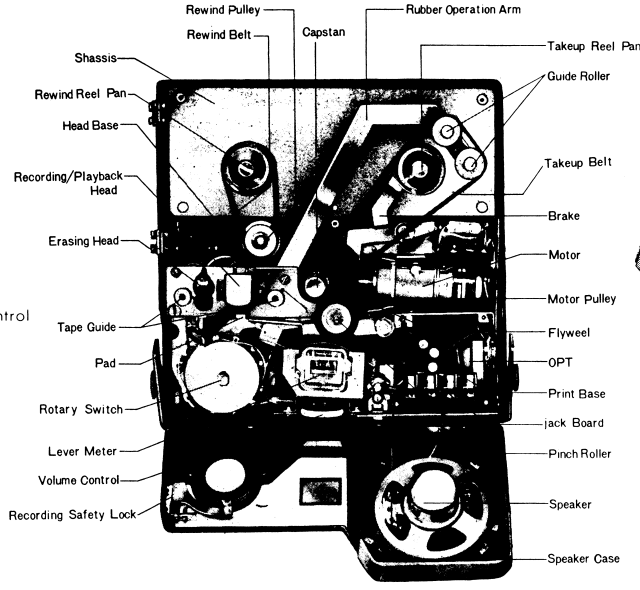
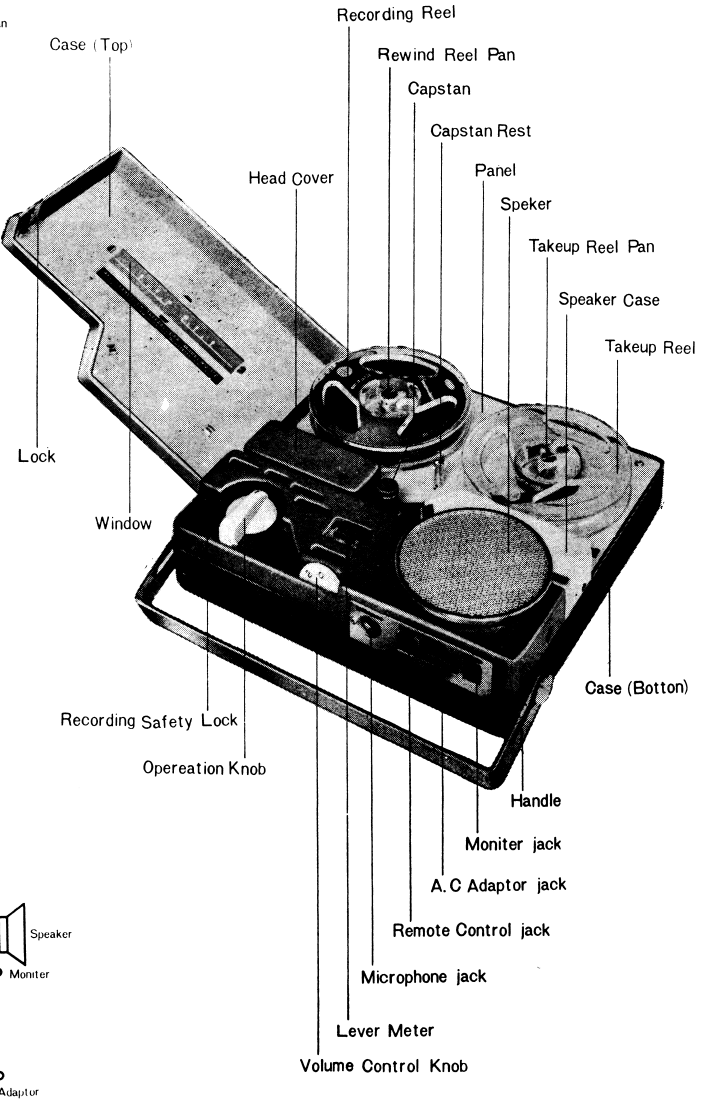
SPECIFICATIONS

Power source :	self contained dry batteries (penlight dry cells. (♯-3) 6 for amplifier and 6 for motor. 9 volts each) 100/115/230 volt AC operation with AC adapter.
Power comsumption :	amplifier : 9 volts 19 mA motor : 9 volts 160 mA
Rated Power output:	100mW Max.
Semiconductor complement :	OC 71 2 OC 72 2 thermister 1 diode 1
Recording system :	DC bias
Erasing system :	DC erasure
Recording level indication :	miniature output meter
Tape speed :	two speeds. 3 ¾″ (9.5cm) sec. 1 ⅞″ (4.75cm) sec.
Recording time :	15min. × 2 at 3 ¾″ 30min. × 2 at 1 ⅞″
Rewinding :	less than 3 min.
Operation :	Simplified one knob control and volume control
Frequency response :	200-5,000 at 3 ¾″ 200-4,000 at 1 ⅞″
Input :	100 k ohm unbalaced
Output :	10 ohm unbalanced
Speaker :	Built-in 2 ½″ PM speaker
Dimensions :	6 ½″ × 6 ⅞″ × 1 ¾″
Weight :	3 ½″ lbs complete with batteries

