

## SPECIFICATIONS

Power Source:	Dual Power Matic (AC or Battery Powered) AC. 110 V, 220 V, 50~60 cps. Batteries 6 "UM-2" size flash light battery
Power Output:	700 mW (max.)
Transistor:	2SB-173(1) 2SB-175(2) 2SB-178(2) 2SB-172(1)
Recording System:	AC Bias
Erasure System:	DC Erase
Track System:	2 track system
Tape Speed:	2 speed 3-3/4 and 1-7/8 ips.
Frequency Response:	100~7,000 cps. at 3-3/4 ips. 100~4,000 cps. at 1-7/8 ips.
Input:	"MIC." input 20 K $\Omega$ "AUX." input 100 K $\Omega$
Output:	"EXT. SP." output 8 $\Omega$
Program Time:	2 hours (double track) for +50% tape at 1-7/8 ips.
Built in Speaker:	3-1/4" permanent dynamic speaker
Battery Life:	More than 10 hours (using NATIONAL "Hi-Top")
Dimensions:	10-1/4" (W) x 3-1/4" (H) x 8-7/8" (D)
Weight:	7 lbs.

## PARTS LOCATION

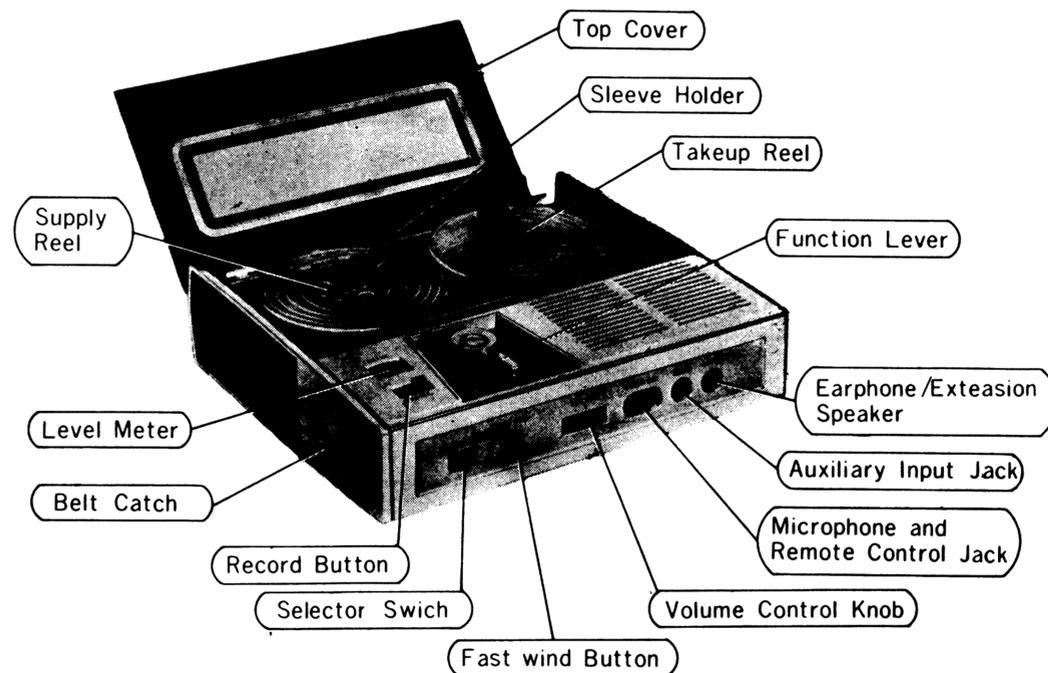


Fig. 1

## DISASSEMBLY INSTRUCTIONS

### A. TO REMOVE BOTTOM COVER

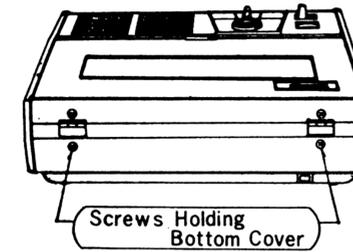


Fig. 2

1. Unscrew and remove two (2) screws holding Bottom Cover and gently disengage Cover from Recorder Body. (Fig. 2)

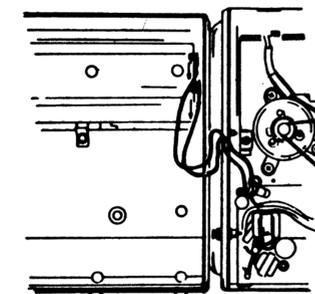


Fig. 3

2. Pull off DC supply wires from battery terminals on the battery compartment. (Fig. 3)

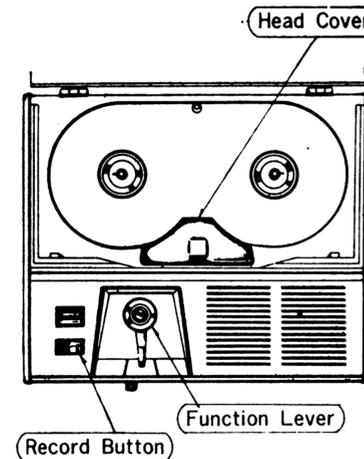


Fig. 4

### B. TO REMOVE TOP COVER

1. Unscrew and remove large screw holding Function Lever.
2. Pull out Record Button. (Fig. 4)
3. Remove Head Cover by pulling up at both ends.

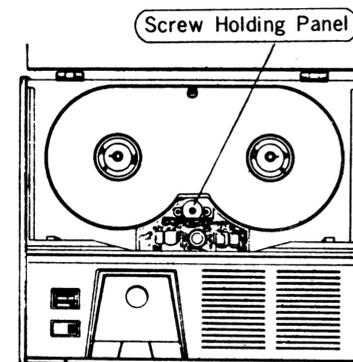


Fig. 5

4. Unscrew and remove screw holding Panel. (Fig. 5)
5. Place recorder upside-down and remove seven (7) screws holding Panel to Base.
6. Gently lift rear side of Panel, so that Cover can be removed from Base.

## MECHANISM ADJUSTMENT

### 1. PINCH ROLLER ADJUSTMENT

- A. Shaft of Pinch Roller must be parallel to Shaft of Capstan.
- B. Pressure between Capstan and Pinch Roller can be checked as follows:
  - a. Set the recorder in "PLAY" mode with the speed set at 3-3/4 ips.
  - b. Hook a loop of Thread at Pinch Roller Shaft and Spring Scale, and pull until Pinch Roller is disengaged from Capstan.
  - c. The proper Pressure is between 310 and 430 grams (approx. 11.0 and 15.3 oz).
  - d. If Pressure is not within the above range, adjust Pinch Roller Spring.

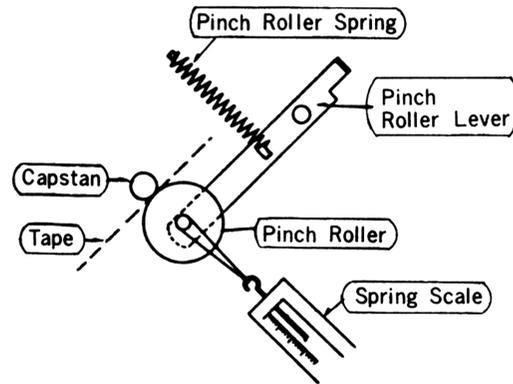


Fig. 11

### 2. TAKEUP TORQUE ADJUSTMENT

- A. Place a 4 inch Tape Reel on either Takeup Reel Table or Supply Reel Table and hang the end of Tape on a Tension Gauge.

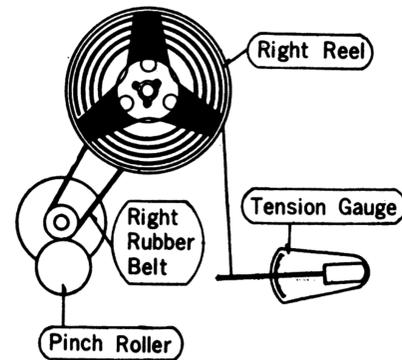


Fig. 12

- B. Proper Tensions are as follows:

- a. Forward, Fast Forward mode .....  
0.82~1.18 oz × 1.67"
- b. Reverse, Rewind mode .....  
0.64~0.96 oz × 1.67"

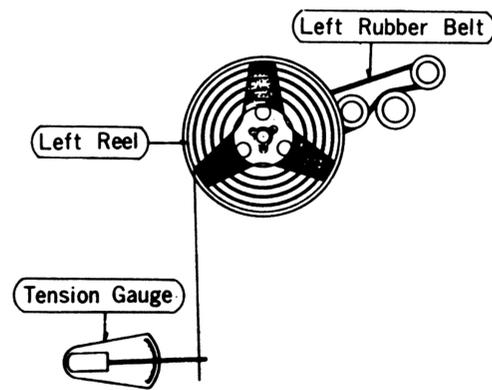


Fig. 13

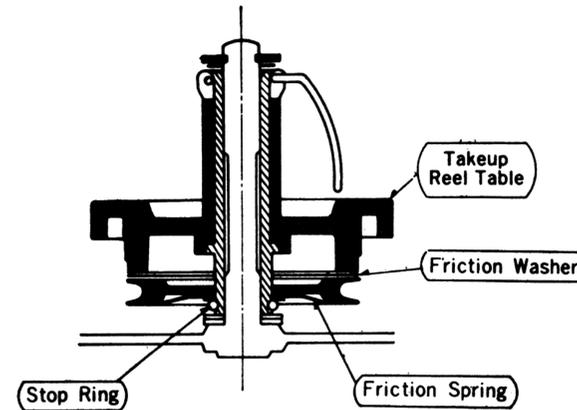


Fig. 14

- C. If tension is not within the above range, make the following adjustments.
  - a. Clean oil and dust from all drive points to eliminate slippage and Friction Washer. Especially check coupling of Rubber Belt.
  - b. Adjust the torque with the Friction Spring of Takeup Reel Table or Supply Reel Table. If the torque is too strong, loosen or replace the Friction Spring; and if too weak, tighten or replace it.

