

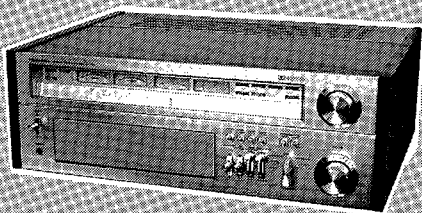


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# TOSHIBA

## AM/FM STEREO RECEIVER

# SA-7100



### SPECIFICATIONS

#### ■ AMPLIFIER SECTION

Power Output  
20 Hz ~ 20 kHz Both  
Channel Driven: 110W x 2 4 ohms  
1 kHz Both Channel  
Driven: 110W x 2 8 ohms  
140W x 2 4 ohms

Total Harmonic  
Distortion: at 8 ohms  
Rated Power Output: 0.08%  
1W: 0.03%

Intermodulation  
Distortion: 0.05%

Damping Factor: 50

Input (Sensitivity/Impedance)  
PHONO 1: 2.5 mV/47k ohms  
PHONO 2: 2.5 mV/47k ohms/  
100k ohms

TUNER/AUX: 150 mV/47k ohms  
TAPE: 150 mV/47k ohms  
PHONO Overload Level: 350 mV rms at 1 kHz  
Output Level  
TAPE REC: 150 mV  
DIN: 30 mV  
PRE OUT: 950 mV

Frequency Response  
PHONO (RIAA  
Equalization): 30 Hz to 15 kHz  $\pm 0.2$  dB  
AUX, TAPE: 10 Hz to 50 kHz  $+0.5$  dB  
Tone Control  
BASS:  $\pm 10$  dB, (100 Hz)  
TREBLE:  $\pm 10$  dB, (10 kHz)  
Loudness Contour: +8 dB (100 Hz),  
+4 dB (10 kHz)

Signal to Noise Ratio (IHF short-circuited A network,  
rated power)  
PHONO: 80 dB  
AUX, TAPE: 95 dB

Filter  
LOW: 20 Hz -6 dB/oct.  
HIGH: 7 kHz -6 dB/oct.

#### ■ FM TUNER SECTION

Usable Sensitivity: Mono 9.8 dBf (1.7  $\mu$ V)  
50 dB Quieting  
Sensitivity: Mono 14.7 dBf (3.0  $\mu$ V)  
Stereo 37.6 dBf (42  $\mu$ V)

Signal to Noise Ratio: Mono 75 dB, Stereo 68 dB  
Distortion  
100 Hz: Mono 0.1%, Stereo 0.2%  
1 kHz: Mono 0.1%, Stereo 0.2%  
6 kHz: Mono 0.2%, Stereo 0.25%  
Frequency Response: 20 Hz to 15 kHz  $+0.5$  dB,  
-1.5 dB

Capture Ratio: 1.0 dB  
Alternate Channel  
Selectivity: 80 dB  
Spurious Response Ratio: 100 dB  
Image Rejection Ratio: 85 dB  
IF Rejection Ratio: 100 dB  
AM Suppression Ratio: 55 dB  
Stereo Separation: 45 dB (1 kHz), 30 dB  
(30 Hz to 15 kHz)

#### ■ AM TUNER SECTION

Sensitivity: 300  $\mu$ V/m (IHF, ferrite  
antenna)  
Selectivity: 35 dB  
Signal to Noise Ratio: 50 dB  
Image Rejection Ratio: 45 dB

#### ■ MISCELLANEOUS

Power Requirements: AC 120V 60 Hz  
Power Consumption: 370 watts (UL) 4.4 A (CSA)  
Dimensions (W x H x D): 550 x 190 x 460 (mm)  
Weight: 19.5 kg



## 2. OPERATING CONTROLS

### FRONT VIEW

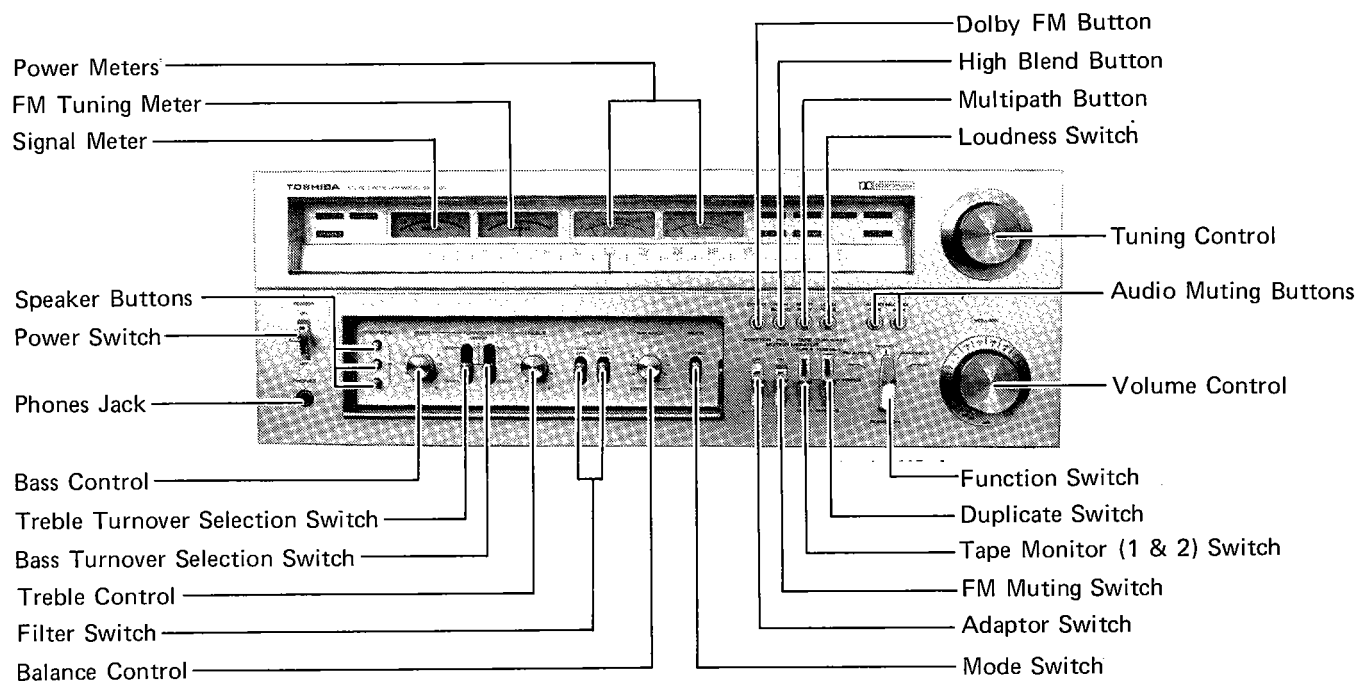


Figure 2.

### REAR VIEW

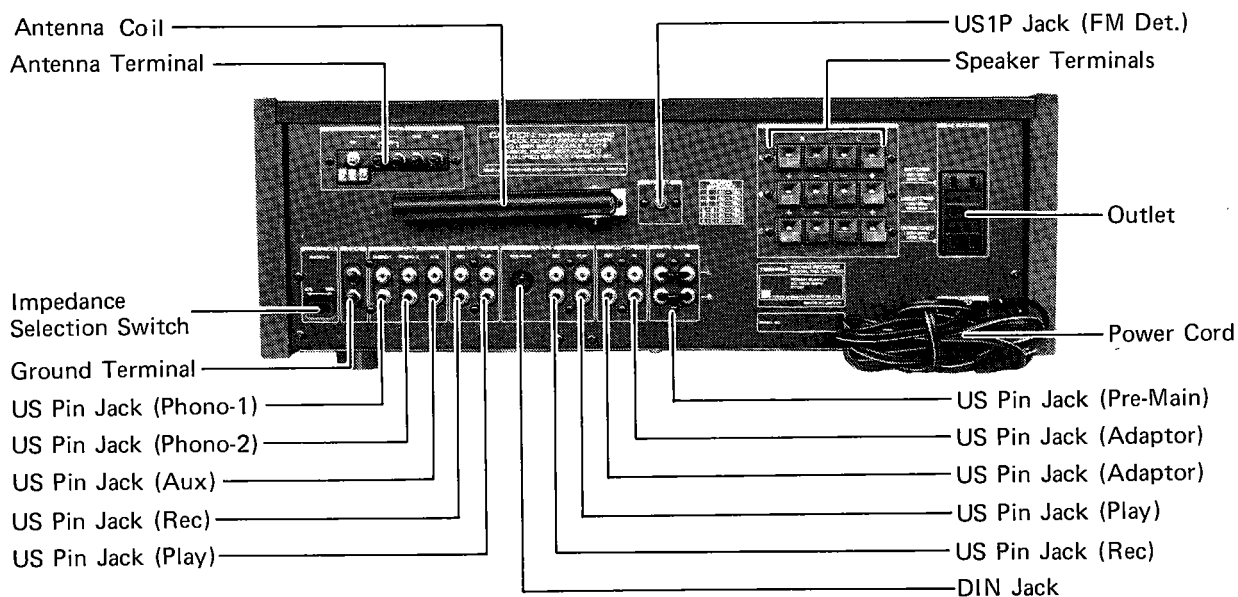


Figure 3.

