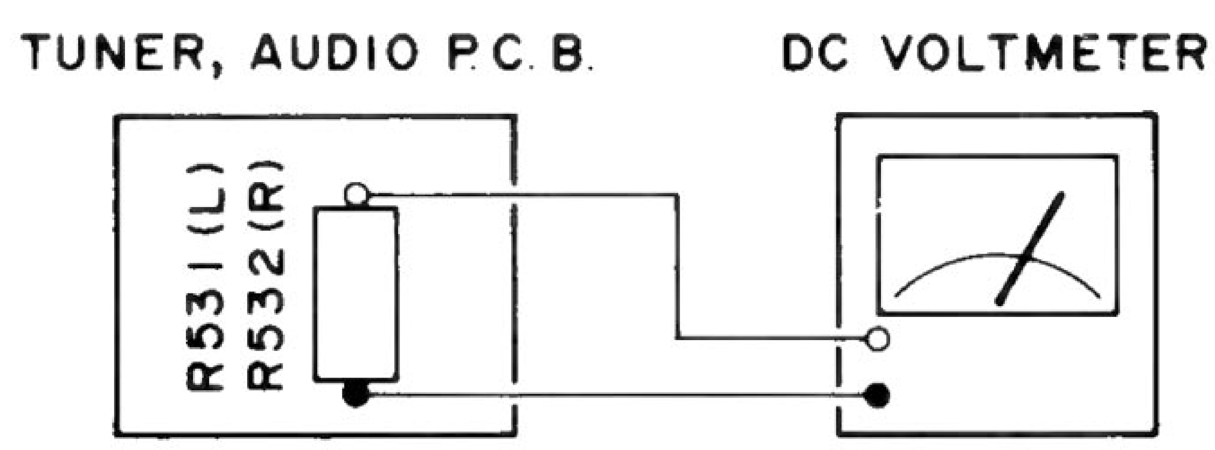


Figure 15

STEP 3

Check the idling current of Main Amp. with no input.
Check the DC Voltage across Emitter resistor R529 (R531) (L ch) and R530 (R532) (R ch).
** should be 2.35 mV +4.7/−1.88 mV. **

REPAIR
(1) Check the value of R541 (L ch) and R542 (R ch).
(2) Check the Bias circuit of D501, D503 (L ch) and/or D502, D504 (R ch).
(3) Check TR505 (L ch) and TR506 (R ch).
(4) Check TR501, TR503 (L ch) and TR502, TR504 (R ch).
(5) Check for short-circuits on TUNER AUDIO P.C.B.

CHECK

NG — DC Voltage is above 7.05 mV or below 0.47 mV.

OK — DC Voltage is 2.35 mV +4.7/−1.88 mV.

2

2

CONNECTION

- Connect Oscilloscope and V.T.V.M. to Speaker Terminal.
- Connect 8Ω load to Speaker Output.
- Connect Audio Osc. to input of Main Amp circuit: C503's plus (+) side (L), and/or C504's plus (+) side (R).
- Input should be 1 V and output should be 21.9 V (at 1 kHz).

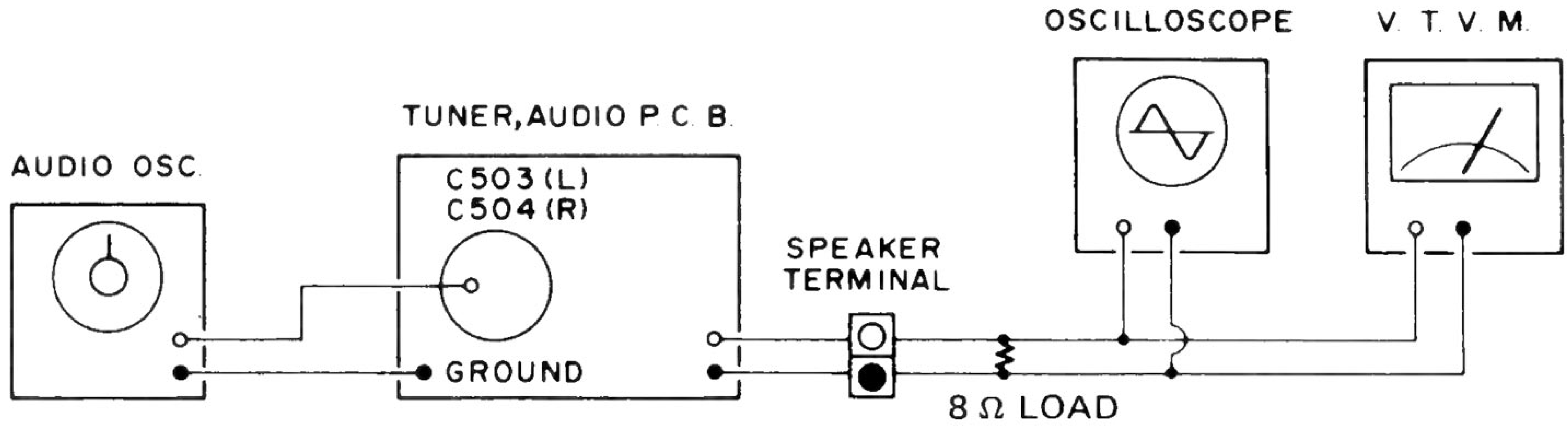


Figure 16

STEP 4

Check for symmetrical clipping of Output Signal wave shape.
** input level should be about 800 mV to 1.3 V. **

CHECK

REPAIR
(1) Check TR501, 503, 505, 507, 509 (L) and TR502, 504, 506, 508, 510 (R).
(2) Check STEP 2 and STEP 3.
(3) Check Main Amp. circuits.

NG
Output signal wave is not clipping symmetrically.

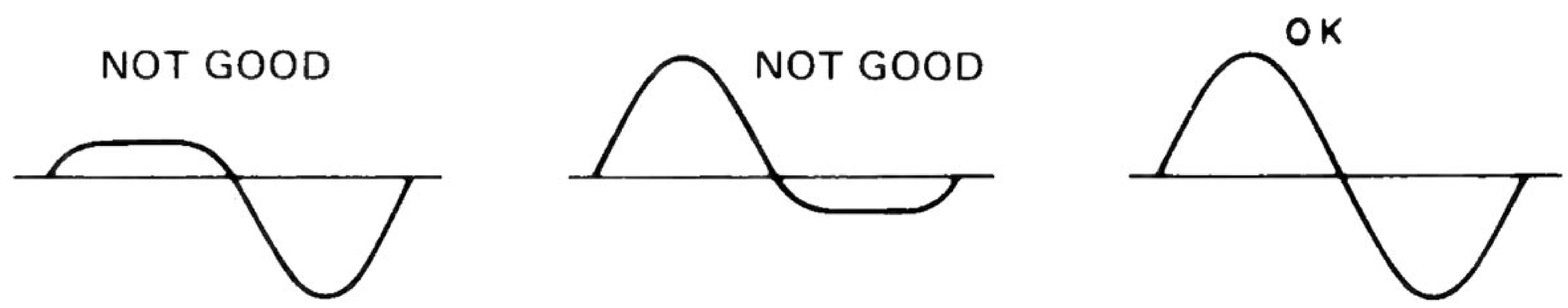


Figure 17

OK
Symmetrical clipping (Balanced) of Output signal wave.

ADJUSTMENT

Adjust output from Audio Osc. (1 kHz) to produce 60 watts rated output power.

STEP 5

Check the Main Amp. Gain.
** should be about 26.8 dB **

$$\left(dB = 20 \log \frac{\text{OUTPUT Voltage}}{\text{INPUT Voltage}} \right)$$

CHECK

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

NG
Input level is not 1 V ±2 dB.

OK
Input level is at least 1 V ±2 dB for rated output power.

END

Proceed to next section.

Preamp. Operation Check

START

CONNECTION

- Connect Audio Osc. to PHONO Input.
- Connect Oscilloscope and V.T.V.M. with decibel scale to TAPE OUT Jack.
- Set SELECTOR Switch to PHONO.

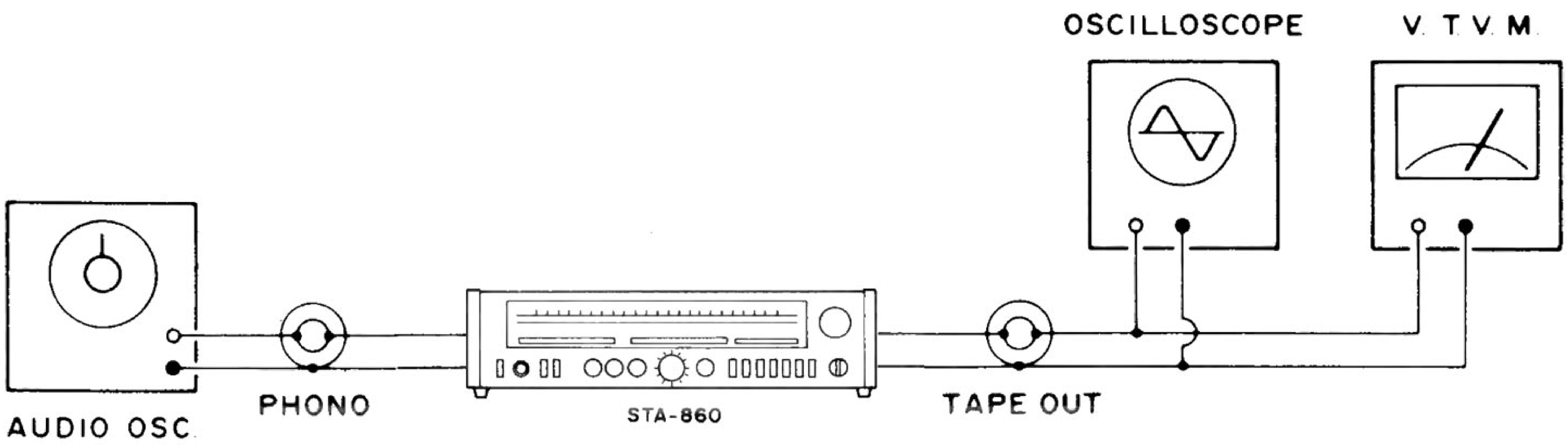


Figure 18

STEP 1

Check the PHONO Equalization Response.

** RIAA Curve **

100 Hz — +12.9 dB
1 kHz — 0 dB
10 kHz — −13.7 dB

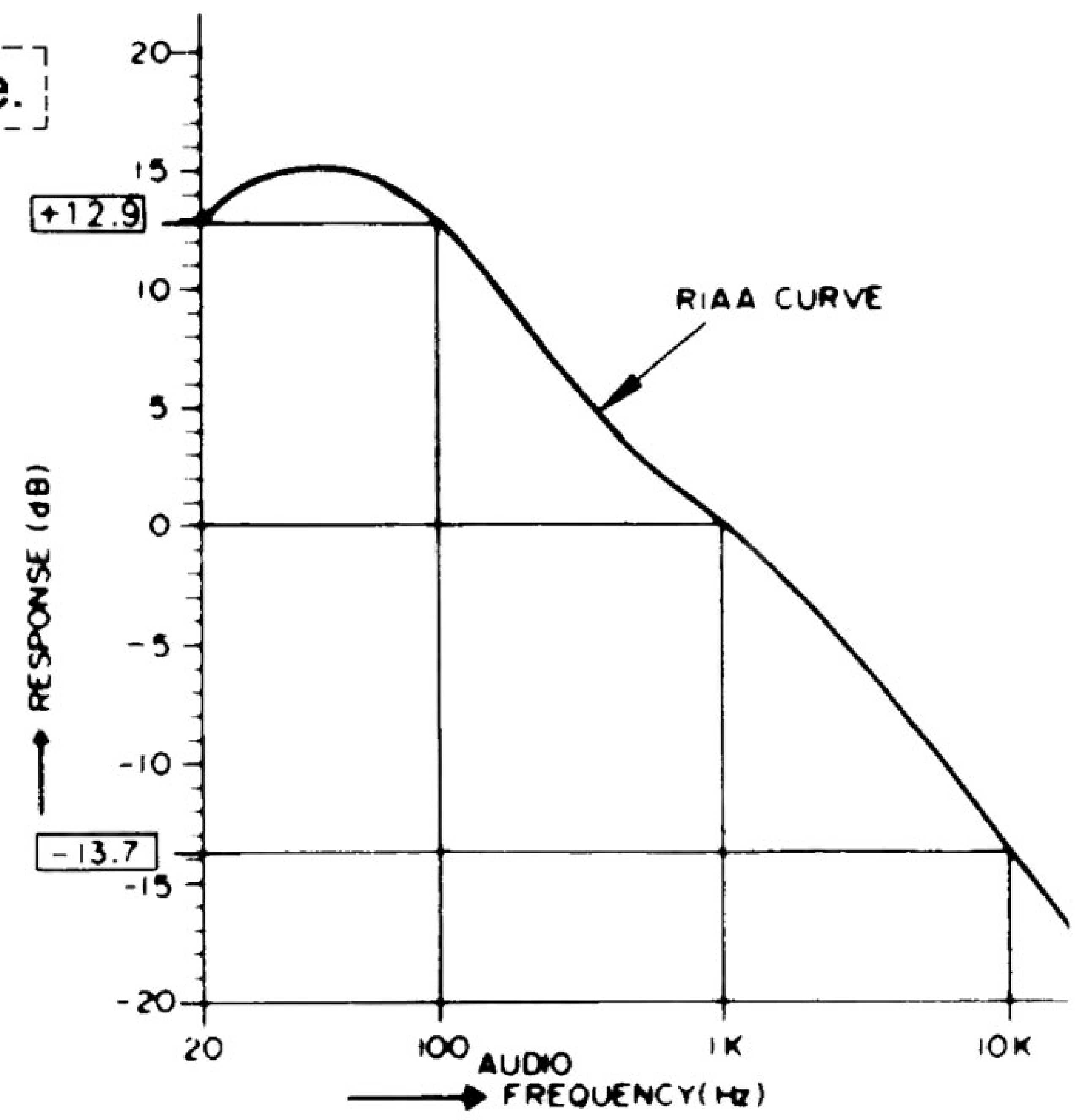


Figure 19

REPAIR

(1) Check IC301.
(2) Check C307, C309, R309, R311 (L ch) and C308, C310, R310, R312 (R ch).
(3) Check PRE amp. circuits.

CHECK

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.

Tone Control Operation Check

START

CONNECTION

- Connect Audio Osc. to AUX/TV input jack.
- Connect Oscilloscope and V.T.V.M. to Speaker Terminal.
- Connect 8Ω load to Speaker Output.
- Set SELECTOR Switch to AUX/TV position.
- TAPE MONITOR: OFF
- MONO Switch: STEREO
- LOUDNESS: OFF

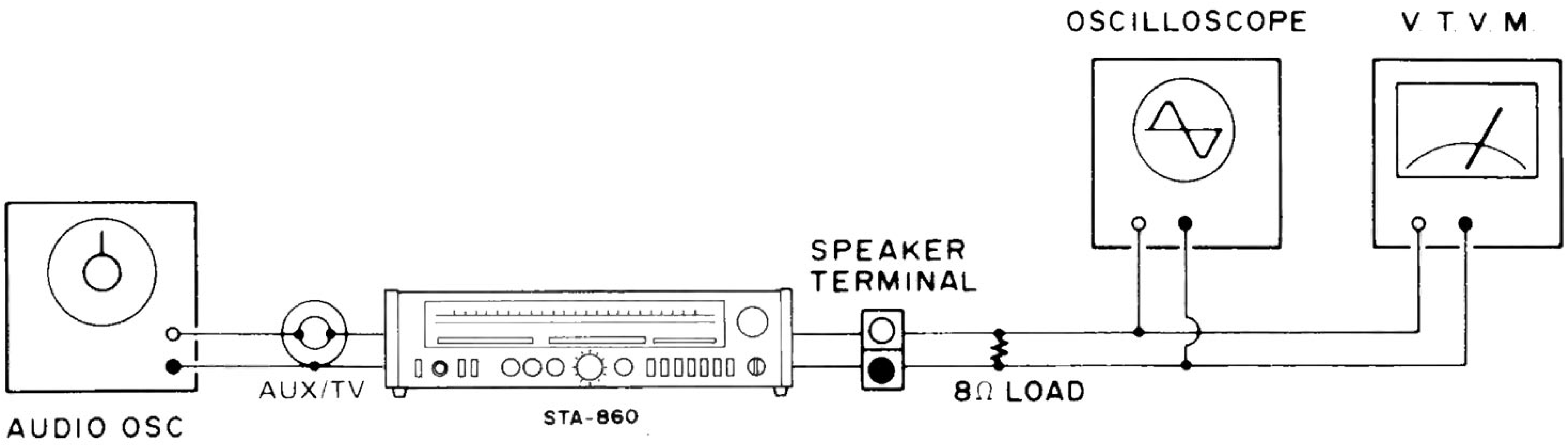


Figure 20

STEP 1

Check BASS Action at 100 Hz.

** TONE CONTROL Curve **

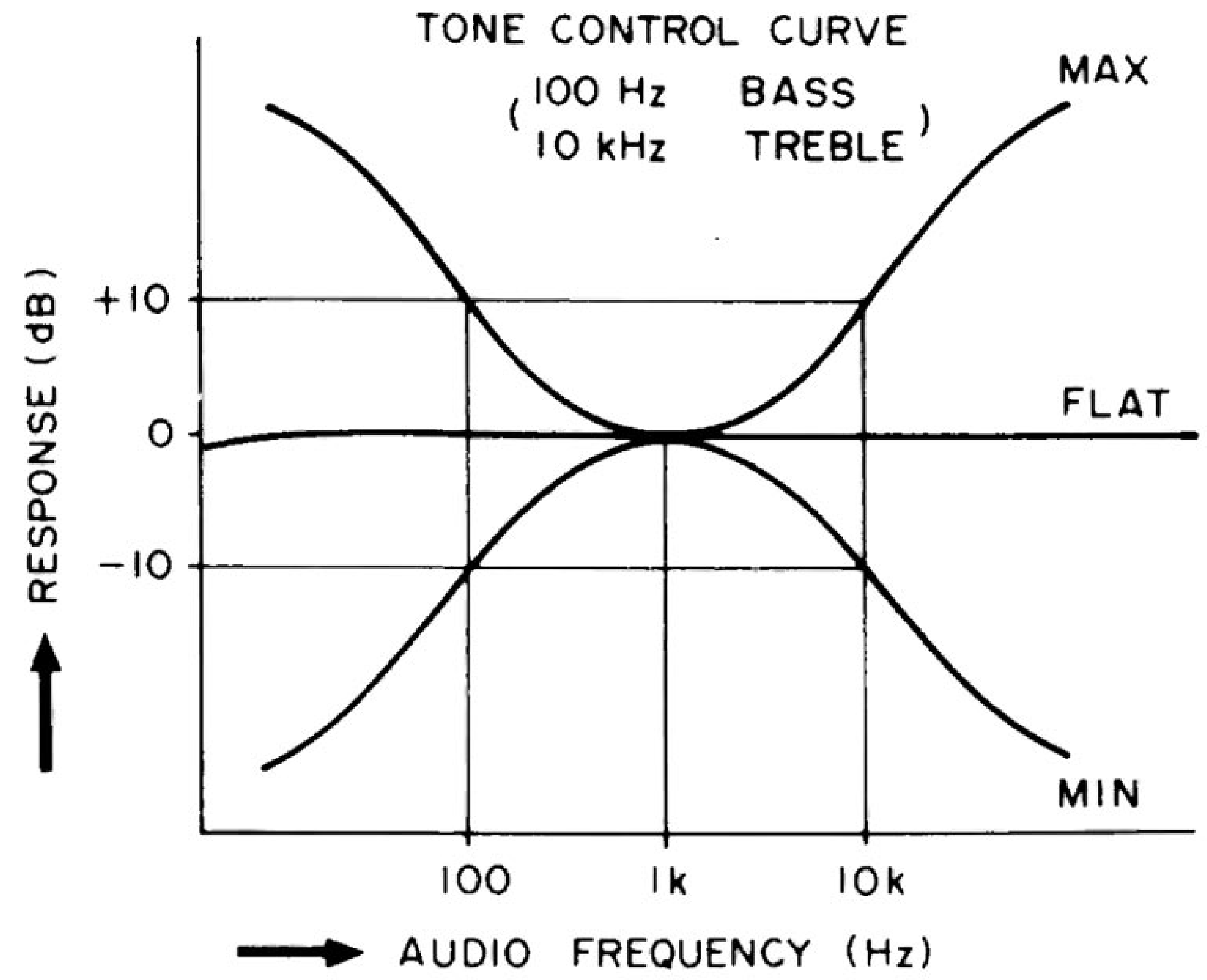


Figure 21

REPAIR

(1) Check Bass Control circuit on TUNER AUDIO P.C.B.

(2) See TROUBLESHOOTING on Page 40.

CHECK

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

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

3

3

STEP 2

Check TREBLE Action at 10 kHz

** TONE CONTROL Curve (Figure 21) **

REPAIR

(1) Check Treble Control circuit on TUNER AUDIO P.C.B.
(2) See TROUBLESHOOTING on Page 40.

CHECK

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 48 mV RMS output level.
(−30 dB Volume position)

** LOUDNESS Curve **

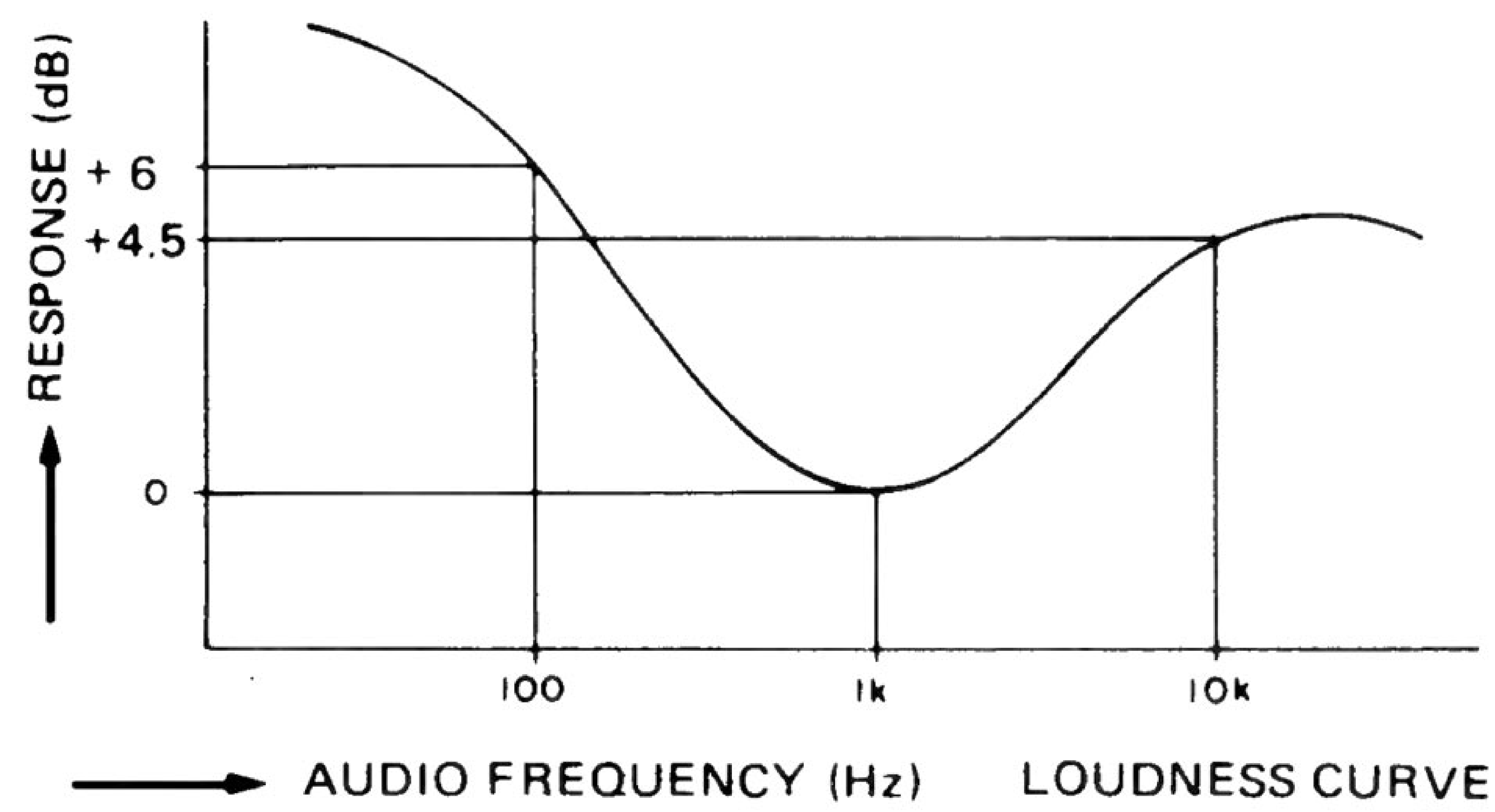


Figure 22

REPAIR

(1) Check Loudness circuit on TUNER AUDIO P.C.B.
(2) See TROUBLESHOOTING on Page 40.

CHECK

NG

Loudness Compensation does not fall within +6±2.5 dB at 100 Hz and +4.5±2.5 dB at 10 kHz.

OK

Loudness Compensation falls within +6±2.5 dB at 100 Hz and +4.5±2.5 dB at 10 kHz.

END

Proceed to next section.

Protector Circuit Operation Check

START

CONNECTION

- Connect Audio Osc. (1 kHz) to AUX/TV input jack.
- Connect Audio Oscilloscope and V.T.V.M. to Speaker terminals.
- Connect 2, 4 or 8Ω Load to Speaker Output terminal.

STEP 1

Check the reset circuits
** Figure 23, 24 **

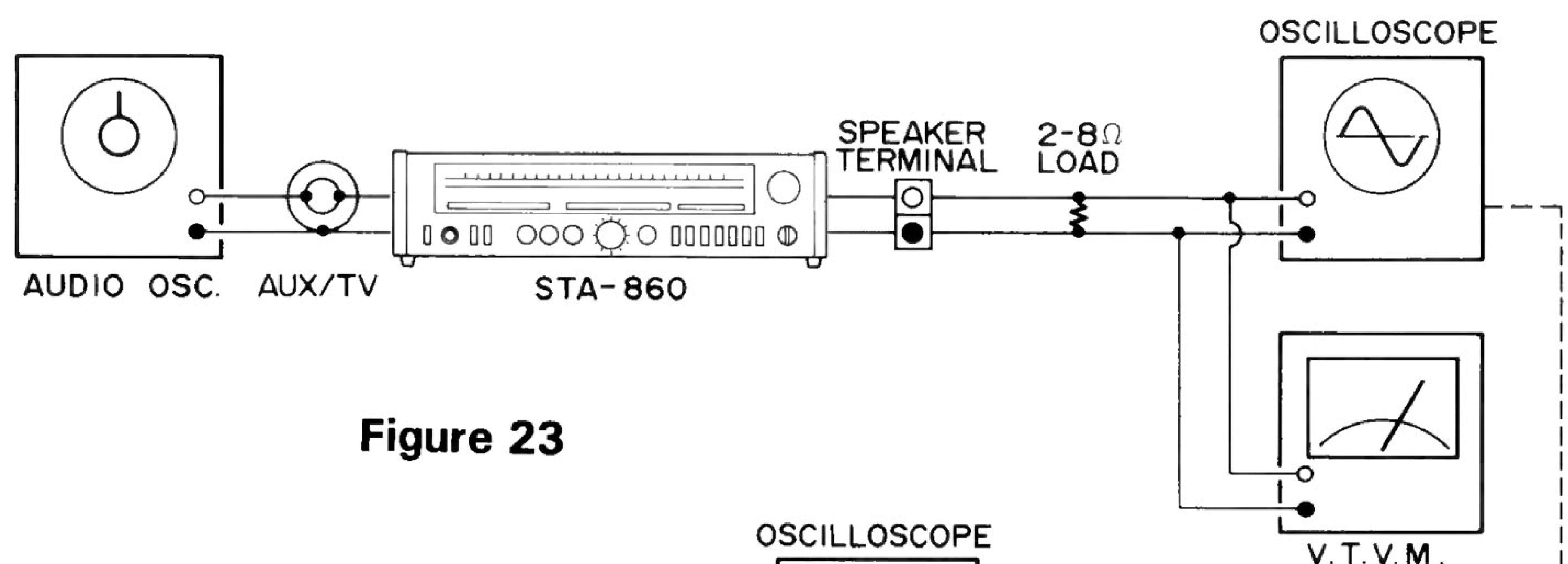


Figure 23

(When protector circuit is activated)

Figure 24

(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 signal is shorted (Figure 24).
(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 TOUBLESHOOTING on Page 41.)

CHECK

NG — Reset circuit does not work.

OK — Reset circuit works.

END — Proceed to next section.

Output Power LED Meter Operation Check

START

ADJUSTMENT

See POWER LED METER ADJUSTMENT on Page 33.

CONNECTION

- Connect Audio Osc. (1 kHz) to AUX/TV input jack.
- Connect 8Ω load to Speaker output terminals.
- Connect Oscilloscope and V.T.V.M. to Speaker terminals. (Output level: 0.3 – 60 W Figure 25).

STEP 1

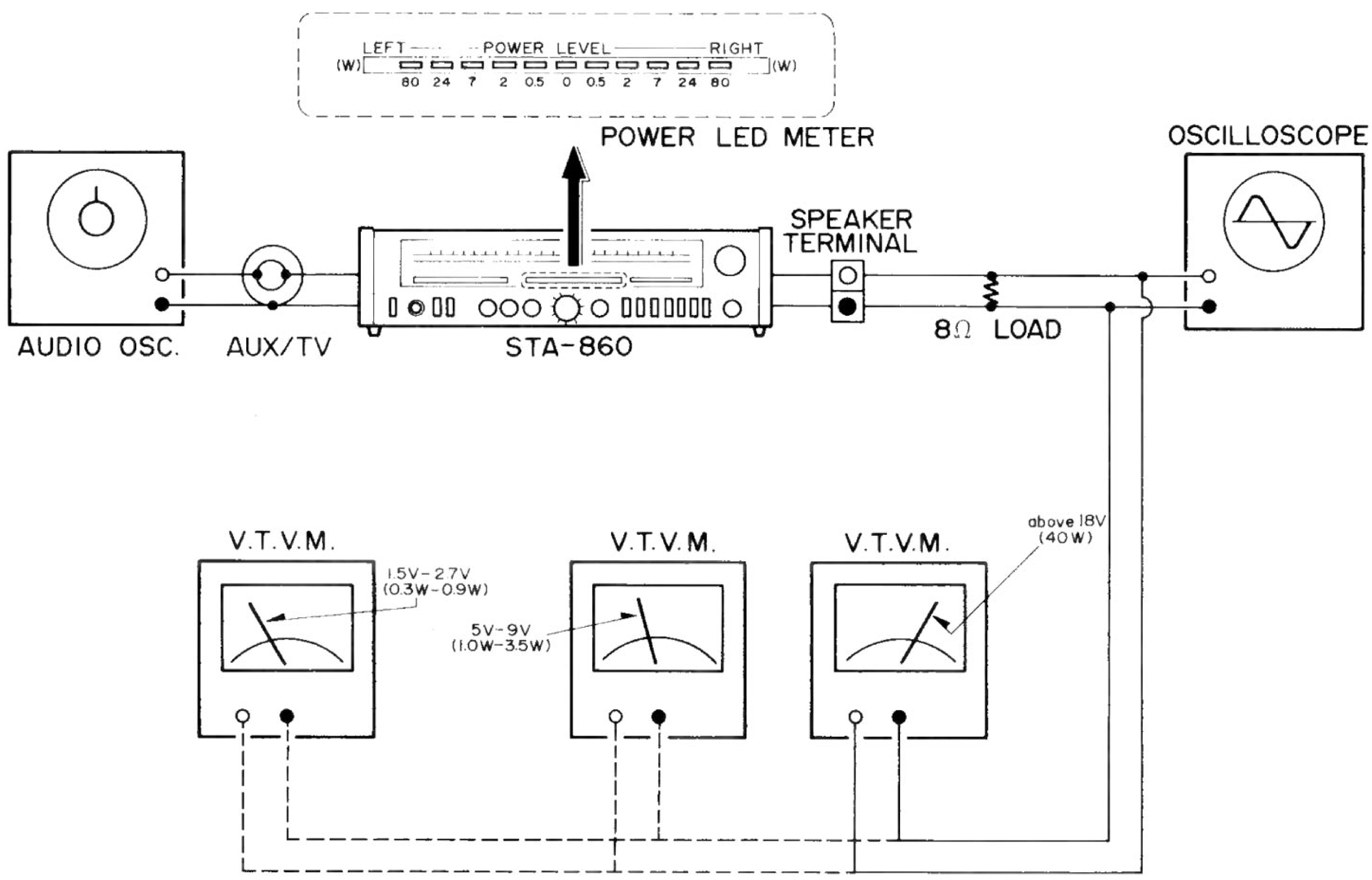


Figure 25

Output level on V.T.V.M.

