

TCM-81/83/87

SERVICE MANUAL



Photo : TCM-87

US Model
E Model

TCM-81

Canadian Model

TCM-83

AEP Model

UK Model

TCM-83/87

Model Name Using Similar Mechanism	TCM-11, 31 TCM-13, 33	
Tape Transport Mechanism Type	TCM-81	MT-81-13
	TCM-83/87	MT-83-13

SPECIFICATIONS

Recording system 2-track 1-channel monaural
Frequency response 150–6,000Hz
Speaker Approx. 4cm (1 $\frac{5}{8}$ inches) dia.
Power output (DC) 130mW (at 10% harmonic distortion)
Input (except TCM-83/87)

Microphone input jack (minijack)
sensitivity 0.2mV for 3k Ω or lower
impedance microphone

Output Earphone jack (minijack) for 8–300 Ω
earphone

Power requirements 3V DC, two R6 (size AA) batteries
two NC-AA rechargeable batteries
(1.2V) (supplied to TCM-87), DC IN
3V jack accepts :

- Sony AC-D2M AC power adaptor (not supplied), or the AC power adaptor supplied to TCM-87 for use on :

AEP	220V AC, 50Hz
UK	240V AC, 50Hz

- Sony DCC-70 car battery cord (not supplied) for use with 12V car battery

Battery life

Battery	Recording hours
Sony battery SUM-3 (NS)	Approx. 4
Sony alkaline battery AM3 (N)	Approx. 12
NC-AA Rechargeable battery (TCM-87)	Approx. 4

Dimensions

TCM-81 : Approx.
136.3×94.8×40.5mm (w/h/d)
(5 $\frac{3}{8}$ × 3 $\frac{3}{4}$ × 1 $\frac{5}{8}$ inches)

TCM-83/87 : Approx.
137.2×94.8×40.5mm (w/h/d)
(5 $\frac{1}{2}$ × 3 $\frac{3}{4}$ × 1 $\frac{5}{8}$ inches)

incl. projecting parts and controls

TCM-81 : Approx. 251g (8.9 oz)

TCM-83/87 : Approx. 252g (8.9 oz)

incl. batteries

Weight

Supplied accessories Battery tube (1), AC-power adaptor (1)
(TCM-87 only).

Battery charge adaptor (1) (TCM-87 only), Rechargeable battery (2) (TCM-87 only)

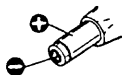
Design and specifications subject to change without notice.

CASSETTE-CORDER
SONY®

Note

This appliance conforms with EEC Directive 87/308/EEC regarding interference suppression.

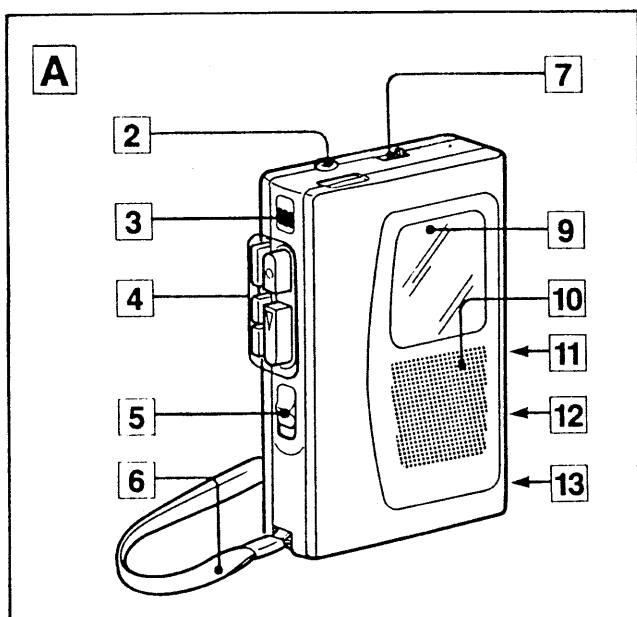
Note: If an AC power adaptor or a car battery cord not manufactured by Sony is used, a fuse must be installed in the battery cord and the polarity of the plug must be as illustrated.



SECTION 1 GENERAL

This section is extracted from instruction manual.

PARTS IDENTIFICATION



- 1** EAR (EARPHONE) jack
- 2** Built-in microphone
- 3** Tape operation buttons
● REC (record)/▼ PLAY/■ STOP/▼ FF/CUE (fast forward/cue)/▲ REW/REVIEW (rewind/review)
- 4** PAUSE switch
- 5** Hand strap (TCM-83/87)
- 6** TAPE COUNTER and reset button (TCM-83/87)
For indexing the tape contents. Before recording push the reset button to set the counter to "000".
- 7** Cassette holder
- 8** Speaker (front)
- 9** MIC PLUG IN POWER (external microphone)
- 10** DC IN 3 V (external power input) jack (right side)
- 11** Battery compartment (right side)

SERVICE NOTE

- **Repairing printed resistor**

Cut both sides of the resistor and solder the carbon resistor having same value in place of printed one of the conductor side.

