

The Harman Kardon Model hk100m

Stereo Cassette Deck

Technical Manual

harman/kardon

PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors.
2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.
3. Replacement for output and driver transistors, if necessary, must be made from the same beta group as the original type.
4. If one output transistor burns out (open or short) always remove all the output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohmmeter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.
5. When mounting a replacement power transistor, be sure that the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistor failure.
6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.
7. Fuses must be replaced with size and type indicated. Use of other types can expose components to destructive current levels.

ALIGNMENT PROCEDURES

General Conditions (unless otherwise noted)

1. Tape Select Switch is LN position.
2. Dolby NR Switch is OFF position.
3. Input Selector Switch is LINE position.
4. MPX Filter Switch is OFF position.
5. Input Level Controls at maximum.
6. Output Level Control at maximum.
7. Bias Fine Trim Control at center.
8. Connect 10k ohm (1/4W) carbon resistors across both left and right line output jacks.

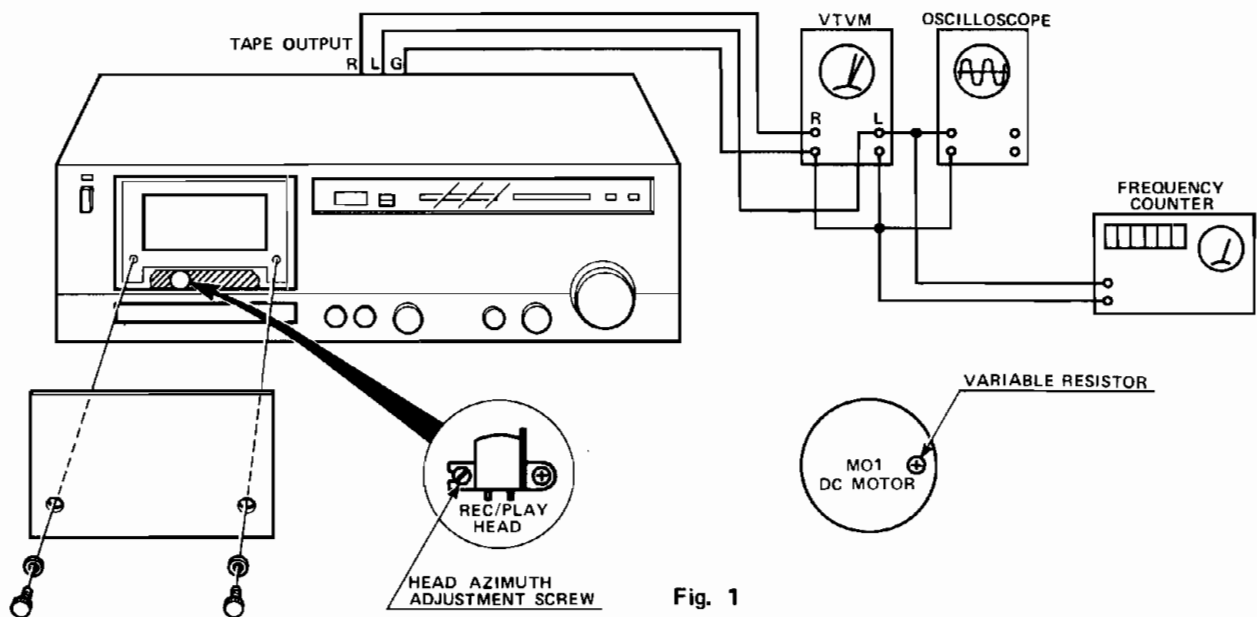


Fig. 1

HEAD AZIMUTH ADJUSTMENT

Equipment Required: Dual Channel AC V.T.V.M. and 10 kHz Test Tape (TEAC MTT-114)

1. Connect dual channel AC V.T.V.M. to TP3 (left), TP2 (right) and TP1 (ground).
2. Play back the "A" side of the test tape and adjust Head Azimuth Adjustment Screw so that the output indicated by the V.T.V.M. will be maximum and the difference of output between left and right becomes less than 1 dB.
3. Play back the "B" side of the test tape and adjust Head Azimuth Adjustment Screw for maximum output.
4. Repeat steps 2 and 3, and adjust Head Azimuth Adjustment Screw until the difference of outputs from side "A" and side "B" becomes less than 1 dB.

ALIGNMENT PROCEDURES

TAPE SPEED ADJUSTMENT

Equipment Required: Frequency Counter and 3 kHz Test Tape (TEAC MTT-111D)

1. Connect frequency counter to TP3 (or TP2) and TP1 (ground).
2. Play back the test tape and adjust the variable resistor built in the DC motor for 3 kHz \pm 1%.

PLAYBACK AMP LEVEL ADJUSTMENT

Equipment Required: Dual Channel AC V.T.V.M. and Test Tape (TEAC MTT-150)

1. Connect dual channel AC V.T.V.M. to TP3 (left), TP2 (right) and TP1 (ground).
2. Play back the test tape and adjust VR103 (left) and VR104 (right) so that the output will be 580 mV +0.5 dB -0 dB.

PLAYBACK EQUALIZER FREQUENCY CHARACTERISTIC ADJUSTMENT

Equipment Required: Dual Channel AC V.T.V.M. and Test Tape (TEAC MTT-316)

1. Set tape select switch to FeCr position.
2. Connect dual channel AC V.T.V.M. to TP3 (left), TP2 (right) and TP1 (ground).
3. Play back the test tape and adjust VR101 (left), VR102 (right) so that the playback frequency response is within the range as shown in Fig. 2.

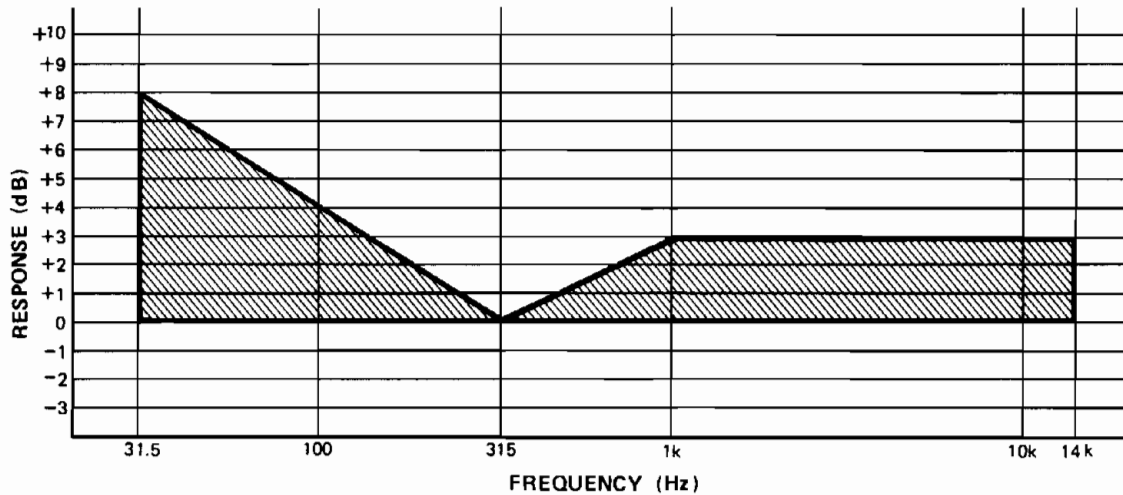


Fig. 2

RECORD BIAS TRAP ADJUSTMENT

Equipment Required: Frequency Counter and Dual Channel AC V.T.V.M.

1. Set tape select switch to METAL position.
2. Connect frequency counter and AC V.T.V.M. to TP9 and TP8 (ground).
3. Place unit in record mode.
4. Confirm that bias frequency is within the 105 kHz \pm 5 kHz, and output becomes 100 mV \sim 150 mV.
5. Connect dual channel AC V.T.V.M. to TP5 (left), TP4 (right) and TP10 (ground).
6. Place unit in record mode.
7. Adjust TC601 (left) and TC602 (right) so that the output becomes 100 mV.
8. Connect dual channel AC V.T.V.M. to TP7 (left), TP6 (right) and TP8 (ground).
9. Place unit in record mode.
10. Adjust L303, L305 (left) and L304, L306 (right) so that the output becomes minimum (less than 480 mV).

ALIGNMENT PROCEDURES

RECORD/PLAYBACK LEVEL ADJUSTMENT

Equipment Required: Audio Signal Generator, Dual Channel AC V.T.V.M. and a Normal (TDK AC-222), FeCr (SONY CS-30), CrO2 (TDK AC-512) and Metal (SCOTCH M-1) Blank Test Tapes

1. Connect dual channel AC V.T.V.M. to TP5 (left), TP4 (right) and TP10 (ground).
2. Place unit in record mode.
3. Set tape select switch to METAL position.
4. Adjust TC601 (left) and TC602 (right) so that the output becomes 100 mV.
5. Set tape select switch to CrO2 position.
6. Adjust VR603 so that the output becomes 54 mV.
7. Set tape select switch to FeCr position.
8. Adjust VR602 so that the output becomes 50 mV.
9. Set tape select switch to LN position.
10. Adjust VR601 so that the output becomes 40 mV.
11. Connect dual channel AC V.T.V.M. to TP3 (left), TP2 (right) and TP1 (ground).
12. Connect audio signal generator to both left and right line input jacks.
13. Set tape select switch to METAL position.
14. Set the generator for a 400 Hz signal. Place unit in record mode. Adjust generator input level for an output on the V.T.V.M. of 580 mV -10 dB.
15. Recording this signal on the metal blank test tape and playing it, adjust VR301 (left) and VR302 (right) by repeating record and playback so that the output on V.T.V.M. becomes 580 mV -10 dB.
16. Confirm the same level for CrO2, FeCr and LN positions as it is with METAL position by using the CrO2, FeCr and normal blank test tapes.

RECORD BIAS LEVEL ADJUSTMENT

Equipment Required: Audio Signal Generator, Distortion Meter, Two Dual Channel AC V.T.V.M. (1 and 2) and a Normal Blank Test Tape (TDK AC-222)

1. Connect dual channel AC V.T.V.M. 1 to TP5 (left), TP4 (right) and TP10 (ground), and connect dual channel AC V.T.V.M. 2 and distortion meter to TP3 (left), TP2 (right) and TP1 (ground).
2. Connect audio signal generator to both left and right line input jacks.
Set the generator for a 1 kHz signal. Place unit in record mode. Adjust generator input level for an output on the V.T.V.M. 2 of 580 mV.
3. Vary the bias level as read on the V.T.V.M. 1 of 40 mV, with VR601 and record on a blank test tape.
4. Play back the test tape and read the 1.3% on distortion meter.
5. If the above distortion is not obtained, adjust VR601 slightly. Repeat steps 3 and 4 until distortion on the distortion meter is adjusted 1.3%.
6. Keep note of the bias level on V.T.V.M. 1 at the time.
7. Place unit in record mode.
8. Set tape select switch to METAL position.
9. Adjust TC601 (left) and TC602 (right) so that the bias level becomes +8.8 dB of level obtained at step 6 on V.T.V.M. 1.
10. Set tape select switch to LN position.
11. Adjust VR601 so that the bias level becomes same level obtained at step 6 on V.T.V.M. 1.
12. Set tape select switch to FeCr position.
13. Adjust VR602 so that the bias level becomes +1.8 dB of level obtained at step 6.
14. Set tape select switch to CrO2 position.
15. Adjust VR603 so that the bias level becomes +2.5 dB of level obtained at step 6.

