WM-EX20

SERVICE MANUAL

Ver 1.0 1999. 08

US Model
Canadian Model
AEP Model
UK Model
E Model
Australian Model
Tourist Model

Model Name Using Similar Mechanism	NEW
Tape Transport Mechanism Type	MT-WMEX20-162

SPECIFICATIONS

Tape section

Frequency response (Dolby NR off): Playback: 30 – 18,000 Hz
Output: Headphones (REMOTE 🎧 jack)
Load impedance 8 – 300 Ω

General

Power requirements: 1.5 V
One rechargeable battery or one R6 (size AA) battery
Dimensions (w/h/d): Approx. 78.7 × 108.6 × 18.7 mm ($3^1/_8 \times 4^3/_8 \times {}^3/_4$ inches), incl. projecting parts and controls
Mass: Approx. 180 g (6.4 oz)
Approx. 240 g (8.5 oz) (incl. rechargeable battery and a cassette)

Supplied accessories:
Battery case (1)
Stereo earphones with remote control (1)
Battery charger (1)
US, CND model : BC-7DC
AEP, FR model : BC-7DY
E, JE model : BC-7HT
UK model : BC-7S
AUS model : BC-7SG
KR model : BC-9HR
Rechargeable battery (1)
US, CND, AEP, UK, FR, AUS model : NC-6WM, 1.2V, 600mAh, Ni-Cd
KR, E, JE model: NH-14WM, 1.2V, 1400mAh, Ni-MH
Rechargeable battery carrying case (1)
Carrying pouch (1)
E, JE, model:
AC plug adaptor (1)

Design and specifications are subject to change without notice

- Abbreviation
  CND : Canadian model
  FR : French model
  AUS : Australian model
  KR : Korea model
  JE : Tourist model

CASSETTE PLAYER

MICROFILM

SONY®

SECTION 1
GENERAL

This section is extracted from instruction manual.

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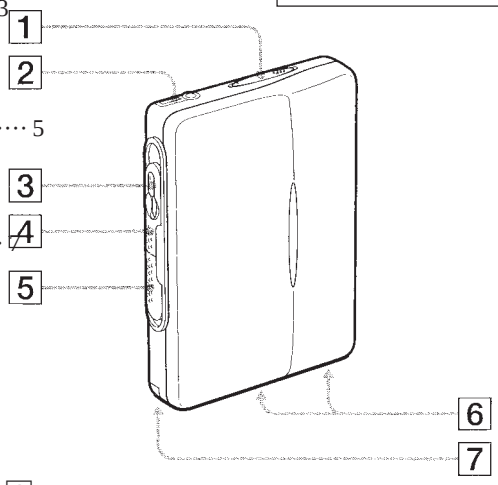
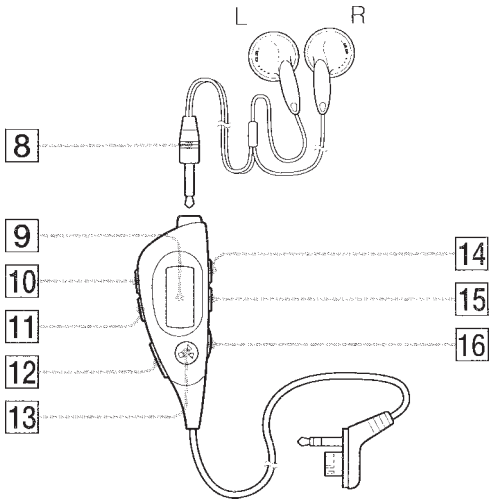


1 ◢ VOL knob
2 ∩ REMOTE jack
3 Operation button
4 HOLD/OPERATION knob
5 OPEN knob
6 Dry battery case contact
7 Rechargeable battery compartment



8 Headphones plug
9 DISPLAY window
10 SOUND button
11 MODE button
12 HOLD button
13 ◄►(PLAY), ■(STOP), button
14 FF button
15 REW button
16 VOL knob

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.

Flexible Circuit Board Repairing
- Keep the temperature of soldering iron around 270˚C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ 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.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈSES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPÉMENTS PUBLIÉS PAR SONY.

SECTION 2
SERVICE NOTE

[Service Mode]

The service mode enables to operate the mechanism of WM-EX20 while the MAIN board is opened.

Rotation of the idler gear (A) (S side) is detected using the photo-reflector (PH702) in the WM-EX20. PH702 is located on the MAIN board, therefore the rotation of the idler gear (A) (S side) cannot be detected by PH702 when the MAIN board is removed. As a result, the motor cannot be controlled and cannot run correctly.

To repair the machine after the MAIN board is removed while the main power is turned on, follow the procedures as described below.

1. Setting

1) Remove the cabinets referring to section "3. DISASSEMBLY". Open the MAIN board.
2) Connect the motor (M601) and the plunger solenoid (PM701) to the MAIN board using the jumper wires. When the extension jig (1-769-143-11) (10 wires as a set) is used, they can be connected easily.
3) Short the TAPE IN switch land (BP1) with solder. Input a square (or sine) wave of 10 Hz (at 1.3 Vp-p) to both PH IN T land (TP37) and PH IN S land (TP36) with jumper wire.
4) Connect DC 1.3 V from external regulated power supply to ⊕ and ⊖ terminals of the battery.

2. PRE-SET status

The set must be in this state before the PLAY, FF and REW modes can be entered.

1) Make sure that the slider (F/R) is in the center position and that the F/R switch (S702) is in the center position. Make sure that the reel gear does not rotate by rotating the flywheel on the F side clockwise. If improper, place the set in the preset state according to the following instructions:
2) Repeat the step below some times to ensure the above conditions.

* Pull away the trigger level from the plunger with tweezers or other means. Then rotate the flywheel on the F side clockwise.

3) Turn the stabilized power supply OFF once and then ON.

3. FF, REW modes

1) Check for "2. Preset state" and push the FF switch and the REW switch.
2) Move the F/R switch (S702) to the movement of the slider to enter the FF/REW mode.

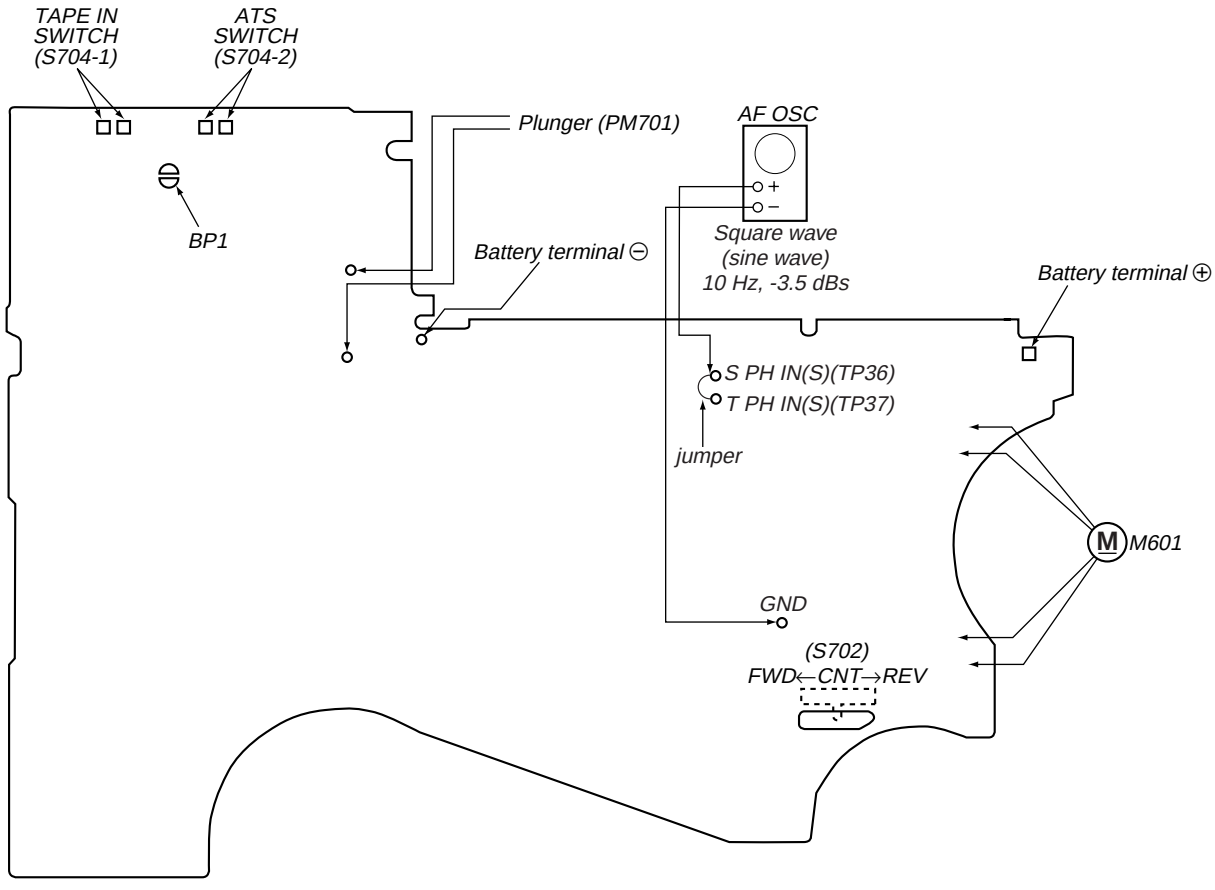
4. PLAY mode

1) Check for "2. Preset state".
2) Push the ◄► switch on the remote commander to move the lever (SW) toward the R side. With timing to this, move the F/R switch (S702) to enter the PLAY (R side) mode.

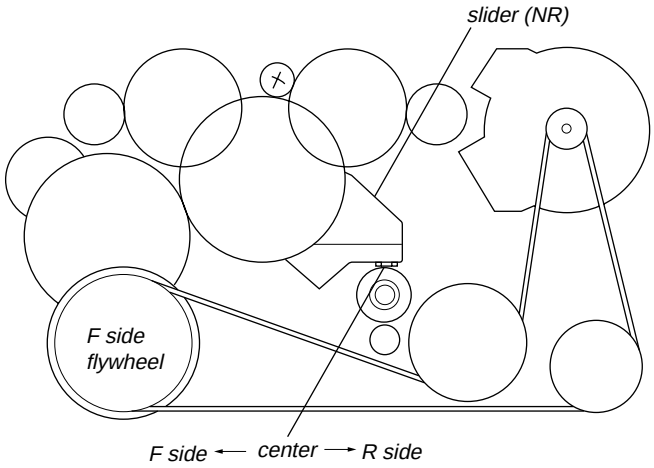
Note 1: If failed, retry from the preset state.

Note 2: The ◄►, ■, FF, and REW switches on the remote commander should be used whenever possible.

