

<ART-041-0>

# **SERVICE MANUAL**

STEREO TAPE DECK

# **RT-1050**

FU

<74C01Y91H>

 **PIONEER®**

# CONTENTS

1.	SPECIFICATIONS	3
2.	PARTS IDENTIFICATION	5
3.	DISASSEMBLY	
3.1	Back Covers	8
3.2	Side Boards	8
3.3	Amplifier Panel	8
3.4	Mechanical Panel	9
3.5	Replacing Head Assembly	9
4.	TROUBLE-SHOOTING CHART	
4.1	Transport Mechanism and Control System (1)	10
4.2	Transport Mechanism and Control System (2)	11
4.3	Electronic Circuit Trouble	13
5.	MECHANICAL ADJUSTMENTS	
5.1	Reel Base Height Adjustment	16
5.2	Brake Adjustment	16
5.3	Take-up Torque and Back Tension Adjustments	17
5.4	Pinch Roller Contact Pressure Adjustment	18
6.	TAPE HEAD ADJUSTMENTS	
6.1	Coarse Adjustments	19
6.2	Playback Head Fine Adjustment	19
6.3	Record Head Fine Adjustment	19
7.	CIRCUIT ADJUSTMENTS	
7.1	Playback Level Adjustment	20
7.2	Playback Equalizer Adjustment	20
7.3	Bias Oscillator Amplitude Adjustment	21
7.4	Bias-trap Adjustment	21
7.5	Recording Bias Adjustment	21
7.6	Erase Head Dummy Coil Adjustment	22
7.7	Level Meter Adjustment	22
7.8	Recording Level Adjustment	22
7.9	Recording-playback Frequency Response Adjustment	22
7.10	Peak Indicator Level Adjustment	23
8.	LEVEL DIAGRAMS	24
9.	SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LIST	
9.1	Electro-parts List	25
9.2	Connection Diagram (Amplifier)	27
9.3	Schematic Diagram (Amplifier)	29
9.4	Connection Diagram (Control)	31
9.5	Schematic Diagram (Control)	31
9.6	PB Amplifier Assembly (RWF-023)	32
9.7	Fuse Board Assembly (RWX-046)	37

9.8	REC Amplifier Assembly (RWF-021)	38
9.9	EQ. SW Assembly (RWS-021)	44
9.10	SW Circuit Assembly (RWS-017)	46
9.11	Control Circuit Assembly (RWG-045)	50
9.12	Oscillator Assembly (RWA-013)	54
9.13	Other P.C. boards	58
10.	EXPLODED VIEWS AND PARTS LIST	
10.1	Exterior	59
10.2	Amplifier Components	63
10.3	Take-up Mechanism	66
10.4	Tape Path and Capstan Motor	69
11.	PACKING METHOD AND PARTS LIST	73
12.	CIRCUIT DESCRIPTION	
12.1	Amplifier Section	75
12.2	Control Circuit	76
13.	SELECTION OF LINE FREQUENCY AND VOLTAGE	80



# 1. SPECIFICATIONS

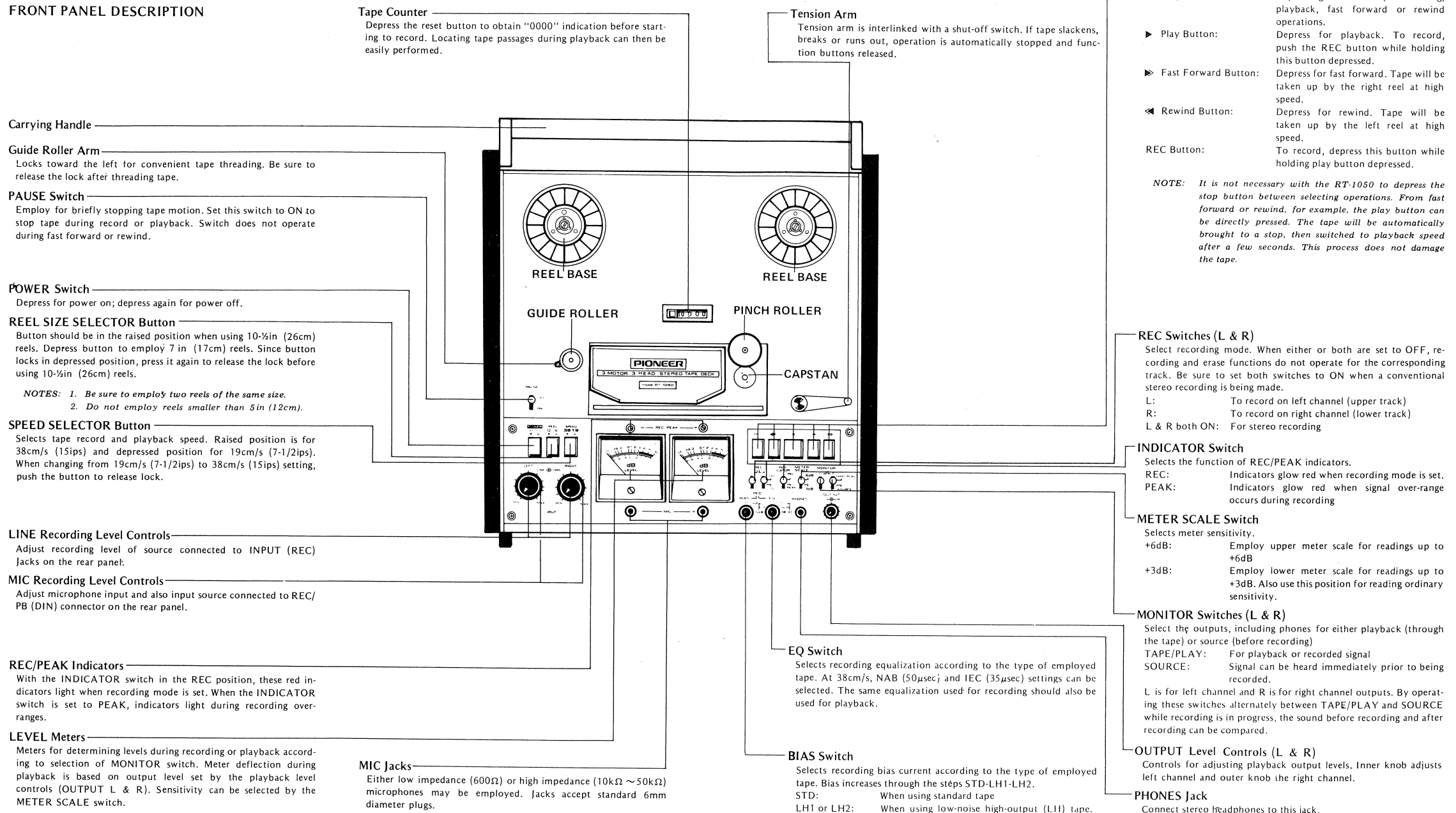
Operation .....	3-motor, 3-head system
Heads .....	2-track 2-channel playback head x 1 2-track 2-channel recording head x 1 2-track 2-channel erase head x 1 (Optional head assembly unit Pioneer PP-204T; 4-track 2-channel recording, playback operations)
Motors .....	For reel drive; 6-pole inner rotor induction motor x 2 For capstan drive; 4/8-pole 2-speed hysteresis synchronous motor x 1
Tape Speeds .....	38 cm/s (15 ips), 19 cm/s (7-1/2 ips)
Acceptable Reel Sizes .....	10-1/2 in (26 cm), 7-in (17 cm)
High Speed Wind Times .....	10-1/2 in (26 cm) reel; 110 sec at 740 m (2,400 feet) tape 7-in (17 cm) reel; 90 sec at 370 m (1,200 feet) tape
Wow and Flutter .....	38 cm/s (15 ips); 0.04% WRMS (0.06% RMS) 19 cm/s (7-1/2 ips); 0.08% WRMS (0.1% RMS)
Signal to Noise Ratio .....	More than 57 dB
Distortion .....	Less than 1% (Reference level 316 mV at 1,000 Hz)
Frequency Response .....	38 cm/s (15 ips); 30 to 22,000 Hz $\pm$ 3 dB 19 cm/s (7-1/2 ips); 40 to 20,000 Hz $\pm$ 3 dB
Stereo Channel Separation .....	More than 53 dB (at 1,000 Hz)
Erase Ratio .....	More than 60 dB
Recording Bias Frequency .....	125 kHz
Inputs .....	Microphone; 0.25 mV to 80 mV/20k $\Omega$ , 1/4 in (6 $\phi$ mm) jack (Mic impedance; 600 $\Omega$ to 50 k $\Omega$ ) Line input; 50 mV to 25 V/100 k $\Omega$ (Pin jack) REC/PB; 15 mV to 1.5V/1.5 k $\Omega$ (DIN connector)
Outputs .....	Line; 316 mV (-10 dBv)/ 50 k $\Omega$ load with Output level control at max. Output impedance; 3.3 k $\Omega$ ( Pin jack) REC/PB; 316 mV (-10 dBv)/50 k $\Omega$ load with Output level control at max. Output impedance; 3.3 k $\Omega$ (DIN Connector) Headphone; 40 mV/8 $\Omega$ with Output level control at max. Load impedance; 4 to 16 $\Omega$

Subfunctions .....	3-position bias selector 4-position recording equalizer selector; (NAB: 2, IEC: 2) Plug-in type head assembly unit interchangeable; (separately available 4-track 2-channel head assembly Pioneer PP-204T) Indicator selector switch (PEAK-REC indication) Meter scale selector switchable (+3 dB, +6 dB) Tension arm (lock type) Pause lever (lock type); Used as PLAY timing release lever 4-digit tape counter Two parts of LINE INPUT usable Tape monitor switches (L ch. and R ch.) Recording mode switches (L ch. and R ch.) Output level control for LINE OUTPUT LEVEL METER and HEADPHONE Mic recording level control Line recording level Control Carrying handle and deck cover
Power Requirements .....	AC. 120V, 60 Hz
Power Consumption .....	115 W
Dimensions .....	18-1/8 (W) x 17-27/32 (H) x 9-19/32 (D) in (including feet and deck cover) 460 (W) x 453 (H) x 244 (D) mm
Weight .....	Without package; 52 lb. 4 oz. (23.8 kg) With package; 65 lb. 2 oz. (29.6 kg)
Furnished Parts .....	10-1/2 in metal reel (Pioneer PR-100) ..... 1 10-1/2 in reel adaptors (Pioneer PP-220) ..... 2 Reel height-adjustable sheets ..... 2 Connection cords ..... 3 Cleaning kit ..... 1 Cleaning ribbon ..... 1 AC. power cord ..... 1 Fuse (2A) ..... 1 Operating instructions ..... 1

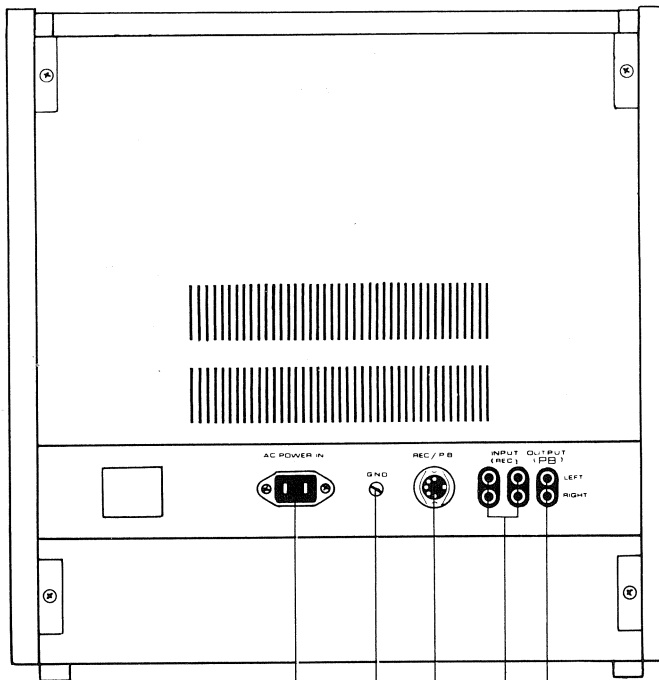
- NOTES:**
- Specifications and the design subject to possible modification without notice due to improvements.
  - Specifications refer to measured values by using standard tape.

## 2. PARTS IDENTIFICATION

### FRONT PANEL DESCRIPTION



REAR PANEL DESCRIPTION



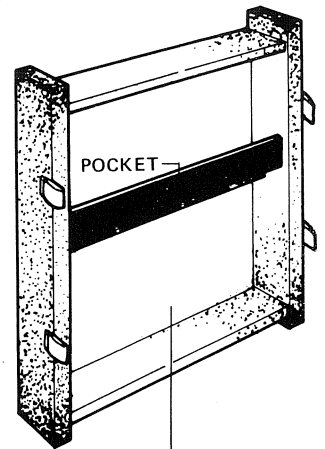
**AC POWER IN** — Socket for connecting AC power cord.

**GND Terminal** — Chassis ground terminal. If externally induced hum etc. is excessive, connect this terminal to amplifier ground terminal or to an earth ground.

**REC/PB Connector (DIN-type)** — Special DIN connector for 2-channel record and playback. If the stereo amplifier is provided with the same type of connector, the separately sold connecting cord (Pioneer PP-101) can be employed to simultaneously perform both recording and playback connections. Recording level of a source employing this connector can be adjusted by the MIC recording level controls on the front panel.

**INPUT (REC) Jacks** — Recording input jacks. Connect these to amplifier recording output (TAPE REC) terminals with accessory cord. Two sets of parallel terminals are provided for convenience in connecting two sources or editing. The upper jacks are for the left channel and the lower for the right channel.

**OUTPUT (PB) Jacks** — Playback output jacks. Connect these to stereo amplifier tape playback terminals (TAPE MONITOR or TAPE PLAYBACK) with accessory connecting cord.



**Deck Cover** — A simple pocket is provided on the inside of the deck cover for storing power cord, connecting cords, etc. when transporting.

**NOTE:** *This pocket is not intended for bulky or heavy items. Small items should be wrapped in paper or cloth before inserting them into this receptacle. Take care not to mar or damage the front panel.*

### 3. DISASSEMBLY

#### 3.1 BACK COVERS (Fig. 1)

1. Take out screws ①~⑦ and remove the back cover (A).  
This exposes the internal mechanism and permits examination.
2. Take out screws ⑧~⑬ and remove back cover (B).  
The amplifiers can then be adjusted.

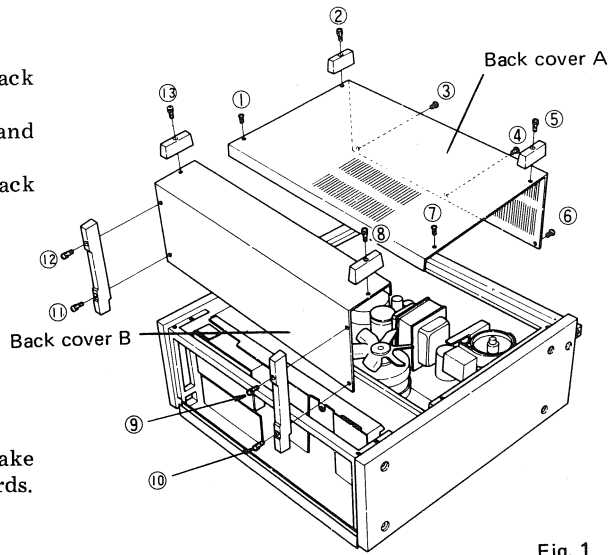


Fig. 1

#### 3.2 SIDE BOARDS (Fig. 2)

Slacken screws ① and ② two or three turns, take out screws ③~⑩, and remove the side boards.

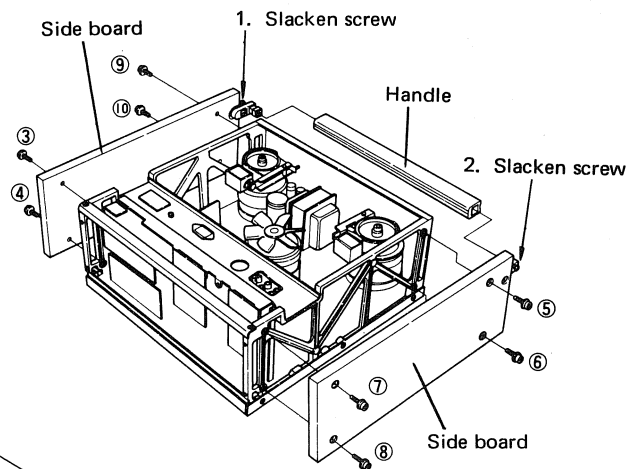


Fig. 2

#### 3.3 AMPLIFIER PANEL (Fig. 3)

1. Remove all knobs.
2. Take out screws ①~④ and remove the amplifier panel.

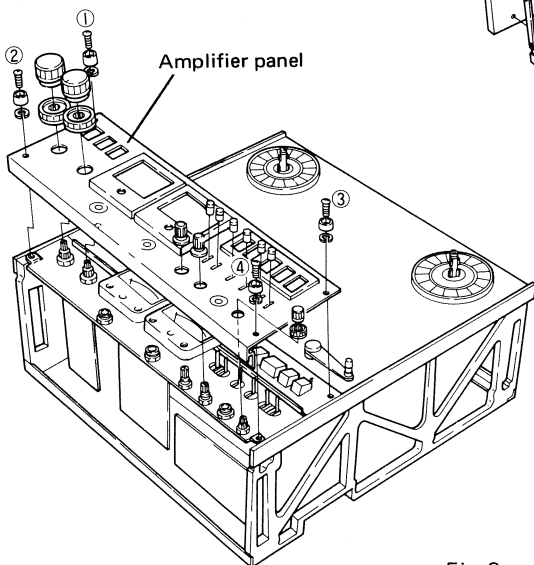


Fig. 3



### 3.4 MECHANICAL PANEL (Fig. 4)

1. Take out screws ① and ② and remove the head housing.
2. Take out screw ③ and remove the pinch roller.
3. Take out screws ④~⑥ and remove the center base by turning the cap.
4. Take out screws ⑦~⑫ and remove the reel bases.
5. Take out screws ⑬~⑮ and remove the roller guide.
6. Take out screw ⑯ and remove the tension arm.
7. Remove the PAUSE knob.
8. Take out screws ⑰~⑳ and remove the mechanical panel by lifting out the decorative aluminum sashes.

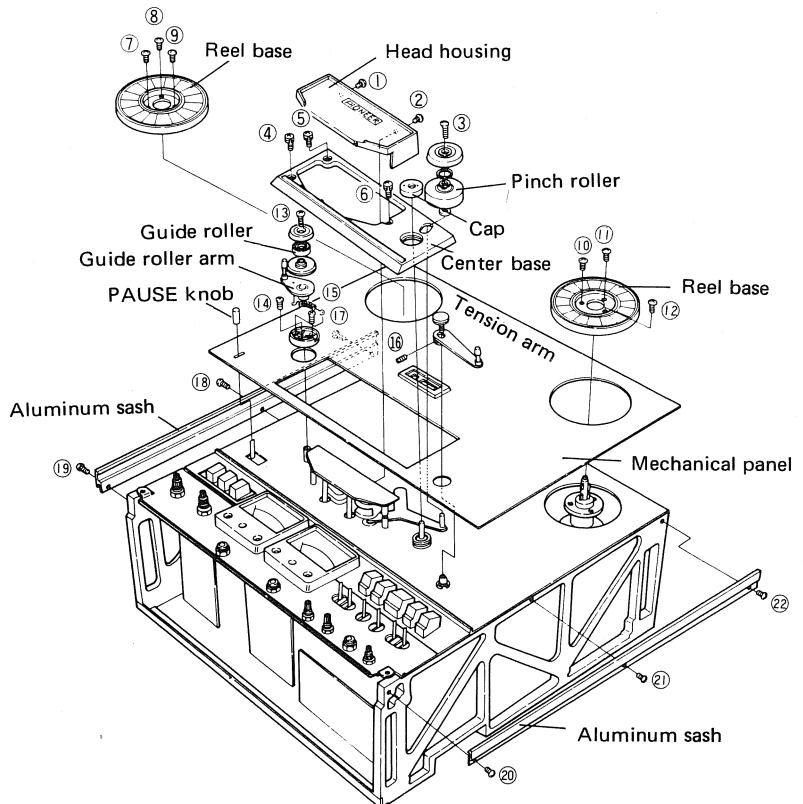
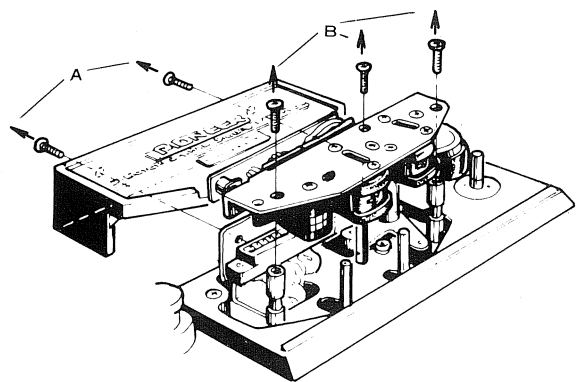


Fig. 4

### 3.5 REPLACING HEAD ASSEMBLY

The RT-1050 is supplied with a 2-channel 2-track head system. The separately sold PP-204T head assembly is available which can be interchanged to provide 4-track 2-channel function. Replacement procedure

1. Remove the 2 screws (A) from the head housing.
2. Take out the 3 screws (B) from the head assembly.
3. Gently pull up both edges of the head assembly to remove it.
4. Reverse the above steps to install replacement head assembly.



## 4. TROUBLE-SHOOTING CHART

### 4.1 TRANSPORT MECHANISM AND CONTROL SYSTEM (1).

“Reel motor” refers to the take-up and supply motors. For further explanation, see section 4.2, Nos. 1 ~ 5.

#### • Power supply and lamps

Lack of Power ON. ————— See 4.2.1 “Power and lamps.”

Lamp does not light. ————— See 4.2.1 “Power and lamps.”

Control system does not function. ————— Burned-out fuse (F5). ————— Replace.  
Defective shut-off switch. ————— Replace.

#### • Playback function

Take-up too weak or too strong. ————— Improperly positioned REEL size switch. ————— Correct position to match reel size.  
Trouble in reel motors. ————— See 4.2.2 “Reel motors.”

Insufficient tape speed. ————— Pinch roller slipping. ————— See 4.2.3 “Pinch roller.”  
Poor pinch roller pressure. ————— See 4.2.3 “Pinch roller.”  
Excessive back tension. ————— Re-adjust. See section 5.3.  
Poor capstan motor torque. ————— See 4.2.4 “Capstan motor.”

Defective tape speed switching. ————— Defective switch (S5). ————— Replace.

Wow and flutter. ————— Dust on pinch roller and capstan. ————— Clean with absolute alcohol.  
Defective pinch roller. ————— See 4.2.3 “Pinch roller.”  
Poor pinch roller pressure. ————— See 4.2.3 “Pinch roller.”  
Excessive friction or sticking of flywheel bearing. ————— Lubricate, clean or replace where necessary.  
Excessive back tension. ————— Re-adjust. See section 5.3.  
Trouble in capstan motor. ————— See 4.2.4 “Capstan motor.”

(Take-up side)  
Tape slackens at start of tape travel. ————— Abnormal take-up torque. ————— See 4.2.2 “Reel motor.”  
Relay RL 603 released earlier. ————— Replace capacitor (C 611).  
Poor back tension. ————— See 4.2.2 “Reel motor.”  
(Supply side)

Tape squeals. ————— Soiled tape guide. ————— Clean with absolute alcohol.  
Damaged tape. ————— Replace.

● Fast forward and rewind

- Take-up delayed until end of tape travel.
  - Poor take-up motor torque. ——— See 4.2.2 “Reel motors”
  - Excessive back tension. ——— See 4.2.2 “Reel motors.”
  
- Tighten or loosen tape winding. ——— Abnormal back tension. ——— Re-adjust. See section 5.3.
  
- Tape slackens at stop of the tape.
  - Difference in sizes of right and left reels. ——— Match reel sizes properly.
  - Brake timing trouble or mal- adjustment. ——— See 4.2.5 “Brake.”
  
- Mechanical noise during operation.
  - Defective reel motors. ——— Replace.
  - Defective guide roller. ——— Replace.
  
- Short interval-time between fast forward or rewind to play. ——— Defective capacitors (C622, C623). ——— Replace.

4.2 TRANSPORT MECHANISM AND CONTROL SYSTEM (2)

1. Power and lamps.

- Lack of power input.
  - Loosened AC socket connection. — Check connection.
  - Burned-out fuse. ——— Replace.
  - Defective AC cord. ——— Replace.
  - Power switch failure. ——— Replace.
  - Defective power transformer. ——— Replace.
  
- Meter lamp does not light.
  - Defective lamp. ——— Replace.
  - Burned-out fuse. ——— Replace.

2. Reel motors . . . Check to make sure line frequency switch is in a proper position.

- No voltage to motor.
  - Defective shut-off switch contact. — Replace.
  - Burned-out fuse (F6 or F7). ——— Replace.
  
- Motor failure despite apparent voltage.
  - Defective phase capacitor. ——— Replace.
  - Stuck motor shaft. ——— Replace the motor.
  - Defective motor coil. ——— Replace the motor.
  - Brake does not clearance. ——— Re-adjust. See section 5.2.

Defective take-up at playback mode. ——— Defective wire wound resistor (R 3 or R 4). ——— Replace.  
 ——— Defective relay contact or relay (RL 602). ——— Replace.  
 ——— Imperfect FUNCTION button contact. ——— Replace.

No back tension in playback mode. ——— Defective wire wound resistor (R 2). ——— Replace.

Defective fast forward. ——— Excessive back tension. ——— Re-adjust. See section 5.3.  
 ——— FUNCTION button contact failure. ——— Replace.

Defective rewind. ——— Excessive back tension. ——— Re-adjust. See section 5.3.  
 ——— Poor FUNCTION button contact. ——— Replace.

No back tension in fast forward mode. ——— Defective wire wound resistor (R 1). ——— Replace.

**3. Pinch roller . . .** Also check solenoid (SL 3).

Revolving sound squeaks.—Stuck bearing. ——— Clean and lubricate.

Dull rotation. ——— Stuck bearing excessive friction. ——— Clean or replace bearing, then lubricate.

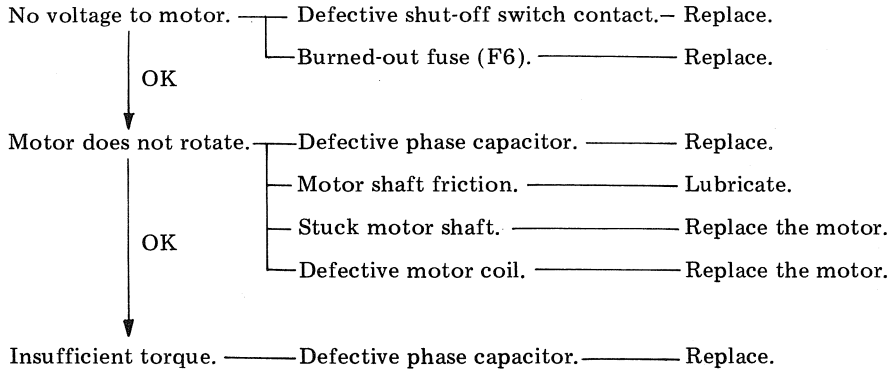
Pinch roller slipping. ——— Dirty pinch roller. ——— Clean with absolute alcohol.

Defective solenoid function. ——— Defective transistors (Q1, Q602).— Replace.  
 ——— Defective diode (D609).— Replace.

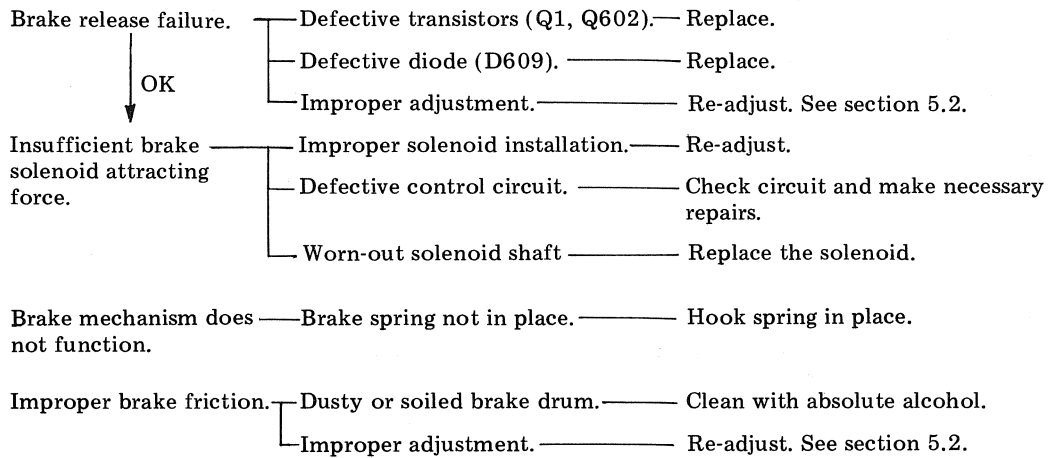
OK

Insufficient attracting force. ——— Imperfect solenoid installation. ——— Re-adjust. See section 5.4.  
 ——— Defective control circuit. ——— Check circuit and make necessary repairs.  
 ——— Worn-out solenoid shaft ——— Replace the solenoid.

