

SERVICE MANUAL

STEREO TUNER

TX-6200

F, KU, FVZ

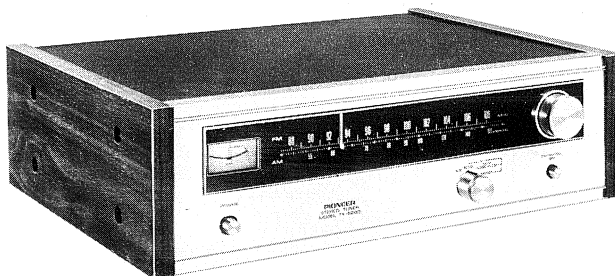
NOTE:

MODEL TX-6200 COMES IN THREE VERSIONS DISTINGUISHED AS FOLLOWS:

Round level on rear panel	Voltage	Type
F	5-position Selector	General export model with de-emphasis selector switch
KU	120V only	UL approved (U.S.A.)
FVZ	5-position Selector	FTZ approved (West Germany)

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1. SPECIFICATIONS

SEMICONDUCTORS

FET	1
ICs	3
Transistors	8
Diodes	6

FM TUNER SECTION

Circuitry	1 FET 1-stage RF Amplifier, 3-gang Variable Capacitor, 5-stage Limiter
Usable Sensitivity (IHF)	1.9 μ V
Capture Ratio (IHF)	1.5dB
Selectivity (IHF)	60dB
Signal-to-Noise Ratio	70dB
Image Rejection (98MHz)	More than 60dB
IF Rejection (98MHz)	More than 90dB
Spurious Rejection	More than 75dB
AM Suppression	50dB
Harmonic Distortion	
Mono	Less than 0.2%
Stereo	Less than 0.4%
Frequency Response	20Hz~15kHz $\begin{matrix} +0.2 \\ -2.0 \end{matrix}$ dB 50Hz~10kHz $\begin{matrix} +0.2 \\ -0.5 \end{matrix}$ dB
Stereo Separation 1kHz	More than 40dB
50Hz to 10kHz	More than 30dB
Sub Carrier Suppression	60dB
Antenna Input	300 Ω Balanced 75 Ω Unbalanced
Muting	ON - OFF
MPX Noise Filter	ON - OFF

AM TUNER SECTION

Circuitry	1-stage RF Amplifier, 2-gang Variable Capacitor
Sensitivity (1HF, Ferrite Antenna).....	300 μ V/m
(1HF)	15 μ V
Selectivity	35dB
Signal-to-Noise Ratio	50dB
Image Rejection	More than 40dB
IF Rejection	More than 50dB
Antenna	Built-in Ferrite Loopstick Antenna

AUDIO SECTION

Output (Level/Impedance)	
FIXED	570mV/2.7k Ω
VARIABLE	60mV~1.8V/2.5k Ω

MISCELLANEOUS

Power Requirements	AC 120V 60Hz or AC 110V, 120V, 130V, 220V and 240V 50/60Hz
Power Consumption	12W
AC Outlet	Unswitched 1
Dimensions	415(W) X 132(H) X 340(D)mm, 16-3/8 X 5-3/16 X 13-3/8 in.
Weight Without Package	7.1kg, 15lb 10 oz
With Package	8.4kg, 18lb 7 oz

FURNISHED PARTS

FM T-type Antenna	1
Connection Cord	1
Polishing Cloth	1
Operating Instructions	1
Fuse 0.5A	1
Fuses 1A	2
(5-line voltage model)	

NOTE:

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

2. FRONT PANEL FACILITIES

POWER SWITCH

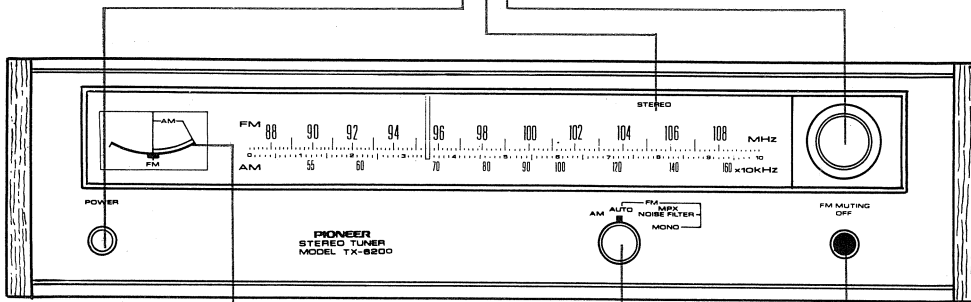
Push-button type. Push it and the power is ON. Push it again and the power is OFF.

FM STEREO INDICATOR LAMP

When the FUNCTION switch is at either FM AUTO or MPX NOISE FILTER, the letter "STEREO" lights, indicating stereo reception.

TUNING KNOB

Used to select desired stations.



AM/FM TUNING METER

For AM reception, turn the TUNING knob to the desired station, peaking the signal meter to the right. For FM, turn the TUNING knob to the desired station; optimum reception is obtained when the pointer comes to the center.

FUNCTION SWITCH

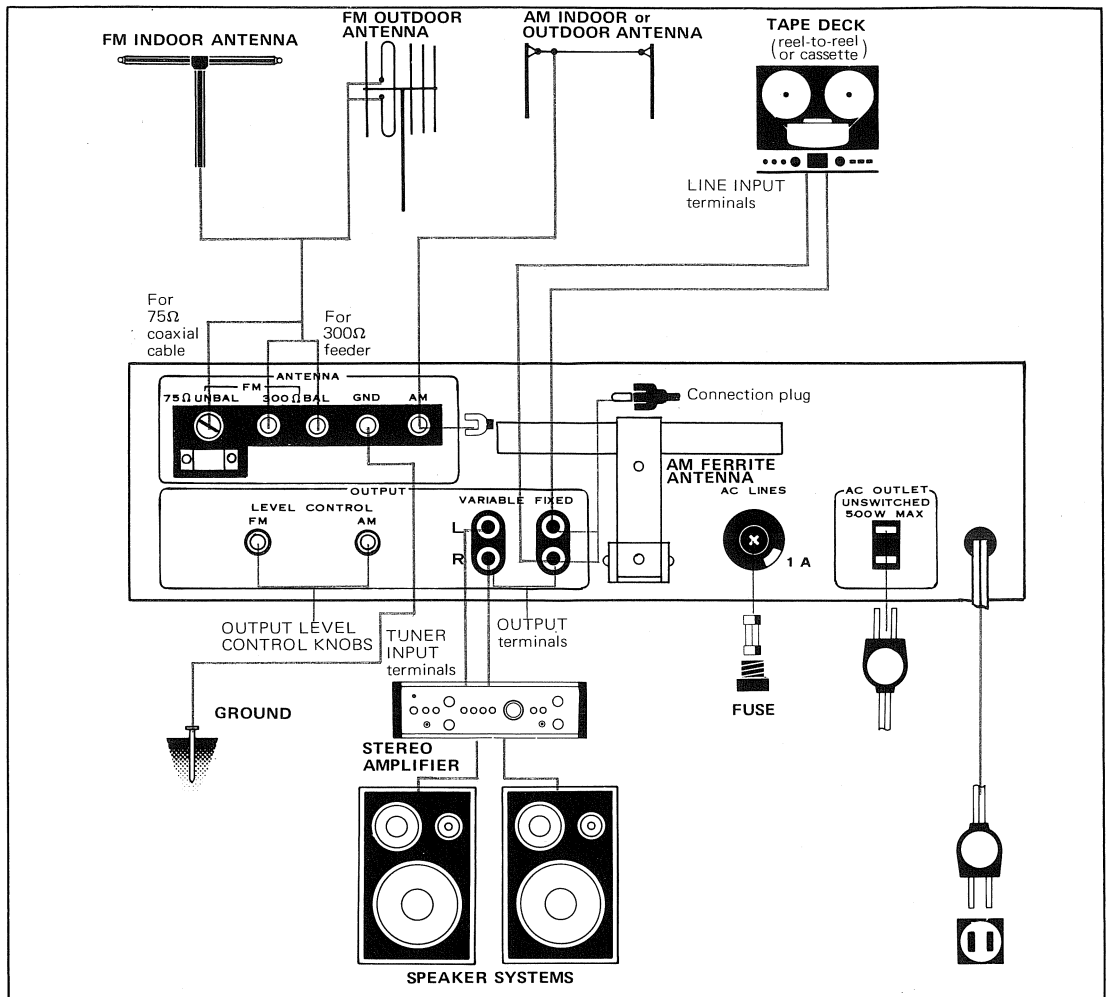
Used to select the kind of operation.

- | | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| AM: | AM reception. |
| FM AUTO: | FM stereo reception; automatic switching to FM monophonic reception. FM stereo indicator lamp lights when FM stereo is being received. |
| MPX NOISE FILTER: | Eliminates noise relatively high frequency during FM stereo reception may sometimes affect stereo separation somewhat. |
| FM MONO: | FM monophonic reception. |

FM MUTING SWITCH

Used to suppress the noise between FM stations while tuning. This switch should be OFF when tuning to weaker stations, because it may also suppress the weaker signal, too.