### 3. DISASSEMBLY INSTRUCTIONS

#### CABINET REMOVAL

1. Remove 4 Screws ①. See figure 4.
2. Open the Cabinet in the direction ②. See figure 4.

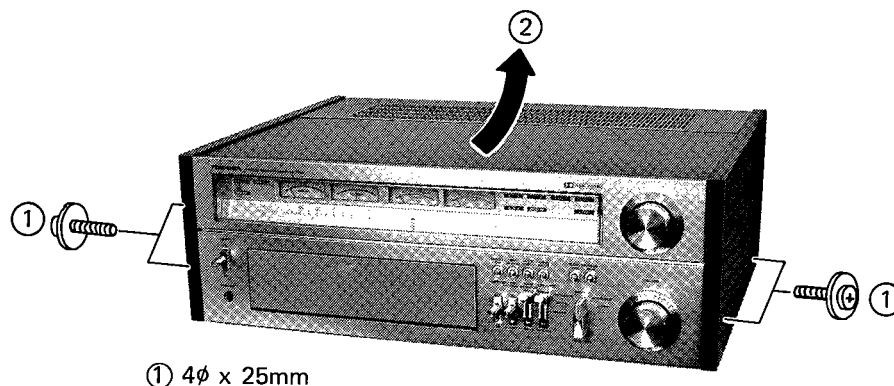


Figure 4.

#### FRONT PANEL REMOVAL

1. Remove the Cabinet. See figure 4.
2. Remove the eleven Knobs ③. See figure 5.
3. Remove three Screws ④. See figure 6.
4. Remove three Screws ⑤. See figure 7.
5. Remove the Front Panel.

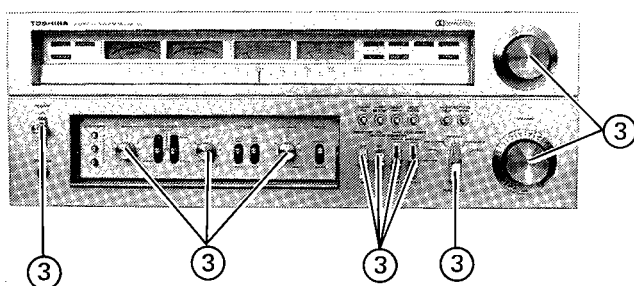


Figure 5.

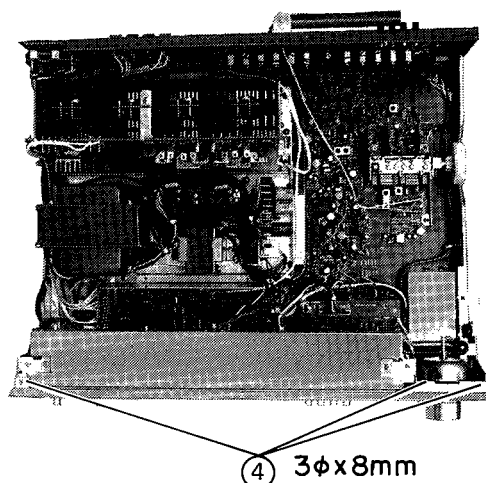


Figure 6.

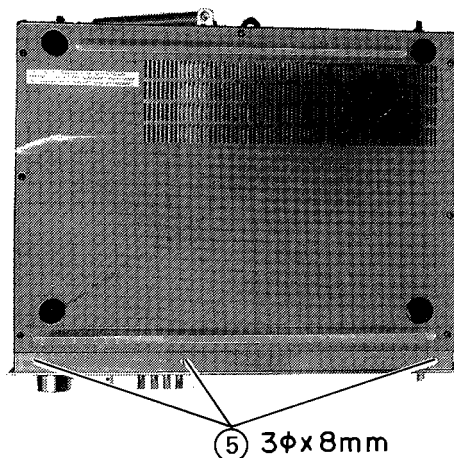


Figure 7.

## 4. DIAL CORD RESTRINGING

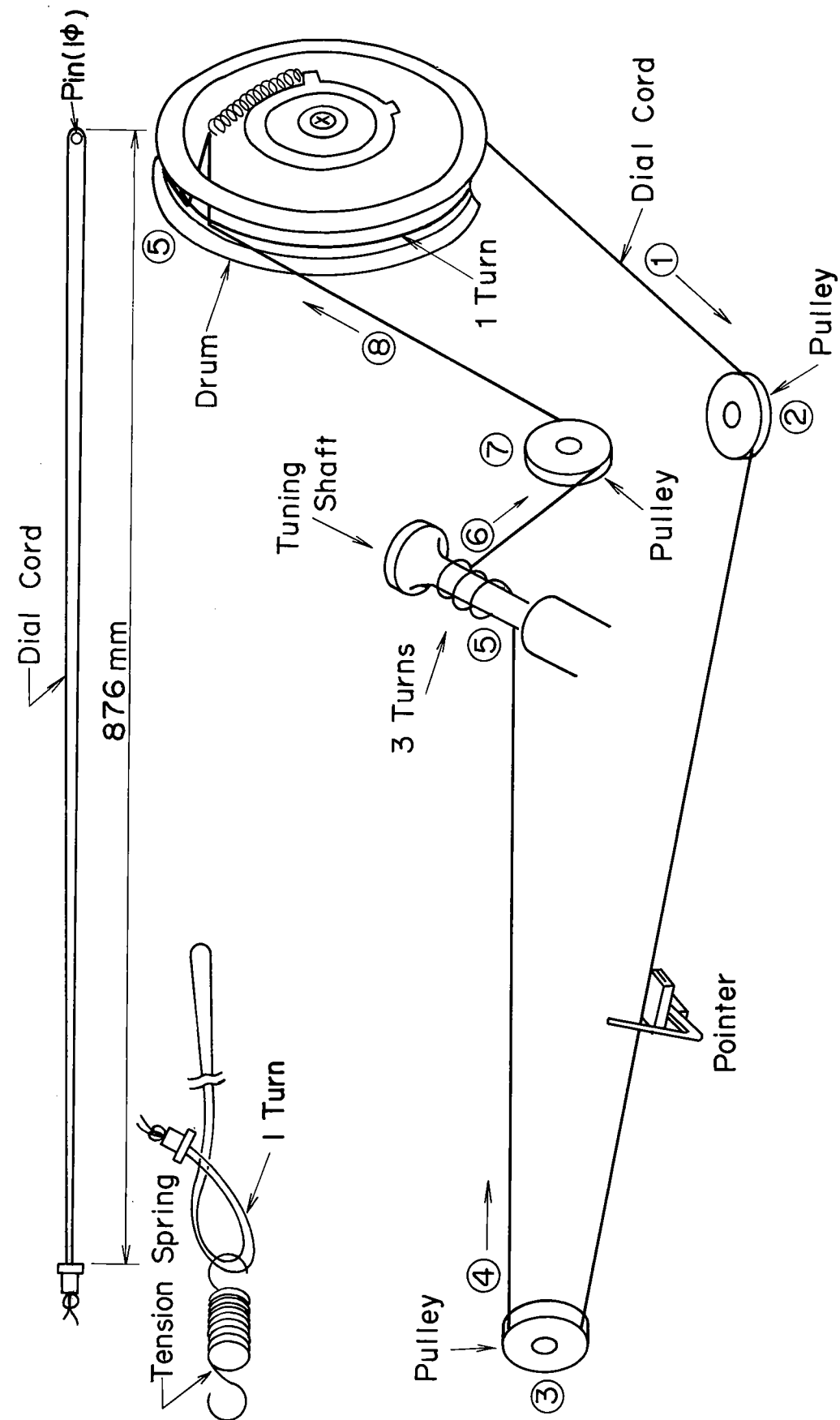
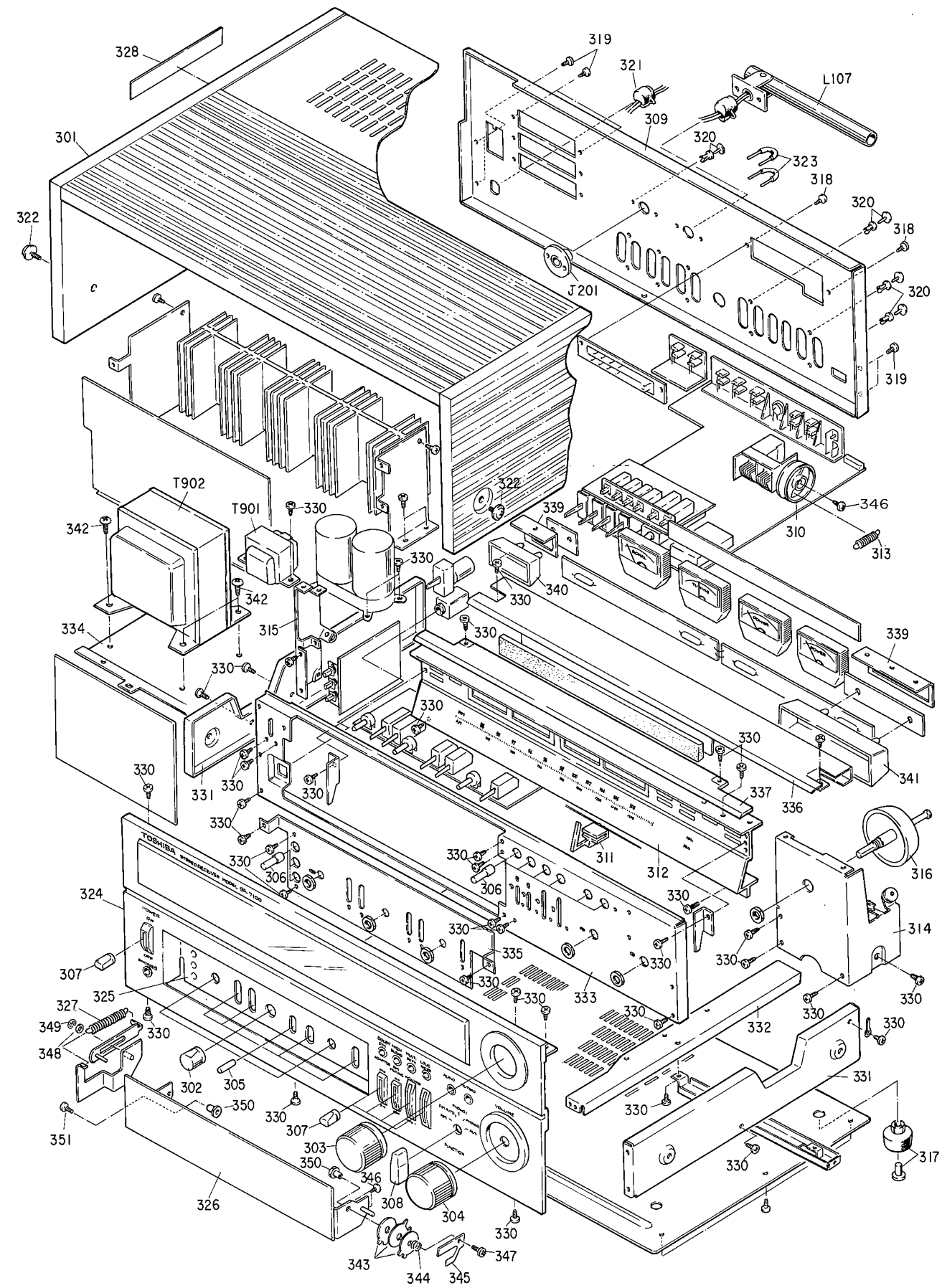


