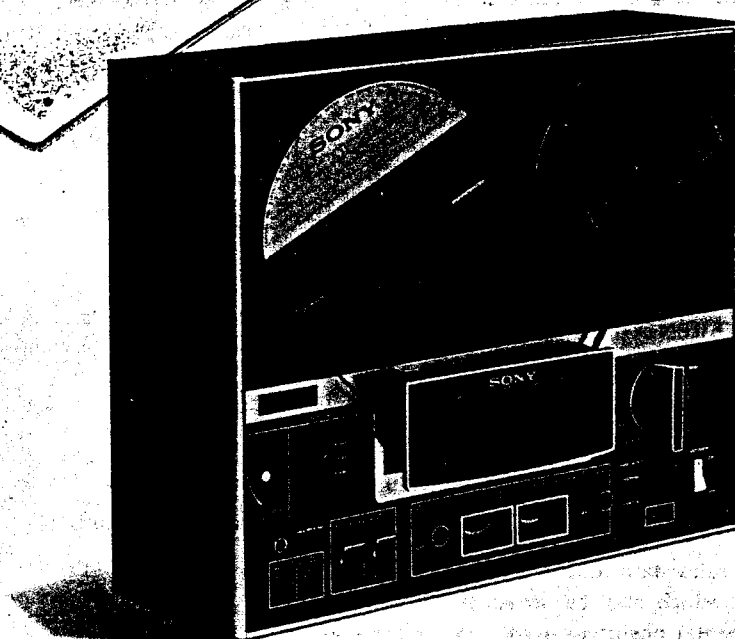


TC-266

ARCHIVE EXEMPLAR

General Export Model

Original



Set using ISO screws

SPECIFICATIONS

Power Requirements: AC 60 Hz, 117 V,
30 W

Track System: Four-track stereo and mono

Reel Size: 7" (18 cm) maximum

Tape Speed: 7½ ips, 3¾ ips and 1⅞ ips
(19 cm/s, 9.5 cm/s and 4.8 cm/s)

Recording Time: (with 1,800 ft tape)

Tape speed	4-track stereo	4-track mono
7½ ips (19 cm/s)	1.5 hrs	3 hrs
3¾ ips (9.5 cm/s)	3 hrs	6 hrs
1⅞ ips (4.8 cm/s)	6 hrs	12 hrs

Frequency Response: 20~25,000 Hz at 7½ ips (19 cm/s)
30~20,000 Hz at 3¾ ips (9.5 cm/s)
30~9,000 Hz at 1⅞ ips (4.8 cm/s)

Signal-to-Noise Ratio: 52 dB or better

Flutter and Wow: 0.09 % at 7½ ips (19 cm/s)
0.12 % at 3¾ ips (9.5 cm/s)
0.17 % at 1⅞ ips (4.8 cm/s)

Recording Bias Frequency: Approx. 160 kHz

Inputs: Two MIC inputs

Impedance: 600 Ω

Maximum sensitivity: -72 dB (0.19 mV)

Two AUX INputs

Impedance: Approx. 100 kΩ

Maximum sensitivity: -22 dB (0.06 V)

Outputs: Two LINE OUTputs

Impedance: 100 kΩ or more

Output level: 0 dB (0.775 V)
with 100 kΩ load

HEADPHONE output

Impedance: 8 Ω load

Output level: -28 dB (30 mV)

Semiconductors: 27 transistors and 4 diodes

Dimensions: 16 7/16 (W) x 8 5/16 (H) x 14 13/16" (D)
(416 x 210 x 376 mm)

Weight: 22 lb 8 oz (10 kg)

Original

SONY®
SERVICE MANUAL

861

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4. CABINET - SIDE VIEW -	3	Circuit Board	31 ~ 32
5. CHASSIS - TOP VIEW -	4	14. ELECTRICAL PARTS LIST	33 ~ 34
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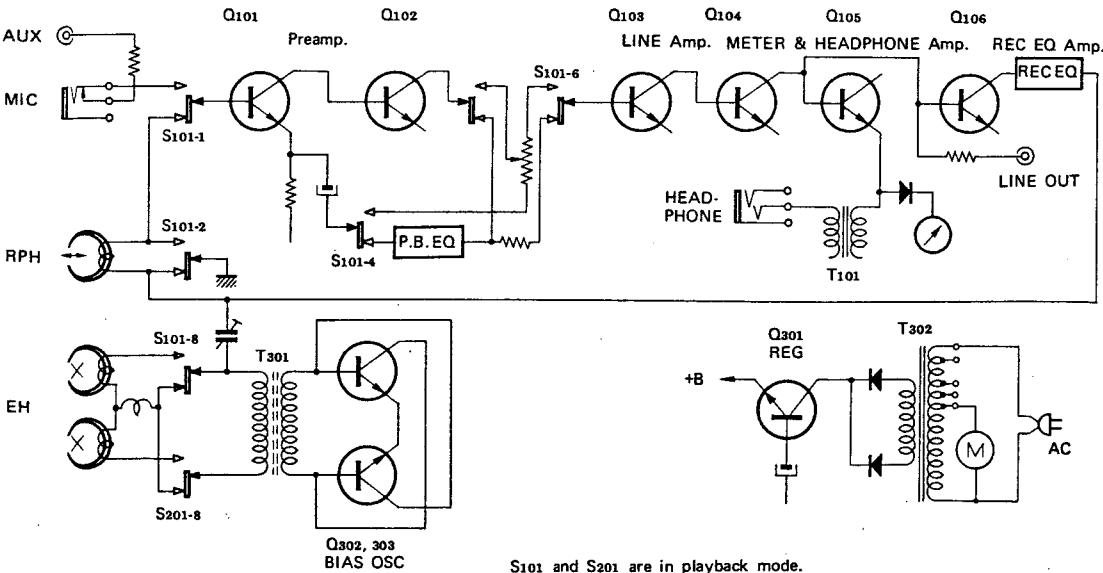
1. GENERAL DESCRIPTION

SONY Model TC-266 is a solid state four-track, two-channel stereophonic deck which may be operated in either vertical or horizontal position on AC household current.

Tape Tension Regulator

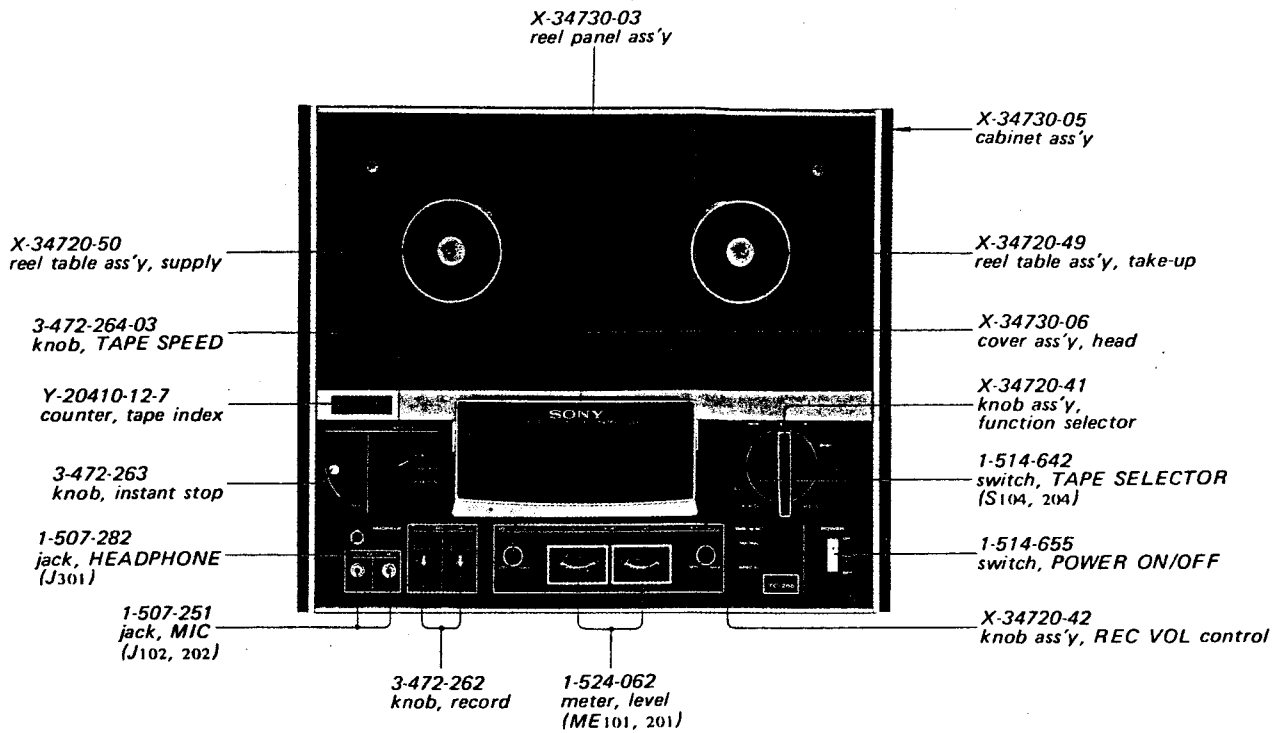
The machine can operate always under the stable tape running by the tape tension regulator which quickly responds to the subtle change of tape tension, so that the tape tension regulator can reduce the wow and flutter extremely.

2. BLOCK DIAGRAM

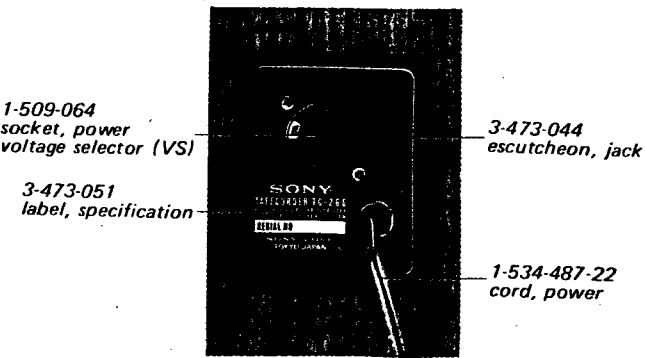


S101 and S201 are in playback mode.

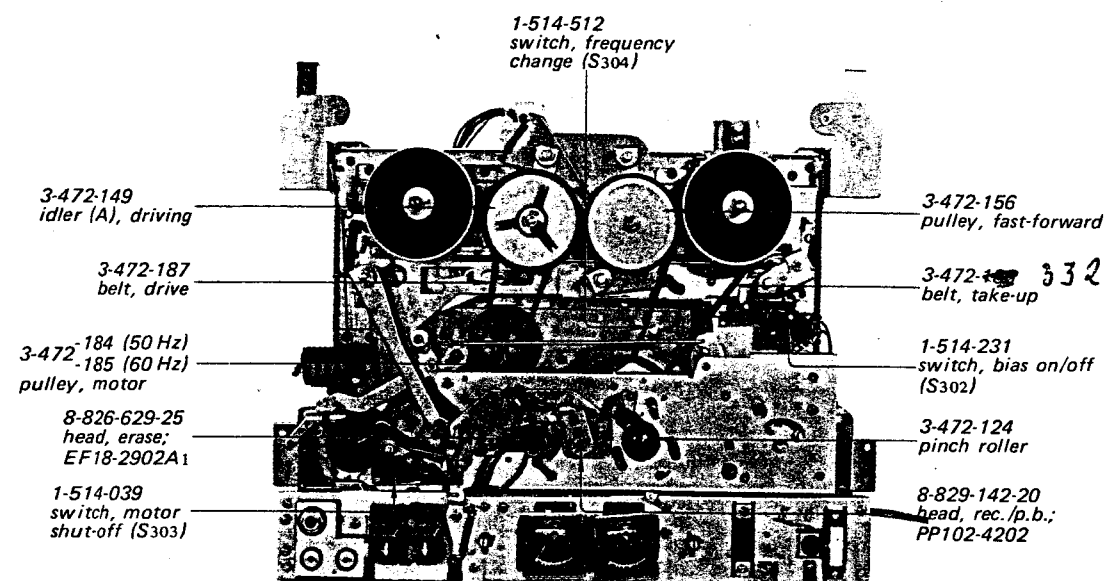
3. CABINET - TOP VIEW -



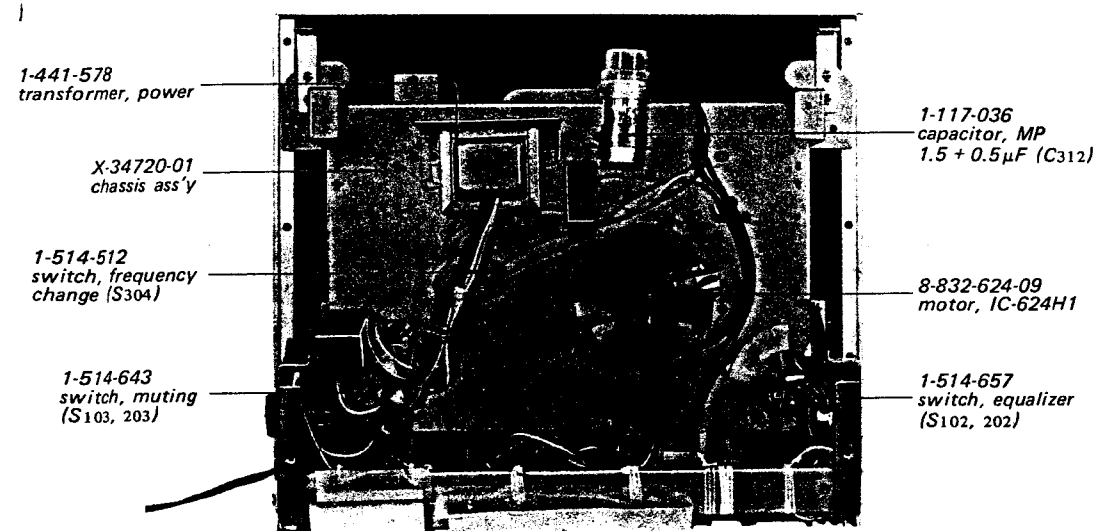
4. CABINET -SIDE VIEW -



5. CHASSIS —TOP VIEW —

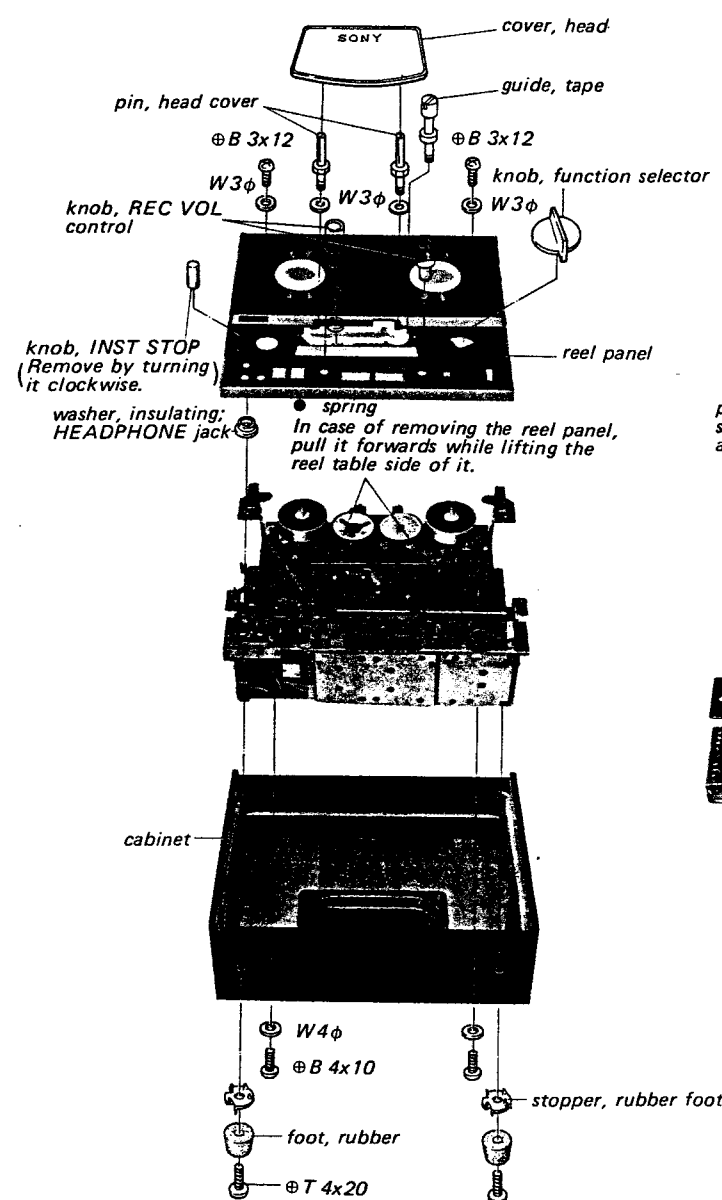


6. CHASSIS — BOTTOM VIEW —

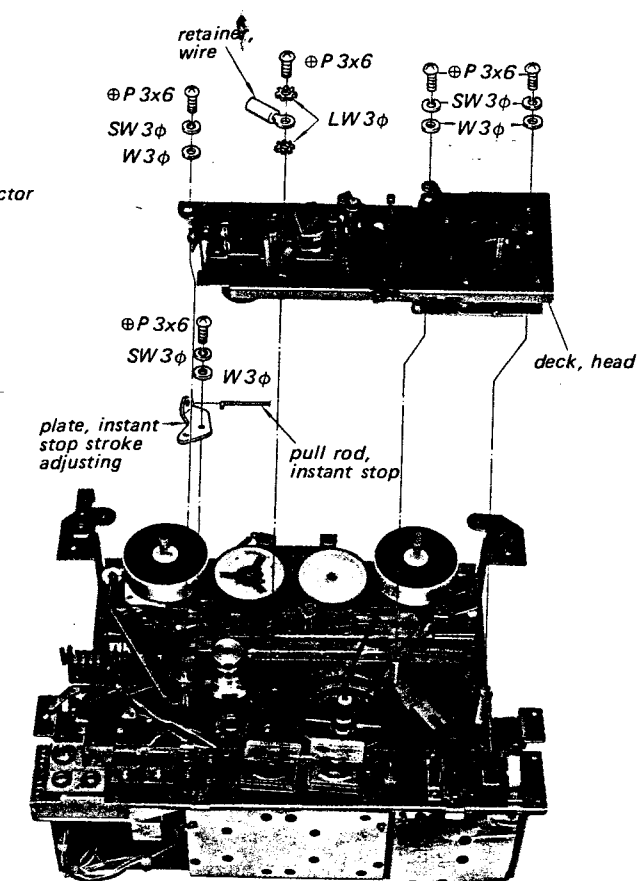


7. DISASSEMBLY

7-1. Cabinet Removal



7-2. Head Deck Removal

CAUTION
(on repairing)

- (1) Never put the machine upside-down on the hard plate with the head cover removed, or the pin of the tape shifter, the shut-off arm pin, the tension arm and others shall be bent by the weight of the machine. If it is necessary to put the machine upside-down put it on a soft cloth with the head cover attached.
- (2) Do not short-circuit B+ circuit to ground, or the transistor Q304 will be broken.
- (3) Turn on the power switch after being certain that the motor fan does not touch anything.
- (4) When removing the instant stop knob, turn it clockwise.

