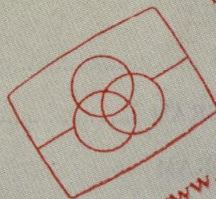


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General Export Model



Set using ISO screws

SPECIFICATIONS

Power Requirements:	AC 100, 110–120, 220–240V 50/60 Hz, 5W DC 6V, Four "C" size standard flashlight batteries, SONY rechargeable battery pack BP-16 or Car battery with SONY car battery cord DCC-126, 3W	Inputs:	MIC Impedance: low impedance Maximum Sensitivity: 0.2mV (–72 dB) AUX Impedance: 100 kΩ Maximum Sensitivity: 60 mV (–22 dB)
Track System:	Two-track mono	Outputs:	MONITOR Impedance: 8 Ω or more Output level: 0.775V (0 dB) with 10 kΩ load
Tape Cassette:	SONY tape cassette or equivalent	Speaker:	4" (100 mm) dynamic speaker Voice coil impedance: 8 Ω
Tape Speed:	1 7/8 ips (4.8 cm/s)	Semiconductors:	1 IC, 3 transistors and 4 diodes
Playing Time:	2.0 hrs total (with C-120 tape cassette)	Dimensions:	9 15/16 (W) x 2 3/4 (H) x 8 1/4" (D) (252 x 69 x 209 mm)
Frequency Response:	50 ~ 10,000 Hz	Weight:	5 lb 8 oz (2.5 kg) with batteries
Signal-to-Noise Ratio:	45 dB or better		
Bias Frequency:	Approx. 85 kHz		
Power Output:	1.5W maximum		

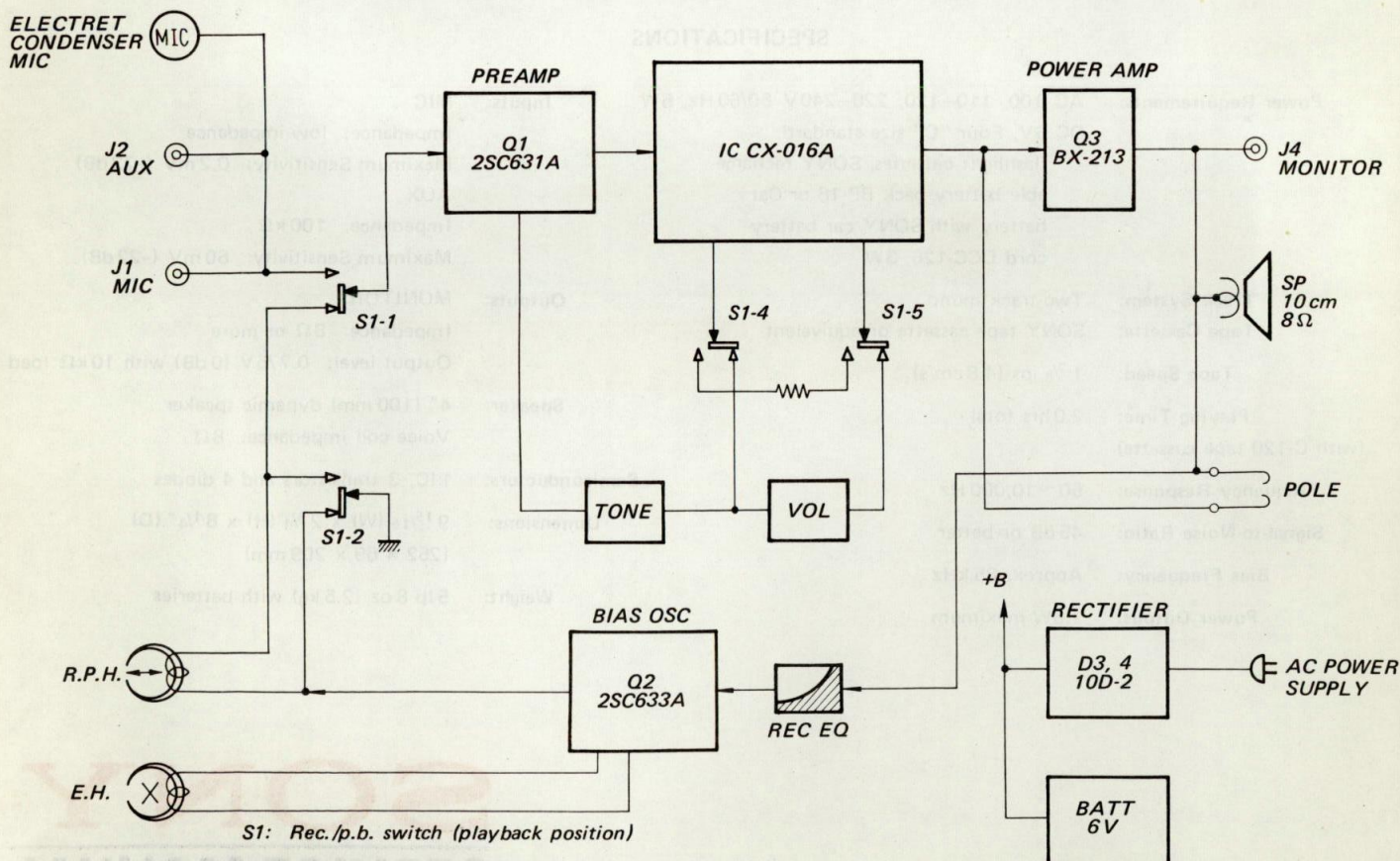
SONY®

SERVICE MANUAL

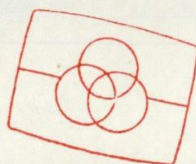
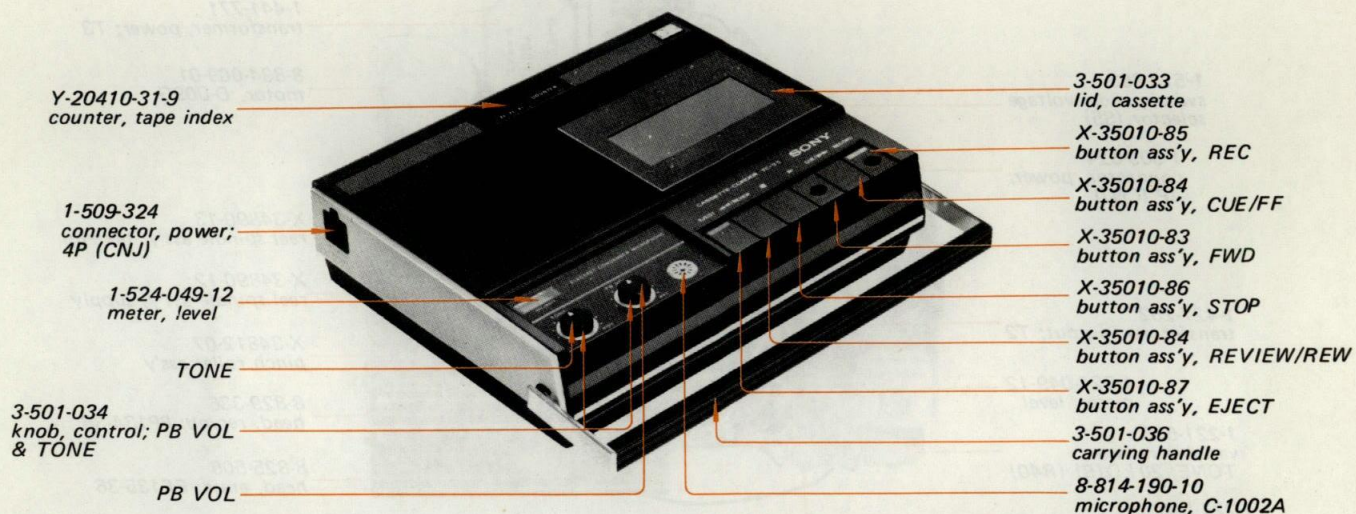
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1. BLOCK DIAGRAM



2. CABINET – TOP VIEW –



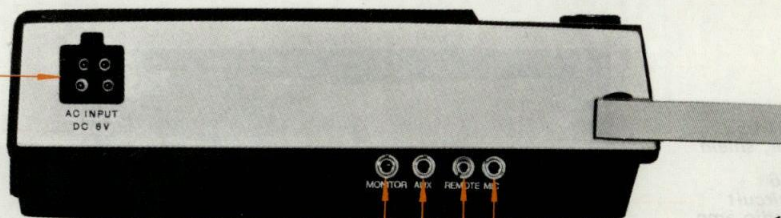
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3. CABINET – SIDE VIEW –

1-509-324
connector, power;
4P (CNJ)



