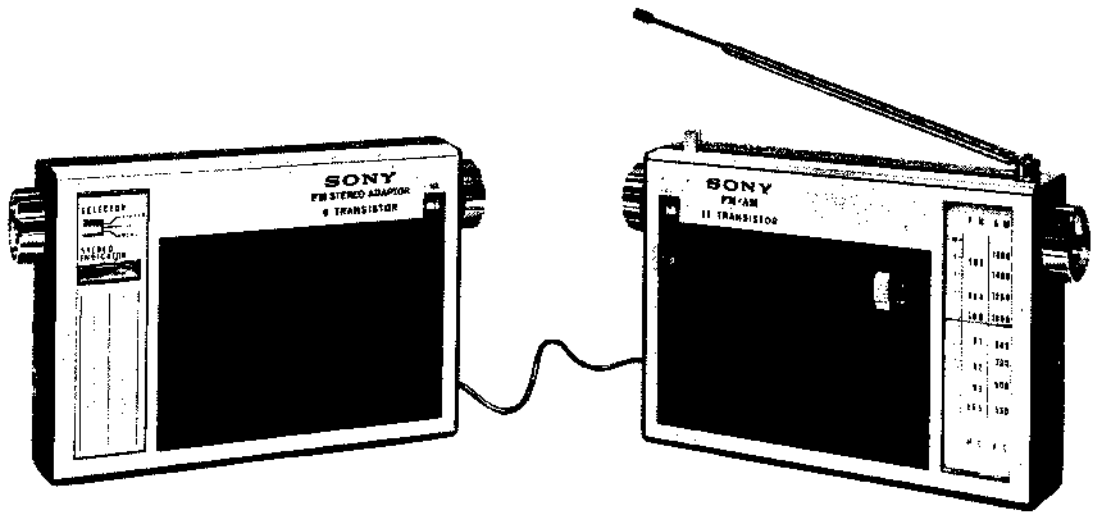
TFM-110W
STA-110



Specifications for TFM-110W

Circuit :	11 Transistor Superheterodyne
Frequency Coverage :	FM 86.5 ~ 108 Mc (3.53 ~ 2.78 m) AM 530 ~ 1,605 Kc (566 ~ 187 m)
Antenna System :	FM Built-in Telescopic Antenna AM Built-in Ferrite Bar Antenna
Intermediate Frequency :	FM 10.7 Mc AM 455 Kc
Maximum Sensitivity : (at 50 mW output)	FM 4 dB (1.5μV/m) AM 27 dB (22μV/m)
Selectivity :	AM 28 dB at 10 Kc off resonance, at 1,400 Kc
Output Power :	300 mW (undistorted) 500 mW (maximum)
Current Drain :	21mA at zero signal, 160 mA at 300 mW output
Speaker :	4" × 2-1/2" (10 × 6.5 cm) PM Dynamic, 8 Ω
Power Source :	Three Size "C" Flashlight Batteries (4.5 Volts in total), or House Current by using SONY AC Power Adapter
Dimensions :	7-1/8" × 5-3/16" × 1-7/8" (180 × 131 × 47.5 mm)
Weight :	2.1 lbs. (0.95 Kg)
Color :	Gray, Beige

SONY®

SERVICE MANUAL

TFM-110W

Block Diagram

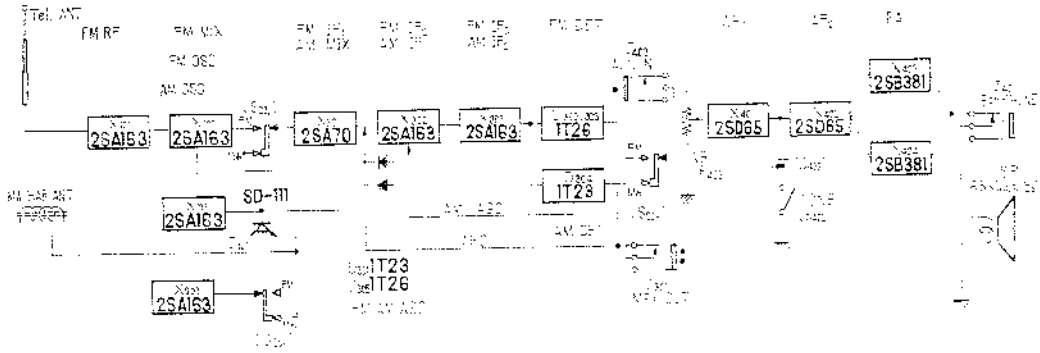


Fig. 1

Major Parts Location

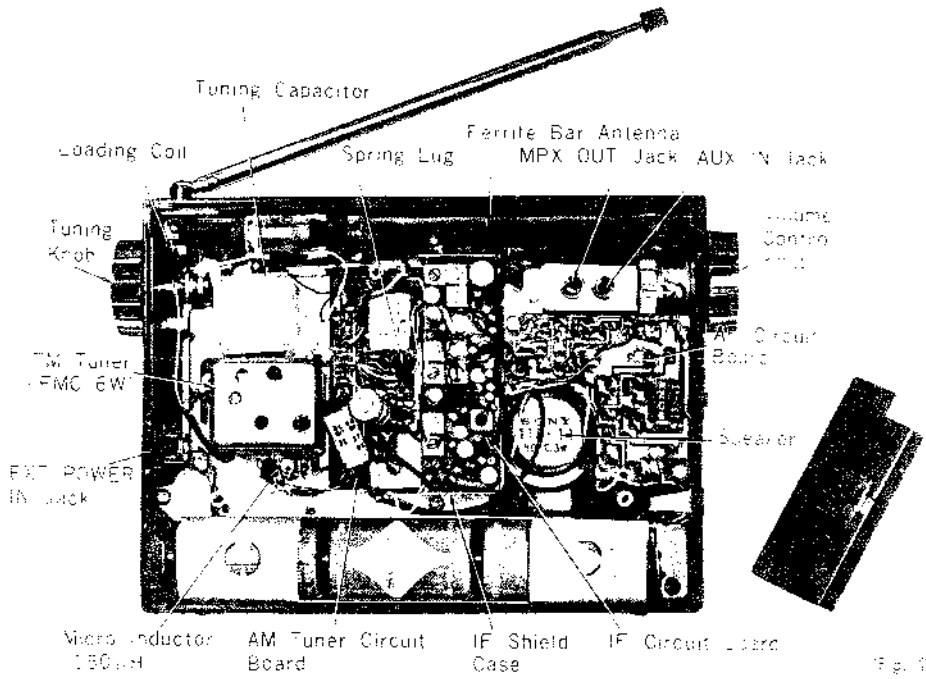


Fig. 2

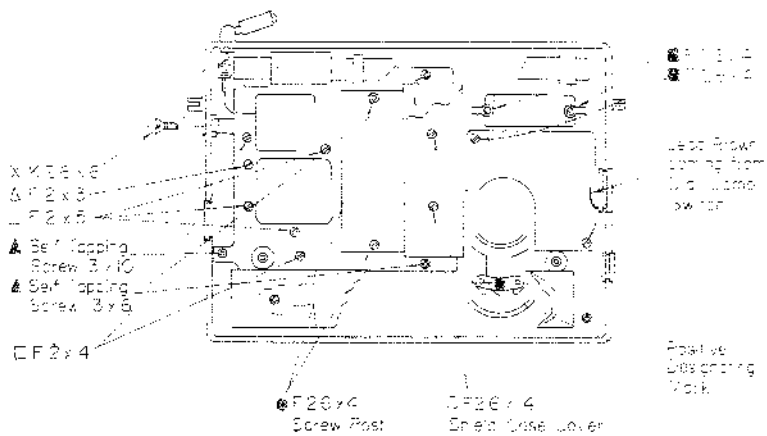


Fig. 3

Removal of Chassis

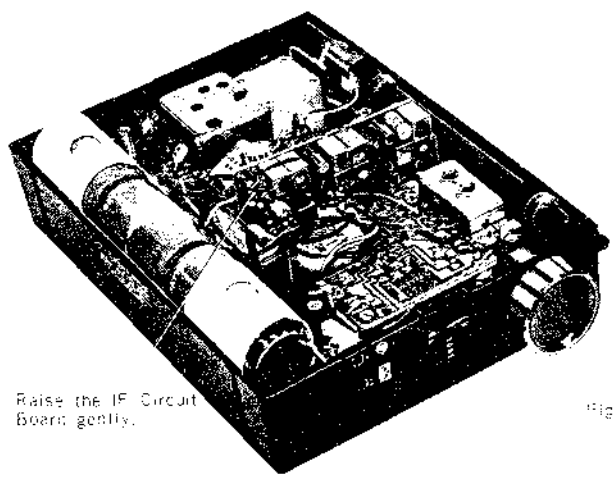
(1) Remove the three Back Cover Holding Screws (⊕RK 2.6×4) to remove the Back Cover.
(2) Take out all the Batteries.
(3) Remove a Battery Cylinder Holding Screw.
(4) Unsolder the FM Loading Coil at the Telescopic Antenna Terminal.
(5) Unsolder the following wires.
   a) Three wires (two black and a red) on the AF Circuit Board coming from the IF Circuit Board.
   b) A black wire at the Battery Positive Contact Plate.
(6) Remove the Volume Control Knob and the Tuning Knob by pulling straight out.
(7) Pull out the two black tip from the Bar Antenna Holders.
(8) Remove the Ferrite Bar at the right side of the Bar Antenna Holders.
(9) Remove the three screws marked with ▲ in Fig. 3.
   Note: Take care that the screws, A and B in Fig. 3, are different in length. So never fail to use the specified screws to the original positions in re-assembling the Chassis.
(10) Remove a screw (K 2.6×6) marked with ※ in Fig. 3.
(11) Remove the EXT POWER IN Jack from the Cabinet by pulling straight out.
(12) Take out the Chassis from the Cabinet gently taking care not to cut the leads.

Removal of AF Circuit Board

(1) Unsolder the three leads (red, yellow and a black) going to the Volume Control.
(2) Unsolder the two leads (brown and a black) going to the Multi-Jack.
(3) Remove the four screws marked with ■ in Fig. 3.
(4) Unsolder the lead (brown) at the AF Circuit Board coming from the Dial Lamp Switch.
(5) Remove the AF Circuit Board from the Cabinet gently taking care not to cut the leads.

Removal of IF Circuit Board

(1) Remove the IF Shield Case Cover.
(2) Remove the two Screws marked with ⬚ in Fig. 3.
(3) Attach tentatively the IF Shield Case to the Chassis with the two Screws removed in preceding step (2).
(4) The IF Circuit Board can be repaired by raising it gently as shown in Fig. 4.
   ☆ If it is necessary to separate the IF Circuit Board completely from the Cabinet, unsolder all the leads going from it to other points and it can now be removed.



Raise the IF Circuit Board gently.

Fig. 4.

Removal AM Tuner Circuit Board

(1) Remove the Chassis as outlined under "Removal of Chassis".

(2) Remove the IF Circuit Board from the Chassis.

(3) Remove the screw and the screw post marked with ● in Fig. 3.

(4) Remove the AM Tuner Circuit Board from the Chassis gently taking care not to cut the leads.

Removal of AM Tuning Capacitor

(1) Remove the Chassis as outlined under "Removal of Chassis".

(2) Set the Pointer to the upper end by turning the Tuning Knob. (near the 1,600 Kc)

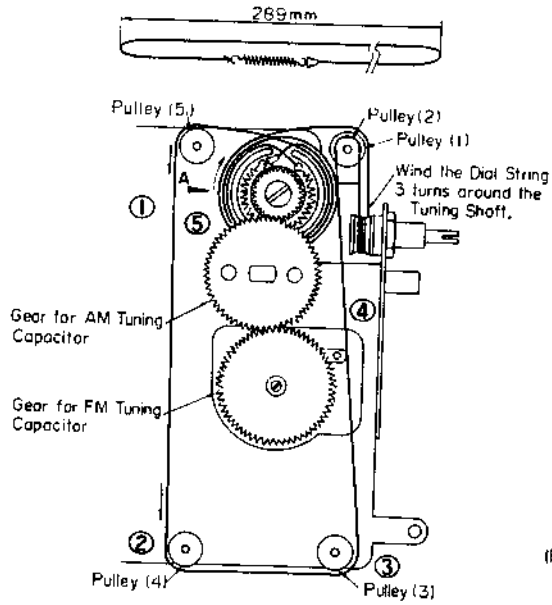
(3) Remove the Dial Cord from the Pointer.

(4) Unscrew the two screws marked with □ in Fig. 3 and remove the Dial Scale from the Chassis.

(5) Pull out the Tuning Gear for AM from the Tuning Capacitor and remove the two AM Tuning Capacitor Holding Screws.

To String the Dial Cord

String the Dial Cord in the order of figures, ①, ②, ③, ④ and ⑤, as shown below while keeping the cut portion of the Tuning Drum faces toward the right upper.



(Fig. 5)

Adjustment of each Gear

(1) Rotate the tuning drum to the extreme clockwise position.

(2) Rotate the tuning drum 1-1/4 turns counter-clockwise from the position set by preceding step (1), so that the cut portion of the drum faces toward position marked with "A" in Fig. 5.

(3) Rotate the gear for the FM tuning capacitor to the extreme clockwise position.