ALIGNMENT PROCEDURES

RECORD/PLAYBACK EQUALIZER FREQUENCY CHARACTERISTIC ADJUSTMENT

Equipment Required: Audio Signal Generator, Two Dual Channel AC V.T.V.M. (1 and 2) and a Normal, FeCr, CrO2 and Metal Blank Test Tapes

1. Connect dual channel AC V.T.V.M. 1 to TP3 (left), TP2 (right) and TP1 (ground), and connect dual channel AC V.T.V.M. 2 to both left and right line output jacks.
2. Connect audio signal generator to both left and right line input jacks.
3. Set tape select switch to METAL position and Dolby NR switch to OFF position.
4. Adjust the generator input level for an output on V.T.V.M. 1 of 580 mV – 25 dB, when the unit is in recording mode.
5. Record the signal from generator on to a metal blank test tape varying the generator frequency from 20 Hz to 20 kHz.
6. Play back the metal tape recorded above, note the frequency response obtained on the V.T.V.M. 2 and compare to Fig. 3.
7. If the above frequency response is not within the shaded DOLBY-NR OFF area on Fig. 3, adjust VR309 (left), VR310 (right), L301 (left peaking) and L302 (right peaking) slightly. Repeat steps 5 and 6 until playback frequency response on the V.T.V.M. 2 is adjusted within the DOLBY-NR OFF range as shown in Fig. 3.
8. Set Dolby NR switch to ON position and check if frequency response is within range of DOLBY-NR ON section of Fig. 3, if not repeat DOLBY-NR OFF procedures.
9. Set tape select switch to LN position and Dolby NR switch to OFF position.
10. Record the signal from generator on to a normal blank test tape varying the generator frequency from 20 Hz to 20 kHz.
11. Play back the normal tape recorded above and note the frequency response obtained on the V.T.V.M. 2.
12. If the above frequency response is not within the shaded DOLBY-NR OFF area of Fig. 4, adjust VR303 (left) and VR304 (right) slightly. Repeat steps 10 and 11 until playback frequency response on the V.T.V.M. 2 is adjusted within the DOLBY-NR OFF range as shown in Fig. 4.
13. Set Dolby NR switch to ON position and check if frequency response is within range of DOLBY-NR ON section of Fig. 4, if not repeat DOLBY-NR OFF procedures.
14. Set tape select switch to FeCr position and Dolby NR switch to OFF position.
15. Record the signal from generator on to a FeCr blank test tape varying the generator frequency from 20 Hz to 20 kHz.
16. Play back the FeCr tape recorded above and note the frequency response obtained on the V.T.V.M. 2.
17. If the above frequency response is not within the shaded DOLBY-NR OFF area of Fig. 5, adjust VR305 (left) and VR306 (right) slightly. Repeat steps 15 and 16 until playback frequency response on the V.T.V.M. 2 is adjusted within the DOLBY-NR OFF range as shown in Fig. 5.
18. Set Dolby NR switch to ON position and check if frequency response is within range of DOLBY-NR ON section of Fig. 5, if not repeat DOLBY-NR OFF procedures.
19. Set tape select switch to CrO2 position and Dolby NR switch to OFF position.
20. Record the signal from generator on to a CrO2 blank test tape varying the generator frequency from 20 Hz to 20 kHz.
21. Play back the CrO2 tape recorded above and note the frequency response obtained on the V.T.V.M. 2.
22. If the above frequency response is not within the shaded DOLBY-NR OFF area of Fig. 5, adjust VR307 (left) and VR308 (right) slightly. Repeat steps 20 and 21 until playback frequency response on the V.T.V.M. 2 is adjusted within the DOLBY-NR OFF range as shown in Fig. 5.
23. Set Dolby NR switch to ON position and check if frequency response is within range of DOLBY-NR ON section of Fig. 5, if not repeat DOLBY-NR OFF procedures.

Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.
“Dolby” and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

ALIGNMENT PROCEDURES

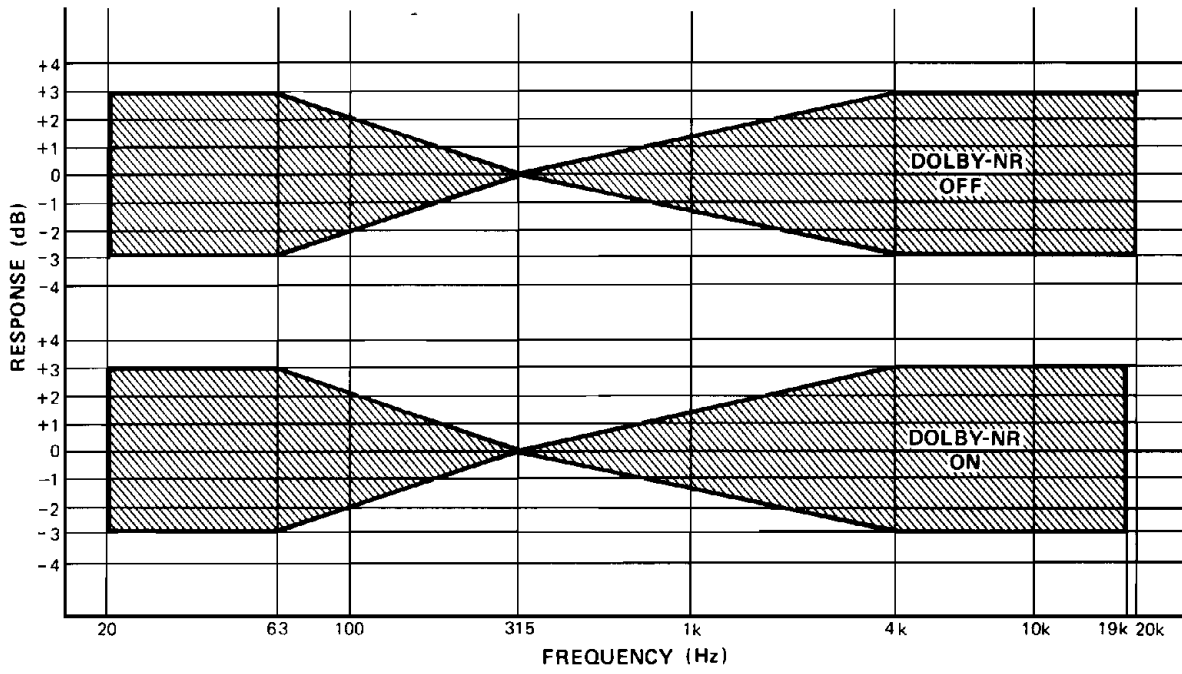


Fig. 3 – Metal

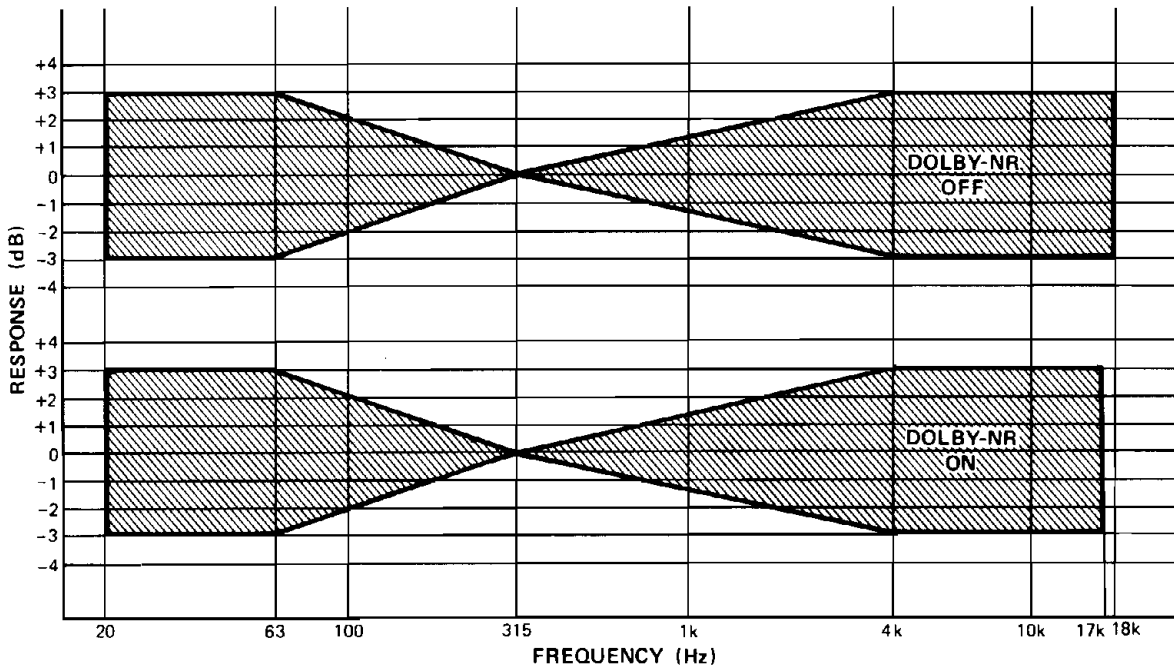


Fig. 4 – Low Noise

ALIGNMENT PROCEDURES

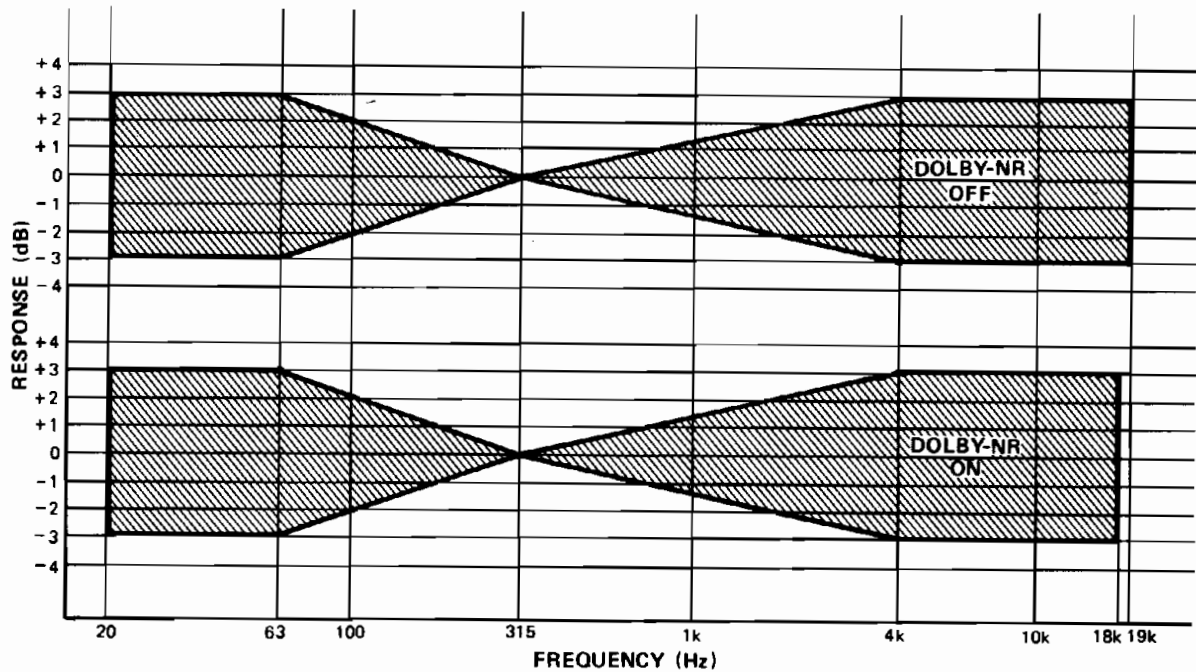


Fig. 5 – FeCr & CrO₂

PEAK LEVEL DISPLAY SENSITIVITY ADJUSTMENT

Equipment Required: Audio Signal Generator, Dual Channel AC V.T.V.M.

1. Connect dual channel AC V.T.V.M. to TP3 (left), TP2 (right) and TP1 (ground).
2. Connect audio signal generator to both left and right line input jacks. Set the generator for a 400 Hz signal. Place unit in record mode. Adjust generator input level for an output on the V.T.V.M. of 580 mV.
3. Adjust VR701 (left) and VR702 (right) so that the 0 dB LEDs will light.
4. Adjust generator input level for an output on the V.T.V.M. of 580 mV -20 dB.
5. Adjust VR703 (left) and VR704 (right) so that the -20 dB LEDs will light.
6. Repeat steps 3 and 5 for best sensitivity.