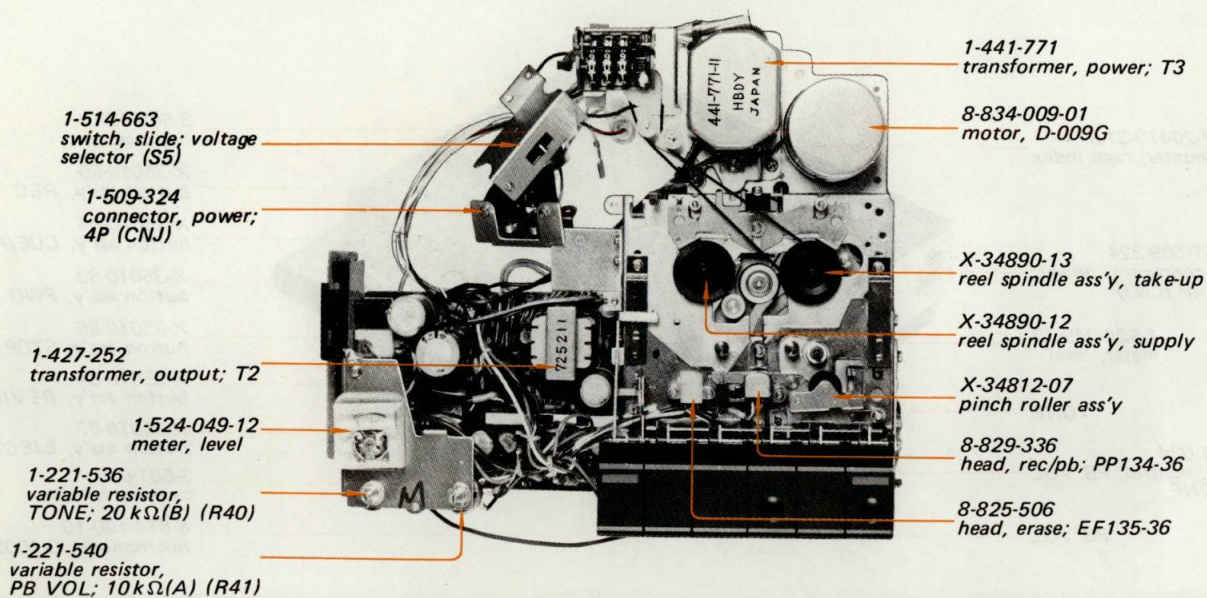
1-507-251-13
jack, MIC (J1)

1-507-195
jack, REMOTE (J3)

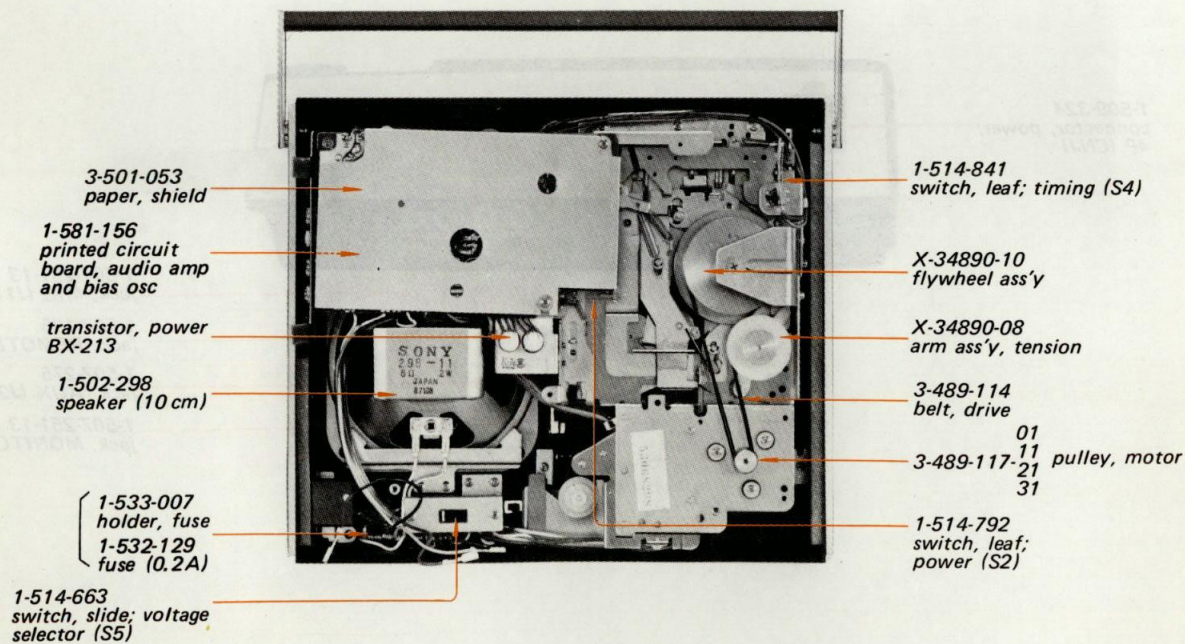
1-507-275
jack, AUX (J2)

1-507-251-13
jack, MONITOR (J4)

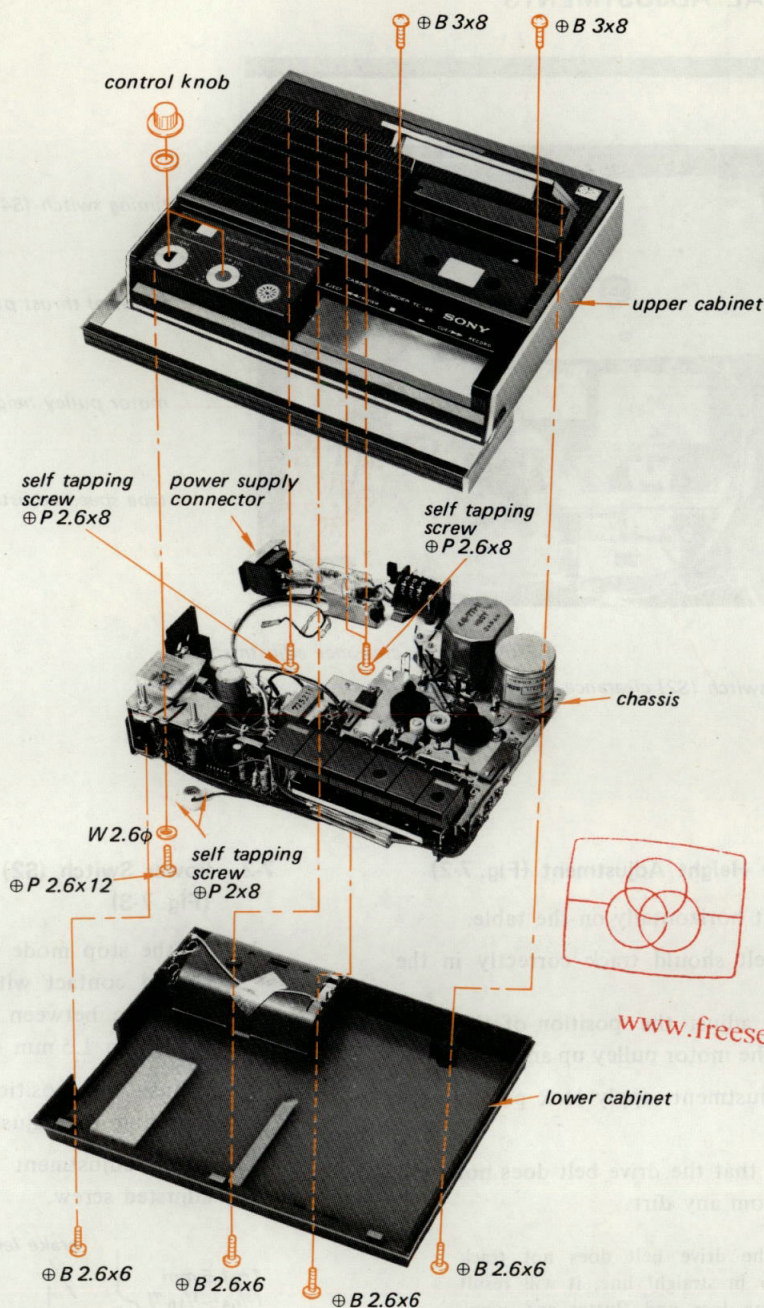
4. CHASSIS — TOP VIEW —



5. CHASSIS — BOTTOM VIEW —



6. DISASSEMBLY



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6-1. Lower Cabinet Removal

Procedure:

1. Remove the four screws ($\oplus B 2.6 \times 6$).
2. Remove the three lead wires connected to battery box by pulling them out.
3. The lower cabinet will come free of the unit.

6-2. Upper Cabinet Removal

Procedure:

1. Pull out the two control knobs.

2. Remove the two screws ($\oplus B 3 \times 8$).
3. Remove the two self tapping screws ($\oplus P 2.6 \times 8$) securing the voltage selector.
4. Remove the two self tapping screws ($\oplus P 2 \times 8$) securing built-in microphone.
5. Remove the screw ($\oplus PS 2.6 \times 12$).
6. Remove the self tapping screw ($\oplus P 2.6 \times 8$) securing power supply connector.
7. Remove the two lead wires connected to speaker by pulling them out.
8. The upper cabinet will come free of the unit.

7. MECHANICAL ADJUSTMENTS

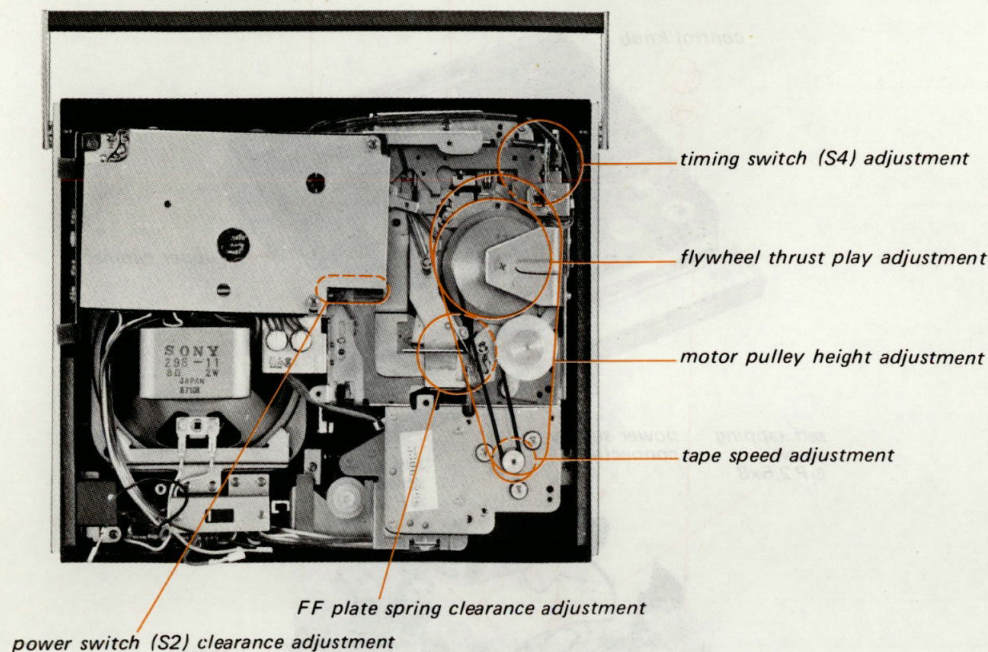


Fig. 7-1. Adjusting parts location

7-1. Motor Pulley Height Adjustment (Fig. 7-2)

1. Place the unit horizontally on the table.
2. The drive belt should track correctly in the straight line.
If necessary, adjust the position of the drive belt moving the motor pulley up and down.
3. After the adjustment, apply lock paint to the set screw.
4. Make certain that the drive belt does not twist and is free from any dirt.

