

TC-353D

USA Model



Set using ISO screws

SPECIFICATIONS

Power Requirements:	AC 120 V, 60 Hz, 35 W	Inputs:	MIC jack x 2 Impedance: low impedance Maximum sensitivity: 0.2 mV (-72 dB)
Track System:	4 track, 2 channel stereo		AUX IN jack x 2 Impedance: 560 k Ω Maximum sensitivity: 0.06 V (-22 dB)
Reel Size:	7" (17.8 cm) maximum	Outputs:	LINE OUT jack x 2 Load impedance: 10 k Ω or more Output level: 0.775 V (0 dB) with 100 k Ω load
Tape Speed:	7 1/2 ips (19 cm/s) 3 3/4 ips (9.5 cm/s) 1 7/8 ips (4.8 cm/s)		HEADPHONE jack x 1 Load impedance: 8 Ω Output level: 30.8 mV (-28 dB)
Frequency Response:	<u>With SONY SLH tape</u> 25 ~ 28,000 Hz at 7 1/2 ips (19 cm/s) 30 ~ 20,000 Hz at 3 3/4 ips (9.5 cm/s) <u>With standard tape</u> 25 ~ 25,000 Hz at 7 1/2 ips (19 cm/s) 30 ~ 17,000 Hz at 3 3/4 ips (9.5 cm/s) 30 ~ 9,000 Hz at 1 7/8 ips (4.8 cm/s)	Semiconductors:	18 transistors and 4 diodes
Signal-to-Noise Ratio:	55 dB or better (with SONY SLH tape) 52 dB or better (with standard tape)	Dimensions:	15 3/8 (W) x 7 7/8 (H) x 13 3/8" (D) (390 x 199 x 340 mm)
Flutter and Wow:	0.12 % WRMS at 7 1/2 ips (19 cm/s)	Weight:	16 lb 9 oz (7.5 kg)
Recording Bias Frequency:	Approx. 160 kHz		

SONY[®]
SERVICE MANUAL

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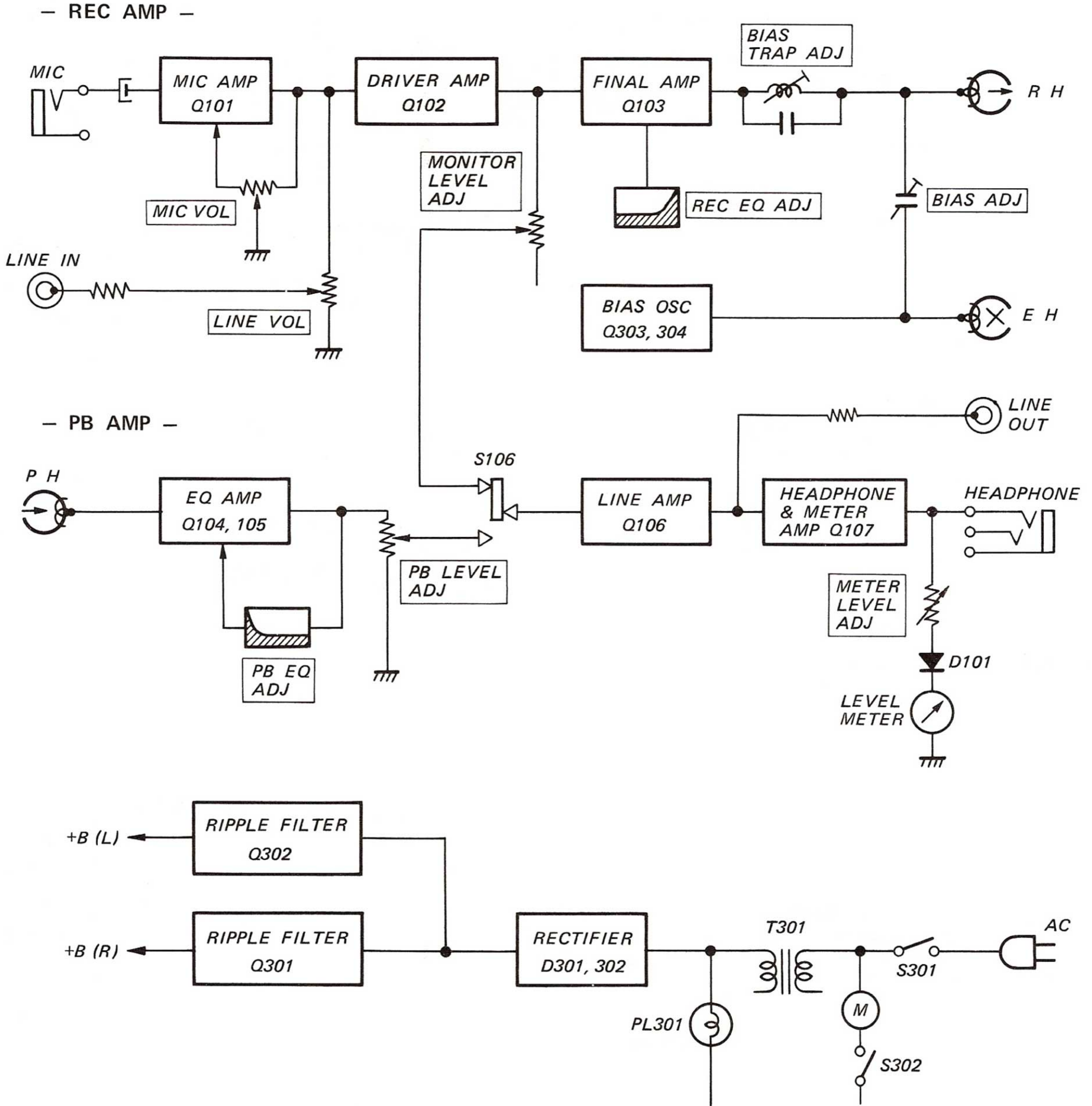
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When ordering replacement parts, you should use PART NUMBER listed on the Parts Lists or shown in the EXPLODED VIEW. The reference number should not be used for ordering purposes.

SECTION 1

OUTLINE

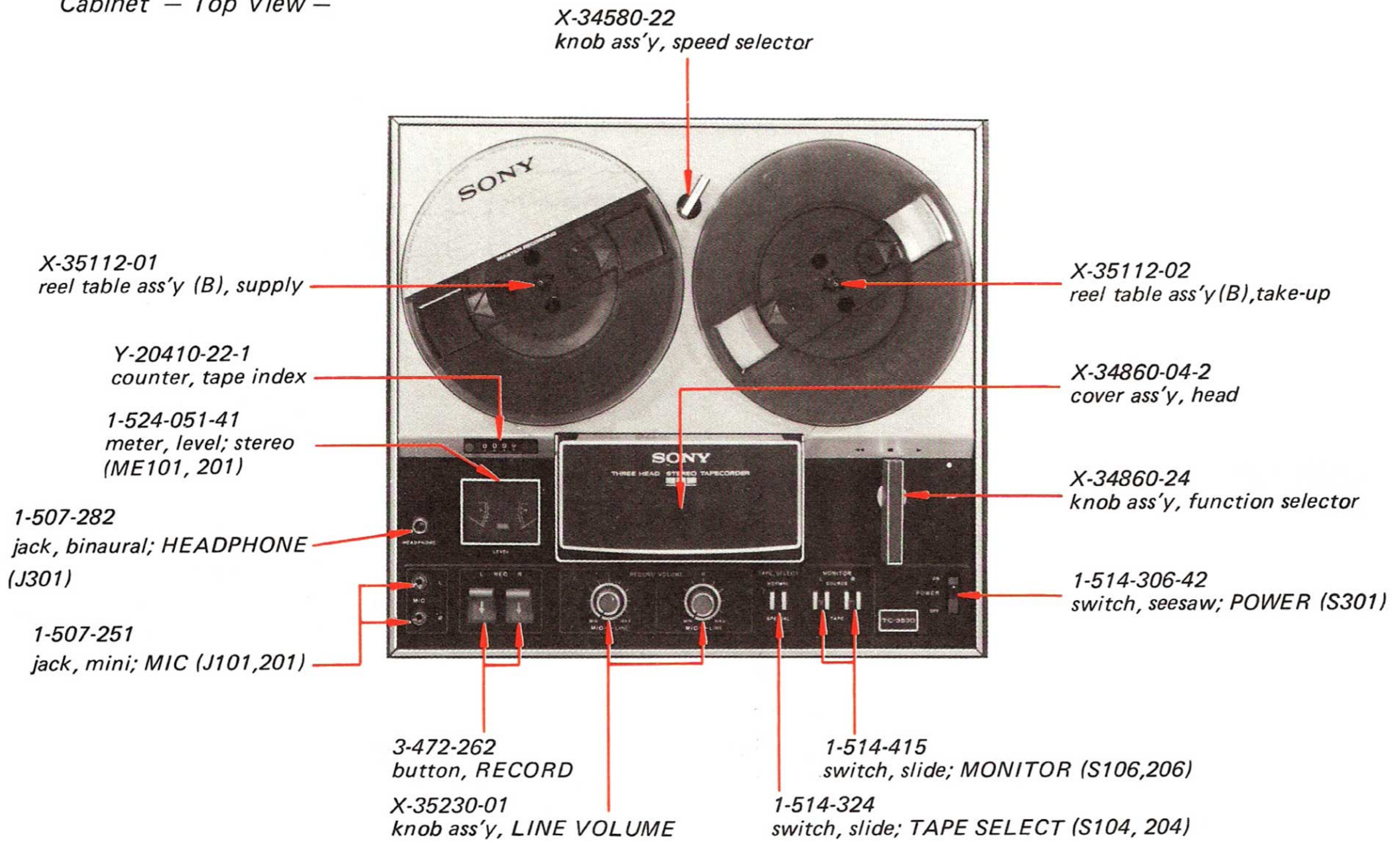
1-1. BLOCK DIAGRAM



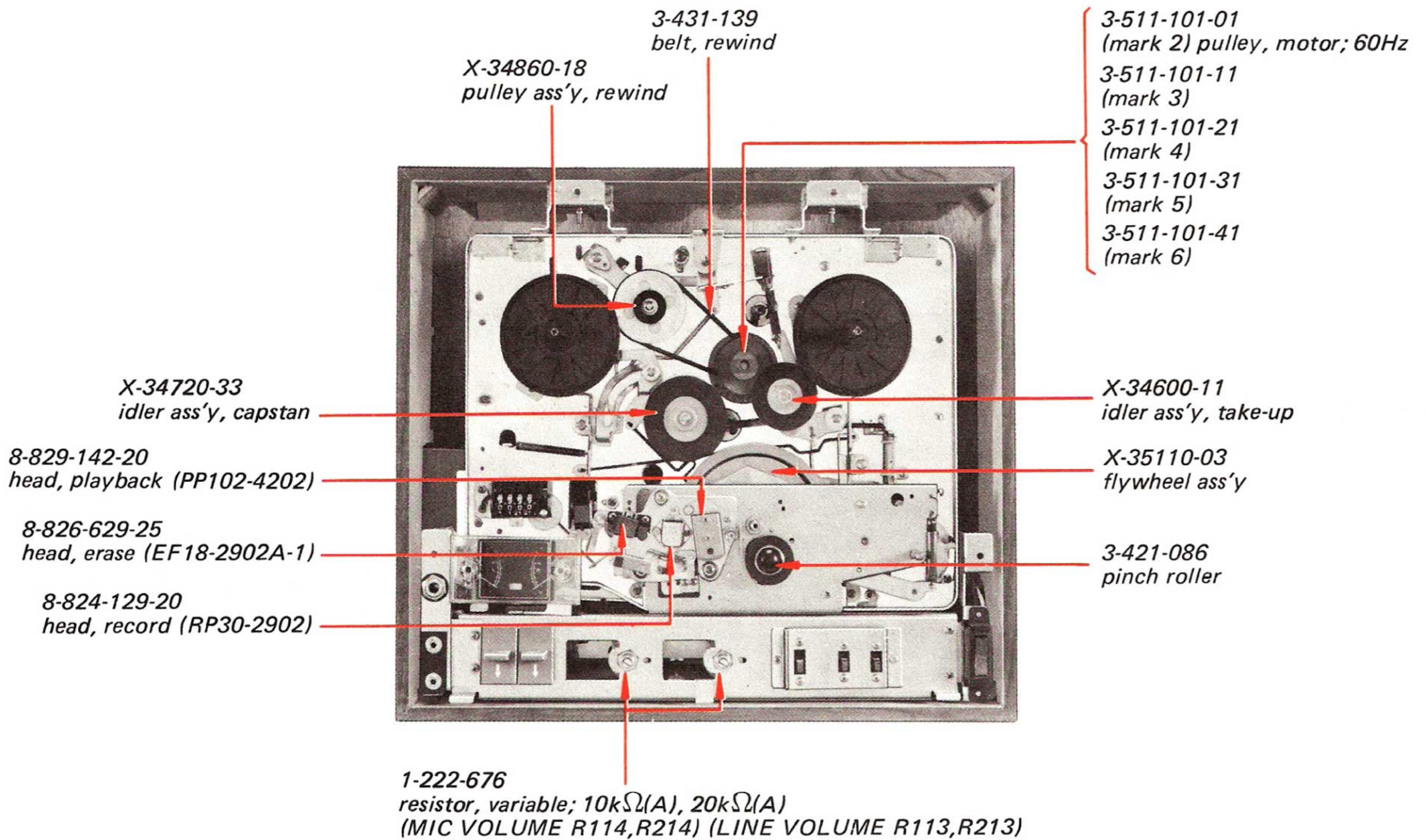
S106..... SOURCE POSITION

1-2. MAJOR PARTS LOCATION

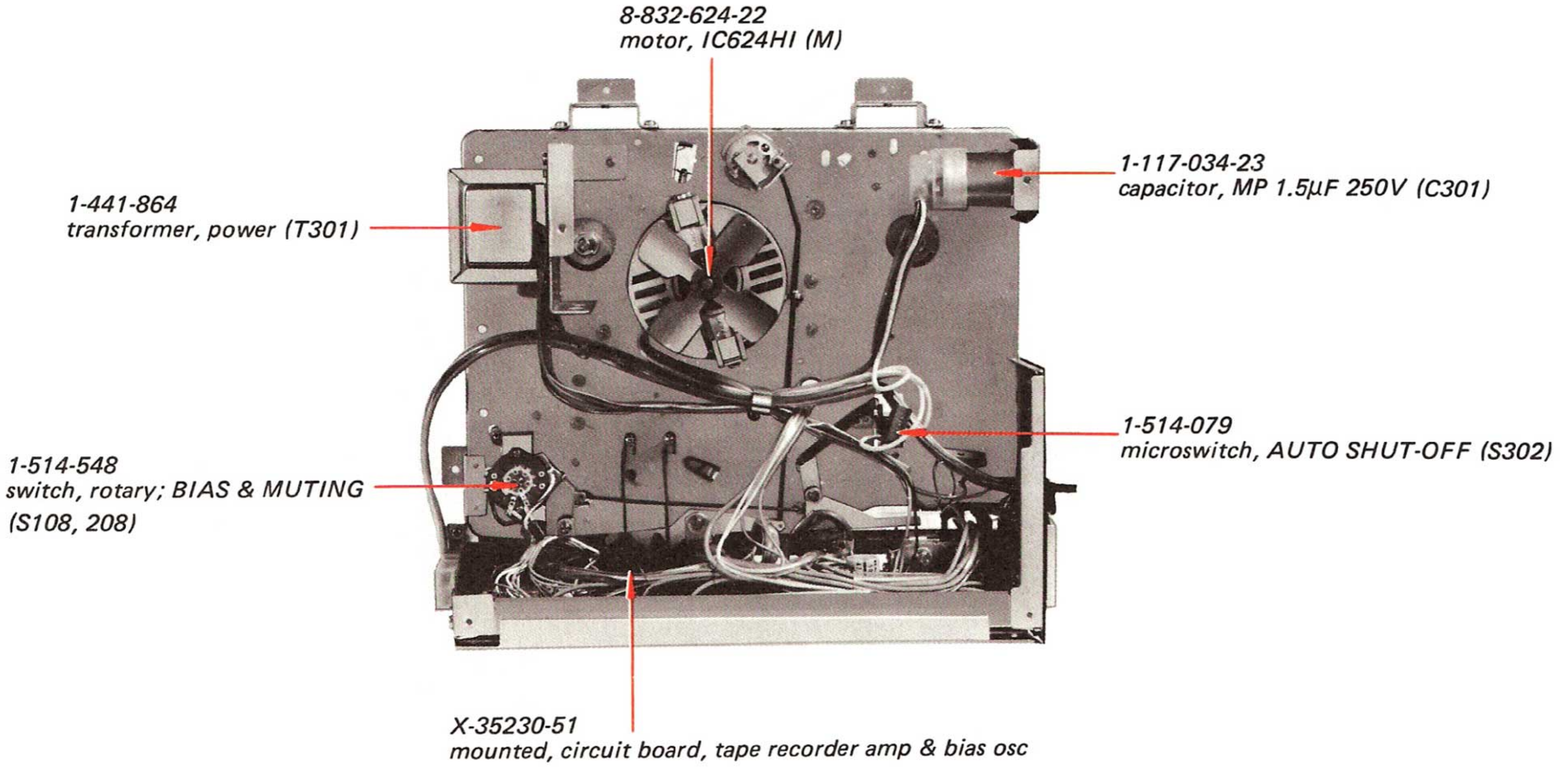
Cabinet — Top View —



Chassis — Top View —



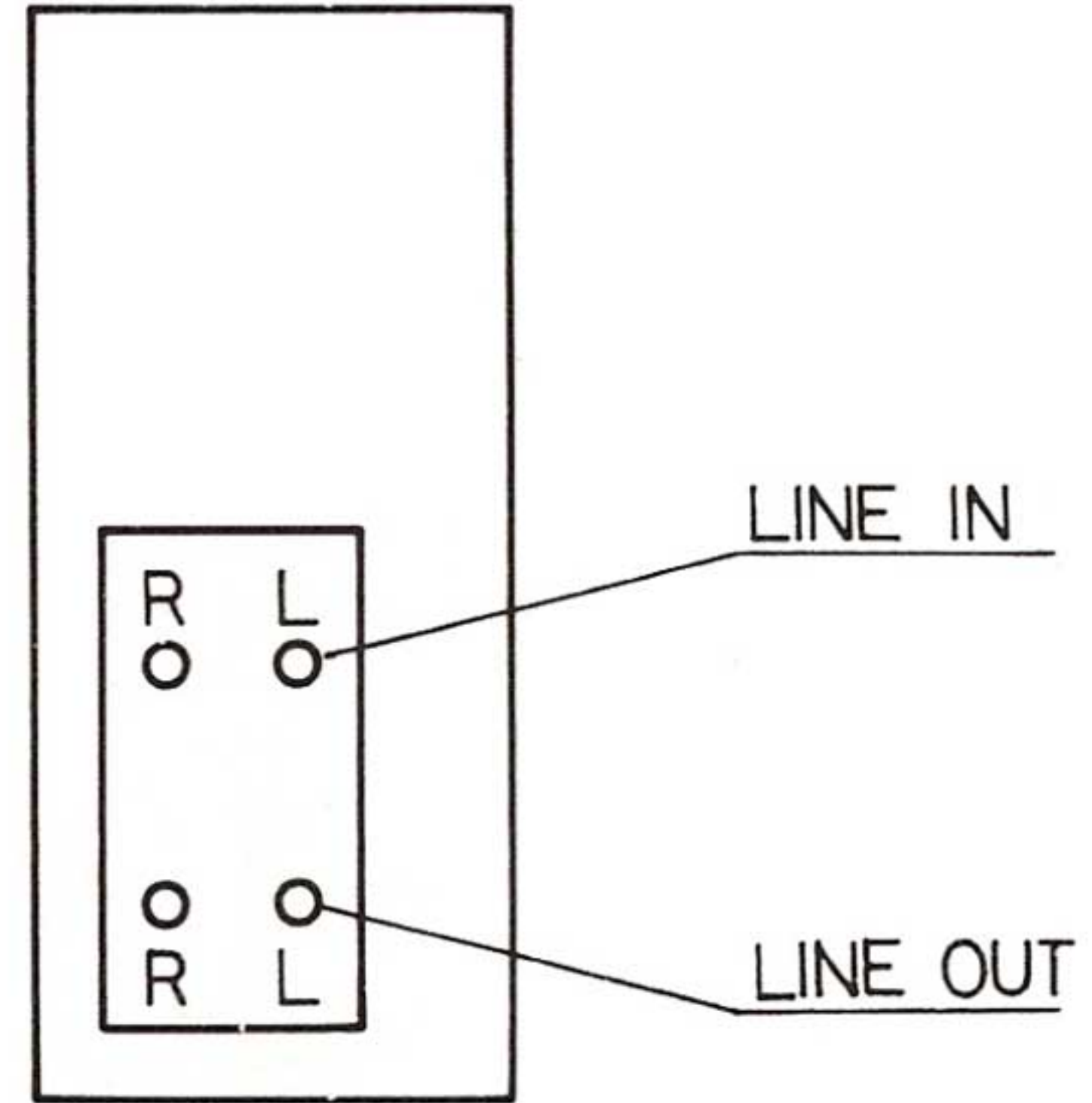
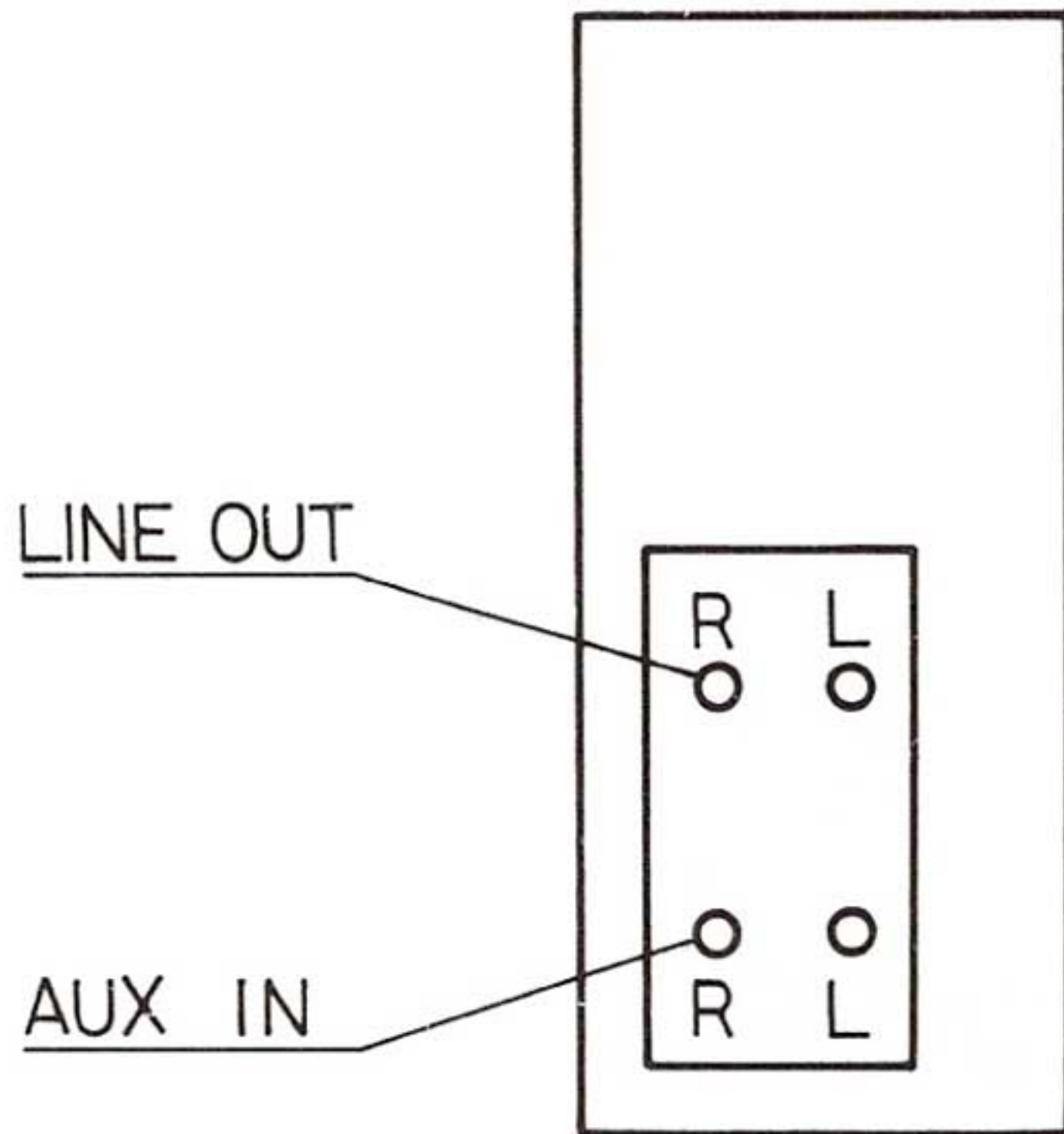
Chassis — Bottom View —



