TC-353D

USA Model

ISO

Set using ISO screws

SPECIFICATIONS

Power Requirements: AC 120 V, 60 Hz, 35 W

Track System: 4 track, 2 channel stereo

Reel Size: 7" (17.8 cm) maximum

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)

Frequency Response:
With SONY SLH tape
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)
With standard tape
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)

Signal-to-Noise Ratio: 55 dB or better (with SONY SLH tape)
52 dB or better (with standard tape)

Flutter and Wow: 0.12 % WRMS at 7 1/2 ips (19 cm/s)

Recording Bias Frequency: Approx. 160 kHz

Inputs:
MIC jack x 2
Impedance: low impedance
Maximum sensitivity: 0.2 mV (−72 dB)
AUX IN jack x 2
Impedance: 560 kΩ
Maximum sensitivity: 0.06 V (−22 dB)

Outputs:
LINE OUT jack x 2
Load impedance: 10 kΩ or more
Output level: 0.775 V (0 dB) with 100 kΩ load
HEADPHONE jack x 1
Load impedance: 8 Ω
Output level: 30.8 mV (−28 dB)

Semiconductors: 18 transistors and 4 diodes

Dimensions: 15 3/8 (W) x 7 7/8 (H) x 13 3/8" (D)
(390 x 199 x 340 mm)

Weight: 16 lb 9 oz (7.5 kg)

SONY®
SERVICE MANUAL

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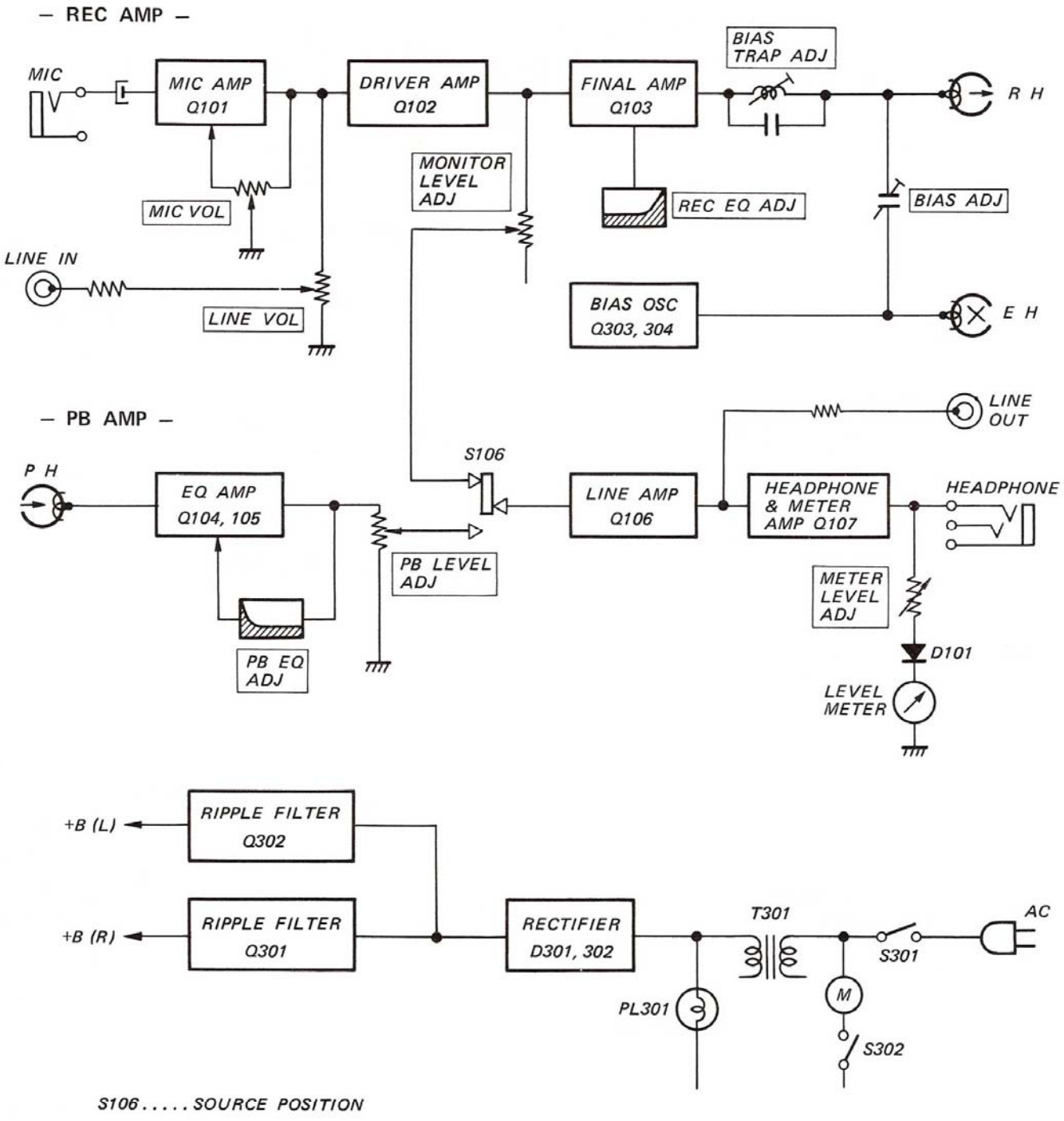
When ordering replacement parts, you should use PART NUMBER listed on the Parts Lists or shown in the EXPLODED VIEW. The reference number should not be used for ordering purposes.

SECTION 1

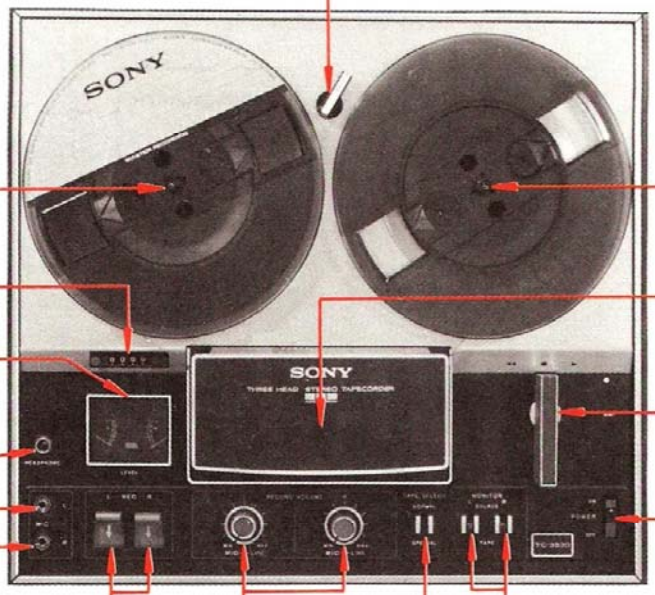
OUTLINE

1-1. BLOCK DIAGRAM



1-2. MAJOR PARTS LOCATION

Cabinet — Top View —



X-34580-22
knob ass'y, speed selector

X-35112-01
reel table ass'y (B), supply

X-35112-02
reel table ass'y (B), take-up

Y-20410-22-1
counter, tape index

X-34860-04-2
cover ass'y, head

1-524-051-41
meter, level; stereo
(ME101, 201)

X-34860-24
knob ass'y, function selector

1-507-282
jack, binaural; HEADPHONE
(J301)

1-514-306-42
switch, seesaw; POWER (S301)

1-507-251
jack, mini; MIC (J101,201)

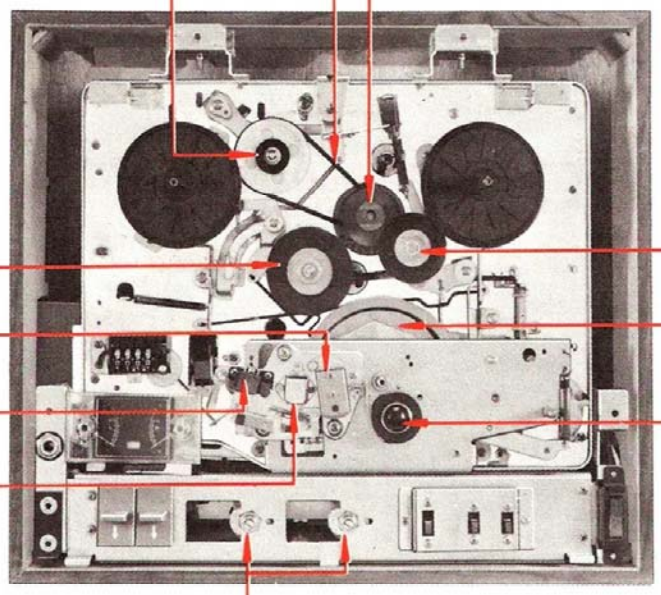
3-472-262
button, RECORD

X-35230-01
knob ass'y, LINE VOLUME

1-514-415
switch, slide; MONITOR (S106,206)

1-514-324
switch, slide; TAPE SELECT (S104, 204)

Chassis — Top View —



3-431-139
belt, rewind

X-34860-18
pulley ass'y, rewind

3-511-101-01
(mark 2) pulley, motor; 60Hz
3-511-101-11
(mark 3)
3-511-101-21
(mark 4)
3-511-101-31
(mark 5)
3-511-101-41
(mark 6)

X-34720-33
idler ass'y, capstan

X-34600-11
idler ass'y, take-up

8-829-142-20
head, playback (PP102-4202)

X-35110-03
flywheel ass'y

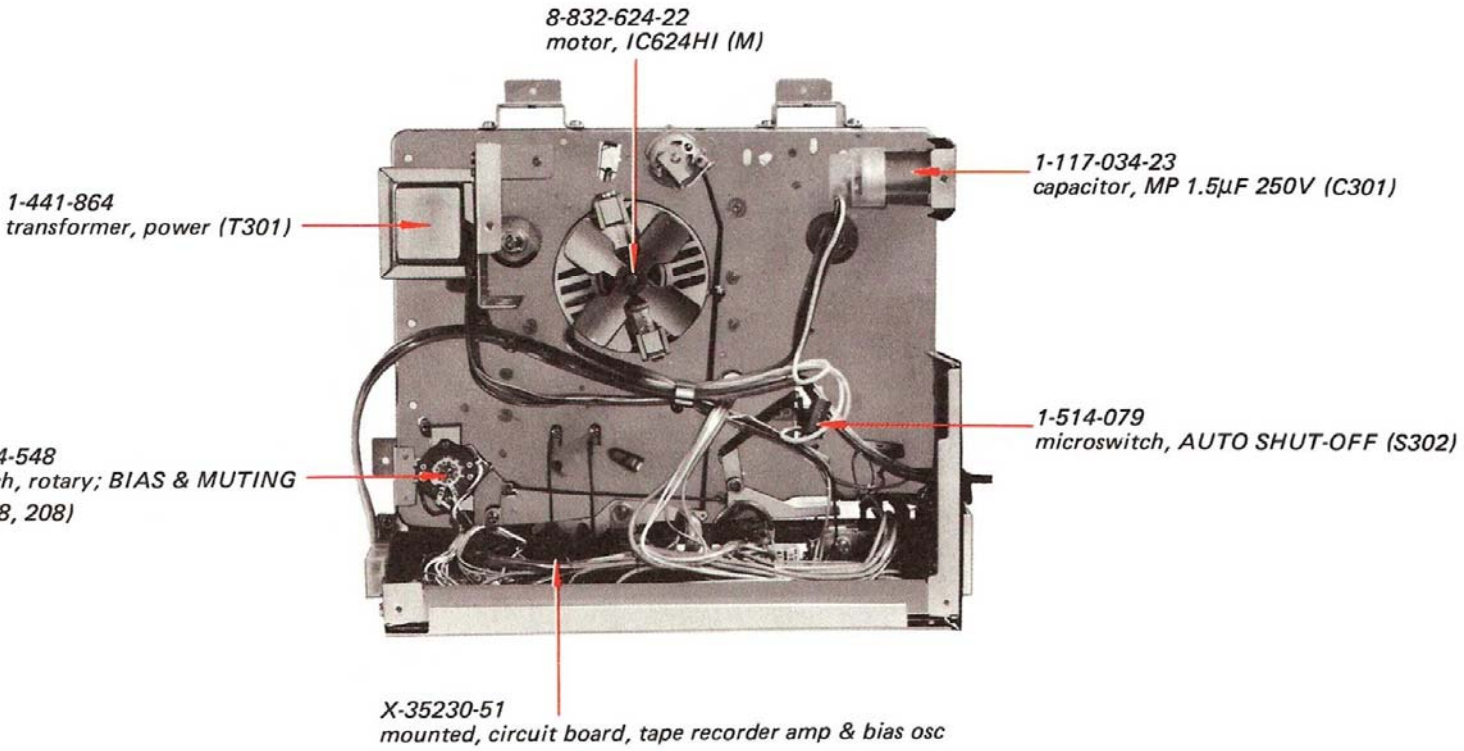
8-826-629-25
head, erase (EF18-2902A-1)

3-421-086
pinch roller

8-824-129-20
head, record (RP30-2902)

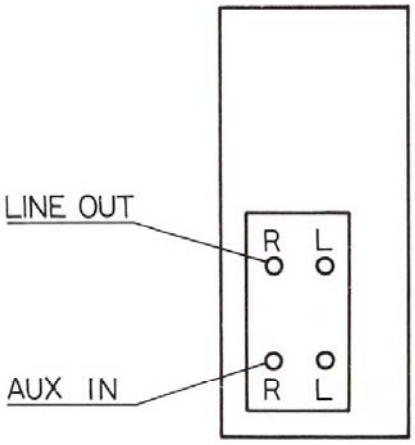
1-222-676
resistor, variable; 10kΩ(A), 20kΩ(A)
(MIC VOLUME R114,R214) (LINE VOLUME R113,R213)

