

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 μ 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 μ 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 μ 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 μ 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 Ω resistor and Frequency Counter to CN3-1 on Tape Switch P.C.B.	Record, Pause Monitor SW — Source Tape SW — ZX Eq. SW — 70 μ s Dolby NR SW — OFF MPX SW — OFF	Tape Switch P.C.B. T301 R301,R302	1. Connect an additional 0.1 Ω 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 Ω 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 μ 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 μ s (ZX/SX) 120 μ 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 μ s (ZX/SX) 120 μ 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.

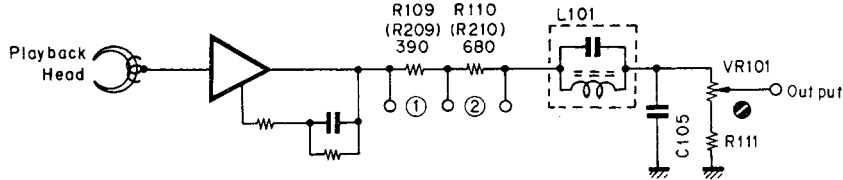


Fig. 5.1

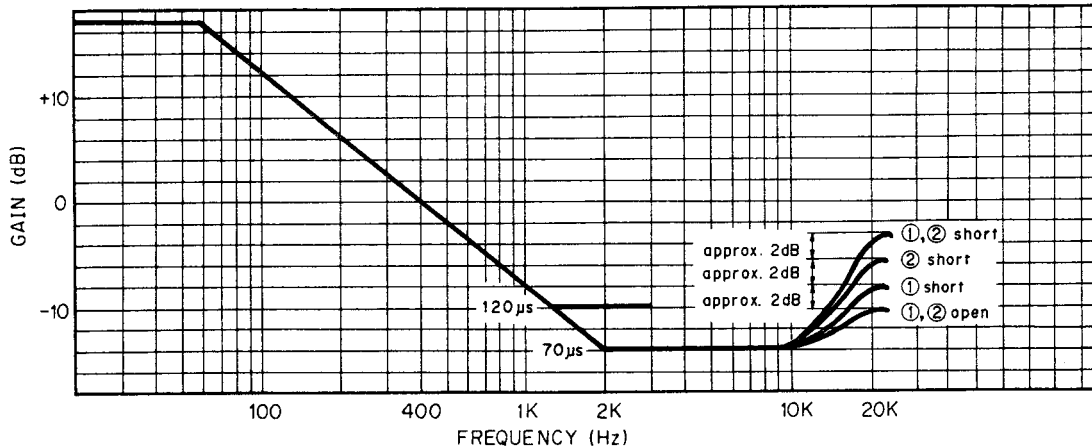


Fig. 5.2

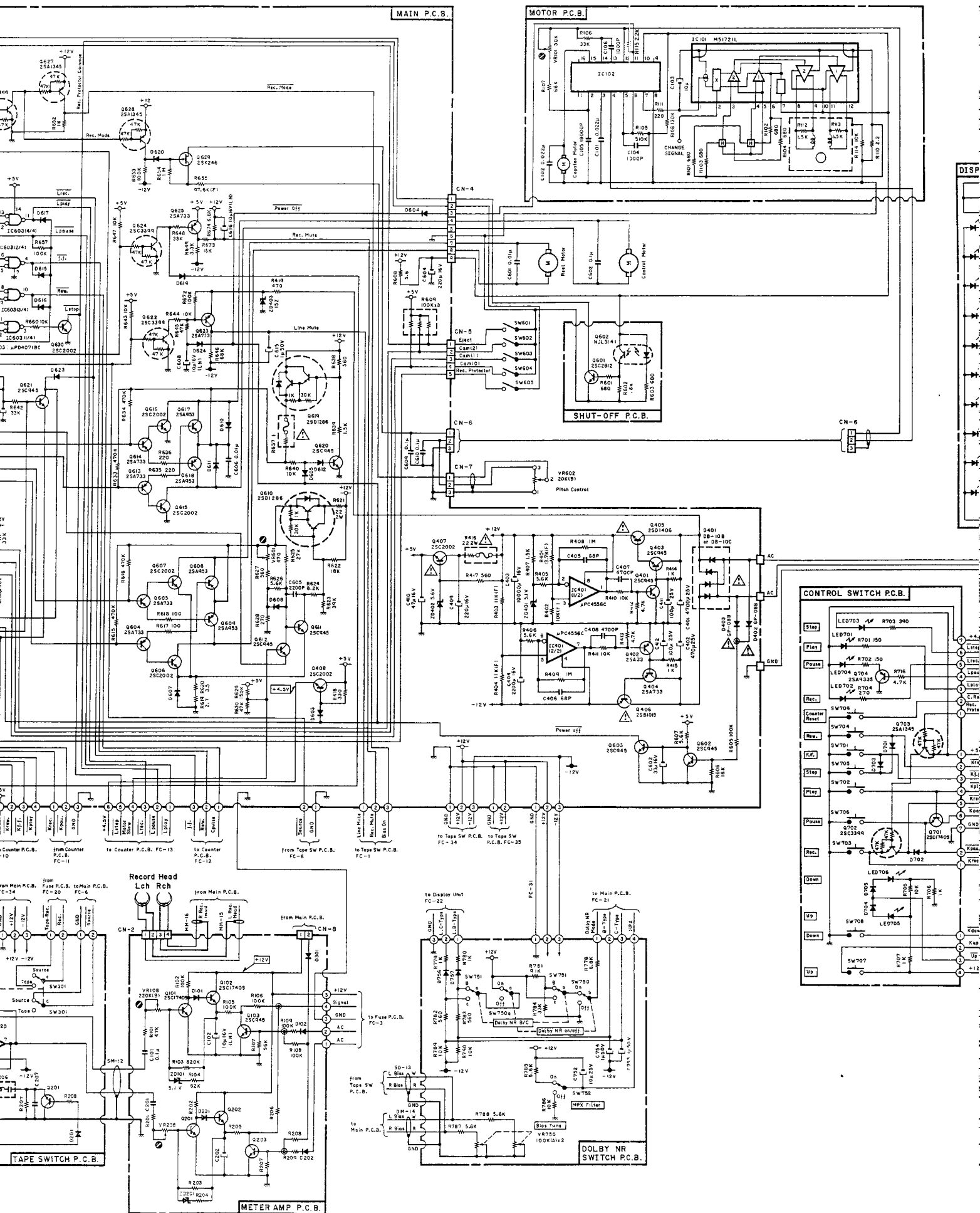