3. CONNECTION DIAGRAM



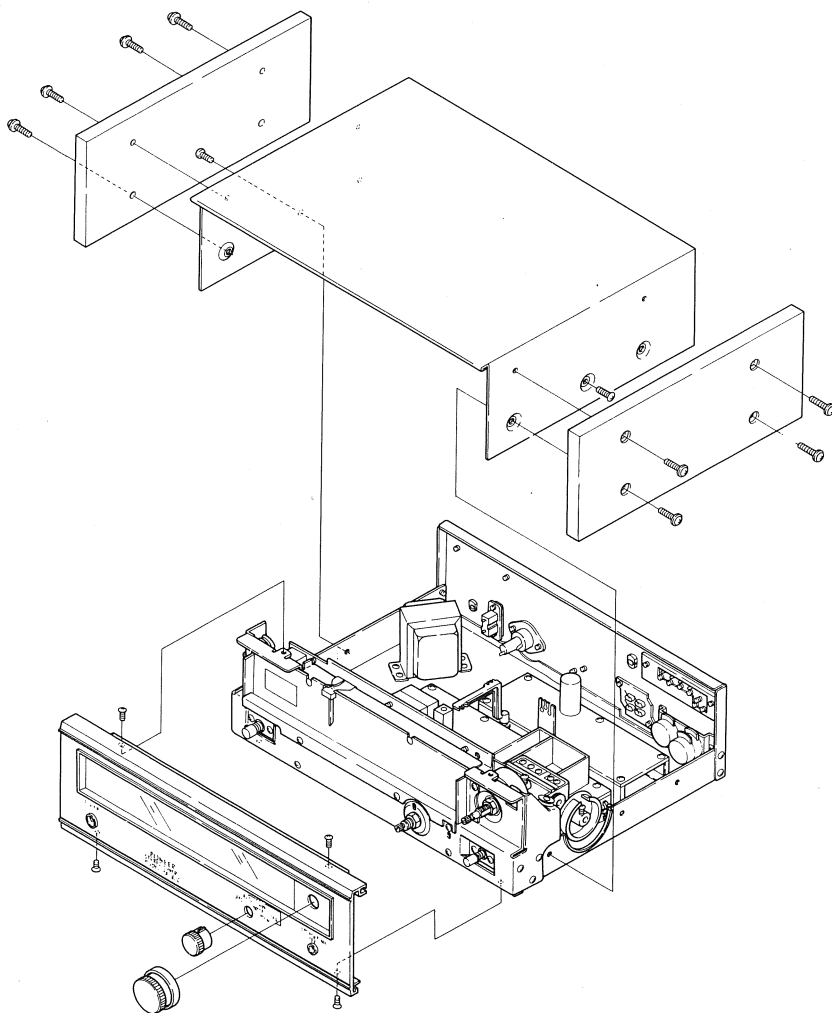
4. DISASSEMBLY

Top Cover

Remove the sideboards by unscrewing the four screws on either side of the bonnet. Unscrew the two screws fastening the bonnet. Slip backward, lifting the rear panel of the bonnet slightly.

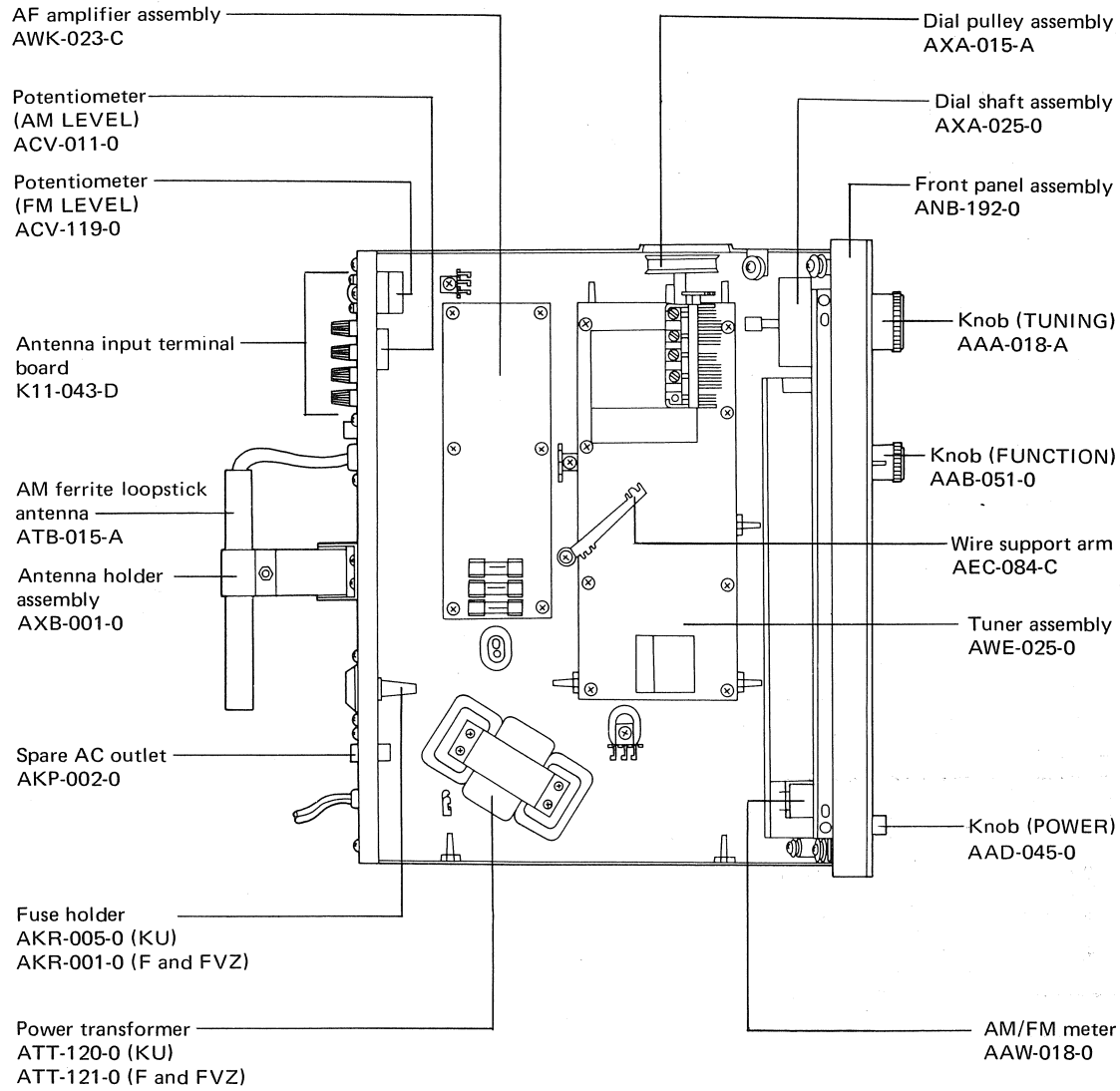
Front Panel

Remove the TUNING and FUNCTION knobs. Slip the panel off gently after unscrewing the four front panel-held screws (two each, top and bottom).

