

# WM-35/45

## SERVICE MANUAL



WM-45: **AL 11**  
*US Model*  
*Canadian Model*

WM-35:  
*AEP Model*  
*UK Model*

### SPECIFICATIONS

Tape Transport Mechanism Type	MF-WMF45
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Frequency response 40–15,000 Hz (with metal tapes or CrO<sub>2</sub> tapes)  
40–15,000 Hz (with normal tapes)  
Power requirements 3 V dc, two Size AA batteries (IEC designation R6)  
Battery life (hours)

Batteries	Playback
Sony Eveready AM3 alkaline or Eveready No. 91 alkaline	8
Sony SUM-3(NS) New Super or Eveready No. 1015	4

For maximum performance, we recommend the use of alkaline batteries.

Dimensions Approx. 106 x 140 x 43 mm (w/h/d)  
(4 $\frac{1}{4}$  x 5 $\frac{5}{8}$  x 1 $\frac{3}{4}$  inches)  
incl. projecting parts and controls  
Approx. 89 x 137 x 37 mm (w/h/d)  
(3 $\frac{5}{8}$  x 5 $\frac{1}{2}$  x 1 $\frac{1}{2}$  inches)  
excl. projecting parts and controls  
Weight Approx. 330 g (12 oz) incl. batteries excl. other accessories  
Accessories supplied Stereo headphones (1 pair open air type)  
Belt clip (1)

STEREO CASSETTE PLAYER  
**SONY**<sup>®</sup>



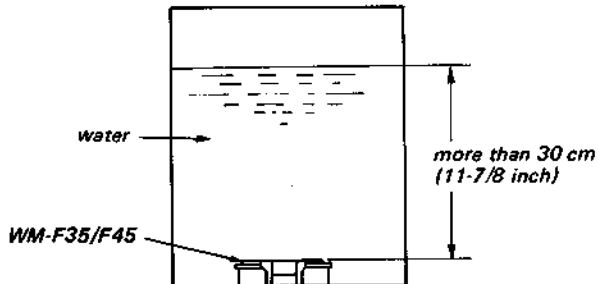
# WM-35/45

## NOTE ON REPAIR

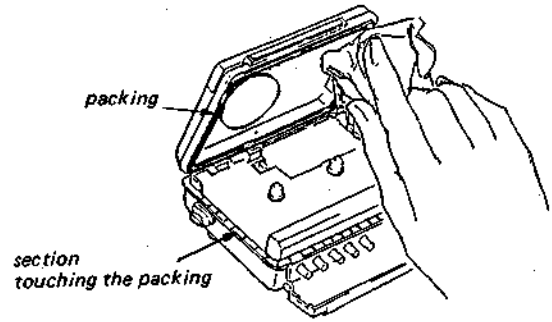
This model is waterproof, so be sure to confirm waterproofing after repair.

## WATERPROOF CHECK

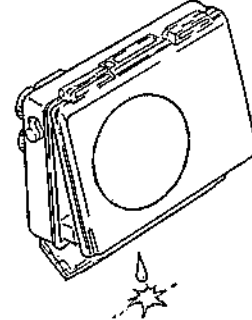
- (1) Insert batteries or a cassette tape in the set.  
(So that it will sink.)
- (2) Place in more than 30 cm of water for 30 minutes.  
(Close DC jack and packing firmly.)



- (3) Remove from the water after 30 minutes and wipe off all moisture.
- (4) Check all operations. (If water has entered, abnormal operation will occur.)
- (5) Open the cassette case and wipe off all moisture on the packing and case sections touching the packing.



- (6) Shake the set and confirm that no water comes out.

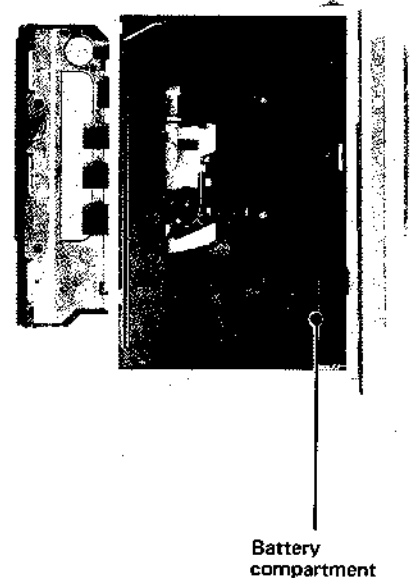
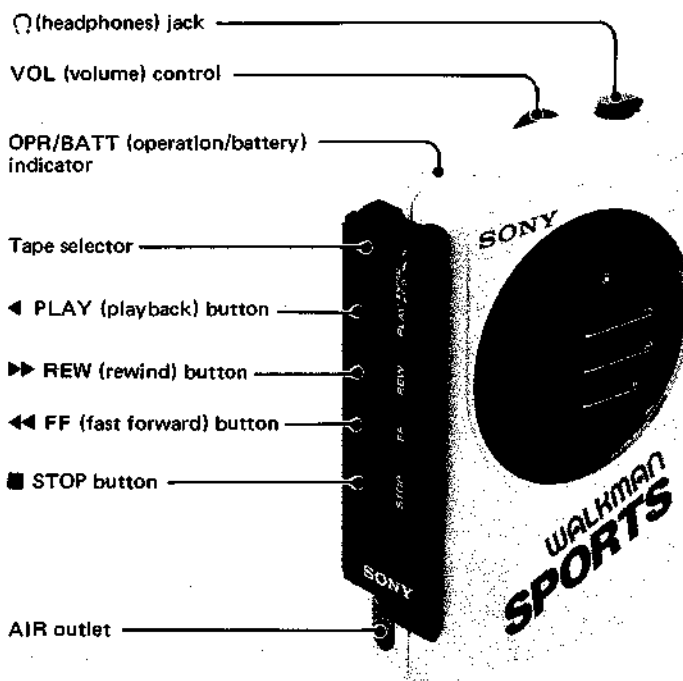


- (7) When waterproofing is confirmed, mount the ornamental sheet and ornamental plate assy (A).  
(Wipe off the water on the screw to prevent rusting.)

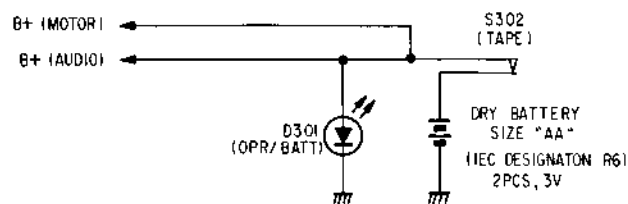
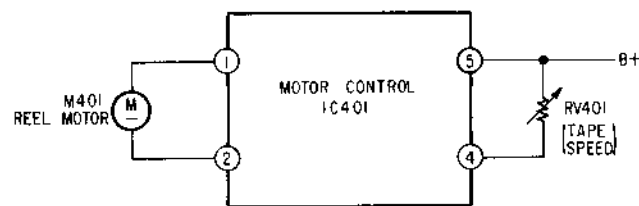
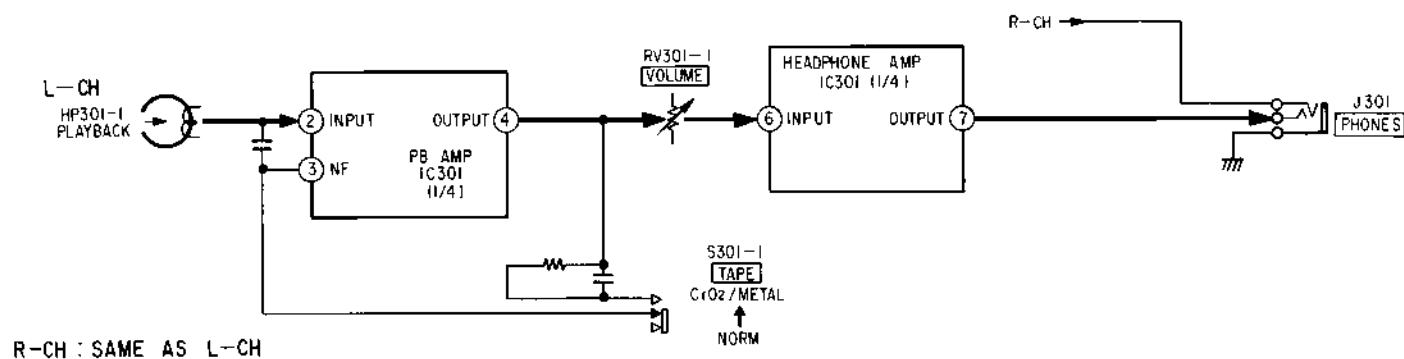
## IF LEAKAGE OCCURS DURING WATERPROOF CHECK:

Dry the mechanism section and amp board, jack, etc. with a hairdryer, perform waterproofing procedures again and recheck starting with step (1).

