

# PS-LX510

## SERVICE MANUAL

US Model  
Canadian Model  
AEP Model  
E Model



SILVER MODEL SHOWN

### SPECIFICATIONS

#### Turntable

Platter	30 cm (12 in.), aluminum-alloy diecast
Motor	Linear torque BSL (brushless and slotless) motor
Drive system	Direct drive
Control system	Quartz lock servo control system
Speed	33 $\frac{1}{3}$ rpm, 45 rpm
Wow and flutter	0.03% (WRMS)*, 0.035% (WRMS) $\pm 0.045\%$ (DIN)
Signal-to-noise ratio	75 dB (DIN-B)
Automatic system	Lead-in, return, repeat, reject, up/down, record size selection
Load characteristics	0% up to 1.5g tracking force (at lead-in groove of a record)
Speed deviation	Within $\pm 0.003\%$

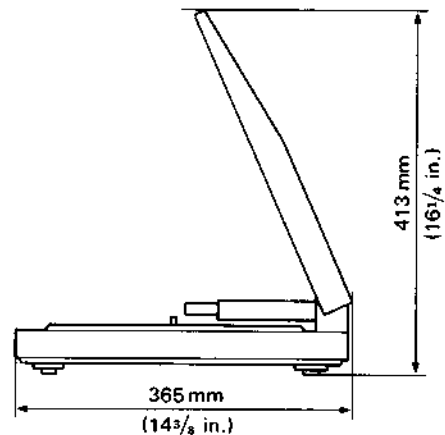
#### Tonearm

Type	Linear tracking tonearm
Pivot-to-stylus length	75 mm (3 in.)
Tracking error	$\pm 0.1^\circ$
Tracking force adjustment range	$\pm 0.25$ g
Usable cartridge	plug-in type, 6 g

#### General

Power requirements	120 V ac, 60 Hz (US, Canadian model) 220 V ac, 50/60 Hz (AEP model) 110 - 220 V, 120 - 240 V ac, 50/60 Hz (E model)
Power consumption	10 W
Dimensions	Approx. 430 x 90 x 356 mm (w/h/d) (16 $\frac{15}{16}$ x 3 $\frac{5}{8}$ x 14 in.) including projecting parts and controls

With the dust cover opened.



- Continued on page 2 -

#### ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE TRAME ET UNE MARQUE  $\triangle$  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  $\triangle$  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

# STEREO TURNTABLE SYSTEM

# SONY®

AUD



**Weight**                      Approx. 5 kg (11 lbs 0 oz), net  
                                      Approx. 6.1 kg (13 lbs 7 oz), in shipping  
                                      carton

Design and specifications subject to change without notice.

\* This new measuring method concerns only the turntable assembly, including the platter. It excludes wow and flutter caused by the tonearm, the cartridge, or the record. Measured by obtaining signal from magnetic pick-up head.

**Cartridge VL-45G**  
(supplied only with Canadian and partial US model)

Type: Moving magnet  
Frequency Response: 10 Hz – 20 kHz  
Channel Separation: 23 dB at 1 kHz  
Output Voltage: 5 mV at 1 kHz, 5 cm/sec., 45°  
Load Impedance: 50 kΩ – 100 kΩ  
Tracking Force: 1.0 – 1.5 g (1.25 g recommended)  
Stylus: Sony ND-145G  
Weight: 6 g

**Cartridge XL-250G (supplied only with AEP, E model)**

Type: Moving magnet  
Frequency Response: 10 Hz – 20 kHz  
Channel Separation: 23 dB at 1 kHz  
Output Voltage: 5 mV at 1 kHz, 5 cm/sec., 45°  
Load Impedance: 50 kΩ – 100 kΩ  
Tracking Force: 1.0 – 1.5 g (1.25 g recommended)  
Stylus: Sony ND-250G  
Weight: 6 g

## FEATURES

### Linear tracking tonearm

Compared with a pivoted tonearm, a linear tracking arm has a very small tracking error (which means greatly reduced harmonic distortion) and almost no pressure on the inside wall of the groove of records (which means improved trackability and channel separation).

### Front panel operation with the dust cover closed

The ARM TRANSPORT buttons allow you to move the tonearm easily over the desired point of the record with the dust cover closed.

Start/stop of the record play and tonearm up/down can also be controlled using the buttons on the front panel.

### Fully automatic system

The movement of the turntable and the tonearm is controlled by a microcomputer and is activated by the "feather-touch" function buttons on the front panel.

### Automatic record size selection

The record size is automatically set by a photo sensor system. If no record is on the turntable, the tonearm will not descend but will automatically return to the tonearm resting position.

### Muting system

A muting system activates when the tonearm is lifted and is deactivated after the tonearm lowers onto a record so there is no need to turn the amplifier volume down every time a stylus is placed on a record.

### Quartz lock servo system

The turntable maintains an accurate and drift-free speed by referring to a frequency generated by a very stable quartz oscillator.

### Linear torque BSL motor

Direct drive system with Sony's unique BSL (brushless and slotless) motor which has an extremely low noise level and whose smoothness virtually eliminates wow and flutter. Its high torque assures a quick start to 33 1/3 rpm after only a half revolution.

### Synchronized operation with the Sony cassette decks

When the tonearm lowers onto the lead-in groove of a record, the cassette deck stand-by mode is released and the record mode assumed. This synchronized operation is possible with Sony cassette decks equipped with a four-pin remote control jack which is connected with the Sony RM-65 synchro remote control unit.

## SAFETY CHECK-OUT (US Model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

### LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.

3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

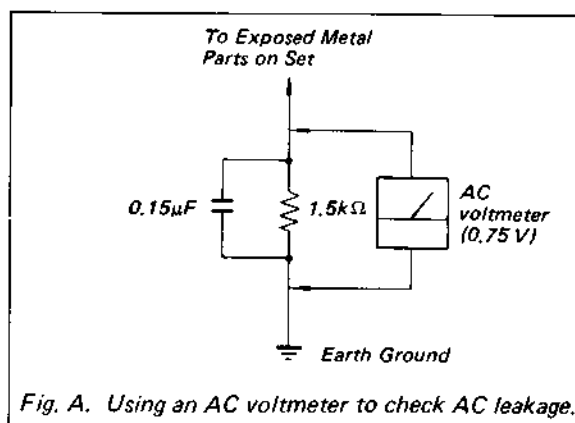
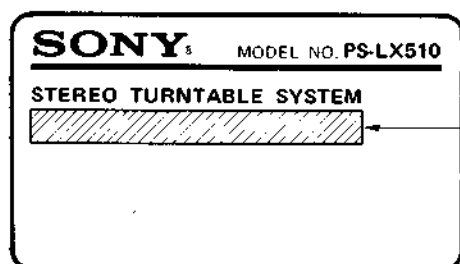


Fig. A. Using an AC voltmeter to check AC leakage.

## MODEL IDENTIFICATION

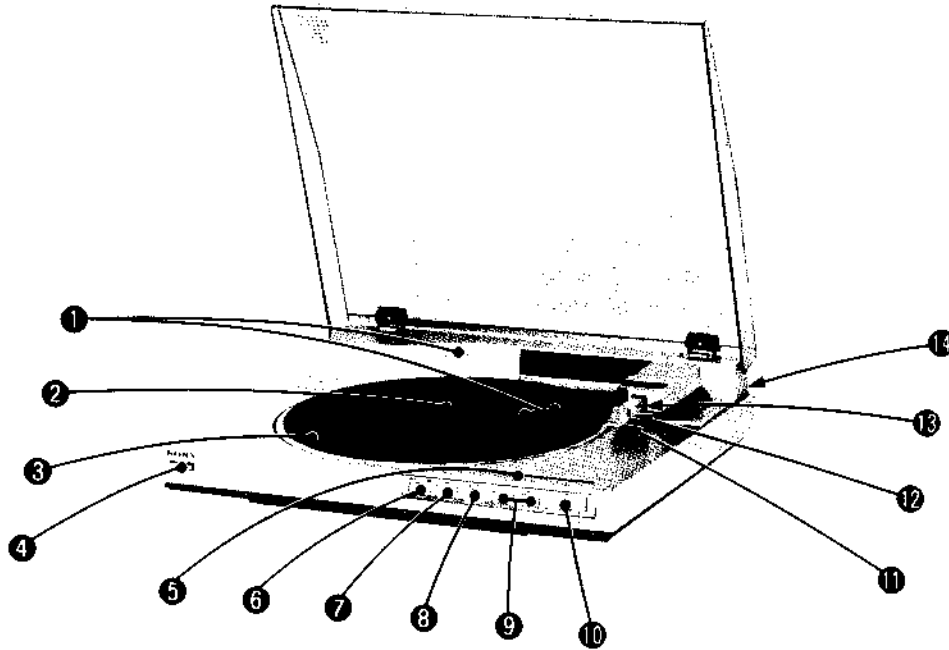
— Specification Label —



US, Canadian : AC: 120 V ~ 60 Hz 10W  
 AEP : AC: 220 V ~ 50/60 Hz 10W  
 E : AC: 110 - 220 V, 220 - 240 V ~ 50/60 Hz 10W

**LOCATION AND FUNCTION OF CONTROLS**

The photo shows the assembled turntable.  
Each number in the text is keyed to that of the photo.

**1 Auto-record-size selection holes and lamp****2 Center spindle****3 Rubber mats** which indicates some trouble.**4 POWER switch**

Press to turn on the turntable. To turn the turntable off, press it again.

**5 QUARTZ LOCK indicator**

The indicator illuminates in green when the turntable rotations is locked to the nominal speed by the quartz lock control system. The indicator goes out when the turntable rotations is out of the nominal speed which indicates some trouble.

**6 SPEED selector and indicators**

Selects the record speed. When the POWER switch is turned on, the speed is always  $33\frac{1}{3}$  rpm and the indicator on the right illuminates. When the selector is pressed, 45 rpm is selected and the indicator on the left illuminates.

**7 REPEAT button and indicator**

Press this button to repeat play. The indicator illuminates and repeat play continues until this button is pressed to stop it. If the START/STOP button is pressed during repeat play, the tonearm returns to the tonearm resting position and the turntable stops rotating.

**8 ARM LIFTER button**

This button lifts and lowers the tonearm.

When the tonearm is on the tonearm resting position, it cannot be lifted up with this button.

**9 ARM TRANSPORT buttons**

To move the tonearm inwards, press the ◀ button. To move it outwards press the ▶ button. The tonearm is raised automatically and continues to move while the button is depressed. The tonearm will stop when the button is released. For fine adjustment of the tonearm drop-point over a record, press and immediately release the appropriate button. This button is useful for beginning a record partway through, or for skipping to another selection.

**10 START/STOP button and indicator**

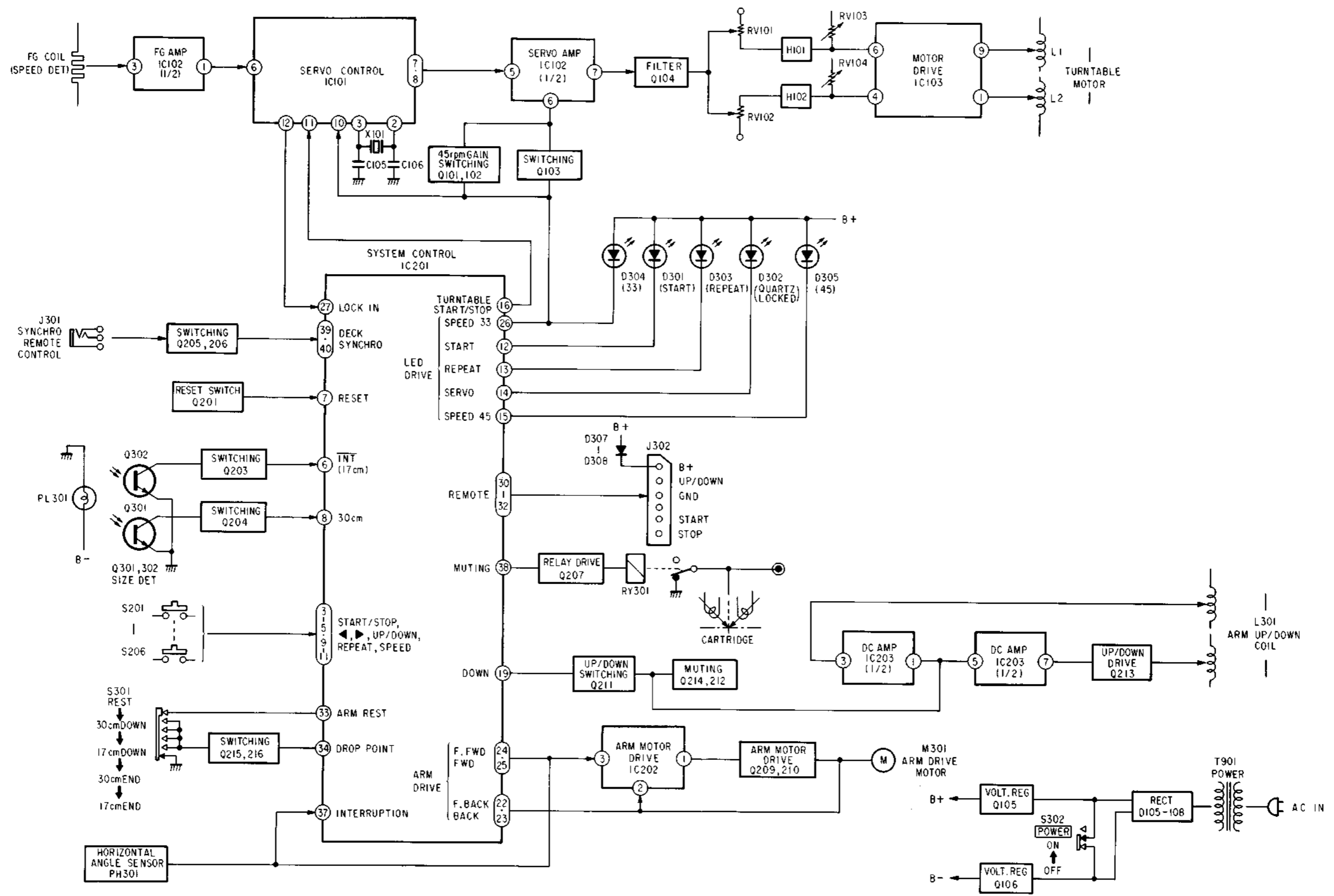
Press this button to start the record playing, and the indicator illuminates. To stop during play, press it again.

**11 Cartridge****12 Cartridge locking screw****13 Tracking force adjustment lever****14 Synchro remote control jack (rear)**

Synchronized recording from disc to tape is possible on specified Sony cassette decks by using the optional RM-65 synchro remote control unit.

