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 KΩ
	"AUX." input 100 KΩ
Output:	"EXT. SP," output 8 Ω
Program Time:	2 hours (double track) for +50% tape at 1-7/8 ips.
Built in Speaker:	3-1/4" parmanent dynamic speaker
Battery Life:	More than 10 hours (using NATIONAL "Hi-Top")
Dimensions:	10-1/4"(W)×3-1/4"(H)×8-7/8"(D)
Weight:	7 lbs.

PARTS LOCATION

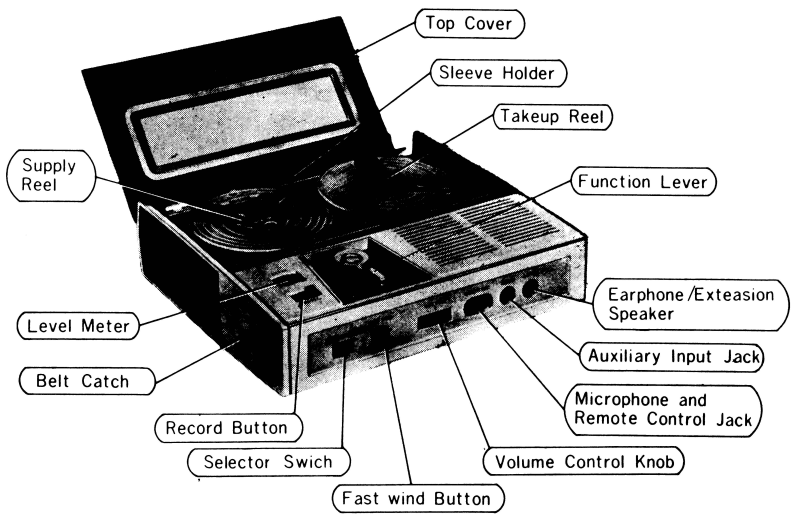


Fig. 1

DISASSEMBLY INSTRUCTIONS

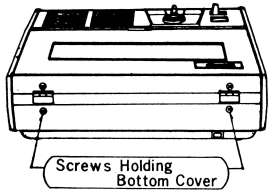


Fig. 2

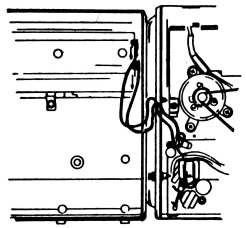


Fig. 3

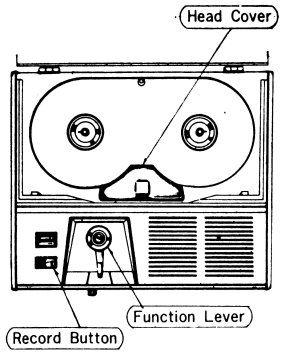


Fig. 4

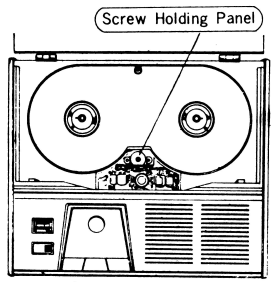


Fig. 5

A. TO REMOVE BOTTOM COVER·

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

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

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.

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 cheched 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.

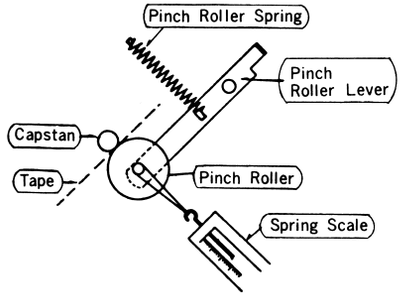


Fig. 11

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.

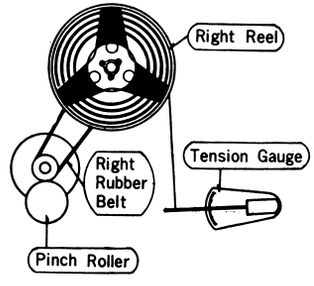


Fig. 12

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″

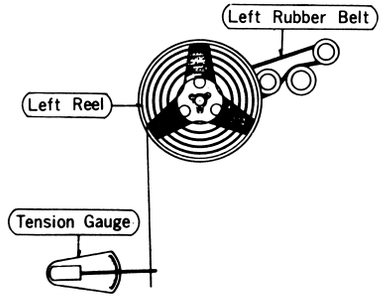


Fig. 13

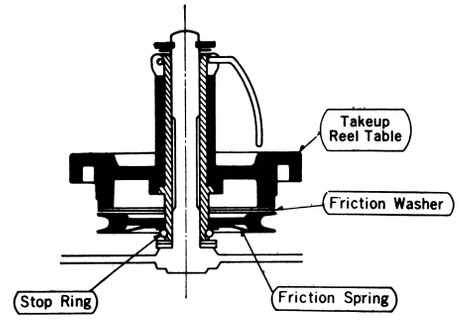


Fig. 14

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 tention 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.

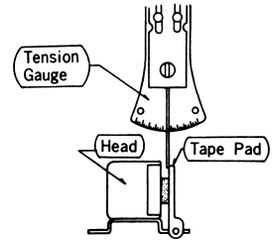


Fig. 15

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;

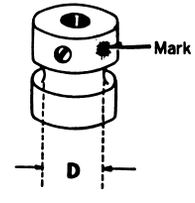


Fig. 16

Mark	Parts No.	Size of D	
Black	M-976	0.135″	Faster ↑
Colorless	M-977	0.131″	↓ Slower
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

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

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 +3φ×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 2.6φ×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 N2.6ϕ	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 +3ϕ×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