(1) 1.5 – 2.7 V (0.3 – 0.9 W) .... 1st LED lights
(2) 5 – 9 V (1.0 – 3.5 W) .... up to 3rd LED Lights
(3) above 22 V (Above 60 W) .... all LEDs light
* Below 1.5 V (Below 0.3 W) .... center green LED Lights

REPAIR

(1) Check the value of R701 and R702.
(2) See TROUBLESHOOTING On Page 40.

CHECK

NG — Power Meter LEDs do not light correctly.

OK — Power Meter LEDs light correctly.

END — Proceed to next section.

Expander Circuit Operation Check

START

CONNECTION

- Connect Audio Osc. (1 kHz) to AUX/TV input jack.
- Connect 8Ω load to Speaker output terminals.
- Connect Oscilloscope and V.T.V.M. to Speaker terminals.
- VOLUME: MAX
- EXPANDER Switch: ON
- EXPANDER VR: MAX to MIN

STEP 1

Check level ratio between L ch & R ch at Resonant Frequency (4.5 kHz)
** should be better than 14 dB (nominal: 18 dB) **

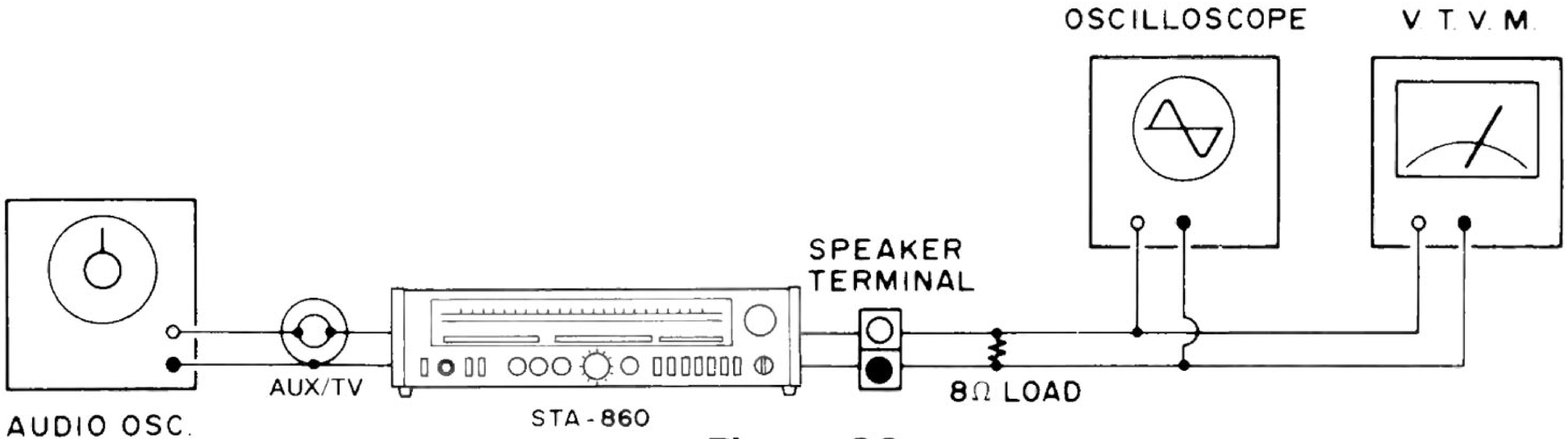


Figure 26

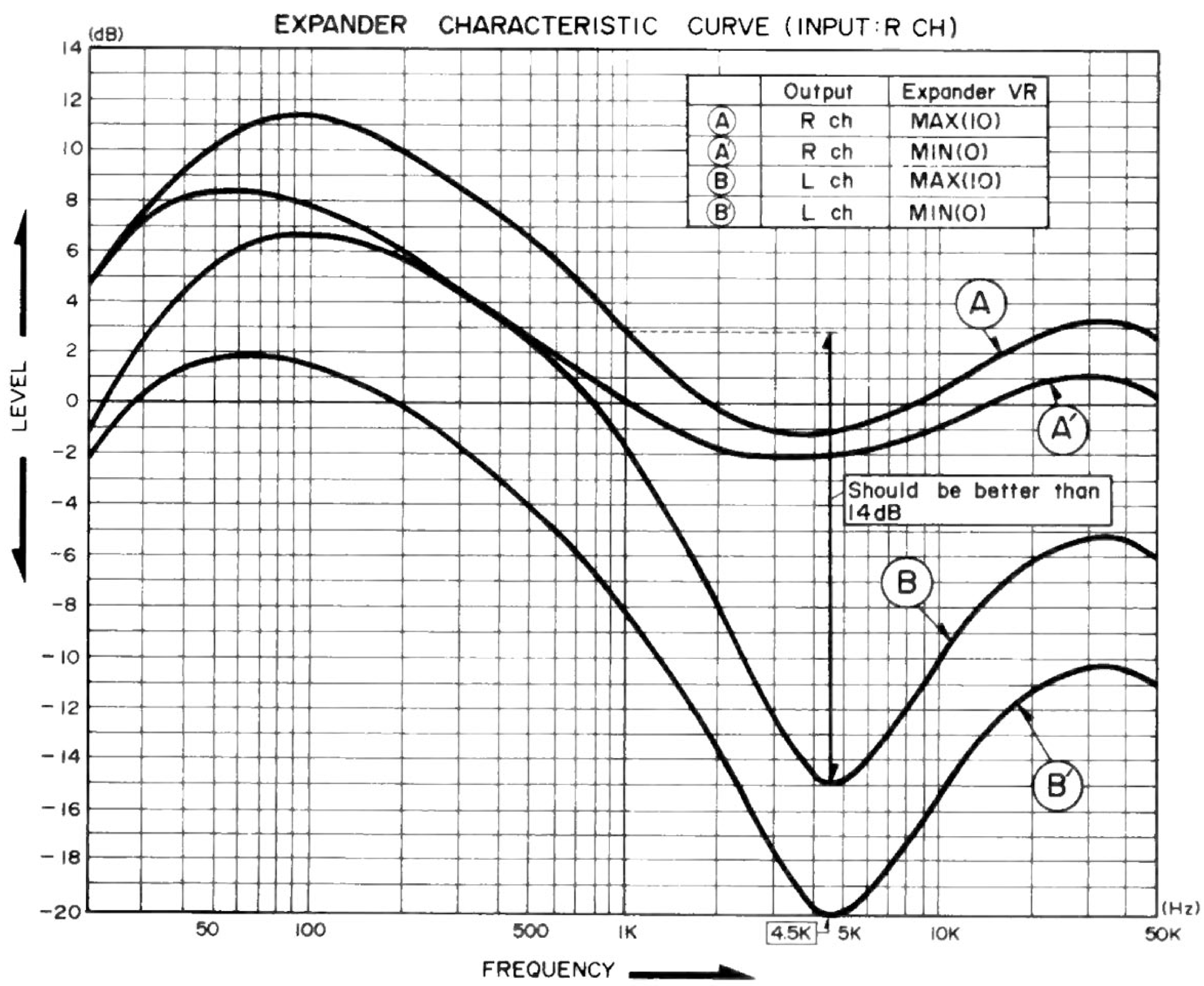


Figure 27

REPAIR

(1) Check Expander circuit.
(2) See TROUBLESHOOTING on Page 41.

CHECK

NG — Level ratio is worse than 14 dB.

OK — Level ratio is better than 14 dB.

END — Proceed to next section.

RF and IF Operation Check

AM Operation Check

START

ADJUSTMENT

Adjust per AM IF/RF Alignment, if required.
See AM ALIGNMENT Section on Page 34.

CONNECTION

- Connect standard loop antenna to AM Standard Signal Generator (400 Hz, 30% mod.) and radiate signal into AM Ferrite Antenna L201.
- Connect Oscilloscope, Distortion Meter and V.T.V.M. to TAPE OUT jack.
- Set SELECTOR Switch to AM position.

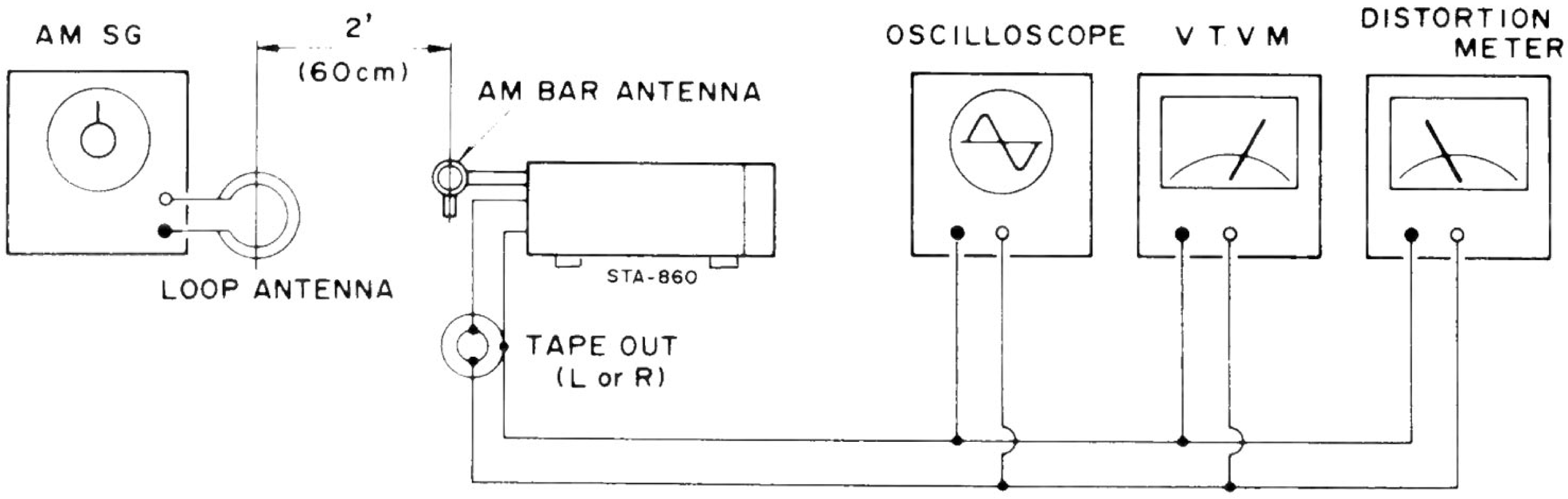


Figure 28

STEP 1

Check AM coverage

** The lowest dial pointer setting should be under 520 kHz and highest position should be over 1620 kHz. **

REPAIR

(1) Readjust AM coverage. (See Page 34 for AM ALIGNMENT.)

CHECK

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 20 dB point at 600/1000/1400 kHz.

** Better than 500 μV/m**

REPAIR

(1) Readjust AM Tracking. (See Page 34 for AM ALIGNMENT.)
(2) Check AM circuit.

CHECK

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

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

4

4

STEP 3

Check AM Distortion (Input level set to 5 mV/m).
** Less than 2.0% (Nominal: 0.8%) **

CHECK

REPAIR
(1) Readjust AM IF/RF. (See Page 34 for AM ALIGNMENT.)
(2) Check AM RF/IF circuit.

NG — Distortion is higher than 2.0%.

OK — Distortion is less than 2.0%.

STEP 4

Check AM Tape Out level (Input level set to 5 mV/m).
** Falls within 175 mV±2.5 dB. **

CHECK

REPAIR
(1) Readjust AM IF/RF. (See Page 34 for AM ALIGNMENT.)
(2) Check the value of R263.
(3) Check AM IF Detector circuit.

NG — Tape Out level does not fall within 175 mV±2.5 dB.

OK — Tape Out level falls within 175 mV±2.5 dB.

STEP 5

Check the AM Signal LED Meter after the FM Signal LED Meter adjustment.
** No signal = LED Meter does not light. **
** 31.6 mV/m = All LEDs light up. **

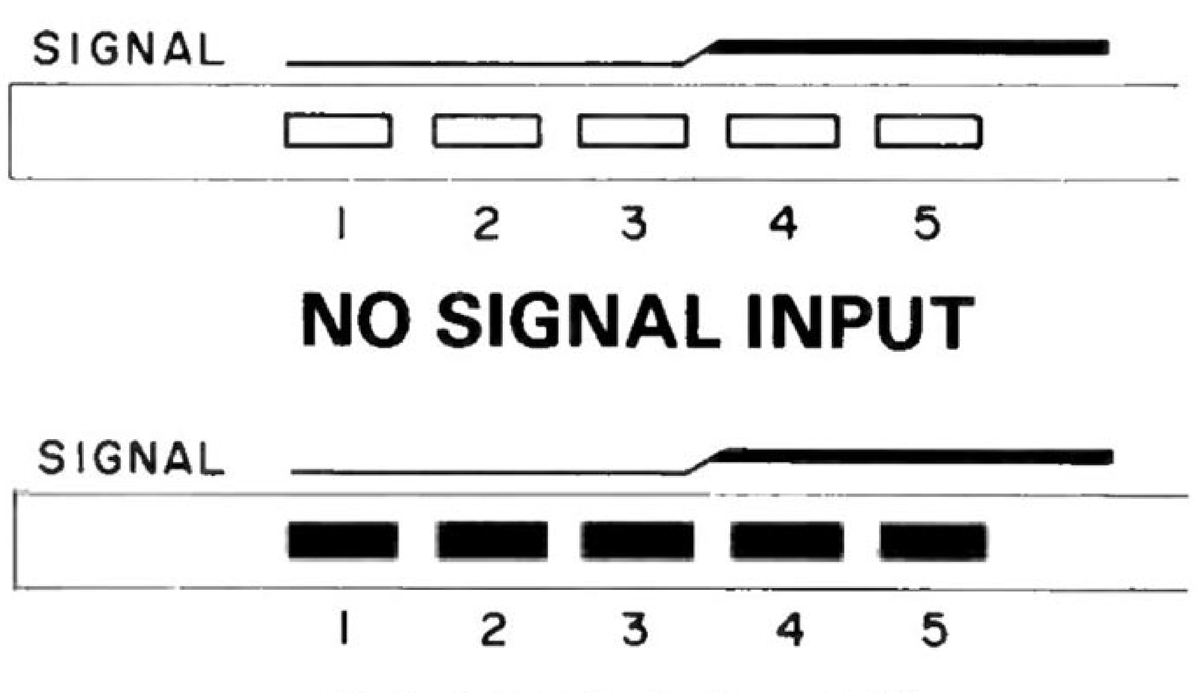


Figure 29

CHECK

REPAIR
(1) Verify LEDs function on FM: return to AM.
(2) Check the value of R254.
(3) Check the AM IF circuits.
(4) See TROUBLESHOOTING on Page 39.

NG — Signal LED Meter does not indicate correctly.

OK — Signal LED Meter indicates correctly.

END — Proceed to next section.

FM RF/IF Operation Check

START

ADJUSTMENT

Adjust per FM Alignment, if required.
See Page 35 for FM RF & IF Alignment.

CONNECTION

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

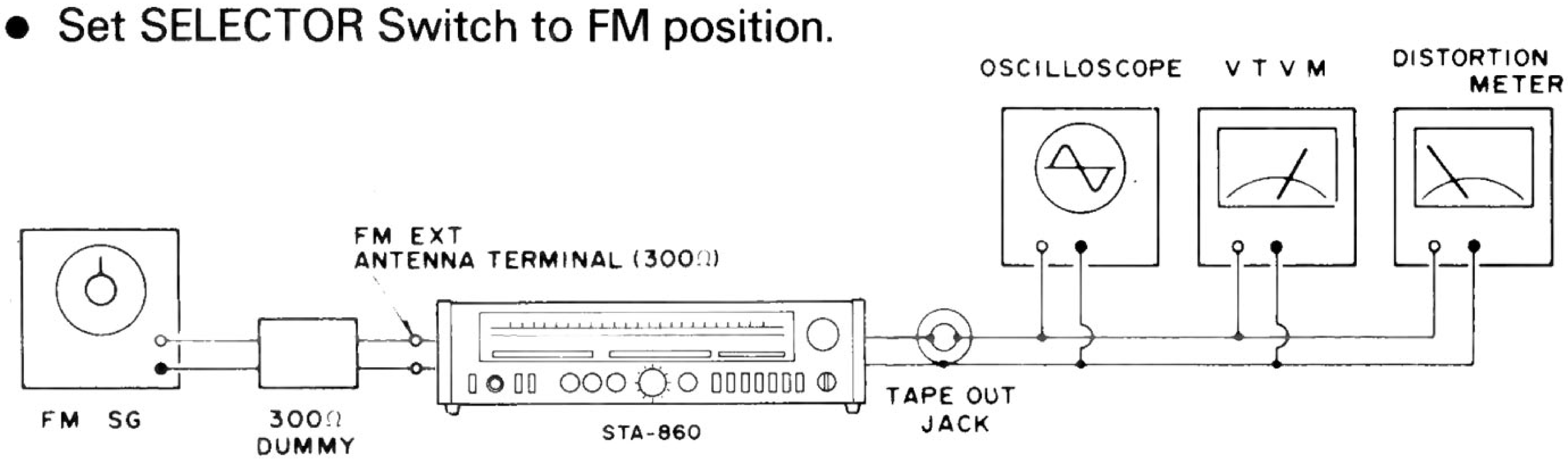


Figure 30

STEP 1

Check FM coverage.

** The lowest dial pointer setting on unit is 87.9 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 Page 35 for FM RF & IF Alignment.)
(2) Check FM RF circuits.

CHECK

NG — Coverage is less than 87.9 MHz — 108 MHz.

OK — Coverage is at least 87.9 MHz — 108 MHz.

STEP 2

Check IHF Sensitivity at 90, 98 and 106 MHz.

** should be less than 3.8 μV. **

REPAIR

(1) Readjust FM tracking. (See Page 35 for FM RF & IF Alignment.)
(2) Check FM RF circuits.

CHECK

NG — FM IHF sensitivity is higher than 3.8 μV.

OK — FM IHF sensitivity is lower than 3.8 μV.

STEP 3

Check T.H. Distortion for MONO signal.
(Input: 1 mV, FM Standard SG: 98 MHz)

** Lower than 0.4% **

REPAIR

(1) Readjust RF/IF. (See Page 35 for FM RF & IF Alignment.)
(2) Check RM RF/IF circuits.

CHECK

NG — T.H. Distortion is higher than 0.4%.

OK — T.H. Distortion is lower than 0.4%.

5

5

STEP 4 — Check Signal-to-Noise ratio. (Input signal: 1 mV, FM Standard SG: 98 MHz)
** should be higher than 66 dB. **

REPAIR: (1) Readjust RF/IF. (See Page 35 for FM RF & IF Alignment.)
(2) Check FM RF/IF circuits.

CHECK

NG: Signal-to-Noise ratio is lower than 66 dB.

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

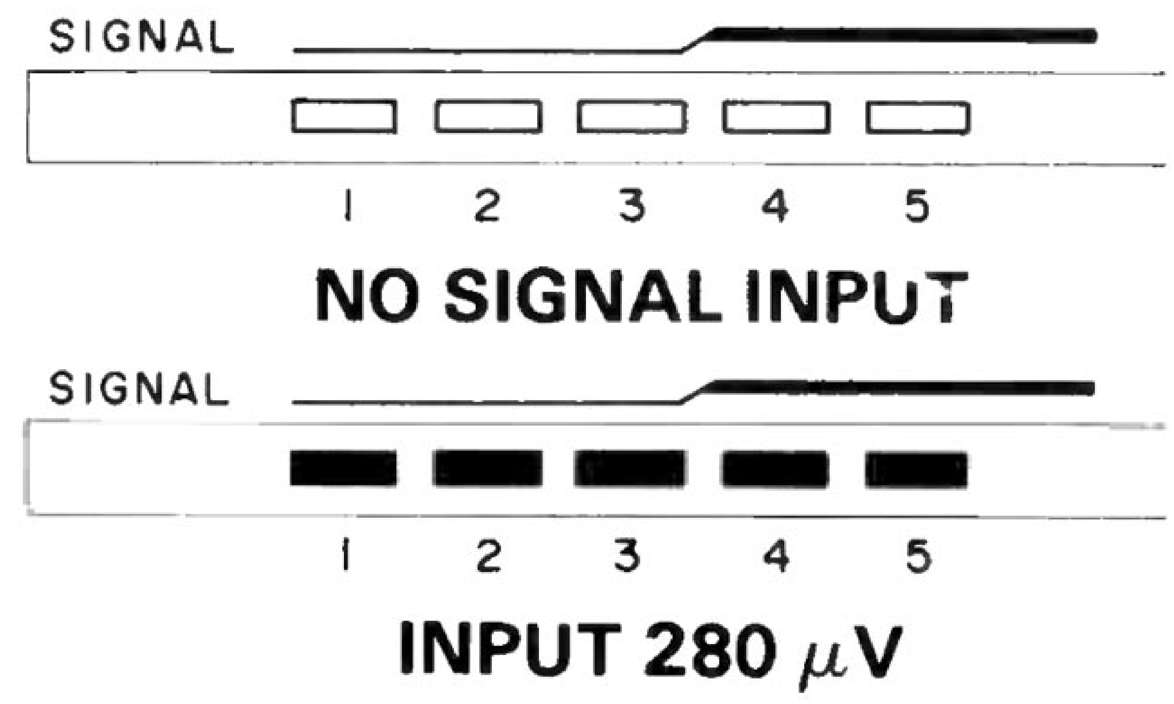


Figure 31

STEP 5 — Check the Signal LED Meter.
** No signal = LED Meter does not light. **
** 280 μV Input = All LEDs light. **

REPAIR: (1) Verify LEDs function on AM; return to FM.
(2) Readjust VR202 for all LED's lit at 280 μV input.
(3) Check FM IF circuit.

CHECK

NG: Signal LED Meters do not light correctly.

OK: Signal LED Meter light correctly.

STEP 6 — Check FM 75 μsec de-emphasis response curve.
** See Fiugre 32. **

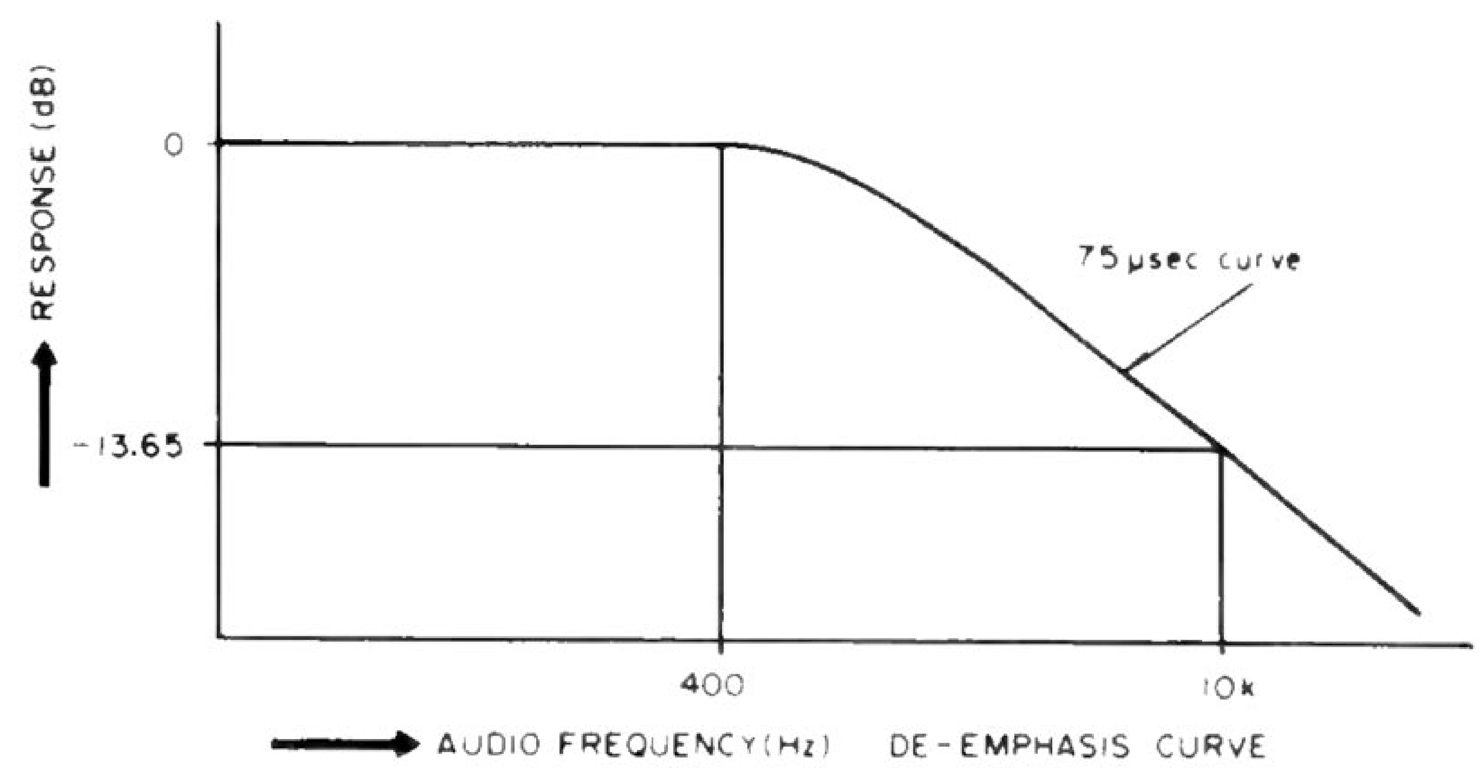


Figure 32

REPAIR: (1) Check and/or change value of C225 (L ch), C226 (R ch). (Pins 7 and 6, IC202)

CHECK

NG: FM 75 μsec response at 10 kHz modulation does not fall within −13.65±1.5 dB.

OK: FM 75 μsec response at 10 kHz modulation falls within −13.65±1.5 dB.

STEP 7 — Check Muting threshold. (Input: 98 MHz)
** Input 3.5—9.0 μV (Nominal 5.5 μV) **

REPAIR: Readjust VR201 (Pin 13, IC201).

CHECK

NG: Muting level is not 3.5—9.0 μV.

OK: Muting level is 3.5—9.0 μV.

END: Proceed to next section.

FM MPX Operation Check

START

ADJUSTMENT — Adjust FM MPX Alignment.

CONNECTION

- Connect FM Stereo SG (1000 Hz, 67.5 kHz dev., 9% Pilot) through FM Standard SG to 300 Ω Antenna Terminal.
- Connect Oscilloscope, Distortion Meter and V.T.V.M. to TAPE OUT Jack.
- Set SELECTOR Switch to FM position.
- Set MONO Switch to OUT (stereo) position.

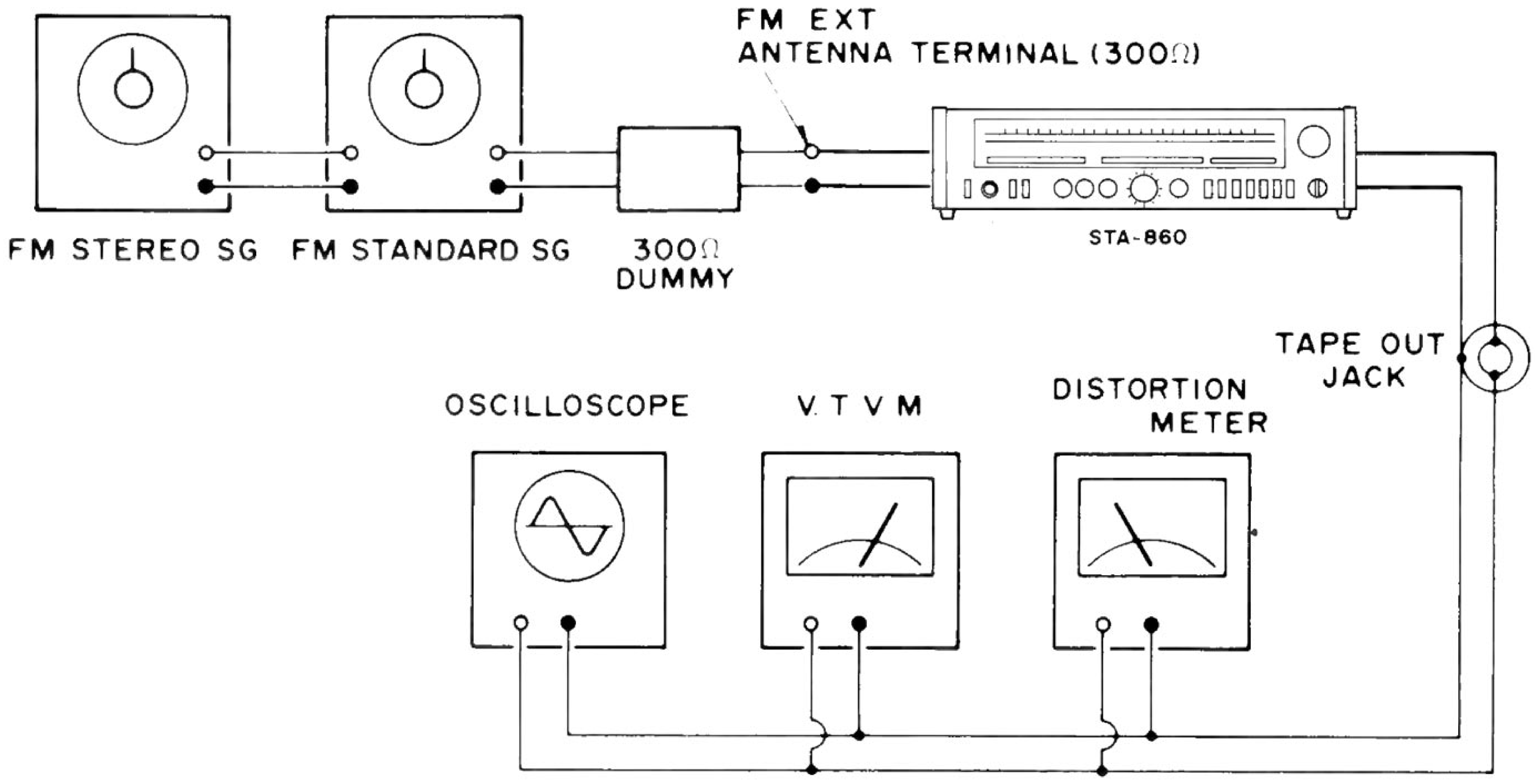


Figure 33

STEP 1 — Check the Stereo indicator sensitivity.
** Lower than 3.5 – 9.0 μV (Nominal: 5.5 μV) **

REPAIR
(1) Readjust FM MPX. (See Page 37 for FM MPX Alignment.)
(2) See TROUBLESHOOTING on Page 39.

CHECK

NG — Stereo indicator sensitivity is higher than 3.5 – 9.0 μV.

OK — Stereo indicator sensitivity is lower than 3.5 – 9.0 μV.

STEP 2 — Check Stereo Separation at 100, 1 k and 10 kHz (input = 1 mV).
** More than 28 dB at 100 Hz **
** 33 dB at 1 kHz **
** 28 dB at 10 kHz **

REPAIR
(1) Readjust FM MPX. (See Page 37 for FM MPX Alignment.)
(2) See TROUBLESHOOTING on Page 39.