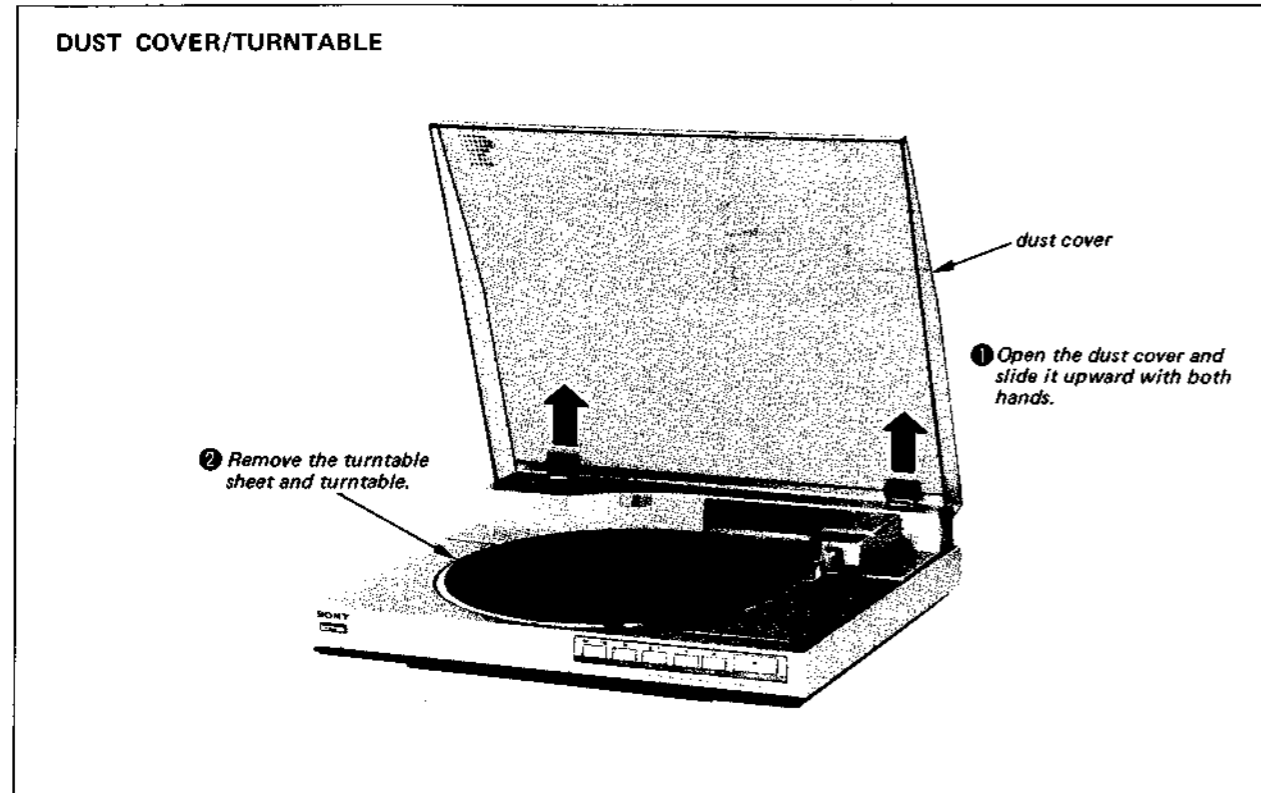
SECTION 1  
OUTLINE

1-1. BLOCK DIAGRAM

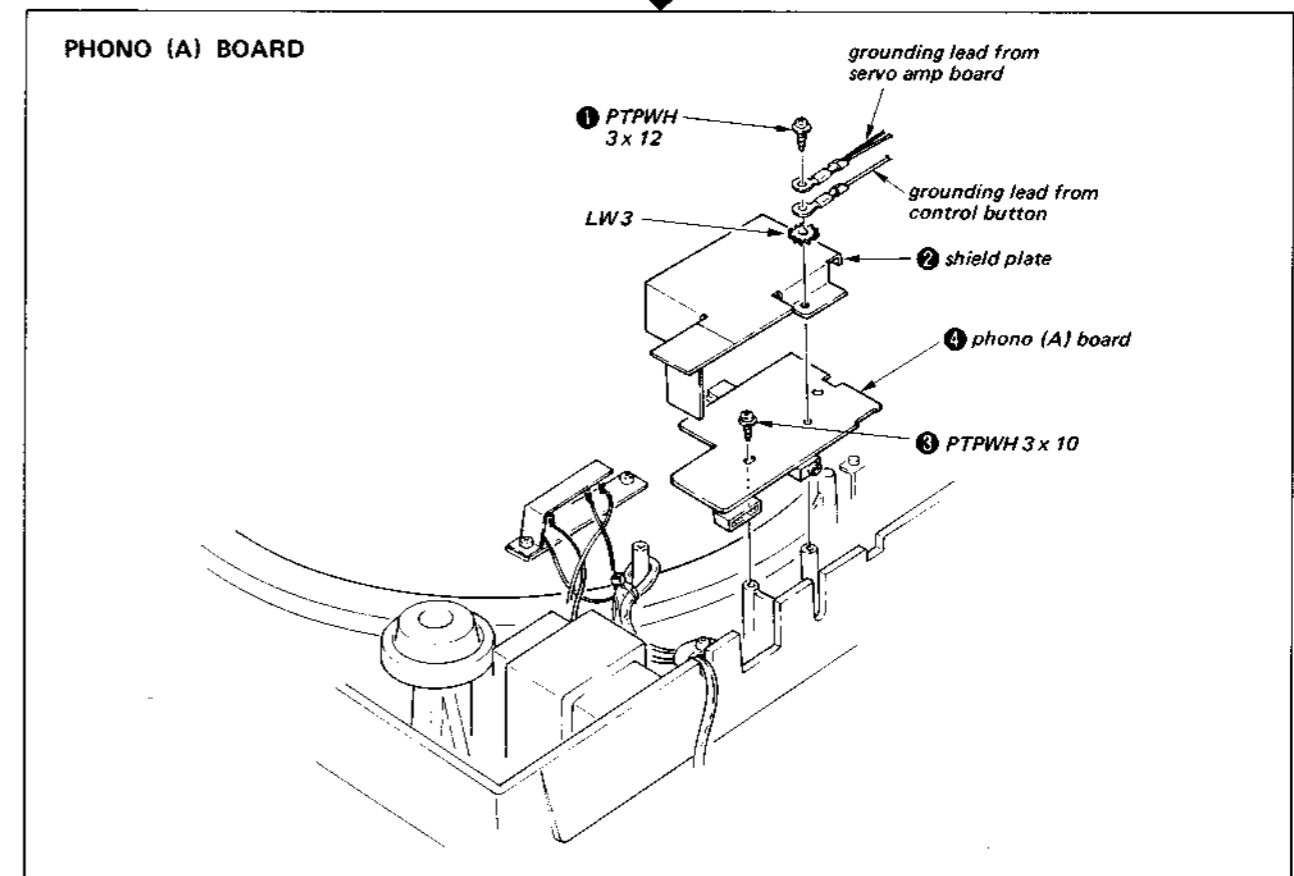
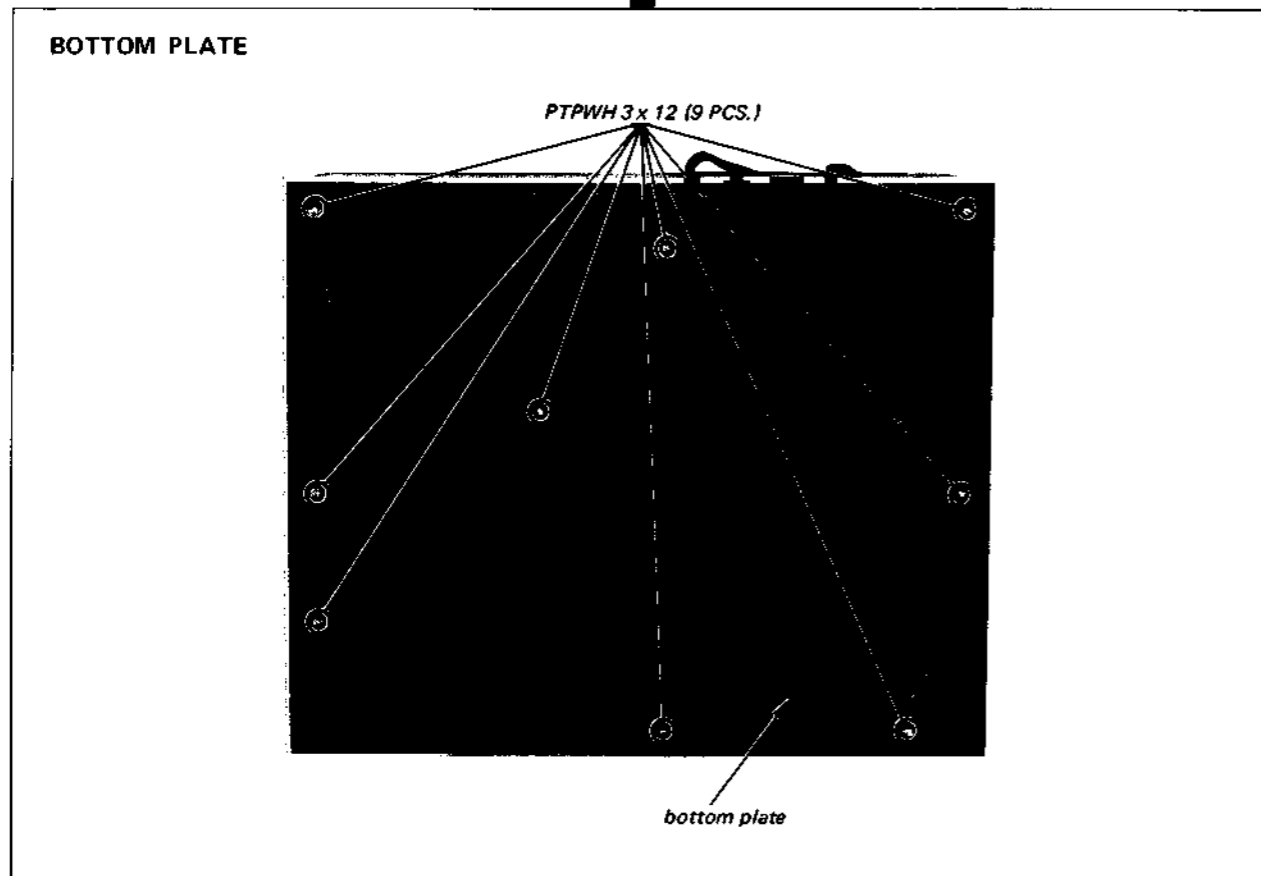
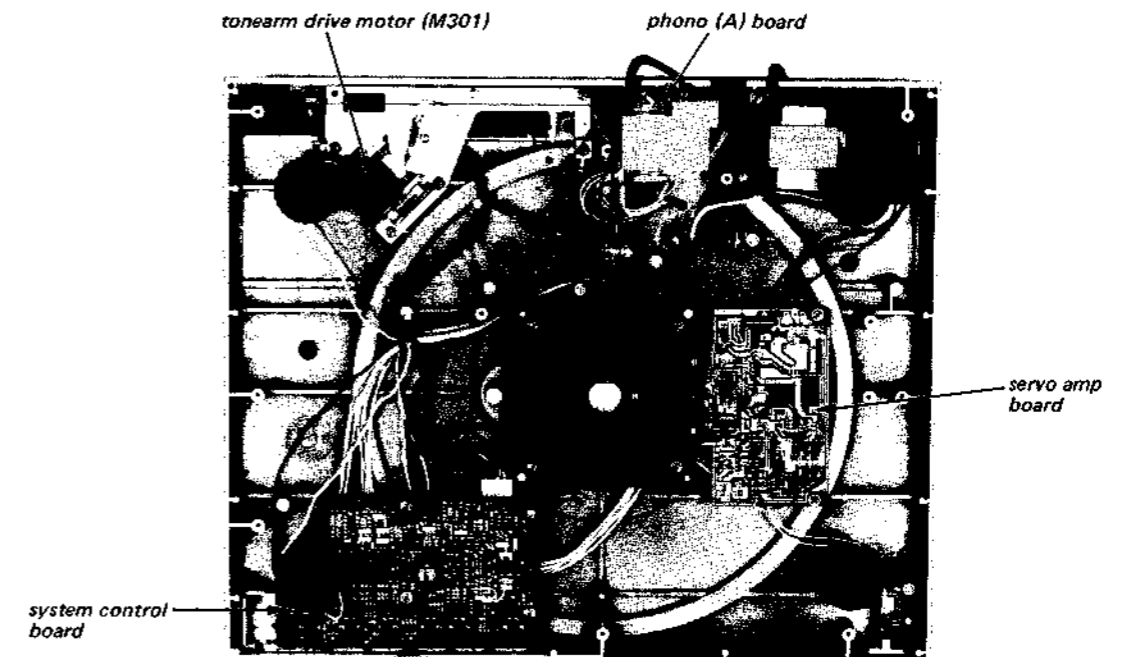