Figure 8.

## 5. CABINET PARTS LOCATIONS



## 6. CIRCUIT ADJUSTMENTS

### ADJUSTMENT POINTS

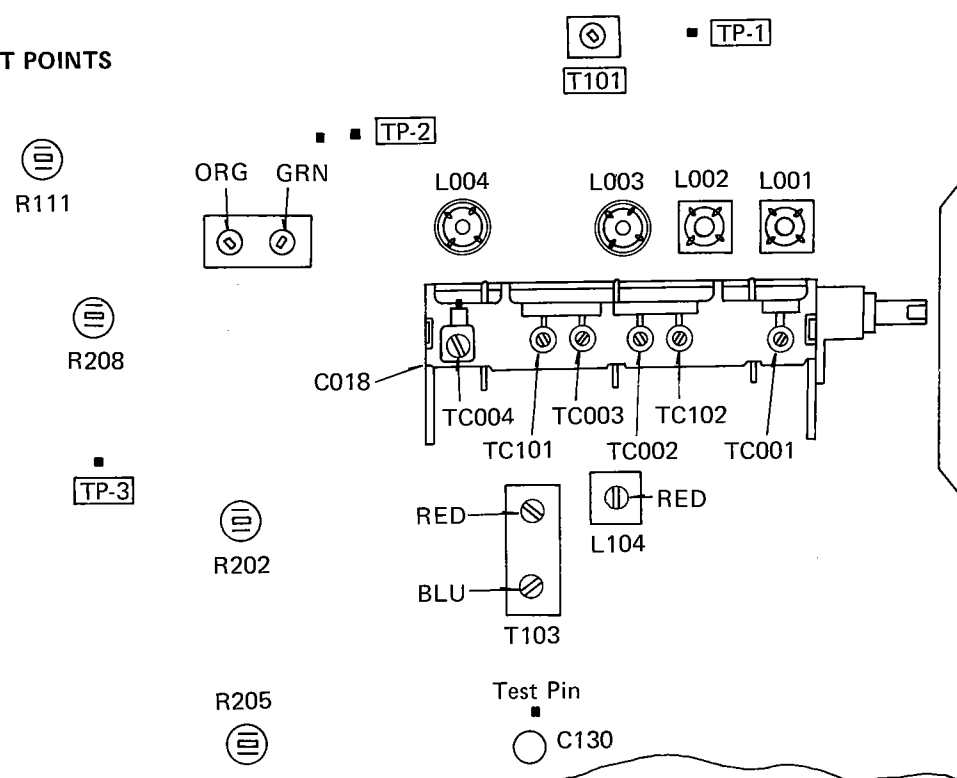


Figure 10. Top View of Tuner P.C. Board

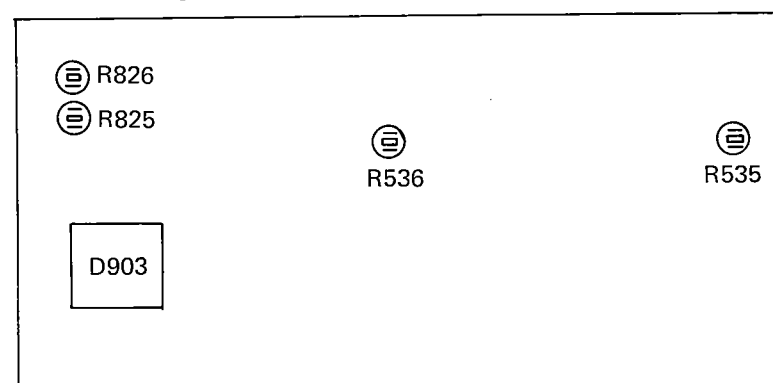


Figure 11. Top View of Main, Protector and Meter P.C. Board

### IF ADJUSTMENT

Adjusting Circuit	Connection		Adjustment	Remarks
	Input	Output		
IF	Connect signal generator to AM Ferrite Antenna.	Connect signal generator to Test Pin.	RED BLUE IT103 (Red and Blue)	Adjust for scope pattern with specified marker (455 kHz) as illustrated in Fig. 12.

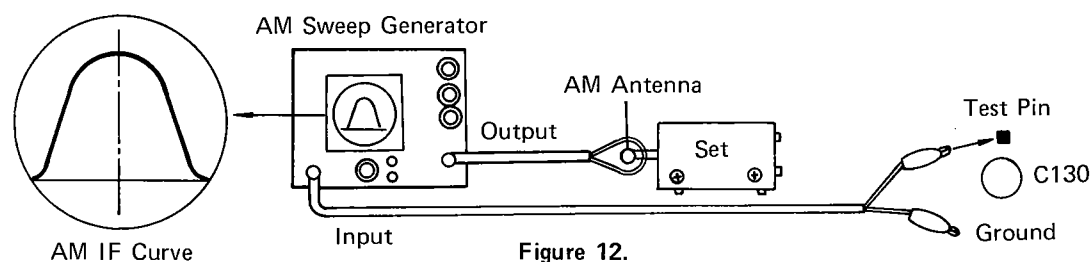


Figure 12.

