

SERVICE MANUAL

AKAI TAPE RECORDER

MODEL 1800L

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I. SPECIFICATIONS

STYLE	: Portable	LINE INPUT	: 150 mV Impedance 150 K.Ohms
WEIGHT	: 36.3 lbs (16.5 kg)	DIN INPUT	: 20 mV Impedance 36 K.Ohms
DIMENSIONS	: 15-3/8" x 13-3/4" x 10-1/2" (390 x 340 x 267 mm)	MIC INPUT	: 3 mV Impedance 30 K.Ohms
POWER SUPPLY	: AC 100 to 240 V, 50/60 Hz	FAST FORWARD AND REWIND	
RECORDING		TIME	: 180 seconds for 1,200 foot tape at 50 Hz, 150 seconds for 1,200 foot tape at 60 Hz.
SYSTEM	: Reel In-line 4-track stereo, monaural recording Cartridge .. In-line 8-track stereo recording Transfer ... Pre-recorded conventional reel tape can be dubbed on the cartridge tape.	MONITOR	
PLAY BACK		SYSTEM	: Can be monitored the program being recorded by using a stereo headphone.
SYSTEM	: Reel In-line 4-track stereo, monaural play back Cartridge .. In-line 8-track stereo play back	MOTOR	: Condenser starting induction one-speed motor. Revolution ... 1,450 to 1,480 at 50 Hz 1,740 to 1,770 at 60 Hz
TAPE SPEED	: Reel 2 speeds 3-3/4", 7-1/2" Cartridge .. 3-3/4"	HEADS	
TAPE SPEED		a. REEL	
DEVIATION	: Within $\pm 3\%$	REC/PLAY	
WOW AND		HEAD	: In-line 4-track stereo/monaural Gap 4/1,000 mm Impedance ... 4,000 Ohms at 1,000 Hz
FLUTTER	: Reel Less than 0.2% at 7-1/2" (Play back only) Less than 0.3% at 3-3/4"	ERASE HEAD	: In-line 4-track stereo Gap 0.1 mm Impedance 3,600 Ohms at 60 Hz.
Cartridge .. Less than 0.35%		b. CARTRIDGE	
FREQUENCY		REC/PLAY	
RESPONSE	: Reel 60 to 13,000 Hz ± 4 db at 7-1/2" 60 to 10,000 Hz ± 4 db at 3-3/4" Cartridge .. 50 to 10,000 Hz ± 3 db	HEAD	: In-line 8-track stereo Gap 4/1,000 mm Impedance 1,800 Ohms $\pm 15\%$ at 1,000 Hz
SIGNAL TO		ERASE HEAD	: In-line 8-track stereo Gap 0.1 mm Impedance 210 Ohms $\pm 15\%$ at 60 KHz
NOISE RATIO	: Reel Better than 48 db Cartridge .. Better than 43 db	RECORDING LEVEL	
DISTORTION	: Reel Within 3.0% at 1,000 Hz (Total Harmonics) 0 VU recording (Speaker Output 250 mW) Cartridge .. Within 3.0% at 1,000 Hz 0 VU recording	INDICATOR	: VERTICAL Indication model, "A" VU Meter
CROSSTALK	: Reel Less than -55 db (Monaural) Less than -43 db (Stereo) Cartridge .. Less than -40 db	TRANSISTOR	
ERASE RATIO	: Reel Less than -70 db for all track. Cartridge .. Less than -65 db	USED	: 4 2SC4581G (C, D)
INSULATION		TUBE USED	: 1 12AT7 3 6AR5 1 6CA4
RESISTANCE	: More than 50 M.Ohms	SILICON	
INSULATION		DIODE USED	: 1 10D1 1 SL-150
DURABILITY	: 1,000 V, AC for more than one minute duration.	GERMANIUM	
MAIN OUTPUT	: 3 W per each channel, total 6 W.	DIODE USED	: 2 1N-34A
LINE OUTPUT	: 2.5 V at volume maximum (250 Hz 0 VU recorded tape used).	REELS USED	: 7", 5", 3" reels
DIN OUTPUT	: 2.5 V at volume maximum Impedance 82 K.Ohms	CARTRIDGE	
		USED	: LEAR JET PAK 8-track

II. MEASURING METHOD

TAPE SPEED DEVIATION

1. Method involving use of pre-recorded tape.
Playback on the tape recorder to be tested a tape pre-recorded at $1,000 \text{ Hz} \pm 0.1\%$ for measuring tape speed deviation. Connect the appropriate output to a frequency counter meter in order to measure the tape speed deviation from the deviation of the measured frequency.

2. Method involving use of timing tape (designed for tape speed measurement).

This method utilizes a timing tape marked at intervals of $7\frac{1}{2}''$. The running time of the tape over 60 marked section is measured in order to calculate the deviation of the tape speed. In applying this method, however, it should be born in mind that the timing tape might stretch or contract, measurement error is inevitable, so that it is necessary to measure the total length of the tape in advance.

WOW AND FLUTTER

Playback the 3,000 Hz pre-recorded tape whose wow and flutter level is guaranteed to be smaller than 0.07% for measurement by means of a wow meter. It is also possible for a 3,000 Hz sine wave to be recorded and played for measurement by means of the wow meter. In this case, however, the wow meter indicates a value as much as twice the value given in the specification on the first page.

SIGNAL TO NOISE RATIO



Playback a tape containing a 1,000 Hz sine wave recorded at "0" VU level on a standard recorder. Connect a V.T.V.M. to the line output jack of the recorder and measure its output.

Then remove the tape and measure the noise level under the same condition. Convert each of the measured values into decibels.

TOTAL HARMONIC DISTORTION FACTOR



Connect the measuring instrument as shown above, and record the 1,000 Hz sine wave at "0" VU. Playback the resultant signal and measure the overall distortion factor. Measure the noise level of the tape recorder with the tape removed; connect the audio oscillator directly to the distortion meter for measurement of the distortion factor of the oscillator.

The required distortion factor may be obtained from the results of the above measurement by the following formula.

$$d_0 = d - d_1 - d_2$$

where,

- d_0 = Required
- d = Overall distortion factor
- d_1 = Noise level
- d_2 = Distortion factor of the oscillator

(Note: New tape of particularly good quality should be used for measurement of the distortion factor.)

POWER OUTPUT

Playback a tape containing a sine wave of 1,000 Hz recorded at 0 VU on a standard recorder.

Connect a V.T.V.M. to the line output jack of the recorder and measure the voltage at the output of the recorder to be tested.

CROSSTALK (Crosstalk between the tracks)



As shown in the figure, first record a 1,000 Hz sine wave on track No. 3 at +3 VU level. Next, remove the 1,000 Hz input signal and record under a non-input condition.

Then, playback the tape on track No. 3 and No. 1 (reversed condition of tape) through the 1,000 Hz B.P.F. (Band Pass Filter, Sensitivity . . . 1:1) and obtain a ratio between the two from the following formula.

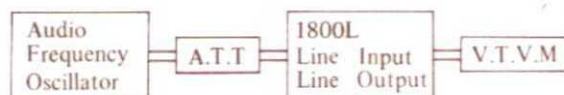
$$C = 20 \log \frac{E_0}{E_2 - E_1} \quad (\text{db})$$

- | | | |
|---|---|--|
| { | C = Desired crosstalk ratio (db) | |
| | E_0 = 1,000 Hz signal output level | |
| | E_2 = 1,000 Hz crosstalk output level | |
| | E_1 = No-input signal record level | |

PLAYBACK :

- 5) Set the Record/Playback Knob in "Play" position.
- 6) Connect a V.T.V.M. to the Line output.
- 7) Playback the tape previously recorded.
- 8) Adjust the output level to "0" dbm at 1,000 Hz as indicated on the V.T.V.M. by the range selector of a V.T.V.M.
- 9) Playback the recorded spot frequencies with the conditions in (9) ; make a memo of output level and plot the value on a graph.

FREQUENCY RESPONSE



Connect the measuring instrument as in the above diagram, and measure the frequency response in the following sequence :

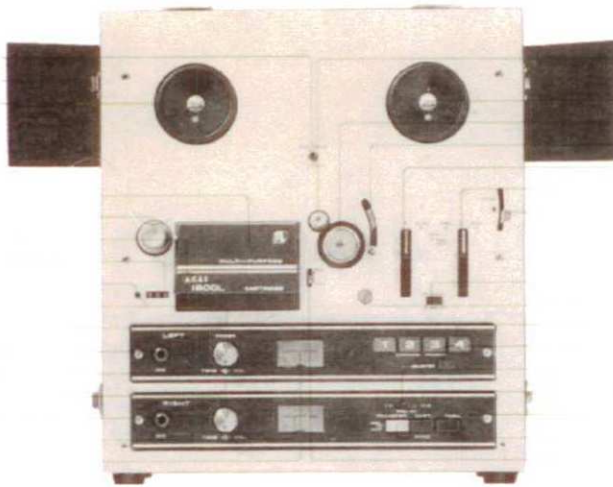
RECORD :

- 1) Give a sine wave of 1,000 Hz to the Line Input of the recorder to be tested, through an attenuator from an audio frequency generator.
- 2) Set the Record/Playback Knob in "Rec" position and adjust the line input volume so that the VU meter needle indicates "0" VU.
- 3) Under the condition described in (2), lower the input level 10 db by means of the attenuator.
- 4) Record the spot frequency in the range of 50 Hz to 18,000 Hz from the audio frequency generator.

III. CONTROL LOCATIONS

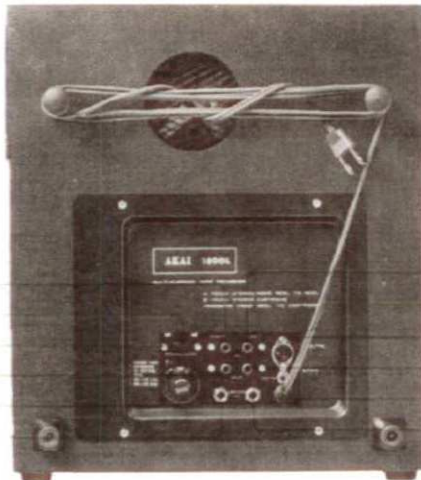
Case (Accessories) Switch
 Solenoid Release (Left)
 Solenoid Release (Right)

Motor Control
 Tape Control
 Tape Control (Emergency Stop)
 Motor Release
 Tape Control (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)

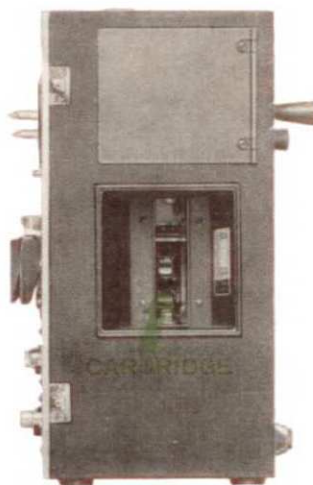


Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)
 Motor Release (Emergency Stop)

Emergency Stop (Left)
 Emergency Stop (Right)
 Emergency Stop (Left)
 Emergency Stop (Right)
 Emergency Stop (Left)
 Emergency Stop (Right)



Emergency Stop (Left)
 Emergency Stop (Right)
 Emergency Stop (Left)
 Emergency Stop (Right)
 Emergency Stop (Left)
 Emergency Stop (Right)



IV. DISMANTLING OF TAPE TRANSPORT UNIT & AMPLIFIERS



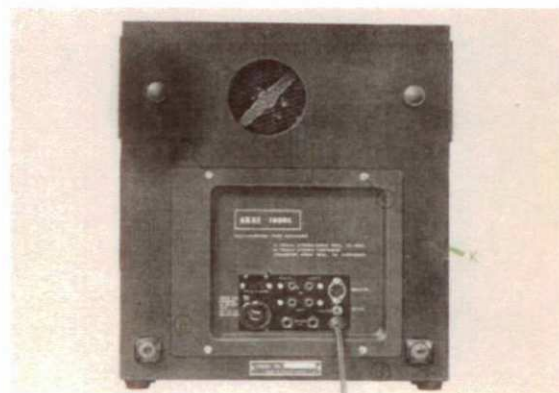
(1) Remove RETAINING SCREW (a) by using a Philips-head screw driver and remove PINCH WHEEL CAP (C) and PINCH WHEEL (W) by hand.



