



Service Manual

Nakamichi LX-5

Discrete Head Cassette Deck



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1. GENERAL

1.1. Control Functions

The Nakamichi LX-5 control functions are shown below:

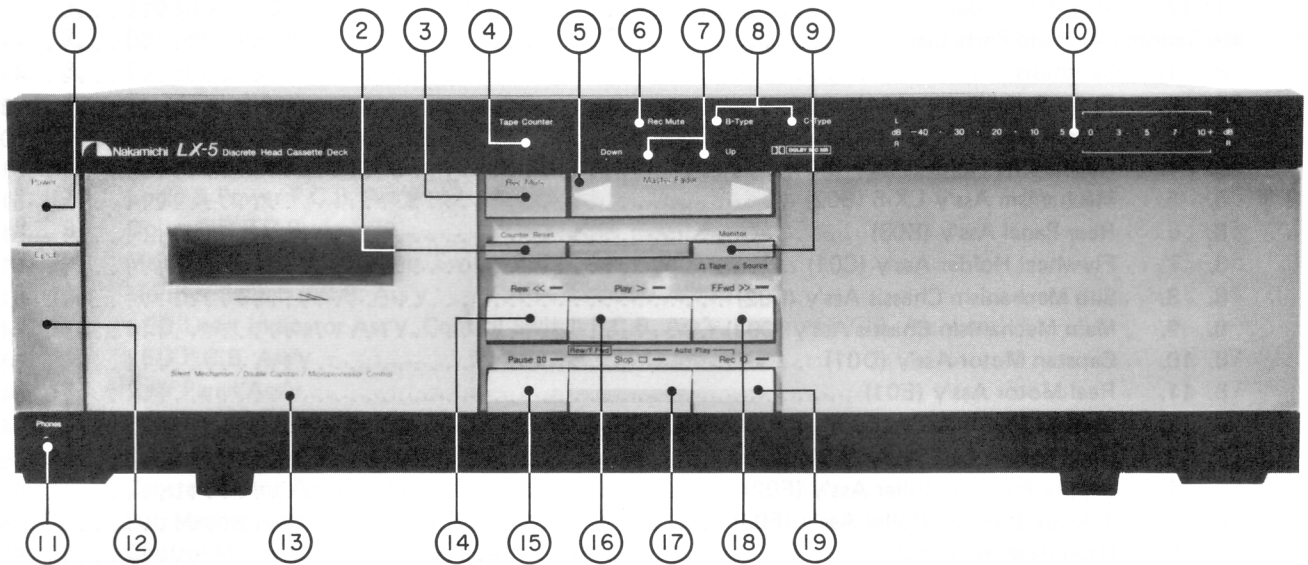


Fig. 1.1 Front View

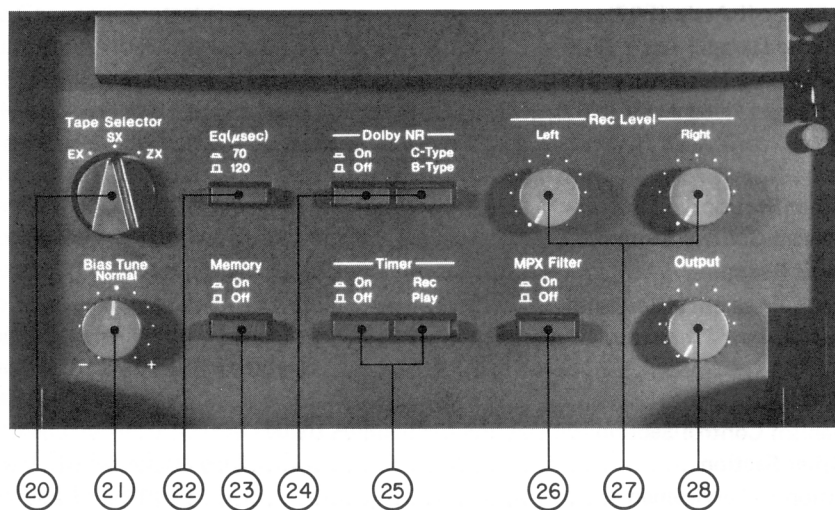


Fig. 1.2 Front View (Hinged Panel Opened)

- | | |
|----------------------------|------------------------------|
| 1. Power Switch | 15. Pause Button |
| 2. Counter Reset Button | 16. Play Button |
| 3. Rec. Mute Button | 17. Stop Button |
| 4. Tape Counter | 18. Fast-Forward Button |
| 5. Master Fader Control | 19. Record Button |
| 6. Rec. Mute Indicator | 20. Tape Selector Switch |
| 7. Master Fader Indicators | 21. Bias Tune Control |
| 8. Dolby NR Indicators | 22. Eq. Switch |
| 9. Monitor Switch | 23. Tape Start Memory Switch |
| 10. Peak Level Meters | 24. Dolby NR Switch |
| 11. Headphone Jack | 25. Timer Switch |
| 12. Eject Button | 26. MPX Filter Switch |
| 13. Cassette Holder | 27. Input Level Controls |
| 14. Rewind Button | 28. Output Level Control |

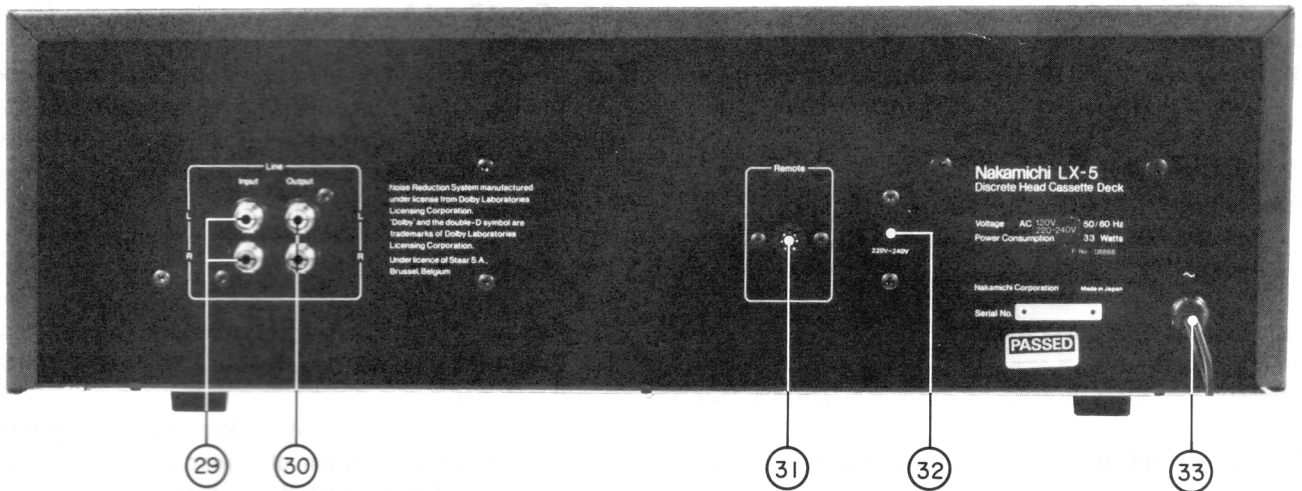


Fig. 1.3 Rear View

- 29. Input Jacks
- 30. Output Jacks
- 31. Remote Control Jack

- 32. Voltage Selector
- 33. Power Cord

1.2. Voltage Selector

Voltage selector is installed on the rear panel for Other Version of the Nakamichi LX-5. This voltage selector can select either 120 V or 220-240 V at customer's disposal.

2. REMOVAL PROCEDURES

2.1. Top Cover Ass'y

Refer to Fig. 2.1.

- (1) Remove F01 and F02, then disassemble F03 (Top Cover Ass'y).

2.2. Bottom Cover Ass'y

Refer to Fig. 2.1.

- (1) Remove F04, then disassemble F05 (Bottom Cover Ass'y).

2.3. Cassette Case Cover Ass'y

Refer to Fig. 2.1.

- (1) Push the Eject Button to open the Cassette Case Ass'y.
- (2) Pull out F06 (Cassette Case Cover Ass'y) upwardly.

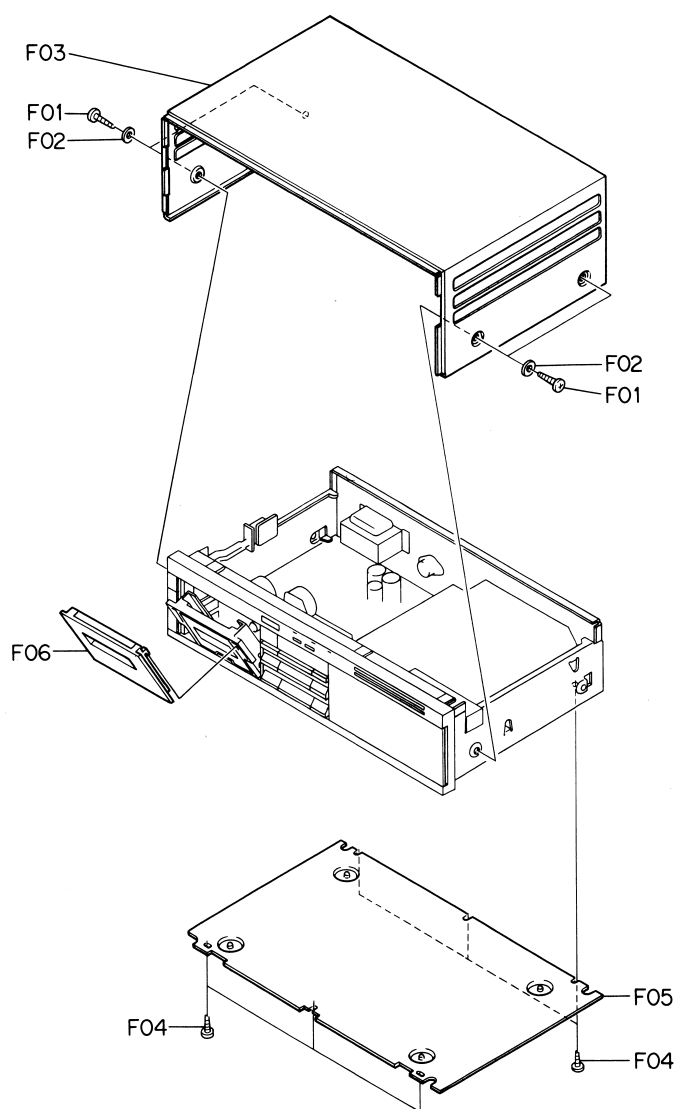


Fig. 2.1

2.4. Front Panel Ass'y

Refer to Fig. 2.2.

- (1) Refer to Fig. 2.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to items 2.1 and 2.2.
- (2) Pull out F01 (Volume Knobs) and remove F02, then disassemble F03 (Front Panel Ass'y including 6 connectors).

2.5. Mechanism Ass'y

Refer to Fig. 2.2.

- (1) Remove Front Panel Ass'y referring to item 2.4.
- (2) Remove F04, then disassemble F05 (Power Switch P.C.B. Ass'y).
- (3) Remove F06 (Power Switch Joint Bar) by releasing the self-interlocking pin of Power Switch Joint Bar from F07 (Power Switch P.C.B. Ass'y).
- (4) Refer to Bottom View A. Remove F08, then turn F09 (Dolby NR P.C.B. Ass'y) over as an arrow head.
- (5) Remove F10, F11 and F12, then disassemble F13 (Mechanism Ass'y including 5 connectors).

2.6. Headphone Jack Ass'y

- (1) Remove F14, then disassemble F15 (Headphone Jack Ass'y).
- (2) Remove F16 and F17, then disassemble F18 (Headphone Jack).

2.7. Logic & Power P.C.B. Ass'y

Refer to Fig. 2.3.

- (1) Refer to Fig. 2.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to items 2.1 and 2.2.
- (2) Remove 7 connectors and the wires connected by wrapping from F02 (Logic & Power P.C.B. Ass'y).
- (3) Remove F01, then disassemble F02 (Logic & Power P.C.B. Ass'y).

2.8. Dolby NR P.C.B. Ass'y

Refer to Fig. 2.3.

- (1) Refer to Fig. 2.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to items 2.1 and 2.2.
- (2) Remove the wires connected by wrapping from F04 (Dolby NR P.C.B. Ass'y).
- (3) Remove F03, then disassemble F04 (Dolby NR P.C.B. Ass'y) by releasing the self-interlocking pin of the P.C.B. Supporters.

2.9. Main P.C.B. Ass'y and Amp. Switch P.C.B. Ass'y

Refer to Fig. 2.3.

- (1) Refer to Fig. 2.2. Remove Front Panel Ass'y referring to item 2.4.
- (2) Remove F05, then disassemble F06 (Amp. Shield Cover Plate).
- (3) Pull out F07 (Selector Knob) and F08 (Switch Knobs).
- (4) Remove F09 and F10, then disassemble F11 (Main P.C.B. Ass'y and Amp. Switch P.C.B. Ass'y).

- (5) Remove F12, F13 and F14, then disassemble F15 (Main P.C.B. Ass'y).
- (6) Remove F16, F17 and F18, then disassemble F19 (Amp. Switch P.C.B. Ass'y).

2.10. Monitor Switch P.C.B. Ass'y
Refer to Fig. 2.3.

- (1) Refer to Fig. 2.2. Remove Front Panel Ass'y referring to item 2.4.
- (2) Remove F20, then disassemble F21 (Monitor Switch Shield Cover).
- (3) Remove F22 and F23, then disassemble F24 (Monitor Switch P.C.B. Ass'y).

