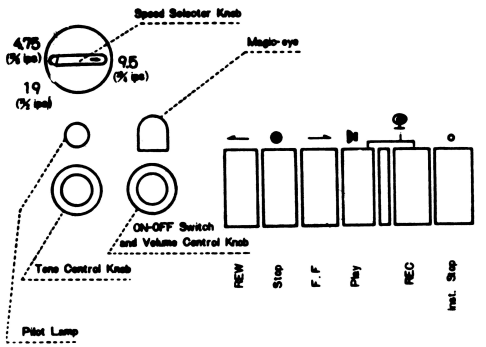
SPESIFICATION

Power source :	AC mains 100-250V 50~ 60~
Power consumption :	abt. 40W
Rated output :	2W (3W maximum)
Tube complement :	12AX7 1 Voltage amplifier
	6BM8 2 " " , oscillator and power-amplifier
	6DA5 1 recording level indicator
Recording system :	AC bias at 40KC
Erasing system :	AC erasure
Tape speeds :	3 speeds
	7½, 3¾ and 1⅞ ips
Playing time :	30 min. × 2 at 7½ ips with 7" 1,200 ft. tape
	1 hour × 2 at 3¾ ips with 7" 1,200 ft. tape
	2 hours × 2 at 1⅞ ips with 7" 1,200 ft. tape
Frequency response :	50 — 12,000 c/s at 7½ ips
	50 — 8,000 c/s at 3¾ ips
	50 — 5,000 c/s at 1⅞ ips
Operation :	keyboard operation
Recording level indication :	magic-eye
Inputs :	1 — microphone 20 KΩ unbalanced
	1 — radio and phono 1 MΩ unbalanced
Output impedance :	3 Ω
Fast forward :	within 3 minutes with 7" 1,200 ft. tape
Rewind :	" "
Built-in speaker :	6" × 4" permanent dynamic speaker
Tape counter :	digital
Dimensions and weight :	12" × 13" × 7½"
	abt. 22 lbs.

DESCRIPTION OF MECHANISM



a. General

(1) The mechanism is so designed that push-buttons work only after power is on by turning volume-control knob clockwise. When power is turned off push-buttons are unlocked and return to original positions.

(2) When one of push buttons, Rewind, F.F., Play-back and Record is pressed, previously locked buttons return to their original positions.

(3) To play-back or record from Rewind or F.F. position, Stop button must first be pressed and then Play-back or Record button. While in Rewind or F.F. position, Instant-pause button does not work.

(4) To record, both Play-back and Record buttons shall be pressed together. Record button alone sets amplifier for recording, but has no mechanical action.

(5) While in Record or Play-back position, tape speed can not be changed.

(6) Turn volume-control knob clockwise. Power is on, pilot lamp is lighted, and motor and reel-pulleys rotate, but both supply-reel and take-up-reel holders remain stationary.

(7) Turn speed-knob to desired position. Idler is set at proper position.

(8) Press Play-back button. Idler and pinch-roller are pressed against capstan and by their rotation tape is propelled. Take-up reel rotates and winds up tape. Play-back thus commences.

(9) Press Instant-pause button while in Record or Play-back position. Pinch-roller is freed and supply reel holder is braked, and tape stops. Release the button. Tape resumes progress.

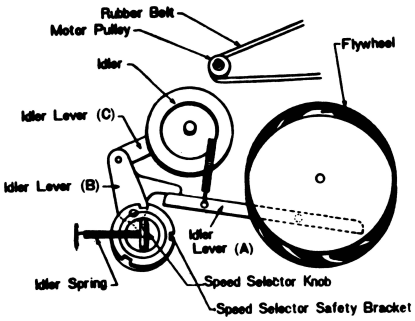
(10) Press Rewind button. Belt is pressed against supply reel holder by rewind-tension-pulley, and tape is rewound fast.

(11) Press F.F. button. Take-up reel rotates and winds up tape fast.

b. Speed Change.

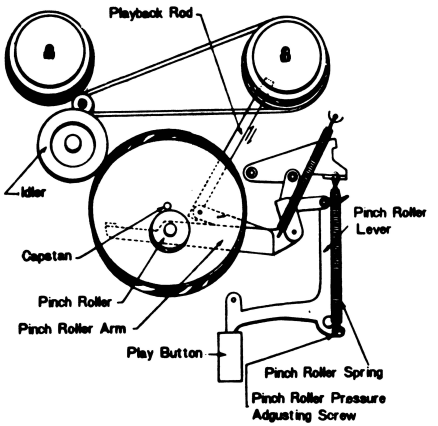
Turn speed-knob.

Idler lever shaft is moved up and down by cam beneath the knob and idler is set at the required position of motor-pully. Press Play-back button. Idler lever (A) (see figure 2) is freed and idler is pressed against motor-pulley and flywheel by spring. While in Playback position, safety device in the knob prevents accidental change of speed.



c. Recordand Play-back.

Record button pushes switch-lever and changes over amplifier for recording. Press Play-back button. Idler is pressed against motor-pulley and flywheel, and capstan rotates. Pinchroller is pressed against capstan, and tape-pads are pressed against head-cores. Tape is passed between pads and heads. Take-up reel pulley is pushed up by play-back rod and clutch Plate, and felt disk is pressed against stainless steel surface by the action of foam resin spring. Rotation is thus transmitted to reel-holder by slippery friction of felt. Take-up reel winds only the length of tape sent out through capstan and pinch-roller without slack. Supply-reel holder rotates under the friction between felt disk and steel surface as shown, thus imparting back-tension to tape.



d. Fast Forward

F.F. roller is pressed against reel-pulley and its rotation is transmitted to take-up-rel holder. F.F. roller consists of two disks pressing each other by spring, with a felt ring between the two, so that when it is over-loaded, the two disks slip each other to get automatic speed control. In this case, supply-reel-horder imparts back tension to tape with its own weight, same as in the case of Play back.

(4) **Bias current.**

Proper bias shall be given for optimum recording. After adjusting oscillation frequency, attach resistor 100Ω in series to ground side of Record/Play-back head and measure voltage at the both ends. Adjust with trimmer condenser.

Porper A.C. bias : 0.2¿ mA (with resistor, 100Ω

Voltage at the both ends : $0.25 \times 10^{-3} \times 100 = 0.025$V).

(5) **Erasing current.**

If erasing current is not proper, insufficient erasure or over-heat of erase-head may occur. Attach resistor, 10Ω to ground side of erase head, and measure voltage at the both ends. Proper erasing current : 25 - 45mA (with resistor, 10Ω attached, voltage at the both ends : 0.25 - 0.45V). If proper value is not obtained, adjust it by changing the capacity of condenser, C500PF, connected in series to erase head.