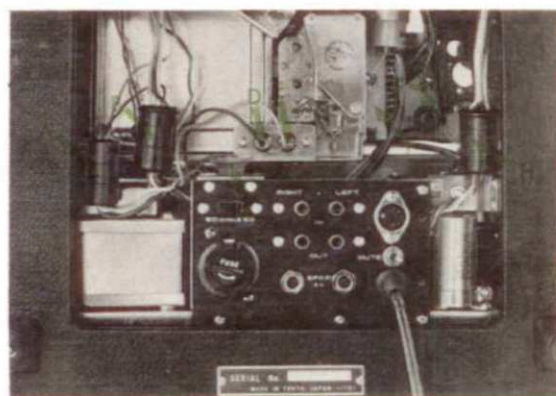
(2) Loosen RETAINING SCREWS of DECK CONTROL KNOBS (A) & (B) by using a Philips-head screw driver and remove KNOBS by hand.



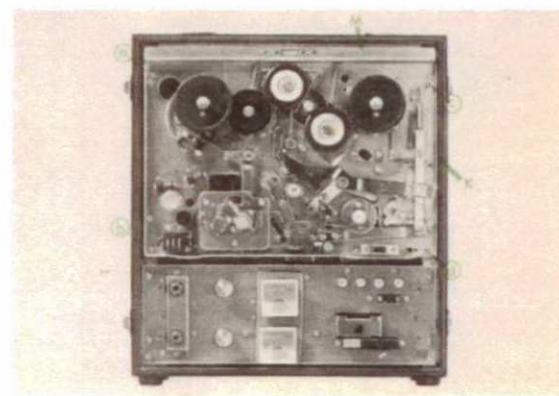
(3) Remove RETAINING SCREWS (marked (a) to (f)) by using a Philips-head screw driver and remove DECK PANEL (D) with HEAD COVER. Any front mechanism control adjustment may then be accessible.



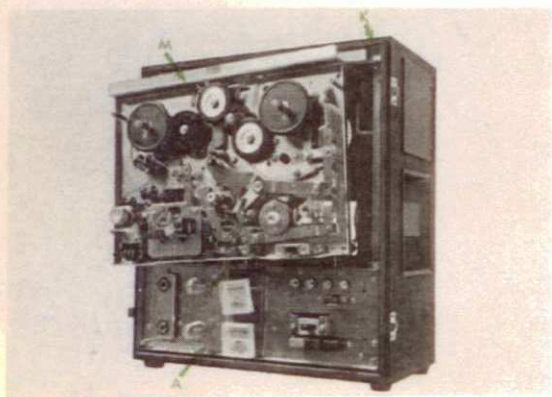
(4) Remove RETAINING SCREWS (marked (a) to (d)) and remove BACK PANEL (B) by hand from CASE (K).



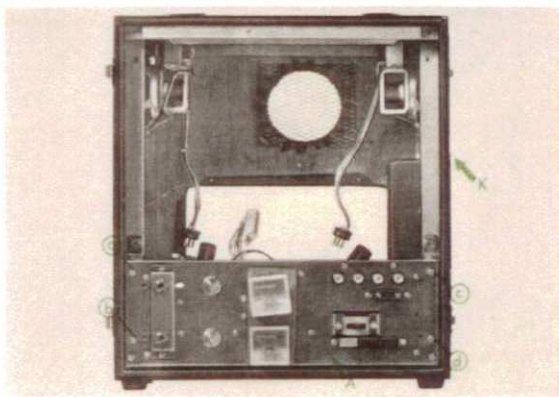
(5) Carefully disconnect PLUGS (marked (A) to (H)) in rear of machine, by hand.



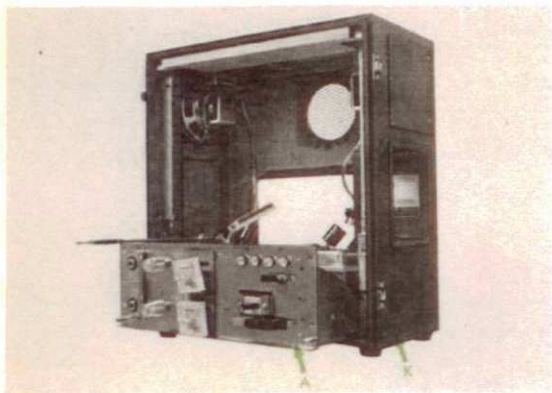
(6) Remove RETAINING SCREWS (marked (a) to (d)) by using a Philips-head screw driver. TAPE TRANSPORT MECHANISM ASSEMBLY (M) is now released from the CASE (K).



- (7) Carefully lift TAPE TRANSPORT MECHANISM ASSEMBLY (M) from CASE (K) as shown in picture, and remove FLEXIBLE RELEASE (R) from the bracket. TAPE TRANSPORT MECHANISM ASSEMBLY (M) may then be removed from AMPLIFIER ASSEMBLY (A).



- (8) Remove RETAINING SCREWS (marked (a) to (d)) by using a Philips-head screw driver. AMPLIFIER ASSEMBLY (A) may then be released from the CASE (K).



- (9) Remove AMPLIFIER ASSEMBLY (A) by carefully lifting from the CASE (K) as shown in picture. Any amplifier control adjustment is now accessible.

- (10) Assembly procedure is accomplished in the opposite order of dismantling.

V. TRANSPORT MECHANISM

DRIVING OF CAPSTAN

Figure 1.

- A Motor
- B Driving Belt (flat belt)
- C Capstan
- D Flywheel

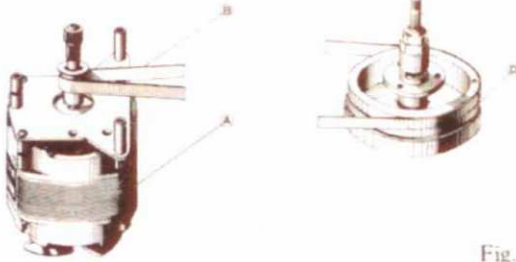


Fig. 1

High-speed rotation of *Motor* (A) is reduced by *Driving Belt* (B) and transmitted to *Capstan* (C), which is connected with flywheel with ample inertia. This enables the rated rotation to be attained by absorbing minor rotation distortion of the motor itself.

Capstan Rotation : 300 R.P.M. at 50 Hz

Motor Rotation : 1,450 to 1,480 R.P.M. at 50 Hz

1,770 to 1,780 R.P.M. at 50 Hz

DRIVING OF PINCH WHEEL

Put tape between rotating capstan and pinch wheel, and push the pinch wheel against the capstan. This will transport the tape at rated speed. The appropriate pressure of pinch wheel is between 1,000 to 1,150 grams at the tape speed of 7-1/2" (19 cm) per second.

RECORDING AND PLAYBACK

Turn the RECORD/PLAYBACK KNOB (A) to "PLAY" position, and pinch wheel presses against capstan to move tape at the rated speed. At the same time, *Idler* (B) moves between *Motor Bushing* (C) and the *Take-Up Reel Spindle* (D) to transmit the motor rotation to (D) so that the tape is moved and wound on the take-up reel.

The Take-up Reel Spindle Base is made up of two plastic rollers (1 and 2) with a clutch felt in between. The Idler is rotating the plastic roller (2) underneath. Therefore, the tape-winding friction is adjusted by the slipping of the felt to maintain the winding of the tape.

On the other hand, the *Supply Reel Spindle* (H) has a *Brake Roller* (E) hung on the Plastic Roller (4) underneath, which provides appropriate back tension by the felt clutch slipping to the rotation of the Pulley (3) above.

To prevent accidental erasure, the *Record Interlock Button* (F) must be depressed before the RECORD/PLAYBACK KNOB can be moved to the "REC" position. The *Safety device* (G) is depressed to operate the recording mechanism.

(See figure 2)

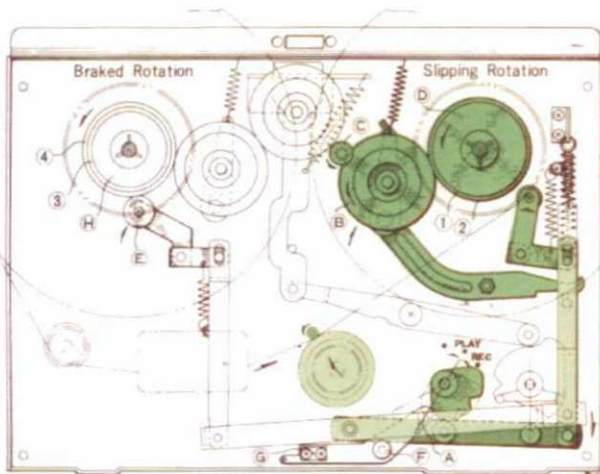


Fig. 2

FAST-FORWARD MECHANISM

Turn the *FAST FWD-REWIND knob A* to "FAST FWD" position, and the *cam B* under the knob pushes up the *Lever C*. The *Idler D* moves into the space between the *Plastic Roller F*, above the *Take-Up Reel Spindle* and the upper part of the rotating motor drive bushing to transmit the motor rotation to the take-up reel spindle. At the same time, *Brake Rollers H* and *I* come off the reel spindle to free the *Supply Reel Spindle G*, thereby allowing fast winding of the tape onto the take-up reel.

(See figure 3)

Fig. 3

REWIND MECHANISM

Turn the *FAST FWD-REWIND knob A* to "REWIND" position, and the *cam B* under the knob pushes the *Lever C* up. The *Idler D* moves into the space between the upper part of the rotating *Motor drive bushing E* and the *Intermediate Pulley F* to transmit the high-speed rotation of the motor through the intermediate pulley to the *Supply Reel Spindle G*. At the same time, *Brake Rollers H* and *I* come off the reel spindles (*J* and *G*), thereby rewinding the tape into the supply reel at a fast speed.