CHECK

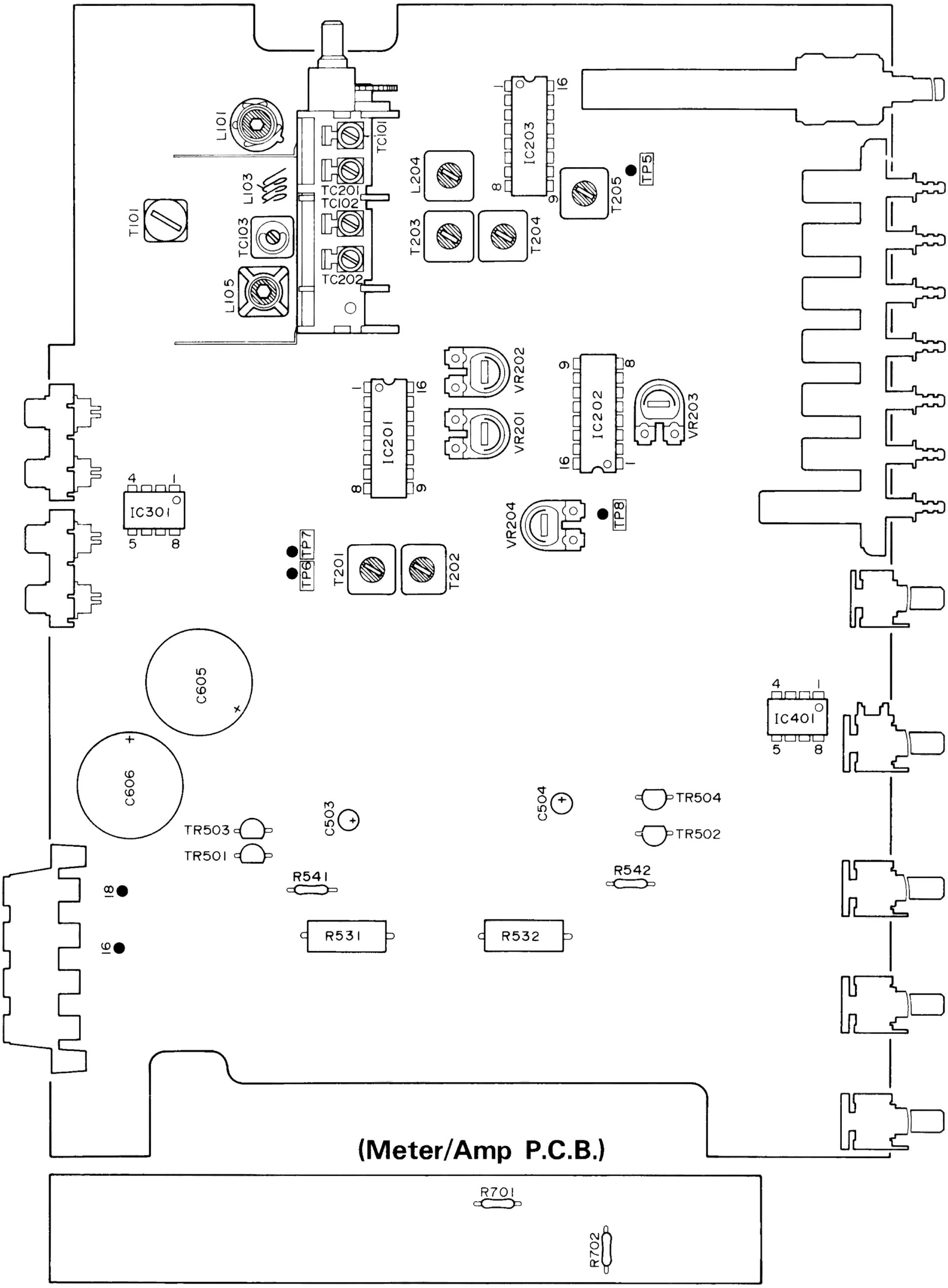
NG — Separation is less than 28 dB at 100 Hz, 33 dB at 1 kHz and 28 dB at 10 kHz.

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

END — Proceed to ALIGNMENT section.

ALIGNMENT INSTRUCTIONS

FM Coil & Trimmer Location
(Tuner, Audio P.C.B.)



Note: Refer to P.C.B. illustration for alignment and adjustment points.

Figure 34

Audio Circuit Adjustment

< Equipment Required >

1. DC Voltmeter

Notes:

- Maintain voltage at 120 volts AC, 60 Hz (U.S.A., Canada)
  (Use 220 volts AC, 50 Hz for Continental European and 240 volt AC, 50 Hz for UK & Australian models.)
- Set SELECTOR Switch to AUX/TV.
- Set MONO Switch to IN position.
- Set Volume to minimum.

< Set-Up >

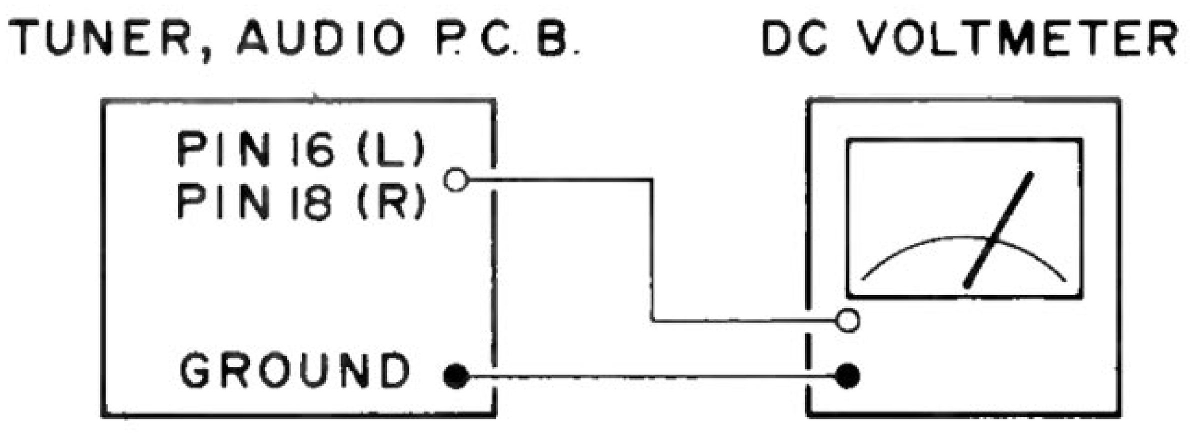


Figure 35

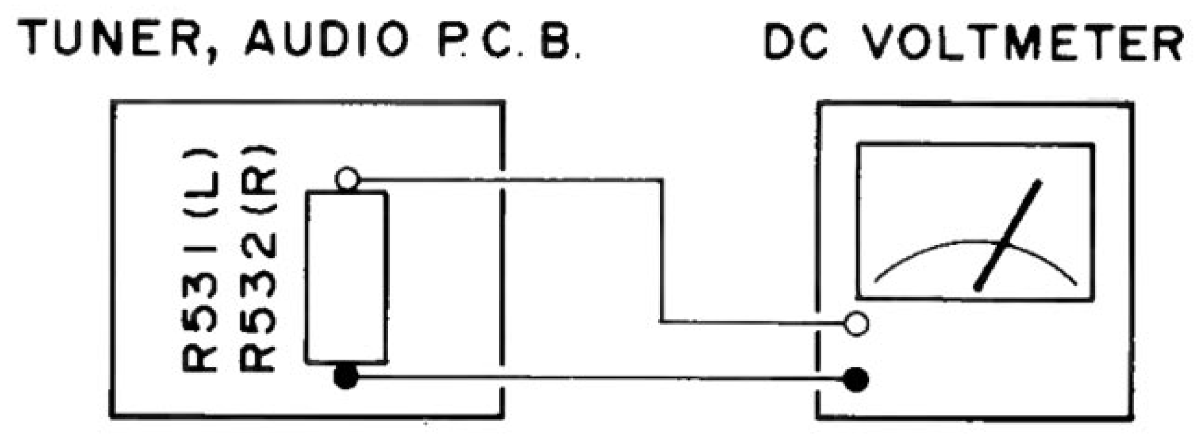


Figure 36

- Connect DC Voltmeter to Pin 16 (L) or Pin 18 (R) and GROUND of TUNER AUDIO P.C.B.
- Connect DC Voltmeter to R531 (L ch) or R532 (R ch).

< Adjustment Check >

Step	Adjustment	Equipment	Level	Adjustment
1	Check Balance by measuring DC voltage across OUTPUT TERMINAL of L and R channel.	DC Volt Meter (Figure 35)	DC voltage should be less than ±50 mV.	Check: TR501(L), TR503(L), TR502(R), TR504(R)
2	Idling current adjustment	DC Volt Meter (Figure 36)	Adjust voltage across Emitter resistors R531 and R532 to 2.35 mV +0.47/−1.88 mV (8 Ω Load)	Check the value of R541(L), R542(R)

Power LED Meter Adjustment

< Equipment Required >

1. Audio Oscillator
2. Oscilloscope
3. AC Voltmeter

Notes:

- Maintain voltage at 120 volts AC, 60 Hz (U.S.A., Canada)
  (Use 220 volts AC, 50 Hz for Continental European and 240 volt AC, 50 Hz for UK & Australian models.)

- Set SELECTOR Switch to AUX/TV.
- Set VOLUME to MAX.
- Set BASS, TREBLE, BALANCE to center (other function: OFF).

< Set-Up >

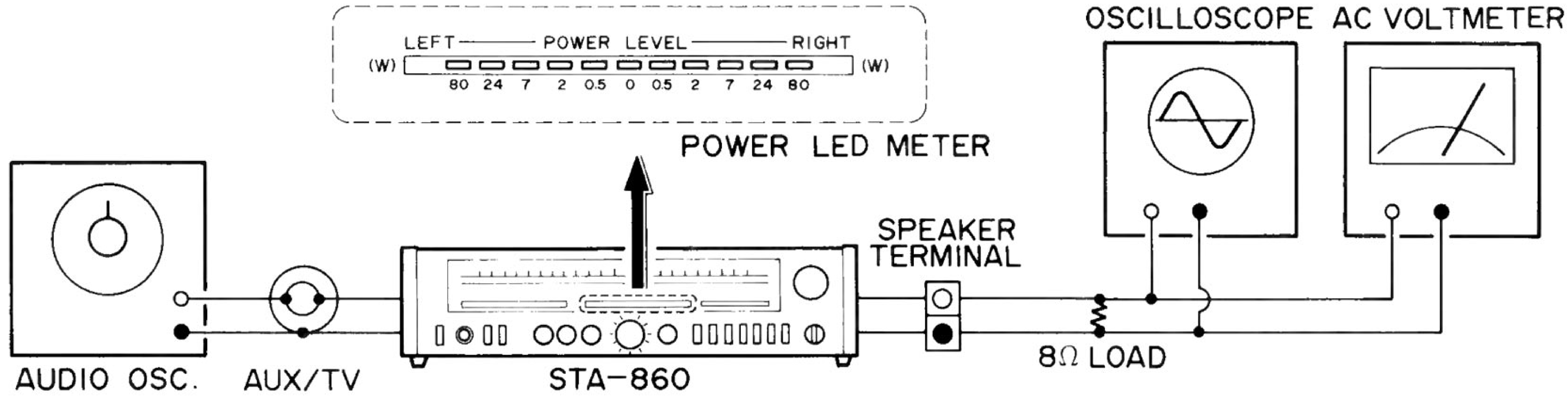


Figure 37

- Connect Audio Oscillator to AUX/TV.
- Connect Oscilloscope and AC Voltmeter to Speaker Terminal.

< Adjustment Check >

Step	Audio Freq.	Level	Adjustment	Remarks
1	1000 Hz	Adjust input to get output level of 1.5−2.7 V (0.3−0.9 W) (8 Ω load).	R701(L) R702(R)	Check so that the 1st LED glows.
2	1000 Hz	Adjust input to get output level of 5−9 V (1.0−3.5 W) (8 Ω load).	R701(L) R702(R)	Check so that the up to 3rd LED glows.
3	1000 Hz	Adjust input to get output level of above 22 V (above 60 W). (8 Ω Load)	R701(L) R702(R)	Check so that all LEDs glow.
4	Repeat STEPs 1−3. Adjust the output level difference of L and R channel within 2.5 dB for STEPs 1 and 2, ±2 dB for STEP 3.			

AM IF & RF Alignment

< Equipment Required >

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

Notes:

- Signal Generator output should be no higher than necessary to obtain an output reading.
- Maintain voltage at 120 volts AC, 60 Hz (U.S.A., Canada) (Use 220 volts AC, 50 Hz for Continental European and 240 volt AC, 50 Hz for UK & Australian models.)

- Set SELECTOR Switch to AM.
- Set BASS, TREBLE and BALANCE to center;
- Volume to min.

< Set-Up >

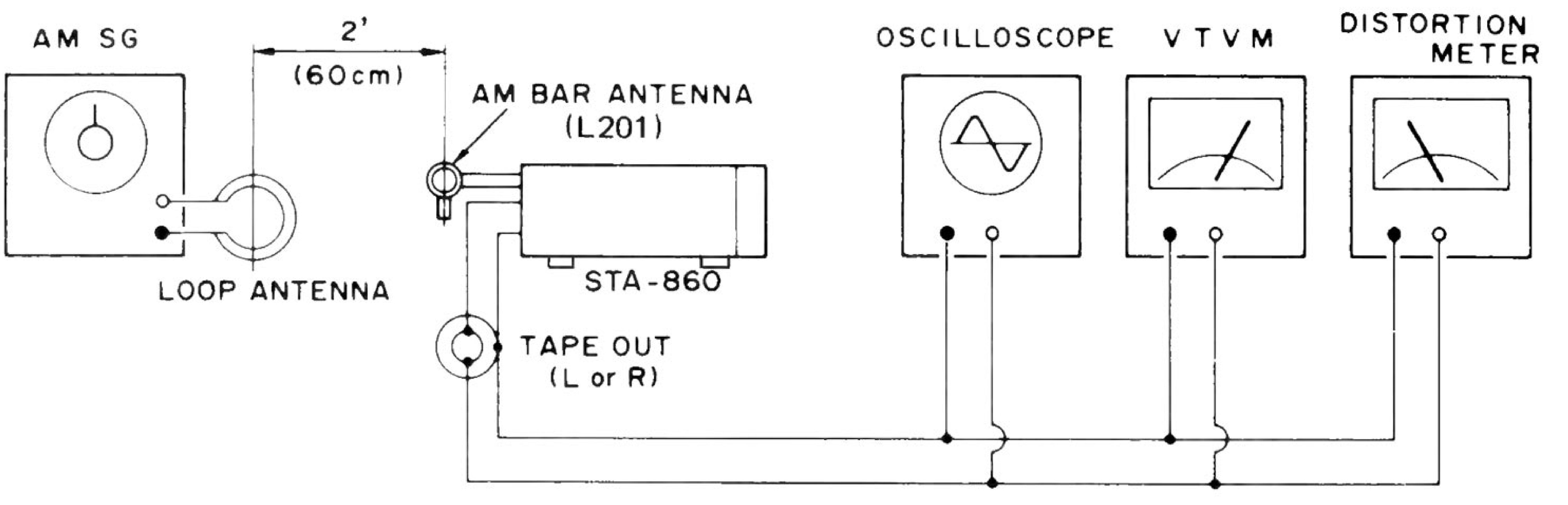


Figure 38

- Connect Standard Loop Antenna to Signal Standard Generator and radiate signal into the AM Antenna.
- Connect Oscilloscope, AC Voltmeter and Distortion meter to TAPE OUT jack.

< Adjustment Check >

Step	Signal Generator Frequency	Dial Setting	Indicator	Adjustment	Remarks
1	455 kHz (400 Hz, 30% mod.)	Point of non-interference (near 600 kHz)	• AC Voltmeter • Oscilloscope • Distortion Meter	T203, 204, 205 (AM IFT)	Adjust for maximum reading on meter.
2	520 kHz (400 Hz, 30% mod.)	Tuning Gang fully closed.	Same as above	L204 (AM OSC Coil)	Same as above
3	1620 kHz (400 Hz, 30% mod.)	Tuning Gang fully opened.	Same as above	TC202 (AM OSC Trimmer)	Same as above
4	600 kHz (400 Hz, 30% mod.)	600 kHz	Same as above	L201 (AM ANT. Coil)	Same as above
5	1400 kHz (400 Hz, 30% mod.)	1400 kHz	Same as above	TC201 (AM ANT. Trimmer)	Same as above
6	Repeat STEPs 4 and 5 until no further change is noticed.				

FM RF & IF Alignment

< Equipment Required >

1. Standard Signal Generator
2. FM Dummy Antenna
3. Oscilloscope
4. AC Voltmeter
5. Distortion Meter
6. Center Tuning Meter
   (1.2 kΩ, 200 μA)

Notes:

- Signal Generator output should be no higher than necessary to obtain an output reading.
- Maintain voltage at 120 volts AC, 60 Hz (U.S.A., Canada) (Use 220 volts AC, 50 Hz for Continental European and 240 volt AC, 50 Hz for UK & Australian models.)

- Set SELECTOR Switch to FM.
- Set MONO Switch to OUT position.

< Set-Up >

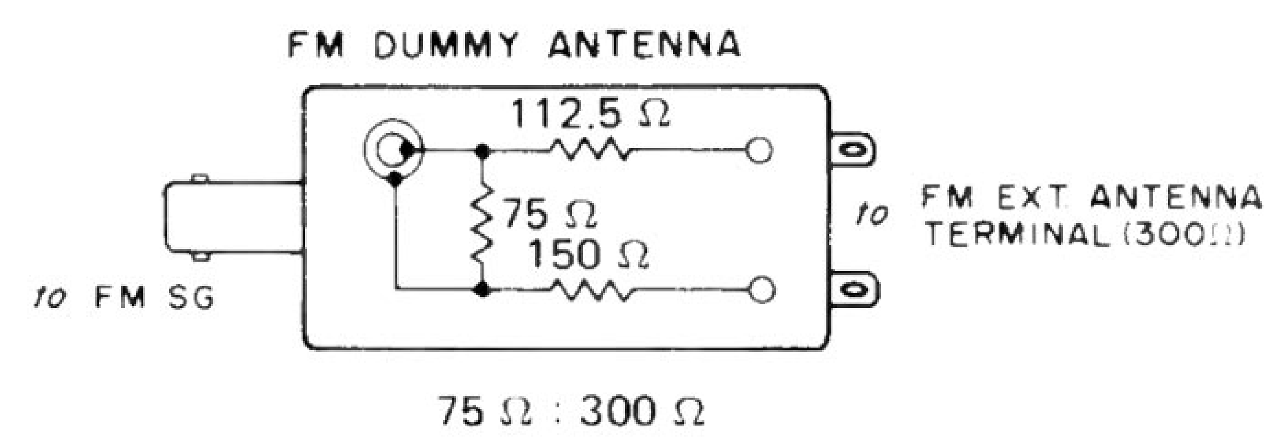


Figure 39

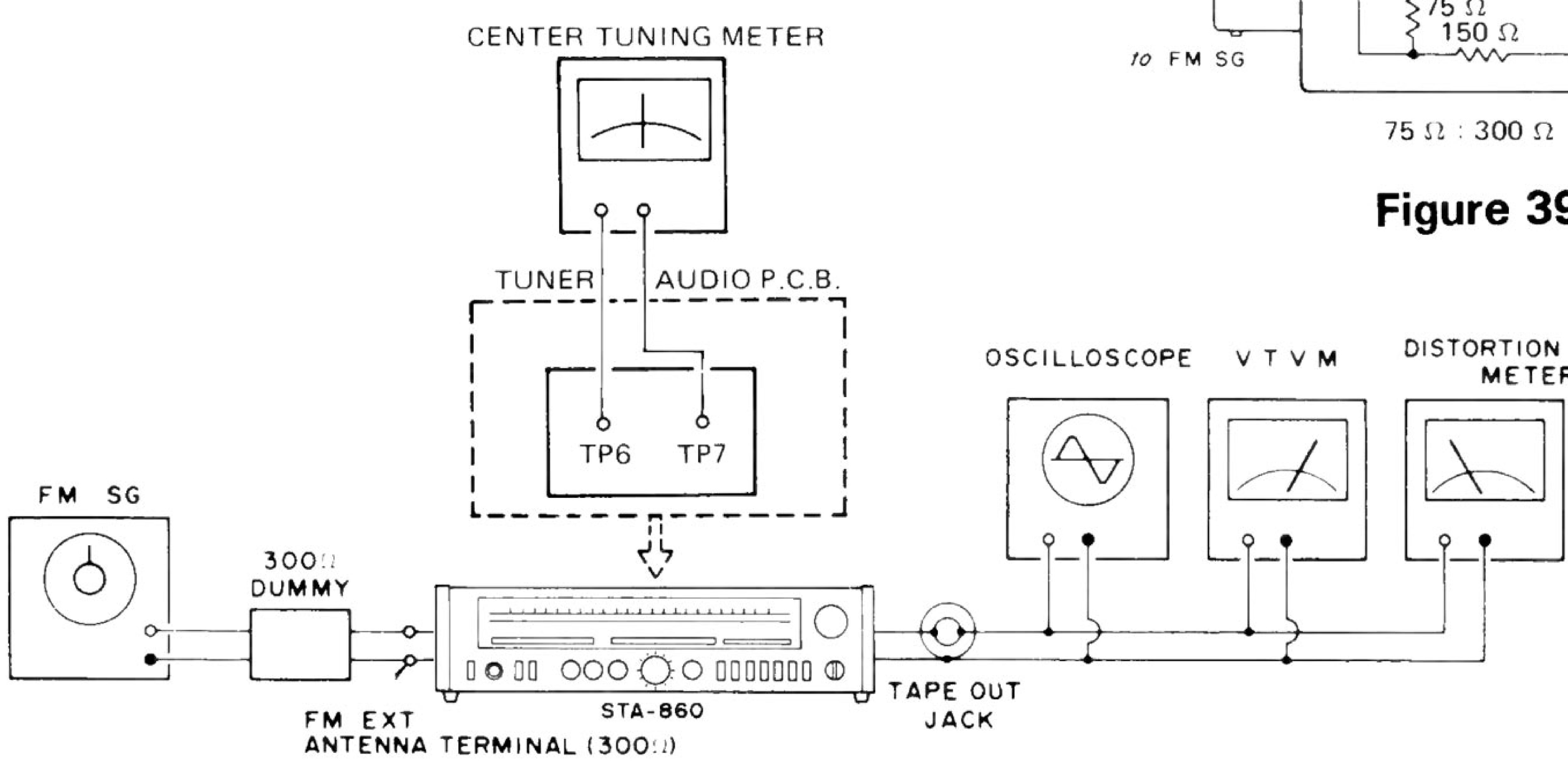


Figure 40

- Connect Standard Signal Generator to FM Antenna Terminal (300 Ω) through FM Dummy Antenna (300 Ω).
- Connect Oscilloscope, AC Voltmeter to Distortion Meter to TAPE OUT jack.
- Connect Center Tuning Meter (1.2 kΩ, 200 μA) to TP 6 and TP 7 on TUNER/AUDIO P.C.B.

< Adjustment Check >

Step	Signal Generator Frequency	Dial Setting	Indicator	Adjustment	Remarks
1	98 MHz (1000 Hz, 75 kHz dev.) Input: about 3 – 4μV	98 MHz	• AC Voltmeter • Oscilloscope • Distortion Meter	T101 FM IF	Adjust for maximum reading on meter.
2	98 MHz (1000 Hz, 75 kHz dev.) Input: no input (unit off)	98 MHz	• Center Tuning	T201 (Primary)	Adjust for maximum point on Center Tuning Meter.
3	98 MHz (1000 Hz, 75 kHz dev.) Input: 1 mV	98 MHz	• AC Voltmeter • Oscilloscope • Distortion Meter	T202 (Secondary)	Adjust for minimum Distortion (about 0.4%) (Nominal 0.1%)
4	Repeat STEPs 1, 2 and 3 until no further improvement is noticed.				See Figures 42 and 41.

Step	Signal Generator Frequency	Dial Setting	Indicator	Adjustment	Remarks
5	87.9 MHz (1000 Hz, 75 kHz dev.) Input: 1 mV	87.4 MHz*	• AC Voltmeter [• Oscilloscope • Distortion Meter]	L105 (FM OSC. Coil)	Adjust for maximum reading on meter.
6	108 MHz (1000 Hz, 75 kHz dev.)	108.3 MHz	• AC Voltmeter [• Oscilloscope • Distortion Meter]	TC103 (FM OSC. Trimmer)	Adjust for maximum reading on meter
7	Repeat STEPs 5 and 6 until no further improvement is noticed.				
8	90 MHz (1000 Hz, 75 kHz dev.) Input: about 2–4μV	90 MHz	• AC Voltmeter [• Oscilloscope • Distortion Meter]	L101 (FM Antenna Coil) L103 (FM RF Coil—stretch or squeeze)	Adjust for maximum reading on meter.
9	106 MHz (1000 Hz, 75 kHz dev.) Input: about 2–4μV	106 MHz	• AC Voltmeter [• Oscilloscope • Distortion Meter]	TC101 (FM Antenna Trimmer) TC102 (FM RF Trimmer)	Adjust for maximum reading on meter.
10	Repeat STEPs 8 and 9 until no further improvement is noticed.				
11	98 MHz (1000 Hz, 75 kHz dev.) Input: 3.5–9.0 μV	98 MHz	• AC Voltmeter [• Oscilloscope • Distortion Meter]	VR201 (Mute Threshold Adj.)	MUTE switched ON and adjust VR201 for no signal output.
12	98 MHz (1000 Hz, 75 kHz dev.) Input: 280 μV	98 MHz	• Signal Meter (LEDs) on Set	VR202 (FM signal meter adj.)	Adjust until all the signal LEDs light.

* European models must not be able to tune below 87.5 MHz.

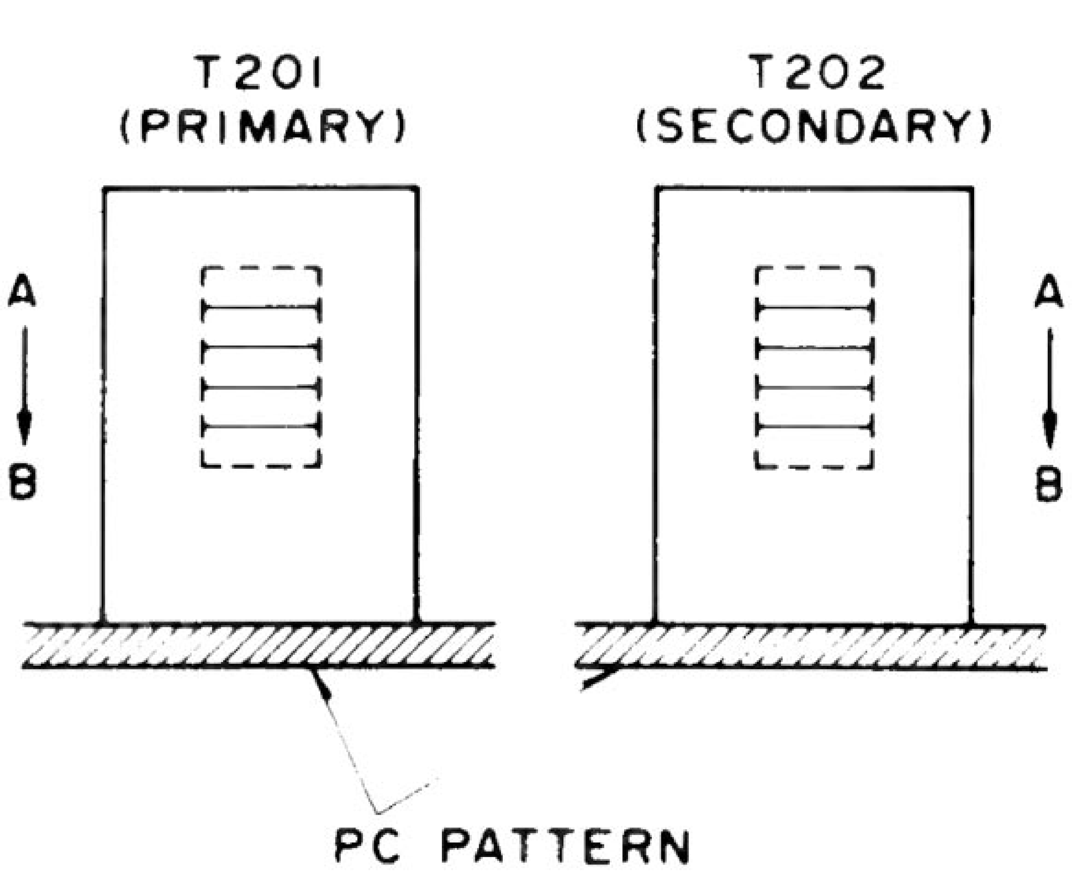


Figure 41

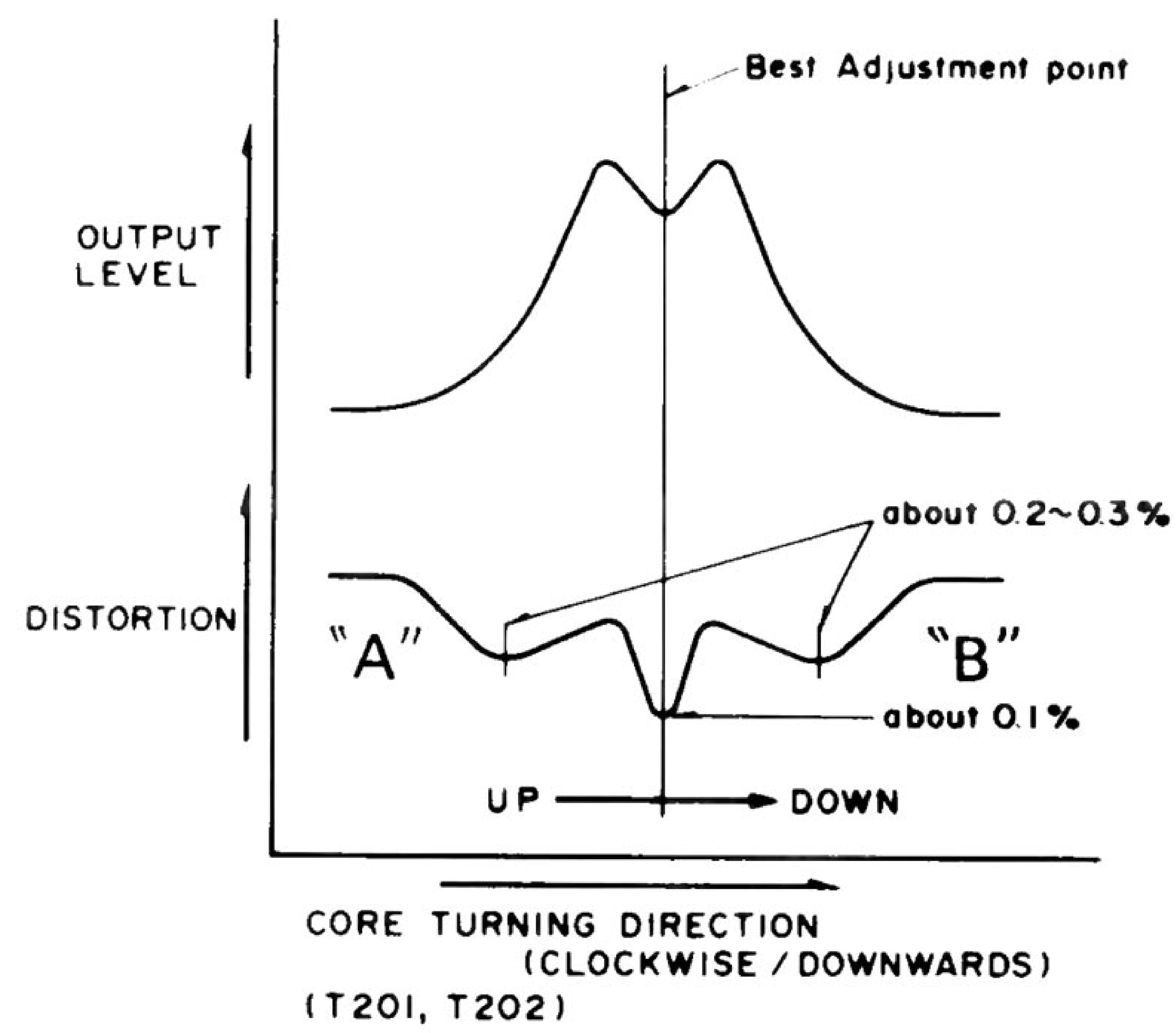


Figure 42

< Equipment Required >

1. Stereo Modulator
   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% deviation
3. Audio Generator of composite signal
4. AC Voltmeter
5. Oscilloscope
6. Distortion Meter
7. Frequency Counter

Notes:
- Signal Generator output should be no higher than necessary to obtain an output reading.
- Maintain voltage at 120 volts AC, 60 Hz (U.S.A., Canada) (Use 220 volts AC, 50 Hz for Continental European and 240 volt AC, 50 Hz for UK & Australian models.)