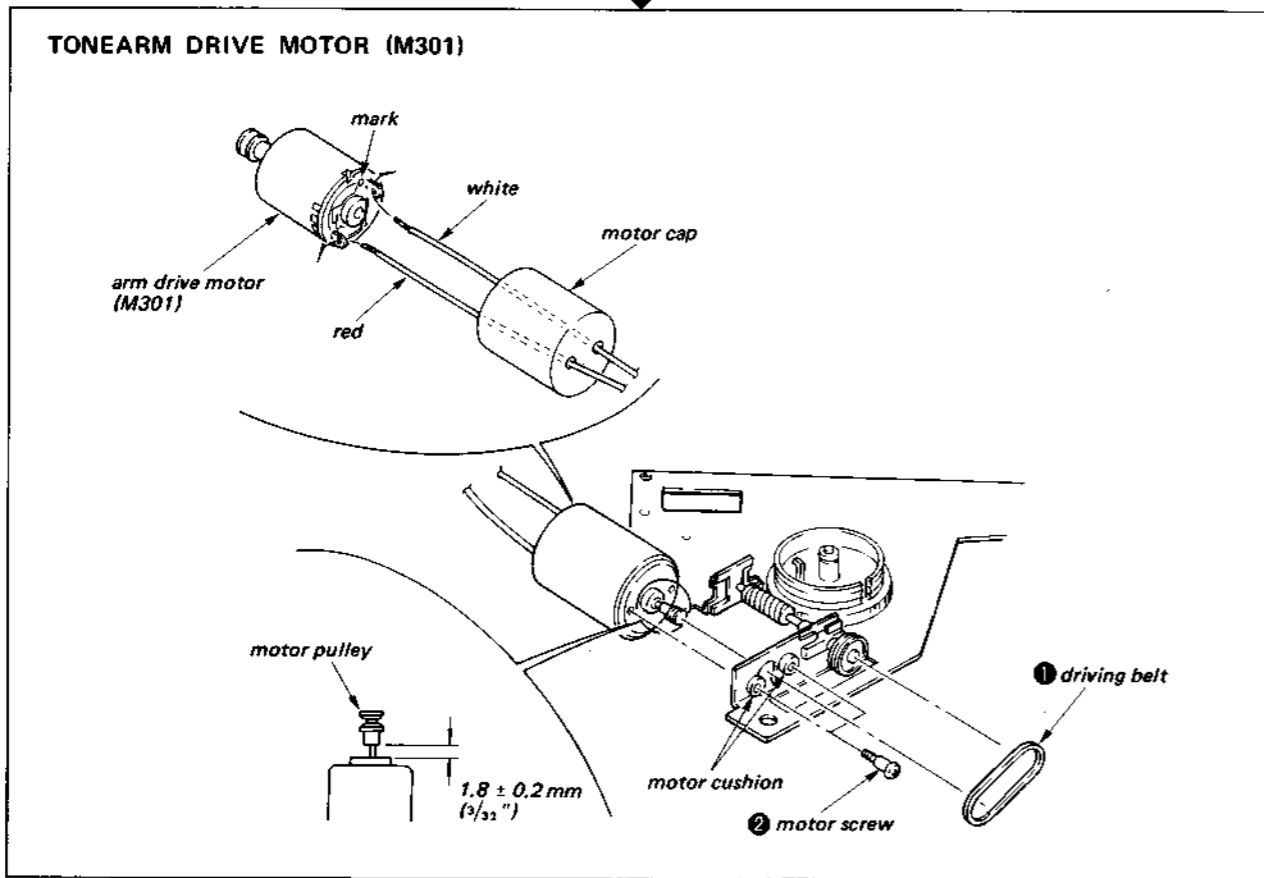
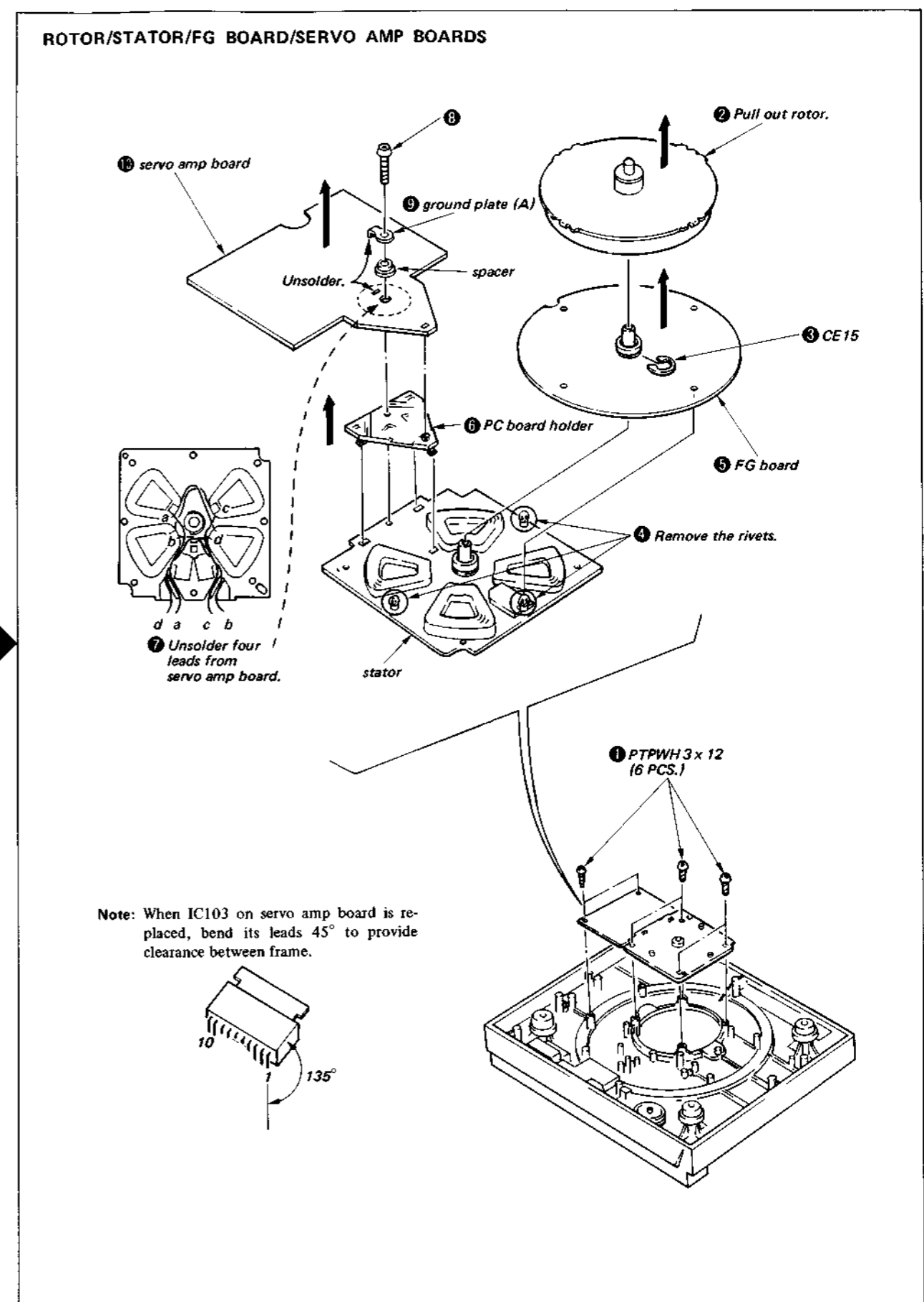
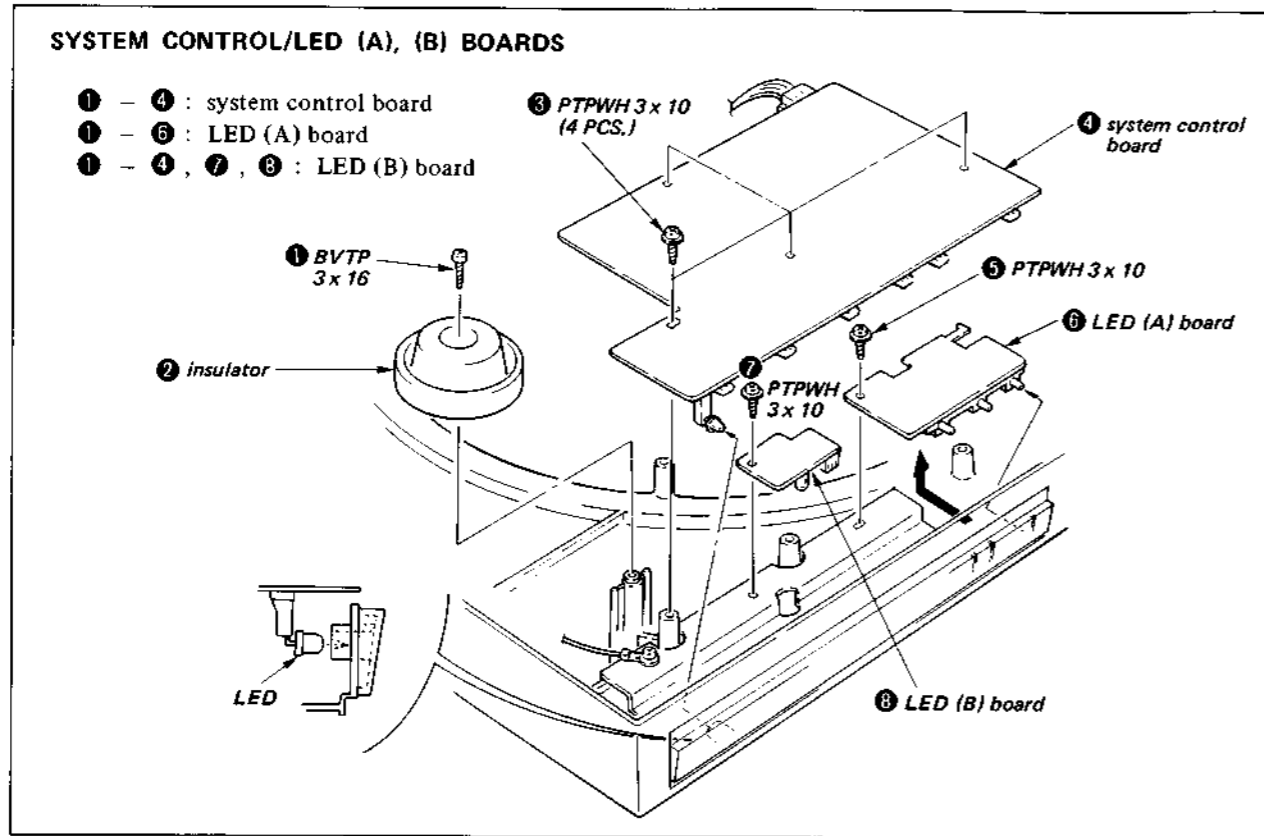
SECTION 2  
DISASSEMBLY

2-1. REMOVAL Note: Follow the disassembly procedure in the numerical order given.

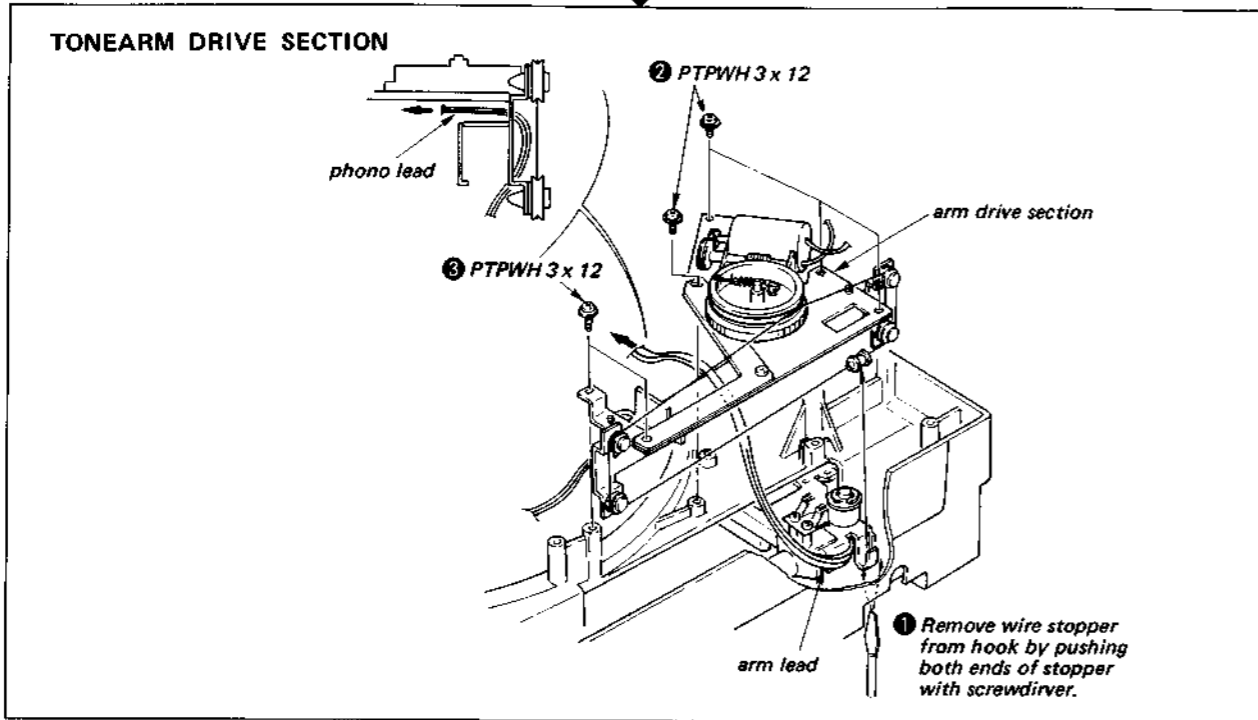


— With bottom plate removed —

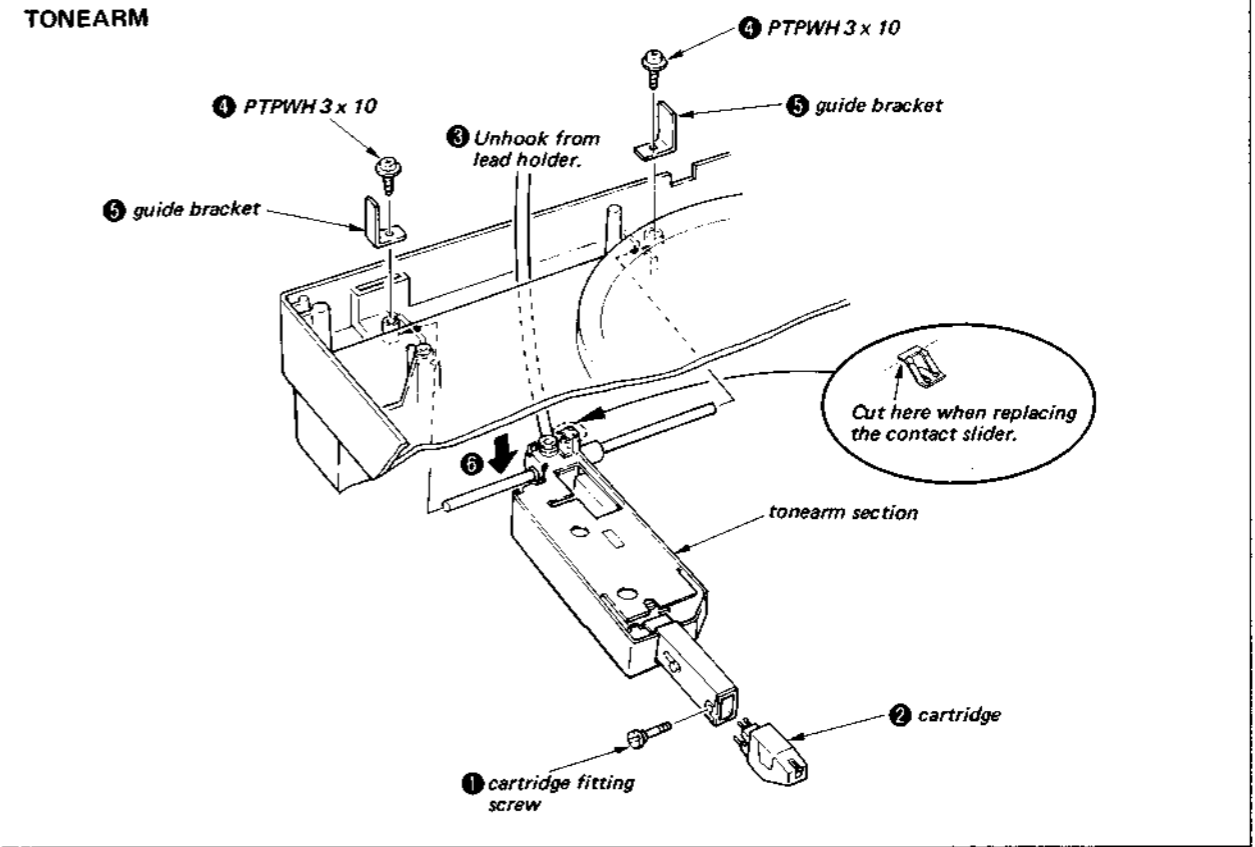
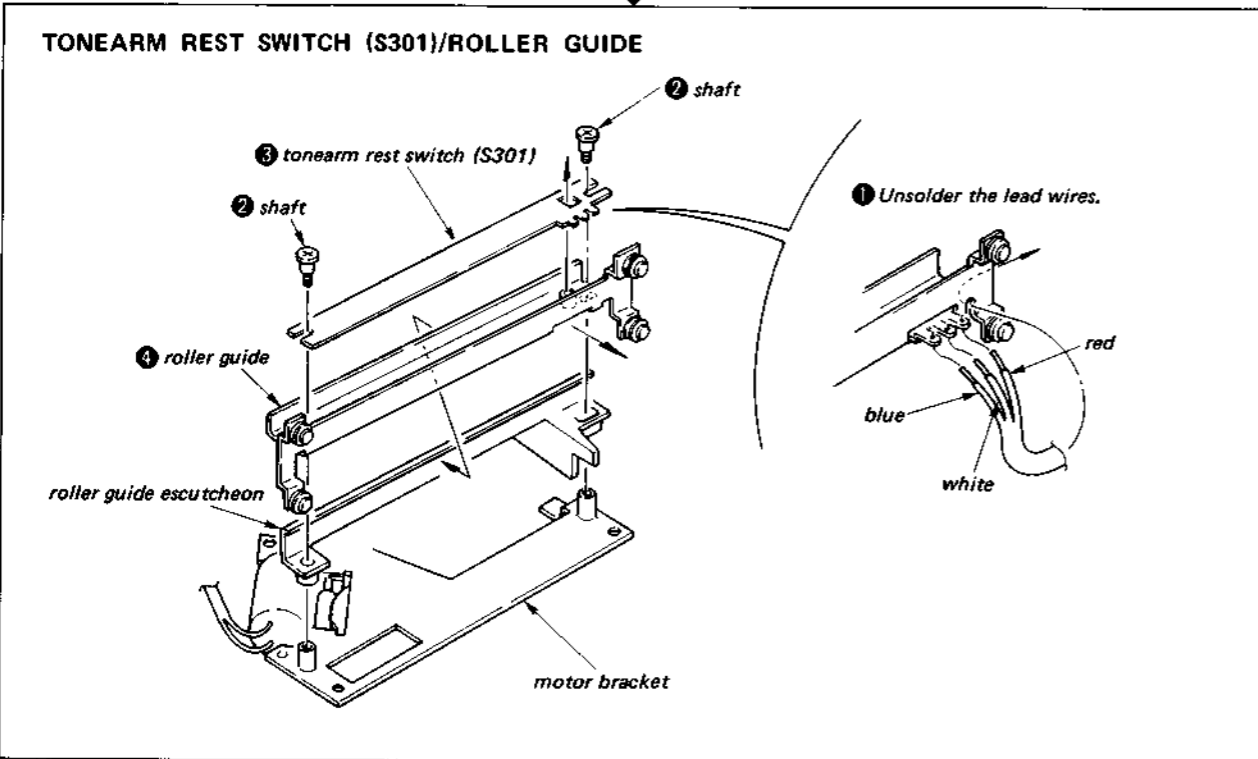