PINCH ROLLER TENSION ADJUSTMENT

Bend the adjustment point hooked by spring in the arrow directions so that the tension by pinch roller may be 390g \pm 30g when keeping apart pinch roller from capstan (about 0.5 mm) and returning it to rotate. (Fig. 6)

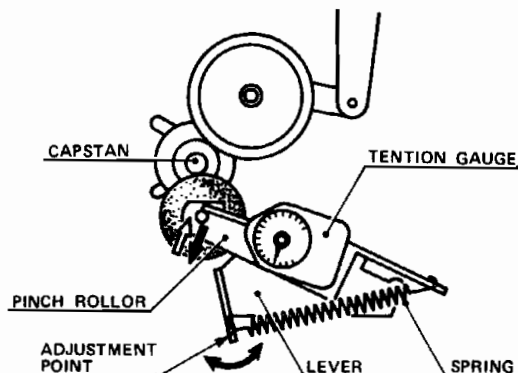
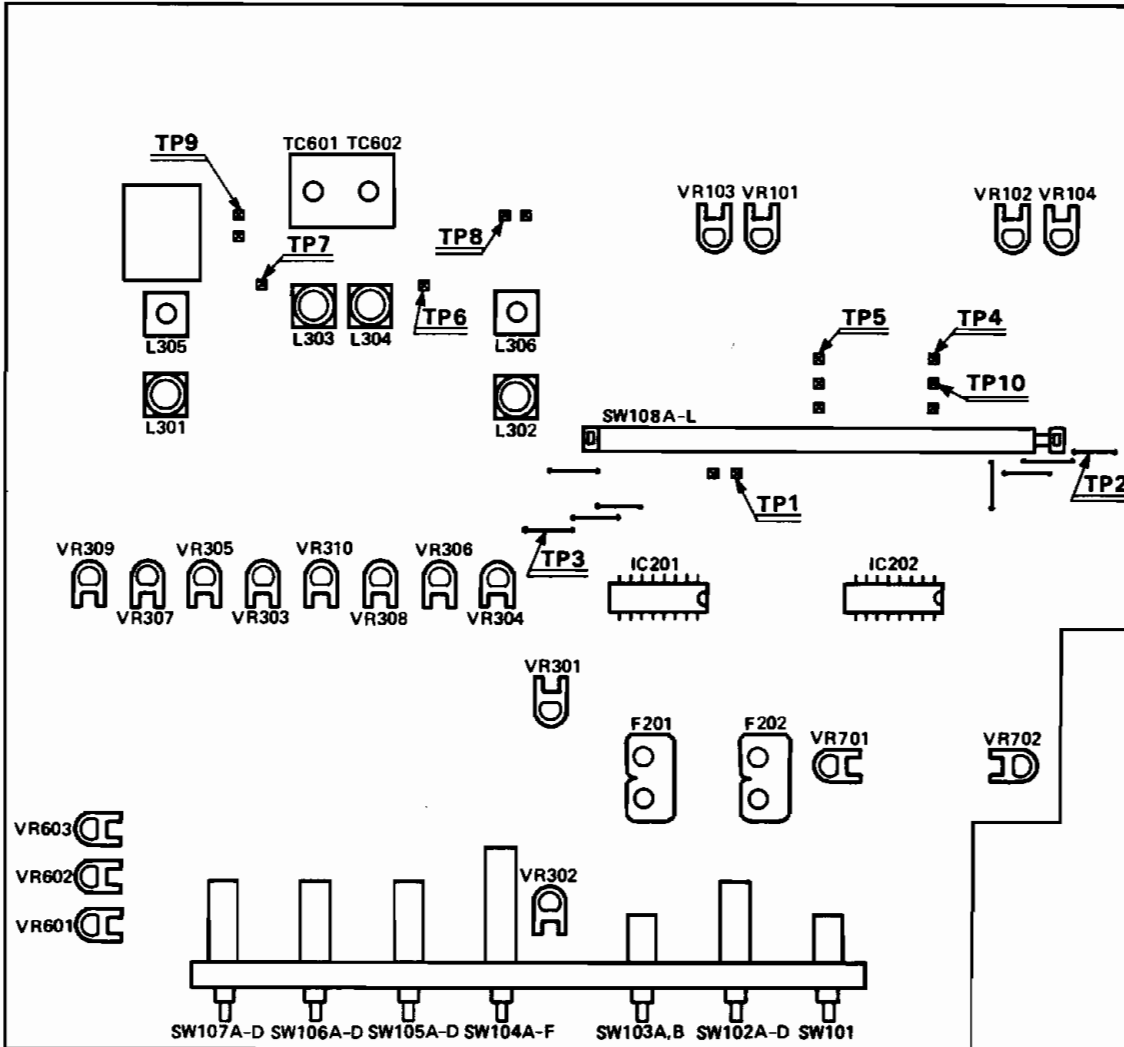


Fig. 6

ALIGNMENT PROCEDURES

MAIN P.C. BOARD



PEAK LEVEL DISPLAY P.C. BOARD (BOTTOM VIEW)

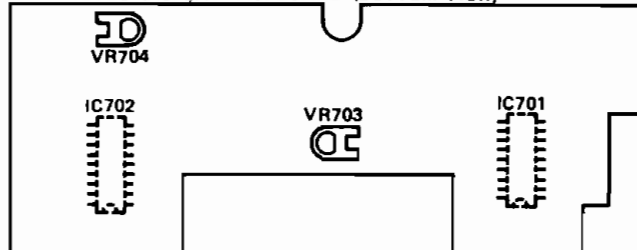
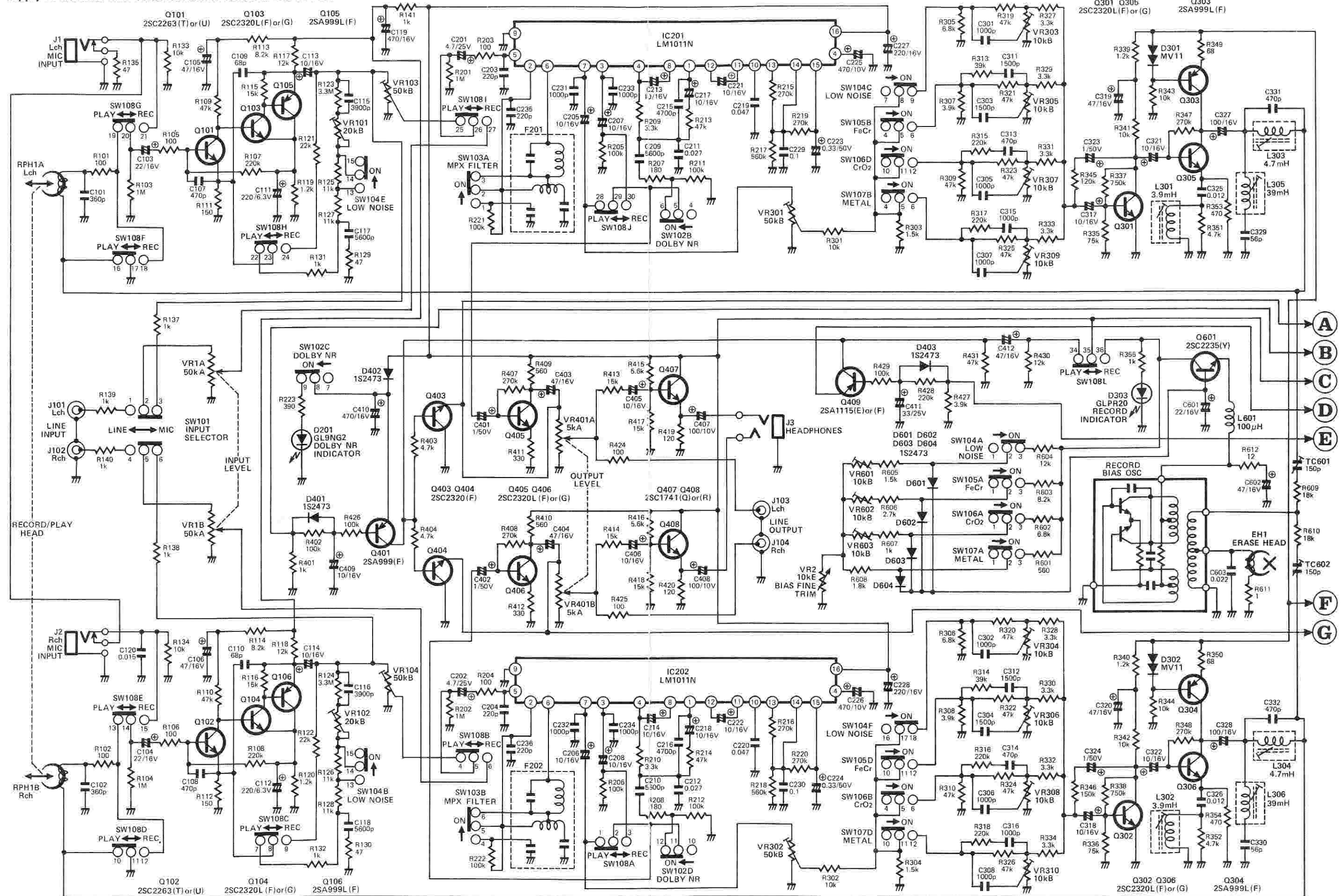


Fig. 7 - Alignment Points Location

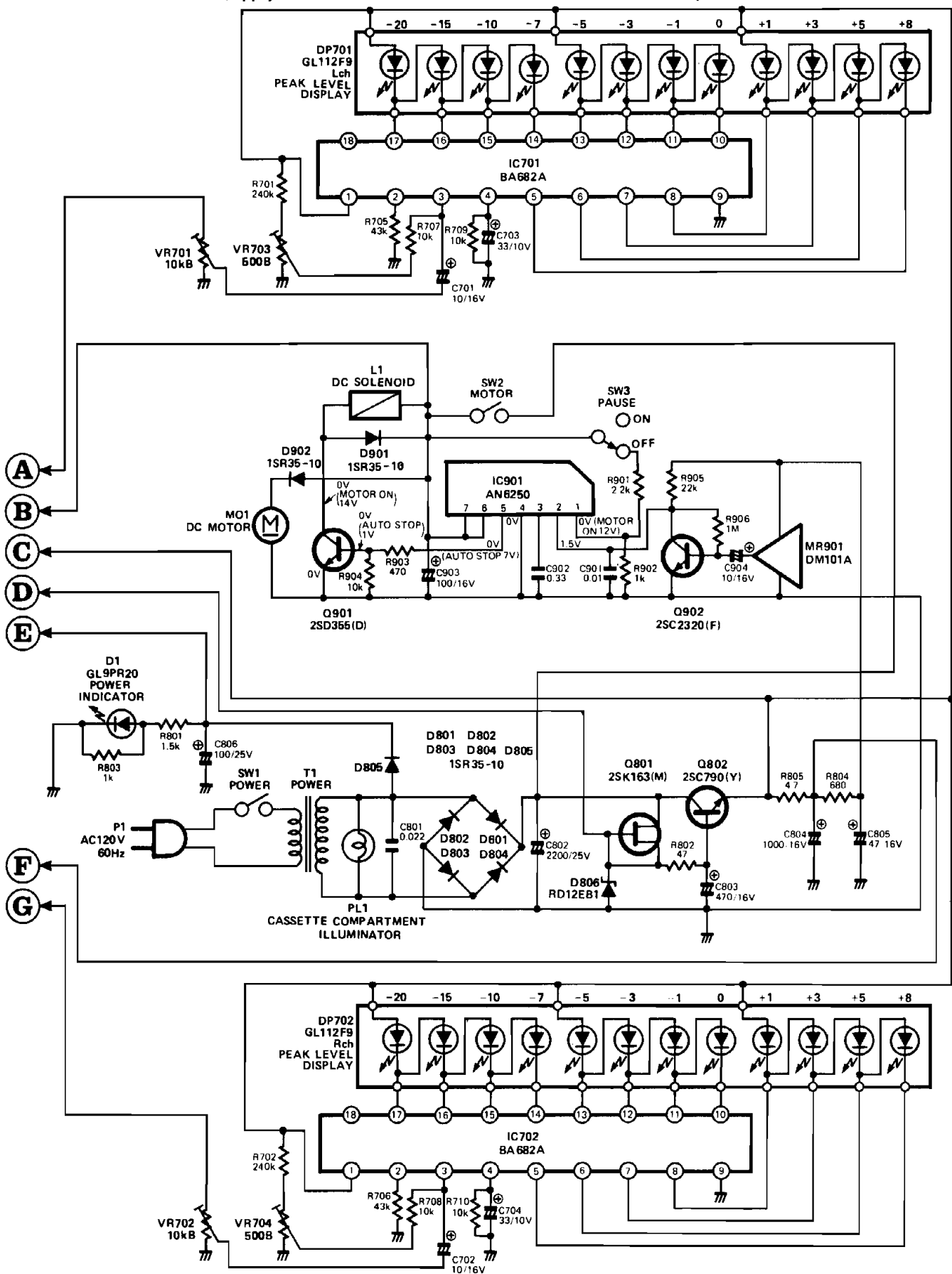
SCHEMATIC DIAGRAM

(Apply to the units with Serial No. 01001 to Serial No. 03000)