Note: When the drive belt does not track correctly in straight line, it will result in driving loss and flutter and wow. Hence, after replacement of the motor pulley or flywheel, be sure to perform the above adjustment.

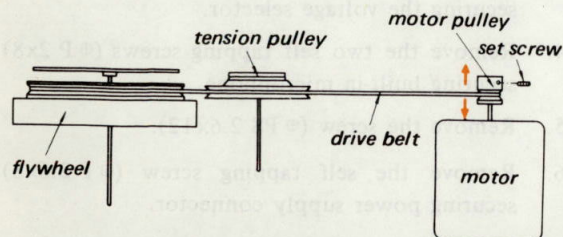


Fig. 7-2.

7-2. Power Switch (S2) Clearance Adjustment (Fig. 7-3)

1. In the stop mode one side of the leaf switch should contact with the brake lever and the clearance between the switch contacts should be 1.0 to 1.5 mm ($\frac{3}{64} \sim \frac{1}{16}$ ").
2. Adjust the position of the leaf switch by loosening the adjusting screw.
3. After adjustment apply lock paint to the adjusted screw.

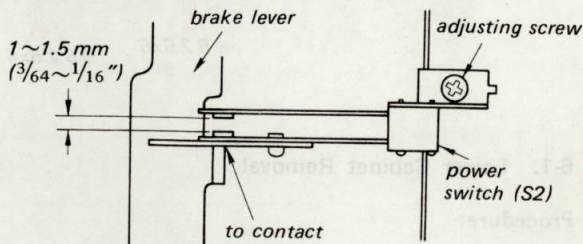


Fig. 7-3.

7-3. Tape Speed Adjustment

1. Playing back the SONY alignment tape SPC-4 with 6V DC power supply or equivalent, measure the output frequency at the MONITOR jack with a frequency counter.

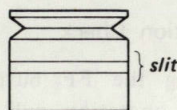
- The frequency should be 980 to 1,025 Hz (1 kHz-2% to 1 kHz+2.5%).

Note: The frequency difference between the beginning and end portions of the tape should be within 10 Hz.

- If necessary, adjust by replacing the motor pulley with one of those in the following table.
- After replacing the motor pulley, perform the Motor Pulley Height Adjustment on page 6.

MOTOR PULLEY

Part No.	Identification	Tape Speed
3-489-117-01	no slit	-2%
3-489-117-11	one slit	standard
3-489-117-21	two slits	+2%
3-489-117-31	three slits	-1%



7-4. Timing Switch (S4) Adjustment (Fig. 7-4)

- Push and lock the record button.
- One side of the leaf switch should contact with the record lever and the clearance between the switch contacts should be 1.0 to 1.5 mm ($\frac{3}{64} \sim \frac{1}{16}$ "). Adjust by loosening the adjusting screws.
- After adjustment apply lock paint to the screws.

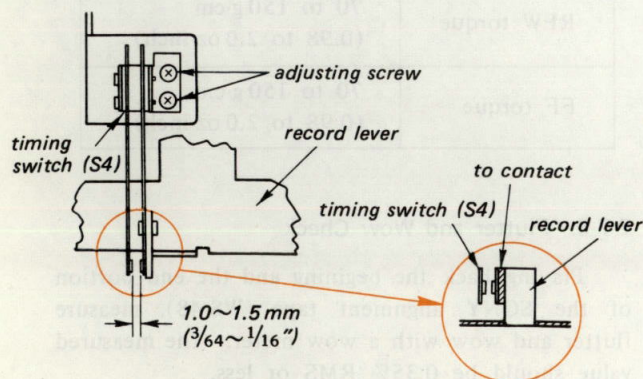


Fig. 7-4.

7-5. Flywheel Thrust Play Adjustment (Fig. 7-5)

Adjust the thrust screw for play of 0.1 to 0.4 mm ($\frac{1}{64}$ ") between the thrust screw and the flywheel.

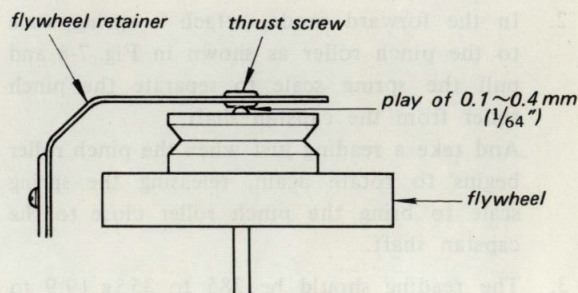


Fig. 7-5.

7-6. FF Plate Spring Clearance Adjustment (Fig. 7-6 and Fig. 7-7)

- In the stop mode, clearance between the roller and the FF plate spring should be 0 to 0.5 mm ($\frac{1}{64}$ ") and the FF plate spring should be flush with the roller as shown in Fig. 7-7. If necessary, adjust the clearance by bending the portion "a" of the FF plate spring.
- After adjustment make certain that the take-up reel table begins to rotate before the FF button is locked. Wider clearance will result in rotation of the take-up reel table after the FF button is locked.

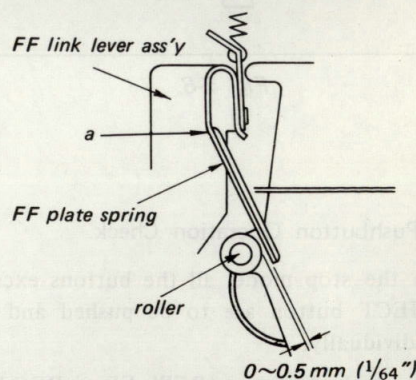


Fig. 7-6.

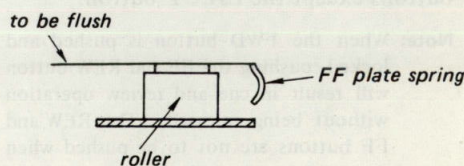


Fig. 7-7.

7-7. Check After Adjustment

7-7-1. Pinch Roller Pressure Check

1. Make certain that the pinch roller and the capstan shaft contact each other in parallel.
2. In the forward mode, attach a spring scale to the pinch roller as shown in Fig. 7-8 and pull the spring scale to separate the pinch roller from the capstan shaft.
And take a reading just when the pinch roller begins to rotate again, releasing the spring scale to bring the pinch roller close to the capstan shaft.
3. The reading should be 285 to 355g (9.9 to 12.7 oz).

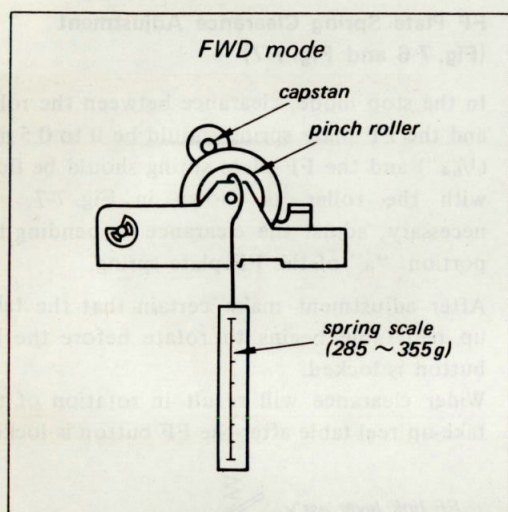


Fig. 7-8.

7-7-2. Pushbutton Operation Check

1. In the stop mode, all the buttons except the EJECT button are to be pushed and locked individually.
2. The locked button (REW, FF or REC button) is to be released by pushing one of the other buttons except the EJECT button.

Note: When the FWD button is pushed and locked, pushing the FF and REW button will result in cue and review operation without being released. The REW and FF buttons are not to be pushed when the REC button is locked.

3. The FWD and FF buttons are not to be locked simultaneously.
4. The FWD and REW buttons are not to be locked simultaneously.
5. The REC and FF buttons are not to be locked simultaneously.
6. The REC and REW buttons are not to be locked simultaneously.

7-7-3. Review Function Check

When pushing the REW button slowly in the FWD mode, review operation will be performed according to the following sequence and when releasing the button, the review operation will be released according to the reverse sequence.

1. Pinch roller separates from capstan shaft.
2. Rotation of take-up reel spindle stops.
3. Supply reel table starts to rotate.

7-7-4. Cue Function Check

When pushing the FF button slowly in the FWD mode, cue operation will be performed according to the following sequence, and when releasing the button, the cue operation will be released according to the reverse sequence.