8. MECHANICAL ADJUSTMENT

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

Parts	Adjusting or Checking Items
Head Deck	8-7. Tape Shifter Position Adjustment (page 9) 8-22. Instant Stop Adjustment (page 13)
Motor	8-11. Motor Pulley Height Check (page 10) 8-11. Capstan Idler Position Check (page 10) 8-23. Tape Speed Check (page 13)
Reel Table	8-12. Reel Table Height Adjustment (page 10) 8-13. Take-up Back-tension Adjustment (page 10) 8-14. FWD Torque Adjustment (page 10)
Driving Idler	8-18. FF & REW Torque Adjustments (page 12) 8-20. Driving Idler Height Check (page 12)
Tension Regulator Arm, Tension Regulator Arm Brake Felt	8-1. Tension Regulator Adjustment (page 7) 8-2. Tension Regulator Back-tension Adjustment (page 7)

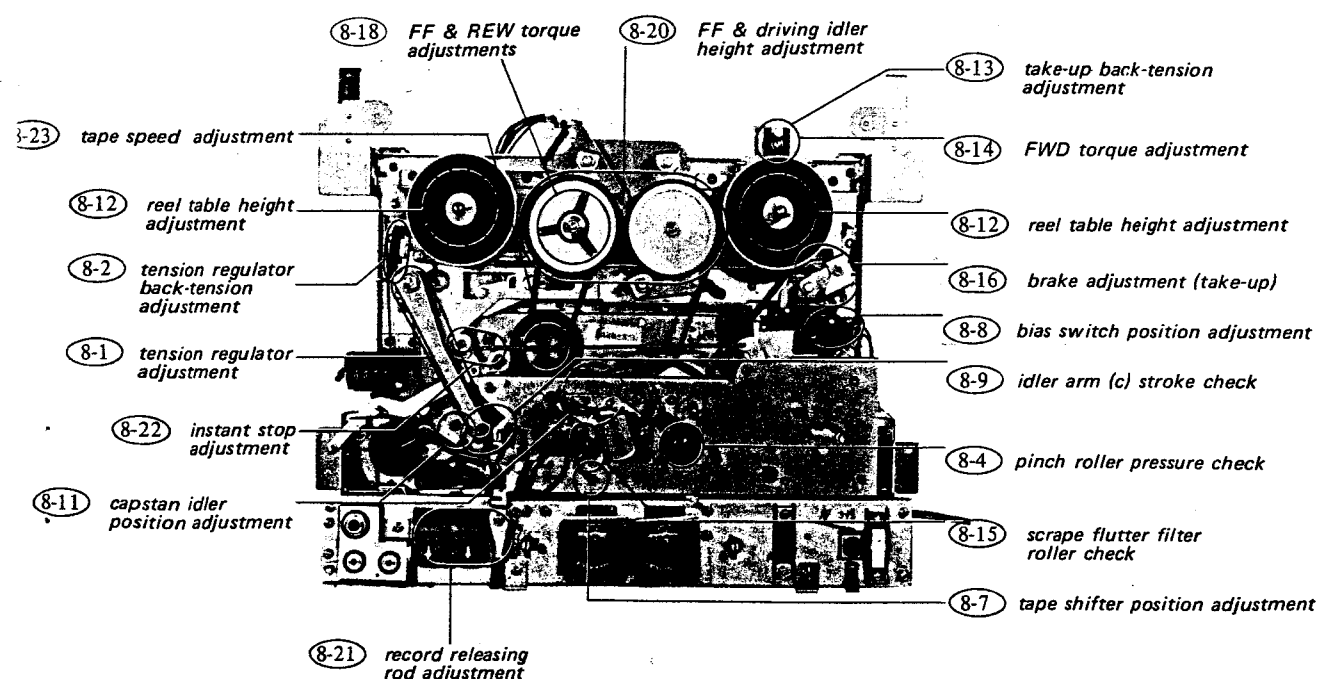


Fig. 8-1 Adjusting parts location (1)

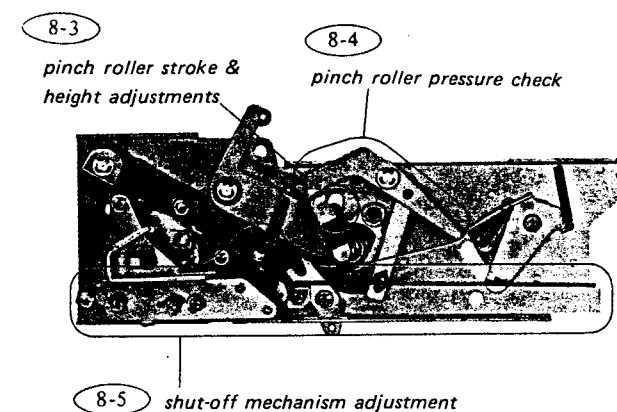


Fig. 8-2 Adjusting parts location (2)

8-1. Tension Regulator Adjustment

— in STOP mode —

- (1) Adjust the adjusting screw so that the clearance shown is 8.5mm ($11/32$ "") after having been turned the reel table counterclockwise with hand.
- (2) After the adjustment, apply lock paint to the screw.

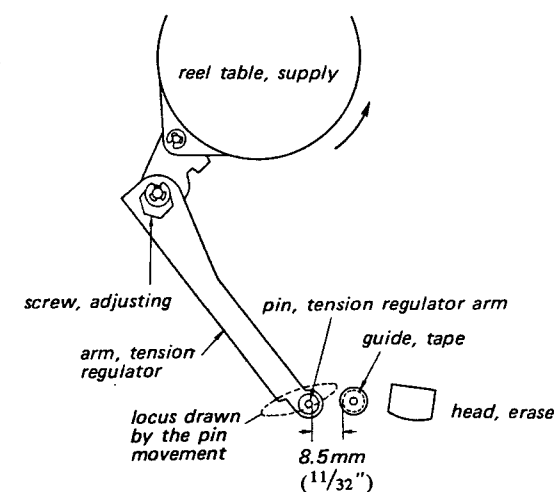


Fig. 8-3 Tension regulator adjustment

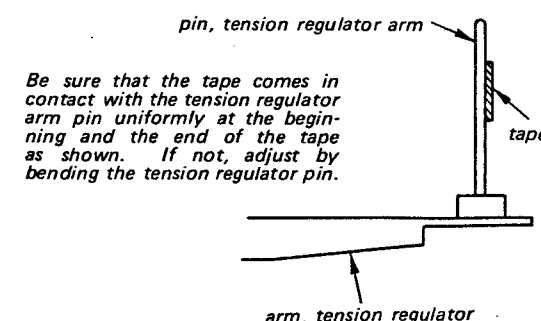


Fig. 8-4 Tension regulator adjustment

8-2. Tension Regulator Back-tension Adjustment

— in FWD & FF modes —

- (1) Make the tension regulator adjustment.
- (2) Adjust by changing the hooking position of the spring to obtain the specified values on the tension gauge at the beginning and the end of the tape as shown in Fig. 8-5.
If it is not obtained the specified values, adjust by bending the stud or perform the tension regulator adjustment.

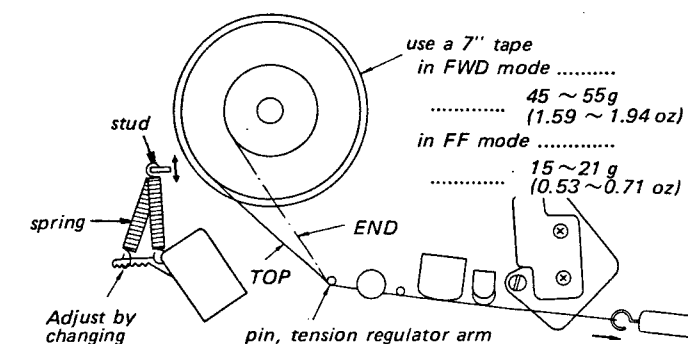


Fig. 8-5 Tension regulator back-tension adjustment

8-3. Pinch Roller Stroke & Height Adjustments

- (1) Remove the head deck (See page 5).
- (2) Adjust the screw ① so that the pinch roller shaft comes in contact with the retractive lever at the position (A) shown in Fig. 8-7, in STOP mode.
- (3) Fix the screw ① while pushing the joint lever in the direction shown with arrow in Fig. 8-6.
- (4) Be sure that the washer for the pinch roller shaft does not come in contact with the part indicated with ▲ on the retractive lever shown in Fig. 8-7 when the function selector knob is changed slowly from FWD to FF.
- (5) After the adjustment, apply lock paint to the screw.

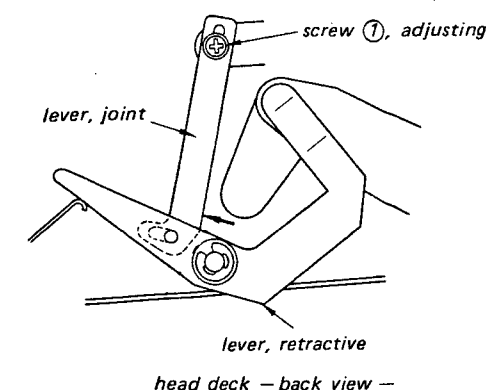


Fig. 8-6 Pinch roller stroke adjustment

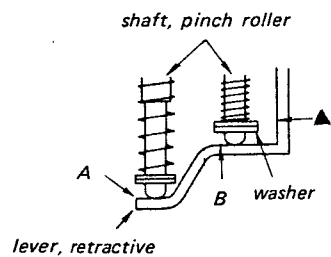


Fig. 8-7 Pinch roller stroke adjustment

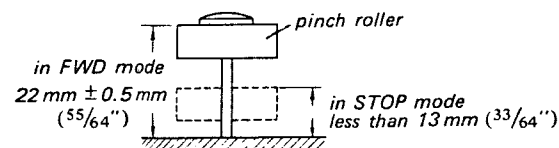


Fig. 8-8 Pinch roller height adjustment

* Dummy Capstan

As the pinch roller stroke adjustment and the pinch roller pressure check require the dummy capstan, make it as follows.

Prepare a flywheel ass'y (for TC-266) and remove the capstan shaft (dummy capstan) from the flywheel ass'y by patting the head of the capstan shaft with the hammer, taking care not to bend the shaft. Flywheel Ass'y

Part No.: X-34720-03

8-4. Pinch Roller Pressure Check — in STOP mode —

- (1) Put the dummy capstan * into the capstan bearing and be sure that the clearance between the pinch levers (A) and (B) is approx. 0.5mm ($\frac{1}{64}$ ").

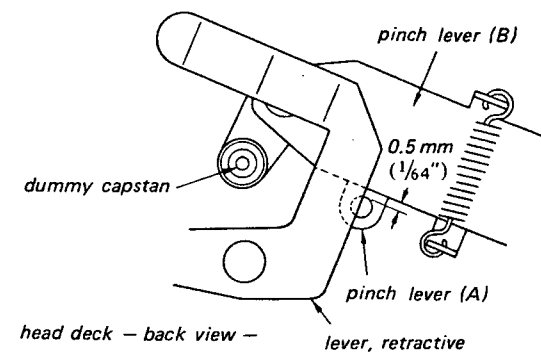


Fig. 8-9 Pinch roller pressure check

Be sure that the tension gauge indicates 800~1,000 g (1 lb 12 oz ~ 2 lb 3 oz) when the pinch roller is detached from the capstan in FWD mode.

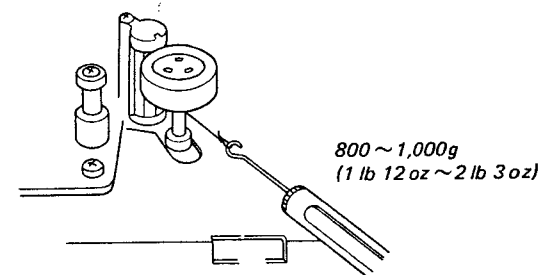


Fig. 8-10 Pinch roller pressure check

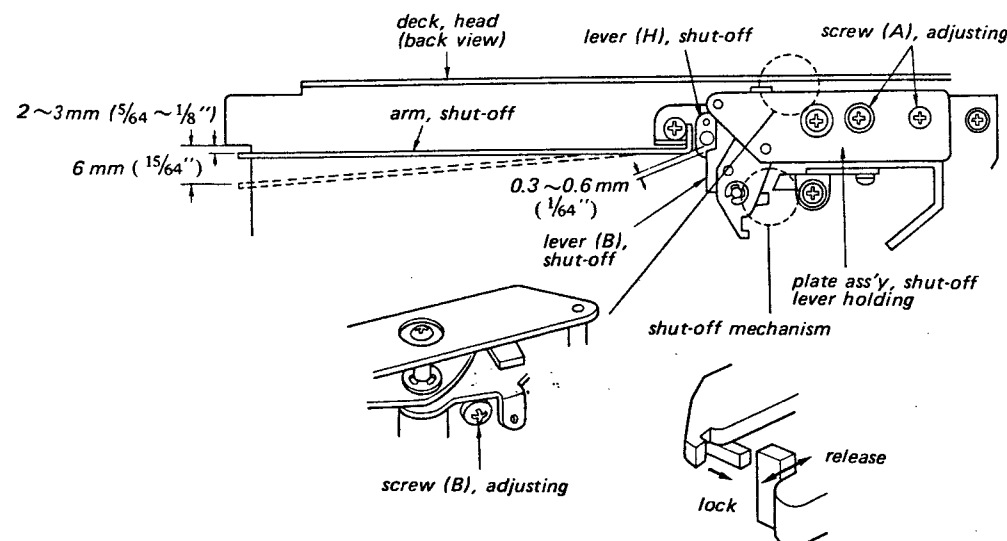


Fig. 8-11 Shut-off mechanism adjustment

8-5. Shut-off Mechanism Adjustment — in STOP mode —

- (1) Loosen the two screws (A) and adjust by positioning the shut-off lever holding plate ass'y so that the shut-off mechanism is locked when the clearance between the shut-off arm and the head deck is 6mm ($\frac{15}{64}$ "), and the shut-off mechanism is released completely when it is 2~3mm ($\frac{5}{64}$ ~ $\frac{1}{8}$ ").
- (2) Adjust the screw (B) so that the clearance between the shut-off levers (B) and (H) is 0.3~0.6mm ($\frac{1}{64}$ ") in STOP mode.
- (3) After the adjustment, apply lock paint to the screws.

8-6. Speed Selector Cam Position Adjustment — in FWD mode —

Adjust the screw to locate the idler arm (c) pin at the center position between the two stopper slits shown, at 19 cm/s tape speed.

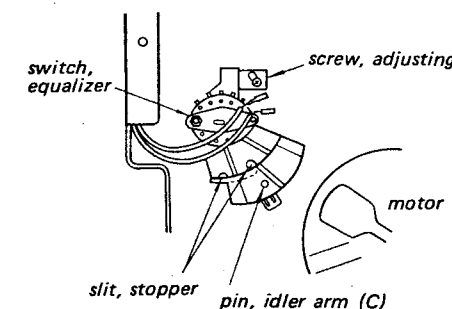


Fig. 8-12 Speed selector cam position adjustment

8-7. Tape Shifter Position Adjustment — in STOP mode —

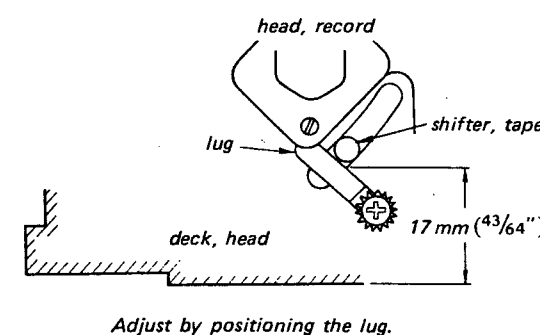


Fig. 8-13 Tape shifter position adjustment

8-8. Bias Switch Position Adjustment

- (1) Loosen the two screws and adjust by positioning the switch.
- (2) Be sure that the switch is in ON position in FWD mode, and when the function selector knob is changed slowly from FWD to STOP the record knob is released after the switch is in OFF.

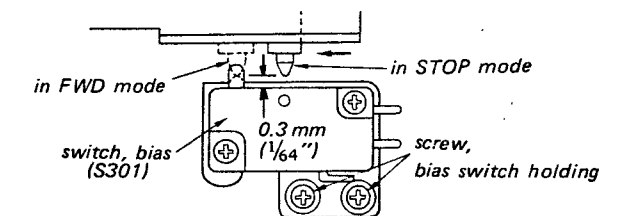


Fig. 8-14 Bias switch position adjustment

8-9. Idler Arm (C) Stroke Check

— in FWD mode at 4.8 cm/s ($\frac{17}{8}$ ips) tape speed —

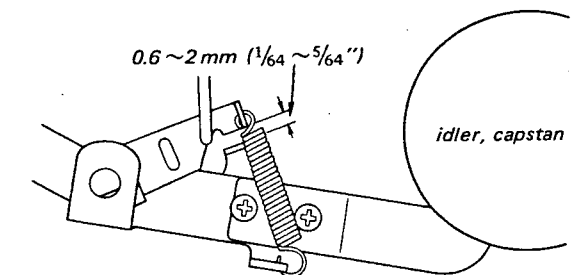


Fig. 8-15 Idler arm (c) stroke check

8-10. Muting Switch Position Adjustment — in FWD mode —

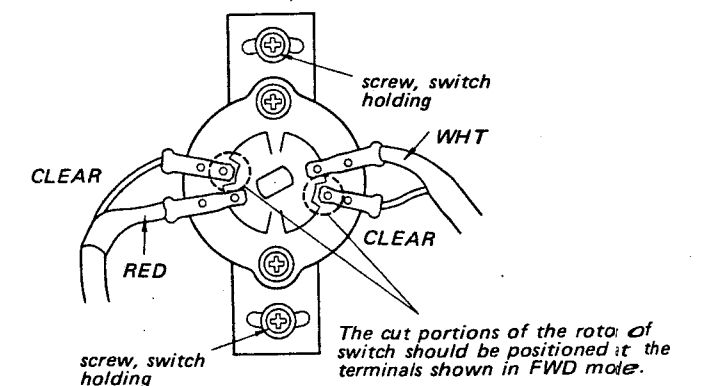


Fig. 8-16 Muting switch position adjustment

8-11. Capstan Idler Position Adjustment
— in FWD mode —

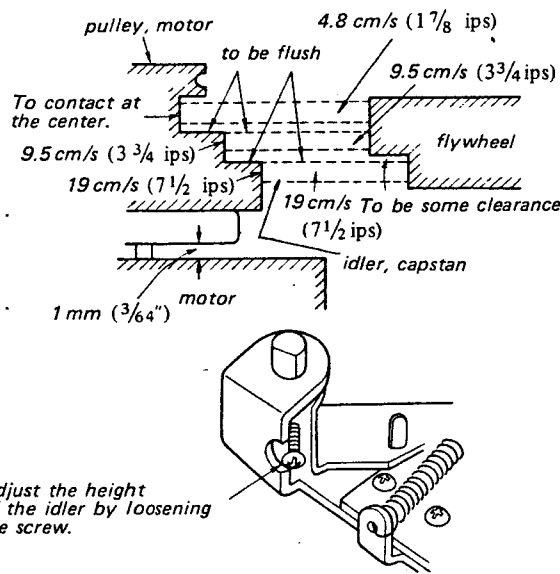


Fig. 8-17 Capstan idler position adjustment

After the adjustment, be sure that the capstan idler does not come in contact with the flywheel and the motor pulley in STOP mode with 60Hz use and the clearance between the capstan idler and the motor pulley is more than 3 mm (1/8 inch) in STOP mode with 50 Hz use.