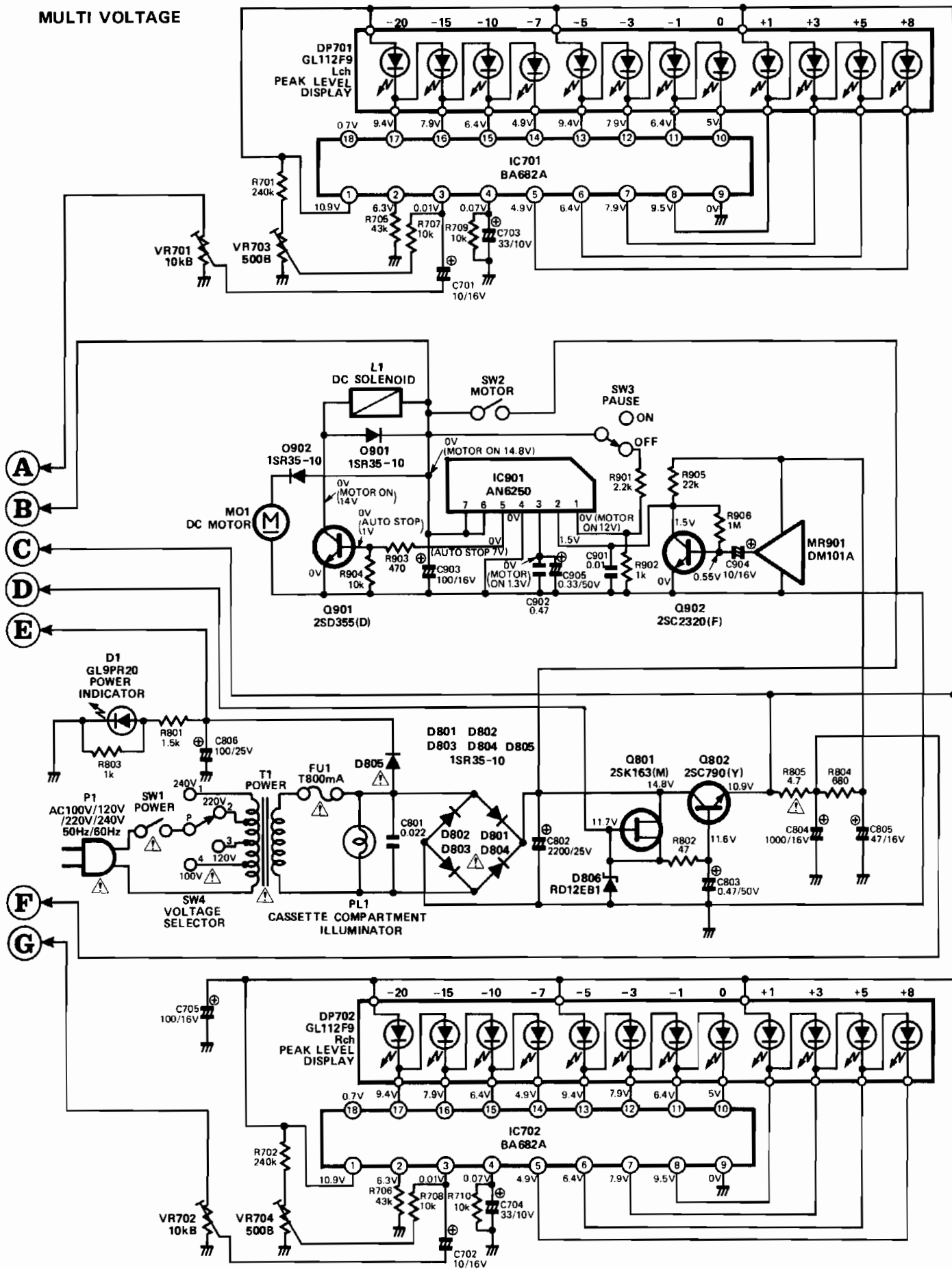
SCHEMATIC DIAGRAM

REGULAR VOLTAGE (Apply to the units with Serial No. 01001 to Serial No. 03000)



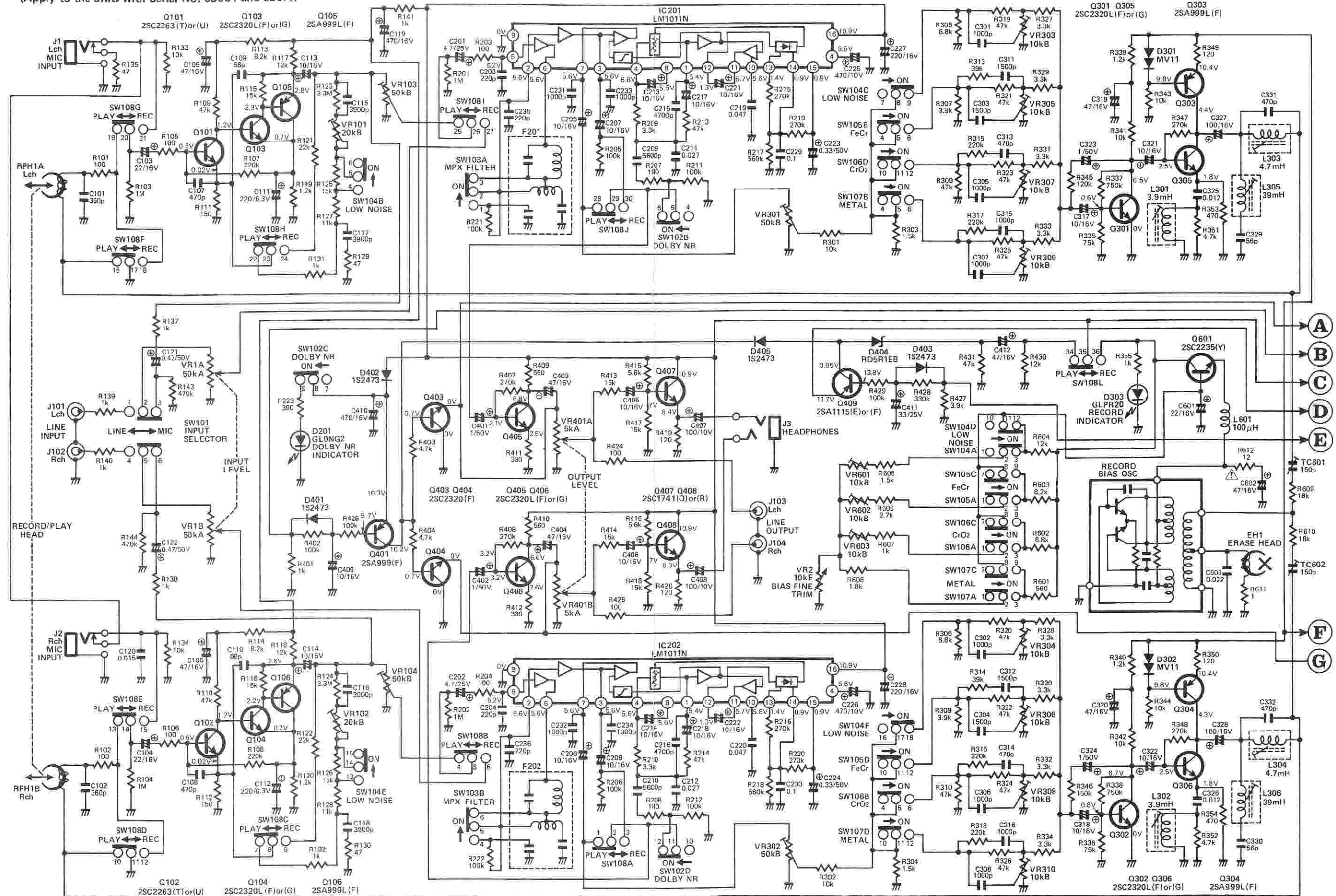
SCHEMATIC DIAGRAM

MULTI VOLTAGE



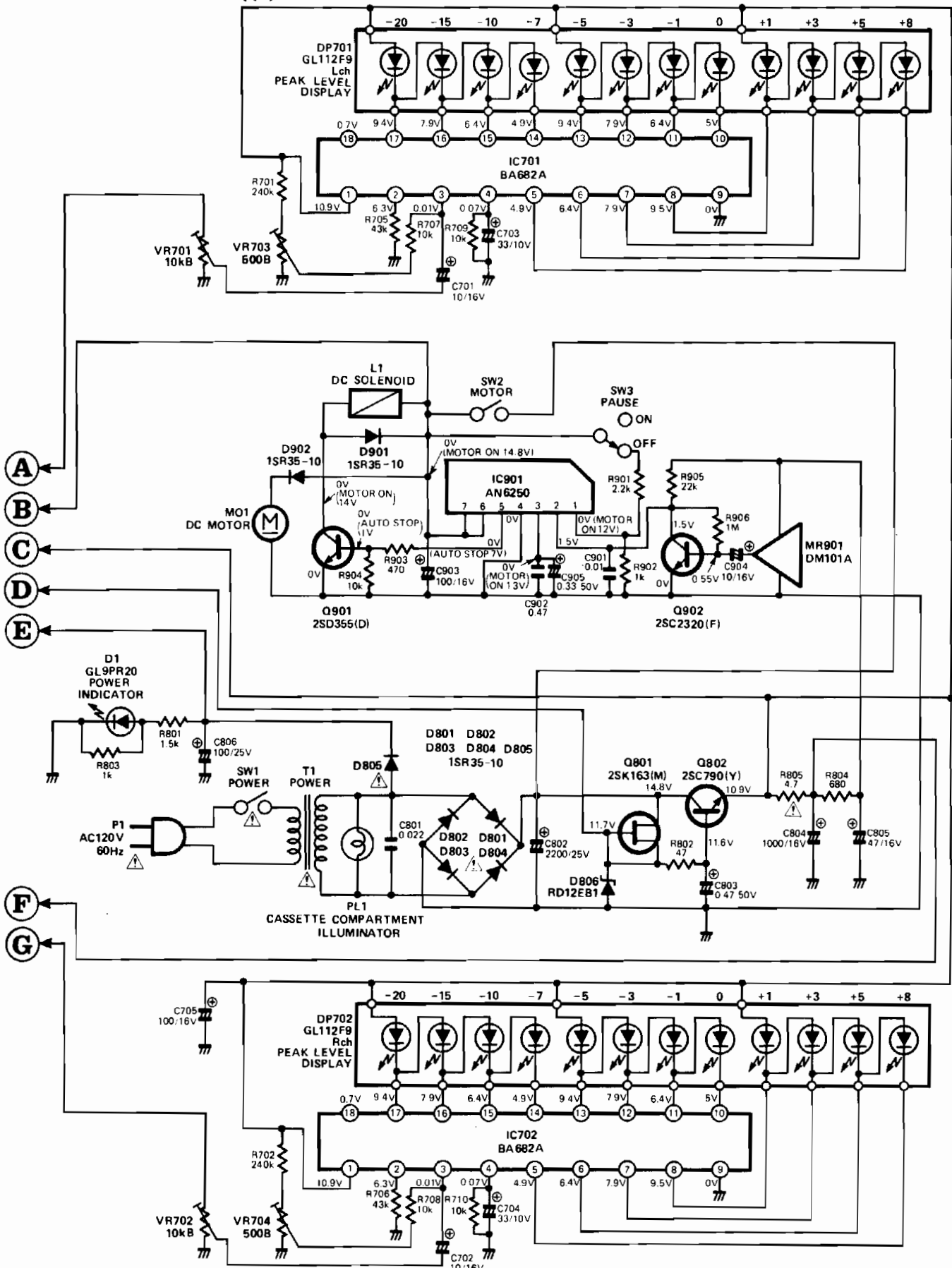
SCHEMATIC DIAGRAM

(Apply to the units with Serial No. 03001 and above)




SCHEMATIC DIAGRAM

REGULAR VOLTAGE (Apply to the units with Serial No. 03001 and above)

