TC-780

USA Model

ISO

Set using ISO screws

SPECIFICATIONS

Power Requirements: AC 117 V, 50/60 Hz, 130 W

Track System: Four-track stereo and mono

Reel Size: 7″ (18 cm) maximum

Tape speed: $7^1/_2$ ips, $3^3/_4$ ips and $1^7/_8$ 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
$7^1/_2$ ips (19 cm/s)	1.5 hrs	3 hrs
$3^3/_4$ ips (9.5 cm/s)	3 hrs	6 hrs
$1^7/_8$ ips (4.8 cm/s)	6 hrs	12 hrs

Frequency Response: (with standard tape)
20 – 25,000 Hz at $7^1/_2$ ips (19 cm/s)
20 – 18,000 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: (with standard tape) 56 dB or better

Flutter and Wow:
0.04 % at $7^1/_2$ ips (19 cm/s)
0.07 % at $3^3/_4$ ips (9.5 cm/s)
0.1 % at $1^7/_8$ ips (4.8 cm/s)

Recording Bias Frequency: 160 kHz

Inputs:
Two MIC inputs
Impedance: 600 Ω
Maximum sensitivity: 0.2 mV (–72 dB)

Two AUX inputs
Impedance: 100 kΩ
Maximum sensitivity: 60 mm V (– 22 dB)

Outputs:
Two LINE outputs
Impedance: 100 kΩ
Output level: 0.775 V (0 dB)

HEADPHONE outputs
Impedance: 8 Ω load
Output level: 50 mV (–24 dB)

Semiconductors: 2 FET's, 80 transistors, 5 thermistors and 114 diodes

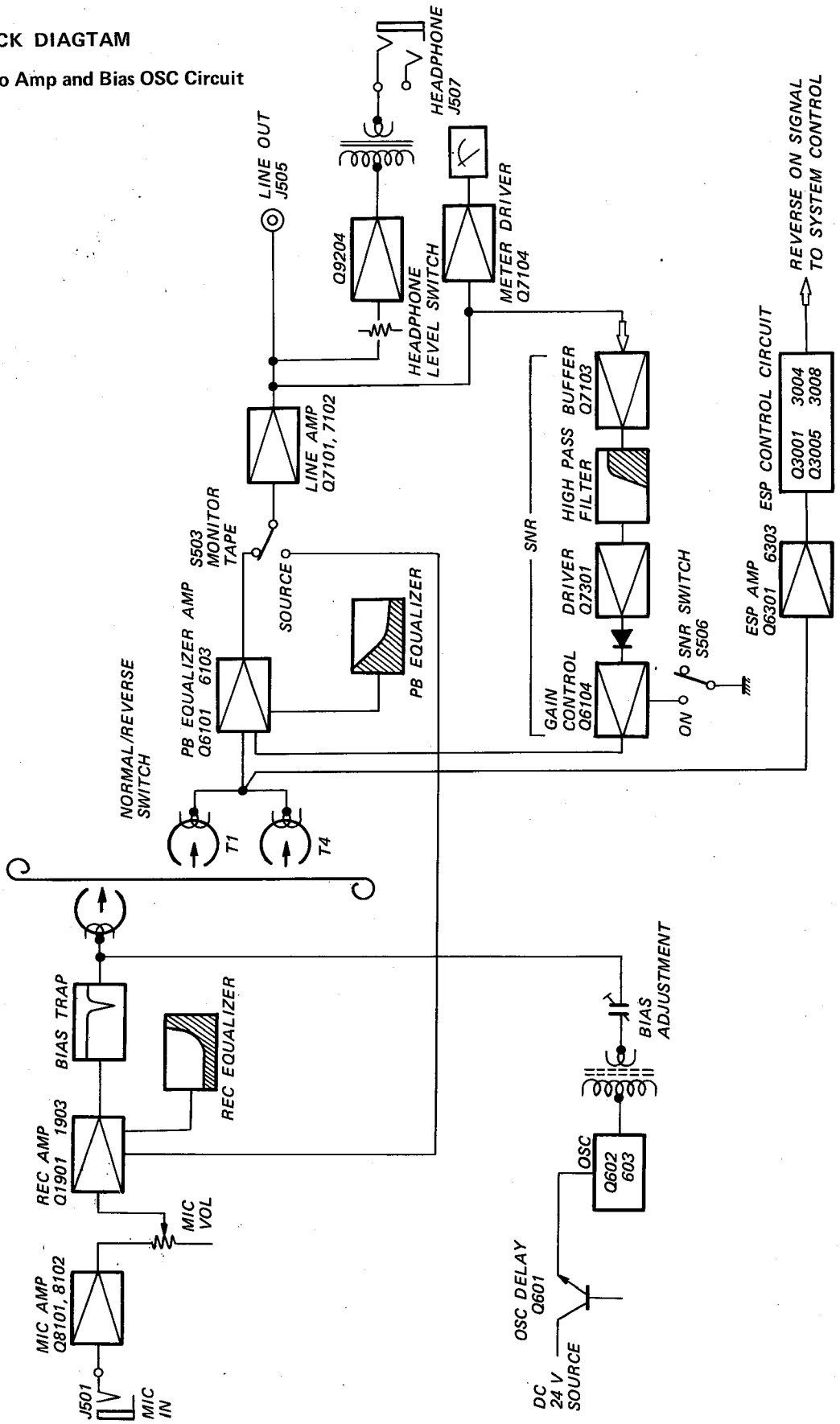
Dimensions: 18 1/8″ W) x 23 7/16″ (H) x 10 7/16″ (D)
(460 x 596 x 266 mm)

Weight: 65 lb 6 oz (39 kg)

SONY®
SERVICE MANUAL

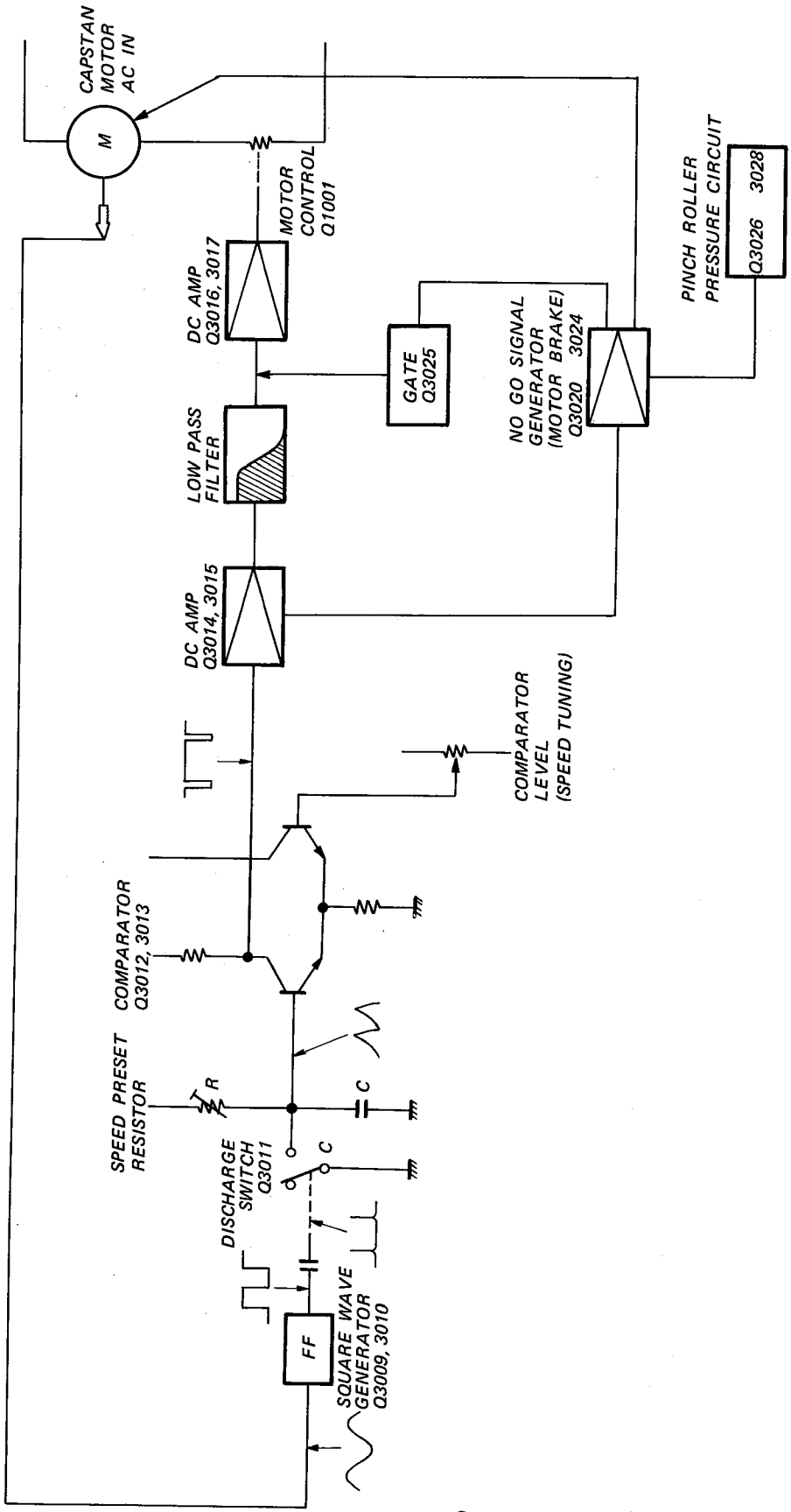
BLOCK DIAGTAM

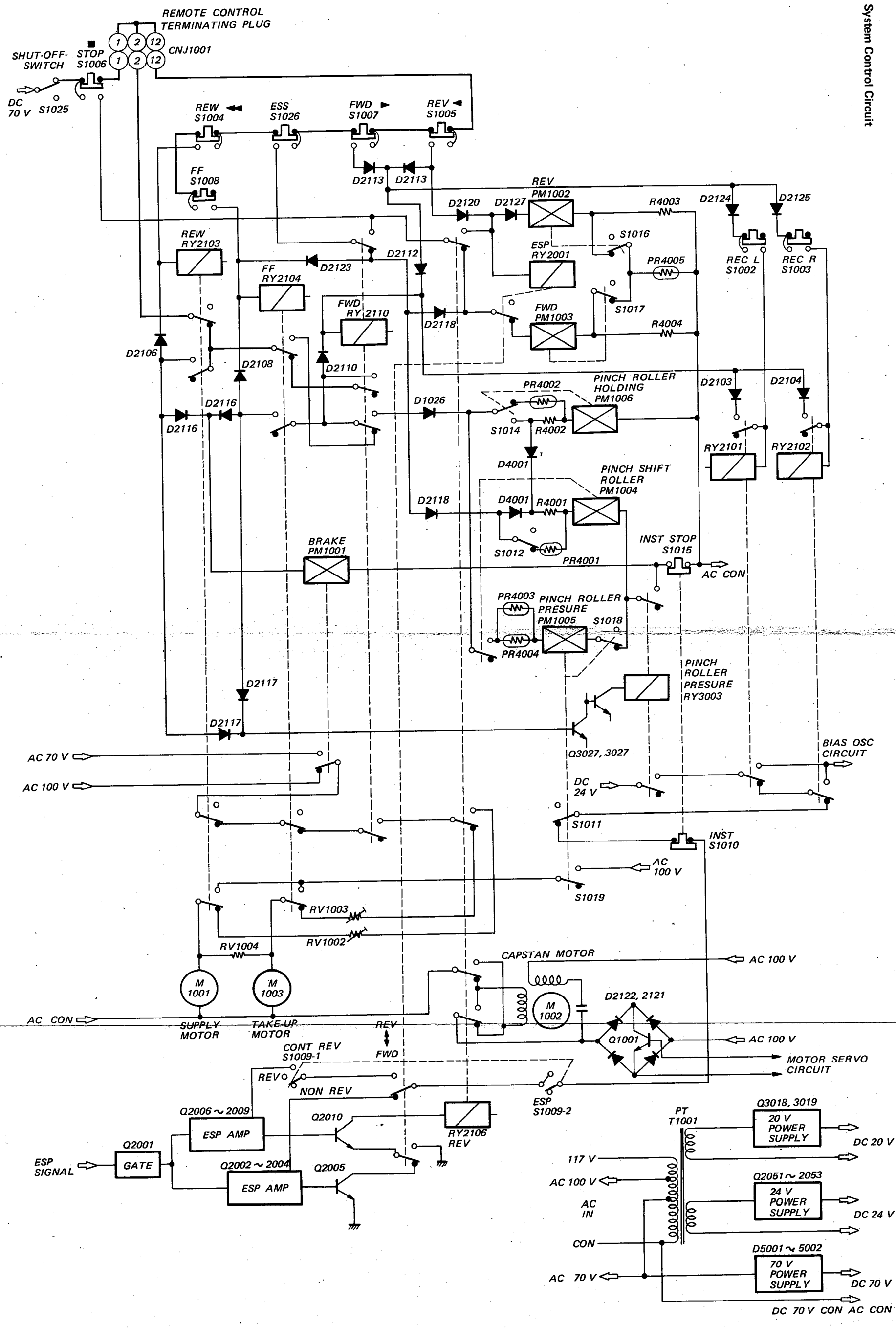
Audio Amp and Bias OSC Circuit



Note: Equalizer Switching, Tape Selector, and SOS & ECHO are omitted.
Only L-CH is represented in this diagram.

Capstan Servo Control Circuit




REMOTE CONTROL TERMINATING PLUG
CNJ1001
SHUT-OFF-SWITCH
STOP S1006
DC 70 V
S1025
REW S1004
ESS S1026
FWD S1007
REV S1005
FF S1008
D2113
D2113
REV PM1002
D2120
D2127
R4003
D2124
D2125
REC L S1002
REC R S1003
S1016
ESP RY2001
PR4005
REW RY2103
D2112
D2123
FF RY2104
FWD RY2110
D2118
FWD PM1003
S1017
R4004
D2106
D2108
D2110
D2116
D2116
D1026
PR4002
PINCH ROLLER HOLDING PM1006
S1014
R4002
D2103
D2104
RY2101
RY2102
D4001
PINCH SHIFT ROLLER PM1004
D2118
D4001
R4001
S1012
BRAKE PM1001
PR4001
INST STOP S1015
AC CON
PR4003
PINCH ROLLER PRESURE PM1005
S1018
PR4004
D2117
D2117
PINCH ROLLER PRESURE RY3003
Q3027, 3027
AC 70 V
AC 100 V
BIAS OSC CIRCUIT
DC 24 V
S1011
INST S1010
AC 100 V
S1019
RV1003
RV1002
RV1004
CAPSTAN MOTOR
AC 100 V
M 1001
M 1003
M 1002
D2122, 2121
AC CON
SUPPLY MOTOR
TAKE-UP MOTOR
REV
FWD
Q1001
AC 100 V
MOTOR SERVO CIRCUIT
CONT REV S1009-1
REV
NON REV
ESP S1009-2
Q2006 ~ 2009
ESP AMP
Q2010
RY2106 REV
Q2001
GATE
ESP SIGNAL
Q2002 ~ 2004
ESP AMP
Q2005
PT T1001
Q3018, 3019
20 V POWER SUPPLY
DC 20 V
117 V
AC 100 V
AC IN
Q2051 ~ 2053
24 V POWER SUPPLY
DC 24 V
CON
D5001 ~ 5002
AC 70 V
70 V POWER SUPPLY
DC 70 V
DC 70 V CON AC CON

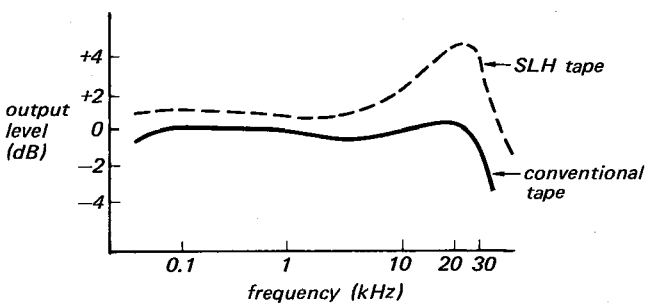
GENERAL DESCRIPTION

Tape Select Switch

TC-780 employs the TAPE SELECT switch for NORMAL and SLH (Super Low-Noise High-Output) tape.

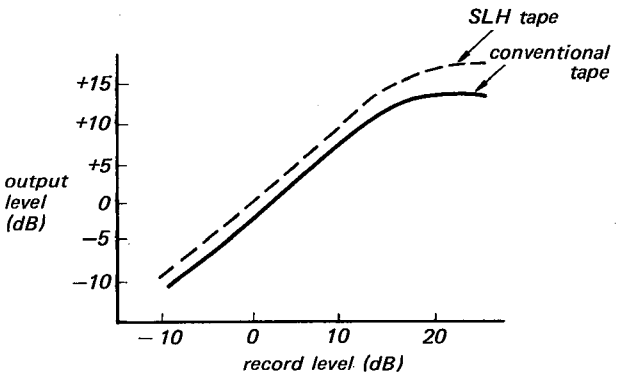
The function of the TAPE SELECT switch is as follows.

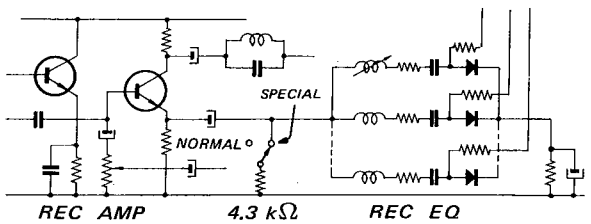
1. SLH tapes have much higher frequency response characteristics than conventional tapes.
   When recording on SLH tapes with conventional tape recorder, the high frequency range is emphasized. To improve the linearity of the high frequency range, record equalizer should be adjusted for SLH tapes and compensation amount of the high frequency range should be decreased.



frequency response characteristics (7 1/2 ips, 19 cm/s)

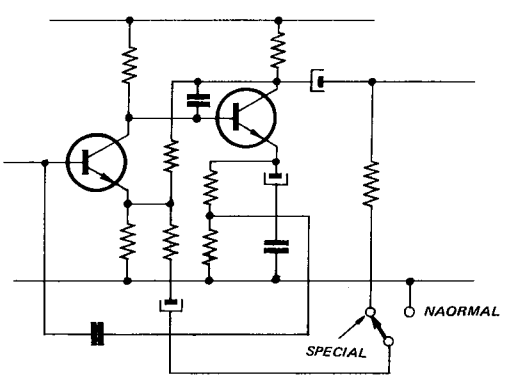
2. SLH tapes have better linearity than conventional tapes for recording level of 2.5 dB higher.
   So SLH tapes are to be recorded in higher level by 1.5 dB connecting 4.3 kΩ resistor in parallel to the record equalizer.





record level change

3. Also SLH tapes have better sensitivity by approximately 1 dB than conventional tapes. So the actual recorded level is higher by approximately 2.5 dB.
   When playing a recorded SLH tape, the gain is decreased by approximately 2.5 dB by applying negative feed back to the line amp.
   According to the above reasons, SLH tapes have much improved dynamic range and signal to noise ratio.



LINE AMP gain change

SNR

When playing a tape, sometimes noises are heard at low-level recorded portion and during the interval of music.

SNR (Sonymatic Noise Reduction) has a function to decrease these noises automatically without any change in the frequency response.

As indicated in Fig. 1. when the SNR switch is ON, the input and output level characteristic curve below −20 dB becomes steeper.

LINE OUTput of each channel goes into the rectifier being mixed and passing through the high-pass filter after amplified by ac amp. The rectified output is applied between base and collector of the controller.

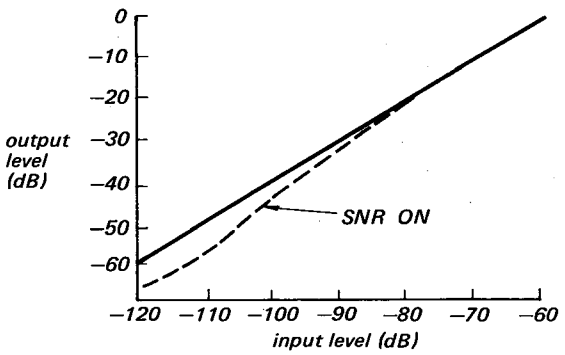


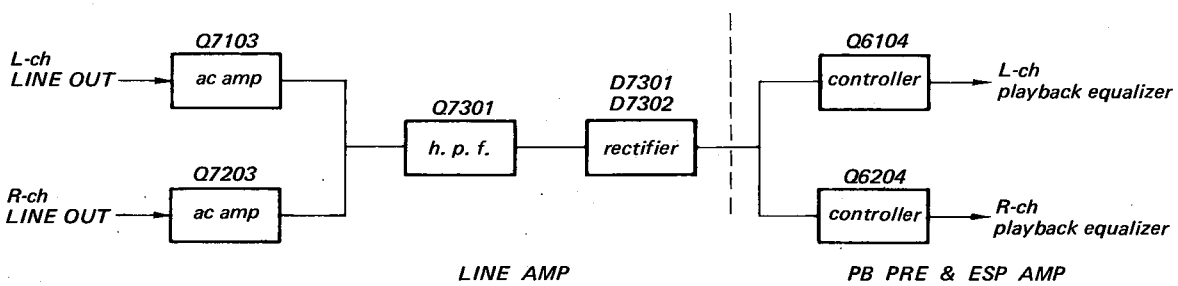
Fig. 1. INPUT-OUTPUT characteristics

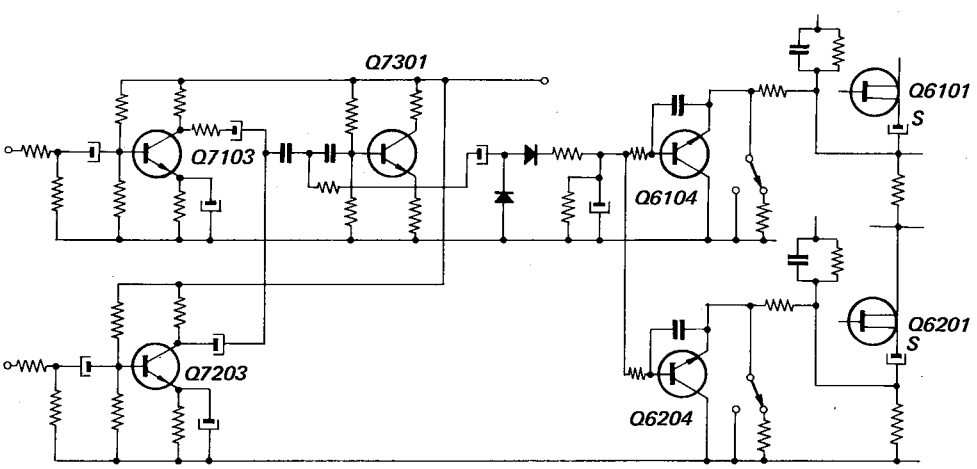
In general, when the signal level between emitter and collector of the transistor is extremely low, dc voltage between base and emitter (in this model base and collector) can change the impedance between emitter and collector.

Therefore, by putting this controller into the NF circuit of the equalizer, the amplifier gain can be controlled.

When a big signal (more than −20 dB) comes into the Noise Reduction circuit, dc output can be obtained according to the input level, and the impedance of the controller decreases without any change in the NF amount because the decrease range is reduced by the transistor.

However, when the input is less than −20 dB, dc output will be decreased, then the controller base current will be decreased.

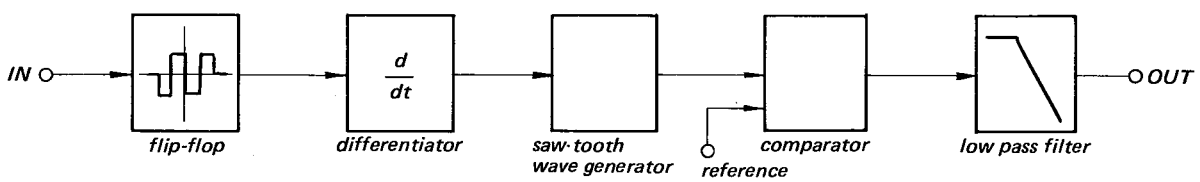


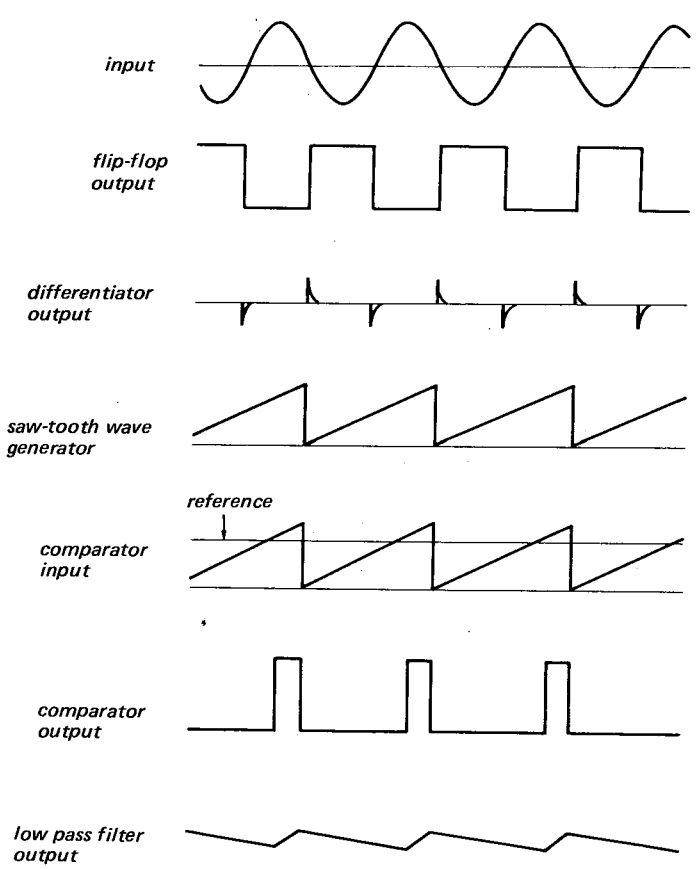


By this operation the impedance between emitter and collector and the NF amount will increase, then amplification will be lowered. Namely, when the input signal becomes lower than a certain amount, amplification is decreased automatically.

Servo Amp Operation Principle

1. From the frequency generator (FG) of the capstan motor, sine wave syncronized to the rotation is delivered into the flip-flop which comprises Q3009 and Q3010.
2. Output of the flip-flop is square wave, which is differentiated with C3008 and R3029 and transformed into the pulse wave.
3. The positive pulse of this wave behaves as the trigger pulse for the saw-tooth wave generator which comprises Q3011, C3009 and R3030~3032 and generates the saw-tooth wave.
4. This saw-tooth wave is delivered into the comparator (Q3012 and Q3013) and generates the rectangular wave which corresponds to the portions exceeding the reference level determined by the base voltage of Q3013.
5. This rectangular wave is delivered into the low-pass filter and transfered to the dc voltage.
6. This dc voltage controls the base current of Q1001 through Q3018. The impedance between emitter and collector is changed by the base current, and then the ac voltage on the capstan motor is controlled.





wave form for each section in servo amp.

The output of the low-pass filter is simplified and represented as follows:

$$V = \frac{t1}{t2} E$$

Where t1: existing time of comparator output
t2: time of no comparator output
t0: t1 + t2 ..... cycle

Since t2 is determined by the slope of the saw-tooth wave and the reference level, when C, R of the saw-tooth wave generator are constant, t2 is constant. Therefore, when the cycle changes, only t1 is changed without any change in t2.

When the capstan motor speed becomes faster, the cycle becomes shorter and then t1 becomes shorter.

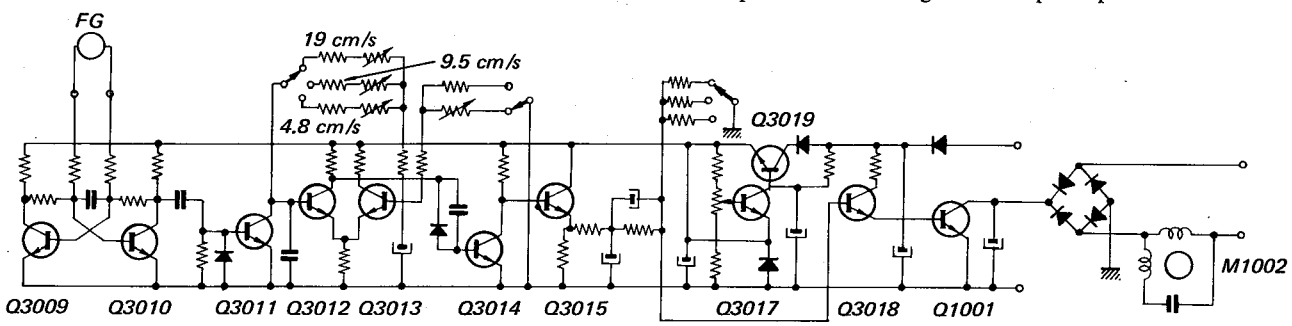
When t1 becomes 0, the output becomes also 0 and the impedance between emitter and collector of Q1001 becomes bigger and then the voltage on the motor is decreased resulting in slowing down the speed, and vice versa.

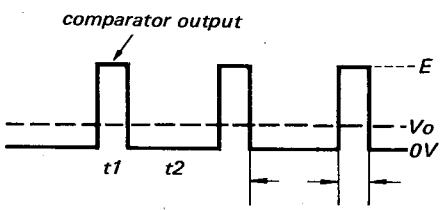
As mentioned above, the motor speed becomes stable when t1 is 0 i. e., when the top of the saw-tooth wave is the same as the reference level.

Since the motor speed at the stable point is determined by t2, each speed can be adjusted by changing R value of C, R time constant.

The speed change is accomplished according to this principle.

Also the stable point of the speed can be changed by the reference level. The SPEED TUNING is accomplished according to this principle.





Diode Switching

TC-780 employs diode switching for selecting the playback and record equalizers.

1. Record equalizer selecting circuit is indicated in Fig. 2. With the TAPE SPEED 7½ ips (19 cm/s) and the TAPE SELECT switch NORMAL, normal bias voltage is applied on D406, and D402, D403, D404 and D405 are in the cut-off state by reverse bias.
   Therefore the record equalizer selecting can be accomplished by changing normal bias voltage.

2. Playback equalizer selecting circuit is indicated in Fig. 3. When forward bias voltage is applied on D7101 in the play mode with the TAPE SPEED 7½ ips (19 cm/s), RV7103 and R7101 will be short-circuited.

   Then equalizer characteristics is determined by RV7102.
   When forward bias voltage is applied on D7103 in the play mode with the TAPE SPEED 3 ¾ ips (9.5 cm/s), R7101 is short-circuited and then D7101 is in the cut-off state by reverse bias. Therefore equalizer characteristics is determined by RV7102 and RV7103.
   When in the play mode with the TAPE SPEED 1 7/8 ips (4.8 cm/s), both D7101 and D7103 are in the cut-off state by reverse bias.
   Then equalizer characteristics can be determined by RV7102, RV7103 and R7101.

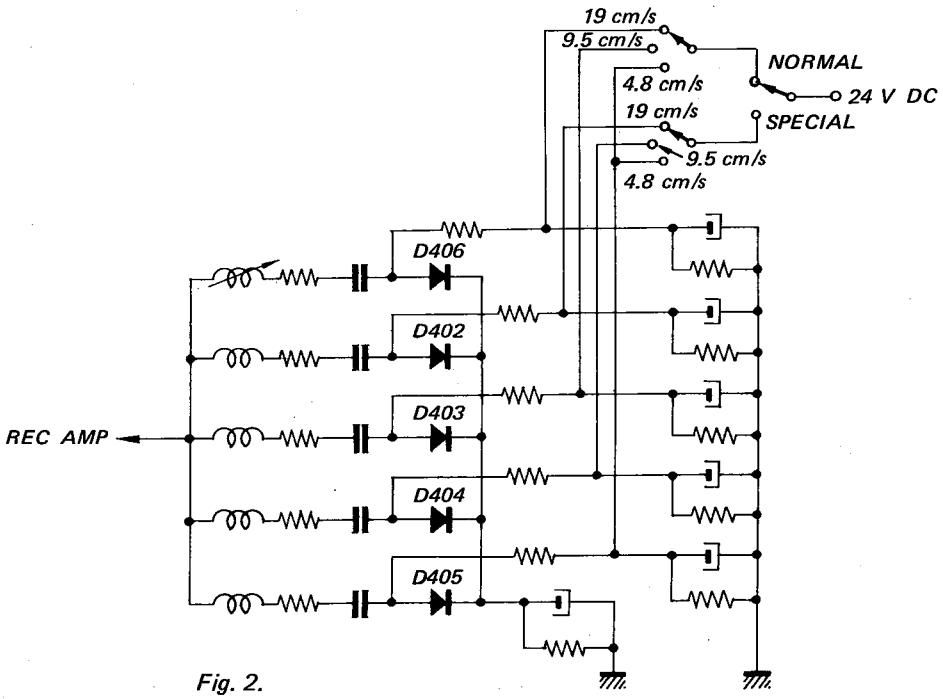


Fig. 2.

