

CFM-A50

SERVICE MANUAL

Ver. 1.2 2005.06

US Model
AEP Model
UK Model



Model Name Using Similar Mechanism	NEW
Tape Transport Mechanism Type	MF-A50-117

SPECIFICATIONS

Radio section

Frequency range

- FM 87.6 – 108MHz (US model)
- FM 87.6 – 107MHz (AEP, UK model)
- AM 530 – 1,710kHz (US model)
- MW 531 – 1,602kHz (AEP, UK model)
- LW 153 – 279kHz (AEP, UK model)

Aerials

- FM : Telescopic aerial
- AM : Built-in ferrite bar aerial

Cassette-corder section

Recording system

- 2-track 1channel monaural

Fast winding time

- Approx. 120 s (sec.) with Sony cassette C-60

Frequency response

- TYPE I (normal) : 100 – 8,000Hz

General

Speaker

- Full range : 9.2cm dia., 4 ohms, cone type (1)

Output

- Earphone jack (minijack)
- For 32 ohms impedance earphone

Maximum power output

2.3 W

Power requirements

- 120V AC, 60Hz (US model)
- 230V AC, 50Hz (AEP, UK model)
- 6V DC, four R20 (size D) batteries

Power consumption

AC 6W

Battery life

FM recording

- | | |
|----------------------|-------------|
| Sony R20P : | approx. 13h |
| Sony alkaline LR20 : | approx. 35h |

Tape playback

- | | |
|----------------------|-------------|
| Sony R20P : | approx. 7h |
| Sony alkaline LR20 : | approx. 20h |

Dimensions

- Approx. 289 x 200 x 123 mm (w/h/d)
- (11 1/2 x 7 7/8 x 4 7/8 inches) (incl. projecting parts)

Mass

- Approx. 2.4 kg (5 lb. 5 oz) (incl. batteries)

Supplied accessory

- AC power cord (1)
- Earphone (1)

Design and specifications are subject to change without notice.

9-923-167-14
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Sony Corporation
Personal Audio Group
Published by Sony Engineering Corporation

RADIO CASSETTE-CORDER

SONY®

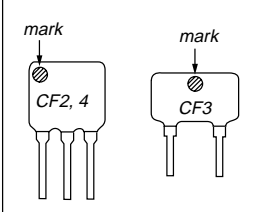
TABLE OF CONTENTS

Specifications	1
1. GENERAL	
Location and Function of Controls	3
2. DISASSEMBLY	
2-1. Cabinet (Rear) Removal	4
2-2. ISS SW Board, Battery Case, BATTERY Board, POWER Board Removal	4
2-3. Main Board, TUN LED Board, TACT SW Board Removal	5
2-4. H/P JACK Board, Door Ear (PH), Box Ear (PH) Removal	5
2-5. Mechanism Deck, DECK CONTROL Board Volume Board Removal	6
3. DIAL POINTER SETTING	7
4. ADJUSTMENTS	
4-1. Mechanical Adjustment	8
4-2. Electrical Adjustment	8
5. DIAGRAMS	
5-1. Schematic Diagram (AEP,UK Model)	12
5-2. Printed Wiring Boards (AEP,UK Model)	15
5-3. Printed Wiring Boards (US Model)	19
5-4. Schematic Diagram (US Model)	23
6. EXPLODED VIEWS	
6-1. Cabinet (Rear) Section	28
6-2. Cabinet (Front) Section	29
6-3. Mechanism Deck Section-1 (MF-A50-117)	30
6-4. Mechanism Deck Section-2 (MF-A50-117)	31
7. ELECTRICAL PARTS LIST	32

HOW TO CHANGED THE CERAMIC FILTERS

This model is used three ceramic filters of CF2, CF4 and CF3. You must used same type of color marked ceramic filters in order to meet same specifications.

Therefore, the ceramic filter must changed three pieces together since it's supply three pieces in one package as a spare parts.

	Mark	Center frequency
	red	10.70MHz
	blue	10.67MHz
	orange	10.73MHz
	black	10.64MHz
white	10.76MHz	

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK \triangle OR DOTTED LINE WITH MARK \triangle ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SECTION 1 GENERAL

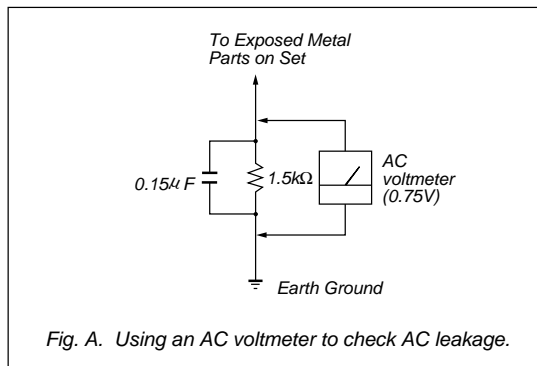
SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer :
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

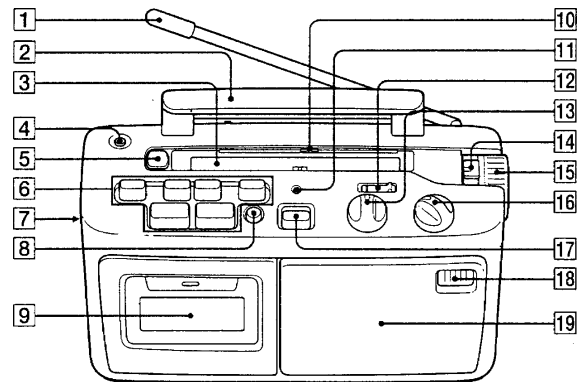
The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)



This section is extracted from instruction manual.

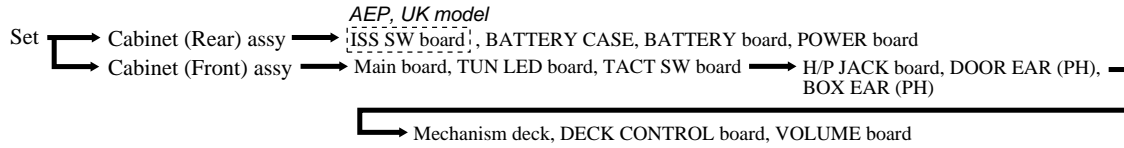
LOCATION AND FUNCTION OF CONTROLS



- 1 FM telescopic aerial
- 2 Carrying handle
- 3 Dial scale
- 4 Ⓜ (earphone) jack (mini jack)
- 5 LIGHT (Dial scale light) button
- 6 Tape operation buttons
- 7 EARPHONE POCKET box
- 8 SLOW PLAYBACK button
- 9 Cassette compartment lid
- 10 Frequency marker
- 11 OPR/BATT indicator
- 12 EASY LISTENING ADJUSTMENT switch
- 13 EASY LISTENING ADJUSTMENT control
- 14 BAND switch
- 15 TUNING control
- 16 VOLUME control
- 17 FUNCTION switch
- 18 Built-in microphone
- 19 Speaker

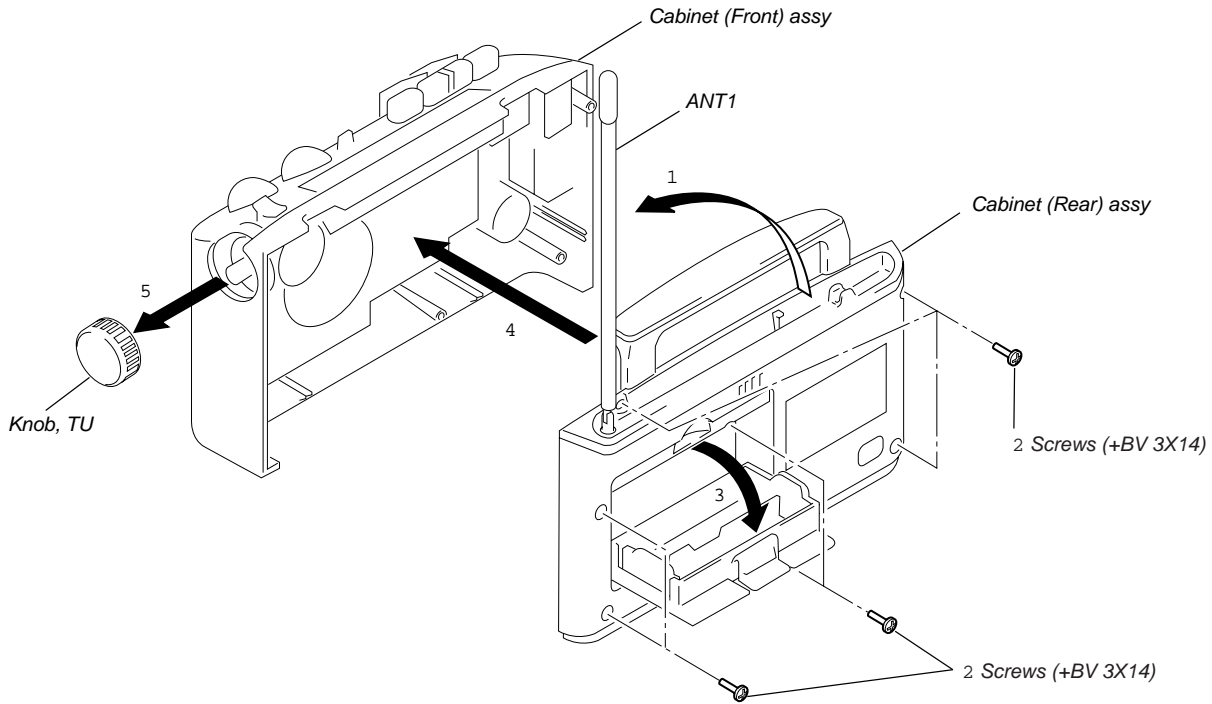
SECTION 2 DISASSEMBLY

● The equipment can be removed using the following procedure.