1/32W carbon resistor is supplied for the replacing part of the printed resistor.

- **Notes on chip component replacement**

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

SECTION 2 MECHANICAL ADJUSTMENTS

PRECAUTION

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

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

Power Supply Voltage : 3V dc

Torque Measurement

Torque	Meter Reading	Torque Meter
Forward	More than 25 g·cm (More than 0.34 oz·inch)	CQ-102C
Fast Forward and Rewind	More than 60 g·cm (More than 0.83 oz·inch)	CQ-201B
Back Tension	1.5–4 g·cm (0.021–0.056 oz·inch)	CQ-102C

Tape Tension Measurement

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

SECTION 3 ELECTRICAL ADJUSTMENTS

Test tape

Type	Signal	Used for
WS-48A	3kHz, 0dB	tape speed adjustment

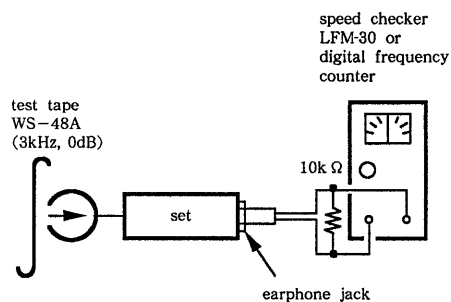
Tape Speed Adjustment

Setting :

VOL control : mechanical mid

Procedure :

Mode : playback

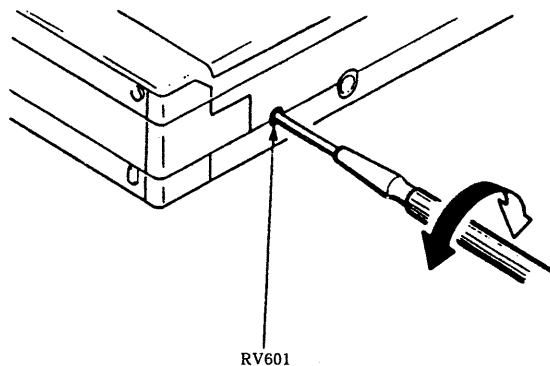


Specification :

Speed checker	Digital frequency counter
–0.5 to +1.5%	2,985–3,045 Hz

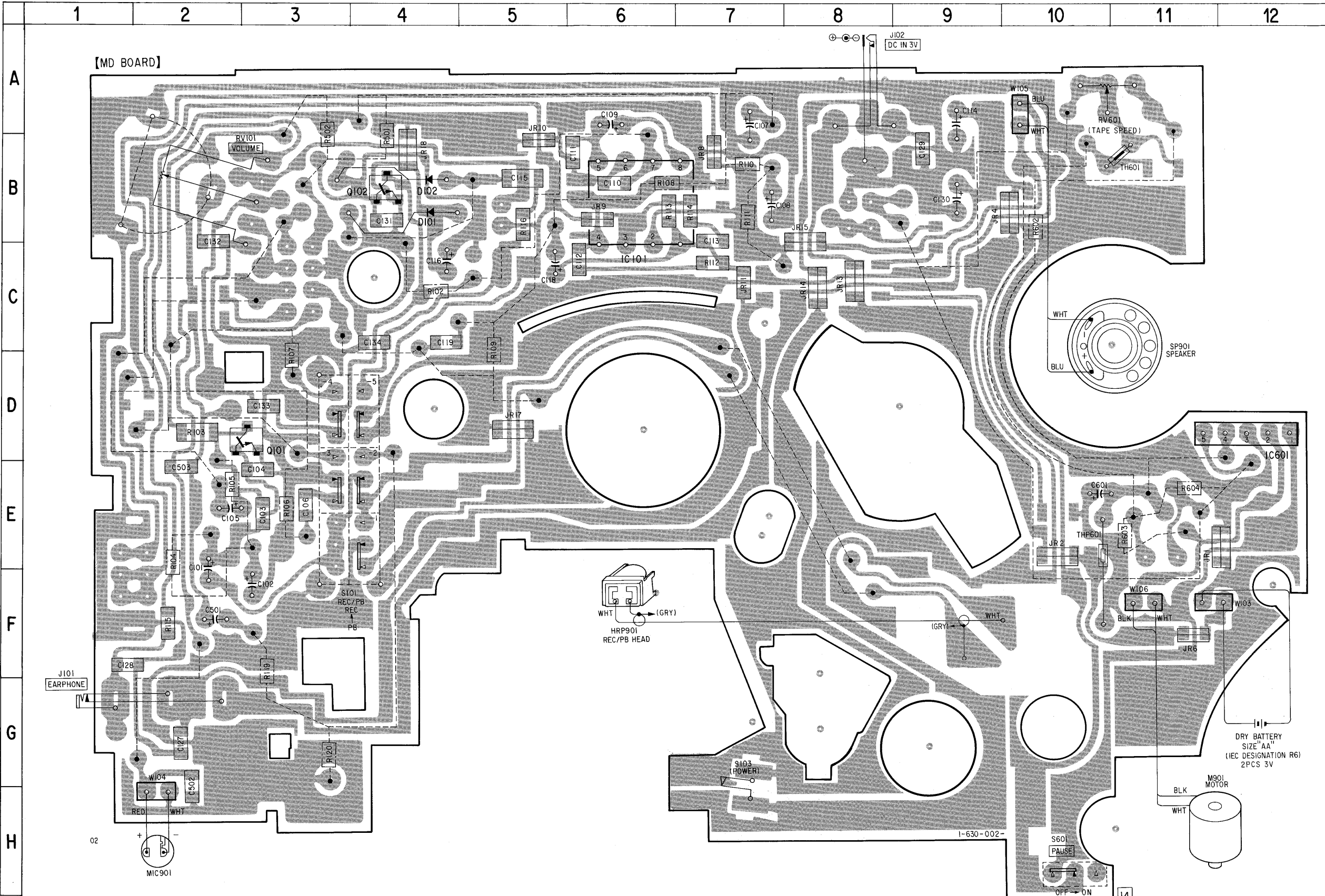
Frequency difference between the beginning and the end of the tape should be within 1% (30Hz).