### 3. PRESSURE PAD ADJUSTMENT

- A. Set the unit in "PLAY" mode.
- B. Place a tension gauge at the center of Tape Pad.
- C. Gradually draw Pad from Head until Pad is disengaged from Head, and then read the scale.
- D. The proper pressure is between 6 grams and 14 grams. (Approx. 0.21 and 0.50 oz.)
- E. If pressure is not within the above range, Adjust Pad Spring.

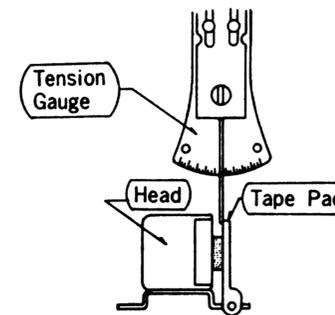


Fig. 15

### 4. TAPE SPEED ADJUSTMENT

- A. Measure Tape Speed for 1 minute by using Tape-Speed Measuring Tape and Stop Watch.
- B. If Tape Speed is not within the range of ± 3%, make adjustment of Tape Speed in the following manner.
  - a. Check stain of Motor Belt, Burn of Flywheel Shaft Metal, etc.
  - b. Replacement of Motor Pulley;

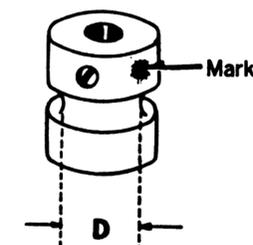


Fig. 16

Mark	Parts No.	Size of D	
Black	M-976	0.135"	↓ Slower ↑ Faster
Colorless	M-977	0.131"	
Red	M-978	0.127"	

REPLACEMENT PARTS LIST

**ATTENTION:** Parts which are not listed are part of an assembly and are not stocked as a separate item.  
To obtain parts not listed, order the entire assembly.

RESISTOR

Ref. No.	Description	Part No.
R 1	Carbon Film Resistor 200 Ω 1/4 Watt 10 %	QRD-14TRK201
R 2	Carbon Film Resistor 68 KΩ 1/4 Watt 10 %	QRD-14TRK683
R 3, 31	Carbon Film Resistor 22 KΩ 1/4 Watt 10 %	QRD-14TRK223
R 4, 14, 27	Carbon Film Resistor 10 KΩ 1/4 Watt 10 %	QRD-14TRK103
R 5	Carbon Film Resistor 120 Ω 1/4 Watt 10 %	QRD-14TRK121
R 6, 11	Carbon Film Resistor 1.2 KΩ 1/4 Watt 10 %	QRD-14TRK122
R 7, 30	Carbon Film Resistor 6.8 KΩ 1/4 Watt 10 %	QRD-14TRK682
R 8, 23	Carbon Film Resistor 100 KΩ 1/4 Watt 10 %	QRD-14TRK104
R 9	Carbon Film Resistor 2.7 KΩ 1/4 Watt 10 %	QRD-14TRK272
R 10	Carbon Film Resistor 2.2 KΩ 1/4 Watt 10 %	QRD-14TRK222
R 12, 25	Carbon Film Resistor 560 Ω 1/4 Watt 10 %	QRD-14TRK561
R 13, 26, 33	Carbon Film Resistor 33 KΩ 1/4 Watt 10 %	QRD-14TRK333
R 15	Carbon Film Resistor 330 Ω 1/4 Watt 10 %	QRD-14TRK331
R 16	Carbon Film Resistor 10 Ω 1/4 Watt 10 %	QRD-14TRK100
R 17	Carbon Film Resistor 270 Ω 1/4 Watt 10 %	QRD-14TRK271
R 18	Carbon Film Resistor 1.5 KΩ 1/4 Watt 10 %	QRD-14TRK152
R 19, 32	Carbon Film Resistor 68 Ω 1/4 Watt 10 %	QRD-14TRK680
R 20	Carbon Film Resistor 2.2 Ω 1/4 Watt 10 %	QRD-14TRK2R2
R 21	Carbon Film Resistor 47 Ω 1/4 Watt 10 %	QRD-14TRK470
R 22	Carbon Film Resistor 820 Ω 1/4 Watt 10 %	QRD-14TRK821
R 24	Carbon Film Resistor 10 Ω 1/2 Watt 10 %	QRD-12TRK100
R 28	Carbon Film Resistor 4.7 Ω 1/4 Watt 10 %	QRD-14TRK4R7
R 29	Carbon Film Resistor 22 KΩ 1/4 Watt 10 %	QRD-14TRK223

VARIABLE RESISTORS

VR	Variable Resistor 10 KΩ-A	EVJ-AOAT12A14
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CAPACITORS

C 1, 12	Electrolytic Capacitor 50 μF WV10V	QCE-A10V50
C 2	Electrolytic Capacitor 1 μF WV10V	QCE-A10V1
C 3, 7, 26	Polystyrene Capacitor 820 PF	QCQ-K05821M
C 4, 21	Polystyrene Capacitor 0.1 μF	QCQ-K05104M
C 5, 8	Electrolytic Capacitor 30 μF WV6V	QCE-A6V30
C 6	Polystyrene Capacitor 0.05 μF	QCQ-K05503M
C 9, 24	Electrolytic Capacitor 10 μF WV10V	QCE-A10V10
C 10	Electrolytic Capacitor 0.5 μF WV10V	QCE-A10V0R5
C 11	Electrolytic Capacitor 50 μF WV6V	QCE-A6V50
C 13	Electrolytic Capacitor 500 μF WV12V	QCE-A12V500
C 14, 15, 17, 20	Polystyrene Capacitor 0.0039 μF	QCQ-K05392M
C 16	Polystyrene Capacitor 0.001 μF	QCQ-K05102M
C 18	Polystyrene Capacitor 0.02 μF	QCQ-K05203M
C 19	Electrolytic Capacitor 3 μF WV15V	QCE-A15V3
C 22	Electrolytic Capacitor 100 μF WV10V	QCE-A10V100
C 23	Electrolytic Capacitor 500 μF WV15V	QCE-A15V500
C 25	Electrolytic Capacitor 50 μF WV12V	QCE-A12V50

TRANSISTORS

Ref. No.	Description	Part No.
Tr 1	Transistor	2SB 173
Tr 2, 3	Transistor	2SB 175
Tr 4, 5	Transistor	2SB 178
Tr 6	Transistor	2SB 172

DIODES

D 1, 2	Diode	SW-05X
D 3, 4	Diode	OA-70

THERMISTOR

SM E260	Thermistor	QVM-500A
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TRANSFORMER

T 1 E298	Input Transformer	QLA-0113
T 2 E299	Output Transformer	QLA-322
T 3 E300	Oscillator Transformer	QLB-0119
T 4 E301	Power Transformer	QLP-0366

SWITCHES

S 1 E319	Record/Playback Selector Switch	ESD-0162
S 2 E320	Forward/Reverse Selector Switch	QSS-1022
S 3 E321	Voicematic/OFF/Sound Monitor Selector Switch	QSS-1023
S 4 E322	Leaf Switch	QSB-0151
S 5 E323	Power ON-OFF Switch	QSB-0132
S 6	AC/DC Selector Switch (complete with Relay)	—
S 7 E324	Voltage Selector Switch	QSS-1011

ELECTRICAL PARTS

101 E326	Forward Head Assembly	QXV-0023
102 E327	Reverse Head Assembly	QXV-0024
103 E306	Mic/Remote Jack	QJA-0404
104 E307	Aux. Jack	QJA-0110
105 E307	Ext. SP. Jack	QJA-0110
106 E308	VU Meter	QSL-0026
107 E309	Speaker	PM-7711
108 E310	Relay	QSK-0104
109 E311	Printed Circuit Board-A Assembly	QEI-0103
110 E312	Printed Circuit Board-A Assembly	QEI-0104
111 E291	AC Cord Bushing	QTD-1126
112 E313	Insulating Paper-A	QBK-1047
113 E314	Insulating Paper-B	QBK-1048
114	—	—
115 E317	Conceal Plate for Jack	QGK-1118
116 X196A	Screw Round Head +3 φ×5	QHM-230×5U3
117 M323	Printed Circuit Board Mounting Metal	QTT-1242
118 M938	Spring for Switch E319 Drive Lever	QBT-1175
119 M944	Hexagonal Screw	QMN-1114
120 M939	Drive Lever for Switch E319	QML-1258
121 G521	Speaker Mounting Metal	QTT-1238
122 X301A	Tapping Screw 2.6 φ×8	QHB-526×8U3