Jack Panel

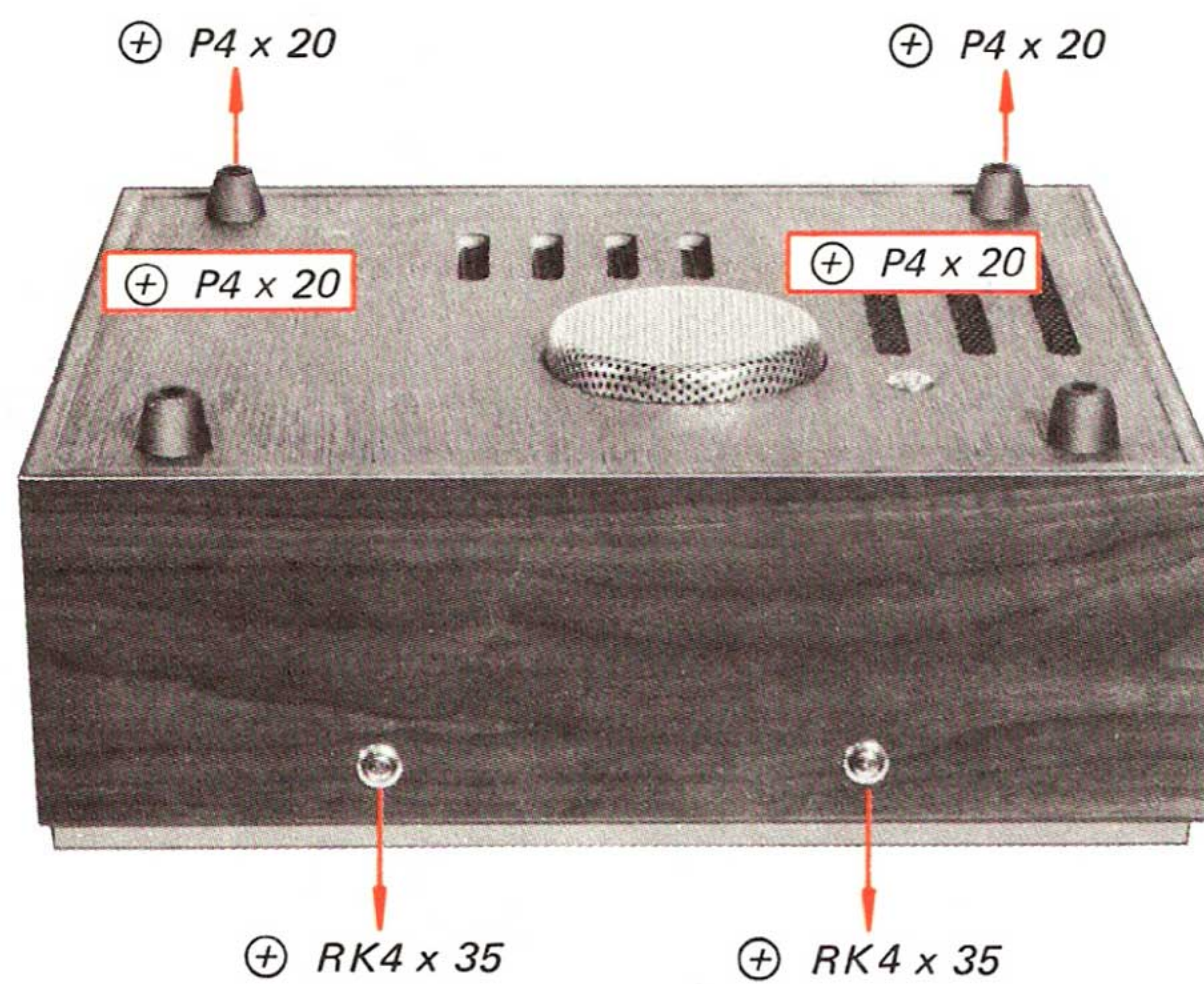
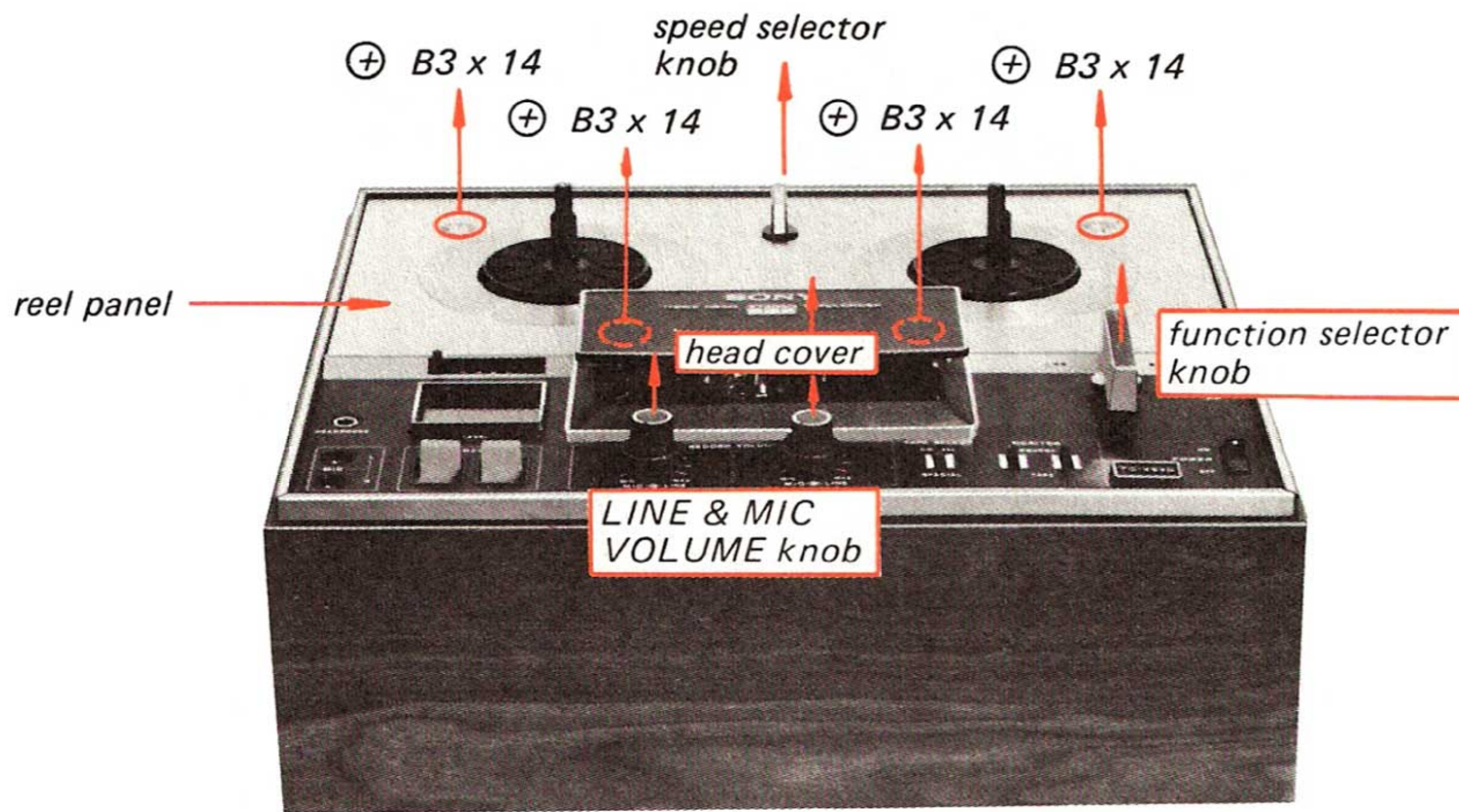
Serial No. 10,001 ~ 12,999

Serial No. 13,101 and later



SECTION 2

DISASSEMBLY



SECTION 3 ADJUSTMENT PROCEDURES

3-1. MECHANICAL ADJUSTMENTS

Brake (Supply) Adjustment — in FF mode —

supply reel table

$\frac{1}{32}'' (0.8 \text{ mm})$

Adjust by bending this portion.

Speed Selector Knob Positioning

When tape speed is set to 9.5 cm $3 \frac{3}{4}''$, speed selector knob should point 9.5 cm $3 \frac{3}{4}''$ position.

If necessary, adjust by adjusting screw.

9.5 cm $3 \frac{3}{4}''$

adjusting screw

speed selector knob

Tape Touch Adjustment

supply or take-up reel table

Bend this portion so that the tape does not touch the reel in FF, REW and FWD modes.

Rewind Idler Adjustment in STOP mode

supply reel table

rewind idler

$\frac{1}{32}'' (0.8 \text{ mm})$

Adjust by bending this portion.

Actuator Adjustment

auto shut-off switch

adjusting screw

$\frac{1}{8}'' (3 \text{ mm})$

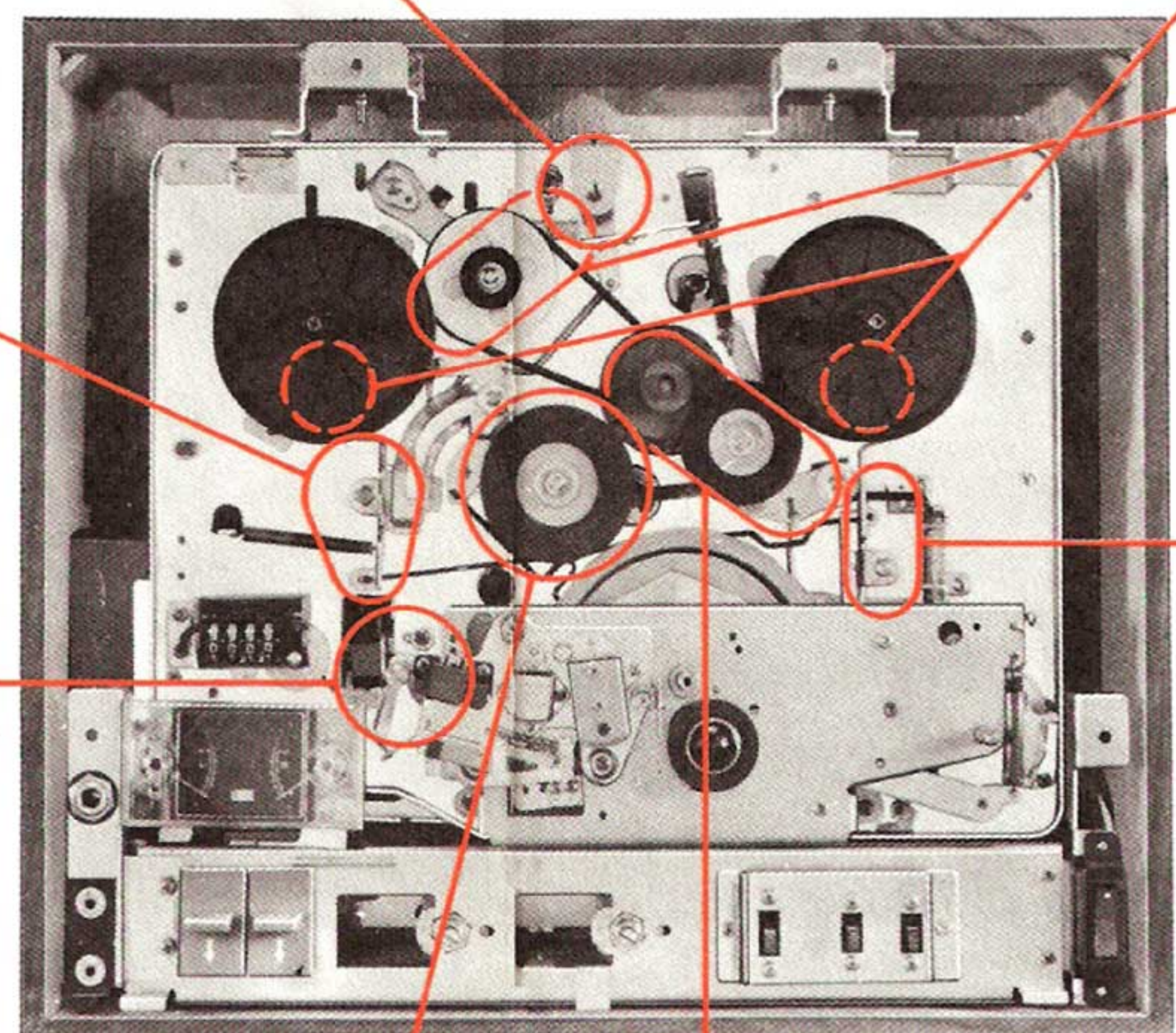
$\frac{5}{64}'' (2 \text{ mm})$

actuator

When actuator comes to **A**, auto shut-off switch should be turned ON.

When actuator comes to **B**, auto shut-off switch should be turned OFF.

If necessary, adjust auto shut-off switch position by adjusting screw.



Brake (Take-up) Adjustment in STOP mode

take-up reel table

$\frac{1}{32}'' (0.8 \text{ mm})$

Adjust by bending this portion.

Capstan Idler Position Adjustment in STOP mode

1. Clearance Adjustment

more than $\frac{3}{64}'' (1 \text{ mm})$

motor pulley

capstan idler

Adjust by contracting or expanding this portion.
2. Height Adjustment

Adjust the portion **A** shown in the figure in the item 1 by bending so that the height of capstan idler at $7 \frac{1}{2}$ ips (19 cm/s) and $1 \frac{7}{8}$ ips (4.8 cm/s) are as shown.

$\frac{1}{32}'' (0.8 \text{ mm})$

position at $1 \frac{7}{8}$ ips (4.8 cm/s)

capstan idler

to be flush

motor pulley

position at $7 \frac{1}{2}$ ips (19 cm/s)

$\frac{23}{32}'' (18.3 \text{ mm})$

to be flat

frame

Take-up Idler Position Adjustment — in FF and STOP modes —

1. Height Adjustment
— in FF mode —

Adjust the position of the take-up idler by bending the crank supporter so that the motor pulley and the take-up idler are the same height as shown.

motor pulley

to be flat

take-up idler

crank supporter

crank rod

If necessary, adjust by rod as shown.
2. Position Check
— in STOP mode —

Make sure that the clearance between the motor pulley and the take-up idler is greater than $\frac{5}{64}'' (2 \text{ mm})$

take-up reel table

motor pulley

take-up idler

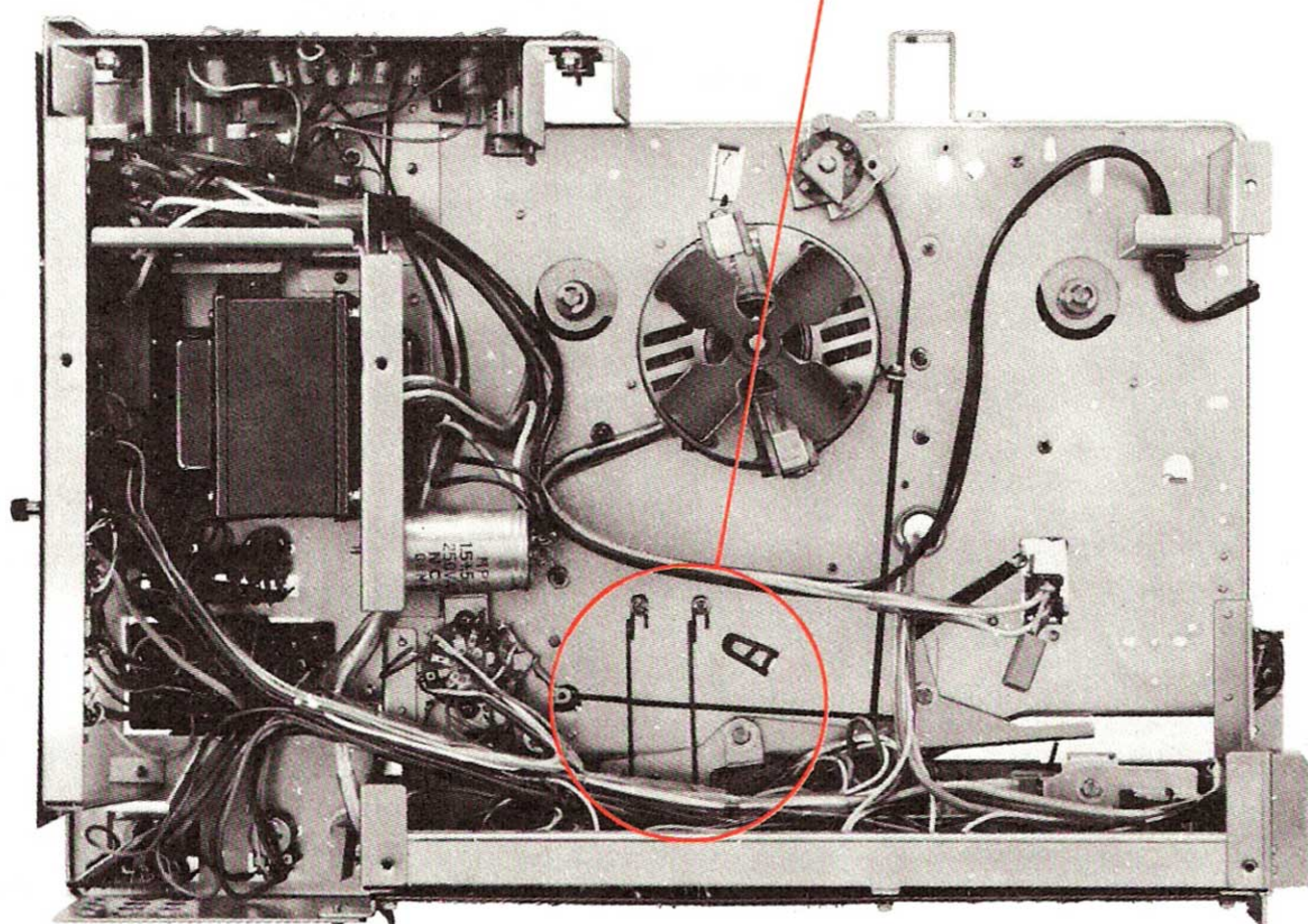
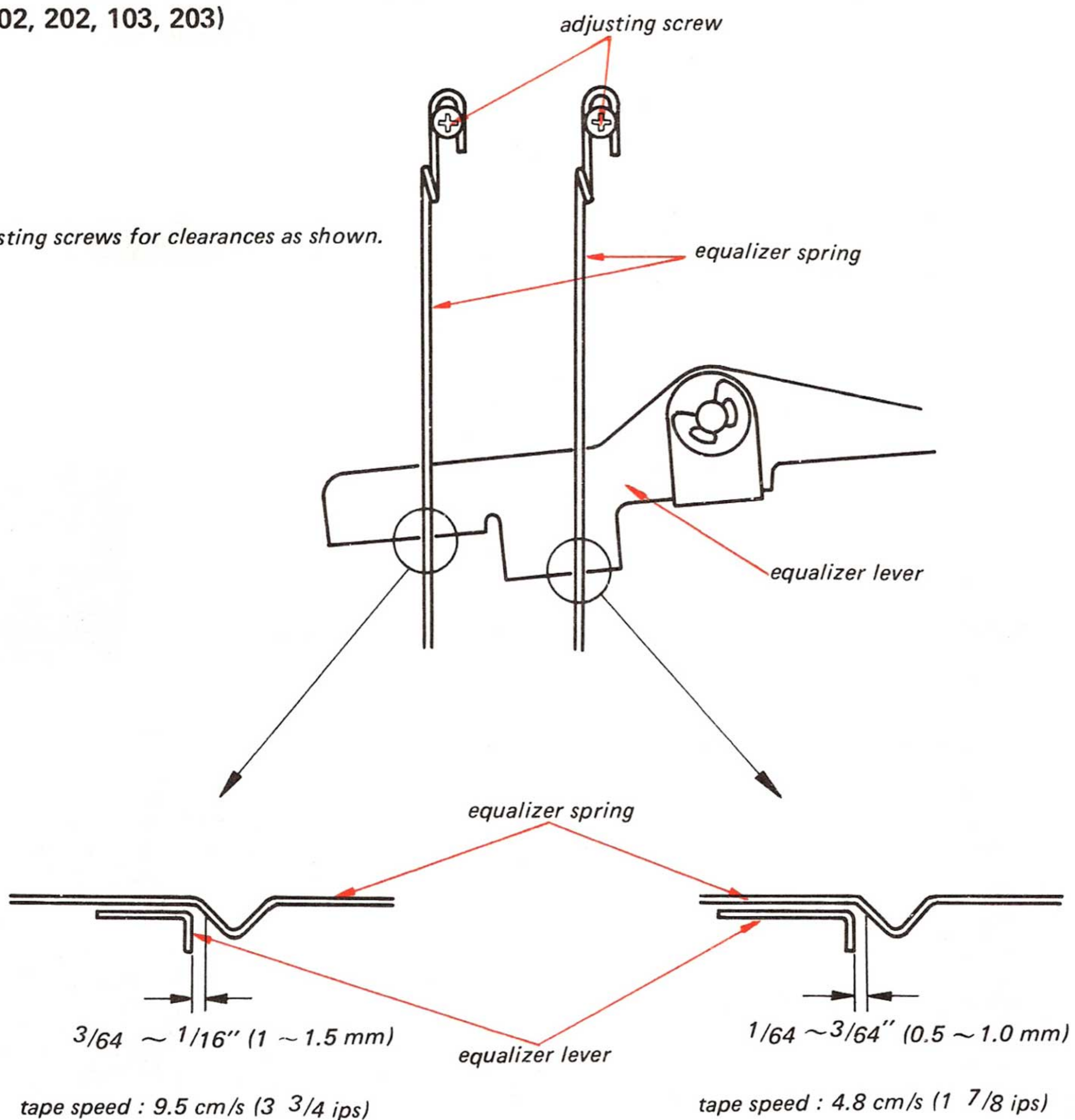
greater than $\frac{5}{64}'' (2 \text{ mm})$

rod

Equalizer Switch Adjustment.

