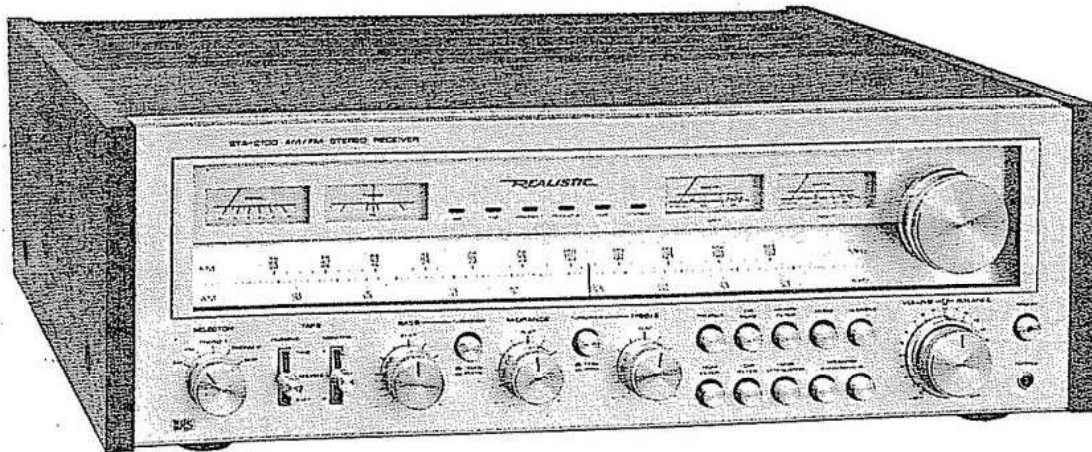


REALISTIC[®]

Service Manual

31-2076

STA-2100
AM/FM STEREO RECEIVER
Catalog Number : 31-2076



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

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(1) ELECTRICAL PERFORMANCE SPECIFICATIONS

AM SECTION

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

	UNIT	NOMINAL	LIMIT
Frequency Coverage	(kHz)	515—1650	520—1620
IF	(kHz)	455	—
Antenna Sensitivity for S/N 20 dB at 600 kHz, 1000 kHz and 1400 kHz	(μ V/m)	200	400
Terminal Sensitivity	(μ V)	10 μ V	—
S/N Ratio at 5 mV/m Input	(dB)	45	40
ACA at S/N 6 dB Input, 1000 kHz	(dB)	40	28
AGC Distortion at 100 mV/m Input, 80 % modulation	(%)	1.5	4.0
IF Rejection Ratio at 600 kHz	(dB)	56	48
Image Rejection Ratio at 1400 kHz	(dB)	60	52
Bandwidth at 6 dB down, 1000 kHz	(kHz)	6.0	4.5—8.0
Distortion at 5 mV/m Input	(%)	1.0	3.0
Tape Out Level at 5 mV/m Input	(mV)	175	175 \pm 3 dB
Audio Fidelity at 5 mV/m Input (1 kHz = 0 dB) -6 dB Point	(Hz)	50—3K	70—2.5K
Whistle Modulation of 2nd and 3rd Harmonic at 1 mV, 5 mV and 100 mV	(%)	3.0	10.0
Dial Calibration at 600 kHz	(kHz)	0	\pm 25
at 1400 kHz	(kHz)	0	\pm 50
Spurious Response at 1000 kHz referred to 20 dB S/N Input	(dB)	50	45
AGC Figure of Merit at 1000 kHz	(dB)	48	40

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

The Set shall operate in satisfactory manner through a temperature range from 0°C through plus 45°C.

FM SECTION

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

	UNIT	NOMINAL	LIMIT
Frequency Coverage	(MHz)	86.5—108.5	88—108
IF	(MHz)	10.7	—
IHF Sensitivity at 90, 98 and 106 MHz	(μ V)	1.6	2.5
	(dBf)	9.3	13.2
S/N 50 dB Quieting Sensitivity	(μ V)	2.0	3.5
	(dBf)	11.2	16.0
-3 dB Limiting Sensitivity	(μ V)	1.5	2.0
IF Rejection Ratio at 90 MHz	(dB)	95	80
Image Rejection Ratio at 106 MHz	(dB)	80	70
Spurious Response at 98 MHz	(dB)	90	75
Capture Ratio	(dB)	1.5	2.5
ACA \pm 400 kHz off tuned, 50 μ V Input	(dB)	75	60
Harmonic Distortion at 1 mV Input	(%)	0.05	0.3
Dial Calibration Accuracy at 90, 98 and 106 MHz	(kHz)	—	\pm 300
AFC Holding Range	(kHz)	\pm 250	\pm 330
AM Suppression	(dB)	55	48
Maximum Handling Capacity	(mV)	200	100
Tape Out Level	(mV)	680	680 ± 2 dB
Muting Sensitivity	(μ V)	3.0	2—6
S/N Ratio at 1 mV Input	(dB)	70	65
Frequency Response at 10 kHz at 75 μ sec	(Hz)	—	\pm 1.5 dB
at 25 μ sec	(Hz)	—	\pm 1.5 dB

Temperature range for satisfactory operation is 0°C to 45°C. All Sets must meet the requirements of FCC.

FM STEREO SECTION

- Notes: 1. Output readings are taken across a non-reactive 47K load termination.
2. Output is measured at TAPE OUT terminals.
3. Signal voltage in this specification is the voltage appearing across the tuner input terminals.
4. Standard modulation: Main carrier (L+R) — 33.75 kHz deviation (45%)
Sub carrier (L-R) — 33.75 kHz deviation (45%)
Pilot (19 kHz) — 6 kHz deviation (8%)

	UNIT	NOMINAL	LIMIT
Stereo Sensitivity	(μ V)	3.0	2—6
Stereo Separation at 1 mV Input at 100 Hz	(dB)	45	33
at 1 kHz	(dB)	52	35
at 10 kHz	(dB)	40	30
Stereo Distortion at 1 kHz, 1 mV Input	(%)	0.1	0.5
Sub Carrier Rejection Ratio	(dB)	60	54
SCA Rejection Ratio	(dB)	80	—
Stereo Tape Out Level	(mV)	580	580 ± 2.5 dB

AUDIO SECTION

		UNIT	NOMINAL	LIMIT
Input Impedance	PHONO 1	(K Ω)	50	—
	PHONO 2	(K Ω)	60	—
	AUX	(K Ω)	60	—
	TAPE 1	(K Ω)	60	—
	TAPE 2	(K Ω)	60	—

	UNIT	NOMINAL	LIMIT
Output Power, Both Channels Driven at 8 ohms from 20 to 20 kHz, THD 0.1 %	(W)	125	120
THD at -3 dB Rated Power from 20 to 20 kHz	(%)	0.05	0.1
Sensitivity for Rated Power			
PHONO 1 LOW/MID/HIGH Level	(mV)	2/4/8	2/4/8 ± 2 dB
PHONO 2	(mV)	2.2	2.2 ± 2 dB
AUX	(mV)	140	140 ± 2 dB
TAPE 1	(mV)	140	140 ± 2 dB
TAPE 2	(mV)	140	140 ± 2 dB
Frequency Response at 10 W ± 2 dB	(Hz)	15 - 25K	20 - 20K
BASS Action at 100 Hz (Turnover switch: 300 Hz)	(dB)	± 10	± 10 ± 2 dB
at 50 Hz (Turnover switch: 150 Hz)	(dB)	± 10	± 10 ± 2 dB
TREBLE Action at 10 kHz (Turnover switch: 3 kHz)	(dB)	± 10	± 10 ± 2 dB
at 20 kHz (Turnover switch: 6 kHz)	(dB)	± 10	± 10 ± 2 dB
MIDRANGE Action at 1.5 kHz	(dB)	± 6	± 6 ± 2 dB
S/N Ratio (Input: Shorted) (IHF)			
at PHONO 1	(dB)	70	60
at PHONO 2	(dB)	70	60
at AUX	(dB)	75	65
at TAPE 1, 2	(dB)	75	65
Hum and Noise at Minimum Volume	(mV)	0.8	1.5
Cross Talk at 1 kHz, AUX position (Input 4.7 KΩ terminated)	(dB)	60	50
Loudness Contour at 100 Hz (-30 dB Volume position)	(dB)	+ 6	+ 6 ± 2 dB
High Filter Effect at 10 kHz	(dB)	- 6	- 6 + 1 dB - 2 dB
Low Filter Effect at 50 Hz	(dB)	- 3	- 3 + 1 dB - 2 dB
PHONO Equalizer Response at 100 Hz	(dB)	RIAA	RIAA ± 1.5 dB
at 10 kHz	(dB)	RIAA	RIAA ± 1.5 dB
PHONO Over Load at 1 kHz per Channel	(mV)	230	200
Channel Balance at Maximum Volume	(dB)	0	± 1.5 dB
Tape Out Level with PHONO 2.6 mV Input	(mV)	140	140 ± 2 dB
(47 KΩ terminated) with AUX 160 mV Input	(mV)	140	140 ± 2 dB
IM Distortion at -3 dB Rated Power	(%)	0.05	0.2
DC Balance at No Signal and Output	(mV)	0	± 30
Audio Attenuator	(dB)	10	10 ± 2 dB
Tape Out Level for DIN Jack (3.3 KΩ terminated)			
AM - 400 Hz, 30% modulation 5 mV Input	(mV)	3.3	3.3 ± 2.5 dB
FM - 1000 Hz, 22.5 kHz dev. 1 mV Input	(mV)	3.3	3.3 ± 2.5 dB
PHONO - 3.6 mV Input	(mV)	3.3	3.3 ± 2.5 dB
AUX - 230 mV Input	(mV)	3.3	3.3 ± 2.5 dB
Hum and Noise, Volume and Tone at Maximum (Input, 4.7 KΩ terminated)	(mV)	15	-

- Notes:**
1. The supply voltage is 120 volts AC from a regulated power supply.
 2. The power source must be insulated from other equipment connected antenna or output.
 3. The room temperature is 25 degrees C.
 4. Nominal Specs represent the design specs; all units should be able to approximate these - some will exceed and some may drop slightly below these specs.
Limit Specs represent the absolute worst condition which still might be considered acceptable; in no case should a unit perform to less than within any Limit Spec.

(2) DISASSEMBLY INSTRUCTIONS

1. Remove the Bottom Cover (Metal plate) as follows:
Turn the Receiver up side down and remove sixteen screws from the bottom as shown in Figure A.
Lift the Bottom Cover off.

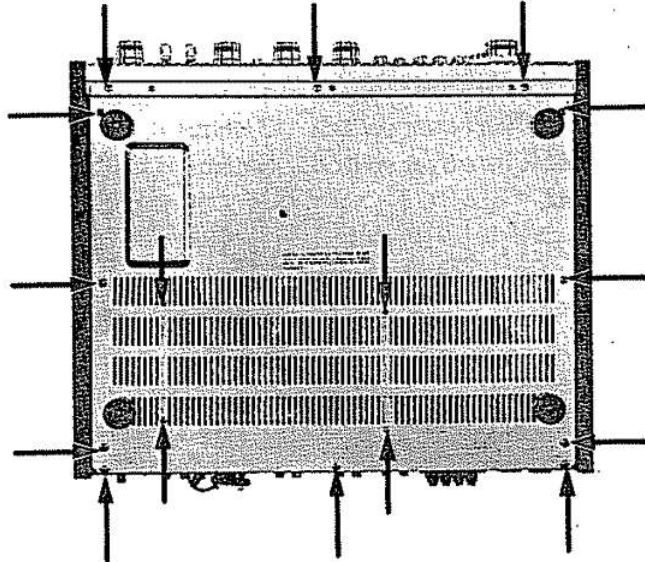


Figure A

2. To remove the Cabinet
 - a) Remove two screws from the upper Back Panel as shown in Figure B1.
 - b) Remove two screws from each side of the Cabinet (Figure B 2) and pull off Cabinet toward rear of unit.
Be careful not to lose the screw inserts when the screws are removed.

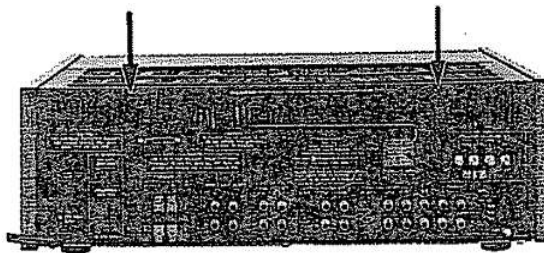


Figure B1



Figure B2

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

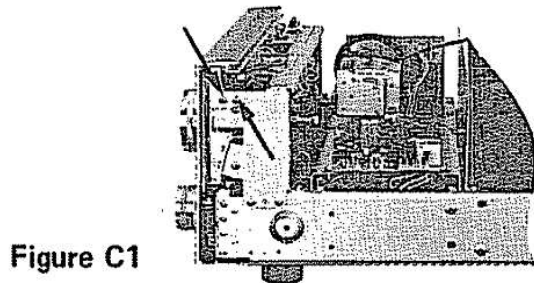


Figure C1

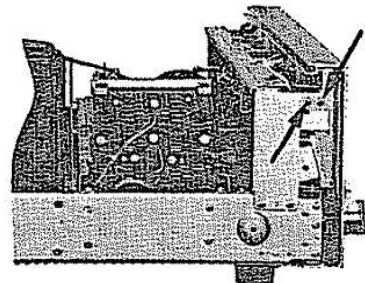


Figure C2

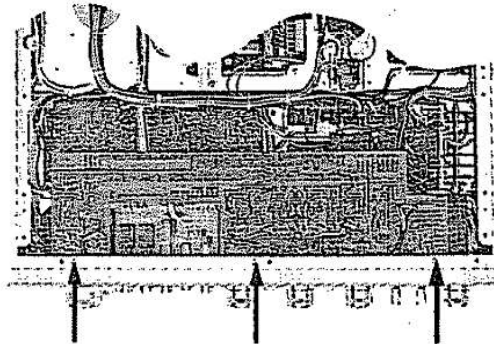


Figure C3

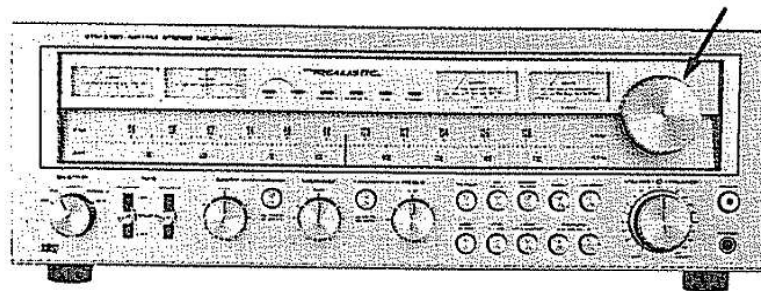


Figure C4

4. To remove Rear Panel from Chassis
Remove five screws from Rear Panel. (Figure D)

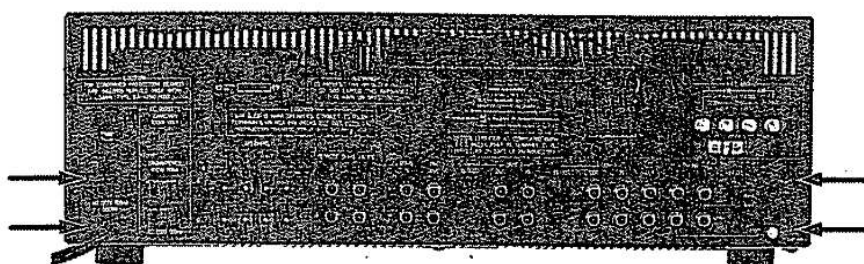
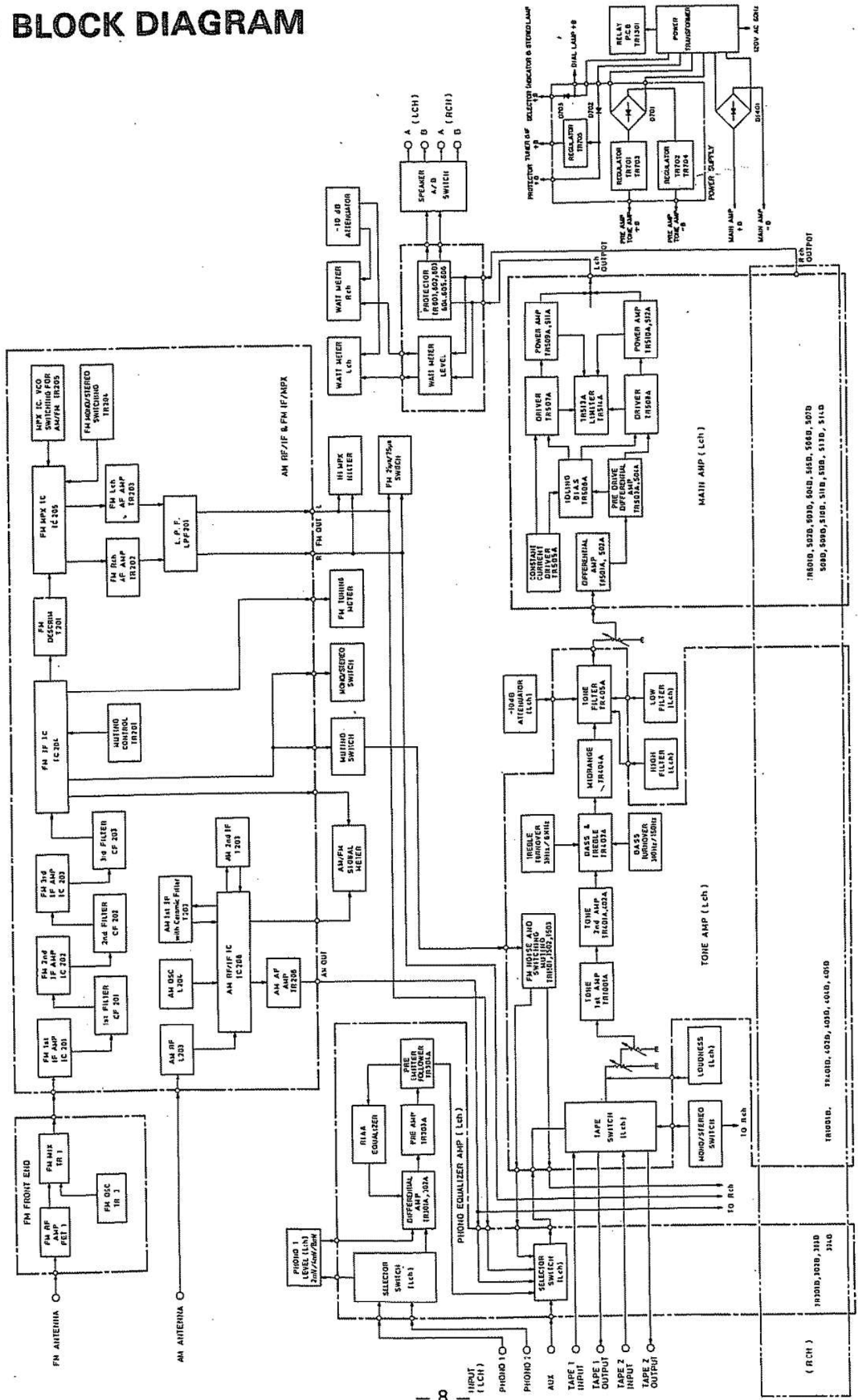


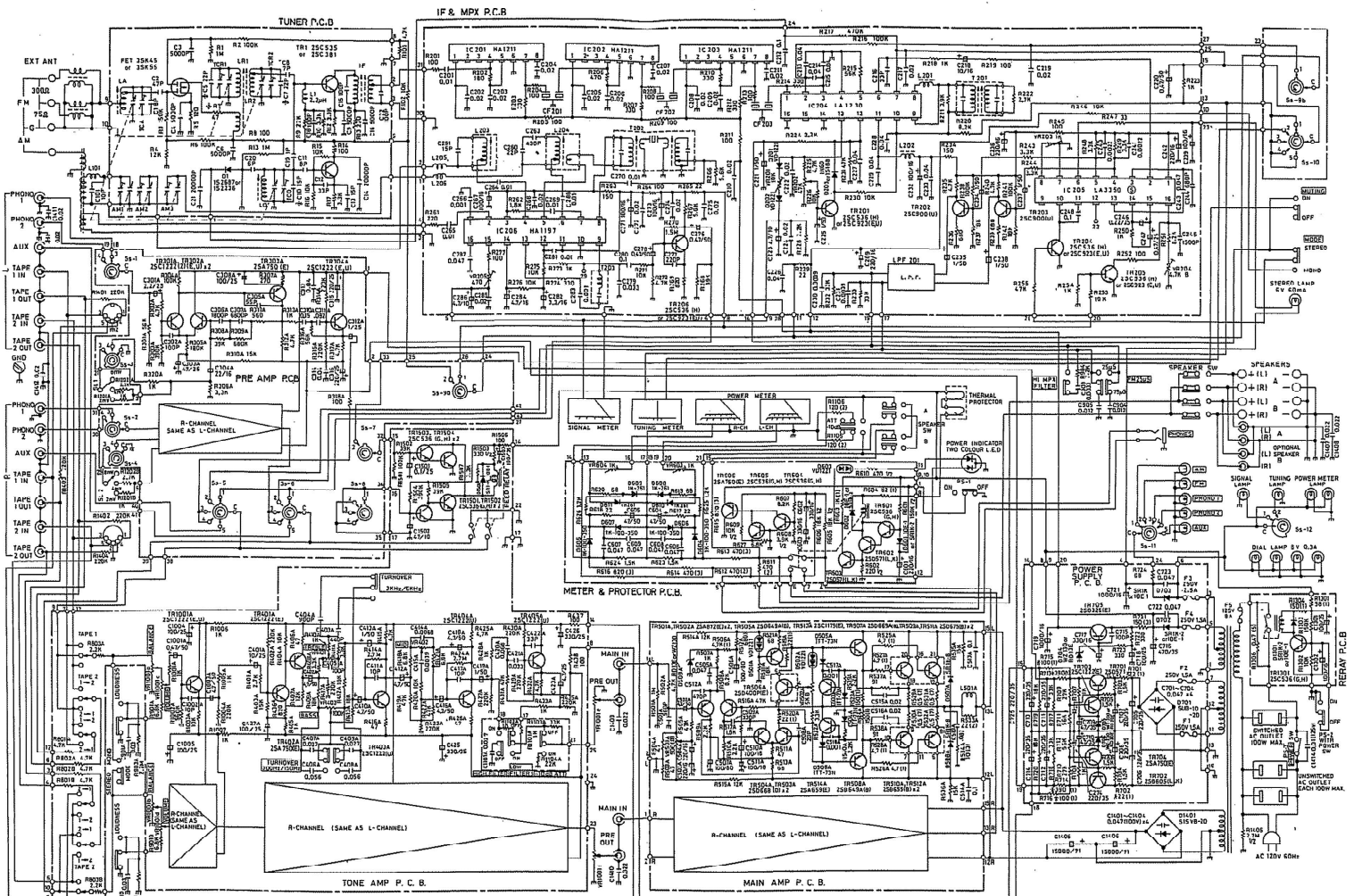
Figure D

(3) BLOCK DIAGRAM



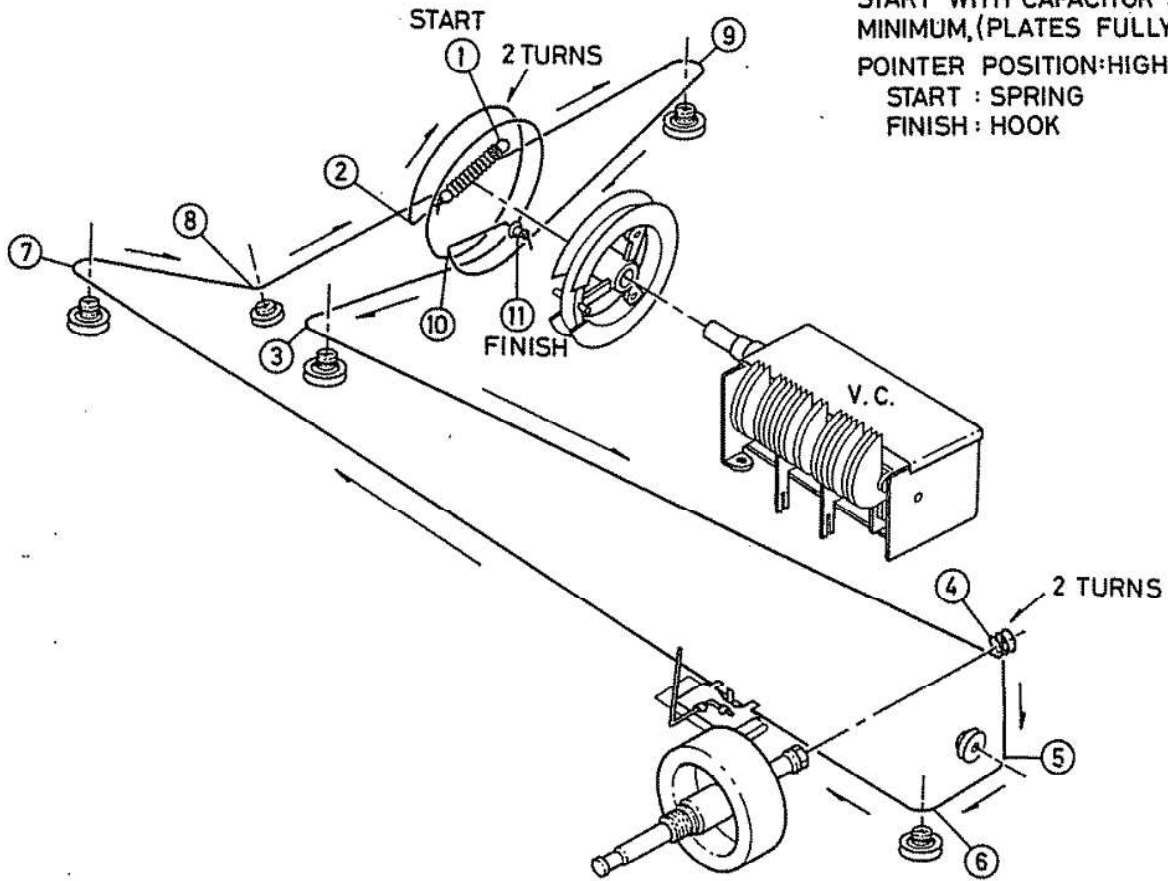
SCHEMATIC DIAGRAM

STA-2100 Cat. No. 31-2076

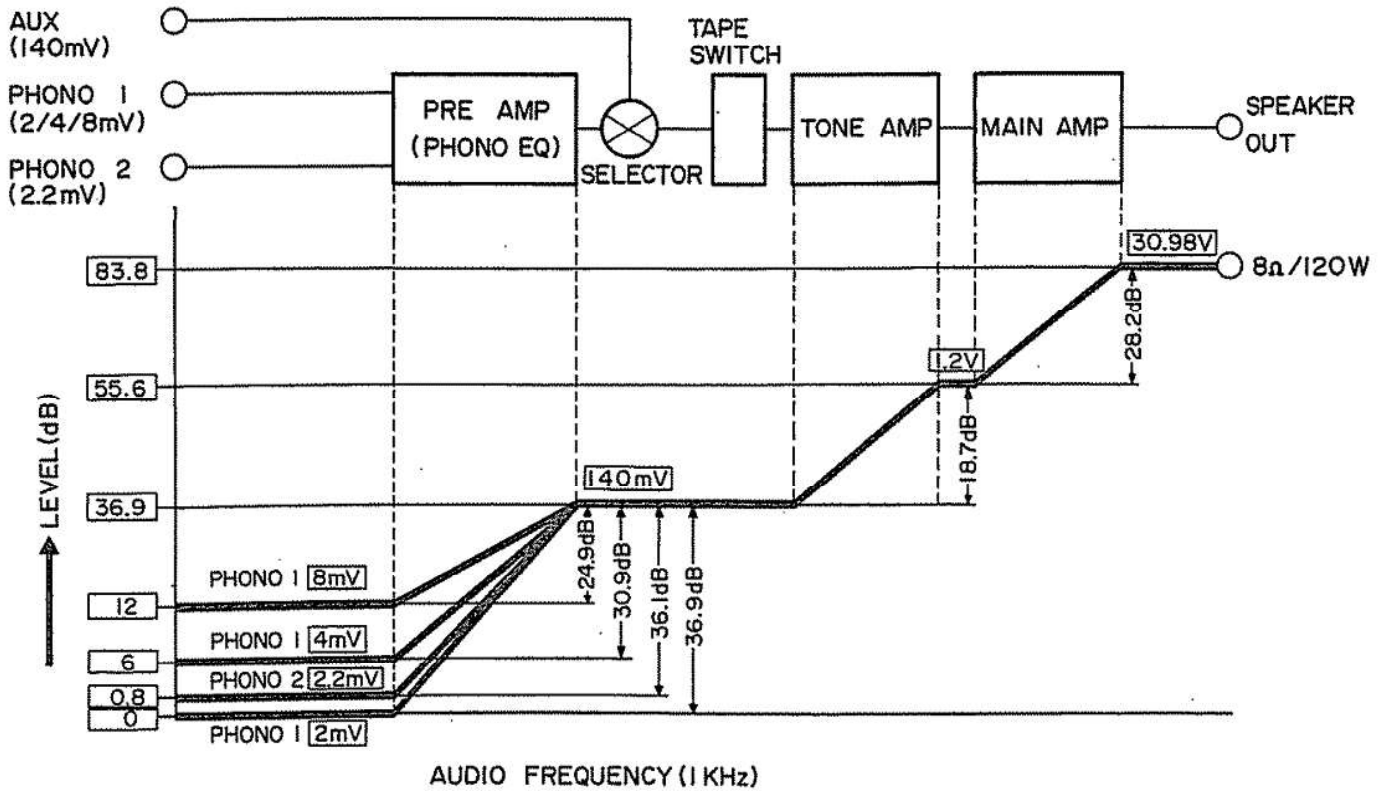


- NOTE
- (1) S11-S12 SELECTOR SWITCH 1-AM, 2-FM, 3-PHONO-1, 4-PHONO-2, 5-AUX, C-COMMON
 - (2) ALL RESISTANCE VALUES ARE INDICATED IN "OHMS" (K=1000Ω, M=10000Ω)
 - (3) ALL CAPACITANCE VALUES ARE INDICATED IN "μF" (P=10⁻⁹μF)
 - (4) R-() VALUES IS USED FOR C.S.A. MODELS ONLY.
 - (5) P6-1, P6-2 POWER SWITCH
 - (6) VR401A-401B: TREBLE CONTROL VR402A-402B: MIDRANGE CONTROL VR402A-402B: BASS CONTROL
 - (7) VR1001a-1001b: BALANCE CONTROL VR1001c-1001d: VOLUME CONTROL
 - (8) S1-1, S1-2 PHONO LEVEL SW 2mV/mV/RmV

(4) DIAL STRINGING DIAGRAM

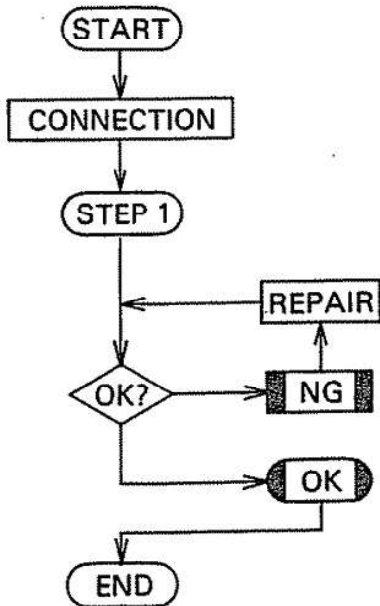


(5) LEVEL DIAGRAM



(6) OPERATION CHECK FOR CIRCUITS

1) POWER SUPPLY OPERATION CHECK



Connect AC Cord to 120 V AC, 60 Hz.

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

1. Check Power Supply P.C.B., Fuse and Power Transformer.
2. See TROUBLESHOOTING on page 27 and 28.

DC Voltage is not correct.

DC Voltage is correct.

Proceed to next section.

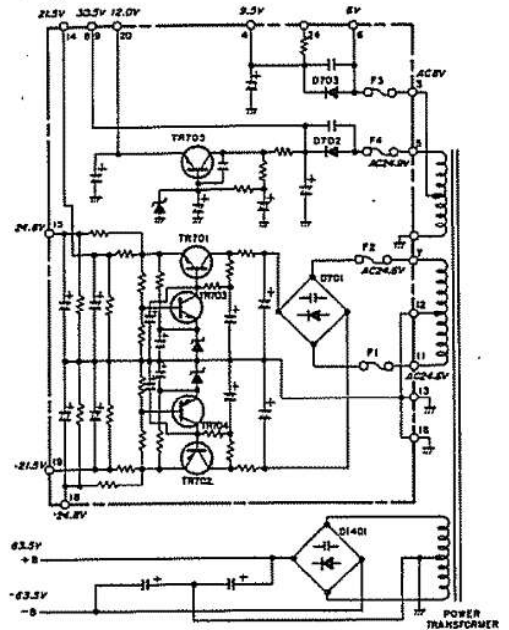
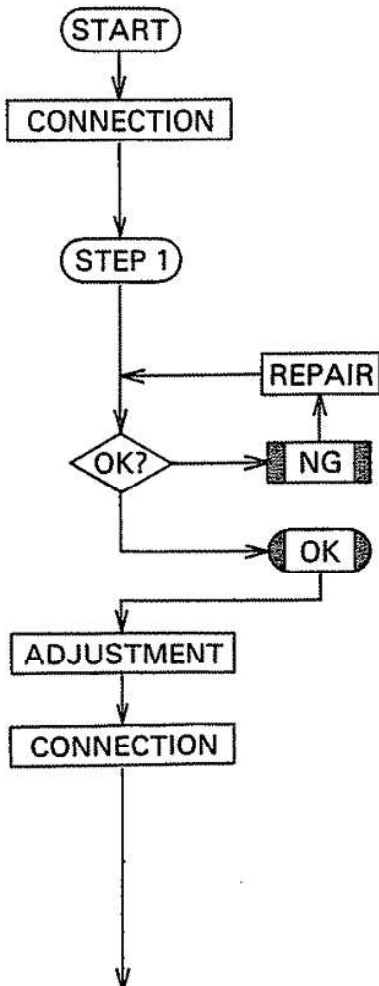


Figure 1

2) AUDIO SECTION OPERATION CHECK

(1) MAIN AMP. OPERATION CHECK



Connect 8Ω Load to Speaker Output.

