

# SERVICE MANUAL

# SILVER

## MODEL SD1500



## SPECIFICATIONS

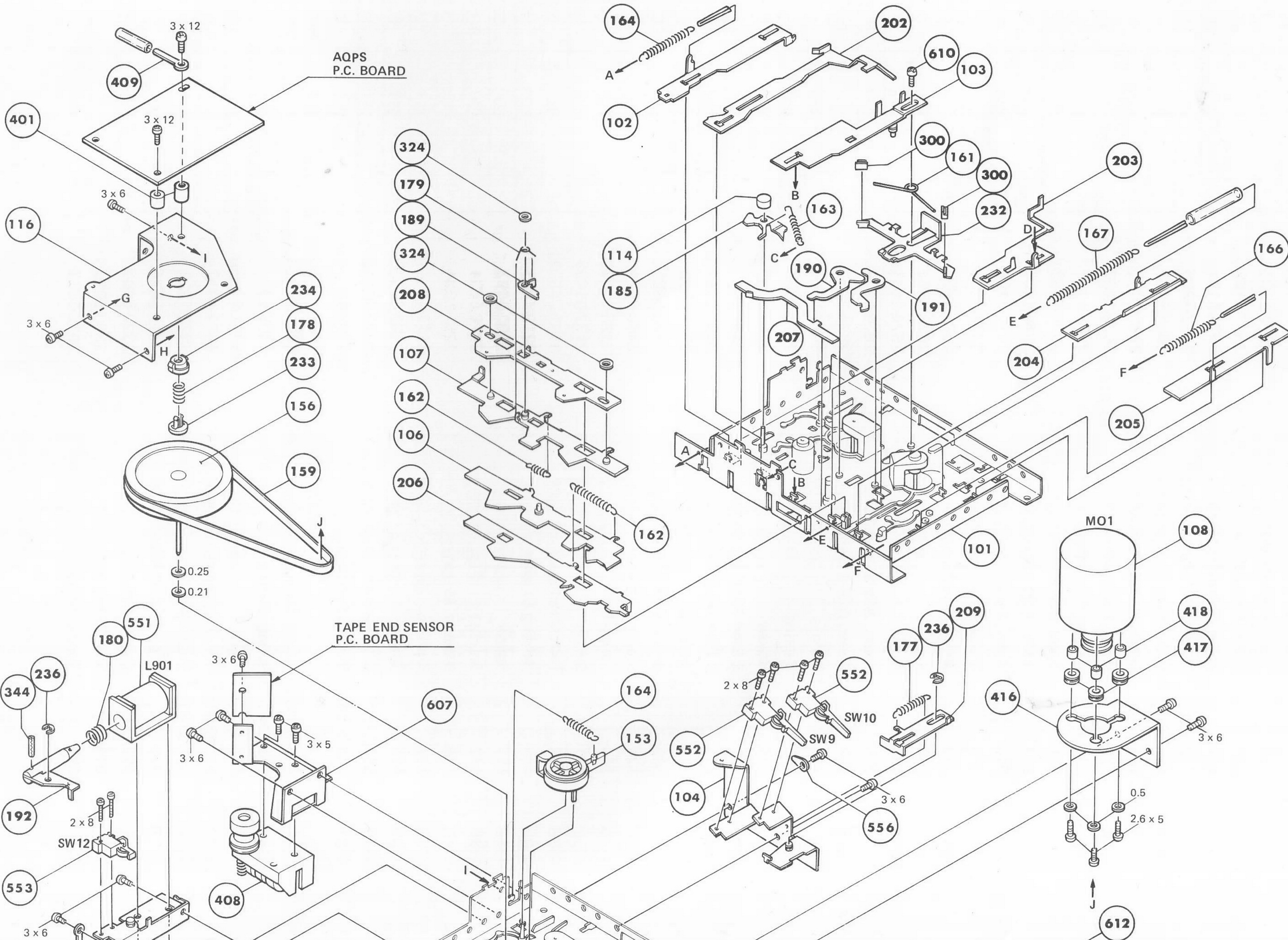
POWER SUPPLY .....	AC 220V, 50 Hz
POWER CONSUMPTION .....	25 W
DIMENSIONS .....	435 (W) x 125 (H) x 190 (D) mm
WEIGHT .....	3.9 kg
TYPE .....	4 track 2 channel stereo or monaural
TAPE SPEED .....	4.75 cm/sec.
REWIND TIME .....	100 seconds with C60 cassette tape
FREQUENCY RESPONSE .....	METAL : 30 – 15000 Hz
(REC/PLAY)	NORMAL : 30 – 14000 Hz
SIGNAL/NOISE RATIO .....	DOLBY NR IN : 57 dB (METAL)
	DOLBY NR OUT : 52 dB (METAL)
DISTORTION (REC/PLAY) .....	0.8%
WOW AND FLUTTER .....	0.04% (WRMS)
INPUT SENSITIVITY/IMPEDANCE .....	30 mV/18 k ohm
OUTPUT LEVEL/IMPEDANCE .....	600 mV/22 k ohm

Specifications may be changed without notice.

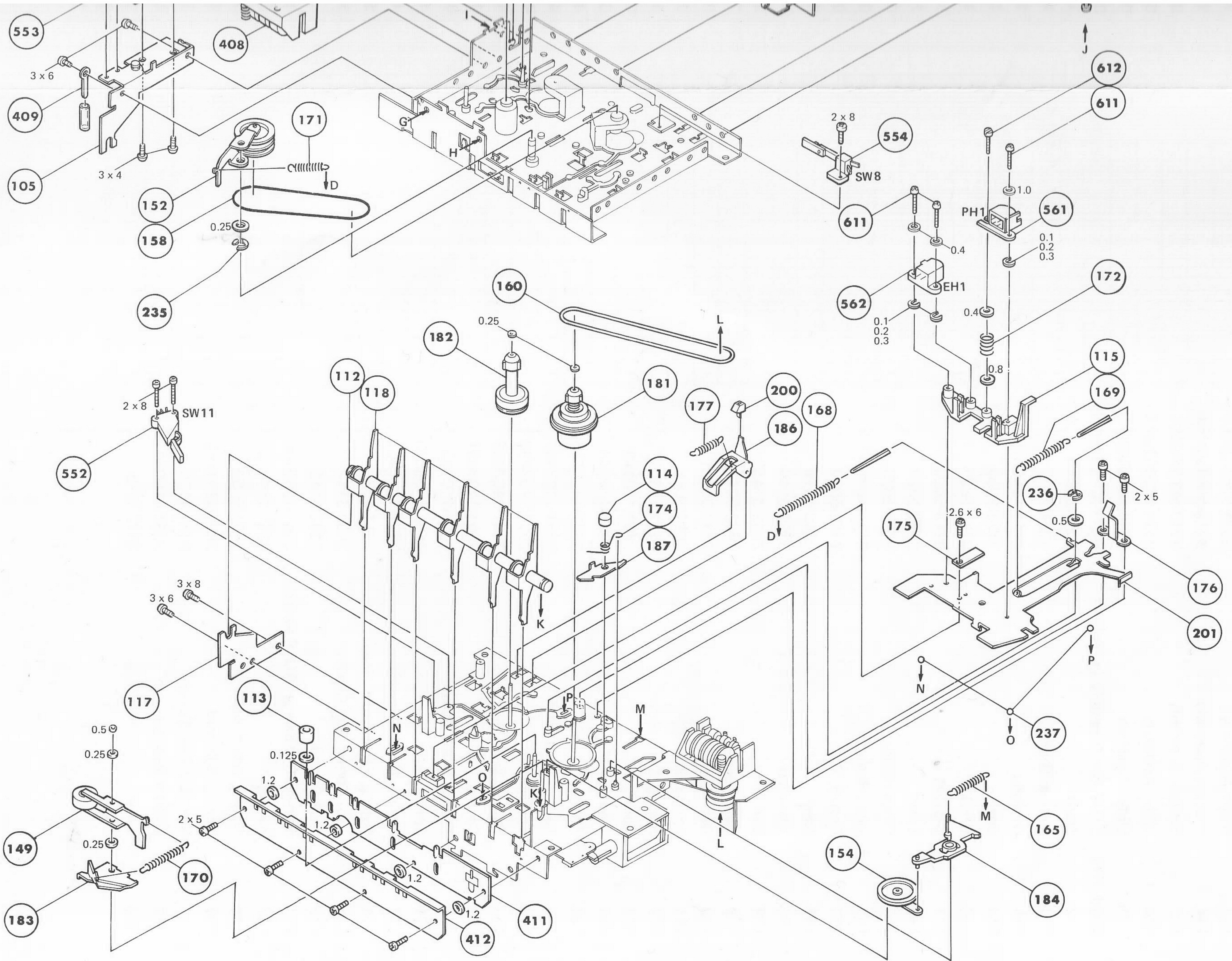
**NOTE:** When spare parts are needed, type the quantity desired in the "ORDER Q'TY" column of the order form in this Service Manual and send copy.