## PARTS IDENTIFICATION



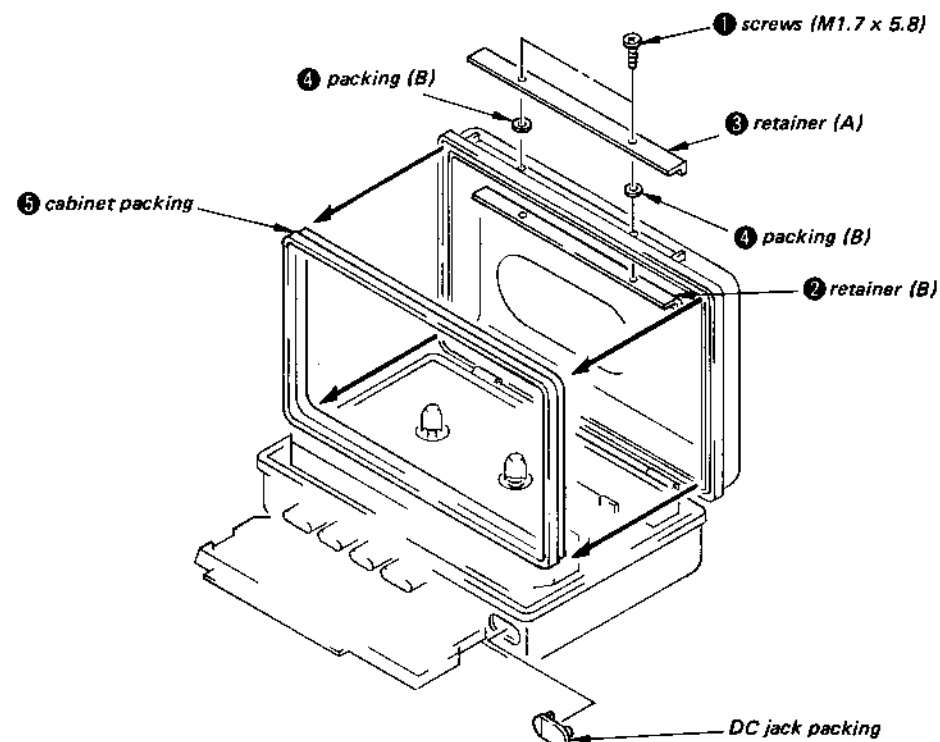
SECTION 1  
BLOCK DIAGRAM



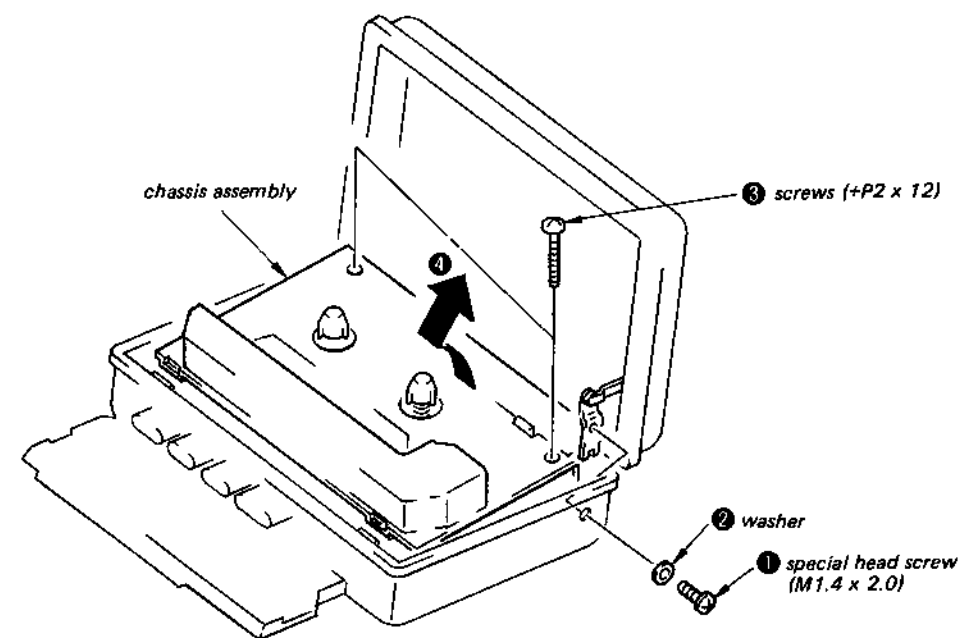
SECTION 2  
DISASSEMBLY

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

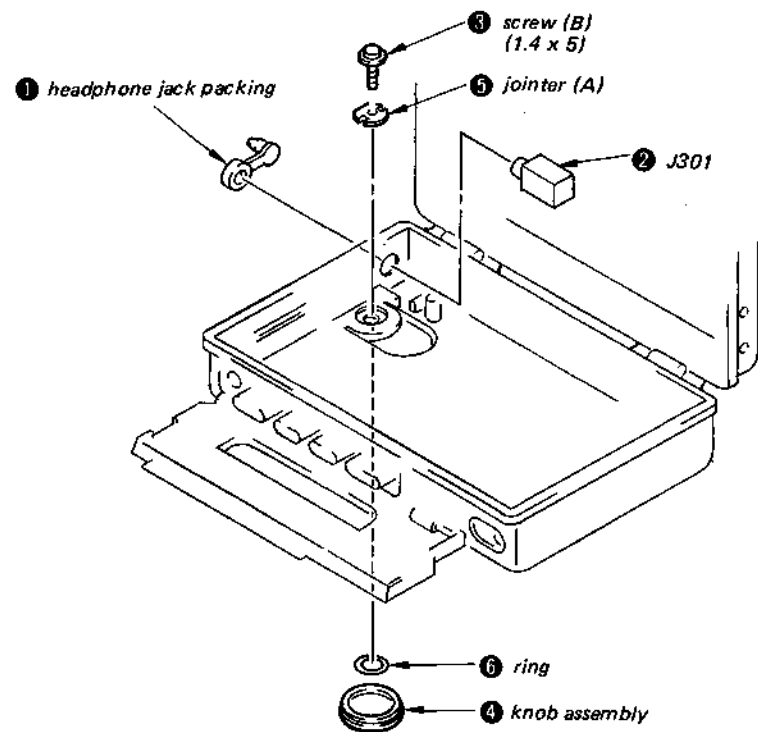
PACKINGS



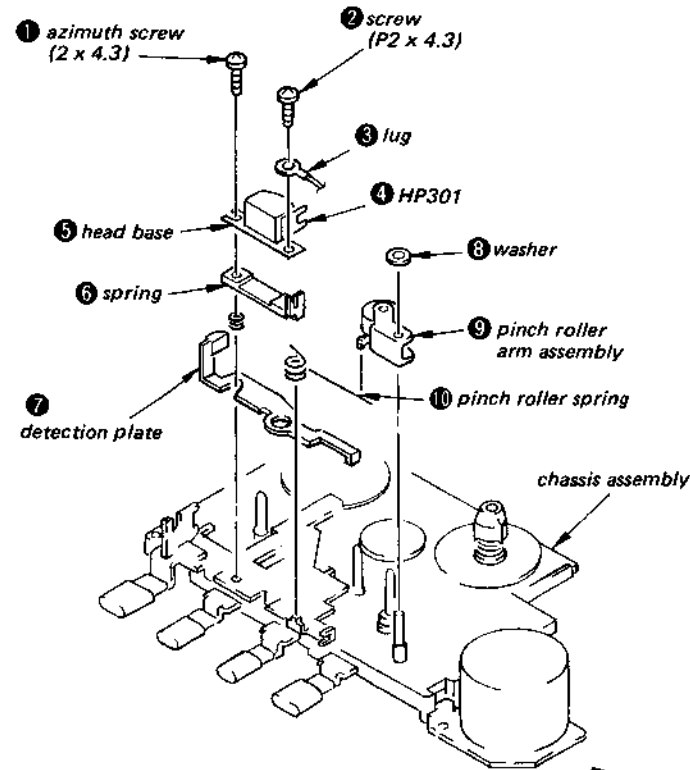
CHASSIS ASSEMBLY



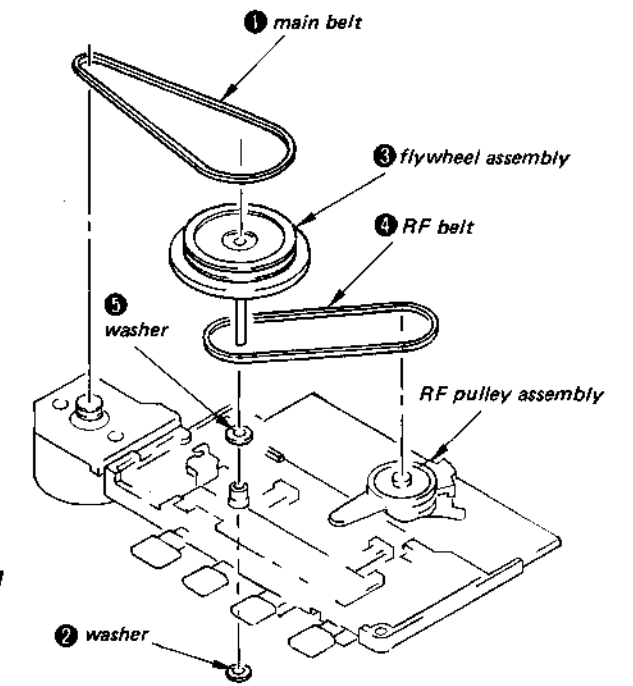
VOLUME KNOB, HEADPHONE JACK (J301)



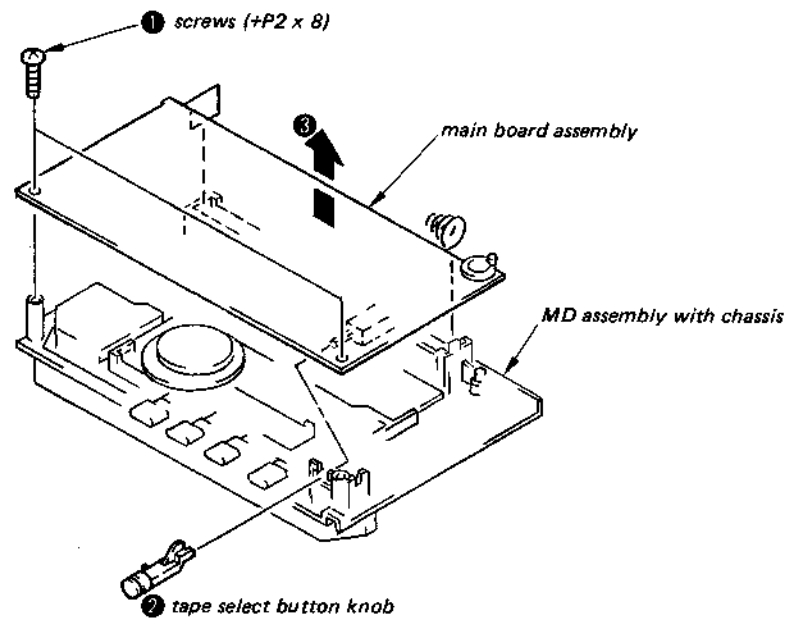
PB HEAD AND PINCH ROLLER ASSEMBLY



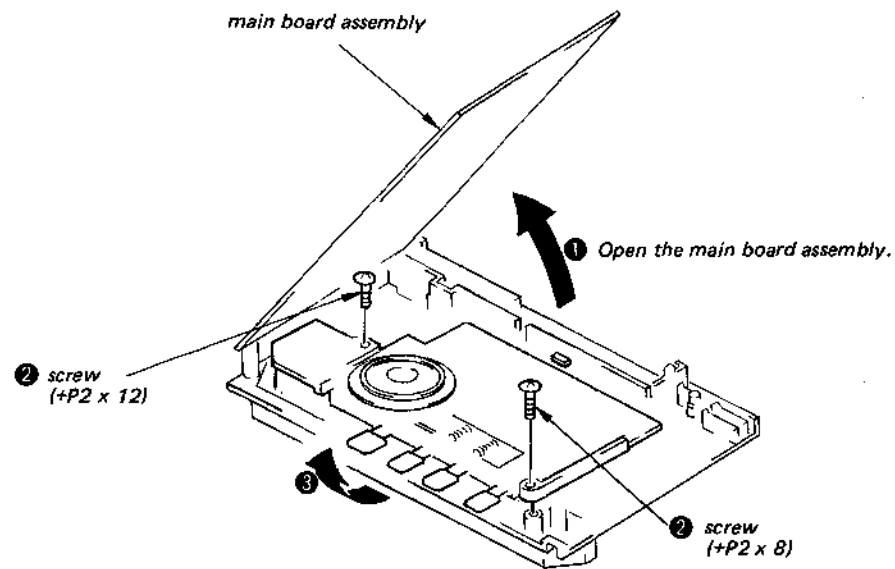
DRIVING BELTS AND FLYWHEEL ASSEMBLY



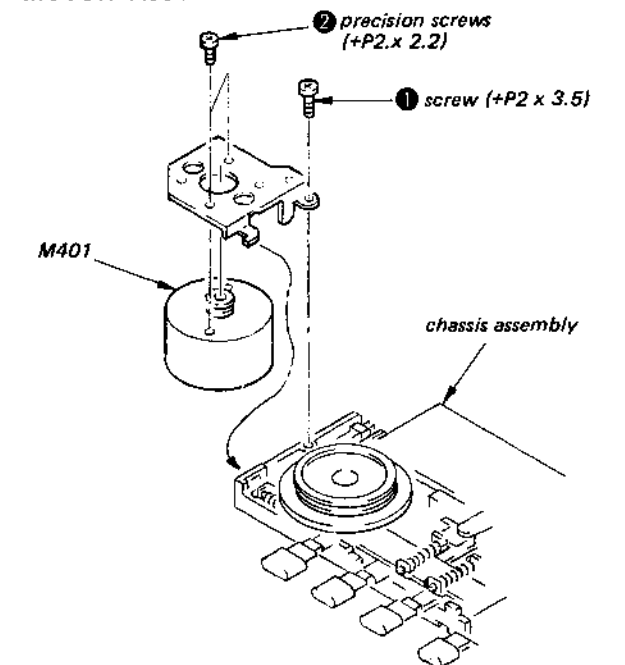
