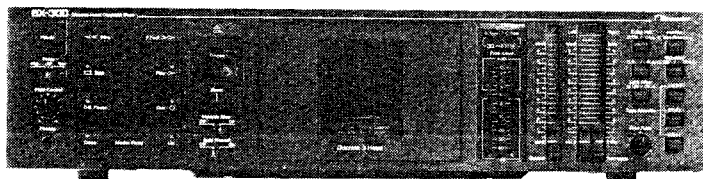




# Service Manual

# Nakamichi BX-300 BX-300E

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 BX-300. This voltage selector can select either 120 V or 220—240 V at customer's disposal.

### 1.2. Packing Materials and Owner's Manual

<u>Part No.</u>	<u>Description</u>	<u>Q'ty</u>
0F03812A	Carton Box BX-300 (U.S.A., Canada, Australia & Others)	1
0F03821A	Carton Box BX-300 (Japan)	1
0F03813A	Carton Box BX-300E	1
0F03674C	Packing	2
DA03800A	Extension Cord	1
OD04450A	Owner's Manual BX-300 (U.S.A., Canada & Australia)	1
OD04451A	Owner's Manual BX-300 (Japan)	1
DA03801A	Owner's Manual BX-300E & BX-300 (Others)	1

## 2. TEST TAPES AND GAUGES

- (1) 400 Hz Level Tape (DA09005B)
- (2) 1 kHz Track Alignment B Tape (DA09087B)
- (3) 10 kHz PB Frequency Response Tape (DA09003B)
- (4) 15 kHz PB Frequency Response Tape (DA09002B)
- (5) 20 kHz PB Frequency Response Tape (DA09001B)
- (6) 15 kHz Azimuth Tape (DA09004B)
- (7) 3 kHz Speed and Wow/Flutter Tape (DA09006C)
- (8) Tape Travelling Cassette (DA09071A)
- (9) Reference EXII Tape (DA09066B)
- (10) Reference SX Tape (DA09025B)
- (11) Reference SX-E Tape (DA09086A)
- (12) Reference ZX Tape (DA09037B)
- (13) EH Tilt Check Gauge S (DA09088A)
- (14) Stroke Check Gauge S (DA09090A)
- (15) Tape Guide Height Check Gauge S (DA09091A)
- (16) Tilt Check Gauge S (DA09039B)

### 3. MECHANICAL ADJUSTMENT

#### 3.1. Record Head and Playback Head Tilt Adjustment

Remove the Cover Plate Ass'y by loosening two screws. Refer to Fig. 3.1.

- (1) Remove the pad lifter from the playback head.
- (2) Load a Tilt Check Gauge S in the cassette deck.
- (3) 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.
- (4) Remove both of the Height Gears.
- (5) 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 away from the heads, then return them to the original place to be in contact with record head and playback head surfaces after Play mode is securely locked.
- (6) Beacon Playback Head "Lower" will light on when height adjustment screw (PH) turned counterclockwise but Playback Head "Upper" when clockwise. Adjust so that both "Upper" and "Lower" will light on even when you move the slide knob away from the heads and then return it to the original place.
- (7) Same procedures will apply to the Beacons Record Head "Upper" and "Lower", except for the height adjustment screw (RH).
- (8) 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, (4) through (7) will have to be repeated till satisfactory results are obtained.
- (9) Mount the pad lifter on the playback head.

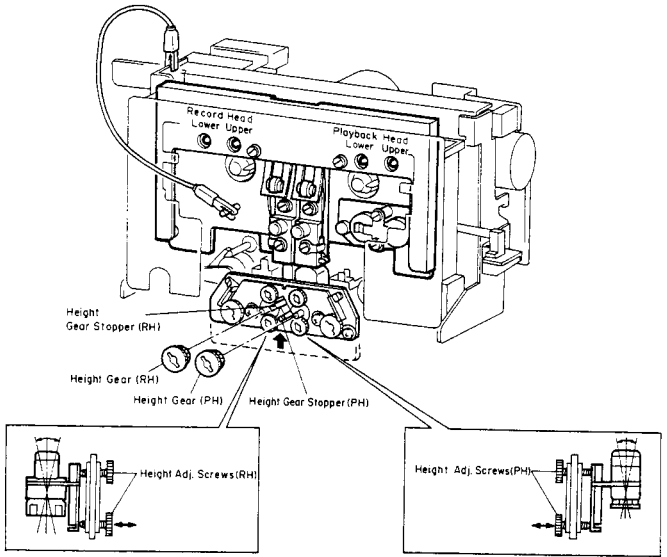


Fig. 3.1

#### 3.2. Head Base Stroke Check

Remove the Cover Plate Ass'y.

Refer to Fig. 3.2.

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

- (1) Load a Stroke Check Gauge S in the cassette deck.
- (2) 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.
- (3) Check to insure whether the line "P" on the Playback Head Indicator meets the central line on the Indicator Plate.
- (4) Check to insure whether the line "P" on the Playback Head Indicator locates between the 2 lines on the Record Head Indicator, thus check can be made on record head stroke.

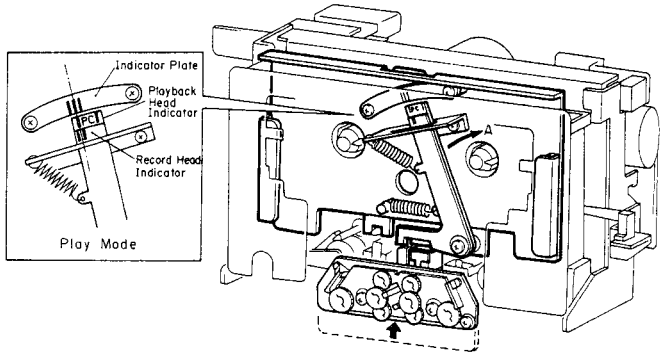


Fig. 3.2

#### 3.3. Erase Head Stroke Adjustment and Tape Guide Height Check

Remove the Head Mount Base Ass'y and the Cover Plate Ass'y. Refer to Fig. 3.3.

##### (1) Erase Head Stroke Adjustment

- (a) Load a Tape Guide Height Check Gauge S 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 screw A that assembles erase head with erase head plate.
- (d) After completion of adjustment, screw A shall be locked with lock tight paint.

##### (2) Supply Tape Guide Height Check

- (a) Load a Tape Guide Height Check Gauge S 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 a Tape Guide Height Check Gauge S 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.

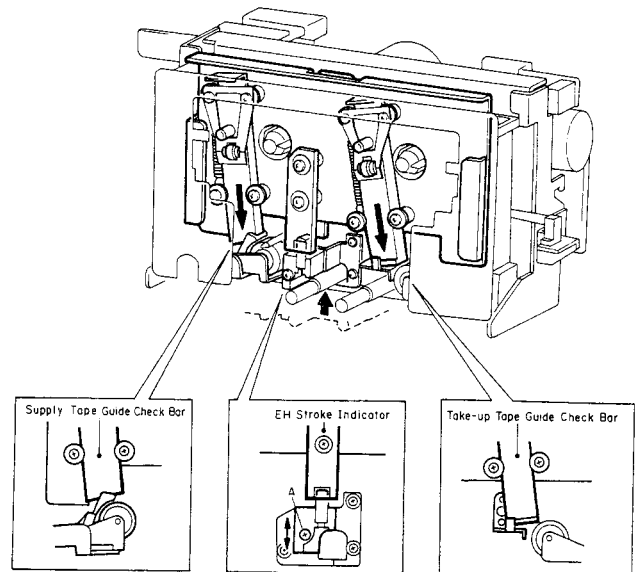


Fig. 3.3

### 3.4. Erase Head Height and Tilt Adjustment

Refer to Fig. 3.4.

- (1) Remove the Cassette Case Ass'y, Head Mount Base Ass'y and Cover Plate Ass'y.
- (2) Load an EH Tilt Check Gauge S 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 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 the first Beacon is illuminating.
- (5) Turn Screw "Tilt" counterclockwise (or clockwise) to light on the second Beacon. Excessive turning will cause the first

Beacon to light off. Adjustments of Screw "Tilt" will therefore be conducted till both of the first and the second Beacons illuminate.

- (6) Turn Screw "Azimuth" counterclockwise (or clockwise) to light on the third Beacon. Excessive turning will cause either the first or the second Beacon to light off, and therefore adjust Screw "Azimuth" until all of the 3 Beacons 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.

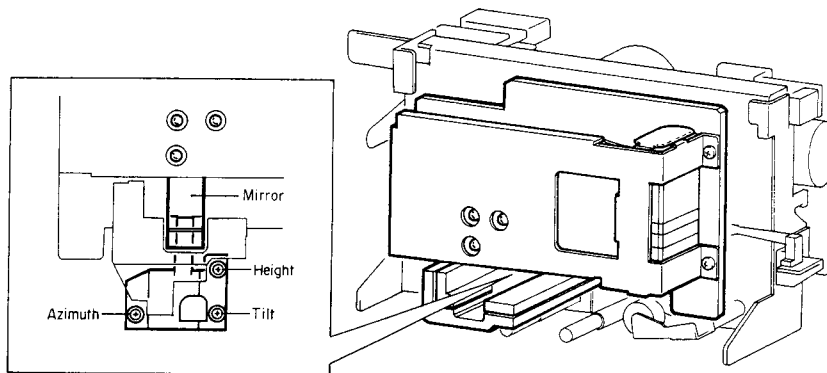


Fig. 3.4

### 3.5. Playback Head and Record Head Height Adjustment and Azimuth Alignment

Refer to Fig. 3.5.

#### (1) Playback Head Height Adjustment and Azimuth Alignment

- (a) Set the Monitor switch to Tape, then connect a VTVM to the Output Jacks.
- (b) Load a 1 kHz Track Alignment Tape, 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, 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

- (a) Set the cassette deck in Stop mode.
- (b) Set the Monitor switch to Tape, Eq. switch to 70  $\mu$ s and Tape Selector switch to ZX.
- (c) Load a reference ZX tape and connect a VTVM to Output Jacks.
- (d) Feed in 400 Hz (0 dB) to the Input Jacks.
- (e) Set the cassette deck in Record and Play mode and turn the RH Height Gear until the outputs of both channels become maximum.
- (f) Feed in 15 kHz (-20 dB) to the Input Jacks and turn the RH Azimuth Alignment Screw until the outputs of both channels become maximum.
- (g) Repeat (d) to (f) one or two times to obtain optimum performance.

