

TC-110A



Set using ISO screws



(General Export Model)



(USA and CANADA Model)

SPECIFICATIONS

Power Requirements:	AC 3W 100V, 110V ~ 120V, 220V ~ 240V 50/60 Hz with voltage selector (for General Export)	Power Output:	1.5W maximum
	AC 3W 117V, 60 Hz (for USA and CANADA)	Recording Bias Frequency:	Approx. 85 kHz
	DC 1.8W 6V Four flashlight batteries size "C" 1.5V or equivalents	Inputs:	MIC input Impedance: Low impedance Maximum sensitivity: 0.2 mV (-72 dB)
	SONY Rechargeable Battery Pack BP-9.		AUX input Impedance: 100 k Ω Maximum sensitivity: 60 mV (-22 dB)
	Car Battery DC 12V by using SONY Car Battery Cord DCC-126.	Output:	MONITOR output Impedance: 8 Ω load or more Output level: 0.775V (0dB) in Record Mode 1.1V (3 dB) in PB Mode
Track System:	Two-track mono	Speaker:	3 $\frac{1}{16}$ x 2 $\frac{3}{4}$ " (100 x 70 mm) dynamic speaker Voice coil impedance: 8 Ω
Reel:	SONY tape cassette or equivalent	Semiconductors:	1 IC, 3 transistors and 6 diodes
Tape Speed:	1 $\frac{7}{8}$ ips (4.8 cm/s)	Dimensions:	5 $\frac{3}{4}$ (W) x 2 $\frac{1}{2}$ (H) x 9 $\frac{1}{2}$ " (D) (146 x 64 x 241 mm)
Recording Time: (with C-120 tape cassette)	2.0 hrs	Weight:	3lb 13 oz (1.75 kg)
Frequency Response:	50 ~ 10,000 Hz		
Signal-to-Noise Ratio:	46 dB or more		
Flutter and Wow:	0.28% (WRMS) or more		

SONY®

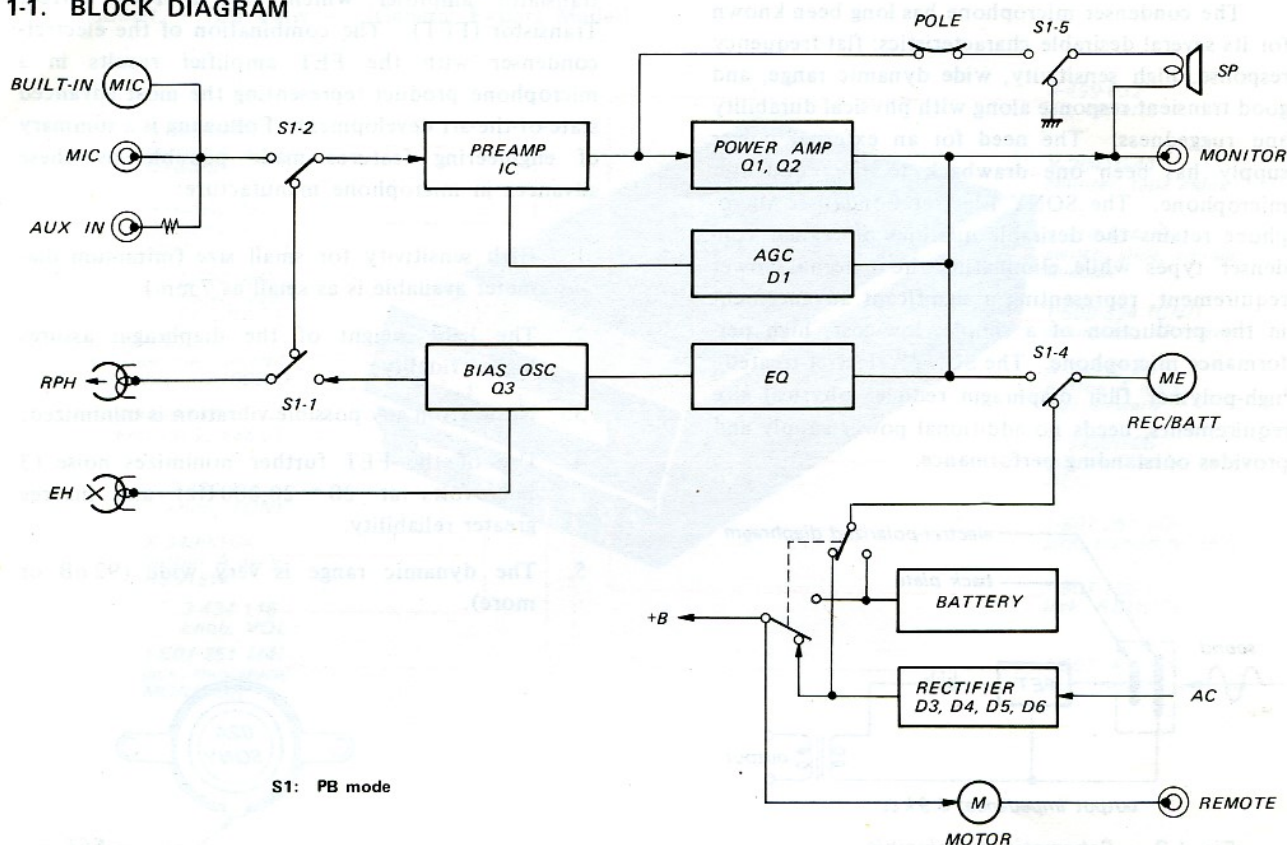
SERVICE MANUAL

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SECTION 1 GENERAL DESCRIPTION

1-1. BLOCK DIAGRAM



1-2. INTRODUCTION

The SONY Model TC-110A is a compact cassette-type recorder which operates on either household AC or on four "C" size flashlight batteries or the optional accessory rechargeable battery pack, BP-9. Record volume is adjusted to the optimum level by the built-in automatic gain control (AGC) circuit to assure proper recording level without touching the controls. All functions are operated with finger-tip ease by the piano-key mode switches. Portable convenience is provided with the built-in speaker and built-in electret condenser microphone. The TC-110A also features the End-of-Tape Alarm which provides audible warning when the end of the cassette tape is reached to prevent the possibility of inadvertently missing important material while recording. It operates in any carrying position, providing two-track monophonic high fidelity cassette performance.

1-3. TECHNICAL FEATURES

1-3-1. End-of-Tape Alarm

The TC-110A is provided with a special sensing

circuit which produces an audible alarm through the speaker when the end of the cassette tape is reached during recording. The alarm sounds when the sensing poles are short-circuited by foil strips at the end of the tape producing positive feedback. (The sensing pole is grounded during playback and there is no alarm.)

Note: The End-of-Tape Alarm operates only when foil equipped cassettes are used, such as the SONY AUTO-SENSOR tape cassette.

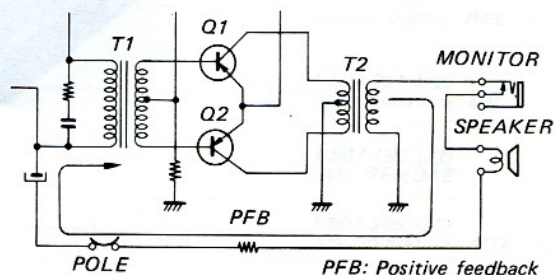


Fig. 1-1. Schematic in principle (end-of-tape alarm)

1-3-2. Electret Condenser Microphone

The condenser microphone has long been known for its several desirable characteristics: flat frequency response, high sensitivity, wide dynamic range, and good transient response along with physical durability and ruggedness. The need for an external power supply has been one drawback to the condenser microphone. The SONY Electret Condenser Microphone retains the desirable qualities of regular condenser types while eliminating the external power requirement, representing a significant advancement in the production of a simple, low-cost, high performance microphone. The SONY "electret-treated" high-polymer film diaphragm reduces physical size requirements, needs no additional power supply and provides outstanding performance.

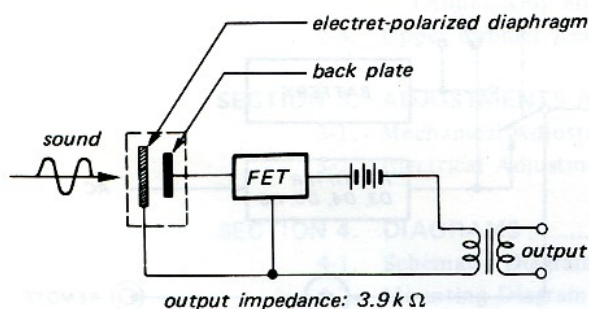


Fig. 1-2. Schematic in principle (electret condenser microphone)

Note: The "electret-treatment" is based on the fact that certain materials, when placed in a high potential electric field, retain an electric polarization when removed from the field. Extensive research by SONY engineers has developed the electret principle to an advanced state of stability unattainable until now.

Another milestone is the built-in impedance-translator amplifier which uses a Field Effect Transistor (FET). The combination of the electret-condenser with the FET amplifier results in a microphone product representing the most advanced state-of-the-art development. Following is a summary of engineering features made possible by these advances in microphone manufacture:

1. High sensitivity for small size (minimum diameter available is as small as 7 mm).
2. The light weight of the diaphragm assures higher fidelity.
3. Noise from any possible vibration is minimized.
4. Use of the FET further minimizes noise (3 microvolts at 20 ~ 20,000 Hz) and insures greater reliability.
5. The dynamic range is very wide (92 dB or more).

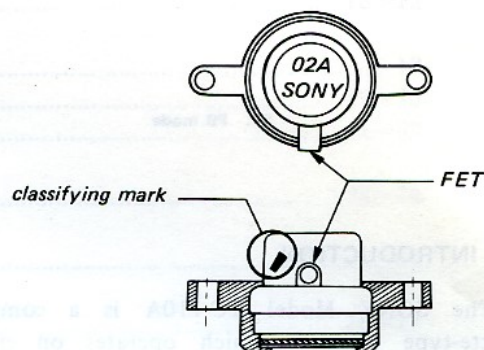
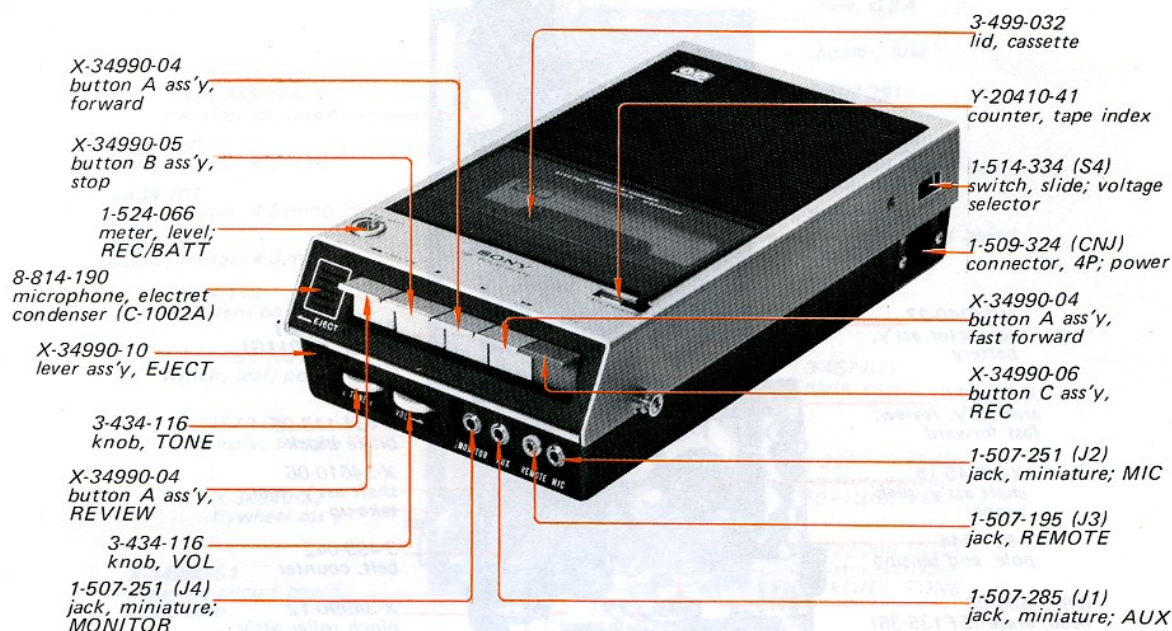