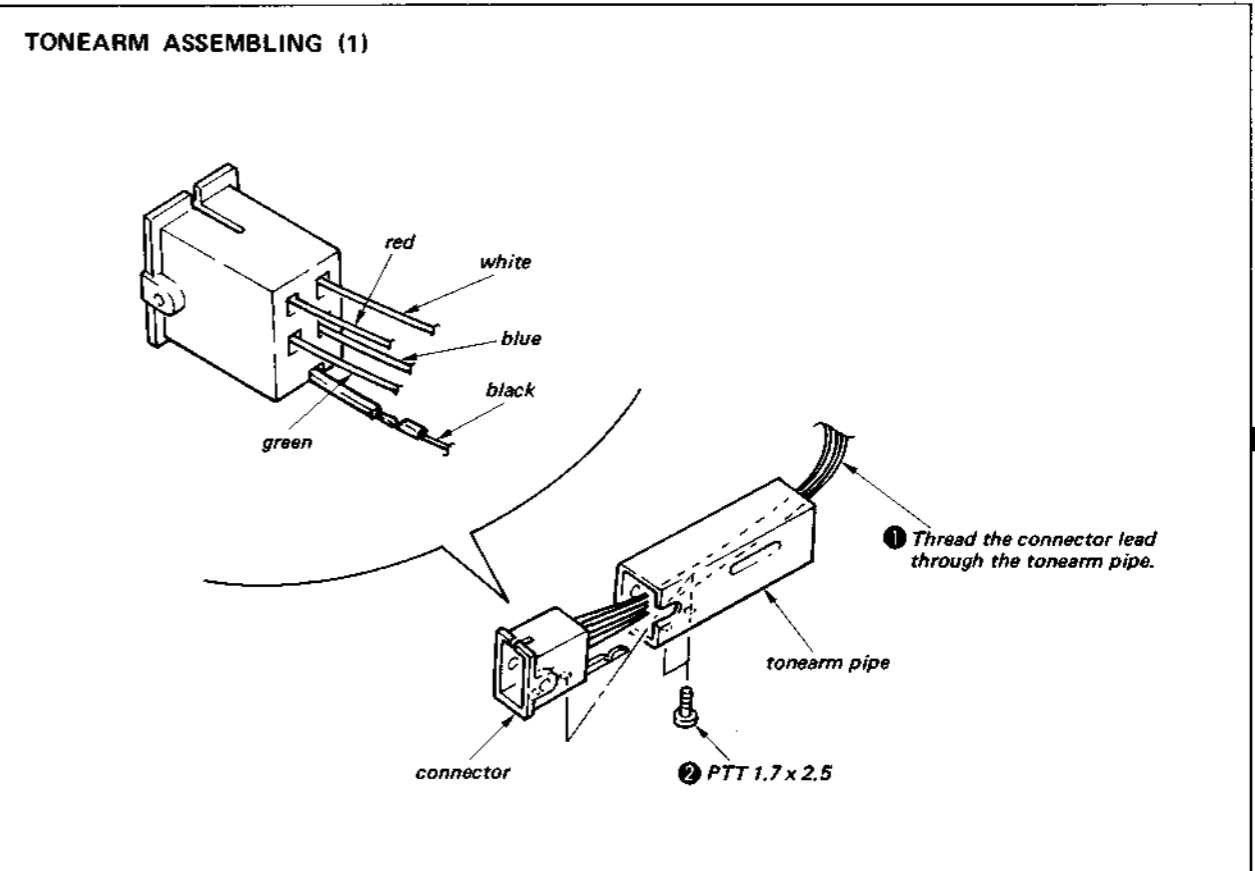
Remove the bottom plate.  
(See page 7.)



TONARM DRIVE CORD STRINGING  
(See page 15.)

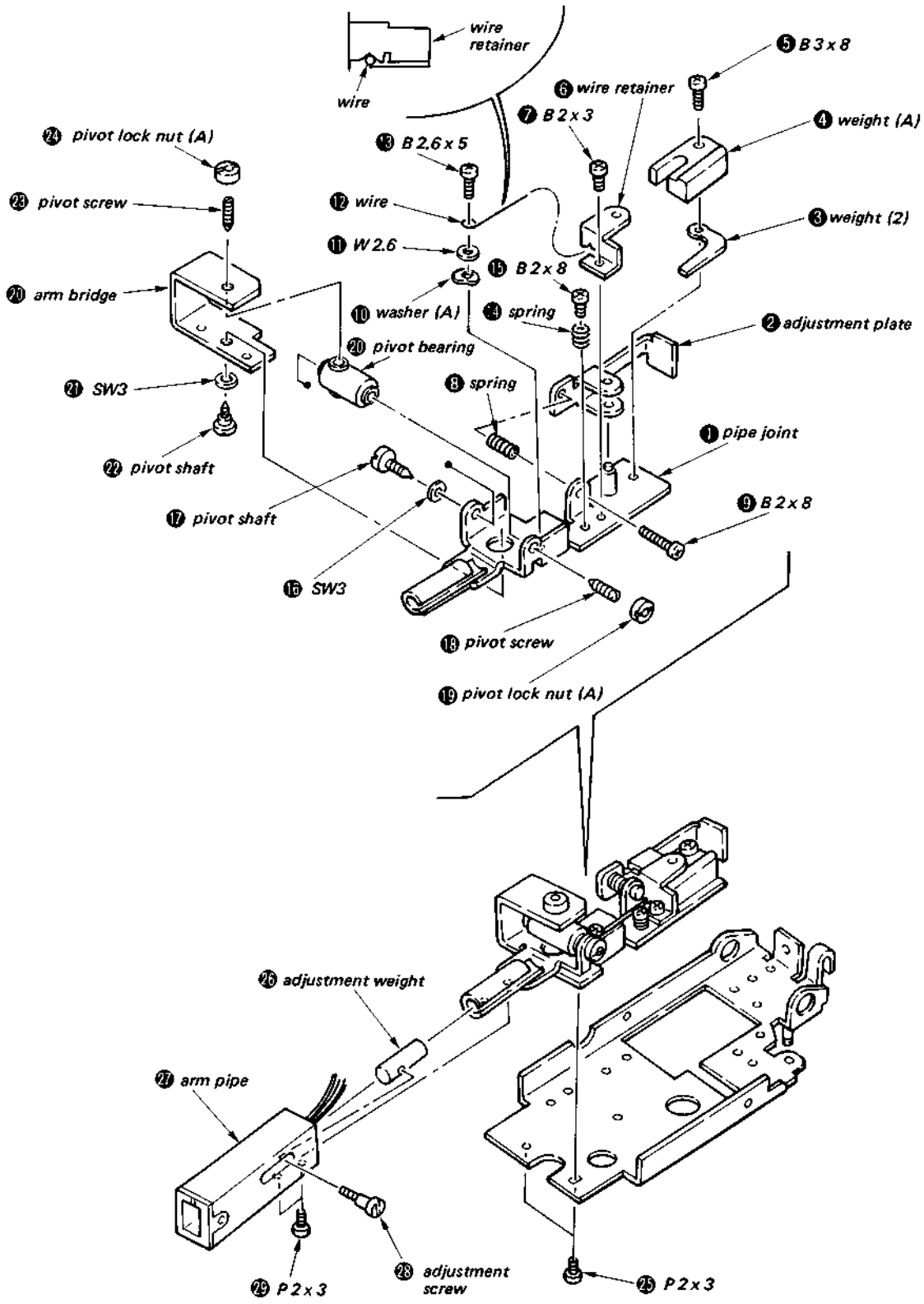


2-2. TONARM ASSEMBLING

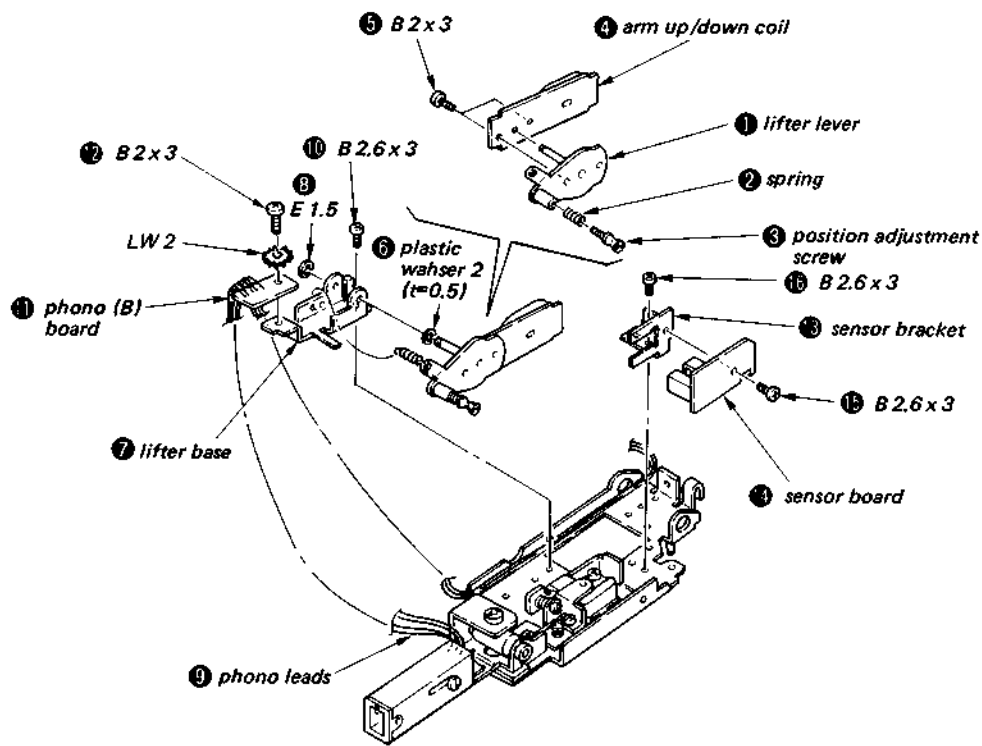




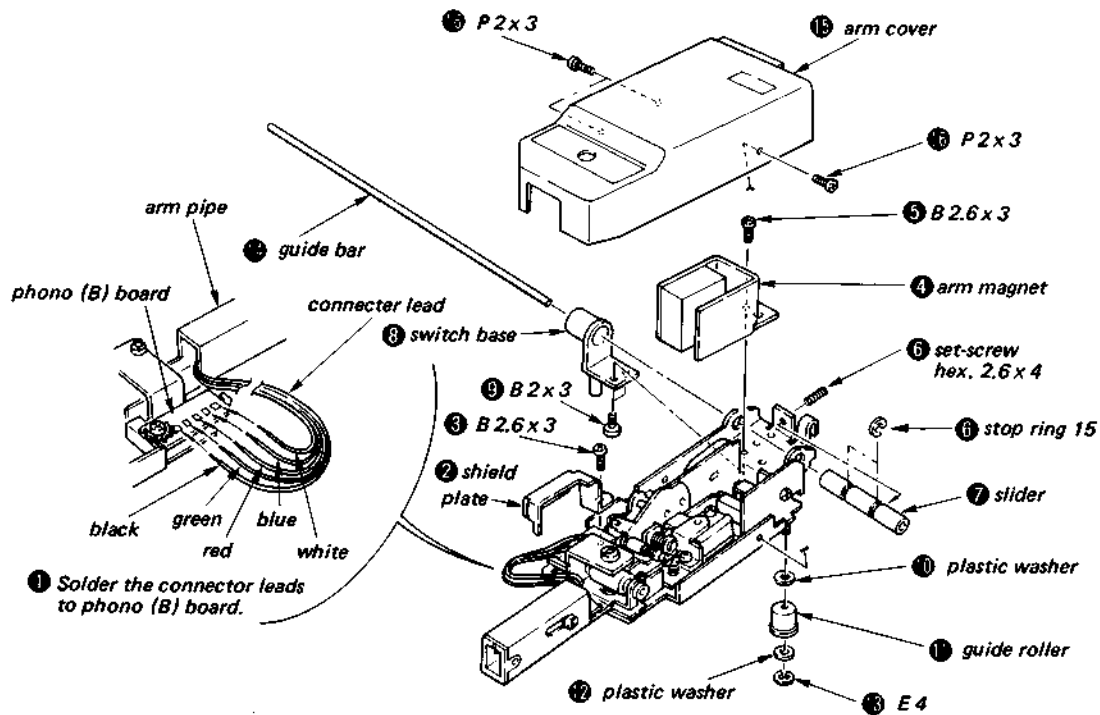
TONARM ASSEMBLING (2)



TONEARM ASSEMBLING (3)

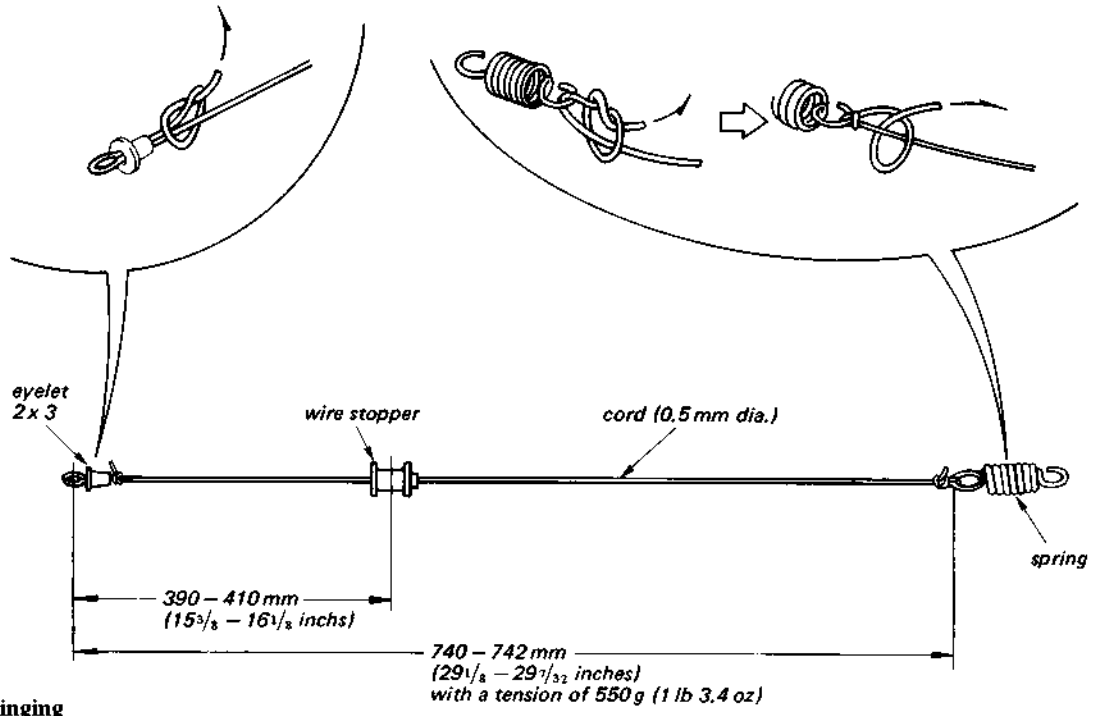


TONEARM ASSEMBLING (4)