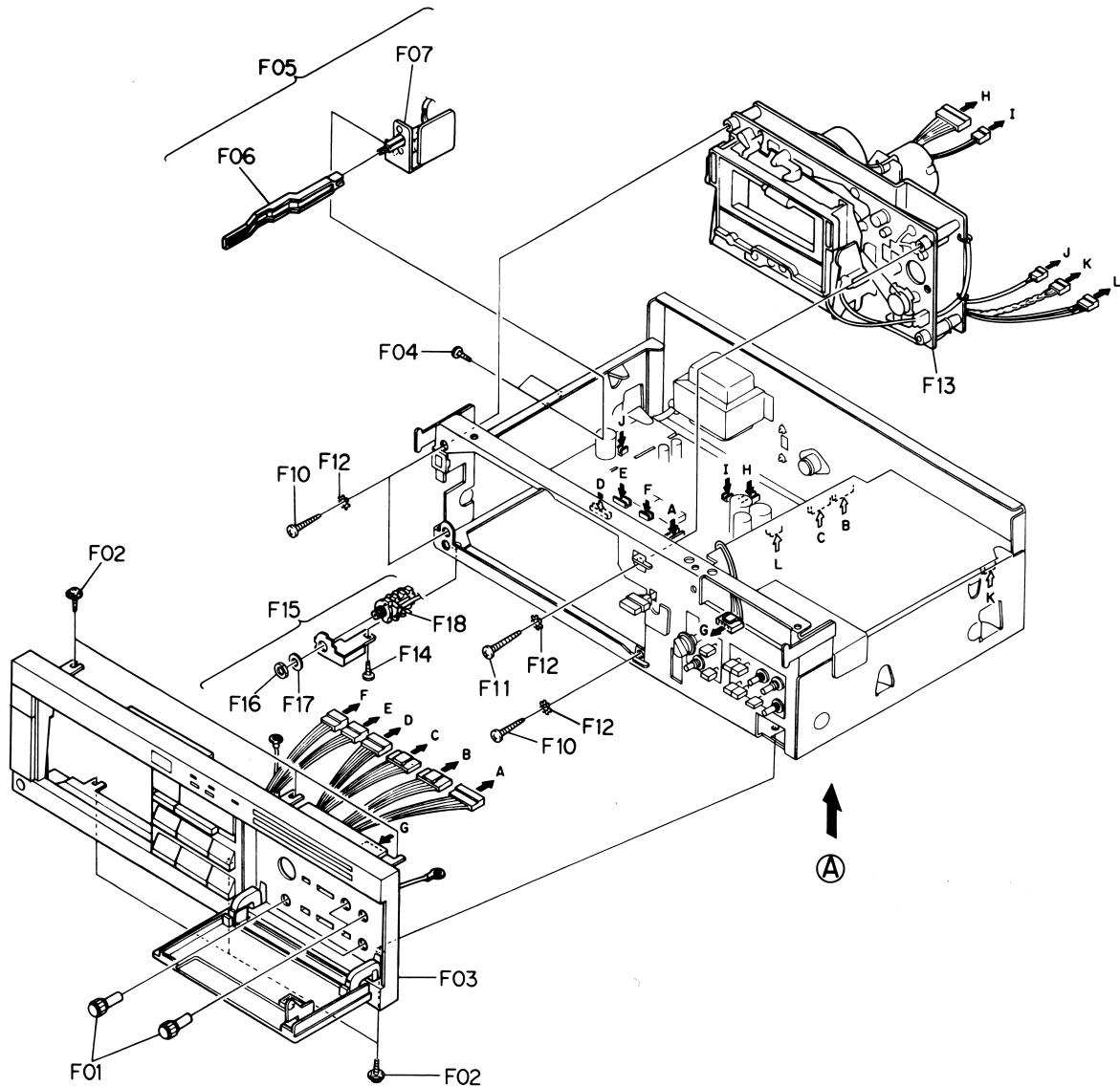


Fig. 2.2

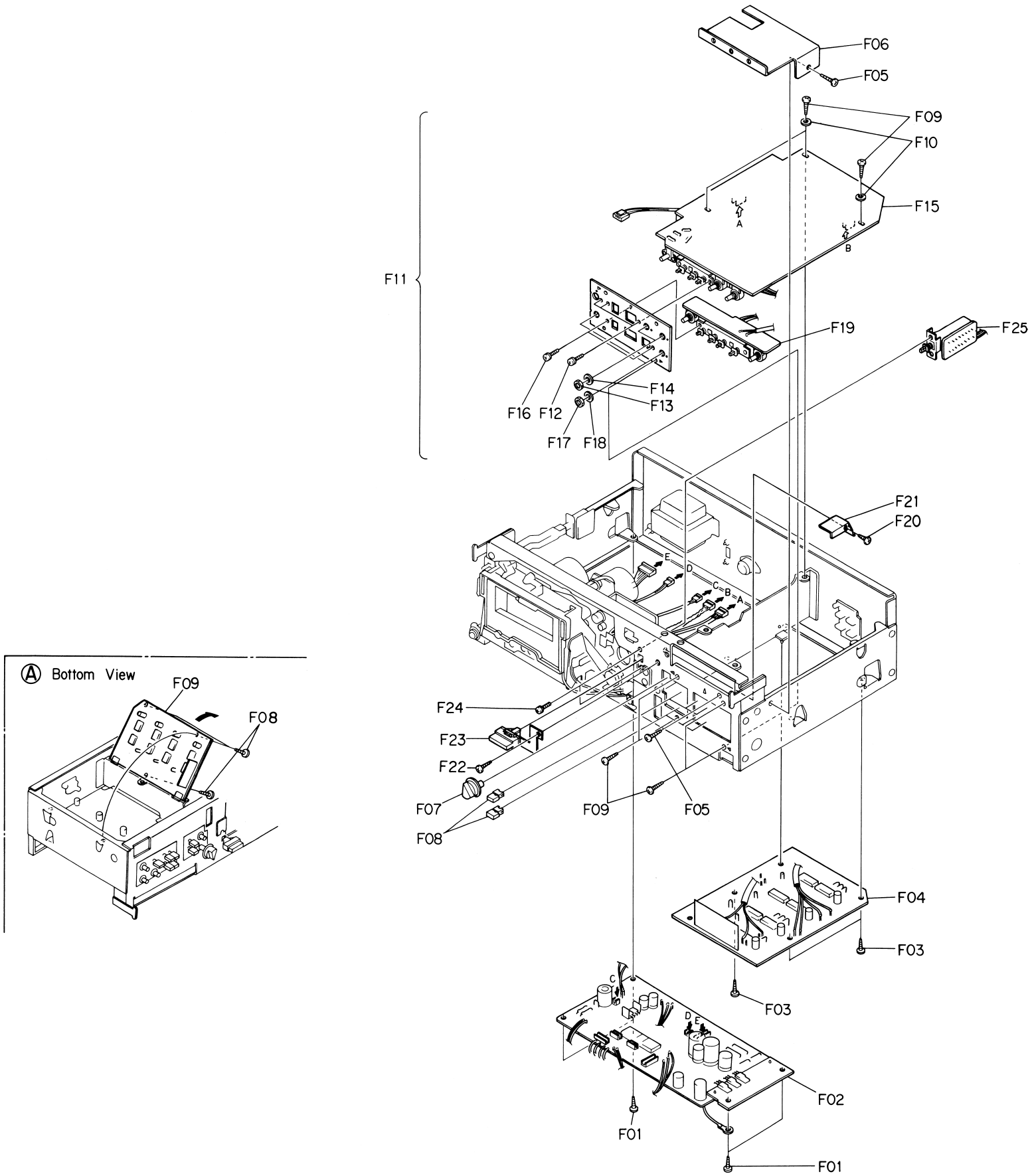


Fig. 2.3

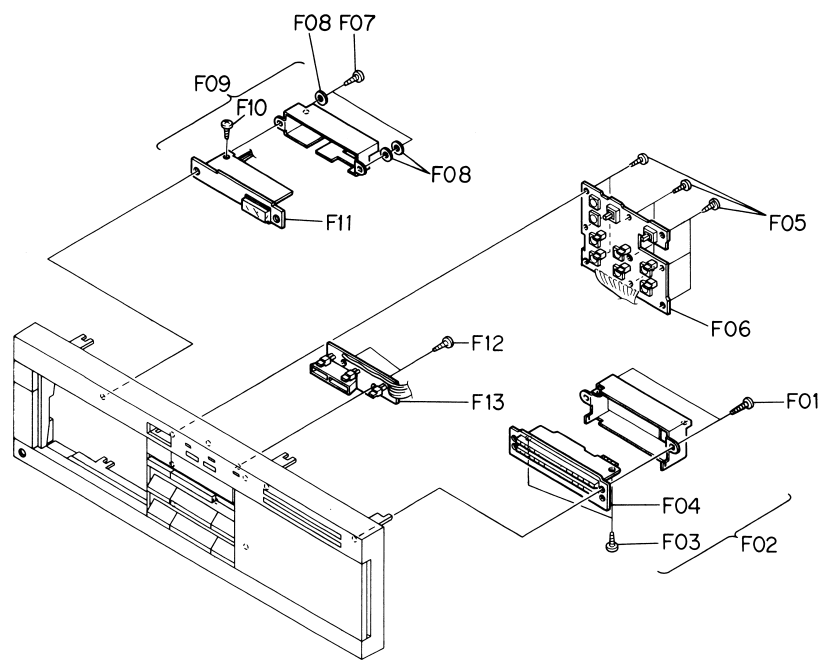


Fig. 2.4

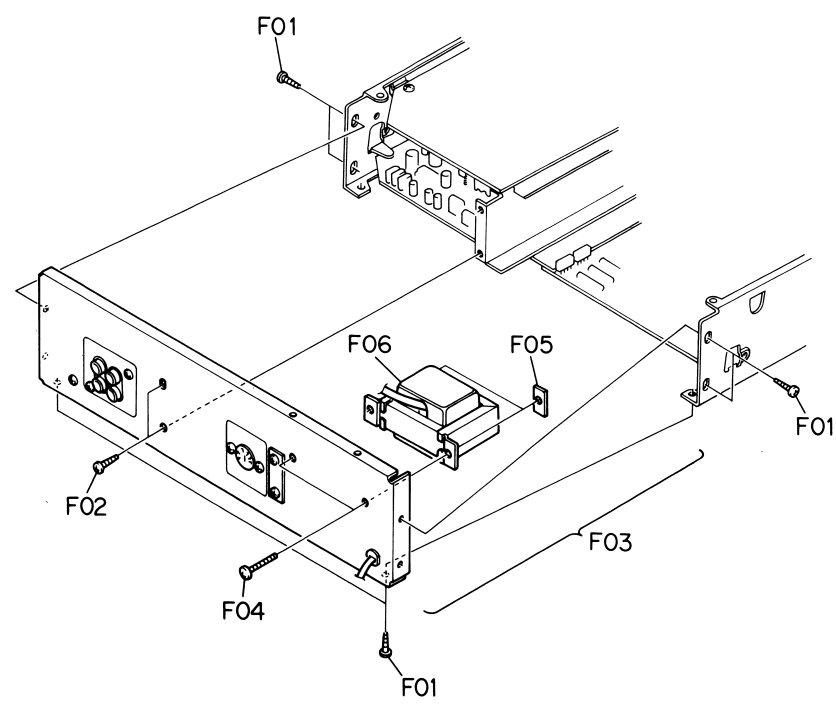


Fig. 2.5

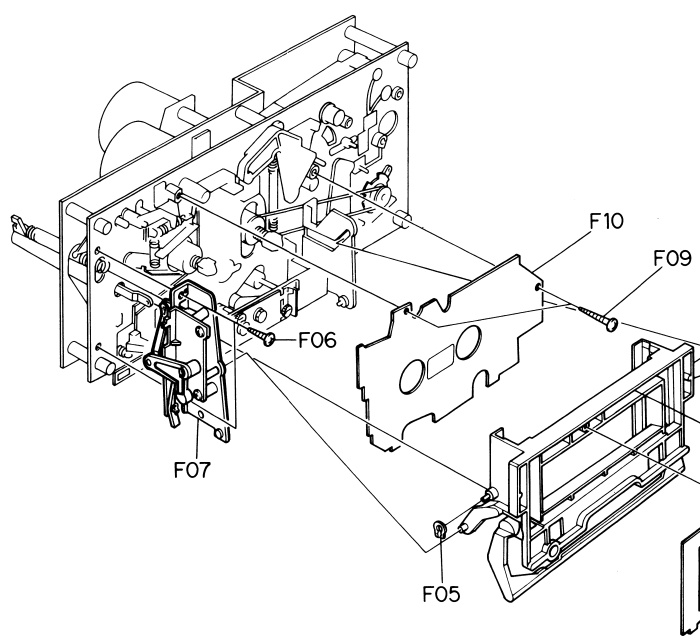


Fig. 2.6

2.11. LED Level Indicator Ass'y, Control Switch P.C.B. Ass'y, Counter P.C.B. Ass'y and LED P.C.B. Ass'y

Refer to Fig. 2.4.

- (1) Refer to Fig. 2.2. Remove Front Panel Ass'y referring to item 2.4.
- (2) Remove F01, then disassemble F02 (LED Level Indicator Ass'y).
- (3) Remove F03, then disassemble F04 (Indicator P.C.B. Ass'y).
- (4) Remove F05, then disassemble F06 (Control Switch P.C.B. Ass'y).
- (5) Remove F07 and F08, then disassemble F09 (Counter P.C.B. Ass'y).
- (6) Remove F10, then disassemble F11 (Counter-1 P.C.B. Ass'y and Counter-2 P.C.B. Ass'y).
- (7) Remove F12, then disassemble F13 (LED P.C.B. Ass'y).

2.12. Rear Panel Ass'y

Refer to Fig. 2.5.

- (1) Refer to Fig. 2.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to items 2.1 and 2.2.
- (2) Remove F01 and F02, then disassemble F03 (Rear Panel Ass'y).

2.13. Power Transformer

Refer to Fig. 2.5.

- (1) Refer to Fig. 2.1. Remove Top Cover Ass'y and Bottom Cover Ass'y referring to items 2.1 and 2.2.
- (2) Remove F04 and F05, then disassemble F06 (Power Transformer).

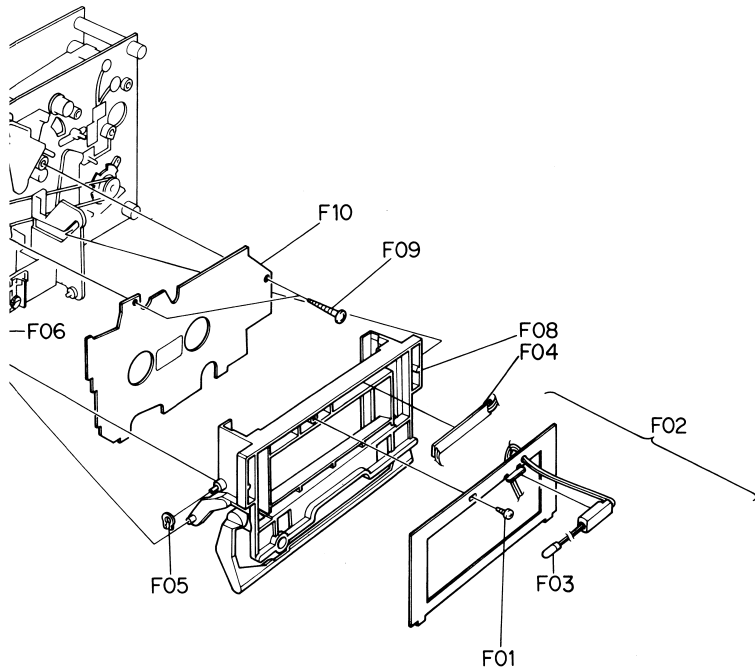


Fig. 2.6

2.14. Cassette Case Ass'y and Cover Plate Ass'y

Refer to Fig. 2.6.

- (1) Refer to Fig. 2.2. Remove Mechanism Ass'y referring to item 2.5.
- (2) Remove F01, then disassemble F02 (Cassette Case Plate Ass'y).
- (3) Remove F03 (Cassette Case Lamp) from Cassette Case Plate, then pull out F04 (Lamp P.C.B.) from F08 (Cassette Case Ass'y).
- (4) Push the Eject Button to open the Cassette Case Ass'y.
- (5) Remove F05 and F06, then disassemble F07 (Cassette Case Holder L Ass'y) by releasing the self-interlocking pin of Damper Lock Arm and F08 (Cassette Case Ass'y).
- (6) Remove F09, then disassemble F10 (Cover Plate Ass'y).

2.15. Capstan Motor Ass'y and Flywheel Ass'y

Refer to Fig. 2.7.

- (1) Refer to Fig. 2.2. Remove Mechanism Ass'y referring to item 2.5.
- (2) Remove F01, F02 and F03, then disassemble F04 (Flywheel Holder Ass'y) and F05 (Capstan Belt).
- (3) Remove F06, then disassemble F07 (Capstan Motor Ass'y).
- (4) Remove F08, then disassemble F09 (3P Lug Terminal).
- (5) Remove F10 (Supply Flywheel Ass'y), then disassemble F11 (Take-up Flywheel Ass'y).
- (6) After removing both Flywheel Assemblies, disassemble F12 (Thrust Washer 3mm), F13 (Thrust Washer 2.6mm), F14 (Flange Thrust Cap) and F15 (Flange Thrust Spring).

2.16. Sub Mechanism Chassis Ass'y

Refer to Fig. 2.8.

- (1) Refer to Fig. 2.7. Remove Flywheel Holder Ass'y referring to item 2.15.
- (2) Remove F01, F02 and F03, then disassemble F04 (Sub Mechanism Chassis Ass'y).

2.17. Control Motor Ass'y and Reel Motor Ass'y

Refer to Fig. 2.8.

- (1) Remove Sub Mechanism Chassis Ass'y referring to item 2.16.
- (2) Remove F05, then disassemble F06 (Control Motor Ass'y).
- (3) Remove F07, then disassemble F08 (Reel Motor Ass'y).

2.18. Cam Control Volume

Refer to Fig. 2.8.

- (1) Remove Sub Mechanism Chassis Ass'y referring to item 2.16.
- (2) Remove F09, then disassemble F10 (Volume Coupler).
- (3) Remove F11 and F12, then disassemble F13 (Cam Control Volume).

2.19. Reel Hub Ass'y and Idler Ass'y

Refer to Fig. 2.8.

- (1) Remove Sub Mechanism Chassis Ass'y referring to item 2.16.
- (2) Remove F14 (Reel Hub Head), then disassemble F15

(Reel Hub B Ass'y), F16 (Reel Hub Take-up Ass'y), F17 (Reel Hub Supply Ass'y), F18 (Back Tension Ass'y) and F19 (Back Tension Spring).

- (3) Remove F20, then disassemble F21 (Idler Ass'y).

2.20. Cam Drive Gear and Control Cam

Refer to Fig. 2.8.

- (1) Remove Sub Mechanism Chassis Ass'y referring to item 2.16.
- (2) Remove F22, then disassemble F23 (Cam Drive Gear).
- (3) Remove F24, then disassemble F25 (Counter-Load Arm Ass'y).
- (4) Remove F26, then disassemble F27 (Control Cam).

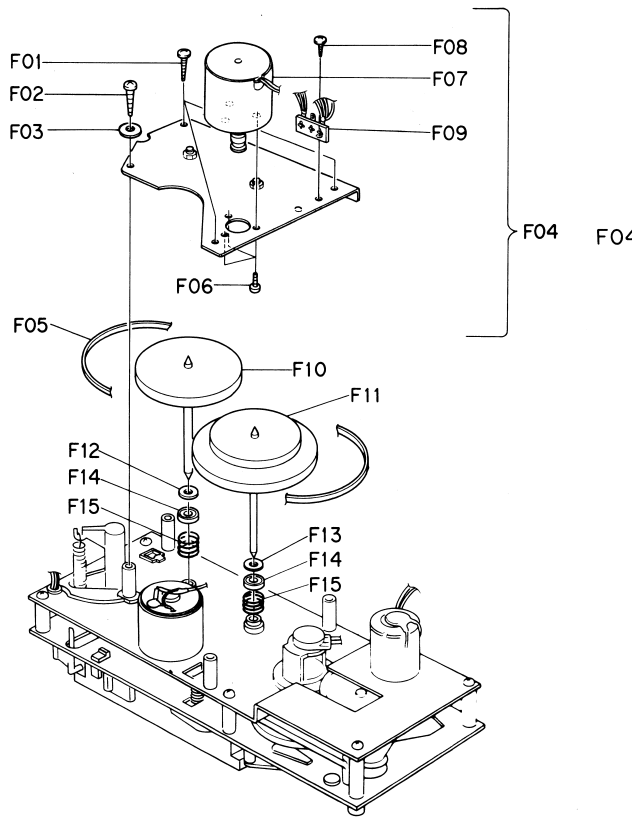


Fig. 2.7

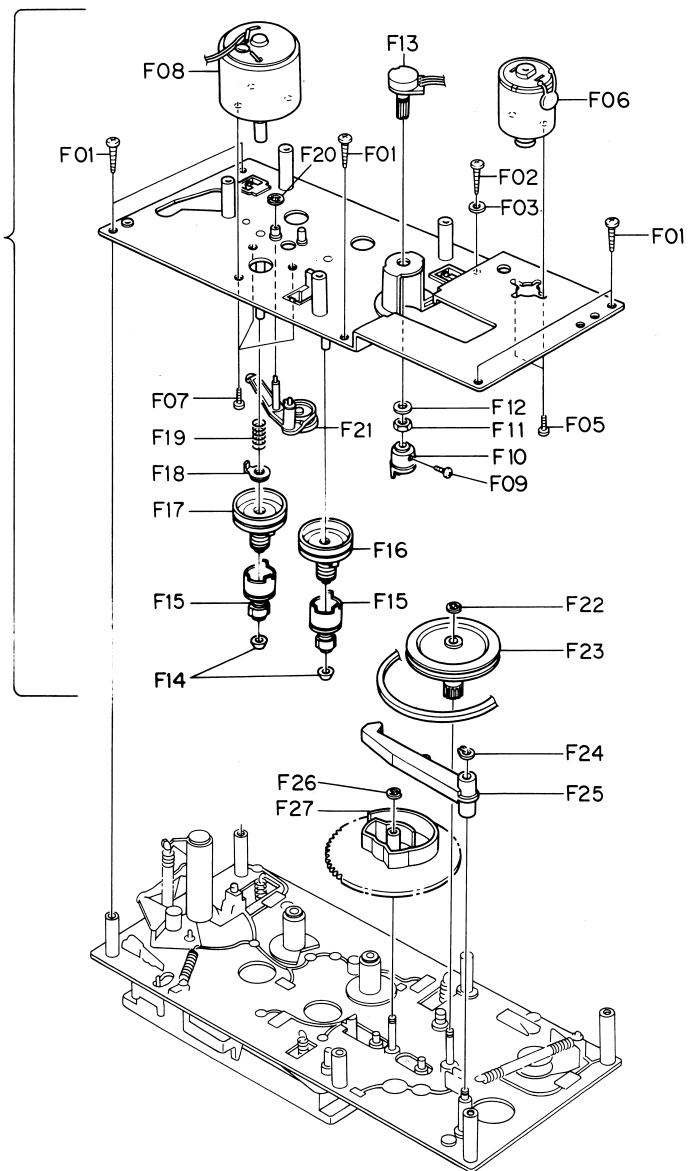


Fig. 2.8

2.21. Head Mount Base Ass'y

Refer to Fig. 2.9.

- (1) Refer to Fig. 2.6. Remove Cassette Case Ass'y referring to item 2.14.
- (2) Remove F01, then disassemble F02 (Head Mount Base Ass'y).

2.22. Erase Head, Pressure Roller and Tape Guide

Refer to Fig. 2.9.

- (1) Remove Head Mount Base Ass'y referring to item 2.21.
- (2) Remove F03, then disassemble F04 (Erase Head).
- (3) Remove F05, then disassemble F06 (Supply Pressure Roller).
- (4) Remove F07, then disassemble F08 (Supply Tape Guide).
- (5) Remove F09, then disassemble F10 (Take-up Pressure Roller).
- (6) Remove F11, then disassemble F12 (Take-up Tape Guide).

2.23. Playback Head Ass'y and Record Head Ass'y

Refer to Fig. 2.9.

- (1) Remove Head Mount Base Ass'y referring to item 2.21.
- (2) Turn F13 by 90° by pushing it, then disassemble F14 (Playback Head Ass'y).
- (3) Turn F15 by 90° by pushing it, then disassemble F16 (Record Head Ass'y).