Connect DC Voltmeters to Main Amp Board, Pin No. 15 (L or R) and Ground (Plus +) and Pin No. 12 (L or R) and Ground (Minus -).
(Both Left and Right Board - See Figure 2)

Check Power Supply voltage with no input (must be ± 64.5V)

- (1) Check D1401, C1405 or C1406.
- (2) Check for short-circuits.
- (3) See TROUBLESHOOTING.

DC Voltage is not ± 64.5V.

DC Voltage is ± 64.5V.

Adjust DC Balance and Idling Current.
See ALIGNMENT INSTRUCTIONS on page 20.

Connect 8Ω Load to Speaker Output.
Connect DC Voltmeter to Main Amp. P.C.B. as shown in Figure 3.

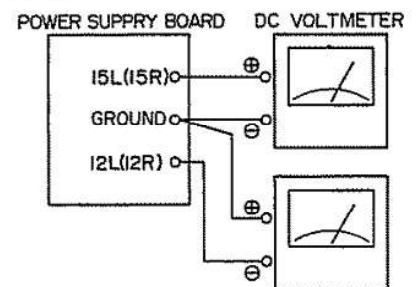


Figure 2

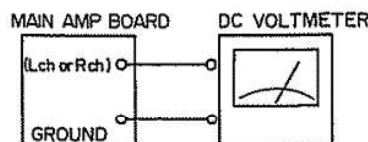
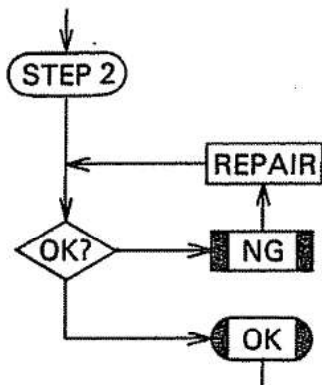


Figure 3



Check for Balance of DC Voltage at L and R channel output terminals (within ± 15 mV).

- (1) Readjust VR501A and VR501B.
- (2) See TROUBLESHOOTING.

DC Voltage over ± 15 mV.

DC Voltage within ± 15 mV.

CONNECTION

Connect 8Ω Load to Speaker Output.

Connect DC Voltmeter to Main Amp. P.C.B. as shown in Figure 4.

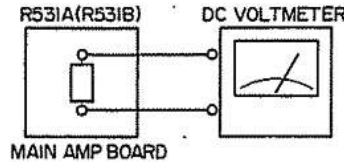
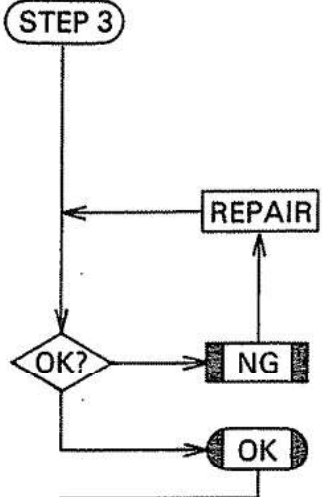


Figure 4

Check the Idling current of Main Amp:

Check the DC Voltage across Emitter Resistor R531A (L ch) and R531B (R ch); should be $9\text{ mV} \pm 1\text{ mV}$.

[Adjust: VR502A (L ch) and VR502B (R ch)]



- (1) Readjust VR502A and VR502B.
- (2) Check the Bias circuit of D502A, R522A (L ch) and/or D502B, R522B (R ch).
- (3) Check TR505A (L ch) and TR505B (R ch).
- (4) Check TR503A, 504A (L ch) and TR503B, 504B (R ch).
- (5) Check for short-circuits on Main P.C.B.

DC Voltage is above 10 mV or below 8 mV

DC Voltage is $9\text{ mV} \pm 1\text{ mV}$.

Connect 8Ω Load to Speaker Output.

Connect Audio Osc. to Main Amp. Input, Pin No. 13L (Left) and/or 13R (Right). See Figure 5.

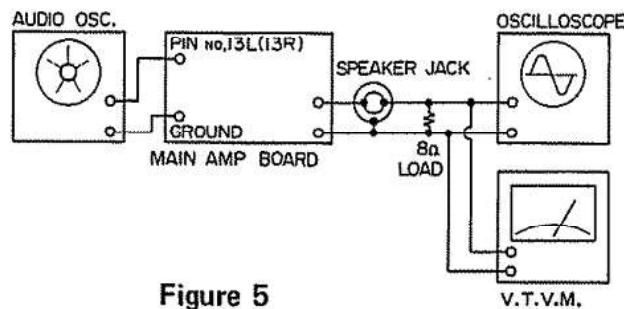


Figure 5

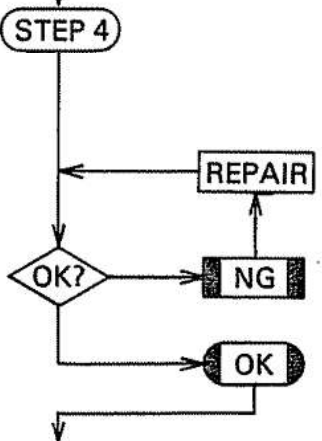
Check for symmetrical clipping of Output Signal wave shape.

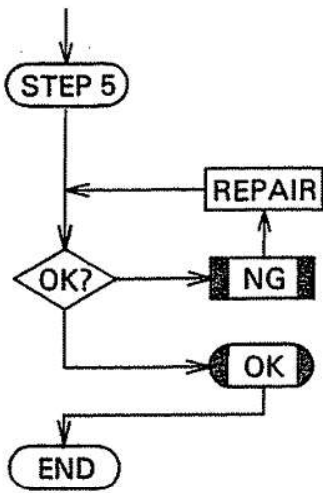
Adjust output from Audio Osc. to produce clipping in the output waveform (should be about $900\text{ mV} - 1.2\text{ V}$).

- (1) Check TR507A, 508A, 510A, 511A, 512A (L ch) and TR507B, 508B, 509B, 510B, 511B, 512B (R ch).
- (2) Check STEP 2 and STEP 3.
- (3) Check Main Amp. circuits.

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

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





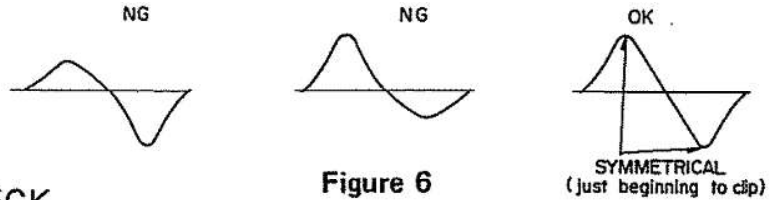
Check the Main Amp. Gain (designed level for Main Amp. is about 28 dB). Adjust output from Audio Osc. to produce 120 watts rated output power. (Both channels driven – Figure 5)

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

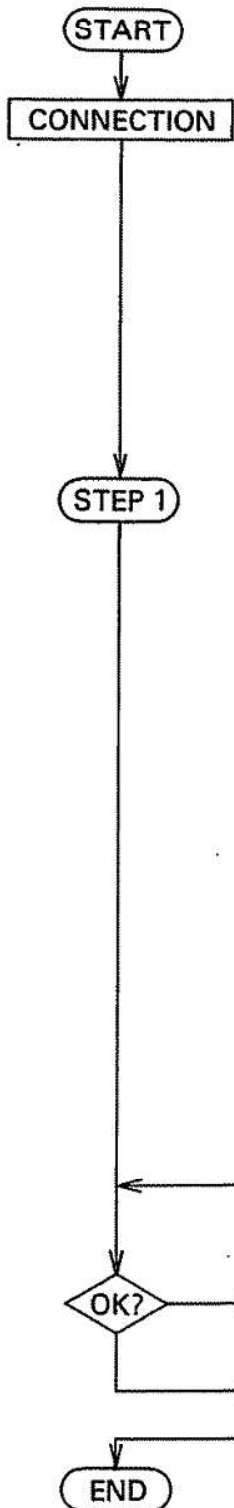
Input level is not $1.2V \pm 2$ dB.

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

Proceed to next section.



(2) PREAMP. OPERATION CHECK



Set SELECTOR Switch to PHONO 2.

Connect Audio Osc. to PHONO 2 Input.

Connect Oscilloscope and V.T.V.M. to TAPE OUT 1 Jack. (See Figure 7)

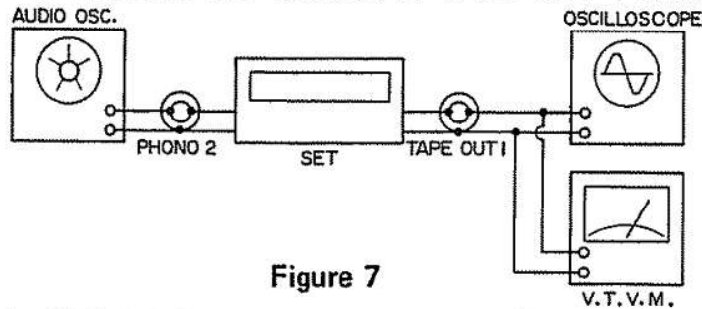


Figure 7

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

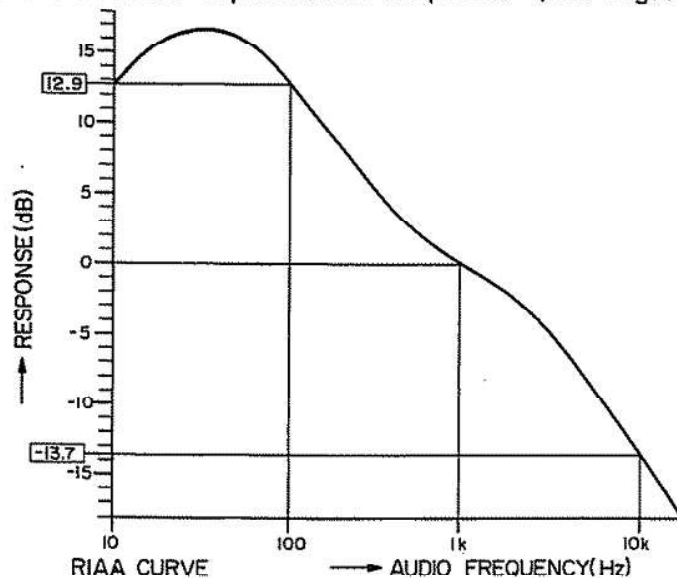


Figure 8

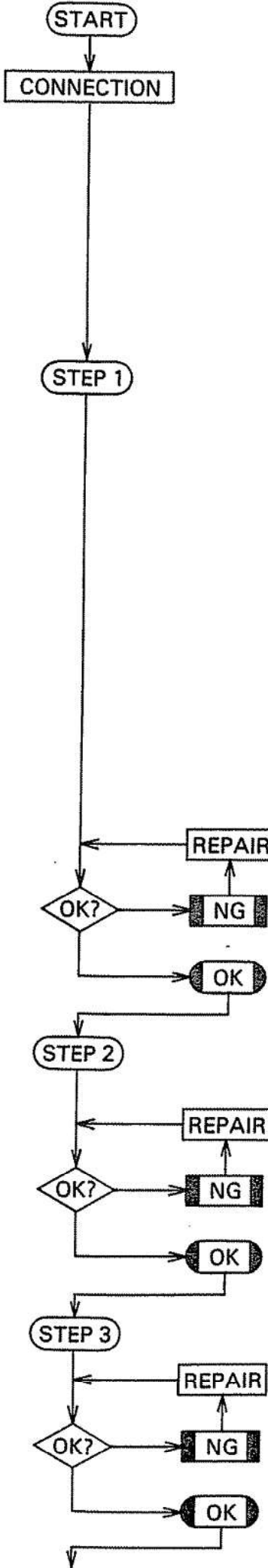
- (1) Check TR 301A, 302A, 303A, 304A (L ch) and TR 301B, 302B, 303B, 304B (R ch).
- (2) Check C306A, 307A, R308A, 309A (L ch) and C306B, 307B, R308B, 309B (R ch).
- (3) Check PRE Amp. circuits.

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

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

Proceed to next section.

(3) TONE CONTROL OPERATION CHECK



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

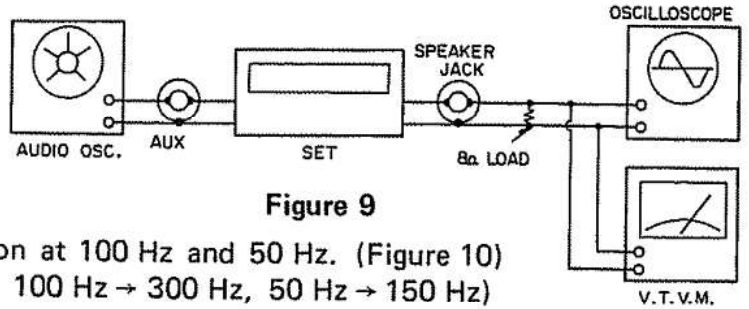
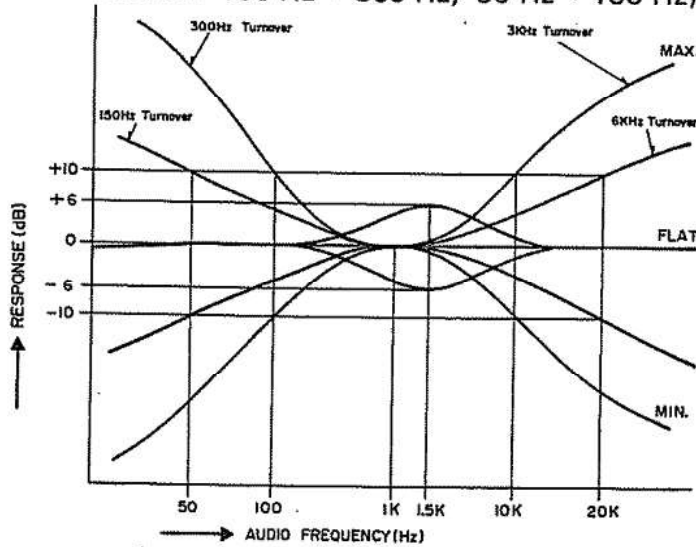


Figure 9

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



TONE CONTROL CURVE
 Figure 10

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

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

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

Check TREBLE Action at 10 kHz and 20 kHz. (Figure 10)
 (Turnover switch: 10 kHz → 3 kHz, 20 kHz → 6 kHz)

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

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

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

Check midrange Action at 1.5 kHz. (Figure 10)

Check midrange control circuit on TONE CONTROL P.C.B.

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

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

STEP 4

Check LOUDNESS compensation at -30 dB Volume position from rated power. (Figure 11)

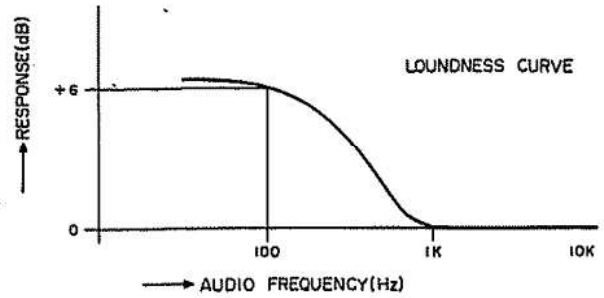
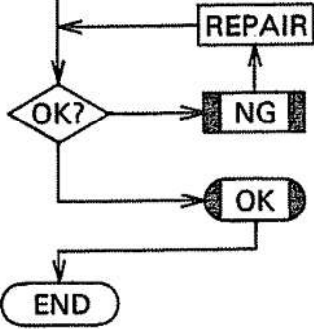


Figure 11



Check Loudness circuit and see TROUBLESHOOTING.

Loudness Compensation does not fall within $+6 \pm 2$ dB at 100 Hz.

Loudness Compensation falls within $+6 \pm 2$ dB.

Proceed to the next section.

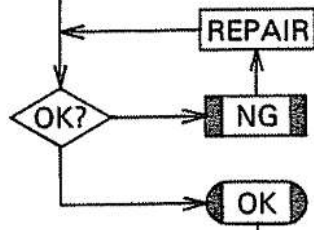
(4) PROTECTOR CIRCUITS OPERATION CHECK

START

STEP 1

Check for "click" sound of Relay A when Power is switched "on". (active 0.2 second delay)

- (1) Check Relay A on Relay board.
- (2) Check TR1301.
- (3) Check Relay circuit.



Relay circuit does not work.

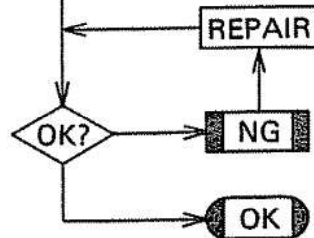
Relay circuit works.

STEP 2

After STEP 1, check for the "click" sound of Relay B activating after about a five second delay.

At the same time, check that the indicator LED turned to green (from red).

- (1) Check TR601-603 and TR604-606.
- (2) Check the Protector circuit.
- (3) Check the LED.
- (4) Check Relay B.



Protector Relay B circuit does not work.

Protector Relay B circuit works.

Same equipment connection as Figure 9. Remove the Primary Fuse (8A) and connect each side of Fuse Holder to AC Ampere-Meter. (Figure 12)

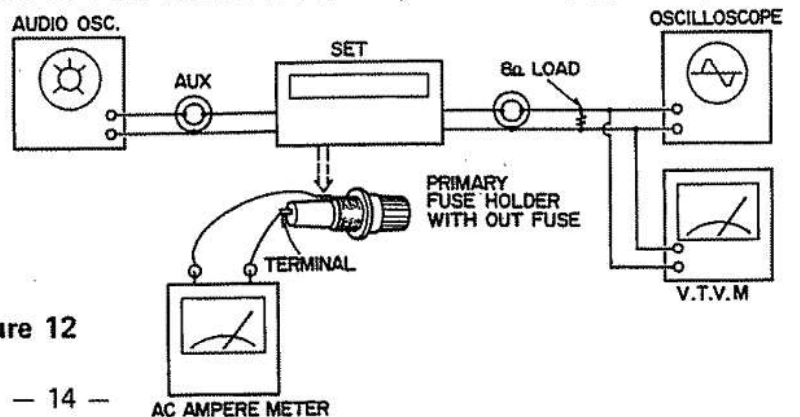


Figure 12

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

- (1) Check TR507A, 508A (L ch) and TR507B, 508B (R ch).
 (2) Check the Limiter circuit on Main Amp board.

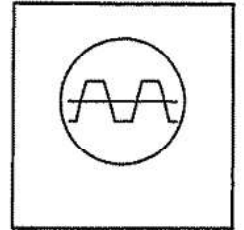


Figure 13

Limiting circuit does not work.

Limiting circuit works.

Replace fuse and disconnect AC Ampmeter. Same equipment connection as Figure 9.

Disconnect wires from Pin No. 13L (Left) and 13R (Right) on Main Amp board.

Connect regulated DC power supply to Pin No. 2 and 7 on Protector & Meter board as shown in Figure 14.

Check Relay B action when DC voltage is applied to either Pin No. 2 or 7 on Protector board (+10V and -10V as shown Figure 15).

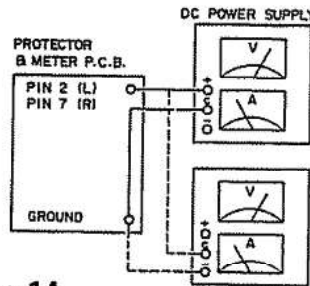


Figure 14

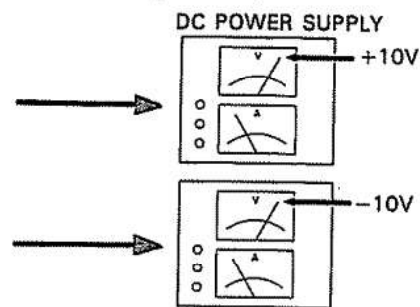


Figure 15

- (1) Check Relay B.
 (2) Check Protector circuits.

Relay B does not activate.

Relay B activates.

Reconnect wires to Pin 13L and 13R.
 Proceed to next section.

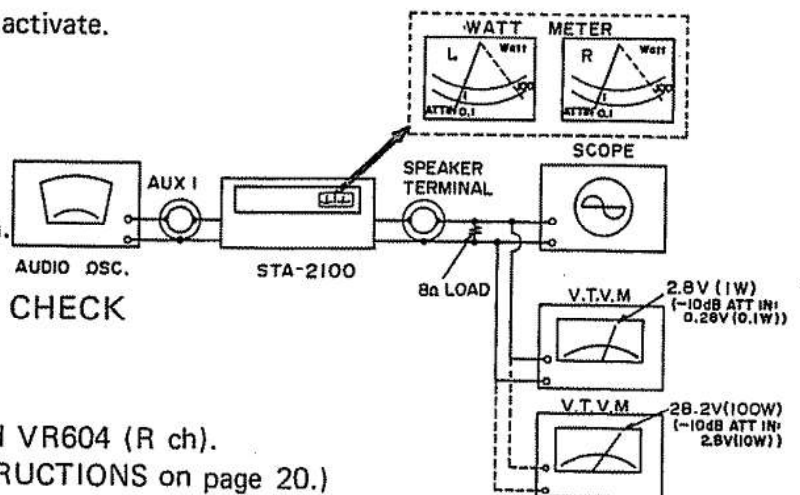


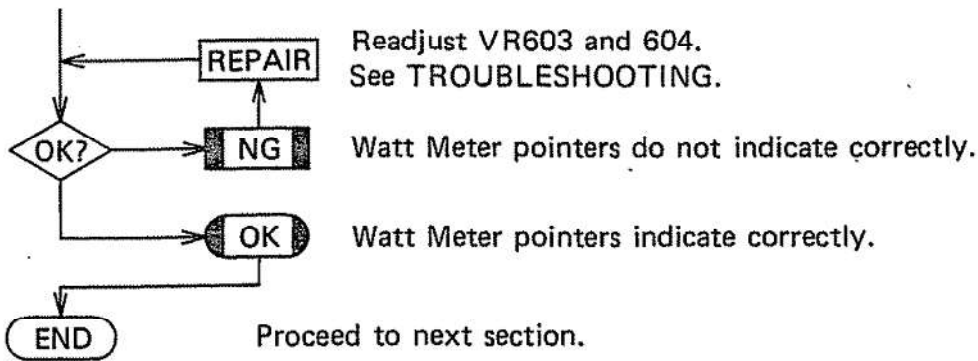
Figure 16

Adjust VR603 (L ch) and VR604 (R ch).
 (See ALIGNMENT INSTRUCTIONS on page 20.)

Connect Audio Osc. (1 kHz) to AUX 1 Input Jack.
 Connect 8Ω load to Speaker output terminals.
 Connect Oscilloscope and V.T.V.M. to Speaker terminals.
 (Output level: 100 watts/1 watt – Figure 16)

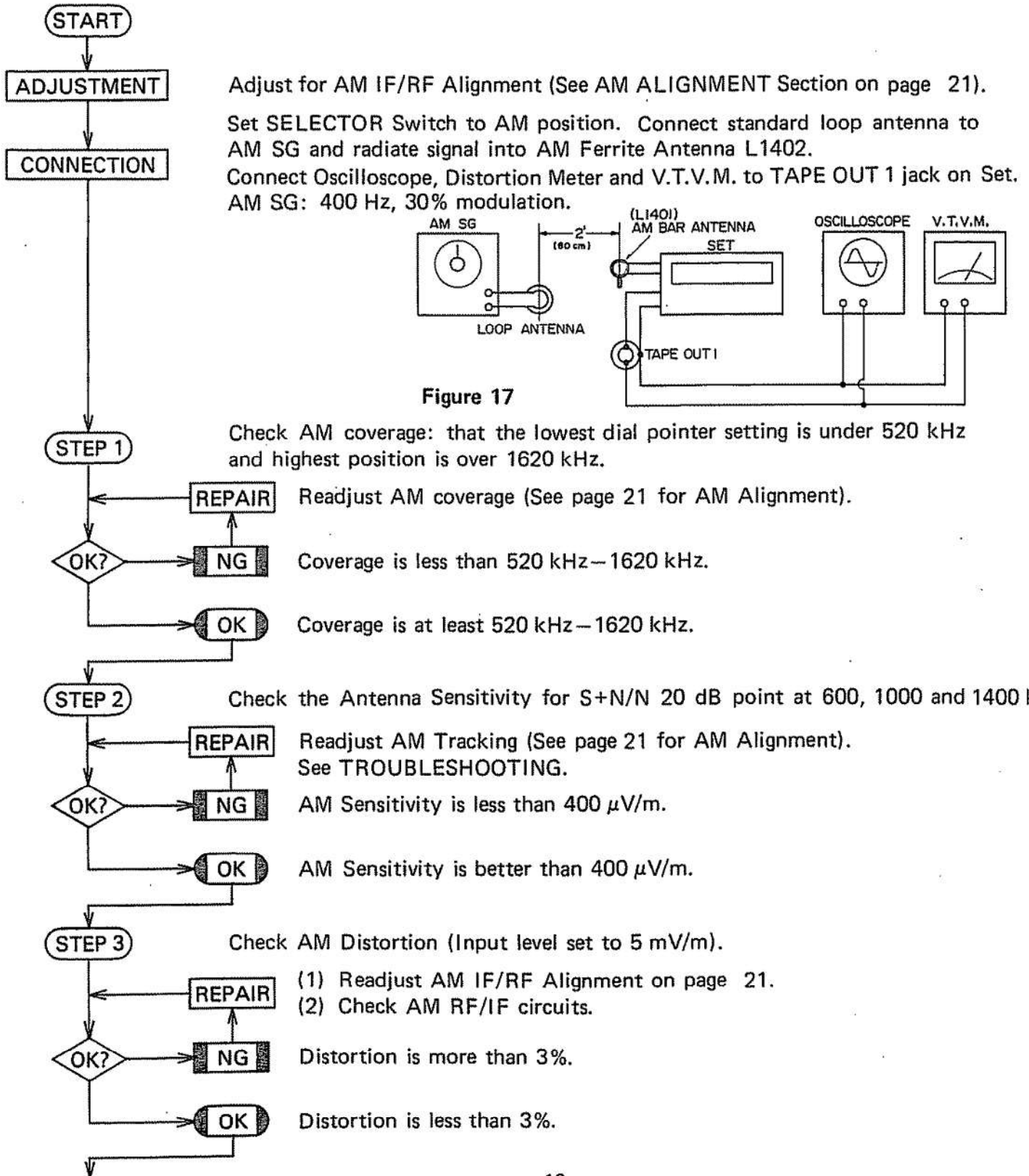
Check Watt Meter pointers (L ch and R ch) per following procedure:

- Check Watt Meter pointers at 1 watt and 100 watts (L ch and R ch) when output levels are set to 2.8V and 28.3V on V.T.V.M. (8Ω load).
- Check that Watt Meter pointers indicate twice the value when both A and B Speakers switches are pressed (4Ω load).
- Check Watt Meter pointers when “-10 dB ATTENUATOR” switch is pushed.



3) RF and IF OPERATION CHECK

(1) AM OPERATION CHECK



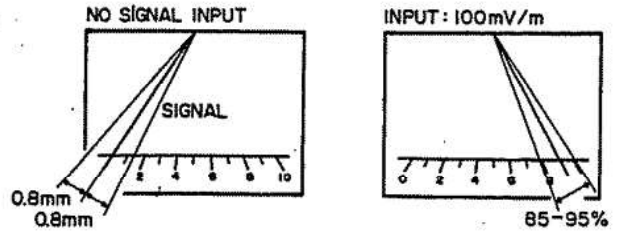
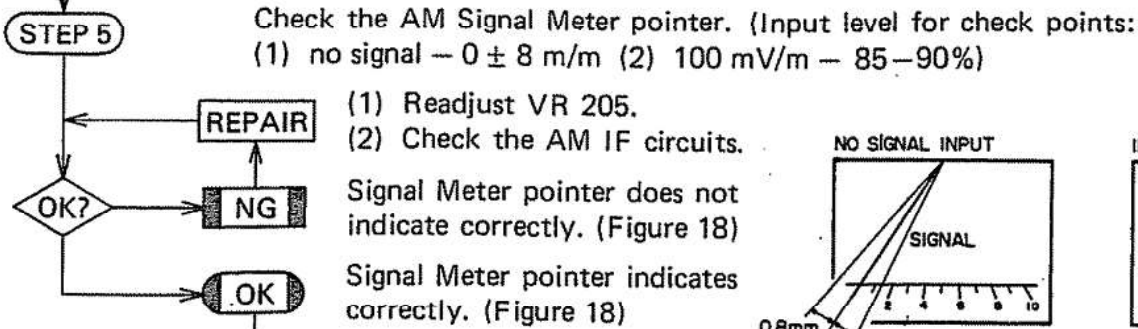
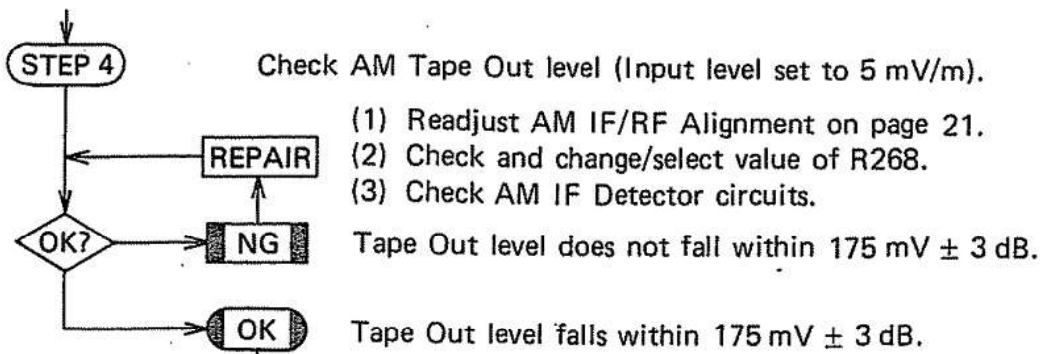


Figure 18

END Proceed to next section.