- Set SELECTOR Switch to FM.
- Set MONO Switch to OFF position.
- Set MUTE Switch to OFF position.

< Set-Up >

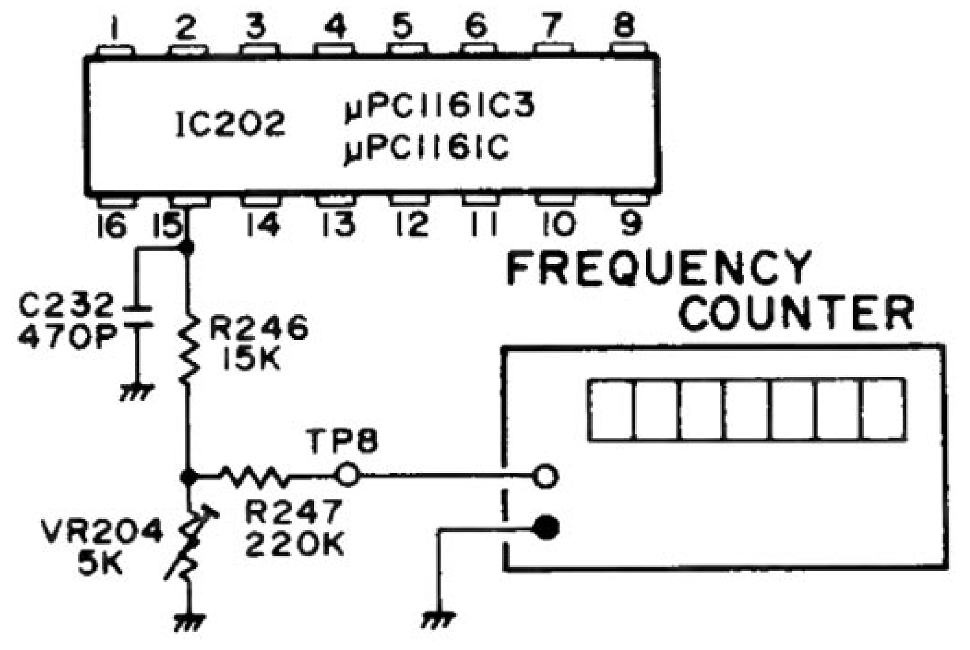


Figure 43

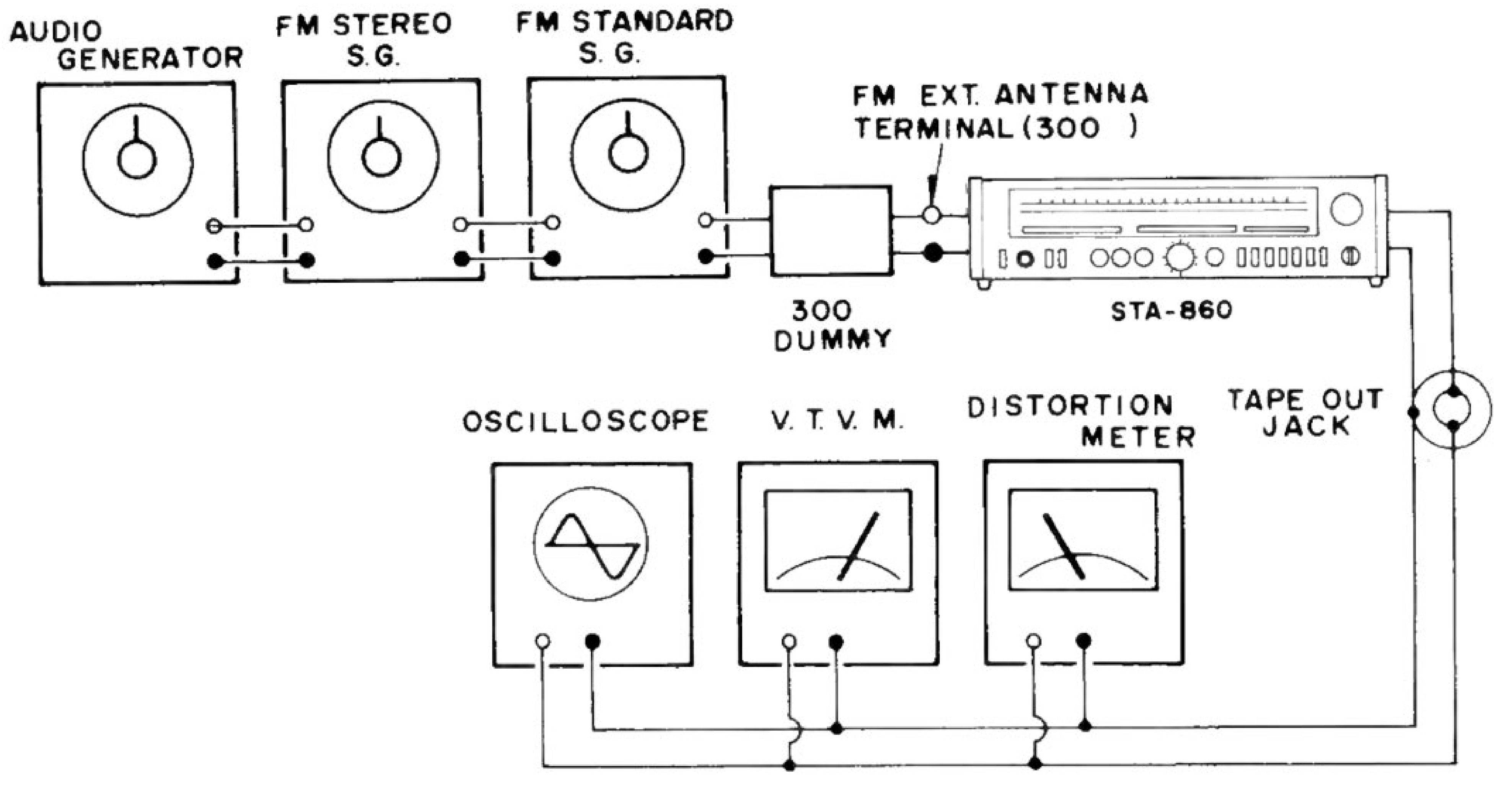


Figure 44

- Connect Stereo Modulator to EXT.Mod. terminal of FM Signal Generator.
- Connect to FM Antenna terminal through FM Dummy Antenna (300 Ω). (See Figure 39 Dummy Ant.)
- Connect Oscilloscope, AC Voltmeter to Distortion Meter to TAPE OUT jack.
- Connect Counter to Test Point 8 near IC202 and GROUND.

< Adjustment Check >

Step	Stereo Modulation	Indicator	Adjustment	Remarks
1	Mono. 1 kHz (1000 Hz, No Mod.) Input 1 mV	• Counter	VR204 (76 kHz Adj.)	Adjust for 76 kHz±50 Hz on Counter
2	Composite MPX Signal 1 kHz on Left channel ONLY	• AC Voltmeter (TAPE OUT jack of Right channel)	VR203 (Separation)	Adjust for minimum reading on meter.
3	Composite MPX Signal 1 kHz on Left channel ONLY	• AC Voltmeter (TAPE OUT jack of Left channel)	VR203 (Separation)	Adjust for minimum reading on meter.
4	Repeat STEPs 2 and 3 until AC Voltmeter reading is at least −33 dB. (i.e. 33 dB separation) Nominal: 48 dB			
5	Composite MPX Signal 1 kHz	• AC Voltmeter	—	With 3.5 — 9 μV antenna input signal, Stereo indicator LED (D721) should come on.
6	Composite MPX Signal 1 kHz	• Distortion Meter	—	With 1 mV antenna input signal, Stereo Distortion should be less than 1.5%.

TROUBLESHOOTING

SYMPTOM	CAUSE AND REMEDY
1) No output	(1) Faulty AC power cord: Replace. (2) Defective POWER switch: Replace. (3) Broken wire in the Power Transformer: Replace. (4) Blown primary Fuse: Replace. (5) Defective D601 or diodes, transistor(s) in Power Supply circuit on TUNER AUDIO P.C.B.: Replace the defective component(s). (6) Main Amp or Temperature Protector circuit activated or defective: Deactivate or repair.
2) Blows Fuse	(1) Defective Rectifier D601: Replace. (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(s). (4) Defective Power Transformer: Replace.
3) "A" Speakers do not work.	(1) Speaker Selector Switch defective: Replace. (2) Poor contact in Speaker Output Terminals: Repair or replace. (3) Poor contact in Speaker Selector Switch: Repair or replace.
4) "B" Speakers do not work.	(1) Speaker Selector Switch defective: Replace. (2) Poor contact in Speaker Output Terminals: Repair or replace. (3) Poor contact in Speaker Selector Switch: Repair or replace.
5) No output on one channel with VOLUME at maximum and BALANCE at center, when a test signal is applied to the BALANCE control (VR402) terminal of the non-operating channel.	(1) Defective IC401, TR401, TR501, Left channel (equiv. Rt. ch.). Also TR607, TR610 and SCR501: Replace the defective part(s). (2) Defective resistor or capacitor of TONE and MAIN AMP circuit: Replace the defective component(s).
6) No output when a test signal is applied to the input terminals	(1) Defective MONO Switch or TAPE Monitor Switch: Repair or replace. (2) Defective SELECTOR Switch: Replace.
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 defective component(s). (2) Defective MONO-Stereo or TAPE Monitor Switch: Repair or replace. (3) Defective SELECTOR Switch: Replace. (4) Defective IC301: Replace.

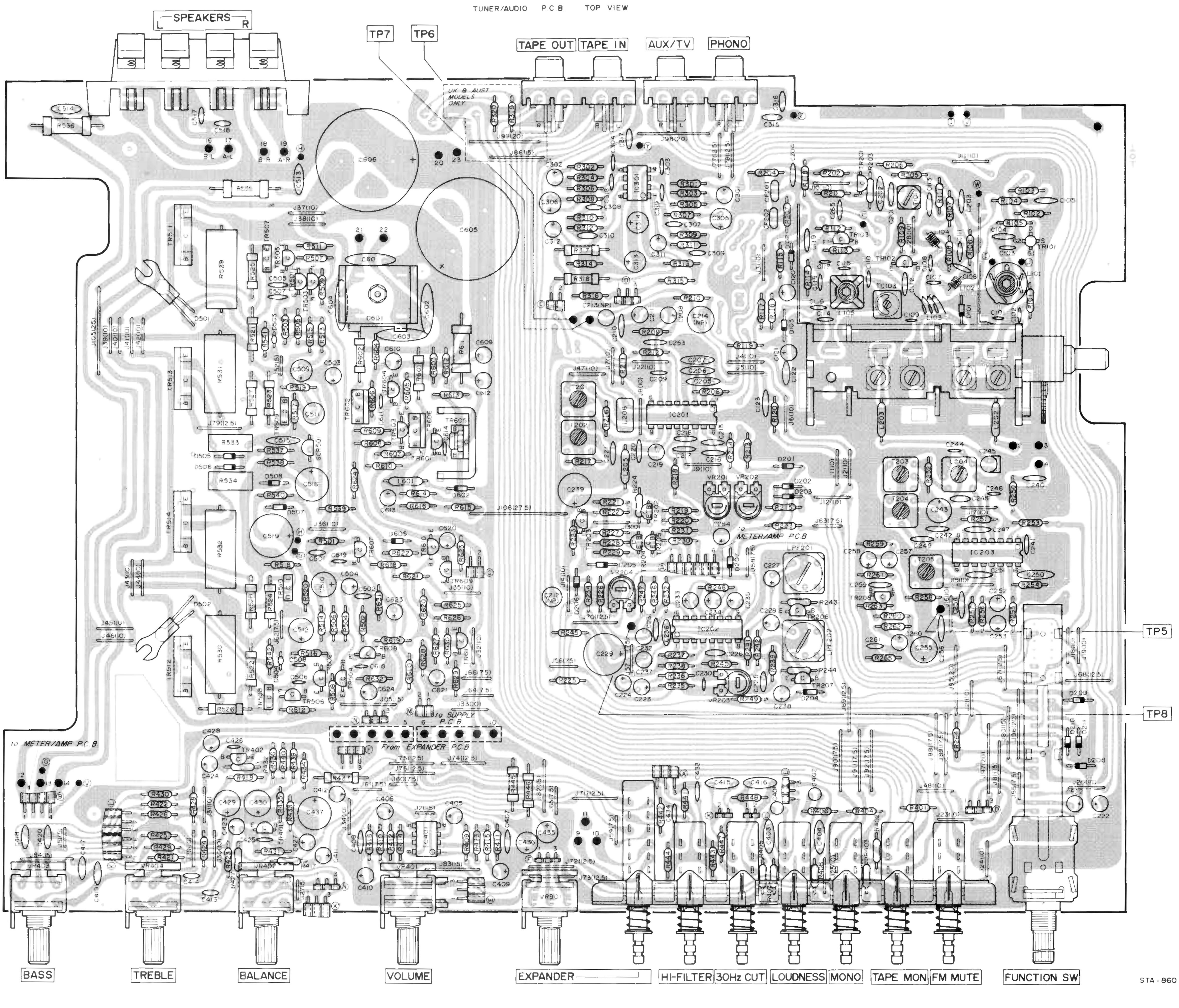
SYMPTOM	CAUSE AND REMEDY
8) DC not balanced within ±50 mV at output of L/R channel	(1) Defective TR501, TR503, TR505(L) or TR502, TR504, TR506(R): Replace the defective Transistor(s). (2) Improper value for R503, R511(L) or R504, R512(R): Select suitable value Resistor.
9) Speaker works normally but Headphone does not work.	(1) Defective R543(L) or R544(R): Change defective resistor(s). (2) Headphone plug does not mate with jack: Replace the plug.
10) All the inputs work normally except AUX/TV input.	(1) Poor contact in AUX/TV input jack: Repair or replace. (2) Poor contact in SELECTOR Switch: Repair or replace.
11) PHONO input inoperative	(1) Poor contact in PHONO input jack: Repair or replace. (2) Faulty SELECTOR Switch: Repair or replace.
12) TAPE OUT inoperative	(1) Poor contact in TAPE OUT output jack: Repair or replace.
13) TAPE IN inoperative	(1) Poor contact in TAPE IN input jack: Repair or replace the jack.
14) No AM or FM (Tuner B+ voltage is 13–14 V.)	(1) Broken secondary winding in the Power Transformer: Replace the Transformer. (2) Defective Diode D602: Replace. (3) Faulty capacitor C612 or C613: Replace. (4) Faulty resistor R611: Replace. (5) Defective transistor TR605, TR606: Replace. (6) Short-circuit in Tuner B+ circuit: Repair the short. (7) Poor contact in SELECTORS Switch: Repair or replace the switch.
15) No FM	(1) Poor contact in SELECTOR Switch: Repair or replace. (2) IC, transistor, diode, resistor, capacitor, inductor or IFT of FM IF circuit defective: Replace the defective component(s). (3) FM Front End defective: Replace the defective part(s). (4) Faulty FM Antenna lead-in/circuitry: Repair or replace the Antenna lead-in/circuitry.
16) No AM	(1) Poor contact in SELECTOR Switch: Repair or replace. (2) IC, transistor, diode, resistor, capacitor or IFT of AM IF circuit defective: Replace the defective component(s). (3) Bar-Antenna Coil defective: Repair or replace.
17) No FM MPX Separation	(1) Improper adjustment: Readjust VR203 and VR204. (2) IC202 in MPX circuit defective. Replace. (3) VR203, VR204 defective: Replace the Trimmer Resistor(s).

SYMPTOM	CAUSE AND REMEDY
18) No STEREO light or FM Stereo does not work.	(1) Broken STEREO Indicator LED (D721): Replace. (2) Defective IC202 of FM MPX circuit: Replace the defective IC. (3) VR204 defective or misadjusted: Replace the defective Trimmer Resistor or adjust.
19) LOUDNESS has no effect	(1) Defective LOUDNESS Switch: Replace. (2) Defective C401, C403, R405, R407(L) or C402, C404, R406, R408(R): Replace the defective part(s).
20) MONO Stereo not effective	(1) Defective MONO-Stereo Switch: Repair or replace.
21) MUTING not effective	(1) Defective MUTE Switch: Repair or replace. (2) Defective Transistor TR202, TR203, TR206, TR207: Replace the defective Transistor(s). (3) Defective Trimmer resistor VR201: Replace. (4) Defective Diode D204, D206: Replace. (5) Defective IC201: Replace.
22) TAPE Monitor does not operate.	(1) Defective TAPE Monitor Switch: Replace or repair.
23) BASS has no effect.	(1) VR404 (100 kΩ control) defective: Replace. (2) Defective C415, 417, 419, R429, 421(L) or C416, 418, 420, R430, 422(R): Replace the defective part(s).
24) TREBLE has no effect.	(1) VR403 (100 kΩ control) defective: Replace. (2) Defective C413, R421, 423, 427(L) or C414, R422, 424, 428(R): Replace the defective part(s).
25) 30 Hz Cut FILTER	(1) Defective 30 Hz Cut Filter switch: Replace the switch. (2) Defective C415, 416 in 30 Hz Cut Filter circuit: Replace the defective capacitor(s).
26) HIGH FILTER has no effect.	(1) Defective HIGH FILTER switch: Replace. (2) Defective C433: Replace.
27) POWER LED Meter does not work.	(1) Defective POWER LED Meter L or/and R: Repair or replace the LED(s). (2) Defective Diode, capacitor or resistor of meter circuit: Replace the defective component(s). (3) Defective IC(s) IC701, IC702: Replace.
28) AM/FM signal meter not functioning	(1) Defective AM/FM Signal Meter D716-720; IC703: Replace the defective diode(s) or IC. (2) Incase of FM reception, IC201, D202, D203, VR202 defective: Replace the defective part(s). (3) In case of AM reception, IC203, R254, R255 defective: Replace the defective part(s).

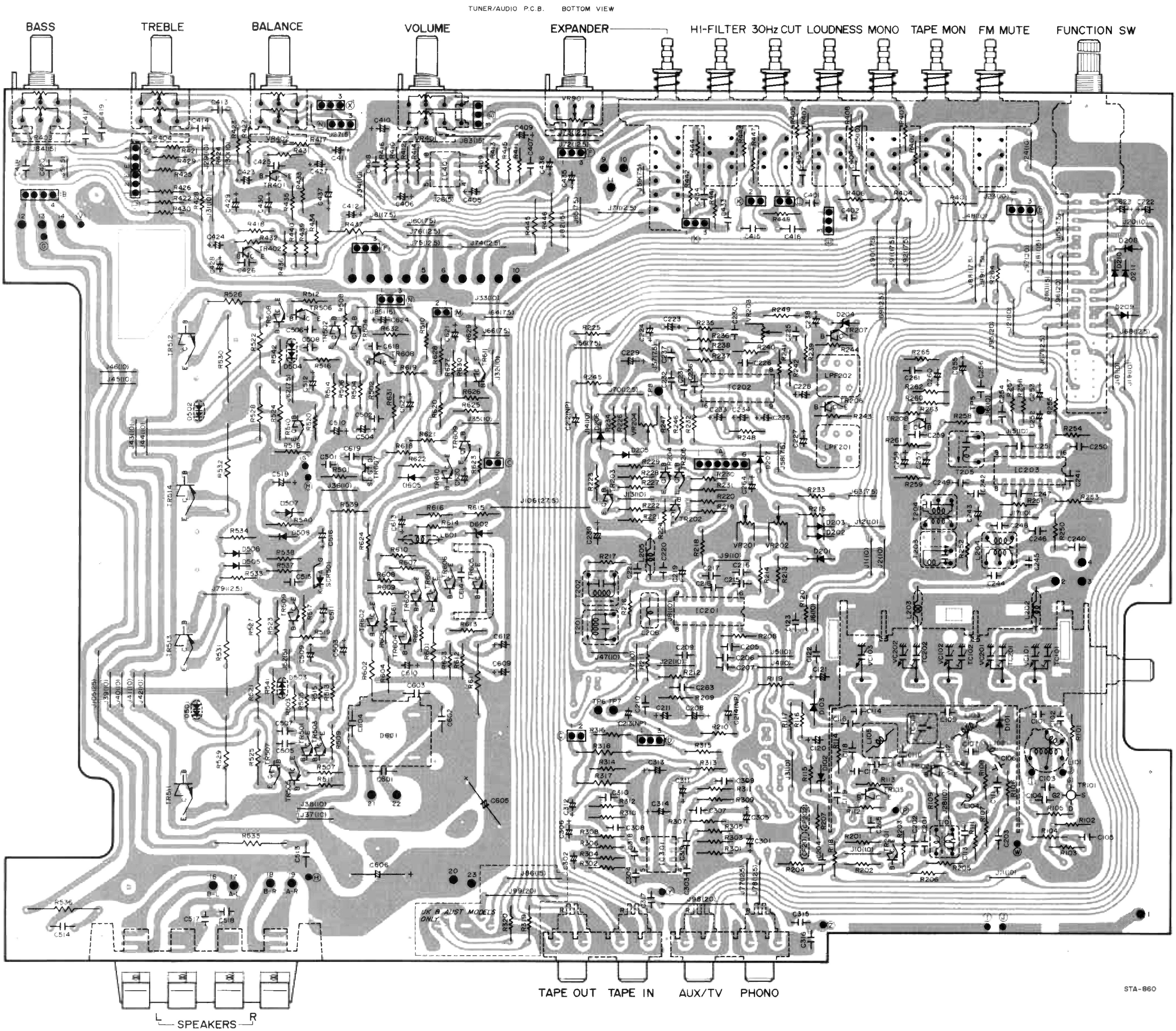
SYMPTOM	CAUSE AND REMEDY
29) TUNING LED meter not functioning	(1) Defective D715: Replace. (2) Improper adjustment: Readjust T201, T202.
30) Protector circuit does not work.	(1) Defective SCR501, TR607 through TR611: Replace the defective Transistor(s). (2) Defective Resistor(s), Capacitor(s), Diode(s) in Protector circuit: Replace the defective component(s).
31) EXPANDER has no effect.	(1) Defective EXPANDER switch: Replace. (2) Defective IC 901 – 903: Replace. (3) Defective Transistor TR901/902: Replace. (4) Defective capacitor(s), resistor(s), in expander circuit: Replace the defective component(s).

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

TOP VIEW

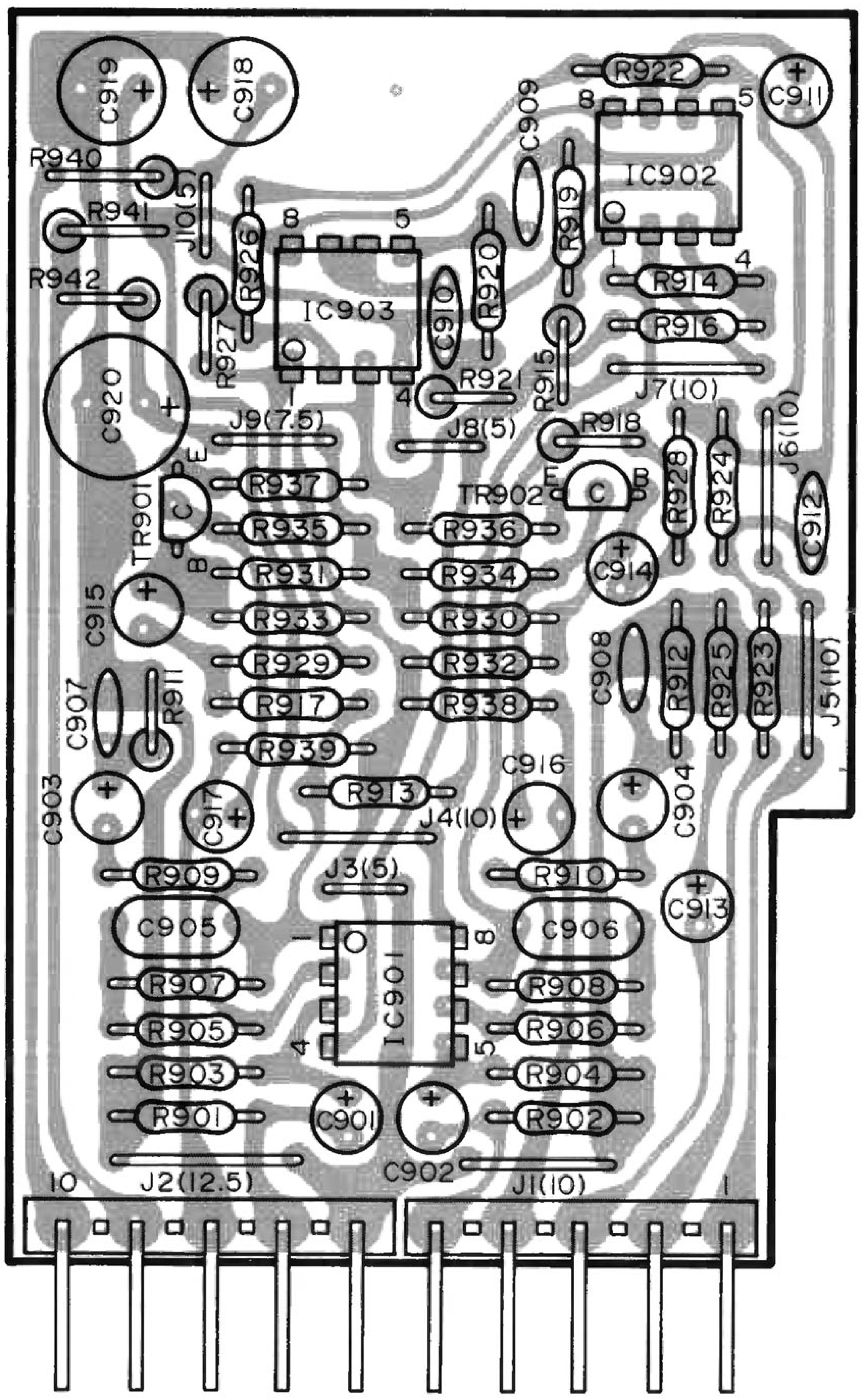


BOTTOM VIEW

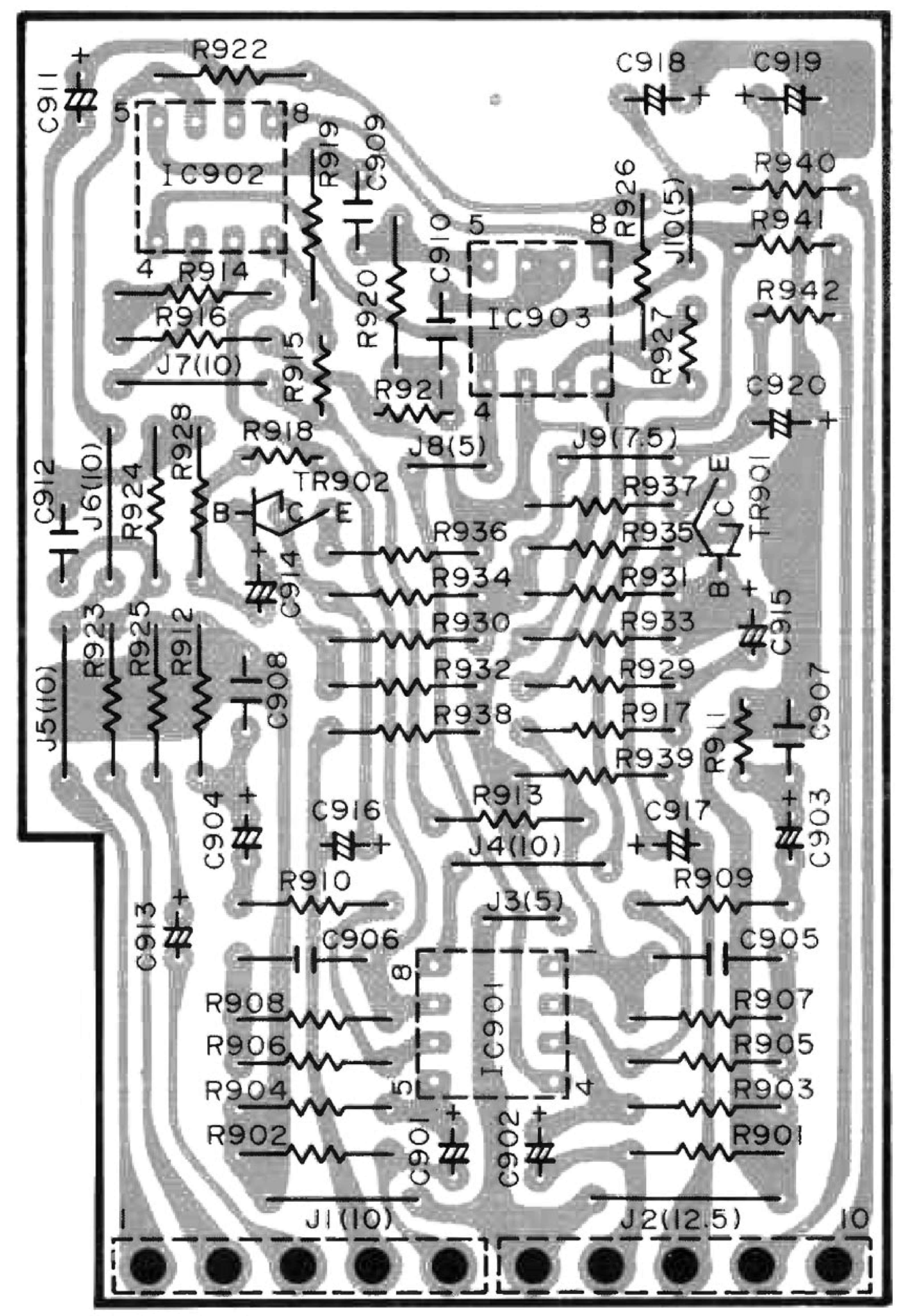

TUNER/AUDIO P.C.B. BOTTOM VIEW
BASS
TREBLE
BALANCE
VOLUME
EXPANDER
HI-FILTER
30Hz CUT
LOUDNESS
MONO
TAPE MON
FM MUTE
FUNCTION SW
UK & AUST MODELS ONLY
TAPE OUT
TAPE IN
AUX/TV
PHONO
L
SPEAKERS
R
STA-860

