

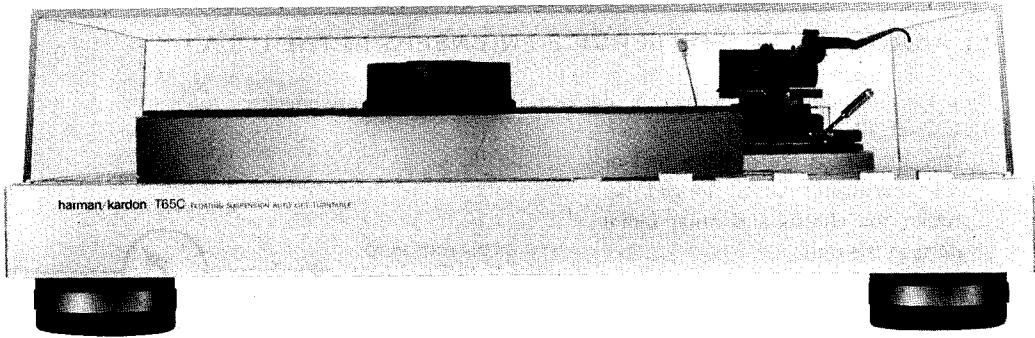
# The Harman Kardon Model T65C

Manual No. 78A

## FLOATING SUSPENSION AUTO LIFT TURNTABLE

T65C

# Technical Manual



**harman/kardon**  
240 CROSSWAYS PARK WEST, WOODBURY, N.Y. 11797  
1112-H15278A2 P-08849 1850 PRINTED IN JAPAN

T65C

**SPECIFICATIONS**

<b>Wow &amp; Flutter (WRMS)</b>	0.025%
<b>Rumble (DIN-B WTD)</b>	-70dB, DIN 45544 record reference
<b>Pitch Adjustable Range</b>	±4%
<b>Tonearm</b>	
<b>Effective Tonearm Mass</b>	9.5g (plus the mass of the cartridge used)
<b>Stylus Overhang</b>	18 mm
<b>Offset Angle</b>	25.5°
<b>Effective Length</b>	216 mm
<b>Tracking Error</b>	±2 degrees
<b>Phono Capacitance</b>	70/170/270pF
<b>Tracking Force</b>	0 ~ 3 grams

<b>Acceptable Weight of Cartridge</b>	4.5 ~ 13 g
<b>Dimensions (W x H x D)</b>	17-1/2" x 5-3/4" x 15-1/2" (443x145x384 mm)
<b>Weight</b>	17 lbs. 10 oz. (8 kg)
<b>Power Supply</b>	
U.S.A. and Canada models	AC120V, 60Hz
General model	AC110-120V/220-240V 50/60Hz
<b>Power Consumption</b>	
U.S.A. and Canada models	8W
General model	10W

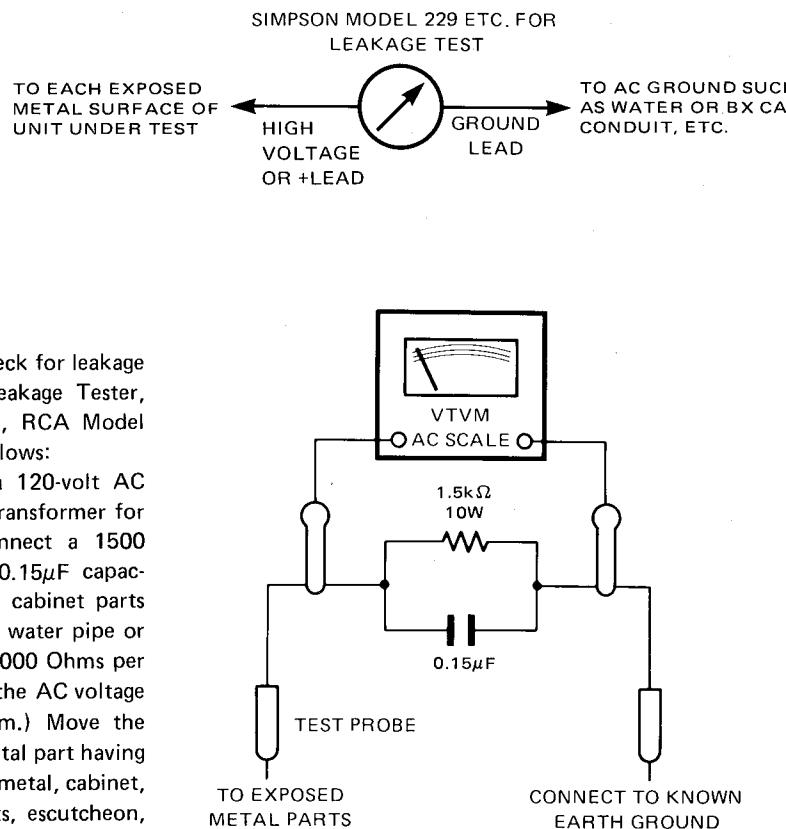
Specifications and components subject to change without notice.  
Overall performance will be maintained or improved.

**LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A.)**

Before returning the unit to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. which were removed for servicing are properly reinstalled.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows:  
Plug the power cord directly into a 120-volt AC receptacle (do not use an Isolation Transformer for this test). Using two clip leads, connect a 1500 Ohm, 10-watt resistor paralleled by a  $0.15\mu F$  capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 Ohms per volt, or higher, sensitivity to measure the AC voltage drop across the resistor. (See Diagram.) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal, cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the On and Off positions.)

A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.



## DISASSEMBLY PROCEDURES (REFER TO PAGES 6, 7 AND 13)

**NOTE:** Before disassembling the unit, remove the platter, platter mat, counterweight and headshell with cartridge, and securely tie the arm to the armrest with string, etc. Then gently turn the unit upside down and place it on cloths, etc. piled up on both sides to protect the arm and cabinet from damage.

### 1 CABINET BOTTOM ASSEMBLY (102) REMOVAL

Remove a screw **A** and 10 screws **B** and remove the Cabinet Bottom Assembly (102).

\* Toothed washer is attached to the screw **A**.

### 2 FRONT PANEL ASSEMBLY (103) REMOVAL

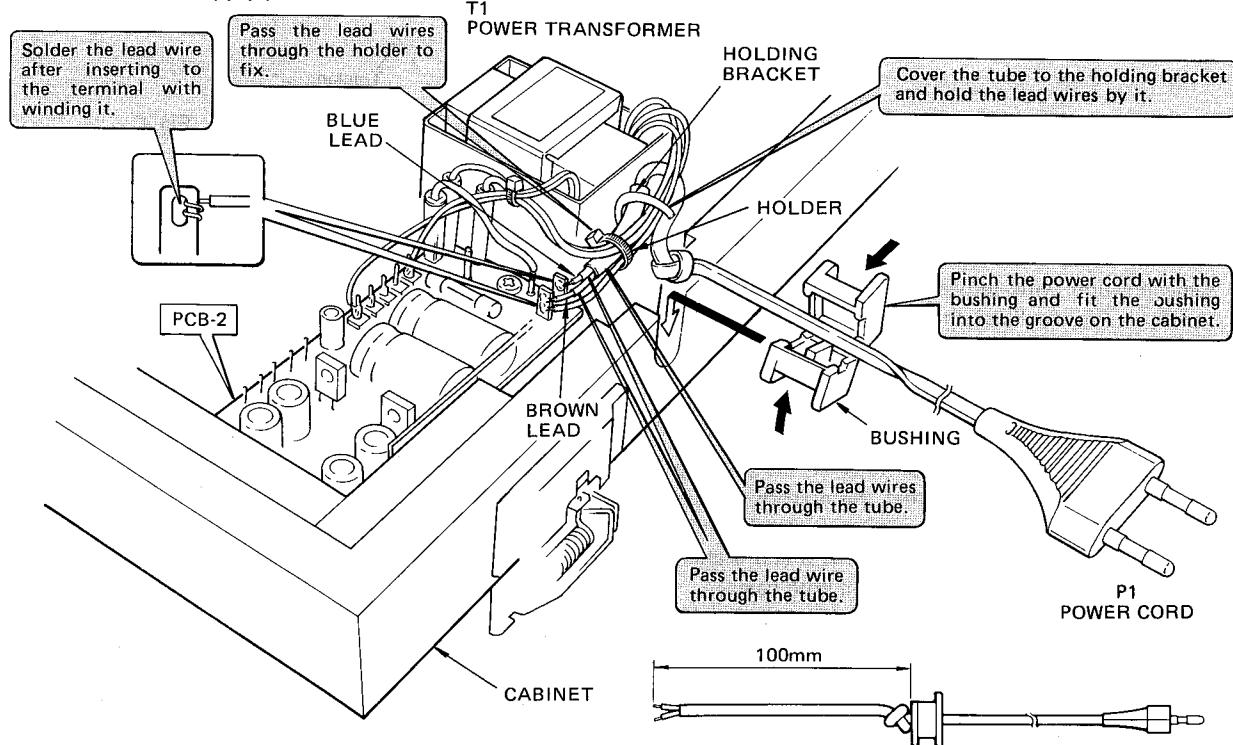
1. Remove the Cabinet Bottom Assembly (102). (Refer to step **1**.)
2. Remove 6 screws **C** and remove the Bracket (184) with PCB-3 and PCB-7 by pulling the Front Panel Assembly (103) slightly forward then remove the Front Panel Assembly.

### 3 PICK-UP ASSEMBLY (129) REMOVAL

1. Remove the Cabinet Bottom Assembly (102). (Refer to step **1**.)
2. Unsolder the lead wires connected to the Solenoid (L1) on Pick-up Assembly (129) from Photo Transistor P.C.Board (PCB-6), and unsolder the lead wires connected to the Capacitance Trim Selector P.C. Board (PCB-4).
3. Loosen screw **D** and remove the Lever Assembly (107).
4. Remove 3 screws **E** and remove the Pick-up Assembly (129) with the Capacitance Trim Selector P.C.Board (PCB-4).
5. Pull out the Cap. Trim Knob (139/140).
6. Remove the Nut **F**. (Fit a narrow tipped tool such as radio pliers into the groove of the nut and turn it counterclockwise.)

## POWER CORD REPLACEMENT(FOR SERVICE ENGINEERS OTHER THAN NORTH AMERICA)

In order to prevent fire or shock hazard when replacing the power cord, follow the procedure below to replace the parts with the standard supply parts.



## CARTRIDGE REPLACEMENT INSTRUCTION

Only use cartridges in the headshell provided. Be sure to use a cartridge weighting 4.5 to 13 grams.

- Release the tonearm clamp and lift the tonearm gently.
- Loosen the headshell clamp and gently pull the headshell with cartridge. (See Fig. A.)
- Disconnect the 4 leads from cartridge pins using a tweezers and, then loosen the retaining screws so that the cartridge comes out.
- Replace the leads onto the new cartridge. Refer to Fig. B for correct placement of leads.
- When all leads are connected properly, install cartridge to the headshell as shown in the Fig. B.
- Temporarily tighten the retaining screw to hold the cartridge.
- Insert the headshell with the cartridge fully into the tonearm and then tighten the headshell clamp.

When cartridge is replaced with new one, it is necessary to adjust the Overhang and Tracking angle.

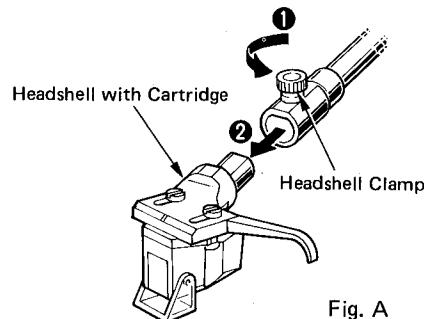


Fig. A

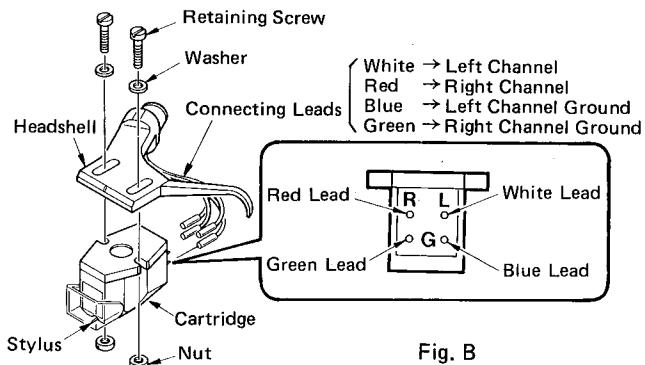


Fig. B

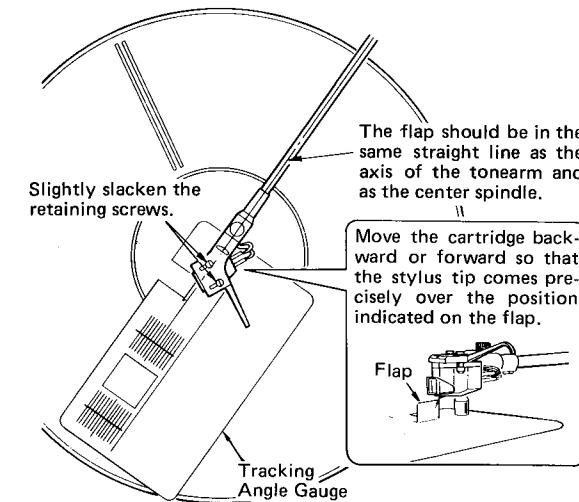


Fig. C

### ● Tracking Angle Adjustment

- Check to be sure that the overhang adjustment has been completed.
- Now move the tracking angle gauge until it is in the same position with respect to the tonearm as that shown in Fig. D. Place the stylus over the tracking angle setting point while keeping stylus guard attached.
- Without changing the stylus position, turn the cartridge so that its front edge is parallel with the lines on the gauge.
- Now move the gauge so that it is in the position shown in Fig. E and check that the cartridge is still parallel with the parallel lines as it was in step 3 above. If it is not parallel, then repeat steps 3 and 4 alternately until the cartridge is parallel in both cases.
- When the above adjustment is completed, then fully tighten the screws that attach the cartridge to the headshell.

