

RABCO ST-8

Straight Line Tracking System

Technical Manual



WARNING

These technical instructions are for use by qualified service personnel only. To avoid electric shock, do not perform any servicing other than that contained in the operating instructions unless qualified to do so.

NO PARTS ARE
AVAILABLE
FOR THIS MODEL

harman/kardon

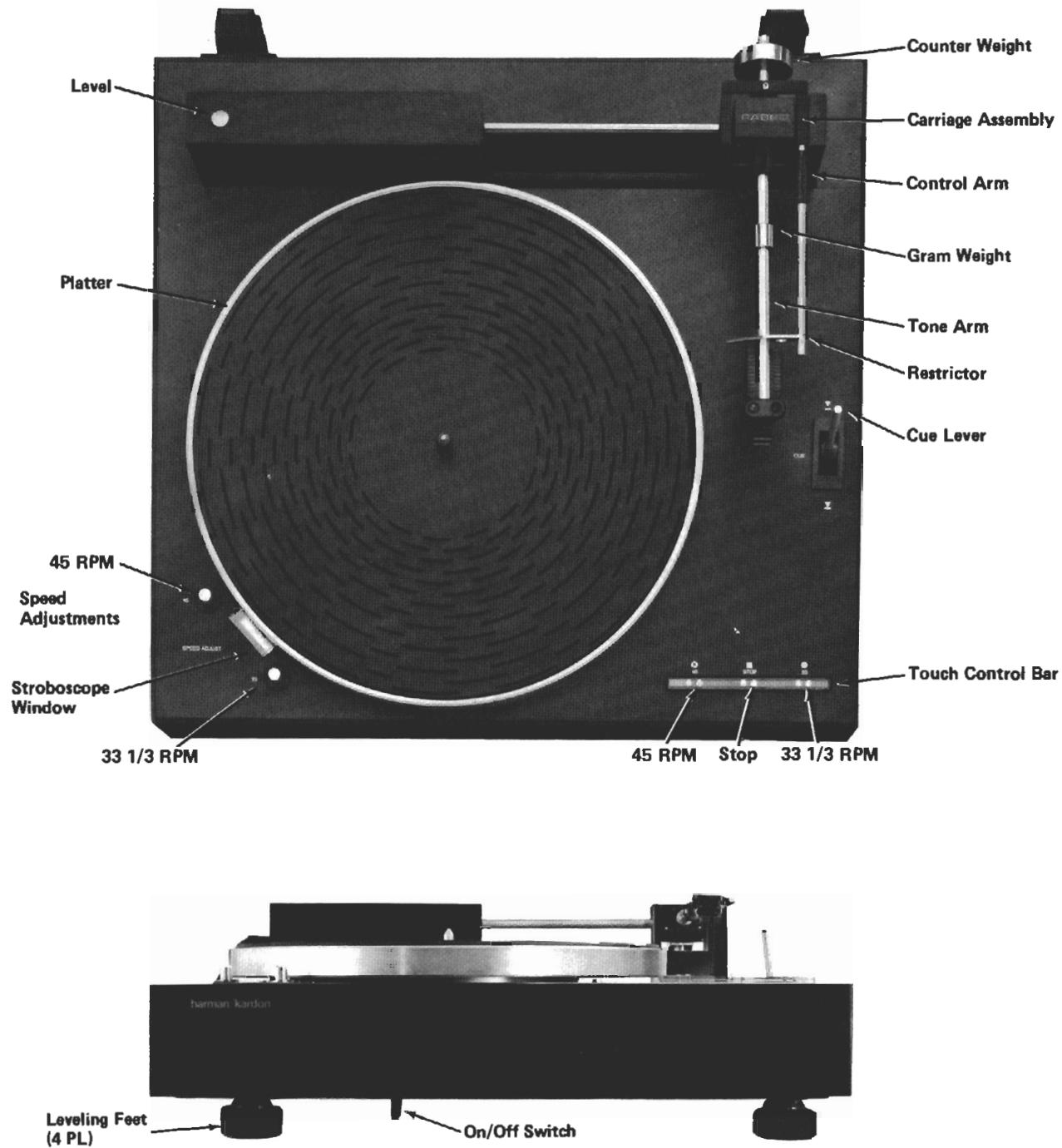
SPECIFICATIONS

Tracing Error:	0°
Skating Force:	0 gms.
Tone Arm Mass (effective):	6 gms.
Stylus Overhang:	0
Turntable Rumble DIN B.:	-65dB.
Wow and Flutter	
NAB weighted:	.03%
DIN B.:	.08%
Hum (Tone Arm In)	
DIN 45544:	-75dB.
Speeds:	33-1/3, 45 RPM.
Speed Constancy:	±0.3%
Speed Adjustment Range:	±5.5%
Motor/Drive:	Brushless D.C. (Hall effect) with precision ground belt
Turntable Weight:	2.7 lbs./1.2 Kg.
Dimensions (incl. dust cover):	6-3/4" H x 16-1/2" W x 16-1/4" D 171 mm. H x 419 mm. W x 413 mm. D
Weight Total:	23 lbs./10.4 Kg.

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Figure 1. General view of ST-8 turntable



Warning: To prevent fire or shock hazard, do not expose this turntable to rain or moisture.

I MECHANICAL CONCEPT

The concept of the ST-8 mechanism is shown in Figure 2. The tone arm is supported in a two-axis gimbal mount. The vertical axis contains the Air — damped stylus elevation mechanism. In the vertical axis the tone arm is supported by a tracking roller that rolls against the tracking shaft. When the tone arm is tangential to the record groove the tracking wheel is biased in angle so that the carriage travels toward the platter center at approximately 0.17 inch per minute. This corresponds to the average velocity of the master disc. As the tone arm attempts to pivot in angle to track pitch variations, the angle of the tracking roller axis changes relative to the cylinder axis. This change in direction of the tracking roller accelerates or decelerates the motion of the carriage to track the pitch of the groove. The correction is continuous, self-adjusting, and automatic.