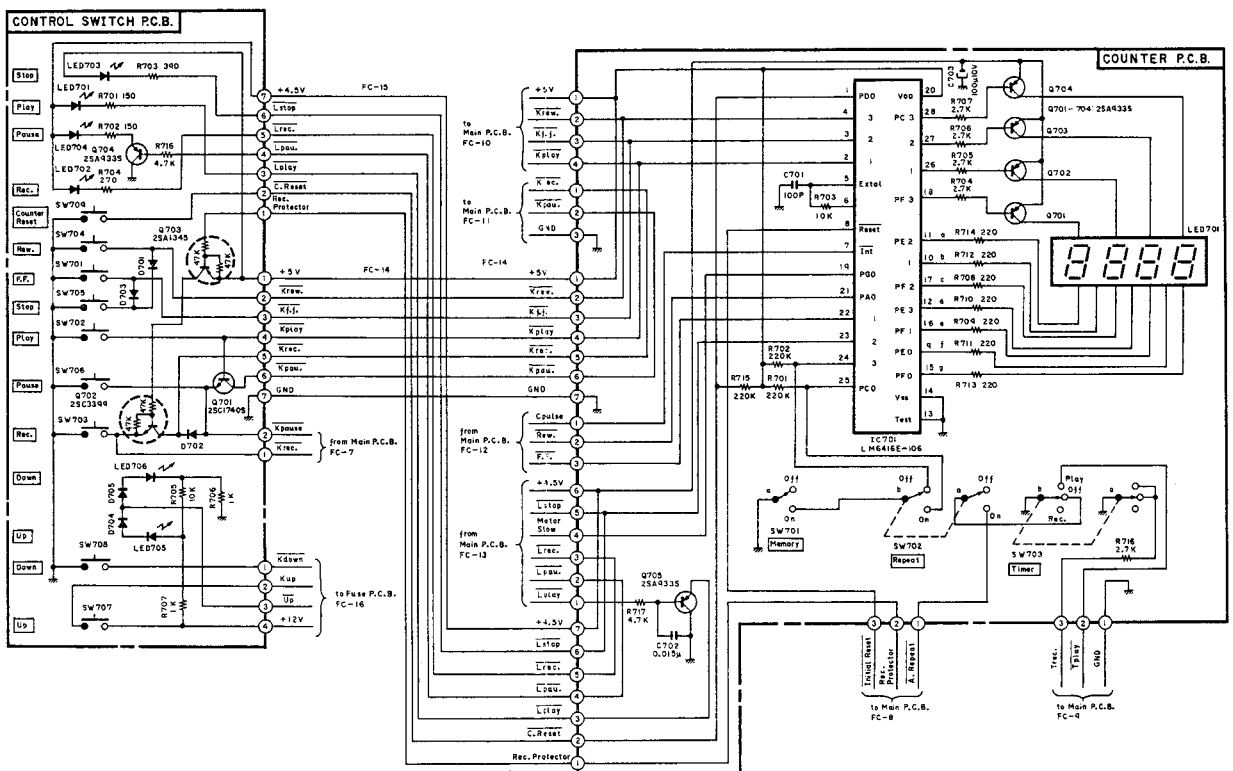
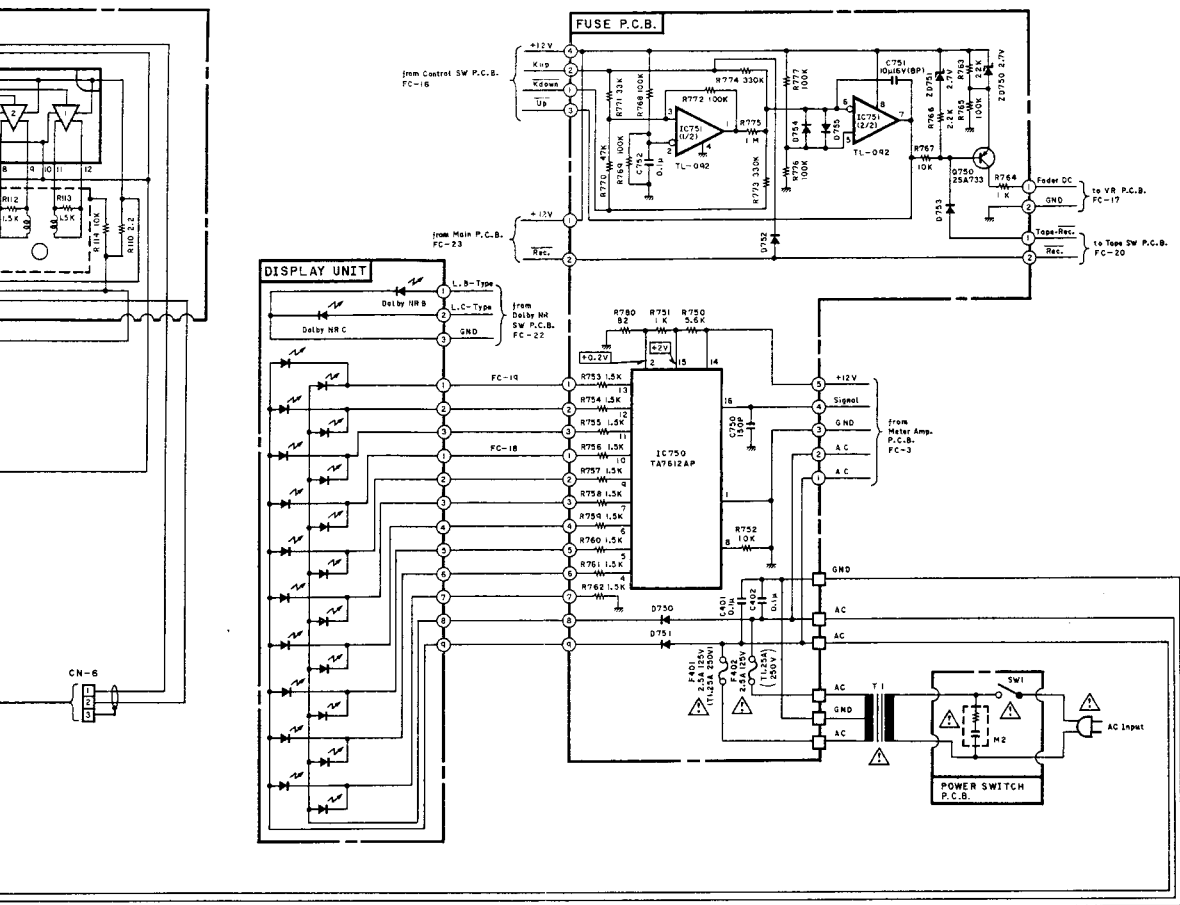
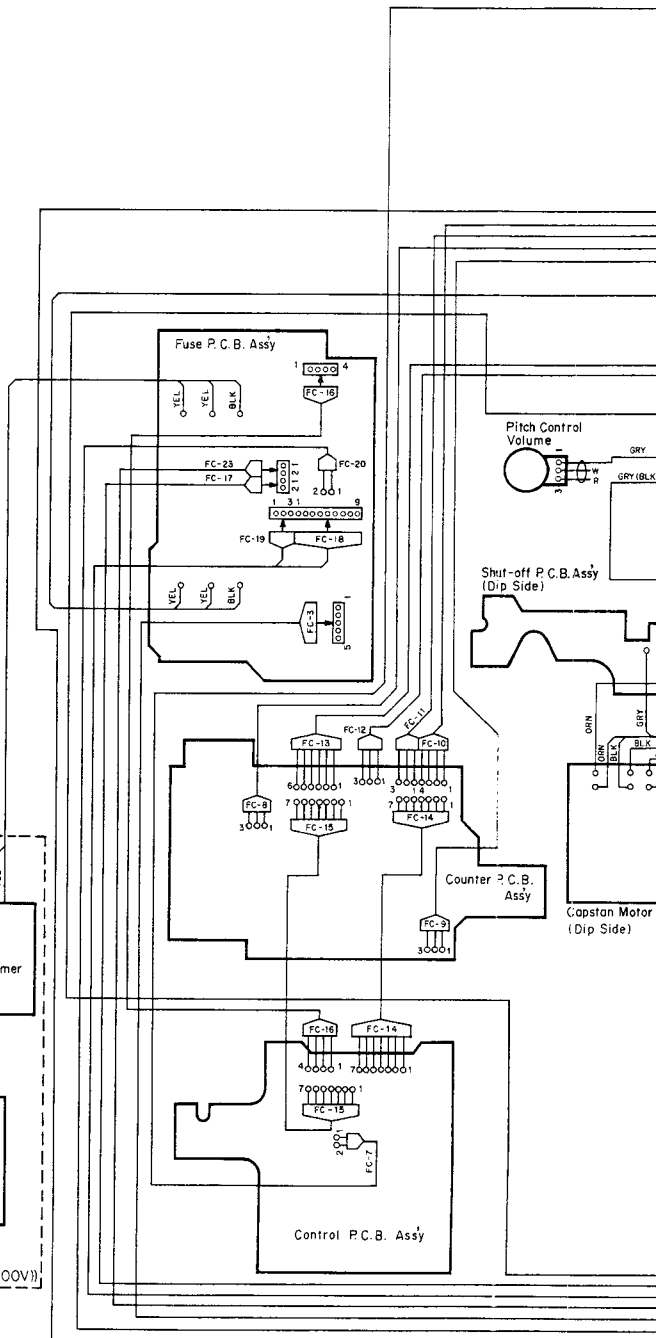
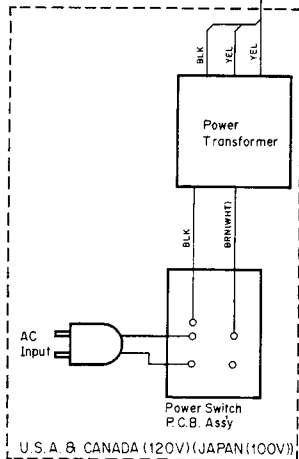
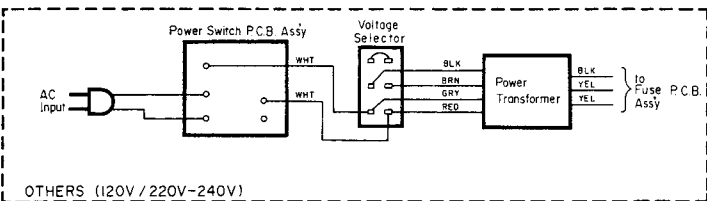
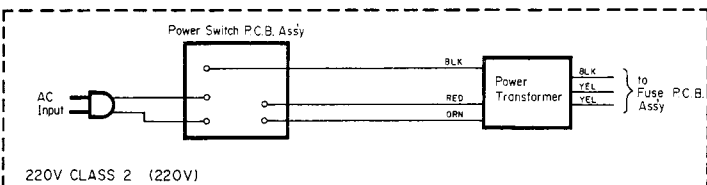
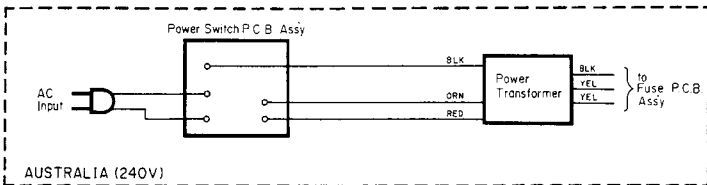
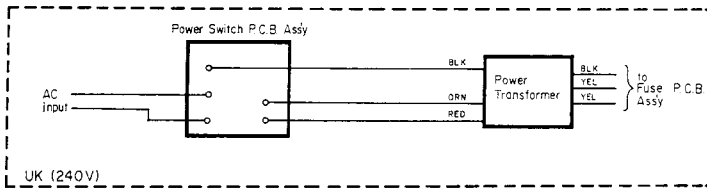