(2) FM RF/IF OPERATION CHECK

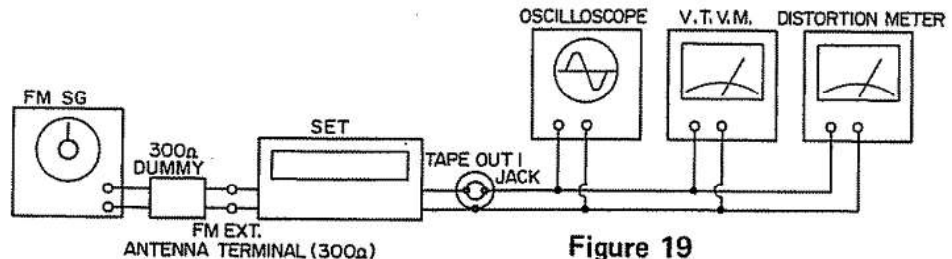
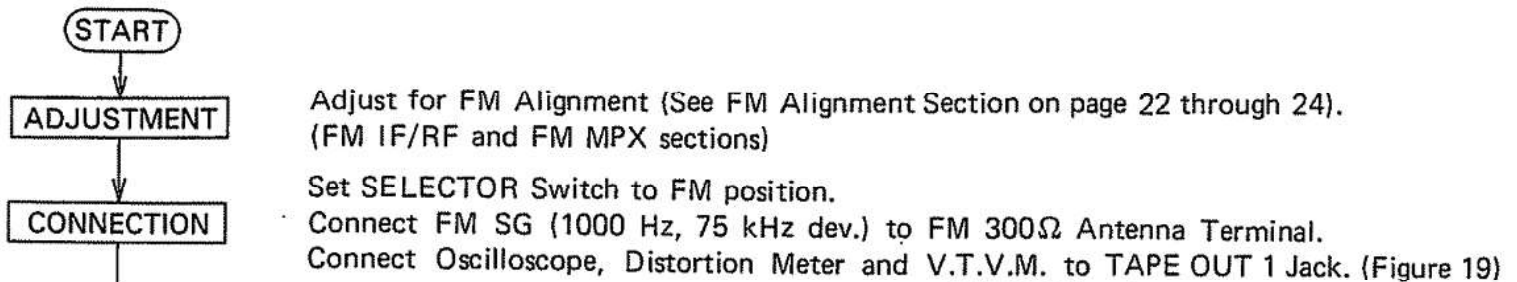
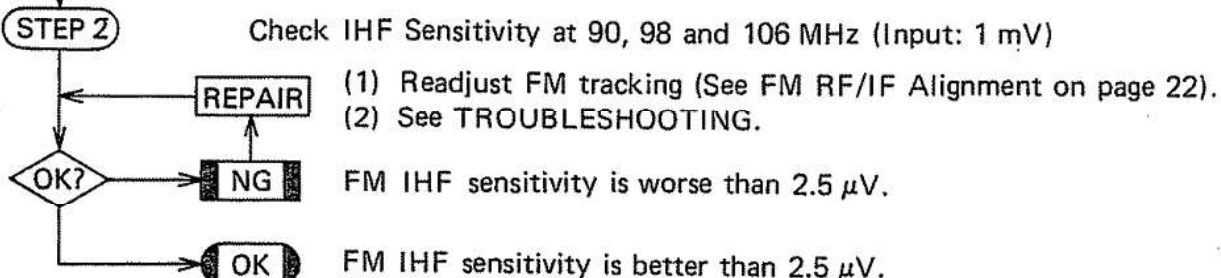
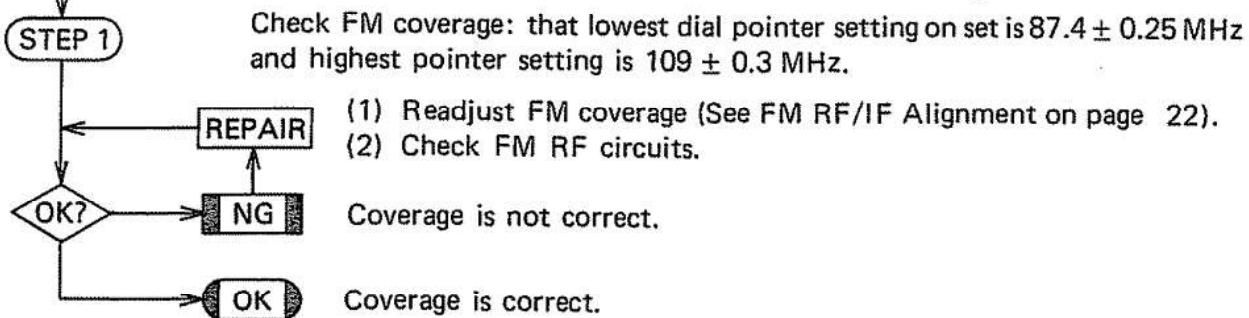


Figure 19



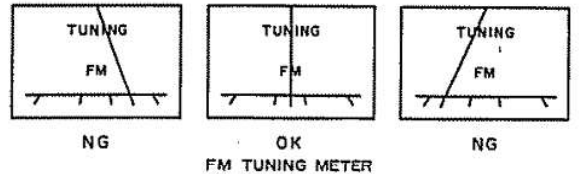
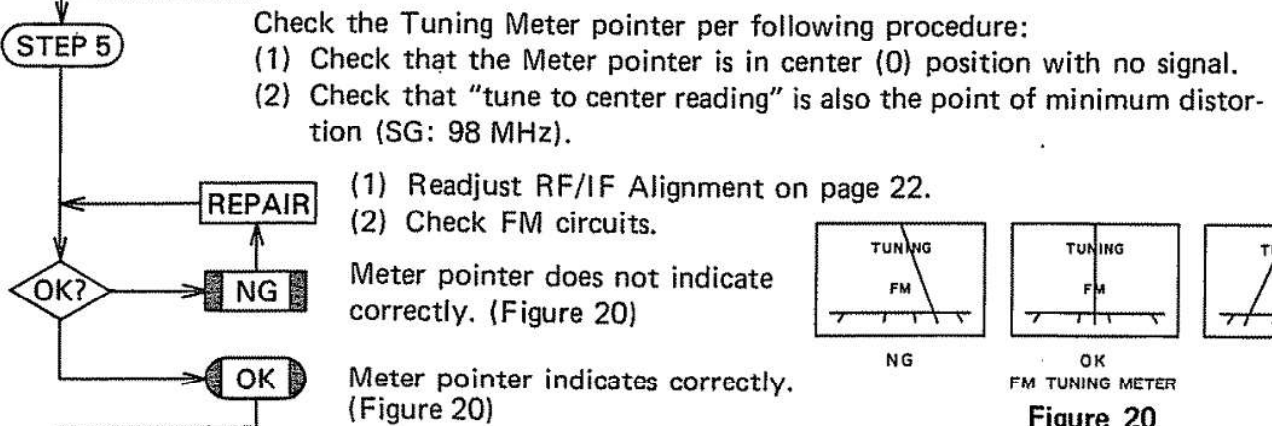
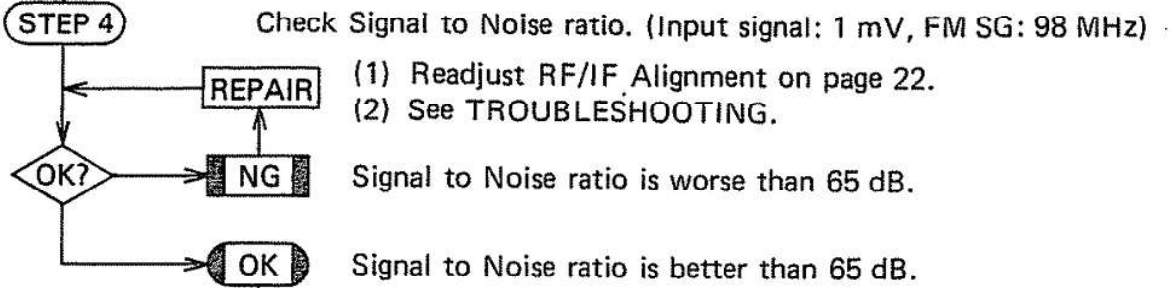
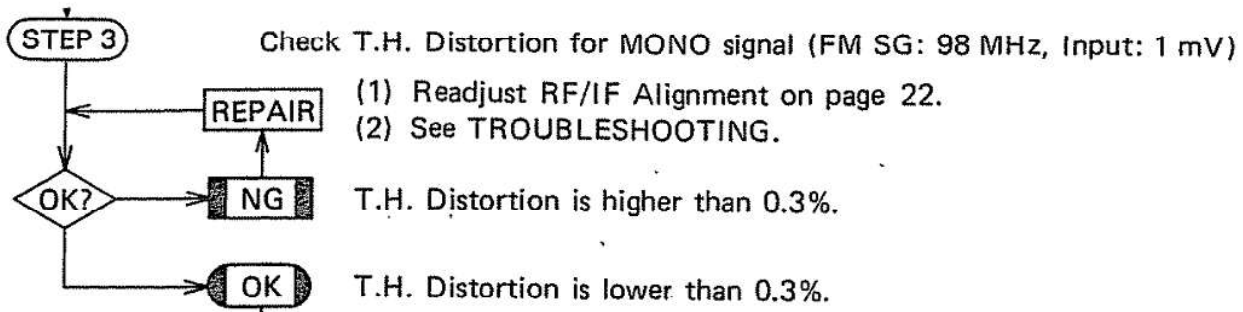


Figure 20

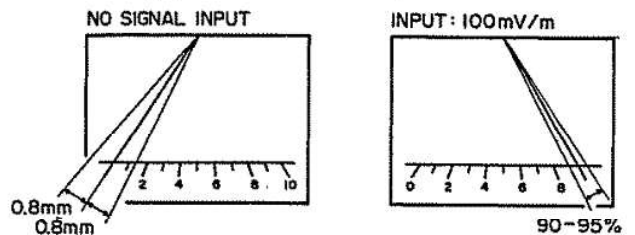
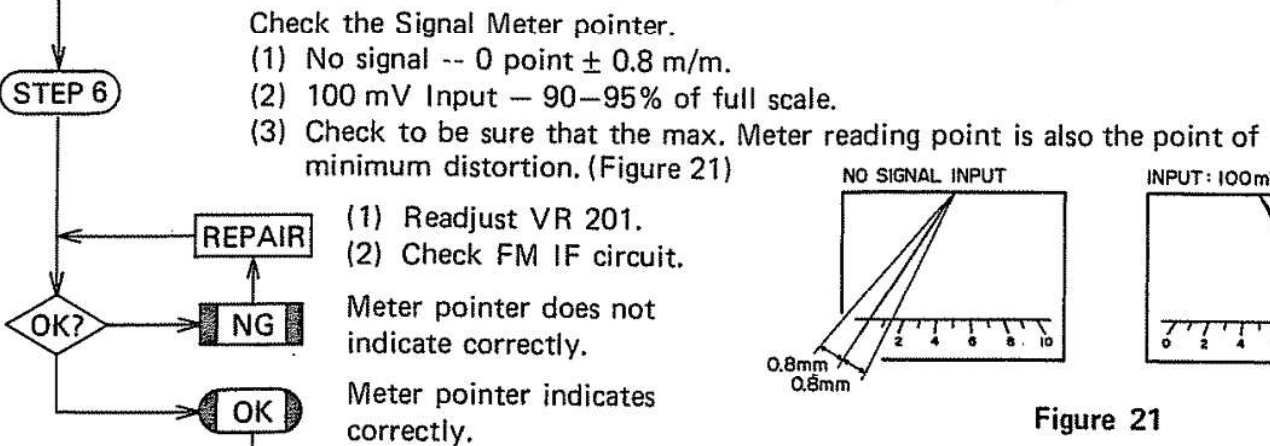


Figure 21

STEP 7 Check FM 75 μ sec de-emphasis and 25 μ sec de-emphasis response curves.

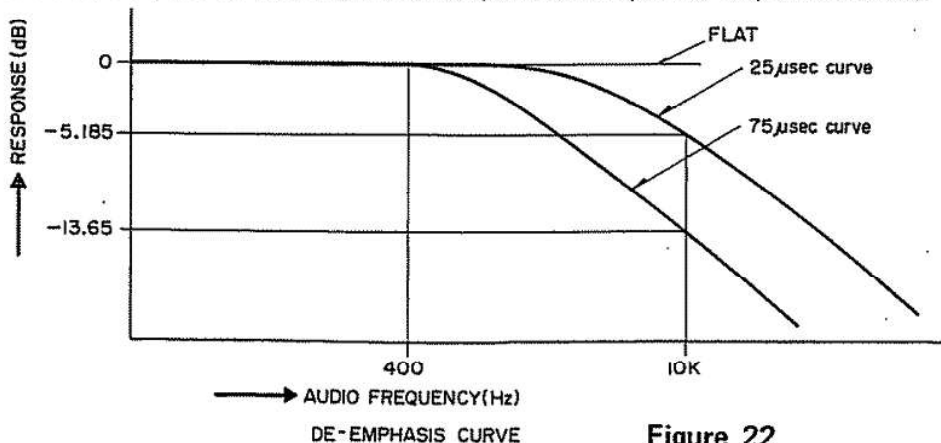
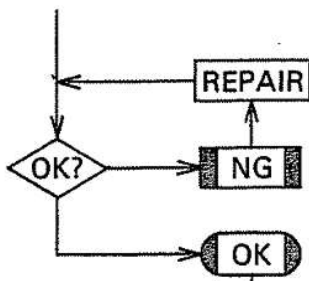


Figure 22



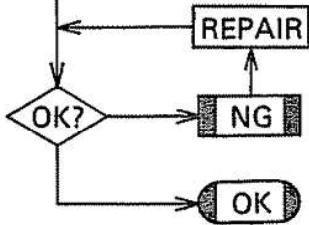
Check (replace or change value) of C230 and C904 (L ch) and/or C231 and C905 (R ch).

FM 75 μ sec response at 10 kHz modulation does not fall within $-13.65 +1$ dB or $-13.65 -3$ dB and/or FM 25 μ sec at 10 kHz modulation does not fall within -5.185 dB $+1$ dB or -5.185 dB -3 dB.

FM 75 μ sec at 10 kHz modulation falls within -13.65 $^{+1}_{-3}$ dB and FM 25 μ sec at 10 kHz modulation falls within -5.185 $^{+1}_{-3}$ dB.

Check the Muting by applying an input of 3 μ V at 98 MHz, with MUTE switched "on".

STEP 8



(1) Readjust VR 202.
(2) See TROUBLESHOOTING.

Muting level is not 3 μ V \pm 1 μ V.

Muting level is 3 μ V \pm 1 μ V.

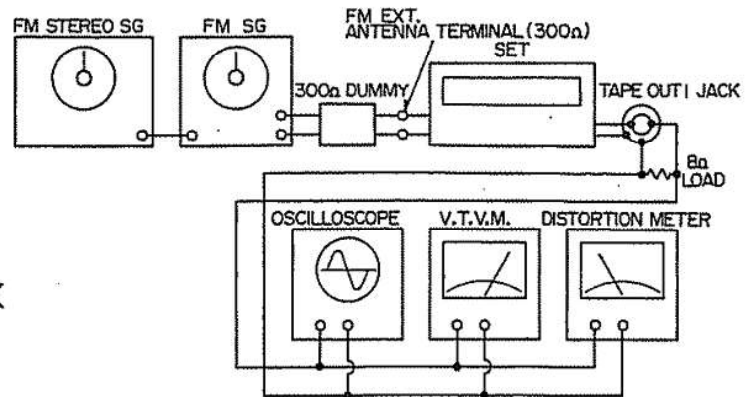
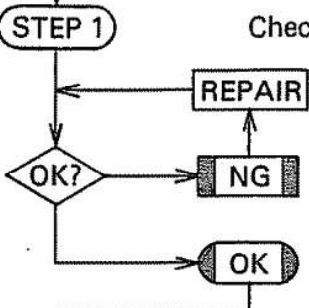
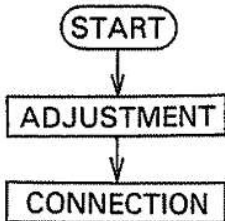


Figure 23

Adjust for FM MPX Alignment on page 24.

Same equipment connection as Figure 19. Connect FM Stereo SG to FM SG. Stereo Modulation – 67.5 kHz dev. 8% Pilot Frequency – 98 MHz, 1 kHz modulation (Figure 23)

(3) FM MPX OPERATION CHECK

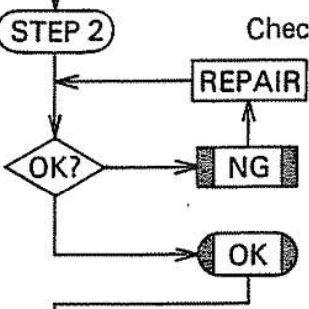


Check Stereo indicator sensitivity (Figure 23) (Input: near 2.5 μ V)

(1) Readjust FM MPX Alignment on page 24.
(2) See TROUBLESHOOTING.

Stereo indicator sensitivity does not fall within 2–6 μ V.

Stereo indicator sensitivity falls within 2–6 μ V (nominal sensitivity is 3 μ V).

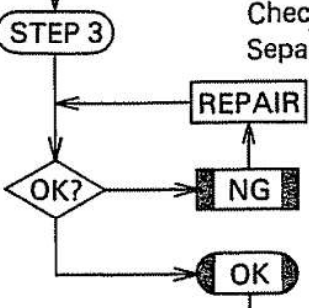


Check Stereo Separation at 100, 1 k and 10 kHz (input: 1 mV)

(1) Readjust FM MPX Alignment on page 24.
(2) See TROUBLESHOOTING.

Separation is less than 33 dB at 100 Hz, 35 dB at 1 kHz and 30 dB at 10 kHz.

Separation is better than 33 dB at 100 Hz, 35 dB at 1 kHz and 30 dB at 10 kHz.



Check FM MPX Filter (with FM MPX FILTER Switched "on", check the Separation at 10 kHz modulation).

(1) See TROUBLESHOOTING.

MPX Filter Separation does not fall within 15 dB \pm 2.5 dB.

MPX Filter Separation falls within 15 dB \pm 2.5 dB.

END

Proceed to next section.

(7) ALIGNMENT INSTRUCTIONS

AUDIO CIRCUIT ADJUSTMENT/CHECK

EQUIPMENT REQUIRED

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

- Notes
- Maintain voltage at 120 volts, AC 60 Hz.
 - Set SELECTORS Switch to AUX.
 - Set MODE Switch to STEREO.
 - See P.C.B. illustration for alignment points/adjustments.

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

MAIN AMP ADJUSTMENT

STEP	ADJUSTMENT	EQUIPMENT	CONNECTION	AUDIO FREQ.	LEVEL	ADJUSTMENT
1	Check Balance by measuring DC voltage across OUTPUT TERMINAL of L and R channel.	DC Volt Meter	See Fig. 24.	No signal	DC voltage should be less than 15mV.	VR501A (L ch) VR501B (Rch)
2	Idling current adjustment	DC Volt Meter	See Fig. 25.	No signal	Adjust voltage across Emitter resistors R531A (L ch) and R531B (R ch) to 9mV (8 ohm Load).	VR502A (L ch) VR502B (Rch)

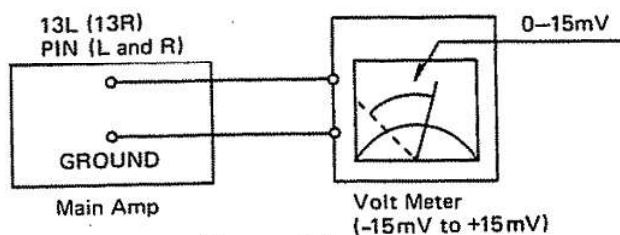


Figure 24

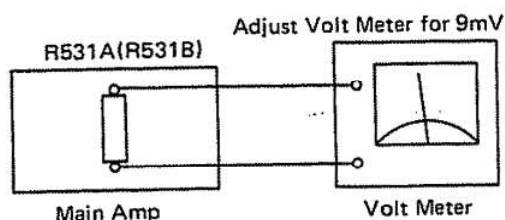


Figure 25

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

WATT METER ADJUSTMENT

STEP	ADJUSTMENT	EQUIPMENT	CONNECTION	AUDIO FREQ.	SETTING	LEVEL	ADJUSTMENT
1	WATT Meter level adjustment	Audio Osc. V.T.V.M. Oscilloscope	See Fig. 26.	1000 Hz	VOLUME: Max BASS MID., TRE- BLE, BAL- ANCE: center	Adjust input to AUX 1 to get output level of 28.3V (100W) (8 ohm load).	VR603 (L ch) VR604 (Rch) so the WATT meters indicate 100W.

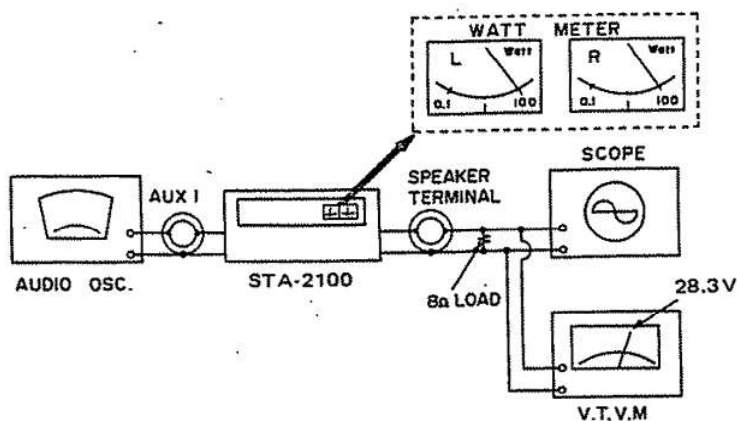


Figure 26

AM-FM IF & MPX COIL & TRIMMER LOCATIONS

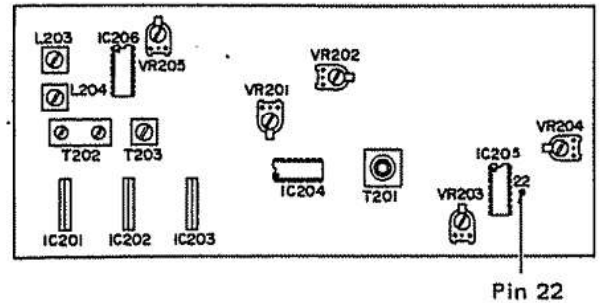
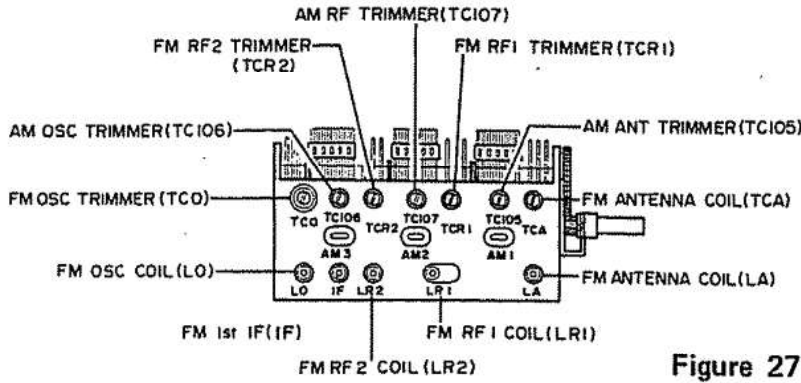


Figure 27

AM IF & RF ALIGNMENT EQUIPMENT REQUIRED

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

- Notes
- Signal generator output should be no higher than necessary to obtain an output reading.
 - Maintain line voltage at 120 volts, 60 Hz AC.
 - Set SELECTOR switch to AM.
 - See P.C.B. illustrations for alignment points/adjustments.

STEP	GENERATOR COUPLING	GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Connect standard loop ANTENNA to Signal Generator and radiate signal into the AM Ferrite antenna. See Fig. 28	455 kHz (400 Hz, 30 % Mod.)	Point of non-interference (near 600 kHz)	AC Voltmeter to TAPE OUT 1 Jack	T202 (Both sections) T203	Adjust for maximum reading on meter.
2	Same as above	600 kHz (400 Hz, 30 % Mod.)	600 kHz	Same as STEP 1	L204 (AM OSC Coil) L1401 (AM ANT Coil) L203 (AM RF Coil)	Adjust for maximum reading on meter. Refer to Fig. 27
3	Same as above	1400 kHz (400 Hz, 30 % Mod.)	1400 kHz	Same as STEP 1	TC 106 (AM OSC Trimmer) TC 105 (AM ANT Trimmer) TC 107 (AM RF Trimmer)	Adjust for maximum reading on meter. Refer to Fig. 27 and 28.
4	Repeat STEPs 2 and 3 until no further change is noticed.					
5	Same as STEP 1	1000 kHz (400 kHz, 30% Mod.) Output level to 100 mV/m	1000 kHz	Same as above	VR205	Adjust so the Meter Pointer on Receiver is between 85 % and 90% on the Meter.

AM ALIGNMENT SET-UP

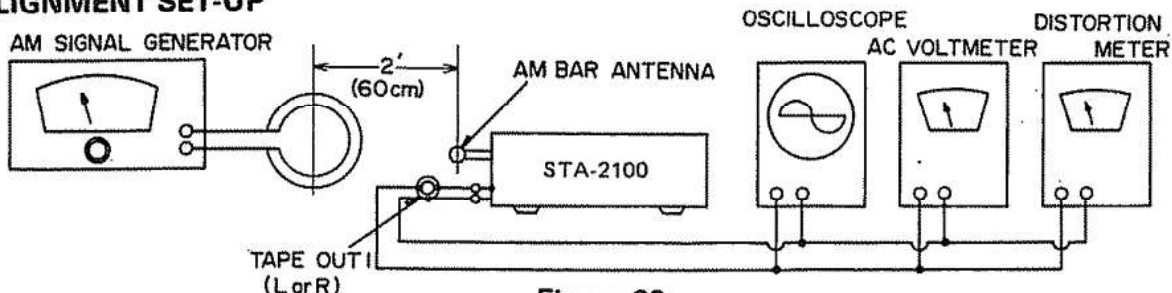


Figure 28

FM RF & IF ALIGNMENT

EQUIPMENT REQUIRED

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

- Notes
- Signal Generator output should be no higher than necessary to obtain an output reading.
 - Maintain Line voltage at 120 volts 60 Hz AC.
 - Set SELECTOR Switch to FM.
 - Refer to P.C.B. illustrations 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: no input (unit off)	Near to 98 MHz	TUNING Meter	T 201 (Primary)	Adjust for Center Point on TUNING Meter. Refer to Fig. 29, 30 and 31.
2	Same as above	98 MHz (400 Hz, 75 kHz dev.) Input: 1 mV	Same as above	AC Voltmeter Scope and Distortion Meter to TAPE OUT 1 Jack (L or R)	T 201 (Secondary)	Adjust for minimum Distortion (about 0.1%). Refer to Fig. 29, 30 and 31.
3	Repeat STEPs 1 and 2 until no further improvement is noticed.					
4	Same as STEP 1	90 MHz (400 Hz, 75 kHz dev.) Input: about 2 ~ 3 μ V	90 MHz	Same as STEP 2	LO (FM OSC Coil) LR 1, LR 2 (FM 1st and 2nd RF Coil) LA (FM Antenna Coil)	Adjust for maximum reading on meter. Refer to Fig. 27 and 31.
5	Same as STEP 1	106 MHz (400 Hz, 75 kHz dev.) Input: about 2 ~ 3 μ V	106 MHz	Same as STEP 2	TCO (FM OSC Trimmer) TCR 1, TCR 2 (FM 1st and 2nd RF Trimmer) TCA (FM Antenna Trimmer)	Adjust for maximum reading on meter. Refer to Fig. 27 and 31.
6	Repeat STEPs 4 and 5 until no further improvement is noticed.					
7	Same as STEP 1	98 MHz (400 Hz, 75 kHz dev.) Input: 10 μ V	98 MHz	Same as STEP 2	IF (FM 1st IFT) (FM Front-end Board)	Adjust for maximum reading on meter. Refer to Fig. 27 and 31.
8	Repeat STEP 7 until no further improvement is obtained. Go back and check STEPs 1 and 2 and realign if necessary.					
9	Same as STEP 1	98 MHz (400 Hz, 75 kHz dev.) Input: 3 μ V.	98 MHz	Same as STEP 2	VR202	"MUTE" switched "ON" and adjust VR202 for no signal output.
10	Same as STEP 1	98 MHz (400 Hz, 75 kHz dev.) Input: 100mV	98 MHz	SIGNAL Meter	VR201	Adjust so the Meter Pointer on Receiver is 90-95% of full scale.
11	Same as STEP 1	98 MHz (400 Hz, 75 kHz dev.) Input: 100mV	98 MHz	TUNING, SIGNAL Meter	—	With "tune to center" for TUNING and maximum on Signal Meter, Distortion Meter should indicate minimum.

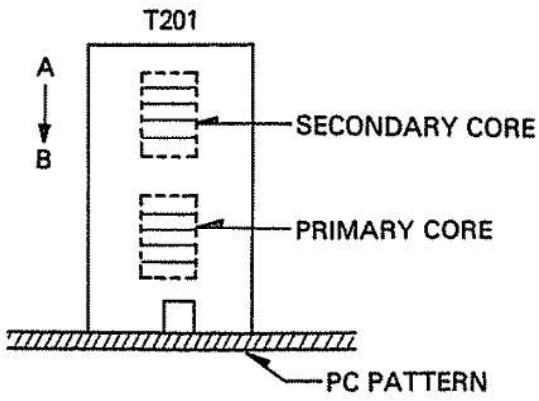


Figure 29

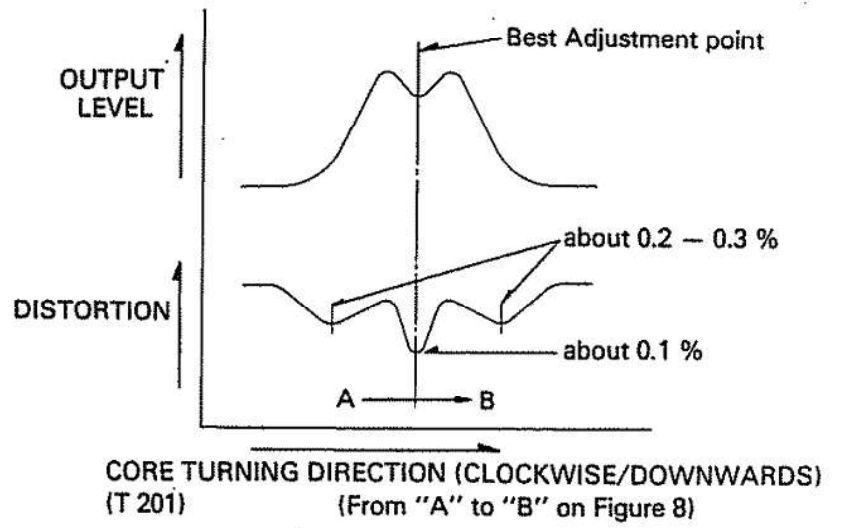


Figure 30

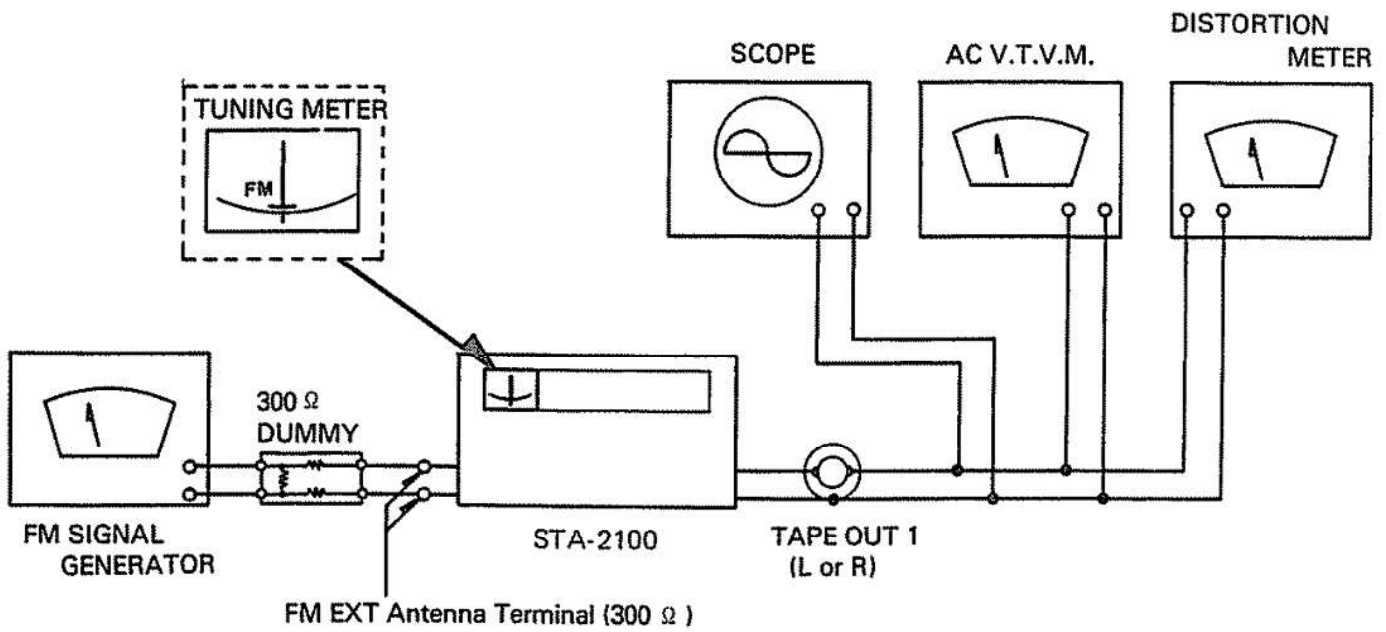


Figure 31

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 8% (6 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 Pin No. 22 of IF & MPX Board (Pin 12 of IC 205)	VR204	Adjust for 19 kHz \pm 50 Hz on Counter. Refer to Fig. 32.
2	Same as above	Composite MPX Signal 1 kHz on Left channel ONLY	AC Voltmeter connector for TAPE OUT 1 Jack of Right channel	VR203 (Separation)	Adjust for minimum reading on meter Refer to Fig. 33.
3	Same as above	Composite MPX Signal 1 kHz on Right channel ONLY	AC Voltmeter connector for TAPE OUT 1 Jack of Left channel	Same as above	Same as above
4	Repeat STEPs 2 and 3 until AC Voltmeter reading is at least -45 dB re same channel output. (ie. 45 dB separation)				
5	Same as STEP 1	Composite MPX Signal 1 kHz	AC Voltmeter connected to TAPE OUT 1 Jack	—	With 3 μ V antenna input signal, Stereo indicator lamp should come on.
6	Same as STEP 1	Composite MPX Signal 1 kHz	Distortion Meter Connected to TAPE OUT 1 Jack	—	With 1 mV antenna input signal, Stereo Distortion should be less than 0.35%.

FM STEREO ALIGNMENT SET-UP

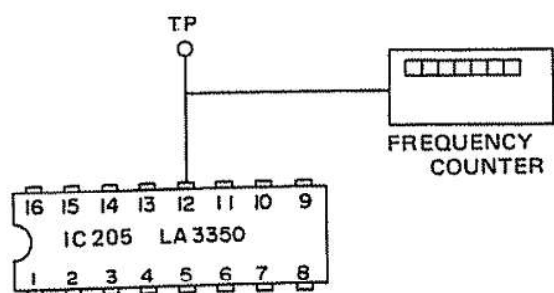


Figure 32

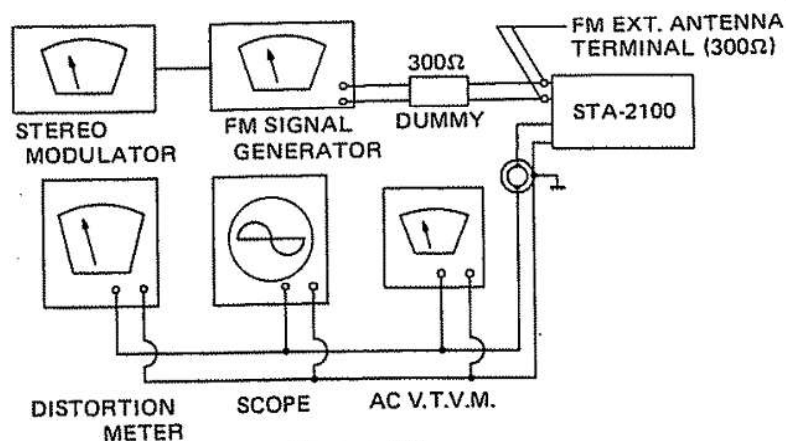


Figure 33

(8) BRIEF DESCRIPTION OF PROTECTOR CIRCUITS

1. Inrush Current Protective Circuit

When you switch Power "ON", the indicator LED will light up red. At first, AC voltage is provided to Power Transformer through R1306, and after 0.2 second, TR1301 will be turned on, and thus AC voltage is provided through Relay A.

This is to protect the Power Transformer T1401 from inrush current. This circuit is made up of Time Constant circuit R1302 and C1302. (Figure 34)

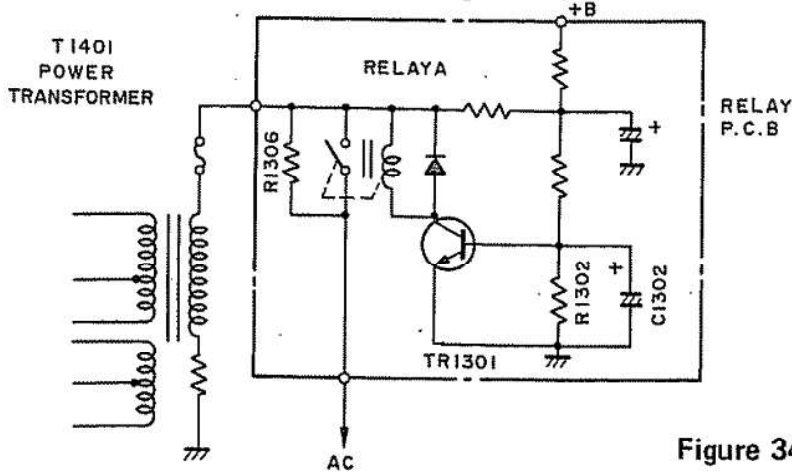


Figure 34

2. Speaker Protective Circuit

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

This is to protect Speakers from switching transients.