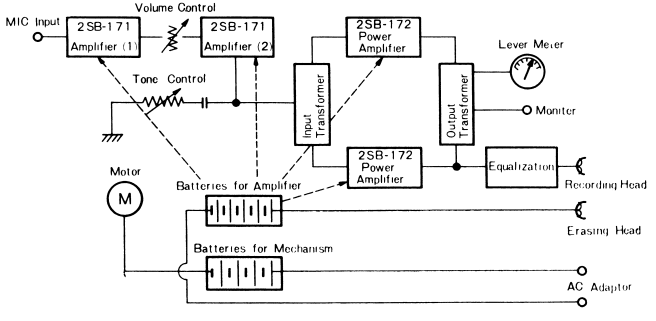
FUNCTIONAL PARTS

NATIONAL MODEL RQ-112

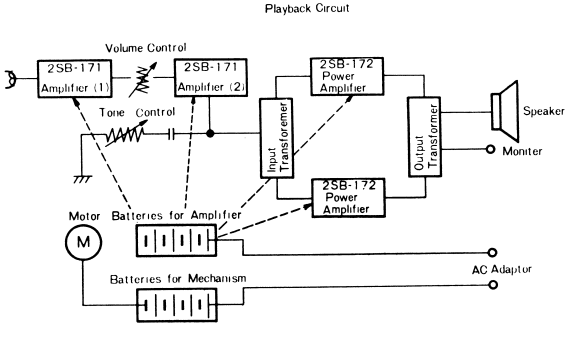




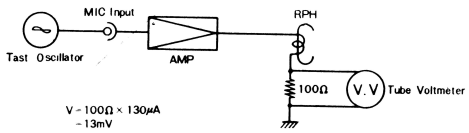
Recording Circuit



Playback Circuit



100Ω in series to record-head, and let VU meter indicates 0 when current is 130 μA.
If no testers are available, play-back tape recorded at the position of OVU and ludge by hearing.

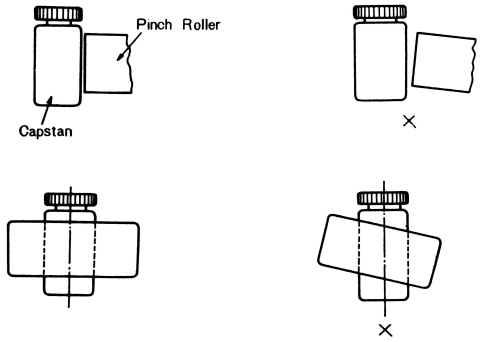


f. Conditioning of Functional Parts :

As the conditioning of functional details according to numerical values is practically not easy, determine it by watching actual performance of each part. Balance of capstan and pressure of pads affect the performances of tape-recorder and tape, and shall be carefully conditioned.

j. Balance of Capstan :

When balance is lost, it will result in irregular travelling of or even stretching of one edge of tape.
Adjust as shown so that capstan and pinch-roller are maintained in a close and parallel contact.



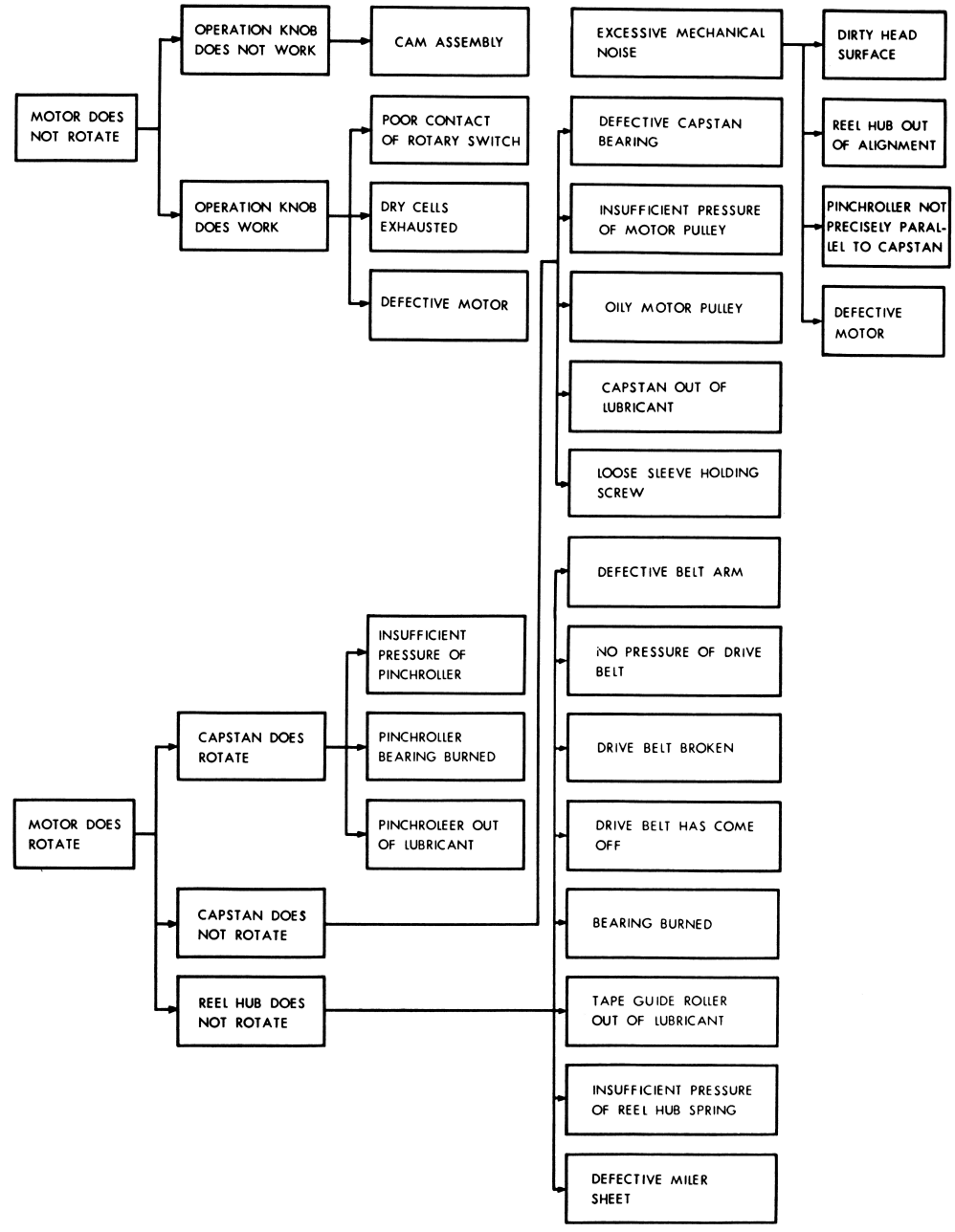
h. Lubrication :