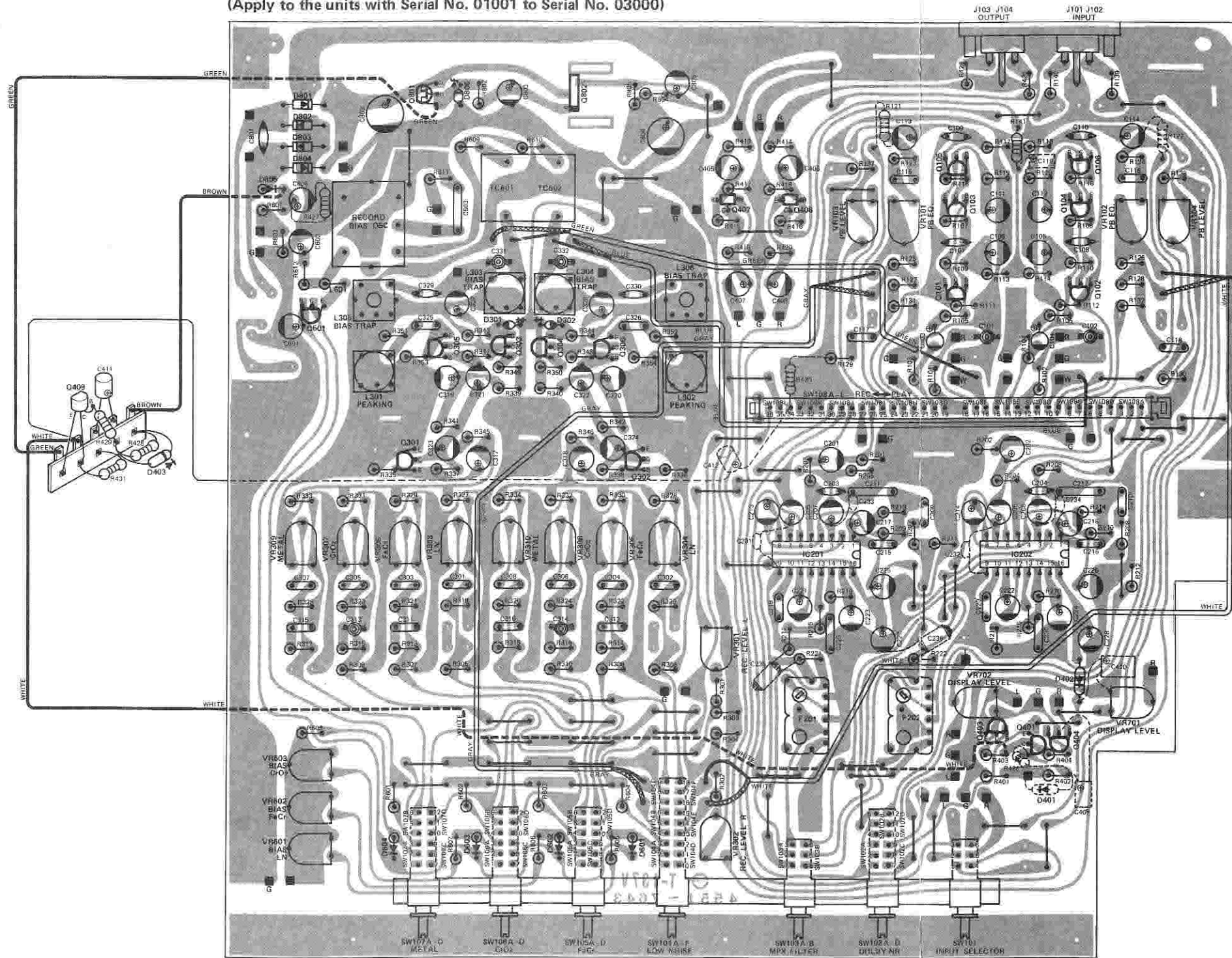


SCHEMATIC DIAGRAM NOTES

1. ALL RESISTANCES ARE 1/4 WATTS, UNLESS OTHERWISE NOTED, VALUES ARE IN OHMS.
K = 1000, M=1000K
2. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. $\text{pF} = \mu\mu\text{F}$
3. ALL VOLTAGES READING FROM CHASSIS ARE MEASURED WITH V.T.V.M. UNDER NO SIGNAL CONDITIONS.
4.  SAFETY- REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

MAIN P.C. BOARD

(Apply to the units with Serial No. 01001 to Serial No. 03000)

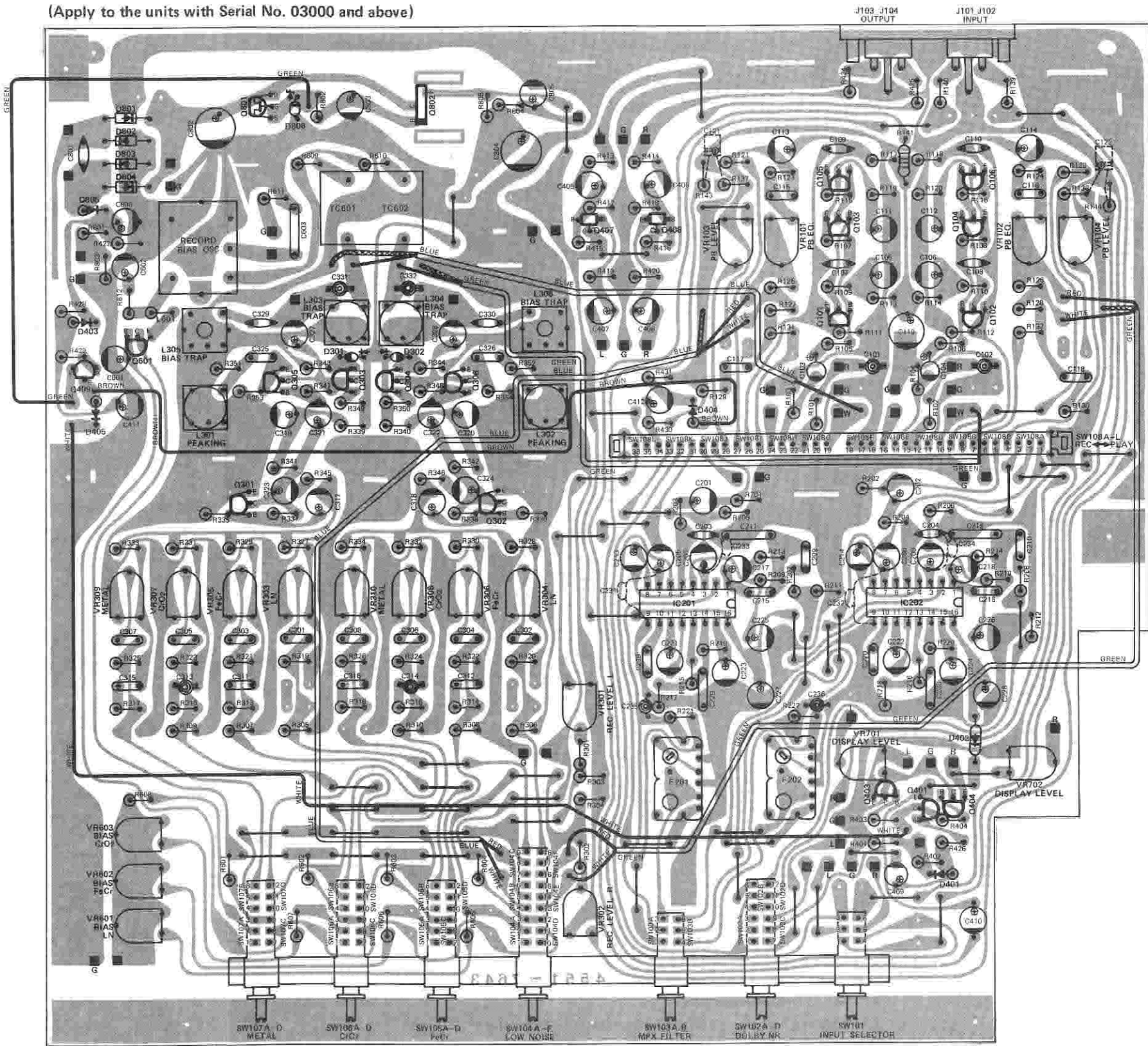


Ref. No.	Part No.	Description
RESISTORS		
R612	5102-1204713	12 ohm $\pm 2\%$ 1/4W Fuse
R805	5102-4R75713	4.7 ohm $\pm 5\%$ 1/4W Fuse
VR101, 102	5101-203083H	Variable Resistor, 20 k ohm
VR103, 104	5101-503083H	Variable Resistor, 50 k ohm
VR301, 302	5101-5037187	Variable Resistor, 50 k ohm
VR303, 304, 305, 306, 307, 308, 309, 310	5101-103083H	Variable Resistor, 10 k ohm
VR601, 602, 603, 701, 702	5101-1037187	Variable Resistor, 10 k ohm
CAPACITORS		
C103, 104	5345-226C0212	22 μF $\pm 20\%$ 16V Electrolytic
C105, 106, 319, 320, 412, 602, 805	5345-476-16	47 μF $+50\%$ -10% 16V Electrolytic
C111, 112	5345-227-06	220 μF $+50\%$ -10% 6.3V Electrolytic
C113, 114, 317, 318, 321, 322, 409	5345-106C0212	10 μF $\pm 20\%$ 16V Electrolytic
C119, 410, 803	5345-477-16	470 μF $+50\%$ -10% 16V Electrolytic
C121, 122	5345-474-50	0.47 μF $+75\%$ -10% 50V Electrolytic
C201, 202	5345-475D0212	4.7 μF $\pm 20\%$ 25V Electrolytic
C205, 206, 207, 208, 213, 214, 217, 218, 221, 222, 405, 406	5345-106-16	10 μF $+50\%$ -10% 16V Electrolytic
C223, 224	5345-334F0212	0.33 μF $\pm 20\%$ 50V Electrolytic
C225, 226	5345-477-10	470 μF $+50\%$ -10% 10V Electrolytic
C227, 228	5345-227-16	220 μF $+50\%$ -10% 16V Electrolytic
C323, 324	5345-105-50	1 μF $+75\%$ -10% 50V Electrolytic
C327, 328	5345-107C0212	100 μF $\pm 20\%$ 16V Electrolytic
C407, 408	5345-107-10	100 μF $+50\%$ -10% 10V Electrolytic
C411	5345-336D0212	33 μF $\pm 20\%$ 25V Electrolytic
C601	5345-226-16	22 μF $+50\%$ -10% 16V Electrolytic
C802	5345-228-25	2200 μF $+50\%$ -10% 25V Electrolytic
C804	5345-108-16	1000 μF $+50\%$ -10% 16V Electrolytic
C806	5345-107-25	100 μF $+50\%$ -10% 25V Electrolytic
TC601, 602	5372-61	Trimmer Capacitor

MAIN P.C. BOARD

(Apply to the units with Serial No. 03000 and above)

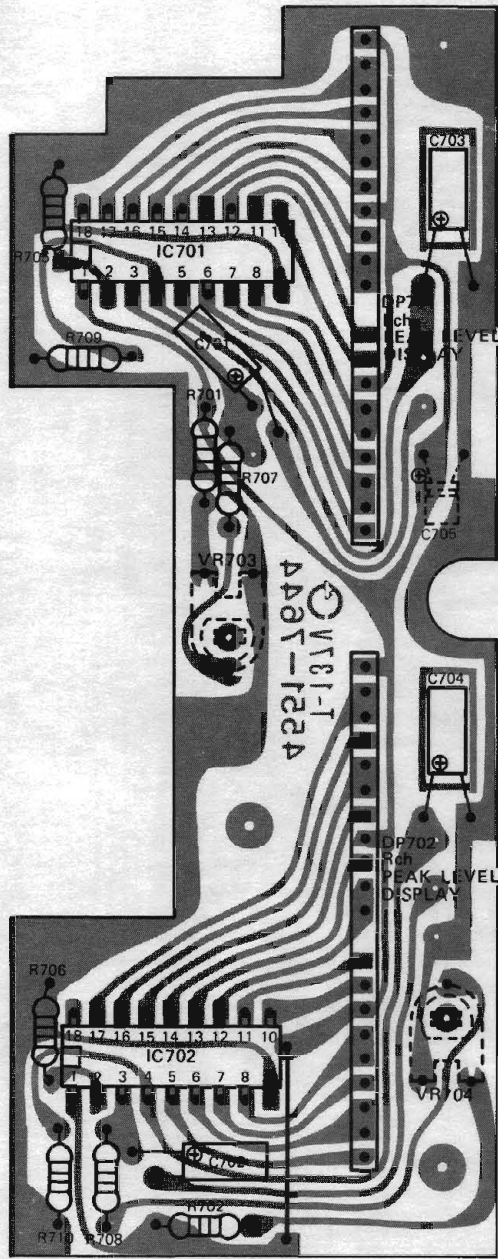
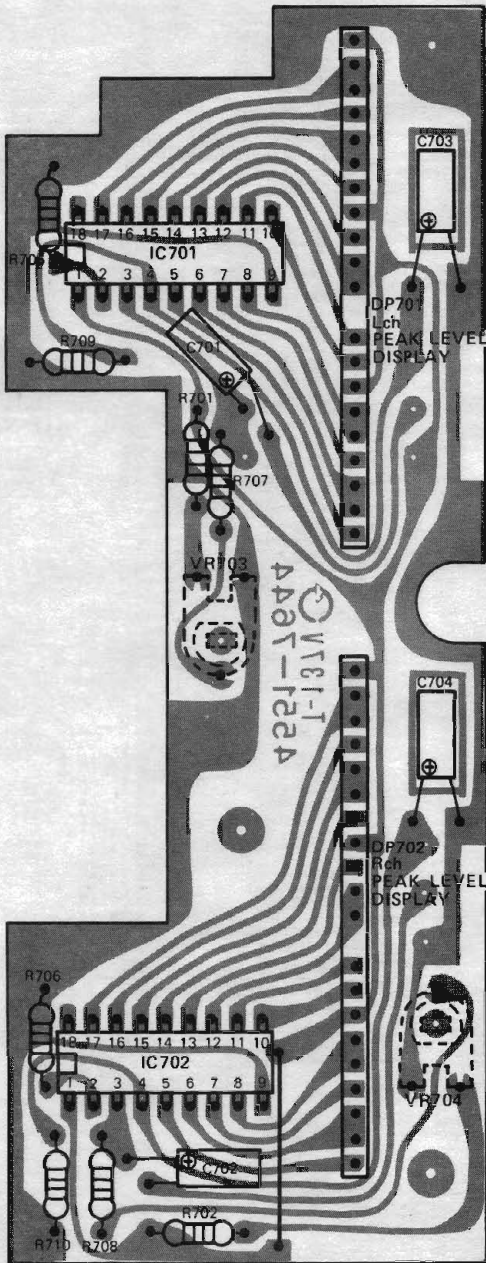
Ref. No.	Part No.	Description
SEMICONDUCTORS		
IC201, 202	5652-LM1011N	Integrated Circuit, LM1011N Dolby NR Amp.
Q101, 102	5613-2263(T)	Transistor, 2SC2263(T) or (U) Play Equalizer/Mic. Amp.
Q103, 104	5613-2320L(F)	Transistor, 2SC2320L(F) or (G) Play Equalizer/Mic. Amp.
Q105, 106	5611-999L(F)	Transistor, 2SA999L(F) Play Equalizer/Mic. Amp.
Q301, 302, 305, 306	5613-2320L(F)	Transistor, 2SC2320L(F) or (G) Rec. Equalizer Amp.
Q303, 304	5611-999L(F)	Transistor, 2SA999L(F) Rec. Equalizer Amp.
Q401	5611-999(F)	Transistor, 2SA999(F) Audio Muting
Q403, 404	5613-2320(F)	Transistor, 2SC2320(F) Audio Muting
Q407, 408	5613-1741(Q)	Transistor, 2SC1741(Q) or (R) Headphone Amp.
Q409	5611-1115(E)	Transistor, 2SA1115(E) or (F) Muting
Q601	5613-2235(Y)	Transistor, 2SC2235(Y) Bias Control Amp.
Q801	5616-2SK163(M)	Field Effect Transistor, 2SK163(M) Current Regulator
Q802	5613-790(Y)	Transistor, 2SC790(Y) Voltage Regulator
D301, 302	5641-MV11	Varistor, MV11
D401, 402, 403, 405	5631-1S2473	Diode, 1S2473
D404	5635-RD5R1EB	Zener Diode, RD5R1EB
D801, 802, 803, 804, 805	5632-1SR35-10	Diode, 1SR35-100
D806	5635-RD12EB1	Zener Diode, RD12EB1
COILS		
L301, 302	5933-70316	3.9 mH Peaking
L303, 304	5933-70416	4.7 mH Bias Trap
L305, 306	5933-70214	39 mH Bias Trap
L601	5955-101325	100 μH Line Choke
MISCELLANEOUS		
F201, 202	6171-0402	Complex, Record Bias Osc.
SW101, 102A-D, 103A,B	4431-03087350	3-Gang Push Switch, Input Selector, Dolby NR, MPX Filter
SW104A-F, 105A-D, 106A-D, 107A-D	4431-04187157	4-Gang Push Switch, Tape Selector
SW108A-L	4421-122718	Slide Switch, Record/Playback
J101, 102, 103, 104	4484-24	4-Pin Jack, Line Input & Line Output