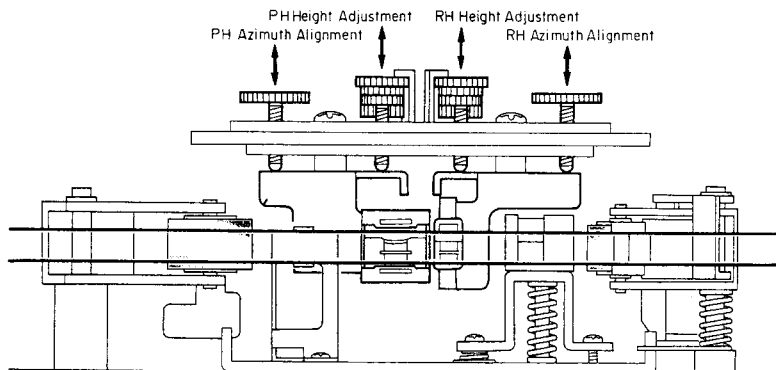


Fig. 3.5

### 3.6. Pressure Adjustment of Take-up Pressure Roller

Refer to Fig. 3.6.

- (1) Set the cassette deck in Play mode.
- (2) Measure the torque of the Take-up Pressure Roller and check whether the torque is in a range of  $320 \pm 50$  g-cm.
- (3) If torque is out of the range, correct it by changing the installation point of the Pressure Roller Spring.

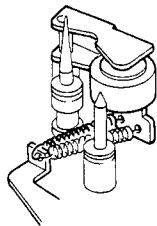


Fig. 3.6

### 3.7. Tape Travelling Check

Load and playback a Tape Travelling Cassette and check the following:

- (1) Tape is in contact with heads sufficiently.
- (2) Tape waviness is small on the heads and pressure rollers.
- (3) Tape is free from waviness or slippage from the tape guides.

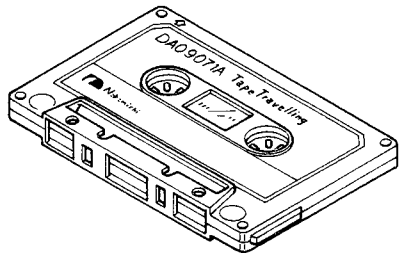


Fig. 3.7

### 3.8. Eject Damper Adjustment

Refer to Fig. 3.8. Load a cassette tape, and with opening the Cassette Case by pressing the Eject button and closing it by hand, adjust the speed of damper action by the Adjustment Screw.

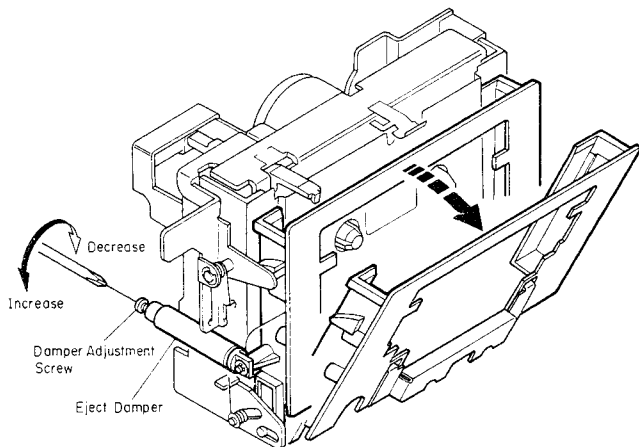


Fig. 3.8

### 3.9. Reel Motor Speed Adjustment in Play Mode

- (1) To warm-up the cassette deck, load a C-60 cassette tape and set the cassette deck in Play mode.
- (2) After more than four minutes, load a torque meter TW-211 (made by Sony) and set the cassette deck in Play mode.
- (3) Adjust VR601 on the Main P.C.B. Ass'y to obtain exactly 50 g-cm on the torque meter.

### 3.10. Tape Speed Adjustment

Refer to Fig. 3.9.

- (1) Set the Pitch Control Knob on the Front Panel to its mechanical center position.
- (2) Connect a frequency counter to the Output Jacks.
- (3) Load a 3 kHz Speed and Wow/Flutter Tape and play it back.
- (4) Adjust VR101 on the Motor P.C.B. Ass'y to obtain 3,000 Hz on the frequency counter.

CCW: Motor drives fast.

CW: Motor drives slowly.

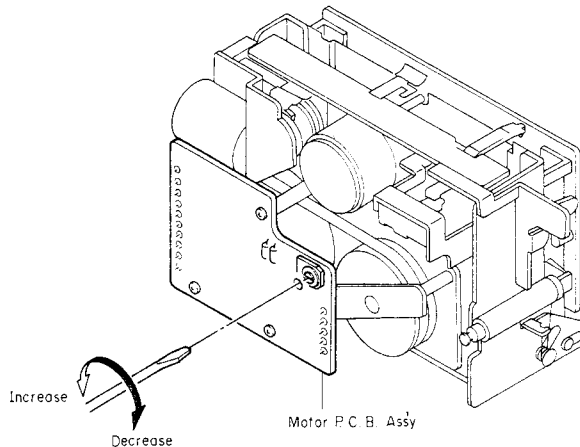


Fig. 3.9

### 3.11. Lubrication

The tape transport is of a lubrication-free type mechanism. When the following parts are replaced, apply the specified lubricant.

- (1) Molykote (R) Grease (X5-6020)  
Cam Motor Pulley  
Thrust portion on the Capstan Shaft
- (2) FLOIL GB-TS-1  
Washer between Reel Hub Ass'y and Back Tension Spring
- (3) Diamond Oil (EP56)  
Reel Hub Shaft
- (4) Anderol 456  
Capstan Shaft

Note: We suggest that you use the above specified lubricant or equivalent type.

The company dealing in the above lubricant is as follows:

- (a) Molykote (R) Grease (X5-6020)  
Dowcorning Co., Ltd., 1-15-1 Nishishinbashi, Minato-ku, Tokyo, Japan
- (b) FLOIL GB-TS-1  
Kanto Chemicals Co., Ltd., 2-7 Kanda Sakuma-cho, Chiyoda-ku, Tokyo, Japan
- (c) Diamond Oil (EP-56)  
Mitsubishi Oil Co., Ltd., 1-2-4 Toranomom, Minato-ku, Tokyo, Japan
- (d) Anderol 456  
Toyo Kokusai Oil Co., Ltd., 3-3-5 Hatchobori, Chuo-ku, Tokyo, Japan

# 4. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

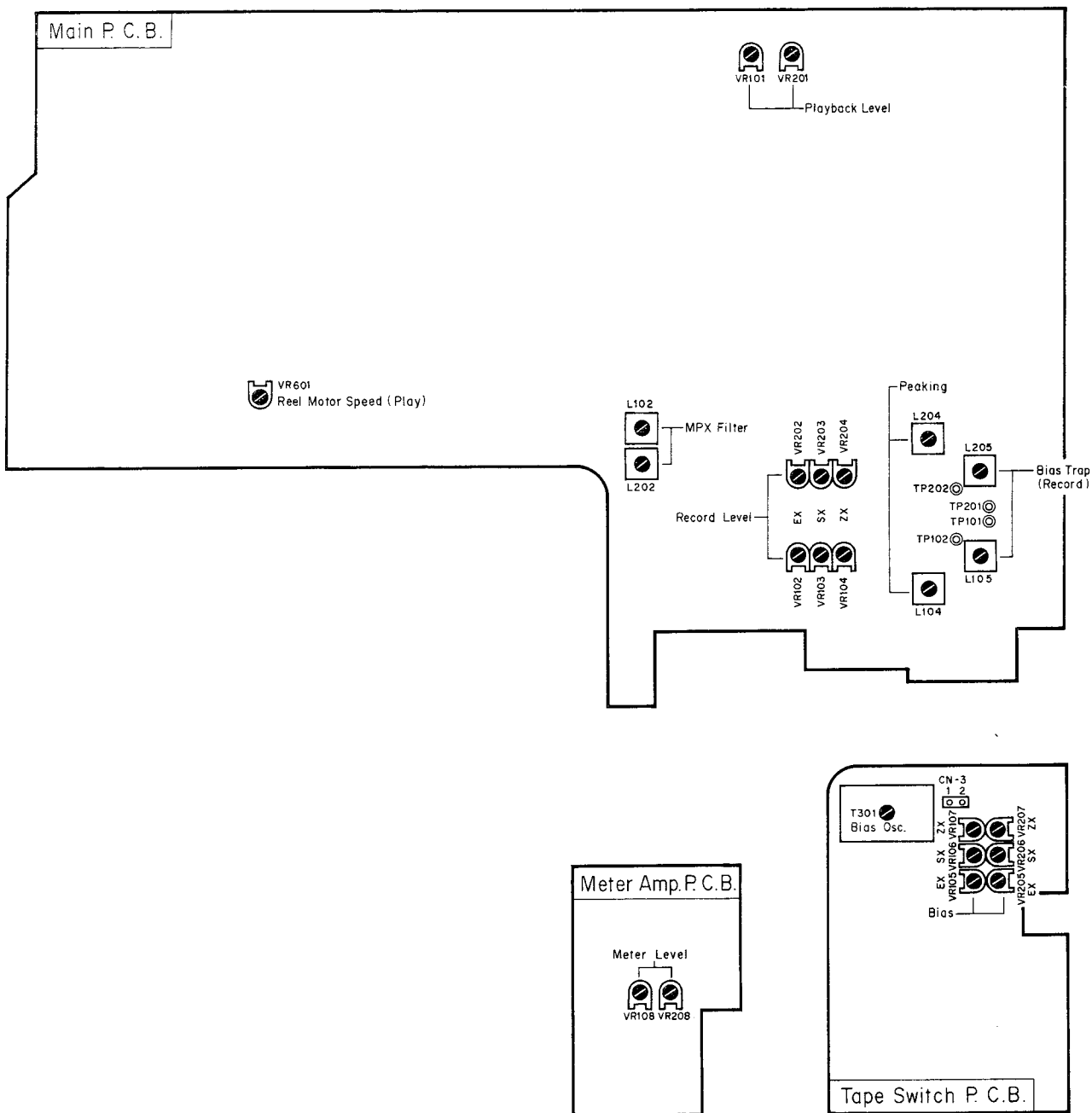


Fig. 4

## 5. ELECTRICAL ADJUSTMENTS

- Notes: 1. Electrical adjustment should be performed after mechanical adjustment is completed.  
 2. Before adjustment, set the Bias Tune control and the Pitch control on the Front Panel to their mechanical center positions.