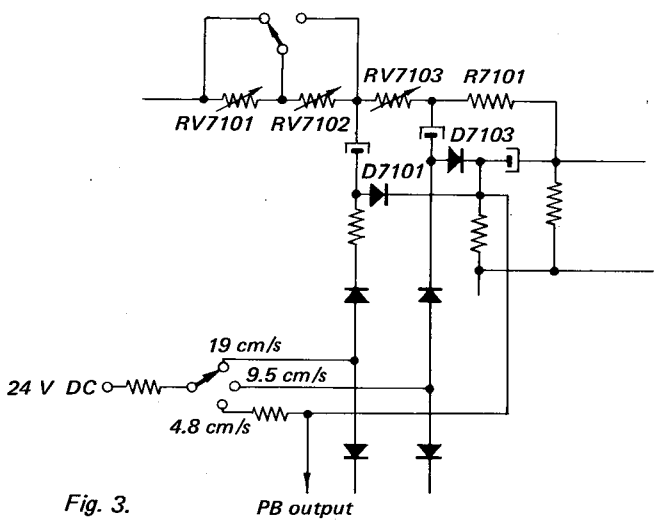
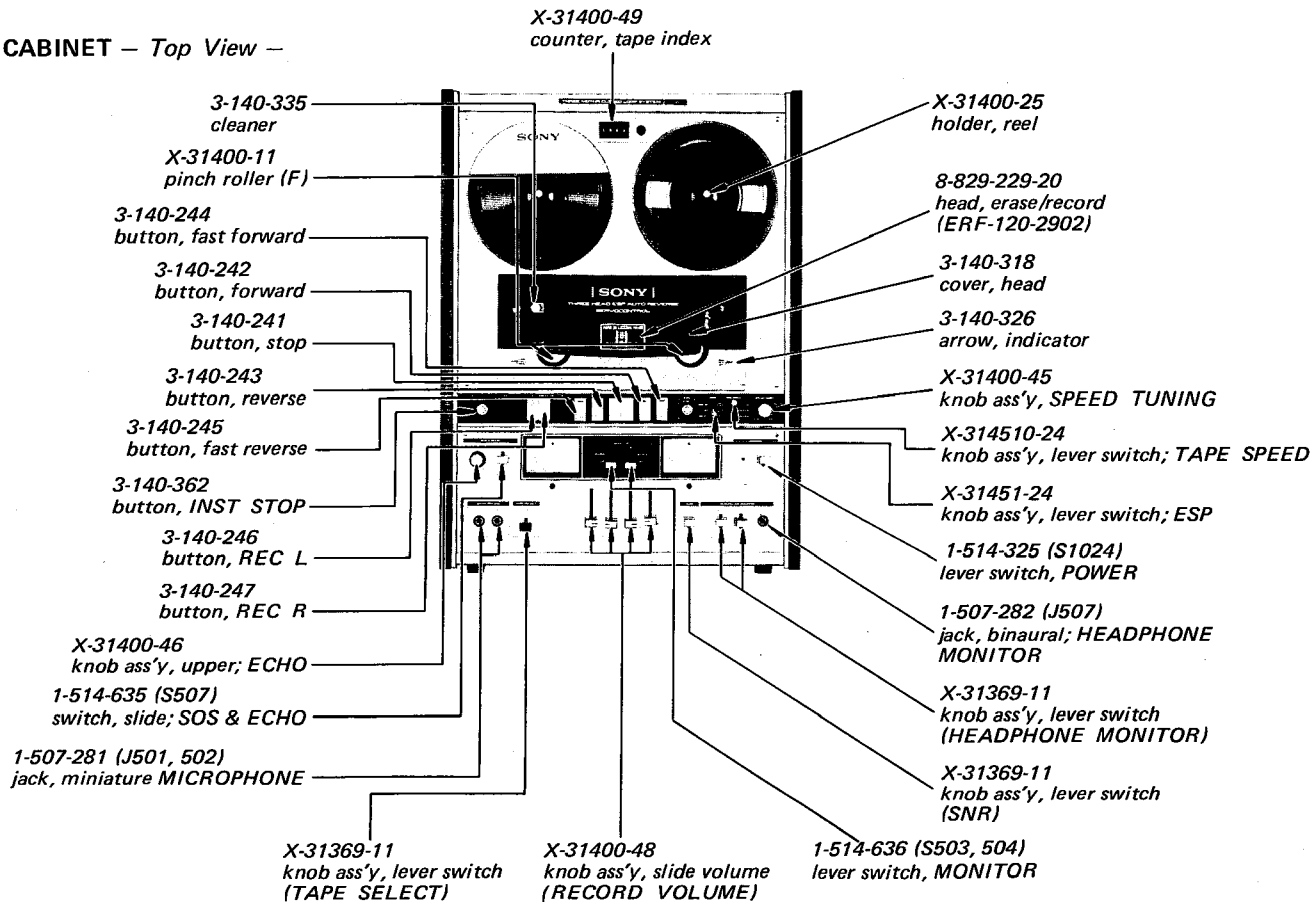


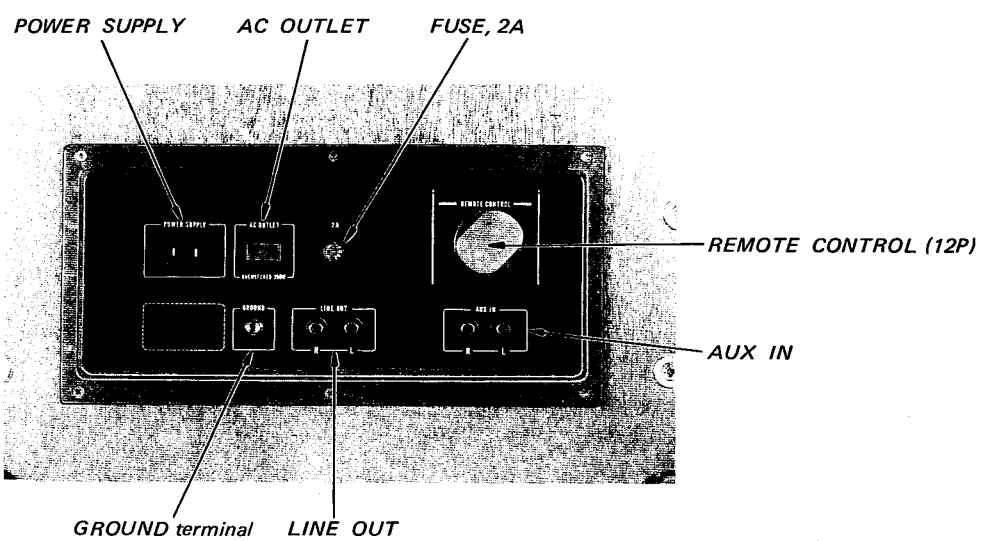
Fig. 3.

MAJOR PARTS LOCATIONS

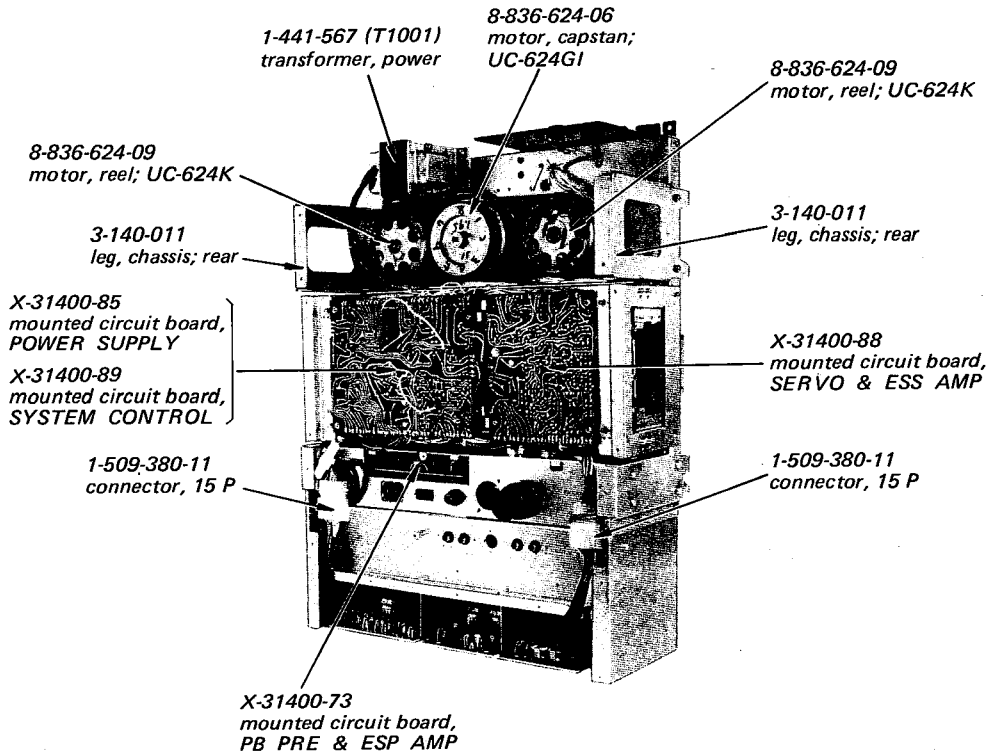
CABINET – *Top View* –



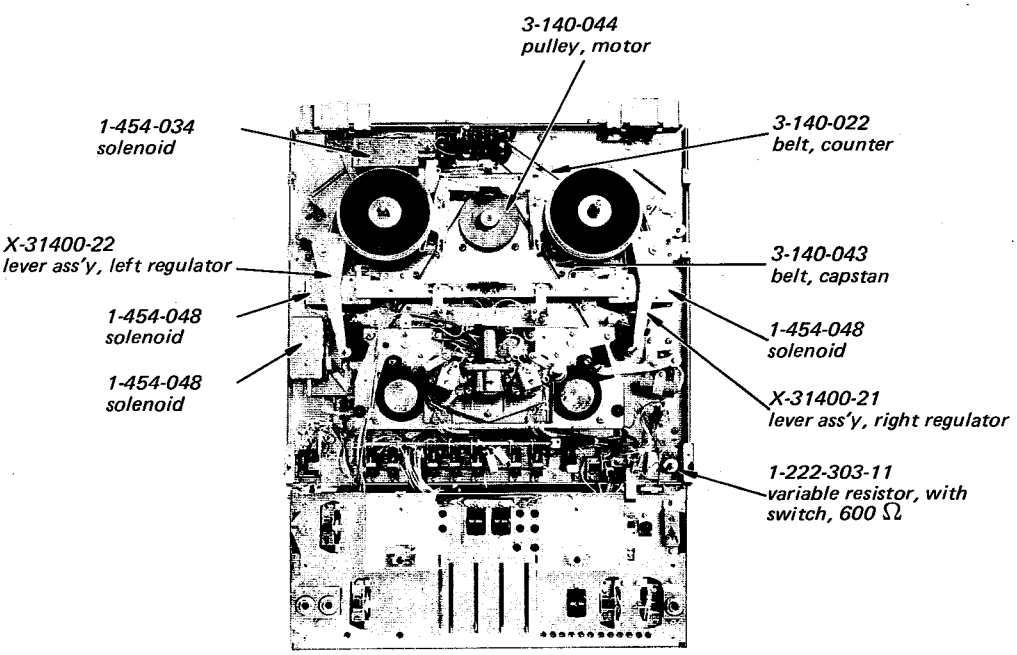
CABINET – *Back View* –



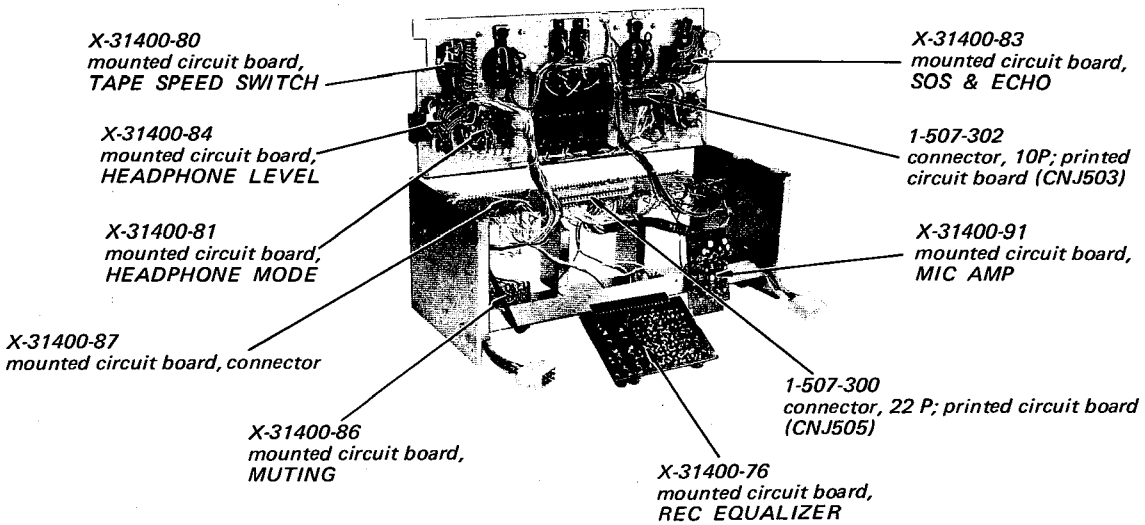
CHASSIS – *Top View* –



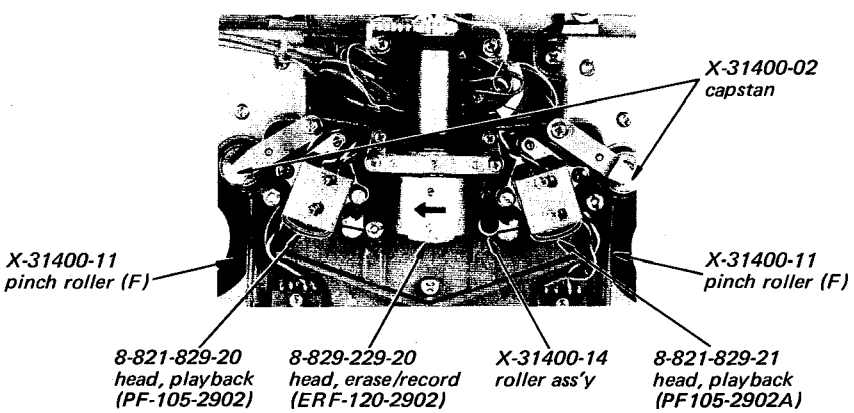
CHASSIS – *Bottom View* –



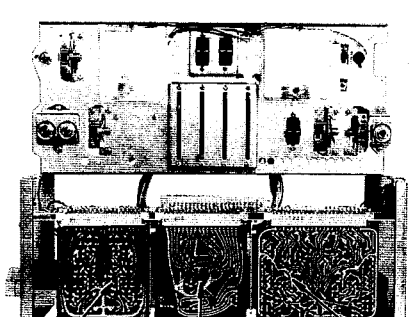
CHASSIS – *Head Deck View* –



ELECTRICAL PARTS – *Top View* –



– *Bottom View* –



DISASSEMBLY

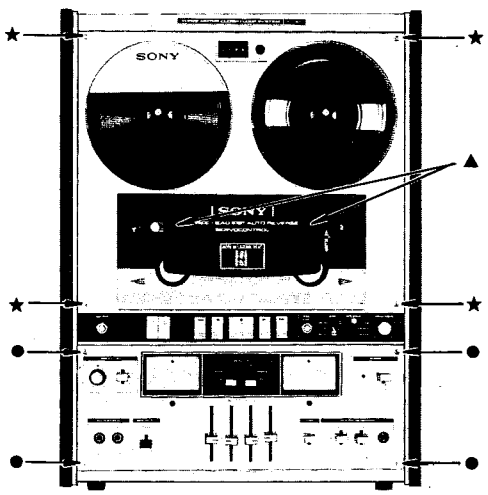


Fig. 4. Screws for disassemble

REEL PANEL REMOVAL

(1) Remove the four screws marked ★ in Fig. 4 .

(2) Lift the head cover and remove the screws marked ▲ under the both side of it.

(3) The reel panel will come free of the set with the head cover and the tape cleaner.

AMPLIFIER PANEL REMOVAL

(1) Remove the four screws marked ● in Fig. 4.

(2) Pull off all of the knobs.

(3) The amplifier panel will come free of the set.

MECHANICAL CONTROL PANEL REMOVAL

(1) Remove the reel panel.

(2) Remove the amplifier panel.

(3) Pull off the SPEED TUNING knob.

(4) Remove the two screws (⊕B 3 x 4) under the overlapped part of the reel panel and mechanical control panel.

(5) The mechanical control panel will come free of the set.

CABINET REMOVAL

(1) Remove the eight screws (⊕ P 4 x 40) securing the cabinet at the back of the set.

(2) Pull out the chassis from the cabinet.

Note: This removal should be made on the board and flat desk without anything on it. Otherwise the printed circuit boards located in the bottom part of the set might be damaged.

SASH REMOVAL

(1) Remove the reel, amplifier and mechanical control panel.

(2) Pull off the remote control terminating plug located at the back of the set.

(3) Placing the chassis horizontally, remove the ten screws securing the sash.

(4) The sash will come free of it.

MECHANICAL ADJUSTMENT

Capstan Flywheel Height Adjustment (Fig. 5 and 6.)

(1) The clearance between the flywheel and the chassis should be between 0.5 and 1.0 mm (1/64 and 3/64") as shown in Fig. 6.

(2) If necessary, adjust by the thrust screw.

(3) At this time the capstan should not rattle nor touch the head chassis when moved up and down by a hand. And also the flywheel should not touch the pinch lever.

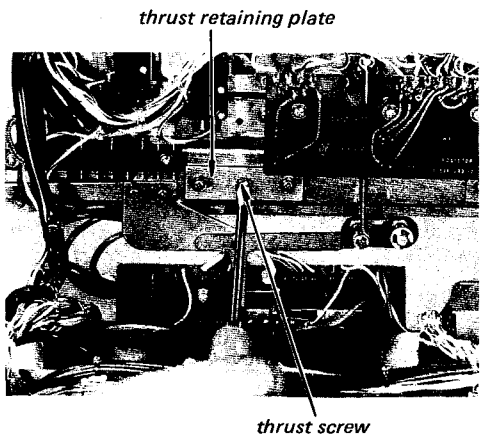


Fig. 5.

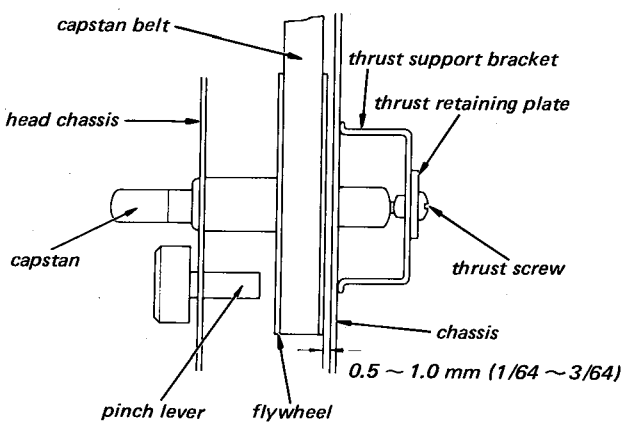


Fig. 6.

Direction Switch Adjustment (Fig. 7.)

(1) Loosen the two screws securing the switch link.

(2) Place the set in the reverse play mode.

(3) Push the switch link to the right (indicated by arrow) until it stops at the end of the slide switch stroke.

(4) Tighten the screws.

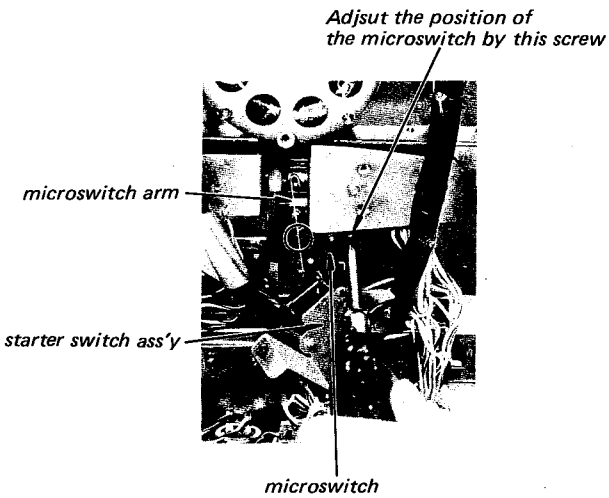


Fig. 7.

ESP Microswitch Adjustment (Fig. 8.)

(1) Remove the starter switch ass'y as shown in Fig. 8.

(2) In the stop mode loosen the screw at the right side of the microswitch.

(3) Position the microswitch for the contact of its button and the microswitch arm as shown in the circle.

(4) Tighten the loosened screw.

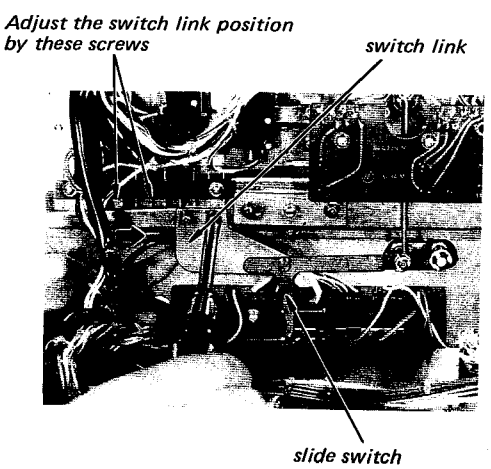


Fig. 8.

Starter Microswitch Adjustment (Fig. 9 and 10.)

(1) In the play mode the microswitch should be actuated by the delay spring arm.

(2) In the stop mode the microswitch should be released.

(3) If necessary, loosen the adjusting screw and position the starter microswitch ass'y.

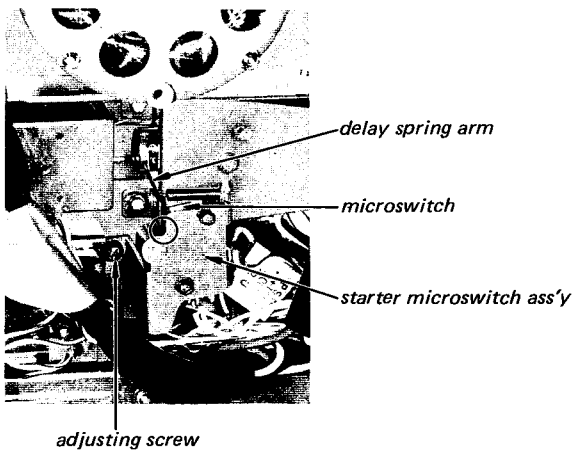


Fig. 9. *in the play mode*

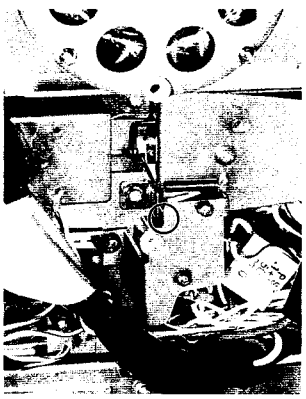


Fig. 10. *in the stop mode*

Tape Shifter Stroke Adjustment (Fig. 11.)

(1) When the tape shifter solenoid is energized, the tape shifter shaft should almost touch the head chassis.
If necessary, adjust by bending the part "a" of the plunger link.

(2) In the FF and FWD mode the tape shifter shaft should keep the tape from touching the roto bi-lateral head.
If necessary, adjust by bending the plunger stopper.

Tape Shifter Microswitch Adjustment (Fig. 11.)

(1) Push the pole piece slowly.

(2) After the microswitch is actuated, the pole piece should be pushed more by 0.5 to 1.0 mm (1/64 to 3/64").

(3) If necessary, adjust by bending the part "b" of the plunger link.

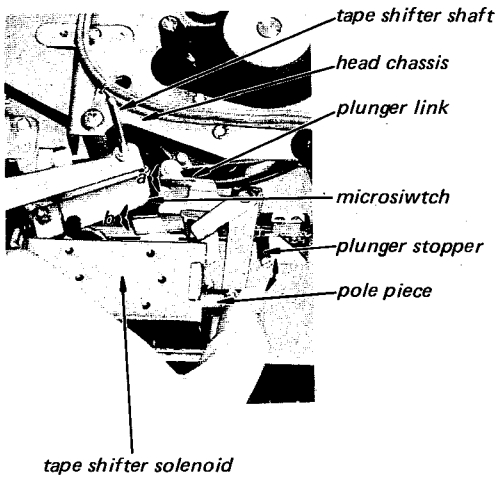


Fig. 11.

Lift Solenoid Microswitch Adjustment (Fig. 12.)

(1) Push the pole piece slowly.

(2) After the microswitch is actuated, the pole piece should be pushed more by 0.5 to 1.0 mm (1/64 to 3/64").

(3) If necessary, adjust the position of the microswitch by the adjusting screw.

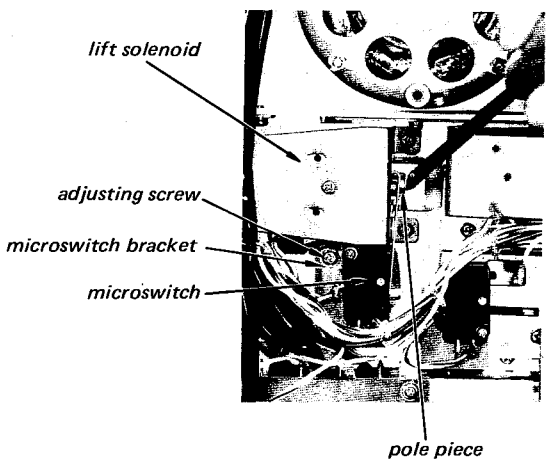


Fig. 12.

Lift Link Adjustment (Fig. 13.)

(1) In the stop mode pull the lift link in the derection shown by arrow until the pinch roller rises completely.

(2) Place the set in the play mode.

(3) At this time the lift link should move more by approximately 0.5 mm (1/64") to be locked.

(4) If necessary, adjust by the stopper screw and then lock it by the lock screw.

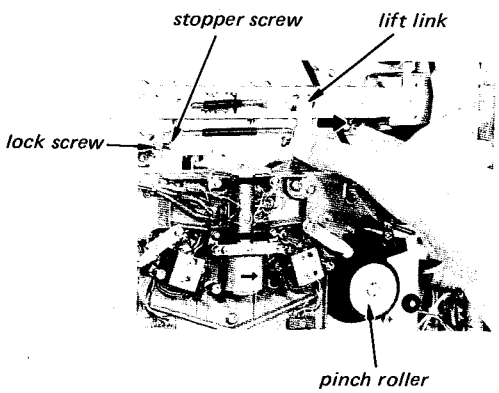


Fig. 13.

Pressure Link Adjustment (Fig. 14.)

(1) Place the set in the play mode.

(2) The pinch roller mechanism will be locked.

(3) At this time the regulator open-plate should return by 0.5 to 1.0 mm(1/64 to 3/64").

(4) If necessary, adjust by positioning the pressure link.

Note: If the position of the pressure link is extremely different from the place where it should be, the pinch roller mechanism would not be locked.

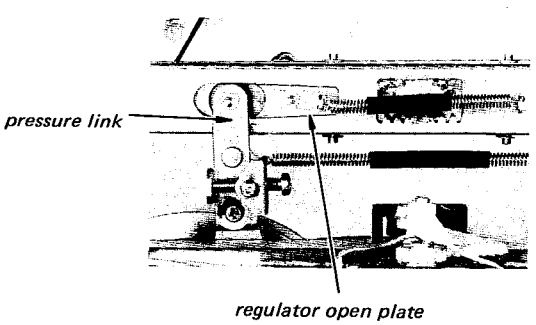


Fig. 14.

INST STOP Lock Adjustment (Fig. 15.)

(1) In the play mode, push the INST STOP button slowly.

(2) The clearance between the INST STOP lock arm and the shifter lever should be approximately 0.3 mm (1/8").

(3) If necessary, adjust by bending the shifter lever with a pair of pliers.

Note: When pushing the INST STOP button, confirm that the pinch roller pressure is released and the tape shifter does not touch the tape.
When releasing the INST STOP button, confirm that the shifter lever does not gear with the INST STOP lock arm.

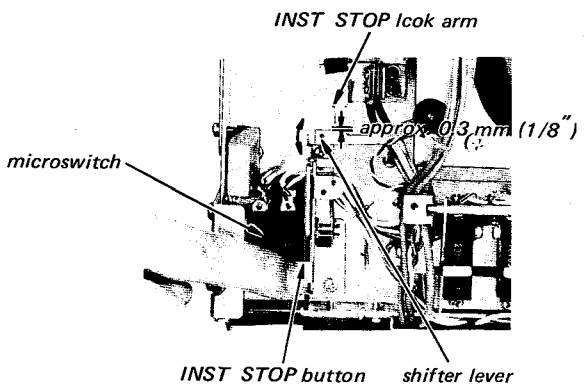


Fig. 15.

Clearance Adjustment of Regulator Brake Block (Fig. 16.)

(1) In the stop mode, the clearance between the regulator brake block and the brake drum should be approximately 0.5 mm (1/64").

(2) If necessary, adjust by bending the part "A".

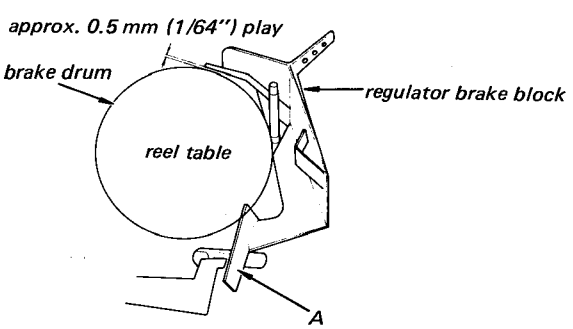


Fig. 16.

Brake Adjustment (Fig. 17.)

(1) In the stop mode, release the brake spring.

(2) When pushing the brake lever, the bottom side of the right and left brake levers should be straight.

(3) If necessary, adjust by bending the encircled parts with a pair of pliers.

(4) Attach the brake spring again.

(5) Adjust the position of the limiter springs so that brake torque is 1,100 to 1,600 g·cm (15.3 to 22.2 oz·inch) in pushing the brake lever.

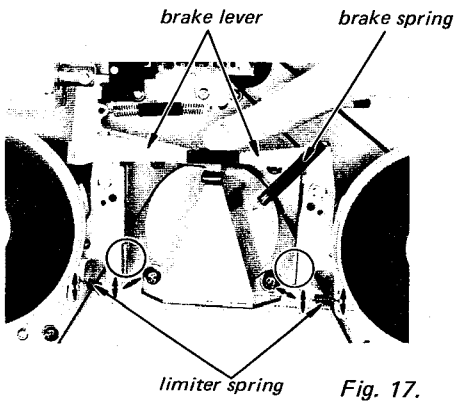


Fig. 17.

Shut-off Switch Adjustment (Fig. 18.)

(1) Thread a tape tightly.

(2) In the stop mode, move the shut-off switch arm slowly in the direction shown by the arrow.

(3) When the tape comes to touch the edge of the pinch roller, the microswitch should be released.

(4) If necessary adjust the position of the micro-switch by loosening the adjusting screw.