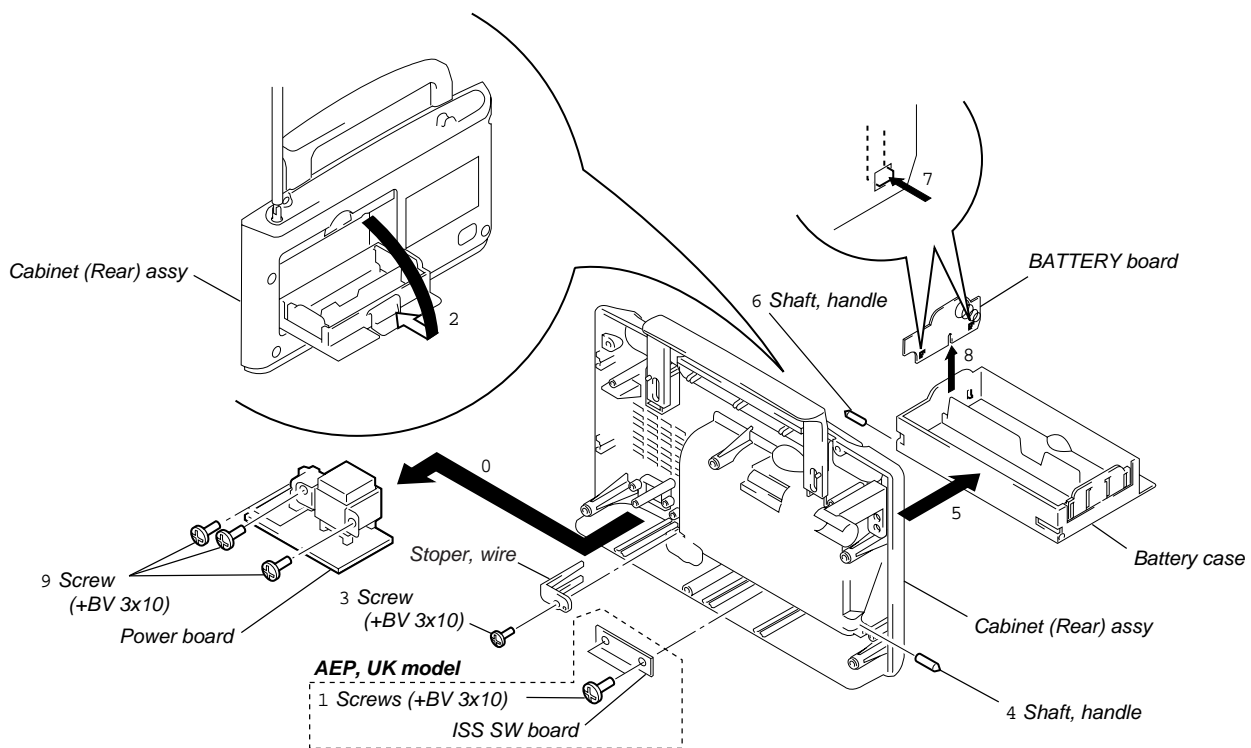


Note : Follow the disassembly procedure in the numerical order given.

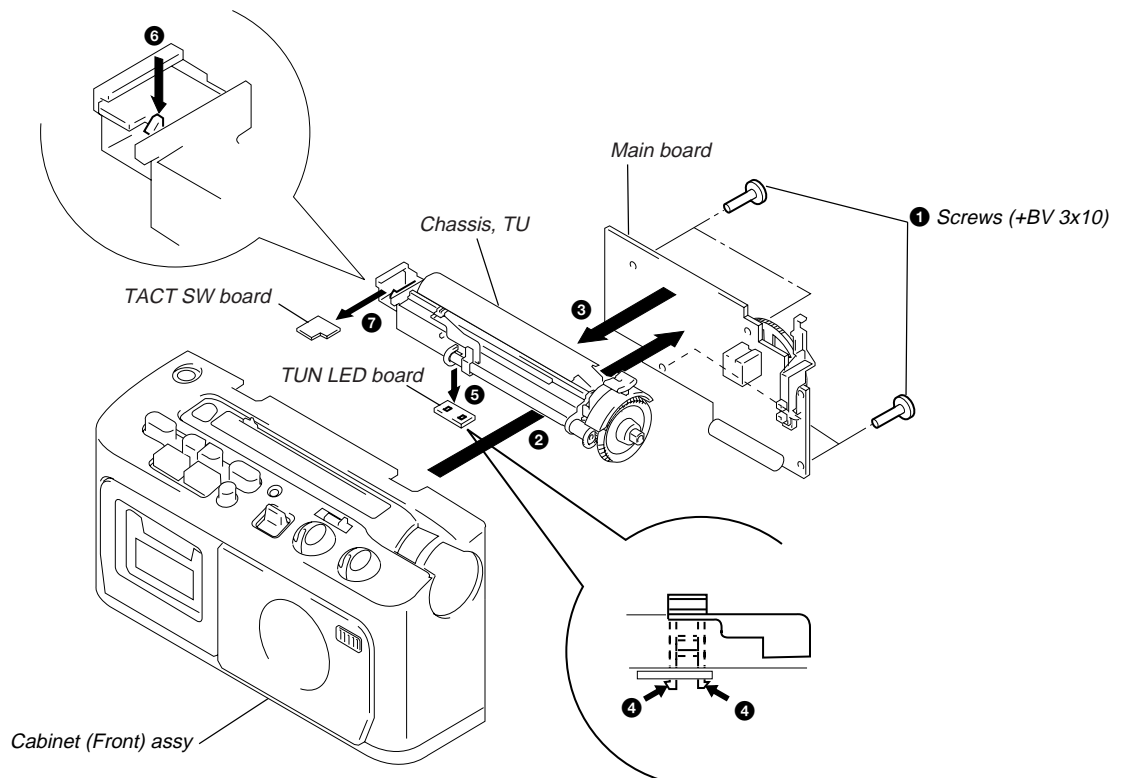
2-1. CABINET (REAR) REMOVAL



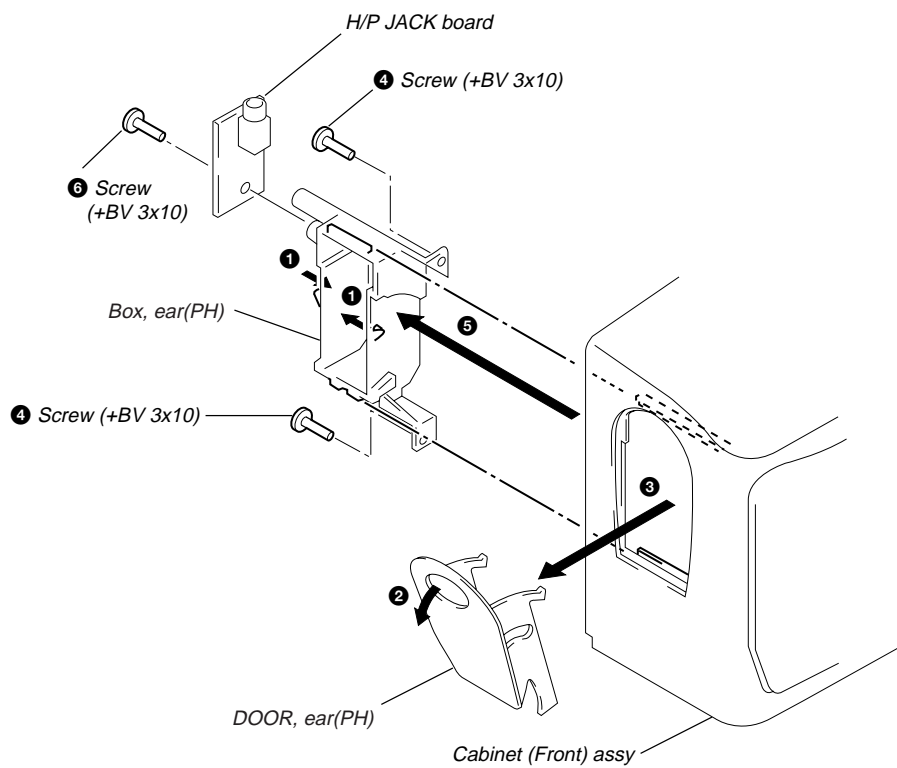
2-2. ISS SW BOARD, BATTERY CASE, BATTERY BOARD, POWER BOARD REMOVAL



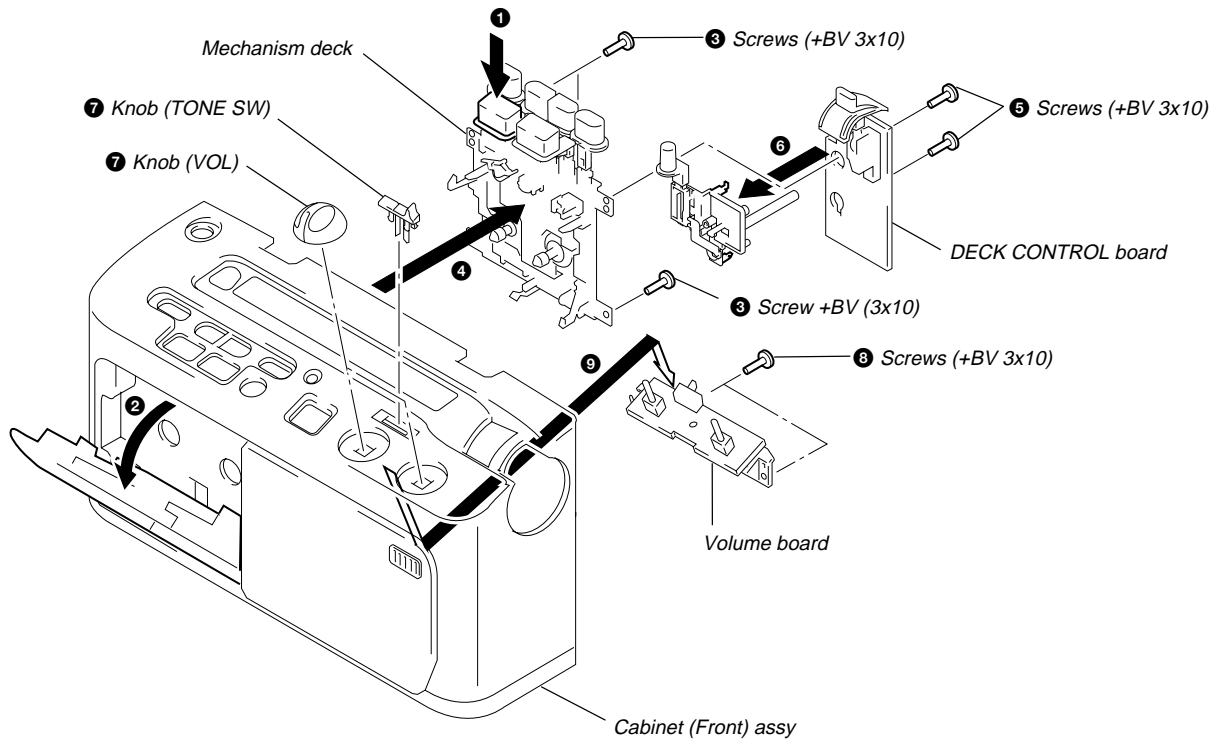
2-3. MAIN BOARD, TUN LED BOARD, TACT SW BOARD REMOVAL