### 5.1. Adjustment Instructions

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Tape Speed Adjustment	3 kHz Speed and Wow/Flutter Tape	Frequency Counter to Output Jacks	Playback Eq. SW — 70 $\mu$ s	Motor P.C.B. VR101	1. Set the Pitch Control to its mechanical center position. 2. Adjust VR101 to obtain 3 kHz $\pm$ 0.5% on the frequency counter.
2	Meter Level Calibration	400 Hz to Input Jacks	VTVM to Output Jacks	Monitor SW — Source	Meter Amp. P.C.B. VR108,VR208	1. Set the Output Level control to max. 2. Feed in 400 Hz, then adjust the Input Level controls to obtain 1.0 V $-$ 4 dB on the VTVM. 3. Adjust VR108 (VR208) so that the 0 dB segment of the level meter starts to illuminate. 4. Adjust the Input Level control to obtain 1.0 V $+$ 1 dB on the VTVM and check to insure that the upper segment of the 5. 0 dB segment starts to illuminate.
3	MPX Filter Adjustment	19 kHz $\pm$ 100 Hz to Input Jacks	VTVM to Output Jacks	Monitor SW — Source Dolby NR SW — OFF MPX SW — ON	Main P.C.B. L102,L202	1. Set the Output Level control to max. 2. Adjust the Input Level controls to obtain 1 V on the VTVM. 3. Set the MPX Filter switch to ON, then adjust L102 (L202) to obtain the minimum reading on the VTVM (the minimum reading will be less than $-$ 30 dB).
4	Playback Head Track Alignment	1 kHz Track Alignment B Tape	VTVM to Output Jacks	Playback Monitor SW — Tape Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF	PH Height Gear	Adjust the PH Height Gear to obtain minimum readings for both channels on the VTVM. Refer to "Playback Head Height Adjustment and Azimuth Alignment" in item 3.5.
5	Playback Head Azimuth Alignment	15 kHz Azimuth Tape	VTVM to Output Jacks	Playback Monitor SW — Tape Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF	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 3.5. Note: Repeat steps 4 and 5 one or two times to obtain optimum performance.
6	Playback Level Calibration	400 Hz Level Tape	VTVM to Output Jacks	Same as above	Main P.C.B. VR101,VR201	1. Set the Output Level control to max. 2. Adjust VR101 (VR201) to obtain 1.0 V on the VTVM.
7	Playback Frequency Response Adjustment	400 Hz Level Tape 10 kHz PB Frequency Response Tape 15 kHz PB Frequency Response Tape 20 kHz PB Frequency Response Tape	VTVM to Output Jacks	Playback Monitor SW — Tape Eq. SW — SX Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. R109,R209 R110,R210	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 R109 (R209) and/or R110 (R210) to obtain the following levels against the level for the 400 Hz level tape. 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 Refer to "Playback Frequency Response Adjustment" in item 5.2. 3. Conduct step 5 "Playback Head Azimuth Alignment".
8	Bias Oscillation Frequency and Erase Current Adjustment		VTVM across the additional 0.1 $\Omega$ resistor and Frequency Counter to CN3-1 on Tape Switch P.C.B.	Record, Pause Monitor SW — Source Tape SW — ZX Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF	Tape Switch P.C.B. T301 R301,R302	1. Connect an additional 0.1 $\Omega$ resistor in series to the Erase Head, then connect a VTVM across the resistor. 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 shoring either R301 or R302. 4. After completion of the erase current adjustment, re-check the bias oscillation frequency. 5. Remove the additional 0.1 $\Omega$ resistor.
9	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. L104,L204	1. Remove the bias-cut-jumper from the dip side of the Tape Switch P.C.B. Ass'y. 2. Adjust L104 (L204) to obtain approx. $+$ 16 dB at 23 kHz on the VTVM. 3. Re-solder the bias-cut-jumper.
10	Bias Trap Adjustment (Record Amp.)	Remove input signals	VTVM to TP102, TP202 on Main P.C.B.	Same as above	Main P.C.B. L105,L205	Adjust L105 (L205) to obtain minimum reading on the VTVM.



STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
11	Record Head Height Adjustment	400 Hz (0 dB) to Input Jacks	VTVM to Output Jacks	Record, Playback Monitor SW — Tape Tape SW — ZX Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF	RH Height Gear	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 3.5.
12	Record Head Azimuth Alignment	15 kHz (—20 dB) to Input Jacks	VTVM to Output Jacks	Same as above	Record Head Azimuth Alignment Screw	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 3.5. Note: Repeat steps 11 and 12 one or two times to obtain optimum performance.
13	Record Level Calibration and Recording Bias Current Adjustment	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 — Source/ Tape Tape SW — ZX/SX/ EX Eq. SW — 70 $\mu$ s (ZX/SX) 120 $\mu$ s (EX) Dolby NR SW — C-Type/B-Type/ OFF MPX SW — OFF	Main P.C.B. (Level) ZX: VR104,VR204 SX: VR103,VR203 EX: VR102,VR202  Tape Switch P.C.B. (Bias) ZX: VR107,VR207 SX: VR106,VR206 EX: VR105,VR205	Adjustment should be made in the order of ZX, SX and EX. 1. Set the Monitor switch to Source and Dolby NR switch to C-Type. 2. Feed in 400 Hz, then set the Input Level controls to obtain 0 dB (1 V) on the VTVM. 3. Set the Monitor switch to Tape. 4. Load a reference ZX tape, reference SX or SX-E (for BX-300E) tape and reference EXII tape. 5. Adjust Record Cal. VR104 (VR204) for ZX, VR103 (VR203) for SX and VR102 (VR202) for EX to center position. 6. 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. 7. Feed in 15 kHz (—20 dB), then adjust Bias VR107 (VR207), VR106 (VR206) and VR105 (VR205) to obtain the same readings as source monitor levels on the VTVM. 8. Feed in 400 Hz (0 dB), then adjust Record Cal. VR104 (VR204), VR103 (VR203) and VR102 (VR202) to obtain 0 dB on the VTVM. 9. Repeat above 7 and 8 two or three times to obtain optimum performance. 10. Set the Dolby NR switch to OFF. 11. 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 $\pm$ 3 dB against the levels in Dolby NR C-Type. 12. Set the Dolby NR switch to B-Type. 13. 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 $\pm$ 3 dB against the levels in Dolby NR OFF. 14. Check to insure whether the total harmonic distortion is less than 0.9% for ZX tape and 1.0% for SX/SX-E and EXII tapes. 15. If above is not sufficient, repeat 6 to 14 till satisfactory results are obtained.
14	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 $\mu$ s (ZX/SX) 120 $\mu$ s (EX) Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. L104,L204	1. Set the Monitor switch to Source. 2. Feed in 400 Hz (0 dB) and adjust the Input Level controls to obtain 0 dB (1 V) on the VTVM. 3. Switch the Generator output level to —20 dB. 4. Set the Monitor switch to Tape, then record and play it back. 5. Feed in 20 Hz to 20 kHz (—20 dB), and check to insure whether the output levels are within —20 dB $\pm$ 3 dB. 6. If above is not sufficient, adjust L104 (L204) to obtain approx. —20 dB on the VTVM at 20 kHz. 7. Conduct step 13 "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, check on item 3.7 "Tape Travelling Check" will be required.

### 5.2. Playback Frequency Response Adjustment

Figs. 5.1 and 5.2 show the playback amp. circuit for adjustment and the playback equalization curve.

This adjustment will be required if playback level is not sufficient during playing back a 20 kHz PB frequency response tape.

The peaking portion of the equalization curve compensates the gap loss of the playback head. Peaking level is varied by the short circuit of R109 (R209) and/or R110 (R210) on the Main P.C.B. Ass'y.

