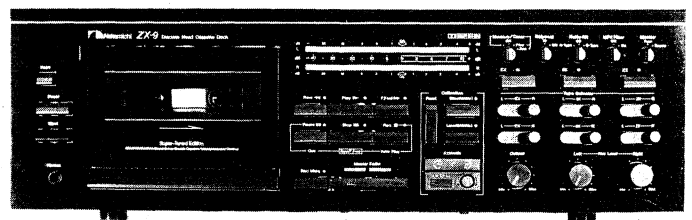




Service Manual

Nakamichi ZX-9

Discrete Head Cassette Deck



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1. GENERAL

1.1. Voltage Selector

Voltage selector is installed on the rear panel for Other version of the Nakamichi ZX-9. This voltage selector can select either 120 V or 220-240 V at customer's disposal.

1.2. Parts List for Carton and Packing

Part No.	Description	Q'ty
OF03671A	Inner Carton	1
OF03672A	Outer Carton	1
OF03629A	Packing	2

2. MECHANICAL ADJUSTMENTS

2.1. Mechanism Control Cam Adjustment

Before adjustment, remove the Front Panel Ass'y and the Cover Plate.

(1) Offset Adjustment of Control Motor Driver

(a) Refer to Fig. 2.1.

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 cassette deck 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 cassette deck 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 cassette deck in F.F., Pause, or Cue mode by pressing each button (press F.F. and Pause buttons to set the cassette deck in Cue mode) and check to insure that the pointer is in a range of "F", "PS", or "CU" 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.

(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 k Ω) 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 — 2.0 V $\pm$ 0.25 V
Fast (F.F./Rew.)	-2.0 V — 2.0 V $\pm$ 0.25 V
Pause	-6.5 V — 2.6 V $\pm$ 0.4 V
Play	-9.1 V — 2.6 V $\pm$ 0.4 V

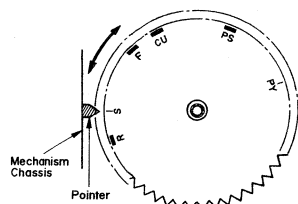


Fig. 2.1

(c) Resistors for Adjustment

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

(d) Adjustment Procedures

- Set the cassette deck in Stop mode, then check to insure that the voltage at the sliding contact of VR604 is 0 V ($\pm$ 0.3 V).
- Set the cassette deck 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 ($\pm$ 0.25 V) than in Stop mode.
- Press the Pause button to set the cassette deck in Pause mode. Adjust the value of R649 to obtain -6.5 V ($\pm$ 0.4, -0.15 V) at the sliding contact of VR604.
- Set the cassette deck 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 ($\pm$ 0.4 V) than in Pause mode.

2.2. Reel Motor Speed Adjustment in Play Mode

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

2.3. Record Head and Playback Head Tilt Adjustment

Note: On items 2.3 — 2.9, refer to Fig. 2.2 flow chart.

Refer to Figs. 2.3 and 2.4.

- Load a Tilt Check Gauge M-9039 (DA09039A) in the cassette deck.
- Clip the grounding terminal of the Tilt Check Gauge with one end of the cord with clip, and the chassis of the cassette deck with the other end.
- Remove both of the Height Gears.
- Set the cassette deck 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 it 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 cassette deck in Stop mode and fit both of the serrated Height Gears. Then set the cassette deck 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.

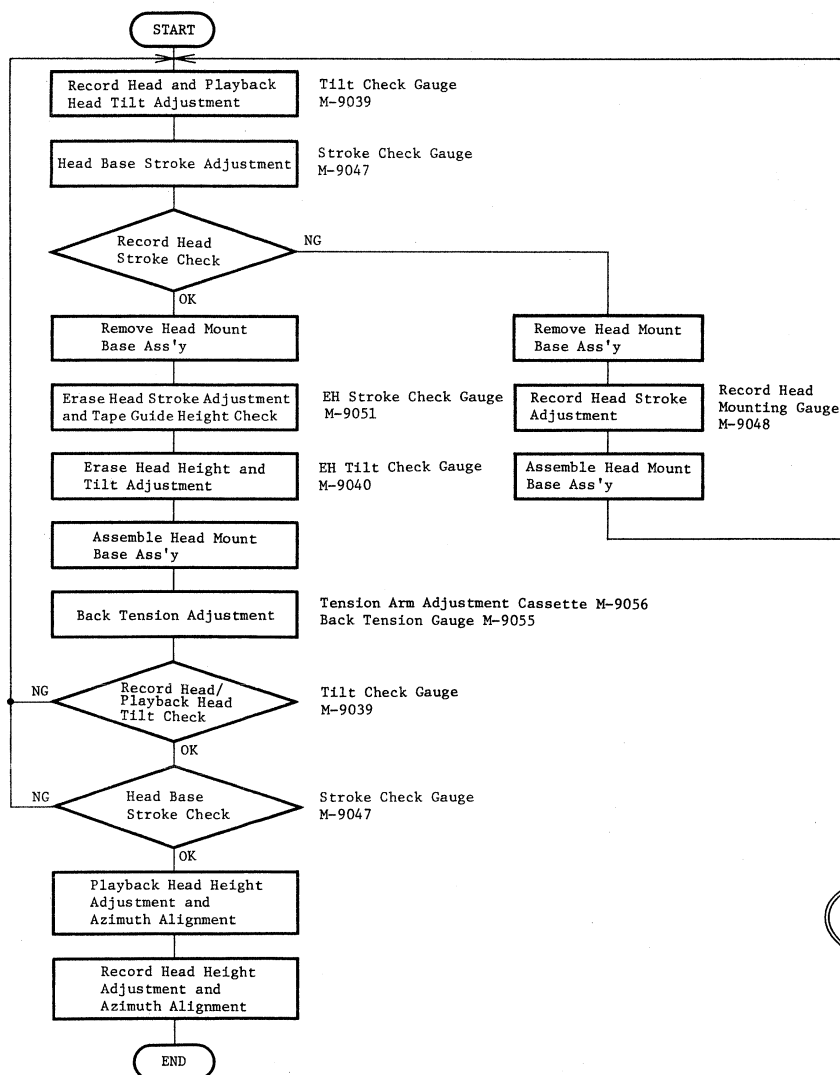


Fig. 2.2

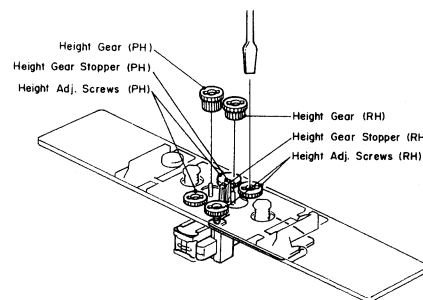


Fig. 2.3

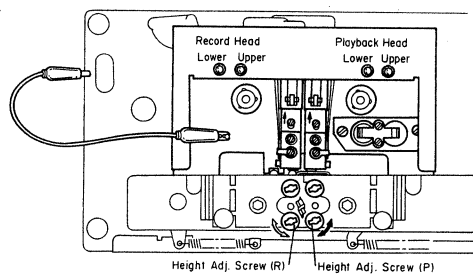


Fig. 2.4

2.4. Head Base Stroke Adjustment

Refer to Fig. 2.5.

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

(1) Head Base Stroke Adjustment in Play Mode

- (a) Load a Stroke Check Gauge M-9047 (DA09047B) in the cassette deck.
- (b) Move Record Head Indicator and Playback Head Indicator to the direction of arrow mark "A" with your finger tip and then set the cassette deck in Play mode. Then slowly release the Indicators and insure whether each of the Indicators is in contact with record and playback heads.
- (c) Check to insure whether the "P" pointer on the Playback Head Indicator locates between the 2 lines on the Indicator Plate.
- (d) 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).
- (e) 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.

- (f) If the record head stroke is noted to be misaligned, adjustment can be made with a Record Head Mounting Gauge M-9048 (DA09048A).

(2) Head Base Stroke Adjustment in Cue Mode

- (a) Load a Stroke Check Gauge M-9047 (DA09047B) in the cassette deck.
- (b) Move Record Head Indicator and Playback Head Indicator to the direction of arrow mark "A" with your finger tip and then set the cassette deck in Cue (F.F. and Pause) mode. Then slowly release the Indicators and insure whether each of the Indicators is in contact with record and playback heads.
- (c) Check to insure whether the "C" pointer on the Playback Head Indicator locates between the 2 lines on the Indicator Plate.
- (d) If the playback head stroke is noted to be misaligned, adjust VR610 on the Logic & Power P.C.B. Ass'y till satisfactory results are obtained.
- (e) After completion of the Head Base Stroke Adjustment, check to insure accuracy of the Head Base Stroke Adjustment in Play mode. If the above are inaccurate, items (1) and (2) will have to be repeated till satisfactory results are obtained.

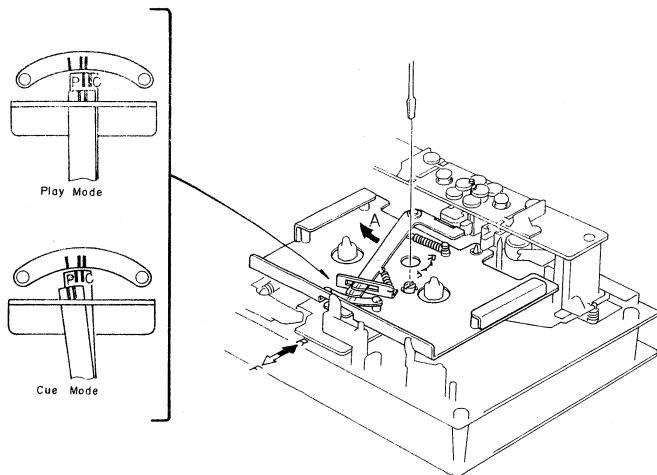


Fig. 2.5

2.5. Erase Head Stroke Adjustment and Tape Guide Height Check

Remove the Head Mount Base Ass'y.
Refer to Figs. 2.6 and 2.7.

(1) Erase Head Stroke Adjustment

- (a) Load an EH Stroke Check Gauge M-9051 (DA09051A) in the cassette deck.
- (b) Set the cassette deck 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 (DA09051A) in the cassette deck.
- (b) Set the cassette deck 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 (DA09051A) in the cassette deck.
- (b) Set the cassette deck 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.

2.6. Erase Head Height and Tilt Adjustment

Refer to Figs. 2.8 and 2.9.

- (1) Remove Head Mount Base Ass'y.
- (2) Load an EH Tilt Check Gauge M-9040 (DA09040A) in the cassette deck.
- (3) Set the cassette deck 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.

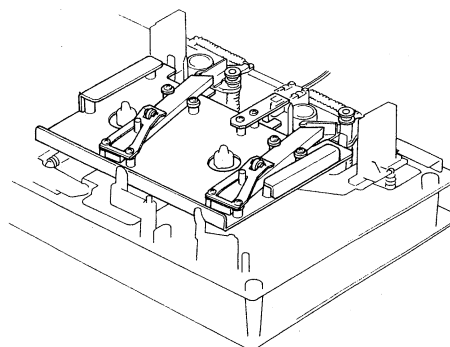


Fig. 2.6

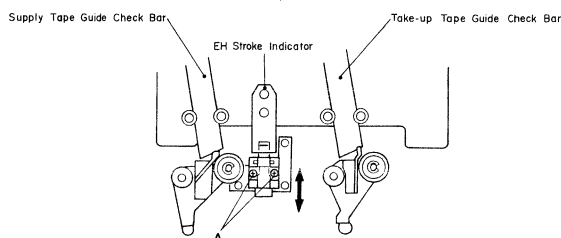


Fig. 2.7

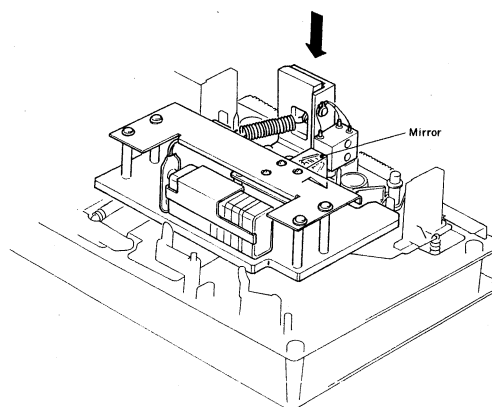


Fig. 2.8

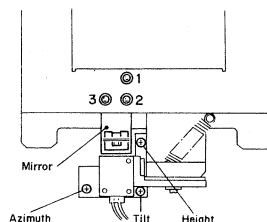


Fig. 2.9

2.7. Back Tension Adjustment

Refer to Figs. 2.10 — 2.13.

- (1) Load a Tension Arm Adjustment Cassette (DA09056A) in the cassette deck referring to Fig. 2.10.
- (2) Set the cassette deck 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. 2.11. Do not bend the top of the Back Tension Arm.
- (4) Set the cassette deck in Stop mode, and remove the Tension Arm Adjustment Cassette (DA09056A), then set the cassette deck in Cue mode. In Cue mode, check to insure that the gap is found between the Supply Reel Hub B Ass'y and the Felt of Back Tension Ass'y as shown in Fig. 2.12.
- (5) Load the Back Tension Gauge (DA09055A) in the cassette deck.
- (6) Set the cassette deck 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. 2.13, and obtain the torque of 7 g-cm to 9 g-cm range.

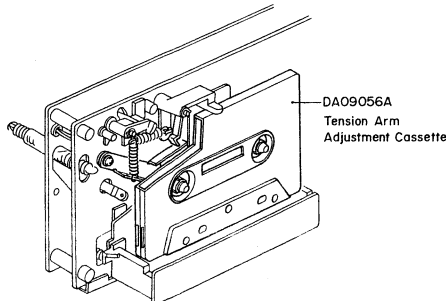


Fig. 2.10

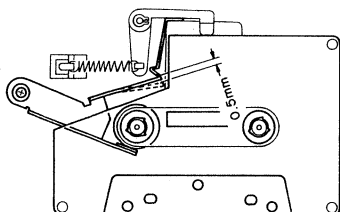


Fig. 2.11

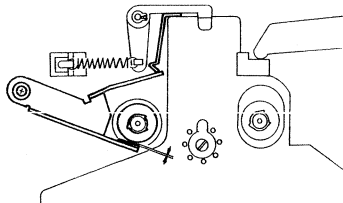


Fig. 2.12

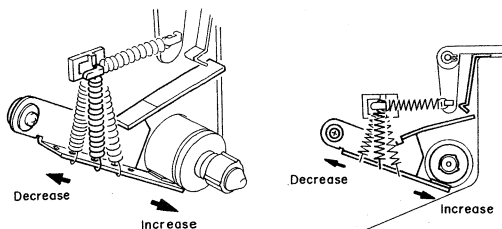


Fig. 2.13

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

(1) Playback Head Height Adjustment and Azimuth Alignment

Refer to Fig. 2.15.

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

(2) Record Head Height Adjustment and Azimuth Alignment

Refer to Figs. 2.14 — 2.16.

- (a) Set the cassette deck in Stop mode.
- (b) Press the Azimuth Alignment Start button to ON.
- (c) Adjust the Azimuth Alignment Knob so that the Slide Lever of the Azimuth Alignment Wire is located at the center of the slit of the Azimuth Alignment Wire as shown in Fig. 2.14.
- (d) Press the Azimuth Alignment Start button to OFF.
- (e) Set the Monitor switch to Tape, Eq. switch to 70 μ s and Tape Selector button to SX.
- (f) Load a reference SX tape (DA09025A) and connect a VTVM to Output Jacks.
- (g) Press the Record and Play buttons, then press the Level Calibration Start button to oscillate 400 Hz. Turn the RH Height Gear until the outputs of both channels become maximum.
- (h) Press the Bias Calibration Start button to oscillate 15 kHz, then turn the RH Azimuth Alignment Screw until the outputs of both channels become maximum.
- (i) Repeat (g) and (h) one or two times to obtain optimum performance.
- (j) Press the Record and Play buttons, then press the Azimuth Alignment Start button to ON. Adjust VR304 on the Main P.C.B. Ass'y so that the red indicator in the middle of the Azimuth Indicator is lit up. Note: Use the same side of the tape as used in the above steps.
- (k) After completion of the above adjustment, press the Record and Play buttons, then press the Level Calibration Start button to oscillate 400 Hz. Record 400 Hz tone to the same portion of both sides A and B of the tape.
- (l) 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. 2.16. 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.

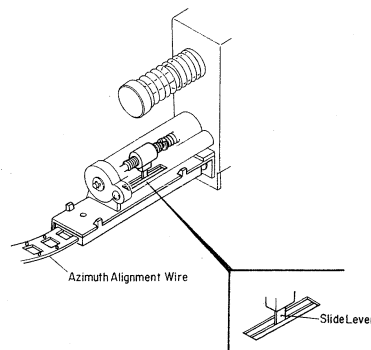
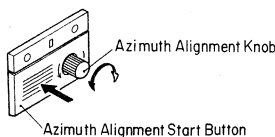


Fig. 2.14

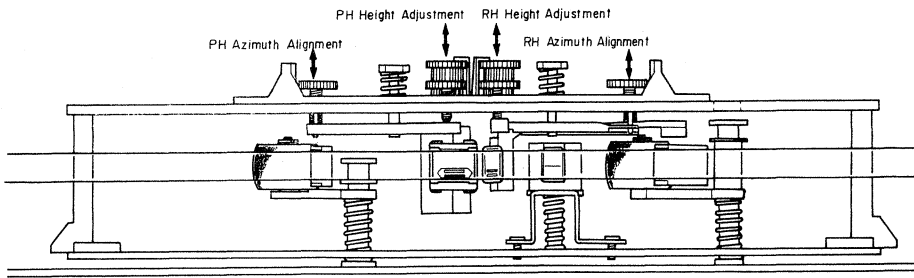


Fig. 2.15

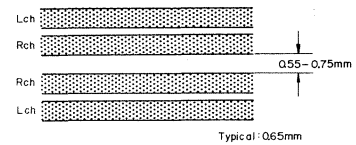


Fig. 2.16

2.9. Record Head Stroke Adjustment

Refer to Figs. 2.17 and 2.18.

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.
- (3) Remove the record head assembly.
- (4) Adjustment of Record Head Mounting Gauge M-9048 (DA0-9048A)
 - (a) Mount the Block B onto the Mounting Gauge Plate.
 - (b) Loosen the 2 screws fixing the Block A.
 - (c) As shown in Fig. 2.17, 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. 2.18, 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 touches 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.
 - (b) Loosen the 2 screws fixing the Block A.
 - (c) As shown in Fig. 2.17, 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. 2.18, 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.

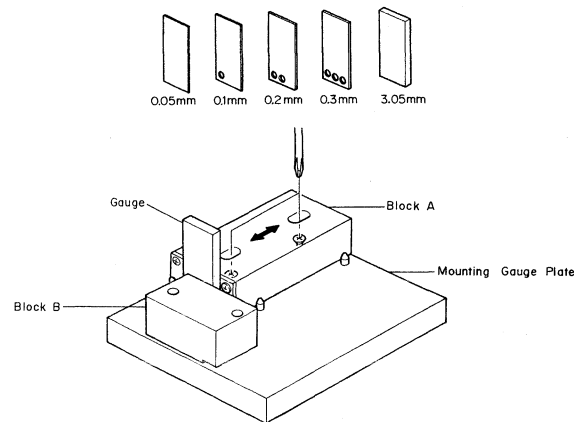


Fig. 2.17

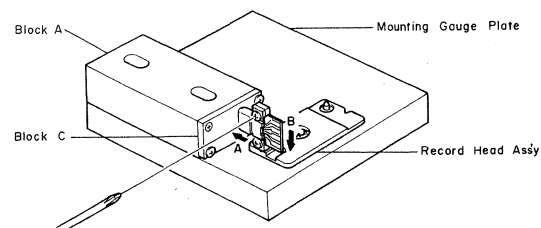


Fig. 2.18

2.10. Tape Travelling Adjustment

The adjustment shall be made with a modified version of the current type EXII C-90 as shown in Fig. 2.19. (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 cassette deck.
- (2) Release the back-tension (rotate the Supply Reel and feed out some length of tape) and set the cassette deck 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 items 2.3 to 2.9, 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 cassette deck 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.

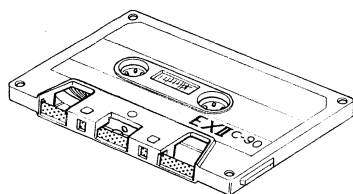


Fig. 2.19

2.11. Flywheel Ass'y Height Adjustment

Refer to Fig. 2.20.