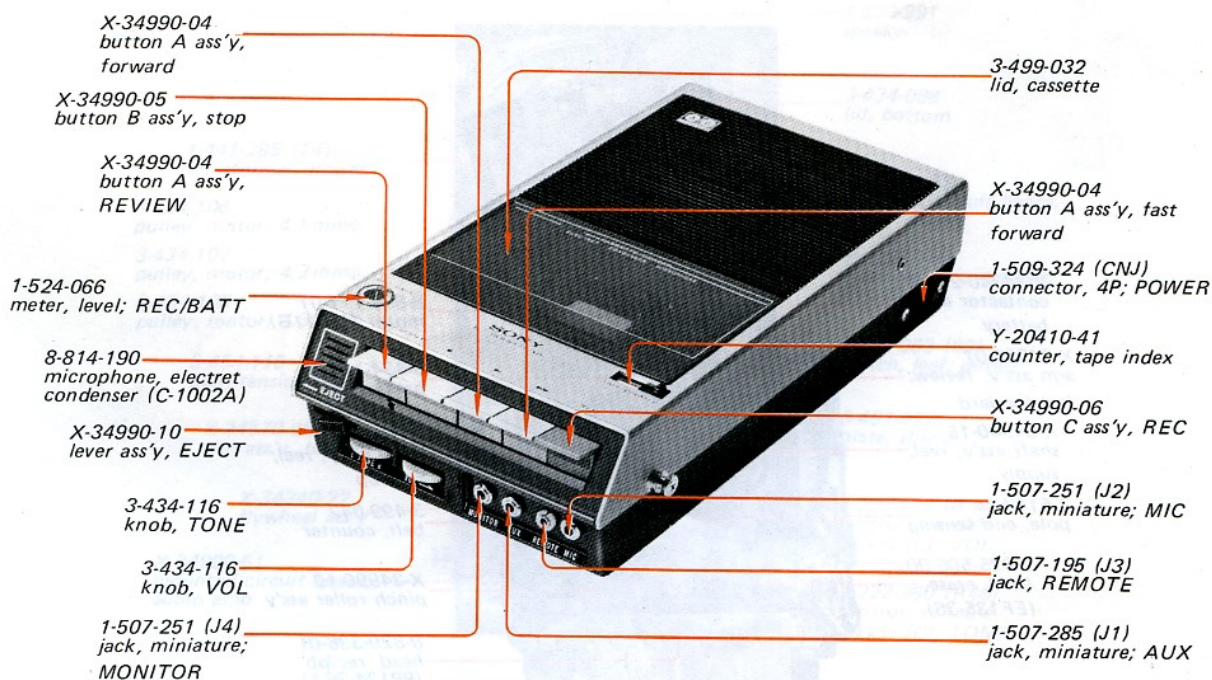
Fig. 1-3. Construction

1-4. MAJOR PARTS LOCATIONS

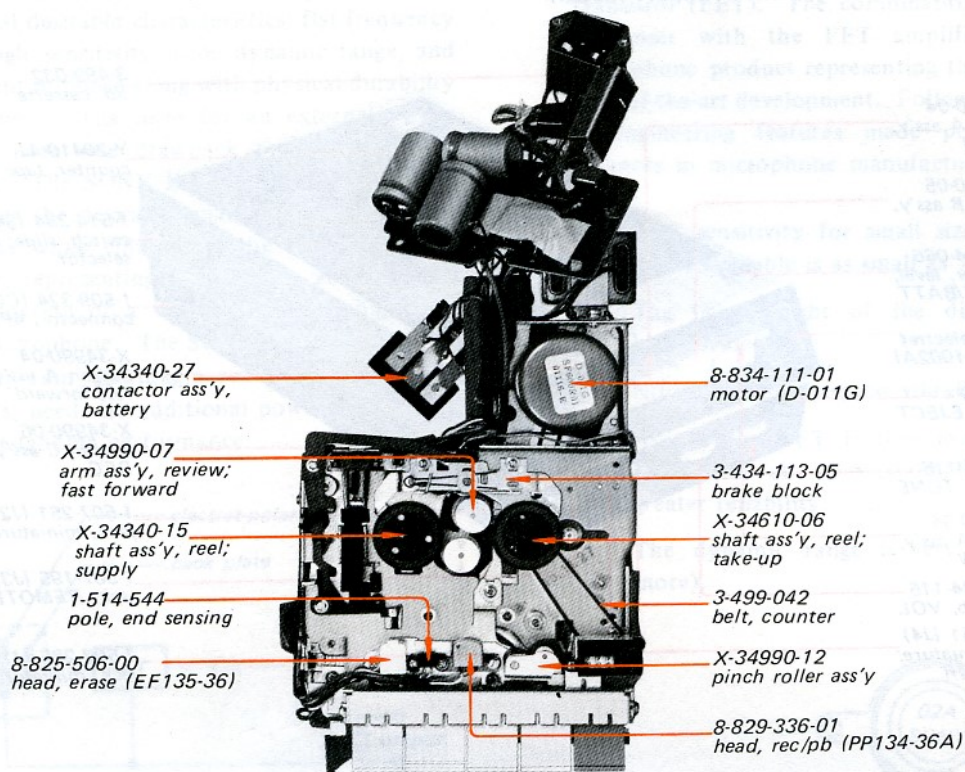
Cabinet — Top View — (General Export Model)



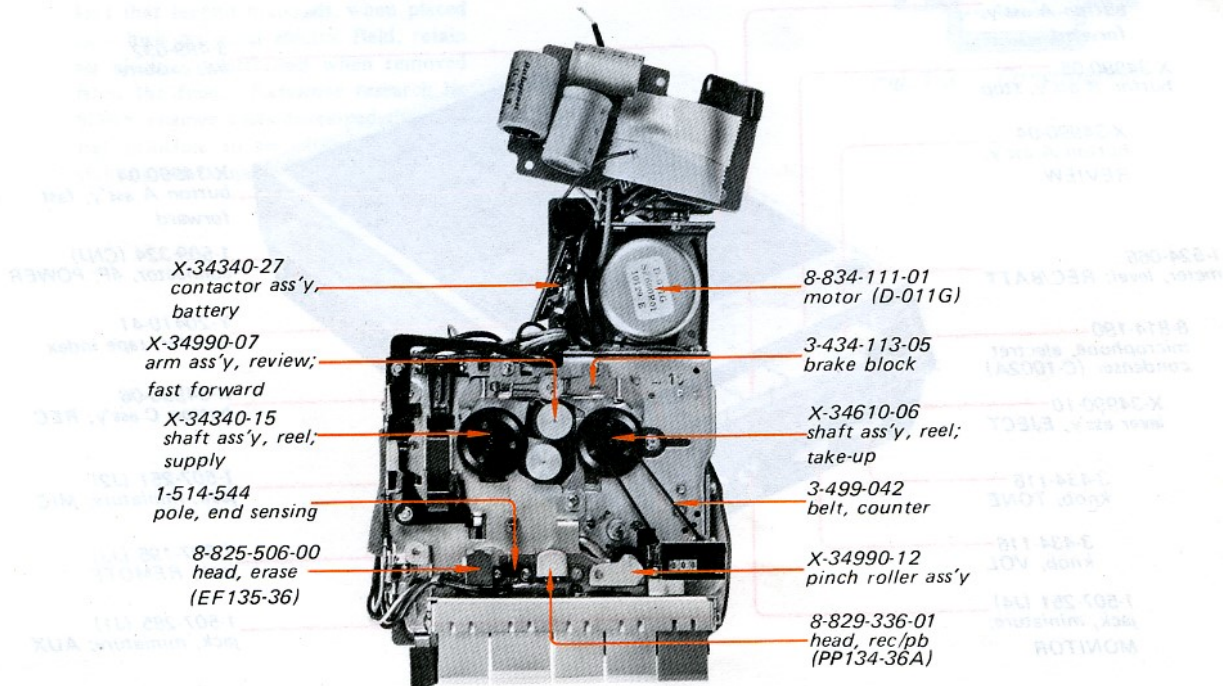
Cabinet — Top View — (USA and CANADA Model)



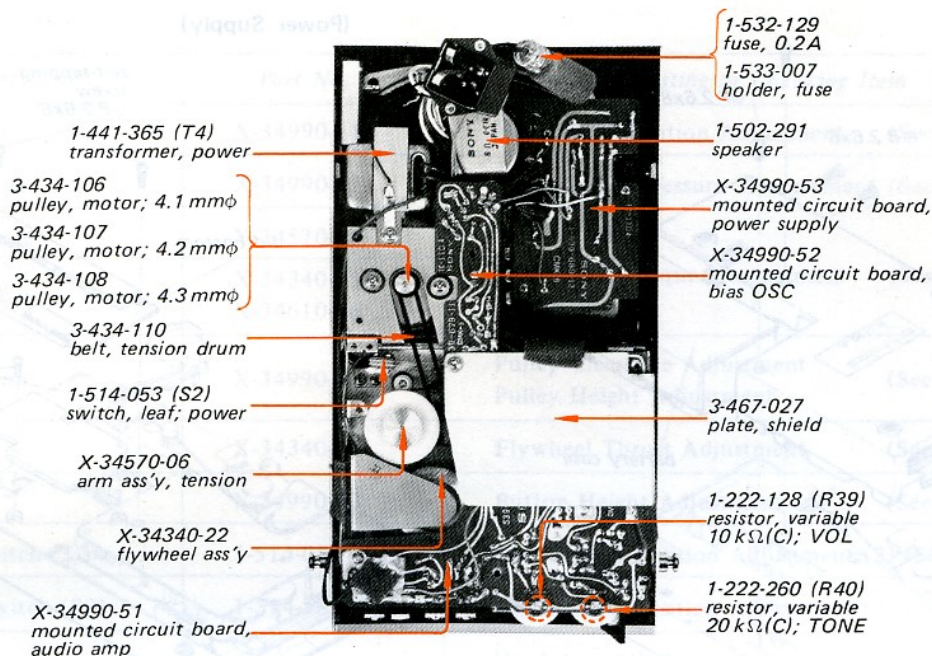
Chassis — Top View — (General Export Model)



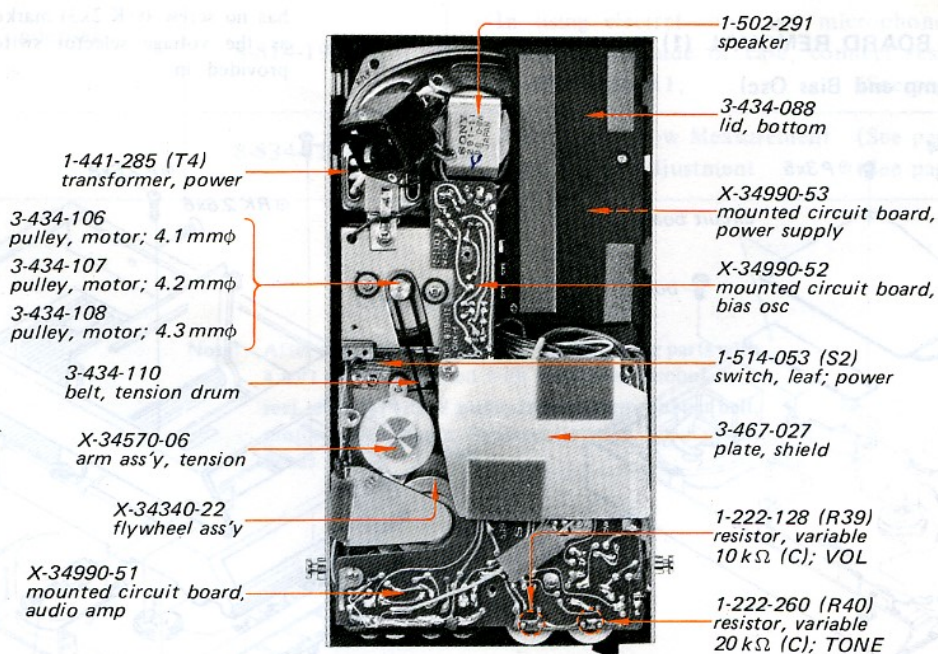
Chassis — Top View — (USA and CANADA Model)



Chassis — Bottom View — (General Export Model)



Chassis — Bottom View — (USA and CANADA Model)



SECTION 2 DISASSEMBLY

2-1. LOWER CABINET REMOVAL

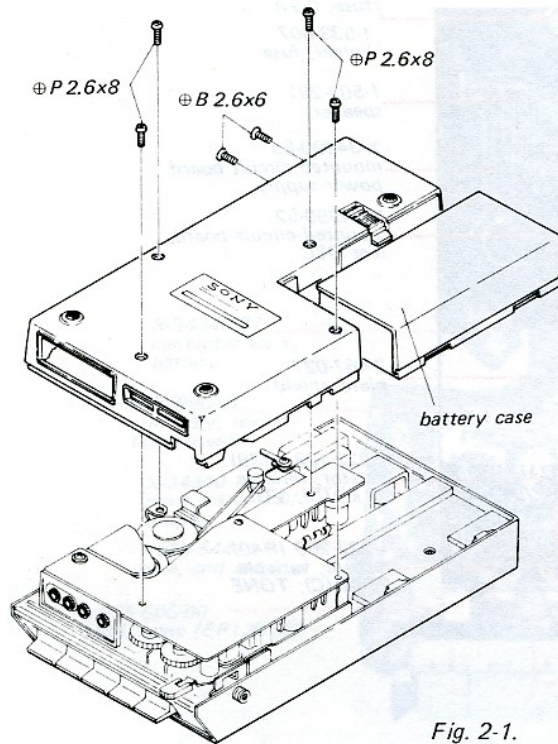


Fig. 2-1.

2-3. CIRCUIT BOARD REMOVAL (2) (Power Supply)

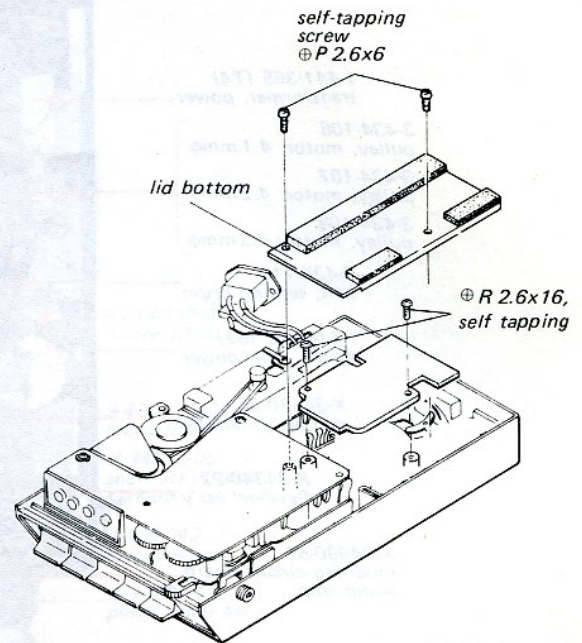


Fig. 2-3.

2-2. CIRCUIT BOARD REMOVAL (1) (Audio Amp and Bias Osc)

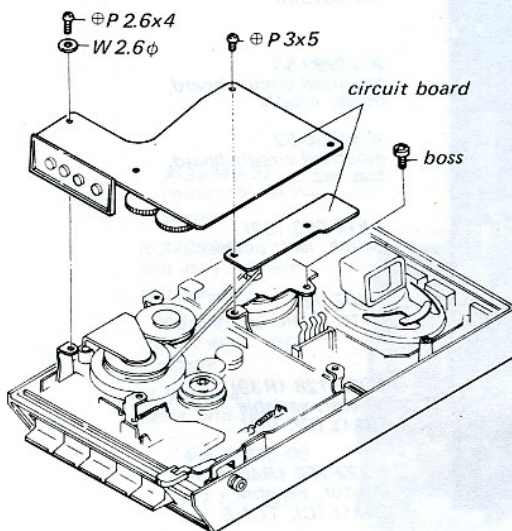


Fig. 2-2.

2-4. UPPER CABINET REMOVAL

Note: For USA and Canada model, the unit has no screw ($\ominus K 2 \times 3$) marked with $\blacktriangle$ as the voltage selector switch is not provided in.

