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Nakamichi

# Service Manual

*Donald Sangster c/r*

Thames Environmental Consultancy

P.O. Box 1  
THAMES  
Ph. 07 868-3079

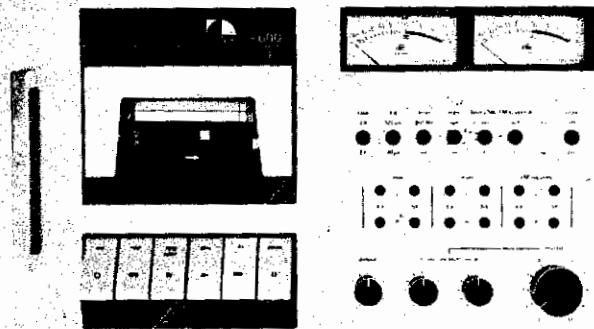
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# Nakamichi 600

Number 3843488

## 2Head Cassette Console



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1. GENERAL

Nakamichi 600 control functions are shown with reference to the following explanations.

For keeping the optimum performance of Nakamichi 600, maintenance such as cleaning of head, capstan shaft and pressure roller, and demagnetization of heads, lubrication, etc. is required.

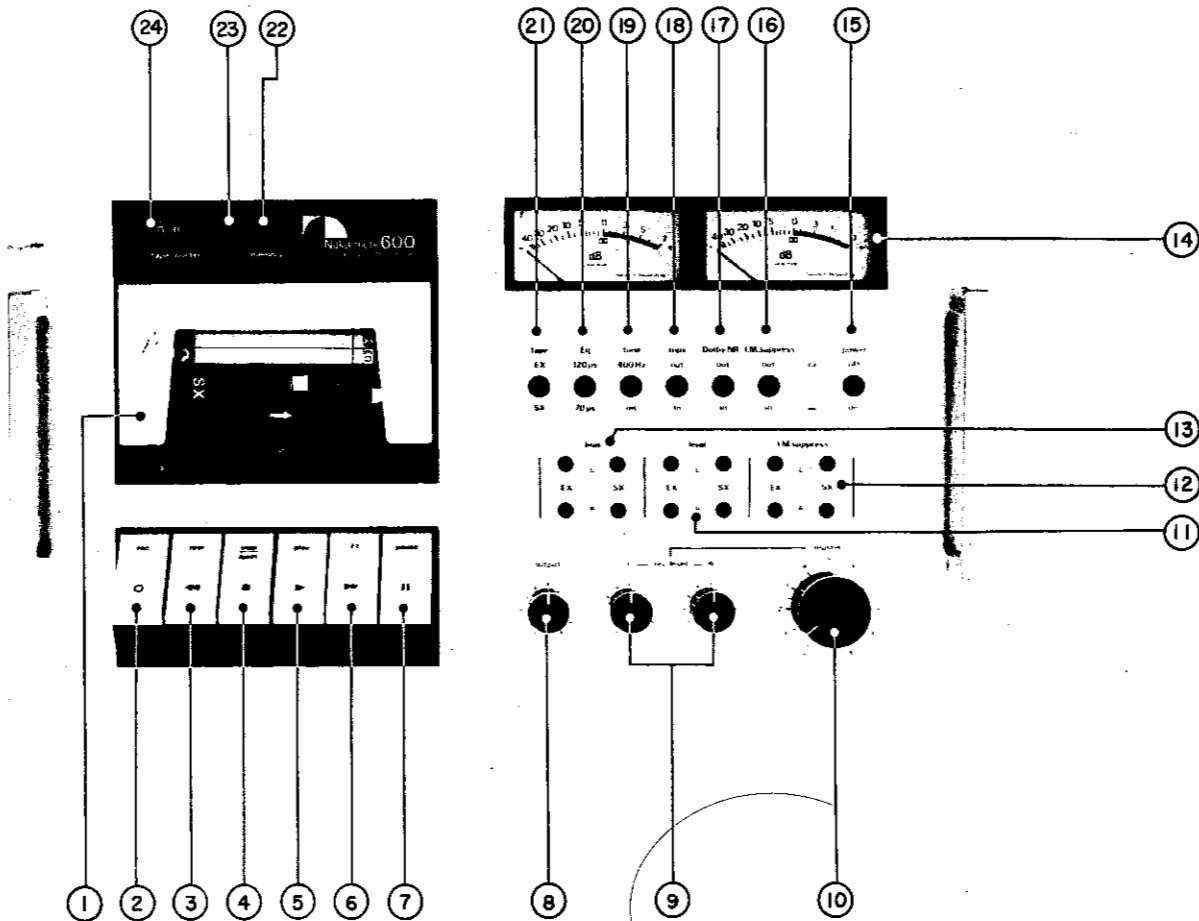


Fig. 1. 1 Front View

- |                                  |                               |
|----------------------------------|-------------------------------|
| 1. Cassette Lid                  | 15. Power Switch              |
| 2. Record Button                 | 16. I.M. Suppress Switch      |
| 3. Rewind Button                 | 17. Dolby NR Switch           |
| 4. Stop/Eject Button             | 18. MPX Switch                |
| 5. Playback Button               | 19. Tone Switch               |
| 6. Fast Forward Button           | 20. Eq. Switch                |
| 7. Pause Button                  | 21. Tape Switch               |
| 8. Output Level Control          | 22. Tape Start Memory Switch  |
| 9. Input Level Controls (L/R)    | 23. Tape Counter Reset Button |
| 10. Input Level Control (Master) | 24. Tape Counter              |
| 11. Record Level Cal. Volume     | 25. Line Input Jacks          |
| 12. I.M. Suppress Cal. Volume    | 26. DIN Socket                |
| 13. Bias Adj. Volume             | 27. Line Output Jacks         |
| 14. Peak Level Meter             | 28. Voltage Selector          |

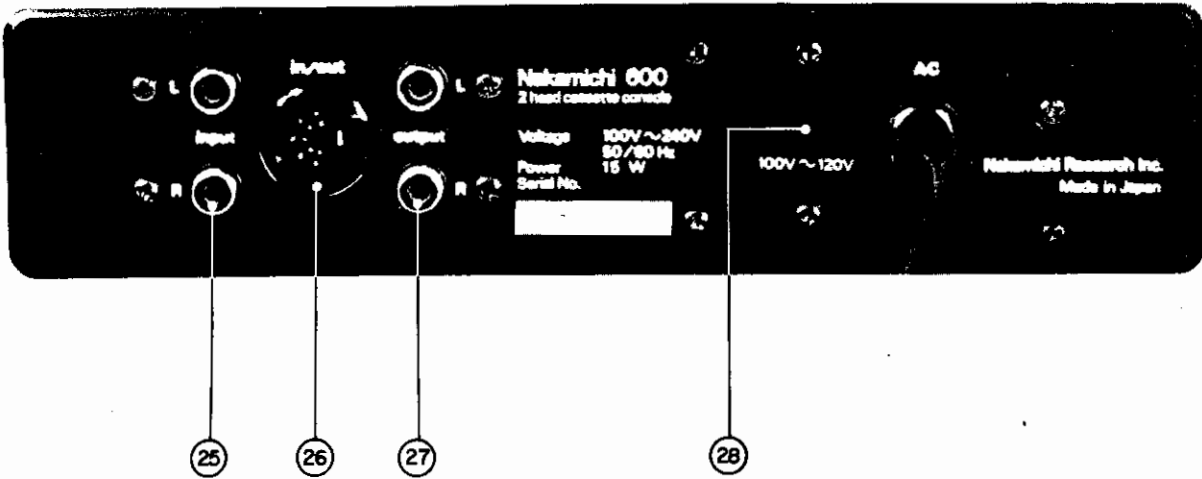


Fig. 1.2 Rear View

**Voltage Selector**

Change-over either to 100 ~ 120V or 220V ~ 240V.

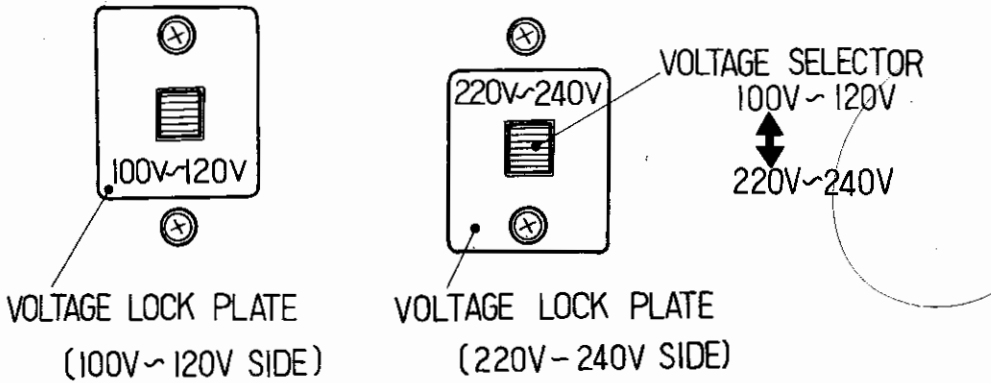


Fig. 1.3

**Note 1:** When cassette lid is opened, no control button operates.

**Note 2:** When mechanism ass'y is reassembled, check to insure whether the record link ass'y (see Fig. 9.2.2) is fixed to the correct position, i.e. when record button is depressed (cassette is loaded), record link acts.

**Note 3:** When memory counter indicates "000" to "010" memory rewind stop function (stops at "999") does not operate because of lacking in the electric charge for the capacitor (Shut-off P.C.B.) which will conduct to drive the solenoid.

**Note 4:** Dolby NR under license from Dolby Laboratories Inc. The word "DOLBY NR" and the Double-D-Symbol are trademarks of Dolby Laboratories Inc.

## 2. PRINCIPLE OF OPERATION

### 2.1. P.B. Eq. Amp. Circuit

Fig. 2.1.1 shows the playback equalizer circuit, and Fig. 2.1.2 is its system diagram. Fig. 2.1.3 shows the time constant of equalizer. The playback head is connected with circuit's input.

Amplifier 1 (Q101 and Q102) is an equalizer amplifier and its time constant is illustrated in Fig. 2.1.3.

R, L and C compose a peaking circuit. This circuit compensates the air gap loss of the playback head so that high-frequency response may be improved.

Phase shifter acts to compensate the phase delay characteristics of the frequency response. Phase delay characteristics are improved within 30 degrees up to 10KHz. Therefore modulation for the complex wave will reduce.

P.B. Eq. Amp. gain is adjusted by semi-fixed volume VR101 (Amp. 2-Q104, 105) to obtain 580mV output level when 400Hz P.B. Reference Tape (DA09005A) is being played back.

I.M. Suppressor circuit (Intermodulation Suppressor) is located between Amp 2 and Amp 3 (Q106), and circuit is connected with front panel I.M. Suppress "In" and disconnected from "Out". Refer to the item 2.2, I.M. Suppressor circuit.

Equalizer switch (70μ/120μ) is connected with Amp 3.

The overall time constants in P.B. Eq. Amp. are as follows:

Eq. SW. — 70μs  
3180μ (50Hz) + 70μ (2275Hz)

Eq. SW. — 120μs  
3180μ (50Hz) + 120μ (1326Hz)

Shown below is the table for the position of tape switch and Eq. switch.

| Tape SW. | Eq. SW. | Tape  |
|----------|---------|---|
| SX       | 70μ     | Nakamichi SX<br>TDK SA                          |
| EX       | 120μ    | Low-Noise High-Density<br>(Including EX, EX II) |
| EX       | 70μ     | Nakamichi EX, EX II                             |

When 70μ is selected at EX tape position, signal to noise ratio will be improved by 4.7dB (WTD).

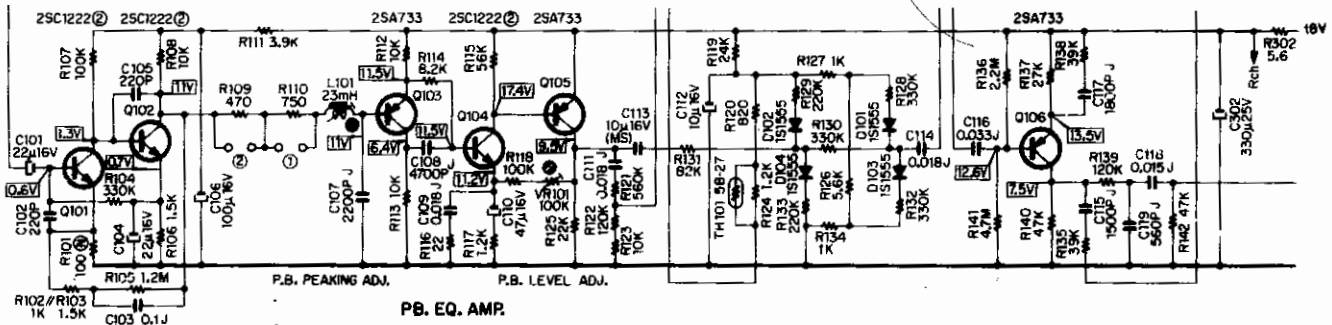


Fig. 2. 1. 1 P.B. Eq. Amp. Circuit

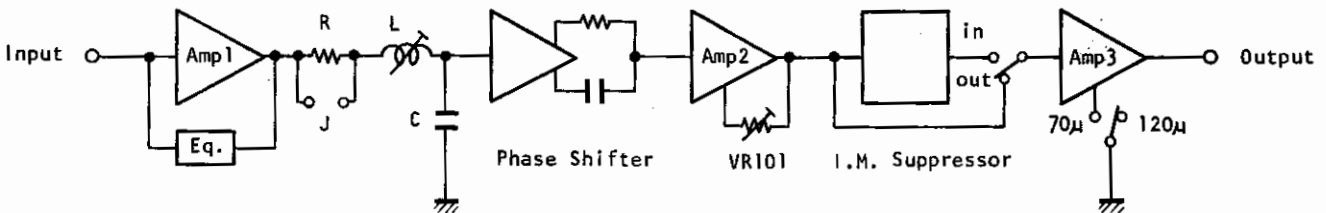


Fig. 2. 1. 2 P.B. Eq. Amp. System Diagram

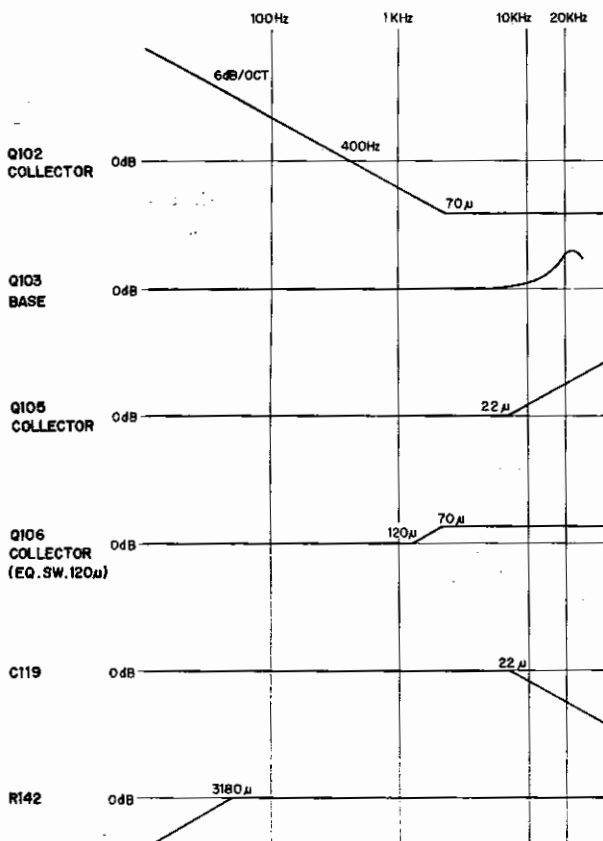


Fig. 2. 1. 3 P.B. Eq. Amp. Time Constant

## 2.2. I. M. Suppressor

Fig. 2.2.1 shows the input vs. output characteristics at 400Hz of Nakamichi 600.

While input level is small, output level is in proportion to input level. But when input level exceeds a certain point, output will not be in proportion to input but has a tendency to saturate (curve A) because of disadvantages due to the magnetic properties of tape.

I.M. Suppressor (Intermodulation Suppressor), while playing back playback amp. gain is compensated as shown by curve B so that overall characteristics becomes curve C. Curve C allows recording at higher levels than normally possible by reducing the saturation and distortion.

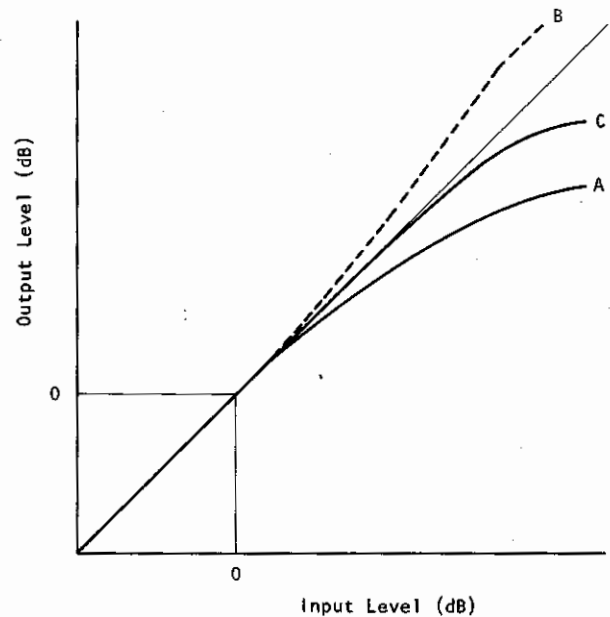


Fig. 2. 2. 1 I.M. Suppressor Input vs. Output Characteristics

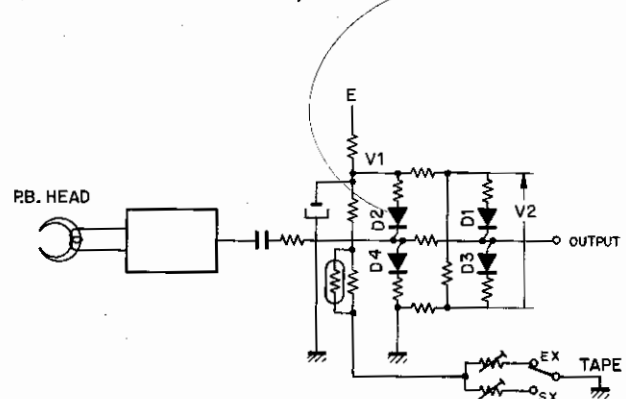


Fig. 2. 2. 2 I.M. Suppressor Circuit

I.M. Suppressor circuit is shown in Fig. 2.2.2.

Circuit consists of resistors and diodes which are composed attenuator, and semi-fixed volume which determines the I.M. Suppressor action level.

The voltage (V1) is adjusted by semi-fixed volume to obtain minimum reading of total harmonic distortion at 400Hz 0dB for the tape to be used.

While input signal level is small, diodes D1 to D4 are On and static operating point level of the output signal is  $V1/2$ . When input signal exceeds  $V2/2$ , D1 and D3 are cut off. Accordingly attenuation decreases, i.e. gain increases. In case input signal exceeds  $V1/2$ , D2 and D4 are also cut off.

Diodes D1 to D4 act as variable resistors until it is cut off, because it is used at small electric current. And resistance varies according to the value of the applied voltage to the diode.

## 2.3. Unattended Record or Playback, and Shut-off Circuit

### 2.3.1. Unattended Record or Playback

- (1) Depress the record button then depress the play button (Depress only the play button for unattended playback).
- (2) Depress the pause button.
- (3) Turn Off the external power source.
- (4) When external power turns On, approximately 4 seconds after the transport will automatically release itself from the pause mode and begin to record (or play).

### 2.3.2. Shut-off Circuit

Fig. 2.3.1 and 2.3.2 show the shut-off circuit and timing chart. Fig. 2.3.3 shows the flow chart for the shut-off function.

Following are explanations according to the order of the flow chart Nos.:

#### (1) External Power On

When external power is turned On at attended record or playback mode, transistor Q606 turns to On approximately 4 seconds later. By the Q606 On, differentiated positive pulse is added to the Q602 base through capacitor C607.

Then Q602 turns to On and Q601 base current flows. Q601 turns to On and base current of the Q602 is supplied through Q601.

Therefore Q602 and Q601 construct memory circuit when trigger is added to the Q601 base.

When Q601 turns to On solenoid is driven through the charge of C606 (2200 $\mu$ F).

As resistance of the solenoid is about 12 ohm, an electric charge of C606 is discharged quickly while C606 is charging through resistor R615 (470 ohm). And about 70 msec after the voltage of Q601 collector becomes less than about 1.2V, then enough base current does not flow to the Q602 and therefore Q602 turns to Off and Q601 turns to Off.

C606 starts charging again preparing for the next solenoid drive.

From the above, solenoid works as a pulse motion. Solenoid action will release the pause button.

#### (2) Tape End

At a tape end, magnet pulley which is assembled with tape counter stops and therefore reed switch On/Off stops. Therefore the discharge of the C604 through Q604 (synchronizing with the periodic reed switch On/Off) stops. While C604 is kept to charge about by 4.5V, Q603 turns to On and Q601 turns to On.

The action of the solenoid is the same as item (1). Solenoid acts to release the play, record, FF and REW buttons (therefore start switch will open).

#### (3) Stop Button Depressing

When stop button is depressed, play, record, FF and REW buttons are released mechanically.

#### (4) Power Off

DC power supply (+18V) will discharge by the power switch off. While the C606 time constant is great, Q605 turns to On then Q603 turns to On then Q601 turns to On.

Solenoid is driven and control buttons are released.

In case pause button is depressing, solenoid does not work because Q603 base is connected to ground through pause button, and no control button is released.

#### (5) Memory Rewind

When the tape counter reaches "999" counter switch closes. At memory switch On and rewind mode, the differentiated negative trigger pulse is added to the Q601 base and Q601 turns to On. And solenoid is driven.



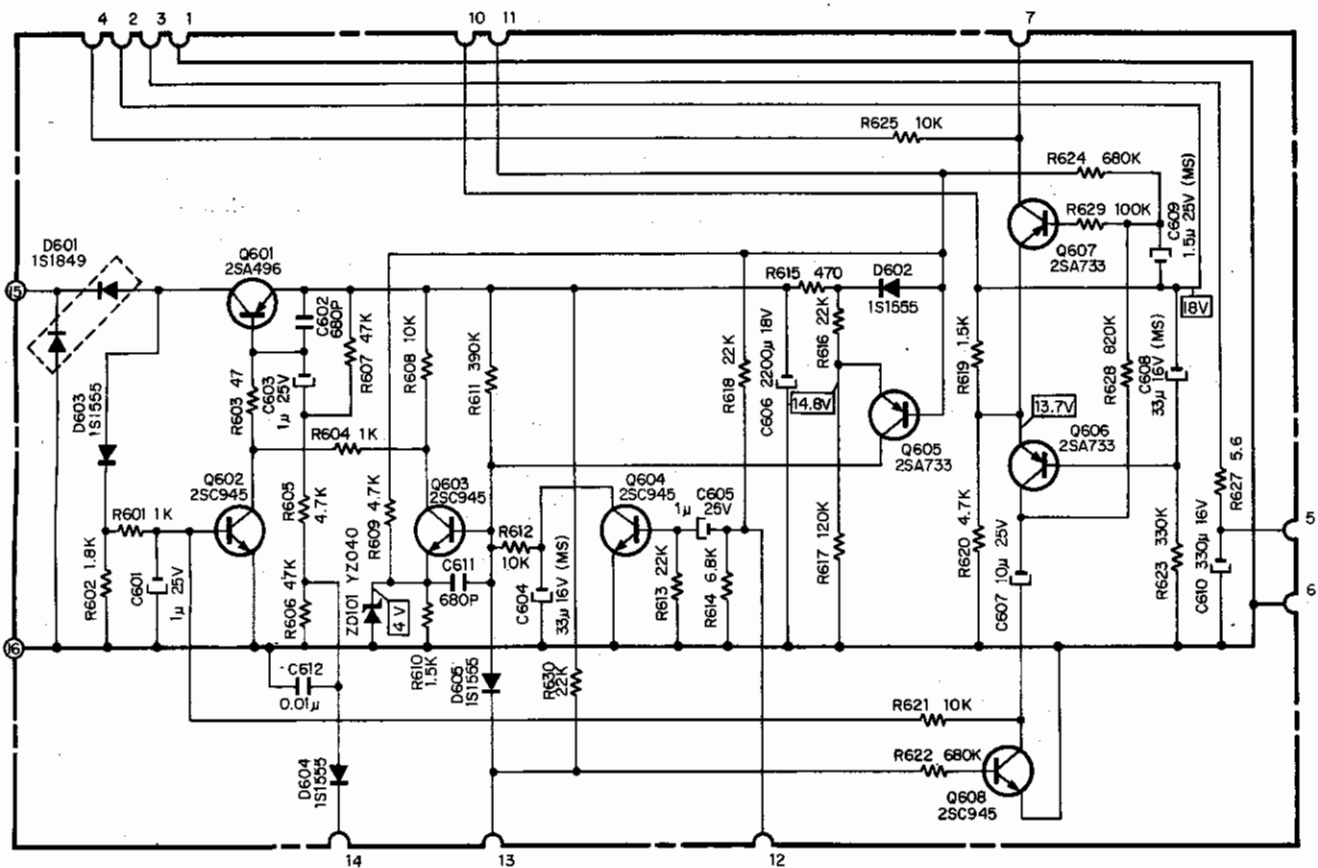


Fig. 2. 3. 1 Shut-off Circuit

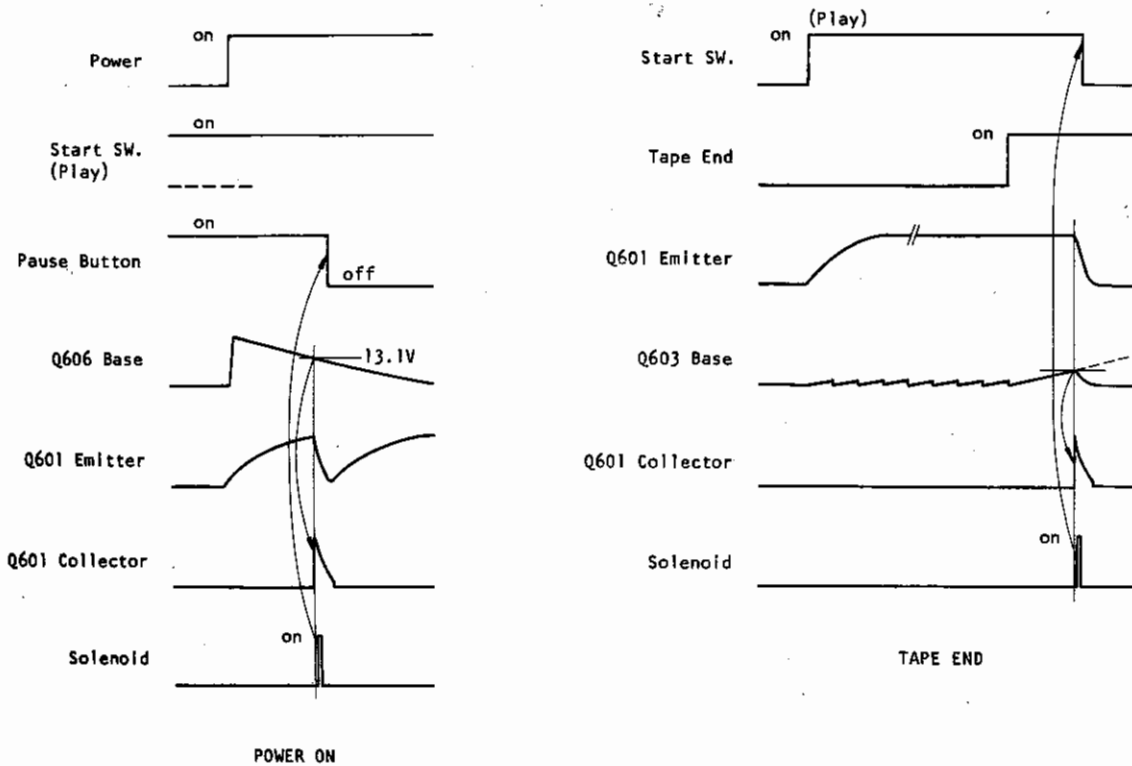


Fig. 2. 3. 2 Shut-off Timing Chart

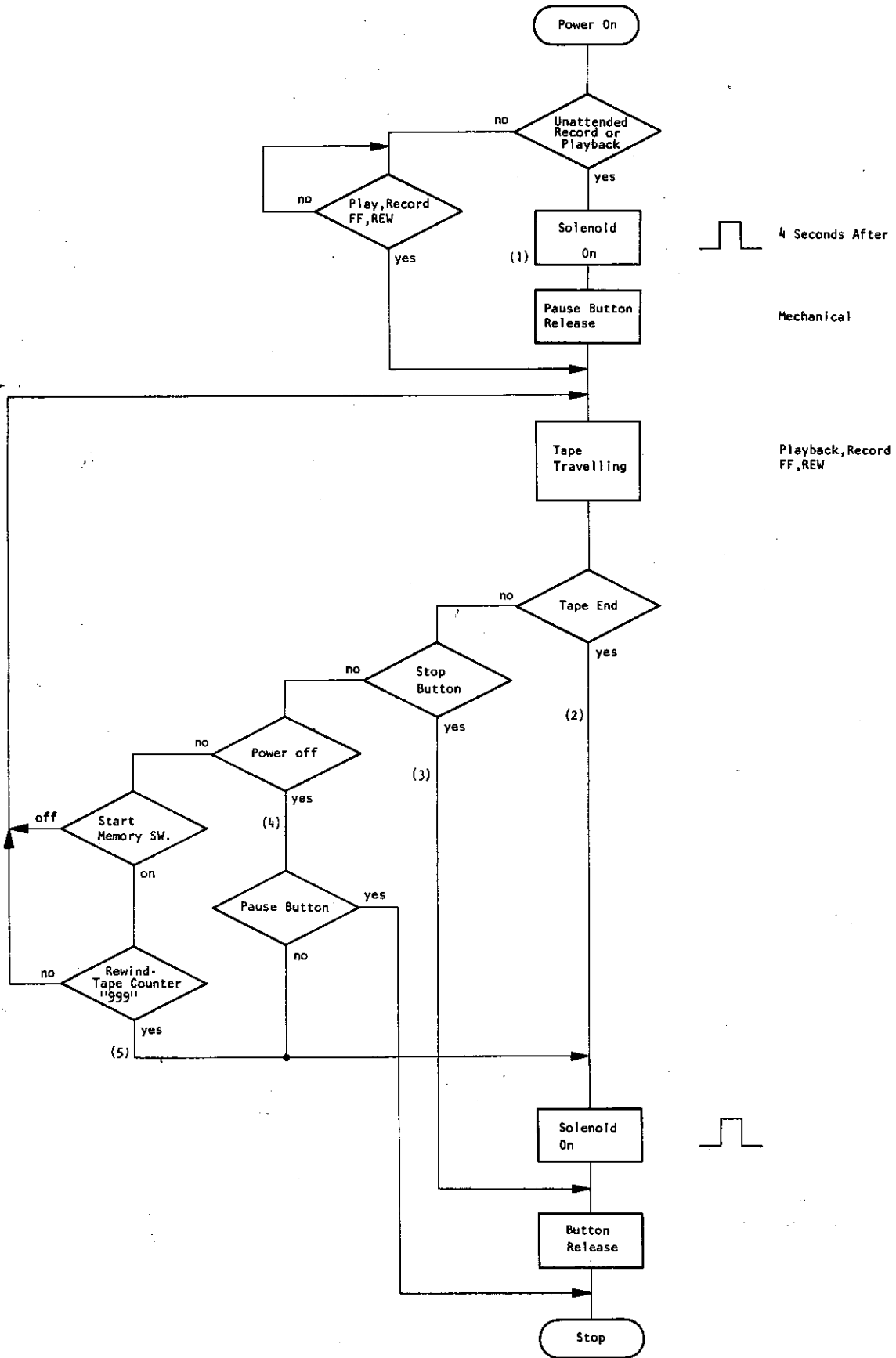


Fig. 2. 3. 3 Shut-off Flow Chart

### 3. REMOVAL PROCEDURES

#### 3.1. Cabinet

Refer to the Fig. 9.1 (A01) and remove (F01) (five spots).