8-12. Reel Table Height Adjustment
— in FWD, REW & FF modes —

- Adjust the height of the reel table by loosening the screw so that the tape does not come in contact with the reel in FWD, REW & FF modes.
- Perform the back-tension and FWD torque adjustments.
- After the adjustment, apply lock paint to the screw.

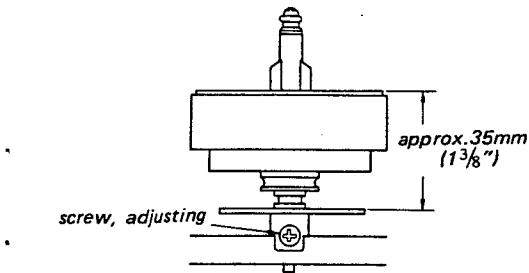


Fig. 8-18 Reel table height adjustment

8-13. Take-up Back-Tension Adjustment
— in REW mode —

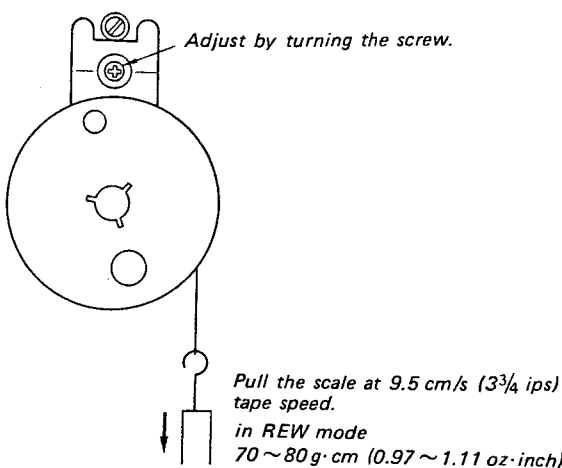


Fig. 8-19 Take-up back-tension adjustment

After the adjustment, perform the FWD torque adjustment and apply lock paint to the screw.

8-14. FWD Torque Adjustment
— in FWD mode —

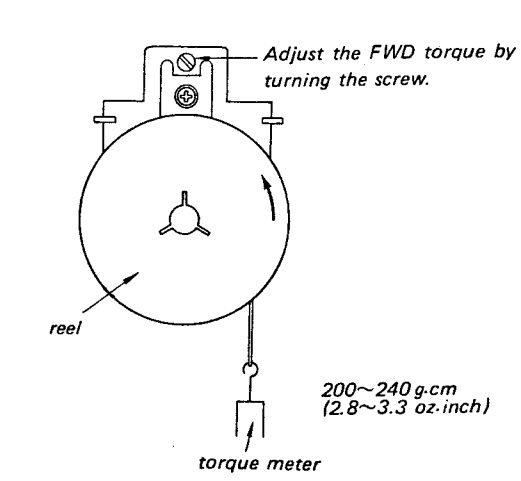


Fig. 8-20 FWD torque adjustment

8-15. Scrape Flutter Filter Roller Check
— in FWD mode at 4.8 cm/s (1 7/8 ips) tape speed —

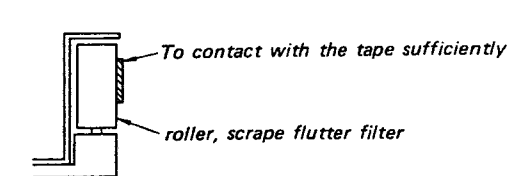


Fig. 8-21 Scrape flutter filter roller check

8-16. Brake Adjustment
— in STOP mode —

supply brake torque	direction A	500~700 g-cm (6.96~9.74 oz-inch)
	direction B	1,000~1,500 g-cm (13.9~21 oz-inch)
take-up brake torque	direction C	400~550 g-cm (5.56~7.65 oz-inch)
	direction D	1,600~1,800 g-cm (22.2~25 oz-inch)

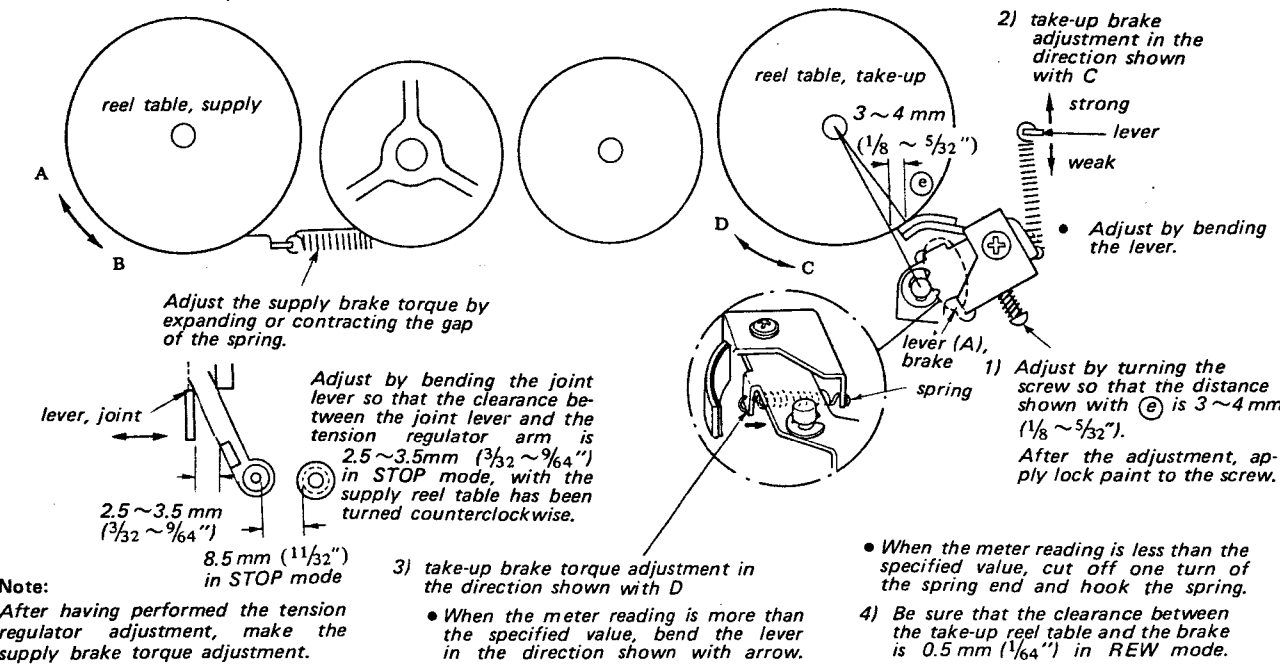


Fig. 8-22 Brake adjustment

8-17. Tape Slack Check

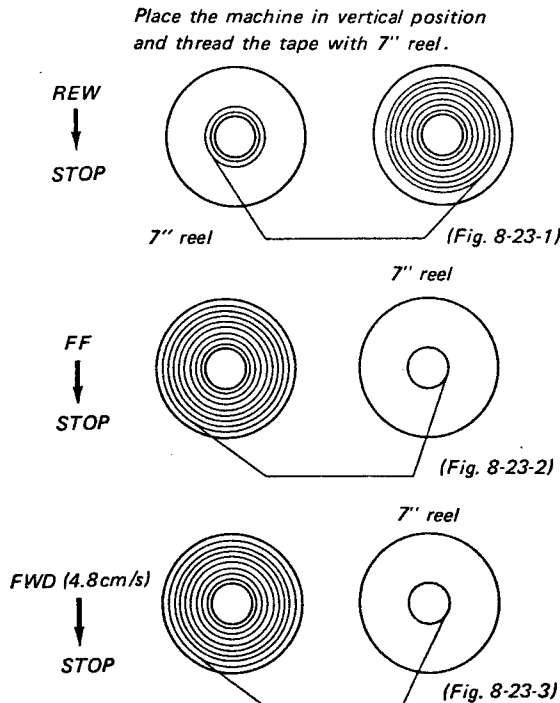


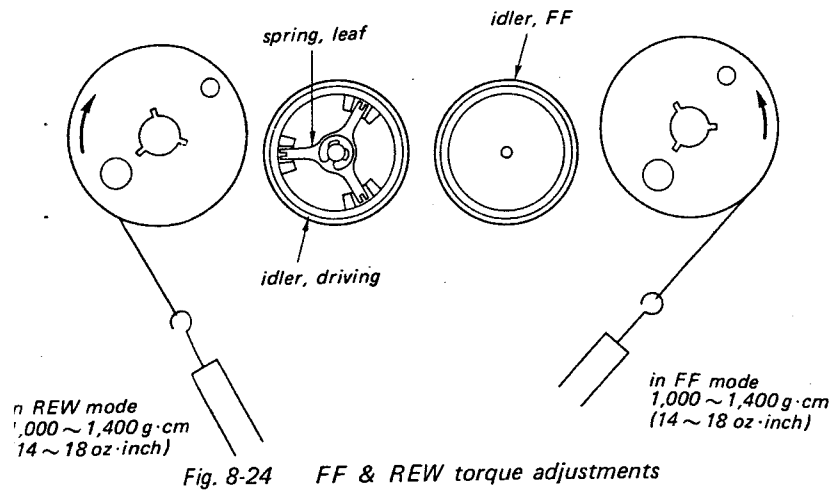
Fig. 8-23 Tape slack check

- When changing the function selector knob slowly from REW to STOP at the end of the tape, be sure not to slack the tape (See Fig. 8-23-1).
- When changing the function selector knob quickly from FF to STOP at the beginning of the tape, be sure not to slack the tape (See Fig. 8-23-2).
- When pulling the instant stop knob in FWD mode at the beginning of the tape, be sure not to slack the tape.
- When changing the function selector knob from FWD to STOP at the beginning of the tape at the 4.8 cm/s (1 7/8 ips) tape speed, be sure not to slack the tape (See Fig. 8-23-3).

8-18. FF & REW Torque Adjustments

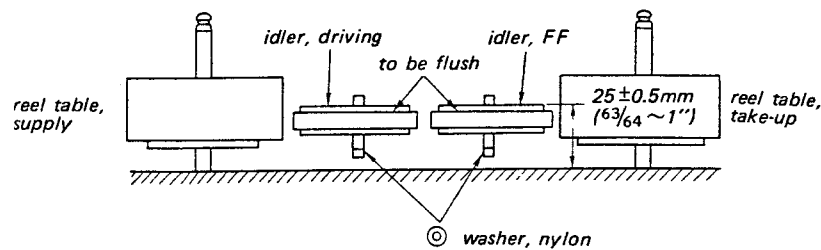
— in FF & REW modes —

Adjust the position of the leaf spring to obtain the specified values on the torque meter.
(Read the values when the driving idler is forced to stop the motion.)



8-20. FF & Driving Idler Height Adjustments

— in STOP mode —

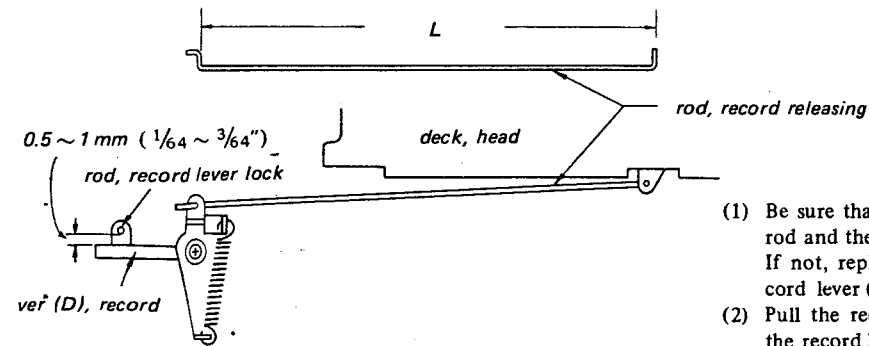


nylon washer

Part No.	Thickness
3-425-197-01	0.13 mm
3-425-197-11	0.25 mm
3-425-197-21	0.50 mm

8-21. Record Releasing Rod Adjustment

— in STOP mode —



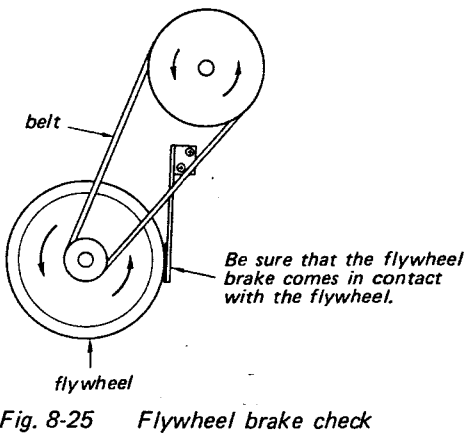
rod, record releasing

Part No.	L (length)
3-473-040-02	121.0 mm
3-473-040-11	121.5 mm
3-473-040-21	122.0 mm

- Be sure that the clearance between the record lever lock rod and the record lever (D) is 0.5 ~ 1 mm (1/64 ~ 3/64"). If not, replace the record releasing rod or bend the record lever (D).
- Pull the record knobs in STOP mode and be sure that the record knob is released before the pinch roller comes in contact with the capstan when changing the function selector knob to FWD.

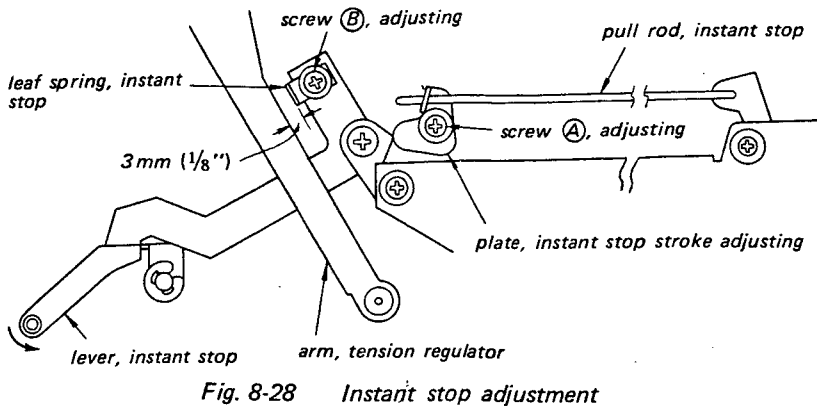
8-19. Flywheel Brake Check

— in REW mode —



8-22. Instant Stop Adjustment

— in STOP mode —

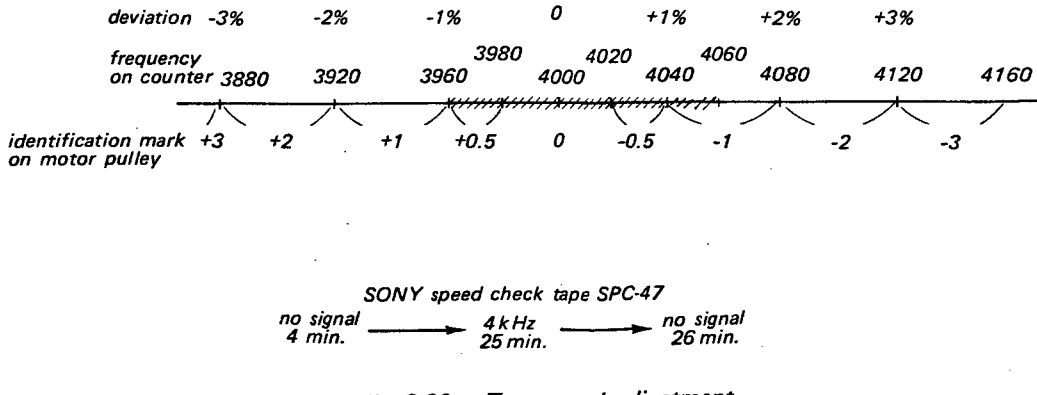


- Be sure that the tension regulator adjustment has been made.
- Adjust the screw A so that the clearance between that pinch roller and the capstan is 1 ~ 2 mm (3/64 ~ 5/64") when pulling the instant stop lever in FWD mode, and the instant stop knob is not locked when pulling in STOP, FF and REW modes.
- Adjust the screw B so that the clearance between the tension regulator arm and the instant stop leaf spring is 3 mm (1/8") in STOP mode.
- After the adjustment, apply lock paint to the screws.

8-23. Tape Speed Adjustment

— in FWD mode —

- Playback the SONY speed check tape (SPC-47) at 19 cm/s (7 1/2 ips) tape speed in horizontal position.
 - If the counter reading is out of 3,960 ~ 4,060 Hz replace with the motor pulley with identification mark shown below.
- (As for Part No. of the motor pulley, refer to page 23.)



Standard			
	19cm/s (7 1/2 ips)	9.5cm/s (3 3/4 ips)	4.8cm/s (1 7/8 ips)
Deviation (%)	±1.5	±1.5	±1.5
Variation Limit (%)	1	1	1

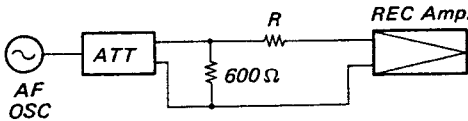
9. ELECTRICAL ADJUSTMENT

Note:

- (1) Before connecting the measuring equipments to the input or the output jack of the machine, take the impedance-matching correctly as shown below.

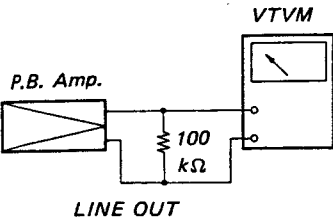
Input	Rated Input Level (Input Impedance)	Output	Rated Output Level (Load Impedance)
MIC	-60 dB (600Ω)	LINE OUT	0 dB (100 kΩ)
AUX	-10 dB (10 kΩ)		
REC/P.B. Con- nector	-33 dB (80 kΩ)	REC/P.B. Con- nector	0 dB (100 kΩ)

Input Connection



Input	R
AUX	10 kΩ
MIC	0 Ω
REC/P.B. Connector	80 kΩ

Output Connection



- (2) During the adjustment, set the REC level controls to the position where the LINE OUT level is 0dB (0.775 V) when delivering a 1 kHz signal of -60 dB (0.775 mV) into the MIC jack.
- (3) Before making the head adjustment, demagnetize and clean the REC/P.B. head with swab or soft cloth dampened with denatured alcohol.