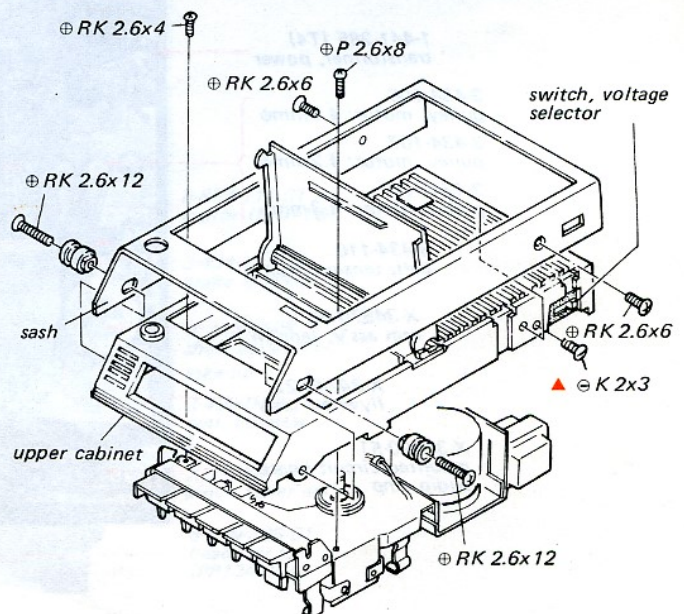


Fig. 2-4.

SECTION 3

ADJUSTMENT AND MEASUREMENTS

In case the parts described in the table below are reassembled or replaced, the following adjustments and checks are necessary.

<i>Parts</i>	<i>Part No.</i>	<i>Adjusting or Checking Item</i>
Head Deck	X-34990-11	Head Deck Position Adjustment (See page 14.)
Pinch Roller	X-34990-12	Pinch Roller Pressure Measurement (See page 14.)
Tension Arm	X-34570-06	Reel Table Torque Measurement (See page 15.)
Reel Table	X-34340-15 X-34610-06	
Review Arm	X-34990-07	Pulley Clearance Adjustment Pulley Height Adjustment (See page 13.)
Flywheel	X-34340-22	Flywheel Thrust Adjustment (See page 15.)
Button	X-34990-03	Button Height Adjustment (See page 14.)
Power Switch (S2)	1-514-053	Leaf Switch Position Adjustment (2) (See page 15.)
Muting Switch (S3)	1-514-583	Leaf Switch Position Adjustment (3) (See page 15.)
Rec/pb Head	8-829-336-01	Head Azimuth Adjustment (See page 17, 18.) Recording Bias Adjustment (See page 17, 18.) Overall Output Measurement (See page 17, 18.)
Erase Head	8-825-506-00	Erase Ratio Measurement (See page 17, 18.)
REC/BATT Level Meter	1-524-066	Level Meter Calibration (See page 17, 18.)
Electret Condenser Microphone	8-814-190	In using electret condenser microphone marked in red paint on side of case, connect resistor R2 in parallel with R1. (See page 21.)
Motor	8-834-111-01	Flutter and Wow Measurement (See page 15.) Tape Speed Adjustment (See page 17, 18.)

Note: After the adjustments, clean the following parts with a soft cloth dampened with denatured alcohol.
reel table, FF/REW pulley, tension arm, rubber belt, motor pulley, brake, flywheel, capstan, pinch roller, heads

TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	REMEDY
Mechanical Section		
Tape does not move		
a. Motor runs.	1. Slippage due to oil or dirt on belt, pulleys, pinch roller, reel shaft tire, etc. 2. Insufficient pinch roller pressure against capstan 3. Defective tape cassette 4. Drive belt is slipped off 5. Drive belt stretched	Clean Replace loose tension spring (See page 14). Replace Re-attach. Replace.
b. Motor does not run.	1. Defective motor 2. Improper leaf switch (S2) position adjustment	Replace. Make leaf switch (S2) position adjustment (See page 15).
Tape is not taken up	1. Defective review arm 2. Defective take-up reel shaft	Replace. Replace.
No "REWIND" or "FF"	1. Slippage due to oil on reel shaft tire, review arm pulley, flywheel 2. Defective review arm 3. Insufficient clearance or height between pulleys	Clean. Replace. Adjust clearance or height between pulleys (See page 13).
Incorrect Tape Speed	1. Poor tape speed adjustment 2. Capstan badly worn 3. Drive belt stretched 4. Slippage due to oil or grease on belt, reel shaft tire or other drive parts. 5. Drive belt twisted.	Make tape speed adjustment (See page 17). Replace. Replace. Clean. Remove twists.
Flutter and Wow	1. Eccentric pinch roller, flywheel 2. Slippage due to oil or dirt on pinch roller, flywheel 3. Drive belt, reel shaft tire or pinch roller worn 4. Defective motor 5. Loose motor pulley set-screw	Replace. Clean. Replace. Replace. Tighten.

SECTION 3

ADJUSTMENT AND MEASUREMENTS

SYMPTOM	PROBABLE CAUSE	REMEDY
Electrical Section		
AC power is not supplied to the unit	1. Power cord open 2. Defective power connector 3. Defective power transformer	Replace. Repair or replace. Replace.
Defective Playback Function		
No sound	1. Speaker coil open 2. Defective volume control 3. Poor contact of MONITOR jack 4. Defective transistor 5. Driver or output transformer winding open	Replace. Replace. Repair or replace. Replace. Replace.
Low volume		
a. Tape is normally recorded.	1. Low ac power supply voltage 2. Low B+ voltage 3. Dirty or worn head 4. Defective resistors, capacitors, transistors, or speaker 5. Record/playback head not adjusted properly-azimuth. 6. Defective driver or output transformer. 7. Defective head pad	Check amplifier circuit. Clean or replace. Replace. Make head azimuth adjustment (See page 17). Replace. Replace.
b. Insufficient volume when recording	1. Defective microphone 2. Impedance mismatch between microphone and MIC input circuit 3. Dirty head	Replace. Replace microphone. Clean.
Defective Record Function		
a. Level meter does not operate.	1. Defective record/playback switch 2. Defective diode D2 3. Defective resistor R29 4. Fault in equalizer circuit 5. Defective microphone 6. Defective microphone or AUX jack 7. Fault in amplifier circuit 8. Defective level meter 9. Defective semi-fixed resistor R41	Replace. Replace. Replace. Check circuit. Replace. Repair or replace. Check circuit. Replace. Replace.
b. No record bias	1. Poor soldering of oscillator transformer lead wire 2. Defective resistor R31	Re-solder. Replace.
c. No oscillation	1. Defective oscillator transistor Q3 2. Oscillator transformer T3 winding open	Replace. Replace.

SECTION 3 ADJUSTMENT AND MEASUREMENTS

SYMPTOM	PROBABLE CAUSE	REMEDY
d. Distortion	1. Low bias voltage 2. Defective microphone 3. Defective tape cassette 4. Impedance mismatch between microphone and MIC input circuit 5. Record/playback head not adjusted properly-azimuth.	Check oscillator circuit. Replace. Replace. Replace microphone Make head azimuth adjustment (See page 17).
e. Poor frequency response (No high)	1. Head pad worn 2. Dirty or worn head 3. Magnetized head 4. Bias current too high or too low 5. Record/playback head not adjusted properly-azimuth.	Replace. Clean or replace. Demagnetize. Make recording bias adjustment (See page 17). Make head azimuth adjustment (See page 17).
Defective Erasing Function	1. Dirty, worn or open erase head 2. Fault in erase circuit 3. Improper recording bias adjustment	Clean or replace. Check circuit. Make recording bias adjustment (See page 17).
Noise		
a. Oscillation	1. Defective record/playback switch 2. Defective resistor in oscillator circuit	Replace. Replace.
b. Noise when turning volume control knob	1. Defective volume control 2. Defective coupling capacitor C12	Replace. Replace.
c. Intermittent Noise	1. Damaged electrical components 2. Noise from ac power line	Replace.
d. Noise while playing	1. Magnetized head (hissing) 2. Poor Contact of record/playback switch 3. Defective transistor	Demagnetize. Repair or replace. Replace.
e. Hum	1. Poor recording 2. Worn head 3. Defective motor	Replace. Replace.
f. Motorboating	1. Defective de-coupling capacitors C7, C17	Replace.
g. Static pop	1. Drive belt with static built-up	Apply antistatic agents on belt.

3-1. MECHANICAL ADJUSTMENTS

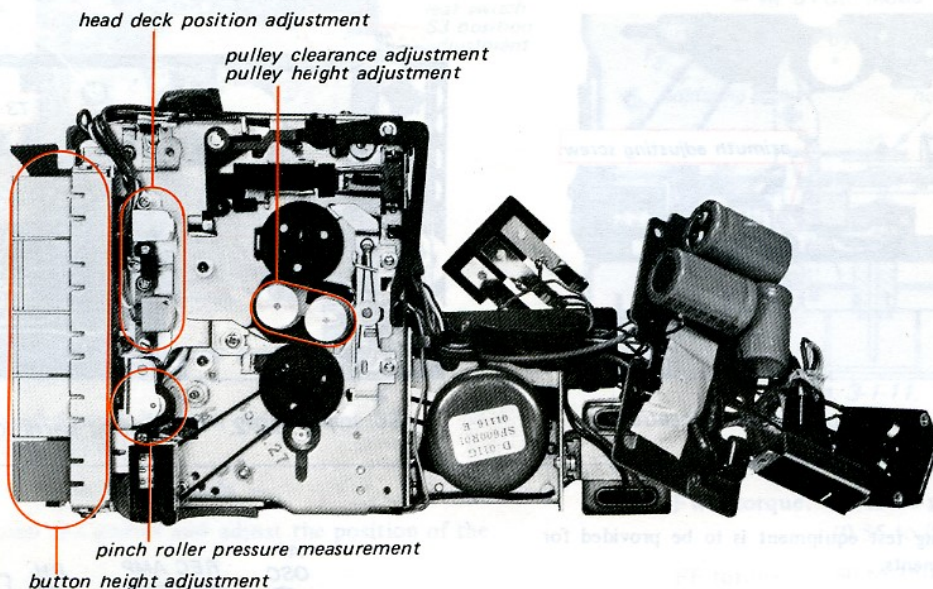


Fig. 3-1-1. Adjusting parts location

3-1-1. Pulley Clearance Adjustment (Fig. 3-1-2.)

— in STOP mode —

Adjust the clearances by bending the spring. Clearance "b" must be greater than "a".

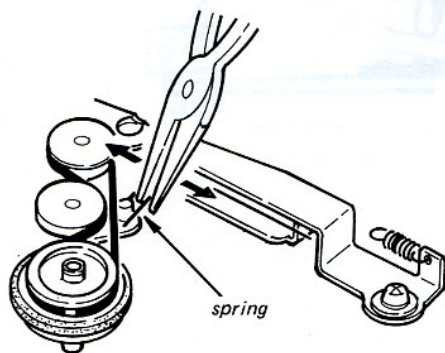
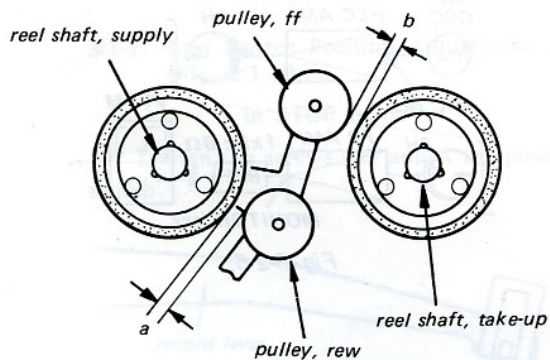


Fig. 3-1-2.

3-1-2. Pulley Height Adjustment (Fig. 3-1-3.)

— in STOP mode —

Adjust the height by bending the lever.

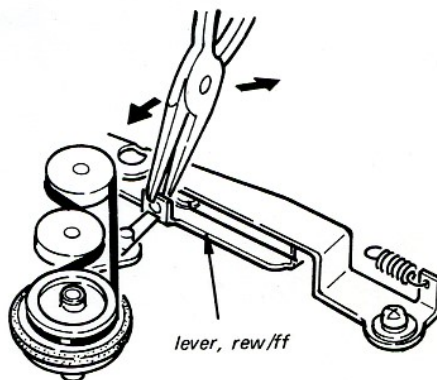
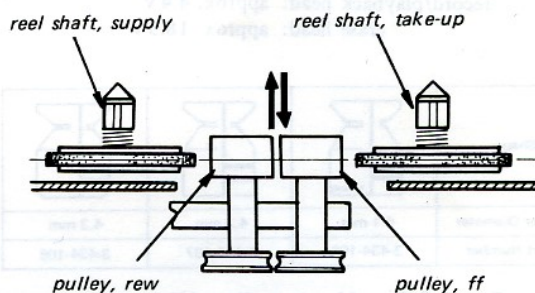


Fig. 3-1-3.

3-1-3. Button Height Adjustment (Fig. 3-1-4.)

— in STOP mode —

Adjust the height by bending the adjusting plate with a screw driver.

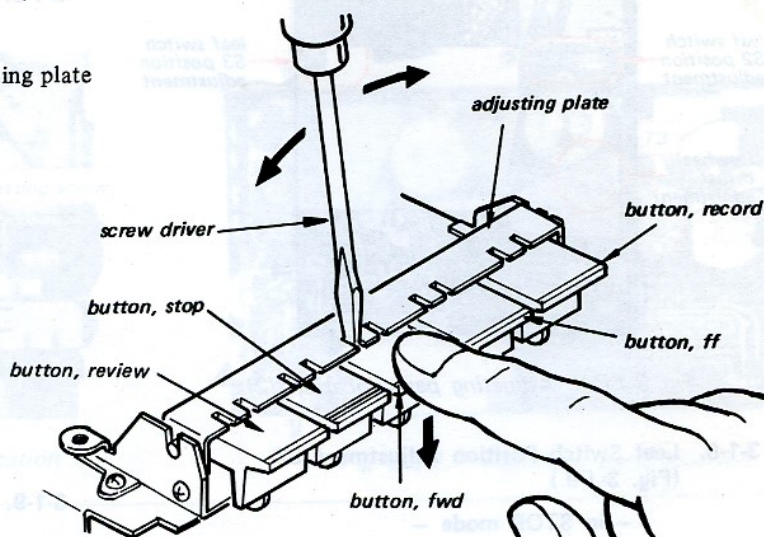


Fig. 3-1-4.

3-1-4. Head Deck Position Adjustment (Fig. 3-1-6.)

— in FWD mode —

1. Cut away the portions of one side of the cassette case indicated with oblique line in Fig. 3-1-5 with a pair of cutting pliers and put it into the unit.
2. Loosen the two screws marked with ▲ in Fig. 3-1-6.
3. Adjust the position of the head deck in FWD mode as shown in Fig. 3-1-6.
4. Tighten the two screws.
5. Apply lock paint to the screw.