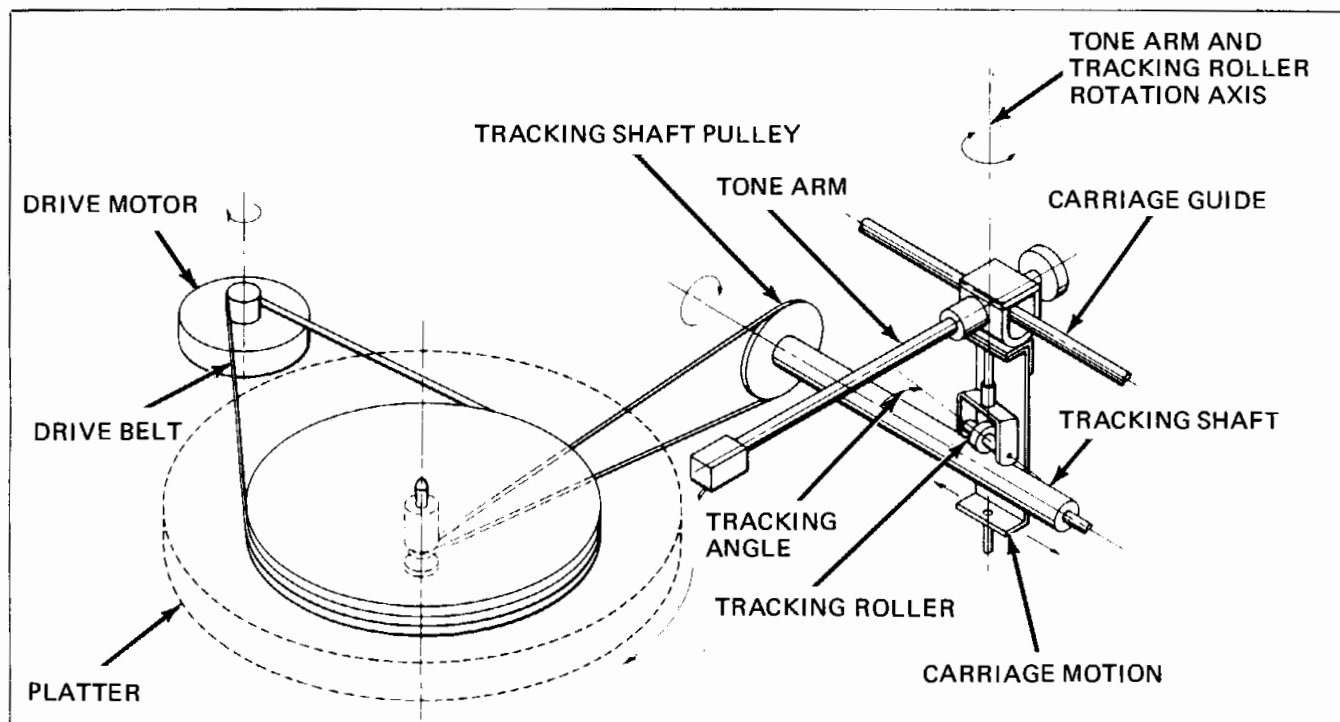


Figure 2. Tracking and drive schematic

II PRINTED CIRCUIT BOARD

The ST-8 is activated by turning on power switch S2 located under the front edge of the unit. This provides primary voltage to the power supply, enabling voltage to the motor assembly, and 9 volts to the transistor circuits. The red stop lamp will be illuminated since emitter follower Q5 is conducting in stop mode. Buffer Q6 also conducts, which disables motor drive switch Q7. In addition Q21 will conduct in stop mode, which will inhibit Q22 and, thereby, eliminate a ground return for trip solenoid LI. Also, on initial turn-on stop mode transistors, Q11 and Q12 will conduct since the emitters are at 9 volts and the bases initially at ground through C1 and C2. This causes bistable switch transistor Q2 and Q9 to conduct, ensuring that both 33-1/3 and 45 RPM circuits are in stop mode.

In addition, the red stop lamp will be illuminated. With the bases of Q2 and Q9 positive, there will be no current flow through diodes CR2 and CR3. As a result the base of stop lamp driver Q5 will be positive and it will conduct, and stop lamp DS2 will light. When Q5 conducts it will also cause buffer Q6 to conduct, driving the base of motor driver switch Q7 to ground. Since the emitter is at ground Q7 will not conduct, and no return will be provided for motor drive voltage at pin 15 of the board.

Since the 33-1/3 and 45 RPM start circuits are essentially identical, only 33-1/3 RPM will be discussed. The basic 33-1/3 start circuit is comprised of buffer Q1 and bistable switch comprised of Q2 and Q3. When the 33-1/3 touch control is shorted by finger contact, it grounds the base of Q1 causing it to conduct. This places a positive voltage on the base of bistable switch Q3 which, in turn, conducts, providing a return for the green 33-1/3 RPM lamp, DS3. In addition the current flow through diode CR2 inhibits stop lamp driver Q5, which extinguishes the red stop lamp and causes buffer Q4 to conduct. When Q4 conducts it enables IC1 which closes providing a return for the 33-1/3 RPM motor drive at pin 7 of the board.

The end of record function operates as follows:

Q19 and Q20 function as a single pole double throw switch, the action of which provides one second of activating voltage to the solenoid when the trip function is initiated.

When the unit is turned on, light from LED1 impinges on photocell VI, reducing the resistance to several thousand ohms. This places voltage on the base of Q18, which conducts, causing Q17 to conduct. When Q17 conducts, the positive voltage at the base of Q19 causes it to conduct, charging capacitor C5.

At the end of a record the photocell interrupter breaks the light path to VI, which rapidly increases in resistance.

Accordingly the supply current to the base of Q18 is reduced, and it no longer conducts. This inhibits Q17, and the bases of Q19 and Q20 are effectively grounded. With its base grounded and Q19 inhibited, Q20 conducts because of the positive charge on C5. For approximately one second, 9 volts which C5 was charged to is applied through Q20 to the base of Q22, which conducts. This provides a return circuit for the solenoid, which is activated for one second. The solenoid plunger moves the trip pin which engages the tracking shaft gear assembly. The gear assembly is connected to the cue lever linkage, and returns the cue lever to the rear position.

MUTING PRINTED CIRCUIT BOARD

When Q22 conducts (solenoid trip energization), a positive voltage is applied to terminal E3 and the gate of SCR1. SCR1 triggers and energizes mute relay K1. The tone arm/cartridge wires are then short circuited. When the tone arm cues up, lift switch S3 closes and short circuits SCR1, anode to cathode, thereby resetting it for another cycle. At the same time, continuity is maintained through K1.

When the tone arm is cued down, lift switch S3 opens, deenergizing relay K1. This allows the tone arm/cartridge to have continuity with output cables.