### FREQUENCY COVERAGE AND TRACKING ADJUSTMENTS

Step	Adjusting Circuit	Connection		SG Frequency	Position of Tuning Dial	Adjustment	VTVM
		Input	Output				
1	OSC (Frequency Coverage)	Connect signal generator to test loop. SG output 120 dB	Connect VTVM to REC PIN JACK (TAPE-1)	600 kHz (400 Hz 30% MOD.)	Tune to 600 kHz signal	L104	Maximum
2				1400 kHz (400 Hz 30% MOD.)	Tune to 1400 kHz signal	TC101	
Repeat steps 1 and 2.							
3	ANT (Tracking)	Connect signal generator to test loop.	Connect VTVM to REC PIN JACK (TAPE-1)	600 kHz (400 Hz 30% MOD.)	Tune to 600 kHz signal	Ferrite Ant. Coil L107	Maximum
4				1400 kHz (400 Hz 30% MOD.)	Tune to 1400 kHz signal	TC102	
Repeat steps 3 and 4.							

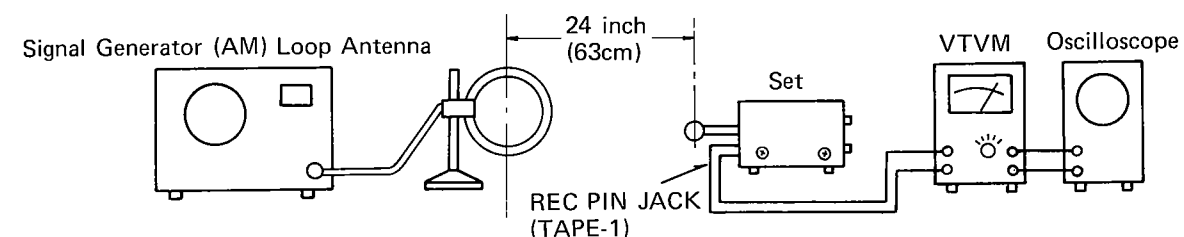


Figure 13.

### FM ADJUSTMENT

#### IF ADJUSTMENT

Step	Adjusting Circuit	Connection		SG Frequency	Position of Tuning Dial	Adjustment	Remarks
		Input	Output				
1	IF	Connect sweep generator to Test Point (TP-1).	Connect oscilloscope to Test Point (TP-2).	10.7 MHz	Tuning Gang fully counter-clockwise.	T102 (Orange Color)	Adjust for the best waveform. 
2						T102 (Green Color)	Adjust for straight line in bandwidth. 
3						T101	Adjust for minimum noise in bandwidth.



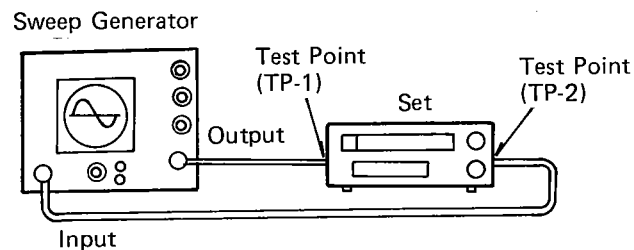


Figure 14.

## FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Step	Adjusting Circuit	Connection		SG Frequency	Position of Tuning Dial	Adjustment	Remarks
		Input	Output				
1	OSC. (Frequency Coverage)	Connect FM Signal generator to FM antenna terminal. (300 ohm)	Connect VTVM to REC PIN JACK (TAPE-1)	88 MHz (1 kHz 100% MOD.)	Tune to 88 MHz Signal.	L004	Adjust for tuning meter probe at center position.
2				108 MHz (1 kHz 100% MOD.)	Tune to 108 MHz Signal.	TC004	
Repeat steps 1 and 2.							
3	RF (Tracking)	Connect FM Signal generator to FM antenna terminal. (300 ohm)	Connect VTVM to REC PIN JACK (TAPE-1)	88 MHz (1 kHz 100% MOD.)	Tune to 88 MHz Signal.	L001 L002 L003	Adjust for minimum S/N ratio.
4				108 MHz (1 kHz 100% MOD.)	Tune to 108 MHz Signal.	TC001 TC002 TC003	
Repeat steps 3 and 4.							

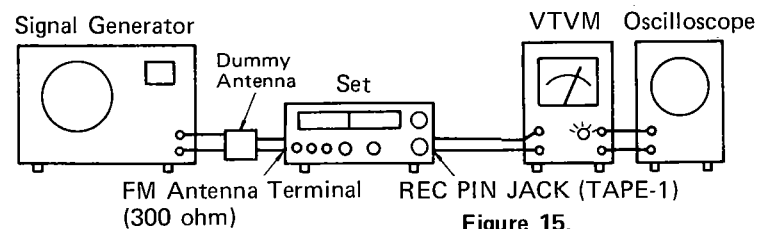


Figure 15.

## PILOT SIGNAL ADJUSTMENT

Step	Connection		SG Frequency	Position of Tuning Dial	Adjustment	Remarks
	Input	Output				
1	—	Connect frequency counter to Test Point (TP-3).	—	Any position.	R202	Adjust the R202 for 19±0.1 kHz reading counter no signal input.

## DISTORTION ADJUSTMENT

Step	Connection		SG Frequency	Position of Tuning Dial	Adjustment	Remarks
	Input	Output				
1	Connect FM signal generator to FM antenna terminal (300 ohm) output 60 dB.	Connect VTVM, oscilloscope and distortion meter to REC PIN JACK (TAPE-1)	98 MHz	Tune to 98 MHz signal.	T102 (Green Color) T101	Minimum distortion.

## SEPARATION ADJUSTMENT

Step	Connection		SG Frequency	Position of Tuning Dial	Adjustment	Remarks
	Input	Output				
1	Connect FM signal generator to FM antenna terminal (300 ohm). Connect the modulator to signal generator.	Connect VTVM, oscilloscope to REC PIN JACK L and R. (TAPE-1)	98 MHz	Tune to 98 MHz signal.	R208	Adjust opposite channel's output level for minimized indication.

## DOLBY FREQUENCY CHARACTERISTIC ADJUSTMENT

Step	Connection		SG Frequency	Position of Tuning Dial	Adjustment	Remarks
	Input	Output				
1	Connect signal generator to FM antenna terminal (300 ohms) 50% MOD. 60 dB 400 Hz/2 kHz	Connect VTVM to REC PIN JACK (TAPE-1)	98 MHz	Tune to 98 MHz signal.	R205	Tune in 98 MHz and set the output to 0 dB. (400 Hz 50% MOD.)
2						Lower signal generators modulation degree and set output to -15.7 dB. (400 Hz)
3						Shift modulation frequency of signal generator from 400 Hz to 2 kHz and adjust R205 to set output to -20 dB.

## IDLING ADJUSTMENT

1. Connect a tester to test points No. 1 and 3, 2 and 4, 5 and 7, 6 and 8.
2. Adjust the semi-fixed Resistors (R535 and R536) so that the tester indicates 8.8mV to 22mV.

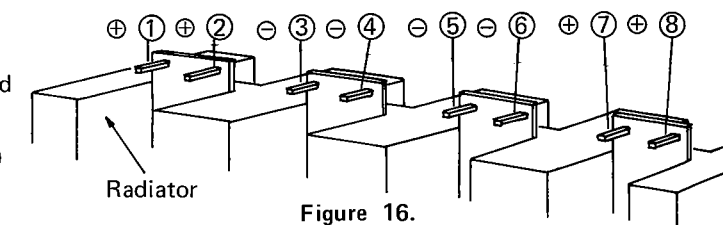


Figure 16.

## POWER METER ADJUSTMENT

Step	Connection		SG Frequency	Volume Control	Adjustment	Remarks
	Input	Output				
1	Connect signal generator to AUX JACK.	Connect 8 ohm and VTVM to speaker terminal A.	1 kHz	Maximum	R825 R826	Increase input to get 20V at 8 ohm load.
2						Adjust so the power meter indicates 50W at 20V of output voltage.

## FM SIGNAL METER ADJUSTMENT

Step	Connection		SG Frequency	Position of Tuning Dial	Adjustment	Remarks
	Input	Output				
1	Connect signal generator to FM antenna terminal. (300 ohm)	—	98 MHz (1 kHz 100% MOD. 100 dB)	Tune to 98 MHz signal.	R111	Adjust so the signal meter indicates fully 5 scale.

