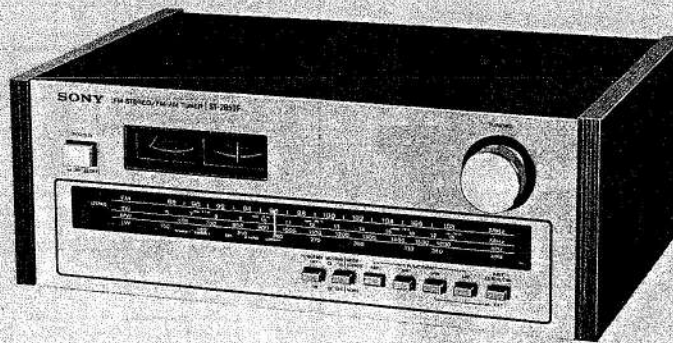


ST-2950F

UK Model
AEP Model



FM STEREO/FM-AM TUNER

SPECIFICATIONS

GENERAL

Power Requirements:	110, 127, 220 or 240 V ac adjustable, 50/60 Hz
Power Consumption:	23 W
Dimensions:	Approx. 390 (w) x 145 (h) x 310 (d) mm 15 ³ / ₈ (w) x 5 ³ / ₄ (h) x 12 ¹ / ₄ (d) inches Including projecting parts and controls
Weight:	Approx. 6.0 kg, 13 lb 4 oz (net) Approx. 7.8 kg, 17 lb 2 oz (with shipping carton)

FM SECTION

Tuning Range:	87.5 MHz – 108 MHz
Antenna Terminals:	300 Ω balanced 75 Ω unbalanced
Intermediate Frequency:	10.7 MHz
Sensitivity at 50 dB Quieting:	4.0 μ V (MONO) 50 μ V (STEREO)
Sensitivity at 46 dB Quieting (40 kHz deviation):	50 μ V (STEREO)
Usable Sensitivity:	2.0 μ V (IHF) 1.7 μ V, S/N = 26 dB (40 kHz deviation)
S/N Ratio:	73 dB (MONO) 68 dB (STEREO)
Harmonic Distortion:	at 100 Hz 0.2% (MONO) 0.3% (STEREO) at 1 kHz 0.2% (MONO) 0.3% (STEREO) at 10 kHz 0.2% (MONO) 0.6% (STEREO)

IM Distortion:	0.2% (MONO) 0.3% (STEREO)
Separation:	35 dB at 100 Hz 40 dB at 1 kHz 35 dB at 10 kHz
Frequency Response:	40 Hz – 12.5 kHz \pm 0.5 dB \pm 1.5 dB
Alternate Channel Selectivity:	50 dB (400 kHz)
Capture Ratio:	1.0 dB
AM Suppression Ratio:	54 dB
Image Response Ratio:	45 dB
IF Response Ratio:	90 dB
Spurious Response Ratio:	75 dB
RF Intermodulation:	60 dB
Sub-carrier Product Ratio:	50 dB
Muting Threshold:	Approx. 5 μ V
Output Level/impedance:	750 mV, 5 k Ω at 100% modulation

SONY
SERVICE MANUAL

5T-2950F

AM (MW, LW and SW) SECTION

		MW	LW	SW
Tuning Range		530 kHz – 1,605 kHz	150 kHz – 350 kHz	6 MHz – 18 MHz
Antenna	built-in	provided	provided	none
	external	provided	provided	provided
Intermediate Frequency		468 kHz		
Usable Sensitivity	built-in antenna	250 μ V/m (1,000 kHz)	500 μ V/m (250 kHz)	-----
	external antenna	100 μ V (1,000 kHz)	100 μ V (250 kHz)	30 μ V (12 MHz)
S/N Ratio		50 dB (50 mV/m)	50 dB (50 mV/m)	50 dB (5 mV)
Harmonic Distortion		0.5 % (50 mV/m, 400 Hz)	0.5 % (50 mV/m, 400 Hz)	0.5 % (5 mV, 400 Hz)
Selectivity		50 dB (10 kHz)	50 dB (10 kHz)	45 dB (10 kHz)

MEMO

**SECTION 3
ALIGNMENTS AND ADJUSTMENTS**

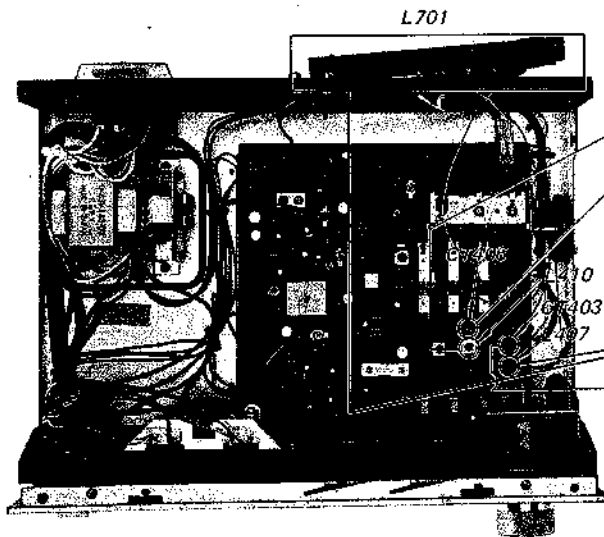
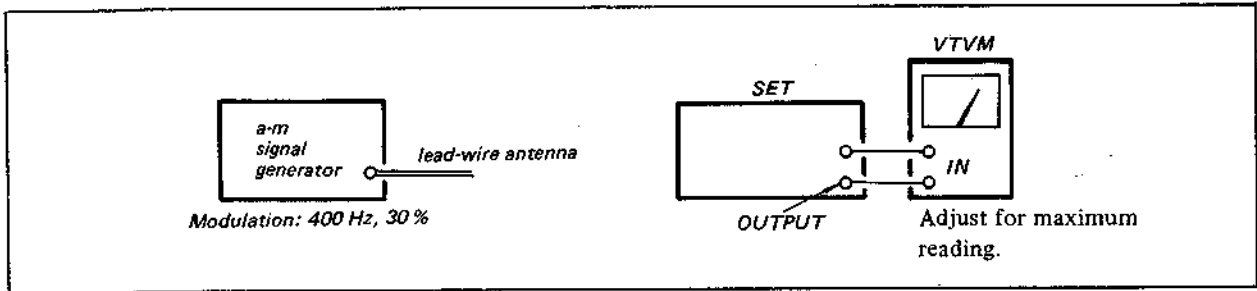
FM FREQUENCY COVERAGE AND TRACKING ALIGNMENT

