

TC-150/BT-50

USA Model
Canada Model
E Model
AEP Model
UK Model



BT-50: for USA

CASSETTE-CORDER

SPECIFICATIONS

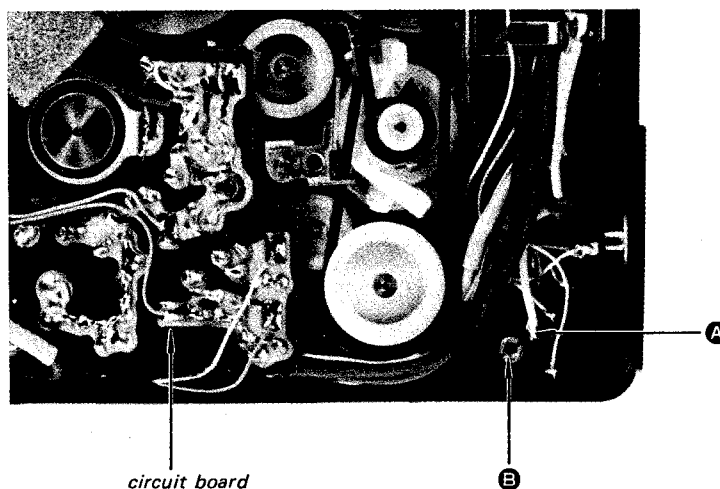
Power Requirements:	6 V dc, four batteries, size AA, (IEC Designation R-6), Rechargeable Battery Pack BP-28 (optional) or 12 V car battery with SONY Car Battery Cord DCC-127H (optional) 120 V ac, 60 Hz with SONY AC Power Adaptor AC-9W (optional) for USA Model with SONY AC Power Adaptor AC-9 (optional) for Canada Model 220 ~ 240 V ac (100, 110 ~ 127 V adjustable), 50/60 Hz with SONY Power Adaptor AC-4W (optional) for E Model 110, 220 V ac adjustable, 50/60 Hz with SONY Power Pack AC-456C (optional) ... for AEP Model 240 V ac, 50 Hz with SONY AC Power Adaptor AC-15 (optional) for UK Model	Fast Winding Time:	Approx. 1 min. 50 sec. with SONY Cassette C-60
Power Consumption:	6 W (with AC-9W or AC-9) 9 W (with AC-15) 9 VA (with AC-456C) 7.4 VA at 50 Hz (with AC-4W) 6.8 VA at 60 Hz (with AC-4W)	Frequency Response:	90 ~ 10,000 Hz (USA, Canada, E, AEP Model) 150 ~ 8,000 Hz (UK Model)
Power Output:	360 mW (max.) (USA, Canada, E, AEP Model) 320 mW (max.) (UK Model)	Input:	MIC 1 (mini jack) sensitivity 0.2 mV (-72 dB) for low impedance microphone
Speaker:	5 cm (2 inches) dia.	Output:	EARPHONE 1 (mini jack) 8 Ω earphone or load impedance 10 k Ω or higher
Recording System:	2-track 1-channel monaural	Other Jack:	REMOTE 1
Tape Speed:	4.8 cm/sec (1 $\frac{7}{8}$ ips)	Battery Life:	Approx. 2.5 hours of continous recording from the built-in microphone with SONY Super Batteries, size AA (IEC Designation R-6)
		Dimensions:	Approx. 174(w) x 29.5(h) x 113(d) mm 6 $\frac{7}{8}$ (w) x 1 $\frac{1}{4}$ (h) x 4 $\frac{1}{2}$ (d) inches
		Weight:	Approx. 760 g (1 lb 11 oz)

0 dB = 0.775 V

SONY®

SERVICE MANUAL

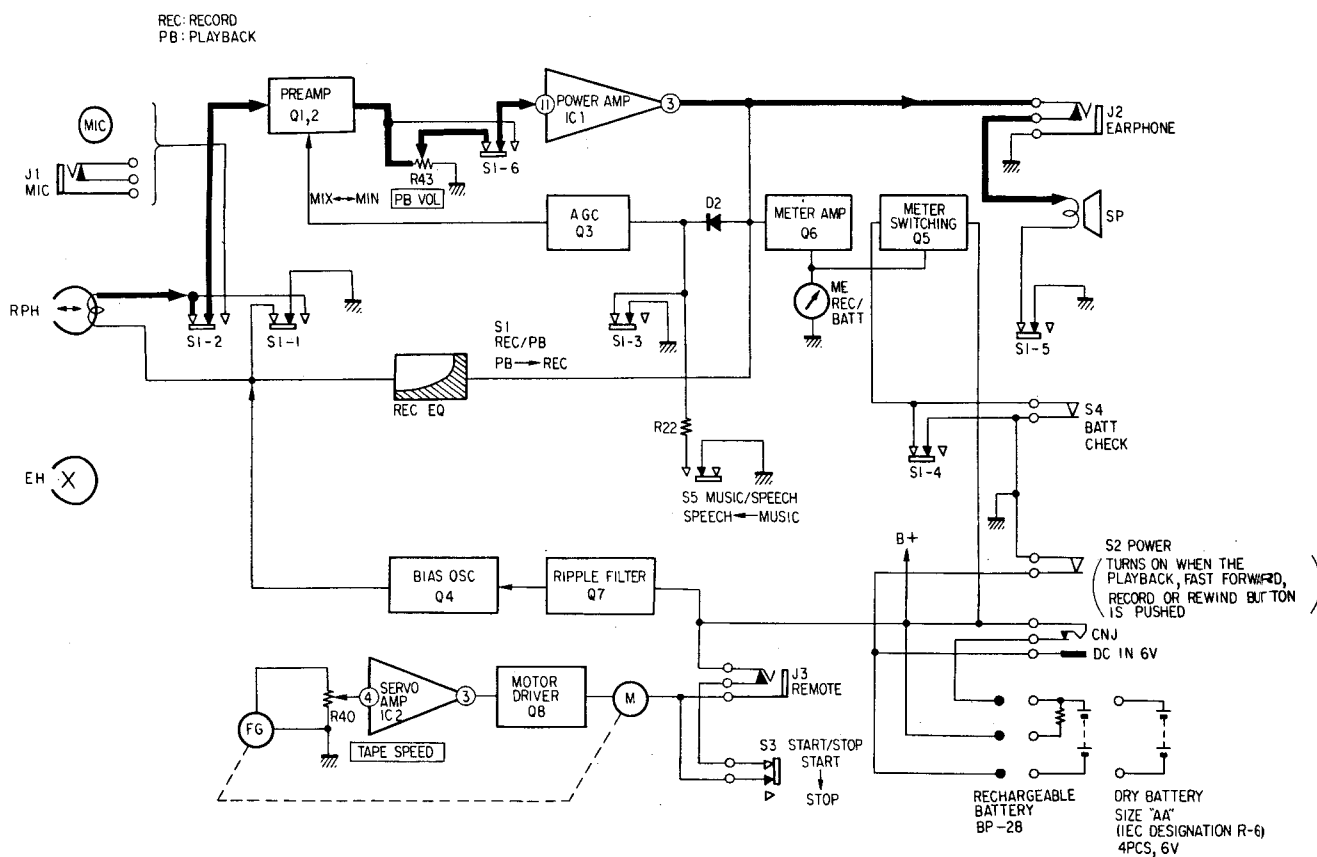
SERVICING NOTE



Before attaching the lower panel, confirm that portion **A** is detached from portion **B**.