Adjustment Location :



SECTION 4
DIAGRAMS

4-1. PRINTED WIRING BOARD



• SEMICONDUCTOR
LOCATION

Ref. No.	Location
IC101	B-6
IC601	D-12
Q101	D-3
Q102	B-4
D101	B-4
D102	B-4

• SEMICONDUCTOR
LEAD LAYOUTS

LA5523



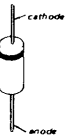
NJM2073D



2SC1623



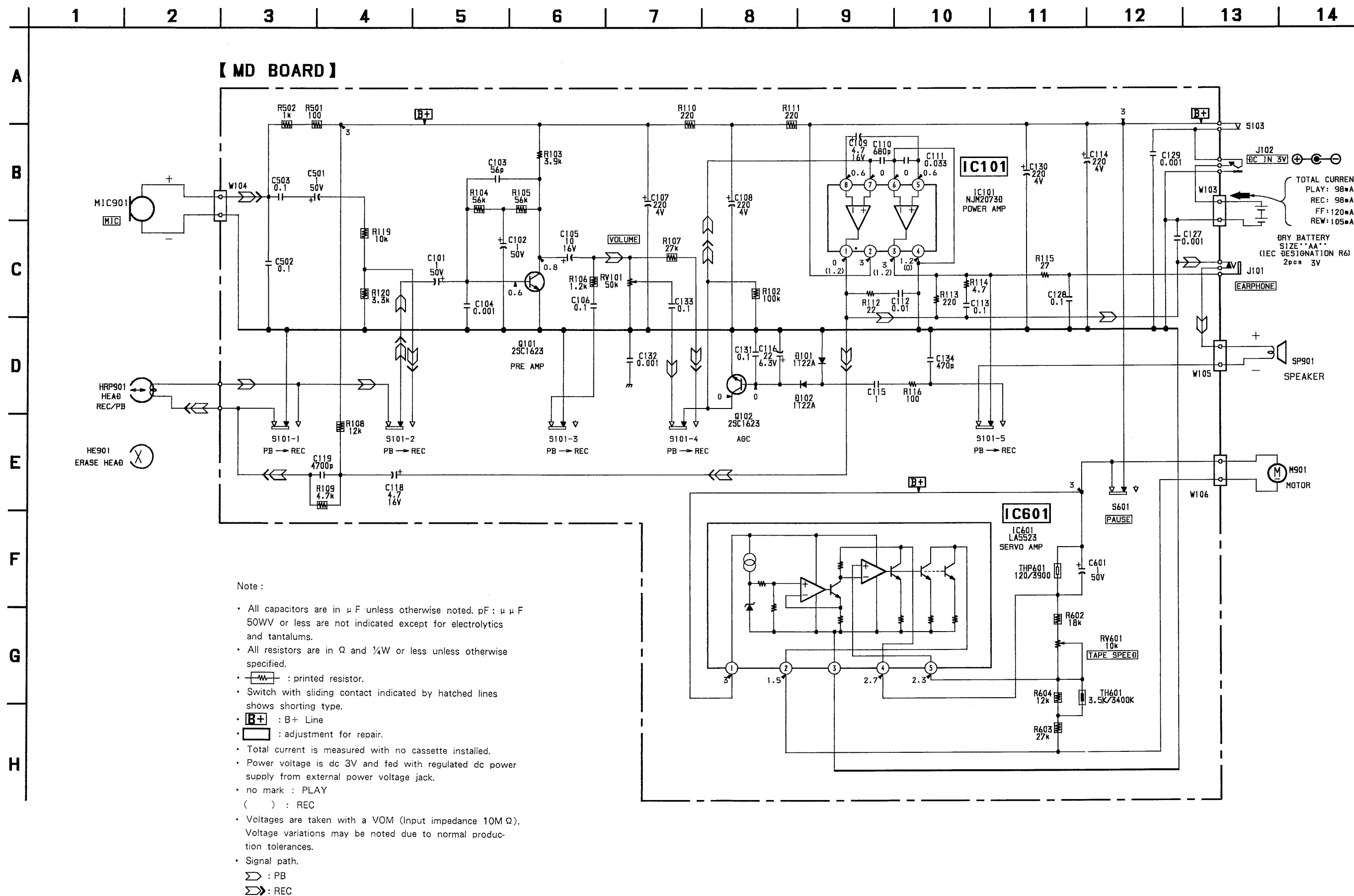
1T22A



Note :

- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : parts mounted on the conductor side.
- : Through hole.
- : Chip components extracted from the side which is seen.
- : Printed resistor.
- : Pattern on the side which is seen.
- : Pattern on the rear side.

4-2. SCHEMATIC DIAGRAM



SECTION 5 EXPLODED VIEWS

NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Color indication of Appearance Parts
Example:
KNOB, BALANCE (WHITE)....(RED)
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