# CASSETTE TAPE RECORDER MECHANICAL EXPLODED VIEW [MR058MF(A)]





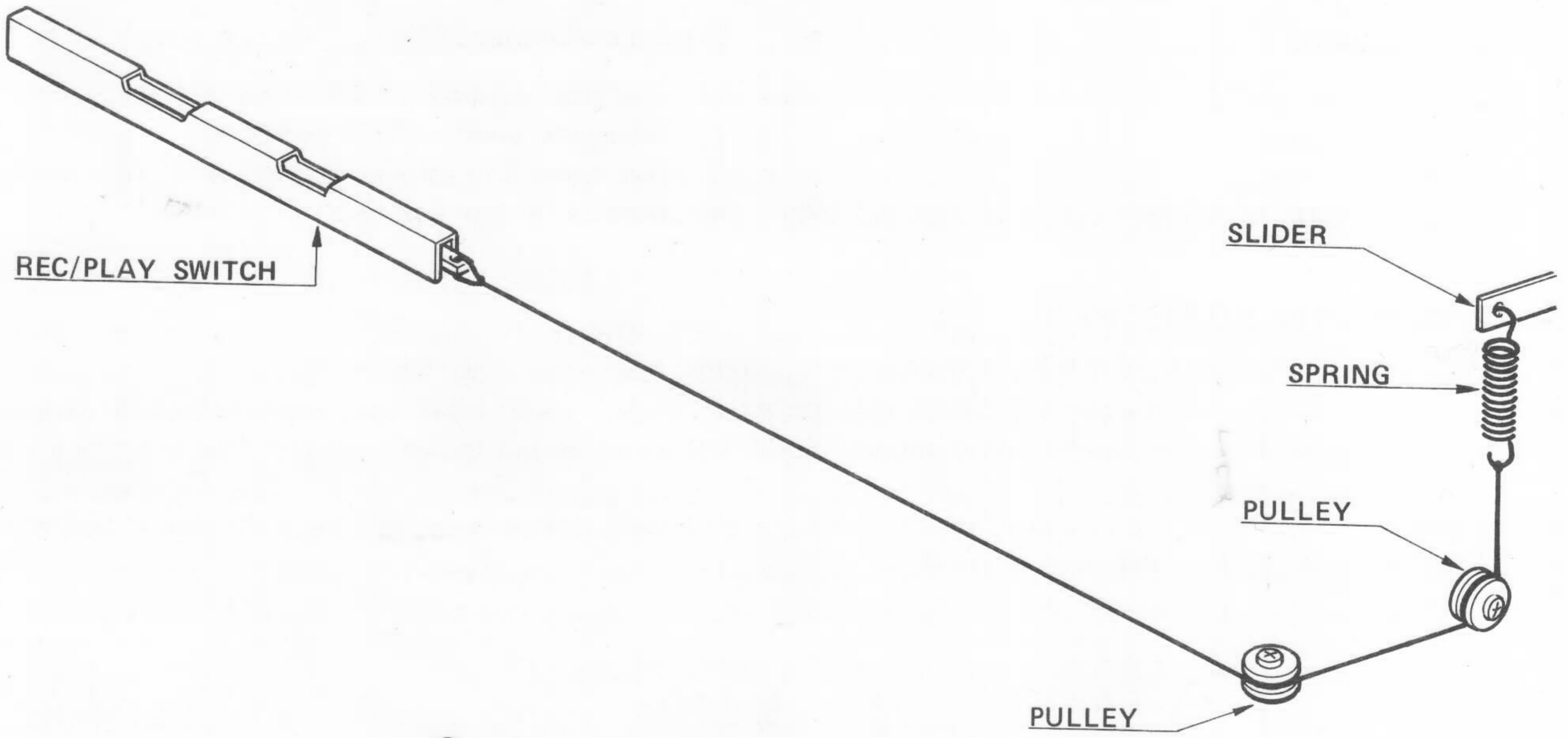


NOTE: The notation "3 x 6" means the screw diameter is 3 mm; its length is 6 mm.