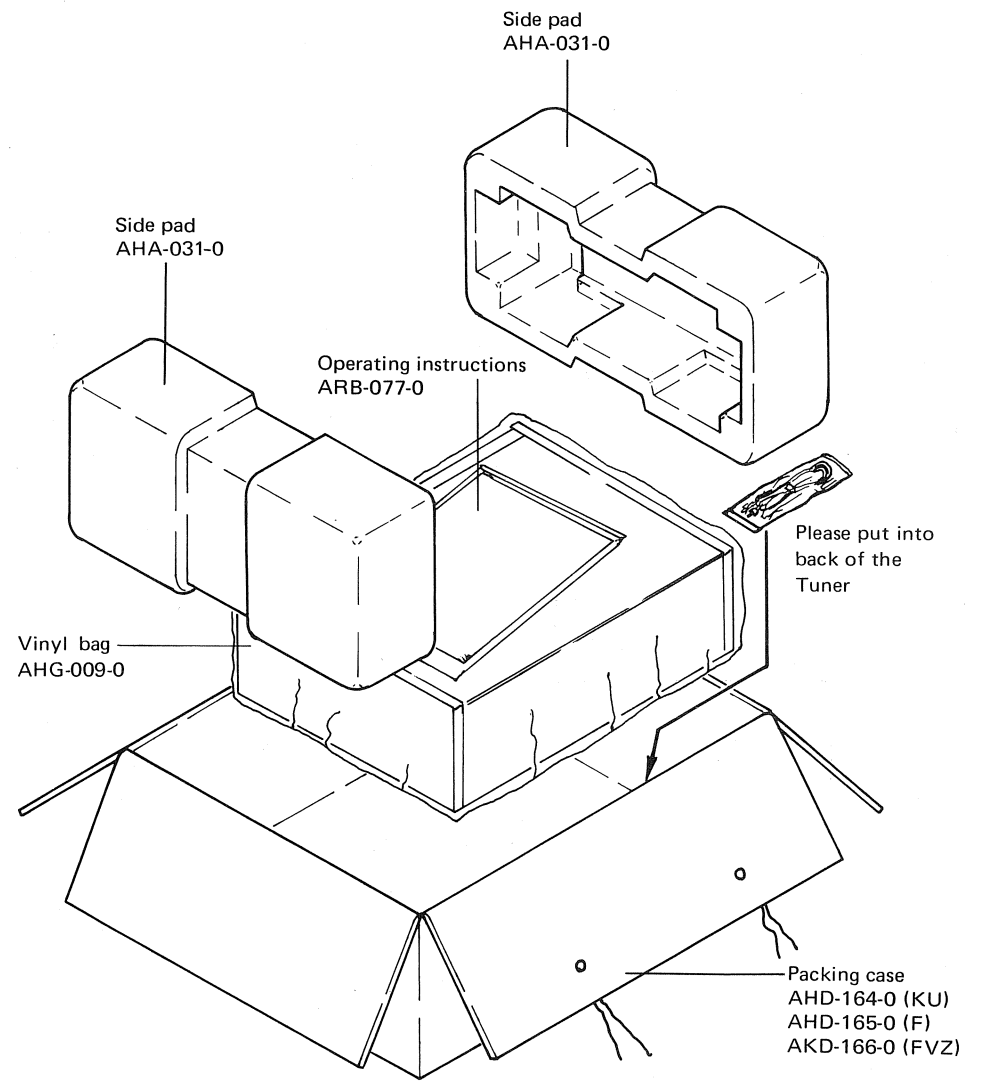


5. PARTS LOCATION

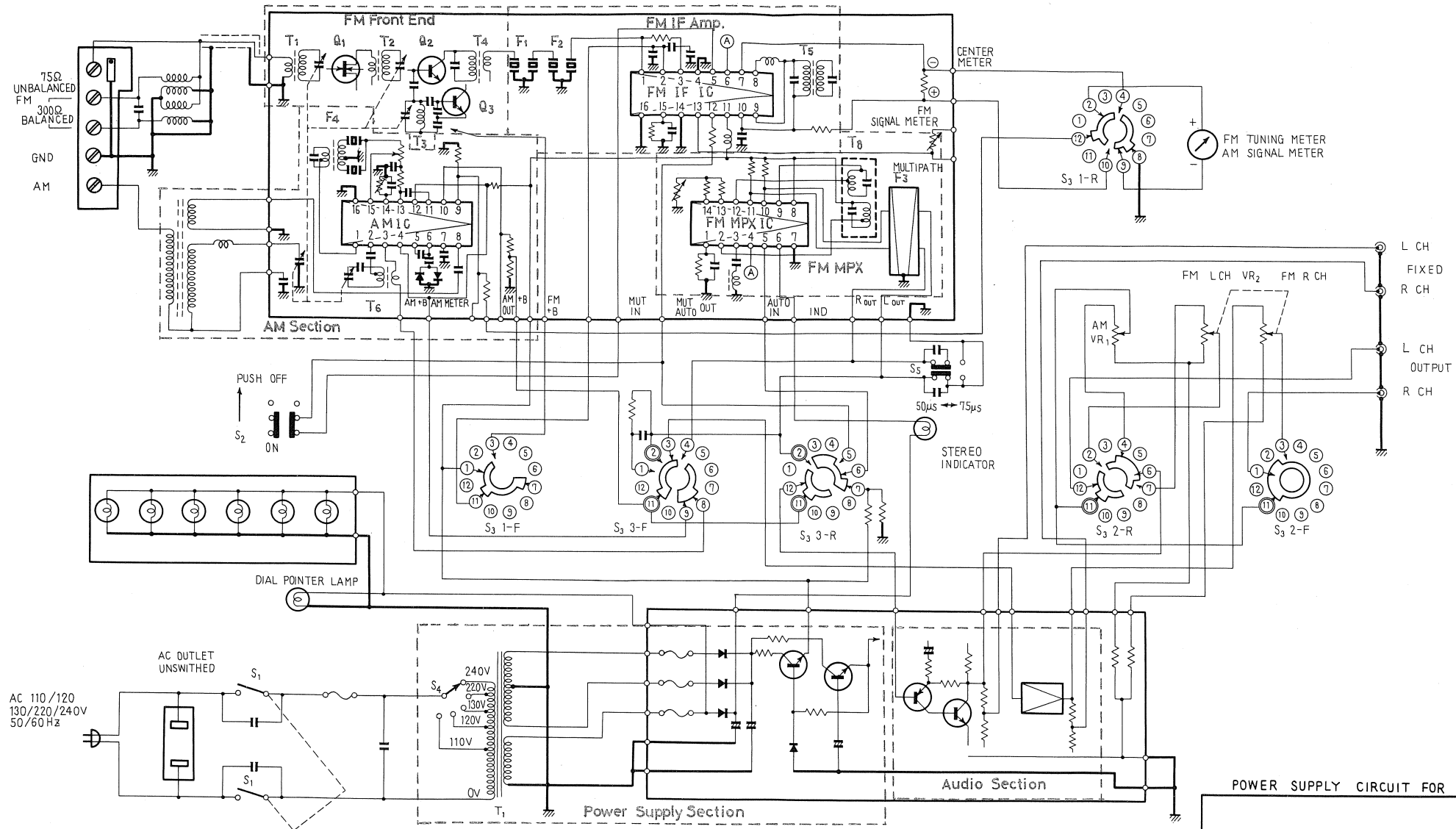
Top View



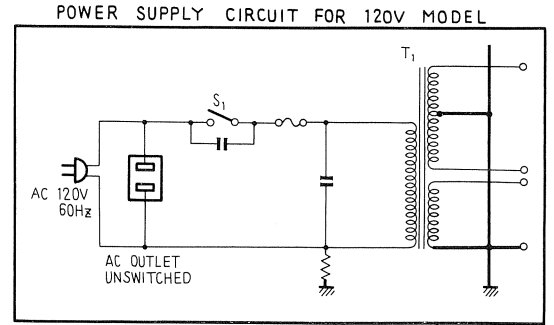
6. PACKING METHOD AND PART NUMBERS



7. BLOCK DIAGRAM



- S₁ POWER SW
 ON ↔ OFF
- S₂ MUTING
 OFF ↔ ON
- S₃ FUNCTION
 1. AM
 2. FM — AUTO
 3. — MPX NOISE FILTER
 4. — MONO
- S₄ VOLTAGE SELECTOR
 S₅ DE-EMPHASIS SWITCH
 75μs ↔ 50μs



8. CIRCUIT DESCRIPTION

8.1 FM SECTION

*FM Front End

The unit consists of a tuning-type radio frequency amplifying circuit utilizing MOS-type FET and a frequency converting circuit utilizing two transistors. The input signal from the antenna terminal is fed to tuning coil T1. The secondary side of T1 is the tuning circuit, where the selectivity and image interference ratio can be improved. Next, the signal is amplified by Q1. The amplified signal is fed via T2 to the base of Q2, the mixing transistor. At the same time, the local oscillating output from Q3 is fed to the base of Q2.

T4 is tuned to the frequency difference (10.7 MHz) between the receiving frequency and the local oscillation. The receiving frequency signal is converted to the intermediate frequency (10.7 MHz) by Q2, Q3, and T4.

*FM IF Amp

The unit consists of a ceramic filter and a high-density integrated circuit (IC).

The signal converted to the IF is fed to the IC through the two-stage ceramic filter.

The configuration of the IC is shown in Fig. 1. Differential amplifiers are used as limiters from the first to third stage, thus improving the AM quieting ratio, capture ratio, etc. A quadrature detector circuit with excellent linearity through a wide bandwidth is employed as a discriminator, thus minimizing troublesome distortion. A discriminated composite signal is produced on the muting circuit.

Muting is effected by switching ON-OFF a muting analog switch which applies DC voltage from the IF rectified and the detector circuitry.

Configuration of the FM IF IC

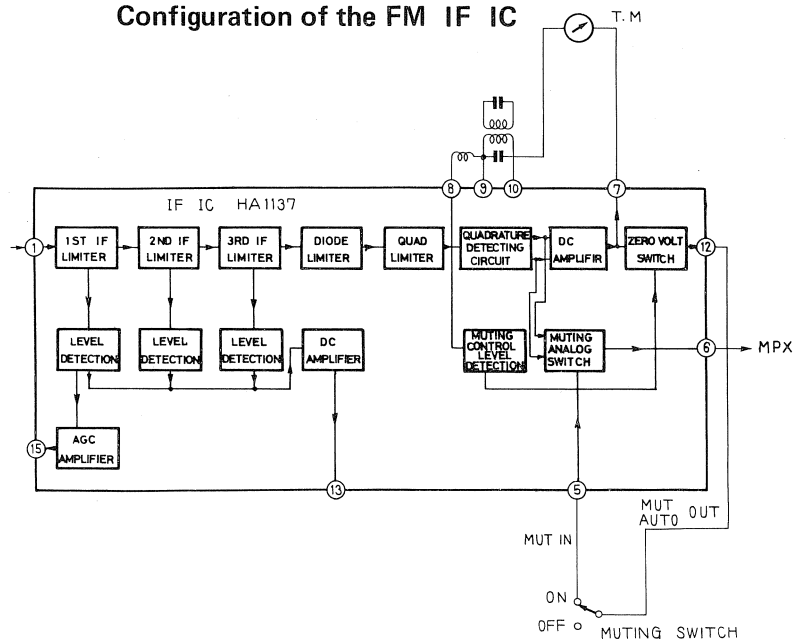


Fig. 1

*FM MPX

The unit employs integrated circuits (IC). The configuration is shown in Fig. 2.

Demodulation is effected by a "Double-balanced differential demodulation circuit" employing two differential amplifiers. This provides excellent channel separation for preventing SCA beat interference, and decreases carrier leak and distortion.

The composite signal from the IF unit is amplified by the audio amplifier, and divided into the pilot signal line and main (L + R) and sub (L - R) signal lines.

The main and sub signals are fed to the demodulation circuitry, while the pilot signal (19kHz) is amplified and converted to 38kHz by a multiplier.

The converted pilot signal (38kHz) is fed to the demodulation circuitry as a switching signal for switching the main and sub signals, thereby extracting stereo signals (L & R).

Automatic FM-mono/stereo selection is effected by the AND gate which supplies two levels: DC voltage from the IF rectified and the switching signal (38kHz). Simultaneously, the stereo indicator lamp is automatically switched.

Switched stereo signals are fed to a low-pass filter which eliminates any carrier leak.

8.2 AM SECTION

The unit employs integrated circuits. The configuration is shown in Fig. 3.

The circuit consists of a one-stage radio frequency amplifier, a two-stage intermediate frequency amplifier, and concentrated-type filters. The sensitivity of RF amplifier and the first-stage IF amplifier are controlled by AGC.

8.3 AUDIO SECTION, POWER SUPPLY SECTION

The audio section consists of a two-stage direct coupled amplifier. The power supply section consists of a full-wave rectifier circuit utilizing diodes, a stabilizer circuit utilizing transistors and a zener diode for a tuner unit, and an active ripple-filter utilizing transistors for the audio section.