Chassis — Bottom View —

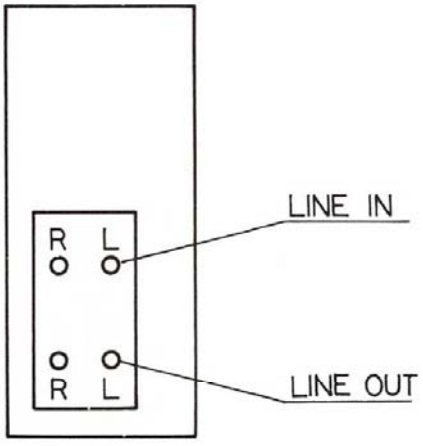


Jack Panel

Serial No. 10,001 ~ 12,999

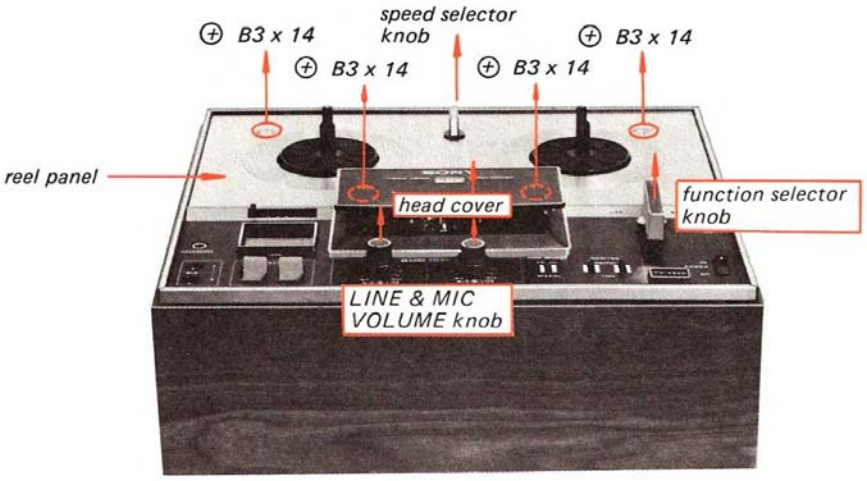


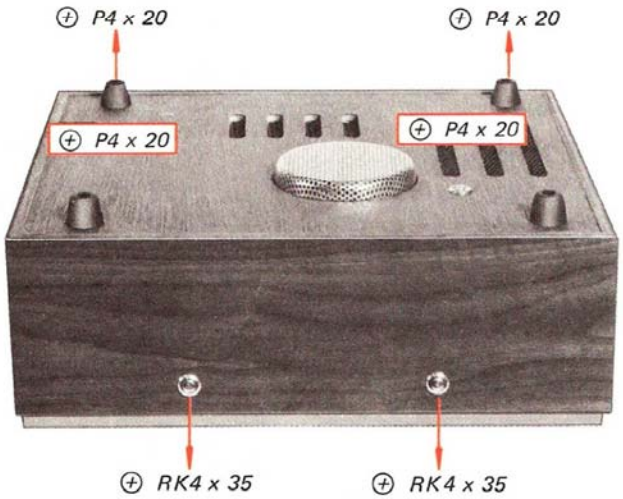
Serial No. 13,101 and later



SECTION 2

DISASSEMBLY

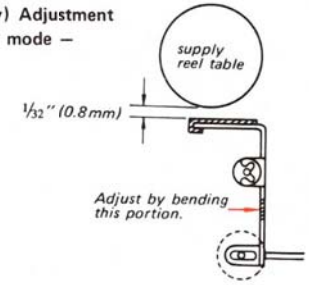




SECTION 3
ADJUSTMENT PROCEDURES

3-1. MECHANICAL ADJUSTMENTS

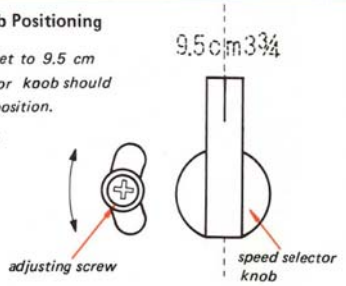
Brake (Supply) Adjustment
— in FF mode —



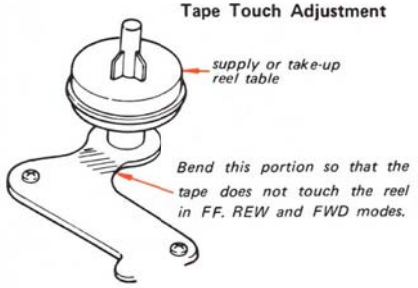
Speed Selector Knob Positioning

When tape speed is set to 9.5 cm 3 3/4", speed selector knob should point 9.5 cm 3 3/4" position.

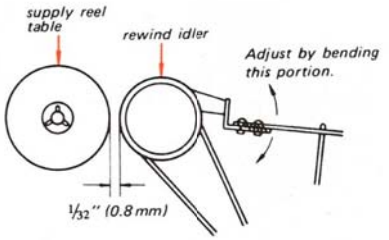
If necessary, adjust by adjusting screw.



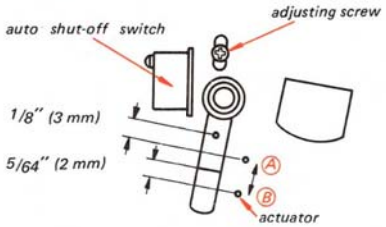
Tape Touch Adjustment



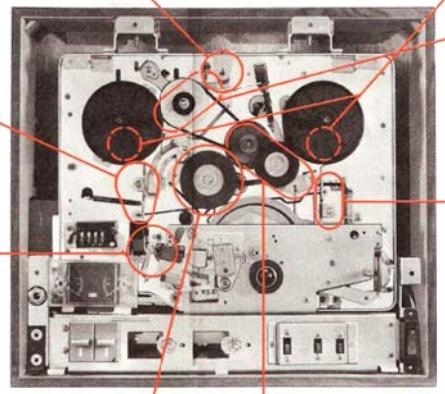
Rewind Idler Adjustment
in STOP mode



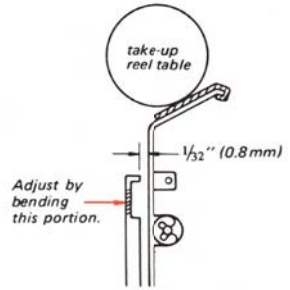
Actuator Adjustment



When actuator comes to Ⓐ, auto shut-off switch should be turned ON.
When actuator comes to Ⓑ, auto shut-off switch should be turned OFF.
If necessary, adjust auto shut-off switch position by adjusting screw.

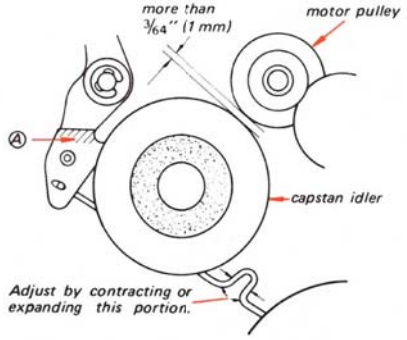


Brake (Take-up) Adjustment
in STOP mode



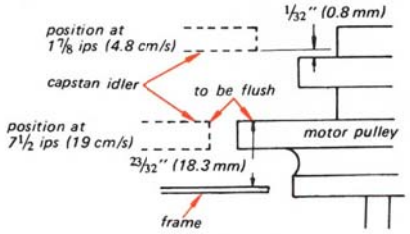
Capstan Idler Position Adjustment
in STOP mode

1. Clearance Adjustment



2. Height Adjustment

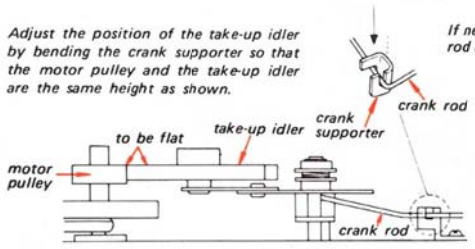
Adjust the portion Ⓐ shown in the figure in the item 1 by bending so that the height of capstan idler at 7 1/2 ips (19 cm/s) and 1 7/8 ips (4.8 cm/s) are as shown.



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

1. Height Adjustment
— in FF mode —

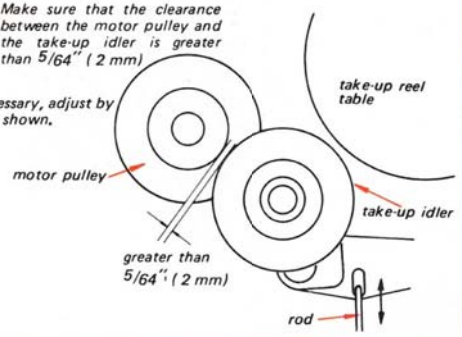
Adjust the position of the take-up idler by bending the crank supporter so that the motor pulley and the take-up idler are the same height as shown.



2. Position Check
— in STOP mode —

Make sure that the clearance between the motor pulley and the take-up idler is greater than 5/64" (2 mm)

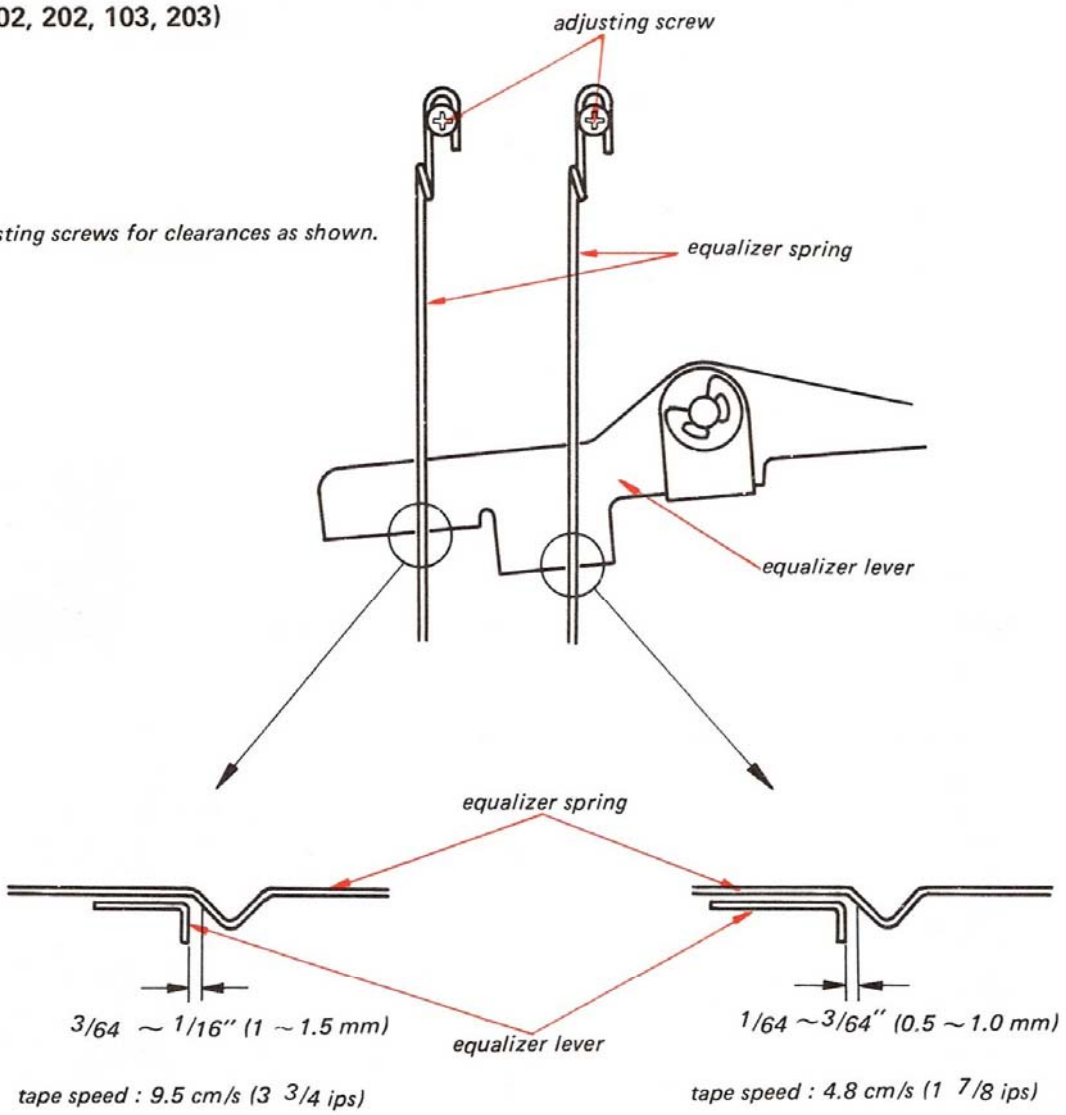
If necessary, adjust by rod as shown.



Equalizer Switch Adjustment.