#### 3.2. Front Panel

Refer to the Fig. 9.1 (A01) and remove (F01) through (F06).

#### 3.3. Mechanism Ass'y

Remove the cabinet and front panel (3.1, 3.2).

Refer to the Fig. 9.2.1 (A02-1) and remove (F01) through (F03).

#### 3.4. Record/Playback Head, Erase Head and Pressure Roller

Remove the cabinet and front panel (3.1, 3.2).

Then depress the play button.

Refer to the Fig. 3.1.

##### 3.4.1. Record/Playback Head

Remove (F02) through (F04).

##### 3.4.2. Erase Head

Remove (F05) through (F08).

##### 3.4.3. Pressure Roller

Remove (F01).

**Note:** When record/playback head is replaced, twist the signal wires (red and white) which are soldered to head terminals for reducing the influence of hum.

#### 3.5. Cassette Case Ass'y

Remove the mechanism ass'y (3.3).

Refer to the Fig. 3.2 and remove (F01) through (F07).

Remove (F04) and (F05) by pincers with care.

#### 3.6. Cassette Lid Ass'y

Remove the cassette case ass'y (3.5).

Refer to the Fig. 3.2 and remove (F08) through (F12). (F13), lid cover is bonded to (F12).

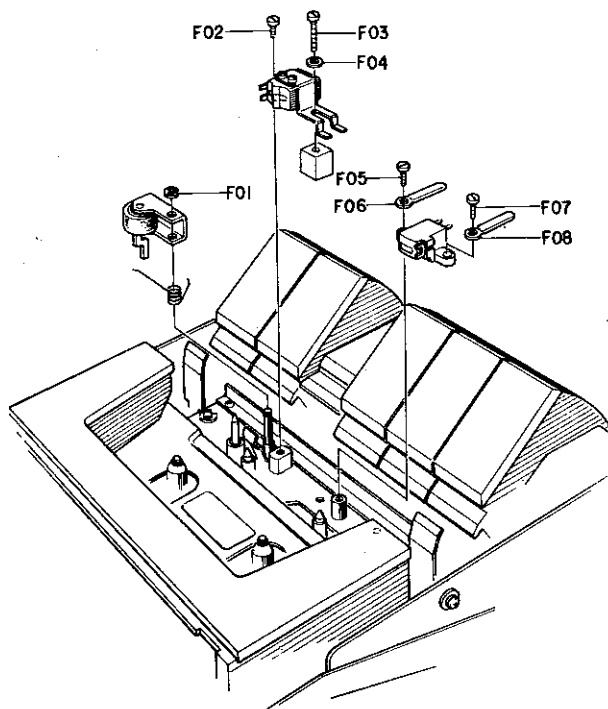


Fig. 3.1

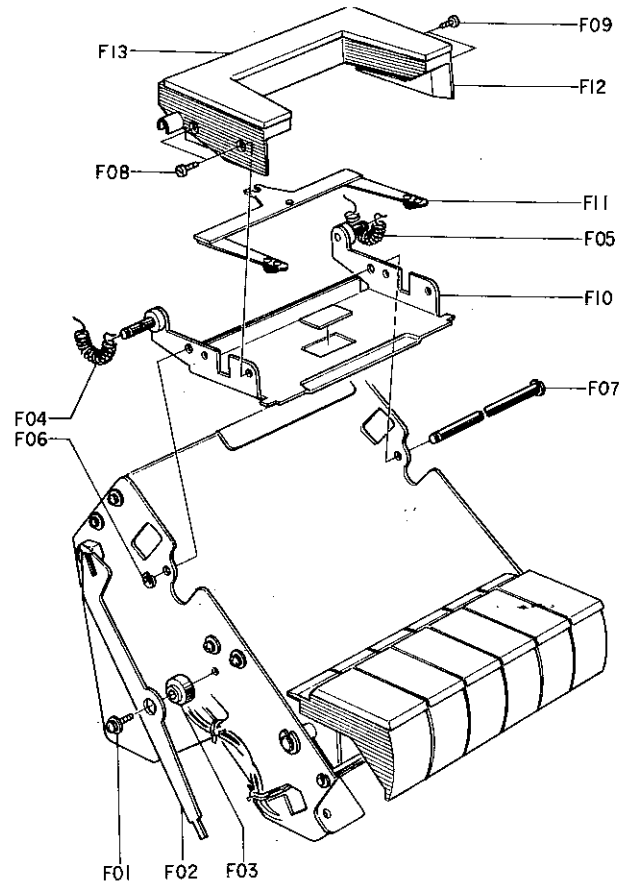


Fig. 3.2

**3.7. Control Button**

Remove the mechanism ass'y (3.3).

Refer to the Fig. 3.3 and remove (F01) through (F05).

Note: Following are assembled in pair.

F06-F07, F08-F09, F10-F11, F13-F14, F15-F16

**3.8. Counter Holder Ass'y**

Remove the front panel (3.2).

Refer to the Fig. 3.4 and remove (F01).

Remove (F02) through (F06) then counter ass'y and memory switch, and reed switch will be removed.

Note: The reed switch terminal shall not be in contact with the chassis.

**3.9. Reel Hub Ass'y (Supply, Take-up)**

Remove the cassette case ass'y (3.5).

Refer to the Fig. 3.5 and remove (F01) and (F02).

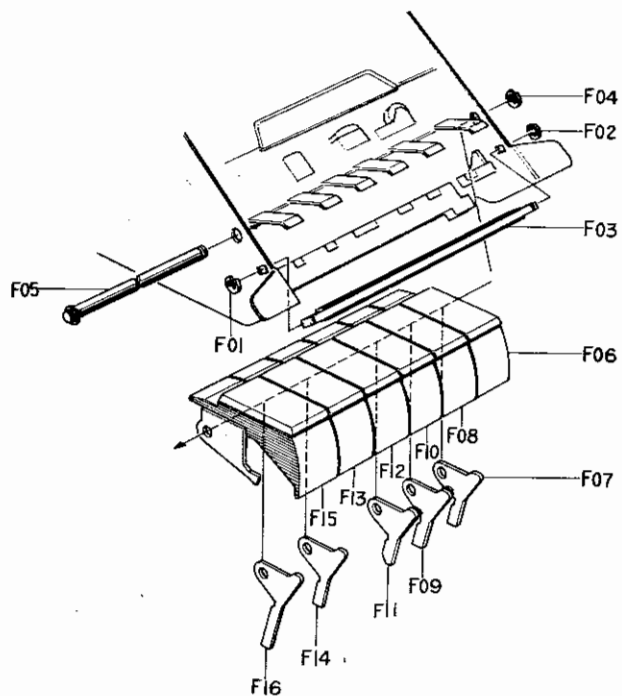


Fig. 3.3

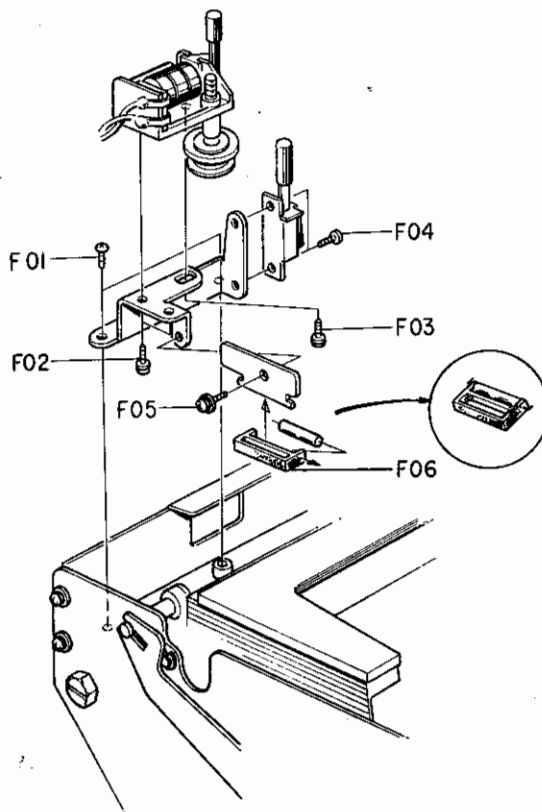


Fig. 3.4

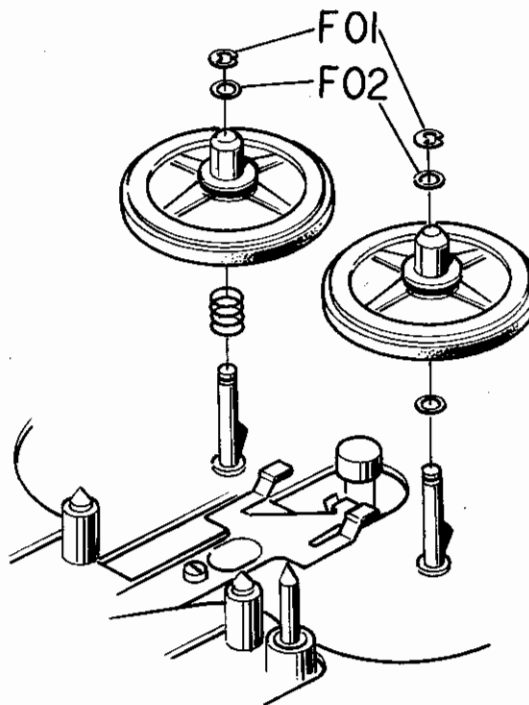


Fig. 3.5

### 3.10. Motor and Motor Governor Ass'y

Remove the mechanism ass'y (3.3).

Refer to the Fig. 3.6 and remove (F01) then move the solenoid.

Remove (F02) through (F08) so that governor ass'y is removed.

Remove (F09) and lift the motor then remove (F10) and (F11).

Then loosen (F12) and remove (F13) so that motor is removed.

Note: Readjustment of solenoid position, belt travelling, tape speed and wow/flutter will be required.

### 3.11. Flywheel

Remove the mechanism ass'y (3.3).

Refer to the Fig. 3.7 and remove (F01) through (F05) then remove the belt and flywheel (F06).

Note: Readjust the clearance between flywheel and flywheel holder. Belt travelling, tape speed and wow/flutter check will be required.

### 3.12. Idler Pulley

Remove the Flywheel (3.11). Refer to the Fig. 3.7 and remove (F07) through (F09).

Note: Readjust the brake timing. Belt travelling, tape speed and wow/flutter check will be required.

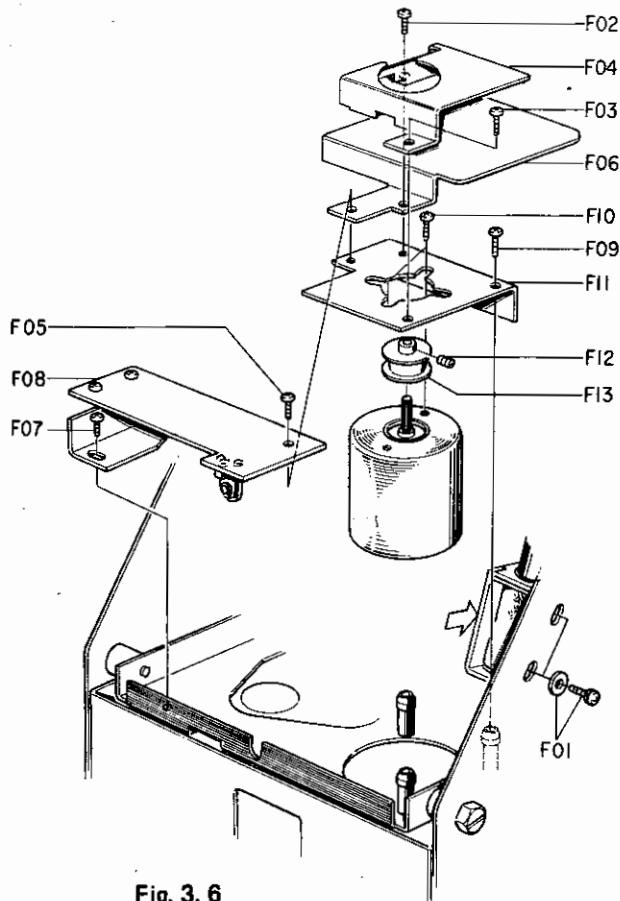


Fig. 3.6

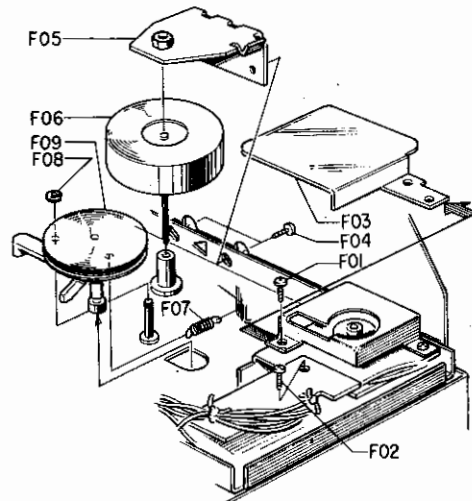


Fig. 3.7

### 3.13. Front Control Ass'y

Remove the cabinet and front panel (3.1, 3.2).

Refer to the Fig. 9.2.1 (A02-1) and remove (F05).

### 3.14. Main P.C.B. Ass'y

Remove the front control ass'y (3.13).

Refer to the Fig. 9.2.2 (A02-2) and remove (F01) through (F04).

Remove (F05), main P.C.B. ass'y.

### 3.15. Dolby P.C.B. Ass'y

Remove the main P.C.B. ass'y (3.14).

Unplug the Dolby P.C.B. (F06) from the main P.C.B.

### 3.16. Record Link Ass'y

Remove the main P.C.B. ass'y (3.14).

Refer to the Fig. 9.2.2 (A02-2) and remove (F12) and (F13).

### 3.17. VR P.C.B. Ass'y

Remove the cabinet and front panel (3.1, 3.2).

Refer to the Fig. 9.2.1 (A02-1) and remove (F07) through (F09).

### 3.18. Meter Ass'y

Remove the cabinet and front panel (3.1, 3.2).

Refer to the Fig. 9.2.2 (A02-2) and remove the (F07) and (F08).

### 3.19. Power Supply P.C.B. Ass'y

Remove the cabinet (3.1).

Refer to the Fig. 9.2.2 (A02-2) and remove (F21) through (F23).

### 3.20. Power Switch Ass'y

Remove the main P.C.B. (3.14).

Refer to the Fig. 9.2.2 (A02-2) and remove (F09) through (F11).

## 4. MEASUREMENT AND MAINTENANCE INSTRUMENTS

### 4.1. Measurement Instruments

- (1) Audio Generator (20Hz – 200KHz)
- (2) AC Milivolt Meter (with dB measures)
- (3) Oscilloscope (DC – 5MHz)
- (4) Distortion Meter
- (5) Speed & Wow/Flutter Meter
- (6) Frequency Counter (DC – 1MHz)
- (7) Ohm Meter
- (8) DC Volt Meter
- (9) AC Volt Meter
- (10) Tape Travelling Cassette B (part No. DA09027A)
- (11) Torque Gauge (DA09013A)
- (12) 15KHz Azimuth Tape (DA09004A)
- (13) 3KHz Speed & Wow/Flutter Tape (DA09006A)
- (14) 1KHz Track Alignment Tape (DA09007A)
- (15) 400Hz Level Tape (DA09005A)
- (16) 20KHz P.B. Frequency Response Tape (DA09001A)
- (17) 15KHz P.B. Frequency Response Tape (DA09002A)
- (18) 10KHz P.B. Frequency Response Tape (DA09003A)
- (19) Reference EXII Tape (DA09021A)
- (20) Reference SX Tape (DA09025A)
- (21) Track Viewer (DA09012A)
- (22) Tape Guide Adjuster (0D09001A)
- (23) Information Terminals, Model M-300  
(For positioning of record/playback head)

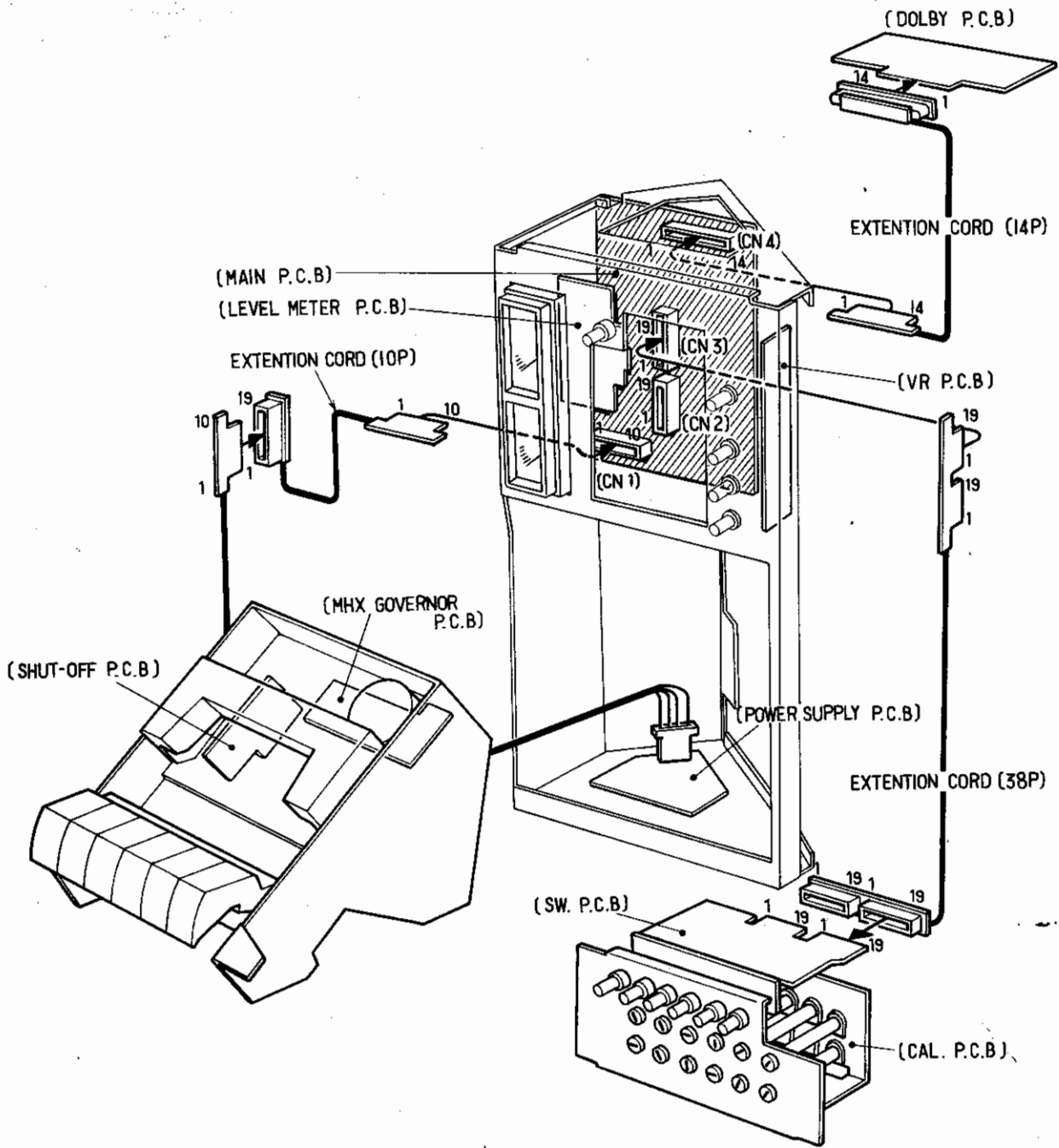
### 4.2. Maintenance Instruments

Refer to the Fig. 4.1 Extension Cord Connection.

- (1) Extension cord (10p) (part No. DA09020A)
- (2) Extension cord (14p) (DA09016A)
- (3) Extension cord (38p) (DA09026A)

Note: Refer to the item 3 "Removal Procedures".

When a check is made on Amp. etc. by means of an extension cord, re-adjustment shall be made without fail (after final installation to the model chassis). The check without removal of an extension cord will cause inaccurate adjustments.



PERSPECTIVE VIEW

Fig. 4 Extension Cord Connection

## 5. MECHANICAL ADJUSTMENTS

### 5.1. Take-up Torque and Rewind Torque Adjustment

To adjust torque, move torque plate as shown in the Fig. 5.1. The take-up torque should be  $45 \pm 10$ g-cm and rewind torque should be 35 to 60g-cm.

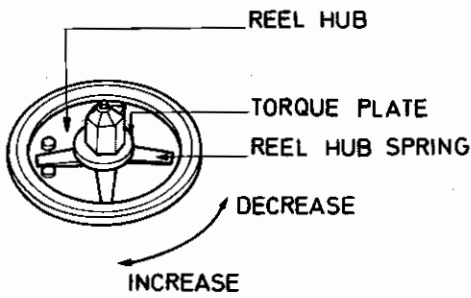


Fig. 5. 1

### 5.2. Tape Speed Adjustment

- (1) Connect a frequency counter to the output jack.
- (2) Load the 3KHz Speed Wow Flutter Tape (DA-09006A) and play it back.
- (3) Adjust the tape speed adjust potentiometer. See Fig. 5.2.

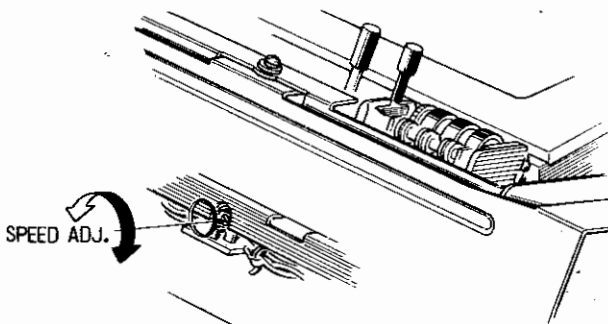


Fig. 5. 2

### 5.3. Record/Playback Head Height Adjustment and Azimuth Alignment

See Fig. 5.3.

- (1) Load the Track Viwer (DA09012A) and check the positions of record/playback head. Check to insure that the L-R center of head coincides in position with the middle point between two lines (0.3mm distance) on the track viwer.
- (2) If the L-R center deviates from the middle point over 0.2mm. Correct the deviation by adding a head height spacer as illustrated in the item 9.18 (B09).
- (3) Connect a VTVM to output jacks.
- (4) Load the 1KHz Track Alignment Tape (DA09007A). Insert the Tape Guide Adjuster (OD09001A) into each hole of the tape guide beside the head. Adjust the jig for minimizing each output signal of the right and left channels.

- (5) Load the 15KHz Azimuth Tape (DA09004A). Adjust the azimuth alignment screw for maximizing each output signal of the right and left channels. After completion of the adjustment in this step, check the head height as directed in Step (4).

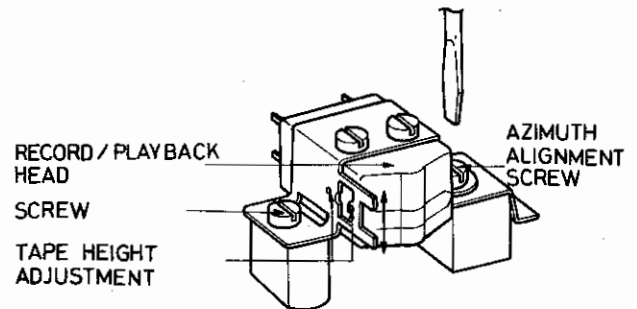


Fig. 5. 3

### 5.4. Head Base Stroke Adjustment

- (1) Remove the mechanism ass'y referring to the item 3.3, mechanism ass'y removal procedure.
- (2) Adjust the height of head base stroke adjustment plate as illustrated in Fig. 5.4 (Height Adj.).
- (3) Load the "INFORMATION TERMINALS M-300" jig for positioning the record/playback head, pushing backward to eliminate the clearance between reference pin and jig.
- (4) Depress the play button and check to insure whether the positioning of the head is within the specified tolerance. If not, adjust the head base stroke adjustment plate from the bottom side at stop mode. See Fig. 5.4 (Stroke Adj.).

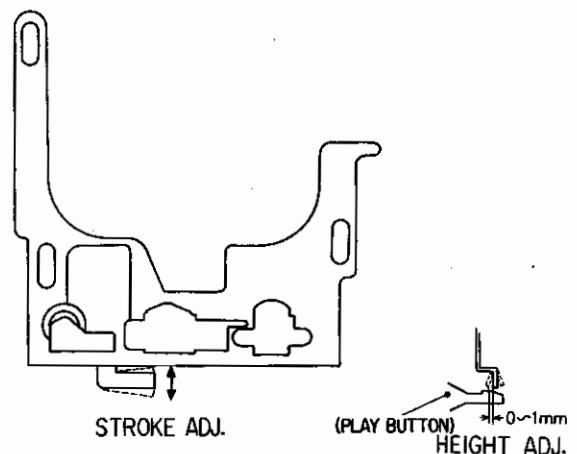


Fig. 5. 4



**5.5. Pause Timing Adjustment**

This adjustment is required for avoiding the tape spill or tape skip by the inaccurate pause timing.

See Fig. 5.5.

- (1) Set to the playback mode without loading the cassette tape.
- (2) Depressing the pause button gradually, check to insure the gap between pressure roller and capstan shaft which will be approximately 0.1mm when take-up pulley stops rotation because of changing mode from playback to pause.
- (3) In case above is not sufficient, remove the record link ass'y referring to the item 3.16, record link ass'y removal procedure. And adjust the pressure roller as illustrated in the figure.

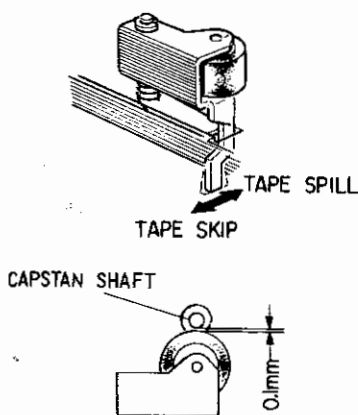


Fig. 5.5

**5.6. Belt Travelling Adjustment**

Refer to the Fig. 5.6 and item 3.10, motor and motor governor ass'y removal procedure.

- (1) Adjust the motor pulley position and check to insure whether the drive belt is travelling along the correct position and the staying at the correct position, i.e. the center part of motor pulley and the idler pulley without contacting the belt guide at the following modes:  
Playback, FF, REW, FF to Stop, REW to Stop
- (2) In case motor pulley is tilting, insert spacers into the A, B (when belt slips upward on the motor pulley) or C (when belt slips downward).

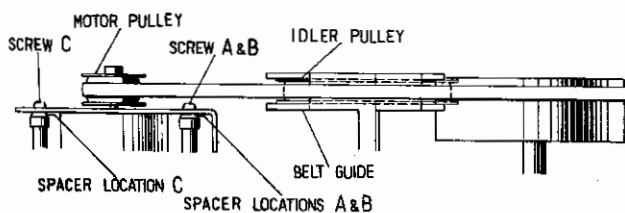


Fig. 5.6

**5.7. Flywheel Adjustment**

Refer to the Fig. 5.7 and item 3.1, cabinet removal procedure. Adjust the flywheel clearances should be 0.05 to 0.1mm. After adjustment lock the lock nut.

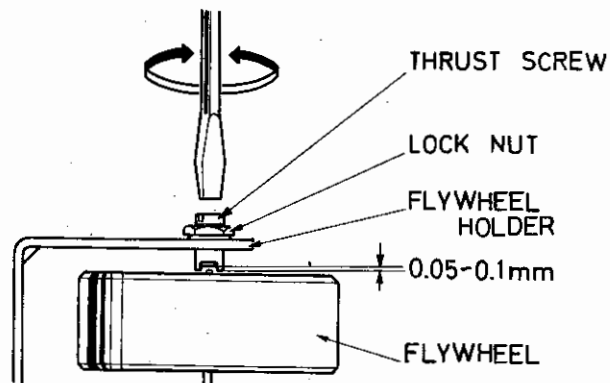


Fig. 5.7

**5.8. Brake Timing Adjustment**

Remove the cassette case referring to the item 3.5, cassette case ass'y removal procedure.

Refer to the Fig. 5.8.

Loosen screw A, and adjust the contact point between idler pulley and brake to meet each other when control button is depressed and mode is changed from FF to Stop, REW to Stop and Play to Stop.

Fasten screw A and check to insure the gap between idler pulley and brake is approximately within 0.2mm.

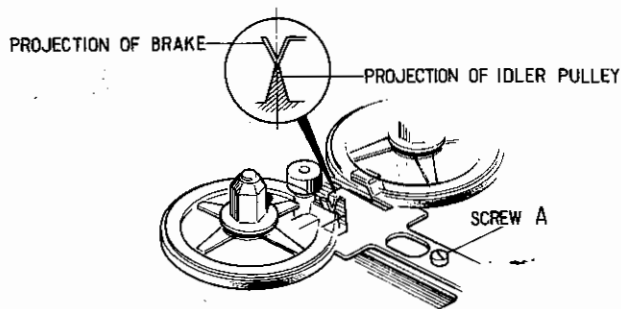


Fig. 5.8

**5.9. Mute SW. and Start SW. Timing Adjustment**

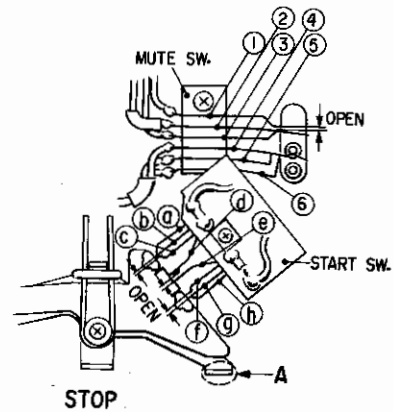
See Fig. 5.9. Following are each stage of status from stop mode to play mode. Adjust (bend) each transfer to obtain accurate movement.

Item 5.4, head stroke adjustment has to be performed prior to this adjustment.