- (1) Adjust the Thrust Screw so that the gap between the Motor Coil Ass'y and the Take-up Flywheel Ass'y becomes 0.7 mm.
- (2) Connect a synchroscope to the CN22-1 of the D/D Motor control P.C.B. Ass'y. Set the synchroscope to AC input.
- (3) Check to insure that the peak to peak level of sine waveform is greater than 20 mV.
- (4) Adjust the Thrust Screw until the height of the Supply Flywheel Ass'y becomes equal to that of the Take-up Flywheel Ass'y.
- (5) Apply a quantity of lock tight paint to the Thrust Screws.

Note: Perform the following procedures, if the Flywheel Ass'y is replaced.

- (a) Turn the Thrust Screw so that the gap between the Motor Coil Ass'y and the Flywheel Ass'y becomes approx. 1 mm.
- (b) From the front side of the cassette deck, insert the Washer 3.1 mm FT (2.6 mm FT), then press the Washer 3 mm (Washer 2.5 mm) into the capstan shaft for supply (take-up) until the washer contacts with the flange sufficiently. Refer to Fig. 5.8.
- (c) Perform the "Flywheel Ass'y Height Adjustment" in item 2.11. •

2.12. Lubrication

ZX-9 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.

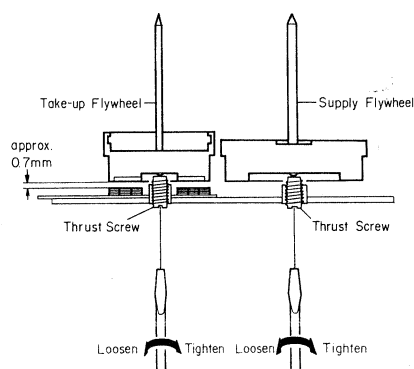


Fig. 2.20

3. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

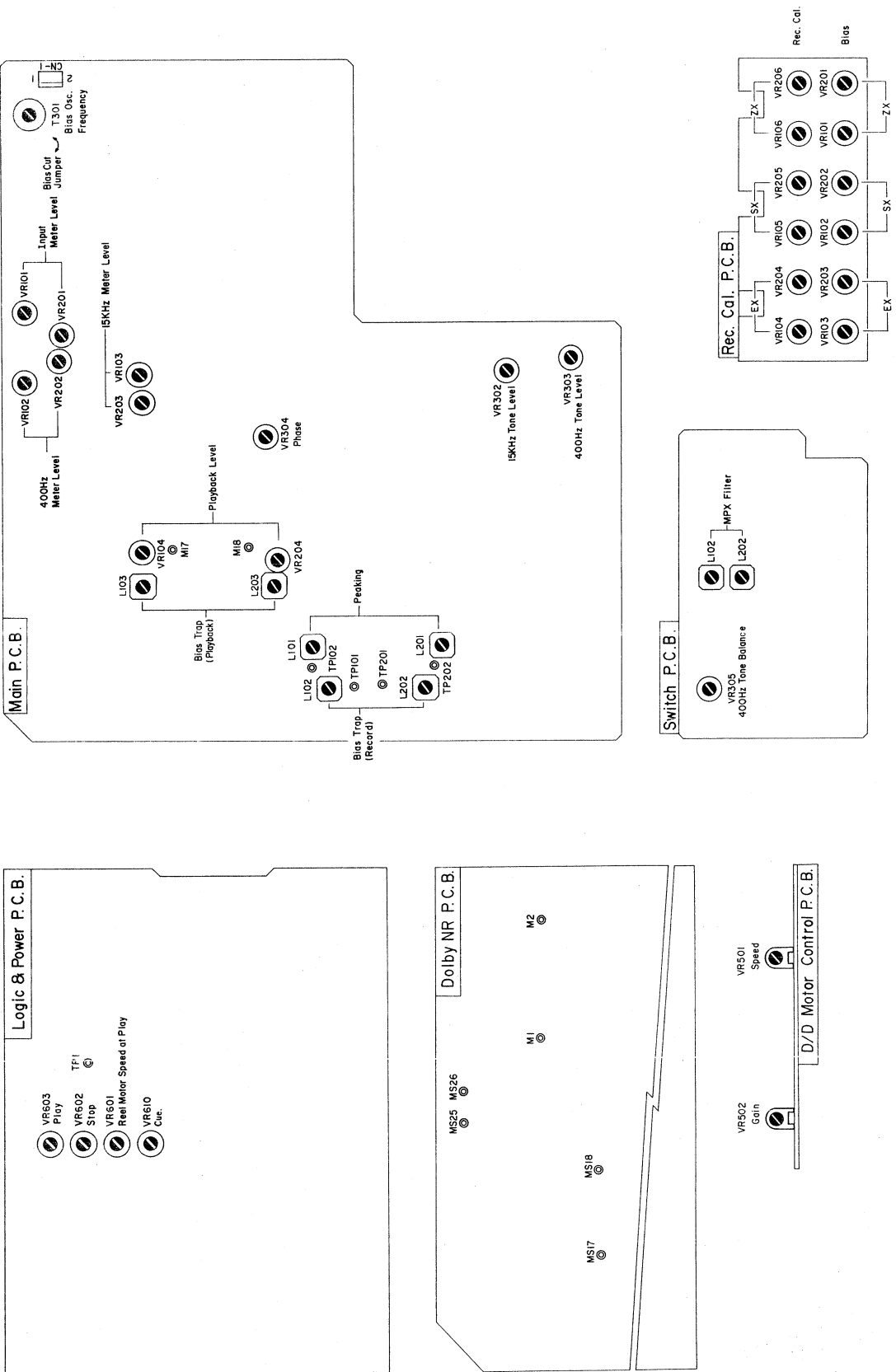


Fig. 3

4. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

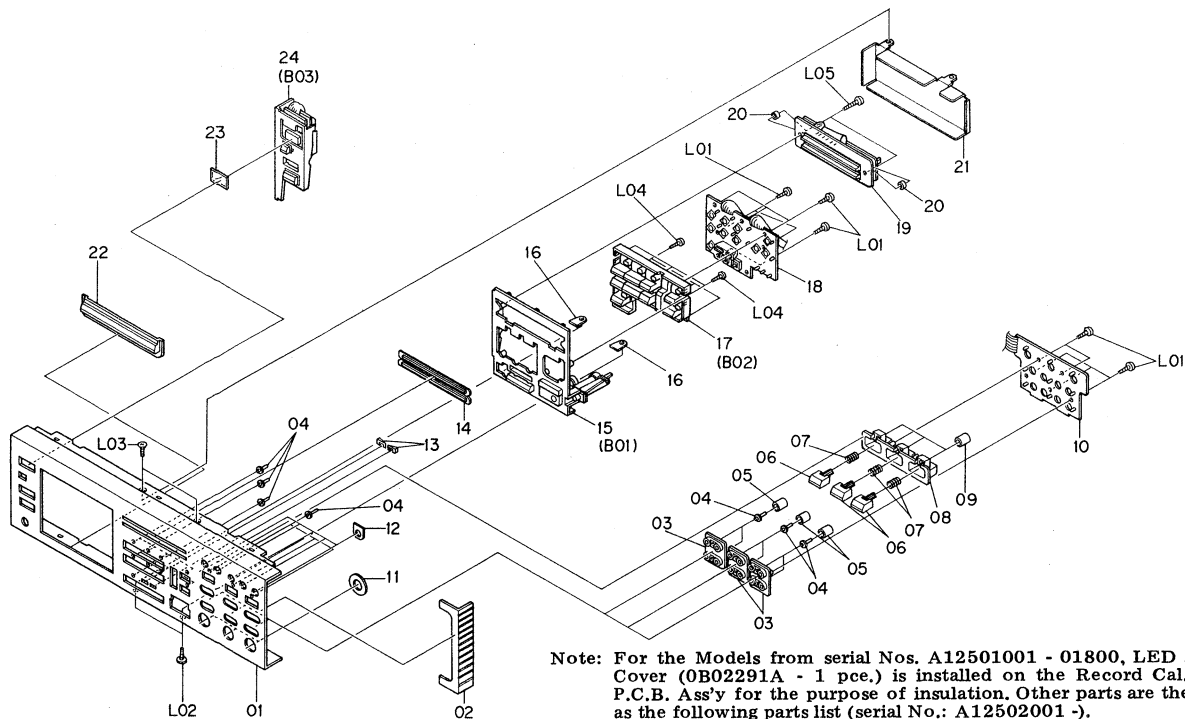
Note: Electrical adjustment should be performed after mechanical adjustment is completed.

4.1. Adjustment and Measurement Instructions

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Tape Speed and Motor Gain Adjustment	3 kHz Speed and Wow/Flutter Tape (DA09006B)	Frequency Counter and Wow/Flutter Meter to Output Jacks	Playback	D/D Motor Control P.C.B. VR501 (Speed) VR502 (Gain)	1. Adjust VR501 to obtain 3 kHz $\pm 0.5\%$ on the frequency counter. 2. Adjust VR502 to obtain the minimum reading on the wow/flutter meter. 3. Check to insure that the tape speed is 3 kHz $\pm 0.5\%$ on the frequency counter.
2	Tone Level Calibration	Tone 400 Hz and 15 kHz	VTVM to MS25, MS26 on Dolby NR P.C.B. and Output Jacks	Tone — 400 Hz/ 15 kHz Monitor SW — Source	Main P.C.B. VR303 (400 Hz) VR302 (15 kHz) Switch P.C.B. VR305 (400 Hz Balance)	1. Press the Level Calibration Start button to oscillate 400 Hz. 2. Adjust VR303 to obtain 90 mV on the VTVM at MS26 (R ch). 3. Adjust VR305 to obtain the same level as R ch on the VTVM at MS25. 4. Measure the reading on the VTVM at the Output Jacks. 5. Press the Bias Calibration Start button to oscillate 15 kHz. 6. Adjust VR302 to obtain 20 dB lower level than in 4 on the VTVM at the Output Jacks. 7. Press the Calibration Reset button to stop the tone oscillation.
3	Meter Level Calibration	400 Hz to Input Jacks and Tone 400 Hz and 15 kHz	VTVM to MS25, MS26 on Dolby NR P.C.B.	Tone — OFF/400 Hz/ 15 kHz Monitor SW — Source	Main P.C.B. VR101,VR201 VR102,VR202 VR103,VR203 VR303 (400 Hz) VR302 (15 kHz)	1. Feed in 400 Hz, then adjust the Input Level controls to obtain 90 mV -1.3 dB on the VTVM. 2. Adjust VR101 (VR201) so that the 0 dB segment of the level meter starts illuminating. 3. Press the Level Calibration Start button to oscillate 400 Hz, then adjust VR303 to obtain 90 mV -0.5 dB on the VTVM. 4. Adjust VR102 (VR202) so that the 0 dB segment of the level meter starts illuminating. 5. Press the Bias Calibration Start button to oscillate 15 kHz, then adjust VR302 to obtain 9 mV -0.5 dB on the VTVM. 6. Adjust VR103 (VR203) so that the 0 dB segment of the level meter starts illuminating. 7. Press the Calibration Reset button. 8. Re-adjust the tone level according to step 2 "Tone Level Calibration".
4	MPX Filter Adjustment	19 kHz ± 100 Hz to Input Jacks	VTVM to Output Jacks	Monitor SW — Source Dolby NR SW — OFF MPX SW — IN	Switch P.C.B. L102,L202	1. Turn the Output level control fully clockwise (maximum position). 2. Adjust the Input Level controls to obtain 1 V on the VTVM. 3. Set the MPX Filter switch to IN, then adjust L102 (L202) to obtain the minimum reading on the VTVM (the minimum reading will be less than -30 dB).
5	Playback Head Track Alignment	1 kHz Track Alignment Tape (DA09007A)	VTVM to Output Jacks	Playback Monitor SW — Tape Eq. SW — $70 \mu s$ Dolby NR SW — OFF MPX SW — OUT	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 2.8.
6	Playback Head Azimuth Alignment	15 kHz Azimuth Tape (DA09004A)	VTVM to Output Jacks	Playback Monitor SW — Tape Eq. SW — $70 \mu s$ Dolby NR SW — OFF MPX SW — OUT	Playback Head Azimuth Alignment Screw	Adjust the Playback Head Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM. Refer to "Playback Head Height Adjustment and Azimuth Alignment" in item 2.8. Note: Repeat steps 5 and 6 one or two times to obtain optimum performance.
7	Playback Level Calibration	400 Hz Level Tape (DA09005A)	VTVM to MS25, MS26 on Dolby NR P.C.B.	Same as above	Main P.C.B. VR104,VR204	Adjust VR104 (VR204) to obtain 90 mV on the VTVM.
8	Playback Frequency Response Adjustment	400 Hz Level Tape (DA09005A) 10 kHz PB Frequency Response Tape (DA09003A) 15 kHz PB Frequency Response Tape (DA09002A) 20 kHz PB Frequency Response Tape (DA09001A)	VTVM to Output Jacks	Playback Monitor SW — Tape Tape SW — SX Eq. SW — $70 \mu s$ Dolby NR SW — OFF MPX SW — OUT	Main P.C.B. R155,R255 R156,R256	1. Load a 400 Hz level tape and play it back. Adjust the Output level control to a certain level (0 dB for example). 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. Short R155 (R255) or R156 (R256) to obtain the following levels against the level for the 400 Hz level tape. 10 kHz: -20 dB -1 dB to $+2$ dB 15 kHz: -20 dB -1 dB to $+3$ dB 20 kHz: -20 dB -1 dB to $+4$ dB 3. Conduct step 6 "Playback Head Azimuth Alignment". 4. If above is not sufficient, refer to "Playback Frequency Response Adjustment" in item 4.2.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
9	Bias Oscillation Frequency and Erase Current Adjustment		VTVM across the additional 0.1 Ω resistor and Frequency Counter to CN1-1 on Main P.C.B.	Record, Pause Monitor SW — Source Tape SW — ZX Eq. SW — 70 μ s Dolby NR SW — OFF MPX SW — OUT	Main P.C.B. T301 R309,R310	1. Connect an additional 0.1 Ω resistor in series to the Erase Head, then connect a VTVM across it. 2. Adjust T301 to obtain 105 kHz on the frequency counter. 3. 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 R309 or R310. 4. After completion of the erase current adjustment, re-check the bias oscillation frequency. 5. Remove the additional 0.1 Ω resistor.
10	Record Amplifier Equalizer Adjustment	23 kHz (—20 dB) to Input Jacks	VTVM to TP101, TP201 on Main P.C.B.	Same as above	Main P.C.B. L101,L201	1. Remove the bias-cut-jumper from the dip side of the Main P.C.B. Ass'y. 2. Adjust L101 (L201) to obtain approx. +16 dB at 23 kHz on the VTVM. 3. Re-solder the bias-cut-jumper.
11	Bias Trap Adjustment (Record Amp.)	Remove input signals	VTVM to TP102, TP202 on Main P.C.B.	Same as above	Main P.C.B. L102,L202	Adjust L102 (L202) to obtain minimum reading on the VTVM.
12	Bias Trap Adjustment (Playback Amp.)	Remove input signals	VTVM to M17, M18 on Main P.C.B.	Record, Pause Monitor SW — Tape Tape SW — ZX Eq. SW — 70 μ s Dolby NR SW — OFF	Main P.C.B. L103,L203	Adjust L103 (L203) to obtain minimum reading on the VTVM.
13	Record Head Height Adjustment and Azimuth Alignment	Tone 400 Hz and 15 kHz	VTVM to Output Jacks	Record, Playback Monitor SW — Tape Tape SW — SX Eq. SW — 70 μ s Dolby NR SW — OFF	PH Height Gear Record Head Azimuth Alignment Screw Rec. Cal. P.C.B. (Level) VR105,VR205 (Bias Current) VR102,VR202 Main P.C.B. VR304 (Phase)	1. In Stop mode, press the Azimuth Alignment Start button to ON. Then adjust the Azimuth Alignment knob so that the Slide Lever of the Azimuth Alignment Wire is located at the center of the slit of the Azimuth Alignment Wire as shown in Fig. 2.14. After above adjustment, press the Azimuth Alignment Start button to OFF. 2. Record Head Height Adjustment: a. Load a reference SX tape (DA09025A), then press the Record and Play buttons. b. Press the Level Calibration Start button to oscillate 400 Hz. c. Adjust the Sensitivity Control VR105 (VR205) and Bias Control VR102 (VR202) to the center position. d. Adjust the RH Height Gear to obtain maximum readings of both channels on the VTVM. 3. Record Head Azimuth Alignment: a. Load a reference SX tape (DA09025A), then press the Record and Play buttons. b. Press the Bias Calibration Start button to oscillate 15 kHz. c. Adjust the Record Head Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM. d. Repeat 2 and 3 one or two times to obtain optimum performance. 4. Azimuth Phase Adjustment: a. Press the Record and Play buttons. b. Press the Azimuth Alignment Start button to ON, then adjust VR304 on the Main P.C.B. Ass'y so that the red indicator in the middle of the Azimuth indicator is lit up.
14	Record Level Calibration and Recording Bias Current Adjustment	Tone 400 Hz and 15 kHz and 10 kHz/20 kHz (—20 dB) to Input Jacks	VTVM and Distortion Meter to Output Jacks	Record, Playback Tone — 400 Hz/ 15 kHz Monitor SW — Tape Tape SW — ZX/SX/ EX Eq. SW — 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW — C-Type/B-Type/ OFF MPX SW — OUT	Rec. Cal. P.C.B. (Level) ZX: VR106,VR206 SX: VR105,VR205 EX: VR104,VR204 (Bias) ZX: VR101,VR201 SX: VR102,VR202 EX: VR103,VR203	Adjustment should be made in the order of ZX, SX and EX. 1. Set the Dolby NR switch to C-Type. 2. Load a reference ZX tape (DA09037A), reference SX tape (DA09025A) and reference EXII tape (DA09066A). 3. Adjust Sensitivity Controls VR106 (VR206) for ZX, VR105 (VR205) for SX and VR104 (VR204) for EXII to the maximum position. 4. Adjust Bias Controls VR101 (VR201) for ZX, VR102 (VR202) for SX and VR103 (VR203) for EXII to the maximum position. 5. Press the Record and Play buttons, then press the Azimuth Alignment Start button to ON. Turn the Azimuth Alignment Knob so that the red indicator in the middle of the Azimuth Indicator is lit up. After above adjustment, press the Azimuth Alignment Start button to OFF.

5.2. Front Panel Ass'y (A01)



Note: For the Models from serial Nos. A12501001 - 01800, LED P.C.B. Cover (0B02291A - 1 pce.) is installed on the Record Cal. LED P.C.B. Ass'y for the purpose of insulation. Other parts are the same as the following parts list (serial No.: A12502001 -).