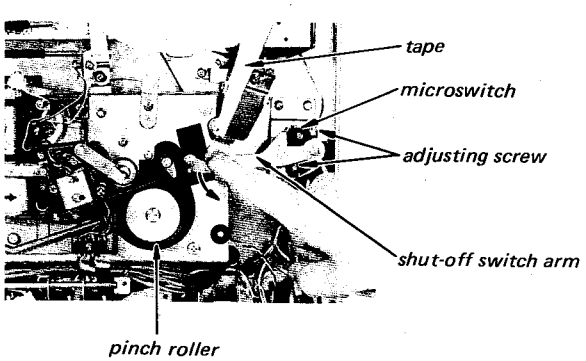


Fig. 18.

Tension Regulator Adjustment (Fig. 19.)

(1) In the play mode, push slowly the tension arm.

(2) When it comes to the point 3 mm (1/8") from the tension arm stopper, regulator tube should touch the regulator plate.

(3) If necessary, adjust by the adjusting screw.

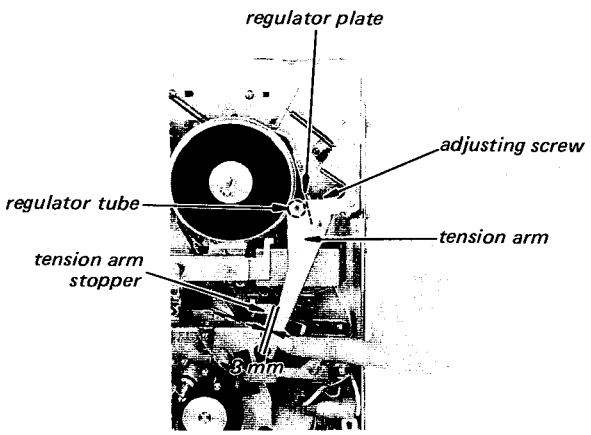


Fig. 19.

Tension Arm Stopper Adjustment (Fig. 20.)

(1) In the stop mode, when pushing the tension arm toward the head chassis, the clearance between the shaft and the head chassis should be approximately 0.5 mm (1/64").

(2) If necessary, adjust the position of the tension arm stopper by loosening the adjusting screws.

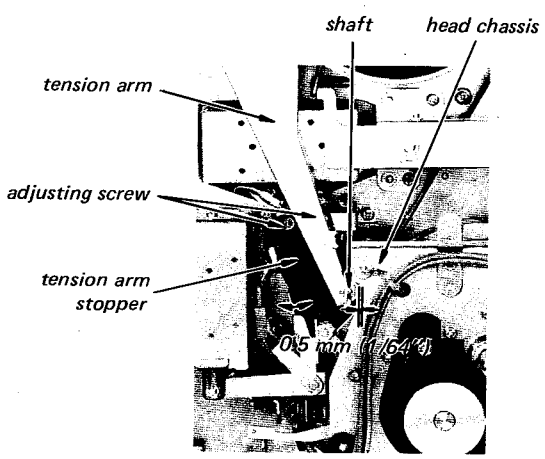


Fig. 20.

Back Tension (in the FF and REW mode) Adjustment (Fig. 21.)

(1) In the rewind mode, measure the tension at the right reel table with a torque meter.

(2) The tension should be 100 to 130 g·cm (1.3 to 1.7 oz·inch).

(3) If necessary, adjust by RV1004.

(4) In the farst forward mode, measure the tension at the left reel table by a torque meter.

(5) The tension should be 100 to 130 g·cm (1.3 to 1.7 oz·inch).

(6) If necessary, adjust by RV1004.

Note: Sliding up the slide terminal of RV1004 makes the torque weaker and vice versa.

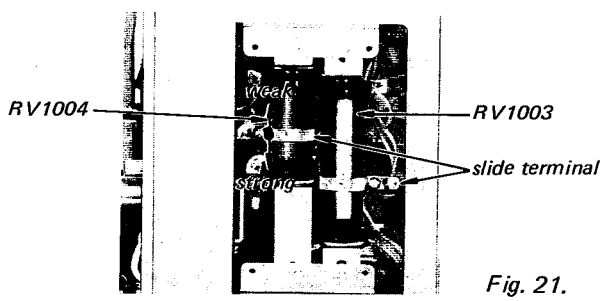


Fig. 21.

Back Tension Adjustment (Fig. 22.)

(1) In the play and reverse play mode, back tension measured by a torque meter should be 60 to 75 g·cm (0.84 to 1.03 oz·inch).

(2) If necessary, adjust by positioning the adjusting spring.

Reel Height Adjustment (Fig. 22.)

(1) In the play and reverse play mode, a tape should not touch the fringe of a reel and should run at mid between the reel fringes.

(2) If necessary, adjuste the reel height with 3 ϕ hexagonal screw driver.

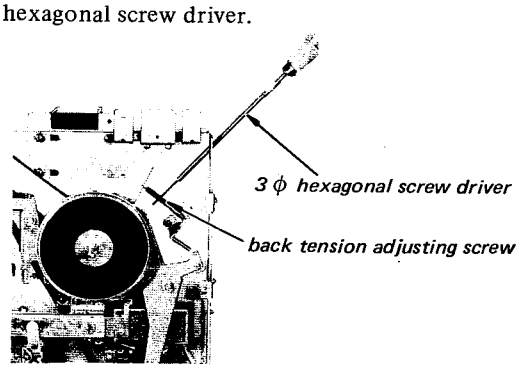


Fig. 22.

Tape Speed Adjustment (Fig. 23.)

(1) Thread SONY alignment tape SPC-47.

(2) Connect a frequency counter to LINE OUT of the set.

(3) With the SPEED TURNING switch in the OFF position, play the tape and measure the frequency.

(4) The frequency for each tape speed (19 cm/s, 9.5 cm/s and 4.8 cm/s) should meet the following value.

tape speed		counter reading
19 cm/s	(7 1/2 ips)	4,000 Hz
9.5 cm/s	(3 3/4 ips)	2,000 Hz
4.8 cm/s	(1 7/8 ips)	1,000 Hz

(5) If necessary, adjust by R3032 for 19 cm/s, R3035 for 9.5 cm/s and R3038 for 4.8 cm/s.

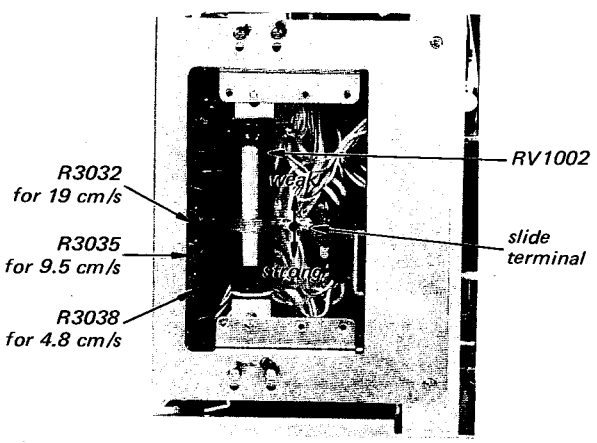


Fig. 23.

Take-up Torque Adjustment (Fig. 23.)

(1) In the play mode, the torque of the take-up reel should be approximately 350 g·cm (5 oz·inch)

(2) If necessary, adjust by RV1003 in Fig. 21.

(3) In the reverse play mode, the torque of the supply reel should be approximately 350 g·cm (5 oz·inch).

(4) If necessary, adjust by RV1002 in Fig. 23.

ELECTRICAL ADJUSTMENTS

Precaution

(1) Before making the adjustments, clean the heads with a soft swab moistened with denatured alcohol and demagnetize them with a head demagnetizer (SONY Model HE-2).

(2) Adjustments should be performed in numerical order and for both L-CH and R-CH, unless otherwise noted.

(3) After the adjustments, apply lock paint to the parts adjusted.

(4) Deliver input signals to the MICROPHONE jack and take out output signals from the LINE OUT jack, unless otherwise noted.

(5) Make sure that no abnormal tape-path is observed.

Test Equipments Required

audio oscillator
attenuator (600 Ω)
VTVM
oscilloscope
resistors 600 Ω and 100 kΩ (1/4 W)
blank tape (erased with a bulk eraser)
SONY alignment tapes: J-19-F2 and J-9-F1

Head Adjustment

SONY TC-780 employs rote bi-lateral head as record and erase head, careful attentions are required for adjustments.
During the manufacturing procedure, the head ass'y is adjusted with special jigs using microscope.
When replacing the heads, the following adjustments should be performed.

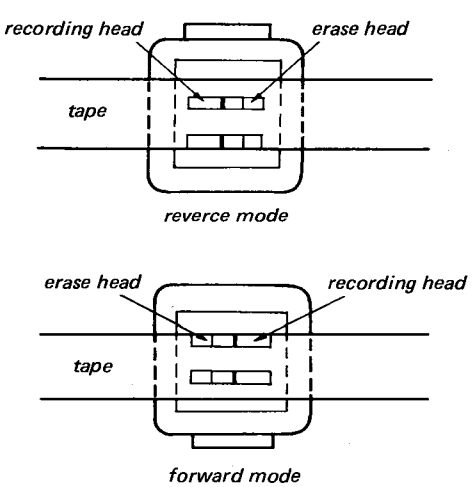


Fig. 24.

Record and Playback Head Adjustments

(1) Thread a reel of blank tape.

(2) Adjust by rotating the tape guides (A), (B), and (C) so that the tape is not riding on the lips of each tape guide. And tighten them temporarily.

(3) In the reverse play mode, adjust by the height and zenith adjusting screws for close contact of the lower edge of the core of the record head and that of the tape as shown in Fig. 24.

(4) In the forward mode, find whether the upper side of the core comes in close contact with that of the tape.

(5) If the upper side of the tape comes below that of the core as shown in Fig. 25. perform the following steps.

1. Rotate the tape guide (B) counterclockwise and lift up the tape by half of the difference between the tape and the core.
2. In the reverse play mode, adjust by the height and zenith adjusting screw for the close contact of the lower side of the tape and that of the core.
3. Place the set in the play mode again and confirm that the lower side of the tape comes in close contact with that of the core.

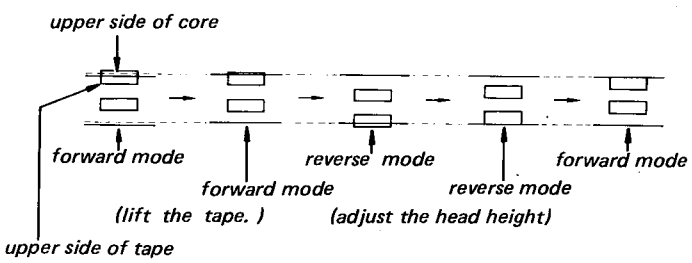


Fig. 25.

(6) If the upper side of the tape comes above that of the core as shown in Fig. 26. perform the following steps.

1. Rotate the tape guide (B), clockwise and bring down the tape by half of the difference between the tape and the core.
2. In the reverse play mode, adjust by the height and the zenith adjusting screw for the close contact of the lower side of the tape and that of the core.
3. Place the set in the play mode again and confirm that the lower side of the tape comes in close contact with that of the core.

(7) After the above adjustment, adjust the tape running position by the tape guide (A) and (C) without rotating (B).

(8) Perform zenith adjustment by the zenith adjusting screw to make slit of the head core gap parallel to the tape guide (B).

(9) Azimuth and phase adjustment of the record head is to be performed after playback head adjustment.

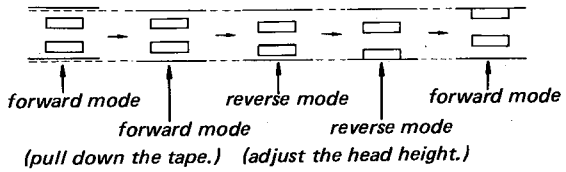


Fig. 26.

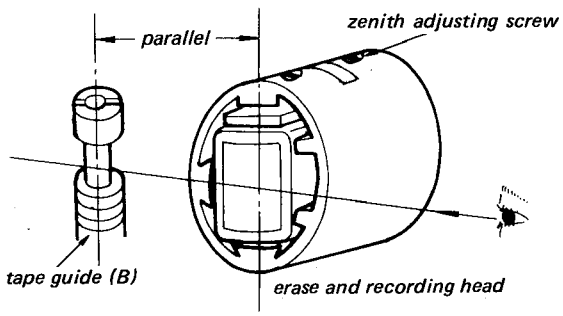
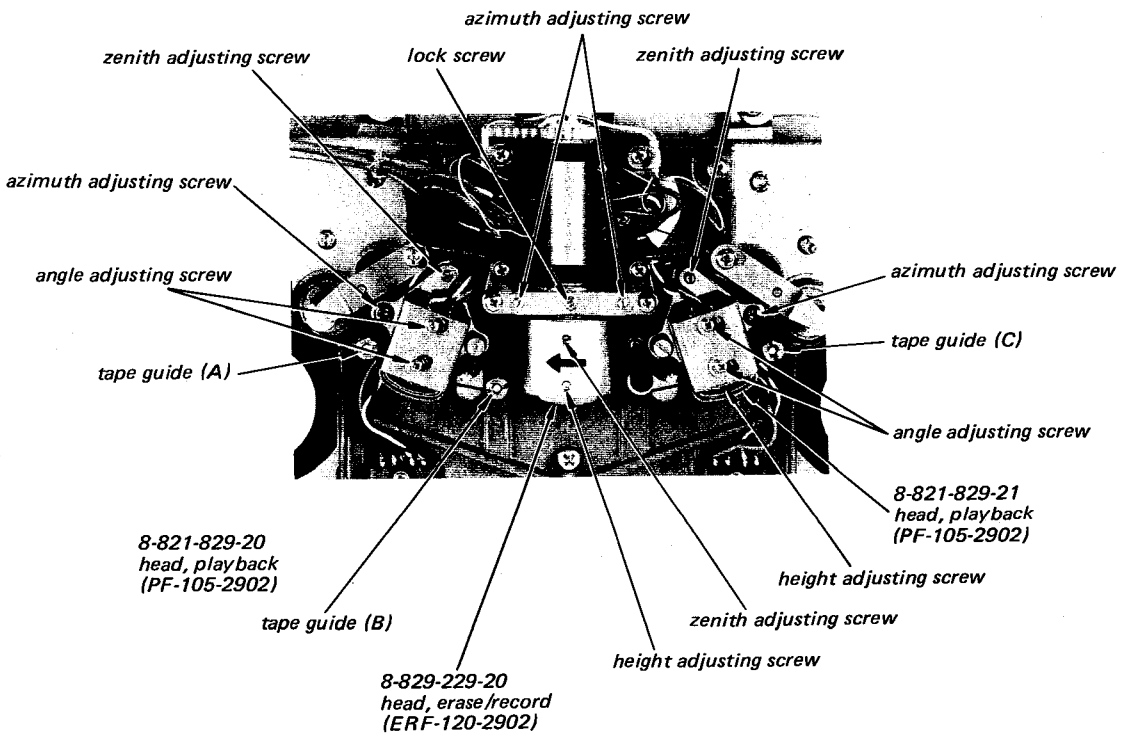


Fig. 27.



Playback Head Adjustment

(1) In the play mode, adjust by the height and zenith adjusting screws so that the upper side of the core of the right side playback head comes in close contact with that of the tape as shown in Fig. 29.

(2) Perform zenith adjustment to make the slit of head core gap parallel to the tape guide.

(3) In the reverse play mode, adjust by the height and zenith adjusting screw so that the lower side of the core of the left side playback head comes in close contact with that of the tape as shown in Fig. 29.

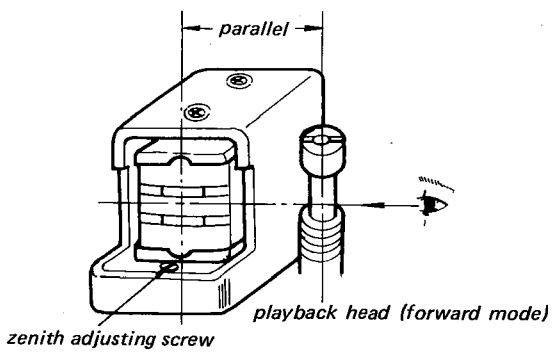


Fig. 28.

(4) Playing the third tone of SONY alignment tape J-19-F2, perform azimuth adjustment by the azimuth adjusting screw to obtain maximum reading on VTVM.

(5) Playing the third tone of SONY alignment tape J-19-F2, hold slightly the supply side reel to obtain stronger back tension and confirm that the LINE OUT reading on VTVM is decreased. If it is increased, the fitness of the tape is not suitable. Perform the angle adjustment of the head.

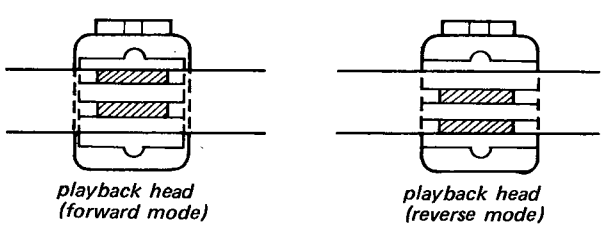


Fig. 29.

(6) Phase Adjustment of the Playback Head.

1. Playing back the first tone (400 Hz, 0 dB) of SONY alignment tape J-19-F2, confirm that the Lissajous figure on the oscilloscope indicates the same phase as shown in Fig. 30.
2. Playing back the third tone (10 kHz, −10 dB), adjust the azimuth adjustment finely for the phase shift less than 30 degrees in the Lissajous figure.

Azimuth and Phase Adjustment of the Record Head

(1) Recording a 15 kHz signal and playing back the recorded signal, adjust the azimuth adjustment to obtain maximum reading on VTVM.

(2) Phase adjustment

1. Recording a 1 kHz signal and playing back the recorded signal, confirm that the Lissajous figure on the oscilloscope indicates the same phase as shown in Fig. 30.
2. Recording a 15 kHz signal and playing back the recorded signal, adjust the azimuth adjustment for the phase shift less than 30 degrees in the Lissajous figure.

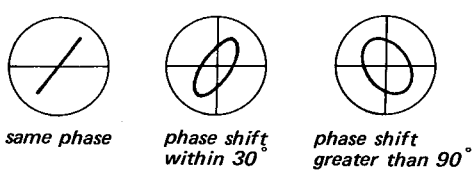


Fig. 30.

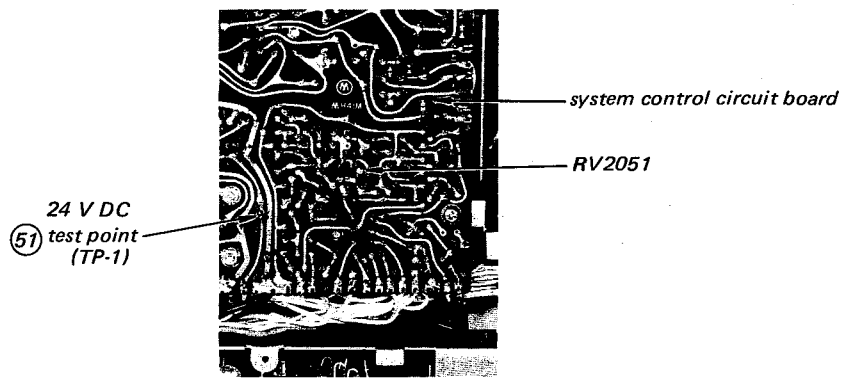


Fig. 31.

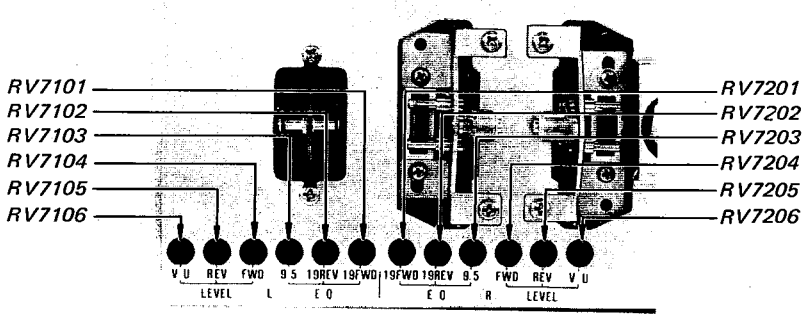


Fig. 32.

Power Voltage Adjustment (Fig. 31.)

1. Set the ac power voltage to 117 V.
2. Adjust RV2051 to obtain 24 V at (51) in the system control circuit board.

Playback Output Level Meter Calibration (Fig. 32.)

1. Playing the first tone (400 Hz, 0 dB) of the SONY alignment tape J-19-F2 with the TAPE SPEED 7 1/2 ips (19 cm/s) and TAPE SELECT switch NORMAL, adjust RV7104 (RV7204) in the line amp circuit board to obtain 0 dB (0.775 V) output on the VTVM.
2. Similarly playing the first tone in the reverse play mode, adjust RV7105 (RV7205) to obtain 0 dB (0.775 V) output on the VTVM.
3. At this time, adjust RV7106 (RV7206) for zero indication on the level meter.
4. Confirm that the output level decreases by approximately 2.5 dB when setting the TAPE SELECT switch to SPECIAL.

Playback Equalizer Adjustment (Fig. 32.)

1. Playing the second tone (400 Hz, −10 dB) of the SONY alignment tape J-19-F2 with the TAPE SPEED 7 1/2 ips (19 cm/s) and TAPE SELECT switch NORMAL, confirm that the output is −10 dB (0.24 V) on the VTVM.
2. Then playing the third tone (10 kHz, −10 dB), adjust RV7102 (RV7202) in the line amp circuit board for −10 dB (0.24 V) output on the VTVM.
3. Similarly adjust RV7101 (RV7201) in the reverse play mode.
4. Playing the second and third tones with the TAPE SPEED 3 3/4 ips (9.5 cm/s), adjust RV7103 (RV7203) for −10 dB (0.24 V) on the VTVM.
5. Playing the second and third tones in the reverse play mode, confirm that the both outputs are the same.

Note: The parts in ( ) are for R-ch adjustment.

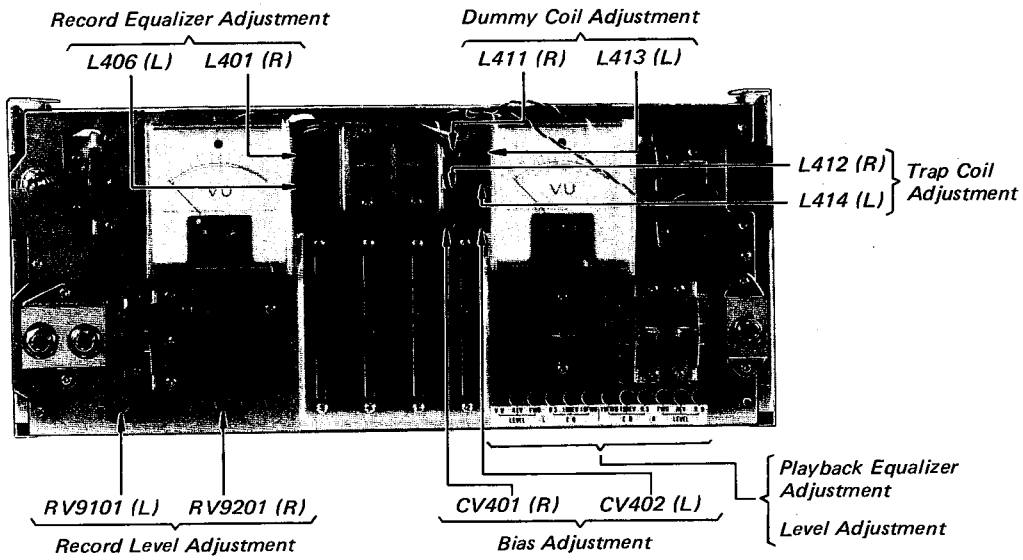


Fig. 33.

Trap Coil Adjustment (Fig. 33, Fig. 34.)

1. Turn the trimmer capacitor CV401 (CV402) for bias adjustment fully counterclockwise.
2. Connect a 10 Ω resistor to the cold side of the record head in series and VTVM across the resistor.
3. In the stereo record mode, adjust the core of the trap coil L412 (L414) for −38 dB (10 mV) on the VTVM.
   (Namely the leakage of erase current from the erase head to the record head is kept within 1 mA).

   Note: the parts in ( ) are for R-ch adjustment.

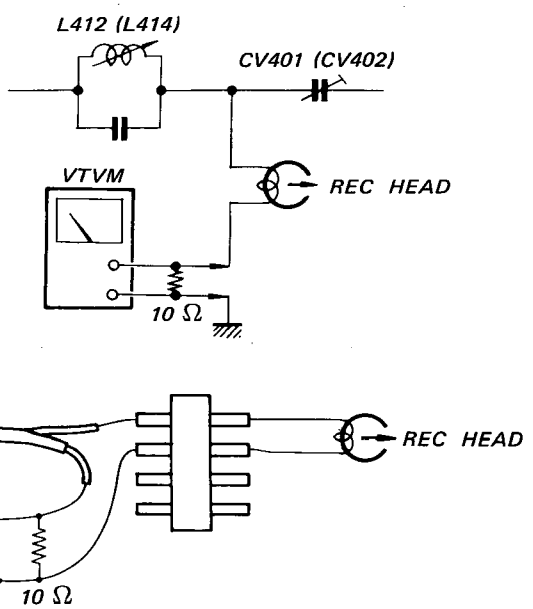


Fig. 34.

Record Level Adjustment (Fig. 33.)

1. Deliver a 1 kHz −60 dB (0.775 mV) signal into the MIC INput jack.
2. Record the signal on the SLH tape in stereo with the TAPE SPEED 7 1/2 ips (19 cm/s) and play it back. Then adjust the microphone volume for 0 dB (0.775 V) output on the VTVM.
3. Set the MONITOR switch to SOURCE. Then adjust RV9101 (RV9201) in the rec & headphone amp circuit board for 0 dB (0.775 V) output on the VTVM.

   Note: The parts in ( ) are for R-ch adjustment.

Bias Adjustment (Fig. 35.)

1. Delivering a 1 kHz −60 dB (0.775 mV) signal, set the input level for 0 dB (0.775 V) output on LINE OUT.
2. Turn the bias trimmer capacitors CV401 and CV402 fully counterclockwise.
3. Recording the signal on a blank SLH tape (TAPE SPEED switch 7 1/2 ips 19 cm/s, TAPE SELECT switch SPECIAL), playback the recorded signal.
4. As the trimmer capacitors CV401 and CV402 are turned clockwise slowly, VTVM reading will go up to a maximum, and then start falling. Adjust CV401 and CV402 until VTVM reads 0.3 dB below and beyond the maximum reading.

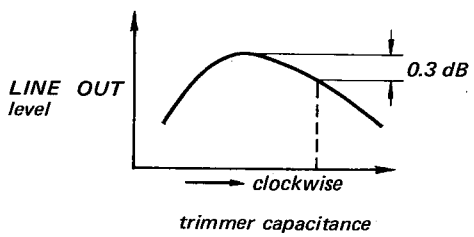


Fig. 35. Bias adjsutment

Record Equalizer Adjustment (Fig. 33.)

1. Set the TAPE SPEED switch to 7 1/2 ips (19 cm/s) and the TAPE SELECT switch to NORMAL.
2. Connect a 10 Ω resistor to the cold side of the record head in series and the VTVM across the resistor. And remove the bias osc circuit board.
3. In the stop mode deliver a 25 kHz −80 dB (0.078 mV) signal into the MIC INput jack and set the microphone volume to the mechanical mid portion.
4. Adjust L401 (L406) in the rec equalizer circuit board for a maximum reading on the VTVM.

Dummy Coil Adjustment

1. Connect a frequency counter to erase head lead wire through 1 or 2 PF capacitor.
2. With the TAPE SPEED 7 1/2 ips (19 cm/s) and in the stereo record mode, memorize the reading of the frequency counter. (approximately 160 kHz)
3. Then set the R-ch to the record mode and adjust L413 for the same value as the step 2.
4. Similarly set the L-ch to the record mode and adjust L411 for the same value as the step 2.

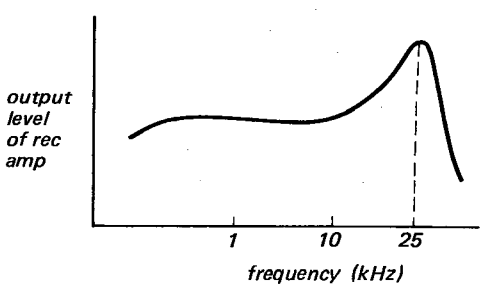


Fig. 36. Rec equalizer characteristics

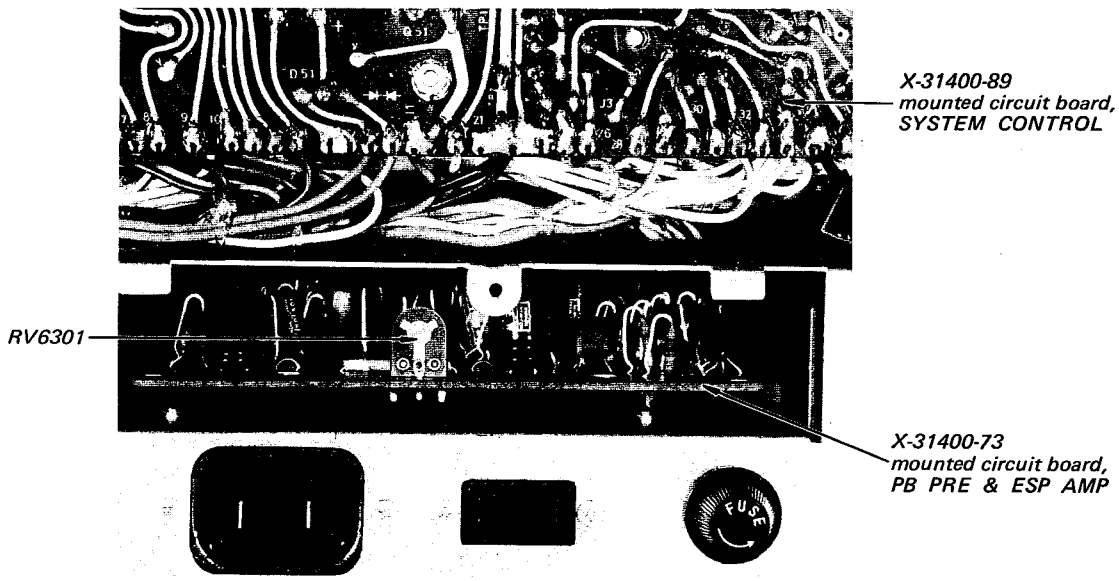


Fig. 36.

ESP Amplifier Gain Adjustment (Fig. 36.)

1. In the play mode, deliver a 500 Hz −40 dB (7.75 mV) signal into the LINE OUT jack of R-ch.
2. At this time, adjust RV6301 in the pb pre & esp amp circuit board for 4 V at the hot side of C2002 in the system control circuit board.

ESP Reverse Time Adjustment

1. In the play mode with ESP switch REV, deliver a 500 Hz −10 dB (0.24 V) signal into the LINE OUT jack of R-ch.
2. Adjust RV2001 in the system control circuit board for reverse operation in 8 ±2 seconds.
3. In the reverse play mode with ESP switch CONT REV, confirm the similar reverse operation.

Servo Amp Adjustment

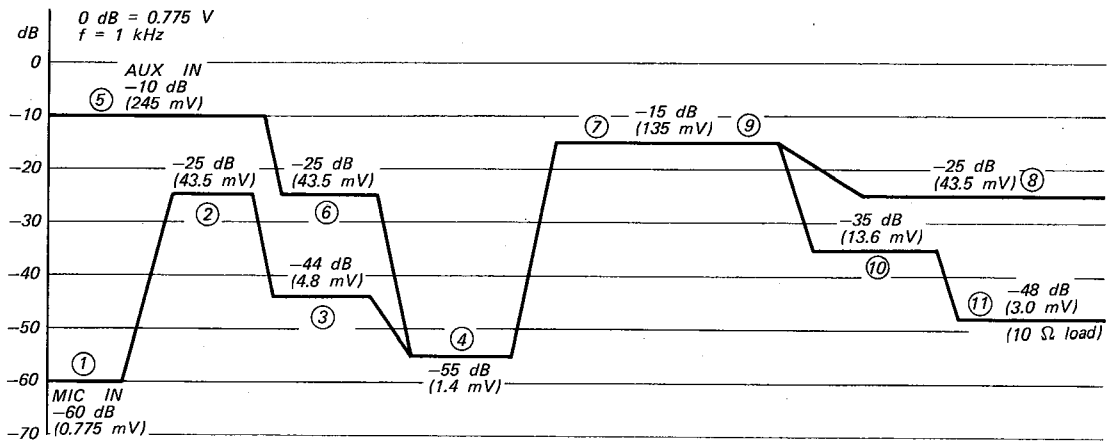
1. Set the ac power voltage to 117 V.
2. Adjust the R3059 for 20 V at the B source i. e. emitter of Q3018 in the servo & esp amp circuit board.