2-4. H/P JACK BOARD, DOOR EAR (PH), BOX EAR (PH) REMOVAL



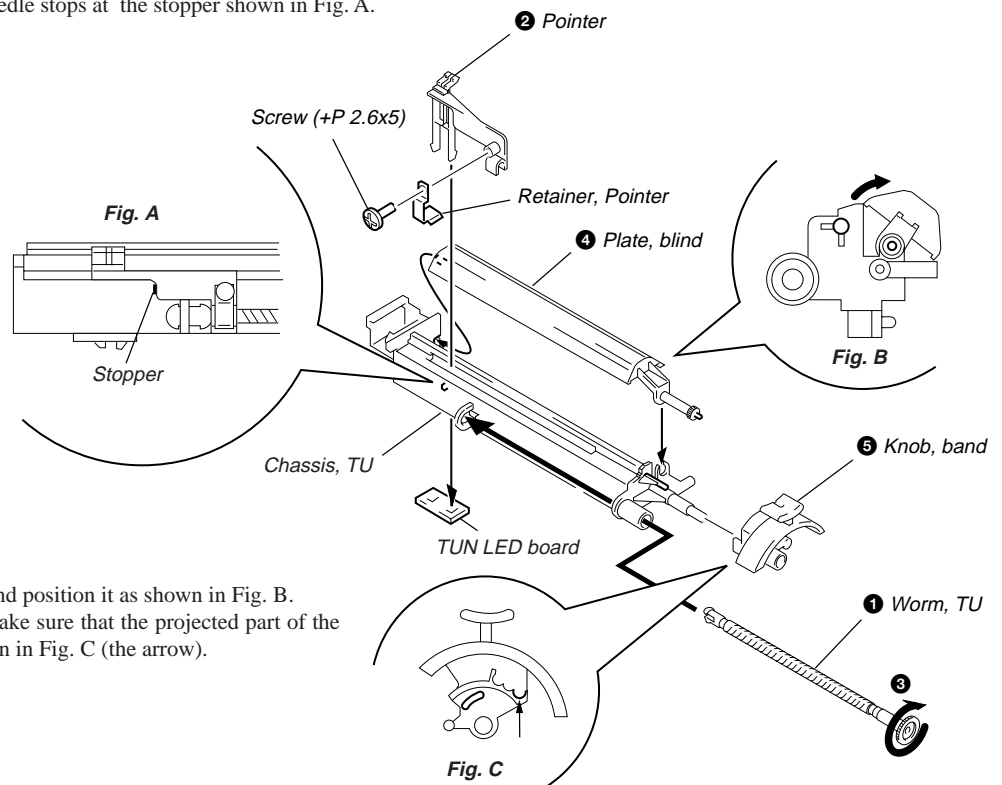
2-5. MECHANISM DECK, DECK CONTROL BOARD, VOLUME BOARD REMOVAL



SECTION 3 DIAL POINTER SETTING

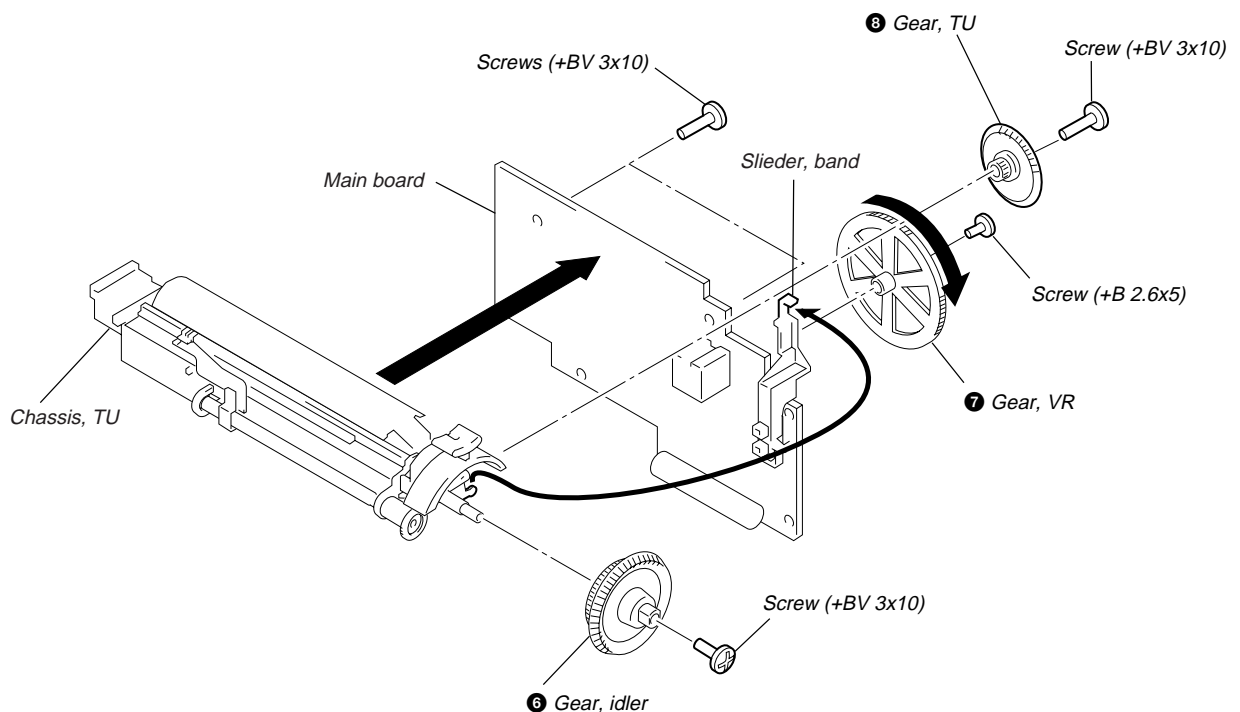
Note : Follow the instaoation procedure in the numerical order given.

- ❶ Attach TU worm to tuner chassis.
- ❷ Attach needle, tighten needle spring using a bolt, then attach TU LED board.
- ❸ Rotate TU worm until needle stops at the stopper shown in Fig. A.



- ❹ Mount PLATE BLIND and position it as shown in Fig. B.
- ❺ Attach the band knob. Make sure that the projected part of the tuner chassis fits as shown in Fig. C (the arrow).

- ❻ Tighten idler gear, combine projected part of band knob and the band slider so that they interlock, then mount to main board.
- ❼ Mount VR gear to main board, then turn in the direction of the arrow until it stops.
- ❽ Fasten the TU gear to the TU chassis with the screw.



SECTION 4 ADJUSTMENTS

4-1. MECHANICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab :

record/playback head	pinch roller
erase head	rubber belts
capstan	
2. Demagnetize the record/playback head with a head demagnetizer. (Do not bring the head demagnetizer close to the erase head.)
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.

Torque Measurement

Torque	Torque Meter	Meter Reading
Forward	CQ-102C	20 – 55 g•cm (0.28 – 0.76 oz•inch)
Forward Back Tension	CQ-102C	2 – 5 g•cm (0.028 – 0.069 oz•inch)
Fast Forward	CQ-201B	more than 50 g•cm (more than 0.7 oz•inch)
Rewind	CQ-201B	more than 50 g•cm (more than 0.7 oz•inch)

Tape Tension Measurement

Torque Meter	Meter Reading
CQ-403A	more than 70g (more than 2.47 oz)

4-2. ELECTRICAL ADJUSTMENTS

TAPE RECORDER SECTION

FUNCTION switch : TAPE (RADIO OFF)
 SLOW PLAYBACK switch : OFF
 EASY LISTENING ADJUSTMENT switch : OFF
 VOLUME : MIN

Standard Output Level

Output terminal	Earphone	Speaker
load impedance	32Ω	3.2Ω
output signal level	0.25V (-10dB)	0.775V (0dB)

Test Tape

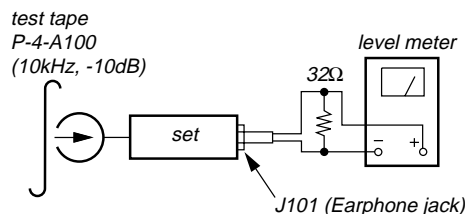
Type	Signal	Used for
WS-48A	3kHz, 0dB	Tape Speed Adjustment

0dB=0.775V

Record/Playback Head Azimuth Adjustment

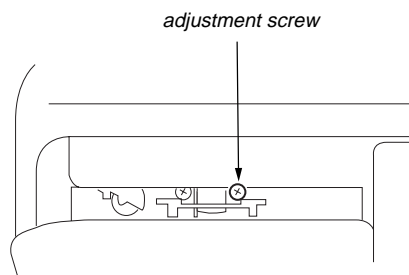
Procedure :

1. Playback Mode



2. Rotate the screw to adjust level meter reading to the maximum.
Note : Adjust to the maximum peak though there may be two or three peaks
3. After the adjustment, lock the adjustment screws with suitable locking compound.

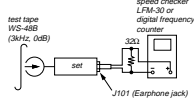
Adjustment Location :



Tape Speed Adjustment

Procedure :

1. Mode - Playback (Normal Speed)



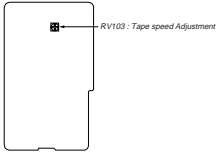
2. Adjust RV103 so becomes the adjustment value below.
3. Set to slow playback switch (S105) ON mode.

Confirm that the become adjustment value as to follows.

Adjustment Value :	Digital frequency counter
Speed checker	2.970 - 3.030Hz
	-1 to +1%

Frequency difference between the beginning and the end of the tape should be within 1.5% (45Hz).