III TROUBLESHOOTING (Refer to Figures 3 and 11)

Conditions	Possible Cause & Corrective Measures
1. When the arm is cued to the "up" position, the arm does not nestle all the way up into the notch of the restrictor arm.	1. a. Stop bar screw not properly adjusted or loose. Refer to stop bar screw adjustment procedure. b. Gap between threaded lift pin and lift bracket too large. Refer to lift pin adjustment.
2. When the arm is cued "down", the stylus does not reach the surface of the record.	2. a. Cartridge not shimmed properly. b. Stop bar screw adjusted too far down preventing the roller assembly and tone arm from dropping to the correct position. Refer to stop bar screw adjustment. c. Foreign object jammed under lift bracket.
3. When the arm is cued "down", no damping takes place at all. Arm drops hard and quickly to the record surface.	3. a. Defective Airpot—Replace. Use tool No. 9. b. Airpot mounting nut loose. Use tool No. 4. c. Airpot retaining ring loose or not seated in groove. Use Tool No. 9.
4. Extreme drift of tone arm as it comes down on the record.	4. a. Tone arm improperly balanced or weighted. b. Unit not leveled. c. Stop bar adjusting screw not engaged in roller guide groove. Refer to stop bar adjustment.
5. Tone arm does not track at all. Carriage does not move.	5. Check that tracking shaft is rotating. (The tracking shaft is the black cylinder visible through the carriage opening.) If it is not: a. Rotate the platter counterclockwise one rev. and try again. b. Tracking belt off of tracking pulley.
6. As arm tracks across record, arm starts to "lead" the carriage.	6. a. Mis-adjustment of tracking screw. Turn screw clockwise in very small increments until proper tracking occurs. b. Foreign object jammed under lift bracket. c. Lift pin adjusted with no air gap between the lift pin and the lift bracket. See lift pin adjustment. d. Extension spring (101) off. e. Slide shaft belt off pulley.
7. As arm tracks across record, arm starts to lag behind carriage.	7. a. Mis-adjustment of tracking screw. Turn screw counterclockwise in very small increments until proper tracking occurs. b. Tracking roller Spring broken or one end disconnected.
8. Arm lifts and unit returns to "stop" mode before record material has been completely played.	8. a. Check tracking—if arm is "leading" the carriage, reset tracking as per step 6a. b. Check position of LED photocell bracket—refer to tripping adjustments. c. Check for defective LED located over Photocell. d. Check sensitivity adjustment of Photocell.
9. Arm gets to end of record but does not lift off.	9. a. Check tracking—if arm is "lagging" the carriage; reset tracking as per step 7. b. Check for solenoid "click" when arm enters run-out record grooves. If no "click" is heard, check solenoid, photocell, and tripping adjustment. If "click" is heard, check solenoid position adjustment.

III TROUBLESHOOTING (continued)

Conditions	Possible Cause & Corrective Measures
10. Arm gets to end of record and lifts up but the unit does not switch to "stop" mode.	10. a. Micro-switch incorrectly positioned. Refer to micro-switch adjustment. b. Micro-switch defective—replace.
11. Arm gets to end of record and lifts off record but does not return all the way up into the notch in the restrictor arm.	11. a. Restrictor arm incorrectly positioned. Refer to restrictor arm adjustment. b. Stop bar screw too loose. Refer to stop bar screw adjustment. c. Too large a gap between lift pin and lift bracket. Refer to lift pin adjustment.
12. Unit tracks poorly and jams tripping gears—particularly after being disassembled for service.	12. "O" ring belt installed with reversed twist. Install "O" ring so that as the spindle and bearing assembly is turned clockwise, the tracking shaft rotates clockwise as viewed from the tracking gear end.
13. Scraping noise heard when platter is running.	13. a. Turntable belt twisted. Carefully remove the belt and re-install properly with the shiny side of the belt out. b. Motor not properly positioned. Refer to motor alignment.
14. Cannot synchronize strobe at 33-1/3 RPM or at 45 RPM.	14. a. Turntable belt riding on shoulder of motor pulley. Reposition belt to the center area. Dull side of belt contacts pulley. b. Strobe mask may be covering wrong portion of strobe mirror for line voltage used. For 50 hz, mask should be on outer edge of the mirror. For 60 hz, mask should be on inner edge of mirror. c. Coarse speed control incorrectly set. Refer to coarse speed adjustment. d. Defective coarse speed control. Replace.
15. Excessive "Wow and Flutter."	15. a. Turntable belt twisted, worn or has rough spots. Replace or reposition belt. b. Motor binding. Replace motor. c. Tracking shaft binding. Loosen tracking shaft pulley wheel and reposition for more end play. d. Defective "O" ring. Replace. e. Nick on-tracking shaft pulley. Polish with very fine emery paper. f. Lack of lubricant inside spindle bearing assembly.
16. Excessive "rumble."	16. a. Set screws too tight against motor housing. Refer to motor alignment. b. Defective motor. Replace.
17. Loss of L or R channel.	17. a. Defective cartridge. b. Open (broken) or shorted wires between receptacle on roller assembly and output cables. Check continuity of all 4 wire paths. c. Faulty mute circuit board. d. Broken lug/wire in tone arm. e. Lift switch not closed when cued up.

III TROUBLESHOOTING (continued)

Conditions	Possible Cause & Corrective Measures
18. Hum	18. a. Broken circuit in ground path. Scrape through anodize on underside of tone arm, and check continuity between tone arm tube and chassis. b. Try disconnecting ground lug on phono output cable. c. Reverse AC power cord in receptacle.
19. Hum pick up as hand goes near arm. Static audible as carriage is moved manually from left to right.	19. Loose knurled nut on tone arm. Tighten by hand as securely as possible.
20. Unit does not light up.	20. a. Blown fuse. Check power supply components. b. Check that AC master switch is "on." c. Check bulbs.
21. Unit starts but shuts off immediately more than once.	21. a. Trip gear and or microswitch positioned incorrectly. Refer to Detent spring/micro-switch position adjustment. b. Check photocell sensitivity adjustment. c. Rotate platter counterclockwise one revolution and try to start. Trip pin may have become engaged due to shipping.
22. Unit changes speed while playing record.	22. Check power supply regulation.
23. Cueing lever works but arm won't drop, or drops very slow.	23. a. Improperly balanced and weighted arm. b. Extension spring (101) off.
24. Acoustic feedback.	24. a. Check all four feet; four are equally soft and not deformed. b. Check unit is level. c. Check for close proximity of speaker.
25. Unit will not shut off with certain records.	25. Excessive or insufficient lead out groove area; leadout beyond RIAA standards.
26. High frequency content of program material sounds excessively brilliant.	26. Cable capacitance needs to be matched more closely to cartridge. Refer to cable capacitance matching in adjustment section. Cable capacitance is approximately 110 pf. (incl. tone arm) per channel.
27. Strobe mirror scratched or broken.	27. Replace mirror by cementing new mirror directly on defective one.
28. Ticking noise when platter is rotating.	28. Trip gear rubbing on tracking shaft gear. Refer to detent spring, microswitch adjustment.
29. Strobe lamp on, touch control lamps off, motor won't turn.	29. a. Check PCB pins 1, 19 and 20, cold solder joints. b. 9V supply to mute board shorted to chassis. c. Check 9V and 24V supply components.