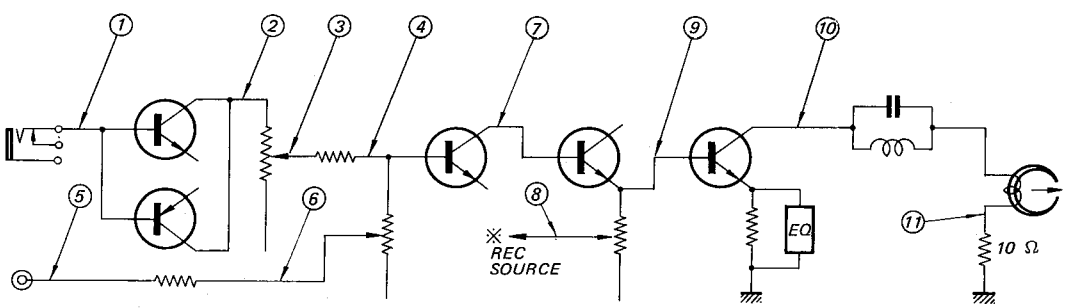
Tape Speed Adjustment

1. Play the SONY alignment tape SPC-47 with the TAPE SPEED 7 1/2 ips (19 cm/s) and connect a frequency counter to the LINE OUT jack.
2. Adjust R3032 in the servo & esp amp circuit board for 3968 ∼ 4032 Hz on the counter.
3. With the TAPE SPEED 3 3/4 ips (9.5 cm/s), adjust R3034 for 1984 ∼ 2016 Hz.
4. With the TAPE SPEED 1 7/8 ips (4.8 cm/s), adjust R3038 for 990 ∼ 1010 Hz.

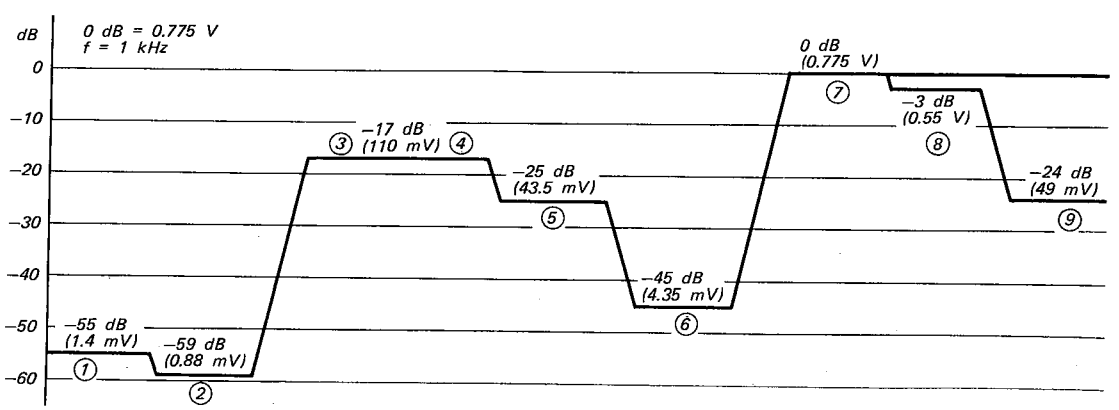
LEVEL DIAGRAM

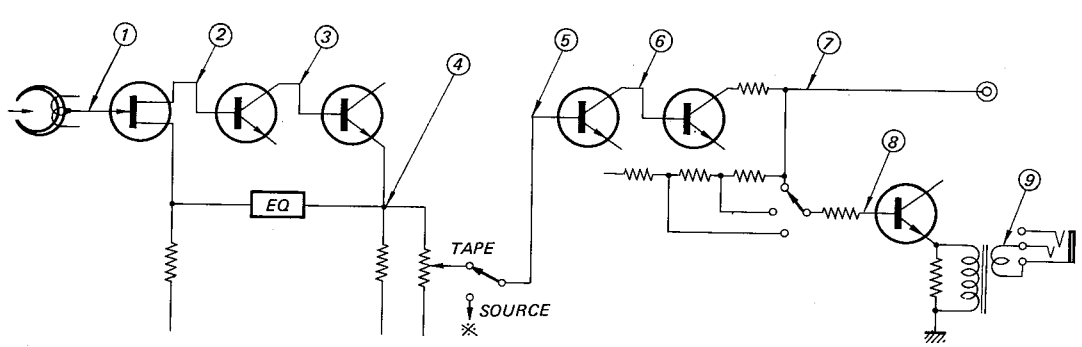
Record mode





Playback mode





ELECTRICAL PARTS LIST

MOUNTED CIRCUIT BOARDS

Ref. No.	Part No.	Description
	X-31400-71-3	REC & HEADPHONE AMP.
	X-31400-72-2	BIAS OSC
	X-31400-73-2	PB PRE & ESP AMP
	X-31400-76-2	REC EQUALIZER
	X-31400-77-4	LINE AMP.
	X-31400-79-1	PB HEAD SELECT
	X-31400-80-1	TAPE SPEED SWITCH
	X-31400-81-1	HEADPHONE MODE
	X-31400-82-1	ESP & TAPE SPEED
	X-31400-83-2	SOS & ECHO
	X-31400-84-1	HEADPHONE LEVEL
	X-31400-85-1	POWER SUPPLY
	X-31400-86-1	MUTING
	X-31400-87-1	CONNECTOR
	X-31400-88-1	SERVO & ESS AMP.
	X-31400-89-1	SYSTEM CONTROL
	X-31400-90-1	POSISTOR
	X-31400-91-2	MIC AMP.

PRINTED CIRCUIT BOARDS

	1-539-288-12	POSISTOR
	1-539-291-12	HEADPHONE MODE
	1-539-292-11	ESP & TAPE SPEED
	1-539-293-11	TAPE SPEED SWITCH
	1-539-294-11	REC & HEADPHONE AMP.
	1-539-295-11	MIC AMP.
	1-539-296-11	PB HEAD SELECT
	1-539-297-11	PB PRE & ESP AMP.
	1-539-298-11	LINE AMP.
	1-539-299-11	BIAS OSC
	1-539-300-11	CONNECTOR
	1-539-301-12	POWER SUPPLY
	1-539-313-11	SOS & ECHO
	1-539-314-11	HEADPHONE LEVEL
	1-539-332-11	REC EQUALIZER
	1-539-361-12	SYSTEM CONTROL
	1-539-362-12	SERVO & ESS AMP.
	1-539-415-13	MUTING

SEMICONDUCTORS

Ref. No.	Part No.	Description
Q101		transistor, 2SC634
Q102		transistor, 2SC634
Q103		transistor, 2SC634
Q104		transistor, 2SC634
Q601		transistor, 2SC634
Q602		transistor, 2SC634
Q603		transistor, 2SC634
Q1001		transistor, 2SC807A
Q2001		transistor, 2SC634
Q2002		transistor, 2SC634
Q2003		transistor, 2SC634
Q2004		transistor, 2SC634
Q2005		transistor, 2SC634
Q2006		transistor, 2SC634
Q2007		transistor, 2SC634
Q2008		transistor, 2SC634
Q2009		transistor, 2SC634
Q2010		transistor, 2SC634
Q2051		transistor, 2SD28
Q2052		transistor, 2SC634
Q2053		transistor, 2SC634
Q3001		transistor, 2SC805
Q3002		transistor, 2SC805
Q3003		transistor, 2SC634
Q3004		transistor, 2SC634
Q3005		transistor, 2SC634
Q3006		transistor, 2SC634
Q3007		transistor, 2SC634
Q3008		transistor, 2SC634
Q3009		transistor, 2SC634
Q3010		transistor, 2SC634
Q3011		transistor, 2SC634
Q3012		transistor, 2SC634
Q3013		transistor, 2SC634
Q3014		transistor, 2SC634
Q3015		transistor, 2SC634
Q3016		transistor, 2SC634
Q3017		transistor, 2SA610
Q3018		transistor, 2SC634
Q3019		transistor, 2SC805
Q3020		transistor, 2SC634
Q3021		transistor, 2SC634
Q3022		transistor, 2SC634
Q3023		transistor, 2SC634
Q3024		transistor, 2SC867
Q3025		transistor, 2SC634
Q3026		transistor, 2SC634
Q3027		transistor, 2SC634
Q3028		transistor, 2SC634
Q6101,6201		FET, 2SK35
Q6102,6202		transistor, 2SC632
Q6103,6203		transistor, 2SC634
Q6104,6204		transistor, 2SC634
Q6301		transistor, 2SC632
Q6302,6303		transistor, 2SC634
Q7101,7201		transistor, 2SC634
Q7102,7202		transistor, 2SC634
Q7103,7203		transistor, 2SC634
Q7104,7204		transistor, 2SC634
Q7301		transistor, 2SC634

Ref. No.	Part No.	Description
Q7302		transistor, 2SC634
Q8101,8201		transistor, 2SC632
Q8102,8202		transistor, 2SA564
Q9101,9201		transistor, 2SC632
Q9102,9202		transistor, 2SC634
Q9103,9203		transistor, 2SC634
Q9104,9204		transistor, 2SC634
D101		diode, 1T22A
D102		diode, 1T22A
D103		diode, 1T22A
D104		diode, 1T22A
D401		diode, 10D05
D402		diode, 10D05
D403		diode, 10D05
D404		diode, 10D05
D405		diode, 10D05
D406		diode, 10D05
D407		diode, 10D05
D408		diode, 10D05
D409		diode, 10D05
D410		diode, 10D05
D801		diode, 10D05
D1001		diode, 10D05
D1002		diode, 10D05
D1003		diode, 10D05
D1004		diode, 10D05
D2001		diode, 1T22
D2002		diode, 1T22
D2003		diode, 1T22
D2004		diode, 1T22
D2005		diode, 1T22
D2006		diode, 1T22
D2007		diode, 1T22
D2008		diode, 10D2
D2101		diode, 10D2
D2102		diode, 10D2
D2103		diode, 10D2
D2104		diode, 10D2
D2105		diode, 10D2
D2106		diode, 10D2
D2107		diode, 10D2
D2108		diode, 10D2
D2109		diode, 10D2
D2110		diode, 10D2
D2111		diode, 10D05
D2112		diode, 10D2
D2113		diode, CD2
D2114		diode, 10D2
D2115		diode, 10D2
D2116		diode, CD2
D2117		diode, CD2
D2118		diode, CDR2
D2119		diode, 10D2
D2120		diode, 10D2
D2121		diode, CD2
D2122		diode, CDR2
D2123		diode, 10D2
D2124		diode, 10D2
D2125		diode, 10D2
D2126		diode, 10D2
D2127		diode, 10D2
D2051		diode, CD2
D3001		diode, CD2
D3002		diode, 10D2
D3003		diode, 10D2
D3004		diode, 10D05
D3005		diode, 10D05
D3006		diode, 10D05
D3007		diode, 10D05
D3008		diode, 10D2
D3009		diode, 10D2
D3010		diode, 10D2
D3011		diode, 10D05
D3012		diode, 10D2
D3013		diode, 10D2
D3014		diode, 1T22
D3015		diode, 1T22
D3016		diode, 1T22
D3017		diode, 1T22
D3018		diode, 1T22
D3019		diode, 1T22
D3020		diode, 10D2
D3021		diode, 10D05
D3022		diode, 1T22
D3023		diode, 10D05
D3024		diode, 1T22
D3025		diode, 10D2
D3026		diode, 1T22
D3027		diode, 10D05
D4001		diode, CD2
D5001		diode, CDR2
D5002		diode, CD2
D7101,7201		diode, 10D05
D7102,7202		diode, 10D05
D7103,7203		diode, 10D05
D7104,7204		diode, 10D05
D7105,7205		diode, 1T22A
D7301		diode, 1T22
D7302		diode, 1T22
D7303		diode, 1T22
DZ2001		zener diode, 1S332
DZ2051		zener diode, 1S332
DZ3001		zener diode, 1T243M
DZ3002		zener diode, 1S332
DZ3003		zener diode, 1S330
PR4001,4002	1-800-060	posistor

Ref. No.	Part No.	Description
PR4003	1-800-061	posistor
PR4004,4005	1-800-061	posistor

COILS & TRANSFORMERS

L401	1-407-285	variable inductor, 1.5 mH
L402	1-407-196	variable inductor, 1.2 mH
L403	1-407-198	micro inductor, 2.2 mH
L404	1-407-198	micro inductor, 2.2 mH
L405	1-407-198	micro inductor, 2.2 mH
L406	1-407-285	variable inductor, 1.5 mH
L407	1-407-196-11	variable inductor, 1.2 mH
L408	1-407-198	micro inductor, 2.2 mH
L409	1-407-198	micro inductor, 2.2 mH
L410	1-407-198	micro inductor, 2.2 mH
L411	1-407-284	variable inductor, 1 mH
L412	1-407-288	variable inductor, 4.7 mH
L413	1-407-284	coil, dummy, 1mH
L414	1-407-288	coil, dummy, 4.7 mH
L601	1-407-196-11	micro inductor, 1.2 mH
L7101,7201	1-407-263	variable inductor, 220 μH
T601	1-433-146	transformer, oscillator
T1001	1-441-567	transformer power
T9101,9202	1-427-270	transformer, output

CAPACITORS

All capacitors in microfarads unless otherwise indicated.
(p = μμF, elect = electrolytic)

C101	1-105-677-12	0.022	50 V	mylar
C102	1-105-677-12	0.022	50 V	mylar
C103	1-105-677-12	0.022	50 V	mylar
C104	1-105-671-12	0.0068	50 V	mylar
C105	1-105-671-12	0.0068	50 V	mylar
C106	1-105-683-12	0.068	50 V	mylar
C107	1-121-404	33	25 V	elect
C108	1-121-398	10	25 V	elect
C109	1-105-679-12	0.033	50 V	mylar
C301	1-105-671-12	0.0068	50 V	mylar
C302	1-105-671-12	0.0068	50 V	myalr
C401	1-105-683-12	0.068	50 V	mylar
C402	1-105-679-12	0.033	50 V	mylar
C403	1-105-683-12	0.068	50 V	mylar
C404	1-105-681-12	0.047	50 V	mylar
C405	1-105-687-12	0.15	50 V	mylar
C406	1-105-683-12	0.068	50 V	mylar
C407	1-105-679-12	0.033	50 V	mylar
C408	1-105-683-12	0.068	50 V	mylar
C409	1-105-681-12	0.047	50 V	mylar
C410	1-105-687-12	0.15	50 V	mylar
C411	1-121-729	10	6.3 V	elect
C412	1-121-398	10	25 V	elect
C413	1-121-398	10	25 V	elect
C414	1-121-398	10	25 V	elect
C415	1-121-398	10	25 V	elect
C416	1-121-398	10	25 V	elect
C417	1-129-115-31	220 p	50 V	polyethylene
C418	1-129-115-31	220 p	50 V	polyethylene
C501	1-121-729	10	6.3 V	elect
C502	1-121-729	10	6.3 V	elect
C601	1-121-404	33	25 V	elect
C602	1-121-391	1	25 V	elect
C603	1-105-685-12	0.1	50 V	mylar
C604	1-129-358-31	680 p	500 V	polyethylene
C605	1-129-123-31	470 p	50 V	polyethylene
C606	1-129-123-31	470 p	50 V	polyethylene
C607	1-121-404	33	25 V	elect
C608	1-121-404	33	25 V	elect
C1001	1-117-082	4	250 V	MP
C1002	1-117-082	4	250 V	MP
C1003	1-117-082	4	250 V	MP
C1004	1-117-054	0.5 V	350 V	MP
C2001	1-121-398	10	25 V	elect
C2002	1-121-416	100	25 V	elect
C2003	1-121-391	1	50 V	elect
C2004	1-121-391	1	50 V	elect
C2005	1-105-673-12	0.01	50 V	mylar
C2006	1-105-685-12	0.1	50 V	mylar
C2051	1-121-422	220	25 V	elect
C2052	1-121-398	10	25 V	elect
C2053	1-121-404	33	25 V	elect
C2054	1-121-388	1000	35 V	elect
C2055	1-121-388	1000	35 V	elect
C2056	1-105-661-12	0.001	50 V	mylar
C2101	1-121-707	3.3	160 V	elect
C2102		– discarded –		
C2103	1-121-791	10	200 V	elect
C2104	1-117-054	0.5	350 V	MP
C2105	1-117-054	0.5	350 V	MP
C2106	1-117-054	0.5	350 V	MP
C2107	1-121-707	3.3	160 V	elect
C2108	1-121-707	3.3	160 V	elect
C3001		– discarded –		
C3002	1-121-395	4.7	25 V	elect
C3003	1-121-396	4.7	50 V	elect
C3004	1-121-398	10	25 V	elect
C3005	1-105-671-11	0.0068	50 V	myalr
C3006	1-121-392	3.3	25 V	elect
C3007	1-105-683-12	0.068	50 V	mylar
C3008	1-105-661-12	0.001	50 V	mylar
C3009	1-105-677-12	0.022	50 V	mylar
C3010	1-121-416	100	25 V	elect
C3011	1-105-661-12	0.001	50 V	mylar
C3012	1-121-416	100	25 V	elect
C3013	1-121-416	100	25 V	elect

Ref. No.	Part No.			
C3014	1-121-422	220	25 V	elect
C3015	1-121-733	470	25 V	elect
C3016	1-121-398	10	25 V	elect
C3017	1-121-404	33	25 V	elect
C3018	1-121-423	220	50 V	elect
C3019	1-121-410	47	25 V	elect
C3020	1-121-398	10	25 V	elect
C3021	1-121-398	10	25 V	elect
C3022	1-121-398	10	25 V	elect
C3023	1-121-398	10	25 V	elect
C3024	1-121-398	10	25 V	elect
C3025	1-121-708	10	160 V	elect
C6101,6201	1-105-661-12	0.001	50 V	mylar
C6102,6202	1-121-729	10	10 V	elect
C6103,6203	1-121-401	33	6.3 V	elect
C6104,6204	1-121-397	10	16 V	elect
C6105,6205	1-121-397	10	16 V	elect
C6106,6206	1-107-056	56 p	500 V	silvered mica
C6107,6207	1-105-679-12	0.033	50 V	mylar
C6108,6208	1-105-673-12	0.01	50 V	mylar
C6109,6209	1-121-410	47	25 V	elect
C6110,6210	1-121-410	47	25 V	elect
C6111,6211	1-105-661-12	0.001	50 V	mylar
C6301	1-121-391	1	50 V	elect
C6302	1-105-677-12	0.022	50 V	mylar
C6303	1-121-391	1	50 V	elect
C6304	1-105-661-12	0.001	50 V	mylar
C6305	1-105-685-12	0.1	50 V	mylar
C6306	1-121-391	1	50 V	elect
C6307	1-121-398	10	25 V	elect
C6308	1-121-397	10	16 V	elect
C6309	1-121-391	1	50 V	elect
C6310	1-105-673-12	0.01	50 V	mylar
C6311	1-105-661-12	0.001	50 V	mylar
C6312	1-107-177	220 p	500 V	silvered mica
C7101,7201	1-121-397	10	16 V	elect
C7102,7202	1-121-397	10	16 V	elect
C7103,7203	1-121-397	10	16 V	elect
C7104,7204	1-121-410	47	25 V	elect
C7105,7205	1-107-159	33 p	500 V	silvered mica
C7106,7206	1-105-663-12	0.0015	50 V	mylar
C7107,7207	1-121-407	47	6.3 V	elect
C7108,7208	1-105-671-12	0.0068	50 V	mylar
C7109,7209	1-121-397	10	16 V	elect
C7110,7210	1-121-442	1	50 V	elect
C7111,7211	1-121-400	33	3 V	elect
C7112,7212	1-121-442	1	50 V	elect
C7113,7213	1-121-442	1	50 V	elect
C7114,7214	1-121-397	10	16 V	elect
C7115,7215	1-121-442	1	50 V	elect
C7116,7216	1-121-397	10	16 V	elect
C7117,7217		– discarded –		
C7118,7218	1-105-663-12	0.0015	50 V	mylar
C7119,7219	1-121-442	1	50 V	elect
C7301	1-105-685-12	0.1	50 V	mylar
C7302	1-105-685-12	0.1	50 V	mylar
C7303	1-121-397	10	16 V	elect
C7304	1-121-419	220	6.3 V	elect
C7305	1-105-669-12	0.0047	50 V	mylar
C8101,8201	1-121-397	10	16 V	elect
C8102,8202	1-121-397	10	16 V	elect
C8103,8203	1-105-661-12	0.001	50 V	mylar
C8104,8204	1-121-413	100	6.3 V	elect
C8105,8205	1-121-397	10	16 V	elect
C8106,8206	1-121-413	100	6.3 V	elect
C8107,8207	1-121-397	10	16 V	elect
C8108,8208	1-121-416	100	25 V	elect
C9101,9201	1-121-416	100	25 V	elect
C9102,9202	1-121-729	10	6.3 V	elect
C9103,9203	1-121-413	100	6.3 V	elect
C9104,9204	1-107-159	33 p	500 V	silvered mica
C9105,9205	1-105-675-12	0.015	50 V	mylar
C9106,0206	1-127-204	0.5	15 V	aluminium
C9107,9207	1-121-397	10	16 V	elect
C9108,9208	1-121-738	10	50 V	elect
C9109,9209	1-121-391	1	50 V	elect
C9110,9210	1-121-397	10	16 V	elect
C9111,9211	1-129-126-31	620 p	50 V	polyethylene
C9112,9212	1-121-391	1	50 V	elect
CV401	1-141-034	30～200 p		trimmer
CV402	1-141-034	30～200 p		trimmer
	1-129-107-31	100 p	50 V	polyethylene
	1-129-115-31	220 p	50 V	polyethylene
	1-129-123-31	470 p	50 V	polyethylene
	1-129-131-31	1000 p	50 V	polyethylene
	1-105-673-12	0.01	50 V	mylar
	1-105-675-12	0.015	50 V	mylar
	1-105-677-12	0.022	50 V	mylar
	1-105-683-12	0.068	50 V	mylar

RESISTORS

All resistors are ¼W and carbon type, unless otherwise indicated.

R101	1-242-709	33 kΩ
R102	1-242-709	33 kΩ
R103	1-242-709	33 kΩ
R104	1-242-709	33 kΩ
R105	1-242-709	33 kΩ
R106	1-242-691	5.6 kΩ
R107	1-242-681	2.2 kΩ
R108	1-242-709	33 kΩ
R109	1-242-695	8.2 kΩ
R110	1-242-709	33 kΩ
R111	1-242-695	8.2 kΩ
R112	1-242-681	2.2 kΩ

Ref. No.	Part No.	Description
R113	1-242-705	22 kΩ
R114	1-242-705	22 kΩ
R115	1-242-697	10 kΩ
R116	1-242-697	10 kΩ
R117	1-242-705	22 kΩ
R118	1-242-705	22 kΩ
R119	1-242-667	560 Ω
R201	1-242-712	43 kΩ
R202	1-242-707	27 kΩ
R203	1-242-708	30 kΩ
R204	1-242-712	43 kΩ
R205	1-242-707	27 kΩ
R206	1-242-708	30 kΩ
R301	1-242-707	27 kΩ
R302	1-242-707	27 kΩ
R303	1-242-717	68 kΩ
R304	1-242-717	68 kΩ
R401	1-242-629	15 Ω
R402	1-242-629	15 Ω
R403	1-242-629	15 Ω
R404	1-242-629	15 Ω
R405	1-242-629	15 Ω
R406	1-242-629	15 Ω
R407	1-242-629	15 Ω
R408	1-242-629	15 Ω
R409	1-242-629	15 Ω
R410	1-242-629	15 Ω
R411		– discarded –
R412		– discarded –
R413	1-242-697	10 kΩ
R414	1-242-697	10 kΩ
R415	1-242-697	10 kΩ
R416	1-242-697	10 kΩ
R417	1-242-697	10 kΩ
R418	1-242-697	10 kΩ
R419	1-242-697	10 kΩ
R420	1-242-697	10 kΩ
R421	1-242-697	10 kΩ
R422	1-242-697	10 kΩ
R423		– discarded –
R424	1-242-673	1 kΩ
R425	1-242-721	100 kΩ
R426	1-242-721	100 kΩ
R427	1-242-721	100 kΩ
R428	1-242-721	100 kΩ
R429	1-242-721	100 kΩ
R430	1-242-689	4.7 kΩ
R431	1-242-689	4.7 kΩ
R501	1-242-695	8.2 kΩ
R502	1-242-695	8.2 kΩ
R503		– discarded –
R504		– discarded –
R505	1-242-681	2.2 kΩ
R506	1-242-688	4.3 kΩ
R507	1-242-688	4.3 kΩ
R601	1-242-671	820 Ω
R602	1-242-625	10 Ω
R603	1-242-625	10 Ω
R604	1-242-688	4.3 kΩ
R605	1-242-657	220 Ω
R606	1-242-641	47 Ω
R607	1-242-641	47 Ω
R608	1-242-697	10 kΩ
R801	1-242-719	82 kΩ
R802	1-242-719	82 kΩ
R803	1-242-673	1 kΩ
R804	1-242-673	1 kΩ
R2001	1-242-675	1.2 kΩ
R2002	1-242-721	100 kΩ
R2003	1-242-737	470 kΩ
R2004	1-242-697	10 kΩ
R2005	1-242-705	22 kΩ
R2006	1-242-721	100 kΩ
R2007	1-242-721	100 kΩ
R2008	1-242-705	22 kΩ
R2009	1-242-707	27 kΩ
R2010	1-242-735	390 kΩ
R2011	1-242-721	100 kΩ
R2012	1-242-701	15 kΩ
R2013	1-242-685	3.3 kΩ
R2014	1-242-617	4.7 kΩ
R2015	1-242-705	22 kΩ
R2016	1-242-721	100 kΩ
R2017	1-242-721	100 kΩ
R2018	1-242-705	22 kΩ
R2019	1-242-707	27 kΩ
R2020	1-242-735	390 kΩ
R2021	1-242-721	100 kΩ
R2022	1-242-701	15 kΩ
R2023	1-242-699	12 kΩ
R2024	1-242-617	4.7 kΩ
R2025	1-242-689	4.7 kΩ
R2026	1-242-704	20 kΩ
R2051	1-242-645	68 Ω
R2052	1-242-685	3.3 kΩ
R2053	1-242-691	5.6 kΩ
R2054	1-242-691	5.6 kΩ
R2055	1-242-701	15 kΩ
R2056		– discarded –
R2057	1-242-699	12 kΩ
R3001		– discarded –
R3002	1-242-707	27 kΩ
R3003	1-244-895	8.2 kΩ ½W
R3004	1-242-721	100 kΩ
R3005	1-242-733	330 kΩ
R3006	1-242-685	3.3 kΩ

Ref. No.	Part No.	Description	
R3007	1-242-705	22 kΩ	
R3008	1-242-733	330 kΩ	
R3009	1-242-705	22 kΩ	
R3010	1-242-685	3.3 kΩ	
R3011	1-242-705	22 kΩ	
R3012	1-242-705	22 kΩ	
R3013	1-242-729	220 kΩ	
R3014	1-242-723	120 kΩ	
R3015	1-242-730	240 kΩ	
R3016	1-242-705	22 kΩ	
R3017	1-242-637	33 Ω	
R3018	1-242-723	120 kΩ	
R3019	1-242-705	22 kΩ	
R3020	1-242-707	27 kΩ	
R3021	1-221-175	20 kΩ (B)	variable
R3022		– discarded –	
R3023	1-242-697	10 kΩ	
R3024	1-242-721	100 kΩ	
R3025	1-242-673	1 kΩ	
R3026	1-242-673	1 kΩ	
R3027	1-242-721	100 kΩ	
R3028	1-242-697	10 kΩ	
R3029	1-242-697	10 kΩ	
R3030	1-242-722	110 kΩ	
R3031	1-242-685	3.3 kΩ	
R3032	1-221-173	5 kΩ (B)	variable
R3033	1-242-729	220 kΩ	
R3034	1-242-689	4.7 kΩ	
R3035	1-221-175	20 kΩ (B)	variable
R3036	1-242-736	430 kΩ	
R3037	1-242-697	10 kΩ	
R3038	1-221-176	50 kΩ (B)	variable
R3039	1-242-703	18 kΩ	
R3040	1-242-685	3.3 kΩ	
R3041	1-242-685	3.3 kΩ	
R3042	1-242-661	330 Ω	
R3043	1-242-699	12 kΩ	
R3044	1-242-687	3.9 kΩ	
R3045	1-242-693	6.8 kΩ	
R3046	1-242-681	2.2 kΩ	
R3047	1-242-633	22 Ω	
R3048	1-242-673	1 kΩ	
R3049	1-242-673	1 kΩ	
R3050	1-242-653	150 Ω	
R3051	1-242-649	100 Ω	
R3052	1-242-659	270 Ω	
R3053	1-242-673	1 kΩ	
R3054	1-242-681	2.2 kΩ	
R3055	1-242-689	4.7 kΩ	
R3056	1-242-713	47 kΩ	
R3057	1-242-673	1 kΩ	
R3058	1-242-689	4.7 kΩ	
R3059	1-221-173	5 kΩ (B)	variable

Ref. No.	Part No.	Description		
R3060	1-242-697	10 kΩ		
R3061	1-242-697	10 kΩ		
R3062	1-242-669	680 Ω		
R3063	1-207-268	3.3 Ω	1 ½W	wire wound
R3064	1-242-669	680 Ω		
R3065	1-242-681	2.2 kΩ		
R3066	1-242-721	100 kΩ		
R3067	1-242-717	68 kΩ		
R3068	1-242-697	10 kΩ		
R3069	1-242-705	22 kΩ		
R3070	1-206-093	1 kΩ	1 W	metal oxide film
R3071	1-242-701	15 kΩ		
R3072	1-242-709	33 kΩ		
R3073	1-242-709	33 kΩ		
R3074	1-242-709	33 kΩ		
R3075	1-242-709	33 kΩ		
R3076	1-242-709	33 kΩ		
R3077	1-242-709	33 kΩ		
R3078	1-242-709	33 kΩ		
R3079	1-242-721	100 kΩ		
R3080	1-242-717	68 kΩ		
R3081	1-242-705	22 kΩ		
R3082	1-242-705	22 kΩ		
R3083	1-242-729	220 kΩ		
R3084	1-242-721	100 kΩ		
R3085	1-242-673	1 kΩ		
R3086	1-242-709	33 kΩ		
R3087	1-242-690	5.1 kΩ		
R3088	1-242-690	5.1 kΩ		
R4001	1-206-042	1.5 kΩ	5 W	metal film
R4002	1-206-042	1.5 kΩ	5 W	metal film
R4003	1-206-042	1.5 kΩ	5 W	metal film
R4004	1-206-042	1.5 kΩ	5 W	metal film
R5001	1-207-393	8.2 Ω	5 W	wire wound
R6001	1-242-701	15 kΩ		
R6101,6201	1-242-721	100 kΩ		
R6102,6202	1-242-708	30 kΩ		
R6103,6203	1-242-699	12 kΩ		
R6104,6204	1-242-689	4.7 kΩ		
R6105,6205	1-242-667	560 Ω		
R6106,6206	1-242-705	22 kΩ		
R6107,6207	1-242-709	33 kΩ		
R6108,6208	1-242-681	2.2 kΩ		
R6109,6209	1-242-665	470 Ω		
R6110,6210	1-242-693	6.8 kΩ		
R6111,6211	1-242-749	1.5 MΩ		
R6112,6212	1-242-733	330 kΩ		
R6113,6213	1-242-661	300 Ω		
R6114,6214	1-242-697	10 kΩ		
R6301	1-242-713	47 kΩ		
R6302	1-242-707	27 kΩ		
R6303	1-242-681	2.2 kΩ		
R6304	1-242-673	1 kΩ		