– MAIN BOARD (SIDE B) —

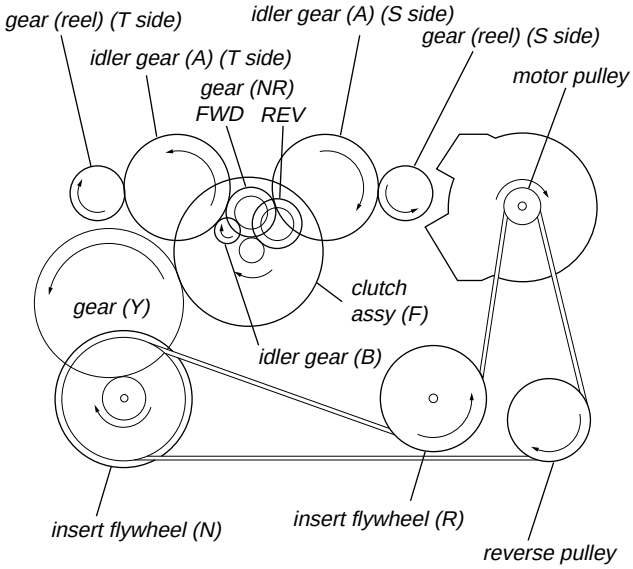


[Slider (NR)]

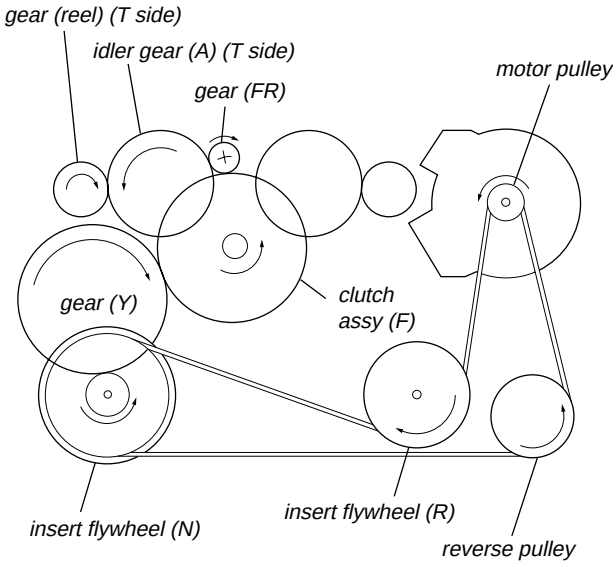


[Rotational system]

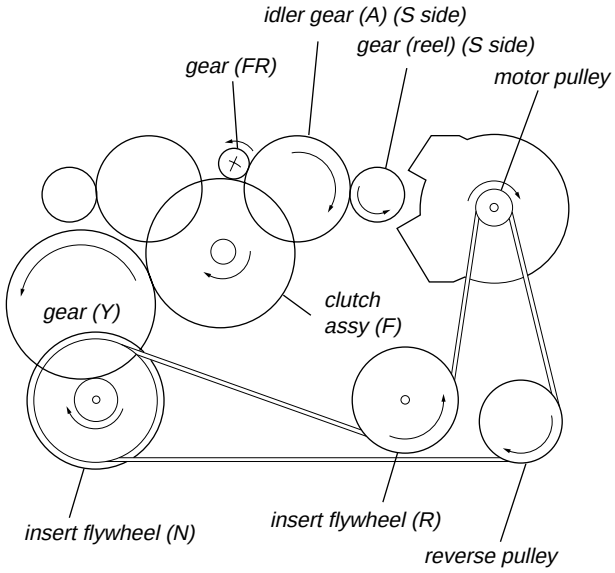
1. Rotational System of PLAY Mode



2. Rotational System of FF Mode



3. Rotational System of REW Mode



SECTION 3
DISASSEMBLY

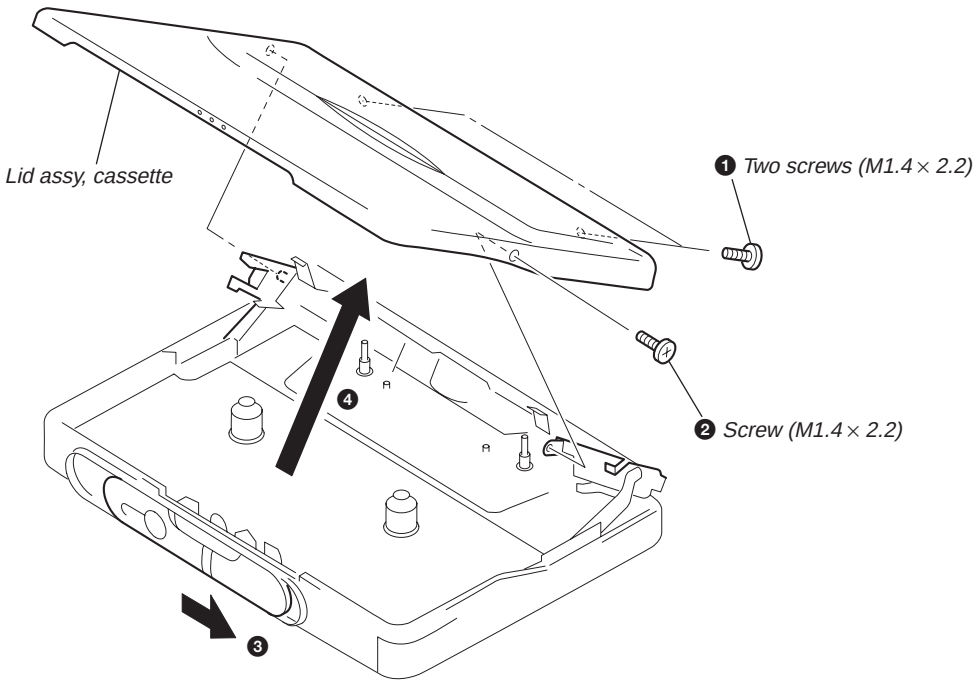
• The equipment can be removed using the following procedure.

Set ➡ Lid Assy, Cassette ➡ Case ➡ Ornament (OPEN) Block Assy ➡ "Sub Board", "Switch, Leaf", "Main Board" ➡ Belt (F1), Motor (M601)

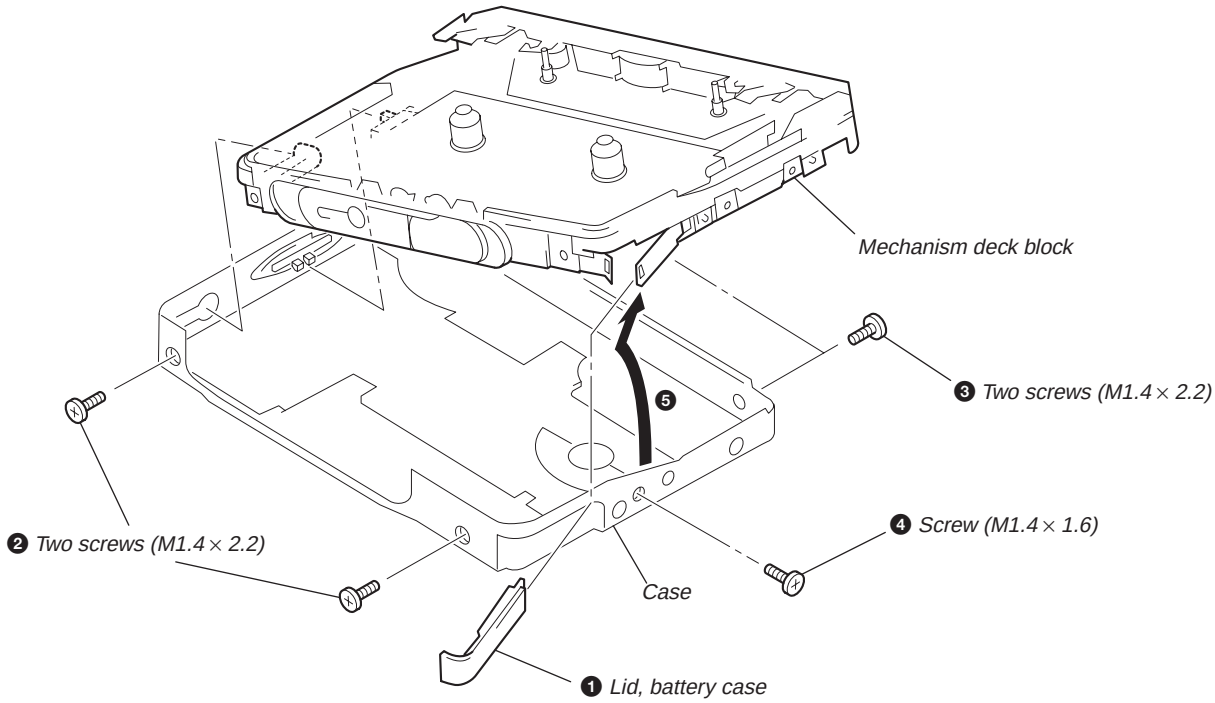
Case ➡ Holder Assy ➡ Pinch Lever (N)/(R) Assy ➡ Magnetic Head (HP701)