IV DISASSEMBLY PROCEDURE

To service various portions of the ST-8, it may be necessary to partially or fully disassemble the unit. For purposes of explanation, we will identify these as four stages of disassembly. For each adjustment, we will specify which stage or stages of disassembly are required to accomplish the repairs or adjustments.

STAGE 1 – REMOVAL OF PLATTER AND MAIN DRIVE BELT

STAGE 2 – REMOVAL OF TOP PLATE, FRONT

STAGE 3 – REMOVAL OF LEFT HAND COVER AND TOP PANEL, REAR

STAGE 4 – REMOVAL OF SIDE WALL

A WORD OF CAUTION. . .The items described are **ALL** dress pieces and have been finished to provide a high quality aesthetic appearance.

EXTREME CARE should be taken when removing, storing, or replacing these parts to avoid scratching or damaging their appearance.

STAGE 1 — Remove mat, retaining ring and curved washer. Remove platter and main drive belt.

STAGE 2 — Remove entire tone arm assembly from carriage, remove two screws holding top front panel in place (These are two different screws, note their positions), remove top front panel.

STAGE 3 — Remove two screws and then left hand cover, remove two panel screws and then rear top panel.

NOTE: Use caution in removing plate. Be sure it does not tear the slide shaft belt or become scratched by the tracking adjustment screw.

STAGE 4 — Remove six screws and lock washers from the bottom and then the entire side wall as an assembly.

NOTE: On some units it may be necessary to remove front and rear shield first. Remove three screws, nuts and then shields.

LIST OF TOOLS REQUIRED

The tools normally found in a well-equipped service shop generally will suffice in the disassembly and servicing of the ST-8. However, the following lists standard tools required that can be considered semi-special.

1. 1/4 Socket or Nut Driver (Hollow)
2. 3/16 Socket or Nut Driver (Hollow)
3. 5/16 Socket or Nut Driver (Hollow)
4. 3/16 Open End Wrench (Small pattern)
5. 1/4 Open End Wrench (Small pattern)
6. .050 Hex Key Wrench (Allen)
7. 1/16 Hex Key Wrench (Allen)
8. Pliers, Ext. Ring (Waldes 0018 or equiv.)
9. Pliers, Ext. Ring (Waldes 0200 or equiv.)

V ADJUSTMENTS

Figure 3 shows the ST-8 after all four stages of disassembly. The callouts represent location of adjustments that will be referred to in the following paragraphs. It is recommended that you familiarize yourself with the location of these adjustments.

For some adjustments supplementary line drawings are included with the actual procedures, to provide greater clarity.

Adjustments included are:

1. Threaded Lift Pin
2. Stop Bar Assembly
3. Stop Bar Screw
4. Tracking Screw
5. Tripping
6. Solenoid Position
7. Detent Spring/Microswitch Position
8. Photocell Sensitivity
9. Motor Alignment
10. Coarse Speed Adjust
11. Restrictor Arm
12. Conversion of ST-8 Multivoltage Units
13. Carriage Assembly Removal
14. Cable Capacitance Matching
15. Lift Switch

LUBRICATION

All necessary pivot and bearing surfaces have been lubricated at the factory and will seldom, if ever, require further attention.

Refer to figure 13 Exploded View for positions.

Motor (Item 50)	The motor is a slow RPM (445 & 600) Brushless DC Hall Effect type that has pre-lubricated bearings. It should require no further lubrication for the life of the unit under normal operating conditions.
Platter Bearing (Items 46 & 48)	The platter turns on a brass bearing and hardened stainless steel post, both of which are lubricated with a special TFE filled synthetic oil. Under normal operating conditions, it is not necessary to replace this oil for at least 3,000 running hours. When replacing, we recommend you use the same lubricant.
Linkages (Items 40 & 91)	To be greased sparingly, when required, with a medium consistency silicone grease or equivalent.

Exercise care to keep the motor pulley (50), belt (4), platter drive ring (3), tracking shaft (93), trip pin (98), tracking belt (108), tracking pulley (104), and bearing tracking groove (46), free of oil or grease. If necessary these can be cleaned with alcohol.