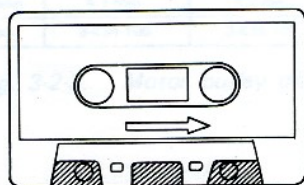


Fig. 3-1-5.

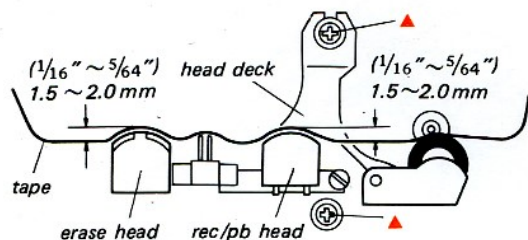


Fig. 3-1-6.

3-1-5. Pinch Roller Pressure Measurement (Fig. 3-1-7.)

— in FWD mode —

In the forward mode, hook a spring scale to the pinch roller and detach the pinch roller from the capstan by pulling the spring scale. Then allow the pinch roller to come near the capstan and read the spring scale just when the pinch roller touches the capstan.

Specification: 280 g to 360 g
(10 oz to 12.7 oz)

FWD mode

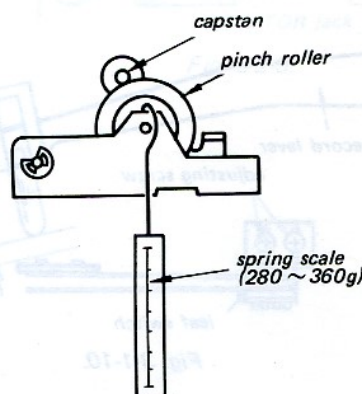


Fig. 3-1-7.

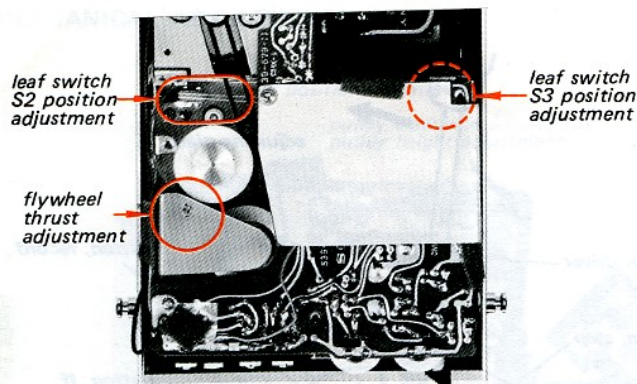


Fig. 3-1-8. Adjusting parts location (2)

3-1-6. Leaf Switch Position Adjustment S2 (Fig. 3-1-9.)

— in STOP mode —

Loosen the screws and adjust the position of the switch.

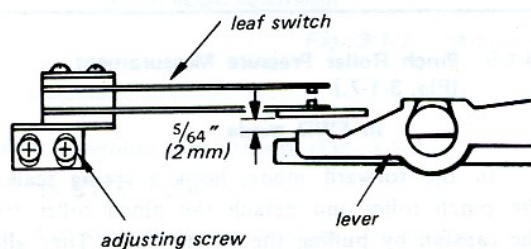


Fig. 3-1-9.

3-1-7. Leaf Switch Position Adjustment S3 (Fig. 3-1-10.)

— in STOP mode —

Loosen the screws and adjust the position of the switch.

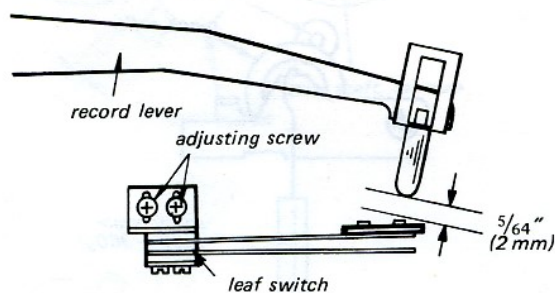


Fig. 3-1-10.

3-1-8. Flywheel Thrust Adjustment

— in STOP mode —

Adjust the gap by turning the screw.

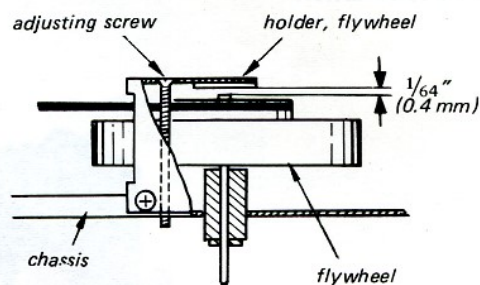


Fig. 3-1-11.

3-1-9. Reel Table Torque Measurement

FWD torque; 40 to 60 g-cm
(0.55 to 0.85 oz-inch)

FF torque; 60 to 150 g-cm
(0.85 to 2.1 oz-inch)

REW torque; 60 to 150 g-cm
(0.85 to 2.1 oz-inch)

3-1-10. Flutter and Wow Measurement

Play the SONY alignment tape WS-48 and make sure that a wow meter reads less than 0.35% at every point of tape.

3-2. ELECTRICAL ADJUSTMENTS

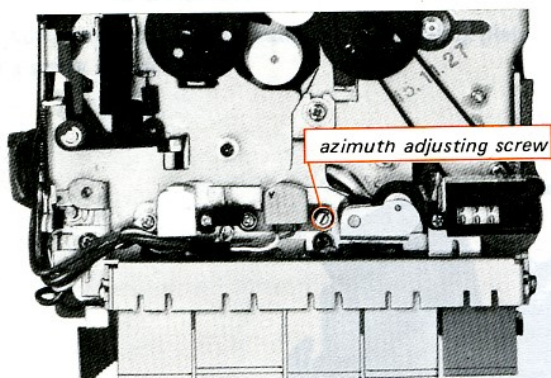


Fig. 3-2-1. Adjusting parts location

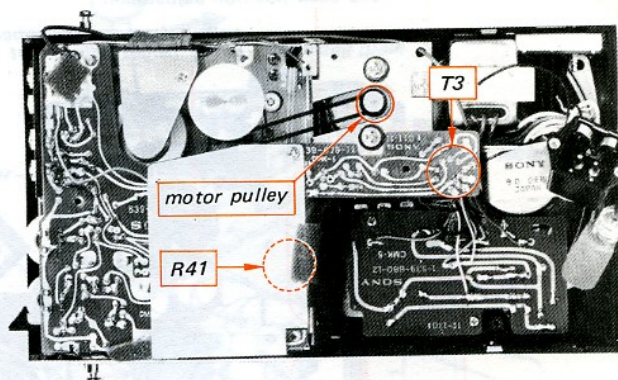


Fig. 3-2-2. Adjusting parts location

Notes:

- The following test equipment is to be provided for these adjustments.
 SONY alignment tape cassettes P-4-A81 and SPC-4
 Blank tape cassette
 8 Ω and 600 Ω resistor
 VTVM
 Audio oscillator
 Frequency counter
- After performing the adjustment, apply lock paint to the azimuth adjusting screw.
- Bias voltages across heads shall be read with the following values on VTVM.

record/playback head: approx. 4.4 V
 erase head: approx. 18.3 V

Shape			
Outer Diameter	4.1 mm	4.2 mm	4.3 mm
Part Number	3-434-106	3-434-107	3-434-108

Fig. 3-2-3. Motor pulley dimensions

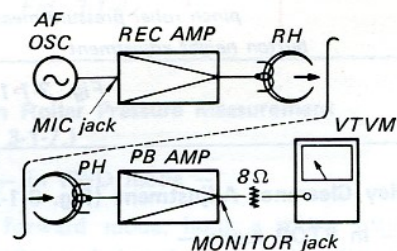


Fig. 3-2-4.

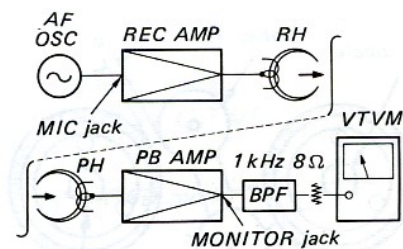


Fig. 3-2-5.

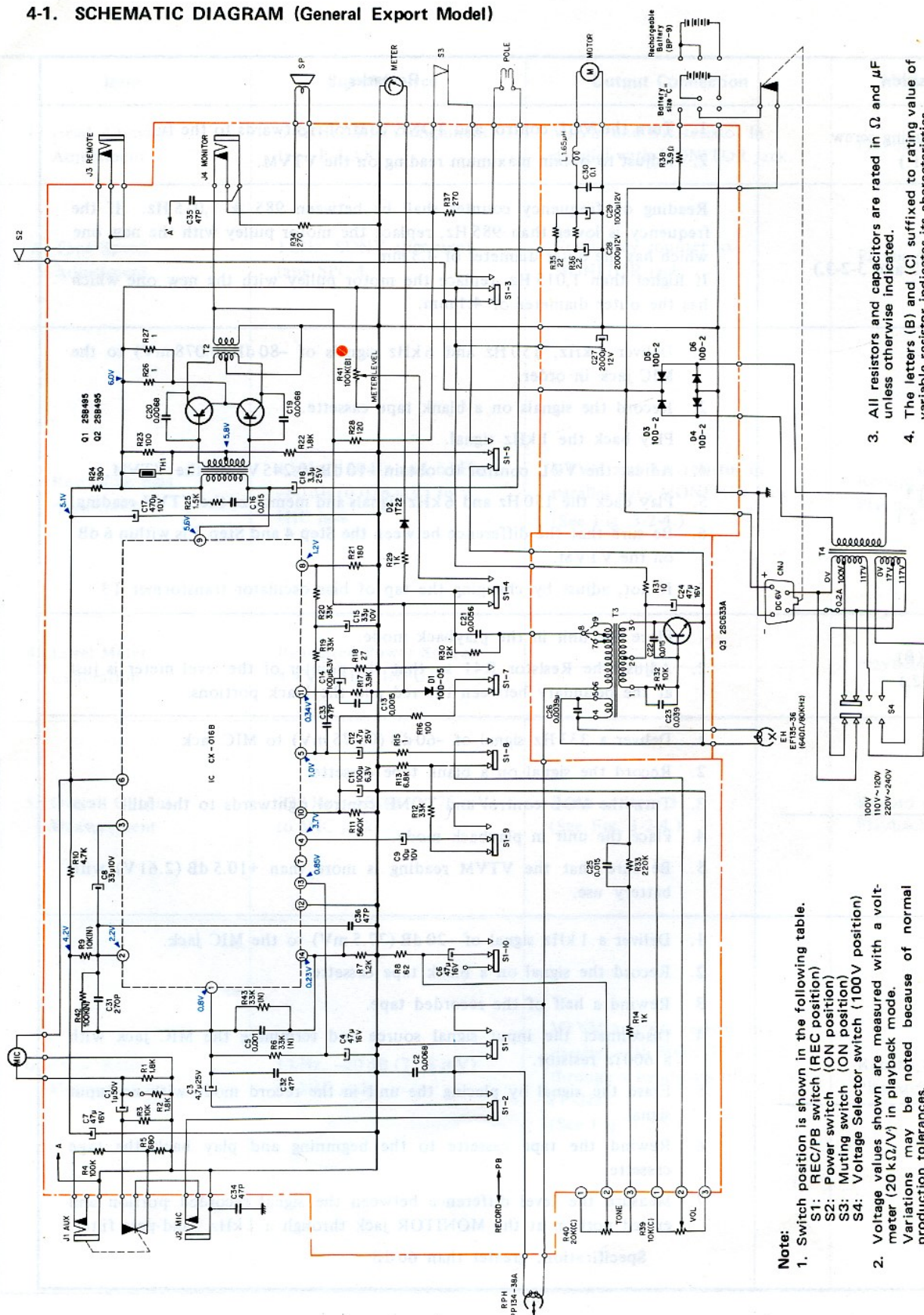
SECTION 4
DIAGRAMS

Item	Signal Source	Output Connection	Mode
1. Head Azimuth Adjustment	6.3 kHz, SONY alignment tape P-4-A81	VTVM and 8Ω resistor in parallel with MONITOR jack.	Playback
2. Tape Speed Adjustment	1 kHz, SONY alignment tape SPC-4	Frequency counter to MONITOR jack.	Playback
3. Recording Bias Adjustment	1 kHz, 150 Hz and 6 kHz, -80 dB (0.078 mV) to MIC jack.	VTVM and 8Ω resistor in parallel with MONITOR jack. (See Fig. 3-2-4.)	Record and Playback
4. Level Meter Calibration	Regulated Power Source 4.4 V to DC INPUT	_____	Playback
5. Overall Output Measurement	333 Hz, -60 dB (0.775 mV) to MIC jack.	Same as Item 3. (See Fig. 3-2-4.)	Record and Playback
6. Erase Ratio Measurement	1 kHz, -20 dB (77.5 mV) to MIC jack.	VTVM and 8Ω resistor in parallel with MONITOR jack through a band-pass filter (1 kHz). (See Fig. 3-2-5.)	Record and Playback

Adjusting Position	Remarks
Amplitude adjusting screw (see Fig. 3-2-1.)	1. Turn the VOL control and TONE control rightwards to the full. 2. Adjust to obtain maximum reading on the VTVM.
Motor pulley (see Fig. 3-2-2 and 3-2-3.)	Reading on frequency counter shall be between 985 & 1,015 Hz. If the frequency is lower than 985 Hz, replace the motor pulley with the new one which has the outer diameter of 4.3 mm. If higher than 1,015 Hz, replace the motor pulley with the new one which has the outer diameter of 4.1 mm.
Bias oscillator transformer T3 (see Fig. 3-2-2.)	1. Deliver 1 kHz, 150 Hz and 6 kHz signals of -80 dB (0.078 mV) to the MIC jack in order. 2. Record the signals on a blank tape cassette. 3. Play back the 1 kHz signal. 4. Adjust the VOL control to obtain -10 dB (0.245 V) on the VTVM. 5. Play back the 150 Hz and 6 kHz signals and memorize the VTVM reading. 6. Be sure that the difference between the Step 4 and Step 5 is within 6 dB on the VTVM. 7. If not, adjust by changing the tap of bias oscillator transformer T3.
100 k Ω (B) (see Fig. 3-2-2.)	1. Place the unit in the playback mode. 2. Adjust the Resistor R41 so that the pointer of the level meter is just at the boundary between the red and the black portions.
	1. Deliver a 333 Hz signal of -60 dB (0.775 mV) to MIC jack. 2. Record the signal on a blank tape cassette. 3. Turn the VOL control and TONE control rightwards to the full. 4. Place the unit in playback mode. 5. Be sure that the VTVM reading is more than +10.5 dB (2.61 V) with battery use.
	1. Deliver a 1 kHz signal of -20 dB (77.5 mV) to the MIC jack. 2. Record the signal on a blank tape cassette. 3. Rewind a half of the recorded tape. 4. Disconnect the input signal source and terminate the MIC jack with a 600 Ω resistor. 5. Erase the signal by placing the unit in the record mode with no input signal. 6. Rewind the tape cassette to the beginning and play back the tape cassette. 7. Measure the level difference between the signal recorded portion and erased portion at the MONITOR jack through a 1 kHz band-pass filter. Specification: greater than 60 dB