**CABINET PARTS**

Ref. No.	Description	Part No.	
130	G509	Plastic Case Lid Assembly	QYA-0048
131	G510	Head Cover Assembly	QYR-0060
132	G511	Plastic Case Body Assembly	QYB-0096
132-1	G517	Hinge	QKC-1012
132-2	X519	Tapping Screw 3 φ × 6	QHM-530 × 6U3
132-3	G518	Capstan Rest	QMP-1085
132-4	X379	Lock Washer 3 φ	QWG-301K3
132-5	X394	Hexagonal Nut N3 φ	QNN-3022U3
132-6	G519	Head Cover Holder	QMN-1113
132-7	X393	Hexagonal Nut N2.6 φ	QNN-2622U3
132-8	G530	Lock Spring for Plastic Case Lid	QBP-1081
132-9	X519	Tapping Screw 3 φ × 6	QHM-530 × 6U3
132-10	G520	Side Panel	QGK-1119
132-11	G531	Screw +3 φ × 10	QHV-230 × 10V1
132-12	G253	Belt Catch	QKT-1094
132-13	X378	Lock Washer 4 φ	QWG-401K3
132-14	X395	Hexagonal Nut N4 φ	QNN-4022U3
133	G512	Plastic Case Bottom	QYC-0056
133-1	G522	Tape for Battery Removing	QFQ-1009
133-2	X519	Tapping Screw 3 φ × 6	QHM-530 × 6U3
133-3	G523	Battery Contact Plate-A	QJB-0022
133-4	G524	Battery Contact Plate-B	QJB-0023
133-5	G525	Battery Contact Plate-C	QJB-0024
133-6	G526	Battery Spring	QJB-0025
134	G513	AC Cord Pocker Lid Assembly	QEO-0013
134-1	G527	Lock Button	QGT-3010
134-2	G528	Lock Button Spring	QBP-1080
134-3	X374	Lock Button Flat Washer	QWP-2012N1
134-4	X520	Tapping Screw 2 φ × 5	QHB-520 × 5U3
135	G514	Battery Pocket Lid Assembly	QEO-0012
136	G515	Function Control Lever	QGT-2028
137	G251	Function Control Lever Screw	QHQ-1035
138	G516	Record Button	QGO-1026
139	G533	Fast Forward Button	QGO-1022
140	G534	Volume Control Knob	QGT-1044
141	G532	Screw +3 φ × 6	QHT-230 × 6V1

**ACCESSORIES**

A 1	Dynamic Microphone	WM-2095N
A 2	Microphone Stand	WN-105N
A 3	4" Recording Tape	QFT-41NR55Z
A 4	4" Empty Reel	QFR-41NZ
A 5	Connection Cord-R	QEB-0017
A 6	Magnetic Earphone	EAE-1QB
A 7	Carrying Bag	QFK-0018
A 8	Carrying Belt	QKH-1026
A 9	Splicing Tape	QFS-0002-1
A 10	2 Pin Plug Adaptor	QJP-0601
A 11	Instruction Book	QQT-0212

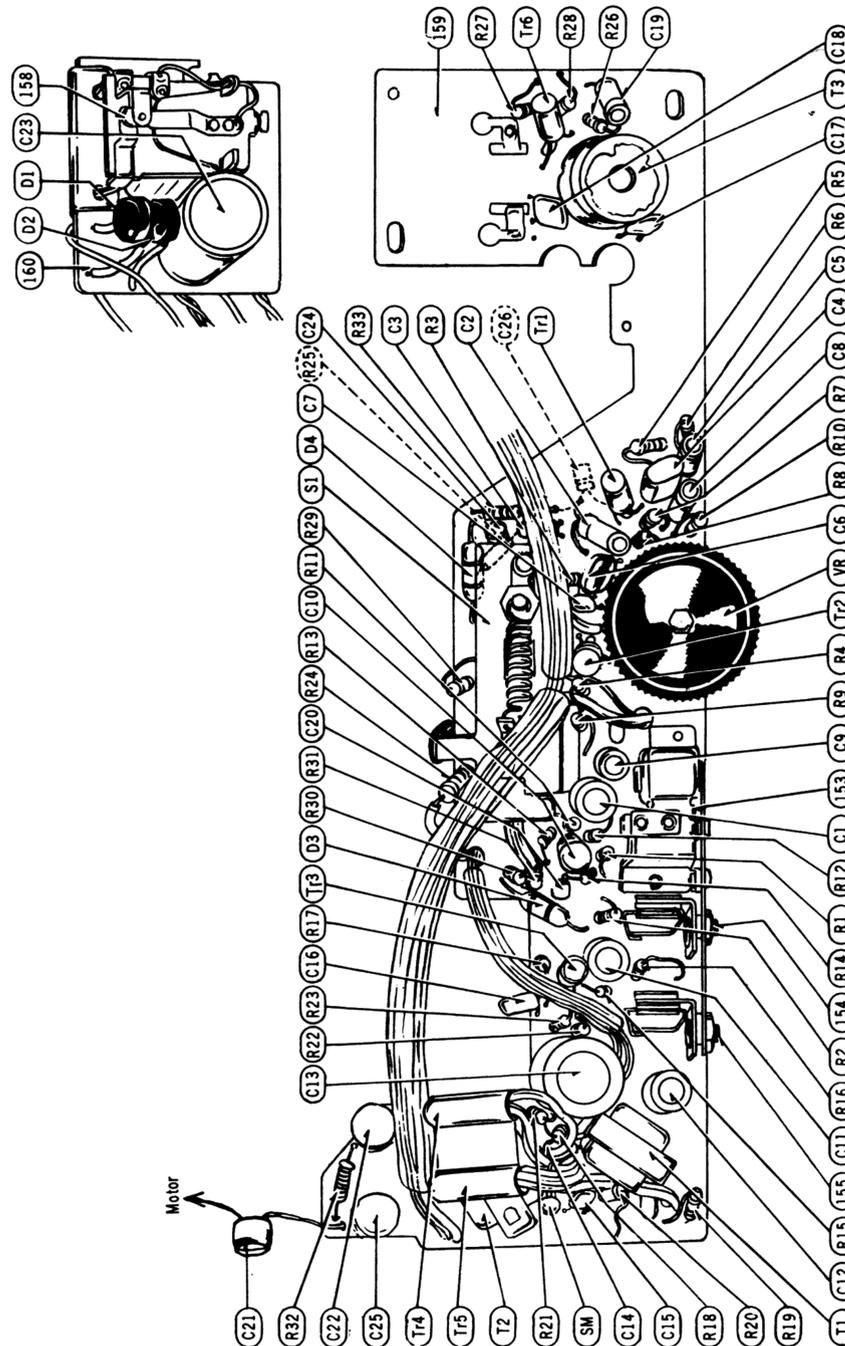
**PACKING**

P 1	Packing Case	QPN-1375
P 2	Dust Cover	QFD-0064
P 3	Inner Cushion (R)	QPN-1377
P 4	Inner Cushion (L)	QPN-1378
P 5	Accessory Case	QPW-1046

**NATIONAL MODEL RQ-401S**

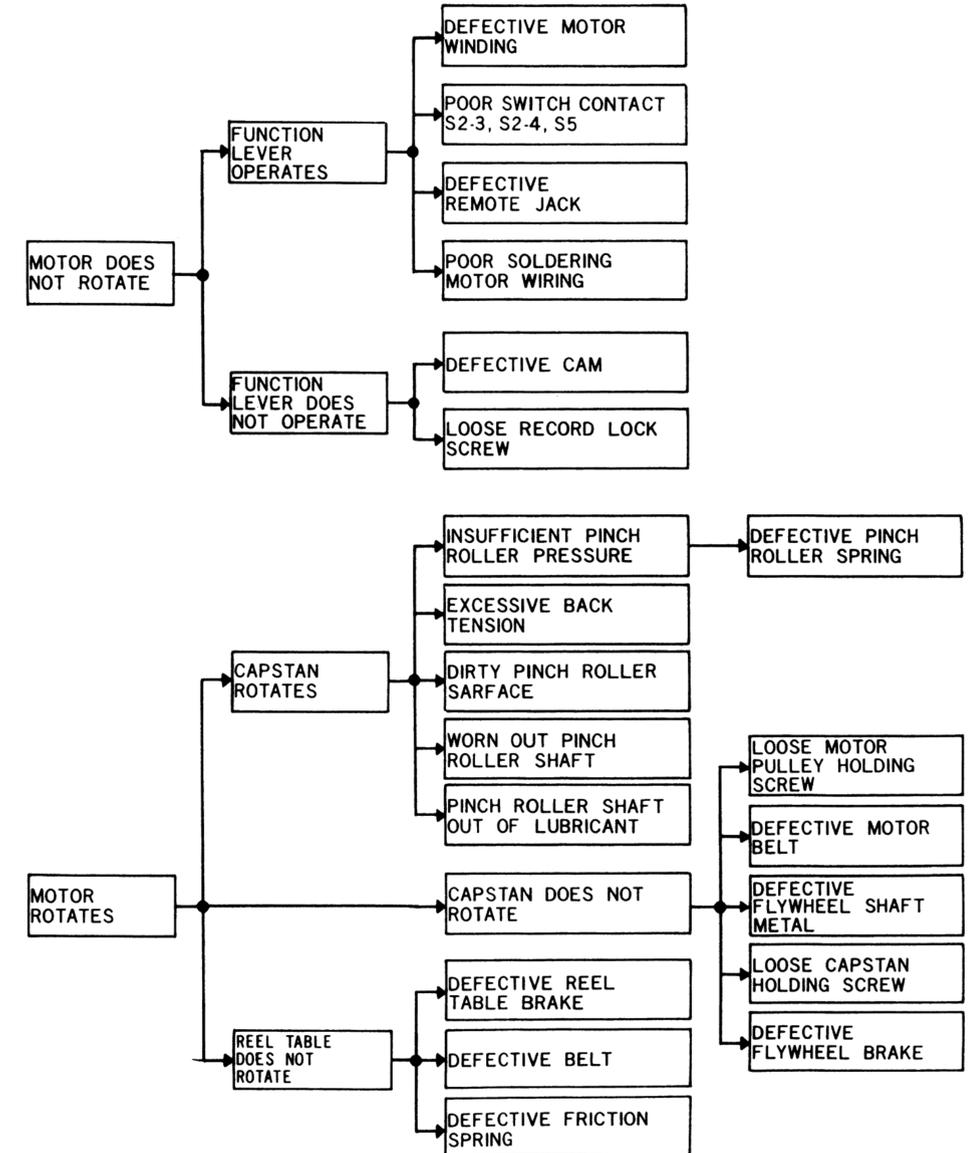
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**CIRCUIT BOARD**