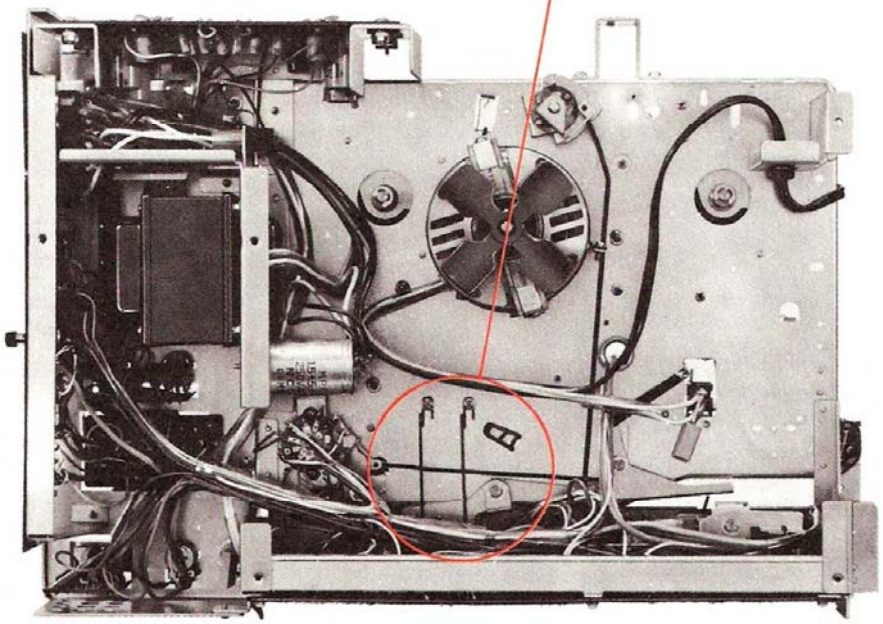
(S102, 202, 103, 203)

Adjust by adjusting screws for clearances as shown.



tape speed : 9.5 cm/s (3 3/4 ips)

tape speed : 4.8 cm/s (1 7/8 ips)



Wow (Flutter) Measurement

Switch Settings

TAPE SELECT Switch : NORMAL
MONITOR Switch : TAPE

Note: When measuring the wow (flutter) at the tape speed 7½ ips (19 cm/s) and 3¾ ips (9.5 cm/s), play back the SONY alignment tapes WS-19-7 and WS-9-7 and at the tape speed of 1⅞ ips (4.8 cm/s), record and play back a SONY blank tape "super 150".

at 7½ ips (19 cm/s) and 3¾ ips (9.5 cm/s)

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

7½ ips (19 cm/s) : Play back the tape WS-19-7.
3¾ ips (9.5 cm/s) : Play back the tape WS-9-7.

at 1⅞ 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	7½ ips (19 cm/s)	0.19% RMS
	3¾ ips (9.5 cm/s)	0.24% RMS
	1⅞ 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 7½ 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 ↑	3-511-101-01
3	↕	3-511-101-11
4	↕	3-511-101-21
5	↕	3-511-101-31
6	↓ smaller	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 1b)

3-2. ELECTRICAL ADJUSTMENTS/ MEASUREMENTS

Preface for the Adjustment

1. 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).
2. The adjustments should be made in numerical order and for both R-CH and L-CH, unless otherwise noted.
3. After the adjustments, apply lock paint to the parts adjusted.
4. 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
   * 1kHz bandpass filter
   * Screwdriver for adjustment
   * SONY SLH tape
5. TAPE SELECT and TAPE SPEED switches should be set as follows unless otherwise specified.

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

6. Rated input and output levels are as follows:

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

7. The following signals are recorded on the alignment tape:

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

8. RECORD VOLUME control should be set as follows:

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) (MONITOR switch: TAPE position).
Step 3. Adjust the R150 (R250) to obtain 0 dB (0.775 V) on the VTVM.

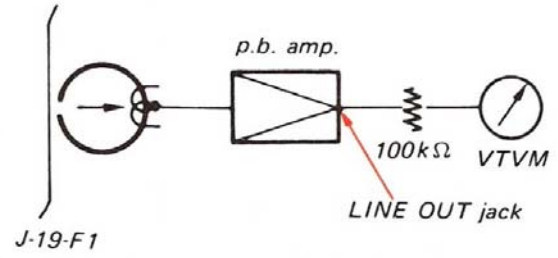


Fig. 3-2-1. RECORD VOLUME control setting

Step 4. Thread a blank tape and place the set in REC mode (MINITOR switch: TAPE position), deliver a 1kHz 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).

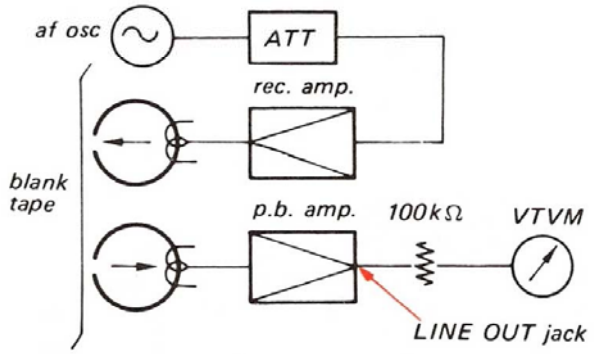


Fig. 3-2-2. RECORD VOLUME control setting

9. Input connection is as follows:

a. in case that balanced attenuator is used

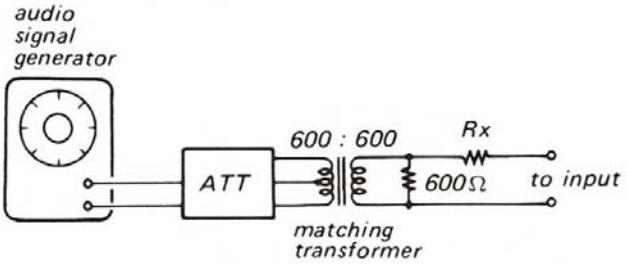


Fig. 3-2-3. Input connection

b. in case that unbalanced attenuator is used

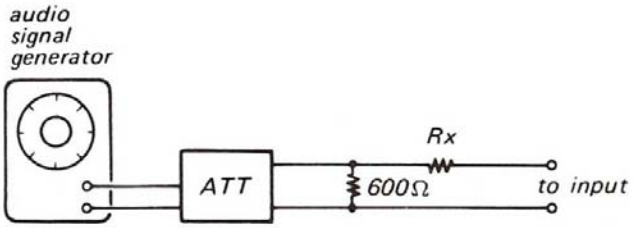


Fig. 3-2-4. Input connection

Input	MIC	LINE IN
Value of Rx	300Ω	10kΩ

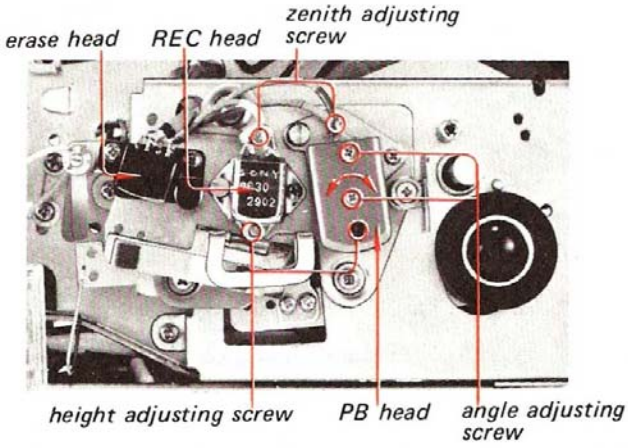


Fig. 3-2-5. Adjusting parts location for the items 2 and 3

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.

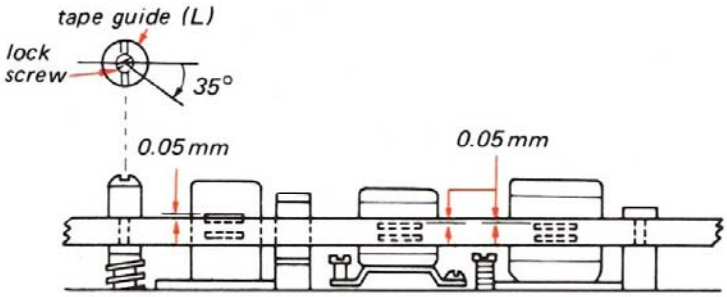


Fig. 3-2-6. Tape path adjustment

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.

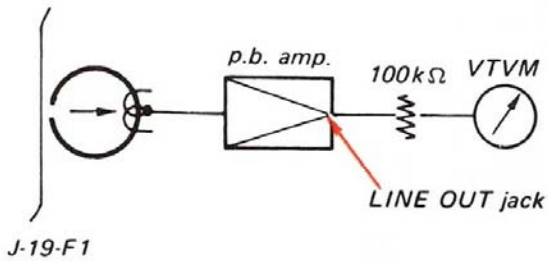


Fig. 3-2-7. Playback head angle adjustment

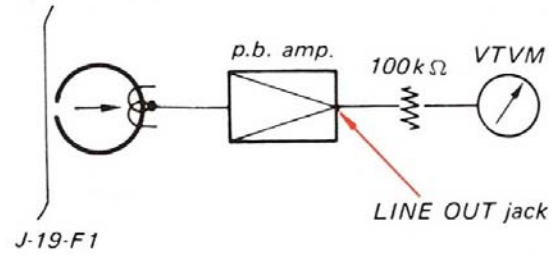


Fig. 3-2-8. Test setup for the items 4, 5 and 6

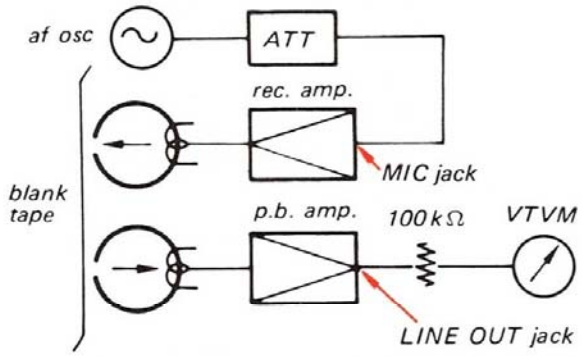


Fig. 3-2-9. Test setup for the items 8,9 and 10

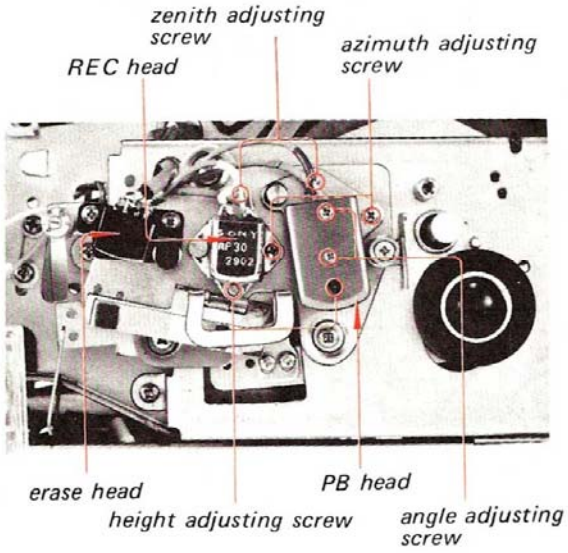


Fig. 3-2-10. Adjusting parts location for the items 4, 8 and 9

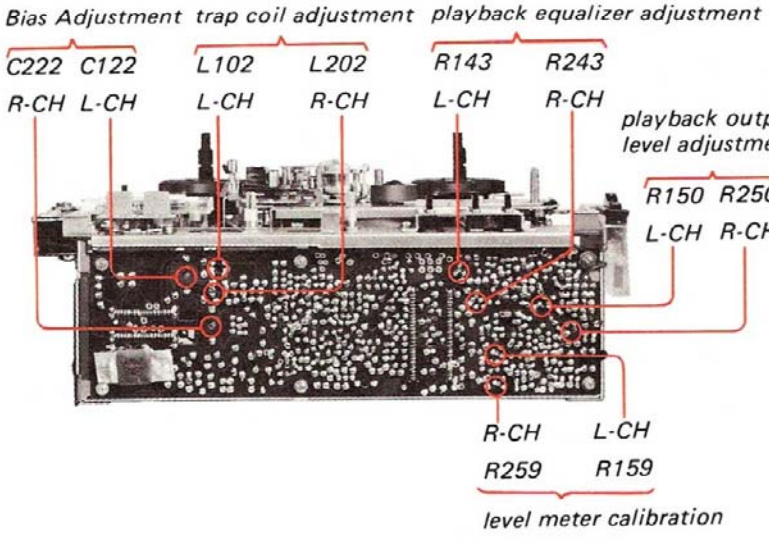


Fig. 3-2-11. Adjusting parts location for the items 5, 6, 7 and 10

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 (10kHz).
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 (0.775V) 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

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

J-19-F1	Tone	4th	5th	6th		7th
	Frequency	10kHz	7kHz	80 Hz		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.

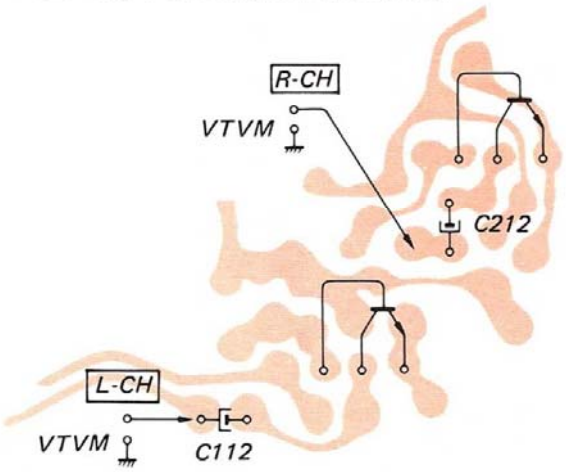


Fig. 3-2-12. Trap coil adjustment

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.