(6) **Record level indicator.**

If recording level is not proper, insufficient play-back out-put or distortion of sound may occur. To cure this, either short-circuit grid and ground of oscillation tube V2 b 9 BM / 8 p or short-circuit plate and grid of oscillation coil TOC-1, then stop oscillation and see if magic eye closes when signal current to record-head is 0.03mA at 1KC/S, by adjusting semi-fixed volume-control, VR3 500KΩ (B).

MAINTENANCE

a. Cleaning and Lubrication.

Parts to be oiled are so marked.

Capstan bearing	1-2	drops
Pinch-roller	〃 1	〃
Idler	〃 1	〃
Motor	1-2	〃

Care shall be taken not to over-lubricate or soil other parts with oil unnecessarily. Spindle or machine oil shall be used. Rubber parts such as idler, belt, and pinch-roller may slip if soiled with oil or foreign matter. Clean such with cloth saturated with carbon tetrachloride.

b. Maintenance.

(1) **Record Play-back and Erase heaes.**

Good performance of tape-recorder depends largely on heads. Accumulation of dust on head cores shall not be over-looked. It must be cleaned with carbon tetrachloride. Head cores are brushed by tape continually and their efficiency is lowered by wear. Life of head is 1000 hours, after which head shall be replaced with new one.

(2) **Motor.**

Motor rarely gets wrong. But occasional oiling is necessary. Oil it after each 500 hours of performance. Use spindle oil or machine oil.

(3) **Mechnism.**

(a) **Idler.**

The surface of idler in contact with motor-pulley shall ba cleaned with carbon tetrachoride. The surfaces of motor-pulley and flywheel in contact with idler shall also be cleaned. oil bearing 1-2 drops aftar 200 hours of performance.

(b) **Pinch-rolle.**

The surfarce of pinch-roller in contact with capstan shall be similarly cleaned. Bearing shall be oiled 2-3 drops after 200 hours of performance.

(c) **Capstan.**

Clean capstan with benzene. oil bearing 1-2 drops once in 200 hours. The surface of capstan in contact with pinch-roller shall be kept flee of oil. otherwise tape may slip and pinch-roller rubbey may be damaged'

(d) **Rewind tension pulley.**

oil bearing once in 200 hours. The surface in contact with belt shall be cleaned with benzene. Any oil on the surface will cause slip, and shall be cleaned.

(e) **F.F. Pulley.**

oil bearing once in 200 hours. The surface in contact with reel holder shall ba cleaned with carbon tetrachoride. Any oil on the surface of rubber part shall be cleaned to prevent slip.

(f) **Reel-holders.**

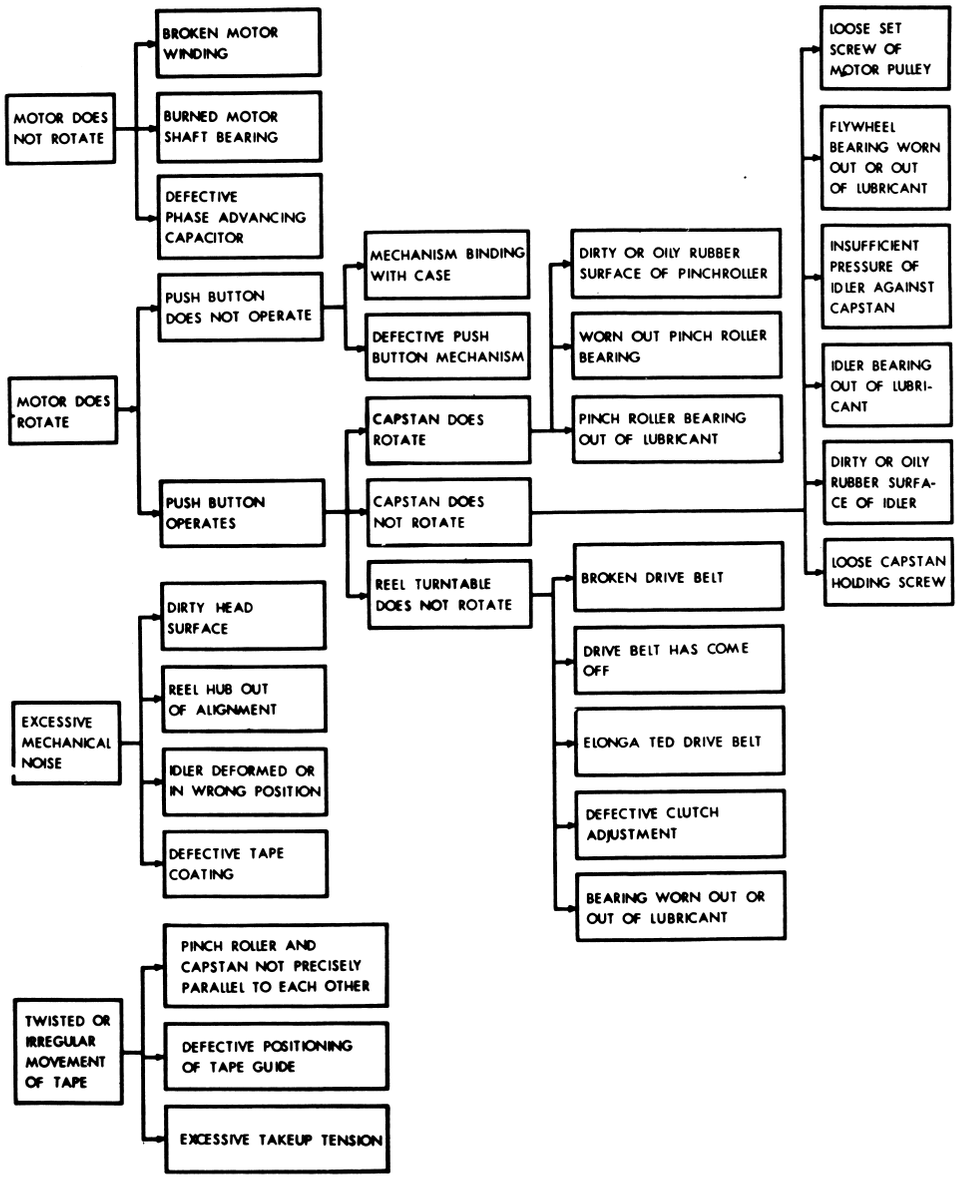
The surfaces of supply-reel-holder in contact with brake and belt shall be occasionally cleaned.

The surface of take-up-reel-holder in contact with F.F.pulley shall be kept free from dust to prevent slip.

a. Electric cycls

This tape-recorder is designed to be adaptable to either cycles, 50 or 60 per second, by changing diameter or capstan according to the cycles of power source. For50 C/S the sleeve shall be attached to capstan and for 60C /S the sleeve removed. Be sure you are operating on proper cycles.