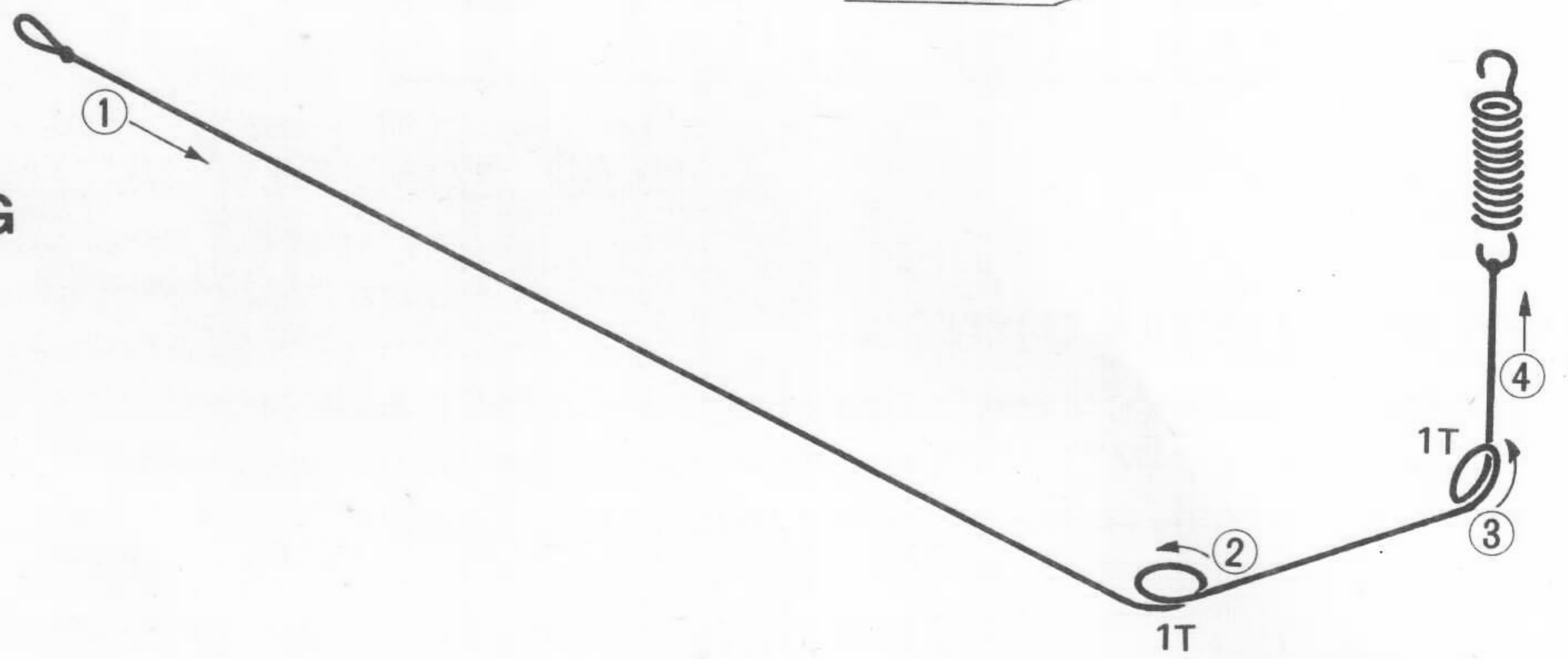
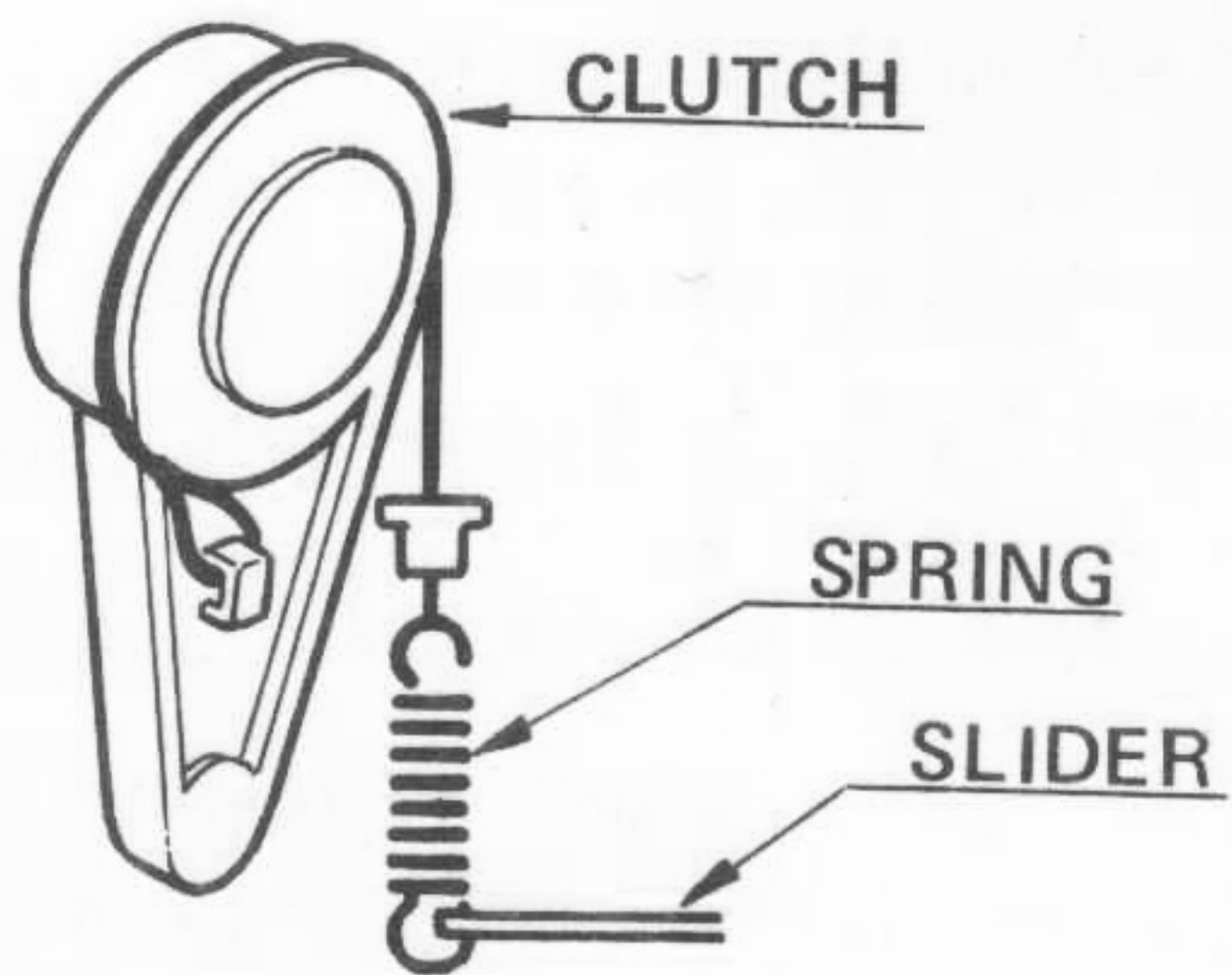
The notation "0.5" means the washer thickness is 0.5 mm.