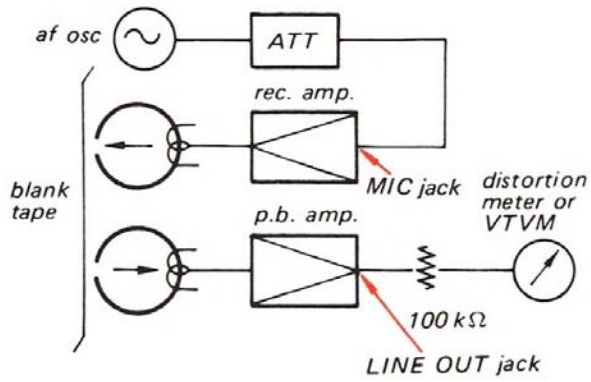


Fig. 3-2-13. Test setup for the items 11, 12, 13, 14 and 15

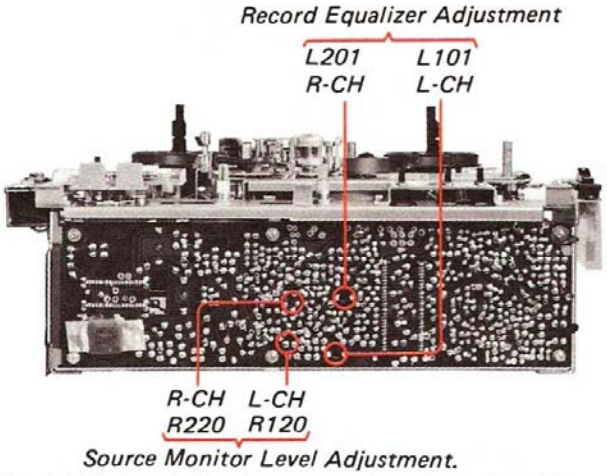


Fig. 3-2-14. Adjusting parts location for the items 11 and 12

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
7½ 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
3¾ ips (9.5 cm/s)	100 Hz	0±3 dB / 0±3 dB
	6 kHz	0±3 dB / 0±3 dB
1⅞ 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 : 7½ 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 : 7½ 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.