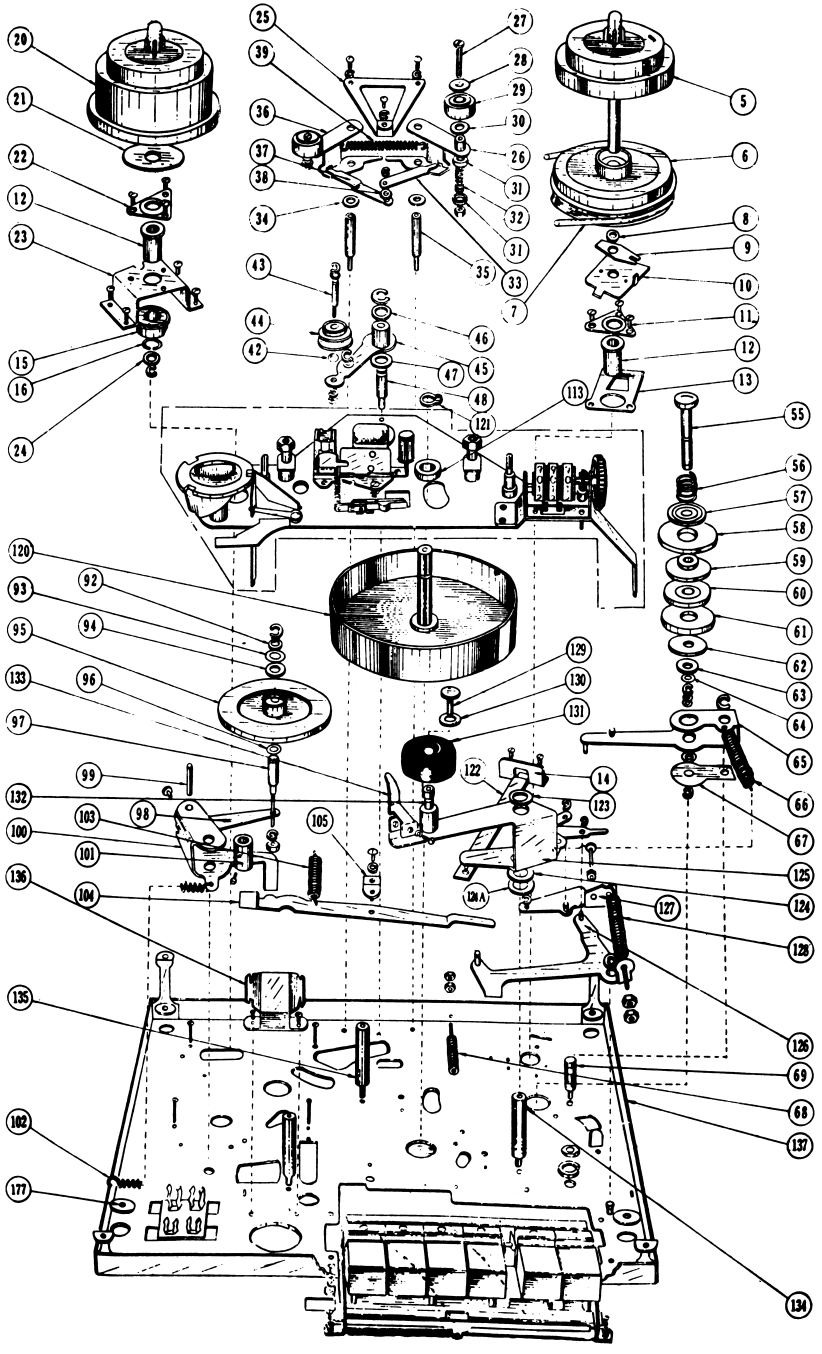
RQ-720 TROUBLE SHOOTING GUIDE 1
MECHANISM (1)
MALFUNCTIONS IN RECORD PLAYBACK MOTION