Never attempt alignment of the fm front-end section for the fm frequency coverage and tracking alignment. If the fm frequency coverage alignment is required, replace the fm front-end board.

In the case of tracking alignment, ask your nearest SONY Service Station to send your set to the Factory Service Center.

LW/MW/SW FREQUENCY COVERAGE AND TRACKING ALIGNMENT

Setup:



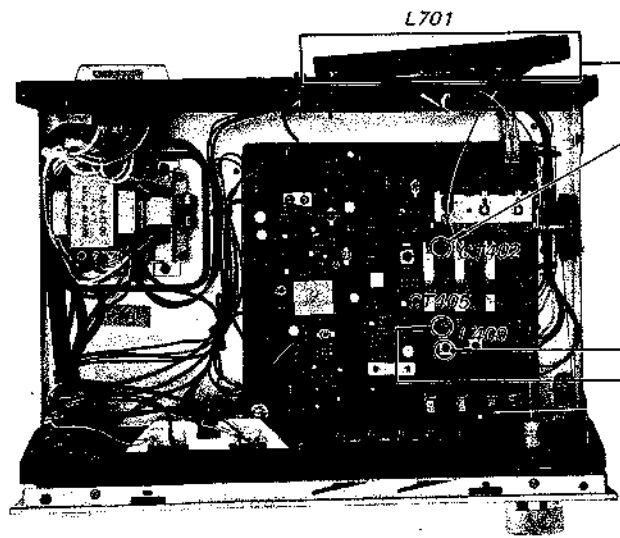
Step	LW FREQUENCY COVERAGE ALIGNMENT	DIAL INDICATION
1	L410 (150 kHz)	150 kHz
2	CT406 (350 kHz)	350 kHz

Note: Repeat step 1 and 2 several times, and finish the alignment at step 2.

Step	LW TRACKING ALIGNMENT
1	L407, 701 (150 kHz)
2	CT403 (300 kHz)

Note: Repeat step 1 and 2 several times, and finish the alignment at step 2.

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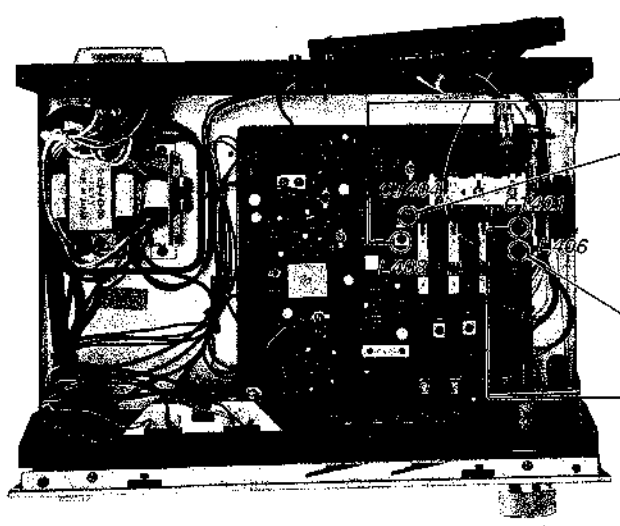


Step	MW TRACKING ALIGNMENT
1	L701 (600 kHz)
2	CT402 (1,400 kHz)

Note: Repeat step 1 and 2 several times, and finish the alignment at step 2.

Step	MW FREQUENCY COVERAGE ALIGNMENT
1	L409 (530 kHz)
2	CT405 (1,605 kHz)

Note: Repeat step 1 and 2 several times, and finish the alignment at step 2.



Step	SW FREQUENCY COVERAGE ALIGNMENT	DIAL INDICATION
1	L408 (6 MHz)	6 MHz
2	CT404 (18 MHz)	18 MHz

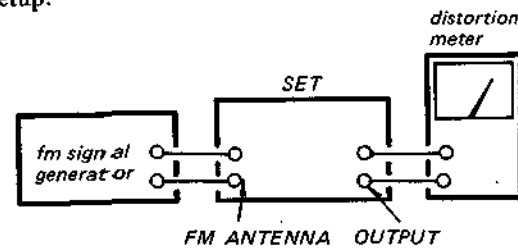
Note: Repeat step 1 and 2 several times, and finish the alignment at step 2.

Step	SW TRACKING ALIGNMENT
1	L406 (6 MHz)
2	CT401 (18 MHz)

Note: Repeat step 1 and 2 several times, and finish the alignment at step 2.

FM IF ALIGNMENT

Setup:



FM Signal Generator Setting:

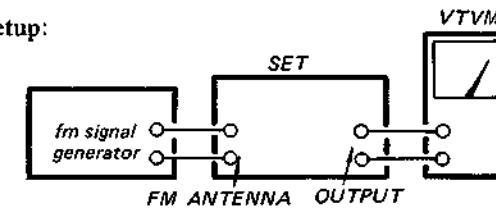
Carrier frequency: 98 MHz
 Modulation: 400 Hz,
 75 kHz deviation (100%)
 Output level: 1 mV (60 dB)

Procedure:

Tune the set to 98 MHz and adjust the primary-side core (black) of IFT201 for a minimum distortion reading.