Fig. 8.2.1.2 Serial No.: A12702001 -



- 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



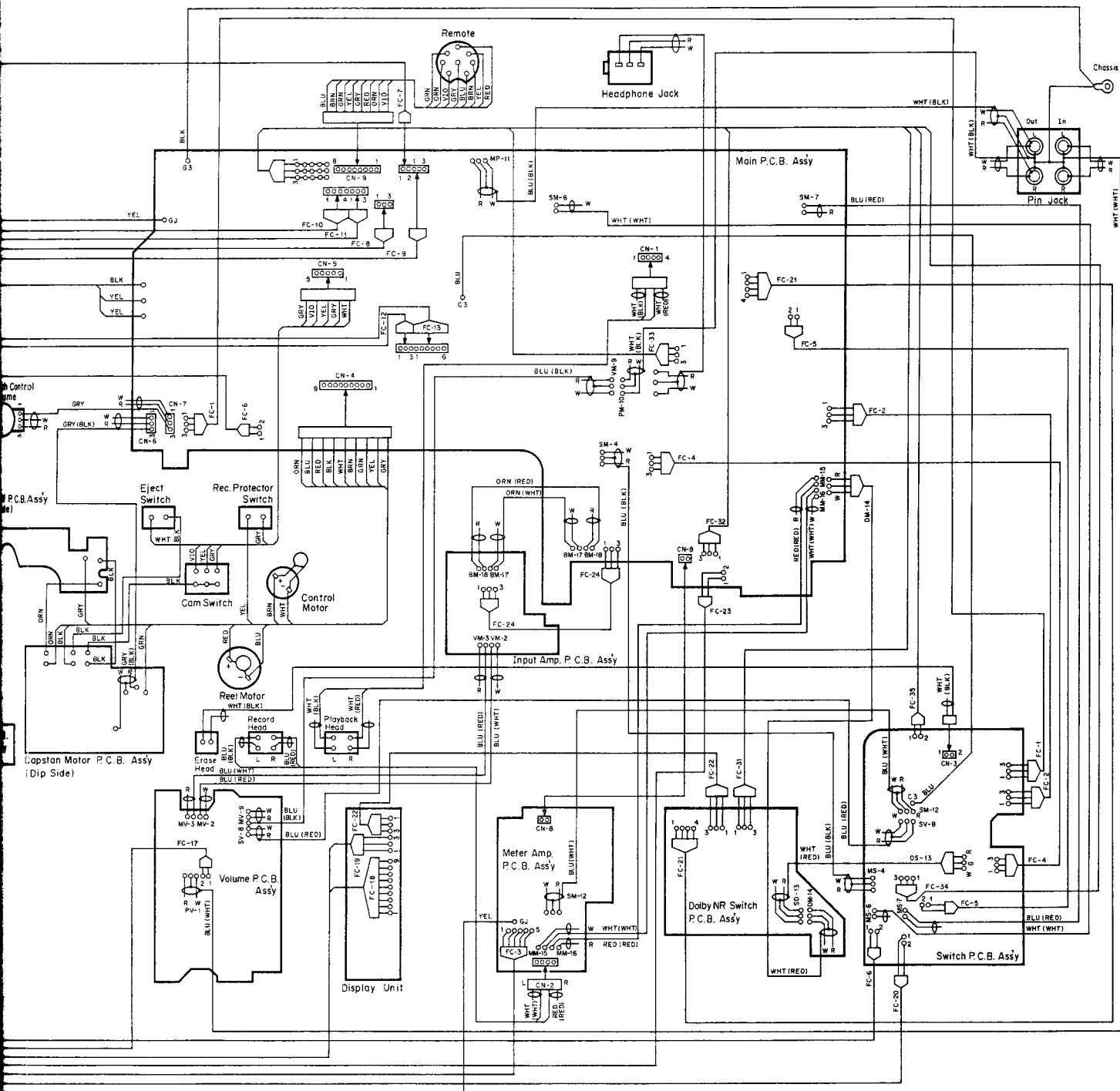


Fig. 10

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

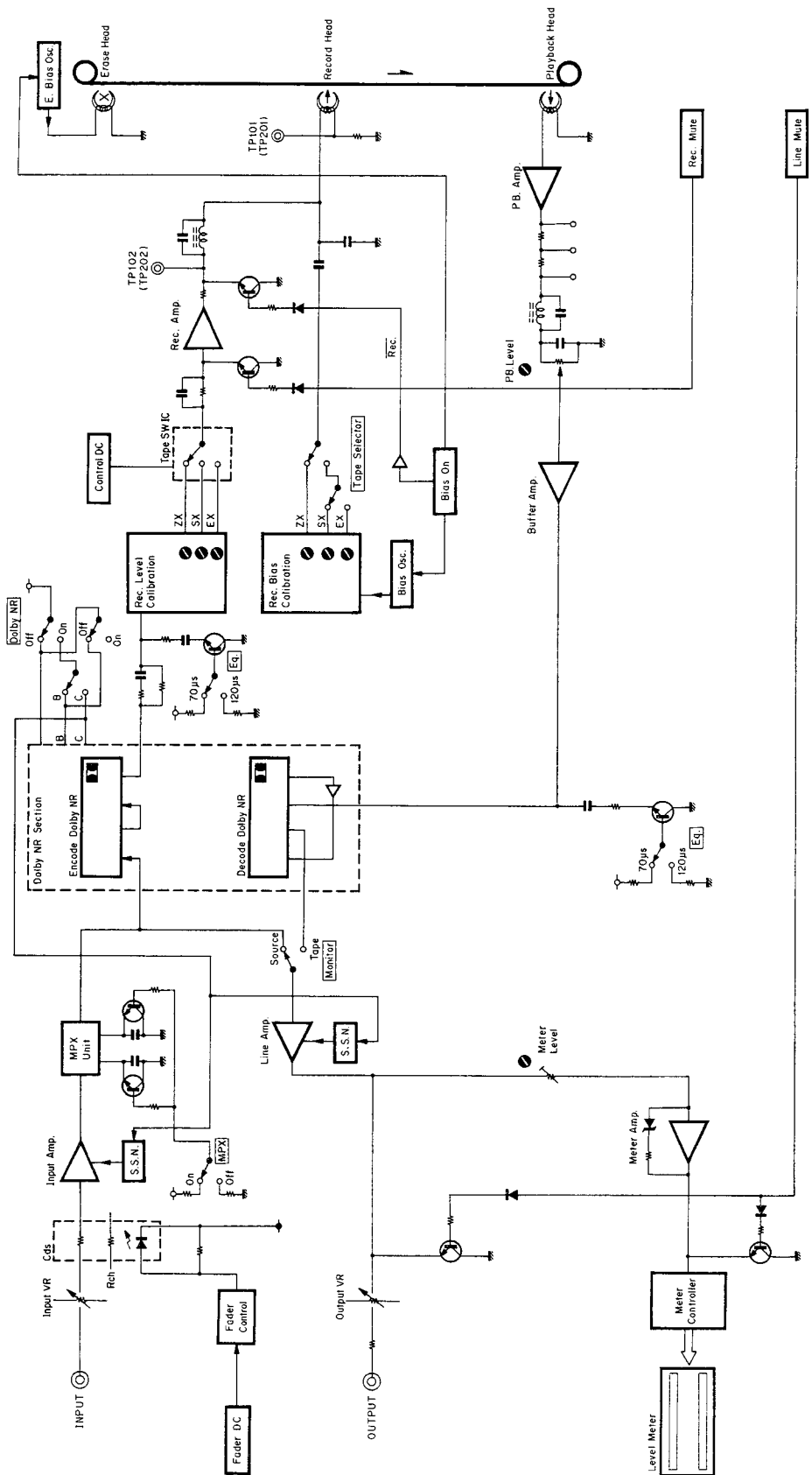