Ref. No.	Part No.	Description
R6305	1-242-723	120 kΩ
R6306	1-242-723	120 kΩ
R6307	1-242-727	180 kΩ
R6308	1-242-705	22 kΩ
R6309	1-242-707	27 kΩ
R6310	1-242-697	10 kΩ
R6311	1-242-737	470 kΩ
R6312	1-242-689	4.7 kΩ
R6313	1-242-705	22 kΩ
R7101,7201	1-242-689	4.7 kΩ
R7102,7202	1-242-697	10 kΩ
R7103,7203	1-242-697	10 kΩ
R7104,7204	1-242-697	10 kΩ
R7105,7205	1-242-713	47 kΩ
R7106,7206	1-242-709	33 kΩ
R7107,7207	1-242-731	270 kΩ
R7108,7208	1-242-713	47 kΩ
R7109,7209	1-242-728	200 kΩ
R7110,7210	1-242-683	2.7 kΩ
R7111,7211	1-242-713	47 kΩ
R7112,7212	1-242-681	2.2 kΩ
R7113,7213	1-242-663	390 Ω
R7114,7214	1-242-695	8.2 kΩ
R7115,7215	1-242-668	620 Ω
R7116,7216	1-242-707	27 kΩ
R7117,7217	1-242-713	47 kΩ
R7118,7218	1-242-747	1.2MΩ
R7119,7219	1-242-723	120 kΩ
R7120,7220	1-242-695	8.2 kΩ
R7121,7221	1-242-697	10 kΩ
R7122,7222	1-242-668	620 Ω
R7123,7223	1-242-707	27 kΩ
R7124,7224	1-242-739	560 kΩ
R7125,7225	1-242-681	2.2 kΩ
R7126,7226	1-242-665	470 Ω
R7127,7227	1-242-713	47 kΩ
R7301	1-242-713	47 kΩ
R7302	1-242-717	68 kΩ
R7303	1-242-701	15 kΩ
R7304	1-242-719	82 kΩ
R7305	1-242-691	5.6 kΩ
R7306	1-242-689	4.7 kΩ
R7307	1-242-713	47 kΩ
R7308	1-242-701	15 kΩ
R8101,8201	1-242-683	2.7 kΩ
R8102,8202	1-242-719	82 kΩ
R8103,8203	1-242-705	22 kΩ
R8104,8204	1-242-695	8.2 kΩ
R8105,8205	1-242-687	3.9 k Ω
R8106,8206	1-242-645	68 Ω
R8107,8207	1-242-705	22 k Ω
R8108,8208	1-242-719	82 kΩ
R8109,8209	1-242-687	3.9 kΩ
R8110,8210	1-242-645	68 Ω
R8111,8211	1-242-695	8.2 kΩ
R8112,8212	1-242-683	2.7 kΩ
R9101,9201	1-242-733	330 kΩ
R9102,9202	1-242-709	33 kΩ
R9103,9203	1-242-729	220 kΩ
R9104,9204	1-242-706	24 kΩ
R9105,9205	1-242-681	2.2 kΩ
R9106,9206	1-242-647	82 Ω
R9107,9207	1-242-695	8.2 kΩ
R9108,9208	1-242-677	1.5 kΩ
R9110,9210	1-242-675	1.2 kΩ
R9111,9211	1-242-671	820 Ω
R9112,9212	1-242-712	43 kΩ
R9113,9213	1-242-721	100 kΩ
R9114,9214	1-242-681	2.2 kΩ
R9115,9215	1-242-697	10 kΩ
RV501,502	1-222-301	10 kΩ (D) variable
RV503,504	1-222-302	30 kΩ (D) variable
RV505-1	1-222-750	50 kΩ (A) variable
RV505-2	1-222-750	50 kΩ (A) variable
RV1001	1-222-303	600 Ω variable
RV1002	1-227-134	150 Ω 15 W semi-fixed wire wound
RV1003	1-227-134	150 Ω 15 W semi-fixed wire wound
RV1004	1-227-095	1.5 kΩ semi-fixed wire wound
RV2001	1-222-702	470 kΩ (B) variable
RV2051	1-222-701	10 kΩ (B) variable
RV6301	1-221-663	2 kΩ (B) variable
RV7101,7201	1-221-383	10 kΩ (B) variable
RV7102,7202	1-221-383	10 kΩ (B) variable
RV7103,7203	1-221-383	10 kΩ (B) variable
RV7104,7204	1-221-383	10 kΩ (B) variable
RV7105,7205	1-221-383	10 kΩ (B) variable
RV7106,7206	1-221-663	2 kΩ (B) variable
RV9101,9201	1-221-383	10 kΩ (B) variable

JACKS

J501,502	1-507-281	miniature, MICROPHONE
J503,504	1-507-142	phono (2 p), AUX IN
J505,506	1-507-142	phono (2 p), LINE OUT
J507	1-507-282	binaural, HEADPHONE

CONNECTORS

CNJ501	1-507-300	22 P, printed circuit board
CNJ502	1-507-300	22P , printed circuit board
CNJ503	1-507-302	10 P, printed circuit board
CNJ504	1-507-301	18 P, printed circuit board
CNJ505	1-507-300	22 P, printed circuit board
CNJ506	1-507-301	18 P, printed circuit board
CNJ507	1-509-380-11	15 P
CNJ508	1-508-420-11	15 P

Ref. No.	Part No.	Description
CNJ509	1-509-371	3 P
CNJ1001	1-509-354	12 P
CNJ1002	1-509-062	POWER SUPPLY
CNJ1003	1-509-333	AC OUTLET
CNP507	1-508-420-11	15 P
CNP1001	1-508-400	3 P
CNJ1002	1-509-380-11	15 P
CNP1003	1-506-307	plug, terminating; remote control

SWITCHES

S501	1-514-634	slide, TAPE SPEED
S502	1-514-347	slide, TAPE SELECT
S503,504	1-514-636	lever, MONITOR
S505	1-514-635	slide, HEADPHONE MONITOR LEVEL
S506	1-514-636	lever, SNR
S507	1-514-635	slide, SOS & ECHO
S508	1-514-454	slide, PB head select
S509	1-514-635	slide, HEADPHONE MONITOR MODE
S1001	1-514-590	leaf, muting
S1002	1-514-057-10	micro, REC (L)
S1003	1-514-057-10	micro, REC (R)
S1004	1-514-057-10	micro, rewind
S1005	1-514-057-10	micro, reverse
S1006	1-514-057-10	micro, stop
S1007	1-514-057-10	micro, forward
S1008	1-514-057-10	micro, fast forward
S1009	1-514-633	slide, ESP
S1010	1-514-057-10	micro, INST STOP
S1011	1-514-231-21	micro
S1012	1-514-093-21	micro
S1013	1-514-093-21	micro
S1014	1-514-231-21	micro
S1015	1-514-057-10	micro, INST STOP
S1016	1-514-231-21	micro
S1017	1-514-231-21	micro
S1018	1-514-231-21	micro
S1019	1-514-231-21	micro
S1020	1-514-231-21	micro
S1021	1-514-274	leaf, SPEED TUNING lamp
S1022	1-514-633	slide, TAPE SPEED
S1023		– built in RV1001 –
S1024	1-514-325-21	lever, POWER
S1025	1-514-231-21	micro, shut-off
S1026	1-514-057-10	micro, ESS

ENCAPSULATED COMPONENTS C-R

CP1001	1-101-534	0.1 μF + 120 Ω	500 V
CP1002	1-101-534	0.1 μF + 120 Ω	500 V
CP1003	1-101-534	0.1 μF + 120 Ω	500 V
CP1004	1-101-534	– discarded –	
CP1005	1-231-057	0.033 μF + 120Ω	500 V
CP1006	1-231-057	0.033 μF + 120 Ω	500 V
CP1007	1-231-057	– discarded –	
CP1008	1-101-534	0.1 μF + 120 Ω	500 V
CP2101,2102	1-231-057	0.033 μF + 120 Ω	500 V
CP2103,2104	1-101-534	0.1 μF + 120 Ω	500 V
CP3001,3002	1-231-057	0.033 μF + 120 Ω	500 V

HEADS

RH501,502 EH501,502	8-829-229-20	record/erase (ERF120-2902)
RH501,503	8-821-829-21	playback (PF105-2902A)
RH502,504	8-821-829-20	playback (PF105-2902)

MISCELLANEOUS

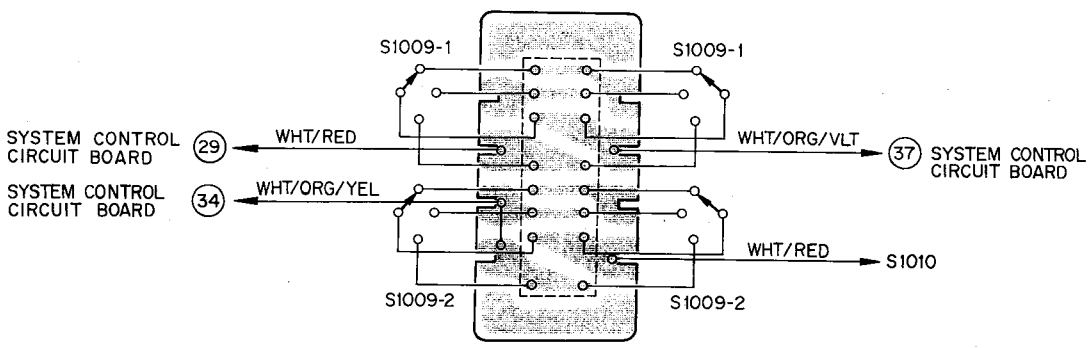
PM1001	1-454-034	solenoid, brake
PM1002	1-454-048	solenoid, REV
PM1003	1-454-048	solenoid, FWD
PM1004	1-454-048	solenoid, tape shifter
PM1005	1-454-062	solenoid, pinch roller
PM1006	1-454-048	solenoid, pinch roller
RY601,602	1-515-127	relay, (650 Ω, 24 V)
RY2001	1-515-126	relay, (7.2 kΩ, 80 V)
RY2101	1-515-126	relay, (7.2 kΩ, 80 V)
RY2102	1-515-126	relay, (7.2 kΩ, 80 V)
RY2103	1-515-126	relay, (7.2 kΩ, 80 V)
RY2104	1-515-126	relay, (7.2 kΩ, 80 V)
RY2105	1-515-126	relay, (7.2 kΩ, 80 V)
RY2106	1-515-127	relay, (650 Ω, 24 V)
RY3001	1-515-126	relay, (7.2 kΩ, 80 V)
RY3002,3003	1-515-127	relay, (650 Ω, 24 V)
RY7301	1-515-127	relay, (650 Ω, 24 V)
PL501,502	1-524-060	lamp, record
ME501,502	1-524-060	meter, VU
M1001	8-836-624-09	motor, reel (UC-624K1)
M1002	8-836-624-06	motor, capstan (UC-624G1)
M1003	8-836-624-09	motor, reel (UC-624K1)
F	1-533-048	holder, fuse
	1-509-411	pin terminal
	1-509-372	pin terminal
	1-536-179	terminal strip, 1L1
PL1001,1002	1-518-093	lamp

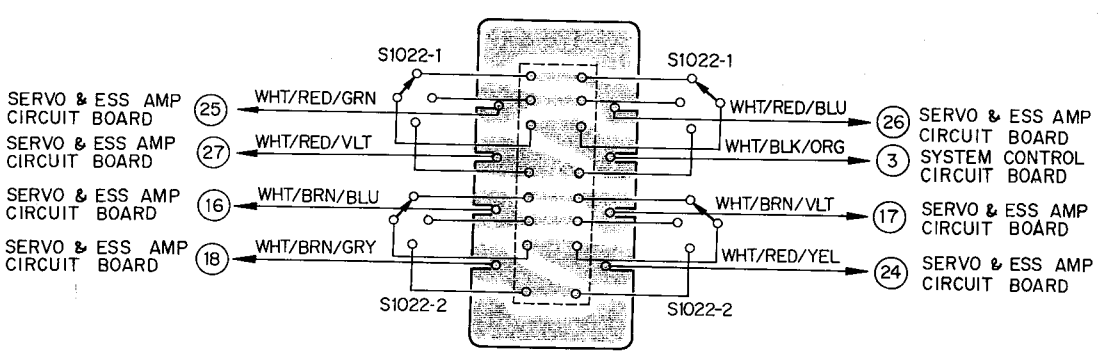
Ref. No.	Part No.	Description
	SCREWS	
	7-621-255-25	(+) P 2 x 4
	7-621-255-35	(+) P 2 x 5
	7-621-255-55	(+) P 2 x 8
	7-621-259-35	(+) P 2.6 x 5
	7-621-259-45	(+) P 2.6 x 6
	7-621-259-55	(+) P 2.6 x 8
	7-621-259-65	(+) P 2.6 x 10
	7-621-259-75	(+) P 2.6 x 12
	7-621-259-85	(+) P 2.6 x 14
	7-621-260-55	(+) P 2.6 x 25
	7-621-559-45	(+) P 2.6 x 6
	7-621-559-55	(+) P 2.6 x 8
	7-682-145-01	(+) P 3 x 4
	7-682-147-01	(+) P 3 x 6
	7-682-148-01	(+) P 3 x 8
	7-682-170-04	(+) P 4 x 40
	7-682-246-01	(+) K 3x 5
	7-682-348-04	(+) RK 3 x 8
	7-682-349-04	(+) RK 3 x 10
	7-682-526-04	(+) B 2 x 6
	7-682-547-01	(+) B 3 x 6
	7-682-551-04	(+) B 3 x 14
	7-682-551-05	(+) B 3 x 14
	7-682-559-45	(+) K 2.6 x 6
	7-682-559-55	(+) K 2.6 x 8
	7-682-561-01	(+) B 4 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
	7-682-649-01	(+) PS 3 x 10
	7-682-650-01	(+) PS 3 x 12
	7-682-651-01	(+) PS 3 x 14
	7-682-654-01	(+) PS 3 x 25
	7-682-660-01	(+) PS 4 x 6
	7-682-661-01	(+) PS 4 x 8
	7-682-662-01	(+) PS 4 x 10
	7-682-666-01	(+) PS 4 x 20
	7-683-237-01	3 x 3 lock W/hexagonal socket
	7-683-238-21	3 x 4 lock W/hexagonal socket
	7-683-238-31	3 x 4 lock W/hexagonal socket
	7-683-239-01	3 x 5 lock W/hexagonal socket
	7-683-239-31	3 x 5 lock W/hexagonal socket
	NUTS	
	7-622-107-02	2.6 ϕ
	7-622-207-02	2.6 ϕ
	7-684-013-01	3 ϕ
	7-684-014-01	4 ϕ

Ref. No.	Part No.	Description
	WASHERS	
	7-623-105-16	W 2 ϕ (middle)
	7-623-107-16	W 2.6 ϕ (middle)
	7-623-108-06	W 3 ϕ (small)
	7-623-108-16	W 3 ϕ (middle)
	7-623-110-06	W 4 ϕ (small)
	7-623-110-16	W 4 ϕ (middle)
	7-623-112-16	W 5 ϕ (middle)
	7-623-113-16	W 6 ϕ (middle)
	7-623-205-22	SW 2 ϕ
	7-623-207-22	SW 2.6 ϕ
	7-623-208-22	SW 3 ϕ
	LUGS	
	7-623-508-01	3 ϕ
	7-623-510-01	4 ϕ
	RETAINING RINGS	
	7-624-104-01	E-2
	7-624-105-01	E-2, 3
	7-624-106-01	E-3
	7-624-108-01	E-4
	7-624-109-01	E-5
	7-624-110-01	E-6
	STEEL BALL	
	7-671-112-01	2 ϕ

MOUNTING DIAGRAM (Conductor side)

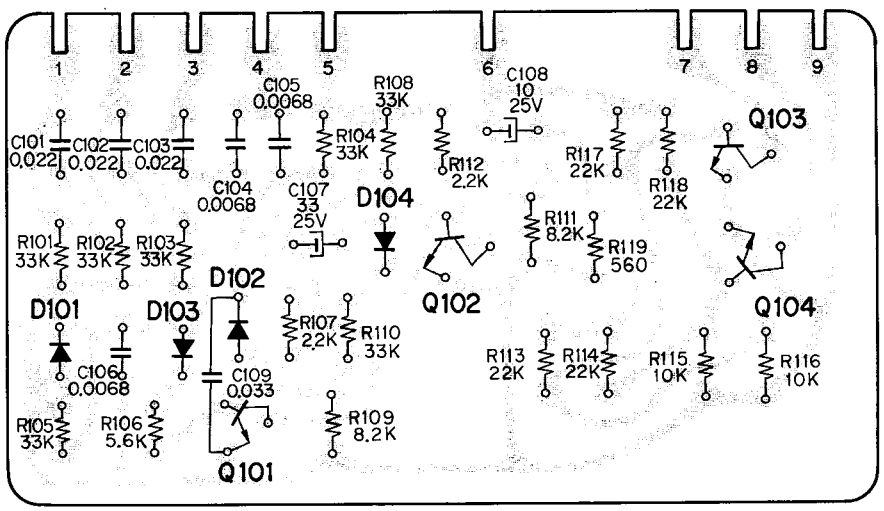
SWITCH CIRCUIT BOARD



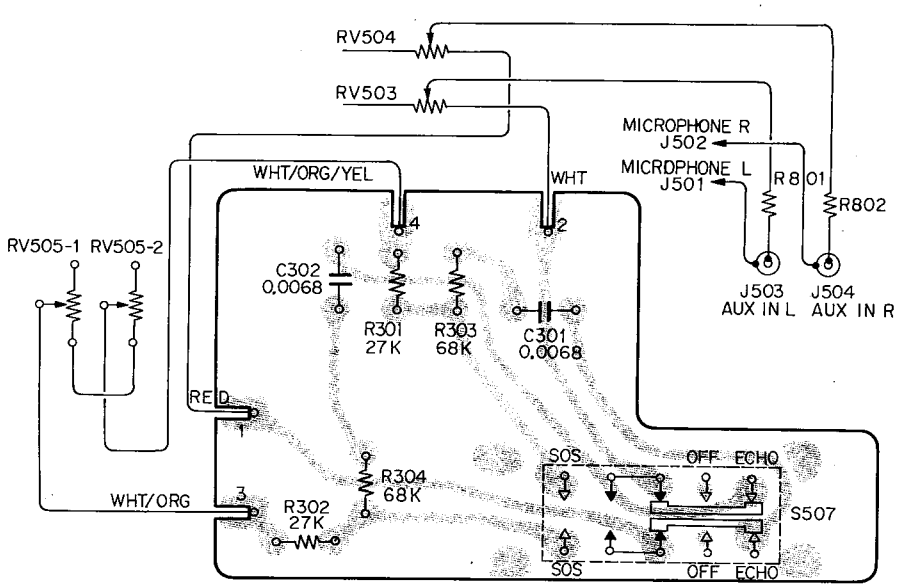


MOUNTING DIAGRAM (Conductor Side)

MUTING CIRCUIT BOARD

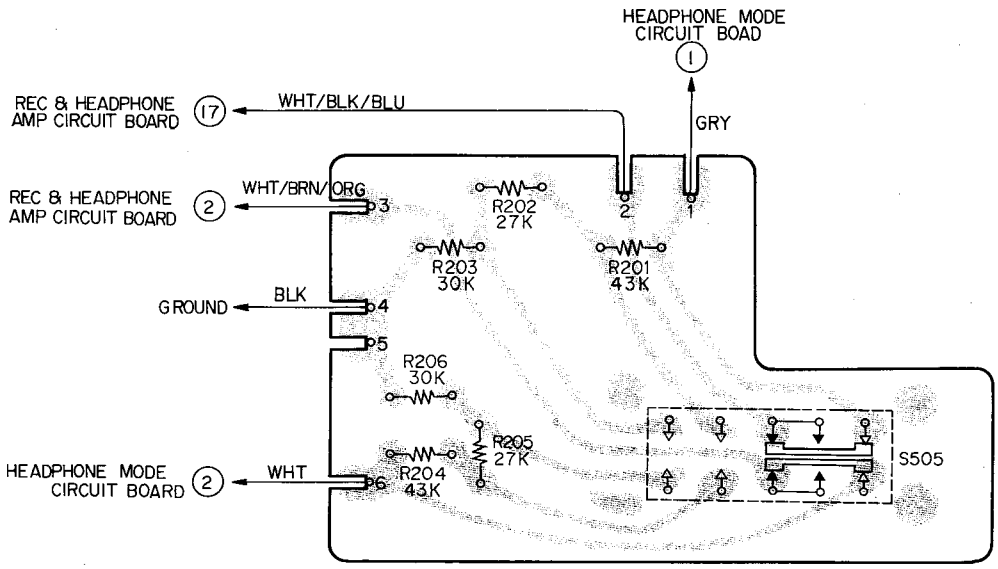


SOS & ECHO CIRCUIT BOARD

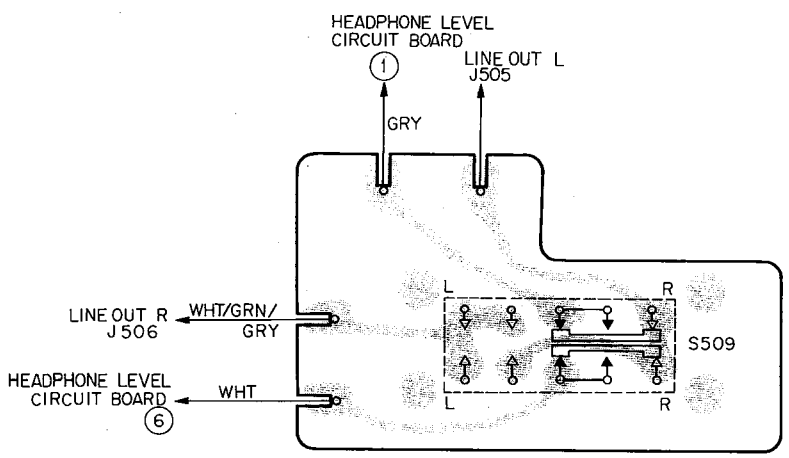


MOUNTING DIAGRAM (Conductor Side)

HEADPHONE LEVEL CIRCUIT BOARD

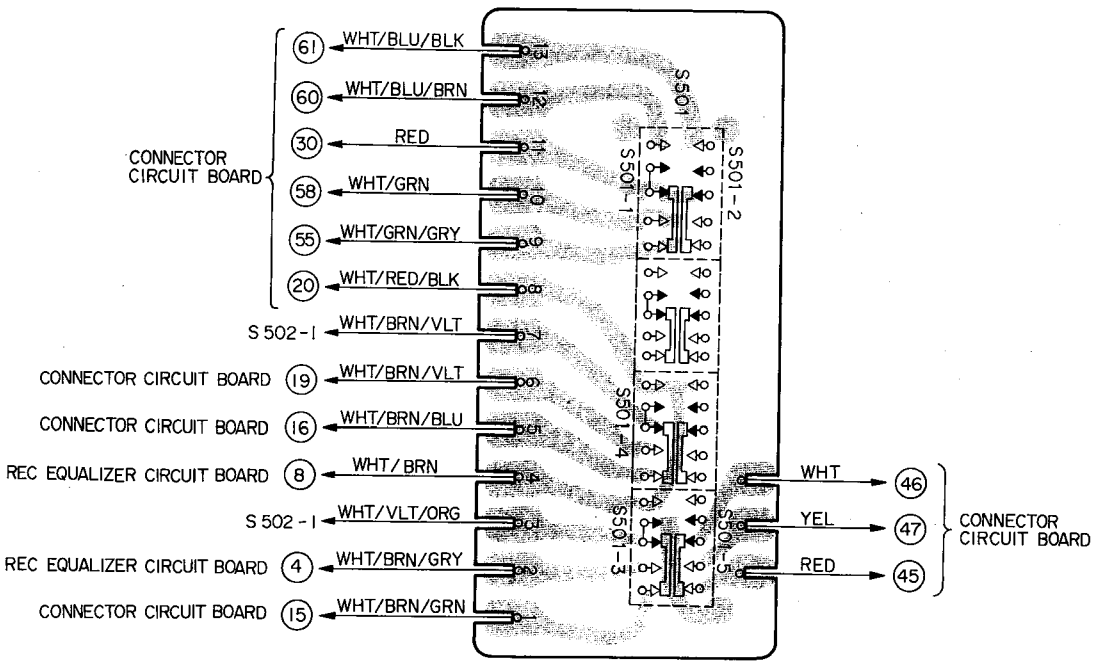


HEADPHONE MODE CIRCUIT BOARD

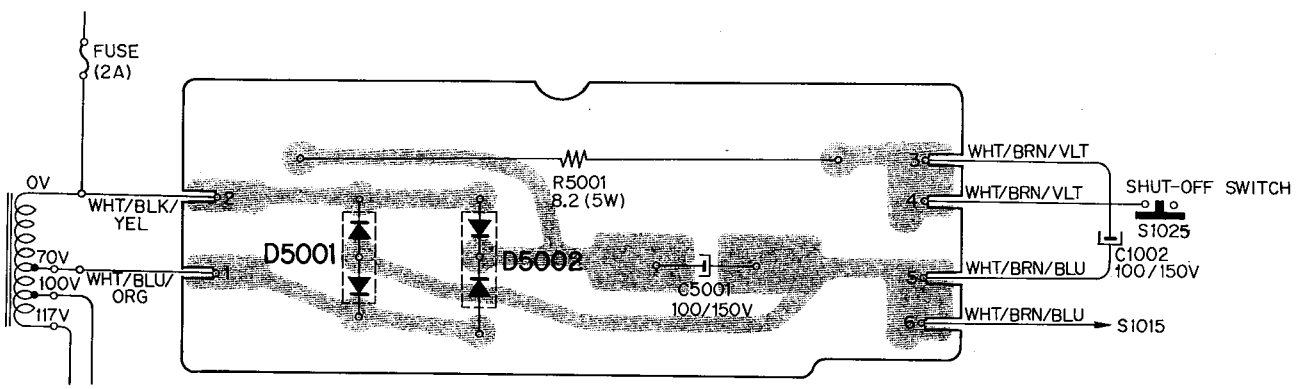


MOUNTING DIAGRAM (Conductor Side)

TAPE SPEED SWITCH CIRCUIT BOARD



POWER SUPPLY CIRCUIT BOARD



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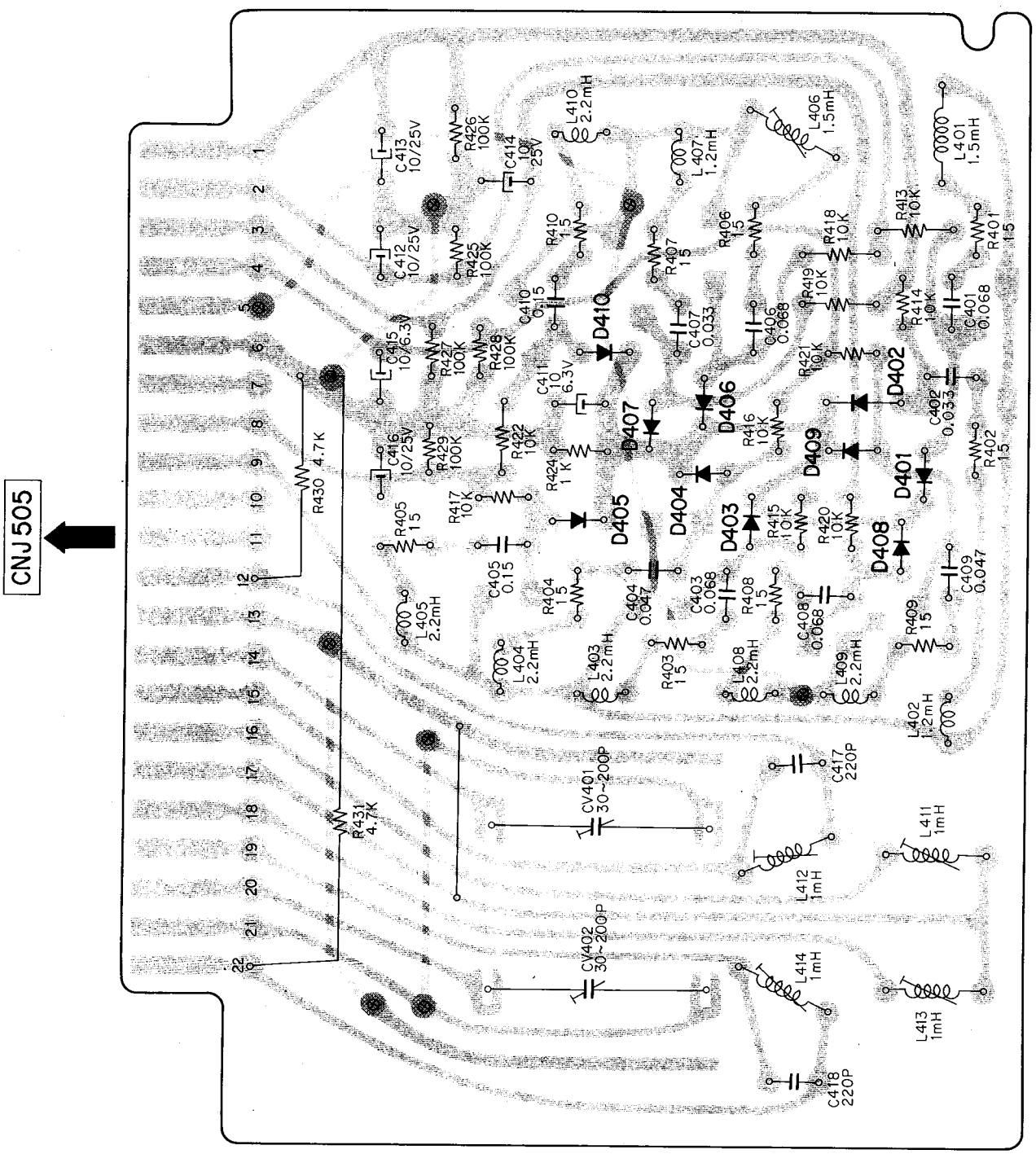
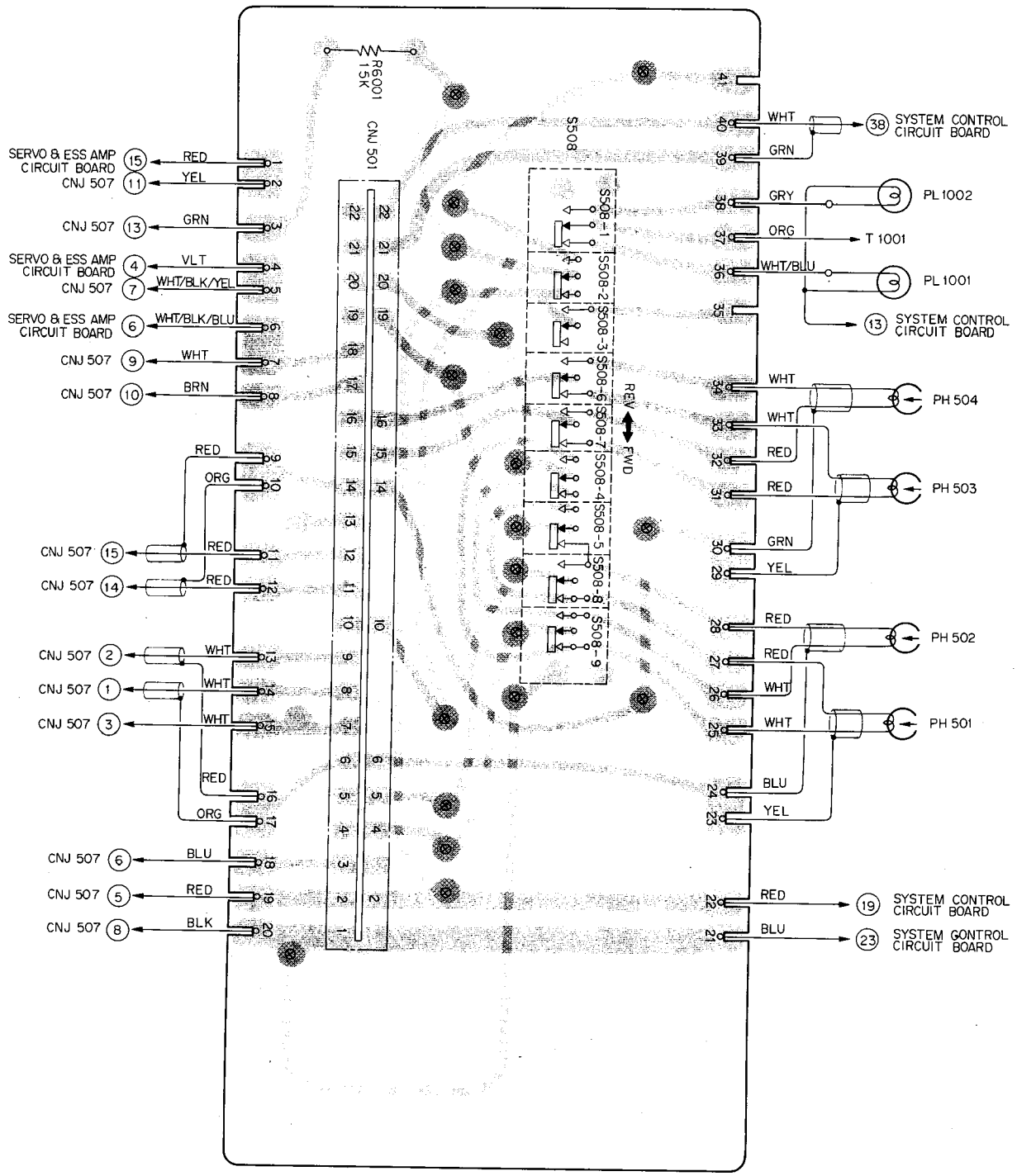
MOUNTING DIAGRAM (Conductor Side)