SIGNAL METER ADJUSTMENT

Setup:

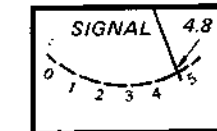


FM Signal Generator Setting:

Carrier frequency: 98 MHz
 Modulation: 400 Hz,
 75 kHz deviation (100%)
 Output level: 1 mV (60 dB)

Procedure:

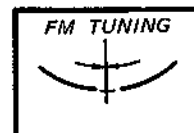
Tune the set to 98 MHz and adjust RT201 for specified pointer position (See figure below.) on the SIGNAL meter.



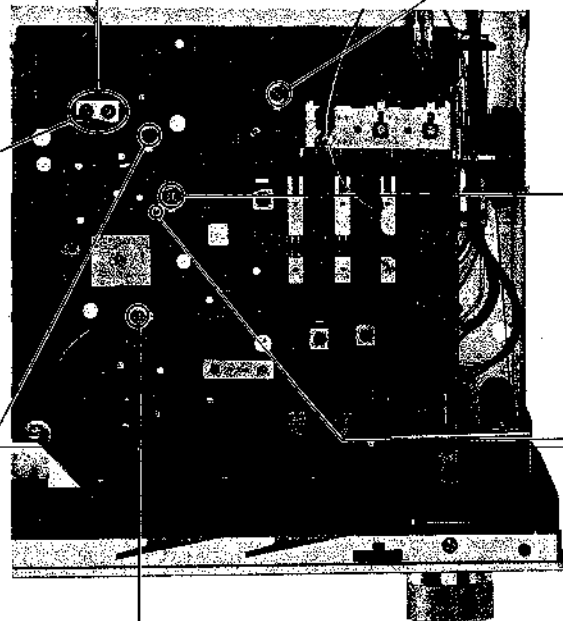
FM DISCRIMINATOR ALIGNMENT

Procedure:

1. Detune the set.
2. Turn the secondary-side core (blue) of IFT201 for null-point reading on the FM TUNING meter.



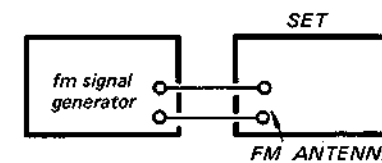
Null-point reading



19 kHz ADJUSTMENT

Setup:

MUTING/MODE switch: ON/STEREO



FM Signal Generator Setting:

Carrier frequency: 98 MHz
 Modulation: 400 Hz,
 75 kHz deviation (100%)
 Output level: 1 mV (60 dB)

A) With Frequency Counter

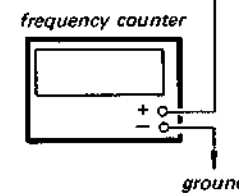
Procedure:

1. Tune the set to 98 MHz.
2. Adjust RT301 for 19 kHz \pm 100 Hz on the counter.

B) Without Frequency Counter

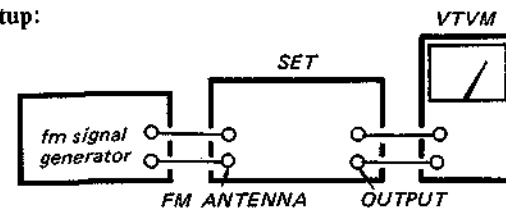
Procedure:

1. Tune the set to FM stereo signal.
2. Turn RT301 clockwise or counterclockwise and secure RT301 at the center in lighting-up range of stereo lamp as shown below.



FM OUTPUT LEVEL ADJUSTMENT

Setup:



FM Signal Generator Setting:

Carrier frequency: 98 MHz,
 Modulation: 400 Hz,
 75 kHz deviation (100%)
 Output level: 1 mV (60 dB)

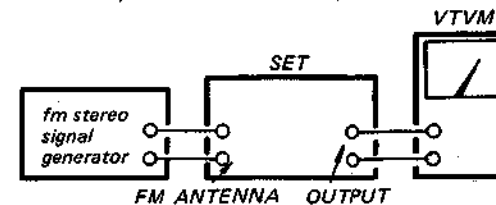
Procedure:

Adjust RT202 for 750 mV (-0.3 dB) reading on the VTVM.

FM STEREO SEPARATION ADJUSTMENT

Setup:

MUTING/MODE switch: ON/STEREO

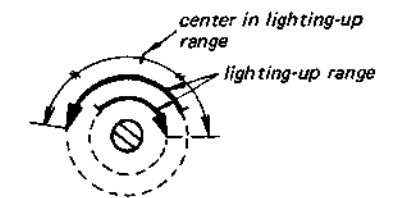


FM Stereo Signal Generator Setting:

Main carrier frequency: 98 MHz
 Output level: 1 mV (60 dB)
 Mode: Stereo
 Audio (400 Hz) Mod: 67.5 kHz deviation (90%)
 Pilot (19 kHz) Mod: 7.5 kHz deviation (10%)

Procedure:

1. Set the signal generator channel selector to L-CH.
2. Tune the set to 98 MHz.
3. Connect the VTVM to the OUTPUT "L-CH" of the set and calibrate the VTVM for 0 dB reading.
4. Turn the stereo signal generator channel selector from L-CH to R-CH and adjust RT501 for minimum output on the VTVM.
5. Connect the VTVM to the OUTPUT "R-CH" of the set and calibrate the VTVM for 0 dB reading.
6. Turn the stereo signal generator channel selector from R-CH to L-CH and adjust RT501 for minimum output on the VTVM.