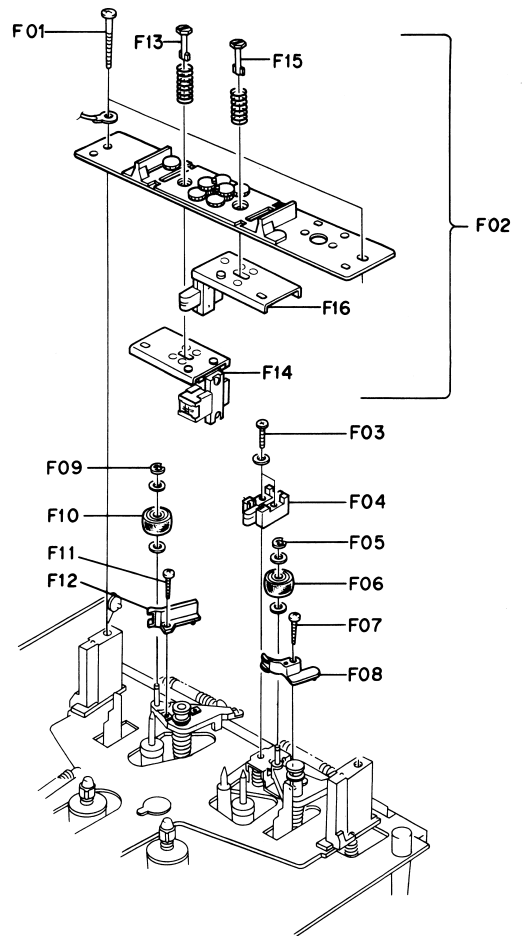


Fig. 2.9

3. MEASUREMENT INSTRUMENTS

- (1) Audio Generator (20 Hz – 200 kHz)
- (2) AC Millivolt Meter (with dB measures)
- (3) Oscilloscope (DC – 5 MHz)
- (4) Distortion Meter
- (5) Speed & Wow/Flutter Meter
- (6) Frequency Counter (DC – 1 MHz)
- (7) Ohm Meter
- (8) DC Volt Meter
- (9) AC Volt Meter
- (10) Torque Gauge (DA09013A)
- (11) 15 kHz Azimuth Tape (DA09004A)
- (12) 3 kHz Speed & Wow/Flutter Tape (DA09006A)
- (13) 1 kHz Track Alignment Tape (DA09007A)
- (14) 400 Hz Level Tape (DA09005A)
- (15) 20 kHz PB Frequency Response Tape (DA09001A)
- (16) 15 kHz PB Frequency Response Tape (DA09002A)
- (17) 10 kHz PB Frequency Response Tape (DA09003A)
- (18) Reference EXII Tape (DA09066A)
- (19) Reference SX Tape (DA09025A)
- (20) Reference ZX Tape (DA09037A)
- (21) Tilt Check Gauge M-9039 (DA09039A)
- (22) EH Tilt Check Gauge M-9040 (DA09040A)
- (23) EH Stroke Check Gauge M-9051 (DA09051A)
- (24) Stroke Check Gauge M-9047 (DA09047B)
- (25) Record Head Mounting Gauge M-9048 (DA09048A)
- (26) Back Tension Gauge (DA09055A)
- (27) Tension Arm Adjustment Cassette (DA09056A)
- (28) Audio Analyzer T-100
(including Distortion, Wow/Flutter, Speed, Oscillator and dB meters)

Note: (10) – (28) are the products of Nakamichi Corporation.

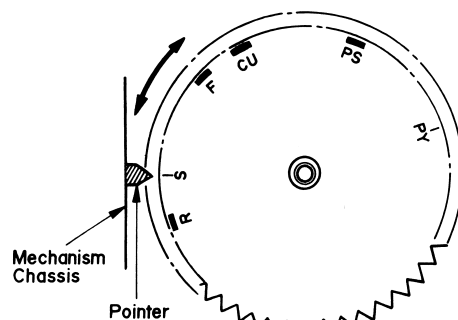


Fig. 4.1

4. MECHANICAL ADJUSTMENTS

4.1. Mechanism Control Cam Adjustment

Before adjustment, disassemble the Front Panel Ass'y, then remove the Cover Plate referring to items 2.4 and 2.14.

(1) Offset Adjustment of Control Motor Driver

(a) Refer to Figs. 4.1 and 4.2.

Adjust VR602 and VR603 on the Logic & Power P.C.B. Ass'y to locate approximately at the middle of the variable range. Then turn ON the Power switch.

VR602 (for Cam position stop)

VR603 (for Cam position play)

(b) Press the Stop button to set the LX-5 in Stop mode. Adjust VR602 (for stop) so that the "S" mark on the Cam corresponds to the pointer on the mechanism chassis.

(c) Press the Play button to set the LX-5 in Playback mode.

(Cam will rotate, and the position marked with "PY" comes to the pointer.) Adjust VR603 (for play) so that the "PY" mark on the Cam corresponds to the pointer.

(d) Repeat above (b) and (c) 2 – 3 times so that the "S" and "PY" marks on the Cam correspond to the pointer accurately in Stop and Playback modes respectively.

(This adjustment is required because the position adjusted by one volume will be slightly changed when the other volume is adjusted.)

(e) Set the LX-5 in F.F. or Pause mode by pressing each button and check to insure that the pointer is in a range of "F" or "PS" mark respectively.

(f) If out of the range, precise adjustment for each position according to "(2) Offset Fine Adjustment of Control Motor Driver" will be required.

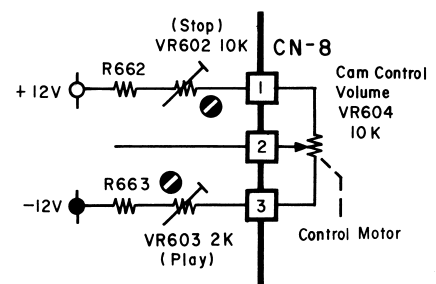


Fig. 4.2

(2) Offset Fine Adjustment of Control Motor Driver

Adjust only if a satisfactory result is not obtained in "(1) Offset Adjustment of Control Motor Driver". This adjustment is made by changing the value of the fixed resistors on the Logic & Power P.C.B. Ass'y.

Note: The value of voltage is typical value.

(a) Observation Point of Reference Voltage

Observe the each voltage at the sliding contact of the Cam Control Volume VR604 (10 kΩ) in Stop, Fast (F.F. or Rew.), Pause and Playback modes.

(b) Reference Voltage

Reference voltage at the sliding contact of VR604 (Cam Control Volume) in each mode is as follows:

Mode	Reference Voltage (Typical Value)
Stop	0 V
Fast (F.F./Rew.)	-2.0 V
Pause	-6.5 V
Play	-9.1 V

} -2.0 V ±0.25 V
} -2.6 V ±0.4 V

(c) Resistors for Adjustment

Mode	Ref. No.	Typical Value
Fast (F.F./Rew.)	R647	22 kΩ
Pause	R649	76.8 kΩ (F)
Play	R648	10 kΩ

(d) Adjustment Procedures

- Set the LX-5 in Stop mode, then check to insure that the voltage at the sliding contact of VR604 is 0 V (±0.3 V).
- Set the LX-5 in F.F. mode, then adjust the value of R647 so that the voltage at the sliding contact of VR604 will become lower by 2.0 V (±0.25 V) than in Stop mode.
- Press the Pause button to set the LX-5 in Pause mode. Adjust the value of R649 to obtain -6.5 V (+0.4, -0.15 V) at the sliding contact of VR604.
- Set the LX-5 in Playback mode, then adjust the value of R648 so that the voltage at the sliding contact of VR604 will become lower by 2.6 V (±0.4 V) than in Pause mode.

4.2. Reel Motor Speed Adjustment in Play Mode

Refer to Fig. 4.3.

- Connect a DC voltmeter to TP1 and GND on the Logic & Power P.C.B. Ass'y.
- Without loading a cassette tape, set the LX-5 in Play mode.
- Adjust VR601 on the Logic & Power P.C.B. Ass'y to obtain -4 V on the DC voltmeter.

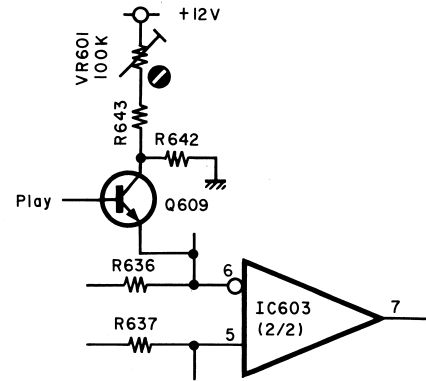


Fig. 4.3

4.3. Record Head and Playback Head Tilt Adjustment

Note: On items 4.3 – 4.9, refer to Fig. 4.4 flow chart. Refer to Figs. 4.5 and 4.6.

- Load a Tilt Check Gauge M-9039 (DA09039A) in the LX-5.
- Clip the grounding terminal of the Tilt Check Gauge with one end of the cord with clip, and the chassis of the LX-5 with the other end.
- Remove both of the Height Gears.
- Set the LX-5 in Play mode. Check to insure whether the Beacons Playback Head "Upper" or "Lower" and Record Head "Upper" or "Lower" are illuminating. In order not to give damages onto the head surfaces, push both of slide knobs of the Gauge to the direction of arrow marks, then return them to the original place to be in contact with record head and playback head surfaces after Play mode is securely locked.
- Check to insure freedom from contact between the Gauge and pad lifter.
- Beacon Playback Head "Lower" will light on when height adjustment screw (P) turned clockwise but Playback Head "Upper" when counterclockwise. Adjust so that both "Upper" and "Lower" will light on even when you move the slide knob to the direction of an arrow mark and then return them to the original place.
- Same procedures will apply to the Beacons Record Head "Upper" and "Lower", except for the height adjustment screw (R).
- Set the LX-5 in Stop mode and fit both of the serrated Height Gears. Then set the LX-5 again in Play mode and insure all of the 4 Beacons are illuminating. If not, (3) through (7) will have to be repeated till satisfactory results are obtained.

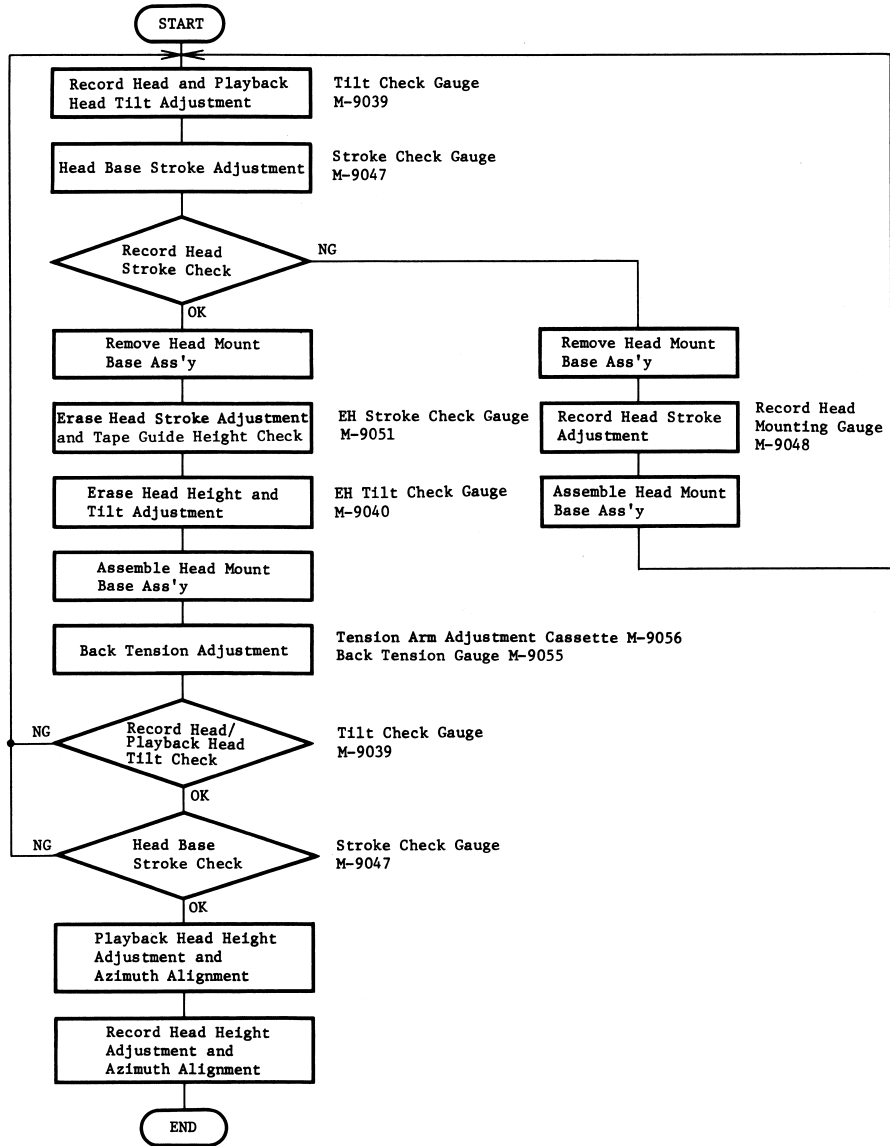


Fig. 4.4

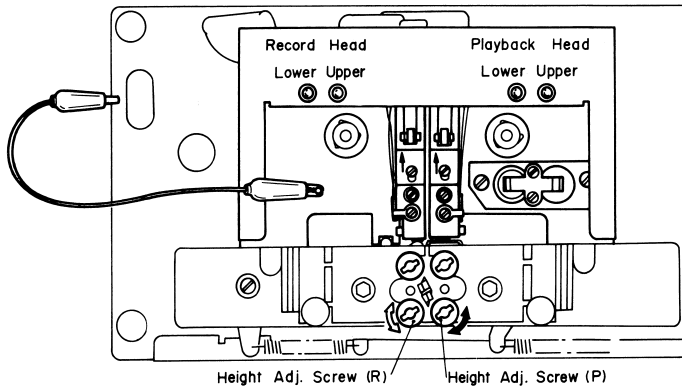


Fig. 4.5

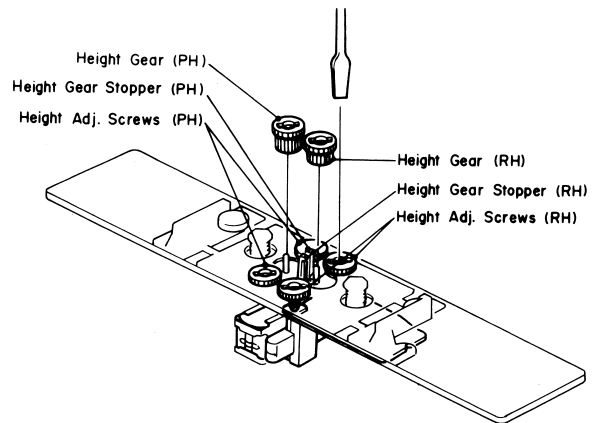


Fig. 4.6

4.4. Head Base Stroke Adjustment

Note: Before you conduct this adjustment, adjust with a "Tilt Check Gauge" to insure freedom from tilt on the playback head and record head.

Refer to Fig. 4.7.

- (1) Load a Stroke Check Gauge M-9047 (DA09047B) in the LX-5.
- (2) Move Record Head Indicator and Playback Head Indicator to the direction of arrow mark "A" with your finger tip and then set the LX-5 in Play mode. Then slowly release the Indicators and insure whether each of the Indicators is in contact with record and playback heads.
- (3) Check to insure whether the "P" pointer on the Playback Head Indicator locates between the 2 lines on the Indicator Plate.
- (4) If the playback head stroke is noted to be misaligned, adjustment can be made by moving the stroke adjuster assembled in the head base assembly (either forwardly or backwardly).
- (5) Check to insure whether the "P" pointer on the Playback Head Indicator locates between the 2 lines on the Record Head Indicator, thus check can be made on record head stroke.
- (6) If the record head stroke is noted to be misaligned, adjustment can be made with a Record Head Mounting Gauge M-9048 (DA09048A).

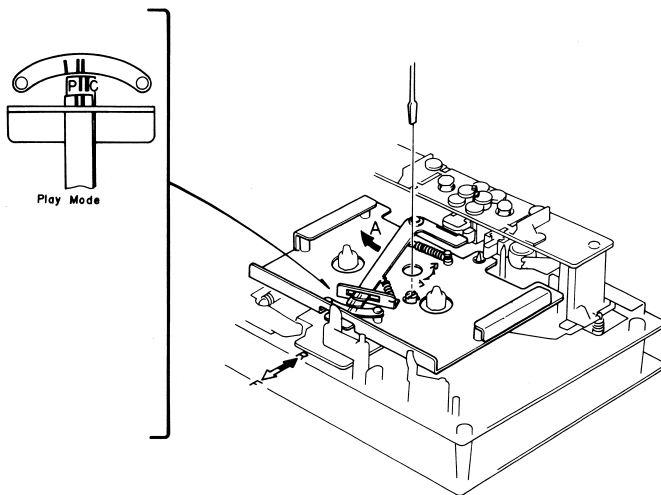


Fig. 4.7

4.5. Erase Head Stroke Adjustment and Tape Guide Height Check

Remove Head Mount Base Ass'y referring to item 2.21. Refer to Figs. 4.8 and 4.9.

(1) Erase Head Stroke Adjustment

- (a) Load an EH Stroke Check Gauge M-9051 (DA0-9051A) in the LX-5.
- (b) Set the LX-5 in Play mode, thus check can be made on erase head stroke through the EH Stroke Indicator.
- (c) Check to insure whether the erase head surface is aligned with red line on the EH Stroke Indicator. If not, adjust the erase head stroke by loosening 2 screws A that assemble erase head and erase head plate.
- (d) After completion of adjustment, 2 pcs. of screws shall be locked with lock tight paint.

(2) Supply Tape Guide Height Check

- (a) Load an EH Stroke Check Gauge M-9051 (DA0-9051A) in the LX-5.
- (b) Set the LX-5 in Play mode.
- (c) Slide the Supply Tape Guide Check Bar down against the supply tape guide, and check to insure that the Supply Tape Guide Check Bar is accepted by the supply tape guide.

(3) Take-up Tape Guide Height Check

- (a) Load an EH Stroke Check Gauge M-9051 (DA0-9051A) in the LX-5.
- (b) Set the LX-5 in Play mode.
- (c) Slide the Take-up Tape Guide Check Bar down against the take-up tape guide, and check to insure that the Take-up Tape Guide Check Bar is accepted by the take-up tape guide.