EXPANDER P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

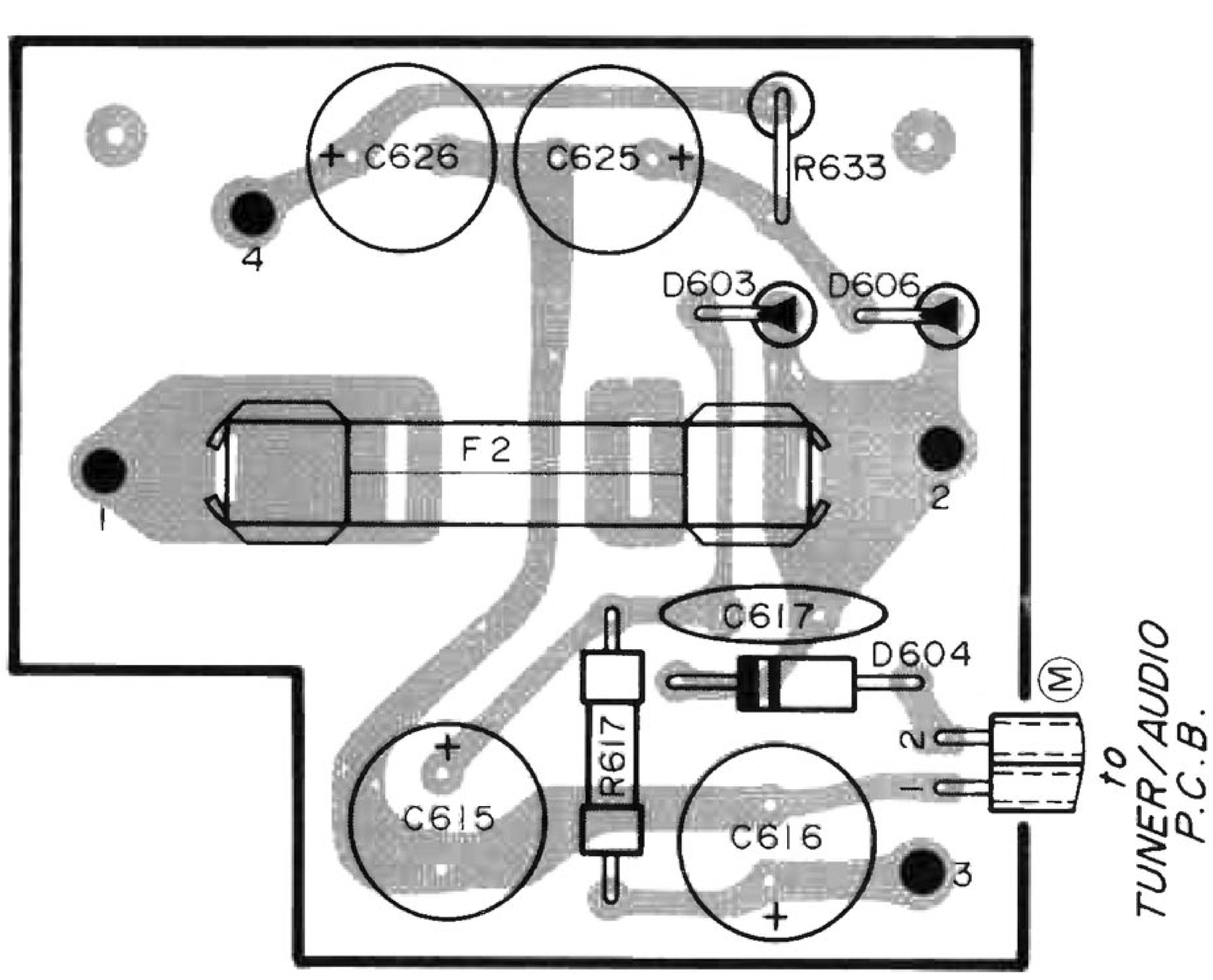


BOTTOM VIEW

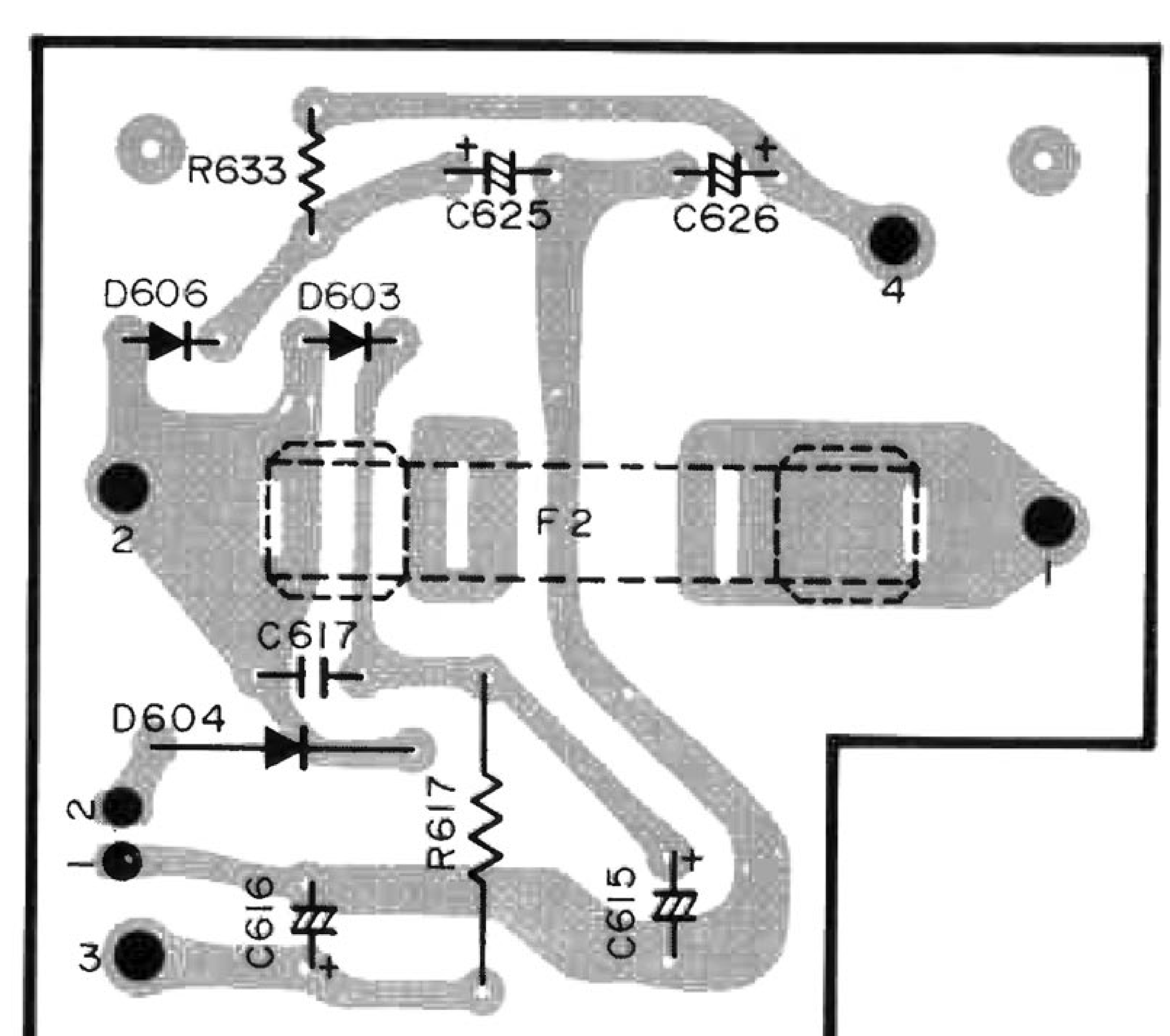


SUPPLY P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

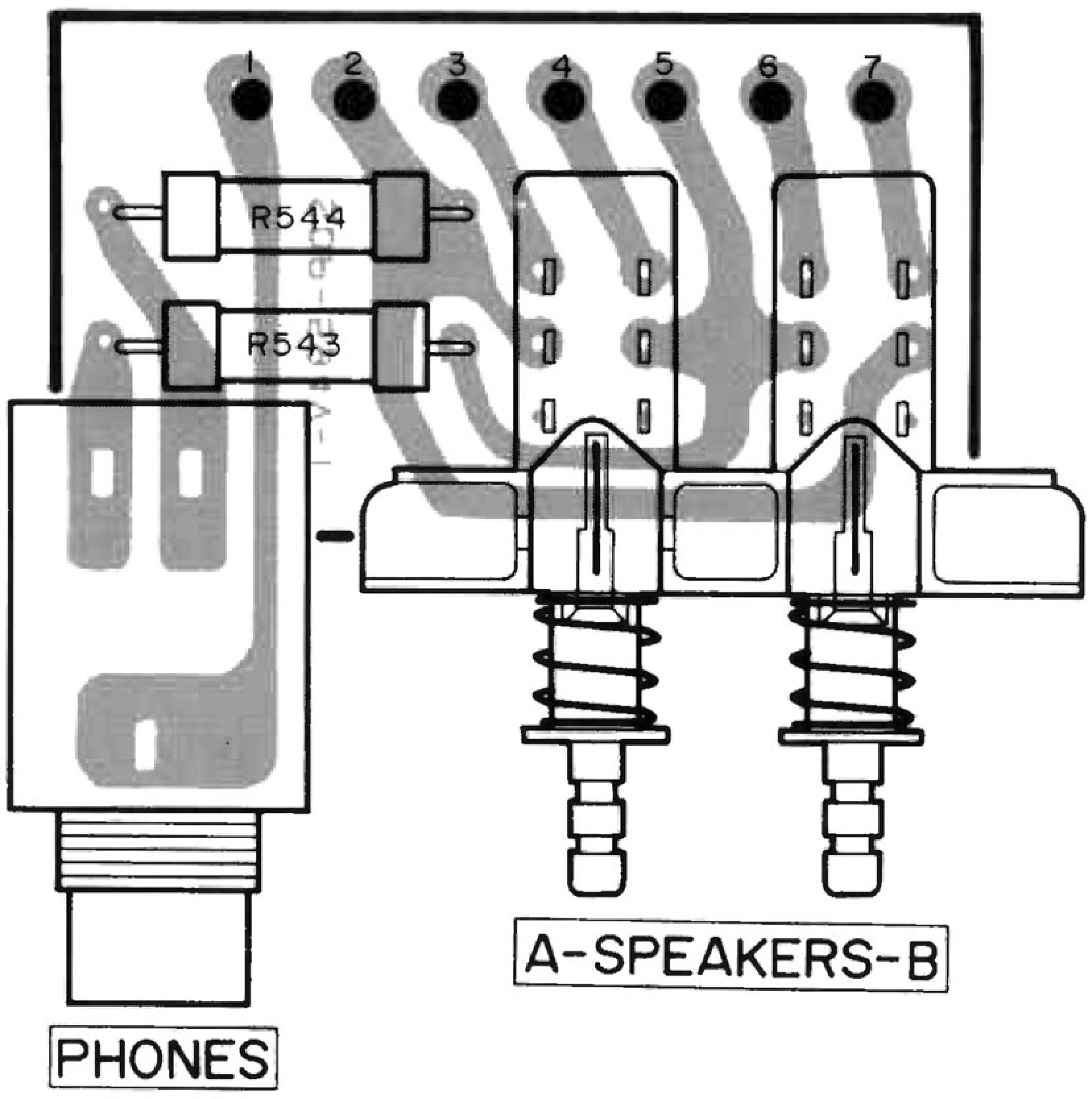


BOTTOM VIEW

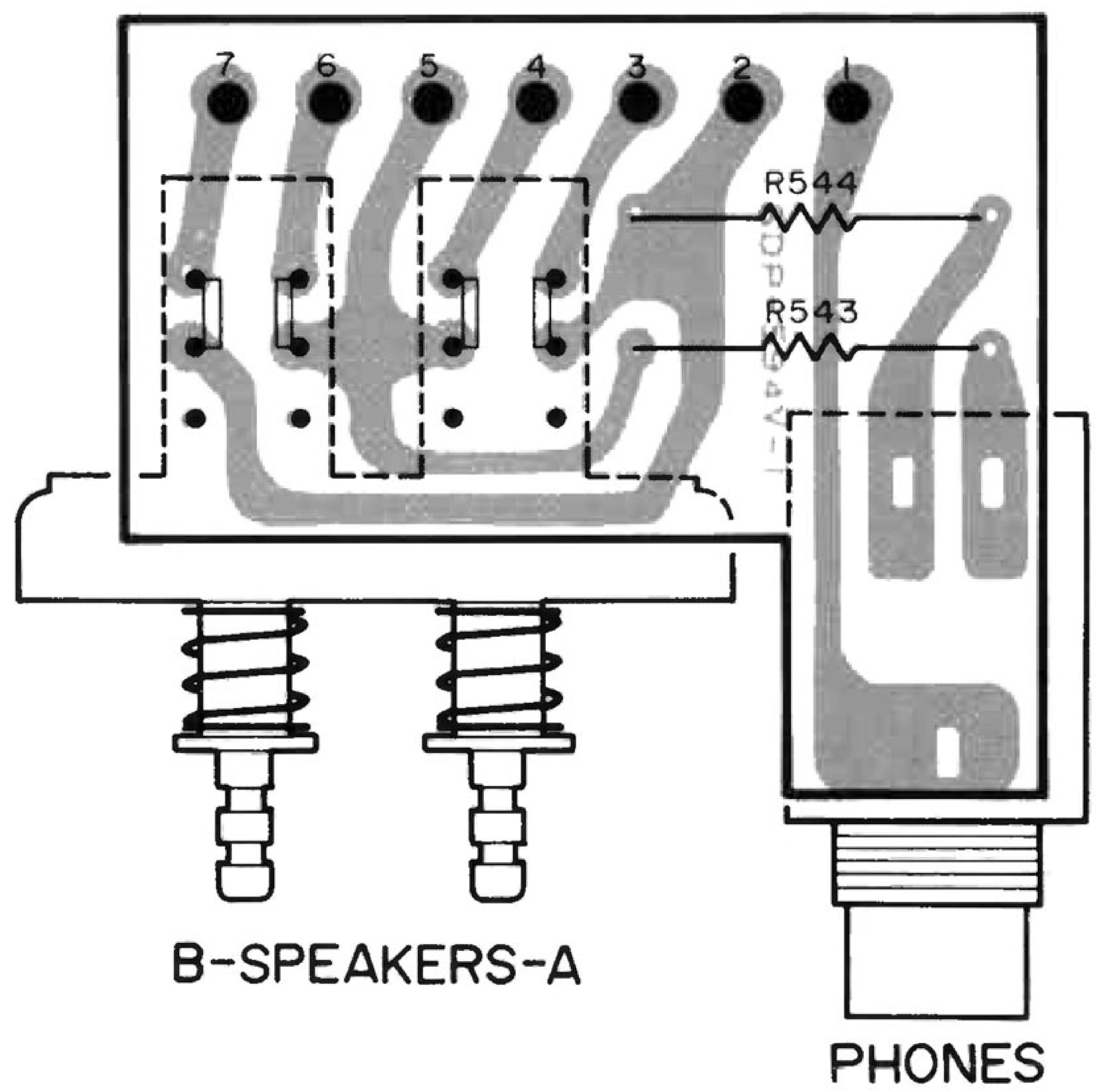


SP SWITCH P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

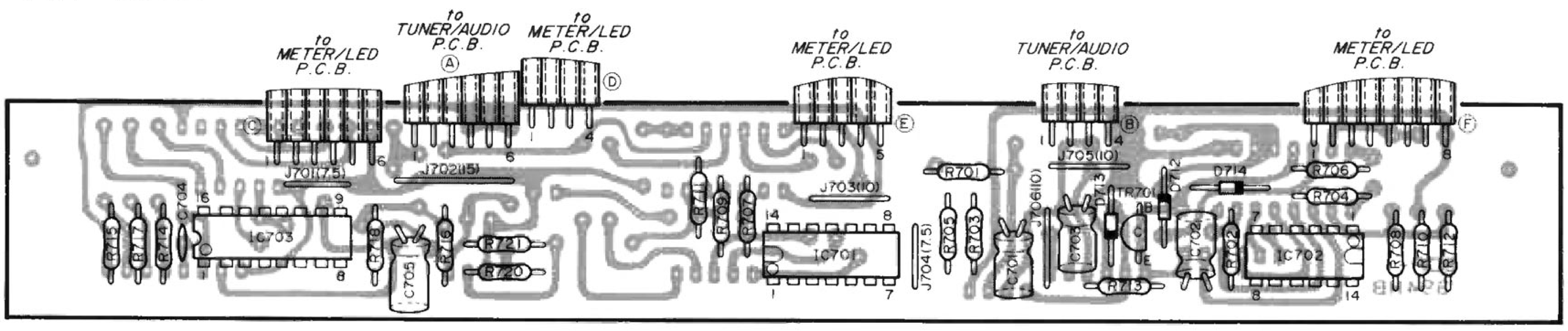


BOTTOM VIEW

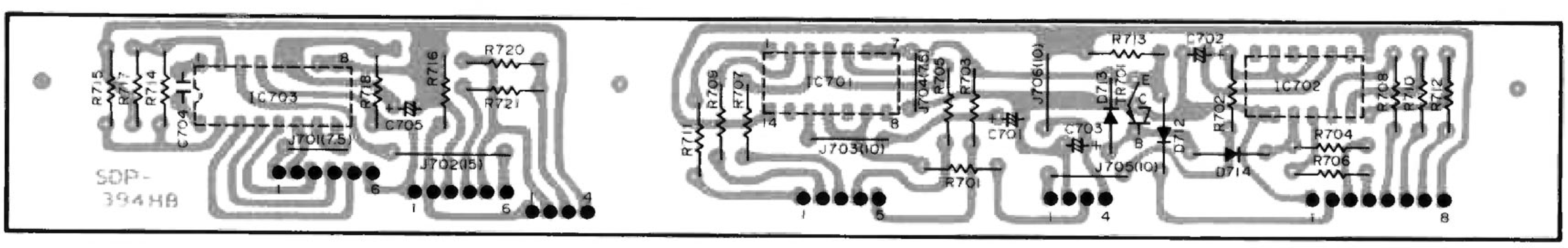


METER/AMP P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

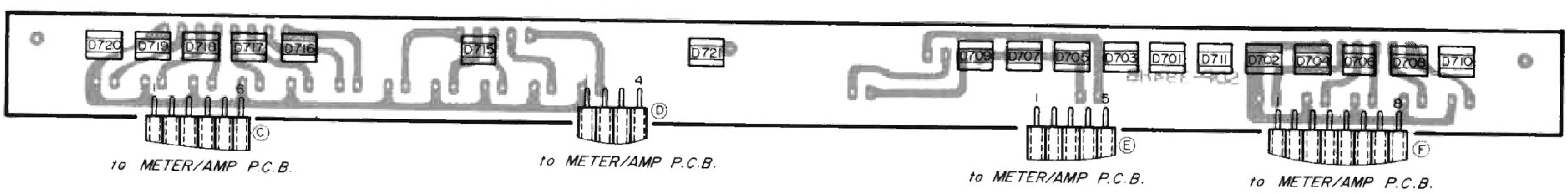


BOTTOM VIEW

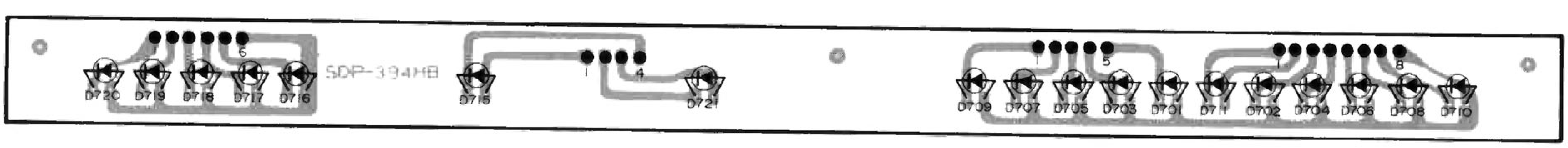


METER/LED P.C.B. (TOP & BOTTOM VIEWS)

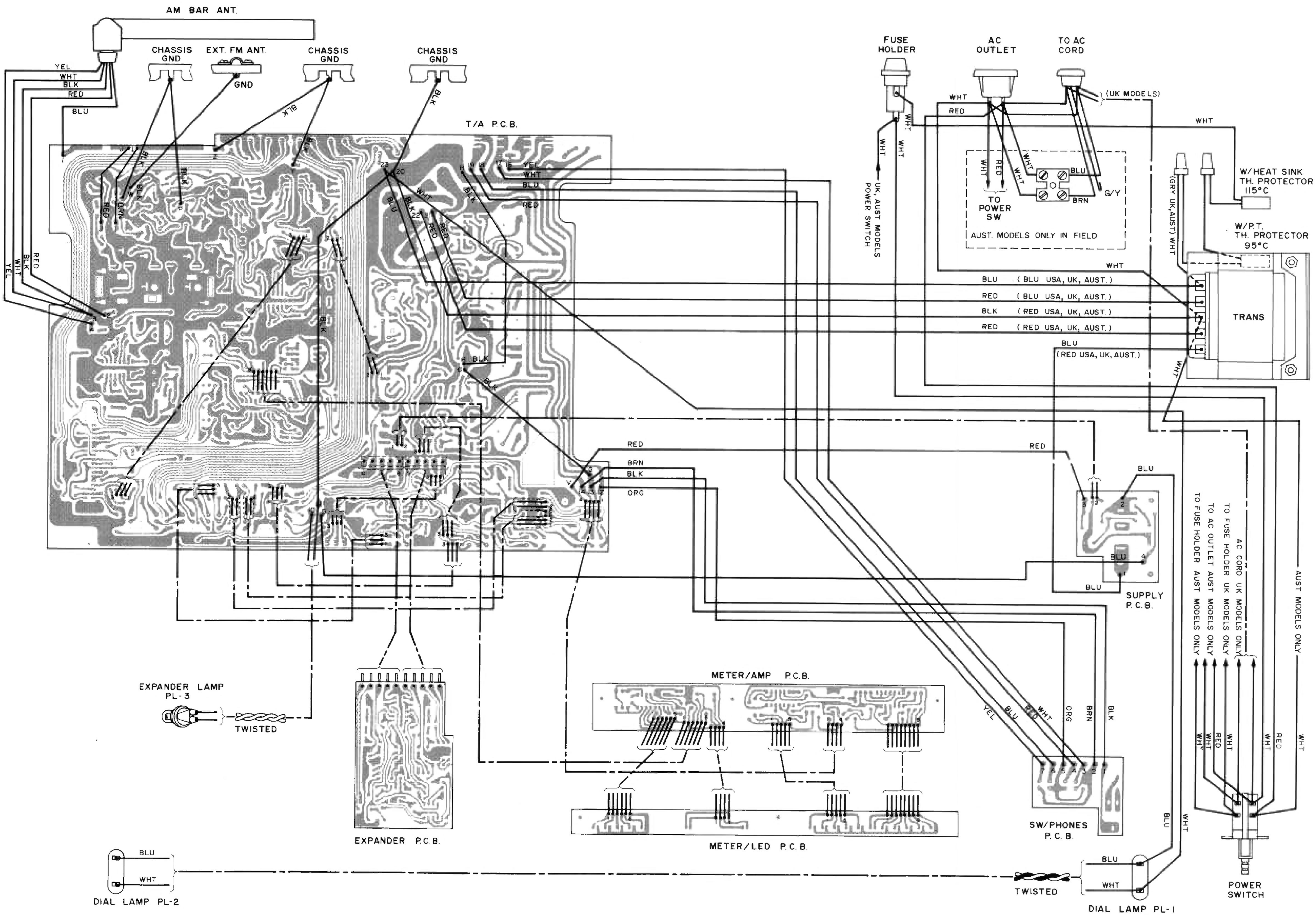
TOP VIEW



BOTTOM VIEW



WIRING DIAGRAM



ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice of this Service Manual. Don't degrade the safety of the product through improper servicing.
(US .... USA, CA .... Canada, UK .... United Kingdom, AU .... Australia)
CH = NPO RB = Low Noise

CAPACITORS

Ref. No.	Material	Value (μF)	Volt-age (V)	Tolerance (%)	R/S Part No.
C101	Ceramic	18 P(CH)	50	±5	
C102	Ceramic	100 P	50	±5	
C103	Ceramic	100 P	50	±5	
C104	Ceramic	0.022	50	+80/−20	
C105	Ceramic	0.022	50	+80/−20	
C106	Ceramic	0.01	50	+80/−20	
C107	Ceramic	15 P	50	±5	
C108	Ceramic	10 P	50	±0.5PF	
C109	Ceramic	15 P(CH)	50	±5	
C110	Ceramic	1 P(CH)	50	±0.25PF	
C111	Ceramic	0.001	50	±10	
C112	Ceramic	0.022	50	+80/−20	
C113	Ceramic	0.022	50	+80/−20	
C114	Ceramic	18P(N470)	50	±5	
C115	Ceramic	10P(CH)	50	±0.5PF	
C116	Ceramic	12P(CH)	50	±5	
C117	Ceramic	15P(CH)	50	±5	
C118	Ceramic	18P(CH)	50	±5	
C119	Ceramic	0.022	50	+80/−20	
C120	Electrolytic	1	50	±20	
C121	Electrolytic	0.47	50	±20	
C122	Mylar	0.022	50	±10	
C123	Ceramic	0.022	50	+80/−20	
C124	Ceramic	15 P	50	±5	
C201	Ceramic	0.01	50	+80/−20	
C202	Ceramic	0.047	50	+80/−20	
C203	Ceramic	0.022	50	+80/−20	
C204	Ceramic	0.022	50	+80/−20	
C205	Ceramic	0.047	50	+80/−20	
C206	Ceramic	0.047	50	+80/−20	
C207	Ceramic	0.047	50	+80/−20	
C208	Electrolytic	1	50	±20	
C209	Ceramic	100 P	50	±5	
C210	Ceramic	0.022	50	+80/−20	
C211	Electrolytic	0.47	50	±20	
C212	Electrolytic	4.7	50	±20	
C213	Electrolytic	0.47	50	±20	
C214	Electrolytic	33	10	±20	
C215	Ceramic	0.022	50	+80/−20	
C216	Ceramic	0.022	50	+80/−20	
C217	Ceramic	0.022	50	+80/−20	
C218	Ceramic	0.022	50	+80/−20	
C219	Electrolytic	10	25	±20	

Ref. No.	Material	Value (μF)	Volt-age (V)	Tolerance (%)	R/S Part No.
C220	Ceramic	0.022	50	+80/−20	
C221	Ceramic	0.022	50	+80/−20	
C222	Electrolytic	4.7	50	±20	
C223	Electrolytic	10	25	±20	
C224	Electrolytic	10	25	±20	
C225	Mylar (US/CA)	0.0022	50	±10	
C225	Mylar (UK/AU)	0.0012	50	±10	
C226	Mylar (US/CA)	0.0022	50	±10	
C226	Mylar (UK/AU)	0.0012	50	±10	
C227	Electrolytic	2.2	50	±20	
C228	Electrolytic	2.2	50	±20	
C229	Electrolytic	1000	16	±20	
C230	Ceramic	100 P	50	±5	
C231	Ceramic	0.022	50	+80/−20	
C232	Polystyrene	470 P	50	±5	
C233	Electrolytic or	1.5(RB)	50	±20	CC-155MFAP
C233	Tantalum	1.5	25	±20	
C234	Electrolytic or	3.3(RB)	50	±20	
C234	Tantalum	3.3	25	±20	
C235	Electrolytic or	0.22(RB)	50	±20	
C235	Tantalum	0.22	25	±20	
C236	Mylar	0.047	50	±10	
C237	Polystyrene	470 P	50	±5	
C238	Electrolytic	1	50	±20	
C239	Electrolytic	220	16	±20	
C240	Ceramic	0.022	50	+80/−20	
C241	Ceramic	0.001	50	±10	
C242	Ceramic	0.022	50	+80/−20	
C243	Electrolytic	100	16	±20	
C244	Ceramic	15 P	50	±5	
C245	Polystyrene	340 P	50	±2	
C246	Ceramic	68 P	50	±5	
C247	Ceramic	0.022	50	+80/−20	
C248	Mylar	0.022	50	±10	
C249	Ceramic	0.022	50	+80/−20	
C250	Ceramic	0.047	50	+80/−20	
C251	Ceramic	0.001	50	±10	
C252	Electrolytic	4.7	50	±20	
C253	Electrolytic	3.3	50	±20	
C254	Ceramic	0.01	50	+80/−20	
C255	Electrolytic	100	16	±20	
C256	Ceramic	0.022	50	+80/−20	
C257	Electrolytic	0.22(RB)	50	±20	

Ref. No.	Material	Value (μF)	Volt-age (V)	Tolerance (%)	R/S Part No.
C258	Electrolytic	0.47	50	±20	
C259	Ceramic	220 P	50	±5	
C260	Electrolytic	0.47	50	±20	
C261	Mylar	0.01	50	±10	
C262	(not used)				
C263	Ceramic	0.022	50	+80/−20	
C264	Electrolytic	1	50	±20	
C265	Ceramic	0.022	50	+80/−20	
C301	Electrolytic	0.47(RB)	50	±20	
C302	Electrolytic	0.47(RB)	50	±20	
C303	Ceramic	82 P	50	±5	
C304	Ceramic	82 P	50	±5	
C305	Electrolytic	33	25	±20	
C306	Electrolytic	33	25	±20	
C307	Mylar	0.0047	50	±5	
C308	Mylar	0.0047	50	±5	
C309	Mylar	0.018	50	±5	
C310	Mylar	0.018	50	±5	
C311	Electrolytic	0.47(RB)	50	±20	
C312	Electrolytic	0.47(RB)	50	±20	
C313	Electrolytic	47	25	±20	
C314	Electrolytic	47	25	±20	
C315	Mylar	0.0047	50	±5	
C316	Mylar	0.0047	50	±5	
C317	Mylar	0.0047	50	±5	
C318	Ceramic	0.0022	50	±10	
C319	Ceramic	0.0022	50	±10	
C320	Mylar	0.0047	50	±5	
C401	Polystyrene	180 P	50	±5	CC-181KJGP
C402	Polystyrene	180 P	50	±5	CC-181KJGP
C403	Mylar	0.082	50	±10	
C404	Mylar	0.082	50	±10	
C405	Electrolytic	1	50	±20	
C406	Electrolytic	1	50	±20	
C407	Ceramic	220 P	50	±5	
C408	Ceramic	220 P	50	±5	
C409	Electrolytic	47	25	±20	
C410	Electrolytic	47	25	±20	
C411	Electrolytic	10	25	±20	
C412	Electrolytic	10	25	±20	
C413	Mylar	0.0015	50	±10	
C414	Mylar	0.0015	50	±10	
C415	Mylar	0.056	50	±10	
C416	Mylar	0.056	50	±10	
C417	Mylar	0.039	50	±10	
C418	Mylar	0.039	50	±10	
C419	Mylar	0.039	50	±10	

Ref. No.	Material	Value (μF)	Volt-age (V)	Tolerance (%)	R/S Part No.
C420	Mylar	0.039	50	±10	
C421	(not used)				
C422	(not used)				
C423	Electrolytic	1	50	±20	
C424	Electrolytic	1	50	±20	
C425	Ceramic	25 P	50	±5	
C426	Ceramic	25 P	50	±5	
C427	Electrolytic	1.5(RB)	50	±20	CC-155MFAP
C428	Electrolytic	1.5(RB)	50	±20	CC-155MFAP
C429	Electrolytic	100	16	±20	
C430	Electrolytic	100	16	±20	
C431	(not used)				
C432	(not used)				
C433	Mylar	0.018	50	±10	
C434	Mylar	0.018	50	±10	
C435	Electrolytic	47	25	±20	
C436	Electrolytic	47	25	±20	
C437	Electrolytic	330	25	±20	
C501	Mylar	0.001	50	±5	
C502	Mylar	0.001	50	±5	
C503	Electrolytic	2.2	50	±20	
C504	Electrolytic	2.2	50	±20	
C505	Ceramic	5 P	50	±0.5PF	
C506	Ceramic	5 P	50	±0.5PF	
C507	Ceramic	5 P	50	±0.5PF	
C508	Ceramic	5 P	50	±0.5PF	
C509	Electrolytic	100	16	±20	
C510	Electrolytic	100	16	±20	
C511	Electrolytic	100	25	±20	
C512	Electrolytic	100	25	±20	
C513	Mylar	0.056	50	±10	
C514	Mylar	0.056	50	±10	
C515	Ceramic	0.047	50	+80/−20	
C516	Electrolytic	220	25	±20	
C517	Mylar	0.0047	50	±5	
C518	Mylar	0.0047	50	±5	
C519	Electrolytic	220	50	±20	
△C601	Ceramic	0.047	100	+80/−20	
△C602	Ceramic	0.047	100	+80/−20	
△C603	Ceramic	0.047	100	+80/−20	
△C604	Ceramic	0.047	100	+80/−20	
△C605	Electrolytic	10000	50	±20	CC-109MJAP
△C606	Electrolytic	10000	50	±20	CC-109MJAP
C607	(not used)				
C608	(not used)				
C609	Electrolytic	10	35	±20	
C610	Electrolytic	10	35	±20	

Ref. No.	Material	Value (μF)	Voltage (V)	Tolerance (%)	R/S Part No.
C611	Ceramic	22 P	50	±5	
C612	Electrolytic	33	25	±20	
C613	Electrolytic	10	25	±20	
C614	Ceramic	0.001	50	±10	
C615	Electrolytic	470	16	±20	
C616	Electrolytic	220	16	±20	
C617	Ceramic	0.047	50	+80/−20	
C618	Ceramic	100 P	50	±5	
C619	Ceramic	100 P	50	±5	
C620	Electrolytic	10	50	±20	
C621	Electrolytic	22	16	±20	
C622	Electrolytic	1.5(RB)	50	±20	CC155MFAP
C623	Electrolytic	4.7	50	±20	
C624	Electrolytic	4.7	50	±20	
C625	Electrolytic	470	16	±20	
C626	Electrolytic	470	16	±20	
C701	Electrolytic	1	50	±20	
C702	Electrolytic	1	50	±20	
C703	Electrolytic	10	25	±20	
C704	Ceramic	0.0047	50	±10	
C705	Electrolytic	1	50	±20	
C901	Electrolytic	2.2	50	±20	
C902	Electrolytic	2.2	50	±20	
C903	Electrolytic	1	50	±20	
C904	Electrolytic	1	50	±20	
C905	Mylar	0.12	50	±10	
C906	Mylar	0.12	50	±10	
C907	Mylar	0.0033	50	±10	
C908	Mylar	0.0033	50	±10	
C909	Mylar	0.01	50	±5	
C910	Mylar	0.039	50	±5	
C911	Electrolytic	4.7	50	±20	
C912	Mylar	0.039	50	±5	
C913	Electrolytic	2.2	50	±20	
C914	Electrolytic	1	50	±20	
C915	Electrolytic	1	50	±20	
C916	Electrolytic	2.2	50	±20	
C917	Electrolytic	2.2	50	±20	
C918	Electrolytic	100	25	±20	
C919	Electrolytic	100	25	±20	
C920	Electrolytic	100	25	±20	
△C1101	Ceramic "Line Pass UK535 Type" (USA)	0.01	125	+80/−20	C-1343

Ref. No.	Material	Value (μF)	Voltage (V)	Tolerance (%)	R/S Part No.
△C1101	Metalized Paper "Line Pass × type" (UK/AU)	0.01	250	±20	
△C1101	Ceramic "Line Pass MY type" (CA)	0.01	125	+80/−20	

COILS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
L101	FM Antenna	CA8677	143310110A
L102	Air, Trap		141100031A
L103	Air, FM RF		141200330A
L104	Air, Trap		141100031A
L105	FM Osc.		121300860A or 121301140A
L201	AM Bar Antenna		111110010A
L202/203	Inductor		142000340A
L204	MW Osc.		121100770A or 121101120A
L205	Inductor 2.2 μH		142000340A
L206	Inductor 18 μH		142000290A or 142000430A
L601	Inductor 18 μH		142000710A

TRANSFORMERS

Ref. No.	Description	R/S Part No.	Mfr's Part No.
T101	IFT 10.7		133000700A
	IFT 10.7		133000600A
*T201	IFT 10.7		133000680Bor
	IFT 10.7		133000660A
*T202	IFT 10.7		133000690Bor
	IFT 10.7		133000670A
T203	IFT 455		131000640A or
	IFT 455		131000980A
T204	IFT 455		131000650A or
	IFT 455		131010021A
T205	IFT 455		131000480A or
	IFT 455		131000970A

Ref. No.	Description	R/S Part No.	Mfr's Part No.
⚠ P.T.	Power 120V AC, 60Hz (U.S.) Power 120V AC, 60Hz (CA) Power 240V AC, 50Hz (UK, AU)	TA-1071	10101083SA 10101084SA 10101085SA

*See SPECIAL PAIRED PARTS on Page 55.

