



In this photo you can see Model TX-6800.

Service Manual

AM/FM STEREO TUNER

TX-6800

TX-608

 **PIONEER®**

Both Model TX-6800 and TX-608 have the same basic performance. The major difference is in appearance, Model TX-6800 being fitted with wooden side and top panels, while Model TX-608 employs metal.

MODEL TX-6800 COMES IN TWO VERSIONS DISTINGUISHED AS FOLLOWS.

Type	Voltage	Remarks
KU	120V only	U.S.A. model
KC	120V only	Canada model

MODEL TX-608 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
HE	220V and 240V (Switchable)	Europe model
HB	220V and 240V (Switchable)	United Kingdom model
HP	220V and 240V (Switchable)	Oceania model
S	110V, 120V, 220V and 240V (Switchable)	General export model
S/G	110V, 120V, 220V and 240V (Switchable)	U.S. military model

This service manual is applicable to the TX-6800/KU. When repairing the TX-608/KU, please see page 23, and for the other types, please refer to the additional service manuals.

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1. SPECIFICATIONS

Semiconductors

ICs	3
FET	1
Transistors	8
Diodes	15

FM Section

Usable Sensitivity	MONO:	10.8dBf (1.9 μ V)
50dB Quieting Sensitivity . .	MONO:	15dBf
	STEREO:	38dBf
Signal-to-Noise Ratio at 65dBf	MONO:	80dB
	STEREO:	74dB
Distortion at 65dBf	MONO:	100Hz 0.1%
		1kHz 0.1%
		6kHz 0.15%
	STEREO:	100Hz 0.2%
		1kHz 0.2%
		6kHz 0.25%
Capture Ratio		1.0dB
Alternate Channel Selectivity		60dB
Stereo Separation	1kHz:	40dB
	30Hz to 15kHz:	35dB
Frequency Response	20Hz to 15kHz	± 0.5 dB
Spurious Response Ratio . .		70dB
Image Response Ratio		60dB
IF Response Ratio		80dB
AM Suppression Ratio		55dB
Subcarrier Product Ratio . .		50dB
Muting Threshold		17.2dBf (4.0 μ V)
De-Emphasis Switch (Switchable)		25 μ s - 75 μ s
Antenna Input		300ohms balanced
		75ohms unbalanced

AM Section

Sensitivity	
IHF, ferrite antenna . . .	300 μ V/m
IHF, external antenna . .	15 μ V
Selectivity	35dB
Signal-to-Noise Ratio	50dB
Image Response Ratio	40dB
IF Response Ratio	70dB
Antenna	Built-in Ferrite Antenna

Audio Section

Output Level	650mV/4.3k Ω (FM 100% MOD.)
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Miscellaneous

Power Requirements	120V 60Hz
Power Consumption	14W
Dimensions	451(W) x 151(H) x 284(D) mm 17-3/4(W) x 5-15/16(H) x 11-3/16(D) in
Weight (Without Package) . .	5.3 kg (11lb 11oz)

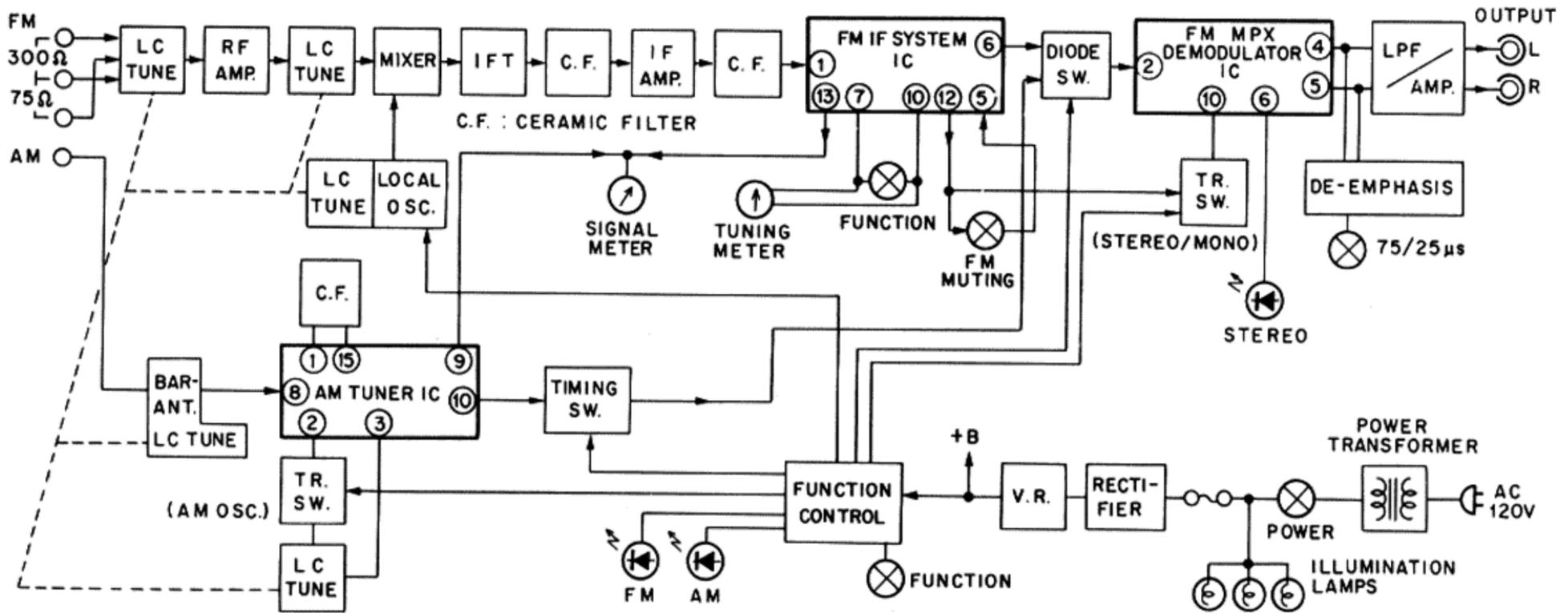
Furnished Parts

FM T-type Antenna	1
Connection Cord with Pin Plugs	1
Operating Instructions	1

NOTE:

Specifications and the design subject to possible modification without notice due to improvements.

3. BLOCK DIAGRAM



4. CIRCUIT DESCRIPTIONS

4.1 AM TUNER

The AM tuner employs a 2-ganged tuning capacitor, a single-element ceramic filter, and an IC (HA1138) consisting of an RF amplifier, mixer, 2-stage IF amplifier, detector and AGC amplifier. See Fig. 4-1 for the block diagram.

When the FUNCTION switch (S_3) is in the FM position, +B is applied to the emitter of Q_{11} via R_{52} , R_{62} and R_{65} . Q_{11} will turn off, and the local oscillator circuit will be opened.

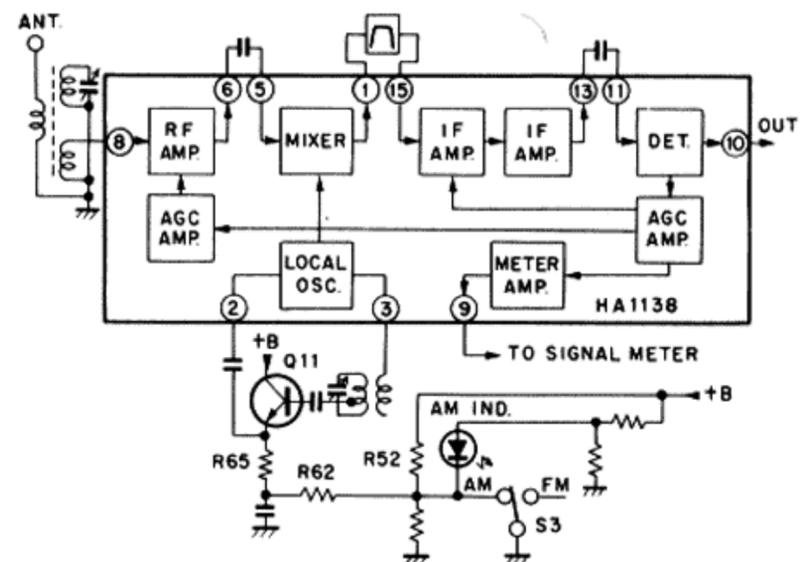


Fig. 4-1 AM tuner

4.2 FM TUNER

Front-End

A frequency linear 3-gang variable capacitor is used with a single stage FET RF amplifier.

The FET possesses high input impedance compared with a transistor, and allows simple coupling with the input tuning circuit, plus a significant advantage in terms of noise.

The local oscillator, Q₃ employs a modified Clapp circuit, thereby reducing the amount of drift caused by changes in time, ambient temperature, and power supply voltage. Also since the oscillator signal is obtained from the tuning circuit, there are far fewer higher harmonics, resulting in a much cleaner waveform with less spurious interference.

The oscillator signal is applied to the base of the mixer transistor Q₂ via low capacity capacitor.

When the FUNCTION switch (S₃) is in the AM position, +B is applied to the cathode of D₁ via R₃₄. D₁ will be cut-off and Q₃ will turn off.

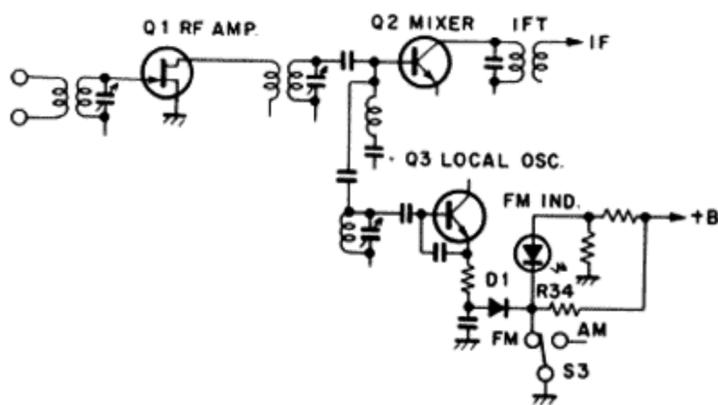


Fig. 4-2 FM front end

IF Amplifier and Detector

This stage includes 2 dual-element ceramic filters, a transistor and an IC (PA3001-A) with a high SN ratio and very little distortion. The transistor inserted between the two ceramic filters is employed for impedance matching purposes as well as to increase the gain.