(S102, 202, 103, 203)

Adjust by adjusting screws for clearances as shown.



Wow (Flutter) Measurement

Switch Settings

TAPE SELECT Switch : NORMAL
MONITOR Switch : TAPE

Note: When measuring the wow (flutter) at the tape speed $7\frac{1}{2}$ ips (19 cm/s) and $3\frac{3}{4}$ ips (9.5 cm/s), play back the SONY alignment tapes WS-19-7 and WS-9-7 and at the tape speed of $1\frac{7}{8}$ ips (4.8 cm/s), record and play back a SONY blank tape "super 150".

at $7\frac{1}{2}$ ips (19 cm/s) and $3\frac{3}{4}$ ips (9.5 cm/s)

Measure the wow (flutter) at the tape end in both vertical and horizontal set positions.

$7\frac{1}{2}$ ips (19 cm/s) : Play back the tape WS-19-7.

$3\frac{3}{4}$ ips (9.5 cm/s) : Play back the tape WS-9-7.

at $1\frac{7}{8}$ ips (4.8 cm/s)

Deliver a 3 kHz signal of -60 dB (0.775 mV) to the MIC jack, record the signal on a SONY blank tape at the end approx. five minutes and read the wow meter.


The wow (flutter) should be approx. as follows:

	Tape Speed	Wow (Flutter)
in both horizontal or vertical position	$7\frac{1}{2}$ ips (19 cm/s)	0.19% RMS
	$3\frac{3}{4}$ ips (9.5 cm/s)	0.24% RMS
	$1\frac{7}{8}$ ips (4.8 cm/s)	0.4% RMS

Tape Speed Adjustment

- Step 1. Connect a frequency counter to the LINE OUT jack.
- Step 2. Play back the SONY speed check tape SPC-47 (4 kHz) at $7\frac{1}{2}$ ips (19 cm/s) tape speed in horizontal position.

Note: If the counter reading is out of the range between 3,920 and 4,080 Hz, replace the motor pulley.

Motor Pulley		
Mark	Diameter	Part No.
2	bigger  smaller	3-511-101-01
3		3-511-101-11
4		3-511-101-21
5		3-511-101-31
6		3-511-101-41

Torque Measurement

Take-up torque: 300 ± 25 g.cm (4.2 ± 0.3 oz.inch)

Fast forward torque: 1200 ± 100 g.cm (16.8 ± 1.4 oz.inch)

Rewind torque: 1400 ± 100 g.cm (19.6 ± 1.4 oz.inch)

Back Tension (supply reel table) Measurement

In forward mode: 80 ~ 120 g.cm (1.1 ~ 1.7 oz.inch)

Pinch Roller Pressure Measurement

1200 ~ 1500 g (2.6 ~ 3.3 lb)

3-2. ELECTRICAL ADJUSTMENTS/ MEASUREMENTS

Preface for the Adjustment

- Before making the following adjustments, clean the record head and the playback head with a soft cloth or swab dampened with denatured alcohol, and demagnetize the heads with a head demagnetizer (SONY Model HE-2).
- The adjustments should be made in numerical order and for both R-CH and L-CH, unless otherwise noted.
- After the adjustments, apply lock paint to the parts adjusted.
- The adjustments require the test equipments as follows:
 - * Audio oscillator
 - * Attenuator 600Ω
 - * VTVM
 - * SONY alignment tape J-19-F1
 - * Blank tape SONY Super 150
 - * Resistors 600Ω and 100kΩ
 - * 1 kHz bandpass filter
 - * Screwdriver for adjustment
 - * SONY SLH tape
- TAPE SELECT and TAPE SPEED switches should be set as follows unless otherwise specified.

TAPE SELECT : NORMAL

TAPE SPEED : 7½ ips (19 cm/s)

- Rated input and output levels are as follows:

	Input Level (Signal Source Impedance)	Output Level (Load Resistor)
MIC	-60 dB, 0.775 mV (600Ω)	LINE OUT 0 dB, 0.775 V (100kΩ)
LINE IN	-10 dB, 0.245 V (10kΩ)	

- The following signals are recorded on the alignment tape:

Tape \ Tone	1	2	3	4
J-19-F1	10 kHz -10 dB	400 Hz 0 dB	400 Hz -10 dB	10 kHz -10 dB
Tape \ Tone	5	6	7	used for
J-19-F-1	7 kHz -10 dB	80 Hz -10 dB	40 Hz -10 dB	Azimuth and level adjustment, Frequency response measurement.

- RECORD VOLUME control should be set as follows:

- Connect a VTVM and a 100kΩ resistor in parallel with the LINE OUT jack.
- Thread the SONY alignment tape J-19-F1 and play back the 2nd tone (400 Hz) (MONITOR switch: TAPE position).
- Adjust the R150 (R250) to obtain 0 dB (0.775 V) on the VTVM.

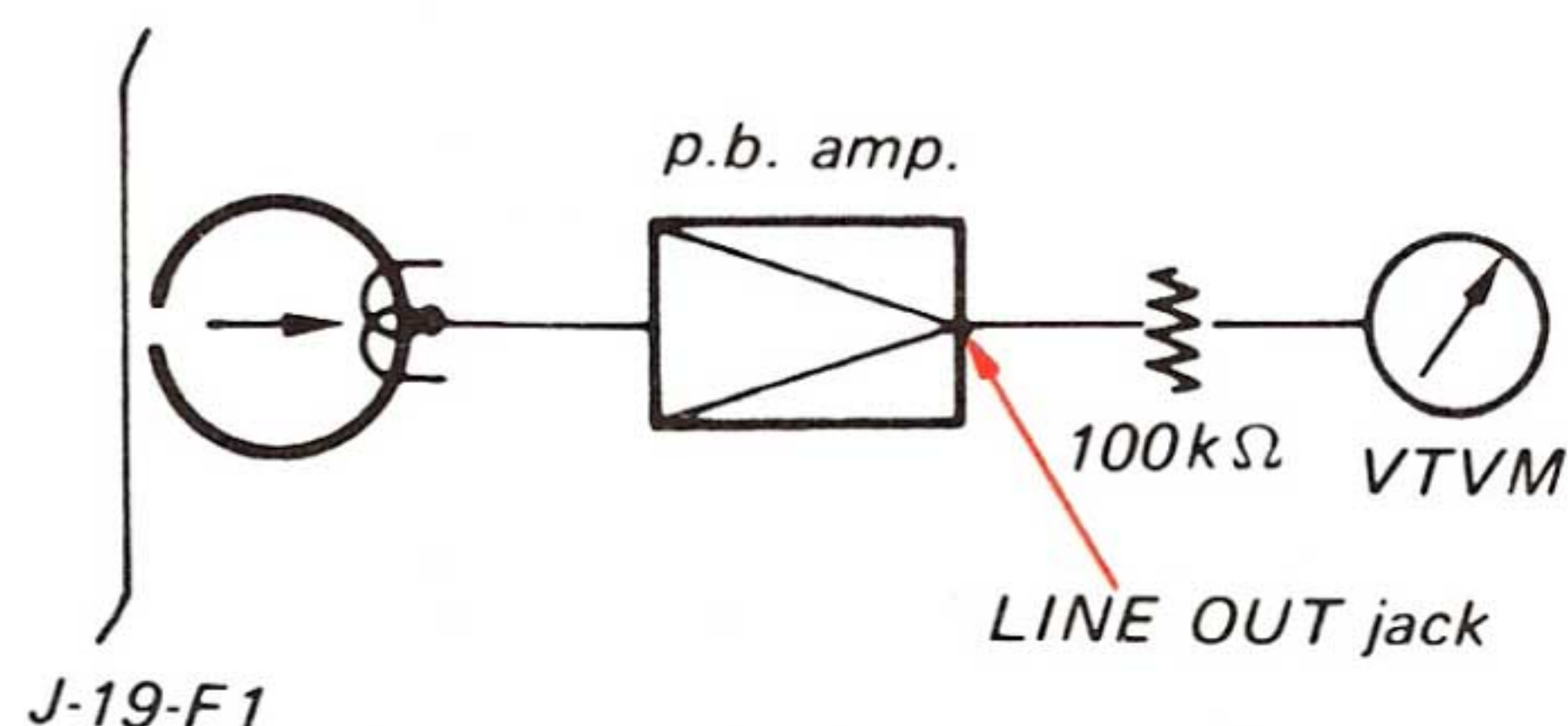


Fig. 3-2-1. RECORD VOLUME control setting

- Thread a blank tape and place the set in REC mode (MINITOR switch: TAPE position), deliver a 1 kHz signal of -60 dB (0.775 mV) to the MIC jack and adjust the RECORD VOLUME control so that the VTVM indicates 0 dB (0.775 V).

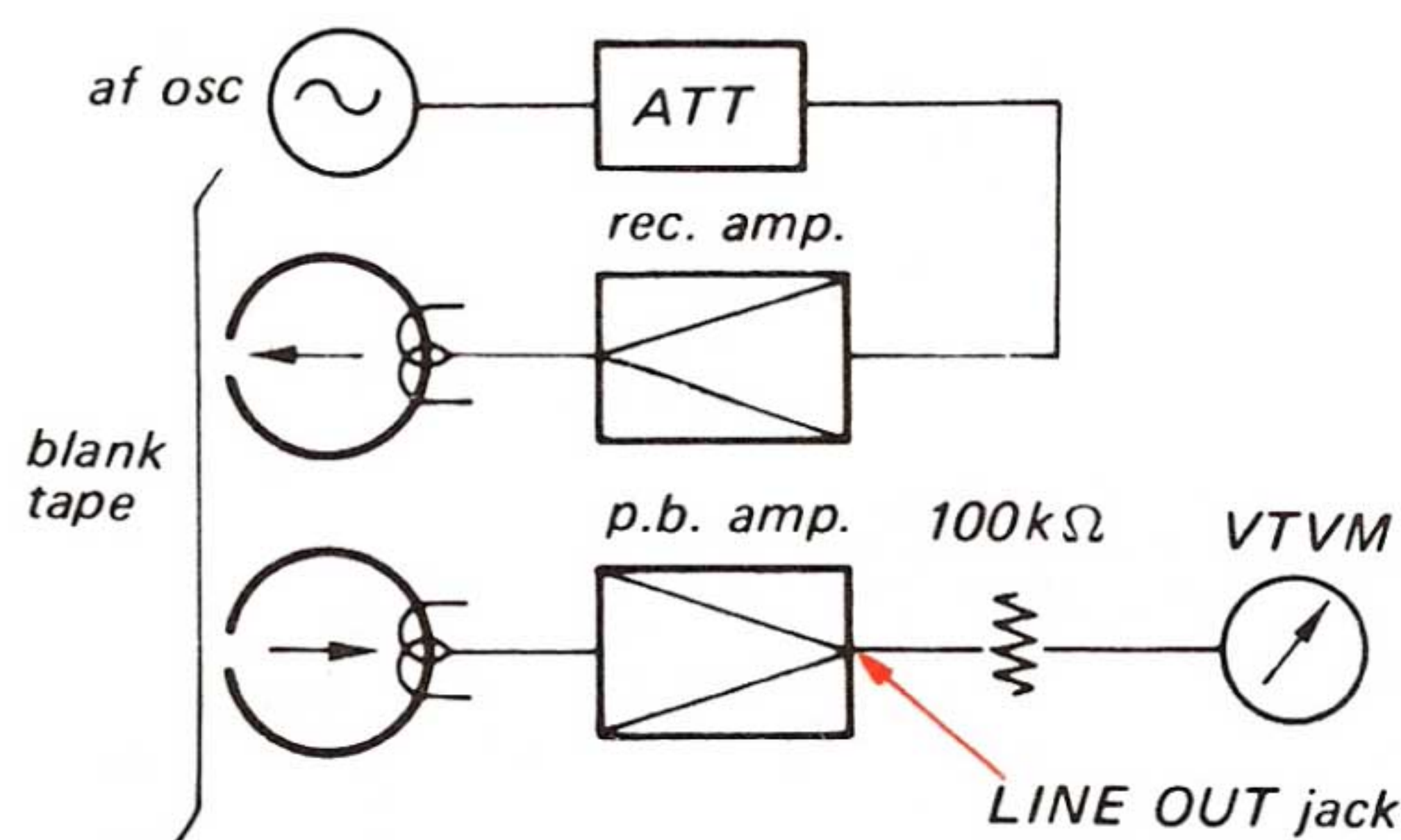


Fig. 3-2-2. RECORD VOLUME control setting

9. Input connection is as follows:

a. in case that balanced attenuator is used

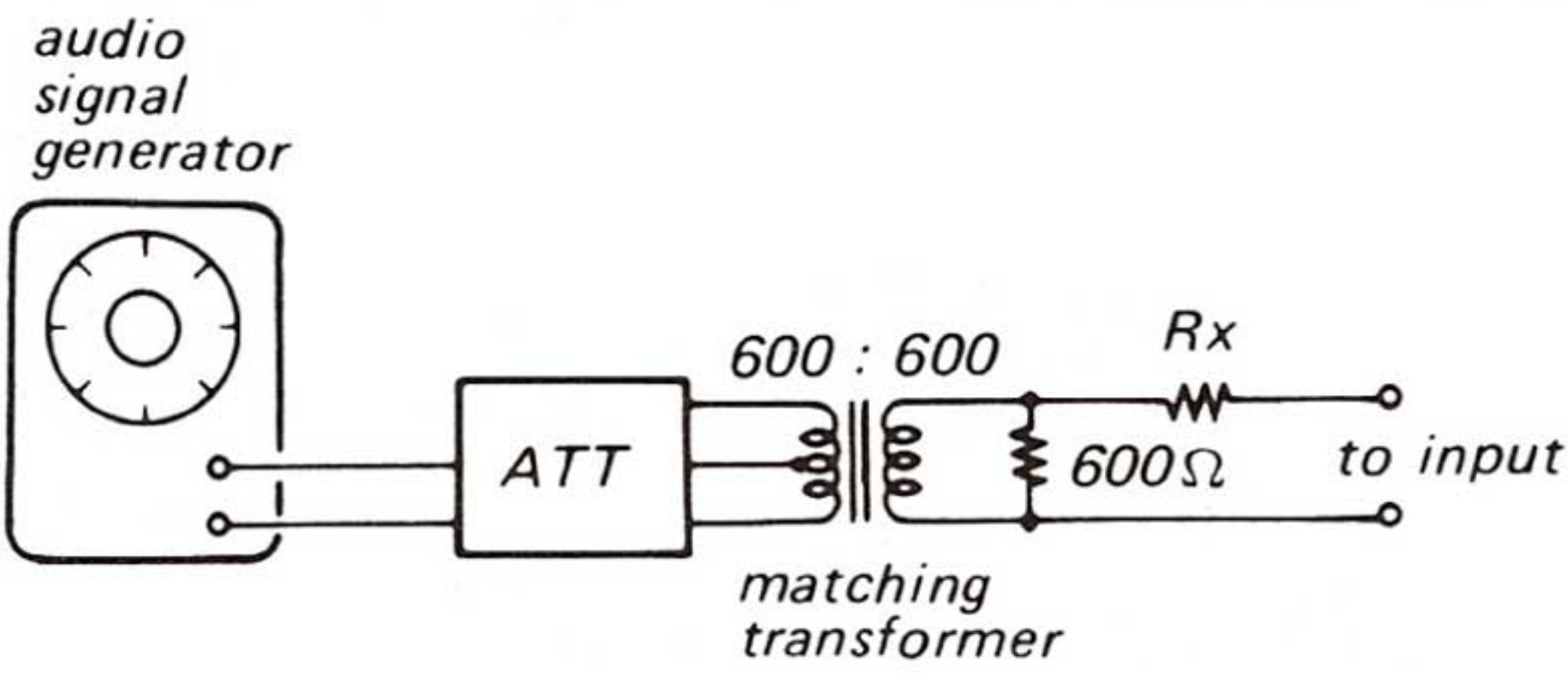


Fig. 3-2-3. Input connection

b. in case that unbalanced attenuator is used

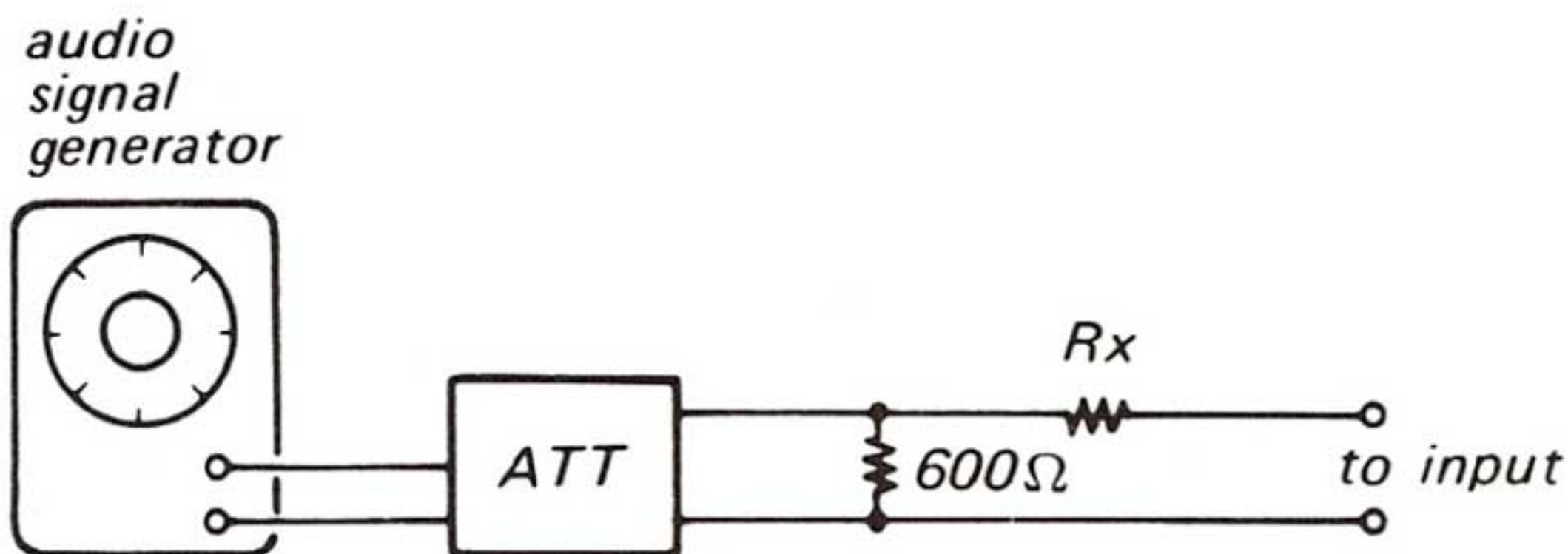


Fig. 3-2-4. Input connection

Input	MIC	LINE IN
Value of Rx	300Ω	10 kΩ

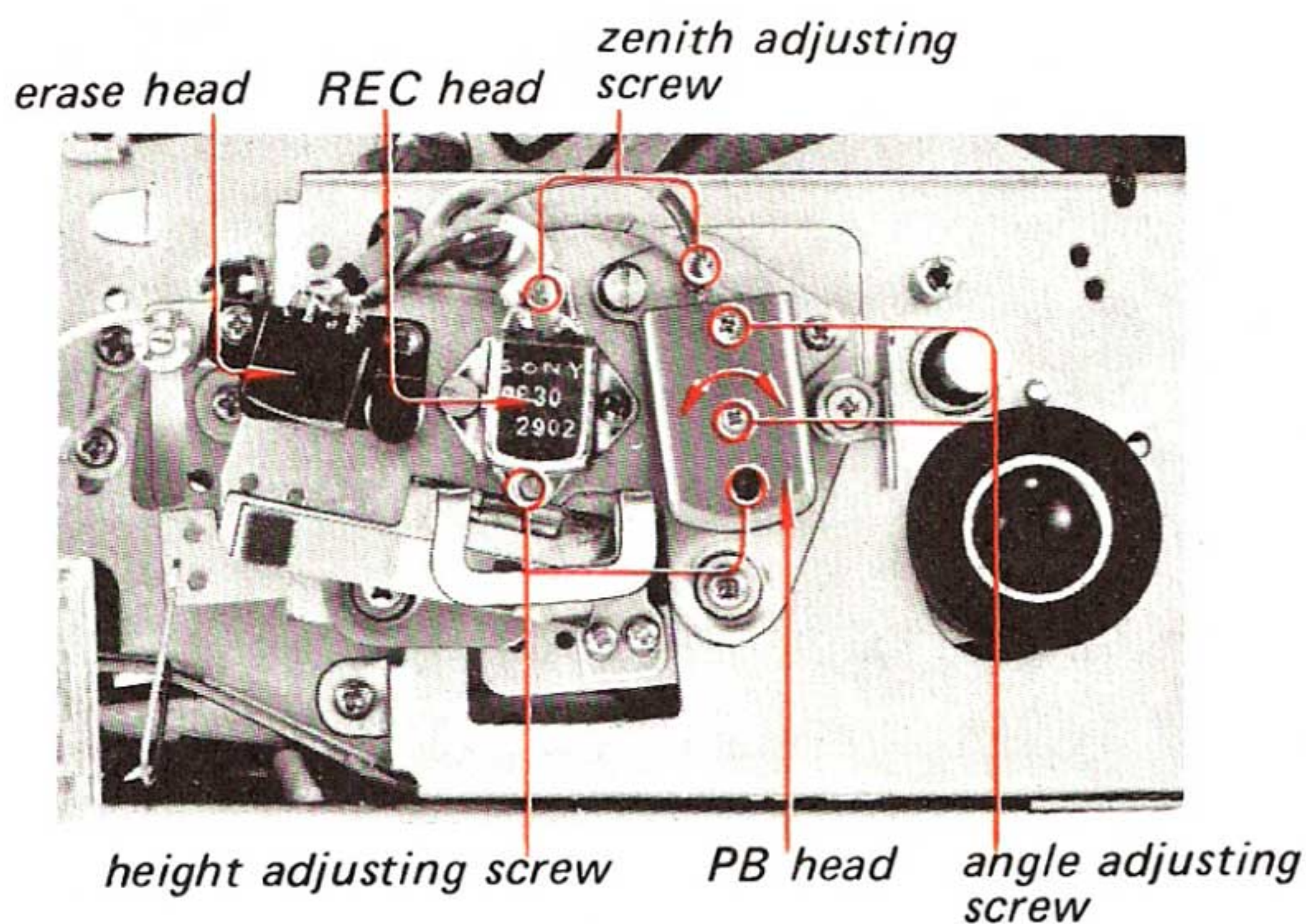


Fig. 3-2-5. Adjusting parts location for the items 2 and 3

1. Tape Path Adjustment

- Step 1. Thread a tape.
- Step 2. Loosen the lock screw and align the upper edge of the erase head core and that of the tape by turning the tape guide (L).
- Step 3. Turn the tape guide (L) clockwise by approximately 35 degrees from the position obtained in the preceding step so that the upper edge of the tape is approximately

0.05 mm lower than that edge of the erase head core.