SECTION 1 OUTLINE

1-1. BLOCK DIAGRAM



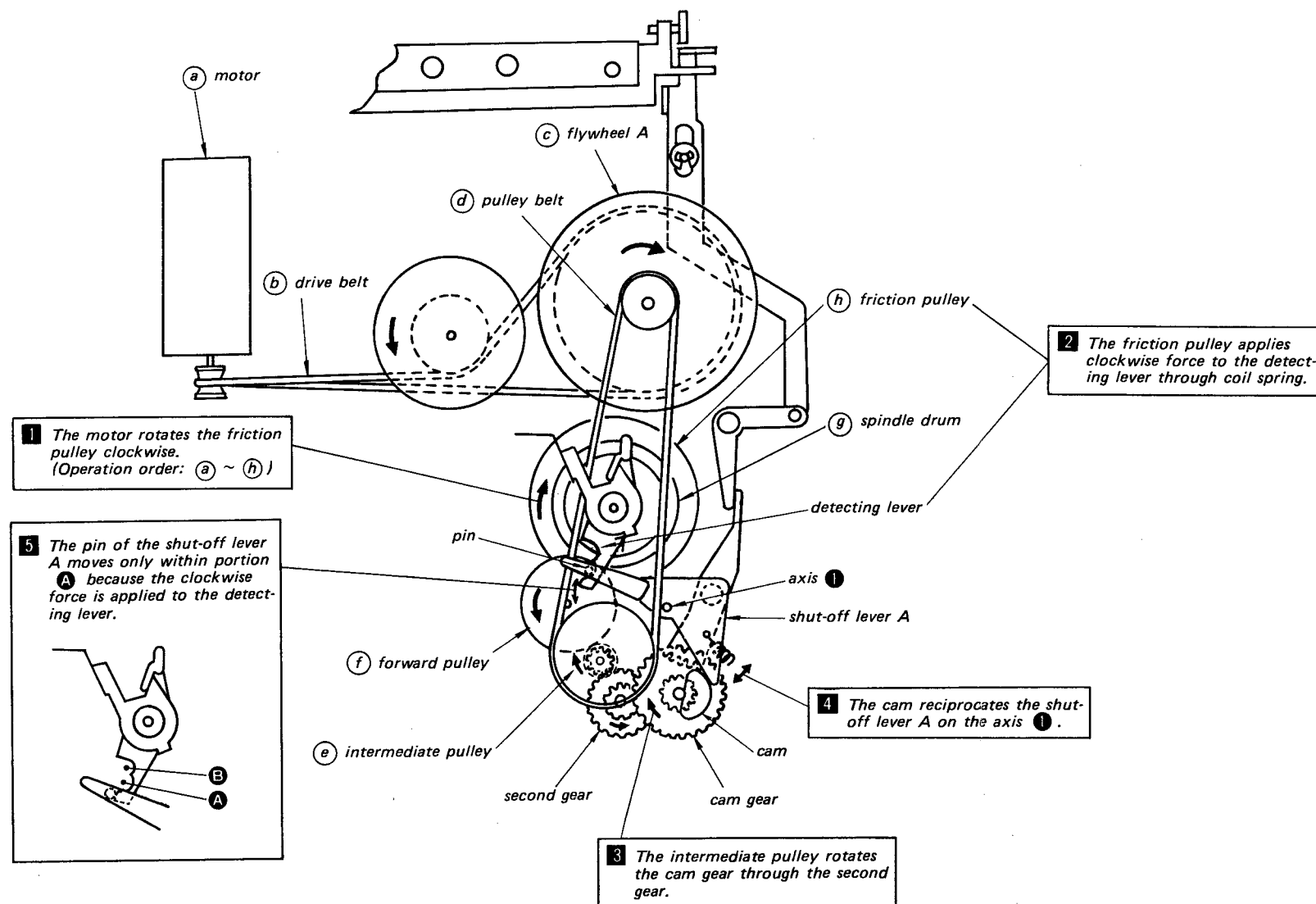
1-2. AUTOMATIC SHUT-OFF MECHANISM

TC-150 mechanism is so designed that it is automatically shuts tape transport off at tape end in record or playback mode. When the tape comes to the end, the tape tension stops the take-up reel spindle from rotating. This mechanism mechanically detects such

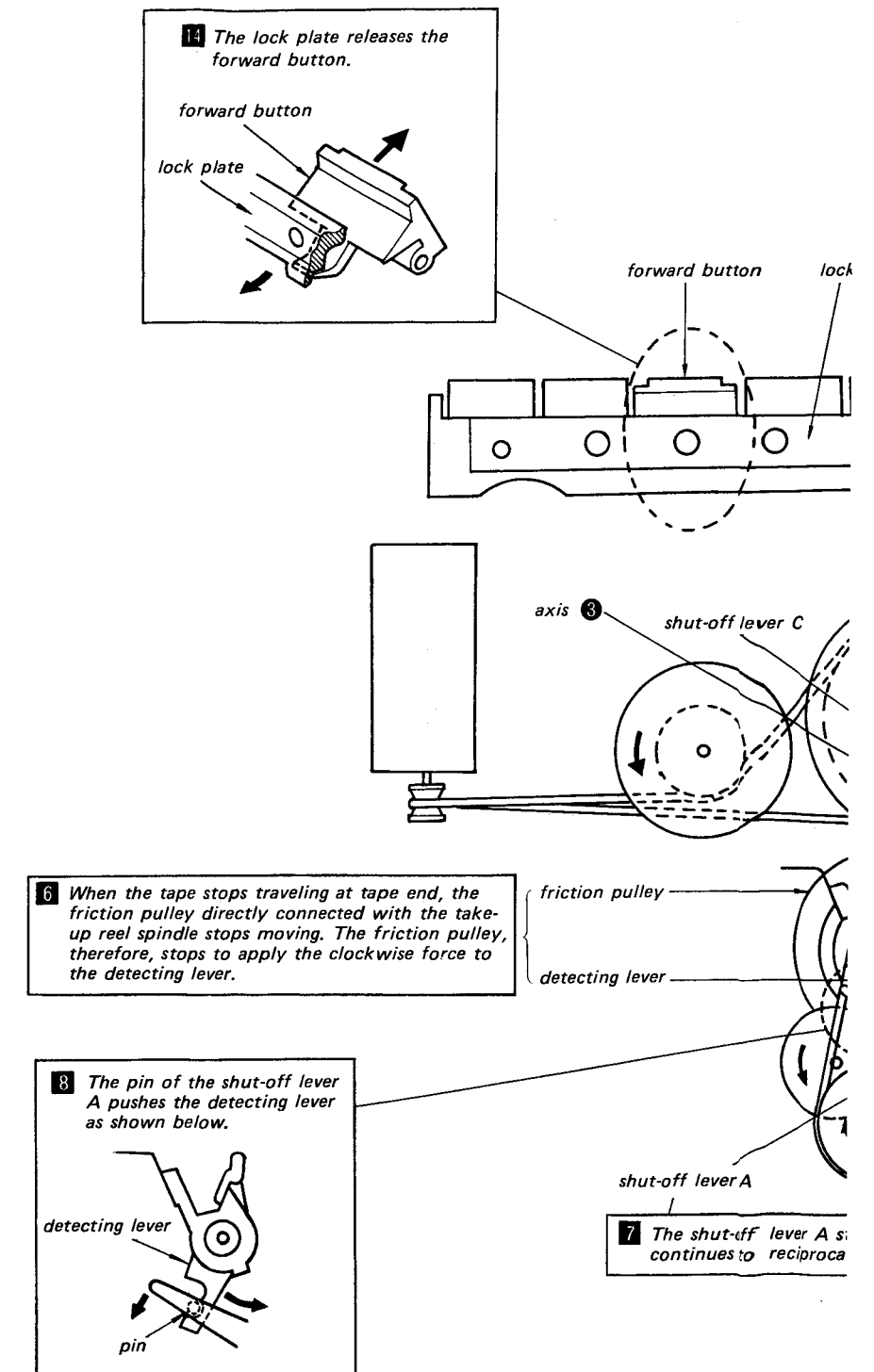
stop of the reel spindle rotation and returns tape transport to stop mode.

This operation in playback mode is described as follows. The operation in record mode is the same as in playback mode.

During tape travel: 1 ~ 5

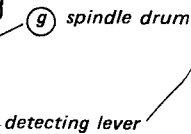
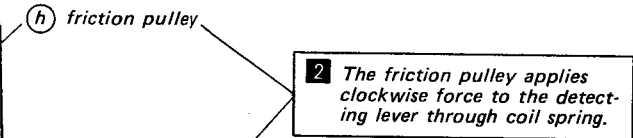
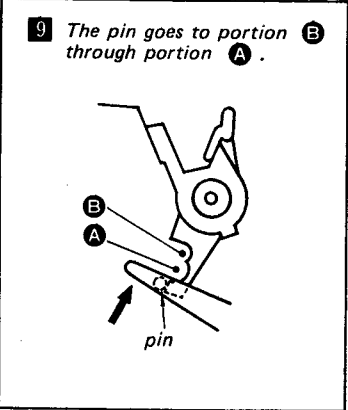
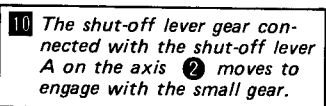
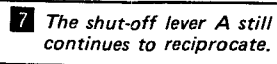
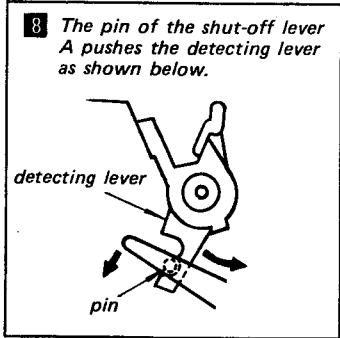
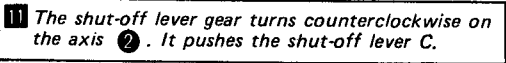
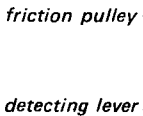
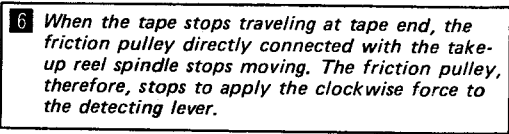
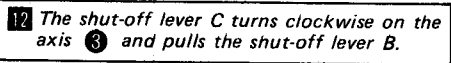
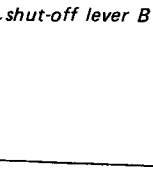
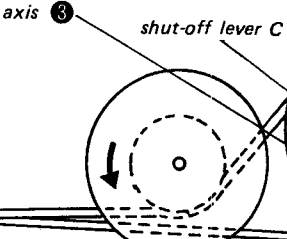
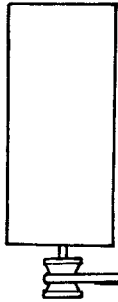
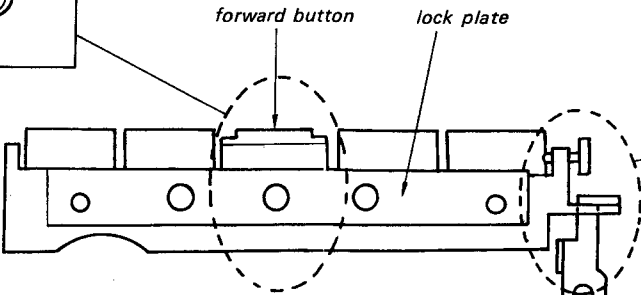
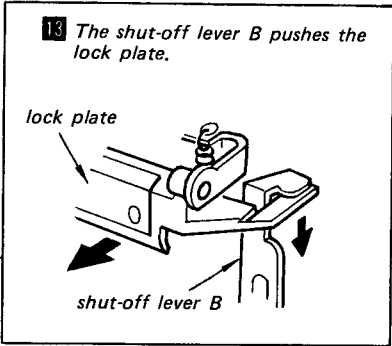
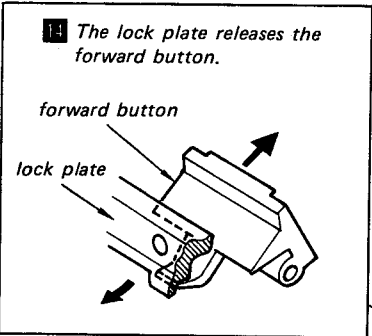