(See figure 4)

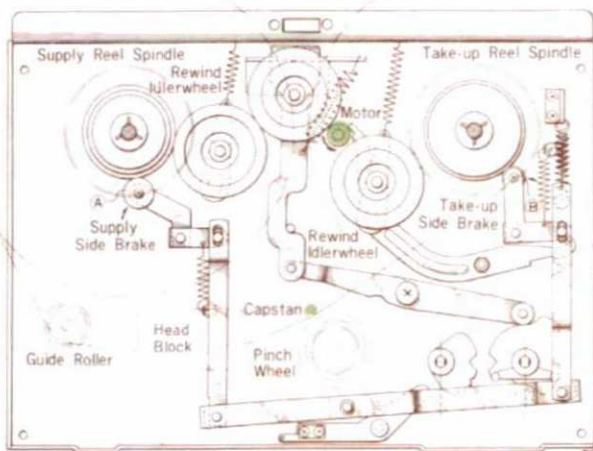
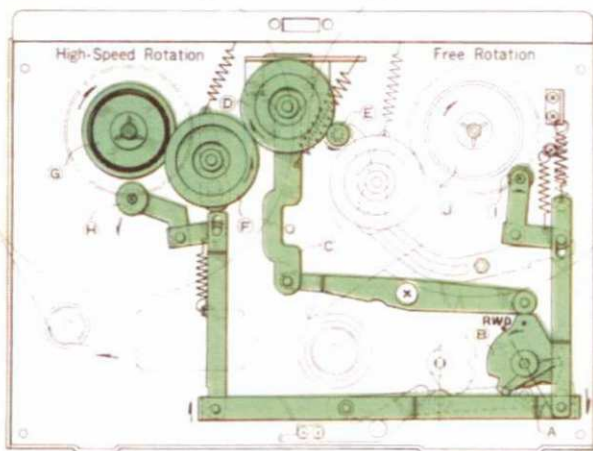
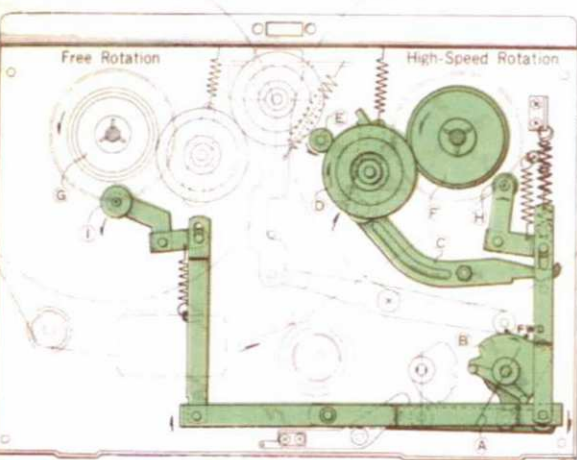
Fig. 4

STOP CONTROL

Push the stop lever to "STOP" position, *Brake Roller A* and *B* depress reel spindles to stop rotation of the reel spindles.

As the brake rubber depresses the plastic rollers under the reel spindles, no friction is brought to bear on the tape itself.

Fig. 5



Modes of Operation	Pinch Wheel	Take-up Idler Wheel	Rewind Idler Wheel	Take-up Side Brake	Supply Side Brake
(a) STOP	x	x	x	o	o
(b) FAST-FORWARD	x	o	x	x	x
(c) REWIND	x	x	o	x	x
(d) RECORDING PLAYBACK	o	o	x	x	o

NOTES : X-marks indicate "open" and
o-marks "engaged"

RECORD/PLAYBACK CHANGING MECHANISM

By turning RECORD/PLAYBACK KNOB (N) to the recording position, CAM (a) pushes RECORDING LEVERS (b) and (c) as illustrated in dotted line. Accordingly, FLEXIBLE RELEASE (d) which is linked with LEVER (c) pushes LEVER (e), whose axis of rotation is SCREW (f), as illustrated in dotted line. Then, RECORD/PLAYBACK CHANGING SWITCHES (SW-1) and (SW-2) which are linked with LEVER (e) turn to recording position.

If the SWITCHES do not operate properly, so abnormal oscillation may occur and recording also does not take place. Adjust SCREW (f) so that proper component parts operations are obtained.

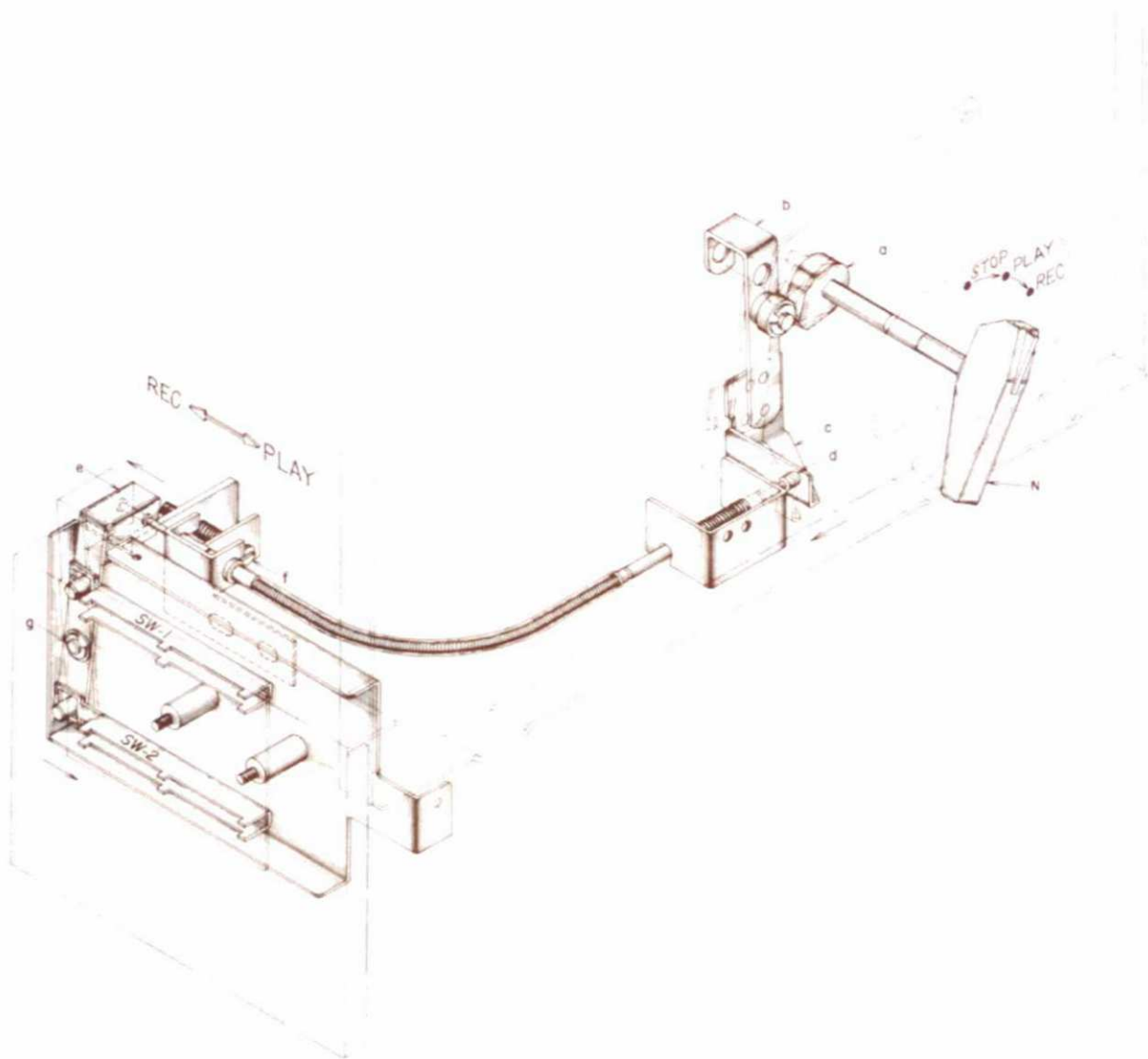


Fig. 6

VI. MECHANISM ADJUSTMENT

1. ADJUSTMENT OF PINCH WHEEL

It is important that the pinch wheel shaft is kept in complete alignment with the capstan shaft. A proper pinch wheel pressure is between 1,000 and 1,150 grams when the unit is operated at the tape speed of 7-1/2 ips. Any deviation from this specification will result in wow and flutter. Check pinch wheel pressure by a spring scale, and if necessary, adjust the pinch wheel load spring.

2. ADJUSTMENT OF TAKE-UP IDLER WHEEL

The take-up idler wheel must be kept in complete alignment with the take-up reel shaft. When the unit is set in fast forward condition, the idler wheel will contact with the upper knurled wheel of the take-up reel shaft assembly, and it will contact with the lower knurled wheel during record or play operation. Adjust idler wheel load spring so that the idler wheel pressure is kept between 50 and 80 grams. The idler wheel rapidly wears if the pressure is excessive. Slippage occurs if the pressure is smaller than the specification.

4. ADJUSTMENT OF INTERMEDIATE WHEEL

The intermediate wheel is located between the rewind idler wheel and the rubber ring which is used on the upper part of the supply reel shaft assembly. When the unit is set in rewind condition, it will contact with these parts simultaneously transmitting torque of motor. An adequate pressure is 50 grams. Adjust the load spring of the intermediate wheel if the pressure is not sufficient.

5. ADJUSTMENT OF TAKE-UP REEL SHAFT ASSEMBLY

Felt clutch material is attached to the bottom side of the reel table base plate so that recording tape will not be stretched during fast forward operation because of excessive tension. To check the amount of friction of this part, place a 5-inch reel with a tape 60 m/m in diameter, and gently pull the end of tape upward using a spring scale. Adjust the conical spring so that the amount of tension at this part will be kept between 400 and 500 grams. Other felt clutch material is attached to the take-up drive wheel. It is to provide proper slipping operation during record or play operation. The procedure for checking friction of this part is the same as the foregoing, and between 150 and 200 grams of friction will provide the best result. Adjust the star-shaped spring just under the take-up drive wheel. When the unit is set the rewind operation, the amount of friction of this part will be greatly reduced and will become 15 to 20 grams. Check to see whether this is satisfactory, if not, readjust the star-shaped spring for Brake, and the pressure of the spring retainer will be adjusted accordingly. (See figure 1 (b) at right)

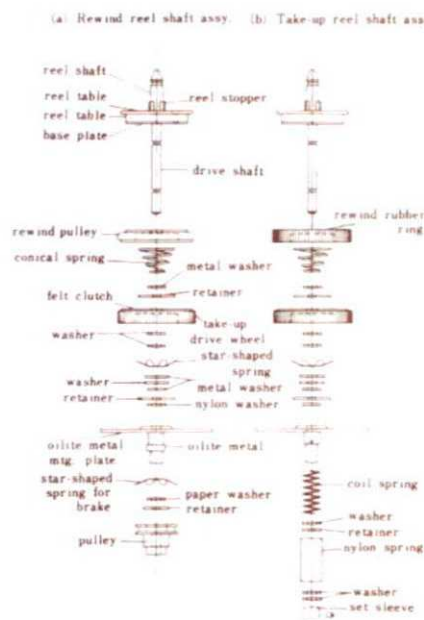


Fig. 1

3. ADJUSTMENT OF REWIND IDLER WHEEL

The rewind idler wheel must be kept in complete alignment with the rewind reel shaft. The amount of pressure on the knurled motor bushing should be maintained at about 50 grams during rewind operation. Adjust both the idler load spring and rewind roller.

6. ADJUSTMENT OF SUPPLY REEL SHAFT ASSEMBLY

Felt clutch material is used between the lower side of the reel table base plate and the rewind rubber ring to protect recording tape from excessive tension during the rewind operation. To check the amount of friction of this part, place onto the supply reel table a 5-inch reel with a tape 60 m/m in diameter, and gently pull the end of tape upward by a spring scale. Adjust the conical spring so that the amount of tension is kept between 400 and 500 grams. Other felt clutch material is attached to the rewind drive wheel to provide proper slipping operation during record or play operation. The procedure for checking friction of this part is the same as the foregoing, and between 80 and 120 grams of friction will give the best result. When the unit is set to fast forward operation, the amount of friction will be greatly reduced and will become 15 to 20 grams. Check to see whether this is correct. If not, readjust coil spring and spring retainer washer. (See figure 1 (a) at left)

7. HEAD ADJUSTMENT

Since adjustment of the Heads critically affects tape recorder performance, it is essential that Heads be carefully adjusted with precision measuring equipment and a suitable recorded tape.