Configuration of the FM MPX IC

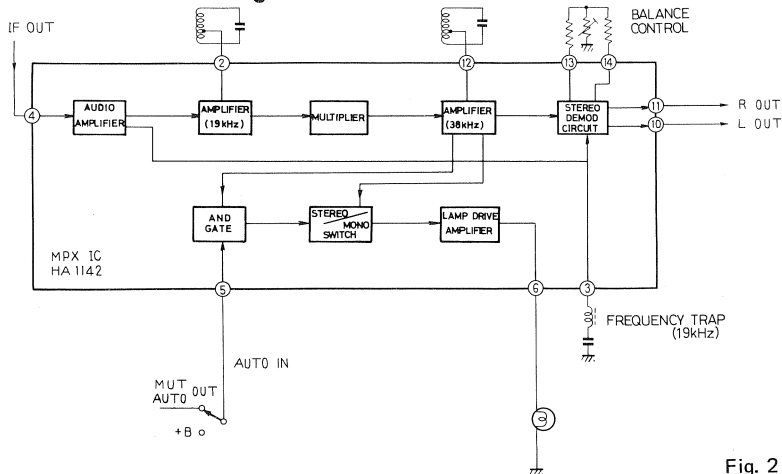


Fig. 2

Configuration of the AM IC

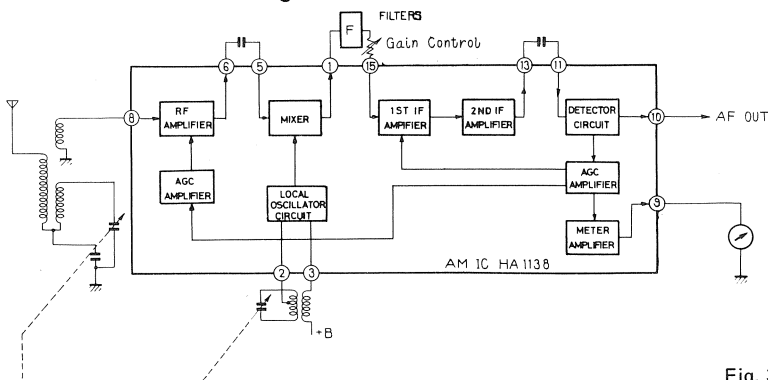


Fig. 3

9. ALIGNMENT PROCEDURE

Required Instruments

- * FM signal generator
- * MPX signal generator
- * Voltmeter
- * Oscilloscope
- * Distortion meter

9.1 ALIGNMENT OF AM SECTION

Tracking Alignment

1. Set an AM signal generator at 400Hz and 30% modulation. Connect it to the AM antenna terminals through 1k Ω dummy.
2. Connect an oscilloscope and a voltmeter (V.T.V.M.) in parallel to the VARIABLE OUTPUT terminals.
3. Set the output level of the signal generator at approximately 30dB and the frequency of the signal generator and the frequency scale of the set at 600kHz.
4. Adjust T6 of the tuner assembly and the core of the bar-antenna for maximum output reading.
5. Set the frequency of the signal generator and the frequency scale of the set at 1,400kHz.
6. Adjust TC4 and TC5 of the tuner assembly for maximum output reading.
7. Repeat steps 3 to 6 several times so that maximum output can be adjusted at individual steps.

9.2 ALIGNMENT OF FM SECTION

Tracking Alignment

1. Set an FM signal generator at 400Hz and 100% modulation. Connect it to the FM antenna terminals through 300 Ω balanced dummy antenna.
2. Connect an oscilloscope, a voltmeter (V.T.V.M.), and a distortion meter in parallel to the VARIABLE OUTPUT terminals.
3. Set the output level of the signal generator at 8 to 10dB.

* KU model:

Set the frequency of the signal generator and the frequency scale of the set at 90MHz.

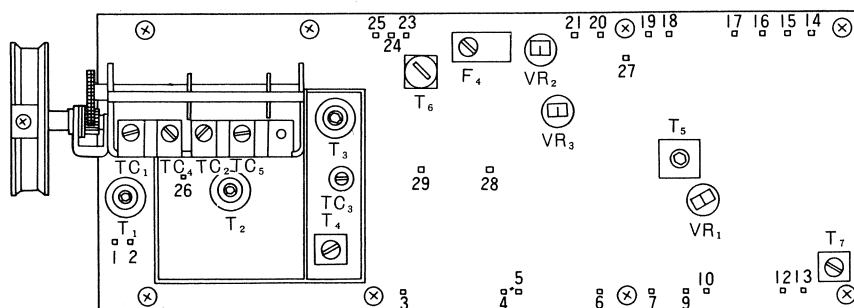
* F model, FVZ model:

Set the frequency of the signal generator at 87.4MHz, and the frequency scale of the set at the left end (lower position).

4. Adjust each core of T1, T2, and T3 of the tuner assembly individually for maximum output reading.
5. Set the frequency of the signal generator and the frequency scale of the set at 106MHz.
6. Adjust TC1, TC2, and TC3 of the tuner assembly for maximum output reading.
7. Repeat steps 3 to 6 several times so that maximum output can be adjusted at individual steps.
8. Set the frequency scale at 90MHz once again, and adjust the core of T4 in the tuner assembly for maximum output reading.
9. Induce noise by disturbing the fine tuning. Adjust the primary winding core (lower side) of T5 until the AM/FM tuning meter needle points at the middle point.
10. Set the frequency of the signal generator and the frequency scale of the set at 98MHz, and the output level of the signal generator at 60dB. Accurate tuning must be done with an AM/FM tuning meter.
11. Adjust the secondary winding core (upper side) of T5 in the tuner assembly for minimum distortion meter reading.

Alignment of FM MPX Section

1. Set the output level of the MPX signal generator modulation at 60dB, under the positions 1kHz, 67.5kHz deviation for the main signal (L + R), and 19kHz, 7.5kHz deviation for the pilot signal.
2. Adjust T7 of the tuner assembly for maximum output reading, feeding only the left-signal from the signal generator modulation.
3. During step 2, adjust the core of T4 in the tuner assembly for minimum distortion meter reading.
4. Adjust VR1 of the tuner assembly for maximum separation feeding the pilot signal and the left or right signal from the signal generator modulation.



10. DIAL CORD STRINGING

1. Set the tuning variable capacitor at the fully-closed position. Tie one end of the thread to the spring of the TUNING pulley along with the variable capacitor. Put on the thread in the pulley order (A, B, C) shown in Fig. 1.

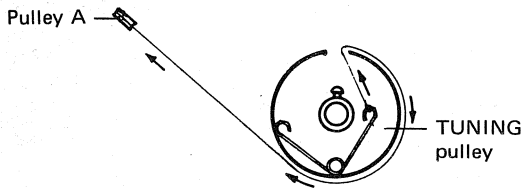


Fig. 1

2. Put the thread on pulley D, then wind it around the TUNING shaft three times, as shown in Fig. 2.

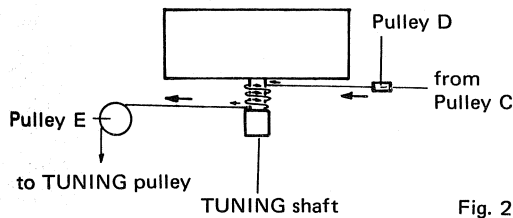


Fig. 2

3. Put the thread on pulley E, then wind it around the TUNING pulley twice, and knot it to the spring, as shown in Fig. 3.

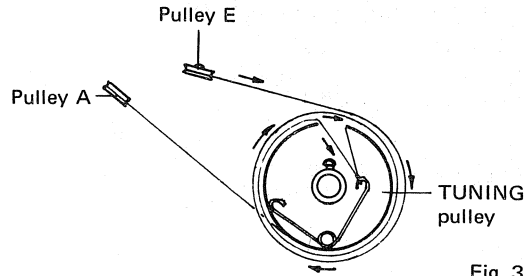


Fig. 3

4. Check to make sure that there is no trouble in the movement of the thread when turning the TUNING shaft, then cut off the excess thread.
5. Set the variable capacitor at the fully-opened position. Adjust the thread setting dial needle to the right end (higher position of the frequency scale), as shown in Fig. 4.