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

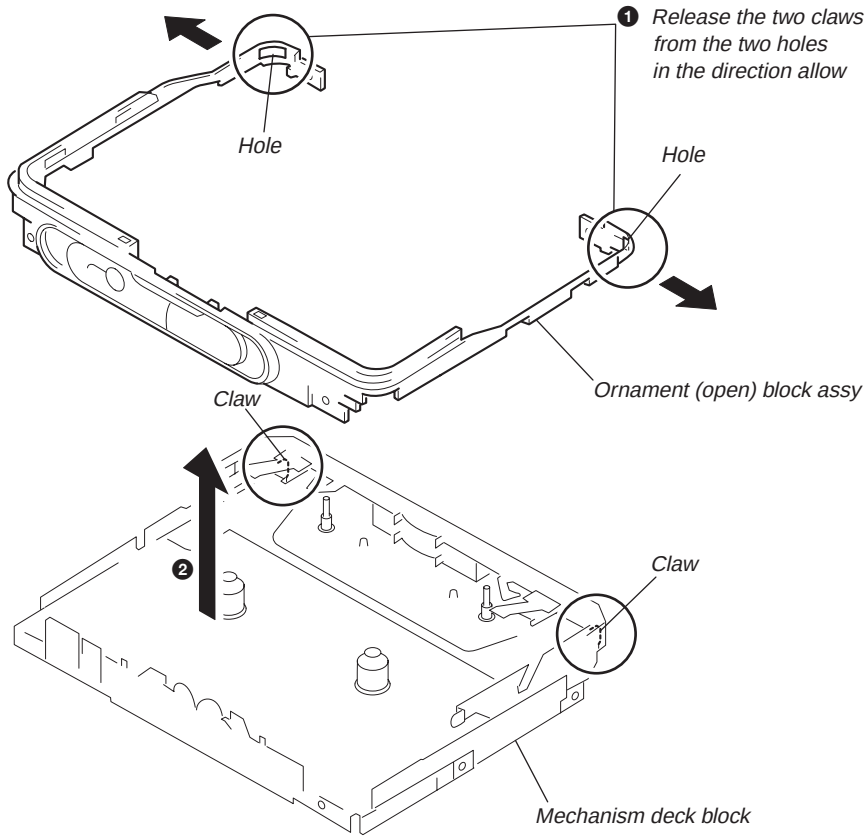
3-1. LID ASSY, CASSETTE



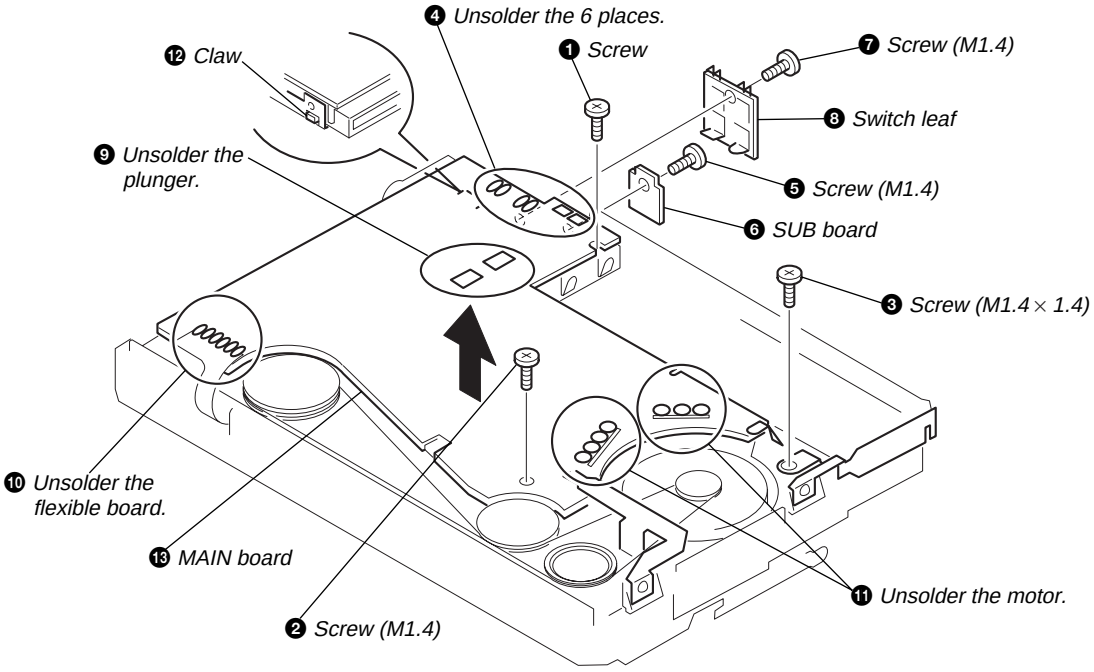
3-2. CASE



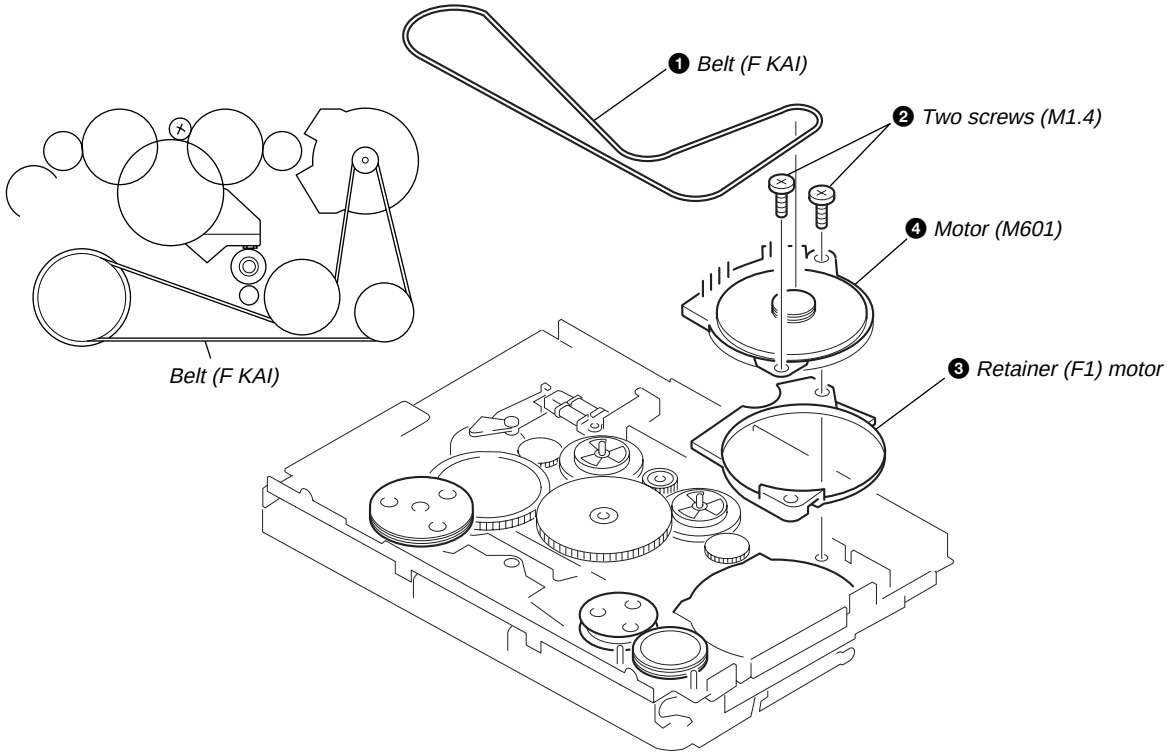
3-3. ORNAMENT (OPEN) BLOCK ASSY



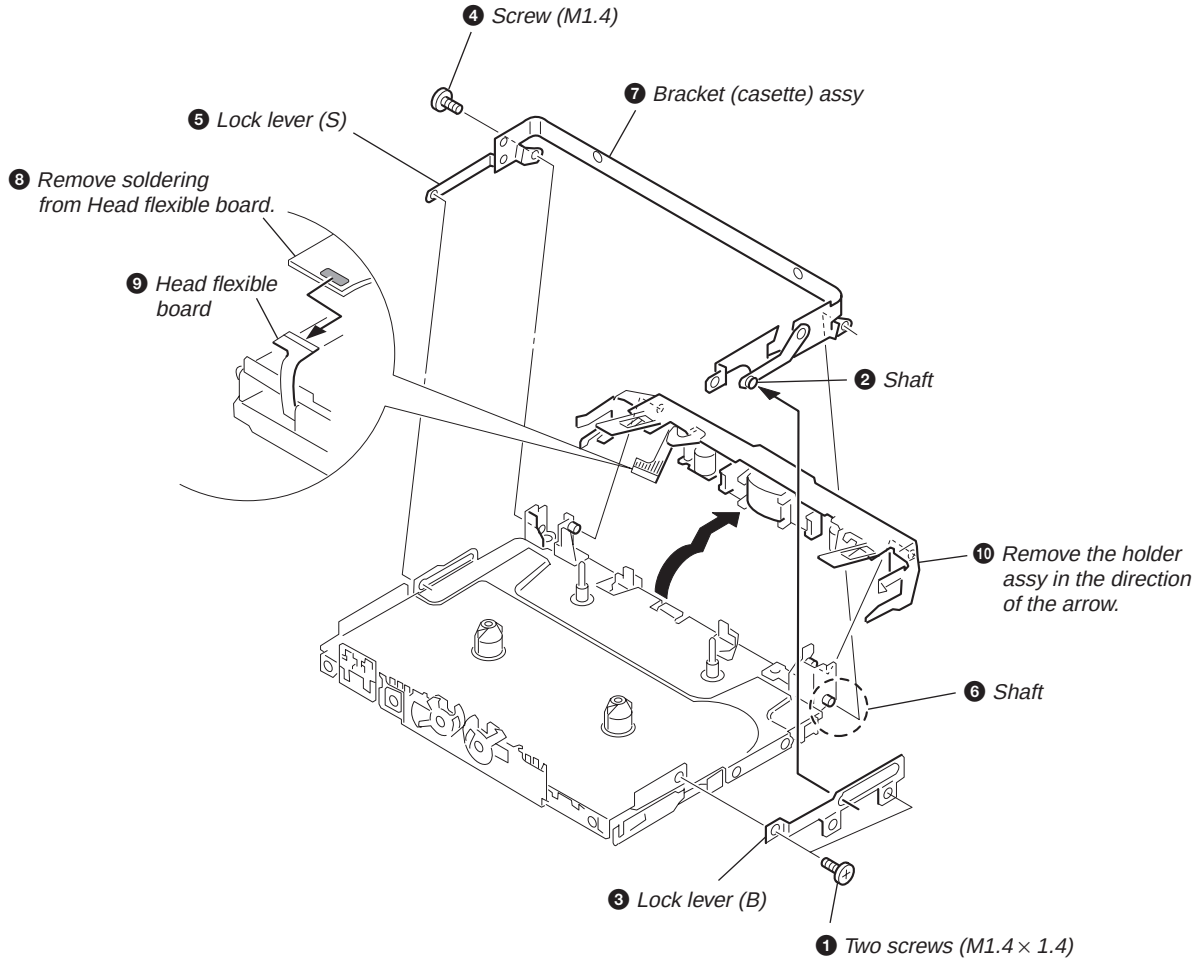
3-4. "SUB BOARD", "SWITCH, LEAF", "MAIN BOARD"



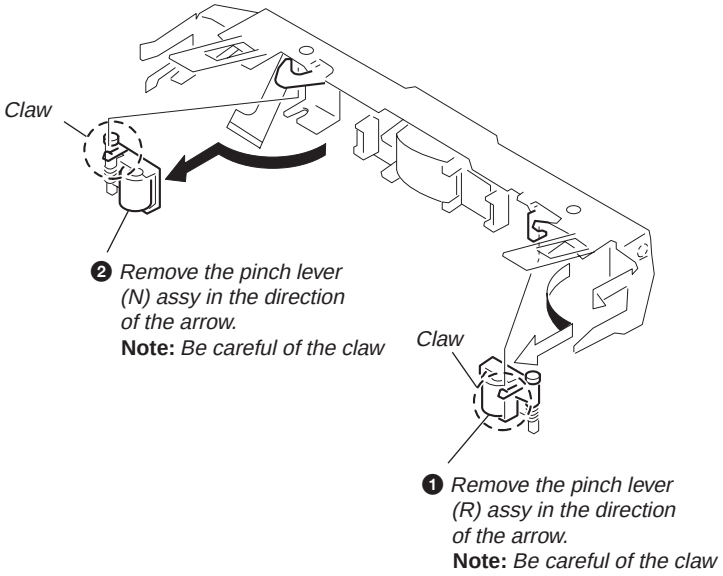
3-5. BELT (F KAI), MOTOR (M601)



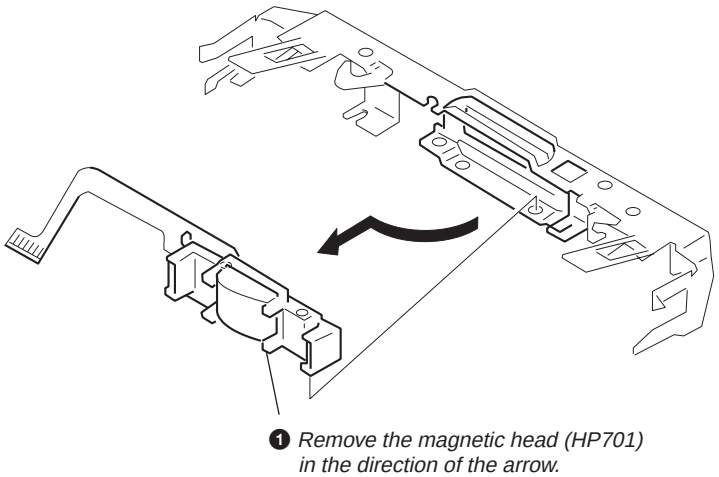
3-6. HOLDER ASSY



3-7. PINCH LEVER (N)/(R) ASSY



3-8. MAGNETIC HEAD (HP701)



SECTION 4
MECHANICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab :
   playback head　　pinch roller
   capstan　　rubber belt
2. Demagnetize the playback head with a head demagnetizer.
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 (1.3 V) unless otherwise noted.

Torque Measurement

Mode	Torque Meter	Meter Reading
FWD	CQ-102C	15 – 25 g • cm (0.21 – 0.35 oz • inch)
FWD back tension		less than 2 g • cm (less than 0.03 oz • inch)
REV	CQ-102RC	15 – 25 g • cm (0.21 – 0.35 oz • inch)
REV back tension		less than 2 g • cm (less than 0.03 oz • inch)
FF, REW	CQ-201B	more than 50 g • cm (more than 0.69 oz • inch)

SECTION 5
ELECTRICAL ADJUSTMENT

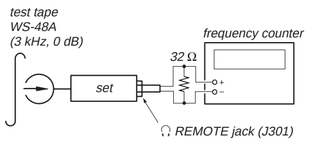
PRECAUTION

• Supplied voltage : 1.3 V
• Switch and control position
　　VOL switch : NORM
• Remote control position
　　HOLD switch : OFF
　　VOL control : MAX
　　SOUND mode : NORM
　　DOLBY mode : OFF

Test tape

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

Tape Speed Adjustment
Procedure :



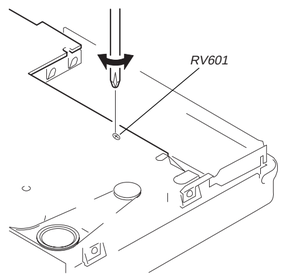
1. Playback WS-48A (tape center part) in the REV state and adjust RV601 so that the frequency counter reading becomes 3,000 Hz.