Fig. 5.2

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
A01	HA04320A	Front Panel Ass'y Serial No.: A12502001 -	1	07	BA04547A	Azimuth Switch P.C.B. Ass'y	1
01	0H04095A	Front Panel	1	08	0J04502B	Cal. Volume Joint	12
02	0H04001B	Side Cover	1	09	BA04542A	Record Cal. P.C.B. Ass'y	1
03	0H04056B	Cal. Volume Flange	3	10	0B02228B	Cassette Case Lamp	1
04	0H03999A	LED Lens	12	11	0J04506C	Lamp Holder	1
05	0J04496A	Cal. Volume Reflector	6	12	0J04469A	Cassette Case Plate	1
06	0H04089A	Selector Knob	3	13	CA08389A	Mechanism Ass'y ZX-9	1
07	0J04497A	Selector Spring	3	14	BA04618A	Power Switch P.C.B. Ass'y (U.S.A. & Canada)	1
08	0H04055B	Selector Flange	1		BA04620A	Power Switch P.C.B. Ass'y (UK, 220V Class 2, Australia & Others)	1
09	0J04541A	Selector Reflector	3		BA04594A	Power Switch P.C.B. Ass'y (Japan)	1
10	BA04545A	Record Cal. LED P.C.B. Ass'y	1	15	BA04763A	Main P.C.B. Ass'y	1
11	0H04002A	Volume Flange	3	16	0J04470B	Side Chassis L	1
12	0H04029A	Function Flange	5	17	0J04472B	Center Chassis	1
13	0H04031A	Fader Lens	2	18	0J04471B	Side Chassis R	1
14	0H04000A	Meter Cover	1	19	BA04766A	Dolby NR P.C.B. Ass'y	1
15	HA04328A	Front Escutcheon A Ass'y	1	20	0B08771A	Hinge	2
16	0J04486A	Panel Holder	2	21	BA04774A	Logic & Power P.C.B. Ass'y (Japan)	1
17	HA04311A	Control House Ass'y	1		BA04775A	Logic & Power P.C.B. Ass'y (U.S.A., Canada & Others)	1
18	BA04544A	Control Switch P.C.B. Ass'y	1		BA04776A	Logic & Power P.C.B. Ass'y (UK, 220V Class 2 & Australia)	1
19	BA04543A	Indicator P.C.B. Ass'y	1	22	HA04323A	Rear Panel Ass'y (Japan)	1
20	0J04454A	Indicator P.C.B. Stud	2		HA04327A	Rear Panel Ass'y (U.S.A. & Canada)	1
21	0J04458A	Meter Shield Case	1		HA04326A	Rear Panel Ass'y (220V Class 2)	1
22	0H04023B	Cover Escutcheon	1		HA04322A	Rear Panel Ass'y (UK)	1
23	0H04030A	Counter Lens	1		HA04325A	Rear Panel Ass'y (Australia)	1
24	HA04310A	Front Escutcheon B Ass'y	1		HA04324A	Rear Panel Ass'y (Others)	1
L01	0E00862A	BT M3x6 @ Pan	11		0B08515A	Insu-Lock	25
L02	0E00593A	M3x6 @ Binding (Bronze)	2	23	0B02542A	Cassette Case Lamp P.C.B.	1
L03	0E00505A	M3x6 @ Countersunk	2	24	0J04561A	Headphone Jack Cover	1
L04	0E00859A	BT M2.6x6 @ Binding	6	L01	0E00857A	BT M3x6 @ Binding	31
L05	0E00831A	BT M3x10 @ Pan	2	L02	0E00944A	BT M4x15 @ Binding (Black Chromate)	3
A02	JA03938A	Chassis Ass'y (Japan)	1	L03	0E00924A	BT M4x16 @ Binding (Chromate)	1
	JA03942A	Chassis Ass'y (U.S.A. & Canada)	1	L04	0E00078A	Washer 4mm Toothed Lock	4
	JA03941A	Chassis Ass'y (220V Class 2)	1	L05	0E00612A	BT M3x6 @ Pan (2A)	5
	JA03937A	Chassis Ass'y (UK)	1	L06	0E00962A	BT M2x6 @ Binding (Black Chromate)	1
	JA03940A	Chassis Ass'y (Australia)	1	L07	0E00860A	BT M3x6 @ Binding (Black Chromate)	4
	JA03939A	Chassis Ass'y (Others) Serial No.: A12501001 -	1	L08	—	Switch Nut A	(6)
01	JA03893A	Headphone Holder Ass'y	1				
02	0J04135C	Mechanism Bracket	1				
03	0J04478A	Sub Chassis	1				
04	BA04546A	Volume P.C.B. Ass'y	1				
05	BA04770A	Switch P.C.B. Ass'y	1				
06	0J04476C	Front Chassis	1				

5.3. Chassis Ass'y (A02)

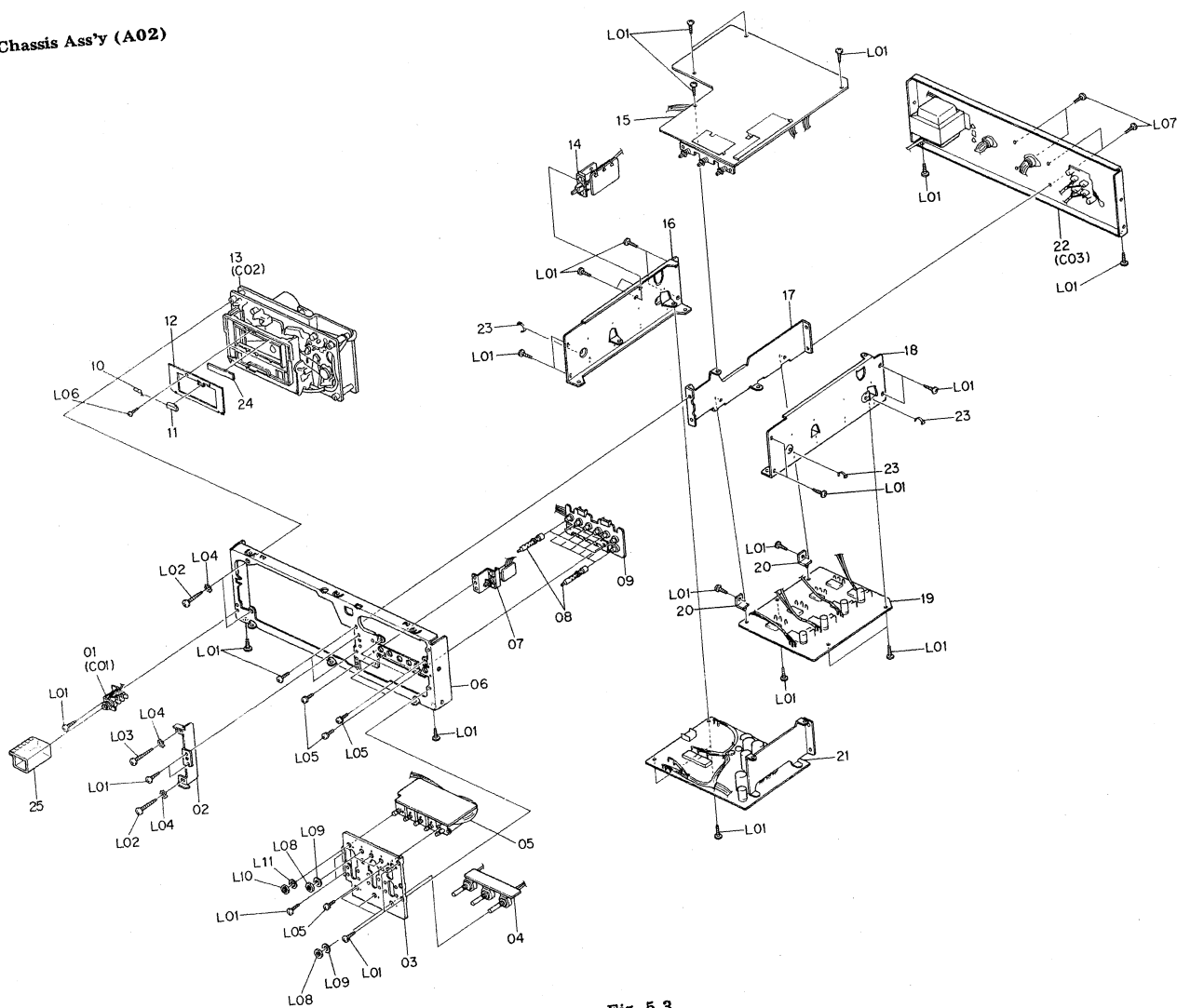


Fig. 5.3

Schematic Ref. No.	Part No.	Description	Q'ty
L09	—	Switch Washer A	(6)
L10	—	Switch Nut B	(1)
L11	—	Switch Washer B	(1)

5.4. Front Escutcheon A Ass'y (B01)

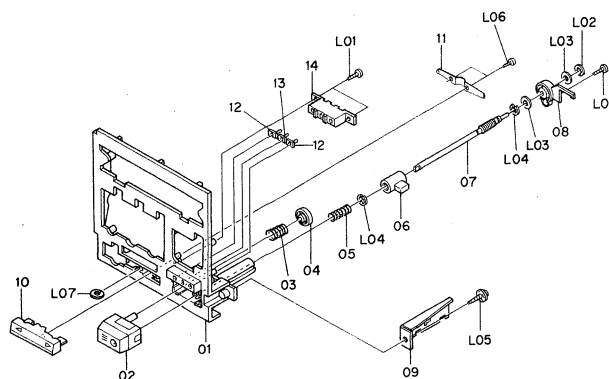


Fig. 5.4

5.5. Control House Ass'y (B02)

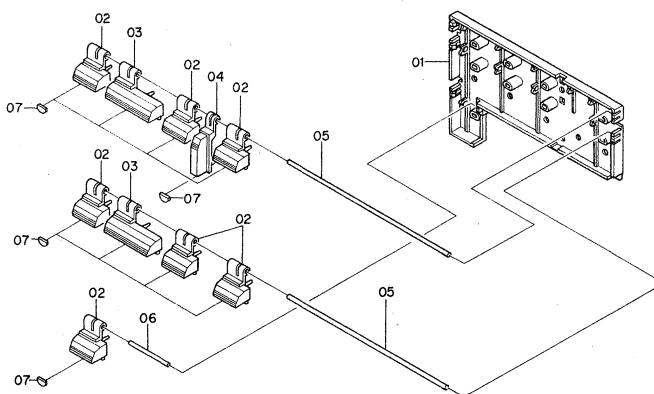


Fig. 5.5

Schematic Ref. No.	Part No.	Description	Q'ty
B01	HA04328A	Front Escutcheon A Ass'y Serial No.: A12501001 -	1
01	0H04099A	Front Escutcheon G	1
02	HA04232A	Adjustment Cover Ass'y	1
03	0J04459A	Adjustment Knob Spring	1
04	0J04460B	Adjustment Flange Stopper	1
05	0J04464A	Adjustment Bar Spring	1
06	0J04462B	Adjustment Slide Joint	1
07	0J04463A	Adjustment Rod	1
08	0J04461B	Adjustment Rod Stopper	1
09	0J04465A	Adjustment Wire Holder	1
10	0H04090A	Fader Knob	1
11	0J04467B	Fader Spring	1
12	0H04005A	Adjustment Lens A	2
13	0H04006A	Adjustment Lens B	1
14	0J04466A	Adjustment Lamp House	1
L01	0E00961A	BT M2x5 ⊕ Binding (Chromate)	3
L02	0E00874A	Stopper Ring CS 2mm	1
L03	0J04061A	Washer FT20	2
L04	0E00222A	E-Ring 2mm	2
L05	0E00920A	M3x6 ⊕ Pan Polywave	1
L06	0E00853A	BT M2x3 ⊕ Pan	2
L07	0J04586A	Fader Washer	1
B02	HA04311A	Control House Ass'y Serial No.: A12501001 -	1
01	0H04016A	Control House	1
02	0H04086A	Control Knob A	7
03	0H04087A	Control Knob B	2
04	0H04088A	Control Knob C	1
05	0J04493A	Shaft A	2
06	0J04494A	Shaft B	1
07	0J04495A	Control Cushion	10
B03	HA04310A	Front Escutcheon B Ass'y Serial No.: A12501001 -	1
01	0H04012C	Front Escutcheon B	1
02	0H04085A	Eject Knob	1
03	0J04488A	Eject Spring	1
04	0J04487B	Eject Stopper	1
05	0H04084A	Reset Switch Knob	1
06	0J04489B	Reset Cushion	2
07	BA04548A	Counter P.C.B. Ass'y	1
08	BA04642A	Counter Control P.C.B. Ass'y	1
09	0J04491A	Counter P.C.B. Stud	1
10	0J04492B	Counter Shield Case	1
11	0J04327A	Counter Himelon	1
12	0J04563C	Counter P.C.B. Insulator	1
L01	0E00862A	BT M3x6 ⊕ Pan	2
L02	0E00883A	BT M3x18 ⊕ Pan	1
L03	0E00037A	Earth Lug B-5	1
C01	JA03893A	Headphone Holder Ass'y Serial No.: A12501001 -	1
01	0B08511A	Headphone Jack	1
02	0J04474A	Headphone Jack Holder	1
L01	—	Headphone Jack Washer	(1)
L02	—	Headphone Jack Nut	(1)

5.6. Front Escutcheon B Ass'y (B03)

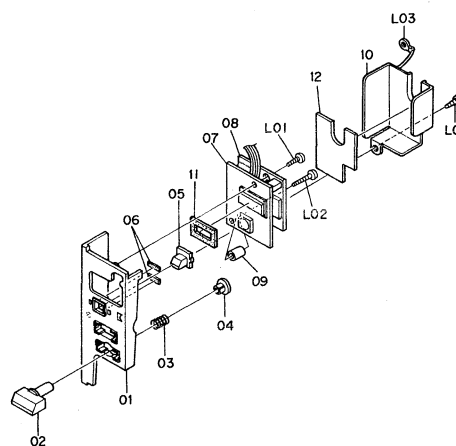


Fig. 5.6

5.7. Headphone Holder Ass'y (C01)

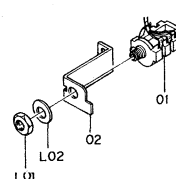


Fig. 5.7

5.8. Mechanism Ass'y ZX-9 (C02)

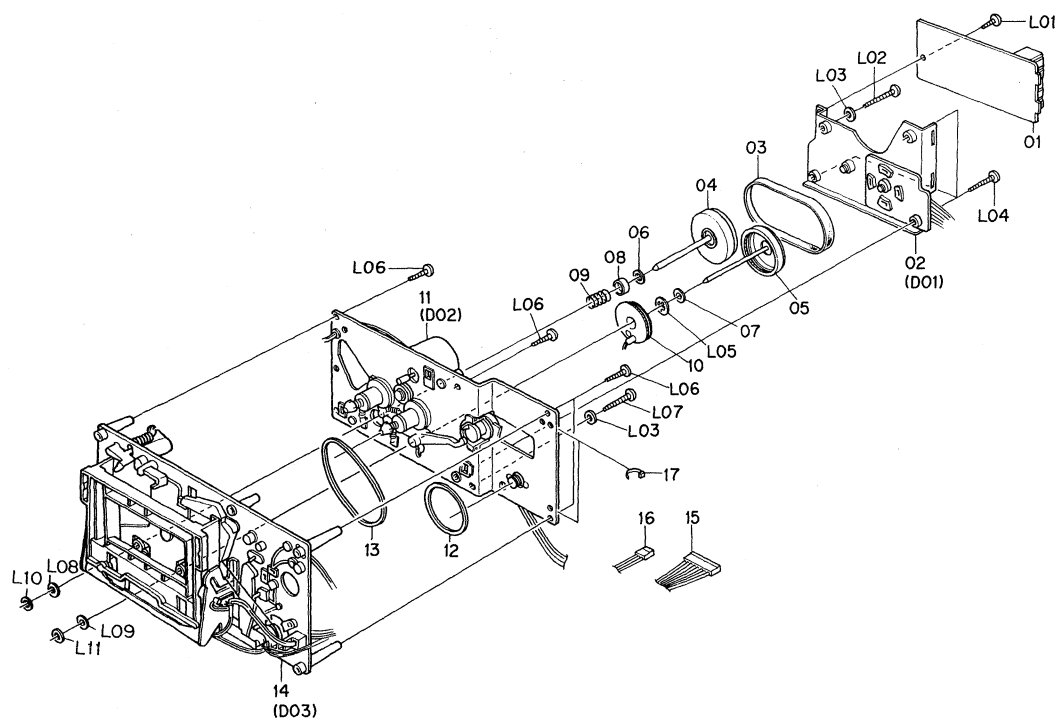


Fig. 5.8

Schematic Ref. No.	Part No.	Description	Q'ty
C02	CA08389A	Mechanism Ass'y ZX-9 Serial No.: A12501001 -	1
01	BA04777A	D/D Motor Control P.C.B. Ass'y	1
02	CA08384A	Flywheel Holder Ass'y	1
03	OC08334A	Capstan Belt	1
04	CA08380B	Supply Flywheel Ass'y	1
05	CA08390B	Take-up Flywheel Ass'y	1
06	OC08021B	Thrust Washer 3.1mm	1
07	OC08020B	Thrust Washer 2.6mm	1
08	OC08243A	Flange Thrust Cap	1
09	OC08244A	Flange Thrust Spring	1
10	CA08391A	Sensor Coil Sub Ass'y	1
11	CA08343A	Sub Mechanism Chassis Ass'y	1
12	OC08099B	Control Motor Belt	1
13	OC08098B	Counter Belt B	1
14	CA08385A	Main Mechanism Chassis Ass'y	1
15	OB08943B	9P-H Connector	1
16	OB08672A	3P-H Connector	1
17	OB08515A	Insu-Lock	10
-	OM04388A	Mechanism Serial No. Seal	1
L01	OE00857A	BT M3x6 ⊕ Binding	1
L02	OE00834A	BT M3x30 ⊕ Pan	1
L03	OE00178A	Washer 3mm	2
L04	OE00833A	BT M3x20 ⊕ Pan	3
L05	OE03023A	Stopper Ring CS 8mm	1
L06	OE00883A	BT M3x18 ⊕ Pan	5
L07	OE00835A	BT M3x25 ⊕ Pan	1
L08	OC08347A	Washer 3.1 mm FT	1
L09	OC08348A	Washer 2.6 mm FT	1
L10	OC08345A	Capstan Washer 3 mm	1
L11	OC08346A	Capstan Washer 2.5 mm	1