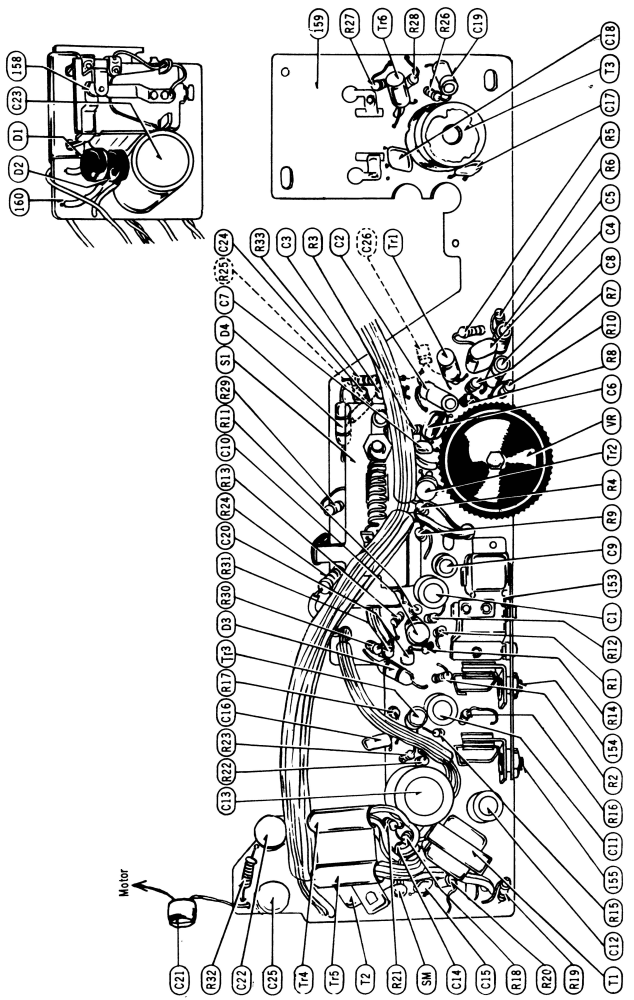
ACCESSORIES

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 Adptor	QJP-0601
A 11	Instruction Book	QQT-0212

PACKING

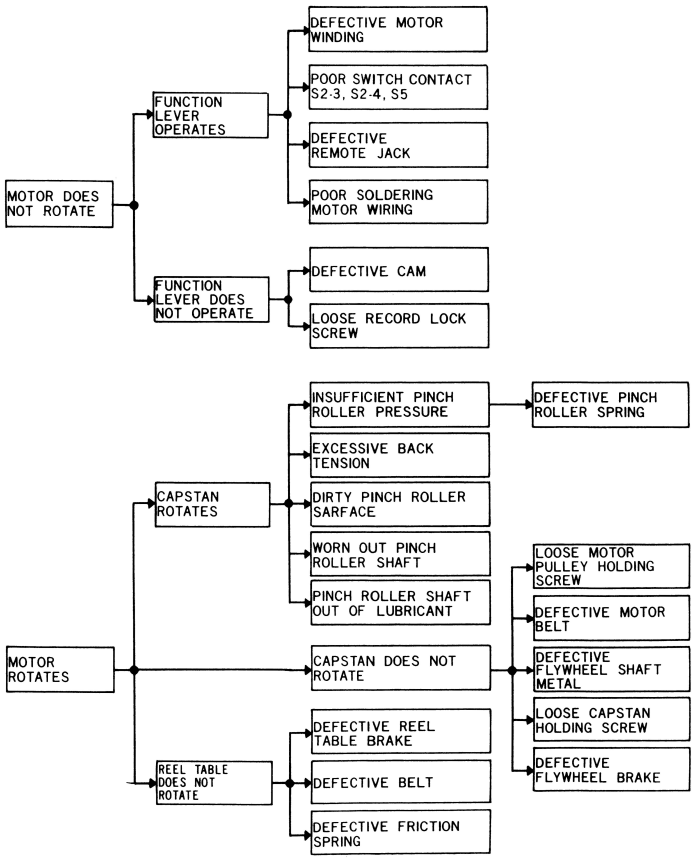
P 1	Packing Case	QPN-1375
P 2	Dust Cover	QFD-0064
P 3	Inner Cushion (R)	QPN-1377
P 4	Inner Cushion (L)	QPN-1378
P 5	Accessory Case	QPW-1046