(4) Rotate the gear for the AM tuning capacitor to the extreme counter-clockwise position.

(5) Adjust the position of each gear so that the gears may engage each other with perfect operation.

Frequency Coverage and Tracking Adjustment

MW Band

Preparation for Adjustments

☆ Receiver to be Adjusted

Power Source Voltage :	Keep 4.5 Volts during the adjustments.
Volume Control setting :	Maximum
Tone Switch setting :	High
Band Switch setting :	AM
☆ Load for Output :	Connect 8Ω resistor instead of speaker.
☆ Output Meter : (VTVM can be used also.)	Connect across the load resistor 8Ω.
☆ Signal Source :	Use SSG (Standard Signal Generator) which can deliver RF signals modulated at 30% with 1,000 c/s.
☆ Radiating Antenna :	Use loop type.

Frequency Coverage Adjustment

(1) Deliver a 520 Kc signal from the SSG.

(2) Set the Tuning Capacitor at the maximum capacitance position by turning the Tuning Knob of the Receiver counter-clockwise.

(3) Adjust the core of the MW OSC Coil (L_{202}) to tune to the signal.

(4) Set the Tuning Capacitor at the minimum capacitance position by turning the Tuning Knob of the Receiver clockwise.

(5) Deliver a 1,680 Kc signal from the SSG.

(6) Adjust the MW OSC Trimmer Capacitor (C_{204}) to tune to the signal.

(7) Repeat the above procedures (1～6) until the frequency range between 520 Kc and 1,680 Kc is fully covered.

Tracking Adjustment

(1) Deliver a 620 Kc signal from the SSG.

(2) Tune to the signal by turning the Tuning Knob of the Receiver.

(3) Adjust the position of the MW ANT Coil (L_{201}) along the Ferrite Bar to obtain the maximum output.

(4) Deliver a 1,400 Kc signal from the SSG.

(5) Tune to the signal by turning the Tuning Knob of the Receiver.

(6) Adjust the MW ANT Trimmer Capacitor (C_{203}) to obtain the maximum output.

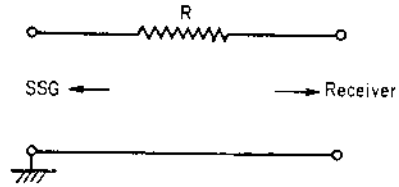
(7) Repeat the above procedures (1～6) until the maximum output is obtained.

FM Band

Preparation for Adjustments

☆ Receiver to be Adjusted

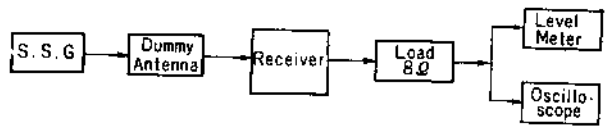
Power Source Voltage :	Keep 4.5 Volts during the adjustments.
Band Switch setting :	FM
Volume Control setting :	Maximum
☆ Load for Output :	Connect 8Ω resistor instead of Speaker.
☆ Output Meter : (VTVM can be used also)	Connect across the load resistor 8Ω.
☆ Signal Source :	Use SSG (Standard Signal Generator) which can deliver RF signals modulated at 30% with 1,000 c/s.
☆ Dummy Antenna :	Unsolder the lead at the Telescopic Antenna terminal. Connect the SSG to the telescopic antenna lead and ground of the receiver through the Dummy Antenna as shown in Fig. 6.



(Fig. 6)

* Nominal input impedance of the receiver is 75Ω.
* R is then calculated as follows :
  $R = 75\Omega - Rs\ [\Omega]$
  where Rs is output impedance of the SSG which is usually 50Ω or 75Ω.

Arrangement of Test Equipments



(Fig. 7)

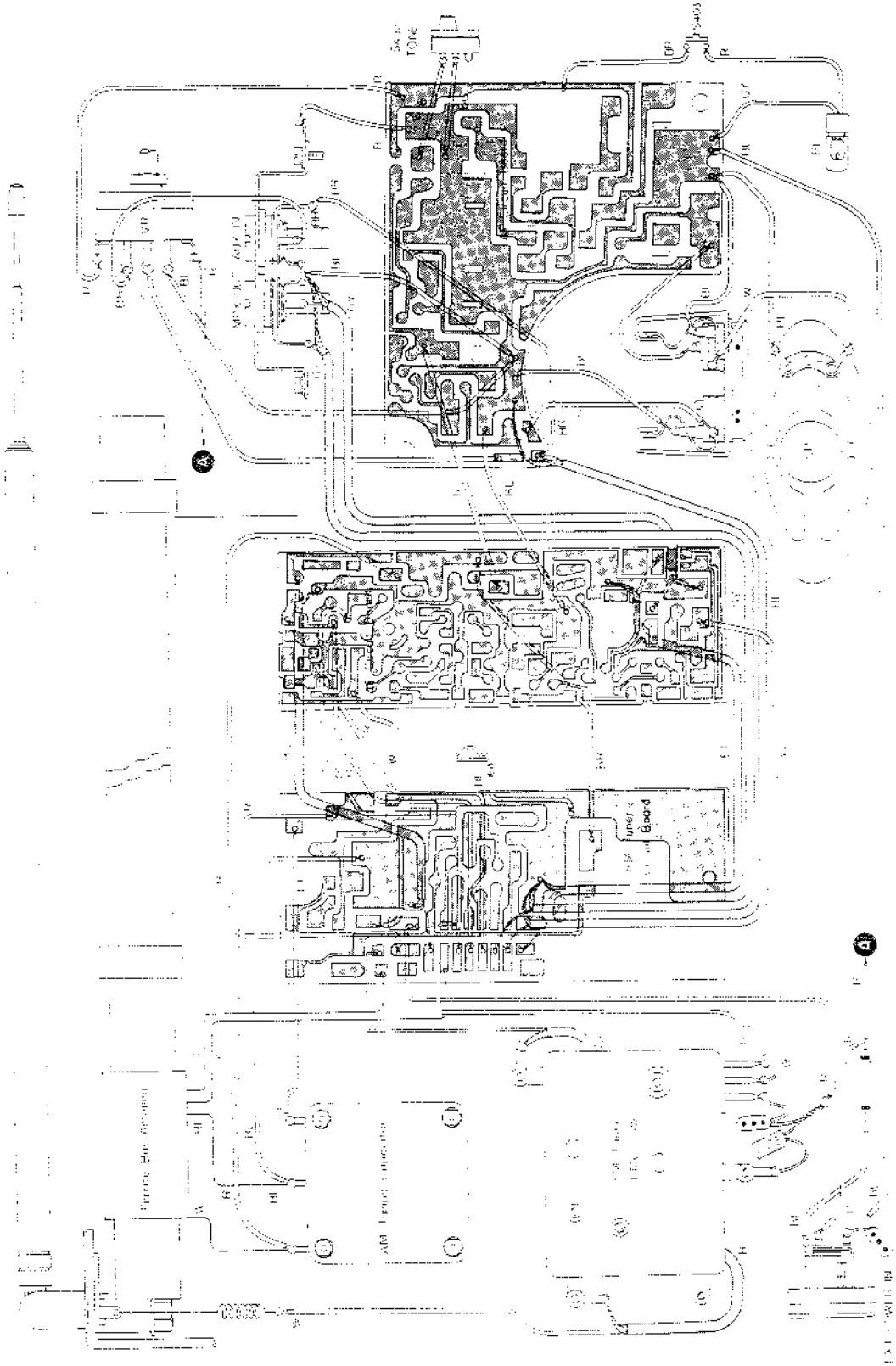
1. Frequency Coverage Adjustment

(1) Set the modulation of the SSG to "AM".
(2) Deliver a 85.5 Mc signal from the SSG.
(3) Set the Tuning Capacitor at the maximum capacitance position by turning the Tuning Knob of the Receiver counter-clockwise.
(4) Adjust the core and gap of the FM OSC Coil (L_{104}) to tune to the signal.
(5) Deliver a 109.5 Mc signal from the SSG.
(6) Set the Tuning Capacitor at the minimum capacitance position by turning the Tuning Knob of the Receiver clockwise.
(7) Adjust the FM OSC Trimmer Capacitor (C_{102-2}) to tune to the signal.
(8) Repeat the above procedures (2–7) until the frequency range between 85.5 Mc and 109.5 Mc is fully covered.

2. Tracking Adjustment

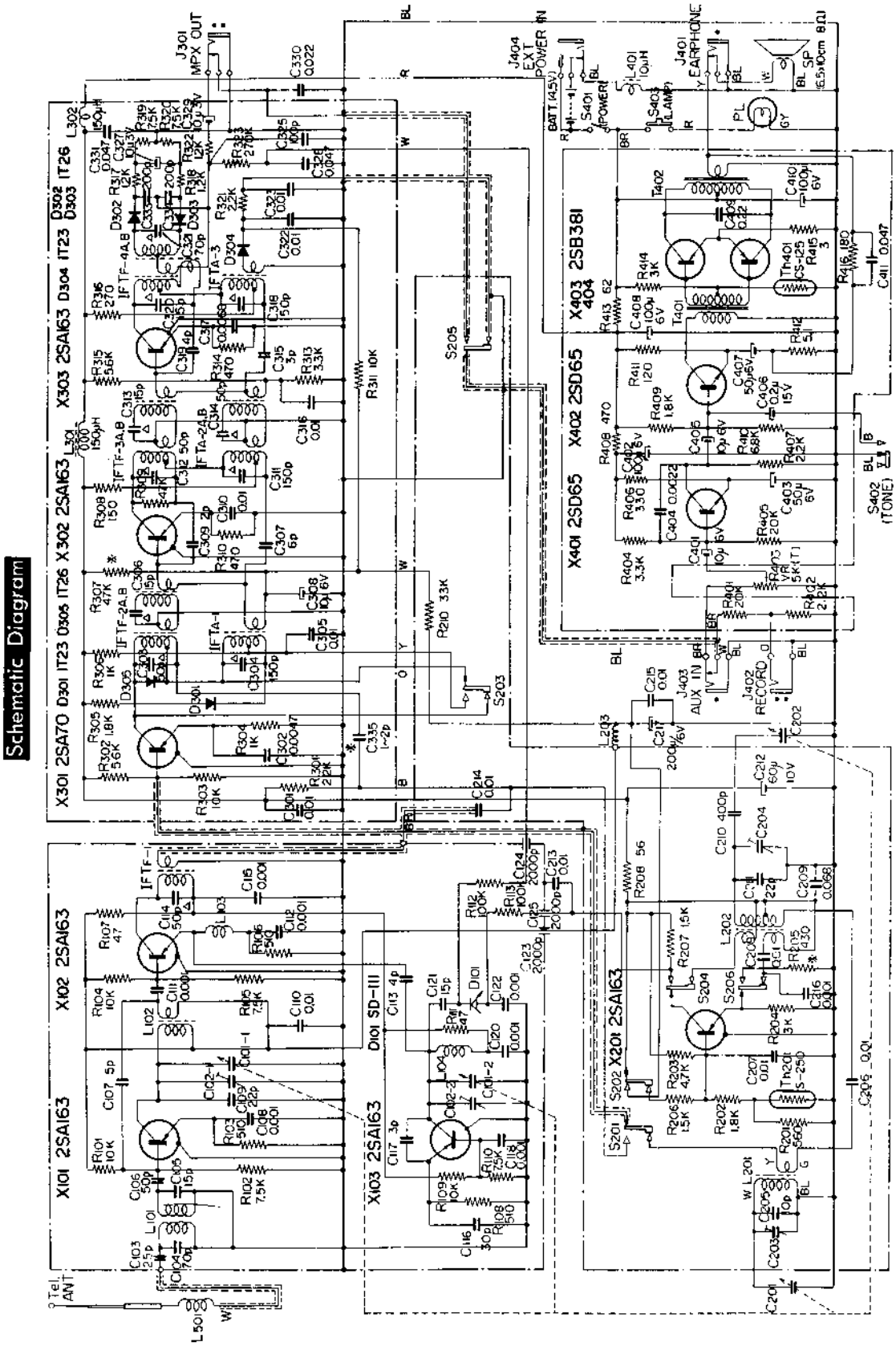
(1) Set the modulation of the SSG to "AM".
(2) Deliver a 86 Mc signal from the SSG.
(3) Tune to the signal correctly by turning the Tuning Knob of the Receiver.
(4) Change the modulation of the SSG to "FM".
(5) Adjust the FM RF Coil (L_{102}) for the maximum reading on the Output Meter.
(6) Change the modulation of the SSG to "AM".
(7) Deliver a 109 Mc signal from the SSG.
(8) Tune to the signal correctly by turning the Tuning Knob of the Receiver.
(9) Change the modulation of the SSG to "FM".
(10) Adjust the FM RF Trimmer Capacitor (C_{102-1}) to obtain the maximum output.
(11) Repeat the above procedures (1～10) until the maximum output is obtained.