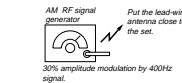
Adjustment Location :
[DECK CONTROL BOARD]
(Component side)



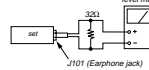
[TUNER SECTION]

AM Section

Function switch : RADIO
Band switch : AM (US model)
MW or LW (AEP, UK model)
MIN

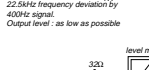
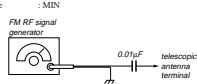


30% amplitude modulation by 400Hz signal.
Output level : as low as possible



FM Section

Function switch : RADIO
Band switch : FM
Volume : MIN



- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

AM IF ALIGNMENT () : AEP, UK only	
Adjust for a maximum reading on level meter.	
T1	455kHz
AM (MW) FREQUENCY COVERAGE ADJUSTMENT	
Adjust for a maximum reading on level meter.	
L3	530kHz
CT1 - 2	1,780kHz (1,690kHz)
AM (MW) TRACKING ADJUSTMENT	
Adjust for a maximum reading on level meter.	
L6 (L6 - 1)	620kHz
CT1 - 1	1,400kHz

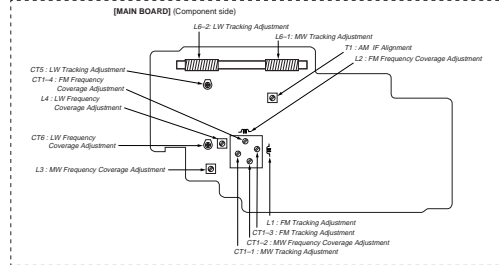
AEP, UK model

LW FREQUENCY COVERAGE ADJUSTMENT	
Adjust for a maximum reading on level meter.	
L4	145kHz
CT6	300kHz
LW TRACKING ADJUSTMENT	
Adjust for a maximum reading on level meter.	
L6 - 2	145kHz
CT5	300kHz

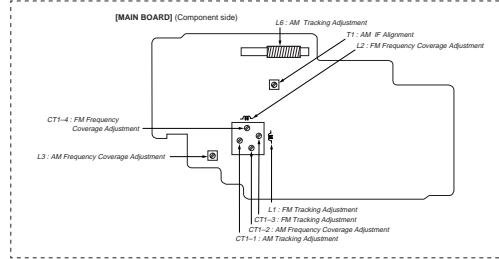
FM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for a maximum reading on level meter.	
L2	86.5MHz (87MHz)
CT1 - 4	109.5MHz (108.30MHz)
FM TRACKING ADJUSTMENT	
Adjust for a maximum reading on level meter.	
L1	86.5MHz (87MHz)
CT1 - 3	109.5MHz (108.30MHz)

Adjustment Location : MAIN board (Component side)

AEP, UK model

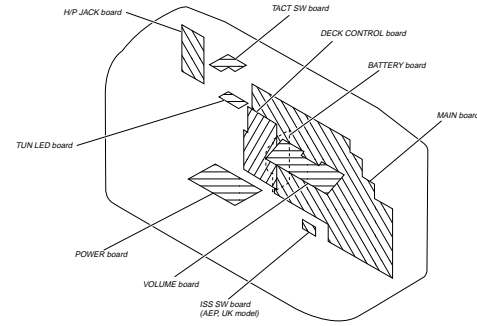


US model



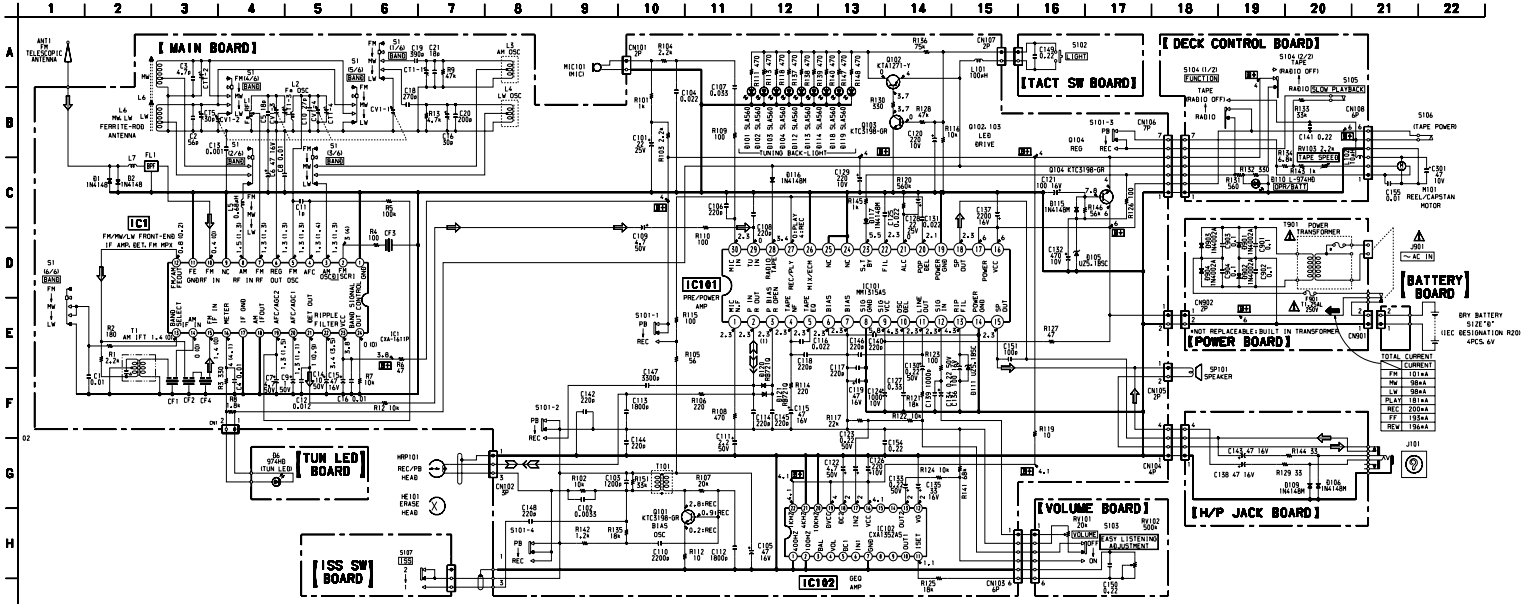
SECTION 5 DIAGRAMS

• CIRCUIT BOARDS LOCATION



CFM-A50

5-1. SCHEMATIC DIAGRAM (AEP/UK MODEL) • Refer to page 26 for IC Block Diagrams.



Note:

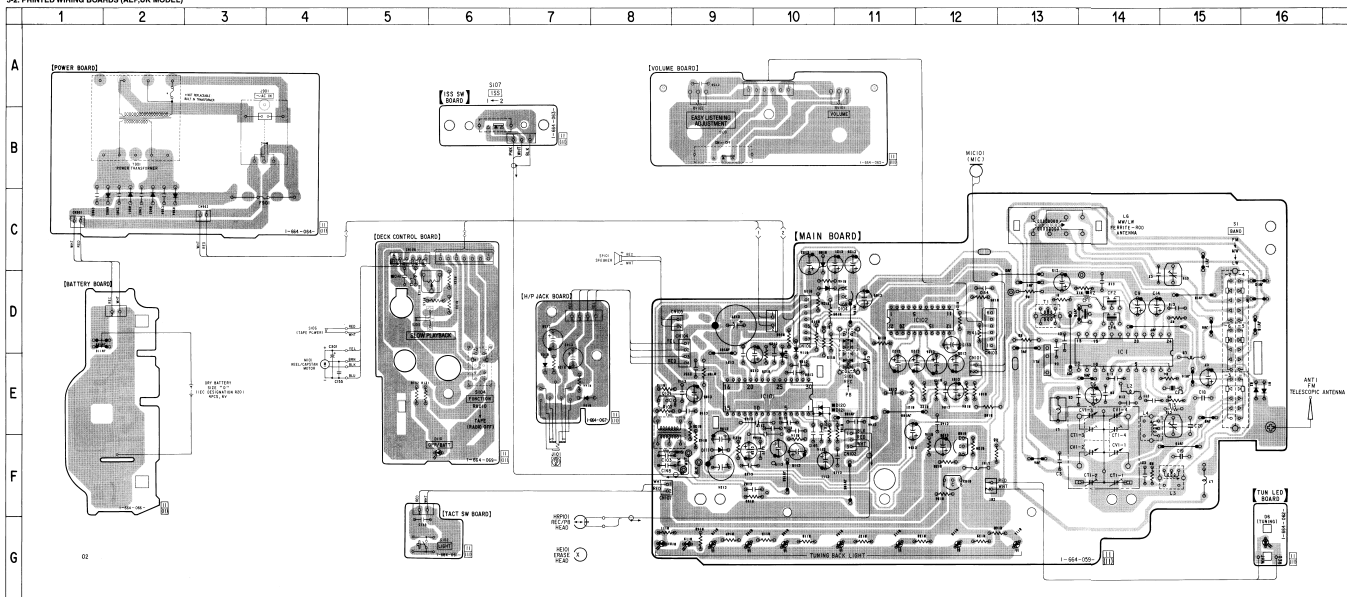
- All capacitors are in μF unless otherwise noted. pF : 100 pF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and $\frac{1}{2}\text{W}$ or less unless otherwise specified.

Note: The components identified by mark Δ , or dotted line with mark Δ , are critical for safety. Replace only with part number specified.

- \square : B+ Line.
- \square : adjustment for repair.
- Power voltage is dc: 6V and fed with regulated dc power supply from external power voltage jack.

- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
- no mark : FM
- () : MW, LW
- Voltages are taken with a VOM (input impedance 10 M Ω). Voltage variations may be noted due to normal production tolerances.
- Signal path
- FM
- PB
- REC

5-2. PRINTED WIRING BOARDS (AEP/UK MODEL)