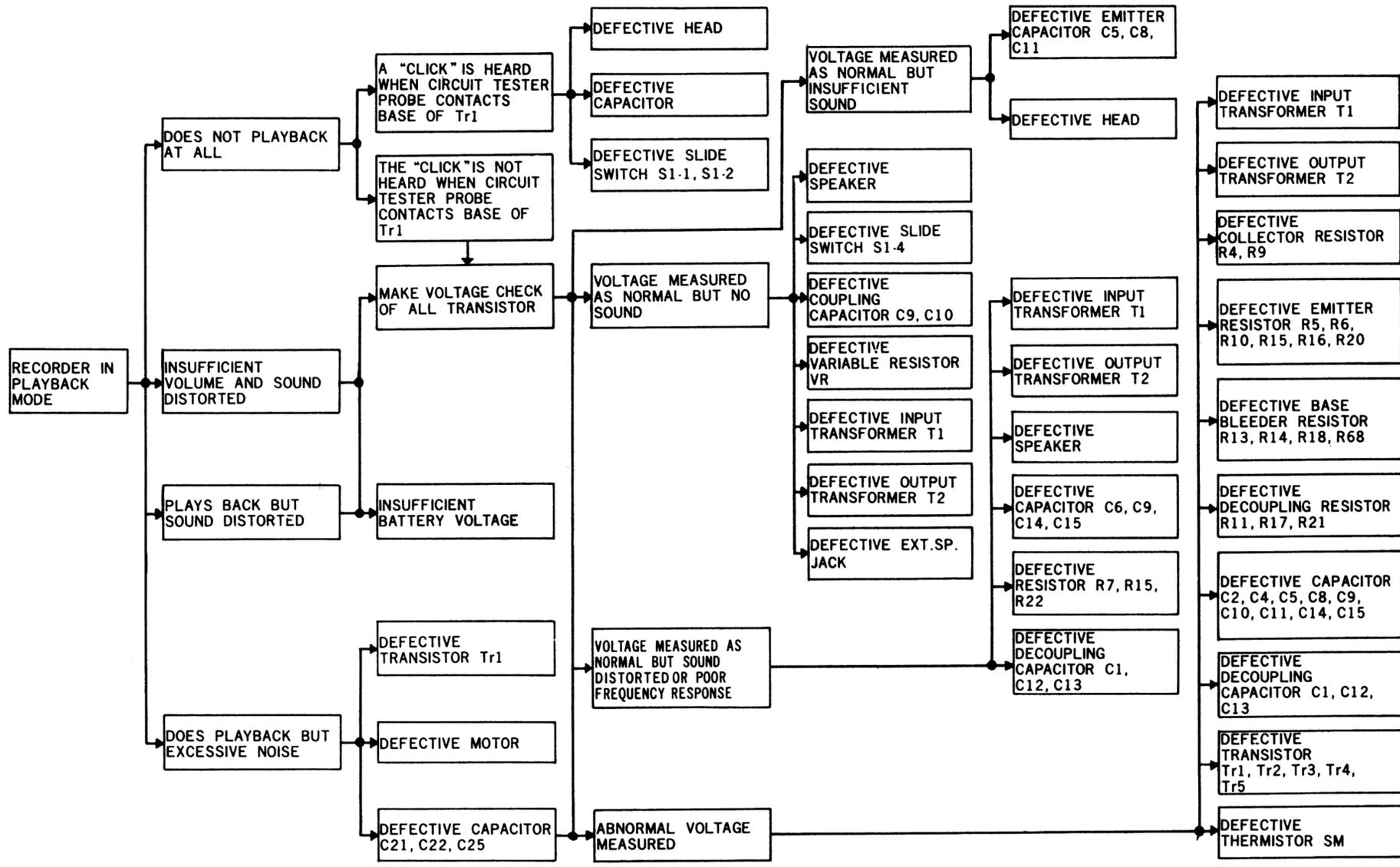
**TROUBLE SHOOTING GUIDE 1**

**MALFUNCTION IN RECORD/PLAYBACK MOTION**

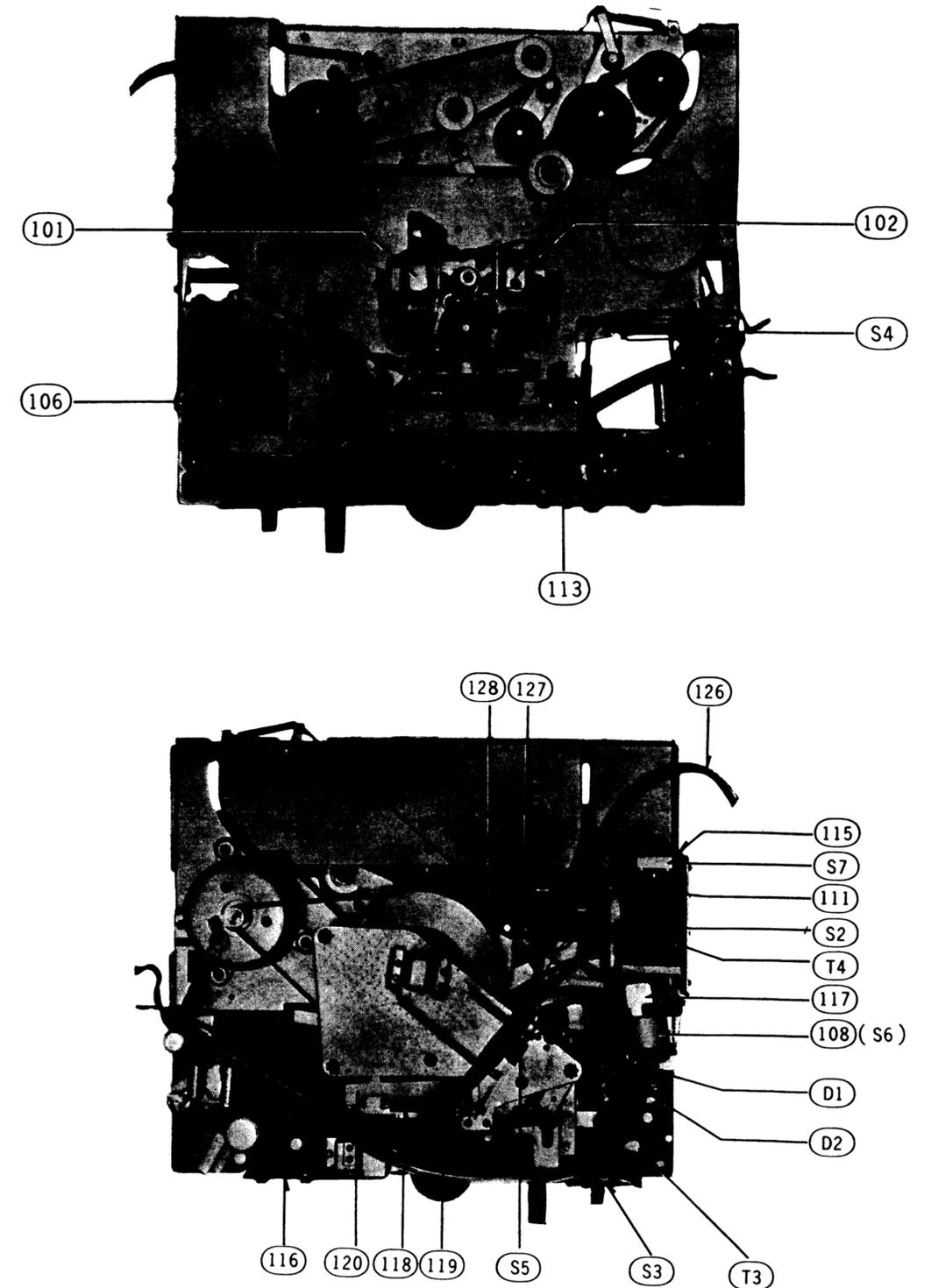


TROUBLE SHOOTING GUIDE 4

DEFECTIVE PLAYBACK CIRCUIT