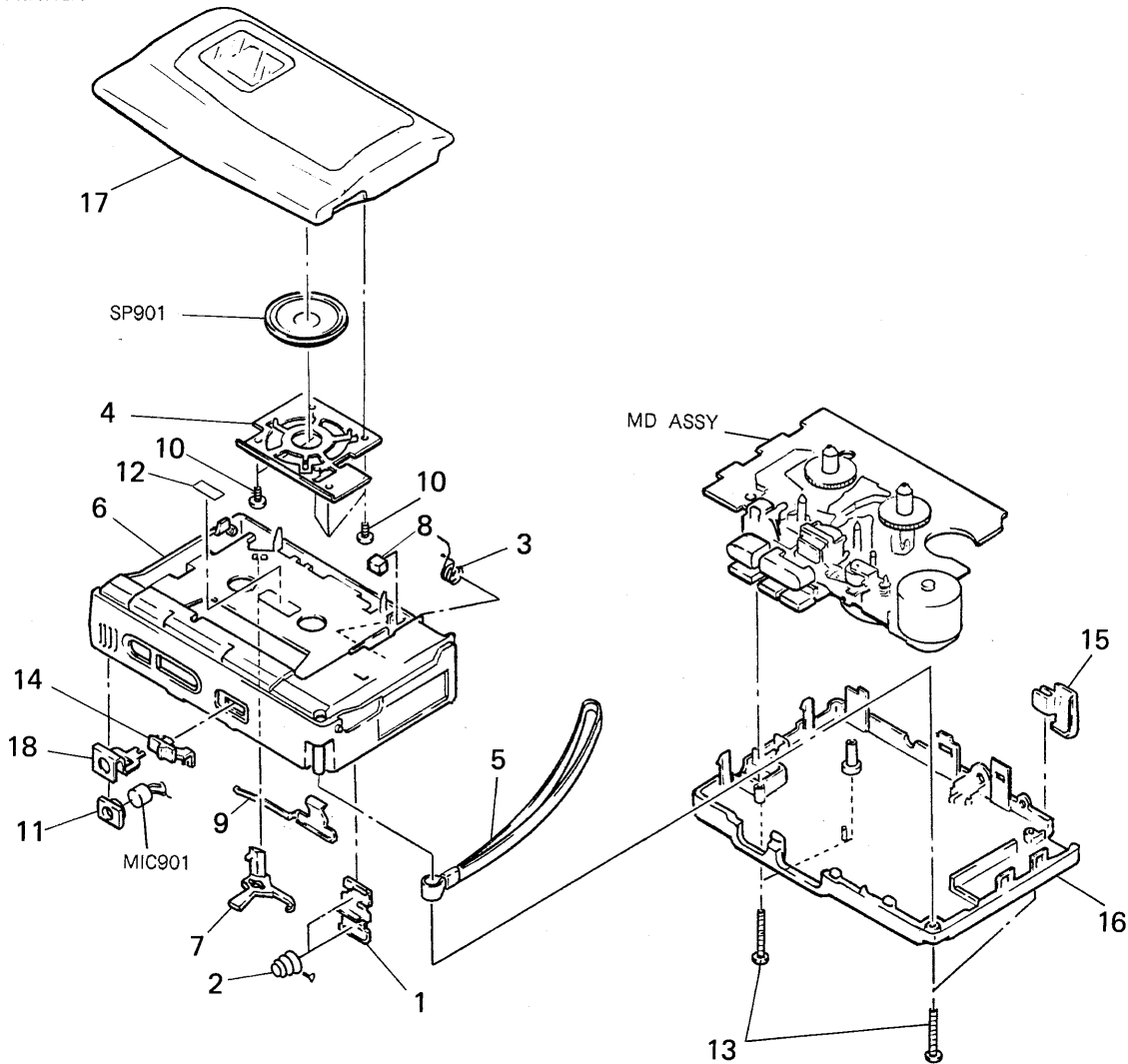
(81) : TCM-81

(83) : TCM-83

(87) : TCM-87

↑ ↑
 Parts color Cabinet's color

5-1. CABINET

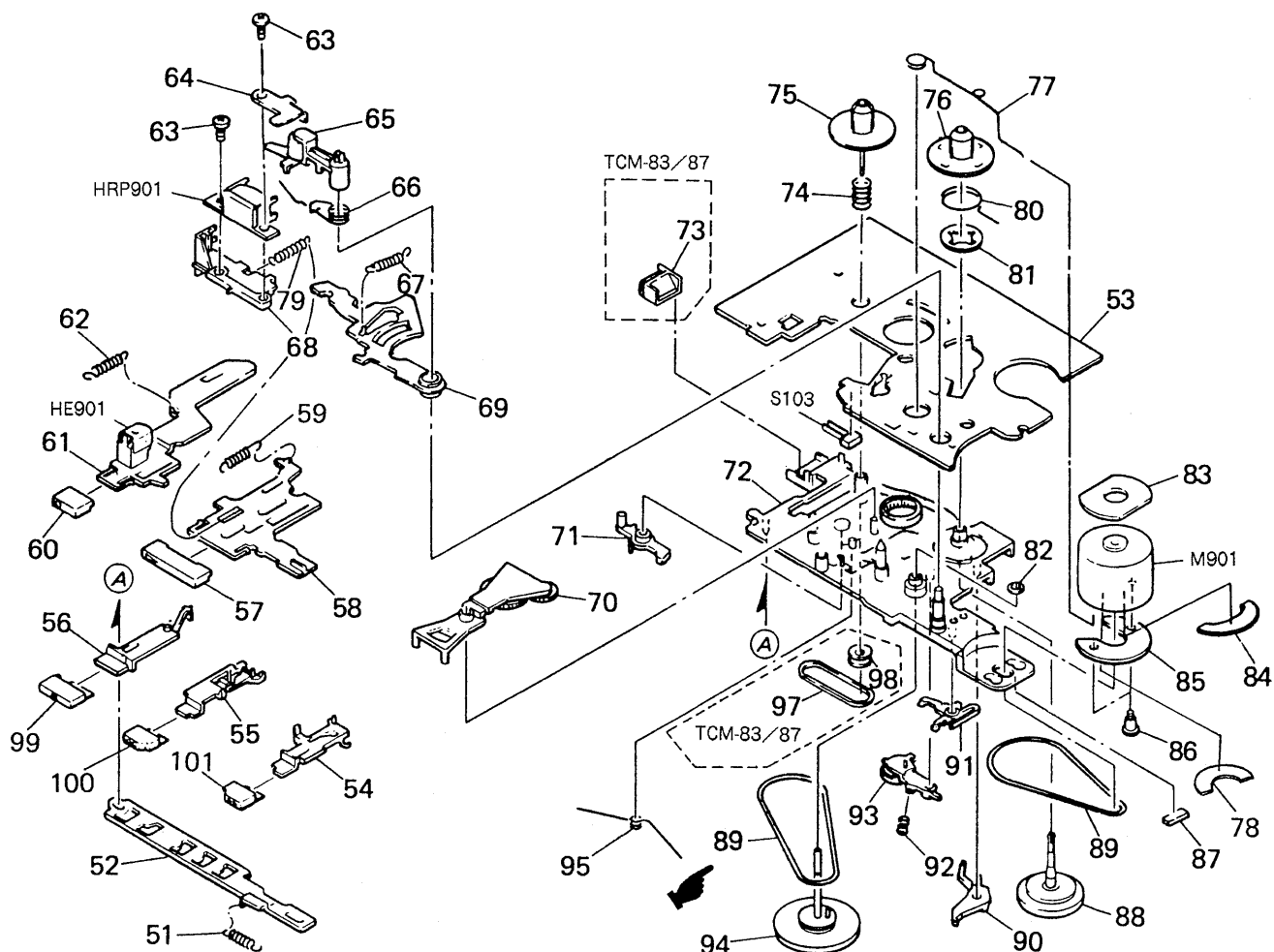


Ref.No.	Part No.	Description	Remark
1	3-352-440-01	HOLDER (BATTERY TERMINAL)	
2	3-352-439-01	SPRING	
3	3-352-433-01	SPRING	
4	* 3-367-091-01	RETAINER, SP	
5	3-320-982-01	STRAP, HAND (83/87)	
6	3-367-100-01	CABINET (FRONT) (81:US)	
6	3-367-100-21	CABINET (FRONT) (83/87)	
6	3-367-100-61	CABINET (FRONT) (81:E)	
7	3-320-976-01	CLAW, ERASE SAFETY	
8	9-911-841-XX	CUSHION (B)	
9	3-320-977-01	SPRING	
10	3-318-382-21	SCREW (1.7X3), TAPPING	
11	3-320-975-01	CUSHION (A), MICROPHONE	

Ref.No.	Part No.	Description	Remark
12	3-578-101-11	PLATE, ORNAMENTAL	
13	3-335-640-51	SCREW (M2X16)	
14	3-367-092-01	BUTTON, PAUSE	
15	X-3363-099-1	LID ASSY, BATTERY CASE	
16	3-367-102-01	CABINET (REAR)	
17	X-3363-092-1	LID ASSY, CASSETTE (87)	
17	X-3363-096-1	LID ASSY, CASSETTE (83)	
17	X-3363-098-1	LID ASSY, CASSETTE (81)	
18	* 3-352-434-01	HOLDER (A), MIC	