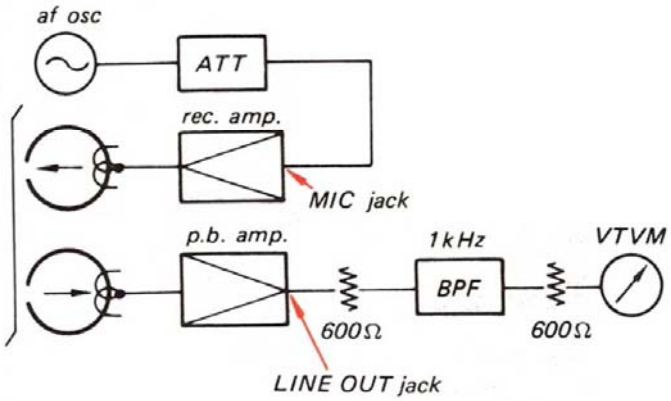


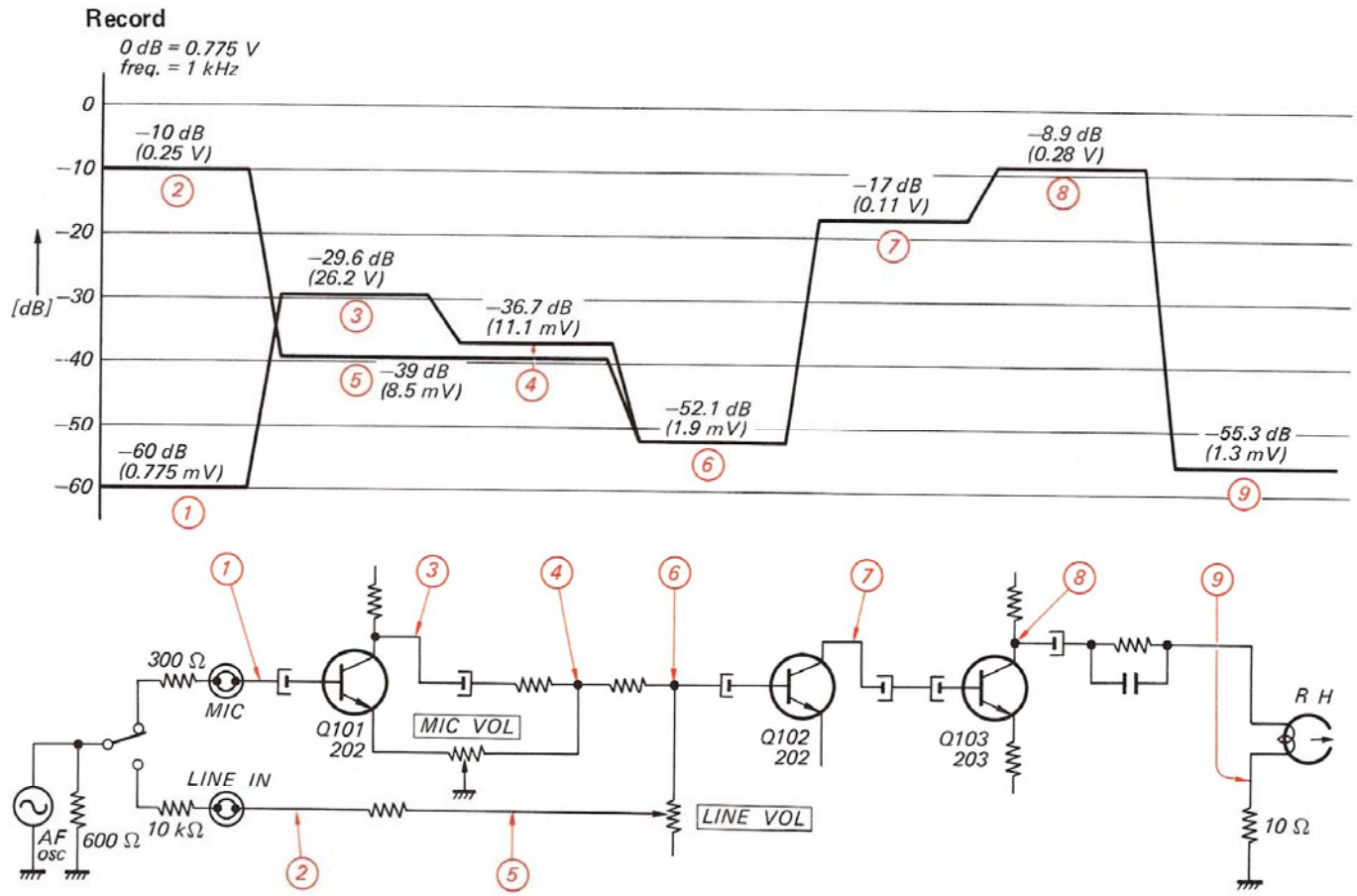
Fig. 3-2-15. Erase ratio measurement

SECTION 4

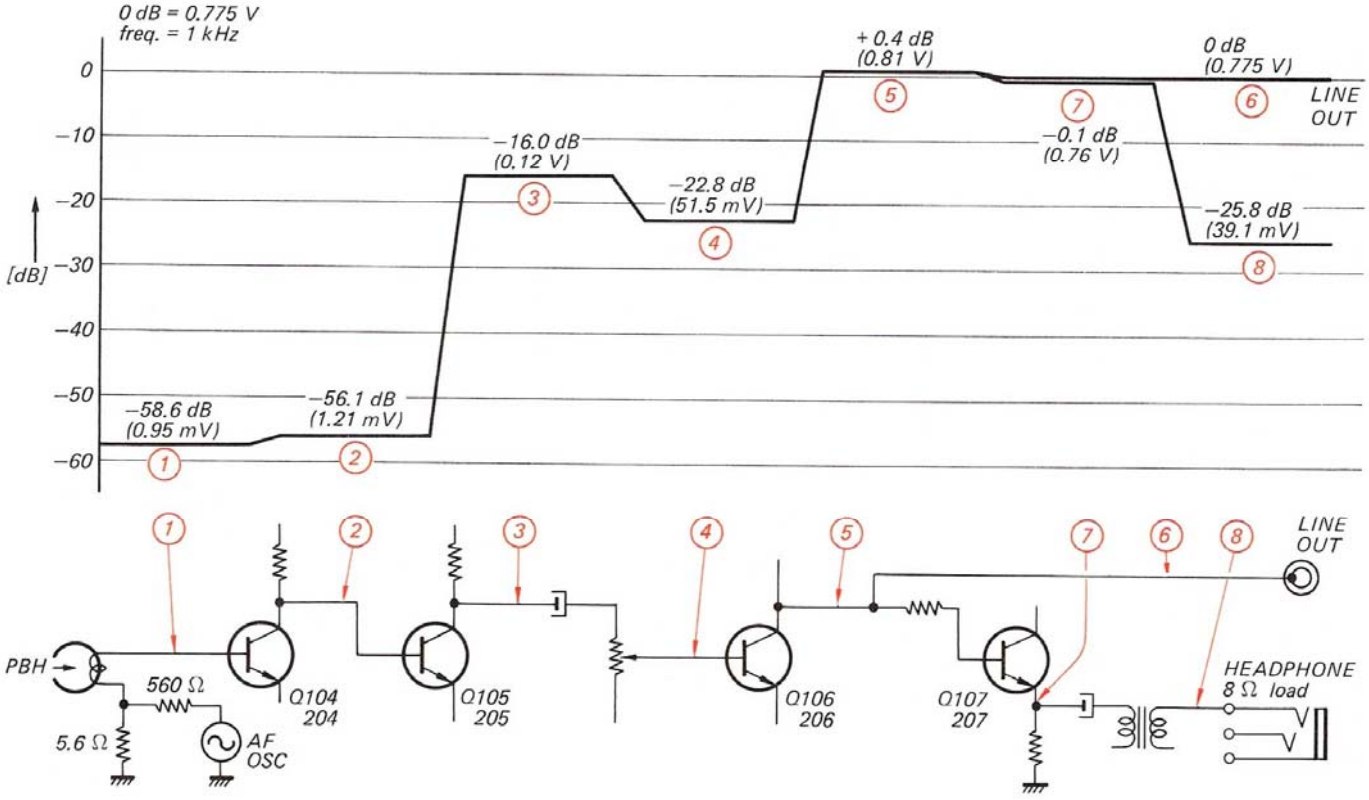
DIAGRAMS

4-1. LEVEL DIAGRAM

Record

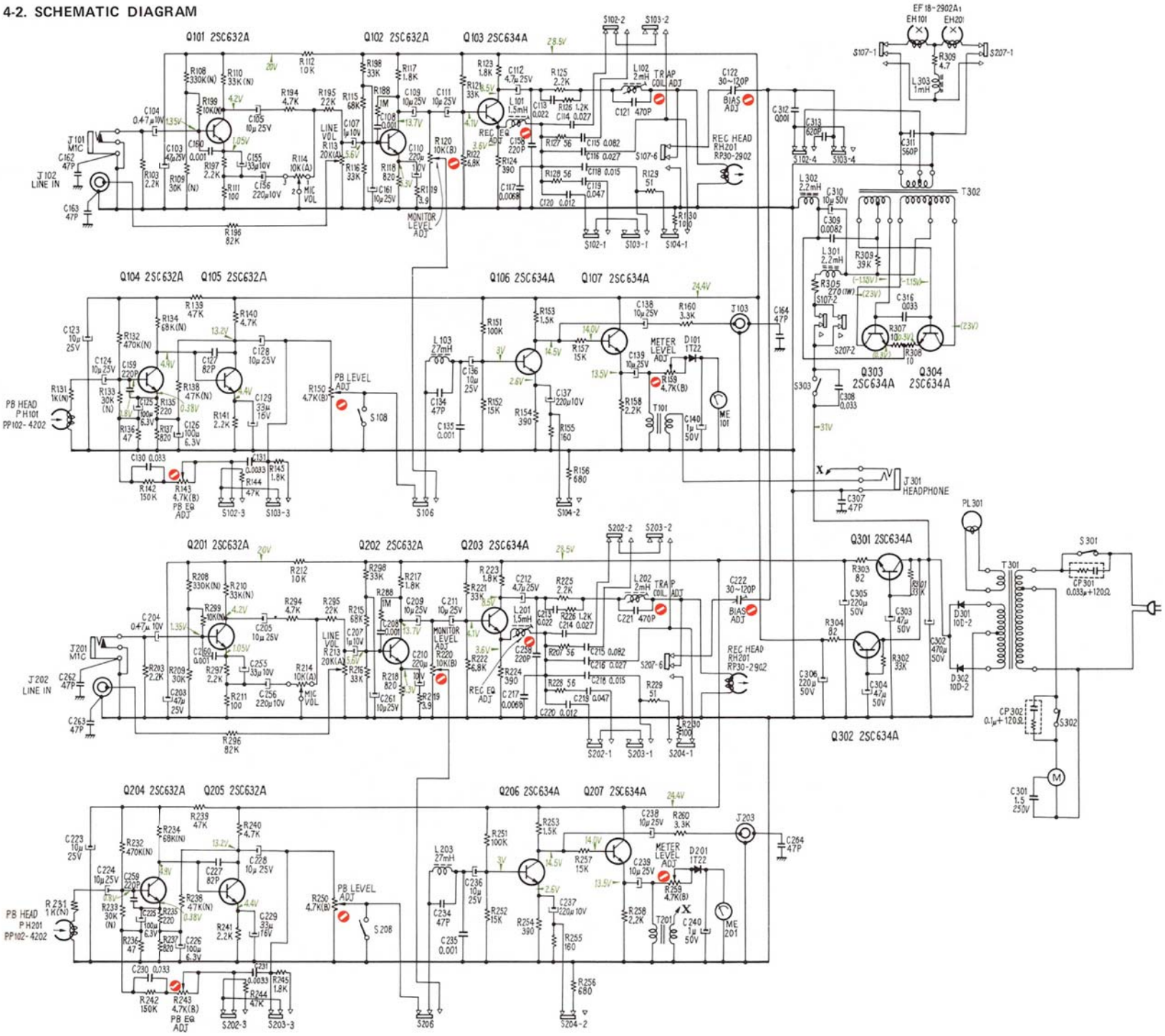


Playback



MEMO

4-2. SCHEMATIC DIAGRAM

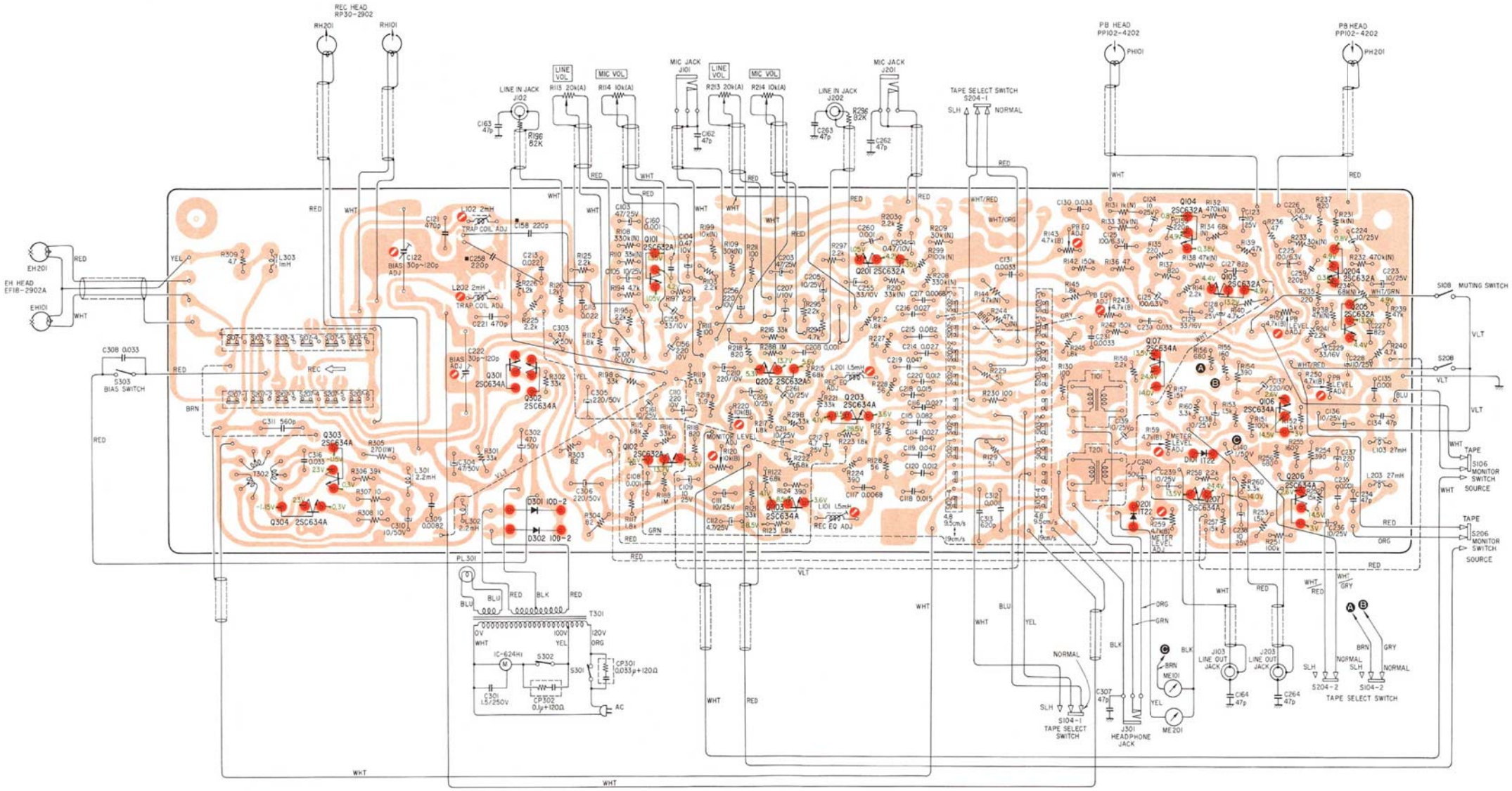


Note:

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 kΩ/V) in playback mode.
   Voltage values in ( ) are measured in record mode.
   Variations may be noted because of normal production tolerances.
4. Switch position

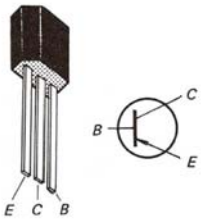
S102, 202 S103, 203	equalizer switch	19 cm/sec (7½ ips)
S104, 204	TAPE SELECT switch	NORMAL
S106, 206	MONITOR switch	TAPE
S107, 207	record switch	on
S108, 208	muting switch	on
S301	POWER switch	ON
S302	auto shut off switch	on
S303	bias switch	off

4-3. MOUNTING DIAGRAM – *Conductor Side* –

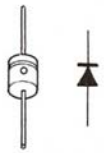


2SC632A
2SC634A

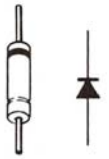
Q101, 102, 103, 104
105, 106, 107
201, 202, 203, 204
205, 206, 207
301, 302, 303, 304