PA3001-A includes the IF limiter amplifier, FM detector (quadrature detector), AF amplifier, muting circuit and the meter drive circuit.

The muting circuit is turned on when pins 5 and 12 are connected by means of the FM MUTING switch. If the dial pointer is moved approx. ± 70 kHz away from a station, and the input level is very low (equivalent antenna input less than 4μ V), a 5V DC signal is generated at pin 12, and applied to pin 5, thereby activating the muting circuit within the IC.

FM MPX Stereo Demodulator

The IC (PA1001-A) employed in the FM multiplex stereo demodulator stage also features a high SN ratio and reduced distortion. Due to the incorporation of a pilot auto-canceller circuit, very good frequency characteristics are obtained. Unlike the more conventional pilot signal (19kHz) canceller circuits, which fail to completely remove the pilot signal if it is not at standard level, PA1001-A pilot auto-canceller circuit also includes a pilot signal level detector circuit. Changes in pilot signal level are consequently responded to immediately, resulting in very effective suppression of the pilot signal leak level.

Filter Circuit

Besides eliminating the sub-carrier signals (more than 23kHz), this PNP transistor 18dB/oct. active filter also serves as an amplifier for the low-pass region, and as a crosstalk canceller.

5. DISASSEMBLY

Side Panels and Top Panel

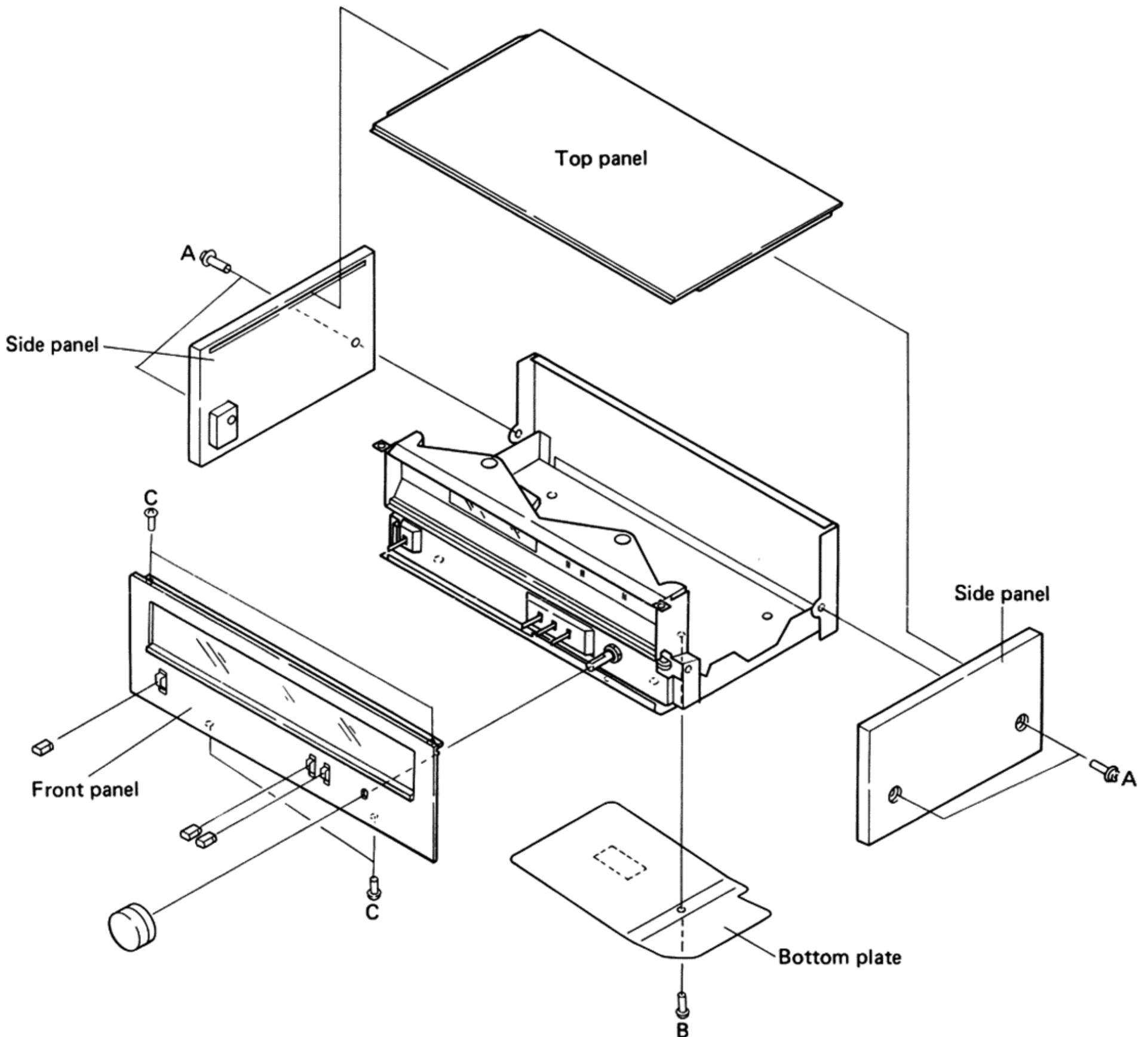
Remove the four screws (A), and remove the side panels.

Bottom Plate

Remove the screw (B).

Front Panel

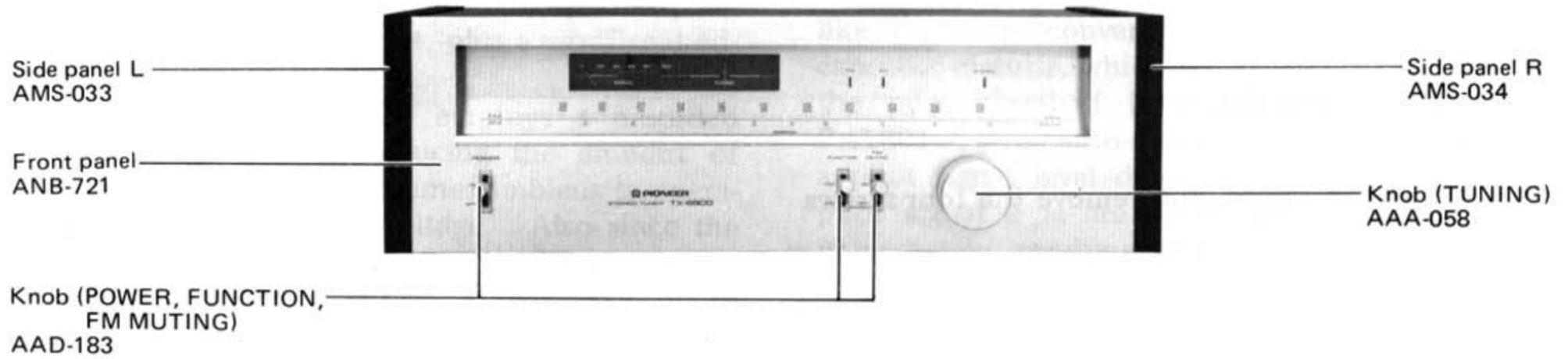
Pull off all the knobs, and remove the four screws (C).