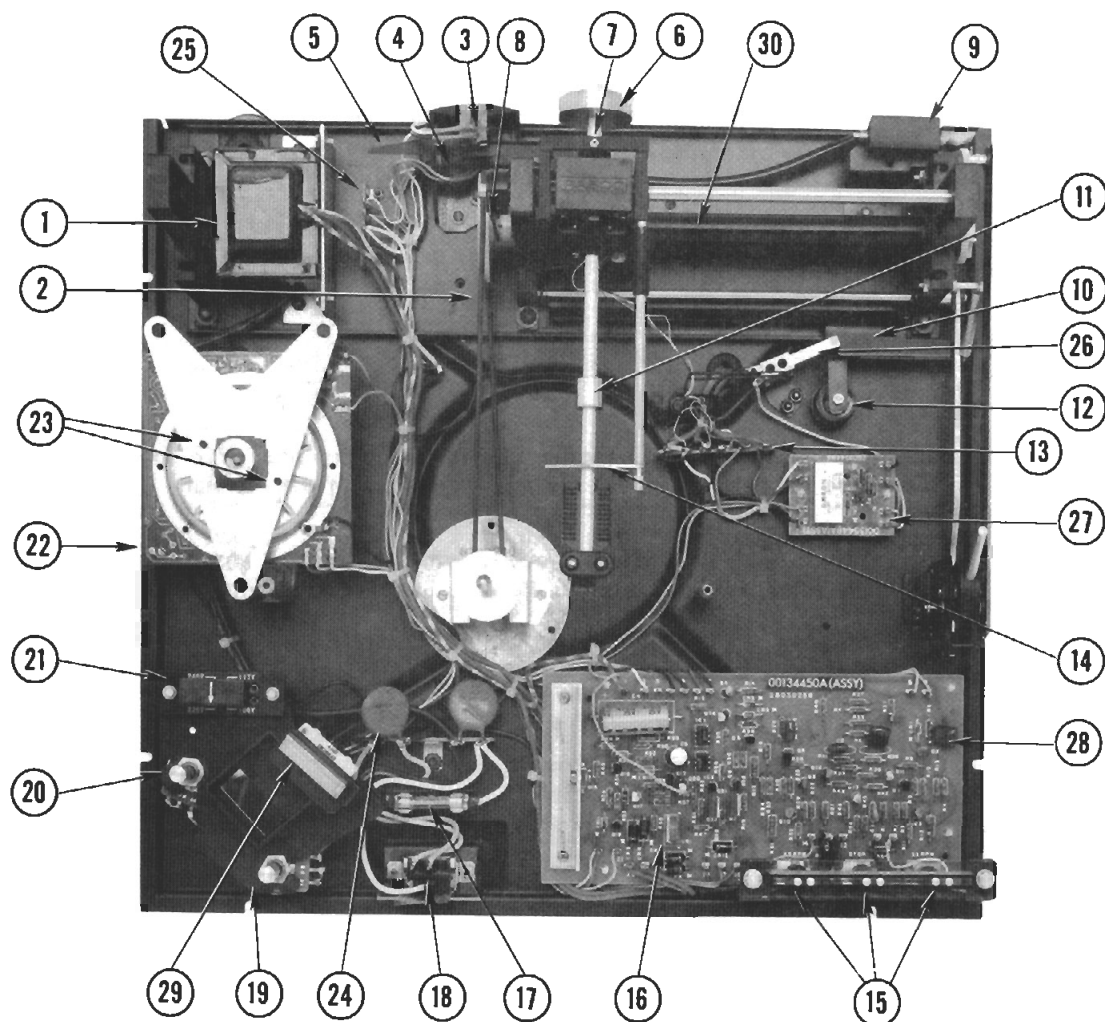


Figure 3. Top view with stages 1 thru 4 of disassembly

FIGURE 3 LEGEND

- | | | | |
|-----|-----------------------|-----|--|
| 1. | Transformer | 16. | Photocell Sensitivity Adjustment (VR1) |
| 2. | Tracking Belt | 17. | Fuse |
| 3. | Photocell LED | 18. | Power Switch |
| 4. | Photocell Assembly | 19. | 33 1/3 RPM Speed Adjust |
| 5. | Photocell Interrupter | 20. | 45 RPM Speed Adjust |
| 6. | Counterweight | 21. | Multivoltage Plug (Export units only) |
| 7. | Stop Bar Screw | 22. | Coarse Speed Adjustment |
| 8. | Slide Shaft Belt | 23. | Motor Alignment Screws |
| 9. | Solenoid | 24. | Terminal Strip TB3 |
| 10. | Lift Bracket | 25. | Terminal Strip TB2 |
| 11. | Gram Weight | 26. | Mute Lift Switch |
| 12. | Airpot | 27. | Mute Circuit Board |
| 13. | Terminal Strip TB1 | 28. | P.C. Board Assembly |
| 14. | Restrictor Arm | 29. | Neon Strobe Lamp |
| 15. | Touch Controls | 30. | Tracking Shaft |

1. THREADED LIFT PIN ADJUSTMENT

A. Reason for Adjustment

To allow for a clearance between the lift pin and the lift plate surface in the arm "down" position so that tracking will occur as a function of the tracking roller and the tracking wheel contacting each other properly. (Refer to Figures 4 and 5.)

B. Pre-Condition for Adjustment

None

C. Required Disassembly

Stages 1 through 4

D. Method of Adjustment (Use Tool No. 4)

With the arm "down" on the surface of a record, adjust the threaded lift pin with a small 3/16" open end wrench to produce a very slight air gap between the head of the lift pin and the surface of the lift plate. This gap should be approximately .020 inches.

After adjustment, the arm, when cued "up", must cradle properly into the restrictor arm notch and the carriage should move freely from left to right in the arm "up" position. Refer to Stop bar screw adjustment.

SPECIAL NOTE:

The gap between the lift plate and the lift pin while typically .020 can vary from unit to unit. The gap can be made smaller or larger if necessary to achieve the following:

1. Free lateral movement of carriage in the arm "up" position.
2. Arm must remain cradled in the restrictor notch as the carriage is moved left to right with the arm "up."
3. A gap is visible between the lift pin and lift plate at the extreme ends of the left and right carriage position with the arm in the "down" position.

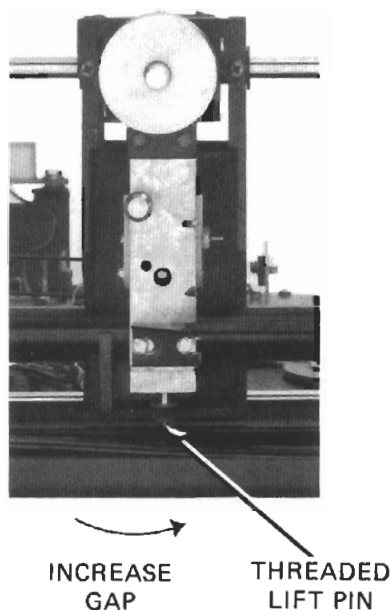


Figure 4. Threaded lift pin adjustment

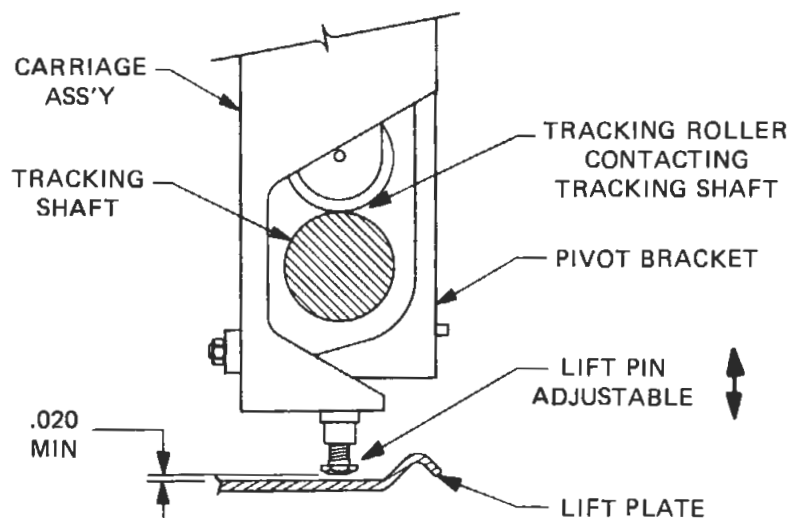


Figure 5. Cued down playing position

2. STOP BAR ASSY. ADJUSTMENT

A. Reason for Adjustment

To assure that the tone arm, roller assembly is aligned correctly and cues down straight.

B. Pre-Conditions

1. Tone arm/cartridge must be properly balanced and weighted.
2. The cartridge must be shimmed (if required).
3. The lift pin adjustment must be set.

C. Required Disassembly

None

D. Method of Adjustment

1. With the cue lever in the cue up position, loosen (2) mounting screws, but leave them hand tight. Adjust the stop bar assy, side to side, so that the tone arm tube is centered in the flat notch in restrictor. The spherical tip of the adjusting screw must be in the "V" groove.
2. Cue tone arm down on record and check for straightness of drop. Arm must return to center of flat when cued up. Tighten (2) mounting screws.
3. There must be a visible gap between spherical tip of screw and roller guide when cued down. See stop bar screw adjustment.