MIC901	1-542-080-11	MICROPHONE, BUILT-IN	
SP901	1-544-497-11	SPEAKER	

REVISED

5-2. MD MT-81-13 : TCM-81
MT-82-13 : TCM-83/87



Ref. No.	Part No.	Description	Remark
51	3-342-031-01	SPRING, TENSION	
52	* 3-342-040-01	PLATE, LOCK	
53	A-3015-737-A	MD BOARD, COMPLETE	
54	3-320-993-01	LEVER, FF	
55	3-320-992-01	LEVER, REW	
56	3-320-994-01	LEVER, STOP	
57	3-367-095-01	BUTTON, PLAY	
58	3-352-449-01	LEVER, PLAY	
59	3-342-029-01	SPRING, TENSION (POWER TENSION)	
60	3-367-097-01	BUTTON, REC	
61	3-320-995-01	LEVER, REC	
62	3-342-032-01	SPRING, TENSION	
63	3-352-473-01	SCREW (2), TAPPING	
64	* 3-370-052-01	RETAINER, LEVER	
65	X-3320-921-1	PINCH ROLLER ASSY	
66	3-352-470-01	SPRING (P), TORSION	
67	3-342-033-01	SPRING, TENSION	
68	* 3-352-447-01	BASE (A), HEAD	
69	3-352-448-01	BASE (B), HEAD	
70	X-3320-920-1	ARM ASSY, FR	
71	3-342-010-01	ARM, CR	
72	X-3352-402-1	CHASSIS ASSY, MECHANICAL	
73	1-548-582-11	COUNTER, TAPE (SMALL TYPE) (83/87)	
74	3-342-030-01	SPRING, COMPRESSION	
75	3-342-013-01	GEAR, S REEL	
76	3-342-014-01	GEAR, T REEL	