(Precaution)

In adjusting Head Height, make sure that the front of the Head is at right angles to the Chassis and that the upper and lower parts of the Head firmly contact the tape.

(I) Reel

(A) Adjustment of Head Height (See Fig. 2 and Fig. 3)

a. Erase Head

Adjust the height of the Erase Head by turning the height control screws \textcircled{a} , \textcircled{a}' as the upper edge of the tape passes the top edge of the CH-1 erase head core. Adjust to 0.125–0.15 mm below CH-1 erase head core.

b. Recording/Playback Head

Adjust the height of the Recording/Playback Head by turning the height control screws \textcircled{b} , \textcircled{b}' in the same manner. Adjust them so that the upper edge of the upper core of the Recording/Playback Head is the same height as the upper edge of the tape.

(B) Adjustment of Vertical Azimuth of the Head

Adjust the vertical azimuth of each head (erase and Recording/Playback) by turning the height control screws \textcircled{a} to \textcircled{b}' until the tape fully contacts each head.

(C) Adjustment of Head Alignment

Recording/Playback Head

Playback an Ampex Alignment tape (8,000 Hz) at 7-1/2" tape speed and turn the alignment control screw \textcircled{d} until the out-put level of both channels reaches the maximum.

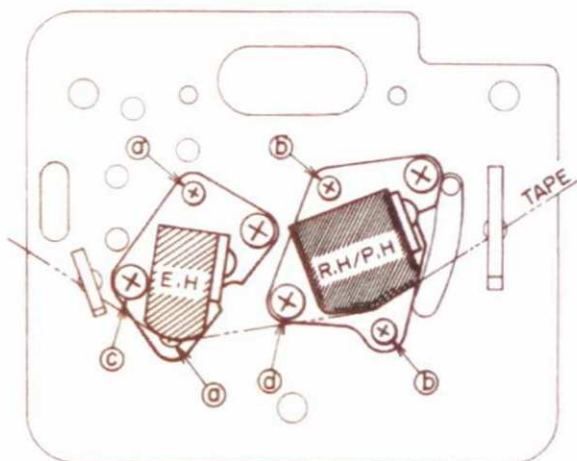


Fig. 2

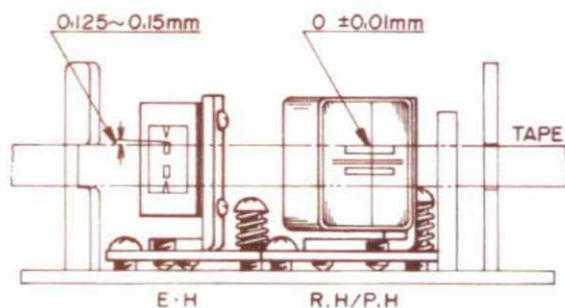


Fig. 3

(II) Cartridge

(1) ADJUSTMENT OF AZIMUTH ALIGNMENT

Playback the test tape for azimuth alignment (8,000 Hz recorded tape) and set the azimuth alignment of head assembly by turning screw (c) until maximum playback output of program 2 or 3 is obtained.

(2) ADJUSTMENT OF HEIGHT

(A) Playback *the test tape and turn screw (d) until the maximum gain of program 1 is obtained.

(B) Set *the blank test tape to the recorder and put to the erasing test. If the erasing is not complete, adjust it as follows :

(I) Turn the screws (a) and (b) clockwise forty-five degrees at the same time and then put to the erasing test again.

Note : Care should be taken to demagnetize the blank test tape every time you put to the erasing test.

(II) If the erasing is not completely done after the above adjustment, turn again the screws (a) and (b) clockwise ten to fifteen degrees at the same time.

(III) If not, continue as (2), till you can get complete erasing. And playback the test tape for azimuth alignment again and turn the screw (c) until the maximum gain of program 2 or 3 is obtained.

(IV) Playback again *the test tape and turn the screw (d) until the maximum gain of program 1 is obtained.

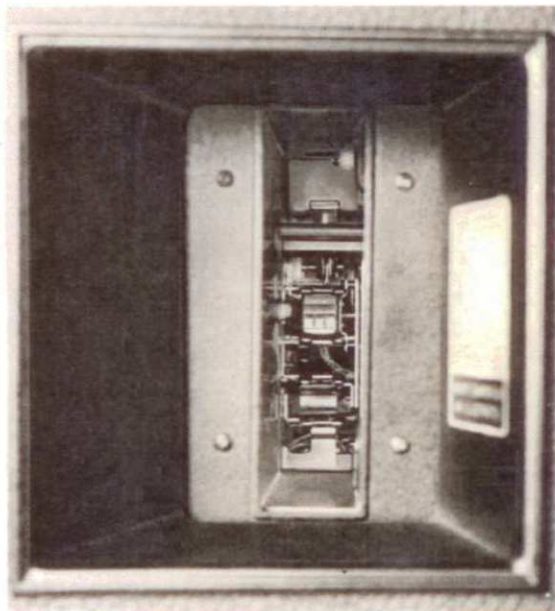
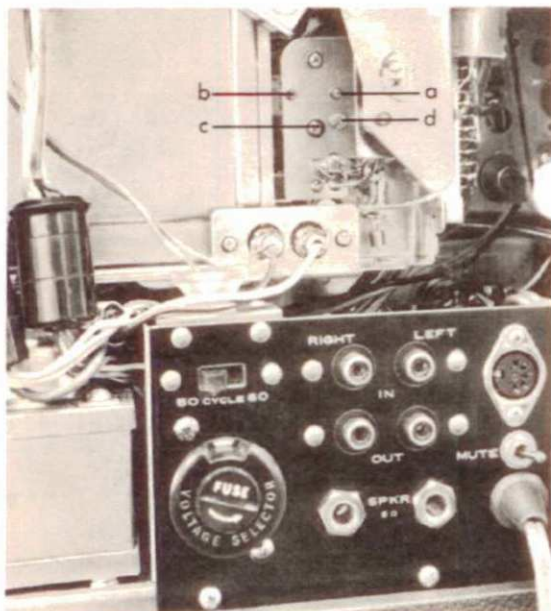
* TEST TAPE

This test tape is specially designed to make an adjustment of head height by AKAI.

Program 1	1,000 Hz
Program 2	Blank
Program 3	1,000 Hz
Program 4	3,000 Hz

* BLANK TEST TAPE

This blank test tape is specially designed to have one rotation of fifteen seconds.



VII. AMPLIFIER ADJUSTMENT

1. ADJUSTMENT OF RECORDING BIAS FREQUENCY (See Fig. 1)

- Put on the resistor 10 or 50 Ohms in series with the Erase Head and connect the Vertical Input Terminal of the Oscilloscope to points (a) and (b).
- Feed in the sine wave signal from an Audio Frequency Oscillator to the Horizontal Input of the Oscilloscope and tune the Dial of the Audio Frequency Oscillator until the Oscilloscope displays a circular or linear pattern. Then read the figure on the Dial of the Audio Frequency Oscillator.
- If it reads 60 K.Hz \pm 5 K.Hz, the Recording Bias Frequency is correct.
- If it is not correct, it may be adjusted by inserting another condenser (C314) value 550 PF.

2. ADJUSTMENT OF RECORDING BIAS VOLTAGE (See Fig. 2)

- Reel
 - Connect the V.T.V.M. to the Point (A), then read the figure on the meter of the V.T.V.M.
 - If it reads AC 40 \pm 5 V, the Recording Bias Voltage is correct.
 - If it not correct, it may be adjusted by inserting another resistor (R315) value 56 k ohms.

Note : There is no way of adjusting the erasing bias voltage, but the correct bias voltage is between AC 40 to 50 V.

II) Cartridge

Connect the V.T.V.M. to the Point (B) and if it not reads correct bias voltage between AC 30 to 33 V, it may be adjusted by inserting another resistor (R314) value 100 K ohms.

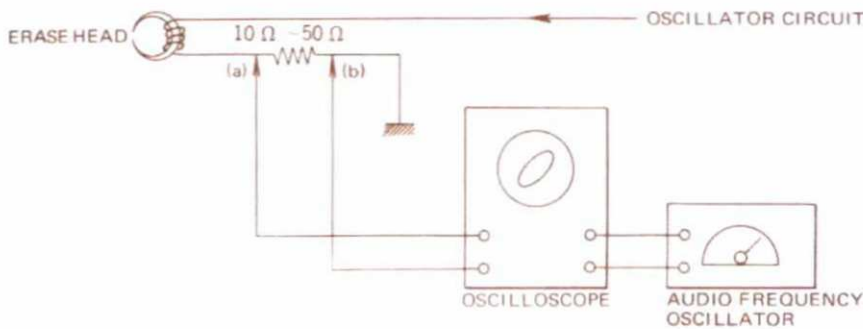


Fig. 1

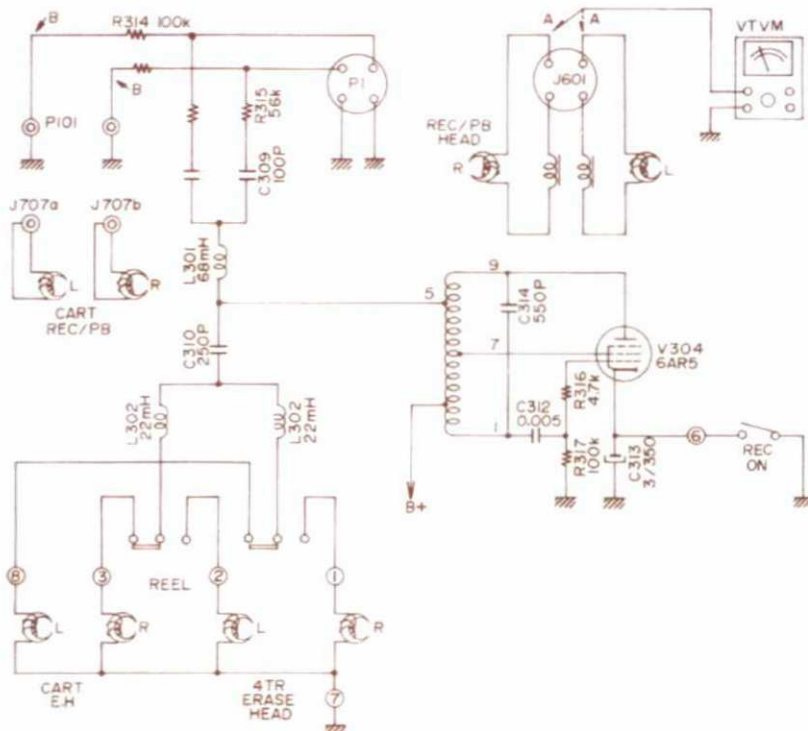


Fig. 2

VIII. MAINTENANCE PROCEDURES

1. LUBRICATION INSTRUCTION

For maximum service life and optimum performance, lubricate the parts identified below after each 500 hours of operation. Use only light machine oil of good quality.