1. Pinch roller separates from capstan shaft.
2. Take-up reel spindle rotates at the same speed as in the FF mode.

7-7-5. Torque Check

Each torque should meet the following value.

FWD torque	40 to 60 g·cm (0.56 to 0.85 oz·inch)
REW torque	70 to 150 g·cm (0.98 to 2.0 oz·inch)
FF torque	70 to 150 g·cm (0.98 to 2.0 oz·inch)

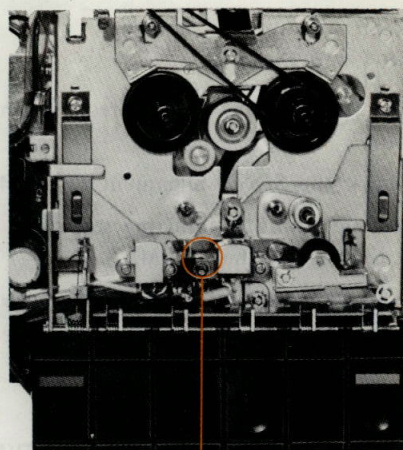
7-7-6. Flutter and Wow Check

Playing back the beginning and the end portion of the SONY alignment tape (WS-48), measure flutter and wow with a wow meter. The measured value should be 0.35% RMS or less.

8. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

(1) Necessary Test Equipments

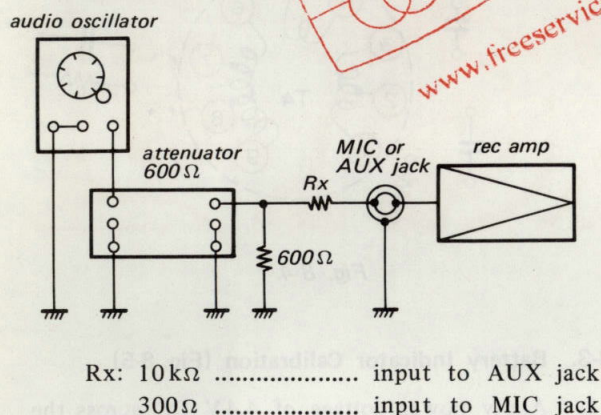
1. Audio oscillator
2. Attenuator (600 Ω)
3. VTVM
4. Resistors; 8 Ω (10W), 300 Ω ($\frac{1}{4}$ W), 10k Ω ($\frac{1}{4}$ W)
5. Blank tape cassette C-60 (completely erased with a bulk eraser)
6. SONY alignment tapes
 P-4-A81 (6.3 kHz, -10 dB) for Azimuth Adjustment
 P-4-L81 (333 Hz, 0 dB) for Level Adjustment



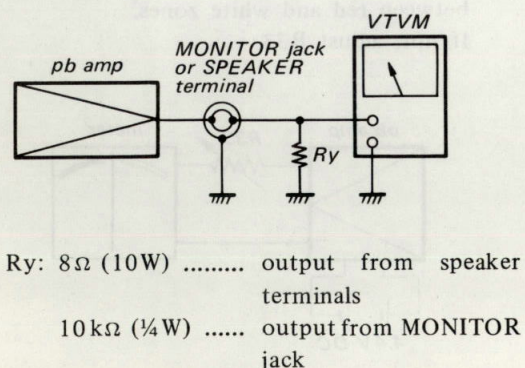
PB head azimuth adjustment

(2) Test Equipment Connections

1. Input Connection

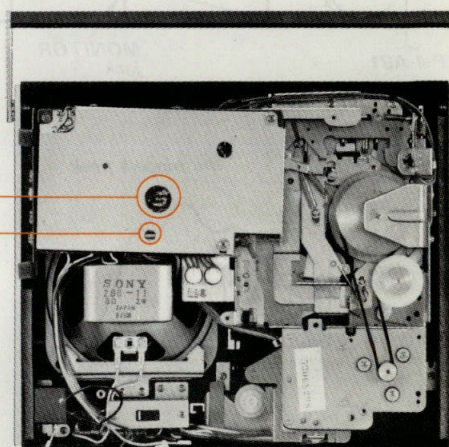


2. Output Connection



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recording bias adjustment
 battery indicator calibration



Precautions

1. Before adjustments, clean the heads with soft cloth moistened with denatured alcohol and demagnetize them using a head demagnetizer (SONY Model HE-2).
2. Adjustments should be performed in order.
3. After adjustments, apply lock paint to the each adjusted part.
4. Deliver input signals to the MIC jack with the TONE control turned extremely clockwise, unless otherwise specified.
5. Normal position of PB VOLUME:
 Playing back the SONY alignment tape (P-4-L81) the PB VOLUME is to be set at a position to obtain +2 dB reading on the VTVM connected between the speaker terminals.

8-1. PB Head Azimuth Adjustment (Fig. 8-1 and Fig. 8-2)

1. Set the PB VOLUME to the prescribed normal position.
2. Play back the SONY alignment tape P-4-A81.
3. Adjust the azimuth adjusting screw for maximum reading on the VTVM.

Note: Several peaks may appear, adjust for the biggest peak as shown in Fig. 8-2.

Setup:

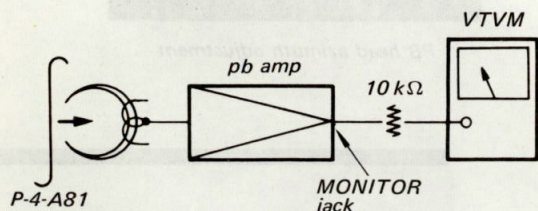


Fig. 8-1.

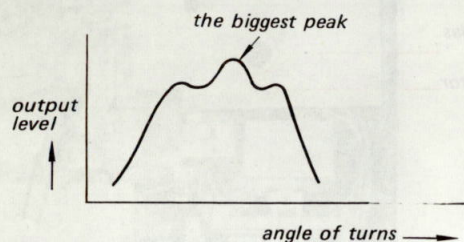


Fig. 8-2.

8-2. Recording Bias Adjustment (Fig. 8-3 and Fig. 8-4)

1. Set the TONE control to the mechanical mid position.
 2. Deliver 1 kHz and 6 kHz signals of -80 dB (77 μ V) to the MIC jack and record them on a blank tape cassette.
 3. When playing back the recorded portion the output of 6 kHz signal should be within 0 \pm 2 dB against that of 1 kHz signal.
 4. If necessary, repeat the above steps 2 and 3 changing the connection of tap of bias osc transformer as shown in Fig. 8-4.
- When the output of 6 kHz signal is higher than that of 1 kHz signal, connect the tap 9 in Fig. 8-4. When the former is lower than the later, connect the tap 7 in Fig. 8-4.

Setup:

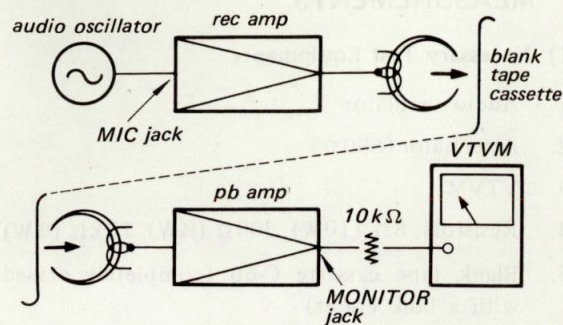


Fig. 8-3.

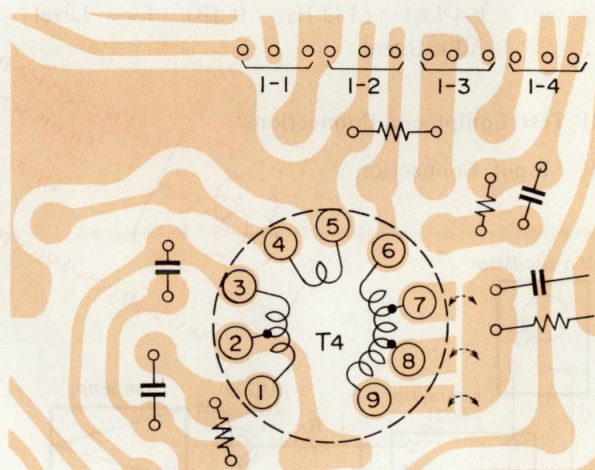


Fig. 8-4.

8-3. Battery Indicator Calibration (Fig. 8-5)

1. Apply power voltage of 4.4V DC across the unit as shown in Fig. 8-5.
2. When placing the unit in the playback mode, the indicator should indicate the boundary between red and white zones. If not, adjust R33.

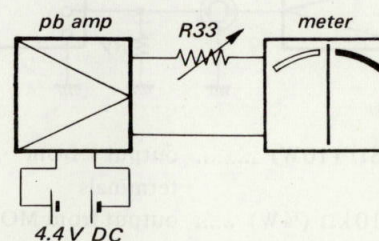


Fig. 8-5.

8-4. Check after Adjustments

8-4-1. Overall Frequency Response Measurement (Fig. 8-6 and Fig. 8-7)

1. Deliver 1 kHz, 150 Hz, and 6 kHz signals of -80 dB (77 μ V) to the MIC jack and record them on a blank tape cassette.
2. Playing back the recorded 1 kHz signal, set the PB VOLUME for -10 dB (0.24 V) on the VTVM connected as shown in Fig. 8-6.
3. Continue to play back the recorded portion and measure the output level of each frequency.
4. The output level should meet the following specification in Fig. 8-7.

Note: TONE control is to be set at a proper position to meet the specification.