MAIN BOARD ASSEMBLY



MD ASSEMBLY



MOTOR ASSEMBLY



SECTION 3  
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.

3-1. MECHANICAL ADJUSTMENT

TORQUE MEASUREMENT

Mode	Torque meter	Meter reading
FWD	CQ-102C	20 - 35 g·cm (0.28 - 0.49 oz·inch)
FWD Back Tension		2 - 4.5 g·cm (0.03 - 0.06 oz·inch)
REV	CQ-102RB	20 - 35 g·cm (0.28 - 0.49 oz·inch)
REV Back Tension		2 - 4.5 g·cm (0.03 - 0.06 oz·inch)
FF, REW	CQ-201B	more than 60 g·cm (0.83 oz·inch)

TAPE TENSION MEASUREMENT

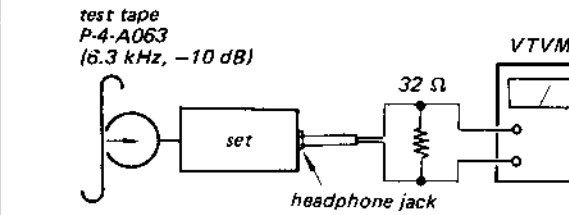
Mode	Tension meter	Meter reading
FWD	CQ-403A	more than 60 g (2.1 oz)
REV	CQ-403R	more than 60 g (2.1 oz)