CIRCUIT BOARD



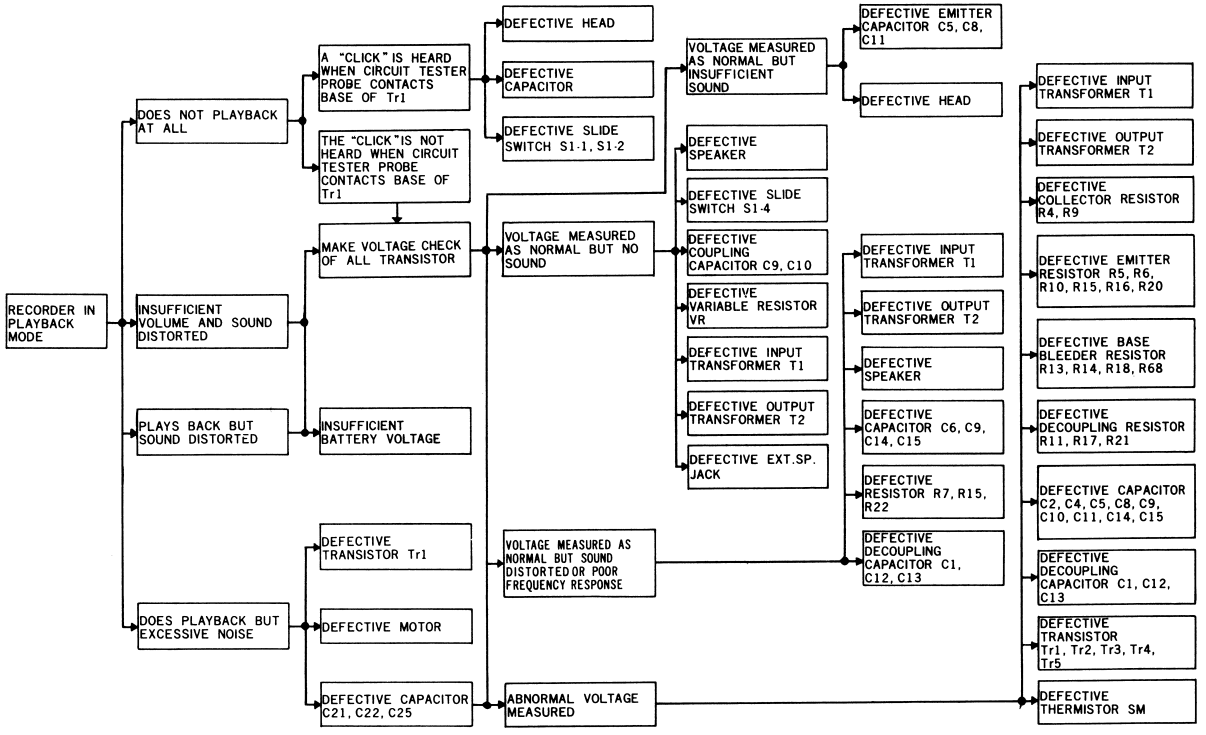
TROUBLE SHOOTING GUIDE 1

MALFUNCTION IN RECORD/PLAYBACK MOTION

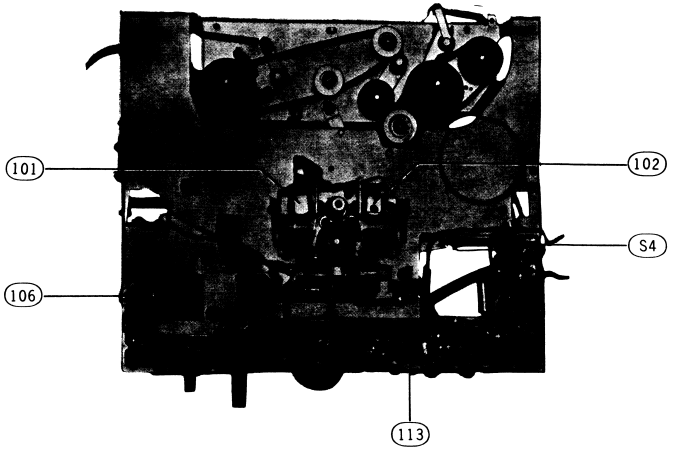


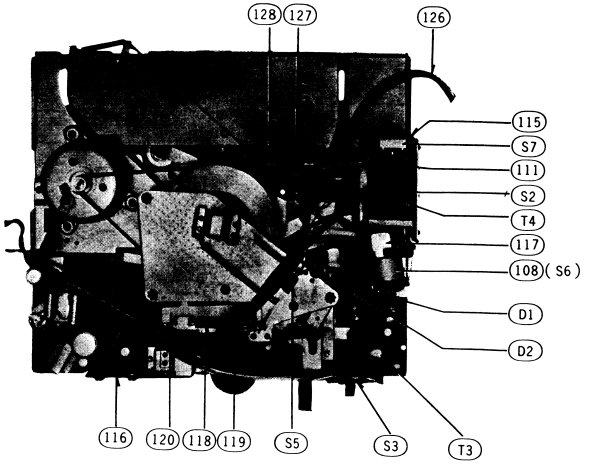
TROUBLE SHOOTING GUIDE 4

DEFECTIVE PLAYBACK CIRCUIT

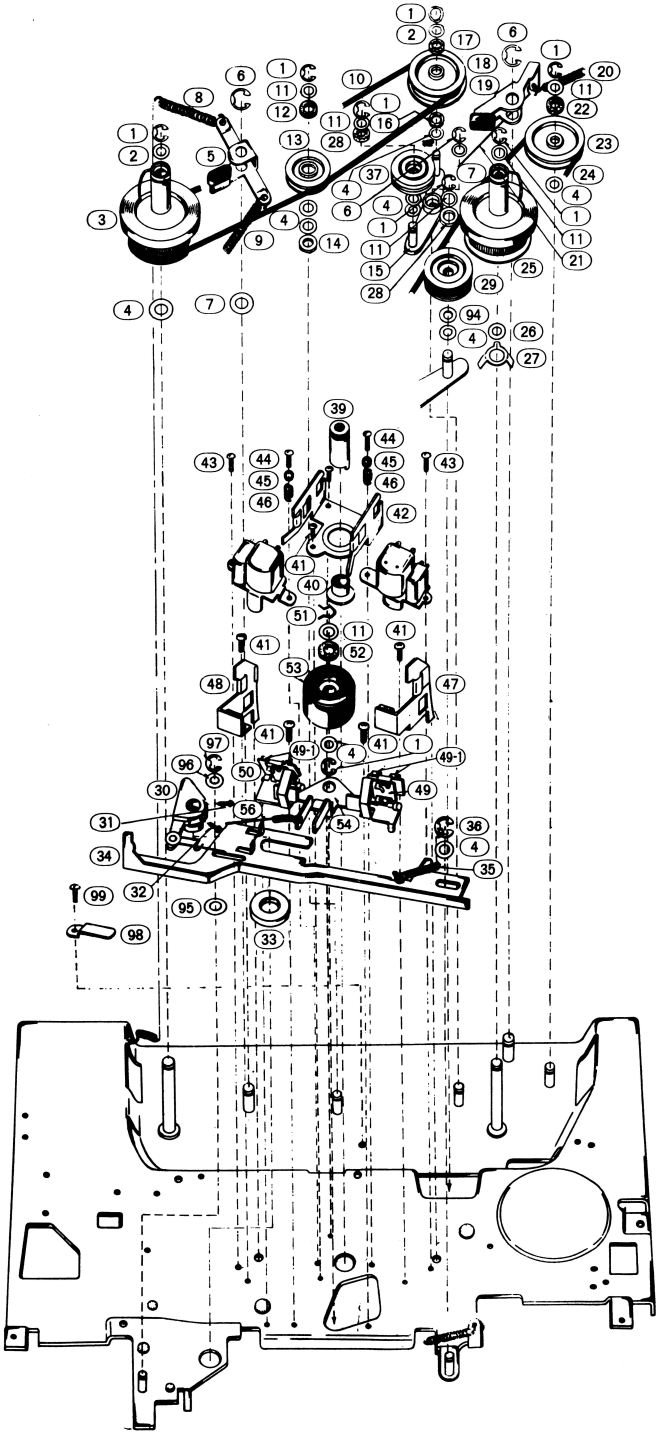