Specification Value :

Digital frequency counter
2,985 to 3,015 Hz

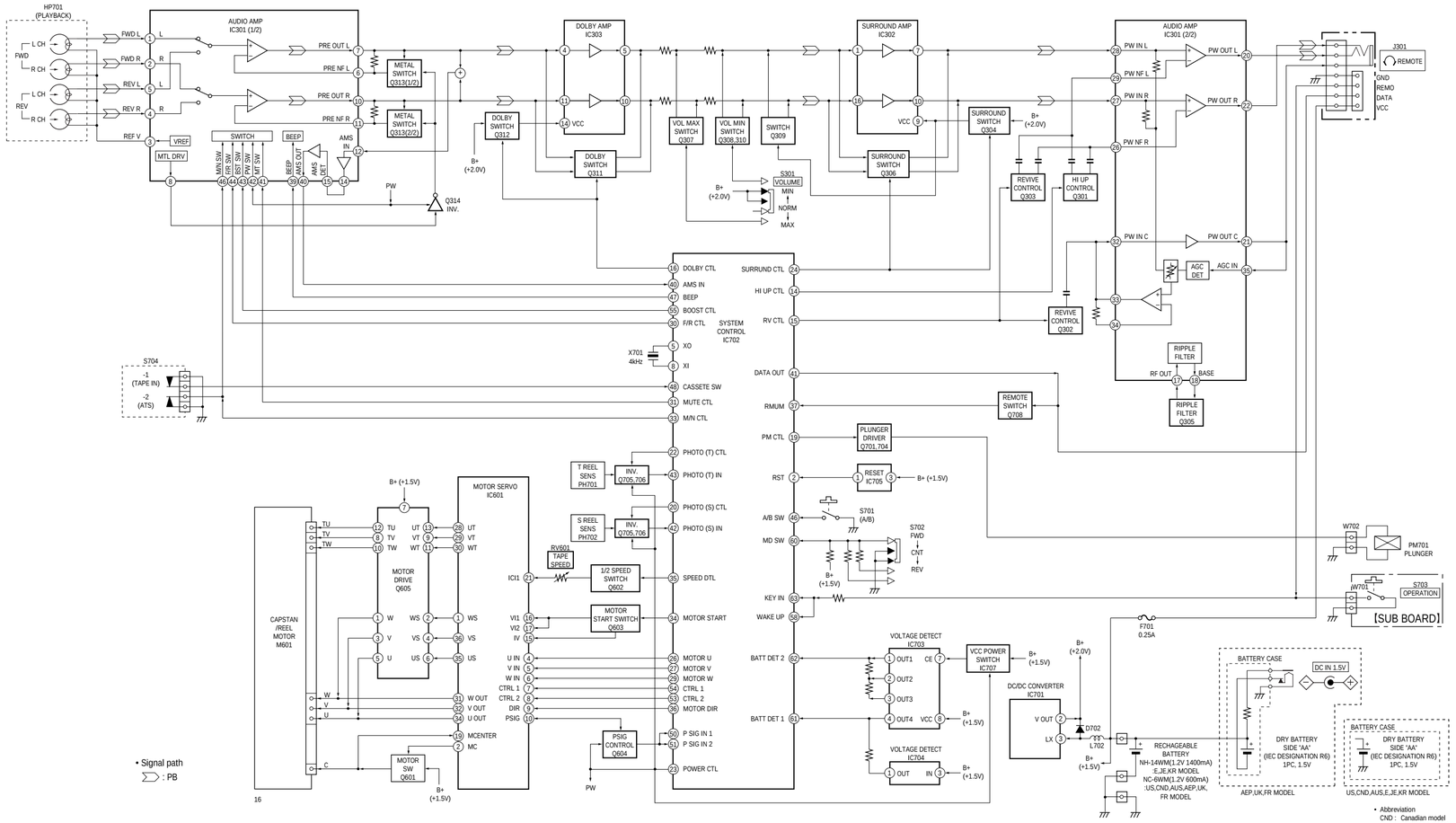
2. Playback WS-48A (tape counter part) in the FWD state. Check that frequency counter reading is within 2.5% of reading of step 1.

Adjustment Location :



SECTION 6
DIAGRAMS

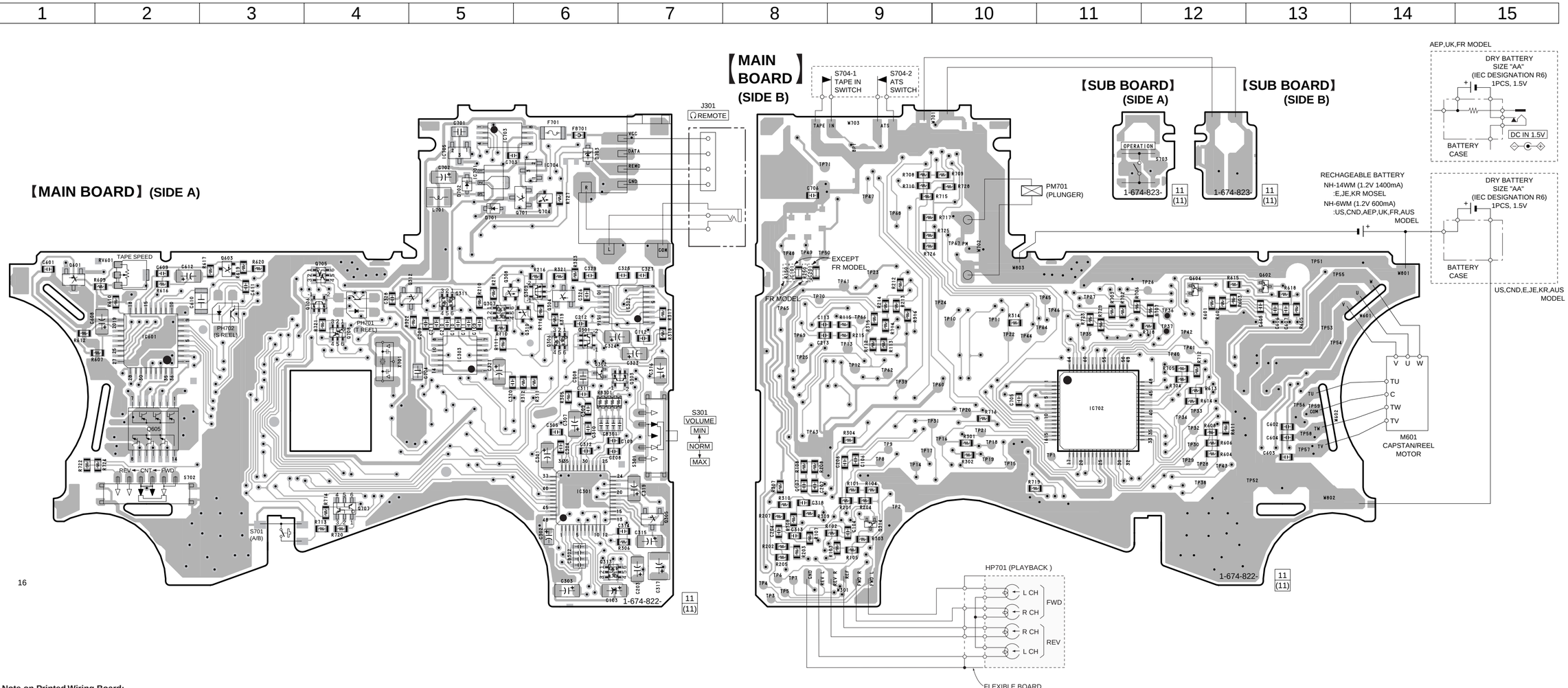
6-1. BLOCK DIAGRAM



6-2. PRINTED WIRING BOARD

- **Semiconductor Location**

Ref. No.	Location
D701	B-5
D702	B-5
D703	B-6
IC301	E-6
IC302	C-7
IC303	D-5
IC601	D-2
IC701	B-5
IC702	D-11
IC703	B-5
IC704	B-6
IC705	B-5
Q301	D-6
Q302	D-6
Q303	D-7
Q304	C-6
Q305	E-7
Q306	D-6
Q307	C-5
Q308	C-5
Q309	C-6
Q310	C-6
Q311	C-5
Q312	C-4
Q313	F-6
Q314	E-9
Q601	C-1
Q602	C-13
Q603	C-3
Q604	C-12
Q605	D-2
Q701	B-6
Q704	B-6
Q705	C-4
Q706	C-4
Q707	E-4
Q708	C-4



Note on Printed Wiring Board:

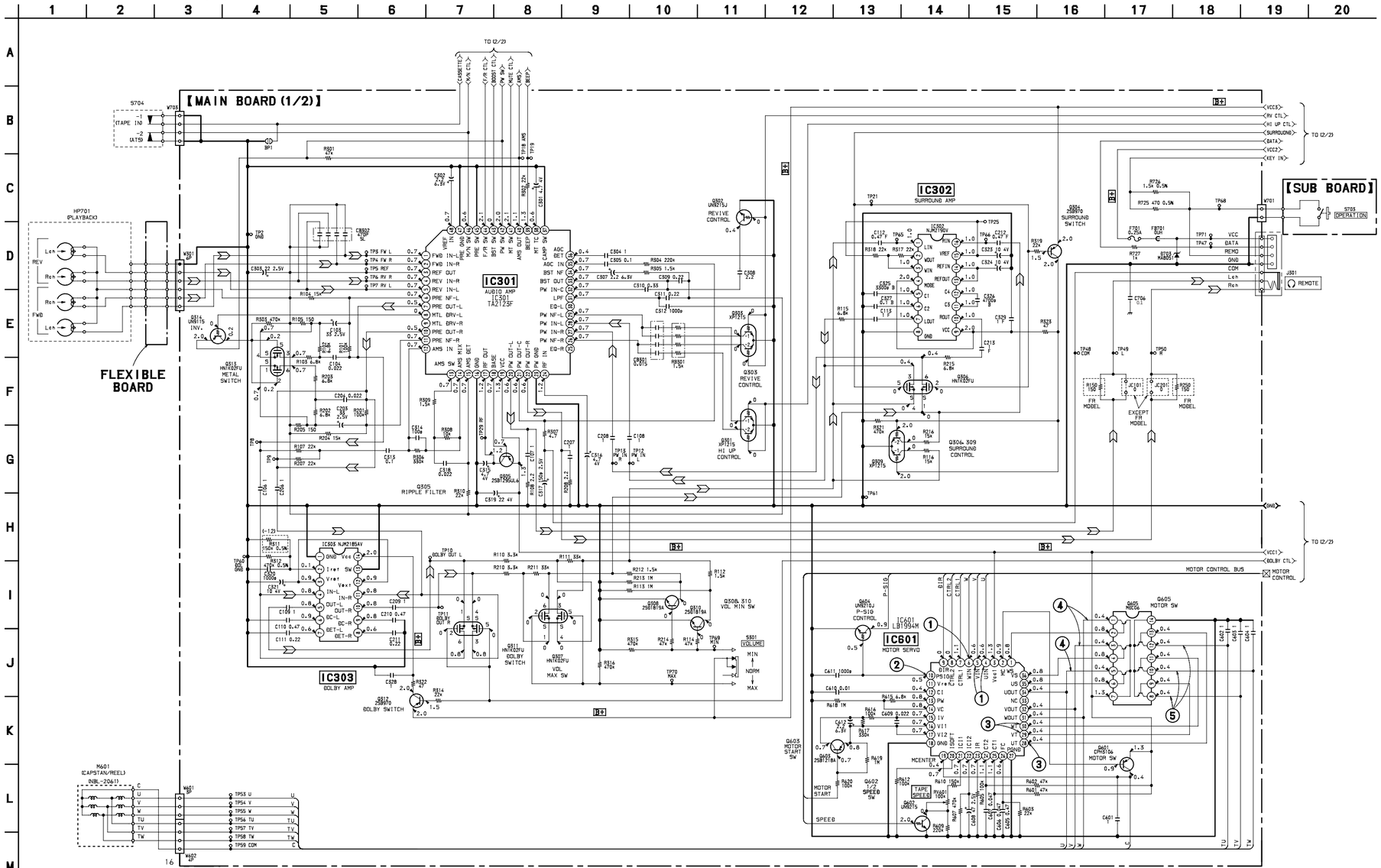
- ——— : parts extracted from the conductor side.
- ● : Through hole.
- ▒▒▒ : Pattern from the side which enables seeing.

