Service
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Service Manual

SPECIFICATIONS

Power supply — Battery	6 V.D.C. (4× Philips type R14)
Power supply — Mains	240V. 50 Hz
Current drain — Battery	Less than 250 mA D.C. (Play)
Power Consumption — Mains	6 watts
Output power	.7 mW R.M.S.
Frequency response	200 Hz — 6000 Hz
Loudspeaker impedance	8 ohms
Input impedance (MIC.)	1.5 kohm
Record system	D.C. bias, 2 track, monaural
Erase system	D.C. erase
Tape speed	4.75 cm/sec.
F.F. time (for C60 cassette)	within 140 sec.
Rewind time (for C60 cassette)	within 95 sec.
Auto stop	mechanical auto. stop

DISASSEMBLY

Case back removal. Place the unit face-down on a protected surface. Remove the battery cover, and the batteries (if fitted). Remove 2 screws from recesses at the top of the rear cover and 1 screw from the battery compartment. Slide the mains socket and jack socket assemblies from the rear cover and lay the rear cover down, taking care not to strain the wiring to the battery compartment.

P.C. board and mechanism. Removal of 2 screws securing the amplifier P.C. board (one from each end of the board) enables the board to be rotated for service access to the component side of the board and to the rear of the cassette mechanism. For complete removal of the mechanism, remove the Tone and Volume control knobs, release 2 further screws (one in a projecting lug on the motor mounting plate, and the other in the diagonally opposite corner of the mechanism chassis), slide the power supply P.C. board out of its recess and unsolder the leads to the loudspeaker. The complete assembly can then be lifted from the front case and rotated for service access, taking care not to strain the wiring to the slider controls and microphone (or these items may also be released from the front cover, if preferred).

Re-assembly is effected in the reverse order, in all cases.

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Output power	.7 mW R.M.S.
Frequency response	200 Hz – 6000 Hz
Loudspeaker impedance	8 ohms
Input impedance (MIC.)	1.5 kohm
Record system	D.C. bias, 2 track, monaural
Erase system	D.C. erase
Tape speed	4.75 cm/sec.
F.F. time (for C60 cassette)	within 140 sec.
Rewind time (for C60 cassette)	within 95 sec.
Auto stop	mechanical auto. stop

DISASSEMBLY

Case back removal. Place the unit face-down on a protected surface. Remove the battery cover, and the batteries (if fitted). Remove 2 screws from recesses at the top of the rear cover and 1 screw from the battery compartment. Slide the mains socket and jack socket assemblies from the rear cover and lay the rear cover down, taking care not to strain the wiring to the battery compartment.