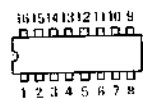


SECTION 4
DIAGRAMS

4-1. MOUNTING DIAGRAM

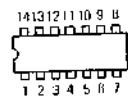
— Conductor Side —

IC201: HA1137



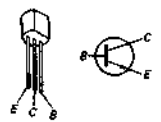
(Top view)

IC301: HA-1156

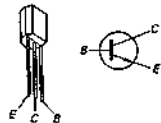


(Top view)

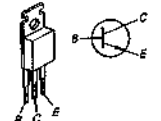
Q201
Q501, 502: 2SC900



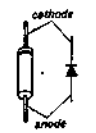
Q401 ~ 406: 2SC710



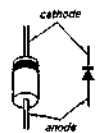
Q601: 2SC1173



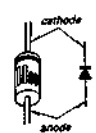
D201, 301,
D401, 402: 1S1555
D202,
D403: 1T22A



D602: 10E2
D603:

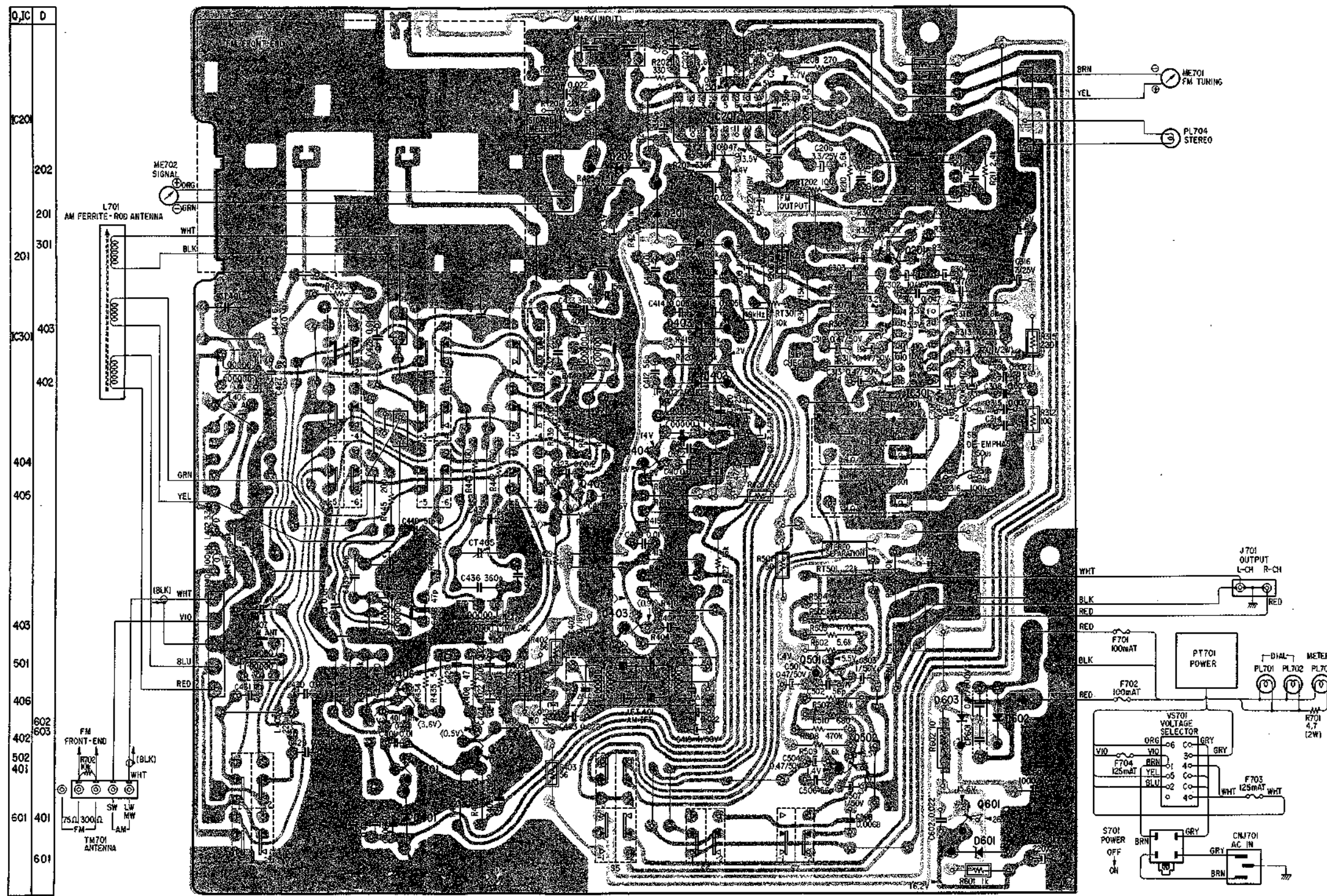
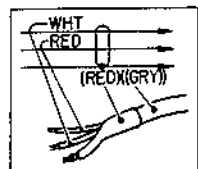


D601: EQA01-16R



Note:

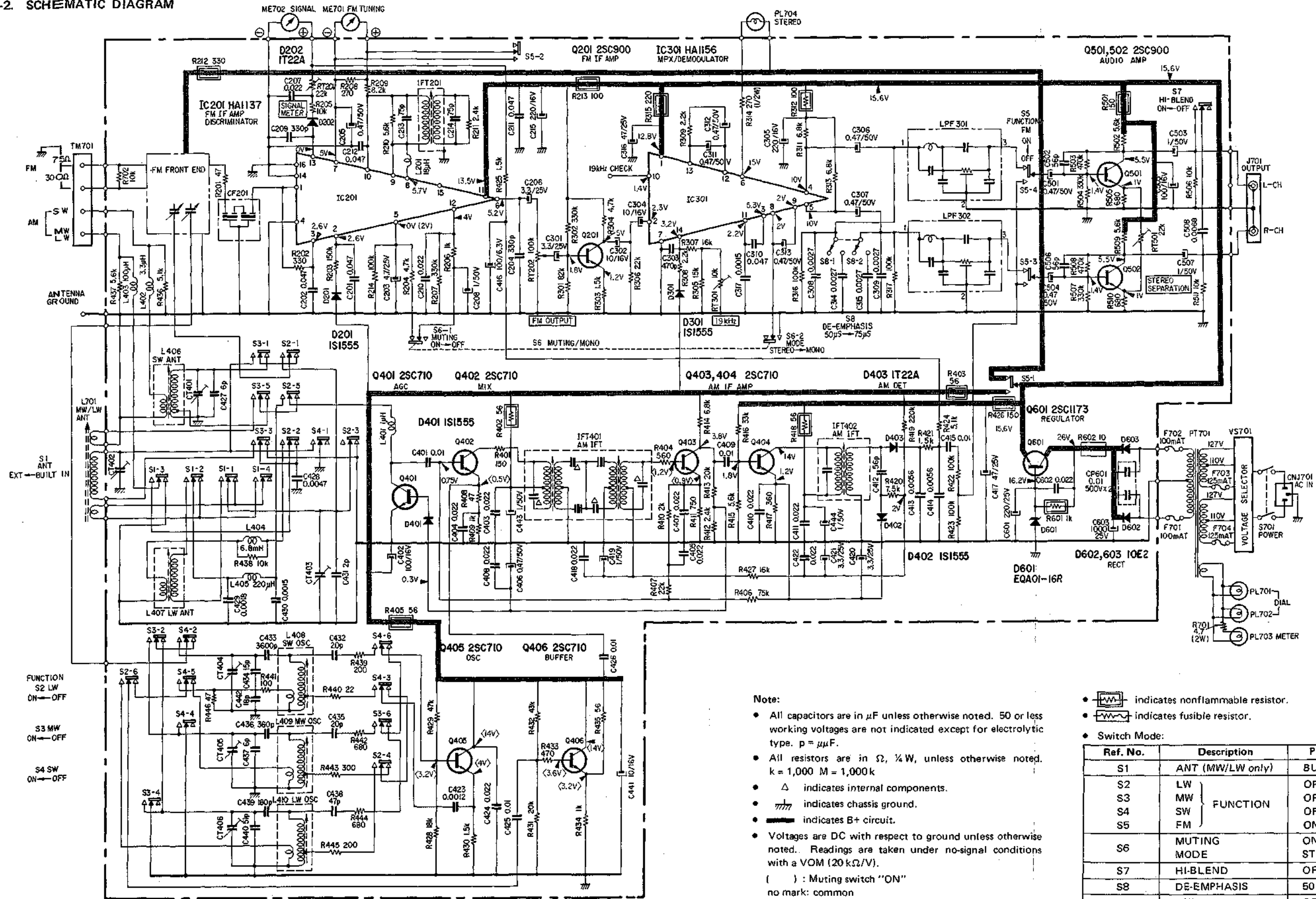
- shows the location of stenciled part number. Refer to this mark when replacing the parts.
- Capacitors marked Δ are built in transformers.
- () : Muting switch "ON".
- : B+ pattern



- S1 ANTENNA SELECTOR
EXT BUILT IN
- S2 FUNCTION (LW)
ON OFF
- S3 FUNCTION (MW)
ON OFF
- S4 FUNCTION (SW)
ON OFF
- S5 FUNCTION (FM)
ON OFF
- S6 MUTING / MODE
OFF MONO ON STEREO
- S7 HI-BLEND
ON OFF

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4-2. SCHEMATIC DIAGRAM



Note:

- All capacitors are in μF unless otherwise noted. 50 or less working voltages are not indicated except for electrolytic type. $p = \mu\text{F}$.
- All resistors are in Ω , $\frac{1}{4}W$, unless otherwise noted. $k = 1,000$ $M = 1,000k$
- Δ indicates internal components.
- --- indicates chassis ground.
- --- indicates B+ circuit.
- Voltages are DC with respect to ground unless otherwise noted. Readings are taken under no-signal conditions with a VOM (20 $k\Omega/V$).
- () : Muting switch "ON"
no mark: common
< > : AM
- Voltage variations may be noted due to normal production tolerances.

- indicates nonflammable resistor.
- indicates fusible resistor.
- Switch Mode:

Ref. No.	Description	Position
S1	ANT (MW/LW only)	BUILT IN
S2	LW	OFF
S3	MW	OFF
S4	SW	OFF
S5	FM	ON
S6	MUTING MODE	ON STEREO
S7	HI-BLEND	OFF
S8	DE-EMPHASIS	50 μS
S701	POWER	OFF