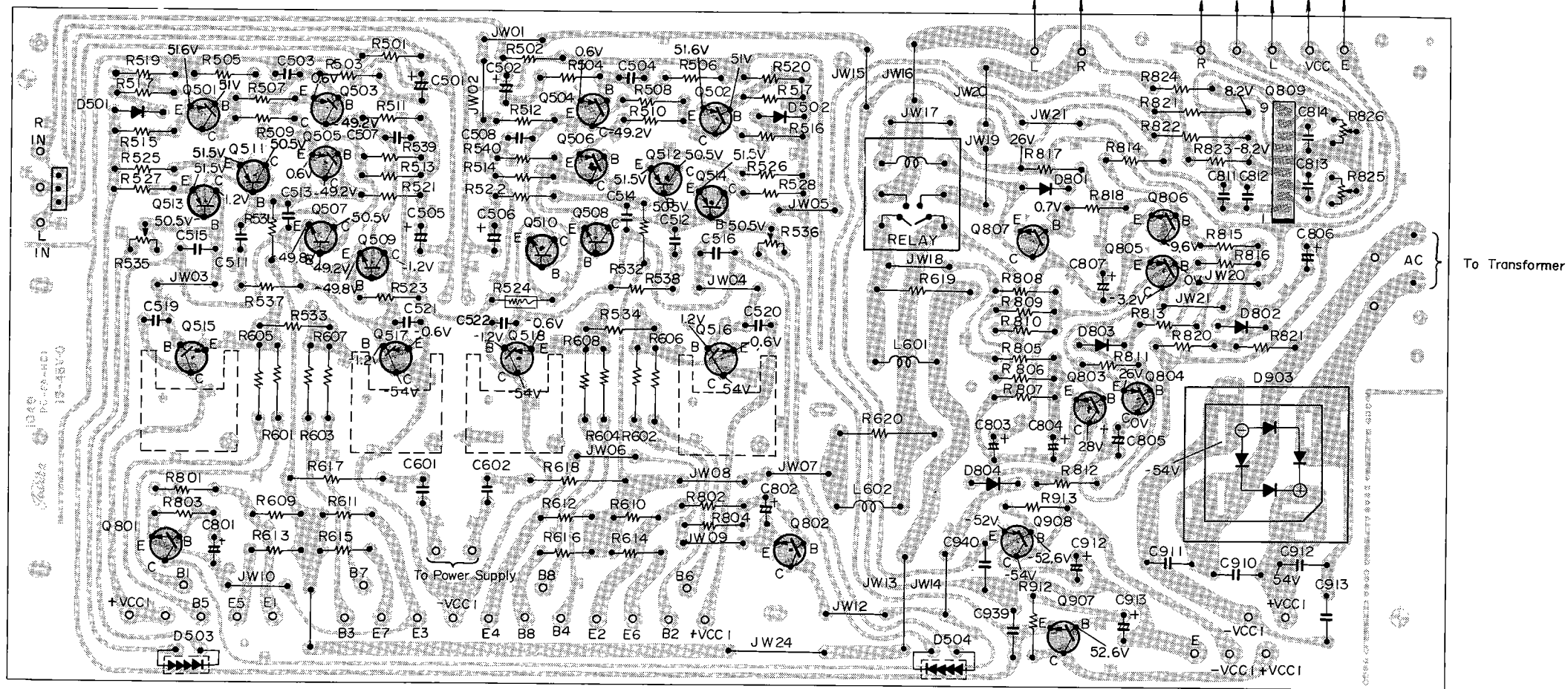


## P.C. BOARD PARTS LOCATIONS

[illegible]

- 11 -

## BOTTOM VIEW OF MAIN, PROTECTOR, METER P.C. BOARD







## 9. SCHEMATIC DIAGRAM

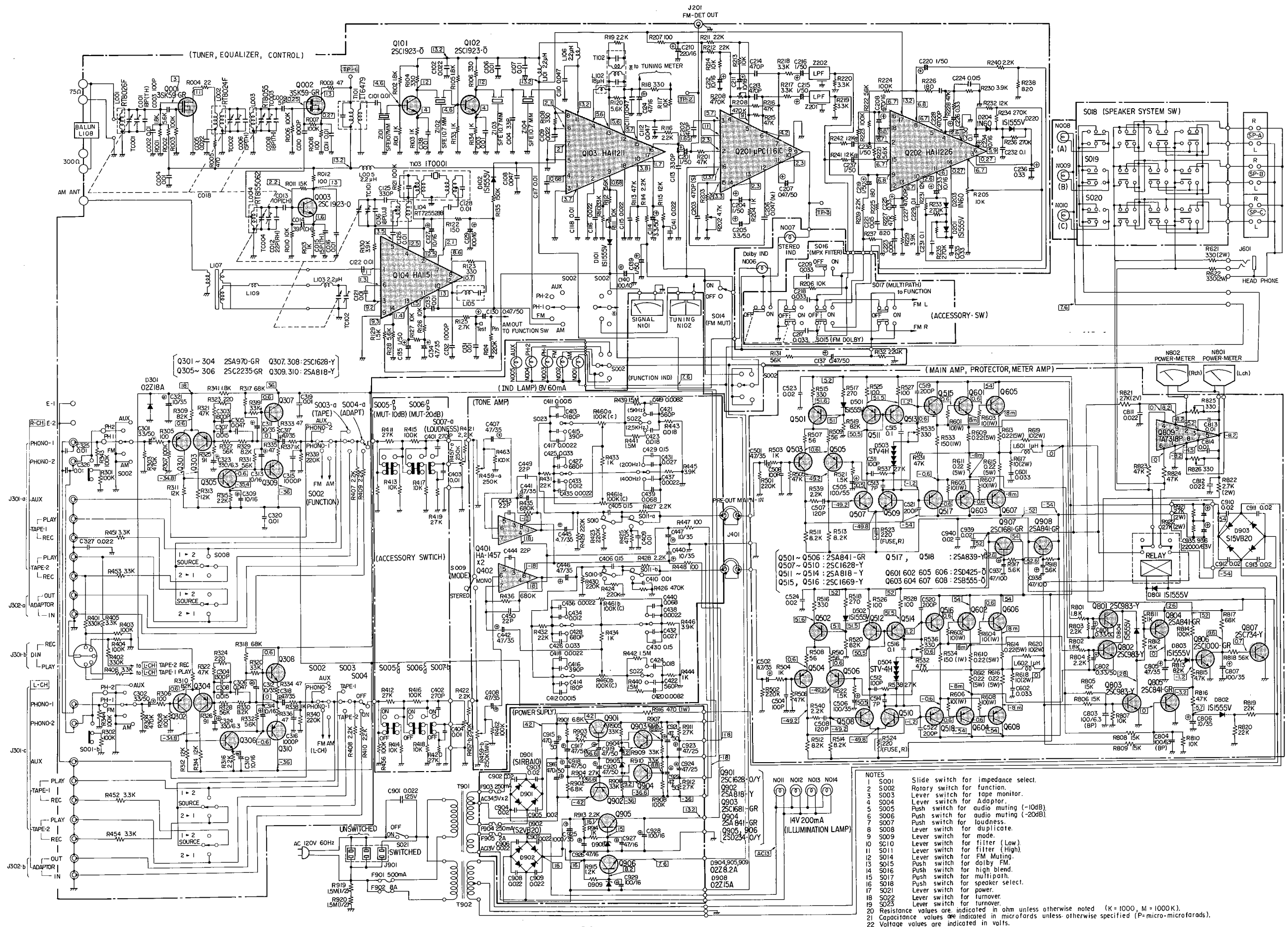


Figure 26.