Motor

Flywheel Assembly

Rewind Idler Wheel and Wind Take-Up Idler 1 drop

Intermediate Idler 1 drop

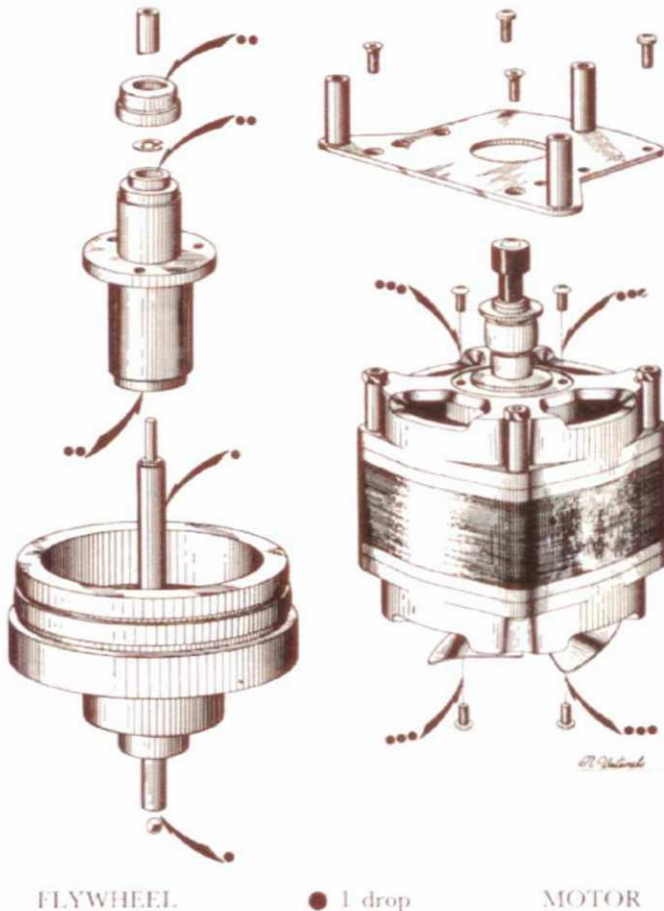
Pinch Wheel 1 drop

Also apply a liberal film of light machine grease to each roller surface of all levers and cams.

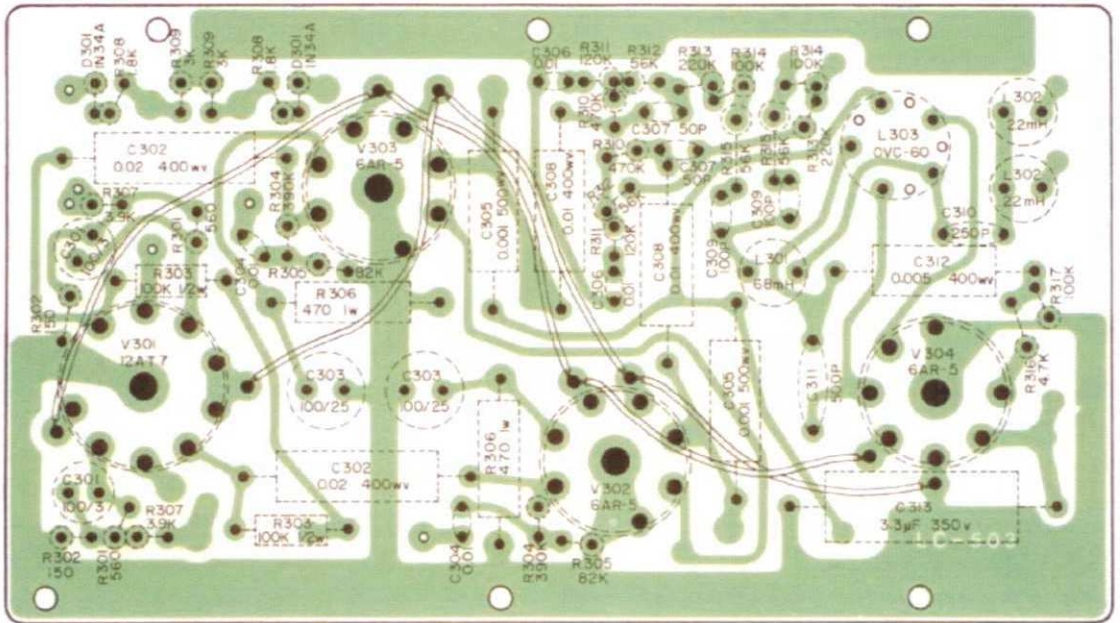
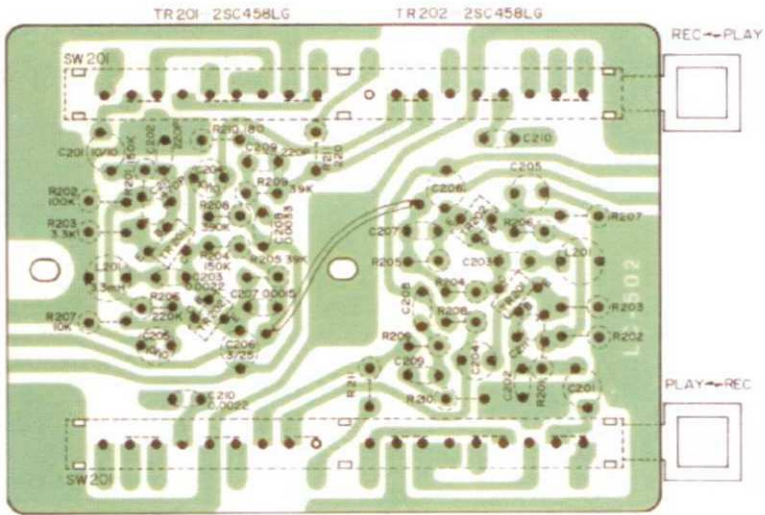
CAUTION : DO NOT OVER-LUBRICATE, AND WIPE OFF EXCESS OIL WITH A COTTON SWAB SOAKED IN ALCOHOL. OTHERWISE, THE EXCESS LUBRICANT MAY BE SCATTERED DURING OPERATION. AND THE RUBBER COMPONENT PARTS WILL DETERIORATE.

2. CLEANING TAPE HEADS AND OTHER PARTS

Wipe surface of tape heads, guide roller bearing, capstan bushing and pinch wheel periodically with a soft cloth soaked in alcohol or carbon-tet.