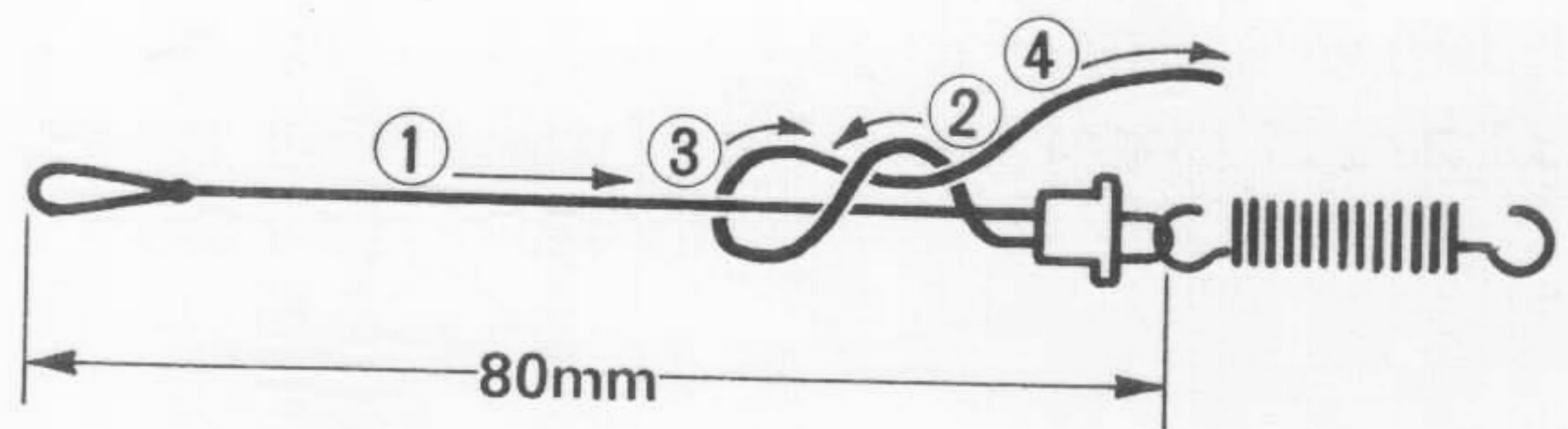
# SWITCH CORD STRINGING



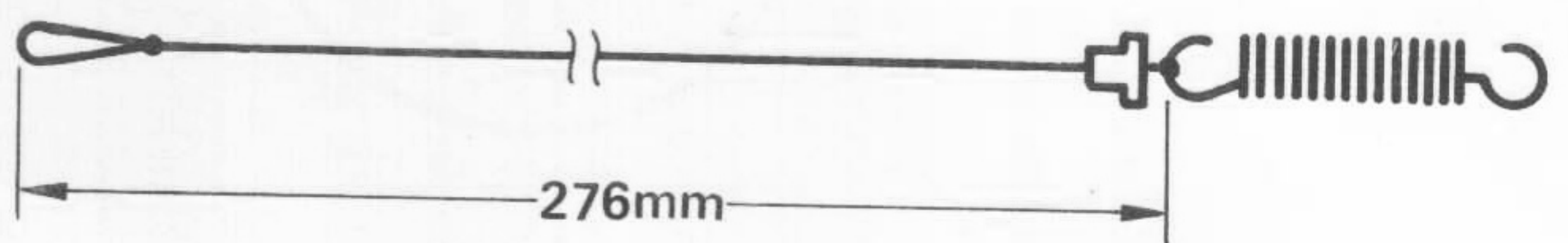
# CLUTCH CORD STRINGING



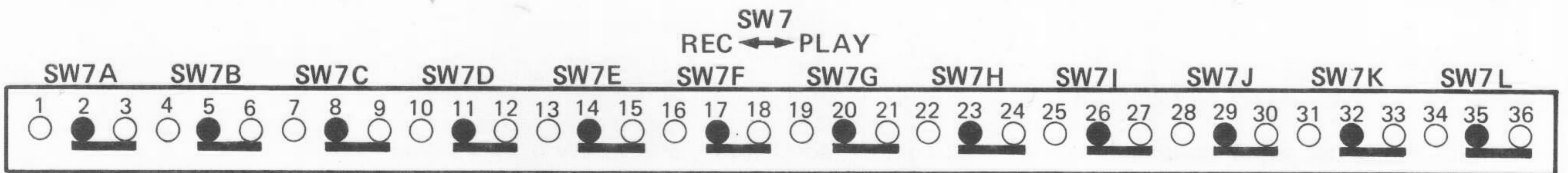
CLUTCH CORD



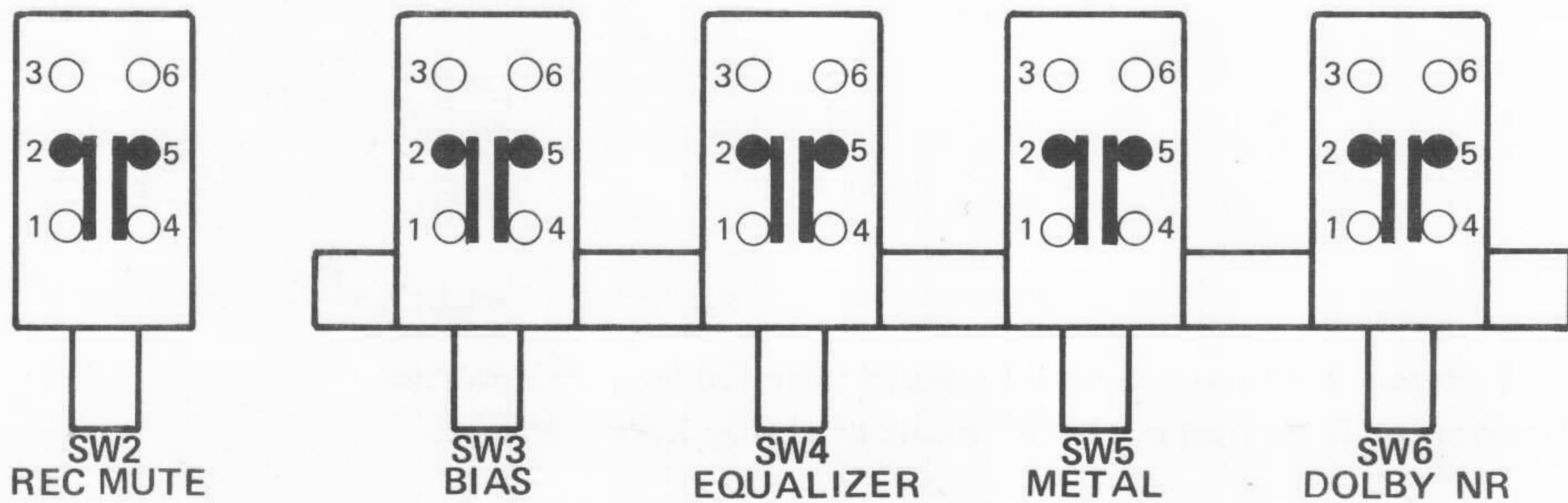
SWITCH CORD



# SWITCH CONNECTION VIEW (TOP VIEW)



↑  
ON





# CASSETTE TAPE RECORDER ADJUSTMENT

## Equipment Required:

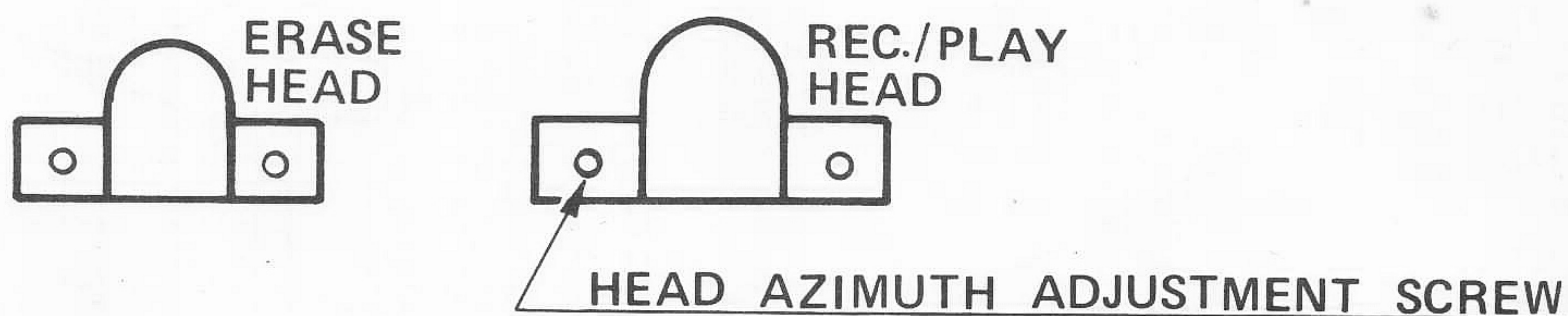
1. Dual Channel AC V.T.V.M.
2. Frequency Counter
3. Audio Signal Generator
4. Test Tapes (TEAC MTT-114, 111D, 150, TDK AD-222)

## General Conditions:

1. Bias and Equalizer is NORMAL position.
2. Dolby NR Switch is OFF position.
3. Rec. Level Control is at maximum.
4. Balance Control is at mechanical center.