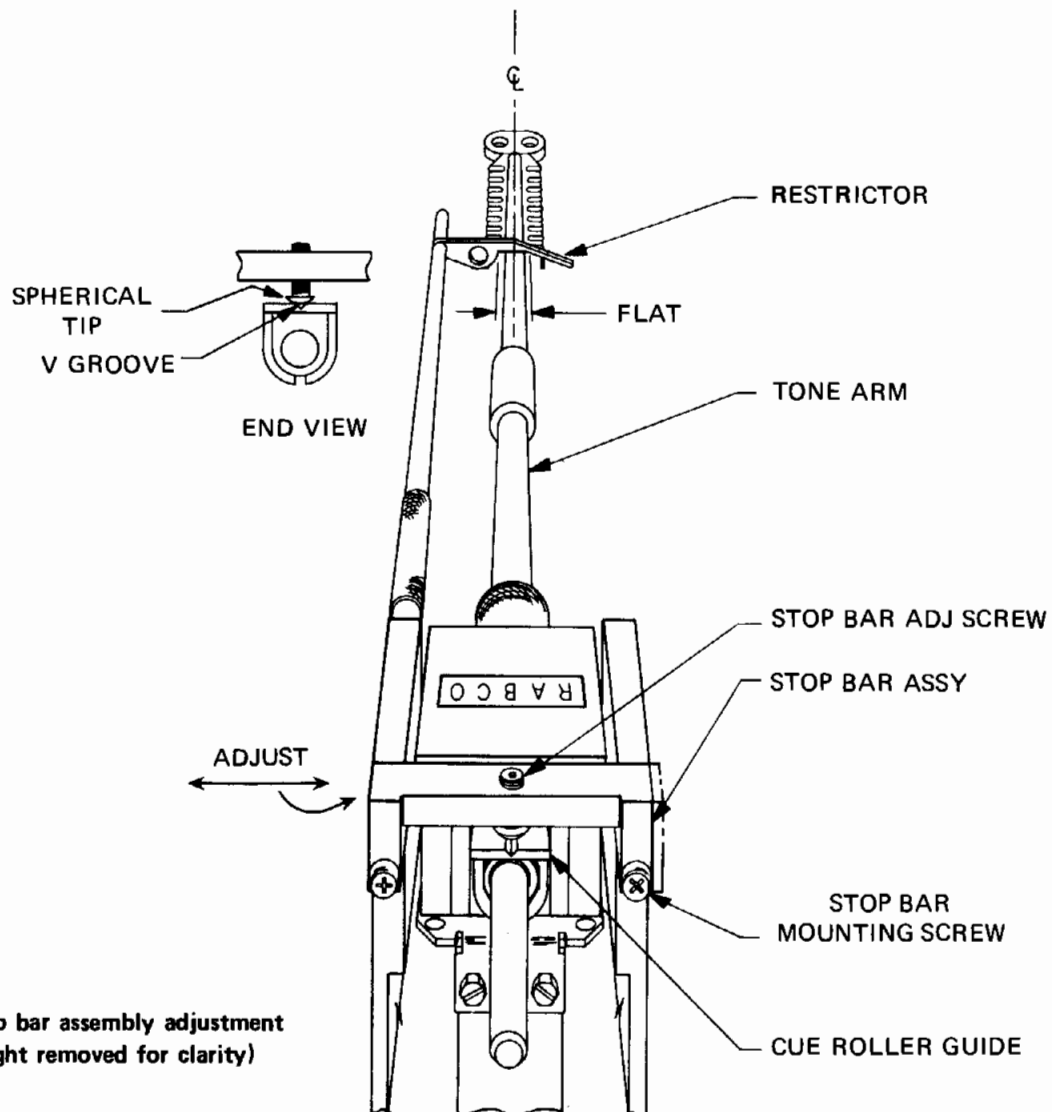


Figure 6. Stop bar assembly adjustment
(counterweight removed for clarity)

3. STOP BAR SCREW ADJUSTMENT

A. Reason for Adjustment

To allow the arm to cue far enough down so the tracking force weighting applies and allows the arm to track.

B. Pre-Conditions

1. Cartridge must be shimmed (if required).
2. Tone arm/cartridge must be zero balanced and have correct tracking gram force set.
(See Owner's Manual for the above)
3. The lift pin and stop bar assembly adjustments must be set.

C. Required Disassembly

None

D. Method of Adjustment (Refer to figures 1 and 7) (Use tool No. 6)

1. With cue lever in the cue down position, adjust the screw to permit the lower surface of the cartridge (near stylus) to reach the top surface of the platter (without record or mat). This position should suffice in most cases; but to satisfy other conditions, it can vary slightly. See threaded lift pin adjustment.
2. Check that when the arm is cued down on a record, there is a visible gap between adjusting screw tip and the roller.
3. Check that the tone arm, when cued up, is just contacting the restrictor at various carriage positions.

CAUTION: 1. THE STOP BAR SCREW/ROLLER GAP IS OVER ADJUSTED IN THE DECREASING DIRECTION CAN PREVENT TRACKING, PARTICULARLY IF THE CARTRIDGE IS NOT SHIMMED (IF REQUIRED) OR THE RECORD (USED IN THIS ADJUSTMENT) IS EXTREMELY WARPED.