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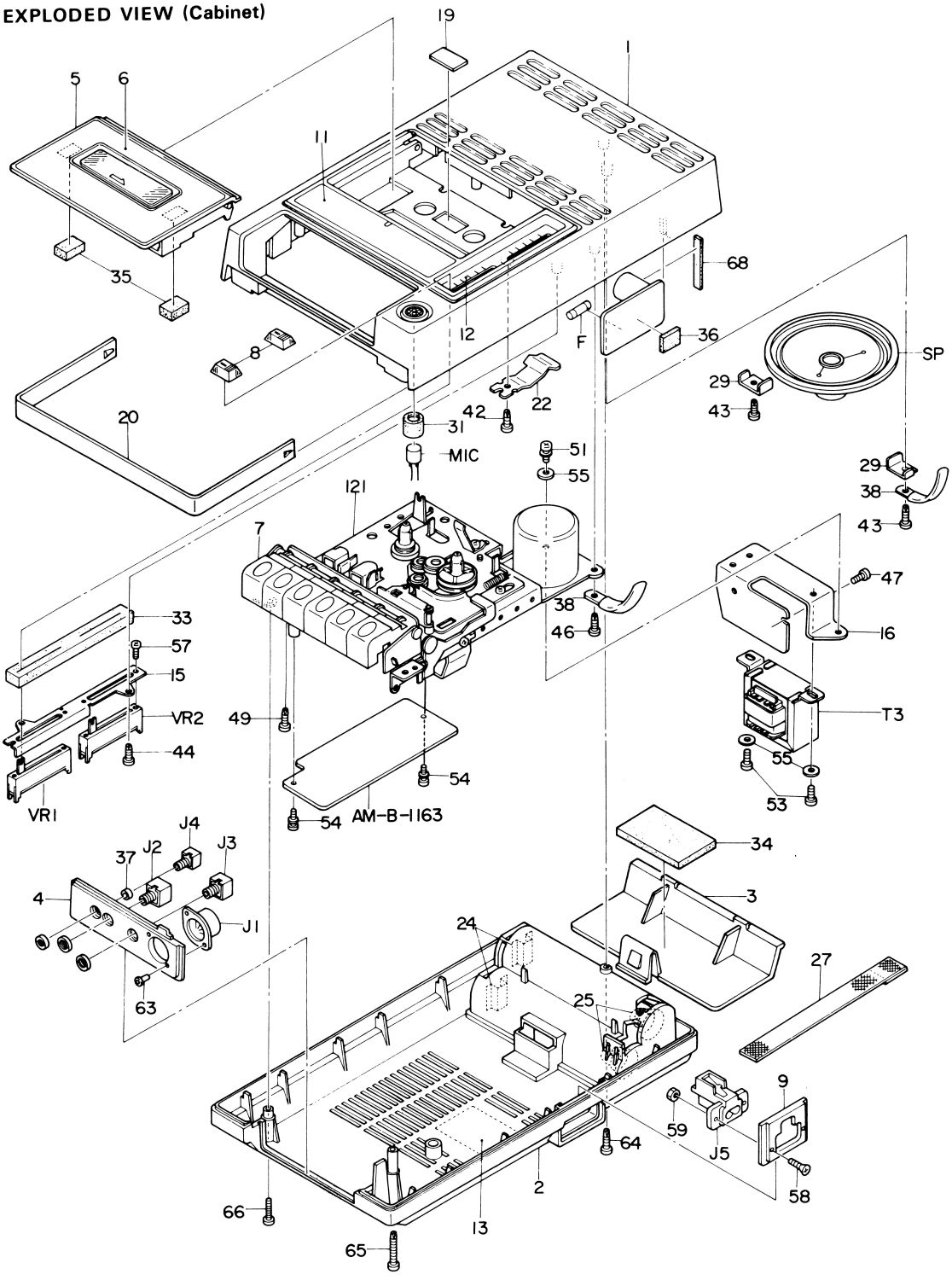
Re-assembly is effected in the reverse order, in all cases.

EXPLODED VIEW (Cabinet)



CABINET ASSEMBLY

Ref. No.	Description	Code Number	Ref. No.	Description	Code Number
1	Cabinet front	4802 443 37008	11	Metcal — function strip	4802 454 27044
2	Cabinet rear	4802 443 57007	12	Metcal — volume and tone controls	4802 454 27045
3	Battery Compartment lid	4802 443 67039	19	Reflector (orange)	4802 462 77111
4	Mounting Plate (jack sockets)	4802 454 27042	20	Handle	4802 498 57012
5	Cassette Holder	4802 443 67041	22	Cassette Holder Spring	4802 492 67195
7	Push Button (6x)	4802 410 27057	24	Battery Terminal (+ ve), 2x	4802 256 67018
8	Slider Control Knob (2x)	4802 411 67043	25	Battery Spring (- ve), 2x	4802 256 67024
9	Mounting Plate (mains socket)	4802 454 27043	29	Speaker Retainer, 2x	4802 403 57136
				Fuseholder	4802 492 67004