10D-2
D301, 302

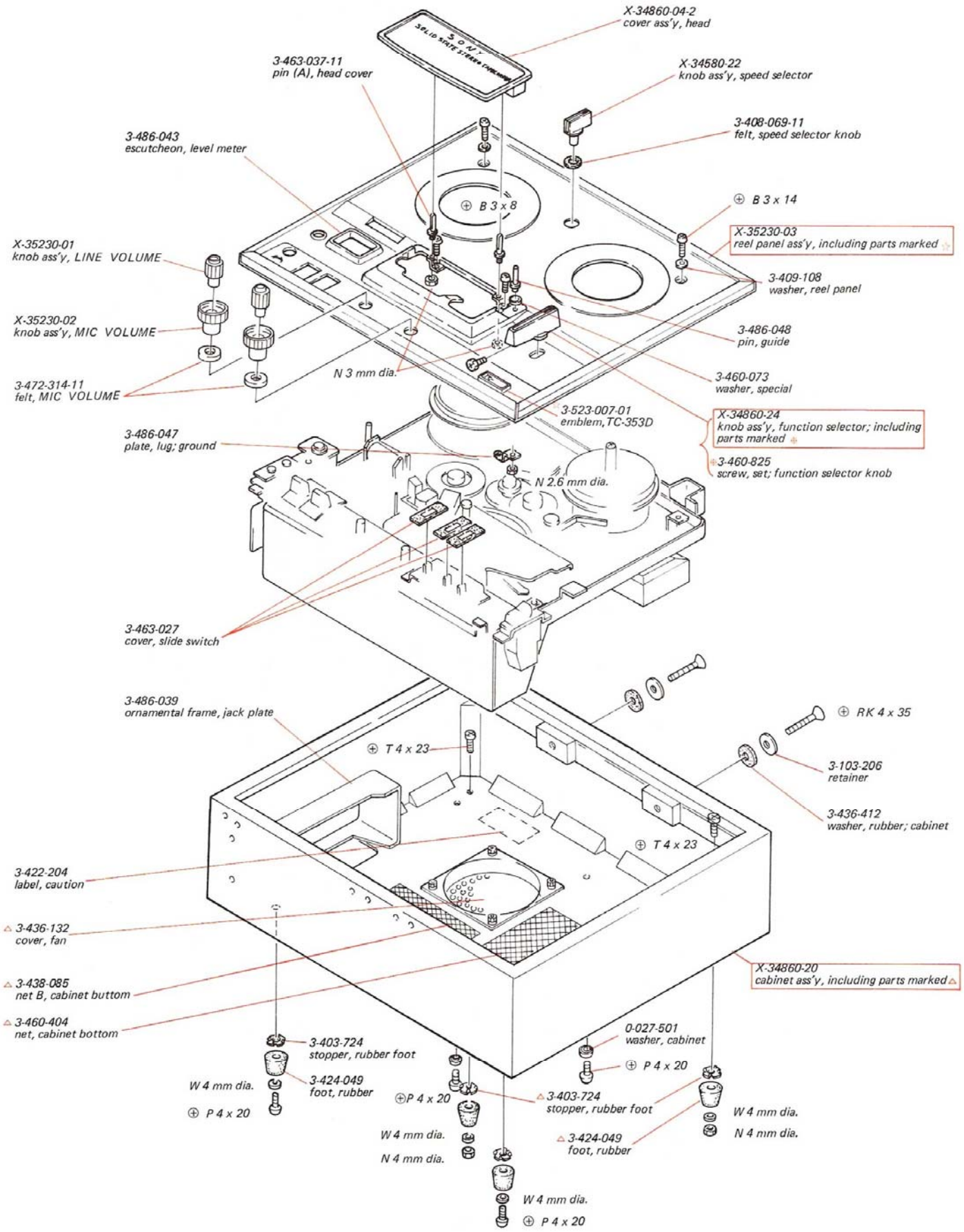


1T22
D101, 201

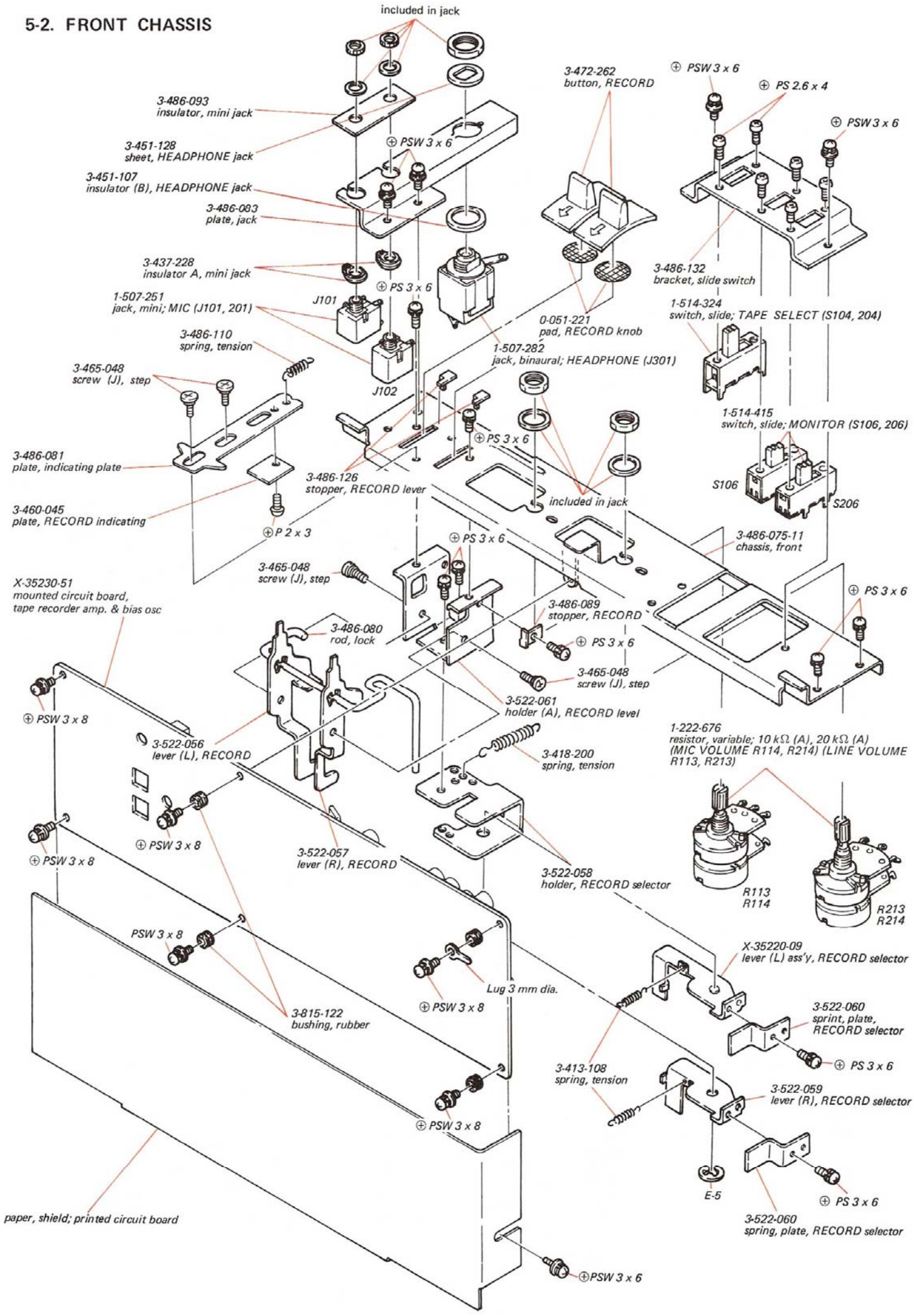


SECTION 5
EXPLODED VIEWS

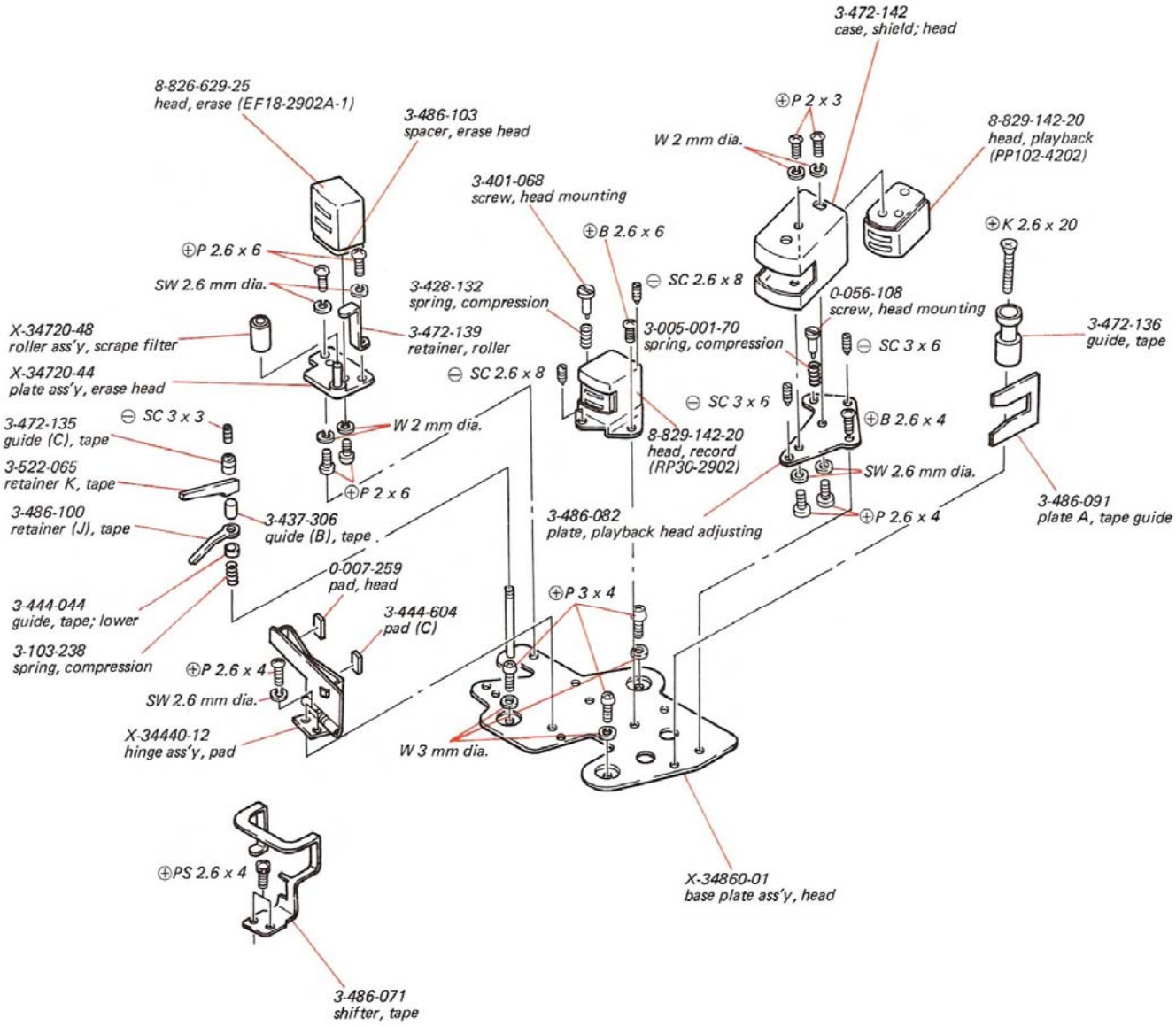
5-1. CABINET – *Top View* –



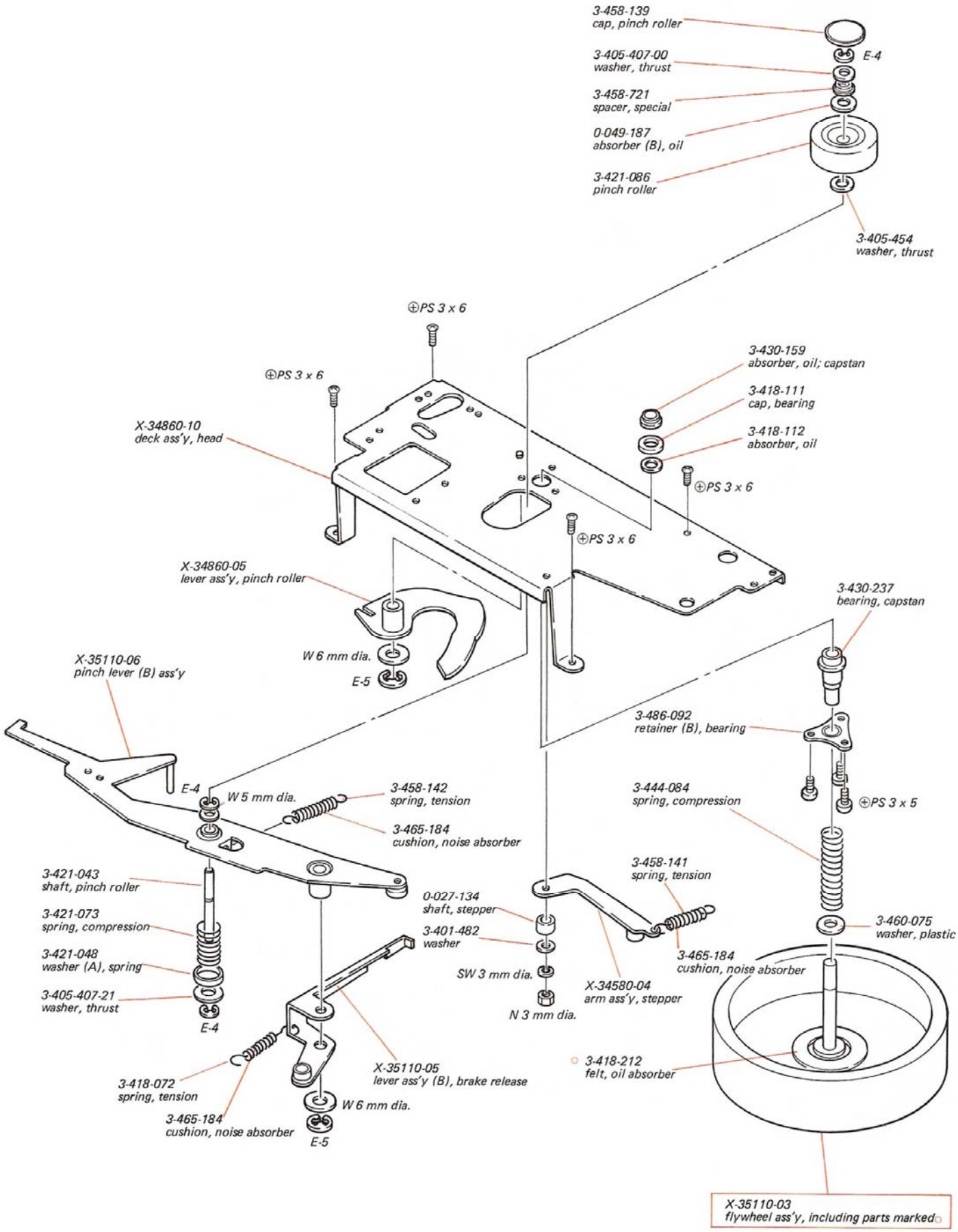
5-2. FRONT CHASSIS

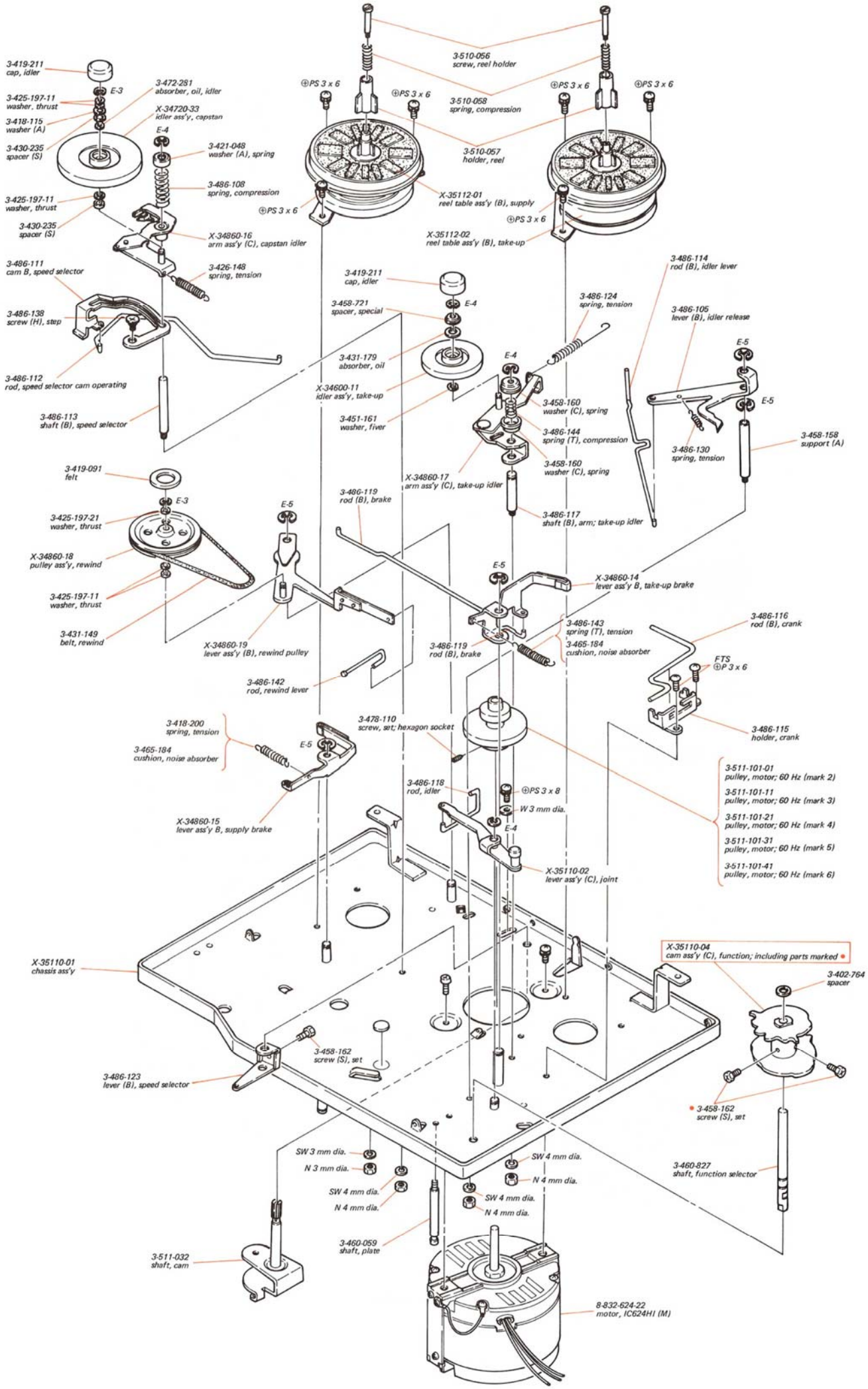


5-3. HEAD DECK – *UPPER* –

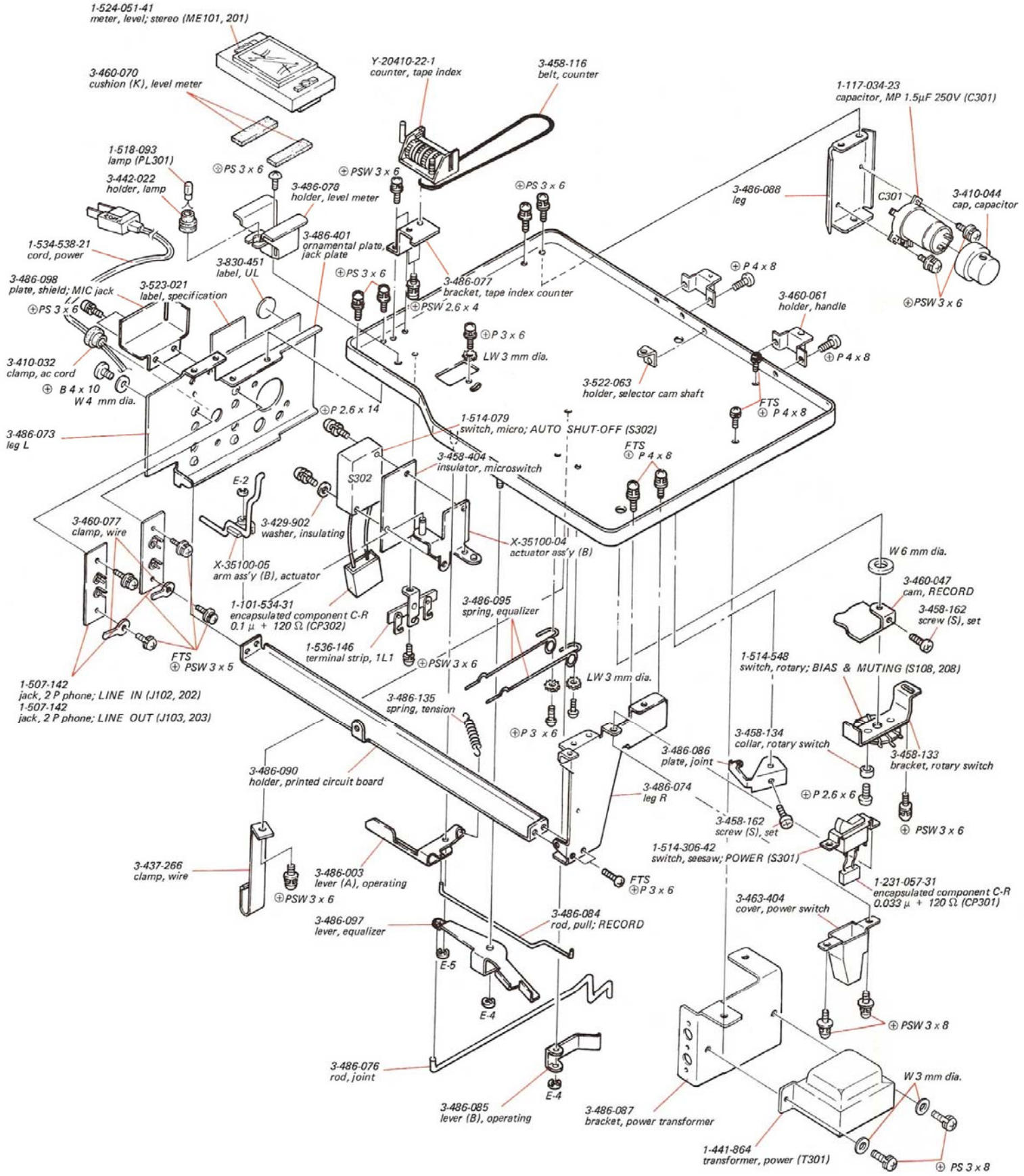


5-4. HEAD DECK – *LOWER* –

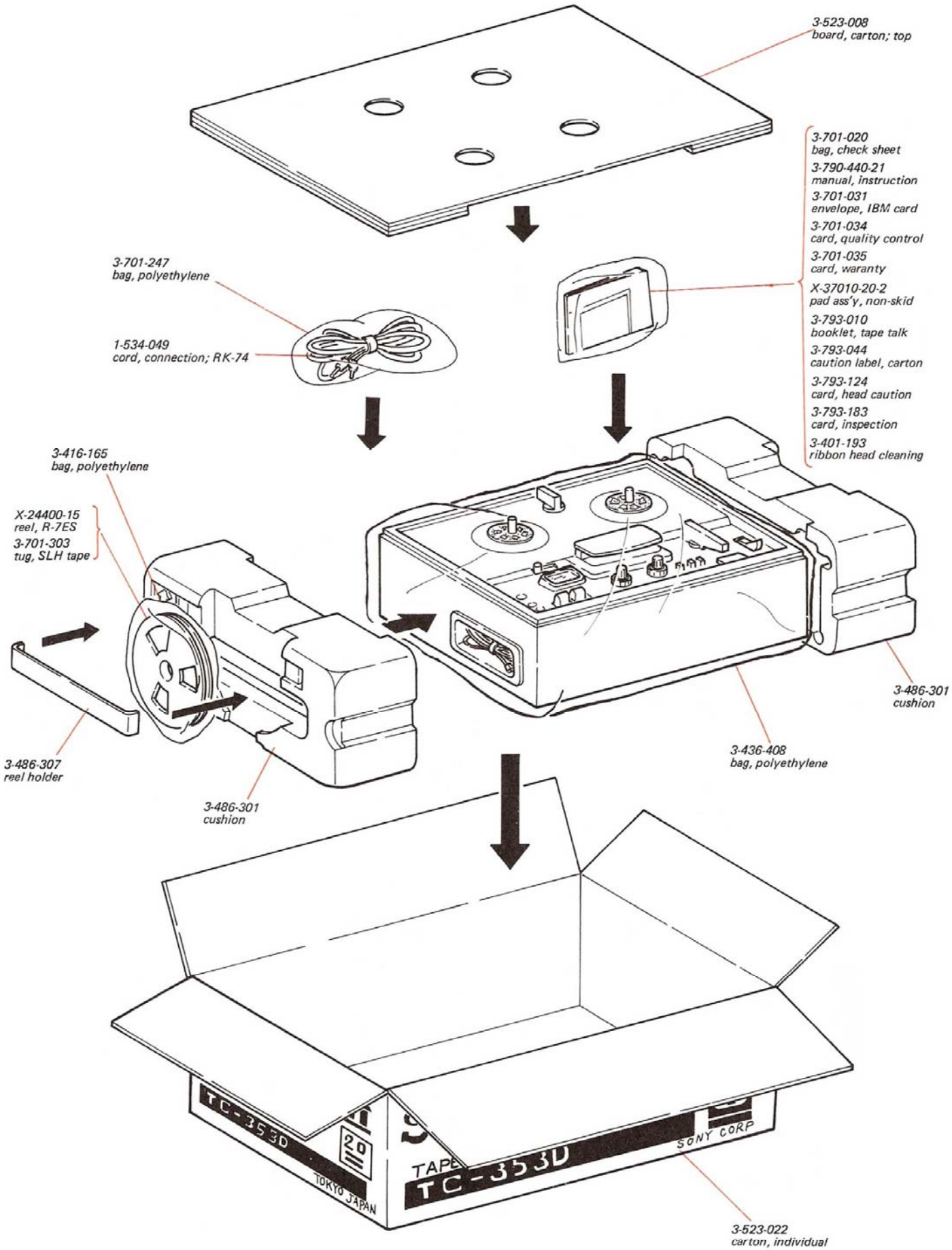



3-419-211
cap, idler
E-3
3-425-197-11
washer, thrust
3-418-115
washer (A)
3-430-235
spacer (S)
3-472-281
absorber, oil, idler
X-34720-33
idler ass'y, capstan
E-4
3-421-048
washer (A), spring
3-486-108
spring, compression
3-425-197-11
washer, thrust
3-430-235
spacer (S)
X-34860-16
arm ass'y (C), capstan idler
3-486-111
cam B, speed selector
3-426-148
spring, tension
3-486-138
screw (H), step
3-486-112
rod, speed selector cam operating
3-486-113
shaft (B), speed selector
3-419-091
felt
E-3
3-425-197-21
washer, thrust
X-34860-18
pulley ass'y, rewind
3-425-197-11
washer, thrust
3-431-149
belt, rewind
E-5
X-34860-19
lever ass'y (B), rewind pulley
3-486-142
rod, rewind lever
3-418-200
spring, tension
3-465-184
cushion, noise absorber
E-5
X-34860-15
lever ass'y B, supply brake
3-510-056
screw, reel holder
⊕PS 3 x 6
⊕PS 3 x 6
3-510-058
spring, compression
3-510-057
holder, reel
X-35112-01
reel table ass'y (B), supply
⊕PS 3 x 6
⊕PS 3 x 6
⊕PS 3 x 6
⊕PS 3 x 6
X-35112-02
reel table ass'y (B), take-up
3-419-211
cap, idler
E-4
3-458-721
spacer, special
3-431-179
absorber, oil
X-34600-11
idler ass'y, take-up
3-451-161
washer, fiver
3-486-124
spring, tension
E-4
3-458-160
washer (C), spring
3-486-144
spring (T), compression
3-458-160
washer (C), spring
X-34860-17
arm ass'y (C), take-up idler
3-486-114
rod (B), idler lever
3-486-105
lever (B), idler release
E-5
E-5
3-458-158
support (A)
3-486-130
spring, tension
3-486-119
rod (B), brake
3-486-117
shaft (B), arm; take-up idler
E-5
X-34860-14
lever ass'y B, take-up brake
3-486-143
spring (T), tension
3-465-184
cushion, noise absorber
3-486-119
rod (B), brake
3-486-116
rod (B), crank
FTS
⊕P 3 x 6
E
3-486-115
holder, crank
3-478-110
screw, set; hexagon socket
3-486-118
rod, idler
⊕PS 3 x 8
W 3 mm dia.
E-4
X-35110-02
lever ass'y (C), joint
3-511-101-01
pulley, motor; 60 Hz (mark 2)
3-511-101-11
pulley, motor; 60 Hz (mark 3)
3-511-101-21
pulley, motor; 60 Hz (mark 4)
3-511-101-31
pulley, motor; 60 Hz (mark 5)
3-511-101-41
pulley, motor; 60 Hz (mark 6)
X-35110-01
chassis ass'y
X-35110-04
cam ass'y (C), function; including parts marked •
3-402-764
spacer
3-458-162
screw (S), set
• 3-458-162
screw (S), set
3-486-123
lever (B), speed selector
SW 3 mm dia.
N 3 mm dia.
SW 4 mm dia.
N 4 mm dia.
SW 4 mm dia.
N 4 mm dia.
SW 4 mm dia.
N 4 mm dia.
3-460-827
shaft, function selector
3-460-059
shaft, plate
3-511-032
shaft, cam
8-832-624-22
motor, IC624HI (M)

5-6. CHASSIS — *LOWER* —



5-7. PACKING


3-523-008
board, carton; top
3-701-020
bag, check sheet
3-790-440-21
manual, instruction
3-701-031
envelope, IBM card
3-701-034
card, quality control
3-701-035
card, waranty
X-37010-20-2
pad ass'y, non-skid
3-793-010
booklet, tape talk
3-793-044
caution label, carton
3-793-124
card, head caution
3-793-183
card, inspection
3-401-193