ELECTRICAL PARTS LOCATION



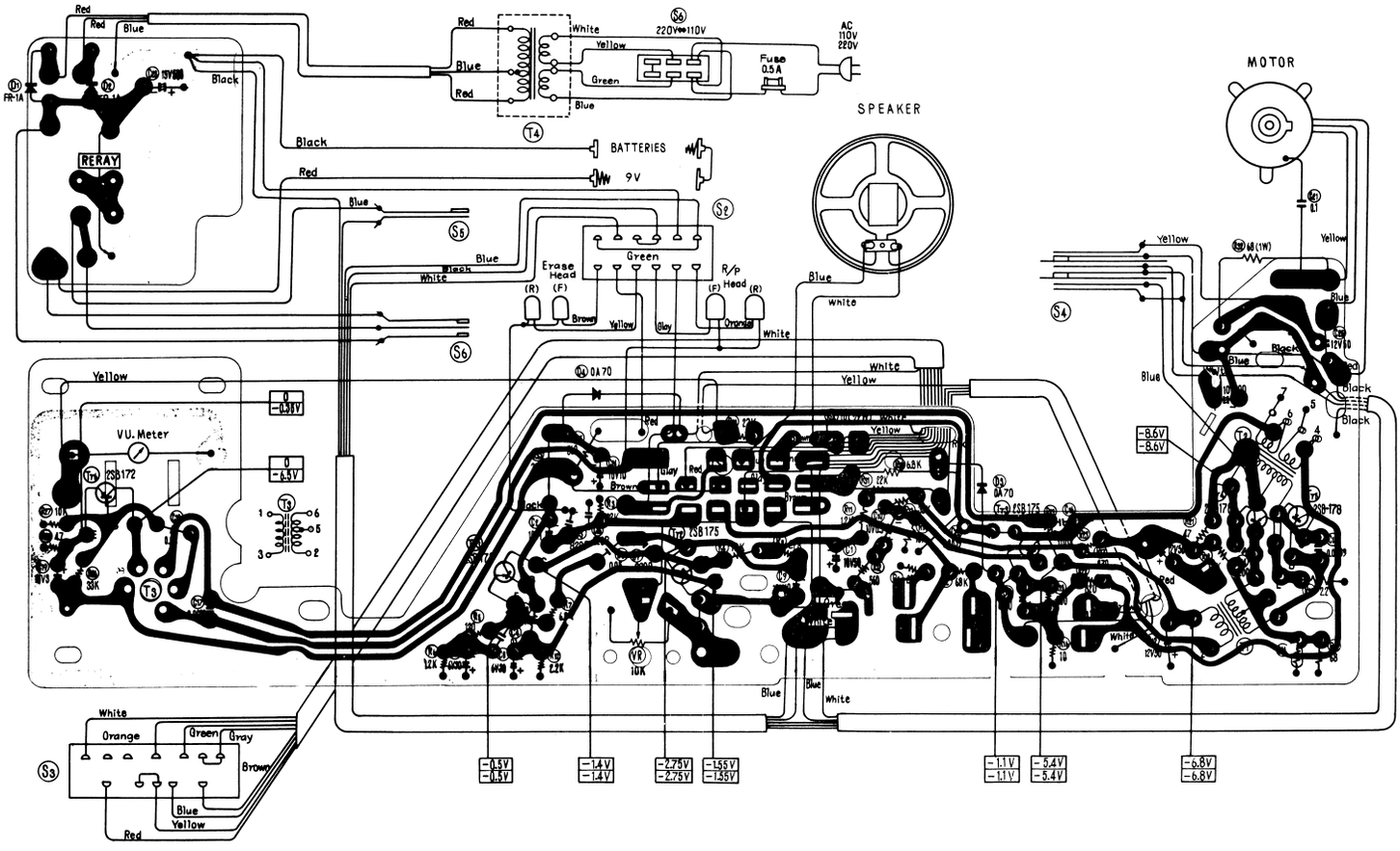


NATIONAL MODEL RQ-401S



WIRING CONNECTION DIAGRAM RQ-401S

CONDUCTOR VIEW

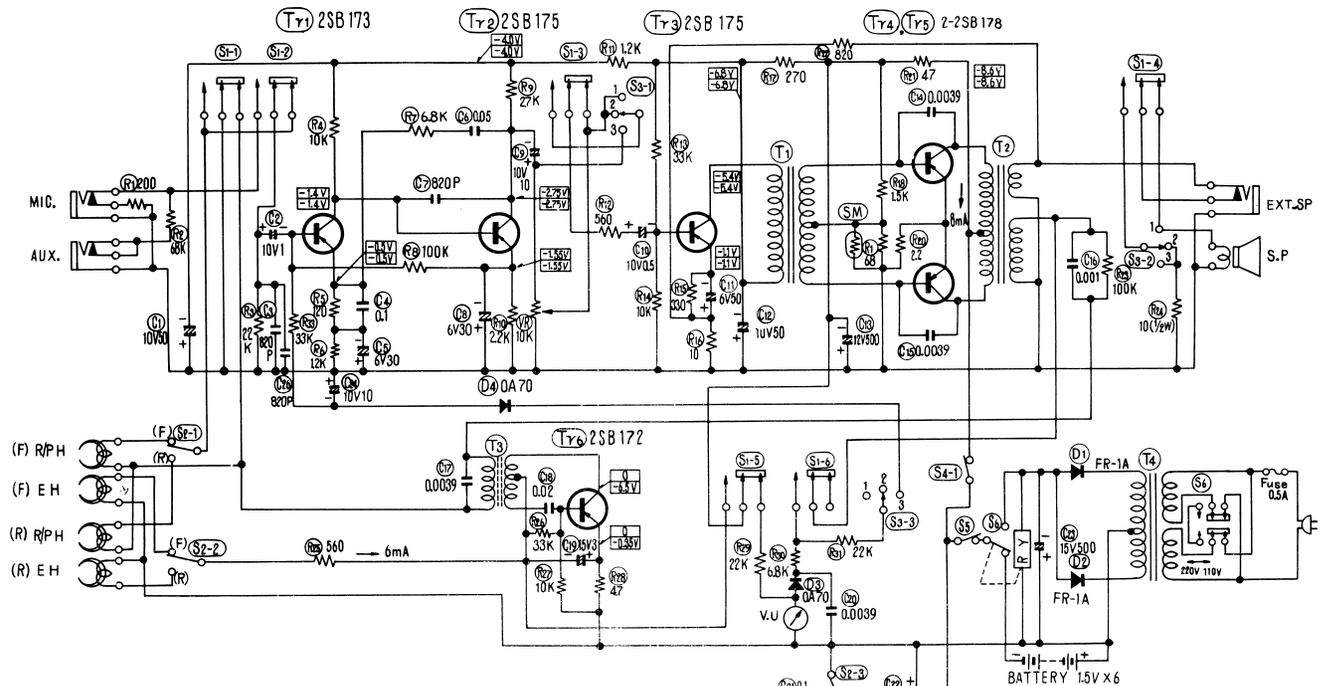


NOTE:

Values indicated in ☐ are DC to chassis ground with no signal applied.