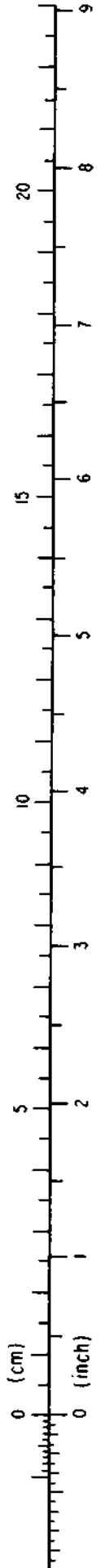
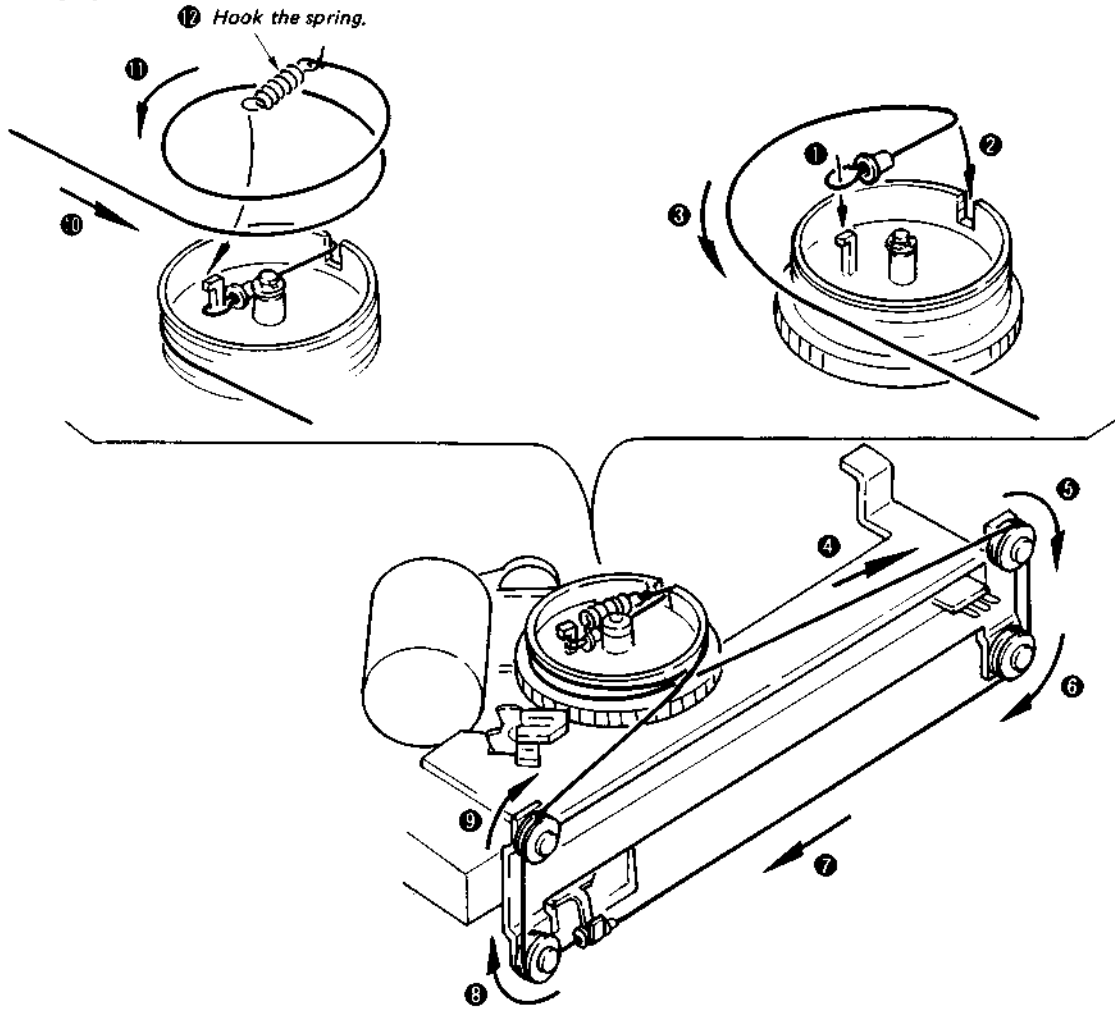


2-3. TONEARM DRIVE CORD STRINGING

(1) Preparation



(2) Stringing

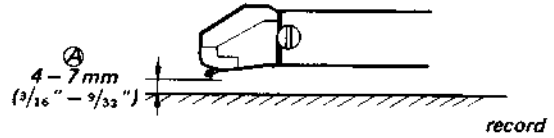


SECTION 3  
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

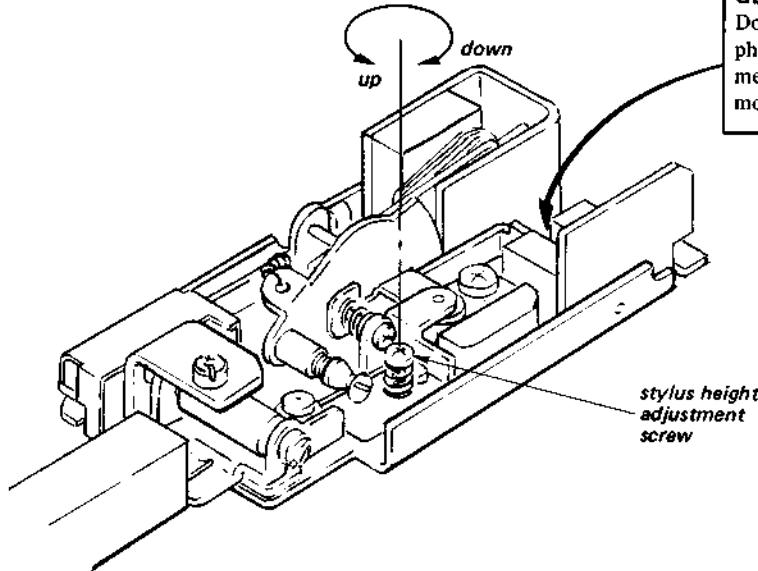
**Stylus Height Adjustment**

1. Put a record.
2. Press ARM TRANSPORT button (◀) and move the arm outside the record.
3. Make sure that clearance (A) is 4 – 7 mm ( $\frac{3}{16}$  –  $\frac{9}{32}$  inches). If necessary, adjust the stylus height adjustment screw.



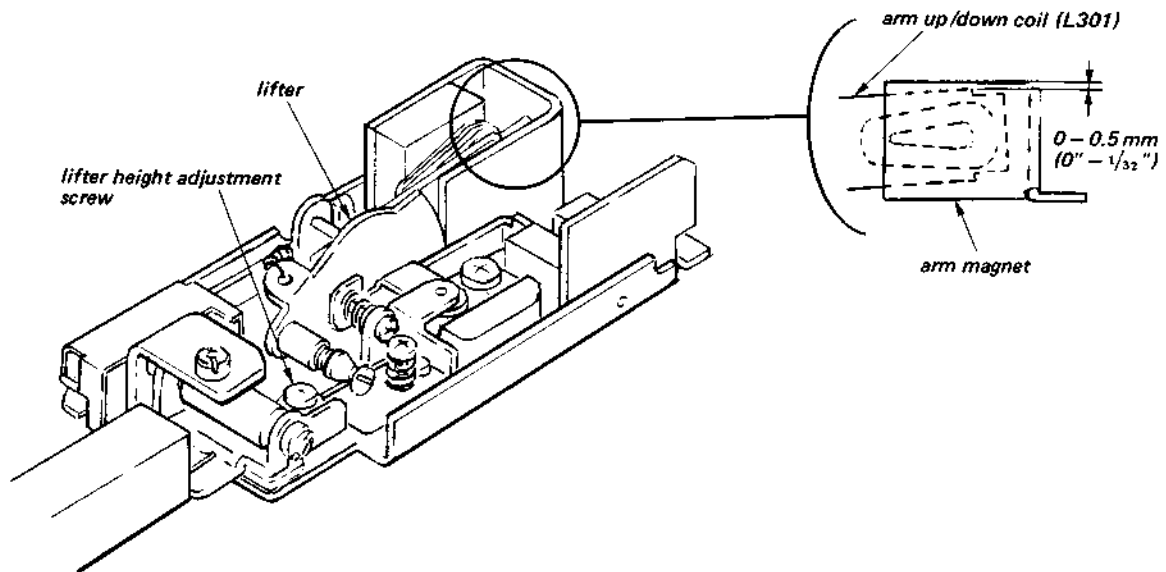
**GENERAL NOTE:**

Do not let a strong light get in the groove of photo interruptor during mechanical adjustment. Otherwise, misoperation of stoppage or moving may occur to the tonearm base.



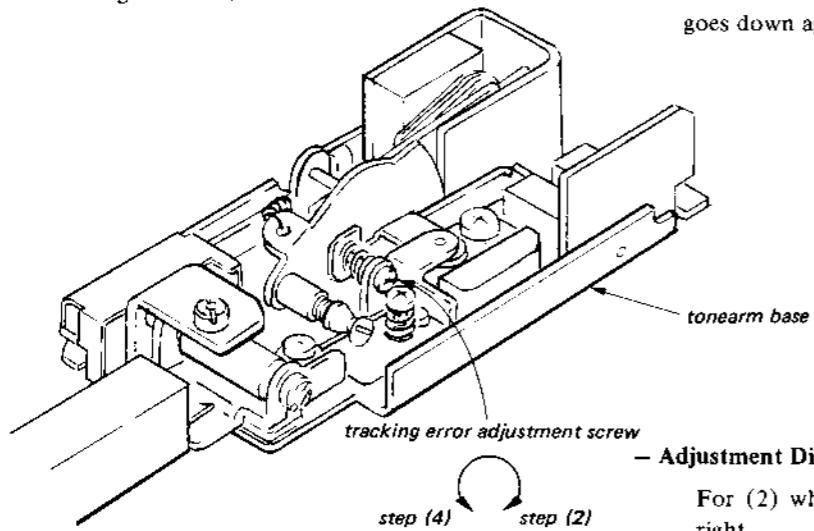
**Lifter Height Adjustment**

Adjust the lifter height adjustment screw so that the arm up/down coil position is 0 – 0.5 mm (0" –  $\frac{1}{32}$ ") as shown below.



**Tracking Error Adjustment**

- (1) Place a test record (YFSC-16) on the turntable and press the START/STOP button for lead-in.
- (2) Adjust with the adjustment screw so that the tonearm base does not move just after the tonearm goes down.
- (3) After completing step (2), cause the tonearm to lead in, and then go UP after the tonearm base moves.
- (4) Check the count at this time, and then check that the difference in count when the tonearm goes down again is within 5 counts.



— Adjustment Direction —

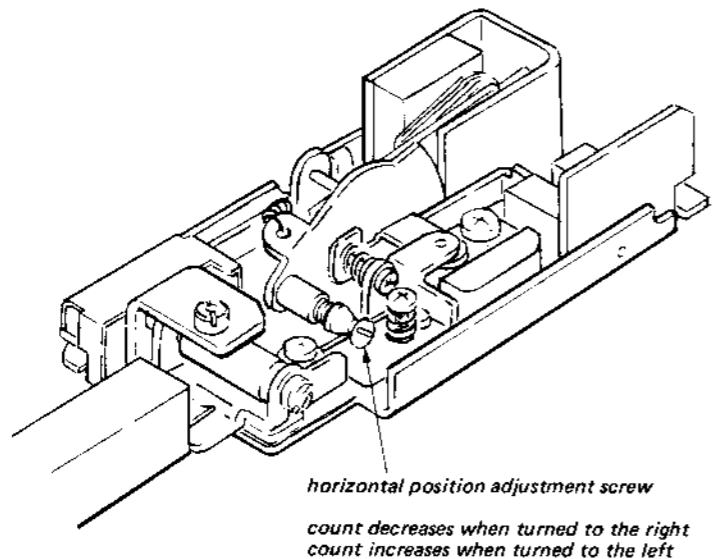
For (2) when the arm base moves, turn to the right.

For (4) when the difference in count is too large, turn to the left.

**Drop Point (30 cm) Adjustment**

- (1) Place a test record (YFSC-16) on the turntable and press the START/STOP button for lead-in.
- (2) Adjust the horizontal position adjustment screw so that the drop point at this time is within the specification.

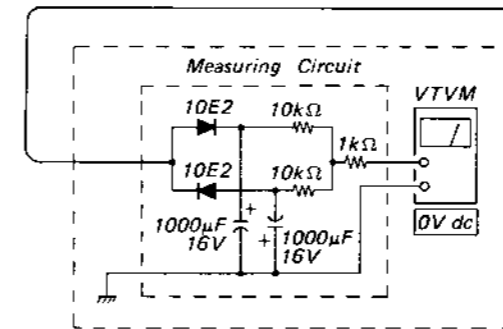
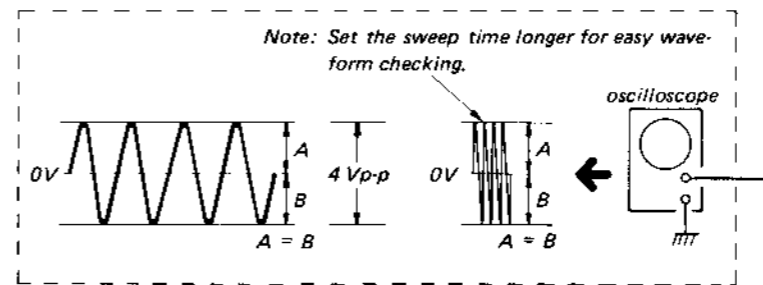
Specification: 9 – 14 counts



**3-2. ELECTRICAL ADJUSTMENT**

**Gain/Offset Adjustment**

1. Connect the pattern (A) to (B), and apply regulated power supply (0V DC) to point (C).
2. Connect a VOM to the emitter of Q104, and adjust the regulated power supply voltage for 1V DC.
3. Adjust RV101 (H1) and RV102 (H2) so that the terminal voltage of IC103 (9) (H1) and (1) (H2) are 4Vp-p. . . . . Gain Adjustment
4. Adjust RV103 (H1) and RV104 (H2) so that the terminal waveforms of IC103 (9) (H1) and (1) (H2) are as shown below (or so that DC potential is 0V). . . . . Offset Adjustment
5. After adjustment, remove the lead wire connecting pattern (A) to (B).



**Offset Adjustment**



RV103, 104

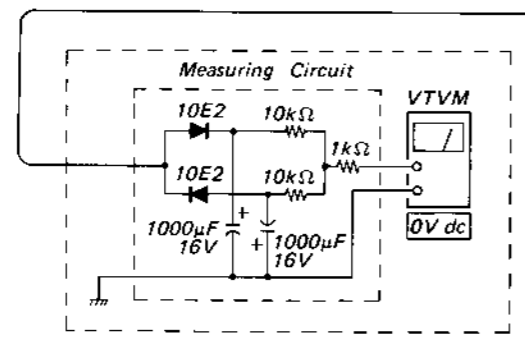
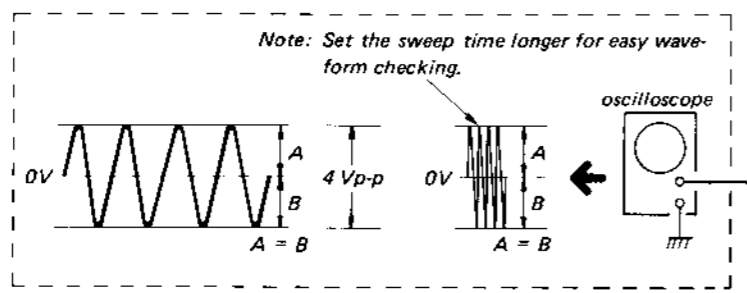
RV101, 102

lead wire (jumper)

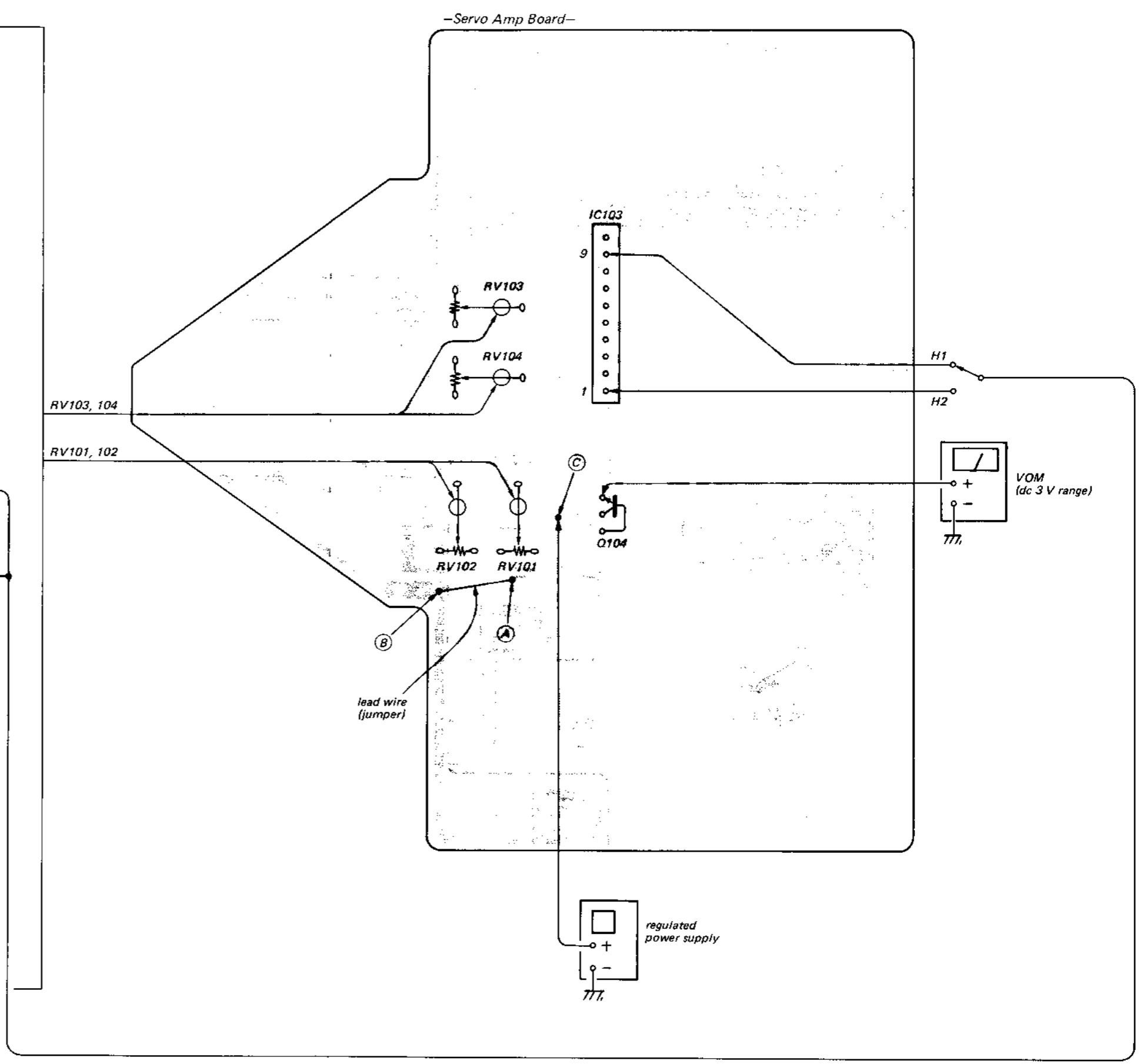
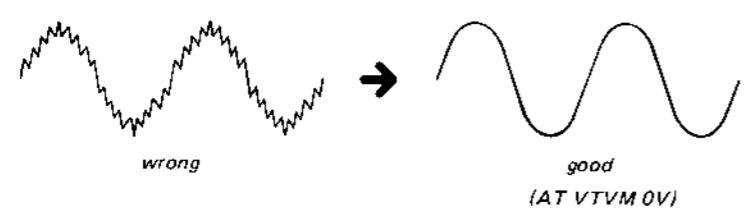
3-2. ELECTRICAL ADJUSTMENT