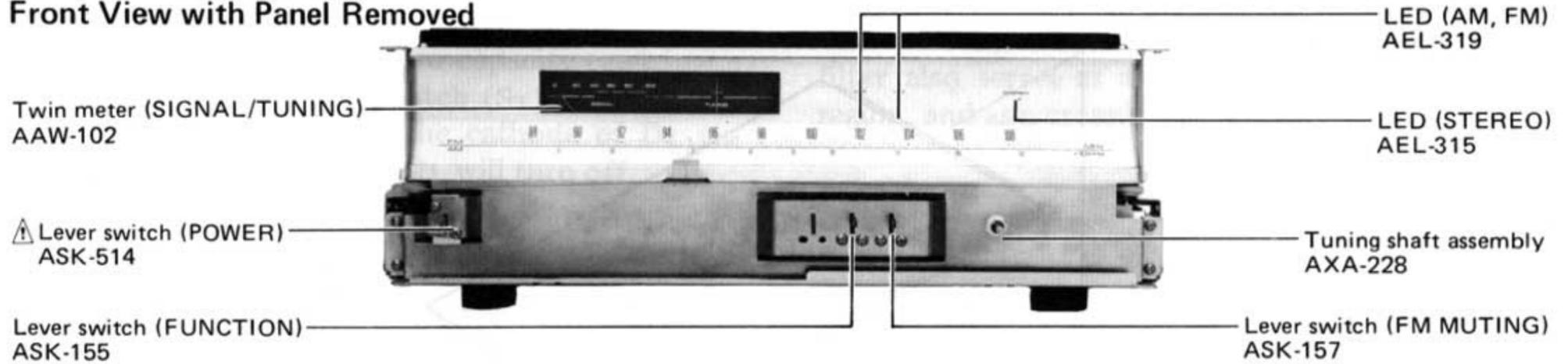
6. PARTS LOCATION

- The \triangle mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

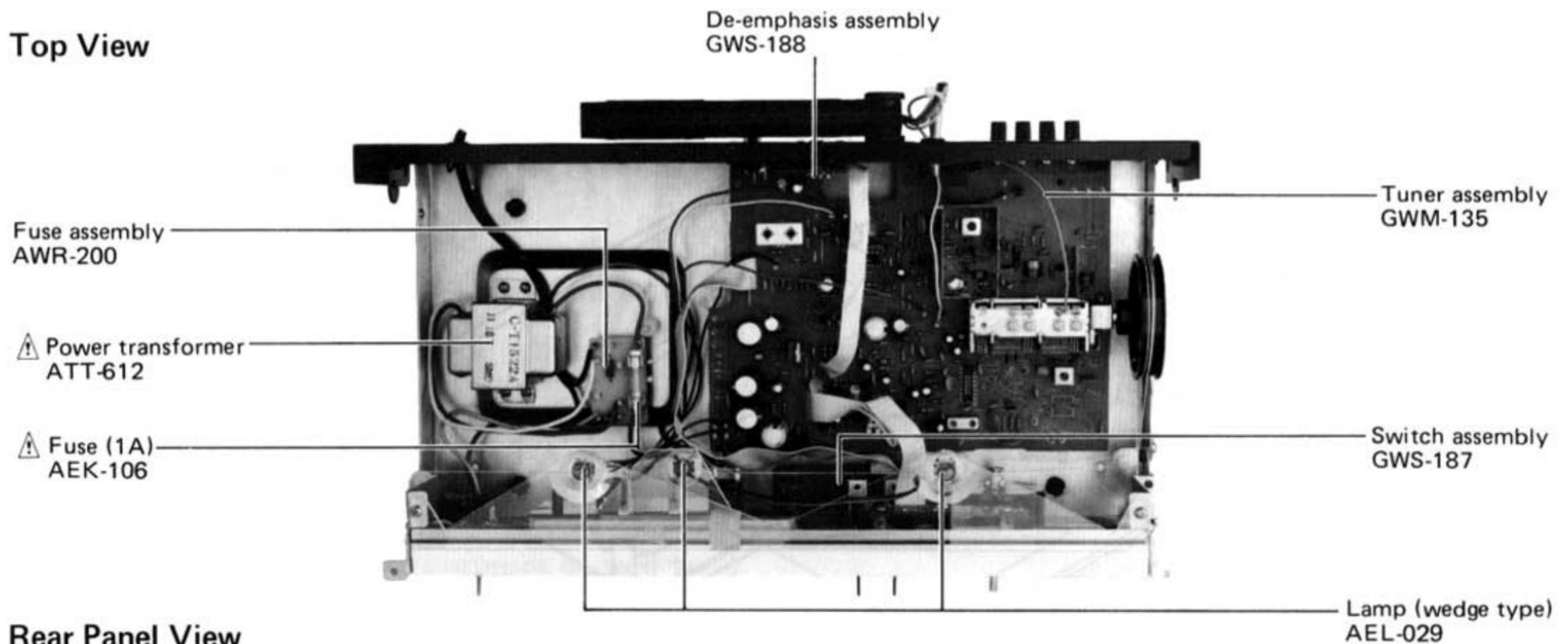
Front Panel View



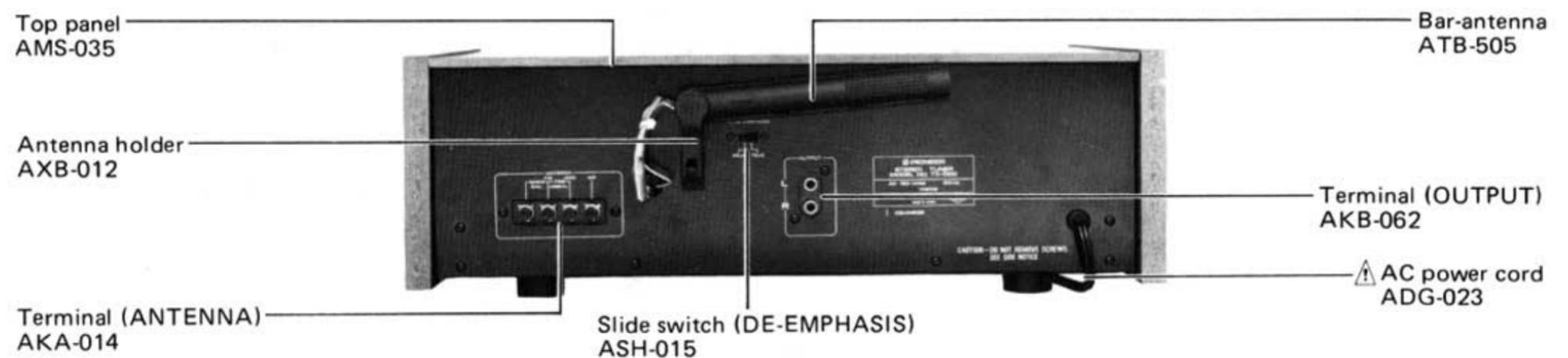
Front View with Panel Removed



Top View

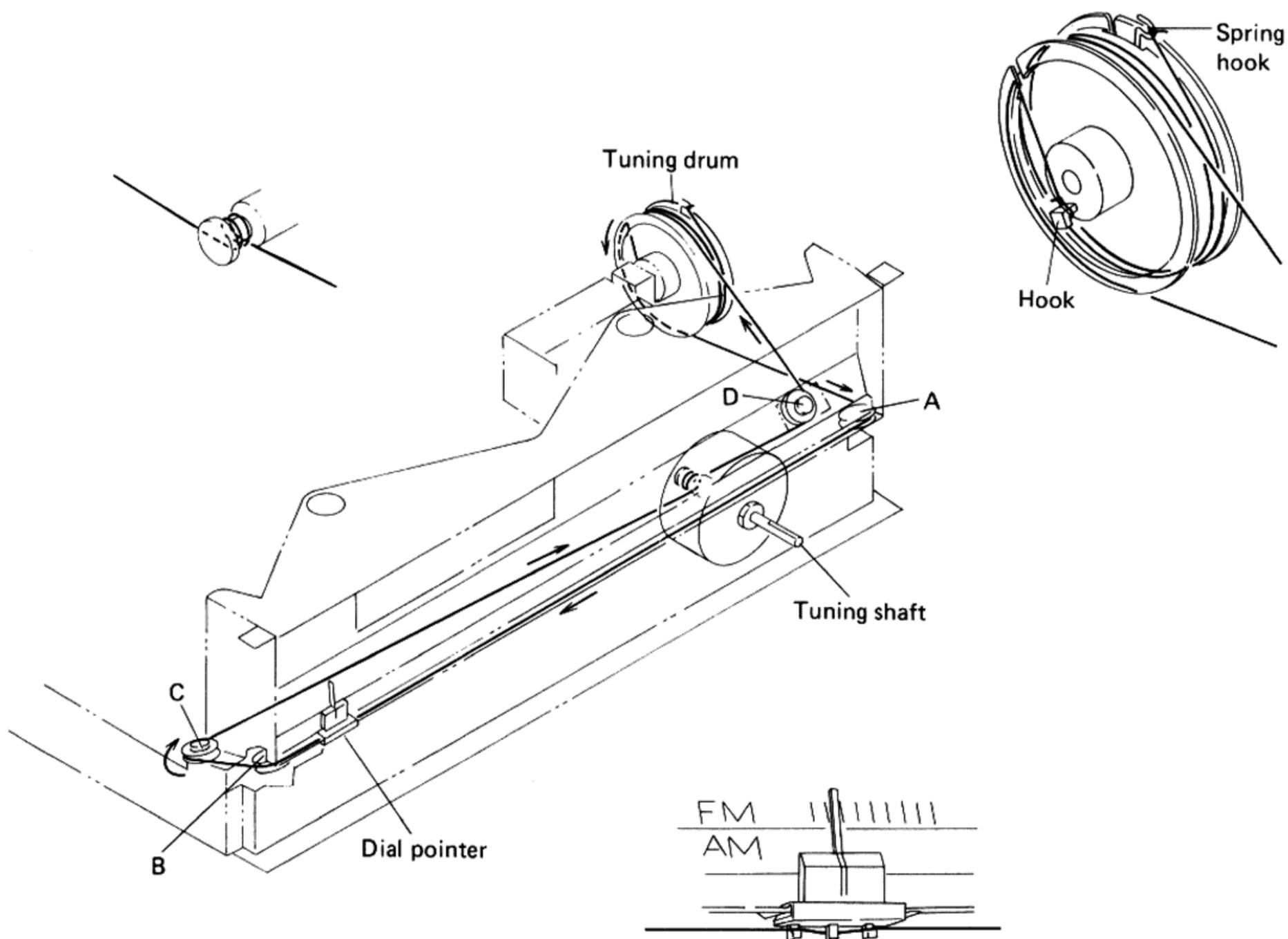


Rear Panel View



7. DIAL CORD STRINGING

1. Remove the wooden case and front panel as described in the "Disassembly" section on page 7.
2. Turn the tuning capacitor shaft fully clockwise.
3. Fix the tuning drum to the tuning capacitor shaft so that the set-screw is uppermost.
4. Tie on end of the dial cord to the hook on the tuning drum.
5. Pass the cord through the cut-out section in the tuning drum, and then take it over pulleys A, B and C in that sequence.
6. Wind the cord around the tuning shaft 2 times.
7. Pass it over pulley D, wind it around the tuning drum 2 times, and finally tie it to the spring hook so that it is tensioned.
8. Turn the tuning shaft, and check that the cord moves smoothly.
9. Cut off any excess cord.
10. Turn the tuning shaft counter-clockwise as far as it will go.
11. Align the dial pointer with the starting point of the dial scale (second division from the left), and then pass the cord over it.
12. Check that the dial pointer is in line with the starting point of the dial scale.
13. Finally apply the locking paint to the cord securing positions (tuning drum hook and spring hook) and the dial pointer connection.



8. ADJUSTMENTS

8.1 FM TUNER

- Connect the FM SG (FM signal generator) to the FM ANTENNA 300Ω terminals via a 300Ω dummy antenna.

- Switch the FUNCTION selector to the FM position, the FM MUTING switch to the OFF position.

- The tuning coils in the FM front end do not have an adjusting core. Consequently, tracking adjustments at 90MHz are performed by regulating the gap between rotor and stator of the tuning capacitors (VC₁, VC₃ and VC₅). The expression "adjust VC (VC₁, VC₃, VC₅) found in the text means that the two outer rotor blades of each of these tuning capacitors are to be extended outwards with spatula (Part No. GGK-066) as shown in Fig. 8-1.