5.9. Rear Panel Ass'y (C03)

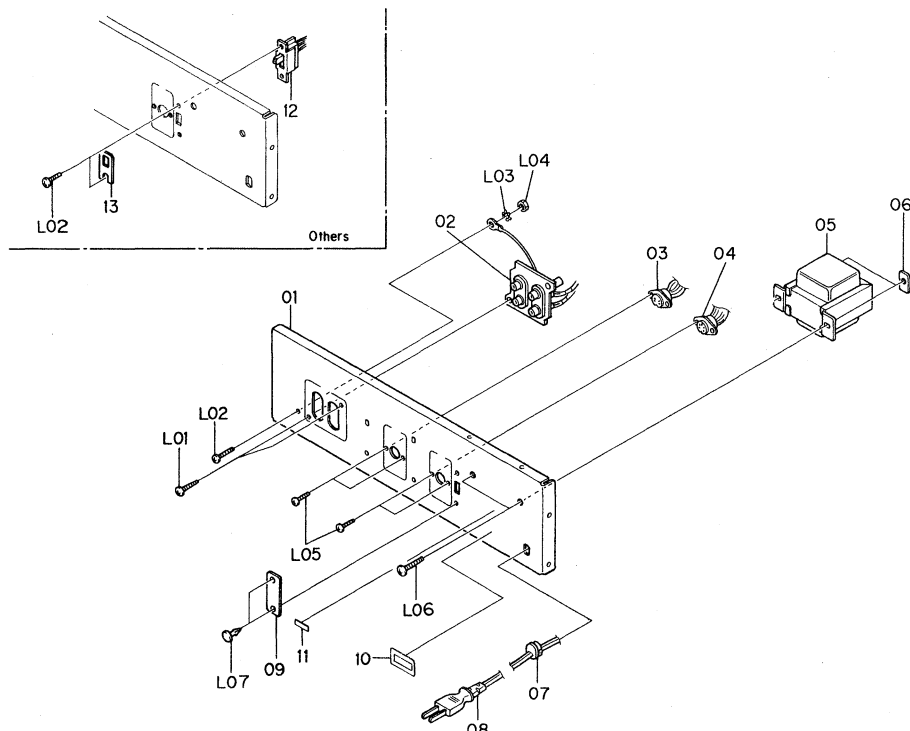


Fig. 5.9

5.10. Flywheel Holder Ass'y (D01)

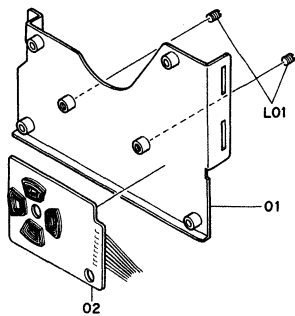


Fig. 5.10

5.11. Sub Mechanism Chassis Ass'y (D02)

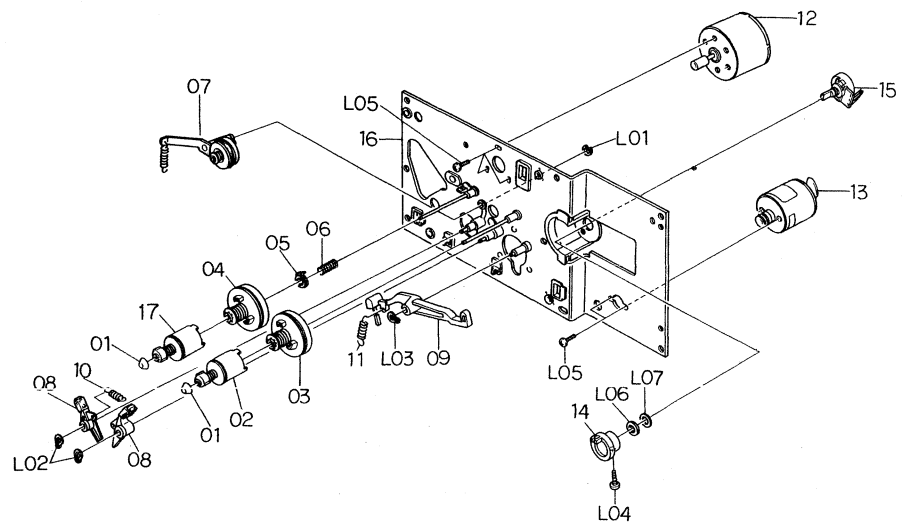


Fig. 5.11

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
C03	HA04327A	Rear Panel Ass'y (U.S.A. & Canada)	1	L04	0E00859A	BT M2.6x6 ⊕ Binding	1
	HA04323A	Rear Panel Ass'y (Japan)	1	L05	0E00226A	M2.6x4 ⊕ Pan	5
	HA04324A	Rear Panel Ass'y (Others)	1	L06	—	Volume Nut	(1)
	HA04322A	Rear Panel Ass'y (UK)	1	L07	—	Volume Washer	(1)
	HA04326A	Rear Panel Ass'y (220V Class 2)	1				
	HA04325A	Rear Panel Ass'y (Australia) Serial No.: A12501001 -	1				
01	0H04100A	Rear Panel	1				
02	BA04785A	Pin Jack P.C.B. Ass'y	1				
03	BA04595A	4P DIN Socket Ass'y	1				
04	BA04596A	8P DIN Socket Ass'y	1				
05	0B06695A	Power Transformer (U.S.A. & Canada)	1				
	0B06693A	Power Transformer (Japan)	1				
	0B06694A	Power Transformer (Others)	1				
	0B06692A	Power Transformer (UK, Australia & 220V Class 2)	1				
06	0C01162B	Bolt Receptacle Plate	2				
07	0B08037U	Cord Bushing C (U.S.A., Canada, Japan, 220V Class 2, Australia & Others)	1				
	0B08351A	Cord Bushing 4K-4 (UK)	1				
08	0B08533A	Power Cord (U.S.A., Canada & Others)	1				
	0B08219B	Power Cord (Japan)	1				
	0B08348A	Power Cord (UK)	1				
	0B08093U	Power Cord (220V Class 2)	1				
	0B05241A	Power Cord (Australia)	1				
09	0J04601A	Switch Cover (U.S.A., Canada, Japan, 220V Class 2, UK & Australia)	1				
10	0M03551B	Pass Label	1				
11	0M03797A	Voltage Label 240V (UK & Australia)	1				
	0M03796A	Voltage Label 220V (220V Class 2)	1				
	0M04293A	Voltage Label 120V/220-240V (Others)	1				
12	0B07092U	Voltage Selector (Others)	1				
13	0M03946A	Voltage Selector Lock Plate C (Others)	1				
L01	0E00921A	BT M3x8 ⊕ Binding (Black Chromate)	2				
*L02	0E00594A	M3x8 ⊕ Binding (Bronze)	3				
L03	0E00172A	Washer 3mm Toothed Lock	1				
L04	0E00507A	Nut Hex. M3	1				
L05	0E00714A	M2.6x6 ⊕ Binding (Bronze)	4				
L06	0E00953A	M4x10 ⊕ Binding Head (Black Chromate)	2				
L07	0B08583A	Plastic Rivet	2				
—	0J03644A	Chobert Rivet	2				
—	0M04387A	Serial Number Plate	1				
—	0F01071A	Free-up Belt (UK, Australia & 220V Class 2)	1				
—	0M04185A	Fuse Mark Label (220V Class 2)	1				
—	0M04113A	LA Label (U.S.A. & Canada)	1				
		*: Depends on the versions.					
D01	CA08384A	Flywheel Holder Ass'y Serial No.: A12501001 -	1				
01	CA08382A	Flywheel Holder Sub Ass'y	1				
02	BA04759A	Motor P.C.B. Ass'y	1				
L01	0C08329A	Thrust Screw	2				
D02	CA08343A	Sub Mechanism Chassis Ass'y Serial No.: A12501001 -	1				
01	0C08039B	Reel Hub Head	2				
02	CA08038B	Reel Hub B Pulley Ass'y	1				
03	CA08037A	Reel Hub Take-up Ass'y	1				
04	CA08064A	Reel Hub Supply Ass'y	1				
05	CA08039A	Back Tension Ass'y	1				
06	0C08269A	Back Tension Spring C	1				
07	CA08193A	Idler Ass'y	1				
08	CA08042A	Brake Ass'y	2				
09	0C08030C	Brake Drive Arm	1				
10	0C08129A	Brake Arm Spring	1				
11	0C08128A	Brake Drive Arm Spring	1				
12	CA08242A	Reel Motor Ass'y	1				
13	CA08034A	Control Motor Ass'y	1				
14	0C08053B	Volume Coupler	1				
15	0B07240A	Volume Control 10K (B)	1				
16	CA08194A	Sub Chassis Ass'y	1				
17	CA08397A	Reel Hub S Pulley Ass'y	1				
L01	0E00698A	E-Ring 2.5 mm	1				
L02	0E00837A	Stopper Ring 3mm	2				
L03	0E00838A	Stopper Ring 4mm	1				

5.12. Main Mechanism Chassis Ass'y (D03)

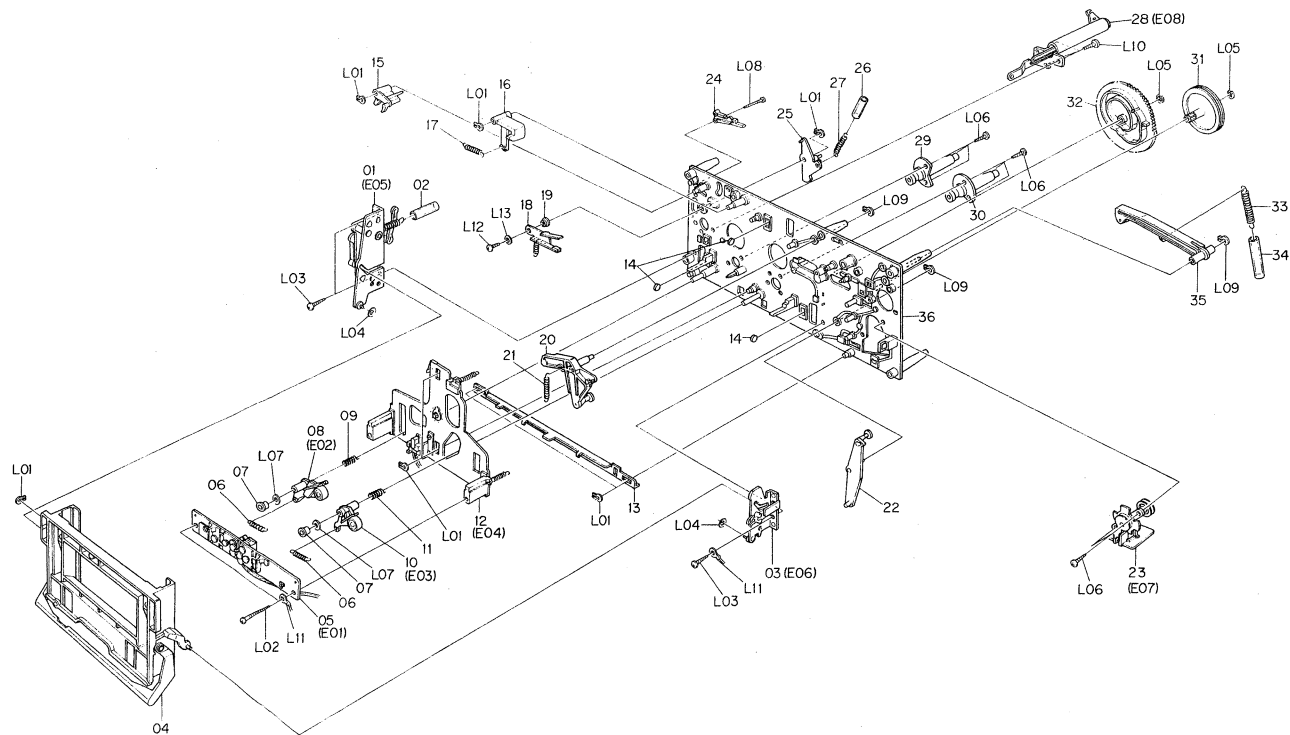


Fig. 5.12

5.13. Head Mount Base Ass'y (E01)

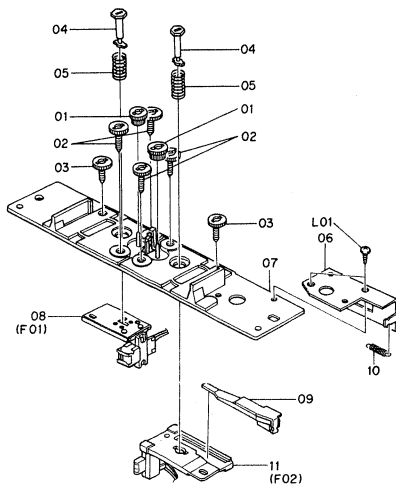


Fig. 5.13

5.14. Supply Pressure Roller Ass'y (E02)

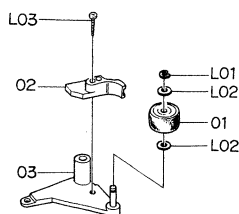


Fig. 5.14

5.15. Take-up Pressure Roller Ass'y (E03)

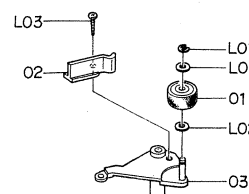


Fig. 5.15

5.16. Head Base Ass'y (E04)

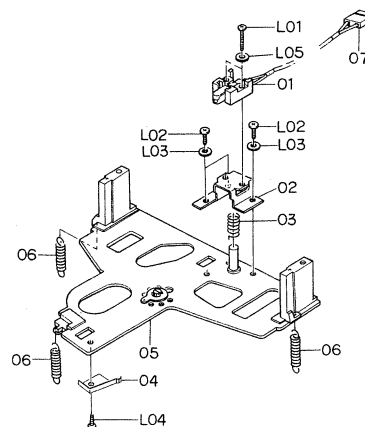


Fig. 5.16

5.17. Cassette Case Holder L
Ass'y (E05)

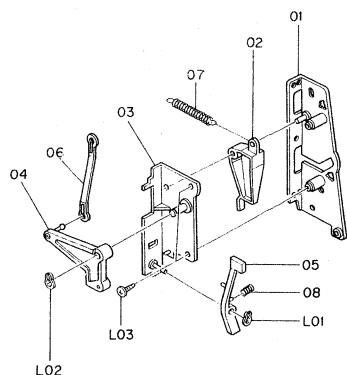


Fig. 5.17

5.18. Cassette Case Holder R
Ass'y (E06)

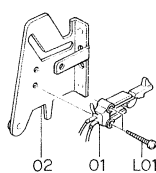


Fig. 5.18

5.19. Auto Shut-off Ass'y (E07)

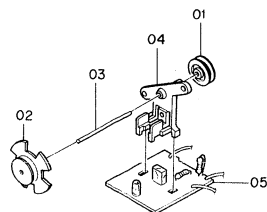
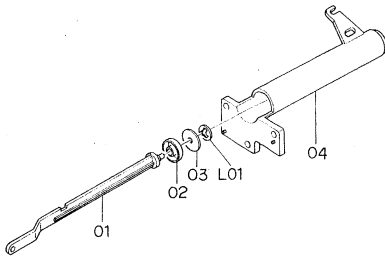
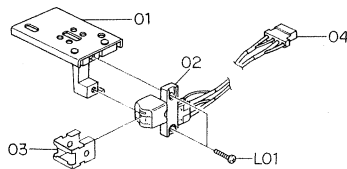
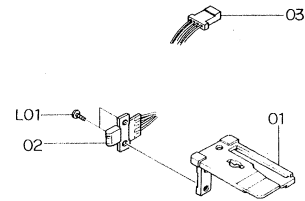


Fig. 5.19

Schematic Ref. No.	Part No.	Description	Q'ty
D03	CA08385A	Main Mechanism Chassis Ass'y Serial No.: A12501001 -	1
01	CA08350A	Cassette Case Holder L Ass'y	1
02	OC08151A	Lid Arm Spring Tube	1
03	CA08022A	Cassette Case Holder R Ass'y	1
04	CA08349A	Cassette Case Ass'y	1
05	CA08345A	Head Mount Base Ass'y	1
06	OC08121A	Supply Pressure Roller Spring	2
07	OC08313A	Pressure Roller Arm Bushing	2
08	CA08053B	Supply Pressure Roller Ass'y	1
09	OC08122B	Supply Pressure Roller Thrust Spring	1
10	CA08079B	Take-up Pressure Roller Ass'y	1
11	OC08183B	Take-up Pressure Roller Thrust Spring	1
12	CA08339A	Head Base Ass'y	1
13	OC08182A	Pressure Roller Drive Bar B	1
14	OC08086B	Head Base Roller	3
15	OC08050B	Record Sensor	1
16	OC08051E	Cassette Hold Arm	1
17	OC08120A	Cassette Hold Arm Spring	1
18	CA08196A	Back Tension Ass'y	1
19	OC08254A	Back Tension Arm Collar	1
20	CA08027A	Head Base Drive Arm Ass'y	1
21	OC08143C	Head Base Drive Arm Spring	1
22	CA08026A	Pressure Roller Drive Arm Ass'y	1
23	CA08396A	Auto Shut-off Ass'y	1
24	OC08119A	Record Protector	1
25	OC08194C	Damper Lock Arm	1
26	OC08153A	Damper Lock Arm Spring Tube	1
27	OC08116A	Record Arm Spring	1
28	CA08030A	Pneumatic Damper Ass'y	1
29	CA08388B	Supply Capstan Flange Ass'y	1
30	CA08383B	Take-up Capstan Flange Ass'y	1
31	OC08186A	Cam Drive Gear	1
32	OC08029H	Control Cam	1
33	OC08117A	Counter-Load Arm Spring	1
34	OC08152A	Counter-Load Arm Spring Tube	1
35	CA08028A	Counter-Load Arm Ass'y	1
36	CA08347A	Main Chassis Ass'y	1
L01	OE00837A	Stopper Ring 3mm	9
L02	OE00834A	BT M3x30 @ Pan	2
L03	OE00831A	BT M3x10 @ Pan	3
L04	OE00254A	Washer 3.1mm	2
L05	OE00222A	E-Ring 2mm	2
L06	OE00876A	BT M2.6x8 @ Pan	8
L07	OE00178A	Washer 3mm	2
L08	OE00879A	BT M2x15 @ Pan	1
L09	OE00838A	Stopper Ring 4mm	3
L10	OE00846A	BT M3x8 @ Pan	3
L11	OE00895A	Earth Lug 3mm	2
L12	OE00859A	BT M2.6x6 @ Binding	1
L13	OC08255A	Washer 2.6mm	1
E01	CA08345A	Head Mount Base Ass'y Serial No.: A12501001 -	1
01	OC08028C	Head Height Adjustment Gear	2
02	OC08027F	Head Height Adjustment Screw	4
03	OC08026D	Azimuth Alignment Screw	2
04	OC08161B	Spring Stopper	2
05	OC08187B	Head Plate Spring	2
06	OC08315A	Azimuth Alignment Wire Hold Plate	1
07	CA08083D	Head Mount Base Sub Ass'y	1
08	CA08341A	P-8L Playback Head Ass'y	1
09	OC08316A	Azimuth Alignment Plate	1
10	OC08317A	Azimuth Spring	1
11	CA08340A	R-8L Record Head Ass'y	1
L01	OE00917A	BT M2.6x5 @ Pan	2
E02	CA08053B	Supply Pressure Roller Ass'y Serial No.: A12501001 -	1
01	OC08164G	Pressure Roller	1
02	OC08189C	Supply Tape Guide	1
03	CA08061A	Supply Pressure Roller Arm Ass'y	1
L01	OE00042A	E-Ring 1.5mm	1
L02	OC08024A	Washer 2mm	2
L03	OE00788A	BT M2x8 @ Pan (Black Chromate)	1
E03	CA08079B	Take-up Pressure Roller Ass'y Serial No.: A12501001 -	1
01	OC08164G	Pressure Roller	1
02	OC08181C	Take-up Tape Guide	1
03	CA08073B	Take-up Pressure Roller Arm Ass'y	1
L01	OE00042A	E-Ring 1.5mm	1
L02	OC08024A	Washer 2mm	2
L03	OE00788A	BT M2x8 @ Pan (Black Chromate)	1
E04	CA08339A	Head Base Ass'y Serial No.: A12501001 -	1
01	GA02103A	E0K Erase Head	1
02	OC08158D	Erase Head Hold Plate	1
03	OC08166A	Erase Head Hold Plate Spring	1
04	OC08174D	Cassette Hold Spring	1
05	CA08003R	Head Base Ass'y	1
06	OC08175A	Head Base L Spring	3
07	OB08944A	2P-H Connector	1
L01	OE00951A	M1.7x7 @ Pan (Black Chromate)	2
L02	OE00909A	M2x6 @ Pan	3
L03	OE00117A	Washer 2mm	3
L04	OE00853A	BT M2x3 @ Pan	1
L05	OE00952A	Washer 1.7mm	2
E05	CA08350A	Cassette Case Holder L Ass'y Serial No.: A12501001 -	1
01	CA08326A	Cassette Case Holder L Sub Ass'y	1
02	OC08073C	Lid Arm A	1
03	OC08306A	Eject Arm Holder	1
04	OC08307A	Eject Arm A	1
05	OC08197C	Eject Arm B	1
06	OC08199B	Eject Arm Joint	1
07	OC08114A	Lid Arm Spring	1
08	OC08211C	Eject Arm Spring	1
L01	OE00837A	Stopper Ring 3mm	1
L02	OE00838A	Stopper Ring 4mm	1
L03	OE00865A	BT M3x10 @ Binding	2
E06	CA08022A	Cassette Case Holder R Ass'y Serial No.: A12501001 -	1
01	OC08133A	Eject Sensor	1
02	CA08044A	Cassette Case Holder R Sub Ass'y	1
L01	OE00840A	BT M2x8 @ Pan	2
E07	CA08396A	Auto Shut-off Ass'y Serial No.: A12501001 -	1
01	OC08047A	Shut-off Pulley A	1
02	OC08309B	Shut-off Pulley B	1
03	OC08088B	Shut-off Pulley Shaft	1
04	OC08207B	Shut-off Pulley Holder	1
05	BA04852A	Shut-off P.C.B. Ass'y	1

5.20. Pneumatic Damper Ass'y (E08)

Fig. 5.20
5.21. P-8L Playback Head Ass'y (F01)

Fig. 5.21
5.22. R-8L Record Head Ass'y (F02)

Fig. 5.22

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
E08	CA08030A	Pneumatic Damper Ass'y Serial No.: A12501001 -	1	03	0C08169D	Pad Lifter 54	1
01	0C08058C	Damper Piston	1	04	0B08946A	4P-H Connector	1
02	0C08102C	Damper Ring	1	L01	0E00886A	M1.7x6.5 @ Pan	2
03	0C08010C	Damper Plate	1	F02	CA08340A	R-8L Record Head Ass'y Serial No.: A12501001 -	1
04	0C08059D	Sylinder	1	01	0C08234B	Record Head Plate	1
L01	0E00874A	Stopper Ring CS 2mm	1	02	GA01050A	R-8LH Record Head	1
F01	CA08341A	P-8L Playback Head Ass'y Serial No.: A12501001 -	1	03	0B02274A	4P-H Connector RED	1
01	CA08307A	Playback Head Plate Ass'y	1	L01	0E00887A	M1.7x4 @ Pan	2
02	GA02034A	P-8LH Playback Head	1				

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
SW1	BA04618A	Power Switch P.C.B. Ass'y (U.S.A. & Canada)	LED601-609 CN10	BA04545A	Record Cal. LED P.C.B. Ass'y	Q405 R604 R605 PL407	BA04852A	Shut-off P.C.B. Ass'y
	BA04594A	Power Switch P.C.B. Ass'y (Japan)		0B02509D	Record Cal. LED P.C.B.		0B07839B	Shut-off P.C.B.
	BA04620A	Power Switch P.C.B. Ass'y (UK, Australia, 220V Class 2 & Others)		0B06333A	LED RED TLR124A		0B06228A	Photo TR PH104
	0B08956C	Power Switch P.C.B. (U.S.A. & Canada)		0B08923B	6P-H Connector		0B05615A	RK 22K 1/4W J
	0B07407A	Power Switch (Japan)	VR001,002 VR003	BA04546A	Volume P.C.B. Ass'y		0B09215A	RF 100 1/4W J
	0B07406A	Power Switch (Japan)		0B02510A	Volume P.C.B. VR 100K (A)		0B08552A	Lamp 12V 25mA
	0B07408A	Power Switch (UK, Australia, 220V Class 2 & Others)		0B07202A	VR 10K (A) x 2			
	0B08342A	Spark Killer (U.S.A. & Canada)	IC601 X601 R612 C601,602 C603 CN14 CN16 FC601 FC602	BA04642A	Counter Control P.C.B. Ass'y			
	0B08363A	Spark Killer (Japan)		0B02514A	Counter Control P.C.B.			
	0B08955A	Spark Killer (UK, Australia, 220V Class 2 & Others)		0B06320A	IC LM6402A-048			
M2	0E00622A	M3x5 @ Pan (2A)		0B08908A	Xtal KBR400BT			
M2	0E00752A	Eyelet 2x3 (2)		0B09749A	RK 1M 1/6W J			
M2	0J04475A	Power Switch Holder (1)		0B05879A	CC 220P 50V K			
	0J04555A	Power Switch Insulator (1)		0B01836A	CE 47μ 10V			
			Q601,602 603,604 LED601	BA04548A	Counter P.C.B. Ass'y			
	BA04547A	Azimuth Switch P.C.B. Ass'y		0B02513B	Counter P.C.B. TR 2SA608SP			
	0B02511A	Azimuth Switch P.C.B.		0B06319A	Counter LED SL1405 20			
	0B07394A	Push Switch (1)		0B06326A	Counter LED SL1405 20			
	0E00622A	M3x5 @ Pan (2A)	R601,602 603,604 R605-611	0B05629A	RK 2.7K 1/4W J			
	0J04473A	Adjustment Switch Holder	SW601	0B01933A	RK 220 1/4W J (7)			
				0B07219A	Switch AKC8S			

6. MOUNTING DIAGRAMS AND PARTS LIST

Notes: 1. Mounting diagram shows a dip side view of the printed circuit board.