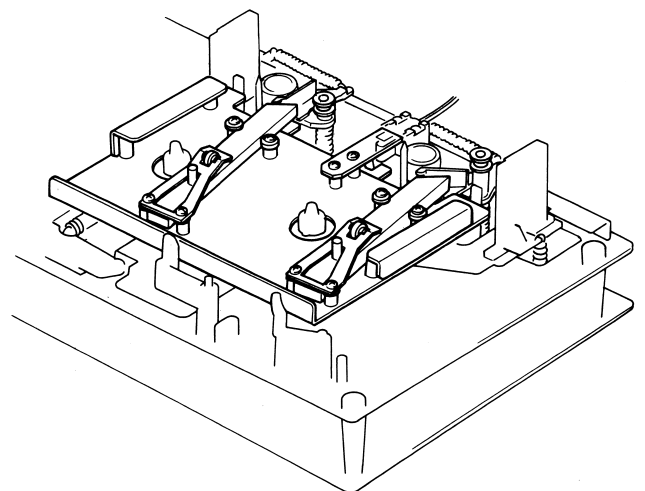


Fig. 4.8

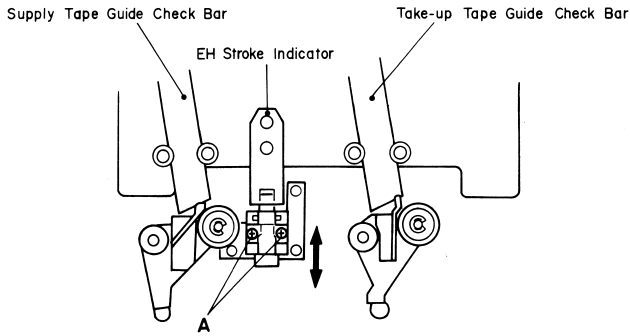


Fig. 4.9

4.6. Erase Head Height and Tilt Adjustment

Refer to Figs. 4.10 and 4.11.

- (1) Remove Head Mount Base Ass'y referring to item 2.21.
- (2) Load an EH Tilt Check Gauge M-9040 (DA09040A) in the LX-5.
- (3) Set the LX-5 in Stop mode.
- (4) Check to insure whether one of the 3 Beacons is illuminating. Look down the mirror as shown by an arrow mark and slowly turn the Screw "Height" counterclockwise (or clockwise) so that the two horizontal lines on the mirror will become superposed on the line (in different color) of the erase head, and check to insure whether Beacon "1" is illuminating.
- (5) Turn Screw "Tilt" counterclockwise (or clockwise) to light on Beacon "2". Excessive turning will cause the Beacon "1" to light off. Adjustments of Screw "Tilt" will therefore be conducted till both of the Beacons "1" and "2" illuminate.
- (6) Turn Screw "Azimuth" counterclockwise (or clockwise) to light on Beacon "3". Excessive turning will cause either Beacon "1" or "2" to light off, and therefore adjust Screw "Azimuth" until all of the 3 Beacons "1", "2" and "3" illuminate.
- (7) Check to insure whether the horizontal line on the mirror corresponds to that on the erase head. If not, (4) through (7) will have to be repeated till satisfactory results are obtained.
- (8) After completion of adjustment, 3 pcs. of screws shall be locked with lock tight paint.

Note: Before use of this gauge, check to insure freedom from dust or dirt, or overflow in the groove of the erase head surface.

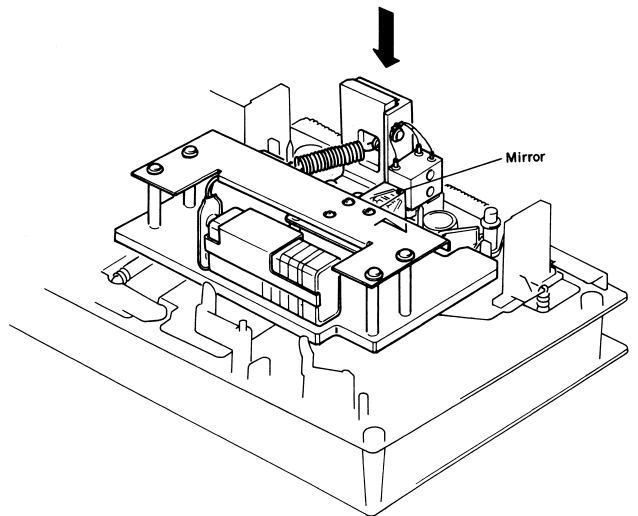


Fig. 4.10

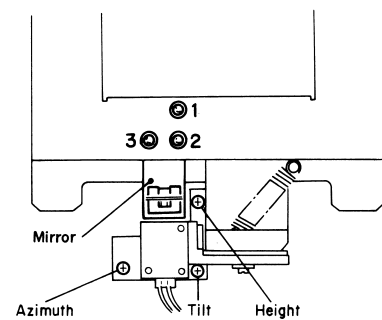


Fig. 4.11

4.7. Back Tension Adjustment

Refer to Figs. 4.12 – 4.14.

- (1) Load a Tension Arm Adjustment Cassette (DA09056A) in the LX-5 referring to Fig. 4.12.
- (2) Set the LX-5 in Play mode.
- (3) Bend the Back Tension Arm with pliers so that the gap between the Cassette Holding Spring assembled on the Head Base Ass'y and the Back Tension Arm becomes 0.5 mm as shown in Fig. 4.13. Do not bend the top of the Back Tension Arm.
- (4) Load the Back Tension Gauge (DA09055A) in the LX-5.
- (5) Set the LX-5 in Play mode and read the torque value of Back Tension Gauge.

If the value is in a range of 6 g-cm to 10 g-cm, adjustment is not necessary. If not, change the installation point of the Back Tension Spring as shown in Fig. 4.14, and obtain the torque of 7 g-cm to 9 g-cm range.

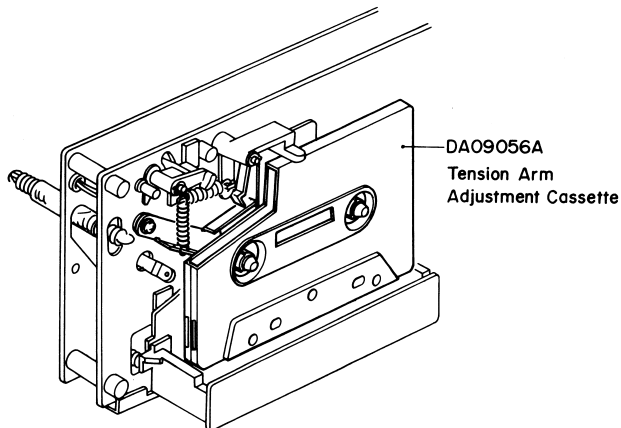


Fig. 4.12

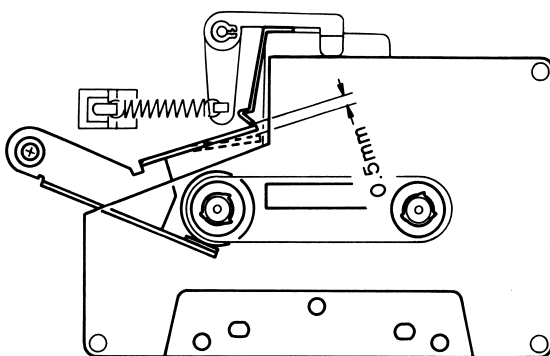


Fig. 4.13

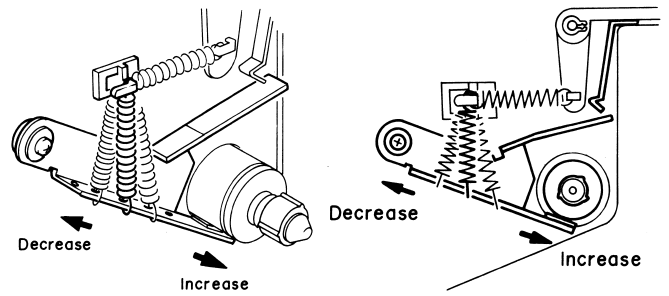


Fig. 4.14

4.8. Playback Head and Record Head Height Adjustment and Azimuth Alignment

(1) Playback Head Height Adjustment and Azimuth Alignment

Refer to Fig. 4.15.

- (a) Connect a VTVM to the Output Jacks.
- (b) Set the Monitor switch to Tape and Eq. switch to 70 μ s.
- (c) Load a 1 kHz Track Alignment Tape (DA09007A), then set the LX-5 in Play mode.
- (d) Turn the PH Height Gear until the outputs of both channels become minimum.
- (e) Load a 15 kHz Azimuth Tape (DA09004A), then set the LX-5 in Play mode.
- (f) Turn the PH Azimuth Alignment Screw until the outputs of both channels become maximum.
- (g) Repeat (c) through (f) one or two times to obtain optimum performance.

(2) Record Head Height Adjustment and Azimuth Alignment

Refer to Fig. 4.15.

- (a) Connect a VTVM to the Output Jacks.
- (b) Set the Bias Tune Volume to the center position.
- (c) Set the Monitor switch to Tape, Eq. switch to 70 μ s, and Tape Selector switch to SX.
- (d) Load a Reference SX Tape (DA09025A), then set the LX-5 in Record and Play mode.
- (e) Feed in 400 Hz (0 dB), then turn the RH Height Gear until the outputs of both channels become maximum.
- (f) Feed in 15 kHz (-20 dB), then turn the RH Azimuth Alignment Screw until the outputs of both channels become maximum.
- (g) Repeat (e) and (f) one or two times to obtain optimum performance.
- (h) After completion of above adjustment, feed in 400 Hz (0 dB) and record it to the same portion of both sides A and B of the tape.
- (i) Immerse the recorded tape in a magnetized developing solution. In turn, check to insure that the recording head tracks across the center are separated with a distance of 0.55 to 0.75 mm (typically 0.65 mm) as illustrated in Fig. 4.16.

Note: Liquid for tape magnetized development solution

"MAGNA-SEE, SOUND CRAFT a product of CBS RECORDS a division of Columbia Broadcasting System, Inc., Danbury, Conn. 06810 U.S.A., or equivalent".

After development, clean the tape otherwise pressure rollers and heads will become dirty.

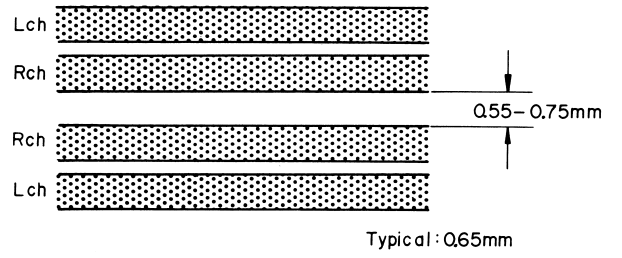


Fig. 4.16

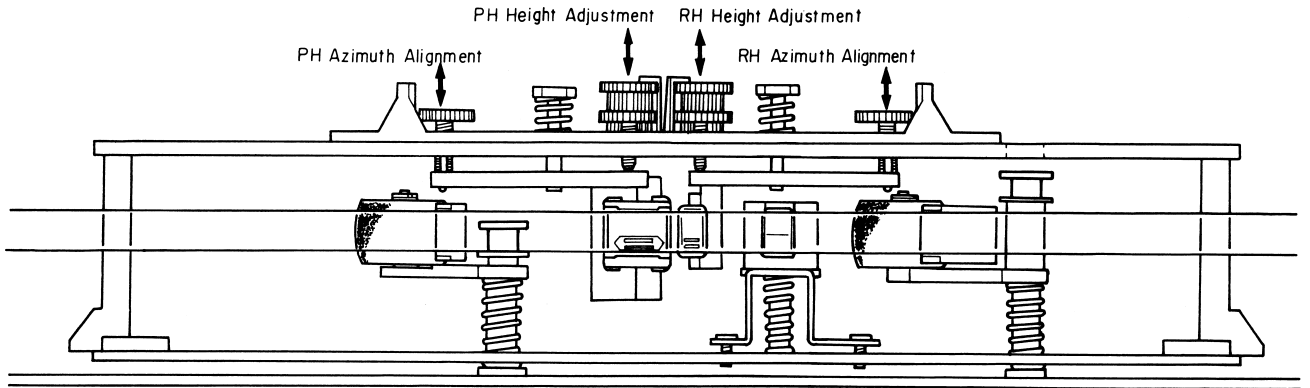


Fig. 4.15

4.9. Record Head Stroke Adjustment

Refer to Figs. 4.17 and 4.18.

Note: This adjustment will be required only to insure freedom from misalignment of the record head stroke in the record head stroke check mode.

- (1) Check the accuracy of the record head stroke.
- (2) Remove Head Mount Base Ass'y referring to item 2.21.
- (3) Remove the record head assembly.
- (4) Adjustment of Record Head Mounting Gauge M-9048 (DA09048A)
 - (a) Mount the Block B onto the Mounting Gauge Plate.
 - (b) Loosen the 2 screws fixing the Block A.
 - (c) As shown in Fig. 4.17, hold the Gauges (3.05 mm and 0.1 mm thickness) between the Block A and Block B, and fix the Block A with screws, pushing the Block A to the 2 guide pins.
- (5) Remove the Block B from the Mounting Gauge Plate.
- (6) As shown in Fig. 4.18, mount the R-8L record head assembly onto the Mounting Gauge Plate, then check the location of the R-8L record head surface. (If record head contacts to the Block C, loosen 2 pcs. of screws that assemble record head and record head plate, then place the R-8L record head assembly onto the Plate.)
- (7) Remove the R-8L record head assembly from the Mounting Gauge Plate.
- (8) Readjustment of Record Head Mounting Gauge M-9048 (DA09048A)
 - (a) Mount the Block B onto the Mounting Gauge Plate.

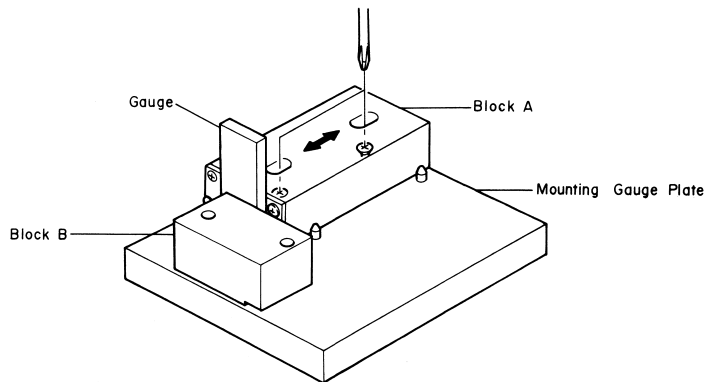
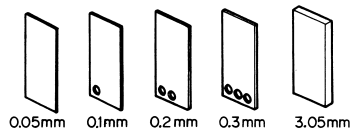


Fig. 4.17

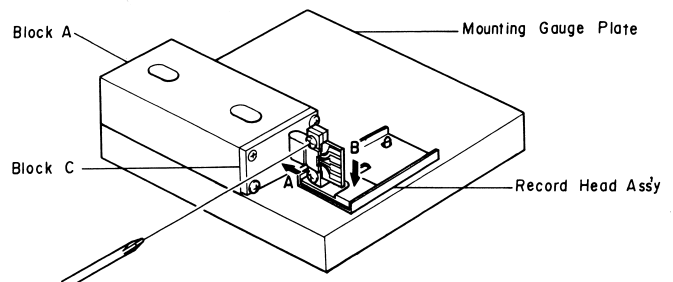


Fig. 4.18

- (b) Loosen the 2 screws fixing the Block A.
- (c) As shown in Fig. 4.17, hold the Gauges (3.05 mm and either one of 0.05, 0.15, 0.2, 0.25, 0.3 or 0.35 mm thickness) between the Block A and Block B, and fix the Block A with screws, pushing the Block A to the 2 guide pins.
- (9) Remove the Block B from the Mounting Gauge Plate.
- (10) Mount the R-8L record head assembly onto the Mounting Gauge Plate.
- (11) As shown in Fig. 4.18, loosen 2 pcs. of screws that assemble record head and record head plate. As the location of the Block A is secured by the item (8)-(c), push the record head to the directions A and B, then tighten 2 pcs. of screws.
- (12) Check to insure freedom from gap between the Block C and record head surface, then tighten the 2 pcs. of screws on the record head assembly with lock tight paint.
- (13) Remove the R-8L record head assembly from the Mounting Gauge Plate.
- (14) Assemble the record head assembly to the head mount base assembly.
- (15) Assemble the head mount base assembly to the mechanism assembly.
- (16) Check the record head stroke. If the above are inaccurate, items (1) through (16) will have to be repeated till satisfactory results are obtained.

4.10. Tape Travelling Adjustment

The adjustment shall be made with a modified version of the current type EXII C-90 as shown in Fig. 4.19 (error will be made if a current type Tape Travelling Cassette (DA09011A) should be used for this purpose).

While modifying an EXII C-90, the tape guides in the cassette housing shall be kept protected to avoid tilt. Check shall be made in the following procedures:

- (1) An EXII C-90 tape thus modified shall be loaded onto the LX-5.
- (2) Release the back-tension (rotate the Supply Reel and feed out some length of tape) and set the LX-5 in Play mode.
- (3) In this juncture, check to insure whether the tape is free from waving or slippage from the tape guide.
- (4) When the modified EXII C-90 is played back, check to insure whether the tape is freedom from waving from head surface or at pressure rollers.
- (5) If either of waving or slippage from the tape guide should be noted, adjustments of "4.3. Record Head and Playback Head Tilt Adjustment", "4.4. Head Base Stroke Adjustment", "4.5. Erase Head Stroke Adjustment and Tape Guide Height Check", "4.6. Erase Head Height and Tilt Adjustment", "4.7. Back Tension Adjustment", "4.8. Playback Head and Record Head Height Adjustment and Azimuth Alignment", "4.9. Record Head Stroke Adjustment", etc. will be required.

As a case may be, the said waving or slippage may have been caused from defective Supply Pressure Roller Ass'y or Take-up Pressure Roller Ass'y without parallel contact with capstans. If such are noted, the Pressure Roller Assemblies will have to be replaced.

Further, excessively weak take-up torque or strong take-up torque may cause defective tape travelling.

The LX-5 is intended to be an adjustment-free model, however if the similar matters as above should be noted, please replace the Reel Hub Ass'y to obtain appropriate take-up torque.

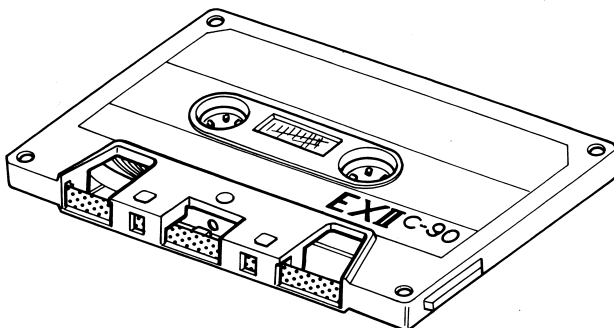


Fig. 4.19

4.11. Flywheel Holder Adjustment

- (1) Refer to Fig. 4.20.

Tighten the Thrust Screws until the gap between the Flywheel Assemblies and Thrust Screws becomes minimized when both of the Capstan Shafts are moved backwardly and forwardly (the Thrust Springs between the Capstan Flanges and Flywheel Thrust Caps are in a flat state).

Excessive tightening of the Thrust Screws however will give damages on the Flywheel Assemblies, to which careful attention is invited.

- (2) Return the Thrust Screws by 1/2 turn.
- (3) Fixing the Thrust Screws with a screwdriver, lock the Lock Nut.
- (4) Apply a quantity of lock tight paint to the Thrust Screws.

4.12. Tape Speed Adjustment

Refer to Fig. 4.21.