ribbon head cleaning
3-701-247
bag, polyethylene
1-534-049
cord, connection; RK-74
3-416-165
bag, polyethylene
X-24400-15
reel, R-7ES
3-701-303
tug, SLH tape
3-486-307
reel holder
3-486-301
cushion
3-436-408
bag, polyethylene
3-486-301
cushion
TC-353D
SONY CORP
TOKYO JAPAN
3-523-022
carton, individual

SECTION 6

ELECTRICAL PARTS LIST

Ref. No.	*Part No.*	*Description*	
		MOUNTED CIRCUIT BOARD	
	X-35230-51	tape recorder amp & bias osc.	
		SEMICONDUCTORS	
Q101, 201		transistor	2SC632A
Q102, 202		transistor	2SC632A
Q103, 203		transistor	2SC634A
Q104, 204		transistor	2SC632A
Q105, 205		transistor	2SC632A
Q106, 206		transistor	2SC634A
Q107, 207		transistor	2SC634A
Q301		transistor	2SC634A
Q302		transistor	2SC634A
Q303		transistor	2SC634A
Q304		transistor	2SC634A
D101, 201		diode	1T22
D301		diode	10D2
D302		diode	10D2
		COILS	
L101, 201	1-407-285	equalizer, 1.5 mH	
L102, 202	1-409-130	trap, 2 mH	
L103, 203	1-407-211-21	micro inductor, 27 mH	
L301	1-407-198-21	micro inductor, 2.2 mH	
L302	1-407-198-21	micro inductor, 2.2 mH	
L303	1-431-038-21	dummy, 1 mH	
		TRANSFORMERS	
T101, 201	1-427-299	output	
T301	1-441-864	power	
T302	1-433-140	bias osc.	
		CAPACITORS	

All capacitors are microfarads unless otherwise noted.
(p = $\mu\mu$F, elect = electrolytic)

C101, 201	———			
C102, 202	———			
C103, 203	1-121-410-51	47	25 V	elect
C104, 204	1-127-022-11	0.47	10 V	elect
C105, 205	1-121-398-51	10	25 V	elect
C106, 206	———			
C107, 207	1-127-023-11	1	10 V	elect
C108, 208	1-105-661-51	0.001	50 V	mylar
C109, 209	1-121-398-51	10	25 V	elect
C110, 210	1-121-420-51	220	10 V	elect
C111, 211	1-121-398-51	10	25 V	elect
C112, 212	1-121-395-51	4.7	25 V	elect
C113, 213	1-105-677-51	0.022	50 V	mylar
C114, 214	1-105-678-12	0.027	50 V	mylar
C115, 215	1-105-684-12	0.082	50 V	mylar
C116, 216	1-105-678-12	0.027	50 V	mylar
C117, 217	1-105-671-51	0.0068	50 V	mylar
C118, 218	1-105-675-51	0.015	50 V	mylar
C119, 219	1-105-681-51	0.047	50 V	mylar
C120, 220	1-105-674-12	0.012	50 V	mylar
C121, 221	1-107-244-51	470 p	50 V	silvered mica
C122, 222	1-141-069	30~120 p	500 V	trimmer (BIAS ADJ)
C123, 223	1-121-398-51	10	25 V	elect
C124, 224	1-121-398-51	10	25 V	elect
C125, 225	1-121-413-51	100	6.3 V	elect
C126, 226	1-121-413-51	100	6.3 V	elect
C127, 227	1-107-129-51	82 p	50 V	silvered mica
C128, 228	1-121-398-51	10	25 V	elect
C129, 229	1-121-403-51	33	16 V	elect
C130, 230	1-105-679-51	0.033	50 V	mylar
C131, 231	1-105-667-51	0.0033	50 V	mylar
C132, 232	———			
C133, 233	———			
C134, 234	1-107-123-51	47 p	50 V	silvered mica
C135, 235	1-105-661-51	0.001	50 V	mylar
C136, 236	1-121-398-51	10	25 V	elect
C137, 237	1-121-420-51	220	10 V	elect
C138, 238	1-121-398-51	10	25 V	elect
C139, 239	1-121-398-51	10	25 V	elect
C140, 240	1-121-391-51	1	50 V	elect
C141, 241	———			
C154, 254				
C155, 255	1-121-402-51	33	10 V	elect
C156, 256	1-121-420-51	220	10 V	elect
C157, 257	———			
C158, 258	1-107-139-51	220 p	50 V	silvered mica
C159, 259	1-107-139-51	220 p	50 V	silvered mica
C160, 260	1-105-661-51	0.001	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	polyproplylene film
C313	1-107-188-51	620 p	500 V	silvered mica
C314	———			

Ref. No.	Part No.	Description
C315	———	
C316	1-105-679-51	0.033 50 V mylar

RESISTORS

All resistors are ¼W, carbon type unless otherwise noted.