- (4) The switches should be set in the following positions, unless otherwise specified.
TAPE SELECTOR SW NORMAL
TAPE SPEED SW 19 cm/s (7½ ips)
- (5) A new tape or a sufficiently-demagnetized tape should be used as a blank test tape.
- (6) Details of SONY alignment tapes, "J-19-K1" and "J-19-F1":

tone align- ment tape	1st	2nd	3rd	4th	5th	6th	7th
J-19-K1	10 kHz -10 dB	400 Hz 0 dB					
J-19-F1	10 kHz -10 dB	400 Hz 0 dB	400 Hz -10 dB	10 kHz -10 dB	7 kHz -10 dB	80 Hz -10 dB	40 Hz -10 dB

- (7) The adjustments should be performed in numerical order, unless otherwise specified.
- 9-1 Tape Pass Adjustment
- 9-2 Tape Curl Adjustment
- 9-3 REC/P.B. Head Azimuth and Angle Adjustments
- 9-4 REC/P.B. Head Phase Check
- 9-5 P.B. Output Level Adjustment and Level Meter Calibration
- 9-6 P.B. Equalizer Adjustment
- 9-7 P.B. S/N Ratio Measurement
- 9-8 Trap Coil Adjustment
- 9-9 Record Bias Adjustment
- 9-10 Record Level Adjustment
- 9-11 Erase Ratio Measurement
- 9-12 Wow & Flutter Measurement
- 9-13 Overall Frequency Response Measurement
- 9-14 Overall S/N Ratio Measurement
- 9-15 Overall Distortion Ratio Measurement
- 9-16 Cross-talk Measurement (between channels)
- 9-17 Cross-talk Measurement (between tracks)
- 9-18 Input & Output Level Checks of REC/P.B. Connector

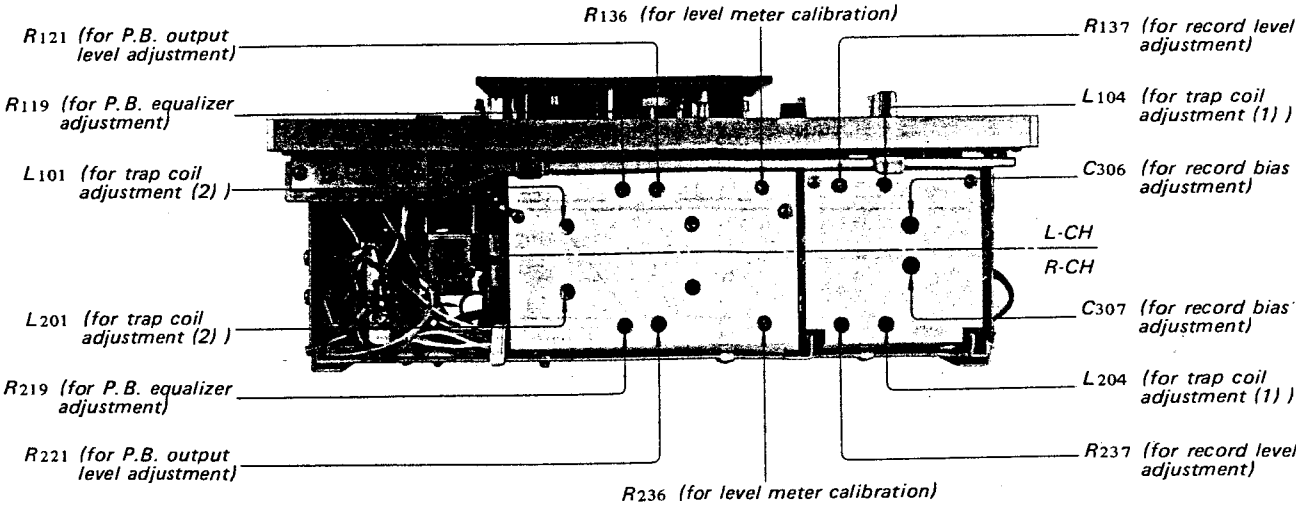


Fig. 9-1 Adjusting parts location (1)

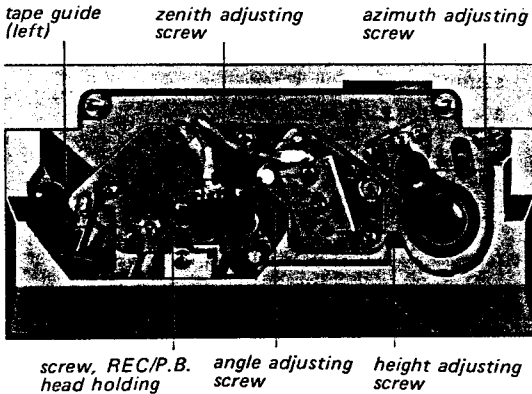


Fig. 9-2 Adjusting parts location (2)

Procedures:

- (1) Thread a blank tape.
- (2) Set the machine in FWD mode at the 19 cm/s (7½ips) tape speed.
- (3) Make the tape loose a little by pushing the tension regulator arm pin in the direction shown with the arrow in Fig. 9-3 and then adjust the zenith and azimuth adjusting screws to obtain the reflection of light as shown in Fig. 9-3.
- (4) Turn the azimuth adjusting screw to be parallel the upper edge of the head core to that of the tape.
- (5) Turn the height adjusting screw to align the upper edge of the head core and that of the tape and memorize the number of turns of the screw.
- (6) Turn the zenith adjusting screw by the same number of the turns in the same direction of the height adjusting screw.
- (7) Repeat the above procedures (5) and (6) to align the upper edge of the head core and that of the tape.
- (8) Turn the height and zenith adjusting screws counterclockwise by approximately 20° from the position obtained in the preceding procedure (7) so that the upper edge of the head core is 0.025 mm lower than that of the tape.
- (9) Be sure to obtain the reflection of light as shown in Fig. 9-3 on the tape at the head by pushing the tension regulator arm pin in the direction shown with the arrow in Fig. 9-3. If not, repeat the above procedures.

9-1. Tape Pass Adjustment

(A) Tape Guide (left) Adjustment

Adjusting Parts:

- tape guide (left) See Fig. 9-2.
- (1) Thread a tape.
- (2) Align the upper edge of the tape just on the upper edge of the erase head core by turning the tape guide located on the left side of the erase head.
- (3) Turn the tape guide located on the left side of the erase head clockwise by approximately 35° from the position obtained in the preceding procedures, so that the upper edge of the tape is approximately 0.05 mm lower than that of the erase head core.

(B) Tentative REC/P.B. Head Adjustment

Adjusting Parts:

- azimuth adjusting screw
height adjusting screw
zenith adjusting screw } See Fig. 9-2.

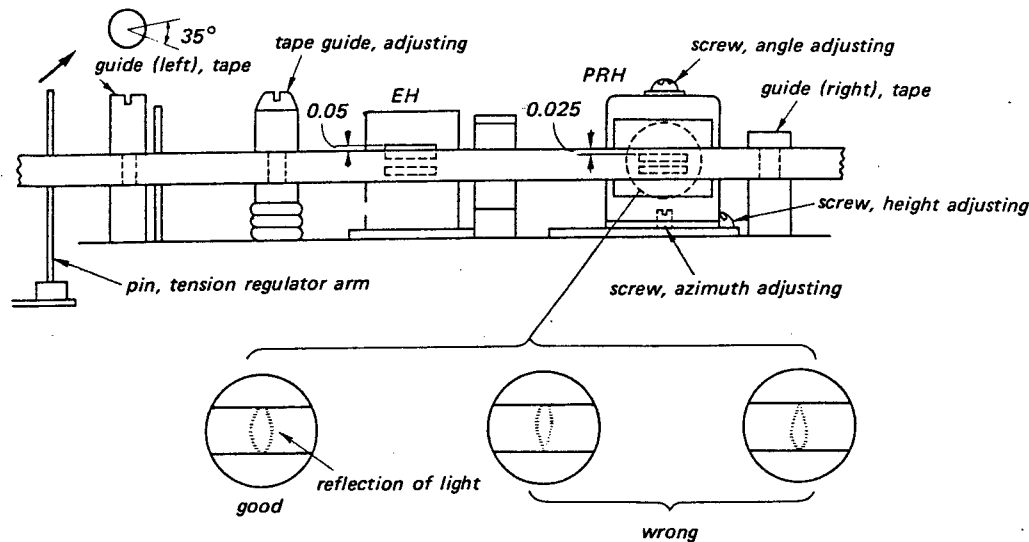


Fig. 9-3 Tape pass adjustment

9-2. Tape Curl Adjustment

Procedures:

- (1) Set the machine at 4.8 cm/s (1 7/8 ips) tape speed.
- (2) Be sure that the tape comes in contact with the two tape guides exactly as shown in Fig. 9-4.
 - If the tape is curled at the left tape guide, adjust by bending the tension regulator arm pin with fingers.
 - If the tape is curled at the right tape guide, loosen the two capstan bearing holding screws and adjust by adding or removing the mylar spacer.

Note: After adding or removing the mylar spacer, perform the head zenith adjustment.

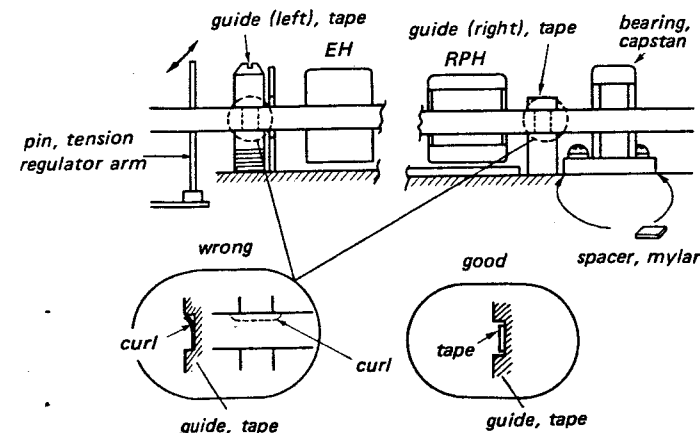


Fig. 9-4 Tape curl adjustment

9-3. REC/P.B. Head Azimuth & Angle Adjustments

Connections:

As shown in Fig. 9-5

Adjusting Parts:

azimuth adjusting screw } See Fig. 9-2
angle adjusting screws }

Switch Setting:

TAPE SPEED switch 19 cm/s (7 1/2 ips)

Procedures:

- (1) Be sure that the head is secured sufficiently to the head deck with the holding screw shown in Fig. 9-2, and the tape pass adjustment has been made.
- (2) Playback the 1st tone (10 kHz) of SONY alignment tape, J-19-F1 or J-19-K1.
- (3) Adjust the azimuth adjusting screw with a non-magnetic screw driver to obtain the maximum reading on the VTVM in both L-CH and R-CH.
If the maximum value of R-CH is not the same as that of L-CH, adjust the screw to obtain the mean value of both L-CH and R-CH maximum readings.
- (4) Adjust the angle of the head by loosening the two angle adjusting screws so that the output level is maximum and the level variation within 1 dB on the VTVM.
- (5) Make the head azimuth adjustment again.

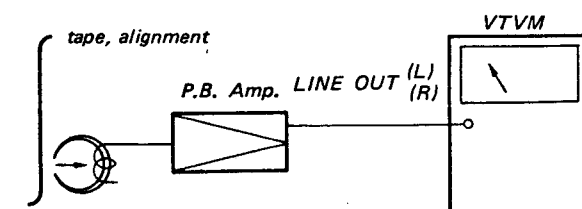


Fig. 9-5 REC/P.B. head azimuth & angle adjustment setup

9-4. REC/P.B. Head Phase Check

Connection:

As shown in Fig. 9-6

Procedures:

- (1) Playback the 2nd tone (400 Hz) of SONY alignment tape J-19-F1 or J-19-K1.
- (2) Make sure to obtain the Lissajous figure with no phase difference on the oscilloscope as shown in Fig. 9-7.
If not, make the head azimuth adjustment.

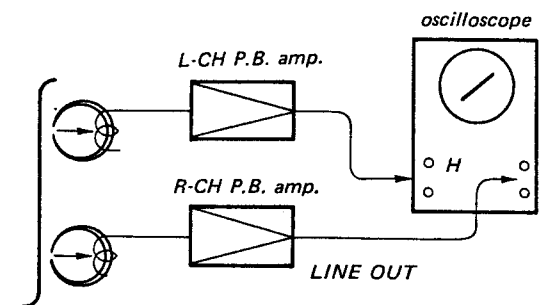
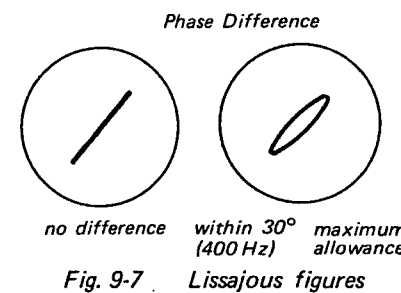


Fig. 9-6 REC/P.B. head phase check setup



9-5. P.B. Output Level Adjustment & Level Meter Calibration

Connection:

As shown in Fig. 9-8

Adjusting Parts:

R121 (R221) - p.b. output level adjustment See Fig. 9-1
R136 (R236) - level meter calibration See Fig. 9-1

Switch Setting:

TAPE SELECTOR switch NORMAL
TAPE SPEED switch 19 cm/s (7 1/2 ips)

Procedures:

- (1) Playback the 2nd tone (400 Hz, 0 dB) of SONY alignment tape J-19-F1 or J-19-K1.
- (2) Adjust R121 (R221) to obtain -0.5 ~ +0.5 dB (0.72 ~ 8.1 V) on the VTVM.

- (3) Adjust R136 (R236) so that the pointer of the level meter just indicates the boundary between the red portion and the black portion.
- (4) Change the TAPE SELECT switch to SLH.
- (5) Be sure that the VTVM reading is -2 ~ -3 dB (0.61 ~ 0.55 V).

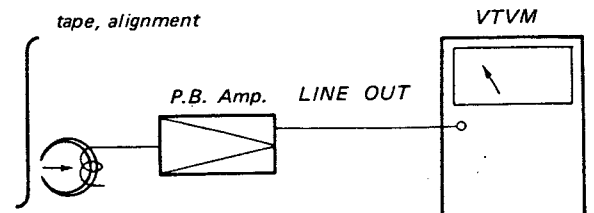


Fig. 9-8 P.B. output level adjustment & level meter calibration

9-6. P.B. Equalizer Adjustment

Connection:

As shown in Fig. 9-9

Adjusting Parts:

R119 (R219) - 19 cm/s (7 1/2 ips) tape speed See Fig. 9-1

Procedures:

- In using the SONY alignment tape J-19-K1
 - (1) Set the TAPE SPEED switch to 19 cm/s (7 1/2 ips) tape speed.
 - (2) Playback the 1st tone (10 kHz, -10 dB) of the tape and memorize the reading on the VTVM.
 - (3) Playback the 2nd tone (400 Hz, 0 dB) of the tape and adjust R119 (R219) so that the reading on the VTVM is 10 dB higher than the reading obtained in the preceding procedure (2).
- In using the SONY alignment tape J-19-F1
 - (1) Set the TAPE SPEED switch to 19 cm/s (7 1/2 ips) tape speed.
 - (2) Playback the 3rd tone (400 Hz, -10 dB) of the tape and memorize the reading on the VTVM.
 - (3) Playback the 4th tone (10 kHz, -10 dB) of the tape and adjust R119 (R219) so that the reading on the VTVM is the same as the reading obtained in preceding procedure (2).
 - (4) Be sure that the deviation of each tone against the 3rd tone (400 Hz) is within the value shown in the table (1).
 - (5) Change the TAPE SPEED switch from 19 cm/s (7 1/2 ips) to 9.5 cm/s (3 3/4 ips).

- (6) Be sure that the deviation of each tone against the 3rd tone (400 Hz) is within the value shown in the table (2).

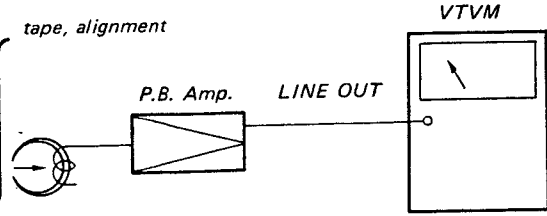


Fig. 9-9 P.B. equalizer adjustment setup

tape tone	4th	5th	6th	7th
frequency	10 kHz	7 kHz	80 Hz	40 Hz
deviation	0±0.5 dB	0±1.5 dB	2±1.5 dB	3±2 dB

Table (1): SONY alignment tape J-19-F₁ (at 19 cm/s)

tape tone	4th	5th	6th	7th
frequency	5 kHz	3 kHz	200 Hz	80 Hz
deviation	0±2 dB	0±2 dB	1±2 dB	2±2 dB

Table (2): SONY alignment tape J-9-F₁ (at 9.5 cm/s)

9-7. P.B. S/N Ratio Measurement

Connection:

As shown in Fig. 9-10

Adjusting Parts:

- ① joint terminal
- ② power transformer holding screw

Procedures:

- (1) Playback the 2nd tone (400 Hz) of the SONY alignment tape J-19-F₁ or J-19-K₁ and be sure that the VTVM reading is 0 dB. If not, make the p.b. output level adjustment again.
- (2) Set the machine at 19 cm/s (7½ ips) tape speed in FWD mode with no tape, by pushing the shut-off lever with finger.
- (3) Be sure that the VTVM reading is less than -49 dB (3 mV).
- (4) S/N ratio will change by reversing the sense of motor and by moving the position of the power transformer. Therefore, select the connection of the joint terminals connected to the motor leads and adjust the position of the power transformer by loosening the screw marked with ▲ in Fig. 9-11 for the best S/N ratio.

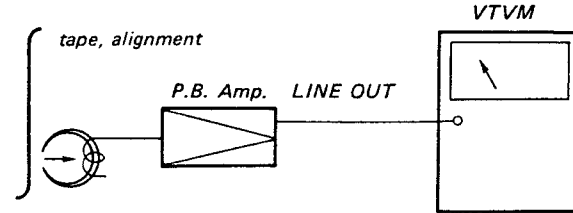


Fig. 9-10 P.B. S/N ratio measurement setup

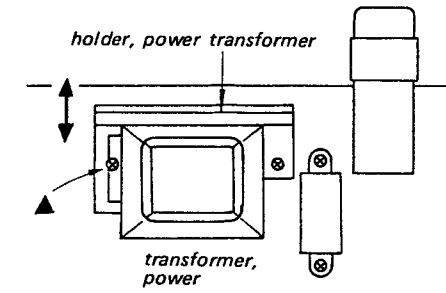


Fig. 9-11 Power transformer position adjustment

9-8. Trap Coil Adjustment (1)

Connection:

As shown in Fig. 9-12

Adjusting Parts:

L104 (L204) See Fig. 9-1

Procedures:

- (1) Connect the VTVM to the check points "P" indicated on the bias osc. & power supply circuit board on page 31.
- (2) Turn the record level controls counterclockwise to the full.
- (3) Push the shut-off arm pin during this adjustment.
- (4) Place the machine in stereo-record mode.
- (5) Adjust L104 (L204) to obtain the minimum reading on the VTVM.