- (1) Remove the Top Cover Ass'y referring to item 2.1.
- (2) Connect a Frequency Counter to the Output Jack.
- (3) Load a 3 kHz Speed Wow/Flutter Tape (DA09006A) and play it back.
- (4) Adjust the Tape Speed Adjustment Volume (VR501) incorporated in the Capstan Motor to obtain 3,000 Hz on the Frequency counter.

CCW: Motor drives slowly.

CW: Motor drives fast.

4.13. Lubrication

LX-5 is a lubrication-free cassette deck except when parts are replaced. Apply the following lubricant for each replaced part:

- (1) LAUNA #100
Capstan Shaft
Pressure Roller Shaft
Thrust Cap
- (2) FLOIL GB-TS-1
Reel Hub Shaft
Thrust portion on the Capstan Shaft

FLOIL GB-TS-1, made by Kanto Chemicals Co., Ltd. in Japan.

We suggest that you use the above or equivalent type. If unavailable please contact Kanto Chemicals Co., Ltd., 2-7 Kanda Suda-cho Chiyoda-ku, Tokyo 101 Japan.

- (3) Silicon Oil #3000 CST
Air Damper Piston

Note: Excessive lubrication may cause defective damper action as the 0.2^φ hole at the end of the cylinder may be filled with oil.

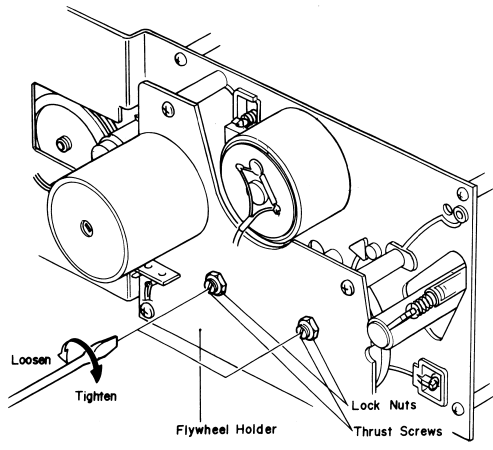


Fig. 4.20

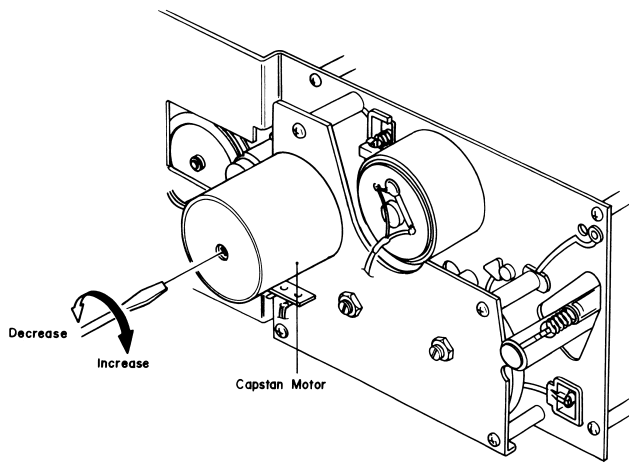


Fig. 4.21

5. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

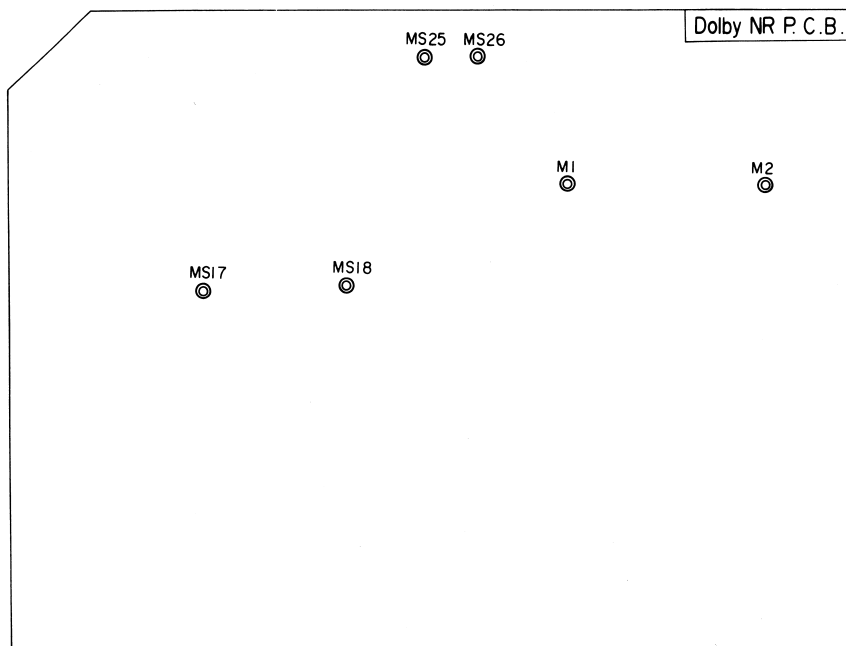
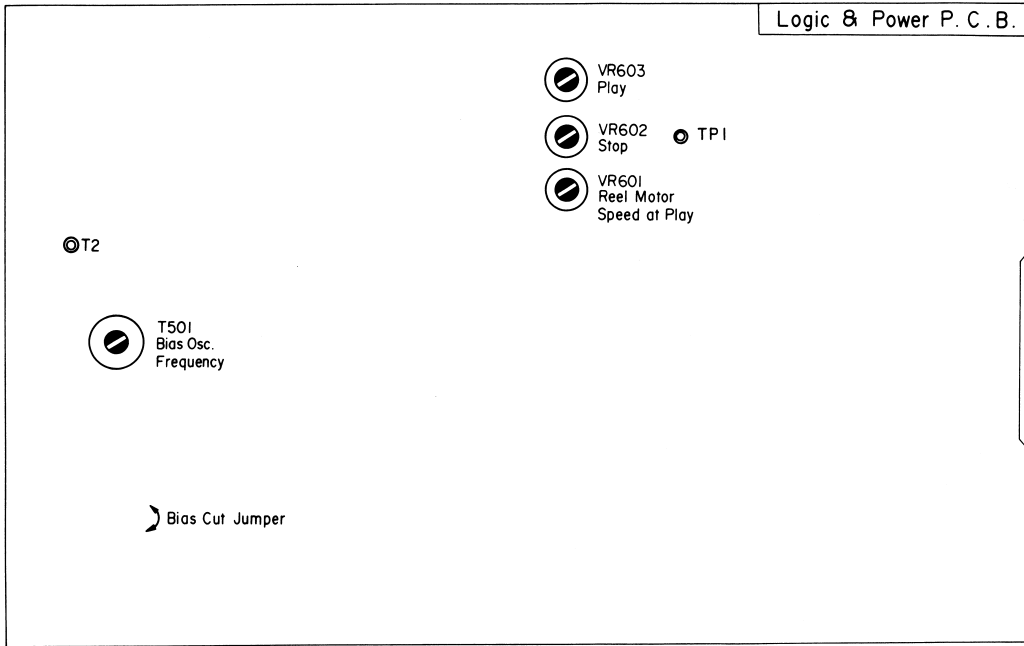
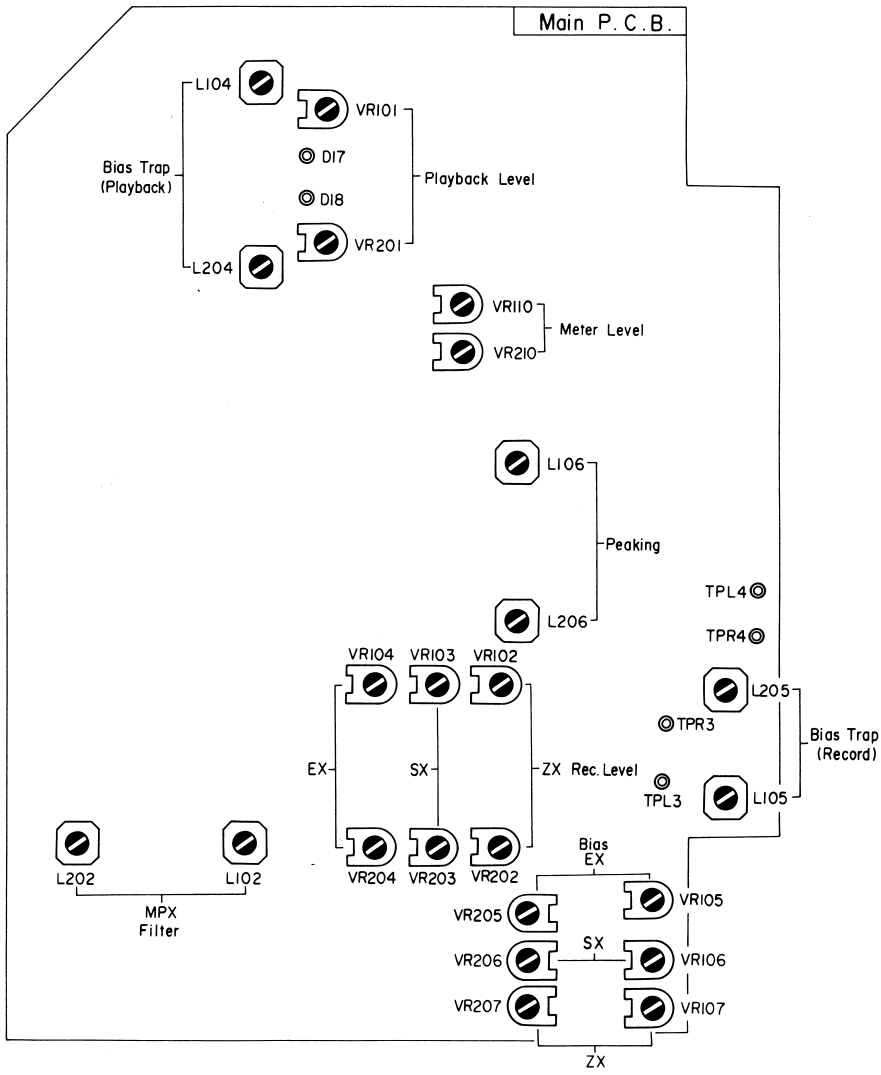


Fig. 5



6. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

6.1. Adjustment and Measurement Instructions

Note: Electrical adjustment should be performed after mechanical adjustment is completed.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE
1	Tape Speed Adjustment	3 kHz Speed and Wow/Flutter Tape (DA09006A)	Frequency Counter to Output Jacks	Playback Monitor SW – Tape
2	Meter Level Calibration	400 Hz to Input Jacks	VTVM to MS25, MS26 on Dolby NR P.C.B.	Monitor SW – Source
3	MPX Filter Adjustment	19 kHz \pm 100 Hz to Input Jacks	VTVM to Output Jacks	Monitor SW – Source MPX SW – OFF/ON Dolby NR SW – OFF
4	Playback Head Track Alignment	1 kHz Track Alignment Tape (DA09007A)	VTVM to Output Jacks	Playback Monitor SW – Tape Tape SW – SX Eq. SW – 70 μ s Dolby NR SW – OFF MPX SW – OFF
5	Playback Head Azimuth Alignment	15 kHz Azimuth Tape (DA09004A)	VTVM to Output Jacks	Same as above
6	Playback Level Calibration	400 Hz Level Tape (DA09005A)	VTVM to MS25, MS26 on Dolby NR P.C.B.	Same as above
7	Playback Frequency Response	400 Hz Level Tape (DA09005A) 10 kHz PB Frequency Tape (DA09003A) 15 kHz PB Frequency Tape (DA09002A) 20 kHz PB Frequency Tape (DA09001A)	VTVM to Output Jacks	Same as above

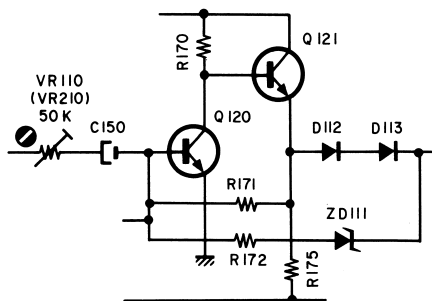


Fig. 6.1 2. Meter Level

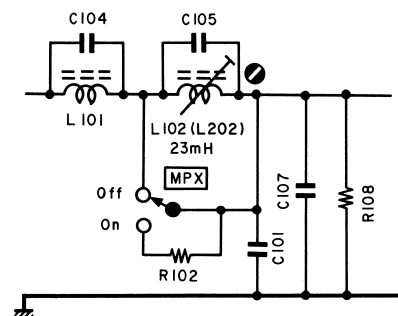


Fig. 6.2 3. MPX Filter

ADJUSTMENT	REMARKS
Capstan Motor Governor P.C.B. VR501	Adjust VR501 to obtain 3 kHz \pm 0.5%. (VR501 is incorporated in the capstan motor.)
Main P.C.B. VR110, VR210	<ol style="list-style-type: none"> 1. Feed in 400 Hz, then adjust the Input Level controls to obtain 90 mV -0.5 dB on the VTVM. 2. Adjust VR110 (VR210) so that the 0 dB segment of the level meter starts illuminating. 3. Adjust the Input Level controls to obtain 90 mV on the VTVM, then decrease the generator output level by 20 dB. 4. Check to insure that the segment for -20 dB illuminates.
Main P.C.B. L102, L202	<ol style="list-style-type: none"> 1. Adjust Input Level controls to obtain 0 dB (1 V) on the VTVM. 2. Set the MPX Filter switch to IN, then adjust L105 (L205) to obtain the minimum reading on the VTVM (the minimum reading will be less than -30 dB).
PH Height Gear	Adjust the PH Height Gear to obtain minimum readings of both channels on the VTVM. Refer to "Playback Head Height Adjustment and Azimuth Alignment" in item 4.8.
Playback Head Azimuth Alignment Screw	Adjust the Playback Head Azimuth Alignment Screw to obtain the maximum readings of both channels on the VTVM. Refer to "Playback Head Height Adjustment and Azimuth Alignment" in item 4.8. Note: Repeat steps 4 and 5 one or two times to obtain optimum performance.
Main P.C.B. VR101, VR201	Adjust VR101 (VR201) to obtain 90 mV on the VTVM.
Main P.C.B. R120, R220 R121, R221	<ol style="list-style-type: none"> 1. Load a 400 Hz level tape and play it back. 2. Load 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the playback head azimuth to obtain maximum levels on the VTVM with each tape. 3. Read the maximum levels with each tape and check to insure that the levels against the 400 Hz level tape are within the following ranges. If not, obtain satisfactory results by shorting R120 (R220) or R121 (R221). 10 kHz (-20 dB) -2 dB to $+2$ dB 15 kHz (-20 dB) -2 dB to $+3$ dB 20 kHz (-20 dB) -2 dB to $+4$ dB Check to insure that the difference in level between 10 kHz (-20 dB) and 20 kHz (-20 dB) is less than 2 dB. 4. Conduct step 5 "Playback Head Azimuth Alignment".

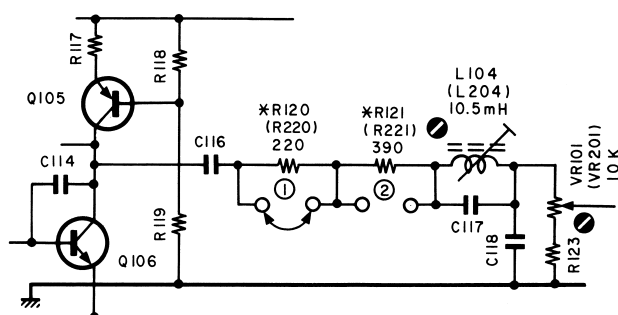


Fig. 6.3

6. Playback Level
7. Playback Frequency Response

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	AD
8	Bias Oscillation Frequency and Erase Current Adjustment		VTVM across the additional 0.1 Ω resistor and Frequency Counter to T2 on Logic & Power P.C.B.	Record, Pause Monitor SW – Source Tape SW – ZX Eq. SW – 70 μ s Dolby NR SW – OFF MPX SW – OFF	Logic T501 R513,
9	Record Amplifier Equalizer Adjustment	23 kHz (–20 dB) to Input Jacks	VTVM to TPL4, TPR4 on Main P.C.B.	Same as above	Main P.C.B. L106,
10	Bias Trap Adjustment (Record Amp.)	Remove input signals	VTVM to TPL3, TPR3 on Main P.C.B.	Same as above	Main P.C.B. L105,
11	Bias Trap Adjustment (Playback Amp.)	Remove input signals	VTVM to D17, D18 on Main P.C.B.	Record, Playback Monitor SW – Tape Tape SW – ZX Eq. SW – 70 μ s Dolby NR SW – OFF MPX SW – OFF	Main P.C.B. L104,
12	Record Head Height Adjustment	400 Hz (0 dB) to Input Jacks	VTVM to Output Jacks	Record, Playback Monitor SW – Tape Tape SW – SX Eq. SW – 70 μ s Dolby NR SW – OFF MPX SW – OFF	RH H
13	Record Head Azimuth Alignment	15 kHz (–20 dB) to Input Jacks	VTVM to Output Jacks	Same as above	Record Azimuth Alignment

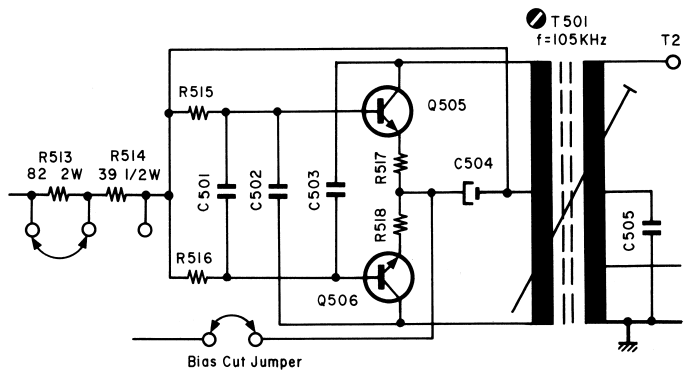


Fig. 6.4

8. Bias Oscillation Frequency and Erase Current

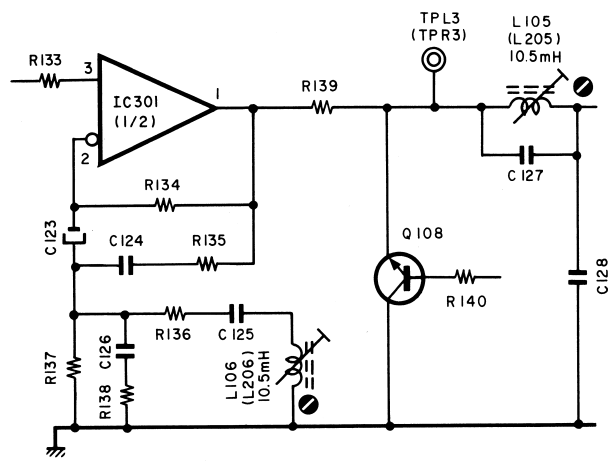


Fig. 6.5

9. Record Amp. Equalizer
10. Bias Trap (Record Amp.)
15. Overall Frequency Response

ADJUSTMENT	REMARKS
Logic & Power P.C.B. T501 R513, R514	<ol style="list-style-type: none"> 1. Connect an additional 0.1 Ω resistor in series to the Erase Head, then connect a VTVM across it. 2. Set the Bias Tune Volume to center position. 3. Adjust T501 to obtain 105 kHz on the frequency counter. 4. Check the erase current by the VTVM. Erase current will be in a range of 310 mA to 400 mA (typically approx. 350 mA). If erase current is not sufficient, increase it by shorting R513 or R514. 5. After completion of the erase current adjustment, re-check the bias oscillation frequency. 6. Remove the additional 0.1 Ω resistor.
Main P.C.B. L106, L206	<ol style="list-style-type: none"> 1. Remove the bias-cut-jumper from the dip side of the Logic & Power P.C.B. Ass'y. 2. Adjust L106 (L206) to obtain peak reading at 23 kHz on the VTVM. 3. Re-solder the bias-cut-jumper.
Main P.C.B. L105, L205	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Adjust L105 (L205) to obtain the maximum reading on the VTVM.
Main P.C.B. L104, L204	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Adjust L104 (L204) to obtain the minimum reading on the VTVM.
RH Height Gear	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Adjust the RH Height Gear to obtain maximum readings of both channels on the VTVM. Refer to "Record Head Height Adjustment and Azimuth Alignment" in item 4.8.
Record Head Azimuth Alignment Screw	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Adjust the Record Head Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM. Refer to "Record Head Height Adjustment and Azimuth Alignment" in item 4.8. <p>Note: Repeat steps 12 and 13 one or two times to obtain optimum performance.</p>