With Power Switch "ON", TR601, 602 and 603 will be turned on through Time Constant circuit R601 and C601. And indicator LED will change to green.

3. Main Amp Protective Circuit

If center voltage of Main Amp goes to ± 5 V (Natural Condition: within ± 15 mV) TR604, 605 and 606 will be turned on, and thus TR601, 602 and 603 will be turned off. If this should occur, Relay B will shut off output to the Speaker terminals and output will drop to zero and thus protect Main Amp and Speakers. In this case, indicator LED will turn to red. (Figure 35)

Note: To prevent AC voltages from upsetting these circuits, capacitors C602 and 603 have been incorporated. If AC voltage is applied to the base of TR604 and 605, it will be grounded through C602 and 603: thus TR604 and 605 are immune to AC voltages.

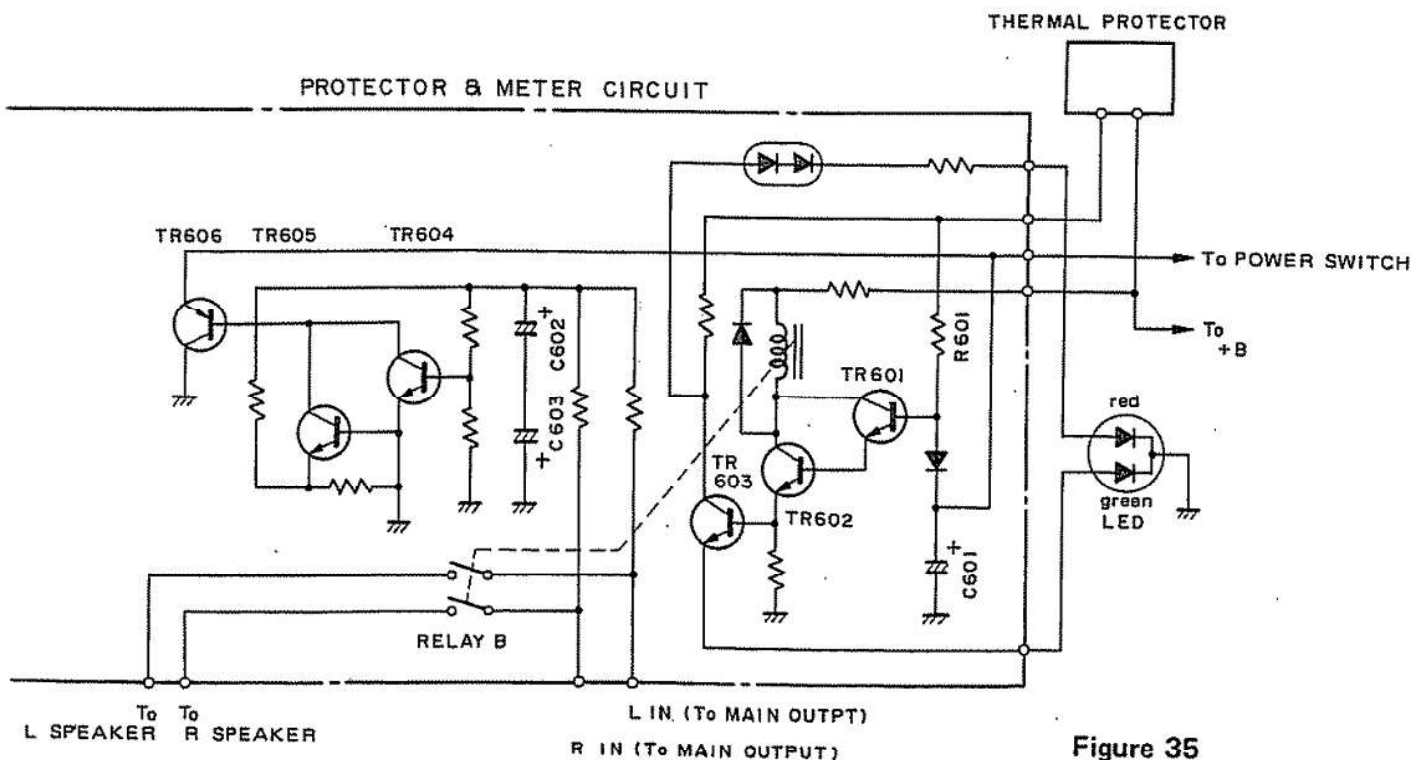


Figure 35

4. Main Amp Limiting Circuit

If Speaker terminals are shorted, the output line (© line of Figure 36A) is grounded and excessively high current flows from collector to emitter of TR509A (TR509B) and TR510A (TR510B), and a high voltage will appear across R529A (R529B) and R530A (R530B). This high voltage goes to base of TR513A (TR513B) and TR514A (TR514B).

When the voltage between base and emitter increases to about 0.6 V, TR513A (TR513B) and TR514A (TR514B) will be turned on.

High current (input signal of TR507A [TR507B] and TR508A [TR508B]) flows from collector to emitter of TR513A (TR513B) and TR514A (TR514B) through D505A (D505B) and D506A (D506B), and collector-to-emitter current of TR509A (TR509B) and TR510A (TR510B) will drop as Figure 36B (from © to ©', from © to ©') because of the output current limiting, and thus protect Power Transistors TR509A (TR509B), TR510A (TR510B) and TR511A (TR511B), TR512A (TR512B).

If this should occur, turn off the Receiver.

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

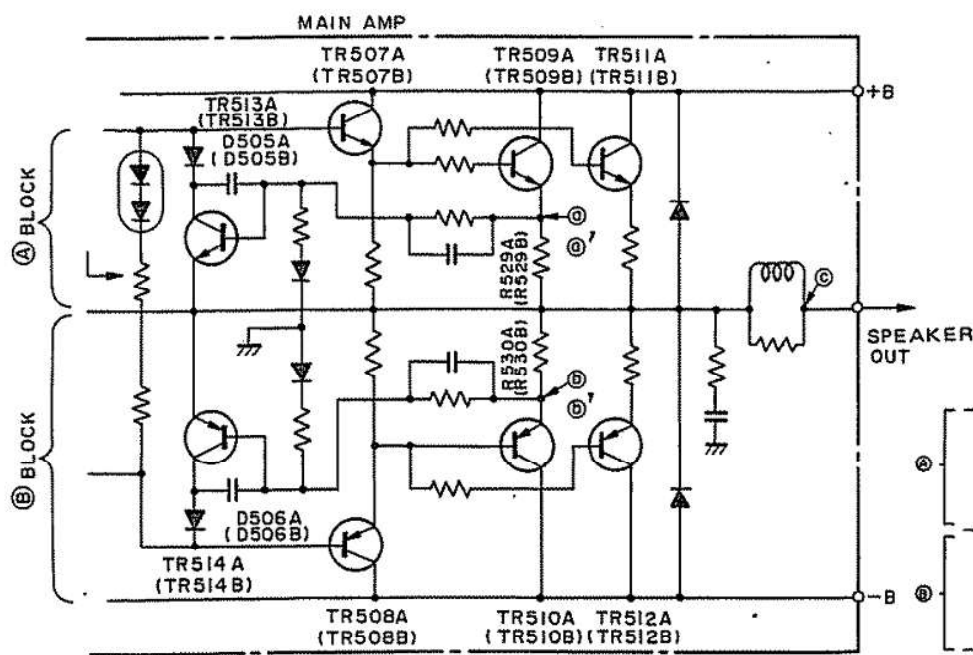


Figure 36A

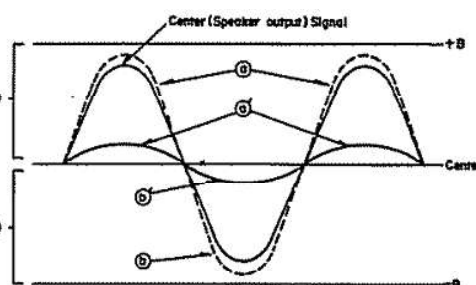


Figure 36B

5. Abnormal Temperature Rise Protection

If the temperature of Main Amp Heat Sink rises to 95°C, the thermal protector switch is shut off and TR601, 602 and 603 will be turned off, and Relay B will shut off.

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

If this should occur, turn the Receiver "OFF". When the temperature of the Main Amp Heat Sink falls to within the operating limits of the Receiver, the Thermal Protector switch will reset itself. When the problem is corrected, turn the Receiver on again. (Figure 35)

6. FM Noise and Switching/Muting Circuit

This circuit performs two functions.

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

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

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

The switch Ss-8 is a shorting type, goes through a short-circuit condition when turning from 1 (AM) to 2 (FM), etc. (it is momentarily grounded). This turns TR1501 off and TR1502 on. Thus, REED Relay is activated and output is cut off. The time constant of R1504 and C1502 allows the cut off condition to last for about one second (before C1502 charges up to a point where TR1501 turns on again, etc.). (Figure 37)

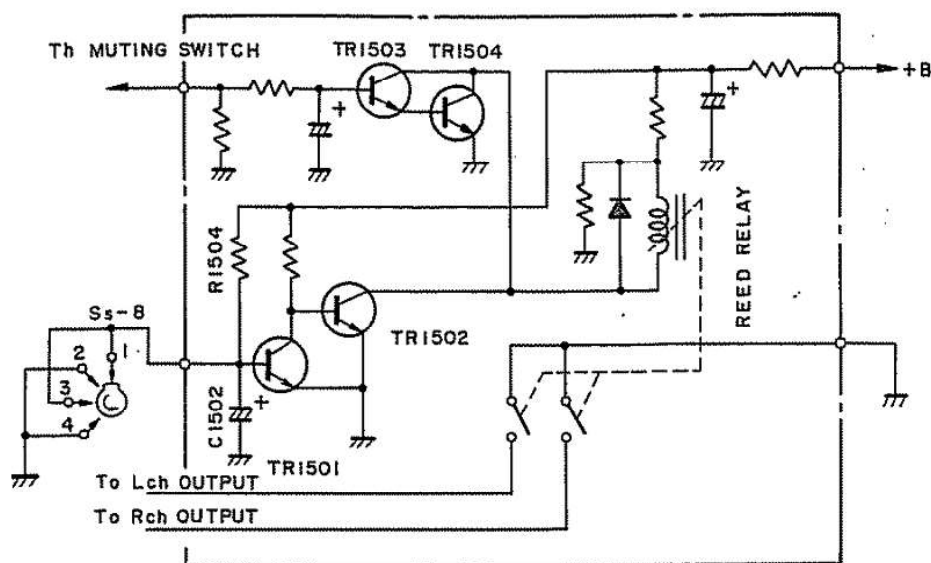


Figure 37

(9) TROUBLESHOOTING

SYMPTOM	CAUSE/REMEDY
1) No output	<ol style="list-style-type: none"> 1. Faulty AC power cord <ul style="list-style-type: none"> • Replace the cord. 2. Defective POWER switch <ul style="list-style-type: none"> • Replace the switch. 3. Broken wire in the Power Transformer <ul style="list-style-type: none"> • Replace the Transformer. 4. Blown Primary Fuse <ul style="list-style-type: none"> • Replace the Fuse. 5. Defective D1401 or diodes, transistors on Power Supply board <ul style="list-style-type: none"> • Replace the defective part(s). 6. Defective Relay A on RELAY Board <ul style="list-style-type: none"> • Replace the Relay.
2) Pilot Lamp does not light for SELECTOR. (AM, FM, PHONO 1, PHONO 2 or AUX)	<ol style="list-style-type: none"> 1. Broken Lamp <ul style="list-style-type: none"> • Replace the Lamp. 2. Open in the Power Transformer tertiary winding <ul style="list-style-type: none"> • Replace the Transformer. 3. Defective diode D703 <ul style="list-style-type: none"> • Replace the diode.
3) Pilot Lamp lights but no Speaker output.	<ol style="list-style-type: none"> 1. Defective capacitor C1405 or C1406 <ul style="list-style-type: none"> • Replace the defective capacitor(s). 2. Defective Rectifier D1401 <ul style="list-style-type: none"> • Replace the defective Rectifier. 3. Defect in the Power Transformer secondary winding <ul style="list-style-type: none"> • Replace the Power Transformer. 4. Defective Relay B on Protector Board <ul style="list-style-type: none"> • Replace the Relay.

SYMPTOM	CAUSE/REMEDY
4) Blows Fuse.	<ol style="list-style-type: none"> 1. Defective Rectifier D1401 <ul style="list-style-type: none"> • Replace the Rectifier. 2. Short circuit in the rectifier circuit <ul style="list-style-type: none"> • Remove the short. 3. Short circuit in Power Transistor Circuitry TR507A-512A or TR507B-TR512B <ul style="list-style-type: none"> • Repair circuit and/or replace the defective Transistor. 4. Defective Relay B or Transistors on Protector board <ul style="list-style-type: none"> • Replace the part(s).
5) "A" Speakers do not work.	<ol style="list-style-type: none"> 1. Speaker switch A defective <ul style="list-style-type: none"> • Replace the switch.
6) "B" Speakers do not work.	<ol style="list-style-type: none"> 1. Speaker switch B defective <ul style="list-style-type: none"> • Replace the switch.
7) 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 VR1001a/1001b.	<ol style="list-style-type: none"> 1. Defective Transistor TR401A-405A, 501A-512A or TR401B-405B, 501B-512B or TR601-606 <ul style="list-style-type: none"> • Replace the defective Transistor(s). 2. Defective resistor or capacitor of TONE, MAIN AMP or PROTECTOR circuit <ul style="list-style-type: none"> • Replace the defective part(s).
8) No output when a test signal is applied to the input terminals except PHONO 1 or 2.	<ol style="list-style-type: none"> 1. Defective MONO-Stereo or TAPE switch <ul style="list-style-type: none"> • Replace or repair the switch. 2. Defective Selector switch <ul style="list-style-type: none"> • Replace the switch.
9) No output when a test signal is applied to the PHONO 1 input terminals.	<ol style="list-style-type: none"> 1. Defective transistor, resistor or capacitor of PRE AMP circuit <ul style="list-style-type: none"> • Replace the part(s). 2. Defective MONO-Stereo or TAPE switch <ul style="list-style-type: none"> • Replace or repair the switch. 3. Defective Selector switch <ul style="list-style-type: none"> • Replace the Selector switch. 4. Defective R1201A, 1202A, or 1201B, 1202B <ul style="list-style-type: none"> • Replace the defective part(s).
10) No output when a test signal is applied to the PHONO 2 input terminals.	<ol style="list-style-type: none"> 1. Defective transistor, resistor or capacitor of PRE AMP circuit <ul style="list-style-type: none"> • Replace the part(s). 2. Defective MONO-Stereo or TAPE switch <ul style="list-style-type: none"> • Replace or repair the switch. 3. Defective Selector switch <ul style="list-style-type: none"> • Replace the Selector switch.
11) No output when a test signal is applied to the desired input.	<ol style="list-style-type: none"> 1. Defective transistors or diodes on Power Supply board <ul style="list-style-type: none"> • Replace the defective part(s). 2. Defective transistor, resistor or capacitor on Tone Control board <ul style="list-style-type: none"> • Replace the defective part(s). 3. Defective transistor, capacitor or resistor on Main Amp board <ul style="list-style-type: none"> • Replace the defective part(s).

SYMPTOM	CAUSE/REMEDY
12) DC not balanced within ± 20 mV at output of L/R channel.	<ol style="list-style-type: none"> 1. Defective TR501A, 502A or TR501B, 502B <ul style="list-style-type: none"> • Replace the defective transistor(s). 2. Improper value for VR501A or 501B <ul style="list-style-type: none"> • Replace or readjust the VR501A or 501B. 3. Defective zener diode D509A or 509B <ul style="list-style-type: none"> • Replace the defective diode(s).
13) Speaker works normally but Headphone does not work.	<ol style="list-style-type: none"> 1. Defective R611 (Left) or R612 (Right) <ul style="list-style-type: none"> • Change it. 2. Headphone plug does not mate with jack <ul style="list-style-type: none"> • Replace the plug.
14) All the inputs work normally except "AUX" input.	<ol style="list-style-type: none"> 1. Poor contact in "AUX" input jack <ul style="list-style-type: none"> • Repair or replace it. 2. Poor contact in Selector switch <ul style="list-style-type: none"> • Repair or replace the switch.
15) "PHONO 1" input not operative.	<ol style="list-style-type: none"> 1. Poor contact in "PHONO 1" input jack <ul style="list-style-type: none"> • Repair or replace it. 2. Faulty Selector switch <ul style="list-style-type: none"> • Repair or replace it. 3. Faulty PHONO Level switch <ul style="list-style-type: none"> • Replace the switch.
16) "PHONO 2" input not operative.	<ol style="list-style-type: none"> 1. Poor contact in "PHONO 2" input jack <ul style="list-style-type: none"> • Repair or replace it. 2. Faulty Selector switch <ul style="list-style-type: none"> • Repair or replace it.
17) "TAPE OUT 1" inoperative.	<ol style="list-style-type: none"> 1. Poor contact in "TAPE OUT 1" output jack <ul style="list-style-type: none"> • Repair or replace the jack.
18) "TAPE IN 1" inoperative.	<ol style="list-style-type: none"> 1. Poor contact in "TAPE IN 1" input jack <ul style="list-style-type: none"> • Repair or replace the jack.
19) "TAPE OUT 2" inoperative.	<ol style="list-style-type: none"> 1. Poor contact in "TAPE OUT 2" output jack <ul style="list-style-type: none"> • Repair or replace the jack.
20) "TAPE IN 2" inoperative.	<ol style="list-style-type: none"> 1. Poor contact in "TAPE IN 2" input jack <ul style="list-style-type: none"> • Repair or replace the jack.
21) No AM or FM (Tuner +B voltage is not 11-12V.)	<ol style="list-style-type: none"> 1. Broken tertiary winding in the Power Transformer <ul style="list-style-type: none"> • Replace the Transformer. 2. Defective Diode D702 <ul style="list-style-type: none"> • Change the defective Diode(s). 3. Faulty capacitor C716, 717, 718 or 719 <ul style="list-style-type: none"> • Change the defective capacitor(s). 4. Defective resistor R721, 722 or 723 <ul style="list-style-type: none"> • Replace the resistor(s). 5. Zener Diode D704 defective <ul style="list-style-type: none"> • Replace the Diode. 6. Short-circuit in Tuner +B circuit <ul style="list-style-type: none"> • Repair the short. 7. Poor contact in Selector switch <ul style="list-style-type: none"> • Repair or replace it. 8. Defective Transistor TR705 <ul style="list-style-type: none"> • Replace the Transistor.

SYMPTOM	CAUSE/REMEDY
22) No FM	<ol style="list-style-type: none"> 1. Poor contact in Selector switch <ul style="list-style-type: none"> • Repair or replace it. 2. IC, Transistor, Diode, resistor, capacitor, Inductor or IFT of FM IF board defective <ul style="list-style-type: none"> • Replace the defective part(s). 3. FM Front End defective <ul style="list-style-type: none"> • Replace the Front End (This board comes assembled). 4. Faulty FM Antenna lead-in/circuitry <ul style="list-style-type: none"> • Replace or repair the Antenna lead-in/circuitry.
23) No AM	<ol style="list-style-type: none"> 1. Poor contact in Selector switch <ul style="list-style-type: none"> • Repair or replace switch. 2. IC, Transistor, Diode, IFT, resistor or capacitor of AM IF defective <ul style="list-style-type: none"> • Replace the defective part(s). 3. Bar-Antenna coil defective <ul style="list-style-type: none"> • Repair or replace it.
24) Poor FM sensitivity.	<ol style="list-style-type: none"> 1. FM Front End defective <ul style="list-style-type: none"> • Replace the Front End. 2. Defective IC201, 202, 203 or 204 <ul style="list-style-type: none"> • Replace the defective IC(s). 3. Defective ceramic filter CF201, 202 or 203 <ul style="list-style-type: none"> • Defective ceramic filter(s). 4. Defective T201 <ul style="list-style-type: none"> • Replace the defective detector coil.
25) Poor FM distortion.	<ol style="list-style-type: none"> 1. Defective T201 <ul style="list-style-type: none"> • Replace the defective detector coil. 2. Defective ceramic filter CF201, 202 or 203 <ul style="list-style-type: none"> • Replace the defective filter(s). 3. Defective IC IC201, 202, 203, or 204 <ul style="list-style-type: none"> • Replace the defective IC. 4. Defective L201 or L202 <ul style="list-style-type: none"> • Change the defective part(s).
26) Poor AM sensitivity.	<ol style="list-style-type: none"> 1. Defective L1402, L202, 203 or T202, 203 <ul style="list-style-type: none"> • Replace the defective part(s). 2. Defective IC206 <ul style="list-style-type: none"> • Replace the defective IC.
27) No FM MPX Separation	<ol style="list-style-type: none"> 1. Improper adjustment <ul style="list-style-type: none"> • Readjust VR203 and VR204. 2. IC205 of MPX board defective <ul style="list-style-type: none"> • Replace the IC. 3. VR203, 204 (Trimmer resistor) defective <ul style="list-style-type: none"> • Replace the Trimmer resistor. 4. Defective Transistor TR202, 203, 204 or 205 <ul style="list-style-type: none"> • Replace the defective Transistor.
28) No STEREO light or FM Stereo does not work.	<ol style="list-style-type: none"> 1. Broken STEREO indicator lamp <ul style="list-style-type: none"> • Replace the lamp. 2. Defective IC205 of MPX board <ul style="list-style-type: none"> • Change the defective IC. 3. Defective Transistor TR202, 203, 204 or 205 <ul style="list-style-type: none"> • Replace the defective Transistor(s). 4. VR 202, 203 defective <ul style="list-style-type: none"> • Replace the defective Trimmer resistor(s).

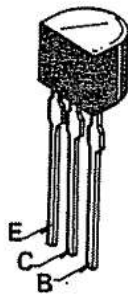
SYMPTOM	CAUSE/REMEDY
29) "LOUDNESS" has no effect.	1. Defective "LOUDNESS" switch <ul style="list-style-type: none"> • Replace the switch. 2. Defective C901A, R901A or C901B, R901B <ul style="list-style-type: none"> • Replace the defective part(s).
30) "Stereo-MONO" not effective.	1. Defective Stereo-MONO "MODE" switch <ul style="list-style-type: none"> • Repair or replace the switch.
31) "MUTING" not effective	1. Defective MUTE switch <ul style="list-style-type: none"> • Repair or replace the switch. 2. Defective Transistor TR201 or TR1501-1504 <ul style="list-style-type: none"> • Replace the defective Transistor(s). 3. Defective Trimmer resistor VR202 <ul style="list-style-type: none"> • Replace the Trimmer resistor. 4. Defective the part(s) of MUTING board <ul style="list-style-type: none"> • Replace the part(s).
32) "HI MPX FILTER" not effective.	1. Defective HI MPX FILTER switch <ul style="list-style-type: none"> • Repair or replace the switch. 2. Defective C903 or R904 <ul style="list-style-type: none"> • Replace the defective part(s).
33) "-10 dB ATTENUATOR" not effective.	1. Defective -10 dB ATTENUATOR switch <ul style="list-style-type: none"> • Repair or replace the switch. 2. Defective R1103A, 1104A, 1105 or R1103B, 1104B, 1106 <ul style="list-style-type: none"> • Replace the resistor(s).
34) "TAPE DUBBING 1 → 2" does not operate.	1. Defective TAPE DUBBING switch <ul style="list-style-type: none"> • Replace it.
35) "TAPE DUBBING 2 → 1" does not operate.	1. Defective TAPE DUBBING switch <ul style="list-style-type: none"> • Replace it.
36) "TAPE MONITOR 1" does not operate.	1. Defective TAPE MONITOR switch <ul style="list-style-type: none"> • Replace it.
37) "TAPE MONITOR 2" does not operate.	1. Defective TAPE MONITOR switch <ul style="list-style-type: none"> • Replace it.
38) "BASS" has no effect. (TURNOVER Switch to 300 Hz)	1. VR403(100K ohm control) defective <ul style="list-style-type: none"> • Replace it. 2. Defective R409A, 412A, 413A, C407A, 409A or R409B, 412B, 413B, C407B, 409B <ul style="list-style-type: none"> • Replace the defective part(s).
39) "BASS" has no effect. (TURNOVER Switch to 150 Hz)	1. VR403 (100K ohm control) defective <ul style="list-style-type: none"> • Replace it. 2. Defective R409A, 412A, 413A, C406A, 408A or R409B, 412B, 413B, C406B, 408B <ul style="list-style-type: none"> • Replace the defective part(s).
40) "TREBLE" has no effect. (TURNOVER Switch to 3 kHz)	1. Faulty VR401 (100K ohm control) <ul style="list-style-type: none"> • Replace it. 2. Defective R408A, 410A, 411A, C404A, 405A or R408B, 410B, 411B, C404B, 405B <ul style="list-style-type: none"> • Replace the defective part(s).

SYMPTOM	CAUSE/REMEDY
41) "TREBLE" has no effect. (TURNOVER Switch to 6 kHz)	1. Faulty VR401 (100K ohm control) <ul style="list-style-type: none"> • Replace it. 2. Defective R408A, 410A, 411A, C403A, 405A or R408B, 410B, 411B, C403B, 405B <ul style="list-style-type: none"> • Replace the defective part(s).
42) WATTs Meter does not work.	1. Defective WATT Meter L or/and R <ul style="list-style-type: none"> • Repair or replace the Meter. 2. Defective Diode, capacitor or resistor of Meter circuit <ul style="list-style-type: none"> • Replace the defective part(s). 3. Defective Trimmer resistor VR601, 602, VR604 or 605 <ul style="list-style-type: none"> • Replace the defective Trimmer resistor.
43) PROTECTOR circuit does not work.	1. Defective resistor or capacitor of PROTECTOR circuit <ul style="list-style-type: none"> • Replace the defective part(s). 2. Defective Diode D601, 602 or 603 <ul style="list-style-type: none"> • Replace the defective Diode(s). 3. Defective Transistor TR601-606 <ul style="list-style-type: none"> • Replace the defective Transistor(s). 4. Defective Relay B <ul style="list-style-type: none"> • Replace it.
44) "SIGNAL" Meter not functioning.	1. Defective SIGNAL Meter <ul style="list-style-type: none"> • Replace it. 2. In case of FM reception, D201, 202 or VR201 defective <ul style="list-style-type: none"> • Replace the defective part(s). 3. In case of AM reception, VR205 or R277 defective <ul style="list-style-type: none"> • Replace the defective part(s).
45) "TUNING" Meter not functioning.	1. Defective TUNING Meter <ul style="list-style-type: none"> • Replace it. 2. Defective R223 or C220 <ul style="list-style-type: none"> • Replace the defective part(s).
46) "FM 25 μ S" has no effect.	1. Defective "FM 25 μ S" switch <ul style="list-style-type: none"> • Replace the switch. 2. Defective C230, 231, R232, 233 or C904, 905 <ul style="list-style-type: none"> • Replace the defective part(s).
47) "LOW FILTER" has no effect.	1. Defective "LOW FILTER" switch <ul style="list-style-type: none"> • Replace the switch. 2. Defective R1101A, 1102A or R1101B, 1102B <ul style="list-style-type: none"> • Replace the defective part(s).
48) "HIGH FILTER" has no effect.	1. Defective "HIGH FILTER" switch <ul style="list-style-type: none"> • Replace the switch. 2. Defective C1101A or C1101B <ul style="list-style-type: none"> • Replace the defective part(s).

(10) IC & TRANSISTOR LEAD IDENTIFICATION



2SC 536
2SC1175
2SA 659



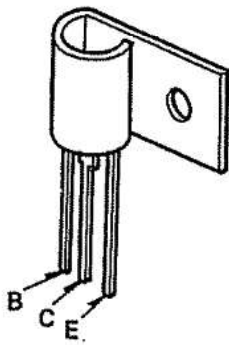
2SA 872



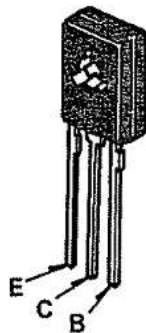
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2SC1222
2SA 750



2SD 571
2SB 605



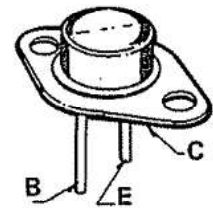
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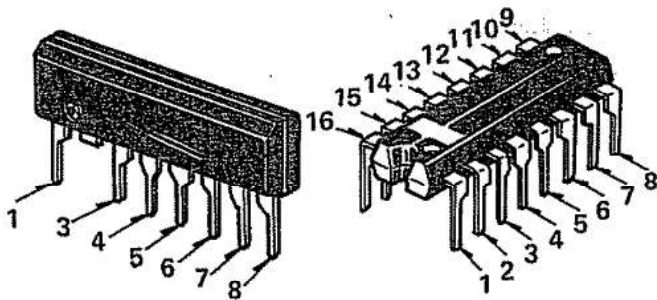
2SB 649A
2SD 668
2SD 669A



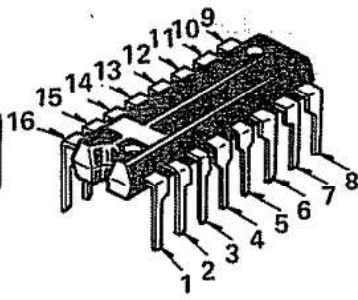
2SD 325



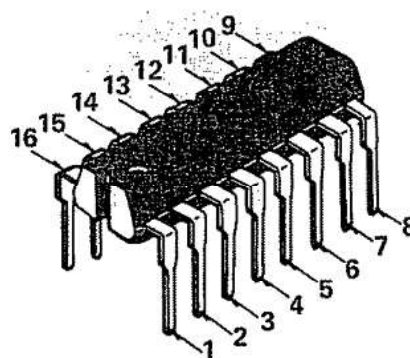
2SB 655
2SD 675



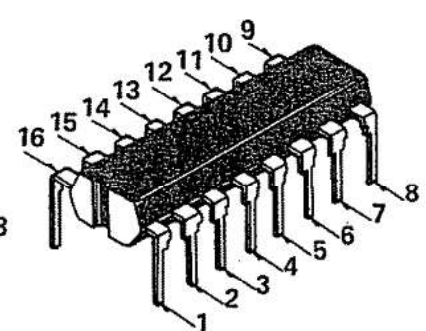
HA 1211



HA 1197



LA-1230



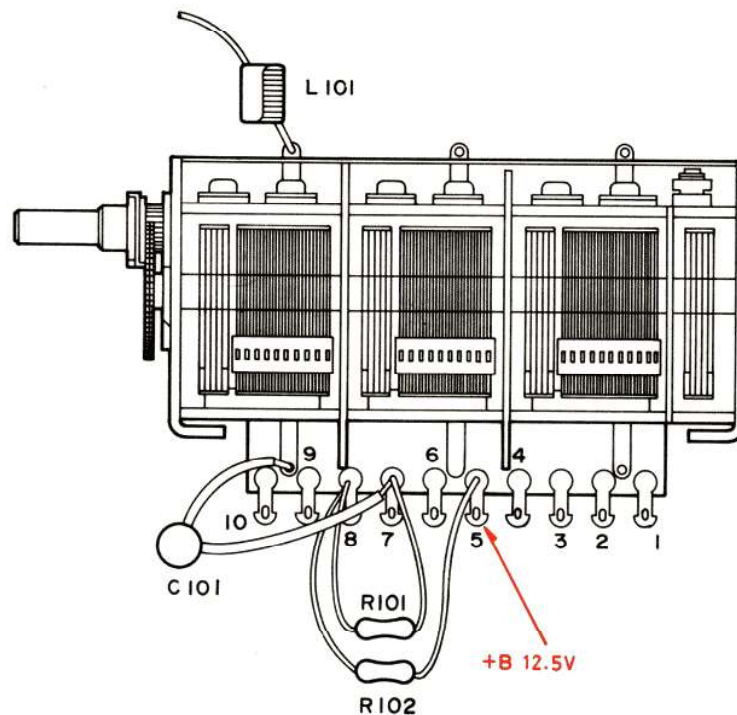
LA-3350

(11) THE VALUE SELECTED PARTS

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

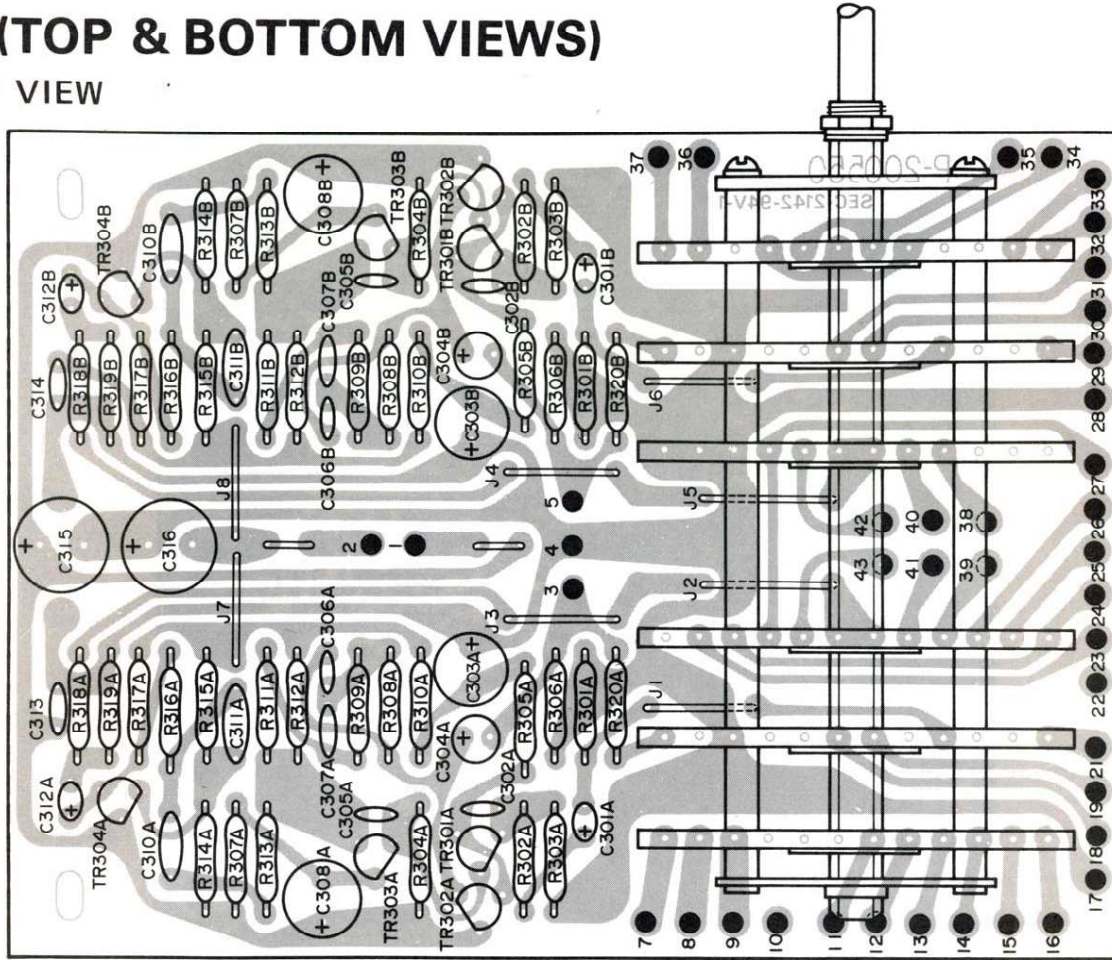
- R268 — This is to control AM IF output level. Use larger value to decrease AM IF output level.
- R232 — This is to control FM IF output level (R233-L ch, R232-R ch).
- R233 — Use larger value to decrease FM IF output level.
- R253 — This is to control FM Stereo Beacon sensitivity.
- R254 — For R253, use larger value to decrease Beacon sensitivity.
For R254, use larger value to increase Beacon sensitivity.
- R537A
- R537B — This is to control Limiting sensitivity for Main Amp.
- R538A — Use larger value to decrease Limiting sensitivity.
- R538B