SECTION 4 DIAGRAMS

4-1. SCHEMATIC DIAGRAM (General Export Model)

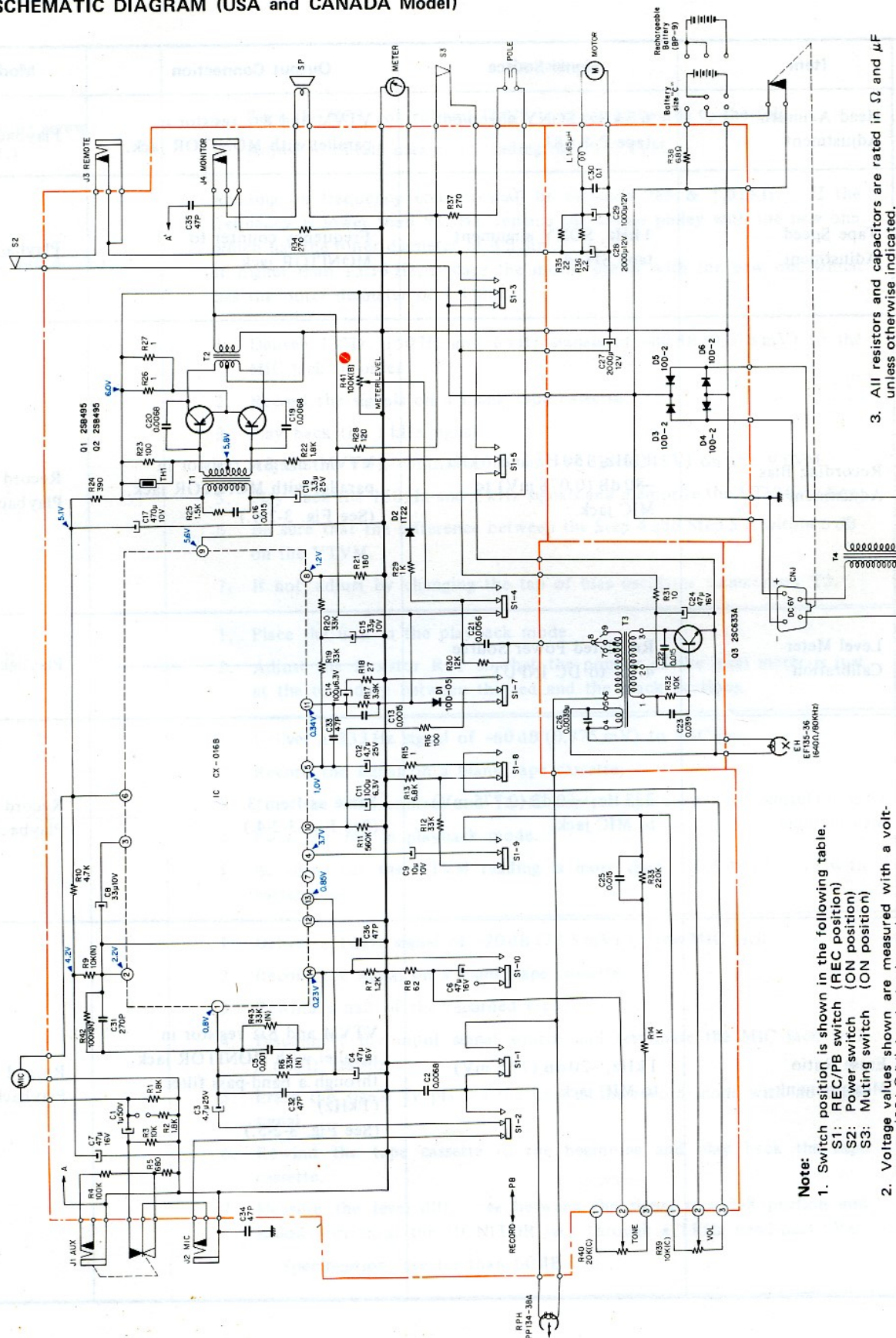


Note:

1. Switch position is shown in the following table.
S1: REC/PB switch (REC position)
S2: Power switch (ON position)
S3: Muting switch (ON position)
S4: Voltage Selector switch (100V position)
2. Voltage values shown are measured with a voltmeter (20 kΩ/V) in playback mode.
Variations may be noted because of normal production tolerances.

3. All resistors and capacitors are rated in Ω and μF unless otherwise indicated.
4. The letters (B) and (C) suffixed to rating value of variable resistor indicates its characteristics.

SCHEMATIC DIAGRAM (USA and CANADA Model)



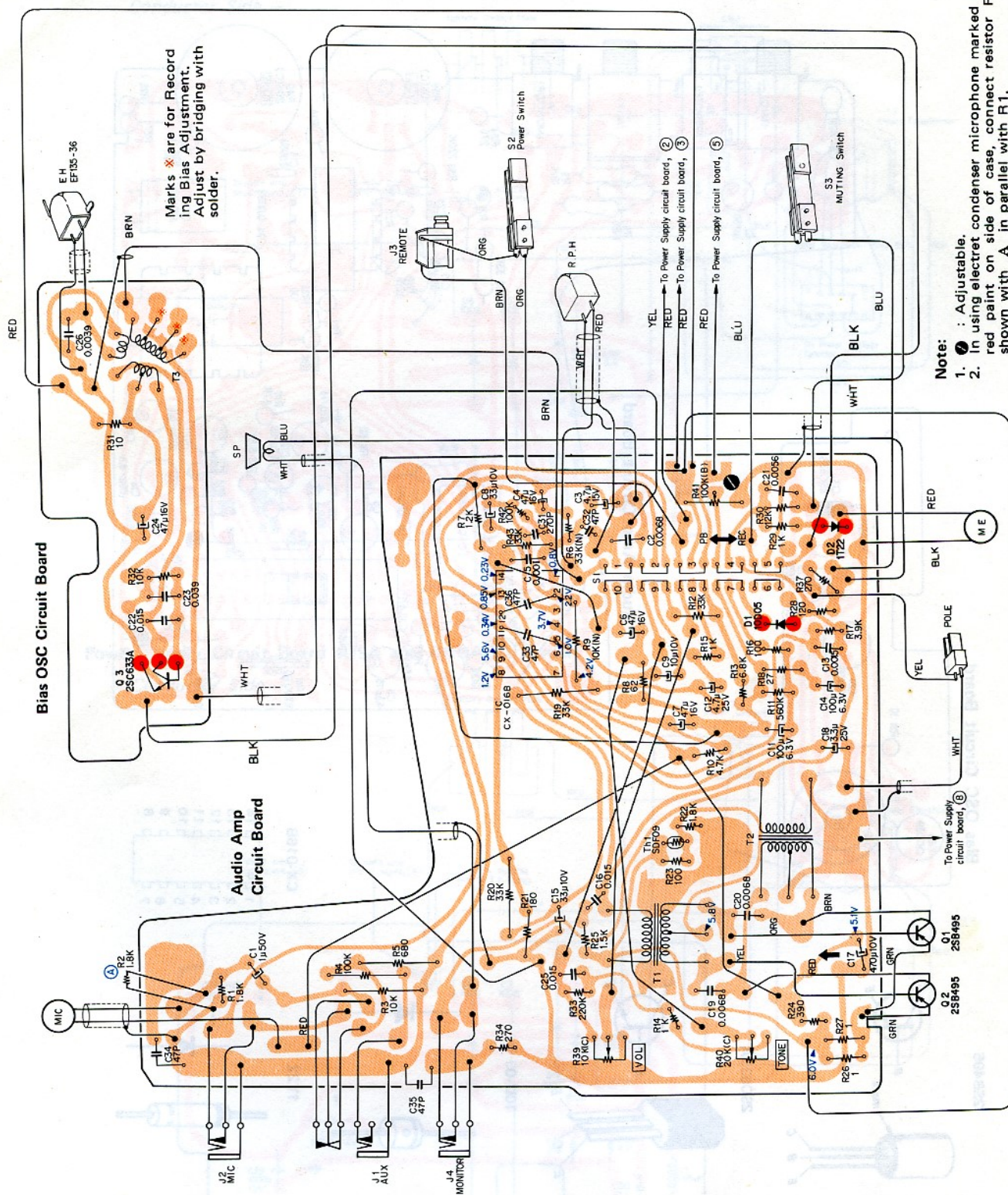
Note:

1. Switch position is shown in the following table.
S1: REC/PB switch (REC position)
S2: Power switch (ON position)
S3: Muting switch (ON position)
2. Voltage values shown are measured with a voltmeter (20 kΩ/V) in playback mode. Variations may be noted because of normal production tolerances.

3. All resistors and capacitors are rated in Ω and μF unless otherwise indicated.
4. The letters (B) and (C) suffixed to rating value of variable resistor indicates its characteristics.

4-2. MOUNTING DIAGRAM

Audio Amp Circuit Board — Conductor Side —

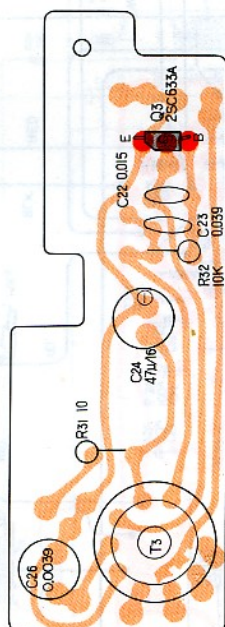


Note:

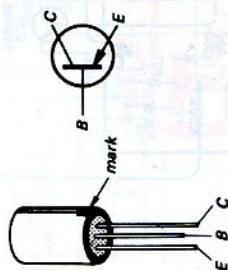
1.  : Adjustable.
2. In using electret condenser microphone marked in red paint on side of case, connect resistor R2 shown with A in parallel with R1.
3. When replacing capacitor, resistor or transistor, solder after laying the parts down in the direction shown by arrows in Mounting Diagram.