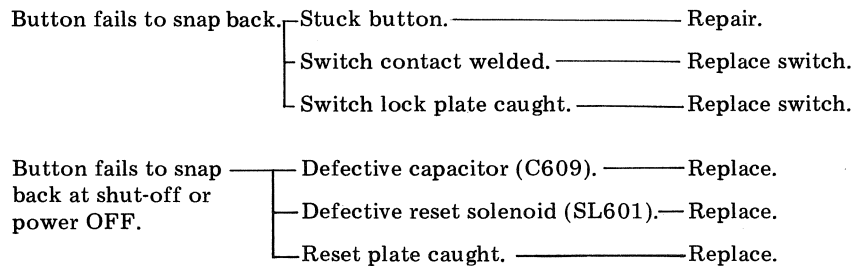
**4. Capstan motor . . .** Check to see that line frequency switch is properly positioned.



**5. Brake . . .** Also check brake solenoids (SL1, SL2).

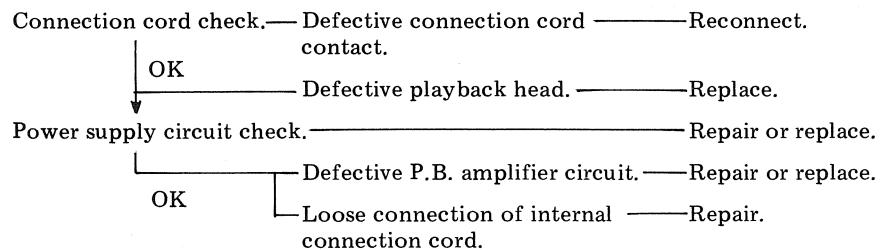


**6. Function button**

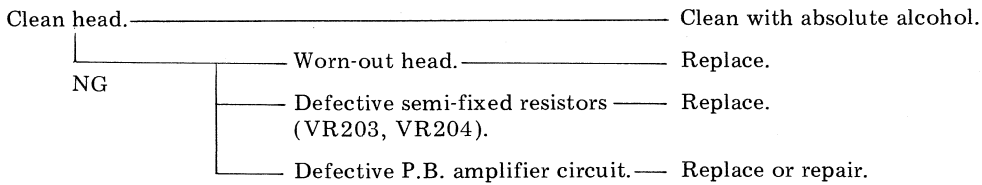


**4.3 ELECTRONIC CIRCUIT TROUBLE**

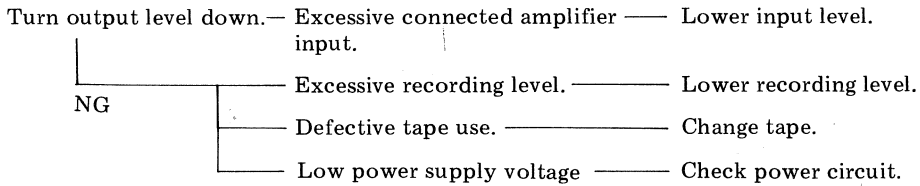
• **No playback sound**



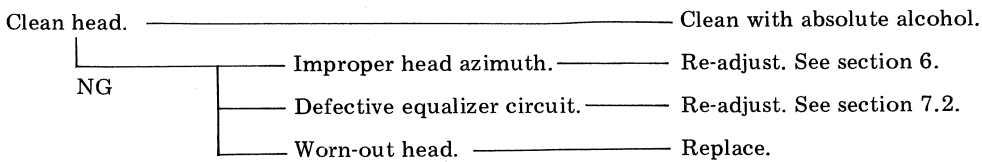
● **Insufficient sound**



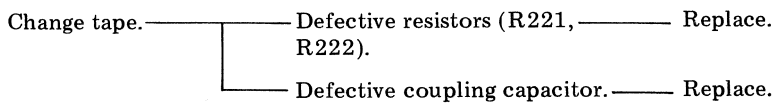
● **Sound distortion**



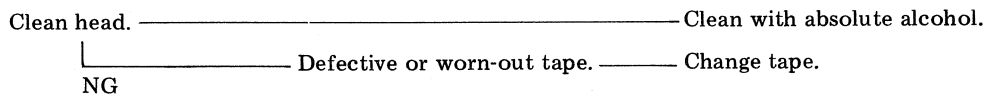
● **Poor treble**



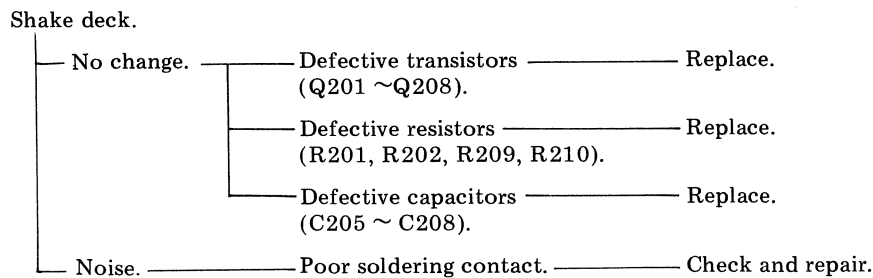
● **Poor bass**



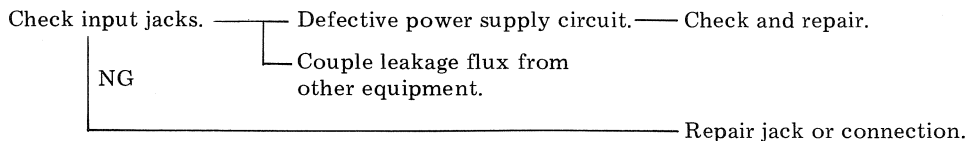
● **Sound drop-out**



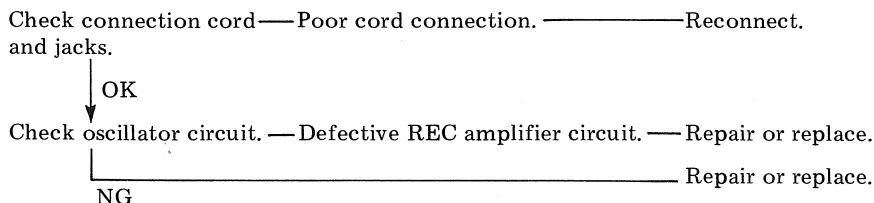
● **Excessive or occasional noise**



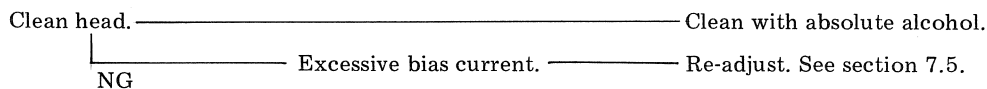
● Excessive hum



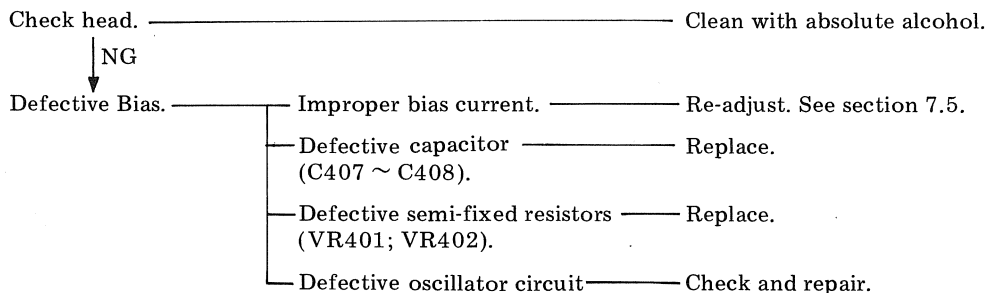
● Recording impossible — Playback possible



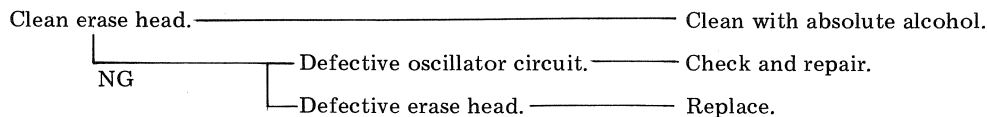
● Poor recording treble, playback treble



● Recorded sound insufficient or distorted



● Erasing does not take place



● Impaired level meter function

- Defective level meter. — Replace.
- Defective semi-fixed resistors (VR301, VR302, VR303, VR304). — Replace.
- Defective diodes (D301, D302). — Replace.

● Excessive crosstalk

- Tape running interference. — Check and repair.
- Incorrect head height. — Re-adjust. See section 6.

## 5. MECHANICAL ADJUSTMENTS

Adjustments must always be made with the tape deck in the specified position (either vertical or horizontal) for the correct values to be obtained in use.

### 5.1 REEL BASE HEIGHT ADJUSTMENT

Adjustment of the reel base height is carried out with the side boards removed, and is necessary whenever supply or take-up motors are replaced or the reel base height is incorrect.

1. Place the tape deck in the horizontal position.
2. Check to ensure that the panel comes into firm contact with the chassis of the transport mechanism in place.
3. Slacken the retaining setscrews and set the clearance between the reel base and the panel to 2mm.
4. After the adjustment is completed, retighten the setscrews firmly (using a torque of at least 10kg·cm or more).

### 5.2 BRAKE ADJUSTMENT

Adjustment should be made whenever the solenoid or motor is replaced and if there is tape slack. First, place the tape deck in the vertical position, and check to ensure the following:

1. That, with the solenoid inoperative (that is, with the brake ON), the clearance A in Fig. 6 is 4mm.
2. That, while pressing home the solenoid shaft (that is, releasing the brake), the motor can be rotated smoothly by hand.

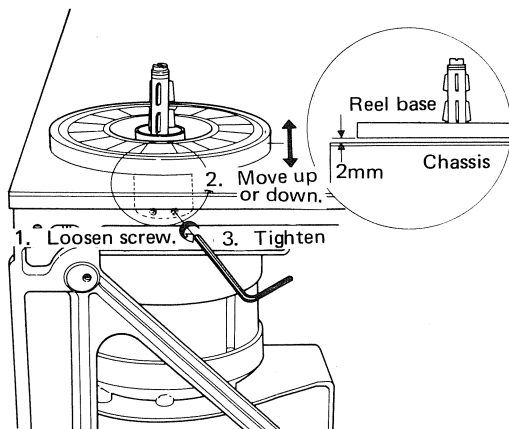


Fig. 5

### • Adjustment (Figs. 6, 7)

1. Operate in the FAST FORWARD or REWIND mode for some two seconds (whichever is appropriate for the reel you are adjusting) before pressing the STOP button to arrest movement of the corresponding reel base. This ensures that all measurements are made under the same conditions.
2. Be careful not to move the reel base, and load a 7 inch reel with 60mm hub, fixing the string on the reel.
3. Pull the tension gauge in direction B (or C) until the reel moves, to measure brake friction.
4. Adjust the brake spring hook position so that the gauge reads between 300 and 450g (900 to 1,350g·cm). The optimum value is the smallest one which can still satisfy the conditions given in "Confirmation After Adjustment" on the next page.
5. When adjustment of the brake spring hook position fails to give values within the specified range, check for the following factors:
  - Dirty brake drum
  - Dirty brake felt
  - Mis-alignment of the brake guide plate
  - Not smooth movement of the brake arm.
6. Read the tension gauge value in the B (or C) direction as above, and compare it with the reading in the corresponding D (or A) direction. The ratio of B:D (or C:A) should be 2.3:1 to 3.7:1.

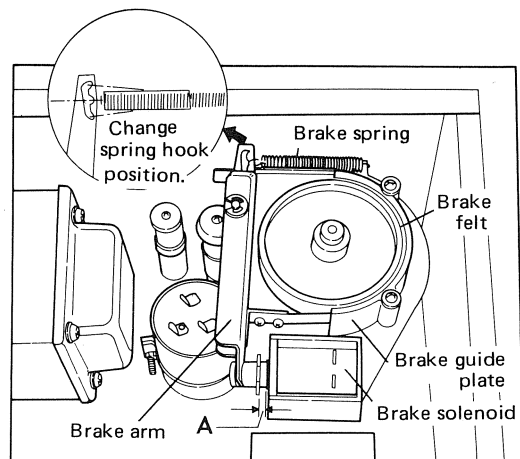


Fig. 6



● Confirmation After Adjustment

1. When the adjustments on the previous page have been completed, load a 10-1/2 inch metal reel with LP (long play — 150%) tape.
2. Check to ensure that in the FAST FORWARD or REWIND mode, when the PLAY button is pressed with some 10 to 40mm more tape on the take-up reel than the supply reel, tape movement stops completely before entering the PLAYBACK mode.
3. If the above condition is not satisfied, the brake adjustment should be repeated until it is.

NOTE:  
If capacitors C<sub>622</sub> and C<sub>623</sub> are defective (less capacitance), it may be impossible to satisfy condition (2).

5.3 TAKE-UP TORQUE AND BACK TENSION ADJUSTMENTS

● Back Tension (Torque) at Playback

1. Set the REEL size selector button to the 10-1/2 inch reel position.
2. Set the tape deck in the vertical position, and operate in the PLAYBACK mode at 19cm/s (7-1/2ips). Measure the back tension of the supply reel base by pulling the tension gauge in direction B as shown in Fig. 7.
3. Adjust the slider of resistance R<sub>2</sub> (500Ω) so that the measured tension is 93 ~ 110g (280 ~ 330g·cm), see Fig. 8.
4. Set the REEL size selector button to the 7 inch reel position, and measure the back tension as detailed in the preceding (2).

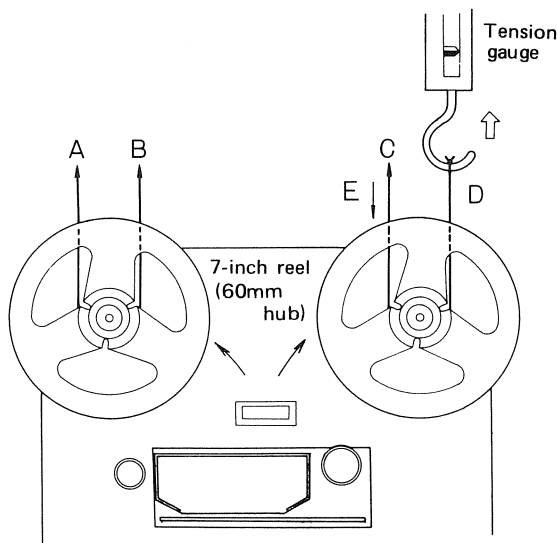


Fig. 7

5. Adjust the slider of resistance R<sub>4</sub> (100Ω) so that the measured tension is 63~77g (190~230g·cm).
6. The slider locking screws must be securely tightened down once the adjustment has been made.

● Take-up Torque at Playback

1. Set the REEL size selector button to the 10-1/2 inch reel position.
2. Set the tape deck in the vertical position, and operate in the PLAYBACK mode at 19cm/s (7-1/2 ips). Measure the take-up torque of the take-up reel base with the tension gauge in direction E, Fig. 7. Ensure that you allow no slack in the thread as it is being taken up.
3. Adjust the slider of resistance R<sub>3</sub> (300Ω) so that the measured tension is 190~210g (570~630g·cm).

● Back Tension (Torque) at Fast Forward

1. Set the tape deck in the vertical position and operate in the FAST FORWARD mode. Measure the back tension of the supply reel base in direction B, Fig. 7.
2. Adjust the slider of resistance R<sub>1</sub> (2kΩ) so that the measured tension is 35~45g (105~135g·cm)

NOTE:  
Adjustment of the FAST FORWARD back tension automatically ensures that the REWIND back tension is correctly adjusted. This is because the same resistance, R<sub>1</sub>, is switched to give the back tension with both the take-up and supply motors.

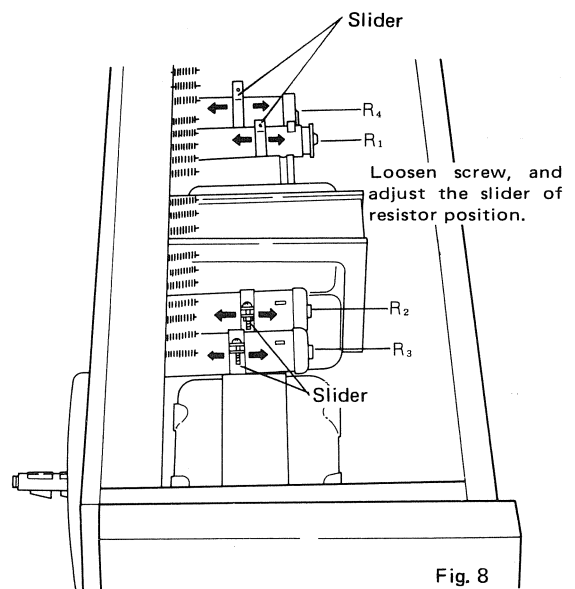


Fig. 8

## 5.4 PINCH ROLLER CONTACT PRESSURE ADJUSTMENT

The following check of pinch roller contact pressure should be carried out whenever the pinch roller or the pinch solenoid which forces the pinch roller into contact with the capstan is replaced.

1. Set the tape deck in the vertical position and set the REEL size selector button to the 10-1/2 inch reel position.
2. Turn the POWER switch and shut-off switch (tension arm interlinked) ON. Set the deck to the PLAYBACK mode.
3. Check to ensure that clearance B in Fig. 9 is 1mm.
4. If this clearance is out of tolerance, the three retaining screws on the pinch solenoid base should be slackened and the bracket repositioned to give the correct clearance.

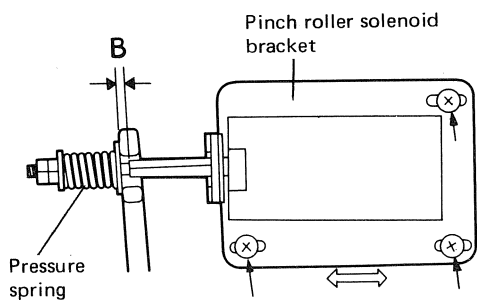


Fig. 9

5. Load a 10-1/2 inch reel of 3M "Scotch" #111 (or equivalent) tape, and get the tape running at FAST FORWARD until there is about the same amount of tape on take-up and supply reels.
6. Get the tape running at 19cm/s (7-1/2 ips) and attach the tension gauge to the pinch roller as shown in Fig.10. Increase the tension until the pinch roller separates from the capstan and tape motion ceases. Check to ensure that the measured tension under these conditions is between 1.7~2kg.
7. If a tension of 1.7~2kg does not arrest tape movement, check for the following factors:
  - Inadequately secured pinch roller contact pressure spring
  - Defective pinch roller contact pressure spring
  - Dirty pinch roller
  - Dirty capstan.

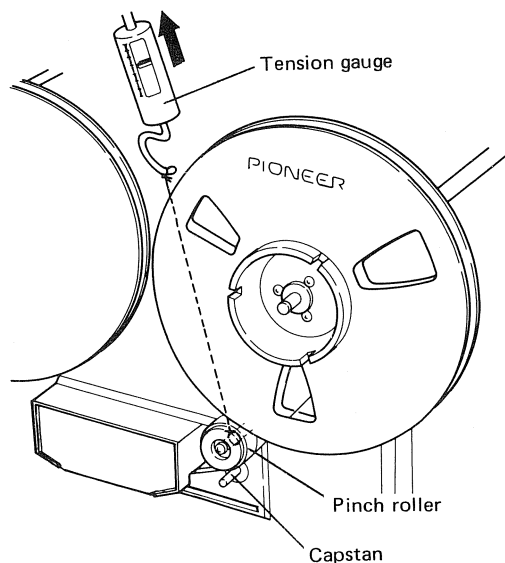


Fig. 10

## 6. TAPE HEAD ADJUSTMENTS

### 6.1 COARSE ADJUSTMENTS

#### • Height (Fig. 11)

Adjust the following screws to give a vertical alignment between the moving tape and the various heads to the dimensions shown in Fig. 11.

PLAYBACK Head . . . . . Screws ①, ②, and ③

RECORD Head . . . . . Screws ⑥, ⑦, and ⑧

ERASE Head . . . . . Screws ⑪ and ⑫

When adjusting the ERASE head, ensure that the heads come into close and uniform contact with the heads and the tape. Fig. 11 gives the standard measurements.

#### • Tilt Angle

Adjust the following screws to ensure that both the top and bottom of each head come into close and uniform contact with the tape when it is in motion.

PLAYBACK Head . . . . . Screw ①

RECORD Head . . . . . Screw ⑥

#### • Azimuth

Adjust the following screws to ensure that the head gap is completely at right angles to the motion of the tape.

PLAYBACK Head . . . . . Screw ③

RECORD Head . . . . . Screw ⑧

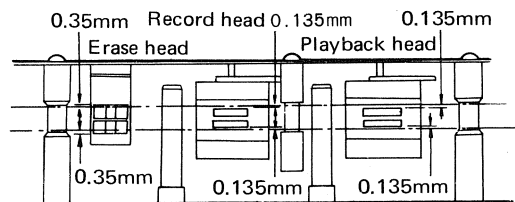


Fig. 11

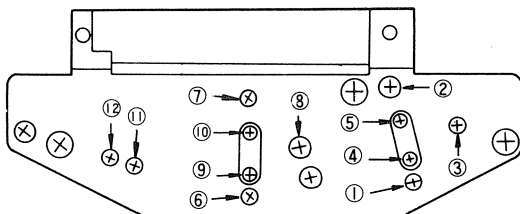


Fig. 12

### 6.2 PLAYBACK HEAD FINE ADJUSTMENT

1. Get the fifth section of the test tape (15kHz, -10dB, full track) running at 19cm/s(7-1/2ips).
2. Adjust screw ③ for the maximum output at the LINE OUTPUT terminals. Minor differences in level between R and L channels can be neglected at this stage.
3. Check to ensure that there is no change in the output level while playing the test tape (step 1 above) when the tape is gently pressed with the fingertip.
4. Should step ③ above result in any difference in output level, slacken the screws ④ and ⑤, and alter the tape tangency to the head by gently twisting the head in the horizontal plane to eliminate the difference.

### 6.3 RECORD HEAD FINE ADJUSTMENT

1. Feed a 500Hz -10dBv (316mV) input signal to the LINE INPUT terminals, set the MONITOR switches to the TAPE position, and record the signal on tape.
2. Now adjust screws ⑥, ⑦ and ⑧ for maximum LINE OUTPUT playback level.
3. With the frequency set at 15kHz, set the MONITOR switches to the TAPE position, and record the signal on tape. Adjust screw ⑧ for the maximum LINE OUTPUT playback level.
4. Check to ensure that there is no change in the output level while playing the recorded tape (above) when the tape is gently pressed with the fingertip.
5. If, at this stage, there is a difference in the output level from L and R channels, slacken screws ⑨ and ⑩ and twist the head in the horizontal plane to eliminate the difference.

# 7. CIRCUIT ADJUSTMENTS

The following instruments are required for circuit adjustments:

- MILLIVOLT METER
- AUDIO OSCILLATOR
- ATTENUATOR
- OSCILLOSCOPE
- FREQUENCY METER (COUNTER)
- AC VOLTMETER (with probe)
- TEST TAPE (PIONEER TT-500A)

Controls on the tape deck are set as follows unless otherwise specified:

- SPEED selector button → 19cm/s (7-1/2ips)
- REEL size selector button → 7 inch reel position
- BIAS switch → STD position
- EQ switch → STD (NAB) position
- METER SCALE switch → +3dB
- REC switches → ON (STEREO)
- OUTPUT level control → MAX

Reference voltage level is measured subject to 0dBv = 1V with 50kΩ load resistor across the LINE OUTPUT terminals.

## 7.1 PLAYBACK LEVEL ADJUSTMENT

1. Connect the millivolt meter(s) to the LINE OUTPUT terminals.
2. Play back the third section of the test tape (700Hz, 0dB, full track).
3. Adjust the following semi-variable resistors so that the LINE OUTPUT terminal playback level is -10dBv (316mV).  
 VR<sub>203</sub> . . . . . L Channel  
 VR<sub>204</sub> . . . . . R Channel  
 These resistors are located on the P.B. amplifier board.

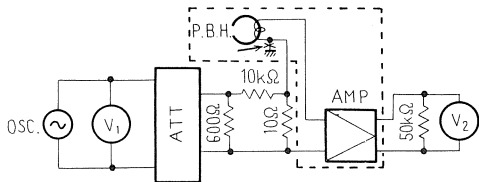


Fig. 13

## 7.2 PLAYBACK EQUALIZER ADJUSTMENT

1. Connect the millivolt meter(s) to the LINE OUTPUT terminals.
2. Play back the second section of the test tape (10kHz, -10dB, full track).
3. Adjust the following semi-variable resistors so that the measured output is -20dBv(100mV). This modifies the equalizer characteristics.  
 VR<sub>201</sub> . . . . . L Channel  
 VR<sub>202</sub> . . . . . R Channel  
 These resistors are located on the P.B. amplifier board.
4. Adjustments made under "Playback Equalizer Adjustment" also affect the adjustments under "Playback Level Adjustment," so that the adjustments should be repeated in turn as many times as necessary.

### ● Playback Frequency Response Check

After "Level" and "Equalizer" adjustments have brought both to their optimum values, play back the fifth (15kHz) through eleventh (50Hz) sections of the test tape, and check to ensure that the playback frequency response is within the 'envelope' of Fig. 14.

### ● Playback Equalization Check

When precise measurements of playback equalization are necessary, they should be made primarily as follows:

1. Unsolder the ground (earth) lead from the playback head and make the connection as shown in Fig. 13.
2. With V<sub>1</sub> held constant, change the oscillator frequency, and adjust the attenuator so that V<sub>2</sub> remains the same at each frequency, noting the reduction in each case.
3. Table 1 gives typical frequency response figures for the playback equalization, in terms of the 0dB reference at 1kHz for NAB(50μs).

	20Hz	100Hz	1kHz	10kHz	20kHz
NAB (50 μs)	+20.5dB	+17dB	0dB	- 9dB	- 9dB
IEC 38cm/s (35 μs)	+20.5dB	+17dB	-0.3dB	-12dB	-12dB

Table 1

### 7.3 BIAS OSCILLATOR AMPLITUDE ADJUSTMENT

1. Connect the AC voltmeter with probe between the oscillator circuit board test point (TP<sub>401</sub>) and ground.
2. Set the tape deck to the RECORDING mode, but without loading a tape.
3. Adjust VR<sub>405</sub> on the oscillator circuit board so that the oscillator voltage is 22V.

**NOTE:**

In view of the high bias oscillator frequency of 125kHz, special care should be taken with probe and wiring to avoid measuring errors.

### 7.4 BIAS-TRAP ADJUSTMENT

1. Connect the oscilloscope between terminal 18(L channel) or terminal 19(R channel) on the oscillator circuit board and ground.
2. Set the tape deck to the RECORDING mode, but without loading a tape.
3. Adjust the coils L<sub>401</sub>(L channel) and L<sub>402</sub>(R channel) so that the oscilloscope waveform has the minimum amplitude (less than 1V peak-to-peak).