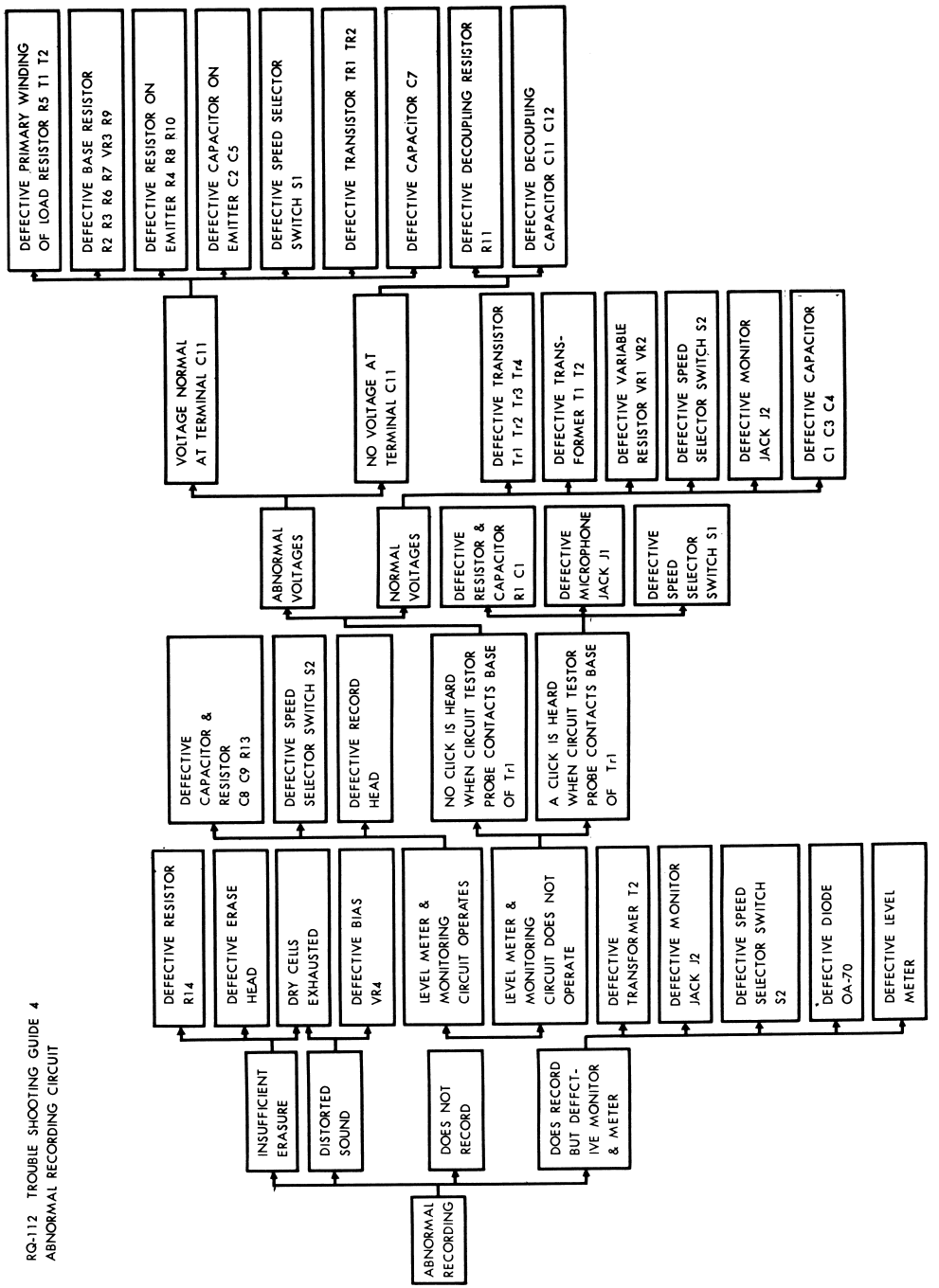
This tape-recorder does not, as a rule, require oiling, but it is preferable to oil once in a year or when parts are repaired, as following :

Capstan bearing	1～2 drops	small drops from needle point
Pinch-roller bearing	1～2 〃	
Rewind-pulley bearing	1～2 〃	
Motor bearing	1 〃	
Reel spindles	1～2 〃	

Use fine spindle oil, but do not over-lubricate or soil other parts with oil, as such will have adverse effects.