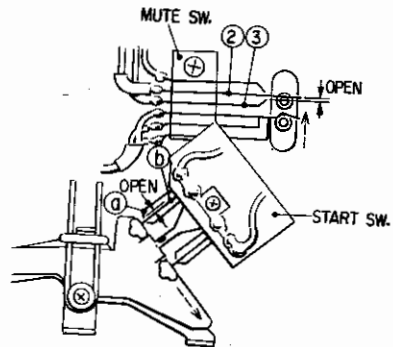
- (1) Stop  
Mute SW. transfer 1-2 is open and start SW. transfers b-c, f-g and d-e are open. Others are close.
- (2) Play Button Depressing Start  
Mute SW. transfer 2-3 opens then start SW. transfer a-b will open.
- (3) In the Course of Depressing  
Mute SW. transfer 1-2 closes then start SW. transfers b-c and d-e will close.
- (4) Depressing End  
Mute SW. transfer 5, 6 will open from 4 simultaneously.  
Check to insure the gap between 5, 6 and 4 is more than 0.5mm.
- (5) At stop mode, check to insure the mute SW. transfer 2-3 touches sufficiently.
- (6) Depress the rewind button and check to insure start SW. transfers a-b, d-e and f-g touch sufficiently.  
If not, at stop mode bend the A in the figure and adjust the stroke.

**5.10. Solenoid Position Adjustment**

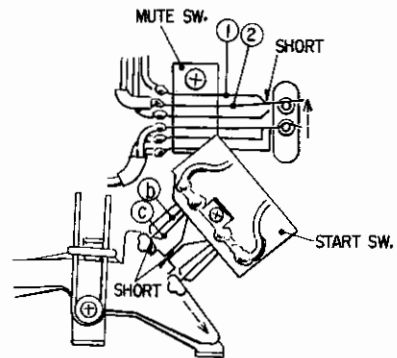
- (1) Remove the mechanism ass'y referring to the item 3.3, mechanism ass'y removal procedure. See Fig. 5.10.
- (2) Loosen the screw a little and move the solenoid in the A direction.
- (3) Depress the play button.
- (4) Holding the solenoid as shown in the figure, slide the solenoid gradually by a flat screw driver in the B direction.
- (5) Then play button will release. Move the solenoid approximately 0.1 to 0.3mm from the released point in the B direction. Fasten the solenoid.
- (6) Assemble the mechanism ass'y and turn the power switch on. And check to insure whether the solenoid can be released at the Play, FF, REW and Pause modes.



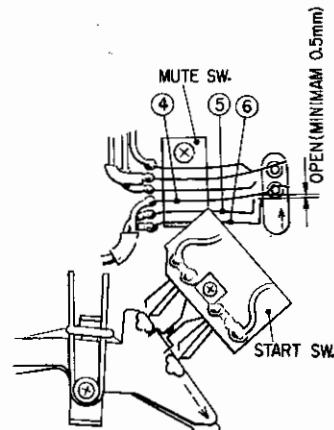
STOP



DEPRESS START



IN THE COURSE OF DEPRESS



DEPRESS END

Fig. 5.9

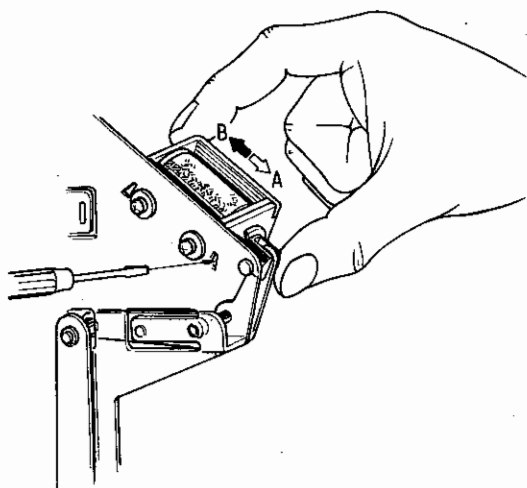


Fig. 5. 10

**5. 11. Record Link Adjustment**

Remove the cabinet referring to the item 3.1, cabinet removal procedure.  
Adjust the record link referring to the Fig. 5.11.

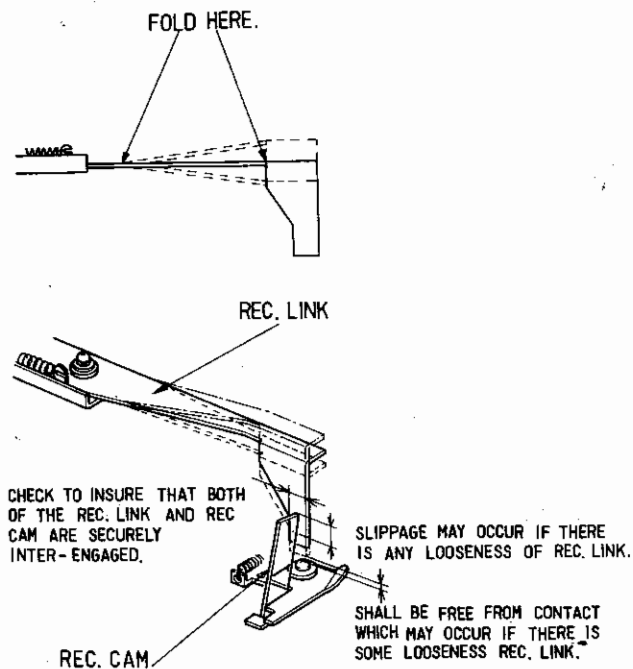


Fig. 5. 11

**5. 12. Lubrication**

After 500 hours of use apply a few drops of light machine oil (LAUNA No. 40) between capstan and capstan bearing. See Fig. 5.12.

After 500 hours of use apply a few drops of light machine oil (LAUNA No. 40) to the pressure roller shaft.

Note: If the lubrication oil is applied also to the capstan shaft and other drive mechanisms, clean it off with an alcohol-dipped cloth.

When flywheel or flywheel holder is replaced apply a few drops of grease to the flywheel holder.

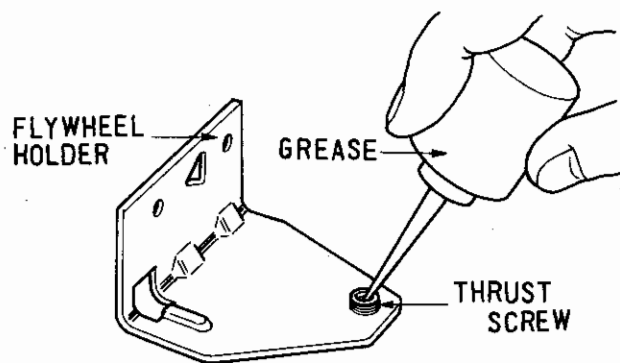
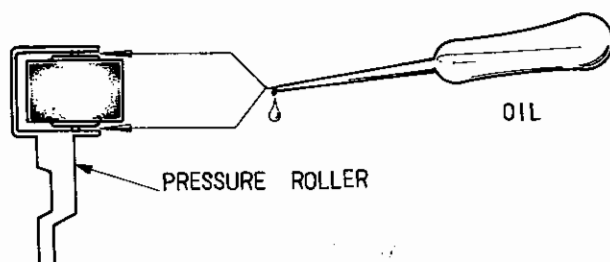
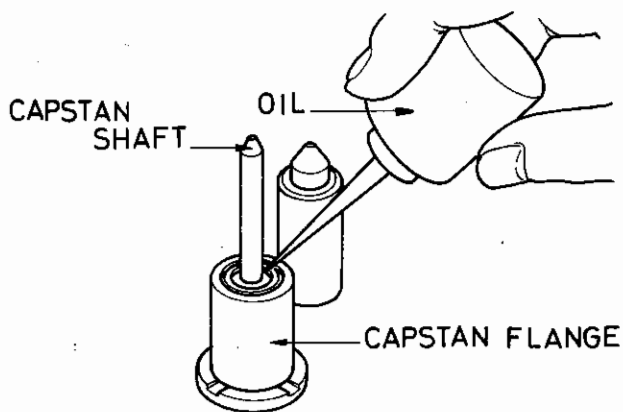


Fig. 5. 12

### 5.13. Tape Travelling Adjustment

Load the Tape Travelling Cassette (DA09027A) and check the following:

- (1) After more than 2 second when depressed play button, the tolerance of the tape travelling fluctuation on the record/playback head shall not be more than 0.1mm.
- (2) Tape is contact with head sufficiently.
- (3) Tape waving is small (on the head and pressure roller).

If tape travelling is not good, re-adjustment of 5.1. "Take-up Torque and Rewind Torque Adjustment", 5.3. "Reocrd/Playback Head Height Adjustment", 5.4. "Head Base Stroke Adjustment" and others will be required.

| STEP | ITEM                            | SIGNAL SOURCE  | OUTPUT CONNECTION                 | MODE  | ADJUSTMENT                             | REMARKS   |
|------|---------------------------------|--|-----------------------------------|---|--|---|
| 1    | Tape Speed                      | 3KHz Speed & Wow/Flutter Tape (DA09006A)   | Frequency Counter to OUTPUT Jacks | Playback  | MHX Motor Governor P.C.B. VR501        | Adjust VR501 to obtain 3KHz $\pm 1.5\%$ .   |
| 2    | Tone Calibration                | 400Hz Test Tone  | VTVM to OUTPUT Jacks              | Record, Pause<br>400Hz Tone SW.-On  | Main P.C.B. VR301                      | 1. Turn on tone SW.<br>2. Turn output level control fully clockwise (maximum position).<br>3. Adjust VR301 to obtain 580mV $\pm 0.3dB$ on the VTVM.<br>Note: If above is not sufficient modification of R150 or R250 on the main P.C.B. will be required.   |
| 3    | Meter Level                     | 400Hz Test Tone  | VTVM to OUTPUT Jacks              | Record, Pause<br>400Hz Tone SW.-On  | Meter P.C.B. VR701, VR702              | Adjust VR701 (VR702) to obtain 0dB on the level meters.   |
| 4    | MPX Filter                      | 19KHz $\pm 100Hz$ to INPUT Jacks   | VTVM to OUTPUT Jacks              | Record Pause<br>MPX SW.-In  | Main P.C.B. L103, L203                 | Adjust the coils to obtain minimum reading on the VTVM.   |
| 5    | Tape Guide Alignment            | 1KHz Track Alignment Tape (DA09007A)   | VTVM to OUTPUT Jacks              | Playback<br>Tape SW.-IX<br>Eq. SW.-70 $\mu$ s<br>Dolby NR/SW.-Out<br>I.M. Suppress SW.-Out<br>MPX SW.-Out | Tape Guide of Record/Playback Head     | Adjust tape guide with Tape Guide Adjuster (DA09001A) to obtain minimum reading of both L and R channels on the VTVM.<br>See item 5.3 "Record/Playback Head Height Adjustment and Azimuth Alignment".   |
| 6    | Playback Head Azimuth Alignment | 15KHz Azimuth Tape (DA09004A)  | VTVM to OUTPUT Jacks              | Same as above   | Azimuth Alignment Screw                | Adjust the azimuth alignment screw to obtain maximum reading of both L and R channels on the VTVM.<br>See item 5.3 "Record/Playback Head Height Adjustment and Azimuth Alignment".  |
| 7    | Playback Level                  | 400Hz Level Tape (DA09005A)  | VTVM to OUTPUT Jacks              | Same as above   | Main P.C.B. VR101, VR201               | Adjust the VR101 (VR201) to obtain 580mV on the VTVM or 0dB on the level meters.  |
| 8    | Adjustment of Hum Balancer      | Blank Tape   | VTVM to OUTPUT Jacks              | Play, Pause<br>Eq. SW.-70 $\mu$ s<br>Dolby NR/SW.-In<br>MPX SW.-In  | Main P.C.B. Hum Balancer (Jumper Wire) | Adjust Hum Balancers to obtain minimum reading of L and R channels on the VTVM.   |
| 9    | Playback Frequency Response     | 400Hz Level Tapes (DA09005A)<br>10KHz P.B. Frequency Response Tapes (DA09003A)<br>15KHz P.B. Frequency Response Tapes (DA09002A)<br>20KHz P.B. Frequency Response Tapes (DA09001A) | VTVM to OUTPUT Jacks              | Playback<br>Tape SW.-IX<br>Eq. SW.-70 $\mu$ s<br>Dolby NR/SW.-Out<br>I.M. Suppress SW.-Out<br>MPX SW.-Out | Main P.C.B. L101, L201                 | 1. Load the 400Hz level tape and play it back. Adjust the output level controls to a certain level (example 0dB).<br>2. Load the 10KHz, 15KHz and 20KHz P.B. frequency response tapes and adjust the playback head azimuth to give maximum levels on the VTVM with each tape.<br>3. Adjust L101, (L201) to obtain the following levels against 400Hz level tape (normally peaking frequency will be adjusted at 23KHz).<br>10KHz tapes $-20dB \pm 3dB$<br>15KHz tapes $-20dB + 3dB, -6dB$<br>20KHz tape<br>4. Conduct step 6 "Playback Head Azimuth Alignment".<br>5. If above is not sufficient refer to the item 6.2.1. "Playback Frequency Response Adjustment". |

Note: When record/playback head is replaced, twist the signal wires (red and white) which are soldered to head terminals for reducing the influence of hum.

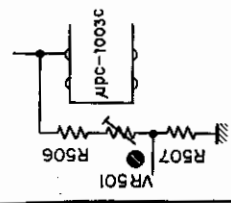


Fig. 6. 1. 1 Tape Speed

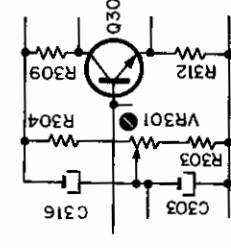


Fig. 6. 1. 2 Tone Calibration

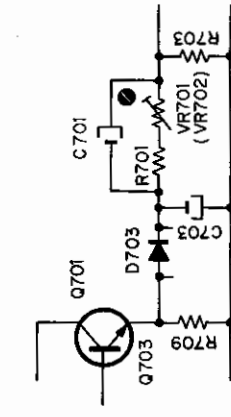


Fig. 6. 1. 3 Meter Level

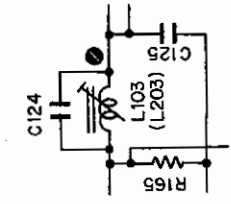


Fig. 6. 1. 4 MPX Filter

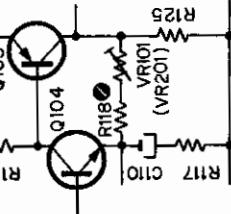


Fig. 6. 1. 5 Playback Level

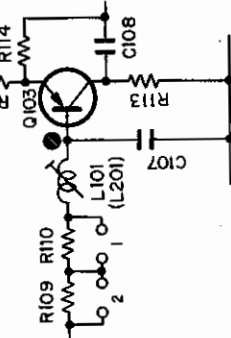
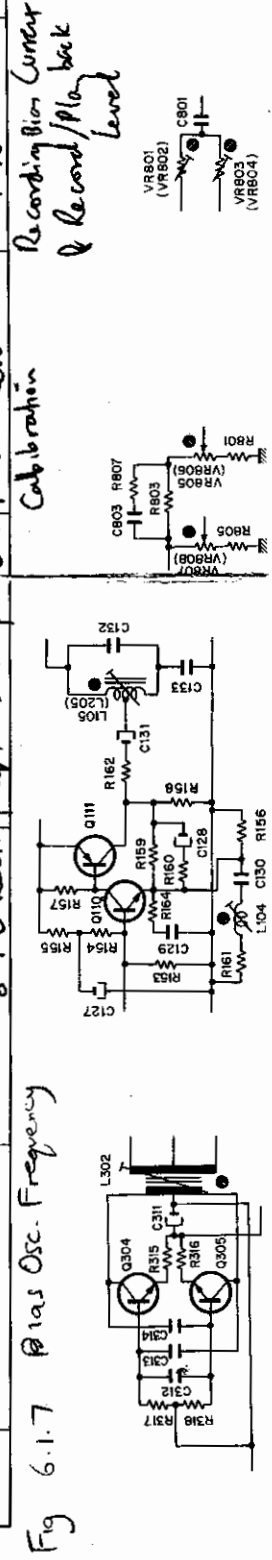


Fig. 6. 1. 6 Playback Frequency Response

| STEP | ITEM   | SIGNAL SOURCE  | OUTPUT CONNECTION  | MODE   | ADJUSTMENT   | REMARKS  |
|------|--|--|--|--|--|--|
| 10   | Bias Oscillation Frequency                     |  | Coupling Bias Oscillator signal (Main P.C.B. CN1-4) to Frequency Counter | Record, Pause  | Main P.C.B. L302   | Adjust the coil to obtain 105KHz on the frequency counter.   |
| 11   | Record Amplifier Equalizer                     | INPUT Jacks 23KHz (-20dB) to INPUT Jacks                                       | VTVM to Main P.C.B. Test Pin TP-L, TP-R                                  | Record, Pause<br>Tape SW.-SX<br>Eq. SW.-70μs<br>Dolby NR SW.-Out<br>I.M. Suppress SW.-Out<br>MPX SW.-Out                                   | Main P.C.B. L104, L204   | 1. Remove the bias-cut-jumper from the dip side of the main P.C.B.<br>2. Adjust the coils to obtain peak readings at 23KHz.<br>3. Resolder bias-cut-jumper.  |
| 12   | Bias Trap                                      | Remove Input Signals   | Same as above  | Same as above  | Main P.C.B. L105, 205  | Adjust the coils to obtain maximum reading on the VTVM.  |
| 13   | Record Level Calibration                       | 400Hz Test Tone or 400Hz to INPUT Jacks  | VTVM to OUTPUT Jacks   | Record & Playback<br>Tape SW.-EX/SX<br>Eq. SW.-120μs (EX)<br>x L I - 70μs (SX)<br>Dolby NR SW.-Out<br>I.M. Suppress SW.-Out<br>MPX SW.-Out | CAL. P.C.B. VR805, VR806, VR807, VR808 (Front Panel Level Semi-fixed Volume) | 1. Record the signals on the Reference EX11 Tape (DA090021A) or Reference SX Tape (DA090025A) and play it back.<br>2. Repeating 1 as above, adjust VR805 (VR806) (for EX11) and VR807 (VR808) (for SX) to obtain 0dB on the level meters in playback mode.   |
| 14   | Recording Bias Current & Record/Playback Level | 400Hz Test Tone or 400Hz to INPUT Jacks & 40Hz to 18KHz (-20dB) to INPUT Jacks | VTVM and Distortion Meter to OUTPUT Jacks                                | Same as above  | CAL. P.C.B. VR801, VR802, VR803, VR804 (Front Panel Bias Semi-fixed Volume)  | 1. Feed in 400Hz and adjust input level controls to obtain 0dB on the level meters.<br>2. Record the signals on the reference EX11 tape (DA09021A) or SX tape (DA09025A).<br>3. Repeating 2 as above, play back the tape and adjust VR801 (VR802) (for EX11) or VR803 (VR804) (for SX) to obtain maximum reading on the VTVM.<br>4. Conduct step 13 "Record Level Calibration".<br>5. Feed in 10KHz (-20dB) and record and play it back. Adjust VR801 (VR802) (for EX11) or VR803 (VR804) (for SX) to obtain approximately -20dB on the VTVM.<br>Then feed in 18KHz (-20dB) and record and play it back. Adjust recording peaking coils L104 (L204) to obtain approximately -20dB on the VTVM (refer to the step 11 "Record Amplifier Equalizer").<br>6. Conduct step 13 "Record Level Calibration".<br>7. Feed in 400Hz and adjust the input level controls to obtain 0dB on the level meter, then record and play it back and check whether the Total Harmonic Distortion (T.H.D.) is less than 1.5%. Feed in 40Hz to 18KHz (-20dB) and record and play it back, and check to insure if the output level is within -20dB ±3dB.<br>8. If T.H.D. exceeds 1.5%, the following adjustments are required.<br>a. Repeat 5 as above. Adjust bias semi-fixed volumes and peaking coils to obtain -22dB instead of -20dB on the VTVM.<br>b. Perform step 13 "Record Level Calibration".<br>c. Repeat 7 as above.<br>d. If above is not sufficient, precise readjustment of step 9 "Playback Frequency Response" or replacement of record/playback Head or check of the item 5.13 "Tape Travelling Adjustment" will be required.<br>9. Conduct step 13 "Record Level Calibration". |



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| STEP | ITEM               | SIGNAL SOURCE                           | OUTPUT CONNECTION                              | MODE   | ADJUSTMENT   | REMARKS  |
|------|--------------------|---|--|--|--|--|
| 15   | I.M. Suppress      | 400Hz Test Tone or 400Hz to INPUT Jacks | VTVM and Distortion Meter to OUTPUT Jacks      | Record & Playback<br>Tape SW: EX/SX<br>Eq. SW: 20μs (EX)<br>70μs (SX)<br>Dolby NR SW: In<br>I.M. Suppress SW: In<br>MPX SW: In | CAL. P.C.B.<br>VR809, VR810,<br>VR811, VR812<br>(Front Panel I.M. Suppress<br>Semi-fixed Volume) | 1. Record the signals on the reference EX II tape or SX tape.<br>2. Adjust VR809 (VR810) for EX(II) and VR811 (VR812) for SX to obtain minimum total harmonic distortion at playback mode.<br>Note: In case semi-fixed volume is turned fully counter-clockwise, leave the volume at that position.  |
| 16   | Dolby Circuit      | 5KHz to INPUT Jacks                     | VTVM to Dolby P.C.B.<br>Connector Terminal     | Record, Erase<br>MPX SW: In  | Dolby P.C.B.<br>VR101, 102,<br>VR201, 202  | Adjust only if board is repaired.<br>1. Remove the bias-cut-jumper from the dip side of main P.C.B.<br>2. Turn LAW Control VR101, 201 fully counter-clockwise.<br>3. Turn GAIN Control VR102, 202 fully counter-clockwise.<br>4. Set Colby NR Switch to Out position and short Test Pin TP101, 201 to ground.<br>5. Connect a VTVM to Metering Terminal 3 for the Right channel or 12 for the Left channel.<br>6. Apply 5KHz signals having a proper level to INPUT so that the VTVM may read 17.5mV at each channel.<br>7. Remove the VTVM from Terminal 3 or 12 and re-connect it to OUTPUT Terminal 6 or 9. Note the output voltage on VTVM.<br>8. Set Dolby NR Switch to In position and adjust GAIN Controls VR102 and 202, till the VTVM indicates 10dB over the noted voltage in 6 as above.<br>9. Set Dolby NR Switch to In position. Note the voltage at OUTPUT Terminal 6 for the Right channel or 9 for the Left channel.<br>10. Remove TP101, 201 short and adjust LAW Control VR101, 201 for 2dB drop in the voltage at OUTPUT Terminal.<br>11. Resolder the bias-cut-jumper. |
| 17   | Crosstalk          | 1KHz to INPUT Jacks                     | 1KHz Band Pass Filter,<br>VTVM to OUTPUT Jacks | Record & Playback<br>Tape SW: SX<br>Eq. SW: 20μs<br>Dolby NR: SW-Out<br>I.M. Suppress SW: Out<br>MPX SW: In                    |  | 1. Erase the tape with bulk eraser.<br>2. Adjust input level controls to obtain 0dB on the level meters, and record the signals on the reference tape.<br>3. Turn the cassette tape the other way round and play it back.<br>4. Measure the difference between 2 and 3.  |
| 18   | Channel Separation | 1KHz to INPUT Jacks                     | Same as above                                  | Same as above  |  | 1. Erase the tape with bulk eraser.<br>2. Adjust Lch (Rich) input level control to obtain 0dB on the level meter, and close Rich (Lch) input level control.<br>3. Record and play it back, then measure the Rich (Lch) level.  |

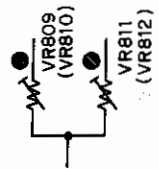


Fig. 6. 1. 11 I.M. Suppress

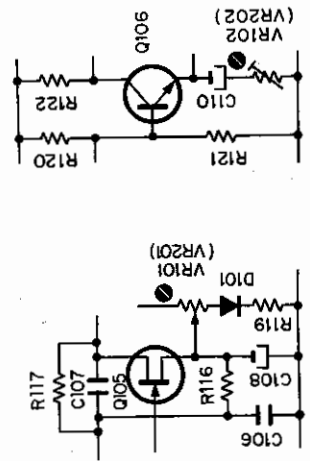


Fig. 6. 1. 12 Dolby Circuit

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|    |                           |   |  |   |   |
|----|---------------------------|---|--|---|---|
| 19 | Erase                     | 1K-Hz to INPUT Jacks                        | 1KHz Band Pass Filter,<br>VTVM to OUTPUT Jacks | Record & Playback<br>Tape SW.-SX<br>Eq. SW.-70µs<br>Dolby NR SW.-Out<br>I.M. Suppress SW.-Out<br>MPX SW.-In                       | 1. Erase the tape with bulk eraser.<br>2. Adjust input level controls to obtain 0dB on the level meters, and record the signals on the reference tape.<br>3. Rewind the Tape then close input level controls.<br>4. Record and play it back, then measure the difference between 1 and 2.   |
| 20 | Signal to Noise Ratio     | 400Hz to INPUT Jacks                        | VTVM and Distortion Meter<br>to OUTPUT Jacks   | Record & Playback<br>Tape SW.-SX<br>Eq. SW.-70µs<br>Dolby NR SW.-In<br>I.M. Suppress SW.-In<br>MPX SW.-In                         | 1. Feed in 400Hz and record, and play it back.<br>2. Adjust the input level controls to obtain 3% total harmonic distortion in playback mode.<br>3. Close the input level controls then record.<br>4. After reword, play back and check to the output level difference between 2 and 3.<br>Note: The filter of CCITT curve shall be used in the measurements. |
| 21 | Total Harmonic Distortion | 400Hz to INPUT Jacks                        | Distortion Meter to<br>OUTPUT Jacks            | Record & Playback<br>Tape SW.-EX/SX<br>Eq. SW.-120µs (EX)<br>70µs (SX)<br>Dolby NR SW.-Out<br>I.M. Suppress SW.-Out<br>MPX SW.-In | 1. Adjust input level controls to obtain 0dB on the level meters.<br>2. Record and play it back.<br>3. Read the distortion meter.   |
| 22 | Wow/Flutter               | 3KHz Speed & Wow/Flutter<br>Tape (DA09006A) | Wow/Flutter Meter to<br>OUTPUT Jacks           | Playback  | Playback and read the wow/flutter meter.  |

## 6.2. Frequency Response Adjustment

### 6.2.1. Playback Frequency Response Adjustment

Fig. 6.2.1 shows the playback equalization curve for Nakamichi 600, and Fig. 6.2.2 is the circuit for adjustment.

#### (1) Level Adjustment (for middle frequency response):

This adjustment will be required when playback level is not sufficient at 10KHz P.B. Frequency Response Tape (refer to the item 6.1.9.).  
Playback equalization level can be varied by the modification of R102 (R202).

- About +2dB ..... R102 (R202) to 1.5K
- About +1dB ..... R102 (R202) to 1.2K
- 0dB ..... R102 (R202) 1K
- About -1dB ..... R102 (R202) to 820ohm

#### (2) Peaking Adjustment (for high frequency response):

This adjustment will be required when playback level is not sufficient at 20KHz P.B. Frequency Response Tape (refer to the item 6.1.9.).

Peaking portion compensates the air gap loss of the playback head. Peaking frequency is varied by the coil L101 (L201) and peaking level is varied by the short circuit of R109 (R209) or R110 (R210) as illustrated in the figure.

### 6.2.2. Record Current Frequency Response Adjustment

Record Eq. peaking is adjusted for compensating the overall frequency response when playback frequency response is completed.

Normally however peaking frequency is pre-adjusted to 23KHz in record mode.  
See Fig. 6.2.3.

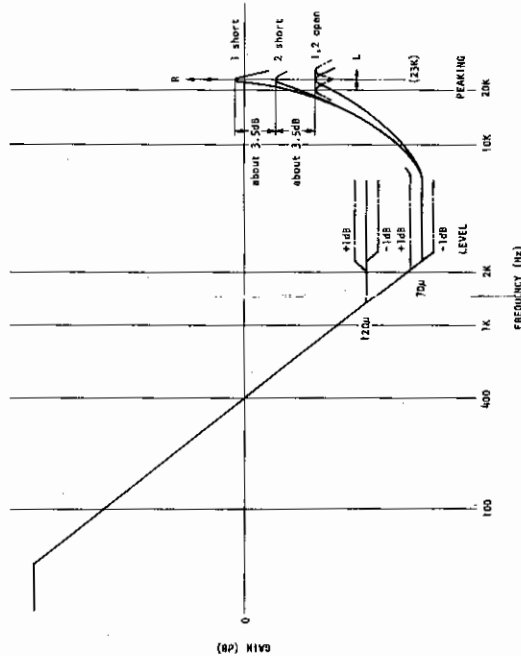


Fig. 6.2.1 Playback Equalizer

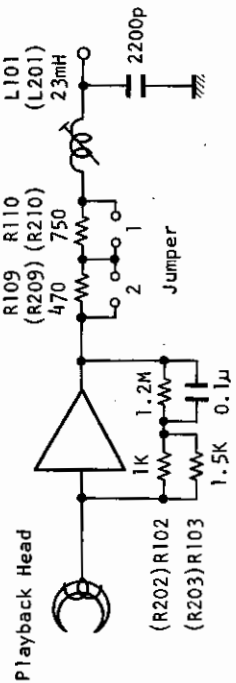


Fig. 6.2.2

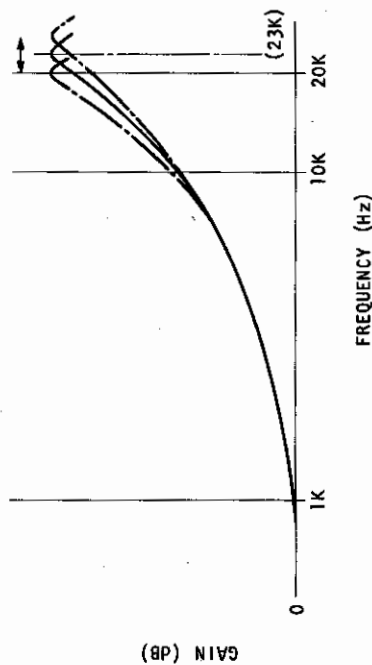


Fig. 6.2.3 Record Eq. Peaking

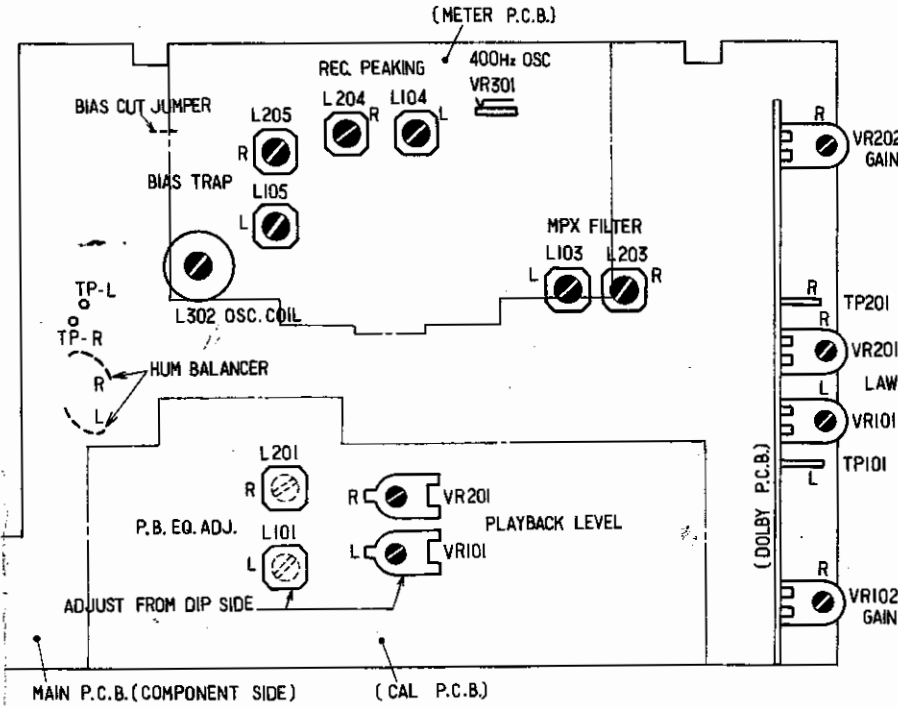
p 23



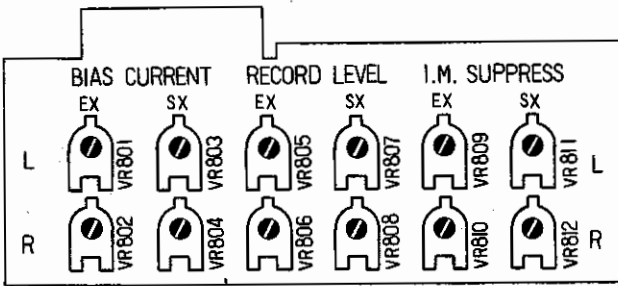
7. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

Note: For adjustment, removal of meter ass'y is required (see item 3.18 meter ass'y removal procedure). When re-adjustment of Dolby P.C.B. Ass'y is required, remove the main P.C.B. from chassis (see item 3.14 main P.C.B. removal procedures).