### 7.5 RECORDING BIAS ADJUSTMENT

1. Connect the millivolt meter to the LINE OUTPUT terminals and feed a 1kHz input signal at -10dBv (316mV) to the LINE INPUT terminals.
2. Load 3M "Scotch" #111 (or equivalent) tape on which you record. Set the MONITOR switches to the TAPE position, and play back as you are recording. Adjust the LINE RECORDING level control to give an output of -10dBv at the LINE OUTPUT terminals.
3. After some 30 seconds of this, gradually turn the semi-variable resistors VR<sub>401</sub> (L channel) and VR<sub>402</sub> (R channel) in a clockwise direction, past the point where the playback level peaks, to a point where it has dropped back -0.5dB.
4. Repeat the adjustment detailed in (3) above alternately for L and R channels several times.
5. After completing the adjustment (3), set the recording bias to LH<sub>1</sub> and LH<sub>2</sub> in turn, maintaining the same frequency and level settings, and keeping on recording.
6. With the final level achieved by adjustment (3) (0.5dB below the maximum) as the new reference 0dB, check to ensure that the level drops by the following amounts:

With LH<sub>1</sub> : 0.9 ± 0.4 dB  
 With LH<sub>2</sub> : 2.2 ± 0.9 dB

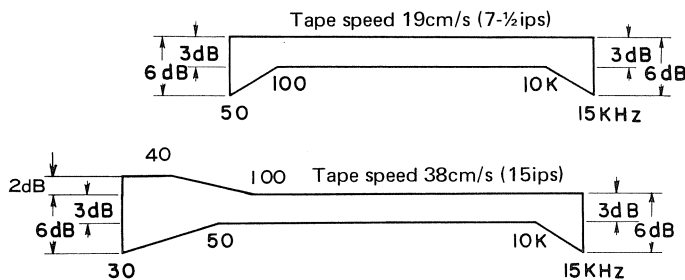


Fig. 14

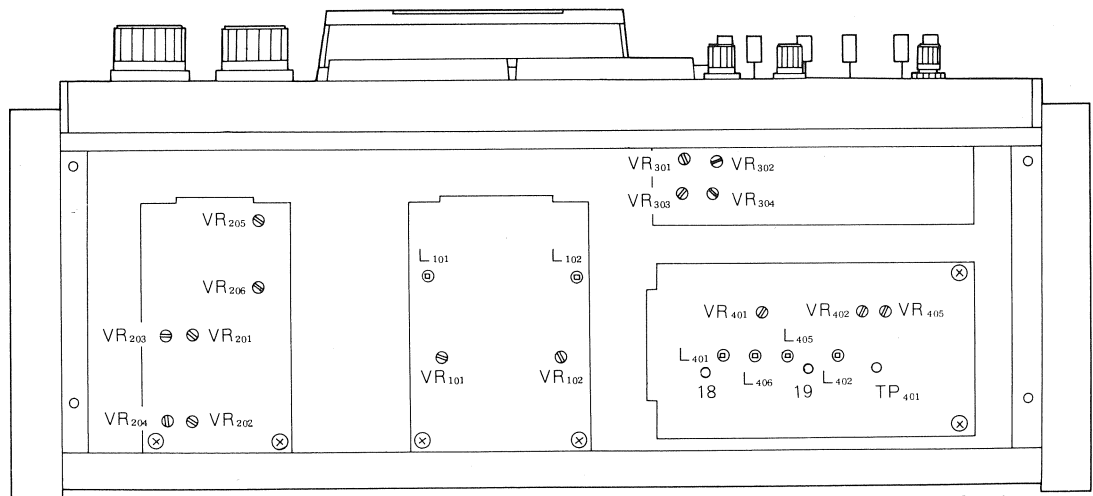


Fig. 15

## 7.6 ERASE HEAD DUMMY COIL ADJUSTMENT

1. Connect the frequency counter between the bias oscillator circuit board test point (TP<sub>401</sub>) and ground.

2. Set the tape deck to the STEREO RECORDING mode without loading a tape, and measure the frequency.

Then, with the deck switched first to L channel MONO recording and then to R channel MONO recording, adjust the coils L<sub>405</sub> (L) and L<sub>406</sub> (R) to give the same frequency as with STEREO RECORDING.

## 7.7 LEVEL METER ADJUSTMENT

1. Connect the millivolt meter(s) to the LINE OUTPUT terminals.

2. Set the MONITOR switches to SOURCE, and apply a 1kHz input signal at -10dBv (316mV) to the LINE INPUT terminals.

3. Adjust the LINE RECORDING level controls to give an output level of -10dBv (316mV) at the LINE OUTPUT terminals.

4. Set the METER SCALE switch to +3dB position, and adjust VR<sub>301</sub> (L channel) and VR<sub>302</sub> (R channel) so that the meters indicate zero "0" on the lower of the two calibration scales.

5. Set the METER SCALE switch to +6dB position, and adjust VR<sub>303</sub> (L channel) and VR<sub>304</sub> (R channel) so that the meters indicate zero "0" on the upper of the two calibration scales.

## 7.8 RECORDING LEVEL ADJUSTMENT

1. Connect the millivolt meter(s) to the LINE OUTPUT terminals.

2. Set the MONITOR switches to SOURCE and apply a 1kHz input signal at -10dBv (316mV) to the LINE INPUT terminals.

3. Record this signal on 3M "Scotch" #111 (or equivalent) tape and, at the same time, adjust the output level at the LINE OUTPUT terminals to -10dBv (316mV) by the LINE RECORDING level control.

4. Adjust VR<sub>101</sub> (L channel) and VR<sub>102</sub> (R channel) to give the same output level (-10dBv, 316mV) as with the MONITOR switches set at TAPE.

5. Check to ensure that the difference between the level for either channel recorded alone and the same channel when both channels are recorded simultaneously is  $\pm 0.3$ dB or less.

## 7.9 RECORDING-PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

This adjustment should be made only after the "RECORDING BIAS ADJUSTMENT" has been completed.

1. Connect the millivolt meter(s) to the LINE OUTPUT terminals, apply a 1kHz input signal at -10dBv (316mV) to the LINE INPUT terminals, switch the MONITOR switches to TAPE, and record on 3M "Scotch" #111 (or equivalent) tape.

2. Adjust the LINE RECORDING level control to give an output level of -10dBv (316mV) at the LINE OUTPUT terminals.

3. Leaving the LINE RECORDING level controls in this position, reduce the input level by a further 20dB by means of the attenuator (that is to -30dBv), and play back recordings of both 1kHz and 15kHz signals as you make them.

4. Adjust L<sub>101</sub> (L channel) and L<sub>102</sub> (R channel) so that the deviation in the monitor output levels measured in step 3 above comes into the 'envelopes' shown in Fig. 16. Furthermore adjust L<sub>101</sub> (L channel) and L<sub>102</sub> (R channel) so that the difference between the response at 1kHz and 15kHz in "playback Frequency Response Check" (playback response alone) varies within  $\pm 1$ dB of the difference (recording and playback response) in step 3.

5. If the deviation exceeds  $\pm 3$ dB, carry out the adjustment in the "Azimuth" section before repeating the adjustments in this section.

6. Check to ensure that frequency response remains within the 'envelopes' of Fig. 16 after both recording and playback for input signal frequencies of 50, 100, 250, 2.5k, 5k, 10k, 15k, and 20kHz.

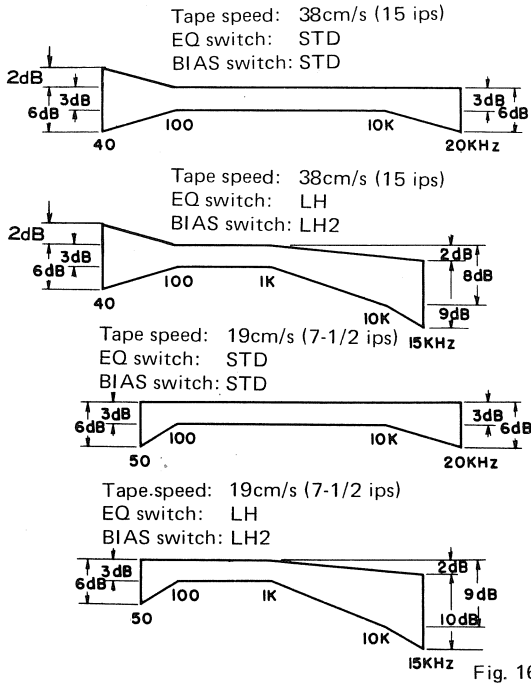


Fig. 16

Recording Equalization Check

When precise measurements of recording equalization are necessary, they should be made primarily as follows:

1. Unsolder the ground connection from the recording head, and make the connection as shown in Fig. 17.
2. With  $V_1$  held constant, change the oscillator frequency, and adjust the attenuator so that  $V_2$  remains the same at each frequency, noting the reduction in each case.
3. Table 2 gives typical recording equalization characteristics for a tape speed of 19cm/s (7-1/2ips), set at STD, in terms of a 1kHz reference.

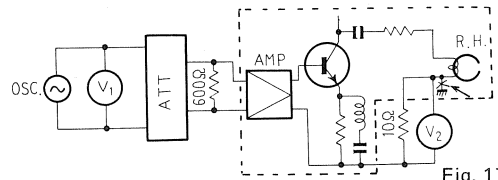


Fig. 17

STD

Frequency	20Hz	1kHz	7kHz	15kHz	Peak 25kHz	Peak 30kHz
Tape speed	20Hz	1kHz	7kHz	15kHz	Peak 25kHz	Peak 30kHz
19cm/s	+7dB	0dB	+6dB	+13.7dB	+26.7dB	
38cm/s IEC (35μs)	+7dB	-0.2dB	+1.3dB	+5.0dB		+11.8dB
38cm/s NAB (50μs)	+7dB	-0.4dB	-0.8dB	+2.0dB		+8.0dB

LH

Frequency	20Hz	1kHz	7kHz	15kHz	Peak 28.5kHz	Peak 40kHz
Tape speed	20Hz	1kHz	7kHz	15kHz	Peak 28.5kHz	Peak 40kHz
19cm/s	+7dB	-0.2dB	+1.8dB	+6.5dB	+17dB	
38cm/s IEC (35μs)	+7dB	-0.3dB	+0.1dB	+1.4dB		+9dB
38cm/s NAB (50μs)	+7dB	-0.8dB	-3dB	-2.5dB		+4dB

Table 2

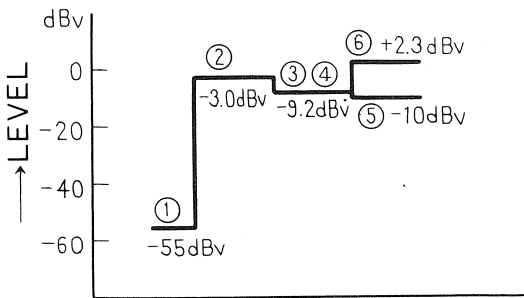
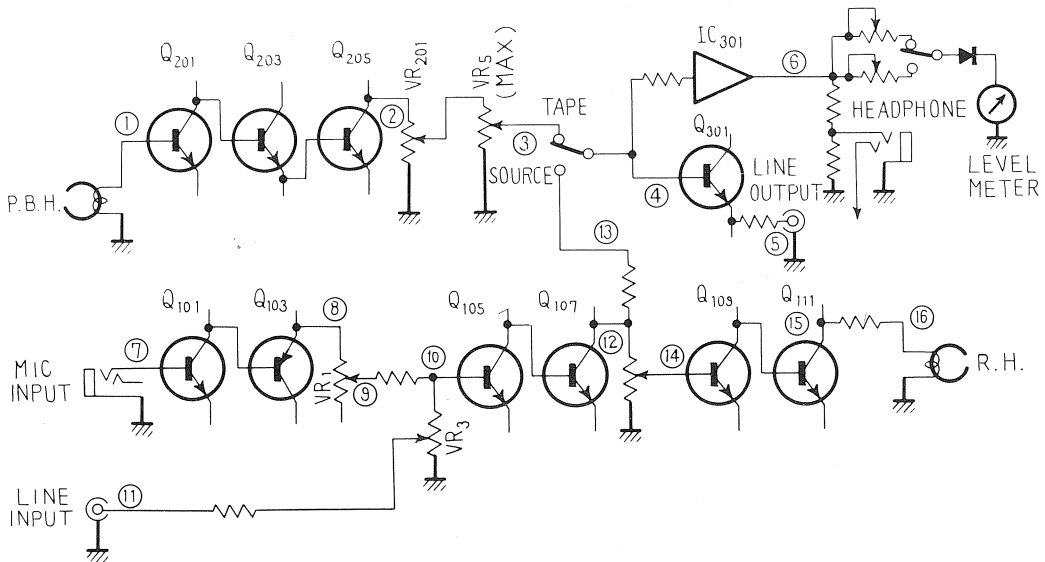
7.10 PEAK INDICATOR LEVEL ADJUSTMENT

This adjustment is performed by means of a screwdriver for radio frequency applications.

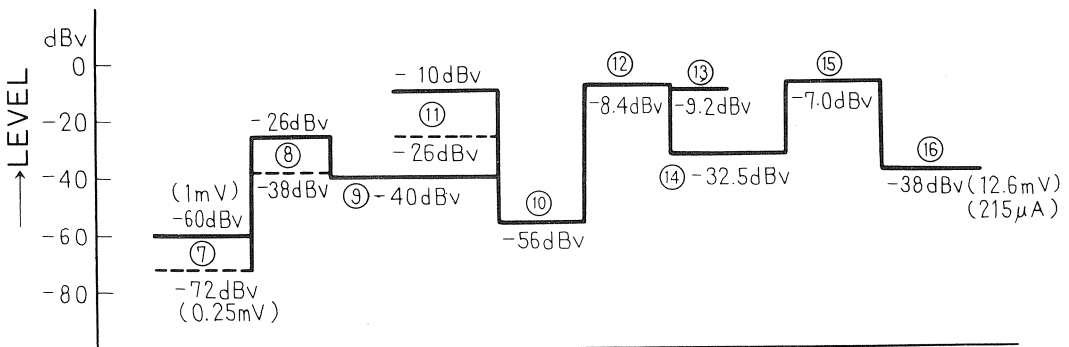
1. Connect the millivolt meter to the LINE OUTPUT terminals, and apply a 1kHz input signal at -10dBv (316mV) to the LINE INPUT terminals.
2. Set the MONITOR switches to SOURCE, and adjust the LINE RECORDING level controls to give -10dBv output at the LINE OUTPUT terminals.
3. Set the tape deck to the RECORDING mode, and the INDICATOR switch to PEAK.
4. Raise the input level by 6dB (to -4dBv), turn VR<sub>205</sub> and VR<sub>206</sub> down (anticlockwise), and check to ensure that the peak indicators (LED: Light-emitting diode) are not illuminated.

5. Gradually turn VR<sub>205</sub> and VR<sub>206</sub> up (clockwise) and set them to the point where the LED's illuminate.
6. Check to ensure that when the input level is dropped by 1dB (to -5dBv) the LED's go out, and that they come back on when the level is raised again by 1dB. If they are not extinguished at -5dBv, gradually turn VR<sub>205</sub> and VR<sub>206</sub> down, stopping where they do go out. Increase the input level by 1dB (to -4dBv), and the LED's should illuminate. If they do not come on even at -4dBv, gradually turn VR<sub>205</sub> and VR<sub>206</sub> clockwise, stopping where they do illuminate, and check that they go out at the -5dBv level.
7. Finally, vary the input level slowly between -4dBv and -5dBv, and check to ensure that they come on at -4dBv and go out at -5dBv.

# 8. LEVEL DIAGRAMS



- 0dBv = 1V
- FREQUENCY: 1kHz
- 19cm/s, STD
- LEVEL meter indicate '0'





## 9. SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LIST

### 9.1 ELECTRO-PARTS LIST

- CAPACITORS: IN  $\mu$ F UNLESS OTHERWISE NOTED p: pF
- RESISTORS: IN  $\Omega$ ,  $\frac{1}{4}$ W UNLESS OTHERWISE NOTED k: k $\Omega$ , M: M $\Omega$

#### CAPACITORS

Symbol	Description	Part No.	
C1	Electrolytic 1,000 35V	RCH-010-0	
C2	MP 1+2.8 250V	RCL-015-0	
C3	MP 0.5+4 250V	RCL-010-0	
C4	MP 0.5+4 250V	RCL-010-0	

#### RESISTORS

Symbol	Description	Part No.	
R1	Wire wound 2k 20W	RCN-023-0	Adjustable type
R2	Wire wound 500 20W	RCN-022-0	Adjustable type
R3	Wire wound 300 20W	RCN-021-0	Adjustable type
R4	Wire wound 100 20W	RCN-020-0	Adjustable type
R001	Carbon film 1.5k	RD $\frac{1}{4}$ PS 152J	
R002	Carbon film 100k	RD $\frac{1}{4}$ PS 104J	
R003	Carbon film 100k	RD $\frac{1}{4}$ PS 104J	
R004	Carbon film 1.5k	RD $\frac{1}{4}$ PS 152J	
R009	Carbon film 22k	RD $\frac{1}{4}$ PS 223J	
R010	Carbon film 22k	RD $\frac{1}{4}$ PS 223J	
R013	Carbon film 3k	RD $\frac{1}{4}$ PS 302J	
R014	Carbon film 6.2k	RD $\frac{1}{4}$ PS 622J	
VR1/VR3	Variable resistor 10k-A dual	RCV-014-0	Rec. L
VR2/VR4	Variable resistor 10k-A dual	RCV-014-0	Rec. R
VR5/VR6	Variable resistor 50k-B dual	RCV-012-A	P.B.

#### SEMICONDUCTORS

Symbol	Description	Part No.	
Q1	Transistor 2SC1444-O or Y		
D1	Diode W06B		
D2	Diode W06B		
D3	Diode W06B		

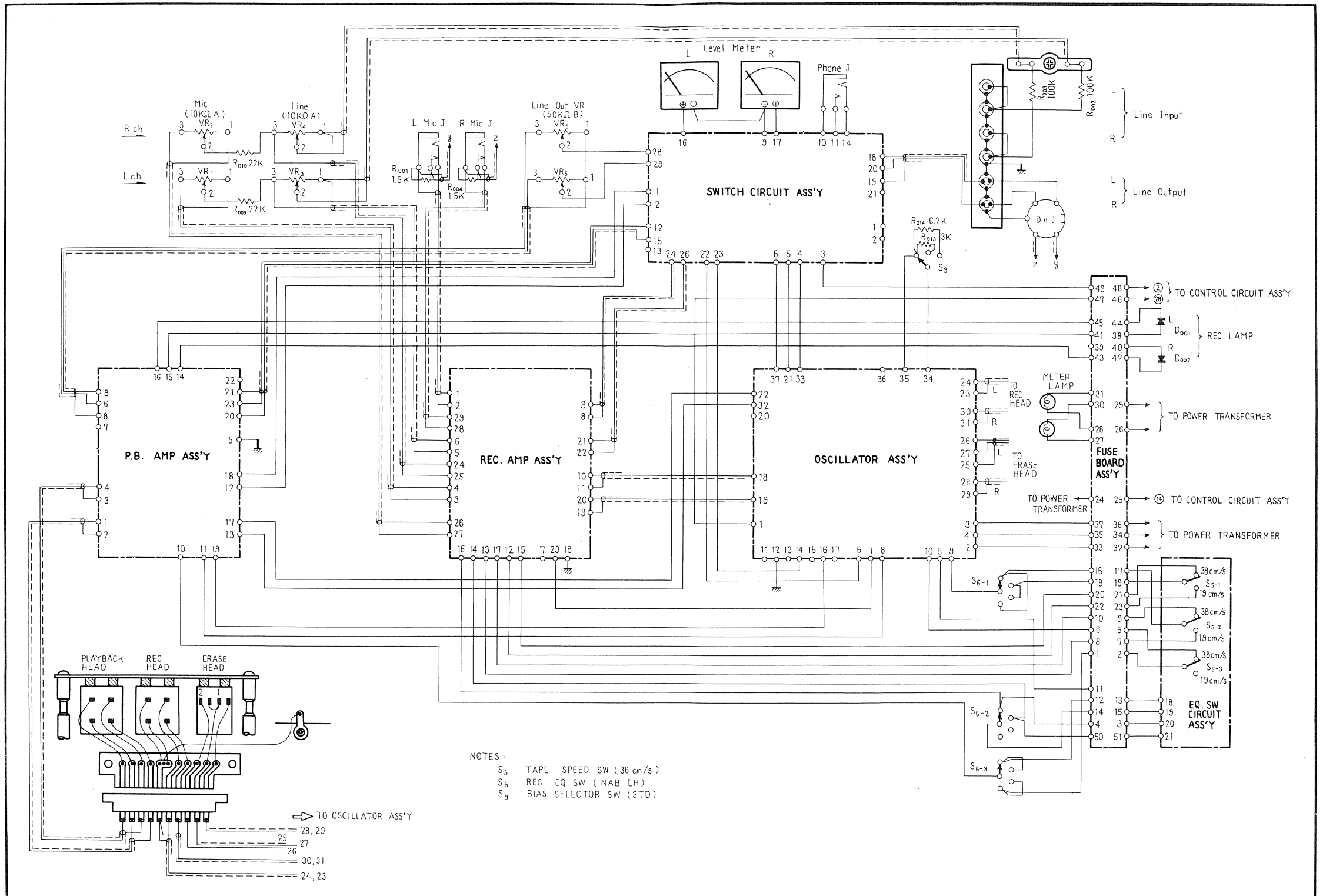
#### SWITCHES

Symbol	Description	Part No.	
S6	Rotary switch (EQ)	RSB-011-0	
S9	Rotary switch (BIAS)	RSB-008-0	
S13, S14	Slide switch (Line frequency)	RSH-015-A	
S15	Microswitch (Shut-off)	RSF-013-0	
S20	Lever switch (PAUSE)	RSK-025-0	

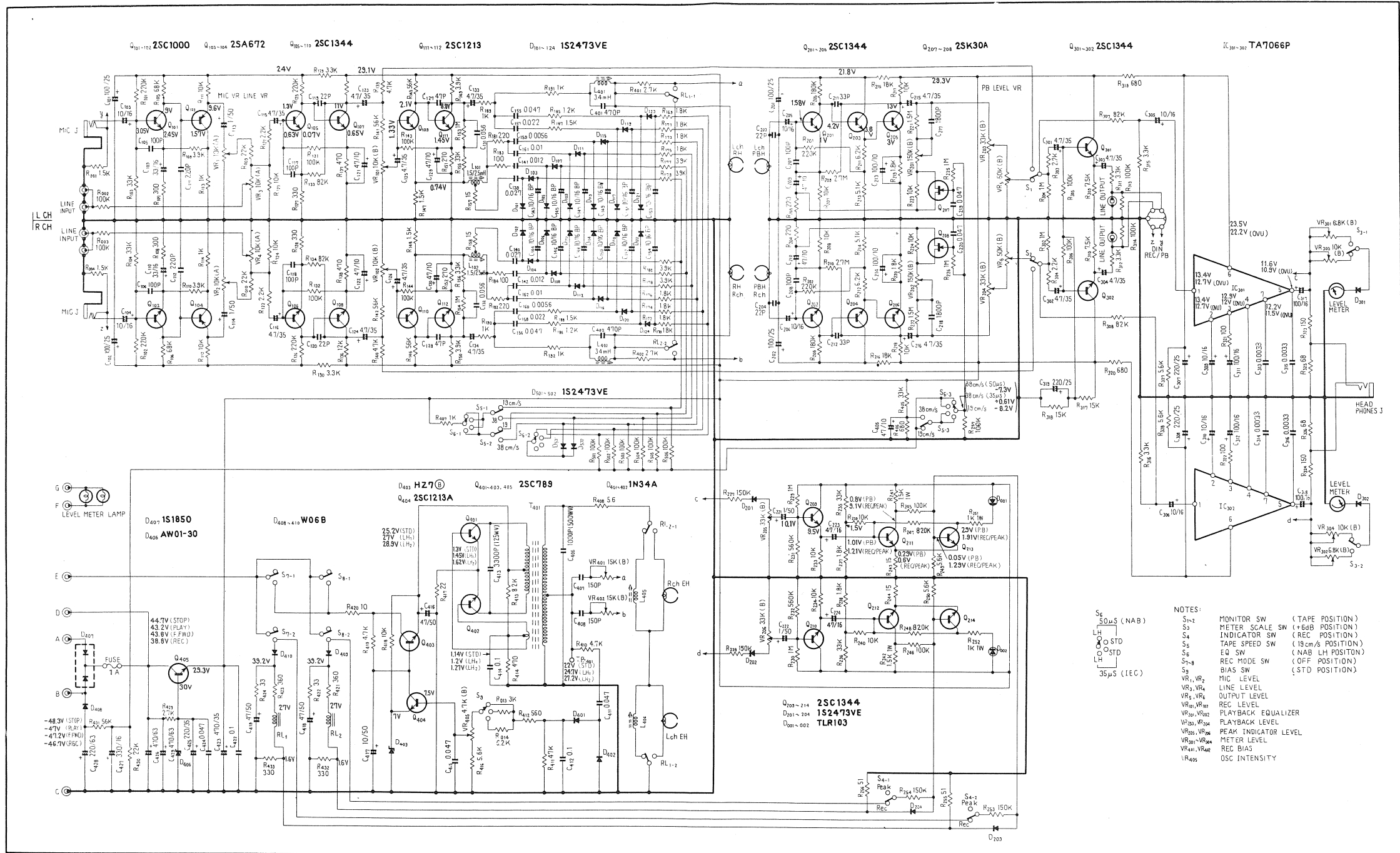
**OTHERS**

Symbol	Description	Part No.	
	Control circuit assembly	RWG-045-A	
	EQ. SW assembly	RWS-021-0	
	SW circuit assembly	RWS-017-0	
	PB amplifier assembly	RWF-023-0	
	REC amplifier assembly	RWF-021-0	
	Oscillator assembly	RWA-013-B	
	Fuse board assembly	RWX-046-A	
	Shut-off switch board assembly	RWX-047-0	
	Motor fuse board assembly	RWX-048-0	
	REC lamp board assembly	RWX-049-0	
	Head unit	RWX-044-0	Including heads
T1	Power transformer	RTT-048-A	
M1	Reel motor	RXM-015-0	
M2	Reel motor	RXM-015-0	
M3	Capstan motor (A)	RXM-012-0	
	Fuse holder (Line voltage selector)	AKR-001-0	
	Level meter	RAW-020-A	
	Phone jack (MIC)	K72-024-0	Microphone
	Phone jack A (PHONES)	RKN-002-0	Headphones
	Connector socket (DIN type 5P)	RKP-006-0	
	Phono jack A (6-jacks)	RKB-004-0	
	AC socket	RKP-003-A	
F1	Fuse 2A	REK-022-0	
CR3	Spark killer	RWX-030-0	
CR4	Spark killer	RWX-030-0	
SL1	Brake release solenoid	RXP-020-0	
SL2	Brake release solenoid	RXP-020-0	
SL3	Pinch roller pressure solenoid	RXP-011-D	
SL601	Release solenoid	RXP-019-A	Function button
	AC power cord	RDG-007-0	

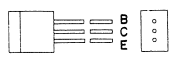
9.2 CONNECTION DIAGRAM (AMPLIFIER)