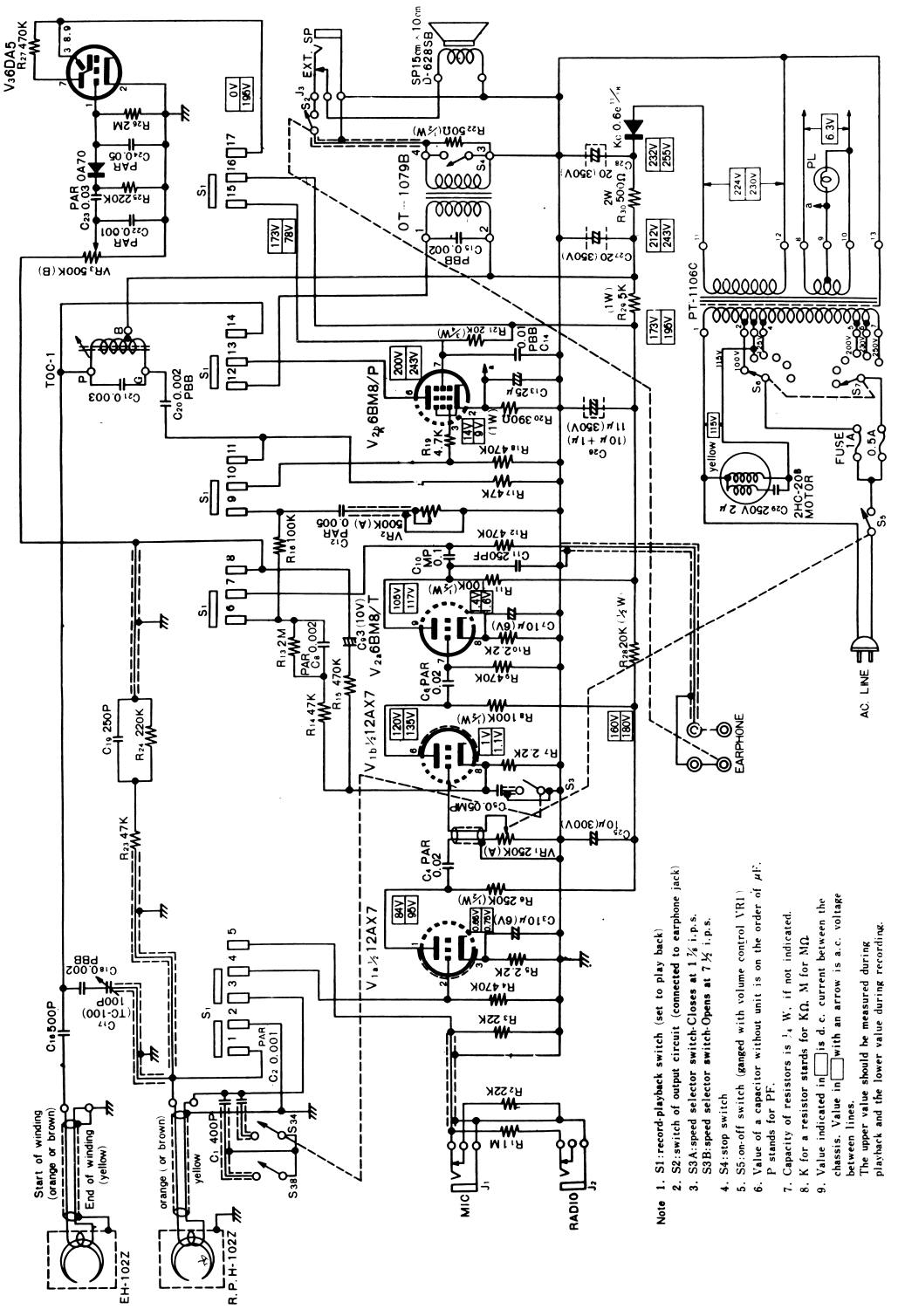
REPLACEMENT PARTS

1 Volume control knob
2 Head cover
3 Panel
4 Plastic console assembly
5 Takeup reel pan
6 Reel-pan Pulley
7 Rubber belt
8 Takeup reel pan shaft & washers
9 Reel pan shaft washers
10 Clutch plate
11 Takeup reel pan spacer Holder-B
12 Reel pan spacer
13 Takeup reel pan spring
14 Clutch plate Guide
15 Reel pan spindle oil cap
16 Rewind reel pan adgusting washer
17 Counter pulley (A)
18 Takeup reel spindle Bearing
19 Takeup reel spindle bracket
20 Rewind reel pan
21 Rewind-reel pan felt washer
22 Rewind-reel pan spacer holder
23 Rewind-reel pan bracket
24 Rewind-reel pan adgusting Washer
25 Brake holding bracket
26 Takeup brake Roller (Assembly)
27 〃
28 〃
29 〃
30 〃
31 〃
32 〃
33 Takeup brake arm
34 Rewind brake arm washer
35 Rewind brake arm shaft
36 Rewind brake Roller assembly
37 Rewind brake arm
38 Brake arm washer
39 Brake spring
40 Brake Rod spring
41 Brake Rod washer
42 Rewind tension pulley shaft
43 Rewind tension pulley washer
44 Rewind tension pulley
45 Rewind tension arm
46 Rewind shaft washer
47 Rewind tension arm washer
48 Rewind tension arm shaft
49 Rewind Rod washer
50 Rewind Rod bracket
51 Rewind Rod spring (B)
52 Rewind Rod
53 Rewind Rod spring (A)
54 Rod washer
55 Fast forward lever (Assembly)
56 〃
57 〃
58 〃
59 〃
60 〃
61 〃
62 〃
63 〃
64 〃
65 Fast forward lever
66 Pinch roller spring
67 Phenolic washer for fast forward lever
68 Fast forward lever shaft assembly
69 〃
70 Fast forward Rod (A)
71 Fast forward Rod spring
72 Fast forward Rod washer
73 Recording/Playback Head RPH-102Z
74 Erasing Head EH-102
75 RP Head spacer
76 Erasing Head limitter (spacer)
77 Recording Head Base
78 Erasing Head spring
79 Erasing Head bracket spring
80 Capstan screw
81 Capstan 50～
82 Capstan speacer
83 Capstan washer
84 Limitter
85 Tape Guide screw
86 Tape Guide washer (A)
87 Tape Guide
88 Tape Guide washer (B)
89 Tape Guide plate
90 Metal hook for Drive Idler (Assembly)
91 〃
92 Idler washer (A)
93 Idler washer
94 Idlerfelt
95 Idler
96 Idler washer (C)
97 Idler shaft
98 Drive Idler lever (C)
99 Drive Idler arm pin
100 Drive Idler lever (B)
101 Drive Idler arm spacer
102 Drive Idler spring
103 Drive Idler lever spring
104 Drive Idler lever-A assembly
105 〃
106 Drive Idler lever speacer
107 Speed selector knob
108 Speed selector knob safety metal
109 Speed selector spring
110 Speed selector knob washer
111 Speed selector switch (A) 1
112 Speed selector switch (B) 1
113 Capstan oil cap
114 Flywheel bearing
115 Flywheel bearing relain
116 Counter
117 Counter spring joint
118 Counter holding bracket
119 Sub-Base plate
120 Flywheel
121 Capstan holding washer
122 Takeup Rod
123 Pinch Roller Holder Washer
124 Pinch Roller Washer (A)
125 Pinch Roller Holder Washer (B)
126 Pinch Roller Holder
127 Pinch Roller lever (A)
128 Pinch Roller lever (B)
129 Pinch Roller spring
120 Pinch Roller holding screw
131 Pinch Roller felt
132 Pinch Roller
133 Pinch Roller shaft
134
135 Pole-A (for) Rub-base plate
136 Pole-B (for) Sub-base plate
137 Magic-eye holder
138 Instant Stoplever-A Assembly
139 Instant Stop lever-B Assembly
140 Instant Stop Rod
141 Instant Stop lever C spring
142 Instant Stop rod spring
143 Instant Stop lever C assembly
144 Counter Shaft bearing
145 Counter pulley
146 Counter rubber belt
147 Motor mounting board rubber-cushion (A)
148 Motor mounting board rubber-cushion (B)
149 Washer for above
150 Motor holding screw
151 Motor holding washer
152 Motor mounting rubber cushion
153 Motor mounting spacer
154 Washer for motor mounting
155 Motor pulley
156 Motor
161 Motor mounting board
162 Rewind button assembly
163 Stop button
164 Fast foward assembly
165 Recoring/Playback and Instant stop button assembly
166 〃 〃
167 〃 〃
168 Puch button leaf spring
169 Push button shaft
170 Push button frame assembly
171 Viny pipe-A for push button shaft
172 Viny pipe-B for push button shaft
173 Push button lever spring
174 Push button lever bracket
175 Push button lever
176 Push button lever-A spring
177 Base plate rubber cushion washer
173 Rubber cushion
179 Pipe
180
181 Stop switch