3-2. ELECTRICAL ADJUSTMENTS

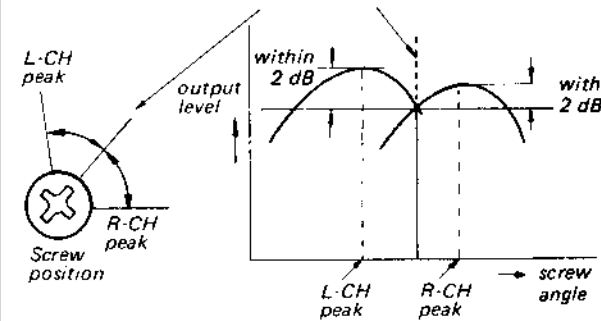
PB Head Azimuth Adjustment

Procedure:

- Mode: playback



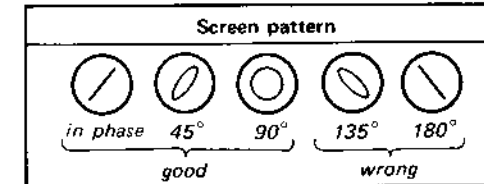
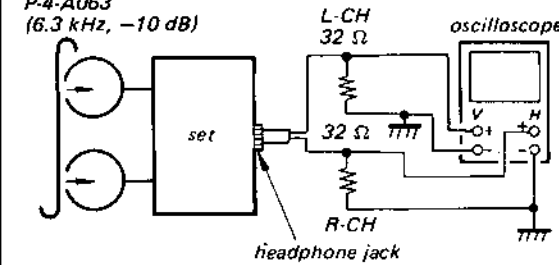
- Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 2 dB.



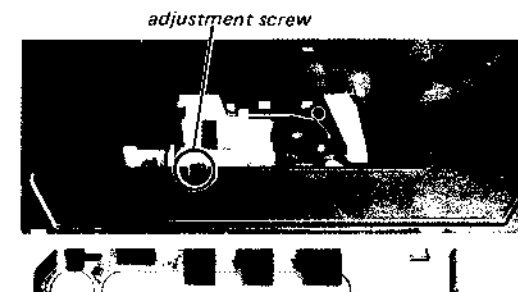
3. Phase Check

Mode: playback

test tape  
P-4-A063  
(6.3 kHz, -10 dB)



Adjustment Location:



Tape Speed Adjustment

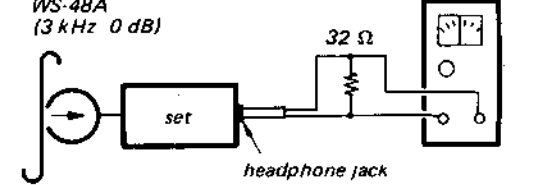
Setting:

VOL control: mechanical mid

Procedure:

- Mode: playback

test tape  
WS-48A  
(3 kHz 0 dB)

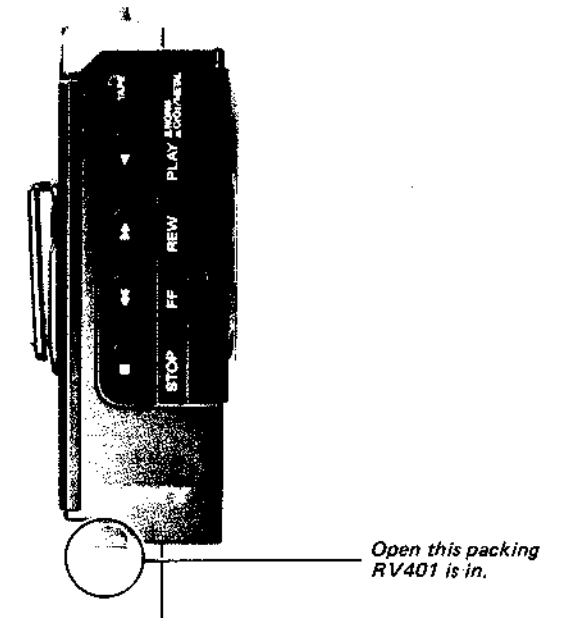


- Play back the center of the tape in FWD mode and adjust RV401 for the specification.
- The specification should be satisfied in any condition of tape top, tape end, high and low voltage, vertical and horizontal stand.

Specification:

Speed checker	Digital frequency counter
±3%	2,910 - 3,090 Hz

Adjustment Location:



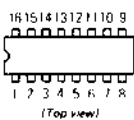
SECTION 4  
DIAGRAMS

WM-35/45 WM-35/45

4-1. MOUNTING DIAGRAM - Conductor Side -

• Semiconductor Lead Layouts

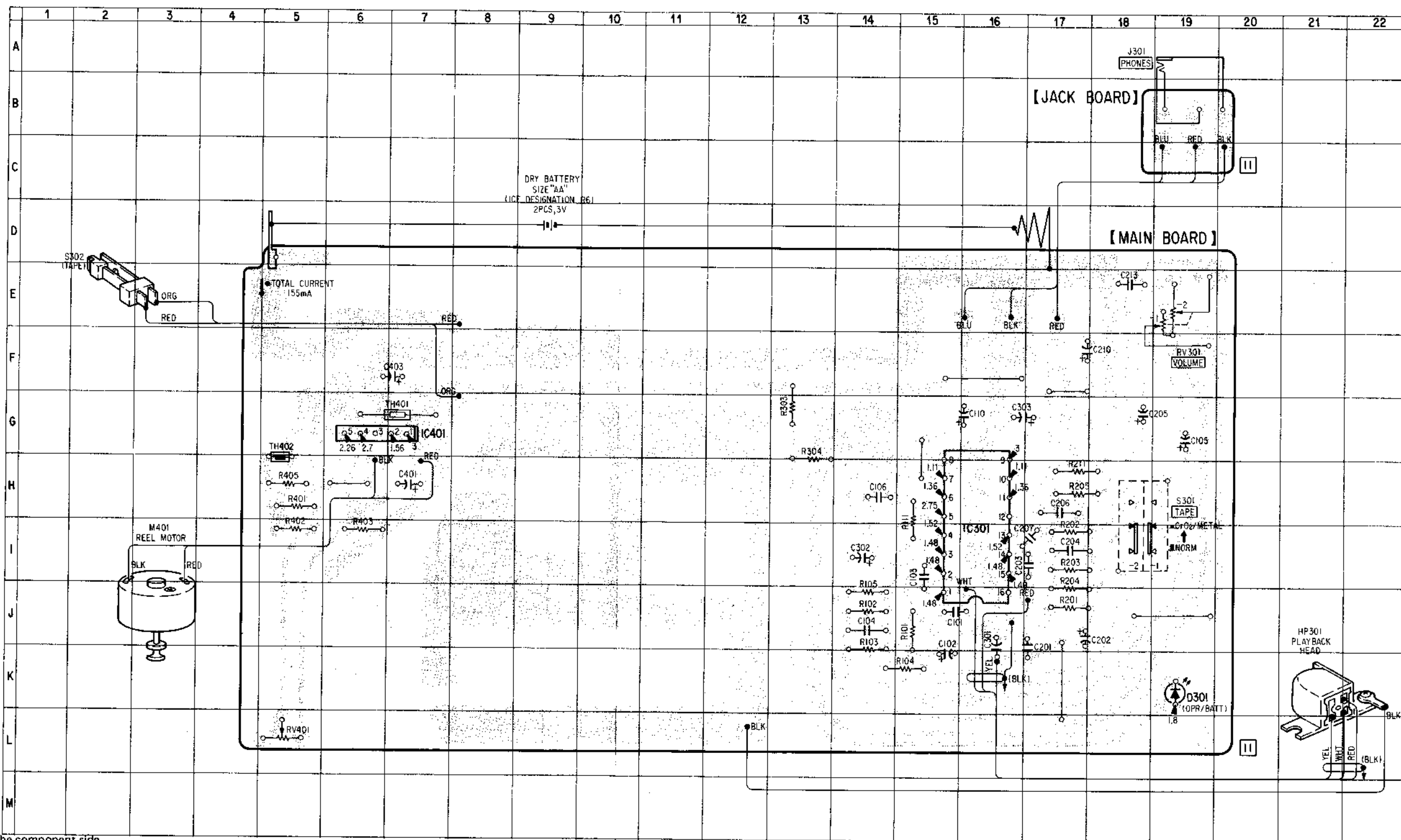
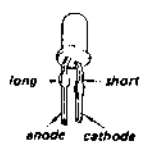
LA4570