### 9.3 SCHEMATIC DIAGRAM (AMPLIFIER)



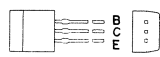
2SA672  
2SC1344



2SC1000



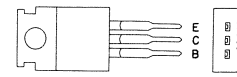
2SC1213  
2SC1213A



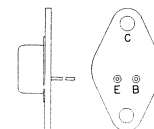
2SK30A



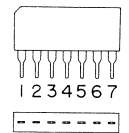
2SC789



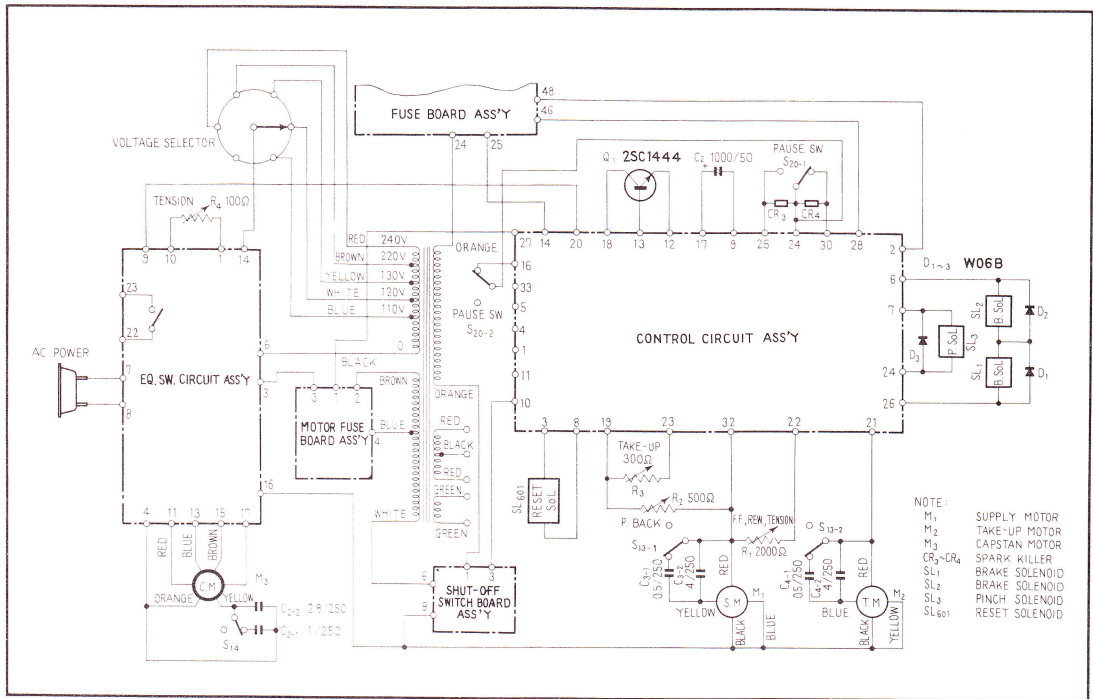
2SC1444



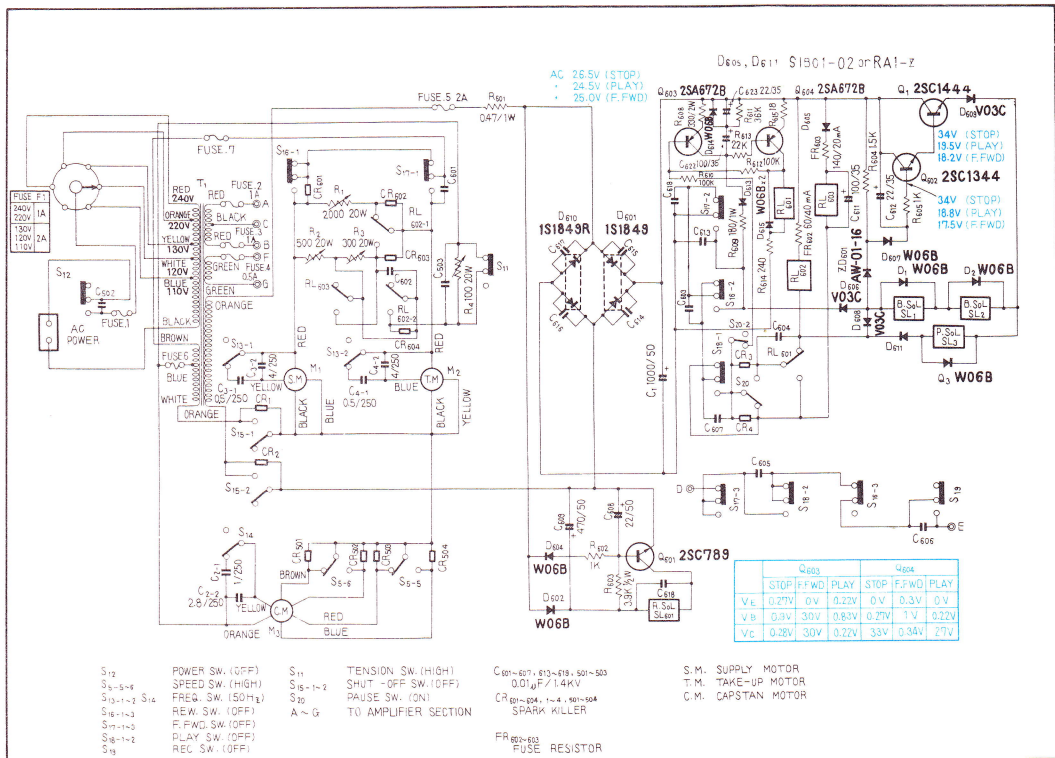
TA7066P



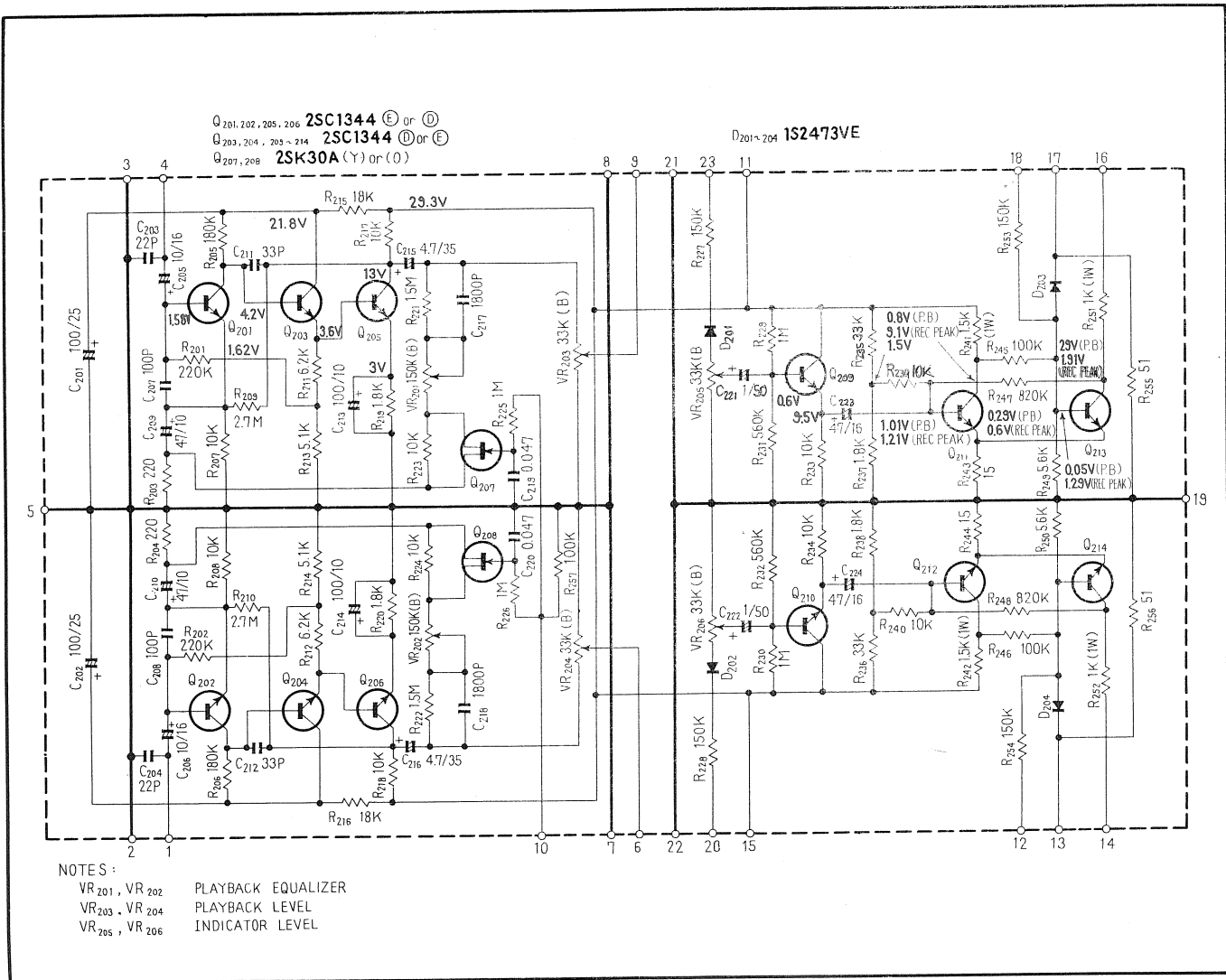
9.4 CONNECTION DIAGRAM (CONTROL)



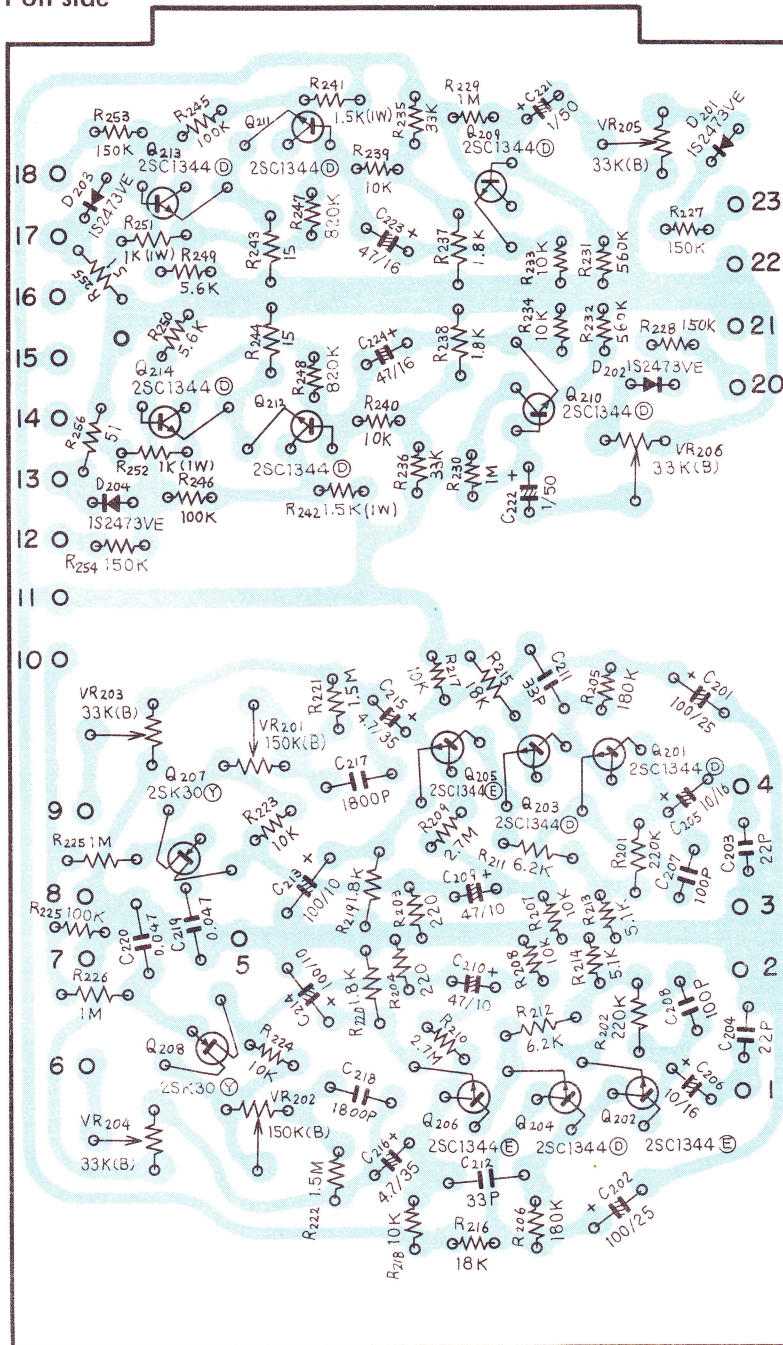
9.5 SCHEMATIC DIAGRAM (CONTROL)



9.6 PB AMPLIFIER ASSEMBLY (RWF-023-0)



Foil side



2SC1344

2SK30A



- CAPACITORS: IN  $\mu$ F UNLESS OTHERWISE NOTED p: pF
- RESISTORS: IN  $\Omega$ ,  $\frac{1}{2}$ W UNLESS OTHERWISE NOTED k: k $\Omega$ , M: M $\Omega$

## Parts List of PB Amplifier Assembly

### CAPACITORS

Symbol	Description			Part No.	
C201	Electrolytic	100	25V	CEA 101P 25	
C202	Electrolytic	100	25V	CEA 101P 25	
C203	Styrol	22p	50V	RCE-019-0	
C204	Styrol	22p	50V	RCE-019-0	
C205	Electrolytic	10	16V	CSZA 100M 16	Tantalum
C206	Electrolytic	10	16V	CSZA 100M 16	Tantalum
C207	Styrol	100p	50V	RCE-003-0	
C208	Styrol	100p	50V	RCE-003-0	
C209	Electrolytic	47	10V	CEA 470P 10	
C210	Electrolytic	47	10V	CEA 470P 10	
C211	Styrol	33p	50V	RCE-016-0	
C212	Styrol	33p	50V	RCE-016-0	
C213	Electrolytic	100	10V	CEA 101P 10	
C214	Electrolytic	100	10V	CEA 101P 10	
C215	Electrolytic	4.7	35V	CEA 4R7P 35	
C216	Electrolytic	4.7	35V	CEA 4R7P 35	
C217	Mylar	0.0018	50V	CQMA 182K 50	
C218	Mylar	0.0018	50V	CQMA 182K 50	
C219	Mylar	0.047	50V	CQMA 473K 50	
C220	Mylar	0.047	50V	CQMA 473K 50	
C221	Electrolytic	1	50V	CEA 010P 50	
C222	Electrolytic	1	50V	CEA 010P 50	
C223	Electrolytic	47	16V	CEA 470P 16	
C224	Electrolytic	47	16V	CEA 470P 16	

### RESISTORS AND POTENTIOMETERS

Symbol	Description			Part No.	
R201	Carbon film	220k		RD $\frac{1}{4}$ VS 224J	
R202	Carbon film	220k		RD $\frac{1}{4}$ VS 224J	
R203	Carbon film	220		RD $\frac{1}{4}$ VS 221J	
R204	Carbon film	220		RD $\frac{1}{4}$ VS 221J	
R205	Carbon film	180k		RD $\frac{1}{4}$ VS 184J	
R206	Carbon film	180k		RD $\frac{1}{4}$ VS 184J	
R207	Carbon film	10k		RD $\frac{1}{4}$ VS 103J	
R208	Carbon film	10k		RD $\frac{1}{4}$ VS 103J	
R209	Carbon film	2.7M		RD $\frac{1}{4}$ PS 275J	
R210	Carbon film	2.7M		RD $\frac{1}{4}$ PS 275J	
R211	Carbon film	6.2k		RD $\frac{1}{4}$ VS 622J	
R212	Carbon film	6.2k		RD $\frac{1}{4}$ VS 622J	
R213	Carbon film	5.1k		RD $\frac{1}{4}$ VS 512J	
R214	Carbon film	5.1k		RD $\frac{1}{4}$ VS 512J	
R215	Carbon film	18k		RD $\frac{1}{4}$ VS 183J	



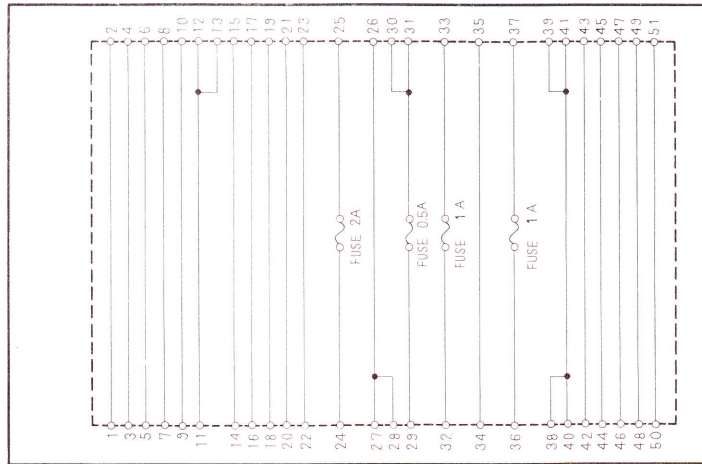
Symbol	Description	Part No.
R216	Carbon film 18k	RD¼VS 183J
R217	Carbon film 10k	RD¼VS 103J
R218	Carbon film 10k	RD¼VS 103J
R219	Carbon film 1.8k	RD¼VS 182J
R220	Carbon film 1.8k	RD¼VS 182J
R221	Carbon film 1.5M	RD¼VS 155J
R222	Carbon film 1.5M	RD¼VS 155J
R223	Carbon film 10k	RD¼VS 103J
R224	Carbon film 10k	RD¼VS 103J
R225	Carbon film 1M	RD¼VS 105J
R226	Carbon film 1M	RD¼VS 105J
R227	Carbon film 150k	RD¼VS 154J
R228	Carbon film 150k	RD¼VS 154J
R229	Carbon film 1M	RD¼VS 105J
R230	Carbon film 1M	RD¼VS 105J
R231	Carbon film 560k	RD¼VS 564J
R232	Carbon film 560k	RD¼VS 564J
R233	Carbon film 10k	RD¼VS 103J
R234	Carbon film 10k	RD¼VS 103J
R235	Carbon film 33k	RD¼VS 333J
R236	Carbon film 33k	RD¼VS 333J
R237	Carbon film 1.8k	RD¼VS 182J
R238	Carbon film 1.8k	RD¼VS 182J
R239	Carbon film 10k	RD¼VS 103J
R240	Carbon film 10k	RD¼VS 103J
R241	Metal oxide 1.5k 1W	RS1P 152J
R242	Metal oxide 1.5k 1W	RS1P 152J
R243	Carbon film 15	RD¼VS 150J
R244	Carbon film 15	RD¼VS 150J
R245	Carbon film 100k	RD¼VS 104J
R246	Carbon film 100k	RD¼VS 104J
R247	Carbon film 820k	RD¼VS 824J
R248	Carbon film 820k	RD¼VS 824J
R249	Carbon film 5.6k	RD¼VS 562J
R250	Carbon film 5.6k	RD¼VS 562J
R251	Metal oxide 1k 1W	RS1P 102J
R252	Metal oxide 1k 1W	RS1P 102J
R253	Carbon film 150k	RD¼VS 154J
R254	Carbon film 150k	RD¼VS 154J
R255	Carbon film 51	RD¼VS 510J
R256	Carbon film 51	RD¼VS 510J
R257	Carbon film 100k	RD¼VS 104J
VR201	Semi-fixed 150k-B	C92-860-0
VR202	Semi-fixed 150k-B	C92-860-0
VR203	Semi-fixed 33k-B	C81-426-0
VR204	Semi-fixed 33k-B	C81-426-0
VR205	Semi-fixed 33k-B	C81-426-0
VR206	Semi-fixed 33k-B	C81-426-0

Continued on the Next Page.

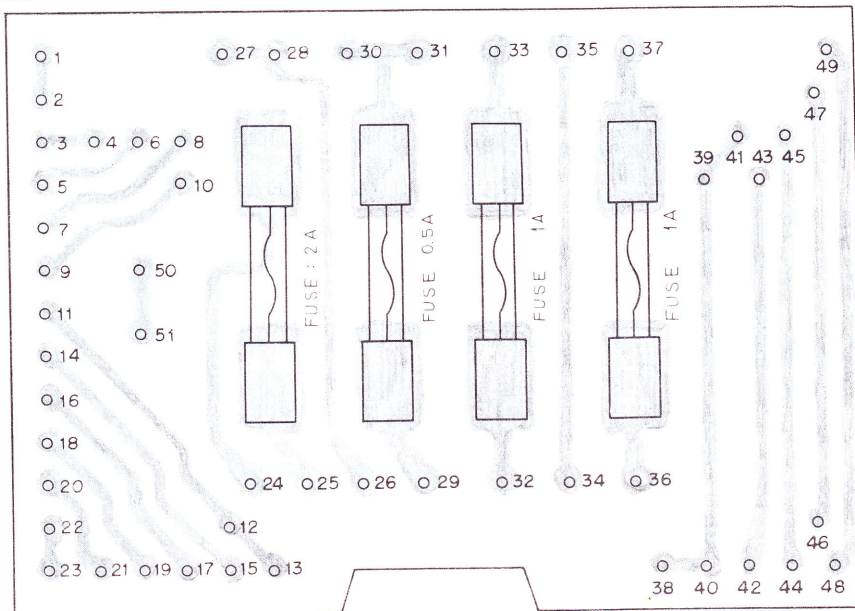
## SEMICONDUCTORS

Symbol	Description	Part No.
Q201	Transistor	2SC1344-E (or D)
Q202	Transistor	2SC1344-E (or D)
Q203	Transistor	2SC1344-D (or E)
Q204	Transistor	2SC1344-D (or E)
Q205	Transistor	2SC1344-E (or D)
Q206	Transistor	2SC1344-E (or D)
Q207	FET	2SK30A-Y (or O)
Q208	FET	2SK30A-Y (or O)
Q209	Transistor	2SC1344-D (or E)
Q210	Transistor	2SC1344-D (or E)
Q211	Transistor	2SC1344-D (or E)
Q212	Transistor	2SC1344-D (or E)
Q213	Transistor	2SC1344-D (or E)
Q214	Transistor	2SC1344-D (or E)
D201	Diode	1S2473VE
D202	Diode	1S2473VE
D203	Diode	1S2473VE
D204	Diode	1S2473VE

9.7 FUSE BOARD ASSEMBLY (RWX-046-A)

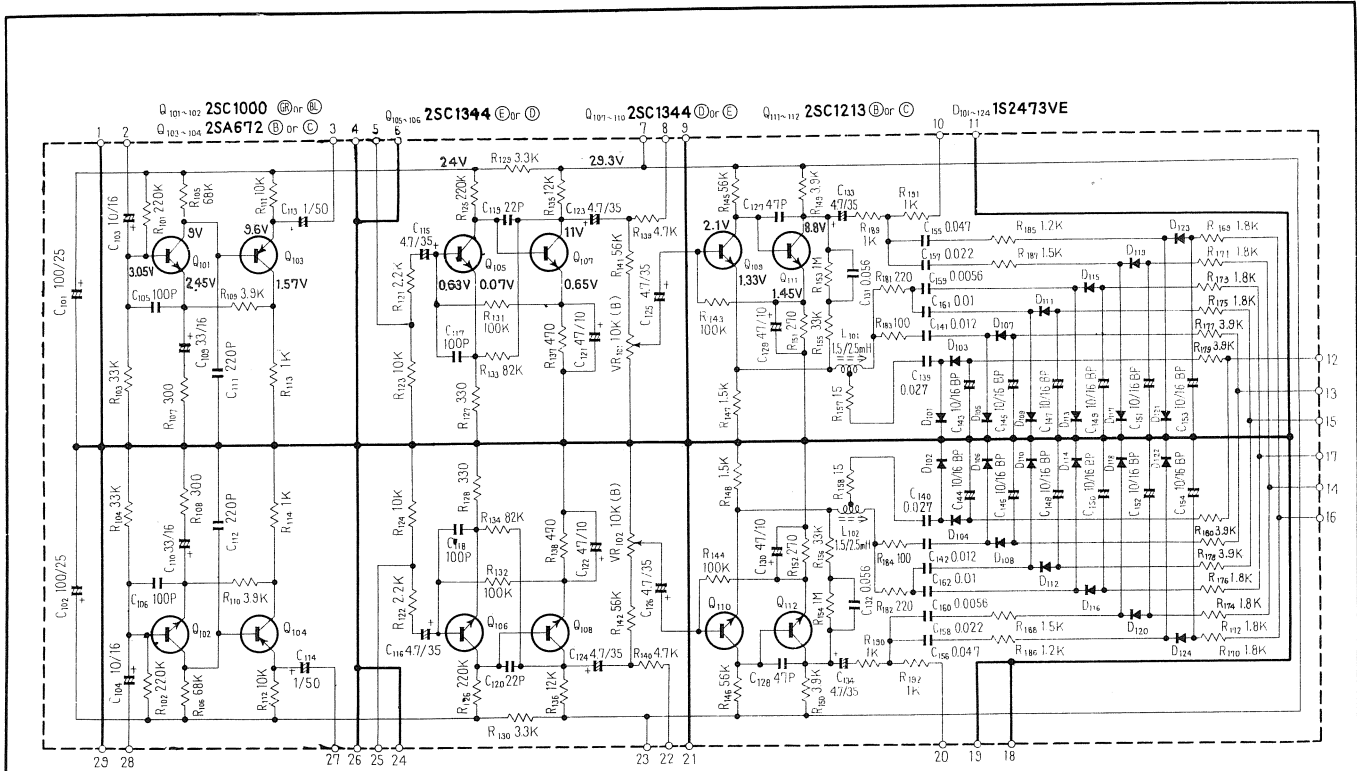


Foil side



Parts List of Fuse Board Assembly

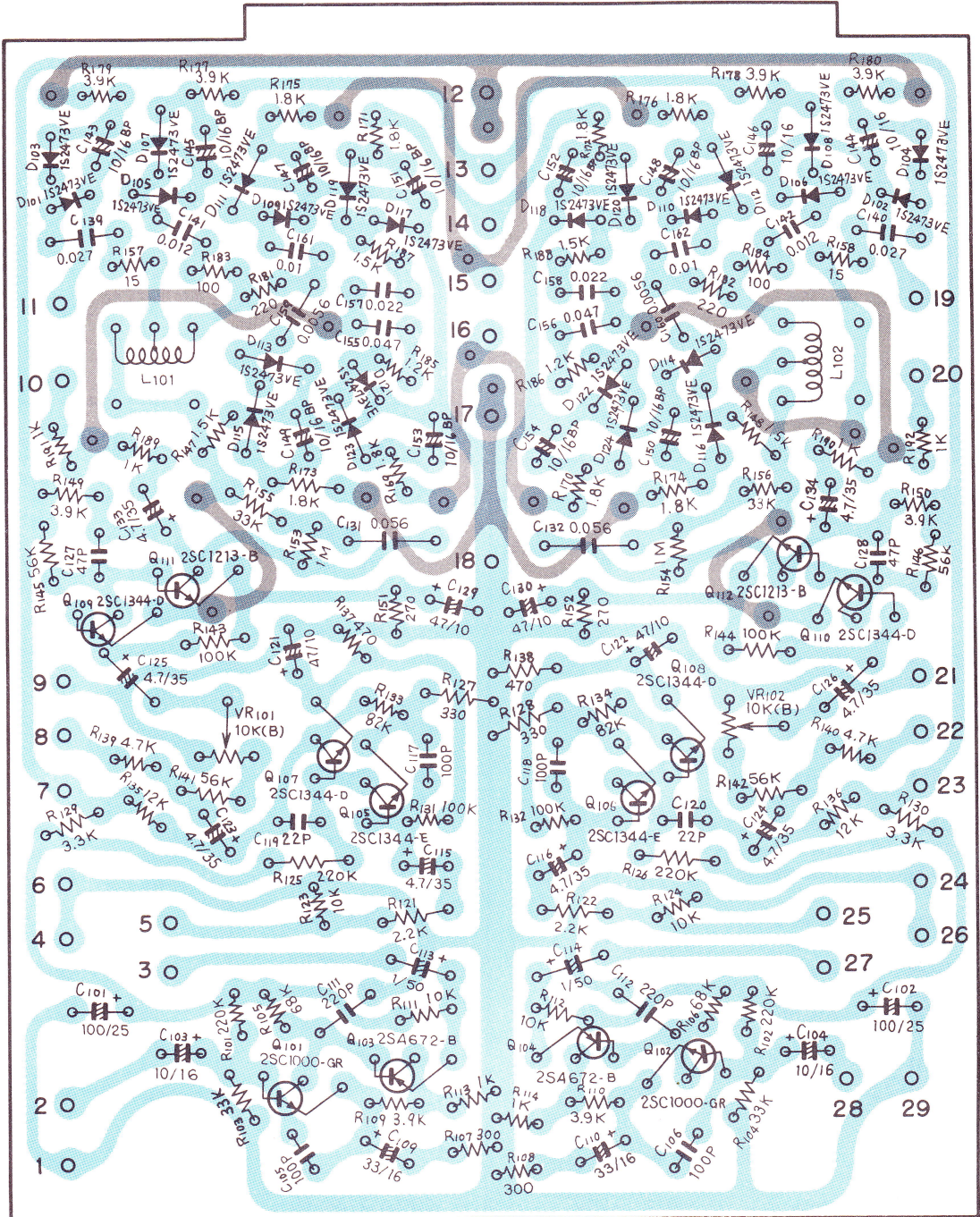
Symbol	Description	Part No.	
	Fuse holder	K91-006-0	
	Fuse 0.5A	REK-020-0	
	Fuse 2A	REK-022-0	
	Fuse 1A	REK-021-0	



NOTES:  
 VR<sub>101</sub> REC LEVEL  
 VR<sub>102</sub> REC LEVEL  
 C<sub>143</sub>-C<sub>154</sub> BI-POLAR CAPACITOR

TERMINAL No.	19 cm/s		36 cm/s (50 μs)		38 cm/s (35 μs)	
	STD	LH	STD	LH	STD	LH
12	20.2V	- 8.2V	- 7.3V	- 7.3V	- 9.9V	- 9.9V
13	- 8.2V	20.2V	- 7.3V	- 7.3V	- 9.9V	- 9.9V
14	- 8.2V	- 8.2V	- 9.8V	- 7.3V	- 9.9V	- 9.9V
15	- 8.2V	- 8.2V	10.5V	- 7.3V	15V	- 9.9V
16	- 8.2V	- 8.2V	- 7.3V	9.8V	- 9.9V	- 9.9V
17	- 8.2V	- 8.2V	- 7.3V	10.5V	- 9.9V	15V

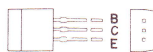
Foil side



2SA672  
2SC1344

2SC1213

2SC1000



- CAPACITORS: IN  $\mu\text{F}$  UNLESS OTHERWISE NOTED p: pF
- RESISTORS: IN  $\Omega$ ,  $\frac{1}{4}\text{W}$  UNLESS OTHERWISE NOTED k: k $\Omega$ , M: M $\Omega$