(12) FRONT END ASSEMBLY

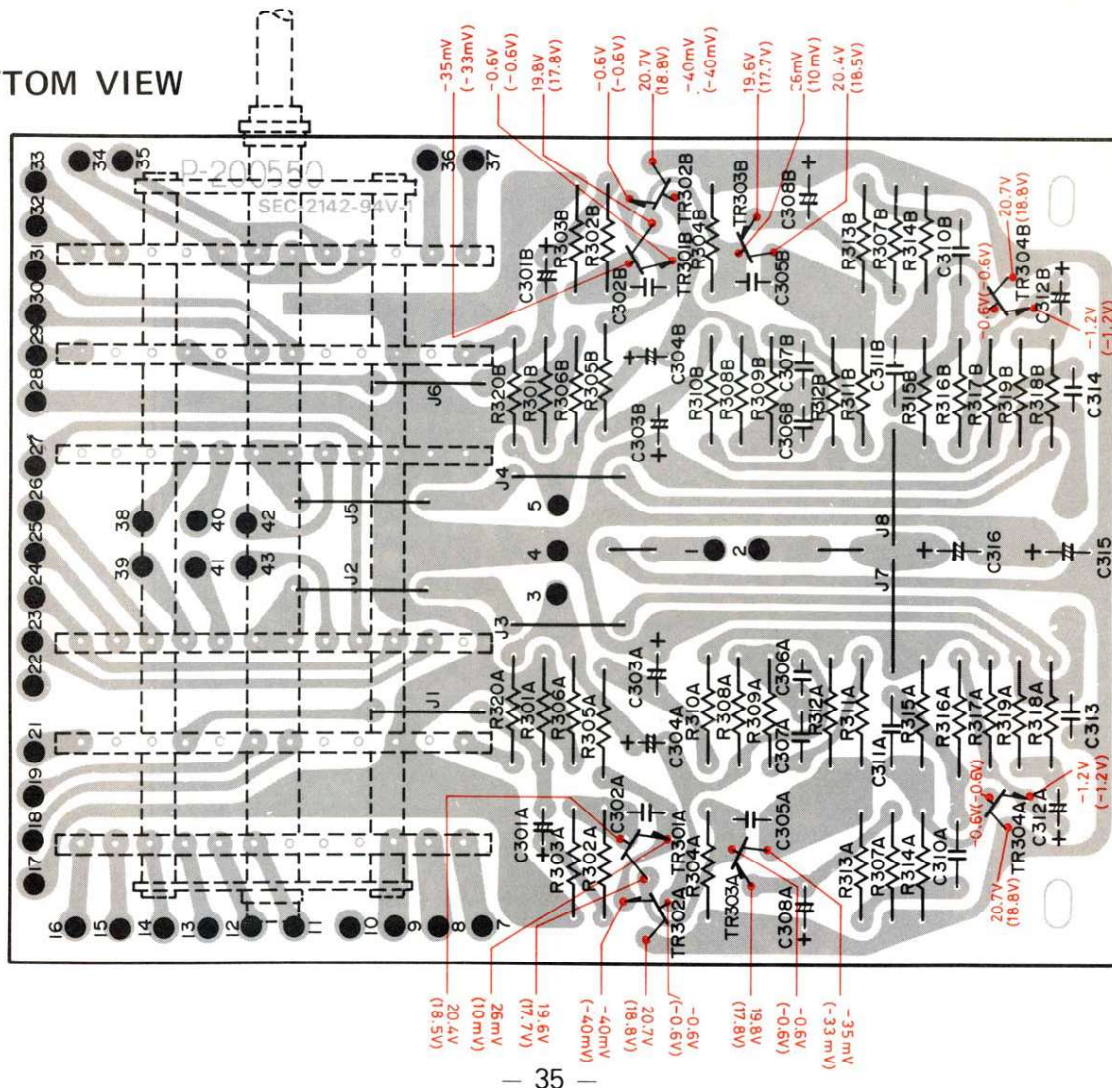


(13) PRE AMP WITH SELECTOR SWITCH P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW



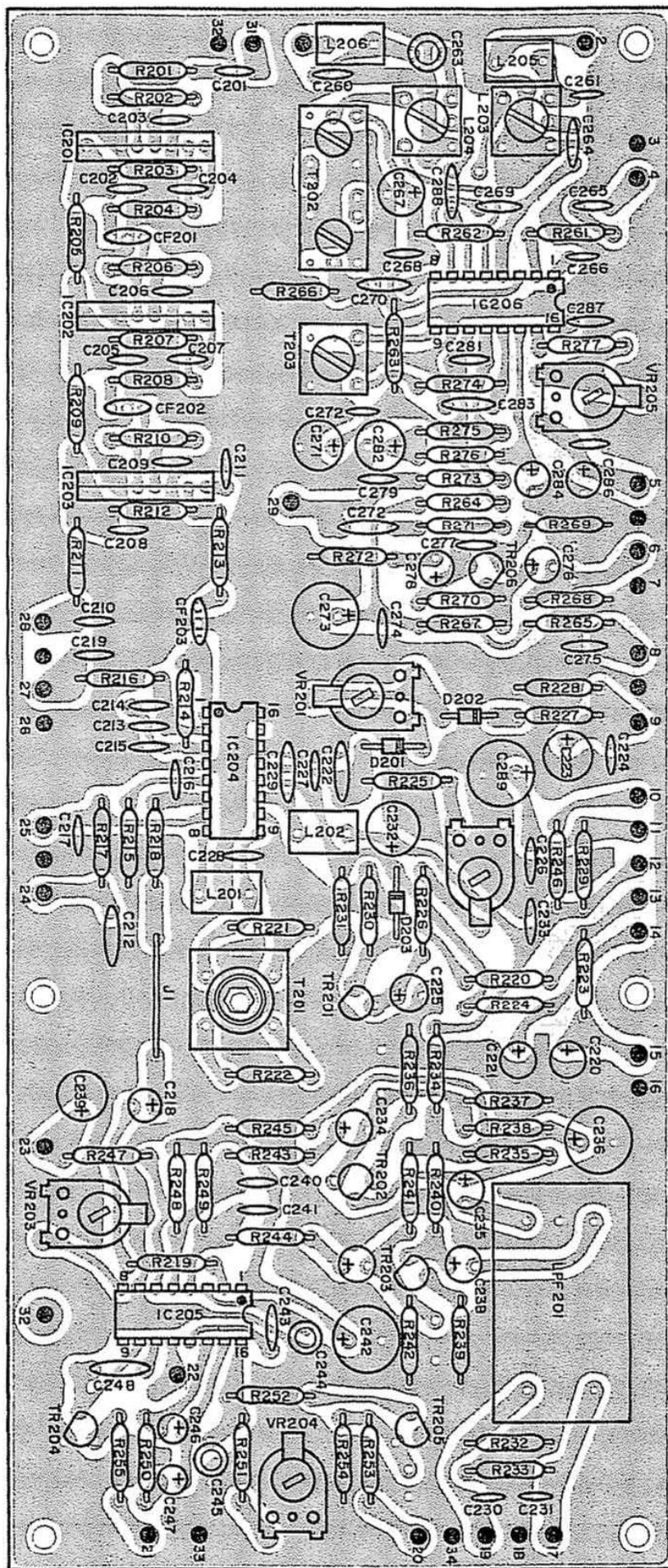
BOTTOM VIEW



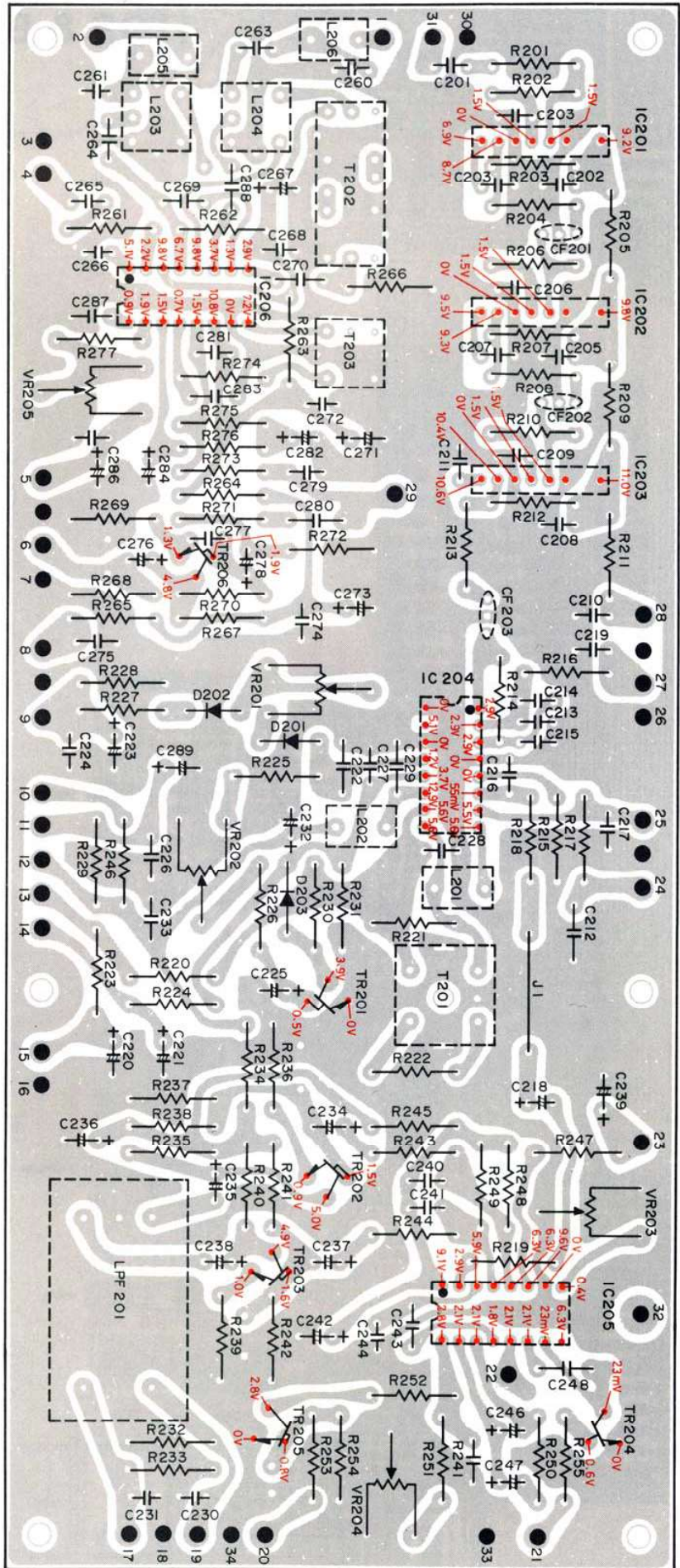
- Voltages are measured to chassis ground with a Voltmeter (Digital Voltmeter, over 10KΩ/V).
- Voltages are measured under two conditions: with no input and 120 watts (1 kHz) output power (inside parenthesis).

(14) AM/FM IF & MPX P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW



BOTTOM VIEW

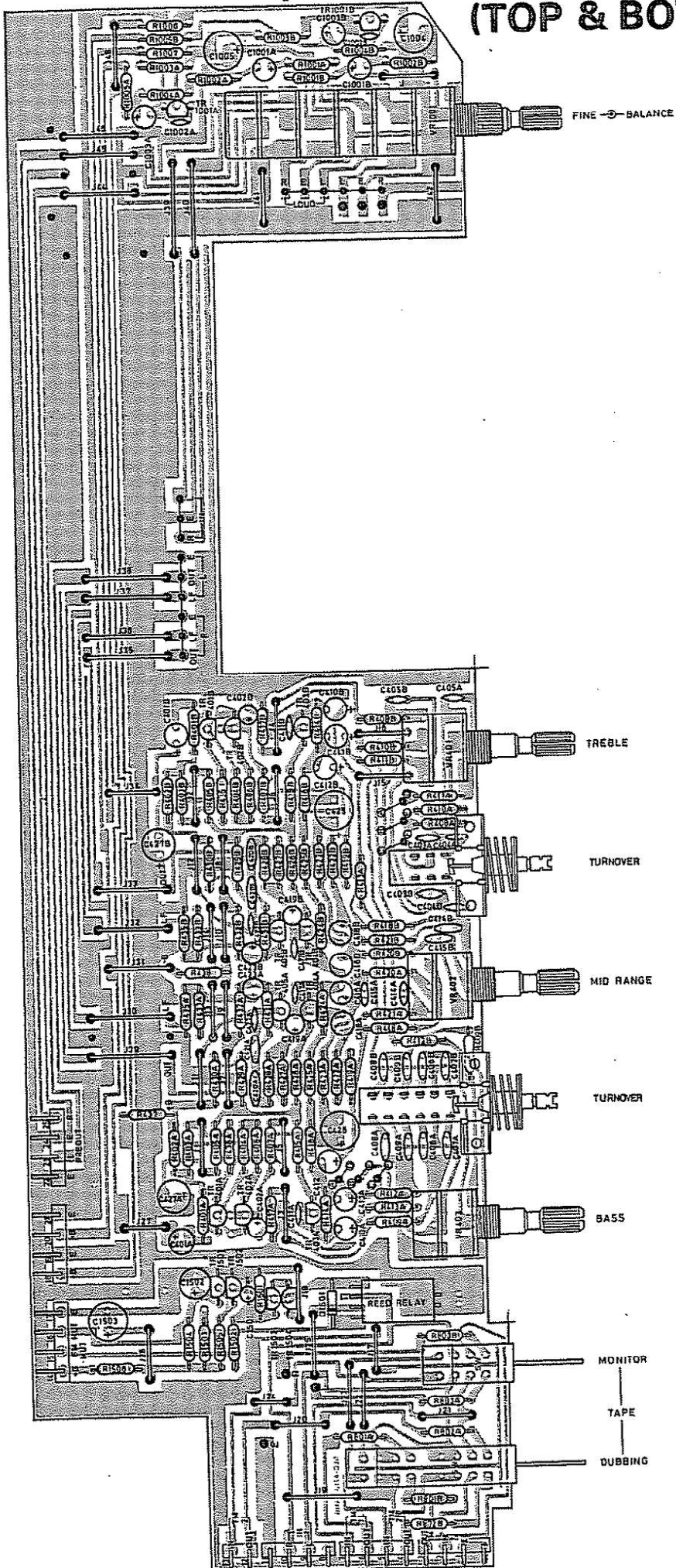


- Voltages are measured to chassis ground with a Voltmeter (Digital Voltmeter, over 10K Ω /V). with Receiver detuned.

(15) TONE AMP, MUTING, TAPE SWITCH P.C.B.

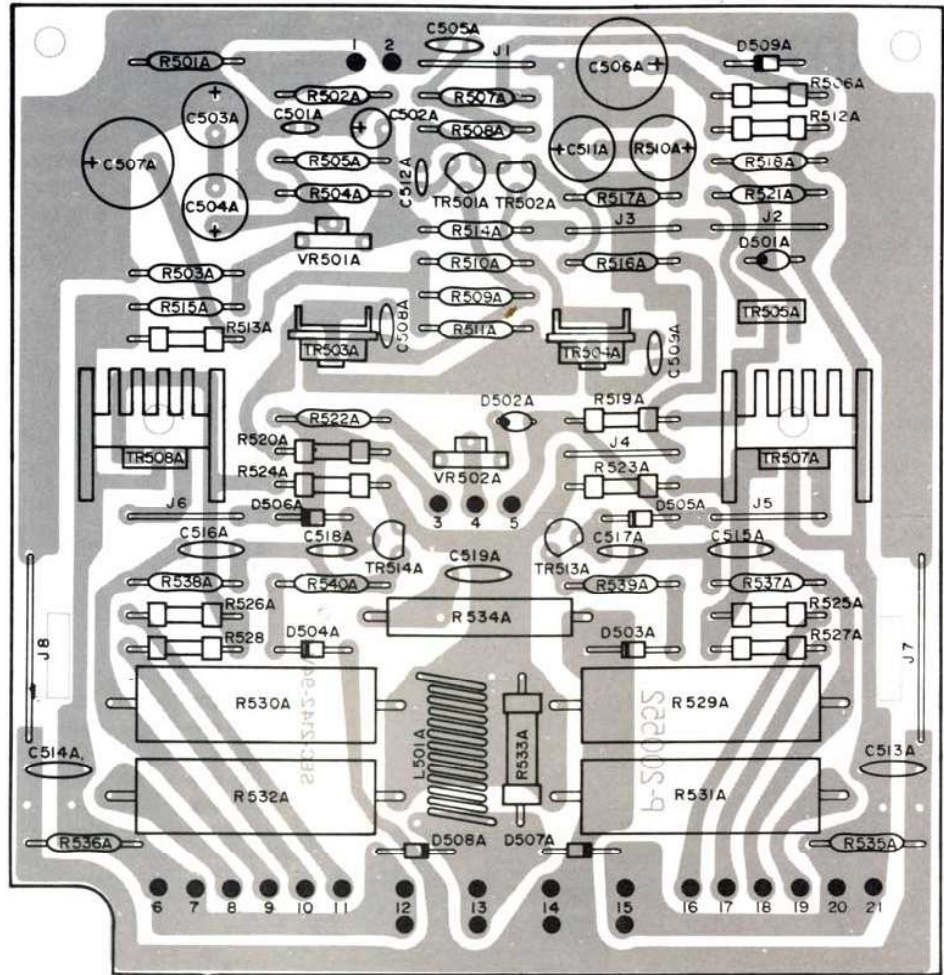
(TOP & BOTTOM VIEWS)

TOP VIEW

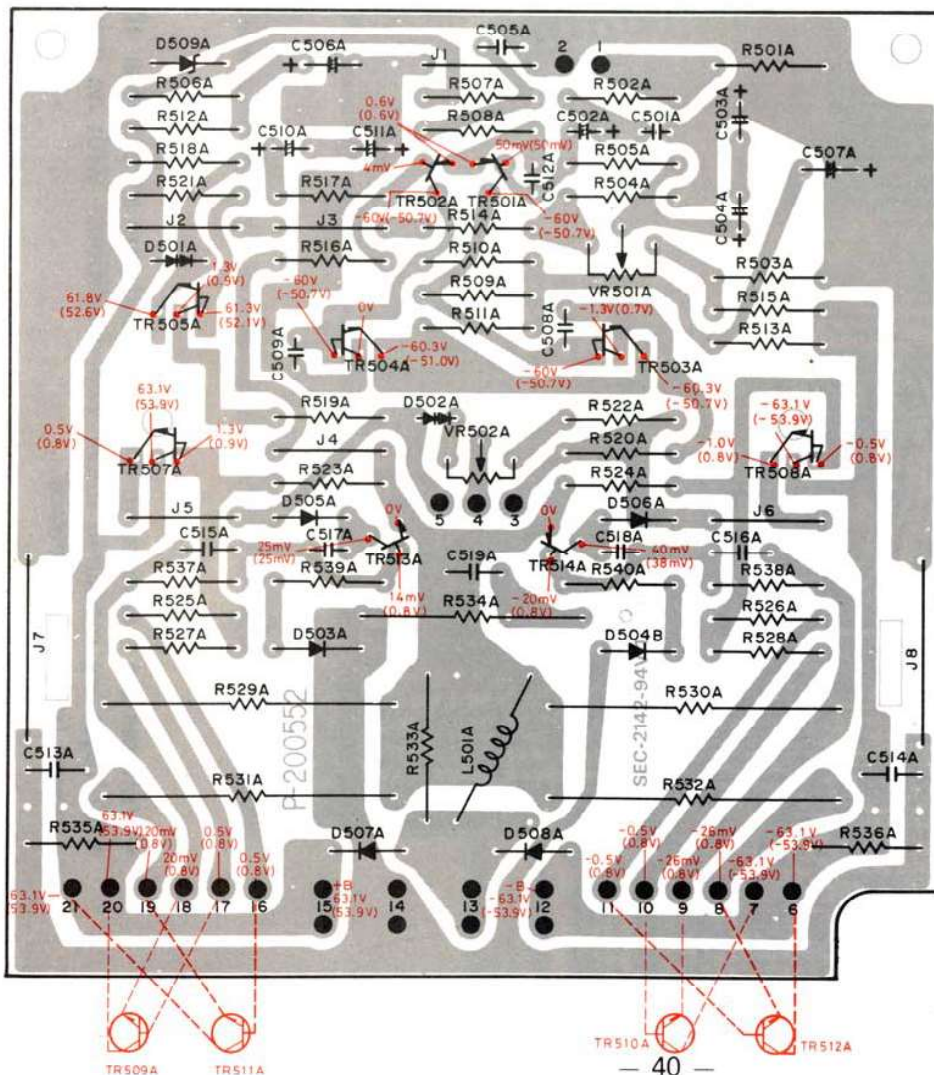


(16) MAIN AMP P.C.B. (LEFT) (TOP & BOTTOM VIEWS)

TOP VIEW



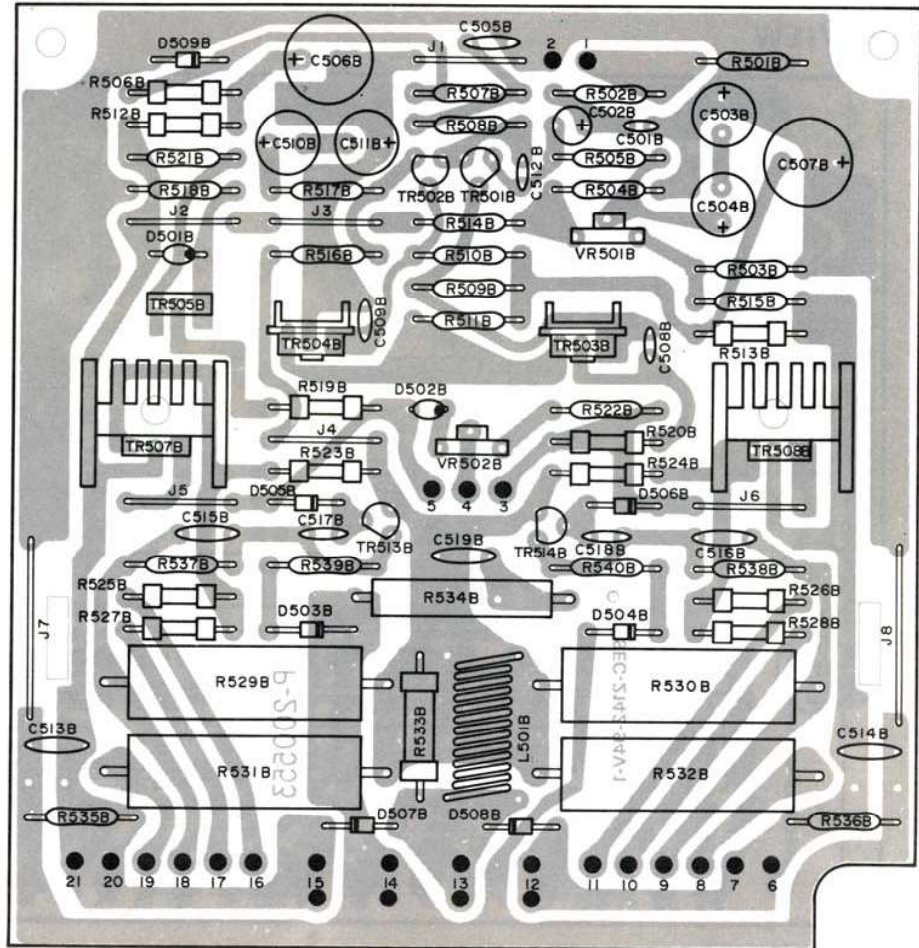
BOTTOM VIEW



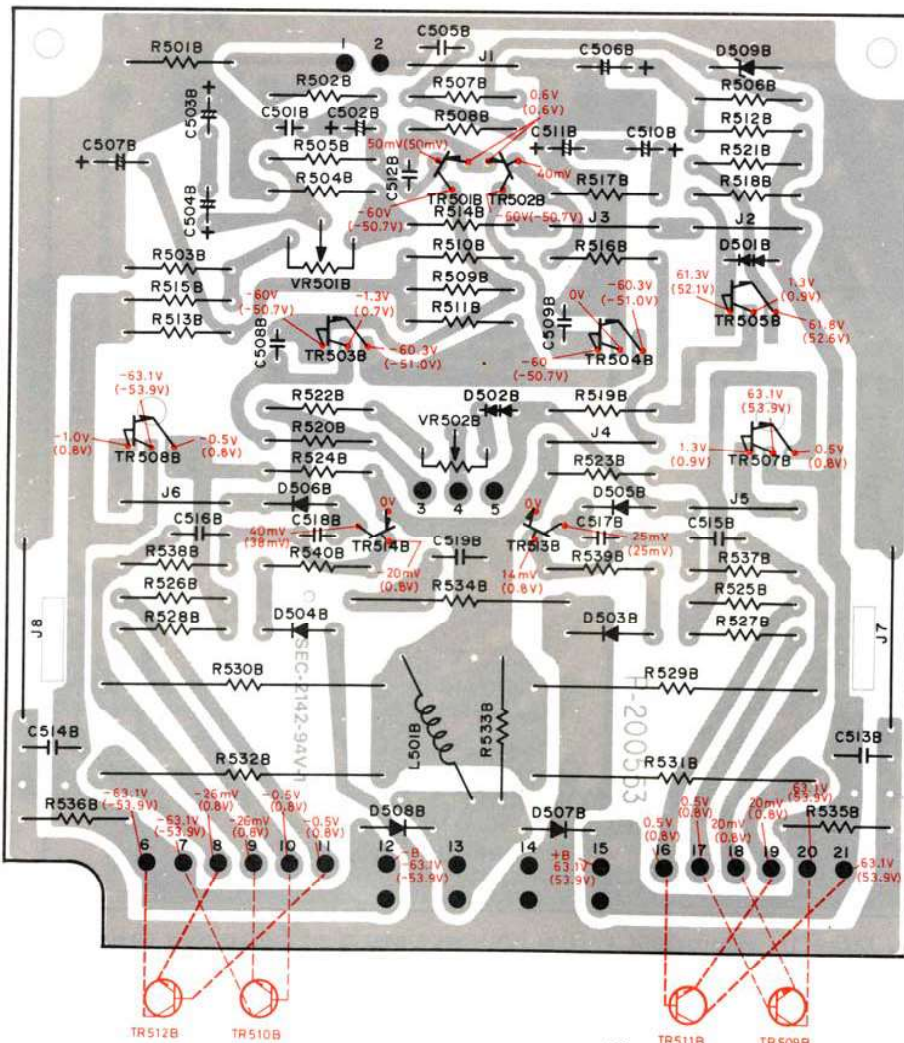
- Voltages are measured to chassis ground with a Voltmeter (Digital Voltmeter, over 10K Ω /V).
- Voltages are measured under two conditions: with no input and 120 watts (1 kHz) output power (inside parenthesis).

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

TOP VIEW



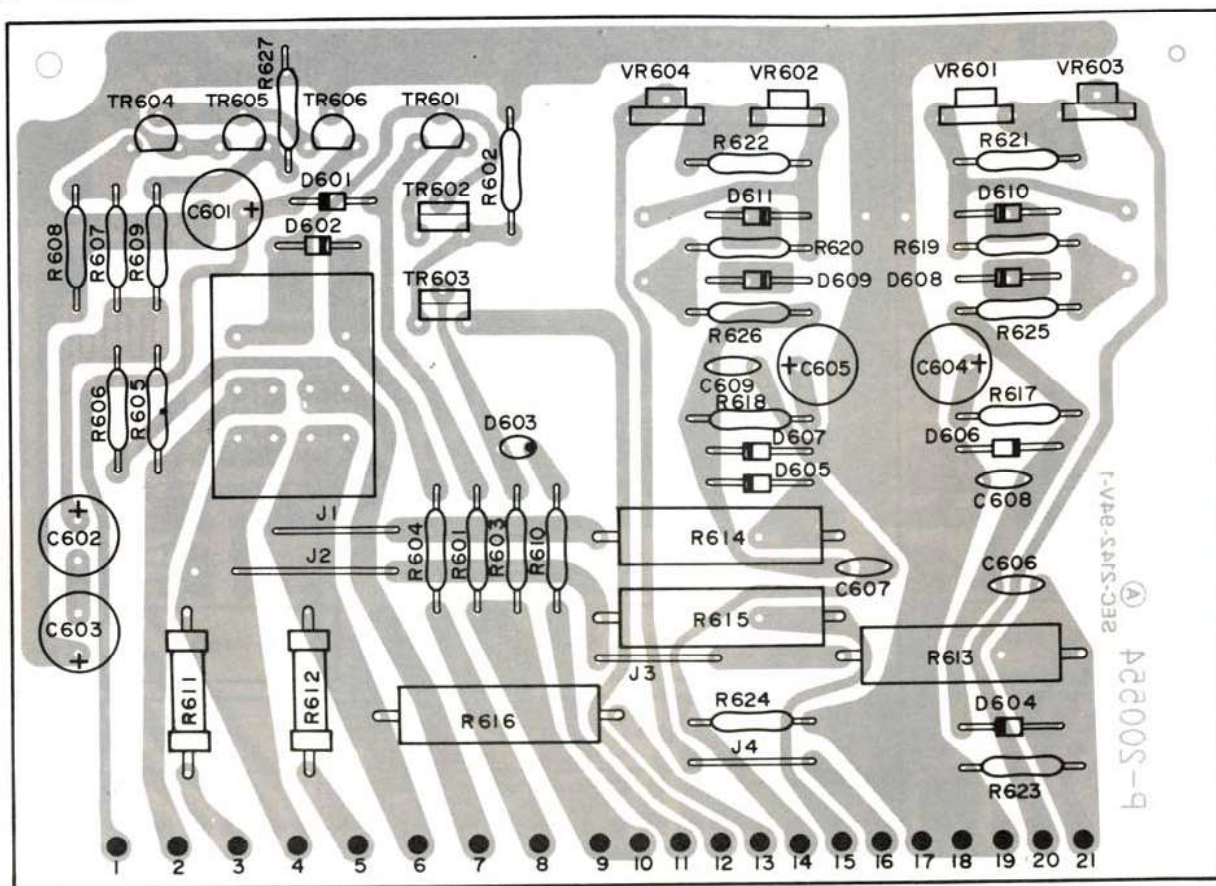
BOTTOM VIEW



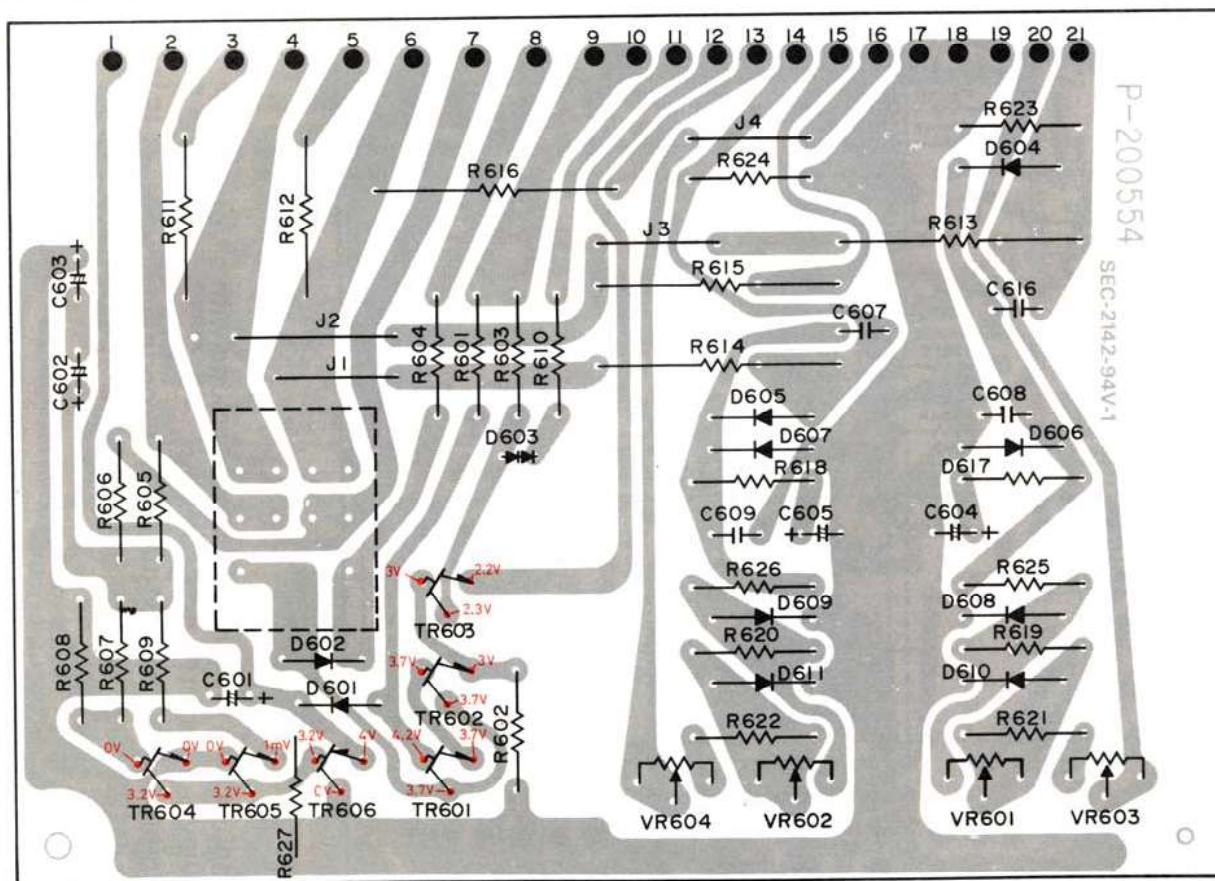
- Voltages are measured to chassis ground with a Voltmeter (Digital Voltmeter, over 10KΩ/V).
- Voltages are measured under two conditions: with no input and 120 watts (1 kHz) output power (inside parenthesis).