• SEMICONDUCTOR LOCATION

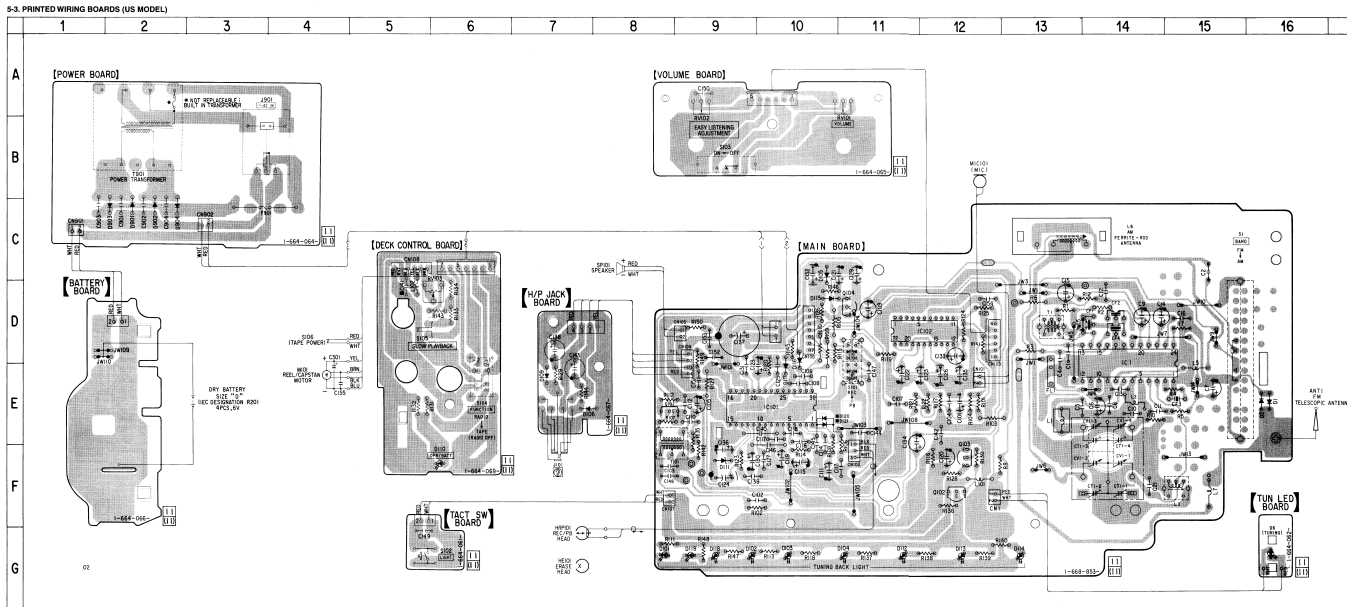
Ref. No.	Location	Ref. No.	Location
D1	E-16	D119	G-9
D2	E-16	D119	G-9
D3	E-16	D119	G-9
D101	G-8	D120	E-10
D102	G-8	D121	E-10
D103	G-10	D801	C-2
D104	G-11	D802	C-2
D105	C-10	D803	C-2
D106	E-7	D804	C-2
D109	E-7		
D110	F-6	IC1	E-14
D111	F-6	IC101	G-13
D112	G-11	IC102	D-11
D113	G-13		
D114	G-13	Q101	E-8
D115	D-10	Q102	F-10
D116	D-10	Q103	F-12
D117	W-10	Q104	D-11

Note:
 • ——— parts extracted from the component side.
 • - - - - - Pattern on the side which is seen.

S-3. PRINTED WIRING BOARDS (US MODEL)

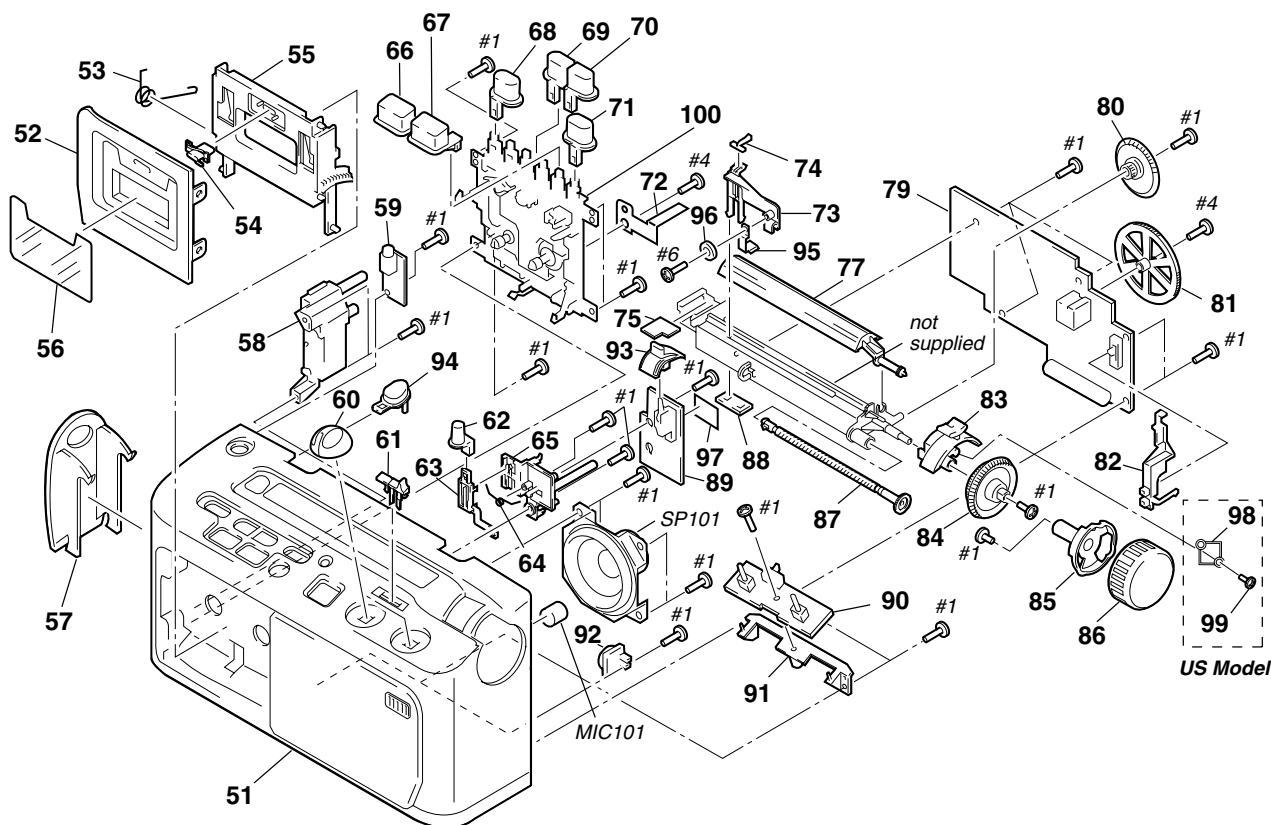
• SEMICONDUCTOR LOCATION

Part No.	Location	Part No.	Location
D1	E-6	D119	G-9
D2	E-16	D119	G-9
D3	D-16	D120	E-10
D101	D-8	D121	E-10
D102	D-8	D81	C-2
D103	G-10	D82	C-2
D104	D-11	D83	C-2
D105	C-10	D84	C-2
D106	E-7	D84	C-2
D109	E-7		
D110	F-6	IC1	E-14
D111	F-8	IC101	E-14
D112	F-8	IC102	D-11
D113	D-13		
D114	D-13	Q101	E-8
D115	D-10	Q102	F-12
D116	D-10	Q103	F-12
D117	H-10	Q104	D-11



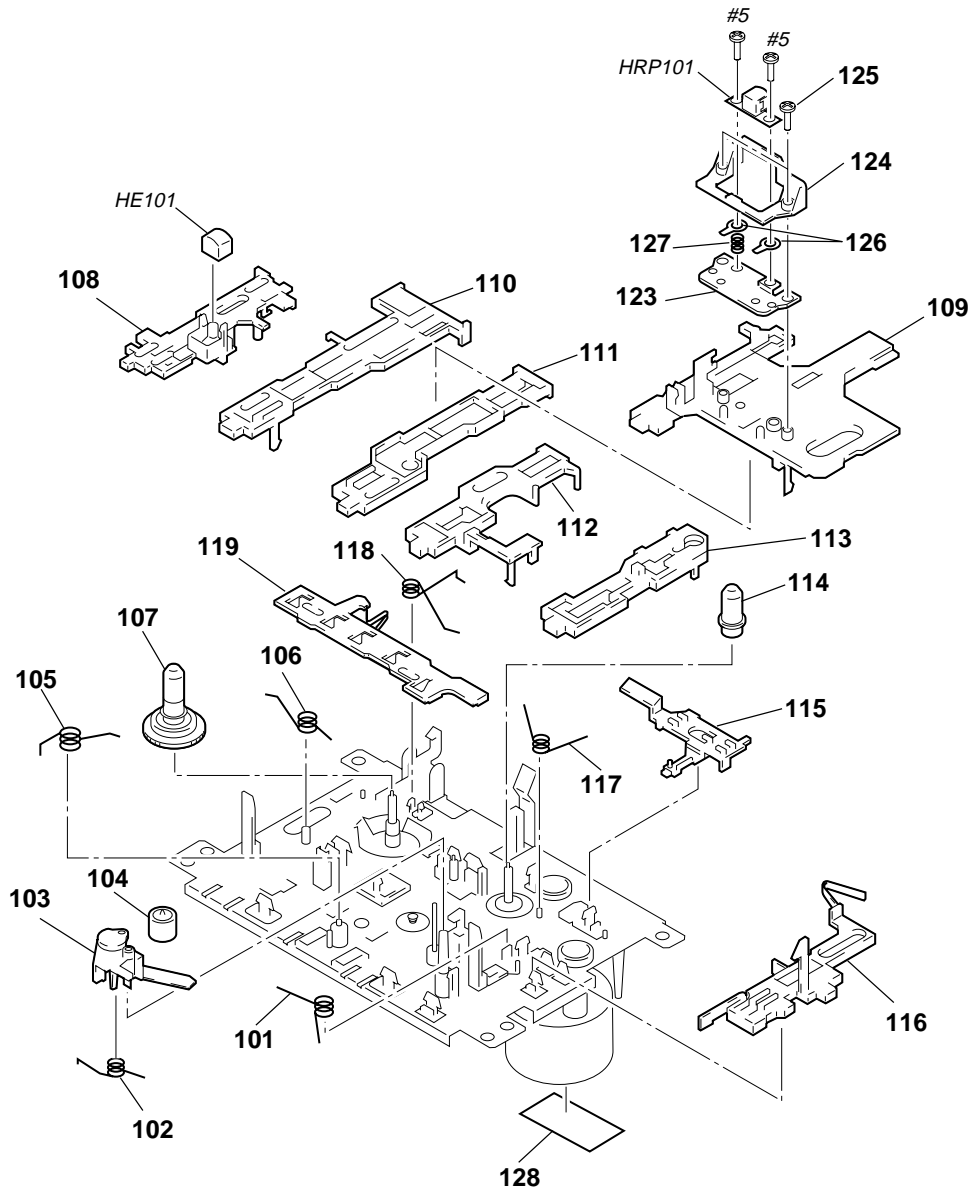
Note:
 • Solid circle: parts extracted from the component side.
 • Dotted circle: Pattern on the side which is seen.