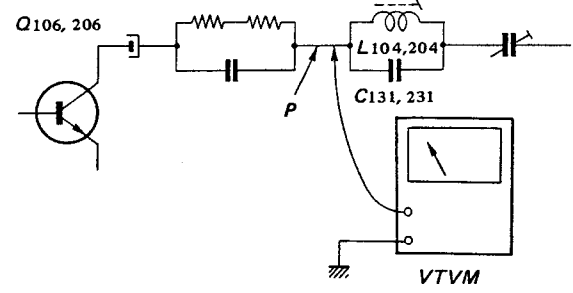


Fig. 9-12 Trap coil adjustment (1) setup

9-9. Trap Coil Adjustment (2)

Connections:

As shown in Fig. 9-13

Adjusting Parts:

L101 (L201) See Fig. 9-1

Procedures:

- (1) Turn the record level controls clockwise to the full.
- (2) Set the L-CH (R-CH) only in record mode.
- (3) Adjust L201 (L101) to obtain the minimum reading (less than -30 dB, 24.5 mV) on the VTVM.

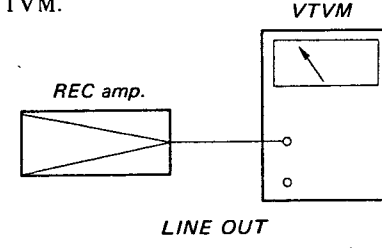


Fig. 9-13 Trap coil adjustment (2) setup

9-10. Record Bias Adjustment

Connections:

As shown in Fig. 9-14

Adjusting Parts:

C306 (C307) See Fig. 9-1

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Be sure that the trap coil adjustment (1) has been made.
- (2) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack.
- (3) Turn the trimmer capacitors, C306 & C307, clockwise to the full seeing from the conductor side of the circuit board.
- (4) Thread a blank tape and place the machine in record mode.
- (5) Set the tape index counter at "0000" by pushing the reset button.
- (6) Memorize the reading on the tape index counter and the position of C306 (C307) at intervals of approximately 5 V on the VTVM, while turning C306 (C307) counterclockwise slowly.
- (7) Rewind the tape.

Note:

- (1) Connect the VTVM across the REC/P.B. head only when measuring them to prevent mis-measurements from the stray capacitance caused by the leads of the VTVM.
- (2) Do not use the shielded wire as the leads of the VTVM.

- (8) Playback the recorded portion of the tape and memorize the LINE OUT levels against each position of the tape index counter obtained in the step (6).
- (9) Search out the position of C306 (C307) where is obtained the highest LINE OUT level and then set C306 (C307) to the point.

Note: As the peak point is obtained in fairly wide range, set C306 (C307) to the point where the least bias voltage is obtained.

- (10) Record two 1 kHz and 15 kHz signals of -40 dB (7.75 mV) on the tape and playback them.
- (11) Turn C306 (C307) counterclockwise so that the line output level at 15 kHz signal is +0.3 ~ -0.5 dB against the level at 1 kHz signal.
- (12) After the adjustment, apply lock paint to C306 (C307).

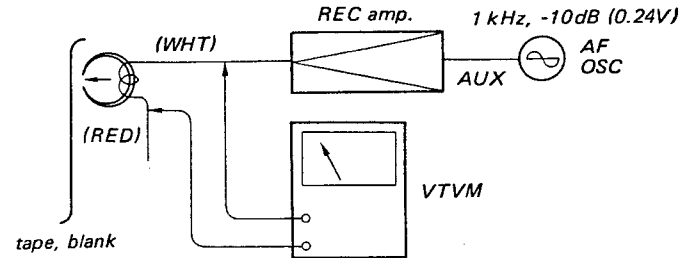


Fig. 9-14 Record bias adjustment setup

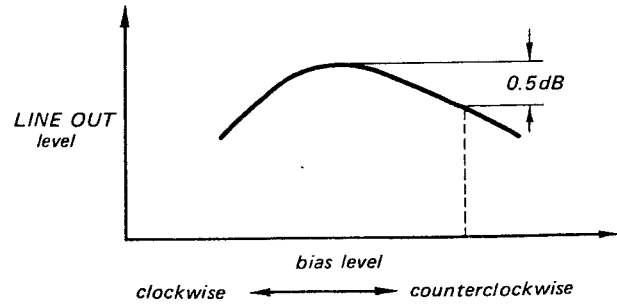


Fig. 9-15 Record bias characteristics

9-11. Record Level Adjustment

Connection:

As shown in Fig. 9-16

Adjusting Parts:

R137 (R237) See Fig. 9-1

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Thread a blank tape.
- (2) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack and record the signal on the blank tape.

- (3) Playback the tape.
- (4) Adjust R137 (R237) so that the VTVM reading is 0 dB (0.775 V).
- (5) Be sure that the level difference between channels is within 2 dB at 9.5 cm/s (3¾ ips) and 4.8 cm/s (1⅞ ips) tape speeds.
- (6) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack again.
- (7) Set the L-CH (R-CH) only in record mode at 19 cm/s (7½ ips) tape speed and memorize the VTVM indication.
- (8) Set the machine in stereo-record mode at 19 cm/s (7½ ips) tape speed and memorize the VTVM indication of L-CH (R-CH).
- (9) Be sure that the level difference between step (7) and step (8) is within 1 dB.

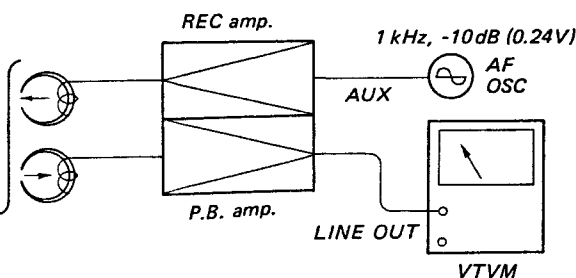


Fig. 9-16 Record level adjustment setup

9-12. Erase Ratio Measurement

Connection:

As shown in Fig. 9-17

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Thread a blank tape.
- (2) Deliver a 1 kHz signal of 0 dB (0.775 V) into the AUX IN jack and record the signal on the blank tape.
- (3) Rewind the tape and erase a part of the tape (record mode with no signal input).
- (4) Memorize the VTVM reading on the recorded part and the erased part of the tape.
- (5) Be sure that the ratio of the recorded part to the erased part is more than 70 dB in level. If not, perform the tape pass adjustment and be sure that the erasing current is 80 ~ 110 mA. To measure the erasing current, connect a 1 Ω resistor in series to the erase head as shown in Fig. 9-18 and the VTVM across the 1 Ω resistor.

Note: Take impedance-matching correctly for the band pass filter (BPF).

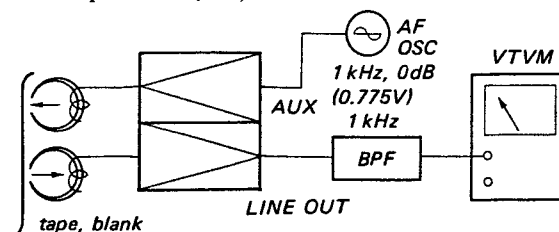


Fig. 9-17 Erase ratio measurement setup

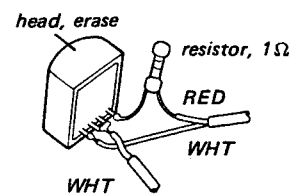


Fig. 9-18 Erasing current check setup

9-13. Wow and Flutter Measurement

Connection:

As shown in Fig. 9-19

Procedures:

- (1) Prepare two SONY alignment tapes, WS-19-7 (for 19 cm/s) and WS-9-7 (for 9.5 cm/s).
- (2) Record the 3 kHz signal near the end of the blank tape for 2 minutes, at 4.8 cm/s (1⅞ ips) tape speed to make the 4.8 cm/s alignment tape.
- (3) Playback the alignment tapes and the tape recorded in step (2) for 30 seconds at the each tape speed and then set the machine in STOP mode.

Note: The measurement should be performed near the end of the each tape.

- (4) Repeat the above step (3) by three times and take the each maximum values on the wow and flutter meter.
- (5) Be sure that the maximum values for the each speed is within the values described in the table below.

TAPE SPEED	Allowable Limit
19 cm/s (7½ ips)	0.12% rms
9.5 cm/s (3¾ ips)	0.18% rms
4.8 cm/s (1⅞ ips)	0.30% rms

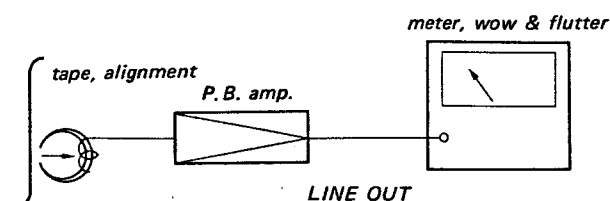


Fig. 9-19 Wow and flutter measurement setup

9-14. Overall Frequency Response Measurement

Connection:

As shown in Fig. 9-20

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Thread a blank tape.
- (2) Deliver a 1 kHz signal of -40 dB (7.75 mV) into the AUX IN jack and record the signal on the blank tape.
- (3) Playback the tape and memorize the VTVM reading.
- (4) Deliver 40 Hz, 70 Hz, 4 kHz, 7 kHz, 10 kHz, 15 kHz and 18 kHz signals of -40 dB (7.75 mV) in turn into the AUX IN jack and record them on the blank tape.
- (5) Playback the tape portion recorded in the step (4) and memorize the VTVM reading respectively.
- (6) Be sure that each deviation in level against 1 kHz signal is within the values shown in the table below.

If not, perform the record bias adjustment.

frequency tape speed	40Hz	70Hz	4kHz	7kHz	10kHz	15kHz	18kHz
19 cm/s (7½ ips)	+2 dB -5 dB	+2 dB -3 dB	+2 dB -3 dB	+2 dB -3 dB	+2 dB -3 dB	+2 dB -3 dB	+2 dB -4 dB
9.5 cm/s (3¾ ips)	+3 dB -6 dB	+3 dB -3 dB	+3 dB -3 dB	+3 dB -3 dB	+3 dB -6 dB		
4.8 cm/s (1⅞ ips)	+3 dB -7 dB	+3 dB -3 dB	+3 dB -3 dB	+3 dB -7 dB			

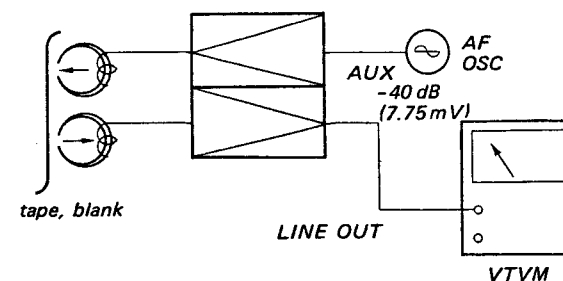


Fig. 9-20 Overall frequency response measurement setup

9-15. Overall S/N Ratio Measurement

Connection:

As shown in Fig. 9-21

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Thread a blank tape.

- (2) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack and record the signal on the blank tape.
- (3) Playback the tape and memorize the VTVM reading.
- (4) Remove the input connection of the audio generator and terminate the MIC and the AUX IN jacks with the dummy resistors (MIC 600 Ω, AUX 10 k Ω).
- (5) Rewind the recorded tape and erase a part of the recorded tape (record mode with no signal input).
- (6) Be sure that the ratio of the recorded part of the tape to the erased part is more than 45 dB at 19 cm/s (7½ ips) tape speed and 44 dB at 9.5 cm/s (3¾ ips) tape speed on the VTVM.

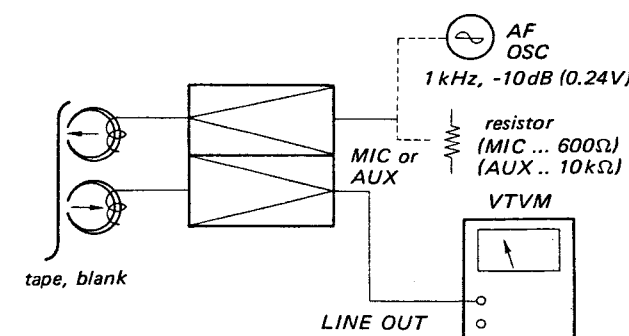


Fig. 9-21 Overall S/N ratio measurement setup

9-16. Distortion Measurement

Connection:

As shown in Fig. 9-22

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Thread a blank tape.
- (2) Deliver a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack and record the signal on the blank tape.
- (3) Playback the tape and be sure that the reading on the distortion meter is within 1.8% at 19 cm/s (7½ ips) tape speed.

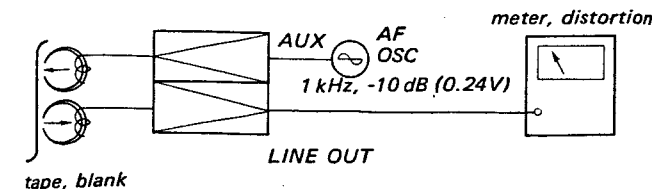


Fig. 9-22 Distortion measurement setup

9-17. Cross-talk Measurement (between channels)

Connection:

As shown in Fig. 9-23

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Thread a blank tape.
- (2) Place the machine in stereo-record mode.
- (3) Deliver a 1 kHz signal of 0 dB (0.775 V) into the L-CH (R-CH) AUX IN jack only.
- (4) Playback the tape.
- (5) Be sure that the ratio of the L-CH (R-CH) LINE OUT to the R-CH (L-CH) LINE OUT is more than 55 dB on the VTVM.

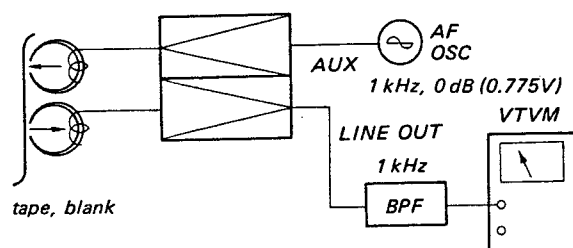


Fig. 9-23 Cross-talk measurement setup (between channels)

9-18. Cross-talk Measurement (between tracks)

Connection:

As shown in Fig. 9-24

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Thread a blank tape.
- (2) Place the machine in stereo-record mode.
- (3) Deliver a 1 kHz signal of +0dB(0.775V) into the L-CH & R-CH AUX IN jacks and record the signal on the blank tape.
- (4) Playback the tape and memorize the L-CH or R-CH VTVM reading, and then take up the tape.
- (5) Turn the recorded tape upside down and put it on the supply reel table.
- (6) Playback the recorded portion of the tape in the step (3) and memorize the L-CH or the R-CH VTVM reading.
- (7) Be sure that the ratio of the VTVM reading obtained in the step (4) to the VTVM reading obtained in the step (6) is more than 70 dB (Variation Limit: within 5 dB).

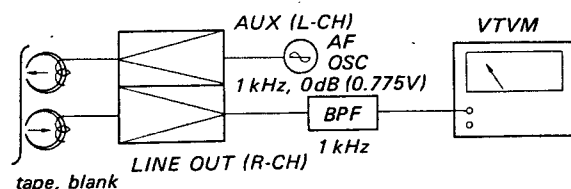


Fig. 9-24 Cross-talk measurement setup (between tracks)

9-19. Input & Output Level Checks of REC/P.B. Connector

Connection:

As shown in Fig. 9-25.

REC Level Control Setting:

Indicated on page 14

Procedures:

- (1) Deliver a 1 kHz signal of -33 dB (17.5 mV) to terminal No. ① (L-CH) or ④ (R-CH) of the rec./p.b. connector shown in Fig. 9-26.
- (2) Place the machine in record mode and be sure that the pointer of the level meter indicates the boundary between the red portion and the black portion.
- (3) Record the signal on the blank tape.
- (4) Playback the tape.
- (5) Be sure that the reading on the VTVM connected to the terminal No. ③ (L-CH) or ⑤ (R-CH) of the rec./p.b. connector is -1 ~ +1 dB (0.69 ~ 0.87 V).

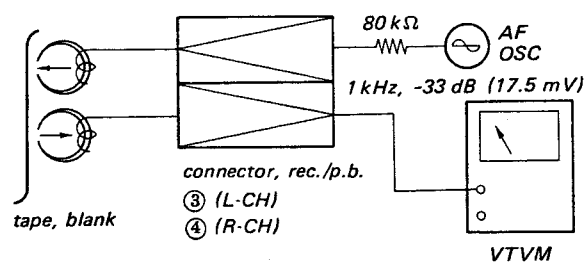


Fig. 9-25 Input & output level checks setup of REC/P.B. Connector

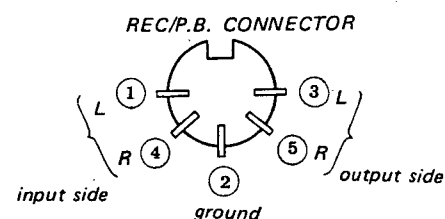


Fig. 9-26 REC/P.B. connector (back view)

10. CONVERSION TO DIFFERENT POWER LINE FREQUENCY

If the deck is to be operated on a line frequency different from the frequency for which the deck is adjusted, it may be easily converted. (Remove the reel panel for access.)

FIRST: Using a screw-driver, turn the line frequency switch (S304) to the correct position for the power to be used (50 or 60 Hz). See Fig. 10-1.

SECOND: Replace the motor pulley as follows:

1. Remove the Instant Stop adjusting plate and withdraw the Instant Stop pull rod.

2. Remove the two screws which hold the motor pulley and take off the pulley of its shaft.
3. Replace the motor pulley with the correct diameter pulley for the line frequency to be used. ALWAYS replace the pulley with the same marking (i.e., "+3") as the one you removed. (This identification mark indicates a fine speed tolerance diameter.)
4. After reassembling the motor pulley, make the instant stop adjustment (Refer to page 13).

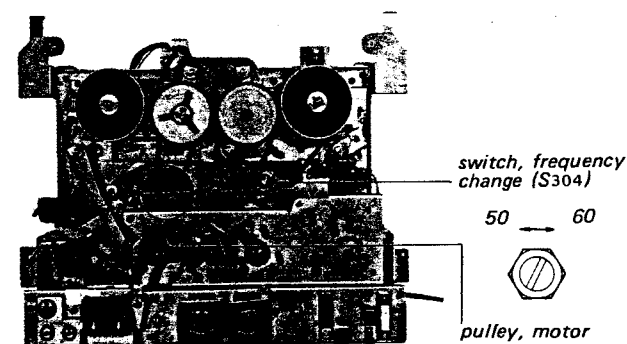


Fig. 10-1 Parts location

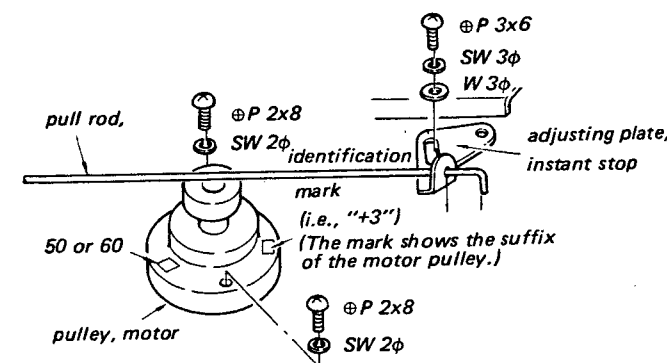


Fig. 10-2 Motor pulley replacement

Motor Pulley Part No.			
for 50 Hz		for 60 Hz	
Identification Mark on Motor Pulley	Part No.	Identification Mark on Motor Pulley	Part No.
+3	3-472-184-61	+3	3-472-185-61
+2	3-472-184-51	+2	3-472-185-51
+1	3-472-184-41	+1	3-472-185-41
+0.5	3-472-184-71	+0.5	3-472-185-71
0	3-472-184-01	0	3-472-185-01
-0.5	3-472-184-81	-0.5	3-472-185-81
-1	3-472-184-11	-1	3-472-185-11
-2	3-472-184-21	-2	3-472-185-21
-3	3-472-184-31	-3	3-472-185-31

10. CONVERSION TO DIFFERENT POWER LINE FREQUENCY

If the deck is to be operated on a line frequency different from the frequency for which the deck is adjusted, it may be easily converted. (Remove the reel panel for access.)