Wiring View



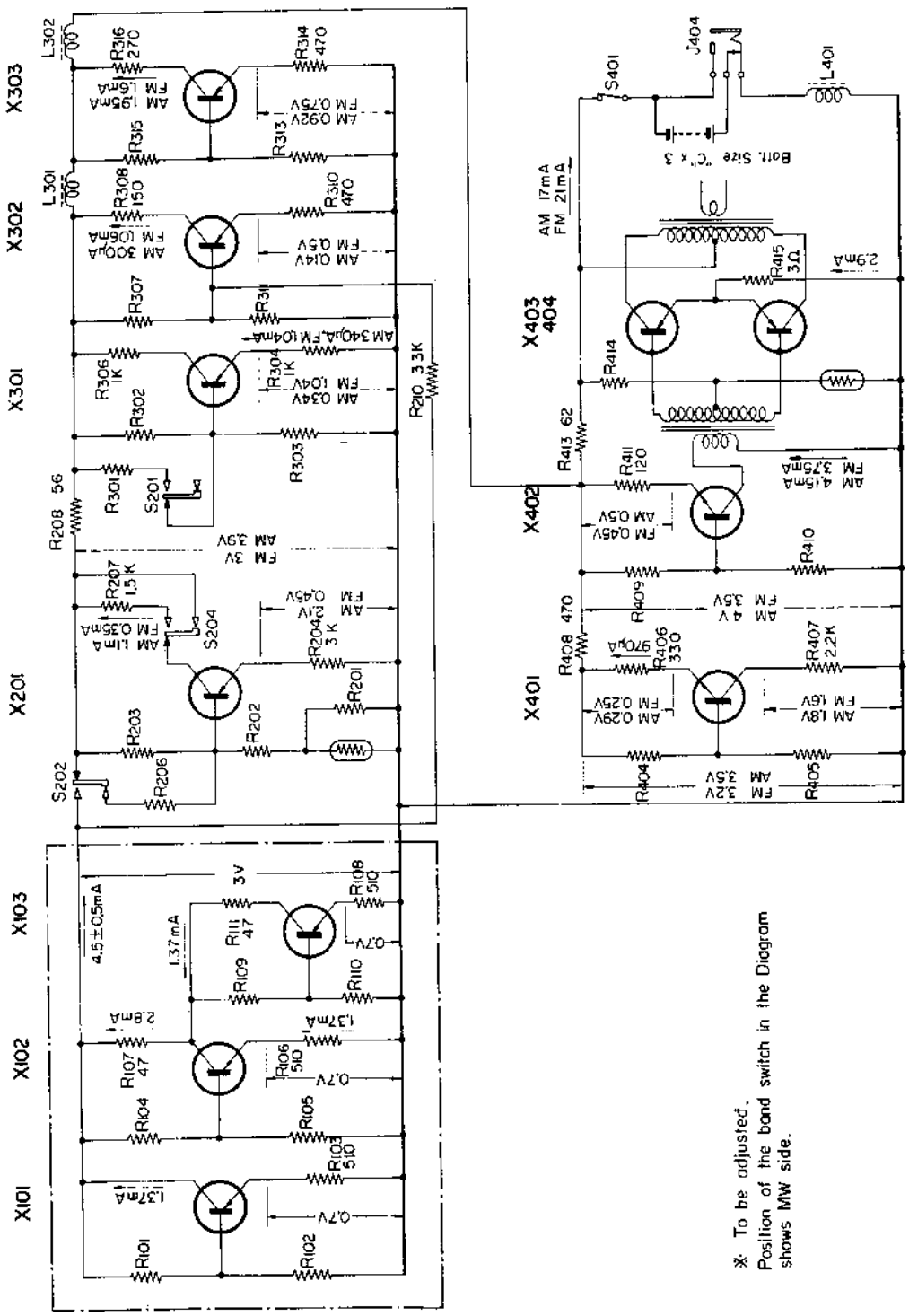
TFM-110W

Schematic Diagram



※ To be adjusted
Position of the band switch (S201~S206) in the Diagram shows MW side.
Capacitors marked with "Δ" are built in relative IF Transformers.

Voltage and Current Distribution Chart at Zero Signal

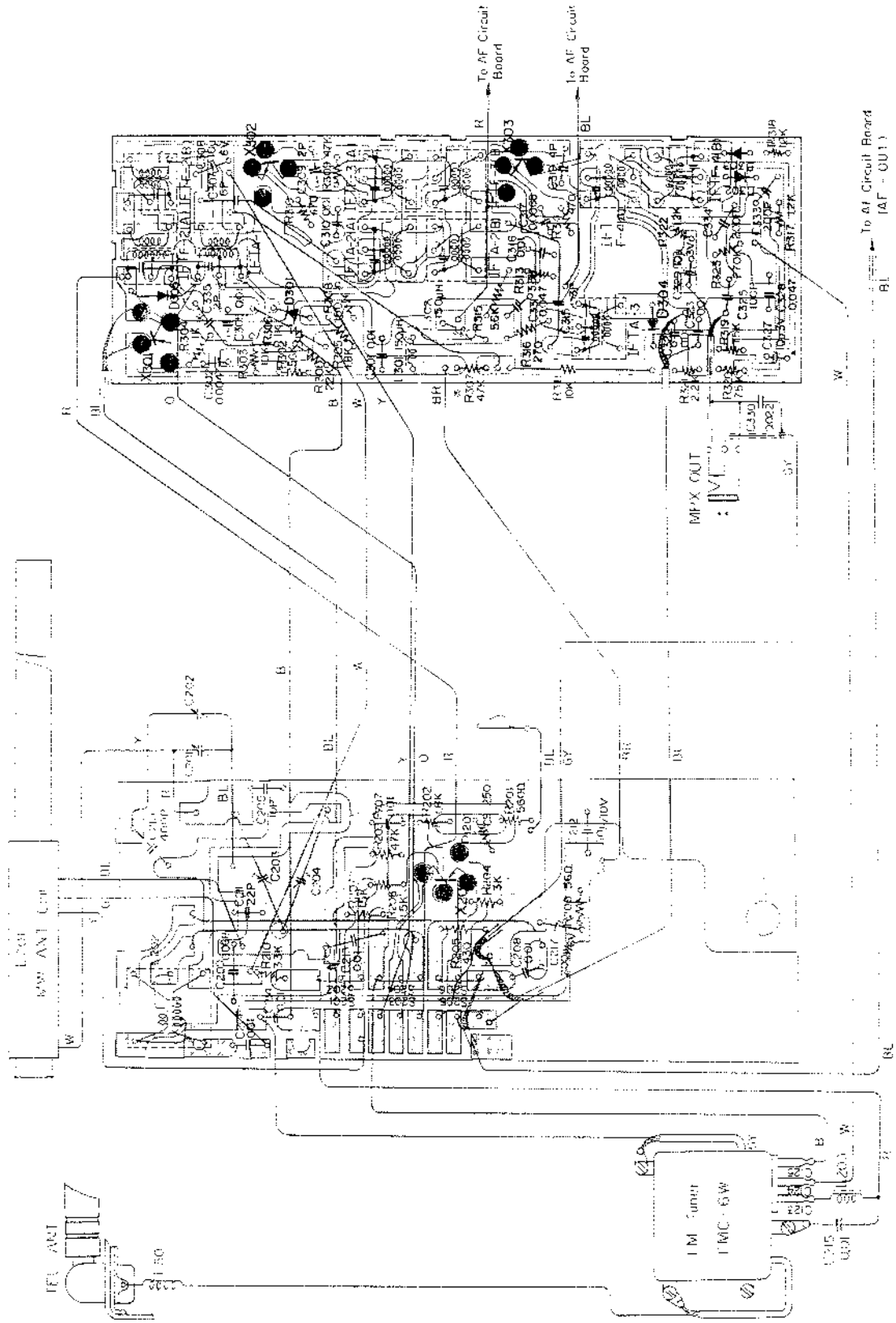


※ To be adjusted.
Position of the band switch in the Diagram shows MW side.