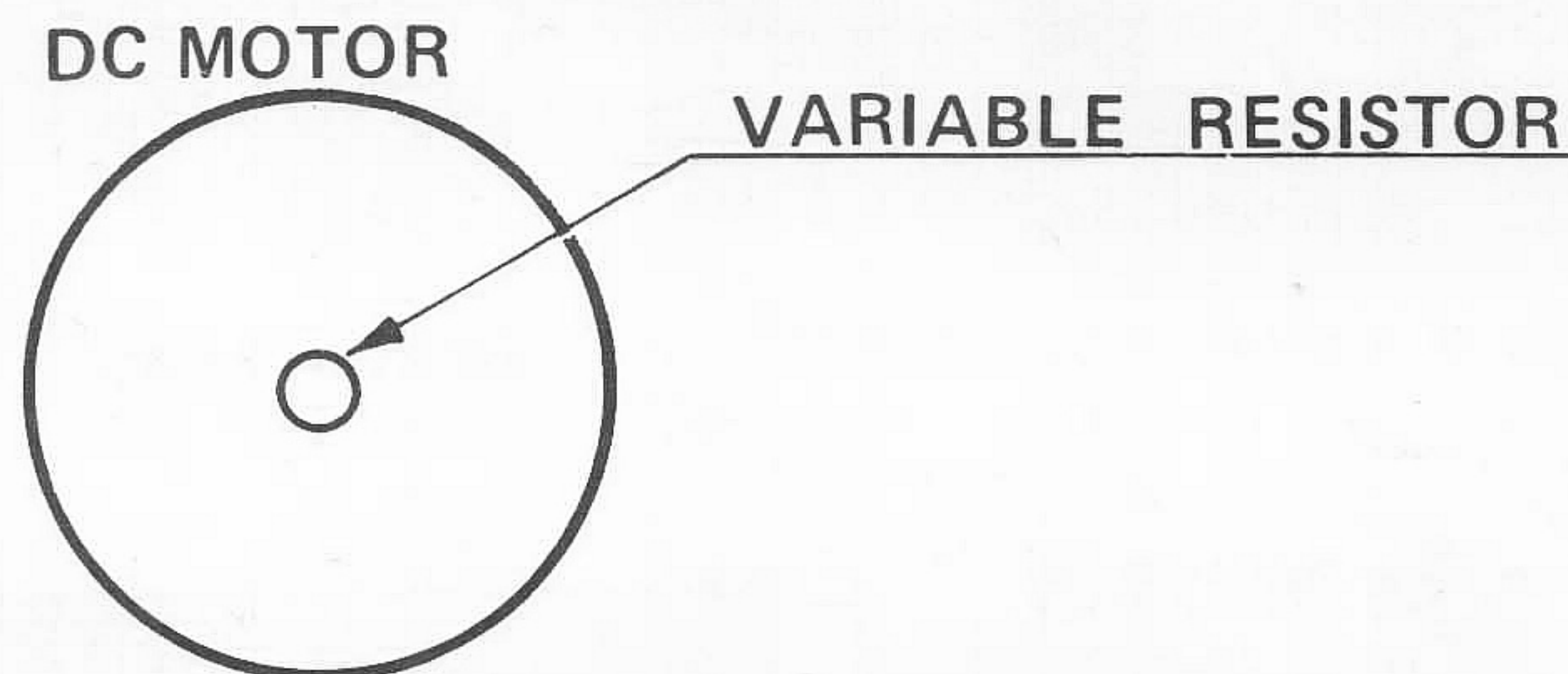
## HEAD AZIMUTH ADJUSTMENT

1. Connect the dual channel AC V.T.V.M. to the both left and right line output jacks (J5 and J6).
2. Play back the "A" side of the test tape (MTT-114) and adjust head azimuth adjustment screw so that the output indicated by the AC V.T.V.M. will be maximum, and the difference of output between left and right becomes less than 3 dB.
3. Play back the "B" side of the test tape and adjust head azimuth adjustment screw until the difference of output from side "A" and side "B" becomes less than 3 dB.



## TAPE SPEED ADJUSTMENT

1. Connect the frequency counter to left or right line output jack (J5 or J6).
2. Play back test tape (MTT-111D) and adjust the variable resistor built in the DC motor for 3 kHz ( $\pm 3\%$ ). In this adjustment, use the central portion of the test tape.



## PLAYBACK LEVEL ADJUSTMENT

1. Connect the dual channel AC V.T.V.M. to TP1 (left), TP2 (right) and TP3 (ground).
2. Play back the test tape (MTT-150), and adjust VR101 (left) and VR102 (right) so that the output will be 775 mV ( $\pm 0.5$  dB).

## DOLBY LEVEL ADJUSTMENT

1. Connect the audio signal generator to line input jacks (J3 and J4), and apply 5 kHz signal.
2. Connect the dual channel AC V.T.V.M. to TP4 (left), TP5 (right) and TP3 (ground), adjust the audio signal generator so that the output becomes 23.5 mV.
3. Setting Dolby NR Switch to ON, adjust VR301 (left) and VR302 (right) so that the output becomes +8 dB ( $\pm 0.25$  dB) of above output.



## **RECORD BIAS TRAP ADJUSTMENT**

1. Connect the dual channel AC V.T.V.M. to TP6 (left), TP7 (right) and TP3 (ground).
2. Set the unit to recording mode.
3. Adjust L203 (left) and L204 (right) so that the output becomes minimum.

## **RECORD BIAS LEVEL ADJUSTMENT**

1. Connect ceramic capacitors (220 pF) to TP8 (left)—TP10 (ground) and TP9 (right)—TP10 (ground).
2. Connect the dual channel AC V.T.V.M. to TP1 (left), TP2 (right) and TP3 (ground).
3. Connect audio signal generator to line input jacks (J3 and J4), and applying 6.3 kHz signal, adjust the input level so that the output of dual channel AC V.T.V.M. becomes 775 mV, when setting the unit in recording mode.
4. Record the signal to test tape (AD-222), turning the VR501 (left) and VR502 (right) from minimum to maximum.
5. Note the maximum output reading on dual channel AC V.T.V.M. in playback mode.
6. Remove ceramic capacitors, record and playback varying the bias level from location obtained at step 5 to maximum.
7. Obtaining a rated bias level when the output becomes 5 dB less than maximum, adjust the bias level to it.

## **RECORD/PLAYBACK OUTPUT LEVEL ADJUSTMENT**

1. Connect the audio signal generator to line input jacks (J3 and J4), and apply 400 Hz signal.
2. Connect the dual channel AC V.T.V.M. to TP1 (left), TP2 (right) and TP3 (ground).
3. Set the unit to recording mode.
4. Adjust the input so that the output becomes 775 mV.
5. 1) Set the Bias and Equalizer Switches to NORMAL position.  
2) Recording this signal on the test tape (AD-222) and playing it, adjust VR201 (left) and VR202 (right) by repeating record and playback so that the output on dual channel AC V.T.V.M. becomes 775 mV (+0.2 dB, -0.8 dB).