Step 4. Fix the tape guide with the lock screw.

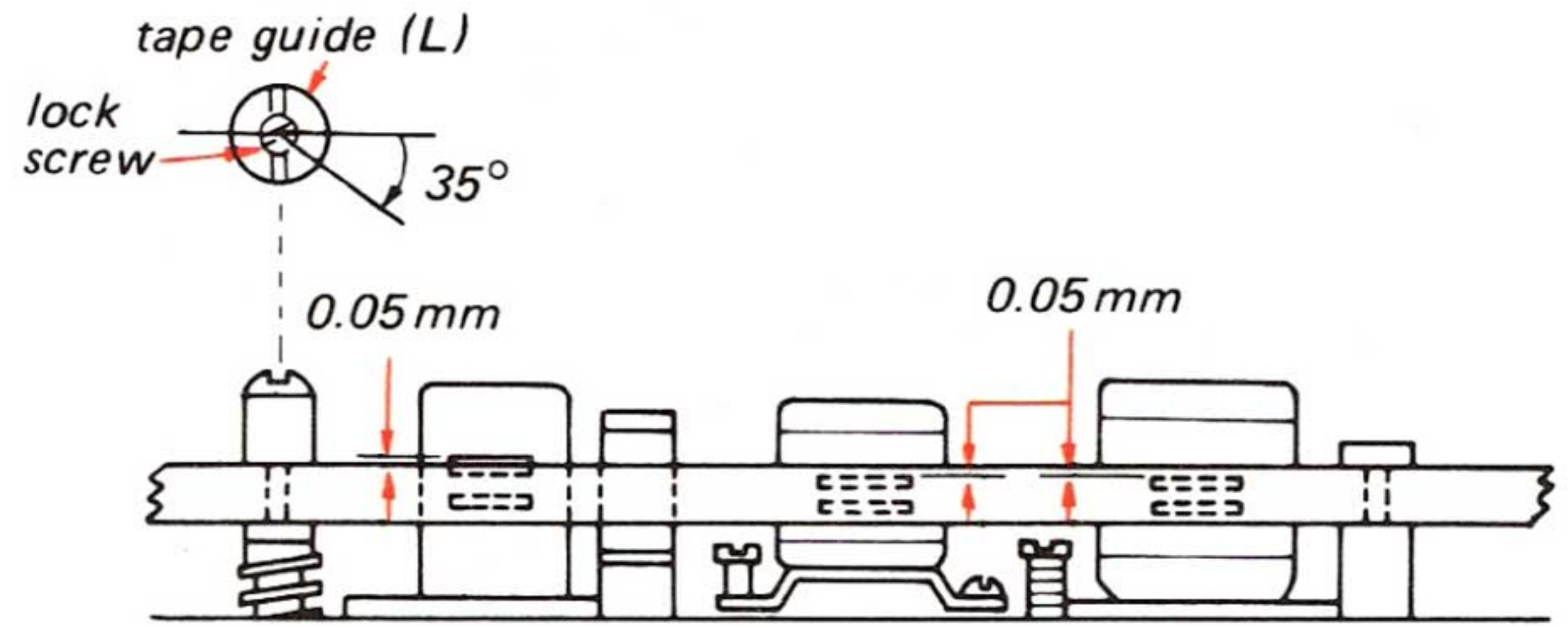


Fig. 3-2-6. Tape path adjustment

2. REC and PB Heads Preadjustments

Note: This adjustments and the following adjustment items 3 and 4 should be repeated alternately several times.

- Step 1. Make rough adjustment for items 3 and 4.
- Step 2. Align the upper edges of the REC and PB head cores and upper edge of the tape by turning the height and zenith adjusting screws. (See Fig. 3-2-5.)
- Step 3. Turn the height and zenith adjusting screws clockwise by approximately 35 degrees from the positions obtained in the preceding step 2 so that the upper edge of the tape is approximately 0.05 mm higher than that of the REC and the PB head cores.

3. Playback Head Angle Adjustment

Switch Settings:

- TAPE SELECT Switch : NORMAL
- TAPE SPEED Switch : 7½ ips (19 cm/s)
- MONITOR Switch : TAPE

- Step 1. Connect a VTVM and a 100kΩ resistor in parallel with the LINE OUT jack.
- Step 2. Thread the SONY alignment tape J-19-F1 and play back the 1st tone (10kHz).
- Step 3. Loosen the angle adjusting screws to position the p.b. head for a maximum VTVM reading. (See Fig. 3-2-5)
- Step 4. Apply lock paint to the screws.

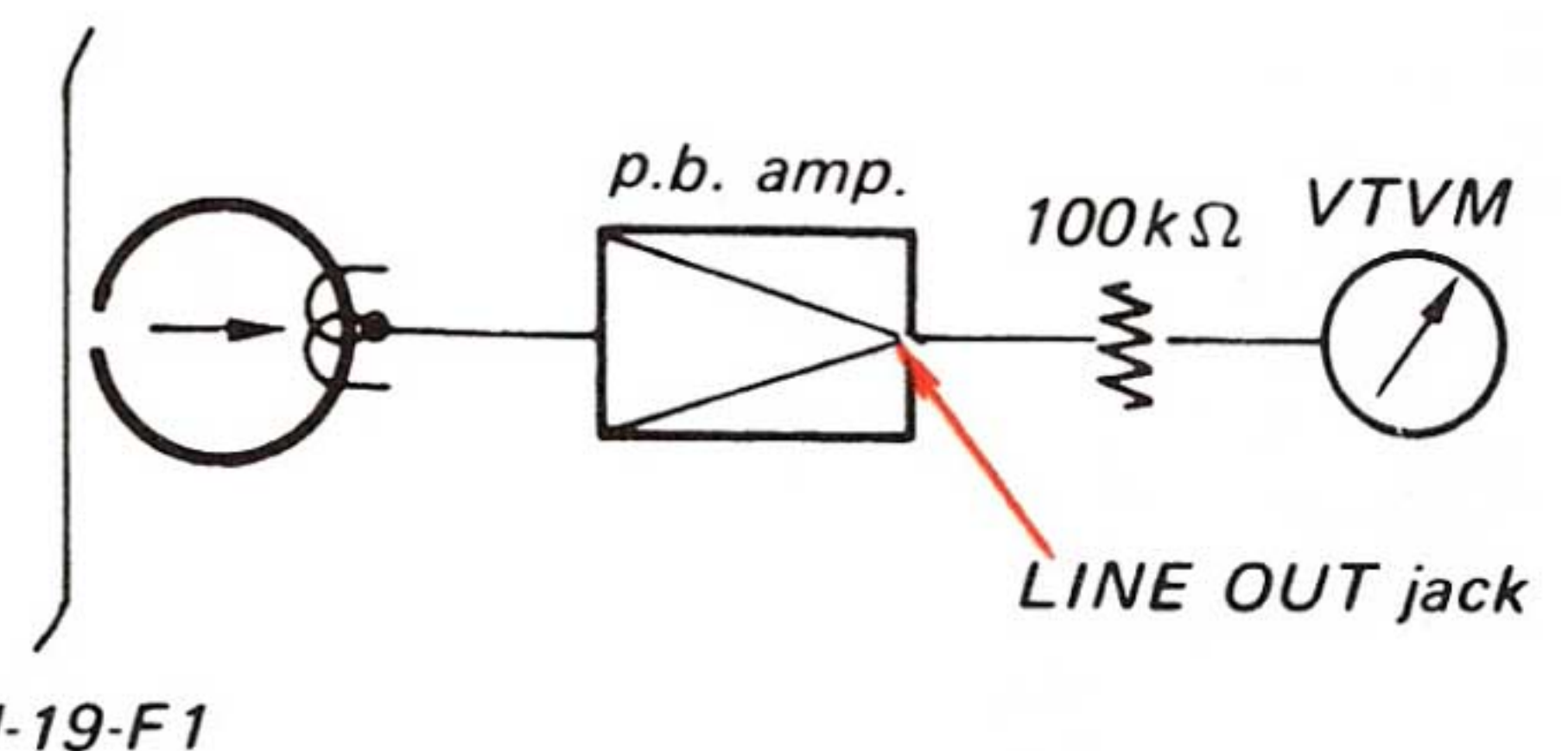


Fig. 3-2-7. Playback head angle adjustment

4. Playback Head Azimuth Adjustment

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 MONITOR Switch : TAPE

- Step 1. Connect a VTVM and a 100kΩ resistor in parallel with the LINE OUT jack.
- Step 2. Thread the SONY alignment tape J-19-F1 and play back the 1st tone (10 kHz).
- Step 3. Adjust the PB head azimuth adjusting screw to obtain a maximum meter reading. (See Fig. 3-2-10.)

Note: If the azimuth angles of L-CH and R-CH are not the same, set the screw midway between two screw positions.

- Step 4. Apply lock paint to the screw.

5. Playback Output Level Adjustment and Level Meter Calibration

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 MONITOR Switch : TAPE

- Step 1. Connect a VTVM and a 100kΩ resistor in parallel with the LINE OUT jack.
- Step 2. Thread the SONY alignment tape J-19-F1 and play back the 2nd tone (400 Hz). (See Fig. 3-2-8.)
- Step 3. Adjust the R150 (R250) to obtain 0 dB (0.775 V) on the VTVM. (See Fig. 3-2-11.)
- Step 4. Adjust the R159 (R259) so that the pointer of level meter stops at the figure 0 on the scale. (See Fig. 3-2-11.)

6. Playback Equalizer Adjustment

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 MONITOR Switch : TAPE

- Step 1. Connect a VTVM and a 100kΩ resistor in parallel with the LINE OUT jack.
- Step 2. Thread the SONY alignment tape J-19-F1 and play back the 3rd tone (400 Hz) and memorize the VTVM reading.
- Step 3. Play back the 4th tone (10kHz) and adjust R143 (R243), to obtain the same VTVM reading as the step 2. (See Fig. 3-2-11.)
- Step 4. Play back the next series of tones and make