When a check is made on Amp. etc. by means of an extension cord, re-adjustment shall be made without fail (after final installation to the model chassis.) The check without removal of an extension cord will cause inaccurate adjustments.

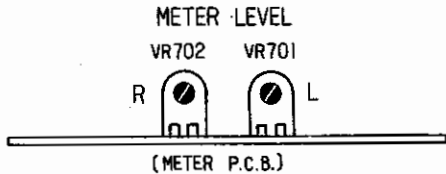


FRONT VIEW



CAL P.C.B. (COMPONENT SIDE)

FRONT VIEW



REAR VIEW

Fig. 7

1222 (2)

1733 (L)

555

nH  
27  
1K  
1 ELR% J

K ELR% J

1K ELR% J

1K ELR% J

1M ELR% J

1K ELR% J

1K ELR% J

1 ELR% J

1 ELR% J

1K ELR% J

1K ELR% J

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1 ELR% J

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1K ELR% J

1K ELR% J

1K ELR% J

1K ELR% J

**MOUNTING DIAGRAM & PARTS LIST**

te: Mounting diagram shows a dip side view of the printed circuit board.

1. Main P.C.B. Ass'y

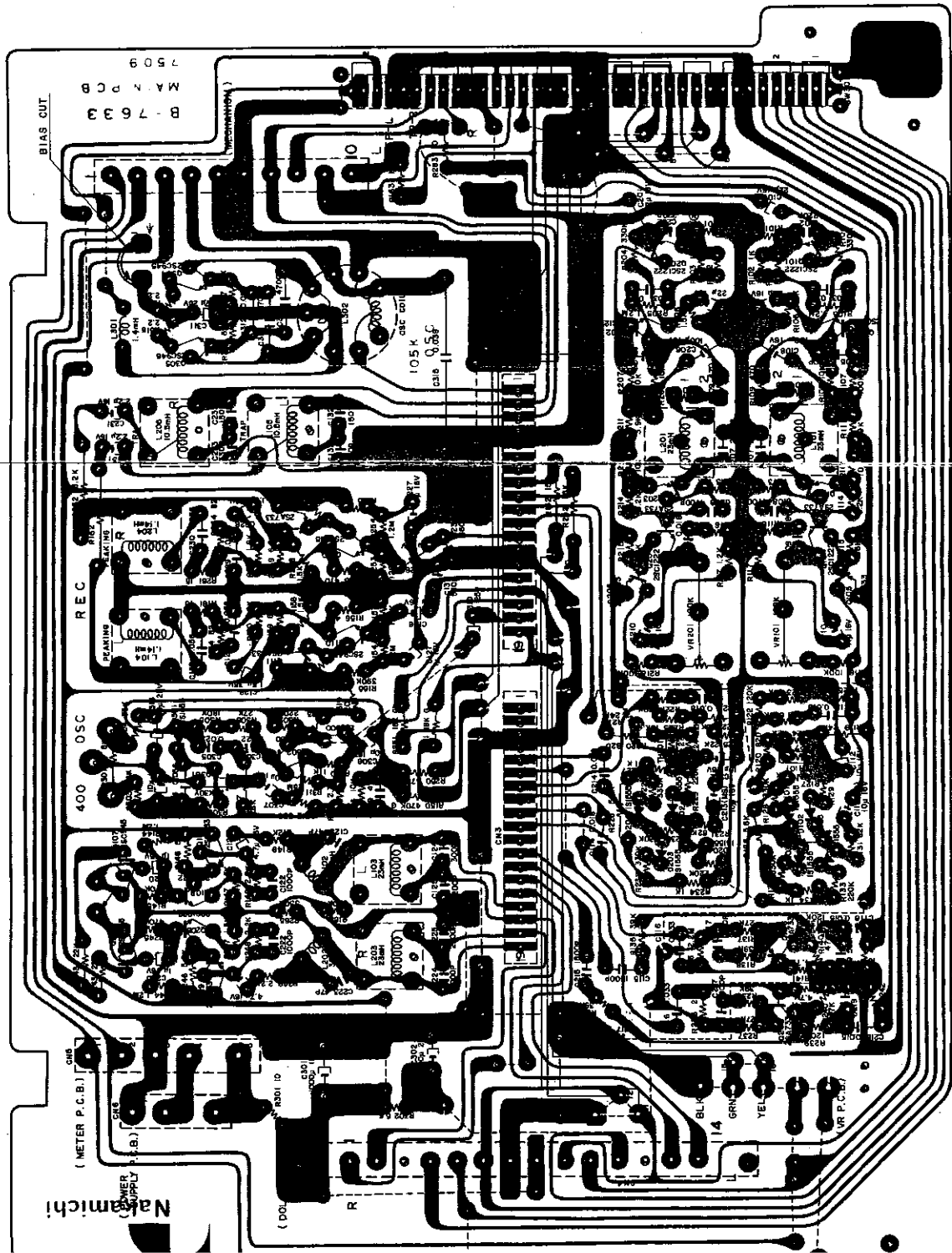


Fig. 8. 1

P 25

| Schematic Ref. No. | Part No. | Description                           |
|--------------------|----------|---------------------------------------|
|                    | BA03715A | Main P.C.B. Ass'y                     |
|                    |          | - P.B. Eq. Amp. -                     |
| Q101, 201          | 0806062A | Transistor 25C1222 (2)                |
| 102, 202           |          |                                       |
| 104, 204           |          |                                       |
| Q103, 203          | 0806013A | Transistor 25A733 (L)                 |
| 105, 205           |          |                                       |
| 106, 206           |          |                                       |
| D101, 201          | 0801909A | Silicon Diode 1S1555                  |
| 102, 202           |          |                                       |
| 103, 203           |          |                                       |
| 104, 204           |          |                                       |
| L101, 201          | 0803857A | 19KHz Coil 23mH                       |
| TH101, 201         | 0801897A | Thermistor 5B-27                      |
| VR101, 201         | 0801812A | Semi-fixed Volume 100K                |
| R101, 201          | 0805633A | Carbon Resistor 100 ELR% J, Noiseless |
| R102, 202          | 0801781A | Carbon Resistor 1K ELR% J             |
| 127, 227           |          |                                       |
| 134, 234           |          |                                       |
| R103, 203          | 0805605A | Carbon Resistor 1.5K ELR% J           |
| 106, 206           |          |                                       |
| R104, 204          | 0801921A | Carbon Resistor 330K ELR% J           |
| 128, 228           |          |                                       |
| 130, 230           |          |                                       |
| 132, 232           |          |                                       |
| R105, 205          | 0805637A | Carbon Resistor 1.2M ELR% J           |
| R107, 207          | 0801920A | Carbon Resistor 100K ELR% J           |
| 118, 218           |          |                                       |
| R108, 208          | 0801833A | Carbon Resistor 10K ELR% J            |
| 112, 212           |          |                                       |
| 113, 213           |          |                                       |
| 123, 223           |          |                                       |
| R109, 209          | 0801792A | Carbon Resistor 470 ELR% J            |
| R110, 210          | 0805635A | Carbon Resistor 750 ELR% J            |
| R111, 211          | 0805664A | Carbon Resistor 3.9K ELR% J           |
| R114, 214          | 0801878A | Carbon Resistor 8.2K ELR% J           |
| R115, 215          | 0805663A | Carbon Resistor 56K ELR% J            |
| R116, 216          | 0805606A | Carbon Resistor 22 ELR% J             |
| R117, 217          | 0805665A | Carbon Resistor 1.2K ELR% J           |
| 124, 224           |          |                                       |
| R119, 219          | 0801832A | Carbon Resistor 24K ELR% J            |
| R120, 220          | 0805511A | Carbon Resistor 820 ELR% J            |
| R121, 221          | 0805665A | Carbon Resistor 560K ELR% J           |
| R122, 222          | 0805669A | Carbon Resistor 120K ELR% J           |
| 139, 239           |          |                                       |
| R125, 225          | 0805661A | Carbon Resistor 22K ELR% J            |
| R126, 226          | 0805673A | Carbon Resistor 5.6K ELR% J           |
| R129, 229          | 0805696A | Carbon Resistor 220K ELR% J           |
| 133, 233           |          |                                       |
| R131, 231          | 0801564A | Carbon Resistor 82K ELR% J            |
| R135, 235          | 0801885A | Carbon Resistor 39K ELR% J            |
| 138, 238           |          |                                       |
| R136, 236          | 0805672A | Carbon Resistor 2.2M ELR% J           |
| R137, 237          | 0805638A | Carbon Resistor 27K ELR% J            |
| R140, 240          | 0805662A | Carbon Resistor 47K ELR% J            |
| 142, 242           |          |                                       |
| R141, 241          | 0805824A | Carbon Resistor 4.7M ELR% J           |
| C101, 201          | 0805636A | Tantalum Capacitor 22µ 16V            |
| C102, 202          | 0801289A | Ceramic Capacitor 220P 50V            |
| 105, 205           |          |                                       |
| C103, 203          | 0801780A | Mylar Capacitor 0.1µ 50V J            |
| C104, 204          | 0801862A | Electrolytic Capacitor 22µ 16V        |
| C106, 206          | 0801400A | Electrolytic Capacitor 100µ 16V       |
| C107, 207          | 0801802A | Mylar Capacitor 2200P 50V J           |
| C108, 208          | 0805652A | Mylar Capacitor 4700P 50V J           |

1. MOUNTING DIAGRAM & PARTS LIST

Note: Mounting diagram shows a dip side view of the printed circuit board.

Fig. 8.1 Main P.C.B. Ass'y

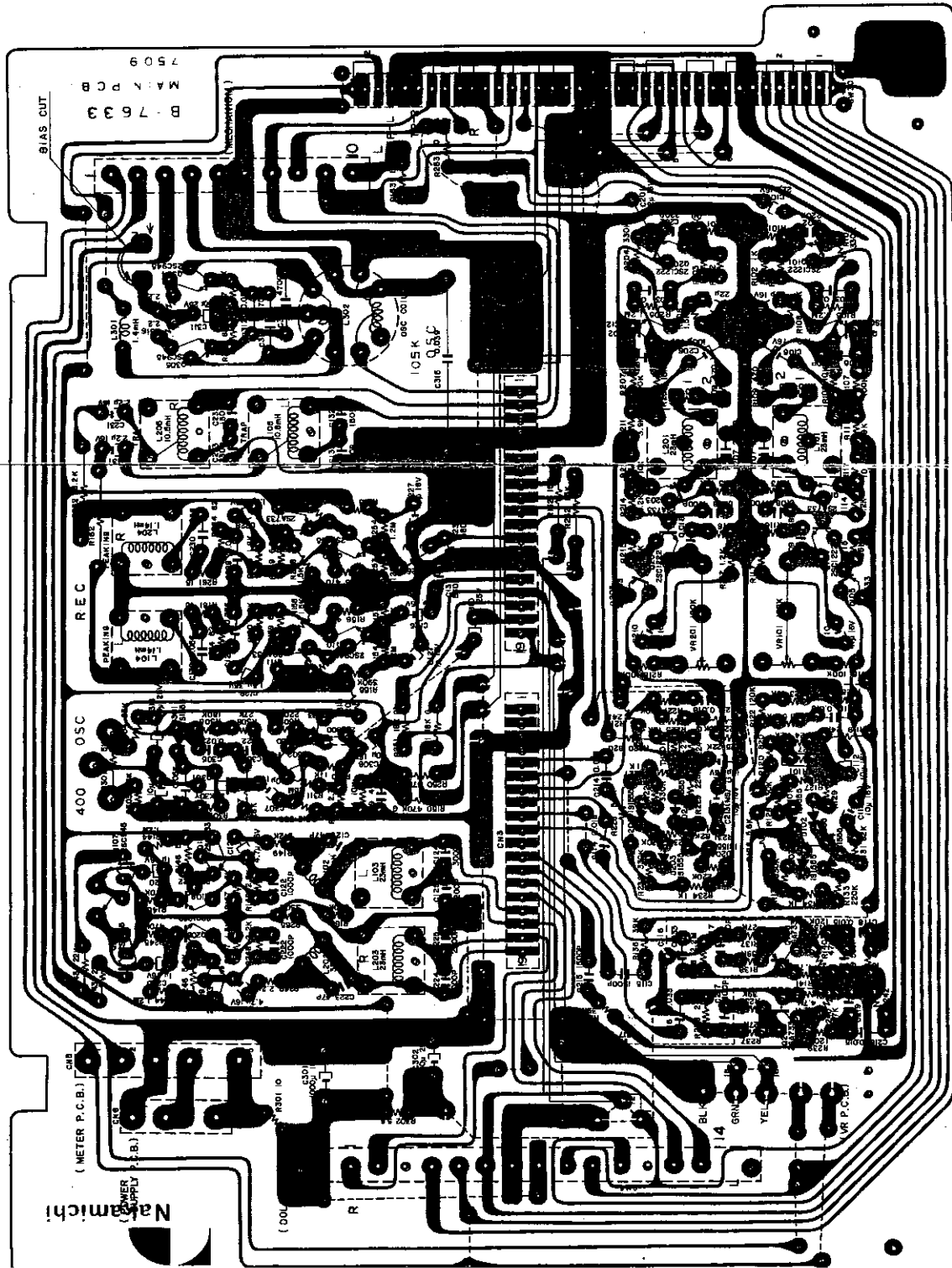


Fig. 8.1

| Schematic Ref. No. | Part No.          | Description               |
|--------------------|-------------------|---------------------------|
| Q101, 201          | BA03715A          | Main P.C.B. Ass'y         |
| 102, 202           | - P.B. Eq. Amp. - |                           |
| 104, 204           | 0B06062A          | Transistor                |
| 105, 205           | 0B06013A          | Transistor                |
| D101, 201          | 0B01909A          | Silicon Diode             |
| 102, 202           | 0B03857A          | 19KHz Coil                |
| 103, 203           | 0B01897A          | Thermistor                |
| 104, 204           | 0B01812A          | Semi-fixed Volume         |
| L101, 201          | 0B05833A          | Carbon Resistor           |
| 105, 205           | 0B01781A          | Noiseless Carbon Resistor |
| 106, 206           | 0B05505A          | Carbon Resistor           |
| 107, 207           | 0B01921A          | Carbon Resistor           |
| 108, 208           | 0B05537A          | Carbon Resistor           |
| 109, 209           | 0B01920A          | Carbon Resistor           |
| 110, 210           | 0B01833A          | Carbon Resistor           |
| 111, 211           | 0B01792A          | Carbon Resistor           |
| 112, 212           | 0B05835A          | Carbon Resistor           |
| 113, 213           | 0B05664A          | Carbon Resistor           |
| 114, 214           | 0B01878A          | Carbon Resistor           |
| 115, 215           | 0B05563A          | Carbon Resistor           |
| 116, 216           | 0B05606A          | Carbon Resistor           |
| 117, 217           | 0B05565A          | Carbon Resistor           |
| 118, 218           | 0B01832A          | Carbon Resistor           |
| 119, 219           | 0B05511A          | Carbon Resistor           |
| 120, 220           | 0B05665A          | Carbon Resistor           |
| 121, 221           | 0B05568A          | Carbon Resistor           |
| 122, 222           | 0B05569A          | Carbon Resistor           |
| 123, 223           | 0B05661A          | Carbon Resistor           |
| 124, 224           | 0B05673A          | Carbon Resistor           |
| 125, 225           | 0B05596A          | Carbon Resistor           |
| 126, 226           | 0B01564A          | Carbon Resistor           |
| 127, 227           | 0B01885A          | Carbon Resistor           |
| 128, 228           | 0B05672A          | Carbon Resistor           |
| 129, 229           | 0B05538A          | Carbon Resistor           |
| 130, 230           | 0B05562A          | Carbon Resistor           |
| 131, 231           | 0B05824A          | Carbon Resistor           |
| 132, 232           | 0B05636A          | Tantalum Capacitor        |
| 133, 233           | 0B01289A          | Ceramic Capacitor         |
| 134, 234           | 0B01780A          | Mylar Capacitor           |
| 135, 235           | 0B01862A          | Electrolytic Capacitor    |
| 136, 236           | 0B01400A          | Electrolytic Capacitor    |
| 137, 237           | 0B01807A          | Mylar Capacitor           |
| 138, 238           | 0B05652A          | Mylar Capacitor           |
| 139, 239           | 0B05655A          | Mylar Capacitor           |
| 140, 240           | 0B05656A          | Mylar Capacitor           |
| 141, 241           | 0B05657A          | Mylar Capacitor           |
| 142, 242           | 0B05658A          | Mylar Capacitor           |
| 143, 243           | 0B05659A          | Mylar Capacitor           |
| 144, 244           | 0B05660A          | Mylar Capacitor           |
| 145, 245           | 0B05661A          | Mylar Capacitor           |
| 146, 246           | 0B05662A          | Mylar Capacitor           |
| 147, 247           | 0B05663A          | Mylar Capacitor           |
| 148, 248           | 0B05664A          | Mylar Capacitor           |
| 149, 249           | 0B05665A          | Mylar Capacitor           |
| 150, 250           | 0B05666A          | Mylar Capacitor           |
| 151, 251           | 0B05667A          | Mylar Capacitor           |
| 152, 252           | 0B05668A          | Mylar Capacitor           |
| 153, 253           | 0B05669A          | Mylar Capacitor           |
| 154, 254           | 0B05670A          | Mylar Capacitor           |
| 155, 255           | 0B05671A          | Mylar Capacitor           |
| 156, 256           | 0B05672A          | Mylar Capacitor           |
| 157, 257           | 0B05673A          | Mylar Capacitor           |
| 158, 258           | 0B05674A          | Mylar Capacitor           |
| 159, 259           | 0B05675A          | Mylar Capacitor           |
| 160, 260           | 0B05676A          | Mylar Capacitor           |
| 161, 261           | 0B05677A          | Mylar Capacitor           |
| 162, 262           | 0B05678A          | Mylar Capacitor           |
| 163, 263           | 0B05679A          | Mylar Capacitor           |
| 164, 264           | 0B05680A          | Mylar Capacitor           |
| 165, 265           | 0B05681A          | Mylar Capacitor           |
| 166, 266           | 0B05682A          | Mylar Capacitor           |
| 167, 267           | 0B05683A          | Mylar Capacitor           |
| 168, 268           | 0B05684A          | Mylar Capacitor           |
| 169, 269           | 0B05685A          | Mylar Capacitor           |
| 170, 270           | 0B05686A          | Mylar Capacitor           |
| 171, 271           | 0B05687A          | Mylar Capacitor           |
| 172, 272           | 0B05688A          | Mylar Capacitor           |
| 173, 273           | 0B05689A          | Mylar Capacitor           |
| 174, 274           | 0B05690A          | Mylar Capacitor           |
| 175, 275           | 0B05691A          | Mylar Capacitor           |
| 176, 276           | 0B05692A          | Mylar Capacitor           |
| 177, 277           | 0B05693A          | Mylar Capacitor           |
| 178, 278           | 0B05694A          | Mylar Capacitor           |
| 179, 279           | 0B05695A          | Mylar Capacitor           |
| 180, 280           | 0B05696A          | Mylar Capacitor           |
| 181, 281           | 0B05697A          | Mylar Capacitor           |
| 182, 282           | 0B05698A          | Mylar Capacitor           |
| 183, 283           | 0B05699A          | Mylar Capacitor           |
| 184, 284           | 0B05700A          | Mylar Capacitor           |
| 185, 285           | 0B05701A          | Mylar Capacitor           |
| 186, 286           | 0B05702A          | Mylar Capacitor           |
| 187, 287           | 0B05703A          | Mylar Capacitor           |
| 188, 288           | 0B05704A          | Mylar Capacitor           |
| 189, 289           | 0B05705A          | Mylar Capacitor           |
| 190, 290           | 0B05706A          | Mylar Capacitor           |
| 191, 291           | 0B05707A          | Mylar Capacitor           |
| 192, 292           | 0B05708A          | Mylar Capacitor           |
| 193, 293           | 0B05709A          | Mylar Capacitor           |
| 194, 294           | 0B05710A          | Mylar Capacitor           |
| 195, 295           | 0B05711A          | Mylar Capacitor           |
| 196, 296           | 0B05712A          | Mylar Capacitor           |
| 197, 297           | 0B05713A          | Mylar Capacitor           |
| 198, 298           | 0B05714A          | Mylar Capacitor           |
| 199, 299           | 0B05715A          | Mylar Capacitor           |
| 200, 300           | 0B05716A          | Mylar Capacitor           |

| Schematic Ref. No.                | Part No.      | Description                                   | Schematic Ref. No. | Part No.          | Description                           |
|-----------------------------------|---------------|---|--------------------|-------------------|---------------------------------------|
| C109, 209<br>111, 211<br>114, 214 | OB05832A      | Mylar Capacitor 0.018 $\mu$ 50V J             | OB05512A           | C131, 231         | Electrolytic Capacitor 2.2 $\mu$ 16V  |
| C110, 210                         | OB01403A      | Electrolytic Capacitor 47 $\mu$ 16V           | OB05829A           | C132, 232         | SP Capacitor 150P 50V J               |
| C112, 212                         | OB01412A      | Electrolytic Capacitor 10 $\mu$ 16V           | OB05611A           | C133, 233         | SP Capacitor 330P 35V J               |
| C113, 213                         | OB05840A      | Electrolytic Capacitor 10 $\mu$ 16V M (MS)    | OB05686A           | C134, 234         | Mylar Capacitor 560P 50V              |
| C115, 215                         | OB05653A      | Mylar Capacitor 1500P 50V J                   |                    | - 400Hz Osc. -    |                                       |
| C116, 216                         | OB05583A      | Mylar Capacitor 0.033 $\mu$ 50V J             | Q301               | OB01600A          | FET 2SK30A (Y)                        |
| C117, 217                         | OB01913A      | Mylar Capacitor 1800P 50V J                   | Q302, 303          | OB01910A          | Transistor 2SC900 (E)                 |
| C118, 218                         | OB05557A      | Mylar Capacitor 0.015 $\mu$ 50V J             | D301               | OB01909A          | Silicon Diode 1S1555                  |
| C119, 219                         | OB05788A      | SP Capacitor 560P 50V J                       | VR301              | OB01470A          | Semi-fixed Volume 5K                  |
|                                   | JA03033A      | Noise Shield (A) Ass'y (2 pcs. for L101, 201) | R303               | OB05673A          | Carbon Resistor 5.6K ELR% J           |
|                                   | - Line Amp. - |   | R304               | OB01879A          | Carbon Resistor 33K ELR% J            |
| Q107, 207                         | OB01872A      | Transistor 2SC945 (L)                         | R305               | OB05669A          | Carbon Resistor 180K ELR% J           |
| Q108, 208                         | OB06062A      | Transistor 2SC1222 (2)                        | R306               | OB05775A          | Carbon Resistor 3.3M ELR% J           |
| Q109, 209                         | OB06013A      | Transistor 2SA733 (L)                         | R307               | OB01830A          | Carbon Resistor 1.8K ELR% J           |
| L102, 202                         | OB03919A      | Inductor 36mH                                 | R308               | OB05538A          | Carbon Resistor 27K ELR% J            |
| L103, 203                         | OB03563A      | 19KHz Coil 23mH                               | R309               | OB05596A          | Carbon Resistor 220K ELR% J           |
| R143, 243                         | OB05661A      | Carbon Resistor 22K ELR% J                    | R310               | OB05826A          | Carbon Resistor 11K ELR% J            |
| R144, 244                         | OB05537A      | Carbon Resistor 1.2M ELR% J                   | R311               | OB05601A          | Carbon Resistor 1.5M ELR% J           |
| R145, 245                         | OB05700A      | Carbon Resistor 470K ELR% J                   | R312               | OB01789A          | Carbon Resistor 330 ELR% J            |
| R146, 246                         | OB05673A      | Carbon Resistor 5.6K ELR% J                   | R313               | OB01782A          | Carbon Resistor 2.7K ELR% J           |
| R147, 247                         | OB05505A      | Carbon Resistor 1.5K ELR% J                   | R314               | OB01833A          | Carbon Resistor 10K ELR% J            |
| R148, 248                         | OB05566A      | Carbon Resistor 2.2K ELR% J                   | R319               | OB05608A          | Carbon Resistor 220 ELR% J            |
| 149, 249                          |               |   | C303, 307          | OB01412A          | Electrolytic Capacitor 10 $\mu$ 16V   |
| R150, 250                         | OB05827A      | Carbon Resistor 470K RD% G                    | 308                |                   |                                       |
| R151, 251                         | OB05834A      | Carbon Resistor 18K RD% G                     | C304               | OB05778A          | Mylar Capacitor 0.056 $\mu$ 50V K     |
| R165, 265                         | OB01921A      | Carbon Resistor 330K ELR% J                   | C305, 306          | OB01916A          | Mylar Capacitor 0.022 $\mu$ 50V J     |
| C120, 220                         | OB01405A      | Electrolytic Capacitor 1 $\mu$ 16V            | C309               | OB01716A          | Ceramic Capacitor 470P 50V            |
| C121, 221                         | OB01389A      | Electrolytic Capacitor 4.7 $\mu$ 16V          | C310               | OB01173A          | Electrolytic Capacitor 1 $\mu$ 25V    |
| C122, 222                         | OB05550A      | Mylar Capacitor 1000P 50V J                   | C316               | OB01674A          | Electrolytic Capacitor 10 $\mu$ 25V   |
| C123, 223                         | OB05789A      | SP Capacitor 47P 50V J                        |                    | - Bias Osc. -     |                                       |
| C124, 224                         | OB05828A      | SP Capacitor 3000P 50V J                      | Q304, 305          | OB01872A          | Transistor 2SC945 (L)                 |
| C125, 225                         | OB01802A      | Mylar Capacitor 2200P 50V J                   | L301               | OB03861A          | Trap Coil 1.4mH                       |
|                                   | - Rec. Amp. - |   | L302               | OB06536A          | Osc. Coil                             |
| Q110, 210                         | OB01872A      | Transistor 2SC945 (L)                         | R315, 316          | OB05605A          | Carbon Resistor 2.2 ELR% J            |
| Q111, 211                         | OB06013A      | Transistor 2SA733 (L)                         | R317, 318          | OB01564A          | Carbon Resistor 82K ELR% J            |
| L104, 204                         | OB01434A      | Peaking Coil 1.14mH                           | C311               | OB01402A          | Electrolytic Capacitor 4.7 $\mu$ 25V  |
| L105, 205                         | OB00068A      | Bias Trap Coil 10.5mH                         | C312               | OB05813A          | Mylar Capacitor 0.056 $\mu$ 50V J     |
| R152, 252                         | OB05591A      | Carbon Resistor 15K ELR% J                    | C313, 314          | OB05652A          | Mylar Capacitor 4700P 50V J           |
| R153, 253                         | OB05568A      | Carbon Resistor 120K ELR% J                   | C315               | OB05799A          | SP Capacitor 0.039 $\mu$ 50V J        |
| R154, 254                         | OB05537A      | Carbon Resistor 1.2M ELR% J                   |                    | - Miscellaneous - |                                       |
| R155, 255                         | OB05595A      | Carbon Resistor 390K ELR% J                   | OB07633A           | Main P.C.B.       |                                       |
| R156, 256                         | OB01792A      | Carbon Resistor 470 ELR% J                    | R301               | OB05663A          | Carbon Resistor 10 ELR% J             |
| R157, 257                         | OB01793A      | Carbon Resistor 3.3K ELR% J                   | R302               | OB05818A          | Carbon Resistor 5.6 ELR% J            |
| R158, 258                         | OB05505A      | Carbon Resistor 1.5K ELR% J                   | C301               | OB01673A          | Electrolytic Capacitor 1000 $\mu$ 18V |
| R159, 259                         | OB01877A      | Carbon Resistor 6.8K ELR% J                   | C302               | OB05793A          | Electrolytic Capacitor 330 $\mu$ 25V  |
| R160, 260                         | OB01830A      | Carbon Resistor 1.8K ELR% J                   | C317               | OB04060A          | Mylar Capacitor 2200P 50V K           |
| R161, 261                         | OB05830A      | Carbon Resistor 15 ELR% J                     | SW301              | OB07036A          | Record Switch                         |
| R162, 262                         | OB01856A      | Carbon Resistor 8.2K R% J                     | CN1                | BA03703A          | 10P Connector Ass'y                   |
| R163, 263                         | OB05663A      | Carbon Resistor 10 ELR% J                     | CN2, 3             | BA03562A          | 19P Connector Sub Ass'y               |
| R164, 264                         | OB05503A      | Carbon Resistor 82 ELR% J                     | CN4                | BA03702A          | 14P Connector Ass'y                   |
| C126, 226                         | OB01405A      | Electrolytic Capacitor 1 $\mu$ 16V            | CN5                | OB08140A          | 5P Plug                               |
| 127, 227                          |               |   | CN6                | OB08156A          | 3P Plug                               |
| C128, 228                         | OB05639A      | Tantalum Capacitor 1.5 $\mu$ 35V              | TP-L, R            | OB03924A          | Test Pin                              |
| C129, 229                         | OB05813A      | Mylar Capacitor 0.056 $\mu$ 50V J             |                    | OB08150A          | 5P Jack Ass'y 2 (1 pce.)              |
| 130, 230                          |               |   |                    | JA03068A          | Record Arm Ass'y (1 pce.)             |
|                                   |               |   |                    | OE00166A          | Screw M2 x 4 Cylinder Head            |
|                                   |               |   |                    | OE00025A          | Washer 2mm Spring                     |