## Parts List of REC Amplifier assembly

### CAPACITORS

Symbol	Description			Part No.	
C101	Electrolytic	100	25V	CEA 101P 25	Tantalum Tantalum
C102	Electrolytic	100	25V	CEA 101P 25	
C103	Electrolytic	10	16V	CSZA 100M 16	
C104	Electrolytic	10	16V	CSZA 100M 16	
C105	Styrol	100p	50V	RCE-003-0	
C106	Styrol	100p	50V	RCE-003-0	
C107	.....				
C108	.....				
C109	Electrolytic	33	16V	CEA 330P 16	
C110	Electrolytic	33	16V	CEA 330P 16	
C111	Styrol	220p	50V	RCE-006-0	
C112	Styrol	220p	50V	RCE-006-0	
C113	Electrolytic	1	50V	CEA 010P 50	
C114	Electrolytic	1	50V	CEA 010P 50	
C115	Electrolytic	4.7	35V	CEA 4R7P 35	
C116	Electrolytic	4.7	35V	CEA 4R7P 35	
C117	Styrol	100p	50V	RCE-003-0	
C118	Styrol	100p	50V	RCE-003-0	
C119	Styrol	22p	50V	RCE-019-0	
C120	Styrol	22p	50V	RCE-019-0	
C121	Electrolytic	47	10V	CEA 470P 10	
C122	Electrolytic	47	10V	CEA 470P 10	
C123	Electrolytic	4.7	35V	CEA 4R7P 35	
C124	Electrolytic	4.7	35V	CEA 4R7P 35	
C125	Electrolytic	4.7	35V	CEA 4R7P 35	
C126	Electrolytic	4.7	35V	CEA 4R7P 35	
C127	Styrol	47p	50V	RCE-012-0	
C128	Styrol	47p	50V	RCE-012-0	
C129	Electrolytic	47	10V	CEA 470P 10	
C130	Electrolytic	47	10V	CEA 470P 10	
C131	Mylar	0.056	50V	CQMA 563K 50	
C132	Mylar	0.056	50V	CQMA 563K 50	
C133	Electrolytic	4.7	35V	CEA 4R7P 35	
C134	Electrolytic	4.7	35V	CEA 4R7P 35	
C135~C138 Vacancies					
C139	Mylar	0.027	50V	CQMA 273K 50	
C140	Mylar	0.027	50V	CQMA 273K 50	
C141	Mylar	0.012	50V	CQMA 123K 50	
C142	Mylar	0.012	50V	CQMA 123K 50	
C143	Electrolytic	10	16V	RCH-011-0	Bi-polar
C144	Electrolytic	10	16V	RCH-011-0	Bi-polar
C145	Electrolytic	10	16V	RCH-011-0	Bi-polar
C146	Electrolytic	10	16V	RCH-011-0	Bi-polar
C147	Electrolytic	10	16V	RCH-011-0	Bi-polar
C148	Electrolytic	10	16V	RCH-011-0	Bi-polar

Symbol	Description			Part No.	
C149	Electrolytic	10	16V	RCH-011-0	Bi-polar
C150	Electrolytic	10	16V	RCH-011-0	Bi-polar
C151	Electrolytic	10	16V	RCH-011-0	Bi-polar
C152	Electrolytic	10	16V	RCH-011-0	Bi-polar
C153	Electrolytic	10	16V	RCH-011-0	Bi-polar
C154	Electrolytic	10	16V	RCH-011-0	Bi-polar
C155	Mylar	0.047	50V	CQMA 473K 50	
C156	Mylar	0.047	50V	CQMA 473K 50	
C157	Mylar	0.022	50V	CQMA 223K 50	
C158	Mylar	0.022	50V	CQMA 223K 50	
C159	Mylar	0.0056	50V	CQMA 562K 50	
C160	Mylar	0.0056	50V	CQMA 562K 50	
C161	Mylar	0.01	50V	CQMA 103K 50	
C162	Mylar	0.01	50V	CQMA 103K 50	

RESISTORS AND POTENTIOMETERS

Symbol	Description			Part No.	
R101	Carbon film	220k		RD $\frac{1}{4}$ VS 224J	
R102	Carbon film	220k		RD $\frac{1}{4}$ VS 224J	
R103	Carbon film	33k		RD $\frac{1}{4}$ VS 333J	
R104	Carbon film	33k		RD $\frac{1}{4}$ VS 333J	
R105	Carbon film	68k		RD $\frac{1}{4}$ VS 683J	
R106	Carbon film	68k		RD $\frac{1}{4}$ VS 683J	
R107	Carbon film	300		RD $\frac{1}{4}$ VS 301J	
R108	Carbon film	300		RD $\frac{1}{4}$ VS 301J	
R109	Carbon film	3.9k		RD $\frac{1}{4}$ VS 392J	
R110	Carbon film	3.9k		RD $\frac{1}{4}$ VS 392J	
R111	Carbon film	10k		RD $\frac{1}{4}$ VS 103J	
R112	Carbon film	10k		RD $\frac{1}{4}$ VS 103J	
R113	Carbon film	1k		RD $\frac{1}{4}$ VS 102J	
R114	Carbon film	1k		RD $\frac{1}{4}$ VS 102J	
	R115~R120 Vacancies				
R121	Carbon film	2.2k		RD $\frac{1}{4}$ VS 222J	
R122	Carbon film	2.2k		RD $\frac{1}{4}$ VS 222J	
R123	Carbon film	10k		RD $\frac{1}{4}$ VS 103J	
R124	Carbon film	10k		RD $\frac{1}{4}$ VS 103J	
R125	Carbon film	220k		RD $\frac{1}{4}$ VS 224J	
R126	Carbon film	220k		RD $\frac{1}{4}$ VS 224J	
R127	Carbon film	330		RD $\frac{1}{4}$ VS 331J	
R128	Carbon film	330		RD $\frac{1}{4}$ VS 331J	
R129	Carbon film	3.3k		RD $\frac{1}{4}$ VS 332J	
R130	Carbon film	3.3k		RD $\frac{1}{4}$ VS 332J	
R131	Carbon film	100k		RD $\frac{1}{4}$ VS 104J	
R132	Carbon film	100k		RD $\frac{1}{4}$ VS 104J	
R133	Carbon film	82k		RD $\frac{1}{4}$ VS 823J	
R134	Carbon film	82k		RD $\frac{1}{4}$ VS 823J	
R135	Carbon film	12k		RD $\frac{1}{4}$ VS 123J	

Continued on the Next Page.

Symbol	Description	Part No.
R136	Carbon film 12k	RD¼VS 123J
R137	Carbon film 470	RD¼VS 471J
R138	Carbon film 470	RD¼VS 471J
R139	Carbon film 4.7k	RD¼VS 472J
R140	Carbon film 4.7k	RD¼VS 472J
R141	Carbon film 56k	RD¼VS 563J
R142	Carbon film 56k	RD¼VS 563J
R143	Carbon film 100k	RD¼VS 104J
R144	Carbon film 100k	RD¼VS 104J
R145	Carbon film 56k	RD¼VS 563J
R146	Carbon film 56k	RD¼VS 563J
R147	Carbon film 1.5k	RD¼VS 152J
R148	Carbon film 1.5k	RD¼VS 152J
R149	Carbon film 3.9k	RD¼VS 392J
R150	Carbon film 3.9k	RD¼VS 392J
R151	Carbon film 270	RD¼VS 271J
R152	Carbon film 270	RD¼VS 271J
R153	Carbon film 1M	RD¼VS 105J
R154	Carbon film 1M	RD¼VS 105J
R155	Carbon film 33k	RD¼VS 333J
R156	Carbon film 33k	RD¼VS 333J
R157	Carbon film 15	RD¼VS 150J
R158	Carbon film 15	RD¼VS 150J
	R159~R168 Vacancies	
R169	Carbon film 1.8k	RD¼VS 182J
R170	Carbon film 1.8k	RD¼VS 182J
R171	Carbon film 1.8k	RD¼VS 182J
R172	Carbon film 1.8k	RD¼VS 182J
R173	Carbon film 1.8k	RD¼VS 182J
R174	Carbon film 1.8k	RD¼VS 182J
R175	Carbon film 1.8k	RD¼VS 182J
R176	Carbon film 1.8k	RD¼VS 182J
R177	Carbon film 3.9k	RD¼VS 392J
R178	Carbon film 3.9k	RD¼VS 392J
R179	Carbon film 3.9k	RD¼VS 392J
R180	Carbon film 3.9k	RD¼VS 392J
R181	Carbon film 220	RD¼VS 221J
R182	Carbon film 220	RD¼VS 221J
R183	Carbon film 100	RD¼VS 101J
R184	Carbon film 100	RD¼VS 101J
R185	Carbon film 1.2k	RD¼VS 122J
R186	Carbon film 1.2k	RD¼VS 122J
R187	Carbon film 1.5k	RD¼VS 152J
R188	Carbon film 1.5k	RD¼VS 152J
R189	Carbon film 1k	RD¼VS 102J
R190	Carbon film 1k	RD¼VS 102J
R191	Carbon film 1k	RD¼VS 102J
R192	Carbon film 1k	RD¼VS 102J
VR101	Semi-fixed 10k-B	C92-049-0
VR102	Semi-fixed 10k-B	C92-049-0



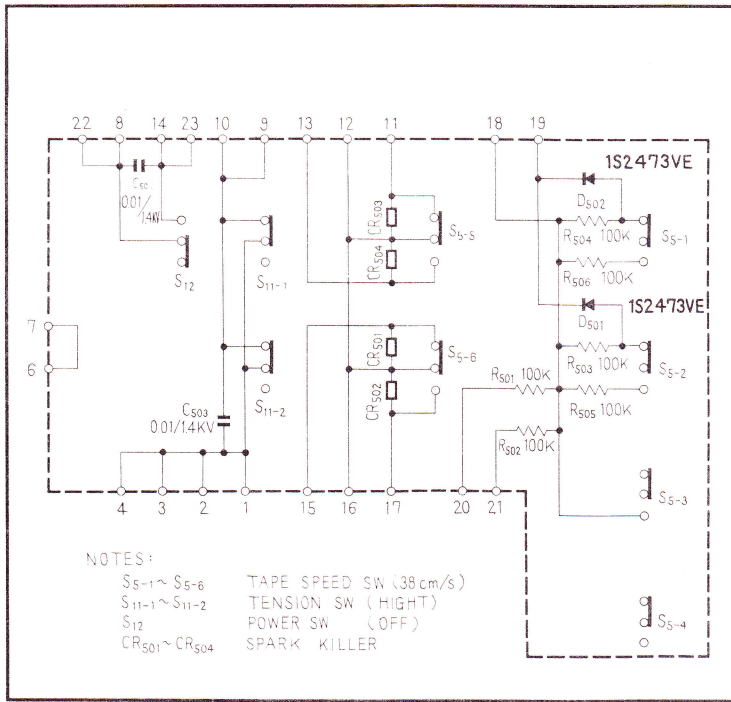
SEMICONDUCTORS

Symbol	Description	Part No.
Q101	Transistor 2SC1000—GR(or BL)	
Q102	Transistor 2SC1000—GR(or BL)	
Q103	Transistor 2SA672—B(or C)	
Q104	Transistor 2SA672—B(or C)	
Q105	Transistor 2SC1344—E(or D)	
Q106	Transistor 2SC1344—E(or D)	
Q107	Transistor 2SC1344—D(or E)	
Q108	Transistor 2SC1344—D(or E)	
Q109	Transistor 2SC1344—D(or E)	
Q110	Transistor 2SC1344—D(or E)	
Q111	Transistor 2SC1213—B(or C)	
Q112	Transistor 2SC1213—B(or C)	
D101	Diode 1S2473VE	
D102	Diode 1S2473VE	
D103	Diode 1S2473VE	
D104	Diode 1S2473VE	
D105	Diode 1S2473VE	
D106	Diode 1S2473VE	
D107	Diode 1S2473VE	
D108	Diode 1S2473VE	
D109	Diode 1S2473VE	
D110	Diode 1S2473VE	
D111	Diode 1S2473VE	
D112	Diode 1S2473VE	
D113	Diode 1S2473VE	
D114	Diode 1S2473VE	
D115	Diode 1S2473VE	
D116	Diode 1S2473VE	
D117	Diode 1S2473VE	
D118	Diode 1S2473VE	
D119	Diode 1S2473VE	
D120	Diode 1S2473VE	
D121	Diode 1S2473VE	
D122	Diode 1S2473VE	
D123	Diode 1S2473VE	
D124	Diode 1S2473VE	

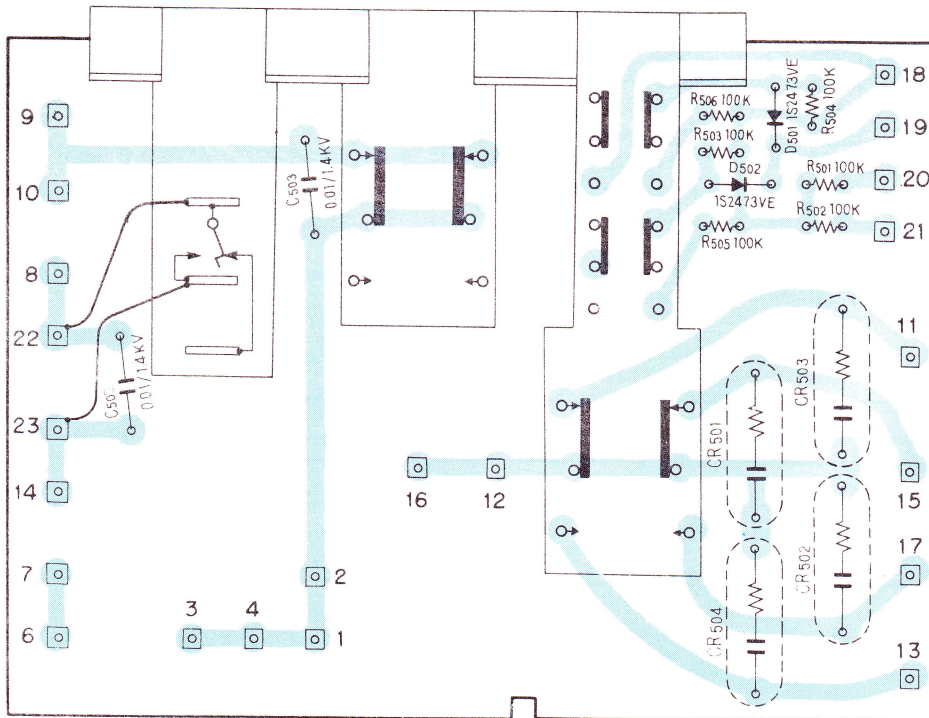
COILS

Symbol	Description	Part No.
L101	Peaking coil	RTF—011—0
L102	Peaking coil	RTF—011—0

# 9.9 EQ. SW ASSEMBLY (RWS-021-0)



## Foil Side



Parts List of EQ. SW Assembly

CAPACITORS

Symbol	Description			Part No.
C502	Ceramic	0.01	1.4kV	C43-003-0
C503	Ceramic	0.01	1.4kV	C43-003-0

RESISTORS

Symbol	Description			Part No.
R501	Carbon film	100k		RD¼VS 104J
R502	Carbon film	100k		RD¼VS 104J
R503	Carbon film	100k		RD¼VS 104J
R504	Carbon film	100k		RD¼VS 104J
R505	Carbon film	100k		RD¼VS 104J
R506	Carbon film	100k		RD¼VS 104J

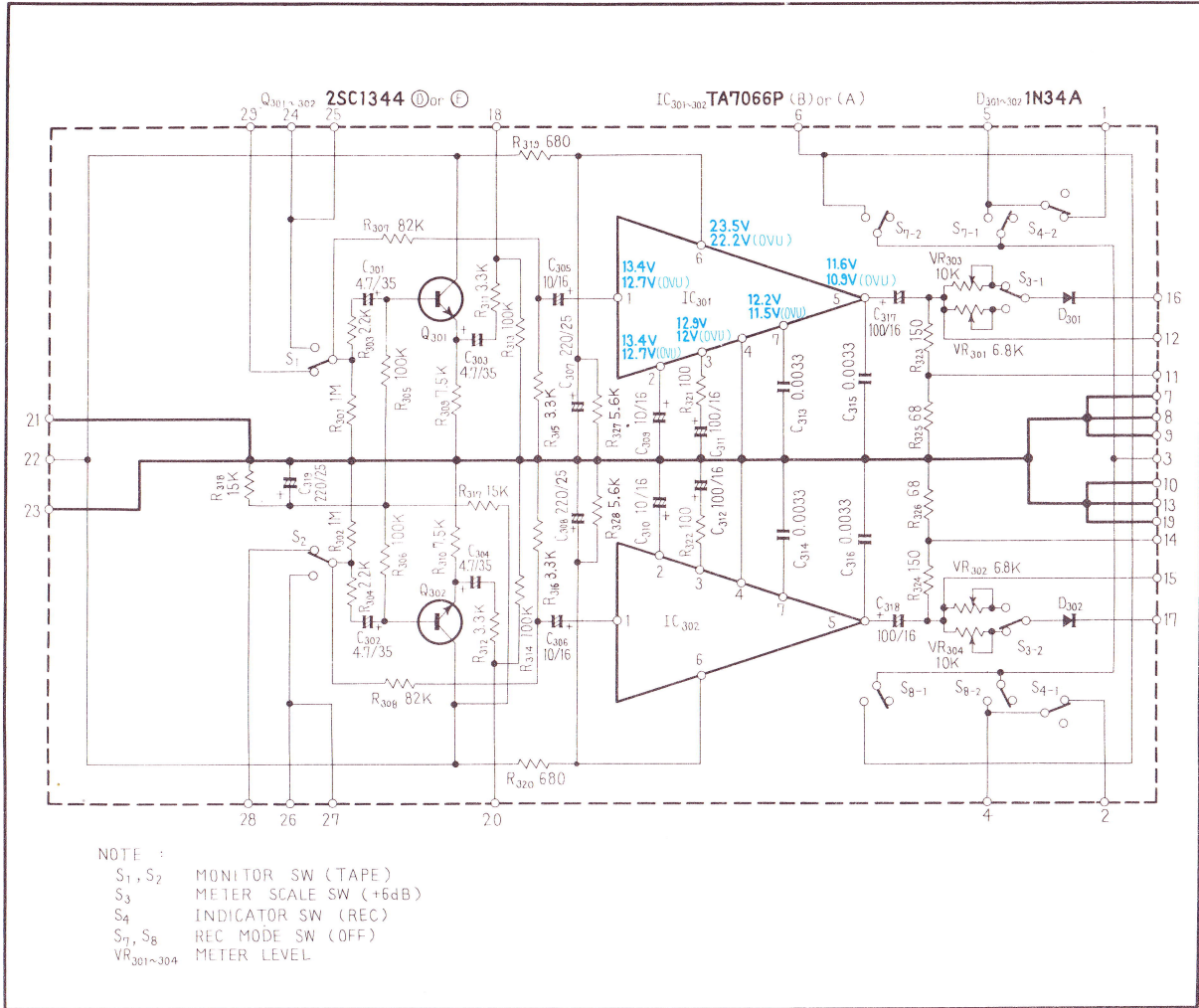
SEMICONDUCTORS

Symbol	Description			Part No.
D501	Diode	1S2473VE		
D502	Diode	1S2473VE		

OTHERS

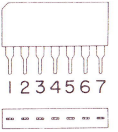
Symbol	Description			Part No.
CR501	Push switch			RSG-021-0
CR501	Spark killer			RWX-030-0
CR502	Spark killer			RWX-030-0
CR503	Spark killer			RWX-030-0
CR504	Spark killer			RWX-030-0

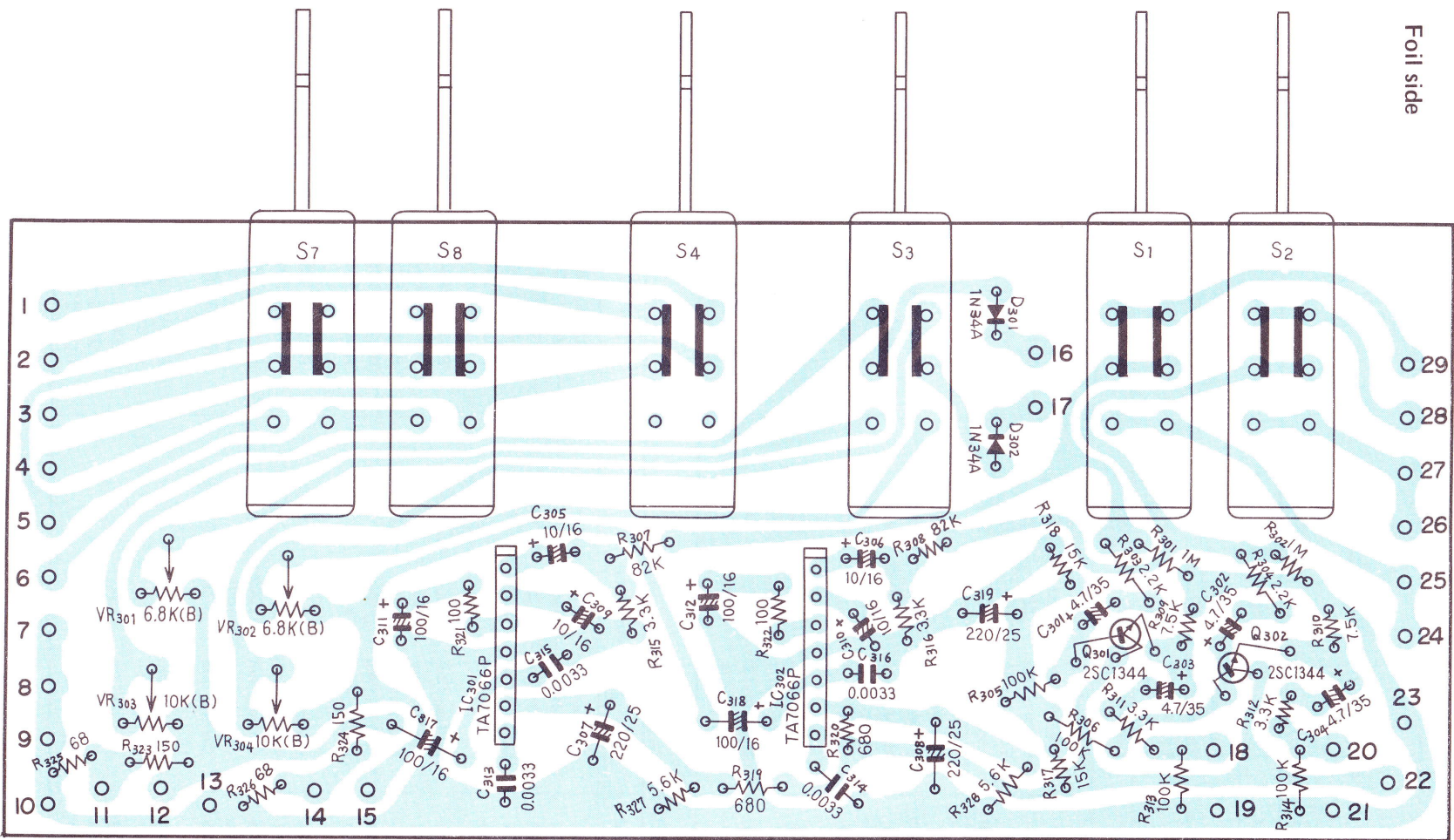
9.10 SW CIRCUIT ASSEMBLY (RWS-017-0)



2SC1344

TA7066P





Foil side

RT-1050

- CAPACITORS: IN  $\mu$ F UNLESS OTHERWISE NOTED p: pF
- RESISTORS: IN  $\Omega$ ,  $\frac{1}{2}$ W UNLESS OTHERWISE NOTED k: k $\Omega$ , M: M $\Omega$

## Parts List of SW Circuit Assembly

### CAPACITORS

Symbol	Description	Part No.
C301	Electrolytic 4.7 35V	CEA 4R7P 35
C302	Electrolytic 4.7 35V	CEA 4R7P 35
C303	Electrolytic 4.7 35V	CEA 4R7P 35
C304	Electrolytic 4.7 35V	CEA 4R7P 35
C305	Electrolytic 10 16V	CEA 100P 16
C306	Electrolytic 10 16V	CEA 100P 16
C307	Electrolytic 220 25V	CEA 221P 25
C308	Electrolytic 220 25V	CEA 221P 25
C309	Electrolytic 10 16V	CEA 100P 16
C310	Electrolytic 10 16V	CEA 100P 16
C311	Electrolytic 100 16V	CEA 101P 16
C312	Electrolytic 100 16V	CEA 101P 16
C313	Mylar 0.0033 50V	CQMA 332K 50
C314	Mylar 0.0033 50V	CQMA 332K 50
C315	Mylar 0.0033 50V	CQMA 332K 50
C316	Mylar 0.0033 50V	CQMA 332K 50
C317	Electrolytic 100 16V	CEA 101P 16
C318	Electrolytic 100 16V	CEA 101P 16
C319	Electrolytic 220 25V	CEA 221P 25

### RESISTORS

Symbol	Description	Part No.
R301	Carbon film 1M	RD $\frac{1}{4}$ VS 105J
R302	Carbon film 1M	RD $\frac{1}{4}$ VS 105J
R303	Carbon film 2.2k	RD $\frac{1}{4}$ VS 222J
R304	Carbon film 2.2k	RD $\frac{1}{4}$ VS 222J
R305	Carbon film 100k	RD $\frac{1}{4}$ VS 104J
R306	Carbon film 100k	RD $\frac{1}{4}$ VS 104J
R307	Carbon film 82k	RD $\frac{1}{4}$ VS 823J
R308	Carbon film 82k	RD $\frac{1}{4}$ VS 823J
R309	Carbon film 7.5k	RD $\frac{1}{4}$ VS 752J
R310	Carbon film 7.5k	RD $\frac{1}{4}$ VS 752J
R311	Carbon film 3.3k	RD $\frac{1}{4}$ VS 332J
R312	Carbon film 3.3k	RD $\frac{1}{4}$ VS 332J
R313	Carbon film 100k	RD $\frac{1}{4}$ VS 104J
R314	Carbon film 100k	RD $\frac{1}{4}$ VS 104J
R315	Carbon film 3.3k	RD $\frac{1}{4}$ VS 332J
R316	Carbon film 3.3k	RD $\frac{1}{4}$ VS 332J
R317	Carbon film 15k	RD $\frac{1}{4}$ VS 153J
R318	Carbon film 15k	RD $\frac{1}{4}$ VS 153J
R319	Carbon film 680	RD $\frac{1}{4}$ VS 681J
R320	Carbon film 680	RD $\frac{1}{4}$ VS 681J

Symbol	Description	Part No.
R321	Carbon film 100	RD¼VS 101J
R322	Carbon film 100	RD¼VS 101J
R323	Carbon film 150	RD¼VS 151J
R324	Carbon film 150	RD¼VS 151J
R325	Carbon film 68	RD¼VS 680J
R326	Carbon film 68	RD¼VS 680J
R327	Carbon film 5.6k	RD¼VS 562J
R328	Carbon film 5.6k	RD¼VS 562J

POTENTIOMETERS

Symbol	Description	Part No.
VR301	Semi-fixed 6.8k-B	RCP-001-0
VR302	Semi-fixed 6.8k-B	RCP-001-0
VR303	Semi-fixed 10k-B	C92-049-0
VR304	Semi-fixed 10k-B	C92-049-0

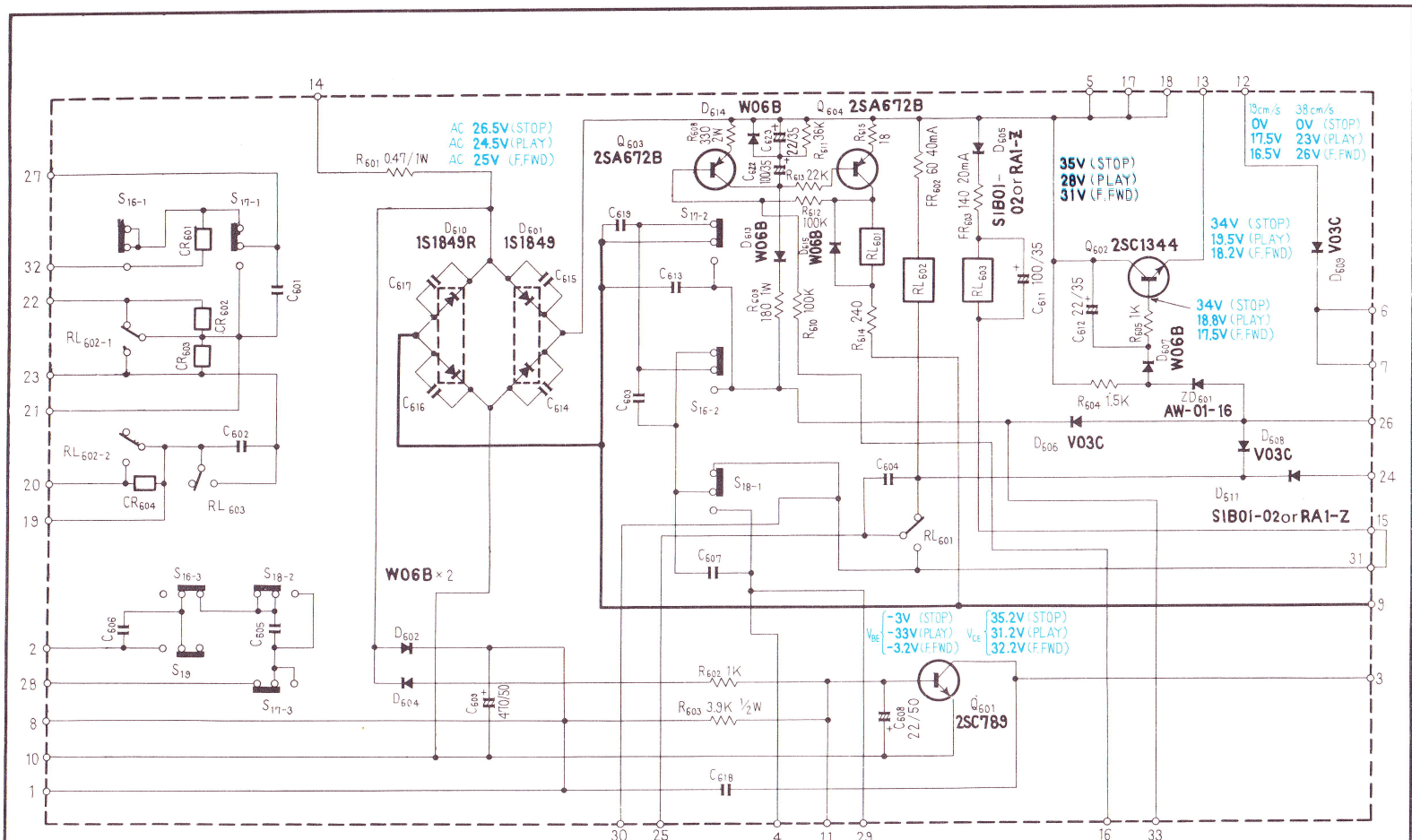
SEMICONDUCTORS

Symbol	Description	Part No.
Q301	Transistor 2SC1344-D(or E)	
Q302	Transistor 2SC1344-D(or E)	
D301	Diode 1N34A	
D302	Diode 1N34A	
IC301	IC TA7066-B(or A)	
IC302	IC TA7066-B(or A)	