Gain/Offset Adjustment

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Offset Adjustment

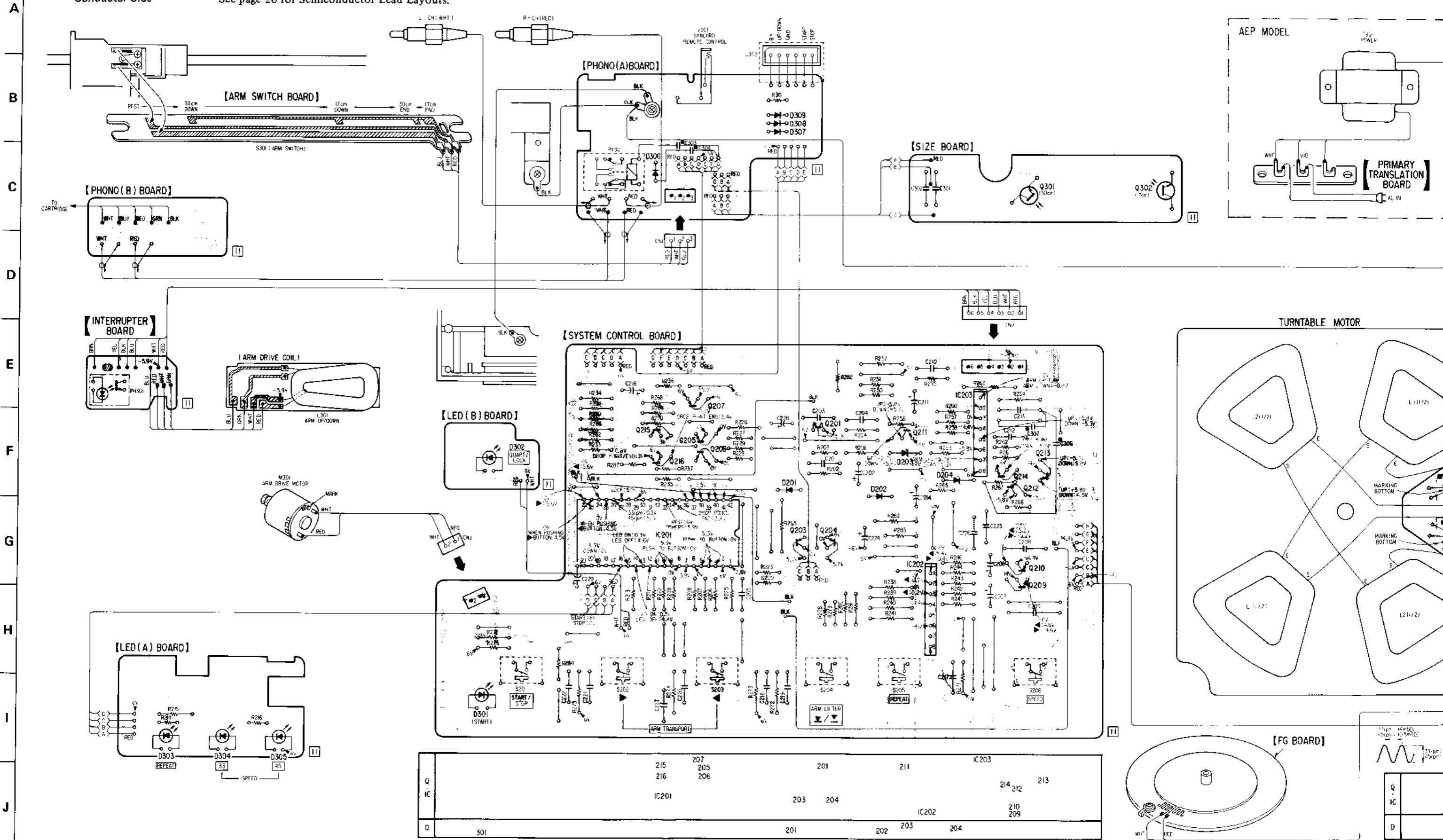


SECTION 4 DIAGRAMS

4-1. MOUNTING DIAGRAM

- Conductor Side -

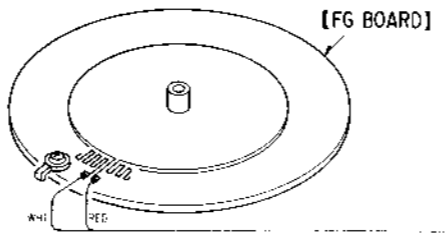
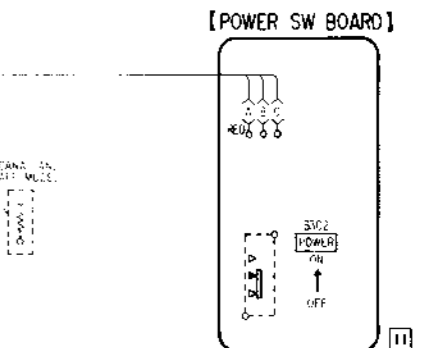
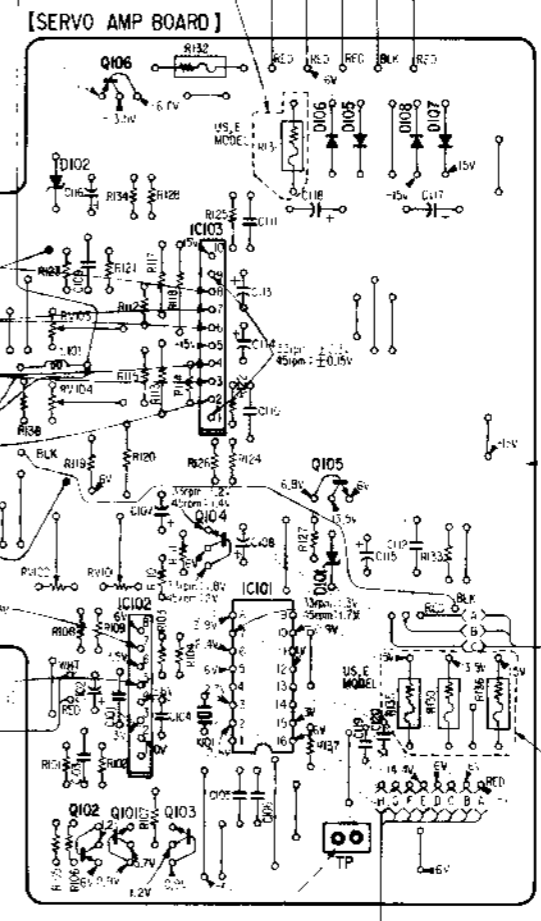
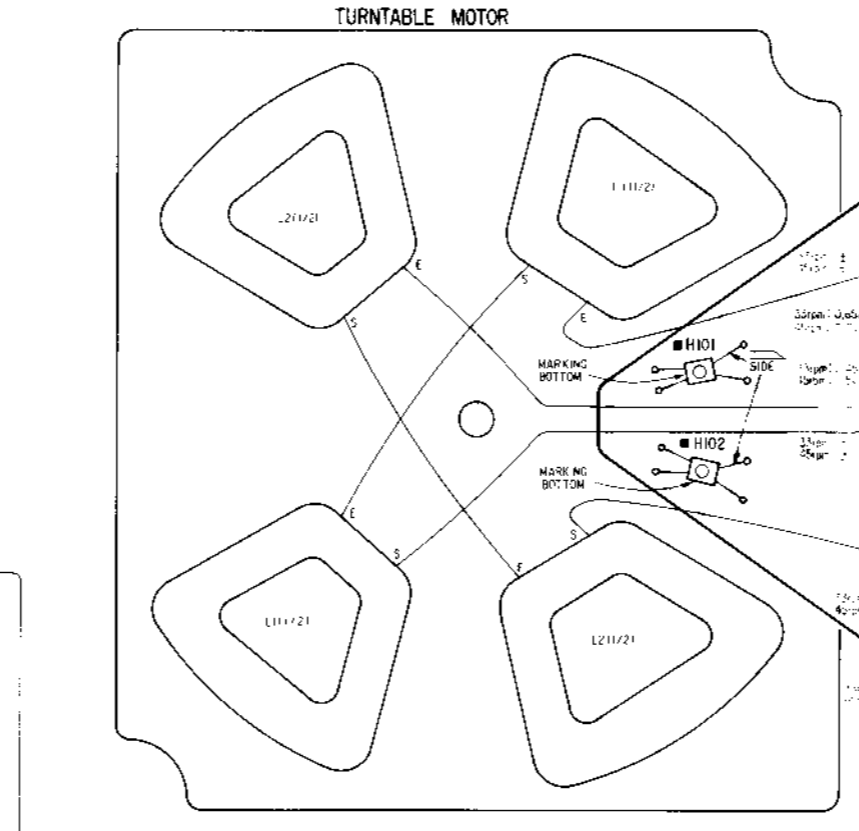
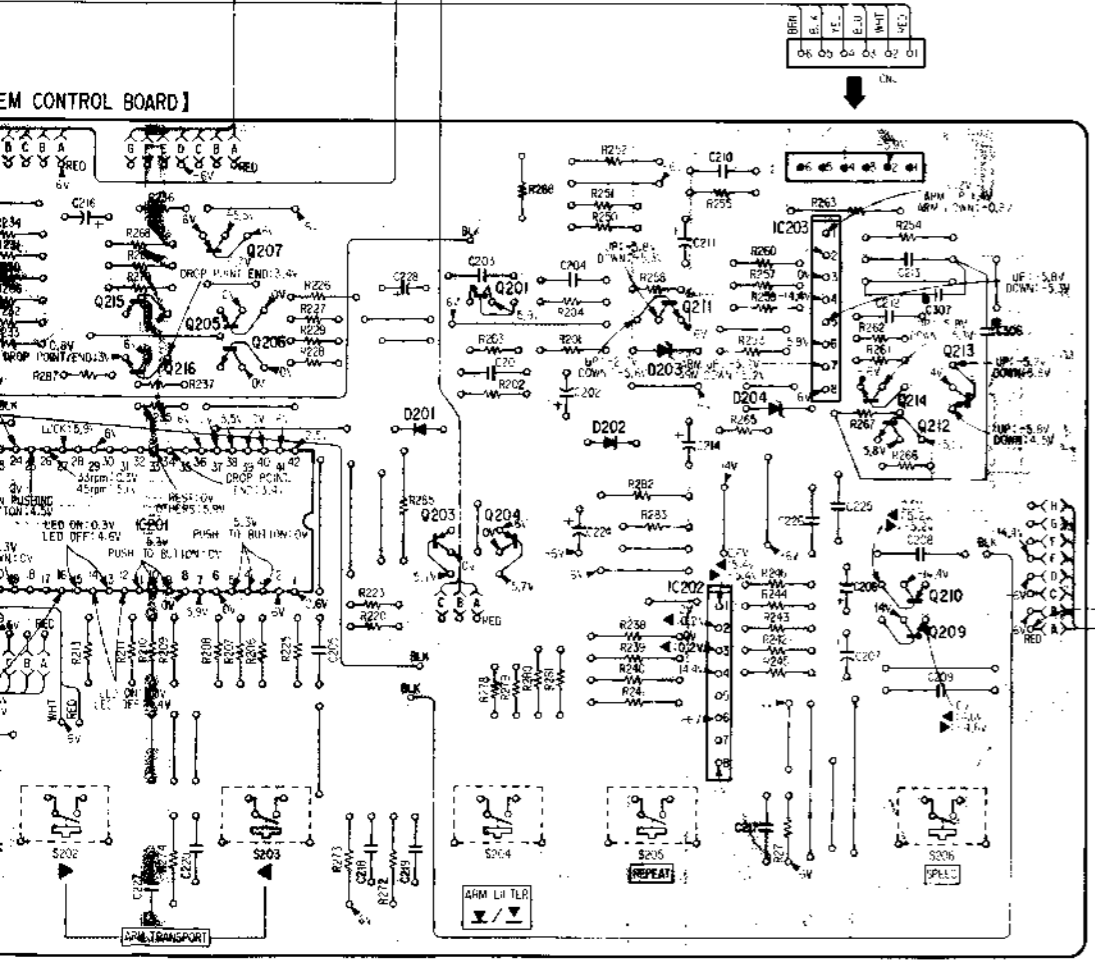
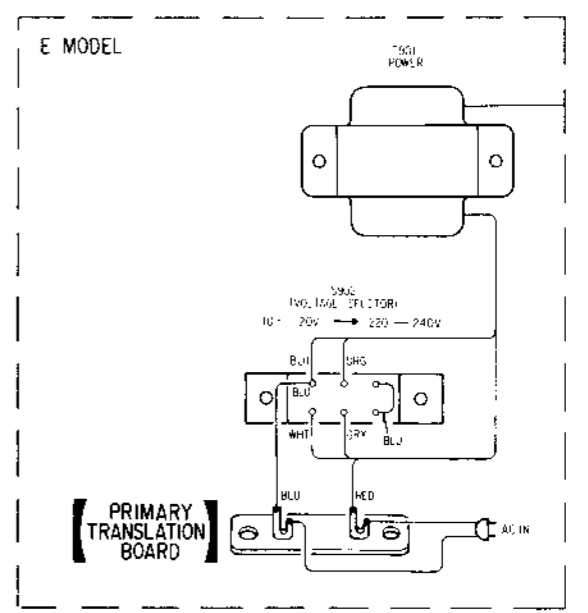
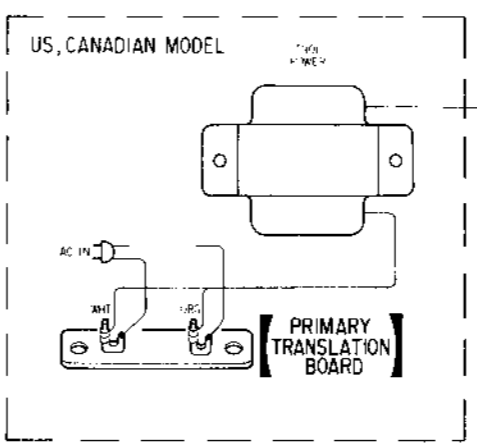
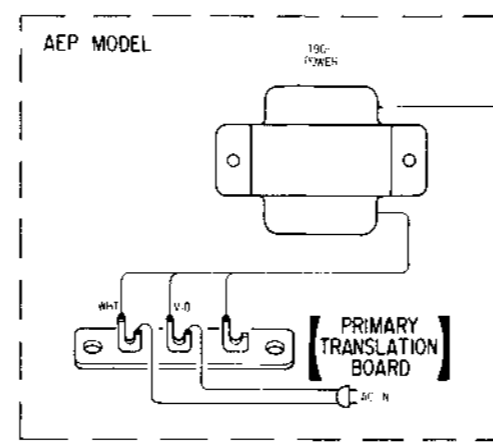
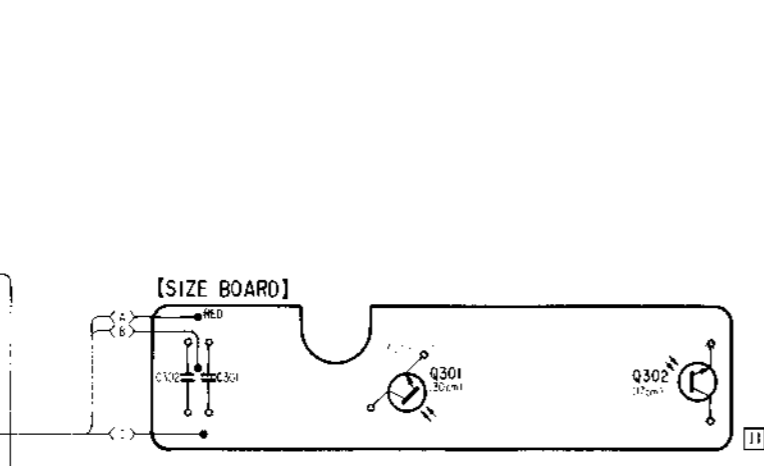
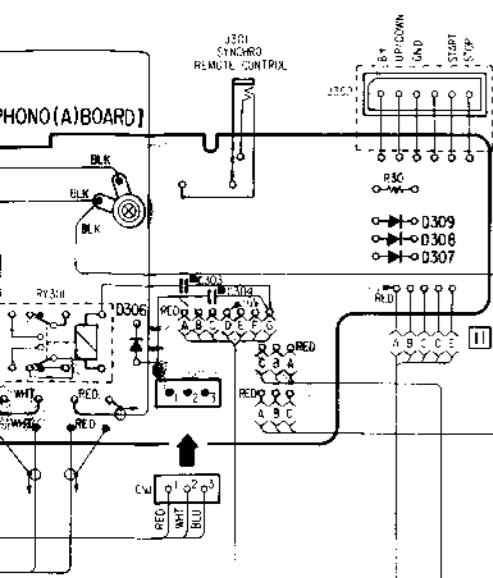
See page 26 for Semiconductor Lead Layouts.