PEAK LEVEL DISPLAY P.C. BOARD

(Apply to the units with Serial No. 01001 to Serial No. 03000)

(Apply to the units with Serial No. 03001 and above)



Ref. No.	Part No.	Description
----------	----------	-------------

RESISTORS

VR703, 704	5101-501083H	Variable Resistor, 500 ohm
------------	--------------	----------------------------

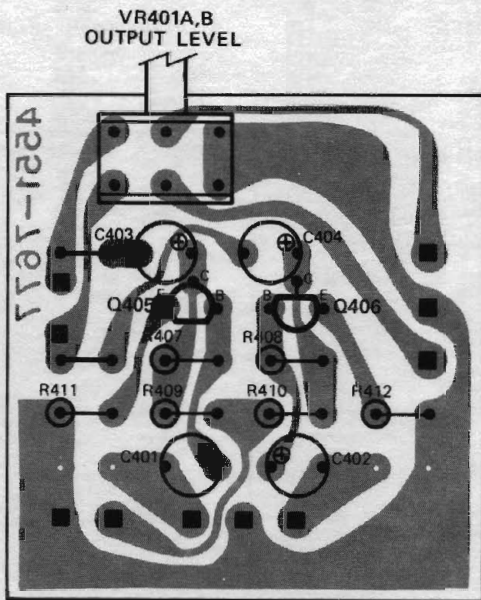
CAPACITORS

C701, 702	5345-106-16	10 μ F +50%–10% 16V Electrolytic
C703, 704	5345-336B0212	33 μ F \pm 20% 10V Electrolytic
C705	5345-107-16	100 μ F +50%–10% 16V Electrolytic

SEMICONDUCTORS

IC701, 702	5652-BA682A	Integrated Circuit, BA682A Peak Level Display Driver
DP701, 702	5623-GL112F9	LED Display, Peak Level

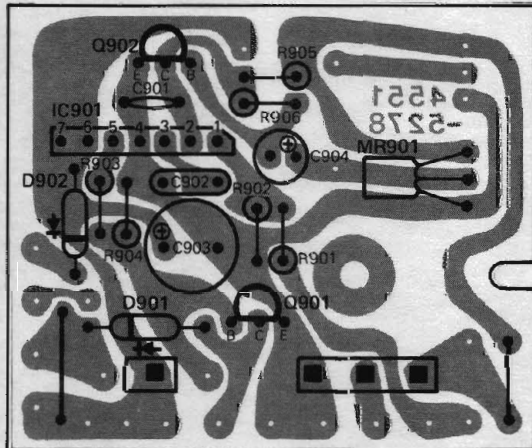
OUTPUT LEVEL CONTROL P.C. BOARD



Ref. No.	Part No.	Description
RESISTORS		
VR401A, B	5113-5027F40	Variable Resistor, 5 k ohm Output Level Control
CAPACITORS		
C401, 402	5345-105F0212	1 μ F \pm 20% 50V Electrolytic
C403, 404	5345-476C0212	47 μ F \pm 20% 16V Electrolytic
SEMICONDUCTORS		
Q405, 406	5613-2320L(F)	Transistor, 2SC2320L(F) or (G) Buffer Amp.

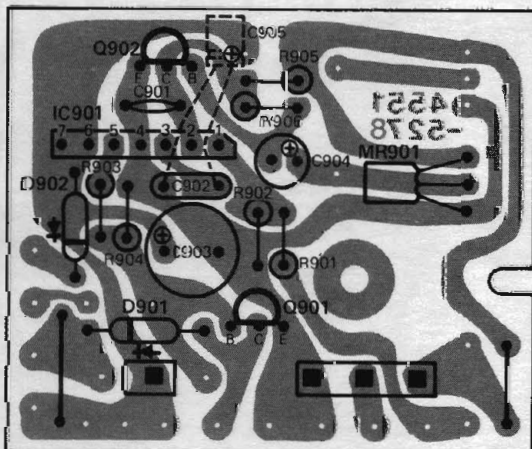
AUTO STOP P.C. BOARD

(Apply to the units with Serial No. 01001 to Serial No. 03000)



Ref. No.	Part No.	Description
CAPACITORS		
C903	5345-107-16	100 μ F +50% -10% 16V Electrolytic
C904	5345-106-16	10 μ F +50% -10% 16V Electrolytic
C905	5345-334F0951	0.33 μ F \pm 20% 50V Electrolytic
SEMICONDUCTORS		
IC901	5654-AN6250	Integrated Circuit, AN6250 Auto Stop Driver
Q901	5614-355(D)	Transistor, 2SD355(D) Solenoid Driver
Q902	5613-2320(F)	Transistor, 2SC2320(F) Auto Stop Pre-Driver
D901, 902	5632-1SR35-10	Diode, 1SR35-100

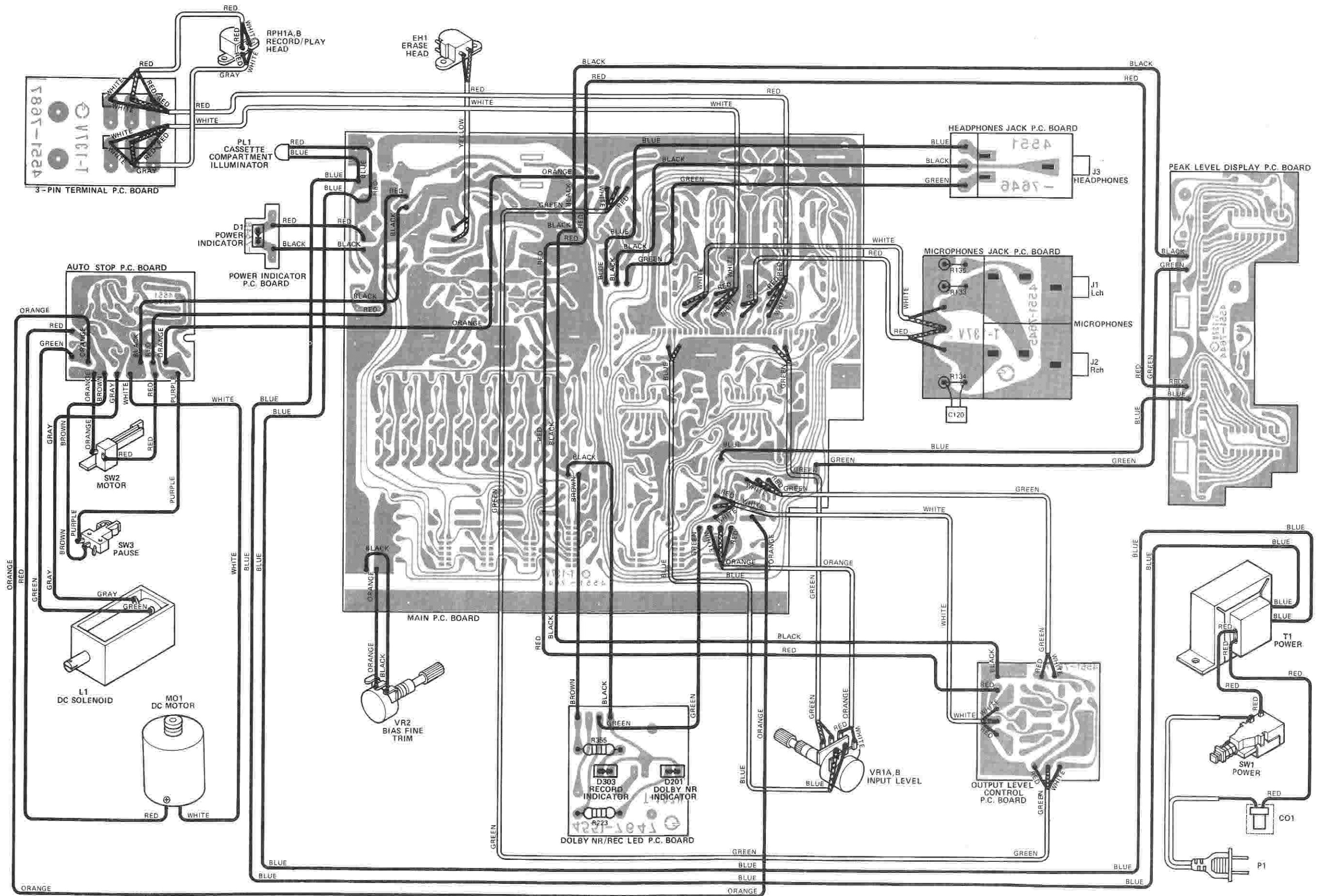
(Apply to the units with Serial No. 03001 and above)