Caution:	
Pattern face side: (Side A)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Side B)	Parts on the parts face side seen from the parts face are indicated.

- Abbreviation
  - CND : Canadian model
  - AUS : Austrarian model
  - FR : French model
  - KR : Korean model
  - JE : Tourist model

6-3. SCHEMATIC DIAGRAM MAIN (1/2) SECTION

• Refer to page 21, 22 for IC Block Diagrams.



• **Waveform**

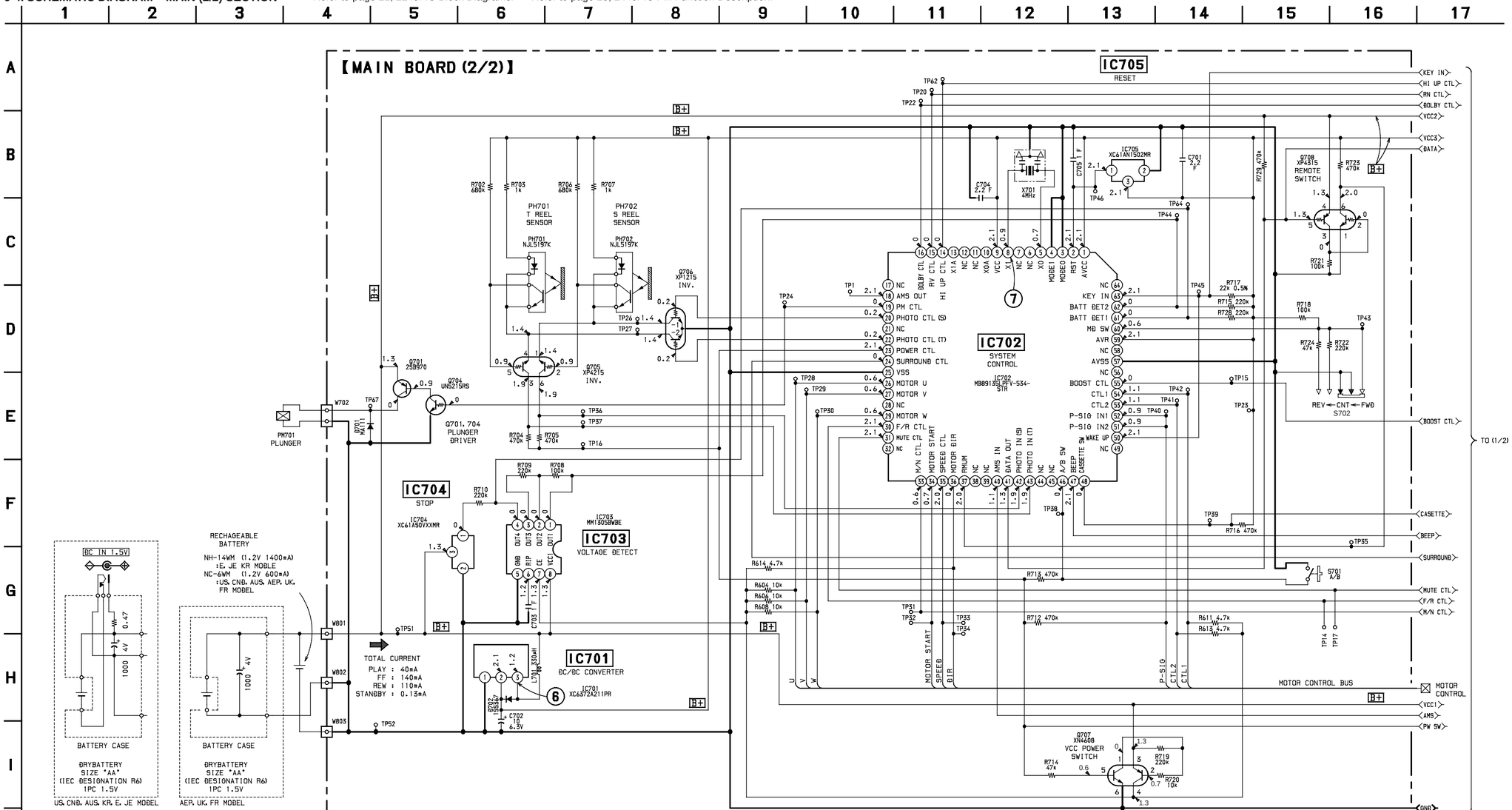
① IC601 ④⑤⑥ 150 Hz 0.5V/div 2µsec/div	④ Q605 ①③⑤ 150 Hz 0.5V/div 5µsec/div
② IC601 ⑩ 444 Hz 0.5V/div 1µsec/div	⑤ Q605 ⑧⑩⑫ 150 Hz 0.5V/div 5µsec/div
③ IC601 ㉘㉙㉚ 150 Hz 0.2V/div 5µsec/div	

Note on Schematic Diagram:

- All capacitors are in µF unless otherwise noted. pF: µµF
  50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- △ : internal component.
- ▭ : panel designation.
- B+ : B+ Line.
- ▬ : adjustment for repair.
- Power voltage is dc 1.5 V and fed with regulated dc power supply from battery terminal.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
  no mark : PLAY
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  Σ : PB
- Abbreviation
  CND : Canadian model.
  AUS : Australian model.
  JE : Tourist model.
  FR : French model.
  KR : Korea model.

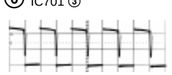
6-4. SCHEMATIC DIAGRAM MAIN (2/2) SECTION

• Refer to page 21, 22 for IC Block Diagrams. • Refer to page 23, 24 for IC Pin Function Description.



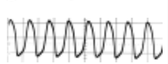
• **Waveform**

⑥ IC701 ③



100 kHz 1V/div 5µsec/div

⑦ IC702 ⑧



4 MHz 1V/div 0.2µsec/div

Note on Schematic Diagram:

- All capacitors are in µF unless otherwise noted. pF: µµF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- △ : internal component.
- ▭ : panel designation.
- B+ : B+ Line.
- ▬ : adjustment for repair.
- Power voltage is dc 1.5 V and fed with regulated dc power supply from battery terminal.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
  no mark: PLAY
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
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- Circled numbers refer to waveforms.
- Abbreviation
  CND : Canadian model.
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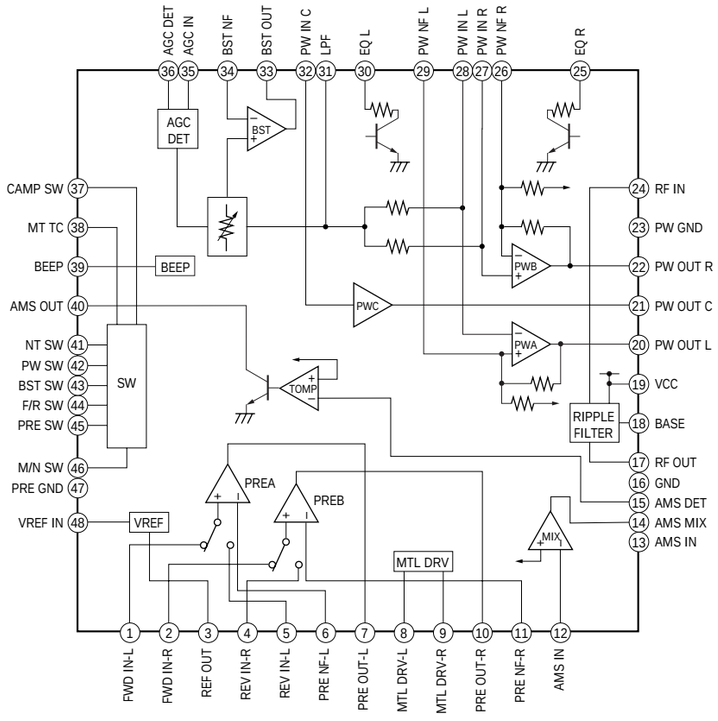
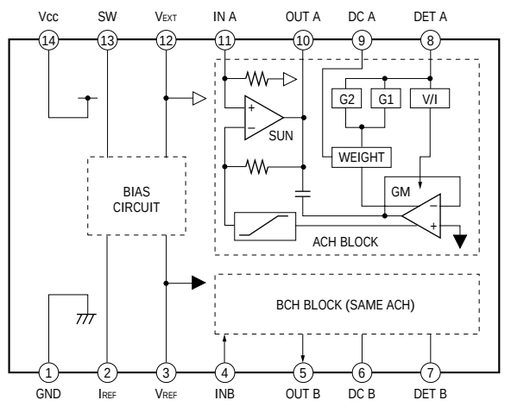
6-5. IC BLOCK DIAGRAMS