ELECTRICAL PARTS LISTS

CAPACITORS

C	Description	V.W.		Code Number
1	0.47 mF aluminium	10		4802 124 47014
2	33 mF electro	10		4802 124 47013
3	3 n3 mylar	10		4802 121 47153
4	0.47 mF aluminium	10		4802 124 47014
5	1n5 mylar	50		4802 121 47148
6	56 p ceramic	50		4822 122 31074
7	1mF electro	16		4802 124 47037
8	4.7 mF electro	16		4802 124 47034
9	10n mylar	50		4802 121 47158
10	4.7 mF electro	16		4802 124 47034
11	330 mF electro	10		4802 124 47011
12	1 mF electro	16		4802 124 47037
13	100 mF electro	10		4802 124 47002
	10 n mylar	50		4802 121 47158
16	33 mF electro	10		4802 124 47013
17	390 p ceramic	50		4822 122 30091
18	6n8 mylar	50		4802 121 47156
19	33 mF electro	10		4802 124 47013
20	0.22 mF aluminium	10	(subst.)	4802 124 47014
21	2200 mF electro	10		4802 124 47007

RESISTORS

All resistors are standard value, 0.25 or 0.5 watt, carbon film types, except where shown below.

VR1	Slider potentiometer,	20K/B (Volume)	4802 105 17058
VR2	Slider potentiometer,	20K/D (Tone)	4802 105 17059

INDUCTORS

T	Description	Code Number
1	Input transformer	4802 142 47031
2	Output transformer	4802 140 67034
3	Mains transformer, 240V.	4802 145 27011
	Loudspeaker (77 mm dia. 8 ohm)	4822 240 30096

SEMI–CONDUCTORS

D	Description	Code Number
1	Diode HV-80	4802 130 37041
2–5	Diode OA636/1000 (1OD1)	4802 130 37022
Q		
1	Transistor 2SC1312G	4802 130 47176
2,3	Transistor BC547 (2SC7 11G)	4822 130 40965
4,5	Transistor BC337 (2SC1209D)	4822 130 40855
6	Transistor BC547 (2SC7 11G)	4822 130 40965
VS	Varistor IN914 (VD – 1123)	5322 130 30009

MISCELLANEOUS

Cct. Ident.	Description	Code Number
J1	5 pole DIN socket, with switch	4822 267 40162
J2,J3	Jack socket, 3.5 mm (Mic. & earphone)	4822 267 30232
J4	Jack socket, 2.5 mm (Remote)	4802 267 37011
J5	A.C. socket (2 pin)	4802 265 27008
	Cover for J5	4802 462 77156
MIC	Condenser microphone	4802 242 37031
S1	Slide switch, 6 way change-over	4802 277 67013
F	Fuse, 1 amp.	4822 253 20018
	Mains lead	4802 321 17025
	Earphone	4802 242 47005

ELECTRICAL ADJUSTMENT

Record Bias Adjustment

This unit uses a DC bias system and the bias current is set to about 70μA. If the distortion factor exceeds 10%, the bias current must be increased according to the procedures below.

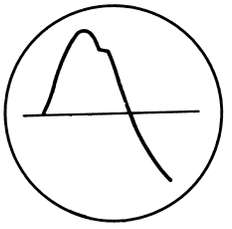
Adjustment

The bias current is determined by the value of R7 and the +B voltage applied thereto. Refer to the circuit diagram.

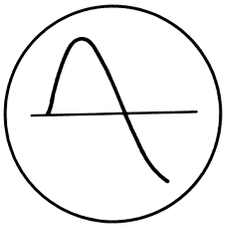
Example: I bias = +B/R7 = 4.6V/68 KΩ $\fallingdotseq$ 68μA

* Head resistance is disregarded.

Accordingly, the bias current is increased as the value of R7 is decreased, and vice versa. In practical cases, R7 should be changed to 56 KΩ to increase the bias current to 82μA. If the bias current is too high, the result is a loss of high frequency response. The distortion can be checked by recording and playing a sine wave signal.