6-2. CABINET (FRONT) SECTION



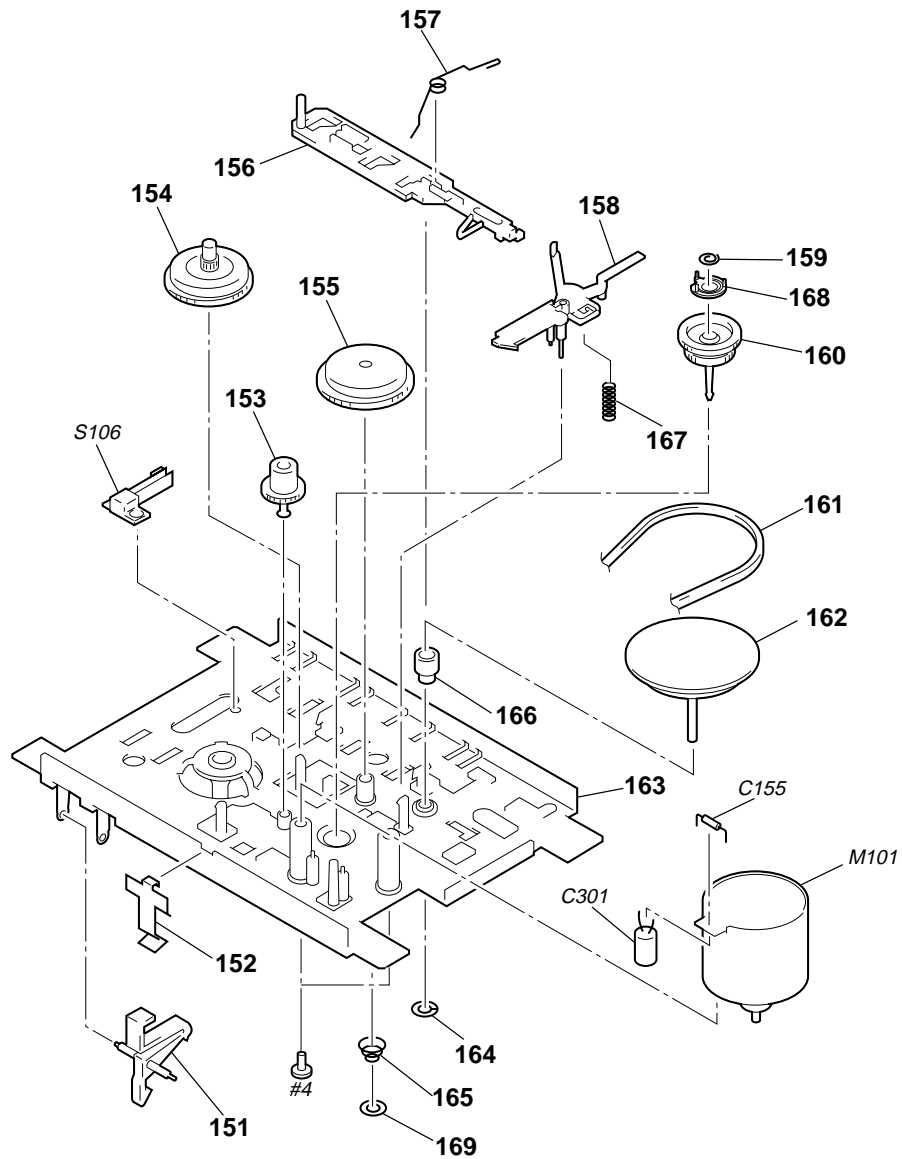
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	X-3373-854-1	CABINET (FRONT) SUB ASSY (WHITE)	(AEP,UK)	77	3-008-140-11	SCALE, DIAL (AEP,UK)	
51	X-3374-233-1	CABINET (FRONT) SUB ASSY (WOOD)	(AEP,UK)	77	3-008-140-21	SCALE, DIAL (US)	
51	X-3374-851-1	CABINET (FRONT) SUB ASSY (WOOD) (US)		* 79	A-3306-588-A	MAIN BOARD, COMPLETE (AEP,UK)	
52	3-008-146-01	DOOR, CASSETTE (WHITE) (AEP,UK)		* 79	A-3321-069-A	MAIN BOARD, COMPLETE (US)	
52	3-008-146-11	DOOR, CASSETTE (WOOD)		80	3-008-141-01	GEAR, TU	
53	3-914-788-01	SPRING (A), CST		81	3-008-143-01	GEAR, VR	
54	3-008-149-01	SENSOR, CASSETTE		82	3-008-139-01	SLIDER, BAND	
55	3-008-147-11	HOLDER, CASSETTE		83	3-008-138-01	KNOB, BAND (AEP,UK)	
56	3-008-148-11	WINDOW, CASSETTE		83	3-025-667-01	KNOB, BAND (US)	
57	3-008-155-31	DOOR, EAR (PH)		84	3-008-142-01	GEAR, IDLER	
58	3-008-156-11	BOX, EAR (PH)		85	3-008-133-01	LIMITTER, TU	
* 59	1-664-067-11	H/P JACK BOARD		86	3-008-132-01	KNOB, TU	
60	3-008-154-01	KNOB (VOL)		87	3-008-137-01	WORM, TU	
61	3-008-151-01	KNOB, TONE (SW)		* 88	1-664-062-11	TUN LED BOARD	
62	3-008-163-01	BUTTON (DELAY)		* 89	1-664-069-11	DECK CONTROL BOARD	
63	3-008-176-01	SLIDER (DELAY)		* 90	1-664-065-11	VOLUME BOARD	
64	3-008-968-01	SPRING (BUTTON)		91	3-008-157-01	HOLDER, VOL	
65	3-008-169-01	HOLDER, MD		92	3-922-112-21	DAMPER	
66	3-008-159-11	BUTTON (STOP)		93	3-008-164-01	BUTTON (RADIO)	
67	3-008-158-11	BUTTON (PLAY)		94	3-008-152-11	BUTTON (LIGHT)	
68	3-008-160-11	BUTTON (PAUSE)		95	3-014-372-01	RETAINER, POINTER	
69	3-008-161-11	BUTTON (FF)		96	4-826-537-11	WASHER, SPECIAL	
70	3-008-162-11	BUTTON (REW)		97	3-831-441-99	CUSHION (B)	
71	3-008-165-11	BUTTON (REC)		98	3-025-668-01	BAND, SPRING (US)	
72	3-008-173-01	SPRING (REC)		99	3-025-669-01	SCREW (US)	
73	3-008-135-01	POINTER		100	A-3250-739-A	MECHANISM DECK (MF-A50-117)	
74	3-008-136-01	POINTER, LED		MIC101	8-814-186-00	MICROPHONE, ELECTRET CONDENSER	
* 75	1-664-061-11	TACT SW BOARD		SP101	1-505-502-11	SPEAKER (9.2cm)	

**6-3. MECHANISM DECK SECTION-1
(MF-A50-117)**



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
101	3-933-010-01	SPRING (S/P), TORSION		* 115	3-933-021-01	SLIDER (FRP)	
102	3-933-025-01	SPRING (P), TORSION		* 116	3-933-006-01	SLIDER (EJECT)	
103	3-933-026-01	LEVER (P)		117	3-934-833-01	SPRING (FRP)	
104	3-933-024-01	ROLLER, PINCH		118	3-934-834-01	SPRING (BT)	
105	3-933-019-01	SPRING (F/R), TORSION		119	3-933-007-01	PLATE, LOCK	
106	3-933-028-01	SPRING (FWD), TORSION		* 123	3-009-076-01	CHASSIS (HEAD)	
107	3-933-016-01	GEAR (S REEL)		124	3-010-625-01	GUIDE, TAPE	
* 108	3-933-023-11	SLIDER (REC)		125	3-342-917-01	SCREW (IT3-C), TAPPING, + B	
109	3-933-022-01	BASE, HEAD		126	3-936-265-01	LUG (T), PLATE	
* 110	3-933-017-11	SLIDER (REW)		127	4-936-201-01	SPRING, COMPRESSION	
* 111	3-933-018-11	SLIDER (FF)		128	3-015-242-01	SHEET, TU	
* 112	3-933-009-11	SLIDER (STOP)		HE101	1-500-131-11	HEAD, MAGNETIC (ERASE)	
* 113	3-933-008-11	SLIDER (PAUSE)		HRP101	1-500-363-11	HEAD, MAGNETIC (RECORD/PLAYBACK)	
114	3-933-004-01	CLAW, REEL					

**6-4. MECHANISM DECK SECTION-2
(MF-A50-117)**



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
151	3-933-029-01	LEVER, ERASING PREVENTION		163	3-932-993-22	CHASSIS, OUTSERT	
152	3-933-182-01	SPRING, CASSETTE		164	3-343-358-01	RING, RETAINING	
153	3-932-995-01	GEAR (MID)		165	3-933-005-01	SPRING (CAM), COMPRESSION	
154	X-3371-667-1	CLUTCH ASSY		166	3-934-336-01	BEARING	
155	3-932-997-01	GEAR (CAM)		167	3-939-383-02	SPRING, COMPRESSION	
* 156	3-932-999-01	SLIDER (SW)		168	3-936-438-01	LEVER (K)	
157	3-932-998-01	SPRING (GROUND), TORSION		169	3-016-349-01	WASHER	
158	3-009-648-01	LEVER (S.OFF)		C301	1-131-381-00	TANTALUM	47uF 10% 10V
159	3-009-650-02	SPRING (K), COMPRESSION		C155	1-162-839-11	CERAMIC	0.01 10% 16V
160	X-3373-572-1	REEL ASSY (N), T		M101	A-3311-283-A	MOTOR ASSY	
161	3-933-020-01	BELT		S106	1-762-679-11	SWITCH, LEAF (TAPE POWER)	
162	X-3371-668-1	CAPSTAN ASSY					

BATTERY

DECK CONTROL

SECTION 7

H/P JACK

ISS SW

MAIN

ELECTRICAL PARTS LIST

NOTE :

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
All resistors are in ohms
METAL : Metal-film resistor
METAL OXIDE :Metal oxide-film resistor
F : nonflammable
- Items marked “ * ” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- SEMICONDUCTORS
In each case, u : μ , for example :
uA..... : μ A..... , uPA..... : μ PA.....
uPB..... : μ PB..... , uPC..... : μ PC.....
uPD..... : μ PD.....
- CAPACITORS
uF : μ F
- COILS
uH : μ H