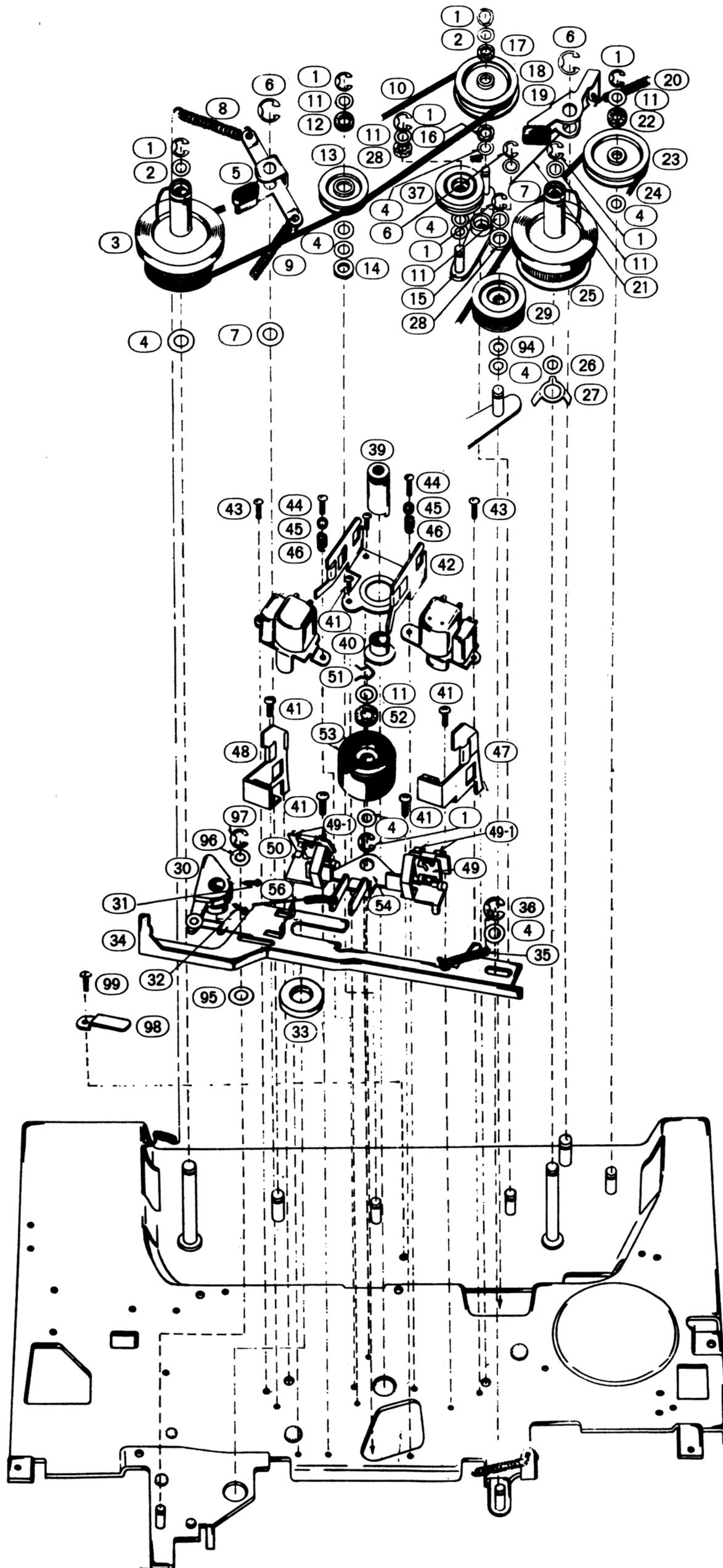


ELECTRICAL PARTS LOCATION



# NATIONAL MODEL RQ-401S

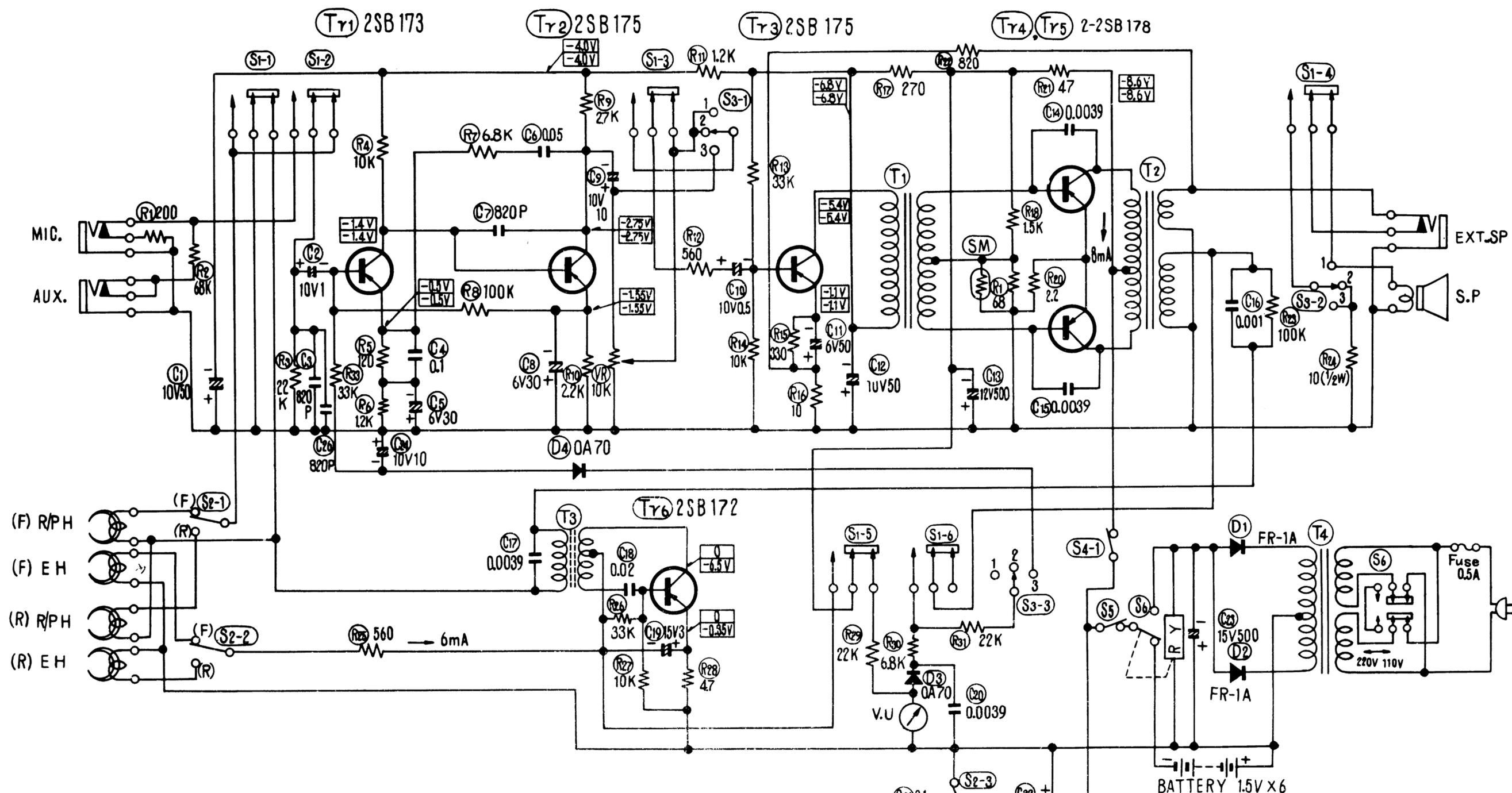
N16-10.



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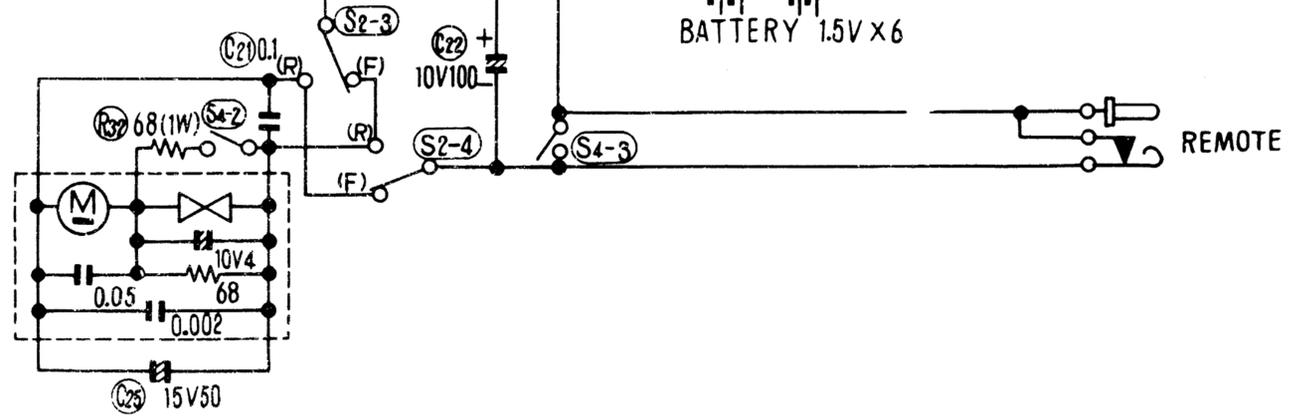