FIRST: Using a screw-driver, turn the line frequency switch (S304) to the correct position for the power to be used (50 or 60 Hz). See Fig. 10-1.

SECOND: Replace the motor pulley as follows:

1. Remove the Instant Stop adjusting plate and withdraw the Instant Stop pull rod.

2. Remove the two screws which hold the motor pulley and take off the pulley of its shaft.
3. Replace the motor pulley with the correct diameter pulley for the line frequency to be used. ALWAYS replace the pulley with the same marking (i.e., "+3") as the one you removed. (This identification mark indicates a fine speed tolerance diameter.)
4. After reassembling the motor pulley, make the instant stop adjustment (Refer to page 13).

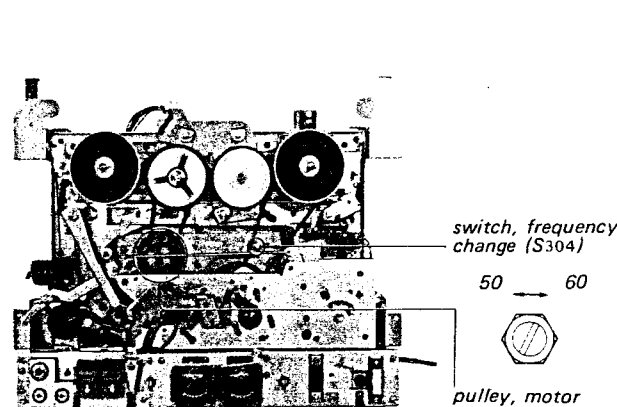


Fig. 10-1 Parts location

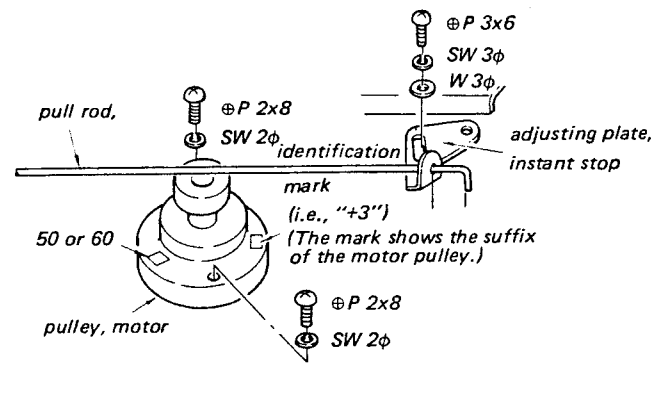
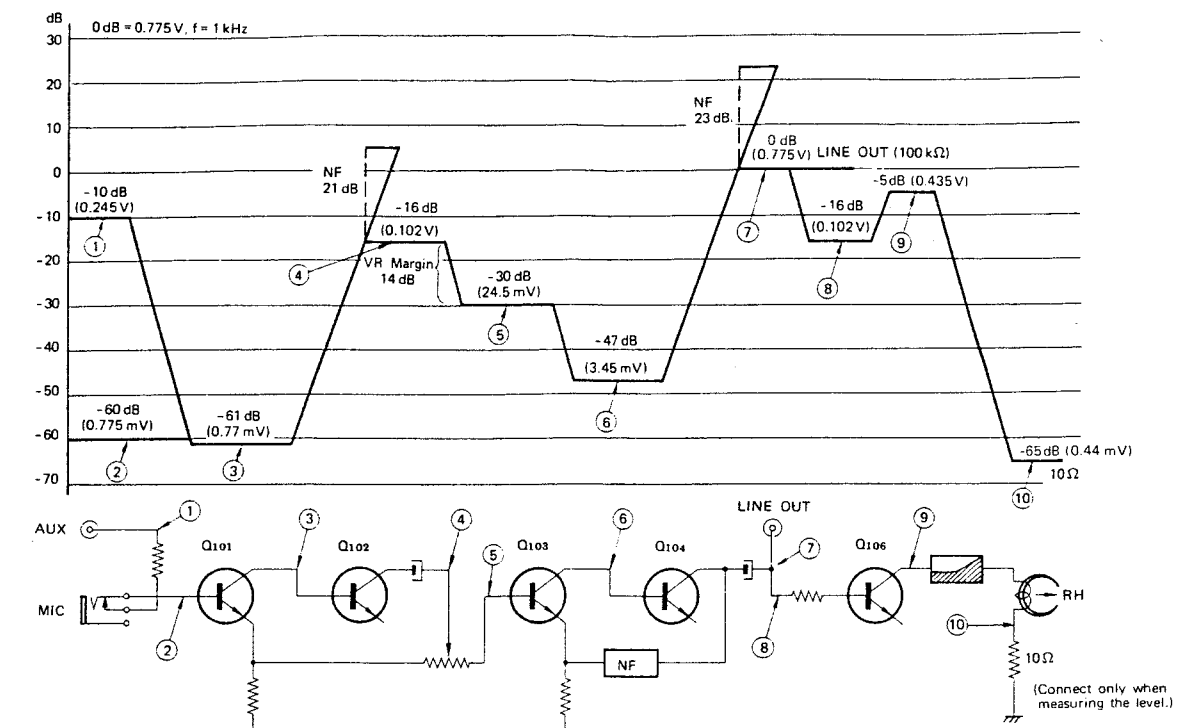


Fig. 10-2 Motor pulley replacement

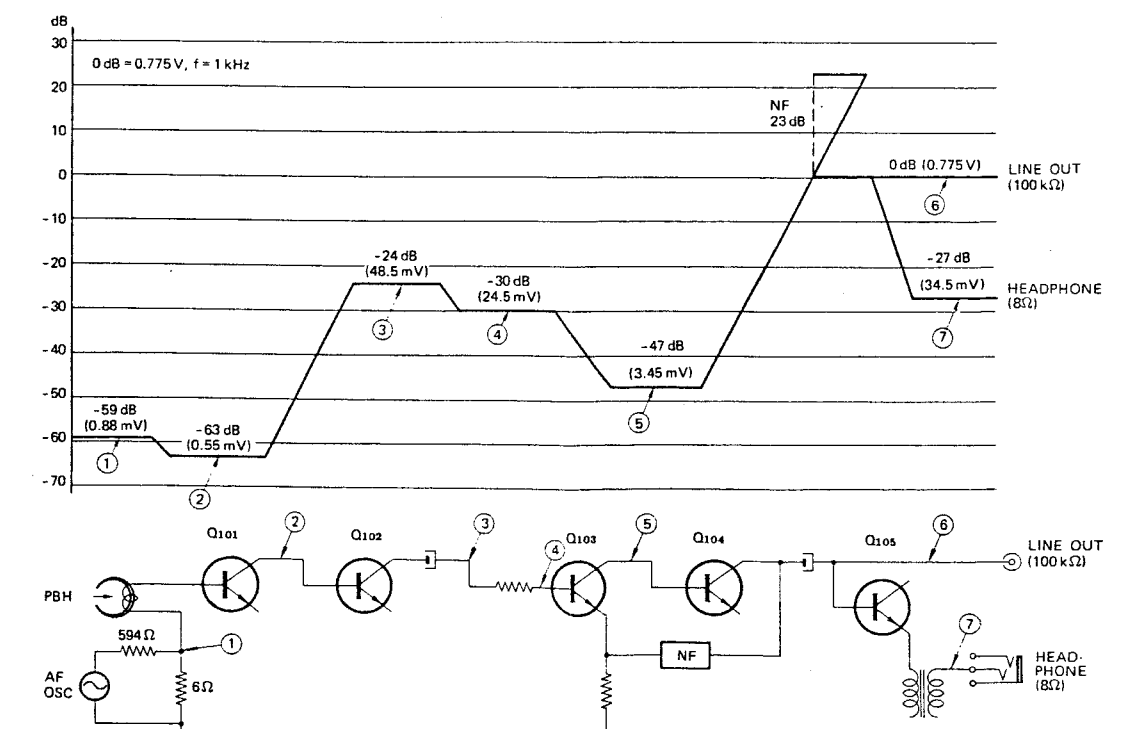
Motor Pulley Part No.			
for 50 Hz		for 60 Hz	
Identification Mark on Motor Pulley	Part No.	Identification Mark on Motor Pulley	Part No.
+3	3-472-184-61	+3	3-472-185-61
+2	3-472-184-51	+2	3-472-185-51
+1	3-472-184-41	+1	3-472-185-41
+0.5	3-472-184-71	+0.5	3-472-185-71
0	3-472-184-01	0	3-472-185-01
-0.5	3-472-184-81	-0.5	3-472-185-81
-1	3-472-184-11	-1	3-472-185-11
-2	3-472-184-21	-2	3-472-185-21
-3	3-472-184-31	-3	3-472-185-31

11. LEVEL DIAGRAM

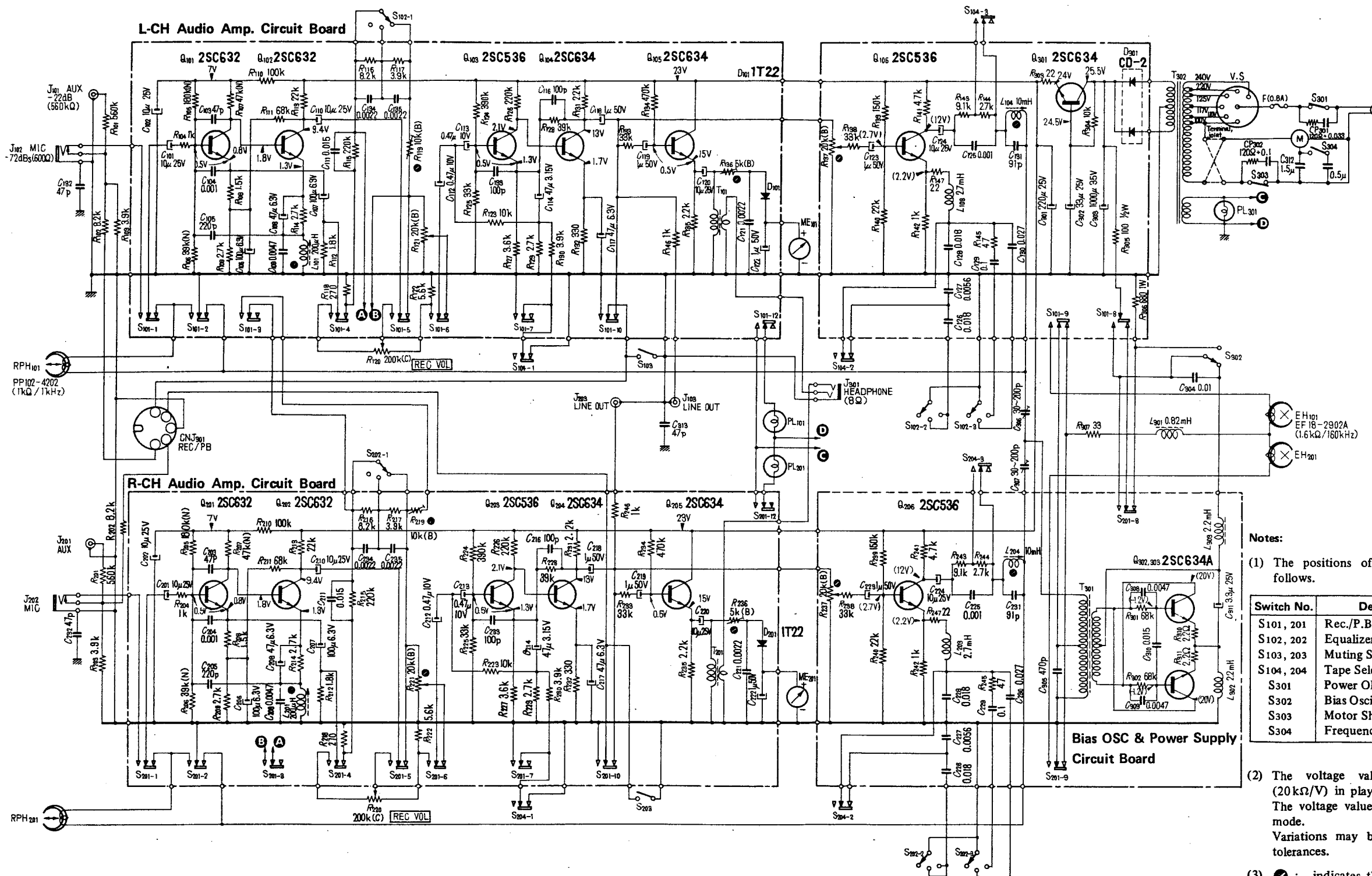
11-1. Record



11-2. Playback



12. SCHEMATIC DIAGRAM



Notes:

(1) The positions of the switches in this diagram are as follows.

Switch No.	Description	Position
S101, 201	Rec./P.B. Switch	Playback
S102, 202	Equalizer Switch	19 cm/s (7½ ips)
S103, 203	Muting Switch	OFF
S104, 204	Tape Selector Switch	Normal
S301	Power ON/OFF Switch	ON
S302	Bias Oscillator Switch	ON
S303	Motor Shut-off Switch	ON
S304	Frequency Change Switch	60 Hz

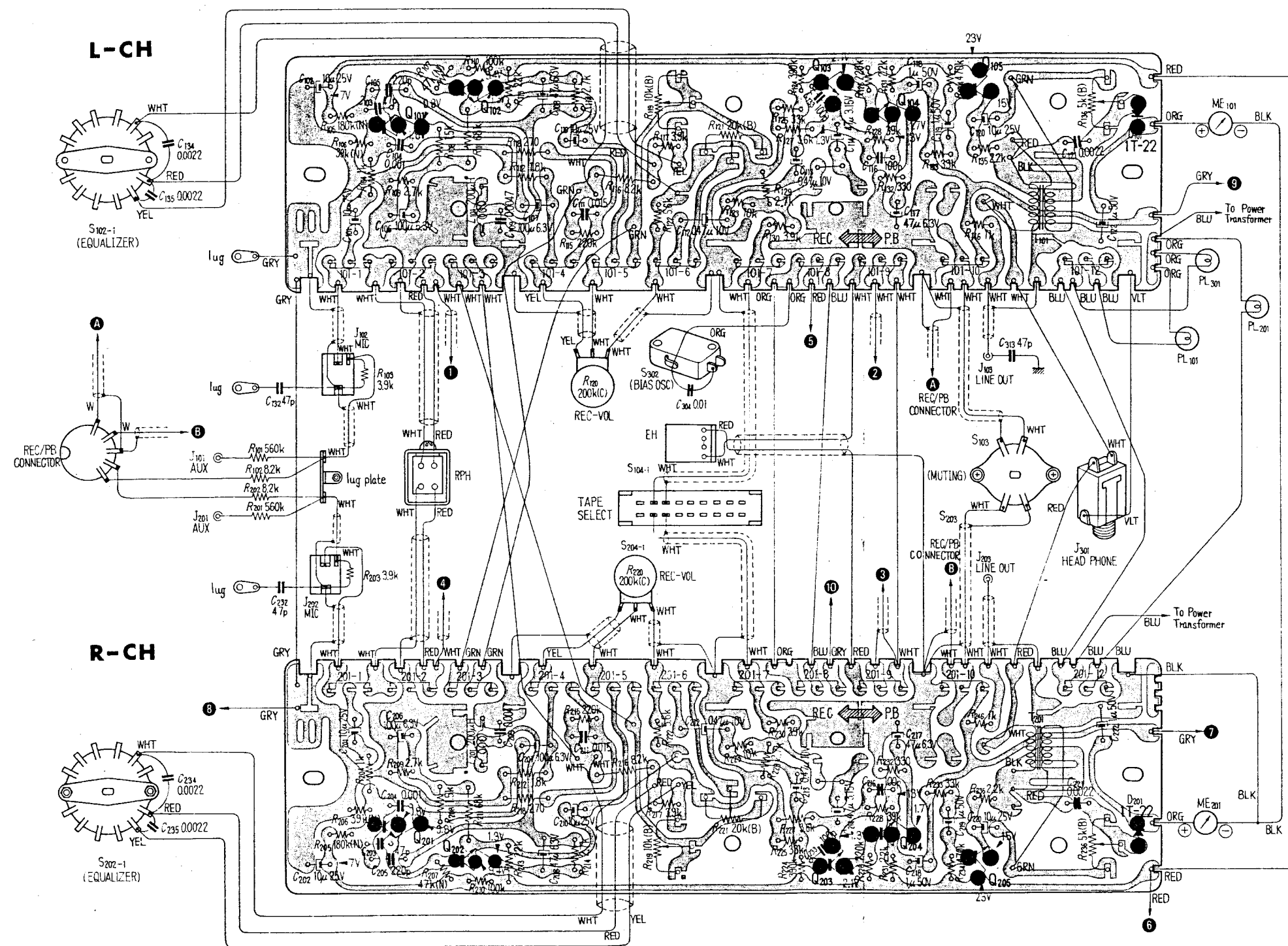
(2) The voltage values are measured with a voltmeter (20 k Ω /V) in playback mode. The voltage values in parentheses are measured in record mode. Variations may be noted because of normal production tolerances.

(3) : indicates the adjustable parts.