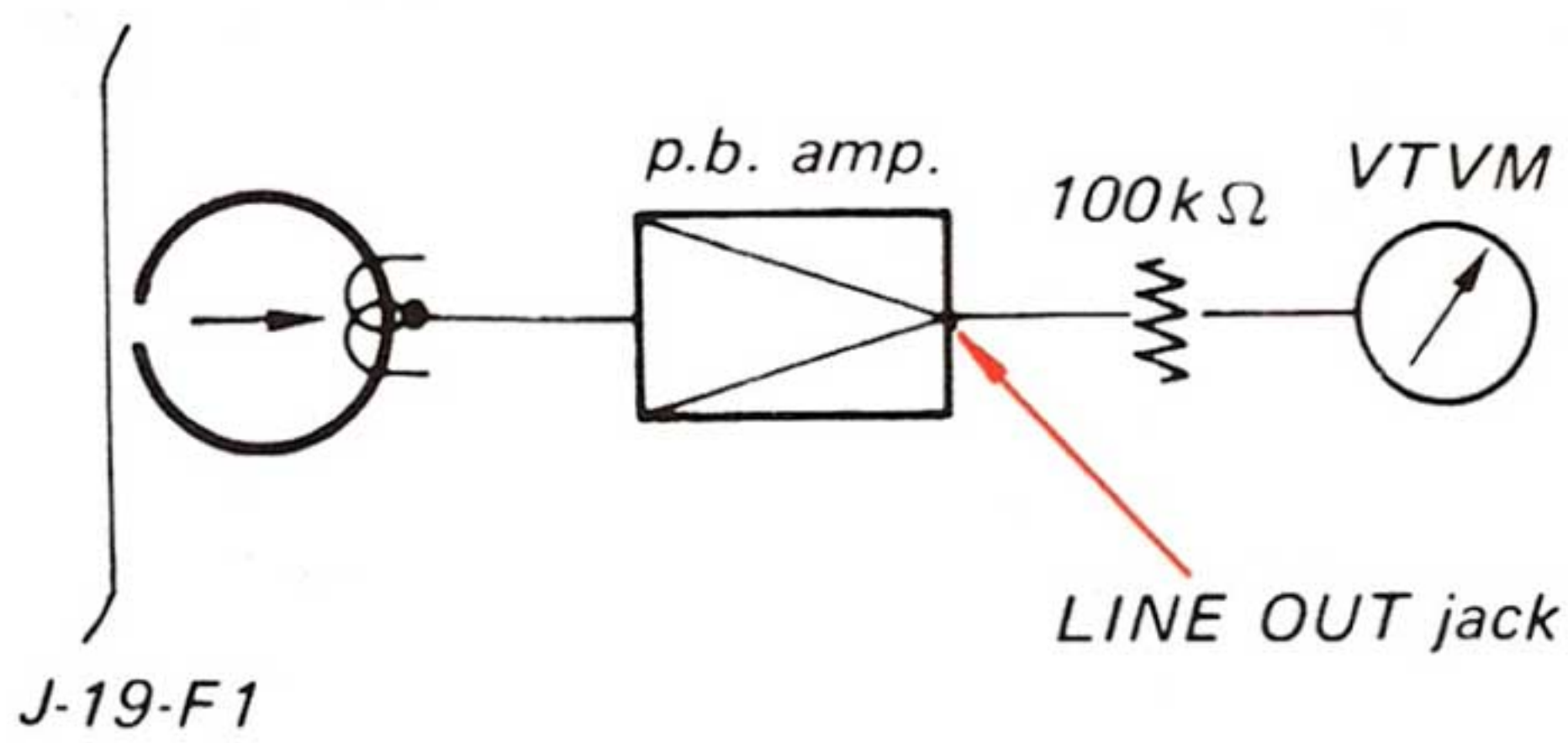


Fig. 3-2-8. Test setup for the items 4, 5 and 6

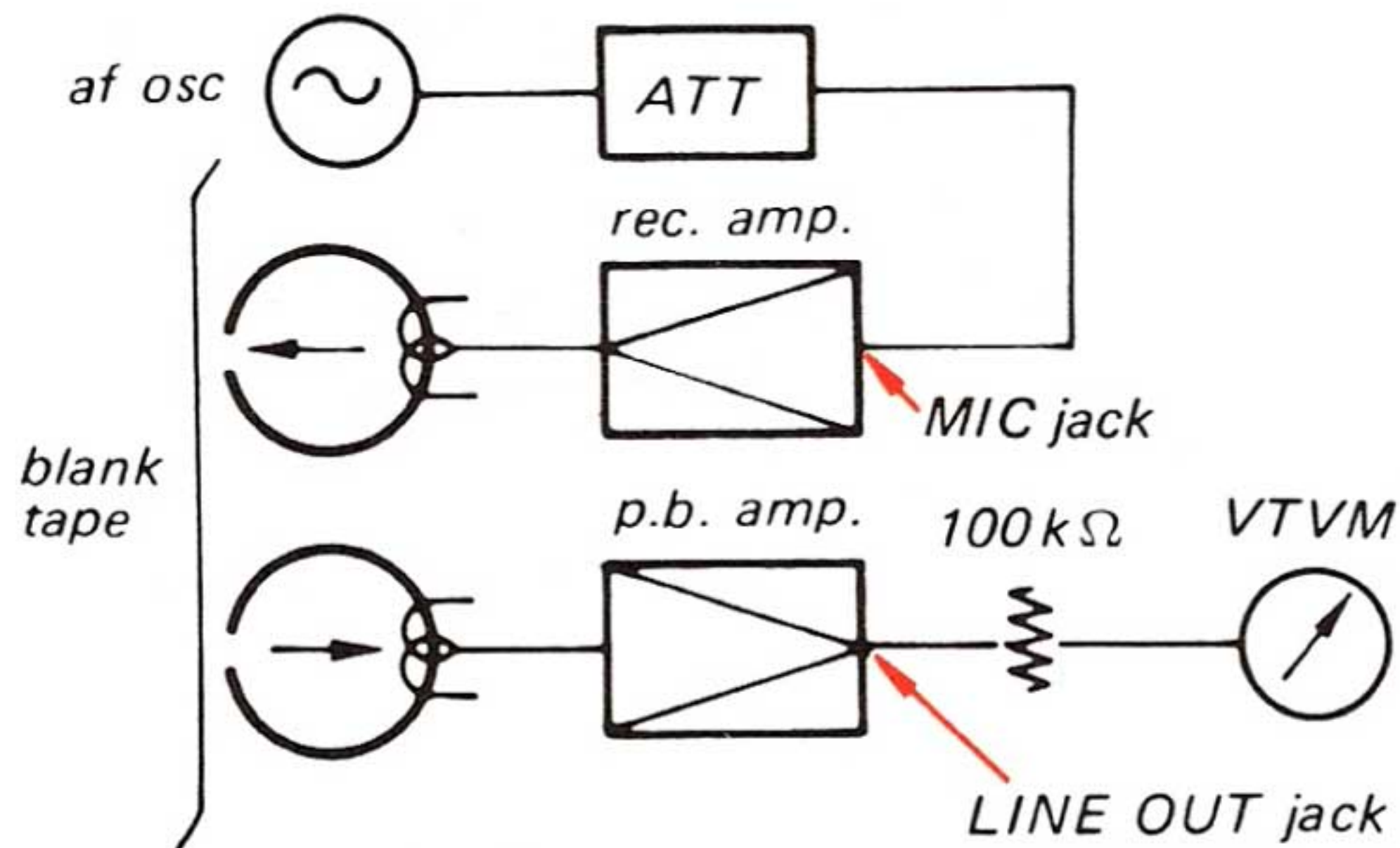


Fig. 3-2-9. Test setup for the items 8, 9 and 10

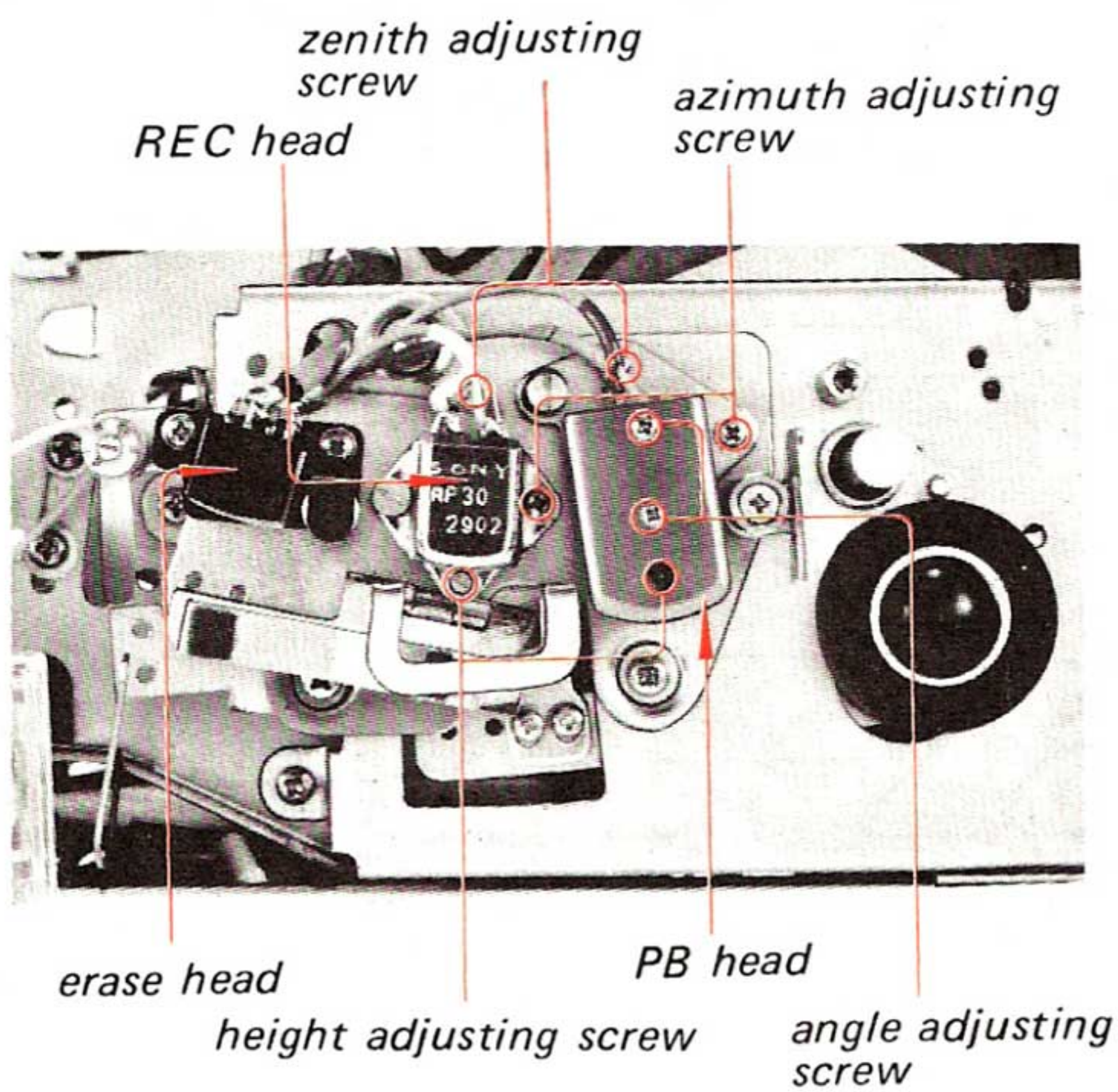


Fig. 3-2-10. Adjusting parts location for the items 4, 8 and 9

Bias Adjustment trap coil adjustment playback equalizer adjustment

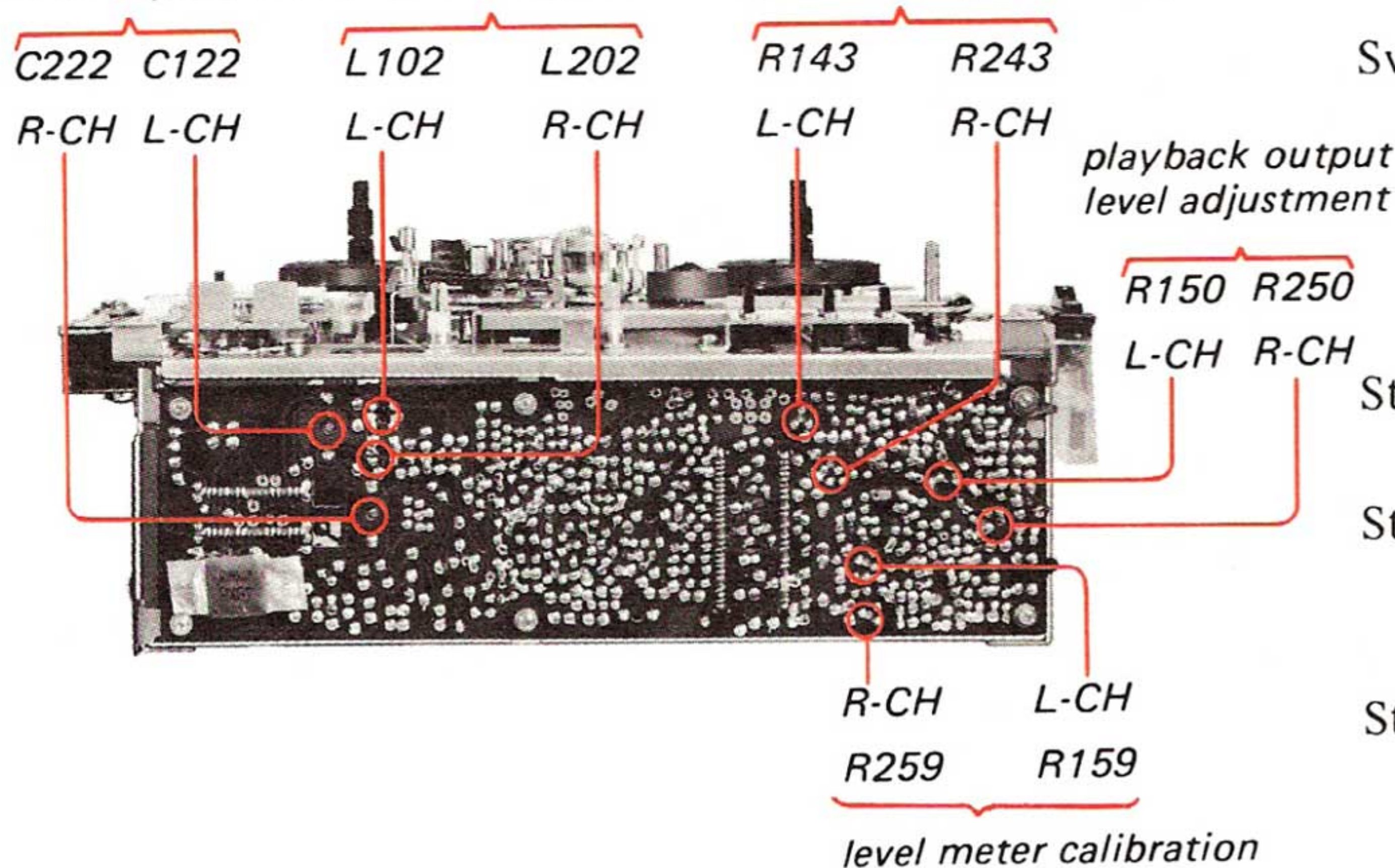


Fig. 3-2-11. Adjusting parts location for the items 5, 6, 7 and 10

sure that each tone output level deviation with respect to the 3rd tone as a zero reference is as follows.

J-19-F1	Tone Frequency	4th 10kHz	5th 7kHz	6th 80 Hz	7th 40 Hz
Deviation from 3rd tone (400 Hz)	0 dB	0±2 dB	L	3±2 dB	4.5±2 dB
			R	3.5±2 dB	5±2 dB

7. Trap Coil Adjustment

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 RECORD VOLUME Control: MIN (fully counterclockwise)

Step 1. Connect a VTVM across the check point and ground as shown in Fig. 3-2-12.

Step 2. Adjust the L102 (L202) to obtain the minimum VTVM reading (less than -5 dB, 0.433 V). (See Fig. 3-2-11.)

Step 3. Lock the cores with paint.

Note: Use a non-magnetic screwdriver.

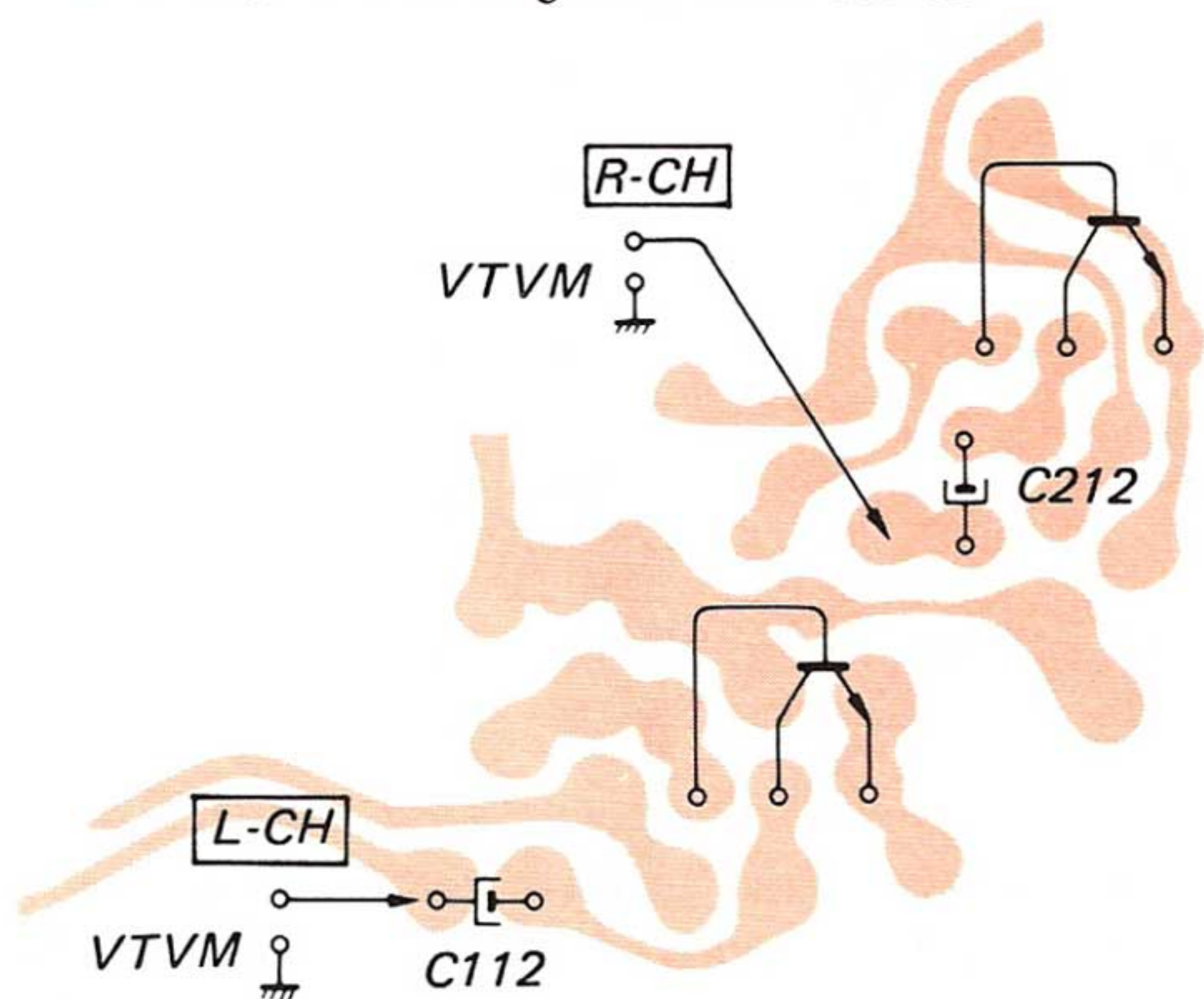


Fig. 3-2-12. Trap coil adjustment

8. Record Track Adjustment

Note: Before making this adjustment, preadjust the record head azimuth, zenith and height adjusting screws. (Refer to the tape path adjustment.)

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 MONITOR Switch : TAPE

Step 1. Connect a VTVM and a 100 kΩ resistor in parallel with the R-CH LINE OUT jack.

Step 2. Deliver a 1 kHz signal of -60 dB (0.775 mV) to the MIC jack of R-CH.

Step 3. Thread a blank tape and place the set in RECORD mode. (See Fig. 3-2-9.)

Step 4. Adjust the record head height adjusting screw to obtain a maximum VTVM reading.

Step 5. Turn the zenith adjusting screw by the same turns in same direction as in the step 4. (See Fig. 3-2-10.)

Note: When the adjusting screws are turned more than 1 turn, make the tape path adjustment again.

9. Record Head Azimuth Adjustment

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 MONITOR Switch : TAPE

Step 1. Connect a VTVM and a 100 kΩ resistor in parallel with the LINE OUT jack.

Step 2. Deliver a 15 kHz signal of -90 dB (0.0245 mV) to the MIC jack and adjust the azimuth adjusting screw to obtain a maximum meter reading. (See Fig. 3-2-9 and 3-2-10.)

Note: 1. If the maximum value of L-CH and R-CH outputs can not be obtained at the same angle, adjust the screw midway between two screw positions.
 2. When the azimuth adjusting screw is turned more than 1 turn, make the record track adjustment.

10. Bias Adjustment

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 MONITOR Switch : TAPE

Step 1. Connect a VTVM and a 100 kΩ resistor in parallel with the LINE OUT jack.

Step 2. Thread a blank tape and place the set in RECORD mode.

Step 3. Deliver a 1 kHz signal of -60 dB (0.775 mV) to the MIC jack and turn the bias adjusting trimmer capacitor C122 (C222) at fully counterclockwise. (See Fig. 3-2-9 and 3-2-11.)

Step 4. Turn the bias adjusting trimmer capacitor C122 (C222) clockwise to obtain a maximum reading on the VTVM, and then turn the capacitor clockwise until the VTVM reading drops 0.5 dB.

Step 5. Apply lock paint to the trimmer capacitors.

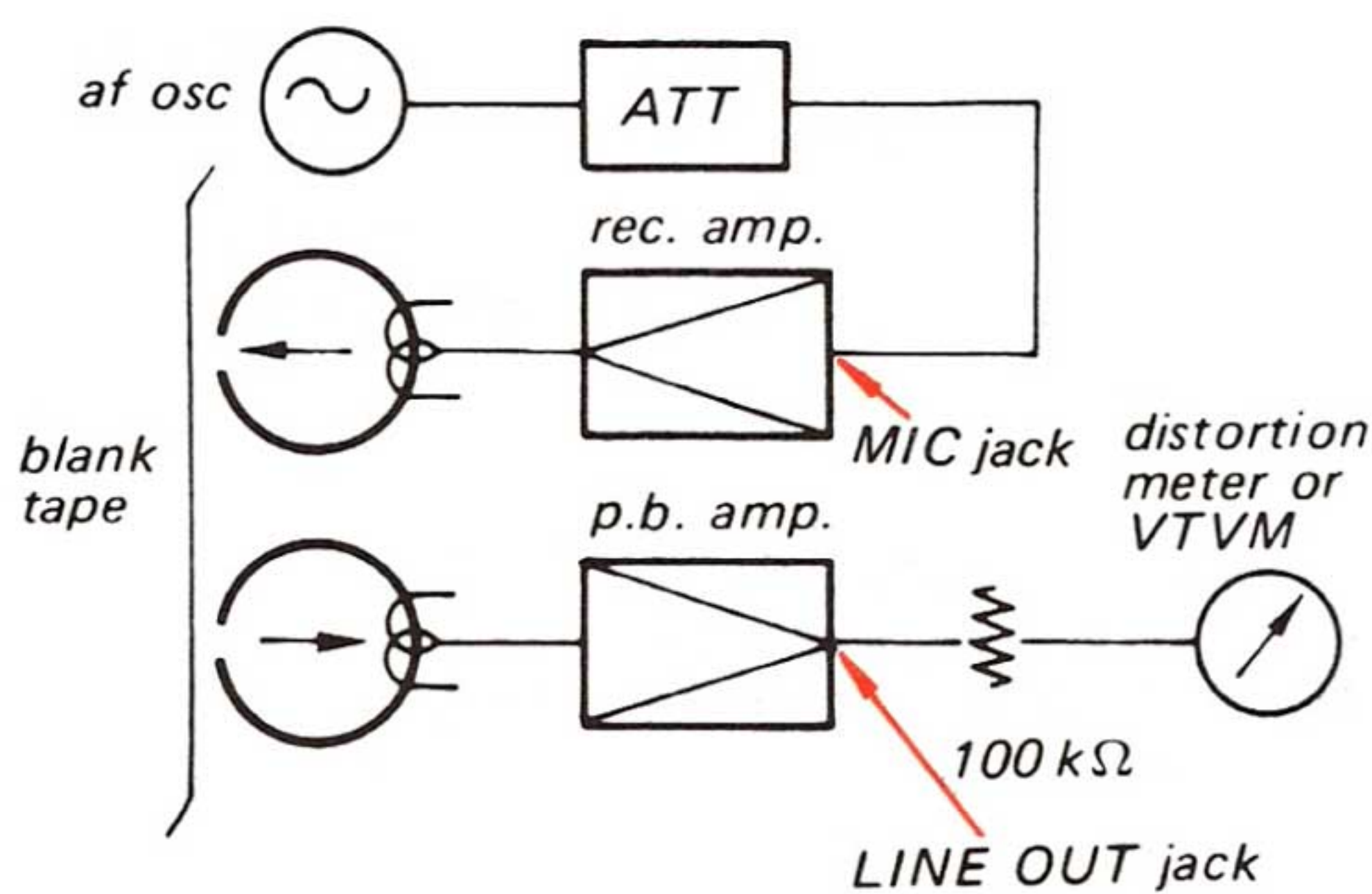


Fig. 3-2-13. Test setup for the items 11, 12, 13, 14 and 15

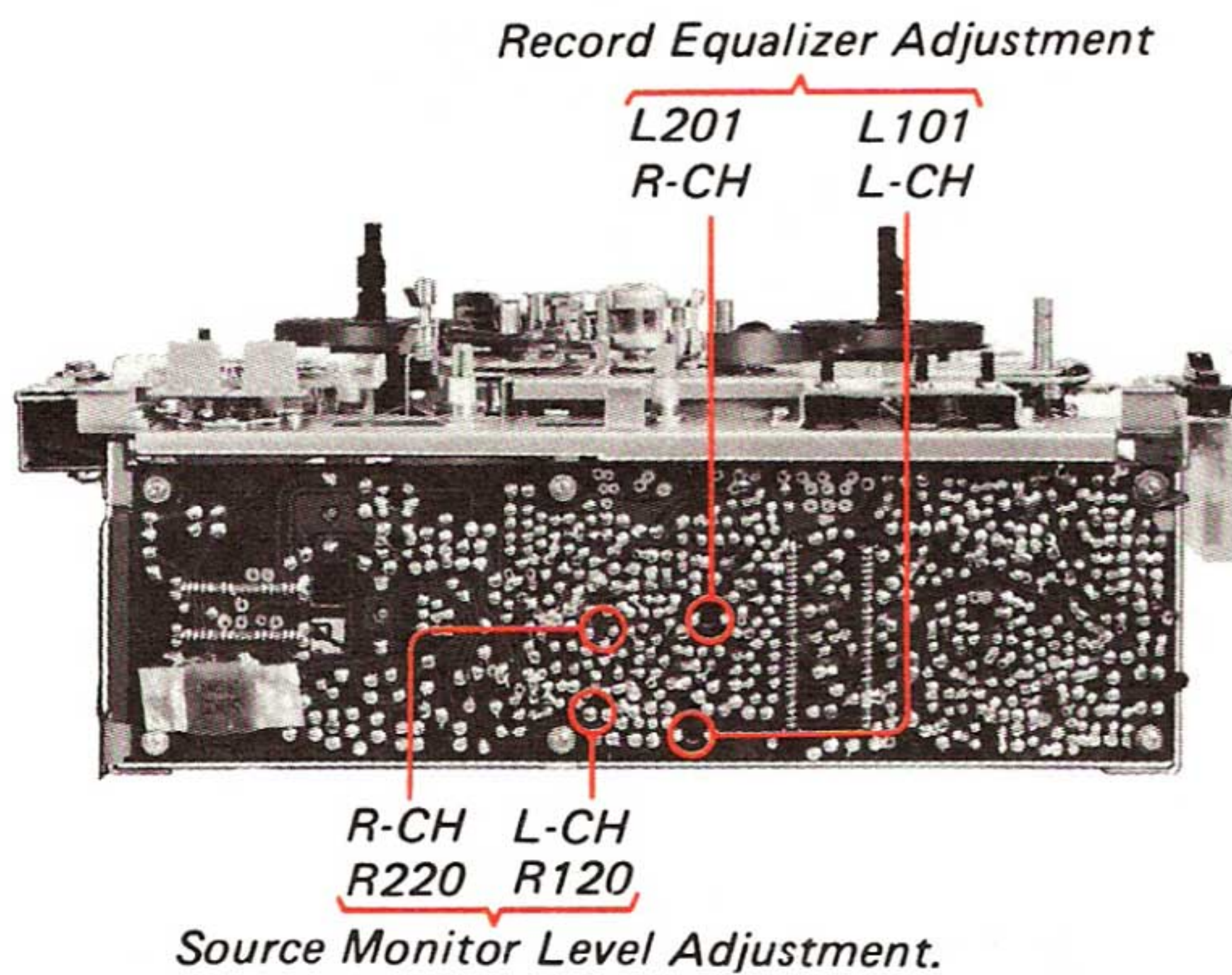


Fig. 3-2-14. Adjusting parts location for the items 11 and 12

11. Source Monitor Level Adjustment

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 MONITOR Switch : SOURCE step 2
 TAPE step 3

Step 1. Connect a VTVM and a 100 kΩ resistor in parallel with the LINE OUT jack.

Step 2. Thread a blank tape and place the set in RECORD mode, deliver a 1 kHz signal of -60 dB (0.775 mV) to the MIC jack and adjust the R120 (R220) to obtain 0 dB (0.775 V) on the VTVM. (See Fig. 3-2-13 and 3-2-14.)

Step 3. Set the MONITOR switch in TAPE position and make sure that the VTVM reads 0 dB (0.775 V). If not, repeat the step 2.

12. Record Equalizer Adjustment

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 MONITOR Switch : TAPE

Step 1. Connect a VTVM and a 100 kΩ resistor in parallel with the LINE OUT jack.

Step 2. Thread a blank tape, place the set in RECORD mode, deliver a 1 kHz signal of -90 dB (0.0245 mV) to the MIC jack and memorize the VTVM reading. (See Fig. 3-2-13.)

Step 3. Record a 18 kHz signal of -90 dB (0.0245 mV) continuously and playing it back, adjust L101 (L201) so that the same VTVM reading as the step 2 is obtained (See Fig. 3-2-14.)

Step 4. Vary the input signal frequency from 10 kHz to 20 kHz and make sure that the output level deviation of the any frequency between 10 kHz and 20 kHz from the output level of 1 kHz signal is between +3 dB and -3 dB. If not, check the tape path.

13. Overall Frequency Response Measurement

Switch Settings:

TAPE SELECT Switch : NORMAL and SPECIAL
 TAPE SPEED Switch : 7½ ips (19 cm/s)
 3¾ ips (9.5 cm/s)
 and 1⅞ ips (4.8 cm/s)
 MONITOR Switch : TAPE

Step 1. Connect a VTVM and a 100 kΩ resistor in parallel with the LINE OUT jack.

Step 2. Thread the SONY tape "super 150" (SONY SLH tape), place the set in RECORD mode, deliver a 1 kHz signal of -90 dB (0.0245 mV) to the MIC jack and memorize the VTVM reading. (See Fig. 3-2-13.)

Step 3. Vary the input signal frequency and read the output level deviation of the each frequency from the output level of 1 kHz signal. The deviation should be as the following table.

Note: When recording the signal on the SONY tape "super 150", set the TAPE SELECT switch to NORMAL and on the SONY SLH tape, to SPECIAL.

Tape Speed	Deviation from 1 kHz Signal	
	Frequency	SUPER 150 SLH
7 1/2 ips (19 cm/s)	55 Hz	0 ⁺³ ₋₅ dB / 0 ⁺³ dB
	12 kHz	0 ⁺³ dB / 0 ⁺³ dB
	18 kHz (20 kHz ...SLH)	0 ⁺³ ₋₆ dB / 0 ⁺³ ₋₆ dB
3 3/4 ips (9.5 cm/s)	100 Hz	0 ⁺³ dB / 0 ⁺³ dB
	6 kHz	0 ⁺³ dB / 0 ⁺³ dB
1 7/8 ips (4.8 cm/s)	100 Hz	0 ⁺³ dB / 0 ⁺³ dB
	1 kHz	0 ⁺³ ₋₁₀ dB / 0 ⁺³ ₋₁₀ dB

14. Overall Signal-to-Noise Ratio Measurement

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7 1/2 ips (19 cm/s)
 MONITOR Switch : TAPE

- Step 1. Connect a VTVM and a 100 kΩ resistor in parallel to the LINE OUT jack.
- Step 2. Place the set in RECORD mode, deliver a 1 kHz signal of -60 dB (0.775 mV) to the MIC jack and record the signal on a blank tape "SONY super 150" (completely erased). (See Fig. 3-2-13.)
Memorize the LINE output level.
- Step 3. Remove the input connection, terminate the MIC jack with a 600 Ω resistor and continue the recording with no input signal. Memorize the LINE output level.