REC EQUALIZER CIRCUIT BOARD



MOUNTING DIAGRAM (Conductor Side)

PB HEAD SELECT CIRCUIT BOARD



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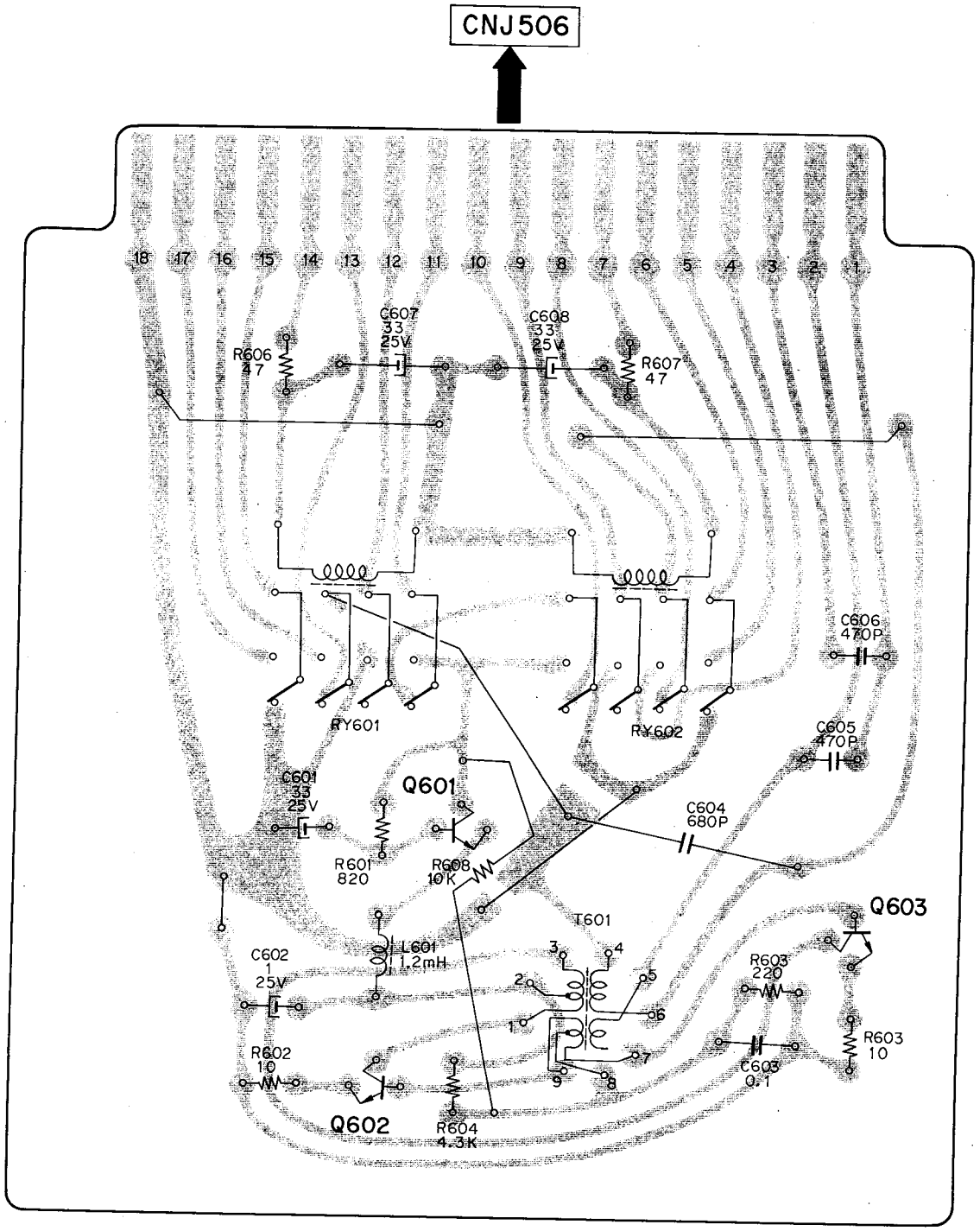
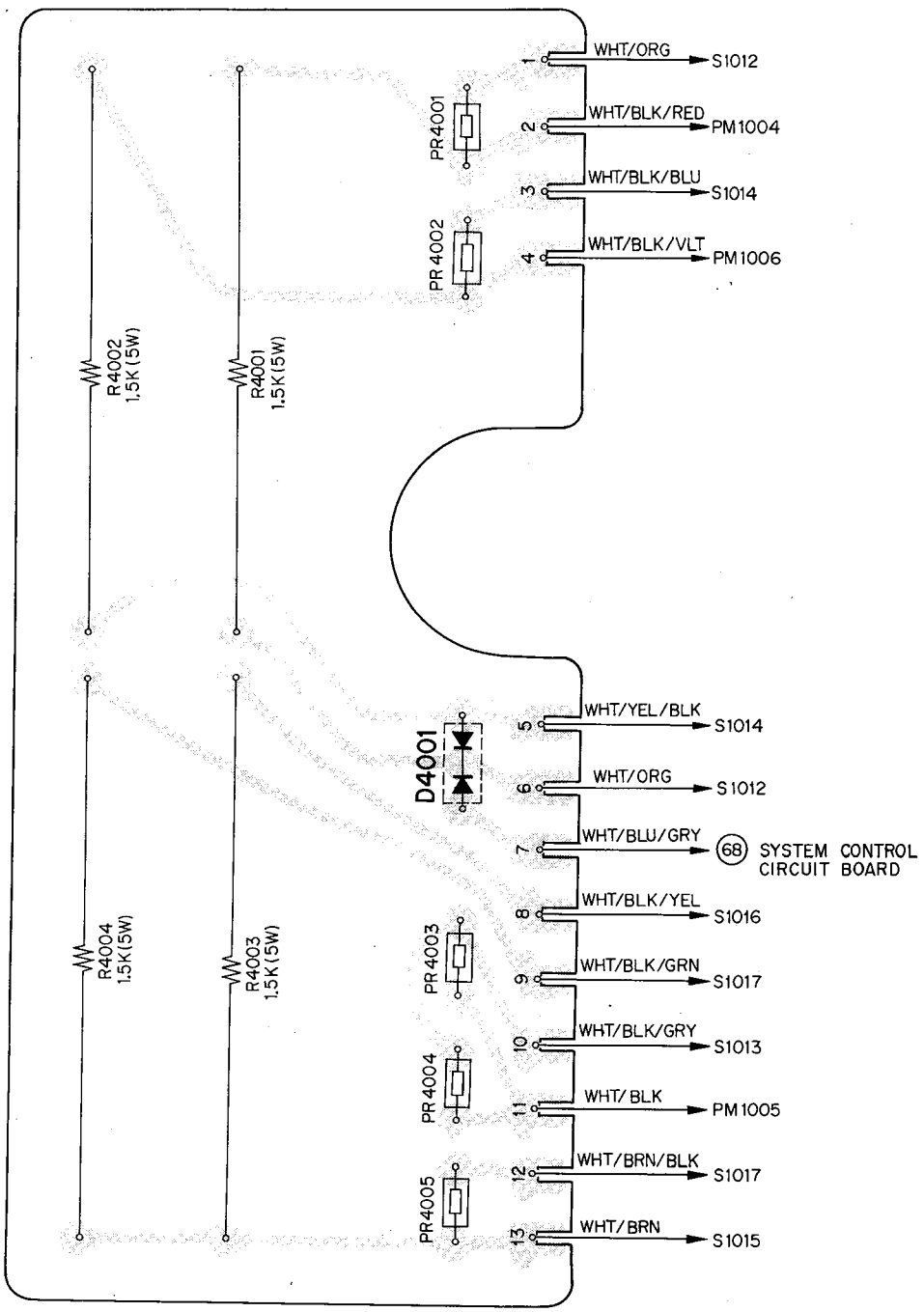
MOUNTING DIAGRAM (Conductor Side)

BIAS OSC CIRCUIT BOARD



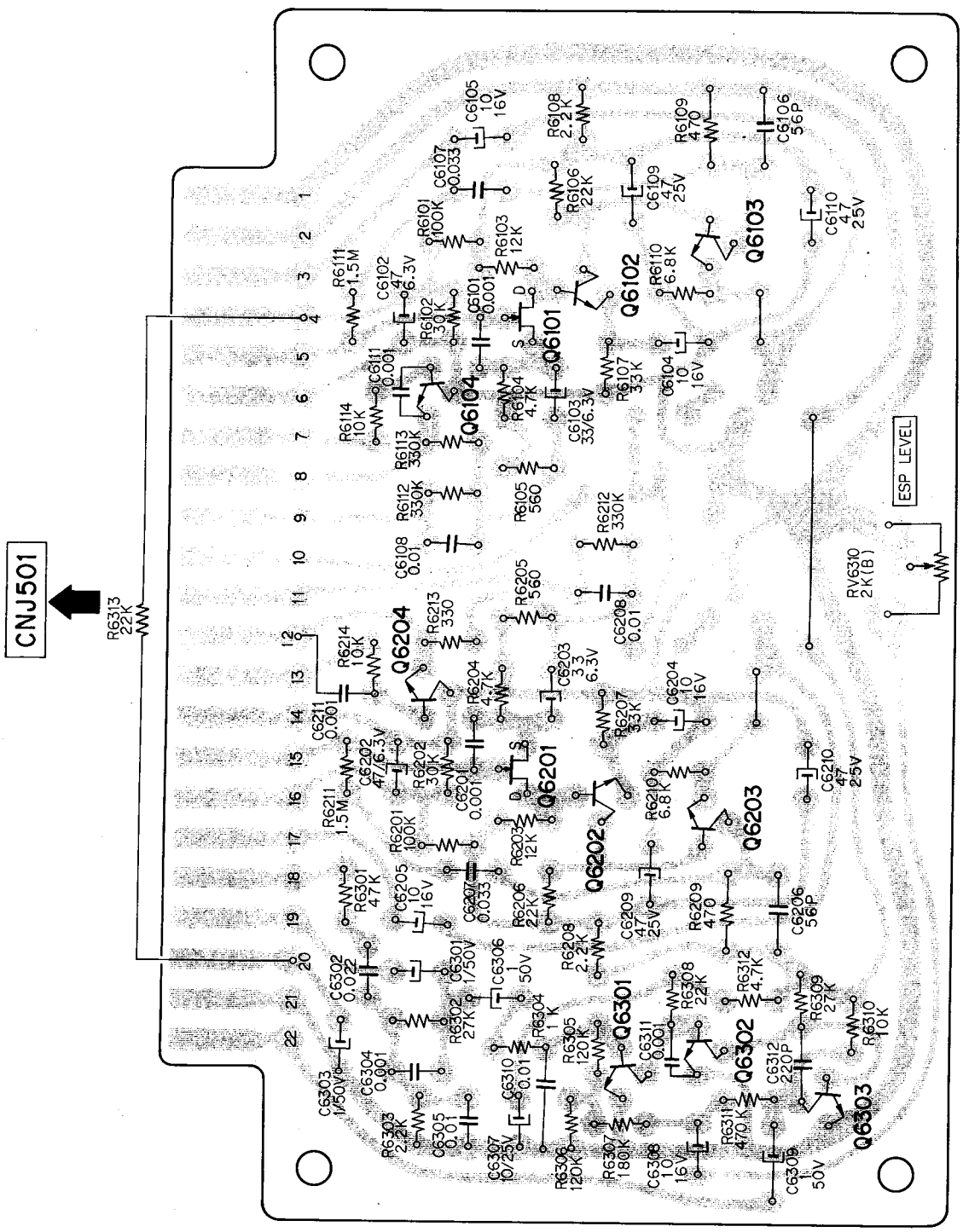
MOUNTING DIAGRAM (Conductor Side)

POSISTOR CIRCUIT BOARD



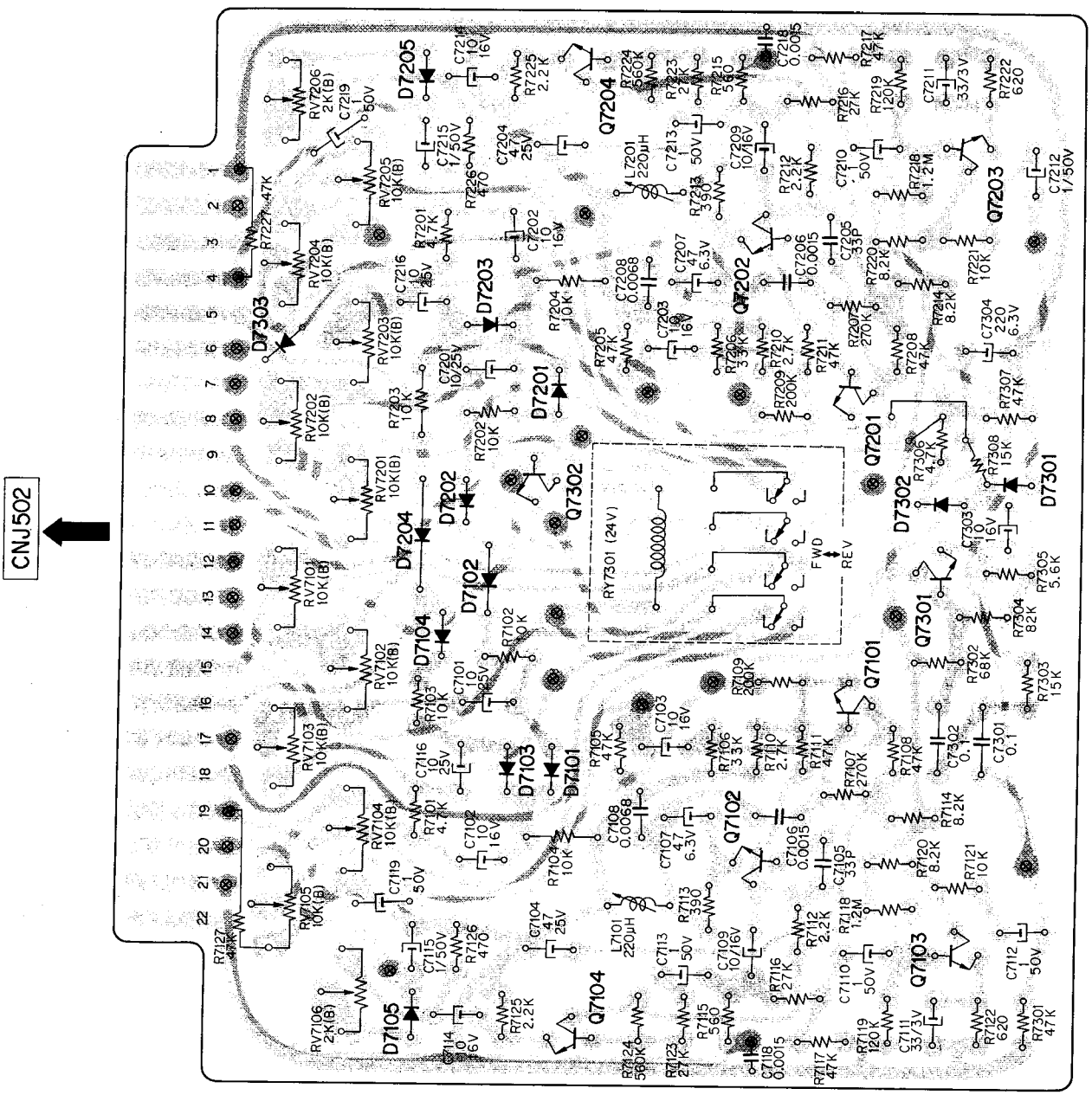
MOUNTING DIAGRAM (Conductor Side)

PB PRE & ESP AMP CIRCUIT BOARD



MOUNTING DIAGRAM (Conductor Side)

LINE AMP CIRCUIT BOARD



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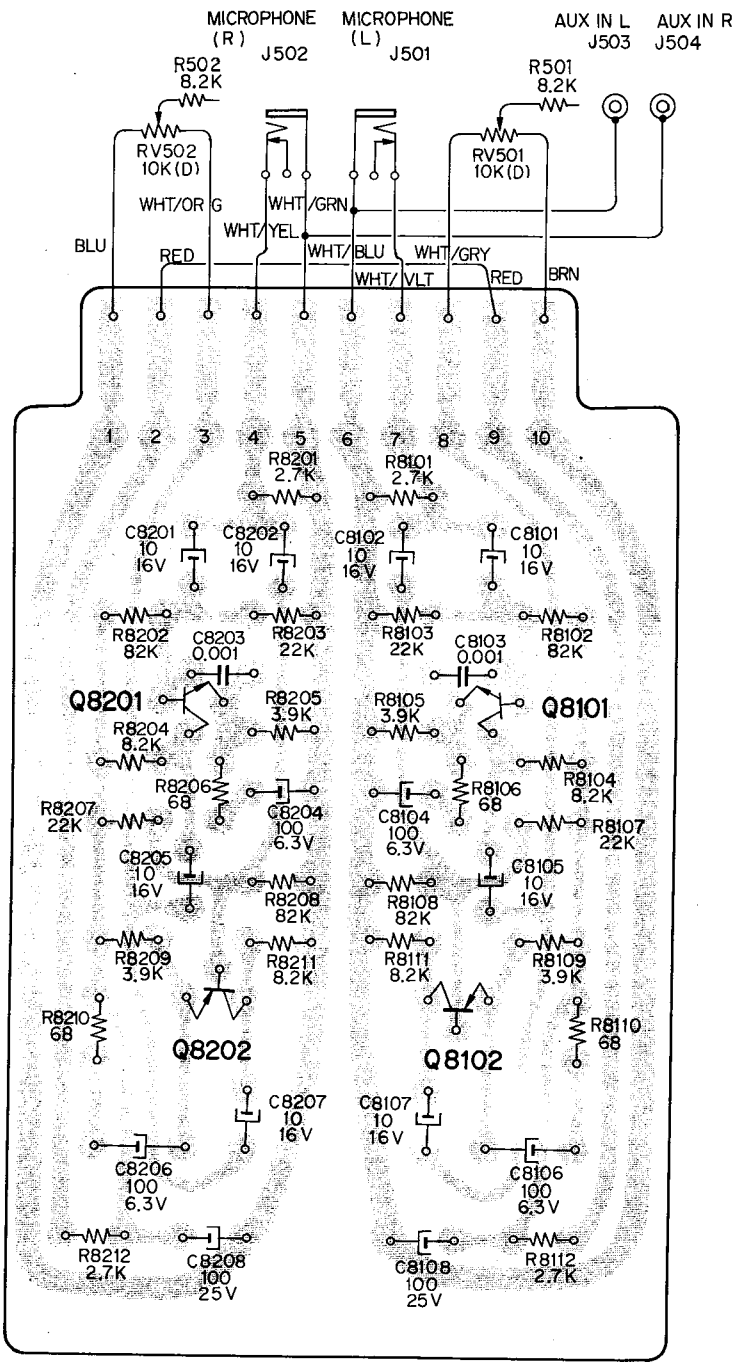
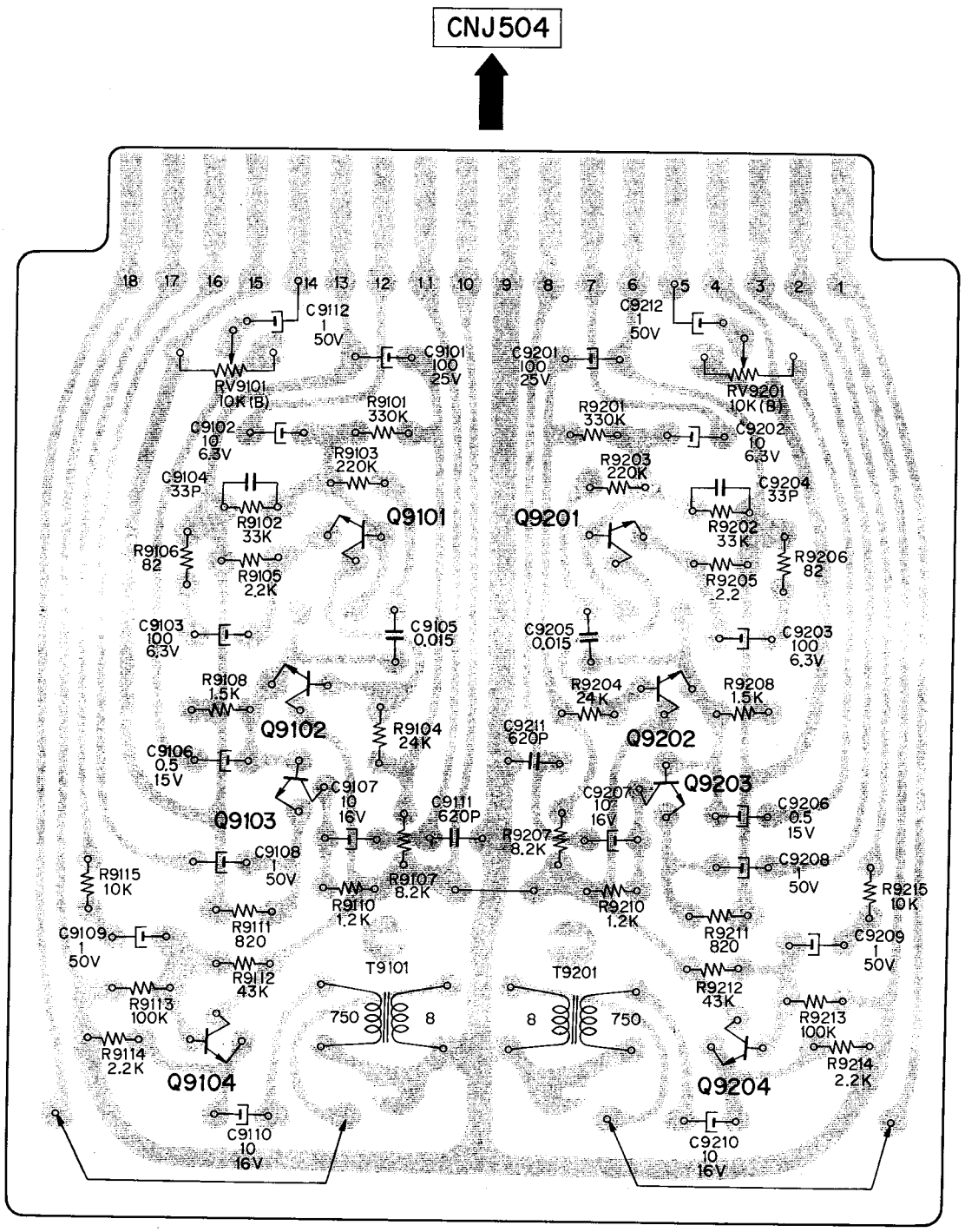
MOUNTING DIAGRAM (Conductor Side)

MIC AMP CIRCUIT BOARD



MOUNTING DIAGRAM (Conductor Side)

REC & HEADPHONE AMP CIRCUIT BOARD



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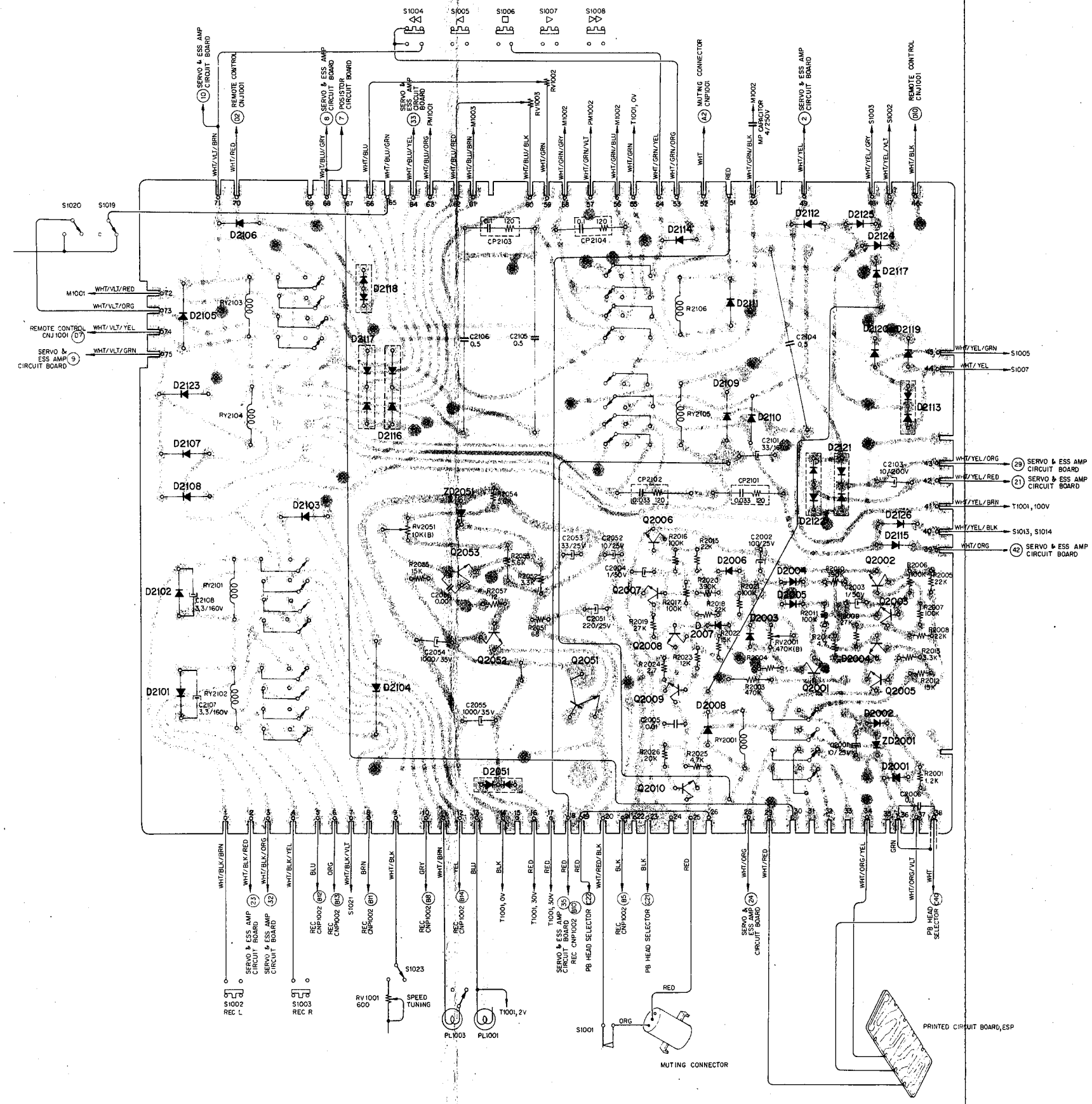
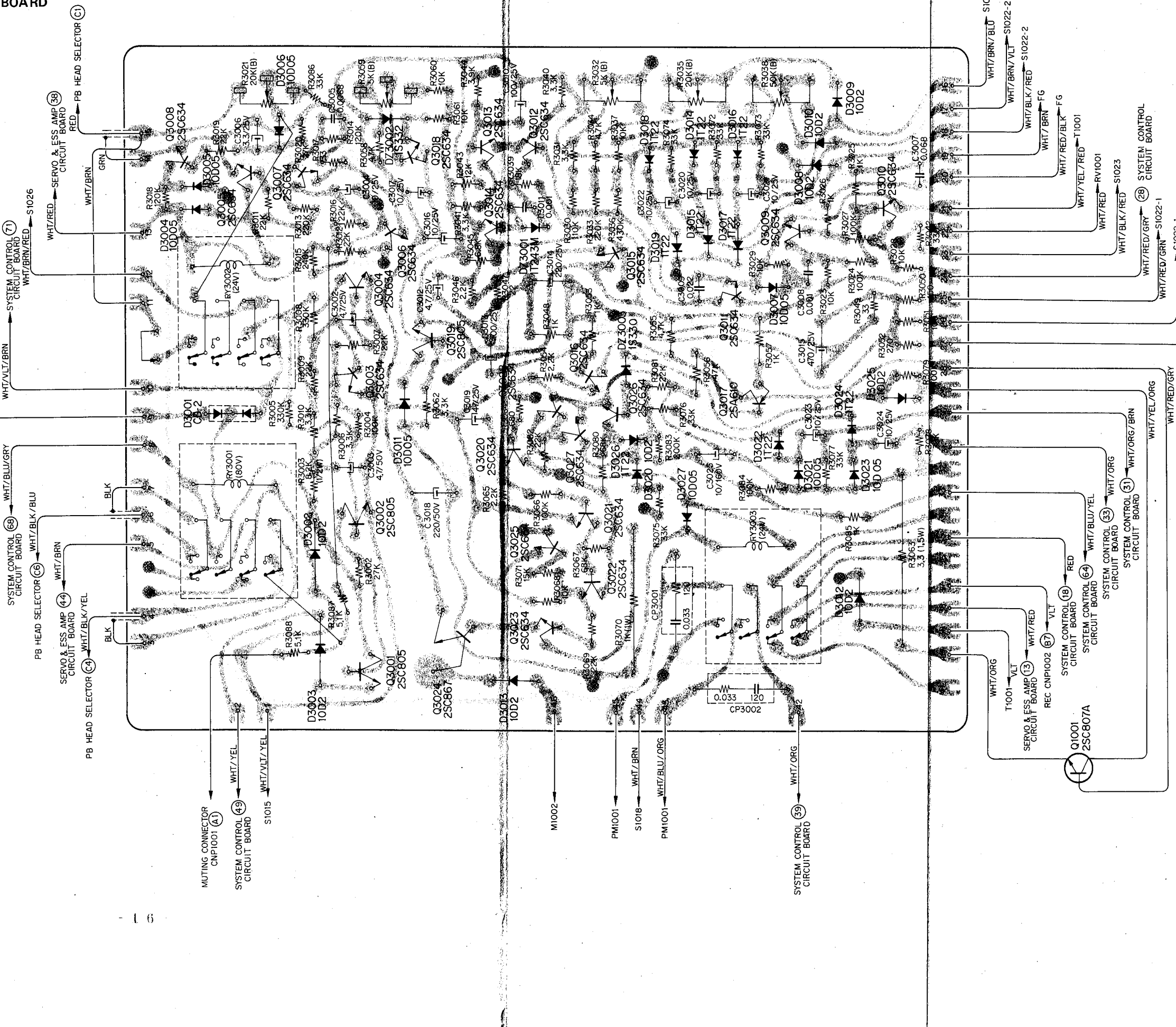
MOUNTING DIAGRAM (Conductor Side)