Insufficient bias current



Normal bias current

MECHANICAL ADJUSTMENT

1. **Head Azimuth Adjustment**
   With V.T.V.M. connected to EAR OUT, play a standard tape (10kHz, — 10dB). Turn the head azimuth adjusting screw for a maximum reading on V.T.V.M. After the adjustment, secure the screw with a locking paint.

2. **Tape Head Demagnetization**
   The tape head may be magnetized if a magnetized tool is brought close to it or the tape deck is used for an extended period of time. When the head is magnetized, the result is a loss of high frequency or an increase of noise in tape. Magnetized tape head should be demagnetized by using a head demagnetizer.

3. **Pinch Roller Pressure**
   400 $\sim$ 650 g
   Read the value indicated on a tension gauge at the point where revolution of the pinch roller comes to half with the gauge pressed onto it.

4. **Take-up Torque**
   40 $\sim$ 75 g-cm
   Measure on the take-up reel platform operating in play. If less than 40 g-cm, check to see if it is caused by slippage between the reel platform and the play idler.
   (1) If found to be slipping, wipe and clean the rubber portion of the take-up reel platform and the pulley of the drive roller assembly, using alcohol.
   (2) If the reel platform itself is the cause of the slippage replace the reel Base Unit.

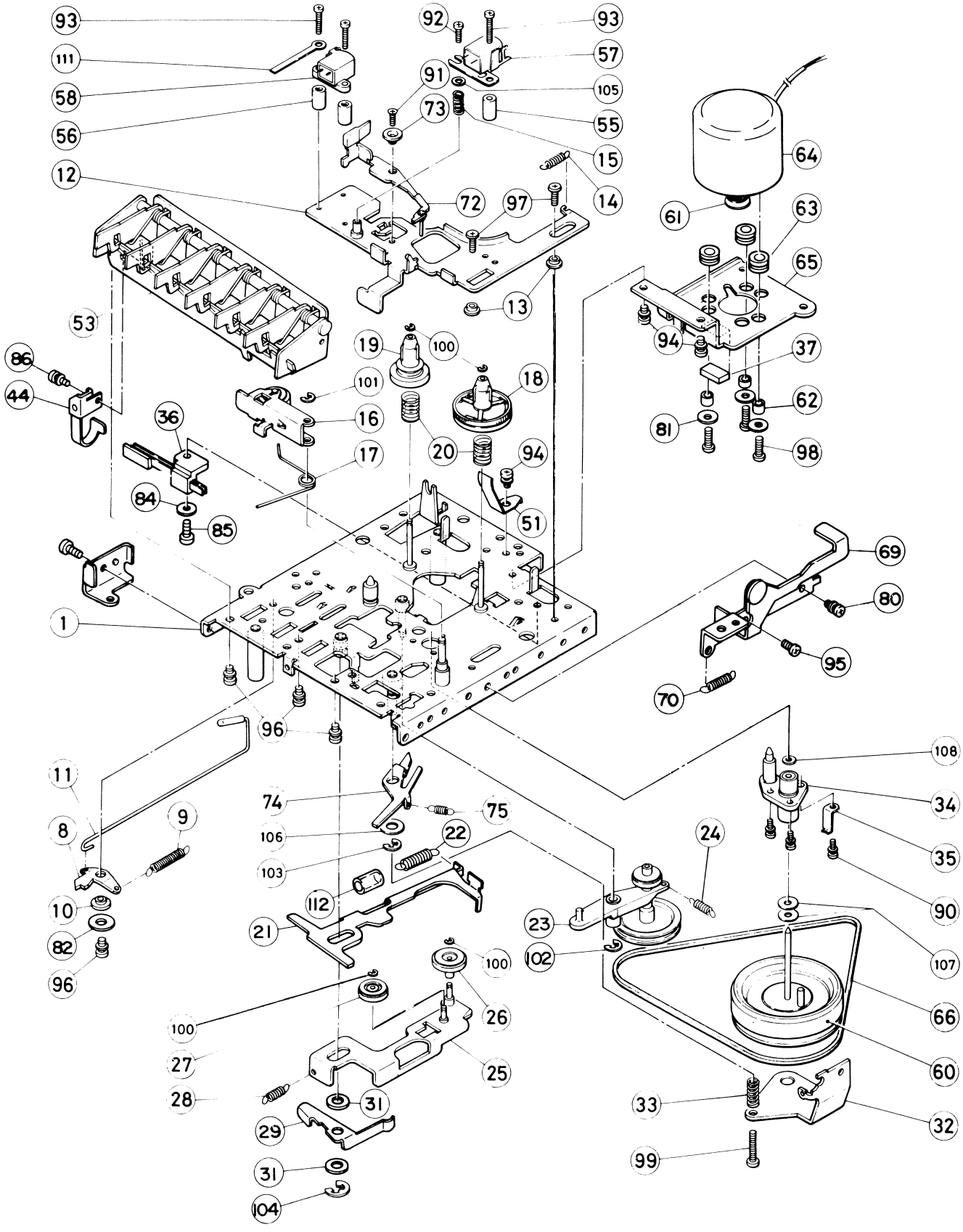
5. **Rewind Torque**
   Better than 70 g-cm
   Measure the torque on the supply reel platform operating in REW. If less than 40 g-cm, clean the supply reel platform, REW idler assembly, REW pulley assembly, drive belt and flywheel with alcohol.