8.2 Dolby P.C.B. Ass'y

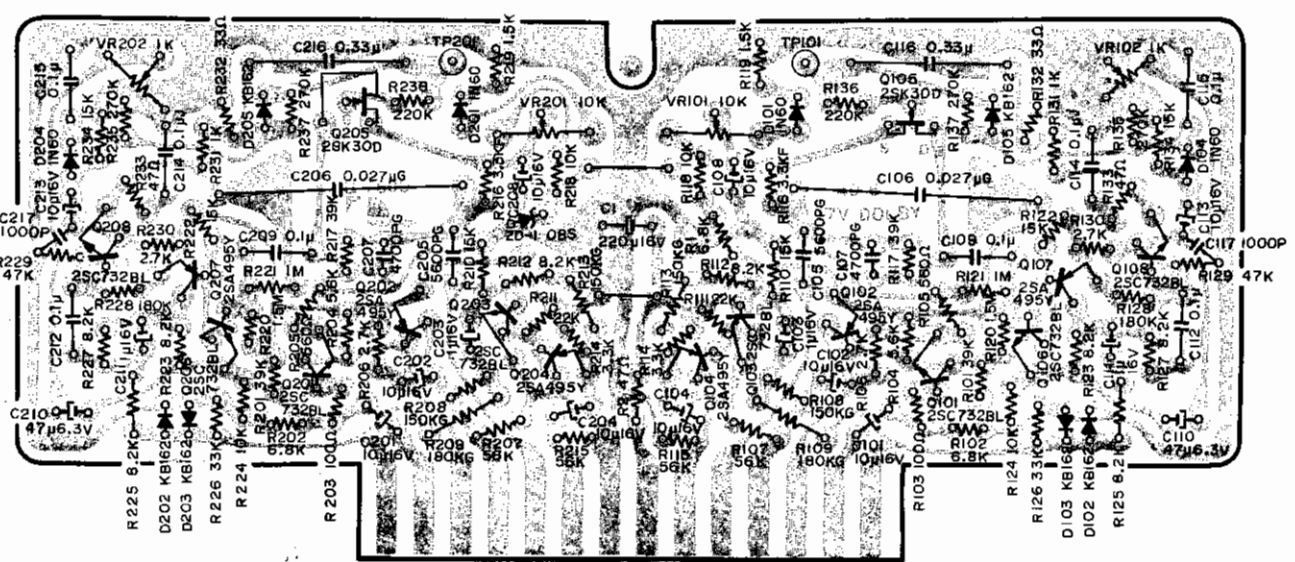


Fig. 8.2

| Schematic Ref. No. | Part No.        | Description               | Schematic Ref. No. | Part No.        | Description                     |
|--------------------|-----------------|---------------------------|--------------------|-----------------|---------------------------------|
|                    | <b>BA03670A</b> | <b>Dolby P.C.B. Ass'y</b> | 123, 223           |                 |                                 |
|                    | <b>0B07609A</b> | 17V Dolby P.C.B.          | 125, 225           |                 |                                 |
| Q101, 201          | <b>0B06005A</b> | Transistor                | 127, 227           | <b>0B01793A</b> | Carbon Resistor 3.3K ELR% J     |
| 103, 203           |                 |                           |                    | <b>0B01585A</b> | Carbon Resistor 3.3K RD% F      |
| 106, 206           |                 |                           |                    | <b>0B01833A</b> | Carbon Resistor 10K ELR% J      |
| 108, 208           |                 |                           |                    |                 |                                 |
| Q102, 202          | <b>0B06006A</b> | Transistor                | 124, 224           | <b>0B05505A</b> | Carbon Resistor 1.5K ELR% J     |
| 104, 204           |                 |                           |                    | <b>0B05601A</b> | Carbon Resistor 1.5M ELR% J     |
| 107, 207           |                 |                           |                    | <b>0B05564A</b> | Carbon Resistor 1M ELR% J       |
| Q105, 205          | <b>0B06001A</b> | FET                       | R119, 219          | <b>0B01879A</b> | Carbon Resistor 33K ELR% J      |
| ZD1                | <b>0B06004A</b> | Zener Diode               | R120, 220          | <b>0B05669A</b> | Carbon Resistor 180K ELR% J     |
| D101, 201          | <b>0B00030A</b> | Germanium Diode           | R121, 221          | <b>0B05562A</b> | Carbon Resistor 47K ELR% J      |
| 104, 204           |                 |                           | R126, 226          | <b>0B01781A</b> | Carbon Resistor 1K ELR% J       |
| D102, 202          | <b>0B01599A</b> | Silicon Diode             | R128, 228          | <b>0B05567A</b> | Carbon Resistor 33 ELR% J       |
| 103, 203           |                 |                           | R129, 229          | <b>0B05600A</b> | Carbon Resistor 270K ELR% J     |
| 105, 205           |                 |                           | R131, 231          |                 |                                 |
| VR101, 201         | <b>0B01458A</b> | Semi-fixed Volume         | R132, 232          |                 |                                 |
| VR102, 202         | <b>0B01428A</b> | Semi-fixed Volume         | R135, 235          |                 |                                 |
| R1, 102, 202       | <b>0B01877A</b> | Carbon Resistor           | 137, 237           |                 |                                 |
| R2, 133, 233       | <b>0B05569A</b> | Carbon Resistor           | R136, 236          | <b>0B05596A</b> | Carbon Resistor 220K ELR% J     |
| R101, 201          | <b>0B01885A</b> | Carbon Resistor           | C1                 | <b>0B01398A</b> | Electrolytic Capacitor 220µ 16V |
| 117, 217           |                 |                           | C101, 201          | <b>0B01412A</b> | Electrolytic Capacitor 10µ 16V  |
| R103, 203          | <b>0B05558A</b> | Carbon Resistor           | 102, 202           |                 |                                 |
| R104, 204          | <b>0B05673A</b> | Carbon Resistor           | 104, 204           |                 |                                 |
| R105, 205          | <b>0B05678A</b> | Carbon Resistor           | 108, 208           |                 |                                 |
| R106, 206          | <b>0B01782A</b> | Carbon Resistor           | 113, 213           |                 |                                 |
| 130, 230           |                 |                           | C103, 203          | <b>0B01405A</b> | Electrolytic Capacitor 1µ 16V   |
| R107, 207          | <b>0B05563A</b> | Carbon Resistor           | C105, 205          | <b>0B01864A</b> | P.P. Capacitor 5600P 50V G      |
| 115, 215           |                 |                           | C106, 206          | <b>0B01892A</b> | P.P. Capacitor 0.027µ 50V G     |
| R108, 208          | <b>0B01859A</b> | Carbon Resistor           | C107, 207          | <b>0B01608A</b> | P.P. Capacitor 4700P 50V G      |
| 113, 213           |                 |                           | C109, 209          | <b>0B01603A</b> | Mylar Capacitor 0.1µ 50V K      |
| R109, 209          | <b>0B01590A</b> | Carbon Resistor           | 112, 212           |                 |                                 |
| R110, 210          | <b>0B05591A</b> | Carbon Resistor           | 115, 215           |                 |                                 |
| 122, 222           |                 |                           | C110, 210          | <b>0B01404A</b> | Electrolytic Capacitor 47µ 6.3V |
| 134, 234           |                 |                           | C114, 214          | <b>0B01780A</b> | Mylar Capacitor 0.1µ 50V J      |
| R111, 211          | <b>0B05661A</b> | Carbon Resistor           | C116, 216          | <b>0B01602A</b> | Mylar Capacitor 0.33µ 50V K     |
| R112, 212          | <b>0B01878A</b> | Carbon Resistor           | C117, 217          | <b>0B04059A</b> | Mylar Capacitor 1000P 50V K     |
|                    |                 |                           | TP101, 201         | <b>0B03924A</b> | Test Pin                        |

8.3. SW. P.C.B. Ass'y

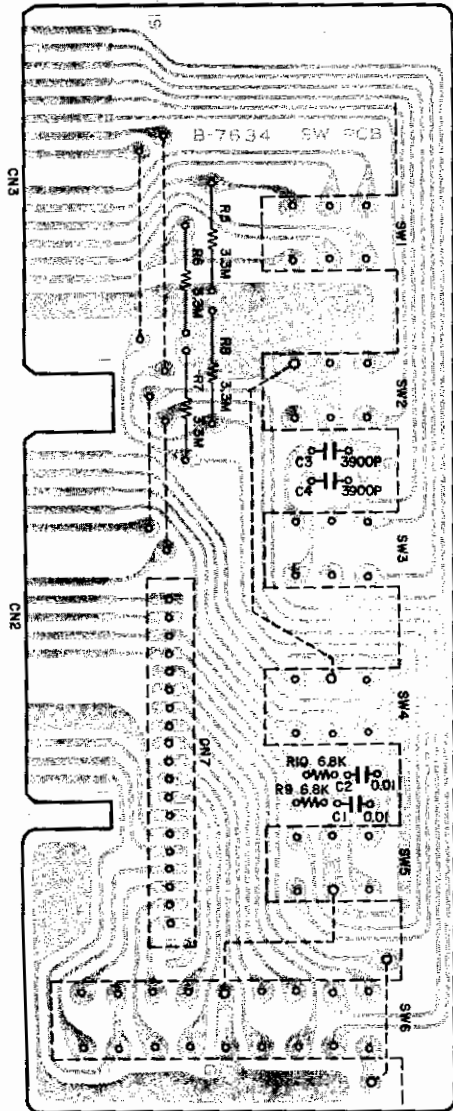


Fig. 8.3

8.4. CAL. P.C.B. Ass'y

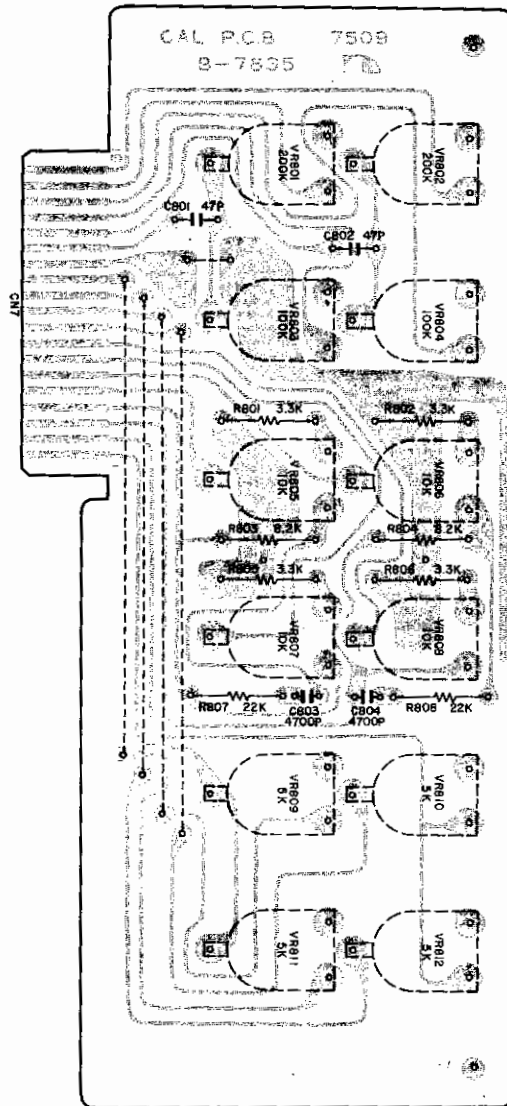


Fig. 8.4

| Schematic Ref. No. | Part No.             | Description                      | Schematic Ref. No.   | Part No. | Description                           |
|--------------------|----------------------|----------------------------------|----------------------|----------|---------------------------------------|
|                    | BA03719A             | SW. P.C.B. Ass'y                 |                      | BA03718A | CAL. P.C.B. Ass'y                     |
| SW1, 2, 3, 4, 5    | OB07634A<br>OB07088A | SW. P.C.B.<br>Push SW.           | VR801, 802           | OB01597A | CAL. P.C.B.<br>Semi-fixed Volume 200K |
| R5, 6, 7, 8        | OB05803A             | Carbon Resistor 3.3M R¼ J        | VR803, 804           | OB01812A | Semi-fixed Volume 100K                |
| R9, 10             | OB01877A             | Carbon Resistor 6.8K ELR¼ J      | VR805, 806           | OB01595A | Semi-fixed Volume 10K                 |
| C1, 2              | OB05681A             | Mylar Capacitor 0.01µ 50V J      | VR809, 810           | OB01805A | Semi-fixed Volume 5K                  |
| C3, 4              | OB01804A             | Mylar Capacitor 3900p 50V J      | VR809, 810, 811, 812 | OB01805A | Semi-fixed Volume 5K                  |
|                    | BA03562A             | 19P Connector Sub Ass'y (1 pce.) | R801, 802, 805, 806  | OB01681A | Carbon Resistor 3.3K R¼ J             |
|                    |                      |                                  | R803, 804            | OB01856A | Carbon Resistor 8.2K R¼ J             |
|                    |                      |                                  | R807, 808            | OB05615A | Carbon Resistor 22K R¼ J              |
|                    |                      |                                  | C801, 802            | OB01456A | Ceramic Capacitor 47P 50V             |
|                    |                      |                                  | C803, 804            | OB05652A | Mylar Capacitor 4700P 50V J           |

8.5. VR P.C.B. Ass'y

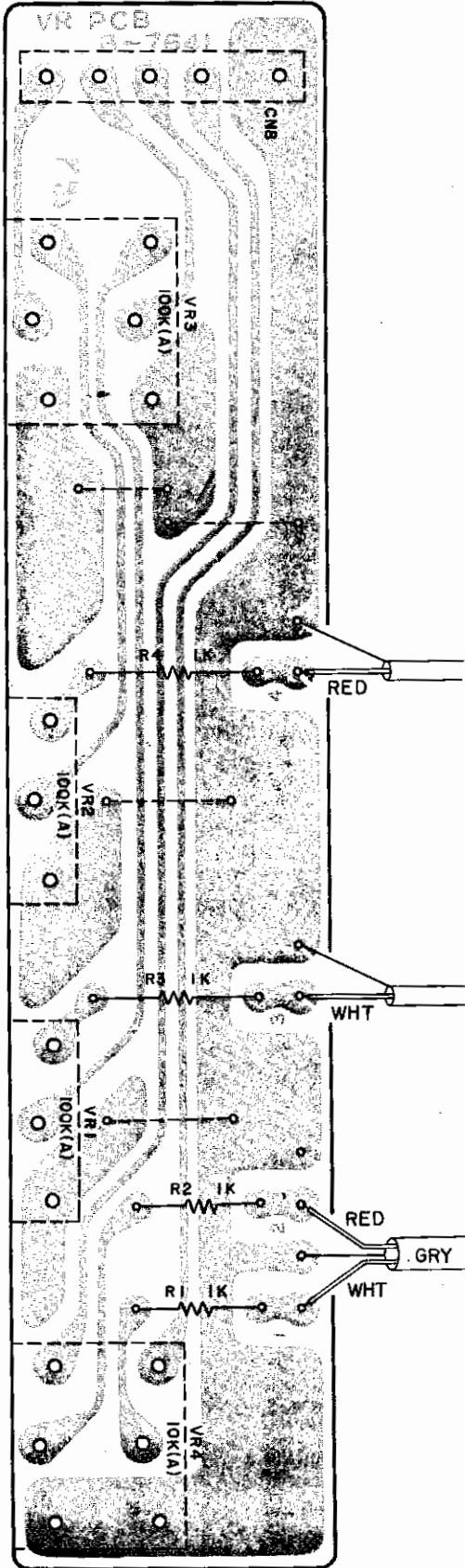


Fig. 8.5

8.6. DIN Pin Jack P.C.B. Ass'y

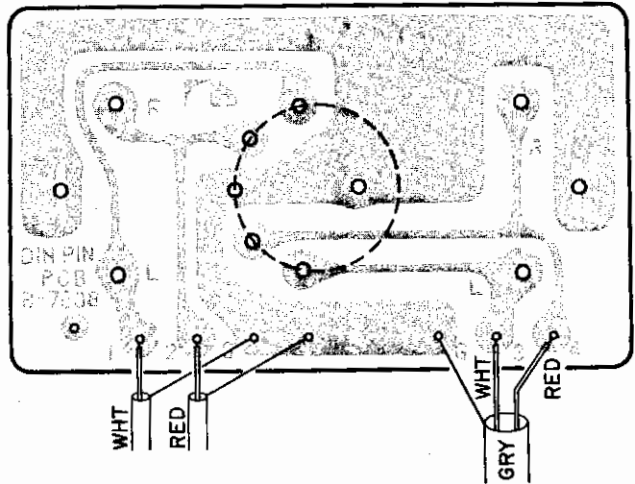


Fig. 8.6

8.7. Meter P.C.B. Ass'y

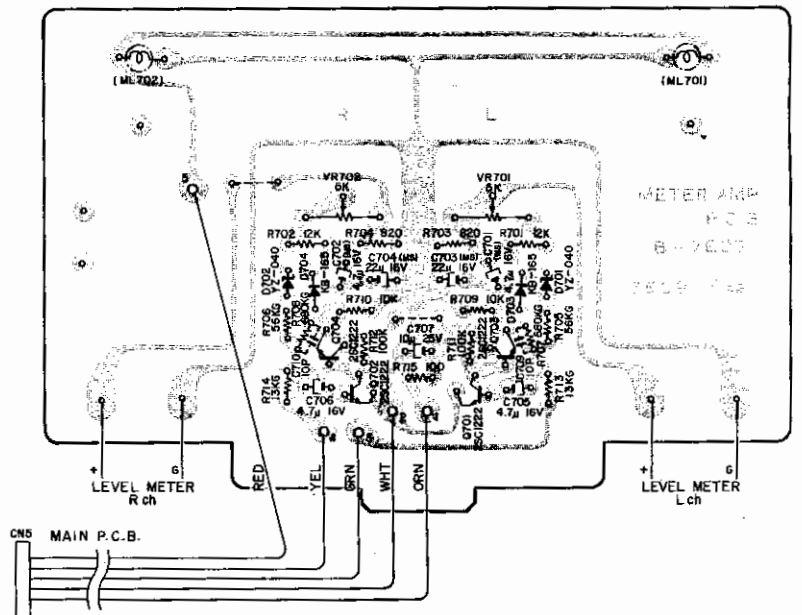


Fig. 8.7



8. 8. Power Supply P.C.B. Ass'y

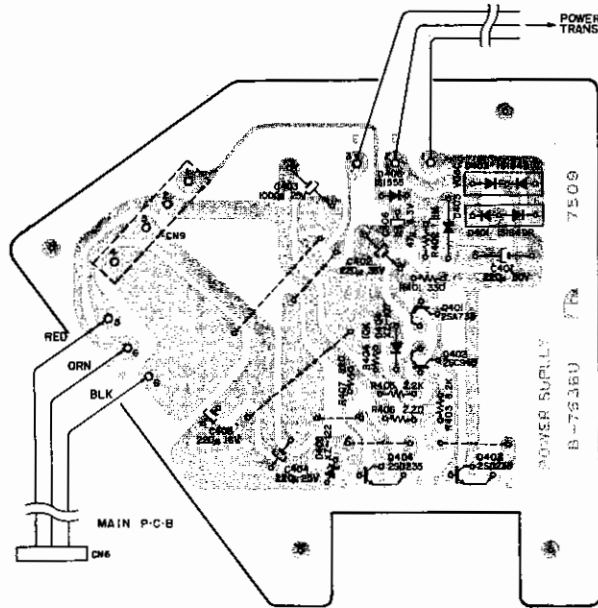


Fig. 8. 8

| Schematic Ref. No. | Part No.        | Description                                 | Schematic Ref. No. | Part No.                                     | Description                              |
|--------------------|-----------------|---|--------------------|--|--|
|                    | <b>BA03720A</b> | <b>VR P.C.B. Ass'y</b>                      |                    | <b>BA03721A</b>                              | <b>Power Supply P.C.B. Ass'y</b>         |
| VR1, 2             | OB07641A        | VR P.C.B. Ass'y                             |                    | OB07636U                                     | Power Supply P.C.B.                      |
| VR3                | OB07089A        | Volume 100K (A)                             | Q401               | OB06013A                                     | Transistor 2SA733 (L)                    |
| VR4                | OB07091A        | Volume 100K (A)                             | Q402               | OB01872A                                     | Transistor 2SC945 (L)                    |
| R1, 2, 3, 4        | OB07090A        | Volume 10K (A)                              | Q403, 404          | OB01823A                                     | Transistor 2SD235 (Y)                    |
|                    | OB01857A        | Carbon Resistor 1K R $\frac{1}{4}$ J        | D401               | OB06038U                                     | Silicon Diode 1S1849R                    |
|                    | OB08140A        | 5P Plug (1 pce.)                            | D402               | OB06037U                                     | Silicon Diode 1S1849                     |
|                    | <b>BA03726A</b> | <b>DIN Pin Jack P.C.B. Ass'y</b>            | D403               | OB01501U                                     | Silicon Diode VO-6C                      |
|                    | OB07638A        | Jack P.C.B.                                 | D404               | OB06059A                                     | Zener Diode XZ-107                       |
|                    | OB08097A        | Jack Unit                                   | D405               | OB06065A                                     | Zener Diode XZ-122                       |
|                    | <b>BA03716A</b> | <b>Meter P.C.B. Ass'y</b>                   | D406               | OB01909A                                     | Silicon Diode 1S1555                     |
| Q701, 702          | OB07637A        | Meter Amp. P.C.B.                           | R401               | OB01789A                                     | Carbon Resistor 330 ELR $\frac{1}{2}$ J  |
| 703, 704           | OB06062A        | Transistor 2SC1222 (2)                      | R402               | OB05670A                                     | Carbon Resistor 1.8M ELR $\frac{1}{2}$ J |
| D701, 702          | OB06063A        | Zener Diode YZ-040                          | R403               | OB05823A                                     | Carbon Resistor 6.2K-ELR $\frac{1}{2}$ J |
| D703, 704          | OB06007A        | Silicon Diode KB165                         | R404               | OB01833A                                     | Carbon Resistor 10K ELR $\frac{1}{2}$ J  |
| VR701, 702         | OB01470A        | Semi-fixed Volume 5K                        | R405               | OB05566A                                     | Carbon Resistor 2.2K ELR $\frac{1}{2}$ J |
| R701, 702          | OB05650A        | Carbon Resistor 12K ELR $\frac{1}{2}$ J     | R406               | OB05605A                                     | Carbon Resistor 2.2 ELR $\frac{1}{2}$ J  |
| R703, 704          | OB05511A        | Carbon Resistor 820 ELR $\frac{1}{2}$ J     | R407               | OB05511A                                     | Carbon Resistor 820 ELR $\frac{1}{2}$ J  |
| R705, 706          | OB05821A        | Carbon Resistor 56K RD $\frac{1}{2}$ G      | C401               | OB05839A                                     | Electrolytic Capacitor 220 $\mu$ 50V     |
| R707, 708          | OB05822A        | Carbon Resistor 680K RD $\frac{1}{2}$ G     | C402               | OB05831A                                     | Electrolytic Capacitor 220 $\mu$ 35V     |
| R709, 710          | OB01833A        | Carbon Resistor 10K ELR $\frac{1}{2}$ J     | C403               | OB01870A                                     | Electrolytic Capacitor 1000 $\mu$ 25V    |
| R711, 712          | OB01920A        | Carbon Resistor 100K ELR $\frac{1}{2}$ J    | C404               | OB01391A                                     | Electrolytic Capacitor 220 $\mu$ 25V     |
| R713, 714          | OB05767A        | Carbon Resistor 13K RD $\frac{1}{2}$ G      | C405               | OB01398A                                     | Electrolytic Capacitor 220 $\mu$ 16V     |
| R715               | OB05558A        | Carbon Resistor 100 ELR $\frac{1}{2}$ J     | C406               | OB01404A                                     | Electrolytic Capacitor 47 $\mu$ 6.3V     |
| C701, 702          | OB05819A        | Electrolytic Capacitor 4.7 $\mu$ 16V M (MS) | OJ03399A           | Heat Sink (1 pce.)                           |  |
| C703, 704          | OB05820A        | Electrolytic Capacitor 22 $\mu$ 16V M (MS)  | OB08127A           | 4P Plug (1 pce.)                             |  |
| C705, 706          | OB01389A        | Electrolytic Capacitor 4.7 $\mu$ 16V        | OB08153A           | 3P Jack Ass'y 1 (1 pce.)                     |  |
| C707               | OB01674A        | Electrolytic Capacitor 10 $\mu$ 25V         | OE00607A           | Screw M3 x 8 Philips Pan Head (3A) (2 pcs.)  |  |
| C709, 710          | OB05798A        | Ceramic Capacitor 10P 50V                   | OE00608A           | Screw M3 x 10 Philips Pan Head (3A) (2 pcs.) |  |
|                    | OB08151A        | 5P Jack Ass'y (1 pce.)                      | OE00507A           | Nut Hex M3 (4 pcs.)                          |  |



8. 9. Shut-off P.C.B. Ass'y

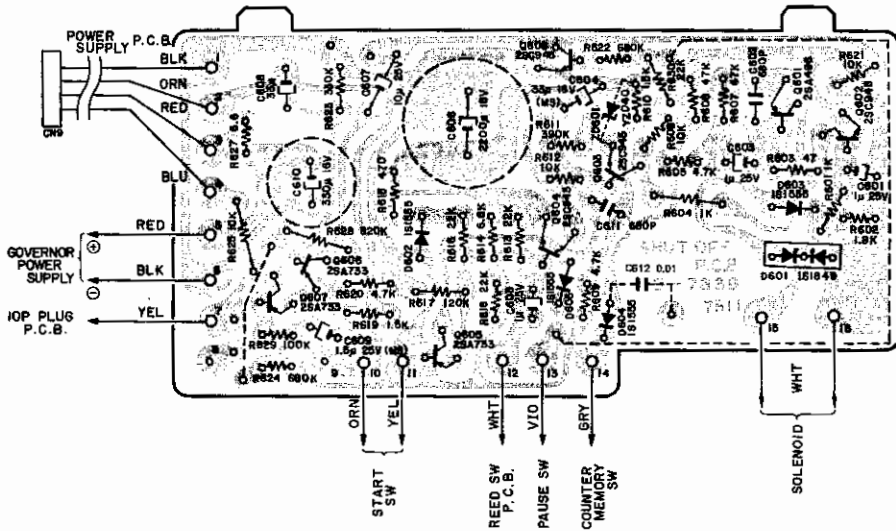


Fig. 8. 9. 1 (Serial No. 3811501-)

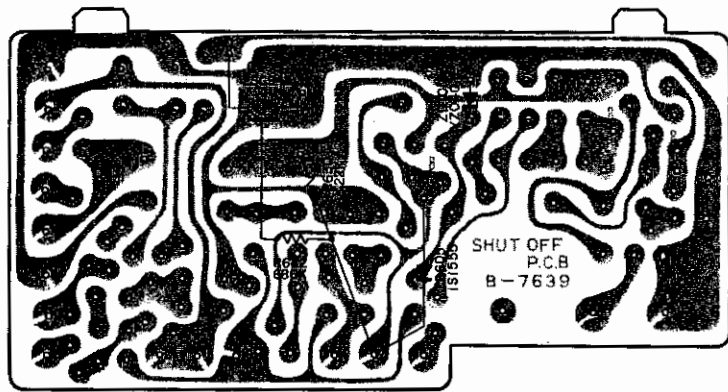
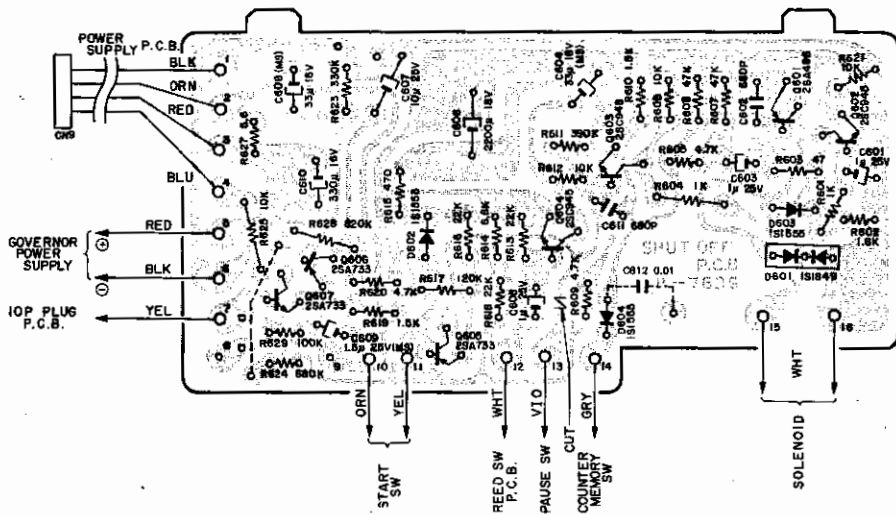


Fig. 8. 9. 2 (Serial No. 3811500)

Note:  
Parts are soldered  
to the dip side of  
P.C.B.