SYSTEM CONTROL CIRCUIT BOARD



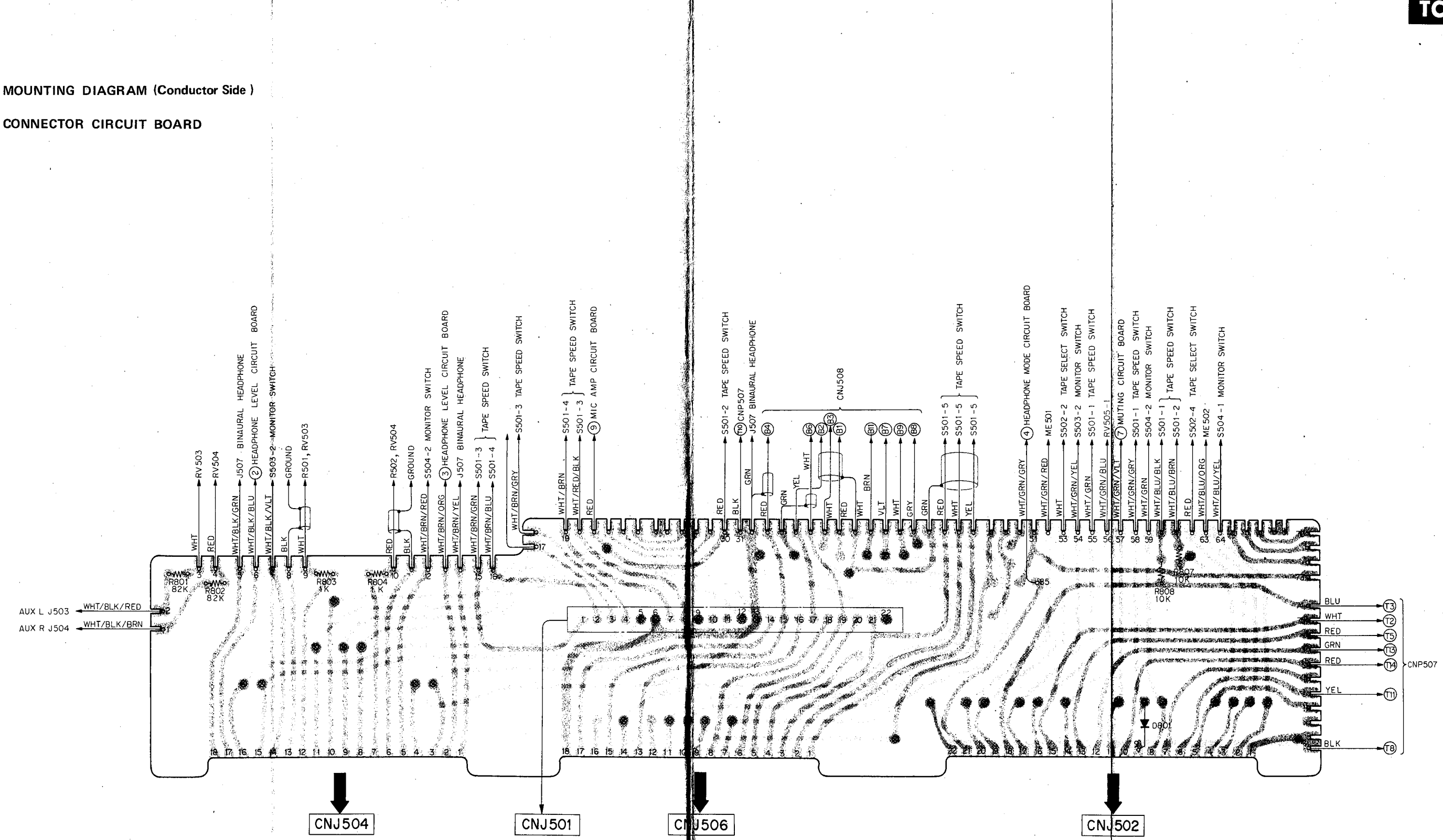
MOUNTING DIAGRAM (Conductor Side)

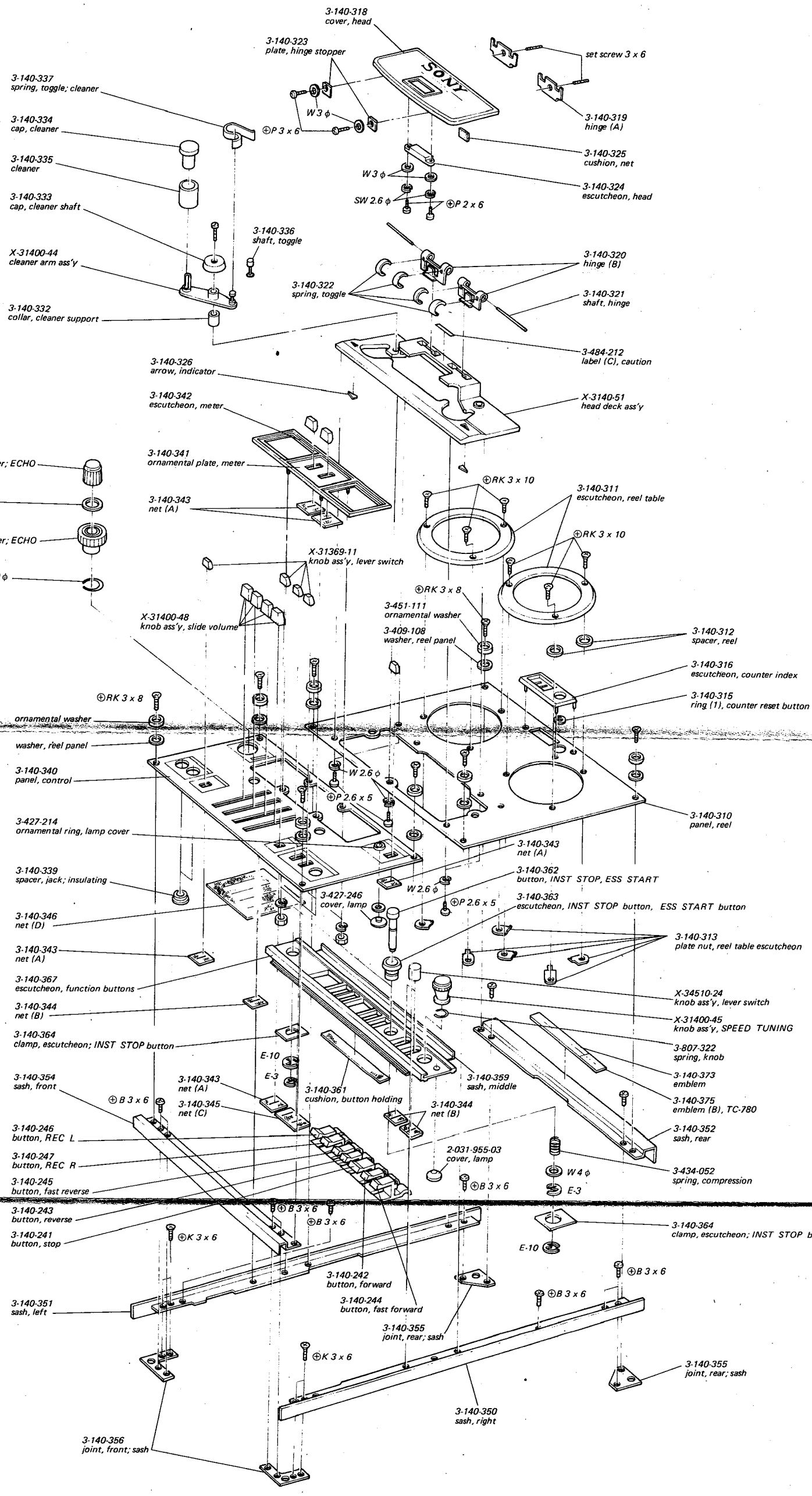
SERVO & ESS AMP CIRCUIT BOARD



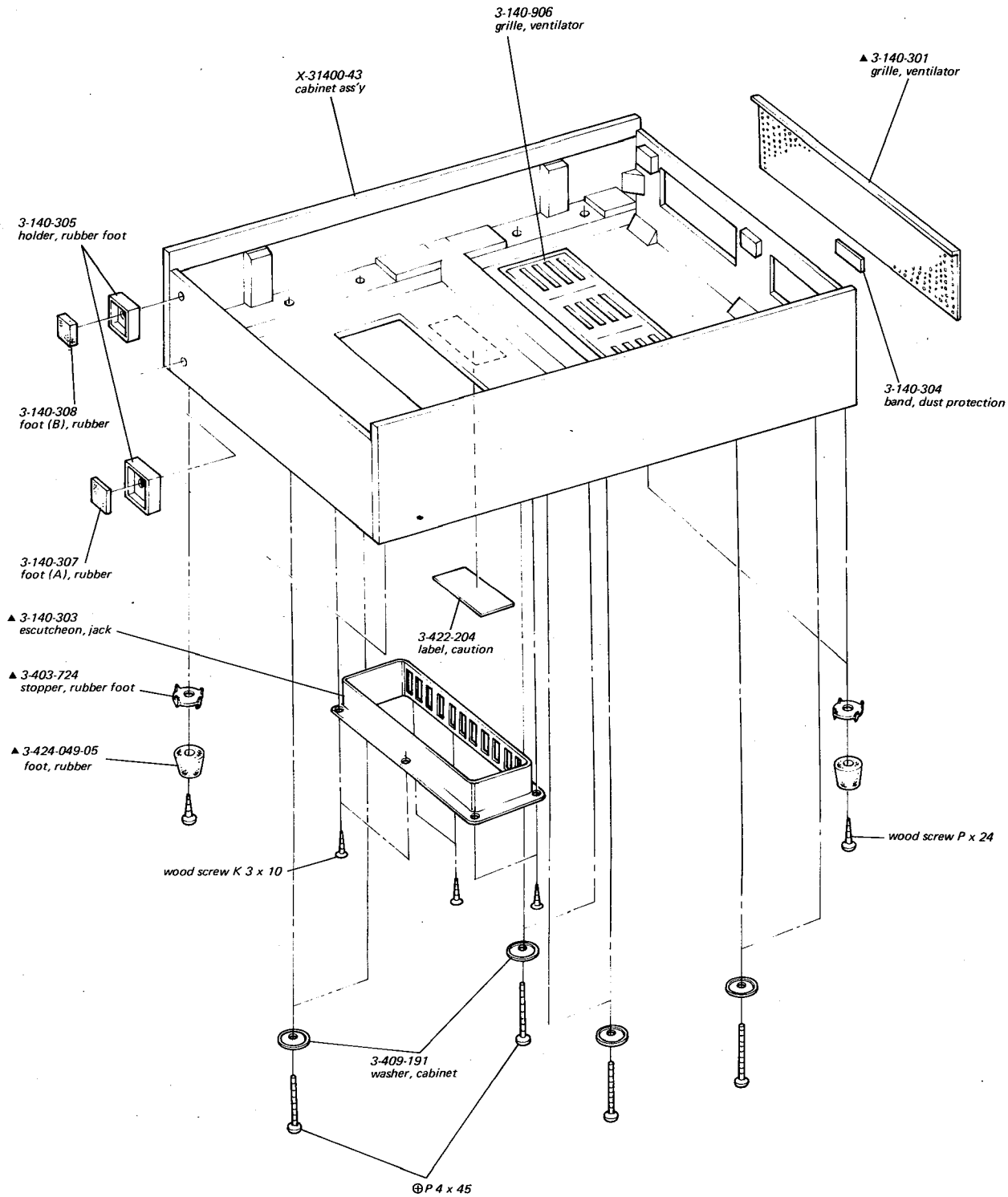
MOUNTING DIAGRAM (Conductor Side)

CONNECTOR CIRCUIT BOARD




3-140-318
cover, head
3-140-323
plate, hinge stopper
SONY
set screw 3 x 6
3-140-319
hinge (A)
3-140-337
spring, toggle; cleaner
W 3 ϕ
⊕P 3 x 6
3-140-334
cap, cleaner
3-140-325
cushion, net
3-140-335
cleaner
W 3 ϕ
3-140-324
escutcheon, head
3-140-333
cap, cleaner shaft
SW 2.6 ϕ
⊕P 2 x 6
3-140-336
shaft, toggle
X-31400-44
cleaner arm ass'y
3-140-320
hinge (B)
3-140-322
spring, toggle
3-140-321
shaft, hinge
3-140-332
collar, cleaner support
3-484-212
label (C), caution
3-140-326
arrow, indicator
X-3140-51
head deck ass'y
3-140-342
escutcheon, meter
X-31400-46
knob ass'y, upper; ECHO
3-140-341
ornamental plate, meter
⊕RK 3 x 10
3-140-311
escutcheon, reel table
3-140-386
washer, pvc
3-140-343
net (A)
⊕RK 3 x 10
X-31400-47
knob ass'y, lower; ECHO
X-31369-11
knob ass'y, lever switch
3-809-156
spring, knob; 10 ϕ
⊕RK 3 x 8
3-451-111
ornamental washer
X-31400-48
knob ass'y, slide volume
3-409-108
washer, reel panel
3-140-312
spacer, reel
3-140-316
escutcheon, counter index
⊕RK 3 x 8
3-140-315
ring (1), counter reset button
ornamental washer
washer, reel panel
3-140-340
panel, control
W 2.6 ϕ
⊕P 2.6 x 5
3-140-310
panel, reel
3-427-214
ornamental ring, lamp cover
3-140-343
net (A)
3-140-339
spacer, jack; insulating
3-140-362
button, INST STOP, ESS START
W 2.6 ϕ
3-427-246
cover, lamp
⊕P 2.6 x 5
3-140-363
escutcheon, INST STOP button, ESS START button
3-140-346
net (D)
3-140-313
plate nut, reel table escutcheon
3-140-343
net (A)
3-140-367
escutcheon, function buttons
X-34510-24
knob ass'y, lever switch
3-140-344
net (B)
X-31400-45
knob ass'y, SPEED TUNING
3-140-364
clamp, escutcheon; INST STOP button
3-807-322
spring, knob
E-10
3-140-373
emblem
E-3
3-140-343
net (A)
3-140-359
sash, middle
3-140-361
cushion, button holding
3-140-375
emblem (B), TC-780
3-140-354
sash, front
⊕B 3 x 6
3-140-345
net (C)
3-140-344
net (B)
3-140-352
sash, rear
3-140-246
button, REC L
2-031-955-03
cover, lamp
3-140-247
button, REC R
W 4 ϕ
3-434-052
spring, compression
3-140-245
button, fast reverse
⊕B 3 x 6
E-3
⊕B 3 x 6
3-140-243
button, reverse
⊕B 3 x 6
3-140-364
clamp, escutcheon; INST STOP button
3-140-241
button, stop
⊕K 3 x 6
E-10
3-140-242
button, forward
⊕B 3 x 6
3-140-351
sash, left
3-140-244
button, fast forward
⊕B 3 x 6
3-140-355
joint, rear; sash
⊕K 3 x 6
3-140-355
joint, rear; sash
3-140-350
sash, right
3-140-356
joint, front; sash

EXPLODED VIEW Cabinet



Parts marked ▲ are included in the "cabinet ass'y, X-31400-43".

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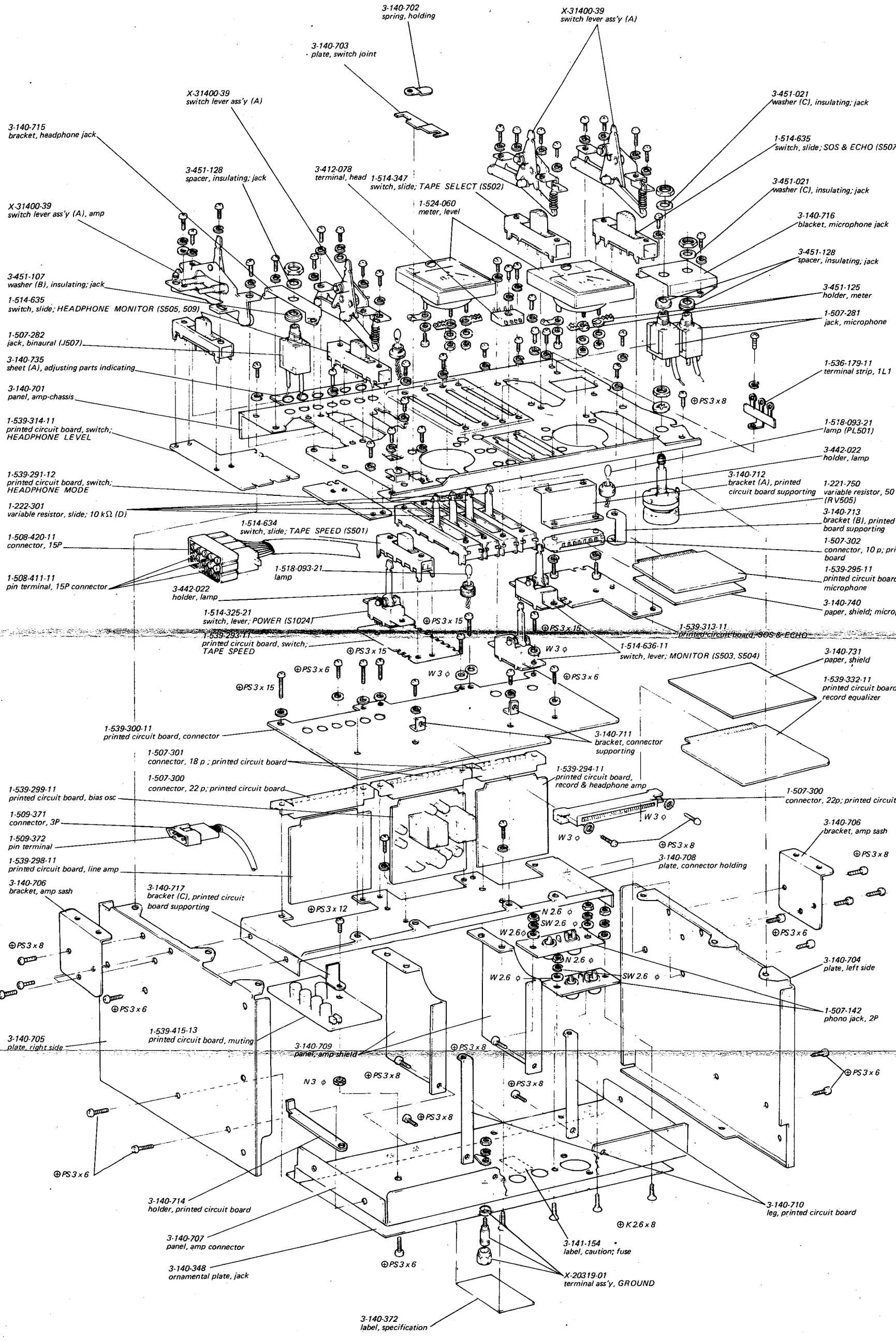
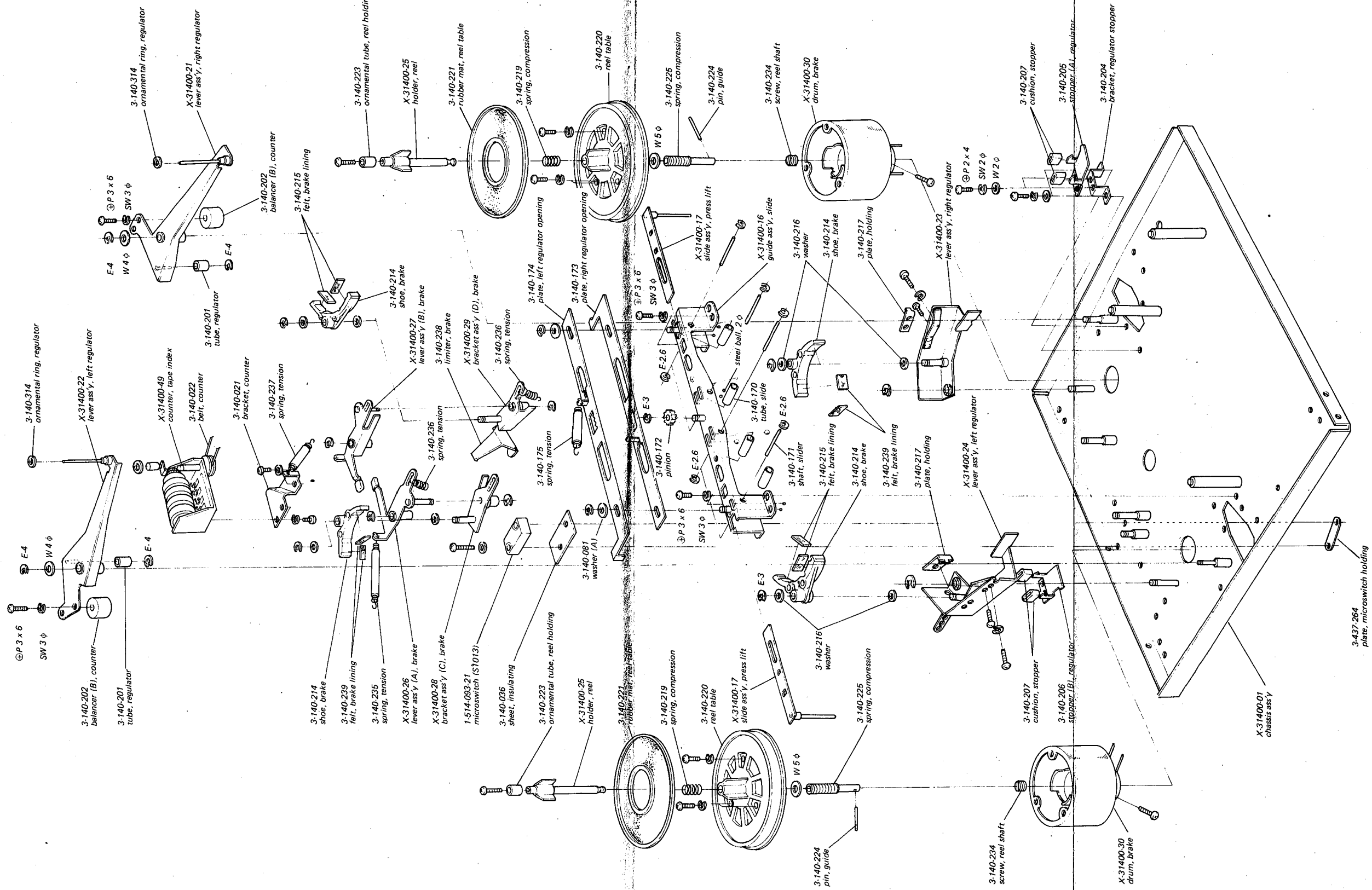
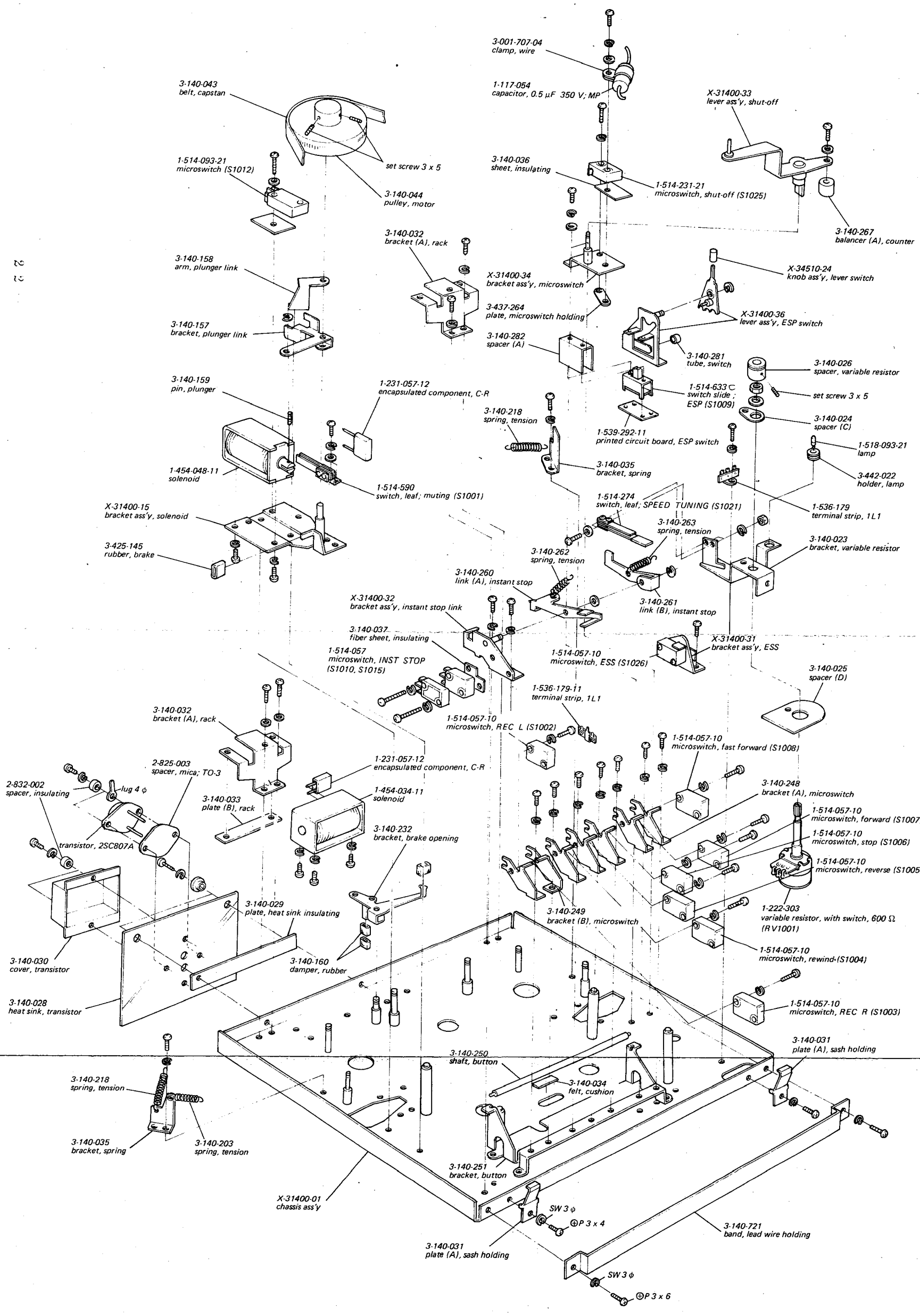
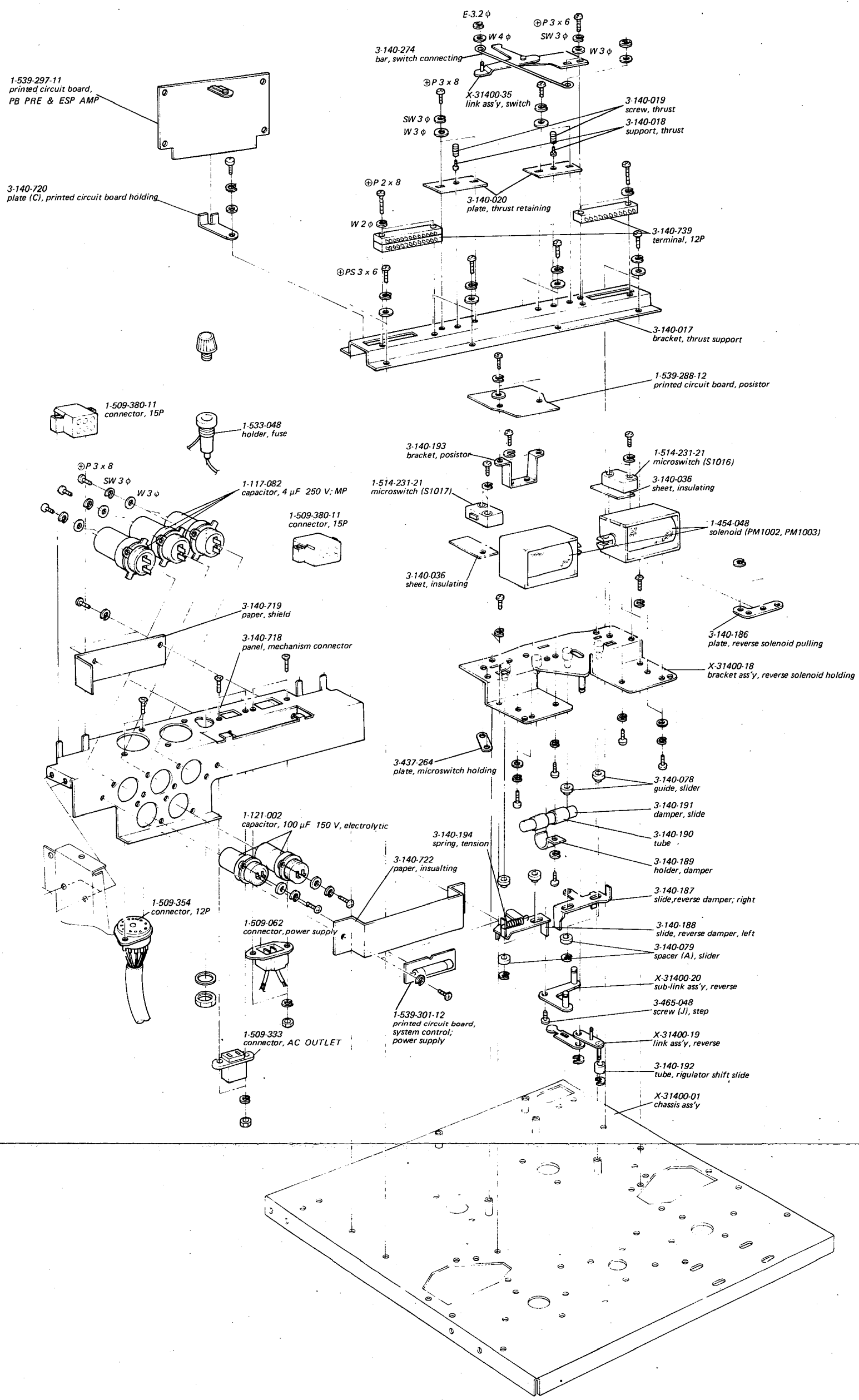