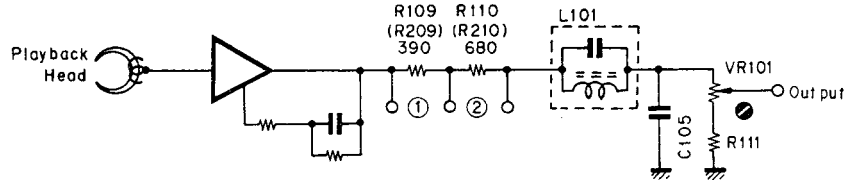


Fig. 5.1

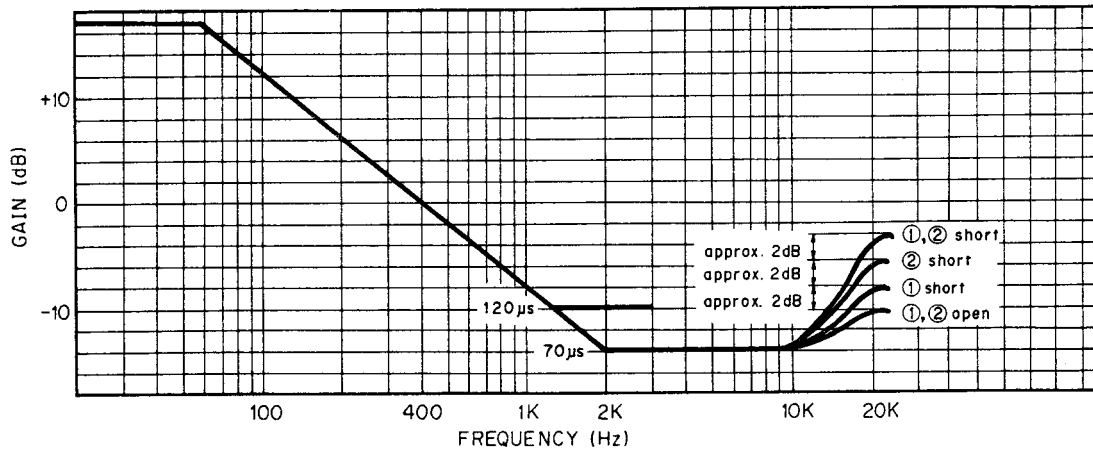


Fig. 5.2

## 8. SCHEMATIC DIAGRAMS

### 8.1. IC Block Diagrams

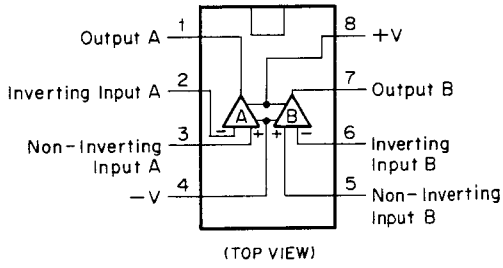


Fig. 8.1.1 Operational Amp. IC 4558DD, 072DE, 4556D, 4556C, 2043DD, 082D, TL092

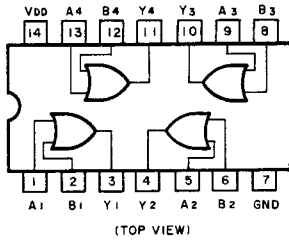


Fig. 8.1.2 OR Gate C-MOS IC  $\mu$ PD4071BC

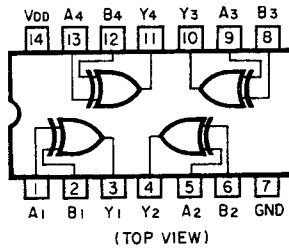


Fig. 8.1.3 Exclusive OR Gate C-MOS IC  $\mu$ PD4030BC

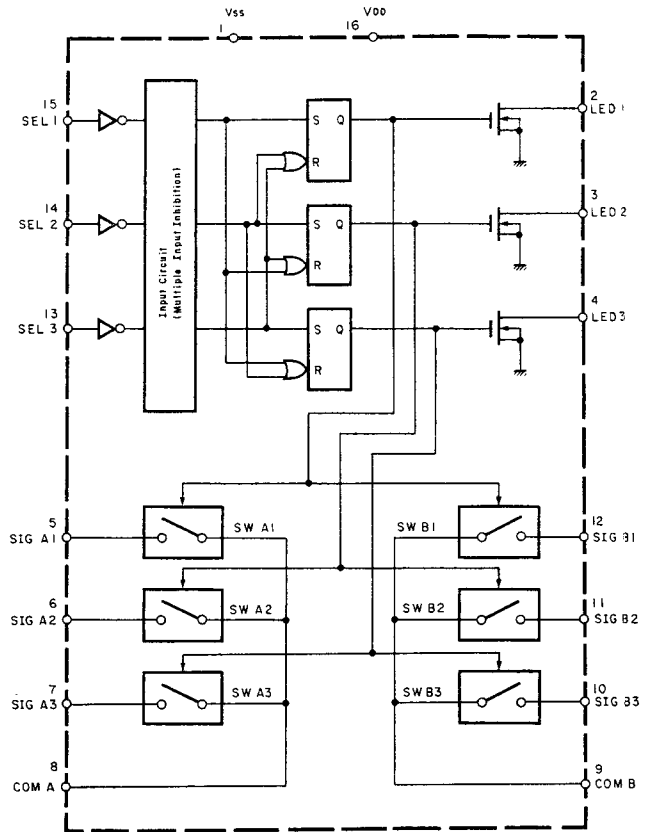


Fig. 8.1.4 Analog Switch Selector TC9145P

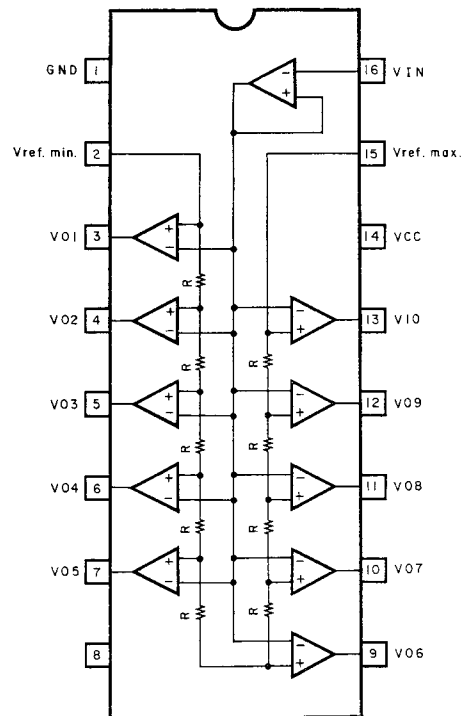


Fig. 8.1.5 Level Meter Driver TA7612AP

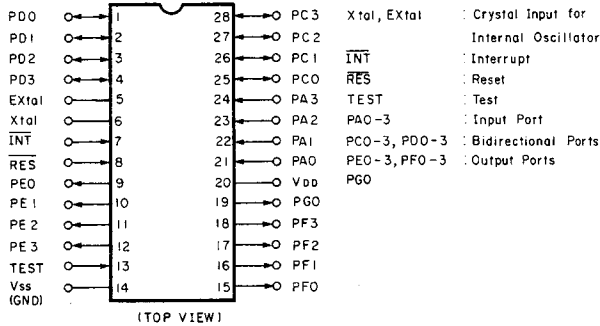
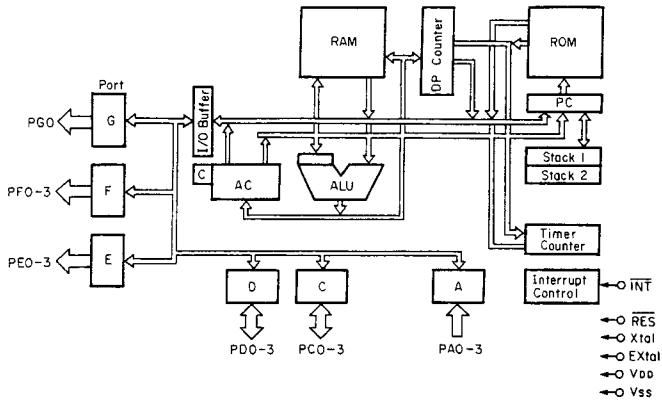
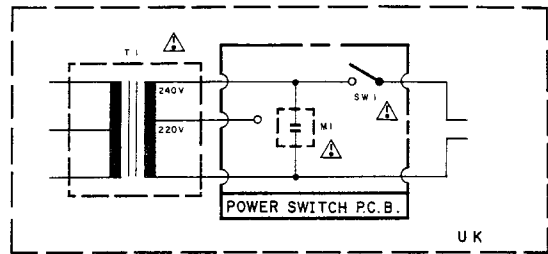
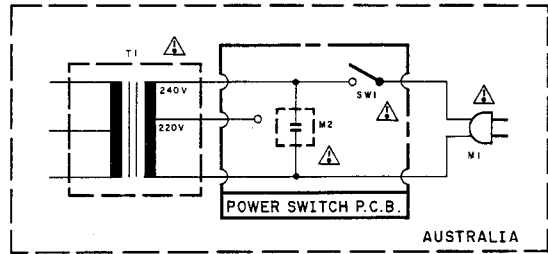


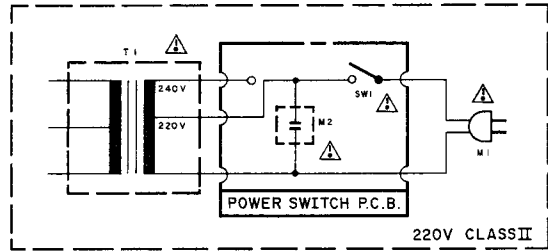
Fig. 8.1.6 4-Bit Micro-processor LM6416E-106