## **LED DISPLAY SENSITIVITY ADJUSTMENT**

1. Connect the dual channel AC V.T.V.M. to TP1 (left), TP2 (right) and TP3 (ground).
2. Connect audio signal generator to line input jacks (J3 and J4).
3. Set the unit in recording mode.
4. Adjust the level of audio signal generator so that the output becomes 775 mV in recording mode.
5. Adjust VR701 (left) and VR702 (right) so that LED Level indicates 0 dB.
6. Adjust the level of audio signal generator so that the output becomes 100 mV.
7. Adjust VR703 (left) and VR704 (right) so that LED Level indicates -18 dB.
8. Repeat steps 4 through 7.



# TRANSISTOR / IC ELEMENTS VOLTAGE CHART

Volts

Q' NO.	Q1	Q2	Q3	Q101 Q102	Q103	Q104	Q105 Q106	Q201 Q202	Q203 Q204	Q205	Q206
MODE	REC./PLAY										
COLL.	25.0	-25.0	12.0	7.9	0	0.4	0	11.8	0.1	0	0
BASE	13.4	-13.4	15.0	0	7.9	7.9	0	0	11.8	0.1	0
EMIT.	12.8	-12.8	12.8	-0.6	8.5	8.5	0	-0.6	12.4	0	0

Volts

Q' NO.	Q301	Q302	Q401 Q402	Q403 Q404	Q451	Q452	Q601	Q602	Q603 Q604	Q751	Q752
MODE	REC. / PLAY										
COLL.	6.8	6.9	11.8	0.3	5.6	5.3	0	7.4	0	0	0
BASE	1.4	1.4	0	11.8	0.6	0.6	0.7	11.8	0.7	0	0
EMIT.	0.8	0.8	-0.5	12.4	0	0	0	12.4	0	0	0

Volts

Q' NO.	Q901	Q902	Q903	Q904
MODE	REC. / PLAY			
COLL.	12.0	0	0	8.5
BASE	0	0	12.0	1.0
EMIT.	0	0	12.0	0.4

Volts

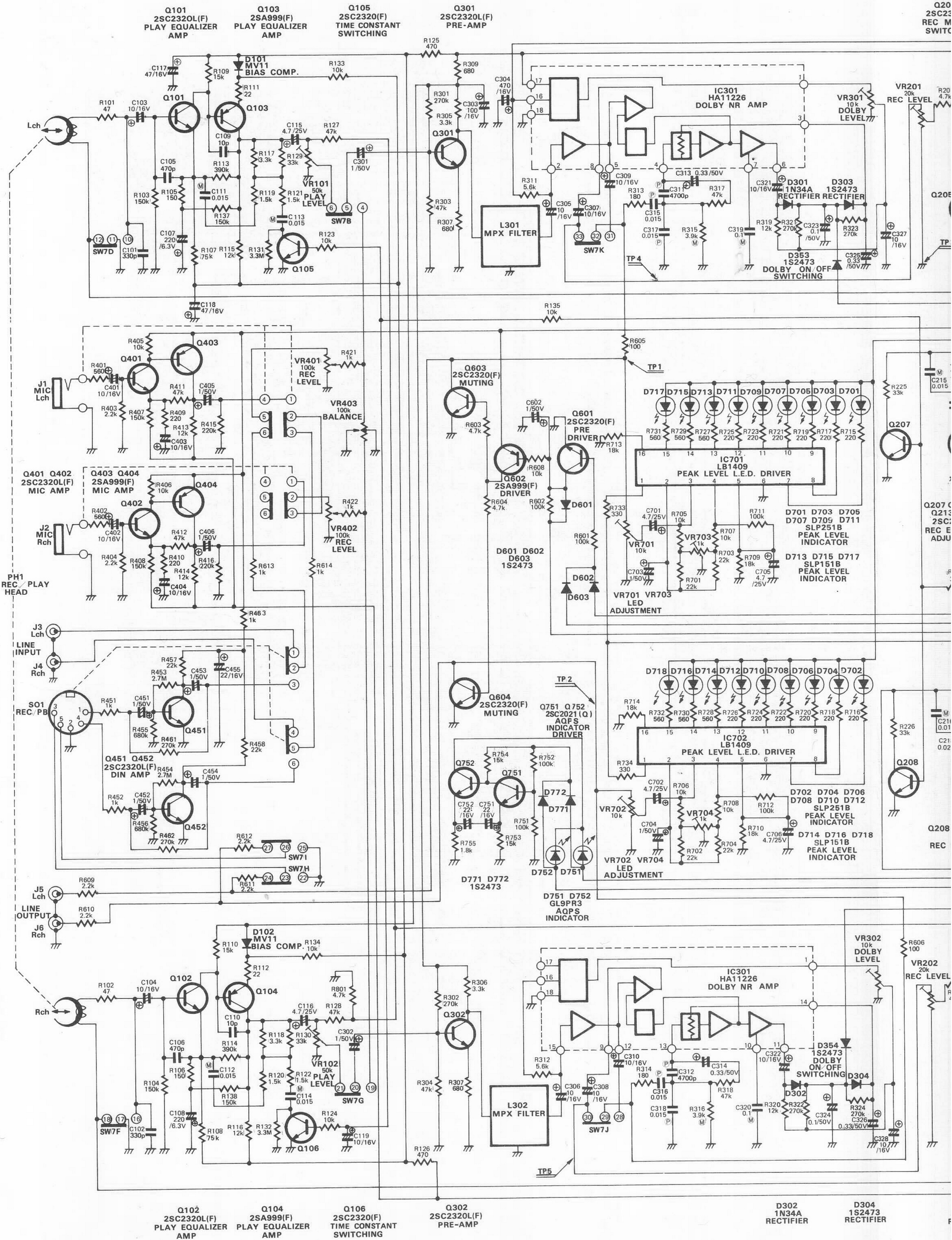
TERMINAL NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
IC301	0.5	6.3	0.3	6.0	6.3	6.0	2.3	6.3	6.3	2.3	5.9	6.2	6.0	0.3	6.3	6.3	12.4	0
IC701, 702	12.8	2.8	0.1	0.1	0	0	7.6	7.5	7.5	7.6	7.8	7.7	7.7	7.7	7.7	0		
IC901	3.7	-	-	0	0	12.0	12.0											
IC902	12.0	0	-															
IC903	1.7	0	1.7	0	0	0	12.0	0	12.0									

NOTE: All voltage readings from chassis are measured with V.T.V.M. under no signal conditions.

## SCHEMATIC DIAGRAM NOTES

- All resistances are 1/4W carbon unless otherwise noted.  
Values are in ohms. k = 1000, M = 1000 k
- The marks of resistors are as follows:  
  - Ⓜ : Metal resistors
  - ⓕ : Fuse resistors
- All capacitance values are in  $\mu\text{F}$  unless otherwise noted. pF =  $\mu\mu\text{F}$
- The marks of capacitors are as follows:  
  - ⊢ : Ceramic capacitors
  - ⊢Ⓢ : Electrolytic capacitors
  - Ⓜ : Mylar capacitors
  - Ⓢ : Stylor capacitors
  - Ⓐ : Aluminum solid capacitors
  - Ⓣ : Tantalum electrolytic capacitors
  - Ⓟ : Polypropylene capacitors
  - ⓔ : Metalized polypropylene capacitors
- The DC work voltage of capacitor is 50 V unless otherwise noted.
- Bias Switch (SW3) is in NORMAL position.
- Equalizer Switch (SW4) is in NORMAL position.
- Metal Switch (SW5) is in OFF position.
- Dolby NR Switch (SW6) is in OFF position.