# 10. PARTS LIST

No.	Part No.	Description
<b>CABINET PARTS</b>		
	20815167	Cabinet Ass'y
	22824237	Knob, Bass/Treble/Balance
	22826176	Knob, Tuning
	22826177	Knob, Volume
	22826205	Knob, Lever, Turnover/Filter/Mode
	22826206	Knob, Push
	22834984	Knob, Lever
	22834851	Knob, Function
	20015132	Plate, Jack (America)
	20015150	Plate, Jack (Canada)
	22742149	Drum, Dial
	20041059	Pointer Ass'y
	20831278	Dial Scale Ass'y
	20866009	Spring, Dial Drum
	22719118	Pulley Ass'y, Right
	22719119	Pulley Ass'y, Left
	22749174	Shaft Ass'y, Tuning
	22828059	Leg
	22701325	Screw (BID), 3/8 x 8mm
	22701326	Tapping Screw, 3/8 x 8mm
	22705022	Rivet, Plastic, 3/8 x 5.5mm
	25845528	Bush, Cord
	22707184	Screw, 4/8 x 25mm
	22164392	2P Plug
	20017118	Panel Ass'y
	20836102	Plate, Decoration
	22843574	Door, Panel
	25771907	Spring, Door
	22950592	Label, Caution
<b>TRANSISTORS, ICS AND DIODES</b>		
		Transistor, 3SK59-GR
		Transistor, 3SK59-GR
		Transistor, 2SC1923-O
		Transistor, 2SC1923-O
		Transistor, 2SC1923-O
	22114626	IC, HA11211
	22114472	IC, HA1151
	22114627	IC, $\mu$ PC1161
	22114624	IC, HA11226
302		Transistor, 2SA970-GR
304		Transistor, 2SA970-GR
306		Transistor, 2SC2235-O
308		Transistor, 2SC1628-Y.JA
310		Transistor, 2SA818-Y.JA
	22114630	IC, HA1457
502		Transistor, 2SA841-GR
504		Transistor, 2SA841-GR
506		Transistor, 2SA841-GR

Symbol No.	Part No.	Description
Q507, 508		Transistor, 2SC1628-Y.JA
Q509, 510		Transistor, 2SC1628-Y.JA
Q511, 512		Transistor, 2SA818-Y.JA
Q513, 514		Transistor, 2SA818-Y.JA
Q515, 516		Transistor, 2SC1669-Y
Q517, 518		Transistor, 2SA839-Y
Q601, 602		Transistor, 2SD425-O
Q603, 604		Transistor, 2SB555-O.JA
Q605, 606		Transistor, 2SD425-O
Q607, 608		Transistor, 2SB555-O.JA
Q801, 802		Transistor, 2SC983-Y
Q803		Transistor, 2SC983-Y
Q804, 805		Transistor, 2SA841-GR
Q806		Transistor, 2SC1000-GR
Q807		Transistor, 2SC734-Y
Q809		IC, TA7318P
Q901		Transistor, 2SC1628-Y.JA
Q902		Transistor, 2SA818-Y.JA
Q903		Transistor, 2SC1681-GR
Q904		Transistor, 2SA841-GR
Q905		Transistor, 2SD234-Y.JA
Q906		Transistor, 2SD234-Y.JA
Q907		Transistor, 2SC1681-GR
Q908		Transistor, 2SA841-GR
D101		Diode, 1S1555V
D102		Diode, 1S1555V
D201		Diode, 1S1555V
D202		Diode, 1S1555V
D203		Diode, 1N60-FD1
D204		Diode, 1N60-FD1
D301		Diode, 02Z18A
D501, 502		Diode, 1S1555V
D503, 504	22115424	Diode, STV-4H
D801		Diode, 1S1555V
D802		Diode, 1S1555V
D803		Diode, 1S1555V
D804		Diode, 1S1555V
D901	22115342	Diode, S1RBA10
D902	22115438	Diode, S2VB20
D903	22115425	Diode, S15VB20
D904, 905		Diode, 02Z8.2A
D908		Diode, 02Z15A
D909		Diode, 02Z8.2A
<b>ELECTRICAL PARTS</b>		
N101	22104400	Meter, Signal
N102	22104399	Meter, Tuning
N801, 802	22104379	Meter, Power
N001, 002, 003, 004, 005, 006, 007, 008	22113383	Lamp, Indicator, 60mA/8V

Symbol No.	Part No.	Description
N009, 010	22113383	Lamp, Indicator, 60mA/8V
N011, 012, 013, 014	22113434	Lamp, Illumination, 200mA/14V
Z101, 102, 103, 104	22153063	Filter, Ceramic
Z201, 202	22135025	Filter, Low Pass
F901	22144390	Fuse, 500mA/125V
F902	22144391	Fuse, 8A/125V
F903, 904	22144389	Fuse, 250mA/125V
F905	22144364	Fuse, 2A/125V
S001	22146691	Switch, Slide, Impedance Select
S002	22195070	Switch, Rotary, Function
S003	22195055	Switch, Lever, Tape Monitor
S004	22195057	Switch, Lever, Adaptor
S005, 006, 007, 015, 016, 017	22195040	Switch, Push
S008	22195056	Switch, Lever, Duplicate
S009	22146768	Switch, Lever, Stereo/Mono.
S010	22146768	Switch, Lever, Low Filter
S011	22146768	Switch, Lever, High Filter
S014	22195057	Switch, Lever, FM Muting
S018, 019, 020	22195041	Switch, Push, Speaker Select
S021	22195038	Switch, Lever, Power
S022	22146767	Switch, Lever, Turnover
S023	22146767	Switch, Lever, Turnover
	22148644	Relay
	22162402	Terminal, Antenna
	22162412	Terminal, 4P, Speaker
L001	22292073	Coil, FM
L002	22294294	Coil, FM
L003	22294217	Coil, FM
L004	22295062	Coil, FM, Oscillator
L005	22291082	Coil, Choke (2.2mH)
L101	22291082	Coil, Choke (2.2mH)
L102	22241036	Coil, Choke (18 $\mu$ H)
L103	22291082	Coil, Choke (2.2mH)
L104	22245288	Coil, Oscillator
L105	22264744	Transformer, IF
L106	22291082	Coil, Choke (2.2mH)
L107	22242600	Coil, Antenna, Ferrite
L108	22290002	Coil, Baloun
L109	22241013	Coil, Choke (10 $\mu$ H)
L601, 602	22210107	Coil, Choke (1 $\mu$ H)
T101	22265654	Transformer, IF
T102	22267349	Transformer, IF
T103	22266337	Transformer, IF
T901	22223109	Transformer, Power
T902	22223108	Transformer, Power
J201	22163361	Jack, US1P, FM Det.
J301	22163639	Jack, US14P, Input/Tape-1/Tape-2
J302, 303	22163671	Jack, US4P, Adaptor/Pre Main
J601	22163649	Jack, Headphones

Symbol No.	Part No.	Description
J901	22167697	Outlet, 3P
	22176549	Cord, Power
<b>CAPACITORS</b>		
NOTE: G = $\pm 2\%$ , J = $\pm 5\%$ , K = $\pm 10\%$ , M = $\pm 20\%$ , D = $\pm 0.5pF$ , Z = $-20+80\%$		
C001	22360159	Ceramic, 18pF, 50V, J
C002	22342103	Ceramic, 0.01mfd, 50V, Z
C003	22349101	Ceramic, 100pF, 50V, K
C004	22342103	Ceramic, 0.01mfd, 50V, Z
C005	22342223	Ceramic, 0.022mfd, 50V, Z
C006	22360158	Ceramic, 15pF, 50V, J
C008	22360159	Ceramic, 18pF, 50V, J
C009	22361509	Ceramic, 5pF, 50V, D
C010	22349101	Ceramic, 100pF, 50V, K
C011	22342103	Ceramic, 0.01mfd, 50V, Z
C012	22360091	Ceramic, 22pF, 50V, J
C013	22360310	Ceramic, 10pF, 50V, D
C014	22360137	Ceramic, 39pF, 50V, J
C015	22360158	Ceramic, 15pF, 50V, J
C016	22342103	Ceramic, 0.01mfd, 50V, Z
C018	22307106	Variable Capacitor
C101	22342103	Ceramic, 0.01mfd, 50V, Z
C102	22342223	Ceramic, 0.022mfd, 50V, Z
C103	22342103	Ceramic, 0.01mfd, 50V, Z
C104	22362330	Ceramic, 33pF, 50V, J
C106	22342103	Ceramic, 0.01mfd, 50V, Z
C107	22342103	Ceramic, 0.01mfd, 50V, Z
C108	22342473	Ceramic, 0.047mfd, 50V, Z
C109	22342223	Ceramic, 0.022mfd, 50V, Z
C110	22342473	Ceramic, 0.047mfd, 50V, Z
C111	22342473	Ceramic, 0.047mfd, 50V, Z
C112	22342473	Ceramic, 0.047mfd, 50V, Z
C113	22349331	Ceramic, 330pF, 50V, K
C114	22448339	Electrolytic, 3.3mfd, 50V
C115	22342223	Ceramic, 0.022mfd, 50V, Z
C116	22342223	Ceramic, 0.022mfd, 50V, Z
C117	22342103	Ceramic, 0.01mfd, 50V, Z
C118	22342103	Ceramic, 0.01mfd, 50V, Z
C121	22342103	Ceramic, 0.01mfd, 50V, Z
C122	22342103	Ceramic, 0.01mfd, 50V, Z
C124	22445471	Electrolytic, 47mfd, 16V
C125	22321049	Polypropylene, 330pF, 50V, J
C126	22342103	Ceramic, 0.01mfd, 50V, Z
C127	22445100	Electrolytic, 10mfd, 16V
C128	22342103	Ceramic, 0.01mfd, 50V, Z
C129	22445101	Electrolytic, 100mfd, 16V
C130	22448478	Electrolytic, 0.47mfd, 50V
C131	22342103	Ceramic, 0.01mfd, 50V, Z
C132	22343102	Ceramic, 1000pF, 50V, M
C133	22342103	Ceramic, 0.01mfd, 50V, Z