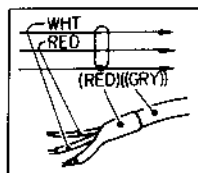
LA5523



TLR124



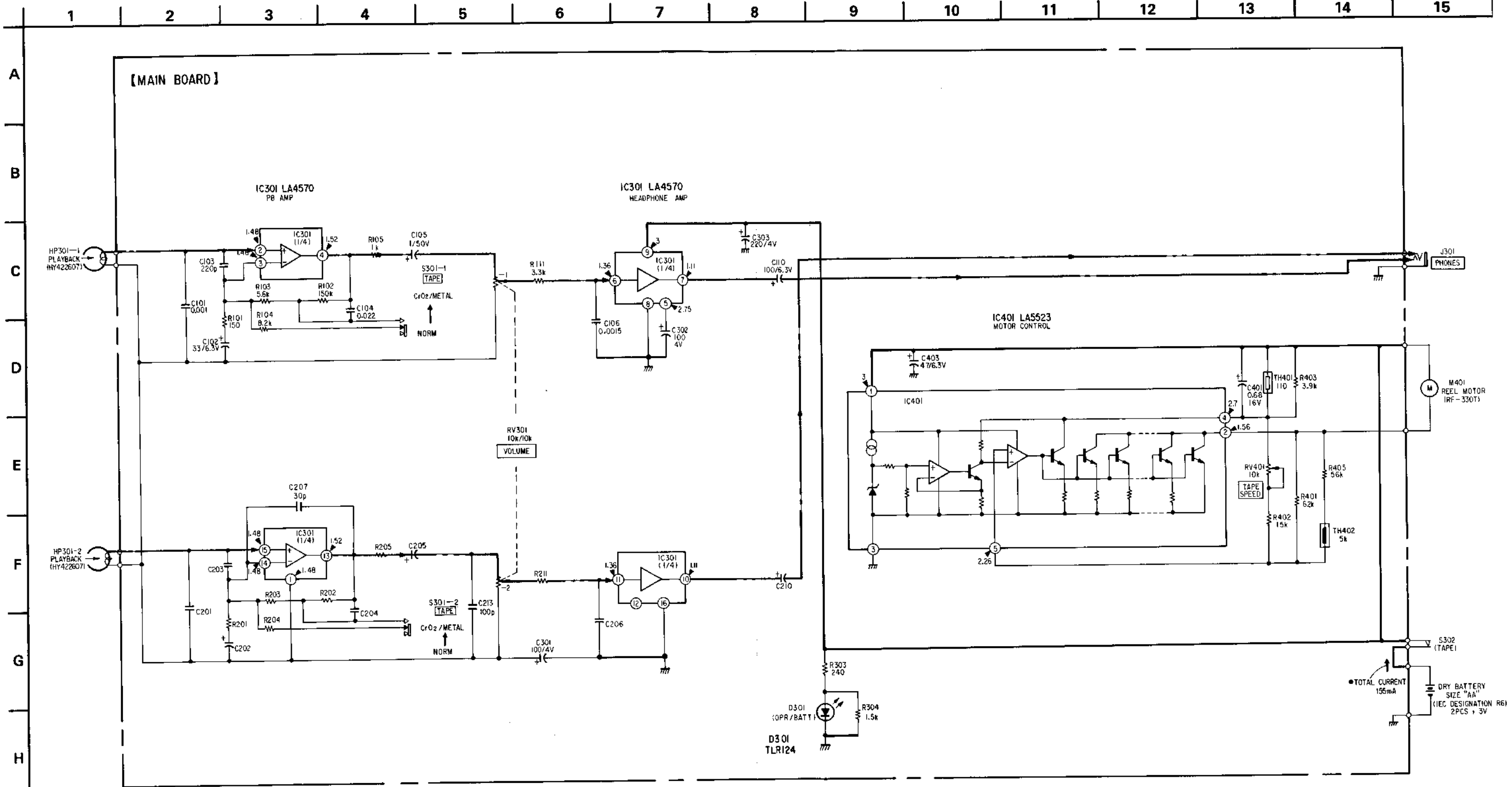
- Note:
- : parts extracted from the component side.
  - : parts extracted from the conductor side.
  - : part mounted on the conductor side.
  - : component-side pattern.
  - Color code or sleeving over the end of the jacket.



• SEMICONDUCTOR LOCATION

Ref. No.	Location
D301	K-19
IC301	I-16
IC401	G-6

4-2. SCHEMATIC DIAGRAM



Note:

- All capacitors are in  $\mu\text{F}$  unless otherwise noted. pF:  $\mu\text{pF}$  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $\frac{1}{6}W$  or less unless otherwise specified.
- Components for right channel have same values as for left channel. Reference numbers are coded from 201.

- : B+ bus.
- : adjustment for repair.
- Total current is measured with no cassette installed. no mark: TAPE MODE

- Power voltage is DC 3 V and fed with regulated dc power supply from DC IN 3 V jack. Voltages are dc with respect to ground in no signal mode. Voltage variations may be noted due to normal production tolerances.

- : signal path.
- : L-CH signal path.
- : R-CH signal path.