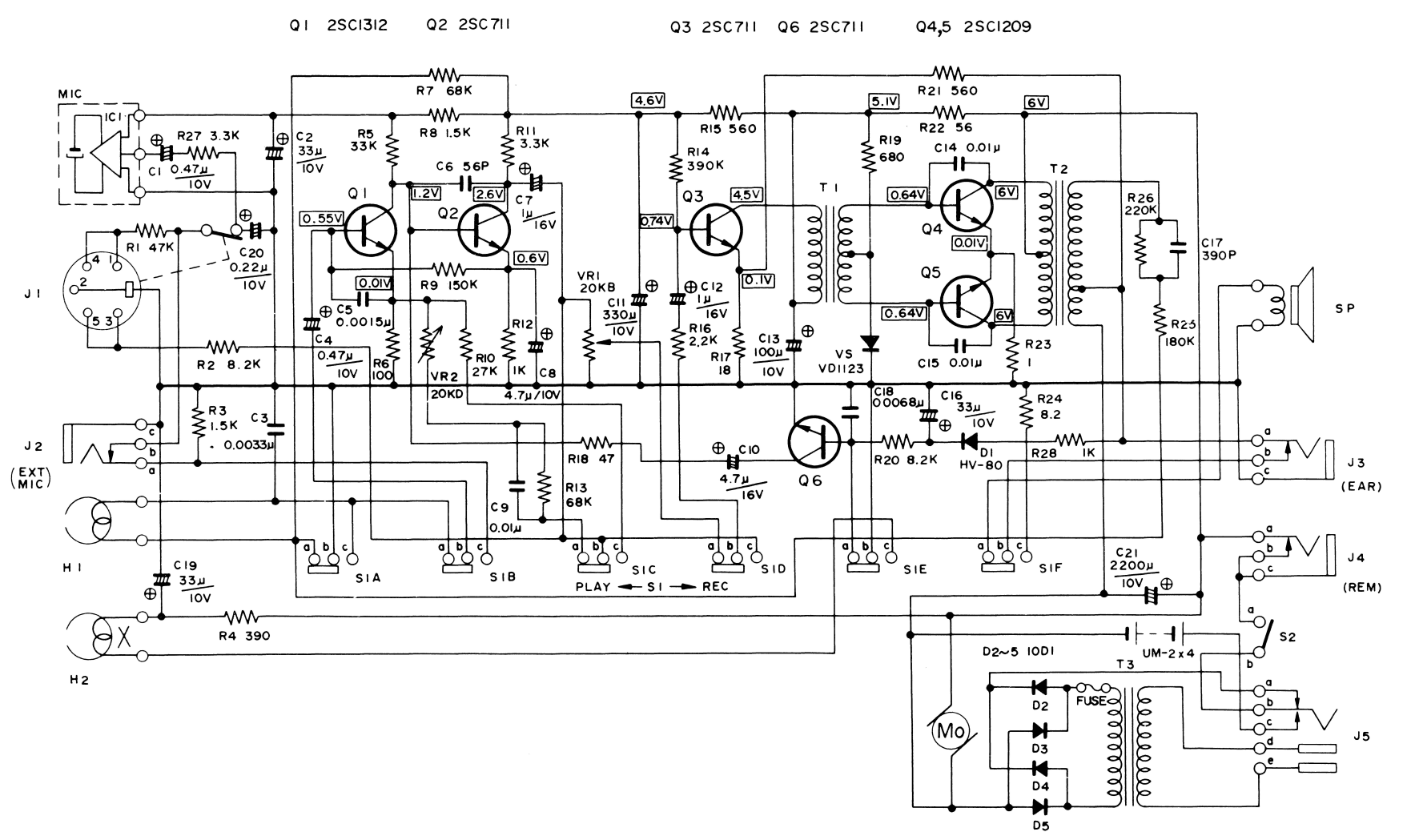
6. **F.F. Torque**
   Better than 70 g-cm
   Measure the torque on the take-up reel platform operating in F. FWD. If less than 40 g-cm, check to see if it is caused by slippage between the reel platform and the play idler. If found to be slipping, clean the rubber portion of the take-up reel platform, the flywheel and the F.F. idler with alcohol.