When tape stops traveling at tape end: 6 ~ 14

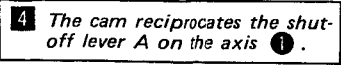


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When tape stops traveling at tape end: 6 ~ 14



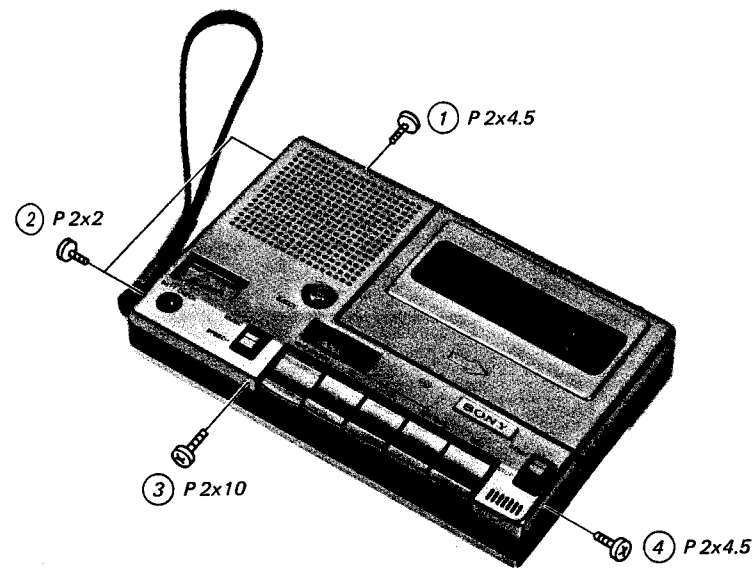
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ut-off lever A



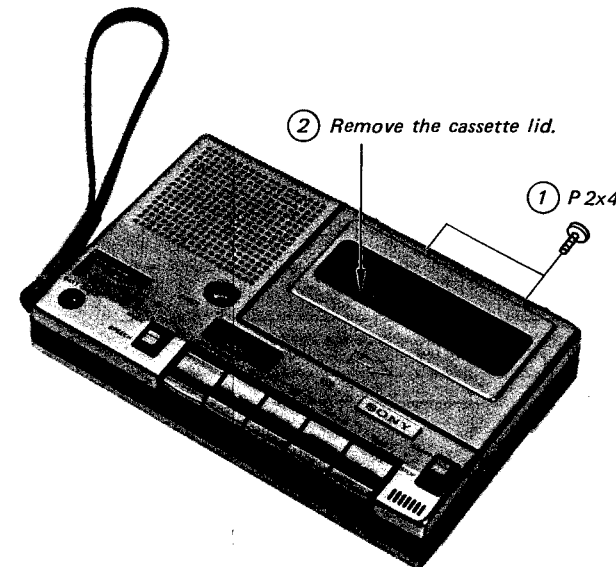
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SECTION 2 DISASSEMBLY

UPPER PANEL REMOVAL

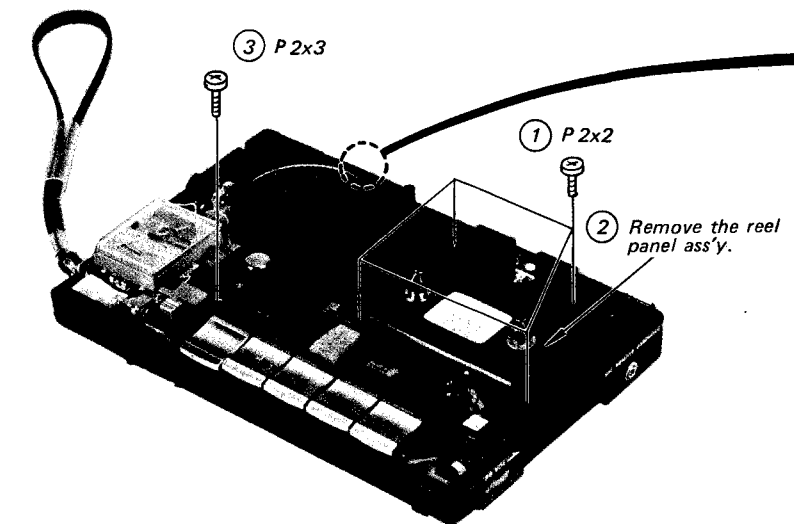


CASSETTE LID REMOVAL

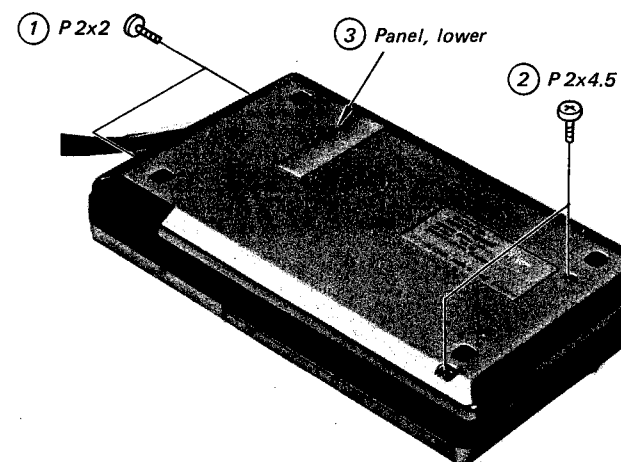


Note: To avoid losing toggle springs attached to the cassette lid, be sure to close the cassette lid and then remove it.

REEL PANEL REMOVAL: ① and ② MAIN CHASSIS REMOVAL (PART 1): ③

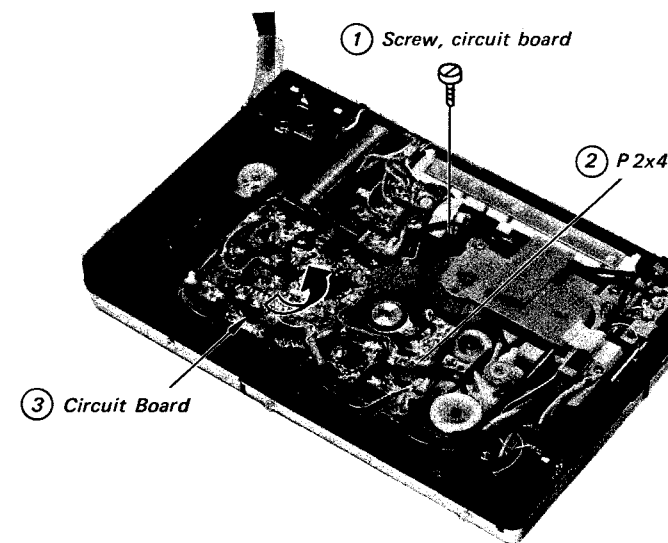


LOWER PANEL REMOVAL

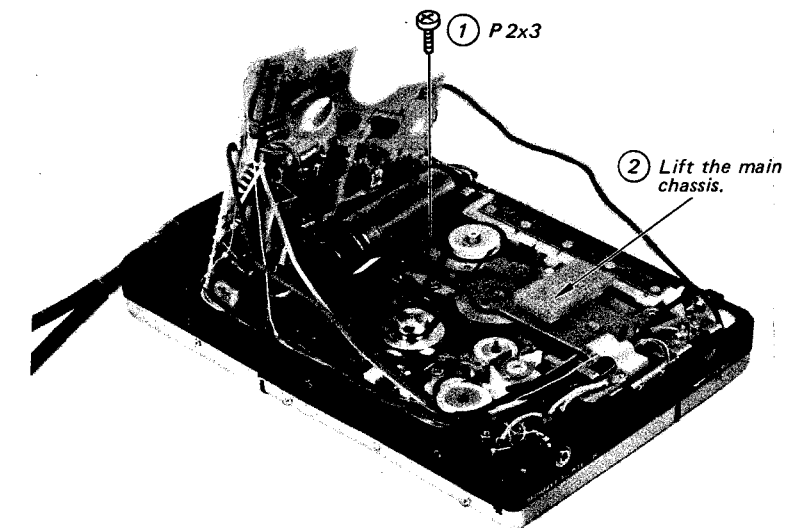


Be sure to use the screws specified above.