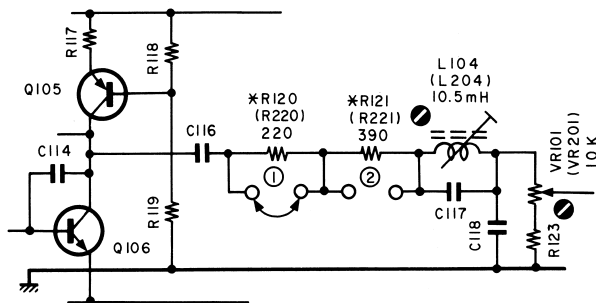


Fig. 6.6

11. Bias Trap (Playback Amp.)

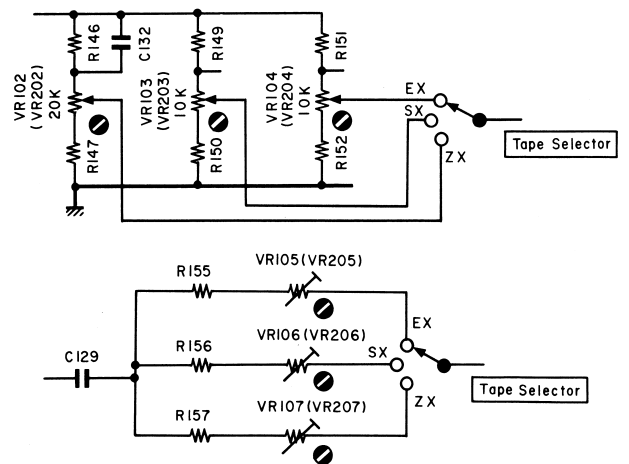


Fig. 6.7

14. Record Level and Recording Bias Current

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE
14	Record Level Calibration and Recording Bias Current Adjustment	400 Hz (0 dB), 10 kHz and 20 kHz (-20 dB) to Input Jacks	VTVM and Distortion Meter to Output Jacks	Record, Playback Monitor SW - Source/Tape Tape SW - ZX/SX/EX Eq. SW - 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW - ON (C-Type/B-Type)/OFF MPX SW - OFF
15	Overall Frequency Response Adjustment	400 Hz (0 dB) and 20 Hz to 20 kHz (-20 dB) to Input Jacks	VTVM to Output Jacks	Record, Playback Monitor SW - Source/Tape Tape SW - ZX/SX/EX Eq. SW - 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW - OFF MPX SW - OFF
16	Crosstalk Measurement	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback Monitor SW - Tape Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - OFF MPX SW - OFF
17	Channel Separation Measurement	1 kHz to Input Jacks	Same as above	Same as above
18	Erasur Measurement	100 Hz to Input Jacks	100 Hz Band Pass Filter and VTVM to Output Jacks	Record and Playback Monitor SW - Tape Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - OFF MPX SW - OFF

ADJUSTMENT	REMARKS
<p>Main P.C.B. (Record Level) ZX: VR102, VR202 SX: VR103, VR203 EX: VR104, VR204</p> <p>(Bias Current) ZX: VR107, VR207 SX: VR106, VR206 EX: VR105, VR205</p>	<p>Adjustment should be made in the order of ZX, SX and EX.</p> <ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Set the Monitor switch to Source and Dolby NR switch to C-Type. 3. Feed in 400 Hz, then set the Input Level controls to obtain 0 dB (1 V) on the VTVM. 4. Set the Monitor switch to Tape. 5. Load a reference ZX tape (DA09037A), reference SX tape (DA09025A) and reference EXII tape (DA09066A). 6. Adjust Record Cal. VR102 (VR202) for ZX, VR103 (VR203) for SX and VR104 (VR204) for EX to center position. 7. Feed in 400 Hz (0 dB), then record and play it back. Adjust Bias VR107 (VR207) for ZX, VR106 (VR206) for SX and VR105 (VR205) for EX to obtain the maximum readings on the VTVM. 8. Feed in 20 kHz (–20 dB), then adjust Bias VR107 (VR207) for ZX, VR106 (VR206) for SX and VR105 (VR205) for EX to obtain the same readings as source monitor levels on the VTVM. 9. Feed in 400 Hz (0 dB), then adjust Record Cal. VR102 (VR202) for ZX, VR103 (VR203) for SX and VR104 (VR204) for EX to obtain 0 dB on the VTVM. 10. Repeat above 8 and 9 two or three times to obtain optimum performance. 11. Set the Dolby NR switch to OFF. 12. Feed in 10 kHz (–20 dB) and 20 kHz (–20 dB), then record and play them back. Check to insure that the levels are within –20 dB ±3 dB against the levels in Dolby NR C-Type. 13. Set the Dolby NR switch to B-Type. 14. Feed in 10 kHz (–20 dB) and 20 kHz (–20 dB), then record and play them back. Check to insure that the levels are within –20 dB ±2 dB against the levels in Dolby NR OFF. 15. Check to insure whether the total harmonic distortion is less than 0.9% for ZX tape and 1.0% for SX and EXII tapes. 16. If above is not sufficient, repeat 7 to 15 till satisfactory results are obtained.
<p>Main P.C.B. L106, L206</p>	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Set the Monitor switch to Source. 3. Feed in 400 Hz (0 dB) and adjust Input Level controls to obtain 0 dB on the VTVM. 4. Decrease the generator output level by 20 dB. 5. Set the Monitor switch to Tape, then record and play it back. 6. Feed in 20 Hz to 20 kHz (–20 dB), and check to insure whether the output levels are within –20 dB ±4 dB. 7. If above is not sufficient, adjust L106 (L206) to obtain approx. –20 dB on the VTVM at 20 kHz. Then, conduct step 14 "Record Level Calibration and Recording Bias Current Adjustment" 8. If above is not sufficient, precise re-adjustment of step 7 "Playback Frequency Response", replacement of Playback Head or Record Head, or check on item 4.10 "Tape Travelling Adjustment" will be required.
	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Erase the tape with bulk eraser. 3. Adjust the Input Level controls to obtain 0 dB on the VTVM, and record the signals on the reference ZX tape (DA09037A). 4. Turn the cassette tape the other way round and play it back. 5. Measure the difference between 3 and 4.
	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Erase the tape with bulk eraser. 3. Adjust L ch (R ch) Input Level control to obtain 0 dB on the VTVM, and close R ch (L ch) Input Level control. 4. Record and play it back, then measure the R ch (L ch) level.
	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Erase the tape with bulk eraser. 3. Adjust Input Level controls to obtain 0 dB on the VTVM, and record the signals on the reference ZX tape (DA09037A). 4. Rewind the tape, close Input Level controls, and then record again. 5. Rewind the tape, play it back, and then measure the difference between 3 and 4.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	A
19	Signal to Noise Ratio Measurement	400 Hz to Input Jacks	IHF-A Curve Filter, Distortion Meter and VTVM to Output Jacks	Record and Playback Monitor SW – Tape Tape SW – ZX Eq. SW – 70 μ s Dolby NR SW – ON (B-Type/C-Type) MPX SW – OFF	
20	Total Harmonic Distortion Measurement	400 Hz to Input Jacks	VTVM and Distortion Meter to Output Jacks	Record and Playback Monitor SW – Tape Tape SW – ZX/SX/EX Eq. SW – 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW – OFF MPX SW – OFF	
21	Wow/Flutter Measurement	3 kHz Speed and Wow/Flutter Tape (DA09006A)	Wow/Flutter Meter to Output Jacks	Playback Monitor SW – Tape Eq. SW – 70 μ s	

6.2. Playback Frequency Response Adjustment

Fig. 6.8 shows a playback equalization curve and Fig. 6.9 is the playback amp. circuit for adjustment.

(1) Peaking Adjustment (for high frequency response)

This adjustment will be required if playback level is not sufficient when 20 kHz PB frequency response tape is played back as referred to step 7 in 6.1 "Adjustment and Measurement Instructions".

Peaking portion compensates the gap loss of the playback head. Peaking level is varied by the short circuit of R120 (R220) or R121 (R221) as illustrated in Fig. 6.8.

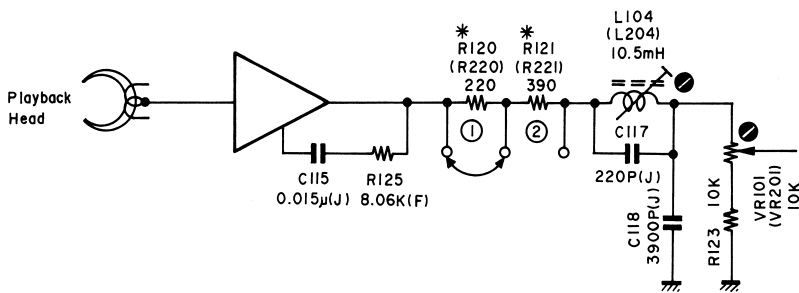


Fig. 6.9 Playback Eq. Amp.

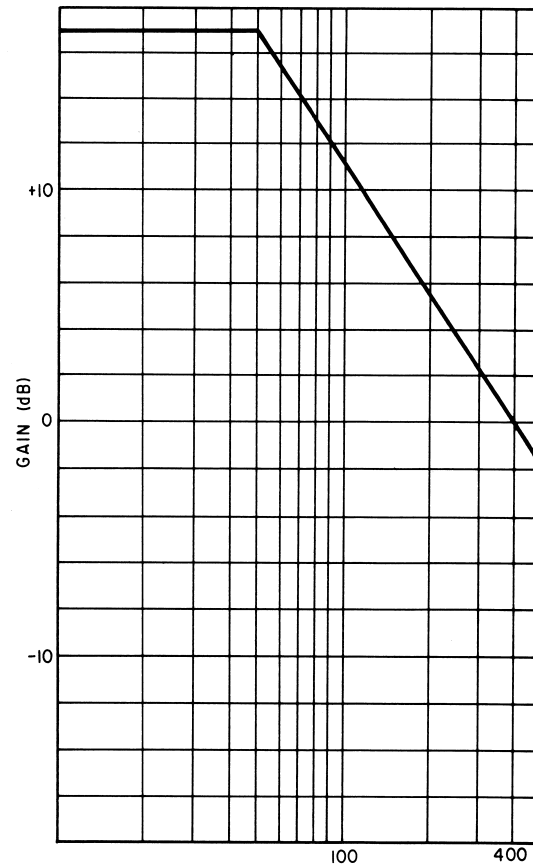


Fig. 6.8 Playback Equalization Curve

ADJUSTMENT	REMARKS
	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Set the Dolby NR switch to B-Type/C-Type. 3. Feed in 400 Hz, then record and play it back. 4. Adjust the Input Level controls to obtain 3% total harmonic distortion in Playback mode. 5. Close the Input Level controls then record. 6. After rework, play back and check the output level difference between 4 and 5. <p>Note: The filter of IHF-A curve shall be used in the measurements.</p>
	<ol style="list-style-type: none"> 1. Set the Bias Tune Volume to center position. 2. Adjust the Input Level controls to obtain 0 dB on the VTVM. 3. Record and play it back. 4. Read the distortion meter and check to insure that the distortion is as follows: <ul style="list-style-type: none"> EXII 1.0% or less SX 1.0% or less ZX 0.9% or less
	<p>Play back and read the wow/flutter meter.</p>

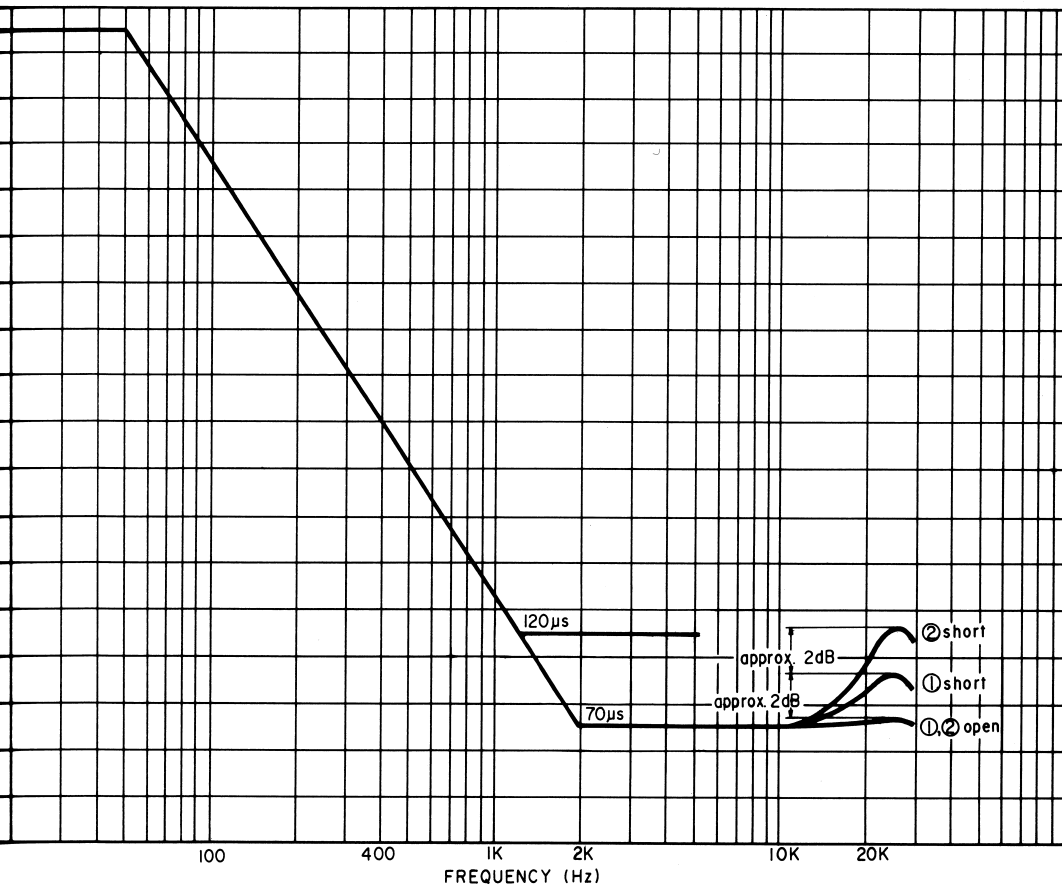


Fig. 6.8 Playback Equalization Curve

6.3. Dolby NR Circuit Check

Dolby NR circuit incorporates Dolby NR ICs which have no adjustment point.

Perform the following checks and make sure that the IC operates accurately, i.e., accuracy of frequency response through IC.

6.3.1. Dolby NR B-Type Circuit Check

(1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to pin No. M17 (M18) on the Dolby NR P.C.B.

Output Connection: VTVM to MS25 (MS26) on the Dolby NR P.C.B.

Mode: Stop
Monitor SW – Tape
Dolby NR SW – B-Type/OFF

- Connect a VTVM to MS25 (MS26) on the Dolby NR P.C.B. Ass'y.
- Set the Dolby NR switch to B-Type. Feed in 1.4 kHz to pin No. M17 (M18) and adjust the generator output control to obtain 9 mV on the VTVM.
- Set the Dolby NR switch to OFF. Check to insure that the reading is +3.2 dB \pm 1.5 dB on the VTVM.

(2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks
Output Connection: VTVM to MS25 (MS26) and M1 (M2) on the Dolby NR P.C.B.

Mode: Stop
Monitor SW – Source
Dolby NR SW – B-Type/OFF

- Connect a VTVM to MS25 (MS26) on the Dolby NR P.C.B. Ass'y.
- Feed in 1.4 kHz and adjust the Input Level controls to obtain 9 mV/2.85 mV on the VTVM.
- Remove the VTVM from MS25 (MS26) and reconnect it to M1 (M2) on the Dolby NR P.C.B. Ass'y.
- Check to insure that the reading at M1 (M2) corresponds to the following with Dolby NR switch OFF and B-Type.

Input Level at MS25, MS26	Level at M1 (IC102-16), M2 (IC202-16)	
	Dolby NR OFF	Dolby NR B-Type
9 mV	0 dB	+3.2 dB \pm 1.5 dB
2.85 mV	0 dB	+8.2 dB \pm 1.5 dB

6.3.2. Dolby NR C-Type Circuit Check

(1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to pin No. M17 (M18) on the Dolby NR P.C.B.

Output Connection: VTVM to MS25 (MS26) on the Dolby NR P.C.B.

Mode: Stop
Monitor SW – Tape
Dolby NR SW – C-Type/OFF

- Connect a VTVM to MS25 (MS26) on the Dolby NR P.C.B. Ass'y.
- Set the Dolby NR switch to C-Type. Feed in 1.4 kHz to pin No. M17 (M18) and adjust the generator output control to obtain 9 mV on the VTVM.
- Set the Dolby NR switch to OFF. Check to insure that the reading is +6.5 dB \pm 1.5 dB on the VTVM.

(2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks
Output Connection: VTVM to MS25 (MS26) and M1 (M2) on the Dolby NR P.C.B.

Mode: Stop
Monitor SW – Source
Dolby NR SW – C-Type/OFF

- Connect a VTVM to MS25 (MS26) on the Dolby NR P.C.B. Ass'y.
- Feed in 1.4 kHz and adjust the Input Level controls to obtain 9 mV/2.85 mV on the VTVM.
- Remove the VTVM from MS25 (MS26) and reconnect it to M1 (M2) on the Dolby NR P.C.B. Ass'y.
- Check to insure that the reading at M1 (M2) corresponds to the following with Dolby NR switch OFF and C-Type.