SWITCH

Symbol	Description	Part No.
S1	Lever switch (MONITOR)	RSK-018-0
S2	Lever switch (MONITOR)	RSK-018-0
S3	Lever switch (METER)	RSK-018-0
S4	Lever switch (INDICATOR)	RSK-018-0
S7	Lever switch (REC MODE)	RSK-018-0
S8	Lever switch (REC MODE)	RSK-018-0

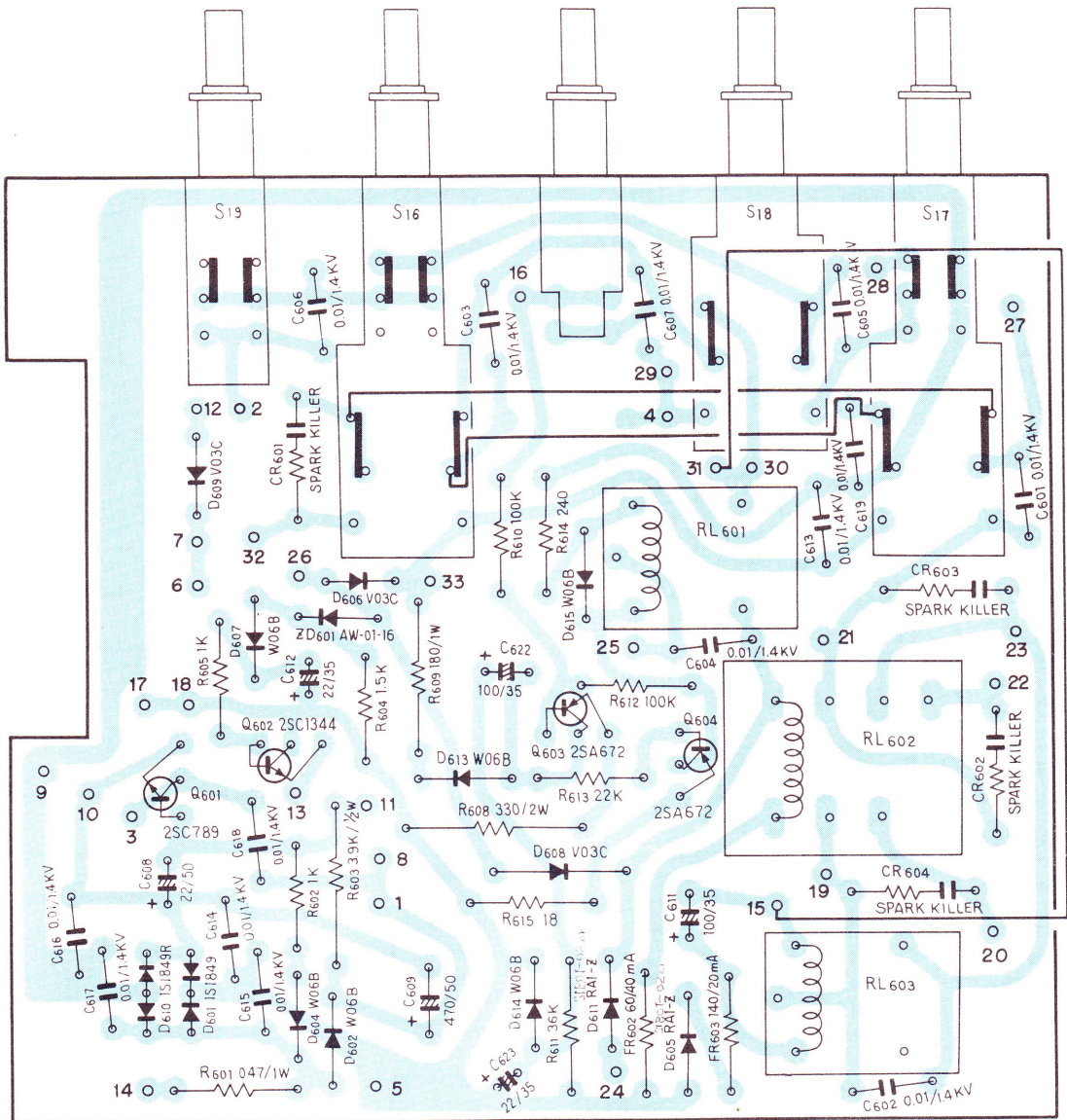
9.11 CONTROL CIRCUIT ASSEMBLY (RWG-045-A)



- NOTES :
- S<sub>16</sub> REW SW (OFF)
  - S<sub>17</sub> F.FWD SW (OFF)
  - S<sub>18</sub> PLAY SW (OFF)
  - S<sub>19</sub> REC SW (OFF)
  - C<sub>601</sub>~607, 613~619 0.01/14KV
  - CR<sub>601</sub>~604 SPARK KILLER

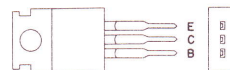


Foil side



2SA672  
2SC1344

2SC789



- CAPACITORS: IN  $\mu$ F UNLESS OTHERWISE NOTED p: pF
- RESISTORS: IN  $\Omega$ ,  $\frac{1}{4}$ W UNLESS OTHERWISE NOTED k: k $\Omega$ , M: M $\Omega$

## Parts List of Control Circuit Assembly

### CAPACITORS

Symbol	Description			Part No.	
C601	Ceramic	0.01	1.4kV	C43-003-0	
C602	Ceramic	0.01	1.4kV	C43-003-0	
C603	Ceramic	0.01	1.4kV	C43-003-0	
C604	Ceramic	0.01	1.4kV	C43-003-0	
C605	Ceramic	0.01	1.4kV	C43-003-0	
C606	Ceramic	0.01	1.4kV	C43-003-0	
C607	Ceramic	0.01	1.4kV	C43-003-0	
C608	Electrolytic	22	50V	CEA 220P 50	
C609	Electrolytic	470	50V	CEA 471P 50	
C610	.....				
C611	Electrolytic	100	35V	CEA 101P 35	
C612	Electrolytic	22	35V	CEA 220P 35	
C613	Ceramic	0.01	1.4kV	C43-003-0	
C614	Ceramic	0.01	1.4kV	C43-003-0	
C615	Ceramic	0.01	1.4kV	C43-003-0	
C616	Ceramic	0.01	1.4kV	C43-003-0	
C617	Ceramic	0.01	1.4kV	C43-003-0	
C618	Ceramic	0.01	1.4kV	C43-003-0	
C619	Ceramic	0.01	1.4kV	C43-003-0	
C622	Electrolytic	100	35V	CEA101P 35	
C623	Electrolytic	22	35V	CEA 220P 35	

### RESISTORS

Symbol	Description			Part No.	
R601	Metal film	0.47	1W	RN1P R47K	
R602	Carbon film	1k		RD $\frac{1}{4}$ PS 102J	
R603	Carbon film	3.9k	$\frac{1}{2}$ W	RD $\frac{1}{2}$ PW 392J	
R604	Carbon film	1.5k		RD $\frac{1}{4}$ PS 152J	
R605	Carbon film	1k		RD $\frac{1}{4}$ PS 102J	
R608	Metal oxide	330	2W	RS2P 331J	
R609	Metal oxide	180	1W	RS1P 181J	
R610	Carbon film	100k		RD $\frac{1}{4}$ PS 104J	
R611	Carbon film	36k		RD $\frac{1}{4}$ PS 363J	
R612	Carbon film	100k		RD $\frac{1}{4}$ PS 104J	
R613	Carbon film	22k		RD $\frac{1}{4}$ PS 223J	
R614	Carbon film	240		RD $\frac{1}{4}$ PSF 241J	Incombustibility
R615	Carbon film	18		RD $\frac{1}{4}$ PS 180J	

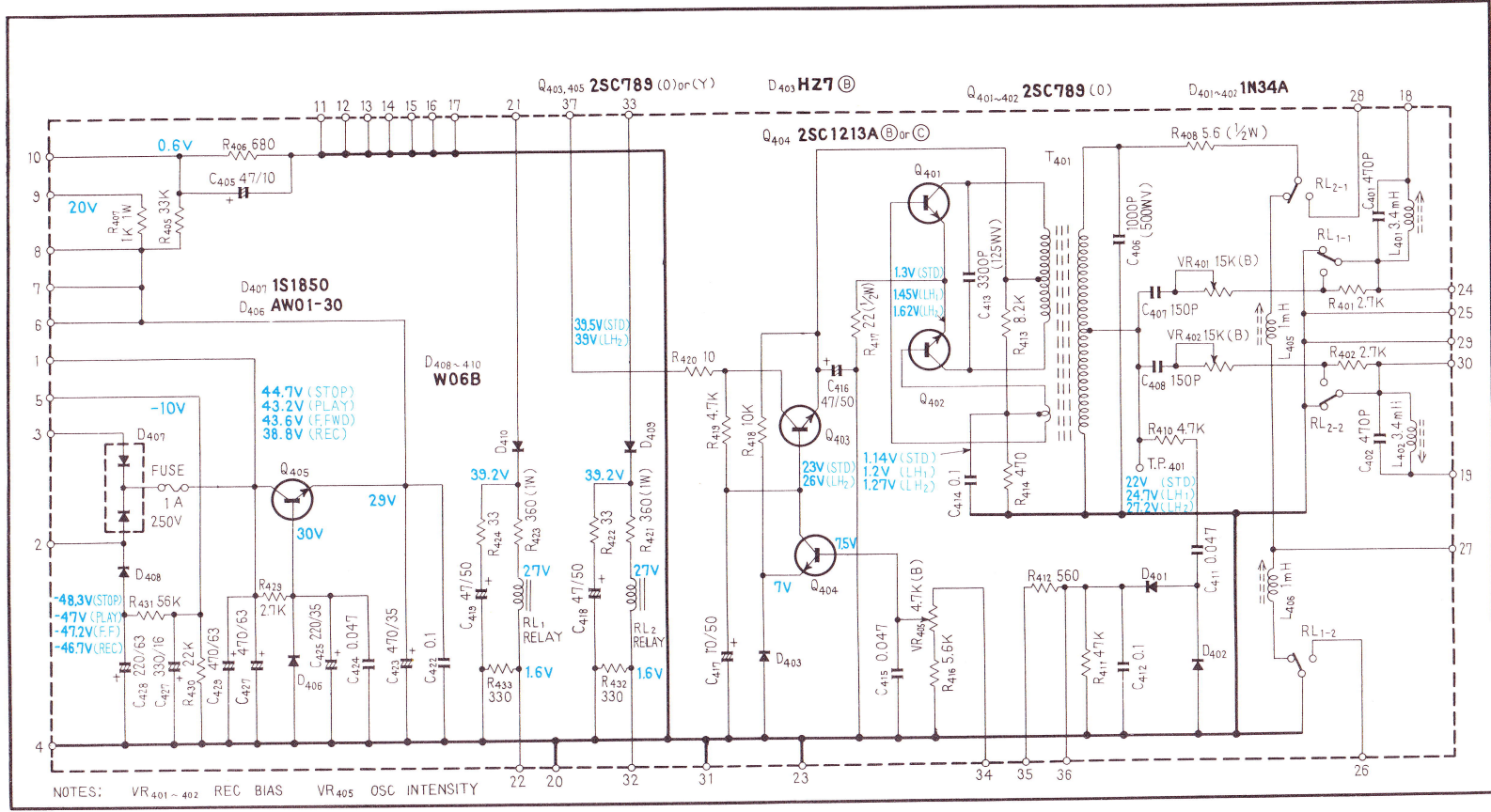
SEMICONDUCTORS

Symbol	Description	Part No.
Q601	Transistor 2SC789-O (or Y)	
Q602	Transistor 2SC1344-D (or E)	
Q603	Transistor 2SA672-B	
Q604	Transistor 2SA672-B	
D601	Diode 1S1849	
D602	Diode W06B	
D603	.....	
D604	Diode W06B	
D605	Diode S1B01-0 2or RA1-Z	
D606	Diode V03C	
D607	Diode W06B	
D608	Diode V03C	
D609	Diode V03C	
D610	Diode 1S1849R	
D611	Diode S1B01-02or RA1-Z	
D613	Diode W06B	
D614	Diode W06B	
D615	Diode W06B	
ZD601	Zener diode AW01-16	

OTHERS

Symbol	Description	Part No.
CR601	Spark killer	RWX-030-0
CR602	Spark killer	RWX-030-0
CR603	Spark killer	RWX-030-0
CR604	Spark killer	RWX-030-0
FR602	Metal film fuse resistor 60Ω/40mA	REK-012-B
FR603	Metal film fuse resistor 140Ω/20mA	REK-013-B
S16	Switch (REW)	RSG-013-A
S17	Switch (F. FWD)	RSG-013-A
S18	Switch (PLAY)	RSG-013-A
S19	Switch (REC)	RSG-013-A
RL601	Relay	RSR-017-0
RL602	Relay	RSR-016-0
RL603	Relay	RSR-017-0

9.12 OSCILLATOR ASSEMBLY (RWA-013-B)





## Parts List of Oscillator Assembly

### CAPACITORS

Symbol	Description	Part No.
C401	Styrol 470p 50V	RCE-014-0
C402	Styrol 470p 50V	RCE-014-0
C403	.....	
C404	.....	
C405	Electrolytic 47 10V	CEA 470P 10
C406	Styrol 0.001 500V	CQSA 102J 500
C407	Styrol 150p 50V	RCE-007-0
C408	Styrol 150p 50V	RCE-007-0
C409	.....	
C410	.....	
C411	Mylar 0.047 50V	CQMA 473K 50
C412	Mylar 0.1 50V	CQMA 104K 50
C413	Styrol 0.0033 125V	CQSA 332J 125
C414	Mylar 0.1 50V	CQMA 104K 50
C415	Mylar 0.047 50V	CQMA 473K 50
C416	Electrolytic 47 50V	CEA 470P 50
C417	Electrolytic 10 50V	CEA 100P 50
C418	Electrolytic 47 50V	CEA 470P 50
C419	Electrolytic 47 50V	CEA 470P 50
C420	.....	
C421	.....	
C422	Mylar 0.1 50V	CQMA 104K 50
C423	Electrolytic 470 35V	CEA 471P 35
C424	Mylar 0.047 50V	CQMA 473K 50
C425	Electrolytic 220 35V	CEA 221P 35
C426	Electrolytic 470 63V	CEA 471P 63
C427	Electrolytic 330 16V	CEA 331P 16
C428	Electrolytic 220 63V	CEA 221P 63
C429	Electrolytic 470 63V	CEA 471P 63

### RESISTORS

Symbol	Description	Part No.
R401	Carbon film 2.7k	RD $\frac{1}{4}$ VS 272J
R402	Carbon film 2.7k	RD $\frac{1}{4}$ VS 272J
R403	.....	
R404	.....	
R405	Carbon film 33k	RD $\frac{1}{4}$ VS 333J
R406	Carbon film 680	RD $\frac{1}{4}$ VS 681J
R407	Metal oxide 1k 1W	RS1P 102J
R408	Carbon film 5.6 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PW 5R6J
R409	.....	
R410	Carbon film 4.7k	RD $\frac{1}{4}$ VS 472J
R411	Carbon film 47k	RD $\frac{1}{4}$ VS 473J
R412	Carbon film 560	RD $\frac{1}{4}$ VS 561J
R413	Carbon film 8.2k	RD $\frac{1}{4}$ VS 822J
R414	Carbon film 470	RD $\frac{1}{4}$ VS 471J
R415	.....	

Symbol	Description	Part No.
R416	Carbon film 5.6k	RD¼VS 562J
R417	Carbon film 22 ½W	RD¼PW 220J
R418	Carbon film 10k	RD¼VS 103J
R419	Carbon film 4.7k	RD¼VS 472J
R420	Carbon film 10	RD¼VS 100J
R421	Metal oxide 360 1W	RS1P 361J
R422	Carbon film 33	RD¼VS 330J
R423	Metal oxide 360 1W	RS1P 361J
R424	Carbon film 33	RD¼VS 330J
R429	Carbon film 2.7k	RD¼VS 272J
R430	Carbon film 22k	RD¼VS 223J
R431	Carbon film 56k	RD¼VS 563J
R432	Carbon film 330	RD¼VS 331J
R433	Carbon film 330	RD¼VS 331J

SEMICONDUCTORS

Symbol	Description	Part No.
Q401	Transistor 2SC789-O	
Q402	Transistor 2SC789-O	
Q403	Transistor 2SC789-O (or Y)	
Q404	Transistor 2SC1213A-B (or C)	
Q405	Transistor 2SC789-O (or Y)	
D401	Diode 1N34A	
D402	Diode 1N34A	
D403	Zener diode HZ-7 (B)	
D406	Diode AW01-30	
D407	Diode 1S1850	
D408	Diode W06B	
D409	Diode W06B	
D410	Diode W06B	

OTHERS

Symbol	Description	Part No.
RL 1	Relay	RSR-012-A
RL 2	Relay	RSR-012-A
L401	Trap coil	RTF-006-0
L402	Trap coil	RTF-006-0
L405	Dummy coil	RTD-008-0
L406	Dummy coil	RTD-008-0
T401	Oscillator transformer	RTD-007-0
VR401	Semi-fixed resistor 15k-B	RCP-006-0
VR402	Semi-fixed resistor 15k-B	RCP-006-0
VR405	Semi-fixed resistor 4.7k-B	C92-051-0
	Fuse 1A	REK-021-0

### 9.13 OTHER P.C. BOARDS

#### Parts List of Shut-off Switch Board Assembly (RWX-047-0)

Symbol	Description	Part No.	
	Spark killer	RWX-030-0	

#### Parts List of Motor Fuse Board Assembly (RWX-048-0)

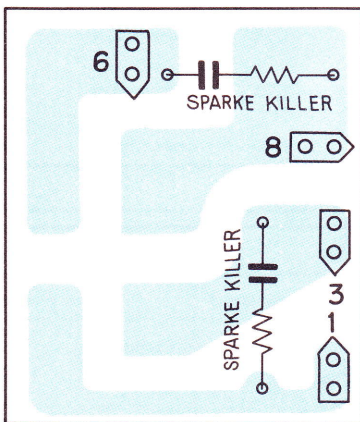
Symbol	Description	Part No.	
	Fuse holder	K91-006-0	
	Fuse 1A	REK-021-0	

#### Parts List of REC Lamp Board Assembly (RWX-049-0)

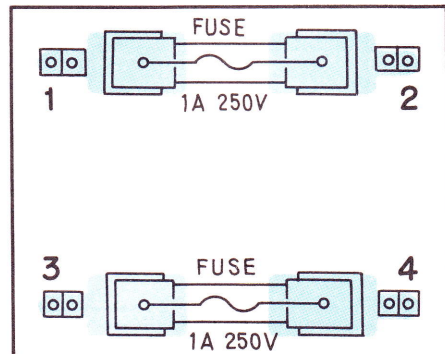
Symbol	Description	Part No.	
	Light-emitting diode TLR-103		

Foil side

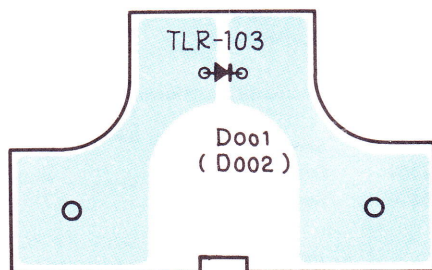
RWX-047-0



RWX-048-0



RWX-049-0





## 10. EXPLODED VIEWS AND PARTS LIST

### NOTE:

Parts number is subject to change for the purpose of improvement with notice of a service bulletin.

Service bulletin will be furnished whenever necessary and you are requested to amend parts number in this manual according to the instructions.

### 10.1 EXTERIOR

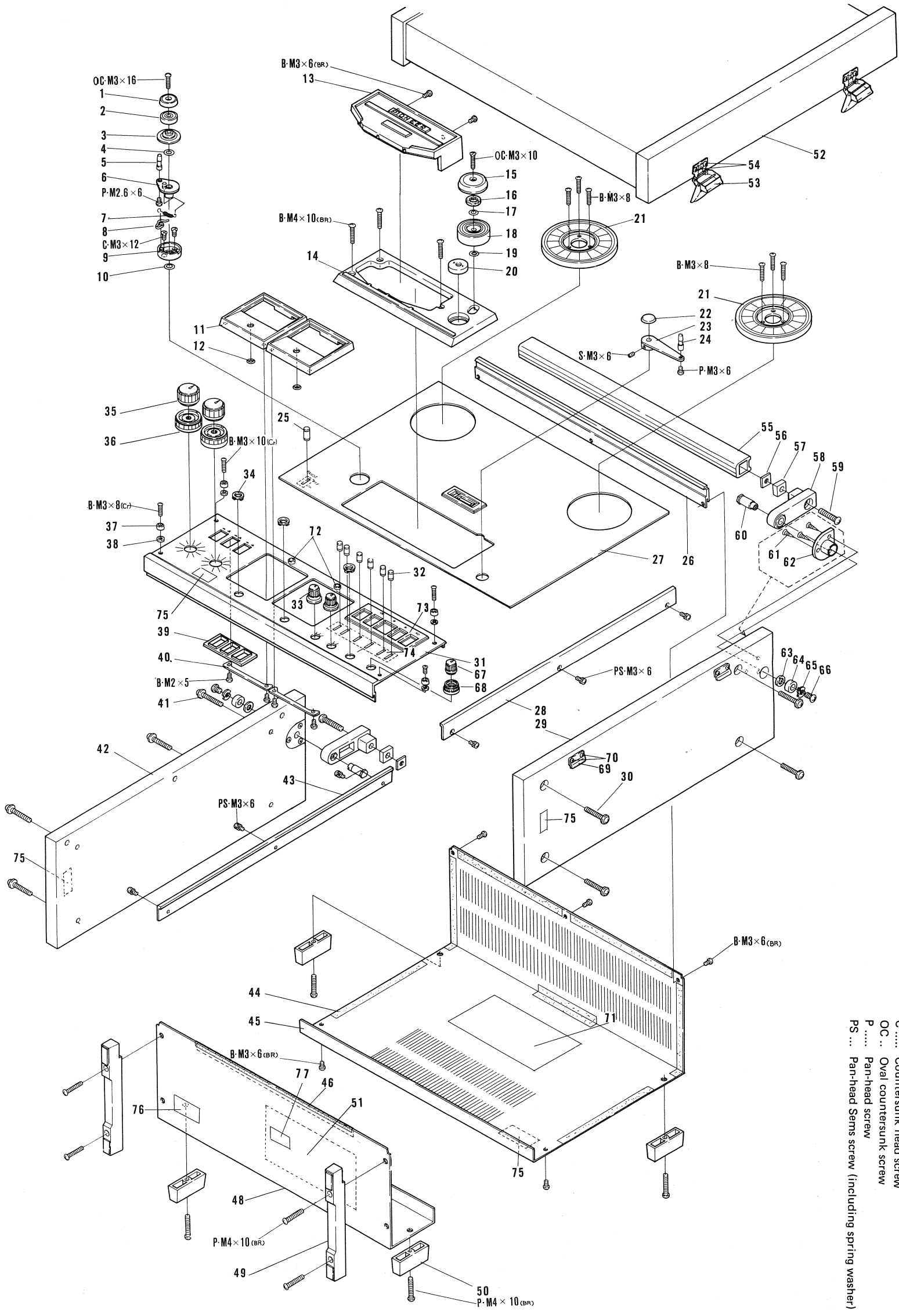
#### Parts List of Exterior

NOTICE: Any parts asterisked (\*) are subject to being not supplied.

Key No.	Description	Part No.	
1	Roller cover (A)	RAH-100-0	
2	Ball bearing	RNX-003-0	
3	Roller cover (B)	RAH-101-0	
4	Washer (6φ) BN1	B22-426-0	
5	Roller arm guide	RLA-355-0	
6	Roller arm assembly	RXA-505-0	
7	Spring (roller arm)	RBH-194-0	
8	Spring (arm lock)	RBK-073-0	
9	Arm guide holder assembly	RXA-452-A	
10	Washer (6φ) BN1	B22-426-0	
11	Meter escutcheon	RAP-050-0	
12	Washer	REB-052-0	
13	Head cover assembly	RXX-137-0	
14	Center base	RAX-018-0	
15	Cap (pinch roller)	RAT-004-0	
16	Felt ring	RED-053-0	
17	Washer (6φ) BN1	B22-426-0	
18	Pinch roller assembly	RXA-309-0	
19	Washer (6φ) BN1	B22-426-0	
20	Cap	RAT-003-0	
21	Reel base assembly	RXA-436-0	
22	Ornamental screw	RAH-079-A	
23	Tension arm assembly	RXA-310-D	
24	Tape guide (C)	RLA-309-A	
25	Knob (PAUSE)	RAA-062-B	
26	Sash (A)	RAP-035-0	
27	Panel assembly	RXX-115-0	
28	Sash (B)	RAP-046-0	
29	Side board (R) assembly	RXA-448-B	
30	Special screw (M4X26)	ABA-011-0	Including 61,62,69,70
31	Amplifier panel	RAH-095-0	
32	Knob (REC, INDICATOR, MONITOR, METER SCALE)	RAA-060-D	
33	Knob (BIAS, EQ)	RAA-076-0	
34	Jack escutcheon	REC-115-A	
35	Knob A (inner) (LINE rec. level)	RAA-074-0	

NOTICE: Any parts asterisked (\*) are subject to being not supplied.