Setup:

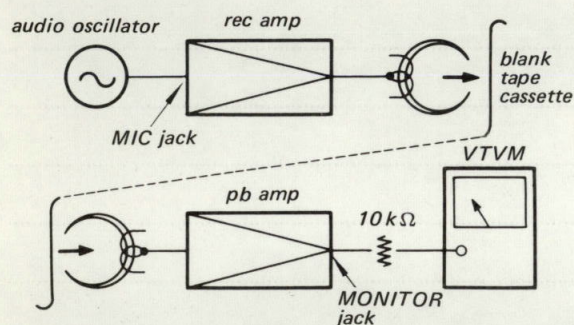


Fig. 8-6.

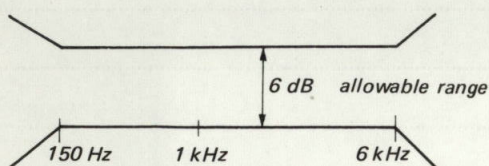


Fig. 8-7.

8-4-2. Overall S/N Ratio Measurement (Fig. 8-8)

1. Deliver a 1 kHz signal of -60 dB (0.77 mV) to the MIC jack and record it on a blank tape cassette.
2. Disconnect the audio oscillator and connect a dummy resistor of 300 Ω across the MIC jack.
3. Place the unit in the record mode with no input signal.

4. Set the PB VOLUME in the prescribed normal position and play back the portion recorded in the step 1 and 3.
5. Check the difference between the two output levels using the VTVM.
6. The difference should be more than 40 dB when operated on batteries or more than 36 dB when operated on ac power supply.

Setup:

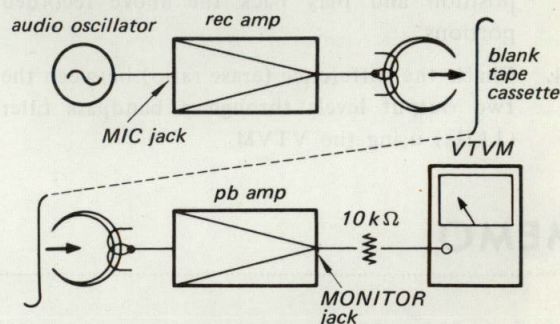


Fig. 8-8.

8-4-3. Overall Maximum Output Measurement (Fig. 8-9)

1. Deliver a 1 kHz signal of -60 dB (0.77 mV) to the MIC jack and record it on a blank tape cassette.
2. Playing back the recorded portion, measure the output level on the VTVM with the TONE and PB VOLUME turned extremely clockwise.
3. The output should be more than 11 dB (2.75 V) when operated on batteries or more than 9 dB (2.2 V) when operated on ac power supply.

Setup:

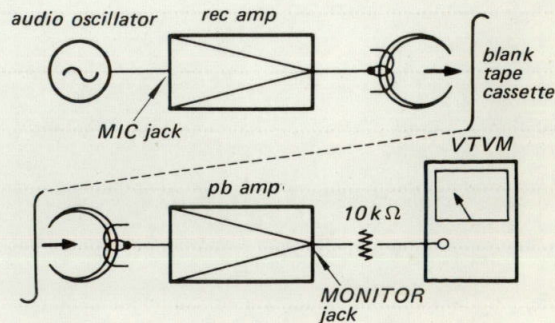


Fig. 8-9.

5. The difference should be more than 60 dB.

1. Deliver a 1 kHz signal of -30 dB (24.5 mV) to the MIC jack and record it on a blank tape cassette.
2. Rewind a half of the recorded portion of the tape, terminate the MIC jack with a dummy resistor of 300Ω and then erase the rewind portion (record mode with no input signal).
3. Set the PB VOLume in the prescribed normal position and play back the above recorded portions.
4. Check the difference (erase ratio) between the two output levels through a bandpass filter (1 kHz) using the VTVM.

audio oscillator

rec amp

MIC jack

blank tape cassette

pb amp

10 k Ω

B.P.F.

1 kHz

VTVM

MONITOR jack

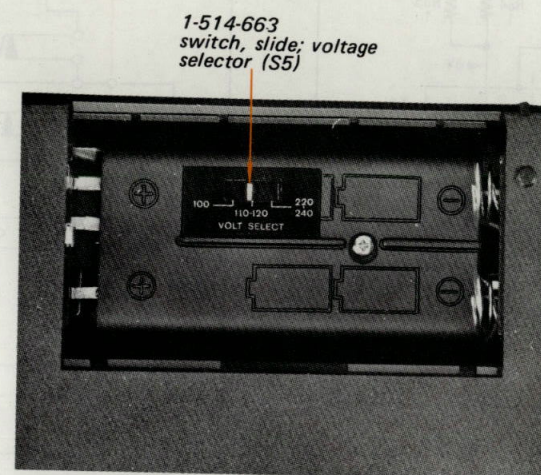
Fig. 8-10.

MEMO

[illegible]

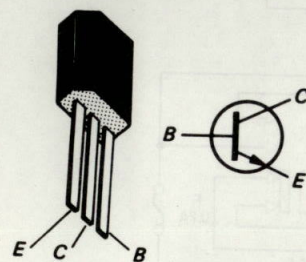
9. ADAPTATION TO THE LOCAL POWER LINE

To adapt the unit to your local power line voltage, take out batteries and slide the voltage selector located inside the battery box with a small screw driver and set it to your local power line voltage, 100, 110-120 or 220-240V.