Mounting Diagram

– Parts Side –

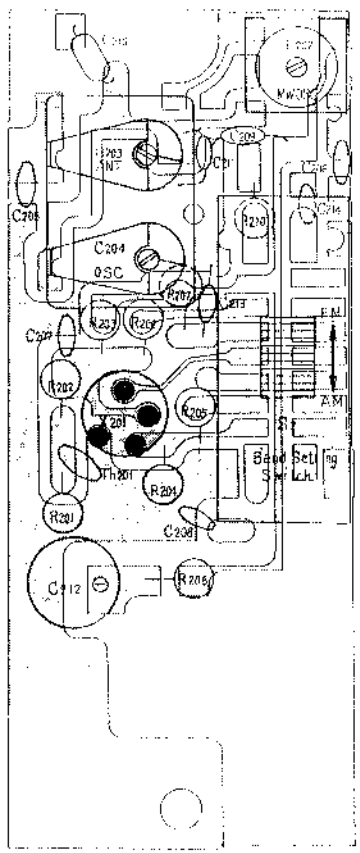
AIA Tuner and IF Sections



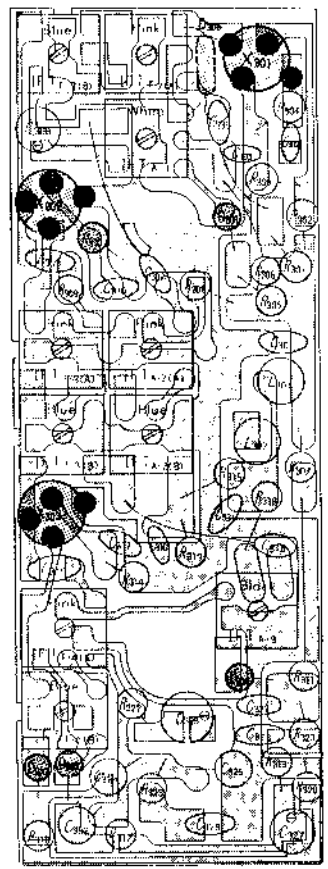
Mounting Diagram

- Parts Side -

AM Tuner Section



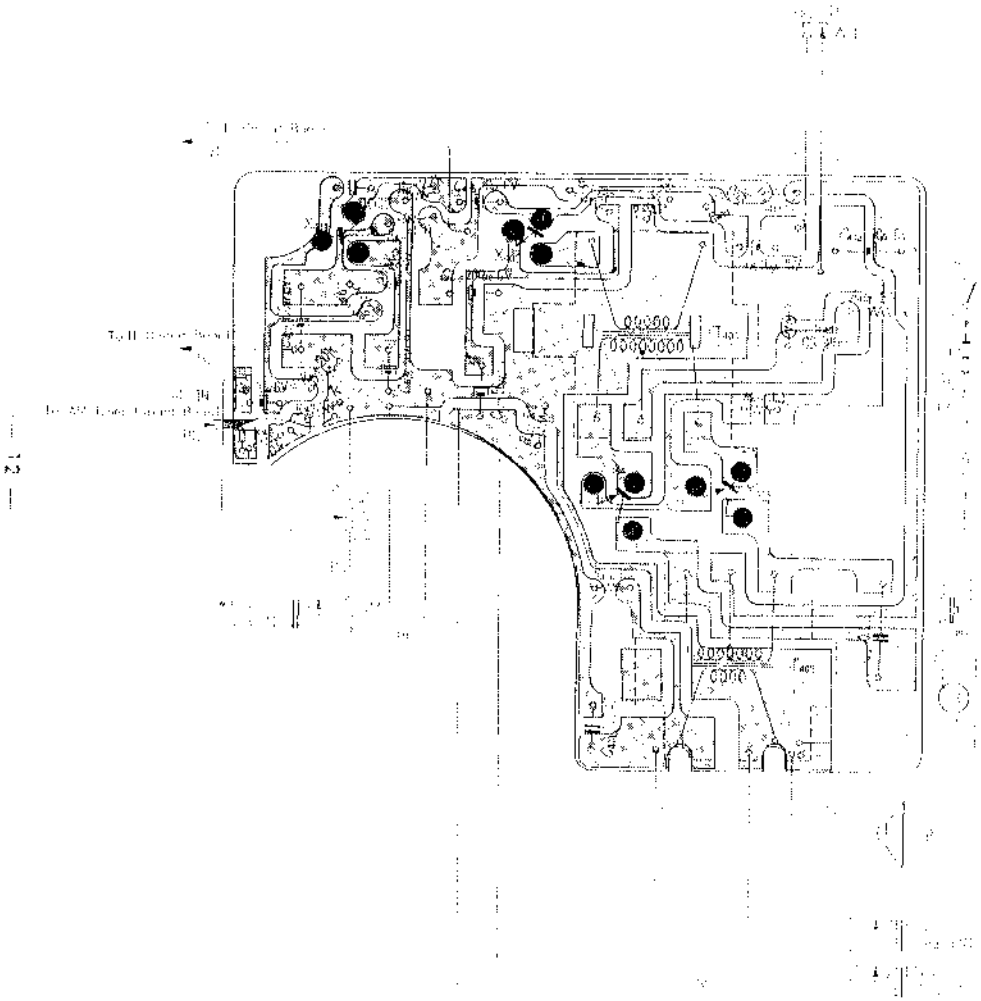
IF Section



Mounting Diagram

— Printed Side —

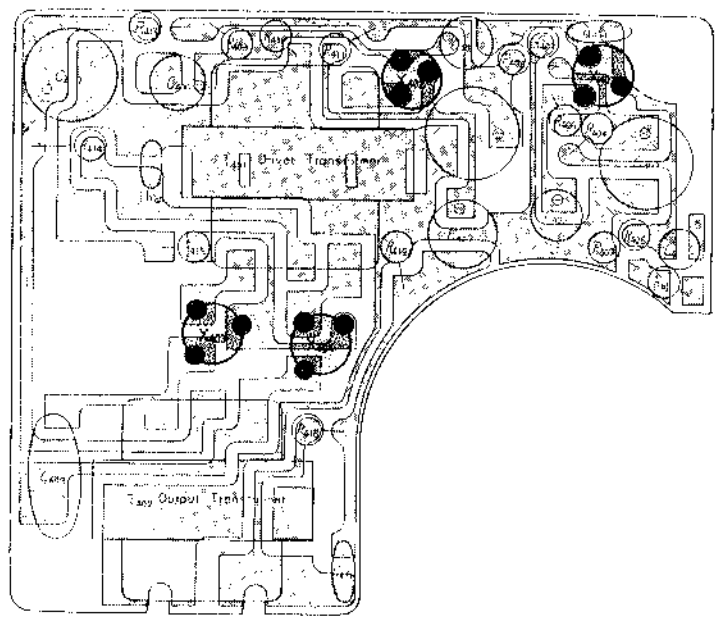
AF Section



Mounting Diagram

— Parts Side —

AF Section



Electronic Parts List

Part No.	Symbol No.	Description
1-501-051-11	Tel. ANT	Telescopic Antenna
1-401-216-11	L_{101}	FM, Antenna Coil
1-425-162-11	L_{102}	FM, RF Coil
1-405-251-11	L_{103}	Injection Coil
-135-11	L_{104}	FM, Oscillator Coil
1-401-200-21	L_{201}	MW, Ferrite Bar Antenna
1-405-110-11	L_{202}	MW, Oscillator Coil
1-407-030-11	L_{203}	Micro Inductor (150μH)
-030-11	L_{301}	〃
-030-11	L_{302}	〃
-037-11	L_{401}	〃 (10μH)
1-401-219-11	L_{501}	FM, Loading Coil
1-403-231-11	IFT_{F-1}	FM, Single Tuned IF Transformer
-240-11	IFT_{F-2} (A)	FM, Double Tuned IF Transformer
-240-21	IFT_{F-2} (B)	〃
-240-11	IFT_{F-3} (A)	〃
-240-21	IFT_{F-3} (B)	〃
-241-11	IFT_{F-4} (A)	FM, Double Tuned IF Transformer for Discriminator
-241-21	IFT_{F-4} (B)	FM, Double Tuned IF Transformer for Discriminator
-026-11	IFT_{A-1}	AM, Single Tuned IF Transformer
-107-11	IFT_{A-2} (A)	AM, Double Tuned IF Transformer
-107-21	IFT_{A-2} (B)	AM, Double Tuned IF Transformer
-108-11	IFT_{A-3}	AM, Single Tuned IF Transformer
1-423-072-11	T_{401}	Driver Transformer
1-427-122-11	T_{402}	Output Transformer
1-507-011-01	J_{301}	MPX OUT Jack
-075-11	J_{401}	Earphone Jack
	J_{402}	Record Jack
-011-01	J_{403}	AUX IN Jack
-100-11	J_{404}	EXT POWER IN Jack
1-513-238-11	$S_{201-206}$	Band Setting Switch
	S_{401}	Power Switch (VR)
1-514-082-12	S_{402}	Tone Switch
-114-12	S_{403}	Dial Light Switch
1-502-118-11	SP	Speaker
1-518-006-02	PL	Dial Light
1-528-002-00	Batt.	Battery (4.5 Volts in total)
	X_{101}	Transistor 2SA163
	X_{102}	〃 2SA163
	X_{103}	〃 2SA163
	X_{201}	〃 2SA163
	X_{301}	〃 2SA70
	X_{302}	〃 2SA163
	X_{303}	〃 2SA163
	X_{401}	〃 2SD65
	X_{402}	〃 2SD65
	X_{403}	〃 2SB381
	X_{404}	〃 2SB381
	D_{101}	Variable Capacitance Diode SD-111
	D_{301}	Diode 1T23B
	D_{302}	〃 1T261
	D_{303}	〃 1T261
	D_{304}	〃 1T23
	D_{305}	〃 1T261
	Th_{201}	Thermistor S-250
	Th_{401}	〃 CS-120
		Resistor
1-208-057-11	R_{101}	10KΩ 1/10W Ceramic
-054-11	R_{102}	7.5KΩ 〃 〃

Part No.	Symbol No.	Description
1-208-026-11	R_{103}	510Ω 1/10W Ceramic
-057-11	R_{104}	10KΩ 〃 〃
-054-11	R_{105}	7.5KΩ 〃 〃
-026-11	R_{106}	510Ω 〃 〃
-105-11	R_{107}	47Ω 〃 〃
-026-11	R_{108}	510Ω 〃 〃
-057-11	R_{109}	10KΩ 〃 〃
-054-11	R_{110}	7.5KΩ 〃 〃
-105-11	R_{111}	47Ω 〃 〃
-145-11	R_{112}	100KΩ 〃 〃
-145-11	R_{113}	100KΩ 〃 〃
1-203-445-11	R_{201}	560Ω 1/16W Carbon
-339-11	R_{202}	1.8KΩ 〃 〃
-424-11	R_{203}	4.7KΩ 〃 〃
-489-11	R_{204}	3KΩ 〃 〃
-606-11	R_{205}	430Ω 〃 〃
-422-11	R_{206}	1.5KΩ 〃 〃
-422-11	R_{207}	1.5KΩ 〃 〃
1-204-188-11	R_{208}	56Ω 〃 〃
	R_{209}	—Deleted—
1-203-634-11	R_{210}	33KΩ 1/16W Carbon
-429-11	R_{301}	22KΩ 〃 〃
-637-11	R_{302}	56KΩ 〃 〃
-427-11	R_{303}	10KΩ 〃 〃
-421-11	R_{304}	1.0KΩ 〃 〃
-339-11	R_{305}	1.8KΩ 〃 〃
-421-11	R_{306}	1.0KΩ 〃 〃
-631-11	*R_{307}	47KΩ 〃 〃
-598-11	R_{308}	150Ω 〃 〃
-636-11	R_{309}	47KΩ 〃 〃
-420-11	R_{310}	470Ω 〃 〃
-427-11	R_{311}	10KΩ 〃 〃
	R_{312}	--Deleted---
1-203-434-11	R_{313}	3.3KΩ 1/16W Carbon
-420-11	R_{314}	470Ω 〃 〃
-425-11	R_{315}	5.6KΩ 〃 〃
-602-11	R_{316}	270Ω 〃 〃
-780-11	R_{317}	1.2KΩ 〃 〃
-780-11	R_{318}	1.2KΩ 〃 〃
-426-11	R_{319}	7.5KΩ 〃 〃
-426-11	R_{320}	7.5KΩ 〃 〃
-423-11	R_{321}	2.2KΩ 〃 〃
-780-11	R_{322}	1.2KΩ 〃 〃
-681-11	R_{323}	270KΩ 〃 〃
-631-11	R_{401}	20KΩ 〃 〃
-423-11	R_{402}	2.2KΩ 〃 〃
1-221-447-11	R_{403}	5KΩ Volume Control
1-203-434-11	R_{404}	3.3KΩ 1/16W Carbon
-631-11	R_{405}	20KΩ 〃 〃
-604-11	R_{406}	330Ω 〃 〃
-423-11	R_{407}	2.2KΩ 〃 〃
-420-11	R_{408}	470Ω 〃 〃
-339-11	R_{409}	1.8KΩ 〃 〃
-438-11	R_{410}	6.8KΩ 〃 〃
-596-11	R_{411}	120Ω 〃 〃
-450-11	R_{412}	5.1Ω 〃 〃
1-204-189-11	R_{413}	62Ω 〃 〃
1-203-489-11	R_{414}	3KΩ 〃 〃
-704-11	R_{415}	3Ω 1/8W 〃
-417-11	R_{416}	180Ω 1/16W 〃
		Capacitor
1-151-088-11	C_{101}	FM, Tuning Capacitor, 2 gang
	C_{102}	FM, Trimmer Capacitor, 2 unit

* To be adjusted

—continued—

Part No.	Symbol No.	Description
1-101-090-11	C_{103}	25PF Ceramic
-319-11	C_{104}	70PF //
-128-11	C_{105}	15PF //
-028-11	C_{106}	50PF //
-216-11	C_{107}	5PF //
-125-15	C_{108}	0.001μF //
-530-11	C_{109}	22PF //
-072-15	C_{110}	0.01μF //
-125-15	C_{111}	0.001μF //
-125-15	C_{112}	0.001μF //
-048-11	C_{113}	4PF //
	C_{114}	50PF (built in IFT_{F-1})
1-101-125-15	C_{115}	0.001μF Ceramic
-120-11	C_{116}	30PF //
-011-11	C_{117}	3PF //
-125-15	C_{118}	0.001μF //
-226-11	*C_{119}	6PF //
1-105-821-12	C_{120}	0.001μF Mylar
1-101-128-11	C_{121}	15PF Ceramic
1-105-821-12	C_{122}	0.001μF Mylar
1-101-799-11	C_{123}	2000PF Feed Through Capacitor
-799-11	C_{124}	2000PF //
-799-11	C_{125}	2000PF //
1-151-079-11	C_{201}	AM, Tuning Capacitor, 2 gang
	C_{202}	//
1-141-011-00	C_{203}	Trimmer Capacitor, 2 unit
	C_{204}	//
1-101-645-11	C_{205}	10PF Ceramic
1-105-351-12	C_{206}	0.01μF Mylar
-833-12	C_{207}	0.01μF //
-351-12	C_{208}	0.01μF //
-356-12	C_{209}	0.068μF //
1-103-090-11	C_{210}	400PF Styrol
1-101-859-11	C_{211}	22PF Ceramic
1-121-221-11	C_{212}	60μF 10 V Electrolytic
1-105-351-12	C_{213}	0.01μF Mylar
-351-12	C_{214}	0.01μF //
-351-12	C_{215}	0.01μF //
-821-12	C_{216}	0.001μF //
1-121-061-00	C_{217}	200μF 6 V Electrolytic
1-101-072-15	C_{301}	0.01μF Ceramic
1-105-829-12	C_{302}	0.0047μF Mylar
	C_{303}	50PF (built in IFT_{F-2})
	C_{304}	150PF (built in IFT_{A-1})
1-101-072-15	C_{305}	0.01μF Ceramic
	C_{306}	15PF (built in IFT_{F-2})
1-101-093-11	C_{307}	6PF Ceramic
1-121-104-00	C_{308}	10μF 6V Electrolytic
1-101-010-11	C_{309}	2PF Ceramic
1-105-833-12	C_{310}	0.01μF Mylar
	C_{311}	150PF (built in IFT_{A-2})
	C_{312}	50PF (// IFT_{F-3})
	C_{313}	15PF (// //)
	C_{314}	50PF (// IFT_{A-2})
1-101-011-11	C_{315}	3PF Ceramic
-072-15	C_{316}	0.01μF //
1-105-831-12	C_{317}	0.0068μF Mylar
	C_{318}	50PF (built in IFT_{A-3})
1-101-048-11	C_{319}	4PF Ceramic
	C_{320}	15PF (built in IFT_{F-4})
	C_{321}	70PF (//)
1-101-072-15	C_{322}	0.01μF Ceramic
-072-15	C_{323}	0.01μF //
	C_{324}	—deleted—
1-103-008-12	C_{325}	100PF Styrol
	C_{326}	—deleted—
1-121-103-00	C_{327}	10μF 3V Electrolytic
1-127-044-11	C_{328}	0.047μF // (Alox)
1-121-103-00	C_{329}	10μF 3V //
1-105-837-12	C_{330}	0.022μF Mylar
-355-12	C_{331}	0.047μF //
	C_{332}	—deleted—
1-103-010-12	C_{333}	200PF Styrol
-010-12	C_{334}	200PF //
1-101-157-11	C_{335}	1PF Ceramic
1-121-104-00	C_{401}	10μF 6V Electrolytic
-115-00	C_{402}	100μF 6V //
-135-00	C_{403}	50μF 6V //
1-105-825-12	C_{404}	0.0022μF Mylar
1-121-104-00	C_{405}	10μF 6V Electrolytic
-206-11	C_{406}	0.2μF 15V //
-135-00	C_{407}	50μF 6V //
-115-00	C_{408}	100μF 6V //
1-105-359-12	C_{409}	0.22μF Mylar
1-121-115-00	C_{410}	100μF 6V Electrolytic
1-127-018-11	C_{411}	0.047μF // (Alox)