UK



AUSTRALIA



220V CLASS II

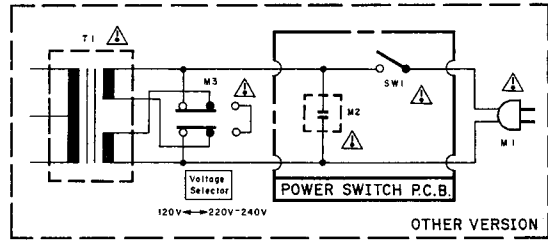


Fig. 8.2.1.1

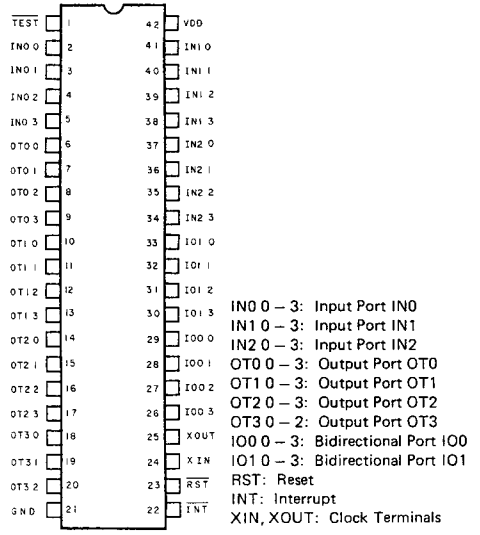
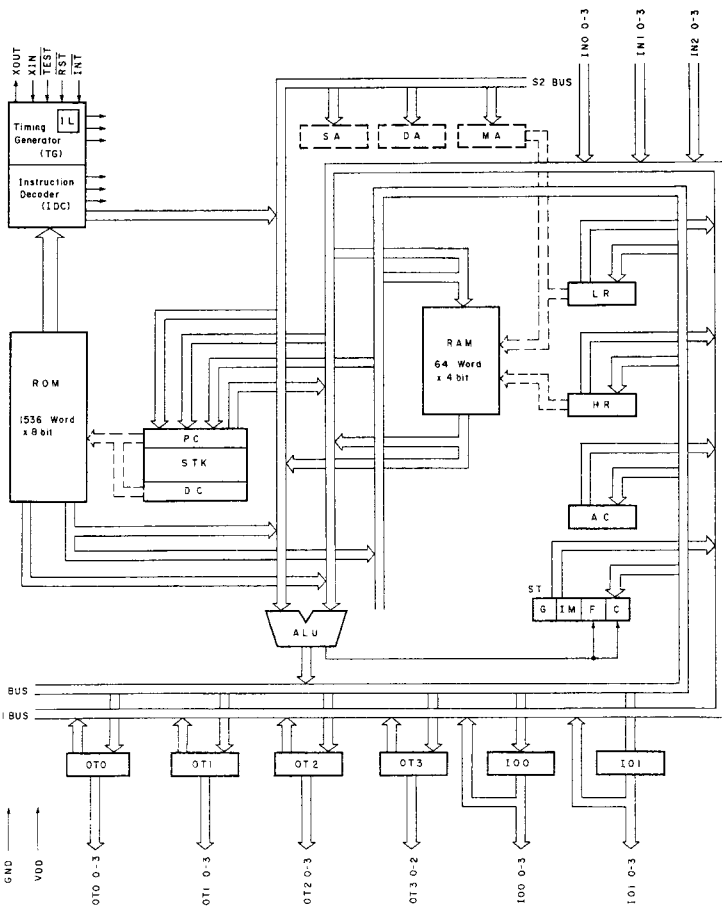
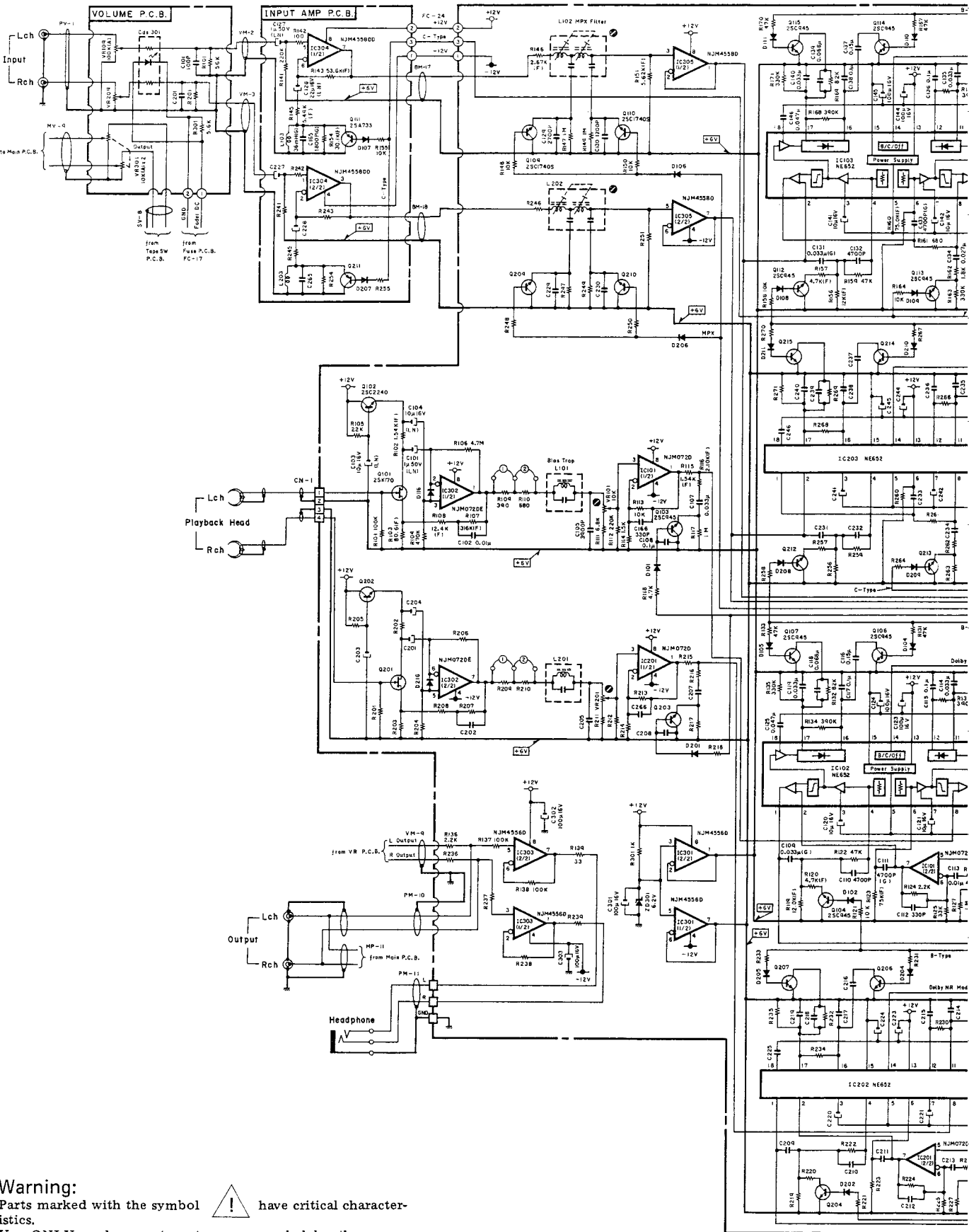



Fig. 8.1.7 4-Bit Micro-processor TMP4315BP-1814

8.2. Schematic Diagrams



**Warning:**

Parts marked with the symbol  have critical characteristics.

Use **ONLY** replacement parts recommended by the manufacturer. It is recommended that the unit be operated from a suitable DC supply or batteries during initial check-out procedure.

**Caution:**

Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamp, or if the resistance from chassis to either side of the power cord is less than 240 k ohms, the unit is defective. **WARNING — DO NOT** return the unit to the customer until the problem is located and corrected.