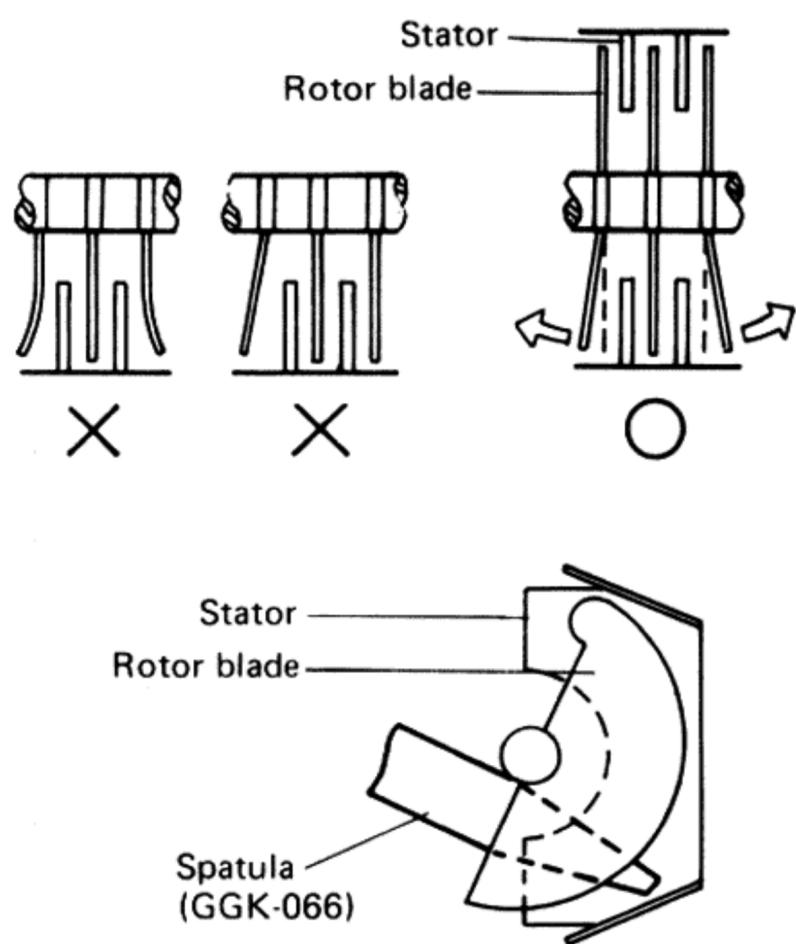


Fig. 8-1 Adjustment of tuning capacitor

1. Set the TX-6800 dial point to a frequency in the 106MHz region so that there will be no input signal.
2. Rotate the N core of T₂ to bring the TUNING meter indicator to dead center.
3. Next tune more accurately to 106MHz, and set the FM SG output to 106MHz, 60 to 80dB (modulation—400Hz, ±75kHz deviation).
4. Adjust TC₅ to obtain maximum deflection of the SIGNAL meter indicator, and a dead center reading in the TUNING meter.

5. Then tune the dial pointer to 90MHz, and set the FM SG output frequency to 90MHz.
6. Adjust the VC₅ to obtain maximum deflection in the SIGNAL meter, and a dead center reading in the TUNING meter.
7. Repeat steps 3 to 6 above.
8. Reset the FM SG output level to 20—30dB, and adjust TC₁ and TC₃ at 106MHz, and VC₁ and VC₃ at 90MHz in the same manner as described above in steps 3 to 7. These adjustments will ensure optimum sensitivity in the 90 to 106MHz range, and minimum difference in sensitivity between the two extreme frequencies.
9. Return to a position with no input signal.
10. Rotate the N core of T₂ again to set the TUNING meter indicator to dead center.
11. Set the FM SG output to 98MHz and 66dB (modulation—400Hz, ±75kHz deviation), and tune the TX-6800 to this position.
12. Then rotate the D core of T₂ to reduce distortion in the demodulator output (OUTPUT terminal) to a minimum.
13. Repeat steps 9 to 12 above until both specifications (center TUNING meter reading in the absence of input signal, and minimum distortion in demodulator output) are satisfactorily met.

Multiplex Decoder

- Connect the MPX SG (FM multiplex generator) to the FM SG external modulator terminal.

- Set the FM MUTING switch to the ON position.

14. Set the FM SG output to 98MHz and 66dB (unmodulated), and tune the TX-6800 to this position.
15. Adjust VR₁ to obtain a 76kHz signal at TP terminal.
16. Then set the FM SG output level to 86dB, and the modulation mode to external. Then with the MPX SG, set Main to 1kHz, L+R to ±67.5kHz deviation, and pilot signal to ±7.5kHz deviation.
17. Rotate the T₁ core around by up to 90° in either direction to reduce the demodulator output (OUTPUT terminal) distortion to a minimum.

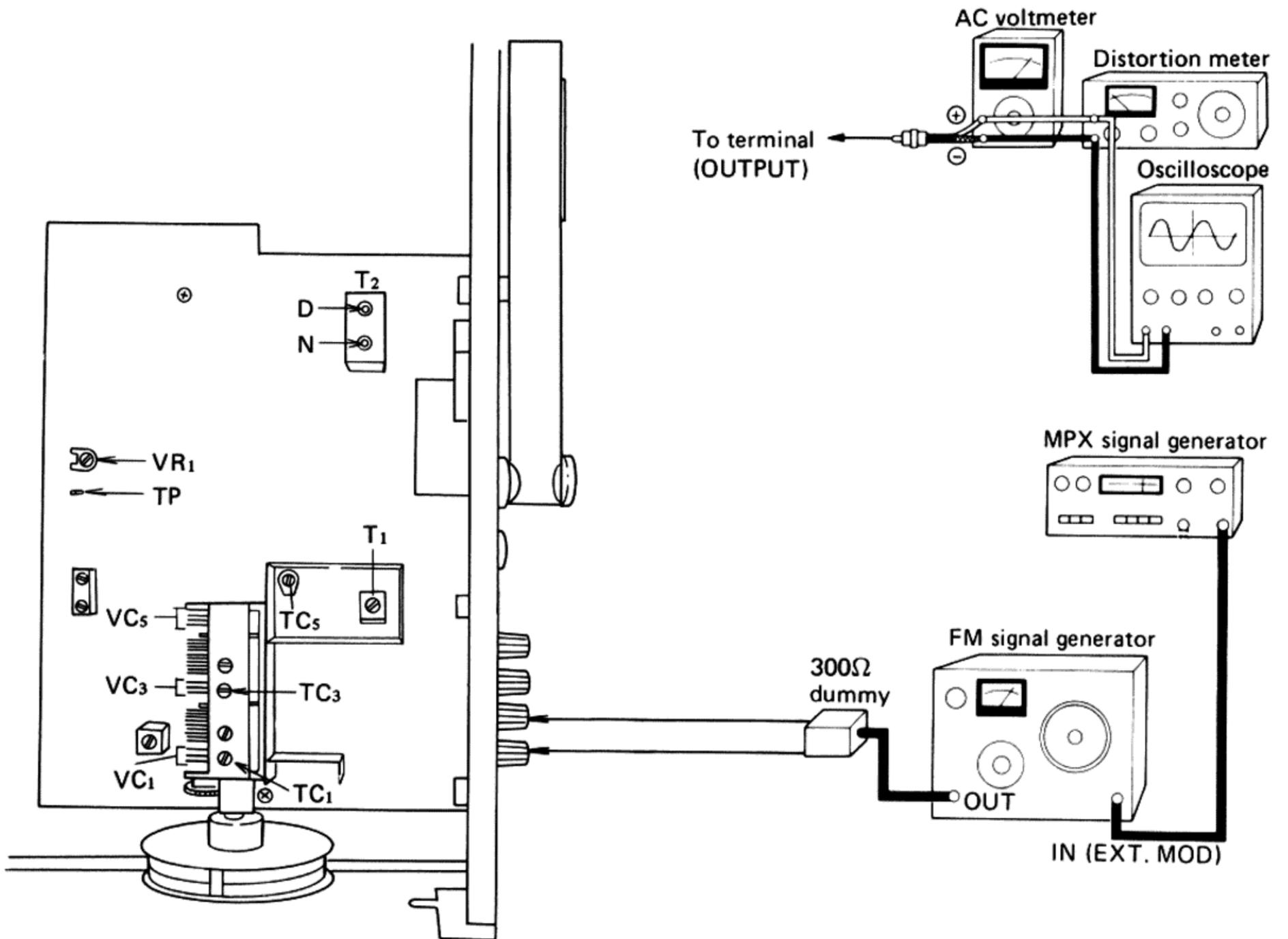


Fig. 8-2 FM tuner adjustments

8.2 AM TUNER

- Connect the AM SG (AM signal generator) to the AM ANTENNA terminal via a $1k\Omega$ resistor.
 - Switch the FUNCTION selector to the AM position.
1. Tune the TX-6800's dial pointer to 600kHz, and the AM SG output to 600kHz, 100dB (modulation 400Hz, 30%).
 2. Adjust the core of T_3 to obtain maximum deflection of the SIGNAL meter indicator.
 3. Then tune to 1400kHz, and set the AM SG output frequency to 1400kHz also.

4. This time adjust TC_4 to obtain maximum SIGNAL meter deflection.
5. Repeat steps 1 to 4 above.
6. Set the AM SG output level to 30dB, adjust the core of the bar-antenna and T_3 at 600kHz, and TC_4 and TC_2 at 1400kHz, in the same manner as described in the above steps. This is the adjustment for optimum sensitivity across the frequency band, and minimum difference in sensitivity at different frequencies.