MISCELLANEOUS		
MR901	5193-DM101A	Magneto-Resistance Element, Auto Stop Sensor

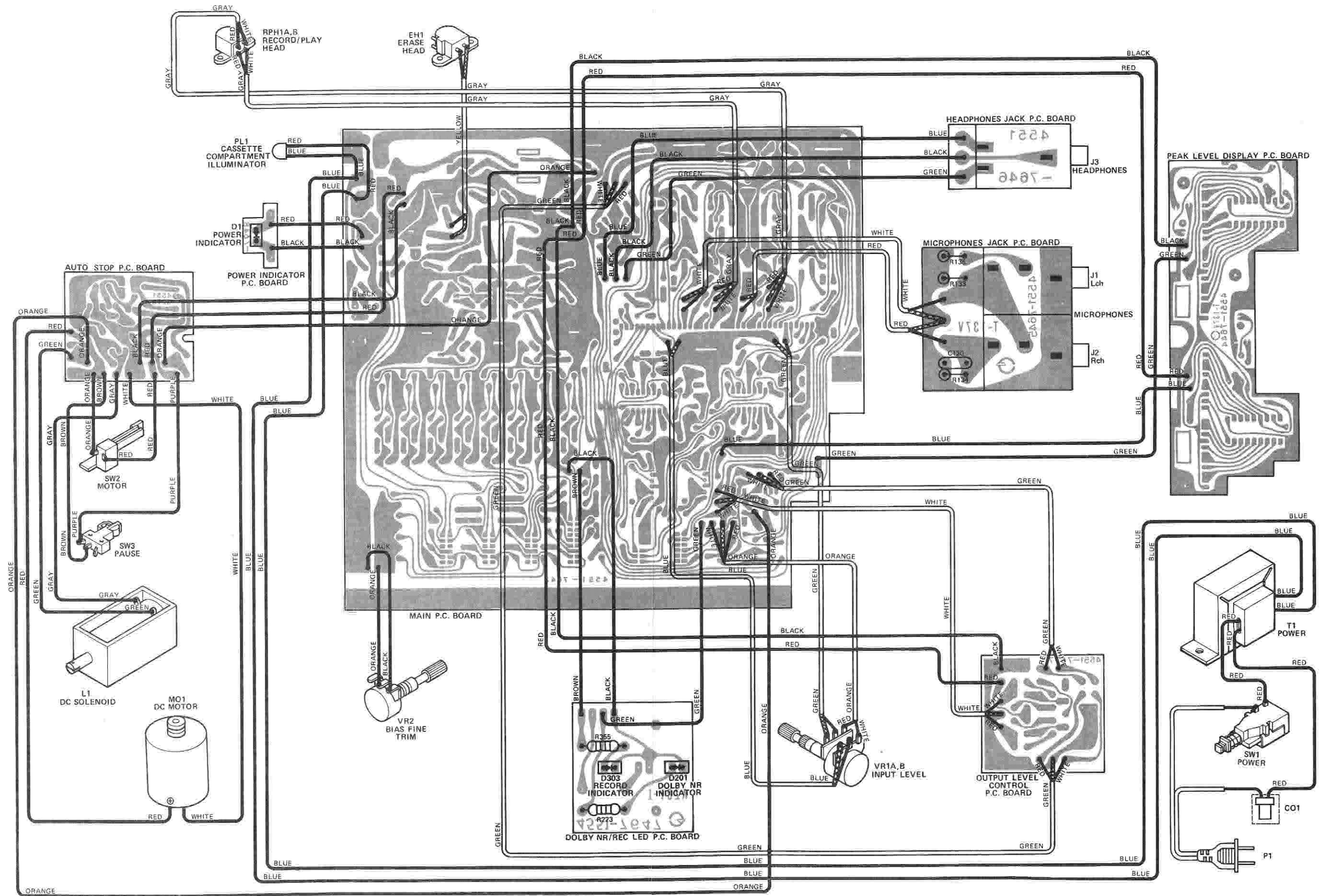
WIRING DIAGRAM

REGULAR VOLTAGE (Apply to the units with Serial No. 01001 to Serial No. 03000)

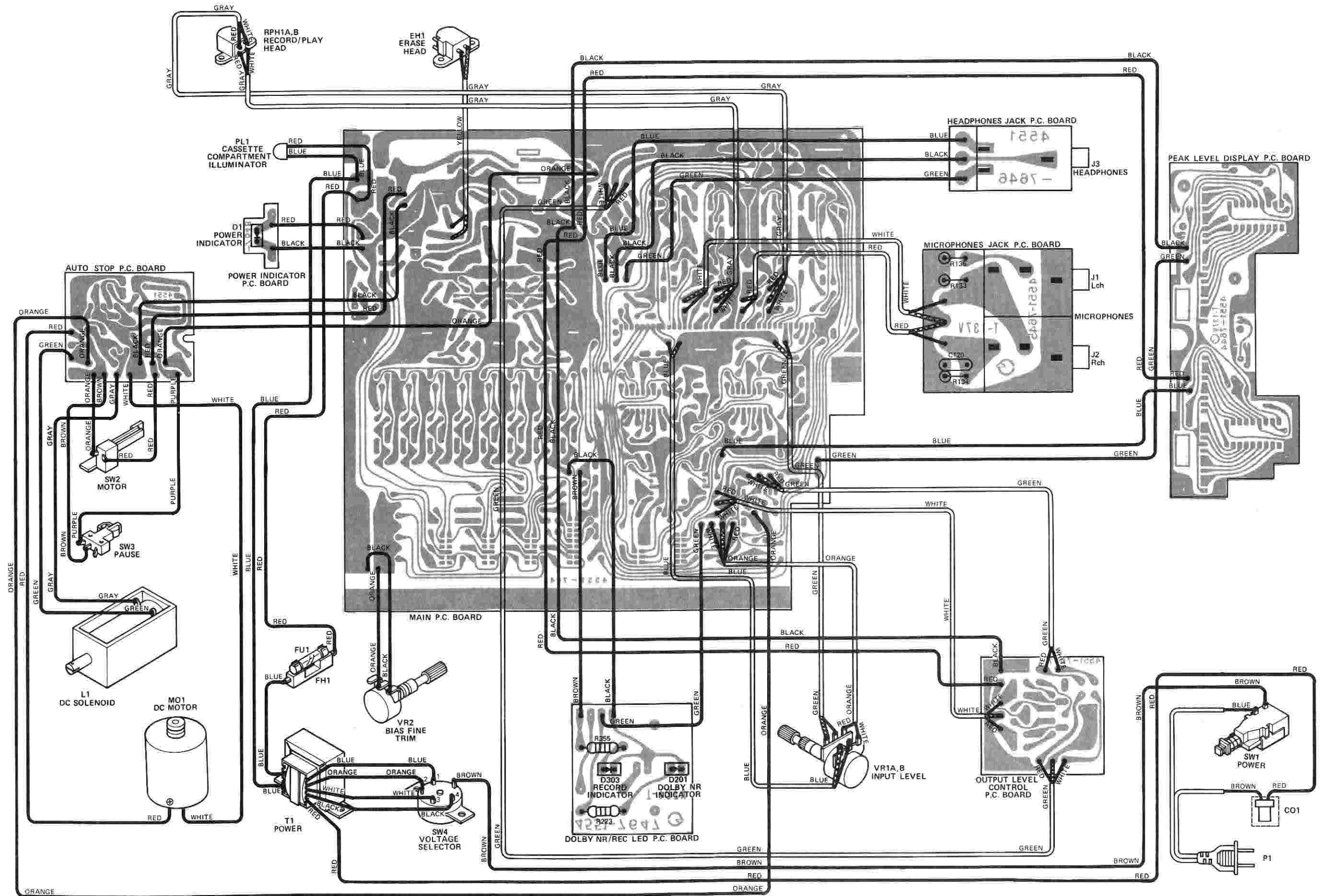


WIRING DIAGRAM

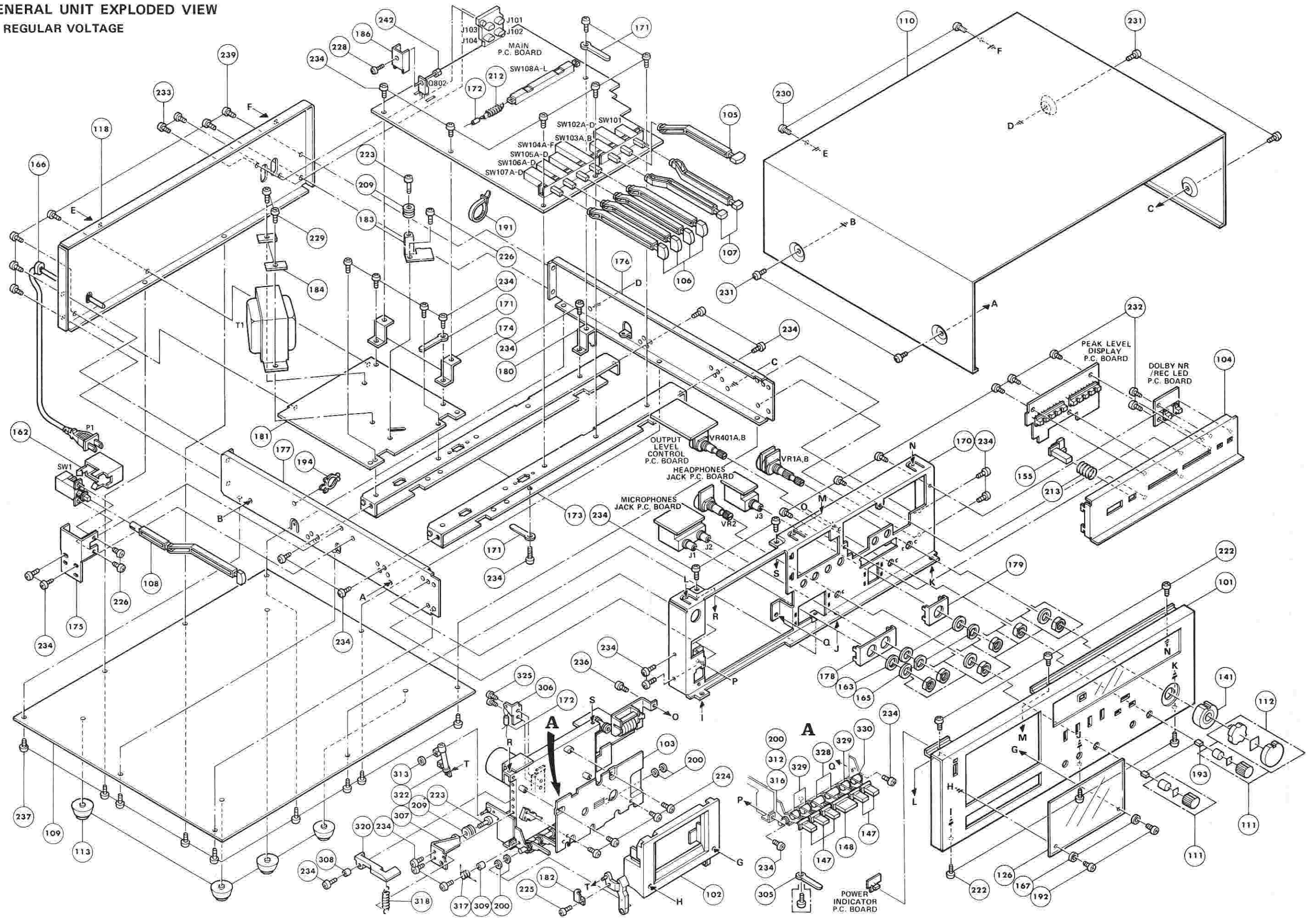
REGULAR VOLTAGE (Apply to the units with Serial No. 03001 and above)