Q		215	207		201	211	IC203	
IC		216	206				214 212 213	
			IC201		203 204		210 209	
D		301			201	202 203 204		

PS-LX510 PS-LX510

7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23



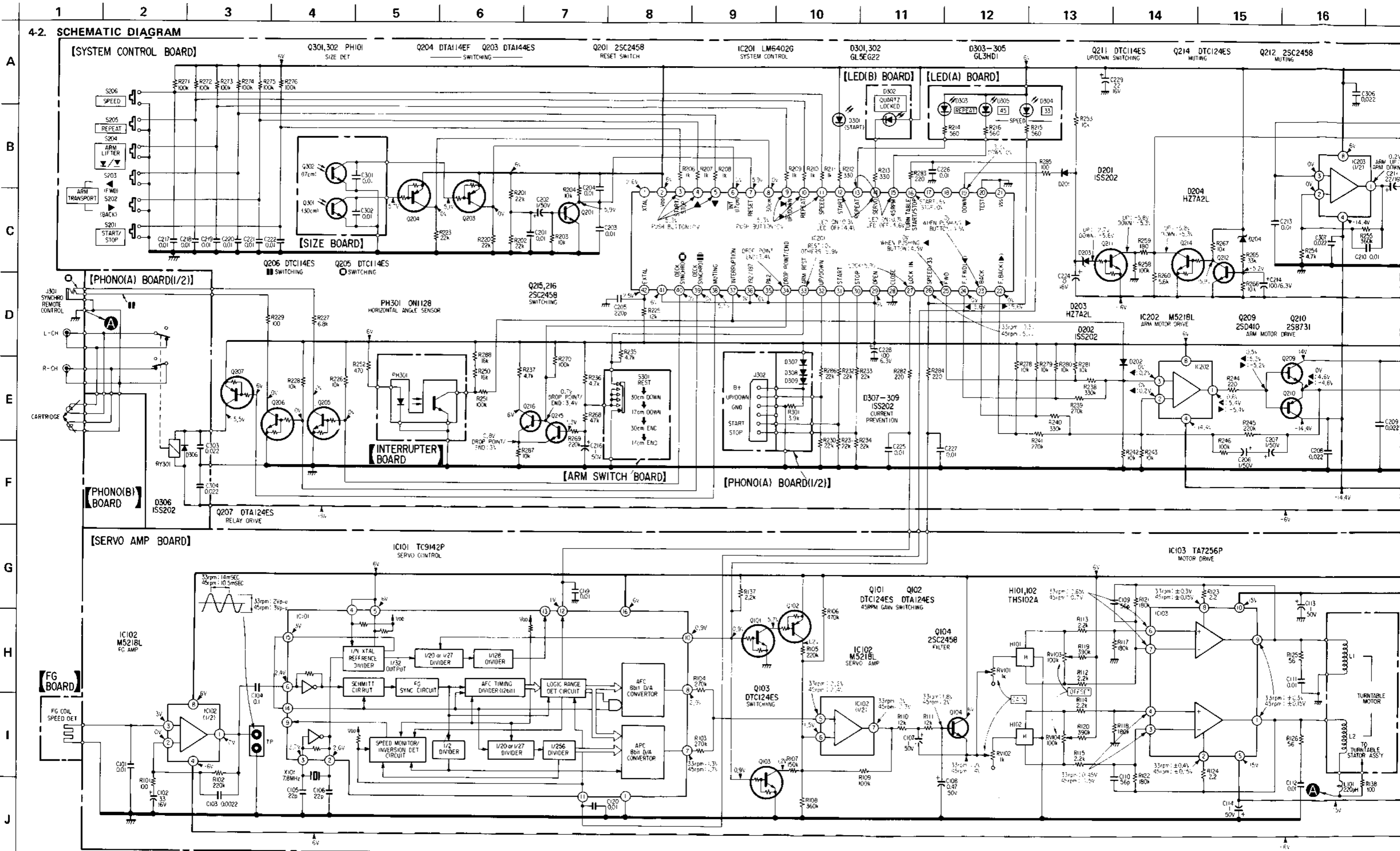
215	207	201	211	IC203	214	212	213
216	206	203	204		210	209	
IC201		202	203	204			

Q	106	IC103	105
IC	IC102	IC104	IC101
D	102, 101, 103	106, 105	108, 107

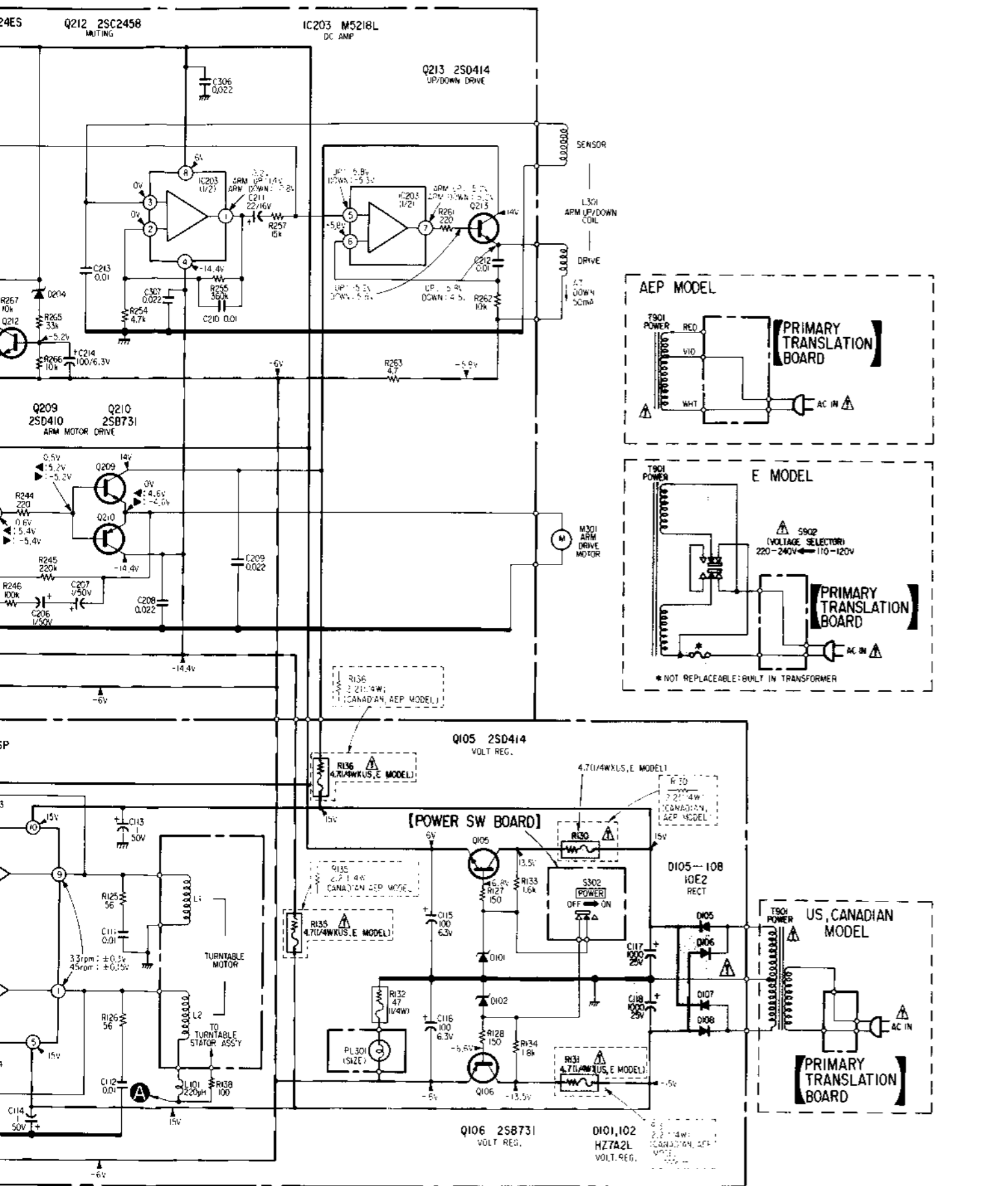
A  
B  
C  
D  
E  
F  
G  
H  
I  
J



4-2. SCHEMATIC DIAGRAM



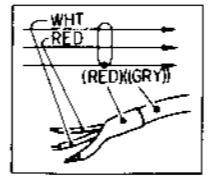
15 16 17 18 19 20 21 22 23



A  
B  
C  
D  
E  
F  
G  
H  
I  
J

**Note for MOUNTING DIAGRAM:**

- Color code of sleeving over the end of the jacket.



- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : part mounted on the conductor side.
- : B+ pattern

**Note for SCHEMATIC DIAGRAM:**

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$ :  $\mu\text{F}$
- 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms,  $\frac{1}{2}$ W unless otherwise noted.
- $\text{k}\Omega$ : 1000  $\Omega$ ,  $\text{M}\Omega$ : 1000  $\text{k}\Omega$
- ▬ : fusible resistor.
- ⊗ : transistor with resistor.
- : adjustment for repair.
- : B+ bus.
- - - : B- bus.
- Readings are taken under no-signal conditions with a VOM (50  $\text{k}\Omega/\text{V}$ ).
- Voltage variations may be noted due to normal production tolerances.
- Switches

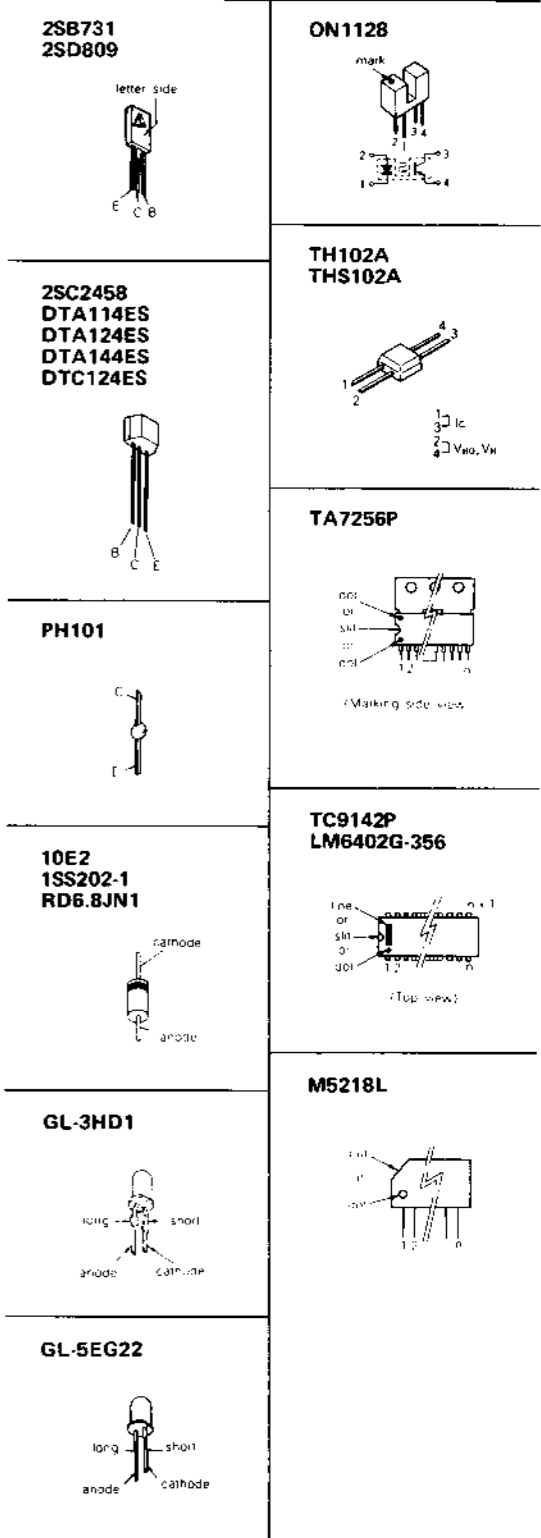
Ref. No.	Switch	Position
S201	START/STOP	OFF
S202	ARM TRANSPORT ▶	OFF
S203	ARM TRANSPORT ◀	OFF
S204	ARM LIFTER	OFF
S205	REPEAT	OFF
S206	SPEED	OFF
S301	Arm Position Det.	REST
S302	POWER	OFF