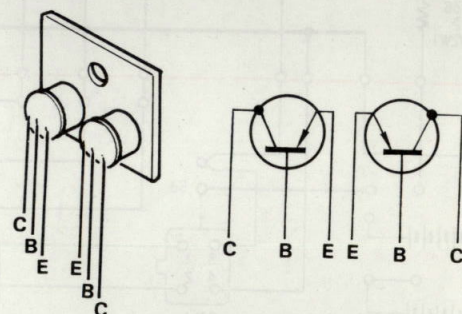


10. SEMICONDUCTOR ELECTRODES

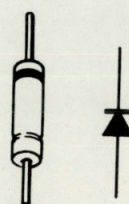
2SC631A
2SC633A



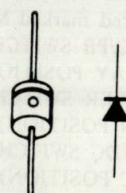
BX-213



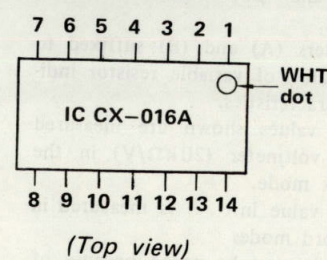
1T22



10D-2

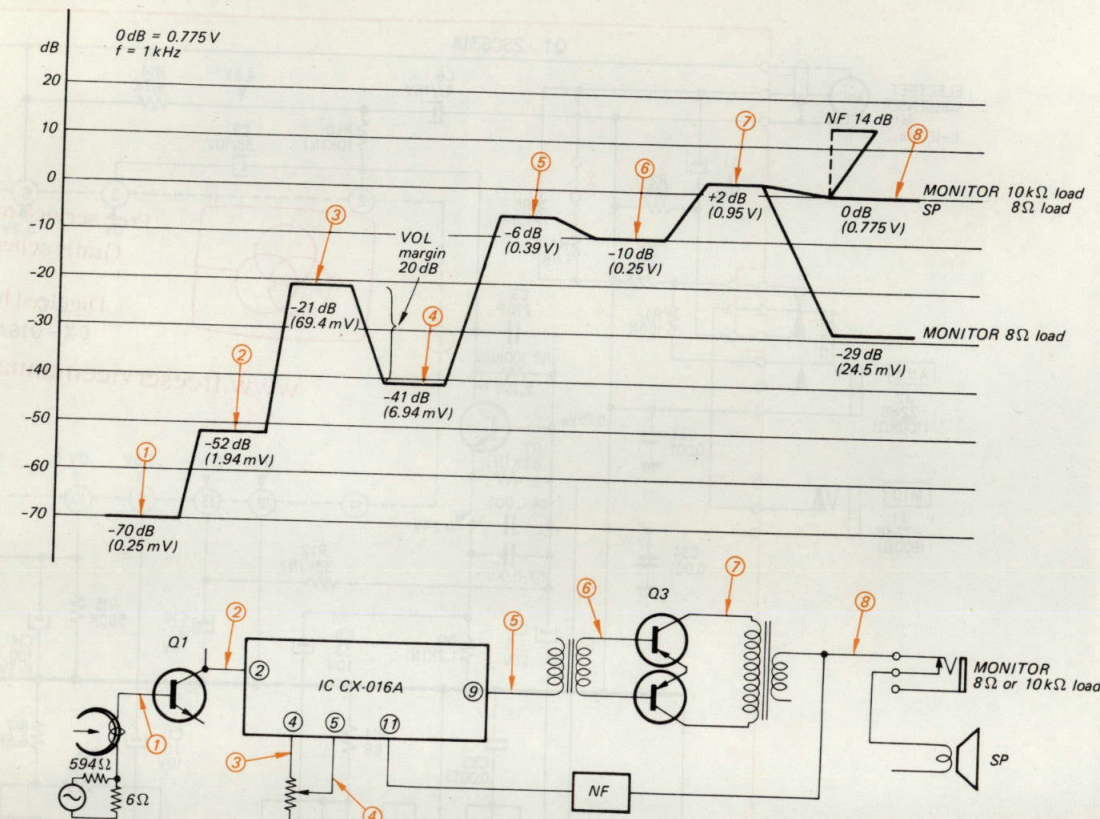


CX-016A

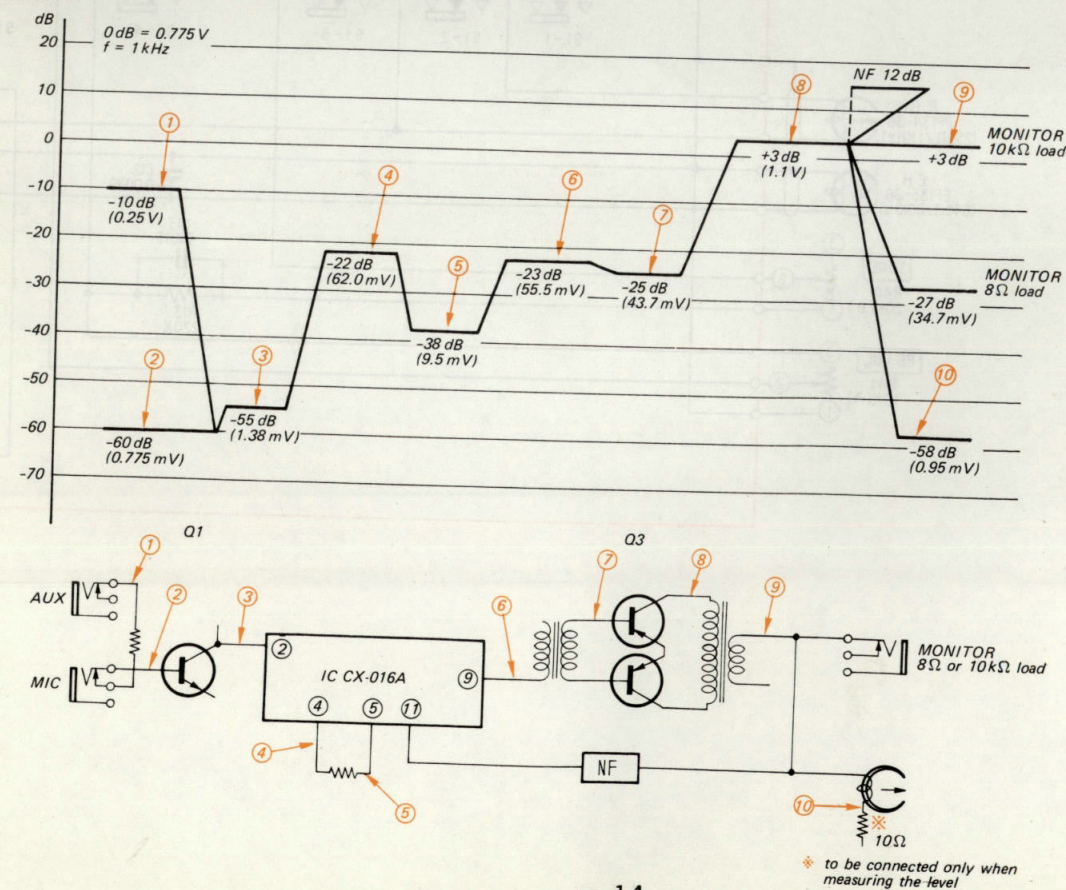


11. LEVEL DIAGRAM

11-1. Playback



11-2. Record

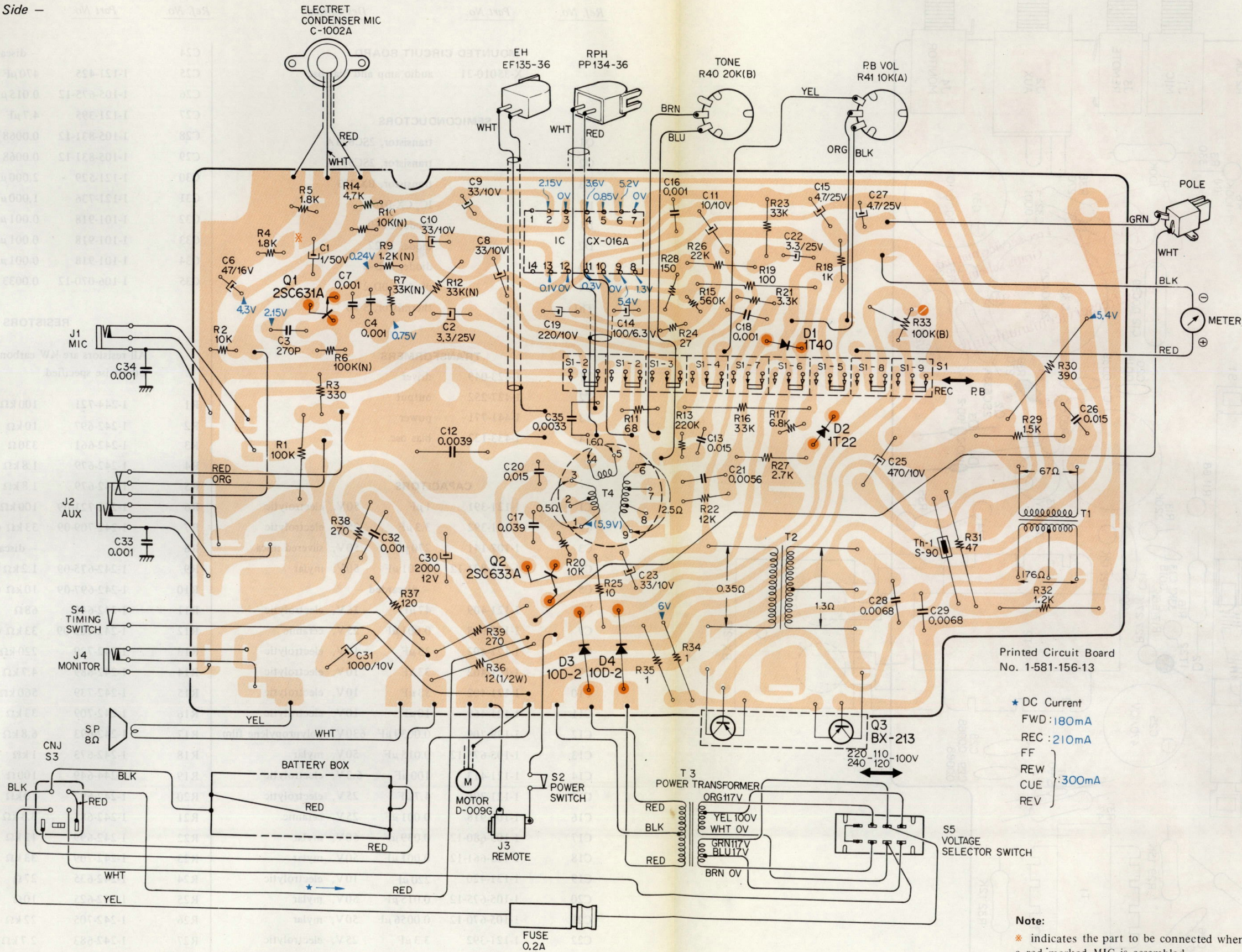


4. * indicates the part to be connected when a red marked MIC is assembled.

- S1: REC/PB SWITCH
(PLAY POSITION)
- S2: POWER SWITCH
(ON POSITION)
- S3: AC/DC SWITCH
(AC POSITION)
- S4: TIMING SWITCH
(REC POSITION)
- S5: VOLTAGE SELECTOR SWITCH
(220 ~ 240 V POSITION)