4. RQ-112 TROUBLE SHOOTING GUIDE 1
MALFUNCTIONS IN RECORD/PLAYBACK MOTION

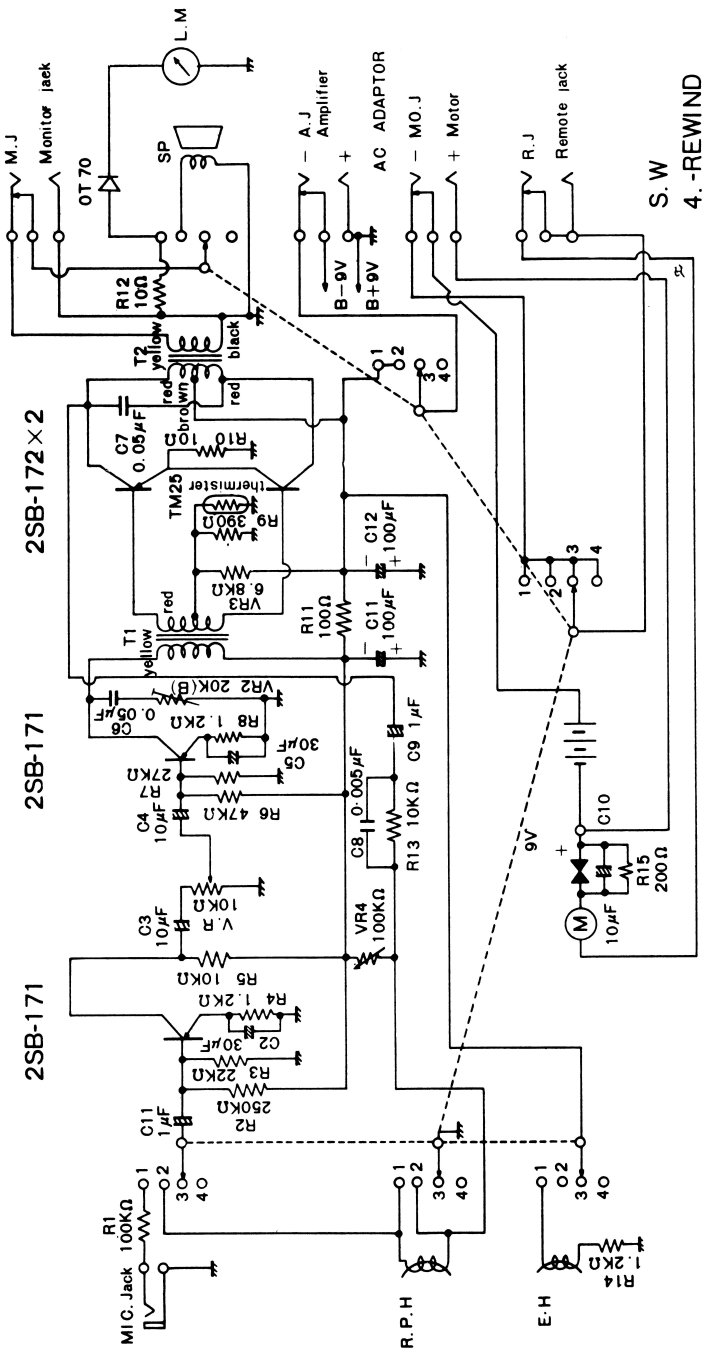




RQ-112 TROUBLE SHOOTING GUIDE 4
ABNORMAL RECORDING CIRCUIT

REPLACEMENT PARTS

1. Head Cover
2. Head Adjustment Plate
3. Recording/Playback Head
4.
5 Head Adjustment Spring
6. Tape Guide
7. Capstan Rest
8. Head Plate Screw
9. Tape Guide 1/2 Spring
10. Reel Spindle Screw
11. Rewind Reel Pan
12. Capstan Screw
13. Rewind Pulley
14. Capstan
15. Panel
16. Flywheel
17. Steel Washer
18. Pinch Roller Lever
19. Guide Roller Hub
20. Guide Roller
21. Pinch Roller C Washer
22. Pinch Roller
23. Friction Fiber
24. Friction Pulley
25. Friction Spring
26. Friction Pulley Spring
27. Steel Washer
28. Pad Arm Shaft Spring/C Washer
29. Brake Arm
30. Brake Arm Shaft C Washer
31. Motor Fiber
32. Motor Spring
33.
34. Motor Holder
35. Motor Pulley
36.
37. Motor
38. Pad Arm Shaft
39. Lug Board 4P
40. Pad Arm Washer
41. Pad Arm Spring
42. Reel Spindle Shaft
43. Lever Stoper Cork
44. Battery Terminal
45. Brake Arm Shaft
46. Panel Speace
47. Brake Arm Spring
48. Main Pulley Shaft
49. Brake Arm Shaft Washer
50. Motor Spring
51. Motor Spring
52. Case C
53. Battery Holder Cover (Key)
54. Battery Holder Cover
55. Speaker Case
56. Handle Fiber Washer
57. Handle Spring
58. Handle
59. Isolated Fiber
60. Speaker Stoper Metal
61. Hinge
62. Window Frame Ring
63.
64. Lock Push Metal
65. Lock L Metal
66. Neme Plate
67. Takeup Reel Pan
68. Case B
69.
70. Lock Screw
71. Lock
72. Lock Rest
73. Speaker Spacer
74. Panching Metal
75. Speaker Ring
76. Speaker
77. Remote Jack
78. Jack Board 4Ø
79. Swich Shaft
80. Amplifier (assembly)
81. Mic Jack Nut
82. Mic Jack Washer
83. Mic Jack
84. Pad Arm
85.
86. V.R. Knob
87. V.R. Metal
88. Level Meter
89. Rewind Lever
90. Clutch Lever
91. Pad Spring
92. Pad Felt
93. Fiber Washer
94. Clutch Lever Shaft Washer
95. Catch Lever
96. Pinch Roller Lever Shaft
97. Catch Lever Shaft.
98.
99. Operater Plate
100. Clutch Lever Shaft Washer
101.
102. Pinch Roller Lever Spring
103.
104. Rotary Switch
105. Takeup Lever
106. Recording Lock Fiber
107. Recording Plate
108. Switch Knob
109.
110. Reel Spindle Spring
111. Rubber Belt (Small)
112. Main Pulley
113. Rubber Belt (Large)
114. Takeup Lever
115. Head Plate Screw
116. Tape Guide Spring (Left)
117. Head Plate Screw
118. Erasing Head
119. Head Base



Carbon film Reristor

R1	RC¼BF100KΩ	±20%
R2	RD¼PZ50KΩ	
R3	RD¼PZ22KΩ	
R4	RC¼BF1.2KΩ	±20%
R5	RD¼PZ10KΩ	
R6	RC¼BF40KΩ	±10%
R7	RC¼BF27KΩ	±20%
R8	RC¼BF1.2KΩ	±20%
R9	RC¼BF390Ω	±10%
R10	RC¼BF100Ω	±20%
R11	RC¼BF100Ω	±20%
R12	RC¼BF100Ω	±10%
R13	RC¼BF1.2KΩ	±20%
R14	RC¼BF20KΩ	±20%
R15	RC¼BF200Ω	±20%