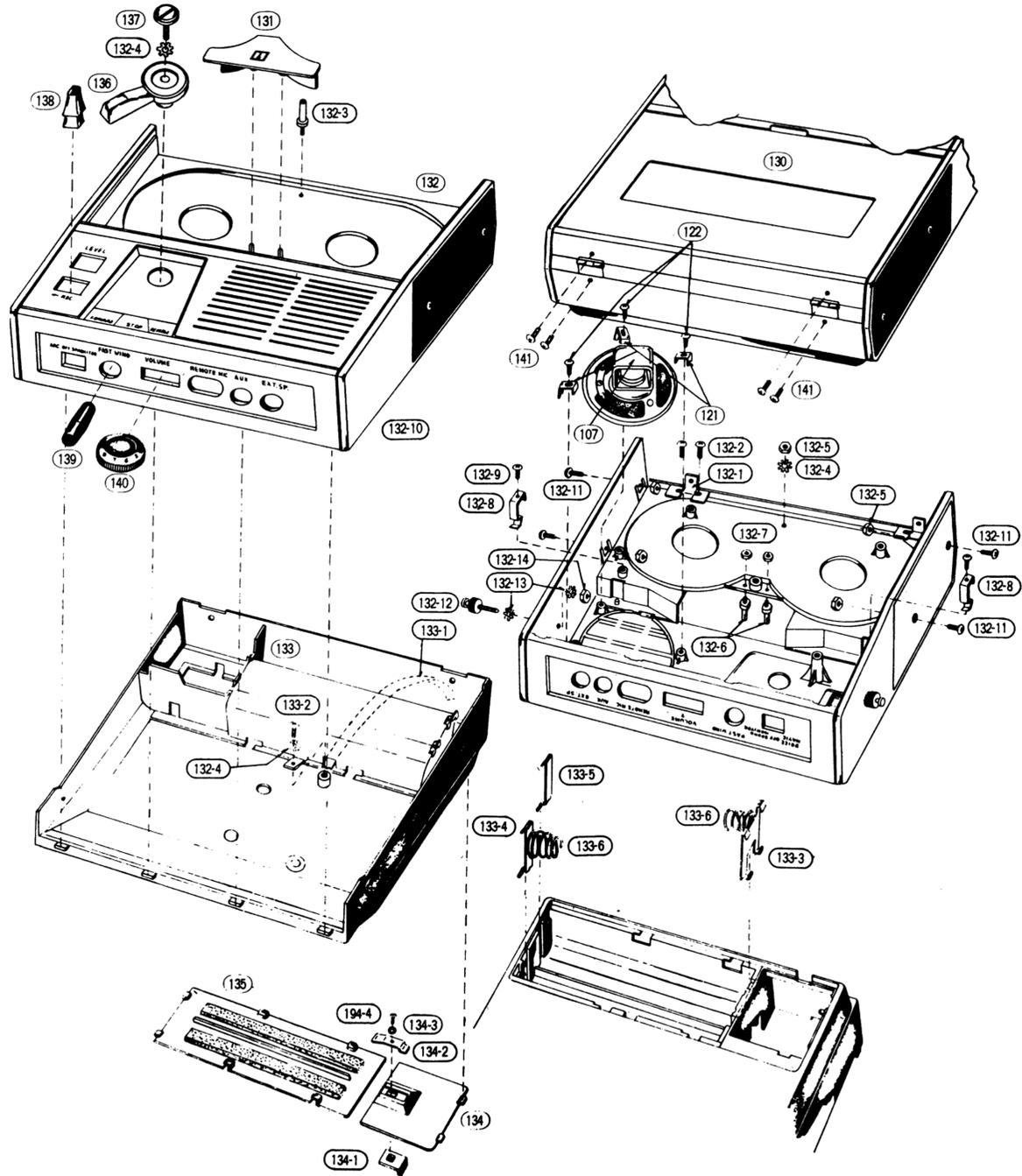
# SCHEMATIC CIRCUIT DIAGRAM RQ-401S



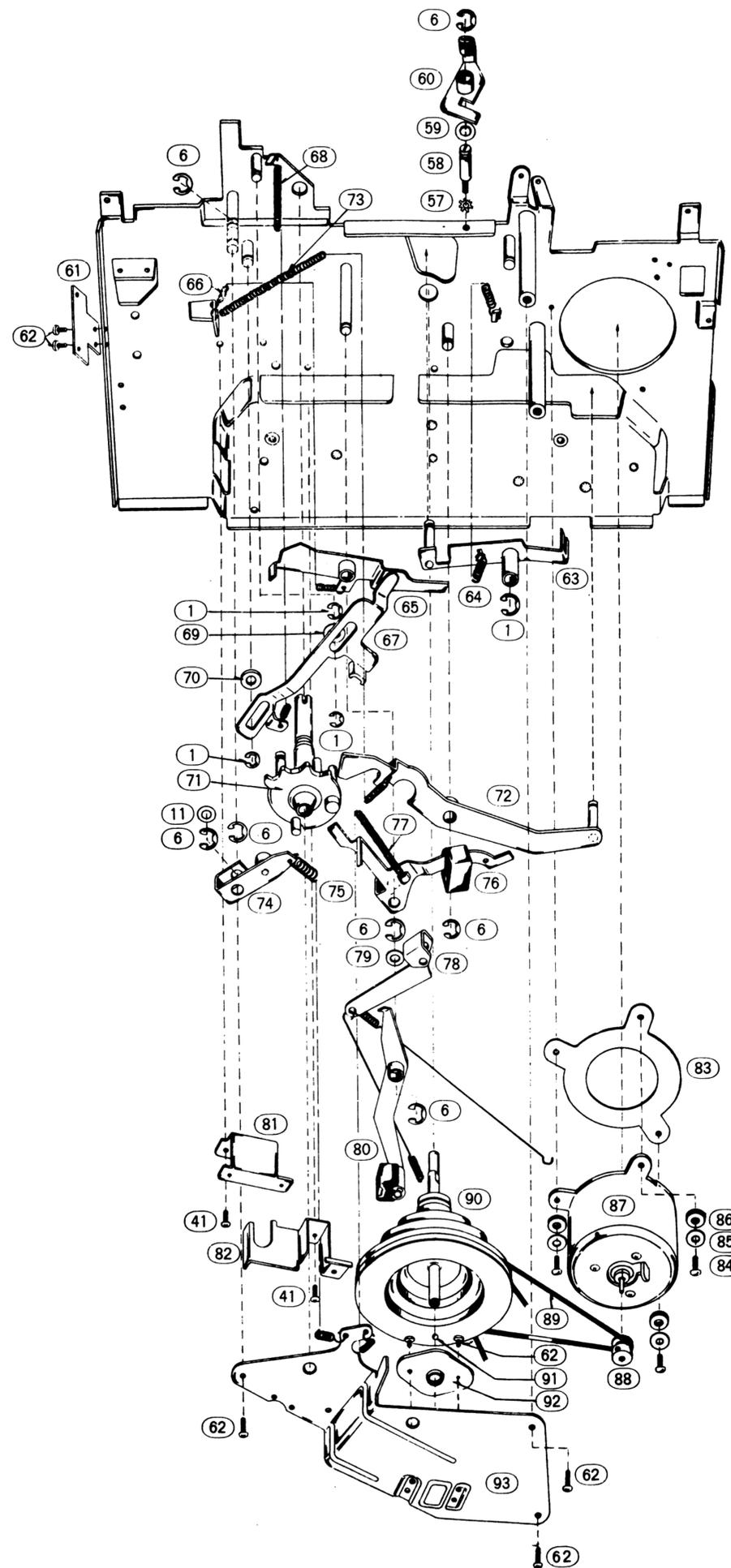
**NOTE:**

1. S1-1~S1-6...Record/Playback Selector Switch (Shown in Playback Position)
2. S2-1~S2-4...Forward/Reverse Selector Switch (shown in Forward)
3. S3-1~S3-3...VOICE MATIC/OFF/SOUND MONITOR Selector Switch (1 SP. MONITOR, 2: OFF, 3: ARC)
4. S1-1 AMP. Power ON-OFF Switch  
S1-2 Motor Govenor Short Switch (Shown in OFF)  
S4-3 Remote Short Switch
5. S5...Leaf Switch For Power ON-OFF (Shown in Playback Position)
6. S6...AC/DC Selector Switch (Shown in DC, Coupled With Relay RY)
7. Values indicated in   are DC to chassis ground with no signal apid.
8. The upper values should be measured during playback and the lower values during recording.
9. All Resistance in  $\Omega$ . K=1,000  $\Omega$ , M=1,000,000  $\Omega$ .
10. All Capacitance in Micro. farads. PF=Micro-microfarads.





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Ref. No.	Description	Part No.	Ref. No.	Description	Part No.		
123	X172A	Screw Round Head +3 $\phi$ $\times$ 8	QHM-230 $\times$ 6U3	48	M905	Tape Guide-C Assembly (Left)	QYQ-0043
124	X299A	Tapping Screw 3 $\phi$ $\times$ 8	QHM-530 $\times$ 8U3	49	M906	Pad-A Assembly (Right)	QXV-0025
125		Voltage Selector Switch Angle	QTT-1301	49-1	M979	Pad Felt	QAP-1093
126		AC Power Cord	QFC-1020	50	M907	Pad-B Assembly (Left)	QXV-0026
127		Fuse	QJF-1001	51	M908	Rinch Roller Spring	QMN-1050
128		Fuse Holder	QTF-1009	52	M437	Oil Seal	QBJ-1059
				53	M909	Pinch Roller	QDP-1053
				54	M1037	Pad Selector Assembly	QXA-0042
				56	M1038	Pad Selector Spring-B (Left)	QBT-1197
				57	X379	Lock Washer 3 $\phi$	QWQ-301K3
				58	M941	Switch Control Lever Shaft	QMS-1211
				59	X360	Fiber Washer 5 $\times$ 8 $\times$ 0.25	QBK-7053
				60	M898	Control Lever Assembly for Switch E319	QXL-0077
				61	M937	Mounting Metal Transformer E301	QTT-1239
				62	X196A	Screw Round Head +3 $\phi$ $\times$ 5	QHM-230 $\times$ 5U3
				63	M935	Pinch Roller Lever Assembly	QXL-0083
				64	M936	Pinch Roller Spring	QBT-1065
				65	M933	Brake Lift Lever Assembly	QXL-0082
				66	M934	Brake Lift Lever Spring	QBT-1174
				67	M931	Fast Forward Lever Assembly	QXL-0081
				68	M932	Fast Forward Lever Spring	QBT-1173
				69	X452	Steel Washer 4 $\times$ 12 $\times$ 0.3	QWQ-1051
				70	X360	Phenolic Washer 4 $\times$ 7 $\times$ 1.0	QBK-7072
				71	M938	Cam	QMF-1131
				72	M929	Takeup Lever Assembly	QXI-0080
				73	M930	Takeup Lever Spring	QBT-1068
				74	M927	Catch Lever Assembly	QXL-0024
				75	M928	Catch Lever Spring	QBT-1067
				76	M925	Clutch Lever Assembly	QXL-0079
				77	M926	Clutch Lever Spring	QBT-1069
				78	M924	Control Lever Assembly for Pinch Roller	QXL-0084
				79	X340	Fiber Washer 5 $\times$ 8 $\times$ 0.5	QBK-7063
				80	M923	Drive Lever Assembly for Switch E320	QXL-0078
				81	M922	Mounting Metal for Switch E320	QTT-1240
				82	M921	Mounting Metal for AC Cord Bushing	QTT-1241
				83	M920	Insulation Paper-D	QBK-1050
				84	X166	Screw Round Head -2.6 $\phi$ $\times$ 8	QHM-126 $\times$ 8U3
				85	X455	Steel Washer	QWP-2612N1
				86	M942	Rubber	QBG-1098
				87	M917	Motor	QDM-0916
				88	M918	Motor Pulley (A. B. C kit)	QDP-1110
				89	M943	Motor Rubber Belt	QDB-0050
				90	M915	Flywheel Assembly	QXF-0027
				91	M916	Thrust Steel Ball for Flywheel	QDK-1002
				92	M914	Flywheel Spacer	QBJ-1063
				93	M913	Sub Base Plate Assembly	QEC-1010
				94	X196A	Screw Round Head +3 $\phi$ $\times$ 5	QHM-230 $\times$ 5U3
				95	X452	Steel Washer 4 $\times$ 12 $\times$ 0.3	QWQ-1051
				96	X337	Fiber Washer 4 $\times$ 7 $\times$ 0.7	QBK-7067
				97	X387	Stop Ring E 3 $\phi$	QNS-304U3
				98	M980	Takeup Lever Guide	QML-1297
				99	X196A	Screw Round Head +3 $\phi$ $\times$ 5	QHM-230 $\times$ 5U3