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SECTION 5
EXPLODED VIEWS

A B C D E F

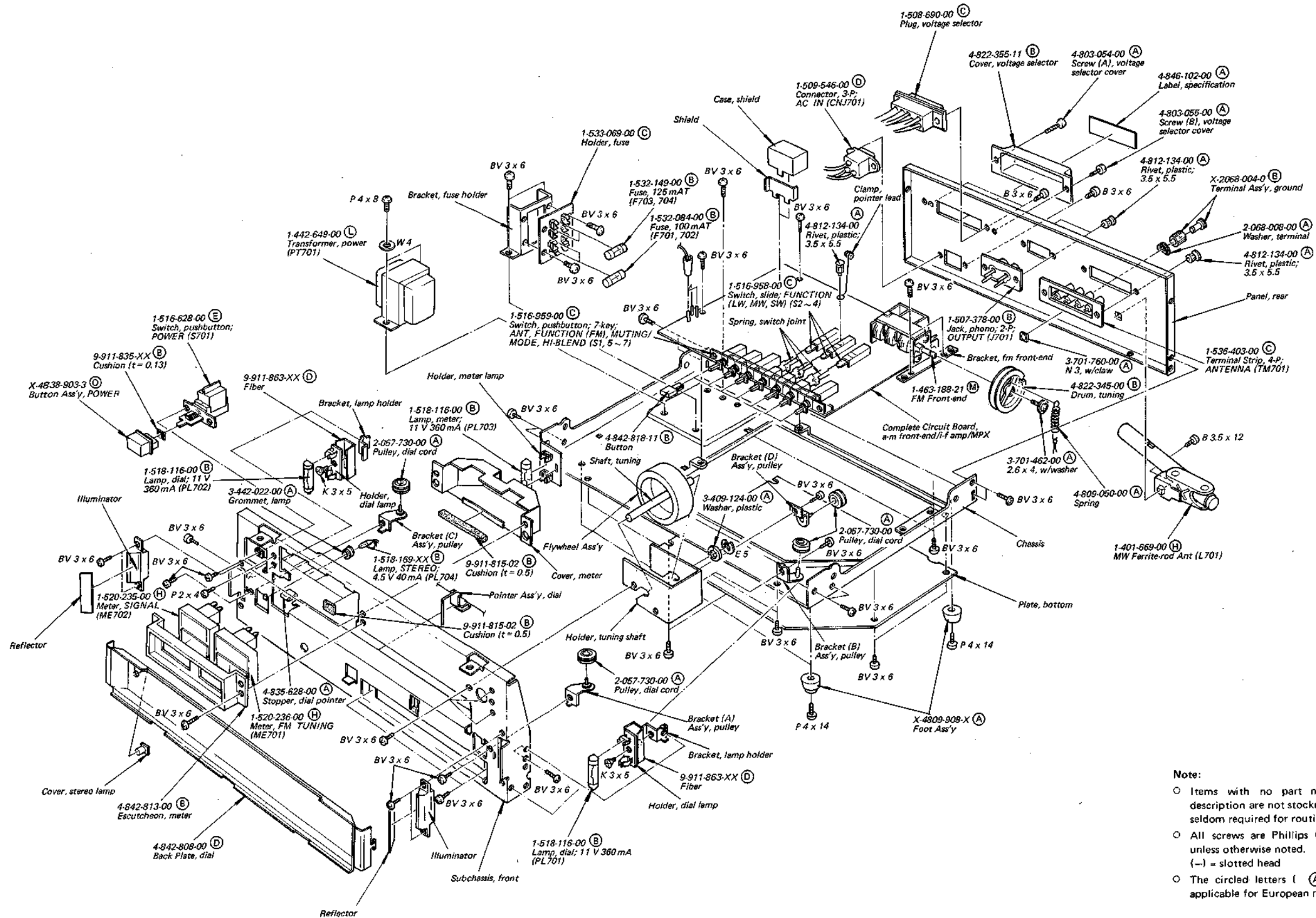
5-1.