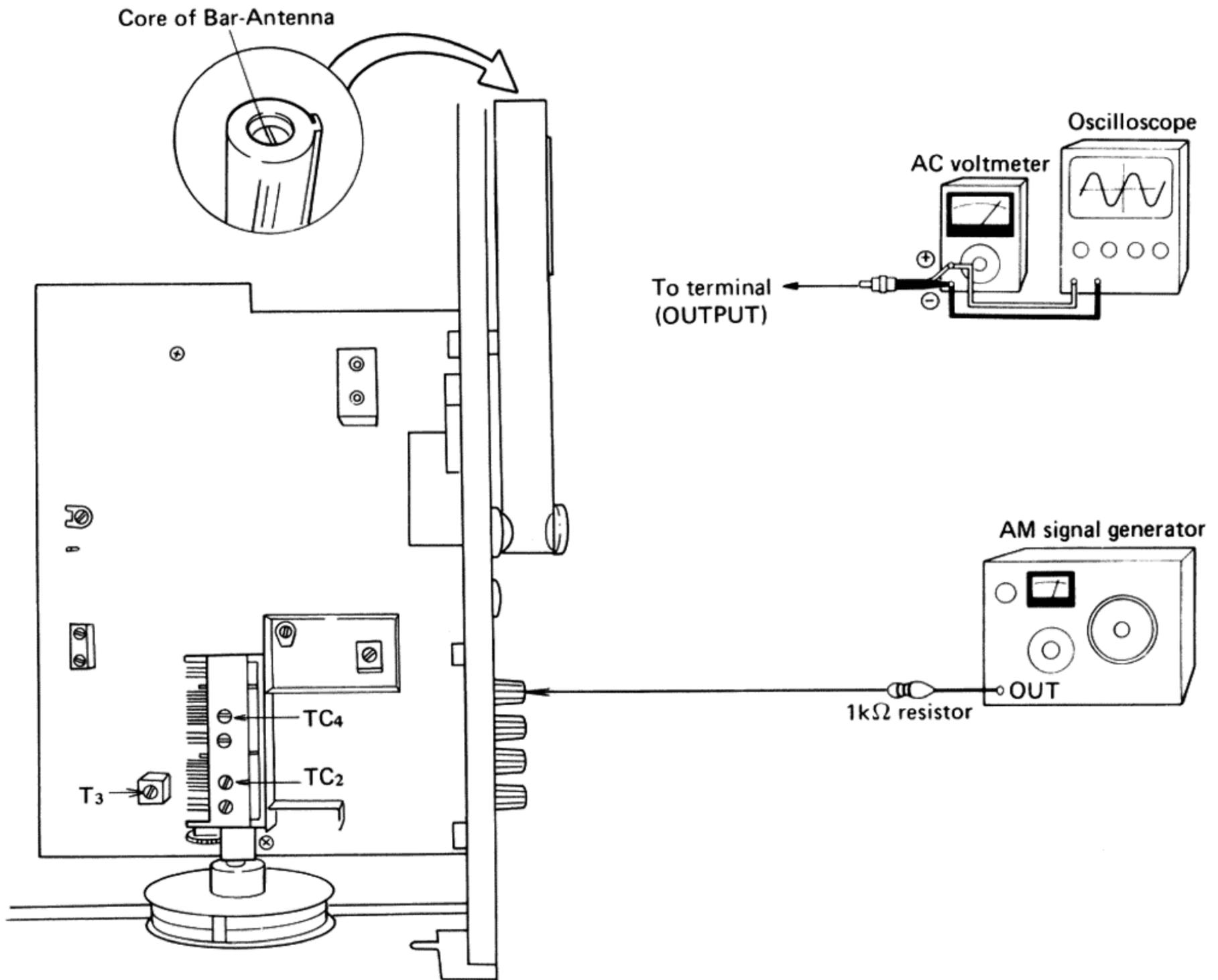
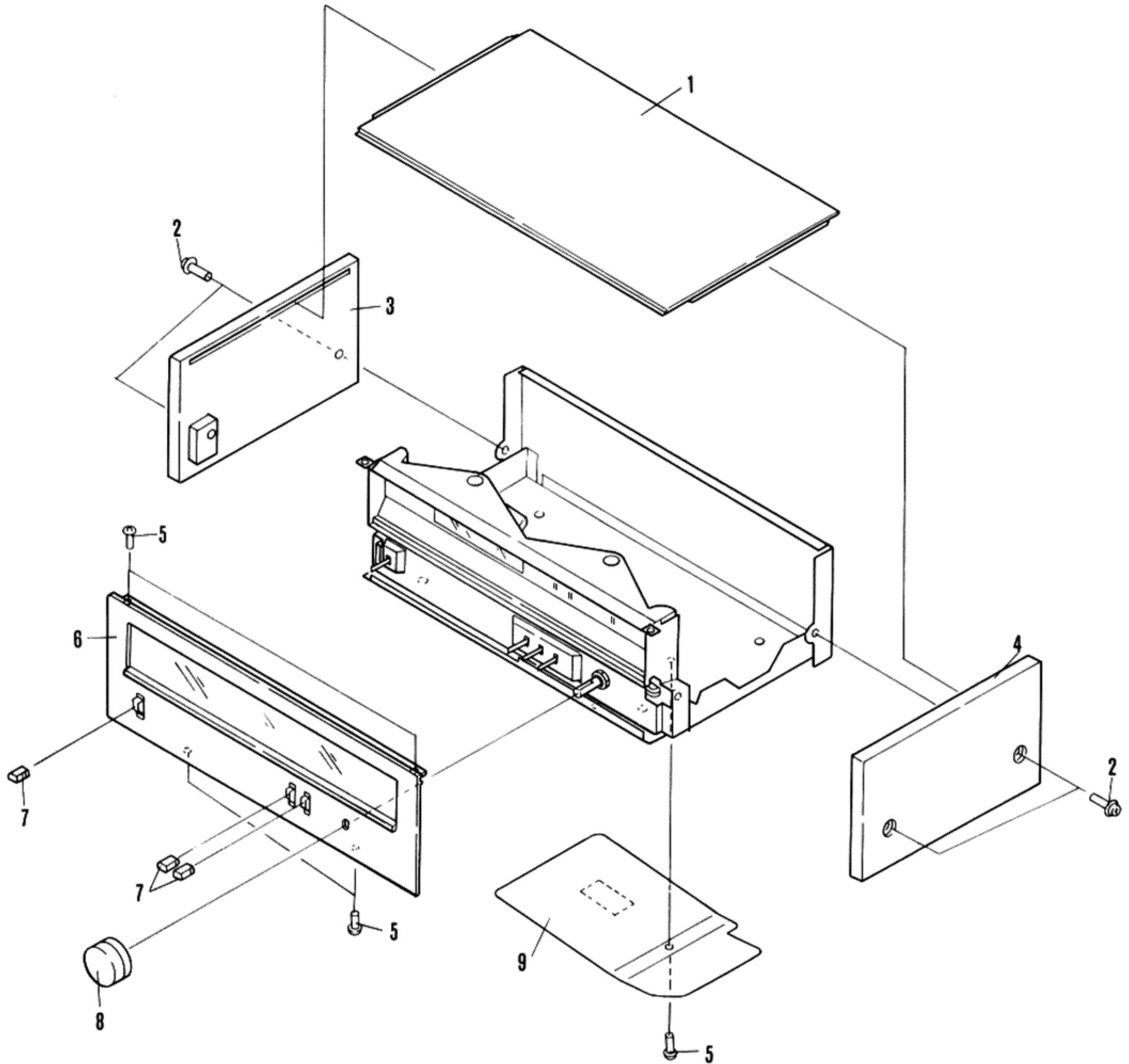


Fig. 8-3 AM tuner adjustments

9. EXPLODED VIEW

9.1 EXTERIOR COMPONENTS

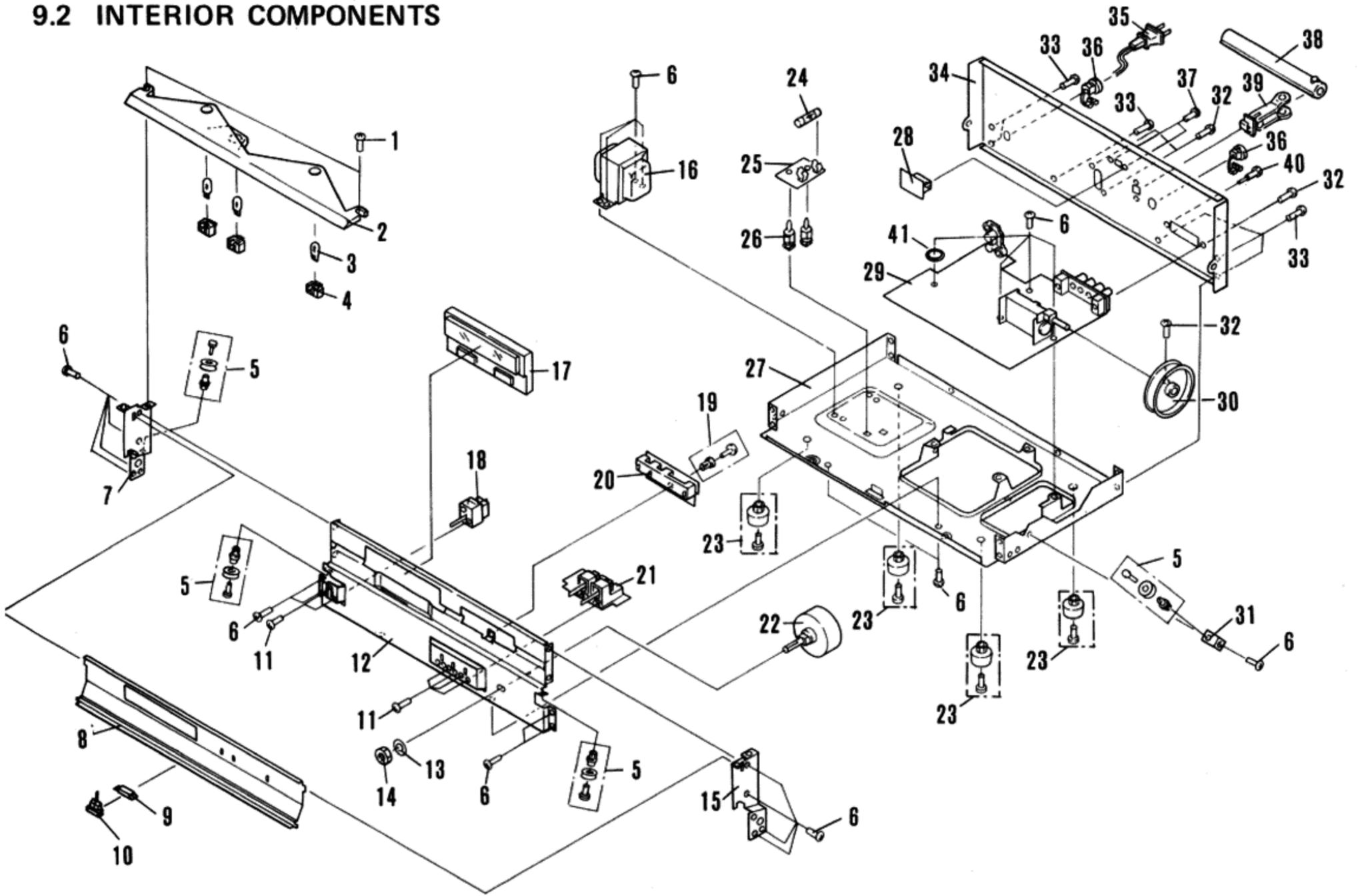


Parts List

Key No.	Part No.	Description
1.	AMS-035	Top panel
2.	ABA-206	Washerfaced screw 4x25
3.	AMS-033	Side panel L
4.	AMS-034	Side panel R
5.	ABA-048	Screw 3x6
6.	ANB-721	Front panel
7.	AAD-183	Knob (POWER, FUNCTION, MUTING)
8.	AAA-058	Knob (TUNING)
9.		Bottom plate

• Parts without part number cannot be supplied.