Ref. No.	Description		Manu-facturer
DIODES			
D101	ITT-73N	Silicon, FM Overload	ITT
D102	WZ110 or	Zener, Regulator	JRC
	RD11E-B2	Zener, Regulator	NEC
D103	ITT-410	Vari-Cap, AFC	ITT
D201—D203	ITT-73N	Silicon, Switching	ITT
D204	RD5.6E (B2) or	Zener, Function Mute	NEC
	WZ-056	Zener	JRC
D205—D211	ITT-73N	Silicon, Switching	ITT
D501/502	MV-11Y	Varistor, Bias Control	OHIZUMI
D503/504	VD1221	Varistor, Regulator	NEC
D505/506	ITT-73N	Silicon, Regulator	ITT
D507	WZ-130 or	Zener, Regulator	JRC
	RD13E (B2) or	Zener	NEC
	RD13E (B3)	Zener	NEC
D508	ITT-73N	Silicon, Regulator	ITT
D601	KBPC 802L	Rectifier	GI
D602	RD5.6E (B2) or	Zener, Regulator	NEC
	WZ056	Zener	JRC
D603/604	SR-1K-2 or	Silicon, Rectifier	UNIZON
	10E-1 or	Silicon	IR
	IN4002	Silicon	GI
D605	ITTN-73N	Silicon, Muting	ITT
D606	SR-1K-2 or	Silicon, Rectifier	UNIZON
	10E-1 or	Silicon	IR
	IN4002	Silicon	GI
D712—714	ITT-73N	Silicon	ITT

Ref. No.	Description	R/S Part No.	Mfr's Part No.
FILTERS			
CF201/202	Ceramic Filter, SFE10.7, MA-8		392300300A
LPF201/202	LOW PASS Filter, 19kHz, 38kHz		524000410B

Ref. No.	Description	Mfr's Part No.
FUSES		
F1 ⚠	Fuse 125V/5A (US/CA), Quick Type	251000390A
	Fuse 250V/2.5A (UK/AU), Quick Type	251200930A
	Fuse 250V/1.5A (US)	251001290A or
	Fuse 250V/1.5A (US)	251000070A
F2 ⚠	Fuse 250V/1.5A (CA/AU/UK)	251000070A

Ref. No.	Description	Manu-facturer
INTEGRATED CIRCUITS (IC'S)		
IC201	LA1231N, Linear, FM IF AMP	SANYO
IC202	μPC1161C3, Linear, MPX or	NEC
	μPC1161C	NEC
IC203	LA1240, Linear, Signal Ind. Driver	SANYO
IC301	LA6458DX, Linear, PHONO EQ Amp or	SANYO
	NJM4558DX or	JRC
	TL4558PB	TI
IC401	LA6458DX, Linear, Tone Flat Amp or	SANYO
	NJM4558DX or	JRC
	TL4558PB	TI
IC701/702	SN-16880N, Linear, Driver	TI
IC703	LB1405, Linear, Driver	SANYO
IC901-903	LA6458DX, Linear, Amp or	SANYO
	NJM4558DX or	JRC
	TL4558PB	TI

Ref. No.	Description	R/S Part No.	Mfr's Part No.
LAMPS			
PLI-2	Tubular 12V/0.15A for Dial		243000890A
PL-3	Wadge Base 12V/0.15A for Expander	L1576	244010010A

Ref. No.	Description		R/S Part No.	Manu-facturer
LIGHT EMITTING DIODES (LED's)				
D701-710	LN05202P (RED)	Power Meter Indicator	L1573	MTSTA
D711	LN317GP (GREEN)	Power Meter Indicator	L1575	MTSTA
D715	LN317GP (GREEN)	Tuning Indicator	L1575	MTSTA
D716-720	LN05202P (RED)	AM/FM Signal Indicator	L1574	MTSTA
D721	LN217RP (RED)	FM Stereo Indicator	L1573	MTSTA

Ref. No.	Material	Value (ohm)	Wattage (V)	Tolerance (%)	R/S Part NO.
RESISTORS					
R101	Carbon	100 K	1/4	±5	
R102	Carbon	47 K	1/4	±5	
R103	Carbon	100 K	1/4	±5	
R104	Carbon	100 K	1/4	±5	
R105	Carbon	47	1/4	±5	
R106	Carbon	330	1/4	±5	
R107	Carbon	18 K	1/4	±5	
R108	Carbon	5.6 K	1/4	±5	
R109	Carbon	1.5 K	1/4	±5	
R110	(not used)				
R111	Carbon	330	1/4	±5	
R112	Carbon	22 K	1/4	±5	
R113	Carbon	10 K	1/4	±5	
R114	Carbon	2.2 K	1/4	±5	
R115	Carbon	10 K	1/4	±5	
R116	Carbon	240 K	1/4	±5	
R117	Carbon	220 K	1/4	±5	
R118	Carbon	470	1/4	±5	
R119	Carbon	390 K	1/4	±5	
R120	Carbon	3.3 K	1/4	±5	
R201	Carbon	470	1/4	±5	
R202	Carbon	3.3 K	1/4	±5	
R203	Carbon	330	1/4	±5	
R204	Carbon	330	1/4	±5	
R205	Carbon	82	1/4	±5	
R206	Carbon	82	1/4	±5	
R207	Carbon	1 K	1/4	±5	
R208	Carbon	330	1/4	±5	
R209	Carbon	27 K	1/4	±5	
R210	Carbon	180 K	1/4	±5	
R211	Carbon	6.8 K	1/4	±5	
R212	Carbon	68 K	1/4	±5	

Ref. No.	Material	Value (ohm)	Wattage (V)	Tolerance (%)	R/S Part NO.
R213	Carbon	15 K	1/4	±5	
R214	Carbon	10 K	1/4	±5	
R215	Carbon	68 K	1/4	±5	
R216	Carbon	15 K	1/4	±5	
R217	Carbon	3.3 K	1/4	±5	
R218	Carbon	27 K	1/4	±5	
R219	Carbon	47 K	1/4	±5	
R220	Carbon	100 K	1/4	±5	
R221	Carbon	27 K	1/4	±5	
R222	Carbon	3.3 K	1/4	±5	
R223	Carbon	1.8 K	1/4	±5	
R224	Carbon	33	1/4	±5	
R225	Carbon	47 K	1/4	±5	
R226	Carbon	10 K	1/4	±5	
R227	Carbon	10 K	1/4	±5	
R228	Carbon	470 K	1/4	±5	
R229	Carbon	820	1/4	±5	
R230	Carbon	47 K	1/4	±5	
R231	Carbon	100 K	1/4	±5	
R232	Carbon	12 K	1/4	±5	
R233	Carbon	10 K	1/4	±5	
R234	Carbon	82	1/4	±5	
R235	Carbon	4.7 K	1/4	±5	
R236	Carbon	4.7 K	1/4	±5	
R237	Carbon	22 K	1/4	±5	
R238	Carbon	22 K	1/4	±5	
R239	Carbon	39 K	1/4	±5	
R240	Carbon	39 K	1/4	±5	
R241	Carbon	3.3 K	1/4	±5	
R242	Carbon	3.3 K	1/4	±5	
R243	Carbon	2.7 K	1/4	±5	
R244	Carbon	2.7 K	1/4	±5	
R245	Carbon	56 K	1/4	±5	
R246	Carbon	15 K	1/4	±5	
R247	Carbon	220 K	1/4	±5	
R248	Carbon	1 K	1/4	±5	
R249	Carbon	1.2 K	1/4	±5	
R250	Carbon	22	1/4	±5	
R251	Carbon	3 K	1/4	±5	
R252	Carbon	220 K	1/4	±5	
R253	Carbon	270	1/4	±5	
R254	Carbon	1 K	1/4	±5	
R255	Carbon	10 K	1/4	±5	
R256	Carbon	10 K	1/4	±5	
R257	Carbon	10 K	1/4	±5	
R258	Carbon	4.3 K	1/4	±5	
R259	Carbon	10 K	1/4	±5	
R260	Carbon	180 K	1/4	±5	
R261	Carbon	33 K	1/4	±5	N-0327EEC
R262	Carbon	4.7 K	1/4	±5	
R263	Carbon	1.2 K	1/4	±5	
R264	Carbon	220	1/4	±5	
R265	Carbon	10 K	1/4	±5	

Ref. No.	Material	Value (ohm)	Wattage (V)	Tolerance (%)	R/S Part NO.
R301	Carbon	100 K	1/4	±5	
R302	Carbon	100 K	1/4	±5	
R303	Carbon	120 K	1/4	±5	
R304	Carbon	120 K	1/4	±5	
R305	Carbon	2.2 K	1/4	±5	
R306	Carbon	2.2 K	1/4	±5	
R307	Carbon	270	1/4	±5	
R308	Carbon	270	1/4	±5	
R309	Carbon	15 K	1/4	±5	
R310	Carbon	15 K	1/4	±5	
R311	Carbon	220 K	1/4	±5	
R312	Carbon	220 K	1/4	±5	
R313	Carbon	100 K	1/4	±5	
R314	Carbon	100 K	1/4	±5	
R315	Carbon	1 K	1/4	±5	
R316	Carbon	1 K	1/4	±5	
⚠R317	Metal Oxide	470	1	±5	N-0169EGE
⚠R318	Metal Oxide	470	1	±5	N-0169EGE
R319	Carbon (AU/UK)	180 K	1/4	±5	
R320	Carbon (AU/UK)	180 K	1/4	±5	
R401	Carbon	4.7 K	1/4	±5	
R402	Carbon	4.7 K	1/4	±5	
R403	Carbon	4.7 K	1/4	±5	
R404	Carbon	4.7 K	1/4	±5	
R405	Carbon	4.7 K	1/4	±5	
R406	Carbon	4.7 K	1/4	±5	
R407	Carbon	10 K	1/4	±5	
R408	Carbon	10 K	1/4	±5	
R409	Carbon	1 K	1/4	±5	
R410	Carbon	1 K	1/4	±5	
R411	Carbon	220 K	1/4	±5	
R412	Carbon	220 K	1/4	±5	
R413	Carbon	18 K	1/4	±5	
R414	Carbon	18 K	1/4	±5	
R415	Carbon	2 K	1/4	±5	
R416	Carbon	2 K	1/4	±5	
R417	Carbon	1.5 K	1/4	±5	
R418	Carbon	1.5 K	1/4	±5	
R419	(not used)				
R420	(not used)				
R421	Carbon	11 K	1/4	±5	
R422	Carbon	11 K	1/4	±5	
R423	Carbon	560	1/4	±5	
R424	Carbon	560	1/4	±5	
R425	Carbon	13 K	1/4	±5	
R426	Carbon	13 K	1/4	±5	
R427	Carbon	4.7 K	1/4	±5	
R428	Carbon	4.7 K	1/4	±5	
R429	Carbon	12 K	1/4	±5	
R430	Carbon	12 K	1/4	±5	

Ref. No.	Material	Value (ohm)	Wattage (V)	Tolerance (%)	R/S Part NO.
R431	Carbon	1.5 M	1/4	±5	
R432	Carbon	1.5 M	1/4	±5	
R433	Carbon	5.6 K	1/4	±5	
R434	Carbon	5.6 K	1/4	±5	
R435	Carbon	220	1/4	±5	
R436	Carbon	220	1/4	±5	
⚠R437	Metal Oxide	47	1	±5	
⚠R438	Metal Oxide	47	1	±5	
R439	Carbon	4.7 K	1/4	±5	
R440	Carbon	4.7 K	1/4	±5	
R441	Carbon	1 K	1/4	±5	
R442	Carbon	1 K	1/4	±5	
R443	Carbon	1 M	1/4	±5	
R444	Carbon	1 M	1/4	±5	
⚠R445	Metal Oxide	1 K	1	±5	
⚠R446	Metal Oxide	1 K	1	±5	
R447	Carbon	1 M	1/4	±5	
R448	Carbon	1 M	1/4	±5	
R501	Carbon	220 K	1/4	±5	
R502	Carbon	220 K	1/4	±5	
R503	Carbon	1 K	1/4	±5	
R504	Carbon	1 K	1/4	±5	
R505	Carbon	33 K	1/4	±5	N-0327EEC
R506	Carbon	33 K	1/4	±5	N-0327EEC
R507	Carbon	1.8 K	1/4	±5	
R508	Carbon	1.8 K	1/4	±5	
R509	Carbon	15 K	1/4	±5	
R510	Carbon	15 K	1/4	±5	
R511	Carbon	27	1/4	±5	
R512	Carbon	27	1/4	±5	
R513	Carbon	1.5 K	1/4	±5	
R514	Carbon	1.5 K	1/4	±5	
R515	Carbon	30 K	1/4	±5	
R516	Carbon	30 K	1/4	±5	
R517	Carbon	2.2 K	1/4	±5	
R518	Carbon	2.2 K	1/4	±5	
R519	Carbon	3.3 K	1/4	±5	
R520	Carbon	3.3 K	1/4	±5	
R521	Metal Oxide	100	1	±5	
R522	Metal Oxide	100	1	±5	
R523	Metal Oxide	100	1	±5	
R524	Metal Oxide	100	1	±5	
R525	Metal Oxide	4.7	1	±5	
R526	Metal Oxide	4.7	1	±5	
R527	Metal Oxide	4.7	1	±5	
R528	Metal Oxide	4.7	1	±5	
⚠R529	Cement	0.47	5	±5	
⚠R530	Cement	0.47	5	±5	
⚠R531	Cement	0.47	5	±5	
⚠R532	Cement	0.47	5	±5	

Ref. No.	Material	Value (ohm)	Wattage age (V)	Tolerance (%)	R/S Part NO.
⚠R533	Cement	0.22	5	±5	
⚠R534	Cement	0.22	5	±5	
⚠R535	Metal Oxide	10	2	±5	
⚠R536	Metal Oxide	10	2	±5	
R537	Carbon	750	1/4	±5	
R538	Carbon	1 K	1/4	±5	
R539	Carbon	6.8 K	1/4	±5	
R540	Carbon	10 K	1/4	±5	
R541	Carbon	91	1/4	±5	
R542	Carbon	91	1/4	±5	
R543	Metal Oxide	270	3	±5	
R544	Metal Oxide	270	3	±5	
⚠R601	Metal Oxide	220	1	±5	
⚠R602	Metal Oxide	220	1	±5	
R603	Carbon	22 K	1/4	±5	
R604	Carbon	22 K	1/4	±5	
R605	Carbon	4.7 K	1/4	±5	
R606	Carbon	4.7 K	1/4	±5	
R607	Carbon	15 K	1/4	±5	
R608	Carbon	16 K	1/4	±5	
R609	Carbon	18 K	1/4	±5	
R610	Carbon	5.6 K	1/4	±5	
⚠R611	Metal Oxide	100	3	±5	
R612	Carbon	10 K	1/4	±5	
R613	Carbon	4.7 K	1/4	±5	
R614	Carbon	3.3 K	1/4	±5	
R615	Carbon	16 K	1/4	±5	
R616	Carbon	15 K	1/4	±5	
⚠R617	Metal Oxide	47	1	±5	
R618	Carbon	3.3 M	1/4	±5	
R619	Carbon	3.3 M	1/4	±5	
R620	Carbon	3.3 M	1/4	±5	
R621	Carbon	15 K	1/4	±5	
R622	Carbon	390 K	1/4	±5	
R623	Carbon	4.7 K	1/4	±5	
R624	Carbon	56 K	1/4	±5	
R625	Carbon	47 K	1/4	±5	
R626	Carbon	8.2 K	1/4	±5	
R627	Carbon	220 K	1/4	±5	
R628	Carbon	2.2 K	1/4	±5	
R629	Carbon	100 K	1/4	±5	
R630	Carbon	47 K	1/4	±5	
R631	Carbon	100 K	1/4	±5	
R632	Carbon	100 K	1/4	±5	
R633	Metal Oxide	6.8	1	±5	

Ref. No.	Material	Value (ohm)	Wattage age (V)	Tolerance (%)	R/S Part NO.
R701	Carbon	750 K	1/4	±5	
R702	Carbon	750 K	1/4	±5	
R703	Carbon	1.2 K	1/4	±5	
R704	Carbon	1.2 K	1/4	±5	
R705	Carbon	1.2 K	1/4	±5	
R706	Carbon	1.2 K	1/4	±5	
R707	Carbon	1.2 K	1/4	±5	
R708	Carbon	1.2 K	1/4	±5	
R709	Carbon	1.2 K	1/4	±5	
R710	Carbon	1.2 K	1/4	±5	
R711	Carbon	1.2 K	1/4	±5	
R712	Carbon	1.2 K	1/4	±5	
R713	Carbon	680	1/4	±5	
R714	Carbon	100 K	1/4	±5	
R715	Carbon	18 K	1/4	±5	
R716	Carbon	1 K	1/4	±5	
R717	Carbon	13 K	1/4	±5	
R718	Carbon	1.8 K	1/4	±5	
R719	(not used)				
R720	Carbon	3.3 K	1/4	±5	
R721	Carbon	2.2 K	1/4	±5	
R901	Carbon	220 K	1/4	±5	
R902	Carbon	220 K	1/4	±5	
R903	Carbon	100 K	1/4	±5	
R904	Carbon	100 K	1/4	±5	
R905	Carbon	3.6 K	1/4	±5	
R906	Carbon	3.6 K	1/4	±5	
R907	Carbon	12 K	1/4	±5	
R908	Carbon	12 K	1/4	±5	
R909	Carbon	3.6 K	1/4	±5	
R910	Carbon	3.6 K	1/4	±5	
R911	Carbon	6.8 K	1/4	±5	
R912	Carbon	6.8 K	1/4	±5	
R913	Carbon	10 K	1/4	±5	
R914	Carbon	10 K	1/4	±5	
R915	Carbon	3.3 K	1/4	±5	
R916	Carbon	3.3 K	1/4	±5	
R917	Carbon	4.7 K	1/4	±5	
R918	Carbon	4.7 K	1/4	±5	
R919	Carbon	10 K	1/4	±5	
R920	Carbon	1.8 K	1/4	±5	
R921	Carbon	1.8 K	1/4	±5	
R922	Carbon	100 K	1/4	±5	
R923	Carbon	2.2 K	1/4	±5	
R924	Carbon	6.8 K	1/4	±5	
R925	Carbon	1 K	1/4	±5	
R926	Carbon	4.7 K	1/4	±5	
R927	Carbon	4.7 K	1/4	±5	
R928	Carbon	4.7 K	1/4	±5	
R929	Carbon	4.7 K	1/4	±5	

Ref. No.	Material	Value (ohm)	Wattage (V)	Tolerance (%)	R/S Part NO
R930	Carbon	270 K	1/4	±5	
R931	Carbon	270 K	1/4	±5	
R932	Carbon	150 K	1/4	±5	
R933	Carbon	150 K	1/4	±5	
R934	Carbon	3.3 K	1/4	±5	
R935	Carbon	3.3 K	1/4	±5	
R936	Carbon	2 K	1/4	±5	
R937	Carbon	2 K	1/4	±5	
R938	Carbon	47 K	1/4	±5	
R939	Carbon	47 K	1/4	±5	
⚠R940	Metal Oxide	270	1	±5	
⚠R941	Metal Oxide	270	1	±5	
R942	Carbon	1 K	1/2	±5	
⚠R1101	Carbon (US/CA)	2.2 M	1/2	±5	

Ref. No.	Description	R/S Part No.	Mfr's Part No.
SWITCHES			
SS1-6	Push, Function		182710020A
	Push, POWER (US/CA)		182110200A
	Push, POWER (UK/AU)		182103830A
	Rotary Slide, FUNCTION SELECTOR	S-7625	181210020A
	Push, SPEAKERS A/B	S-7626	182205480A

Ref. No.	Description	R/S Part No.	Manufacture
SCR			
SCR501	03PIM		NEC

Ref. No.	Description	R/S Part No.	Mfr's Part No.
THERMAL PROTECTOR			
⚠U12	115°C 125V-6A		253010010A
⚠U12	95°C 125V-6A		253000390A

Ref. No.	Description	R/S Part No.	Manufacture
TRANSISTORS			
TR101	3SK74(L) FET, FM RF AMP		NEC
TR102/103	2SC1674(L,K) or		NEC
	2SC2786(L)		NEC
	Silicon, NPN, FM Mixer/Osc.		
TR201	2SC1675(L,K) or		NEC
	2SC930(E,D) or		SANYO
	2SC2787(L)		NEC
	NPN, FM IF AMP		
TR202/203	2SC536(G,H) or		SANYO
	2SC1840(E,F)		NEC
	NPN, FM Muting		
TR204	2SA733A(P) or		NEC
	2SA608KNP(G)		SANYO
	PNP, Enable Sw.		
TR205	2SC945A(P) or		NEC
	2SC536KNP(G)		SANYO
	NPN, Driver		
TR206/207	2SC536(G,H) or		SANYO
	2SC1840(E,F)		NEC
	NPN, FM Muting		
TR208	2SC536(G,H) or		SANYO
	2SC1842(E,F)		NEC
	NPN, AM Audio Amp		
TR401/402	2SC1845(F) or		NEC
	2SC1313(F)		MITSUBISHI
	NPN, Control Amp		
TR501-504	2SC2362(G) or		SANYO
	2SC1845(F)		NEC
	NPN, Differential Amp		
TR505/506	2SA1019(F)	2SA1019	SANYO
	PNP, Pre Driver Amp		
⚠TR507/508	2SD600K(E)		SANYO
	NPN, Power Amp		
⚠TR509/510	2SB631K(E)		SANYO
	PNP, Power Amp		
⚠*TR511/512	2SD1047(D,E)	2SD1047	SANYO
	NPN, Power		
⚠*TR513/514	2SB817(D,E)	2SB817	SANYO
	PNP, Power		
⚠TR601	2SD325(F) or		SANYO
	2SC2275(Q)		NEC
	NPN, Regulator		
⚠TR602	2SB511(F) or		SANYO
	2SA985(Q)		NEC
	PNP, Regulator		
TR603	2SC1175(F) or		SANYO
	2SC1844(E) or		NEC
	KTC1815 (GR)		TOSHIBA
	NPN, Regulator		

Ref. No.	Description	R/S Part No.	Manu-facture
TR604	2SA659(F) or		SANYO
	2SA991(E) or		NEC
	KTA1015(GR)		TOSHIBA
	PNP, Regulator		
⚠TR605	2SD313(E,F) or		SANYO
	2SC2275(Q)		NEC
	NPN, Regulator		
TR606	2SC1175(F) or		SANYO
	2SC1844(E) or		NEC
	KTC1815(GR)		TOSHIBA
	NPN, Regulator		
TR607/608	KTK 30A TM(GR) or	MX5541	TOSHIBA
	KTK246(GR) or		TOSHIBA
	2SK105(H)		NEC
	FET, Protector		
TR609-611	2SC1845(E,U) or		NEC
	2SC2362(H) or		SANYO
	KTC2240(BL)		TOSHIBA
	NPN Noise Canceler		
TR701	2SA984(E)		SANYO
	PNP, Driver		
TR901/902	2SC1845(F) or		NEC
	2SC1313(F)		MITSUBISHI
	NPN, AMP		

* The reference No. with asterisk should be used in pair per each lot. Refer to next low "SPECIAL PAIRED PARTS."

Ref. No.	Description	R/S Part No.	Mfr's Part No.
VARIABLE CAPACITORS			
VC101-103	AVC FM: 3 Gang		151000190B
	AM: 2 Gang		
VC201/202	AVC FM: 3 Gang		151000190B
	AM: 2 Gang		
TC103	Trimmer		154000200A

Ref. No.	Description	R/S Part No.	Mfr's Part No.
VARIABLE RESISTORS			
VR201	Semi-Fixed		
	50kΩB		175205150Aor
	50kΩB		175206210Aor
	50kΩB		175206540A
VR202	Semi-Fixed		
	100kΩB		175205160Aor
	100kΩB		175206220Aor
	100kΩB		175206550A
VR203	Semi-Fixed		
	500kΩB		175205180Aor
	500kΩB		175206240Aor
	500kΩB		175206570A
VR204	Semi-Fixed		
	5kΩB		175205120Aor
	5kΩB		175206180Aor
	5kΩB		175206510A
VR401	Rotary		
	200kΩ (VOLUME)2BL×2	P-7465	171610260Aor
			171604580A
VR402	Rotary		
	100kΩ (BALANCE)1Z×2	P-3152	171610290Aor
			171610270A
VR403/404	Rotary		
	100kΩB (BASS/TERBLE)	P-2292	171610280A
	1KB×2		
VR901	Rotary		
	2kΩ (EXPANDER)1KB	P-7466	171210270Aor
			171210260A

Ref. No.	Description	R/S Part No.	Manu-facturer	Mfr's Part No.
***SPECIAL PAIRED PARTS**				
(Reference No. with asterisk should be replaced in pairs. Do not replace one part only.)				
T201	IFT 10.7 10F-068		TOKO	133000680B
T202	IFT 10.7 10F-069		TOKO	133000690B
T201	IFT 10.7 10F-066		MITMI	133000660A
T202	IFT 10.7 10F-067		MITMI	133000670A
TR511	2SD1047 (D)		SANYO	
TR512	2SD1047 (D)		SANYO	
TR513	2SB 817 (D)		SANYO	
TR514	2SB 817 (D)		SANYO	
TR511	2SD1047 (E)		SANYO	
TR512	2SD1047 (E)		SANYO	
TR513	2SB 817 (E)		SANYO	
TR514	2SB 817 (E)		SANYO	

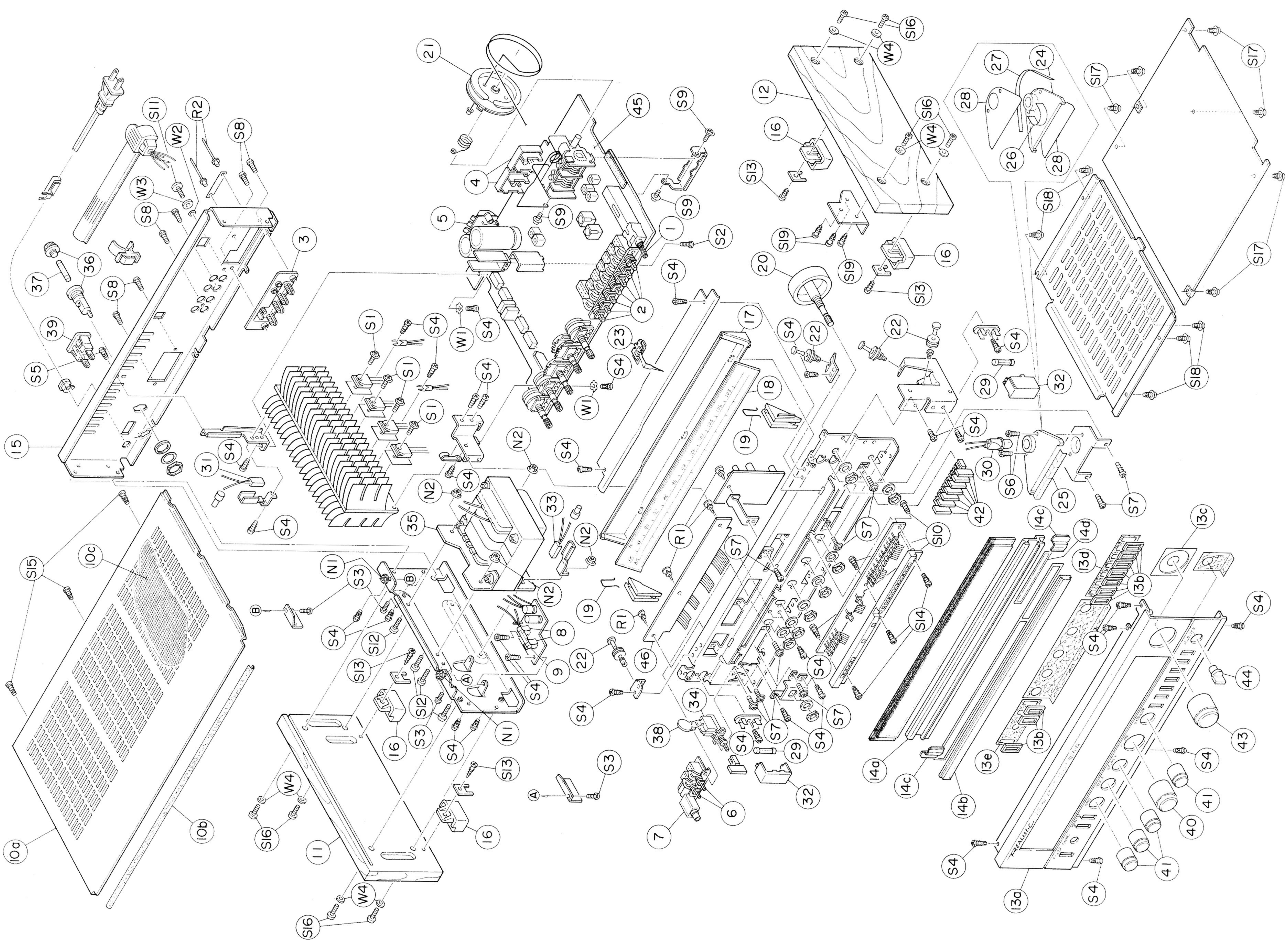
EXPLODED VIEW PARTS LIST

Ref. No.	Description	R/S Part No.	Mfr's Part No.
1	Switch, Rotary Slide, Function		181210020A
2	Switch, Push, 7 Gang		182710020A
3	Screw, Terminal 4P Antenna		192203910A
4	Jack RCA 4P, IN/OUT		192004140A
5	Terminal, Speaker 8P Nip		192310040A
6	Switch, Push, Speaker		182205480A
7	Jack, 6.3, Headphone	J-1397	191010090A
8	Clip, Fuse		197303080A
9	Fuse, 250V 1.5A (US)		251001290A
	Fuse, 250V 1.5A (CA/UK/AU)		251000070A
10	Cabinet Assy, Top	Z-7290	M-00333
	a. Cabinet Top		601210410A
	b. Spacer		852010500A
	c. Net		851310110A
11	Cabinet, Side (L)	Z-7291	601510030A
12	Cabinet, Side (R)	Z-7292	601510040A
13	Panel Ass'y, Front	Z-7293	M-00334
	a. Panel, Front (US/CA/AU)		701010110A
	Panel, Front (UK)		701010120A
	b. Guide Knob, Push		716008980A
	c. Plate, Blind, Tuning Knob		711810030A
	d. Blind, Push Switch		851210770A
	e. Blind, Power Switch etc.		851210780A
14	Plate Ass'y Front	Z-7294	M-00335
	a. Plate, Front		711210080A
	b. Plate, Control		711310110A
	c. Spring, Leaf		434610240A
	d. Sheet, Color		715210060A
15	Panel, Back (US)	Z7295	707010310B
	Panel, Back (CA)		707010320B
	Panel, Back (AU)		707010330B
	Panel, Back (UK)		707010350B
16	Foot		608009100A
17	Window, Dial	D-5570	713610050A
18	Scale, dial	D-5571	717010140A
19	Spring Bar, Dial Side L & R	D-5572	434510120A
20	Shaft Tuning	D-3346	431010060B
21	Pulley, Dial	D-0537	433006040A
22	Pulley, Guide	D-0538	433100420A
23	Pointer Dial	D-1506	435010030A
24	Reflector	D-1507	417010030A
25	Sheet, Color, Reflector		715210070A
26	Blind, Reflector, Wedge Lamp		851210800A
27	Blind, Reflector Side Paper		851210810A
28	Blind, Reflector Upper/Lower Paper		851210830A
29	Lamp, Dial, Tublar Type 12V 0.15A		243000890A
30	Lamp, Wedge Base, 12V 0.15A		244010010A
31	Protector, Thermal, Heat Sink		253010010A
32	Blind, Front Chassis		851210700A
33	Protector, Thermal, Power Transformer		253000390A
⚠34	Switch, Push, Power (US/CA)		182110200A
	Switch, Push, Power (UK/AU)		182103830A
⚠35	Transformer, Power (US)		10101083SA
	Transformer, Power (CA)		10101084SA
	Transformer, Power (UK/AU)		10101085SA