13. MOUNTING DIAGRAM

13-1. Audio Amp. Circuit Boards

– Conductor Side –



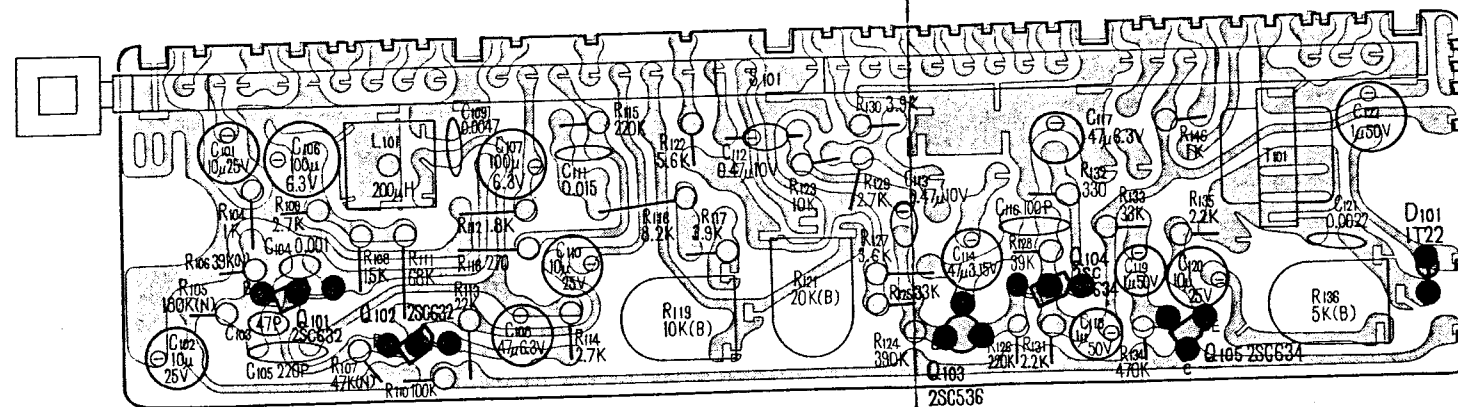
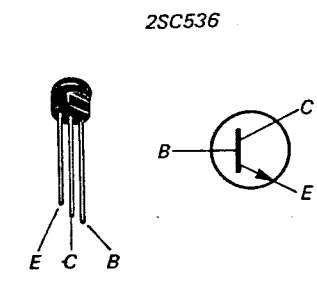
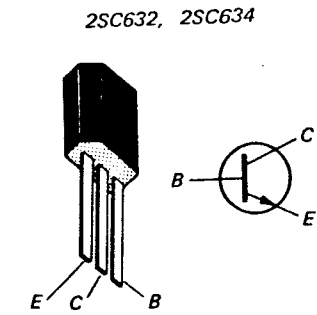
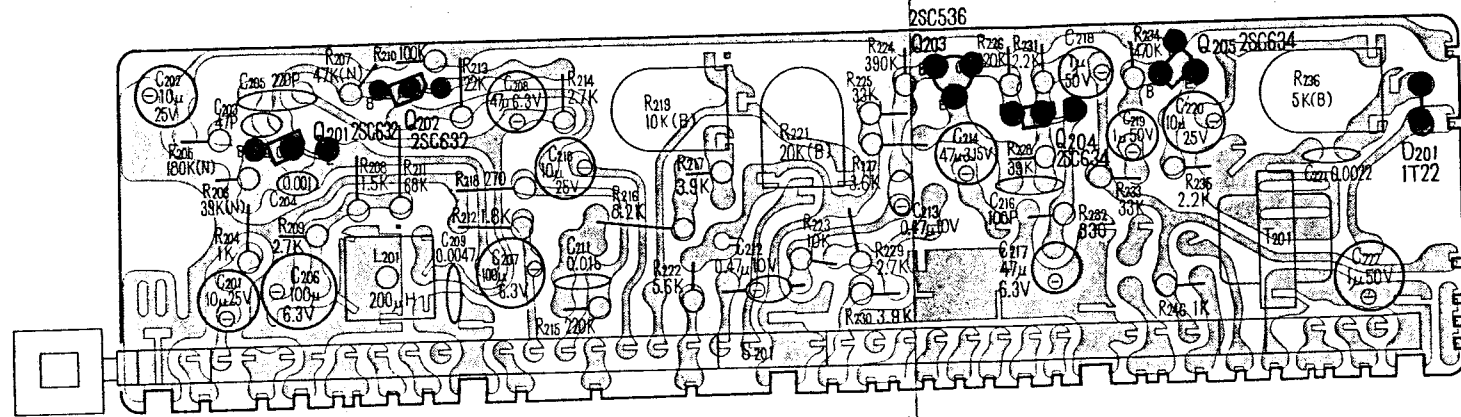
L-CH Audio Amp. Circuit Board
Part No.: 1-539-411-11

R-CH Audio Amp. Circuit Board
Part No.: 1-539-412-11

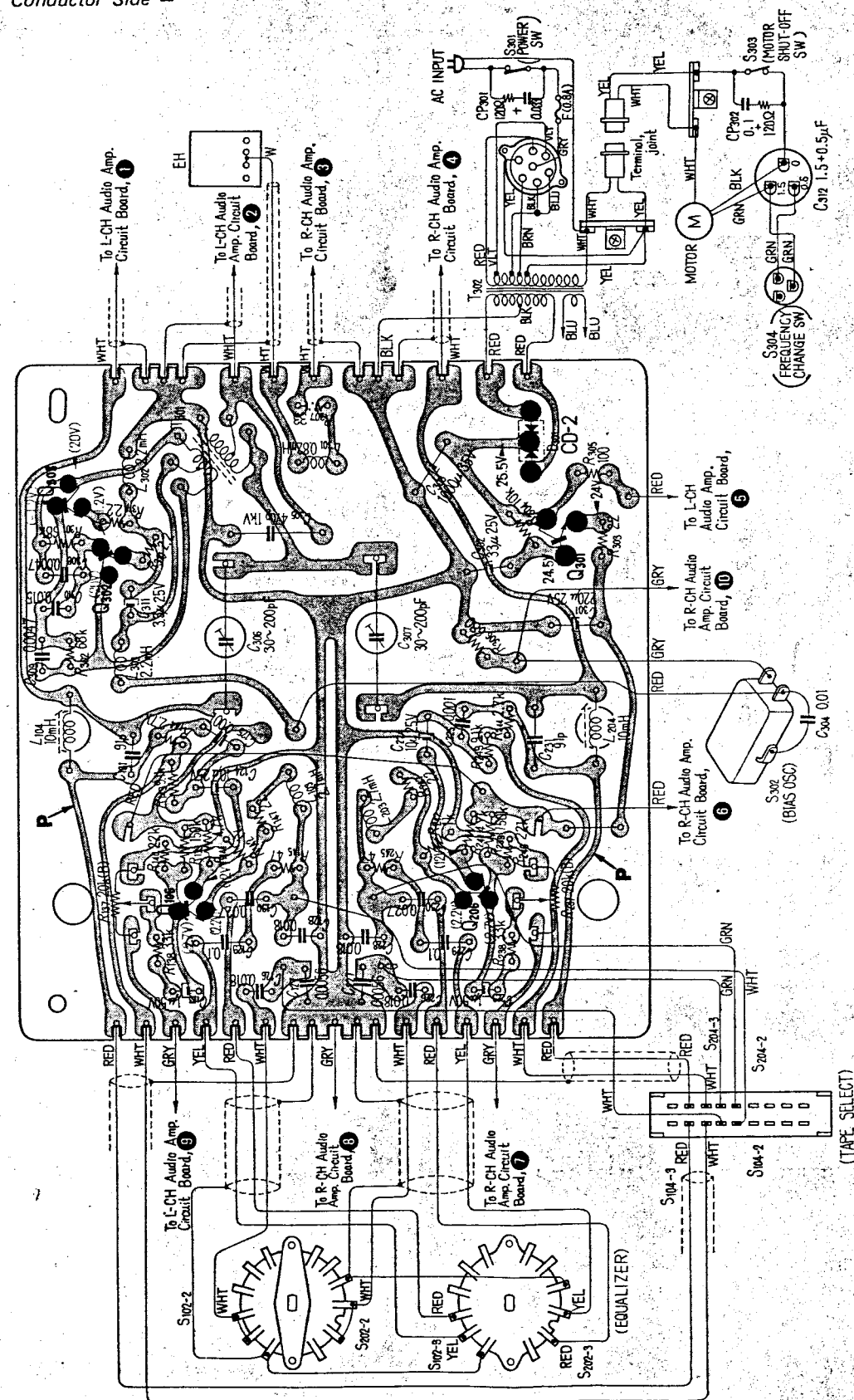
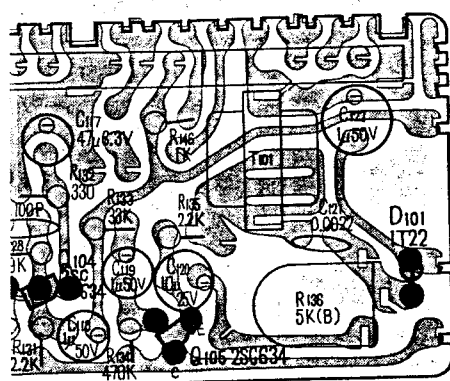
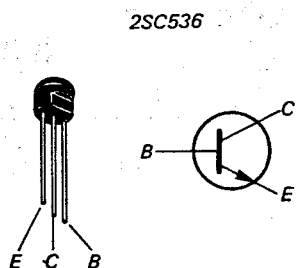
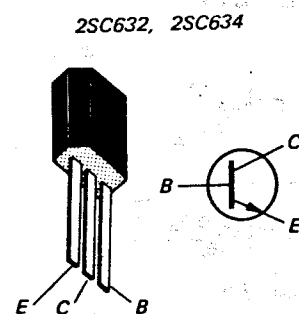
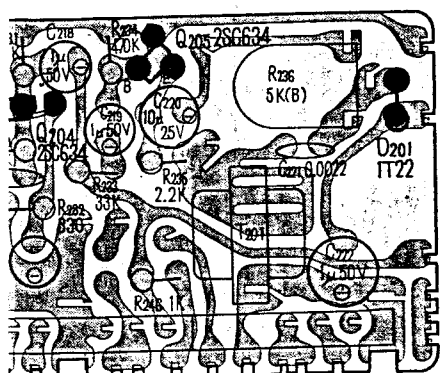
Notes:

- (1) The leads indicated with ① ~ ⑩ are to be connected to the Bias OSC & Power Supply Circuit Board.
- (2) The letter (N) which is suffixed to resistance values shows a low-noise resistor.

13-1. Audio Amp. Circuit Boards
— Component Side —

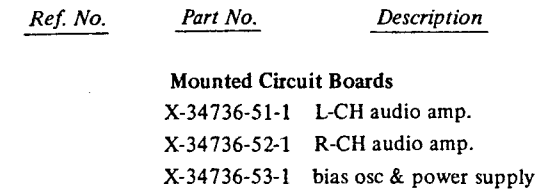


13-2. Bias OSC & Power Supply Circuit Board
— Conductor Side —



Printed Circuit Board
Part No.: 1-539-413-11

14. ELECTRICAL PARTS LIST



D101, 201	diode	1T22
D301	diode	CD-2

	Transformers	
T101, 201	1-427-217	output
T301	1-433-142	bias osc.
T302	1-441-578	power

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
C121, 221	1-105-825-12	0.0022 μ F 50V, mylar
C122, 222	1-121-381	1 μ F 50V, electrolytic
C123, 223	1-121-381	1 μ F 50V, electrolytic
C124, 224	1-121-398	10 μ F 25V, electrolytic
C125, 225	1-105-661-12	0.001 μ F 50V, mylar
C126, 226	1-106-031-12	0.018 μ F 50V, mylar
C127, 227	1-106-019-12	0.0056 μ F 50V, mylar
C128, 228	1-106-031-12	0.018 μ F 50V, mylar
C129, 229	1-105-685-12	0.1 μ F 50V, mylar
C130, 230	1-106-035-12	0.027 μ F 50V, mylar
C131, 231	1-107-168	91 pF 500V, silvered mica
C132, 232	1-107-123	47 pF 50V, silvered mica
C133, 233	1-107-131	100 pF 50V, silvered mica
C134, 234	1-106-066-12	0.0022 μ F 50V, mylar
C135, 235	1-106-066-12	0.0022 μ F 50V, mylar
C301	1-121-422	220 μ F 25V, electrolytic
C302	1-121-404	33 μ F 25V, electrolytic
C303	1-121-388	1,000 μ F 35V, electrolytic
C304	1-105-753-12	0.01 μ F 200V, mylar
C305	1-107-251	470 pF 1 kV, mica
C306	1-141-010	30~200 pF trimmer
C307	1-141-010	30~200 pF trimmer
C308	1-106-359-12	0.0047 μ F 200V, mylar
C309	1-106-359-12	0.0047 μ F 200V, mylar
C310	1-106-086-12	0.015 μ F 50V, mylar
C311	1-121-392	3.3 μ F 25V, electrolytic
C312	1-117-036	1.5+0.5 μ F MP
C313	1-107-123	47 pF 50V, silvered mica

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

R101, 201	1-244-739	560 k Ω	
R102, 202	1-244-695	8.2 k Ω	
R103, 203	1-242-687	3.9 k Ω	
R104, 204	1-242-673	1 k Ω	
R105, 205	1-242-727	180 k Ω	
R106, 206	1-242-711	39 k Ω	
R107, 207	1-242-713	47 k Ω	
R108, 208	1-242-677	1.5 k Ω	
R109, 209	1-242-683	2.7 k Ω	
R110, 210	1-242-721	100 k Ω	
R111, 211	1-242-717	68 k Ω	
R112, 212	1-242-679	1.8 k Ω	
R113, 213	1-242-705	22 k Ω	
R114, 214	1-242-683	2.7 k Ω	
R115, 215	1-242-729	220 k Ω	
R116, 216	1-242-695	8.2 k Ω	
R117, 217	1-242-687	3.9 k Ω	
R118, 218	1-242-659	270 Ω	
R119, 219	1-221-401	10 k Ω (B)	semi-fixed
R120, 220	1-222-318	200 k Ω (C)	variable
R121, 221	1-222-952	20 k Ω (B)	semi-fixed
R122, 222	1-242-691	5.6 k Ω	

Ref. No.	Part No.	Description
R123, 223	1-242-697	10 k Ω
R124, 224	1-242-735	390 k Ω
R125, 225	1-242-709	33 k Ω
R126, 226	1-242-729	220 k Ω
R127, 227	1-242-686	3.6 k Ω
R128, 228	1-242-711	39 k Ω
R129, 229	1-242-683	2.7 k Ω
R130, 230	1-242-687	3.9 k Ω
R131, 231	1-242-681	2.2 k Ω
R132, 232	1-242-661	330 Ω
R133, 233	1-242-709	33 k Ω
R134, 234	1-242-737	470 k Ω
R135, 235	1-242-681	2.2 k Ω
R136, 236	1-221-748	5 k Ω (B) semi-fixed
R137, 237	1-221-952	20 k Ω (B) semi-fixed
R138, 238	1-242-709	33 k Ω
R139, 239	1-242-725	150 k Ω
R140, 240	1-242-705	22 k Ω
R141, 241	1-242-689	4.7 k Ω
R142, 242	1-242-673	1 k Ω
R143, 243	1-242-696	9.1 k Ω
R144, 244	1-242-683	2.7 k Ω
R145, 245	1-242-641	47 Ω
R146, 246	1-242-673	1 k Ω
R147, 247	1-242-633	22 Ω
R301	1-242-717	68 k Ω
R302	1-242-717	68 k Ω
R303	1-242-633	22 Ω
R304	1-242-697	10 k Ω
R305	1-244-849	100 Ω 1/2W
R306	1-209-221	680 Ω 1W
R307	1-242-637	33 Ω
R310	1-242-609	2.2 Ω
R311	1-242-609	2.2 Ω
Switches		
S101, 201	1-514-656	rec./p.b.
S102, 202	1-514-657	equalizer
S103, 203	1-514-643	muting
S104, 204	1-514-642	tape selector

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.

Ref. No.	Part No.	Description
S301	1-514-655	power on/off
S302	1-514-231	bias oscillator
S303	1-514-039	motor shut-off
S304	1-514-512	frequency change
Jacks		
J101, 201	1-507-142	AUX IN
J102, 202	1-507-251	MIC
J103, 203	1-507-142	LINE OUT
J301	1-507-282	HEADPHONE
Heads		
EH101, 201	8-826-629-25	erase (EF18-2902A1)
RPH ¹⁰¹ ₂₀₁	8-829-142-20	rec./p.b. (PP102-4202)
Encapsulated Components		
CP301	1-231-057	0.033 μ F + 120 Ω 500V
CP302	1-101-534	0.1 μ F + 120 Ω 500V
Miscellaneous		
CNJ301	1-509-359	connector, rec./p.b.
M	8-832-624-09	motor (IC-624H1)
ME101, 201	1-524-062-00	meter, level
PL ¹⁰¹ ₃₀₁	1-518-093-21	lamp, pilot
F	1-532-096	fuse, 0.8A
VS	1-509-064	socket, power voltage selector
	1-533-006	holder, fuse
	1-507-323	terminal, joint
	1-506-312	terminal, joint
	1-534-487-22	cord, power
	1-536-146	lug, terminal strip 1-L-1
	1-539-411-11	printed circuit board, L-CH audio amp.
	1-539-412-11	printed circuit board, R-CH audio amp.
	1-539-413-11	printed circuit board, bias osc. & power supply

15. HARDWARES

Part No.	Description
SCREWS	
7-621-259-25	⊕ P 2.6 x 4
7-621-259-35	⊕ P 2.6 x 5
7-621-259-65	⊕ P 2.6 x 10
7-621-560-52	⊕ K 2.6 x 22
7-621-770-64	⊕ B 2.6 x 8
7-621-771-33	⊕ B 2.6 x 5
7-628-254-05	⊕ PS 2.6 x 5
7-628-254-15	⊕ PS 2.6 x 6
7-628-254-35	⊕ PS 2.6 x 10
7-628-254-45	⊕ PS 2.6 x 12
7-682-145-01	⊕ P 3 x 4
7-682-147-01	⊕ P 3 x 6
7-682-148-01	⊕ P 3 x 8
7-682-149-01	⊕ P 3 x 10
7-682-160-01	⊕ P 4 x 6
7-682-161-01	⊕ P 4 x 8
7-682-466-13	⊕ T 4 x 20
7-682-548-13	⊕ B 3 x 8
7-682-550-14	⊕ B 3 x 12
7-682-562-13	⊕ B 4 x 10
7-682-624-01	⊕ PS 2 x 4
7-682-627-01	⊕ PS 2 x 8
7-682-646-01	⊕ PS 3 x 5
7-682-647-01	⊕ PS 3 x 6
7-682-648-01	⊕ PS 3 x 8
7-682-652-01	⊕ PS 3 x 16
7-682-661-01	⊕ PS 4 x 8
7-683-140-01	⊕ SC 3 x 6
7-685-145-31	TA ⊕ P 3 x 6
7-685-146-01	TA ⊕ P 3 x 8

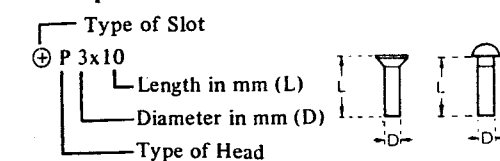
Part No.	Description
NUT	
7-622-108-02	3 ϕ
WASHERS	
7-623-105-12	2 ϕ
7-623-107-02	2.6 ϕ (small)
7-623-107-22	2.6 ϕ
7-623-108-02	3 ϕ (small)
7-623-108-12	3 ϕ (Ni)
7-623-108-18	3 ϕ (Cr)
7-623-110-02	4 ϕ (small)
7-623-110-12	4 ϕ
7-623-113-12	6 ϕ
7-623-207-21	2.6 ϕ
7-623-208-21	3 ϕ
7-623-408-05	3 ϕ star (external) wave
8 ϕ	
LUGS	
7-623-507-01	2.6 ϕ
7-623-508-01	3 ϕ
RETAINING RINGS	
7-624-104-01	E-2
7-624-106-01	E-3
7-624-108-01	E-4
7-624-109-01	E-5
7-624-111-01	E-7
7-624-112-01	E-8