9.2 INTERIOR COMPONENTS



- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Parts List

Key No.	Part No.	Description	Key No.	Part No.	Description
1.	ABA-049	Screw 3x8	21.	GWS-187	Switch assembly
2.		Acrylic board	22.	AXA-228	Tuning shaft assembly
3.	AEL-029	Lamp (wedge type)	23.	AEC-546	Foot assembly
4.	AKK-005	Lamp socket (wedge type)	⚠24.	AEK-106	Fuse (1A)
5.		Pulley assembly	25.	AWR-200	Fuse assembly
6.	ABA-048	Screw 3x6	26.	AEC-554	P.C. board holder
7.		Side plate L	27.		Chassis
8.		Dial scale board	28.	GWS-188	De-emphasis assembly
9.		Smoother	29.	GWM-135	Tuner assembly
10.		Dial pointer	30.		Tuning drum
11.	ABA-025	Pan head screw 3x4	31.		Angle
12.		Sub-panel	32.	ABA-082	Screw 3x10
13.	B22-018	Flat washer	33.	ABA-228	Screw 3x6
14.	B71-010	Nut 7 φ	34.		Rear panel
15.		Side plate R	⚠35.	ADG-023	AC power cord
⚠16.	ATT-612	Power transformer	36.	AEC-327	Strain relief
17.	AAW-102	Twin meter	37.	ABA-034	Pan head screw 3x4
⚠18.	ASK-514	Lever switch (POWER)	38.	ATB-505	Bar-antenna
19.	AEC-352	Nylon rivet	39.	AXB-012	Antenna holder
20.	GWX-308	LED assembly	40.	ABA-115	Special screw
			41.	ABE-035	Washer

10. SCHEMATIC DIAGRAM, P.C.BOARD PATTERNS AND PARTS LIST

10.1 MISCELLANEA

NOTE:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

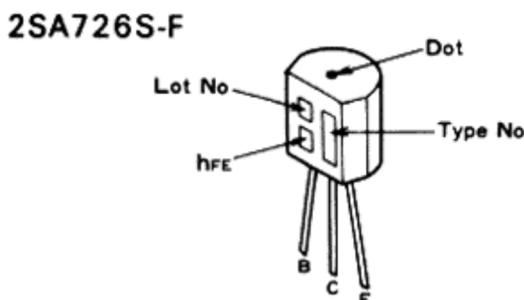
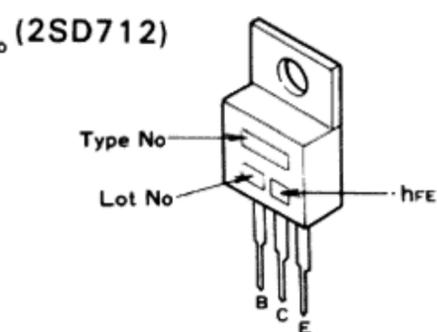
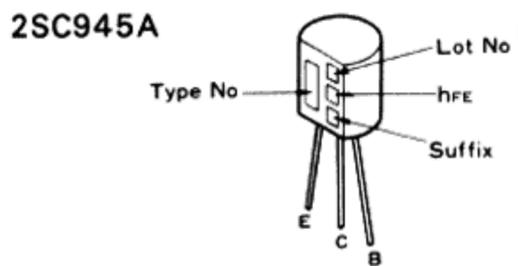
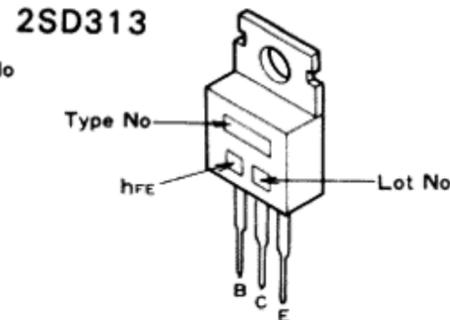
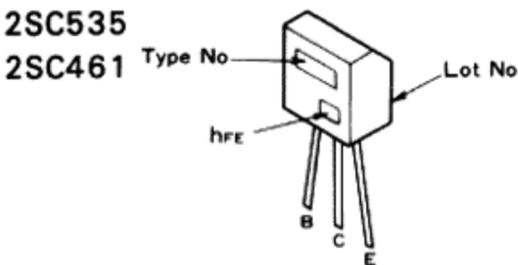
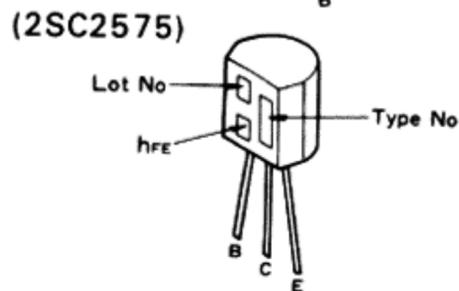
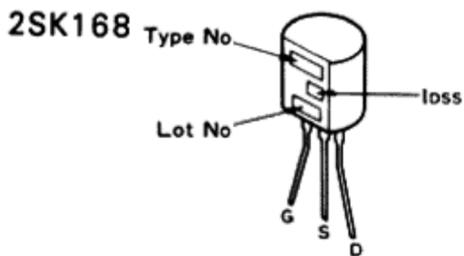
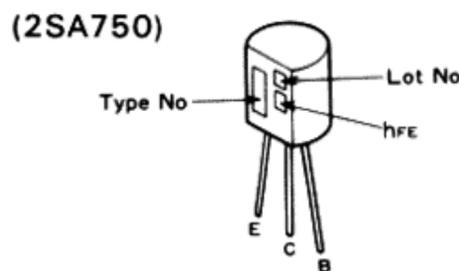
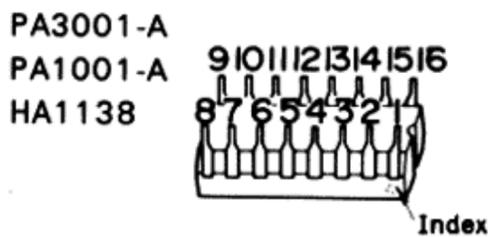
560Ω — 56 × 10¹ — 561 RD¼PS 561 J
 47kΩ — 47 × 10³ — 473 RD¼PS 473 J
 0.5Ω — 0R5 RN2H 0R5 K
 1Ω — 010 RS1P 010 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ 562 × 10¹ 5621 RN¼SR 5621 F

- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

External Appearance of Transistors and ICs



Miscellaneous Parts

LAMPS AND FUSE

Part No.	Symbol & Description
AEL-029	PL1-PL3 Lamp (wedge type)
Δ AEK-106	FU1 Fuse (1A)

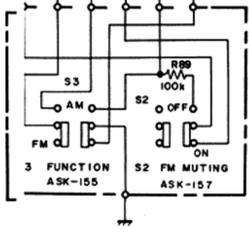
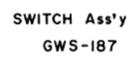
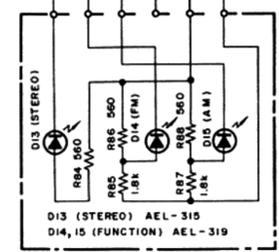
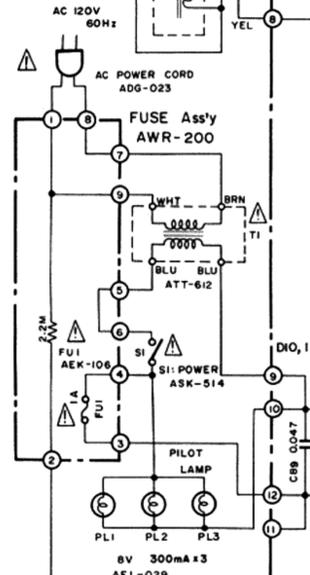
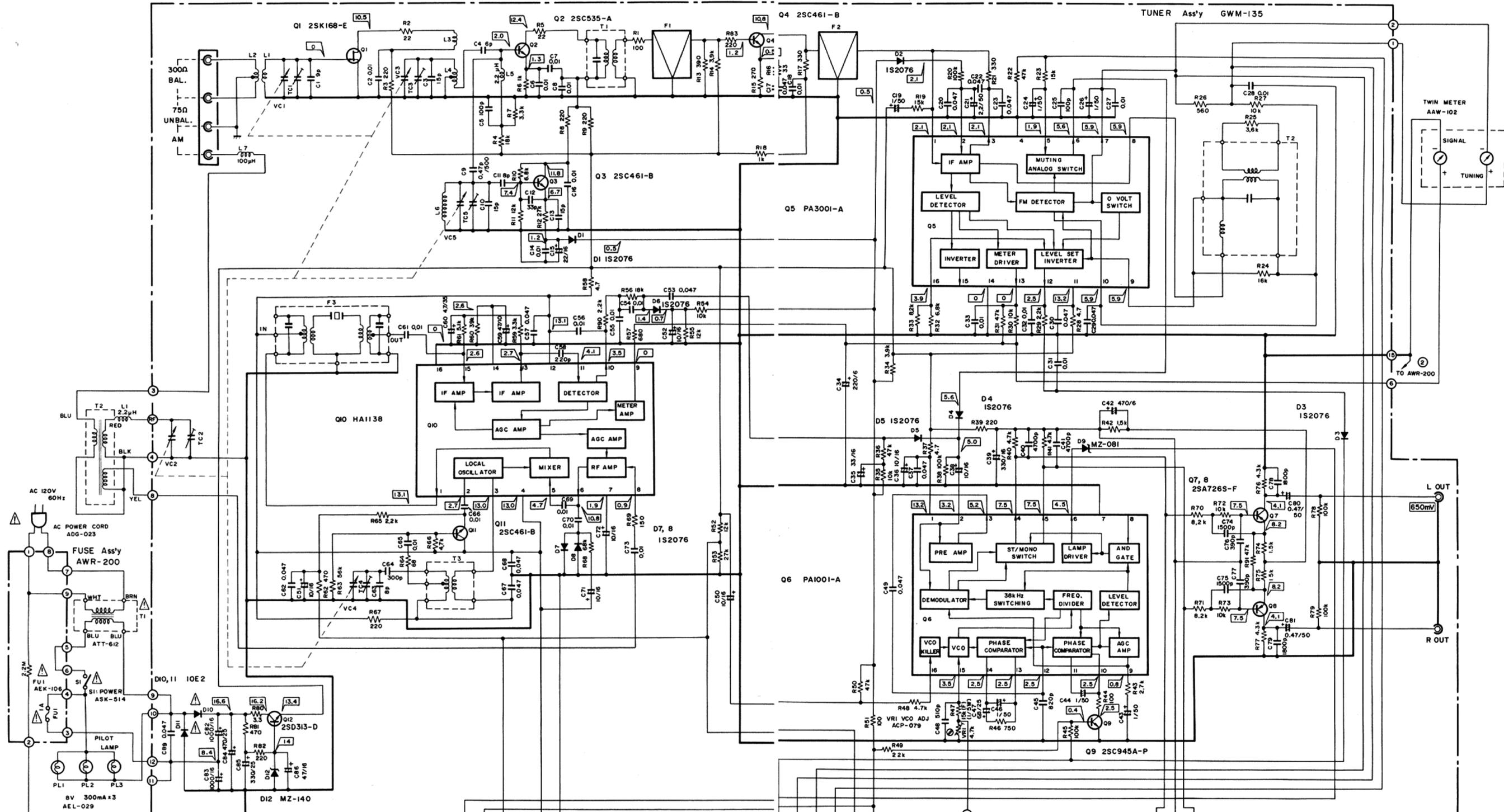
P.C. BOARD ASSEMBLIES