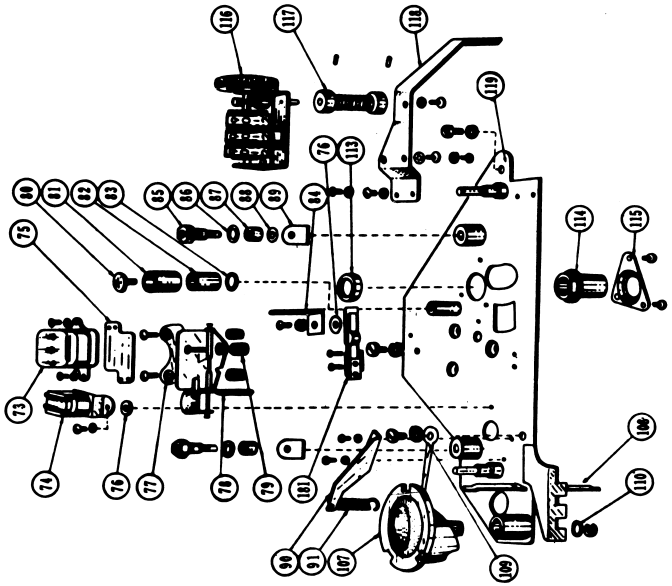
V1 Tube Eletctron 6267
V2 〃 〃 6BM8
V3 〃 〃 6DA5
OA 70 Germanium Diode
R1 Carbon film resistor RD¼LZ1MΩK
R2 〃 〃 〃 RD¼LZ22KΩK
R3 〃 〃 〃 RD¼LZ22KΩK
R4 〃 〃 〃 RD¼LZ470KΩK
R5 〃 〃 〃 RD¼LZ2.2KΩK
R6 〃 〃 〃 RD½LZ250KΩK
R7 〃 〃 〃 RD¼LZ2.2KΩK
R8 〃 〃 〃 RD½LZ100KΩK
R9 〃 〃 〃 RD¼LZ470KΩK
R10 〃 〃 〃 RD¼LZ2.2KΩK
R11 〃 〃 〃 RD½LZ100KΩK
R12 〃 〃 〃 RD¼LZ470KΩK
R13 〃 〃 〃 RD¼LZ2MΩK
R14 〃 〃 〃 RD¼LZ47KΩK
R15 〃 〃 〃 RD¼LZ470KΩ
R16 〃 〃 〃 RD¼LZ100KΩK
R17 〃 〃 〃 RD¼LZ47KΩK
R18 〃 〃 〃 RD¼LZ470KΩK
R19 〃 〃 〃 RD¼LZ4.7KΩK
R20 〃 〃 〃 RD1LZ390ΩK
R21 〃 〃 〃 RD⅝LZ20KΩK
R22 〃 〃 〃 RD½LZ50ΩK
R23 〃 〃 〃 RD¼LZ47KΩK
R24 〃 〃 〃 RD¼LZ220KΩK
R25 〃 〃 〃 RD¼LZ220KΩK
R26 〃 〃 〃 RD¼LZ2MΩK
R27 〃 〃 〃 RD¼LZ470KΩK
R28 〃 〃 〃 RD½LZ20KΩK
R29 〃 〃 〃 RD1LZ5KΩK
R30 〃 〃 〃 RD2LZ500ΩK
VR1 Variable Resistor
SNV-24CA R43 250KΩA ME
VR3 〃 〃
NV-24C R43 500KΩA
VR 〃 〃
NV-16S1.2 500KΩB
C1 Titanium Capacitor400PF±10%
C2 tubular capacitor PAR-4102
C3 Electrolytic tubular capasitor NCT-6V10 10μF
C4 tubular capacitor 0.001μF PAR-4203
C5 MPtubular MPC-4503 0.02μF
C6 tubular capacitor PAR-4203 0.02μF
C7 Electrolytic tubular NCT-6V10 10μF
C8 tubular capacitor 0.02μF PAR-4202 0.002μF
C9 Electrolyitc tubular capacetor NCT-10V3 3μF
C10 MPtubnlar MPC-4104 0.1μF
C11 tubular capacetor 250PF±10%
C12 tubular capacetor PAR-4502 0.005μF
C13 Electrolytic tubular capacetor NCT-25V 25μF
C14 Oell tubulay PBB-6202 0.01μF
C15 tubular capacetor PBB-6202 0.002μF
C16 titanium capacetor 500PF± 5%
C17 capacetor TC-100 100PF
C18 tubular capacitor PBB-6202 0.002μF
C19 Titanium capacitor 100μF 250PF±10%
C20 tubular canacetor PAR-4202 0.002μF
C21 miea capacitor NL-Z0.003μF
C22 tubular capacitor PAR-4102 0.001μF
C23 tubular capacitor PAR-4303 0.03μF
C24 tubular capacitor PAR-4503 0.05μF
C25 Elebtrolytic tubular capacitor CT-300V10 10μF
C26 Electrolytic Capacitor 11μF
C27 〃 〃 RA-350V51E-G 20μF
C29 〃 〃
P.T Power Transformer PT-1106A
Selenium Rectifier KC0.6e11/18
Output Transformer OT-1079B
O.T TOC-1 Oscillator Coil
S.P D-628S Speaker
S1 Sliderswitch TR-6A
J1 TMS Jack
J2 M-3 Jack
J3 M-3 Puug