1

2

3

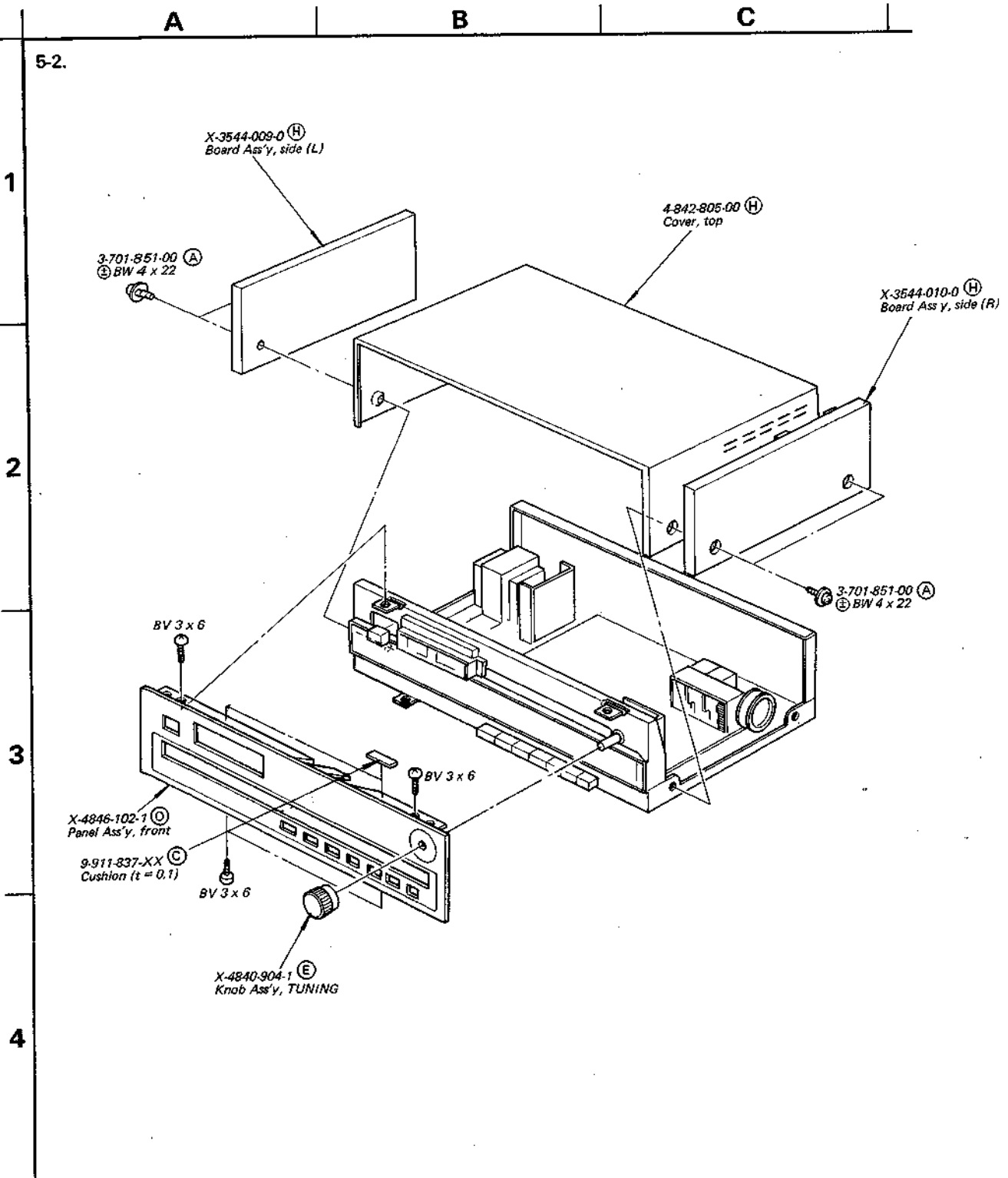
4



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head
- The circled letters (A to Z) are applicable for European model only.

5-2.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head
- The circled letters (A to Z) are applicable for European model only.

**SECTION 6
ELECTRICAL PARTS LIST**

Note: The circled letters (A) to (Z) are applicable for European model only.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
SEMICONDUCTORS		
Transistors		
⇒ Q201	(B) 2SC632A	
Q401 ~ 406	(B) 2SC710	
⇒ Q501, 502	(B) 2SC632A	
Q601	(C) 2SC1173	
ICs		
IC201	(H) HA1137	
⇒ IC301	(J) HA1156W	
Diodes		
D201	(B) 1S1555	
D202	(B) 1T22A	
D301	(B) 1S1555	
D401, 402	(B) 1S1555	
D403	(B) 1T22A	
D601	(C) EQA01-16R	
D602, 603	(B) 10E2	
COILS		
L401	1-407-178-XX (A) Microinductor, 1 μH	
L402	1-407-184-XX (A) Microinductor, 3.3 μH	
L403	1-407-169-XX (A) Microinductor, 100 μH	
L404	1-407-204-XX (B) Microinductor, 6.8 mH	
L405	1-407-173-XX (A) Microinductor, 220 μH	
L406	1-401-663-00 (B) SW Ant	
L407	1-401-664-00 (B) LW Ant	
L408	1-405-730-00 (B) SW Osc	
L409	1-405-732-00 (B) MW Osc	
L410	1-405-731-00 (B) LW Osc	
L701	1-401-669-00 (H) MW/LW Ferrite-rod Ant	

⇒: Due to replacement parts, the descriptions are different from the diagrams.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
TRANSFORMERS		
IFT201	1-404-029-00 (C) FM Discriminator	
IFT401	1-403-963-21 (E) AM IFT	
IFT402	1-403-149-00 (B) AM IFT	
PT701	1-442-649-00 (L) Power	
FILTERS		
CF201	1-527-240-91 (E) Ceramic	
LPF ⁽³⁰¹⁾ ₍₃₀₂₎	1-231-303-00 (C) Low-pass	
CAPACITORS		
All capacitors are in μF and of ceramic unless otherwise noted. (p = pF, elect = electrolytic) 50 or less working volts are omitted except for electrolytic type.		
C201, 202	1-101-925-11 (A) 0.047	
C203	1-121-395-11 (A) 4.7 25 V elect	
C204	1-102-112-11 (A) 330 p	
C205	1-121-726-11 (A) 0.47 50 V elect	
C206	1-121-392-11 (A) 3.3 25 V elect	
C207	1-101-924-11 (A) 0.022	
C208	1-121-391-11 (A) 1 50 V elect	
C209	1-102-112-11 (A) 330 p	
C210	1-101-924-11 (A) 0.022	
C211, 212	1-101-925-11 (A) 0.047	
C213, 214	1-102-732-11 (A) 75 p	
C215	1-121-421-11 (B) 220 16 V elect	
C301	1-121-392-11 (A) 3.3 25 V elect	
C302	1-121-651-11 (A) 10 16 V elect	
C303	1-103-717-11 (A) 470 p polystyrol	
C304	1-121-651-11 (A) 10 16 V elect	
C305	1-121-421-11 (B) 220 16 V elect	
C306, 307	1-121-726-11 (A) 0.47 50 V elect	
C308, 309	1-108-830-12 (A) 0.0027 mylar	
C310	1-108-845-12 (A) 0.047 mylar	
C311 ~ 313	1-121-726-11 (A) 0.47 50 V elect	
C314, 315	1-108-830-12 (A) 0.0027 mylar	

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Note: The circled letters (A to Z) are applicable for European model only.

Ref. No.	Part No.	Description
C316	1-121-410-11 (B) 47	25 V elect
C317	1-108-827-12 (A) 0.0015	mylar
C401	1-101-923-11 (A) 0.01	
C402	1-121-415-11 (B) 100	16 V elect
C403 ~ 405	1-101-924-11 (A) 0.022	
C406	1-121-726-11 (A) 0.47	50 V elect
C407, 408	1-101-924-11 (A) 0.022	
C409	1-101-923-11 (A) 0.01	
C410, 411	1-101-924-11 (A) 0.022	
C412	1-101-884-11 (A) 56 p	
C413, 414	1-108-834-12 (A) 0.0056	mylar
C415	1-108-837-12 (A) 0.01	mylar
C416	1-121-413-11 (A) 100	6.3 V elect
C417	1-121-410-11 (B) 47	25 V elect
C418	1-101-924-11 (A) 0.022	
C419	1-121-391-11 (A) 1	50 V elect
C420, 421	1-121-392-11 (A) 3.3	25 V elect
C422	1-101-924-11 (A) 0.022	
C423	1-108-826-12 (A) 0.0012	mylar
C424	1-101-924-11 (A) 0.022	
C425, 426	1-101-923-11 (A) 0.01	
C427	1-102-943-11 (A) 6 p	
C428	1-108-833-12 (A) 0.0047	
C429	1-108-828-12 (A) 0.0018	mylar
C430	1-108-827-12 (A) 0.0015	mylar
C431	1-102-939-11 (A) 2 p	
C432	1-102-958-11 (A) 20 p	
C433	1-103-738-11 (A) 3600 p	polystyrol
C434	1-102-292-11 (A) 15 p	
C435	1-102-958-11 (A) 20 p	
C436	1-103-714-11 (A) 360 p	polystyrol
C437	1-102-943-11 (A) 6 p	
C438	1-101-880-11 (A) 47 p	
C439	1-103-706-11 (A) 160 p	polystyrol
C440	1-101-882-11 (A) 51 p	
C441	1-121-651-11 (A) 10	16 V elect
C442	1-102-296-11 (A) 18 p	
C443, 444	1-121-391-11 (A) 1	50 V elect
C501	1-121-726-11 (A) 0.47	50 V elect
C502	1-101-884-11 (A) 56 p	
C503	1-121-391-11 (A) 1	50 V elect
C504	1-121-726-11 (A) 0.47	50 V elect
C505	1-121-415-11 (B) 100	16 V elect