Part No.	Description
GWM-135	Tuner assembly
GWS-187	Switch assembly
GWS-188	De-emphasis assembly
GWX-308	LED assembly
AWR-200	Fuse assembly

OTHERS

Part No.	Symbol & Description
Δ ATT-612	T1 Power transformer
ATB-505	T2 Bar-antenna
Δ ASK-514	S1 Lever switch (POWER)
AAW-102	Twin meter (SIGNAL/TUNING)
AKK-005	Lamp socket (wedge type)
Δ ADG-023	AC power cord

10.2 SCHEMATIC DIAGRAM



- SWITCHES**
- S1 : POWER ON-OFF
 - S2 : FM MUTING ON-OFF
 - S3 : FUNCTION AM-FM
 - S4 : DE-EMPHASIS 25μs-75μs
- The under lined indicates the switch position.

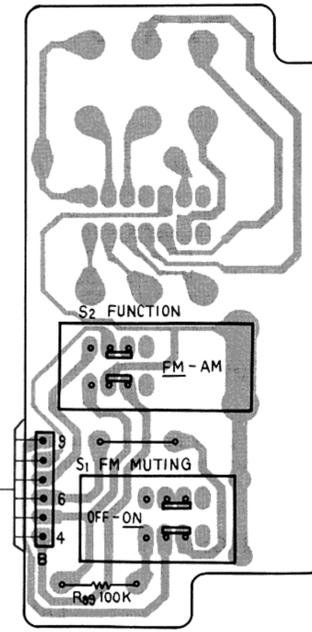
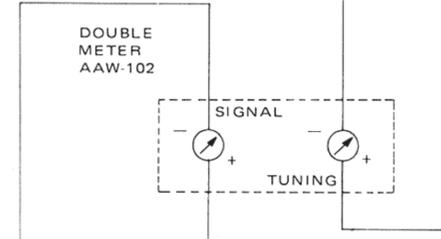
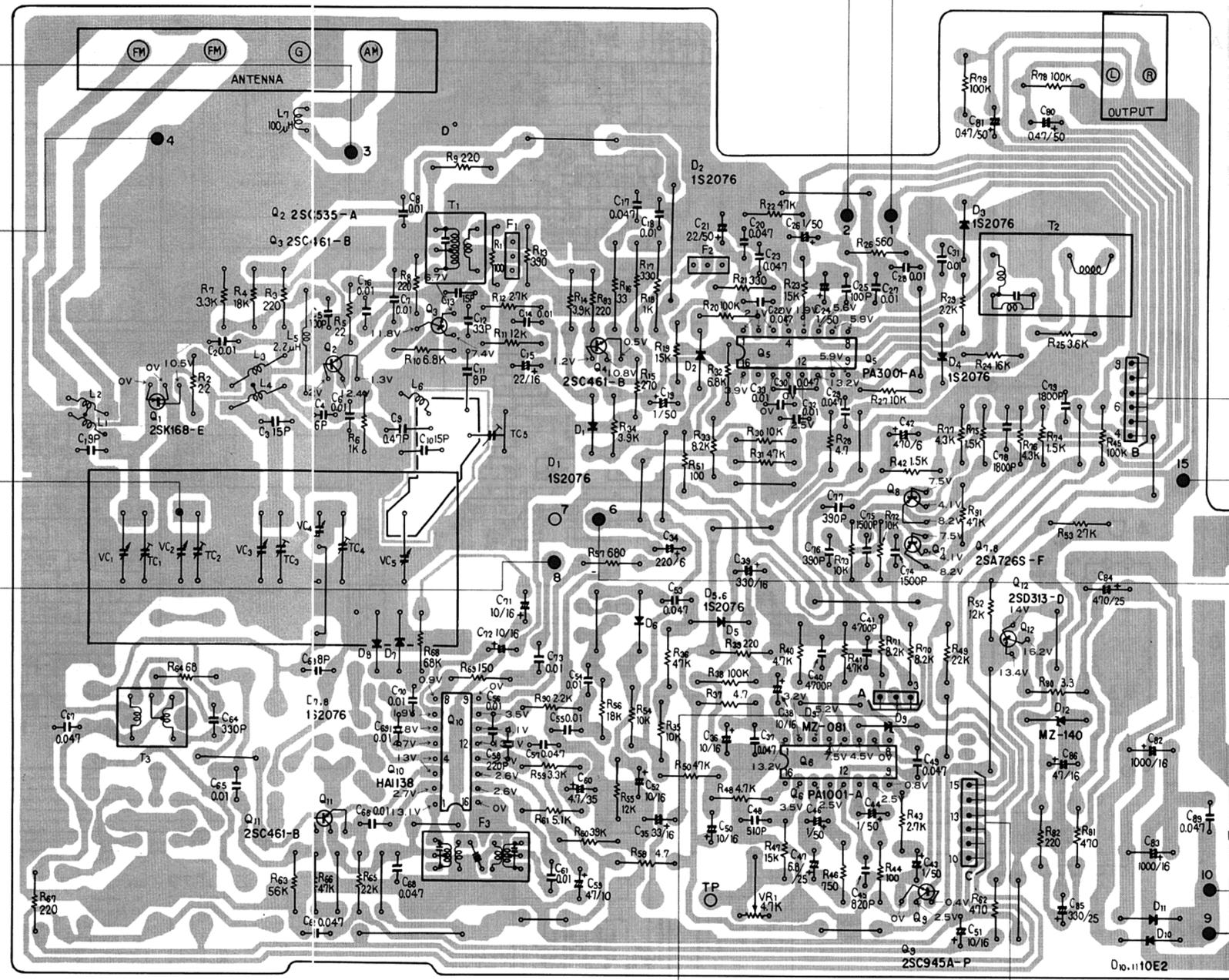
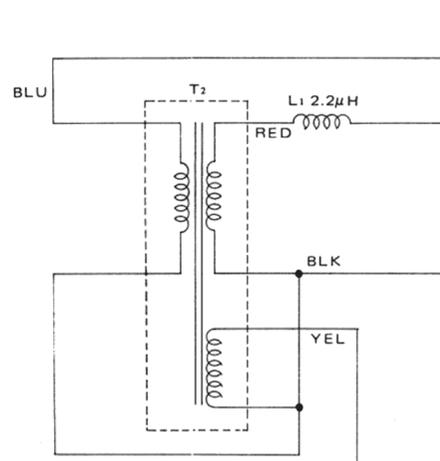
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

- RESISTOR:** Indicated in Ω, 1/4W, ±5% tolerance unless otherwise noted; k, M, MΩ, (F); ±1%, (G); ±2%, (K); ±10% tolerance.
- CAPACITORS:** Indicated in capacity (μF)/voltage(V) unless otherwise noted; p, μF. Indication without voltage is 50V except electrolytic capacitor.
- VOLTAGE:** DC voltage (V) at no input signal
- OTHERS:** : Adjusting point. The mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