The upper values should be measured during playback and the lower values during recording.

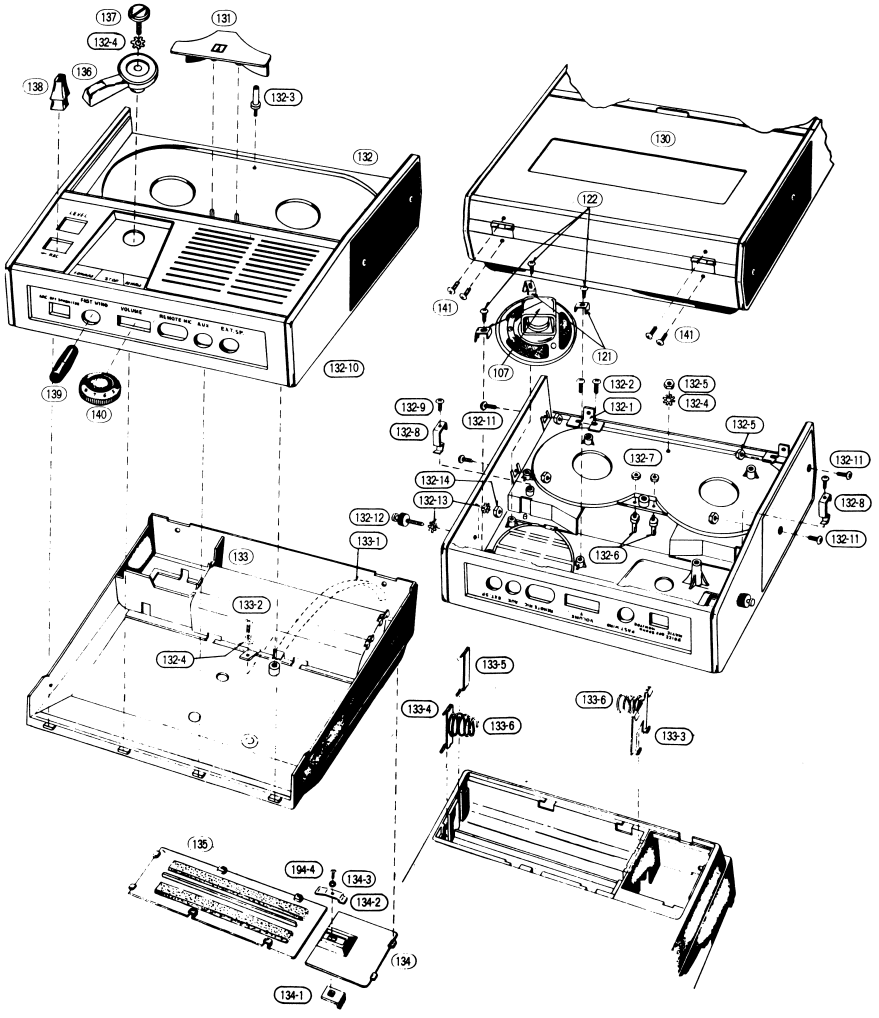
SCHEMATIC CIRCUIT DIAGRAM RQ-401S

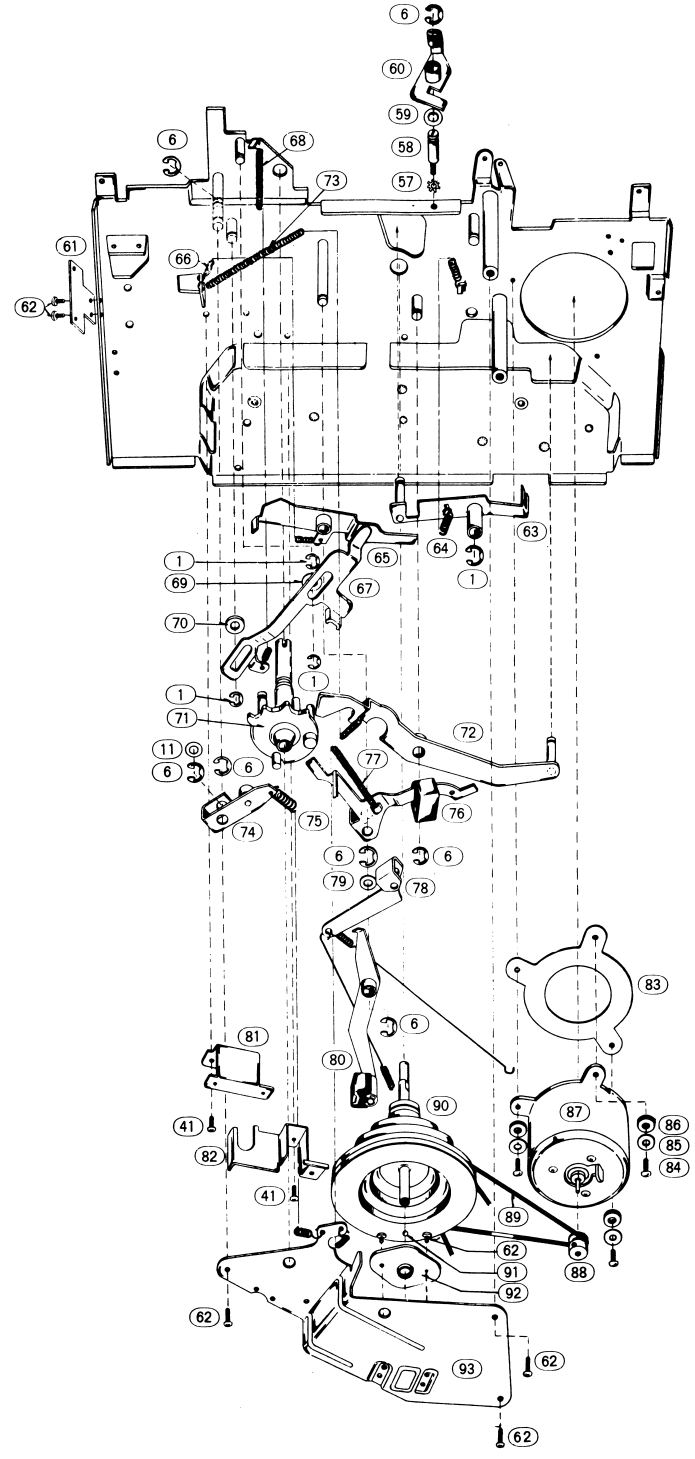


NOTE:

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. ....Leaf Switch S1-1 AMP. Power ON-OFF Switch
   S1-2 Motor Govener 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 appid.
8. The upper values should be measured during playback and the lower values during recording.
9. All Resistance in Ω. K=1,000 Ω, M=1,000,000 Ω.
10. All Capacitance in Micro. farads. PF=Micro-microfarads.