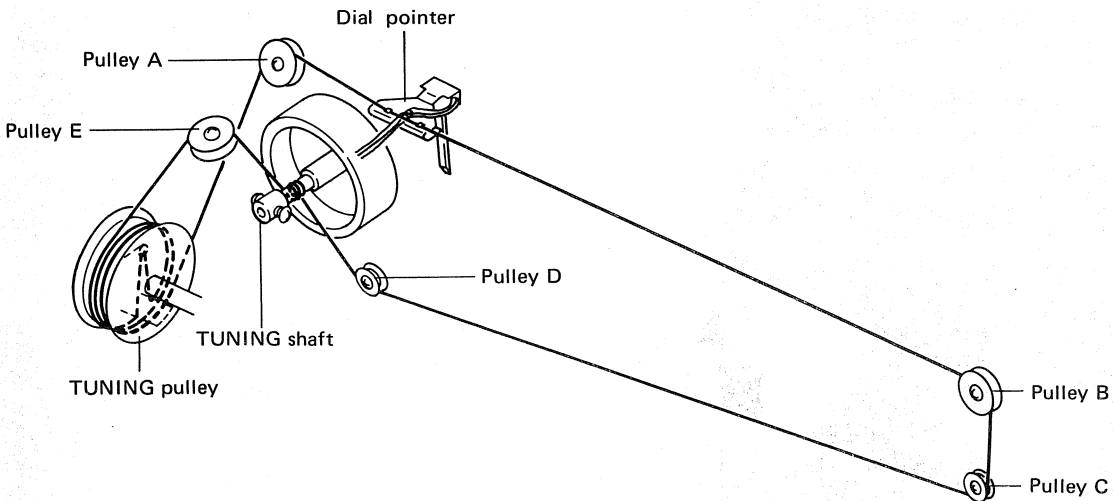


Fig. 4

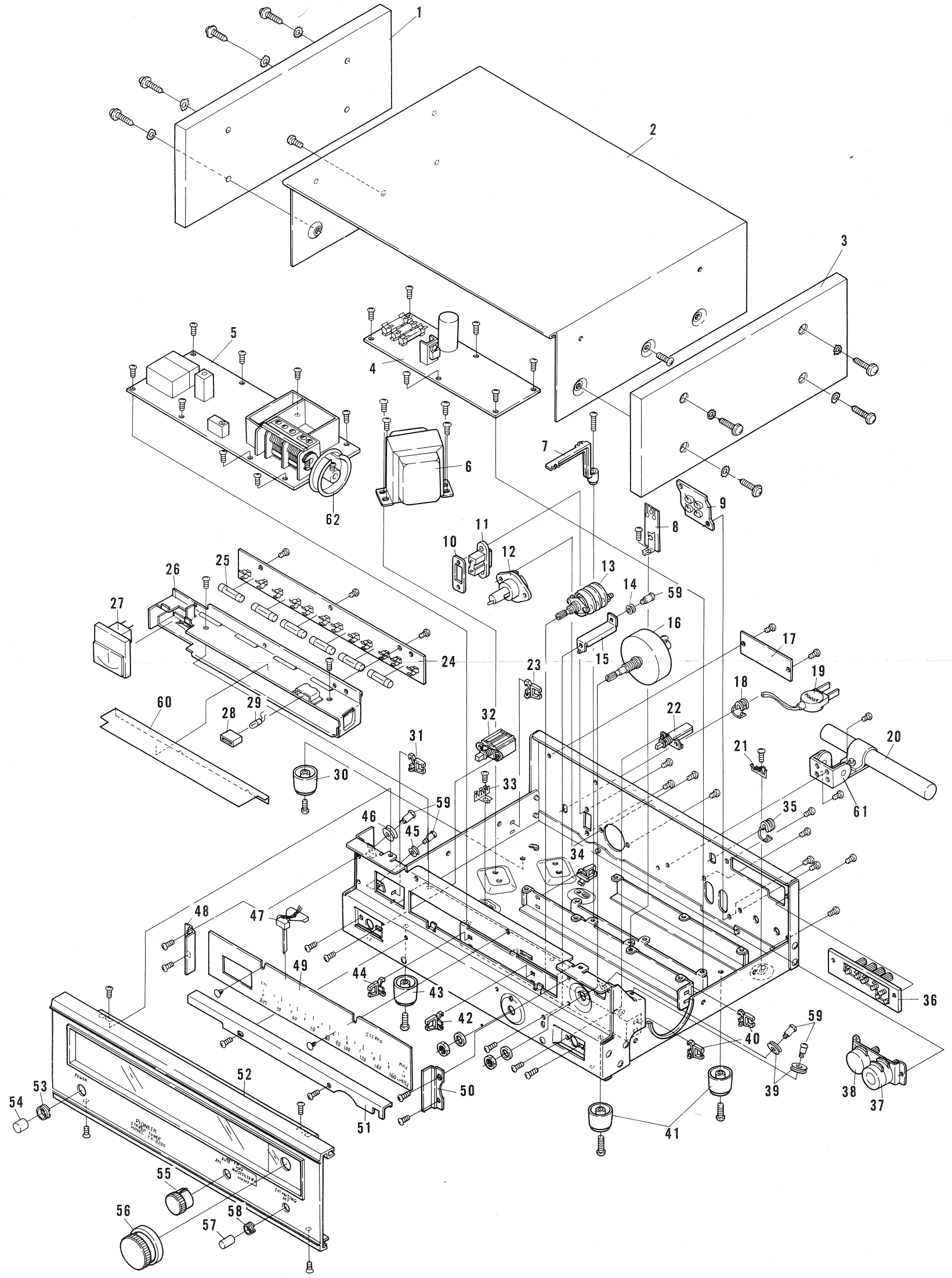
11. EXPLODED VIEW AND PARTS LIST

Parts List of Exploded View

NOTICE: Any parts asterisked (*) are subject to being not supplied.

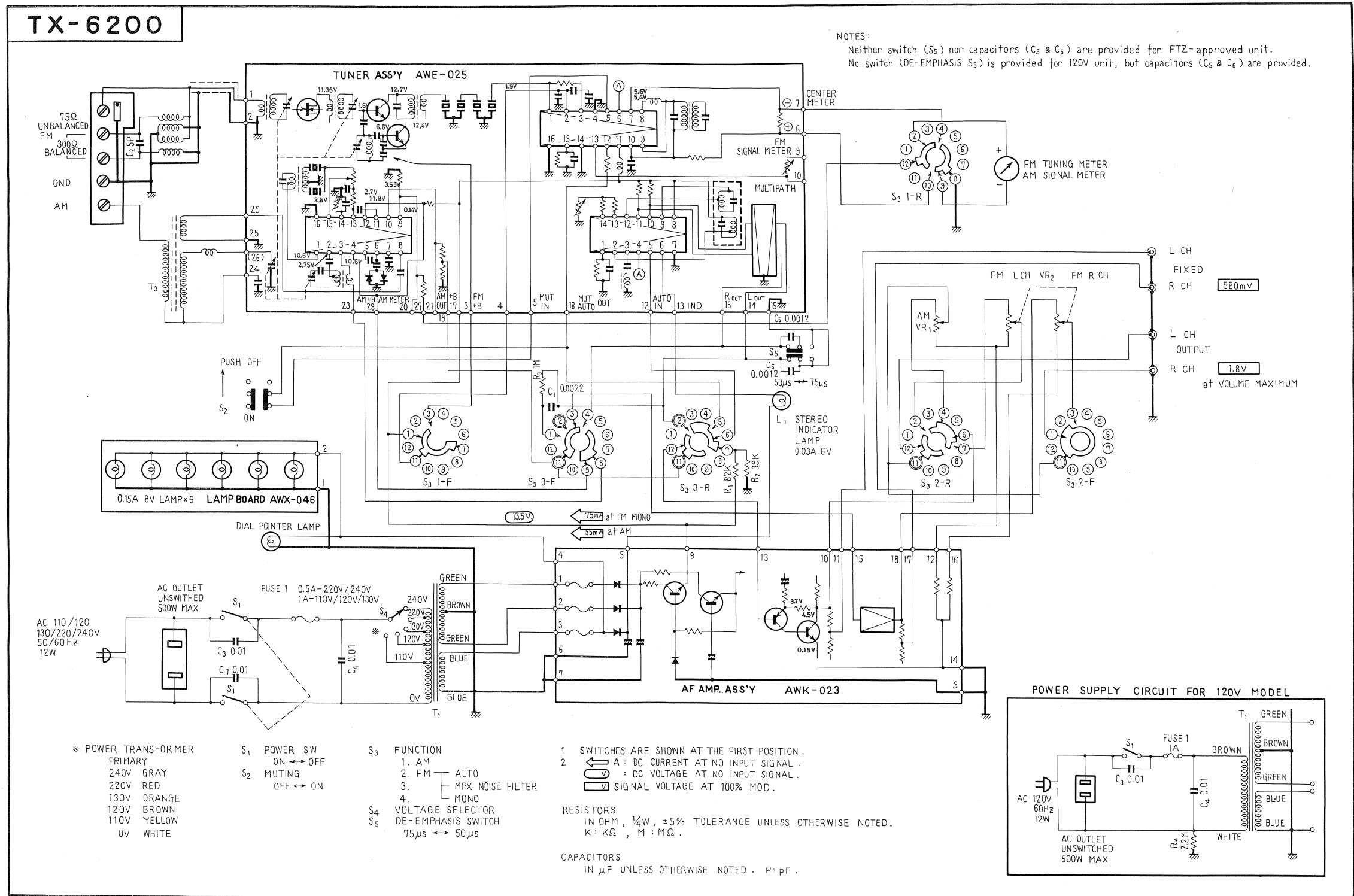
Key No.	Description	Part No.
1	Side board (L)	AMS-003-A
2	Top cover	ANE-023-O
3	Side board (R)	AMS-004-A
4	AF amplifier assembly	AWK-023-C
5	Tuner assembly	AWE-025-O
6	Power transformer	
	KU model	ATT-120-O
	F and FVZ model	ATT-121-O
7	Wire support arm	AEC-084-C
8*	Wire supporter	ANG-019-O
9	Four-fold phono jack A (RCA type)	AKB-014-O
10*	Setting plate	M49-127-A
11	Spare AC outlet	AKP-002-O
12	Fuse holder	
	KU model	AKR-005-O
	F and FVZ model	
	(Line voltage selector)	AKR-001-O
13	Rotary switch (FUNCTION)	ASC-047-A
14*	Pulley	AEC-017-O
15*	Pulley supporter	ANG-083-O
16	Tuning shaft assembly	AXA-025-O
17*	Model name plate	
	KU model	AAL-141-O
	F and FVZ model	AAL-142-O
18*	AC cord stopper	E32-079-O
19	AC power cord	
	KU model	ADG-003-O
	F and FVZ model	ADG-004-O
20	AM ferrite loopstick antenna	ATB-015-A
21*	4P ground terminal	K13-047-O
22	Push switch (FM MUTING)	ASG-040-O
23*	Wire clip S	AEC-037-O
24	Lamp board assembly	AWX-046-A
25	Pilot lamp (for dial scale)	AEL-004-O
26*	Lamp box	ANH-144-A
27	AM/FM meter	AAW-018-O
28*	Cushion	AEB-031-O
29	Pilot lamp	AEL-006-O
30	Foot	AEC-061-A
31*	Wire clip S	AEC-037-O
32	Push switch (POWER)	
	KU model	ASG-023-O
	F and FVZ model	ASG-042-A
33*	4P ground terminal	K13-047-O
34*	Wire clip S	AEC-037-O

Key No.	Description	Part No.	
35*	AC cord stopper	AEC-079-O	
36	Antenna input terminal board	K11-043-D	
37	FM LEVEL CONTROL	ACV-119-O	
38	AM LEVEL CONTROL	ACV-011-O	
39*	Pulley	AEC-006-O	
40*	Wire clip S	AEC-037-O	
41	Foot	AEC-061-A	
42*	Wire clip S	AEC-037-O	
43	Foot	AEC-061-A	
44*	Wire clip S	AEC-037-O	
45*	Pully	AEC-017-O	
46*	Pully	AEC-006-O	
47	Dial pointer	AAF-028-O	
48*	Dial scale holder	ANG-082-O	
49	Dial scale	AAG-047-O	
50*	Dial scale holder	ANG-082-O	
51*	Dial scale holder	ANG-081-O	
52	Front panel assembly	ANB-192-O	
53*	Spacer (A)	AEC-095-A	
54	Knob (POWER)	AAD-045-O	
55	Knob (FUNCTION)	AAB-051-O	
56	Knob (TUNING)	AAA-018-A	
57	Knob (FM MUTING)	AAD-046-B	
58*	Spacer (B)	AEC-096-O	
59*	Pulley shaft	M49-025-E	
60*	Shading plate	AEE-007-A	
61	AM antenna holder assembly	AXB-001-O	
62	Dial pulley assembly	AXA-015-A	



12. SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LIST

12.1 CONNECTION DIAGRAM AND MISCELLANEOUS PARTS



- CAPACITORS: IN μ F UNLESS OTHERWISE NOTED p:pF
- RESISTORS: IN Ω , $\frac{1}{4}$ W UNLESS OTHERWISE NOTED k:k Ω , M: M Ω

Miscellaneous Parts List

CAPACITORS

Symbol	Description	Part No.	
C1	Mylar 0.0022 50V	CQMA 222K 50	
C2	Ceramic 5p 50V	CCDSL 050K 50	
C3	Ceramic 0.01 150V	ACG-002-0	KU model
	Ceramic 0.01 250V	ACG-001-0	F model
	Ceramic 0.01 250V	ACG-001-0	FVZ model
C4	Metallized mylar 0.01 800V	ACE-002-0	KU model
	Ceramic 0.01 250V	ACG-001-0	F model
	Ceramic 0.01 250V	ACG-001-0	FVZ model
C5	Mylar 0.0012 50V	CQMA 122J 50	KU model
	Mylar 0.0012 50V	CQMA 122J 50	F model
	Ceramic 0.01 250V	ACG-001-0	FVZ model
C6	Mylar 0.0012 50V	CQMA 122K 50	KU model
	Mylar 0.0012 50V	CQMA 122K 50	F model
C7	Ceramic 0.01 250V	ACG-001-0	F model

RESISTORS AND POTENTIOMETERS

Symbol	Description	Part No.	
R1	Carbon film 82k	RD $\frac{1}{4}$ PS 823J	
R2	Carbon film 39k	RD $\frac{1}{4}$ PS 393J	
R3	Carbon film 1M	RD $\frac{1}{4}$ PS 105J	
R4	Carbon film 2.2M $\frac{1}{4}$ W	RD $\frac{1}{4}$ PW 225J	KU model only
VR1	AM LEVEL 10k-A2	ACV-011-0	
VR2	FM LEVEL 10k-A2	ACV-119-0	

SWITCHES

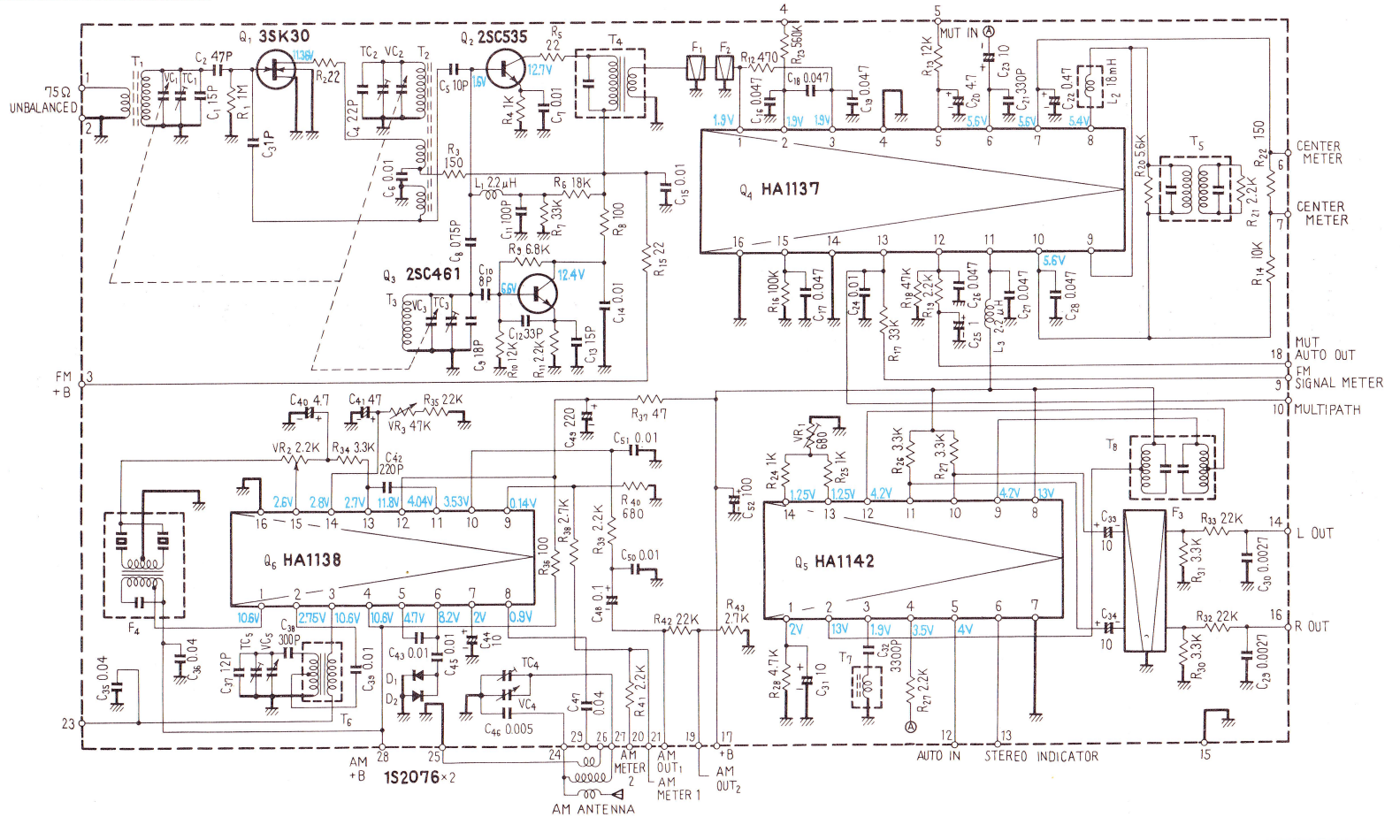
Symbol	Description	Part No.	
S1	Push switch (POWER)		
	KU model	ASG-023-0	
S2	F and FVZ model	ASG-042-A	
	Push switch (FM MUTING)	ASG-040-0	
S3	Rotary switch (FUNCTION)	ASC-047-A	
S4	Line voltage selector (Fuse holder)	AKR-001-0	F and FVZ model
S5	Slide switch (De-emphasis)	S41-022-A	F model only

OTHERS

Symbol	Description	Part No.	
F1	Tuner assembly	AWE-025-O	KU model only
	AF amplifier assembly	AWK-023-C	
	Lamp board assembly	AWX-046-A	
	Power transformer		
	KU model	ATT-120-O	
	F and FVZ model	ATT-121-O	
	AM ferrite loopstick antenna	ATB-015-A	
	Balun	T22-025-A	
	Pilot lamp	AEL-006-O	
	Pilot lamp (for dial scale)	AEL-004-O	
	Fuse (Primary)		
	KU model 1A (UL)	E21-033-A	
	F and FVZ model 0.5A	AEK-016-O	
	Four-fold phono jack A (RCA type)	AKB-014-O	
	Spare AC outlet	AKP-002-O	
	Antenna input terminal board	K11-043-D	
	Fuse holder	AKR-005-O	
	AM/FM meter	AAW-018-O	
	AC power cord		
	KU model	ADG-003-O	
F and FVZ model	ADG-004-O		
RF chock coil	T24-028-A		
FM T-type antenna	D52-013-0		
Connection cord	ADE-005-0		