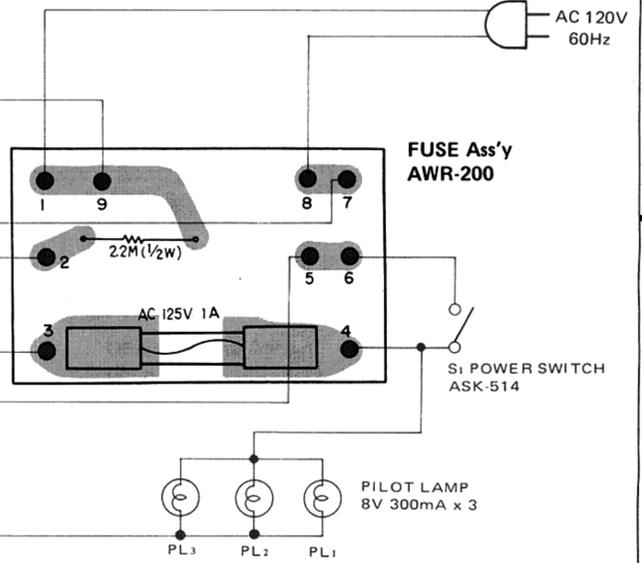
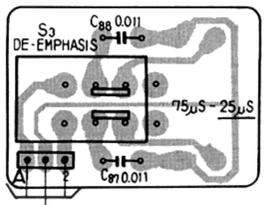
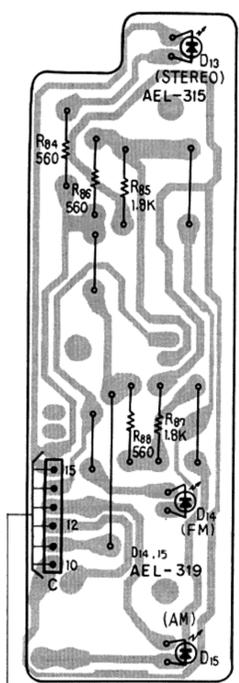
10.3 P.C. BOARDS CONNECTION DIAGRAM

TUNER Ass'y GWM-135

SWITCH Ass'y GWS-187



LED Ass'y GWX-308



10.4 PARTS LIST OF P.C. BOARD ASSEMBLIES

Tuner Assembly (GWM-135)

COILS AND TRANSFORMERS

Part No.	Symbol & Description	
ATE-008	T1	FM IFT
ATE-043	T2	FM det. transformer
ATB-063	T3	AM OSC coil
T24-028	L5	RF choke coil
ATF-049	F1, F2	FM ceramic filter
ATF-074	F3	AM ceramic filter (450kHz)

CAPACITORS

Part No.	Symbol & Description	
ACK-012	VC	Tuning capacitor
ACM-006	TC5	Trimmer
CCDUJ 090D 50	C1	
CGB R47K 500	C9	
CCDXL 080F 50	C63	
CCDCH 080F 50	C11	
CCDUJ 150K 50	C3	
CCDRH 150K 50	C10	
CCDCH 150K 50	C13	
CCDCH 330K 50	C12	
CCDSL 060D 50	C4	
CCDSL 101K 50	C5, C25	
CCDSL 221K 50	C58	
CKDYB 391K 50	C76, C77	
CKDYB 152K 50	C74, C75	
CKDYB 182K 50	C78, C79	
CKDYB 472K 50	C40, C41	
CKDYB 821K 50	C45	
CKDYF 103Z 50	C2, C6, C7, C8, C14, C16, C18, C27, C28, C31, C32, C33, C54, C55, C56, C65, C66, C69, C70, C73, C61	
CKDYF 473Z 50	C17, C20, C22, C23, C29, C30, C37, C49, C53, C57, C62, C67, C68, C89	
CQSH 331K 50	C64	
CQSH 511J 50	C48	
CEANL R47M 50	C80, C81	
CEANL 010M 50	C44, C46	
CEANL 6R8M 25	C47	
CEA 010P 50	C19, C24, C26, C43	
CEA 100P 16	C36, C38, C50, C51, C52, C71, C72	
CEA 102P 16	C82, C83	
CEA 2R2P 50	C21	
CEA 220P 16	C15	
CEA 221P 6	C34	
CEA 331P 25	C85	
CEA 331P 16	C39	
CEA 330P 16	C35	

Part No.	Symbol & Description	
CEA 4R7P 35	C60	
CEA 470P 10	C59	
CEA 470P 16	C86	
CEA 471P 6	C42	
CEA 471P 25	C84	

SEMICONDUCTORS

Part No.	Symbol & Description	
2SK168	Q1	
2SC535	Q2	
2SC461	Q3, Q4, Q11	
2SA726S-F (2SA750)	Q7, Q8	
2SC945A (2SC2575)	Q9	
2SD313 (2SD712)	Q12	
PA3001-A	Q5	
PA1001-A	Q6	
HA1138	Q10	
1S2076 (1S1555) (1S2473)	D1-D8	
△10E2 △(SIB01-02)	D10, D11	
MZ-140 (WZ-140)	D12	
MZ-081 (WZ-081)	D9	

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description	
ACP-079	VR1	Semi-fixed 4.7k-B
RD $\frac{1}{4}$ PM □□□J	R1-R46, R48-R83, R90, R91	
RN $\frac{1}{4}$ PQ □□□□F	R47	

LED Assembly (GWX-308)

Part No.	Symbol & Description	
AEL-315	D13	LED (STEREO)
AEL-319	D14, D15	LED (AM, FM)
RD $\frac{1}{4}$ PM 561J	R84, R86, R88	
RD $\frac{1}{4}$ PM 182J	R85, R87	
ABA-082		Screw 3 x 10

Switch Assembly (GWS-187)

Part No.	Symbol & Description
ASK-157	S1 Lever switch (FM MUTING)
ASK-155	S2 Lever switch (FUNCTION)
RD¼PM 104J	R89

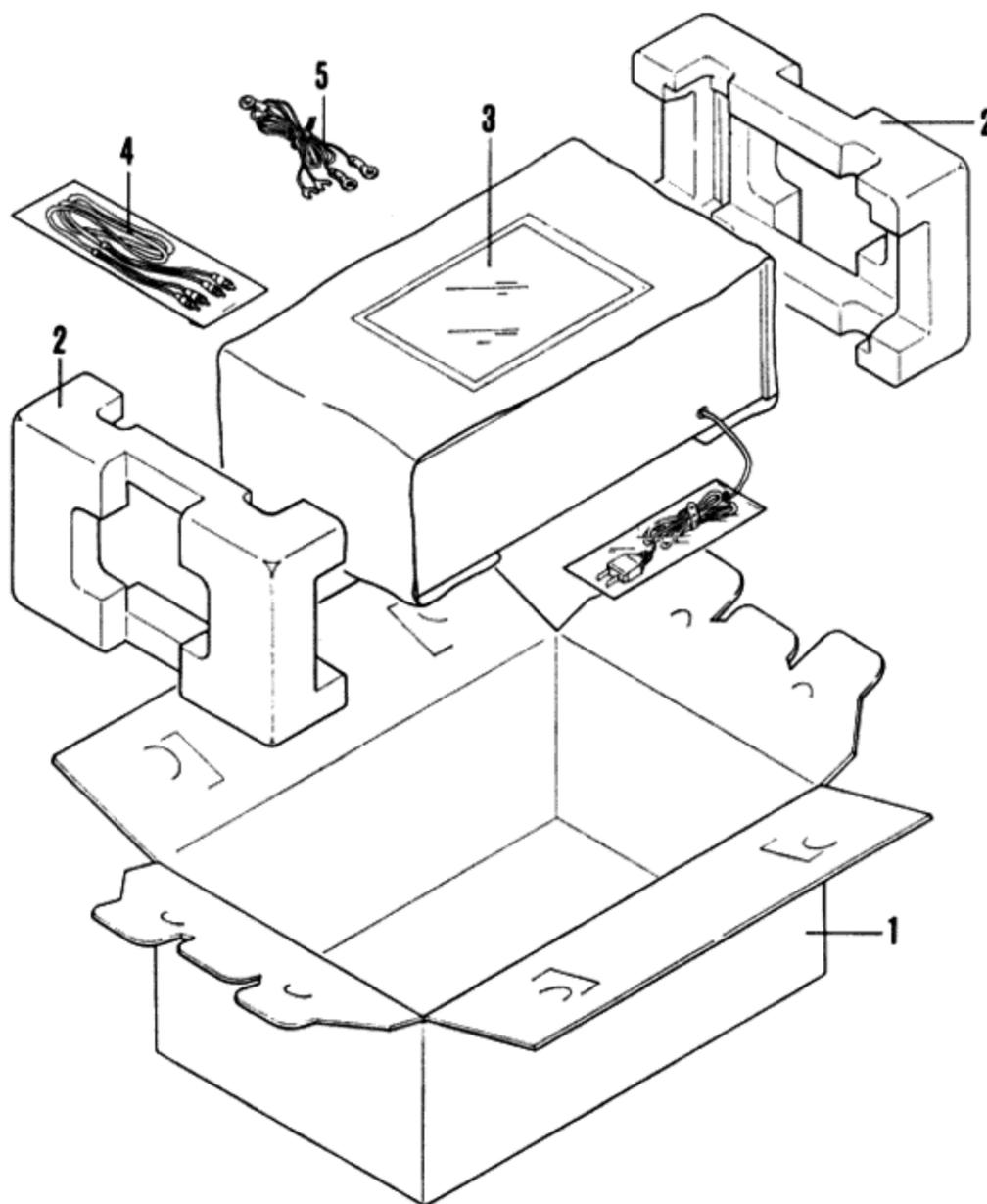
Fuse Assembly (AWR-200)

Part No.	Symbol & Description
⚠ ACN-029	R1 Carbon composition resistor

De-Emphasis Assembly (GWS-188)

Part No.	Symbol & Description
CQMA 113J 50	C87, C88
ASH-015	S3 Slide switch (DE-EMPHASIS)

11. PACKING



Parts List

Key No.	Part No.	Description
1.	AHD-694	Packing case
2.	AHA-188	Side pad
3.	ARB-319	Operating instructions
4.	ADE-005	Connection cord
5.	ADH-002	T-type FM antenna

12. SUPPLEMENTS FOR MODEL TX-608/KU

Model TX-608/KU is the same as Model TX-6800/KU with exception of descriptions in this supplements.

Contrast of Miscellaneous Parts

Symbol	Description	Part No.		Remarks
		TX-6800/KU	TX-608/KU	
	Front panel	ANB-721	ANB-737	
	Side panel L	AMS-033	.....
	Side panel R	AMS-034	.....
	Top panel	AMS-035	.....
	Bonnet case	.....	ANE-249	
	Screw 4 x 25	ABA-206	.....	for side panels
	Screw 4 x 6	.....	ABA-180	for bonnet case
	Operating instructions	ARB-319	ARB-335	
	Packing case	AHD-694	AHD-705	
	Side pad	AHA-188	AHA-189	

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