Ref. No.	Description	R/S Part No.	Mfr's Part No.
36	Holder, Fuse (US)	F-1225	197000110A
	Holder, Fuse (CA)		197000130A
	Holder, Fuse (UK/AU)		197000150A
37	Fuse, 125V 5A Quick Type (US/CA)		251000390A
	Fuse, 250V 2.5A Quick Type (UK/AU)		251200930A
38	Line, Capacitor (US)		CLU0010020
	Line, Capacitor (CA)		CL0C000440
	Line, Capacitor (UK/AU)		CL00E00220
⚠39	Outlet, AC (US/AU)	W-3026	196010020A
	Outlet, AC (CA)		196010010A
40	Knob, Volume	R-5533	652510240A
41	Knob, BASS/TREBLE/BALANCE/ EXPANDER	K-5534	652510250A
42	Knob, Push	K-5535	655010090A
43	Knob, Tuning	K-5536	652110010B
44	Knob, Selector		652505500A
45	Main, P.C.B. Unit	K-9671	U-22057A
46	Meter, Unit Ass'y	K-9672	U-23243

Ref. No.	Description		
HARDWARE			
S1	Screw, Triple	3×10 TR	
S2	Screw, Del-tite	3×14 BT-3	
S3	Screw, Del-tite	3×8 BT-3	
S4	Screw, Tapping	3×8 BT-2	
S5	Screw, Tapping	3×8 BT-2	Black
S6	Screw, Del-tite	3×12 BT-3	
S7	Screw, F-lock	3×5 FL	
S8	Screw, Tap-tite	3×8 BT-B	Black
S9	Screw, F-lock	3×4 FL	
S10	Screw, Tap-tite	3×8 BT-B	
S11	Screw	SWRM M3	
S12	Screw, Del-tite	4×10 BT-3	
S13	Screw, Wood	3.1×16 RW	
S14	Screw, Del-tite	3×12 PT-3	
S15	Screw, NL Tapping	3×8 TNL-2	Black
S16	Screw, Del-tite	4×18 BT-3	Black
S17	Screw, Triple-tap	3×8 PLT-2	
S18	Screw, Triple-tap	3×6 PLT-2	
S19	Screw, Wood	3.1×10 RW	
N1	Nut, Flange	3FN	
N2	Nut, Flange	4FN	
R1	Rivet, Nyron	3×4.5	Black
R2	Rivet, Blind	2.4×5.7	Black
W1	Washer, Toothed	3TW-B	
W2	Washer, Toothed	3TW-A	
W3	Washer	3W	
W4	Washer	5W	Black

EXPLODED VIEW



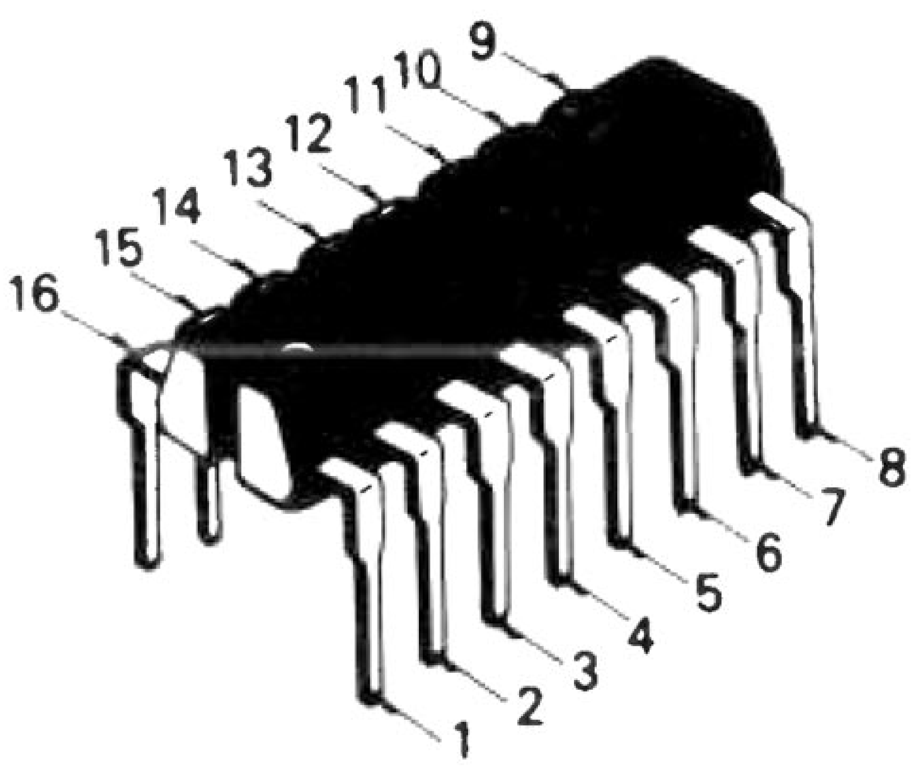
MISCELLANEOUS PARTS LIST

Description	R/S Part No.	Mfr's Part No.
Shield Plate, Tuner Section		473207050B
Jack DIN (UK/AU)		193404220A
Connector Wire, 2P		193903370A
Connector Wire, 4P		193903390A
Connector Wire, 6P		193903410A

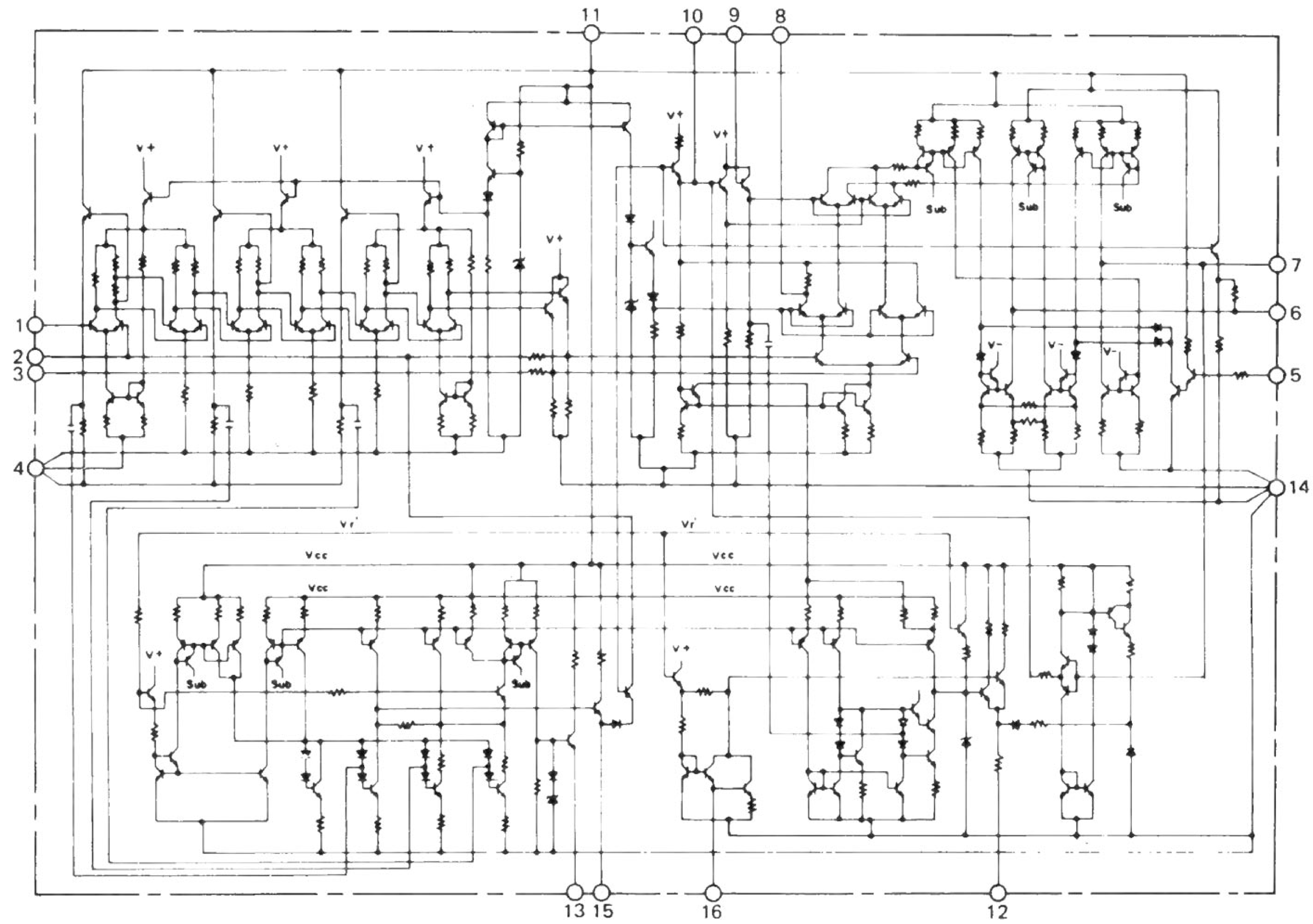
Description	R/S Part No.
Hardware Kit	HW-3102097
Screw Triple Tap 3×10 PLT-2	
Screw Triple Tap 3×6 PLT-2	
Screw NL Tapping 3×8 TNL-2	

IC LEAD IDENTIFICATION & INTERNAL DIAGRAM

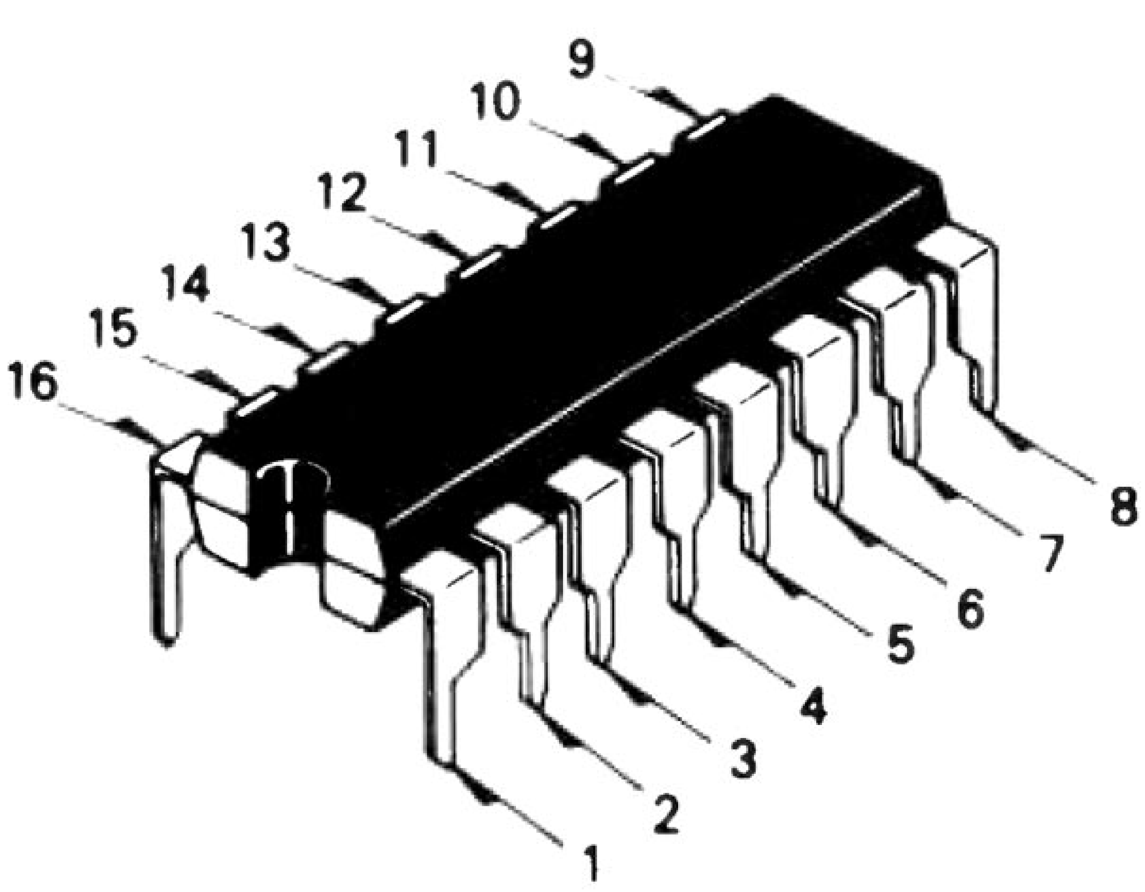
LA1231N IC201



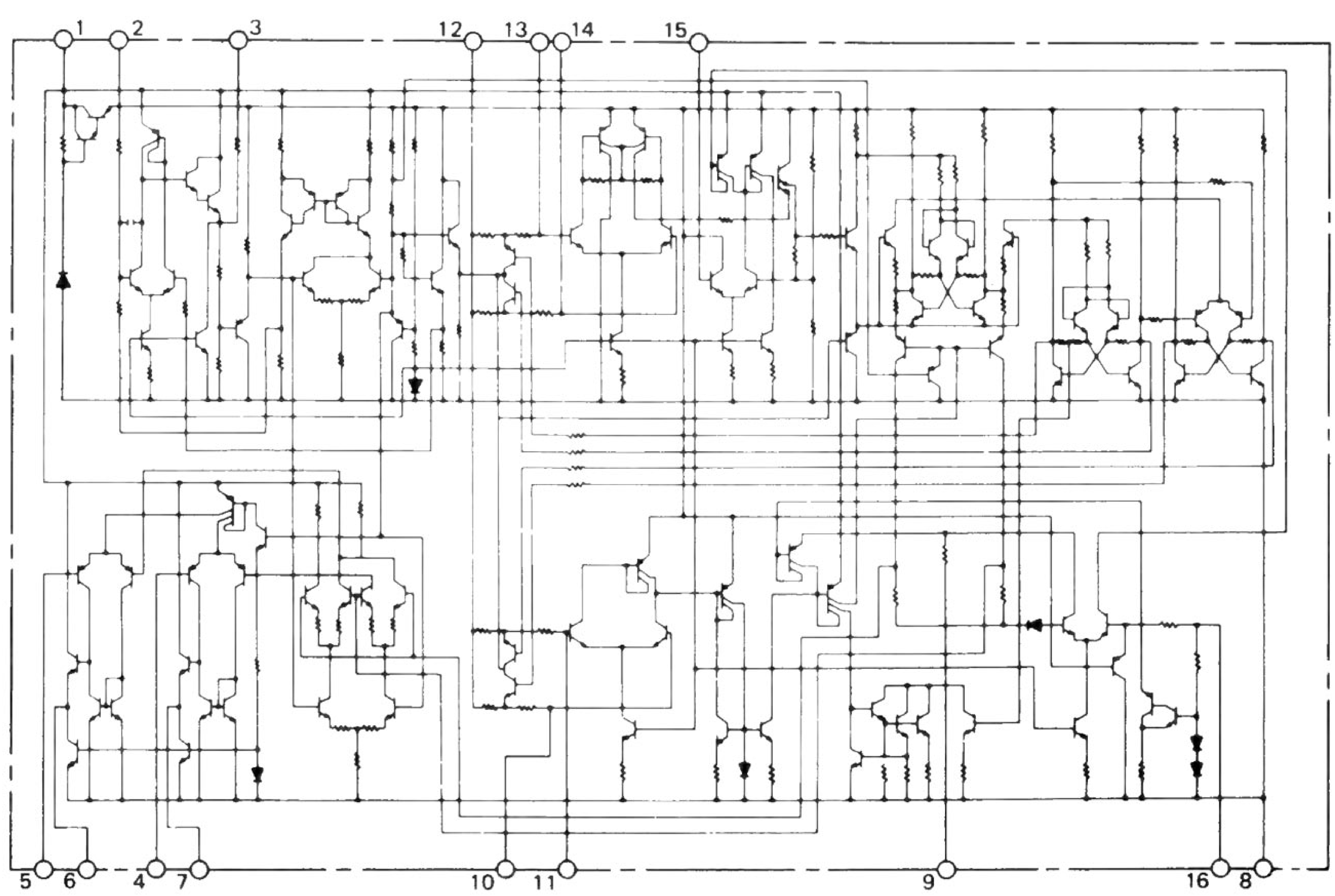
Equivalent Circuit Diagram



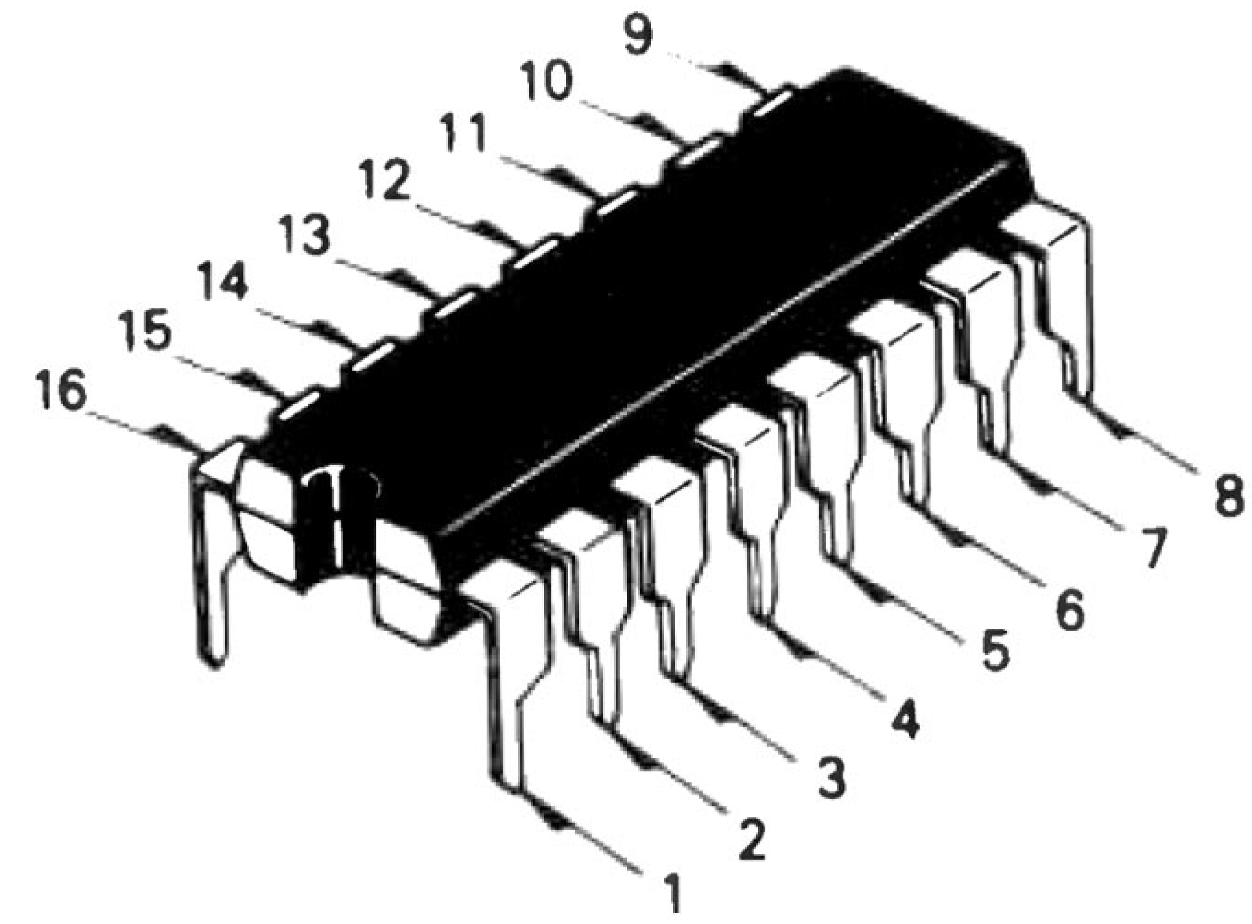
μPC1161C3, μPC1161C IC202



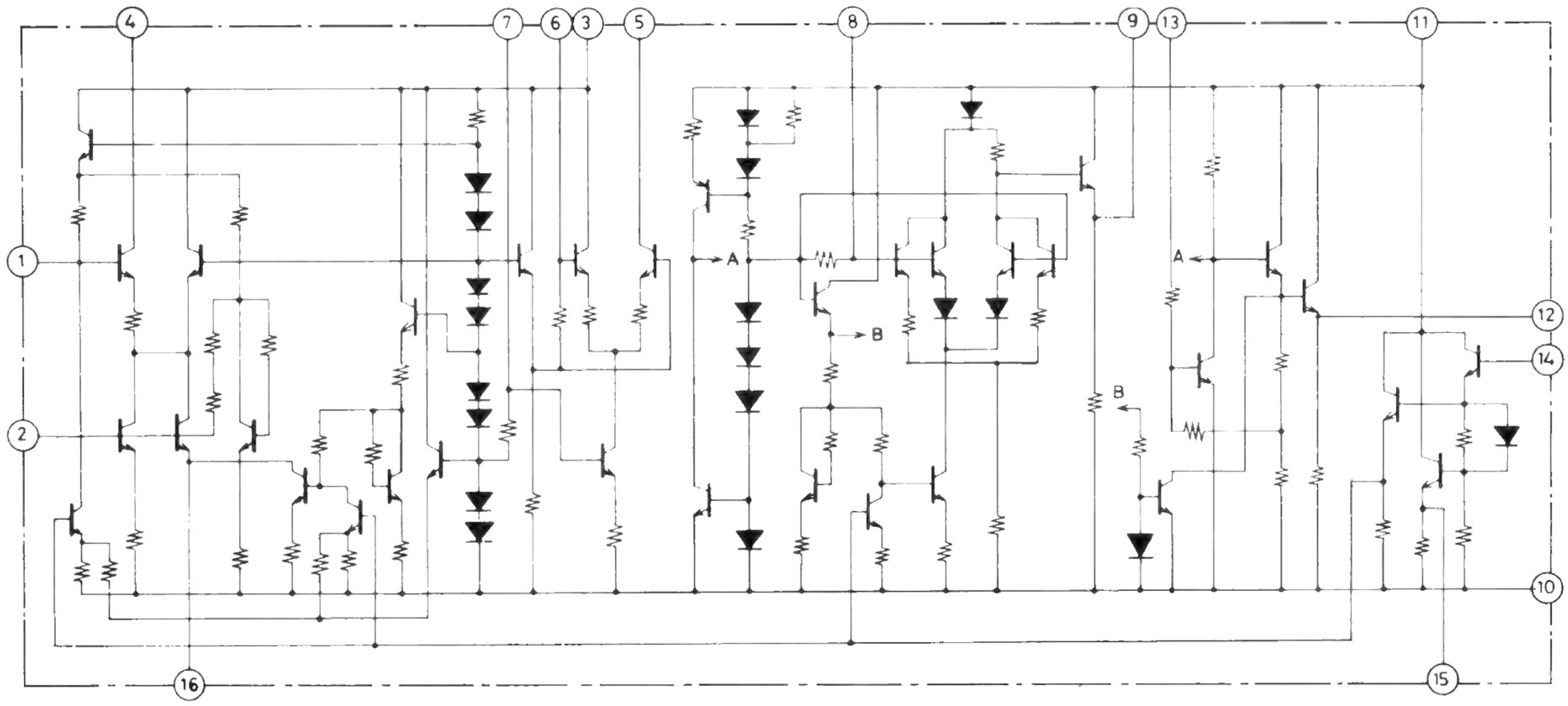
Equivalent Circuit Diagram



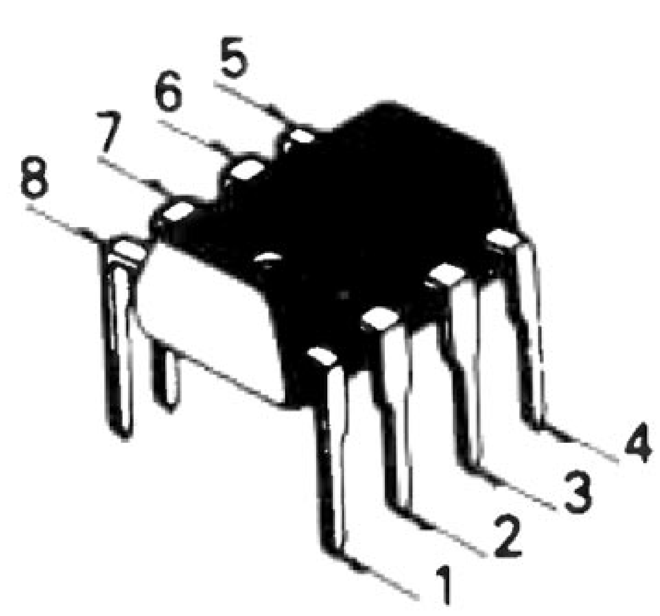
LA1240 . . . . . IC203



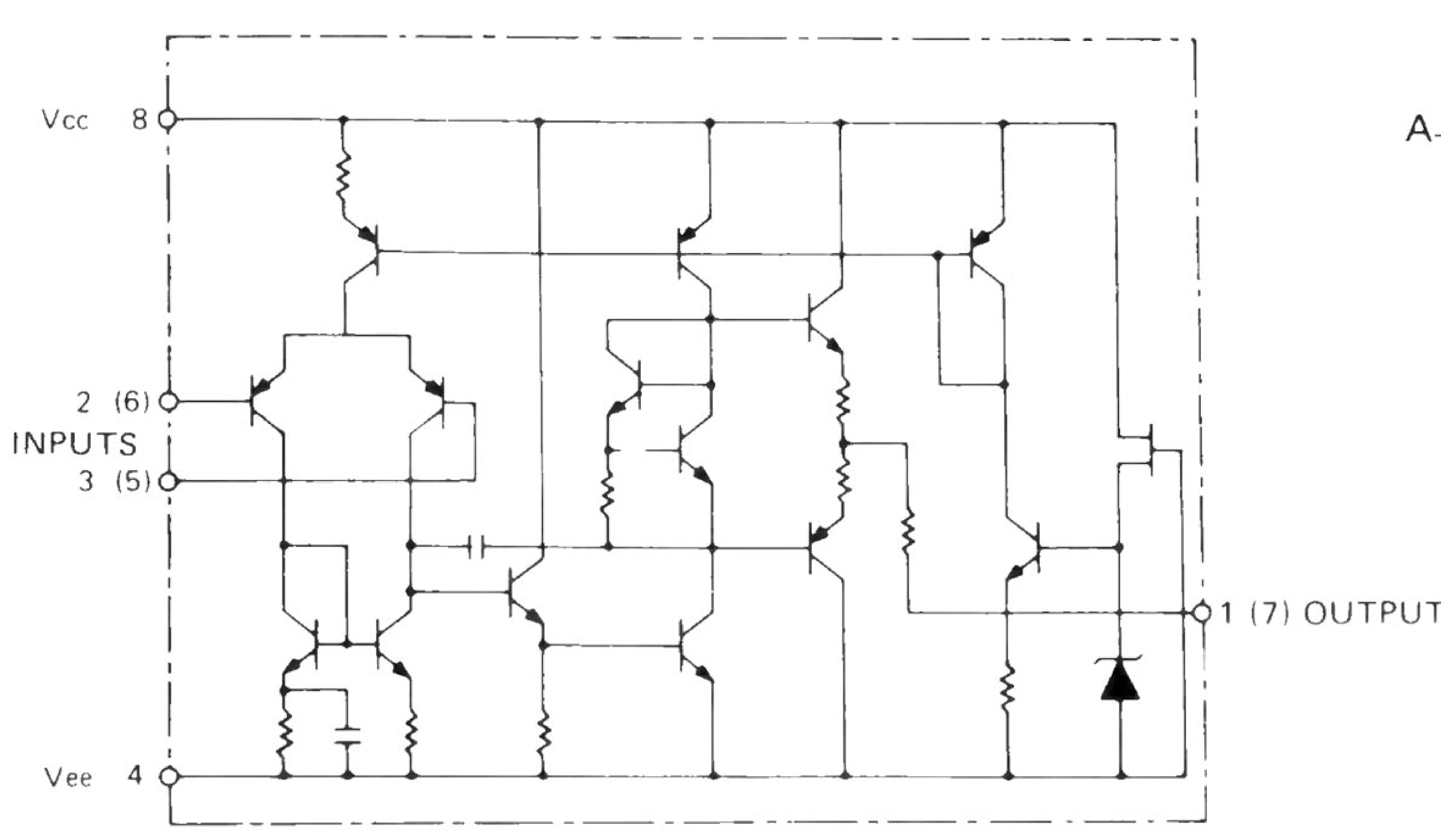
Equivalent Circuit Diagram



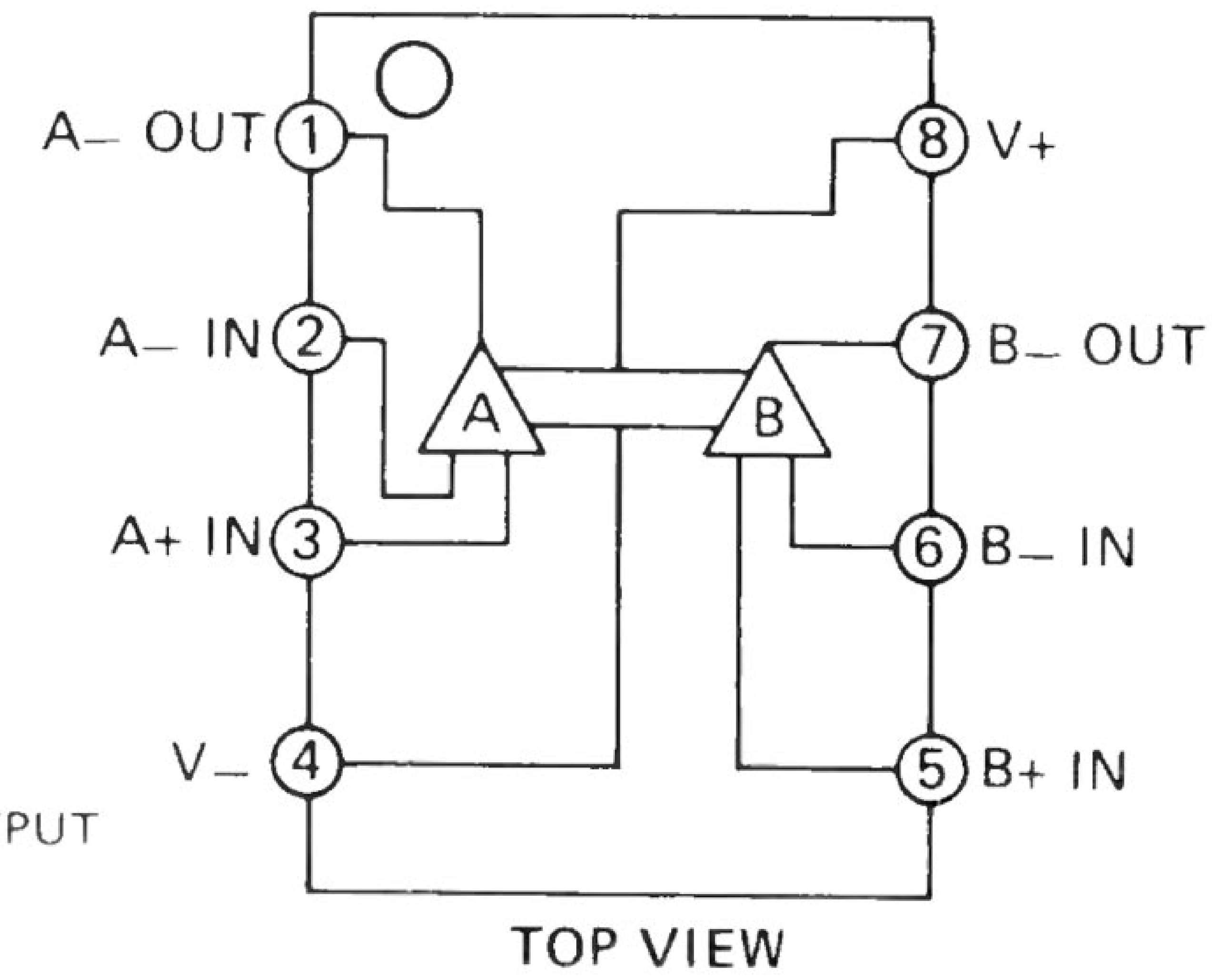
LA6458DX, NJM4558DX, TL4558PB IC301, 401, 901, 902, 903