Q101  
2SC2320L(F)  
PLAY EQUALIZER  
AMP

Q103  
2SA999(F)  
PLAY EQUALIZER  
AMP

Q105  
2SC2320(F)  
TIME CONSTANT  
SWITCHING

Q301  
2SC2320L(F)  
PRE-AMP

Q20  
2SC23  
REC M  
SWITCH

Q102  
2SC2320L(F)  
PLAY EQUALIZER  
AMP

Q104  
2SA999(F)  
PLAY EQUALIZER  
AMP

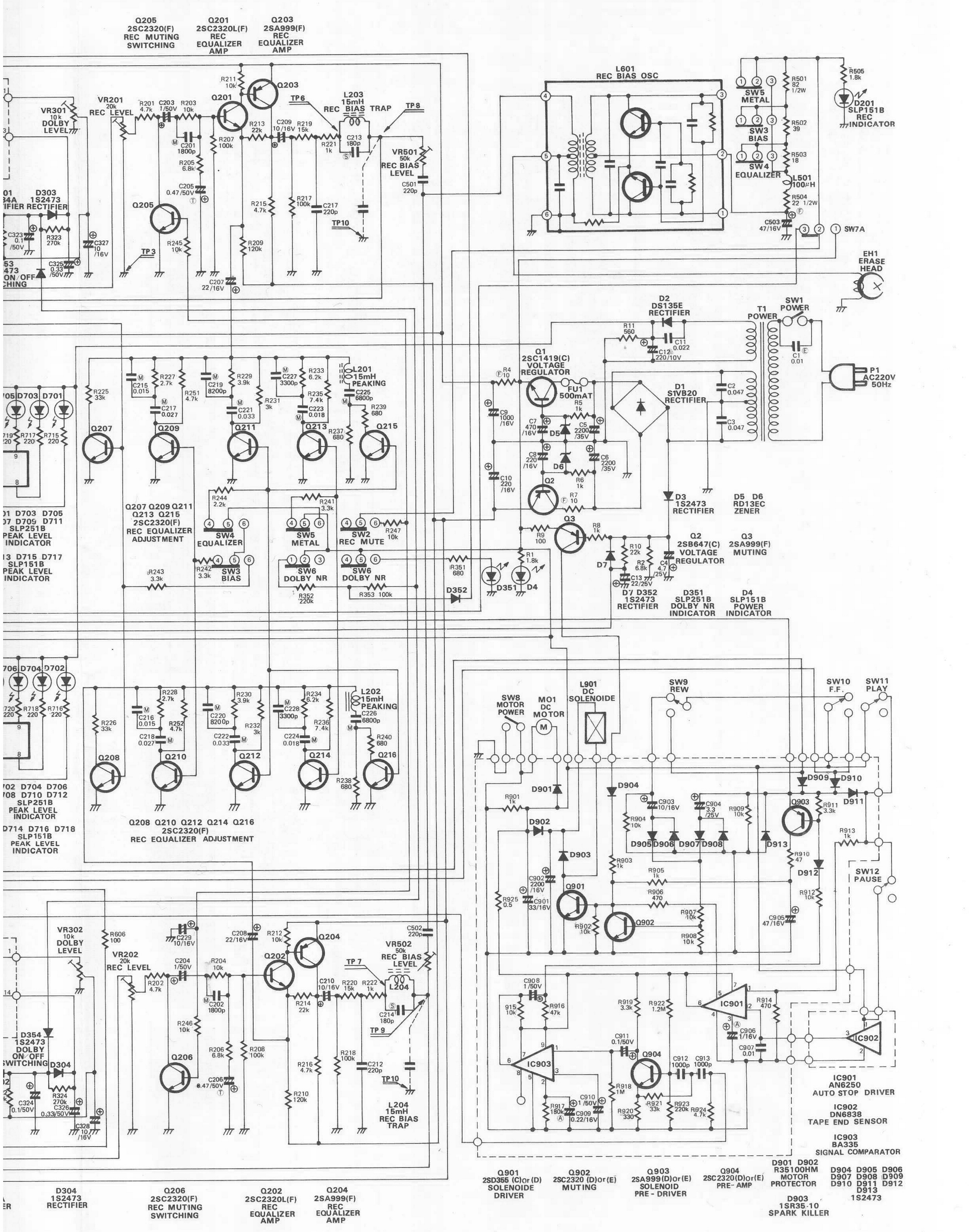
Q106  
2SC2320(F)  
TIME CONSTANT  
SWITCHING

Q302  
2SC2320L(F)  
PRE-AMP

D302  
1N34A  
RECTIFIER

D304  
1S2473  
RECTIFIER





Q205 2SC2320(F) REC MUTING SWITCHING  
Q201 2SC2320L(F) REC EQUALIZER AMP  
Q203 2SA999(F) REC EQUALIZER AMP

L601 REC BIAS OSC

R501 82 1/2W  
R502 39  
R503 18  
R504 22 1/2W  
R505 1.8k  
D201 SLP151B REC INDICATOR  
SW5 METAL  
SW3 BIAS  
SW4 EQUALIZER  
L501 100µH  
C503 47/16V  
SW7A  
EH1 ERASE HEAD  
P1 AC220V 50Hz