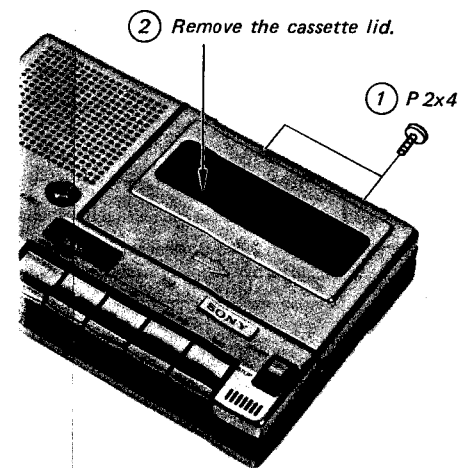
CIRCUIT BOARD REMOVAL



MAIN CHASSIS REMOVAL (PART 2)

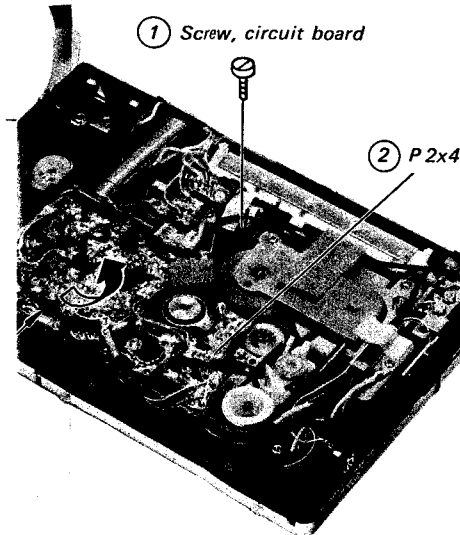


REMOVAL

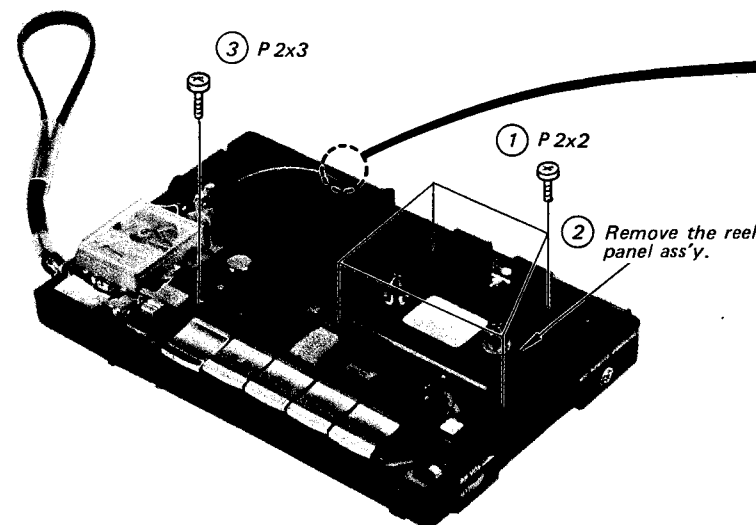


losing toggle springs attached to the cassette lid, close the cassette lid and then remove it.

REMOVAL



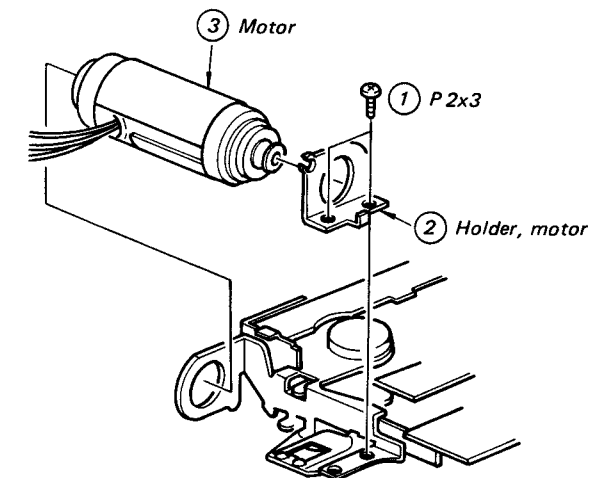
REEL PANEL REMOVAL: ① and ② MAIN CHASSIS REMOVAL (PART 1): ③



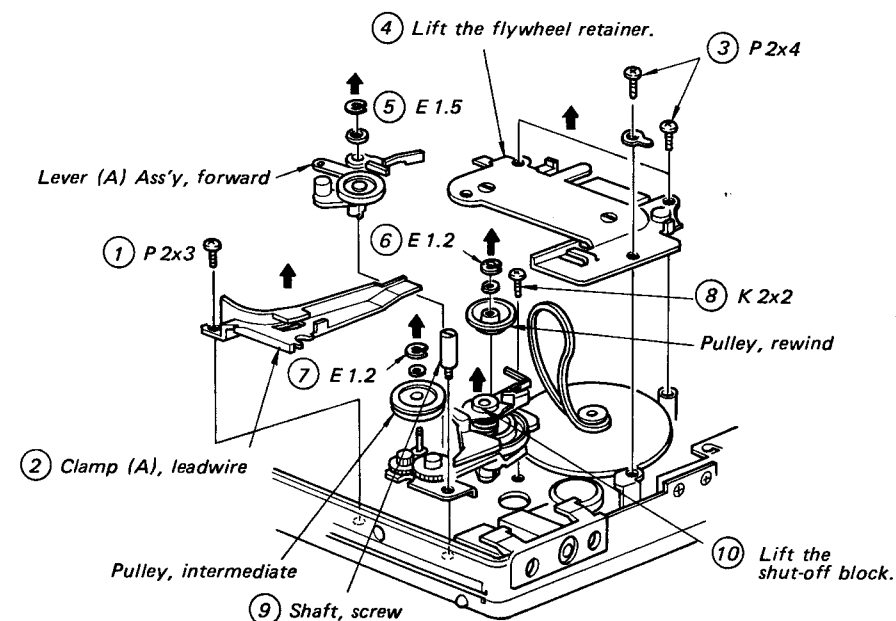
Note:

- Do not remove this screw usually.
- If necessary to remove this screw, do not lose the spring attached on the inside of the case by this screw.

MOTOR REMOVAL



SHUT-OFF BLOCK REMOVAL

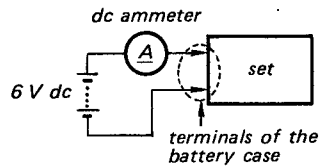


SECTION 3 ADJUSTMENTS AND MEASUREMENTS

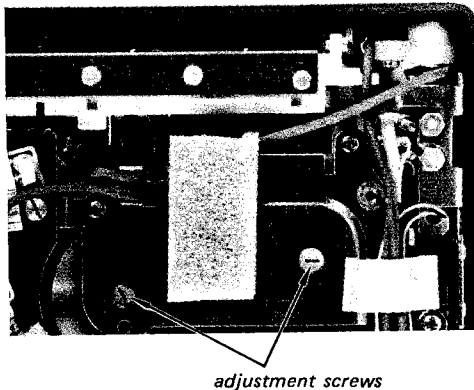
3-1. MECHANICAL ADJUSTMENT AND MEASUREMENTS

1. Flywheel Thrust Play Adjustment

— playback mode —



1. Turn two adjustment screws fully counterclockwise.
2. Turn one of them clockwise carefully.
3. Stop to turn it when the current suddenly increase and back it $\frac{1}{4}$ turn.
4. Adjust the other screw in the same way as step 2 and 3.
5. Secure the adjustment screws with locking compound.



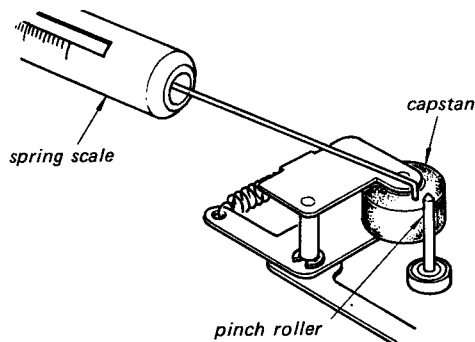
2. Pinch Roller Pressure Measurement

— playback mode —

Read the scale when the pinch roller just touches the capstan and starts to turn.

Permissible reading:

200 ~ 300 g (7 ~ 11 oz)



3. Torque Measurement

Keep the set horizontally and confirm that the B+ voltage is 5 Vdc.

Torque	SONY Torque Meter	Permissible Reading
Forward	CQ101A, CQ102A, CQ103A	25 ~ 45 g·cm (0.35 ~ 0.63 oz·inch)
Fast Forward and Rewind	CQ201A	over 55 g·cm (0.76 oz·inch)
Cue and Review	CQ201A	over 55 g·cm (0.76 oz·inch)

4. Wow and Flutter Measurement

Permissible value: within 0.38 %

3-2. ELECTRICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with alcohol moistened swab:

Record/Playback head	Pinch roller
Erase head	Rubber belts
Capstan	Idlers
2. Demagnetize the record/playback head with a head demagnetizer.
(Do not bring the head demagnetizer close to the erase head, and do not use magnetized screwdriver for adjusting).
3. After the adjustments, apply the locking compound to the adjusted parts.
4. The adjustments should be performed in the order listed in this service manual.
5. The adjustments should be performed with the rated power supply voltage unless otherwise specified.