8. 10. MHX Governor P.C.B. Ass'y

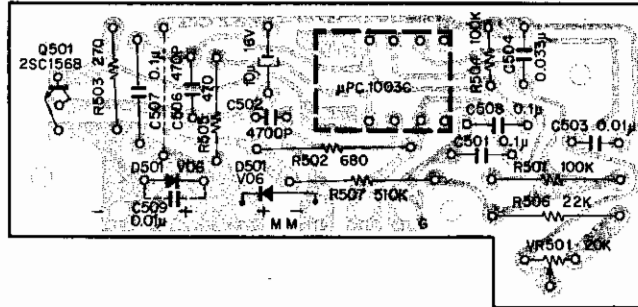


Fig. 8.10

| Schematic Ref. No. | Part No.        | Description                  | Schematic Ref. No. | Part No.                 | Description                            |
|--------------------|-----------------|------------------------------|--------------------|--------------------------|--|
|                    | <b>BA03722A</b> | <b>Shut-off P.C.B. Ass'y</b> | R614               | 0B01877A                 | Carbon Resistor 6.8K ELR% J            |
|                    | 0B07639B        | Shut-off P.C.B.              | R615               | 0B01792A                 | Carbon Resistor 470 ELR% J             |
| Q601               | 0B01695A        | Transistor 2SA496 (O)        | R617               | 0B05568A                 | Carbon Resistor 120K ELR% J            |
| Q602, 603          | 0B01872A        | Transistor 2SC945 (L)        | R622, 624          | 0B05597A                 | Carbon Resistor 680K ELR% J            |
| 604, 608           |                 |                              | R623               | 0B01921A                 | Carbon Resistor 330K ELR% J            |
| Q605, 606          | 0B06013A        | Transistor 2SA733 (L)        | R627               | 0B05818A                 | Carbon Resistor 5.6 ELR% J             |
| 607                |                 |                              | R628               | 0B05674A                 | Carbon Resistor 820K ELR% J            |
| ZD601              | 0B06063A        | Zener Diode YZ040            | R629               | 0B01920A                 | Carbon Resistor 100K ELR% J            |
| D601               | 0B06037U        | Silicon Diode 1S1849         | C602, 611          | 0T04027A                 | Ceramic Capacitor 680P 50V             |
| D602, 603          | 0B01909A        | Silicon Diode 1S1555         | C601, 603          | 0B01173A                 | Electrolytic Capacitor 1μ 25V          |
| 604, 605           |                 |                              | 605                |                          |  |
| R601, 604          | 0B01781A        | Carbon Resistor 1K ELR% J    | C604, 608          | 0B05817A                 | Electrolytic Capacitor 33μ 16V M (MS)  |
| R602               | 0B01830A        | Carbon Resistor 1.8K ELR% J  | C606               | 0B01835A                 | Electrolytic Capacitor 2200μ 18V       |
| R603               | 0B05569A        | Carbon Resistor 47 ELR% J    | C607               | 0B01674A                 | Electrolytic Capacitor 10μ 25V         |
| R605, 609          | 0B01795A        | Carbon Resistor 4.7K ELR% J  | C609               | 0B05815A                 | Electrolytic Capacitor 1.5μ 25V M (MS) |
| 620                |                 |                              | C610               | 0B01502A                 | Electrolytic Capacitor 330μ 16V        |
| R606, 607          | 0B05562A        | Carbon Resistor 47K ELR% J   | C612               | 0B01609A                 | Mylar Capacitor 0.01μ 50V K            |
| R608, 612          | 0B01833A        | Carbon Resistor 10K ELR% J   | 0B08001A           | Tub (2 pcs.)             |  |
| 621, 625           |                 |                              | 0B08152A           | 4P Jack Ass'y 2 (1 pce.) |  |
| R610, 619          | 0B05505A        | Carbon Resistor 1.5K ELR% J  | 0E00037A           | Earth Lug B-5 (1 pce.)   |  |
| R611               | 0B05595A        | Carbon Resistor 390K ELR% J  |                    |                          |  |
| R613, 616          | 0B05661A        | Carbon Resistor 22K ELR% J   |                    |                          |  |
| 618, 630           |                 |                              |                    |                          |  |
|                    |                 |                              |                    | <b>CA03250A</b>          | <b>MHX Governor P.C.B. Ass'y</b>       |

9. MECHANISM ASS'Y & PARTS LIST

9.1. Synthesis Ass'y (A01)

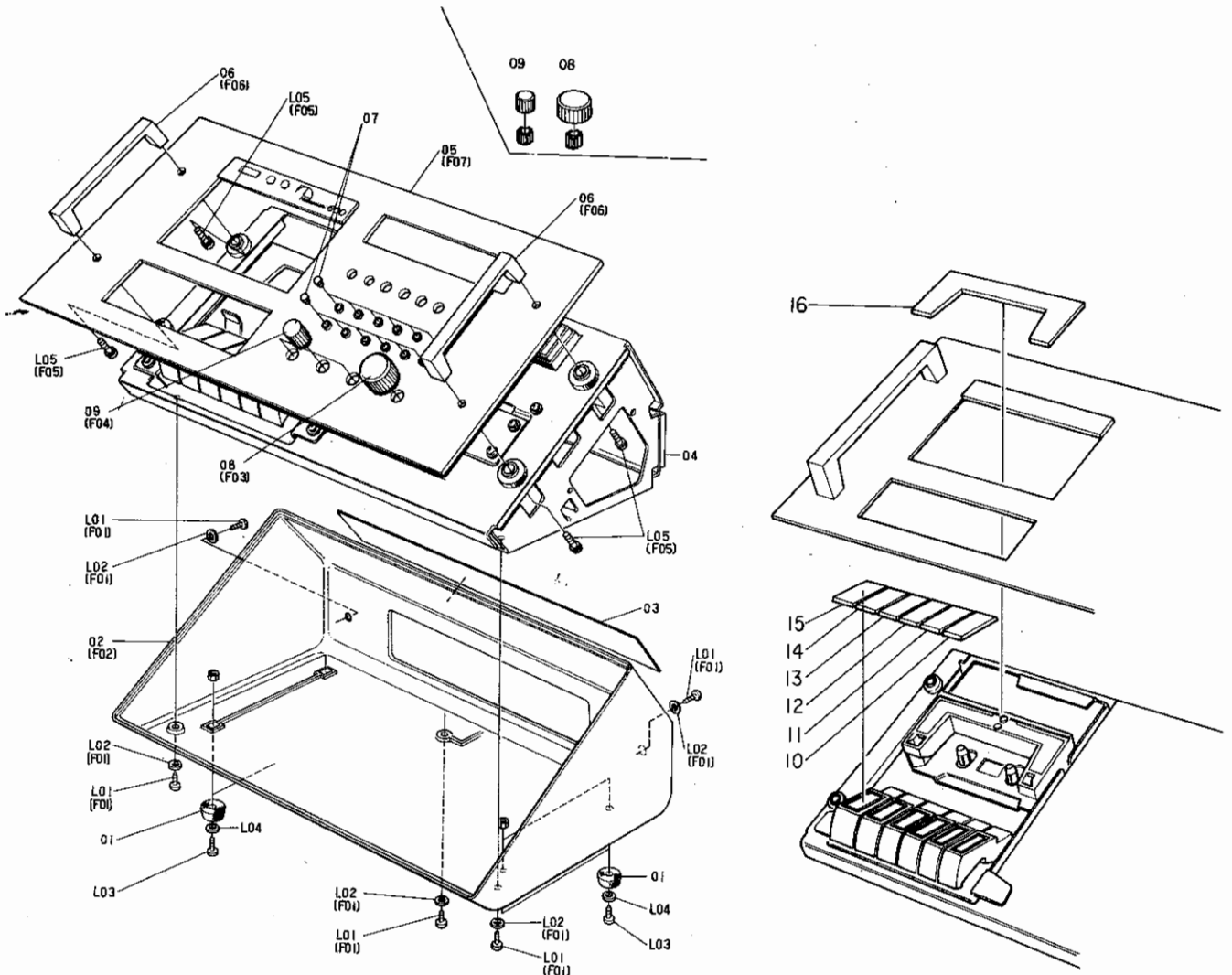


Fig. 9.1

| Schematic Ref. No. | Part No. | Description        | Q'ty | Schematic Ref. No. | Part No. | Description                             | Q'ty |
|--------------------|----------|--------------------|------|--------------------|----------|---|------|
| A01                |          | Synthesis Ass'y    |      |                    |          |   |      |
| 01                 | 0A00518C | Foot               | 4    | 12                 | 0H03407B | Button Cover PLAY                       | 1    |
| 02                 | 0A03253A | Cabinet            | 1    | 13                 | 0H03406B | Button Cover STOP                       | 1    |
|                    | 0M03619A | Gate Screen Plate  | 1    | 14                 | 0H03405B | Button Cover REW.                       | 1    |
|                    | 0M03339A | Caution Label      | 1    | 15                 | 0H03404B | Button Cover REC.                       | 1    |
| 03                 | 0M03618A | Cabinet Plate      | 1    | 16                 | 0H03402A | Lid Cover                               | 1    |
| 04                 | JA03065A | Chassis Ass'y      | 1    | L01                | 0E00594A | Screw M3 x 8 Philips Bind Head (Bronze) | 5    |
| 05                 | HA03628A | Front Panel Ass'y  | 1    | L02                | 0E00197A | Washer 3mm (Bronze)                     | 5    |
| 06                 | HA03632A | Handle Ass'y       | 2    | L03                | 0E00701A | Screw M3 x10 Philips Bind Head (Bronze) | 4    |
| 07                 | 0H03399A | S.F.R. Cover       | 12   | L04                | 0E00253A | Washer 3mm                              | 4    |
| 08                 | HA03631A | V.R. Cap (B) Ass'y | 1    | L05                | 0E00700A | Screw M5 x 16 Philips Pan Head (2A)     | 4    |
| 09                 | HA03630A | V.R. Cap (A) Ass'y | 3    |                    |          |   |      |
| 10                 | 0H03409B | Button Cover PAUSE | 1    |                    |          |   |      |
| 11                 | 0H03408B | Button Cover F.F.  | 1    |                    |          |   |      |

9.2. Chassis Ass'y

9.2.1. Chassis Ass'y (A02-1)

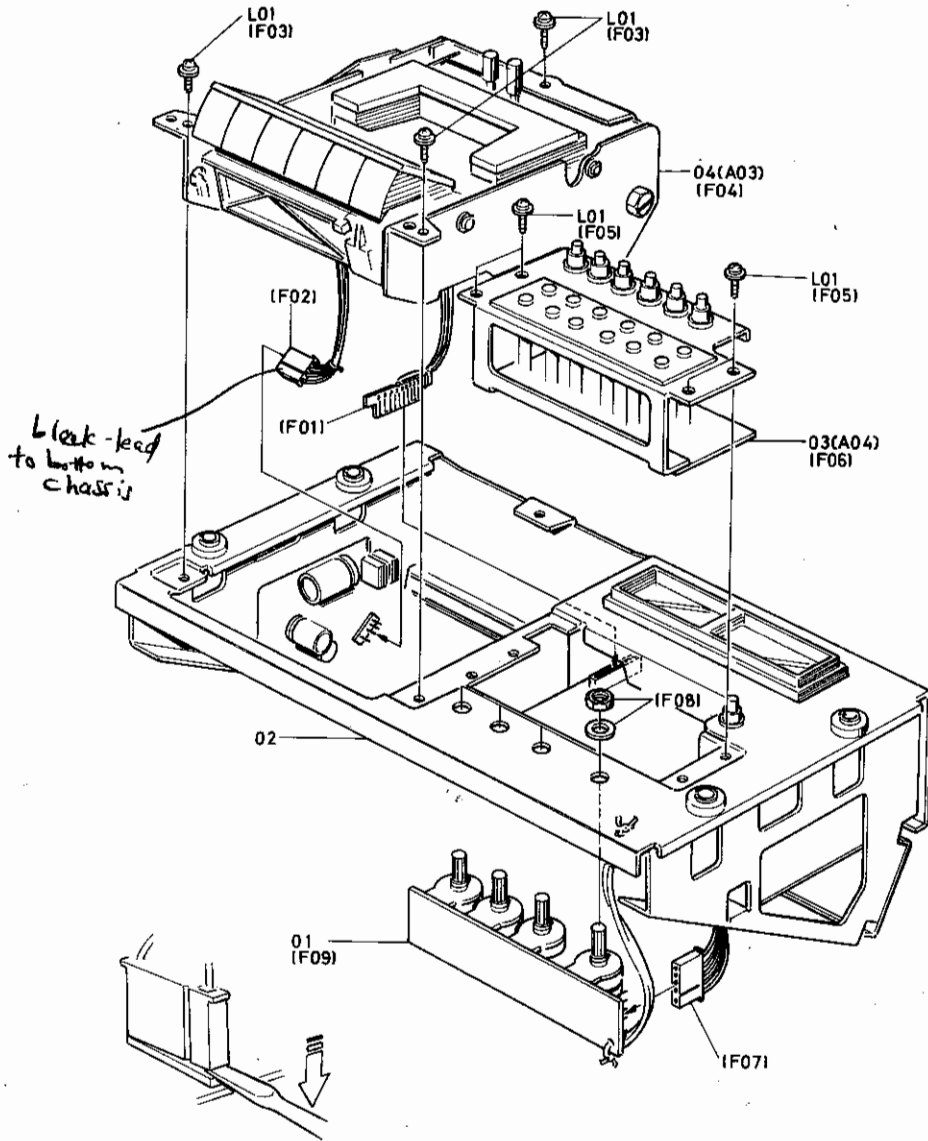


Fig. 9. 2. 1

| Schematic Ref. No. | Part No.        | Description                        | Q'ty     |
|--------------------|-----------------|------------------------------------|----------|
| <b>A02-1</b>       | <b>JA03065A</b> | <b>Chassis Ass'y</b>               | <b>1</b> |
| 01                 | BA03720A        | V.R. P.C.B. Ass'y                  | 1        |
| 02                 | JA03055A        | Main Chassis Ass'y                 | 1        |
| 03                 | JA03053A        | Front Control Ass'y                | 1        |
| 04                 | CA03256A        | Mechanism Ass'y                    | 1        |
| L01                | 0E00606A        | Screw M3 x 6 Philips Pan Head (3A) | 5        |

9. 2. 2. Chassis Ass'y (A02-2)

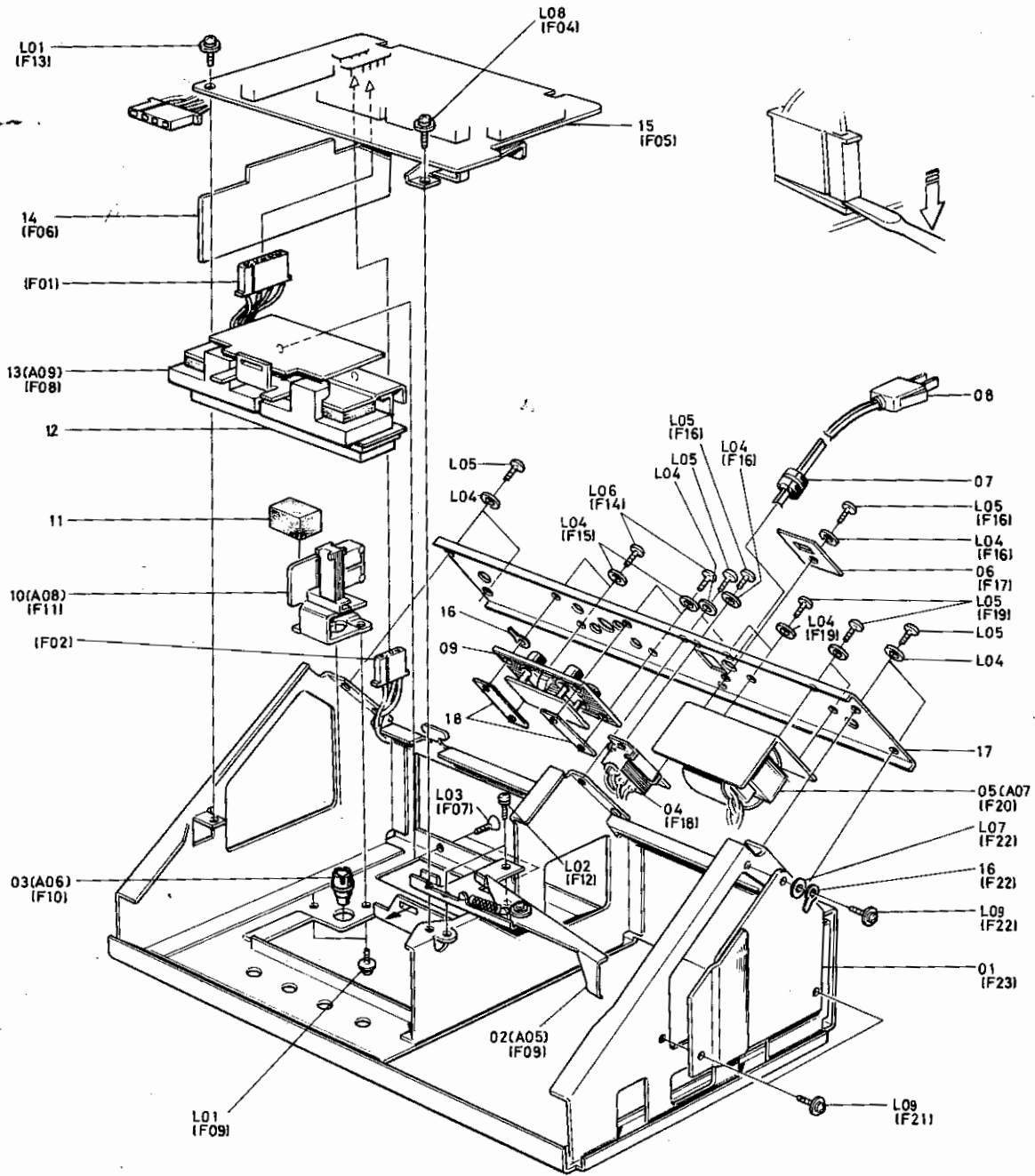


Fig. 9. 2. 2

| Schematic Ref. No. | Part No. | Description                            | Q'ty |
|--------------------|----------|--|------|
| A02-2              | JA03065A | Chassis Ass'y                          | 1    |
| 01                 | BA03721A | Power Supply P.C.B. Ass'y              | 1    |
| 02                 | JA03064A | Record Link Ass'y                      | 1    |
| 03                 | JA03061A | Push Button Ass'y                      | 1    |
| 04                 | 0B07092U | Voltage Selector                       | 1    |
| 05                 | JA03058A | Power Transformer Ass'y                | 1    |
| 06                 | 0M03627A | Voltage Lock Plate                     | 1    |
| 07                 | 0B08037U | Cord Bushing C                         | 1    |
| 08                 | 0B03900U | Power Cord                             | 1    |
| 09                 | BA03726A | DIN Pin Jack Ass'y                     | 1    |
| 10                 | JA03063A | Power SW. Ass'y                        | 1    |
| 11                 | 0J03421A | Dolby N.R. P.C.B. Pad                  | 1    |
| 12                 | 0J03417A | Meter Escutcheon                       | 1    |
| 13                 | JA03067A | Meter Ass'y                            | 1    |
| 14                 | BA03670A | Dolby N.R. P.C.B. Ass'y                | 1    |
| 15                 | BA03715A | Main P.C.B. Ass'y                      | 1    |
| 16                 | 0E00037A | Earth Lug B-5                          | 2    |
| 17                 | JA03059A | Rear Panel Sub Ass'y                   | 1    |
| 18                 | 0J03277A | Metal Seat Nut                         | 2    |
| L01                | 0E00606A | Screw M3 x 6 Philips Pan Head (3A)     | 3    |
| L02                | 0E00612A | Screw M3 x 6 Philips Pan Head (2A)     | 2    |
| L03                | 0E00505A | Screw M3 x 6 Philips Counter-sunk      | 2    |
| L04                | 0E00157A | Washer 3mm collar                      | 16   |
| L05                | 0E00589A | Screw M3 x 6 Philips Pan Head (Bronze) | 12   |
| L06                | 0E00588A | Screw M3 x 8 Philips Pan Head (Bronze) | 4    |
| L07                | 0E00071A | Washer 3mm Fiber                       | 1    |
| L08                | 0E00660A | Screw M3 x 12 Philips Pan Head (3A)    | 1    |
| L09                | 0E00607A | Screw M3 x 8 Philips Pan Head (3A)     | 3    |

9.3. N600 Mechanism Ass'y (A03)

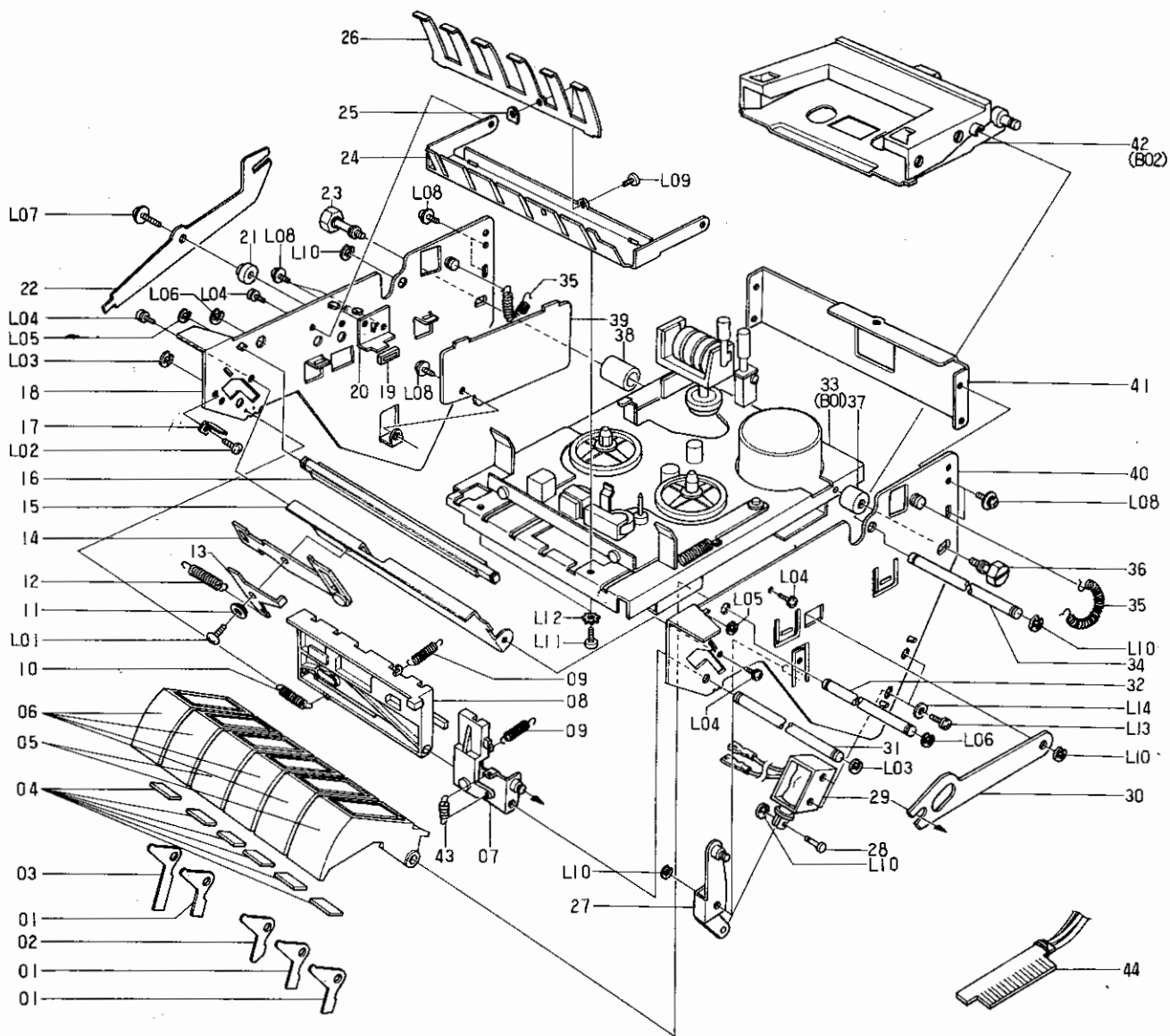


Fig. 9.3

| Schematic Ref. No. | Part No. | Description                         | Q'ty |
|--------------------|----------|-------------------------------------|------|
| A03                | CA03255A | N600 Mechanism Ass'y                | 1    |
| 01                 | 0C03892A | Button Cam (B)                      | 3    |
| 02                 | 0C03893A | Button Cam (C)                      | 1    |
| 03                 | 0C03891A | Button Cam (A)                      | 1    |
| 04                 | 0C03894A | Button Plate                        | 6    |
| 05                 | CA03260A | Deck Button S Ass'y                 | 2    |
| 06                 | CA03261A | Deck Button R Ass'y                 | 4    |
| 07                 | CA03263A | Pause Lock Plate Ass'y              | 1    |
| 08                 | 0C03896A | Lock Plate                          | 1    |
| 09                 | 0C03899A | Pause Lock Spring (B)               | 2    |
| 10                 | 0C03897A | Lock Plate Slide Spring             | 1    |
| 11                 | 0C03883A | Eject Linkage Collar                | 1    |
| 12                 | 0C03900A | Eject Arm Spring                    | 1    |
| 13                 | 0C03882A | Lock Plate Slide Lever              | 1    |
| 14                 | CA03257A | Eject Bar Ass'y                     | 1    |
| 15                 | 0C03881A | Front Hold Plate                    | 1    |
| 16                 | CA03262A | Button Stopper Ass'y                | 1    |
| 17                 | 0C03945A | Lock Plate Stopper                  | 1    |
| 18                 | CA03258A | Side Plate L Ass'y                  | 1    |
| 19                 | 0C03885A | Lid Damper Rubber                   | 1    |
| 20                 | 0C03884A | Lid Adjust Plate                    | 1    |
| 21                 | 0C03905A | Lever Collar                        | 1    |
| 22                 | 0C03904A | Eject Joint Bar                     | 1    |
| 23                 | 0C03887A | Side Plate L Bolt                   | 1    |
| 24                 | 0C03878A | Button Guide                        | 1    |
| 25                 | 0C03880A | Button Spring Holder                | 1    |
| 26                 | 0C03879A | Button Spring                       | 1    |
| 27                 | CA03265A | Shut-off Arm Ass'y                  | 1    |
| 28                 | 0C03906A | Solenoid Pin                        | 1    |
| 29                 | BA03727A | Solenoid sub Ass'y                  | 1    |
| 30                 | 0C03907A | Shut-off Bar                        | 1    |
| 31                 | 0C03901A | Lock Shaft                          | 1    |
| 32                 | 0C03895A | Button Shaft                        | 1    |
| 33                 | CA03256A | N600 Mechanism Sub Ass'y            | 1    |
| 34                 | 0C03903A | Lid Shaft                           | 1    |
| 35                 | 0C03902A | Lid Spring                          | 2    |
| 36                 | 0C03889A | Side Plate R Bolt                   | 1    |
| 37                 | 0C03888A | Side Plate R Collar                 | 1    |
| 38                 | 0C03886A | Side Plate L Collar                 | 1    |
| 39                 | BA03722A | Shut-off P.C.B. Ass'y               | 1    |
| 40                 | CA03259A | Side Plate R Ass'y                  | 1    |
| 41                 | 0C03890A | Rear Hold Plate                     | 1    |
| 42                 | CA03264A | Cassette Case Ass'y                 | 1    |
| 43                 | 0C03898A | Pause Lock Spring                   | 1    |
| 44                 | 0B07551A | 10P Plug Board                      | 1    |
| L01                | 0E00121A | Screw M2.6 x 6 Philips Pan Head     | 1    |
| L02                | 0E00226A | Screw M2.6 x 4 Philips Pan Head     | 1    |
| L03                | 0E00181A | E Ring 3mm                          | 2    |
| L04                | 0E00612A | Screw M3 x 6 Philips Pan Head (2A)  | 4    |
| L05                | 0E00698A | E Ring 2.5mm                        | 2    |
| L06                | 0E00134A | E Ring 4mm                          | 2    |
| L07                | 0E00610A | Screw M3 x 12 Philips Pan Head (3A) | 1    |
| L08                | 0E00606A | Screw M3 x 6 Philips Pan Head (3A)  | 7    |
| L09                | 0E00166A | Screw M2 x 4 Cylinder Head          | 1    |
| L10                | 0E00222A | E Ring 2mm                          | 5    |
| L11                | 0E00509A | Screw M3 x 6 Philips Pan Head       | 2    |
| L12                | 0E00172A | Washer 3mm Toothed Lock             | 2    |
| L13                | 0E00622A | Screw M3 x 5 Philips Pan Head (2A)  | 2    |
| L14                | 0E00597A | Washer 3mm                          | 2    |

9.4. Front Control Ass'y (A04)

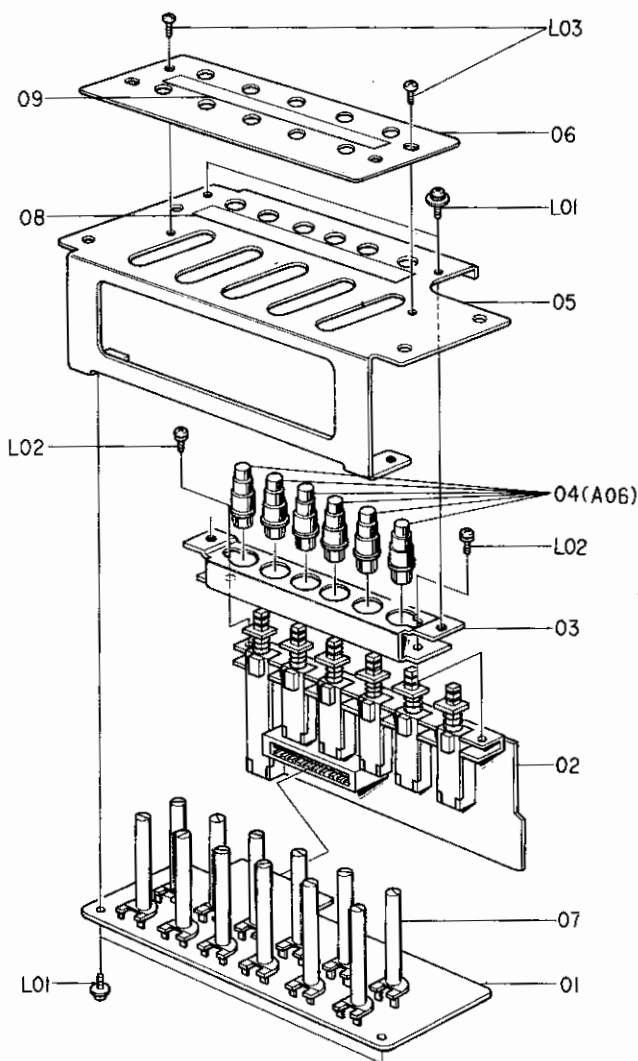


Fig. 9.4

| Schematic Ref. No. | Part No. | Description                        | Q'ty |
|--------------------|----------|------------------------------------|------|
| A04                | JA03053A | Front Control Ass'y                | 1    |
| 01                 | BA03718A | CAL. P.C.B. Ass'y                  | 1    |
| 02                 | BA03719A | SW. P.C.B. Ass'y                   | 1    |
| 03                 | 0J03410A | SW. Holder                         | 1    |
| 04                 | JA03061A | Push Button Ass'y                  | 6    |
| 05                 | 0J03409A | Switch Cover                       | 1    |
| 06                 | 0J03411A | CAL. Cover                         | 1    |
| 07                 | 0B08157A | CAL. Knob                          | 12   |
| 08                 | 0M03629A | CAL. Label                         | 1    |
| 09                 | 0M03628A | SW. Label                          | 1    |
| L01                | 0E00606A | Screw M3 x 6 Philips Pan Head (3A) | 4    |
| L02                | 0E00612A | Screw M3 x 6 Philips Pan Head (2A) | 2    |
| L03                | 0E00226A | Screw M2.6 x 4 Philips Pan Head    | 2    |