• Switch

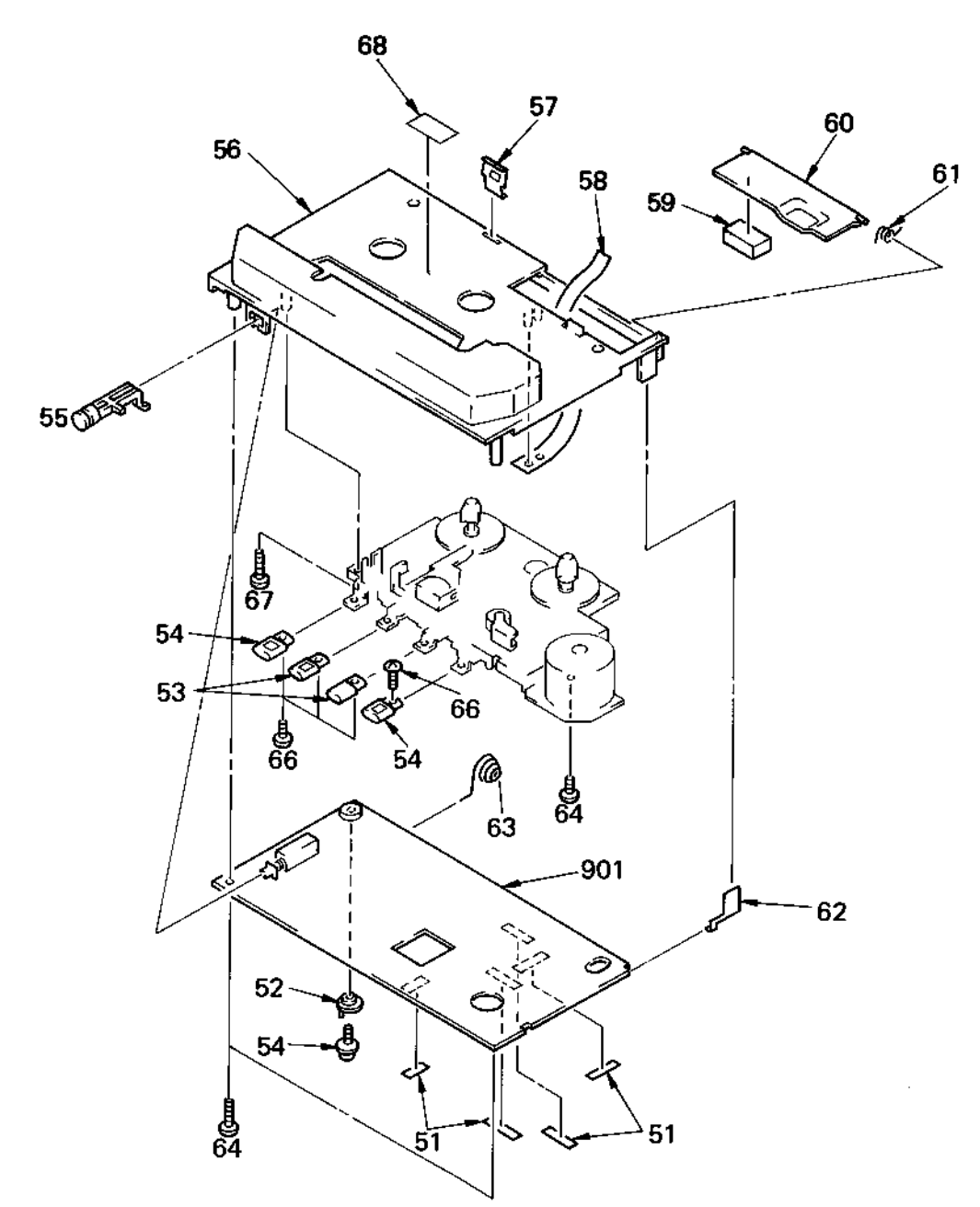
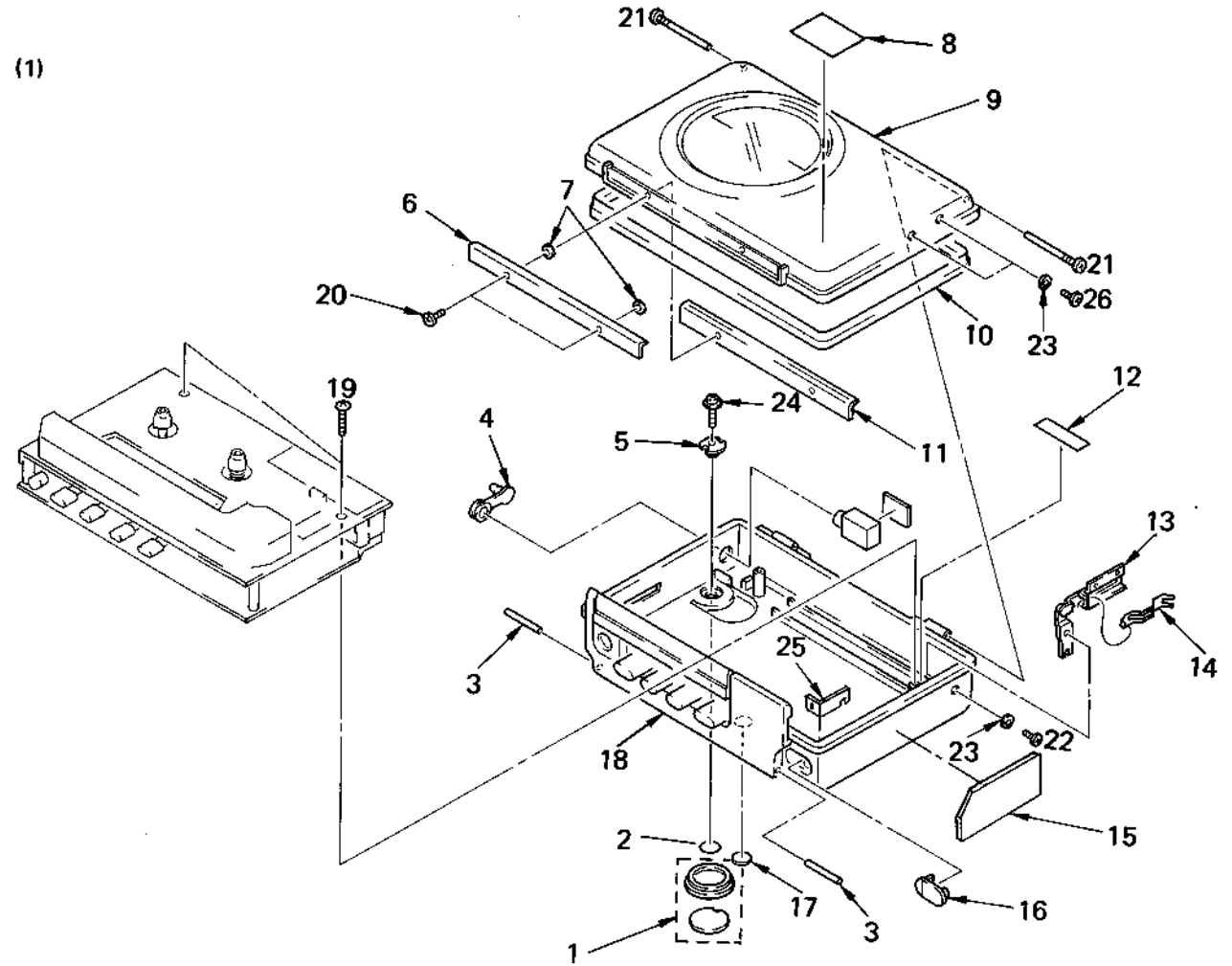
Ref. No.	Switch	Position
S301	(TAPE SELECT) CrO <sub>2</sub> , METAL/NORMAL	NORMAL
S302	(TAPE)	ON

SECTION 5  
EXPLODED VIEWS AND PARTS LIST

NOTE:  
The mechanical parts with no reference number in the exploded views are not supplied.

Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The construction parts of an assembled part are indicated with a collation number in the remark column.