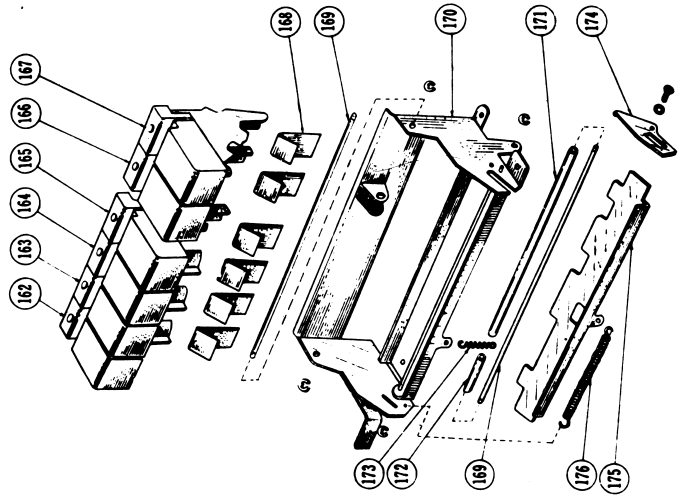


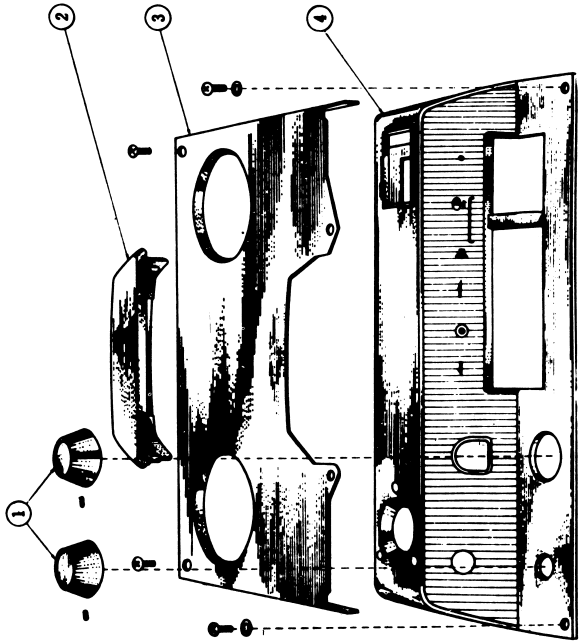
SCHEMATIC DIAGRAM

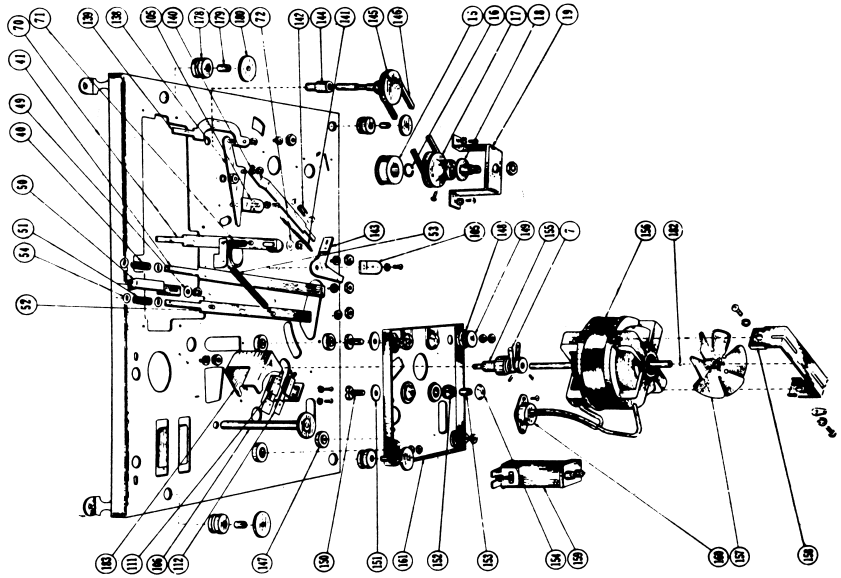


Note
1. S1: record-playback switch (set to play back)
2. S2: switch of output circuit (connected to earphone jack)
3. S3A: speed selector switch-Closes at 1⅞ i.p.s.
   S3B: speed selector switch-Opens at 7½ i.p.s.
4. S4: stop switch
5. S5: on-off switch (ganged with volume control VR1)
6. Value of a capacitor without unit is on the order of μF. P stands for PF.
7. Capacity of resistors is ¼ W. if not indicated.
8. K for a resistor stands for KΩ. M for MΩ.
9. Value indicated in □ is d.c. current between the chassis. Value in □ with an arrow is a.c. voltage between lines.
   The upper value should be measured during playback and the lower value during recording.