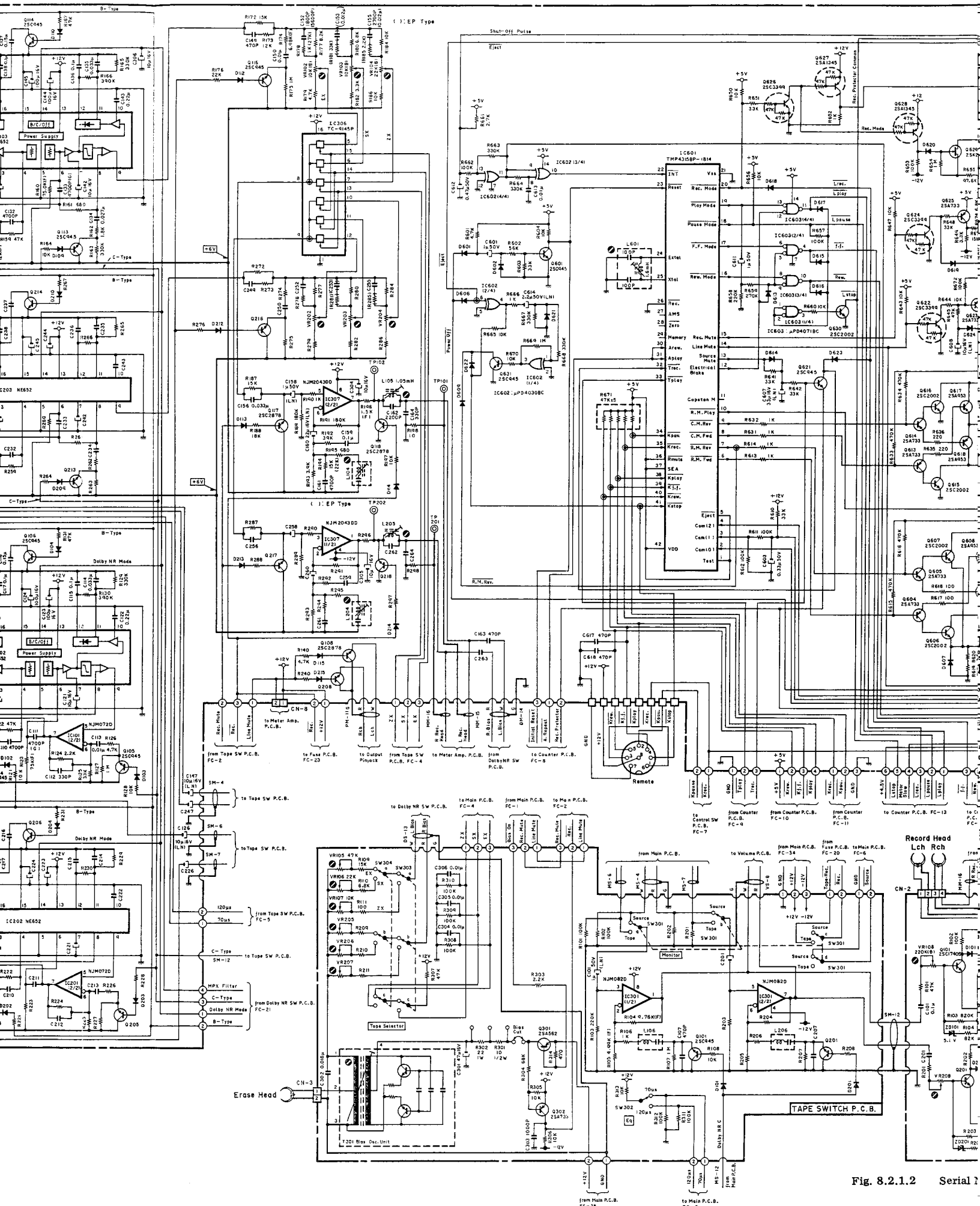


Fig. 8.2.1.2 Serial

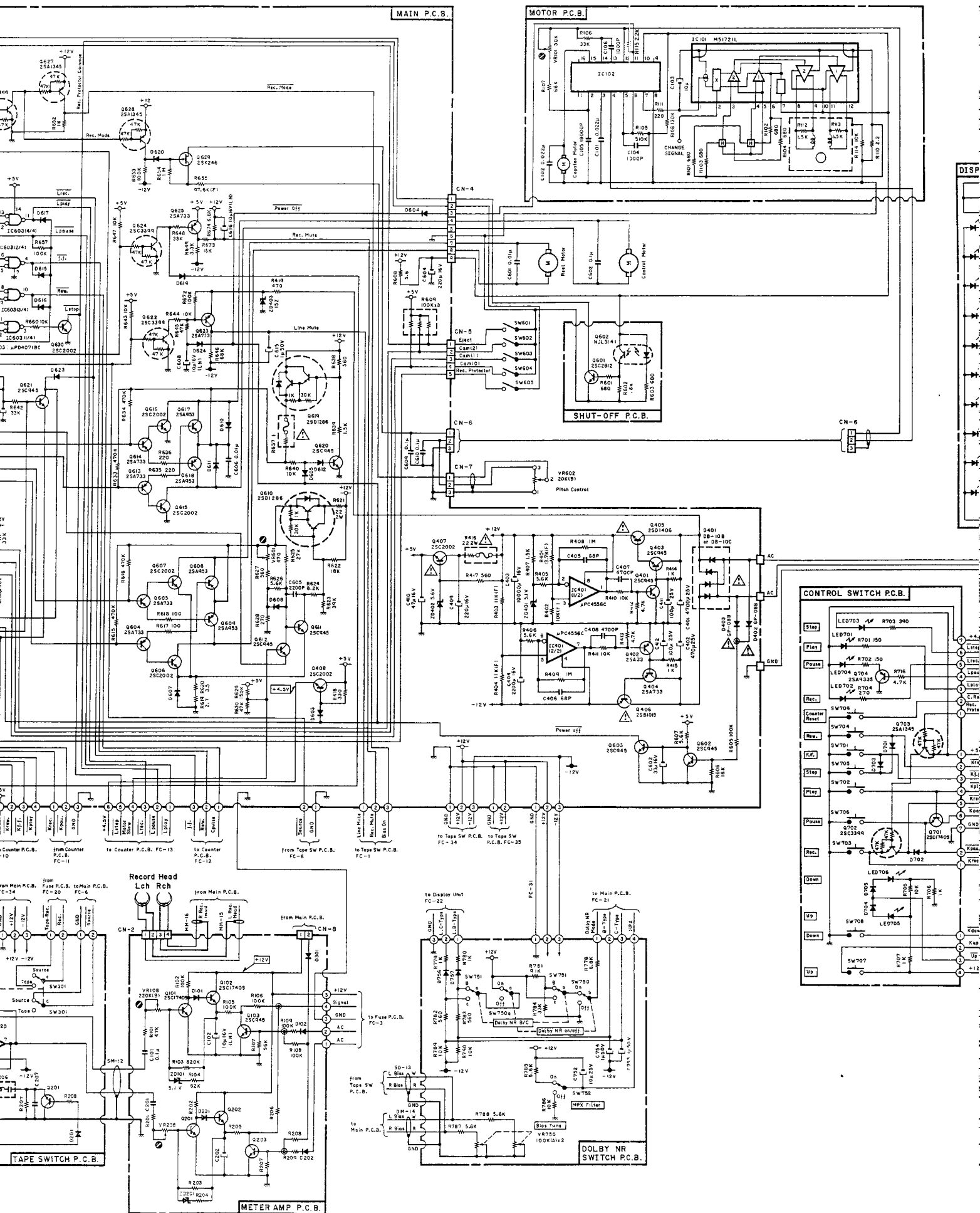
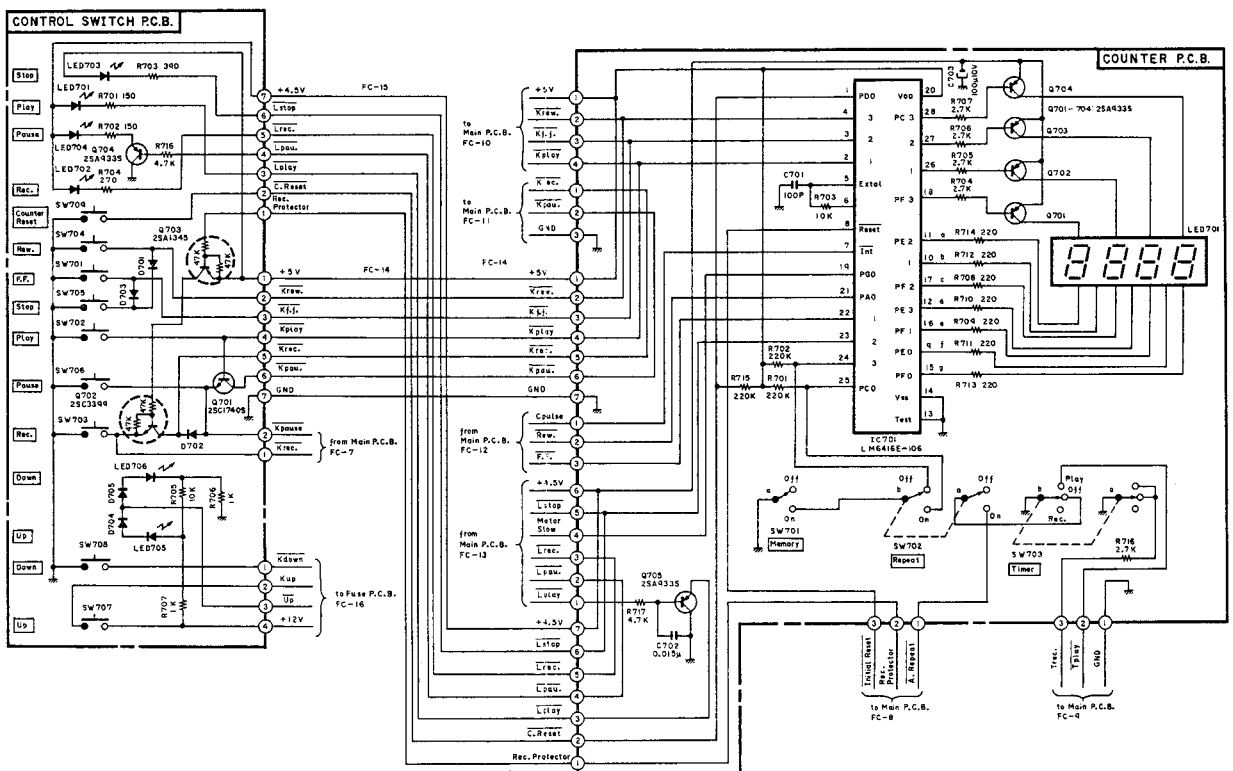
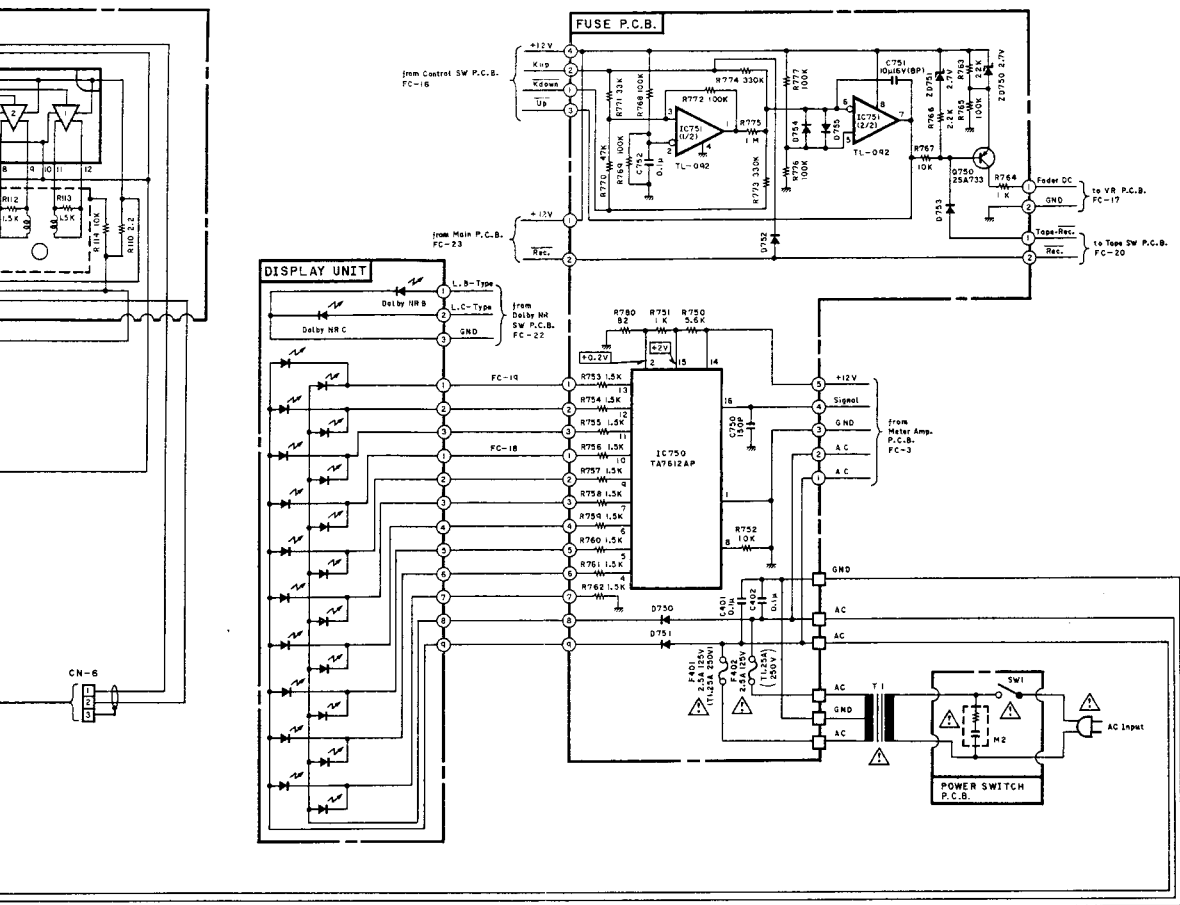