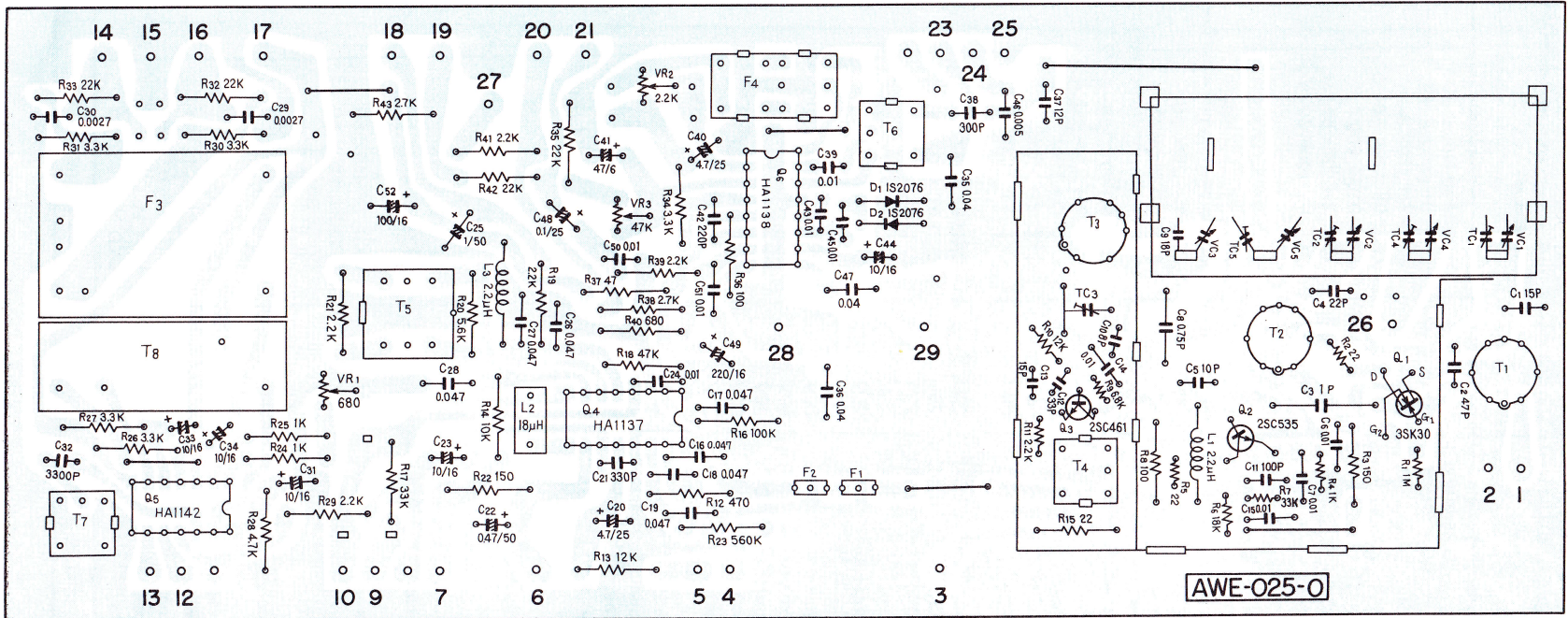
TUNER ASS'Y

AWE - 025 - 0



12.2 TUNER ASSEMBLY (AWE-025)

Foil side



TX-6200

Parts List of Tuner Assembly

CAPACITORS

Symbol	Description	Part No.
C1	Ceramic 15p 50V	CCD TH 150K 50
C2	Ceramic 47p 50V	CCD SL 470K 50
C3	Ceramic 1p 500V	CGB 010K 500
C4	Ceramic 22p 50V	CCD TH 220k 50
C5	Ceramic 10p 50V	CCD SL 100F 50
C6	Ceramic 0.01 50V	CKD YF 103Z 50
C7	Ceramic 0.01 50V	CKD YF 103Z 50
C8	Ceramic 0.75 500V	CGB R75K 500
C9	Ceramic 18p 50V	CCD SH 180K 50
C10	Ceramic 8p 50V	CCD LH 080F 50
C11	Ceramic 100p 50V	CCD SL 101K 50
C12	Ceramic 33p 50V	CCD CH 330K 50
C13	Ceramic 15p 50V	CCD CH 150K 50
C14	Ceramic 0.01 50V	CKD YB 103K 50
C15	Ceramic 0.01 50V	CKD YF 103K 50
C16	Ceramic 0.047 25V	CKD BC 473Z 25
C17	Ceramic 0.047 25V	CKD BC 473Z 25
C18	Ceramic 0.047 25V	CKD BC 473Z 25
C19	Ceramic 0.047 25V	CKD BC 473Z 25
C20	Electrolytic 4.7 25V	CEA 4R7P 25
C21	Ceramic 330p 50V	CKD YB 331K 50
C22	Electrolytic 0.47 50V	CEA R47P 50
C23	Electrolytic 10 16V	CEA 100P 16
C24	Ceramic 0.01 50V	CKD YF 103Z 50
C25	Electrolytic 1 50V	CEA 010P 50
C26	Ceramic 0.047 25V	CKD BC 473Z 25
C27	Ceramic 0.047 25V	CKD BC 473Z 25
C28	Ceramic 0.047 25V	CKD BC 473Z 25
C29	Mylar 0.0027 50V	CQMA 272J 50
C30	Mylar 0.0027 50V	CQMA 272J 50
C31	Electrolytic 10 16V	CEA 100P 16
C32	Styrol 3300p	C15-011-A
C33	Electrolytic 10 16V	CEA 100P 16
C34	Electrolytic 10 16V	CEA 100P 16
C35	Ceramic 0.04 50V	CKD YF 403Z 50
C36	Ceramic 0.04 50V	CKD YF 403Z 50
C37	Ceramic 12p 50V	CCD XL 120K 50
C38	Styrol 300p 50V	CQSA 301J 50
C39	Mylar 0.01 50V	CQMA 103K 50
C40	Electrolytic 4.7 25V	CEA 4R7P 25
C41	Electrolytic 47 6V	CEA 470P 6
C42	Ceramic 220p 50V	CCD SL 221K 50
C43	Ceramic 0.01 50V	CKD YF 103Z 50
C44	Electrolytic 10 16V	CEA 100P 16
C45	Ceramic 0.01 50V	CKD YF 103Z 50

Symbol	Description	Part No.
C46	Ceramic 0.005 50V	CKD YF 502Z 50
C47	Ceramic 0.04 50V	CKD YF 403Z 50
C48	Electrolytic 0.1 25V	CSSA 0R1M 25
C49	Electrolytic 220 16V	CEA 221P 16
C50	Mylar 0.01 50V	CQMA 103K 50
C51	Mylar 0.01 50V	CQMA 103K 50
C52	Electrolytic 100 16V	CEA 101P 16
VC	Tuning capacitor	C64-046-A
TC3	Ceramic trimmer	C43-007-A

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1M	RD¼VS 105J
R2	Carbon film 22	RD¼VS 220J
R3	Carbon film 150	RD¼PS 151J
R4	Carbon film 1k	RD¼VS 102J
R5	Carbon film 22	RD¼VS 220J
R6	Carbon film 18k	RD¼VS 183J
R7	Carbon film 3.3k	RD¼VS 332J
R8	Carbon film 100	RD¼PS 101J
R9	Carbon film 6.8k	RD¼VS 682J
R10	Carbon film 12k	RD¼VS 123J
R11	Carbon film 2.2k	RD¼VS 222J
R12	Carbon film 470	RD¼PS 471J
R13	Carbon film 12k	RD¼PS 123J
R14	Carbon film 10k	RD¼PS 103J
R15	Carbon film 22	RD¼PS 220J
R16	Carbon film 100k	RD¼PS 104J
R17	Carbon film 33k	RD¼PS 333J
R18	Carbon film 47k	RD¼PS 473J
R19	Carbon film 2.2k	RD¼PS 222J
R20	Carbon film 5.6k	RD¼PS 562J
R21	Carbon film 2.2k	RD¼PS 222J
R22	Carbon film 150	RD¼PS 151J
R23	Carbon film 560k	RD¼PS 564J
R24	Carbon film 1k	RD¼PS 102J
R25	Carbon film 1k	RD¼PS 102J
R26	Carbon film 3.3k	RD¼PS 332J
R27	Carbon film 3.3k	RD¼PS 332J
R28	Carbon film 4.7k	RD¼PS 472J
R29	Carbon film 2.2k	RD¼PS 222J
R30	Carbon film 3.3k	RD¼PS 332J
R31	Carbon film 3.3k	RD¼PS 332J
R32	Carbon film 22k	RD¼PS 223J
R33	Carbon film 22k	RD¼PS 223J
R34	Carbon film 3.3k	RD¼PS 332J
R35	Carbon film 22k	RD¼PS 223J

Symbol	Description	Part No.
R36	Carbon film 100	RD¼PS 101J
R37	Carbon film 47	RD¼PS 470J
R38	Carbon film 2.7k	RD¼PS 272J
R39	Carbon film 2.2k	RD¼PS 222J
R40	Carbon film 680	RD¼PS 681J
R41	Carbon film 2.2	RD¼PS 222J
R42	Carbon film 22k	RD¼PS 223J
R43	Carbon film 2.7k	RD¼PS 272J

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	FET 3SK30-B	
Q2	Transistor 2SC535-A (orB)	
Q3	Transistor 2SC461-B	
Q4	IC HA1137	
Q5	IC HA1142	
Q6	IC HA1138	
D1	Diode 1S2076	
D2	Diode 1S2076	