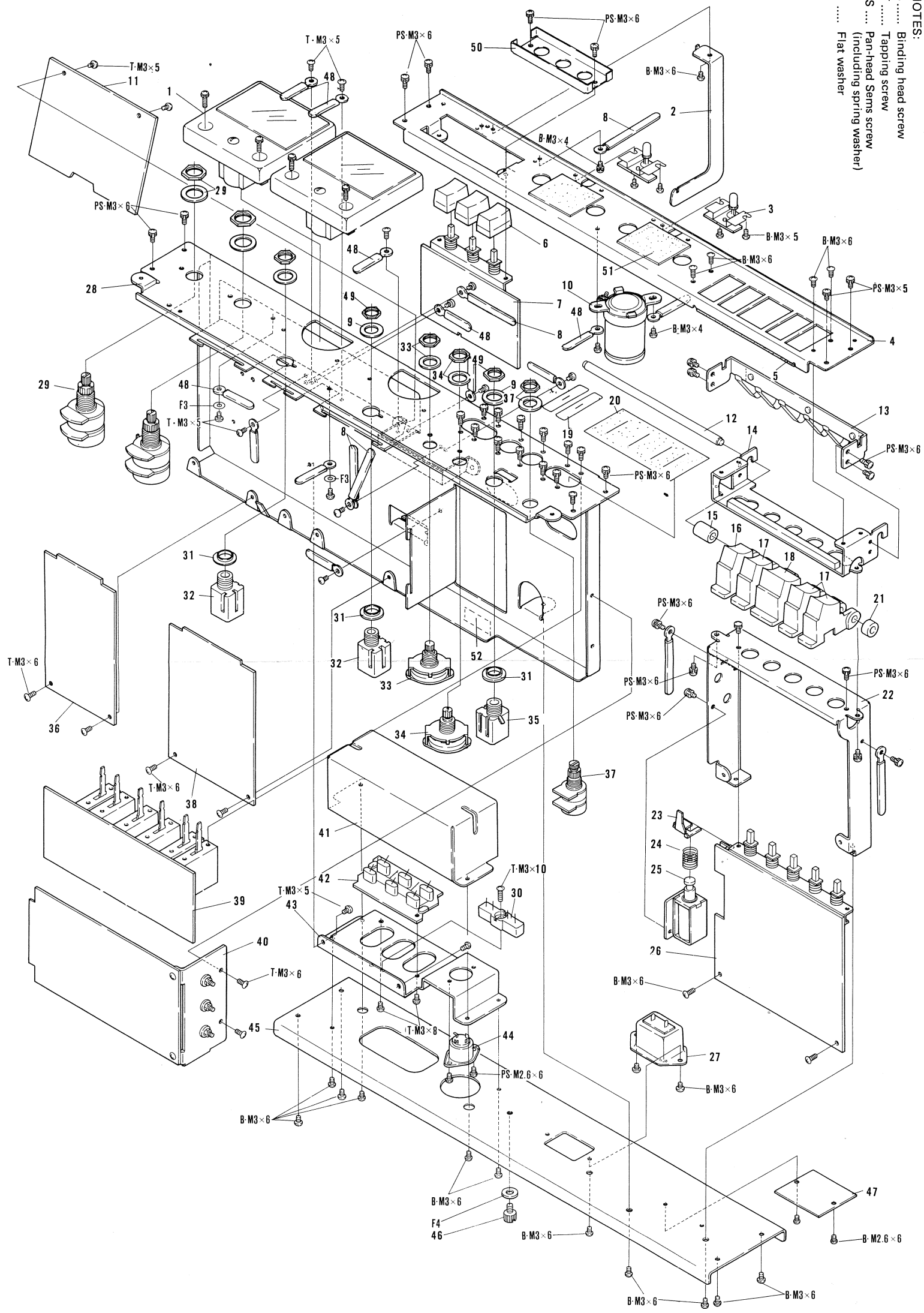
Key No.	Description	Part No.	
36	Knob B (outer) (MIC rec. level)	RAA-075-0	
37	Rosette washer	RAP-041-0	
38	Nylon washer	RBF-007-0	
39	Button guard	REC-145-B	
40	Clamp	RNC-073-0	
41	Special screw (M4X26)	ABA-011-0	
42	Side board (L) assembly	RXA-447-B	Including 61,62,69,70
43	Sash (B)	RAP-036-B	
44*	Cushion (A)	REB-099-0	
45	Back cover (A) assembly	RXX-112-0	Including 44,71
46*	Cushion (B)	REB-100-0	
47	.....		
48	Back cover (B) assembly	RXX-138-0	
49	Foot (A)	REC-116-A	
50	Foot (B)	REC-119-A	
51*	Label (amplifier adj.)	RRH-004-A	
52	Cover assembly	RXA-446-A	Including 53,54
53*	Hook-nosed hinge (B)	RNE-656-0	
54	Round-head wood screw 3.1φX16 (Cr)	.....	
55	Handle	RAP-045-A	
56	Square nut (M5)	RNE-636-0	
57	Rubber packing	REB-126-A	
58	Handle bracket assembly	RXX-136-0	
59	Binder head screw M5X32 (BR)	.....	
60	Handle shaft	RLA-352-0	
61	Countersunk head wood screw 3.1φX16 (BI)	.....	
62*	Handle bush	RNG-060-0	
63	Flat washer	RNE-638-0	
64	Friction rubber	REB-137-0	
65	Pawl washer	RNE-637-0	
66	Binder head screw M5X8 (BR)	.....	
67	Knob A (inner) (OUTPUT-L)	RAA-077-0	
68	Knob B (outer) (OUTPUT-R)	RAA-078-0	
69*	Hook-nosed hinge A	RNE-655-0	
70	Countersunk head wood screw 3.1φX16 (Cr)	.....	
71*	Label (mechanism adj.)	RRH-001-A	
72	Lamp escutcheon	RAT-005-A	
73	Switch escutcheon	RAP-047-0	
74	Masking sheet (A)	RED-072-A	
75*	Caution label (UL)	RRW-026-0	
76*	UL caution card	AAX-001-0	
77*	UL caution	AAX-020-0	
53,69	Hook-nosed hinge assembly	RXX-135-0	
1,2,3,5, 6,7,8,9	Guide roller full assembly	RXX-140-0	



- NOTES:
- B ..... Binding head screw
  - C ..... Countersunk head screw
  - OC ..... Oval countersunk screw
  - P ..... Pan-head screw
  - PS ..... Pan-head Semi screw (including spring washer)

10.2 AMPLIFIER COMPONENTS

- NOTES:  
 B..... Binding head screw  
 T..... Tapping screw  
 PS..... Pan-head Sems screw  
 F..... Flat washer



## Parts List of Amplifier Components NOTICE: Any parts asterisked (\*) are subject to being not supplied.

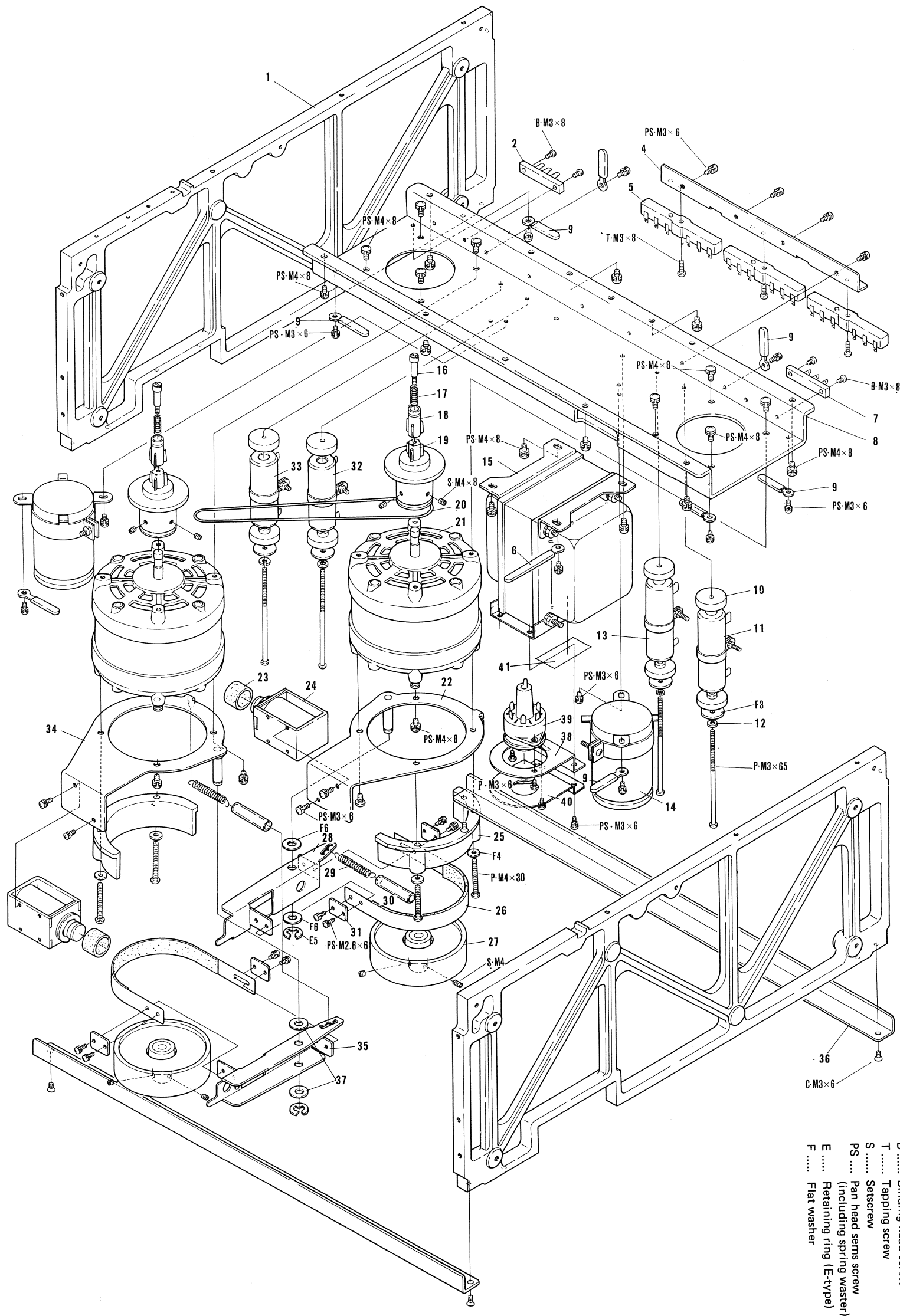
Key No.	Description	Part No.	
1	Level meter	RAW-020-A	
2*	P.C. board holder	RNE-537-A	
3	REC lamp board assembly	RWX-049-0	
4*	Chassis (control section)	RNB-032-D	
5	Felt buffer	RED-052-0	
6	Knob (POWER, REEL, SPEED)	RAC-004-A	
7	EQ. switch assembly	RWS-021-0	
8*	Cord fixer (B)	RNE-513-0	
9	Insulate washer	E34-004-0	
10	Electrolytic capacitor 1,000 $\mu$ F 35V	RCH-010-0	
11	Fuse board assembly	RWX-046-A	
12*	Shaft for function button	RLA-310-A	
13	Button spring assembly	RXA-316-A	
14*	Button frame	RNE-409-A	
15*	Button spacer (B)	RLP-003-A	
16	Function button C (REC)	RAC-003-B	
17	Function button B (REW, PLAY, FF)	RAC-002-A	
18	Function button A (STOP)	RAC-001-A	
19	Mask	REE-046-A	
20	Masking sheet (A)	RED-072-A	
21*	Spacer (A)	RLP-002-0	
22*	Function button bracket	RNE-412-A	
23*	Release cam	RNE-404-B	
24	Return spring	RBH-152-0	
25	Release solenoid	RXP-019-A	
26	Control circuit assembly	RWG-045-A	
27	AC socket	RKP-003-A	
28*	Chassis (amplifier section)	RNB-050-A	
29	Variable resistor 10k $\Omega$ -A dual	RCV-014-0	REC LEVEL
30	Terminal strip (2P)	AKC-023-0	
31	Insulate washer	E32-045-0	
32	Phone jack (MIC)	K72-024-0	
33	Rotary switch (BIAS)	RSB-008-0	
34	Rotary switch (EQ)	RSB-011-0	
35	Phone jack A (Headphone)	RKN-002-A	
36	PB amplifier assembly	RWF-023-0	
37	Potentiometer 50k $\Omega$ -B dual	RCV-012-A	PB LEVEL
38	REC amplifier assembly	RWF-021-0	
39	SW. circuit assembly	RWS-017-0	
40	Oscillator assembly	RWA-013-B	
41*	Shield cover	RNE-543-A	
42	Phono jack A (6-jacks)	RKB-004-0	
43*	Terminal-held frame	RNE-613-A	
44	Connector socket (DIN type 5P)	RKP-006-0	
45*	Rear panel	RNA-126-B	
46	Screw for ground terminal	B11-012-A	
47*	Model name plate	RAL-119-0	
48*	Cord fixer (D)	RNE-605-0	
49	Hex. nut (9 $\phi$ )	B71-004-0	
50*	Safety plate (A)	RNE-700-0	
51	Meter cushion	RED-067-A	
52*	Caution label	RRW-017-0	

## 10.3 TAKE-UP MECHANISM

### Parts List of Take-up Mechanism

NOTICE: Any parts asterisked (\*) are subject to being not supplied.

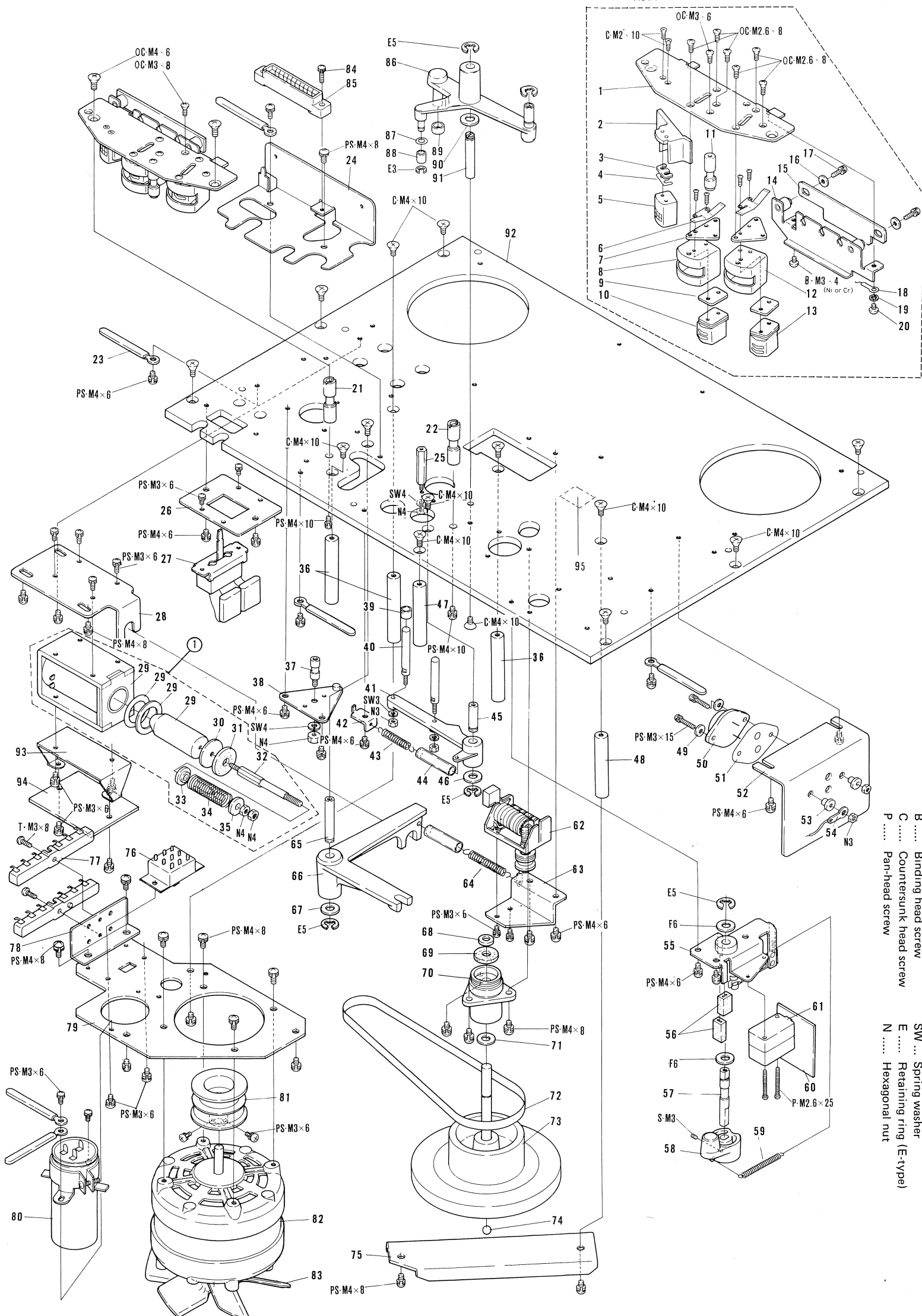
Key No.	Description	Part No.	
1*	Chassis frame	RNG-036-D	
2	Molded terminal (T-type 3P)	RKC-016-0	
3	.....	.....	
4*	Terminal mounting angle steel	RNE-478-0	
5	Terminal strip (6P)	RKC-013-0	
6*	Cord fixer (B)	RNE-513-0	
7	Molded terminal (T-type 3P)	RKC-016-0	
8*	Reel motor chassis	RNB-053-0	
9*	Cord fixer (D)	RNE-605-0	
10	Insulator	RBFB-019-0	
11	Wirewound resistor 100Ω 20W	RCN-020-0	Adjustable type
12	Special spring washer 3φ	.....	
13	Wirewound resistor 2kΩ 20W	RCN-023-0	Adjustable type
14	MP capacitor 0.5+4μF 250V	RCL-010-0	
15	Power transformer	RTT-048-A	
16	Reel base screw	RLA-321-0	
17	Reel base spring	RBH-162-0	
18	Reel stopper	RNG-051-A	
19	Reel base	RNG-055-0	
20	Belt (counter drive)	REB-077-0	
21	Reel motor	RXM-015-0	
22*	Brake base (R) assembly	RXA-508-0	
23	Arm damper	REB-098-0	
24	Brake release solenoid	RXP-020-0	
25*	Brake guide	RNK-111-B	
26	Brake band assembly	RXX-111-0	
27	Brake drum assembly	RXX-110-0	
28*	Brake arm (R)	RNE-724-0	
29	Brake spring	RBH-173-0	
30*	Vinyl tube	.....	
31	Band holdfast	RNE-401-A	
32	Wirewound resistor 500Ω 20W	RCN-022-0	Adjustable type
33	Wirewound resistor 300Ω 20W	RCN-021-0	Adjustable type
34*	Brake base (L) assembly	RXA-509-0	
35*	Brake arm (L)	RNE-723-0	
36*	Reinforce angle	RNC-068-0	
37	Washer 6φ BN1	B22-426-0	
38*	Bracket	RNE-554-0	
39	Fuse holder (line voltage switch)	AKR-001-0	
40*	Safety plate (B)	RNE-701-A	
41*	Caution label	RRW-017-0	



- NOTES:
- B ..... Binding head screw
  - T ..... Tapping screw
  - S ..... Setscrew
  - PS ..... Pan head semi screw (including spring waster)
  - E ..... Retaining ring (E-type)
  - F ..... Flat washer

10.4 TAPE PATH AND CAPSTAN MOTOR

Head unit RWX-044



- NOTES:
- OC ... Oval countersunk screw
  - B ... Binding head screw
  - C ... Countersunk head screw
  - P ... Pan-head screw
  - PS ... Pan-head semi screw (including spring washer)
  - SW ... Spring washer
  - E ... Retaining ring (E-type)
  - N ... Hexagonal nut



Parts List of Tape Path and Capstan Motor

NOTICE: Any parts asterisked (\*) are subject to being not supplied.

Key No.	Description	Part No.
1*	Head base	RNE-415-F
2	E. head holder	REC-122-A
3	Spacer (D)	RNE-612-A
4	E. head spacer (D) (height adjustor) †	RNE-611-0
5	Erase head	RPB-028-A
6	Plate spring	RBK-060-B
7*	Head mount plate	RNE-391-0
8*	Shield case (B)	RNA-096-A
9	Head spacer	RNE-390-A
10	Recording head	RPB-029-A
11	Tape guide (B)	RLA-301-0
12*	Shield case (A)	RNA-095-A
13	Play-back head	RPB-030-A
14	Shield plate (A) assembly	RXA-444-A
15	Connector P.C. board	RNP-114-B
16	Flat washer for M3 (Ni plating)	.....
17	Pan head screw M3X6 (Cr or Ni plating)	.....
18*	Solder-lug	.....
19	Spring washer for M3	.....
20	Pan head screw M3X6 (Cr or Ni plating)	.....
21	Tape guide (A)	RLA-300-B
22	Tape guide (A)	RLA-300-B
23*	Cord fixer (B)	RNE-513-0
24*	Shield plate	RNE-610-0
25*	Head base mounting stud	RLA-311-A
26*	Switch mounting plate	RNE-393-0
27	Lever switch (PAUSE)	RSK-025-0
28*	Solenoid base	RNE-386-B
29	Pinch roller press solenoid	RXP-011-D
30*	Rubber washer	RNE-392-0
31	Felt	RED-054-A
32*	Solenoid rod	RLA-305-B
33	Stepped washer	RLA-304-A
34	Pinch roller press spring	RBH-146-0
35	Stepped washer	RLA-304-A
36*	Motor prop	RLA-417-0
37*	Guide roller shaft	RLA-302-0
38*	Plat	RNE-389-B
39	Shifter damper	REB-109-0
40	Shifter pole	RLA-356-A
41*	Shift arm	RNG-053-A
42*	Spring hook	RNE-406-0
43	Shift spring	RBH-169-0
44*	Vinyl tube	.....
45*	Shift arm shaft	RLA-297-0

† There are four different kinds in thickness of erase head-adjustable spacer as follows:

- REF-004-0 E.H. adj.spacer(A) t = 0.1 mm
- REF-005-0 E.H. adj.spacer(B) t = 0.2 mm
- REF-006-0 E.H. adj.spacer(C) t = 0.3 mm

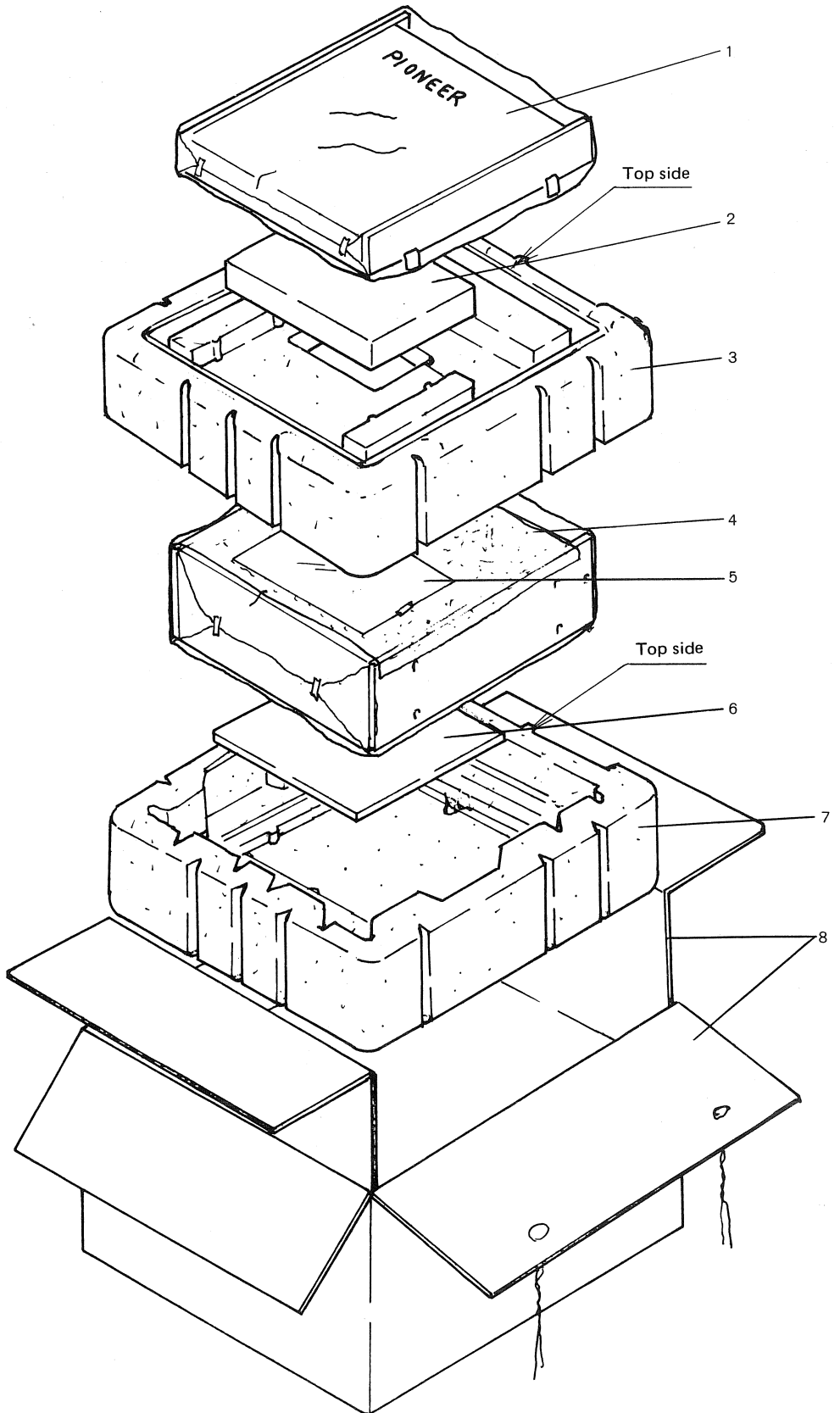
†† Tape speed-adjustable drive pulley is available in three different kinds as follows;

- RLA-345-0 slightly small drive pulley in diam.
- RLA-346-0 standard-size drive pulley in diam.
- RLA-347-0 slightly large drive pulley in diam.

NOTICE: Any parts asterisked (\*) are subject to being not supplied.

Key No.	Description	Part No.
46	Washer (6φ) BN1	B22-426-0
47*	Flywheel prop (H)	RLA-416-0
48*	Flywheel prop (H)	RLA-416-0
49	Washer (6φ) BN1	B22-426-0
50	Transistor 2SC1444-O or Y	.....
51	Insulator	REE-043-0
52*	Heat sink	RNE-407-F
53	Insulate bushing	REE-042-0
54*	Solder lug	
55	Tension arm bracket assembly	RXA-382-A
56	Tension arm damper	REB-103-A
57*	Tension arm shaft	RLA-308-0
58*	Tension arm cam assembly	RXA-360-A
59	Tension arm spring	RBH-149-A
60	Shut-off switch board assembly	RWX-047-0
61	Microswitch (shut-off)	RSF-013-0
62	Tape counter	RAW-017-0
63*	Counter bracket	RNE-394-0
64	Return spring	RBH-170-0
65*	Pinch arm shaft	RLA-307-0
66*	Pinch roller arm (B)	RNG-031-A
67	Washer (6φ) BN1	B22-426-0
68	Rubber washer (A)	REB-052-0
69	Felt	RED-069-0
70	Flywheel bearing assembly	RXA-307-0
71	Washer (6φ) BN2	B22-425-0
72	Drive velt	REB-107-0
73	Flywheel assembly	RXX-119-0
74	Nylon ball	N23-608-A
75*	Flywheel bracket	RNE-475-A
76	Slide switch (Frequency change)	RSH-015-A
77	Terminal strip 6P	RKC-013-0
78*	Terminal strip mounting angle (B)	RNE-652-A
79*	Motor chassis	RNE-702-0
80	MP capacitor (A) 2.8+1μF 250V	RCL-015-0
81	Motor pulley ++	RLA-346-0
82	Capstan motor (A)	RXM-012-0
83	Motor fan (A)	RNC-072-0
84	Pan head screw M3X10 (Cr plating)	.....
85	Multi-channel socket	RKP-004-0
86	Pinch arm (A) assembly	RXA-399-0
87	Washer (6φ) BN1	B22-426-0
88	Shifter roller	RLP-004-0
89	Pinch arm damper	REB-078-0
90	Washer (6φ) BN1	B22-426-0
91*	Pinch arm shaft	RLA-307-0
92*	Mechanism chassis	RNB-030-F
93*	P.C. board stay	RNE-680-0
94	Motor fuse board assembly	RWX-048-0
95*	Caution label	RRW-017-0
①	Pinch roller solenoid assembly	RXX-106-0

# 11. PACKING METHOD AND PARTS LIST



# RT-1050

## Packing and Furnished Parts

NOTICE: Any parts asterisked (\*) are subject to being not supplied.

Key No.	Description	Part No.	
1	Cover assembly	RXA-446-A	
2	Accessory parts box assembly	.....	
2-1	Parts box	RHX-017-0	
2-2*	10-in. reel adaptors (PP-220)	.....	
2-3	Connection cord	RDE-010-A	
2-4	Cleaning kit	REA-005-0	
2-5	Cleaning ribbon	E33-856-0	
2-6	Splicing tape	P45-851-0	
2-7	AC power cord	RDG-007-0	
3	Styrotector (A)	RHA-071-A	
4*	Deck (RT-1050)	.....	
5	Operating instructions	RRB-033-0	
6*	10-in. metal empty reel (PR-100)	.....	
7	Styrotector (B)	RHA-072-A	
8	Packing case set	RHK-122-0	

## 12. CIRCUIT DESCRIPTION

The RT-1050 is a two-track, two-channel, three-head tape deck, with tape speeds of 19cm/s and 38cm/s (7-1/2ips and 15ips). The use of locking push-button type controls considerably simplifies control circuit design, enabling automatic recording whenever used with a timer.

### 12.1 AMPLIFIER SECTION

Fig. 20 gives the block diagram of the amplifier section. The microphone amplifier uses directly coupled NPN/PNP transistors (two stages), and the intermediate amplifier uses directly coupled NPN transistor amplification circuit (again with two stages).

#### • Recording Output Circuit (Fig. 18)

This circuit features the use of diodes in the switching circuit for changing recording equalization.

For instance, with the tape speed set to 19cm/s (7-1/2ips) and the EQ switch at LH (either NAB or IEC),  $D_{105}$  and  $D_{107}$  are biased so that they are ON (conductive).  $L_{101}$  and  $C_{141}$  operate as peaking elements.  $L_{401}$  and  $C_{401}$  form the trap to prevent reverse leakage of recording bias.

#### • Bias Oscillator Circuit (Fig. 19)

Pressing the REC button and switching the REC switches ( $S_7$ ,  $S_8$ ) over to REC causes the voltage +B to be applied. The oscillator output is rectified and fed back to the base of  $Q_{404}$ . The purpose is to achieve a stable bias level by controlling the supply voltage according to the amplitude of the oscillator output. The BIAS switch changes the supply voltage to the oscillator circuit by changing the values of the constants of this control circuit, thus affecting the amplitude of the oscillator output.