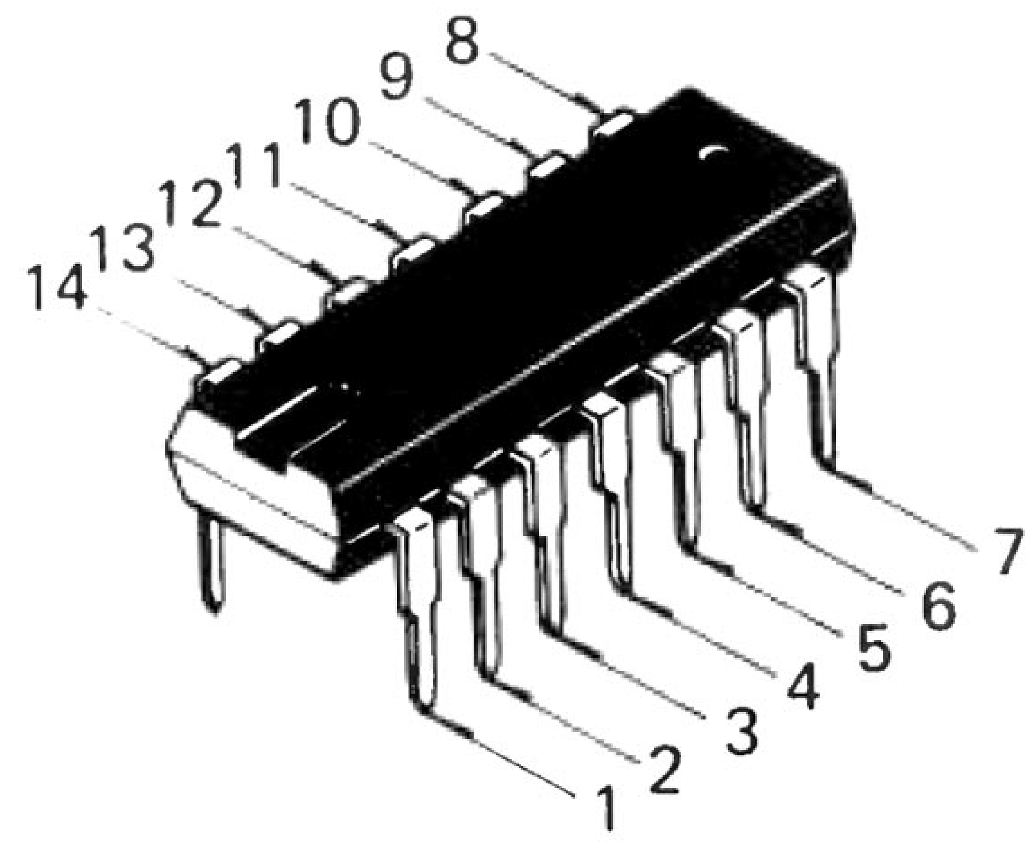
Equivalent Circuit Diagram



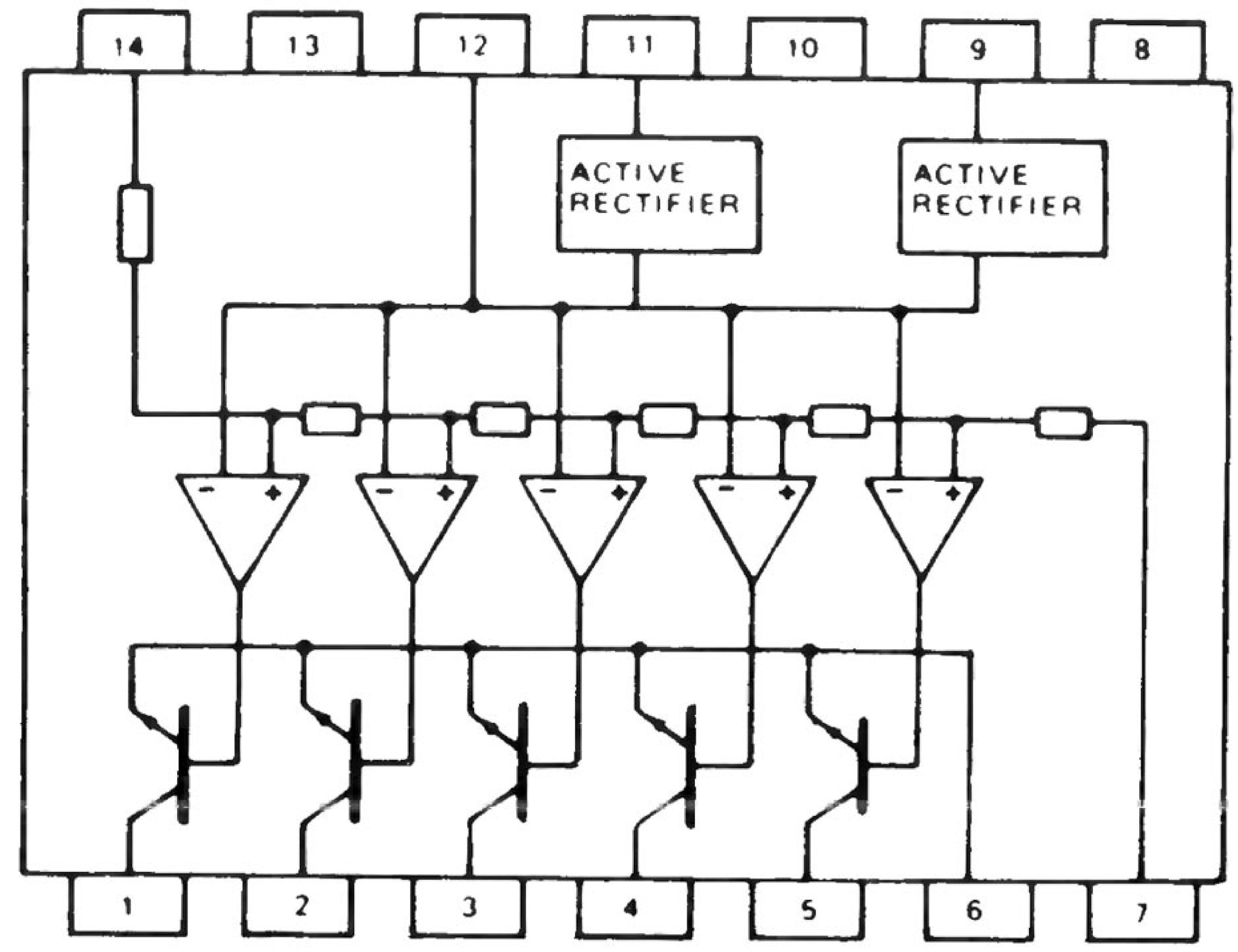
Block Diagram



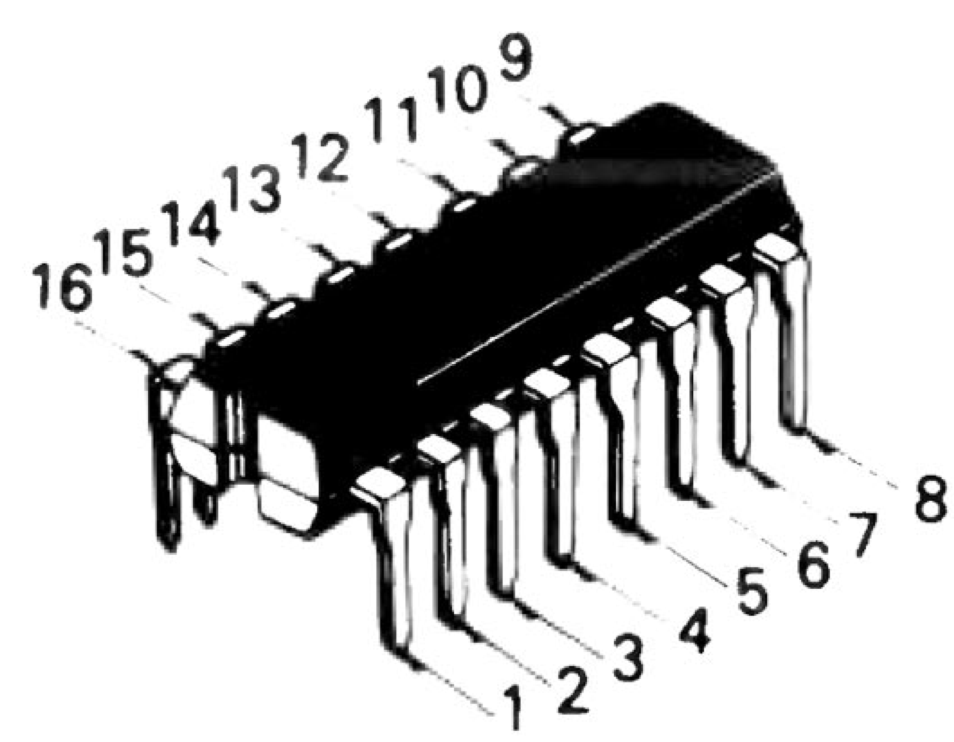
SN16880N IC701, 702



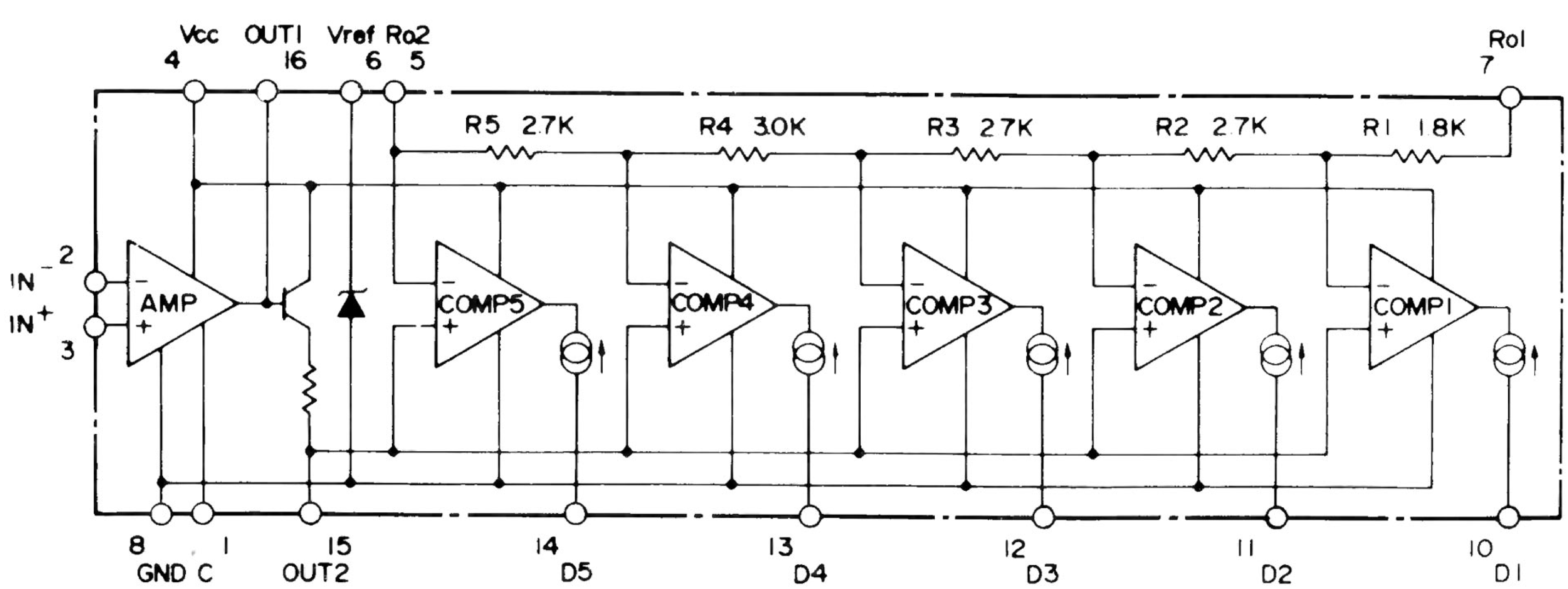
Block Diagram



LB1405 . . . . . IC703

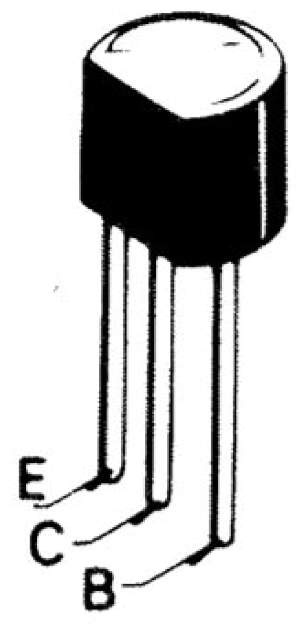


Equivalent Circuit Diagram

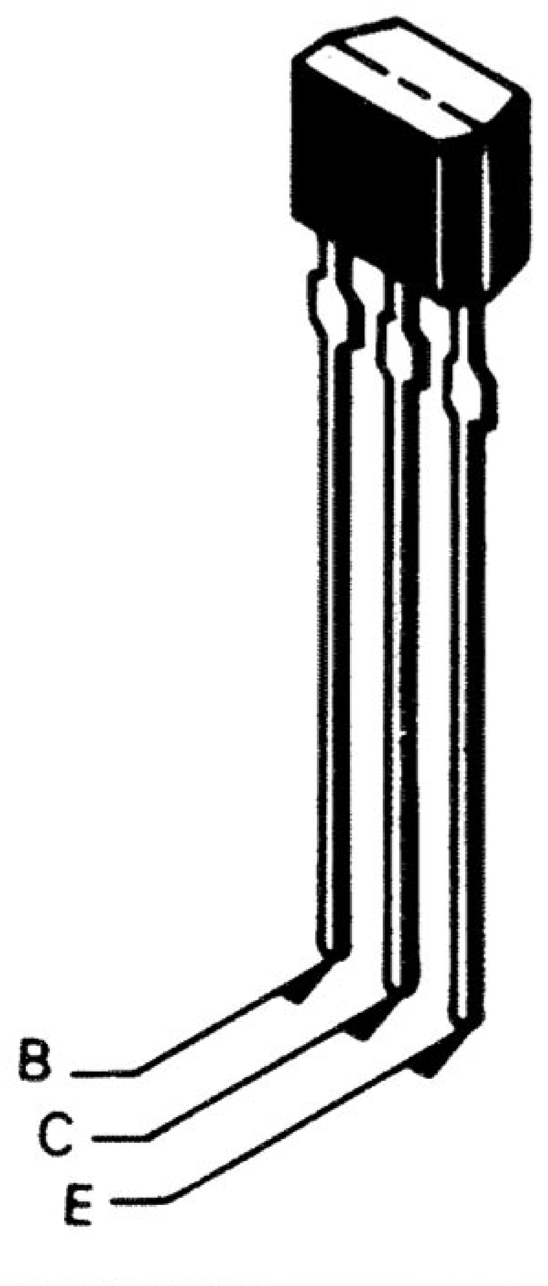


TRANSISTOR LEAD IDENTIFICATION

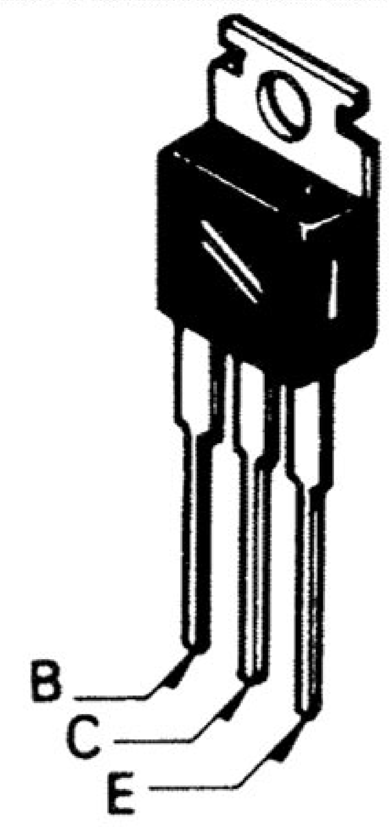
NOTE: The reference numbers without parentheses are used principally. Those with parentheses are used supplementary.



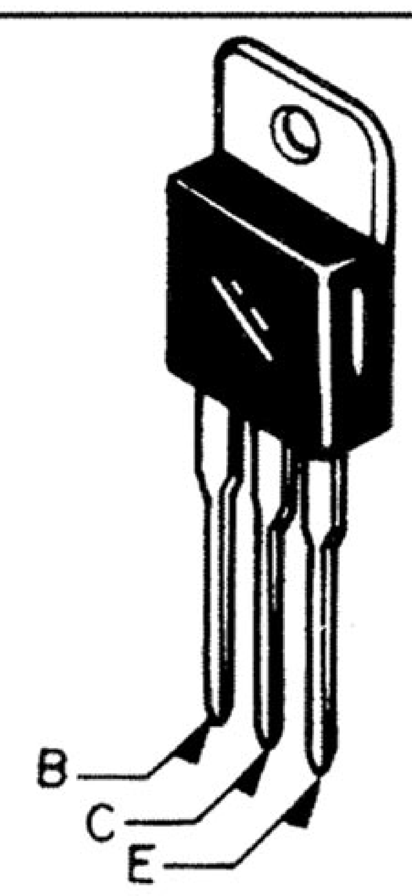
2SA608	(TR204)
2SA659	TR604
2SA733	TR204
2SA984	TR701
2SA991	(TR604)
KTA1015	(TR604)
2SC536	TR202, 203, (205), 206, 207, 208
2SC930	(TR201)
2SC945	TR205
2SC1175	TR603, 606
2SC1674	TR102, 103
2SC1675	TR201
2SC1840	(TR202), (203), (206), (TR207)
2SC1842	(TR208)
2SC1844	(TR603), (606)
2SC1845	TR401, 402, (501), (502), (503), (504), 609. 610, 611, 901, 902
2SC2362	TR501, 502, 503, 504, 516, (609), (610), (611)
KTC1815	(TR603), (606)
KTC2240	(TR609), (610), (611)



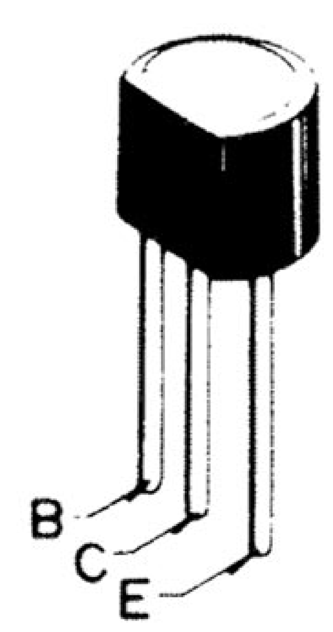
2SC2786	(TR102), (103)
2SC2787	(TR201)



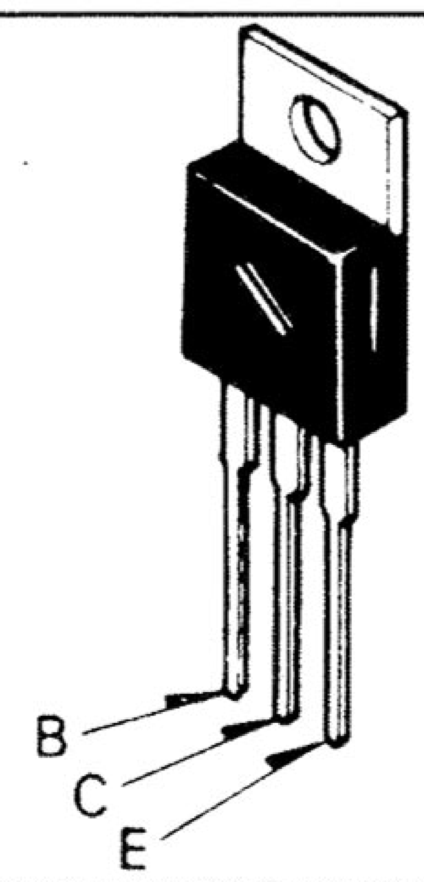
2SA985	(TR602)
2SC2275	(TR601), (605)
2SD313	TR605



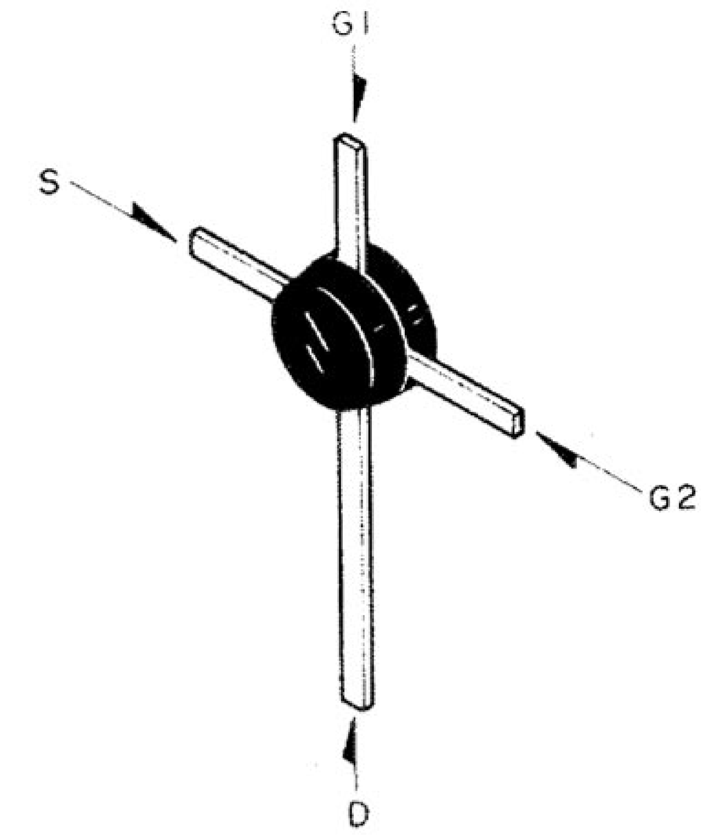
2SB817	TR513, 514
2SD1047	TR511, 512



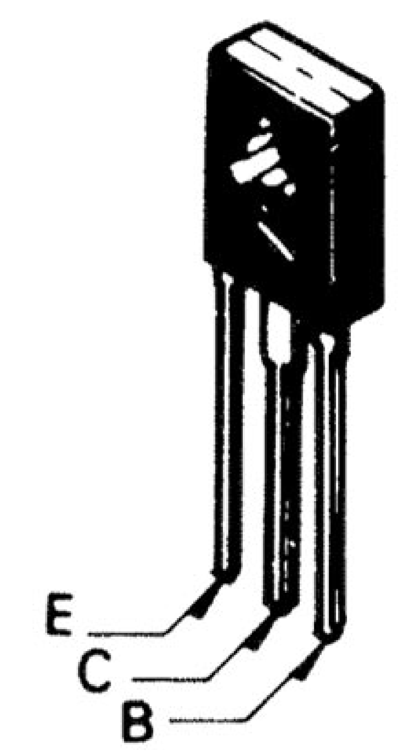
2SC1313	TR401, 402, 901, 902



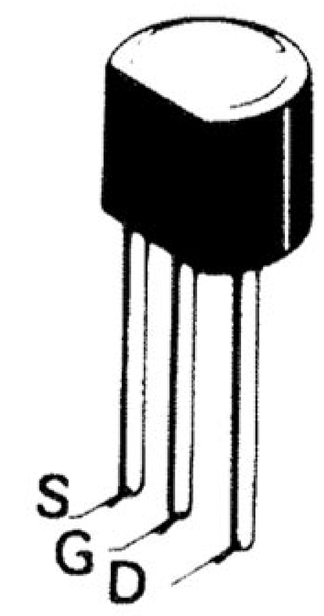
2SB511	TR602
2SD325	TR601



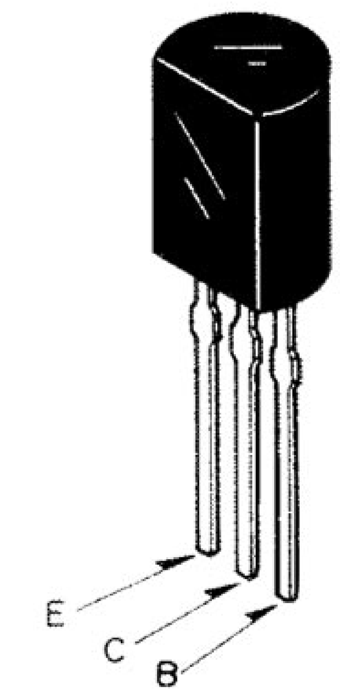
3SK74	TR101



2SB631K	TR509, 510
2SD600K	TR507, 508

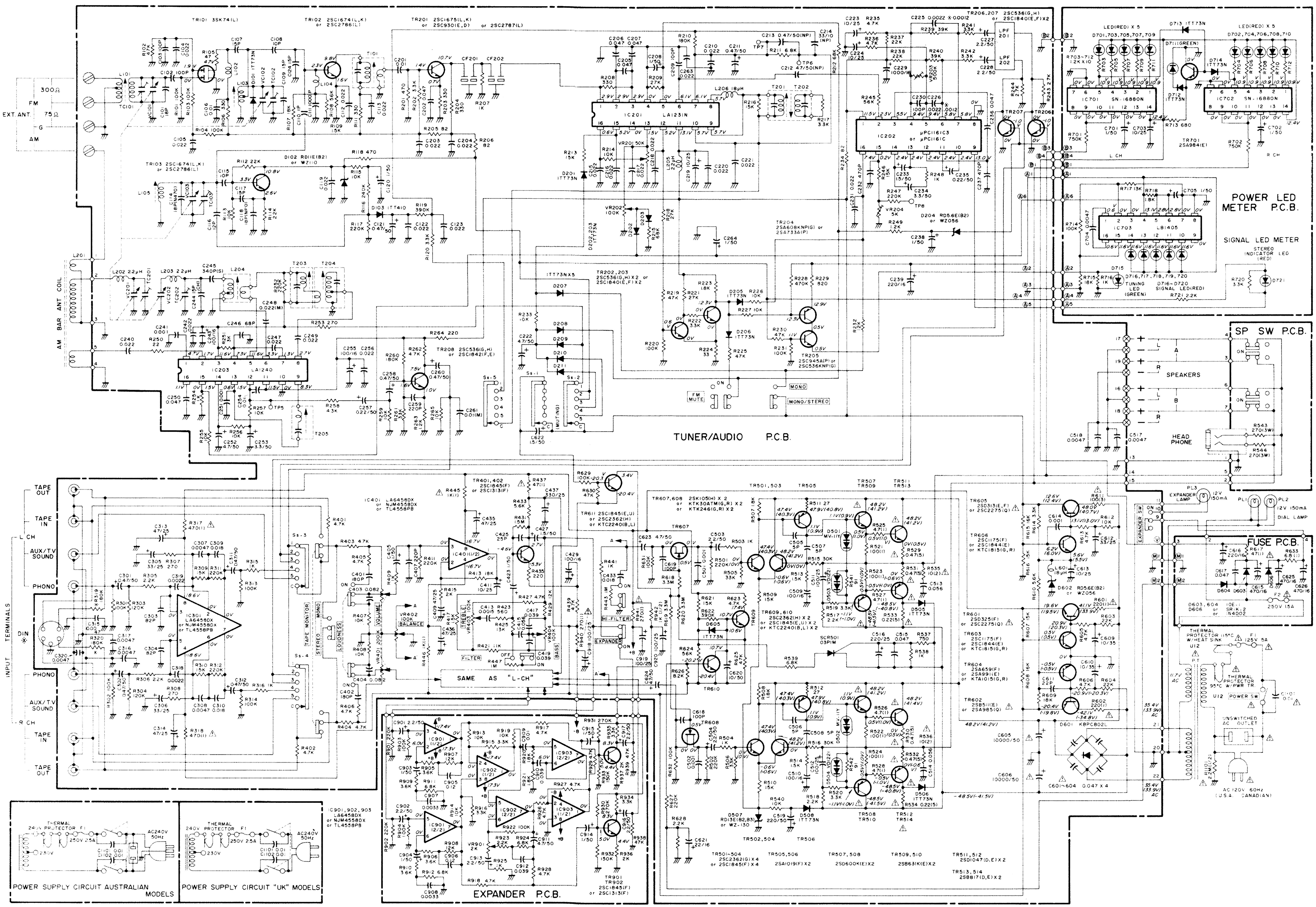


2SK105	(TR607), (TR608)
KTK30A	TR607, 608
KTK246	(TR607), (608)



2SA1019	TR505, 506

SCHEMATIC DIAGRAM



NOTES: (1) Ss-1～Ss-5 : FUNCTION SELECTOR SWITCH
POSITION : 1 - AM, 2 - FM, 3 - FM AUTO-MAGIC, 5 - 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) • VALUES ARE USED FOR EUROPEAN MODELS ONLY.
(5) VOLTAGES ARE MEASURED UNDER TWO CONDITIONS: WITH NO INPUT AND 60 WATTS (1 kHz) OUTPUT POWER (INSIDE PARENTHESIS).

CAUTION: SINCE THE COMPONENTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

Before returning the set to the customer, make appropriate leakage current or resistance measurements to determine that exposed parts are properly insulated from the supply circuit.

RADIO SHACK, A DIVISION OF TANDY CORPORATION

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CANADA: BARRIE, ONTARIO L4M 4W5

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