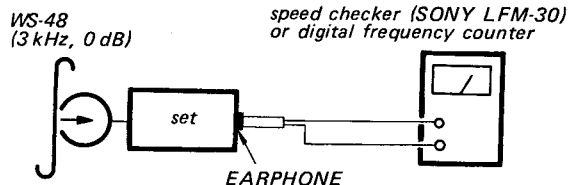
1. Tape Speed Adjustment

Settings:

Power source 6 V dc

Procedure:

1. Mode playback

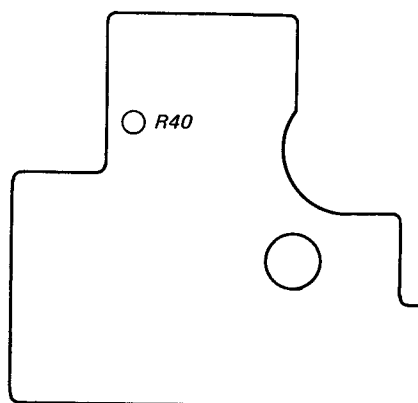


Specifications

1)	Speed checker	Digital frequency counter
	±3 %	2910 Hz ~ 3090 Hz

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

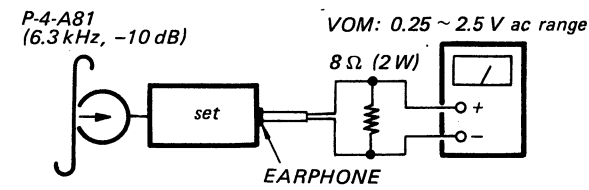
2. If the above specification is not satisfied, adjust R40.



2. Record/Playback Head Azimuth Adjustment

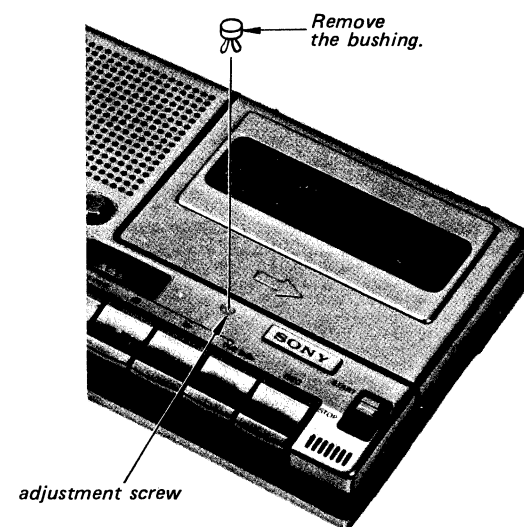
Procedure:

1. Mode playback

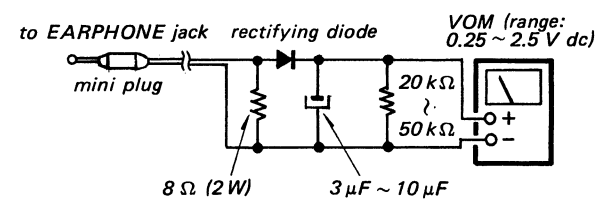


2. Turn the adjustment screw for the highest VOM reading.

Note: Several peaks may appear, take the highest.



Note: When 0.25 ~ 2.5 V ac range is not available on the VOM, use a network as shown below.



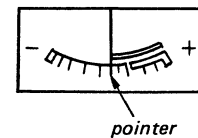
3. REC/BATT Meter Calibration

Setting:

Power source 3.6 V dc

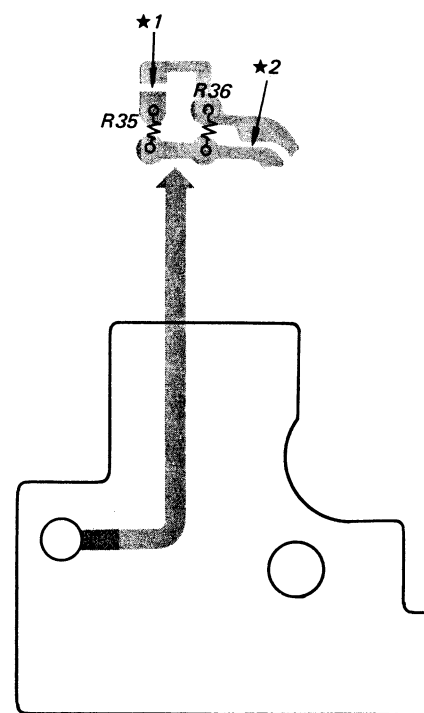
Procedure:

1. Push forward button without cassette.
2. When power source is 3.6 V dc, the pointer should indicate as shown below.



3. If necessary, solder ★ 1 and ★ 2.

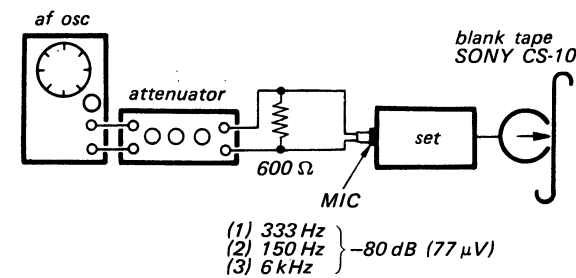
Soldering Portion	Pointer
nothing	- mark
★ 1	↕
★ 1 and ★ 2	
	+ mark



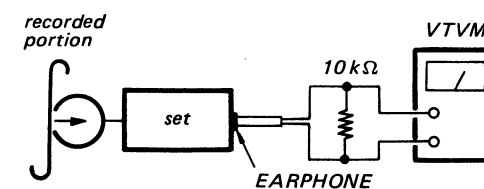
4. Record Bias Adjustment

Procedure:

1. Mode record



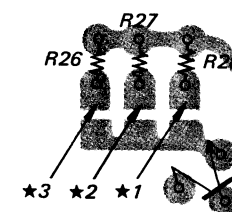
2. Mode playback



Recorded signal	VTVM reading
333 Hz	Adjust VOLUME control for -10 dB (0.25 V).
150 Hz	6 dB allowable range
6 kHz	150 Hz 333 Hz 6 kHz

If necessary, adjust by changing the soldering portions (★ 1, ★ 2 and ★ 3).

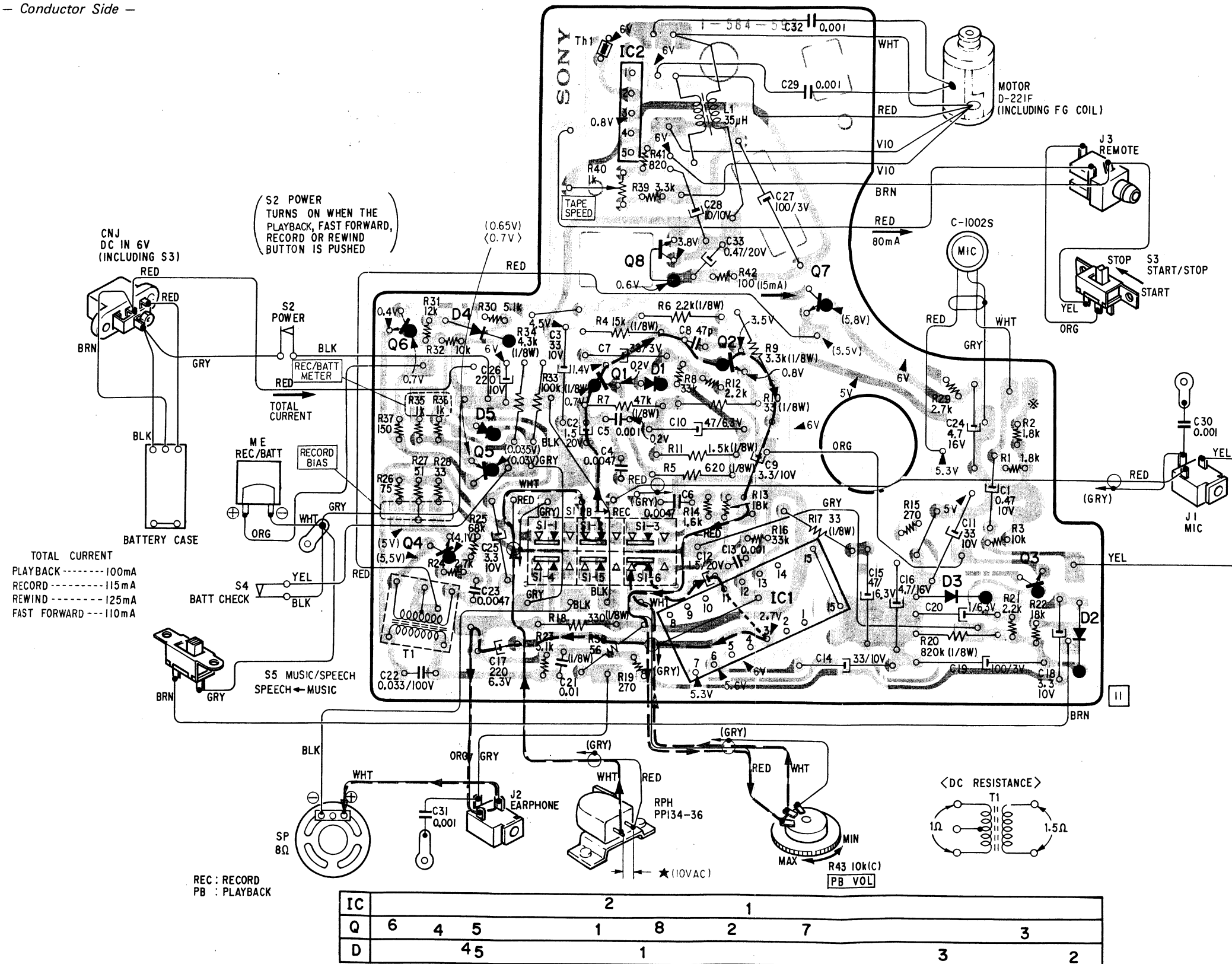
Soldering Portion	6 kHz Level
★ 1	down
★ 2	↕
★ 3	
	up