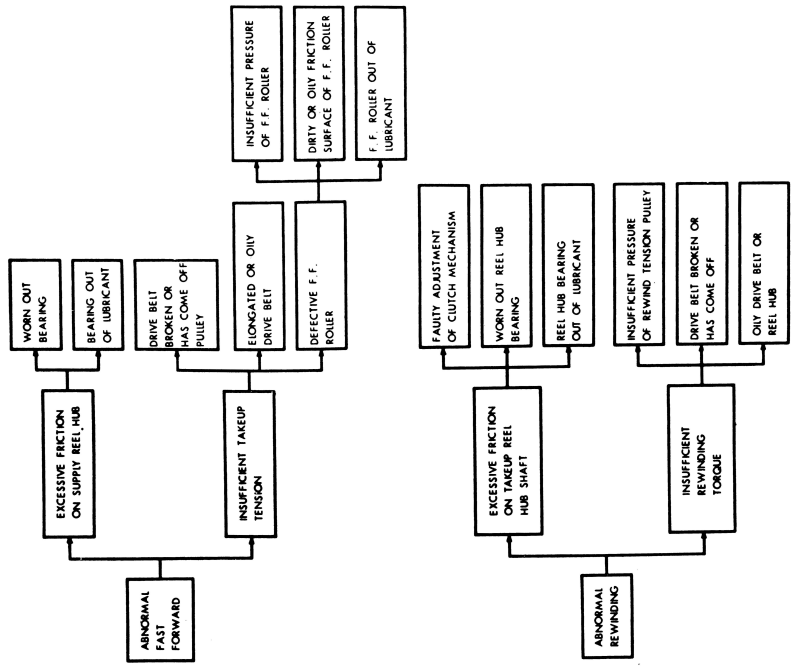




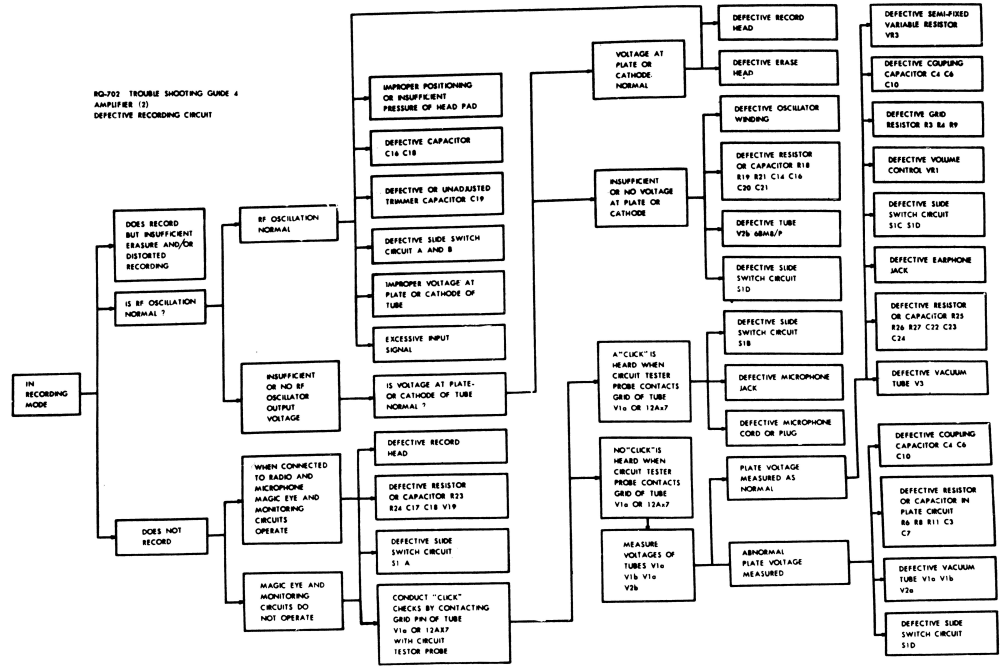


VIEW OF ASSEMBLY

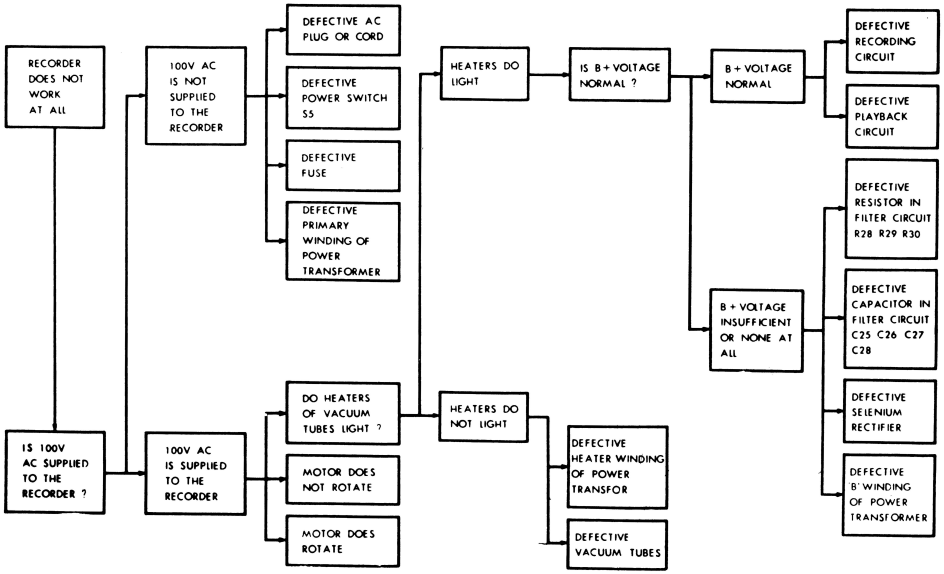
RQ-702 TROUBLE SHOOTING GUIDE 2
MECHANISM (2)
MALFUNCTIONS IN FAST FORWARD/REWIND MOTION
(SEE DETAILED DRAWING OF MECHANISM)



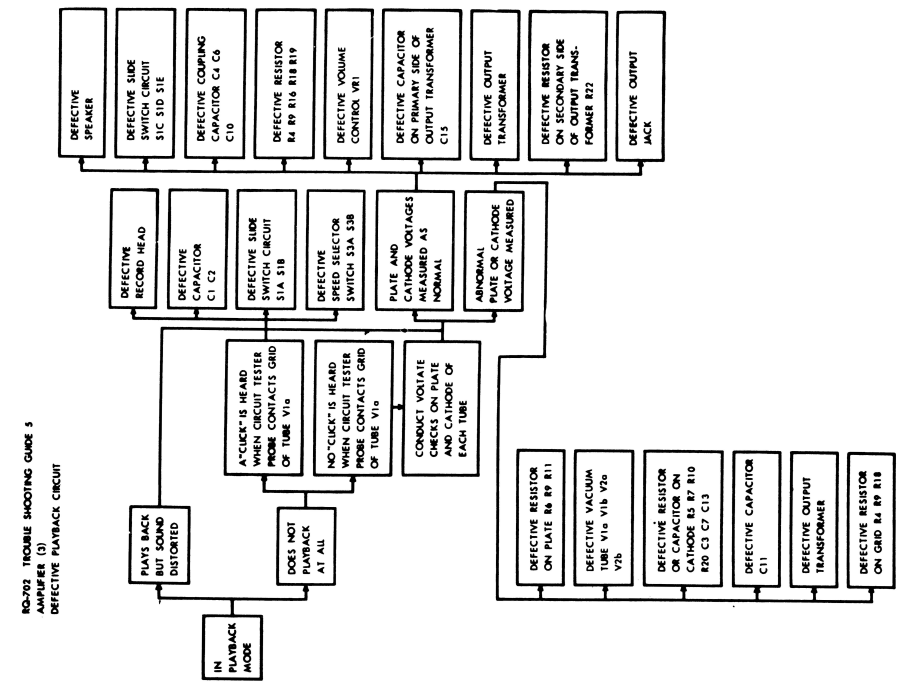
RQ-702 TROUBLE SHOOTING GUIDE 4
AMPLIFIER (2)
DEFECTIVE RECORDING CIRCUIT



RQ-702
TROUBLE SHOOTING GUIDE 3
AMPLIFIER (1)
NO RECORDING OR PLAYBACK



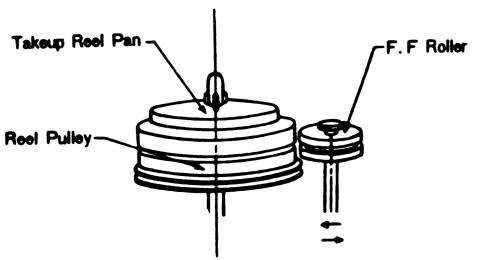
RQ-702 TROUBLE SHOOTING GUIDE 5
AMPLIFIER (3)
DEFECTIVE PLAYBACK CIRCUIT

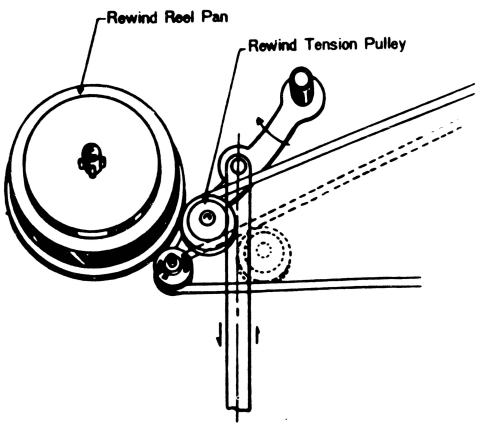


e. Rewind.

Press Rewind button.

Rubber belt is pressed against supply-reel holder by re wind-tension-pulley as shown (figure 5) and rotation of motor is directly transmitted to reel-holder while take-up-reel holder also rotates under the friction of felt disk at the bottom of reel-spindle.





f. Instant-pause.

Press instant-pause button.

Pinch-roller is freed from capstan, supply-reel holder is braked and tape stops instantly. As soon as the button is released, pinch-roller presses against capstan and brake is released and tape is propelled.

g. Stop.

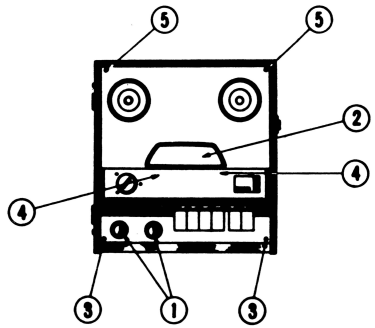
Press Stop button.