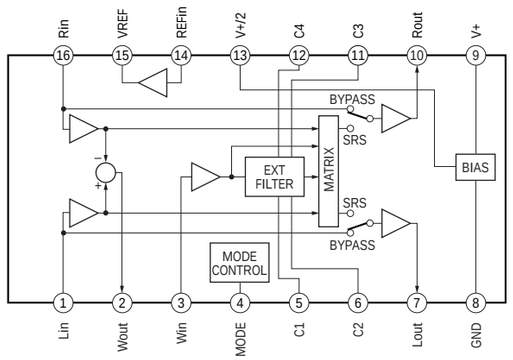
IC301 TA2123AF



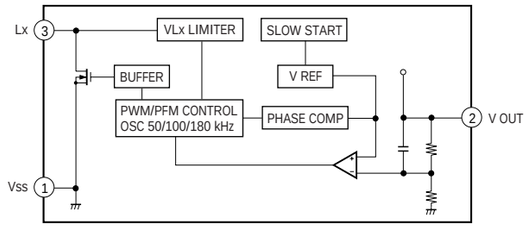
IC303 NJM2185AV



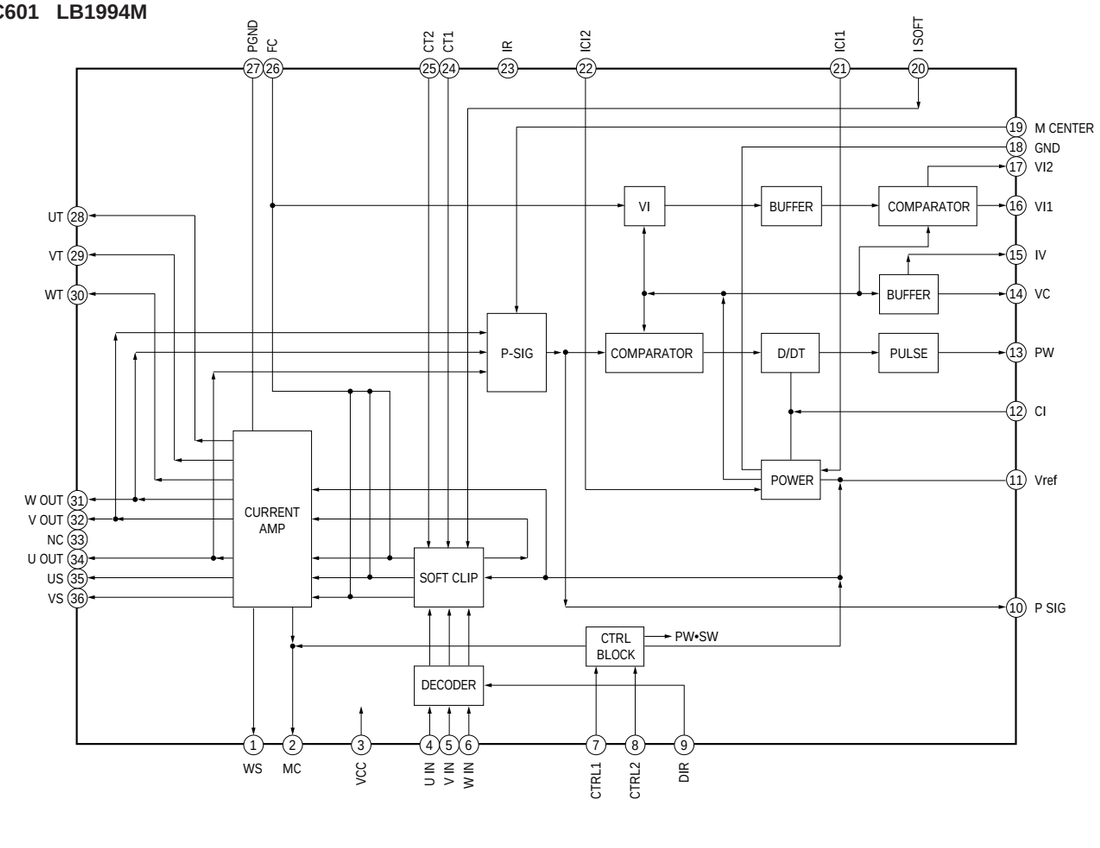
IC302 NJM2190V



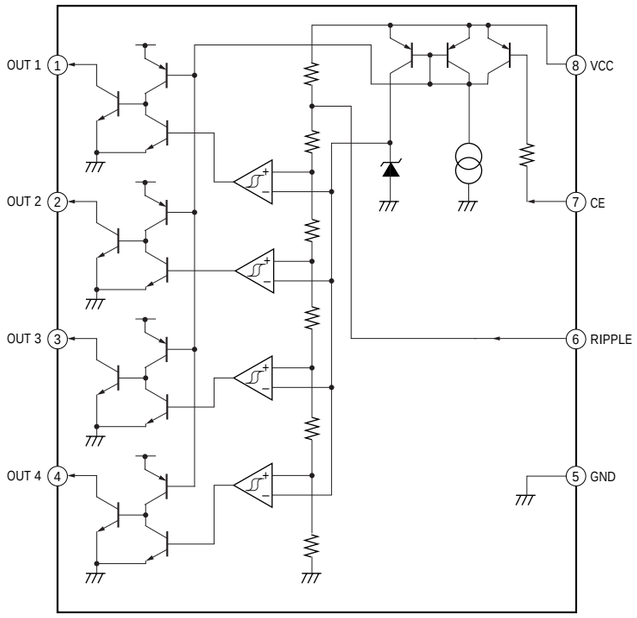
IC701 XC6372A211PR



IC601 LB1994M



IC703 MM1305BWBE



6-6. IC PIN FUNCTION DESCRIPTION

• IC702 MB89135LPFV (SYSTEM CONTROL)

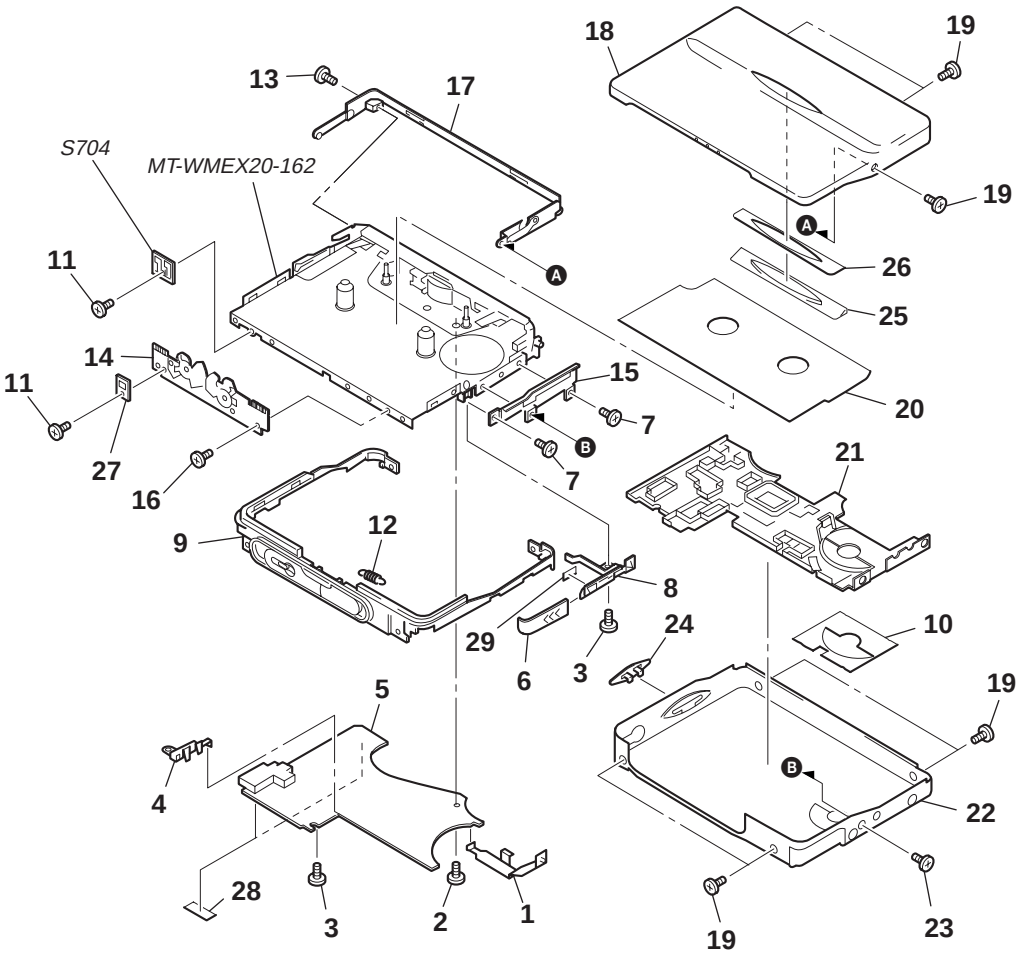
Pin No.	Pin Name	I/O	Description
1	AVCC	–	Power supply terminal. (A/D)
2	RST	I	Reset signal input.
3	MODE0	I	Test input terminal. (Connect to Vss terminal.)
4	MODE1	I	Test input terminal. (Connect to Vss terminal.)
5	X0	I	Crystal oscillator connection terminal. (4 MHz)
6, 7	NC	–	Not used. (Open)
8	X1	O	Crystal oscillator connection terminal. (4 MHz)
9	VCC	–	Power supply pin.
10	X0A	O	Not used. (Open)
11, 12	NC	–	Not used. (Open)
13	X1A	O	Not used. (Open)
14	HI UP CTL	O	Tone select switch signal output. H: HI UP ON
15	RV CTL	O	Tone select switch signal output. H: REVIVE ON
16	DOLBY CTL	O	Dolby circuit control signal output. L: ON
17	NC	–	Not used. (Open)
18	AMS OUT	O	Music with/without detection (AMS) signal output. (H : with, L :without)
19	PM CLT	O	Plunger control signal output. H : ON
20	PHOTO(S)CTL	O	Rotational detection intermittent signal output. H : ON
21	NC	–	Not used. (Open)
22	PHOTO(T)CTL	O	Rotational detection intermittent signal output. H : ON
23	POWER CTL	O	Audio circuit and DDC control signal output. L : STOP, H : NORMAL
24	SURROUND CTL	O	Surround circuit control signal output. L : ON
25	VSS	–	Ground
26	MOTOR U	O	Motor control signal output.
27	MOTOR V	O	Motor control signal output.
28	NC	–	Not used. (Open)
29	MOTOR W	O	Motor control signal output.
30	F/R CTL	O	Head select signal output. L : FWD, H : RVS
31	MUTE CTL	O	Audio muting control signal output. L : MUTE ON
32	NC	–	Not used. (Open)
33	M/N CTL	O	Metal/normal tape select signal output.
34	MOTOR START	O	Motor wake-up signal output. L : wake-up, open : normally
35	SPEED CTL	O	Motor speed 1/2 control signal output. L :1/2 speed, H :normally
36	MOTOR DIR	O	Motor rotational derection control signal output. L :CW, Open :CCW
37	RMUM	I	Remote control with/without detection signal input.
38, 39	NC	–	Not used. (Open)
40	AMS IN	I	Music with/without detection (AMS) signal input. H : without
41	DATA OUT	O	Communication data signal output.
42	PHOTO(S)IN	I	Rotational detectionsignal input.
43	PHOTO(T)IN	I	Rotational detectionsignal input.
44, 45	NC	–	Not used. (Open)
46	A/B SW	I	Side A/B detection switch dignal input. L :side A, H : side B
47	BEEP	O	Beep signal output.
48	CASSETTE SW	I	Cassette with/without detection switch signal input. L :with, H :without
49	NC	–	Not used. (Open)
50	WAKE UP	I	Clock make up signal input.
51	P-SIG IN2	I	Motor P-SIG signal input.
52	P-SIG IN1	I	Motor P-SIG signal input.
53	CTL2	O	Mode select signal output to Motor servo IC (IC601).
54	CTL1	O	Mode select signal output to Motor servo IC (IC601).
55	BOOST CTL	O	Tone select switch signal output. L : OFF, Open : BOOSTON
56	NC	–	Not used. (Open)
57	AVss	–	Ground. (A/D)
58	NC	–	Non connection
59	AVR	I	Reference voltage input. (A/D)
60	MD SW	I(A/D)	MD mode switch signal input. (FWD/CENTER/RVS mode)
61	BATT DET1	I(A/D)	Power voltage detection signal input.
62	BATT DET2	I(A/D)	Power voltage detection signal input.
63	KEY IN	I(A/D)	Operation switch signal input.
64	NC	–	Not used. (Open)

SECTION 7
EXPLODED VIEWS

NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- 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.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- Color Indication of Appearance Parts Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ Parts of Color ↑ Cabinet's Color
- Abbreviation
  CND : Canadian model
  AUS : Australian model
  FR : French model
  KR : Korea model
  JE : Tourist model