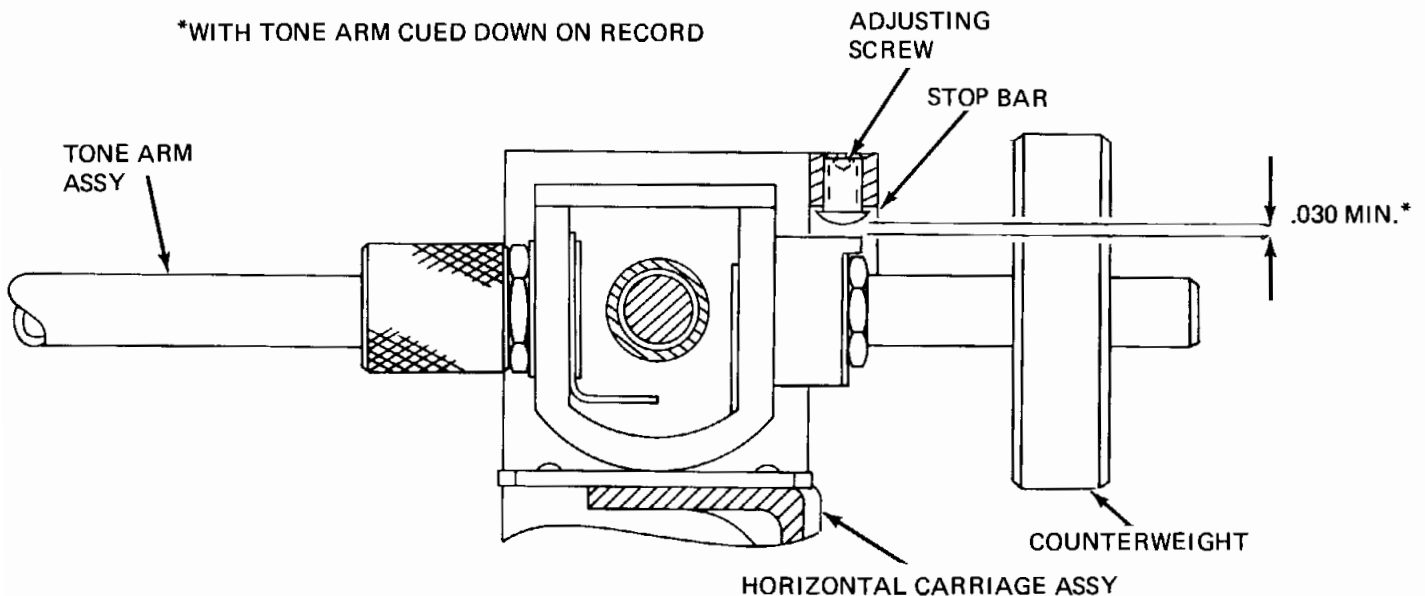


Figure 7. Stop bar screw adjustment

4. TRACKING SCREW ADJUSTMENT

A. Reason for Adjustment

To correct any leading or lagging of the tone arm with respect to the carriage assembly.

B. Pre-Condition

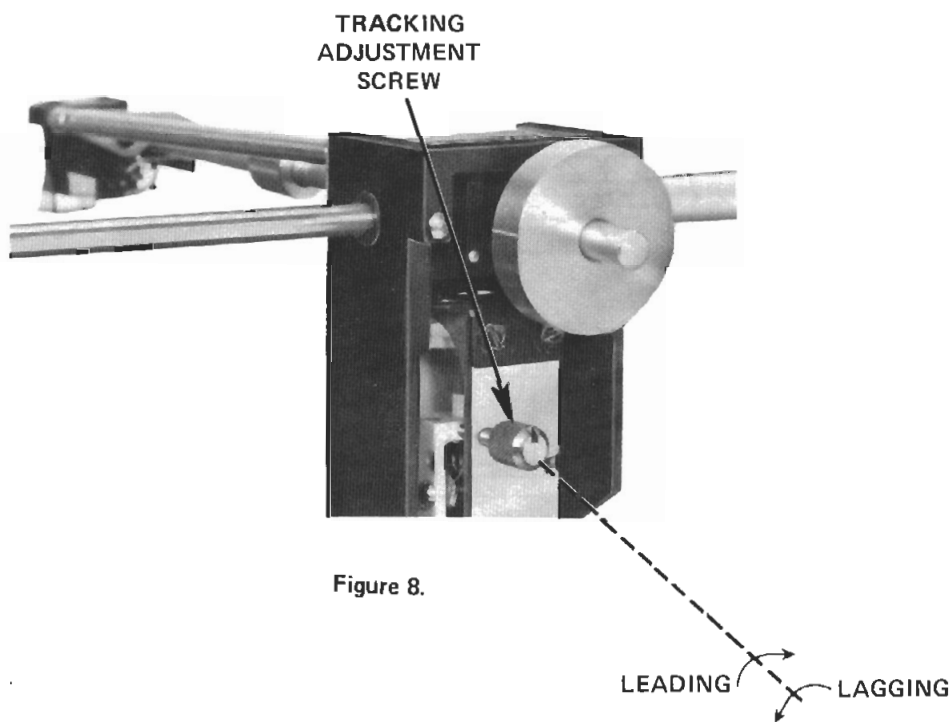
The following adjustments must have been completed; lift pin and stop bar screw; the tone arm must be balanced and properly weighted.

C. Required Disassembly

None

D. Method of Adjustment (Refer to figure 8)

Set the tone arm down on a commercial record turning at 33-1/3 RPM. Allow the arm to travel across approximately 1" of the record. Observe if the arm is leading or lagging the carriage by reference to the restrictor arm. If the arm is leading, the screw must be turned clockwise. If the arm is lagging, the screw must be turned counterclockwise. After each adjustment, the arm must be observed for the 1" travel as previously described. When the arm is tracking properly, it should be checked across an entire 33-1/3 12" record to determine if any accumulated lead or lag occurs. Correct the adjustment if necessary.



5. TRIPPING ADJUSTMENTS

A. Reason for Adjustment

To provide the correct position of the LED/Photocell with respect to the interrupter and ensure the trip function at the end of a record.

B. Pre-Conditions

The tracking adjustments must be set first. The arm must cue straight down.

C. Required Disassembly

Stage 3

D. Method of Adjustment (Refer to figure 9) (Use Tool No. 2)

1. With the unit in the stop position and the arm cued up, move the carriage to the left approx. 1/4" from its limit of travel. Cue the arm down. Loosen the two screws and position the LED/Photocell assembly until the rear edge of the interrupter is as shown in Figure 9. Tighten both screws, making sure the assembly does not move.
2. Check that the orifice in the photocell receptacle is covered by the interrupter when tripping on a record with a small run-out margin, approx. 3/8" wide.