## MECHANICAL PARTS

Ref. No.	Description	Part No.
1	X387	Stop Ring E3 $\phi$
2	X532	Plastic Washer 4 $\times$ 7 $\times$ 0.15
3	M456	Left Reel Table Assembly
4	X337	Fiber Washer 4 $\times$ 7 $\times$ 0.5
5	M881	Left Reel Table Brake Assembly
6	X384	Stop Ring E4 $\phi$
7	X339	Fiber Washer 4 $\times$ 8 $\times$ 0.5
8	M883	Left Brake Spring-A
9	M884	Left Brake Spring-B
10	M887	Left Rubber Belt
11	X536	Plastic Washer 4 $\times$ 7 $\times$ 0.15
12	M437	Oil Seal
13	M888	Guide Roller-A
14	X338	Fiber Washer 4 $\times$ 7 $\times$ 1.0
15	M1040	Sub Takeup Lever Assembly
17	M437	Oil Seal
18	M888	Guide Roller-A
19	M882	Right Reel Table Brake Assembly
20	M885	Right Brake Spring-A
21	M886	Right Brake Spring-B
22	M437	Oil Seal
23	M891	Guide Roller-B
24	M887A	Right Rubber Belt
25	M893	Right Reel Table Assembly
26	X356	Fiber Washer 4 $\times$ 8 $\times$ 0.25
27	M894	Right Reel Friction Spring
28	M437	Oil Seal
29	M945	Takeup Pulley Assembly
30	M895	Recorder Lock Assembly
31	X197	Screw 3 $\phi$ $\times$ 5
32	X196	Screw Round Head +3 $\phi$ $\times$ 5
33	M940	Spacer
34	M896	Record Lock Lever
35	M1039	Record Lock Lever Spring
36	X386	Stop Ring E2.6 $\phi$
37	M899	Capstan Holder Screw
38	X361	Capstan Sleeve Washer
39	M900	Capstan Sleeve
40	M901	Flywheel Shaft Metal
41	X108A	Screw Round Head +2.6 $\phi$ $\times$ 3
42	M902	Tape Guide-A Assembly
43	X194A	Screw Round Head +2 $\phi$ $\times$ 8
44	X195A	Screw Round Head +2 $\phi$ $\times$ 10
45	X454	Steel Washer 2 $\times$ 4 $\times$ 0.3
46	M903	Head Adjust Spring
47	M904	Tape Guide-B Assembly (Right)

## AMPLIFIER ADJUSTMENT

### 1. RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT

Instruments Required: V.T.V.M., Standard Alignment Tape 8 Ω Resistor.  
Measuring Circuit: Refer to Fig. 17.

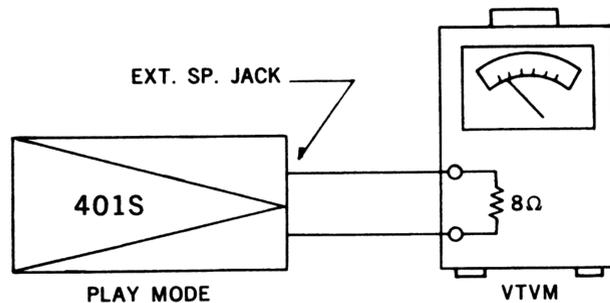


Fig. 17

#### MEASURING METHOD

- As shown in Fig. 17, connect VTVM to Extension Speaker Jack of Model RQ-401S and terminate with 8 Ω Resistor.
- Thread Standard Alignment Tape (Azimuth Adjustment Part) and set the recorder to "PLAY BACK" mode.
- Turn Head Adjustment Screw for maximum reading at VTVM.
- After completion of the above adjustment, lock Screw with Paint.
- Adjust levels of Heads (in relation to Erase Head) as in Fig. 18. For quick check, lift Pressure Pad Assemblies with fingers and note position of Tape in relation to Head.
- Conduct both Normal Forward and Reverse Forward.

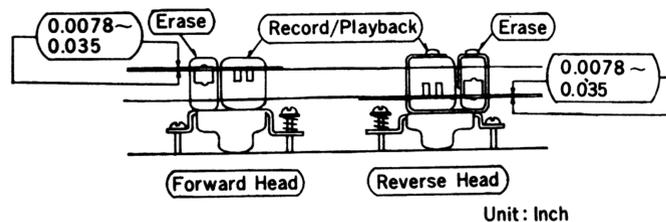


Fig. 18

### 2. RECORD LEVEL ADJUSTMENT

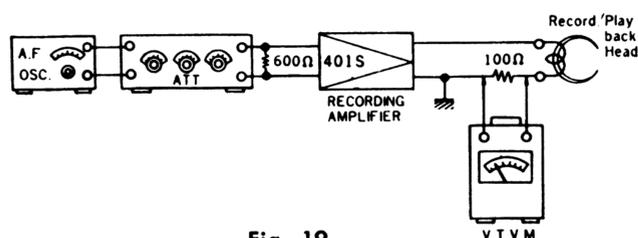


Fig. 19

Instruments Required: AF Oscillator, Attenuator, V.T.V.M. 600 Ω and 100 Resistors.

Measuring Circuit: Refer to Fig. 19.

#### MEASURING METHOD

- Set VOICEMATIC/OFF/SOUND MONITOR Selector Switch (S<sub>3</sub>) at "OFF", in order to cut-off Bias Current from Oscillator Circuit.
- As shown in Fig. 19, connect Output of AF Oscillator to Microphone Input Jack of Model RQ-401S through Attenuator (Terminal with 600 Ω, if impedance of Attenuator is 600 Ω). Disconnect wiring from ground side of Record Head. Insert 100 Ω Resistor between Lead Wire and Terminal.

Connect V.T.V.M. across Resistor.

- Set Recorder to "RECORD" mode with Volume Control set at maximum.
- Set AF Oscillator Output for 1 KC. Adjust Attenuator to obtain 50 mV reading at V.T.V.M. Attenuation level at this setting should be  $-70 \pm 3$  db.
- If Attenuation level is not within the above range, replace R-23. (Lower Resistance Value if Current is low, and vice versa.)
- Also confirm that the Level Meter setting at this moment is  $0 - VU \pm 3 VU$ .
- If setting is not within the above range, replace R-30. (Lower Resistance Value, if setting is low, and vice versa.)

**Note:** In relation to Normal Forward and Reverse Forward, F-23 & R-30 have to be chosen.

### 3. RECORD BIAS FREQUENCY ADJUSTMENT

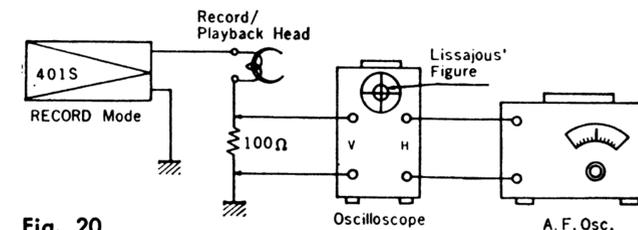


Fig. 20

Instruments Required: Oscilloscope, AF Oscillator, 100Ω Resistor.

Measuring Circuit: Refer to Fig. 20.

#### MEASURING METHOD

- As shown in Fig. 20, insert a 100Ω Resistor to ground Lead Wire of Record/Playback Head. Connect vertical Axis of Oscilloscope across Resistor. Connect horizontal Axis of Oscilloscope

to Output Terminal of AF Oscillator.

- When Model RQ-401S is set to "RECORD" mode, connected as above, Lissajous' Figure will appear on the Oscilloscope. Refer to this Figure to check frequency of Bias Oscillator. The standard Frequency is 30~40 KC.
- If frequency is not within the above range, adjust Core of T-3 (Oscillator Transformer) until the above frequency is obtained.

### 4. RECORD BIAS CURRENT ADJUSTMENT

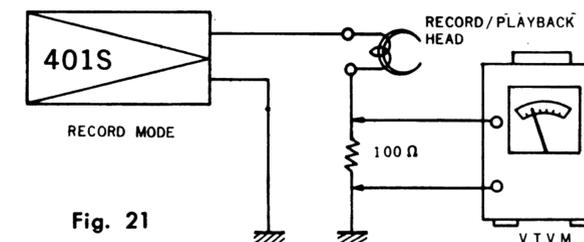


Fig. 21

Instruments Required: V.T.V.M., 100Ω Resistor.

Measuring Circuit: Refer to Fig. 21.