* To be adjusted

Audio Transformer

T_{401} Driver Transformer

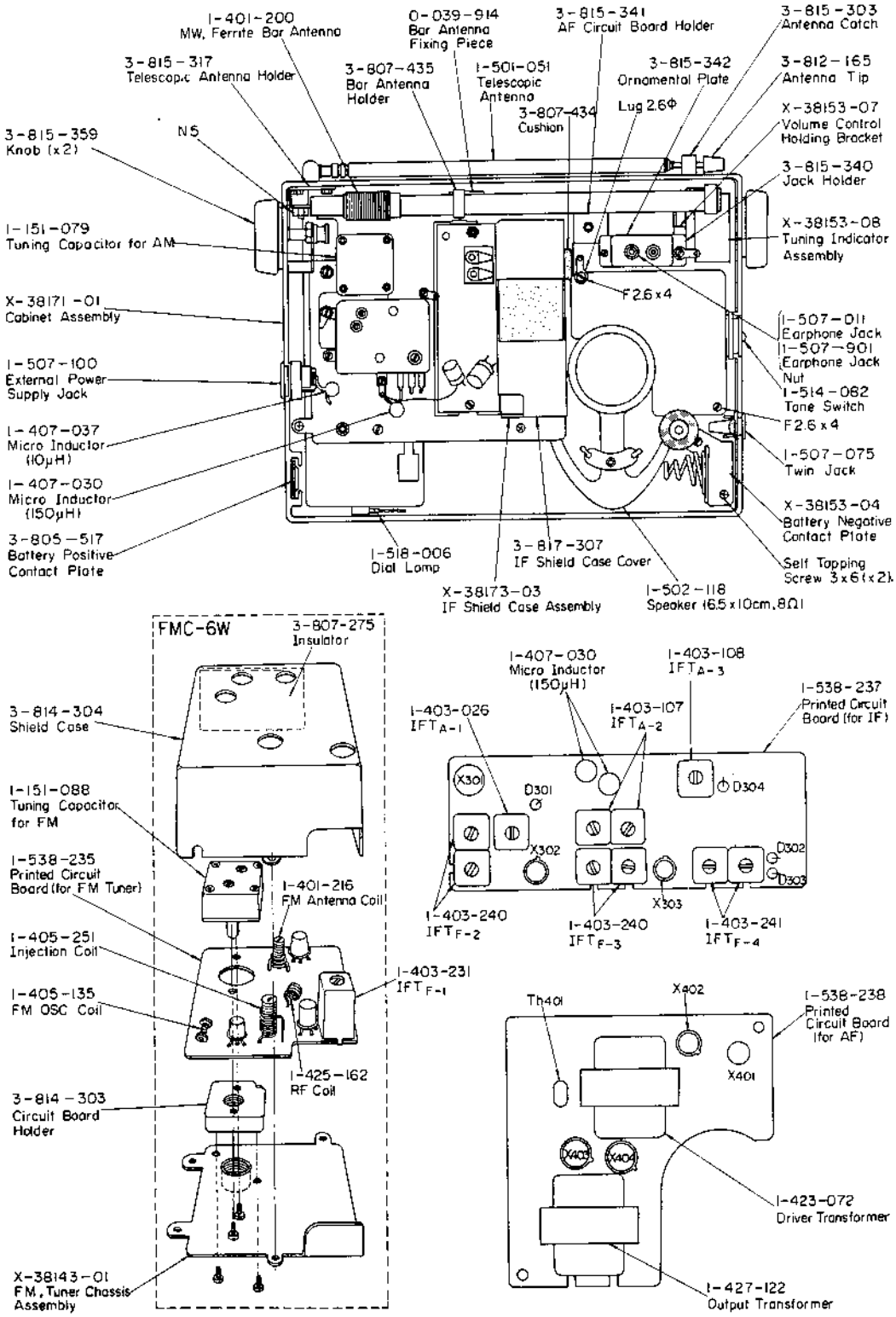
	Impedance	DC Resistance
Primary	820Ω	within 115Ω
Secondary	1.8 KΩ (C•T)	within 190Ω

T_{402} Output Transformer

	Impedance	DC Resistance
Primary	68Ω (C•T)	within 5.7Ω
Secondary	8Ω	within 0.9Ω

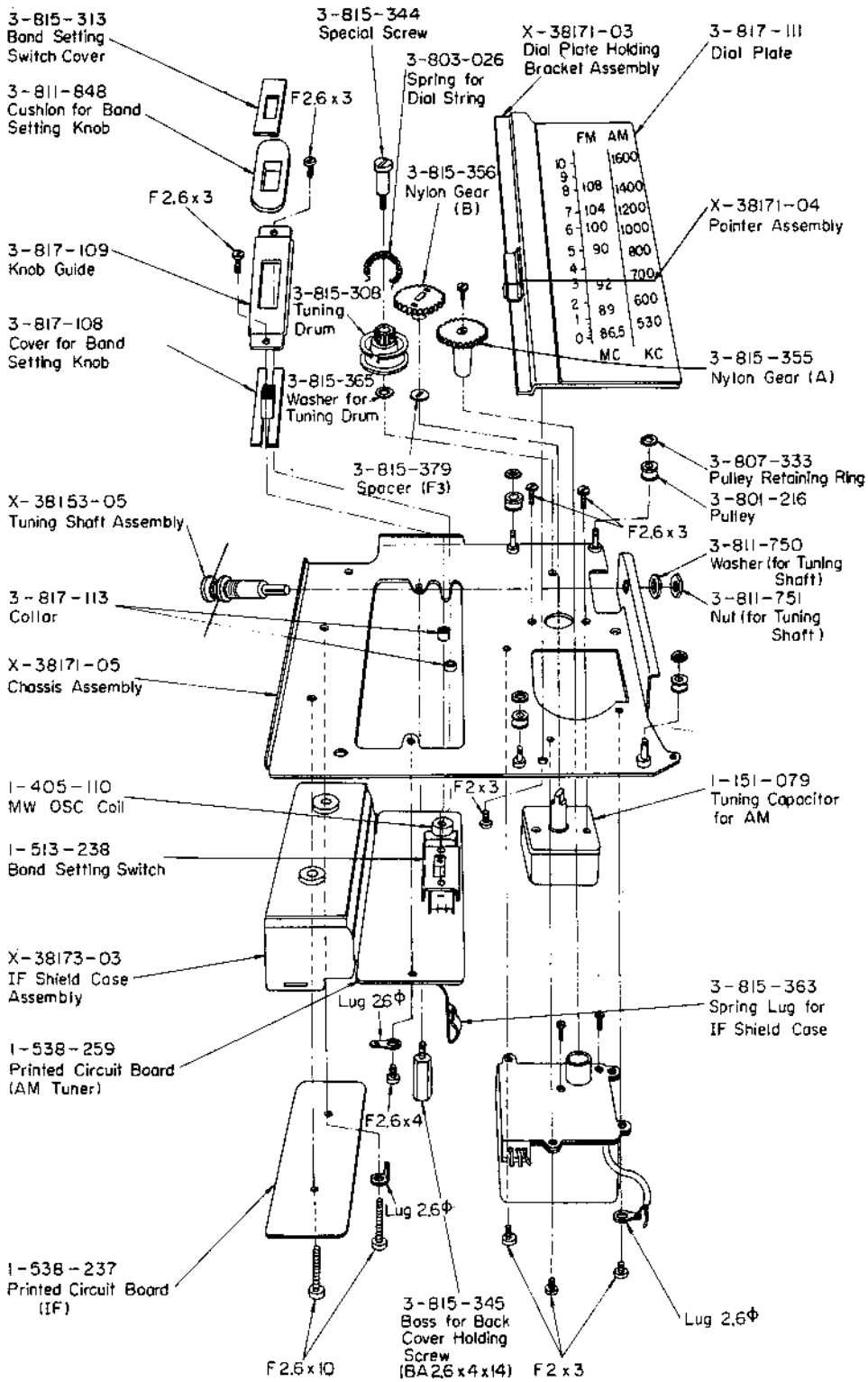
Exploded Diagram

(1)



Exploded Diagram

(2)



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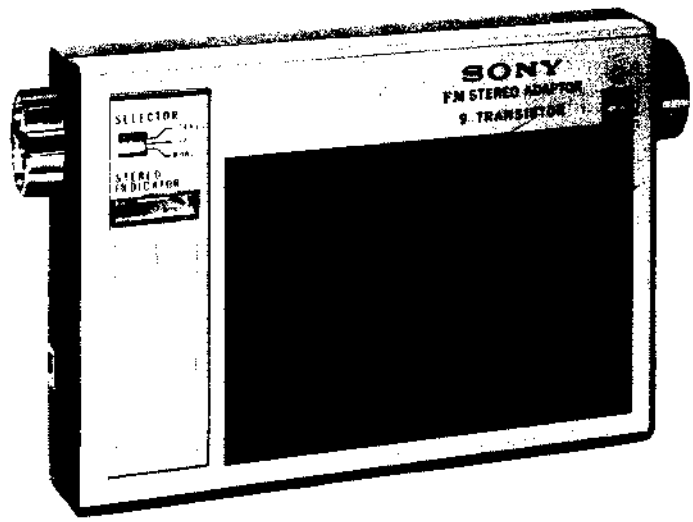


Specifications

Useful Range :	-30～-50 dBm (Pilot Level)			
Channel Separation :	More than 30 dB (at -35 dBm pilot input)			
Distortion Factor :	1% (at 50 mW output with Modulation Frequency of 1 Kc)			
Fidelity :	Frequency	100 c/s	1 Kc	10 Kc
	Tone H	-5 dB	0 dB	-15 dB
	Tone L	-5 dB	0 dB	-25 dB
Output Power :	300 mW (undistorted)			
	500 mW (maximum)			
Current Drain :	17 mA at zero signal, 170 mA at 300 mW output			
Speaker :	4″×2-1/2″ (10×6.5 cm) PM dynamic, 8Ω			
Power Source :	Three Size "C" Flashlight Batteries (4.5 Volts in total)			
Dimensions :	7-1/8″×5-3/16″×1-7/8″ (180×131×47.5 mm)			
Weight :	1-5/8 lbs. (0.75 kg)			
Color :	Gray, Beige			

Block Diagram

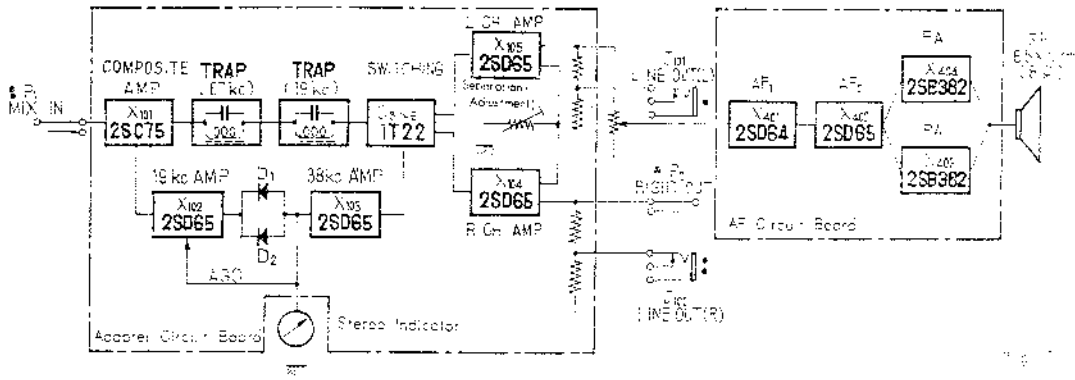


Fig. 1

Removal of Chassis

(1) Remove the two Back Cover Holding Screws (⊖RK 2.6×10) and open the Back Cover.

(2) Take out all the Batteries.

(3) Remove the Battery Cylinder by unscrewing the two screws.

(4) Remove the Mode Selector Knob and the Volume Control Knob by pulling straight out.

(5) Remove the Earphone Jack, the Tone Switch, the Twin Jack and the External Power Supply Jack by pulling straight out.

(6) Remove the four Chassis Holding Screws marked with ▲ in Fig. 2.

(7) Take out the Chassis from the Cabinet gently.

Removal of Adapter Circuit Board

(1) Remove the two Back Cover Holding Screws and open the Back Cover.

(2) Remove the four Adapter Circuit Board Holding Screws marked with ▲ in Fig. 2.

(3) Remove the Adapter Circuit Board from the Chassis taking care not to [illegible]

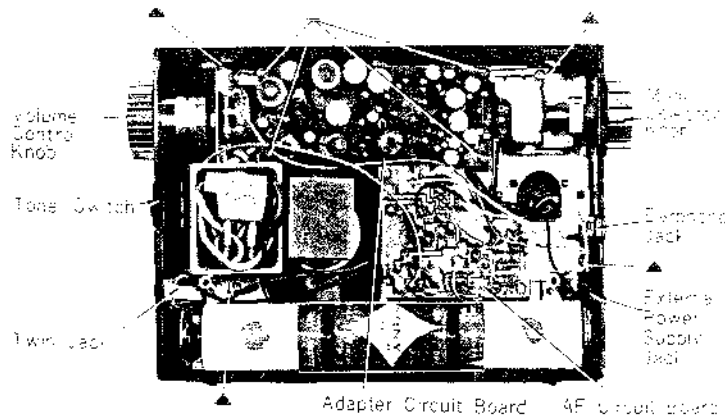


Fig. 2

ADJUSTMENT PROCEDURE

Adjustment for balance of X_{104} and X_{105}

(1) Connect a VTVM to the junction of C_{126}—R_{142} (C_{127}—R_{143}) and ground.

(2) Set the Mode Selector Switch to "MONO".

(3) Unsolder the lead (gray) at the Volume Control coming from the Adapter Circuit Board.

(4) Feed a 1Kc signal of −25 dBs from the Audio Oscillator into the MPX IN (P_1).