(18) PROTECTOR & METER P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW



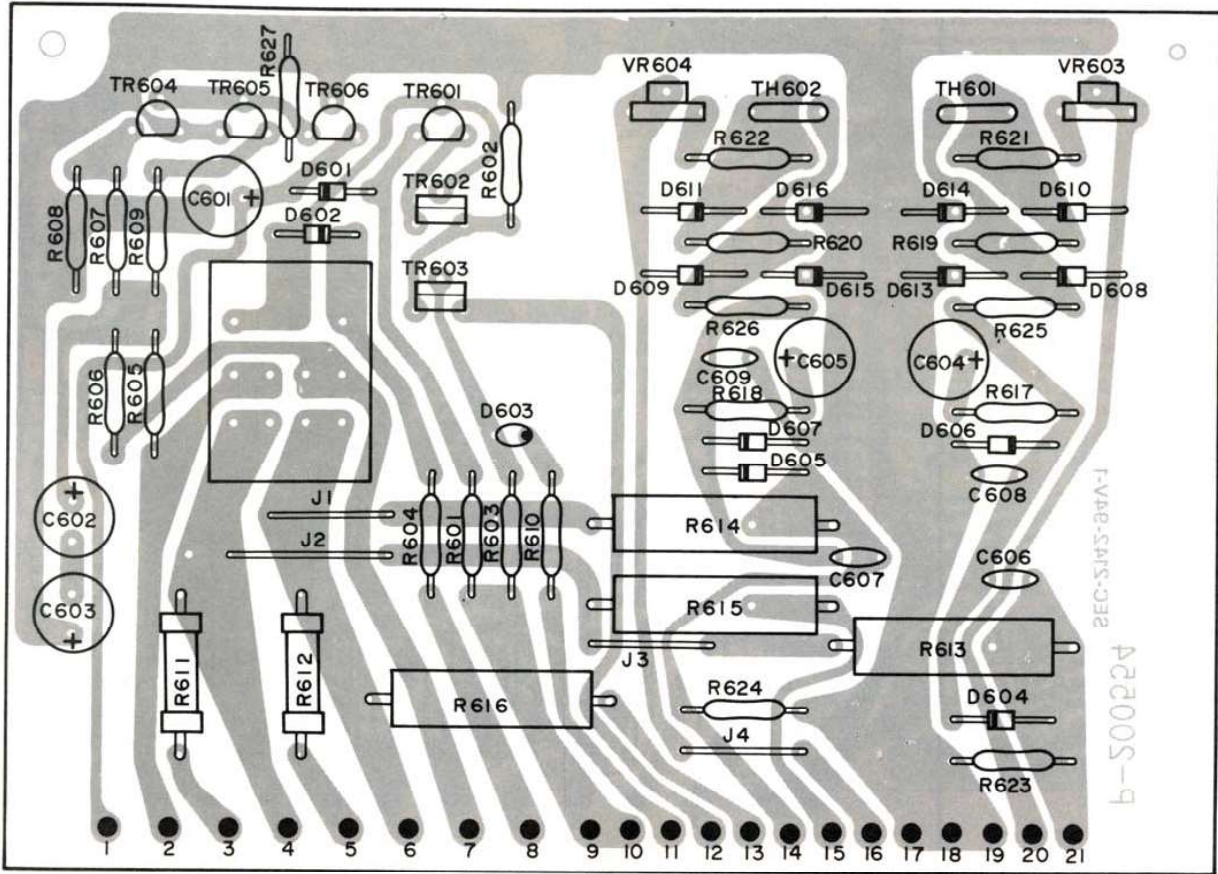
BOTTOM VIEW



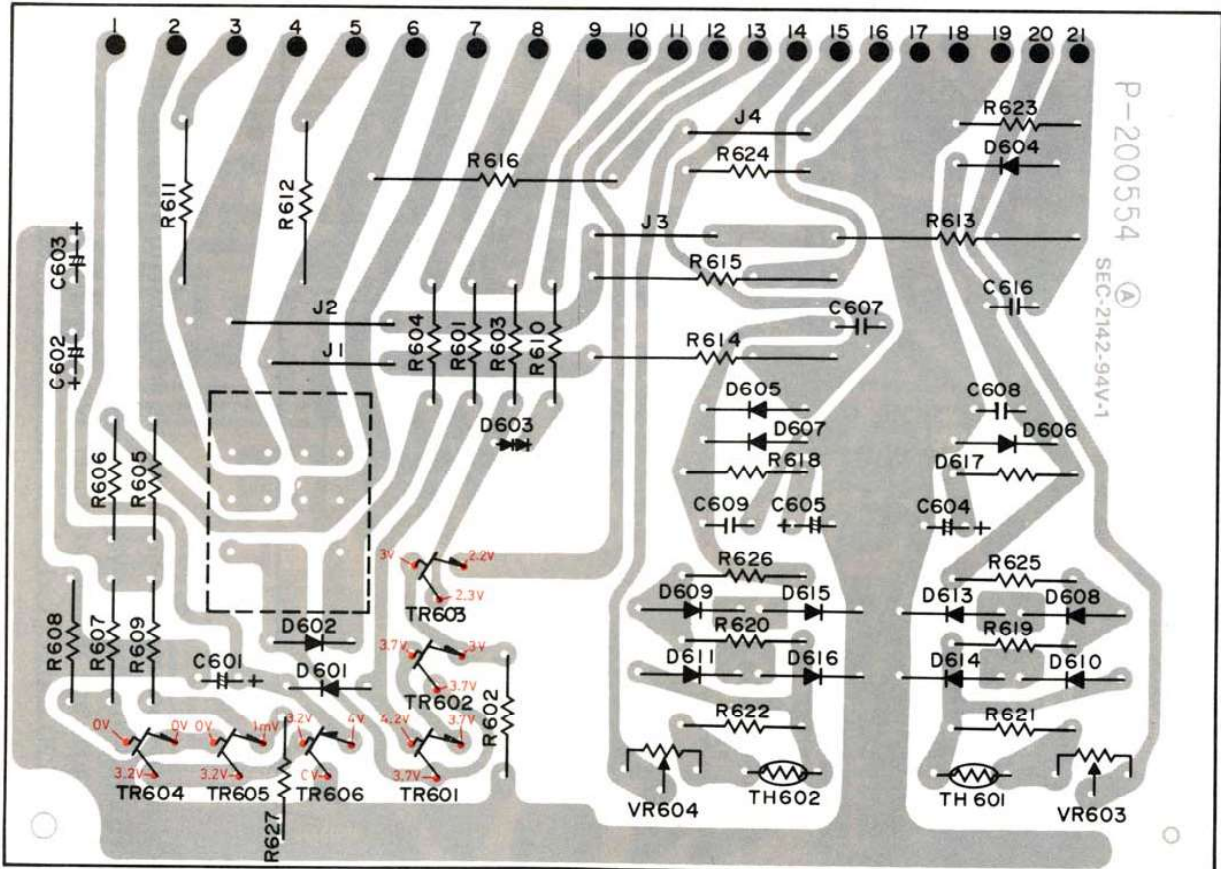
- Voltages are measured to chassis ground with a Voltmeter (Digital Voltmeter, over 10K Ω /V).
- Voltages are measured under two conditions: with no input and 120 watts (1 kHz) output power (inside parenthesis).

AFTER SERIAL NUMBER 111302

TOP VIEW



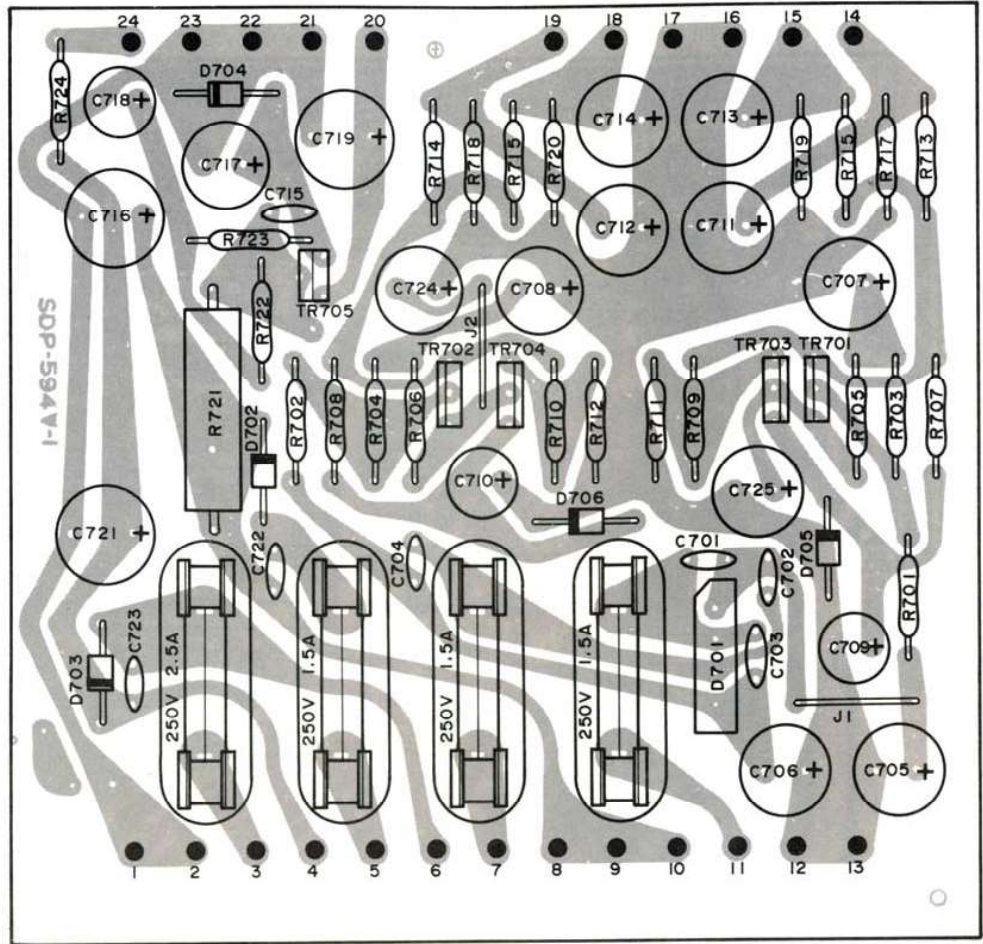
BOTTOM VIEW



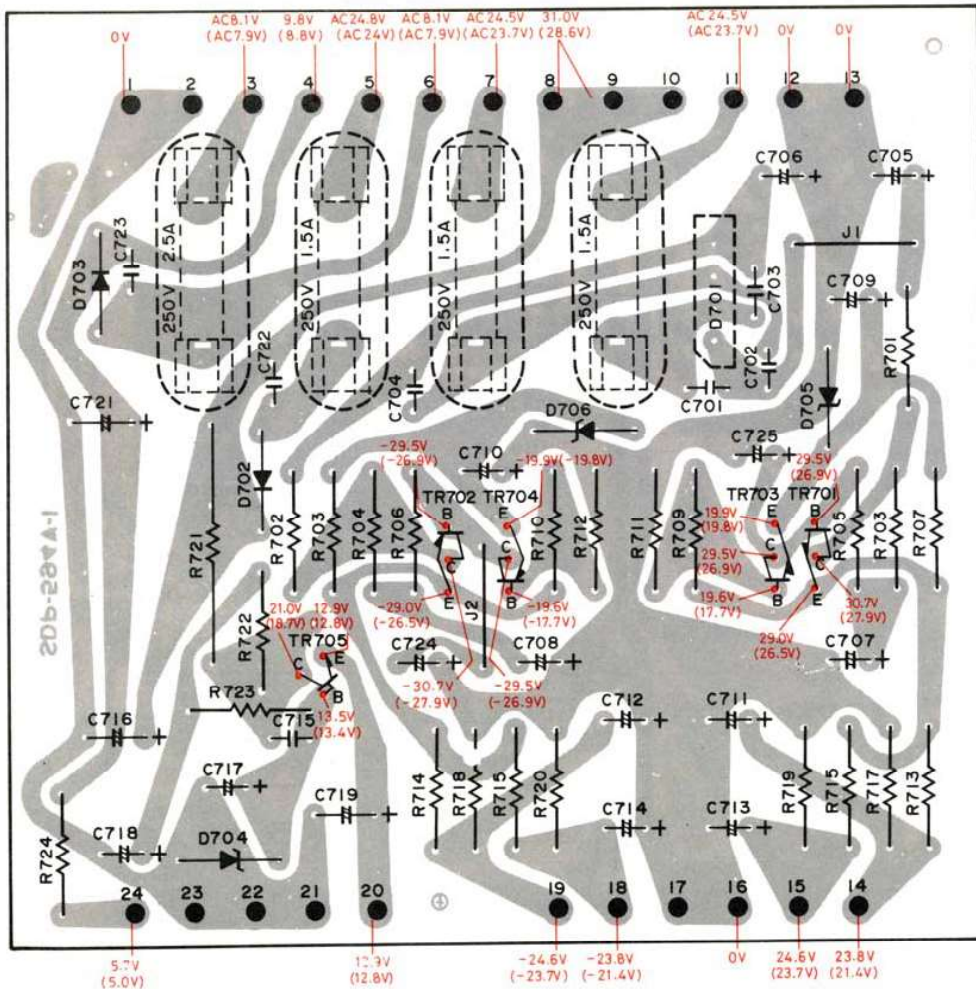
- Voltages are measured to chassis ground with a Voltmeter (Digital Voltmeter, over 10KΩ/V).
- Voltages are measured under two conditions: with no input and 120 watts (1 kHz) output power (inside parenthesis).

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

TOP VIEW



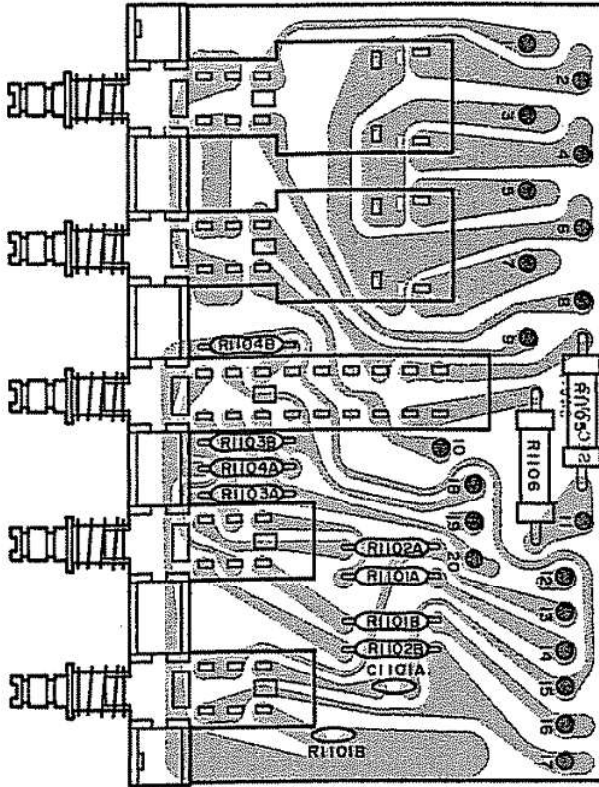
BOTTOM VIEW



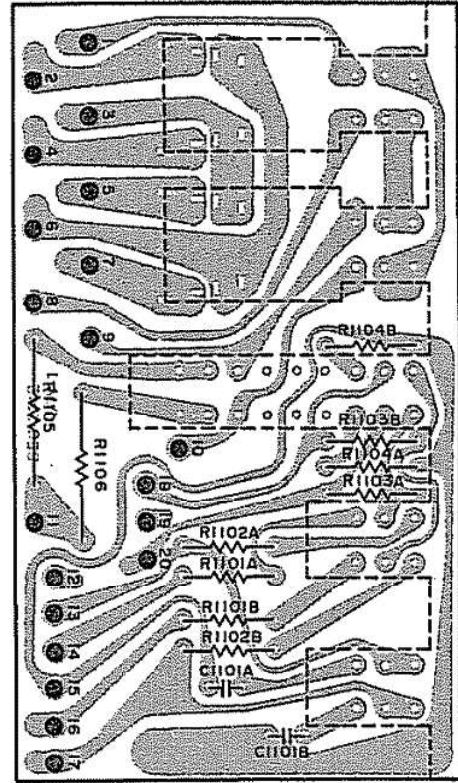
- Voltages are measured to chassis ground with a Voltmeter (Digital Voltmeter, over 10KΩ/V).
- Voltages are measured under two conditions: with no input and 120 watts (1 kHz) output power (inside parenthesis).

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

TOP VIEW

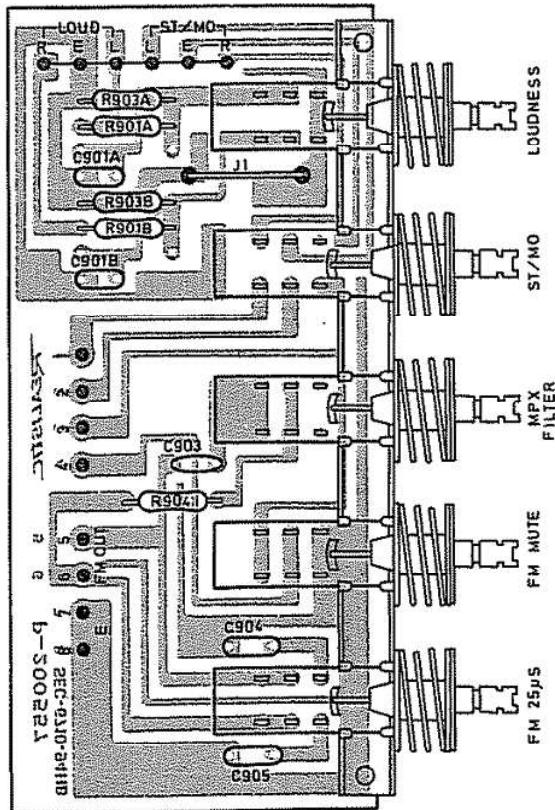


BOTTOM VIEW

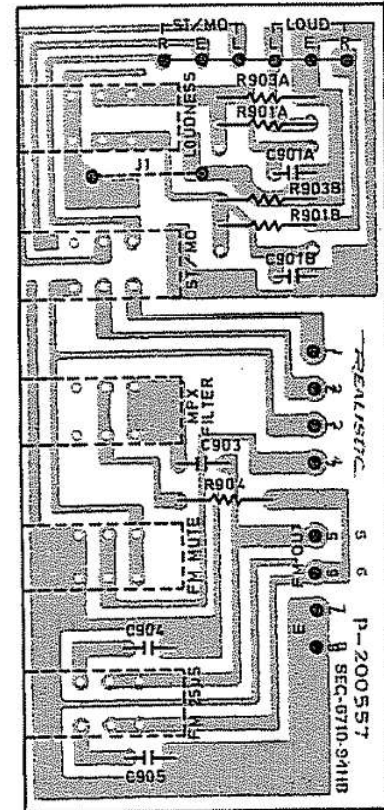


(21) MODE SWITCH P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

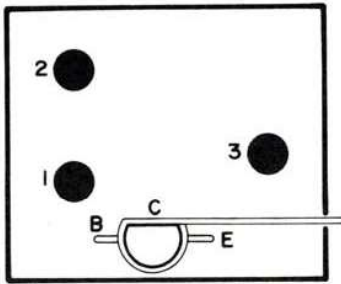


BOTTOM VIEW

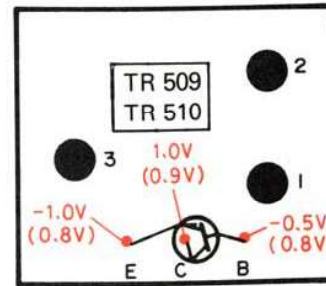


(22) MAIN SUB P.C.B. (LEFT & RIGHT) (TOP & BOTTOM VIEWS)

TOP VIEW

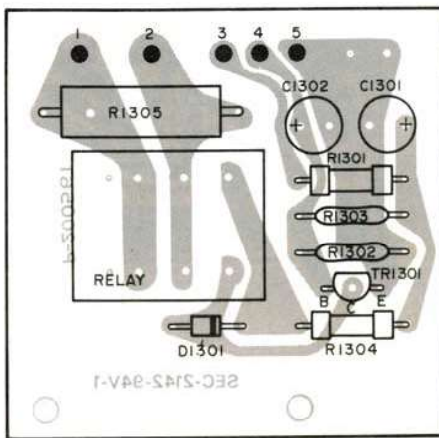


BOTTOM VIEW

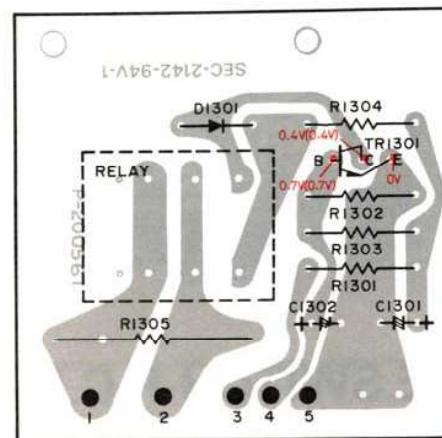


(23) RELAY P.C.B. (TOP & BOTTOM VIEWS)

TOP VIEW

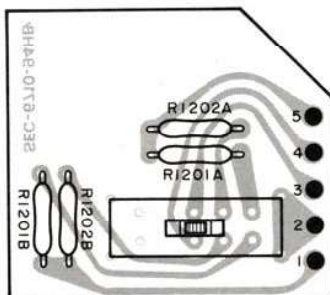


BOTTOM VIEW

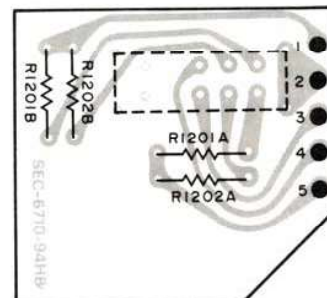


(24) PHONO LEVEL P.C.B. (TOP & BOTTOM VIEWS)

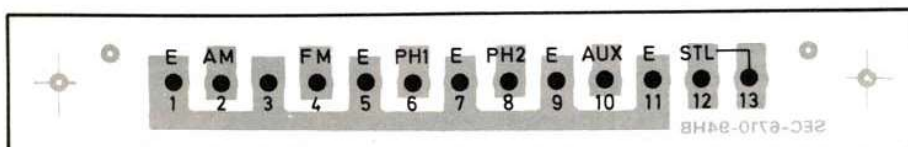
TOP VIEW



BOTTOM VIEW

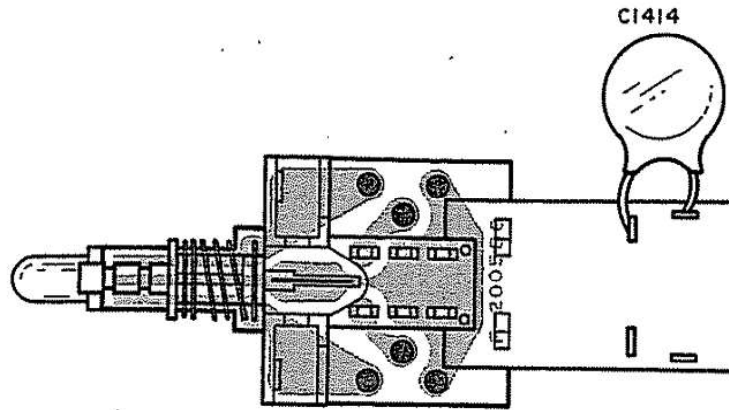


(25) SELECTOR INDICATOR P.C.B. (TOP VIEW)



- Voltages are measured to chassis ground with a Voltmeter (Digital Voltmeter, over 10K Ω /V).
- Voltages are measured under two conditions: with no input and 120 watts (1 kHz) output power (inside parenthesis).

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



(27) ELECTRICAL PARTS LIST

CAPACITORS					Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material
Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material					
					C221	1 μ	50	+75 -10	Electrolytic
C101	10P	50	± 0.5	Ceramic	C222	0.02 μ	50	+80 -20	Ceramic
C201	0.01 μ	50	+80 -20	Ceramic	C223	4.7 μ	10	+75 -10	Electrolytic
C202	0.02 μ	50	+80 -20	Ceramic	C224	0.02 μ	50	+80 -20	Ceramic
C203	0.02 μ	50	+80 -20	Ceramic	C225	1 μ	50	+75 -10	Electrolytic
C204	0.02 μ	50	+80 -20	Ceramic	C226	0.04 μ	50	+80 -20	Ceramic
C205	0.02 μ	50	+80 -20	Ceramic	C227	0.04 μ	50	+80 -20	Ceramic
C206	0.02 μ	50	+80 -20	Ceramic	C228	0.04 μ	50	+80 -20	Ceramic
C207	0.02 μ	50	+80 -20	Ceramic	C229	0.04 μ	50	+80 -20	Ceramic
C208	0.02 μ	50	+80 -20	Ceramic	C230	0.0039 μ	50	± 10	Mylar
C209	0.02 μ	50	+80 -20	Ceramic	C231	0.0039 μ	50	± 10	Mylar
C210	0.02 μ	50	+80 -20	Ceramic	C232	100 μ	16	+50 -10	Electrolytic
C211	0.02 μ	50	+80 -20	Ceramic	C233	0.04 μ	50	+80 -20	Ceramic
C212	0.1 μ	50	± 10	Mylar	C234	1 μ	50	+75 -10	Electrolytic
C213	0.04 μ	50	+80 -20	Ceramic	C235	1 μ	50	+75 -10	Electrolytic
C214	0.04 μ	50	+80 -20	Ceramic	C236	220 μ	16	+50 -10	Electrolytic
C215	0.04 μ	50	+80 -20	Ceramic	C237	1 μ	50	+75 -10	Electrolytic
C216	33P	50	± 5	Ceramic	C238	1 μ	50	+75 -10	Electrolytic
C217	0.02 μ	50	+80 -20	Ceramic	C239	100 μ	16	+50 -10	Electrolytic
C218	10 μ	16	+50 -10	Electrolytic	C240	0.0022 μ	50	± 10	Mylar
C219	0.02 μ	50	+80 -20	Ceramic	C241	0.0022 μ	50	± 10	Mylar
C220	0.47 μ	50	+75 -10	Electrolytic	C242	220 μ	16	+50 -10	Electrolytic

Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material	Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material
C243	0.047 μ	50	± 10	Mylar	C303A,B	47 μ	25	+50 -10	Electrolytic
C244	680P	50	± 5	Polystyrene	C304A,B	22 μ	16	+50 -10	Electrolytic
C245	1500P	50	± 5	Polystyrene	C305A,B	56P	50	± 10	Ceramic
C246	0.22 μ	25	± 20	Aluminum	C306A,B	1800P	50	± 5	Polystyrene
C247	0.47 μ	25	± 20	Aluminum	C307A,B	6800P	50	± 5	Polystyrene
C248	0.1 μ	50	± 10	Mylar	C308A,B	100 μ	25	+50 -10	Electrolytic
C249-259	(Not used)				C309A,B	(Not used)			
C260	22P(NPO)	50	± 5	Ceramic	C310A,B	0.15 μ	50	± 10	Mylar
C261	15P(NPO)	50	± 5	Ceramic	C311A,B	0.082 μ	50	± 10	Mylar
C263	430P	50	± 5	Polystyrene	C312A,B	1 μ	25	+75 -10	Electrolytic
C264	0.01 μ	50	+80 -20	Ceramic	C313	(non-polar) 0.04 μ	50	+80 -20	Ceramic
C265	0.01 μ	50	+80 -20	Ceramic	C314	0.04 μ	50	+80 -20	Ceramic
C266	0.001 μ	50	± 10	Mylar	C315	220 μ	25	+50 -10	Electrolytic
C267	100 μ	16	+50 -10	Electrolytic	C316	220 μ	25	+50 -10	Electrolytic
C268	0.02 μ	50	+80 -20	Ceramic	C401A,B	10 μ	25	+50 -10	Electrolytic
C269	0.01 μ	50	+80 -20	Ceramic	C402A,B	4.7 μ	50	+75 -10	Electrolytic
C270	0.01 μ	50	+80 -20	Ceramic	C403A,B	440P	50	± 5	Polystyrene
C271	100 μ	16	+50 -10	Electrolytic	C404A,B	900P	50	± 5	Polystyrene
C272	0.02 μ	50	+80 -20	Ceramic	C405A,B	100P	50	± 5	Polystyrene
C273	100 μ	16	+50 -10	Electrolytic	C406A,B	0.056 μ	50	± 10	Mylar
C274	0.02 μ	50	+80 -20	Ceramic	C407A,B	0.027 μ	50	± 10	Mylar
C275	0.02 μ	50	+80 -20	Ceramic	C408A,B	0.056 μ	50	± 10	Mylar
C276	0.47 μ	50	+75 -10	Electrolytic	C409A,B	0.027 μ	50	± 10	Mylar
C277	220P	50	± 5	Ceramic	C410A,B	4.7 μ	50	+75 -10	Electrolytic
C278	0.47 μ	50	+75 -10	Electrolytic	C411A,B	10P	50	± 5	Ceramic
C279	0.033 μ	50	± 10	Mylar	C412A,B	4.7 μ	50	+75 -10	Electrolytic
C280	0.1 μ	50	± 10	Mylar	C413A,B	1 μ	50	+75 -10	Electrolytic
C281	0.01 μ	50	+80 -20	Ceramic	C414A,B	0.0068 μ	50	± 10	Mylar
C282	3.3 μ	16	+75 -10	Electrolytic	C415A,B	0.0039 μ	50	± 10	Mylar
C283	0.001 μ	50	± 10	Mylar	C416A,B	4.7 μ	50	+75 -10	Electrolytic
C284	4.7 μ	16	+75 -10	Electrolytic	C417A,B	10P	50	± 5	Ceramic
C285	0.02 μ	50	+80 -20	Ceramic	C418A,B	4.7 μ	50	+75 -10	Electrolytic
C286	4.7 μ	10	+75 -10	Electrolytic	C419A,B	1 μ	50	+75 -10	Electrolytic
C287	0.047 μ	50	± 10	Mylar	C420A,B	0.068 μ	50	± 10	Mylar
C288	0.01 μ	50	+80 -20	Ceramic	C421A,B	0.033 μ	50	± 10	Mylar
C289	220 μ	16	+50 -10	Electrolytic	C422A,B	33P	50	± 5	Ceramic
C301A,B	2.2 μ	25	± 20	Tantalum	C423A,B	4.7 μ	25	+75 -10	Electrolytic
C302A,B	100P	50	± 10	Ceramic	C424A,B	(non-polar) (Not used)			
					C425	330 μ	25	+50 -10	Electrolytic

Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material	Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material
C426	330 μ	25	+50 -10	Electrolytic	C706	220 μ	35	+50 -10	Electrolytic
C427A,B	100 μ	25	+50 -10	Electrolytic	C707	220 μ	35	+50 -10	Electrolytic
C501A,B	56P	50	\pm 5	Ceramic	C708	220 μ	35	+50 -10	Electrolytic
C502A,B	4.7 μ (non-polar)	50	+75 -10	Electrolytic	C709	47 μ	35	+50 -10	Electrolytic
C503A,B	220 μ	16	+50 -10	Electrolytic	C710	47 μ	35	+50 -10	Electrolytic
C504A,B	220 μ	16	+50 -10	Electrolytic	C711	220 μ	35	+50 -10	Electrolytic
C505A,B	(Not used)				C712	220 μ	35	+50 -10	Electrolytic
C506A,B	100 μ	80	+50 -10	Electrolytic	C713	220 μ	35	+50 -10	Electrolytic
C507A,B	100 μ	80	+50 -10	Electrolytic	C714	220 μ	35	+50 -10	Electrolytic
C508A,B	20P	50	\pm 5	Ceramic	C715	100P	50	\pm 5	Ceramic
C509A,B	330P	50	\pm 5	Ceramic	C716	470 μ	35	+50 -10	Electrolytic
C510A,B	100 μ	16	+50 -10	Electrolytic	C717	330 μ	16	+50 -10	Electrolytic
C511A,B	100 μ	16	+50 -10	Electrolytic	C718	100 μ	25	+50 -10	Electrolytic
C512A,B	470P	50	\pm 5	Ceramic	C719	1000 μ	16	+50 -10	Electrolytic
C513A,B	0.1 μ	100	\pm 10	Mylar	C720	(Not used)			
C514A,B	0.1 μ	100	\pm 10	Mylar	C721	1000 μ	16	+50 -10	Electrolytic
C515A,B	0.02 μ	50	\pm 10	Mylar	C722	0.047 μ	50	+80 -20	Ceramic
C516A,B	0.02 μ	50	\pm 10	Mylar	C723	0.047 μ	50	+80 -20	Ceramic
C517A,B	0.001 μ	50	\pm 10	Mylar	C724	220 μ	35	+50 -10	Electrolytic
C518A,B	0.001 μ	50	\pm 10	Mylar	C725	220 μ	35	+50 -10	Electrolytic
C519A,B	0.082 μ	50	\pm 10	Mylar	C901A,B	0.033 μ	50	\pm 10	Mylar
C601	220 μ	16	+50 -10	Electrolytic	C902	(Not used)			
C602	330 μ	16	+50 -10	Electrolytic	C903	0.0033 μ	50	\pm 10	Mylar
C603	330 μ	16	+50 -10	Electrolytic	C904	0.012 μ	50	\pm 10	Mylar
C604	47 μ	50	+50 -10	Electrolytic	C905	0.012 μ	50	\pm 10	Mylar
C605	47 μ	50	+50 -10	Electrolytic	C1001A,B	0.47 μ	50	+75 -10	Electrolytic
C606	0.047 μ	50	+80 -20	Ceramic	C1002A,B	10P	50	\pm 5	Ceramic
C607	0.047 μ	50	+80 -20	Ceramic	C1003A,B	4.7 μ	50	+75 -10	Electrolytic
C608	0.047 μ	50	+80 -20	Ceramic	C1004	100 μ	25	+50 -10	Electrolytic
C609	0.047 μ	50	+80 -20	Ceramic	C1005	100 μ	25	+50 -10	Electrolytic
C701	0.047 μ	50	+80 -20	Ceramic	C1006A,B	100P	50	\pm 10	Ceramic
C702	0.047 μ	50	+80 -20	Ceramic	C1101A,B	0.027 μ	50	\pm 10	Mylar
C703	0.047 μ	50	+80 -20	Ceramic	C1301	100 μ	35	+50 -10	Electrolytic
C704	0.047 μ	50	+80 -20	Ceramic	C1302	100 μ	16	+50 -10	Electrolytic
C705	220 μ	35	+50 -10	Electrolytic					

Ref. No.	Value (F)	Voltage (V)	Tolerance (%)	Material	Ref. No.	Description	R/S Part No.	Mfr's Part No.
C1401	0.047 μ	100	± 20	Ceramic	L1402	AM Bar Antenna Coil (220 μ H)	CA-3945	P-110076
C1402	0.047 μ	100	± 20	Ceramic	T201	FM IFT (3F-033)	CA-7606	P-140033
C1403	0.047 μ	100	± 20	Ceramic	T202	AM IFT (0A-023)	CA-0575	P-130023
C1404	0.047 μ	100	± 20	Ceramic	T203	AM IFT (0A-048)	CA-7882	P-130048
C1405	15000 μ	71	+50	Electrolytic (Lug)	T1401	Power Transformer	TA-0676	P-100511
C1406	15000 μ	71	+50	Electrolytic (Lug)	DIODES			
C1407	0.022 μ	50	+80	Ceramic	Ref. No.	Description	R/S Part No.	Manufacturer
C1408	0.022 μ	50	+80	Ceramic	D 201	VD-1221	DX-0517	NEC
C1409	0.022 μ	50	+80	Ceramic	D 202	VD-1221	DX-0517	NEC
C1410	0.022 μ	50	+80	Ceramic	D 203	1S-188 or 1N-60	DX-0161	SANYO UNIZON HITACHI
C1411	0.022 μ	50	+80	Ceramic	D 501A,B	VD-1221	DX-0517	NEC
C1412	0.022 μ	50	+80	Ceramic	D 502A,B	VD-1221	DX-0517	NEC
C1413	(Not used)				D 503A,B	ITT-73N	DX-1008	ITT
C1414	0.01 μ (UK 535)	125 (UL)	+80	Ceramic (Line-pass)	D 504A,B	ITT-73N	DX-1008	ITT
	0.01 μ (MR type)	125 (C.S.A)	+80	Ceramic (Line-pass)	D 505A,B	ITT-73N	DX-1008	ITT
C1501	0.1 μ	25	± 20	Aluminum	D 506A,B	ITT-73N	DX-1008	ITT
C1502	47 μ	10	+50	Electrolytic	D 507A,B	SR-1K-8	DX-1052	UNIZON
C1503	100 μ	35	+50	Electrolytic	D 508A,B	SR-1K-8	DX-1052	UNIZON
CERAMIC FILTERS					D 509A,B	RD-13E or WZ-130	DX-0405	NEC JRC
Ref. No.	Description	R/S Part No.	Mfr's Part No.		D 601	10E-1 or SR-1K-2	DX-1039	INTER-RECTIFIER UNIZON
CF201	FM Ceramic Filter 10.7 MA-8-A	CA-7536	P-140030		D 602	10E-1 or SR-1K-2	DX-1039	INTER-RECTIFIER UNIZON
CF202	FM Ceramic Filter 10.7 MA-8-A	CA-7536	P-140030		D 603	VD-1221	DX-0517	NEC
CF203	FM Ceramic Filter 10.7 MA-8-A	CA-7536	P-140030		D 604	1K-100-350	DX-0033	UNIZON
COIL & TRANSFORMER					D 605	1K-100-350	DX-0033	UNIZON
Ref. No.	Description	R/S Part No.	Mfr's Part No.		D 606	1K-100-350	DX-0033	UNIZON
L101	Inductor (2.2 μ H)		P-360034		D 607	1K-100-350	DX-0033	UNIZON
L201	Inductor (18 μ H)	C-0709	P-360022		D 608	2-1K261	DX-1107	UNIZON
L202	Inductor (2.2 μ H)	CA-7873	P-360021		D 609	2-1K261	DX-1107	UNIZON
L203	AM RF Coil OR-055 or OR-069	CA-4945	P-340055 or P-340069		D 610	2-1K261	DX-1107	UNIZON
L204	AM OSC Coil OC-065	CA-4946	P-120065		D 611	2-1K261	DX-1107	UNIZON
L205	Inductor (2.2 μ H)	CA-7873	P-360021		D 701	SVB10-200	DX-1115	UNIZON
L206	Inductor (2.2 μ H)	CA-7873	P-360021		D 702	SR-1K-2 or 10E-1	DX-0475	UNIZON
L501A	Inductor (2 μ H)	CB-2298	P-370009		D 703	SR-1K-2 or 10E-1	DX-0475	INTER-RECTIFIER UNIZON
L501B	Inductor (2 μ H)		P-320032		D 704	WZ-130 or RD-13E	DX-0537	JRC NEC
L1401	Balun Coil	CA-2942	P-110012		D 705	WZ-200 or RD-20E	DX-1116	JRC NEC
					D 706	WZ-200 or RD-20E	DX-1116	JRC NEC
					D 1301	SR-1K-2 or 10E-1	DX-0475	UNIZON INTER-RECTIFIER
					D 1401	S15VB-20	DX-1117	SHIN-DENGEN
					D 1501	SR-1K-2 or 10E-1	DX-0475	UNIZON INTER-RECTIFIER

FILTER			
Ref. No.	Description	R/S Part No.	Mfr's Part No.
LPF201	Low Pass Filter (19 kHz, 38 kHz)	CA-3469	P-510007

FUSES			
Ref. No.	Description	R/S Part No.	Mfr's Part No.
F1	Fuse 1.5A, 250V	HF-0004	P-250007
F2	Fuse 1.5A, 250V	HF-0004	P-250007
F3	Fuse 1.5A, 250V	HF-0004	P-250007
F4	Fuse 2.5A, 250V	HF-0021	P-250008
F5	Fuse 8 A, 125V	HF-1133	P-250102

INTEGRATE CIRCUITS			
Ref. No.	Description	R/S Part No.	Manufacturer
IC201	HA-1211	MX-3617	HITACHI
IC202	HA-1211	MX-3617	HITACHI
IC203	HA-1211	MX-3617	HITACHI
IC204	LA-1230	MX-3210	SANYO
IC205	LA-3350(S)	MX-3215	SANYO
IC206	HA-1197	MX-3467	HITACHI

LAMPS			
Ref. No.	Description	R/S Part No.	Mfr's Part No.
PL1401 /1402	Dial Lamp 0.3A, 8V	L-0915	P-240108
PL1403 /1404	Dial Lamp 0.3A, 8V	L-0916	P-240109
PL1405 -1408	Meter Lamp 0.3A, 8V	L-0864	P-240091
PL1409 -1414	Selector Lamp 60 mA, 6V	L-0864	P-240091

LIGHT EMITTING DIODE			
Ref. No.	Description	R/S Part No.	Manufacturer
	LED (red & blue) GL-52 RG	L-0914	SHARP

METERS			
Ref. No.	Description	R/S Part No.	Mfr's Part No.
M1	SIGNAL Meter	M-0391	P-230073
M2	TUNING Meter	M-0392	P-230074
**M3	POWER (R) Meter	M-0393	P-230075
**M4	POWER (L) Meter	M-0393	P-230075

RESISTORS					
Ref. No.	Value (ohm)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R 101	4.7K	¼	± 5	Carbon	
R 102	10K	¼	± 5	Carbon	
R 201	100	¼	± 5	Carbon	
R 202	180	¼	± 5	Carbon	

Ref. No.	Value (ohm)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R 203	330	¼	± 5	Carbon	
R 204	100	¼	± 5	Carbon	
R 205	100	¼	± 5	Carbon	
R 206	470	¼	± 5	Carbon	
R 207	330	¼	± 5	Carbon	
R 208	100	¼	± 5	Carbon	
R 209	100	¼	± 5	Carbon	
R 210	330	¼	± 5	Carbon	
R 211	100	¼	± 5	Carbon	
R 212	330	¼	± 5	Carbon	
R 213	100	¼	± 5	Carbon	
R 214	330	¼	± 5	Carbon	
R 215	56K	¼	± 5	Carbon	
R 216	100K	¼	± 5	Carbon	
R 217	470K	¼	± 5	Carbon	
R 218	1K	¼	± 5	Carbon	
R 219	100	¼	± 5	Carbon	
R 220	8.2K	¼	± 5	Carbon	
R 221	3.9K	¼	± 5	Carbon	
R 222	2.7K	¼	± 5	Carbon	
R 223	1K	¼	± 5	Carbon	
R 224	2.2K	¼	± 5	Carbon	
R 225	4.7K	¼	± 5	Carbon	
R 226	10K	¼	± 5	Carbon	
R 227	(Not used)				
R 228	(Not used)				
R 229	22	¼	± 5	Carbon	
R 230	10K	¼	± 5	Carbon	
R 231	47K	¼	± 5	Carbon	
R 232	33K	¼	± 5	Carbon	
R 233	33K	¼	± 5	Carbon	
R 234	150	¼	± 5	Carbon	
R 235	4.7K	¼	± 5	Carbon	
R 236	680	¼	± 5	Carbon	
R 237	18K	¼	± 5	Carbon	
R 238	100K	¼	± 5	Carbon	
R 239	680	¼	± 5	Carbon	
R 240	4.7K	¼	± 5	Carbon	
R 241	100K	¼	± 5	Carbon	
R 242	18K	¼	± 5	Carbon	
R 243	3.3K	¼	± 5	Carbon	
R 244	3.3K	¼	± 5	Carbon	
R 245	100	¼	± 5	Carbon	
R 246	10K	¼	± 5	Carbon	
R 247	33	¼	± 5	Carbon	
R 248	3.3K	¼	± 5	Carbon	
R 249	3.3K	¼	± 5	Carbon	
R 250	1K	¼	± 5	Carbon	
R 251	8.2K	¼	± 5	Carbon	
R 252	100	¼	± 5	Carbon	
*R253	10K	¼	± 5	Carbon	
*R254	1K	¼	± 5	Carbon	
R 255	47K	¼	± 5	Carbon	
R 256	-260	(Not used)			
R 261	220	¼	± 5	Carbon	
R 262	1.8K	¼	± 5	Carbon	
R 263	150	¼	± 5	Carbon	

* Values may vary from unit to unit for optimum performance. (See page 34)

** See page 57 for Notice of change during production. — 51 —

Ref. No.	Value (ohm)	Wattage (W)	Tolerance (%)	Material	R/S Part No.	Ref. No.	Value (ohm)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R 264	100	¼	± 5	Carbon		R423A,B	220K	¼	± 5	Carbon	
R 265	22	¼	± 5	Carbon		R424A,B	2.7M	¼	± 5	Carbon	
R 266	5.6K	¼	± 5	Carbon		R425A,B	4.7K	¼	± 5	Carbon	
R 267	5.6K	¼	± 5	Carbon		R426A,B	47	¼	± 5	Carbon	
R 268	39K	¼	± 5	Carbon		R427A,B	220K	¼	± 5	Carbon	
R 269	820	¼	± 5	Carbon		R428A,B	1K	¼	± 5	Carbon	
R 270	1.5M	¼	± 5	Carbon		R429A,B	220K	¼	± 5	Carbon	
R 271	10K	¼	± 5	Carbon		R430A,B	220K	¼	± 5	Carbon	
R 272	4.7K	¼	± 5	Carbon		R431A,B	47K	¼	± 5	Carbon	
R 273	1K	¼	± 5	Carbon		R432A,B	4.7K	¼	± 5	Carbon	
R 274	330	¼	± 5	Carbon		R433A,B	1K	¼	± 5	Carbon	
R 275	10K	¼	± 5	Carbon		R434A,B	(Not used)				
R 276	10K	¼	± 5	Carbon		R435A,B	220K	¼	± 5	Carbon	
R 277	100	¼	± 5	Carbon		R436A,B	820	¼	± 5	Carbon	
R301A,B	56K	¼	± 5	Carbon		R437	100	¼	± 5	Carbon	
R302A,B	4.7K	¼	± 5	Carbon		R438	100	¼	± 5	Carbon	
R303A,B	390K	¼	± 5	Carbon		R501A,B	1M	½	± 5	Carbon	
R304A,B	100K	¼	± 5	Carbon		R502A,B	4.7K	½	± 5	Carbon	
R305A,B	180K	¼	± 5	Carbon		R503A,B	47	½	± 5	Carbon	
R306A,B	3.3K	¼	± 5	Carbon		R504A,B	47	½	± 5	Carbon	
R307A,B	270	¼	± 5	Carbon		R505A,B	47K	½	± 5	Carbon	
R308A,B	39K	¼	± 5	Carbon		R506A,B	4.7K	1	± 5	Metal Oxide	
R309A,B	680K	¼	± 5	Carbon		R507A,B	1K	½	± 5	Carbon	
R310A,B	15K	¼	± 5	Carbon		R508A,B	8.2K	½	± 5	Carbon	
R311A,B	560	¼	± 5	Carbon		R509A,B	2.2K	½	± 5	Carbon	
R312A,B	4.7K	¼	± 5	Carbon		R510A,B	2.2K	½	± 5	Carbon	
R313A,B	1K	¼	± 5	Carbon		R511A,B	39	½	± 5	Carbon	
R314A,B	220K	¼	± 5	Carbon		R512A,B	68	1	± 5	Metal Oxide	
R315A,B	220K	¼	± 5	Carbon		R513A,B	68	1	± 5	Metal Oxide	
R316A,B	56K	¼	± 5	Carbon		R514A,B	12K	½	± 5	Carbon	
R317A,B	4.7K	¼	± 5	Carbon		R515A,B	12K	½	± 5	Carbon	
R318A,B	100	¼	± 5	Carbon		R516A,B	47K	½	± 5	Carbon	
R319A,B	(Not used)					R517A,B	1.8K	½	± 5	Carbon	
R320A,B	1K	¼	± 5	Carbon		R518A,B	18K	½	± 5	Carbon	
R401A,B	2.7K	¼	± 5	Carbon		R519A,B	22	1	± 5	Metal Oxide	
R402A,B	220K	¼	± 5	Carbon		R520A,B	22	1	± 5	Metal Oxide	
R403A,B	15K	¼	± 5	Carbon		R521A,B	68	½	± 5	Carbon	
R404A,B	10K	¼	± 5	Carbon		R522A,B	3.3K	½	± 5	Carbon	
R405A,B	1K	¼	± 5	Carbon		R523A,B	150	1	± 5	Metal Oxide	
R406A,B	47	¼	± 5	Carbon		R524A,B	150	1	± 5	Metal Oxide	
R407A,B	12K	¼	± 5	Carbon		R525A,B	4.7	1	± 5	Metal Oxide	
R408A,B	3.3K	¼	± 5	Carbon		R526A,B	4.7	1	± 5	Metal Oxide	
R409A,B	18K	¼	± 5	Carbon		R527A,B	4.7	1	± 5	Metal Oxide	
R410A,B	1K	¼	± 5	Carbon		R528A,B	4.7	1	± 5	Metal Oxide	
R411A,B	3.3K	¼	± 5	Carbon		R529A,B	0.5	7	± 5	Cement	
R412A,B	18K	¼	± 5	Carbon		R530A,B	0.5	7	± 5	Cement	
R413A,B	18K	¼	± 5	Carbon		R531A,B	0.5	7	± 5	Cement	
R414A,B	2.7M	¼	± 5	Carbon		R532A,B	0.5	7	± 5	Cement	
R415A,B	47	¼	± 5	Carbon		R533A,B	22	2	± 5	Metal Oxide	
R416A,B	4.7K	¼	± 5	Carbon		R534A,B	10	3	± 5	Metal Oxide	
R417A,B	220K	¼	± 5	Carbon		R535A,B	15K	½	± 5	Carbon	
R418A,B	6.8K	¼	± 5	Carbon		R536A,B	15K	½	± 5	Carbon	
R419A,B	47K	¼	± 5	Carbon		*R537A,B	91	½	± 5	Carbon	
R420A,B	10K	¼	± 5	Carbon		*R538A,B	91	½	± 5	Carbon	
R421A,B	6.8K	¼	± 5	Carbon		R539A,B	2.2K	½	± 5	Carbon	
R422A,B	47K	¼	± 5	Carbon		R540A,B	2.2K	½	± 5	Carbon	

*Values may vary from unit to unit for optimum performance. (See page 34)

Ref. No.	Value (ohm)	Wattage (W)	Tolerance (%)	Material	R/S Part No.	Ref. No.	Value (ohm)	Wattage (W)	Tolerance (%)	Material	R/S Part No.
R 601	150K	½	± 5	Carbon		R801A,B	4.7K	¼	± 5	Carbon	
R 602	220	½	± 5	Carbon		R802A,B	4.7K	¼	± 5	Carbon	
R 603	1K	1	± 5	Metal Oxide		R803A,B	2.2K	¼	± 5	Carbon	
R 604	82	1	± 5	Metal Oxide		R901A,B	6.8K	¼	± 5	Carbon	
R 605	18K	½	± 5	Carbon		R902A,B	(Notused)				
R 606	18K	½	± 5	Carbon		R903A,B	2.2M	¼	± 5	Carbon	
R 607	8.2K	½	± 5	Carbon		R904	2.2K	¼	± 5	Carbon	
R 608	3.9K	½	± 5	Carbon		R1001A,B	1K	¼	± 5	Carbon	
R 609	10K	½	± 5	Carbon		R1002A,B	560K	¼	± 5	Carbon	
R 610	470	½	± 5	Carbon		R1003A,B	10K	¼	± 5	Carbon	
R 611	470	2	± 5	Metal Oxide		R1004A,B	220K	¼	± 5	Carbon	
R 612	470	2	± 5	Metal Oxide		R1005A,B	1K	¼	± 5	Carbon	
R 613	470	3	± 5	Metal Oxide		R1006	1K	¼	± 5	Carbon	
R 614	470	3	± 5	Metal Oxide		R1007	1K	¼	± 5	Carbon	
R 615	820	3	± 5	Metal Oxide		R1101A,B	1K	¼	± 5	Carbon	
R 616	820	3	± 5	Metal Oxide		R1102A,B	1K	¼	± 5	Carbon	
R 617	22	½	± 5	Carbon		R1103A,B	33K	¼	± 5	Carbon	
R 618	22	½	± 5	Carbon		R1104A,B	22K	¼	± 5	Carbon	
R 619	68	½	± 5	Carbon		R1105	120	2	± 5	Metal Oxide	
R 620	68	½	± 5	Carbon		R1106	120	2	± 5	Metal Oxide	
R 621	(Notused)					R1201A,B	1K	¼	± 5	Carbon	
R 622	(Notused)					R1202A,B	2.7K	¼	± 5	Carbon	
R 623	1.5K	½	± 5	Carbon		R 1301	56	1	± 5	Metal Oxide	
R 624	1.5K	½	± 5	Carbon		R 1302	10K	½	± 5	Carbon	
R 625	1.2K	½	± 5	Carbon		R 1303	150K	½	± 5	Carbon	
R 626	1.2K	½	± 5	Carbon		R 1304	150	1	± 5	Metal Oxide	
R 627	6.8K	½	± 5	Carbon		R 1305	0.47	5	± 5	Cement	
R 701	22(UL)	½	± 5	Carbon		R 1401	220K	¼	± 5	Carbon	
	22(C.S.A.)	1	± 5	Metal Oxide		R 1402	220K	¼	± 5	Carbon	
R 702	22(UL)	½	± 5	Carbon		R 1403	220K	¼	± 5	Carbon	
	22(C.S.A.)	1	± 5	Metal Oxide		R 1404	220K	¼	± 5	Carbon	
R 703	1.5K	½	± 5	Carbon		R 1405	2.2M	½	± 5	Carbon	
R 704	1.5K	½	± 5	Carbon		R 1501	100K	¼	± 5	Carbon	
R 705	1.5K	½	± 5	Carbon		R 1502	39K	¼	± 5	Carbon	
R 706	1.5K	½	± 5	Carbon		R 1503	330	½	± 5	Carbon	
R 707	1K	½	± 5	Carbon		R 1504	390K	¼	± 5	Carbon	
R 708	1K	½	± 5	Carbon		R 1505	39K	¼	± 5	Carbon	
R 709	27K	½	± 5	Carbon		R 1506	100	¼	± 5	Carbon	
R 710	27K	½	± 5	Carbon		R 1507	3.3K	¼	± 5	Carbon	
R 711	56K	½	± 5	Carbon							
R 712	56K	½	± 5	Carbon							
R 713	390(UL)	½	± 5	Carbon							
	390(C.S.A.)	1	± 5	Metal Oxide							
R 714	390(UL)	½	± 5	Carbon							
	390(C.S.A.)	1	± 5	Metal Oxide							
R 715	100(UL)	½	± 5	Carbon							
	100(C.S.A.)	1	± 5	Metal Oxide							
R 716	100(UL)	½	± 5	Carbon							
	100(C.S.A.)	1	± 5	Metal Oxide							
R 717	33K	½	± 5	Carbon							
R 718	33K	½	± 5	Carbon							
R 719	18K	½	± 5	Carbon							
R 720	18K	½	± 5	Carbon							
R 721	150	3	± 5	Metal Oxide							
R 722	330	½	± 5	Carbon							
R 723	330	½	± 5	Carbon							
R 724	68	½	± 5	Carbon							

RELAY			
Ref. No.	Description	R/S Part No.	Mfr s Part No.
REED	Reed Relay HA-224S	R-8099	P-290015
RELAY	Relay for Protector MY4-02-US-40L or MS24D4-0 (Z)	R-8081 R-8081	P-290012 P-290012
RELAY	Relay for Power UL - MS24D2-D C.S.A.-LYZ-0-US or FRL-264	R-8100	P-290016 P-290023 P-290026

FRONT END				Ref. No.	Type No.	Manufacturer	
Ref. No.	Description	R/S Part No.	Mfr's Part No.	TR512A,B	2SB 655 (B)	HITACHI	
	Front-end FL526U12	C-4582	P-150020	TR513A,B	2SC 1175 (E)	SANYO	
				TR514A,B	2SA 659 (E)	SANYO	
SWITCHES				TR601	2SC 536 (G, H)	SANYO	
Ref. No.	Description	R/S Part No.	Mfr's Part No.	TR602	2SD 571 (L, K)	NEC	
Ss1-Ss12	SELECTOR Switch	S-1314	P-180305	TR603	2SD 571 (L, K)	NEC	
	TURNOVER 3K/6K	S-7378	P-180314	TR604	2SC 536 (G, H)	SANYO	
	TURNOVER 300/150	S-7377	P-180313	TR605	2SC 536 (G, H)	SANYO	
SM1-2	TAPE MONITOR	S-5038	P-180209	TR606	2SA 750 (E)	NEC	
SD1-4	TAPE DUBBING	S-5039	P-180210				
	Push Switch 5 gangs	S-7380	P-180300	TR701	2SD 571 (L, K)	NEC	
			or P-180318	TR702	2SB 605 (L, K)	NEC	
SL1-2	Push Switch 5 gangs	S-7379	P-180299	TR703	2SC 1222 (E)	NEC	
PS1-3	PHONO LEVEL	S-7381	P-180301	TR704	2SA 750 (E)	NEC	
	POWER Switch (TV-5) (UL)	S-0856	P-180239	TR705	2SD 325 (E)	SANYO	
	POWER Switch (TV-5) (C.S.A.)		P-180359				
TRANSISTORS				TR1001A,B	2SC 1222 (E, U)	NEC	
Ref. No.	Type No.	Manufacturer		TR1301	2SC 536 (G, H)	SANYO	
TR201	2SC 536 (H)	SANYO		TR1501	2SC 536 (G, H)	SANYO	
	or 2SC923 (E, U)	NEC		TR1502	2SC 536 (G, H)	SANYO	
TR202	2SC 900 (U)	NEC		TR1503	2SC 536 (G, H)	SANYO	
TR203	2SC 900 (U)	NEC		TR1504	2SC 536 (G, H)	SANYO	
TR204	2SC 536 (H)	SANYO					
	or 2SC 923 (E, U)	NEC		VARIABLE RESISTORS			
TR205	2SC 536 (H)	SANYO		Ref. No.	Description	R/S Part No.	Mfr's Part No.
	or 2SC 923 (E, U)	NEC		VR201	Trimmer 10 KΩB		P-170259
TR206	2SC 536 (H)	SANYO		VR202	Trimmer 47 KΩB	P-6467	P-170252
	or 2SC 923 (E, U)	NEC		VR203	Trimmer 1 KΩB	P-6469	P-170245
				VR204	Trimmer 4.7 KΩB	P-6465	P-170248
				VR205	Trimmer 470 KΩB		P-170244
				VR401	Potentiometer		
					TREBLE	P-1889	P-170188
TR301A,B	2SC 1222 (2) (E, U)	NEC		VR402	Potentiometer		
TR302A,B	2SC 1222 (2) (E, U)	NEC			MIDRANGE	P-1889	P-170188
TR303A,B	2SA 750 (E)	NEC		VR403	Potentiometer		
TR304A,B	2SC 1222 (E, U)	NEC			BASS	P-1889	P-170188
TR401A,B	2SC 1222 (E)	NEC		VR501A,B	Trimmer 500ΩB	P-6353	P-170197
TR402A,B	2SA 750 (E)	NEC		VR502A,B	Trimmer 5 KΩB	P-6505	P-170201
TR403A,B	2SC 1222 (U)	NEC		VR603	Trimmer 1 KΩB	P-6352	P-170198
TR404A,B	2SC 1222 (U)	NEC		VR604	Trimmer 1 KΩB	P-6352	P-170198
TR405A,B	2SC 1222 (U)	NEC		VR1001	Potentiometer		
TR501A,B	2SA 872 (E)	HITACHI			VOLUME & BALANCE	P-3090	P-170325
TR502A,B	2SA 872 (E)	HITACHI					
TR503A,B	2SD 668 (C, D)	HITACHI					
TR504A,B	2SD 668 (C, D)	HITACHI					
TR505A,B	2SB 649A (B)	HITACHI					
TR506A,B	2SD 400P-1 (E)	SANYO					
TR507A,B	2SD 669A (B)	HITACHI					
TR508A,B	2SB 649A (B)	HITACHI					
TR509A,B	2SD 675 (B)	HITACHI					
TR510A,B	2SB 655 (B)	HITACHI					
TR511A,B	2SD 675 (B)	HITACHI					

(28) EXPLODED VIEW PARTS LIST

Ref. No.	Description	R/S Part No.	Mfr's Part No.	Ref. No.	Description	R/S Part No.	Mfr's Part No.
1	Front Chassis Ass'y		P-400202	56	Holder for Pre Amp P.C.B.	HB-7818	P-411514
2	Mode Switch Assembled P.C.B.	X-7783	U-23104	57	Shaft Holder Bracket for Selector	HB-7819	P-411169
3	Tone Amp Assembled P.C.B.	X-7778	U-14100	58	Switch Shaft for Selector	HB-1344	P-610094
4	Headphone Jack	J-0919	P-190125	59	P.C.B. Holder for Pre Amp	HB-7820	P-620070
5	Speaker Switch Assembled P.C.B.	X-7784	U-23105	60	Shield Case for Pre Amp	HB-7821	P-411515
6	Cushion for P.C.B.		P-680187	61	Phono Level Transfer Assembled P.C.B.	X-7785	P-23108
7	Dial Scale Plate	D-5273	P-411084	62	Power Switch Assembled P.C.B.	X-7786	U-23113
8	Side Bracket for Panel (R)	HB-7802	P-411503	63	Supporter Bracket (B)		P-411591
9	Side Bracket for Panel (L)	HB-7803	P-411504	64	Main Chassis		P-400203
10	Lamp Holder (Fuse type)	F-1013	P-260012	65	Label for Power Transformer		P-810487
11	Panel for Selector	Z-4113	P-700304	66	Power Transformer	TA-0676	P-100511
12	Function Indicator Lens	HB-7681	P-610442	67	Lug Type Electrolytic Capacitor	CF-7207	P-220037
13	Lens for Stereo	HB-7292	P-610509	68	Main Amp Assembled P.C.B.	X-7779	U-16077
14	Meter Lamp (Fuse type)	L-0864	P-240091	69	Supporter Bracket	HB-7823	P-411261
15	Signal Meter	M-0391	P-230073	70	Protector & Meter Assembled P.C.B.	X-7781	U-23109
16	Tuning Meter	M-0392	P-230074	71	Bracket for Protector & Meter P.C.B.	HB-7824	P-411171
17	Watt Meter		P-230083	72	Bracket for Bridge Diode	HB-7825	P-411167
18	Reflector Tape for Meter	HB-7804	P-690239	73	Bridge Diode	DX-1117	
19	Reflector Holder Ass'y	Z-4114	P-411505	74	Relay Assembled P.C.B.	X-7782	U-23103
20	Dial Reflector	Z-4115	P-610575	75	Bracket for Relay P.C.B.	HB-7073	P-410609
21	Lamp Case	HB-7805	P-610576	76	Thermal Protector Bracket	HB-7836	P-411265
22	Light Intercepting Plate	HB-5077	P-410939	77	Thermal Protector	HB-6880	P-290018
23	Fiber Sheet	HB-7806	P-480199	78	Side Chassis (R)	Z-4116	P-400204
24	Meter Holder	HB-7807	P-411507	79	Side Chassis (L)		P-400205
25	Dial Lamp with Lead	L-0915	P-240108	80	Insulator Washer		P-480039
26	Selector Lamp with Lead	L-0917	P-240107	81	Back Panel (UL)	Z-4117	P-411516
27	Dial Lamp with Lead	L-0916	P-240109		Back Panel (C.S.A.)		P-411517
28	Tuning Shaft Holder	HB-7808	P-411509	82	Bracket for Back Panel	HB-7827	P-410821
29	Tunign Shaft Ass'y	D-3250	P-470025	83	Number Plate	HB-6879	P-730184
30	Pointer Ass'y	D-1243	P-450062	84	AC Cord		P-310092
31	Sub-Pulley Bracket (C)	HB-5084	P-410946	85	Cord Stopper (4N-4)		
32	Sub-Pulley Bracket (D)	HB-5085	P-410947	86	AC Outlet	J-6434	P-190098
33	Sub-Pulley Brakcet (A)	HB-7810	P-411510	87	Fuse Holder (UL)	F-1017	P-260011
34	Sub-Pulley Bracket (B)	HB-7811	P-411511		Fuse Holder (C.S.A.)		P-260013
35	Sub-Pulley Bracket (E)	HB-7812	P-411512	88	Speaker Terminal	J-4561	P-320215
36	Sub-Pulley (Middle)	D-0385	P-610471	89	Antenna Terminal Board	J-4563	P-320218
37	Sub-Pulley (Small)		P-610049	90	Ground Screw	HD-1305	P-420284
38	Dial Pulley	D-0396	P-610439	91	Joint Pin for PRE OUT/MAIN IN	HB-7828	P-190120
39	Dial Spring	RA-5847	P-440014	92	4P Pin Jack	J-0969	P-320137
40	Hook			93	6P Pin Jack	J-0970	P-320151
41	Dial String			94	Balun Coil	CA-3942	P-110012
42	Dial Scale	D-5314	P-700303	95	Balun Coil P.C.B.	X-4972	P-200244
43	Dial Side Bracket (R)	HB-5074	P-710095	96	AM Bar Antenna Coil	CA-3945	P-110076
44	Dial Side Bracket (L)	HB-5075	P-710096	97	Antenna Holder (A)	HB-6370	P-410138
45	Cushion for Light Intercept		P-660178	98	Antenna Holder (B)	HB-6371	P-410139
46	IF Bracket (A)	HB-7813	P-411157	99	Cord Stopper (3P-4)	HB-0598	P-480010
47	IF Bracket (B)	HB-7814	P-411158	100	DIN Jack	J-0747	P-190036
48	Shield Plate	HB-7826	P-411539	101	Wire Stay		P-450073
49	VC Bracket	HB-7815	P-411513	102	Lug Terminal (1L-2P)		P-320098
50	Power Supply Assembled P.C.B.	X-7780	U-17057	103	P.C.B. for Selector Indicator		P-200556
51	P.C.B. Holder for Power Supply (A)	HB-7816	P-411162	104	Shield Plate (B)		P-411605
52	P.C.B. Holder for Power Supply (B)	HB-7817	P-411163	105	Fiber Sheet (B)		P-480213
53	Front-End Assembled P.C.B.	X-7775	U-11023	106	Shield Plate (D)		P-411724
54	IF Assembled P.C.B.	X-7776	U-12042	107	Fiber Sheet (D)		P-480185
55	Pre Amp Assembled P.C.B.	X-7777	U-14101	108	Front Panel Ass'y	Z-4118	P-700316