Electrolytic Tubular Capacitor

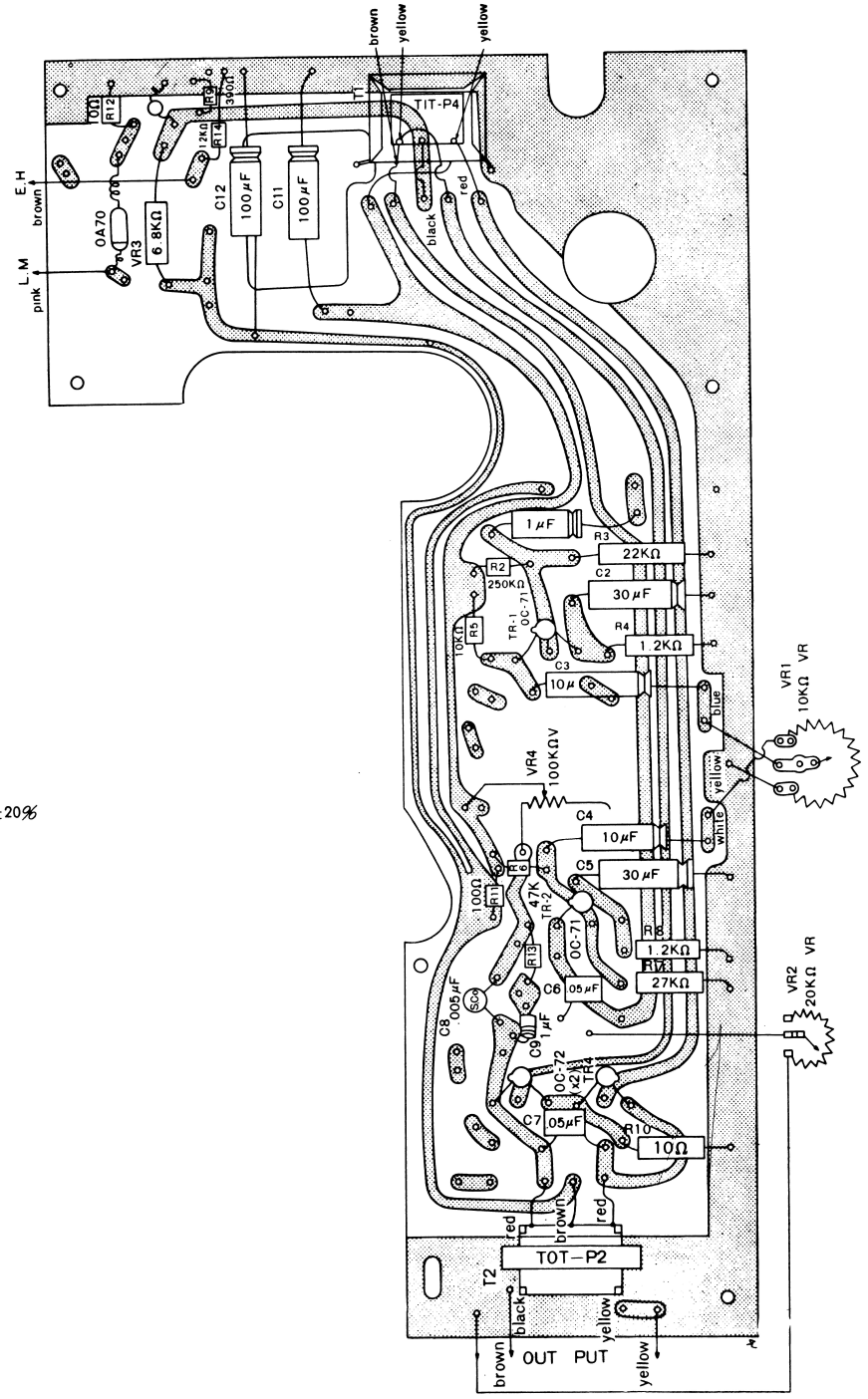
C1	NCT 10V 1μF	
	NCT 10V 30μF	
C3	NCT 10V 10μF	
C4	NCT 10V 10μF	
C5	NCT 10V 30μF	

Titanium Capacitor

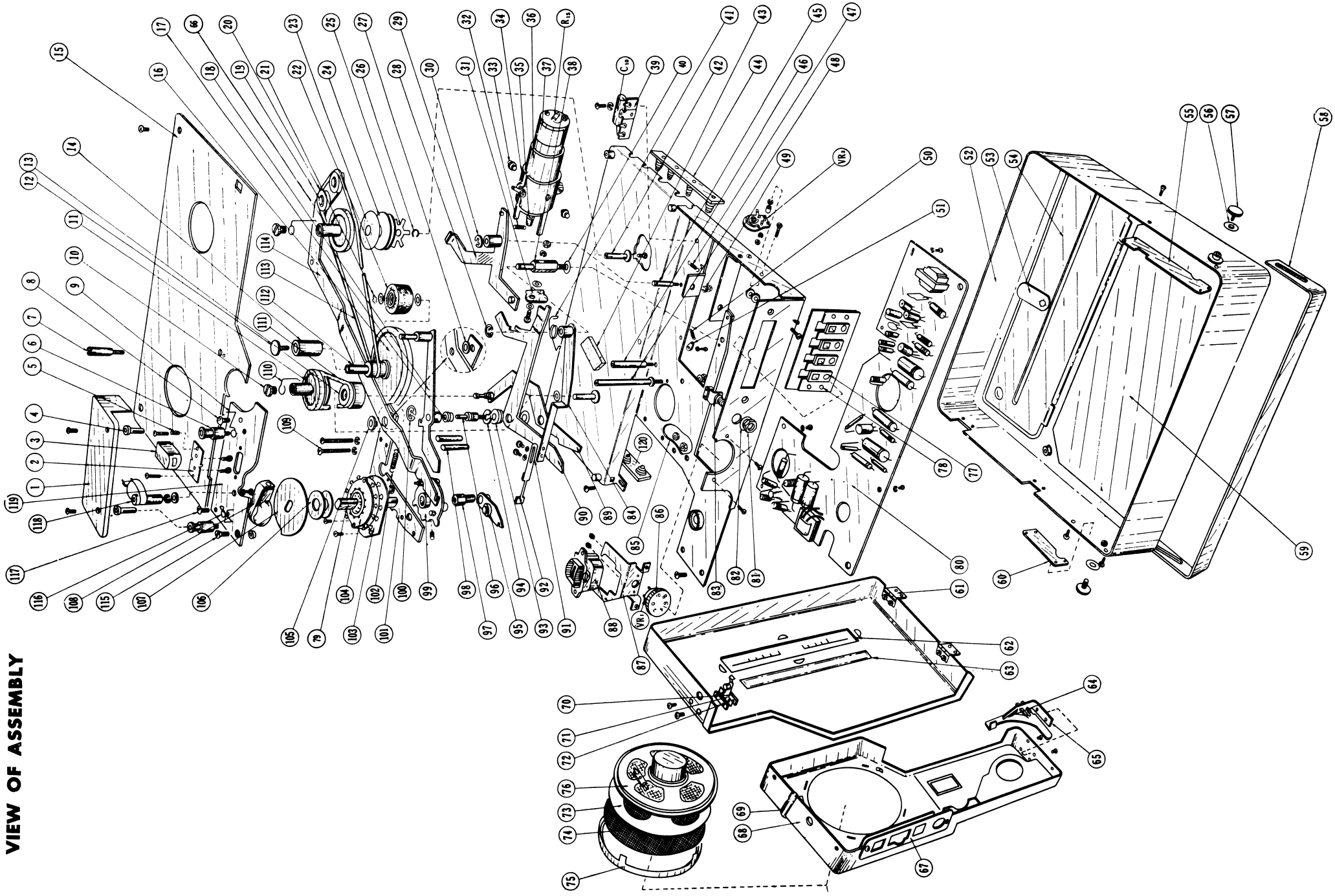
C6	0.05μF (WV50)	
C7	0.05μF (WV50)	
C8	0.05μF (WV50)	±20%
C9	NCT 10V 1μF	
C10	NCT 10V 10μF	
C11	NCT 10V 100μF	
C12	NCT 10V 100μF	