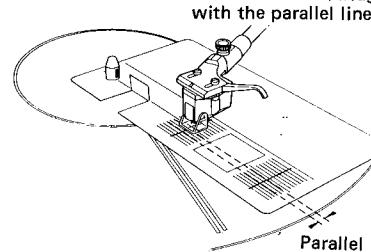


Fig. D

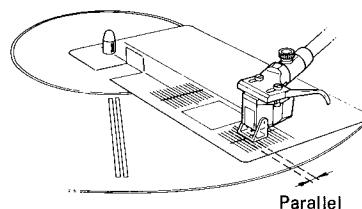


Fig. E

## ALIGNMENT PROCEDURES

### ■ SUSPENSION ADJUSTMENT

#### \*Conditions

1. Make sure to install the platter, rubber platter mat and disc stabilizer.  
(It is not necessary for you to hang the drive belt between the platter and motor pulley.)
2. Install the cartridge and counter weight to the tonearm. (Set the tracking force to about 2g.)  
Secure the tonearm with the tonearm clamp so that it does not move.
3. Be sure that the power is off.

#### ● ADJUSTMENT

1. Adjust so that the space between platter and surface of cabinet is  $4\text{mm} \pm 0.2\text{mm}$  by turning screws ① to ③ as shown in the Fig.1.  
(Turning these screws clockwise moves the platter down and turning them counterclockwise moves it up.)
2. After adjustments, confirm that the platter moves up and down in the well-balanced condition even if the platter is pressed down in the cabinet.

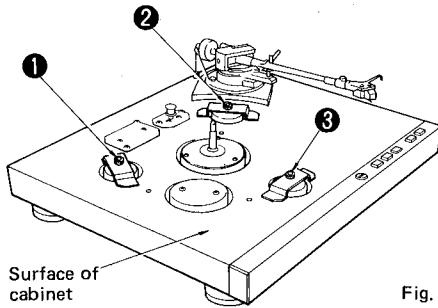


Fig. 1

### ■ DISC END DETECTION POSITION ADJUSTMENT

#### \*Conditions

Be sure not to hang the drive belt between platter and motor pulley.  
Quartz Lock Switch . . . . . ON (button in)  
Lift Switch . . . . . auto

#### ● LP POSITION ADJUSTMENT

1. Depress the 33-speed button.
2. Lower the cue lever. (Arm Lifter is set to the low position.)
3. Adjust the adjustment screw so that the stylus of cartridge detects the disc end position between  $111.94\text{mm} \sim 107.2\text{mm}$  from the center of spindle.

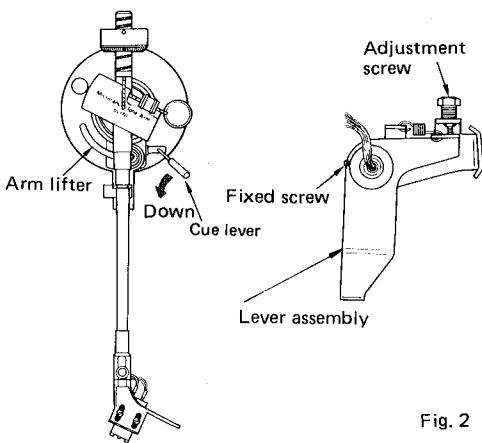


Fig. 2

### ● EP POSITION ADJUSTMENT

1. Depress the 45-speed button.
2. Lower the cue lever. (Arm Lifter is set to the low position.)
3. Adjust the adjustment screw so that the stylus of cartridge detects the disc end position between  $102.74\text{mm} \sim 98.4\text{mm}$  from the center of spindle.

#### NOTE:

1. Turn the adjustment screw clockwise for slower lift-up and counterclockwise for faster lift-up.
2. If it is not within the rate, assumedly, it result from the attached position of lever assembly. Try to change the attaching position by loosing the fixed screw.
3. When the disc end position is detected, the motor revolution stops, and arm lifter is raised.  
If you are going to start it again, place the tonearm on armrest once.

### ■ MOTOR R.P.M. ADJUSTMENT

#### \* Instruments

Frequency Counter

#### \* Conditions

1. Be sure that the drive belt between platter and motor pulley is hang.
2. Flip the cue lever forward to lift the tonearm up.

#### ● ADJUSTMENT

1. Depress the 33-speed button.
2. Set the quartz lock button so that it is in the up position. (In this state, the quartz lock indicator will not light even when the platter rotates.)
3. Set the speed control knob to the center position.
4. Connect the frequency counter to TP1 (+) and TP2 (-). (Refer to **[PCB-1]** on page 13.)
5. Move tonearm over the platter, and rotate the platter.
6. Adjust VR101 so that the frequency becomes  $124.8\text{ kHz}$ .

**NOTE:** Be sure to use the insulated screwdriver for adjustment.

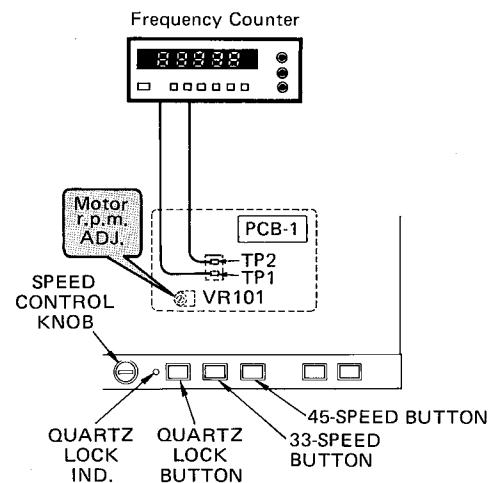
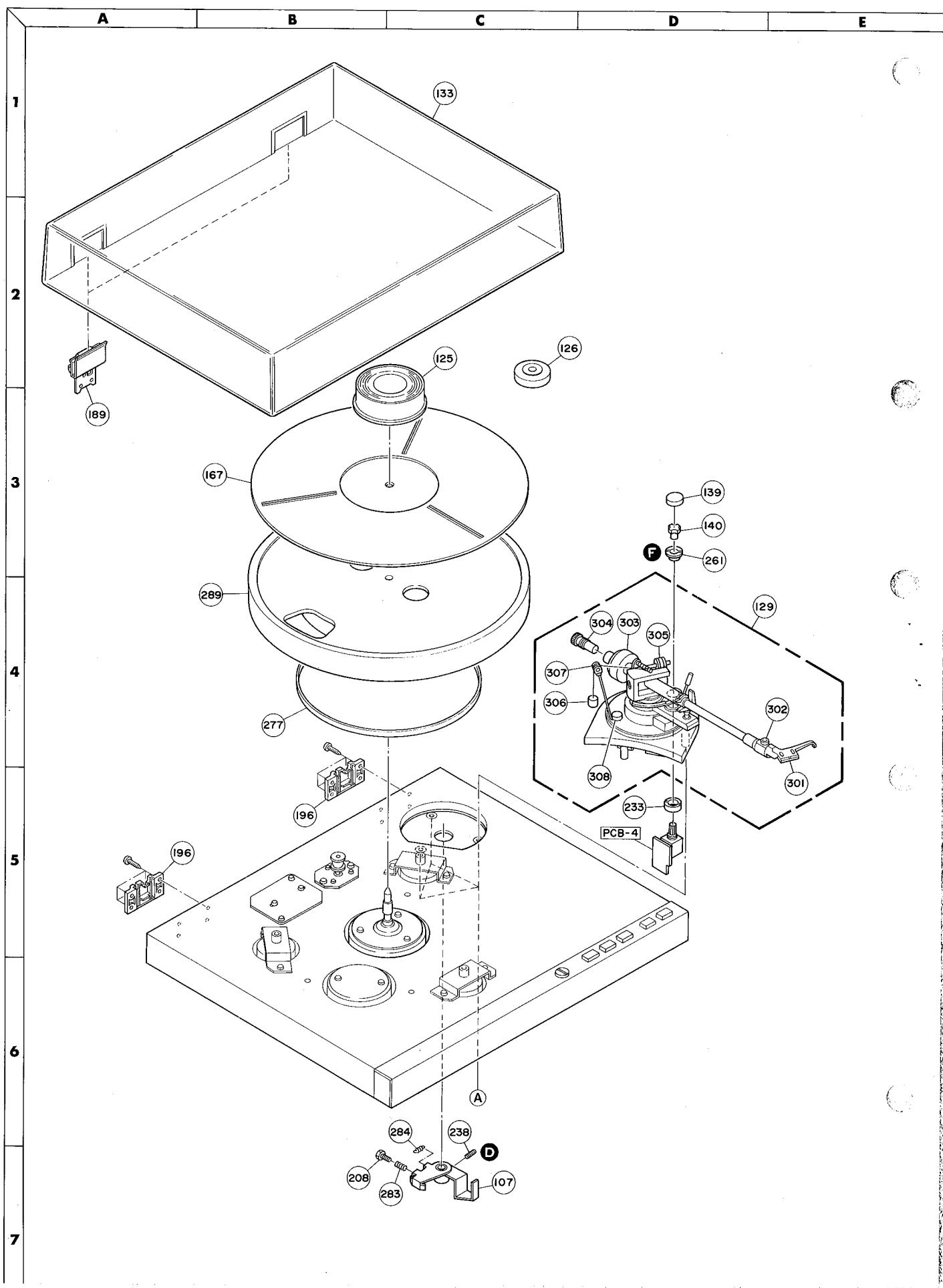
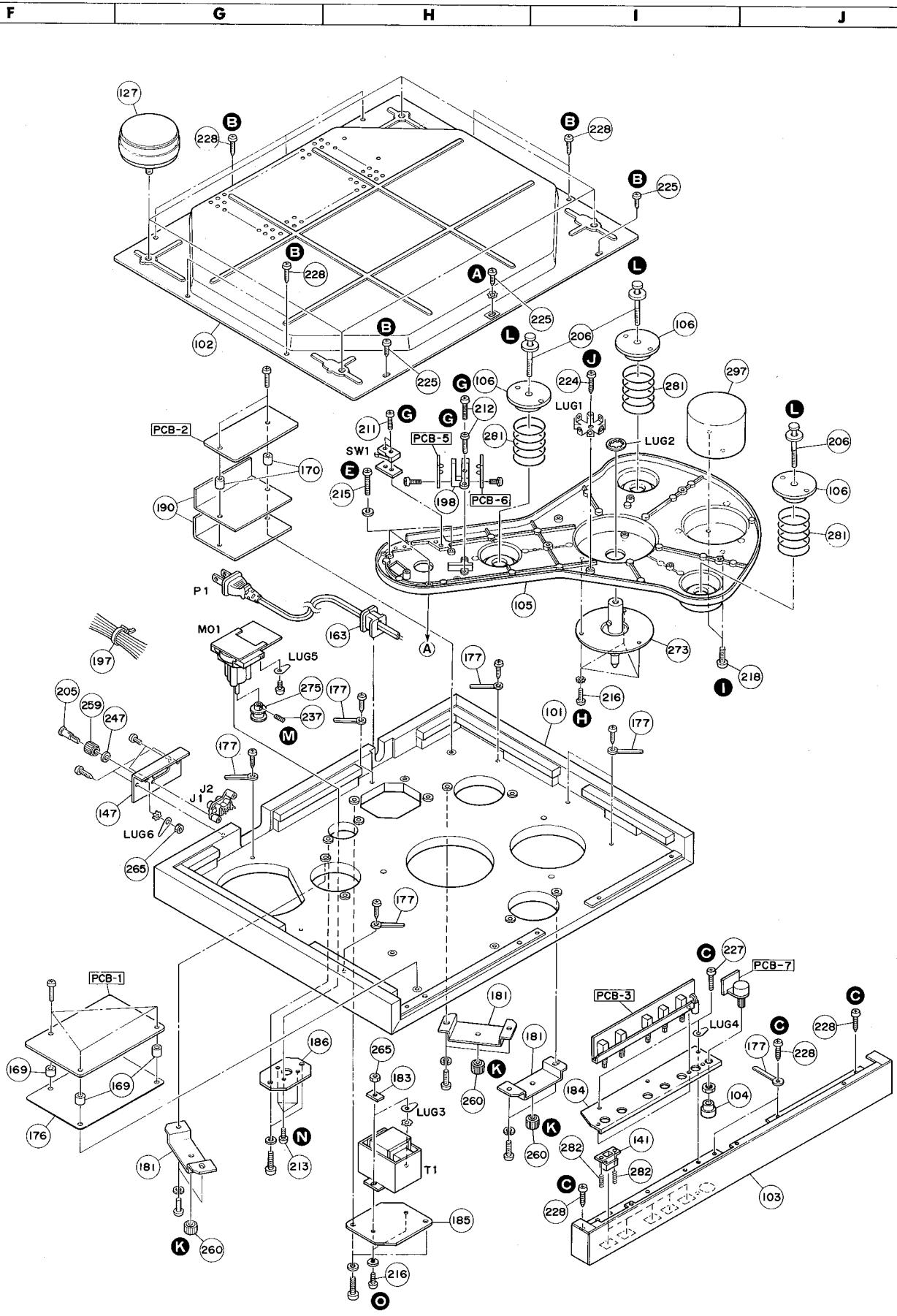