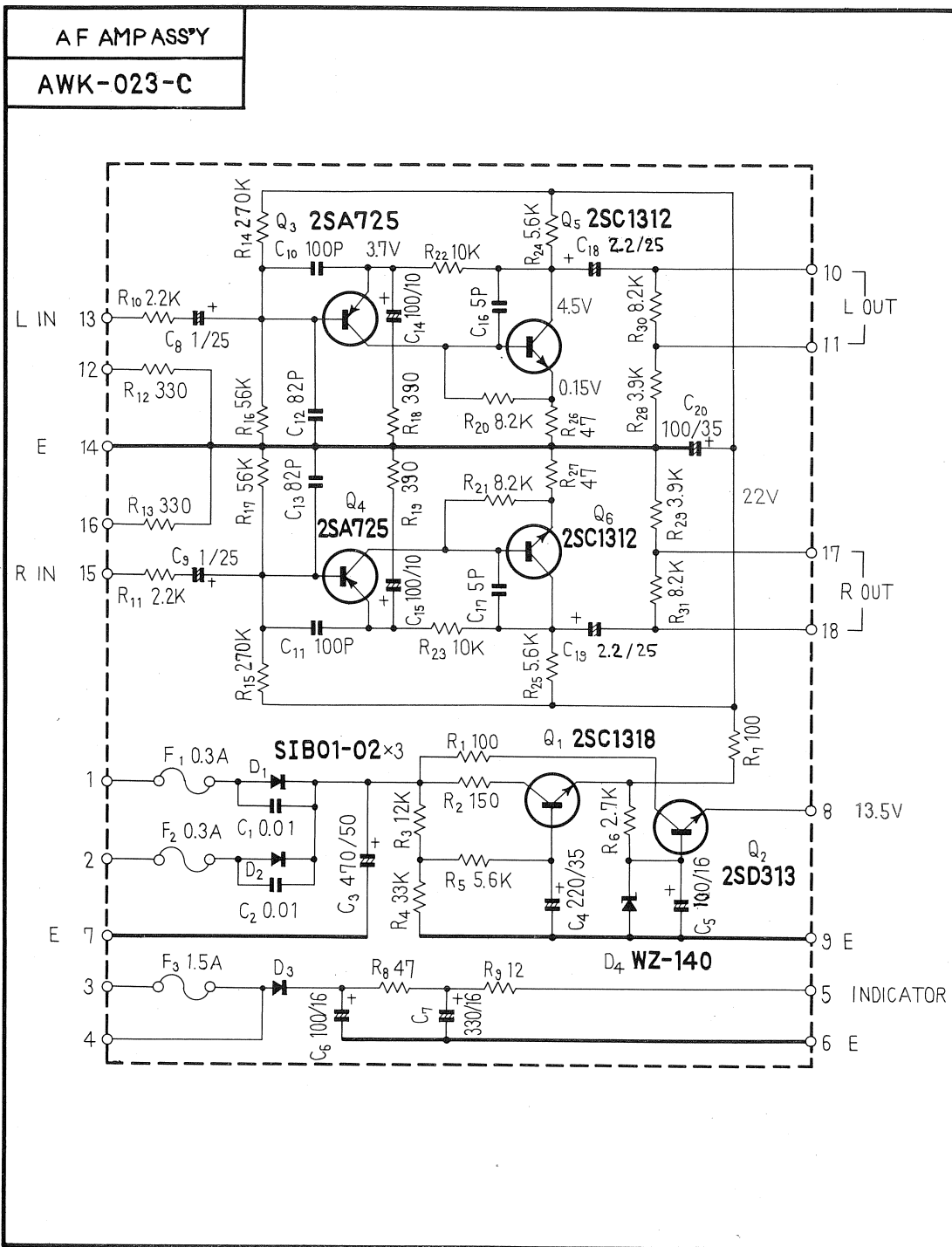
POTENTIOMETERS

Symbol	Description	Part No.
VR1	Semi-fixed 680-B	ACP-013-0
VR2	Semi-fixed 2.2k-B	ACP-001-0
VR3	Semi-fixed 47k-B	C92-048-0

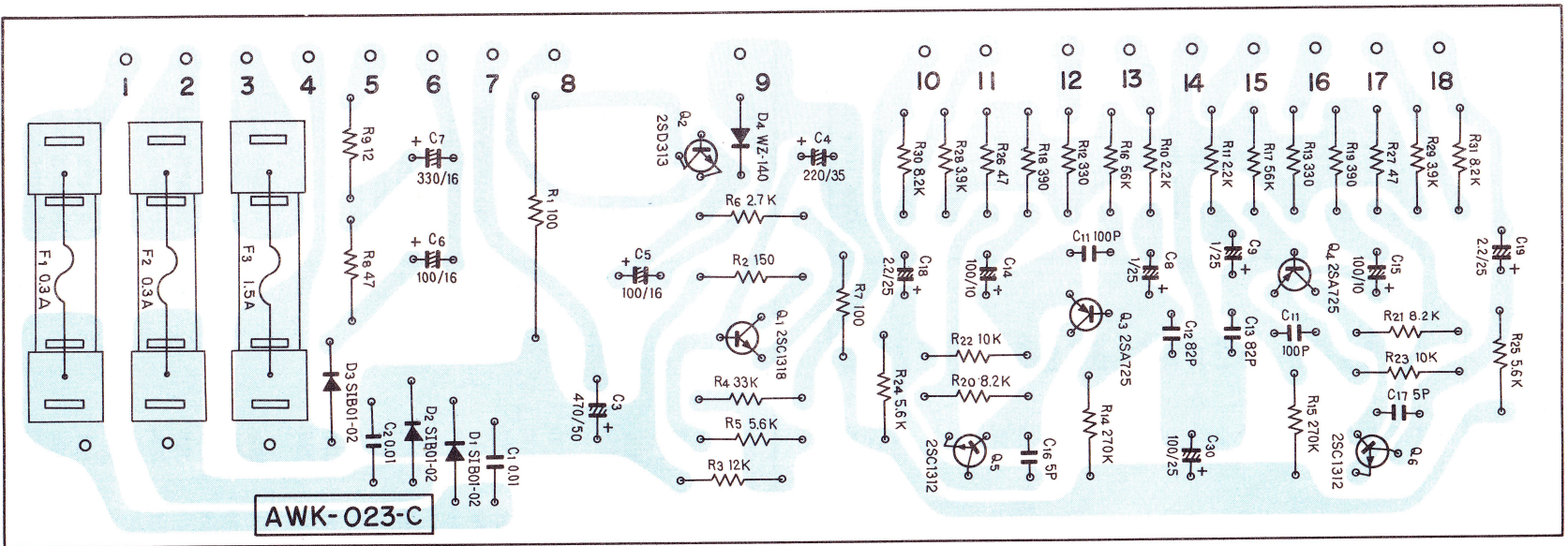
TRANSFORMERS AND COILS

Symbol	Description	Part No.
T1	FM antenna coil	ATC-023-0
T2	FM RF coil	ATC-024-0
T3	FM Osc. coil	ATC-025-0
T4	FM matching coil	ATE-008-0
T5	FM IFT	T73-035-A
T6	AM Osc. coil	ATB-013-0
T7	19kHz transformer	T75-023-B
T8	MPX transformer	ATM-011-0
L1	RF choke coil	T24-028-A
L2	Choke coil	ATH-007-0
L3	RF choke coil	T24-028-A
F1	FM ceramic filter	ATF-013-B
F2	FM ceramic filter	ATF-013-B
F3	Low-pass filter	ATF-016-0
F4	AM ceramic filter	ATF-009-0

12.3 AF AMPLIFIER ASSEMBLY (AWK-023)



Foil side



Parts List of AF Amplifier Assembly

CAPACITORS

Symbol	Description	Part No.
C1	Ceramic 0.01 150V	ACG-002-0
C2	Ceramic 0.01 150V	ACG-002-0
C3	Electrolytic 470 50V	CEA 471P 50
C4	Electrolytic 220 35V	CEA 221P 35
C5	Electrolytic 100 16V	CEA 101P 16
C6	Electrolytic 100 16V	CEA 101P 16
C7	Electrolytic 330 16V	CEA 331P 16
C8	Electrolytic 1 25V	CSSA 010M 25
C9	Electrolytic 1 25V	CSSA 010M 25
C10	Ceramic 100p 50V	CCD SL 101K 50
C11	Ceramic 100p 50V	CCD SL 101K 50
C12	Ceramic 82p 50V	CCD SL 820K 50
C13	Ceramic 82p 50V	CCD SL 820K 50
C14	Electrolytic 100 10V	CEA 101P 10
C15	Electrolytic 100 10V	CEA 101P 10
C16	Ceramic 5p 50V	CCD SL 050K 50
C17	Ceramic 5p 50V	CCD SL 050K 50
C18	Electrolytic 2.2 25V	CEA 2R2P 25
C19	Electrolytic 2.2 25V	CEA 2R2P 25
C20	Electrolytic 100 35V	CEA 101P 35

RESISTORS

Symbol	Description	Part No.
R1	Metal film 100 3W	RN3P 101K
R2	Carbon film 150	RD¼PS 151J
R3	Carbon film 12k	RD¼PS 123J
R4	Carbon film 33k	RD¼PS 333J
R5	Carbon film 5.6k	RD¼PS 562J
R6	Carbon film 2.7k	RD¼PS 272J
R7	Carbon film 100	RD¼PS 101J
R8	Carbon film 47	RD¼PS 470J
R9	Carbon film 12	RD¼PS 120J
R10	Carbon film 2.2k	RD¼PS 222J
R11	Carbon film 2.2k	RD¼PS 222J
R12	Carbon film 330	RD¼PS 331J
R13	Carbon film 330	RD¼PS 331J
R14	Carbon film 270k	RD¼PS 274J
R15	Carbon film 270k	RD¼PS 274J
R16	Carbon film 56k	RD¼PS 563J
R17	Carbon film 56k	RD¼PS 563J
R18	Carbon film 390	RD¼PS 391J
R19	Carbon film 390	RD¼PS 391J
R20	Carbon film 8.2k	RD¼PS 822J
R21	Carbon film 8.2k	RD¼PS 822J
R22	Carbon film 10k	RD¼PS 103J
R23	Carbon film 10k	RD¼PS 103J
R24	Carbon film 5.6k	RD¼PS 562J
R25	Carbon film 5.6k	RD¼PS 562J

Symbol	Description	Part No.
R26	Carbon film 47	RD¼PS 470J
R27	Carbon film 47	RD¼PS 470J
R28	Carbon film 3.9k	RD¼PS 392J
R29	Carbon film 3.9k	RD¼PS 392J
R30	Carbon film 8.2k	RD¼PS 822J
R31	Carbon film 8.2k	RD¼PS 822J

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor 2SC1318-Q	
Q2	Transistor 2SD313-E (or F)	
Q3	Transistor 2SA725-F (or G)	
Q4	Transistor 2SA725-F (or G)	
Q5	Transistor 2SC1312-F (or G)	
Q6	Transistor 2SC1312-F (or G)	
D1	Diode SIB01-02	
D2	Diode SIB01-02	
D3	Diode SIB01-02	
D4	Zener diode WZ-140	

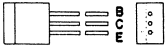
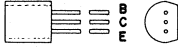
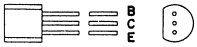
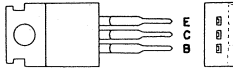
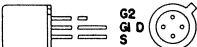
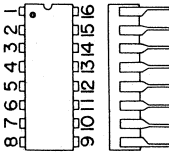
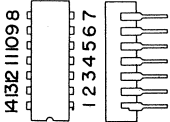
FUSES

Symbol	Description	Part No.
F1	KU model 0.3A (UL) F and FVZ model . . . 0.3A	E21-030-0 AEK-023-0
F2	KU model 0.3A (UL) F and FVZ model . . . 0.3A	E21-030-0 AEK-023-0
F3	KU model 1.5A (UL) F and FVZ model . . . 1.5A	AEK-027-0 AEK-009-0

OTHERS

Symbol	Description	Part No.
	Heat sink	ANH-117-0
	Fuse holder	K91-006-0

13. SKELETON APPEARANCES OF TRANSISTORS

<p>2SC535 2SC461</p>		<p>2SA725 2SC1312</p>	
<p>2SC1318</p>		<p>2SD313</p>	
<p>3SK30</p>		<p>HA1137 HA1138</p>	
<p>HA1142</p>			

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