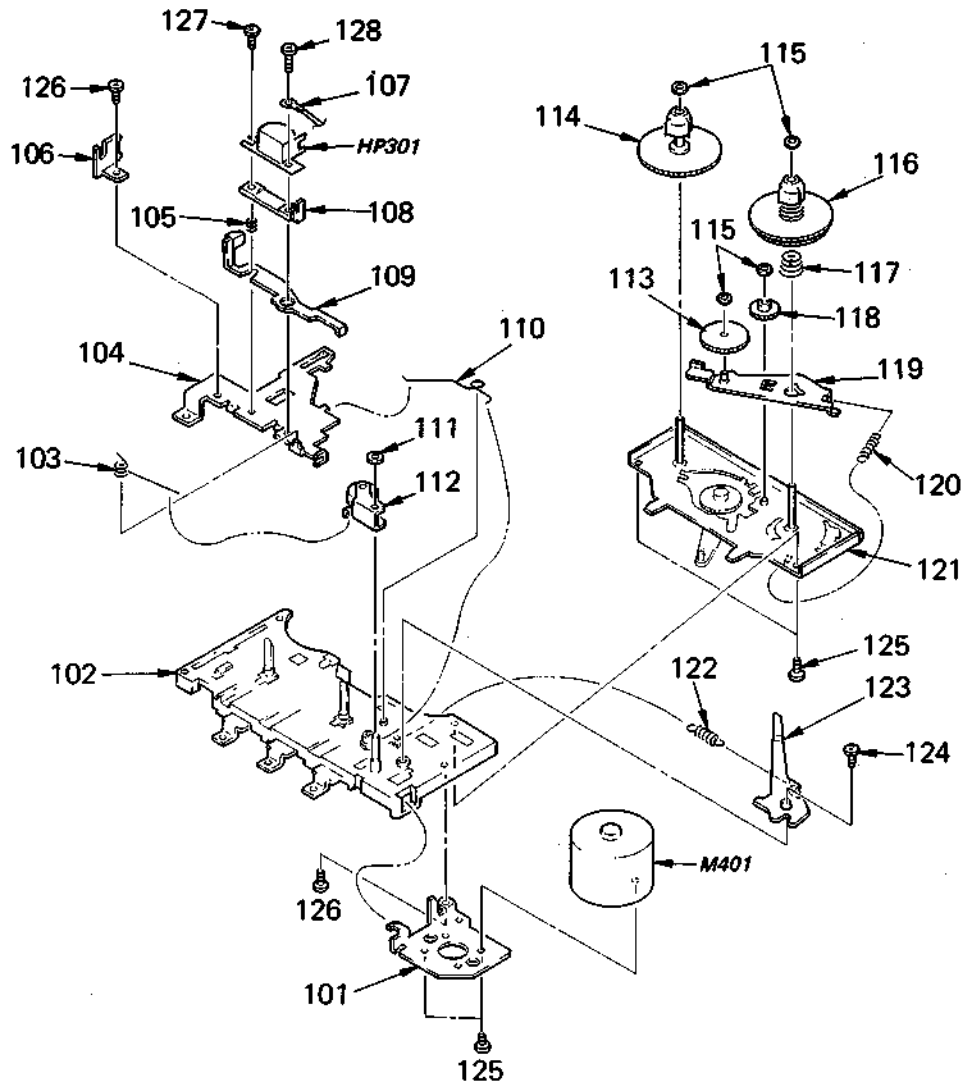


No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
1	X-3334-024-1	(35:YELLOW/45)...KNOB ASSY		16	3-312-826-00	PACKING, DC JACK	
	X-3334-024-2	(35:BLUE).....KNOB ASSY		17	3-312-841-00	(YELLOW)...PLATE (A), ORNAMENTAL, SCREW	
	X-3334-024-3	(35:GREY/45:Canadian:GREY)...KNOB ASSY			3-312-841-60	(BLUE)....PLATE (A), ORNAMENTAL, SCREW	
2	3-326-573-01	RING (DIA.4.9X DIA.7.1), 0			3-312-841-80	(GREY)....PLATE (A), ORNAMENTAL, SCREW	
3	3-649-266-00	PIN, PARALLEL		18	X-3334-033-1	(45:US).....CABINET ASSY, REAR	
4	3-326-520-01	PACKING, HP JACK			X-3334-033-2	(35:UK:YELLOW/45:Canadian:YELLOW).....CABINET ASSY, REAR	
5	3-334-018-01	JOINTER (A)			X-3334-033-3	(35:UK:BLUE).....CABINET ASSY, REAR	
6	3-334-021-01	RETAINER (A)			X-3334-033-4	(35:UK:GREY/45:Canadian:GREY).....CABINET ASSY, REAR	
7	3-326-149-01	PACKING (B)			X-3334-033-5	(35:AEP:YELLOW)...CABINET ASSY, REAR	
8	3-703-709-00	STICKER, SONY SYMBOL (15)			X-3334-033-6	(35:AEP:BLUE)....CABINET ASSY, REAR	
9	X-3334-032-1	(45:US).....CABINET ASSY, FRONT			X-3334-033-7	(35:AEP:GREY)....CABINET ASSY, REAR	
	X-3334-032-2	(45:Canadian:YELLOW)...CABINET ASSY, FRONT		19	7-685-107-19	SCREW +P 2X12 TYPE2 NON-SLIT	
	X-3334-032-3	(35:YELLOW)....CABINET ASSY, FRONT		20	3-326-145-11	SCREW (M1.7X5.8)	
	X-3334-032-4	(35:BLUE).....CABINET ASSY, FRONT		21	3-326-536-11	SCREW, TAPPING	
	X-3334-032-5	(35:GREY).....CABINET ASSY, FRONT		22	3-703-816-01	SCREW (M1.4X2.0), SPECIAL HEAD	
	X-3334-032-6	(45:Canadian:GREY)...CABINET ASSY, FRONT		23	3-326-135-01	WASHER	
10	3-334-010-01	PACKING, CABINET		24	3-318-201-21	SCREW (B) (1.4X5), TAPPING	
11	*3-334-022-01	RETAINER (B)		25	*3-335-647-01	PLATE, BLIND	
12	3-527-213-00	LABEL, SERIAL NUMBER		26	3-703-816-41	SCREW (M1.4X2.5), SPECIAL HEAD	
13	X-3326-102-1	PLATE ASSY, CLICK		902	*1-619-270-11	PC BOARD, JACK	
14	3-326-549-01	SPRING		J301	1-563-298-11	JACK (SMALL TYPE) (DIA. 3.5)	
15	3-335-633-01	(45:Canadian)...LABEL, MODEL NUMBER					
	3-335-634-01	(35:UK).....LABEL, MODEL NUMBER					

No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
51	3-831-441-XX	SPACER, KNOB		61	3-326-134-01	SPRING, TORSION	
52	3-334-019-01	JOINTER (B)		62	3-326-115-01	TERMINAL BOARD, BATTERY	
53	3-334-015-01	BUTTON (B), MD		63	3-335-627-01	SPRING	
54	3-334-014-01	BUTTON (A), MD		64	7-685-105-14	TPG +P 2X8, TYPE 2, NON-SLIT	
55	3-335-628-01	BUTTON, TAPE		65	3-703-502-41	SCREW	
56	3-335-630-01	CHASSIS		66	3-318-204-01	SCREW (M1.7X2.5), TAPPING	
57	3-326-112-01	SPRING		67	7-685-107-11	SCREW +P 2X12 TYPE2 NON-SLIT	
58	3-334-028-01	RIBBON, BATTERY		68	3-335-648-01	PLATE, ORNAMENTAL	
59	9-911-815-02	CUSHION, ANTENNA HOLDER		901	*A-3070-167-A	MOUNTED PCB, MAIN	
60	3-334-029-01	LID, BATTERY CASE					

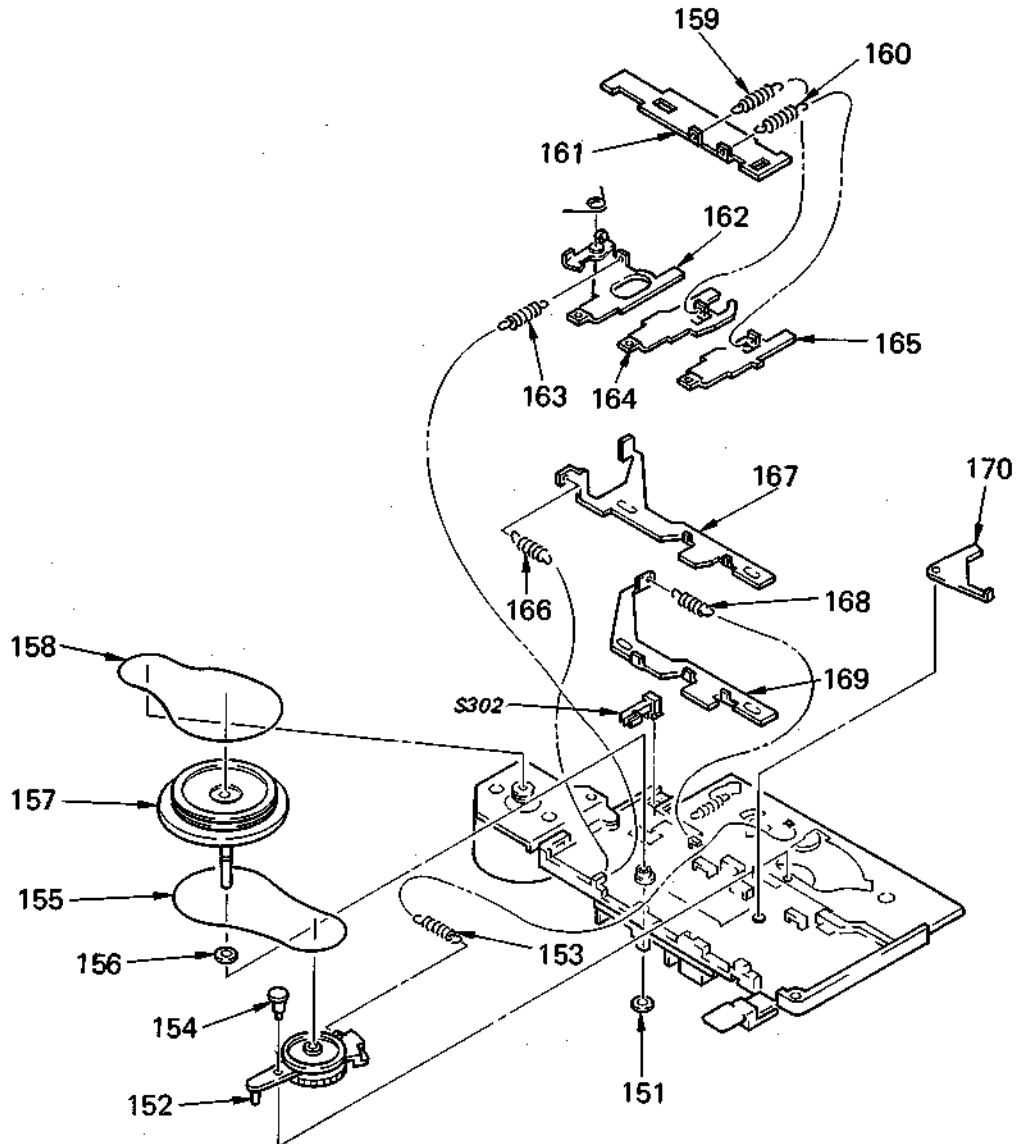


(3)