**Note: Voltages are measured with a VOM (50k $\Omega$ /V).**

**Note: The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.**

**Note: Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.**

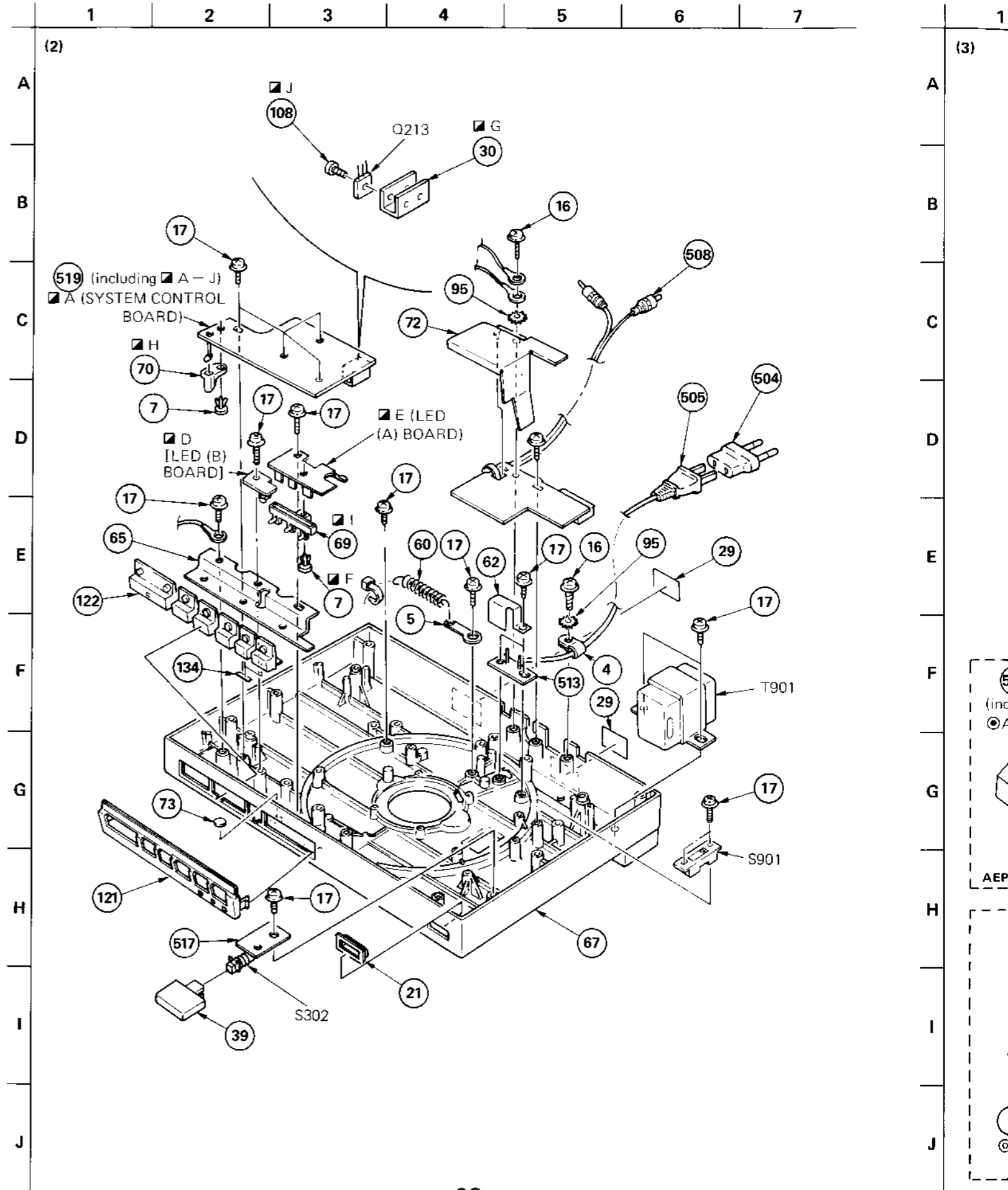
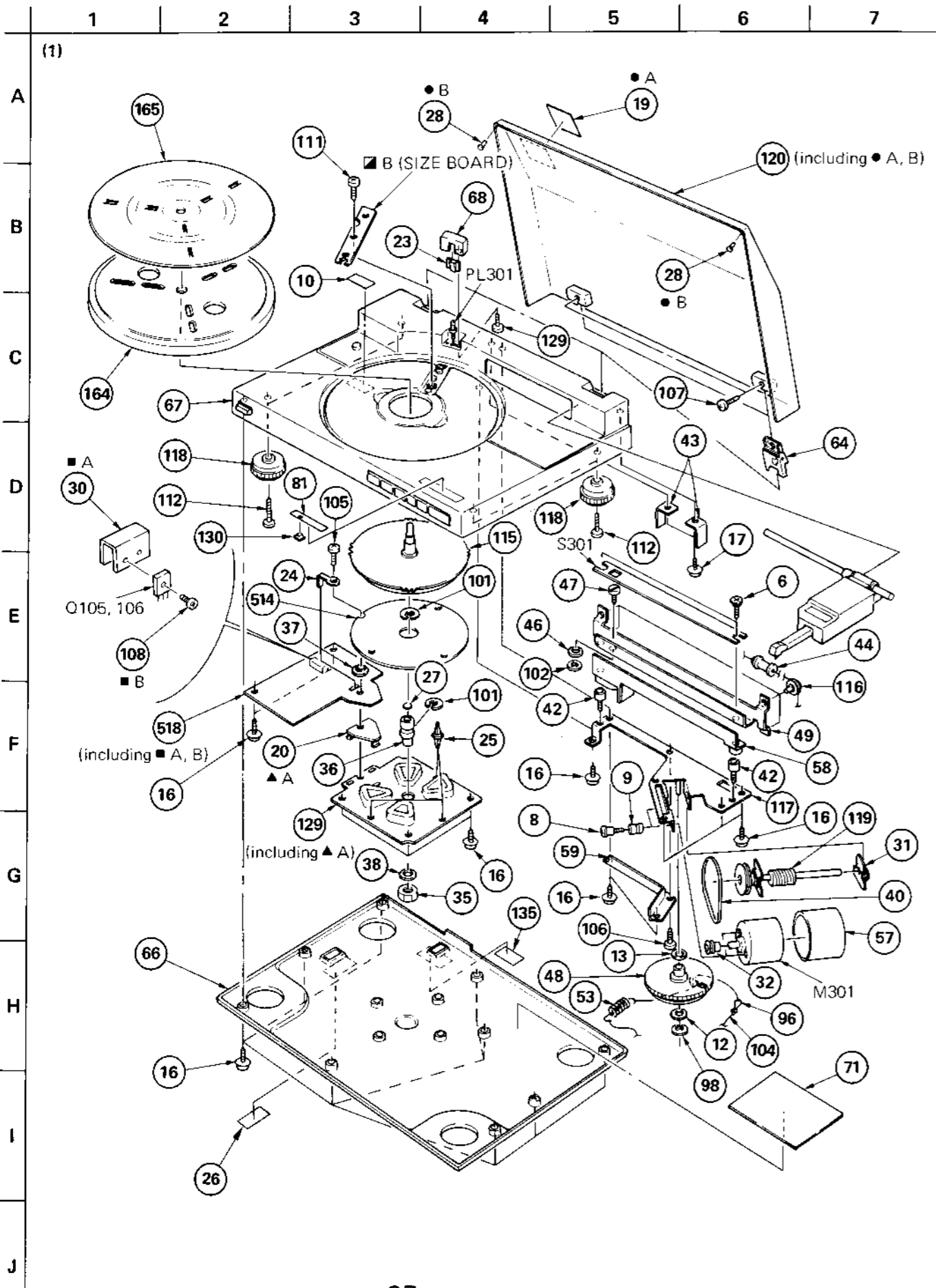
**Semiconductor Lead Layouts**



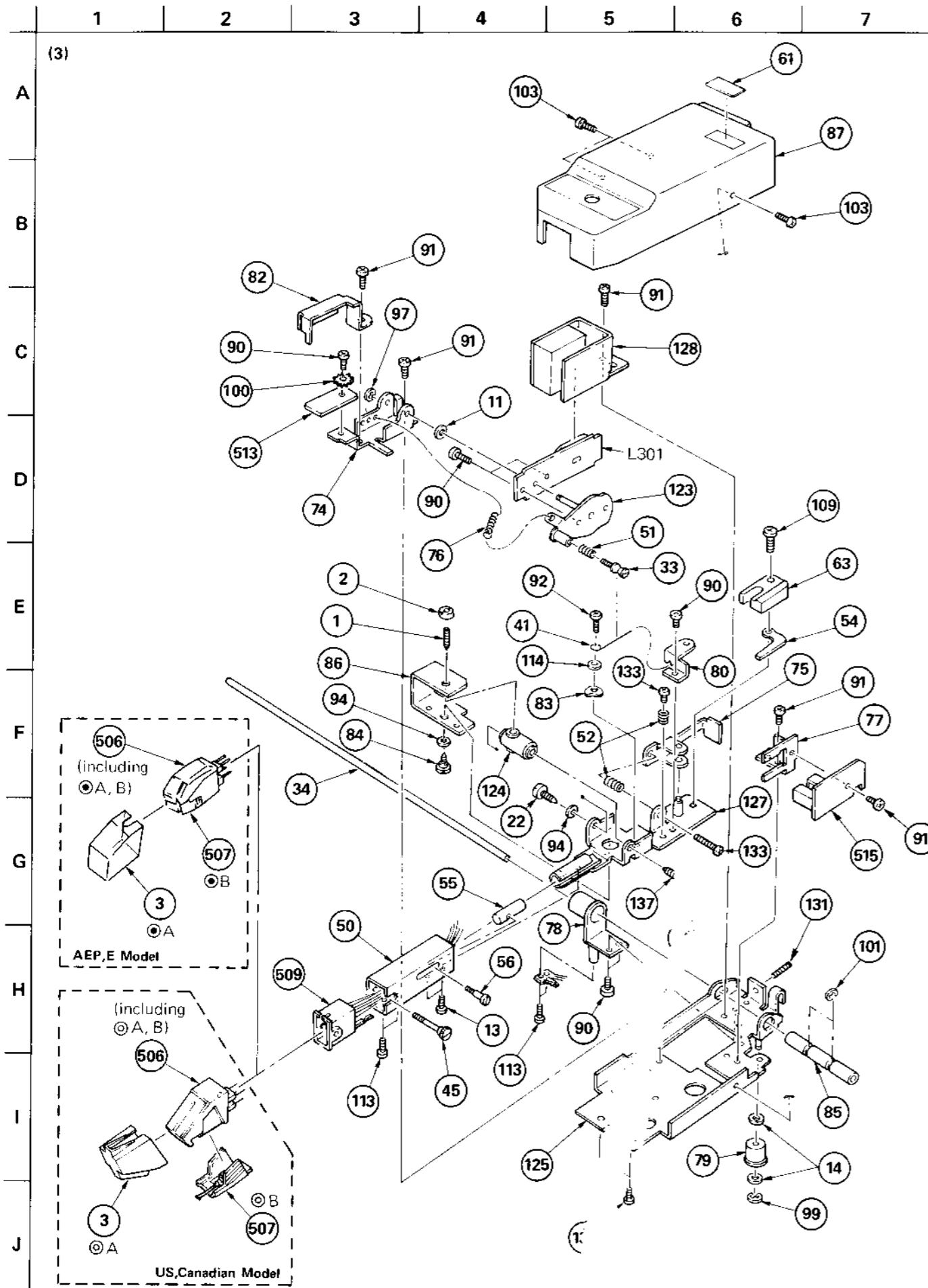
SECTION 5

PS-LX510 PS-LX510

EXPLODED VIEWS AND PARTS LIST



PS-LX510 PS-LX510



GENERAL SECTION		
No.	Part No.	Description
1	2-203-518-71	SCREW, PIVOT
2	2-203-519-00	NUT (A), LOCK, PIVOT
3	2-231-824-01	(AEP,E).....COVER, STYLUS
3	4-903-347-01	(Canadian,PS-LX510C)...COVER, STYLUS
4	3-001-707-01	HOLDER, WIRE
5	3-460-077-00	CLAMP, WIRE
6	3-465-048-00	SHAFT
7	3-531-576-31	RIVET (DIA. 3), NYLON
8	3-570-027-00	SCREW, MOTOR
9	3-570-118-00	CUSHION, MOTOR
10	3-701-030-00	LABEL, SERIAL NUMBER
11	3-701-437-21	WASHER, PLASTIC, 2 (t=0.5)
12	3-701-441-01	WASHER
13	3-701-441-21	WASHER
14	3-701-443-11	WASHER, PLASTIC, 5 (t=0.25)
15	3-703-043-21	(Canadian)...LABEL, CAUTION, MAIN
16	3-703-136-00	SCREW, PTPWH 3X12
17	3-703-137-00	SCREW, PTPWH 3X10
18	3-703-677-00	(US)...LABEL, CAUTION, MAIN;NEW UL
19	3-703-705-01	STICKER, SONY SYMBOL (30)
20	4-857-642-00	HOLDER, PC BOARD
21	4-875-501-00	GUIDE, POWER KNOB
22	4-877-816-00	SHAFT, PIVOT
23	4-879-741-00	WINDOW, LAMP
24	4-881-629-00	PLATE (A), GROUND
25	4-881-636-11	SUPPORT (TMD), PC
26	4-881-683-00	(E)...LABEL, VOLTAGE
27	4-885-135-00	RETAINER, THRUST
28	4-885-183-00	CUSHION (D)
29	4-885-432-01	(AEP).....LABEL, MODEL NUMBER
29	4-887-430-01	(Canadian,US)...LABEL, MODEL NUMBER
29	4-887-434-01	(E).....LABEL, MODEL NUMBER
29	4-887-459-01	(G-AEP).....LABEL, MODEL NUMBER
30	4-885-562-11	HEAT SINK
31	4-885-703-00	GUIDE, WORM SHAFT
32	4-885-704-03	PULLEY, MOTOR
33	4-885-706-04	SCREW, ADJUSTMENT, POSITION
34	4-885-709-00	BAR, GUIDE
35	4-885-723-00	NUT, BEARING
36	4-885-724-00	BEARING
37	4-885-727-00	SPACER
38	4-885-728-00	PACKING
39	4-885-734-00	(SILVER)...BUTTON, POWER
39	4-885-734-12	(BLACK)...BUTTON, POWER
40	4-885-735-00	BELT, DRIVING
41	4-885-737-00	WIRE

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (A-111-111-XX or A-111-111-X) may be different from those used in the set.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

GENERAL SECTION		
No.	Part No.	Description
42	4-885-741-00	SPACER
43	4-885-742-00	BRACKET, GUIDE
44	4-885-744-00	STOPPER, WIRE
45	4-885-746-00	SCREW, FITTING, CARTRIDGE
46	4-885-747-00	WASHER (H)
47	4-885-748-00	PIN, ADJUSTMENT
48	4-885-749-00	WHEEL, WORM
49	4-885-750-00	GUIDE, ROLLER
50	4-885-760-00	PIPE, ARM
51	4-885-764-02	SPRING, COMPRESSION
52	4-885-766-00	SPRING, COMPRESSION
53	4-885-767-00	SPRING, TENSION
54	4-885-768-00	WEIGHT (2)
55	4-885-770-00	WEIGHT, ADJUSTMENT
56	4-885-771-00	SCREW, ADJUSTMENT
57	4-885-775-00	CAP, MOTOR
58	4-885-777-00	(SILVER)...ESCUTCHEON, ROLLER GUIDE
58	4-885-777-11	(BLACK)...ESCUTCHEON, ROLLER GUIDE
59	4-885-787-00	GUIDE, LEAD WIRE
60	4-885-789-00	SPRING, TENSION
61	4-885-792-00	PLUG IN SEAL (A)
62	4-885-798-00	COVER, POWER
63	4-887-310-00	WEIGHT (A)
64	4-887-404-00	(SILVER)...HINGE
64	4-887-404-11	(BLACK)...HINGE
65	4-887-406-00	RETAINER, BUTTON, CONTROL
66	4-887-410-00	(AEP).....PLATE, BOTTOM
66	4-887-410-11	(Canadian,US)...PLATE, BOTTOM
66	4-887-410-21	(E).....PLATE, BOTTOM
67	4-887-411-21	(SILVER)...FRAME, POWER DISPLAY ON/OFF
67	4-887-411-31	(SILVER)...FRAME, POWER DISPLAY ON/STANDBY
67	4-887-411-41	(BLACK)...FRAME, POWER DISPLAY ON/OFF
67	4-887-411-51	(BLACK)...FRAME, POWER DISPLAY ON/STANDBY
68	4-887-412-21	(SILVER)...HOLDER, LAMP
68	4-887-412-11	(BLACK)...HOLDER, LAMP
69	4-887-414-00	HOLDER (A), LED
70	4-887-415-00	HOLDER (B), LED
71	.....	.....
72	4-887-426-00	PLATE, SHIELD
73	4-887-429-00	SPACER
74	4-887-437-01	BASE, LIFTER
75	4-887-438-01	PLATE, ADJUSTMENT
76	4-887-439-01	SPRING, TENSION
77	4-887-440-01	BRACKET, SENSOR
78	4-887-442-01	BASE, SWITCH

CAPACITORS:  
 All capacitors are in  $\mu\text{F}$ . Common capacitors are omitted. Refer to the following lists for their part numbers.  
 MF:  $\mu\text{F}$ , PF:  $\mu\text{pF}$ .

COILS  
 MMH: mH, UH:  $\mu\text{H}$

SEMICONDUCTORS  
 In each case, U:  $\mu$ , for example:  
 UA:  $\mu\text{A}$ , UPA:  $\mu\text{PA}$ , UPC:  $\mu\text{PC}$ , UPD:  $\mu\text{PD}$