Ref. No.	Description	R/S Part No.	Mfr's Part No.	HARDWARE	
				Ref. No.	Description
109	Push Knob	K-3016	P-650299	S 1	Frangle Locked Screw 3 X 6P
110	Push Knob Guide (One of Front Panel Ass'y)	HB-7835	P-610586	S 2	Bind Tapping Screw 3 X 8BT-2
111	Tuning Knob	K-2301	P-650199	S 3	Bind Tapping Screw 3 X 6BT-3
112	Selector Knob	K-2297	P-650196	S 4	Screw with Spring Washer 3 X 6P
113	Push Knob Spring	RB-6204	P-440140	S 5	Bind Tapping Screw 3 X 5BT-2
114	Balance Knob (Outer of Double)	K-3014	P-650289	S 6	Bind Tapping Screw 3 X 10BT-2
115	Volume Knob (Inner of Double)	K-3015	P-650288	S 7	Screw with Stopper 3 X 9 X 3
116	Fiber Sheet for Volume		P-690018	S 8	Bind Tapping Screw 4 X 8BT-3
117	Power Push Knob	K-3017	P-650290	S 9	Bind Tapping Screw 3 X 12BT-2
118	Knob for Lever Switch	K-2300	P-650201	S10	Frangle Locked Screw 2.6 X 6P
119	Front Panel Bracket (R)	HB-7831	P-411518	S11	Bind Tapping Screw 5 X 12BT-3
120	Front Panel Bracket (L)	HB-7832	P-411519	S12	Bind Tapping Screw 4 X 18BT-2
121	Cabinet	Z-4120	P-600129	S13	Toothed Tapping Screw 3 X 8BT-2 (Black)
122	Ventilation Plate (Top)	Z-4121	P-411520	S14	Bind Tapping Screw 3 X 8BT-2 (Black)
123	Plate for Top Cabinet	HB-7834	P-730229	S15	Pan Screw 4 X 37P (Black)
124	Cover for Screw	HB-5105	P-610397	S16	Pan Screw 4 X 30P (Black)
125	Foot	F-0240	P-610485	S17	Wood Screw 3.1 X 13P
126	Bottom Plate	Z-4122	P-411521	S18	Wood Screw 3.1 X 10P
127	Collar for Tuning Shaft	HB-7809	P-610577	S19	Bind Tapping Screw 3 X 8BT-3
128	Power Switch (UL)	S-0856	P-180239	S20	Screw with Washer 4 X 20P (Black)
	Power Switch (C.S.A.)		P-180359	S21	Bind Tapping Screw 4 X 18BT-2
129	Power Switch Cover	HB-6875	P-480145	S22	Bind Tapping Screw 3 X 10BT-2 (Black)
130	LED for Power Indicator	L-0914		W1	Toothed Washer of Outer Side 3W
131	Heat Sink	HH-0284	P-411143	W2	Washer 3W
132	Main Amp Bracket (R)	HB-5061	P-410957	W3	Washer 4W (Black)
133	Main Amp Bracket (L)	HB-5059	P-410953	W4	Washer 5W (Black)
134	Spacer		P-660173	N1	Frangle Nut 5N
				N2	Nut 4N (Black)
				N3	Nut of Outside Cover 4N (Black)
				SW1	Spring Washer 4SW (Black)
				R1	Rivet YB-420
				R2	Rivet YB-320 (Black)
				R3	Rivet YB-429 (Black)
				R4	Rivet YB-420 (Black)

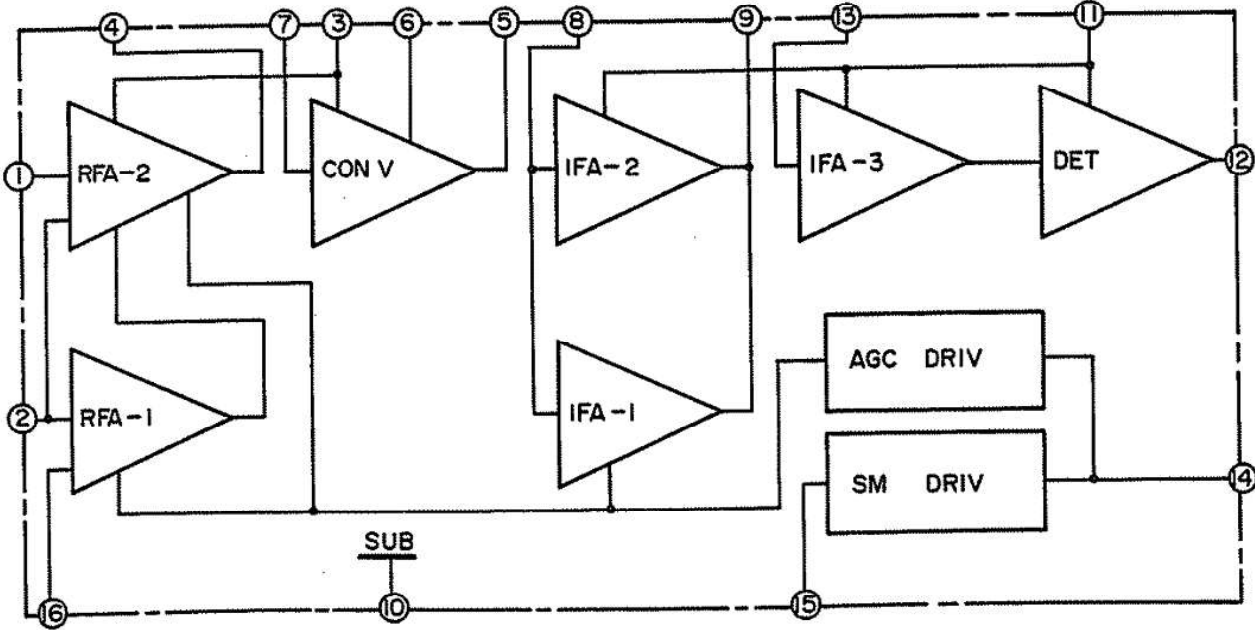
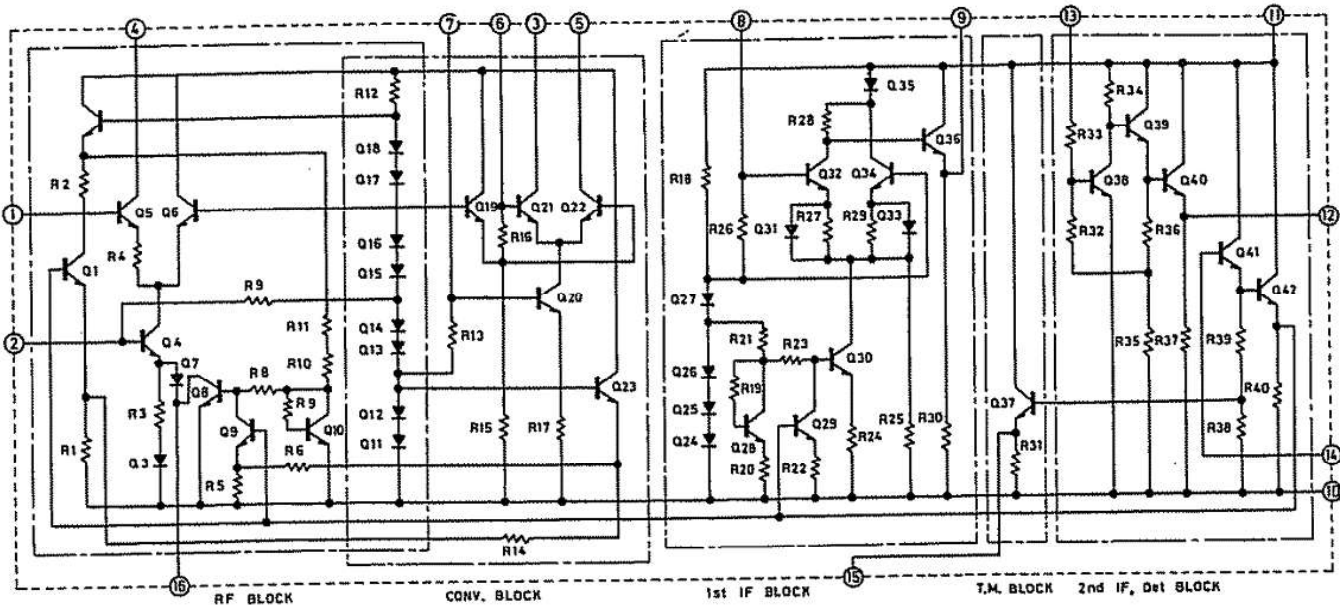
(29) PARTS CHANGE NOTICE

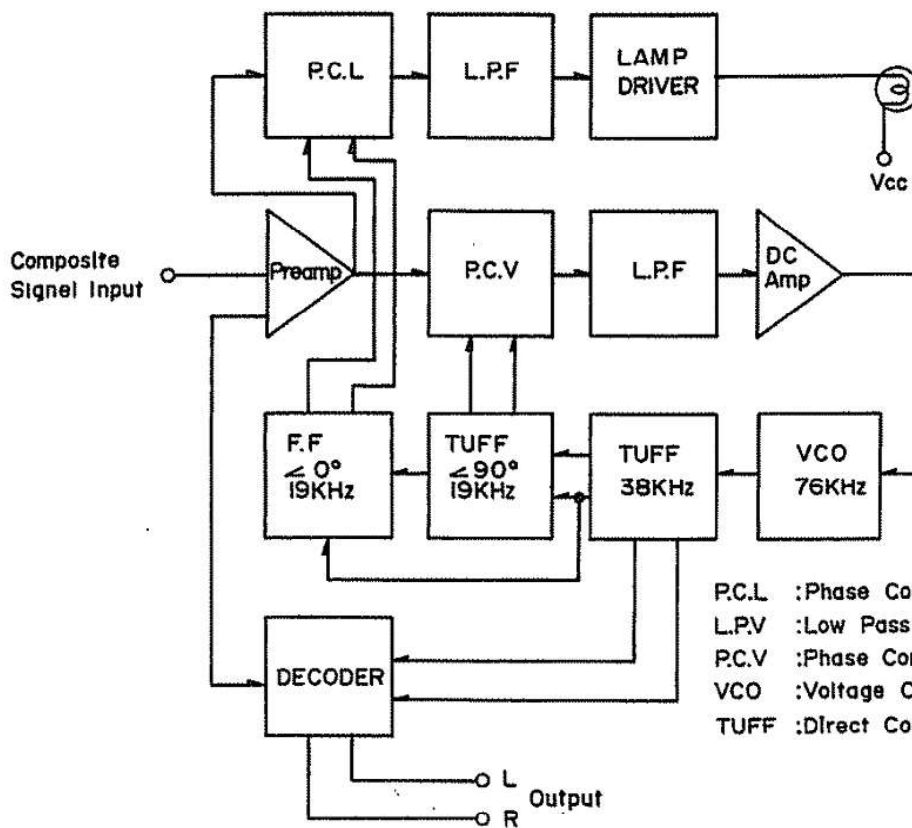
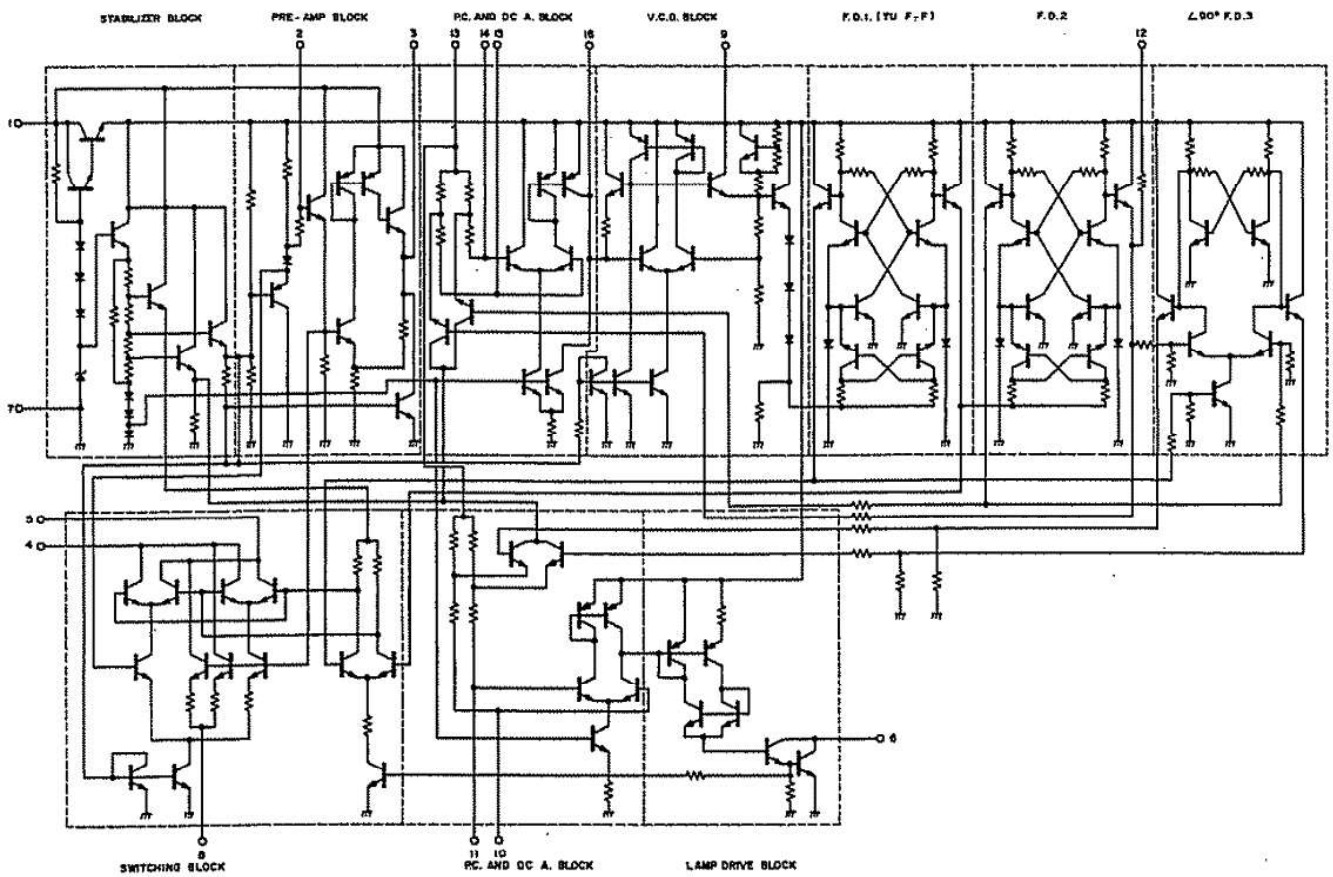
The following parts have been changed/added during the course of production:

Change	Date Code	Serial No.	Reasons
R621 Added 1.5K Ω (½W)	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.
R622 Added 1.5K Ω (½W)	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.
Watt Meter P-230075 to P-230083	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.
D612 Added 2-1K-261	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.
D613 Added 2-1K-261	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.
D614 Added 2-1K-261	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.
D615 Added 2-1K-261	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.
Thermistor TH601 Added STD-500	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.
TH602 Added STD-500	8A8	111302	To decrease unbalanced WATT Meter levels for rise or drop of temperature.

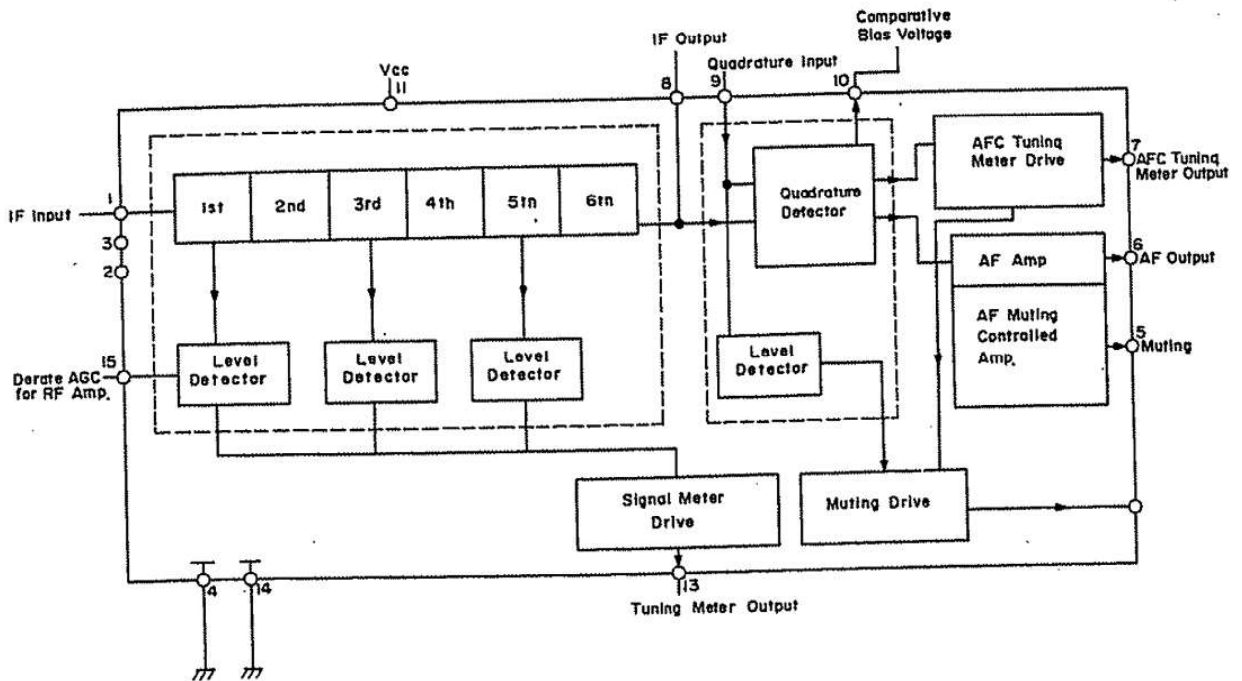
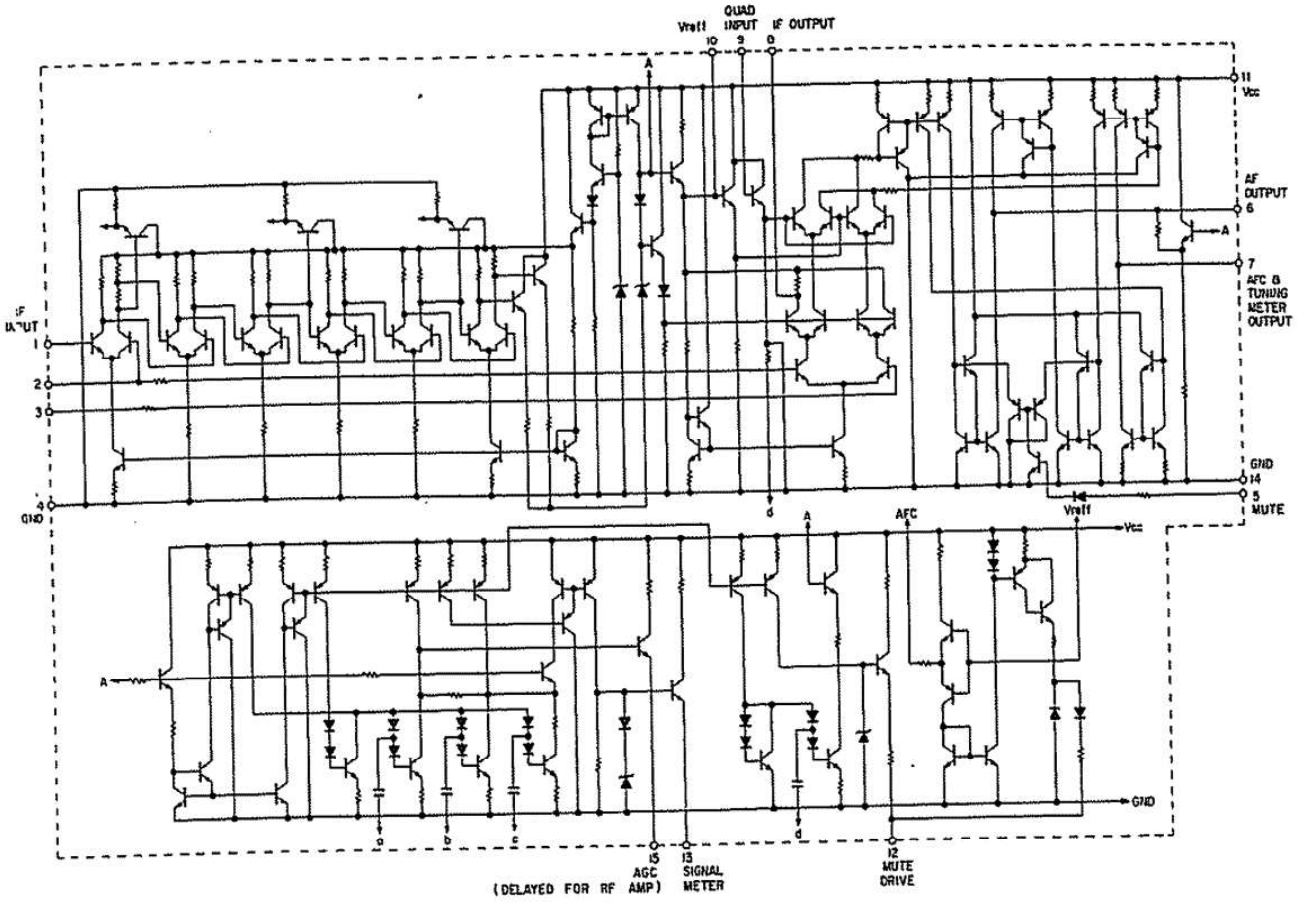
(30) IC INTERNAL DIAGRAM

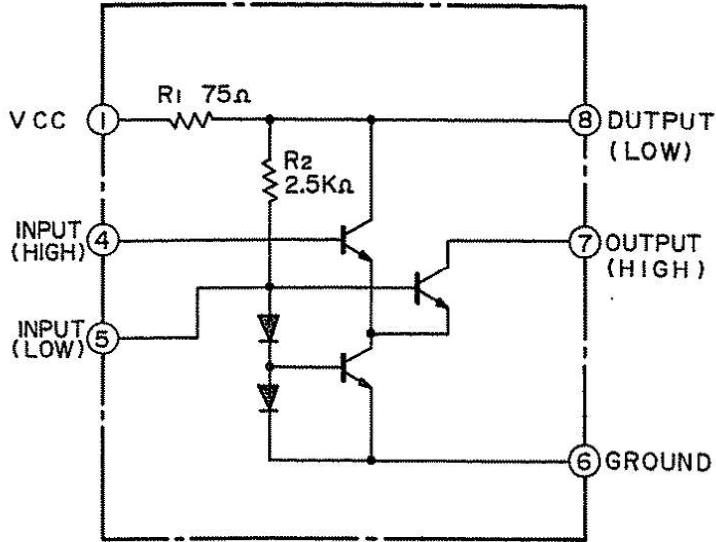
HA-1197





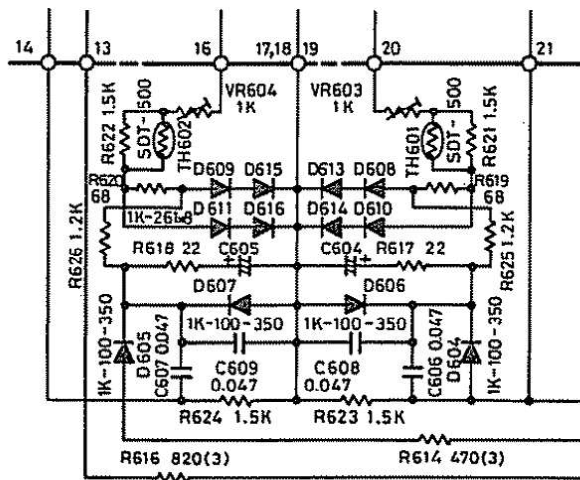
P.C.L :Phase Comparator for Lamp
 L.P.V :Low Pass Filter
 P.C.V :Phase Comparator for VCO
 VCO :Voltage Controlled Oscillator
 TUFF :Direct Coupled Type Flip-flop,





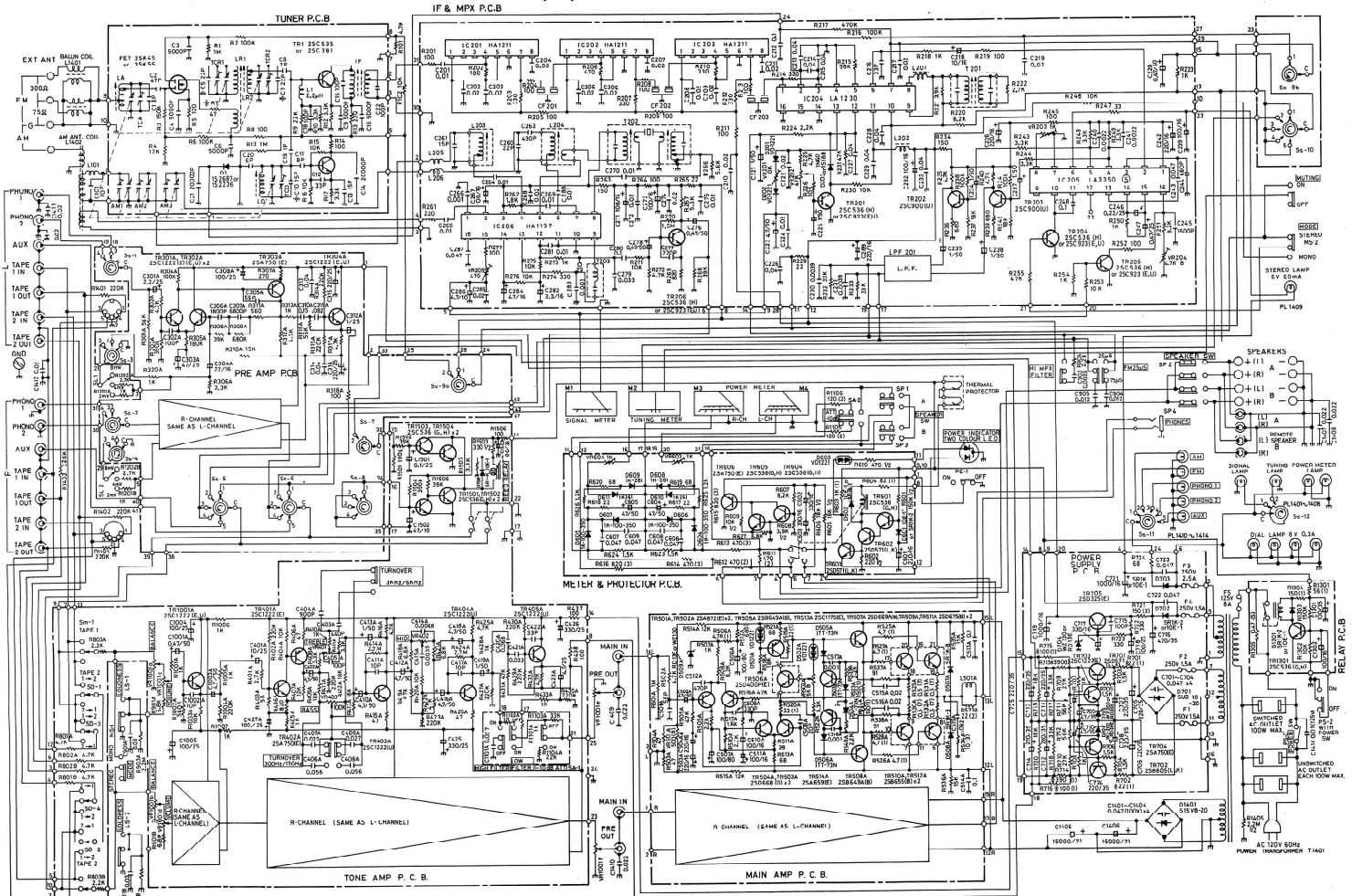
CIRCUIT CHANGE

The "METER" Circuit has been changed from Serial No. "111302".



(31) SCHEMATIC DIAGRAM

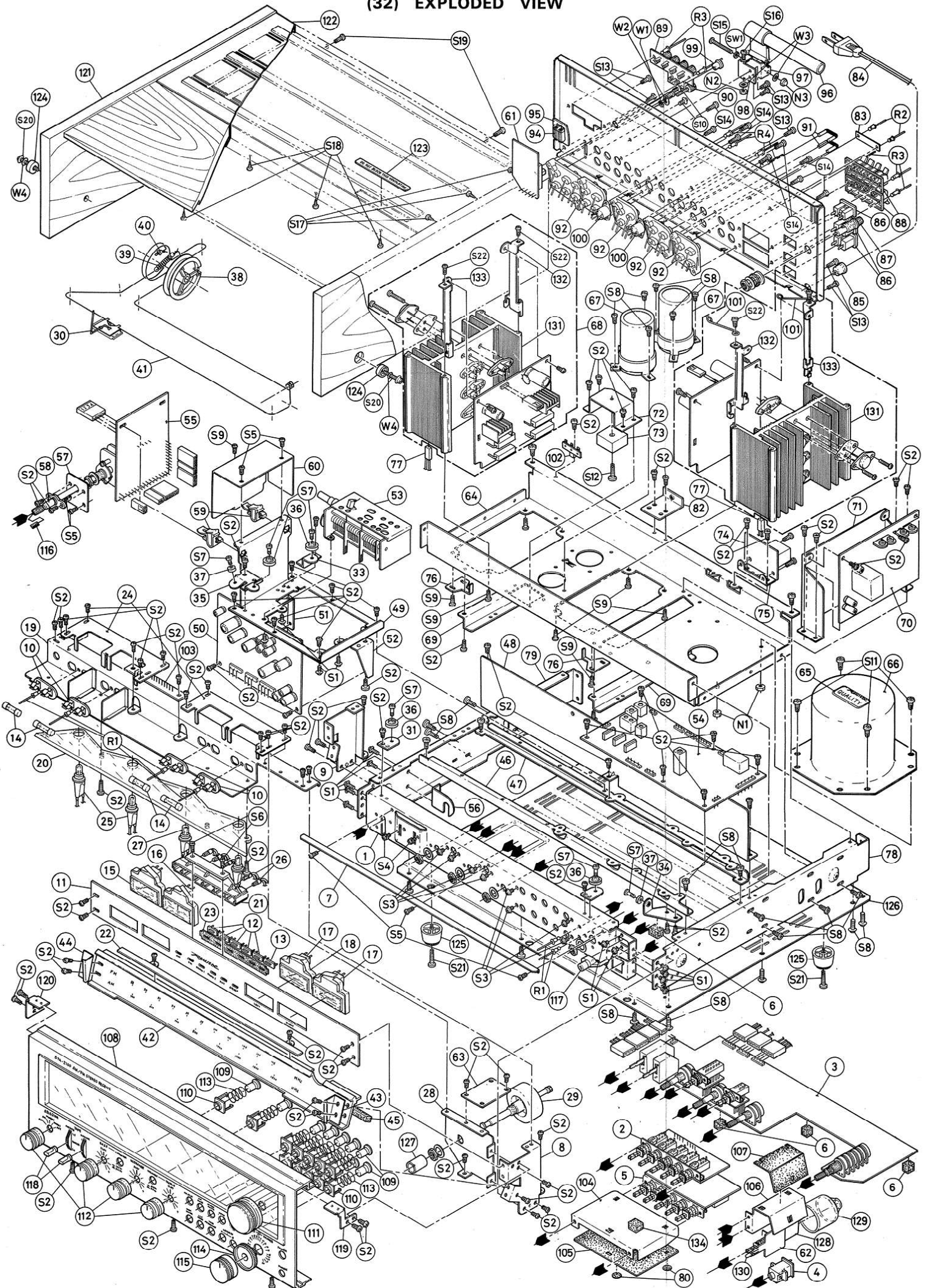
STA-2100 Cat. No. 31-2076



NOTE

- | | | | | |
|------------------|---|-------------|----------------------------------|--|
| 1) S61-S612 | : SELECTOR Switch 1-AM, 2-FM, 3-PHONO 1, 4-PHONO 2, 5-AUX, C-COMMON | 8) S01-S04 | : TAPE DUBBING Switch | 15) All Resistance values are indicated in "Ω". (K = 10 ³ Ω, M = 10 ⁶ Ω) |
| 2) P61-P62 | : POWER Switch | 9) SM1-SM2 | : TAPE MONITOR Switch | 16) All Capacitance values are indicated in "μF". (P = 10 ⁶ μF) |
| 3) S1-S12 | : PHONO LEVEL Switch 2mV/4mV/8mV | 10) S11-S12 | : BALANCE Switch | 17) See each "T.C.G.D." sheet for voltage measurements |
| 4) VR401A-401B | : TREBLE CONTROL | 11) MS1-MS2 | : MUTE/SILENCE Switch | 18) For circuit and pin changes, see PARTS LIST, Parts Change Notice on page D7, and revised schematic diagram on page G1. |
| 5) VR402A-402B | : MIDRANGE CONTROL | 12) S13-S14 | : 10-SEG. 0-1 TUNING LOCK Switch | 19) *C1 values are used for C.S.A. models only. |
| 6) VR403A-403B | : BASS CONTROL | 13) SP1-SP2 | : SPEAKER A Switch | |
| 7) VR1001a-1001b | : BALANCE CONTROL VR1001c-1001f: VOLUME CONTROL | 14) SPS-SP4 | : SPEAKER B Switch | |

(32) EXPLODED VIEW



RADIO SHACK  A DIVISION OF TANDY CORPORATION

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

TANDY CORPORATION

AUSTRALIA

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

BELGIUM

PARC INDUSTRIEL DE NANINNE
5140 NANINNE

U. K.

BILSTON ROAD, WEDNESBURY
WEST MIDLANDS WS10 7JN