9.5. Record Link Ass'y (A05)

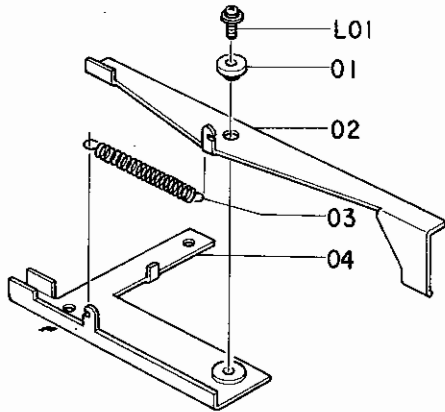


Fig. 9.5

9.8. Power SW. Ass'y (A08)

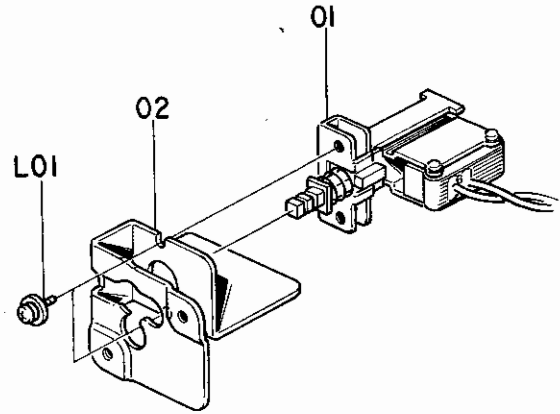


Fig. 9.8

9.6. Push Button Ass'y (A06)

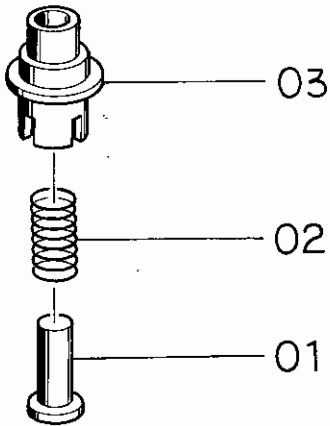


Fig. 9.6

9.7. Power Trans. Ass'y (A07)

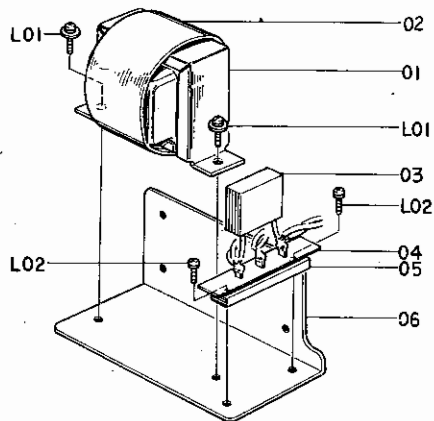


Fig. 9.7

9.9. Meter Ass'y (A09)

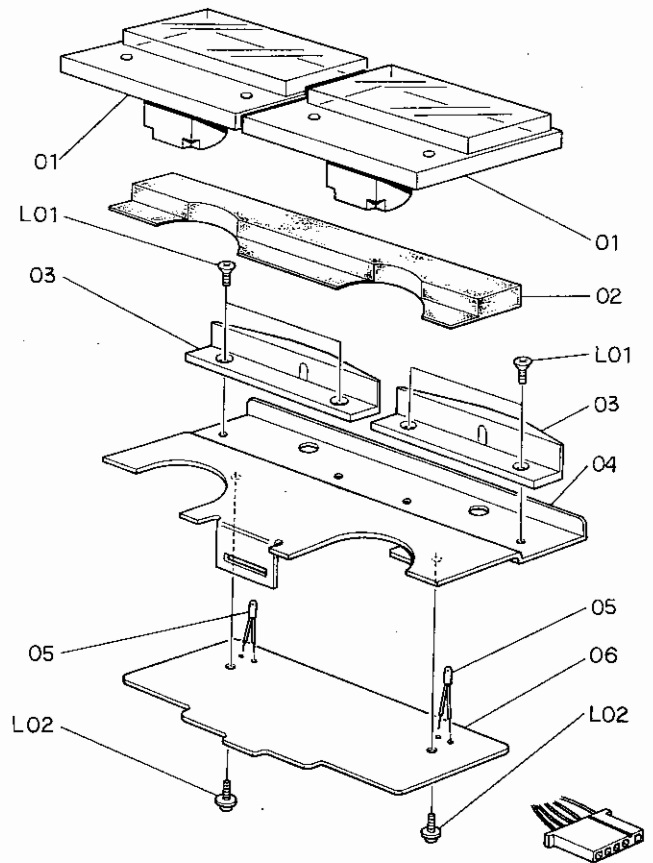


Fig. 9.9

| Schematic Ref. No. | Part No.        | Description                        | Q'ty     |
|--------------------|-----------------|------------------------------------|----------|
| <b>A05</b>         | <b>JA03064A</b> | <b>Record Link Ass'y</b>           | <b>1</b> |
| 01                 | 0J03396A        | Record Link Collar                 | 1        |
| 02                 | 0J03420A        | Record Link                        | 1        |
| 03                 | 0J03423A        | Record Link Spring                 | 1        |
| 04                 | 0J03419A        | Record Arm Chassis                 | 1        |
| L01                | 0E00607A        | Screw M3 x 8 Philips Pan Head (3A) | 1        |
| <b>A06</b>         | <b>JA03061A</b> | <b>Push Button Ass'y</b>           | <b>7</b> |
| 01                 | 0J03413A        | Push Button                        | 1        |
| 02                 | 0J03414A        | SW. Spring                         | 1        |
| 03                 | 0J03412A        | Push Button Flange                 | 1        |
| <b>A07</b>         | <b>JA03058A</b> | <b>Power Trans. Ass'y</b>          | <b>1</b> |
| 01                 | 0B06537U        | Power Trans.                       | 1        |
| 02                 | 0J03051A        | Trans. Shield Plate                | 1        |
| 03                 | 0B03873U        | Spark Killer                       | 1        |
| 04                 | 0B08030U        | 3P Terminal Insulator (A)          | 1        |
| 05                 | 0B08024U        | 3P Terminal Strip                  | 1        |
| 06                 | 0J03422A        | Trans. Holder                      | 1        |
| L01                | 0E00606A        | Screw M3 x 6 Philips Pan Head (3A) | 2        |
| L02                | 0E00510A        | Screw M3 x 8 Philips Pan Head (2A) | 2        |
| <b>A08</b>         | <b>JA03063A</b> | <b>Power SW. Ass'y</b>             | <b>1</b> |
| 01                 | 0B07093U        | Power SW.                          | 1        |
| 02                 | 0J03408A        | Power SW. Holder                   | 1        |
| L01                | 0E00606A        | Screw M3 x 6 Philips Pan Head (3A) | 2        |
| <b>A09</b>         | <b>JA03067A</b> | <b>Meter Ass'y</b>                 | <b>1</b> |
| 01                 | 0B08154A        | Level Meter                        | 2        |
| 02                 | 0J03424A        | Meter Cushion                      | 1        |
| 03                 | 0J03418A        | Lamp House                         | 2        |
| 04                 | JA03052A        | Meter Holder Sub Ass'y             | 1        |
| 05                 | 0B08155A        | Meter Lamp                         | 2        |
| 06                 | BA03716A        | Meter P.C.B. Ass'y                 | 1        |
| L01                | 0E00602A        | Screw M3 x 4 Philips Counter-sunk  | 2        |
| L02                | 0E00606A        | Screw M3 x 6 Philips Pan Head (3A) | 2        |

9. 10. N600 Mechanism Sub Ass'y

9. 10.2. N600 Mechanism Sub Ass'y (B01-2)

9. 10.1. N600 Mechanism Sub Ass'y (B01-1)

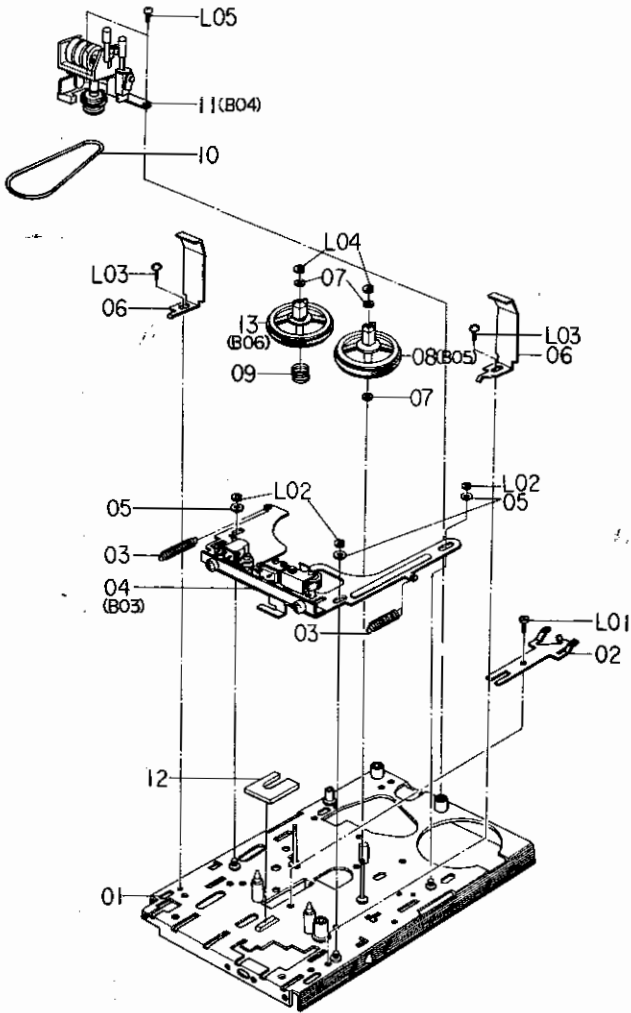


Fig. 9. 10. 1

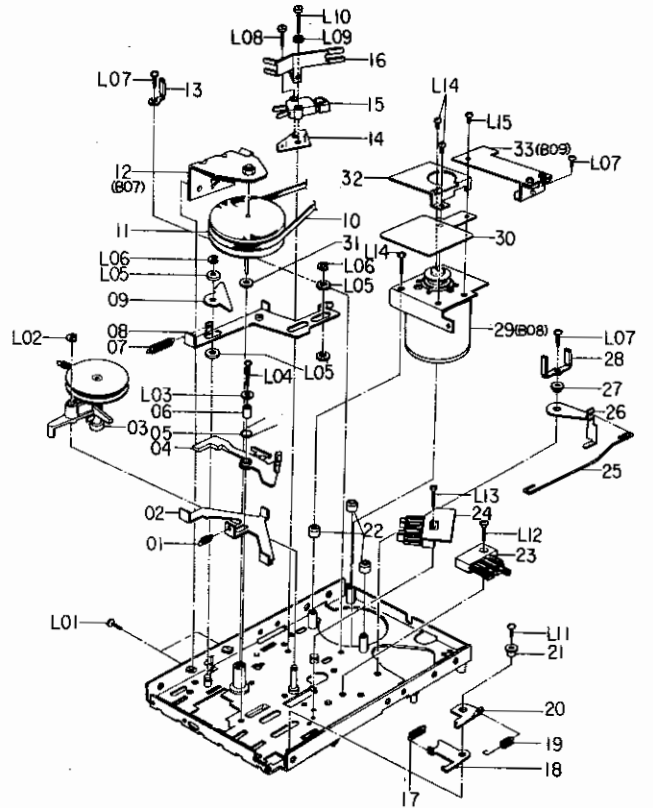


Fig. 9. 10. 2

| Schematic Ref. No. | Part No.        | Description                      | Q'ty     | Schematic Ref. No. | Part No.        | Description                                 | Q'ty     |
|--------------------|-----------------|----------------------------------|----------|--------------------|-----------------|---|----------|
| <b>B01-1</b>       | <b>CA03256A</b> | <b>N600 Mechanism Sub Ass'y</b>  | <b>1</b> | <b>L07</b>         | <b>0E00228A</b> | <b>Screw M2.6 x 6 Philips Pan Head (FT)</b> | <b>3</b> |
| 01                 | CA03266A        | Mechanism Chassis (B) Ass'y      | 1        | L08                | 0E00004A        | Screw M2 x 8 Cylinder Head                  | 1        |
| 02                 | CA03140A        | Brake Ass'y                      | 1        | L09                | 0E00025A        | Washer 2mm Spring                           | 1        |
| 03                 | 0C03694B        | Base Return Spring               | 2        | L10                | 0E00218A        | Screw M2 x 10 Cylinder Head                 | 1        |
| 04                 | CA03269A        | Head Base (B) Ass'y              | 1        | L11                | 0E00231A        | Screw M2.6 x 8 Philips Pan Head (FT)        | 1        |
| 05                 | 0C06243A        | W-4-8-0.2F                       | 3        | L12                | 0E00008A        | Screw M2.6 x 8 Countersunk                  | 1        |
| 06                 | 0C03908A        | Cassette Guide (D)               | 2        | L13                | 0E00223A        | Screw M2 x 10 Countersunk                   | 1        |
| 07                 | 0C03613A        | Washer 1.6mm Plastics            | 3        | L14                | 0E00220A        | Screw M2.6 x 8 Philips Pan Head             | 3        |
| 08                 | CA03269A        | Reel Hub T (B) Ass'y             | 1        | L15                | 0E00219A        | Screw M2.6 x 5 Philips Pan Head             | 1        |
| 09                 | CA03268A        | Reel Hub S (B) Ass'y             | 1        |                    |                 |   |          |
| 10                 | 0C03651A        | Counter Belt (E)                 | 1        |                    |                 |   |          |
| 11                 | CA03271A        | Counter Holder Ass'y             | 1        |                    |                 |   |          |
| 12                 | 0C03863A        | Head Base Spacer                 | 1        |                    |                 |   |          |
| L01                | 0E00166A        | Screw M2 x 4 Cylinder Head       | 1        |                    |                 |   |          |
| L02                | 0E00181A        | E Ring 3mm                       | 3        |                    |                 |   |          |
| L03                | 0E00226A        | Screw M2.6 x 4 Philips Pan Head  | 2        |                    |                 |   |          |
| L04                | 0E00165A        | E Ring 1.2mm                     | 2        |                    |                 |   |          |
| L05                | 0E00219A        | Screw M2.6 x 5 Philips Pan Head  | 2        |                    |                 |   |          |
| <b>B01-2</b>       | <b>CA03256A</b> | <b>N600 Mechanism Sub Ass'y</b>  | <b>1</b> |                    |                 |   |          |
| 01                 | 0C03649A        | See-Saw Arm Spring               | 1        |                    |                 |   |          |
| 02                 | 0C03647B        | See-Saw Arm                      | 1        |                    |                 |   |          |
| 03                 | CA03150A        | Idler Pulley Ass'y               | 1        |                    |                 |   |          |
| 04                 | 0C03646A        | FRP Lever (B)                    | 1        |                    |                 |   |          |
| 05                 | 0C03650B        | Lever Spring                     | 1        |                    |                 |   |          |
| 06                 | 0C03648A        | See-Saw Arm Pipe                 | 1        |                    |                 |   |          |
| 07                 | 0C03748A        | Slide Plate Spring               | 1        |                    |                 |   |          |
| 08                 | 0C03744B        | Pause Slide Plate                | 1        |                    |                 |   |          |
| 09                 | 0C03746C        | Pause Bar                        | 1        |                    |                 |   |          |
| 10                 | 0C03668A        | Driving Belt                     | 1        |                    |                 |   |          |
| 11                 | CA03225A        | Flywheel (B) Ass'y               | 1        |                    |                 |   |          |
| 12                 | CA03226A        | Flywheel Holder (C) Ass'y        | 1        |                    |                 |   |          |
| 13                 | 0C03691A        | Cord Holder                      | 1        |                    |                 |   |          |
| 14                 | 0C03800A        | Pause Switch Mylar               | 1        |                    |                 |   |          |
| 15                 | 0C03743A        | Pause Switch                     | 1        |                    |                 |   |          |
| 16                 | 0C03799E        | Belt Guide                       | 1        |                    |                 |   |          |
| 17                 | 0C03774A        | Base Cam Spring                  | 1        |                    |                 |   |          |
| 18                 | 0C03773C        | Base Cam                         | 1        |                    |                 |   |          |
| 19                 | 0C03791A        | Record Lock Spring (B)           | 1        |                    |                 |   |          |
| 20                 | 0C03652C        | Record Lock (B)                  | 1        |                    |                 |   |          |
| 21                 | 0C03775C        | Base Cam Shaft                   | 1        |                    |                 |   |          |
| 22                 | 0C03805B        | Stud Collar (B)                  | 3        |                    |                 |   |          |
| 23                 | CA03141A        | Mute Switch Ass'y                | 1        |                    |                 |   |          |
| 24                 | CA03231A        | Start Switch (C) Ass'y           | 1        |                    |                 |   |          |
| 25                 | 0C03704A        | Record Sensor Linkage (B)        | 1        |                    |                 |   |          |
| 26                 | 0C03909A        | Record Sensor (B)                | 1        |                    |                 |   |          |
| 27                 | 0C03646A        | Record Lock Shaft                | 1        |                    |                 |   |          |
| 28                 | 0B03067A        | Bind Holder                      | 1        |                    |                 |   |          |
| 29                 | CA03253A        | MHX Motor Ass'y                  | 1        |                    |                 |   |          |
| 30                 | 0C03859A        | Shield Plate                     | 1        |                    |                 |   |          |
| 31                 | 0C03174A        | Washer 2.1mm Plastics            | 1        |                    |                 |   |          |
| 32                 | 0C03814D        | Motor Shield                     | 1        |                    |                 |   |          |
| 33                 | CA03250A        | MHX Governor P.C.B. Ass'y        | 1        |                    |                 |   |          |
| L01                | 0E00226A        | Screw M2.6 x 4 Philips Pan Head  | 2        |                    |                 |   |          |
| L02                | 0E00222A        | E Ring 2mm                       | 1        |                    |                 |   |          |
| L03                | 0E00142A        | Washer 2.6mm                     | 1        |                    |                 |   |          |
| L04                | 0E00229A        | Screw M2.6 x 10 Philips Pan Head | 1        |                    |                 |   |          |
| L05                | 0E00031A        | Washer 4mm                       | 4        |                    |                 |   |          |
| L06                | 0E00181A        | E Ring 3mm                       | 2        |                    |                 |   |          |

9. 11. Cassette Case Ass'y (B02)

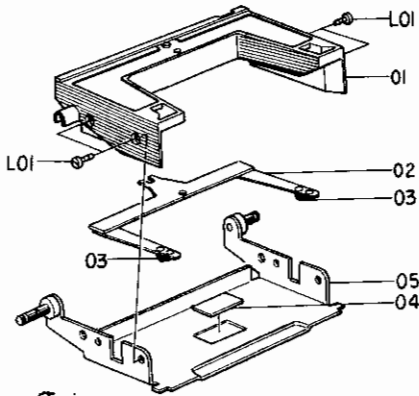


Fig. 9. 11

9. 13. Counter Holder Ass'y (B04)

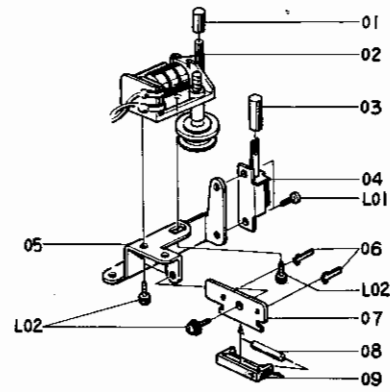


Fig. 9. 13

9. 12. Head Base (B) Ass'y (B03)

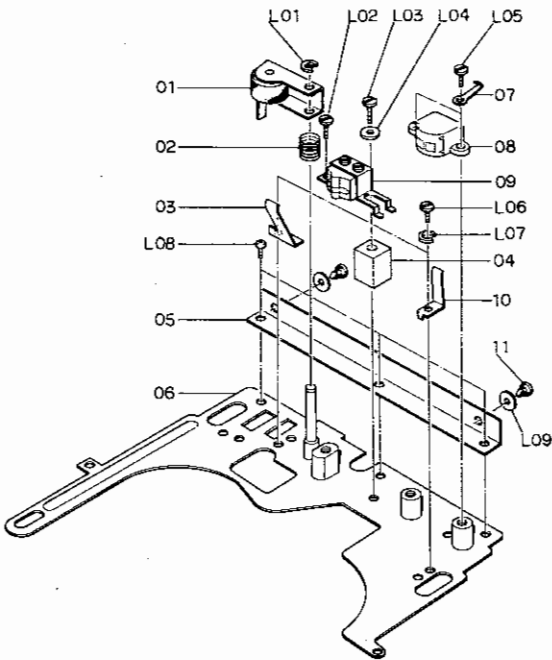


Fig. 9. 12

9. 14. Reel Hub T (B) Ass'y (B05)

9. 15. Reel Hub S (B) Ass'y (B06)

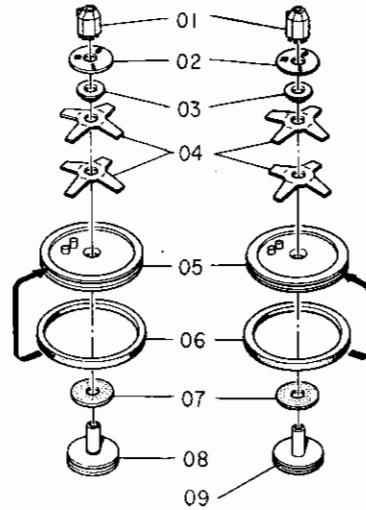


Fig. 9. 14

9. 16. Flywheel Holder (C) Ass'y (B07)

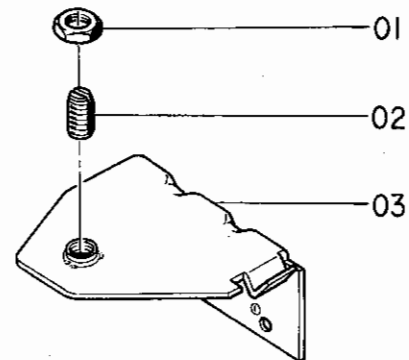


Fig. 9. 15

9. 17. MHX Motor Ass'y (B08)

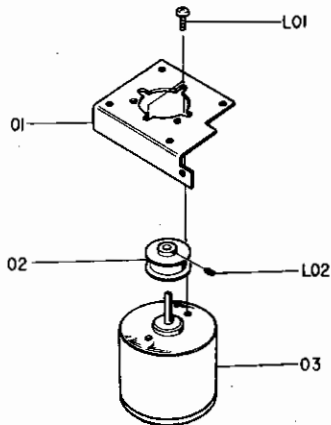


Fig. 9. 16

9. 18. Record/Playback Head Ass'y (B09)

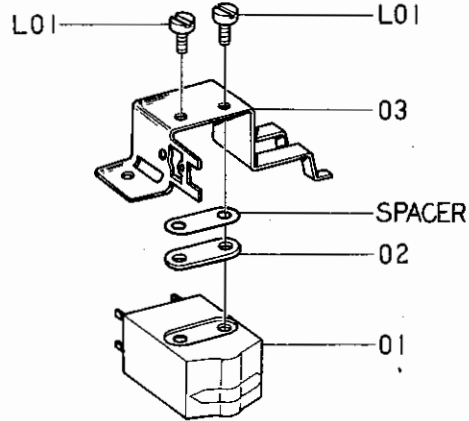


Fig. 9. 17

| Schematic Ref. No. | Part No. | Description                        | Q'ty | Schematic Ref. No. | Part No.             | Description                   | Q'ty |
|--------------------|----------|------------------------------------|------|--------------------|----------------------|-------------------------------|------|
| B02                | CA03264A | Cassette Case Ass'y                | 1    | B05                | CA03269A             | Reel Hub T (B) Ass'y          | 1    |
| 01                 | 0C03925B | Cassette Lid                       | 1    | 01                 | 0C03785B             | Sprocket (B)                  | 1    |
| 02                 | CA03274A | SP. Base Plate Ass'y               | 1    | 02                 | 0C03786B             | Torque Plate                  | 1    |
| 03                 | 0C03924A | Cassette Stabilizer                | 2    | 03                 | 0C03521A             | Thrust Bearing                | 1    |
| 04                 | 0M03638A | Silver Plate 600                   | 1    | 04                 | 0C03520D             | Reel Hub Spring               | 2    |
| 05                 | CA03273B | Cassette Well Ass'y                | 1    | 05                 | 0C03943A             | Pulley (B)                    | 1    |
| L01                | 0E00699A | Screw M2 x 4 Cylinder Head         | 1    | 06                 | 0C03522A             | Reel Hub Ring                 | 1    |
|                    |          |                                    |      | 07                 | 0C03519E             | Reel Hub Felt                 | 1    |
|                    |          |                                    |      | 09                 | 0C03689A             | Pulley (F)                    | 1    |
| B03                | CA03267A | Head Base (B) Ass'y                | 1    | B06                | CA03268A             | Reel Hub S (B) Ass'y          | 1    |
| 01                 | CA03276A | Pressure Roller (B) Ass'y          | 1    | 01                 | 0C03785B             | Sprocket (B)                  | 1    |
| 02                 | 0C03758B | Pressure Roller Spring (B)         | 1    | 02                 | 0C03786B             | Torque Plate                  | 1    |
| 03                 | 0C03691A | Cassette Retainer Spring R         | 1    | 03                 | 0C03521A             | Thrust Bearing                | 1    |
| 04                 | 0C03588A | Azimuth Adjust Rubber              | 1    | 04                 | 0C03520D             | Reel Hub Spring               | 2    |
| 05                 | 0C03942A | Base Angle (B)                     | 1    | 05                 | 0C03943A             | Pulley (B)                    | 1    |
| 06                 | CA03275A | Head Base (B) Sub Ass'y            | 1    | 06                 | 0C03522A             | Reel Hub Ring                 | 1    |
| 07                 | 0C03591A | Cord Holder                        | 2    | 07                 | 0C03519E             | Reel Hub Felt                 | 1    |
| 08                 | 0C03862A | Erase Head                         | 1    | 08                 | 0C03516A             | Pulley (C)                    | 1    |
| 09                 | CA03201B | Record/Playback Head Ass'y         | 1    | B07                | CA03226B             | Flywheel Holder (C) Ass'y     | 1    |
| 10                 | 0C03690A | Cassette Retainer Spring L         | 1    | 01                 | 0C03857A             | Lock Nut                      | 1    |
| 11                 | 0C03767A | Base Stopper Rubber                | 1    | 02                 | CA03281A             | Thrust Screw Ass'y            | 1    |
| L01                | 0E00042A | E Ring 1.5mm                       | 1    | 03                 | CA03280A             | Flywheel Holder (C) Sub Ass'y | 1    |
| L02                | 0E00166A | Screw M2 x 4 Cylinder Head         | 1    | B08                | CA03253A             | MHX Motor Ass'y               | 1    |
| L03                | 0E00218A | Screw M2 x 10 Cylinder Head        | 1    | 01                 | 0J03221A             | Motor Bracket C               | 1    |
| L04                | 0E00149A | Washer 2.3mm                       | 1    | 02                 | 0C03712A             | Motor Pulley TC-B             | 1    |
| L05                | 0E00185A | Screw M2 x 6 Cylinder Head         | 2    | 03                 | 0C03874A             | MHX Motor                     | 1    |
| L06                | 0E00002A | Screw M2 x 3 Cylinder Head         | 2    | L01                | 0E00120A             | Screw M2 x 3 Philips Pan Head | 2    |
| L07                | 0E00025A | Washer 2mm Spring                  | 2    | L02                | 0E00224A             | Screw M2 x 3 Cone Point       | 1    |
| L08                | 0E00120A | Screw M2.6 x 3 Philips Pan Head    | 3    | B09                | CA03207B             | Record/Playback Head Ass'y    | 1    |
| L09                | 0E00030A | Washer 3mm Steel                   | 2    | 01                 | GA02009L             | RP-52 Record/Playback Head    | 1    |
| B04                | CA03271A | Counter Holder Ass'y               | 1    | 02                 | 0G01100B             | Head Hold Spacer              | 1    |
| 01                 | 0C03933A | Counter Knob                       | 1    | 03                 | 0G01099C             | Head Holder (B)               | 1    |
| 02                 | CA03279A | Tape Counter Ass'y                 | 1    | L01                | 0E00002A             | Screw M2 x 3 Cylinder Head    | 2    |
| 03                 | 0C03934A | Memory SW. Knob                    | 1    |                    |                      | Spacer                        |      |
| 04                 | 0B07051A | Memory SW.                         | 1    | AH01115A           | PH Spacer t = 0.1mm  |                               |      |
| 05                 | 0C03931A | Counter Holder                     | 1    | AH01116A           | PH Spacer t = 0.15mm |                               |      |
| 06                 | 0B03924A | Test Pin                           | 2    | AH01117A           | PH Spacer t = 0.2mm  |                               |      |
| 07                 | 0B07640A | Reed SW. P.C.B.                    | 1    | AH01118A           | PH Spacer t = 0.25mm |                               |      |
| 08                 | 0B03803A | Reed SW.                           | 1    | AH01119A           | PH Spacer t = 0.3mm  |                               |      |
| 09                 | 0C03932A | Reed SW. Holder                    | 1    |                    |                      |                               |      |
| L01                | 0E00166A | Screw M2 x 4 Cylinder Head         | 2    |                    |                      |                               |      |
| L02                | 0E00612A | Screw M3 x 6 Philips Pan Head (2A) | 4    |                    |                      |                               |      |