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 -



15. HARDWARES

Part No.	Description	Part No.	Description
SCREWS			
7-621-259-25	⊕ P 2.6 x 4	NUT	
7-621-259-35	⊕ P 2.6 x 5	7-622-108-02	3φ
7-621-259-65	⊕ P 2.6 x 10	WASHERS	
7-621-560-52	⊕ K 2.6 x 22	7-623-105-12	2φ
7-621-770-64	⊕ B 2.6 x 8	7-623-107-02	2.6φ (small)
7-621-771-33	⊕ B 2.6 x 5	7-623-107-22	2.6φ
7-628-254-05	⊕ PS 2.6 x 5	7-623-108-02	3φ (small)
7-628-254-15	⊕ PS 2.6 x 6	7-623-108-12	3φ (Ni)
7-628-254-35	⊕ PS 2.6 x 10	7-623-108-18	3φ (Cr)
7-628-254-45	⊕ PS 2.6 x 12	7-623-110-02	4φ (small)
7-682-145-01	⊕ P 3 x 4	7-623-110-12	4φ
7-682-147-01	⊕ P 3 x 6	7-623-113-12	6φ
7-682-148-01	⊕ P 3 x 8	7-623-207-21	2.6φ
7-682-149-01	⊕ P 3 x 10	7-623-208-21	3φ
7-682-160-01	⊕ P 4 x 6	7-623-408-05	3φ star (external)
7-682-161-01	⊕ P 4 x 8		8φ wave
7-682-466-13	⊕ T 4 x 20	LUGS	
7-682-548-13	⊕ B 3 x 8	7-623-507-01	2.6φ
7-682-550-14	⊕ B 3 x 12	7-623-508-01	3φ
7-682-562-13	⊕ B 4 x 10	RETAINING RINGS	
7-682-624-01	⊕ PS 2 x 4	7-624-104-01	E-2
7-682-627-01	⊕ PS 2 x 8	7-624-106-01	E-3
7-682-646-01	⊕ PS 3 x 5	7-624-108-01	E-4
7-682-647-01	⊕ PS 3 x 6	7-624-109-01	E-5
7-682-648-01	⊕ PS 3 x 8	7-624-111-01	E-7
7-682-652-01	⊕ PS 3 x 16	7-624-112-01	E-8
7-682-661-01	⊕ PS 4 x 8		
7-683-140-01	⊕ SC 3 x 6		
7-685-145-31	TA ⊕ P 3 x 6		
7-685-146-01	TA ⊕ P 3 x 8		

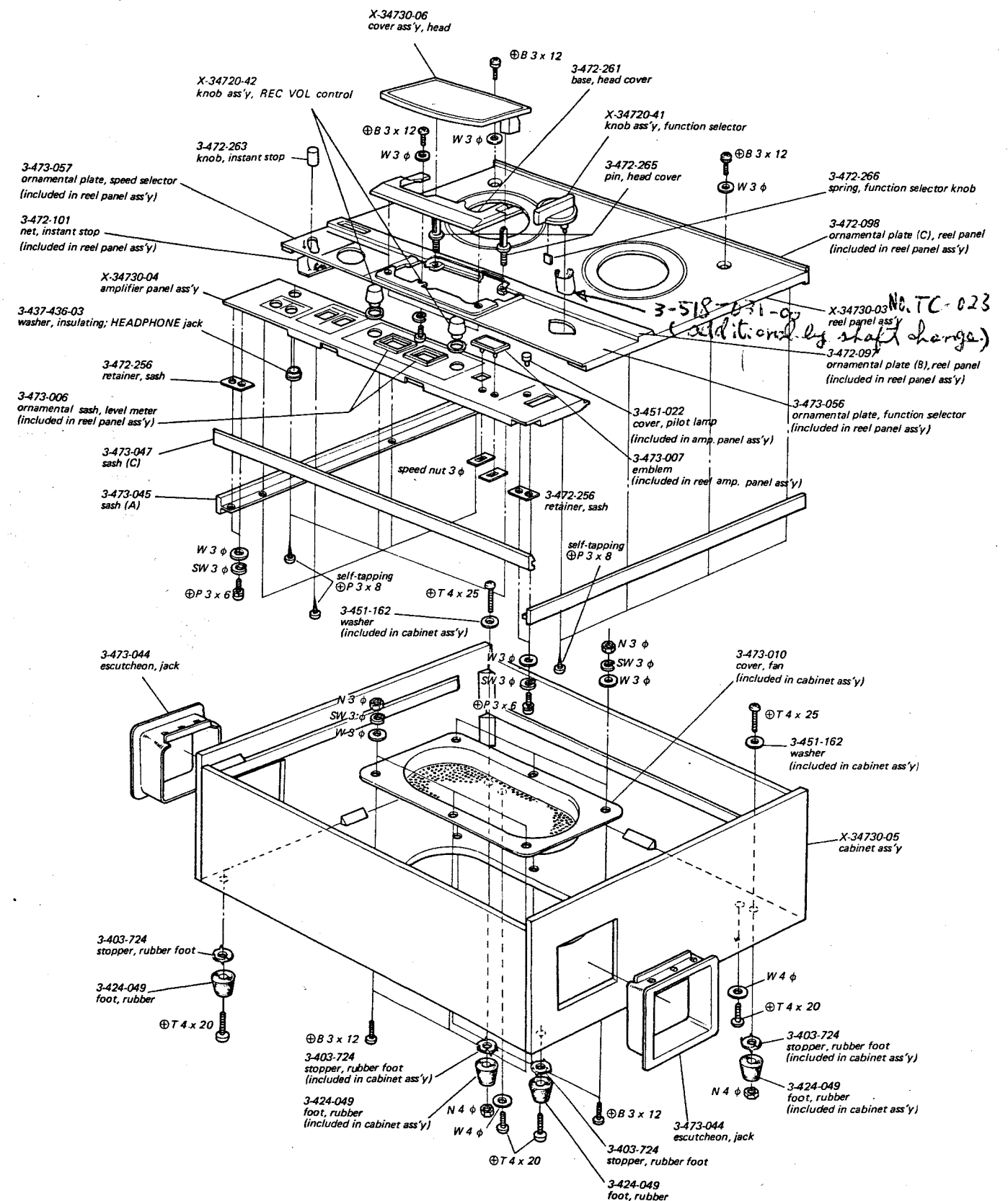
Hardware Nomenclature

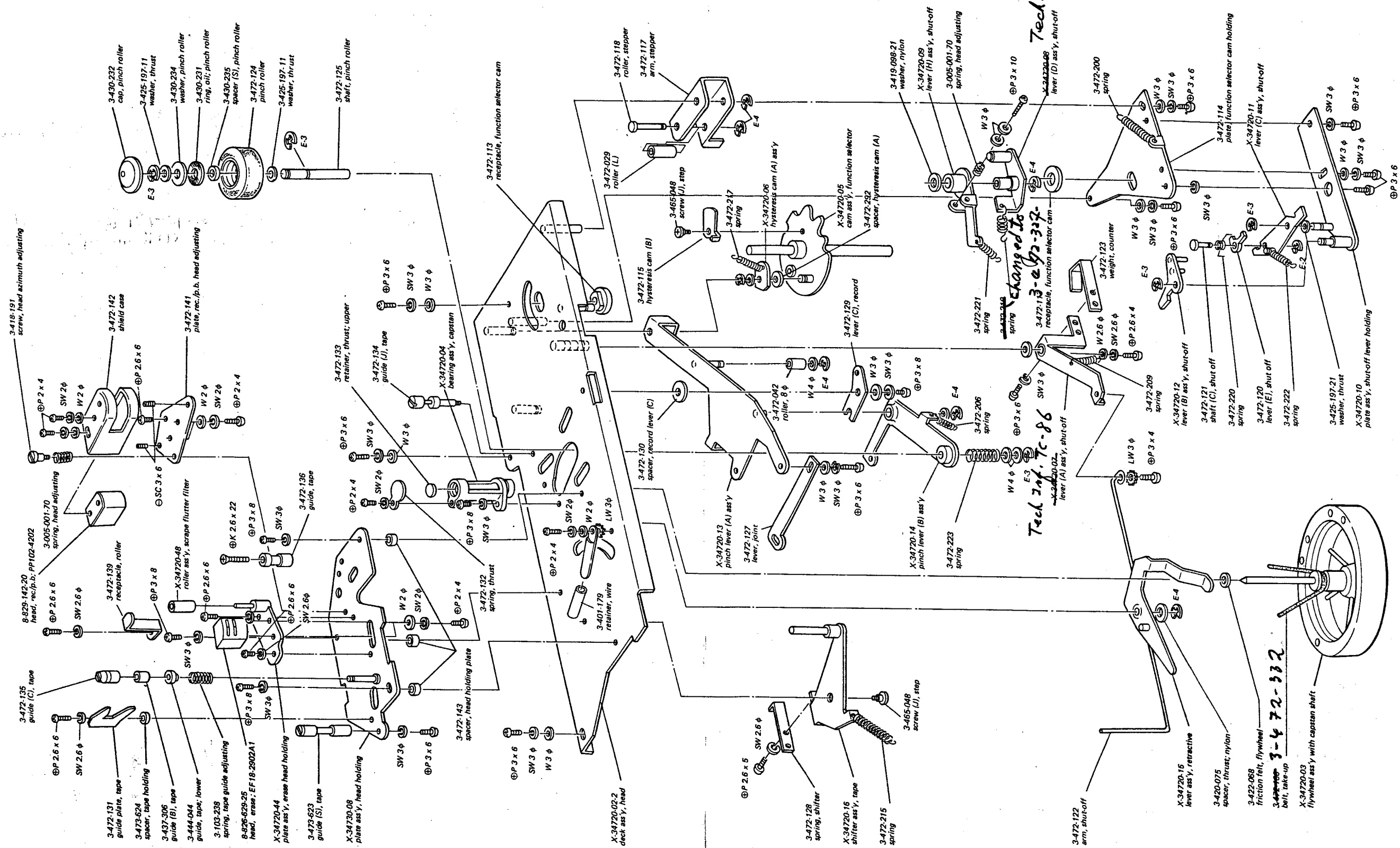
P - Pan Head Screw	⊕	SC - Set Screw	⊕
PS - Pan Head Screw with Spring Washer	⊕	E - Retaining Ring (E Washer)	⊕
K - Flat Countersunk Head Screw	⊕	W - Washer	
B - Binding Head Screw	⊕	SW - Spring Washer	
RK - Oval Countersunk Head Screw	⊕	LW - Lock Washer	
T - Truss Head Screw	⊕	N - Nut	
R - Round Head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

- Example -	
⊕ P 3x10	Type of Slot
Length in mm (L)	
Diameter in mm (D)	
Type of Head	

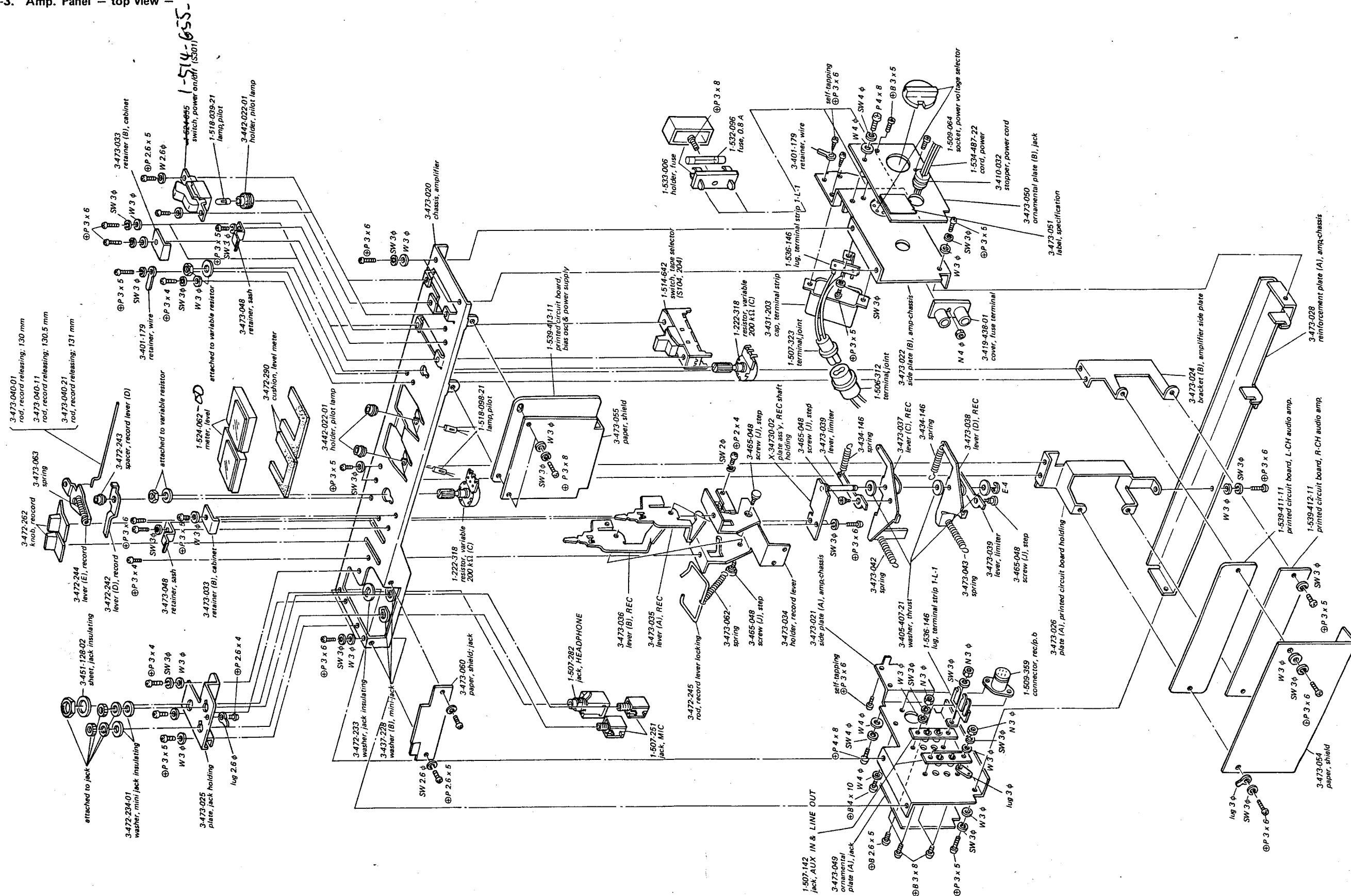
16. EXPLODED VIEW

16-1. Cabinet - top view -

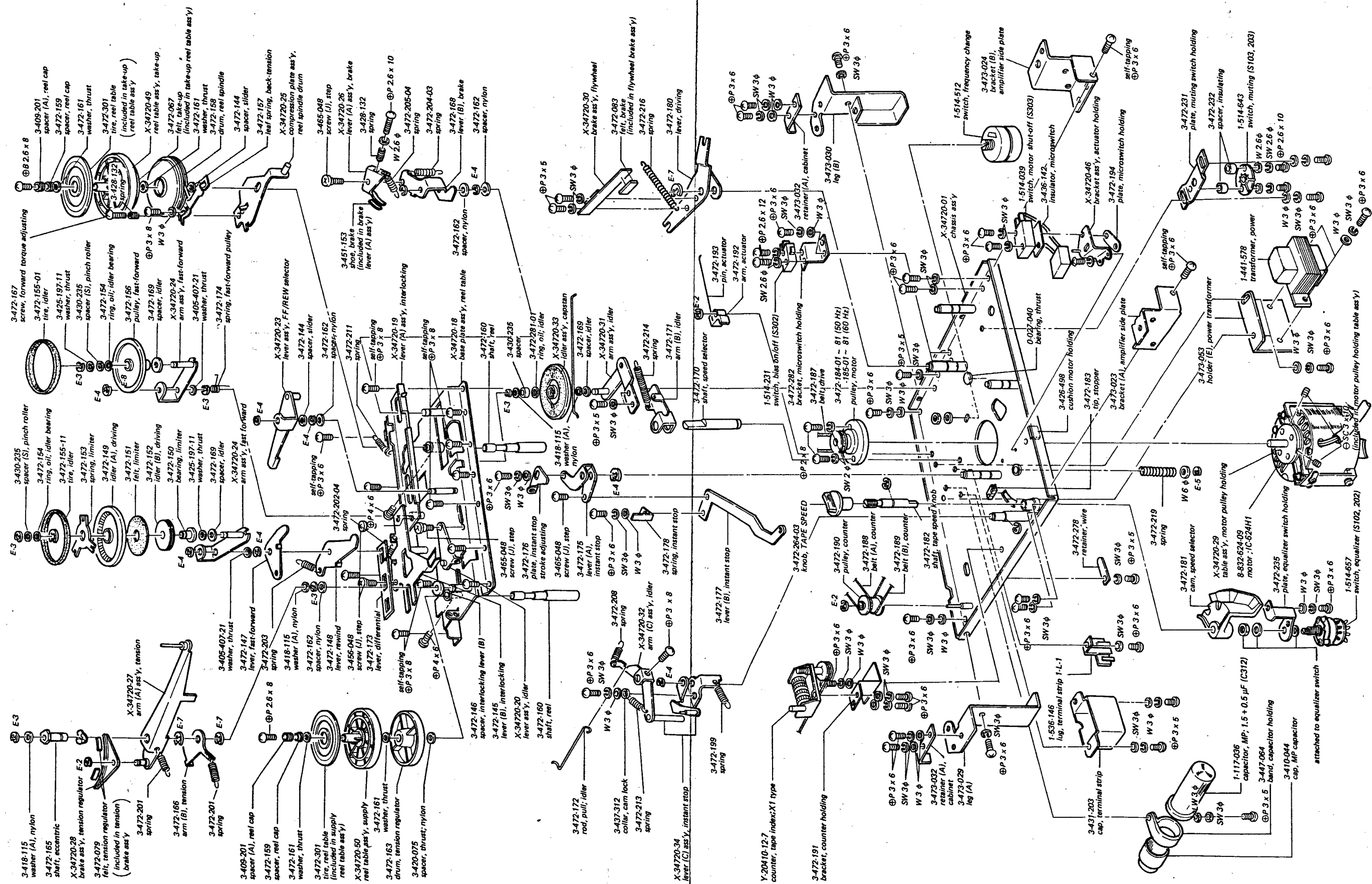


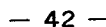


16-3. Amp. Panel — top view —



16-4. Chassis - top view -





3-790-319-13
manual, instruction

3-701-020
bag, check sheet

3-793-183
card, inspection

X-37010-18-2
cleaner ass'y, head

X-37010-20-2
pad ass'y, non-skid

3-793-010-20
booklet, tape talk