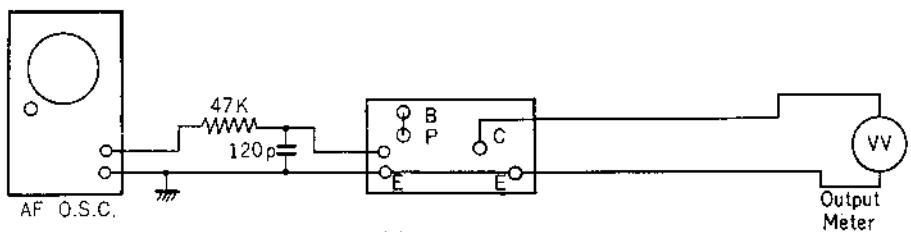
(5) Turn the Core of the Adjustable Resistor (R_{139}) counter-clockwise to the full.

(6) Read the VTVM connected by preceding step (1) and compare the output level of CH-1 (LEFT) with that of CH-2 (RIGHT). If the output level of CH-1 (CH-2) is higher than that of CH-2 (CH-1), increase the resistance value for the Resistor R_{137} (R_{138}) so that the output level of CH-1 (CH-2) becomes the same as that of CH-2 (CH-1).

* Approximately 10Ω resistor may be suitable for 0.5 dB difference in output level.

Adjustment for Adapter Circuit Board

A. Trap Coil Adjustment (Refer to Fig. 6 and Fig. 7)



(Fig. 3)

(1) Connect an Audio Oscillator to the input terminal of the Adapter Circuit Board through the Dummy Load for Tuner as shown in Fig. 3.

(2) Bridge between "B" and "P" (shown in Fig. 7) by soldering.

(3) Deliver a 19 Kc signal from the Audio Oscillator.

(4) Connect a VTVM to the input terminal "I" (shown in Fig. 7) and ground on the Adapter Circuit Board.

(5) Adjust the Level Control Knob of the Audio Oscillator so that the VTVM indicates −10～−20 dBm.

(6) Remove the VTVM connected by preceding step (4) connect it to point "C" (shown in Fig. 7) and ground on the Adapter Circuit Board.

(7) Adjust the 19 Kc Trap Coil to obtain the minimum reading on the VTVM.

(8) Deliver a 67 Kc signal from the Audio Oscillator.

(9) Adjust the 67 kc Trap Coil to obtain the minimum reading on the VTVM.

(10) Unsolder the bridged portion between "B" and "P" with a soldering iron.

B. Channel Separation Adjustment

Preparation

(1) Connect the Audio Oscillator to the left channel terminal of the Stereo Generator.

(2) Connect the output terminal of the Stereo Generator to the input terminal "I" (shown in Fig. 7) of the Adapter Circuit Board through the Dummy Load for Tuner as shown in Fig. 4.

(3) Connect the VTVM to the input terminal of the Adapter Circuit Board as shown in Fig. 4

(4) Deliver a 1 Kc signal from the Audio Oscillator.

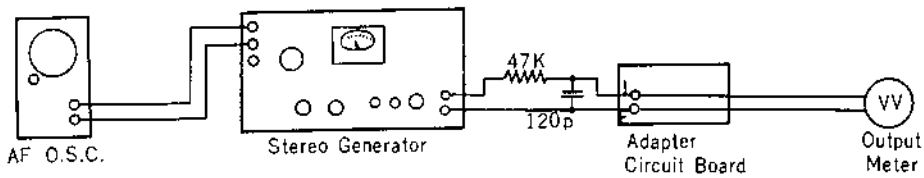
(5) Deliver only pilot signal (19 Kc) from the Stereo Generator.

(6) Adjust the Level Control Knob of the Stereo Generator so that the VTVM indicates −45 dBm.

(7) Turn off the pilot signal and deliver main channel signal from the Stereo Generator.

(8) Adjust the output level of the Audio Oscillator so that the main channel signal becomes −41 dBm.

Note : When it is imposible to obtain the Main Channel only, set the output level of the composite signal (main channel signal+sub channel signal) to −35 dBm.



(Fig. 4)

1. Sub-Carrier Adjustment

Switch Setting :

a) Pilot Switch ..... ON

b) Main & Sub Channel Switch ..... OFF

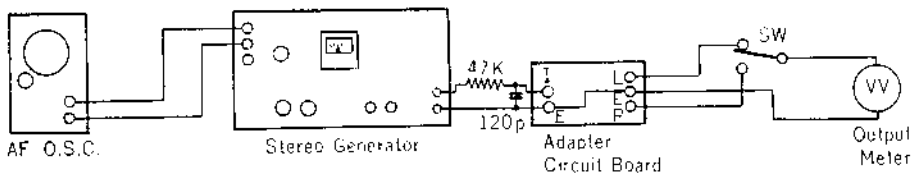
(1) Connect the VTVM to the point "S" (shown in Fig. 7) and ground on the Adapter Circuit Board.

(2) Adjust the cores of the 19 Kc Pick-up Coil, the 19 Kc Doubler Transformer and the 38 Kc Switching Transformer to obtain the maximum output. (Output of 38 Kc sine wave will be approximately +5 dBm.)

(3) Turn the core of the 19 kc Pick-up Transformer clockwise so that the VTVM indicates 2 dB below the maximum output.

(4) Turn the core of the 19 Kc Doubler Transformer counter-clockwise so that the VTVM indicates 2 dB below the output obtained by the preceding step (4).

2. Channel Separation Adjustment



(Fig. 5)

(1) Connect the VTVM to point "R" and point "L" (shown in Fig. 7) on the Adapter Circuit Board through Channel Selector Switch as shown in Fig. 5.

(2) Connect the Stereo Generater to the input terminal "I" (shown in Fig. 7) and ground on the Adapter Circuit Board through the Dummy Load for Tuner as shown in Fig. 5.

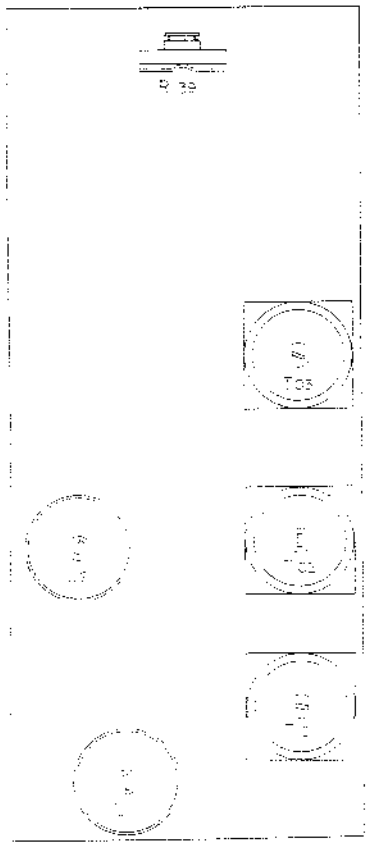
(3) Set the Separation Control (R_{139}) on the Adapter Circuit Board to the extreme counter-clockwise position.

(4) Deliver the sub channel signal and pilot signal from the Stereo Generator, in other words, set Main Channel Switch to the "OFF" position.

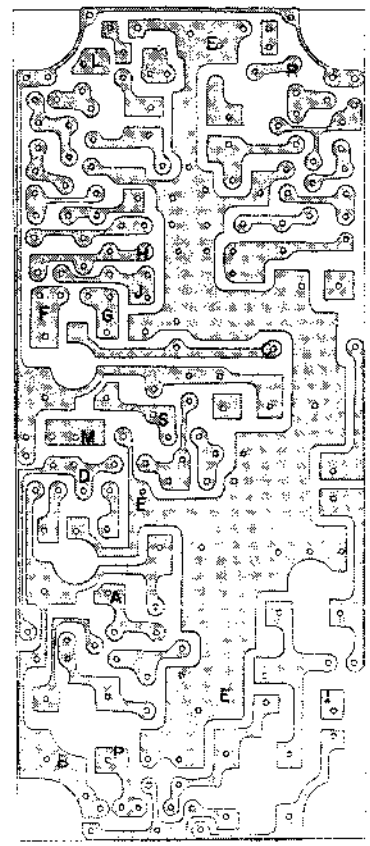
(5) Adjust the core of the 38 Kc Switching Transformer to obtain the maximum output. In this adjustment, the Channel Selector Switch (SW) may be set either Left or Right.
Output level of "L" or "R" terminal on the Adapter Circuit Board will be approximately -41 dBm.

(6) Set the Main Channel Switch of the Stereo Generator to the "ON" position and set the Channel Selector Switch (SW) to the "R" position.

(7) Adjust the Separation Control (R_{139}) to obtain the minimum reading on the VTVM.

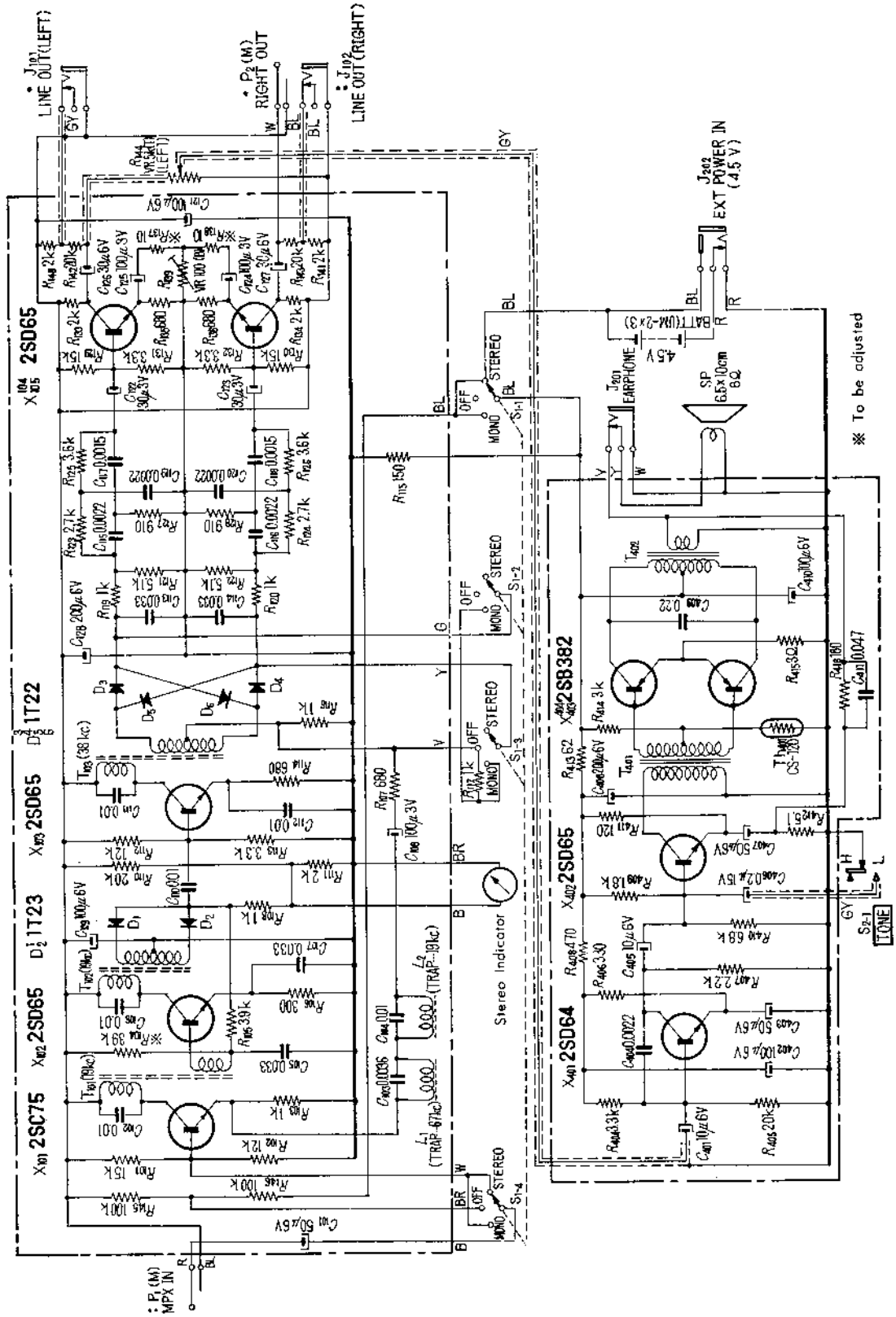


(Fig. 6)