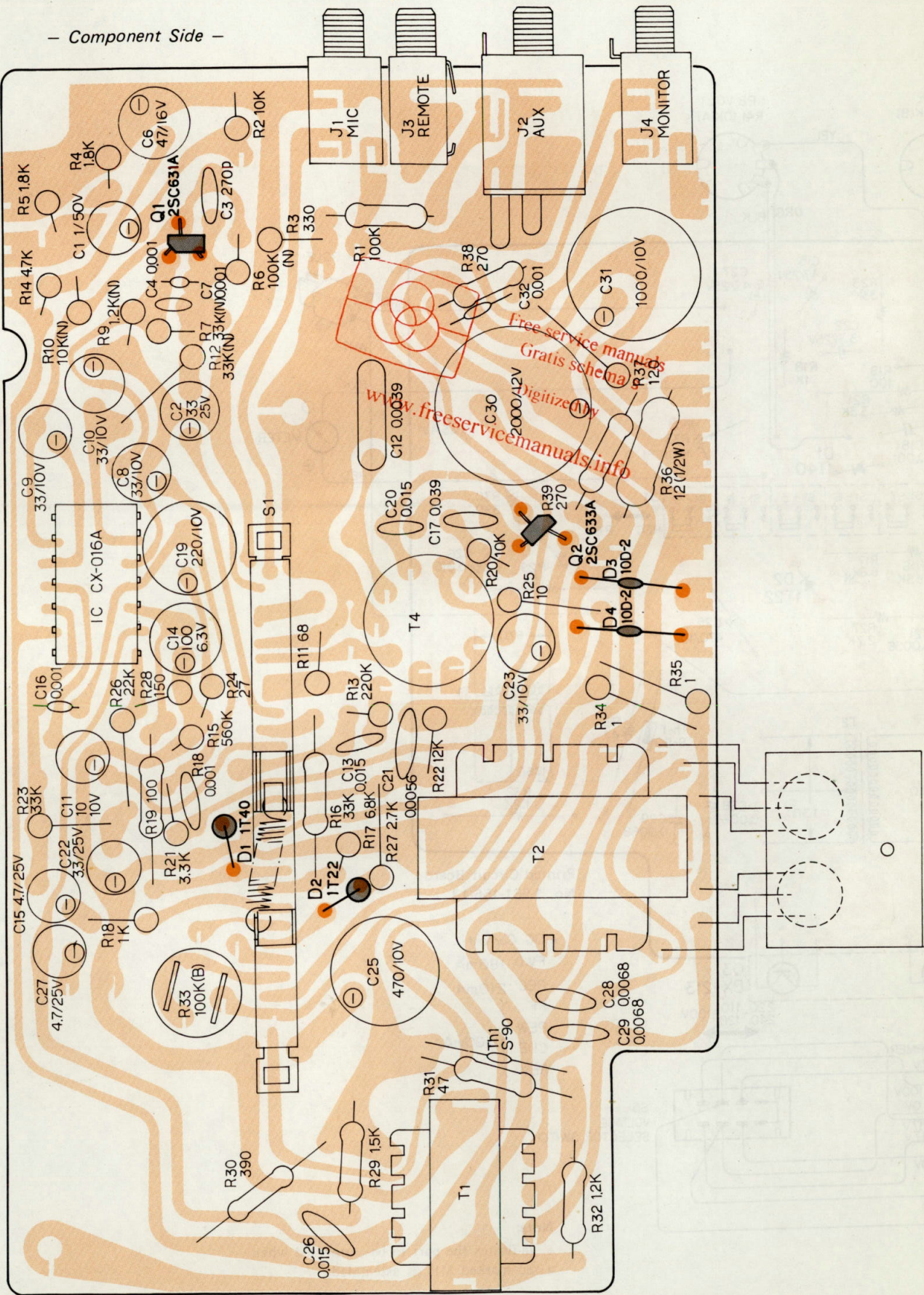
13. MOUNTING DIAGRAM

— Conductor Side —



★ DC Current
FWD: 180mA
REC: 210mA
FF
REW
CUE
REV } 300mA

Note:
* indicates the part to be connected when a red marked MIC is assembled.



14. ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
MOUNTED CIRCUIT BOARD			C24		- discarded -
	X-35010-21	audio amp and bias osc	C25	1-121-425	470 μ F 10V, electrolytic
SEMICONDUCTORS			C26	1-105-675-12	0.015 μ F 50V, mylar
Q1		transistor, 2SC631A	C27	1-121-395	4.7 μ F 25V, mylar
Q2		transistor, 2SC633A	C28	1-105-831-12	0.0068 μ F 50V, mylar
Q3		transistor, BX-213	C29	1-105-831-12	0.0068 μ F 50V, mylar
IC		IC, CX-016A	C30	1-121-529	2,000 μ F 12V, electrolytic
D1		diode, 1T40	C31	1-121-736	1,000 μ F 10V, electrolytic
D2		diode, 1T22	C32	1-101-918	0.001 μ F 25V, ceramic
D3		diode, 10D-2	C33	1-101-918	0.001 μ F 25V, ceramic
D4		diode, 10D-2	C34	1-101-918	0.001 μ F 25V, ceramic
Th1		thermistor, S-90	C35	1-106-070-12	0.0033 μ F 50V, mylar
TRANSFORMERS			RESISTORS		
T1	1-423-049	driver	All resistors are 1/4W carbon unless otherwise specified.		
T2	1-427-252	output	R1	1-244-721	100 k Ω
T3	1-441-771	power	R2	1-242-697	10 k Ω
T4	1-433-132	bias osc.	R3	1-242-661	330 Ω
CAPACITORS			R4	1-242-679	1.8 k Ω
C1	1-121-391	1 μ F 50V, electrolytic	R5	1-242-679	1.8 k Ω
C2	1-121-392	3.3 μ F 25V, electrolytic	R6	1-242-721-09	100 k Ω (N)
C3	1-107-141	270 pF 50V, silvered mica	R7	1-242-709-09	33 k Ω (N)
C4	1-105-821-12	0.001 μ F 50V, mylar	R8		- discarded -
C5		- discarded -	R9	1-242-675-09	1.2 k Ω (N)
C6	1-121-409	47 μ F 16V, electrolytic	R10	1-242-697-09	10 k Ω (N)
C7	1-101-918	0.001 μ F 25V, ceramic	R11	1-242-645	68 Ω
C8	1-121-402	33 μ F 10V, electrolytic	R12	1-242-709-09	33 k Ω (N)
C9	1-121-402	33 μ F 10V, electrolytic	R13	1-242-729	220 k Ω
C10	1-121-402	33 μ F 10V, electrolytic	R14	1-242-689	4.7 k Ω
C11	1-121-469	10 μ F 10V, electrolytic	R15	1-242-739	560 k Ω
C12	1-129-709	0.0039 μ F 630V, polypropylene film	R16	1-242-709	33 k Ω
C13	1-105-675-12	0.015 μ F 50V, mylar	R17	1-242-693	6.8 k Ω
C14	1-121-413	100 μ F 6.3V, electrolytic	R18	1-242-673	1 k Ω
C15	1-121-395	4.7 μ F 25V, electrolytic	R19	1-244-649	100 Ω
C16	1-101-918	0.001 μ F 25V, ceramic	R20	1-242-697	10 k Ω
C17	1-105-680-12	0.039 μ F 50V, mylar	R21	1-242-685	3.3 k Ω
C18	1-105-661-12	0.001 μ F 50V, mylar	R22	1-242-699	12 k Ω
C19	1-121-420	220 μ F 10V, electrolytic	R23	1-242-709	33 k Ω
C20	1-105-675-12	0.015 μ F 50V, mylar	R24	1-242-635	27 Ω
C21	1-105-670-12	0.0056 μ F 50V, mylar	R25	1-242-625	10 Ω
C22	1-121-392	3.3 μ F 25V, electrolytic	R26	1-242-705	22 k Ω
C23	1-121-402	33 μ F 10V, electrolytic	R27	1-242-683	2.7 k Ω
			R28	1-242-653	150 Ω

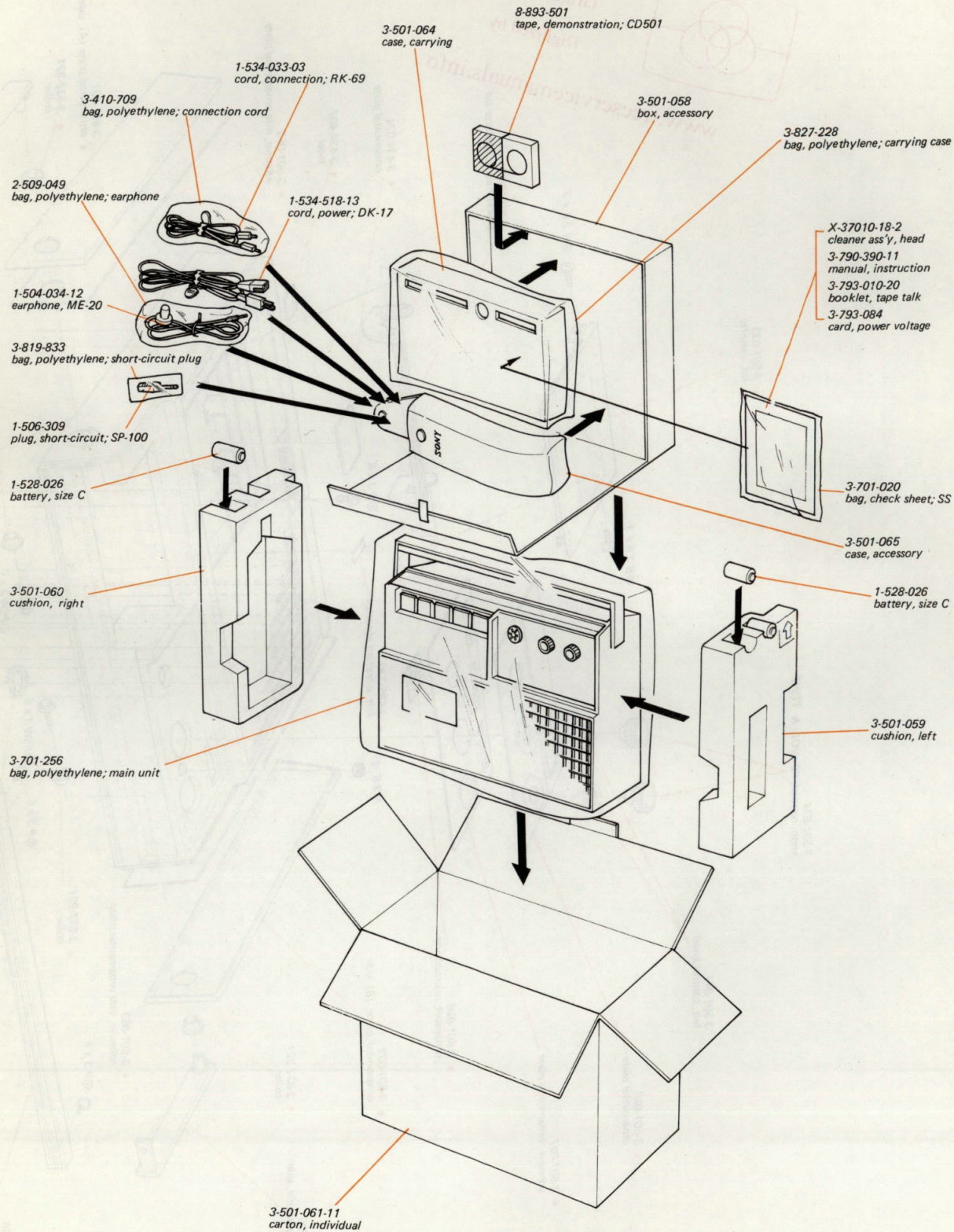
Note: (N) indicates low noise resistor.