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

3. Abbreviation for part name:

TR — Transistor, SiD — Silicon Diode, GD — Germanium Diode, ZD — Zener Diode

RK — Carbon Resistor, RM — Metal Film Resistor, RF — Fail Safe Type Resistor, RC — Cement Resistor

CE — Electrolytic Capacitor, CM — Mylar Capacitor, CC — Ceramic Capacitor, CP — PP Capacitor,

CT — Tantalum Capacitor, C — Mica Capacitor

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

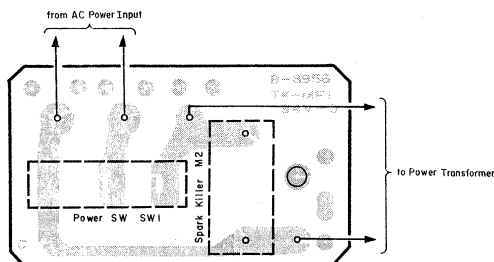


Fig. 6.1

6.2. Azimuth Switch P.C.B. Ass'y

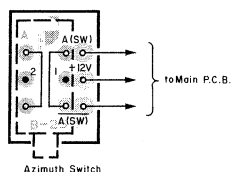


Fig. 6.2

6.3. Record Cal. LED P.C.B. Ass'y

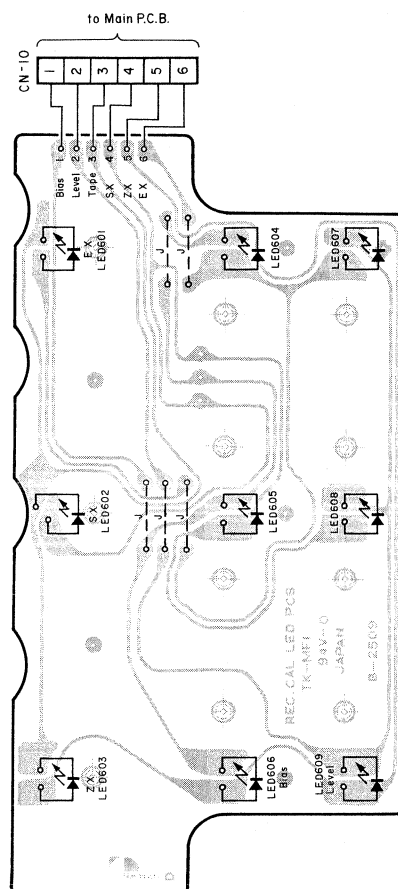


Fig. 6.3

6.4. Volume P.C.B. Ass'y

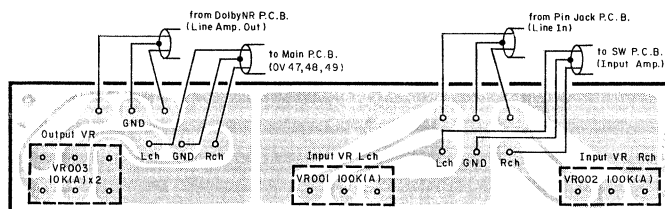


Fig. 6.4

6.5. Counter Control P.C.B. Ass'y

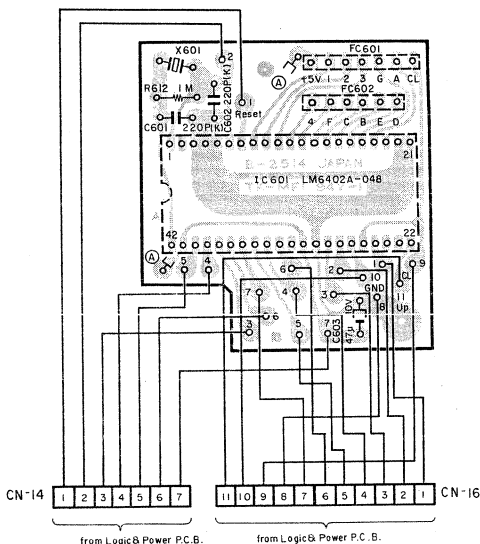


Fig. 6.5

6.6. Counter P.C.B. Ass'y

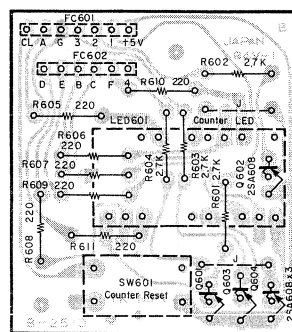


Fig. 6.6

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

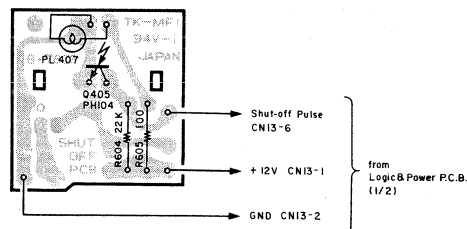


Fig. 6.7

25

6.11. Record Cal. P.C.B. Ass'y

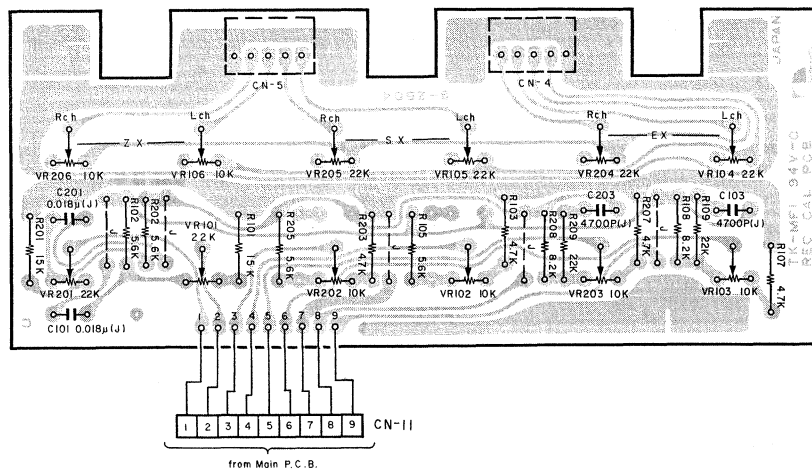


Fig. 6.11

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA04543A	Indicator P.C.B. Ass'y		OJ04580A OJ04534B	P.C.B. Himelon (1) Fader House (1)		BA04542A	Record Cal. P.C.B. Ass'y
IC901 Q901 Q902,903 904,905 D901-903 R902,903 904,905 R906-913	OB02505D OB06284A OB06066A OB06202A OB01909A OB05576A OB01704A	Indicator P.C.B. IC MSL9350RS TR 2SD471 TR 2SA562 (Y) SID 1S1555 RK 470 1/4W J RK 68 1/4W J	Q101,102 201,202 301 Cds301	BA04770A OB02549A OB01872A OB06325B	Switch P.C.B. Ass'y Switch P.C.B. TR 2SC945 (L) Photocoupler MCD7214F	VR101,104 105,201 204,205 VR102,103 106,202 203,206	OB02504D OB07277A OB07404A	Record Cal. P.C.B. Semi-fixed VR 22K Semi-fixed VR 10K
R914,915 R916 R917,919 R918 R920 C903 C904 F901 CN6	OB01857A OB09378A OB05577A OB05575A OB09263A OB05814A OB01403A OB08715A OB02276A OB05236A OB05264A OB06336A	RK 1K 1/4W J RF 22 1W J RK 330 1/4W J RK 560 1/4W J RK 12K 1/4W J CM 8200P 50V J CE 47μ 16V Thermal Fuse 129 6P-H Connector RED 8P Flat Cable (1) Flat Cable (1) Meter Display (1)	L105,205 VR305 R101,201 R102,202 R103,203 312 R104,204 303,313 R105,205 R107,207 R108,208 R109 R110,210 R111,211 R209 R301,302 R304 R305,310 R306 R307,308 R309 R311 C101,201 C102,202 C103,203 C106,206 C107,207 C301,302 305,306 C303,304	OB06690A OB07330A OB01679A OB05625A OB01889A OB01683A OB01857A OB09427A OB05743A OB05868A OB09421A OB05671A OB05960A OB09215A OB05575A OB01888A OB01887A OB05784A OB05508A OB05629A OB01405A OB09283A OB01862A OB09189A OB05687A OB01400A OB01412A OB07393A OB07428A OB07350A OB07392A OB07391A OB08515A	L-C Block Semi-fixed VR 500K RK 100 1/4W J RK 220K 1/4W J RK 100K 1/4W J RK 15K 1/4W J RK 1K 1/4W J RM 5.62K 1/4W F RK 27K 1/4W J RK 680K 1/4W J RM 2.67K 1/4W F RK 2.2M 1/4W J RK 910K 1/4W J RF 100 1/4W J RK 560 1/4W J RK 10K 1/4W J RK 5.6K 1/4W J RK 560K 1/4W J RK 56K 1/4W J RK 2.7K 1/4W J CE 1μ 50V CC 220P 50V K CE 22μ 16V CM 2700P 50V J CM 1200P 50V J CE 100μ 16V CE 10μ 16V Rotary Switch 6-2NS Rotary Switch 4-2S Rotary Switch 2-3 Rotary Switch 2-2S Rotary Switch 2-4NS Insu-Lock (4)	R101,201 R102,105 202,205 R103,107 203,207 R108,208 R109,209 C101,201 C103,203 CN4,5 CN11	OB01683A OB01887A OB01846A OB01856A OB05615A OB05832A OB05652A OB08727A OB08920B OE00612A OJ04481B OJ04483A	RK 15K 1/4W J RK 5.6K 1/4W J RK 4.7K 1/4W J RK 8.2K 1/4W J RK 22K 1/4W J CM 0.018μ 50V J CM 4700P 50V J 5P-S Connector 9P-H Connector M3x6 ⊕ Pan (2A) Shield Case C (1) Record Cal. P.C.B. Holder (1)
Q601,602 LED601 602,603 605,606 612,614 LED604 607,608 609,613 LED610 611 R601-607 R608,609 R610,611 SW601-610 SW611,612	BA04544A OB02508D OB01872A OB06334A OB06333A OB06327A OB01857A OB05615A OB05622A OB07219A OB07396A OB02273A OB02275A OB02272A OB02279A OB02277A OB02278A OB08935B OE00857A	Control Switch P.C.B. Ass'y Control Switch P.C.B. TR 2SC945 (L) LED GRN TLR124A LED RED TLR124A LED RK 1K 1/4W J RK 22K 1/4W J RK 2.2K 1/4W J Switch AKC8S Double Action Switch KHF10901 4P-H Connector BLU 6P-H Connector BLU 2P-H Connector BLU 9P-H Connector BLU 6P-H Connector GRN 9P-H Connector GRN 4P-H Connector BT M3x6 ⊕ Binding (1)	SW301 SW302 SW303 SW304 SW305					
CN7 CN8 CN9 CN12 CN15 CN17 CN19								

6.12. D/D Motor Control P.C.B. Ass'y

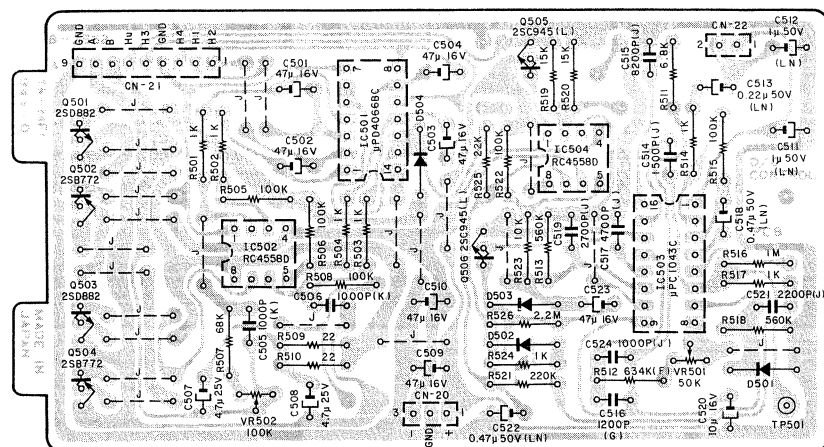


Fig. 6.12

6.13. Motor P.C.B. Ass'y

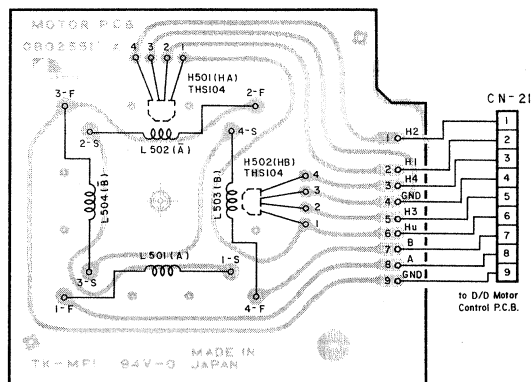


Fig. 6.13

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

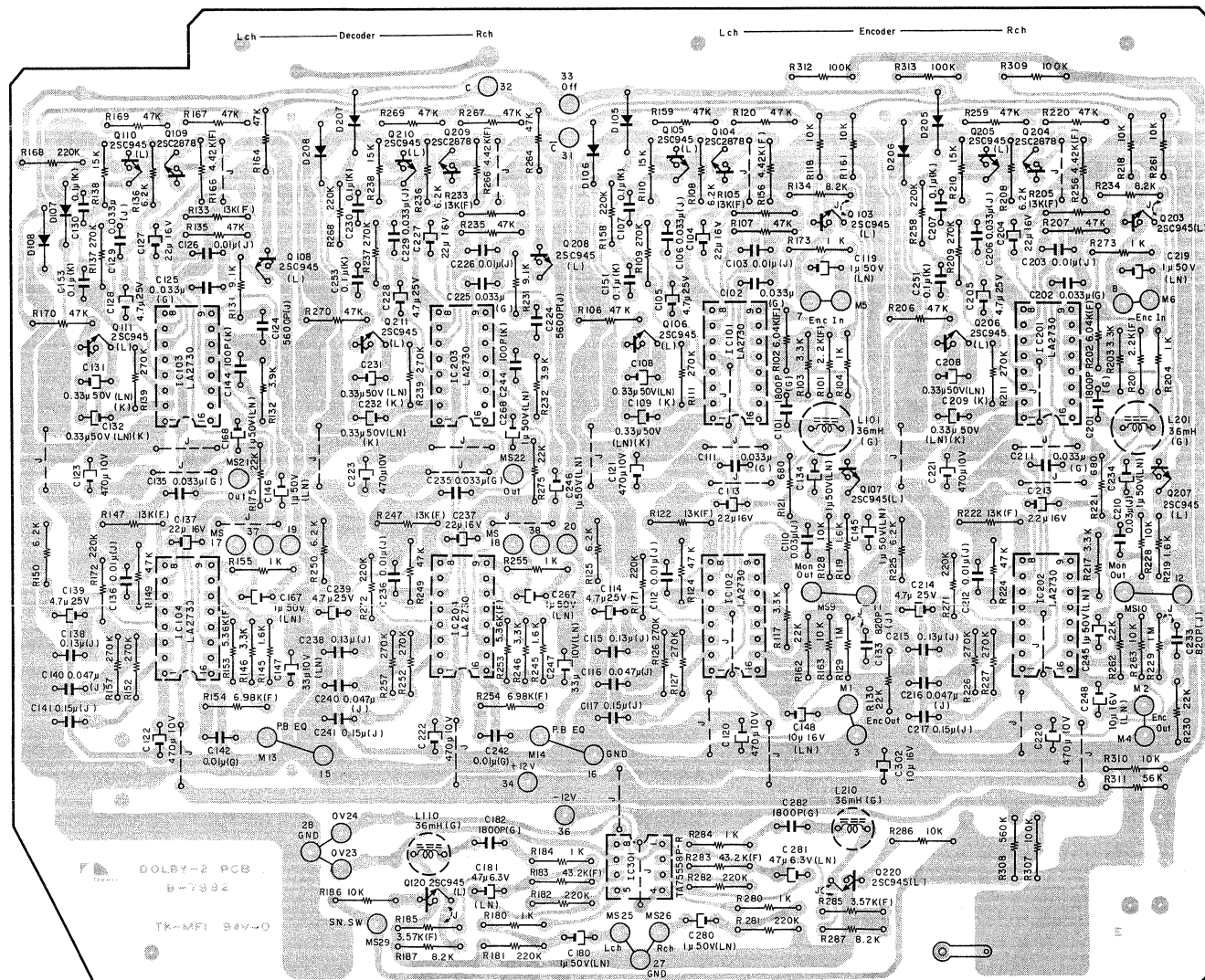


Fig. 6.14

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description		
IC501 IC502,504 IC503 Q501,503 Q502,504 Q505,506 D501-504 VR501 VR502 R501,502 503,504 514,517 524 R505,506 508,515 522 R507 R509,510 R511 R512 R513,518 R516 R519,520 R521 R523 R525 R526 C501,502 503,504 509,510 523,525 C505,506 C507,508 C511,512 C513 C514 C515 C516 C517 C518,522 C519 C520 C521 C524 CN20 CN21 CN22	BA04777A	D/D Motor Control P.C.B. Ass'y	IC103,104 203,204 Q108,110 111,208 210,211 Q109,209 D107,108 207,208 R131,231 R132,232 R133,147 233,247 R135,149 164,167 169,170 235,249 264,267 269,270 R136,150 236,250 R137,139 152,157 237,239 252,257 R138,238 R145,245 R146,246 R153,253 R154,254 R155,255 R166,266 R168,172 268,272 R175,275 C122,123 222,223 C124,224 C125,135 225,235 C126,136 226,236 C127,137 227,237 C128,139 228,239 C129,229 C130,153 230,253 C131,132 231,232 C138,238 C140,240 C141,241 C142,242 C144,244 C146,167 168,246 267,268 C147,247	BA04766A	Dolby NR P.C.B. Ass'y	R159,206 207,220 224,259 R108,125 208,225 R109,111 126,127 209,211 226,227 R110,210 R118,128 161,163 218,228 261,263 R119,219 R121,221 R129,229 R130,162 230,262 R134,234 R156,256 R158,171 258,271 C101,201 C102,111 202,211 C103,112 203,212 C104,113 204,213 C105,114 205,214 C106,206 C107,151 207,251 C108,109 208,209 C110,210 C115,215 C116,216 C117,217 C119,134 219,234 C120,121 220,221 C133,233 C145,245 C148,248	OB05641A	RK 47K 1/4W J	RK 47K 1/4W J	
	OB02552A	D/D Motor Control P.C.B.		— PB Dolby NR —		OB09271A	RK 6.2K 1/4W J	RK 6.2K 1/4W J		
	OB06144A	IC μPD4066BC		OB06388A	IC LA2730		OB05620A	RK 270K 1/4W J	RK 270K 1/4W J	
	OB06124B	IC RC4558D		OB01872A	TR 2SC945 (L)					
	OB06377A	IC μPC1043C								
	OB06316A	TR 2SD882		OB06299A	TR 2SC2878		OB01683A	RK 15K 1/4W J	RK 15K 1/4W J	
	OB06303A	TR 2SB772 (P,Q)		OB01909A	SiD 1S1555		OB01888A	RK 10K 1/4W J	RK 10K 1/4W J	
	OB01872A	TR 2SC945 (L)		OB05694A	RK 9.1K 1/4W J		OB09565A	RK 1.6K 1/4W J	RK 1.6K 1/4W J	
	OB01909A	SiD 1S1555		OB05675A	RK 3.9K 1/4W J		OB05794A	RK 680 1/4W J	RK 680 1/4W J	
	OB09808A	Semi-fixed VR 50K		OB09557A	RM 13K 1/4W F		OB05776A	RK 1M 1/4W J	RK 1M 1/4W J	
	OB09060A	Semi-fixed VR 100K		OB05641A	RK 47K 1/4W J		OB05615A	RK 22K 1/4W J	RK 22K 1/4W J	
	OB01857A	RK 1K 1/4W J					OB01856A	RK 8.2K 1/4W J	RK 8.2K 1/4W J	
							OB09558A	RM 4.42K 1/4W F	RM 4.42K 1/4W F	
							OB05625A	RK 220K 1/4W J	RK 220K 1/4W J	
							OB09409A	CP 1800P 100V G	CP 1800P 100V G	
							OB09240A	CP 0.033μ 100V G	CP 0.033μ 100V G	
							OB05681A	CM 0.01μ 50V J	CM 0.01μ 50V J	
							OB01862A	CE 22μ 16V	CE 22μ 16V	
							OB01402A	CE 4.7μ 25V	CE 4.7μ 25V	
							OB05583A	CM 0.033μ 50V J	CM 0.033μ 50V J	
							OB01603A	CM 0.1μ 50V K	CM 0.1μ 50V K	
							OB09567A	CE 0.33μ 50V K (LN)	CE 0.33μ 50V K (LN)	
							OB09594A	CM 0.03μ 50V J	CM 0.03μ 50V J	
							OB09566A	CM 0.13μ 50V J	CM 0.13μ 50V J	
							OB05796A	CM 0.047μ 50V J	CM 0.047μ 50V J	
							OB05914A	CM 0.15μ 50V J	CM 0.15μ 50V J	
							OB09223A	CE 1μ 50V (LN)	CE 1μ 50V (LN)	
							OB05884A	CE 470μ 10V	CE 470μ 10V	
					OB09783A	CP 820P 100V J	CP 820P 100V J			
					OB09814A	CE 1μ 50V (LN)	CE 1μ 50V (LN)			
					OB09816A	CE 10μ 16V (LN)	CE 10μ 16V (LN)			
					OB08714A	IC Socket 16P (4)	IC Socket 16P (4)			
H501,502 L501-504 CN21	BA04759A	Motor P.C.B. Ass'y								
	OB02551A	Motor P.C.B.								
	OB06374A	Hall Sensor THS104								
	CA08392A	Motor Coil Ass'y								
	OB02239A	9P-H Connector								