77	3-352-453-11	SPRING (GROUND)	
78	3-352-476-01	SHEET (MOTOR)	

Ref. No.	Part No.	Description	Remark
79	3-352-451-01	SPRING, TENSION (POWER TENSION)	
80	3-342-024-01	SPRING	
81	3-342-055-01	WASHER, T REEL	
82	3-321-483-11	RING, RETAINING	
83	3-342-050-11	RUBBER (A), VIBRATION PROOF	
84	3-342-075-01	SPACER, MOTOR	
85	3-318-254-11	CUSHION, MOTOR	
86	3-342-076-01	SCREW (M2), PRECISION STEP	
87	9-911-839-XX	CUSHION (A)	
88	X-3320-918-1	PLATE ASSY, REEL, TAKE-UP	
89	3-480-136-00	BELT	
90	3-342-011-01	LEVER (A), SHUT-OFF	
91	3-342-012-01	LEVER (B), SHUT-OFF	
92	3-342-034-01	SPRING, COMPRESSION	
93	X-3320-919-1	ARM ASSY, IDLER	
94	X-3320-916-1	FLYWHEEL (PA) ASSY	
95	3-342-035-01	SPRING (FR)	
96	3-321-441-11	CUSHION (B)	
97	3-554-103-00	BELT, DRIVING (83/87)	
98	3-320-999-11	PULLEY (COUNTER) (83/87)	
99	3-367-096-01	BUTTON, STOP	
100	3-367-094-01	BUTTON, REW	
101	3-367-093-01	BUTTON, FF	
HE901	8-825-771-21	HEAD, ERASE EBF5-36C	
HRP901	1-543-607-21	HEAD, MAGNETIC (REC/PB)	
M901	X-3320-925-1	MOTOR ASSY	
S103	1-570-549-21	SWITCH, LEAF	