N16-9. NATIONAL MODEL RQ-401S

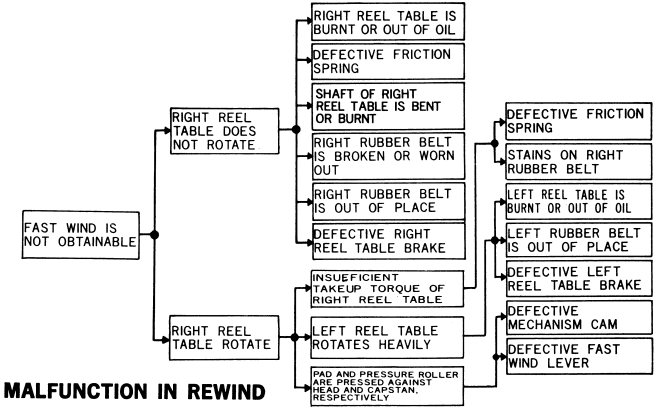




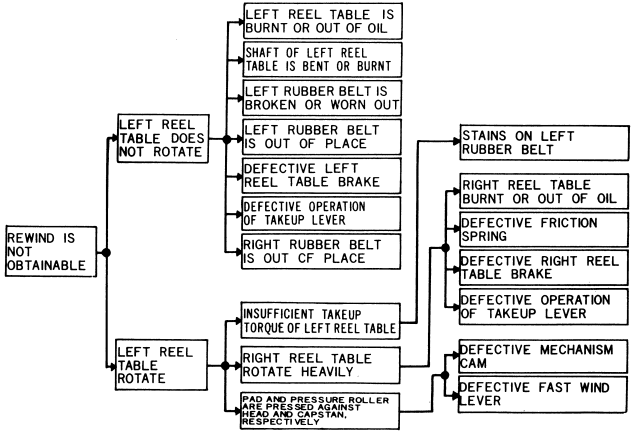
NATIONAL MODEL RQ-401S

TROUBLE SHOOTING GUIDE 2

MALFUNCTION IN FAST WIND

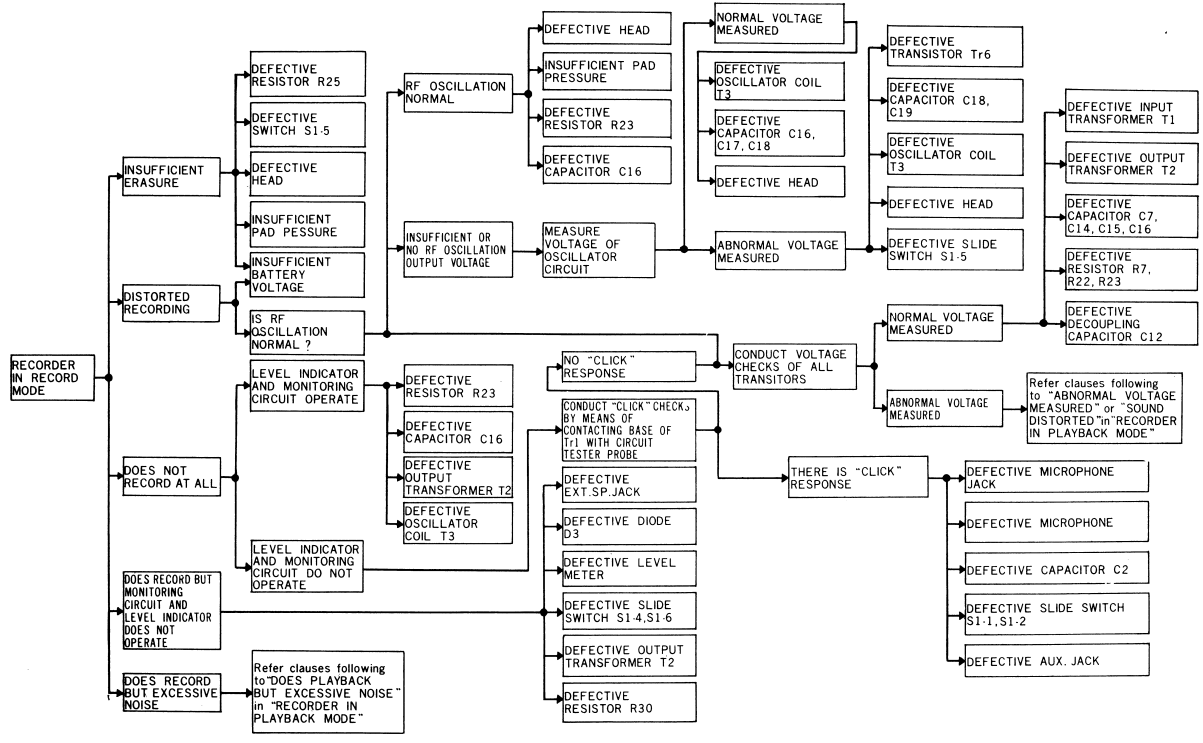


MALFUNCTION IN REWIND



TROUBLE SHOOTING GUIDE 3

DEFECTIVE RECORDING CIRCUIT



N16-5. NATIONAL MODEL RQ-401S

Ref. No.		Description	Part No.
123	X172A	Screw Round Head +3φ×8	QHM-230×6U3
124	X299A	Tapping Screw 3φ×8	QHM-530×8U3
125		Voltage Selector Switch Angle	QTT-1301
126		AC Power Cord	QFC-1020
127		Fuse	QJF-1001
128		Fuse Holder	QTF-1009