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

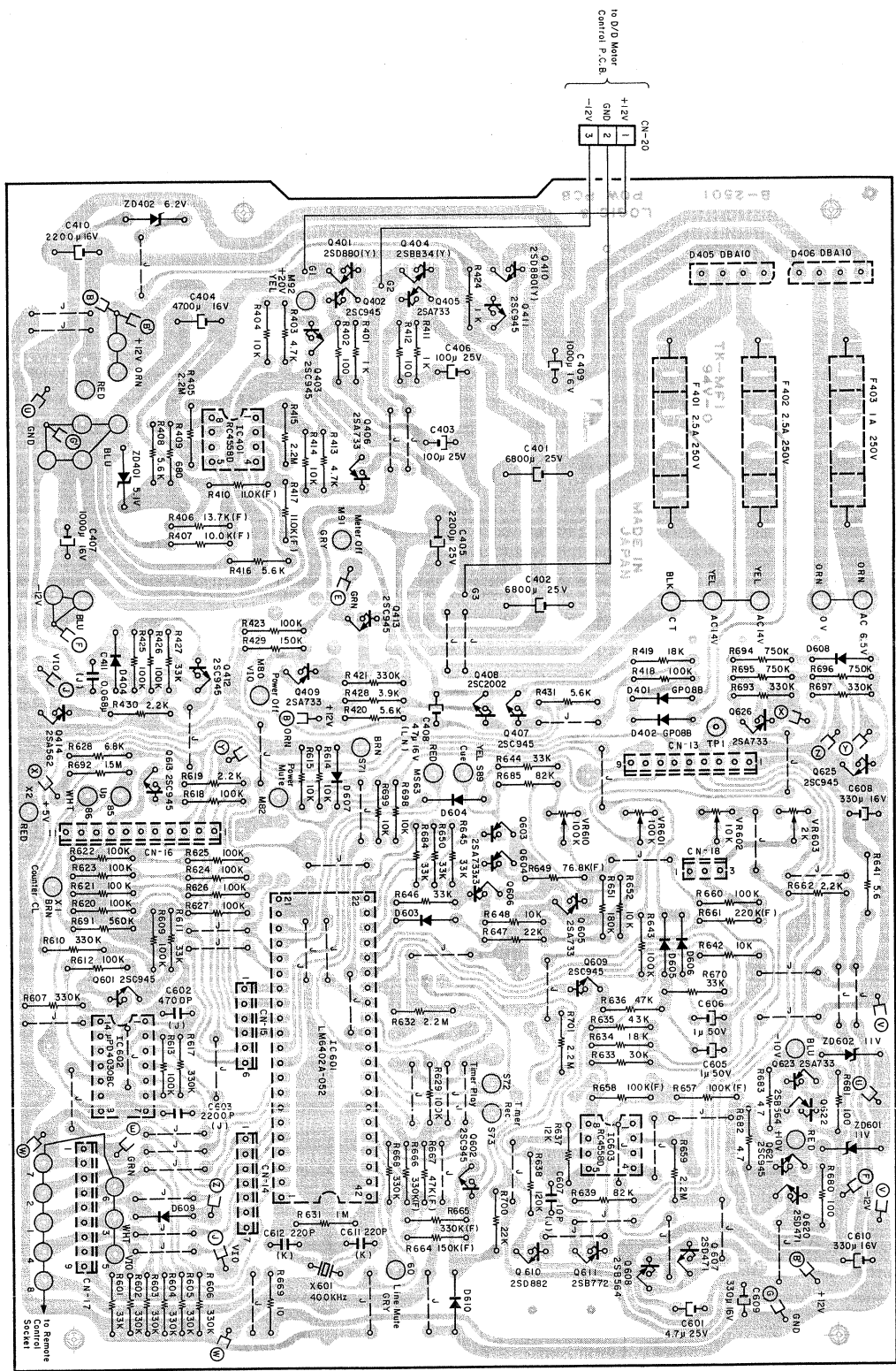


Fig. 6.15

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
IC401 Q402,403 407,411 412,413 Q405,406 409 Q408 Q414 ZD401 ZD402 D401,402 D404 D405,406 R401,411 424 R402,412 R403,413 R404,414 R405,415 R406 R407 R408,416 420,431 R409 R410,417 R418,423 425,426 R419 R421 R427 R428 R429 R430 C401,402 C403,406 C404 C405 C407,409 C408 C410 C411	BA04775A	Logic & Power P.C.B. Ass'y (U.S.A., Canada & Others)	R614,615 642,648 652,698 699	OB01888A	RK 10K 1/4W J	Q401,410 Q404	OM04391A	Fuse Label T1.25A 250V (UK, Australia & 220V Class 2) (2)
	BA04774A	Logic & Power P.C.B. Ass'y (Japan)	R619,662	OB05622A	RK 2.2K 1/4W J		OB06255A	TR 2SD880 (Y)
	BA04776A	Logic & Power P.C.B. Ass'y (UK, Australia & 220V Class 2)	R628 R631 R632,659 701 R633 R634 R635 R636 R637 R638 R639,685 R641 R647,700 R649 R651 R657,658 R661 R664 R665,666 R667 R669 R680,681 R682,683 R691 R692 R694,695 696 C601 C602 C603 C605,606 C607 C608,609 610 C611,612	OB01682A OB05776A OB05671A OB09075A OB05560A OB09750A OB05641A OB09263A OB05621A OB05668A OB09217A OB05615A OB09751A OB05640A OB09305A OB09472A OB09300A OB09756A OB09451A OB09216A OB09215A OB09321A OB05784A OB09380A OB09755A	RK 6.8K 1/4W J RK 1M 1/4W J RK 2.2M 1/4W J RK 30K 1/4W J RK 18K 1/4W J RK 43K 1/4W J RK 47K 1/4W J RK 12K 1/4W J RK 120K 1/4W J RK 82K 1/4W J RF 5.6 1/4W J RK 22K 1/4W J RM 76.8K 1/4W F RK 180K 1/4W J RM 100K 1/4W F RM 220K 1/4W F RM 150K 1/4W F RM 330K 1/4W F RM 47K 1/4W F RF 10 1/4W J RF 100 1/4W J RF 4.7 1/4W J RK 560K 1/4W J RK 1.5M 1/4W J RK 750K 1/4W J		OB08601A OB08602A OE00037A OE00172A OE00507A OE00608A OE00857A OJ04484B	TR Mica TO-220(3) TR Bushing TO-220 (3) Earth Lug B-5 (1) Washer 3mm Toothed Lock (1) Nut Hex. M3 (3) M3x10 ⊕ Pan (3A) (3) BT M3x6 ⊕ Binding (1) Heat Sink (1)
	— DC Supply —							
	OB06124B	IC RC4558D						
	OB06100A	TR 2SC945 (A)						
	OB06013A	TR 2SA733						
	OB06322A	TR 2SC2002						
	OB06202A	TR 2SA562 (Y)						
	OB06058A	ZD 5.1V YZ051						
	OB06314A	ZD 6.2V YZ062						
IC601 IC602 IC603 Q601,602 609,613 621,625 Q603,604 605,606 623,626 Q607,620 Q608,622 Q610 Q611 ZD601,602 D603-610 X601 VR601,610 VR602 VR603 R601,611 644,645 646,650 670,684 R602-607 610,617 668,693 697 R609,612 613,618 620-627 629,643 660	OB06109A	SiD GP08B				OJ04485A		
	OB01909A	SiD 1S1555						
	OB06282A	Diode Bridge DBA10						
	OB01857A	RK 1K 1/4W J						
	OB01679A	RK 100 1/4W J						
	OB01846A	RK 4.7K 1/4W J						
	OB01888A	RK 10K 1/4W J						
	OB05671A	RK 2.2M 1/4W J						
	OB09523A	RM 13.7K 1/4W F						
	OB09203A	RM 10K 1/4W F						
OB01887A	RK 5.6K 1/4W J							
	OB05794A	RK 680 1/4W J						
	OB09504A	RM 11K 1/4W F						
	OB01889A	RK 100K 1/4W J						
	OB05560A	RK 18K 1/4W J						
	OB05627A	RK 330K 1/4W J						
	OB05509A	RK 33K 1/4W J						
	OB05675A	RK 3.9K 1/4W J						
	OB05626A	RK 150K 1/4W J						
	OB05622A	RK 2.2K 1/4W J						
OB09374A	CE 6800μ 25V					— Miscellaneous —		
	OB01272A	CE 100μ 25V						
	OB09377A	CE 4700μ 16V						
	OB05654A	CE 2200μ 25V						
	OB01397A	CE 1000μ 16V						
	OB09218A	CE 47μ 16V (LN)						
	OB01406A	CE 2200μ 16V						
	OB05682A	CM 0.068μ 50V J						
	OB08515A	Insu-Lock (2)						
	— Logic —							
OB06324A	IC LM6402A-052		F401,402	OB02501D	Logic & Power P.C.B.	OB08349A		
	OB06317A	IC μPD4030BC		OB08369A	Fuse 3A 250V (U.S.A., Canada & Others)			
	OB06124B	IC RC4558D	F401,402	OB08781A	Fuse 3A 250V (Japan)			
	OB06100A	TR 2SC945 (A)	F401,402	OB02240A	Fuse T1.25A 250V (UK, Australia & 220V Class 2)			
	OB06013A	TR 2SA733	F403	OB08374A	Fuse 1A 250V (U.S.A., Canada & Others)			
	OB06066A	TR 2SD471	F403	OB08686A	Fuse 1A 250V (Japan)			
	OB06069A	TR 2SB564	F403	OB08457A	Fuse T500mA 250V (UK, Australia & 220V Class 2)			
	OB06316A	TR 2SD882		OB08672A	3P-H Connector			
	OB06303A	TR 2SB772	CN20	OE00857A	BT M3x6 ⊕ Binding (2)			
	OB06231A	ZD 11V RD11EB2						
OB01909A	SiD 1S1555 (8)							
	OB08908A	Xtal KBR400BT						
	OB07257A	Semi-fixed VR 100K						
	OB07256A	Semi-fixed VR 10K						
	OB07329A	Semi-fixed VR 2K						
	OB05509A	RK 33K 1/4W J						
	OB05627A	RK 330K 1/4W J (11)						
	OB01889A	RK 100K 1/4W J (15)						

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA04763A	Main P.C.B. Ass'y	R905	OB01857A	RK 1K 1/4W J	C317	OB09836A	CP 360P 100V J
	— PB Eq. Amp. —		C303	OB01402A	CE 4.7 μ 25V	C318	OB09584A	CP 0.018 μ 100V J
Q106,206	OB06376A	FET 2SK170 (GR)	C304	OB09254A	CP 0.068 μ 100V J	C319	OB05582A	CM 0.022 μ 50V J
Q107,207	OB06180A	TR 2SA970 (GR)	C305	OB09405A	CP 0.022 μ 100V J	C320	OB01802A	CM 2200P 50V J
Q108,208	OB06142A	TR 2SC2240 (BL)	C306,307	OB09191A	CP 4700P 100V J	C321	OB09045A	CM 0.027 μ 50V J
L103,203	OB00068A	Trap Coil 10.5mH		OJ04450A	Osc. Coil Cap (1)	C322	OB05813A	CM 0.056 μ 50V J
VR104,204	OB07233A	Semi-fixed VR 10K		— Meter Amp. —		C323	OB01780A	CM 0.1 μ 50V J
R147,154	OB01889A	RK 100K 1/4W J	IC303	OB06216A	IC μ PC4556C	C324	OB09302A	C 100P 100V J
247,254			IC312,313	OB06280A	IC MSM4066RS	C325	OB09322A	CP 330P 100V J
R148,248	OB09810A	RM 82 1/4W F	Q105,205	OB01872A	TR 2SC945 (L)	C326	OB01914A	CM 3300P 50V J
R150,250	OB09768A	RM 3.92K 1/4W F	305			C327,328	OB01412A	CE 10 μ 16V
R151,251	OB09471A	RM 205K 1/4W F	ZD101,201	OB06058A	ZD 5.1V YZ051		— Azimuth —	
R152,252	OB01857A	RK 1K 1/4W J	D102,103	OB06181A	SiD 1SS53	IC307	OB06124B	IC RC4558D
R153,157	OB01888A	RK 10K 1/4W J	104,202			IC308	OB06216A	IC μ PC4556C
253,257			203,204			IC309	OB06213A	IC TC4013BP
R155,255	OB01933A	RK 220 1/4W J	354			Q316,333	OB06013A	TR 2SA733
R156,256	OB05575A	RF 560 1/4W J	VR101,201	OB07256A	Semi-fixed VR 10K	Q317,318	OB01872A	TR 2SC945 (L)
R158,160	OB09162A	RF 82 1/4W J	VR102,202	OB07269A	Semi-fixed VR 50K	319,330		
258,260			VR103,203	OB07341A	Semi-fixed VR 5K	331,332		
R159,259	OB09431A	RM 8.06K 1/4W F	R123,124	OB01856A	RK 8.2K 1/4W J	334,335		
C123,223	OB05885A	CE 100 μ 10V	223,224			D105,106	OB06181A	SiD 1SS53 (26)
C124,224	OB09281A	CC 150P 50V K	R125,126	OB01889A	RK 100K 1/4W J	205,206		
C125,225	OB05841A	CE 330 μ 10V	225,226			308,309		
C126,226	OB09812A	CC 2P 50V C	316,317			310		
C127,227	OB09833A	CE 4.7 μ 25V (LN)	318			335-349		
C128,228	OB01804A	CM 3900P 50V J	R127,165	OB01920A	RK 100K 1/4W VJ	351,352		
C129,229	OB09247A	C 220P 50V J	227,265			353,356		
C130,131	OB01392A	CE 470 μ 16V	R128,228	OB05615A	RK 22K 1/4W J	VR304	OB07270A	Semi-fixed VR 20K
230,231			R129,229	OB09432A	RM 8.25K 1/4W F	R138,139	OB01889A	RK 100K 1/4W J
C132,232	OB09490A	CP 0.015 μ 100V J	R130,132	OB05625A	RK 220K 1/4W J	238,239		
	— Rec. Amp. —		230,232			935,937		
IC301			R131,137	OB01857A	RK 1K 1/4W J	939,942		
Q101,102	OB06387A	IC RC2043DD	231,237			946,956		
201,202	OB06299A	TR 2SC2878	R133,233	OB01887A	RK 5.6K 1/4W J	958,959		
D101,201			R134,234	OB05627A	RK 330K 1/4W J	961	OB01846A	RK 4.7K 1/4W J
L101,102	OB06181A	SiD 1SS53	R135,235	OB09510A	RM 66.5K 1/4W F	R140,240		
201,202	OB06705A	Trap Coil 1.05mH	R136,236	OB09446A	RM 33.2K 1/4W F	384,385	OB05625A	RK 220K 1/4W J
R101,103	OB01683A	RK 15K 1/4W J	R975	OB05509A	RK 33K 1/4W J	R141,241		
114,201			C114,115	OB01405A	CE 1 μ 50V	934,941		
203,214			116,214			943,944		
R102,202	OB09604A	RM 6.98K 1/4W F	215,216			945,947		
R104,106	OB05640A	RK 180K 1/4W J	C117,217	OB09288A	CC 1000P 50V K	952	OB01888A	RK 10K 1/4W J
204,206			C118,218	OB09218A	CE 47 μ 16V (LN)	R142,144		
R105,116	OB01679A	RK 100 1/4W J	C119,219	OB09385A	CE 0.33 μ 50V (LN)	145,242		
205,216			C310,311	OB01403A	CE 47 μ 16V	244,245		
R107,207	OB01854A	RK 39K 1/4W J	C347	OB01862A	CE 22 μ 16V	377,382		
R108,208	OB05675A	RK 3.9K 1/4W J		— Headphone Amp. —		938,948		
R109,209	OB05560A	RK 18K 1/4W J	IC302	OB06217A	IC RC4560D	949	OB05622A	RK 2.2K 1/4W J
R110,210	OB05691A	RK 390 1/4W J	Q103,203	OB06069A	TR 2SB564	R143,243	OB05615A	RK 22K 1/4W J
R111,211	OB09230A	RM 1.5K 1/4W F	Q104,204	OB06066A	TR 2SD471	376,381		
R112,212	OB01888A	RK 10K 1/4W J	R119,120	OB01889A	RK 100K 1/4W J	389,950		
R113,213	OB05560A	RK 18K 1/4W J	219,220			957	OB01857A	RK 1K 1/4W J
R115,215	OB01682A	RK 6.8K 1/4W J	R121,221	OB01706A	RK 47 1/4W J	R378,379		
R117,217	OB05936A	RK 10 1/4W J	R122,222	OB09331A	RF 8.2 1/4W J	380,974	OB01681A	RK 3.3K 1/4W J
R970	OB01933A	RK 220 1/4W J	R314,315	OB09216A	RF 10 1/4W J	R383,971	OB05743A	RK 27K 1/4W J
C101,201	OB09783A	CP 820P 100V J	C113,213	OB09586A	CC 2200P 50V K	R386,963	OB05509A	RK 33K 1/4W J
C102,202	OB05681A	CM 0.01 μ 50V J	C308,309	OB01400A	CE 100 μ 16V	R936,955		
C103,203	OB05583A	CM 0.033 μ 50V J		— Tone Osc. —		965	OB05784A	RK 560K 1/4W J
C104,204	OB09814A	CE 1 μ 50V (LN)				R940	OB09311A	RK 68K 1/4W J
C105,205	OB09815A	CE 47 μ 6.3V (LN)	IC305	OB06127A	IC RC4559D	R951,953	OB05626A	RK 150K 1/4W J
C106,206	OB05685A	CM 0.082 μ 50V J	IC306	OB06219A	IC μ PD4081BC	R954	OB05627A	RK 330K 1/4W J
C107,207	OB05659A	CM 5600P 50V J	Q314	OB01872A	TR 2SC945 (L)	R960,964	OB01405A	CE 1 μ 50V
C108,208	OB01914A	CM 3300P 50V J	Q315	OB06013A	TR 2SA733	C120,121		
C109,209	OB09834A	CP 2200P 100V J	Q316	OB06181A	SiD 1SS53	220,221	OB05796A	CM 0.047 μ 50V J
C110,210	OB09286A	CP 470P 50V K	D306	OB03919B	Inductor 36mH	329,332	OB01412A	CE 10 μ 16V
C111,211	OB09322A	CP 330P 100V J	L301	OB07270A	Semi-fixed VR 20K	C122,222		
C301,302	OB01502A	CE 330 μ 16V	VR302	OB07269A	Semi-fixed VR 50K	C330,337	OB09372A	CE 2.2 μ 50V
	— Bias Osc. —		VR303	OB09315A	RM 332K 1/4W F	341	OB01862A	CE 22 μ 16V
Q301,302	OB01872A	TR 2SC945 (L)	R353,354			C344,345	— Fader —	
Q303	OB06013A	TR 2SA733	359	OB09583A	RM 97.6K 1/4W F			
Q304	OB06202A	TR 2SA562 (Y)	R355	OB01889A	RK 100K 1/4W J	IC304	OB06216A	IC μ PC4556C
D355	OB06181A	SiD 1SS53	R356,363			Q307,310	OB06013A	TR 2SA733
T301	OB06613A	Osc. Coil	367,371			311,313		
R303,304	OB05668A	RK 82K 1/4W J	R357,368	OB05615A	RK 22K 1/4W J	Q308,309	OB01872A	TR 2SC945 (L)
R305,306	OB09212A	RF 2.2 1/4W J	R358	OB01888A	RK 10K 1/4W J	312		
R307	OB01889A	RK 100K 1/4W J	R360	OB01682A	RK 6.8K 1/4W J	ZD301	OB06290A	ZD 5.6V RD5.6EB2
R308	OB05692A	RK 68K 1/4W J	R361,362	OB05508A	RK 56K 1/4W J	D302,303	OB06181A	SiD 1SS53
R309	OB09296A	RF 39 1/2W J	969			304,305		
R310	OB09295A	RF 82 2W J	R364	OB09527A	RK 130K 1/4W J	R326,328	OB05676A	RK 390K 1/4W J
R311	OB05575A	RK 560 1/4W J	R365	OB05676A	RK 390K 1/4W J	330		
R312	OB01681A	RK 3.3K 1/4W J	R366	OB05622A	RK 2.2K 1/4W J	R327,329	OB05640A	RK 180K 1/4W J
R313	OB05560A	RK 18K 1/4W J	R369	OB09263A	RK 12K 1/4W J	R331,342	OB05692A	RK 68K 1/4W J
			R370	OB05509A	RK 33K 1/4W J	R332	OB05641A	RK 47K 1/4W J
			R372,373	OB09215A	RF 100 1/4W J			