Ref. No.	Part No.	Description
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
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

Ref. No.	Part No.	Description
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

Ref. No.	*Part No.*	*Description*
		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 μ + 120 Ω
CP302	1-101-534-31	encapsulated component C-R 0.1 μ + 120 Ω
PL301	1-518-093	lamp
ME101,201	1-524-051-41	meter, LEVEL
R.H101,201	8-824-129-20	head, record; 45 Ω/1 kHz (RP30 - 2902)
E.H101,201	8-826-629-25	head, erase; 160 Ω/160 kHz (EF18 - 2902A-1)
P.H101,201	8-829-142-20	head, playback; 1 kΩ/1 kHz (PP102 - 4202)
M	8-832-624-22	motor (IC624H1)
	1-534-538-21	cord, ac
	1-536-146	terminal strip, 1L1; small

SECTION 7
HARDWARE

Part No.	Description
	SCREWS
7-682-123-01	⊕ P 2 × 3
7-682-124-01	⊕ P 2 × 4
7-682-125-01	⊕ P 2 × 5
7-621-259-22	⊕ P 2.6 × 4
7-621-259-45	⊕ P 2.6 × 6
7-621-259-52	⊕ P 2.6 × 8
7-621-259-82	⊕ P 2.6 × 14
7-682-144-01	⊕ P 3 × 3
7-682-145-01	⊕ P 3 × 4
7-682-146-01	⊕ P 3 × 5
7-682-147-01	⊕ P 3 × 6
7-682-148-01	⊕ P 3 × 8
7-682-149-01	⊕ P 3 × 10
7-682-150-01	⊕ P 3 × 12
7-682-151-01	⊕ P 3 × 14
7-682-160-01	⊕ P 4 × 6
7-682-161-13	⊕ P 4 × 8
7-682-167-01	⊕ P 4 × 25
7-682-369-04	⊕ RK 4 × 35
7-682-445-01	⊕ T 3 × 4
7-682-447-01	⊕ T 3 × 6
7-682-448-01	⊕ T 3 × 8
7-682-545-01	⊕ B 3 × 4
7-682-547-03	⊕ B 3 × 6
7-682-551-03	⊕ B 3 × 14
7-682-562-13	⊕ B 4 × 10
7-682-563-04	⊕ B 4 × 12
7-621-560-22	⊕ K 2.6 × 20
7-621-771-35	⊕ B 2.6 × 6
7-685-145-01	⊕ P 3 × 6, tapping
7-683-140-01	⊖ SC 3 × 6
7-621-712-67	⊖ SC 2.6 × 8
7-683-137-00	⊖ SC 3 × 3

Part No.	Description
	WASHERS
7-623-105-12	2φ
7-623-107-12	2.6φ
7-623-108	3φ
7-623-108-12	3φ
7-623-110	4φ
7-623-110-12	4φ
7-623-112	5φ
7-623-113	6φ
7-623-113-18	6φ
7-623-205-22	2φ, spring
7-623-207-22	2φ, spring
7-623-208-22	3φ, spring
7-623-210-22	4φ, spring
7-623-308-04	3φ, star (internal)
7-623-408-04	3φ, star (external)
	RETAINING RINGS
7-624-106-01	E-3
7-624-108-01	E-4
7-624-109-01	E-5
	NUTS
7-684-013-01	3φ
7-684-014-01	4φ
7-684-033-01	3φ
7-622-408-11	3φ, speed
	LUGS
3-460-077	3φ

Note: φ indicates mm dia.

Hardware Nomenclature

P – Pan Head Screw . . . . . ⊕

PS – Pan Head Screw with Spring Washer . . . . . ⊕

K – Flat Countersunk Head Screw . . . ⊕

B – Binding Head Screw . . . . . ⊕

RK – Oval Countersunk Head Screw . . ⊕

T – Truss Head Screw . . . . . ⊕

R – Round Head Screw . . . . . ⊕

F – Flat Fillister Head Screw . . . . . ⊖

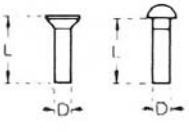
SC – Set Screw . . . . . ⊖

E – Retaining Ring (E Washer) . . . . .

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –

⊕ P 3x10
- P: Type of Head
- 3: Diameter in mm (D)
- 10: Length in mm (L)
- Slit: Type of Slit



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SONY CORPORATION

Printed in Japan

SONY®
SERVICE MANUAL

TC-353D

USA Model

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

Ref. No.	Former		New	
	Part No.	Description	Part No.	Description
C104, 204	1-127-022-11	0.47 μF 10 V electrolytic	1-121-398-11	10 μF 25 V electrolytic
C108, 208	1-105-661-51	0.001 μF 50 V mylar	1-105-666-12	0.0027 μF 50 V mylar
C113, 213	1-105-677-51	0.022 μF 50 V mylar	1-105-676-12	0.018 μF 50 V mylar
C114, 214	1-105-678-51	0.027 μF 50 V mylar	1-105-681-12	0.047 μF 50 V mylar
C115, 215	1-105-684-51	0.082 μF 50 V mylar	1-105-686-12	0.12 μF 50 V mylar
C116, 216	1-105-678-51	0.027 μF 50 V mylar	1-105-681-12	0.047 μF 50 V mylar
C118, 218	1-105-675-51	0.015 μF 50 V mylar	1-105-678-12	0.027 μF 50 V mylar
C119, 219	1-105-681-51	0.047 μF 50 V mylar	1-105-684-12	0.082 μF 50 V mylar
C120, 220	1-105-674-51	0.012 μF 50 V mylar	1-105-679-12	0.033 μF 50 V mylar
C155, 255	1-121-402-51	33 μF 10 V electrolytic	1-121-413-11	100 μF 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 μF 50 V mylar

RESISTORS

On Page 32

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

MEMO

SCHEMATIC DIAGRAM (Ser. No. 10,601 and later)

On page 19 and 20

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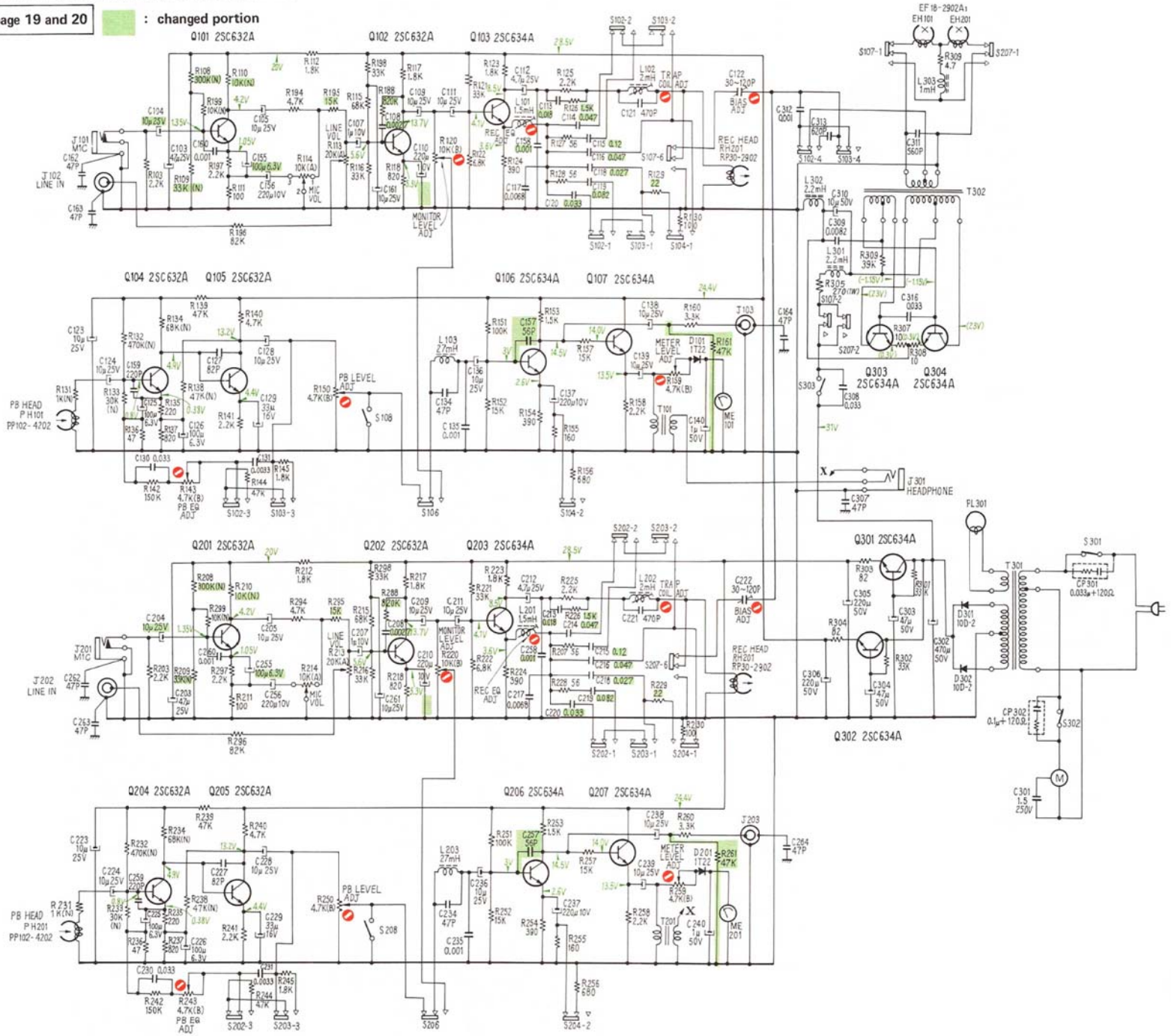


Note:

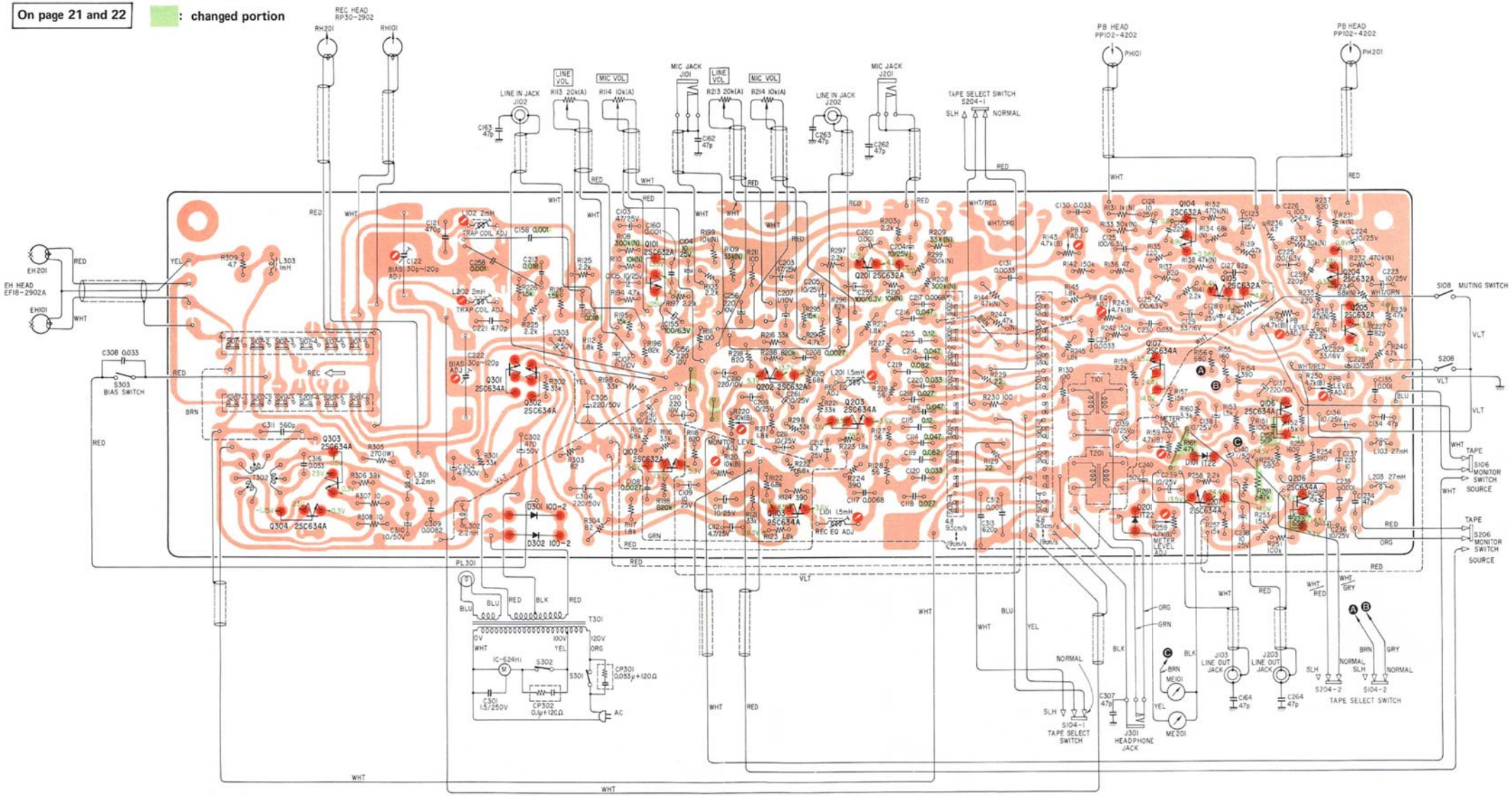
1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. The letter (A), (B) or (C) suffixed to rating value of variable or semi-fixed resistor indicates its characteristics.
3. Voltage values shown are measured with a voltmeter (20 kΩ/V) in playback mode.
   Voltage values 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 (7½ ips)
S104, 204	TAPE SELECT switch	NORMAL
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

MOUNTING DIAGRAM – *Conductor Side* – **(Ser. No. 10,601 and later)**

On page 21 and 22

: changed portion



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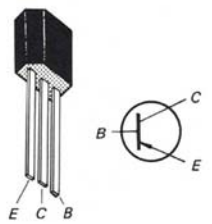
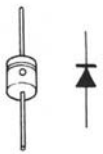
2SC634A

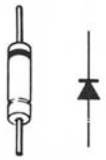
Q101, 102, 103, 104
105, 106, 107
201, 202, 203, 204
205, 206, 207
301, 302, 303, 304



10D-2
D301, 302



1T22
D101, 201



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