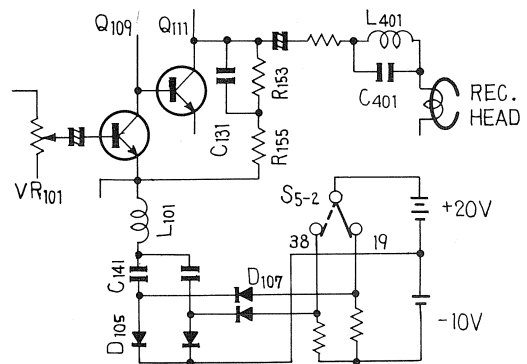


Fig. 18

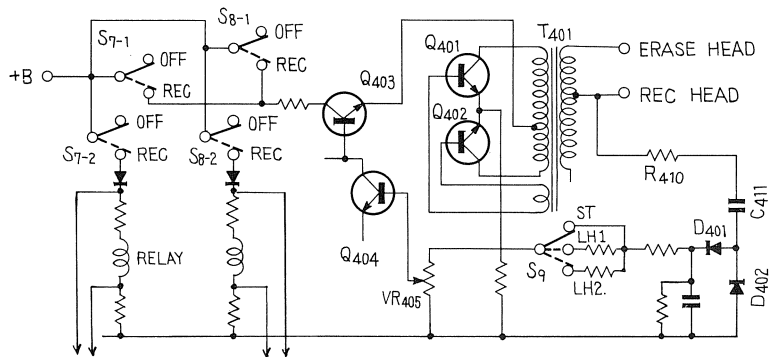


Fig. 19

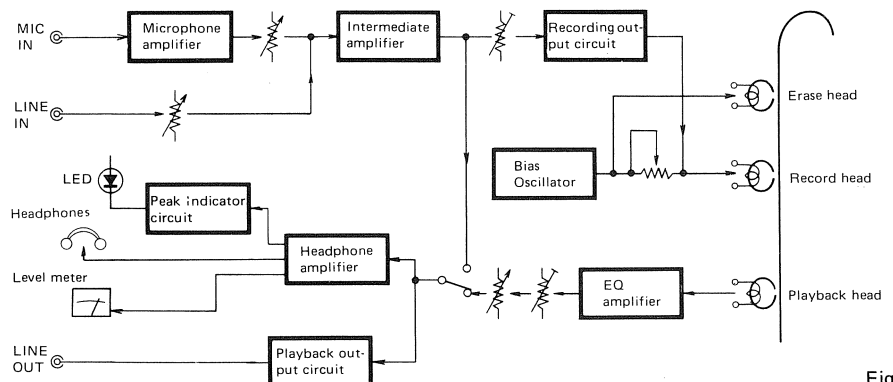


Fig. 20

● EQ Amplifier (Fig. 21)

This is a three-stage direct-coupled circuit. The changeover between NAB(50μs) and 38cm/s (15ips) IEC (35μs) equalization is effected by altering the internal resistance of an FET. For 38cm/s IEC playback response equalization, 0.6V is applied to the FET gate, and for NAB, -10V.

● Peak Indicator (REC Indicator) Circuit (Fig. 22)

As shown in Fig. 22, Q<sub>1</sub> is used as an emitter follower to increase the input impedance of the circuit, and Q<sub>2</sub> and Q<sub>3</sub> form a Schmitt circuit. R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> determine the bias applied to Q<sub>2</sub>, and their values are chosen so that Q<sub>2</sub> is ON in the absence of a signal. The base bias on Q<sub>3</sub> is derived from the collector of Q<sub>2</sub> via R<sub>5</sub> and R<sub>6</sub>. While Q<sub>2</sub> is ON, the Q<sub>2</sub> collector potential is low, and Q<sub>3</sub> remains OFF. Conversely, when Q<sub>2</sub> goes OFF, Q<sub>3</sub> comes ON. In order to simplify the circuit explanation, we assume that the input waveform is sinusoidal.

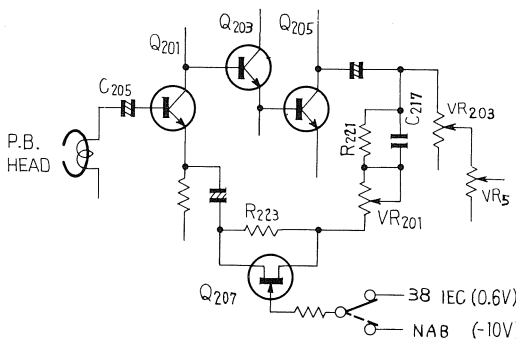
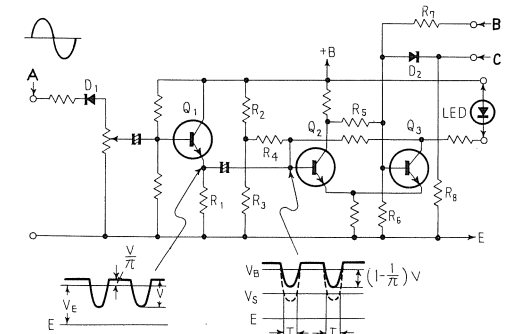


Fig. 21



- VE: Q<sub>1</sub> emitter DC potential with no signal.
- VB: Q<sub>2</sub> base DC potential with no signal.
- V/π: Average value of the half-wave rectified waveform.
- VS: Q<sub>2</sub> base potential when the Schmitt circuit turns over.

Fig. 22

D<sub>1</sub> rectifies the signal into the half-wave rectified waveform, which is added to the base potential of Q<sub>2</sub>. When the amplitude of the input signal is low, the potential does not drop below the value, V<sub>s</sub>, at which Q<sub>2</sub> would remain ON even in the deepest of the rectified 'valleys.' With signals of sufficient amplitude, however, the voltage will drop below V<sub>s</sub> (the sections marked 'T' in Fig. 22), Q<sub>2</sub> will go OFF, Q<sub>3</sub> will switch over from OFF to ON, and the LED will light. A potential only is fed at C while recording. Without it, D<sub>2</sub> comes conductive and, with R<sub>6</sub> >> R<sub>8</sub>, no base current flows, and Q<sub>3</sub> remains OFF whatever the input, and the LED (peak indicator) is inoperative.

When recording, the potential at C ensures that the circuit functions as a peak indicator. Under these conditions, if the INDICATOR switch is set to REC, a potential also is fed at B, and Q<sub>3</sub> remains ON whatever the input, lighting the LED for REC indication.

12.2 CONTROL CIRCUIT

● Relay Operation (Fig. 24)

Three relays are used in the control circuit (RL<sub>6 01</sub>, RL<sub>6 02</sub>, RL<sub>6 03</sub>) and they operate as follows:

RL<sub>6 01</sub> . . . . Operates for Fast Forward (Rewind)

When the F.F. (or REW) button (S<sub>1 7</sub>, S<sub>1 6</sub>) is depressed, the base of Q<sub>6 04</sub>, which is inserted directly in series to the relay, is biased via R<sub>6 13</sub> ~ D<sub>6 13</sub> ~ R<sub>6 09</sub> ~ (S<sub>1 6-2</sub> ~ ) S<sub>1 7-2</sub>, Q<sub>6 04</sub> goes ON, the relay operates, at which the pinch roller solenoid (SL<sub>3</sub>) circuit and relay (RL<sub>6 02</sub>) circuit go OFF.

RL<sub>6 02</sub> . . . . Operates for Recording and Playback

When the PLAY button (S<sub>1 8</sub>) is depressed, a current flows through FR<sub>6 02</sub> ~ RL<sub>6 02</sub> ~ relay contacts (RL<sub>6 01</sub>) ~ S<sub>2 0-1</sub> (PAUSE switch) ~ S<sub>1 8-1</sub> ~ S<sub>1 6-2</sub> ~ S<sub>1 7-2</sub> and operates the relay, the contacts of which carry the supply current to the motors (T·M, S·M), giving the take-up torque and back tension.

RL<sub>6 03</sub> . . . . Operates while STOP is effective  
If STOP function (that is the state in which neither PLAY, F.F., nor REW buttons are depressed), and the tape has been correctly loaded, the shut-off switch will operate (come 'ON'). Current flows through D<sub>6 05</sub> ~ FR<sub>6 03</sub> ~ RL<sub>6 03</sub> ~ S<sub>1 8-1</sub> ~ S<sub>1 6-2</sub> ~ S<sub>1 7-2</sub>, and the relay operates. The contacts short-circuit the resistor (R<sub>3</sub>), in series with the take-up motor, and when they are reset, it is switched back in series.

● Control Circuit for Solenoid Supply Voltage (Fig. 23)

This circuit operates to prevent overheating from continuous operation of the solenoid, thereby dropping the current to that required to hold it ON.

In Fig. 23, Q<sub>1</sub>, Q<sub>602</sub>, and ZD<sub>601</sub> form a voltage stabilization circuit supplying the retaining current for continuous operation of the brake solenoids (SL<sub>1</sub>, SL<sub>2</sub>) and the pinch roller solenoid (SL<sub>3</sub>).

When the PLAY button is pressed, S<sub>18</sub> changes over to the PLAY position, and a closed loop is formed by the power supply (+) ~ Q<sub>1</sub> ~ D<sub>609</sub> ~ (SL<sub>3</sub> ~ D<sub>611</sub>) // (SL<sub>2</sub> ~ SL<sub>1</sub> ~ D<sub>608</sub>) ~ relay contacts (RL<sub>601</sub>) ~ S<sub>20-1</sub> (PAUSE switch) ~ S<sub>18-1</sub> ~ S<sub>16-2</sub> (REW button) S<sub>17-2</sub> (F.F. button) ~ power supply (-).

Q<sub>1</sub> and Q<sub>602</sub> are Darlington connected, and between the base and collector of Q<sub>602</sub> is capacitor C<sub>612</sub>. Capacitors inherently tend to impede rapid changes in voltage, so that when current begins to flow within the circuit the base potential of Q<sub>602</sub> temporarily is close to the collector potential, Q<sub>602</sub> and Q<sub>1</sub> go conductive, current flows and the solenoid operates. When C<sub>612</sub> is charged via R<sub>604</sub> and D<sub>607</sub>, the potential between the poles of C<sub>612</sub> increases, and the base potential of Q<sub>602</sub> comes under the control of ZD<sub>601</sub>. The current which flows through the solenoid then drops to the predetermined holding level.

When the F.F. or REW button (S<sub>17</sub> or S<sub>16</sub>) is pressed, the relay contacts (RL<sub>601</sub>) adopt the positions indicated by the broken lines in Fig. 23, forming the closed loop:

Power supply (+) ~ Q<sub>1</sub> ~ D<sub>609</sub> ~ SL<sub>2</sub> ~ SL<sub>1</sub> ~ D<sub>606</sub> ~ S<sub>17-2</sub> (S<sub>16-2</sub>) ~ power supply (-). In this case no current flows through SL<sub>3</sub>.

The operating current control is the same as for PLAY.

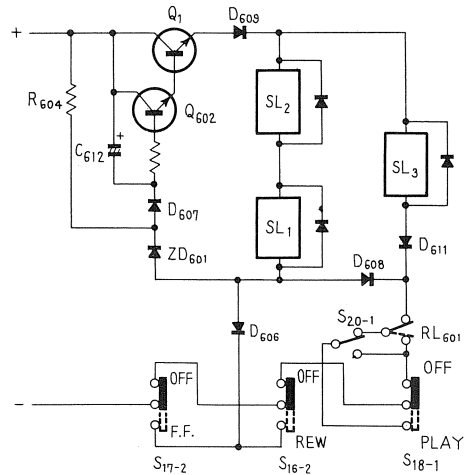
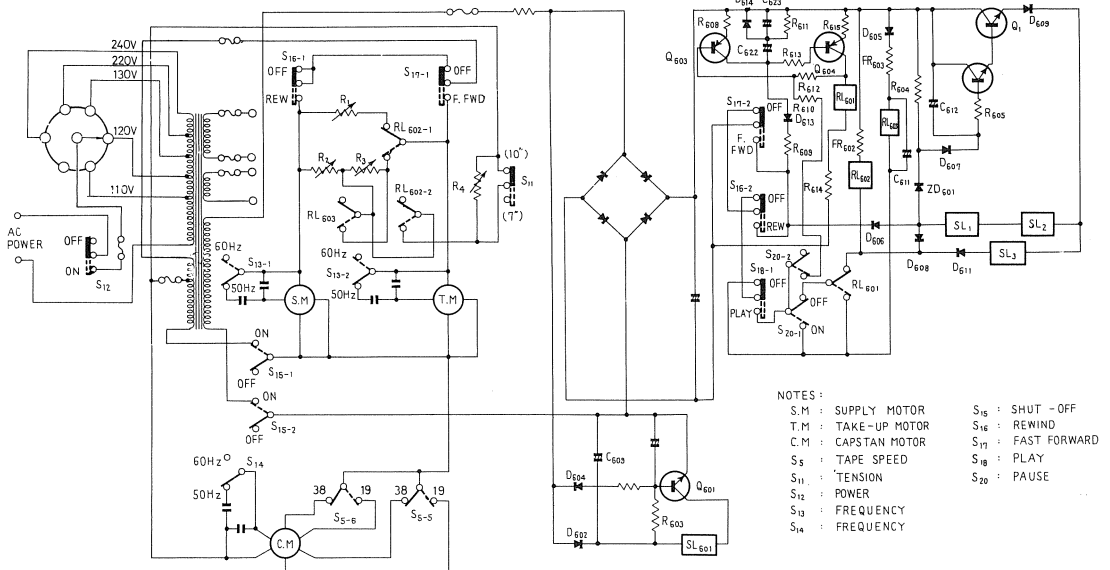


Fig. 23



- NOTES:
- S.M. : SUPPLY MOTOR
  - T.M. : TAKE-UP MOTOR
  - C.M. : CAPSTAN MOTOR
  - S<sub>5</sub> : TAPE SPEED
  - S<sub>11</sub> : TENSION
  - S<sub>12</sub> : POWER
  - S<sub>13</sub> : FREQUENCY
  - S<sub>14</sub> : FREQUENCY
  - S<sub>15</sub> : SHUT - OFF
  - S<sub>16</sub> : REWIND
  - S<sub>17</sub> : FAST FORWARD
  - S<sub>18</sub> : PLAY
  - S<sub>20</sub> : PAUSE

Fig. 24

● **Take-up Torque Control at Playback (Fig. 25, 26)**

In order to prevent tape slackening or hunting when switching from the STOP mode to PLAYBACK, the take-up torque is subject to initial reinforcement.

1. When the tape deck is in the STOP mode (that is with no function button depressed), relay RL<sub>603</sub> is operative, and the relay contacts short-circuit the series resistor (R<sub>3</sub>) of the take-up motor (T.M). Please refer to "Relay Operation."
2. When the PLAY button is depressed, S<sub>18-1</sub> goes over to PLAY, the current from the power supply to RL<sub>603</sub> is cut off, and current flows to RL<sub>602</sub>.
3. Even after the current has been cut off, RL<sub>603</sub> continues to hold on briefly by means of the charge held on C<sub>611</sub> in parallel with it before releasing.
4. This ensures that when the take-up motor is switched on, the series resistor (R<sub>3</sub>) remains ineffective, increasing the initial torque. As soon as RL<sub>603</sub> releases, the current flows through R<sub>3</sub>, and the torque drops to the normal level.

● **Tape Protection at Playback Immediately From F.F. (or REW) (Fig. 27)**

If the PLAY button is pressed while the deck is in the FAST FORWARD (or REWIND) mode, the tape is brought to a halt briefly before resuming travel at the specified speed, in order to protect it.

As shown by Fig. 27, the circuit is structured mainly around Q<sub>603</sub> and Q<sub>604</sub>.

1. The base of Q<sub>604</sub> is biased via R<sub>613</sub> ~ D<sub>613</sub> ~ R<sub>609</sub> ~ S<sub>17-2</sub> (S<sub>16-2</sub>) while the deck is in the FAST FORWARD (or REWIND) mode. Q<sub>604</sub> is thus ON and relay RL<sub>601</sub> is operative.
2. The base of Q<sub>603</sub> is connected via R<sub>612</sub> to the collector of Q<sub>604</sub>. When Q<sub>604</sub> is ON, the base of Q<sub>603</sub> is reverse biased, and Q<sub>603</sub> is OFF.
3. C<sub>622</sub> is charged via R<sub>611</sub> (C<sub>623</sub>) ~ C<sub>622</sub> ~ D<sub>613</sub> ~ R<sub>609</sub> ~ S<sub>17-2</sub> (S<sub>16-2</sub>).
4. When the PLAY button is pressed, S<sub>18-1</sub> goes over to PLAY, S<sub>17-2</sub> (S<sub>16-2</sub>) return to their OFF positions, and the base bias loop for Q<sub>604</sub> (in step 1. above) is broken. The Charge accumulated in C<sub>622</sub>, however, forms the base current of Q<sub>604</sub> and keeps it ON, maintaining the relay RL<sub>601</sub> operative.
5. Even if S<sub>18-1</sub> goes over to PLAY, while the relay RL<sub>601</sub> is operative, its relay contacts (RL<sub>601</sub>) will not cause RL<sub>602</sub> to operate.
6. As C<sub>622</sub> discharges, so the base current of Q<sub>604</sub> drops, with a corresponding increase

in its internal resistance, and a greater potential difference between the emitter and collector.

7. When this potential difference reaches 3V, the reverse bias which had been applied to Q<sub>603</sub> becomes direct bias, and Q<sub>603</sub> comes ON.
8. When Q<sub>603</sub> comes ON, C<sub>622</sub> is rapidly discharged via D<sub>614</sub> ~ R<sub>608</sub> ~ Q<sub>603</sub>, Q<sub>604</sub> goes OFF, and the relay RL<sub>601</sub> releases.
9. As soon as relay RL<sub>601</sub> releases, a current flows through FR<sub>602</sub> ~ RL<sub>602</sub> ~ relay contacts (RL<sub>601</sub>) ~ S<sub>20-1</sub> ~ S<sub>18-1</sub> ~ S<sub>16-2</sub> ~ S<sub>17-2</sub>, causing relay RL<sub>602</sub> to operate so that the tape commences to travel at the specified speed.
10. C<sub>622</sub> is fully charged after some 6 seconds of FAST FORWARD (or REWIND), and it takes about 6 or 7 seconds after the PLAY button is pressed before the specified speed of tape travel commences.
11. R<sub>611</sub> serves to delay the charging of C<sub>622</sub>, and D<sub>614</sub> does to accelerate its discharge. If, therefore, the PLAY button is pressed after only from 0.5 to 6 seconds of FAST FORWARD or REWIND, C<sub>622</sub> will not be fully charged, the time taken for it to discharge (that is during which Q<sub>604</sub> will remain ON), and the pause before the tape commences travel at the specified speed will be correspondingly shortened.

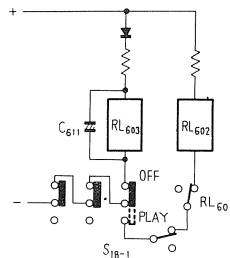


Fig. 25

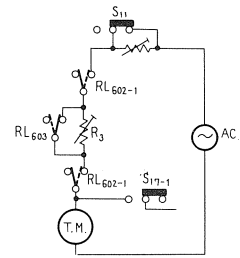


Fig. 26

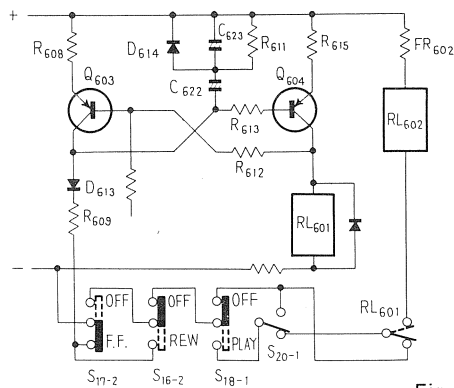


Fig. 27



**The Function of C<sub>623</sub>**

Such delay circuit as shown in Fig. 28 would not protect the tape on those occasions when the length of FAST FORWARD (or REWIND) operation is so short — 0.5 seconds or less — that the tape would not come to a complete halt before attempting to commence travel at the specified speed after pressing the PLAY button. If not prevented, this would cause tape stretch or snap. This possibility arises because of the inadequate charge in C<sub>622</sub> due to the very short time during which the tape deck is in the FAST FORWARD or REWIND mode. In order to prevent it, the circuit shown in Fig. 29, incorporating C<sub>623</sub>, was added. The addition of C<sub>623</sub> and R<sub>611</sub> prevents the delay in the charging of C<sub>622</sub>, and provides sufficient voltage to hold Q<sub>604</sub> ON instantaneously.

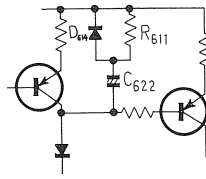


Fig. 28

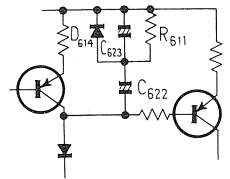


Fig. 29

● **Pause Circuit (Fig. 31)**

When the PAUSE switch is depressed (that is turned ON) during PLAYBACK or RECORDING, S<sub>20</sub> goes over to the PAUSE position, relay RL<sub>602</sub> releases, cutting off the supply to the take-up motor, at the same time cutting off the current to solenoids SL<sub>1</sub>, SL<sub>2</sub>, and SL<sub>3</sub>, bringing the tape to a halt.

**Reduction in Waiting Time by PAUSE Switch Operation**

If FAST FORWARD (or REWIND) has gone on for longer than some 6 seconds, C<sub>622</sub> will be fully charged, and depressing the PLAY button will involve a delay of some 6 or 7 seconds before PLAYBACK can commence. This limitation can be overridden, that is the delay considerably shortened, by the use of the PAUSE switch.

1. As already indicated, pressing the PLAY button would normally mean that the charge accumulated on C<sub>622</sub> holds Q<sub>604</sub> ON for at least several seconds.
2. If, under these conditions, the PAUSE switch is depressed, switches (S<sub>20-1</sub>, S<sub>20-2</sub>) go over to the positions indicated by the broken lines, and the base of Q<sub>603</sub> is directly biased via R<sub>610</sub> ~ S<sub>20-2</sub> ~ S<sub>18-1</sub> ~ S<sub>16-2</sub> ~ S<sub>17-2</sub>. Q<sub>603</sub> comes ON, and C<sub>622</sub> is very rapidly discharged via C<sub>622</sub> ~ D<sub>614</sub> ~ R<sub>608</sub> ~ Q<sub>603</sub> as shown in Fig. 31.
3. This discharge of C<sub>622</sub> reduces the base current of Q<sub>604</sub>, which goes OFF, thus causing relay RL<sub>601</sub> to be released.
4. When the PAUSE switch is put back (OFF), relay (RL<sub>602</sub>) comes immediately operative and tape travel commences.

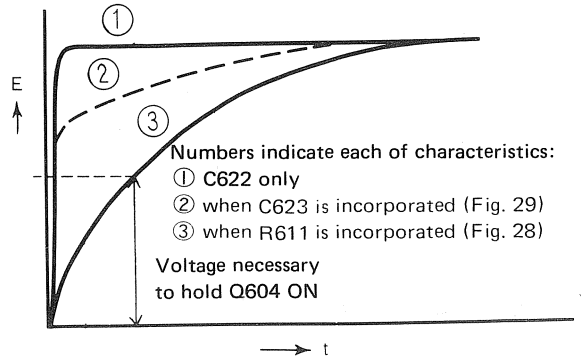


Fig. 30

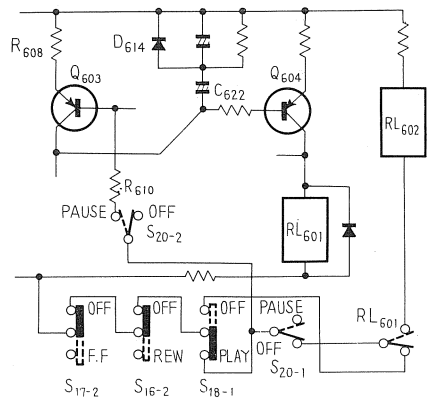


Fig. 31

● **Function Buttons Release Circuit**

When the tape has been fully taken up or has snapped, the shut-off switch (S<sub>15</sub>) goes 'OFF,' and solenoid SL<sub>601</sub> operates to release the function button.

1. S<sub>15</sub> goes ON when the tape is properly loaded, and feeds the AC supply to the circuit.
2. The base of Q<sub>601</sub> is subject to reverse bias via D<sub>604</sub>, and Q<sub>601</sub> is thus OFF. C<sub>609</sub> is also charged via D<sub>602</sub>.
3. When the tape has been fully taken up and S<sub>15</sub> goes OFF, no negative voltage from D<sub>604</sub> comes supplied, and the charge accumulated on C<sub>609</sub> positively biases Q<sub>601</sub> via R<sub>603</sub>, so that Q<sub>601</sub> goes ON, and C<sub>609</sub> discharges via SL<sub>601</sub> ~ Q<sub>601</sub>.
4. This discharge is the means by which the release solenoid operates, so releasing the function button which has been depressed.

5. This circuit, if S<sub>15</sub> is ON, will operate if the power supply is interrupted, and automatically release the function button.

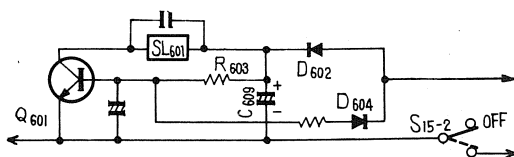


Fig. 32

● **Tape Speed Switching-over**

The capstan motor is a hysteresis synchronous type, operates at the main power supply frequency. Speed switching is effected by altering the number of poles by means of the SPEED SELECTOR switch, S<sub>5</sub>.

- 38cm/s (15ips) . . . . . 4 poles
- 19cm/s (7-1/2ips) . . . . . 8 poles

## 13. SELECTION OF LINE FREQUENCY AND VOLTAGE

### Selection of Line Frequency

1. Make sure power is OFF.
2. Remove back cover (A).
3. 50Hz to 60Hz:
  - Set drive belt on smaller diameter motor pulley.
  - Set switches to 60Hz.
4. 60Hz to 50Hz:
  - Set drive belt on larger diameter motor pulley.
  - Set switches to 50Hz.
5. When drive belt is set, make sure that the belt remains in its proper position as the flywheel is rotated by hand several times.
6. Clean any spots of oil that appear on the drive belt or flywheel with absolute alcohol.

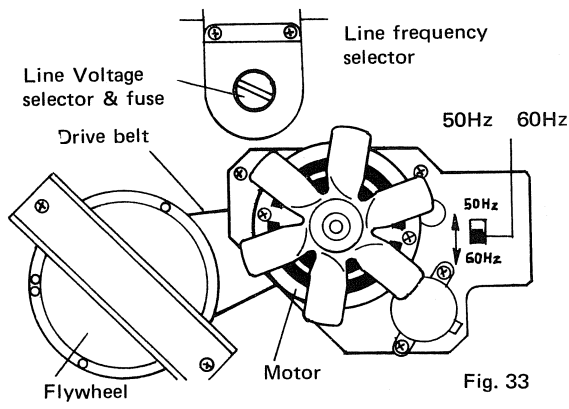


Fig. 33

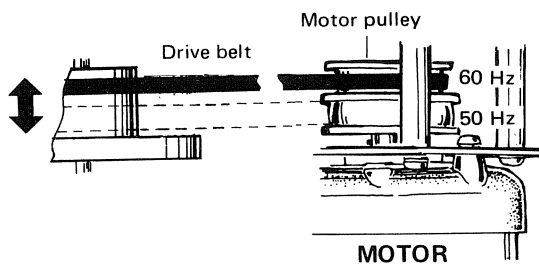


Fig. 34

### Switching Line Voltage Setting and Fuse

1. Make sure power is OFF.
2. Remove back cover (A), then LINE VOLTAGE SELECTOR switch is easily accessible.
3. To remove fuse, turn fuse cap.
4. Remove fuse plug from unit.
5. Put fuse plug back so as to see proper line voltage marking through cut in edge of plug.
6. 1-ampere fuse: used in either 220V or 240V area.
- 2-ampere fuse: used in 110V, 120V, or 130V area.

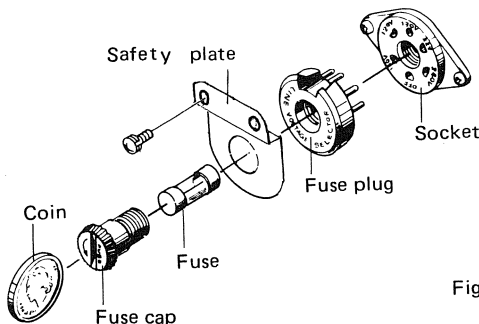


Fig. 35

**PIONEER ELECTRONIC CORPORATION**

4-1, 1-Chome, Meguro, Meguro-ku, Tokyo 153, Japan

**U.S. PIONEER ELECTRONICS CORPORATION**

178 Commerce Road, Carlstadt, New Jersey 07072, U.S.A.

**PIONEER ELECTRONIC (EUROPE) N.V.**

Meir-Center, Meir 21, 2000 Antwerp, Belgium

**PIONEER ELECTRONICS AUSTRALIA PTY. LTD.**

256-B City Road, South Melbourne, Victoria 3205, Australia