Audio Amp Circuit Board — Component Side —

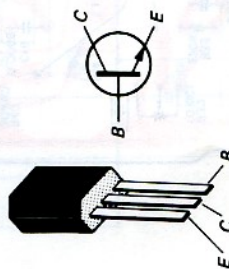
Bias OSC Circuit Board



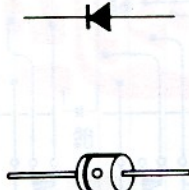
2SB495



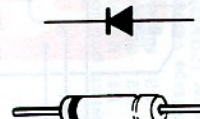
2SC633A



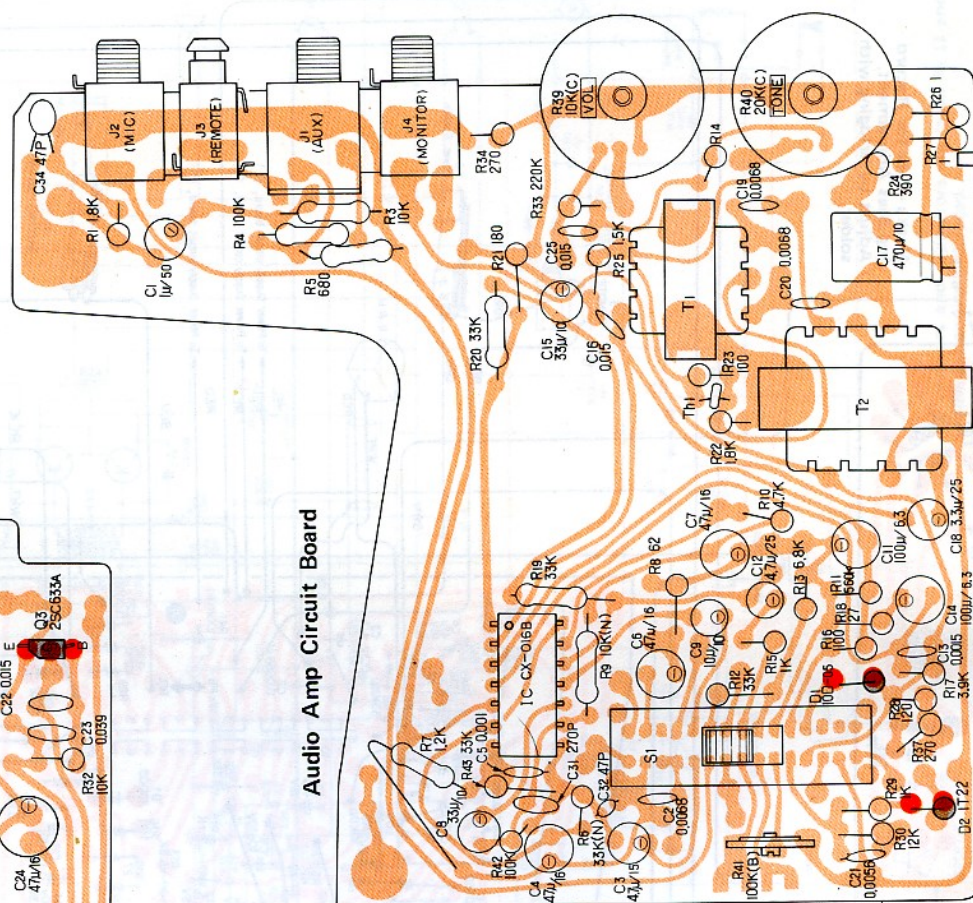
10D-05



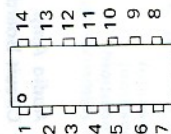
1T22



Audio Amp Circuit Board



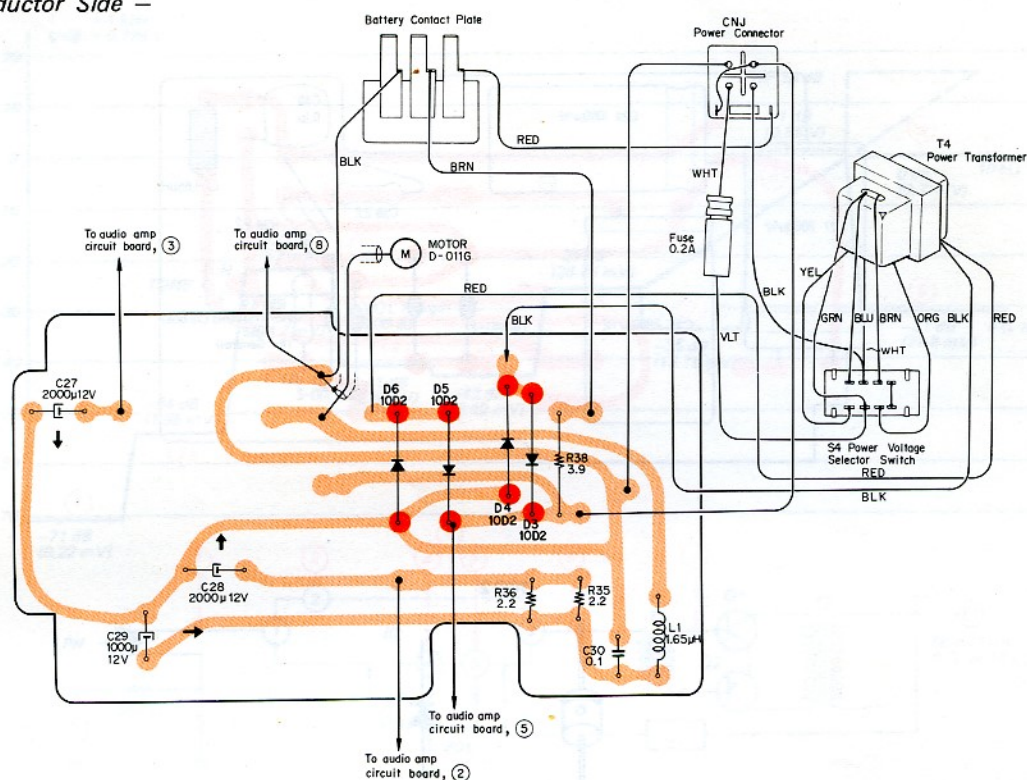
CX-016B



4-3. MOUNTING DIAGRAM

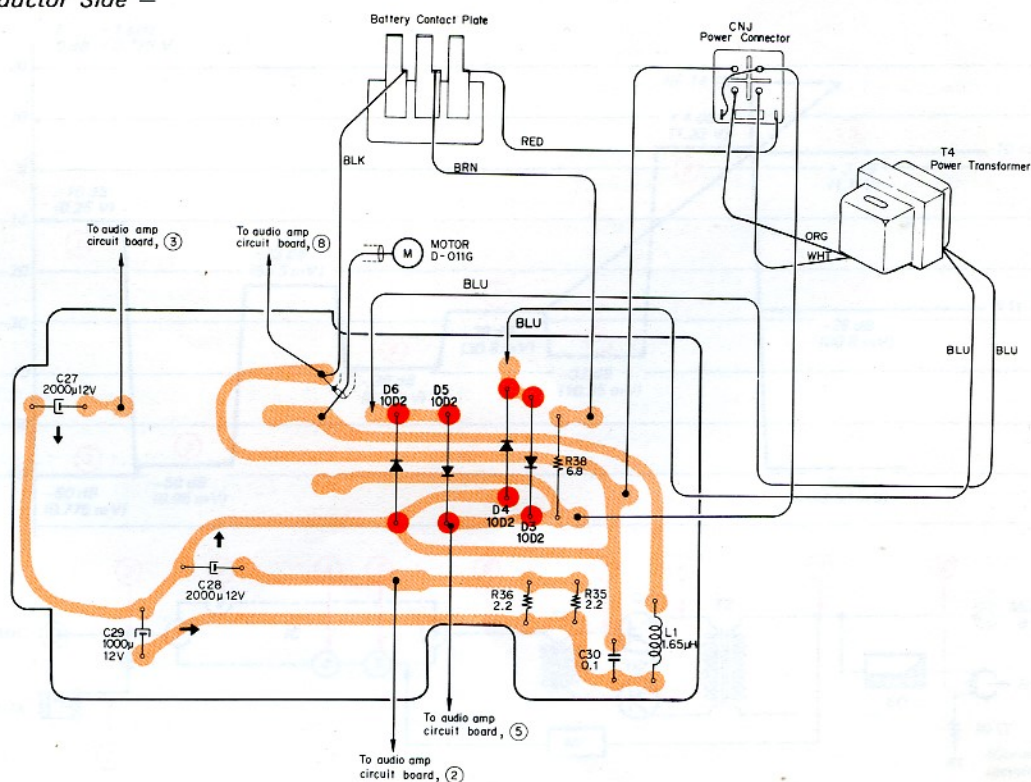
Power Supply Circuit Board (General Export Model)

— Conductor Side —



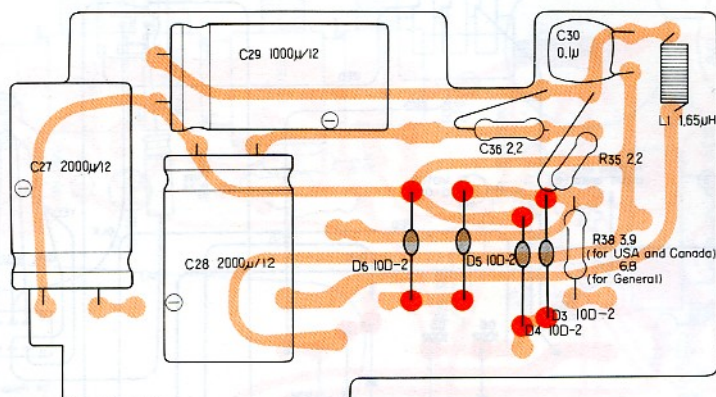
Power Supply Circuit Board (USA and CANADA Model)

— Conductor Side —



Power Supply Circuit Board

— Component Side —

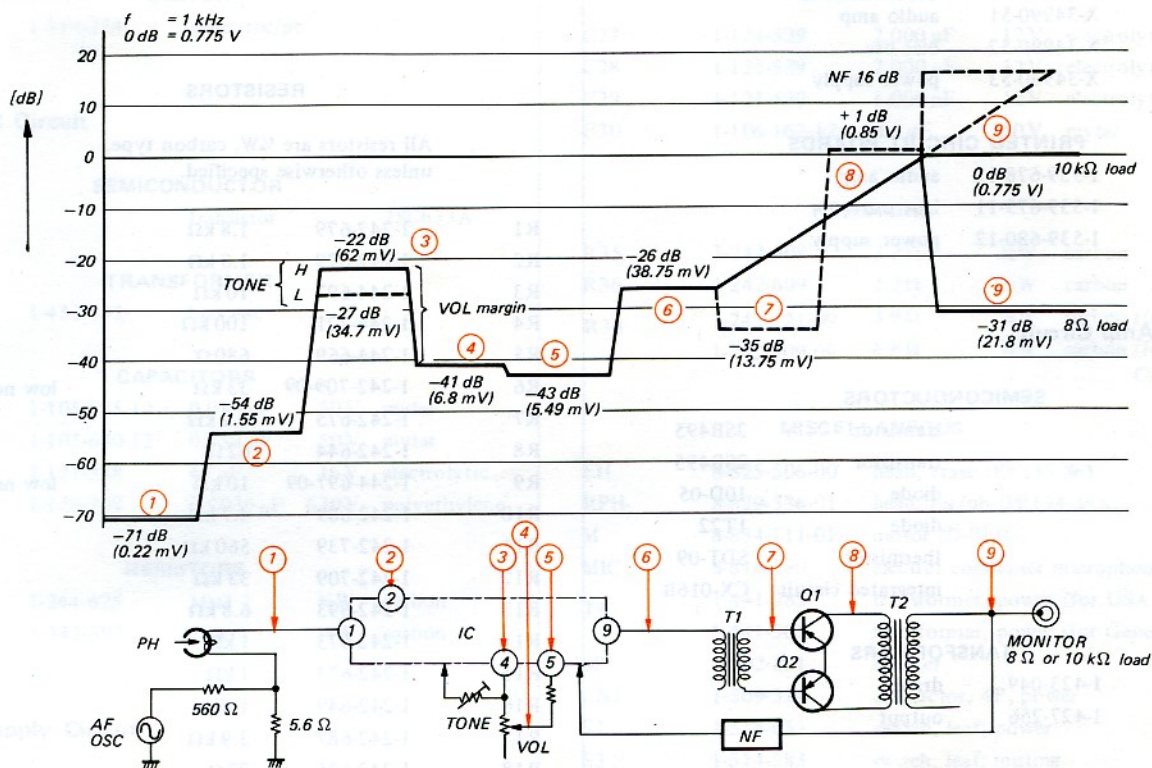


10D2

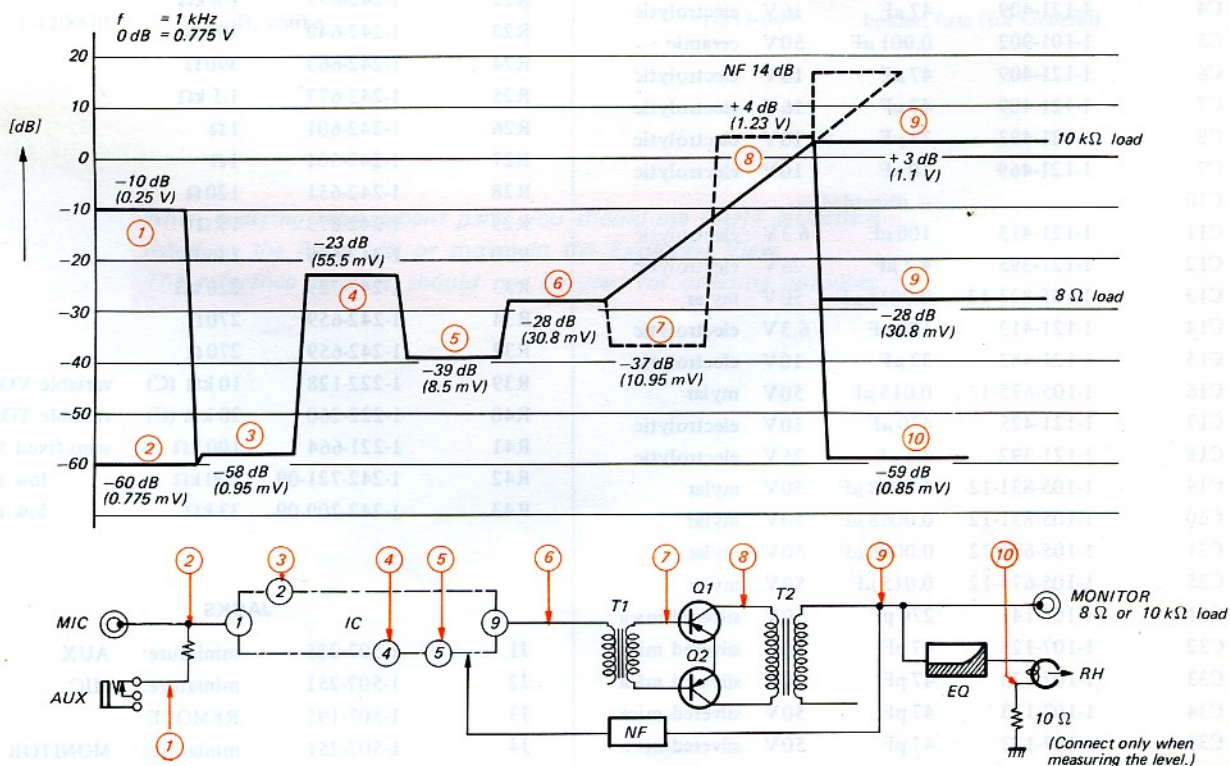


4.4. LEVEL DIAGRAM

Playback



Record



SECTION 5 ELECTRICAL PARTS LIST

Ref. No. Part No. Description

MOUNTED CIRCUIT BOARDS

X-34990-51 audio amp
X-34990-52 bias osc
X-34990-53 power supply

PRINTED CIRCUIT BOARDS

1-539-678-12 audio amp
1-539-679-11 bias osc
1-539-680-12 power supply

Audio Amp Circuit

SEMICONDUCTORS

Q1	transistor	2SB495
Q2	transistor	2SB495
D1	diode	10D-05
D2	diode	1T22
Th1	thermistor	SDT-09
IC	integrated circuit	CX-016B

TRANSFORMERS

T1	1-423-049	driver
T2	1-427-256	output

CAPACITORS

C1	1-121-391	1 μ F	50V	electrolytic
C2	1-105-671-12	0.0068 μ F	50V	mylar
C3	1-121-395	4.7 μ F	25V	electrolytic
C4	1-121-409	47 μ F	16V	electrolytic
C5	1-101-902	0.001 μ F	50V	ceramic
C6	1-121-409	47 μ F	16V	electrolytic
C7	1-121-409	47 μ F	16V	electrolytic
C8	1-121-483	33 μ F	10V	electrolytic
C9	1-121-469	10 μ F	10V	electrolytic
C10		— discarded —		
C11	1-121-413	100 μ F	6.3V	electrolytic
C12	1-121-395	4.7 μ F	25V	electrolytic
C13	1-105-823-12	0.0015 μ F	50V	mylar
C14	1-121-413	100 μ F	6.3V	electrolytic
C15	1-121-483	33 μ F	10V	electrolytic
C16	1-105-675-12	0.015 μ F	50V	mylar
C17	1-121-425	470 μ F	10V	electrolytic
C18	1-121-392	3.3 μ F	25V	electrolytic
C19	1-105-831-12	0.0068 μ F	50V	mylar
C20	1-105-831-12	0.0068 μ F	50V	mylar
C21	1-105-670-12	0.0056 μ F	50V	mylar
C25	1-105-675-12	0.015 μ F	50V	mylar
C31	1-107-141	270 pF	50V	silvered mica
C32	1-107-123	47 pF	50V	silvered mica
C33	1-107-123	47 pF	50V	silvered mica
C34	1-107-123	47 pF	50V	silvered mica
C35	1-107-123	47 pF	50V	silvered mica

Ref. No. Part No. Description

C36 1-107-123 47 pF 50V silvered mica

RESISTORS

All resistors are $\frac{1}{4}$ W, carbon type, unless otherwise specified.