No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
101	*3-596-961-01	BRACKET, MOTOR		116	3-596-934-01	REEL ASSY, TAKE-UP	
102	3-596-953-01	CHASSIS ASSY		117	3-596-936-01	SPRING	
103	3-596-957-01	SP, PINCH ROLLER		118	3-596-941-01	GEAR, FF	
104	*3-596-954-01	PANEL, HEAD		119	3-596-938-01	RIVETING, TG PLATE	
105	3-596-907-01	SPRING		120	3-596-939-01	SPRING	
106	3-596-904-01	GUIDE, TAPE		121	3-596-933-01	RIVETING, REEL PC BOARD	
107	7-623-505-01	LUG, 2		122	3-596-914-01	SPRING	
108	3-596-965-01	BASE, H		123	*3-596-951-01	LEVER, AUTO	
109	*3-596-955-01	PLATE ASSY, DIRECTION		124	3-596-952-01	SCREW, AL	
110	3-596-903-01	SPRING		125	7-627-554-07	SCREW, PRECISION +P 2X2.2	
111	3-596-962-01	SCREW (P.W 1.6X3.8X0.3)		126	7-627-554-18	+P 2X3.5	
112	3-596-913-01	ARM ASSY, PINCH ROLLER		127	3-596-967-01	SCREW (2X4.3), AZIMUTH	
113	3-596-940-01	GEAR, T ROLLER		128	3-596-967-01	SCREW (PLUS MINUS P 2X4.3)	
114	3-596-935-01	REEL ASSY, SUPPLY		HP301	3-596-956-01	HEAD, PLAYBACK	
115	3-596-937-01	SCREW (1.2X3X0.25)		M401	3-596-968-01	PULLEY ASSY, MOTOR	

(4)



No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
151	3-596-932-01	SCREW (1.55X3.8X0.5)		161	3-596-926-01	RETAINER	
152	3-596-943-01	PULLEY ASSY, RF		162	*3-596-963-01	LEVER, STOP BUTTON	
153	3-596-944-01	SPRING		163	3-596-920-01	SPRING	
154	3-596-945-01	SCREW, ARM COLLAR		164	3-596-922-01	LEVER, FF BUTTON	
155	3-596-931-01	BELT, RF		165	3-596-924-01	LEVER, RWD BUTTON	
156	3-701-437-11	WASHER		166	3-596-927-01	SPRING	
157	3-596-959-01	FLYWHEEL ASSY		167	3-596-918-01	PLATE, FUNCTION, SW	
158	3-596-930-01	BELT, MAIN		168	3-596-917-01	SPRING	
159	3-596-923-01	SPRING		169	3-596-916-01	PLATE, FUNCTION	
160	3-596-925-01	SPRING		170	3-596-915-01	LEVER, RWD	
				S302	3-596-958-01	LEAF, SW	

SECTION 6  
ELECTRICAL PARTS LIST

NOTE:

- Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:

- MF:µF, PF:µµF.
- RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS

- MMH : mH, UH : µH

SEMICONDUCTORS

- In each case, U : µ, for example:
- UA...: µA..., UPA...: µPA..., UPC...: µPC,
- UPD...: µPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description				
901	*A-3070-167-A	MOUNTED PCB, MAIN				
902	*1-619-270-11	PC BOARD, JACK				
C101	1-102-074-00	CERAMIC	0.001MF	10%	50V	
C102	1-123-646-00	ELECT	33MF	20%	6.3V	
C103	1-102-110-00	CERAMIC	220PF	10%	50V	
C104	1-161-055-00	CERAMIC	0.022MF	10%	25V	
C105	1-123-611-00	ELECT	1MF	20%	50V	
C106	1-102-119-00	CERAMIC	0.0015MF	10%	50V	
C110	1-123-661-00	ELECT	100MF	20%	6.3V	
C204	1-161-055-00	CERAMIC	0.022MF	10%	25V	
C201	1-102-074-00	CERAMIC	0.001MF	10%	50V	
C202	1-123-646-00	ELECT	33MF	20%	6.3V	
C203	1-102-110-00	CERAMIC	220PF	10%	50V	
C205	1-123-611-00	ELECT	1MF	20%	50V	
C206	1-102-119-00	CERAMIC	0.0015MF	10%	50V	
C207	1-102-962-00	CERAMIC	30PF	5%	50V	
C210	1-123-661-00	ELECT	100MF	20%	6.3V	
C213	1-102-106-00	CERAMIC	100PF	10%	50V	
C301	1-124-433-00	ELECT	100MF	20%	4V	
C302	1-124-433-00	ELECT	100MF	20%	4V	
C303	1-124-434-00	ELECT	220MF	20%	4V	
C401	1-131-415-00	TANTALUM	0.68MF	20%	16V	
C403	1-123-647-00	ELECT	47MF	20%	6.3V	
D301	8-719-812-41	DIODE TLR124				
HP301	3-596-956-01	HEAD, PLAYBACK				
IC301	8-759-802-85	IC LA457D				
IC401	8-759-801-12	IC LA5523				
J301	1-563-298-11	JACK (SMALL TYPE) (DIA. 3.5)				
M401	3-596-968-01	PULLEY ASSY, MOTOR				
R101	1-247-811-00	CARBON	150	5%	1/6W	
R102	1-247-883-00	CARBON	150K	5%	1/6W	
R103	1-247-849-00	CARBON	5.6K	5%	1/6W	
R104	1-247-853-00	CARBON	8.2K	5%	1/6W	
R105	1-249-417-11	CARBON	1K	5%	1/6W	
R111	1-249-423-11	CARBON	3.3K	5%	1/6W	
R201	1-247-811-00	CARBON	150	5%	1/6W	
R202	1-247-883-00	CARBON	150K	5%	1/6W	
R203	1-247-849-00	CARBON	5.6K	5%	1/6W	
R204	1-247-853-00	CARBON	8.2K	5%	1/6W	
R205	1-249-417-11	CARBON	1K	5%	1/6W	
R211	1-249-423-11	CARBON	3.3K	5%	1/6W	

ELECTRICAL PARTS

Ref.No.	Part No.	Description				
R303	1-247-816-00	CARBON	240	5%	1/6W	
R304	1-249-419-11	CARBON	1.5K	5%	1/6W	
R401	1-247-874-00	CARBON	62K	5%	1/6W	
R402	1-247-859-00	CARBON	15K	5%	1/6W	
R403	1-247-845-00	CARBON	3.9K	5%	1/6W	
R405	1-247-873-00	CARBON	56K	5%	1/6W	
RV301	1-230-593-11	RES, VAR, CARBON 10K/10K				
RV401	1-230-775-11	RES, ADJ, CARBON 10K				
S301	1-570-177-11	SWITCH, PUSH (1 KEY)				
S302	3-596-958-01	LEAF, SW				
TH401	1-807-222-11	THERMISTOR (POSITIVE)				
TH402	1-800-279-21	THERMISTOR 5K				

ACCESSORY & PACKING MATERIAL

Part No.	Description
3-326-162-01	WASHER, POLYETHYLENE, SLIT
3-334-035-01	CUSHION (B)
3-334-036-01	CUSHION (A)
3-335-621-01	MASTER CARTON, 6 SETS SUB
3-335-620-01	(45:US).....INDIVIDUAL CARTON
3-335-654-01	(35:UK).....INDIVIDUAL CARTON
3-335-655-01	(35:AEP).....INDIVIDUAL CARTON
3-335-656-01	(45:Canadian)....INDIVIDUAL CARTON
3-527-213-00	LABEL, SERIAL NUMBER
3-701-624-00	BAG, POLYETHYLENE
3-703-485-11	BAG, POLYETHYLENE
3-765-240-11	(35)...MANUAL, INSTRUCTION
3-765-240-21	(45)...MANUAL, INSTRUCTION
3-765-240-31	(45:Canadian)...MANUAL, INSTRUCTION
3-765-240-41	(35:AEP).....MANUAL, INSTRUCTION
3-795-748-21	(45:US)...SAFETY INSTRUCTIONS, HEADPHONE
3-831-441-XX	CUSHION, SPEAKER
3-831-441-XX	SPACER
8-952-261-90	(35:YELLOW/45)...HEADPHONE MDR-W15L/Y SET
8-952-261-91	(35:BLUE).....HEADPHONE MDR-W15L/L SET
8-952-261-92	(35:GREY).....HEADPHONE MDR-W15L/G SET
X-3334-001-1	CASE ASSY, CARRYING