CASSETTE MECHANISM

Ref. No.	Description	Code Number
121	Complete mechanism	4802 691 27017
8	Record safety lever	4802 403 57126
9	Spring, for above	4802 492 37176
10	Record safety lever bushing	4802 403 57127
11	Record safety lever spoke	4802 403 57128
12	Sub-chassis assembly	4802 464 57022
13	Collar, 2x	4802 532 17073
14	Spring, tension	4802 492 37177
15	Spring, compression (record/playback head mtg).	4802 492 37132
16	Pinch roller assembly	4802 403 47012
17	Spring, for above	4802 492 47016
18	Turntable	4802 528 17067
19	REW turntable	4802 528 17068
20	Compression spring, 2x	4802 492 37134
21	Plate	4802 403 57129
22	Spring, tension	4802 492 37178
23	Take-up idler assembly	4802 528 27029
24	Spring, for above	4802 492 37179
25	Fast-formed idler arm assembly	4802 403 27026
26	Take-up idler wheel	4802 528 87071
27	Fast-formed idler wheel	4802 528 87072
28	Spring, tension	4802 492 37181
29	Rewind lever	4802 403 37038
31	Nylon washer, 2x	4802 532 57091
32	Flywheel mounting bracket	4802 403 57131
33	Thrust spring	4802 492 37132
34	Flywheel bearing block	4802 520 17017
35	Earthing plate	4802 403 57132
36	Leaf switch	4802 278 97035
37	Shock absorber (motor mounting)	4802 466 47007
40	Bracket (chassis mounting)	4802 403 57133
44	Record push-plate	4802 403 37039
51	Cassette holder spring	4802 492 67172
53	Push button switch assembly	4802 278 17013
55	Spacer (record/playback head mounting)	4802 532 27056
56	Spacer (erase head mounting), 2x	4802 532 27051
57	Record/playback head	4802 249 17021
58	Erase head	4802 249 47021
60	Flywheel	4802 528 67023
61	Motor pulley	4802 528 87073
62	Spacer, motor mounting, 3x	4802 532 17085
63	Grommet, motor mounting, 3x	4802 325 87011
64	Motor	4802 361 27036
65	Motor mounting bracket	4802 403 57134
66	Drive belt	4802 358 37007
69	Eject lever assembly	4802 403 57135
70	Spring, for above	4802 492 37182
72	Auto-stop lever assembly	4802 403 17022
73	Bushing	4802 532 57079
74	Auto lever	4802 403 57084
75	Spring, for above	4802 492 37187
92	Screw, M2x6 (Rec./playback head adj.)	4822 502 10745
100	E-ring, 1.2 mm. dia.	4822 530 70119
101	E-ring, 1.9 mm. dia.	4822 530 70122
102	E-ring, 2.3 mm. dia.	4822 530 70043
103	E-ring, 3.0 mm. dia.	4822 530 70123
104	E-ring,4.0 mm. dia.	4822 530 70124
107	Washer (with oil groove)	4802 532 57083