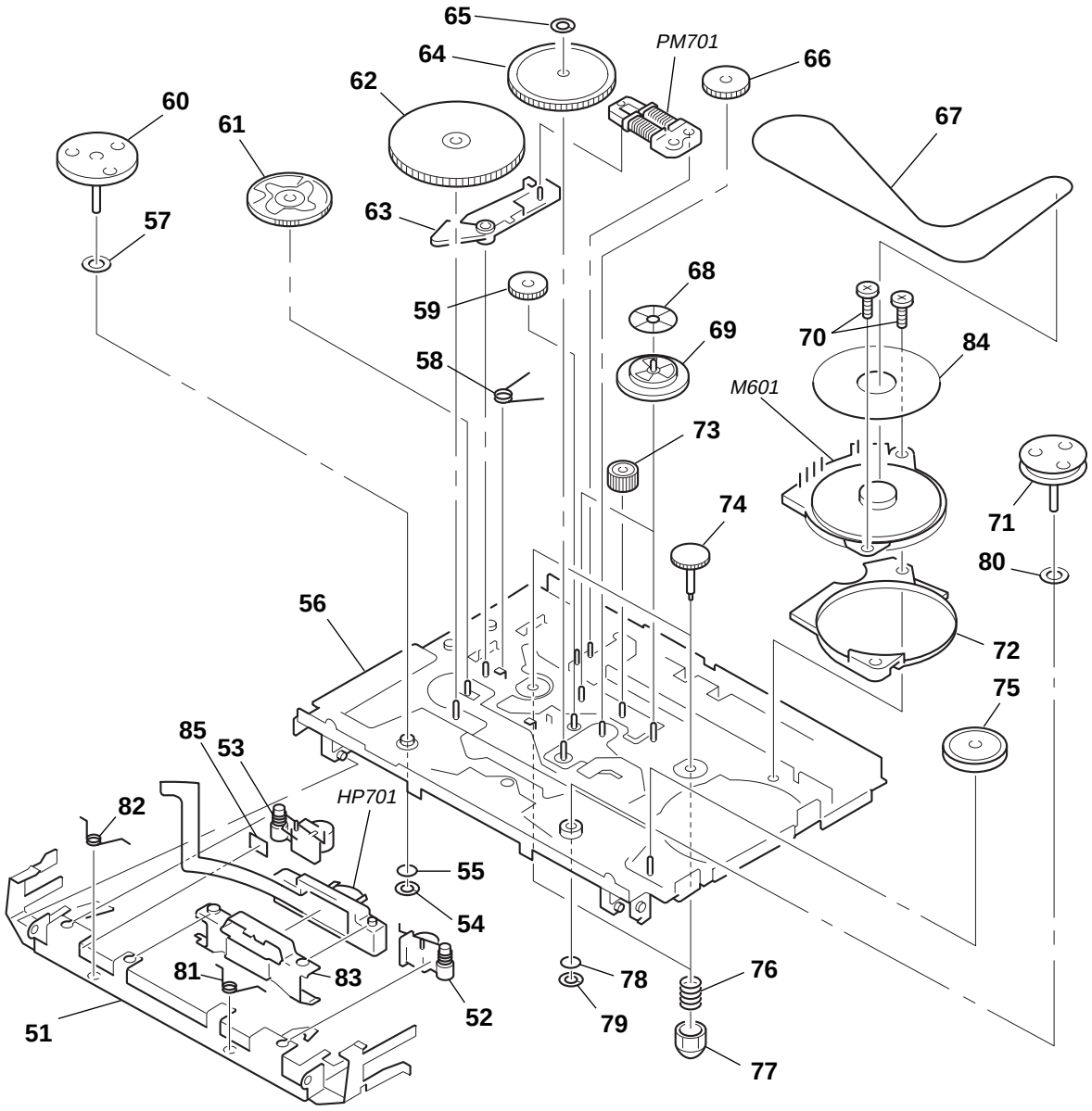
7-1. CASE SECTION



Ref. No.	Part No.	Description	Remarks
1	3-038-057-01	TERMINAL BOARD, BATTERY	
2	3-345-648-71	SCREW(M1.4), TOOTHED LOCK	
3	3-375-114-41	SCREW	
4	3-038-056-01	TERMINAL BOARD (MINUS) (/M)	
5	A-3061-994-A	MAIN BOARD, COMPLETE (EXCEPT FR)	
5	A-3061-997-A	MAIN BOARD, COMPLETE (FR)	
6	3-038-624-01	LID,BATTERY CASE	
7	3-366-892-11	SCREW(M1.4 × 1.4)	
8	X-3377-726-1	TERMINAL BOARD ASSY (/M)	
9	A-3052-056-A	ORNAMENT (OPEN) BLOCK ASSY	
10	3-038-627-01	SHEET (CASE), ADHESIVE	
11	4-963-883-51	SCREW (M1.4), PRECISION PAN	
12	3-029-220-01	SPRING, TENSION	
13	3-365-630-41	SCREW (M1.4)	
14	X-3377-717-1	BRACKET ASSY (/M)	
15	3-038-054-01	LEVER (B) (/M), LOCK	
16	3-366-892-01	SCREW (M1.4)	

Ref. No.	Part No.	Description	Remarks
17	X-3377-780-1	BRACKET (CASSETTE) ASSY	
18	X-3377-779-1	LID ASSY, CASSETTE	
19	3-704-197-41	SCREW (M1.4 × 2.2)	
20	3-038-630-01	COVER, MD (JE)	
20	3-038-630-11	COVER, MD (AEP,UK,FR)	
20	3-038-630-21	COVER, MD (US,CND,E,KR,AUS)	
21	3-038-616-01	ORNAMENT (CASE)	
22	3-038-615-01	CASE(1680)	
23	3-704-197-01	SCREW (M1.4 × 1.6), LOCKING	
24	3-038-617-01	KNOB(VOL)	
25	3-038-625-01	WINDOW (CASSETTE), ORNAMENT	
26	3-038-628-01	SHEET (CASSETTE WINDOW)	
* 27	1-674-823-11	SUB BOARD	
28	3-324-509-01	CUSHION	
29	3-031-460-01	SHEET(BT)	
S704	1-762-553-11	SWITCH, LEAF (TAPE IN/ATS)	

7-2. MECHANISM DECK BLOCK



Ref. No.	Part No.	Description	Remarks
51	X-3377-589-1	HOLDER (FA) ASSY	
52	X-3377-995-1	LEVER (R2) ASSY, PINCH	
53	X-3377-994-1	LEVER (N2) ASSY, PINCH	
54	3-029-275-01	WASHER (STOPPER N)	
55	3-029-278-01	WASHER	
56	X-3377-037-1	CHASSIS ASSY (FA)	
57	3-386-694-01	WASHER	
58	3-029-287-11	SPRING (TG), TORSION	
59	3-029-281-01	GEAR, IDLER (B)	
60	3-029-306-11	FLYWHEEL (N), INSERT	
61	3-029-285-01	GEAR, CAM	
62	3-029-282-01	GEAR(Y)	
63	3-029-284-01	LEVER, TRIGGER	
64	X-3376-813-1	CLUCH ASSY (F)	
65	3-932-724-21	WASHER	
66	3-029-286-01	GEAR(NR)	
67	3-038-612-01	BELT(F KAI)	
68	3-007-433-01	SHEET (N), REFLECTION	
69	3-029-283-01	GEAR, IDLER (A)	
70	3-029-765-01	SCREW (M1.4), TOOTHED LOCK	

Ref. No.	Part No.	Description	Remarks
71	3-029-268-11	FLYWHEEL (R), INSERT	
72	3-029-883-01	RETAINER (F1), MOTOR	
73	3-029-273-01	GEAR(FR)	
74	3-010-273-02	GEAR(REEL)	
75	3-029-288-01	PULLEY, REVERSE	
76	3-010-954-01	SPRING (BT), COMPRESSION	
77	3-010-274-02	TABLE, REEL	
78	3-029-289-01	WASHER	
79	3-029-276-01	WASHER (STOPPER R)	
80	3-007-428-01	WASHER (R)	
81	3-029-271-11	SPRING (HD)	
82	3-038-611-01	SPRING (HD2)	
83	3-038-610-01	LEVER, HEAD	
84	3-038-613-01	SEAL(MOTOR)	
85	3-033-757-01	SHEET(H)	
M601	1-763-165-21	MOTOR (CAPSTAN/REEL MOTOR)	(WITH PULLY)
HP701	1-500-623-31	HEAD, MAGNETIC (PLAYBACK)	
PM701	1-454-674-31	SOLENOID, PLUNGER	

SECTION 8
ELECTRICAL PARTS LIST

MAIN

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.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:
  uF: µF
- RESISTORS
  All resistors are in ohms.
  METAL: metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable
- COILS
  uH: µH
- Abbreviation
  CND : Canadian model
  AUS : Australian model
  FR : French model
  KR : Korea model
  JE : Tourist model
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA...: µA... , uPA... , µPA... ,
  uPB... , µPB... , uPC... , µPC... ,
  uPD..., µPD...

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

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

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

Ref. No.	Part No.	Description			Remarks
	A-3061-994-A	MAIN BOARD, COMPLETE (EXCEPT FR)			
		**********			
	A-3061-997-A	MAIN BOARD, COMPLETE (FR)			
		**********			
	3-032-323-01	PAPER (A), SHIELD			
		< CAPACITOR >			
C103	1-107-520-11	TANTAL. CHIP	33uF	20%	2.5V
C104	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C106	1-115-156-11	CERAMIC CHIP	1uF		10V
C107	1-115-156-11	CERAMIC CHIP	1uF		10V
C108	1-115-156-11	CERAMIC CHIP	1uF		10V
C109	1-115-156-11	CERAMIC CHIP	1uF		10V
C110	1-117-863-11	CERAMIC CHIP	0.47uF	10%	6.3V
C111	1-115-467-11	CERAMIC CHIP	0.22uF	10%	10V
C112	1-113-619-11	CERAMIC CHIP	0.47uF		10V
C113	1-115-156-11	CERAMIC CHIP	1uF		10V
C203	1-107-520-11	TANTAL. CHIP	33uF	20%	2.5V
C204	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C206	1-115-156-11	CERAMIC CHIP	1uF		10V
C207	1-115-156-11	CERAMIC CHIP	1uF		10V
C208	1-115-156-11	CERAMIC CHIP	1uF		10V
C209	1-115-156-11	CERAMIC CHIP	1uF		10V
C210	1-117-863-11	CERAMIC CHIP	0.47uF	10%	6.3V
C211	1-115-467-11	CERAMIC CHIP	0.22uF	10%	10V
C212	1-113-619-11	CERAMIC CHIP	0.47uF		10V
C213	1-115-156-11	CERAMIC CHIP	1uF		10V
C301	1-135-151-21	TANTALUM CHIP	4.7uF	20%	4V
C302	1-113-600-11	TANTAL. CHIP	2.2uF	20%	6.3V
C303	1-135-316-11	TANTAL. CHIP	22uF	20%	2.5V
C304	1-115-156-11	CERAMIC CHIP	1uF		10V
C305	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C307	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C308	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C309	1-125-837-91	CERAMIC CHIP	1uF	10%	6.3V
C310	1-165-112-11	CERAMIC CHIP	0.33uF		16V
C311	1-165-128-11	CERAMIC CHIP	0.22uF		16V
C312	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C313	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C314	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C315	1-135-151-21	TANTALUM CHIP	4.7uF	20%	4V
C316	1-135-151-21	TANTALUM CHIP	4.7uF	20%	4V
C317	1-125-976-91	TANTAL. CHIP	150PF	20%	2.5V
C318	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C319	1-104-847-11	TANTAL. CHIP	22uF	20%	4V
C320	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C321	1-135-201-11	TANTALUM CHIP	10uF	20%	4V

Ref. No.	Part No.	Description			Remarks
C323	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C324	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C325	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C326	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C327	1-107-826-91	CERAMIC CHIP	0.1uF	10%	16V
C328	1-115-156-11	CERAMIC CHIP	1uF		10V
C329	1-115-156-11	CERAMIC CHIP	1uF		10V
C601	1-125-837-91	CERAMIC CHIP	1uF	10%	6.3V
C602	1-115-156-11	CERAMIC CHIP	1uF		10V
C603	1-115-156-11	CERAMIC CHIP	1uF		10V
C604	1-115-156-11	CERAMIC CHIP	1uF		10V
C605	1-117-863-11	CERAMIC CHIP	0.47uF	10%	6.3V
C606	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C607	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C608	1-119-663-11	TANTAL. CHIP	47uF	20%	2.5V
C609	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C610	1-127-671-91	CERAMIC CHIP	10000PF	5%	50V
C611	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C612	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C701	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C702	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C703	1-115-156-11	CERAMIC CHIP	1uF		10V
C704	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C705	1-115-156-11	CERAMIC CHIP	1uF		10V
C706	1-164-360-11	CERAMIC CHIP	0.1uF		16V
		< CAPACITOR BLOCK >			
CB301	1-131-597-21	CERAMIC CHIP 15000PF		0	25V
CB302	1-127-575-21	CERAMIC CHIP 470PF		0	50V
		< DIODE >			
D101	8-719-422-37	DIODE MA8051			
D201	8-719-422-37	DIODE MA8051			
D301	8-719-422-37	DIODE MA8051			
D701	8-719-073-01	DIODE MA111-(K8).S0			
D702	8-719-049-09	DIODE 1SS367-T3SONY			
D703	8-719-422-37	DIODE MA8051			
		< FUSE >			
F701	1-533-792-11	FUSE (SMD) 0.25A/125V			
		< FERRITE BEAD >			
FB701	1-414-760-21	INDUCTOR CHIP 0uH			