6.16. Main P.C.B. Assy

Schematic Ref. No.	Part No.	Description
R333,334	OB05668A	RK 82K 1/4W J
R335,337	OB01888A	RK 10K 1/4W J
344,347		
R336	OB05621A	RK 120K 1/4W J
R338	OB01889A	RK 100K 1/4W J
R339,345	OB01887A	RK 5.6K 1/4W J
R340	OB05629A	RK 2.7K 1/4W J
R341	OB05627A	RK 330K 1/4W J
R343,346	OB05622A	RK 2.2K 1/4W J
350		
R348	OB05691A	RK 390 1/4W J
R349	OB01857A	RK 1K 1/4W J
R351	OB05576A	RK 470 1/4W J
R352	OB05743A	RK 27K 1/4W J
C313	OB05550A	CM 1000P 50V J
C314	OB01913A	CM 1800P 50V J
C315	OB01409A	CE 47μ 25V
C316	OB01674A	CE 10μ 25V
— Miscellaneous —		
IC310	OB02548A	Main P.C.B.
Q109,110	OB06143A	IC μPD4001BC
209,210	OB06299A	TR 2SC2878
Q320,324	OB06013A	TR 2SA733
Q321,322	OB01872A	TR 2SC945 (L)
323,326		
327,328		
D314-318	OB06181A	SiD 1SS53 (16)
320-324		
327-332		
R161,261	OB05622A	RK 2.2K 1/4W J
R162,262	OB01887A	RK 5.6K 1/4W J
916,917		
920,921		
R163,263	OB05691A	RK 390 1/4W J
R164,264	OB01846A	RK 4.7K 1/4W J
R397,903	OB01889A	RK 100K 1/4W J
907,909		
962		
R398,906	OB05641A	RK 47K 1/4W J
R399,972	OB01888A	RK 10K 1/4W J
973		
R901,932	OB05743A	RK 27K 1/4W J
R902	OB01857A	RK 1K 1/4W J
R908	OB05509A	RK 33K 1/4W J
R912,913	OB01854A	RK 39K 1/4W J
R914,915	OB05675A	RK 3.9K 1/4W J
R918,922	OB05629A	RK 2.7K 1/4W J
R919,923	OB05577A	RK 330 1/4W J
924		
R925,927	OB05776A	RK 1M 1/4W J
R926,928	OB05671A	RK 2.2M 1/4W J
R967,968	OB09214A	RF 1 1/4W J
C133,233	OB09187A	CE 1μ 50V (BP)
C335	OB09286A	CC 470P 50V K
C339,340	OB01405A	CE 1μ 50V
C342,343	OB01397A	CE 1000μ 16V
C348	OB09279A	CC 22P 50V K
CN1	OB08656A	2P-T Post
CN2	OB02281A	4P-T Post RED
CN3,19	OB08654A	4P-T Post
CN4,5	OB08183A	5P-T Post
CN6	OB02284A	6P-T Post RED
CN7	OB02283A	4P-T Post BLU
CN8	OB02286A	6P-T Post BLU
CN9	OB02280A	2P-T Post BLU
CN10	OB08642A	6P-T Post
CN11	OB08645A	9P-T Post
CN12	OB02288A	9P-T Post BLU
	OB07395A	Push Switch 6-6-0
	OE00507A	Nut Hex. M3 (1)
	OE00510A	M3x8 ♂Pan (2A) (2)
	OJ04479A	Shield Case A (1)
	OJ04480A	Shield Case B (1)

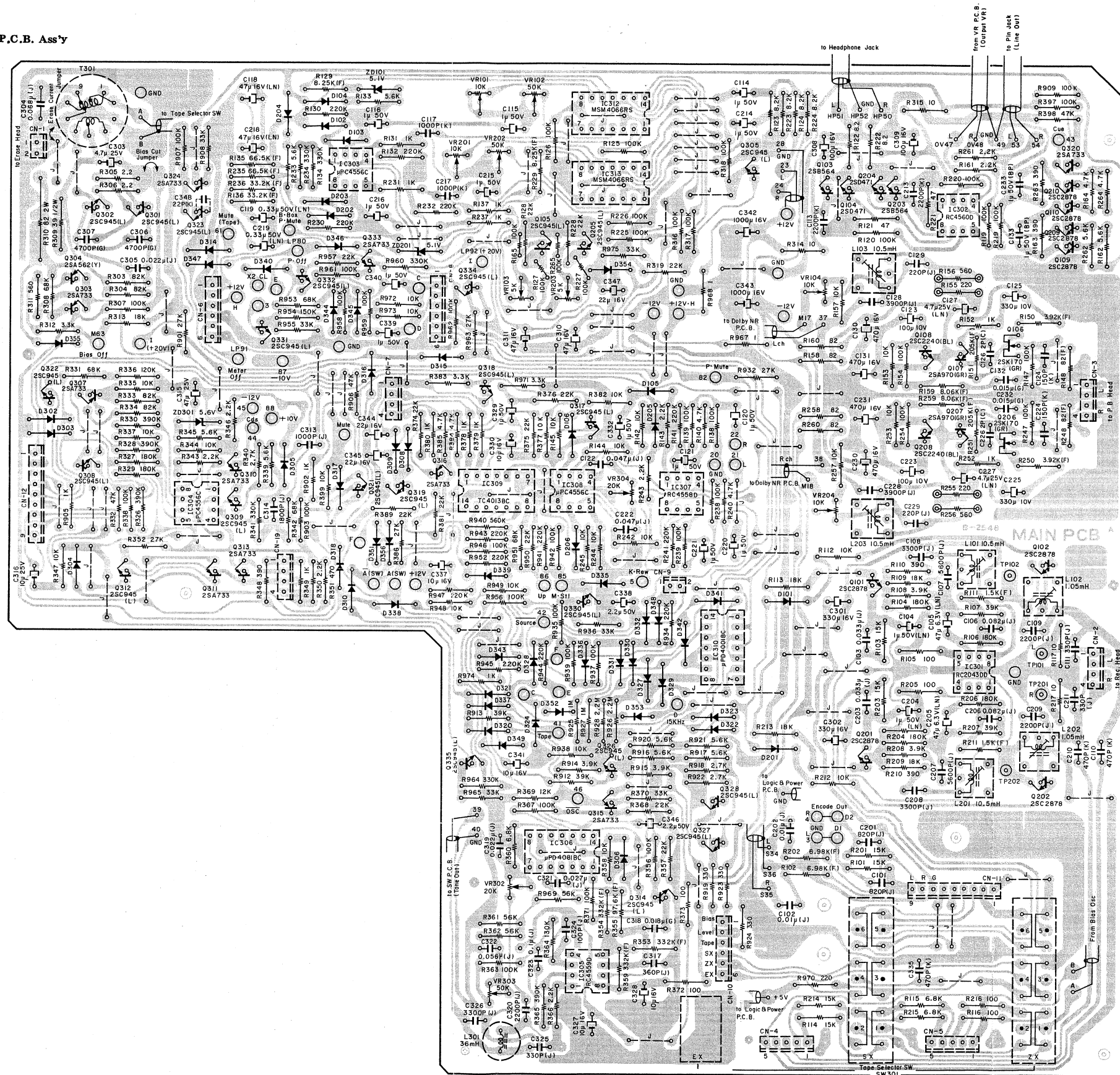


Fig. 6.16

7.3. Mechanism Control Section

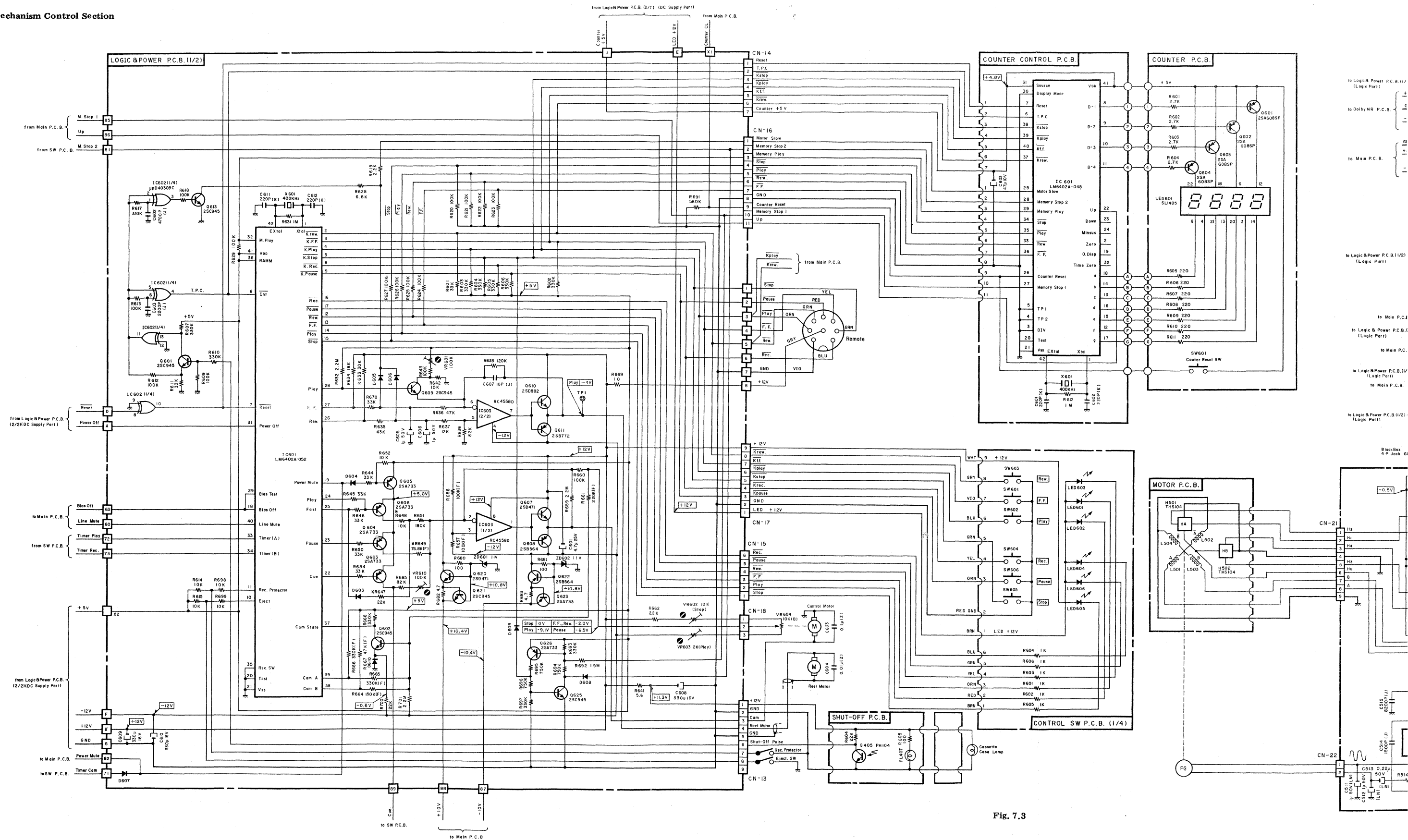


Fig. 7.3

Fig. 7.4

7.5. Dolby NR Section

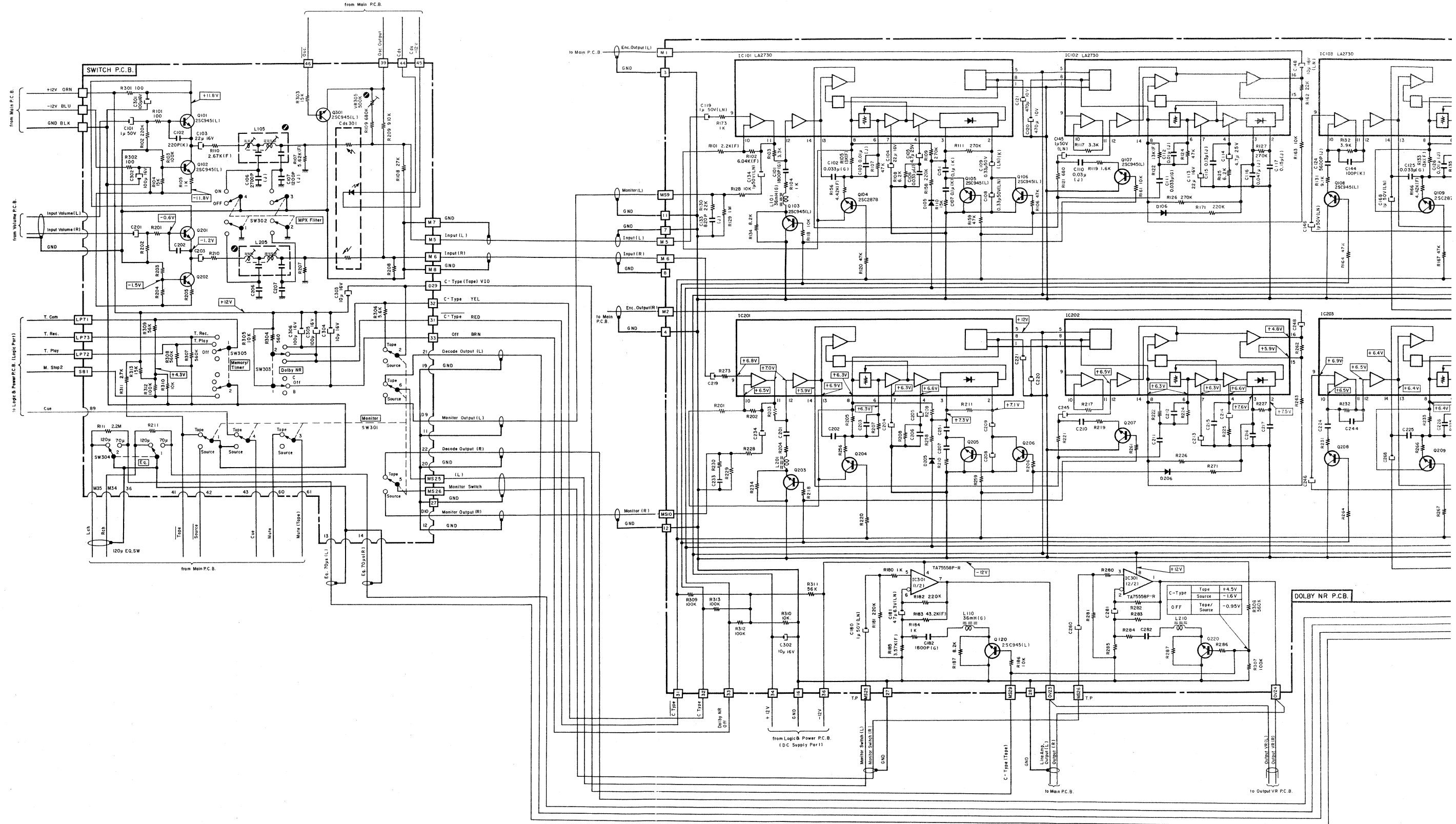
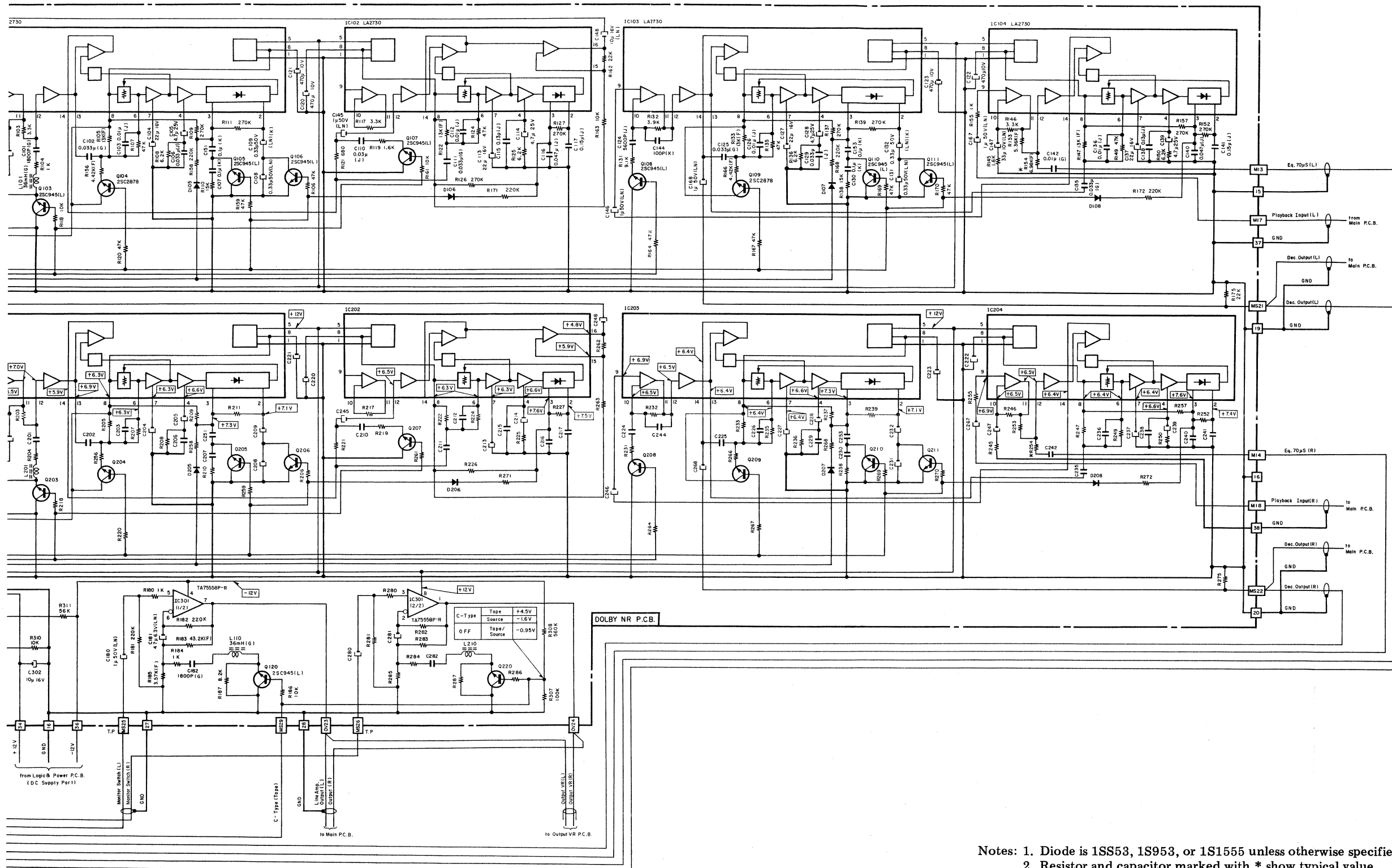


Fig. 7.5



- Notes: 1. Diode is 1S853, 1S953, or 1S1555 unless otherwise specified.
2. Resistor and capacitor marked with * show typical value.