SECTION 6

ELECTRICAL PARTS LIST

MD

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.

Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

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

(81): TCM-81

(83): TCM-83

(87): TCM-87

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
	* A-3015-737-A	MD BOARD, COMPLETE *****				< DIODE >	
		< CAPACITOR >		D101	8-719-022-21	DIODE 1T22A	
				D102	8-719-022-21	DIODE 1T22A	
						< IC >	
C101	1-126-160-11	ELECT 1uF 20% 50V		IC101	8-759-701-54	IC NJM2073D	
C102	1-126-160-11	ELECT 1uF 20% 50V		IC601	8-759-801-12	IC LA5523	
C103	1-163-111-00	CERAMIC CHIP 56PF 5% 50V				< JACK >	
C104	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V		J101	1-566-740-11	JACK (EAR)	
C105	1-126-157-11	ELECT 10uF 20% 16V		J102	1-568-228-11	JACK, EXTERNAL POWER (DC IN 3V)	
						< JUMPER >	
C106	1-163-038-00	CERAMIC CHIP 0.1uF 25V		JR1	1-216-296-00	METAL CHIP 0 5% 1/8W	
C107	1-124-434-00	ELECT 220uF 20% 4V		JR2	1-216-296-00	METAL CHIP 0 5% 1/8W	
C108	1-124-434-00	ELECT 220uF 20% 4V		JR4	1-216-296-00	METAL CHIP 0 5% 1/8W	
C109	1-126-163-11	ELECT 4.7uF 20% 50V		JR6	1-216-295-00	METAL CHIP 0 5% 1/10W	
C110	1-163-007-11	CERAMIC CHIP 680PF 10% 50V		JR8	1-216-295-00	METAL CHIP 0 5% 1/10W	
				JR9	1-216-295-00	METAL CHIP 0 5% 1/10W	
C111	1-163-034-00	CERAMIC CHIP 0.033uF 50V		JR10	1-216-295-00	METAL CHIP 0 5% 1/10W	
C112	1-164-232-11	CERAMIC CHIP 0.01uF 50V		JR11	1-216-295-00	METAL CHIP 0 5% 1/10W	
C113	1-163-038-00	CERAMIC CHIP 0.1uF 25V		JR13	1-216-296-00	METAL CHIP 0 5% 1/8W	
C114	1-124-434-00	ELECT 220uF 20% 4V		JR14	1-216-296-00	METAL CHIP 0 5% 1/8W	
C115	1-162-611-00	CERAMIC CHIP 1uF 25V		JR15	1-216-296-00	METAL CHIP 0 5% 1/8W	
				JR17	1-216-296-00	METAL CHIP 0 5% 1/8W	
C116	1-126-153-11	ELECT 22uF 20% 6.3V		JR18	1-216-296-00	METAL CHIP 0 5% 1/8W	
C118	1-126-163-11	ELECT 4.7uF 20% 50V				< TRANSISTOR >	
C119	1-163-017-00	CERAMIC CHIP 0.0047uF 5% 50V		Q101	8-729-100-66	TRANSISTOR 2SC1623-L6	
C127	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V		Q102	8-729-100-66	TRANSISTOR 2SC1623-L6	
C128	1-163-038-00	CERAMIC CHIP 0.1uF 25V					
C129	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V					
C130	1-124-434-00	ELECT 220uF 20% 4V					
C131	1-163-038-00	CERAMIC CHIP 0.1uF 25V					
C132	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V					
C133	1-163-038-00	CERAMIC CHIP 0.1uF 25V					
C134	1-163-005-11	CERAMIC CHIP 470PF 10% 50V					
C501	1-126-301-11	ELECT 1uF 20% 50V					
C502	1-163-038-00	CERAMIC CHIP 0.1uF 25V					
C503	1-163-038-00	CERAMIC CHIP 0.1uF 25V					
C601	1-126-301-11	ELECT 1uF 20% 50V					