IX. COMPOSITE VIEWS OF COMPONENTS

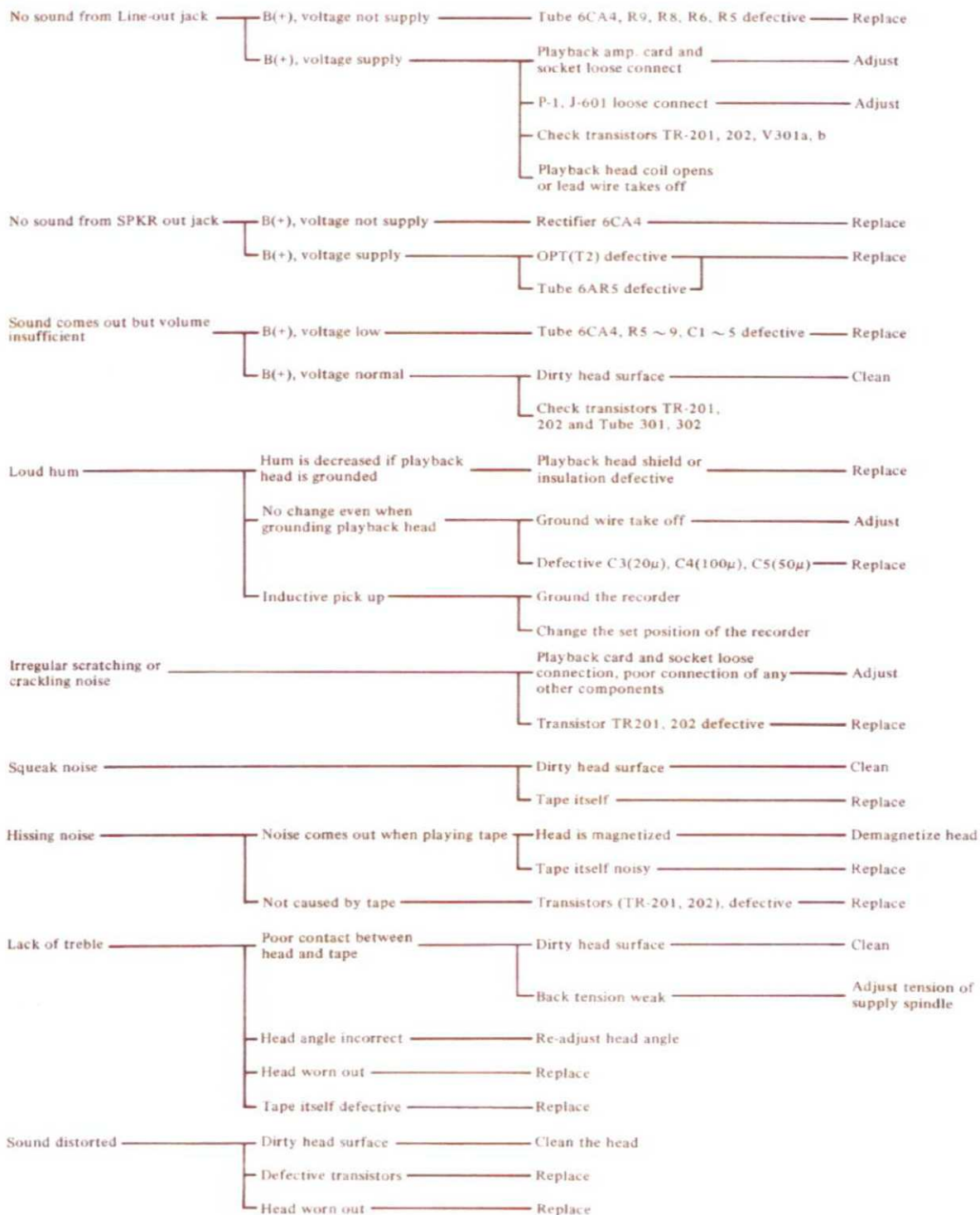


X. TROUBLE SHOOTING CHART

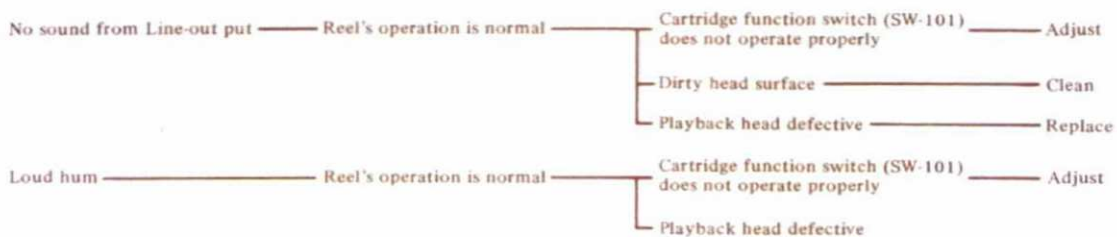
SECTION "A" TROUBLES WITH AMPLIFIER

1. Playback problems. (Unit set in play position.)

a) Reel

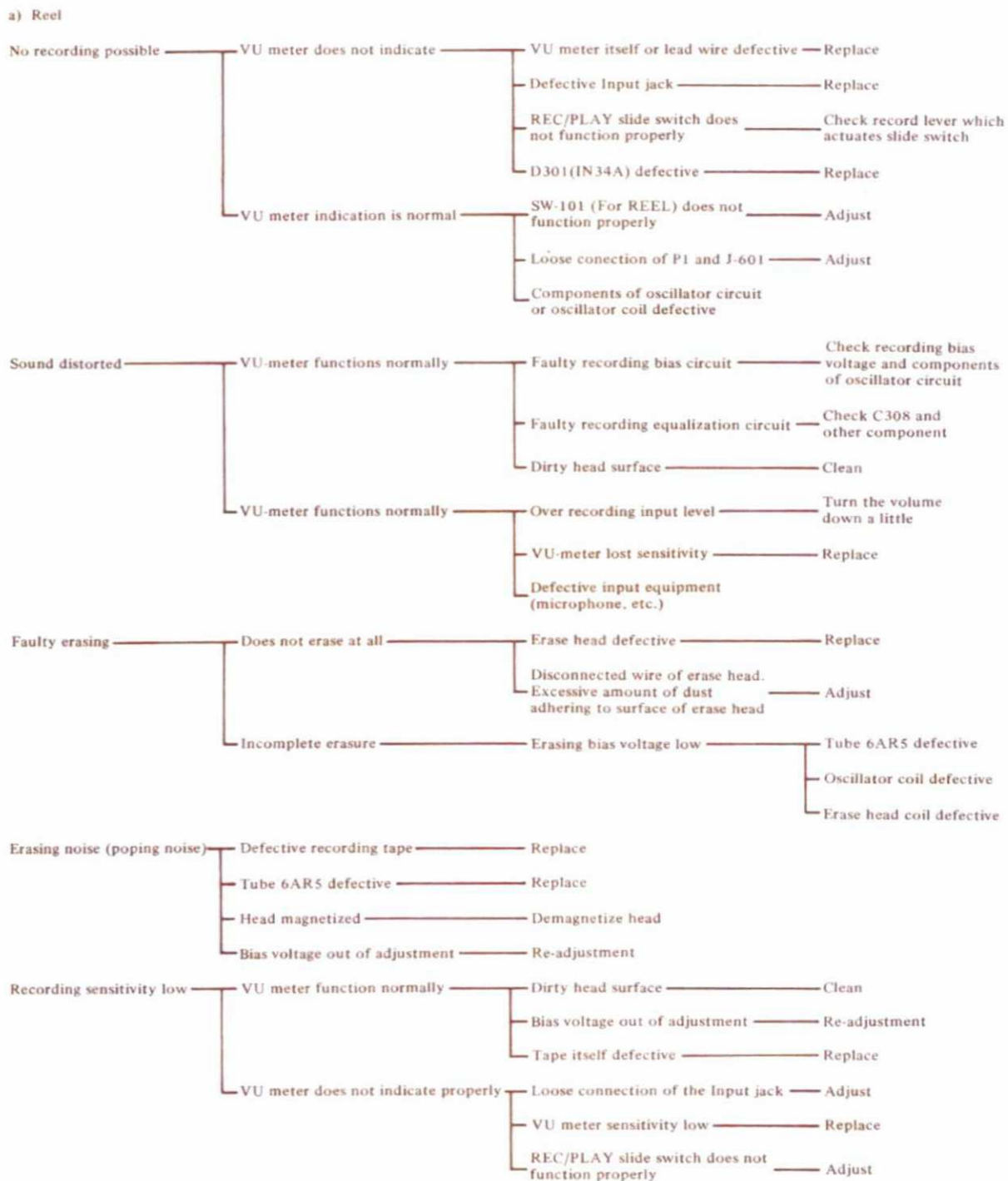


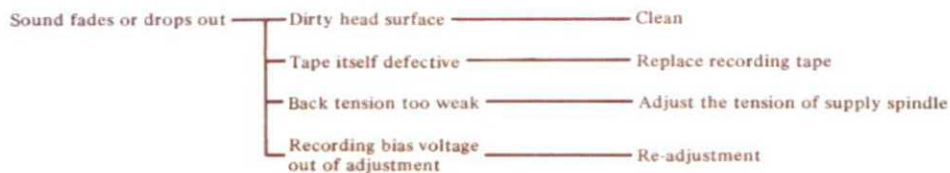
b) Cartridge



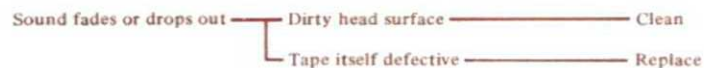
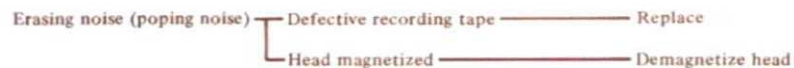
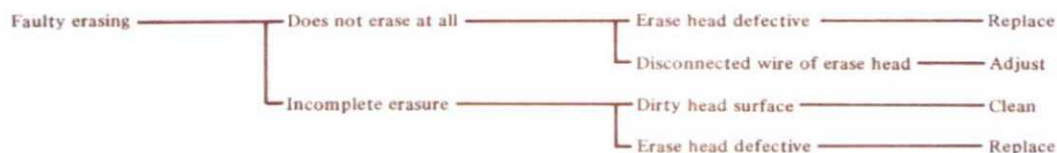
2. Recording problems.

(Unit plays back pre-recorded tapes okay, but recording not satisfactory.)