MAIN

Ref. No.	Part No.	Description	Remarks
		< IC >	
IC301	8-759-579-12	IC TA2123AF(EL)	
IC302	8-759-597-24	IC NJM2190V(TE2)	
IC303	8-759-488-80	IC NJM2185AV-TE2	
IC601	8-759-553-51	IC LB1994M-TLM	
IC701	8-759-597-25	IC XC6372A211PR	
IC702	8-759-597-27	IC MB89135LPFV-534-STR	
IC703	8-759-438-27	IC MM1305BWBE	
IC704	8-759-445-09	IC XC61AS0VXXMR	
IC705	8-759-592-24	IC XC61AN1502MR	
		< JACK >	
J301	1-779-867-81	JACK (🎧/REMOTE)	
		< JUMPER CHIP >	
JC101	1-216-864-11	METAL CHIP 0 5% 1/16W	(EXCEPT FR)
JC201	1-216-864-11	METAL CHIP 0 5% 1/16W	(EXCEPT FR)
		< COIL >	
L701	1-412-034-11	INDUCTOR CHIP 330uH	
		< PHOTO INTERRUPTER >	
PH701	8-749-016-56	REFLECTOR NJL5197K-F20(TE1)	
PH702	8-749-016-56	REFLECTOR NJL5197K-F20(TE1)	
		< TRANSISTOR >	
Q301	8-729-426-36	TRANSISTOR XP1215-TXE	
Q302	8-729-037-76	TRANSISTOR UN9215J-(TX).SO	
Q303	8-729-426-36	TRANSISTOR XP1215-TXE	
Q304	8-729-046-89	TRANSISTOR 2SB970-S(TX).S0	
Q305	8-729-800-71	TRANSISTOR 2SB815B7-TB	
Q306	8-729-038-05	TRANSISTOR HN1K02FU(T5RSONY)	
Q307	8-729-038-05	TRANSISTOR HN1K02FU(T5RSONY)	
Q308	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q309	8-729-426-36	TRANSISTOR XP1215-TXE	
Q310	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q311	8-729-038-05	TRANSISTOR HN1K02FU(T5RSONY)	
Q312	8-729-046-89	TRANSISTOR 2SB970-S(TX).S0	
Q313	8-729-038-05	TRANSISTOR HN1K02FU(T5RSONY)	
Q314	8-729-037-63	TRANSISTOR UN9115J-(TX).SO	
Q601	8-729-043-94	TRANSISTOR CPH3106-PM-TL	
Q602	8-729-037-76	TRANSISTOR UN9215J-(TX).SO	
Q603	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q604	8-729-037-71	TRANSISTOR UN9210J-(TX).SO	
Q605	8-729-039-36	TRANSISTOR MDC06TR	
Q701	8-729-046-89	TRANSISTOR 2SB970-S(TX).S0	
Q704	8-729-020-99	TRANSISTOR UN5215-RS-TX	
Q705	8-729-427-51	TRANSISTOR XP4215-TXE	
Q706	8-729-426-36	TRANSISTOR XP1215-TXE	
Q707	8-729-402-16	TRANSISTOR XN4608	
Q708	8-729-425-46	TRANSISTOR XP4315-TXE	
		< RESISTOR >	
R101	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R102	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R103	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R104	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R105	1-216-811-11	METAL CHIP 150 5% 1/16W	
R107	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R108	1-216-789-11	METAL CHIP 2.2 5% 1/16W	
R110	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R111	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R112	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R113	1-216-857-11	METAL CHIP 1M 5% 1/16W	
R114	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R115	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R116	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R150	1-216-811-11	METAL CHIP 150 5% 1/16W	(FR)
R201	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R202	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R203	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R204	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R205	1-216-811-11	METAL CHIP 150 5% 1/16W	
R207	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R208	1-216-789-11	METAL CHIP 2.2 5% 1/16W	
R210	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R211	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R212	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R213	1-216-857-11	METAL CHIP 1M 5% 1/16W	
R214	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R215	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R216	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R250	1-216-811-11	METAL CHIP 150 5% 1/16W	(FR)
R301	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R302	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R303	1-216-853-11	METAL CHIP 470K 5% 1/16W	
R304	1-216-849-11	METAL CHIP 220K 5% 1/16W	
R305	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R306	1-216-851-11	METAL CHIP 330K 5% 1/16W	
R307	1-216-793-11	RES,CHIP 4.7 5% 1/16W	
R308	1-216-833-91	RES,CHIP 10K 5% 1/16W	
R309	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R310	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R311	1-218-899-11	METAL CHIP 150K 0.50% 1/16W	
R312	1-218-887-11	METAL CHIP 47K 0.50% 1/16W	
R314	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R315	1-216-853-11	METAL CHIP 470K 5% 1/16W	
R316	1-216-853-11	METAL CHIP 470K 5% 1/16W	
R317	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R318	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R319	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R321	1-216-853-11	METAL CHIP 470K 5% 1/16W	
R322	1-216-805-11	METAL CHIP 47 5% 1/16W	
R323	1-216-805-11	METAL CHIP 47 5% 1/16W	
R601	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R602	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R603	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R604	1-216-833-91	RES,CHIP 10K 5% 1/16W	
R605	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R606	1-216-833-91	RES,CHIP 10K 5% 1/16W	
R607	1-216-853-11	METAL CHIP 470K 5% 1/16W	
R608	1-216-833-91	RES,CHIP 10K 5% 1/16W	
R609	1-216-849-11	METAL CHIP 220K 5% 1/16W	
R610	1-216-847-11	METAL CHIP 150K 5% 1/16W	
R611	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R612	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R613	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R614	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	

Ref. No.	Part No.	Description			Remarks
R615	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R616	1-216-845-11	METAL CHIP	100K	5%	1/16W
R617	1-216-851-11	METAL CHIP	330K	5%	1/16W
R618	1-216-857-11	METAL CHIP	1M	5%	1/16W
R619	1-216-857-11	METAL CHIP	1M	5%	1/16W
R620	1-216-845-11	METAL CHIP	100K	5%	1/16W
R702	1-216-855-11	METAL CHIP	680K	5%	1/16W
R703	1-216-821-11	METAL CHIP	1K	5%	1/16W
R704	1-216-853-11	METAL CHIP	470K	5%	1/16W
R705	1-216-853-11	METAL CHIP	470K	5%	1/16W
R706	1-216-855-11	METAL CHIP	680K	5%	1/16W
R707	1-216-821-11	METAL CHIP	1K	5%	1/16W
R708	1-216-845-11	METAL CHIP	100K	5%	1/16W
R709	1-216-849-11	METAL CHIP	220K	5%	1/16W
R710	1-216-849-11	METAL CHIP	220K	5%	1/16W
R712	1-216-853-11	METAL CHIP	470K	5%	1/16W
R713	1-216-853-11	METAL CHIP	470K	5%	1/16W
R714	1-216-841-11	METAL CHIP	47K	5%	1/16W
R715	1-216-849-11	METAL CHIP	220K	5%	1/16W
R716	1-216-853-11	METAL CHIP	470K	5%	1/16W
R717	1-218-879-11	METAL CHIP	22K	0.50%	1/16W
R718	1-216-845-11	METAL CHIP	100K	5%	1/16W
R719	1-216-849-11	METAL CHIP	220K	5%	1/16W
R720	1-216-833-91	RES,CHIP	10K	5%	1/16W
R721	1-216-845-11	METAL CHIP	100K	5%	1/16W
R722	1-216-849-11	METAL CHIP	220K	5%	1/16W
R723	1-216-853-11	METAL CHIP	470K	5%	1/16W
R724	1-216-841-11	METAL CHIP	47K	5%	1/16W
R725	1-218-839-11	METAL CHIP	470	0.50%	1/16W
R726	1-218-851-11	METAL CHIP	1.5K	0.50%	1/16W
R727	1-216-821-11	METAL CHIP	1K	5%	1/16W
R728	1-216-849-11	METAL CHIP	220K	5%	1/16W
R729	1-216-853-11	METAL CHIP	470K	5%	1/16W
		< COMPOSITION CIRCUIT BLOCK >			
RB301	1-234-214-21	RES, NETWORK 1.5K		(3216)	
		< VARIABLE RESISTOR >			
RV601	1-223-325-21	RES, ADJ, METAL GLAZE 100K			
		< SWITCH >			
S301	1-692-605-11	SWITCH, SLIDE (VOLUME)			
S701	1-762-516-11	SWITCH, PUSH (1 KEY)(A/B)			
S702	1-771-475-21	SWITCH, SLIDE (F/R)			
		< VIBRATOR >			
X701	1-767-289-11	VIBRATOR, CERAMIC (4MHz)			
**********					
*	1-674-823-11	SUB BOARD			
		*********			
		< SWITCH >			
S703	1-771-053-21	SWITCH, KEY BOARD (OPERATION)			
**********					

Ref. No.	Part No.	Description	Remarks
		MISCELLANEOUS	
		**********	
S704	1-762-553-11	SWITCH, LEAF (TAPE IN/ATS)	
M601	1-763-165-21	MOTOR (CAPSTAN/REEL MOTOR)	(WITH PULLY)
HP701	1-500-623-11	HEAD, MAGNETIC (PLAYBACK)	
PM701	1-454-674-32	SOLENOID, PLUNGER	
**********			
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-418-544-11	REMOTE CONTROL UNIT(RM-WME22S)	
⚠	1-528-252-21	BATTERY CHARGER (BC-7S) (UK)	
	1-528-299-41	BATTERY, NI-CD (NC-6WM) (AEP,UK,FR)	
	1-528-299-51	BATTERY, NI-CD (NC-6WM) (US,CND)	
⚠	1-528-434-13	BATTERY CHARGER (BC-7SG) (AUS)	
	1-528-543-22	BATTERY, NI-CD (NC-6WM) (AUS)	
⚠	1-528-580-21	BATTERY CHARGER (BC-7HT) (E,JE)	
⚠	1-528-676-22	BATTERY CHARGER (BC-9HR) (KR)	
⚠	1-528-713-21	BATTERY CHARGER (BC-7DC) (US,CND)	
⚠	1-528-744-23	BATTERY CHARGER (BC-7DY) (AEP,FR)	
	1-528-842-11	BATTERY, NICKEL HYDROGEN (NH-14WM)	(E,KR,JE)
⚠	1-569-007-11	ADAPTOR, CONVERSION 2P (E,JE)	
	1-759-213-11	CASE, BATTERY (US,CND,E,KR,AUS,JE)	
	1-759-700-21	CASE, BATTERY (DC IN 1.5V) (AEP,UK,FR)	
	3-008-521-01	CASE, BATTERY RECHARGEABLE	
	3-029-488-01	POUCH, CARRYING	
	3-867-217-01	MANUAL, INSTRUCTION	(JAPNESE/ENGLISH/KOREAN) (JE)
	3-867-217-11	MANUAL, INSTRUCTION (ENGLISH/FRENCH)	(US,CND,AEP,UK,FR,AUS,CND,CND)
	3-867-217-21	MANUAL, INSTRUCTION (GERMAN/DUTCH)	(AEP)
	3-867-217-31	MANUAL, INSTRUCTION (SWEDISH/ITALIAN)	(AEP)
	3-867-217-41	MANUAL, INSTRUCTION	(SPANISH/PORTUGUESE)(AEP,E)
	3-867-217-51	MANUAL, INSTRUCTION (FINNISH) (AEP)	
	3-867-217-61	MANUAL, INSTRUCTION	(ENGLISH/CHINESE/KOREAN) (E,KR)
	8-953-739-90	HEADPHONE MDR-E832SP	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

9-927-157-11

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