Fig. 3

## GENERAL UNIT EXPLODED VIEW





## GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	A415-T65CA	Cabinet Assembly (for U.S.A. and Canada models)
"	A415-T65CC	Cabinet Assembly (for General model)
"	A415-T65CD	Cabinet Assembly (for General model Military version)
102	A424-T65CA	Cabinet Bottom Assembly (for U.S.A. model)
"	A424-T65CB	Cabinet Bottom Assembly (for Canada model)
"	A424-T65CC	Cabinet Bottom Assembly (for General model)
103	A443-T65CA	Front Panel Assembly
104	A634-T65CA	Knob Assembly, Speed Control
105	B211-T65CA	Chassis Assembly (for U.S.A. and Canada models)
"	B211-T65CC	Chassis Assembly (for General model)
106	B219-T65CA	Bracket Assembly, Spring Hold
107	B672-T65CA	Lever Assembly, Auto-up
108	B219-T65CA	Bracket Assembly, Spring Hold
125	1161-00101	Disc Stabilizer
126	1362-7007	45 R.P.M. Adaptor
127	1319-0147	Foot
129	1371-717	Pick-up Assembly (w/L1)
133	1472-01301	Dust Cover
139	1634-05001	Knob, Cap. Trim
140	1355-7040	Knob Base, Cap. Trim
141	1660-00201	Push Button, Quartz Lock, 33/45 Speed, Lift, Cut Indication Plate
147	1724-02601	
163	2114-71264	Bushing, Power Cord (for U.S.A. and Canada models)
"	2114-71270	Bushing, Power Cord (for General model)
167	2115-00101	Platter Mat
169	2132-01401	Spacer
170	2132-7016	Spacer
176	2216-7134	Shield Plate
177	2218-7001	Holding Bracket
181	2219-7865	Bracket
183	2219-7359	Bracket
184	2219-8003	Bracket
185	2219-8004	Bracket
186	2219-8005	Bracket
189	2221-7120	Hinge
190	2224-7074	Insulator
196	2240-7194	Holder
197	2240-7120	Holder
198	2240-7227	Holder
205	2310-7015	Special Screw, GND
206	2310-7020	Special Screw
208	2316-300829	Hexagon-head Screw
211	2327-231029	Screw (+) (2.3X10 mm)
212	2327-300629	Screw (+) (3X6 mm)
213	2327-300649	Screw (+) (3X6 mm)
215	2327-301229	Screw (+) (3X12 mm)
216	2327-301249	Screw (+) (3X12 mm)
218	2327-401449	Screw (+) (4X14 mm)
224	2347-300822	Self-tapping Screw (+) (3X8 mm)
225	2347-300842	Self-tapping Screw (+) (3X8 mm)
227	2347-301022	Self-tapping Screw (+) (3X10 mm)
228	2347-301241	Self-tapping Screw (+) (3X12 mm)
233	2360-7010	Special Boss
237	2371-260429	Set Screw, Motor Pulley
238	2374-30042D9	Set Screw, Lever Assembly
247	2410-7005	Special Washer
259	2440-7011	Special Nut, GND
260	2440-64	Specail Nut
261	2440-7020	Special Nut
265	2446-30229	Hexagon-head Nut
273	2601-7108	Center Spindle Assembly
275	2618-7005	Motor Pulley
277	2642-02701	Drive Belt
281	2651-2101701	Spring
282	2651-2101702	Spring
283	2651-2101116	Spring
284	2651-110331	Spring
289	2665-715	Platter
297	2691-7001	Balancer
301	MA-1699	Headshell
302	MC-3752	Headshell Clamp
303	MC-6262	Counterweight

Ref. No.	Part No.	Description
304	MC-6112	Sub-counterweight
305	MC-6116	Lateral Balancer
306	MC-6129	Anti-skating Weight with Wire
307	MC-6263	Anti-skating Wire Holder
308	MC-6128	Set Screw

## ELECTRICAL PARTS LIST

### CHASSIS MISCELLANEOUS

▲P1	4161-7187	Power Cord (for U.S.A. model)
▲ "	4161-71151	Power Cord (for Canada model)
▲ "	4161-7256	Power Cord (for General model)
▲ T1	5584-701483	Power Transformer (for U.S.A. and Canada models)
▲ "	5584-702483	Power Transformer (for General model)
MO1	4311-1A159	Motor Assembly
▲ SW1	4431-A017128	Microswitch, Rest
J1/2	4482-7127	2-Pin Jack, Output
▲ F1	5732-801031	Fuse, 800mA, 125V (for U.S.A. and Canada models)
▲ "	5732-501030	Fuse, T500mA, 250V (for General model)
L1	N.A. Separately	Solenoid, Auto-lift (Part of Pick-up Assembly)
LCN1	4163-701116	Connector with Lead Wire, 6 Pos.
LCN2	4163-701115	Connector with Lead Wire, 7 Pos.
LCN3	4163-701117	Connector with Lead Wire, 4 Pos.
LUG1	4211-5006	Lug Terminal
LUG2	2467-1406	Lug Terminal
LUG3, 4, 5, 6	4211-5005	Lug Terminal

### PCB-1 MOTOR CONTROL P.C. BOARD

#### RESISTORS

R101	5174-823381	82kΩ, ±1%, 1/4W, Metal
R102	5174-104381	100kΩ, ±1%, 1/4W, Metal
R106	5174-474381	470kΩ, ±1%, 1/4W, Metal
R107	5174-562381	5.6kΩ, ±1%, 1/4W, Metal
R119	5174-393381	39kΩ, ±1%, 1/4W, Metal

#### CONTROL

VR101	5101-1031926	10kΩ
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#### CAPACITORS

C101, 114	5345-474F041	0.47μF, ±20%, 50V, Electrolytic
C104, 108	5345-476C041	47μF, ±20%, 16V, Electrolytic
C105	5345-107C041	100μF, ±20%, 16V, Electrolytic
C106	5345-227C041	220μF, ±20%, 16V, Electrolytic
C109	5345-107C041	100μF, ±20%, 16V, Electrolytic
C110	5345-225F0952	2.2μF, ±20%, 50V, Electrolytic
C113	5345-225F041	2.2μF, ±20%, 50V, Electrolytic
C201	5345-106C041	10μF, ±20%, 16V, Electrolytic
C202	5345-475F0952	4.7μF, ±20%, 50V, Electrolytic
C203	5345-475F041	4.7μF, ±20%, 50V, Electrolytic

#### INTEGRATED CIRCUIT

IC101	5654-TC9142P	TC9142P
IC102	5654-TC4069BP	TC4069UBP

#### TRANSISTORS

Q101, 102, 103, 104, 105, 201, 203	5613-2603(E)	2SC2603(E) or 2SC2603(F)
Q106	5611-1115(E)	2SA1115(E) or 2SA1115(F)
Q202	5613-3246(H)	2SC3246(H)

#### DIODES

D101	5635-HZ9B3L	Zener, HZ9B3L
D102, 201	5631-1S2473	1S2473
D202	5632-1SR35-10	1SR35-100

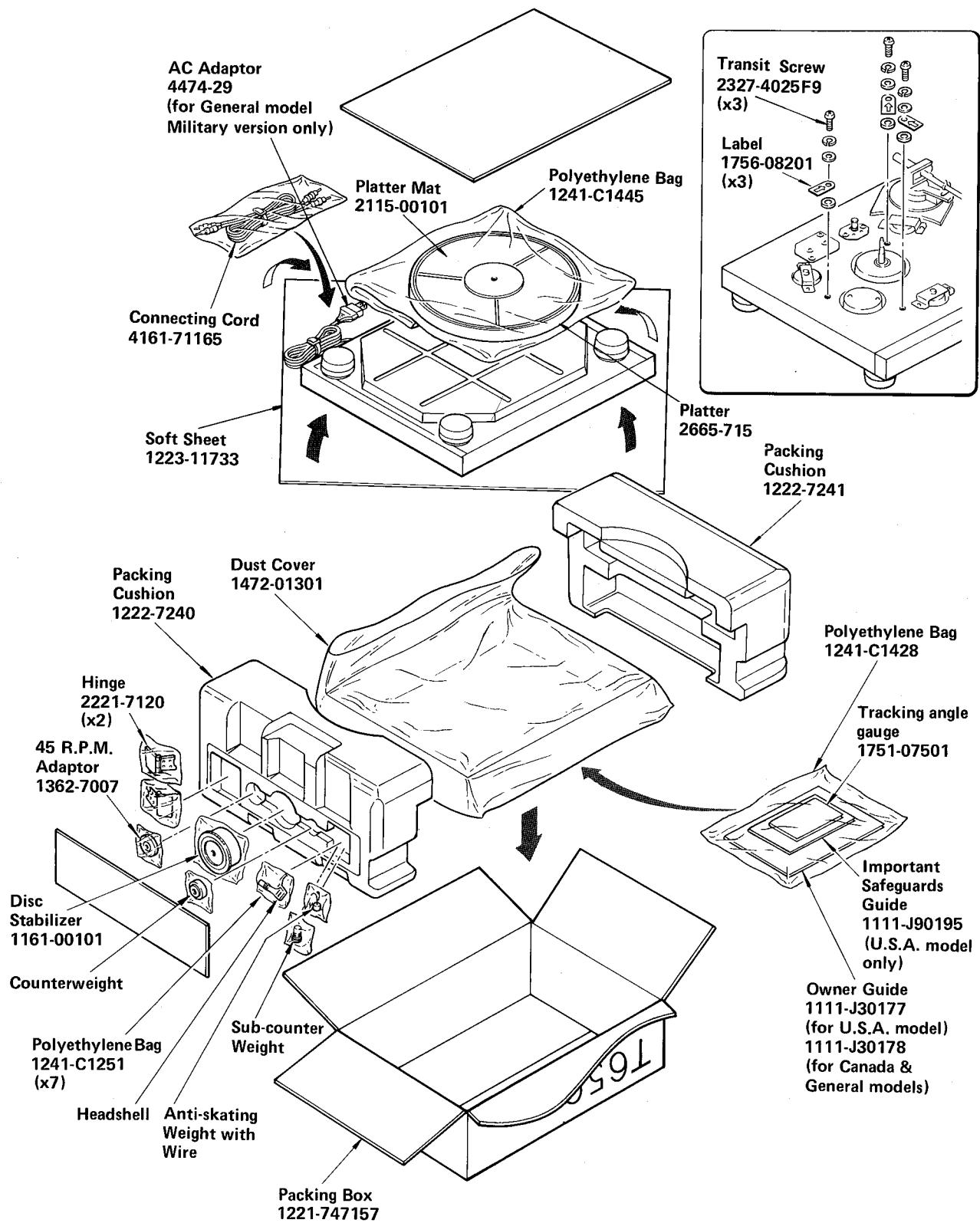
#### MISCELLANEOUS

X101	5691-03993623	Crystal, Osc.
SCR201	5661-03P05M	Thyristor, 03P05M
CN1	4443-064116	Connector, 6 Pos.
CN2	4443-074116	Connector, 7 Pos.

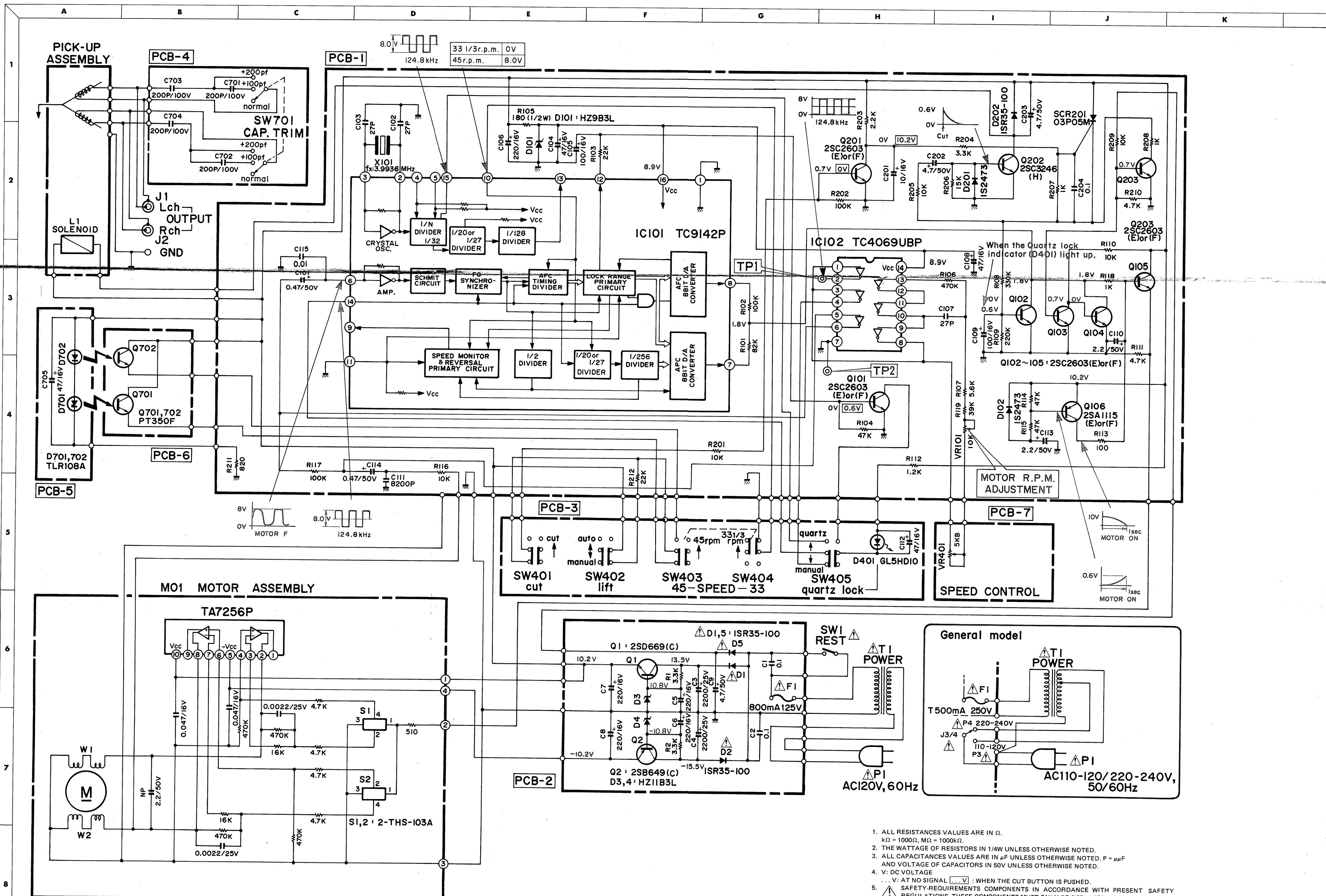
Ref. No.	Part No.	Description
<b>PCB-2 POWER SUPPLY P.C. BOARD</b>		
	<b>CAPACITORS</b>	
C3, 4	5345-228D041	2200 $\mu$ F, $\pm 20\%$ , 25V, Electrolytic
C5, 6, 7, 8	5345-227C041	220 $\mu$ F, $\pm 20\%$ , 16V, Electrolytic
C9	5345-475F041	4.7 $\mu$ F, $\pm 20\%$ , 50V, Electrolytic
	<b>TRANSISTORS</b>	
Q1	5614-669(C)	2SD669(C)
Q2	5612-649(C)	2SB649(C)
	<b>DIODES</b>	
△ D1, 2, 5 D3, 4	5632-1SR35-10 5635-HZ11B3L	1SR35-100 Zener, HZ11B3L
	<b>MISCELLANEOUS</b>	
△ P3/4	4442-2	Connector (General model only)
△ J3/4	D443-T55CA	Connector with Lead Wire (General model only)
	4472-0131	Fuse Holder (X2)
<b>PCB-3 CONTROL SWITCHES P.C. BOARD</b>		
	<b>CAPACITOR</b>	
C112	5345-476C041	47 $\mu$ F, $\pm 20\%$ , 16V, Electrolytic
	<b>DIODE</b>	
D401	5637-GL5HD10	L.E.D., GL5HD10, Quartz Lock Indicator
	<b>MISCELLANEOUS</b>	
SW401, 402, 403, 404, 405	4431-05107154	Push Switch, Cut, Lift, 45/33 Speed, Quartz Lock
<b>PCB-4 CAPACITANCE TRIM SELECTOR P.C. BOARD</b>		
	<b>CAPACITORS</b>	
C701, 702, 703, 704	5359-2015851	200pF, $\pm 5\%$ , 100V, Polypropylene
	<b>MISCELLANEOUS</b>	
SW701	4411-203722	Rotary Switch, Cap. Trim
<b>PCB-5 LED P.C. BOARD</b>		
	<b>CAPACITOR</b>	
C705	5345-476C0951	47 $\mu$ F, $\pm 20\%$ , 16V, Electrolytic
	<b>DIODE</b>	
D701, 702	5637-TLR108A	L.E.D., TLR108A
<b>PCB-6 PHOTO TRANSISTOR P.C. BOARD</b>		
Q701, 702	5621-PT350F	Photo Transistor, PT350F
<b>PCB-7 SPEED CONTROL P.C. BOARD</b>		
VR401	5113-50273136	5k $\Omega$ B, Speed Control

△ SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

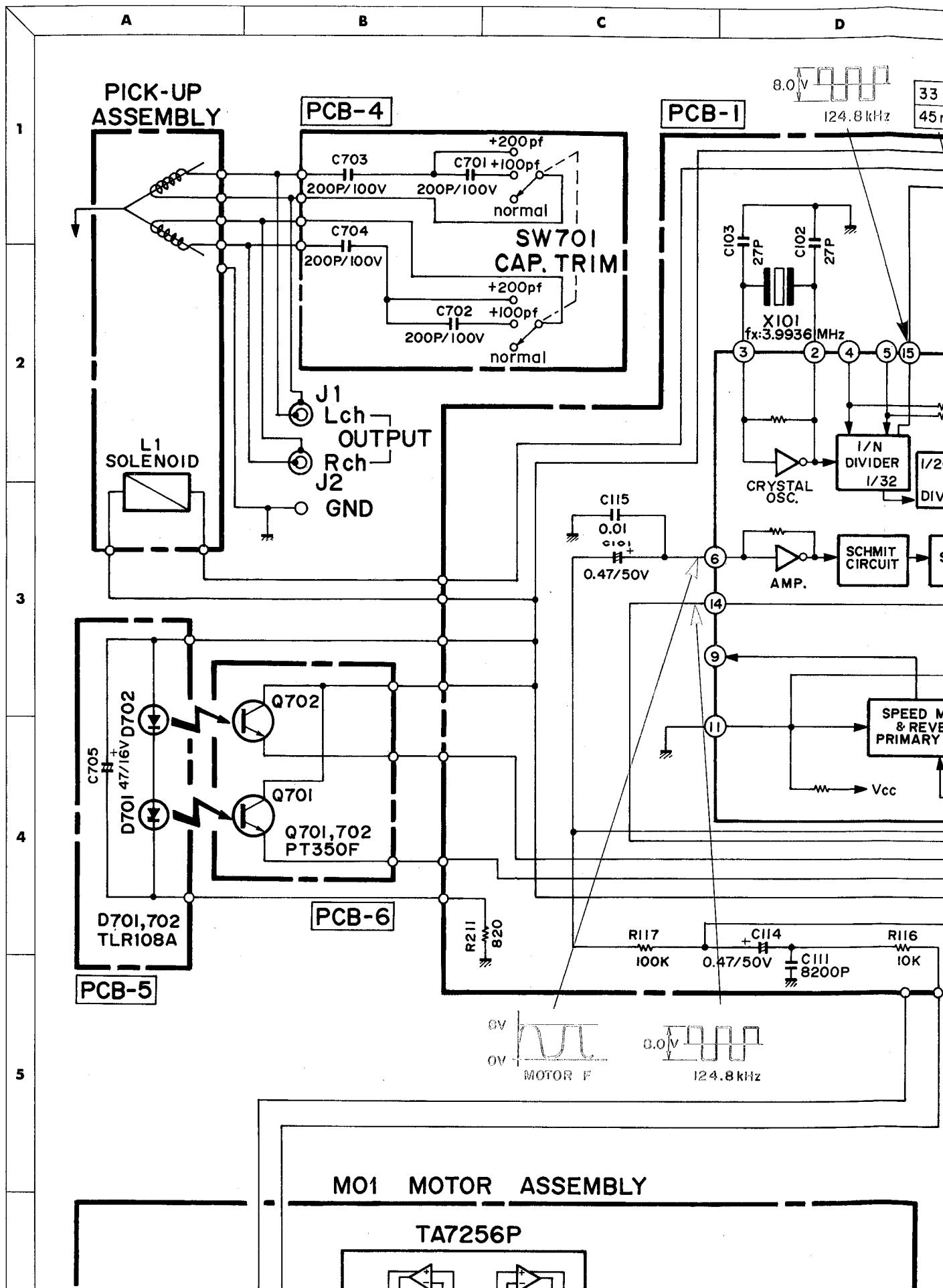
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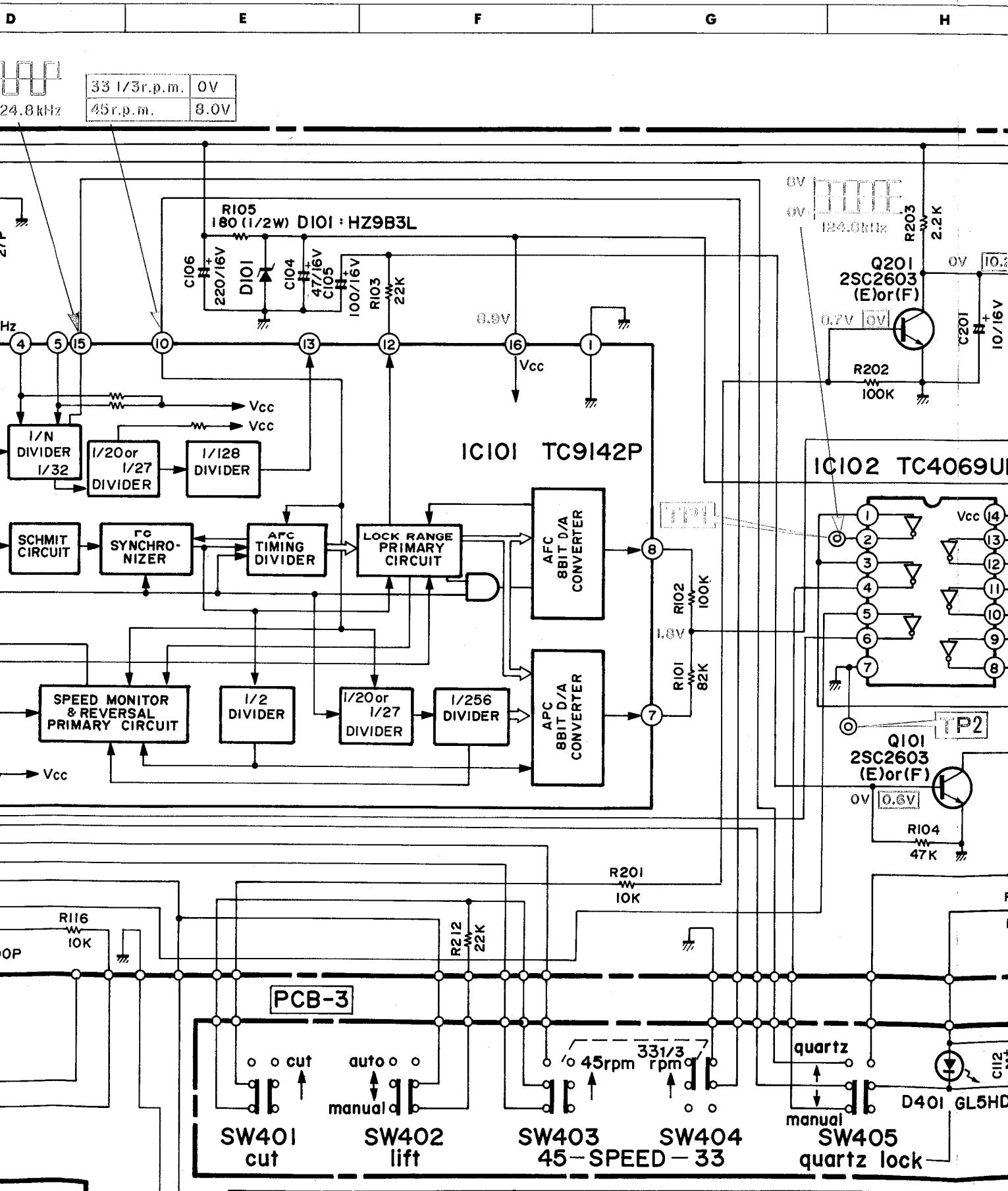