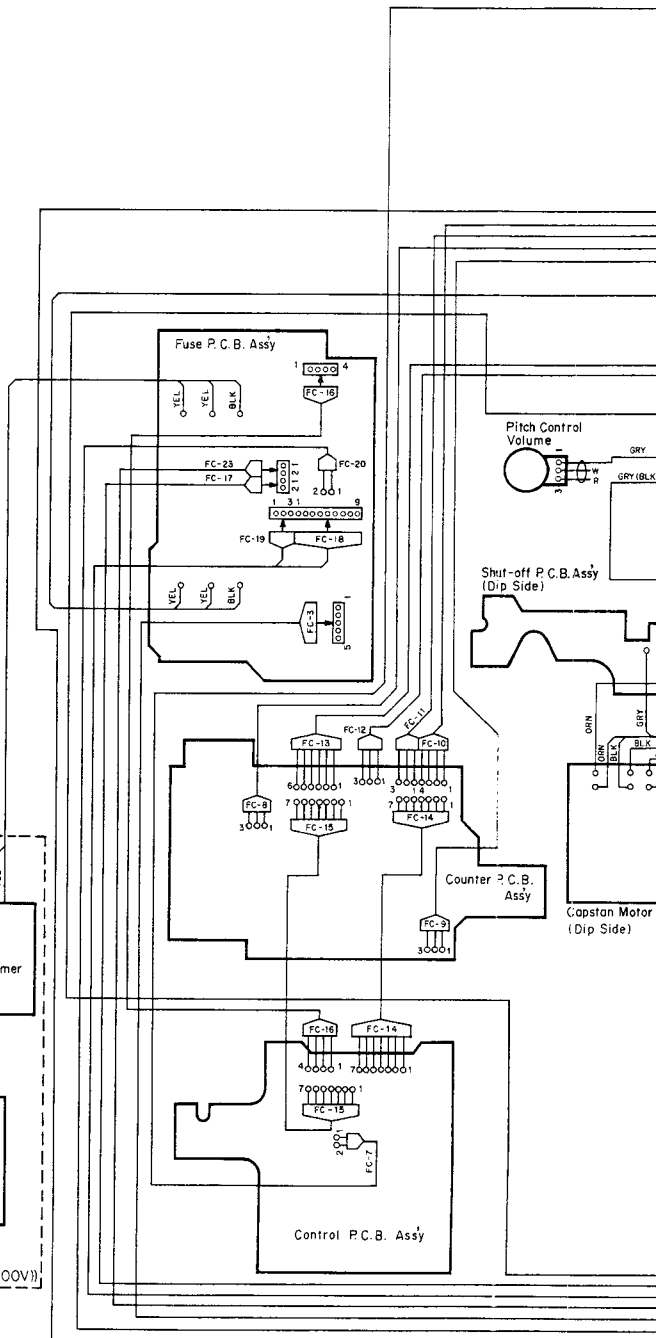
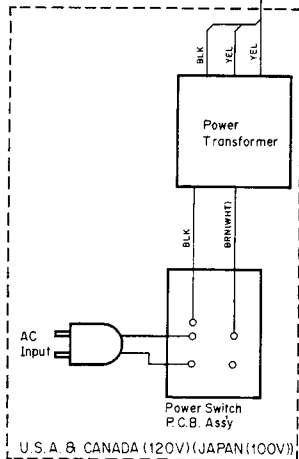
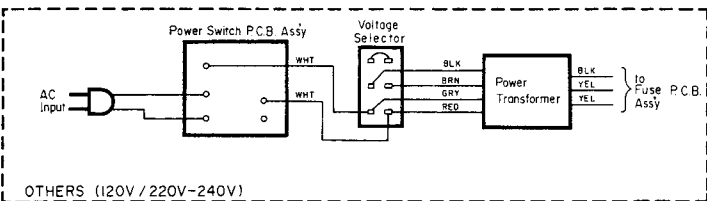
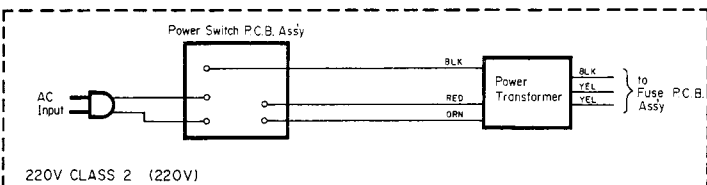
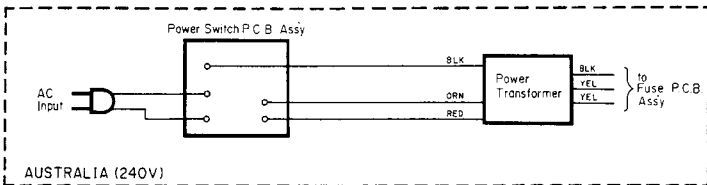
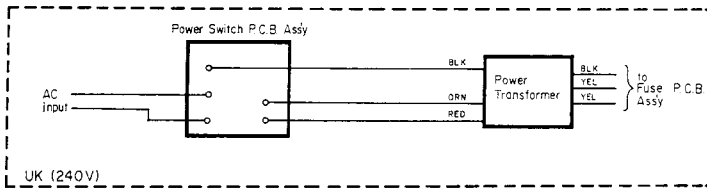
Fig. 8.2.1.2 Serial No.: A12702001 -



- Notes:
1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
  2. Resistor and capacitor marked with \* show typical value.
  3. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.
  4. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.



# 10. WIRING DIAGRAM



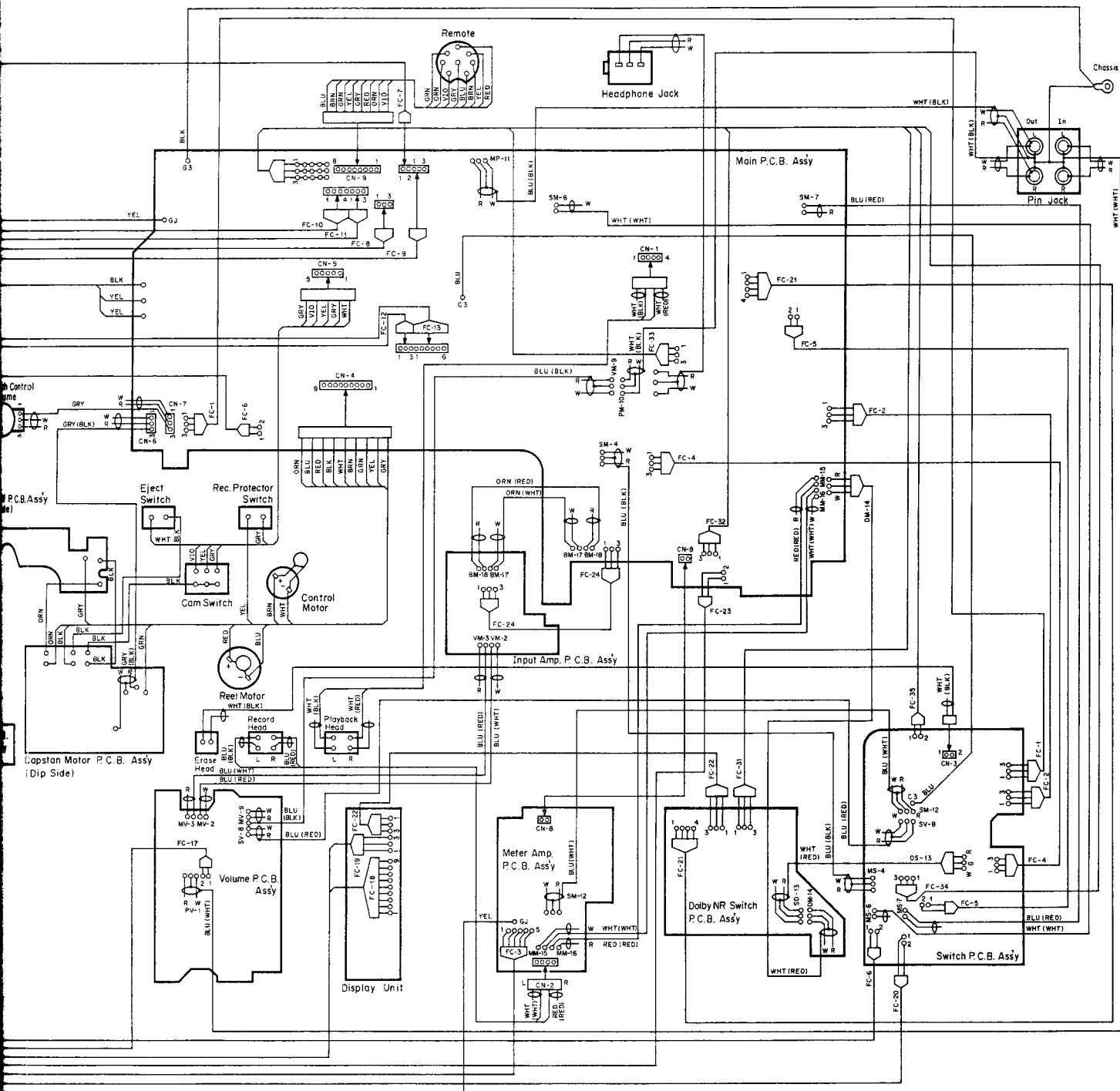


Fig. 10

Notes: 1 Table of wire colors

BRN — Brown	BLU — Blue
RED — Red	VIO — Violet
ORN — Orange	GRY — Gray
YEL — Yellow	WHT — White
GRN — Green	BLK — Black