3-140-702
spring, holding
X-31400-39
switch lever ass'y (A)
3-140-703
plate, switch joint
X-31400-39
switch lever ass'y (A)
3-140-715
bracket, headphone jack
3-451-128
spacer, insulating; jack
3-412-078
terminal, head
1-514-347
switch, slide; TAPE SELECT (S502)
1-524-060
meter, level
3-451-021
washer (C), insulating; jack
1-514-635
switch, slide; SOS & ECHO (S507)
3-451-021
washer (C), insulating; jack
X-31400-39
switch lever ass'y (A), amp
3-140-716
blacket, microphone jack
3-451-128
spacer, insulating; jack
3-451-107
washer (B), insulating; jack
1-514-635
switch, slide; HEADPHONE MONITOR (S505, 509)
3-451-125
holder, meter
1-507-281
jack, microphone
1-507-282
jack, binaural (J507)
3-140-735
sheet (A), adjusting parts indicating
1-536-179-11
terminal strip, 1L1
3-140-701
panel, amp-chassis
⊕PS 3 x 8
1-539-314-11
printed circuit board, switch; HEADPHONE LEVEL
1-518-093-21
lamp (PL501)
3-442-022
holder, lamp
1-539-291-12
printed circuit board, switch; HEADPHONE MODE
3-140-712
bracket (A), printed circuit board supporting
1-221-750
variable resistor, 50 kΩ (A) (RV505)
1-222-301
variable resistor, slide; 10 kΩ (D)
3-140-713
bracket (B), printed circuit board supporting
1-514-634
switch, slide; TAPE SPEED (S501)
1-507-302
connector, 10 p; printed circuit board
1-508-420-11
connector, 15P
1-539-295-11
printed circuit board, microphone
1-518-093-21
lamp
1-508-411-11
pin terminal, 15P connector
3-442-022
holder, lamp
3-140-740
paper, shield; microphone
1-514-325-21
switch, lever; POWER (S1024)
⊕PS 3 x 15
⊕PS 3 x 15
1-539-313-11
printed circuit board, SOS & ECHO
1-539-293-11
printed circuit board, switch; TAPE SPEED
⊕PS 3 x 15
W 3 φ
1-514-636-11
switch, lever; MONITOR (S503, S504)
3-140-731
paper, shield
⊕PS 3 x 6
W 3 φ
⊕PS 3 x 6
⊕PS 3 x 15
1-539-332-11
printed circuit board, record equalizer
1-539-300-11
printed circuit board, connector
3-140-711
bracket, connector supporting
1-507-301
connector, 18 p ; printed circuit board
1-539-294-11
printed circuit board, record & headphone amp
1-507-300
connector, 22p; printed circuit board
1-539-299-11
printed circuit board, bias osc
1-507-300
connector, 22p; printed circuit board
W 3 φ
1-509-371
connector, 3P
W 3 φ
⊕PS 3 x 8
1-509-372
pin terminal
3-140-708
plate, connector holding
1-539-298-11
printed circuit board, line amp
3-140-706
bracket, amp sash
3-140-717
bracket (C), printed circuit board supporting
⊕PS 3 x 12
N 2.6 φ
SW 2.6 φ
W 2.6 φ
⊕PS 3 x 8
⊕PS 3 x 6
N 2.6 φ
3-140-704
plate, left side
W 2.6 φ
SW 2.6 φ
⊕PS 3 x 6
1-507-142
phono jack, 2P
3-140-705
plate, right side
1-539-415-13
printed circuit board, muting
3-140-709
panel, amp shield
⊕PS 3 x 8
⊕PS 3 x 6
N3 φ
⊕PS 3 x 8
⊕PS 3 x 8
⊕PS 3 x 8
⊕PS 3 x 6
3-140-714
holder, printed circuit board
3-140-710
leg, printed circuit board
⊕K 2.6 x 8
3-140-707
panel, amp connector
3-141-154
label, caution; fuse
3-140-348
ornamental plate, jack
⊕PS 3 x 6
X-20319-01
terminal ass'y, GROUND
3-140-372
label, specification

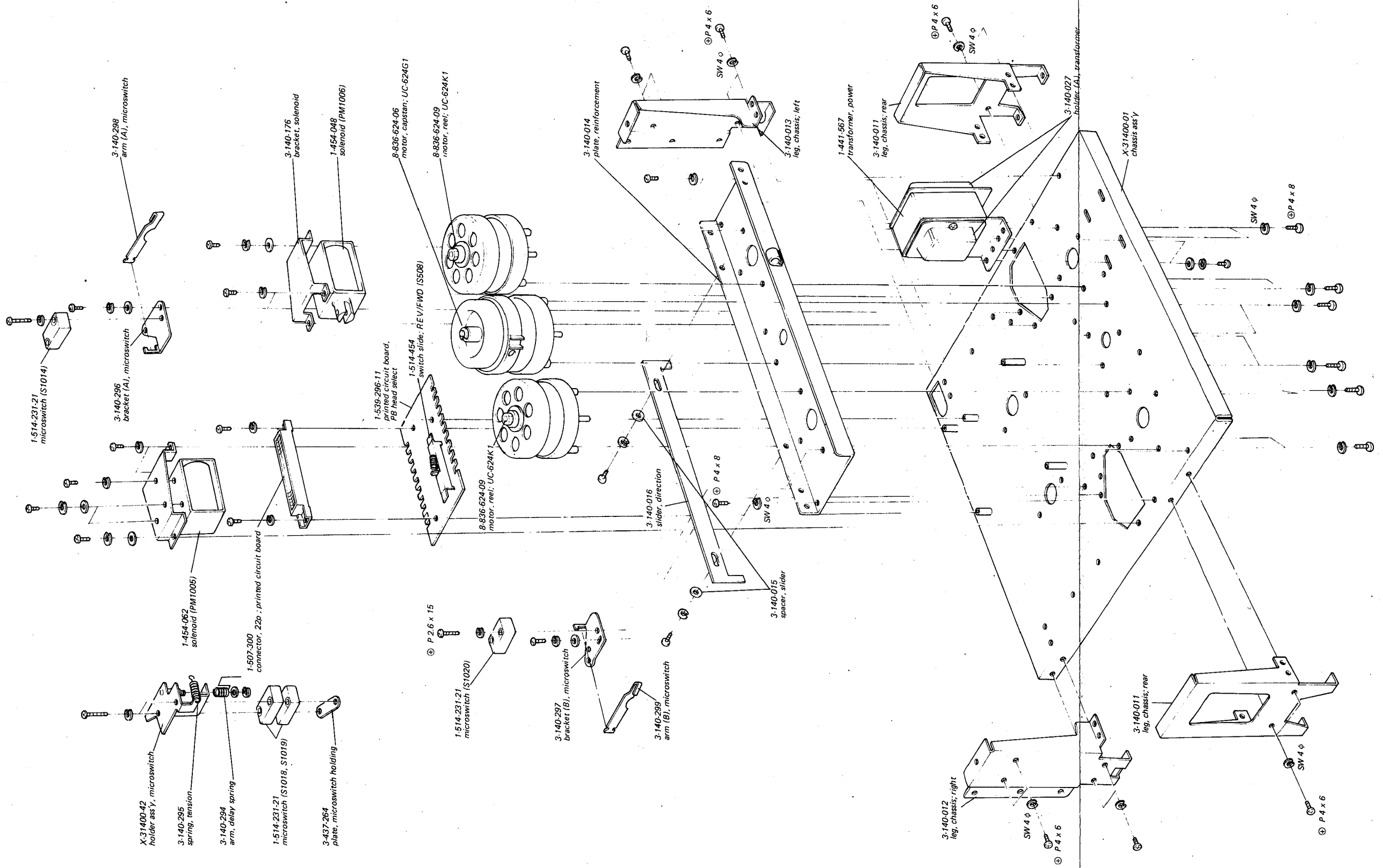
EXPLODED VIEW Chassis Top View 1

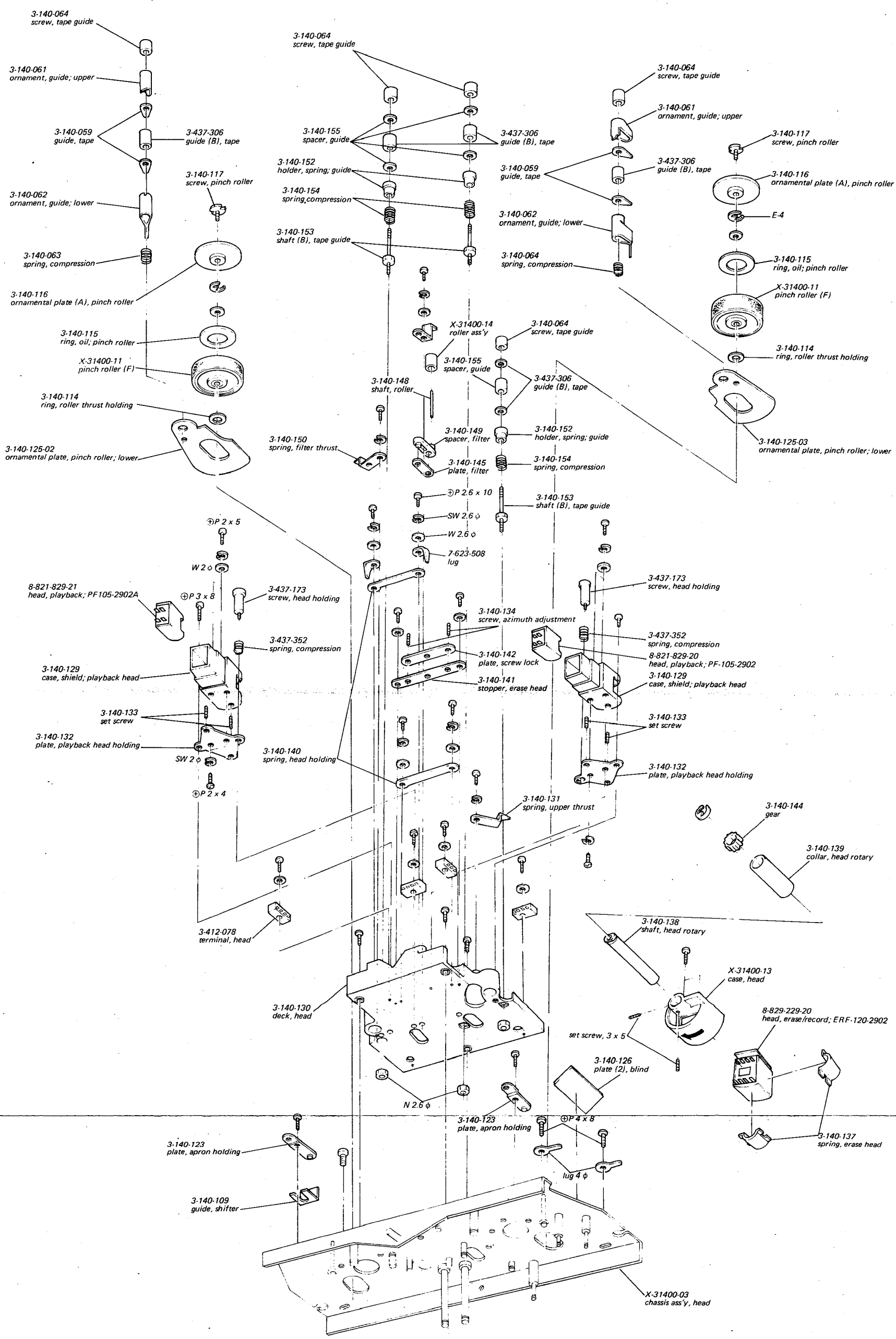


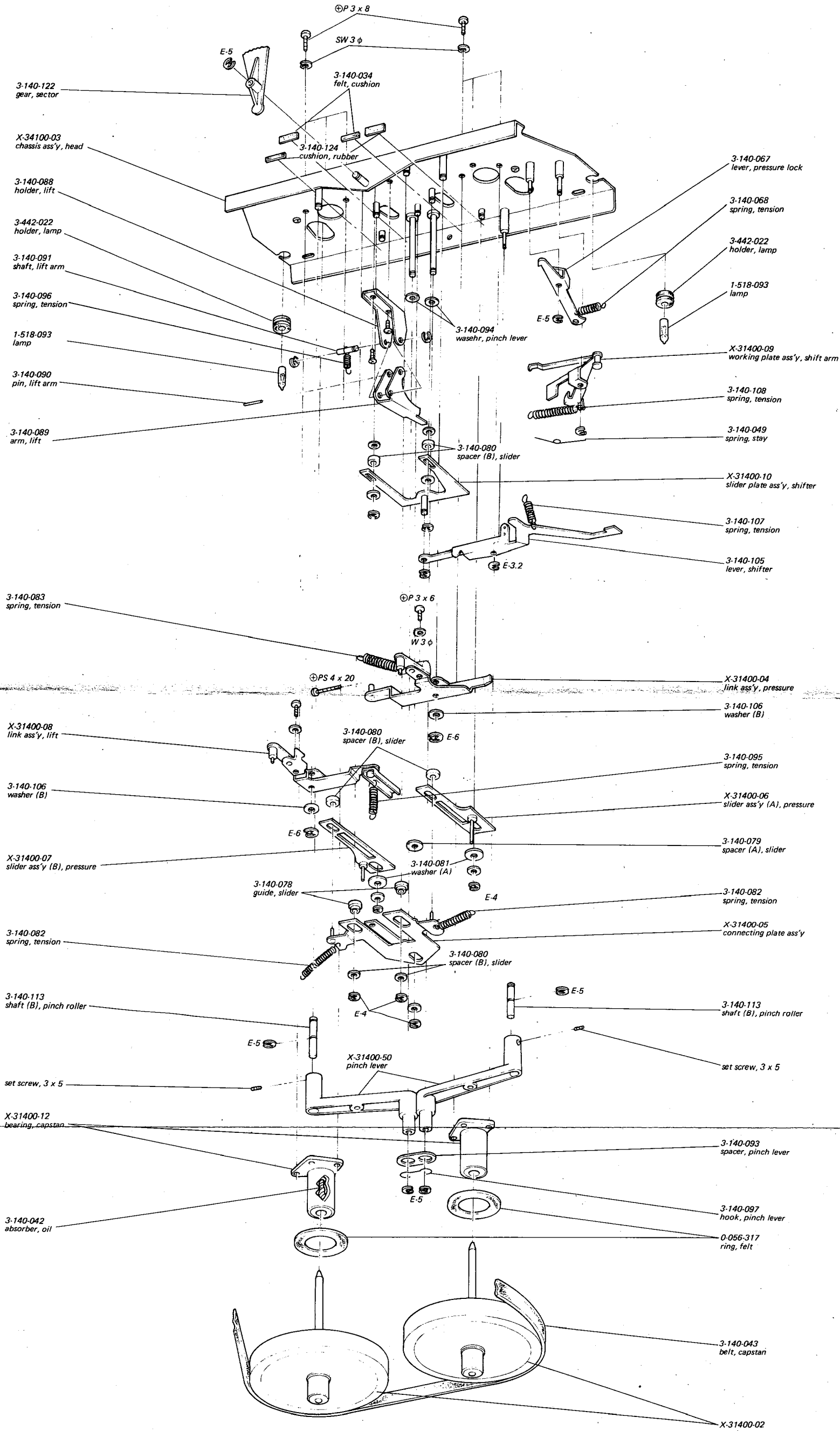

3-140-043
belt, capstan
1-514-093-21
microswitch (S1012)
set screw 3 x 5
3-140-044
pulley, motor
3-140-158
arm, plunger link
3-140-157
bracket, plunger link
3-140-159
pin, plunger
1-231-057-12
encapsulated component, C-R
1-454-048-11
solenoid
1-514-590
switch, leaf; muting (S1001)
X-31400-15
bracket ass'y, solenoid
3-425-145
rubber, brake
3-140-032
bracket (A), rack
3-140-033
plate (B), rack
2-825-003
spacer, mica; TO-3
2-832-002
spacer, insulating
lug 4 ϕ
transistor, 2SC807A
3-140-030
cover, transistor
3-140-028
heat sink, transistor
3-140-029
plate, heat sink insulating
1-231-057-12
encapsulated component, C-R
1-454-034-11
solenoid
3-140-232
bracket, brake opening
3-140-160
damper, rubber
3-140-218
spring, tension
3-140-035
bracket, spring
3-140-203
spring, tension
X-31400-01
chassis ass'y
3-001-707-04
clamp, wire
1-117-054
capacitor, 0.5 μF 350 V; MP
3-140-036
sheet, insulating
X-31400-33
lever ass'y, shut-off
1-514-231-21
microswitch, shut-off (S1025)
3-140-267
balancer (A), counter
X-31400-34
bracket ass'y, microswitch
X-34510-24
knob ass'y, lever switch
3-437-264
plate, microswitch holding
X-31400-36
lever ass'y, ESP switch
3-140-282
spacer (A)
3-140-281
tube, switch
3-140-026
spacer, variable resistor
1-514-633 C
switch slide ; ESP (S1009)
set screw 3 x 5
3-140-024
spacer (C)
1-539-292-11
printed circuit board, ESP switch
1-518-093-21
lamp
3-442-022
holder, lamp
1-514-274
switch, leaf; SPEED TUNING (S1021)
1-536-179
terminal strip, 1L1
3-140-263
spring, tension
3-140-023
bracket, variable resistor
3-140-262
spring, tension
3-140-260
link (A), instant stop
3-140-261
link (B), instant stop
X-31400-32
bracket ass'y, instant stop link
3-140-037
fiber sheet, insulating
1-514-057
microswitch, INST STOP
(S1010, S1015)
1-514-057-10
microswitch, ESS (S1026)
X-31400-31
bracket ass'y, ESS
3-140-025
spacer (D)
1-536-179-11
terminal strip, 1L1
1-514-057-10
microswitch, REC L (S1002)
1-514-057-10
microswitch, fast forward (S1008)
3-140-248
bracket (A), microswitch
1-514-057-10
microswitch, forward (S1007)
1-514-057-10
microswitch, stop (S1006)
1-514-057-10
microswitch, reverse (S1005)
1-222-303
variable resistor, with switch, 600 Ω
(RV1001)
3-140-249
bracket (B), microswitch
1-514-057-10
microswitch, rewind (S1004)
1-514-057-10
microswitch, REC R (S1003)
3-140-031
plate (A), sash holding
3-140-250
shaft, button
3-140-034
felt, cushion
3-140-251
bracket, button
SW 3 ϕ
⊕P 3 x 4
3-140-721
band, lead wire holding
3-140-031
plate (A), sash holding
SW 3 ϕ
⊕P 3 x 6

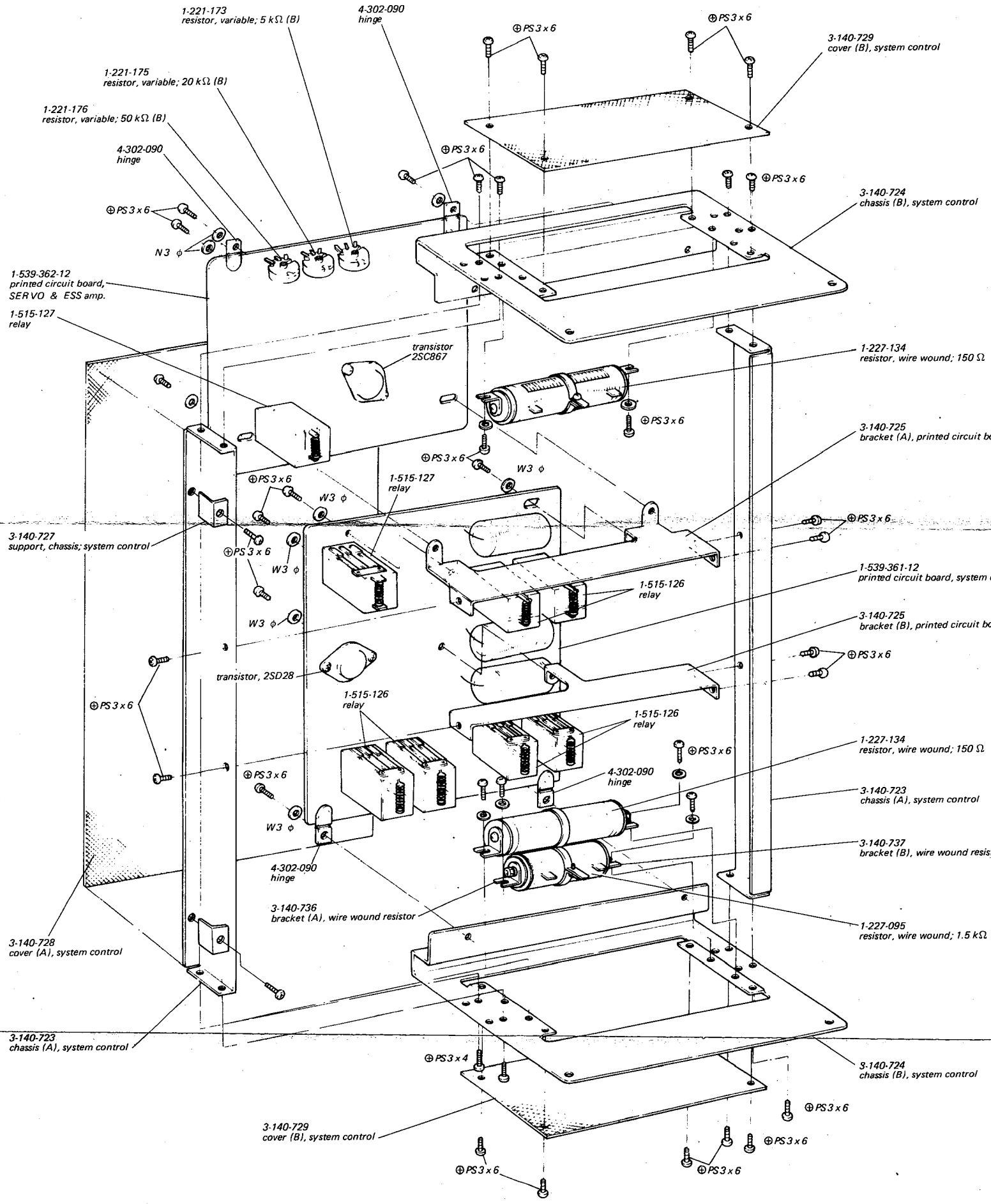

E-3.2 φ
⊕P 3 x 6
W 4 φ
SW 3 φ
W 3 φ
3-140-274
bar, switch connecting
⊕P 3 x 8
X-31400-35
link ass'y, switch
3-140-019
screw, thrust
3-140-018
support, thrust
SW 3 φ
W 3 φ
1-539-297-11
printed circuit board,
PB PRE & ESP AMP
⊕P 2 x 8
3-140-020
plate, thrust retaining
3-140-720
plate (C), printed circuit board holding
W 2 φ
3-140-739
terminal, 12P
⊕PS 3 x 6
3-140-017
bracket, thrust support
1-539-288-12
printed circuit board, posistor
1-509-380-11
connector, 15P
1-533-048
holder, fuse
3-140-193
bracket, posistor
1-514-231-21
microswitch (S1016)
⊕P 3 x 8
SW 3 φ
W 3 φ
1-117-082
capacitor, 4 μF 250 V; MP
1-514-231-21
microswitch (S1017)
3-140-036
sheet, insulating
1-509-380-11
connector, 15P
1-454-048
solenoid (PM1002, PM1003)
3-140-036
sheet, insulating
3-140-719
paper, shield
3-140-186
plate, reverse solenoid pulling
3-140-718
panel, mechanism connector
X-31400-18
bracket ass'y, reverse solenoid holding
3-437-264
plate, microswitch holding
3-140-078
guide, slider
3-140-191
damper, slide
1-121-002
capacitor, 100 μF 150 V, electrolytic
3-140-194
spring, tension
3-140-190
tube
3-140-722
paper, insualting
3-140-189
holder, damper
3-140-187
slide,reverse damper; right
1-509-354
connector, 12P
1-509-062
connector, power supply
3-140-188
slide, reverse damper, left
3-140-079
spacer (A), slider
X-31400-20
sub-link ass'y, reverse
3-465-048
screw (J), step
1-539-301-12
printed circuit board,
system control;
power supply
1-509-333
connector, AC OUTLET
X-31400-19
link ass'y, reverse
3-140-192
tube, rigulator shift slide
X-31400-01
chassis ass'y

EXPLODED VIEW **Chassis Bottom View 2**

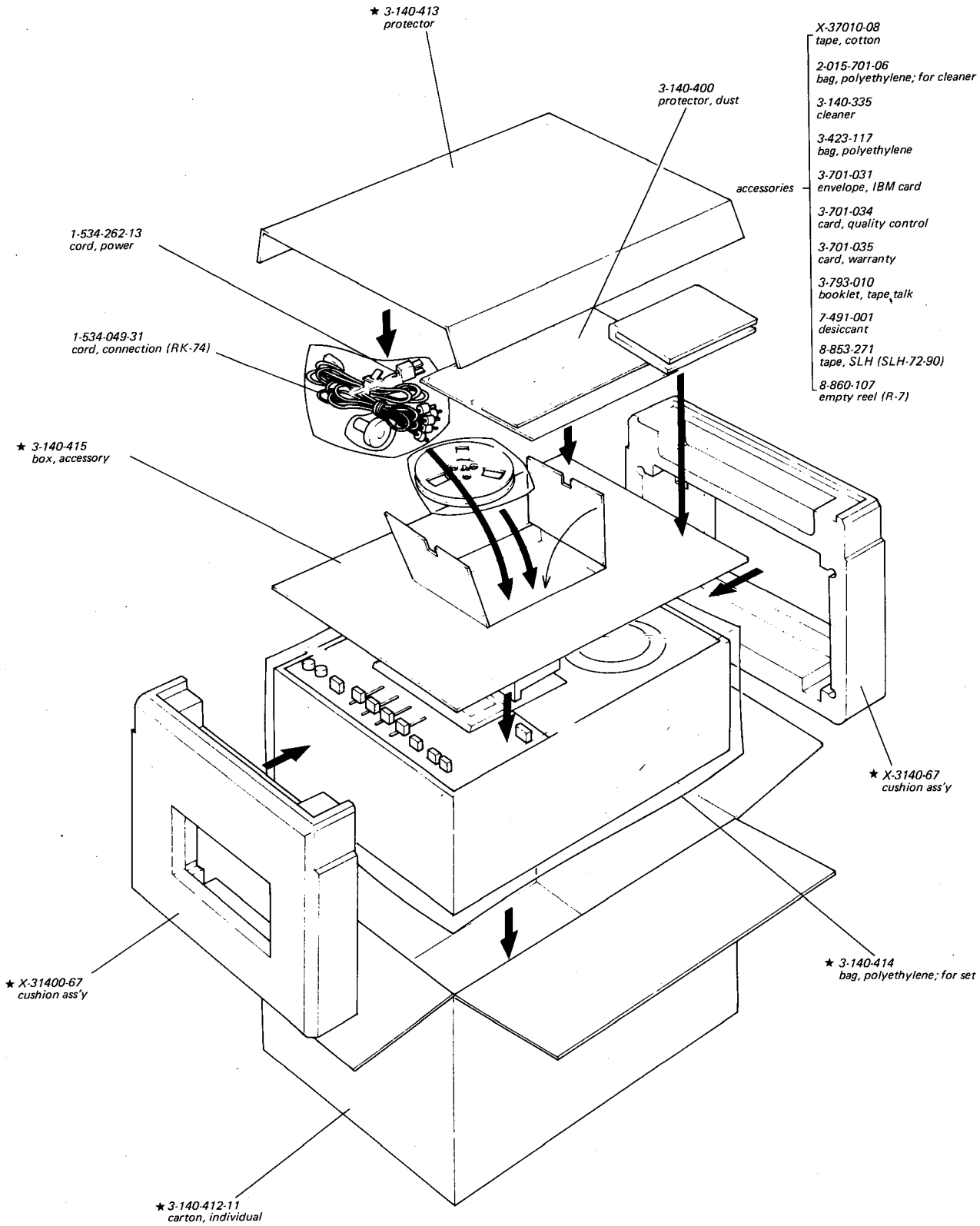



3-140-064
screw, tape guide
3-140-061
ornament, guide; upper
3-140-059
guide, tape
3-437-306
guide (B), tape
3-140-062
ornament, guide; lower
3-140-117
screw, pinch roller
3-140-063
spring, compression
3-140-116
ornamental plate (A), pinch roller
3-140-115
ring, oil; pinch roller
X-31400-11
pinch roller (F)
3-140-114
ring, roller thrust holding
3-140-125-02
ornamental plate, pinch roller; lower
3-140-064
screw, tape guide
3-140-155
spacer, guide
3-437-306
guide (B), tape
3-140-152
holder, spring; guide
3-140-154
spring, compression
3-140-153
shaft (B), tape guide
X-31400-14
roller ass'y
3-140-064
screw, tape guide
3-140-155
spacer, guide
3-437-306
guide (B), tape
3-140-148
shaft, roller
3-140-149
spacer, filter
3-140-152
holder, spring; guide
3-140-150
spring, filter thrust
3-140-145
plate, filter
3-140-154
spring, compression
⊕P 2.6 x 10
3-140-153
shaft (B), tape guide
SW 2.6 ϕ
W 2.6 ϕ
7-623-508
lug
3-140-064
screw, tape guide
3-140-061
ornament, guide; upper
3-140-059
guide, tape
3-437-306
guide (B), tape
3-140-062
ornament, guide; lower
3-140-064
spring, compression
3-140-117
screw, pinch roller
3-140-116
ornamental plate (A), pinch roller
E-4
3-140-115
ring, oil; pinch roller
X-31400-11
pinch roller (F)
3-140-114
ring, roller thrust holding
3-140-125-03
ornamental plate, pinch roller; lower
⊕P 2 x 5
W 2 ϕ
8-821-829-21
head, playback; PF105-2902A
⊕P 3 x 8
3-437-173
screw, head holding
3-437-352
spring, compression
3-140-129
case, shield; playback head
3-140-133
set screw
3-140-132
plate, playback head holding
SW 2 ϕ
⊕P 2 x 4
3-140-140
spring, head holding
3-140-134
screw, azimuth adjustment
3-140-142
plate, screw lock
3-140-141
stopper, erase head
3-140-131
spring, upper thrust
3-437-173
screw, head holding
3-437-352
spring, compression
8-821-829-20
head, playback; PF-105-2902
3-140-129
case, shield; playback head
3-140-133
set screw
3-140-132
plate, playback head holding
3-140-144
gear
3-140-139
collar, head rotary
3-412-078
terminal, head
3-140-138
shaft, head rotary
X-31400-13
case, head
8-829-229-20
head, erase/record; ERF-120-2902
set screw, 3 x 5
3-140-126
plate (2), blind
3-140-130
deck, head
N 2.6 ϕ
3-140-123
plate, apron holding
⊕P 4 x 8
3-140-137
spring, erase head
3-140-123
plate, apron holding
lug 4 ϕ
3-140-109
guide, shifter
X-31400-03
chassis ass'y, head


⊕P 3 x 8
SW 3 φ
E-5
3-140-122
gear, sector
3-140-034
felt, cushion
X-34100-03
chassis ass'y, head
3-140-124
cushion, rubber
3-140-088
holder, lift
3-442-022
holder, lamp
3-140-091
shaft, lift arm
3-140-096
spring, tension
1-518-093
lamp
3-140-090
pin, lift arm
3-140-089
arm, lift
3-140-094
wasehr, pinch lever
3-140-067
lever, pressure lock
3-140-068
spring, tension
3-442-022
holder, lamp
1-518-093
lamp
E-5
X-31400-09
working plate ass'y, shift arm
3-140-108
spring, tension
3-140-049
spring, stay
3-140-080
spacer (B), slider
X-31400-10
slider plate ass'y, shifter
3-140-107
spring, tension
3-140-105
lever, shifter
E-3.2
3-140-083
spring, tension
⊕P 3 x 6
W 3 φ
⊕PS 4 x 20
X-31400-04
link ass'y, pressure
3-140-106
washer (B)
X-31400-08
link ass'y, lift
3-140-080
spacer (B), slider
E-6
3-140-095
spring, tension
3-140-106
washer (B)
X-31400-06
slider ass'y (A), pressure
E-6
3-140-079
spacer (A), slider
X-31400-07
slider ass'y (B), pressure
3-140-081
washer (A)
3-140-078
guide, slider
E-4
3-140-082
spring, tension
3-140-082
spring, tension
X-31400-05
connecting plate ass'y
3-140-080
spacer (B), slider
3-140-113
shaft (B), pinch roller
E-4
E-5
3-140-113
shaft (B), pinch roller
E-5
X-31400-50
pinch lever
set screw, 3 x 5
set screw, 3 x 5
X-31400-12
bearing, capstan
3-140-093
spacer, pinch lever
E-5
3-140-042
absorber, oil
3-140-097
hook, pinch lever
0-056-317
ring, felt
3-140-043
belt, capstan
X-31400-02
capstan


1-221-173
resistor, variable; 5 kΩ (B)
4-302-090
hinge
⊕PS 3 x 6
3-140-729
cover (B), system control
1-221-175
resistor, variable; 20 kΩ (B)
1-221-176
resistor, variable; 50 kΩ (B)
4-302-090
hinge
⊕PS 3 x 6
N3 ϕ
3-140-724
chassis (B), system control
1-539-362-12
printed circuit board,
SERVO & ESS amp.
1-515-127
relay
transistor
2SC867
1-227-134
resistor, wire wound; 150 Ω
W3 ϕ
3-140-725
bracket (A), printed circuit board
3-140-727
support, chassis; system control
1-515-126
relay
1-539-361-12
printed circuit board, system control
3-140-725
bracket (B), printed circuit board
transistor, 2SD28
4-302-090
hinge
3-140-723
chassis (A), system control
3-140-737
bracket (B), wire wound resistor
3-140-736
bracket (A), wire wound resistor
1-227-095
resistor, wire wound; 1.5 kΩ
3-140-728
cover (A), system control
⊕PS 3 x 4
⊕PS 3 x 6

EXPLODED VIEW Packing



★ included in X-31400-66 carton ass'y, individual

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