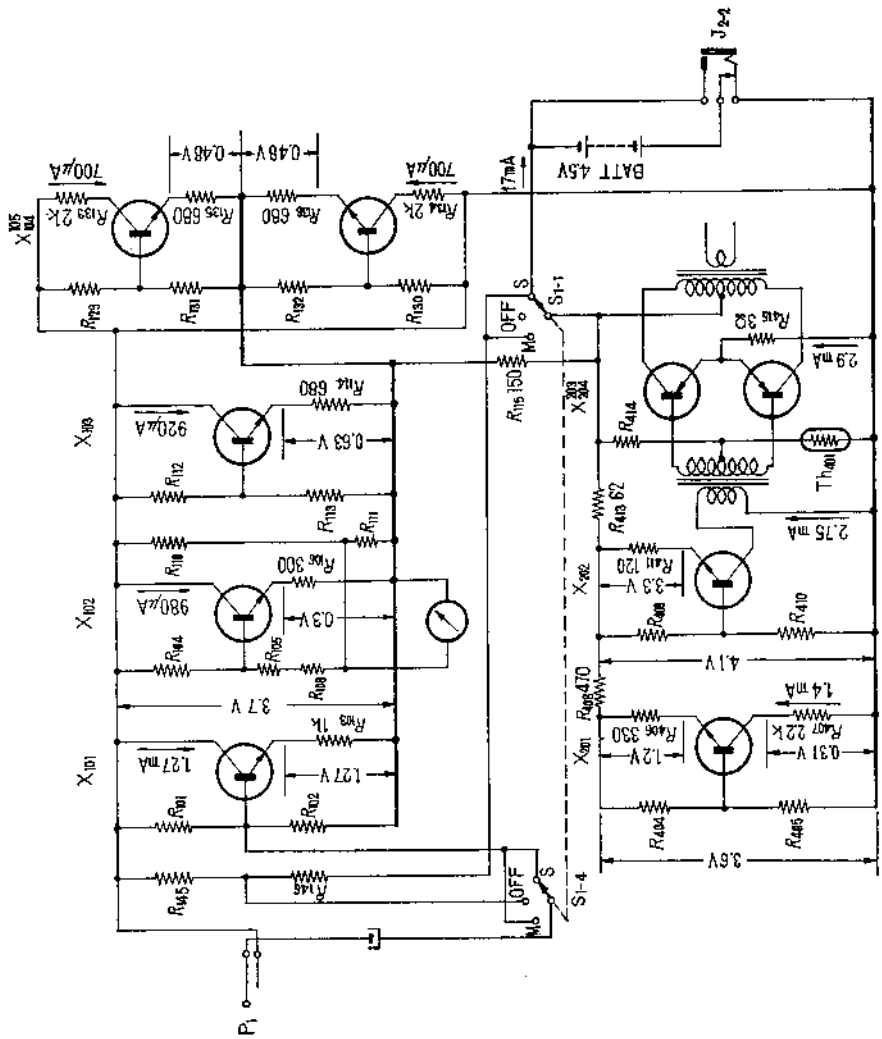


(Fig. 7)

Schematic Diagram



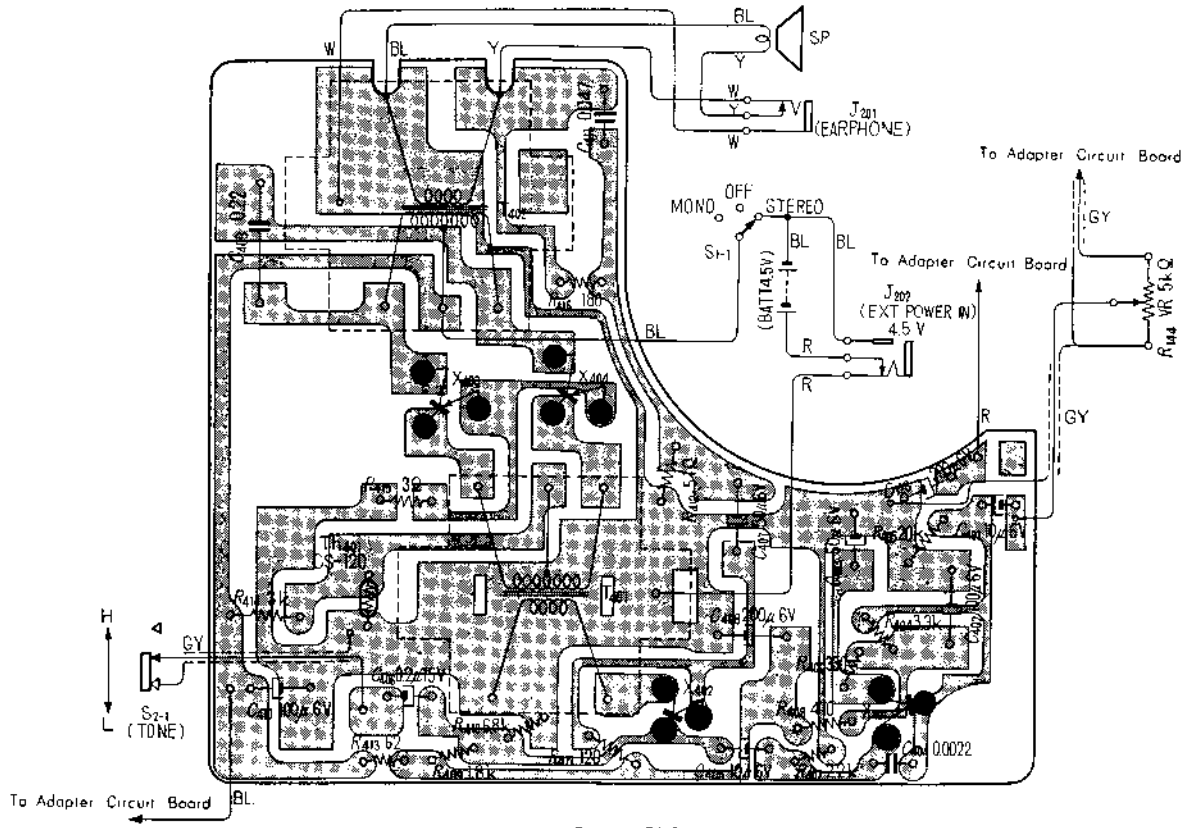
Voltage and Current Distribution Chart at Zero Signal



Mounting Diagram

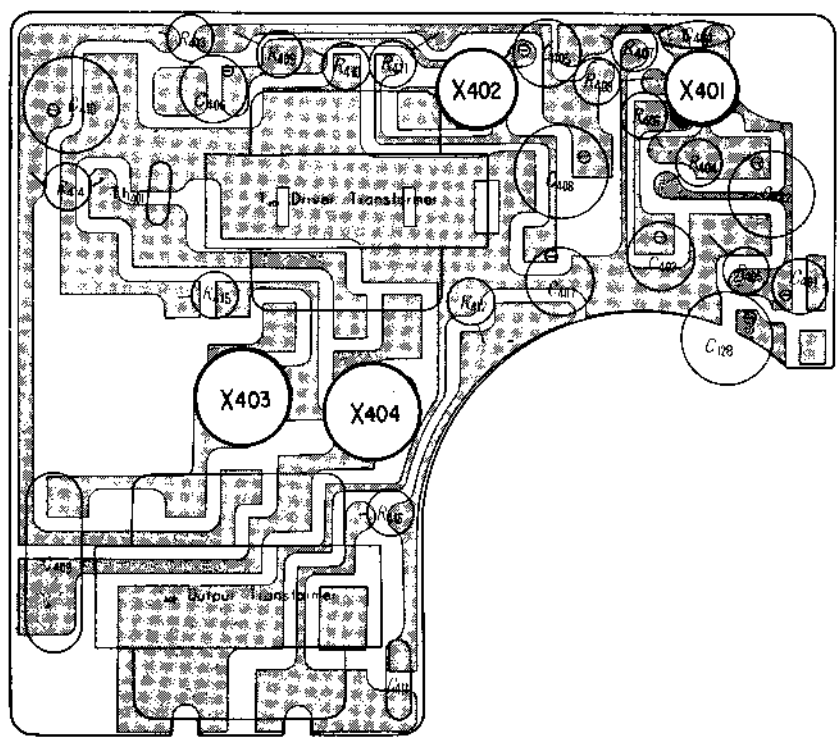
– Printed Side –

AF Section



– Parts Side –

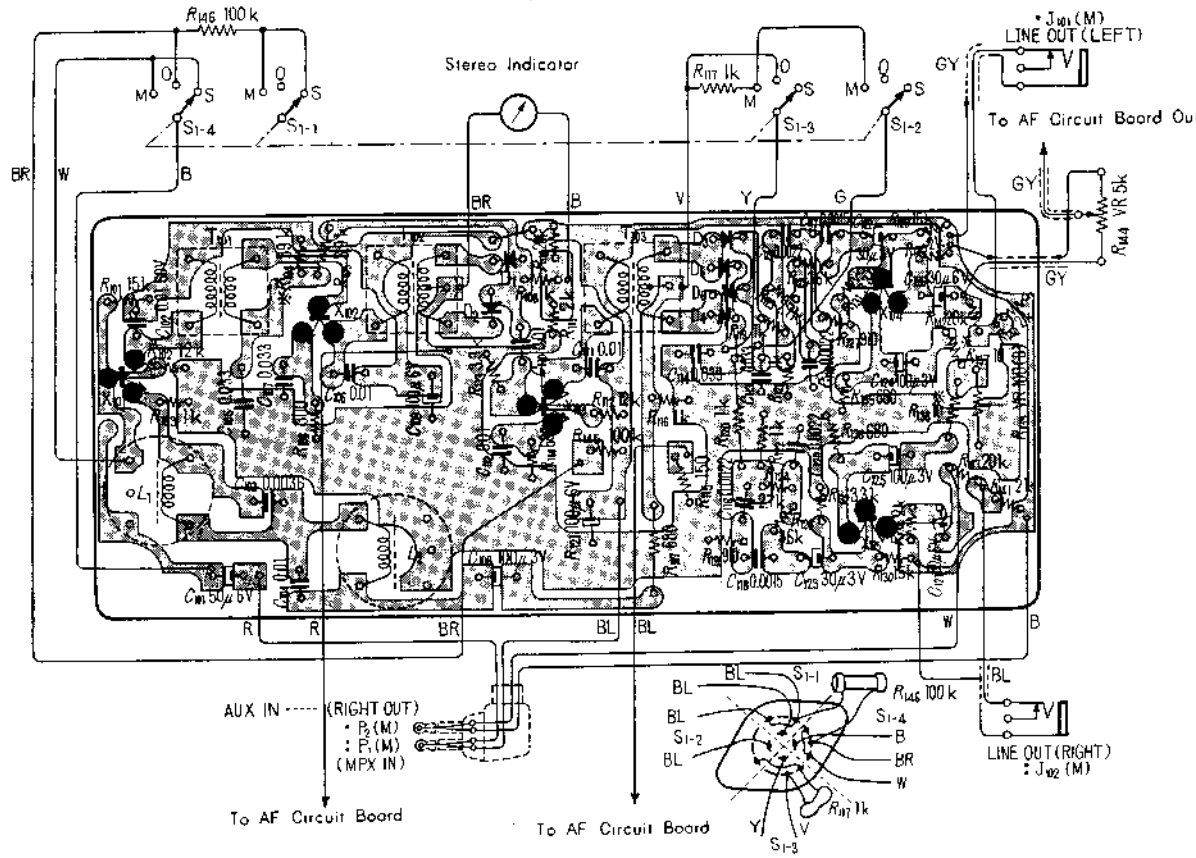
AF Section



Mounting Diagram

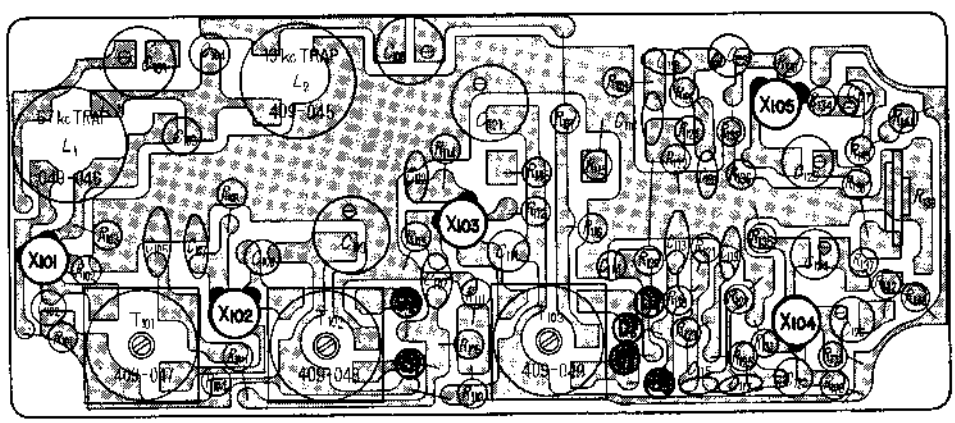
–Printed Side–

Adapter Section



–Parts Side–

Adapter Section



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Electronic Parts List

Part No.	Symbol No.	Description
	X_{101}	Transistor 2SC75
	X_{102}	// 2SD65
	X_{103}	// 2SD65
	X_{104}	// 2SD65
	X_{105}	// 2SD65
	X_{401}	// 2SD64
	X_{402}	// 2SD65
	X_{403}	// 2SB382
	X_{404}	// 2SB382
	D_1	Diode 1T23
	D_2	// 1T23
	D_3	// 1T22
	D_4	// 1T22
	D_5	// 1T22
	D_6	// 1T22
	Th_{401}	Thermistor CS-120
1-520-039-11	M	Stereo Indicator
1-513-233-11	$S_{101-104}$	Mode Selector Switch
1-514-082-11	S_{2-1}	Tone Switch
1-507-075-11	J_{101}	Twin Jack (Line Output)
	J_{102}	// (//)
-050-01	J_{201}	Earphone Jack
-100-11	J_{202}	External Power Supply Jack
1-534-210-11	P_1	Cord with Twin Plug
	P_2	//
1-502-118-11	SP	Speaker
1-409-047-11	T_{101}	Pick-up Transformer
-048-11	T_{102}	Doubler Transformer
-049-11	T_{103}	Switching Transformer
-046-11	L_1	Trap Coil (67 Kc)
-045-11	L_2	// (19 Kc)
1-423-072-11	T_{401}	Driver Transformer
1-427-122-11	T_{402}	Output Transformer
1-528-002-00	Batt.	Battery (4.5 V in total
		Resistor
1-203-629-00	R_{101}	15KΩ 1/16W Carbon
-439-00	R_{102}	12KΩ // //
-421-00	R_{103}	1KΩ // //
-635-00	*R_{104}	39KΩ // //
-878-00	R_{105}	3.9KΩ // //
-603-00	R_{106}	300Ω // //
-610-00	R_{107}	680Ω // //
-421-00	R_{108}	1KΩ // //
	R_{109}	—deleted—
1-203-631-00	R_{110}	20KΩ 1/16W Carbon
-446-00	R_{111}	2KΩ // //
-439-00	R_{112}	12KΩ // //
-434-00	R_{113}	3.3KΩ // //
-610-00	R_{114}	680Ω // //
1-204-598-00	R_{115}	150Ω // //
1-203-421-00	R_{116}	1KΩ // //
-182-00	R_{117}	1KΩ // //
	R_{118}	—deleted—
1-203-421-00	R_{119}	1KΩ 1/16W Carbon
-421-00	R_{120}	1KΩ // //
-448-00	R_{121}	5.1KΩ // //
-448-00	R_{122}	5.1KΩ // //
-447-00	R_{123}	2.7KΩ // //
-447-00	R_{124}	2.7KΩ // //
-490-00	R_{125}	3.6KΩ // //
-490-00	R_{126}	3.6KΩ // //
-623-00	R_{127}	910Ω // //