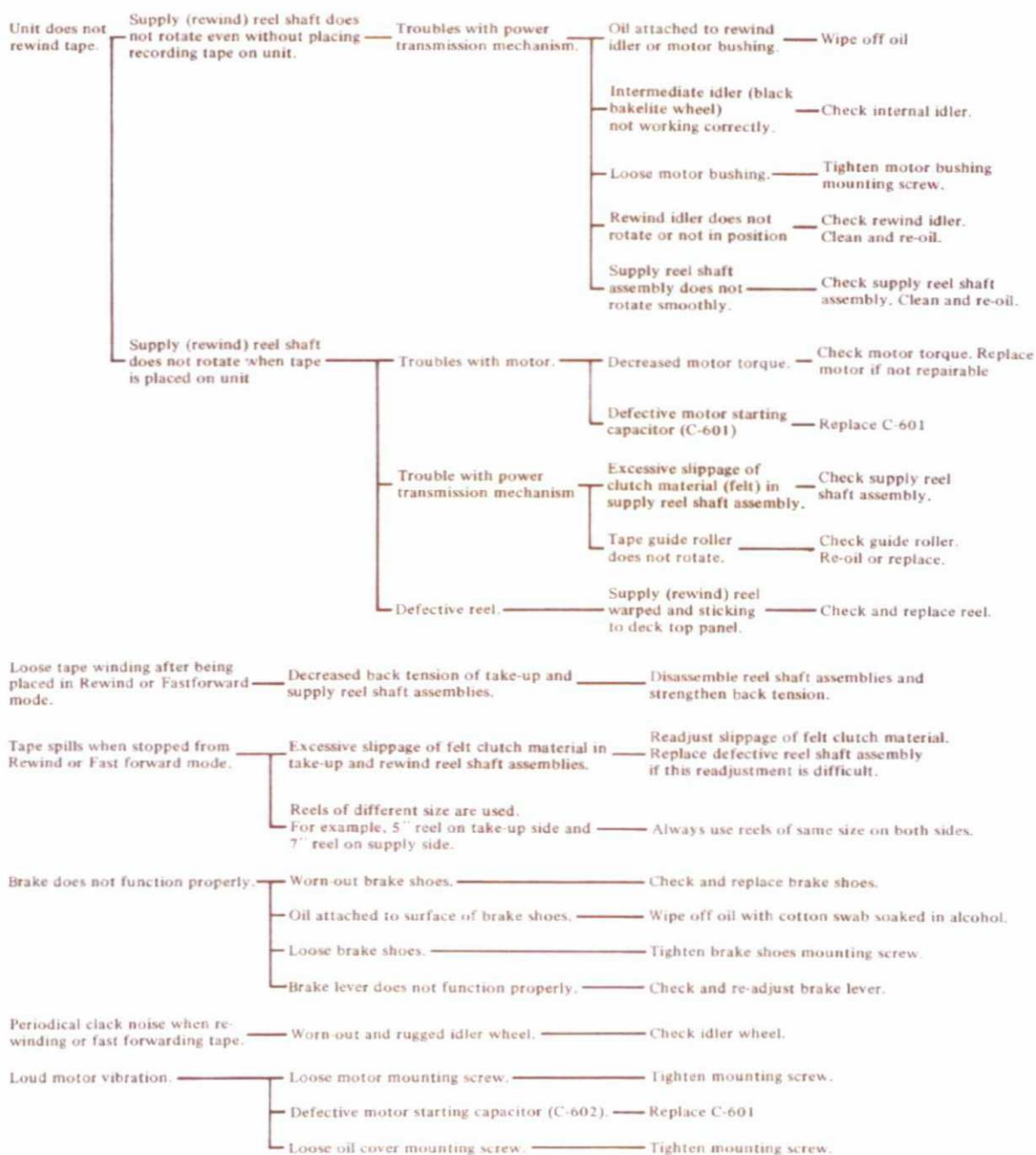


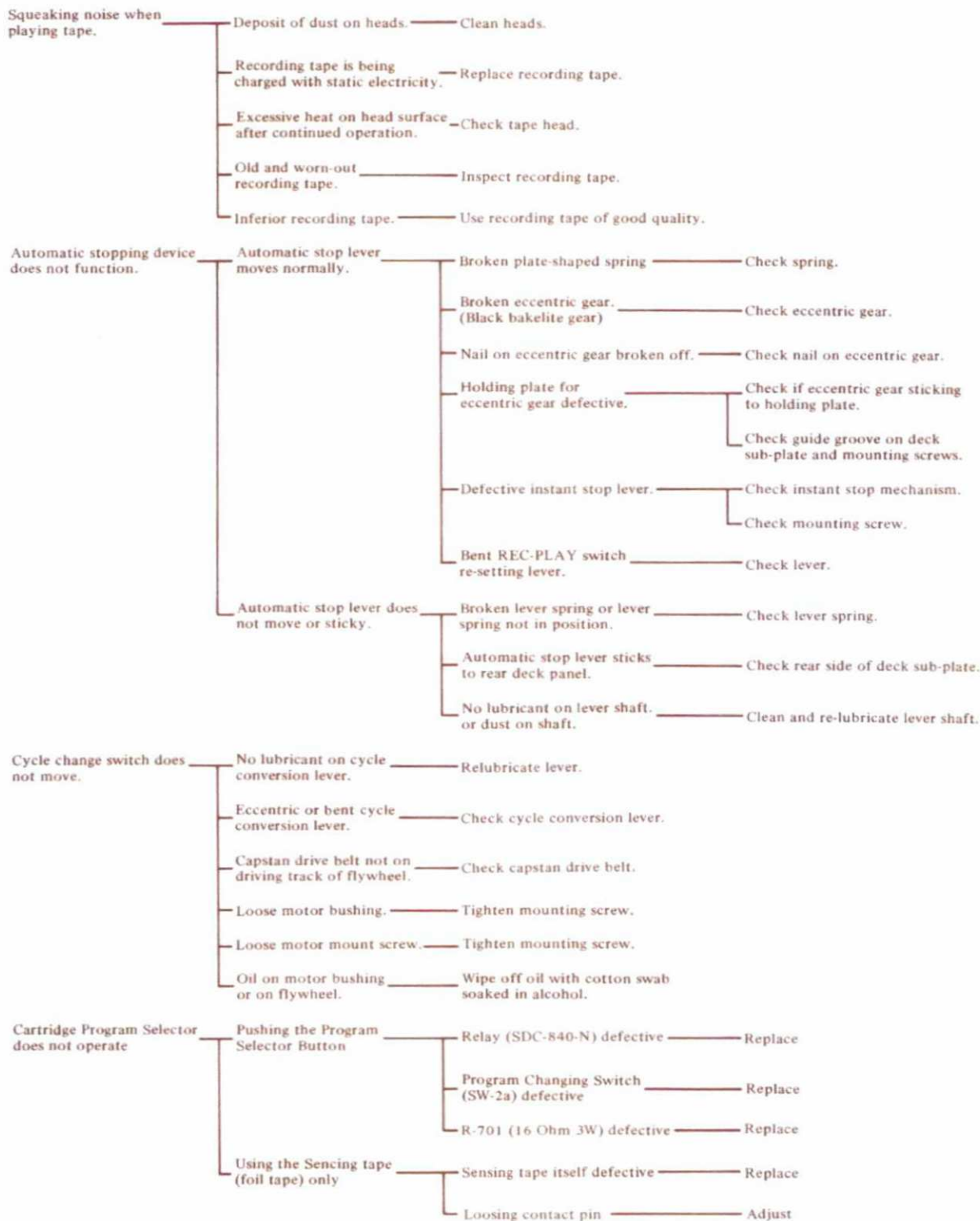


b) Cartridge

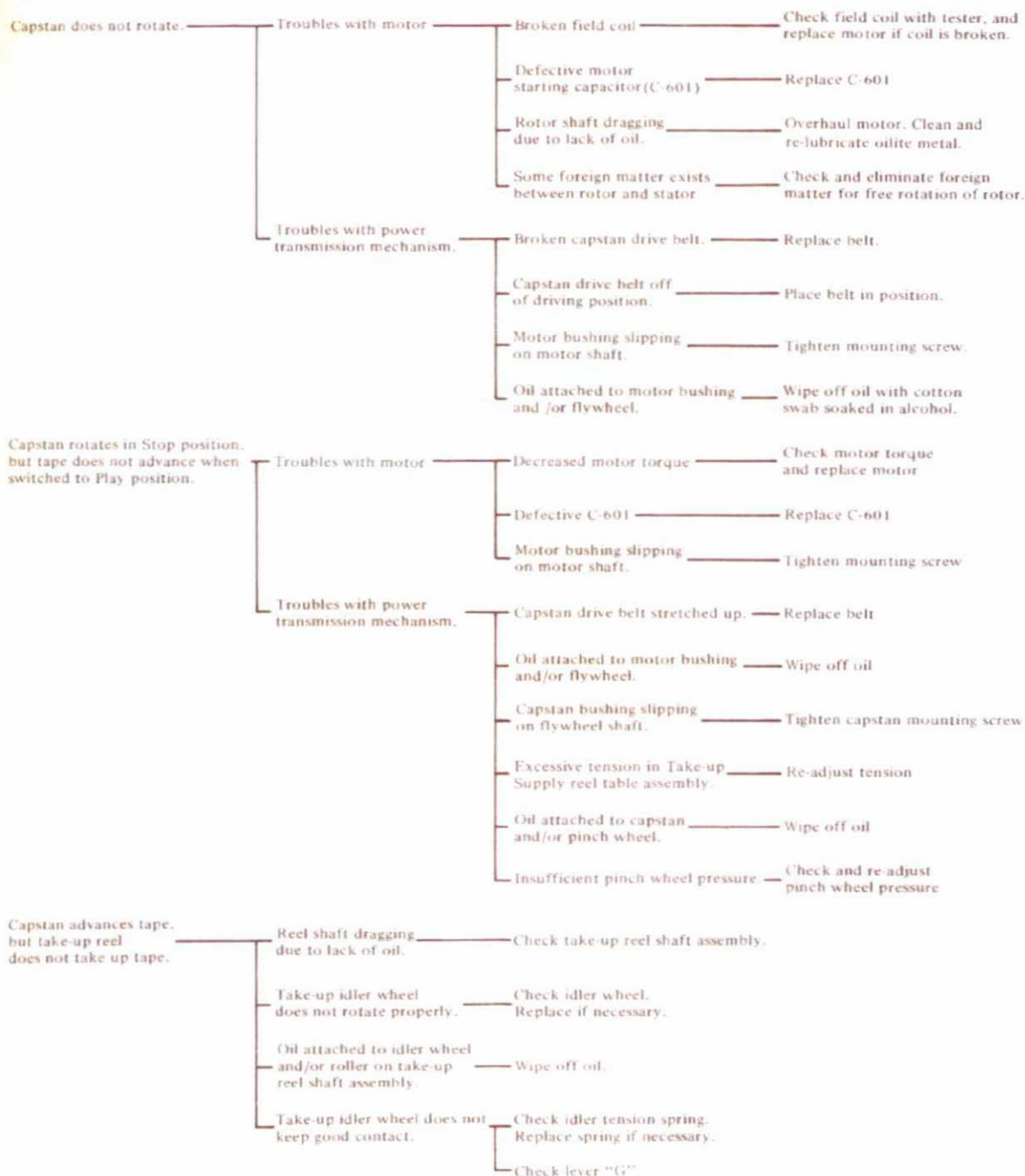


SECTION "B" TROUBLES WITH TAPE TRANSPORT MECHANISM

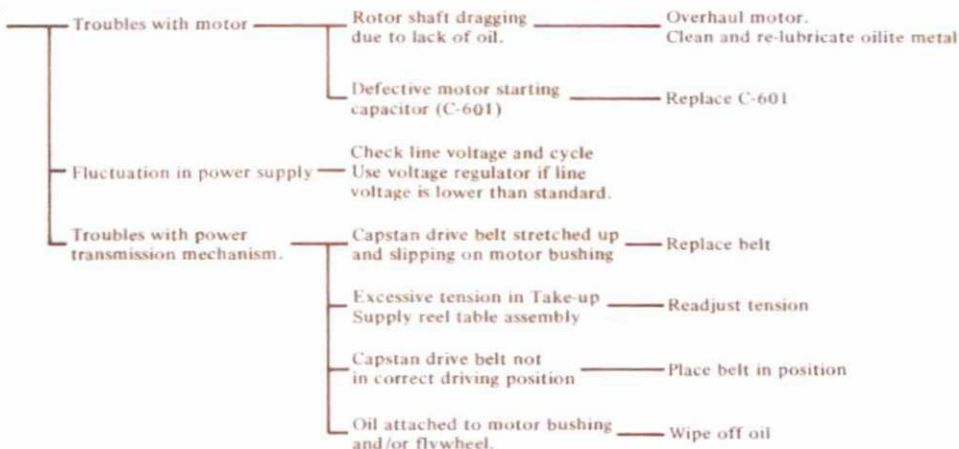




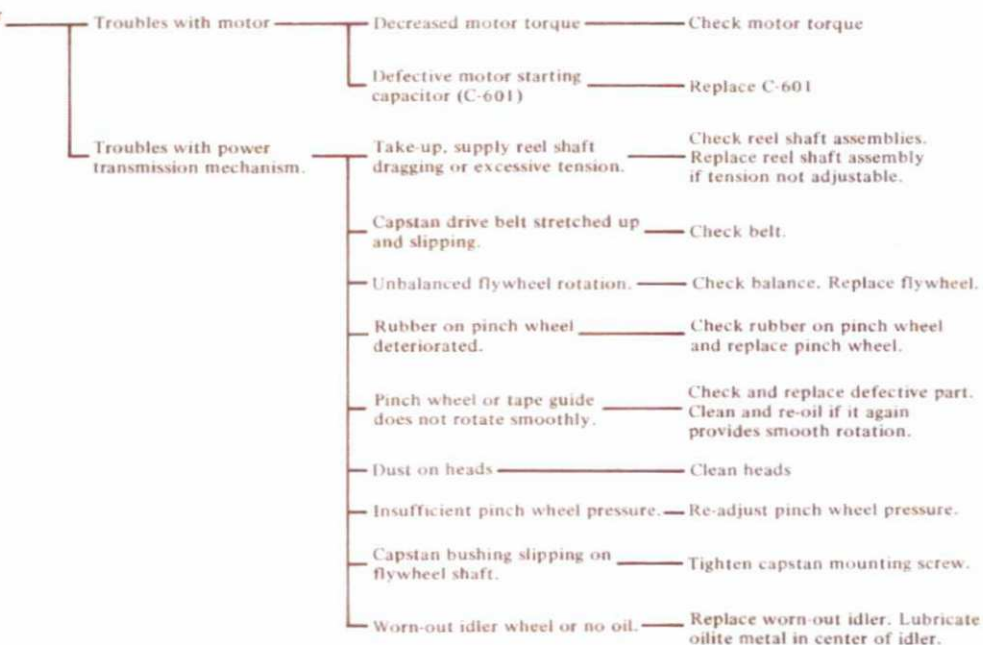
SECTION "B" TROUBLES WITH TAPE TRANSPORT MECHANISM

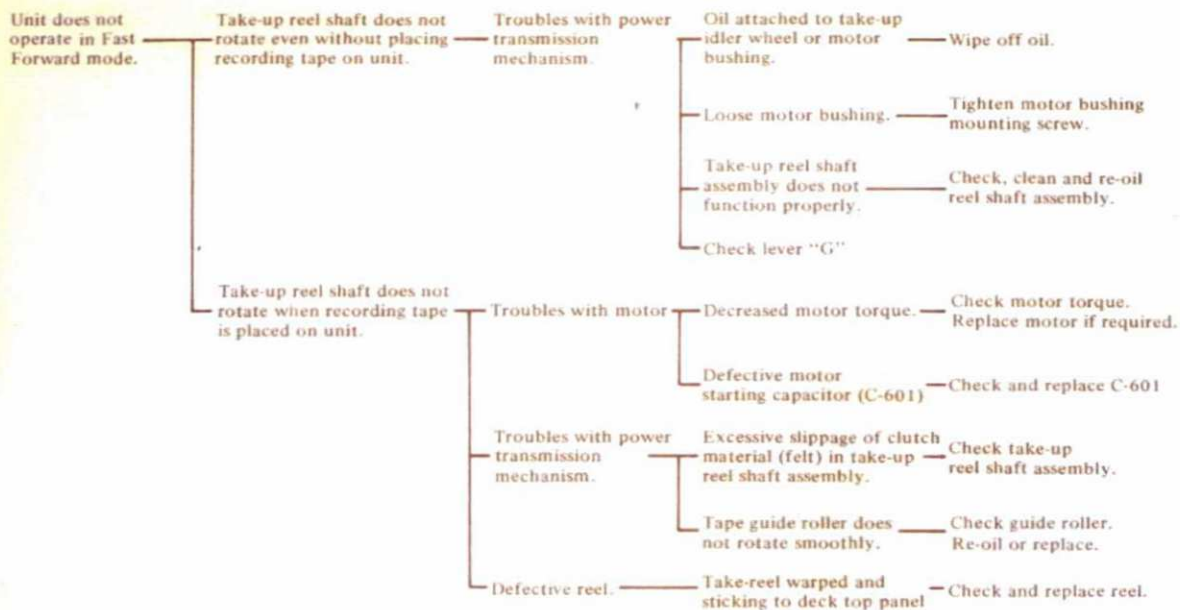


Take-up functions normally,
but tape speed lower
than regular speed.