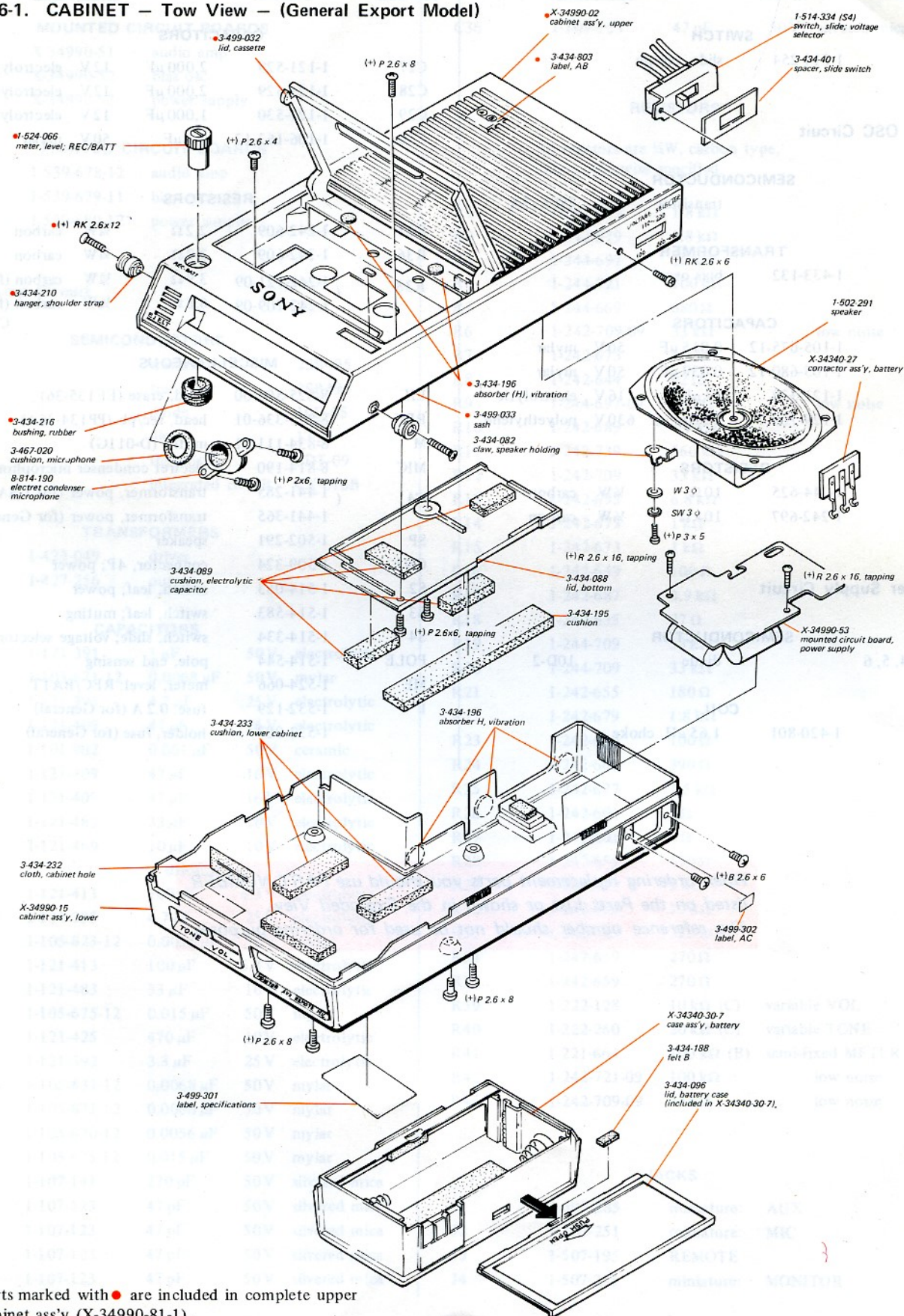
R1	1-242-679	1.8 k Ω	
R2	1-242-679	1.8 k Ω	
R3	1-244-697	10 k Ω	
R4	1-244-721	100 k Ω	
R5	1-244-669	680 Ω	
R6	1-242-709-09	33 k Ω	low noise
R7	1-242-675	1.2 k Ω	
R8	1-242-644	62 Ω	
R9	1-244-697-09	10 k Ω	low noise
R10	1-242-689	4.7 k Ω	
R11	1-242-739	560 k Ω	
R12	1-242-709	33 k Ω	
R13	1-242-693	6.8 k Ω	
R14	1-242-673	1 k Ω	
R15	1-242-673	1 k Ω	
R16	1-242-649	100 Ω	
R17	1-242-687	3.9 k Ω	
R18	1-242-635	27 Ω	
R19	1-244-709	33 k Ω	
R20	1-244-709	33 k Ω	
R21	1-242-655	180 Ω	
R22	1-242-679	1.8 k Ω	
R23	1-242-649	100 Ω	
R24	1-242-663	390 Ω	
R25	1-242-677	1.5 k Ω	
R26	1-242-601	1 Ω	
R27	1-242-601	1 Ω	
R28	1-242-651	120 Ω	
R29	1-242-673	1 k Ω	
R30	1-242-699	12 k Ω	
R33	1-242-729	220 k Ω	
R34	1-242-659	270 Ω	
R37	1-242-659	270 Ω	
R39	1-222-128	10 k Ω (C)	variable VOL
R40	1-222-260	20 k Ω (C)	variable TONE
R41	1-221-664	100 k Ω (B)	semi-fixed METER LEVEL
R42	1-242-721-09	100 k Ω	low noise
R43	1-242-709-09	33 k Ω	low noise

JACKS

J1	1-507-285	miniature:	AUX
J2	1-507-251	miniature:	MIC
J3	1-507-195	REMOTE	
J4	1-507-251	miniature:	MONITOR

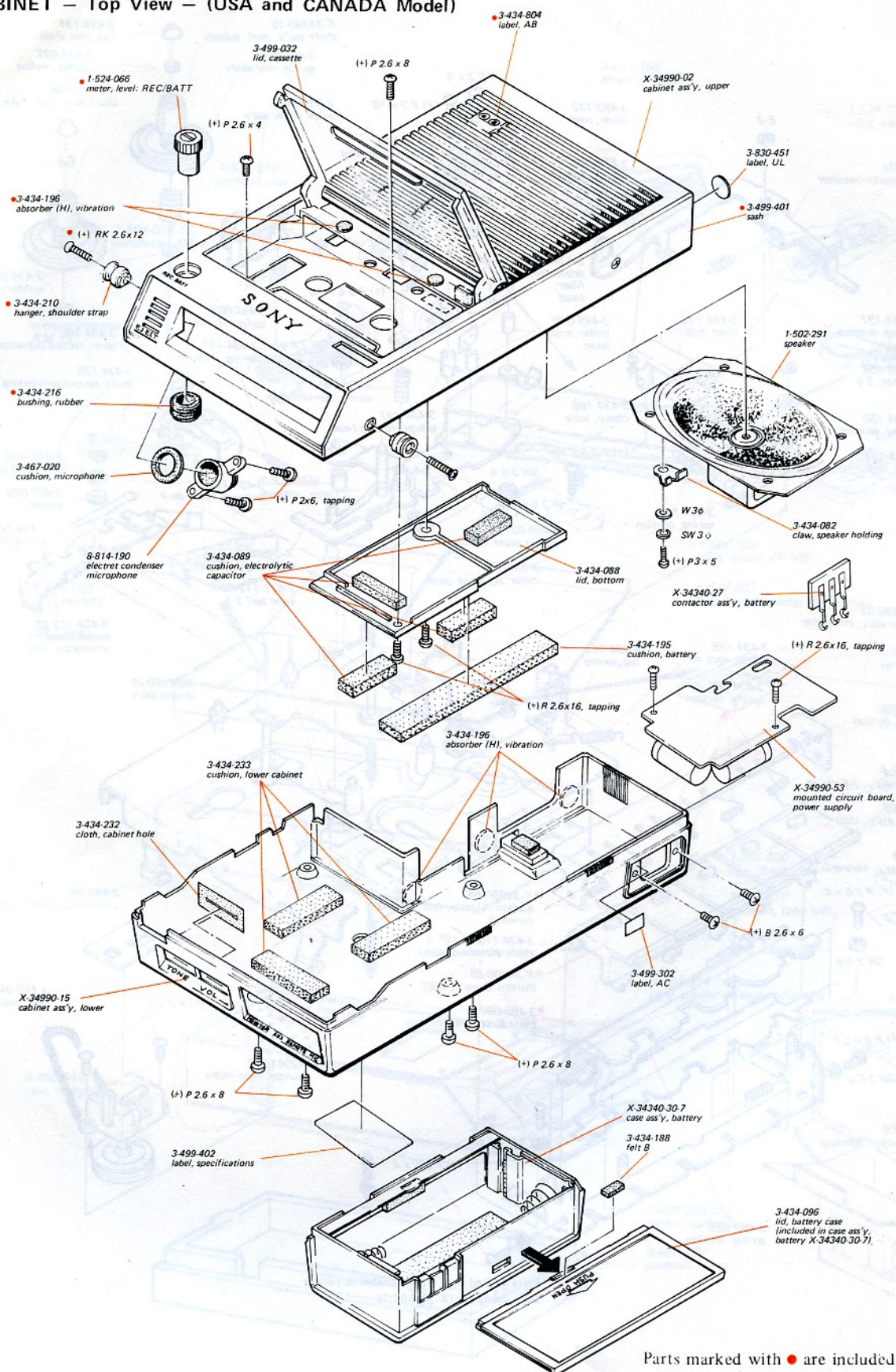
SECTION 6 EXPLODED VIEW

6-1. CABINET – Tow View – (General Export Model)



Parts marked with ● are included in complete upper cabinet ass'y (X-34990-81-1).

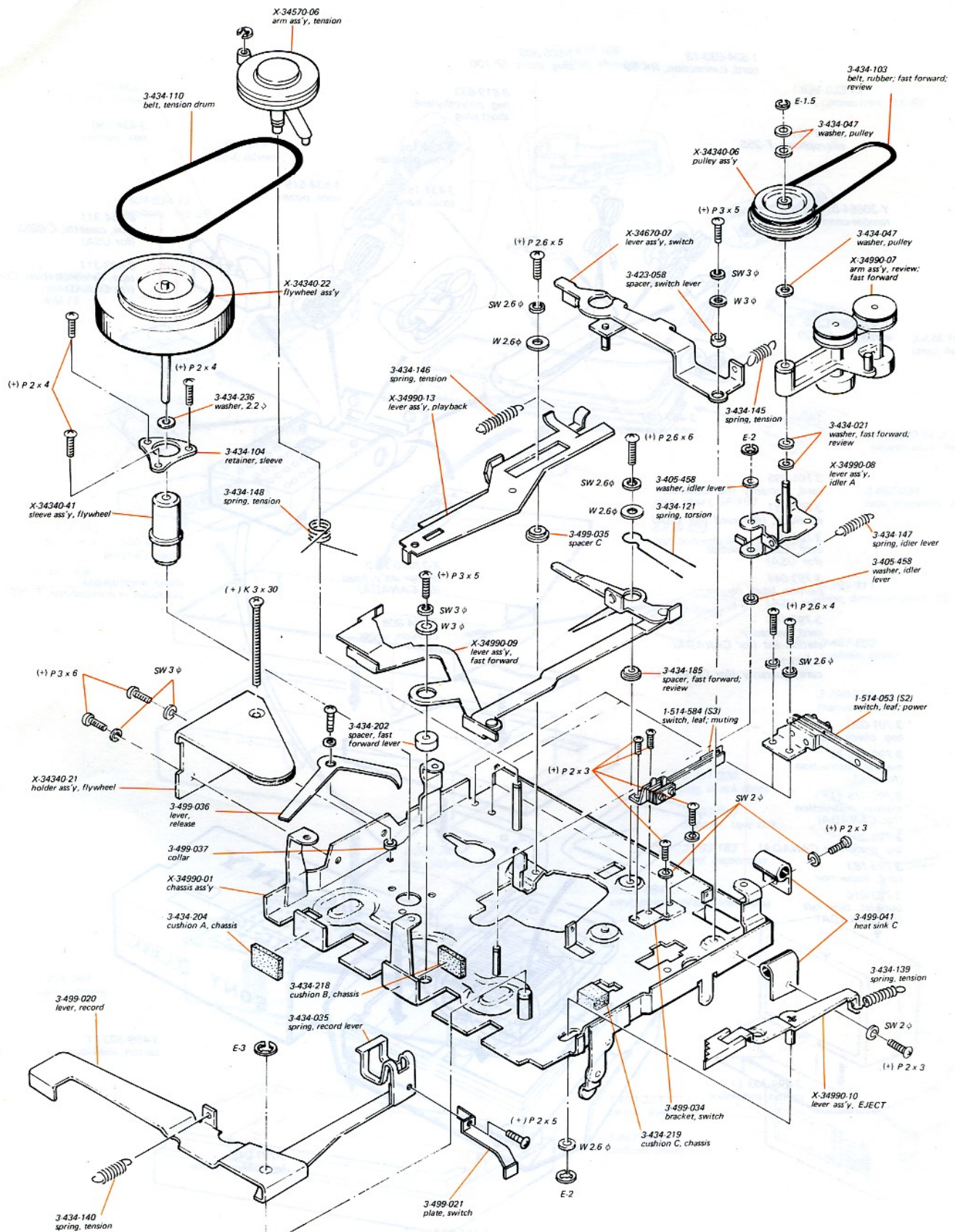
CABINET — Top View — (USA and CANADA Model)