The components identified by mark Δ or dotted line with mark Δ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
*	1-664-066-11	BATTERY BOARD *****				< DIODE >	
	3-008-967-01	SPRING (-)		D106	8-719-987-63	DIODE 1N4148M	
		*****		D109	8-719-987-63	DIODE 1N4148M	
		*****				< JACK >	
*	1-664-069-11	DECK CONTROL BOARD *****		J101	1-566-891-21	JACK (⊙)	
		< CAPACITOR >				< RESISTOR >	
C141	1-136-169-00	FILM 0.22uF 5% 50V		R129	1-249-399-11	CARBON 33 5% 1/4W	
		< CONNECTOR >		R144	1-249-399-11	CARBON 33 5% 1/4W	
		*****				*****	
* CN108	1-580-158-11	PIN, CONNECTOR (PC BOARD) 6P		*	1-664-063-11	ISS SW BOARD (AEP,UK) *****	
		< DIODE >				< SWITCH >	
D110	8-719-057-90	LED L-974HD (OPR/BATT)		S107	1-570-083-11	SWITCH, SLIDE (ISS) (AEP,UK) *****	
		< COIL >				*****	
L102	1-410-509-11	INDUCTOR 10uH		*	A-3306-588-A	MAIN BOARD, COMPLETE (AEP,UK)	
		< RESISTOR >		*	A-3321-069-A	MAIN BOARD, COMPLETE (US) *****	
R131	1-249-414-11	CARBON 560 5% 1/4W				< CAPACITOR >	
R132	1-249-411-11	CARBON 330 5% 1/4W		C1	1-162-306-11	CERAMIC 0.01uF 20% 16V	
R133	1-249-435-11	CARBON 33K 5% 1/4W		C2	1-162-217-31	CERAMIC 56PF 5% 50V	
R134	1-249-427-11	CARBON 6.8K 5% 1/4W				(AEP,UK)	
R143	1-249-417-11	CARBON 1K 5% 1/4W		C2	1-162-306-11	CERAMIC 0.01uF 20% 16V	
		< VARIABLE RESISTOR >				(US)	
RV103	1-228-991-00	RES, ADJ, METAL 2.2K (TAPE SPEED)		C4	1-162-306-11	CERAMIC 0.01uF 20% 16V	
		< SWITCH >		C5	1-162-205-31	CERAMIC 18PF 5% 50V	
S104	1-570-347-11	SWITCH, LEVER SLIDE (FUNCTION)		C6	1-104-664-11	ELECT 47uF 20% 16V	
S105	1-571-890-11	SWITCH, LEAF (SLOW PLAYBACK)		C7	1-126-963-11	ELECT 4.7uF 20% 50V	
		*****		C8	1-162-306-11	CERAMIC 0.01uF 20% 16V	
		*****		C9	1-124-903-11	ELECT 1uF 20% 50V	
		*****		C10	1-102-960-00	CERAMIC 24PF 5% 50V	
*	1-664-067-11	H/P JACK BOARD *****				(US)	
		< CAPACITOR >		C10	1-102-961-00	CERAMIC 27PF 5% 50V	
		*****				(AEP,UK)	
C138	1-104-664-11	ELECT 47uF 20% 16V		C11	1-162-187-31	CERAMIC 1PF 20% 50V	
C143	1-104-664-11	ELECT 47uF 20% 16V		C12	1-162-840-11	CERAMIC 0.012uF 10% 16V	
		*****				(AEP,UK)	
		*****		C12	1-162-841-11	CERAMIC 0.015uF 10% 16V	
		*****				(US)	

Ref. No.	Part No.	Description			Remark	Ref. No.	Part No.	Description			Remark
C13	1-162-294-31	CERAMIC	0.001uF	10%	50V	C148	1-130-048-00	FILM	220PF	5%	50V (AEP,UK)
C14	1-124-907-11	ELECT	10uF	20%	50V						
C15	1-104-664-11	ELECT	47uF	20%	16V						
C16	1-162-306-11	CERAMIC	0.01uF	20%	16V	C151	1-162-282-31	CERAMIC	100PF	10%	50V
C18	1-104-731-11	FILM	270PF	5%	100V	C152	1-136-495-11	MYLAR	0.1uF	5%	50V (US)
C19	1-104-732-11	FILM	390PF	5%	100V	C153	1-136-495-11	MYLAR	0.1uF	5%	50V (US)
C20	1-104-730-11	FILM	200PF	5%	100V	C154	1-136-169-00	FILM	0.22uF	5%	50V
C21	1-102-953-00	CERAMIC	18PF	5%	50V			< FILTER >			
C21	1-102-998-11	CERAMIC	5PF	0.5PF	50V	CF1	1-767-615-11	FILTER, CERAMIC			
					(US)	CF2	1-760-262-61	FILTER, CERAMIC			
						CF3	1-760-262-61	FILTER, CERAMIC			
						CF4	1-760-262-61	FILTER, CERAMIC			
C101	1-126-233-11	ELECT	22uF	20%	50V			< CONNECTOR >			
C102	1-161-045-00	CERAMIC	0.0033uF	10%	50V						
C103	1-130-472-00	MYLAR	0.0012uF	5%	50V	* CN1	1-580-154-11	PIN, CONNECTOR (PC BOARD) 2P			
C104	1-162-843-11	CERAMIC	0.022uF	10%	16V	* CN101	1-580-154-11	PIN, CONNECTOR (PC BOARD) 2P			
C105	1-104-664-11	ELECT	47uF	20%	16V	* CN102	1-580-155-11	PIN, CONNECTOR (PC BOARD) 3P			
C106	1-162-286-31	CERAMIC	220PF	10%	50V	* CN103	1-580-158-11	PIN, CONNECTOR (PC BOARD) 6P			
C107	1-161-057-00	CERAMIC	0.033uF	10%	50V	CN104	1-506-986-11	PIN, CONNECTOR (PC BOARD) 4P			
C108	1-162-286-31	CERAMIC	220PF	10%	50V						
C109	1-126-963-11	ELECT	4.7uF	20%	50V	* CN105	1-580-154-11	PIN, CONNECTOR (PC BOARD) 2P			
C110	1-130-475-00	MYLAR	0.0022uF	5%	50V	* CN106	1-580-159-11	PIN, CONNECTOR (PC BOARD) 7P			
C111	1-126-961-11	ELECT	2.2uF	20%	50V	* CN107	1-580-154-11	PIN, CONNECTOR (PC BOARD) 2P			
C112	1-130-474-00	MYLAR	0.0018uF	5%	50V			< TRIMMER >			
C113	1-162-830-11	CERAMIC	0.0018uF	10%	16V	CT5	1-141-438-21	CAP, ADJ (AEP,UK)			
C114	1-162-286-31	CERAMIC	220PF	10%	50V	CT6	1-141-438-21	CAP, ADJ (AEP,UK)			
C115	1-104-664-11	ELECT	47uF	20%	16V	CT1-1	1-141-461-11	CAP, VAR (AEP,UK)			
C116	1-130-487-00	MYLAR	0.022uF	5%	50V	CT1-1	1-151-628-11	CAP, VAR (US)			
C117	1-162-286-31	CERAMIC	220PF	10%	50V	CT1-2	1-141-461-11	CAP, VAR (AEP,UK)			
C118	1-162-286-31	CERAMIC	220PF	10%	50V	CT1-2	1-151-628-11	CAP, VAR (US)			
C119	1-104-664-11	ELECT	47uF	20%	16V	CT1-3	1-141-461-11	CAP, VAR (AEP,UK)			
C120	1-104-666-11	ELECT	220uF	20%	10V	CT1-3	1-151-628-11	CAP, VAR (US)			
C121	1-104-665-11	ELECT	100uF	20%	16V	CT1-4	1-141-461-11	CAP, VAR (AEP,UK)			
C122	1-126-963-11	ELECT	4.7uF	20%	50V	CT1-4	1-151-628-11	CAP, VAR (US)			
C123	1-126-957-11	ELECT	0.22uF	20%	50V			< VARIABLE CAPACITOR >			
C124	1-124-473-11	ELECT	1000uF	20%	10V	CV1-1	1-141-461-11	CAP, VAR (AEP,UK)			
C125	1-162-843-11	CERAMIC	0.022uF	10%	16V	CV1-1	1-151-628-11	CAP, VAR (US)			
C126	1-104-666-11	ELECT	220uF	20%	10V	CV1-2	1-141-461-11	CAP, VAR (AEP,UK)			
C127	1-136-502-11	MYLAR	0.33uF	5%	50V	CV1-2	1-151-628-11	CAP, VAR (US)			
C128	1-126-233-11	ELECT	22uF	20%	50V	CV1-3	1-141-461-11	CAP, VAR (AEP,UK)			
C129	1-104-666-11	ELECT	220uF	20%	10V	CV1-3	1-151-628-11	CAP, VAR (US)			
C130	1-126-957-11	ELECT	0.22uF	20%	50V	CV1-4	1-141-461-11	CAP, VAR (AEP,UK)			
C131	1-162-843-11	CERAMIC	0.022uF	10%	16V	CV1-4	1-151-628-11	CAP, VAR (US)			
C132	1-124-472-11	ELECT	470uF	20%	10V			< DIODE >			
C133	1-126-957-11	ELECT	0.22uF	20%	50V	D1	8-719-987-63	DIODE 1N4148M			
C134	1-126-957-11	ELECT	0.22uF	20%	50V	D2	8-719-987-63	DIODE 1N4148M			
C135	1-104-663-11	ELECT	33uF	20%	16V	D101	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)			
C136	1-104-665-11	ELECT	100uF	20%	16V	D102	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)			
C137	1-126-768-11	ELECT	2200uF	20%	16V	D103	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)			
C139	1-162-294-31	CERAMIC	0.001uF	10%	50V	D104	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)			
C140	1-162-286-31	CERAMIC	220PF	10%	50V	D105	8-719-010-39	DIODE UZ-5.1BSC			
C142	1-162-286-31	CERAMIC	220PF	10%	50V	D111	8-719-010-39	DIODE UZ-5.1BSC			
C144	1-162-286-31	CERAMIC	220PF	10%	50V	D112	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)			
C145	1-162-286-31	CERAMIC	220PF	10%	50V	D113	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)			
C146	1-162-286-31	CERAMIC	220PF	10%	50V						
C147	1-162-303-11	CERAMIC	0.0033uF	30%	16V						