Ref. No.	Part No.	Description
R29	1-244-677	1.5 kΩ
R30	1-244-663	390 Ω
R31	1-244-641	47 Ω
R32	1-244-675	1.2 kΩ
R33	1-222-845	100 kΩ (B), semi-fixed
R34	1-242-601	1 Ω
R35	1-242-601	1 Ω
R36	1-244-827	12 Ω, ½W
R37	1-242-651	120 Ω
R38	1-242-659	270 Ω
R39	1-242-659	270 Ω
R40	1-221-536	20 kΩ (B), variable TONE
R41	1-221-540	10 kΩ (A), variable PB VOL
SWITCHES		
S1	1-514-454	slide, rec/pb
S2	1-514-792	leaf, power
S3		included in 4P power connector
S4	1-514-841	leaf, timing
S5	1-514-663	slide, voltage selector

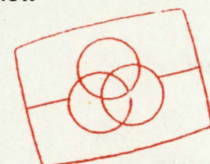
Ref. No.	Part No.	Description
JACKS		
CNJ	1-509-324	connector, power; 4P
J1	1-507-251-13	jack, MIC
J2	1-507-275	jack, AUX
J3	1-507-195	jack, REMOTE
J4	1-507-251-13	jack, MONITOR
HEADS		
EH	8-825-506	erase (EF 135-36)
RPH	8-829-336	rec/pb (PP 134-36)
MISCELLANEOUS		
M	8-834-009-01	motor, D-009G
ME	1-524-049-12	meter, level
MIC	8-814-190-10	microphone, C-1002A
F	1-532-129	fuse, 0.2A
	1-533-007	holder, fuse
	1-514-801	pole, end sensing
SP	1-502-298	speaker (10 cm)
	1-534-518-13	cord, power; DK-17
	1-581-156	printed circuit board, audio amp and bias osc

When ordering replacement parts you should use PART NUMBER listed on the Parts List or shown in the Exploded View. The reference number should not be used for ordering purposes.

15. EXPLODED VIEW
Packing



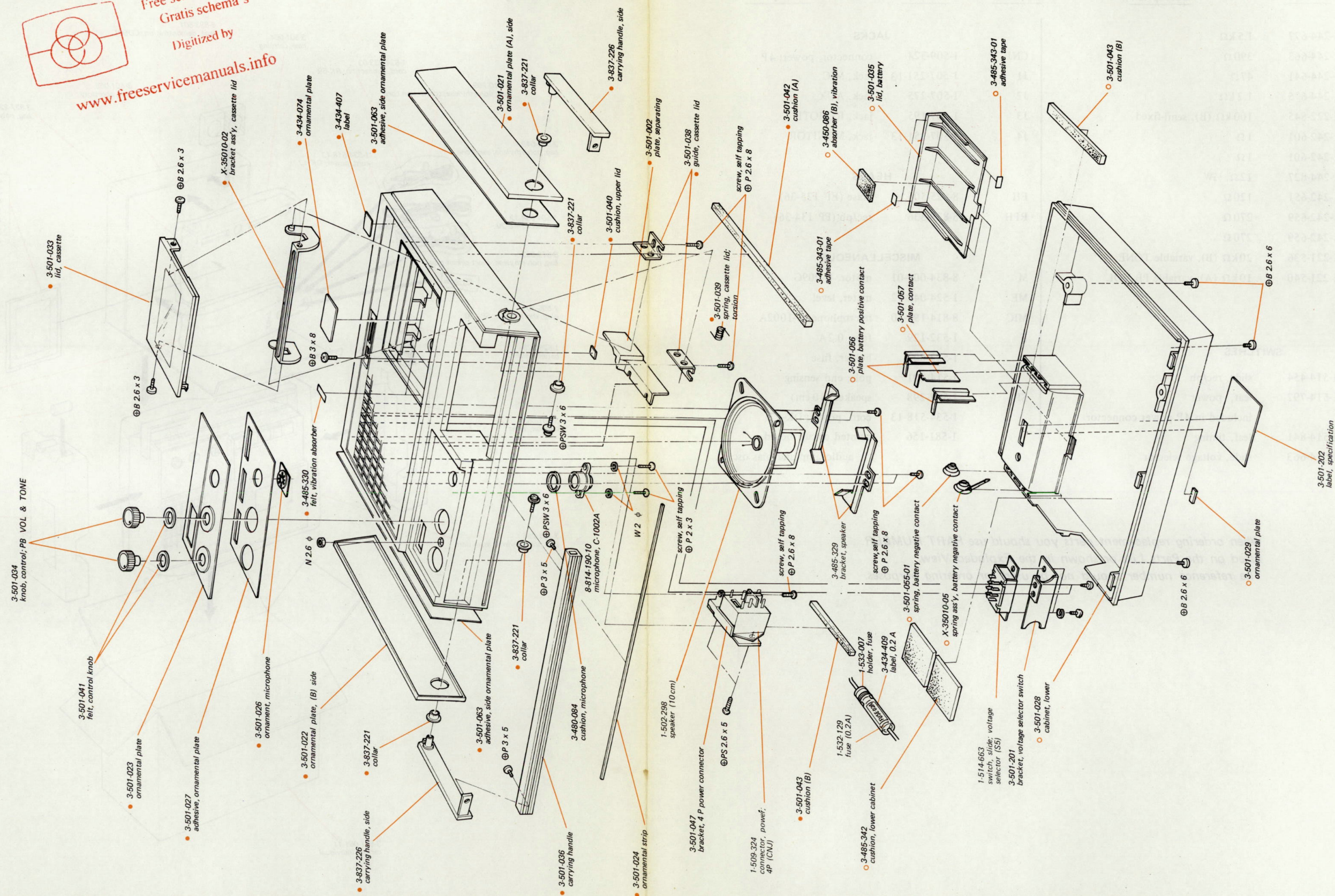
Cabinet — top view —



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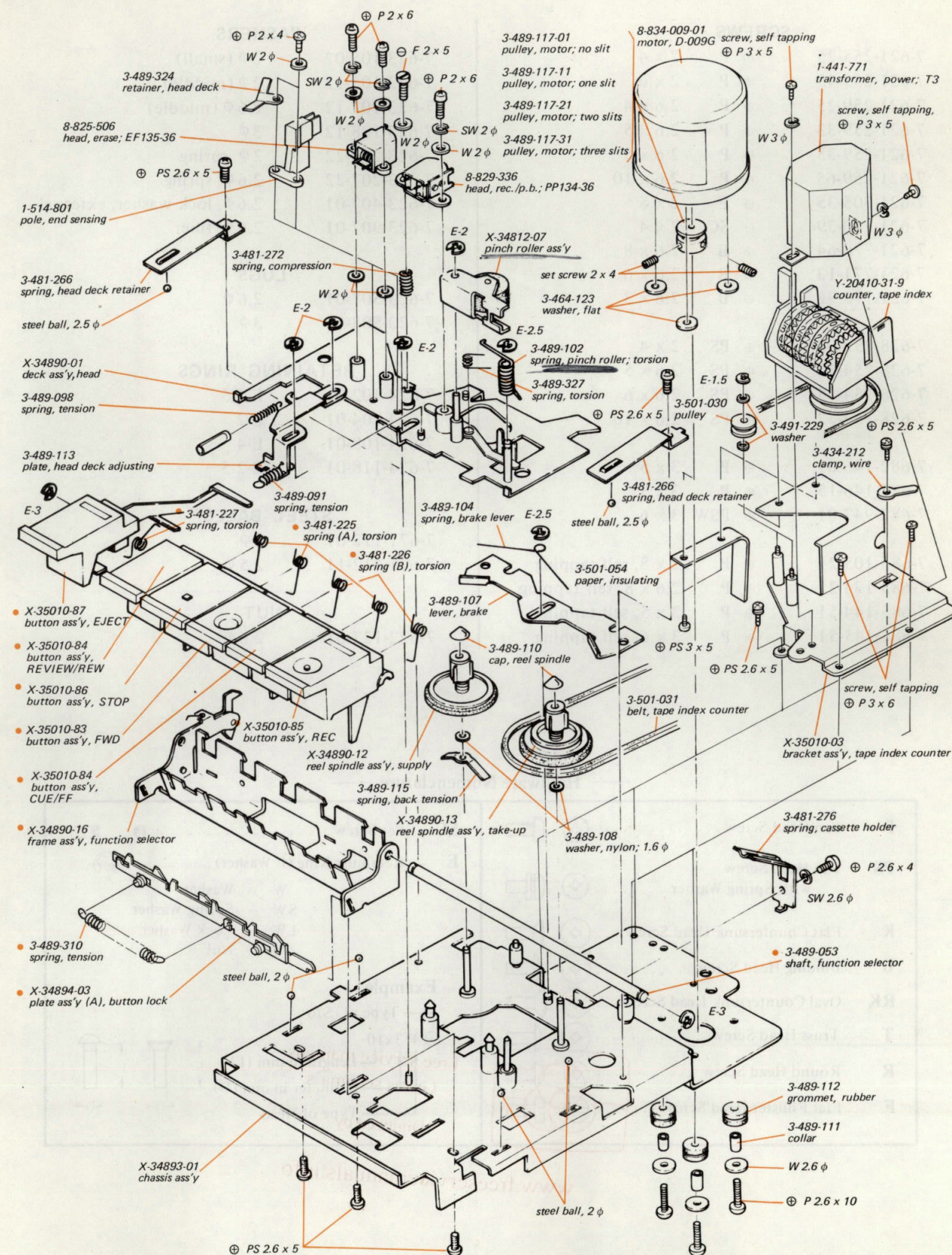
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X-35010-81-2 cabinet ass'y, upper, including parts marked ●
X-35010-82-1 cabinet ass'y, lower, including parts marked ○

Chassis — top view —



X-35010-04 pushbutton ass'y, complete; including parts marked ●.

Chassis — bottom view —