Variable Resistor

VR1	NV-16 10KΩA
VR2	NV-16FA 20KΩ
VR3	RC¼BF68KΩ
VR4	10KΩB
TM-25	(Thermister)
Tr1	2SB—171 (Transistors)
Tr2	2SB—171 (〃)
Tr3	2SB—172 (〃)
Tr4	2SB—172 (〃)
	OA-70 (diode)
T1	TIT—P4
T2	TOT—P2
SW	RS—254 (Rotary Switch)
SP	P—2181S (2½"Speaker)
RPH	Recording/Playback Head
EH	Erasing Head
M	Motor (DC)
L.M	Level Meter
MIC,J	Mic Jack
M,J	Moniter Jack
A.J	Adapter Jack (AC)
MO.J	Adapter Jack (Motor)
R.J	Remote Jack



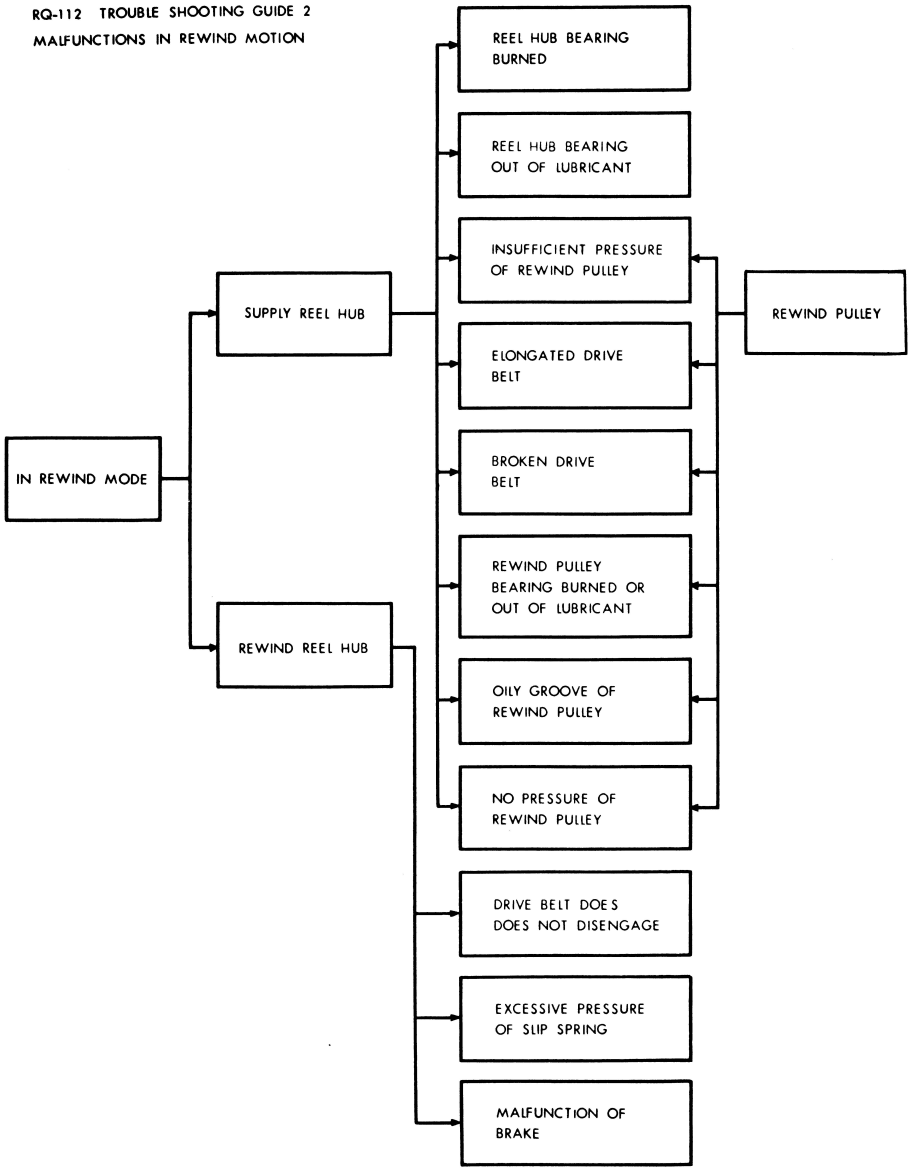
NATIONAL MODEL RQ-112



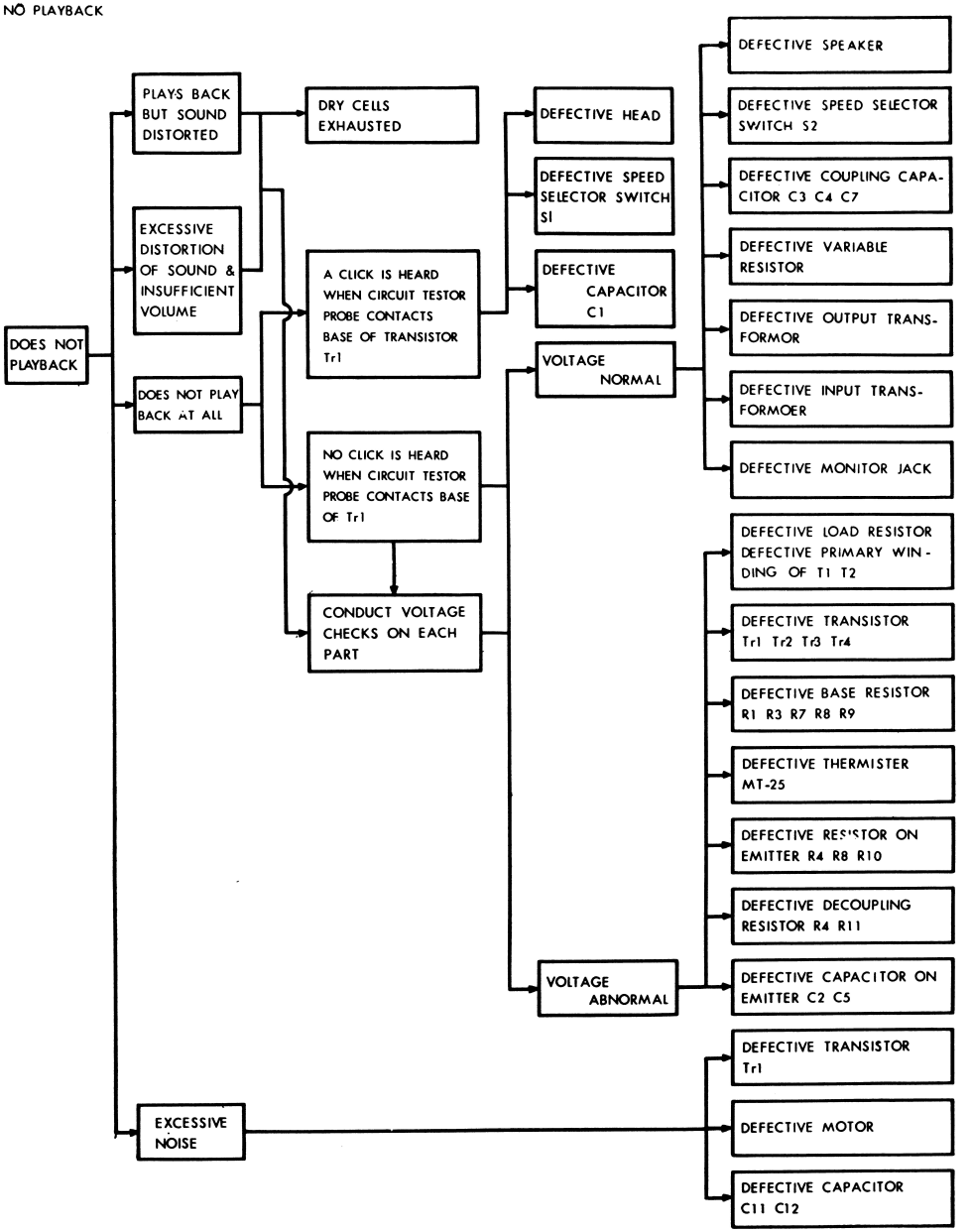
VIEW OF ASSEMBLY

NATIONAL MODEL RQ-112

RQ-112 TROUBLE SHOOTING GUIDE 2
MALFUNCTIONS IN REWIND MOTION

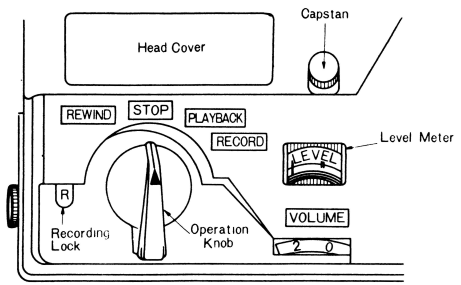


RQ-112 TROUBLE SHOOTING GUIDE 3
NO PLAYBACK



NATIONAL MODEL RQ-112

MECHANISM



a. Single-Knob Control :

This tape-recorder operates by single-knob-cantrol. All movements connected with tape is exclusively controled by operation-knob, which switches electric power ON and OFF at the same time.