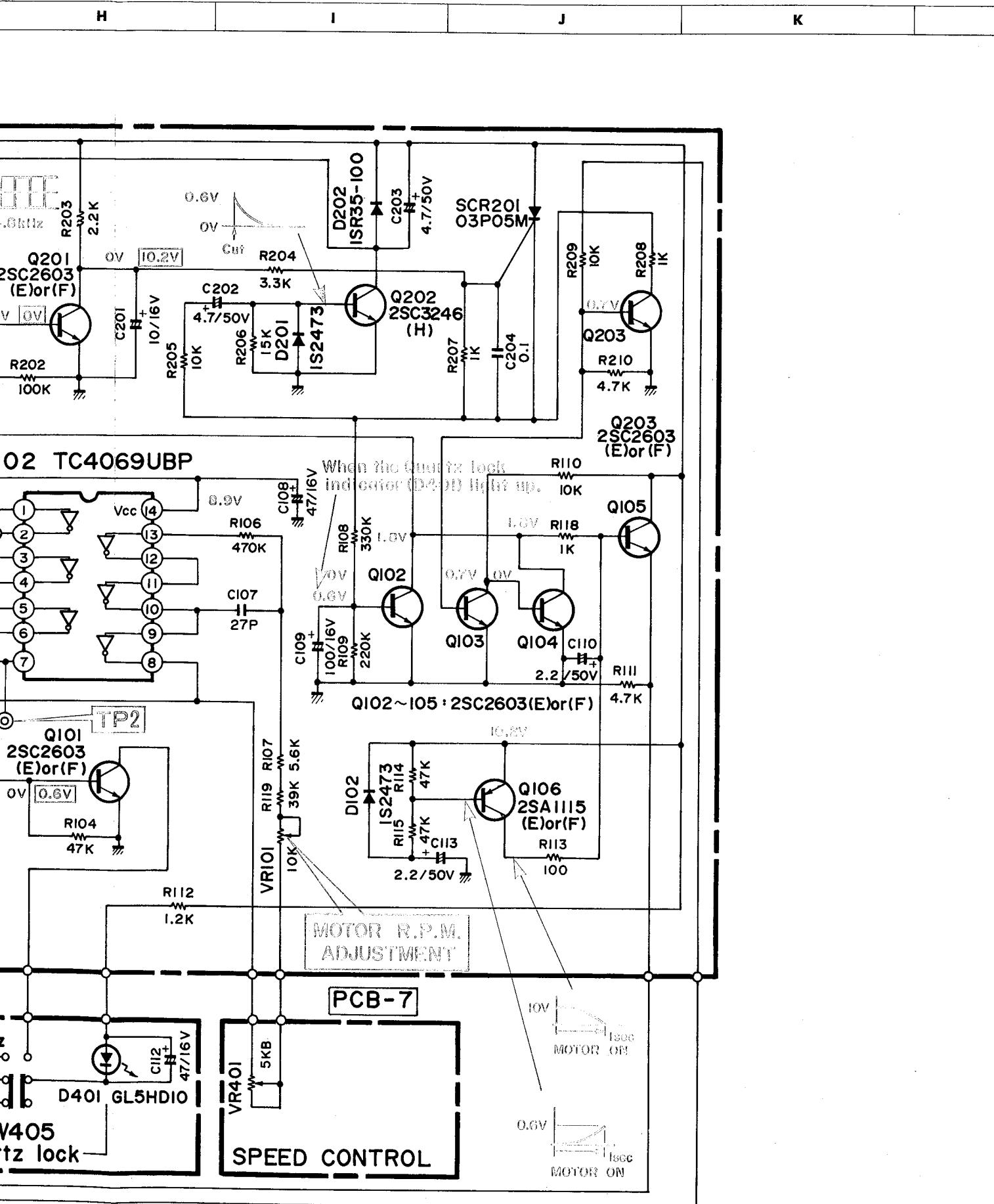
## SCHEMATIC DIAGRAM

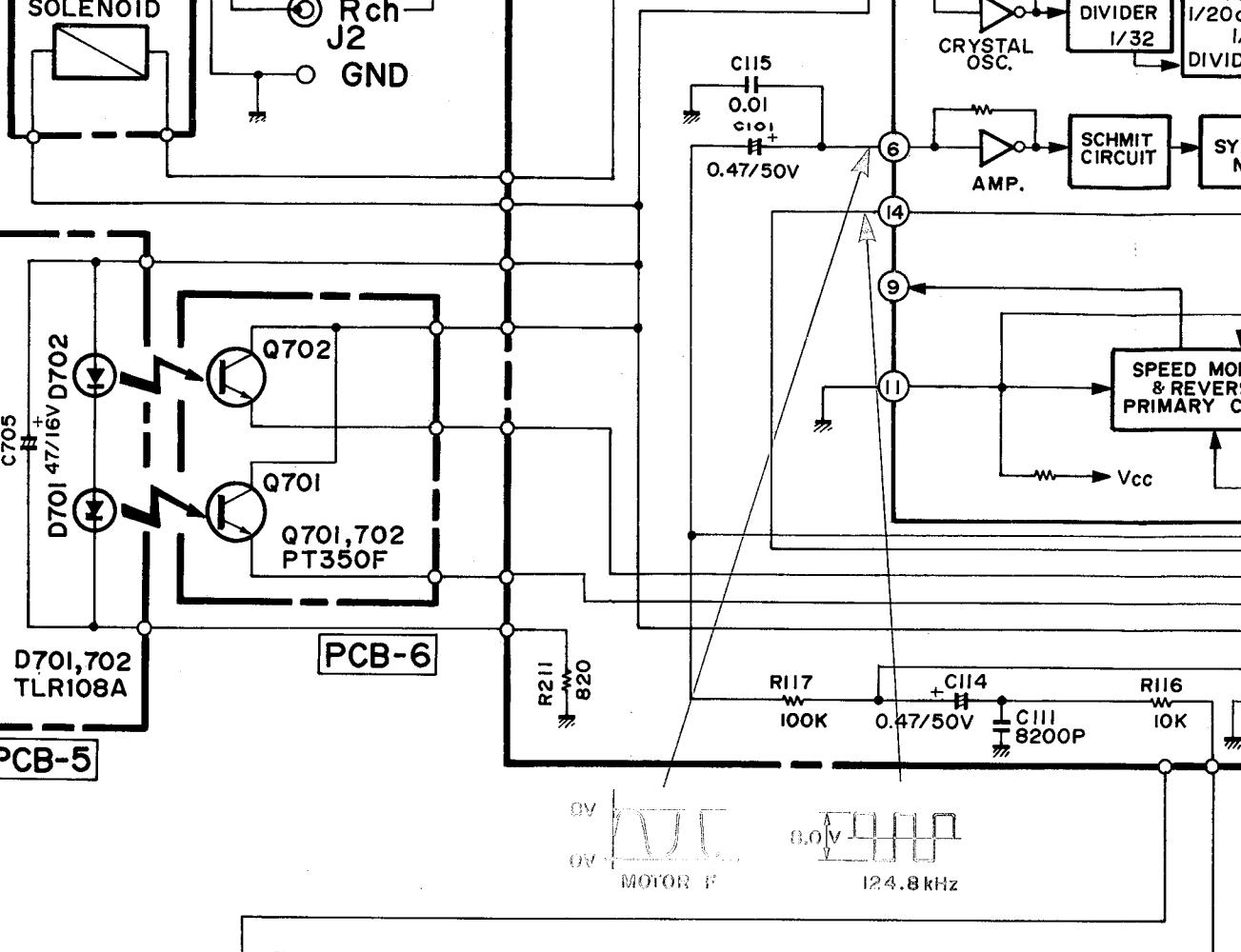


# SCHEMATIC DIAGRAM

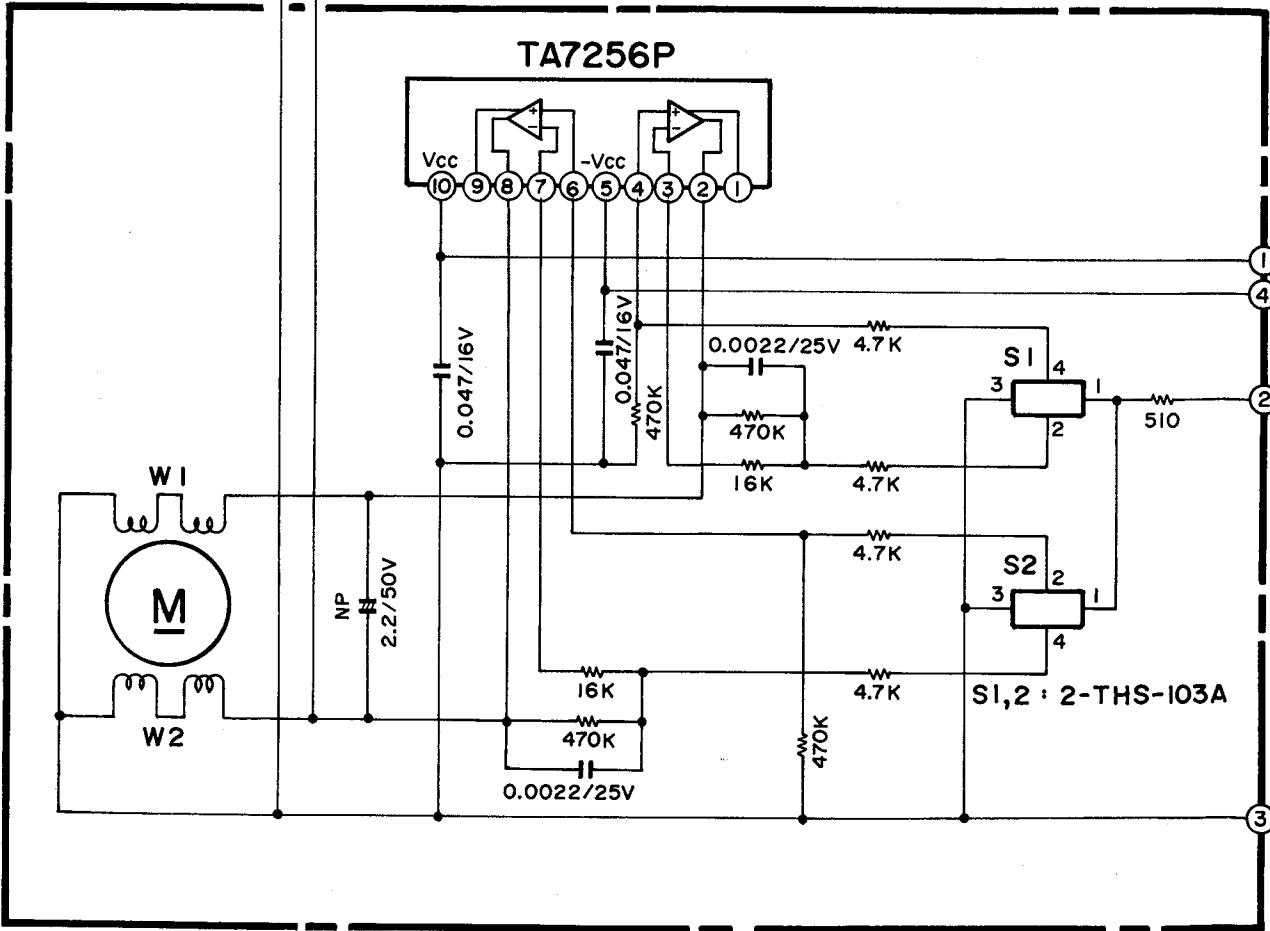


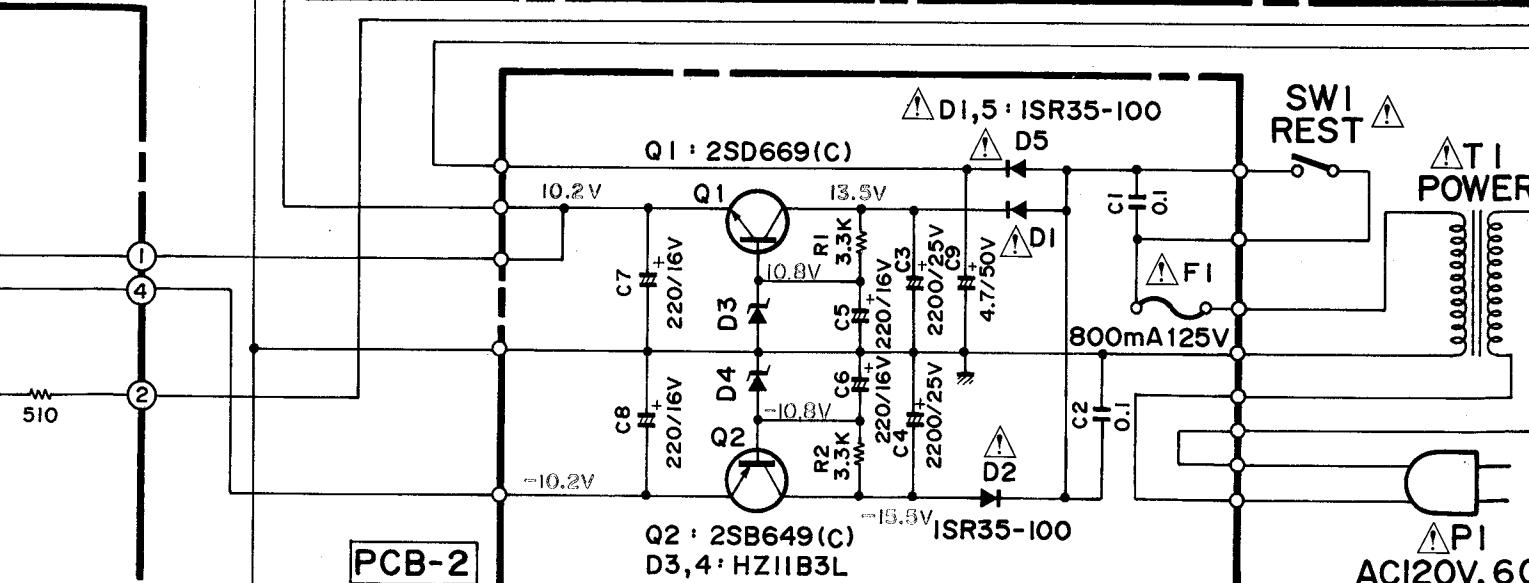
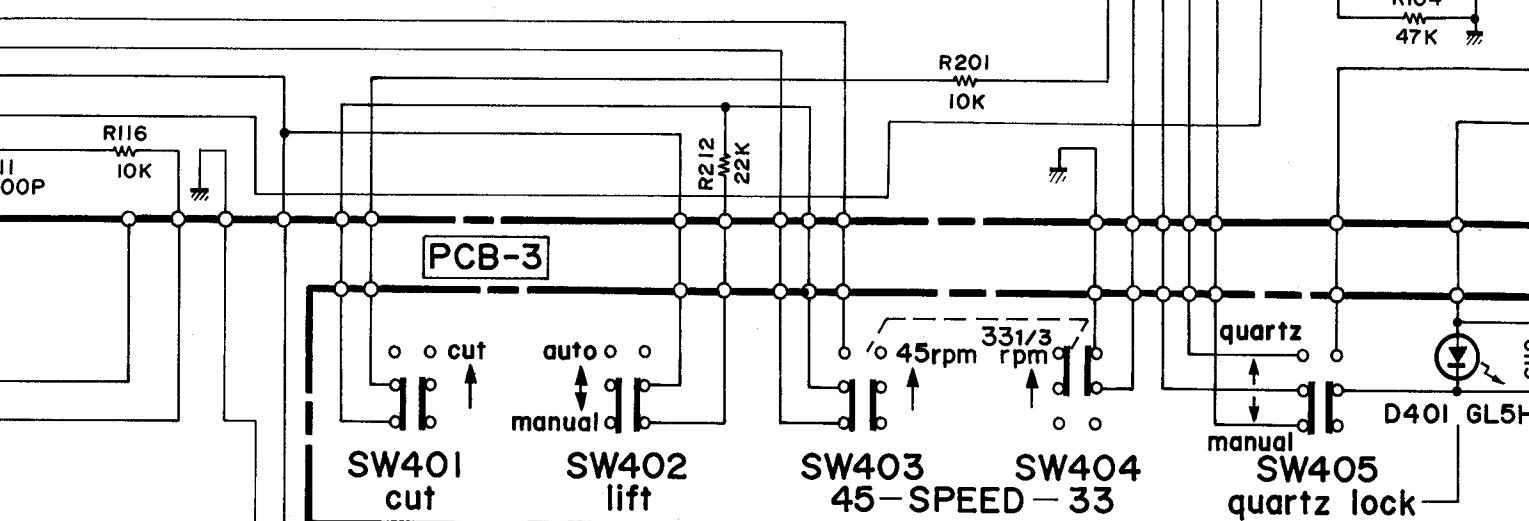
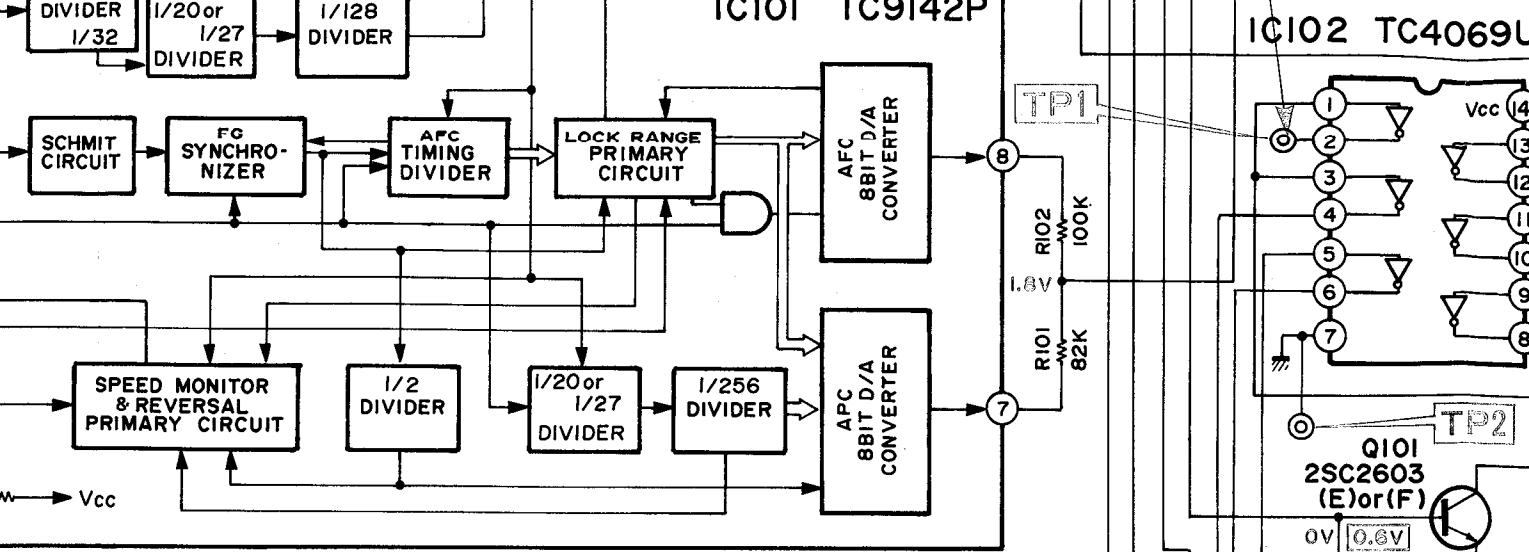