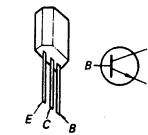
SECTION 4 DIAGRAMS

4-1. MOUNTING DIAGRAM

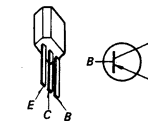
— Conductor Side —



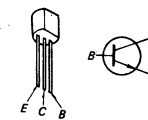
Q1, 2 2SC632A
Q3, 4, 6, 7 2SC634A



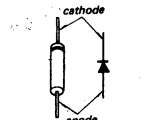
Q5 2SA678



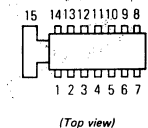
Q8 2SC1474



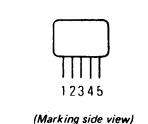
D1, 2, 3, 4, 5 1T40



IC 1 CX-170

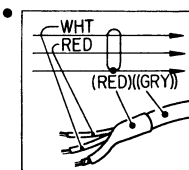


IC 2 BX-295

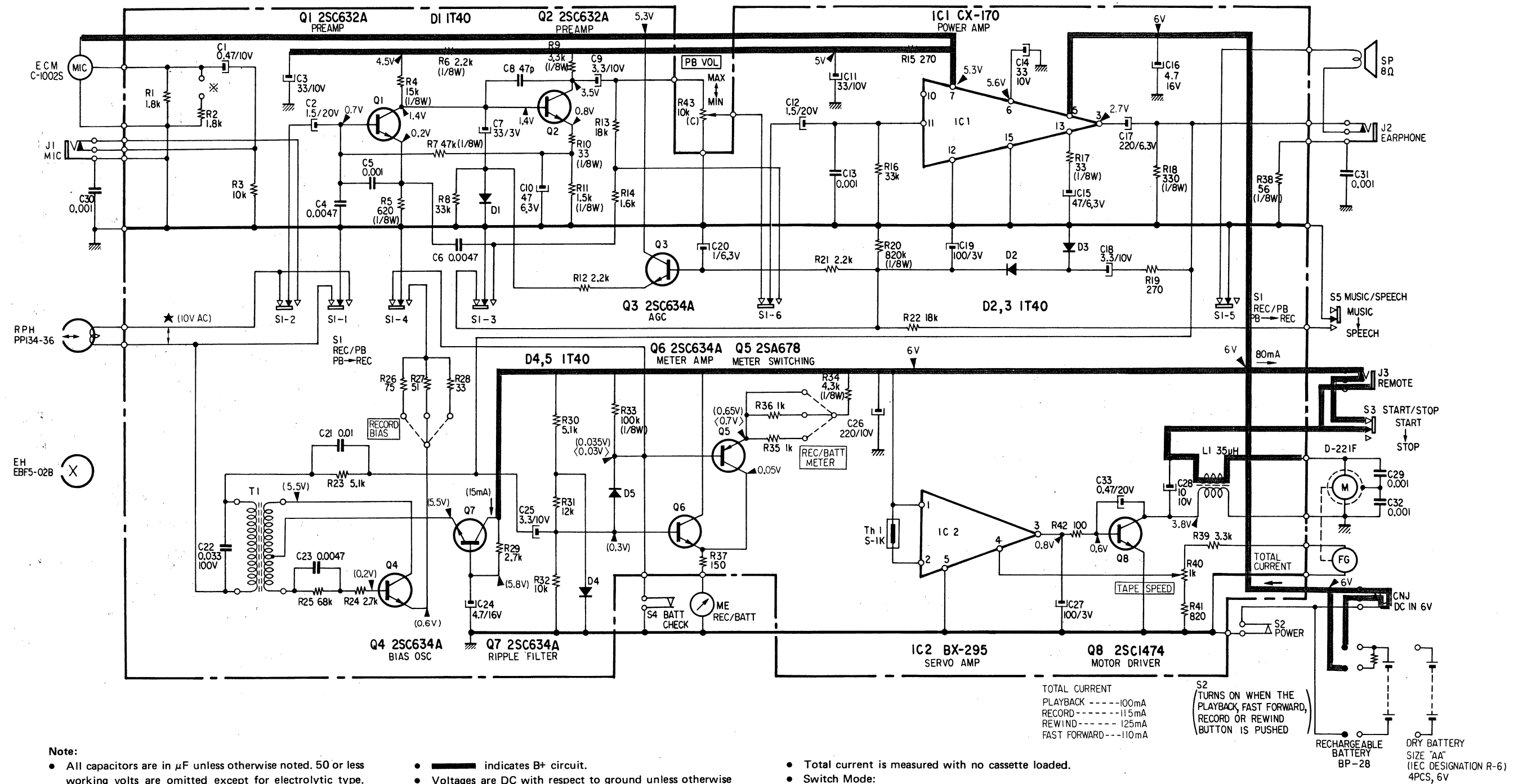


Note:

- B+ pattern
- signal path



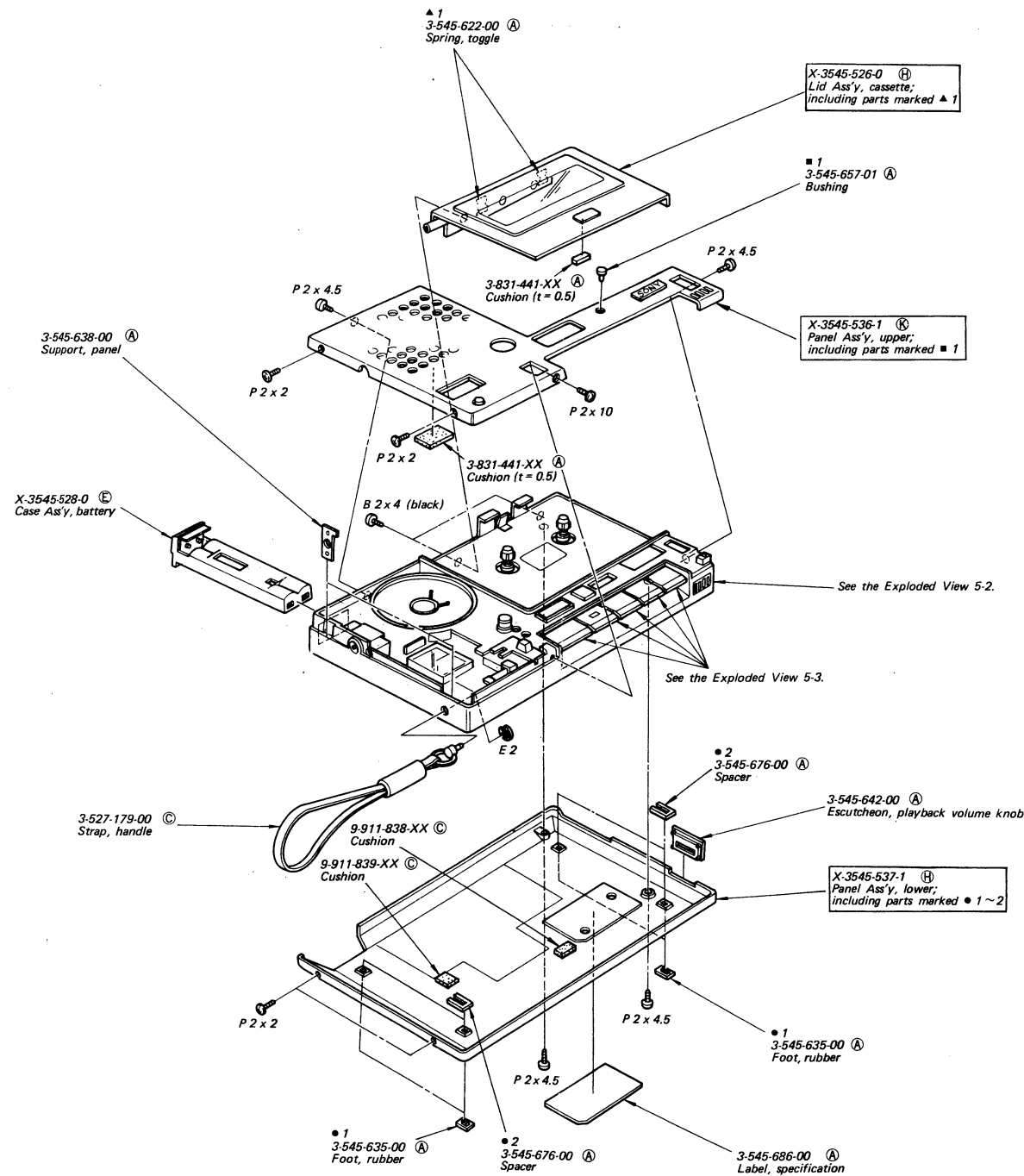
4-2. SCHEMATIC DIAGRAM



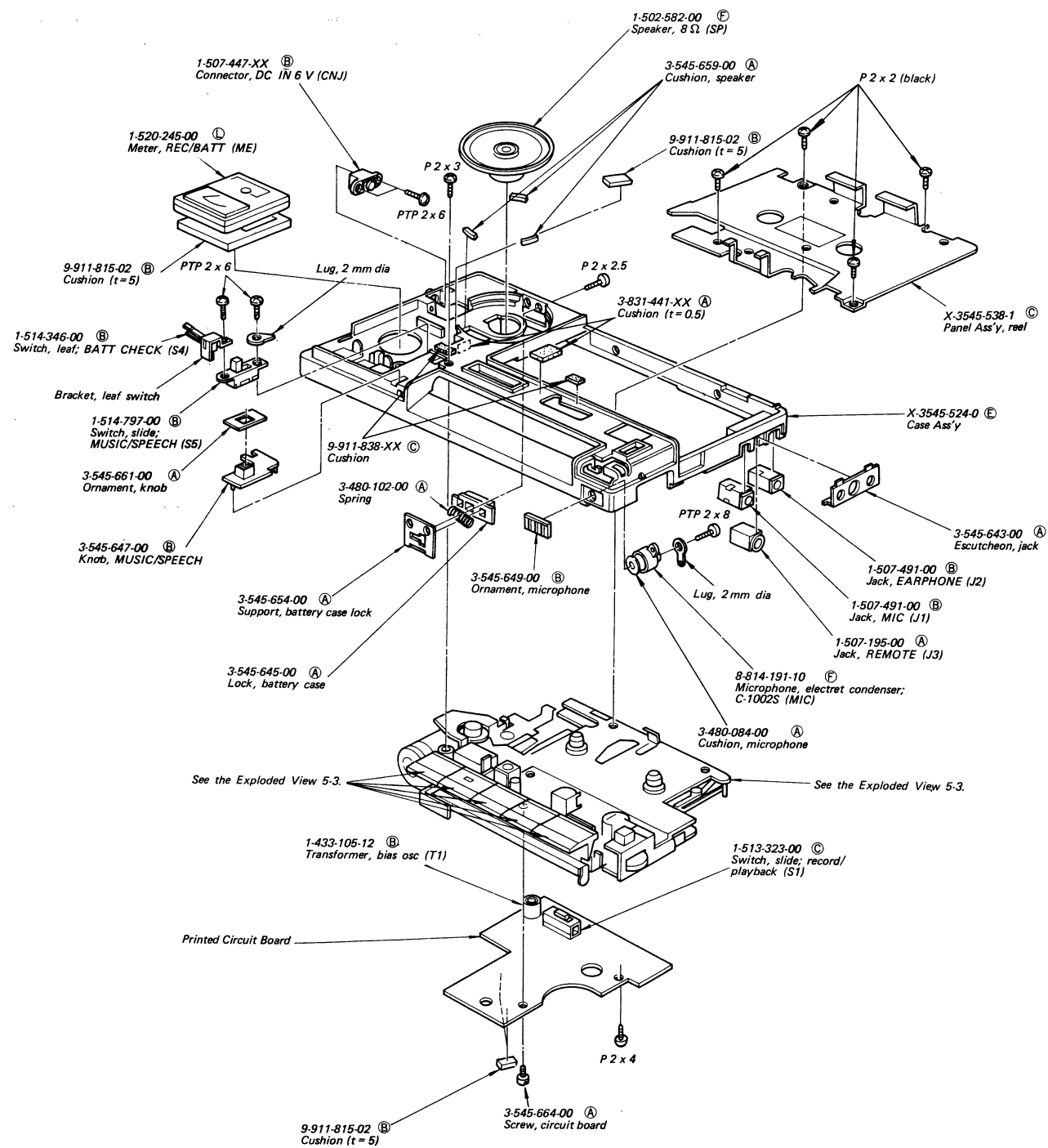
SECTION 5

EXPLODED VIEWS

5-1.



5-2.

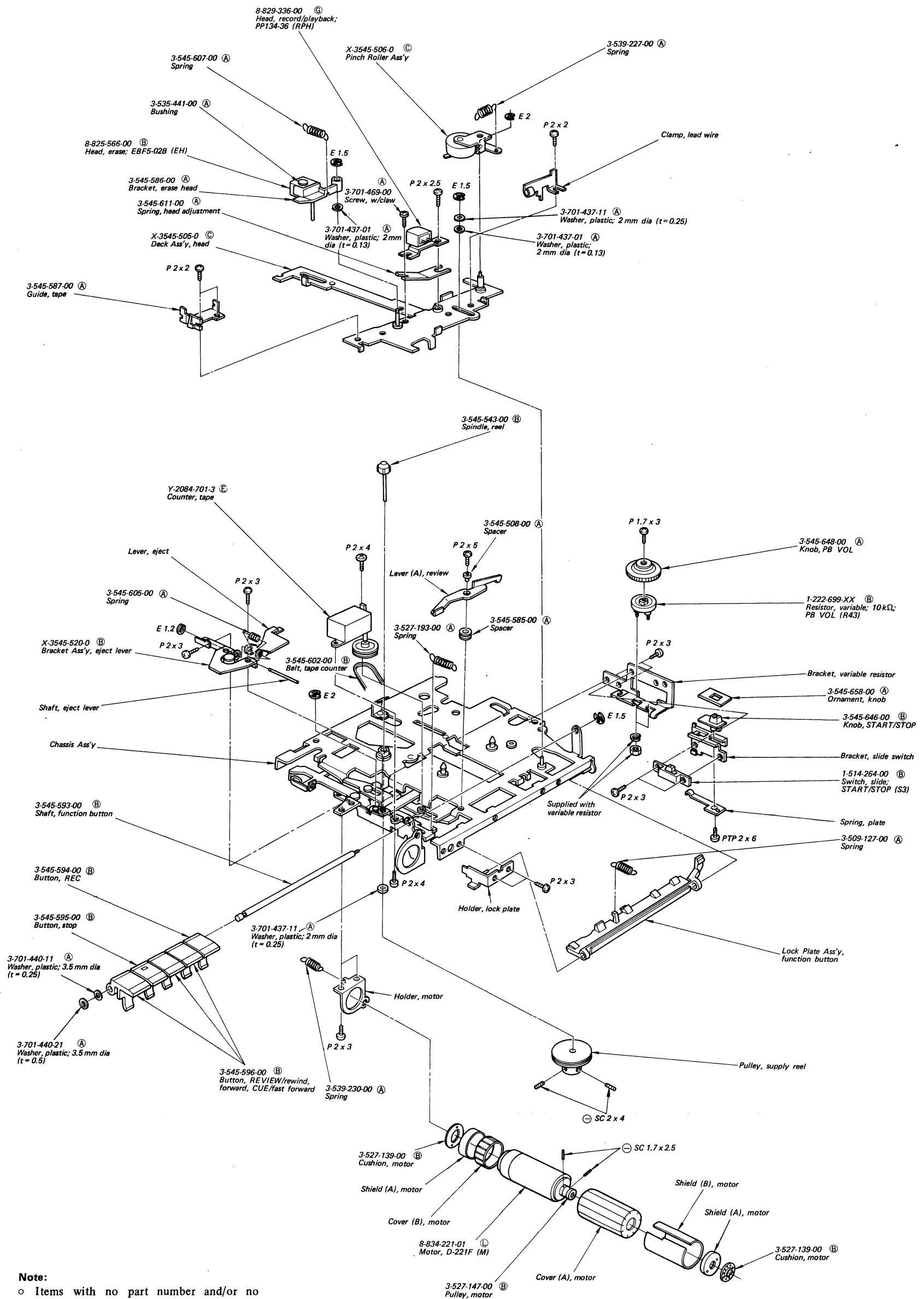


Note:

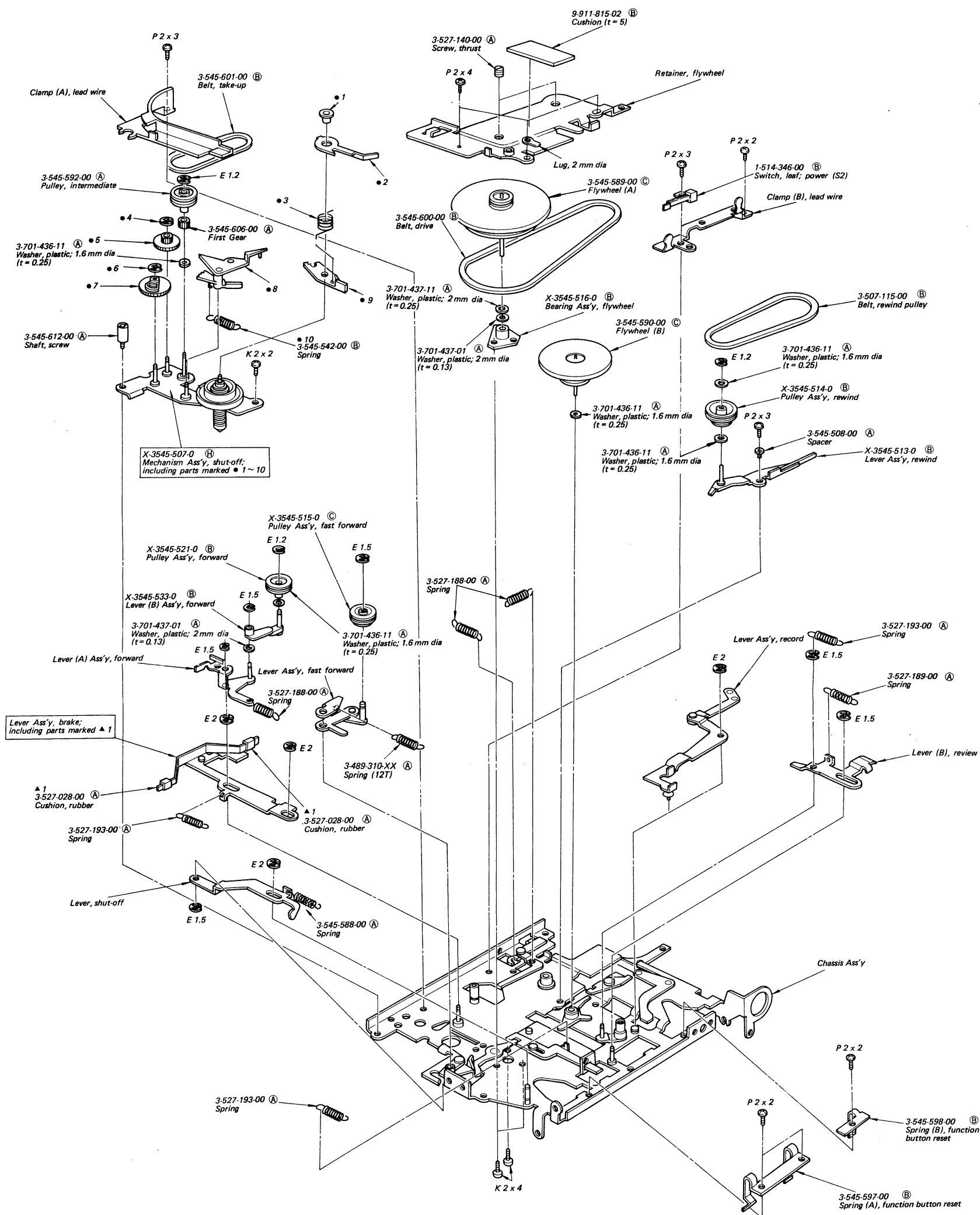
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head
- (□□T) shows the number of coils in spring.

Note:

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SECTION 6 ELECTRICAL PARTS LIST

The mark of (A) to (Z) : for Europe

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
SEMICONDUCTORS		
Q1,2	(B) Transistor	2SC632A
Q3,4	(B) Transistor	2SC634A
Q5	(C) Transistor	2SA678
Q6,7	(B) Transistor	2SC634A
Q8	(B) Transistor	2SC1474
IC1	(F) IC CX170	
IC2	(H) IC BX295	
D1~5	(B) Diode	1S1555
Th1	1-800-198-XX (A) Thermistor	S-1K

CAPACITORS

All capacitors are in μF and of tantalum unless otherwise noted. ($p = \mu\mu\text{F}$)
50 or less working volts are omitted except for electrolytic type.

C1	1-131-169-11 (B) 0.47	10 V
C2	1-131-202-11 (B) 1.5	20 V
C3	1-131-173-11 (C) 33	10 V
C4	1-105-669-12 (A) 0.0047	mylar
C5	1-161-190-11 (A) 0.001	ceramic (boundary layer)
C6	1-105-669-12 (A) 0.0047	mylar
C7	1-131-176-11 (B) 33	3 V
C8	1-107-123-11 (A) 47 p	silvered mica
C9	1-131-170-11 (B) 3.3	10 V
C10	1-131-174-11 (C) 47	6.3 V
C11	1-131-173-11 (C) 33	10 V
C12	1-131-202-11 (B) 1.5	20 V
C13	1-161-190-11 (C) 0.001	ceramic (boundary layer)
C14	1-131-173-11 (C) 33	10 V
C15	1-131-174-11 (B) 47	6.3 V
C16	1-131-171-11 (B) 4.7	16 V
C17	1-121-419-11 (B) 220	6.3 V electrolytic
C18	1-131-170-11 (B) 3.3	10 V
C19	1-131-177-11 (C) 100	3 V
C20	1-131-244-11 (B) 1	6.3 V

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
C21	1-105-673-12 (A) 0.01	mylar
C22	1-105-719-12 (B) 0.033	100 V mylar
C23	1-105-669-12 (A) 0.0047	mylar
C24	1-131-171-11 (B) 4.7	16 V
C25	1-131-170-11 (B) 3.3	10 V
C26	1-121-420-11 (A) 220	10 V electrolytic
C27	1-131-177-11 (C) 100	3 V
C28	1-131-256-11 (C) 10	10 V
C29,30	1-102-074-11 (A) 0.001	ceramic
C31	1-161-190-11 (A) 0.001	ceramic (boundary layer)
C32	1-102-074-11 (A) 0.001	ceramic
C33	1-131-264-11 (C) 0.47	20 V

RESISTORS

All resistors are in Ω , $\pm 5\%$, $1/16$ W and carbon type unless otherwise noted.
 $1/8$ W regular-type carbon resistors are omitted.
Check schematic diagram for resistance values.
k = 1000

R1,2	1-209-878-11 (A) 1.8 k
R3	1-209-781-11 (A) 10 k
R8	1-210-381-11 (A) 33 k
R12	1-209-768-11 (A) 2.2 k
R13	1-210-113-11 (A) 18 k
R14	1-210-371-11 (A) 1.6 k
R15	1-210-363-11 (A) 270
R16	1-210-381-11 (A) 33 k
R19	1-210-363-11 (A) 270
R21	1-209-768-11 (A) 2.2 k
R22	1-210-113-11 (A) 18 k
R23	1-209-774-11 (A) 5.1 k
R24	1-209-770-11 (A) 2.7 k
R25	1-210-388-11 (A) 68 k
R26	1-210-392-11 (A) 75
R27	1-210-101-11 (A) 51
R28	1-210-846-11 (A) 33
R29	1-209-770-11 (A) 2.7 k
R30	1-209-774-11 (A) 5.1 k
R31	1-210-111-11 (A) 12 k

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R32	1-209-781-11 (A)	10 k
R35,36	1-204-122-11 (A)	1 k
R37	1-210-102-11 (A)	150
R39	1-204-123-11 (A)	3.3 k
R40	1-224-726-00 (C)	1 k, adjustable
R41	1-210-108-11 (A)	820
R42	1-210-355-11 (A)	100
R43	1-222-699-XX (B)	10 k, variable; PB VOL

SWITCHES

S1	1-513-323-00 (C)	Slide, record/playback
S2	1-514-346-00 (B)	Leaf, power
S3	1-514-264-00 (B)	Slide, START/STOP
S4	1-514-346-00 (B)	Leaf, BATT CHECK
S5	1-514-797-00 (B)	Slide, MUSIC/SPEECH

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
JACKS		
CNJ	1-507-447-XX (B)	Connector, DC IN 6 V
J1	1-507-491-00 (B)	MIC
J2	1-507-491-00 (B)	EARPHONE
J3	1-507-195-00 (A)	REMOTE

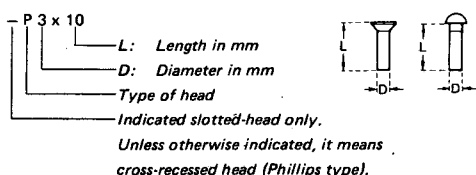
MISCELLANEOUS

EH	8-825-566-00 (B)	Head, erase; EBF5-02B
L1	1-407-847-00 (B)	Coil, microinductor; 35 μ H
M	8-834-221-01 (L)	Motor, D-221F
ME	1-520-245-00 (L)	Meter, REC/BATT
MIC	8-814-191-10 (F)	Microphone, electret condenser; C-1002S
RPH	8-829-336-00 (G)	Head, record/playback; PP134-36
SP	1-502-582-00 (F)	Speaker, 8 Ω
T1	1-433-105-12 (B)	Transformer, bias osc

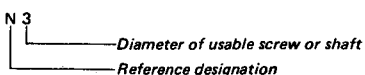
ACCESSORIES	
TC-150	BT-50
_____	A-3003-001-A (M) Pack, battery; BP-28
1-463-138-00 (K) Adaptor, ac; AC-9 W (USA model)	same as TC-150
1-463-806-00 (J) Adaptor, ac; AC-9 (Canada model)	_____
1-504-044-00 (B) Earphone, ME-21	same as TC-150
_____	1-506-309-00 (A) Plug, shorting; SP-100
1-528-027-11 (B) Battery, long-life; size "A" (4 PCS.) (USA, Canada, E model)	same as TC-150
1-534-237-26 (E) Cord, connection; RK-64H	_____
3-545-685-00 (L) Case, carrying	same as TC-150
3-780-914-11 (D) Manual, instruction (AEP, E model)	_____
3-780-914-21 (B) Manual, instruction (USA, Canada model)	same as TC-150
3-780-914-41 (C) Manual, instruction (UK model)	_____
_____	3-793-959-21 (A) Supplement, instruction manual
_____	8-890-036-00 (F) Tape, DC-60S (USA model)
8-893-506-00 (F) Tape, demonstration; CD-803 (USA, Canada, E, AEP, UK model)	_____

HARDWARE NOMENCLATURE

Screw:



Nut, Washer, Retaining ring:



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

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

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— 26 —

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