MD

Ref. No.	Part No.	Description	Remark		
< RESISTOR >					
R102	1-249-441-11	CARBON	100K	5%	1/4W
R103	1-216-212-00	METAL CHIP	3.9K	5%	1/8W
R104	1-249-438-11	CARBON	56K	5%	1/4W
R105	1-249-438-11	CARBON	56K	5%	1/4W
R106	1-249-418-11	CARBON	1.2K	5%	1/4W
R107	1-249-434-11	CARBON	27K	5%	1/4W
R108	1-249-430-11	CARBON	12K	5%	1/4W
R109	1-249-425-11	CARBON	4.7K	5%	1/4W
R110	1-249-409-11	CARBON	220	5%	1/4W
R111	1-249-409-11	CARBON	220	5%	1/4W
R112	1-216-009-00	METAL CHIP	22	5%	1/10W
R113	1-216-033-00	METAL CHIP	220	5%	1/10W
R114	1-216-308-00	METAL CHIP	4.7	5%	1/10W
R115	1-216-011-00	METAL CHIP	27	5%	1/10W
R116	1-216-025-00	METAL CHIP	100	5%	1/10W
R119	1-249-429-11	CARBON	10K	5%	1/4W
R120	1-249-423-11	CARBON	3.3K	5%	1/4W
R501	1-249-405-11	CARBON	100	5%	1/4W
R502	1-249-417-11	CARBON	1K	5%	1/4W
R602	1-249-432-11	CARBON	18K	5%	1/4W
R603	1-249-434-11	CARBON	27K	5%	1/4W
R604	1-249-430-11	CARBON	12K	5%	1/4W
< VARIABLE RESISTOR >					
RV101	1-237-771-11	RES. VAR. CARBON 50K (VOLUME)			
RV601	1-237-278-11	RES. ADJ. CARBON 10K (TAPE SPEED)			
< SWITCH >					
S101	1-571-151-11	SWITCH, SLIDE (REC/PB)			
S103	1-570-549-21	SWITCH, LEAF (POWER)			
S601	1-570-675-11	SWITCH, SLIDE (PAUSE)			
< THERMISTOR >					
TH601	1-808-980-11	THERMISTOR			
THP601	1-808-272-11	THERMISTOR, POSITIVE (120)			
< CONNECTOR >					
W103	* 1-506-984-11	PIN, CONNECTOR (PC BOARD) 2P			
W104	* 1-506-984-11	PIN, CONNECTOR (PC BOARD) 2P			
W105	* 1-506-984-11	PIN, CONNECTOR (PC BOARD) 2P			
W106	* 1-506-984-11	PIN, CONNECTOR (PC BOARD) 2P			

Ref. No.	Part No.	Description	Remark
MISCELLANEOUS *****			
73	1-548-582-11	COUNTER, TAPE (SMALL TYPE) (83/87)	
HE901	8-825-771-21	HEAD, ERASE EBF5-36C	
HRP901	1-543-607-21	HEAD, MAGNETIC (REC/PB)	
M901	X-3320-925-1	MOTOR ASSY	
MIC901	1-542-080-11	MICROPHONE, BUILT-IN	
SP901	1-544-497-11	SPEAKER	

ACCESSORY & PACKING MATERIAL *****			
△	1-465-722-11	ADAPTOR, AC (AC-330) (87:UK)	
△	1-465-723-11	ADAPTOR, AC (AC-330) (87:AEP)	
	1-528-179-11	BATTERY, STORAGE, NI-CD (87)	
	1-528-358-11	ADAPTOR, CHARGE (BCA-33) (87)	
	3-351-508-01	TUBE, PROTECTION	
*	3-367-005-01	CUSHION (UPPER) (81:US)	
*	3-367-006-01	CUSHION (LOWER) (81:US)	
*	3-367-007-01	CARD BOARD (81:US)	
*	3-367-010-01	CUSHION (81:E/83/87)	
*	3-367-021-01	CASE, ACCESSORY (87)	
*	3-367-011-01	INDIVIDUAL CARTON (81:E)	
*	3-367-019-01	INDIVIDUAL CARTON (83)	
*	3-367-022-01	INDIVIDUAL CARTON (87)	
	3-701-623-00	BAG, POLYETHYLENE (81:E/83/87)	
	3-704-365-01	BAG, PROTECTION (87:AEP)	
	3-753-316-11	MANUAL, INSTRUCTION (ENGLISH, FRENCH, SPANISH, PORTUGUESE) (83/87)	
	3-753-316-21	MANUAL, INSTRUCTION (ENGLISH) (81:US)	
	3-753-316-41	MANUAL, INSTRUCTION (GERMAN, DUTCH, SWEDISH, ITALIAN) (83:AEP/87:AEP)	
	3-753-316-51	MANUAL, INSTRUCTION (ENGLISH, FRENCH, SPANISH, POLAND) (81:E)	

Note:

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

Note:

Les composants identifiés par une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.