(1) Turn operation-knob clockwise to PLAY-BACK to set up mechanism for play-back, and to turn ON power switches for amplifier and motor simultaneously.

(2) Turn operation-knob counter-clockwise to REWIND to set up mechanism for rewinding and to switch OFF amplifier.

(3) Press down R-button and turn operation-knob to RECORD. Amplifier now works for recording. R-button is a locking device to prevent accidental erasure.

(4) Volume-control knob is used to adjust recording level and volume of reproduced sound but has no direct connection to power switch. Level-meter indicates recording level only.

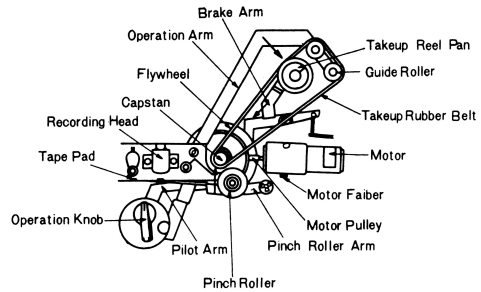
b. Change of Speeds :

Two tape speeds are available by changing capstan diameters. Capstan, equipped with outer sleeve works at the speed of 3-3/4" (9.5 cm) per second, and without sleeve, at 1-7/8" (4.75cm) per second.