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
C134	22447479	Electrolytic, 4.7mfd, 35V	C320	22342103	Ceramic, 0.01mfd, 50V, Z
C135	22448109	Electrolytic, 1mfd, 50V	C321	22447100	Electrolytic, 10mfd, 35V
C136	22360178	Ceramic, 18pF, 50V, J	C323, 324	22442331	Electrolytic, 330mfd, 6.3V
C137	22448478	Electrolytic, 0.47mfd, 50V	C325, 326	22342103	Ceramic, 0.01mfd, 50V, Z
C138	22342103	Ceramic, 0.01mfd, 50V, Z	C327	22342223	Ceramic, 0.022mfd, 50V, Z
C139	22448109	Electrolytic, 1mfd, 50V	C401, 402	22321048	Polypropylene, 270pF, 50V, J
C140	22443101	Electrolytic, 100mfd, 10V	C403, 404	22371103	Mylar, 0.01mfd, 50V, J
C141	22342223	Ceramic, 0.022mfd, 50V, Z	C405, 406	22371154	Mylar, 0.15mfd, 50V, J
C201	22448109	Electrolytic, 1mfd, 50V	C407, 408	22447479	Electrolytic, 4.7mfd, 35V
C202	22321053	Polypropylene, 470pF, 50V, J	C409, 410	22371103	Mylar, 0.01mfd, 50V, J
C203	22321053	Polypropylene, 470pF, 50V, J	C411, 412	22371152	Mylar, 0.0015mfd, 50V, J
C204	22448109	Electrolytic, 1mfd, 50V	C413, 414	22321084	Polypropylene, 180pF, 50V, J
C205	22448339	Electrolytic, 3.3mfd, 50V	C415, 416	22321051	Polypropylene, 390pF, 50V, J
C206	22371473	Mylar, 0.047mfd, 50V, J	C417, 418	22371222	Mylar, 0.0022mfd, 50V, J
C207	22448478	Electrolytic, 0.47mfd, 50V	C419, 420	22371822	Mylar, 0.0082mfd, 50V, J
C208	22445471	Electrolytic, 470mfd, 16V	C421, 422	22321054	Polypropylene, 560pF, 50V, J
C209	22371333	Mylar, 0.033mfd, 50V, J	C423, 424	22371183	Mylar, 0.018mfd, 50V, J
C210	22445221	Electrolytic, 220mfd, 16V	C425, 426	22371333	Mylar, 0.033mfd, 50V, J
C211	22445100	Electrolytic, 10mfd, 16V	C427, 428	22321055	Polypropylene, 680pF, 50V, J
C212	22445100	Electrolytic, 10mfd, 16V	C429, 430	22371154	Mylar, 0.15mfd, 50V, J
C213	22321053	Polypropylene, 470pF, 50V, J	C431, 432	22371273	Mylar, 0.027mfd, 50V, J
C214	22321053	Polypropylene, 470pF, 50V, J	C433, 434	22371123	Mylar, 0.012mfd, 50V, J
C215	22448109	Electrolytic, 1mfd, 50V	C435, 436	22371222	Mylar, 0.0022mfd, 50V, J
C216	22448109	Electrolytic, 1mfd, 50V	C437, 438	22371222	Mylar, 0.0022mfd, 50V, J
C217, 218	22371333	Mylar, 0.033mfd, 50V, J	C439, 440	22371683	Mylar, 0.068mfd, 50V, J
C219	22448109	Electrolytic, 1mfd, 50V	C441, 442	22447479	Electrolytic, 4.7mfd, 35V
C220	22448109	Electrolytic, 1mfd, 50V	C443, 444	22362220	Ceramic, 22pF, 50V, K
C221	22371153	Mylar, 0.015mfd, 50V, J	C445, 446	22447479	Electrolytic, 4.7mfd, 35V
C222	22371153	Mylar, 0.015mfd, 50V, J	C447, 448	22447100	Electrolytic, 10mfd, 35V
C223	22371153	Mylar, 0.015mfd, 50V, J	C449, 450	22362220	Ceramic, 22pF, 50V, K
C224	22371153	Mylar, 0.015mfd, 50V, J	C501, 502	22447479	Electrolytic, 4.7mfd, 35V
C225	22440208	Electrolytic, 0.33mfd, 50V	C503, 504	22362101	Ceramic, 100pF, 50V, K
C226	22440208	Electrolytic, 0.33mfd, 50V	C505, 506	22447101	Electrolytic, 100mfd, 35V
C227	22371472	Mylar, 4700pF, 50V, J	C507, 508	22362121	Ceramic, 120pF, 50V, K
C228	22371472	Mylar, 4700pF, 50V, J	C511, 512	22362101	Ceramic, 100pF, 50V, K
C229	22371104	Mylar, 0.1mfd, 50V, J	C513, 514	22361709	Ceramic, 7pF, 50V, D
C230	22371104	Mylar, 0.1mfd, 50V, J	C515, 516	22371104	Mylar, 0.1mfd, 50V, J
C231	22371104	Mylar, 0.1mfd, 50V, J	C519, 520	22362201	Ceramic, 200pF, 50V, K
C232	22371104	Mylar, 0.1mfd, 50V, J	C521, 522	22362201	Ceramic, 200pF, 50V, K
C233	22445100	Electrolytic, 10mfd, 16V	C523, 524	22340032	Ceramic, 0.02mfd, 500V, Z
C234	22445100	Electrolytic, 10mfd, 16V	C601, 602	22371333	Mylar, 0.033mfd, 50V, J
C235	22440208	Electrolytic, 0.33mfd, 50V	C801, 802	22440208	Electrolytic, 0.33mfd, 50V
C236	22440208	Electrolytic, 0.33mfd, 50V	C803	22440154	Electrolytic, 100mfd, 6.3V
C237, 238	22448109	Electrolytic, 1mfd, 50V	C804	22440154	Electrolytic, 100mfd, 6.3V
C301, 302	22468339	Electrolytic, 3.3mfd, 50V	C805	22447479	Electrolytic, 4.7mfd, 35V
C303, 304	22321076	Polypropylene, 1300pF, 100V, G	C806	22447100	Electrolytic, 10mfd, 35V
C305, 306	22370223	Mylar, 0.047mfd, 250V, G	C807	22447101	Electrolytic, 100mfd, 35V
C307, 308	22370220	Mylar, 0.015mfd, 250V, G	C811, 812	22343223	Ceramic, 0.022mfd, 50V, M
C309, 310	22445100	Electrolytic, 10mfd, 16V	C813, 814	22371103	Mylar, 0.01mfd, 50V, J
C311, 312	22447100	Electrolytic, 10mfd, 35V	C901	22321206	Polypropylene, 0.022mfd, 125V, M
C313, 314	22445100	Electrolytic, 10mfd, 16V	C902, 903, 904, 905	22340032	Ceramic, 0.02mfd, 500V, Z
C315, 316	22343102	Ceramic, 1000pF, 50V, M	C906, 907	22342223	Ceramic, 0.022mfd, 50V, Z
C317, 318	22447479	Electrolytic, 4.7mfd, 35V			
C319	22342103	Ceramic, 0.01mfd, 50V, Z			

Symbol No.	Part No.	Description
C908, 909	22342223	Ceramic, 0.022mfd, 50V, Z
C910, 911, 912, 913	22340032	Ceramic, 0.02mfd, 500V, Z
C915, 916	22448471	Electrolytic, 470mfd, 50V
C917, 918	22448470	Electrolytic, 47mfd, 50V
C919, 920	22448470	Electrolytic, 47mfd, 50V
C921, 922	22448470	Electrolytic, 47mfd, 50V
C923, 924	22447470	Electrolytic, 47mfd, 35V
C925	22447102	Electrolytic, 1000mfd, 35V
C926	22445470	Electrolytic, 47mfd, 16V
C927	22445470	Electrolytic, 47mfd, 16V
C928, 929	22445101	Electrolytic, 100mfd, 16V
C935, 936	22430076	Electrolytic, 22000mfd, 63V
C937, 938	22440036	Electrolytic, 47mfd, 100V
C939, 940	22340032	Ceramic, 0.02mfd, 500V, Z