Ref. No.	Part No.	Description
C506	1-101-884-11 (A) 56 p	
C507	1-121-391-11 (A) 1	50 V elect
C508	1-108-835-12 (A) 0.0068	mylar
C601	1-121-422-11 (B) 220	25 V elect
C602	1-108-841-12 (A) 0.022	mylar
C603	1-121-657-11 (B) 1000	25 V elect
CP601	1-102-355-11 (A) (0.01	500 V) x 2 ceramic
CT401, 403, CT405, 406	1-141-147-00 (B) Trimmer	
CT402, 404	1-141-138-XX (B) Trimmer	

RESISTORS

All resistor are in Ω . Regular-type $\frac{1}{4}$ W carbon resistors are omitted. Check the schematic diagram for the resistance values. (k = 1000)

R212	1-211-534-11 (A) 330	$\frac{1}{4}$ W carbon (nonflammable)
R213	1-211-522-11 (A) 100	$\frac{1}{4}$ W carbon (nonflammable)
R312	1-211-522-11 (A) 100	$\frac{1}{4}$ W carbon (nonflammable)
R314	1-202-559-11 (A) 270	$\frac{1}{2}$ W composition
R315	1-211-530-11 (A) 220	$\frac{1}{4}$ W carbon (nonflammable)
R402, 403, R405, 418	1-211-516-11 (A) 56	$\frac{1}{4}$ W carbon (nonflammable)
R426	1-211-526-11 (A) 150	$\frac{1}{4}$ W carbon (nonflammable)
R501	1-211-526-11 (A) 150	$\frac{1}{4}$ W carbon (nonflammable)
R601	1-211-935-11 (A) 1 k	$\frac{1}{4}$ W carbon (nonflammable)
R602	1-217-523-11 (A) 10	$\frac{1}{4}$ W fusible
R701	1-207-624-11 (B) 4.7	2 W wirewound
RT201	1-222-764-11 (A) 22 k, adjustable	
RT202	1-222-766-11 (B) 100 k, adjustable	
RT301	1-222-752-11 (B) 10 k, adjustable	
RT501	1-222-764-11 (A) 22 k, adjustable	

Note: The circled letters (A to Z) are applicable for European model only.

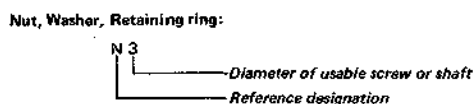
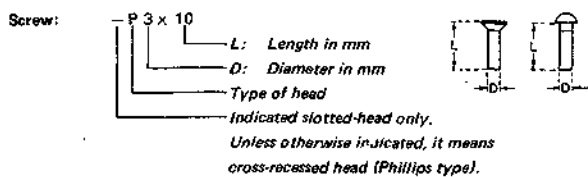
Ref. No.	Part No.	Description
SWITCHES		
S1, 5~7	1-516-959-00	(H) Pushbutton, 7-key; ANT, FUNCTION (FM), MUTING/ MODE, HI-BLEND
S2~4	1-516-958-00	(C) Slide, FUNCTION (LW, MW, SW)
S8	1-516-954-00	(B) De-emphasis
S701	1-516-628-00	(E) Pushbutton, POWER

MISCELLANEOUS		
CNJ701	1-509-546-00	(D) Connector, 3-p; AC IN
F701, 702	1-532-084-00	(B) Fuse, 100 mA
F703, 704	1-532-149-00	(B) Fuse, 125 mA
J701	1-507-378-00	(B) Jack, phono; 2-p; OUTPUT
ME701	1-520-236-00	(H) Meter, FM TUNING
ME702	1-520-235-00	(H) Meter, SIGNAL
PL701~703	1-518-116-00	(B) Lamp, 11 V 360 mA; dial, meter

Ref. No.	Part No.	Description
PL704	1-518-169-XX	(B) Lamp, 4.5 V 40 mA; STEREO
TM701	1-536-403-00	(C) Terminal Strip, 4-p; ANTENNA
	1-463-188-21	(H) FM Front-end
	1-508-690-00	(C) Plug, voltage selector
	1-533-069-00	(C) Holder, fuse

ACCESSORIES	
Part No.	Description
X-4490-002-2	(B) Cloth Ass'y, polishing
1-501-161-00	(F) Ribbon Antenna, f-m
1-534-049-61	(F) Cord, connection; RK-74
1-534-492-00	(C) Cord, SW antenna
1-534-819-00	(G) Cord, power (UK Model)
3-780-970-11	(E) Manual, instruction

HARDWARE NOMENCLATURE



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self-tapping (TA, B) screw and flat washer for replacement
P ⁺ TWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

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