Step 4. The LINE output level difference between the two parts (overall signal-to-noise ratio) should be greater than 44 dB.

15. Erase Ratio Measurement

Switch Settings:

TAPE SELECT Switch : NORMAL
 TAPE SPEED Switch : 7 1/2 ips (19 cm/s)
 MONITOR Switch : TAPE

- Step 1. Connect the equipments as shown in Fig. 3-2-15.
- Step 2. Deliver a 1 kHz signal of -50 dB (2.45 mV) to the MIC jack and record the signal on a blank tape. Memorize the LINE output level.
- Step 3. Disconnect the input connection of the MIC jack.
- Step 4. Rewind half of tone recorded part and erase it. Memorize the LINE output level.
- Step 5. The LINE output level difference between steps 2 and 3 should be greater than 65 dB. If not, check the tape pass and erase current.

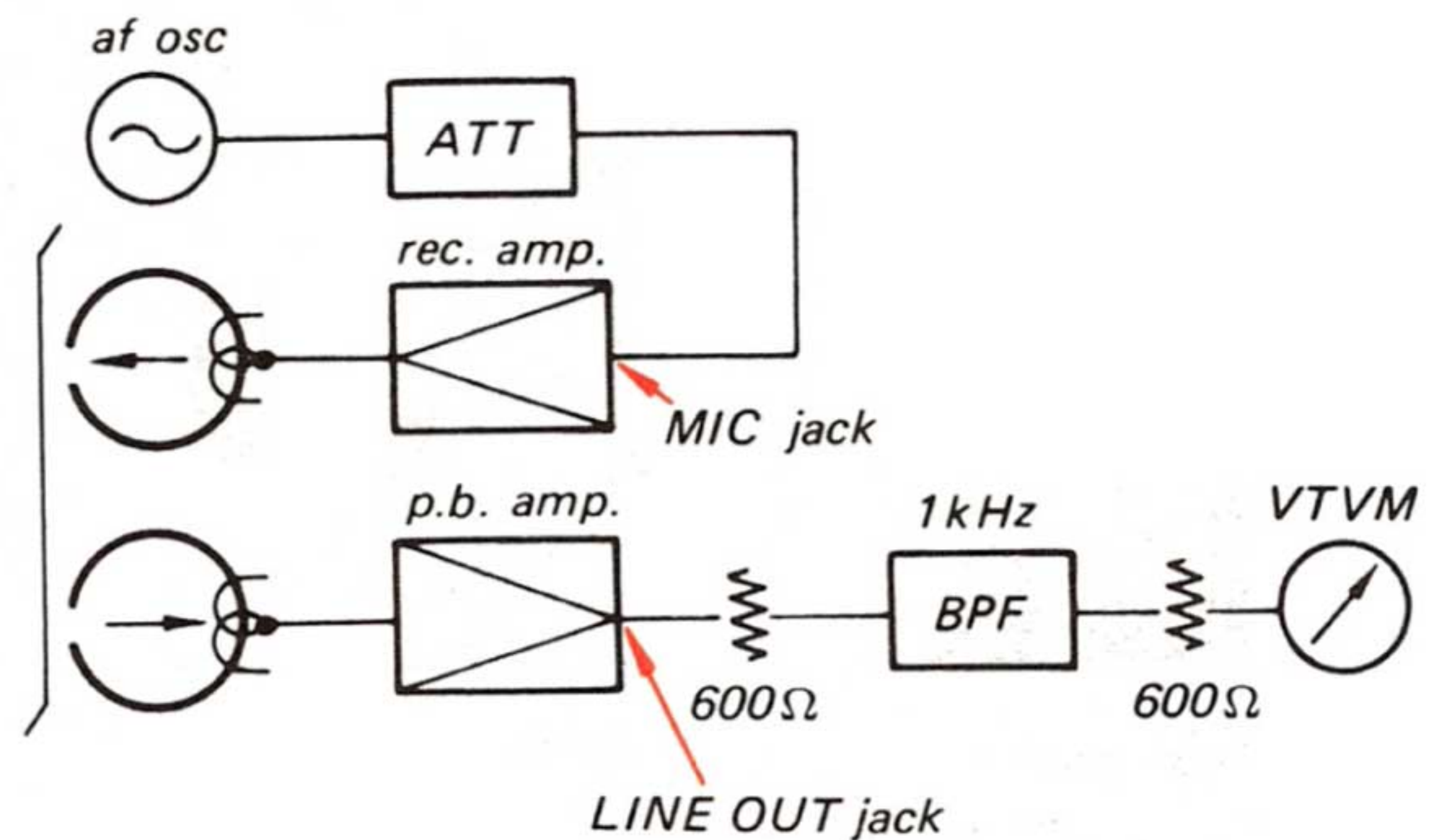
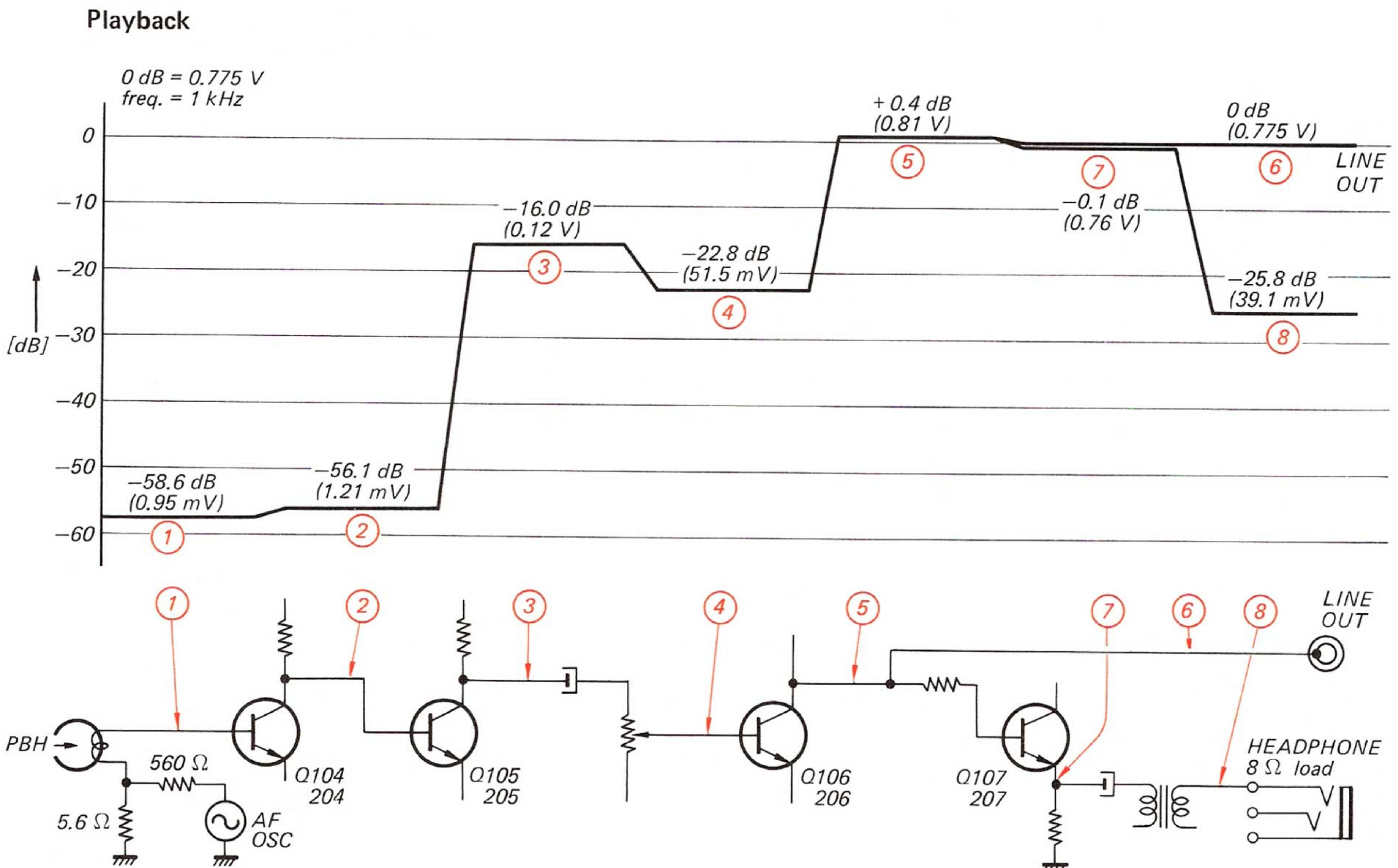
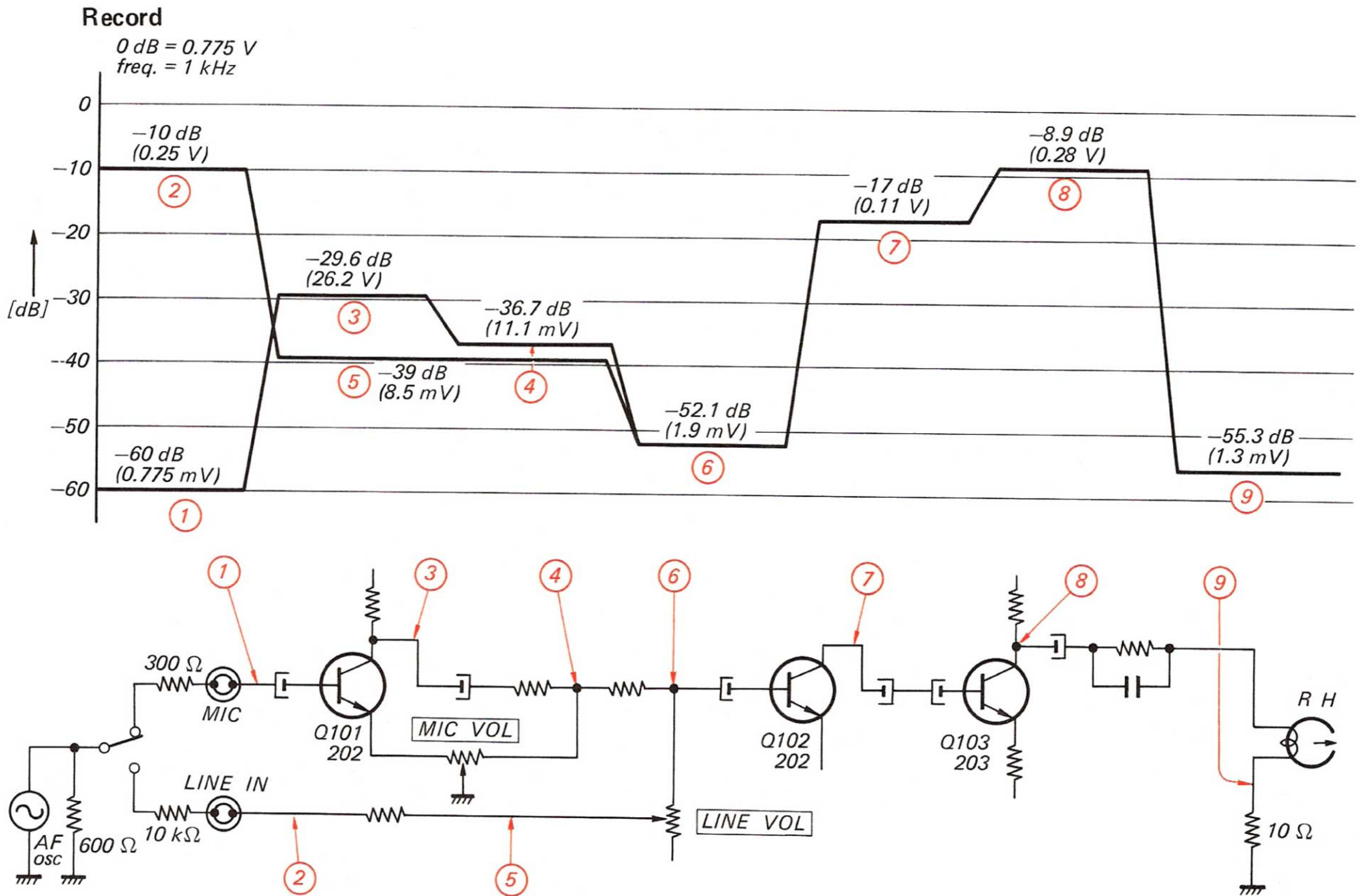


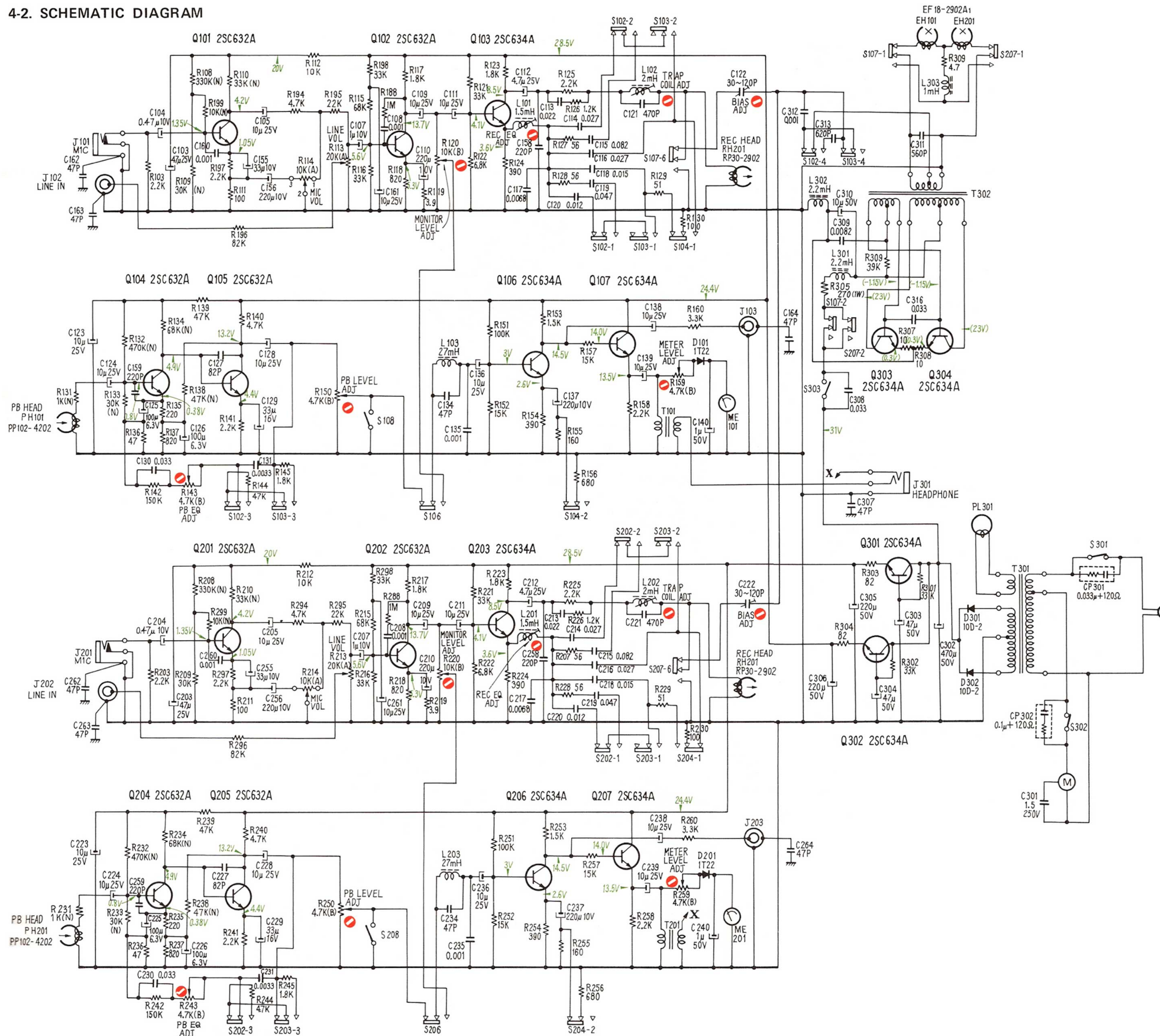
Fig. 3-2-15. Erase ratio measurement

SECTION 4 DIAGRAMS

4-1. LEVEL DIAGRAM



4-2. SCHEMATIC DIAGRAM



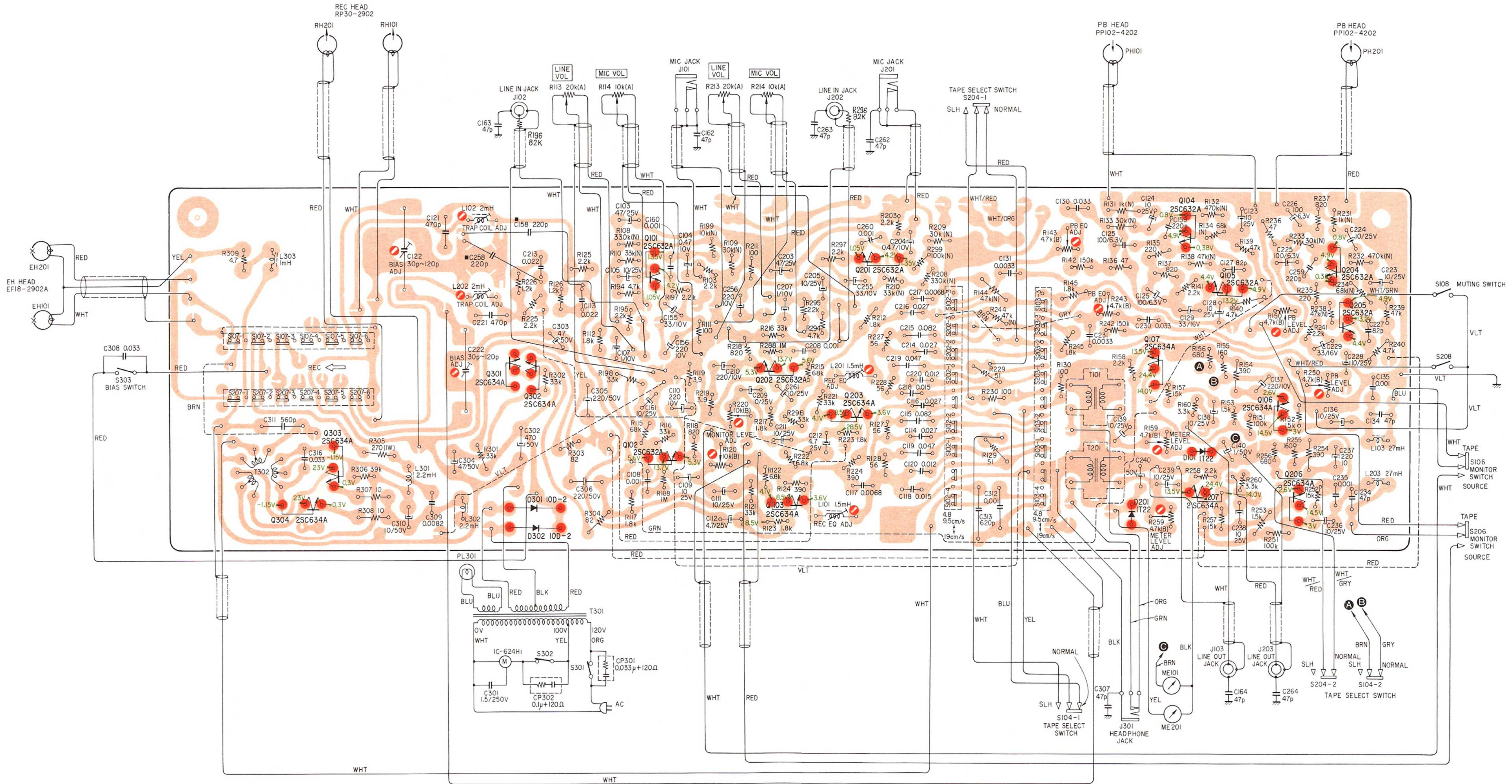
Note:

- All resistors and capacitors are rated in Ω and μF , unless otherwise specified.
- The letter (A), (B) or (C) suffixed to rating value of variable or semi-fixed resistor indicates its characteristics.
- Voltage values shown are measured with a voltmeter (20 $k\Omega/V$) in playback mode. Voltage values in () are measured in record mode. Variations may be noted because of normal production tolerances.