10. WIRING DIAGRAM

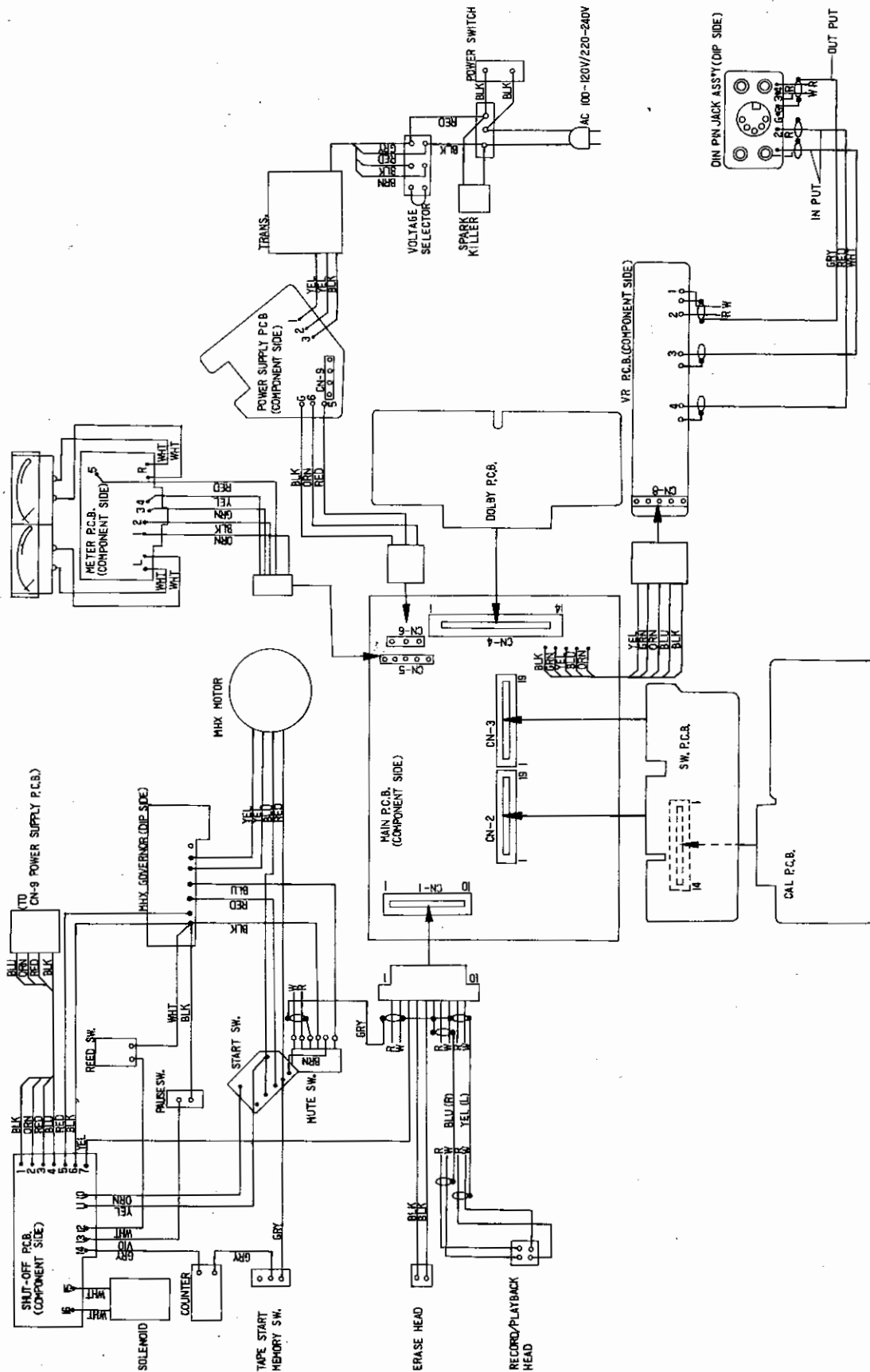


Fig. 10

## 11. EQ. AMP. FREQUENCY RESPONSE

### 11.1. Playback Frequency Response

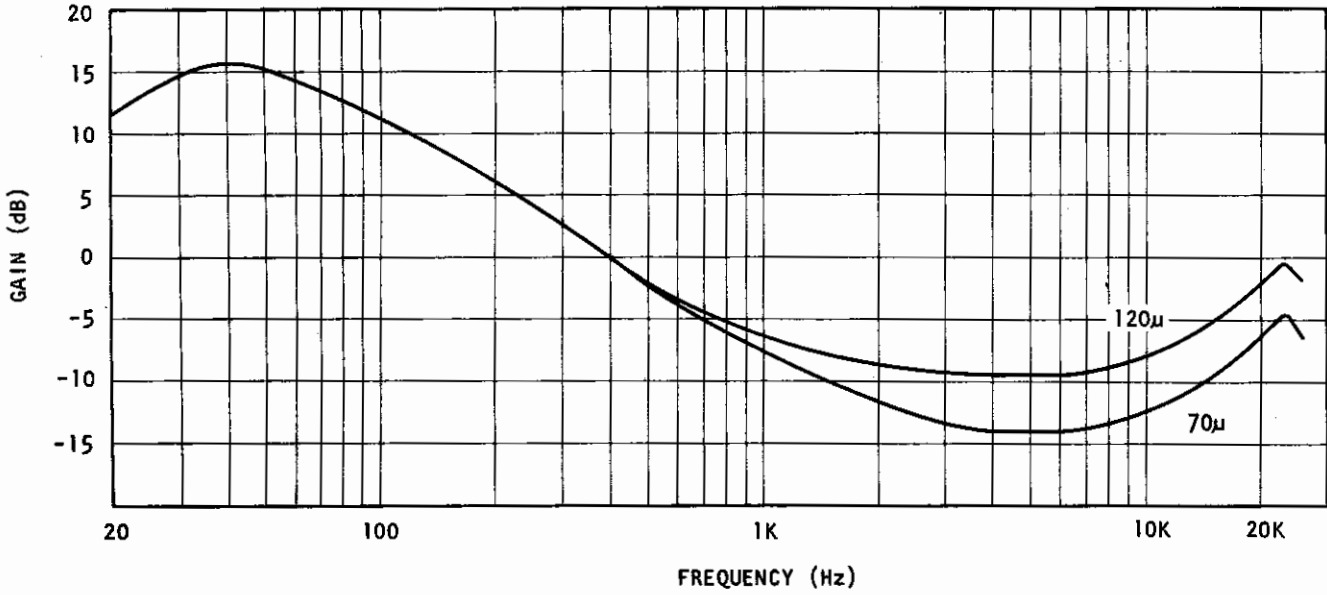


Fig. 11. 1

### 11.2. Record Current Frequency Response

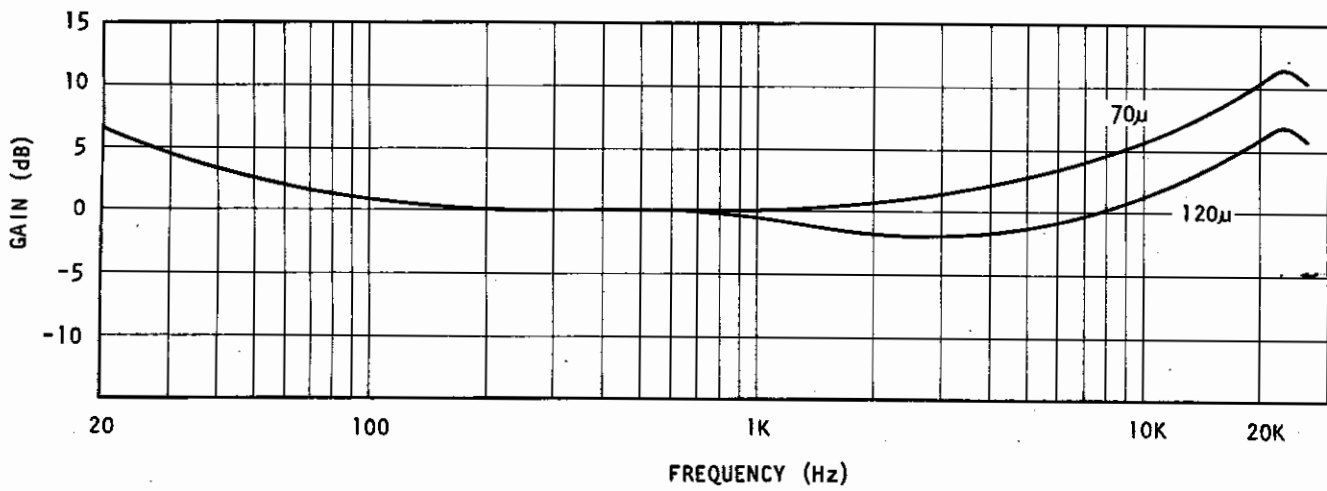


Fig. 11. 2



### 12. BLOCK DIAGRAM

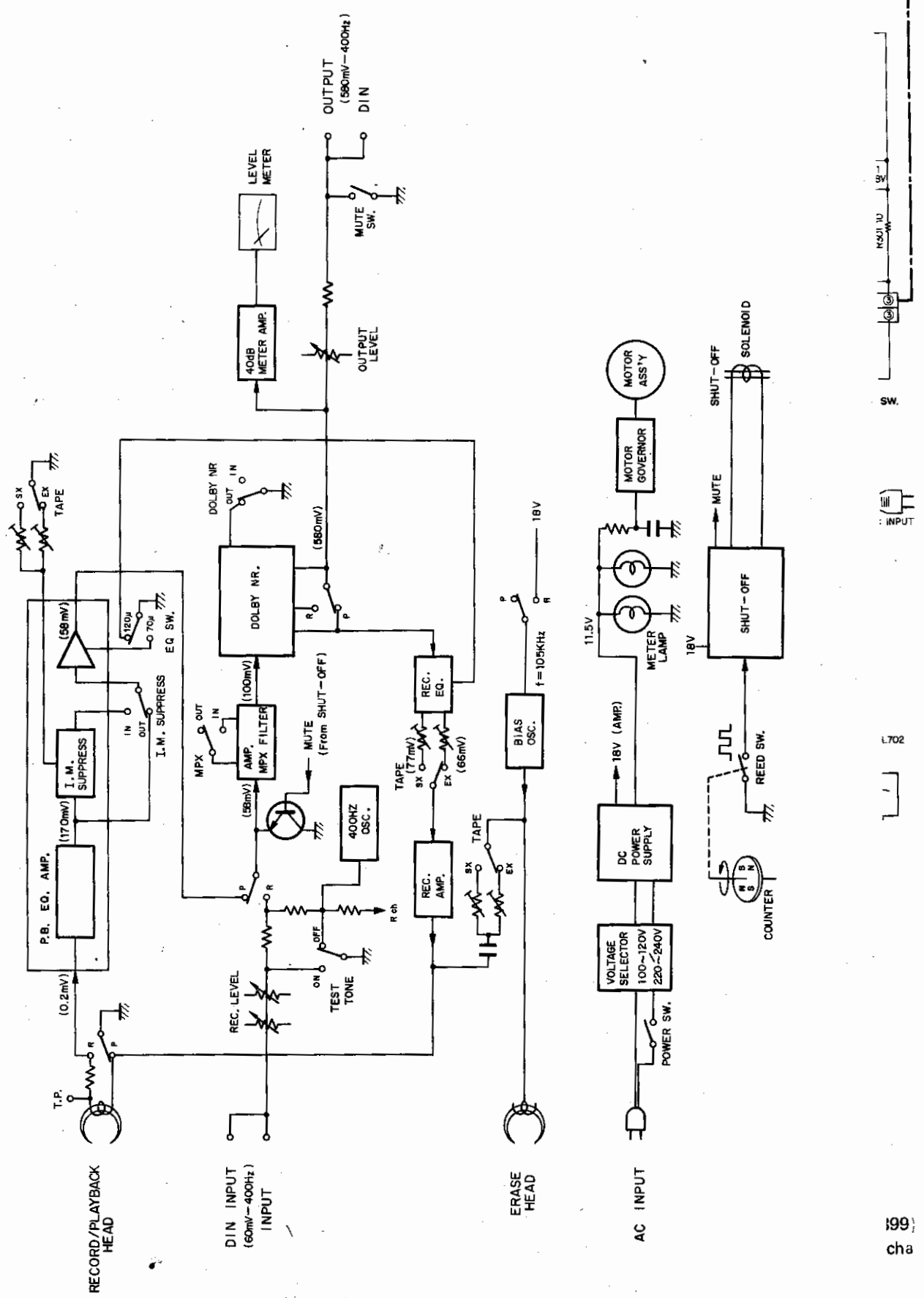
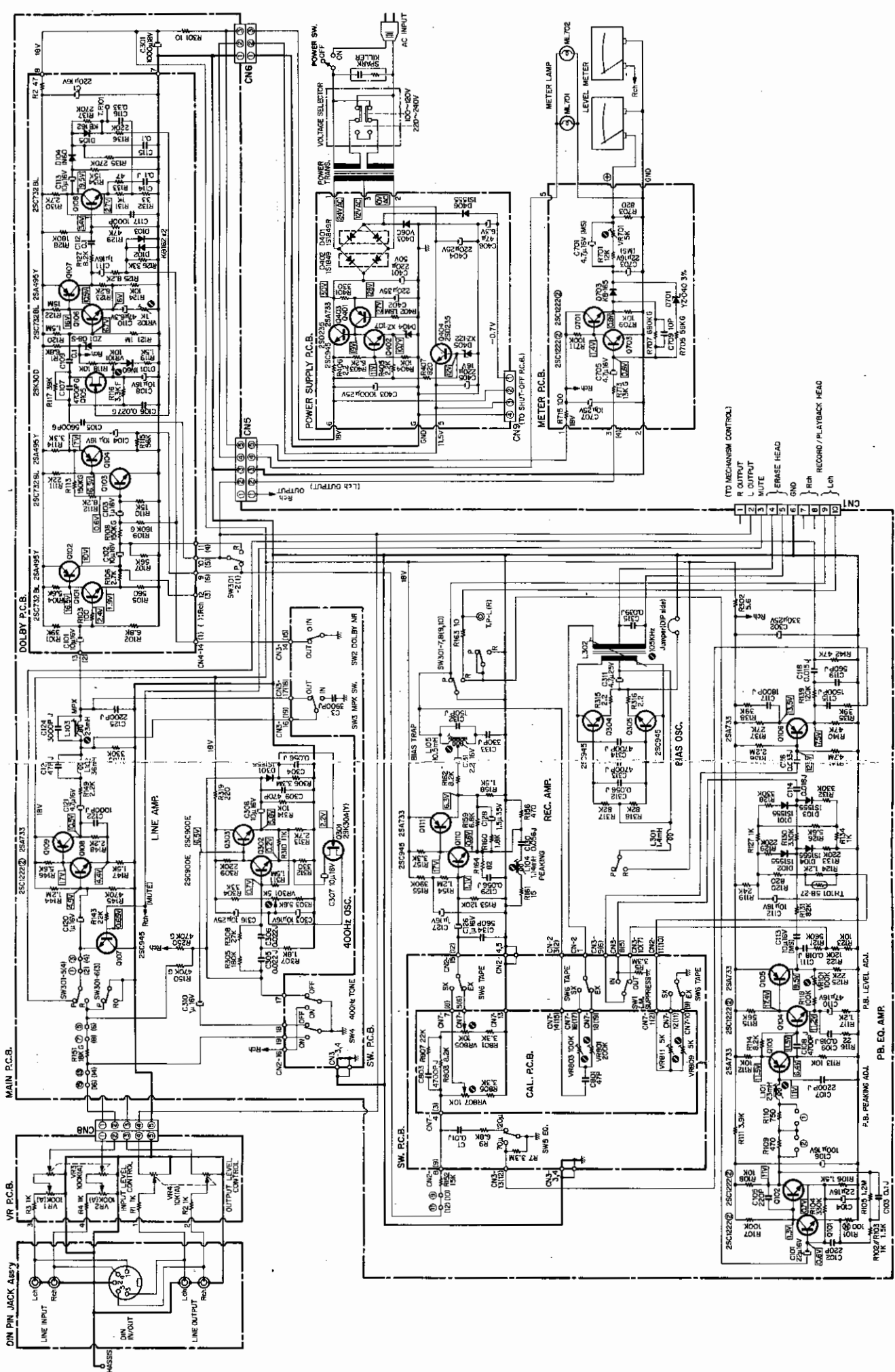


Fig. 12

13. SCHEMATIC DIAGRAM (AMP.)



Note:

- (1) ( ) Shows a R channel's terminal No.
- (2) R channel circuits are omitted when R channel circuit are equal to the L channel.
- (3) On Meter P.C.B., CAL. P.C.B., SW. P.C.B. and VR P.C.B. (part reference Nos. 000-099, 700-799, 800-899), odd numbers show L channel's parts and even numbers show R channel's parts. For example R701 is an L channel's resistor and omitted R702 is an R channel's resistor.
- (4) Part reference Nos. 300-399, 400-499, 500-599, 600-699 show common parts for both channels.

Fig. 13

14. SCHEMATIC DIAGRAM (MECHANISM)

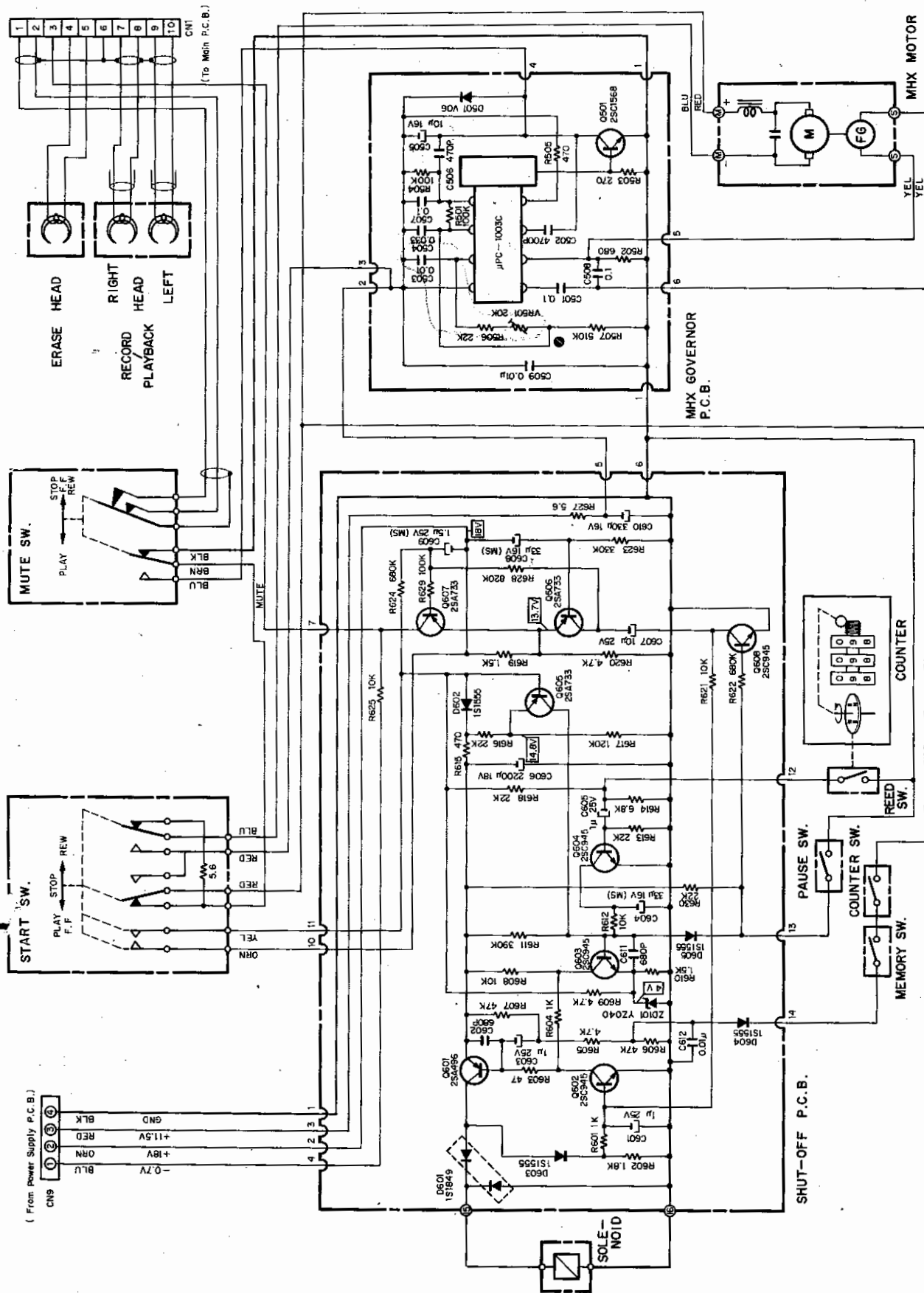


Fig. 14

## 15. SPECIFICATIONS

|   |   |
|---|---|
| Power Source                                      | 100-117, 220-240V 50/60Hz   |
| Power Consumption                                 | 15W Max.  |
| Tape Speed  | 1-7/8 ips. (4.76cm/sec.) $\pm 1\%$  |
| Wow and Flutter                                   | Less than 0.12% WTD Peak  |
| Frequency Response                                | 40-18,000Hz $\pm 3$ dB<br>(SX, EX Tapes, -20dB Rec. Level)  |
| Signal to Noise Ratio<br>(Dolby In, SX Tape, WTD) | Better than 60dB 400Hz, 0dB WTD rms.<br>Better than 68dB 400Hz, 3% THD WTD rms.<br>with IM Suppressor |
| Total Harmonic Distortion                         | Less than 1.5% 400Hz 0dB<br>Less than 0.5% 400Hz 0dB with IM<br>Suppressor-In (SX, EX II Tapes)       |
| Erase   | Better than 60dB below saturation level at 1KHz   |
| Separation  | Better than 35dB, 1KHz, 0dB   |
| Crosstalk   | Better than 60dB, 1KHz, 0dB   |
| Bias Frequency                                    | 105KHz  |
| Transistors                                       | 57  |
| Diodes  | 27  |
| IC's  | 1   |
| Input   | 50 Kohms, 60mV  |
| Output Level                                      | 580mV (400Hz, 0dB, Output Level at Max.)  |
| Dimensions  | 15.75 (W) x 6.70 (H) x 9.33 (D) inches<br>400 (W) x 170 (H) x 237 (D) m/m                             |
| Approximate Weight                                | 14.3 lbs. (6.5 Kgs)   |

\* Specifications and appearance design are subject to change for further improvement without notice.

## 16. TROUBLE SHOOTING

### 16.1. Note

- (1) Check to insure whether the outputs +18V, +11.5V and -0.7V (approximately) of the power supply are correct.
- (2) When a check is made on Amplifier, etc. by means of an extension cord, re-adjustment shall be made without fail (after final installation to the model chassis).  
The check without removal of an extension cord will cause inaccurate adjustments.
- (3) When an adjustment is made on 19KHz MPX. filter, Bias trap coil, Peaking coil and/or Bias frequency, remove Meters and Meter Holder before start of adjustment.
- (4) Either Nakamichi SX or EX II tape shall be used while adjustment (particularly while adjustments of bias and record/playback level).  
Should another different branded tape be used in its place, the machine shall previously be adjusted according to each of the actual tapes in use.  
However, if a low quality tape should be used, optimum quality of machine will not be obtained (such as Distortion, Signal to Noise Ratio, Dynamic Range, etc. will be deteriorated).

- (5) Depress the pause button during Play or Fast-forward. The tape could be stopped but the motor is still rotating.  
Depress the pause button during rewind, and this time the motor and tape are always in rewind mode (the tape keeps rotating).
- (6) When Flywheel is replaced, clean the Capstan before start of the operation (with alcohol-dipped cloth).

### 16.2. Trouble Shooting

#### 16.2.1. Motor does not rotate:

- (1) Defective Motor.
- (2) Defective Motor Governor.
- (3) Defective Start Switch Ass'y.
- (4) Defective Mute Switch Ass'y.
- (5) Wire between Motor and Motor Governor is cut.
- (6) Wire between Motor Governor and Start Switch Ass'y is cut, etc.
- (7) +11.5V is not being supplied to the Motor Governor.

**16.2.2. No power transmission:**

- (1) Defective Power Cord.
- (2) Defective Power Switch.
- (3) Defective Power Transformer.
- (4) Defective D.C. Power Supply Circuit Board.
- (5) Defective Voltage Select Switch.

**16.2.3. Sound is distorted:**

- (1) Incorrect adjustment of Bias against tape.
- (2) Record/Playback Head is dirty.
- (3) Incorrect adjustment of I.M. suppressor.
- (4) Defective cassette tape.
- (5) Record/Playback Head is magnetized.
- (6) Weak Bias oscillation or does not oscillate.
- (7) Defective Record/Playback Head.
- (8) Excessively high level at Record/Playback.

**16.2.4. High Frequency is deteriorated while playback:**

- (1) Incorrect adjustment of Record/Playback Head azimuth.
- (2) Record/Playback Head is dirty.
- (3) Record/Playback Head is magnetized.
- (4) Excessive Wow/Flutter.
- (5) Inaccurate tape travel.
- (6) Defective Record/Playback Head.

**16.2.5. High Frequency is deteriorated while record/playback:**

- (1) Incorrect adjustment of Bias against tape (excessive bias current to the record/playback head).
- (2) Defective cassette tape.
- (3) Defective Record/Playback Head.

**16.2.6. Does not playback:**

- (1) Record/Playback Head is dirty.
- (2) Record/Playback Head is defective (open circuit or short circuit).
- (3) Defective Playback Amplifier.
- (4) Mute is not released.
- (5) Defective Mute Switch.
- (6) Defective Dolby N.R. Circuit Board.
- (7) Defective Output Buffer Amplifier.
- (8) Defective Record Switch.
- (9) Defective Output Jack.
- (10) Wire between Record/Playback Head and Playback Amplifier is cut.

**16.2.7. Does not record:**

- (1) Defective Bias Circuit.
- (2) Defective Erase Head (open circuit or short circuit).
- (3) Defective Record/Playback Head (open circuit or short circuit).
- (4) Record/Playback Head is dirty.
- (5) Defective Dolby N.R. Circuit Board.
- (6) Mute is not released.
- (7) Defective Record Amplifier.
- (8) Defective Record Switch.
- (9) Defective Record Link Ass'y.
- (10) Wire between Record/Playback Head and Record Amplifier is cut.
- (11) Defective Input Amplifier and/or Input Jack.
- (12) Inaccurate tape travel.

**16.2.8. Excessive Wow/Flutter:**

- (1) Defective Flywheel Ass'y.
- (2) Defective Motor.
- (3) Defective Motor Governor.
- (4) Defective Drive Belt.
- (5) Defective Pressure Roller Ass'y.
- (6) Defective Idler Pulley Ass'y.
- (7) Slippage between Pressure Roller and tape.
- (8) No clearance between Flywheel Ass'y and Flywheel Holder Ass'y.
- (9) Defective Cassette Tape (hard to rotate).
- (10) Defective Tape Counter (hard to rotate or sticky, etc.).
- (11) Excessive Back-tension.
- (12) Irregular Take-up Torque.

**16.2.9. Does not erase or incomplete erasure:**

- (1) Erase Head is dirty.
- (2) Defective Erase Head (open circuit or short circuit).
- (3) Inaccurate tape travel.
- (4) Weak Bias oscillation or does not oscillate.
- (5) Excessively high frequency of Bias oscillator.
- (6) Wire between Erase Head and Bias oscillator is cut.

**16.2.10. Auto Shut-off does not work at end of tape:**

- (1) Defective Auto Shut-off Detector.
- (2) Defective Auto Shut-off Driver.
- (3) Defective Solenoid Driver.
- (4) Defective Deck Button (hard to operate).
- (5) Wire between Solenoid and Driver is cut.
- (6) Incorrect adjustment of Solenoid.

x

**16.2.11. Auto Shut-off activates at position other than tape end:**

- (1) Defective Auto Shut-off Detector.
- (2) Defective Auto Shut-off Driver.
- (3) Defective Solenoid Driver.
- (4) Defective Counter.
- (5) Defective Counter Belt.
- (6) Defective Cassette Tape (hard to rotate).

**16.2.12. Meters do not flutter:**

- (1) Defective Meter (open circuit or short circuit).
- (2) Defective Meter Circuit.
- (3) Wire between Meter and Meter Circuit is cut.
- (4) Tape does not playback (playback mode).
- (5) Meter lead is shorted.
- (6) Defective Input Amplifier.

**16.2.13. Defective tape travel:**

- (1) Record/Playback Head is misaligned against Capstan.
- (2) Pressure Roller is misaligned against Capstan.
- (3) Excessive Take-up Torque.
- (4) Pressure of Pressure Roller is weak.
- (5) Erase Head is misaligned against Capstan.
- (6) Defective Capstan (bent, etc.).
- (7) Defective Capstan Flange (bent, etc.).
- (8) Reference Pin is bent.
- (9) Head Base is bent.
- (10) Incorrect adjustment of Record/Playback Head position.
- (11) Defective Erase Head.
- (12) Defective Pressure Roller.

**16.2.14. Pause button does not release:**

- (1) Defective Shut-off Solenoid.
- (2) Defective Solenoid Driver.
- (3) Defective Solenoid Linkage.

**16.2.15. Tape does not rotate:**

- (1) Defective Motor.
- (2) Defective Motor Governor.
- (3) Defective Drive Belt.
- (4) Drive Belt is out of place.
- (5) Defective Reel Hub.
- (6) Defective cassette tape (hard to rotate).
- (7) Incorrect loading of cassette tape.
- (8) Pressure Roller is not in contact with Capstan.

**16.2.16. Drive Belt is out of place:**

- (1) Motor is misaligned.
- (2) Idler Pulley Ass'y is misaligned.
- (3) Excessive clearance between Flywheel Ass'y and Flywheel Holder Ass'y.
- (4) Defective Drive Belt.

**16.2.17. Signal to Noise Ratio is deteriorated:**

- (1) Record/Playback Head is magnetized.
- (2) Excessive Bias Leakage.
- (3) Record/Playback Head is dirty.
- (4) Defective Record/Playback Head.
- (5) Defective cassette tape.
- (6) Defective D.C. Power Supply Board (excessive ripple).
- (7) Defective Input Amplifier (noise is great).
- (8) Defective Output Amplifier (noise is great).
- (9) Incorrect adjustment of hum balance wire.

**16.2.18. Channel separation is deteriorated:**

- (1) Incorrect tape travel.
- (2) Defective Record/Playback Head.

**16.2.19. Tape speed is too fast or slow:**

- (1) Defective Motor.
- (2) Defective Motor Governor.
- (3) Pressure Roller is not in contact with Capstan.
- (4) Defective Mute Switch (contacting chassis).
- (5) Defective cassette tape (hard to rotate).

**16.2.20. Does not Eject:**

- (1) Defective Eject Linkage Arm.
- (2) Defective Stop/Eject Button.
- (3) Eject Linkage Arm is out of place.
- (4) Defective cassette tape.

**16.2.21. Level variations:**

- (1) Incorrect tape travel.
- (2) Record/Playback Head is dirty.
- (3) Defective Record/Playback Head.
- (4) Record/Playback Head is misaligned.
- (5) Defective cassette tape.
- (6) Incorrect adjustment of Head Base stroke.

**16.2.22. Bias does not oscillate:**

- (1) No voltage to Bias oscillation circuit.
- (2) Defective Bias oscillation circuit.
- (3) Defective Erase Head (open circuit or short circuit).

**16.3. Check method when parts are replaced.**

When any part/part ass'y of the Nakamichi 600 is replaced with new one, please check to insure the following.

**16.3.1. When Motor is replaced:**

- (1) Tape speed.
- (2) Wow/Flutter.
- (3) Drive Belt position (out of place).

**16.3.2. When Drive Belt is replaced:**

- (1) Drive Belt position (out of place).
- (2) Tape speed.
- (3) Wow/Flutter.

**16.3.3. When Record/Playback Head is replaced:**

- (1) The inclination of a Record/Playback head.
- (2) Azimuth/Height.
- (3) Tape Travelling.
- (4) Playback output.
- (5) Playback frequency response.
- (6) Overall frequency response.
- (7) Distortion.
- (8) Signal to Noise Ratio.
- (9) Channel separation.

**16.3.4. When Erase Head is replaced:**

- (1) Tape travelling.
- (2) Azimuth/Height (record/playback head).
- (3) Bias frequency.
- (4) Erasure.
- (5) Overall frequency response.

**16.3.5. When Flywheel Ass'y is replaced:**

- (1) Clearance between Flywheel and Flywheel Holder.
- (2) Tape travelling.
- (3) Azimuth/Height.
- (4) Tape speed.

**16.3.6. When Pressure Roller is replaced:**

- (1) Tape travelling.
- (2) Azimuth/Height.
- (3) Tape speed.
- (4) Wow/Flutter.
- (5) Pressure Roller timing.

**16.3.7. When Tape Counter is replaced:**

- (1) Tape speed.
- (2) Wow/Flutter.
- (3) Memory rewind operation.
- (4) Counter check (sticky, etc.).
- (5) Auto shut-off operation.

**16.3.8. When Reel Hub Ass'y is replaced:**

- (1) Torque check (take-up, fastforward and/or rewind).
- (2) Tape speed.
- (3) Wow/Flutter.

**16.3.9. When Deck Button Ass'y is replaced:**

- (1) Button operation.
- (2) Head base stroke.
- (3) Pause switch operation.
- (4) Record switch operation.
- (5) Mute switch operation.
- (6) Start switch operation.

**16.3.10. When Idler Pulley Ass'y is replaced:**

- (1) Drive Belt position (out of place).
- (2) Tape speed.
- (3) Wow/Flutter.
- (4) Rewind time.
- (5) Fastforward time.
- (6) Brake Timing.

**16.3.11. When Motor Governor is replaced:**

- (1) Tape speed.
- (2) Wow/Flutter.

**16.3.12. When Level Meter is replaced:**

- (1) Meter level.
- (2) Meter check (sticky, etc.).

**16.3.13. When Solenoid is replaced:**

- (1) Solenoid position.

**16.3.14. When Record Link Ass'y is replaced:**

- (1) Record Link ass'y adjustment (height).

# Service Manual

# Nakamichi 600

## **NAKAMICHI RESEARCH INC.**

1-153 Suzukicho, Kodaira, Tokyo

Phone: (0423) 42-1111

Telex: 2832610. (NAKREI J)

Cable: NAKREI KKB

## **NAKAMICHI RESEARCH (U.S.A.) INC.**

West Coast Office

1101 Colorado Avenue,

Santa Monica, Calif. 90401

Phone: (213) 451-5901

Telex: 65249 (NAKREI SNM)

## **NAKAMICHI RESEARCH (U.S.A.) INC.**

New York Office

220 Westbury Avenue,

Carle Place, N.Y. 11514

Phone: (516) 333-5440

Telex: 144513 (NAKREI CAPL)