**RESISTORS**

All resistors are 1/4W,  $\pm 5\%$ , carbon film unless otherwise noted. NOTE: K =  $\pm 10\%$

R001	22545182	1.8K ohm
R002	22545562	5.6K ohm
R003	22555104	100K ohm
R004	22545220	22 ohm
R005	22545471	470 ohm
R006	22555104	100K ohm
R007	22555104	100K ohm
R008	22555101	100 ohm
R009	22545470	47 ohm
R010	22555103	10K ohm
R011	22555153	15K ohm
R012	22555101	100 ohm
R013	22555102	1K ohm
R101	22555102	1K ohm
R102	22555182	1.8K ohm
R103	22555102	1K ohm
R104	22555331	330 ohm
R105	22555182	1.8K ohm
R106	22555331	330 ohm
R108	22555331	330 ohm
R110	22555333	33K ohm
R111	22658257	10K ohm, Semi-fixed
R112	22545562	5.6K ohm
R113	22545473	47K ohm
R114	22555222	2.2K ohm
R115	22555123	12K ohm
R117	22545103	10K ohm
R118	22555331	330 ohm
R119	22545222	2.2K ohm
R120	22545562	5.6K ohm
R121	22555104	100K ohm
R122	22545151	150 ohm
R123	22555331	330 ohm

Symbol No.	Part No.	Description
R124	22555224	220K ohm
R125	22545272	2.7K ohm
R126	22555103	10K ohm
R127	22555103	10K ohm
R128	22555562	5.6K ohm
R129	22545152	1.5K ohm
R130	22555392	3.9K ohm
R131	22545563	56K ohm
R132	22545224	220K ohm
R133	22555102	1K ohm
R134	22555102	1K ohm
R135	22555154	150K ohm
R201	22555473	47K ohm
R202	22658256	4.7K ohm, Semi-fixed
R203	22555153	15K ohm
R204	22555102	1K ohm
R205	22658257	10K ohm, Semi-fixed
R206	22545103	10K ohm
R207	22555101	100 ohm
R208	22658282	470K ohm, Semi-fixed
R211	22555223	22K ohm
R212	22555223	22K ohm
R213	22545103	10K ohm
R214	22545103	10K ohm
R215	22555473	47K ohm
R216	22555473	47K ohm
R217, 218	22545332	3.3K ohm
R219, 220	22555332	3.3K ohm
R221, 222	22555562	5.6K ohm
R223, 224	22555104	100K ohm
R225, 226	22555181	180 ohm
R227, 228	22555473	47K ohm
R229, 230	22555392	3.9K ohm
R231, 232	22555123	12K ohm
R233, 234	22555274	270K ohm
R235, 236	22555274	270K ohm
R237, 238	22555821	820 ohm
R239, 240	22555222	2.2K ohm
R241, 242	22555123	12K ohm
R301, 302	22555104	100K ohm
R303, 304	22555474	470K ohm
R305, 306	22555101	100 ohm
R307, 308	22555104	100K ohm
R309, 310	22555823	82K ohm
R311, 312	22555123	12K ohm
R313, 314	22555123	12K ohm
R315, 316	22555222	2.2K ohm
R317, 318	22555683	68K ohm
R319, 320	22555333	33K ohm
R321, 322	22555472	4.7K ohm
R323, 324	22555221	220 ohm
R325, 326	22555910	91 ohm
R327, 328	22555563	56K ohm
R329, 330	22555822	8.2K ohm



Symbol No.	Part No.	Description
R331, 332	22555562	5.6K ohm
R333, 334	22555470	47 ohm
R335, 336	22555470	47 ohm
R337, 338	22555102	1K ohm
R339, 340	22555224	220K ohm
R341	22555182	1.8K ohm
R343, 344	22555104	100K ohm
R401, 402	22545334	330K ohm
R403, 404	22555104	100K ohm
R405, 406	22545332	3.3K ohm
R407, 408	22555222	2.2K ohm
R409, 410	22555222	2.2K ohm
R411, 412	22545273	27K ohm
R413, 414	22545103	10K ohm
R415, 416	22545104	100K ohm
R417, 418	22545103	10K ohm
R419, 420	22545273	27K ohm
R421, 422	22555222	2.2K ohm
R423, 424	22545224	220K ohm
R425, 426	22545474	470K ohm
R427, 428	22545222	2.2K ohm
R429, 430	22545224	220K ohm
R431, 432	22545223	22K ohm
R433, 434	22545102	1K ohm
R435, 436	22545684	680K ohm
R439, 440	22545155	1.5M ohm
R441, 442	22545155	1.5M ohm
R443, 444	22545102	1K ohm
R445, 446	22545392	3.9K ohm
R447, 448	22545101	100 ohm
R451, 452	22555332	3.3K ohm
R453, 454	22555332	3.3K ohm
R455, 456	22545104	100K ohm
R457	22650444	250K ohm, Variable, Volume
R459	22651433	250K ohm, Variable, Balance
R460	22651470	100K ohm, Variable, Treble
R461	22651470	100K ohm, Variable, Bass
R462, 463	22545104	100K ohm
R501, 502	22545224	220K ohm
R503, 504	22545102	1K ohm
R505, 506	22545473	47K ohm
R507, 508	22545560	56 ohm
R509, 510	22545560	56 ohm
R511, 512	22545822	8.2K ohm
R513, 514	22545822	8.2K ohm
R515, 516	22545331	330 ohm
R517, 518	22545271	270 ohm
R519, 520	22545823	82K ohm
R521, 522	22545152	1.5K ohm
R523, 524	22500117	220 ohm, Fusible
R525, 526	22545101	100 ohm
R528, 529	22545101	100 ohm
R531, 532	22545473	47K ohm
R533, 534	22570264	150 ohm, 1W, Metal Oxide Film

Symbol No.	Part No.	Description
R535, 536	22658457	330 ohm, Semi-fixed
R537, 538	22545272	2.7K ohm
R539, 540	22545222	2.2K ohm
R601, 602	22570250	10 ohm, 1W, Metal Film
R603, 604	22570250	10 ohm, 1W, Metal Film
R605, 606	22570250	10 ohm, 1W, Metal Film
R607, 608	22570250	10 ohm, 1W, Metal Film
R609, 610	22500186	0.22 ohm, 5W, Wire Wound
R611, 612	22500186	0.22 ohm, 5W, Wire Wound
R613, 614	22500186	0.22 ohm, 5W, Wire Wound
R615, 616	22500186	0.22 ohm, 5W, Wire Wound
R617, 618	22570295	10 ohm, 2W, Metal Film
R619, 620	22570295	10 ohm, 2W, Metal Film
R621, 622	22570313	330 ohm, 2W, Metal Oxide Film
R801, 802	22545182	1.8K ohm
R803, 804	22545222	2.2K ohm
R805	22545153	15K ohm
R806	22545153	15K ohm
R807	22545103	10K ohm
R808, 809	22545153	15K ohm
R810	22545103	10K ohm
R811	22545102	1K ohm
R812	22545153	15K ohm
R813	22545823	82K ohm
R814	22545104	100K ohm
R815	22545472	4.7K ohm
R816	22545472	4.7K ohm
R817	22545683	68K ohm
R818	22545563	56K ohm
R819	22545223	22K ohm
R820	22545223	22K ohm
R821	22570324	2.7K ohm, 2W, Metal Oxide, Film
R822	22570324	2.7K ohm, 2W, Metal Oxide, Film
R823	22545473	47K ohm
R824	22545473	47K ohm
R825, 826	22658457	330 ohm, Semi-fixed
R901, 902	22555682	6.8K ohm
R903, 904	22545272	2.7K ohm
R905, 906	22555333	33K ohm
R907, 908	22555104	100K ohm
R909, 910	22555333	33K ohm
R911, 912	22545272	2.7K ohm
R913	22555222	2.2K ohm
R914	22555102	1K ohm
R915	22555122	1.2K ohm
R916	22570270	470 ohm, 1W, Metal Oxide Film
R917, 918	22545562	5.6K ohm
R919, 920	22563155	1.5M ohm, 1/2W, K, Solid
R921, 922	22545272	2.7K ohm

## ACCESSORIES

	20951346	Owner's Manual, English
	20951349	Owner's Manual, French (Canada)
	22124452	Feeder, Antenna



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