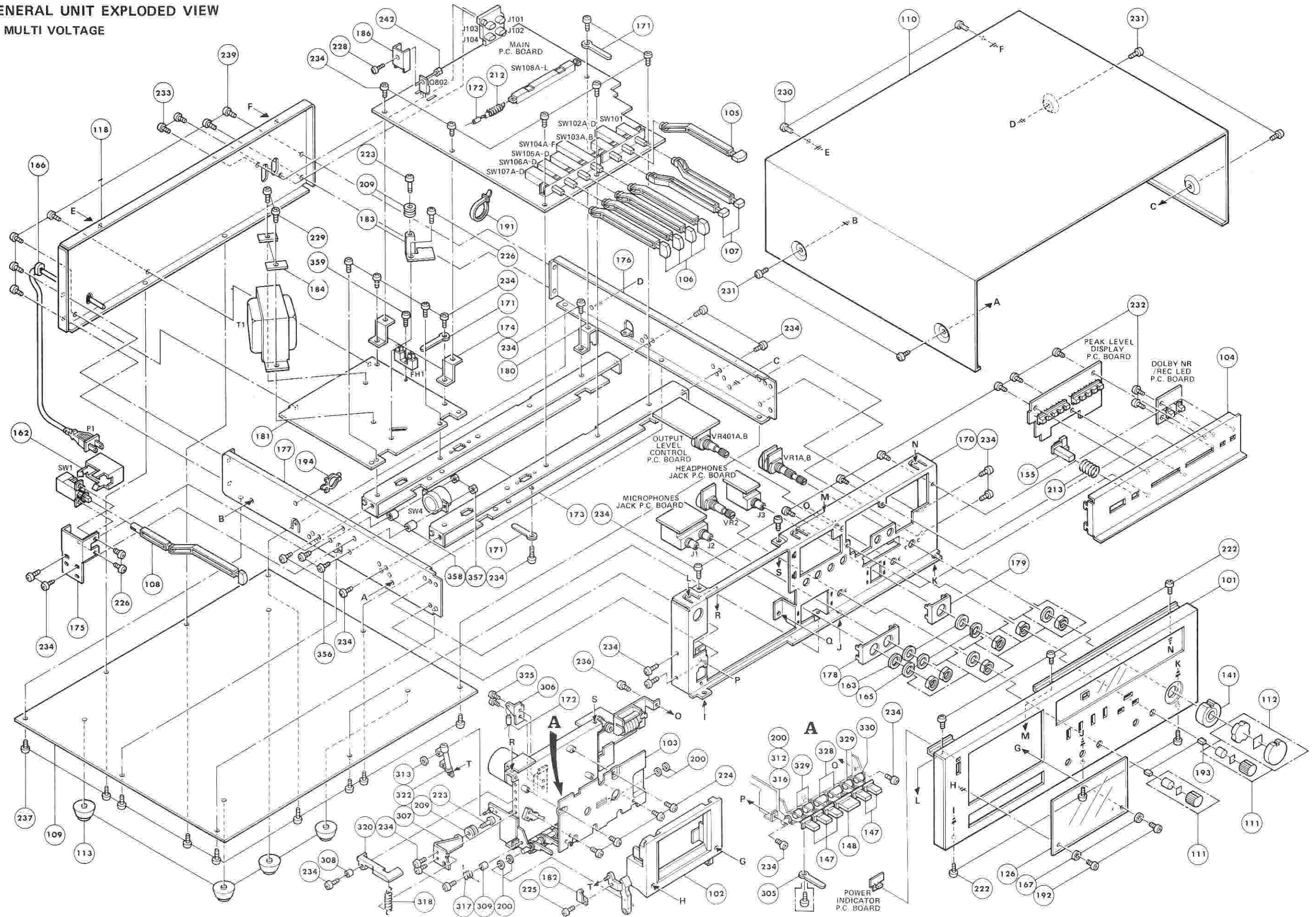
WIRING DIAGRAM
MULTI VOLTAGE



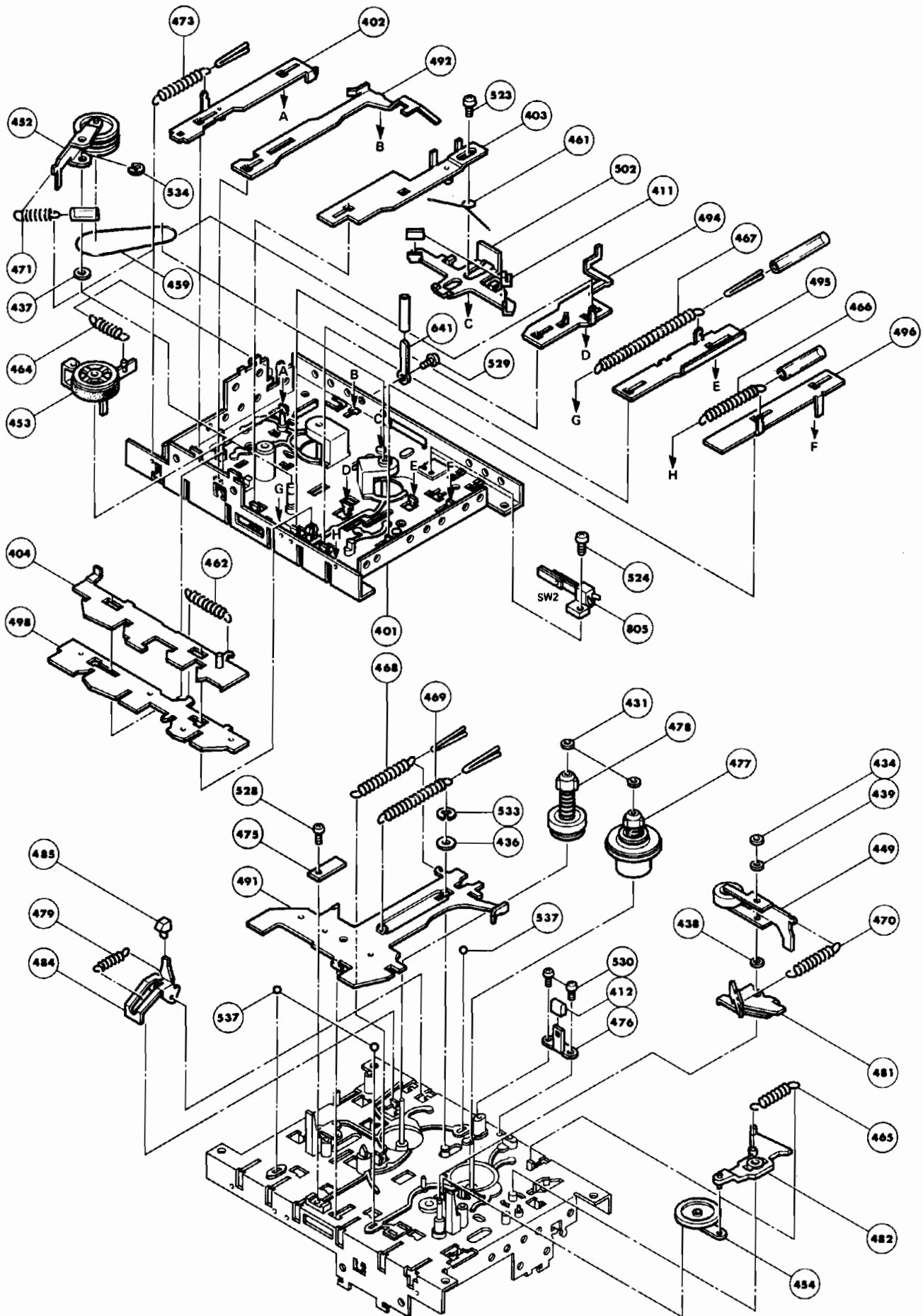
**GENERAL UNIT EXPLODED VIEW
REGULAR VOLTAGE**



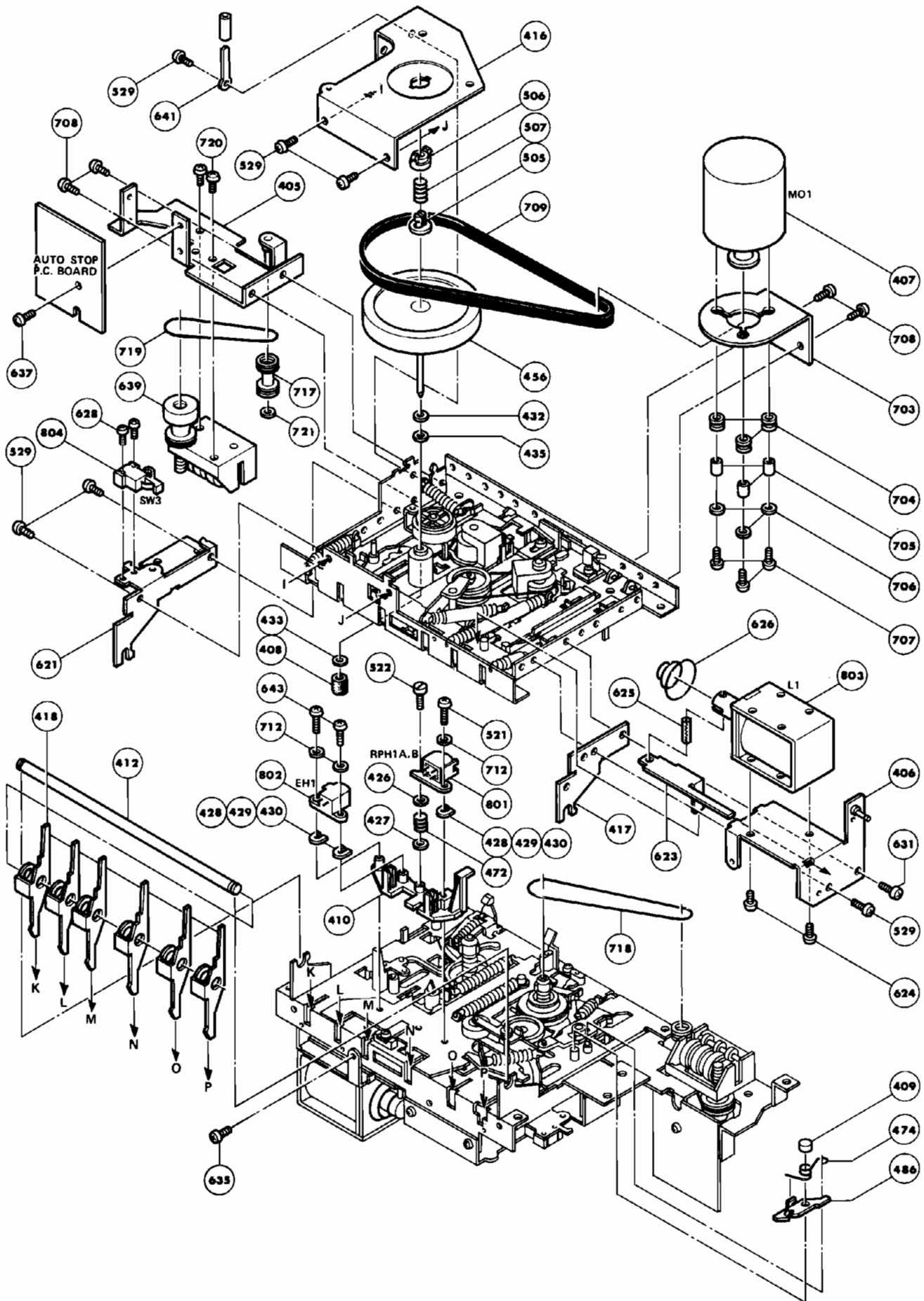
GENERAL UNIT EXPLODED VIEW
MULTI VOLTAGE



CASSETTE TAPE RECORDER EXPLODED VIEW



CASSETTE TAPE RECORDER EXPLODED VIEW



CHASSIS PARTS LIST

Ref. No.	Part No.	Description
GENERAL UNIT		
101	A443-HK100	Front Panel Assembly
102	A612-HK100	Cassette Compartment Slot Assembly
103	A514-HK100-A	Dressing Plate Assembly, Cassette Compartment
105	A662-HK100-A	Push Button Assembly, Dolby NR
106	A662-HK100-B	Push Button Assembly, Metal, CrO2, FeCr, LN
107	A662-HK100-C	Push Button Assembly, MPX Filter, Input Selector
108	A662-HK100-D	Push Button Assembly, Power
110	A414-HK100	Cabinet Top Assembly
111	A634-HK100-A	Knob Assembly, Bias Fine Trim, Output Level
112	A634-HK100-B	Knob Assembly, L ch. Input Level
113	1319-0139	Foot, Cabinet Bottom (x4)
118	1424-03801	Cabinet Back
126	1531-04201	Cassette Compartment Cover
141	1630-01301	Knob, R ch. Input Level
147	1652-02103VN	Push Button, Stop/Eject, Record, Rew., F. FWD, Pause
148	1652-02202VN	Push Button, Play
155	1662-05801VN	Push Button, Reset
162	2133-175	Protector, Power Switch
167	2114-01224	Bushing, Cassette Compartment Cover
192	2310-7016	Special Screw, Cassette Compartment Cover
209	2612-52273	Pulley, Record Cord
322	2692-2	Damper, Eject

CASSETTE TAPE RECORDER

407(MO1)	D311-MR058MFA	DC Motor Assembly (w/Pulley)
449	2614-5025	Pinch Roller
452	2615-5032	Idler, Rew.
453	2662-5010	Clutch, F. FWD
454	2615-5019	Idler, Play
456	2617-5144	Flywheel
459	2642-01452	Belt, Rew. Idler – Supply Reel Spindle
477	2661-415029	Take-Up Reel Spindle
478	2661-415030	Supply Reel Spindle
639	3131-375001	Tape Counter
709	2642-02410	Belt, Motor – Flywheel
717	2617-5147	Wheel, Tape Counter Belt
718	2642-01454	Belt, Take-Up Reel Spindle – Wheel
719	2642-01457	Belt, Wheel – Tape Counter
801 (RPH1A, B)	5874-1320	Record/Playback Head
802 (EH1)	5873-1217	Erase Head
803 (L1)	4333-40212	DC Solenoid
804 (SW3)	4463-50	Spring Switch, Pause
805 (SW2)	4463-53	Spring Switch, Motor

ELECTRICAL

T1	5584-701317	Power Transformer
SW1	4431-01017358	Push Switch, Power
J1, 2	4452-019	2-Pin Jack, Microphones
J3	4451-00107	Headphones Jack
P1	4161-0487	AC Line Cord
VR1A, B	5113-5037282	Variable Resistor, 50 k ohm Input Level Control
VR2	5113-1037521	Variable Resistor, 10 k ohm Bias Fine Trim Control
D1	5637-GL9PR20	Light Emitting Diode, GL9PR20 Power Indicator
D201	5637-GL9NG2	Light Emitting Diode, GL9NG2 Dolby NR Indicator
D303	5637-GL9PR20	Light Emitting Diode, GL9PR20 Record Indicator
PL1	5731-1407123	Lamp, 14V 50mA Cassette Compartment Illuminator

MULTI VOLTAGE VERSION PARTS LIST

AS FOR ALL OTHER PARTS EXCEPT THE FOLLOWING PARTS IN REF. NO., REFER TO REGULAR VOLTAGE UNIT.

Ref. No.	Part No.	Description
PART NO. CHANGE		
118	1424-03803	Cabinet Back
T1	5584-702317	Power Transformer
SW1	4431-01017658	Push Switch, Power
P1	4161-7256	AC Line Cord
ADDITIONAL USAGE		
SW4	4411-104736	Rotary Switch, Power Source Voltage Selector
FU1	5732-80102	Fuse, T800mA 250V
FH1	4472-416	Fuse Holder, FU1