4. Switch position

S102, 202	} equalizer switch	19 cm/sec (7½ ips)
S103, 203		
S104, 204	TAPE SELECT switch	NORMAL
S106, 206	MONITOR switch	TAPE
S107, 207	record switch	on
S108, 208	muting switch	on
S301	POWER switch	ON
S302	auto shut off switch	on
S303	bias switch	off

4-3. MOUNTING DIAGRAM - Conductor Side -

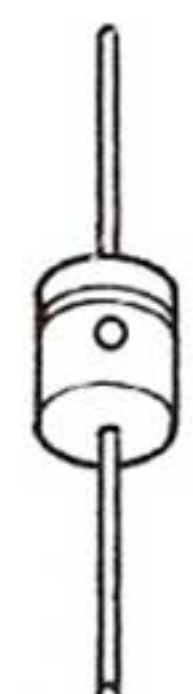


2SC632A
2SC634A

Q101, 102, 103, 104
105, 106, 107
201, 202, 203, 204
205, 206, 207
301, 302, 303, 304



10D-2
D301, 302

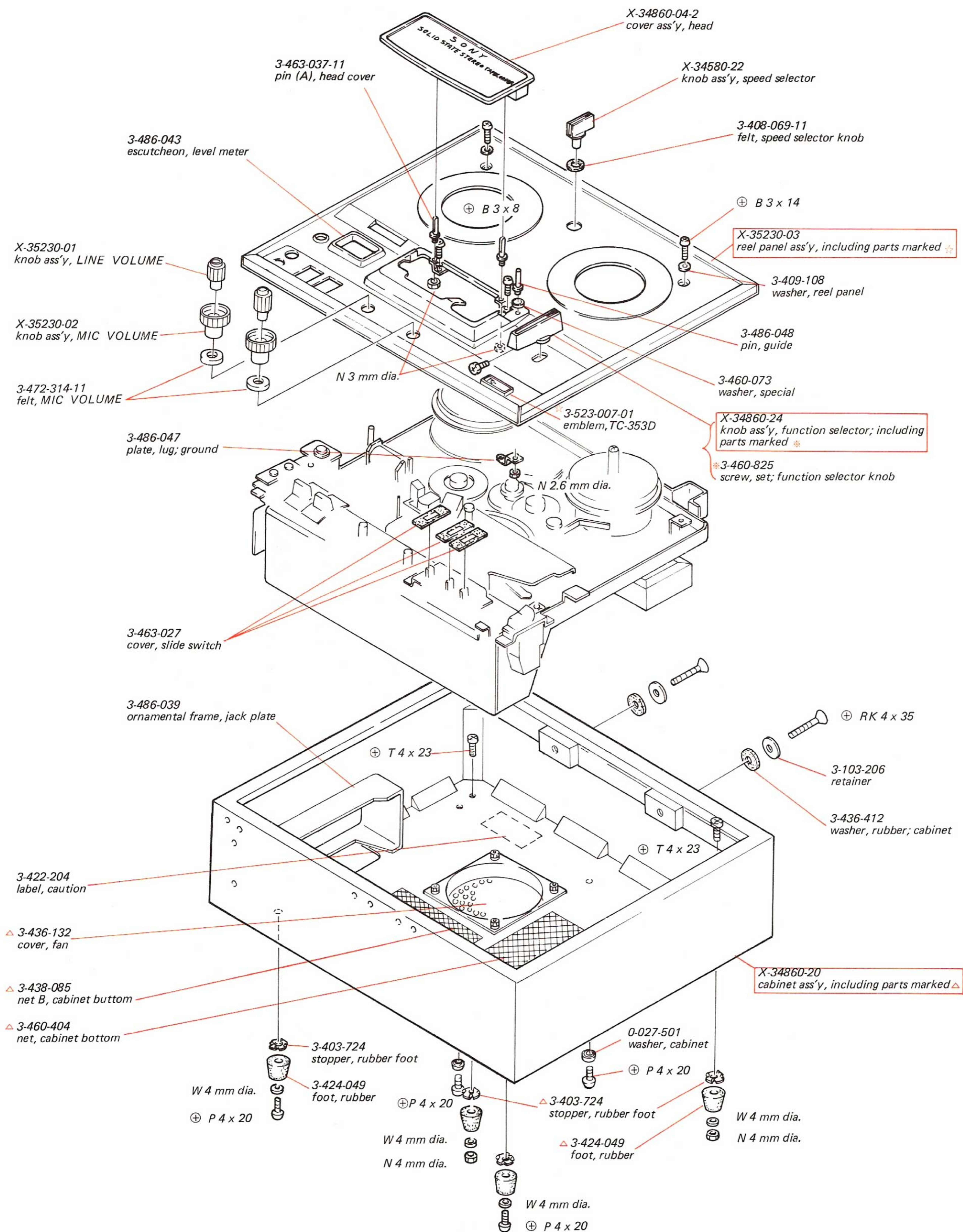


1T22
D101, 201

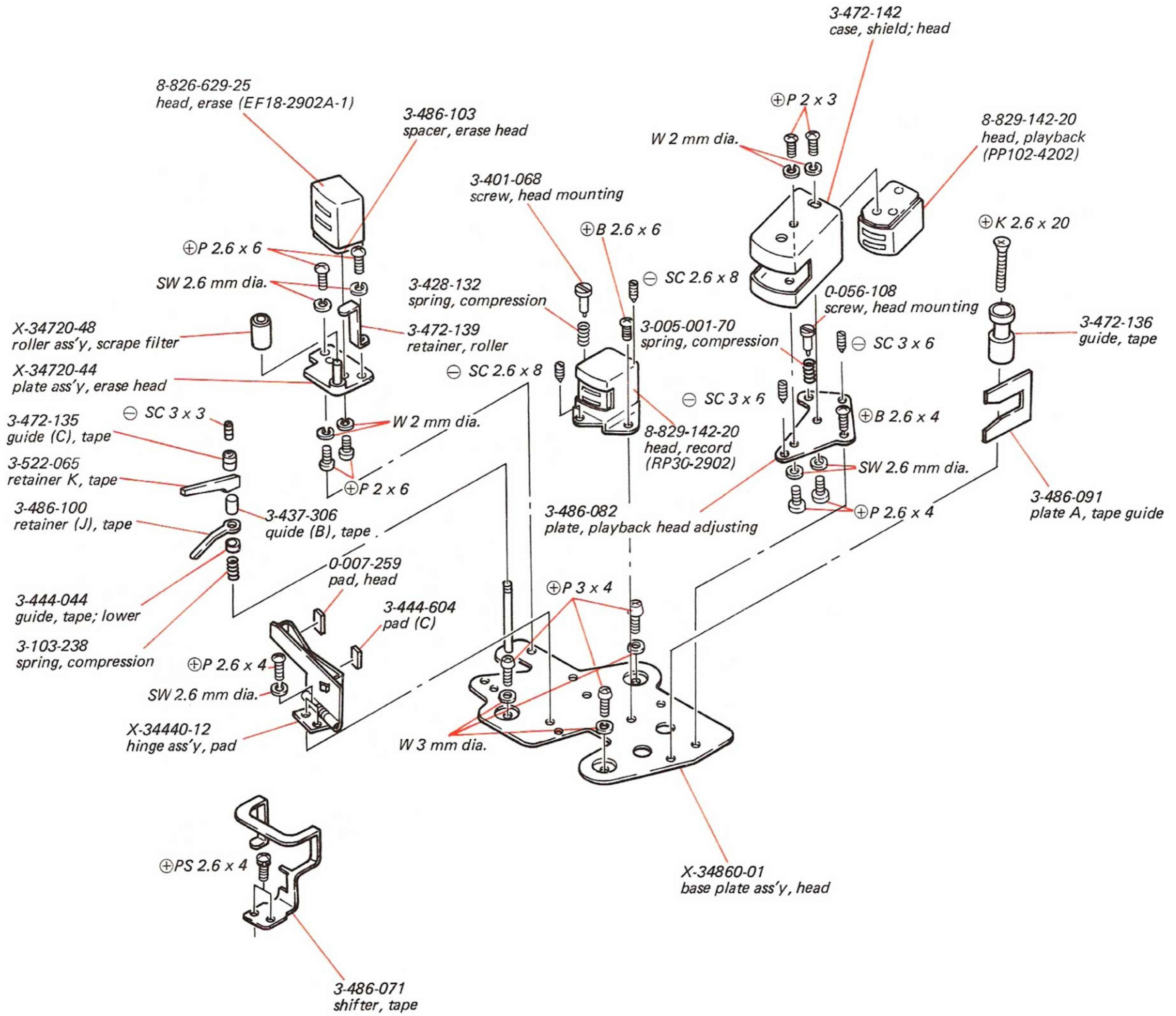


SECTION 5 EXPLODED VIEWS

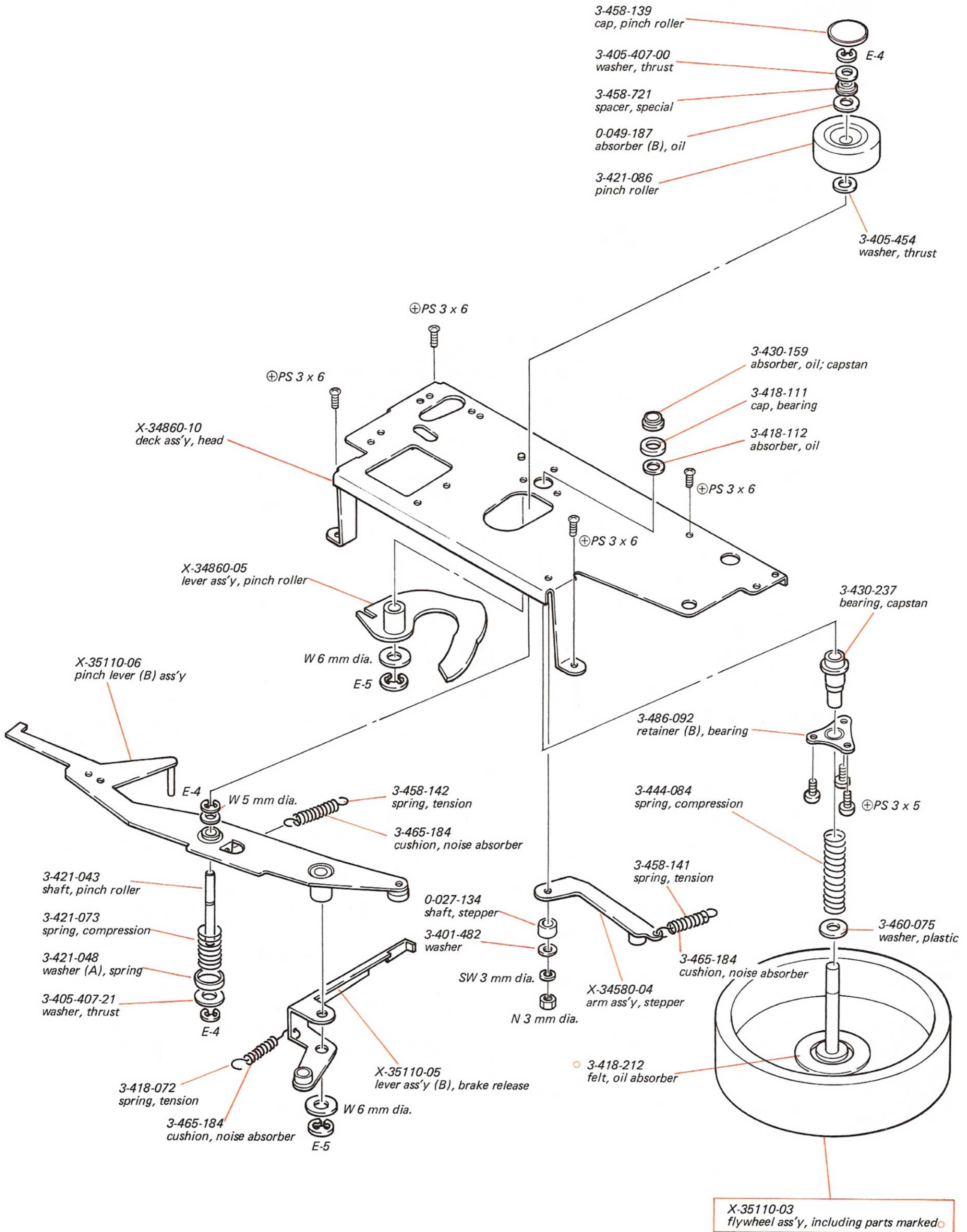
5-1. CABINET – Top View –



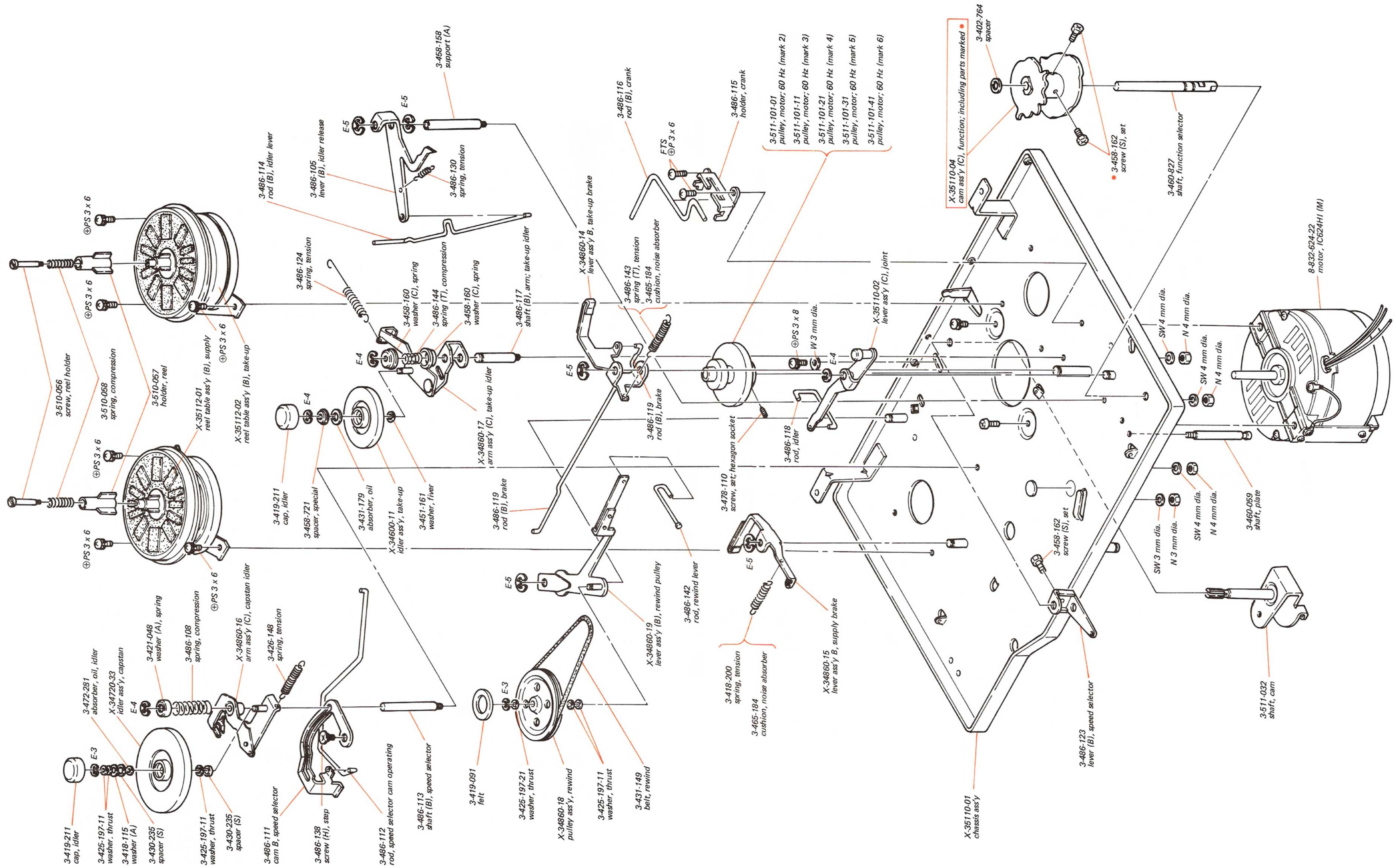
5-3. HEAD DECK — UPPER —



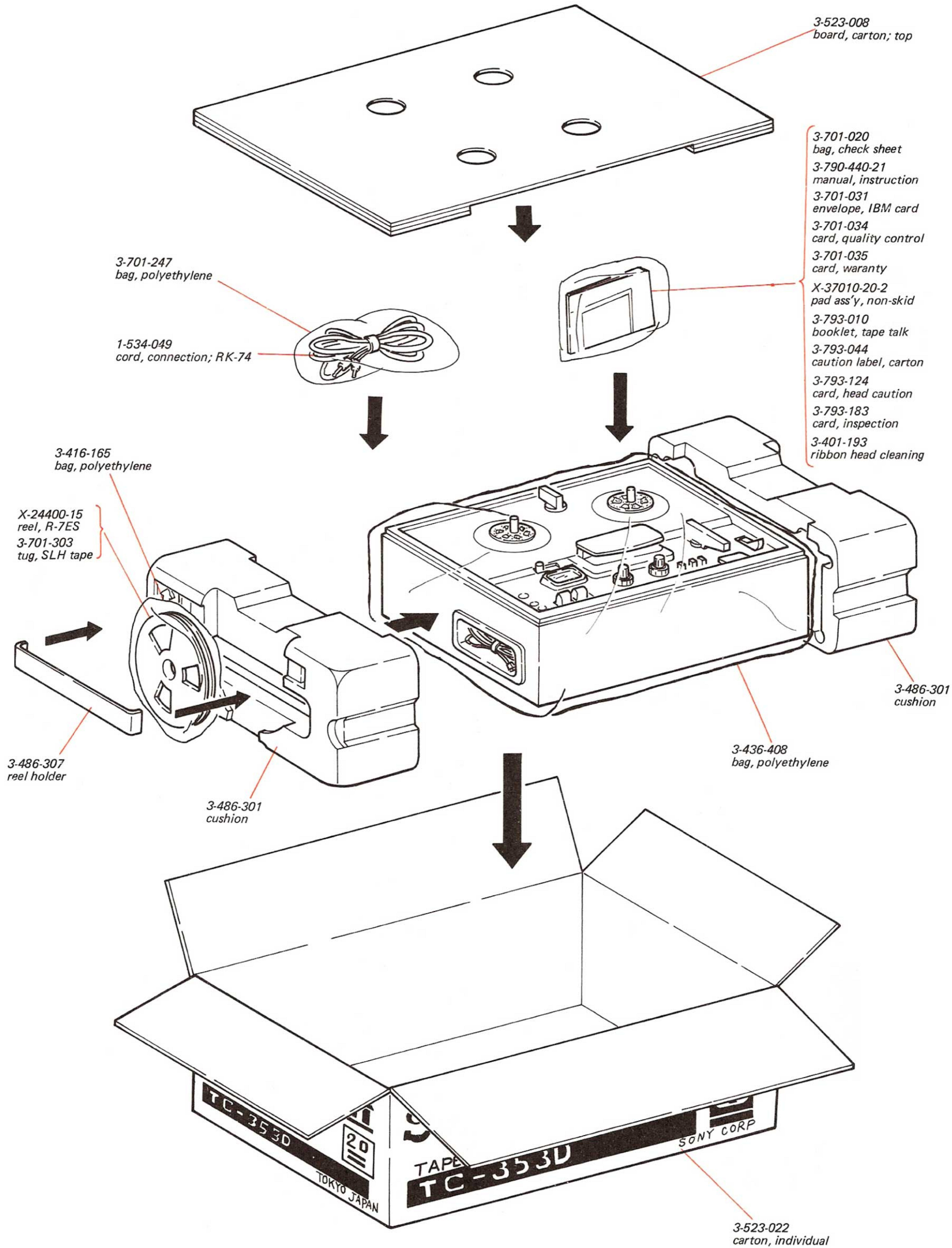
5-4. HEAD DECK – LOWER –



5-5. CHASSIS — UPPER —



5-7. PACKING



SECTION 6

ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<u>MOUNTED CIRCUIT BOARD</u>					
	X-35230-51	tape recorder amp & bias osc.			
<u>SEMICONDUCTORS</u>					
Q101, 201		transistor 2SC632A	C114, 214	1-105-678-12	0.027 50 V mylar
Q102, 202		transistor 2SC632A	C115, 215	1-105-684-12	0.082 50 V mylar
Q103, 203		transistor 2SC634A	C116, 216	1-105-678-12	0.027 50 V mylar
Q104, 204		transistor 2SC632A	C117, 217	1-105-671-51	0.0068 50 V mylar
Q105, 205		transistor 2SC632A	C118, 218	1-105-675-51	0.015 50 V mylar
Q106, 206		transistor 2SC634A	C119, 219	1-105-681-51	0.047 50 V mylar
Q107, 207		transistor 2SC634A	C120, 220	1-105-674-12	0.012 50 V mylar
Q301		transistor 2SC634A	C121, 221	1-107-244-51	470 p 50 V silvered mica
Q302		transistor 2SC634A	C122, 222	1-141-069	30~120p 500 V trimmer (BIAS ADJ)
Q303		transistor 2SC634A	C123, 223	1-121-398-51	10 25 V elect
Q304		transistor 2SC634A	C124, 224	1-121-398-51	10 25 V elect
D101, 201		diode 1T22	C125, 225	1-121-413-51	100 6.3 V elect
D301		diode 10D2	C126, 226	1-121-413-51	100 6.3 V elect
D302		diode 10D2	C127, 227	1-107-129-51	82 p 50 V silvered mica
<u>COILS</u>					
L101, 201	1-407-285	equalizer, 1.5 mH	C128, 228	1-121-398-51	10 25 V elect
L102, 202	1-409-130	trap, 2 mH	C129, 229	1-121-403-51	33 16 V elect
L103, 203	1-407-211-21	micro inductor, 27 mH	C130, 230	1-105-679-51	0.033 50 V mylar
L301	1-407-198-21	micro inductor, 2.2 mH	C131, 231	1-105-667-51	0.0033 50 V mylar
L302	1-407-198-21	micro inductor, 2.2 mH	C132, 232		
L303	1-431-038-21	dummy, 1 mH	C133, 233		
<u>TRANSFORMERS</u>					
T101, 201	1-427-299	output	C134, 234	1-107-123-51	47 p 50 V silvered mica
T301	1-441-864	power	C135, 235	1-105-661-51	0.001 50 V mylar
T302	1-433-140	bias osc.	C136, 236	1-121-398-51	10 25 V elect
<u>CAPACITORS</u>					
All capacitors are microfarads unless otherwise noted. (p = $\mu\mu\text{F}$, elect = electrolytic)					
C101, 201			C137, 237	1-121-420-51	220 10 V elect
C102, 202			C138, 238	1-121-398-51	10 25 V elect
C103, 203	1-121-410-51	47 25 V elect	C139, 239	1-121-398-51	10 25 V elect
C104, 204	1-127-022-11	0.47 10 V elect	C140, 240	1-121-391-51	1 50 V elect
C105, 205	1-121-398-51	10 25 V elect	C141, 241		
C106, 206			C154, 254		
C107, 207	1-127-023-11	1 10 V elect	C155, 255	1-121-402-51	33 10 V elect
C108, 208	1-105-661-51	0.001 50 V mylar	C156, 256	1-121-420-51	220 10 V elect
C109, 209	1-121-398-51	10 25 V elect	C157, 257		
C110, 210	1-121-420-51	220 10 V elect	C158, 258	1-107-139-51	220 p 50 V silvered mica
C111, 211	1-121-398-51	10 25 V elect	C159, 259	1-107-139-51	220 p 50 V silvered mica
C112, 212	1-121-395-51	4.7 25 V elect	C160, 260	1-105-661-51	0.001 50 V mylar
C113, 213	1-105-677-51	0.022 50 V mylar	C161, 261	1-121-398-51	10 25 V elect
			C162, 262	1-107-123-11	47 p 50 V silvered mica
			C163, 263	1-107-123-11	47 p 50 V silvered mica
			C164, 264	1-107-123-11	47 p 50 V silvered mica
			C301	1-117-034-23	1.5 250 V MP
			C302	1-121-810-11	470 50 V elect
			C303	1-121-411-51	47 50 V elect
			C304	1-121-411-51	47 50 V elect
			C305	1-121-423-51	220 50 V elect
			C306	1-121-423-51	220 50 V elect
			C307	1-107-123-11	47 p 50 V silvered mica
			C308	1-105-679-12	0.033 50 V mylar
			C309	1-105-672-12	0.0082 50 V mylar
			C310	1-121-738-51	10 50 V elect
			C311	1-107-221-11	560 p 1500 V silvered mica
			C312	1-129-702-11	0.001 630 V polypropylene film
			C313	1-107-188-51	620 p 500 V silvered mica
			C314		