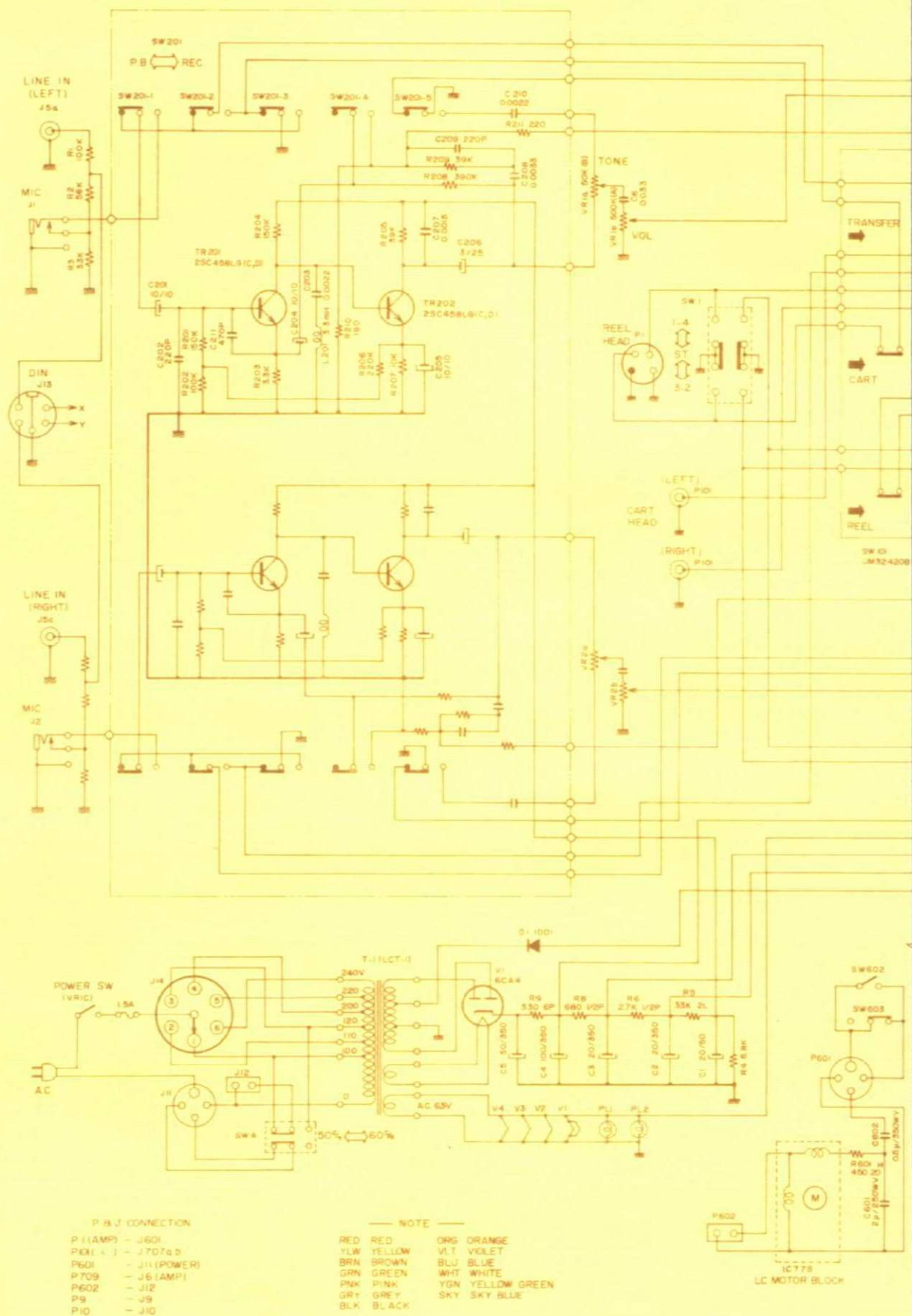


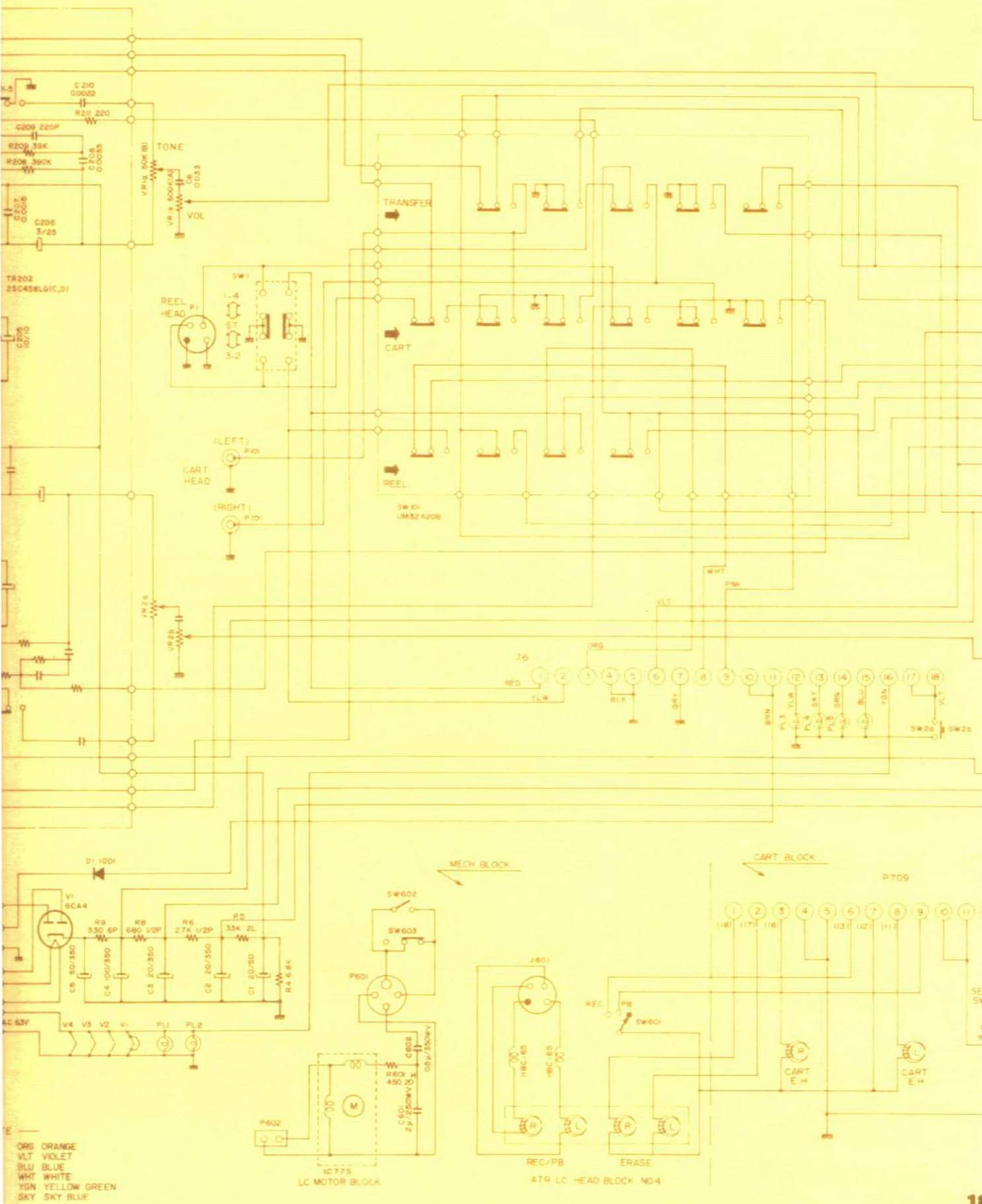
Wow and flutter. Irregular
tape movement.



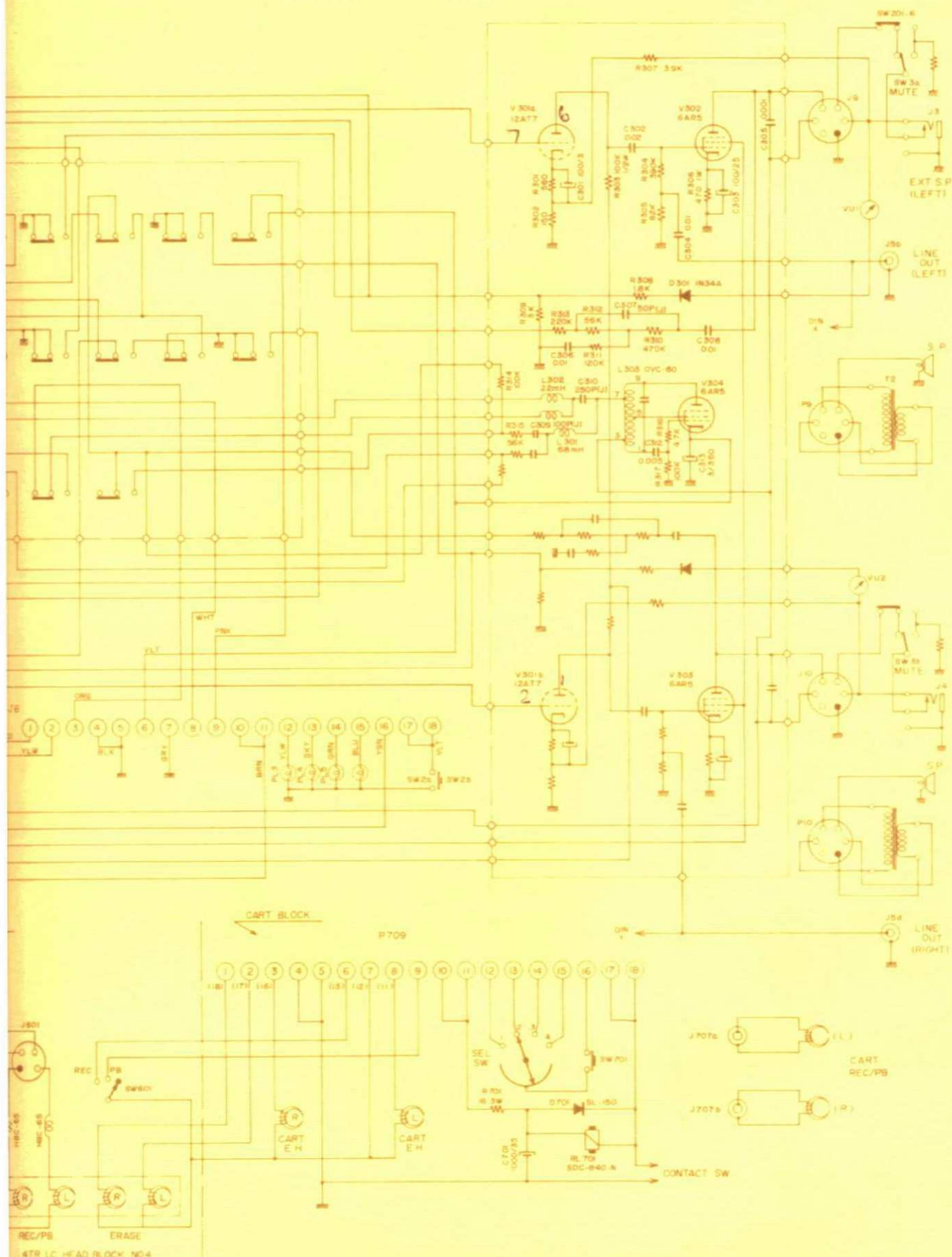


1800L





ORG ORANGE
 VLT VIOLET
 BLU BLUE
 WHT WHITE
 YGN YELLOW GREEN
 SKY SKY BLUE



1800L SCHEMATIC 13624262