D2 DS135E RECTIFIER

Q1 2SC1419(C) VOLTAGE REGULATOR

D1 S1VB20 RECTIFIER

D3 1S2473 RECTIFIER

D5 D6 RD13EC ZENER

D7 D352 1S2473 RECTIFIER

D351 SLP251B DOLBY NR INDICATOR

D4 SLP151B POWER INDICATOR

D901

D902

D903

D904

D905 D906 D907 D908

D909

D910

D911

D912

D913

D914

Q207 Q209 Q211 Q213 Q215 2SC2320(F) REC EQUALIZER ADJUSTMENT

Q208 Q210 Q212 Q214 Q216 2SC2320(F) REC EQUALIZER ADJUSTMENT

Q206 2SC2320(F) REC MUTING SWITCHING

Q202 2SC2320L(F) REC EQUALIZER AMP

Q204 2SA999(F) REC EQUALIZER AMP

Q901 2SD355 (C) or (D) SOLENOID DRIVER

Q902 2SC2320 (D) or (E) MUTING

Q903 2SA999 (D) or (E) SOLENOID PRE-DRIVER

Q904 2SC2320 (D) or (E) PRE-AMP

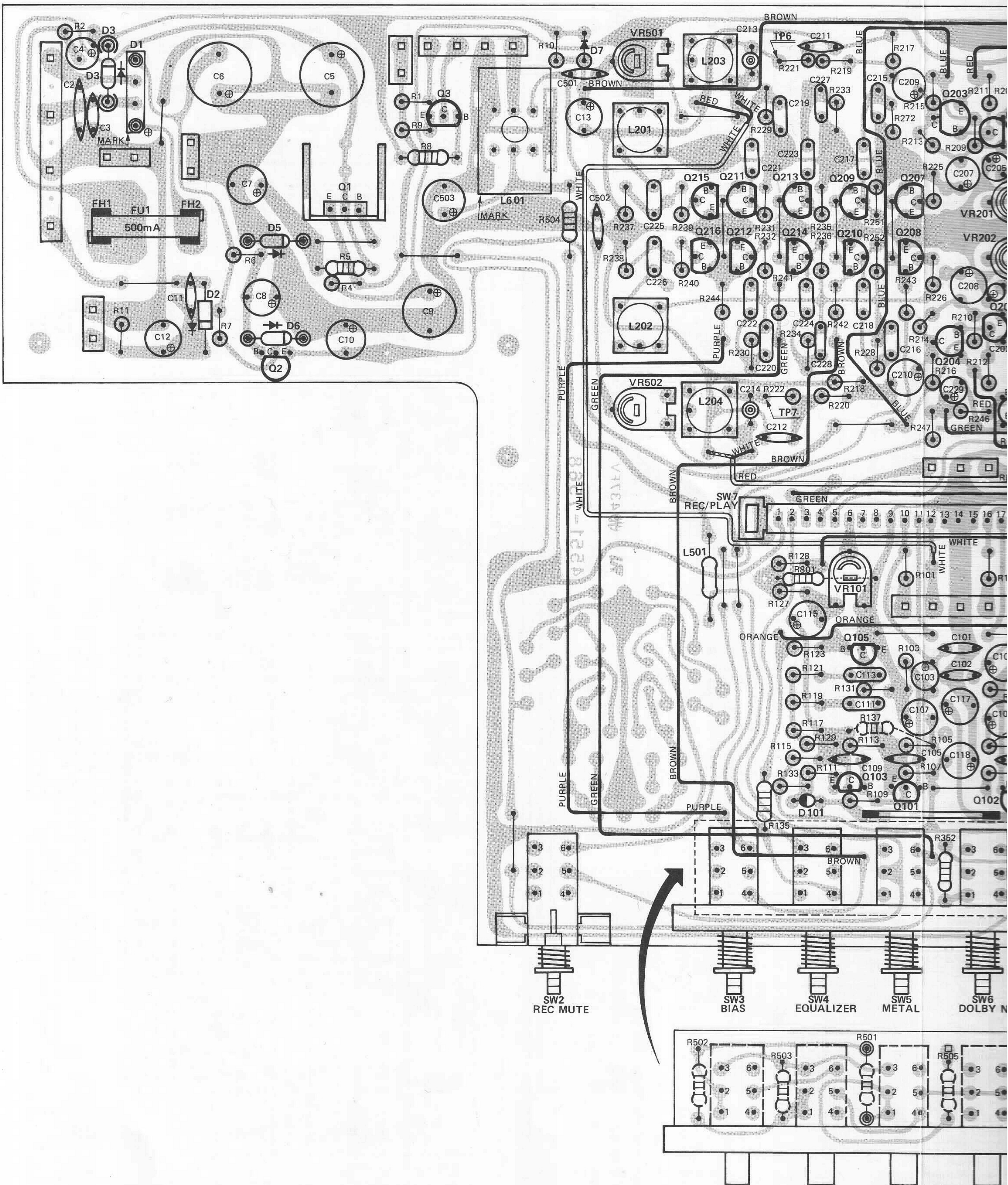
D901 D902 R35100HM MOTOR PROTECTOR

D903 1SR35-10 SPARK KILLER

D904 D905 D906 D907 D908 D909 D910 D911 D912 D913 1S2473

IC901 AN6250 AUTO STOP DRIVER  
IC902 DN6838 TAPE END SENSOR  
IC903 BA335 SIGNAL COMPARATOR

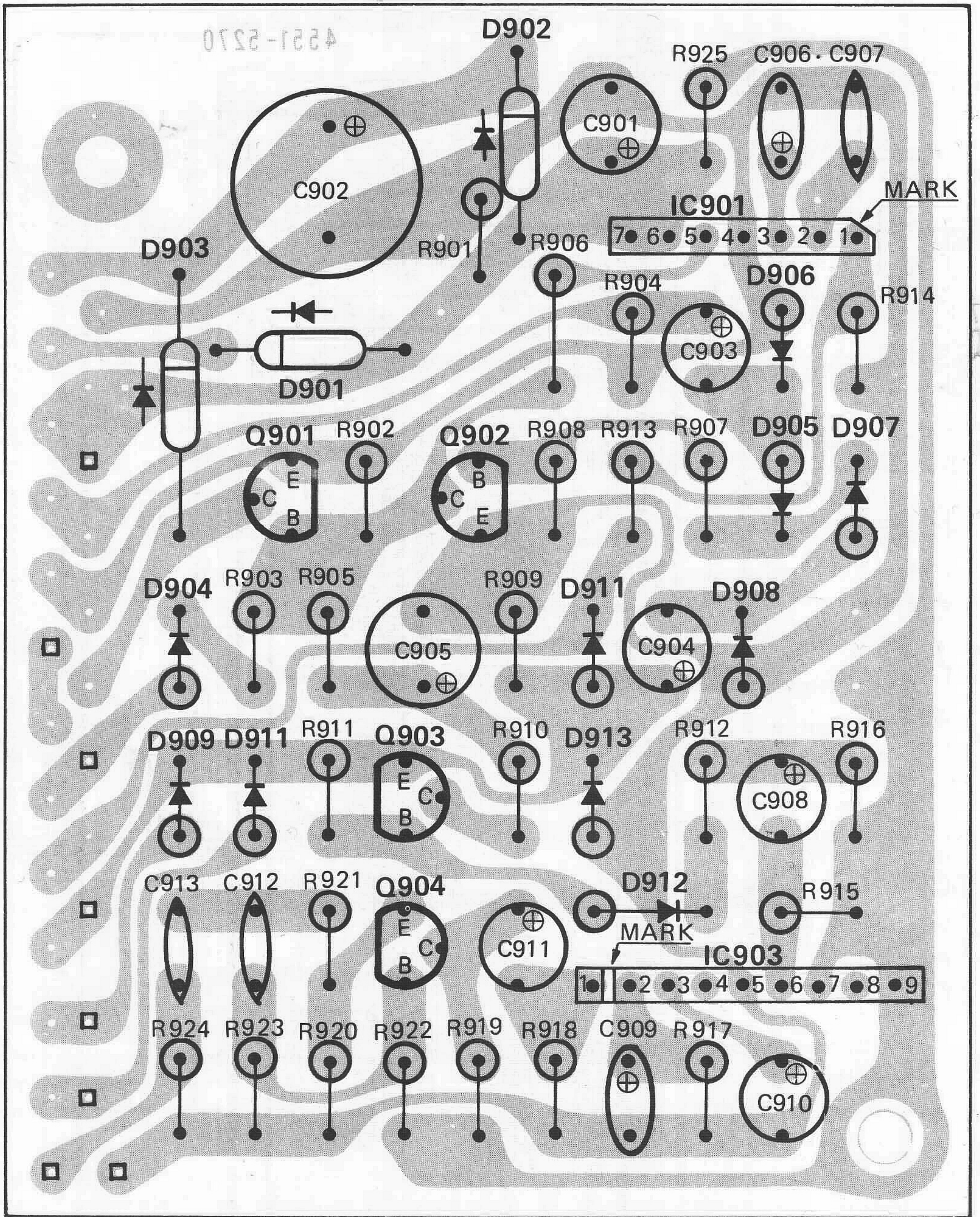












### TRANSISTOR VIEW