Fig. 11.1

11.2. Mechanism Control Section

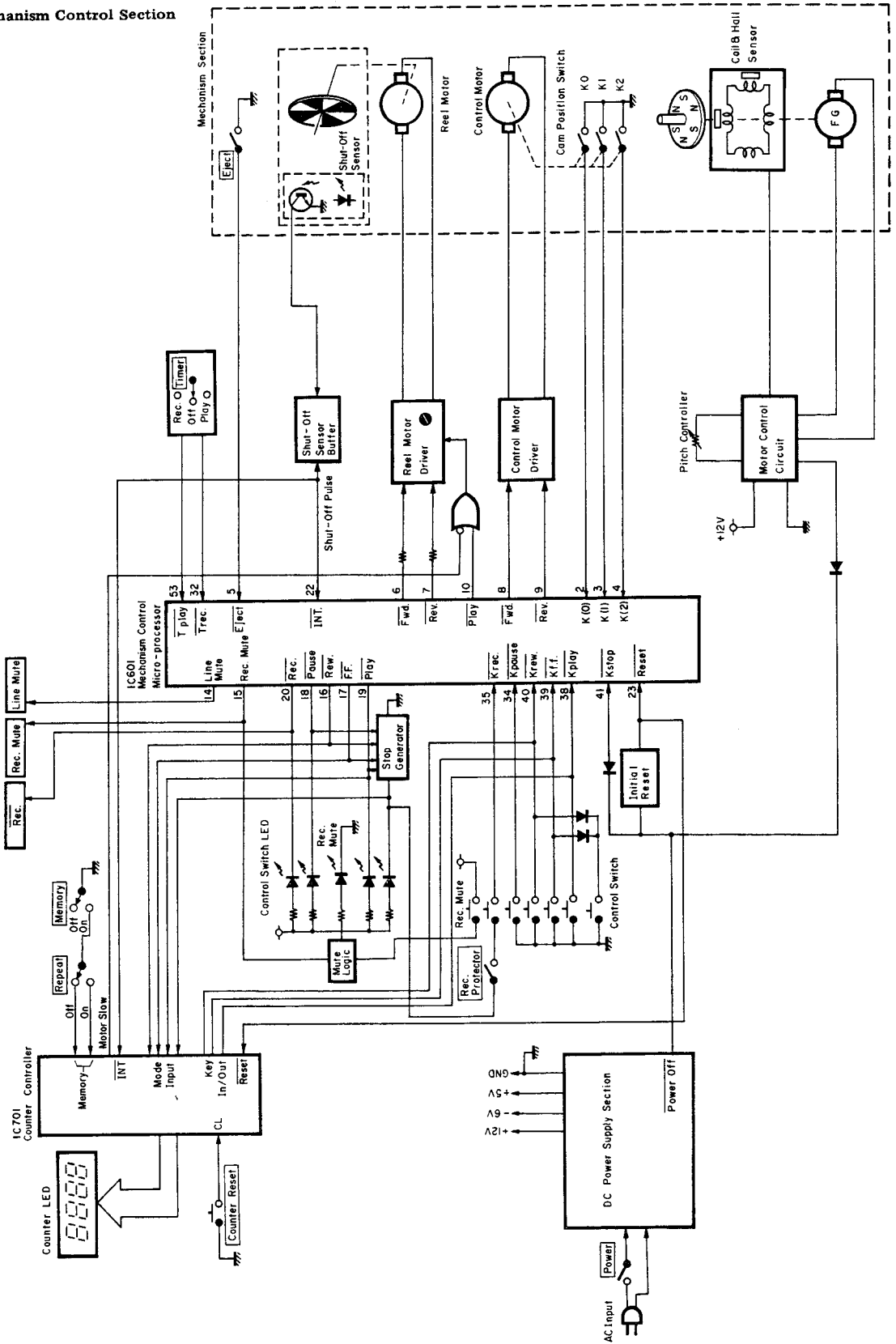


Fig. 11.2