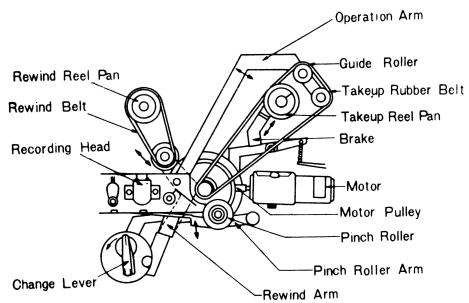
c. Record (Play-back) Mechanism :

Performance of mechanism is exactly same for recording and for play-back except that in the former case, operation-knob shall be turned to RECORD after R-button is pressed down. Electrical connection within amplifier is shifted to and from recording and play-back by means of rotary switch which is controled by the movement of operation-knob.

When operation-knob is set at RECORD or PLAY-BACK, cam-plate turns and cam-pin is freed, and operation-arm, pinchroller arm and brake move in the direction of arrow respectively whereby, pinchroller presses against capstan and transmits rotary motion to tape. Rubber belt touches pulley at the bottom of take-up-reel spindle and



imparts rotary motion to spindle. At the same time, brake comes loose in the direction of arrow and allows spindle start winding up tape without slack. Motor starts rotation by means of rotary switch which is synchronized to the movement of cam-plate. Motor-pulley touches rubber tire of flywheel. All these actions occur almost simultaneously and are transmitted from motor through flywheel, capstan, and by belt to reel-spindle. By the rotation of each part, tape travels.



d. Rewind Mechanism :

Operation-knob at REWIND, cam-pin comes free and rewind-arm moves in the direction of arrwo, rewind-pulley touches rubber tire of flywheel, and supply-reel spindle rotates by means of rubber belt. Rotary motion is transmitted from motor-pulley to flywheel as in the case of play-back. As for take-up-reel spindle, operation-arm is freed and rubber belt and reel-spindle are clearly separated and brake comes off. Reel-spindle thus rotates freely as pulled by tape.

e. Stop Mechanism :

Operation-knob at STOP, lever is freed and motor stops, and tape also stops instantly without any over-run.
This is due to back-tension of rewind-belt, when stopped from record or play-back position, and by brake, when stopped from rewind position.

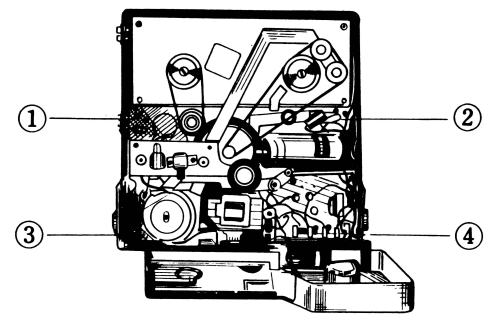
DISASSEMBLING

For disassembling Model RQ-112, take down parts in the sequence of head-cover, panel, speaker-case and chassis.

a. Head-cover :
Pull it out with hand.

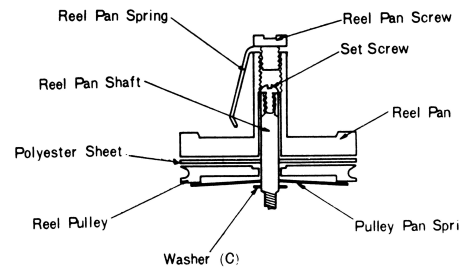
b. Panel :
Remove 2 screws at the corners of farther edge of panel and remove capstan rest at the center of panel by turning counter-clockwise. Panel comes off easily.

c. Speaker-case :
Separate it from operation-knob. Loosen set screw of operation-knob and pull out the knob gently. Remove 4 screws, 2 on each side of speaker-case. Turn over the case and it comes off. Care shall be taken not to damage wire connections to speaker.



d. Chassis :
Remove 4 screws, numbered 1, 2, 3 and 4 as shown Loosen screws on specker-case holders. Raise mechanism slightly and chassis comes off.

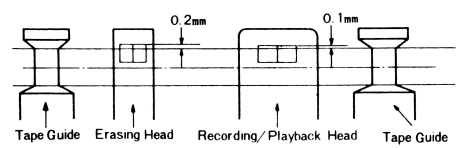
e. Construction of Take-up Reel Spindle :
Rotary motion of reel-pulley is transmitted to reel-holder by slippery friction of Polyester -sheet. The strength of friction can be adjusted by the strength of pressure-spring on pulley.



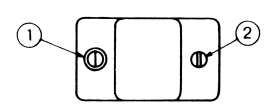
6. CONDITIONING AND MAINTENANCE

Record and play-back circuit system are as shown by block-diagrams, and single amplifier serves for the both systems by switching.
When functional parts are changed, the performances of tape-recorder are liable to go wrong. Re-condition troubles as described below :

a. Positions of Heads :
Record play-back head and erase head function as a set. When the relative positioning of these two are not true, such troubles as imperfect erasure or cross-talk occur. Recondition as shown below:



b. Angle of Heads :
If the gap line in brushing surface of record head does not keep true vertical to tape, frequency response may deteriorate in high-tone range. To correct this, head shall be re-positioned in the following manner:



Obtain a standard recorded tape for testing angle (3,000 c/s signal is recorded in accurate angle). Play-back this tape and find out the angle, by turning screw 2, at which the maximum output is obtained. After conditioning, the screw shall best be paint-locked to prevent accidental divergence.

c. Record Bias:
This tape-recorder employs D.C. bias, so that little conditioning is required when head is changed, but in rewiring it, it is important that original poles are not changed, because of close relation with poles of erase-head.

d. Erase Current :
In erasure, the same applies. Poles shall not be changed to maintain perfect relation with record-head. 4-6 mA of current shall flow to erase-head in normal condition which can be found out by tester.

e. Recording Level :
Recording level is indicated by level-meter. If level-meter fails to indicate actual current to head correctly, it will cause distortion by over-recording or poor S/N ratio by under-recording. The meter has to be kept in good working order.
For testing level-meter, vacuum tube volt-meter and oscillator are used. Test with these instruments as follows :
Introduce 1,000 C/S signal from Mic. Connect resistor,