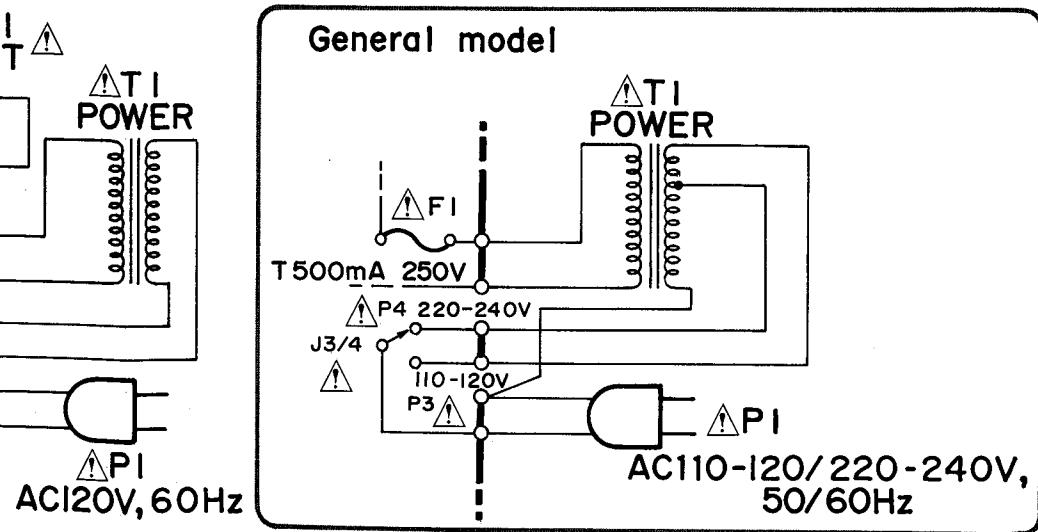
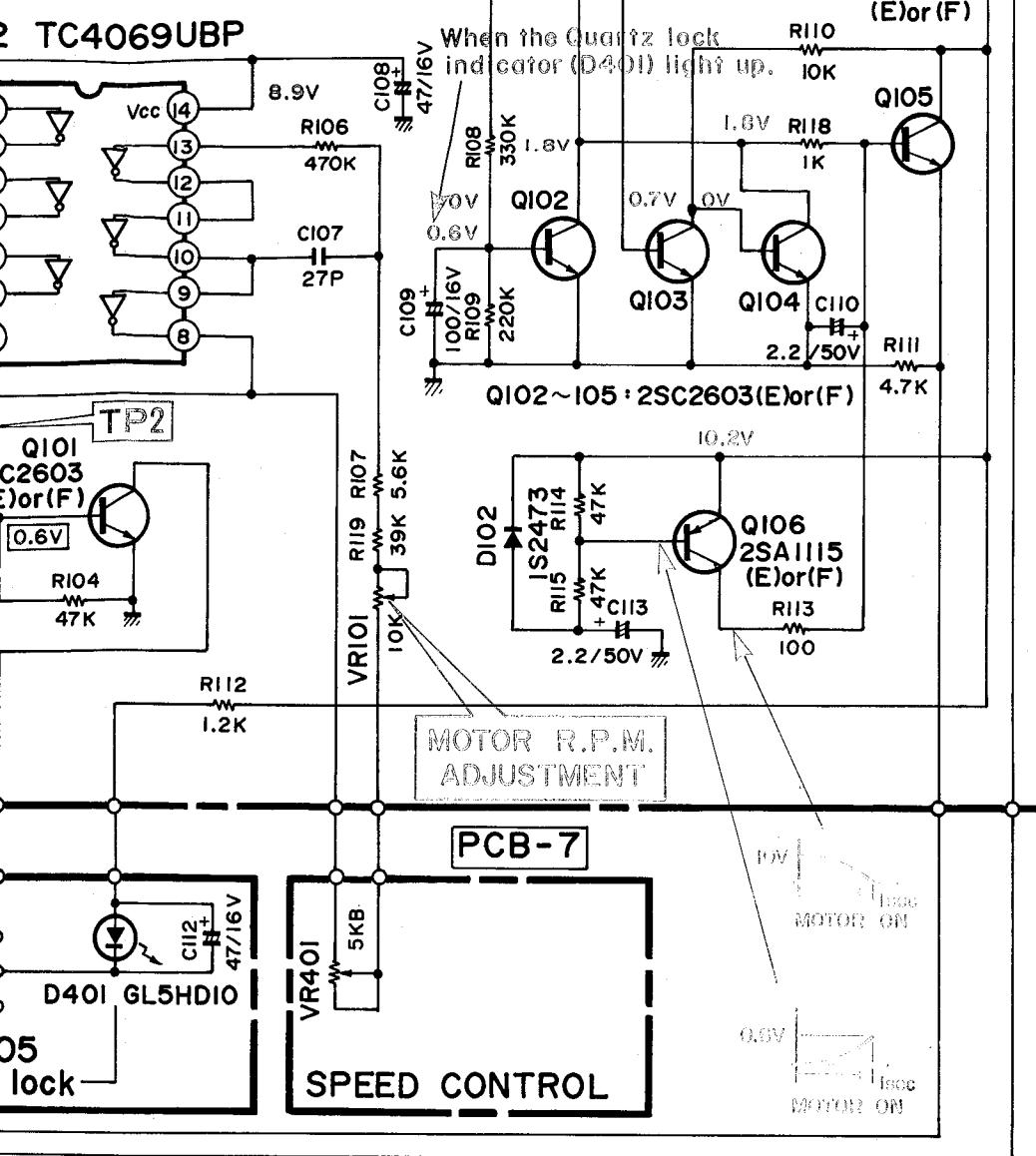


### MO1 MOTOR ASSEMBLY



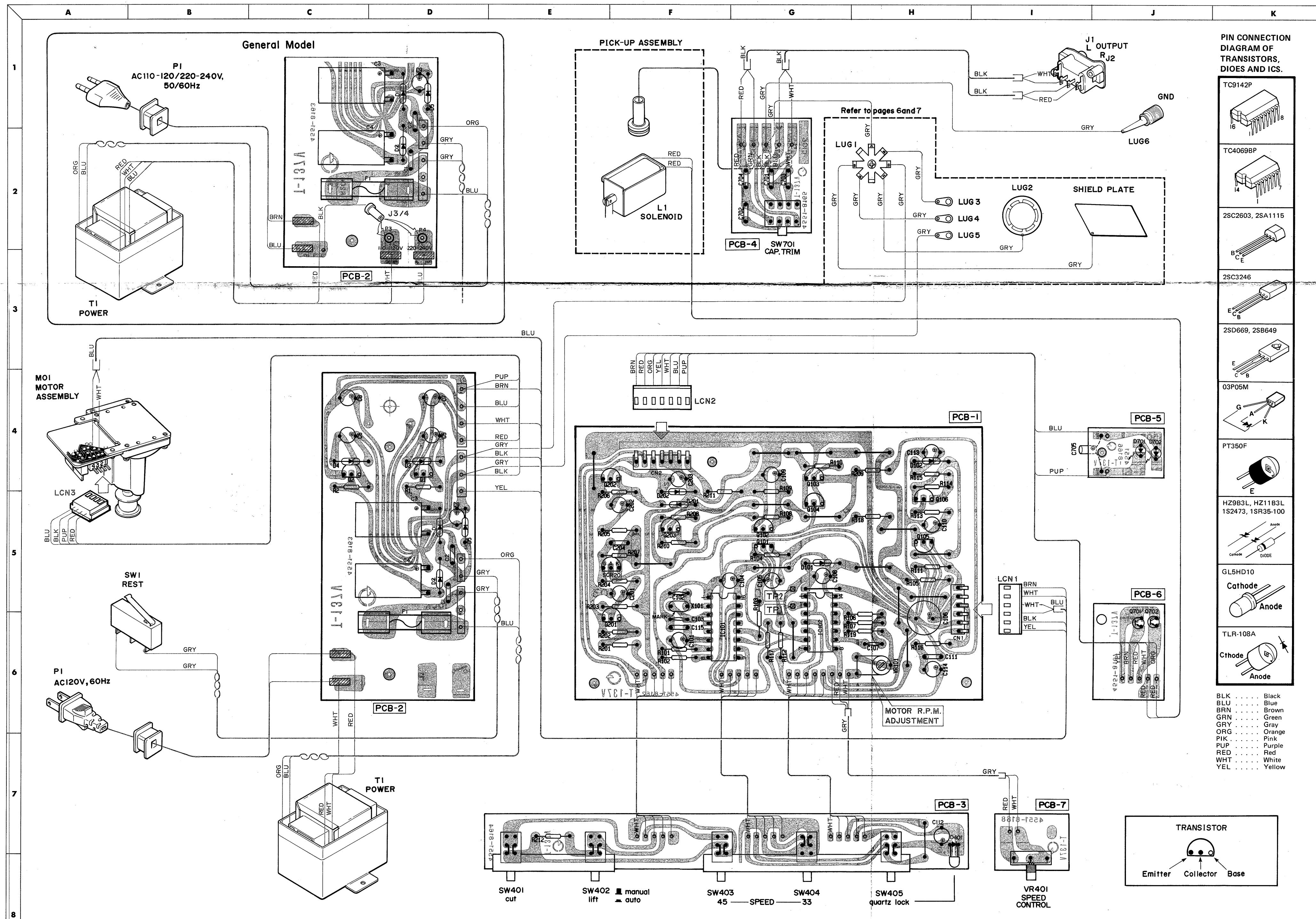


- ALL F  
kΩ = 1
  - THE W
  - ALL C
  - AND V
  - V:
5. !