Part No.	Symbol No.	Description
1-203-623-00	R_{128}	910Ω 1/16W Carbon
-629-00	R_{129}	15KΩ // //
-629-00	R_{130}	15KΩ // //
-434-00	R_{131}	3.3KΩ // //
-434-00	R_{132}	3.3KΩ // //
-446-00	R_{133}	2KΩ // //
-446-00	R_{134}	2KΩ // //
-610-00	R_{135}	680Ω // //
-610-00	R_{136}	680Ω // //
-435-00	*R_{137}	15Ω // //
-435-00	*R_{138}	15Ω // //
1-221-469-11	R_{139}	100Ω Adjustable Resistor
1-203-446-00	R_{140}	2KΩ 1/16W Carbon
-446-00	R_{141}	2KΩ // //
-631-00	R_{142}	20KΩ // //
-631-00	R_{143}	20KΩ // //
1-221-539-11	R_{144}	5KΩ Volume Control
1-203-614-00	R_{145}	100KΩ 1/16W Carbon
-480-00	R_{146}	100KΩ // //
-434-00	R_{401}	3.3KΩ // //
-631-00	R_{402}	20KΩ // //
-604-00	R_{403}	330Ω // //
-423-00	R_{404}	2.2KΩ // //
-438-00	R_{405}	6.8KΩ // //
-339-00	R_{406}	1.8KΩ // //
-596-00	R_{407}	120Ω // //
-450-00	R_{408}	5.1Ω // //
-420-00	R_{409}	470Ω // //
1-204-189-00	R_{410}	62Ω // //
1-203-489-00	R_{411}	3KΩ // //
	R_{412}	(Built in Thermistor)
1-203-704-00	R_{413}	3Ω 5/8W Carbon
-417-00	R_{414}	180Ω 1/16W //
		Capacitor
1-121-135-00	C_{101}	50μF 6V Electrolytic
1-129-202-11	C_{102}	0.01μF PC
1-103-369-12	C_{103}	0.0036μF Styrol
1-129-202-11	C_{104}	0.01μF PC
1-105-679-12	C_{105}	0.033μF Mylar
1-129-202-11	C_{106}	0.01μF PC
1-105-679-12	C_{107}	0.033μF Mylar
1-121-111-00	C_{108}	100μF 3V Electrolytic
-115-00	C_{109}	100μF 6V //
1-105-673-12	C_{110}	0.01μF Mylar
1-129-202-11	C_{111}	0.01μF PC
1-105-673-12	C_{112}	0.01μF Mylar
-679-12	C_{113}	0.033μF //
-679-12	C_{114}	0.033μF //
-665-12	C_{115}	0.0022μF //
-665-12	C_{116}	0.0022μF //
-663-12	C_{117}	0.0015μF //
-663-12	C_{118}	0.0015μF //
-665-12	C_{119}	0.0022μF //
-665-12	C_{120}	0.0022μF //
1-121-115-00	C_{121}	100μF 6V Electrolytic
-113-00	C_{122}	30μF 3V //
-113-00	C_{123}	30μF 3V //
-111-00	C_{124}	100μF 3V //
-111-00	C_{125}	100μF 3V //
-102-00	C_{126}	30μF 6V //
-102-00	C_{127}	30μF 6V //
-123-00	C_{128}	200μF 6V //
-104-00	C_{401}	10μF 6V //
1-105-825-12	C_{402}	0.0022μF Mylar

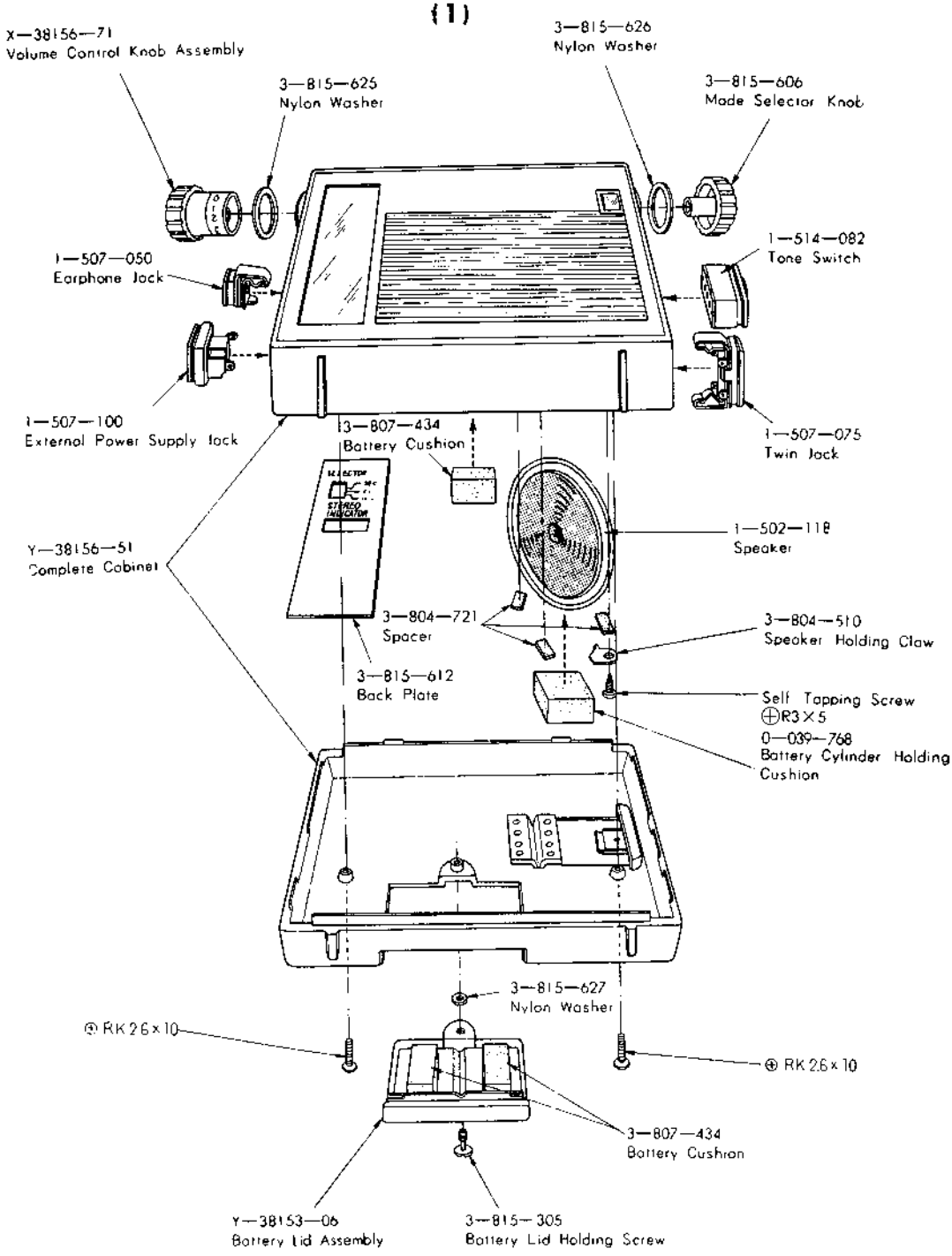
* To be adjusted

—continued—

Part No.	Symbol No.	Description	Part No.	Symbol No.	Description
1-121-135-00	C_{403}	50μF 6V Electrolytic	1-105-395-12	C_{408}	0.22μF Mylar
-104-00	C_{404}	10μF 6V //	1-121-115-00	C_{409}	100μF 6V Electrolytic
-206-00	C_{405}	0.2μF 15V //	1-127-018-11	C_{410}	0.047μF //
-135-00	C_{406}	50μF 6V //	1-121-115-00	C_{411}	100μF 6V //
-115-00	C_{407}	100μF 6V //			

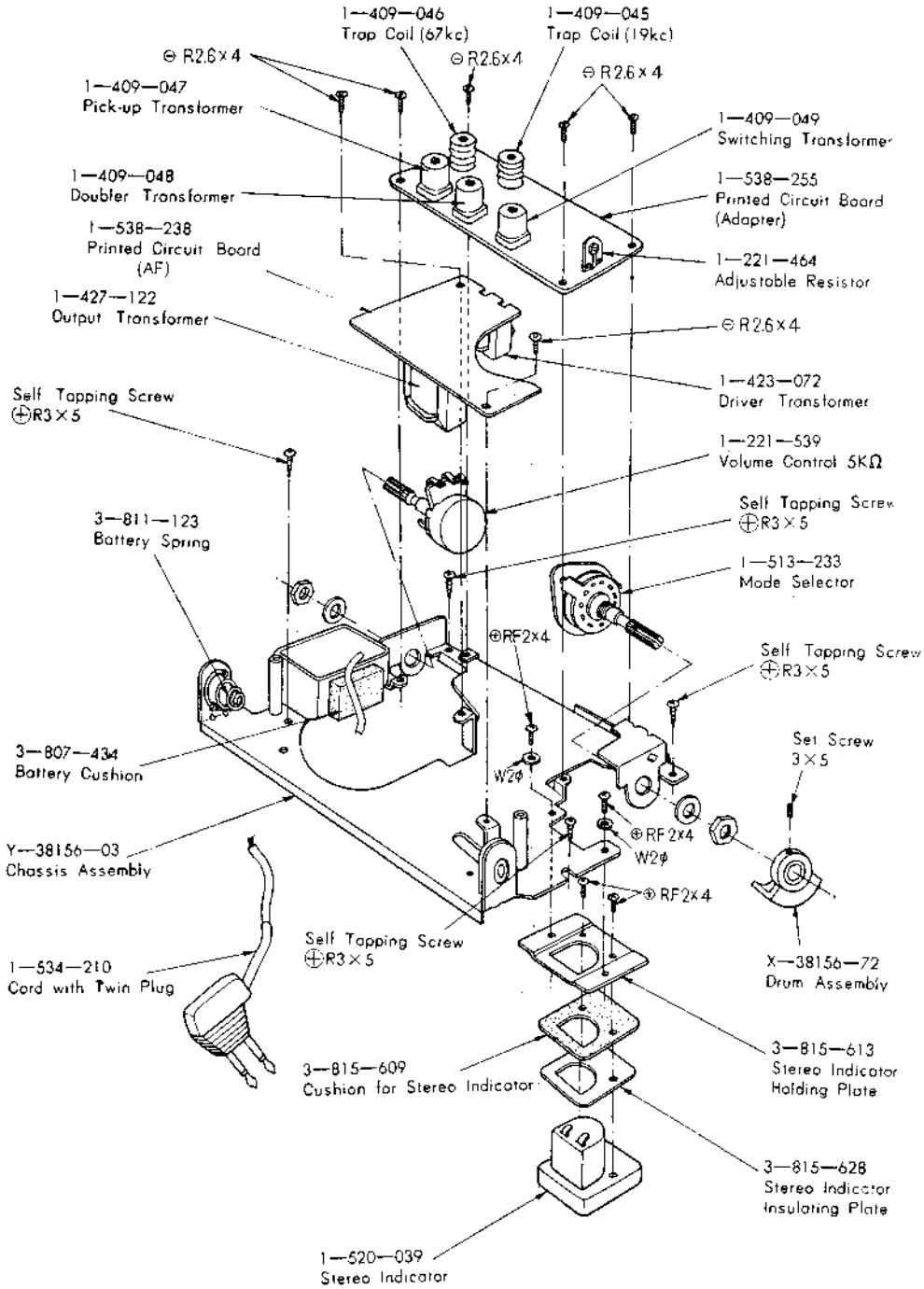
Exploded Diagram

(1)



Exploded Diagram

(2)



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