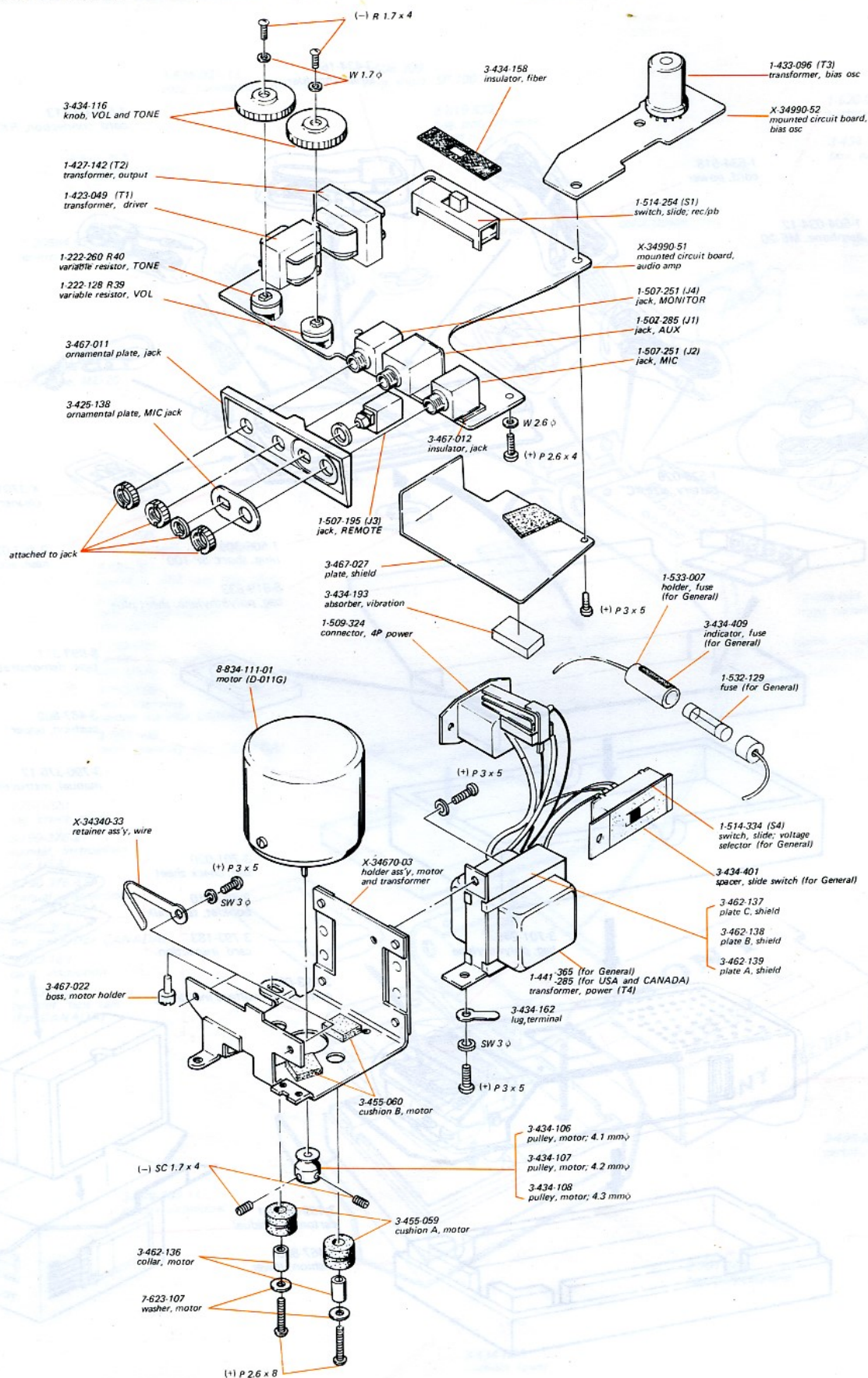
Parts marked with ● are included in complete upper cabinet ass'y (X34990-81-1).



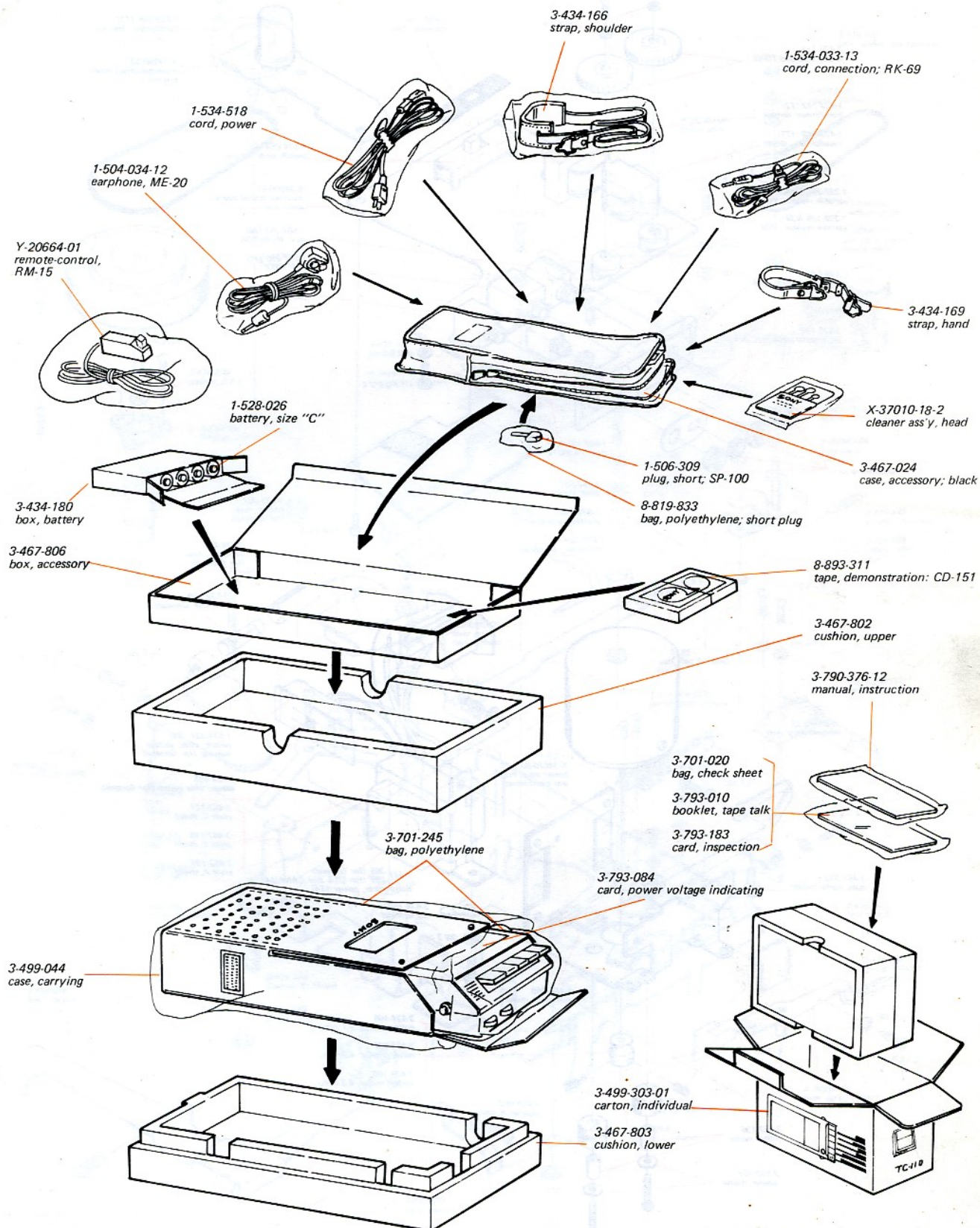
6-3. CHASSIS — Bottom View —



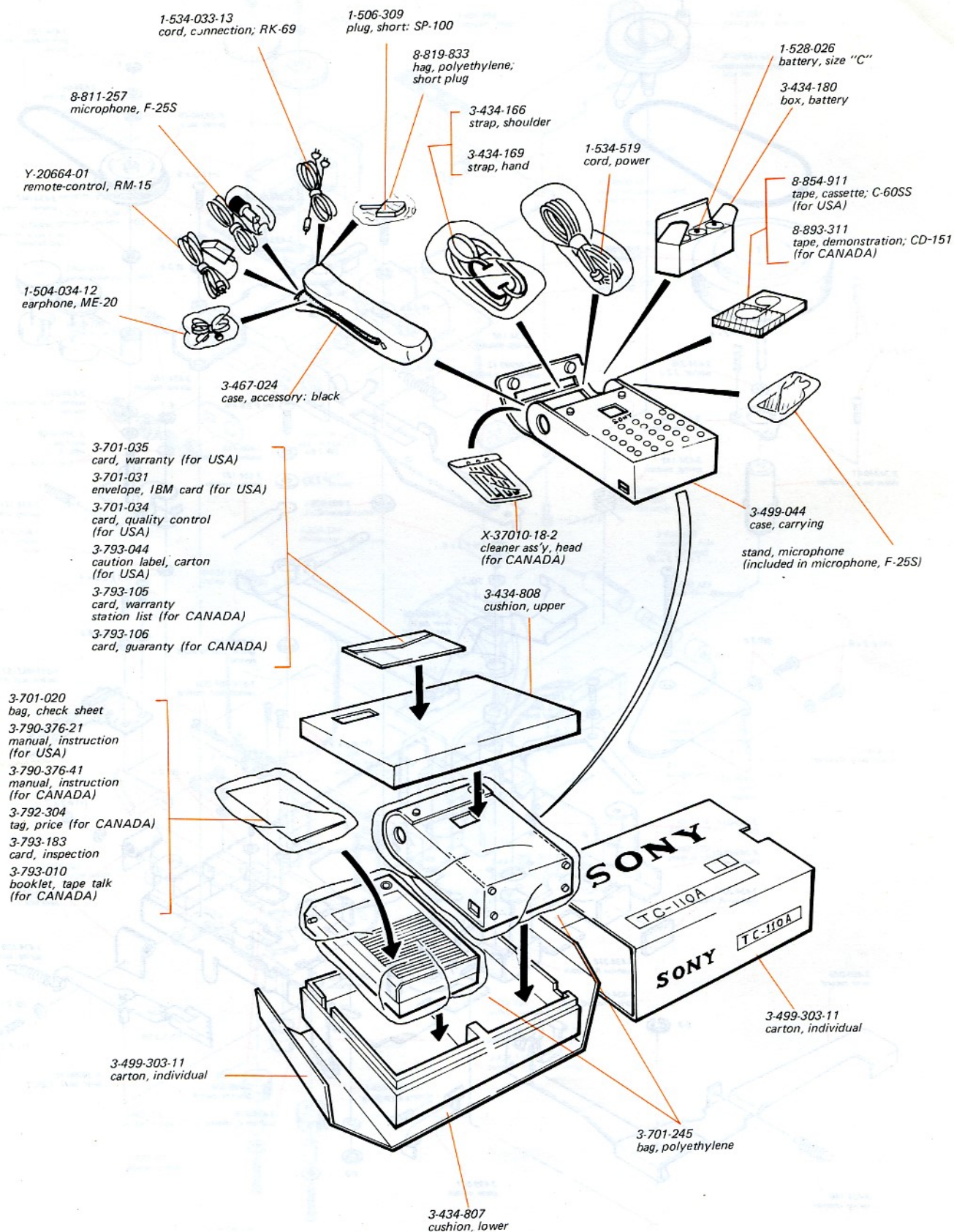
6-4. CIRCUIT BOARD & MOTOR – Top View –



6-5. PACKING (General Export Model)



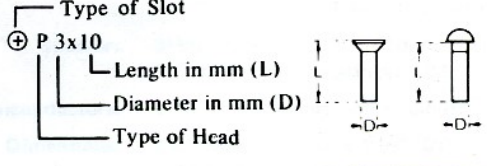
PACKING (USA and CANADA Model)



SECTION 7 HARDWARES

<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
SCREWS		7-682-223-00	⊕ K 2 × 3 (for General and CANADA)
7-621-103-38	⊕ R 1.7 × 4	7-682-255-00	⊕ K 3 × 30
7-621-155-32	⊕ R 2 × 5	WASHERS	
7-621-155-52	⊕ R 2 × 8	7-623-104-15	1.7 φ
7-621-159-52	⊕ R 2.6 × 8	7-623-107-15	2.6 φ
7-621-159-62	⊕ R 2.6 × 10	7-623-108-15	3 φ
7-621-255-15	⊕ P 2 × 3		3.2 φ
7-621-255-25	⊕ P 2 × 4		3.2 φ
7-621-255-63	⊕ P 2 × 10	7-623-205-22	2 φ, spring
7-621-259-23	⊕ P 2.6 × 4	7-623-207-22	2.6 φ, spring
7-621-259-43	⊕ P 2.6 × 6	7-623-208-22	3 φ, spring
7-621-259-53	⊕ P 2.6 × 8	RETAINING RINGS	
7-621-305-52	⊕ P 2 × 8	7-624-102-01	E-1.5
7-621-459-32	⊕ T 2.6 × 5	7-624-104-01	E-2
7-621-659-42	⊕ RK 2.6 × 6	7-624-106-01	E-3
7-621-659-82	⊕ RK 2.6 × 14	7-624-108-01	E-4
7-621-714-28	⊕ SC 1.7 × 4, set	STEEL BALL	
7-621-721-71	⊕ R 2.6 × 6, tapping	7-671-112-01	2 φ
7-621-770-67	⊕ RK 2.6 × 6		
7-628-151-15	⊕ R 3 × 5, w/spring washer		
	⊕ R 3 × 5, w/spring washer		
7-628-151-25	⊕ R 3 × 6, w/spring washer		
	⊕ R 3 × 6, w/spring washer		

Hardware Nomenclature

P - Pan Head Screw		SC - Set Screw	
PS - Pan Head Screw with Spring Washer		E - Retaining Ring (E Washer)	
K - Flat Countersunk Head Screw ...		W - Washer	
B - Binding Head Screw		SW - Spring Washer	
RK - Oval Countersunk Head Screw ...		LW - Lock Washer	
T - Truss Head Screw		N - Nut	
R - Round Head Screw		- Example -	
F - Flat Fillister Head Screw			

SECTION 7
HARDWARES

Part No.	Description	Part No.	Description
7-621-150-00	WASHERS	7-621-150-00	WASHERS
7-621-150-01	WASHERS	7-621-150-01	WASHERS
7-621-150-02	WASHERS	7-621-150-02	WASHERS
7-621-150-03	WASHERS	7-621-150-03	WASHERS
7-621-150-04	WASHERS	7-621-150-04	WASHERS
7-621-150-05	WASHERS	7-621-150-05	WASHERS
7-621-150-06	WASHERS	7-621-150-06	WASHERS
7-621-150-07	WASHERS	7-621-150-07	WASHERS
7-621-150-08	WASHERS	7-621-150-08	WASHERS
7-621-150-09	WASHERS	7-621-150-09	WASHERS
7-621-150-10	WASHERS	7-621-150-10	WASHERS
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7-621-150-94	WASHERS	7-621-150-94	WASHERS
7-621-150-95	WASHERS	7-621-150-95	WASHERS
7-621-150-96	WASHERS	7-621-150-96	WASHERS
7-621-150-97	WASHERS	7-621-150-97	WASHERS
7-621-150-98	WASHERS	7-621-150-98	WASHERS
7-621-150-99	WASHERS	7-621-150-99	WASHERS
7-621-150-100	WASHERS	7-621-150-100	WASHERS