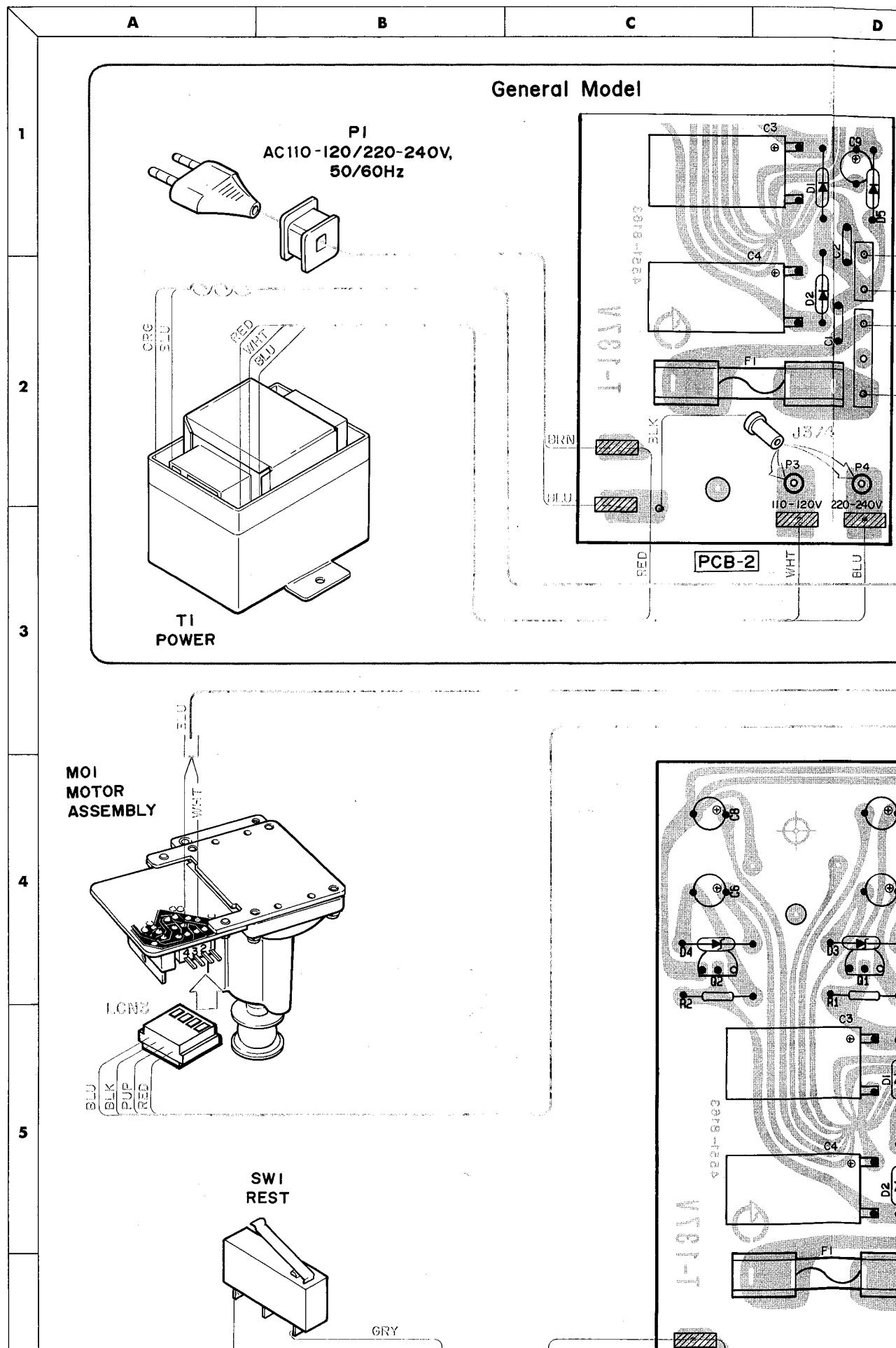


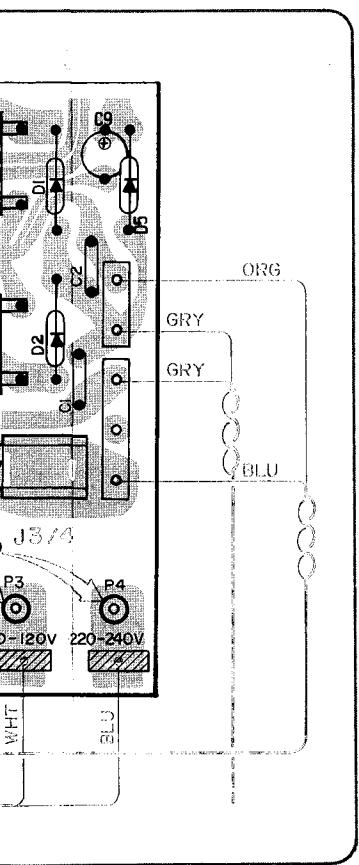
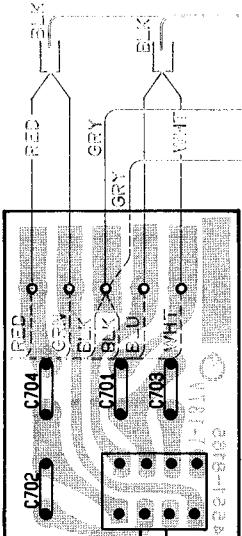
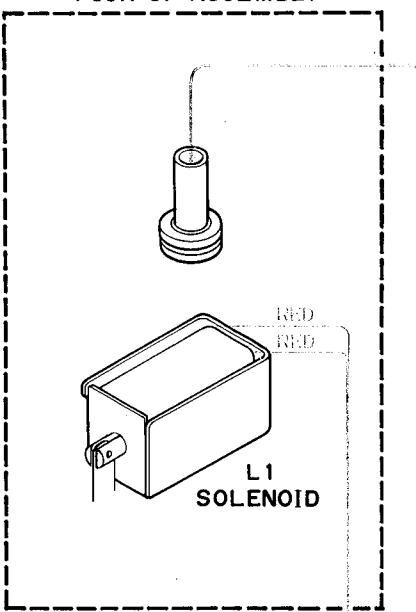
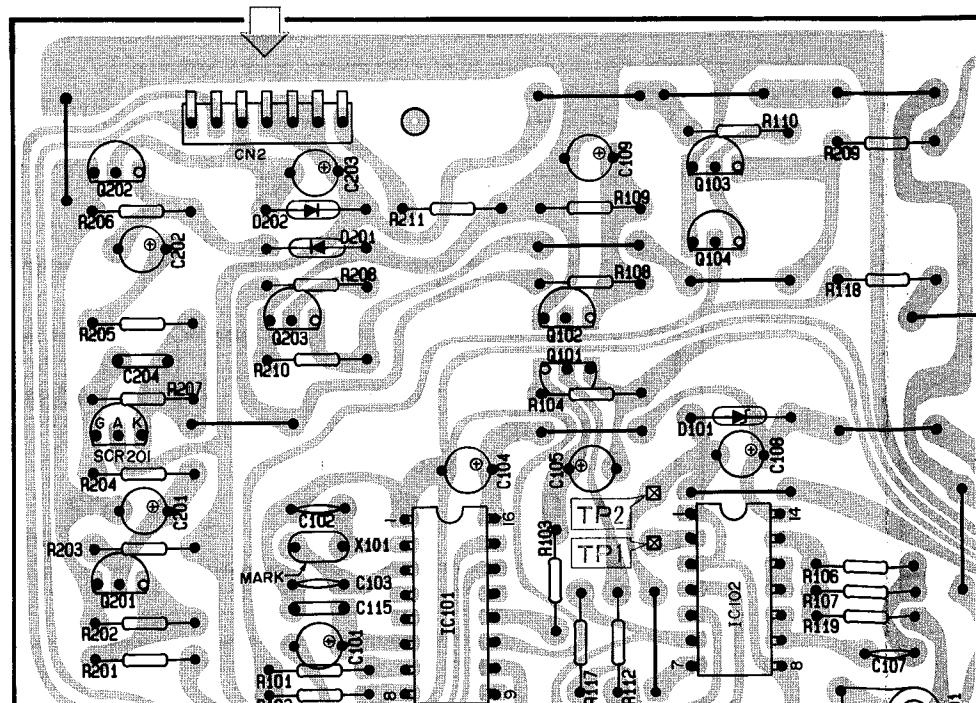
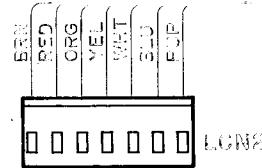
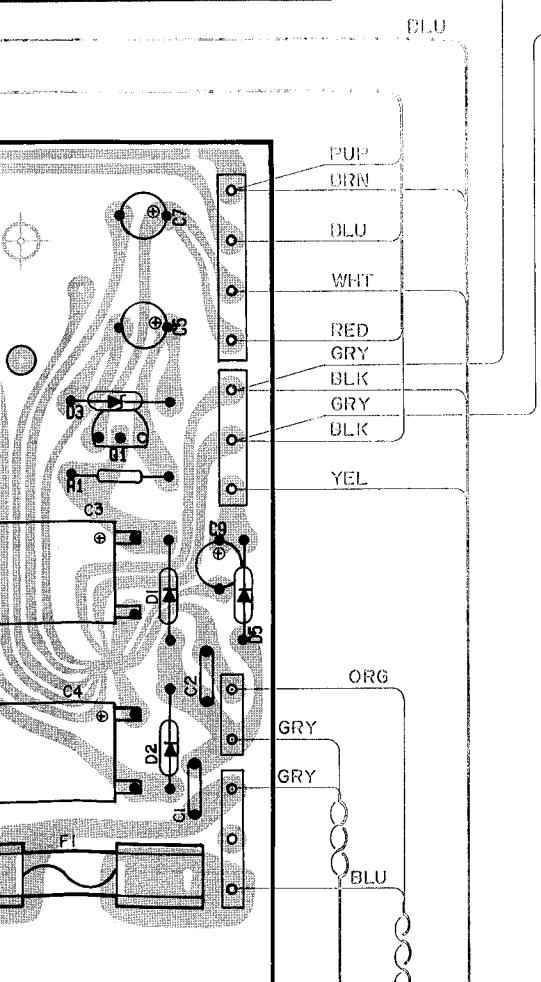
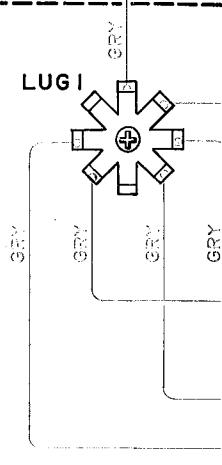
- ALL RESISTANCES VALUES ARE IN  $\Omega$ .  
 $k\Omega = 1000\Omega$ ,  $M\Omega = 1000k\Omega$ .
- THE WATTAGE OF RESISTORS IN 1/4W UNLESS OTHERWISE NOTED.
- ALL CAPACITANCES VALUES ARE IN  $\mu F$  UNLESS OTHERWISE NOTED.  $P = \mu\mu F$  AND VOLTAGE OF CAPACITORS IN 50V UNLESS OTHERWISE NOTED.
- V: DC VOLTAGE  
... V: AT NO SIGNAL ... V : WHEN THE CUT BUTTON IS PUSHED.
- SAFETY-REQUIREMENTS** COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

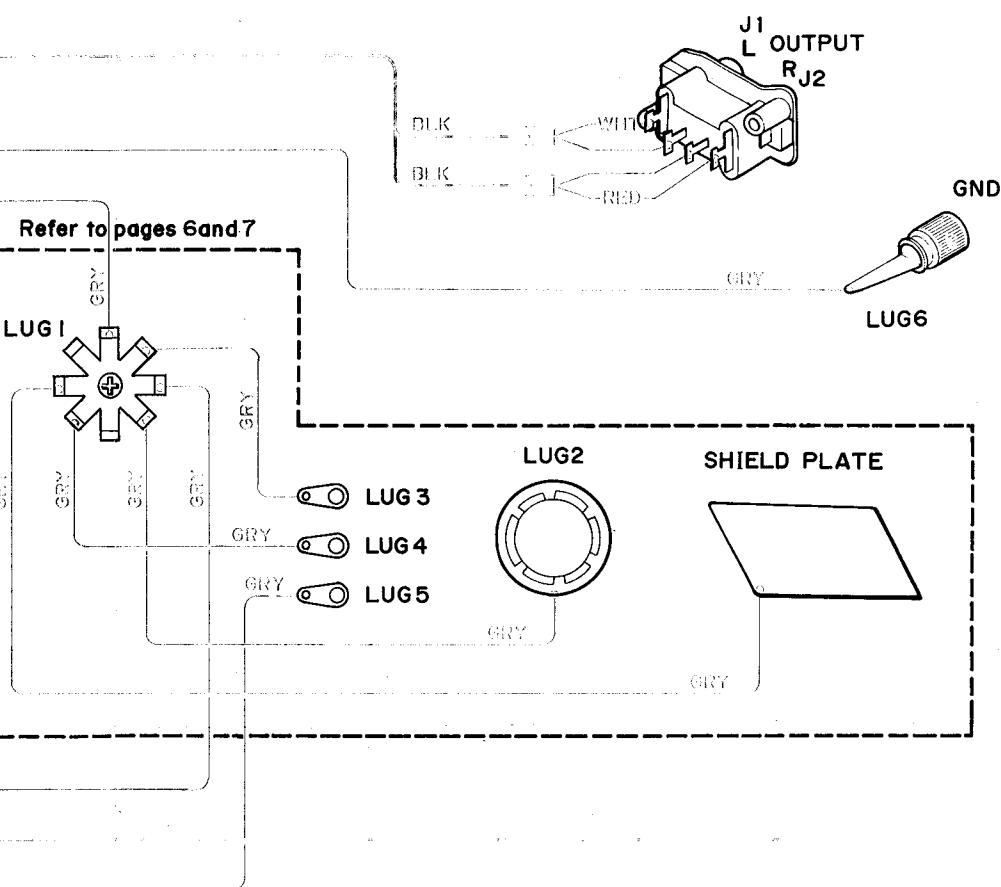
## WIRING DIAGRAM



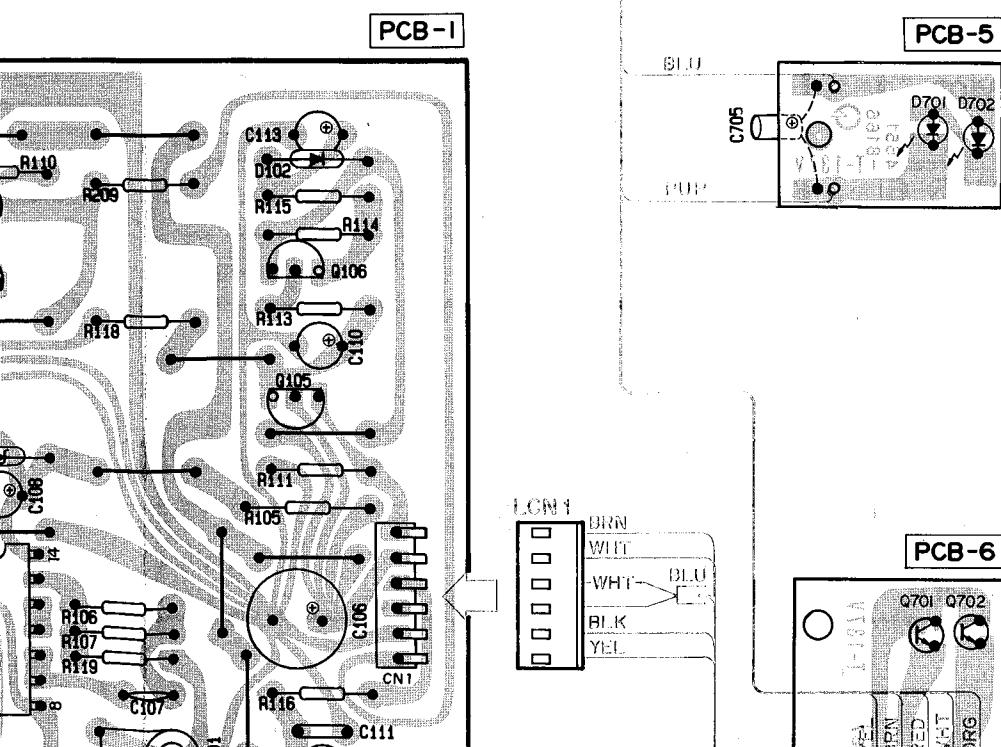
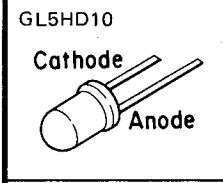
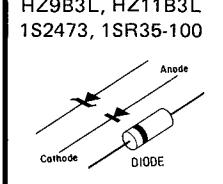
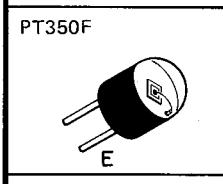
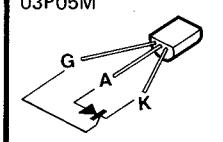
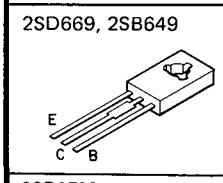
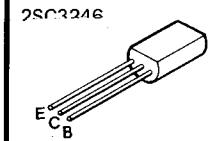
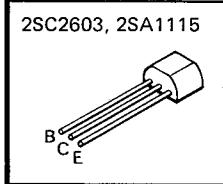
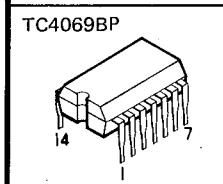
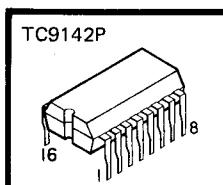
## WIRING DIAGRAM