Push buttons are unlocked, brake-arms stretch both reel-holders are braked and tape stops.

DISASSEMBLING

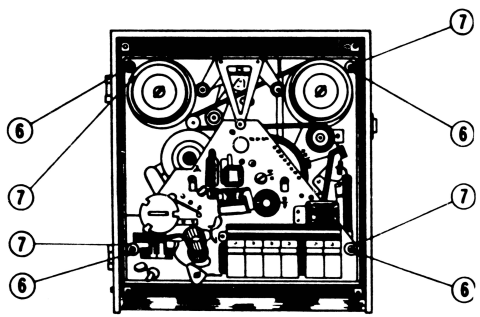
a. Panel (See figure 6 and detail drawing 1).

(1) Loosen set screw ① of knobs.
(2) Pull out head cover ②.
(3) Remove screws ⑧ and pull out mount.
(4) Remove nuts ④ from panel.
(5) Remove 2 screws ⑤ from panel.
(6) Remove panel upwards.



b. Mechanism

(1) Remove nuts ⑥ at corners with 4 m/m box.
(2) Remove washers ⑦
(3) Push sufficient length of power cord into cabinet through the opening in spare parts box.
(4) Remove the whole mechanism gently upwards.



c. Motor

(1) Unhang rubber belt from motor-pulley.
(2) Loosen set screw and remove motor-pulley.
(3) Dis join soldered lead-wires of motor.
(4) Remove nuts from motor holder plate with 3m/m box.
(5) Remove motor and holder plate together from bottom board.
(6) Remove 4 screws from holder plate and screws from oil-cup, and motor comes off.

d. Tape-counter

(1) Loosen set screw at the top of counter-spring joint.
(2) Remove 2 screws from counter holder, and tape-counter and holder come off.
(3) Remove screws on counter, and counter and horder are separated.

e. counter-belt

Remove 2 screws from take-up-reel bearing angle and unhang rubber belt from pulley.

f. Supply-reel holder.

Remove clamp (c washer) from supply-reel holder and pull out reel holder upwards.

g. Take-up-reel horder.

Loosen set screw on reel-holder counter (A) and pull out reel holder upwards.

CONDITIONING

a. Mechanism.

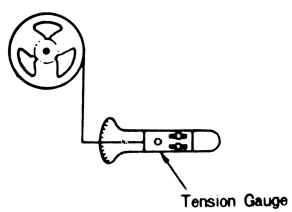
(1) **Pinch-roller.**
Normal pressure of pinch-roller shall be 1.0 Kg - 1.5 Kg. In Play-back position, pull pinch-roller in a direction from the center of capstan to that of pinch-roller. Find out the point where pinch-roller misses rotation and measure the pressure at that point. Adjust the pressure by pinch-roller spring (128)

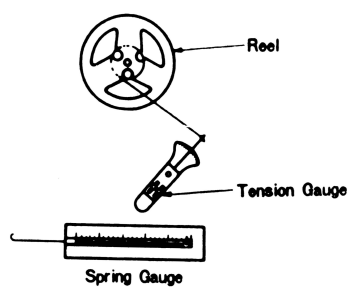
(2) **Idler.**
Normal pressure shall be 200 - 300 gr at the speed of 4.75cm/s. Pull away idler from the line connecting centers of motor-pulley and flywheel in a direction perpendi-cular to the line. Fir.d out the point where it misses rotation and measure the pressure at that point. Adjust the pressure by idler spring (102).

(3) **Winding tension for Play-back.**
Normal tension for No. 7reel, fully loaded shall be 20 - 40 gr. Adjust tension by clutch-adjusting screws.

(4) **Winding tension for F.F.**
Normal tension for No. 7 reel, fully loaded shall be over 100 gr. Adjust tension by F.F. lever spring and by cleaning or changing F.F. rollar (58).

(5) **Rewinding tension.**
Normal tension for fully loaded No. 7 reel shall be over 100 gr. Adjust tension by rewind rod spring (51).

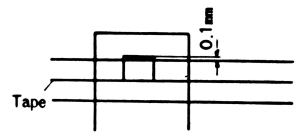




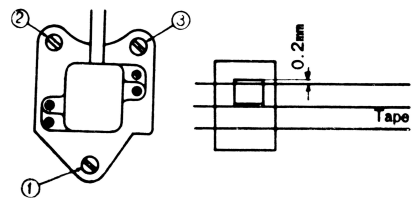
(6) **Pads.**
Normal pressures of pads shall be : 10 - 20 gr for Erase and 25-35 gr for Record/play.

b. Heads.

(1) **Erase head.**
In play-back position, bring down pad forward and see if relative positions of head core and tape are as shown. If head core is located lower than as illustrated, adjust it by inserting spacer beneath the head.



(2) **Record/Play-back head.**
In Play-back position, bring down pad and see if head is accurately levelled and relative positions of head core and tape are as shown. Adjust the height by screws ① ② & ③. Play-back a signal, 7000 c/s at 19 cm/s on Standard tape for adjusting angles, and find out a point where the maximum output is obtained, by adjusting screws ② and. ③ After adjusting angles, the relative positions of head core and tape shall be as shown in figare 11. In case the standard tape is not available, record a signal with a reliable tape-recorder and play it back. Find out the point where the maximum reproduction is obtainable, by hearing.



c. Amplifier.

(1) **Stop-swiitch.**
To prevent the generation of noise from amplifier through speaker, install a stop-switch which will short-ciruit the secondary lines of out-put transformer when in Rewind, F.F. or Stop position.

(2) **Speed switch.**
Amplifier is changed over so that frequency response most suitable for each different speed is obtained in either Record or Play-back position. This equalization of frequency response is effected by changing over the condenser connected in parallel to head in Play-back position and the condenser connected to negative feed-back circuit :
19 cm/s. Switch shall be entirely off and condensers, C1 400PF, C2 0.001μF, C5 0.05μ, not connected to circuit.
9.5cm/s. Condenser, C1 400PF connected. in parallel to Play-back head.
4.75cm/s. condensers, C1 400PF and C2 0.001μF connected in parallel to Play-back head and C5 0.05μF connected to negative feed-back circuit.
Speed switch shall be installed in a manner to satisfy the above requirements.

(3) **Oscillation Frequency.**
Oscillation frequency of recording bias and erasing high frequency oscillation circuit shall be kept at 40 KC/S $\pm$ 10%, by adjusting screws on dust core of oscillation coil, Attach resistor, 10Ω in series to ground side of erase head, and measure by comapring frequency of voltage at the both ends with frequency of standard oscillator (Broun-tube oscilloscope shall present Lissajous figure).