Input Level at MS25, MS26	Level at M1 (IC102-16), M2 (IC202-16)	
	Dolby NR OFF	Dolby NR C-Type
9 mV	0 dB	+6.5 dB \pm 1.5 dB
2.85 mV	0 dB	+11.4 dB \pm 1.5 dB

7. MOUNTING DIAGRAMS AND PARTS LIST

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
SW1 SW1 SW1 M2 M2 M2	BA04626A	Power Switch P.C.B. Ass'y (Japan)	LED301 LED302-306 R301,302 303,305 306 R304 R307 SW301-308 SW309,310 CN15 CN17 CN23	BA04592A	Control Switch P.C.B. Ass'y Serial No.: A12302901 –
	BA04627A	Power Switch P.C.B. Ass'y (U.S.A. & Canada)		OB07993C	Control Switch P.C.B.
	BA04628A	Power Switch P.C.B. Ass'y (UK, Australia, 220V Class 2 & Others)		OB06340A	LED Red TLR208
	OB02519B	Power Switch P.C.B.		OB06341A	LED Green TLG208 (5 pcs.)
	OB07406A	Power Switch (Japan)		OB05575A	Carbon Resistor 560 ERD-25T J
	OB07407A	Power Switch (U.S.A. & Canada)		OB01857A	Carbon Resistor 1K ERD-25T J
	OB07408A	Power Switch S.V.B. (UK, Australia, 220V Class 2 & Others)		OB05676A	Carbon Resistor 390K ERD-25T J
	OB08363A	Spark Killer (Japan)		OB07219A	Switch AKC8S
	OB08342A	Spark Killer (U.S.A. & Canada)		OB07396A	Double Action Switch KHF10901
	OB08955A	Spark Killer (UK, Australia, 220V Class 2 & Others)		OB08928A	6P-H Connector 450mm
	OE00622A	Screw M3x5 Philips Pan Head (2A)		OB08929A	9P-H Connector 450mm
OE00752A	Eyelet 2x3 (2 pcs.)	OB08931A	10P-H Connector 400mm		
OJ04536A	Power Switch Holder (1 pce.)	OM04222A	Label CN-15 (1 pce.)		
			OM04224A	Label CN-17 (1 pce.)	
			OM04332A	Label CN-23 (1 pce.)	
Q405 R604 R605 PL407 CN13	BA04637A	Shut-off P.C.B. Ass'y	LED301 LED302-306 R301,302 303,305 306 R304 R307 SW301-308 SW309,310 CN15 CN17 CN23	BA04592A	Control Switch P.C.B. Ass'y Serial Nos.: A12301001 – A12302900
	OB07839B	Shut-off P.C.B.		OB07993A	Control Switch P.C.B.
	OB06228A	Photo Transistor PH104		OB06340A	LED Red TLR208
	OB05615A	Carbon Resistor 22K ERD-25T J		OB06341A	LED Green TLG208 (5 pcs.)
	OB09215A	Fail Safe Type Resistor 100 RDF-25S J		OB05575A	Carbon Resistor 560 ERD-25T J
	OB08552A	Lamp 12V 25mA		OB01857A	Carbon Resistor 1K ERD-25T J
	OB08947A	9P Connector		OB05676A	Carbon Resistor 390K ERD-25T J
OM04230A	Label CN-13 (1 pce.)	OB07219A	Switch AKC8S		
LED301 302,303 LED304 305 R301,302 CN24	BA04593A	LED P.C.B. Ass'y Serial No.: A12302901 –	LED301 LED302-306 R301,302 303,305 306 R304 R307 SW301-308 SW309,310 CN15 CN17 CN23	OB07993A	Control Switch P.C.B.
	OB07994C	LED P.C.B.		OB06340A	LED Red TLR208
	OB06340A	LED Red TLR208		OB06341A	LED Green TLG208 (5 pcs.)
	OB06327A	LED		OB05575A	Carbon Resistor 560 ERD-25T J
	OB01857A	Carbon Resistor 1K ERD-25T J		OB01857A	Carbon Resistor 1K ERD-25T J
	OB08967A	9P-H Connector 450mm		OB05676A	Carbon Resistor 390K ERD-25T J
	OE00857A	BT Screw M3x6 Philips Binding Head (1 pce.)		OB07219A	Switch AKC8S
	OJ04534A	Fader House (1 pce.)		OB07396A	Double Action Switch KHF10901
OM04236A	Label CN-24 (1 pce.)	OB08928A	6P-H Connector 450mm		
LED301 302,303 LED304 305 R301,302 CN24	BA04593A	LED P.C.B. Ass'y Serial Nos.: A12301001 – A12302900	LED301 LED302-306 R301,302 303,305 306 R304 R307 SW301-308 SW309,310 CN15 CN17 CN23	OB07993A	Control Switch P.C.B.
	OB07994A	LED P.C.B.		OB06340A	LED Red TLR208
	OB06340A	LED Red TLR208		OB06341A	LED Green TLG208 (5 pcs.)
	OB06327A	LED		OB05575A	Carbon Resistor 560 ERD-25T J
	OB01857A	Carbon Resistor 1K ERD-25T J		OB01857A	Carbon Resistor 1K ERD-25T J
	OB08967A	9P-H Connector 450mm		OB05676A	Carbon Resistor 390K ERD-25T J
	OE00857A	BT Screw M3x6 Philips Binding Head (1 pce.)		OB07219A	Switch AKC8S
	OJ04534A	Fader House (1 pce.)		OB07396A	Double Action Switch KHF10901
OM04236A	Label CN-24 (1 pce.)	OB08928A	6P-H Connector 450mm		

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

7.1. Power Switch P.C.B. Ass'y

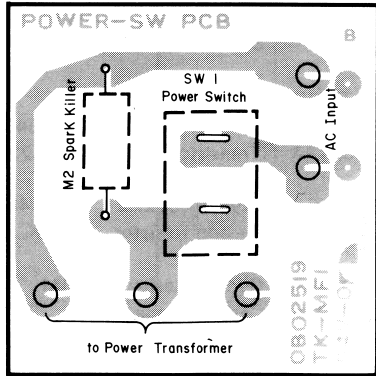


Fig. 7.1

7.2. Shut-off P.C.B. Ass'y

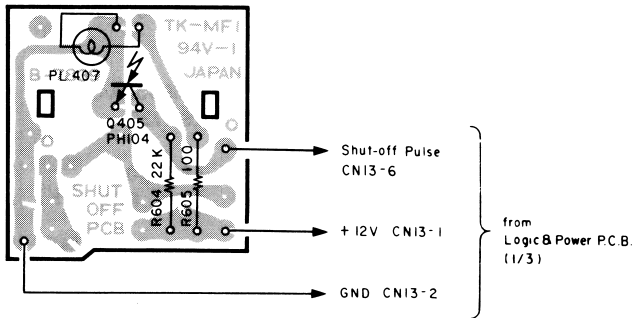


Fig. 7.2

7.4. Control Switch P.C.B. Ass'y

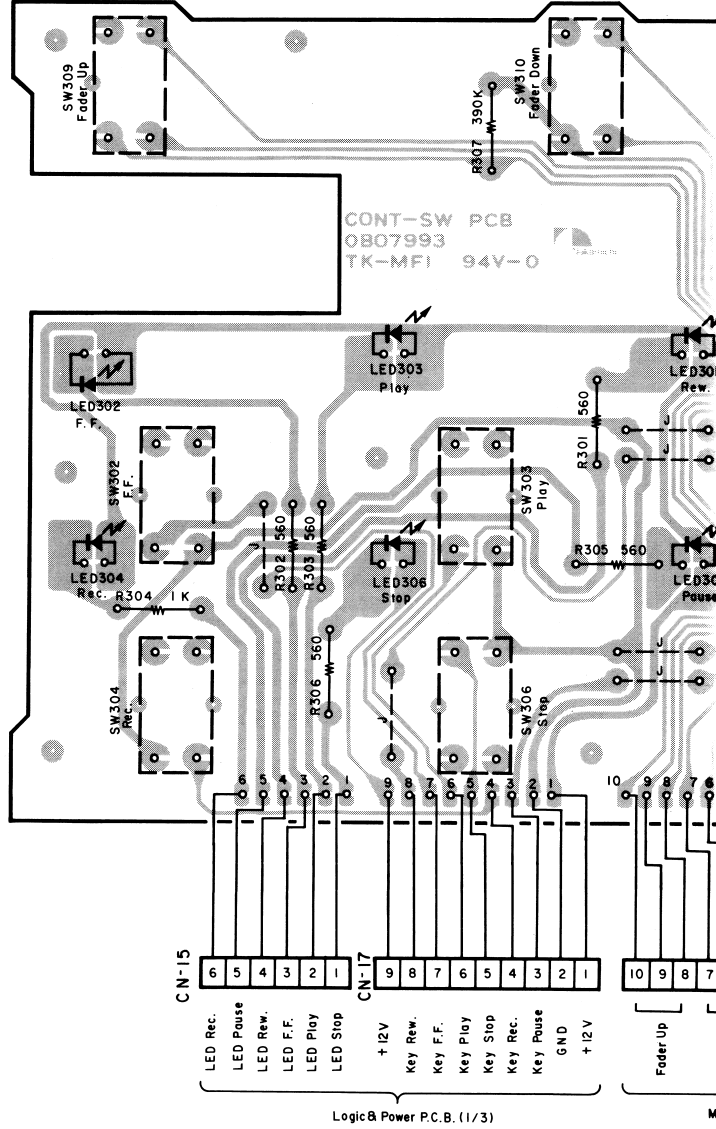


Fig. 7.4.1 Serial No.: A12302901 -

7.3. LED P.C.B. Ass'y

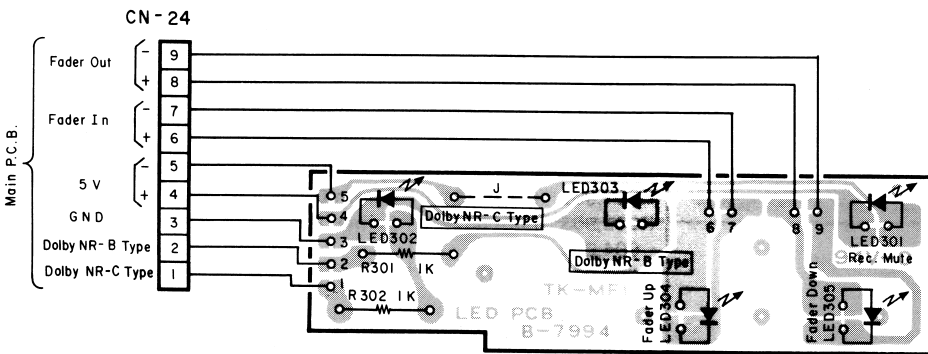


Fig. 7.3.1 Serial No.: A12302901 -

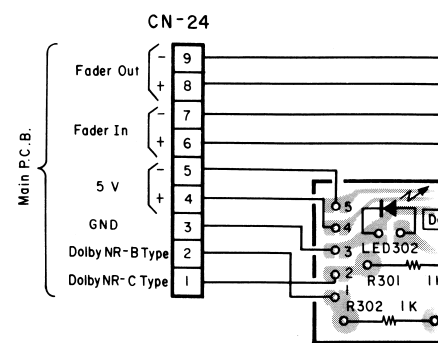
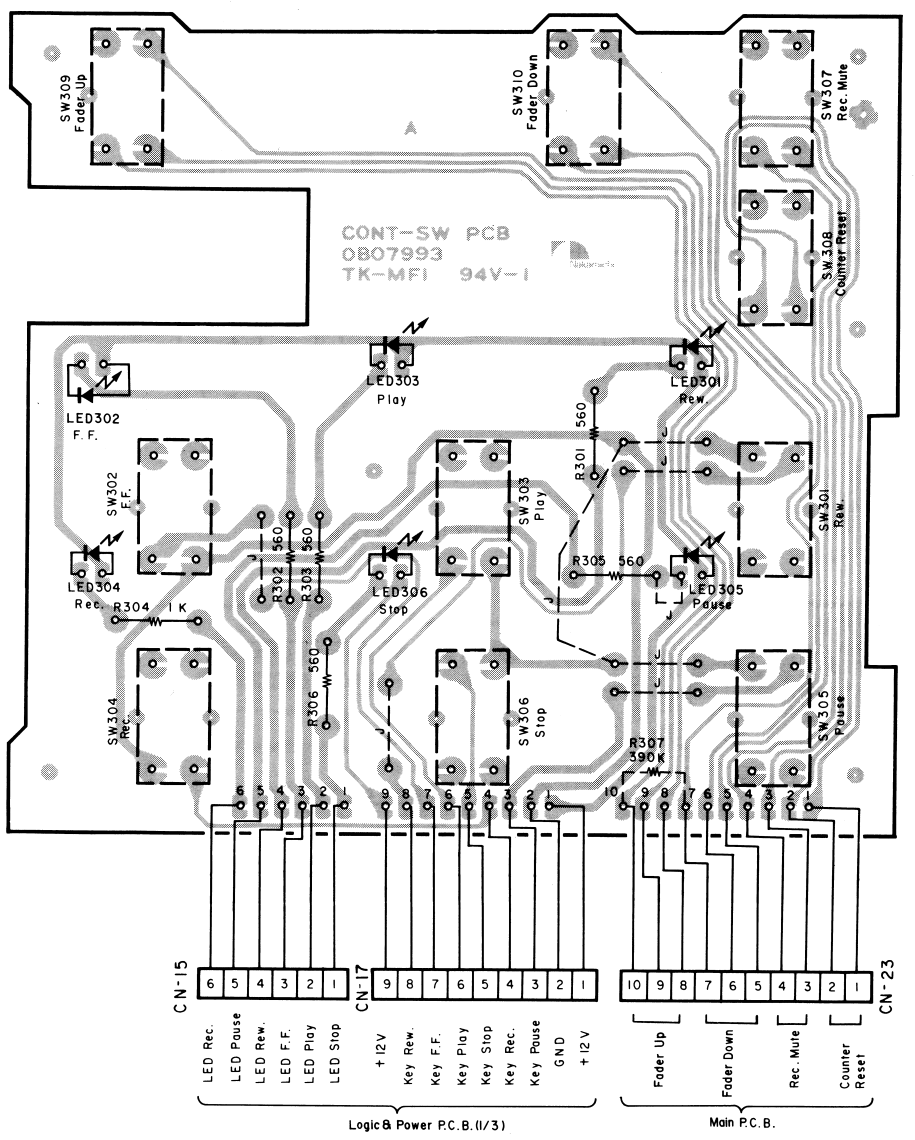
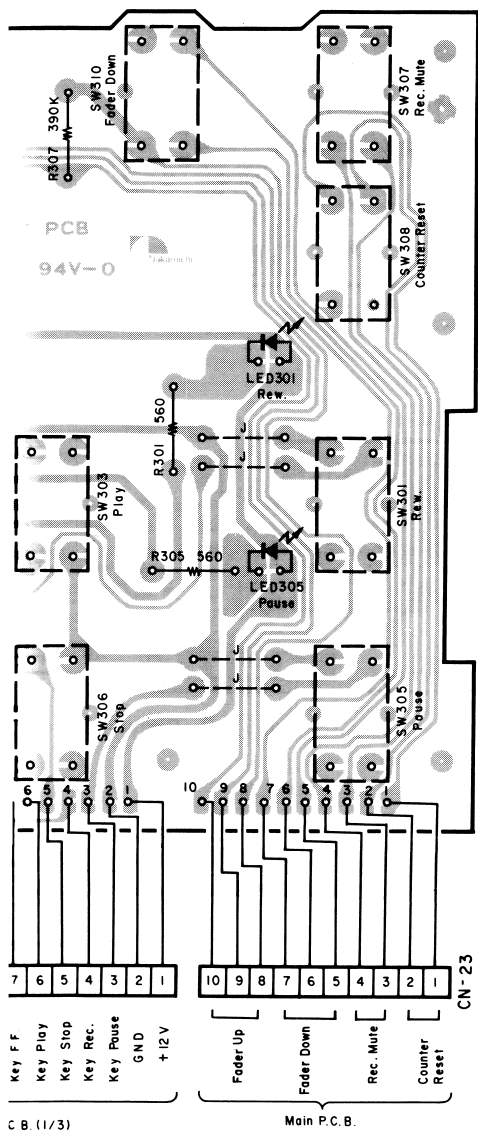