MECHANICAL PARTS

1	X387	Stop Ring E3φ	QNS-304U3
2	X532	Plastic Washer 4×7×0.15	QBJ-3009
3	M456	Left Reel Table Assembly	QXP-0135
4	X337	Fiber Washer 4×7×0.5	QBK-7067
5	M881	Left Reel Table Brake Assembly	QXA-0033
6	X384	Stop Ring E4φ	QNS-404U3
7	X339	Fiber Washer 4×8× 0.5	QBK-7048
8	M883	Left Brake Spring-A	QBT-1164
9	M884	Left Brake Spring-B	QBT-1165
10	M887	Left Rubber Belt	QDM-0055
11	X536	Plastic Washer 4×7×0.15	QBJ-3009
12	M437	Oil Seal	QBJ-1059
13	M888	Guide Roller-A	QDP-1054
14	X338	Fiber Washer 4×7×1.0	QBK-7072
15	M1040	Sub Takeup Lever Assembly	QXL-0101
17	M437	Oil Seal	QBJ-1059
18	M888	Guide Roller-A	QDP-1054
19	M882	Right Reel Table Brake Assembly	QXA-0034
20	M885	Right Brake Spring-A	QBT-1166
21	M886	Right Brake Spring-B	QBT-1167
22	M437	Oil Seal	QBJ-1059
23	M891	Guide Roller-B	QDP-1051
24	M887A	Right Rubber Belt	QDB-0062
25	M893	Right Reel Table Assembly	QXP-0135
26	X356	Fiber Washer 4×8×0.25	QBK-7062
27	M894	Right Reel Friction Spring	QBP-1079
28	M437	Oil Seal	QBJ-1059
29	M945	Takeup Pulley Assembly	QXP-0136
30	M895	Recorder Lock Assembly	QMF-1132
31	X197	Screw 3φ×5	QHQ-1071
32	X196	Screw Round Head +3φ×5	QHM-230×5U3
33	M940	Spacer	QTM-1029
34	M896	Record Lock Lever	QML-1257
35	M1039	Record Lock Lever Spring	QBT-1198
36	X386	Stop Ring E2.6φ	QNS-264U3
37	M899	Capstan Holder Screw	QHQ-1072
38	X361	Capstan Sleeve Washer	QWQ-1072
39	M900	Capstan Sleeve	QMP-1086
40	M901	Flywheel Shaft Metal	QMM-1084
41	X108A	Screw Round Head +2.6φ×3	QHM-226×3U3
42	M902	Tape Guide-A Assembly	QYQ-0041
43	X194A	Screw Round Head +2φ×8	QHM-220×8U3
44	X195A	Screw Round Head +2φ×10	QHM-220×10U3
45	X454	Steel Washer 2×4×0.3	QWP-2012N1
46	M903	Head Adjust Spring	QBT-1170
47	M904	Tape Guide-B Assembly (Right)	QYQ-0042
48	M905	Tape Guide-C Assembly (Left)	QYQ-0043
49	M906	Pad-A Assembly (Right)	QXV-0025
49-1	M979	Pad Felt	QAP-1093
50	M907	Pad-B Assembly (Left)	QXV-0026
51	M908	Rinch Roller Spring	QMN-1050
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 3φ	QWQ-301K3
58	M941	Switch Control Lever Shaft	QMS-1211
59	X360	Fiber Washer 5×8×0.25	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 +3φ×5	QHM-230×5U3
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 4×12×0.3	QWQ-1051
70	X360	Phenolic Washer 4×7×1.0	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 5×8×0.5	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 −2.6φ×8	QHM-126×8U3
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 +3φ×5	QHM-230×5U3
95	X452	Steel Washer 4×12×0.3	QWQ-1051
96	X337	Fiber Washer 4×7×0.7	QBK-7067
97	X387	Stop Ring E 3φ	QNS-304U3
98	M980	Takeup Lever Guide	QML-1297
99	X196A	Screw Round Head +3φ×5	QHM-230×5U3

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.

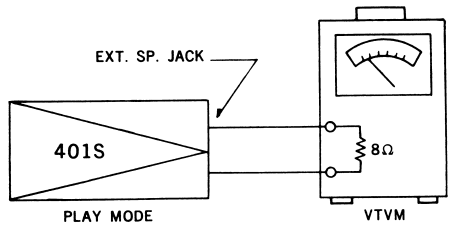


Fig. 17

MEASURING METHOD

1. As shown in Fig. 17, connect VTVM to Extension Speaker Jack of Model RQ-401S and terminate with 8 Ω Resistor.
2. Thread Standard Alignment Tape (Azimuth Adjustment Part) and set the recorder to "PLAY BACK" mode.
3. Turn Head Adjustment Screw for maximum reading at VTVM.
4. After completion of the above adjustment, lock Screw with Paint.
5. 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.
6. Conduct both Normal Forward and Reverse Forward.

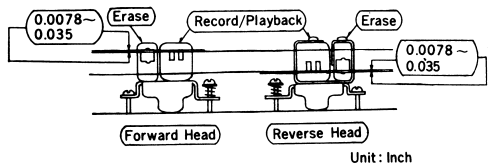


Fig. 18

2. RECORD LEVEL ADJUSTMENT

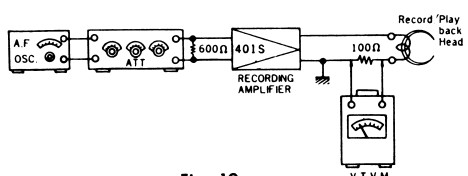


Fig. 19

Instruments Required: AF Oscillator, Attenuator, V.T.V.M. 600 Ω and 100 Resistors.
Measuring Circuit: Refer to Fig. 19.