2. Component side view of the P.C.B. is illustrated unless otherwise specified.

3. Wire tube color is shown in ( ).

# 11. BLOCK DIAGRAMS

## 11.1. Amplifier Section

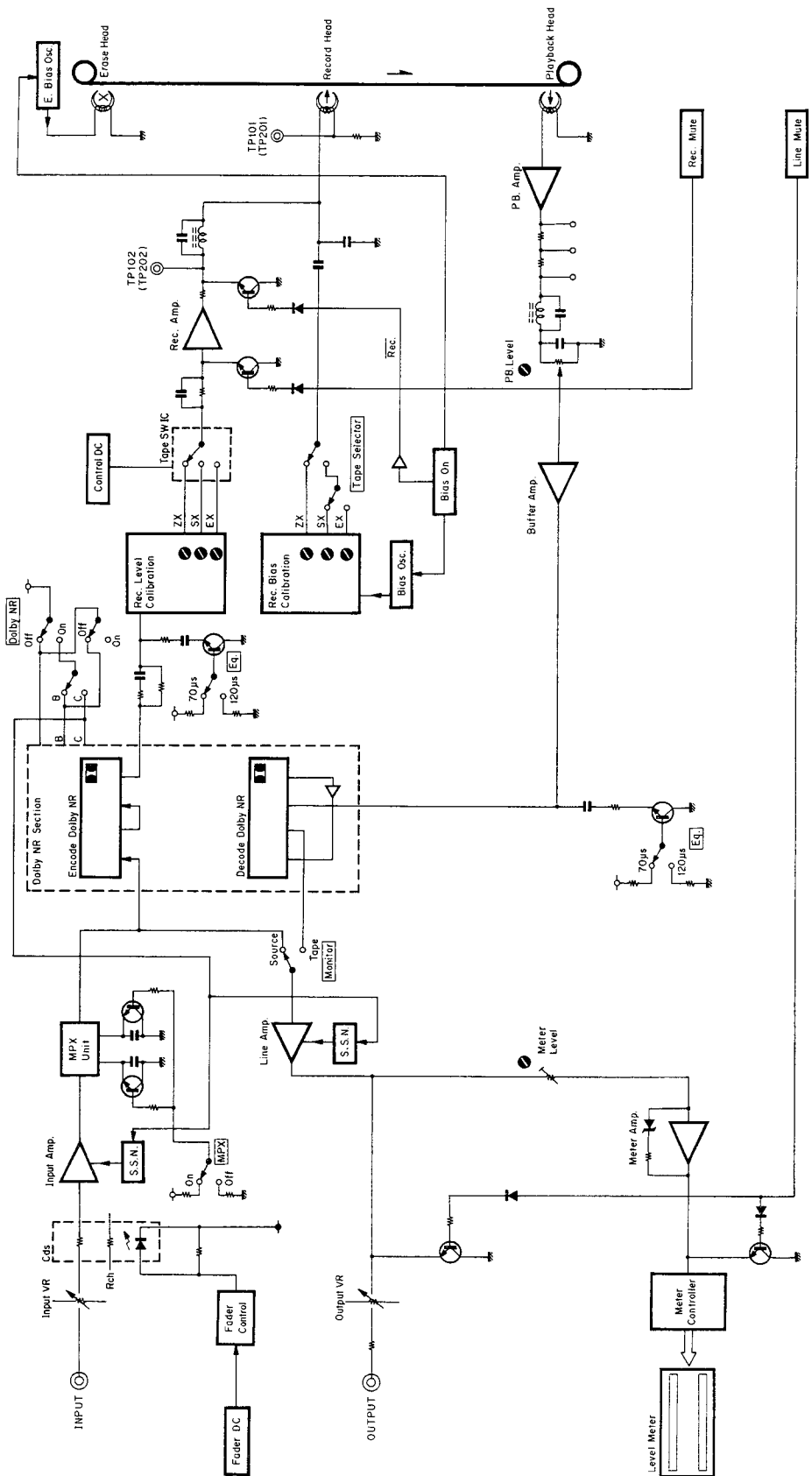


Fig. 11.1

11.2. Mechanism Control Section

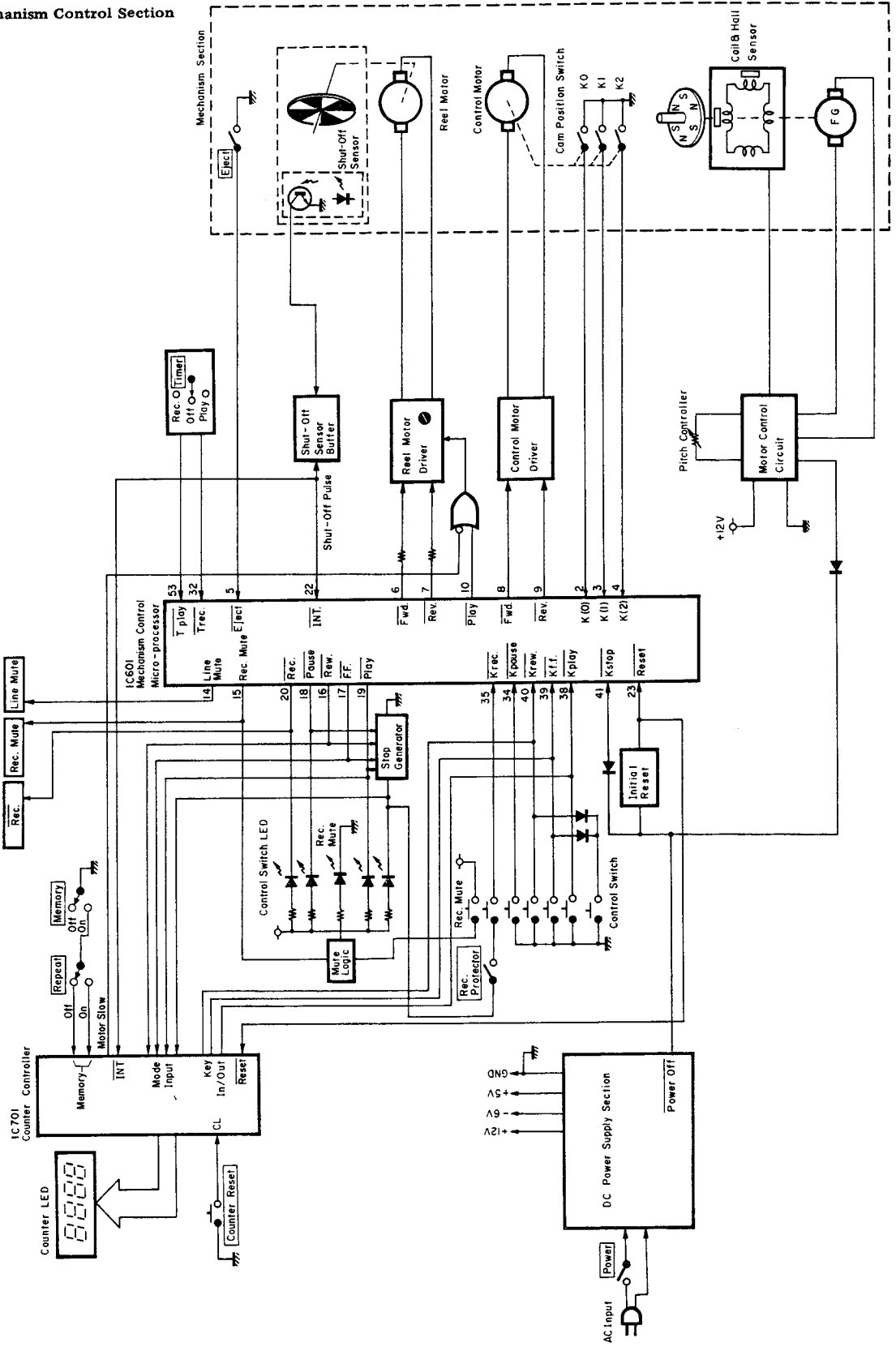


Fig. 11.2

## 12. 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, DD Motor (Capstan Drive) x 1 DC Motor (Reel Drive) x 1 <Mechanism > DC Motor (Cam Drive) x 1
Power Source	100, 120, 120/220-240, 220 or 240 V AC, 50/60 Hz (According to country of sale)
Power Consumption	27 W max.
Tape Speed	1-7/8 ips. (4.8 cm/sec.) $\pm 0.5\%$
Wow and Flutter	Less than $\pm 0.048\%$ WTD Peak Less than 0.027% WTD RMS
Frequency Response	20 Hz–20,000 Hz $\pm 3$ dB (recording level –20 dB)
Signal to Noise Ratio	Dolby C-Type NR on <70 $\mu$ s, ZX tape> Better than 70 dB (400 Hz, 3% THD, IHF A-WTD RMS) Dolby B-Type NR on <70 $\mu$ s, ZX tape> Better than 64 dB (400 Hz, 3% THD, IHF A-WTD RMS)
Total Harmonic Distortion	Less than 0.9% (400 Hz, 0 dB, ZX tape) Less than 1.0% (400 Hz, 0 dB, SX, EXII tape)
Erasure	Better than 60 dB (100 Hz, 0 dB)
Separation	Better than 36 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Input (Line)	50 mV/30 k $\Omega$
Output (Line)	1.0 V (400 Hz, 0 dB, output level control at max.)/2.2 k $\Omega$
(Headphones)	5 mW into 8 $\Omega$ (400 Hz, 0 dB, output level control at max.)
Fast Wind Time	Approx. 80 seconds (with C-60 cassette)
Dimensions	430 (W) x 100 (H) x 250 (D) millimeters 16-15/16 (W) x 3-15/16 (H) x 9-7/8 (D) inches
Approximate Weight	5.6 kg 12 lb. 6 oz

- Specifications and design are subject to change for further improvement without notice.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.
- The word “DOLBY” and the Double-D-Symbol are trademarks of Dolby Laboratories Licensing Corporation.