#### MEASURING METHOD

- As shown in Fig. 21, insert 100Ω Resistor to ground Lead Wire of Record/Playback Head, and connect VTVM across Resistor.
- When the recorder is set to "RECORD" mode, Bias (to be fed to Record Head) will be indicated at VTVM.
- As standard Bias Current for Model RQ-401S is set between 0.8 and 1.2 mA, VTVM reading

should be between 80 and 120 mV ( $0.8 \sim 1.2 \times 10^{-3} A \times 100 \Omega = 0.08 \sim 0.12 V = 80 \sim 120$  mV).

- If Bias Current is not within the above range, make adjustment by varying the Record Bias Frequency within the range of 30~40 KC.

**Note:** The above adjustment must be made for both "FORWARD" and "REVERSE" Operation Heads. Record/Playback and Erase are connected to assure correct phase relationships, and so do not reverse connections to any of the heads, for fear that it will result in an increase in noise and distortion.

### 5. ERASE CURRENT ADJUSTMENT

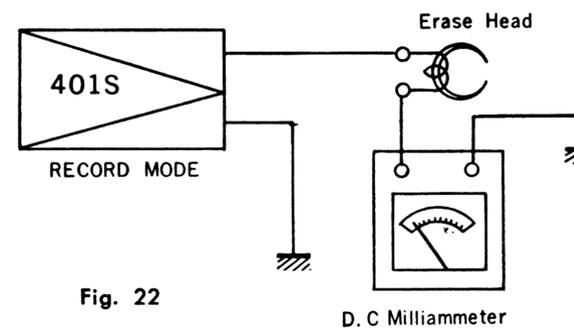


Fig. 22

Instruments Required: DC Milliammeter (having range of 0~20 or 50mA)

Measuring Circuit: Refer to Fig. 22.

#### MEASURING METHOD

- Disconnect wiring from ground side of Erase Head, and insert DC Milliammeter between Wire and Terminal as shown in Fig. 22.
- When the recorder is set to "RECORD" mode, DC Milliammeter will indicate Erase Current.
- Standard Erase Current is between 4 and 8 mA. If Current measured is not within the above range, replace R-25 Resistor. (Lower Resistance Value, if Current is low, and vice versa.)

**Note:** 1. In relation to Fast Forward and Reverse Forward, R-25 should be chosen.  
2. Measure Power Voltage at 9 V.

## TAPE TRANSPORT OPERATION

### OPERATION:

1. Set to required speed by inserting Capstan Sleeve or removing it from Capstan.
2. When Function Control Lever is turned to "FORWARD" position, Motor rotation is transmitted to Flywheel through the medium of Motor Belt. Pinch Roller is pressed against Capstan, and Tape starts running. Simultaneously Takeup Reel Table begins to rotate. The unit is then in "FORWARD PLAYBACK" mode.
3. When Function Control Lever is turned to "REVERSE" position, direction of Motor revolution is reversed from "FORWARD" by means of polarity change, and the reversion is transmitted to Flywheel through Motor Belt.

4. If Record Button is pulled to the left and Function Control Lever is positioned at "FORWARD" or "REVERSE," the unit is put in "REVERSE PLAYBACK" mode.
5. If Remote Control Switch at Microphone is turned to "OFF" while the unit is in "PLAY" or "RECORD" mode, power supply to Motor cuts off, stopping Tape motion. When Button is reset, the unit resumes operation.
6. If "FAST WIND" Button is pushed and Function Control Lever is turned to "FORWARD" or "REVERSE," revolving speed of Takeup Reel Table or Supply Reel Table becomes increased, and the unit is put in "RECORD" mode.

## RECORDING AND PLAYBACK

### FORWARD

When Function Control Lever is set to "FORWARD" position:  
Motor rotation is transmitted to Flywheel through the medium of Motor Belt. At the same time, Pinch Roller is pressed against Capstan and the Left Side Pressure Pad Assembly is pressed against Head. Further, Supply Reel Table Brake and Takeup Reel Table Brake disengage from each Reel Table. Takeup Reel Table starts turning and winds Tape forward at a constant speed. The unit is then in "FORWARD PLAYBACK" mode. If Record Button is pushed to the left and Function Control Lever is set to "FORWARD" position, the unit is in "FORWARD RECORD" mode, with the Mechanism set in the same manner as in the "FORWARD PLAYBACK" mode.

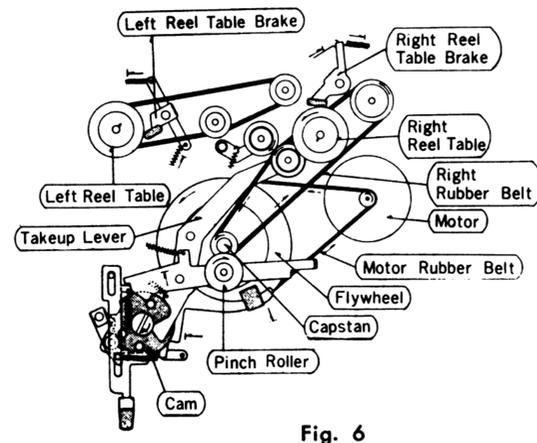


Fig. 6

### REVERSE

When Function Control Lever is set to "REVERSE" position:  
Power Polarity is reversed by Switch S<sub>2</sub> and the direction of Motor revolution is reversed from "FORWARD".  
Motor revolution is, through the agency of Motor Belt, transmitted to Flywheel. At the same time, Pinch Roller is pressed against Capstan and the Right Side Pressure Pad Assembly is pressed against Head. Further, Supply Reel Table Brake and Takeup Reel Table Brake disengage from each Reel Table. Supply Reel Table turns and winds the forwarded Tape at a constant speed. The unit is in "REVERSE PLAYBACK" mode.  
If Record Button is pressed to the left and Function Control Lever is set to "REVERSE" position, the unit is in "REVERSE RECORD" mode, with the mechanism set in the same manner as in the "REVERSE PLAYBACK" mode.

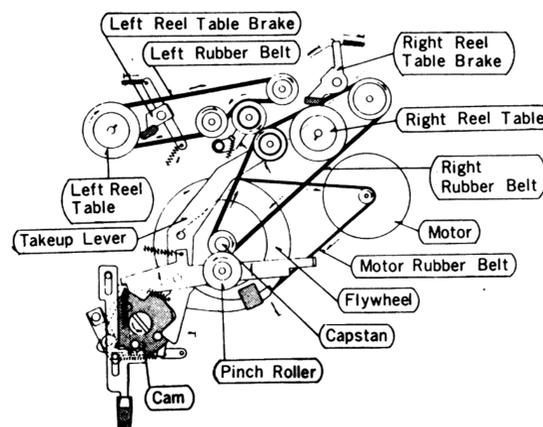


Fig. 7

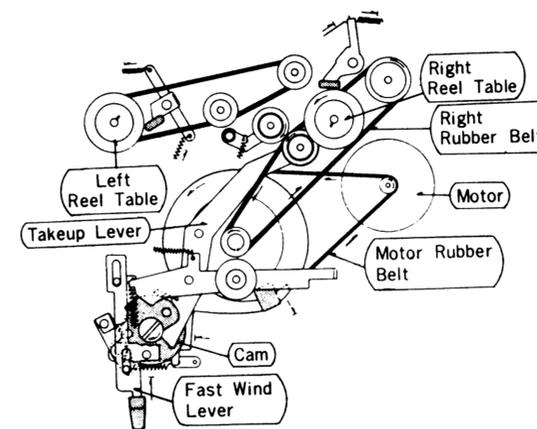


Fig. 8

### FAST FORWARD

When Function Control Lever is set to "FORWARD" position (after pressing the Fast wind Button), the unit is in "FAST FORWARD" mode. Functioning of Mechanism is same as in Forward Playback. But, as Motor Governor is subjected to short by S<sub>4.2</sub>, the number of revolutions increases and consequently the revolution of Takeup Reel Table is quickened to wind Tape.

### REWIND

When Function Control Lever is set to "REVERSE" position (after pressing the Fast Wind Button), the unit is in "REWIND" mode. Functioning of Mechanism is same as in Reverse Playback. But, as Motor Governor is subjected to short by S<sub>4.2</sub>, the number of revolutions increases and consequently the revolution of Supply Reel Table is quickened to wind Tape.

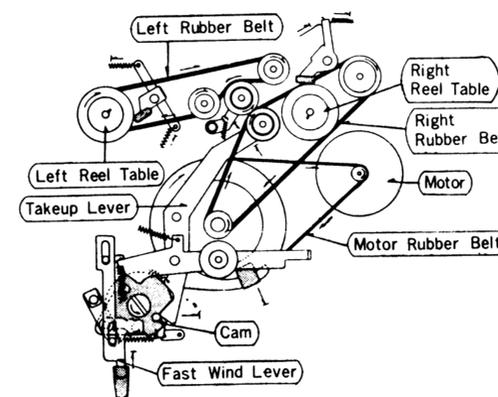


Fig. 9

### STOP

When Function Control Lever is set from "FORWARD" or "REVERSE" position to "STOP" position, the unit is in "STOP" mode.  
As Clutch Lever functions, Power Switch S<sub>5</sub> is set to "OFF" position, and Motor stops turning. At the same time, Takeup Reel Table Brake and Supply Reel Table Brake work to stop feeding of Tape.  
When stopping from "FORWARD RECORD/PLAYBACK" position or "REVERSE RECORD/PLAYBACK" position, Pinch Roller separates from Capstan; and Pad from the surface of Head.

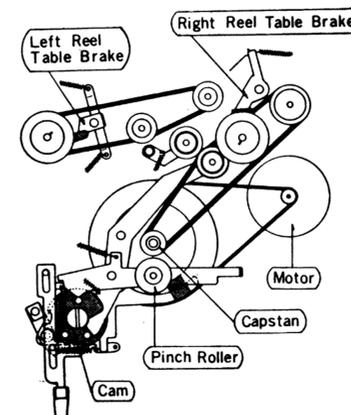


Fig. 10