MEASURING METHOD

1. Set VOICEMATIC/OFF/SOUND MONITOR Selector Switch (S_3) at "OFF", in order to cut-off Bias Current from Oscillator Circuit.
2. As shown in Fig. 19, connect Output of AF Oscillator to Microphone Input Jack of Model RQ-401S through Attenuater (Terminal with 600 Ω, if impedance of Attenuater 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.
3. Set Recorder to "RECORD" mode with Volume Control set at maximum.
4. 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 ± 3 db.
5. If Attenuation level is not within the above range, replace R-23. (Lower Resistance Value if Current is low, and vice versa.)
6. Also confirm that the Level Meter setting at this moment is $0 - VU \pm 3$ VU.
7. 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

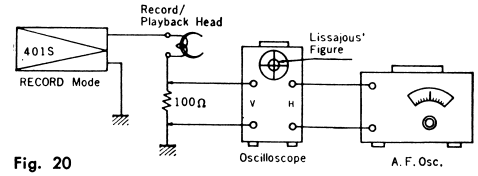


Fig. 20

Instruments Required: Oscilloscope, AF Oscillator, 100Ω Resistor.
Measuring Circuit: Refer to Fig. 20.

MEASURING METHOD

1. 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.
2. 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.
3. 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

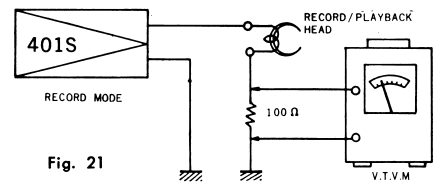


Fig. 21

Instruments Required: V.T.V.M., 100Ω Resistor.
Measuring Circuit: Refer to Fig. 21.

MEASURING METHOD

1. As shown in Fig. 21, insert 100Ω Resistor to ground Lead Wire of Record/Playback Head, and connect VTVM across Resistor.
2. When the recorder is set to "RECORD" mode, Bias (to be fed to Record Head) will be indicated at VTVM.
3. As standard Bias Current for Model RQ-401S is set between 0.8 and 1.2 mA, VTVM reading should 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).
4. 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

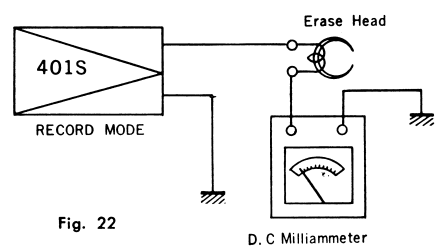


Fig. 22

Instruments Required: DC Milliammeter (having range of 0~20 or 50mA)
Measuring Circuit: Refer to Fig. 22.

MEASURING METHOD

1. Disconnect wiring from ground side of Erase Head, and insert DC Milliammeter between Wire and Terminal as shown in Fig. 22.
2. When the recorder is set to "RECORD" mode, DC Milliammeter will indicate Erase Current.
3. 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. When Pinch Roller is pressed against Capstan and Tape starts running, Supply Reel Table begins to rotate. The unit is then in "REVERSE PLAYBACK" mode.
4. If Record Button is pulled to the left and Function Control Lever is positioned at "FORWARD" or "REVERSE," the unit is put in "RECORD" 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 forwarded 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.

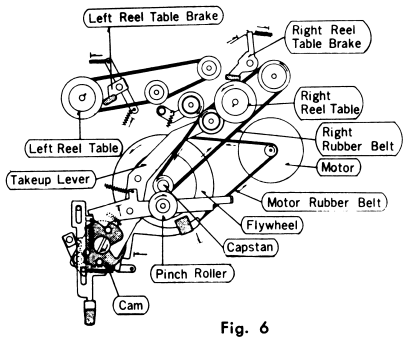


Fig. 6

REVERSE

When Function Control Lever is set to "REVERSE" position:
Power Polarity is reversed by Switch S_2 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.

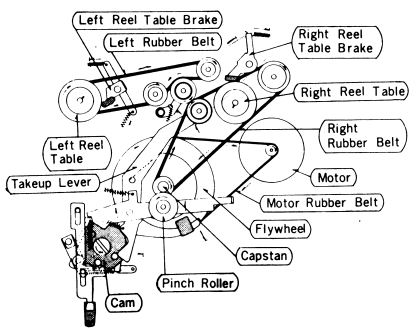


Fig. 7

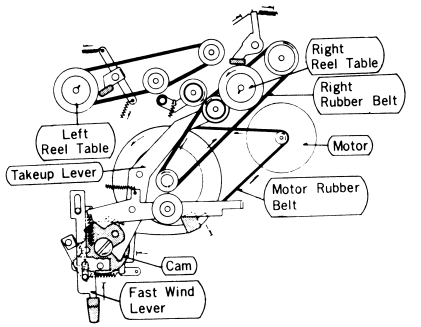


Fig. 8

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 $S_{4\text{-}2}$, the number of revolutions increases and consequently the revolutionof Takeup Reel Table is quickened to wind Tape.

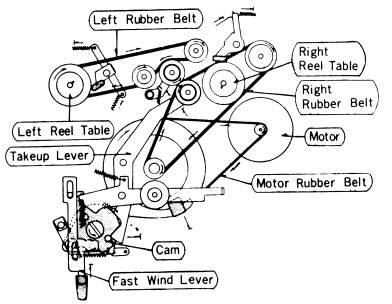


Fig. 9

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 $S_{4\text{-}2}$, the number of revolutions increases and consequently the revolution of Supply Reel Table is quickened to wind Tape.

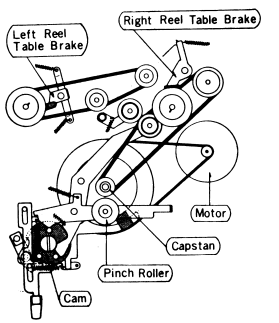


Fig. 10

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_5 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.