Fig. 7.5

8. WIRING DIAGRAM

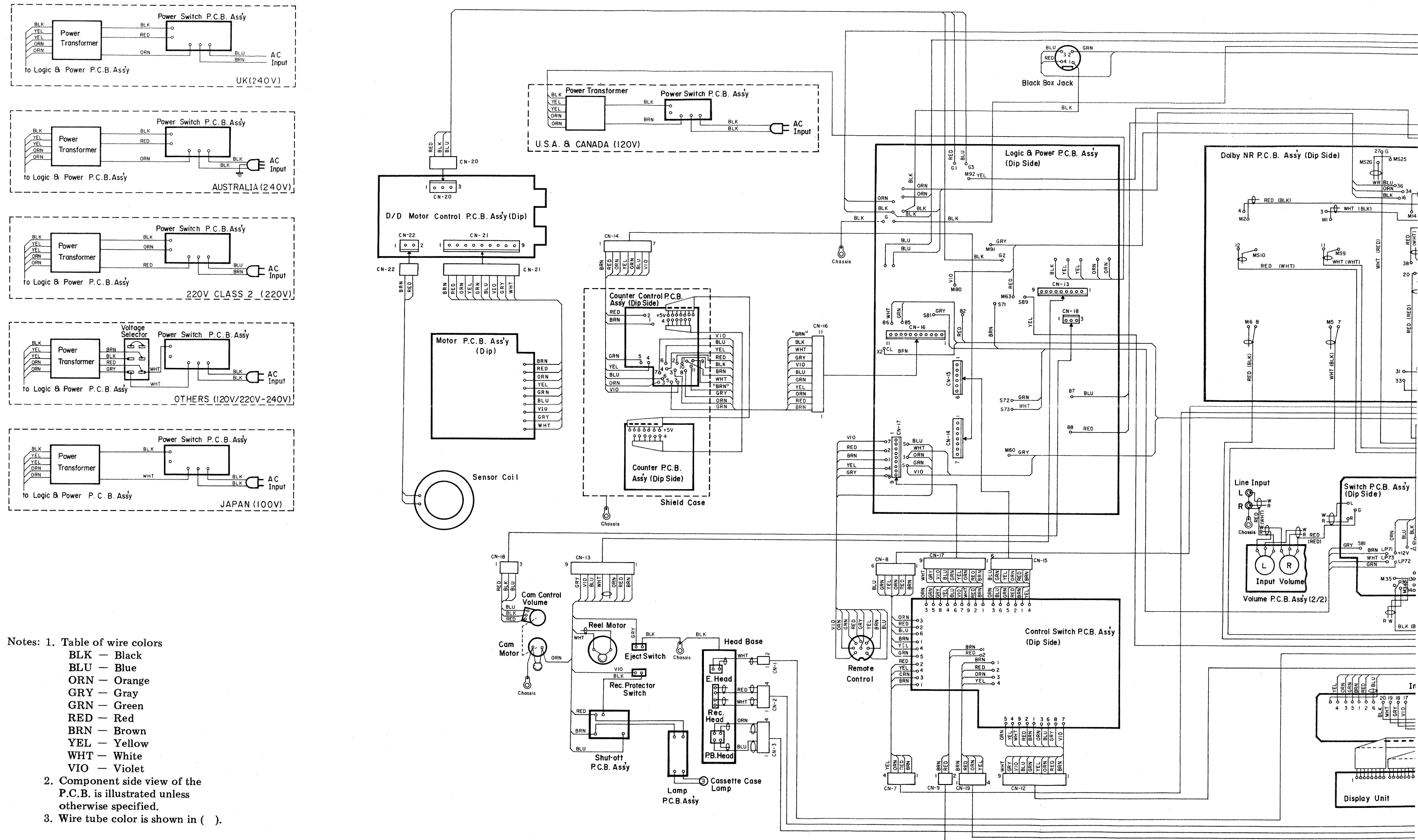


Fig. 8

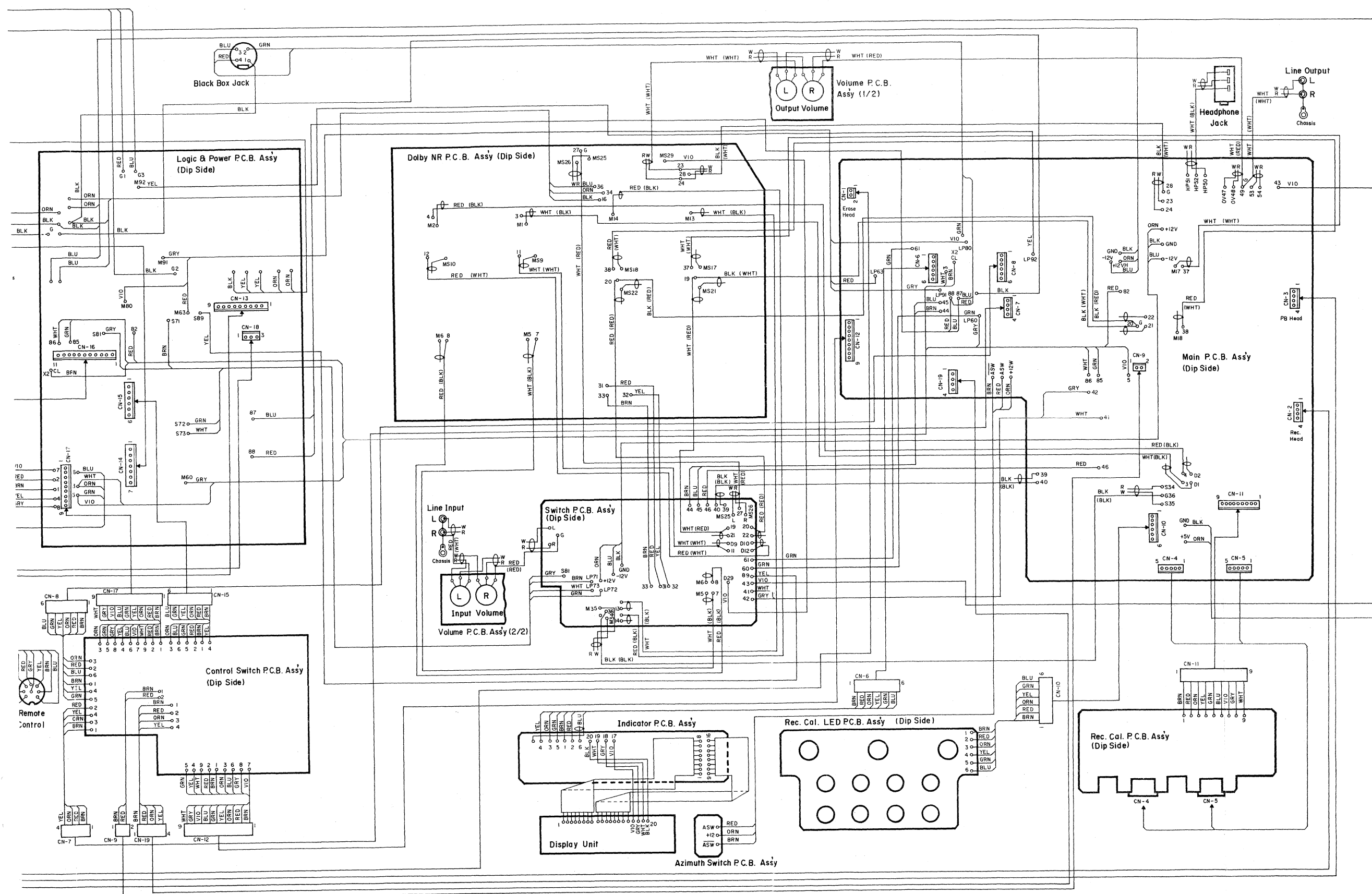


Fig. 8

9. OVERALL TIMING CHART AND EQ. AMP. FREQUENCY RESPONSE

9.1. Overall Timing Chart

Mode	Playback			Record								Cue		
Control Lamp	Stop	Play	Stop	Rec.	Rec./Play	Rec./Pause	Rec./Play	Stop	Play	Rec./Play	Stop	F.F. or Rew.	F.F. or Rew. / Pause	Stop
Reel Motor (Tape)		270ms	10ms		270ms	112ms	40ms	10ms	270ms		10ms	10ms		100ms
Line Mute (Output)		150ms			150ms		150ms		150ms					
Bias					100ms					0.5ms max.				

Fig. 9.1

9.2. Eq. Amp. Frequency Response

(1) Playback Frequency Response

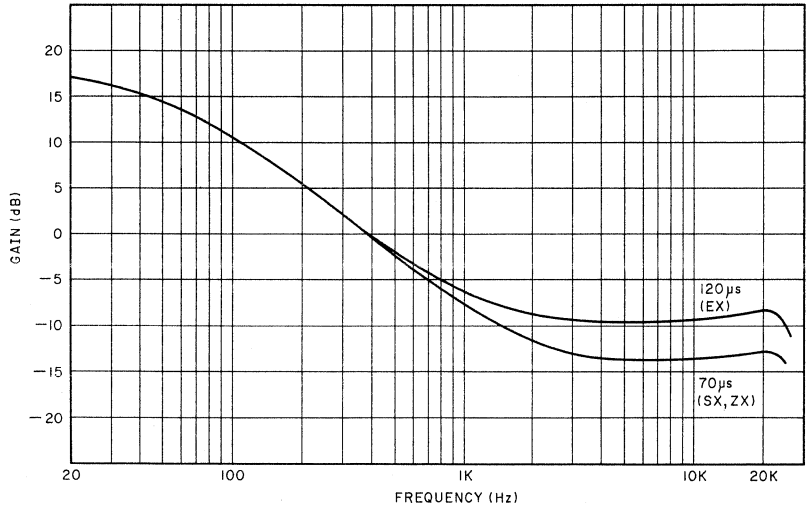


Fig. 9.2.1

(2) Record Current Frequency Response

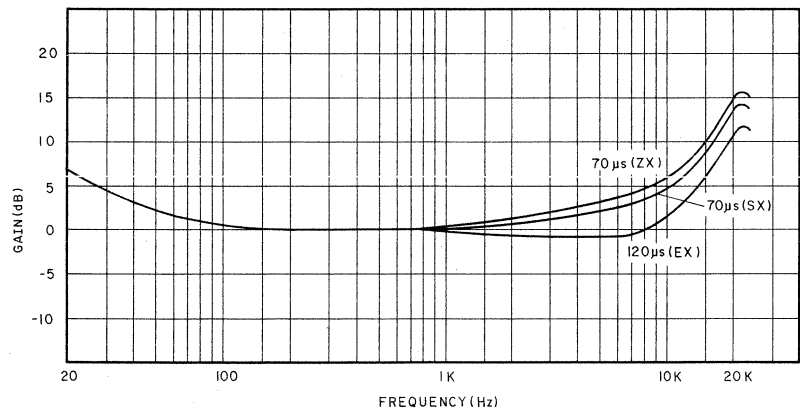


Fig. 9.2.2

10. BLOCK DIAGRAMS

10.1. Amplifier Section

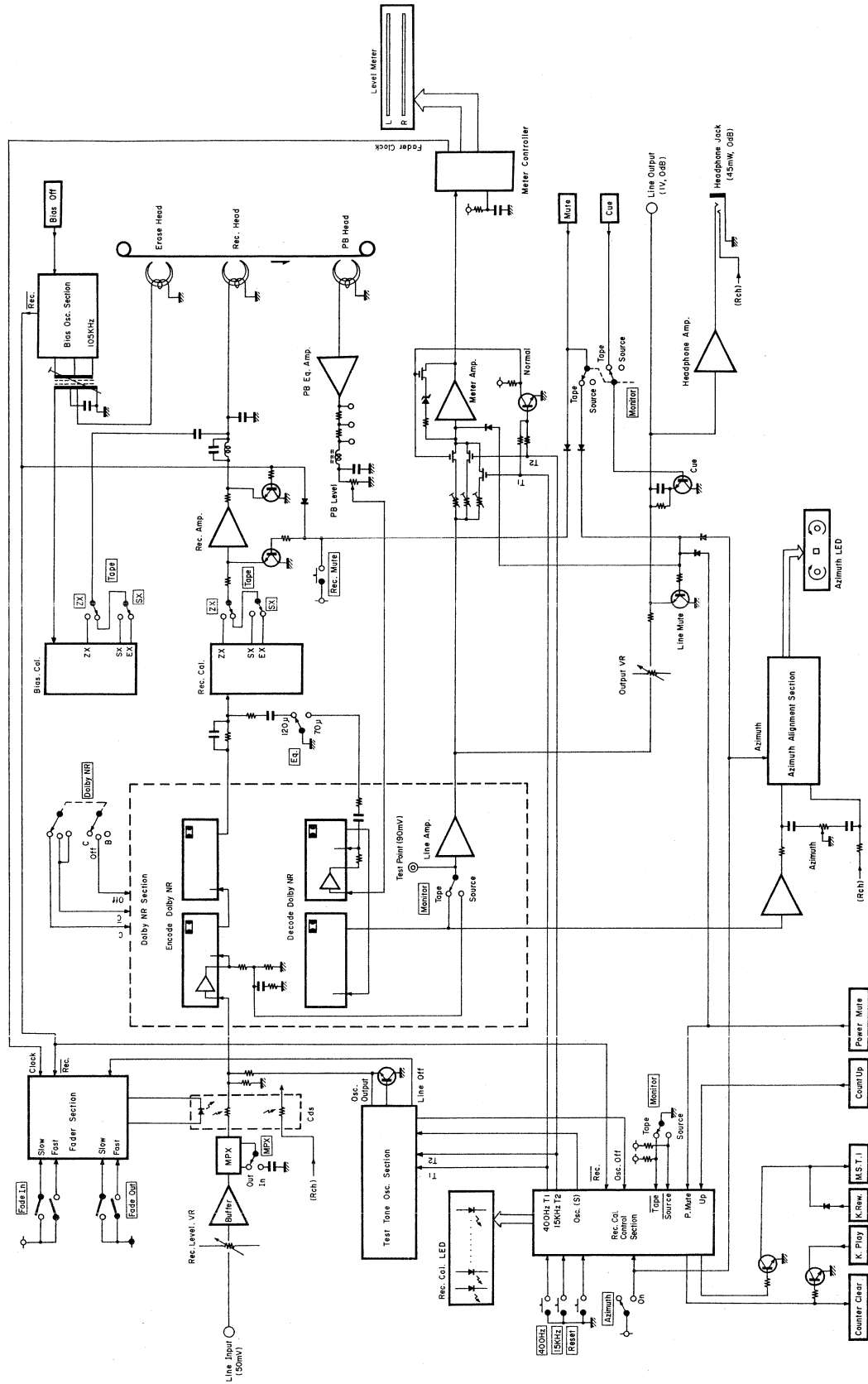


Fig. 10.1

10.2. Mechanism Control Section

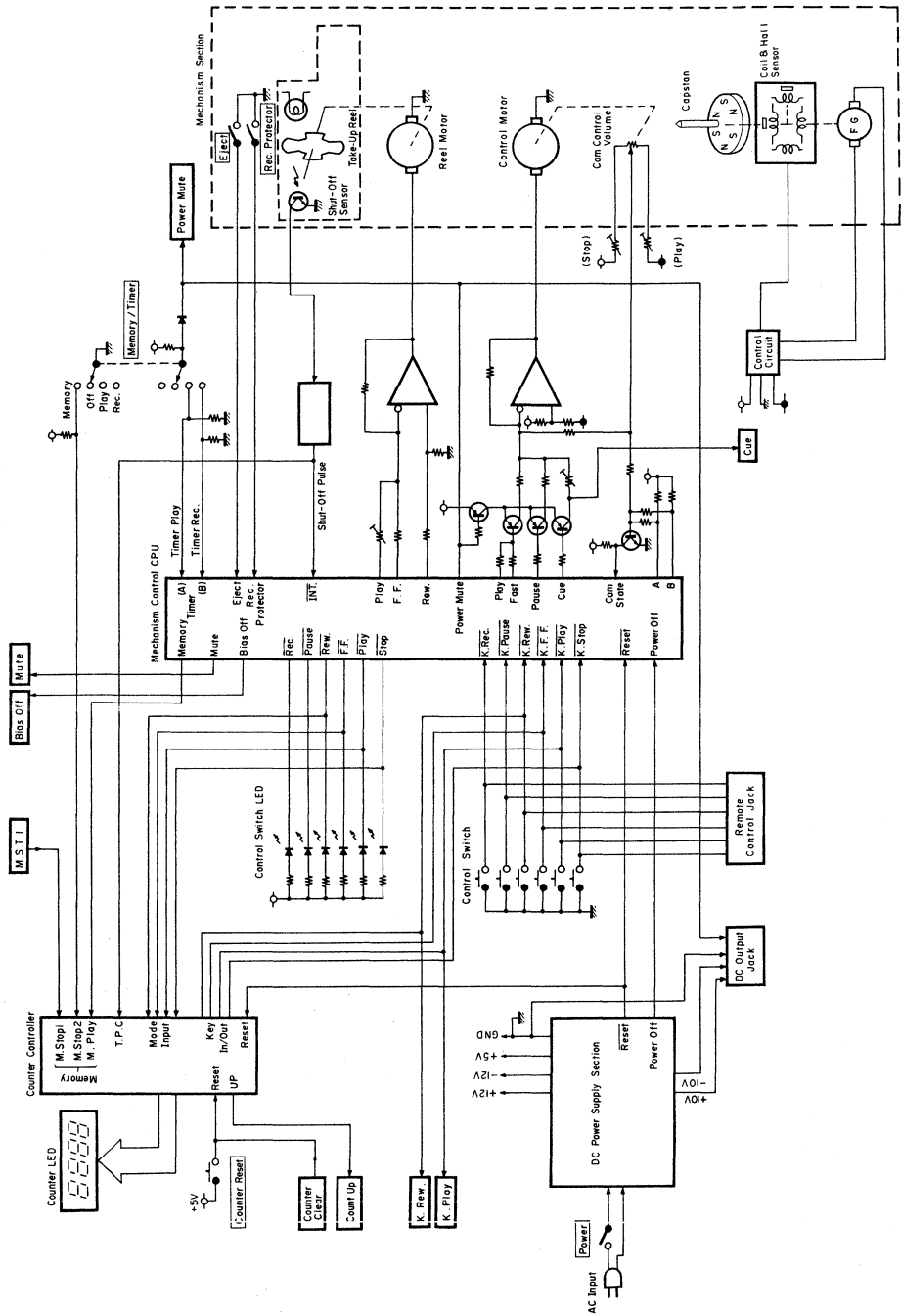


Fig. 10.2

11. SPECIFICATIONS

Track Configuration	4 Tracks/2-Channel Stereo
Heads	3 (Erase Head x 1, Record Head x 1, Playback Head x 1)
Motors (Tape Transport)	FG Servo, Brushless, Slotless, Coreless, Super Linear Torque DD Motor (Capstan Drive) x1
Power Source	100, 120, 120/220-240, 220 or 240 V AC; 50/60 Hz (According to country of sale)
Power Consumption	50 W max.
Tape Speed	1-7/8 ips (4.8 cm/sec) $\pm 0.5\%$
Wow and Flutter	Less than 0.045% Wtd peak Less than 0.022% Wtd rms
Frequency Response	20 Hz—21,000 Hz ± 3 dB (recording level —20 dB, ZX Tape) 20 Hz—20,000 Hz ± 3 dB (recording level —20 dB, SX, EXII Tape)
Signal to Noise Ratio	Dolby C-Type NR on $<70 \mu\text{s}$, ZX Tape Better than 72 dB (400 Hz, 3% THD, IHF A-Wtd rms) Dolby B-Type NR on $<70 \mu\text{s}$, ZX Tape Better than 66 dB (400 Hz, 3% THD, IHF A-Wtd rms)
Total Harmonic Distortion	Less than 0.8% (400 Hz, 0 dB, ZX Tape) Less than 1.0% (400 Hz, 0 dB, SX, EXII Tape)
Erase	Better than 60 dB (100 Hz, 0 dB)
Separation	Better than 37 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Input (Line)	50 mV, 70 k ohms
Output (Line)	1 V (400 Hz, 0 dB, Output Level Control at max.), 2.2 k ohms
(Headphones)	45 mW (400 Hz, 0 dB, Output Level Control at max.), 8-ohm load
BlackBox Series DC Output	± 10 V, 125 mA max.
Dimensions	450 (W) x 135 (H) x 300 (D) millimeters 17-3/4 (W) x 5-5/16 (H) x 11-13/16 (D) inches
Approximate Weight	9.5 kg 21 lb.

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