MAIN POWER

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
D114	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)		R110	1-247-807-31	CARBON 100	5% 1/4W
D115	8-719-987-63	DIODE 1N4148M		R111	1-249-413-11	CARBON 470	5% 1/4W
D116	8-719-987-63	DIODE 1N4148M		R112	1-249-393-11	CARBON 10	5% 1/4W
D117	8-719-987-63	DIODE 1N4148M		R113	1-249-413-11	CARBON 470	5% 1/4W
D118	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)		R114	1-247-815-91	CARBON 220	5% 1/4W
D119	8-719-064-46	LED SLA-560JT3F (TUNING BACK-LIGHT)		R115	1-247-807-31	CARBON 100	5% 1/4W
D120	8-719-049-26	DIODE RB721Q		R116	1-249-429-11	CARBON 10K	5% 1/4W
D121	8-719-049-26	DIODE RB721Q		R117	1-247-863-91	CARBON 22K	5% 1/4W
		< FILTER >		R118	1-249-413-11	CARBON 470	5% 1/4W
FL1	1-236-022-11	FILTER, BAND PASS		R119	1-249-393-11	CARBON 10	5% 1/4W
		< IC >		R120	1-247-897-11	CARBON 560K	5% 1/4W
IC1	8-752-067-21	IC CXA1611P		R121	1-249-432-11	CARBON 18K	5% 1/4W
IC101	8-759-440-96	IC MM1315AS		R122	1-249-429-11	CARBON 10K	5% 1/4W
IC102	8-752-067-34	IC CXA1352AS		R123	1-247-807-31	CARBON 100	5% 1/4W
		< COIL >		R124	1-249-429-11	CARBON 10K	5% 1/4W
L1	1-422-317-31	COIL, AIR-CORE		R125	1-249-432-11	CARBON 18K	5% 1/4W
L2	1-422-230-11	COIL, AIR-CORE		R126	1-247-807-31	CARBON 100	5% 1/4W
L3	1-406-253-11	COIL (OSC) (AEP,UK)		R127	1-249-401-11	CARBON 47	5% 1/4W
L3	1-406-464-61	COIL (OSC) (US)		R128	1-249-437-11	CARBON 47K	5% 1/4W
L4	1-406-252-11	COIL (OSC) (AEP,UK)		R130	1-249-411-11	CARBON 330	5% 1/4W
L5	1-414-140-11	INDUCTOR 0.68uH		R135	1-249-432-11	CARBON 18K	5% 1/4W
L6	1-402-429-41	ANTENNA, FERRITE-ROD (AM) (US)		R136	1-247-876-11	CARBON 75K	5% 1/4W
L6	1-501-881-11	ANTENNA, FERRITE-ROD (LW/MW) (AEP,UK)		R137	1-249-413-11	CARBON 470	5% 1/4W
L7	1-416-404-11	COIL, AIR-CORE		R138	1-249-413-11	CARBON 470	5% 1/4W
L101	1-410-521-11	INDUCTOR 100uH		R139	1-249-413-11	CARBON 470	5% 1/4W
		< TRANSISTOR >		R140	1-249-413-11	CARBON 470	5% 1/4W
Q101	8-729-036-95	TRANSISTOR KTC3198GR		R141	1-249-439-11	CARBON 68K	5% 1/4W
Q102	8-729-037-13	TRANSISTOR KTA1271Y		R142	1-249-418-11	CARBON 1.2K	5% 1/4W
Q103	8-729-036-95	TRANSISTOR KTC3198GR		R145	1-249-417-11	CARBON 1K	5% 1/4W
Q104	8-729-036-95	TRANSISTOR KTC3198GR		R146	1-249-438-11	CARBON 56K	5% 1/4W
		< RESISTOR >		R147	1-249-413-11	CARBON 470	5% 1/4W
R1	1-249-421-11	CARBON 2.2K	5% 1/4W	R148	1-249-413-11	CARBON 470	5% 1/4W
R2	1-249-408-11	CARBON 180	5% 1/4W	R149	1-249-389-11	CARBON 4.7	5% 1/4W (US)
R3	1-249-411-11	CARBON 330	5% 1/4W	R150	1-249-389-11	CARBON 4.7	5% 1/4W (US)
R4	1-247-807-31	CARBON 100	5% 1/4W	R151	1-249-435-11	CARBON 33K	5% 1/4W
R5	1-249-441-11	CARBON 100K	5% 1/4W			< SWITCH >	
R6	1-249-401-11	CARBON 47	5% 1/4W	S1	1-762-908-11	SWITCH, SLIDE (BAND) (AEP,UK)	
R7	1-249-429-11	CARBON 10K	5% 1/4W	S1	1-771-416-11	SWITCH, SLIDE (BAND) (US)	
R8	1-249-420-11	CARBON 1.8K	5% 1/4W	S101	1-572-325-11	SWITCH, SLIDE (REC/PB)	
R10	1-249-416-11	CARBON 820	5% 1/4W (US)			< TRANSFORMER >	
R12	1-249-429-11	CARBON 10K	5% 1/4W	T1	1-404-355-00	TRANSFORMER, IF (US)	
R13	1-249-425-11	CARBON 4.7K	5% 1/4W (AEP,UK)	T1	1-406-575-11	TRANSFORMER, IF (AEP,UK)	
R101	1-249-417-11	CARBON 1K	5% 1/4W	T101	1-416-041-11	TRANSFORMER, BIAS OSCILLATION	
R102	1-249-429-11	CARBON 10K	5% 1/4W	*****			
R103	1-249-421-11	CARBON 2.2K	5% 1/4W	*	1-664-064-11	POWER BOARD	
R104	1-249-421-11	CARBON 2.2K	5% 1/4W			*****	
R105	1-249-402-11	CARBON 56	5% 1/4W		1-533-233-31	HOLDER, FUSE	
R106	1-247-815-91	CARBON 220	5% 1/4W			< CAPACITOR >	
R107	1-247-862-11	CARBON 20K	5% 1/4W	C901	1-101-005-00	CERAMIC 0.022uF	50V (US)
R108	1-249-413-11	CARBON 470	5% 1/4W	C901	1-164-159-11	CERAMIC 0.1uF	50V (AEP,UK)
R109	1-247-807-31	CARBON 100	5% 1/4W				

POWER

TACT SW

TUN LED

VOLUME

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
C902	1-101-005-00	CERAMIC	0.022uF	50V		< VARIABLE RESISTOR >	
				(US)			
C902	1-164-159-11	CERAMIC	0.1uF	50V	RV101	1-225-388-11	RES, VAR, CARBON 20K (VOLUME)
				(AEP,UK)	RV102	1-225-389-11	RES, VAR, CARBON 500K
C903	1-101-005-00	CERAMIC	0.022uF	50V		(EASY LISTENING ADJUSTMENT)	
				(US)		< SWITCH >	
C903	1-164-159-11	CERAMIC	0.1uF	50V	S103	1-762-909-11	SWITCH, SLIDE (ON/OFF)
				(AEP,UK)		*****	
C904	1-101-005-00	CERAMIC	0.022uF	50V		MISCELLANEOUS	
				(US)		*****	
C904	1-164-159-11	CERAMIC	0.1uF	50V			
				(AEP,UK)			
						< CONNECTOR >	
* CN901	1-580-154-11	PIN, CONNECTOR (PC BOARD) 2P			16	1-533-233-31	HOLDER, FUSE
* CN902	1-580-154-11	PIN, CONNECTOR (PC BOARD) 2P			ANT1	1-501-901-11	ANTENNA, HELICAL
					C155	1-162-839-11	CERAMIC 0.01 10% 16V
					C301	1-131-381-00	TANTALUM 47uF 10% 10V
					△ F901	1-532-285-00	FUSE TIME, LAG (T1.25AL/250V) (AEP,UK)
						< DIODE >	
D901	8-719-200-02	DIODE 10E2			△ F901	1-576-101-11	FUSE, GLASS, TUBE (1.25A/250V) (US)
D902	8-719-200-02	DIODE 10E2			HE101	1-500-131-11	HEAD, MAGNETIC (ERASE)
D903	8-719-200-02	DIODE 10E2			HRP101	1-500-363-11	HEAD, MAGNETIC (RECORD/PLAYBACK)
D904	8-719-200-02	DIODE 10E2			M101	A-3311-283-A	MOTOR ASSY
					MIC101	8-814-186-00	MICROPHONE, ELECTRET CONDENSER
						< FUSE >	
△ F901	1-532-285-00	FUSE TIME, LAG (T1.25AL/250V) (AEP,UK)			S106	1-762-679-11	SWITCH, LEAF (TAPE POWER)
△ F901	1-576-101-11	FUSE, GLASS, TUBE (1.25A/250V) (US)			SP101	1-505-502-11	SPEAKER (9.2cm)
					△ T901	1-431-070-11	TRANSFORMER, POWER (AEP,UK)
					△ T901	1-431-735-11	TRANSFORMER, POWER (US)

						< JACK >	
△ J901	1-526-838-11	INLET, AC 2P (AC IN) (AEP,UK)				ACCESSORIES & PACKING MATERIALS	
△ J901	1-540-009-11	INLET, AC (AC IN) (US)				*****	
						< TRANSFORMER >	
△ T901	1-431-070-11	TRANSFORMER, POWER (AEP,UK)			△	1-690-952-11	CORD, POWER (US)
△ T901	1-431-735-11	TRANSFORMER, POWER (US)			△	1-769-412-11	CORD, POWER (AEP,UK)
					△	1-770-019-11	ADAPTOR, CONVERSION PLUG 3P (UK)
						3-858-994-11	MANUAL, INSTRUCTION
						(ENGLISH,GERMAN) (AEP,UK)	
						3-858-994-21	MANUAL, INSTRUCTION
						(FRENCH,SPANISH) (AEP)	
						3-858-994-31	MANUAL, INSTRUCTION
						(DUTCH,SWEDISH,PORTUGUESE) (AEP)	
						3-858-994-41	MANUAL, INSTRUCTION (ENGLISH) (US)
						8-952-251-90	HEADPHONE MDR-E122 SET

						< CAPACITOR >	
C149	1-136-169-00	FILM	0.22uF	5%	50V		

						< SWITCH >	
S102	1-762-798-11	SWITCH, KEYBOARD (LIGHT)				HARDWARE LIST	

						< DIODE >	
*	1-664-062-11	TUN LED BOARD				#1	7-685-647-79
		*****				#2	7-685-649-79
						#3	7-682-547-04
						#4	7-621-770-87
						#5	7-685-782-01
							SCREW +PTT 2X5 (S)
D6	8-719-064-51	LED SLA-360JT3F (TUNING)				#6	7-685-132-19
							SCREW +P 2.6X5 (S) TYPE2 SLIT

						< CAPACITOR >	
* 1-664-065-11	VOLUME BOARD						

C150	1-136-169-00	FILM	0.22uF	5%	50V		

The components identified by mark △ or dotted line with mark △ are critical for safety.
Replace only with part number specified.