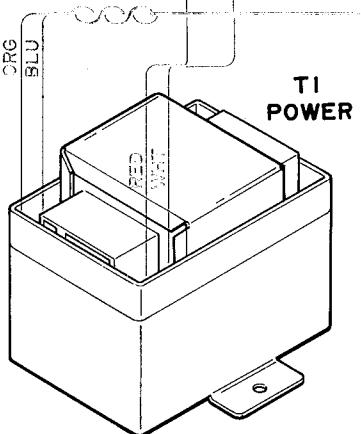
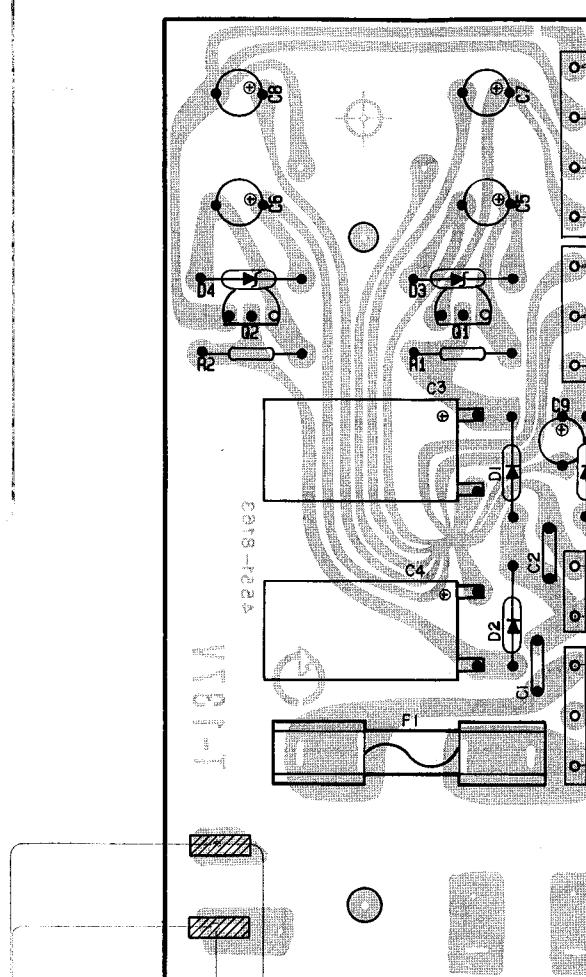
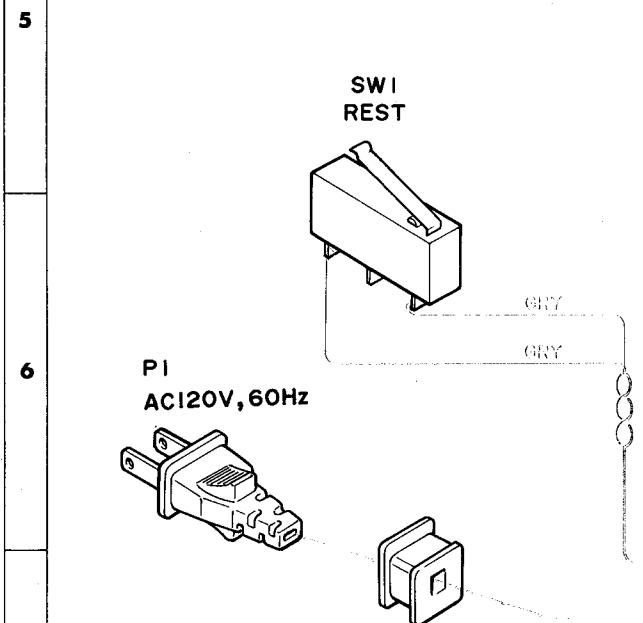
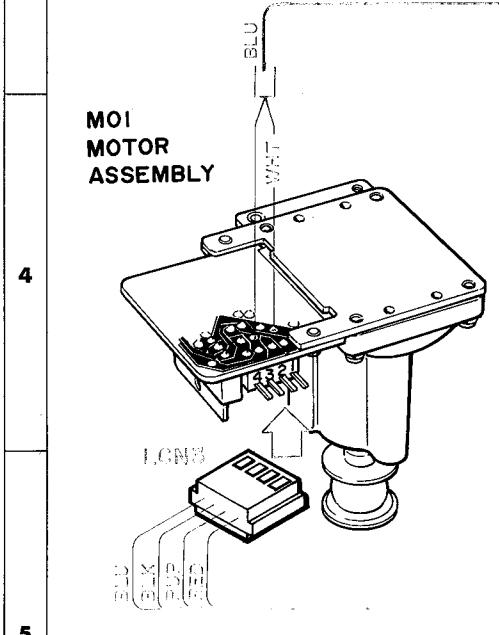
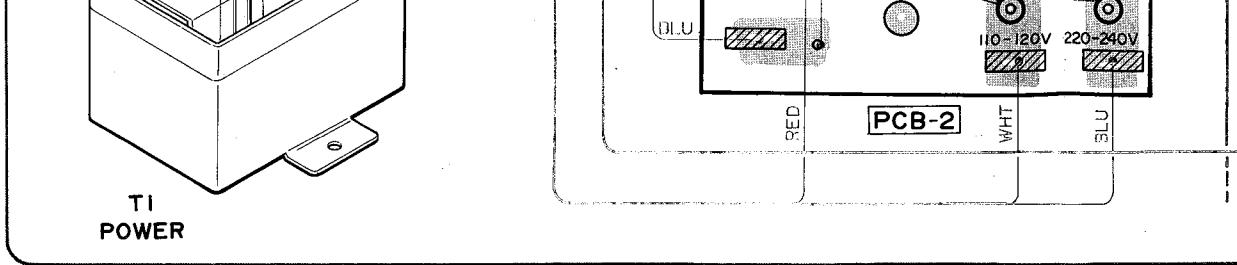


**D****E****F****G**
**PICK-UP ASSEMBLY**

*Refer to pages 6c*


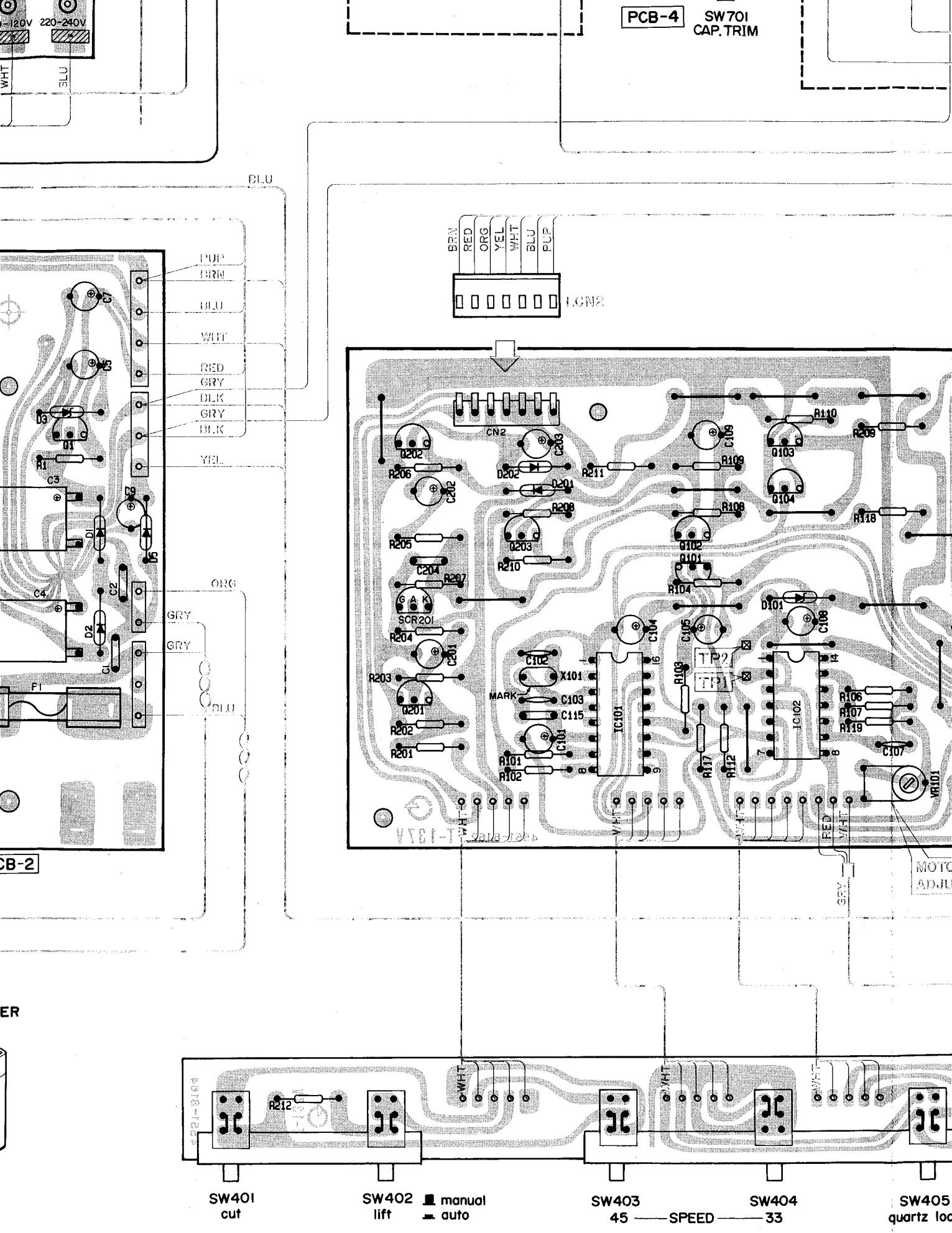
**H****I****J****K**

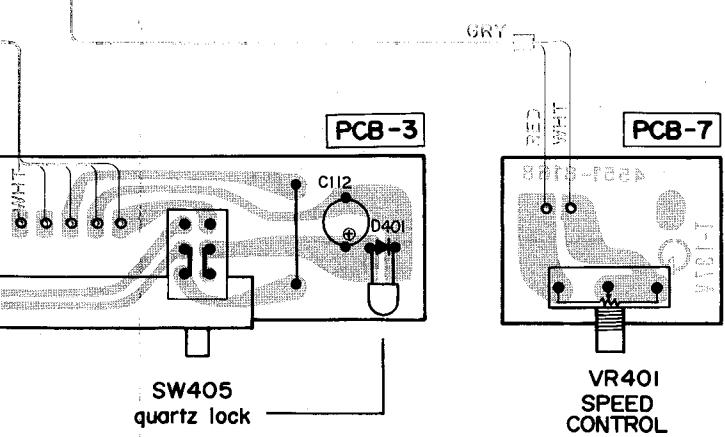
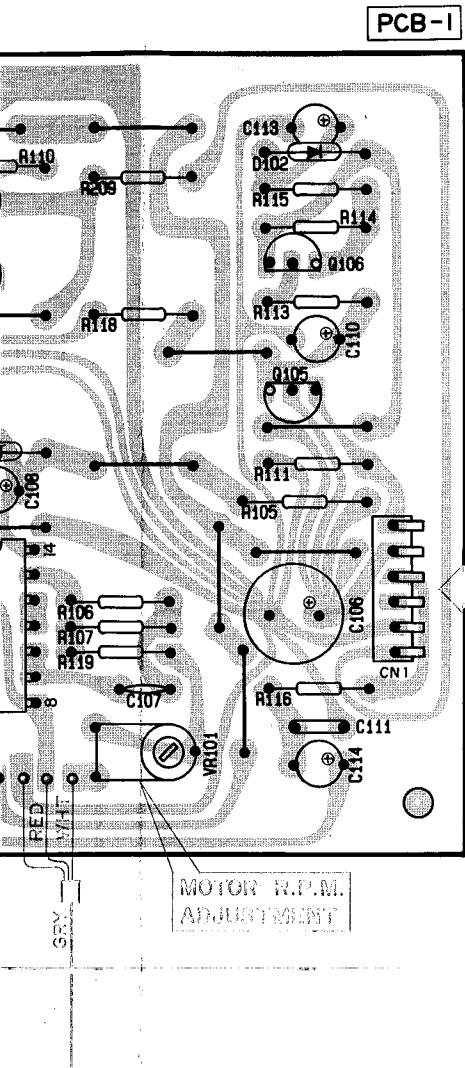
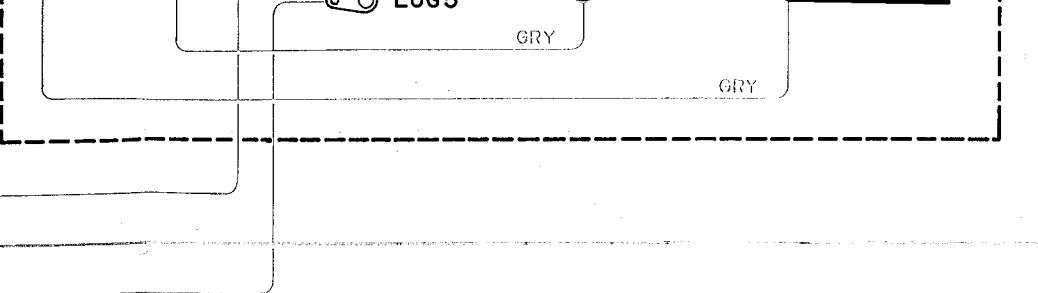
PIN CONNECTION  
DIAGRAM OF  
TRANSISTORS,  
DIOES AND ICS.



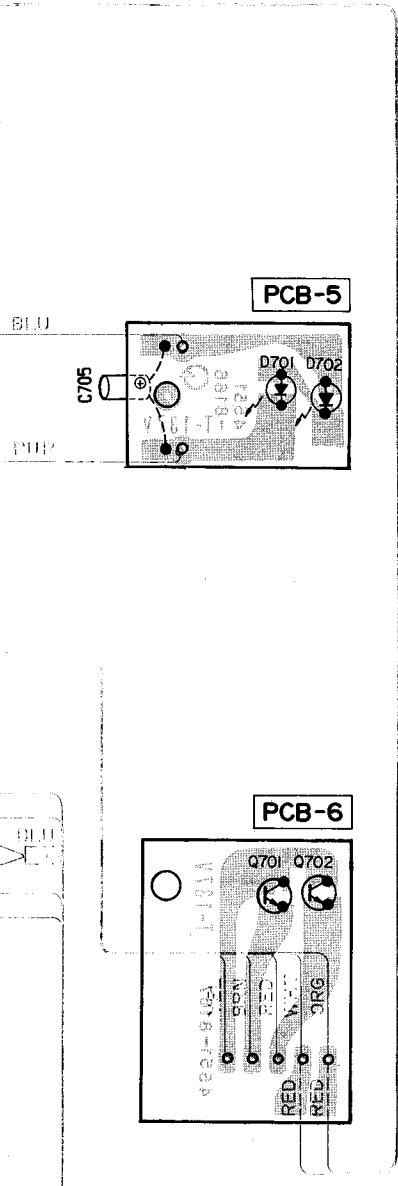


PCB-4 SW701  
CAP. TRIM

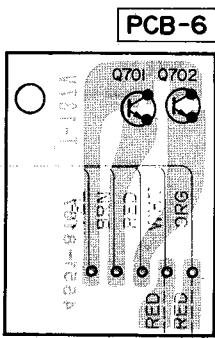




**VR401 SPEED CONTROL**



**PCB-5**



	B C E
	E C B
<b>2SD669, 2SB649</b>	
	E C B
<b>O3P05M</b>	G A K
<b>PT350F</b>	E
	Anode Cathode DIODE
<b>HZ9B3L, HZ11B3L 1S2473, 1SR35-100</b>	
	Cathode Anode
<b>GL5HD10</b>	
	Cathode Anode
<b>TLR-108A</b>	

BLK	.....	Black
BLU	.....	Blue
BRN	.....	Brown
GRN	.....	Green
GRY	.....	Gray
ORG	.....	Orange
PIK	.....	Pink
PUP	.....	Purple
RED	.....	Red
WHT	.....	White
YEL	.....	Yellow