Fig. 7.3.2 Serial No. A12302901 -



No.: A12302901 -

Fig. 7.4.2 Serial Nos.: A12301001 - A12302900

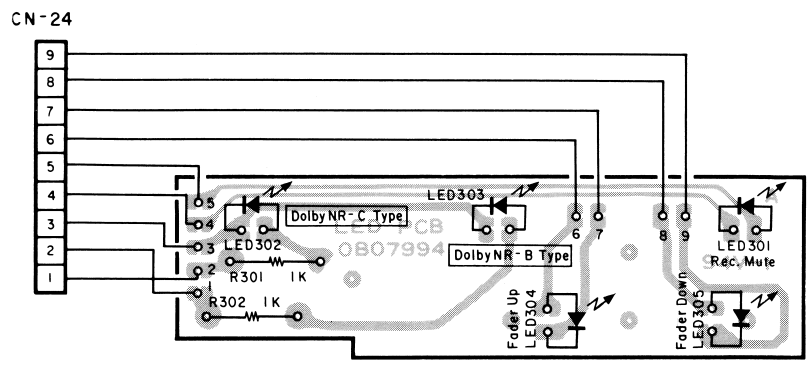


Fig. 7.3.2 Serial Nos.: A12301001 - A12302900

7.5. Counter-1 P.C.B. Ass'y

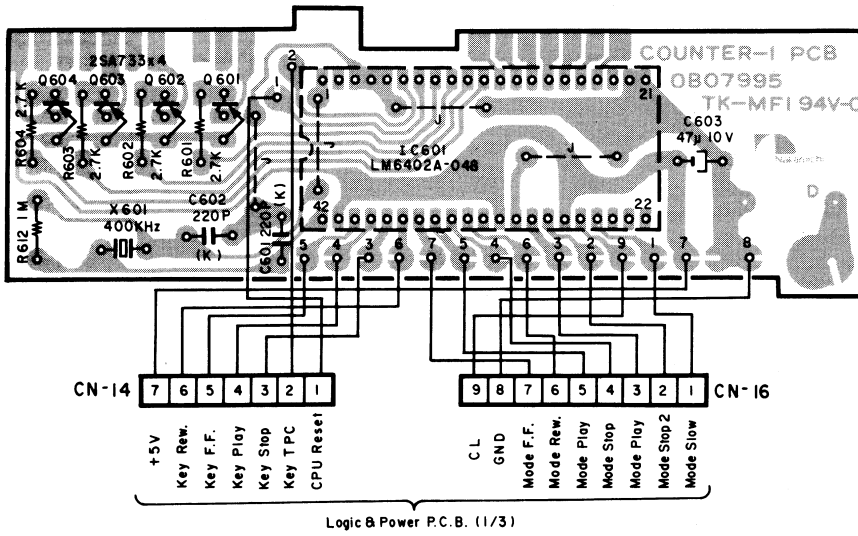


Fig. 7.5.1 Serial No.: A12302901 -

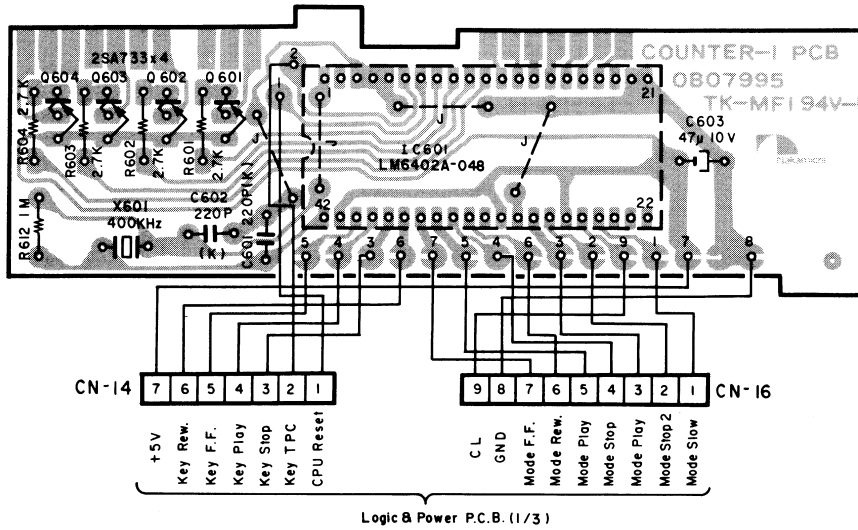


Fig. 7.5.2 Serial Nos.: A12301001 - A12302900

7.6. Counter-2 P.C.B. Ass'y

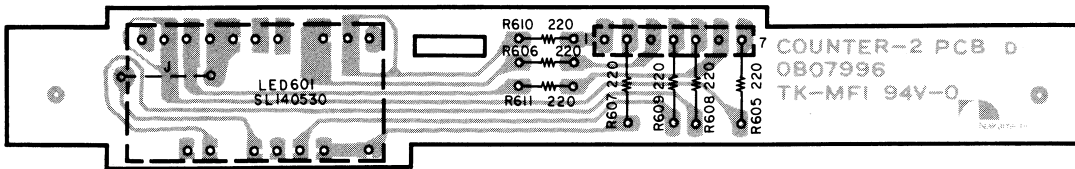


Fig. 7.6

7.7. Indicator P.C.B. Ass'y

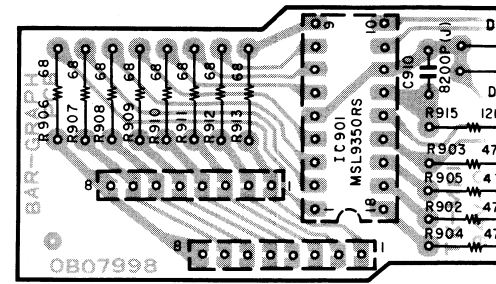


Fig. 7.7.1 Serial N

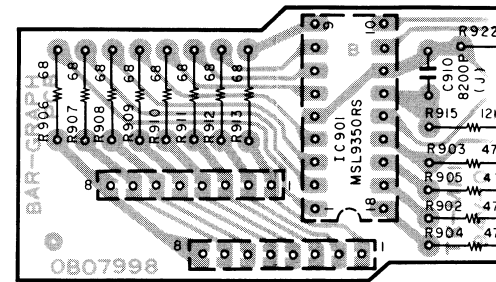


Fig. 7.7.2 Serial Nos.: A

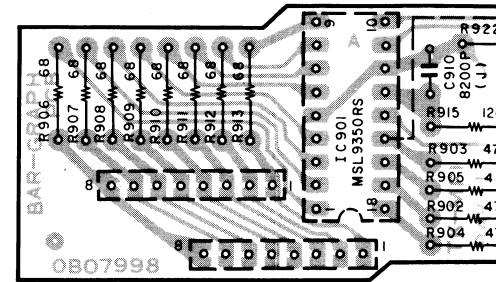


Fig. 7.7.3 Serial Nos.: A

Note: Diode is 1SS

P.C.B. Ass'y

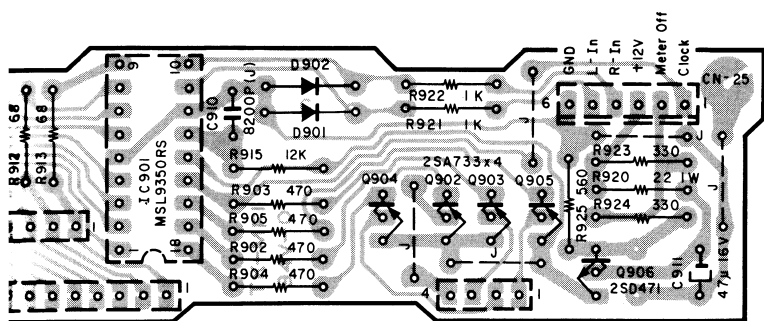


Fig. 7.7.1 Serial No.: A12305404 –

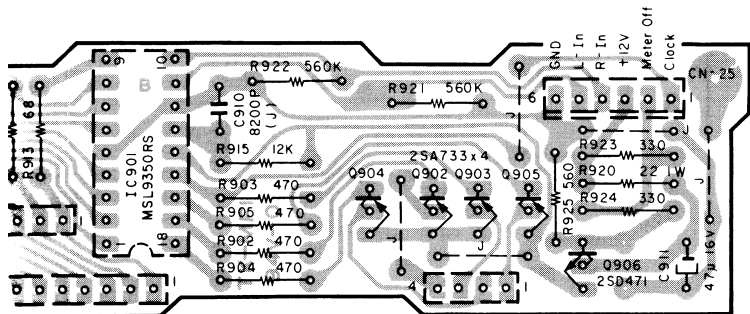


Fig. 7.7.2 Serial Nos.: A12302901 – A12305403

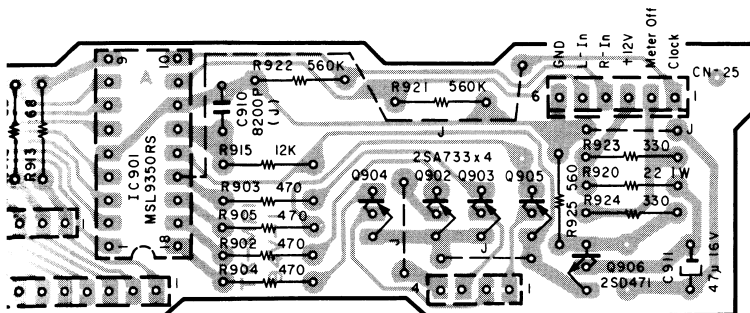


Fig. 7.7.3 Serial Nos.: A12301001 – A12302900

Note: Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.

Schematic Ref. No.	Part No.	Description
	BA04589A	Counter-1 P.C.B. Ass'y Serial No.: A12302901 –
IC601	OB07995D	Counter-1 P.C.B. IC
Q601,602	OB06320A	Transistor LM6402A-048
603,604	OB06013A	Transistor 2SA733
X601	OB08908A	Crystal 400kHz 4BR400BT
R601,602	OB09687A	Carbon Resistor 2.7K ERD-16T J
603,604		
R612	OB09749A	Carbon Resistor 1M ERD-16T J
C601,602	OB09283A	Ceramic Capacitor 220P 50V K
C603	OB01836A	Electrolytic Capacitor 47µ 10V
CN14	OB08930B	7P-H Connector
CN16	OB08929A	9P-H Connector 450mm
	0M04223A	Label CN-16 (1 pce.)
	0M04231A	Label CN-14 (1 pce.)
	0E00037A	Earth Lug B-5 (1 pce.)
	BA04589A	Counter-1 P.C.B. Ass'y Serial Nos.: A12301001 – A12302900
IC601	OB07995A	Counter-1 P.C.B. IC
Q601,602	OB06320A	Transistor LM6402A-048
603,604	OB06013A	Transistor 2SA733
X601	OB08908A	Crystal 400kHz 4BR400BT
R601,602	OB09687A	Carbon Resistor 2.7K ERD-16T J
603,604		
R612	OB09749A	Carbon Resistor 1M ERD-16T J
C601,602	OB09283A	Ceramic Capacitor 220P 50V K
C603	OB01836A	Electrolytic Capacitor 47µ 10V
CN14	OB08930B	7P-H Connector
CN16	OB08929A	9P-H Connector 450mm
	0M04223A	Label CN-16 (1 pce.)
	0M04231A	Label CN-14 (1 pce.)
	0E00037A	Earth Lug B-5 (1 pce.)
	BA04590A	Counter-2 P.C.B. Ass'y
LED601	OB07996D	Counter-2 P.C.B. Counter LED
R605-611	OB06342A	Carbon Resistor 220 ERD-16T J
	OB09661A	Carbon Resistor 220 ERD-16T J (7 pcs.)
	0J04582A	Counter Spacer (1 pce.)
	BA04591A	Indicator P.C.B. Ass'y Serial No.: A12305404 –
IC901	OB07998C	Indicator P.C.B. IC
Q902,903	OB06284A	Transistor MSL9350RS
904,905	OB06013A	Transistor 2SA733
Q906	OB06066A	Transistor 2SD471
D901,902	OB06181A	Silicon Diode 1SS53
R902,903	OB05576A	Carbon Resistor 470 ERD-25T J
904,905		
R906-913	OB01704A	Carbon Resistor 68 ERD-25T J (8 pcs.)
R915	OB09263A	Carbon Resistor 12K ERD-25T J
R920	OB09378A	Fail Safe Type Resistor 22 RSF-1B J
R921,922	OB01857A	Carbon Resistor 1K ERD-25T J
R923,924	OB05577A	Carbon Resistor 330 ERD-25T J

7.8. Amp. Switch P.C.B. Ass'y

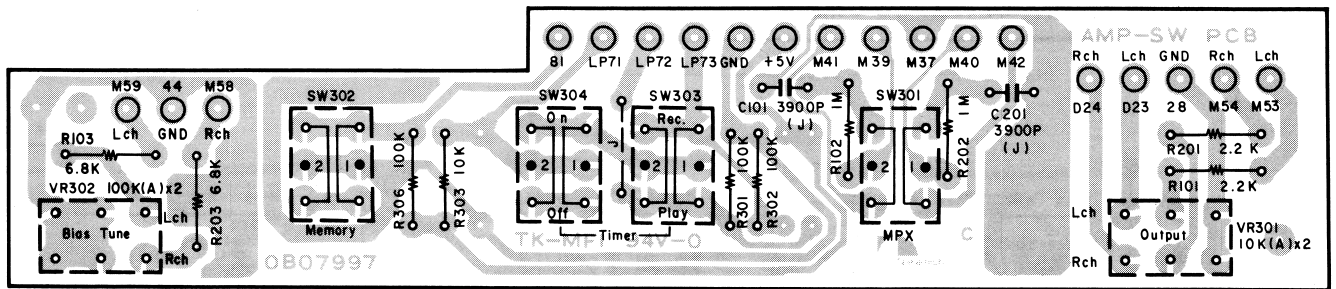


Fig. 7.8.1 Serial No.: A12305404 –

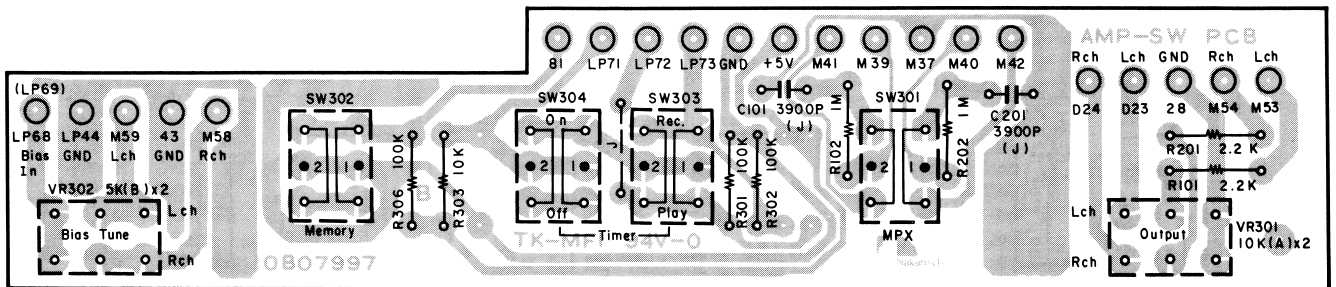


Fig. 7.8.2 Serial Nos.: A12301001 – A12305403

7.9. Monitor Switch P.C.B. Ass'y

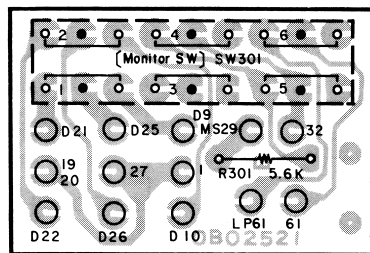
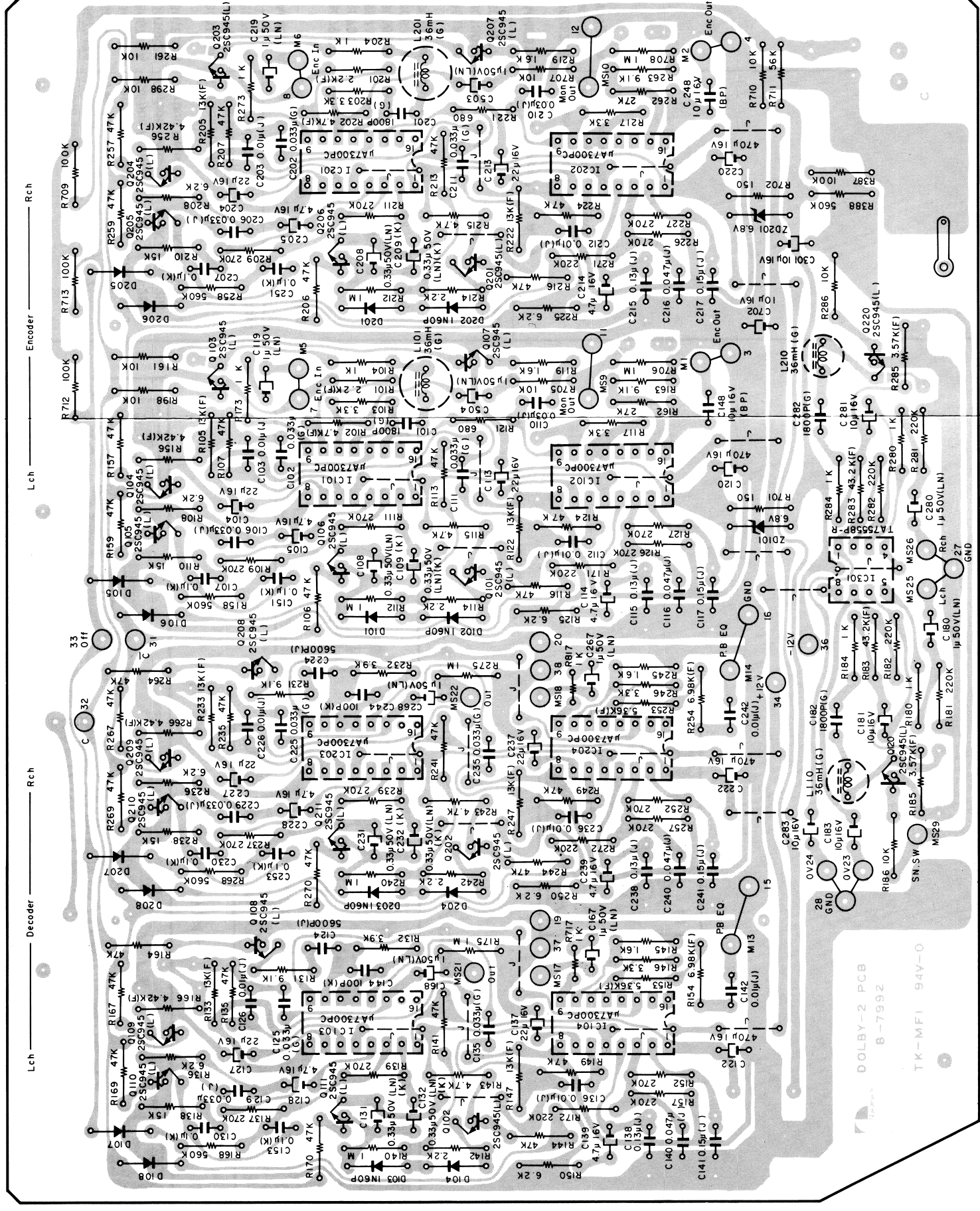


Fig. 7.9

7.10. Dolby NR P.C.B. Ass'y (U.S.A. & Canada)
7.10.1. Dolby NR P.C.B. Ass'y (U.S.A. & Canada)



DOLBY-2 PCB
B-7992
TK-MF1 94V-0

	BA04574A	Dolby NR P.C.B. Ass'y (U.S.A. & Canada)	
		Serial No.: A12302901 -	
	- PB Dolby NR -		
IC103,104 203,204	0B06200A	IC	μ A7300PC
Q102,108 109,110 111,202 208,209 210,211	0B01872A	Transistor	2SC945 (L)
D103,203	0B00030A	Germanium Diode	1N60P
D104,107 108,204 207,208	0B01909A	Silicon Diode	1S1555
R131,231	0B05694A	Carbon Resistor	9.1K ERD-25T J
R132,232	0B05675A	Carbon Resistor	3.9K ERD-25T J
R133,147 233,247	0B09557A	Metal Film Resistor	13K SN14K2E F
R135,141 144,149 164,167 169,170 235,241 244,249 264,267 269,270	0B05641A	Carbon Resistor	47K ERD-25T J
R136,150 236,250	0B09271A	Carbon Resistor	6.2K ERD-25T J
R137,139 152,157 237,239 252,257	0B05620A	Carbon Resistor	270K ERD-25T J
R138,238	0B05591A	Carbon Resistor	15K ERD-25T J
R140,175 240,275	0B05776A	Carbon Resistor	1M ERD-25T J
R142,242	0B05622A	Carbon Resistor	2.2K ERD-25T J
R143,243	0B01846A	Carbon Resistor	4.7K ERD-25T J
R145,245	0B09565A	Carbon Resistor	1.6K ERD-25T J
R146,246	0B01681A	Carbon Resistor	3.3K ERD-25T J
R153,253	0B09426A	Metal Film Resistor	5.36K SN14K2E F
R154,254	0B09604A	Metal Film Resistor	6.98K SN14K2E F
R166,266	0B09558A	Metal Film Resistor	4.42K SN14K2E F
R168,268	0B05784A	Carbon Resistor	560K ERD-25T J
R172,272	0B05625A	Carbon Resistor	220K ERD-25T J
R717,817	0B01857A	Carbon Resistor	1K ERD-25T J
C122,222	0B01392A	Electrolytic Capacitor	470 μ 16V
C124,224	0B05659A	Mylar Capacitor	5600P 50V J
C125,135 225,235	0B09240A	PP Capacitor	0.033 μ 100V G
C126,136 142,226 236,242	0B05681A	Mylar Capacitor	0.01 μ 50V J
C127,137 227,237	0B01862A	Electrolytic Capacitor	22 μ 16V
C128,139 228,239	0B01389A	Electrolytic Capacitor	4.7 μ 16V
C129,229	0B05583A	Mylar Capacitor	0.033 μ 50V J
C130,153 230,253	0B01603A	Mylar Capacitor	0.1 μ 50V K