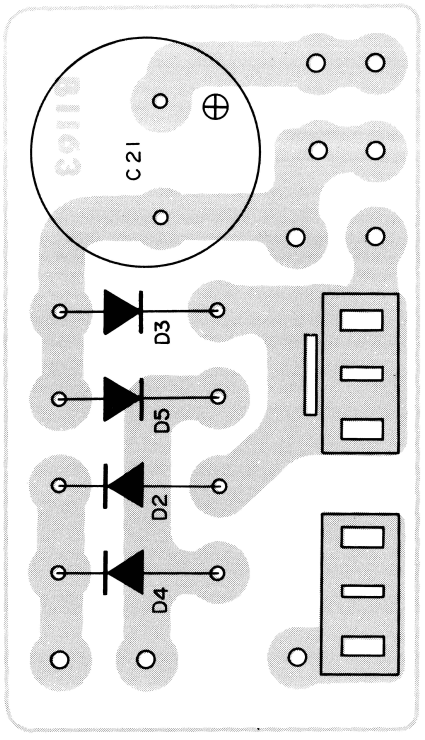
EXPLODED VIEW (Mechanism)



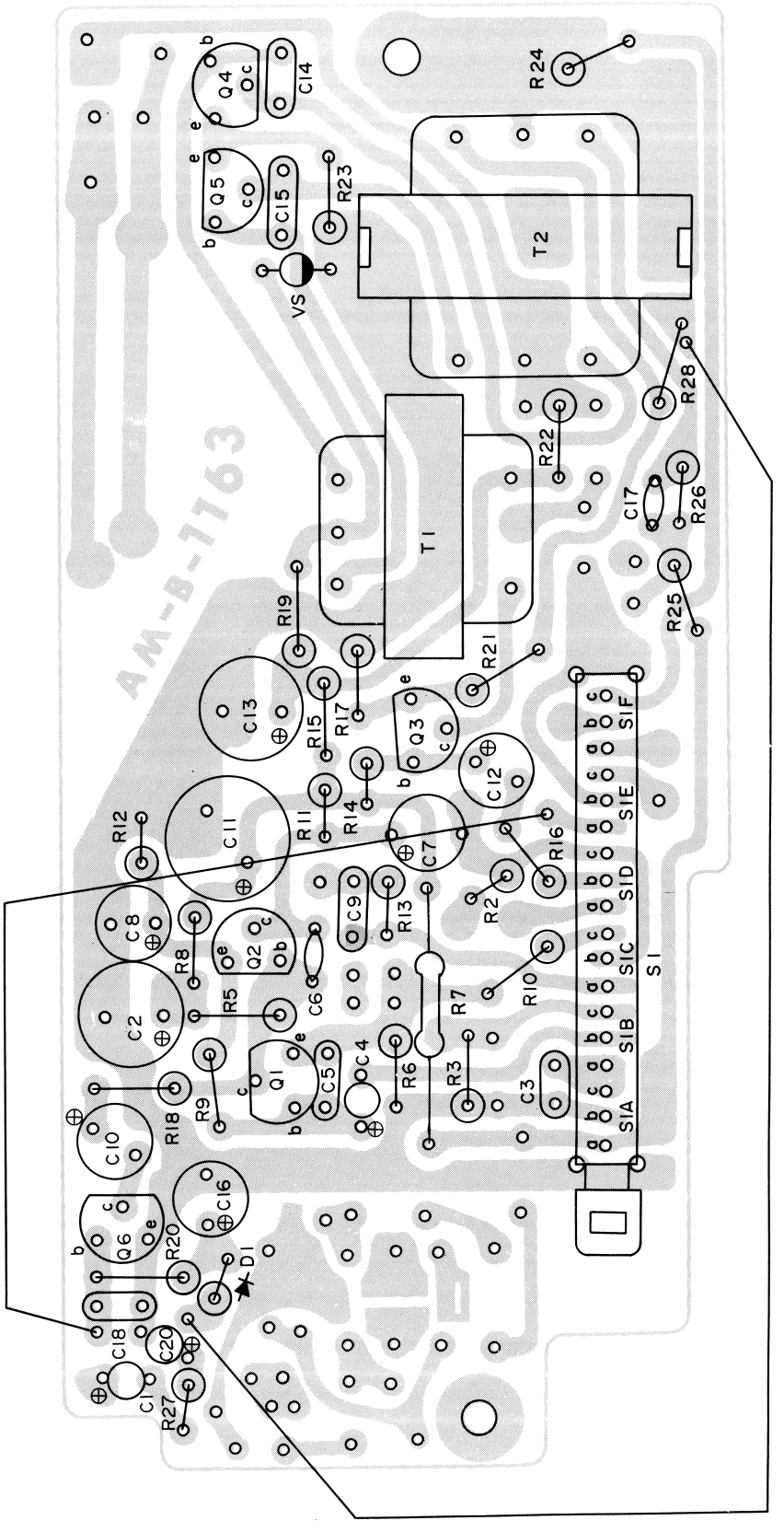

Q1 2SC1312
Q2 2SC711
Q3 2SC711
Q6 2SC711
Q4,5 2SC1209
MIC
IC1
R27 3.3K
C1 0.47μ 10V
C2 33μ 10V
R7 68K
R8 1.5K
R5 33K
R11 3.3K
C6 56P
C7 1μ 16V
Q1
Q2
0.55V
1.2V
2.6V
0.6V
0.01V
R9 150K
C5 0.0015μ
C4 0.47μ 10V
R6 100
VR2 20KΩ
R10 27K
R12 1K
C8 4.7μ/10V
R1 47K
C20 0.22μ 10V
J1
R2 8.2K
R3 1.5K
C3 0.0033μ
J2
(EXT MIC)
H1
H2
C19 33μ 10V
R4 390
VR1 20KB
C11 330μ 10V
4.6V
R15 560
R14 390K
Q3
4.5V
0.74V
0.1V
C12 1μ 16V
R16 2.2K
R17 18
C13 100μ 10V
C10 4.7μ 16V
R18 47
C9 0.01μ
R13 68K
Q6
VS VD1123
R21 560
5.1V
6V
R19 680
R22 56
C14 0.01μ
T1
T2
Q4
Q5
0.64V
0.01V
C15 0.01μ
R23 1
C18 0.0068μ
C16 33μ 10V
D1 HV-80
R24 8.2
R20 8.2K
R28 1K
R26 220K
C17 390P
R25 180K
SP
J3 (EAR)
J4 (REM)
C21 2200μ 10V
S2
UM-2x4
T3
D2~5 1001
D2
D3
D4
D5
FUSE
Mo
J5
S1A
S1B
S1C
S1D
S1E
S1F
PLAY ← S1 → REC

WIRING BOARD LAYOUT

Power Supply



Amp



WIRING BOARD LAYOUT