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C315			
C316	1-105-679-51	0.033	50 V mylar
<u>RESISTORS</u>			
All resistors are ¼W, carbon type unless otherwise noted.			
R101, 201			
R102, 202			
R103, 203	1-242-681-51	2.2 kΩ	
R104, 204			
R107, 207			
R108, 208	1-242-733-71	330 kΩ	low noise
R109, 209	1-242-708-71	30 kΩ	low noise
R110, 210	1-242-709-71	33 kΩ	low noise
R111, 211	1-242-649-51	100 Ω	
R112, 212	1-244-697-51	10 kΩ	
R113, 213	1-222-676	20 kΩ (A)	variable (LINE VOLUME)
R114, 214	1-222-676	10 kΩ (A)	variable (MIC VOLUME)
R115, 215	1-242-717-51	68 kΩ	
R116, 216	1-242-709-51	33 kΩ	
R117, 217	1-242-679-51	1.8 kΩ	
R118, 218	1-242-671-51	820 kΩ	
R119, 219	1-242-615-51	3.9Ω	
R120, 220	1-222-701	10 kΩ (B)	semi-fixed (MONITOR LEVEL ADJ)
R121, 212	1-242-709-51	33 kΩ	
R122, 222	1-242-693-51	6.8 kΩ	
R123, 223	1-242-679-51	1.8 kΩ	
R124, 224	1-242-663-51	390 Ω	
R125, 225	1-242-681-51	2.2 kΩ	
R126, 226	1-242-675-51	1.2 kΩ	
R127, 227	1-242-643-51	56 Ω	
R128, 228	1-242-643-51	56 Ω	
R129, 229	1-242-642-51	51 Ω	
R130, 230	1-242-649-51	100 Ω	
R131, 231	1-242-673-71	1 kΩ	low noise
R132, 232	1-242-737-71	470 kΩ	low noise
R133, 233	1-242-708-71	30 kΩ	low noise
R134, 234	1-242-717-71	68 kΩ	low noise
R135, 235	1-242-657-51	220 Ω	
R136, 236	1-242-641-51	47 Ω	
R137, 237	1-242-671-51	820 Ω	
R138, 238	1-242-713-51	47 kΩ	low noise
R139, 239	1-242-713-51	47 kΩ	
R140, 240	1-242-689-51	4.7 kΩ	
R141, 241	1-242-681-51	2.2 kΩ	
R142, 242	1-242-725-51	150 kΩ	
R143, 243	1-221-978	4.7 kΩ (B)	semi-fixed (PB EQ ADJ)
R144, 244	1-242-713-71	47 kΩ	low noise
R145, 245	1-242-679-51	1.8 kΩ	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R146, 246			
R149, 249			
R150, 250	1-221-978	4.7 kΩ (B)	semi-fixed (PB LEVEL ADJ)
R151, 251	1-242-721-51	100 kΩ	
R152, 252	1-242-701-51	15 kΩ	
R153, 253	1-242-677-51	1.5 kΩ	
R154, 254	1-242-663-51	390 Ω	
R155, 255	1-242-654-51	160 Ω	
R156, 256	1-242-669-51	680 Ω	
R157, 257	1-242-701-51	15 kΩ	
R158, 258	1-242-681-51	2.2 kΩ	
R159, 259	1-221-978	4.7 kΩ (B)	semi-fixed (METER LEVEL ADJ)
R160, 260	1-242-685-51	3.3 kΩ	
R178, 278	1-244-699-51	12 kΩ	
R179, 279			
R187, 287			
R188, 288	1-242-745-51	1 MΩ	
R189, 289			
R193, 293			
R194, 294	1-244-689-51	4.7 kΩ	
R195, 295	1-242-705-51	22 kΩ	
R196, 296		82 kΩ	
R197, 297	1-242-681-51	2.2 kΩ	
R198, 298	1-242-709-51	33 kΩ	
R199, 299	1-242-697-71	10 kΩ	low noise
R301	1-242-709-51	33 kΩ	
R302	1-242-709-51	33 kΩ	
R303	1-242-647-51	82 Ω	
R304	1-242-647-51	82 Ω	
R305	1-209-216-21	270 Ω	1W
R306	1-242-711-51	39 kΩ	
R307	1-242-625-51	10 Ω	
R308	1-242-625-51	10 Ω	
R309	1-242-617-51	4.7 Ω	

SWITCHES

S101, 201			
S102, 202	1-514-813	slide,	EQUALIZER
S103, 203	1-514-813	slide,	EQUALIZER
S104, 204	1-514-324	lead,	TAPE SELECT
S105, 205			
S106, 206	1-514-415	lead,	MONITOR
S107, 207	1-514-856	slide,	RECORD
S108, 208	1-514-548	rotary,	MUTING
S109, 209			
S110, 210			
S301	1-514-306-42	seesaw,	POWER
S302	1-514-079	micro,	AUTO SHUT-OFF
S303	1-514-548	rotary,	BIAS

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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JACKS

J101, 201	1-507-142	mini, MIC
J102, 202	1-507-142	2P phono, LINE IN
J103, 203	1-507-142	2P phono, LINE OUT
J301	1-507-282	binaural, HEADPHONE

MISCELLANEOUS

CP301	1-231-057-31	encapsulated component C-R $0.033 \mu + 120 \Omega$
CP302	1-101-534-31	encapsulated component C-R $0.1 \mu + 120 \Omega$
PL301	1-518-093	lamp
ME101,201	1-524-051-41	meter, LEVEL
R.H101,201	8-824-129-20	head, record; $45 \Omega/1 \text{ kHz}$ (RP30 - 2902)
E.H101,201	8-826-629-25	head, erase; $160 \Omega/160 \text{ kHz}$ (EF18 - 2902A-1)
P.H101,201	8-829-142-20	head, playback; $1 \text{ k}\Omega/1 \text{ kHz}$ (PP102 - 4202)
M	8-832-624-22	motor (IC624H1)
	1-534-538-21	cord, ac
	1-536-146	terminal strip, 1 L1; small

SUPPLEMENT

No. 1
July, 1972

SUBJECT: PRODUCTION CHANGE OF CIRCUIT
APPLICABLE SERIAL NO.: 10,601 and later

This supplement updates the service manual to include production changes starting with serial number 10,601 and later.

File this supplement with the service manual.

CAPACITORS

On Page 31

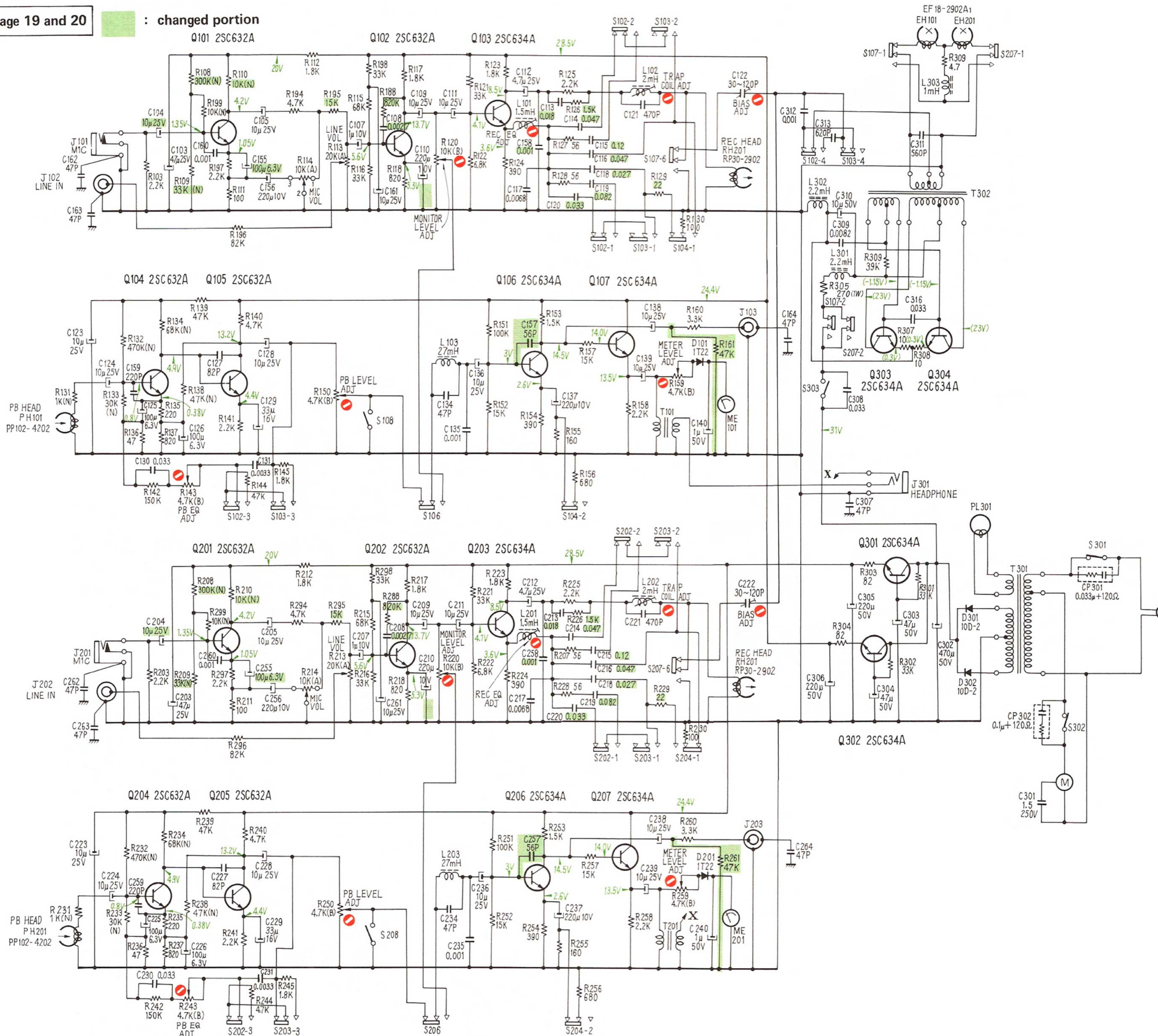
<u>Ref. No.</u>	<u>Former</u>		<u>New</u>	
	<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
C104, 204	1-127-022-11	0.47 μ F 10 V electrolytic	1-121-398-11	10 μ F 25 V electrolytic
C108, 208	1-105-661-51	0.001 μ F 50 V mylar	1-105-666-12	0.0027 μ F 50 V mylar
C113, 213	1-105-677-51	0.022 μ F 50 V mylar	1-105-676-12	0.018 μ F 50 V mylar
C114, 214	1-105-678-51	0.027 μ F 50 V mylar	1-105-681-12	0.047 μ F 50 V mylar
C115, 215	1-105-684-51	0.082 μ F 50 V mylar	1-105-686-12	0.12 μ F 50 V mylar
C116, 216	1-105-678-51	0.027 μ F 50 V mylar	1-105-681-12	0.047 μ F 50 V mylar
C118, 218	1-105-675-51	0.015 μ F 50 V mylar	1-105-678-12	0.027 μ F 50 V mylar
C119, 219	1-105-681-51	0.047 μ F 50 V mylar	1-105-684-12	0.082 μ F 50 V mylar
C120, 220	1-105-674-51	0.012 μ F 50 V mylar	1-105-679-12	0.033 μ F 50 V mylar
C155, 255	1-121-402-51	33 μ F 10 V electrolytic	1-121-413-11	100 μ F 6.3 V electrolytic
C157, 257	-----	-----	1-107-125-11	56 PF 50 V silvered mica
C158, 258	1-107-139-51	220 PF 50 V silvered mica	1-105-661-12	0.001 μ F 50 V mylar

RESISTORS

On Page 32

<u>Ref. No.</u>	<u>Former</u>		<u>New</u>	
	<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
R108, 208	1-242-733-71	330 k Ω (N)	1-242-732-09	300 k Ω (N)
R109, 209	1-242-708-71	30 k Ω (N)	1-242-709-09	33 k Ω (N)
R110, 210	1-242-709-71	33 k Ω (N)	1-242-697-09	10 k Ω (N)
R119, 219	1-242-615-51	3.9 Ω	-----	-----
R126, 226	1-242-675-51	1.2 k Ω	1-242-677-11	1.5 k Ω
R129, 229	1-242-642-51	51 Ω	1-242-633-11	22 Ω
R161, 261	-----	-----	1-242-713-11	47 k Ω
R188, 288	1-242-745-51	1 M Ω	1-242-753-11	820 k Ω
R195, 295	1-242-705-51	22 k Ω	1-242-701-11	15 k Ω

On page 19 and 20 : changed portion



Note:

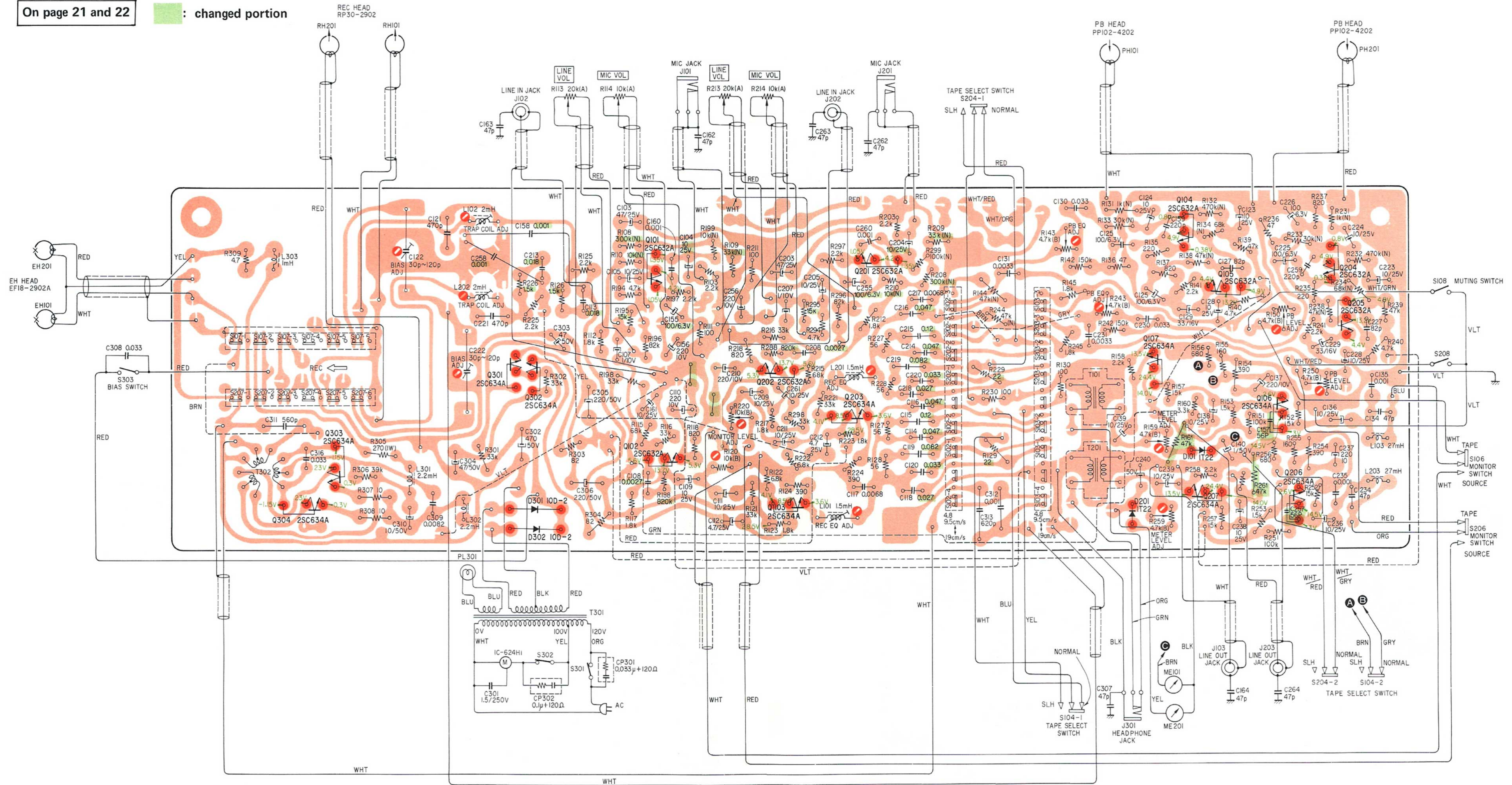
1. All resistors and capacitors are rated in Ω and μF , unless otherwise specified.
2. The letter (A), (B) or (C) suffixed to rating value of variable or semi-fixed resistor indicates its characteristics.
3. Voltage values shown are measured with a voltmeter (20 $k\Omega/V$) in playback mode. Voltage values in () are measured in record mode. Variations may be noted because of normal production tolerances.

4. Switch mode:

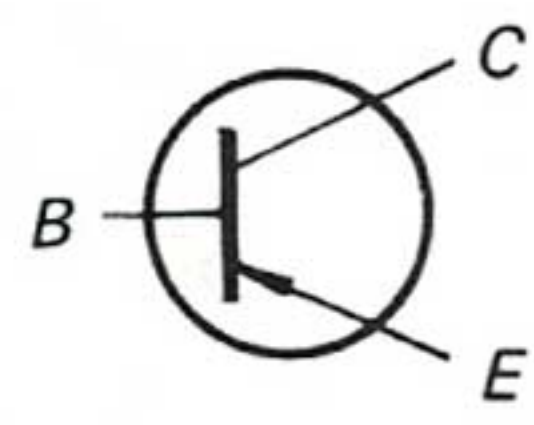
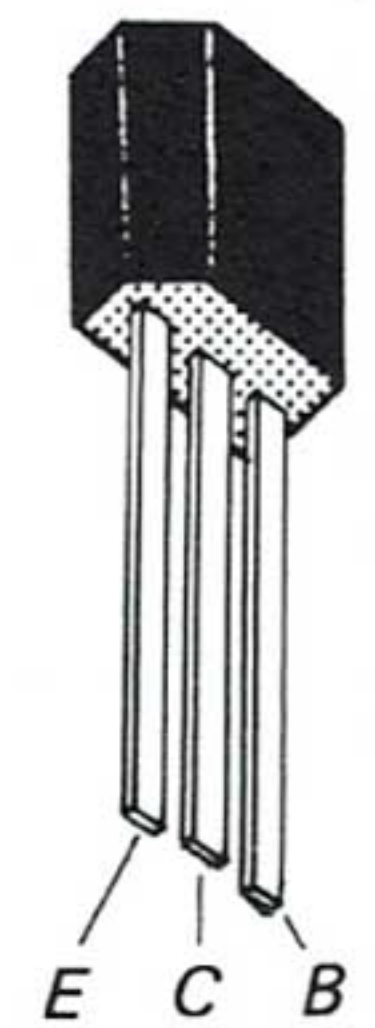
Ref. No.	Switch	Mode
S102, 202 S103, 203	equalizer switch	19 cm/sec (7 1/2 ips)
S104, 204		
S106, 206	MONITOR switch	TAPE
S107, 207	record switch	record
S108, 208	muting switch	off
S301	POWER switch	ON
S302	auto shut off switch	on
S303	bias switch	off

On page 21 and 22

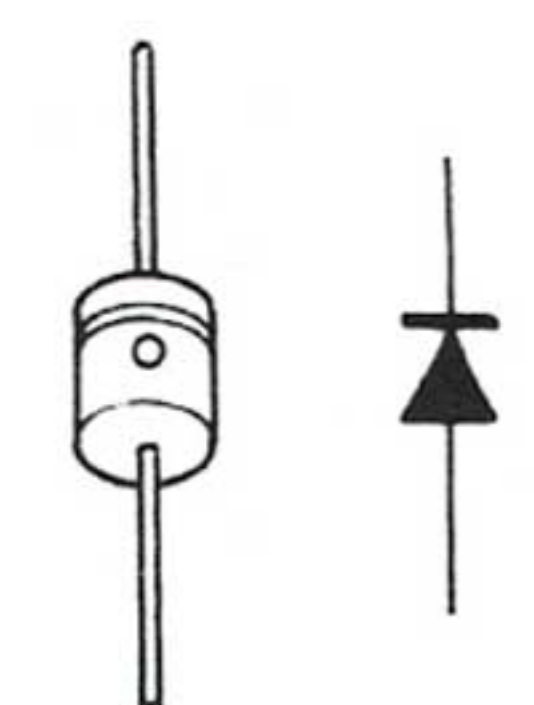
: changed portion



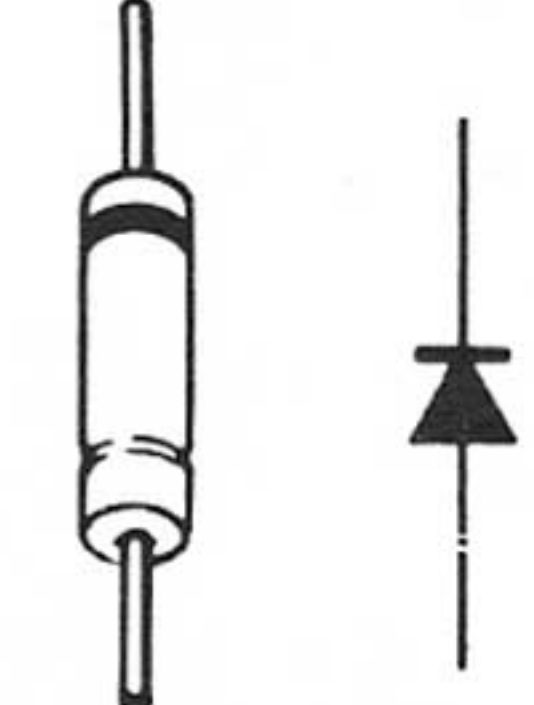
- 2SC632A
- 2SC634A
- Q101, 102, 103, 104
- 105, 106, 107
- 201, 202, 203, 204
- 205, 206, 207
- 301, 302, 303, 304



10D-2
D301, 302



1T22
D101, 201



SONY CORPORATION

2G0528-1

Printed in Japan