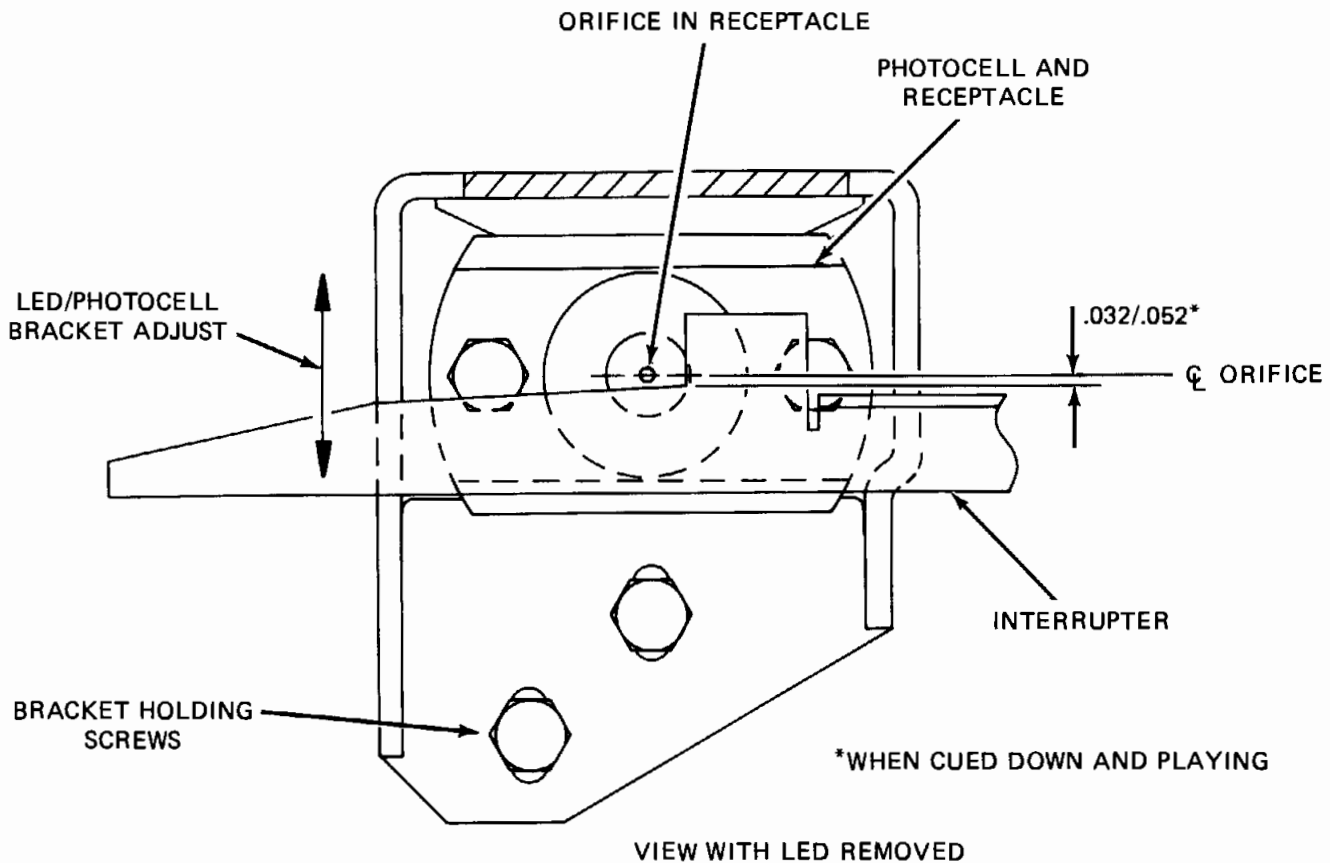


Figure 9. Led/Photocell bracket adjustment

6. SOLENOID POSITION ADJUST

A. Reason for Adjustment

To position the solenoid bracket assembly so that when the solenoid is energized, the plunger pushes the trip pin into full engagement with the tracking gear finger.

B. Pre-Condition

The detent spring/microswitch must be adjusted first.

C. Required Disassembly

Stage 3

D. Method of Adjustment (Refer to figure 10a) (Use Tool No. 2)

1. Adjust the solenoid bracket assembly so that the trip pin is centered in the plunger V groove, and there is $1/16''$ clearance between the gear and the plunger when activated.
2. Check that when the plunger is activated and the tracking gear finger engages the trip pin, the pin going through its complete rotation cycle, does not catch under the bracket.
3. Check that the plunger has freedom to return to stop position when de-energized.

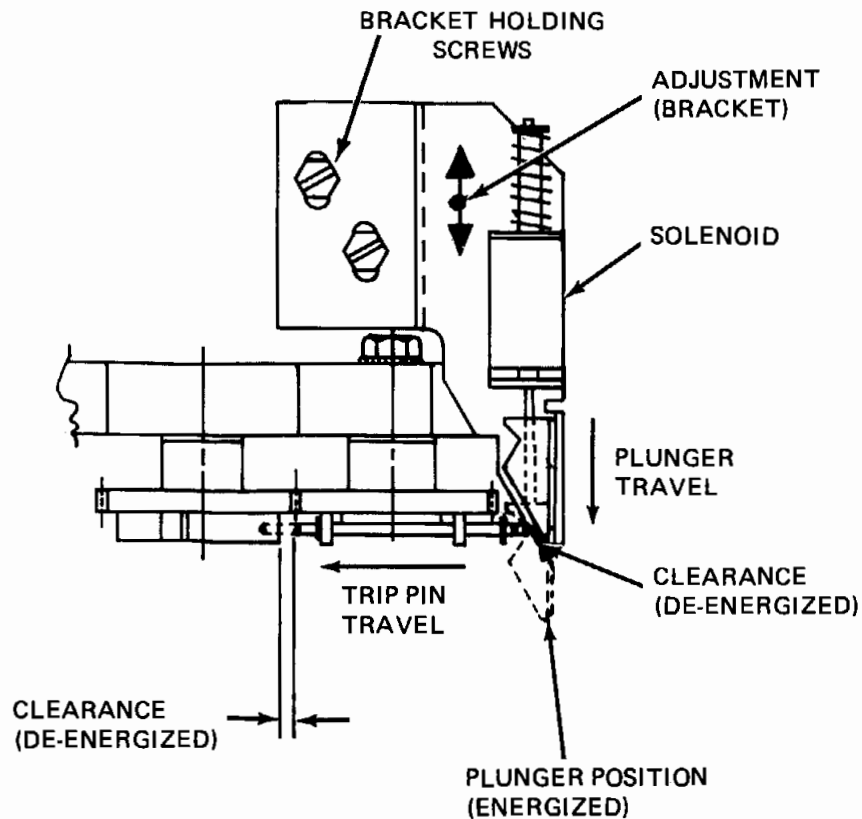


Figure 10a. Solenoid Position Adjust

7. DETENT SPRING MICROSWITCH POSITION ADJUST

A. Reason for Adjustment

To position the trip gear/pin assembly in the detent mode and locate the microswitch for end of cycle shutoff.

B. Pre-Conditions

None

C. Required Disassembly

Stages 1 through 4. Remove retaining ring (165), washer (39) securing linkage (40) to trip gear assembly. Move linkage down for access.

D. Method of Adjustment (Refer to figure 10)

1. Adjust the detent spring so that when the tab on the lever is engaged in the detent (indentation) of the trip gear, the trip pin is horizontal to slightly off horizontal in a clockwise direction. The teeth on the tracking gear should not rub the trip gear teeth. Tighten the two screws. (fig. 10b)
2. Position the microswitch so that the leaf spring just contacts the detent spring when the trip gear is rotated CCW slightly out of the detent position. (fig. 10d). Tighten the two screws. Check by rotating the trip gear CCW until the cam portion moves the detent spring and, in turn, actuates the switch and a "click" is heard. Continue rotating CCW until back in the detent position and another "click" is heard. (fig. 10b).

CAUTION: THE TRIP PIN MUST BE KEPT FREE OF GREASE AND DEBRIS. IT MUST ALSO BE ABLE TO MOVE FREELY BY ITSELF WHEN THE TRIP GEAR IS ROTATED.

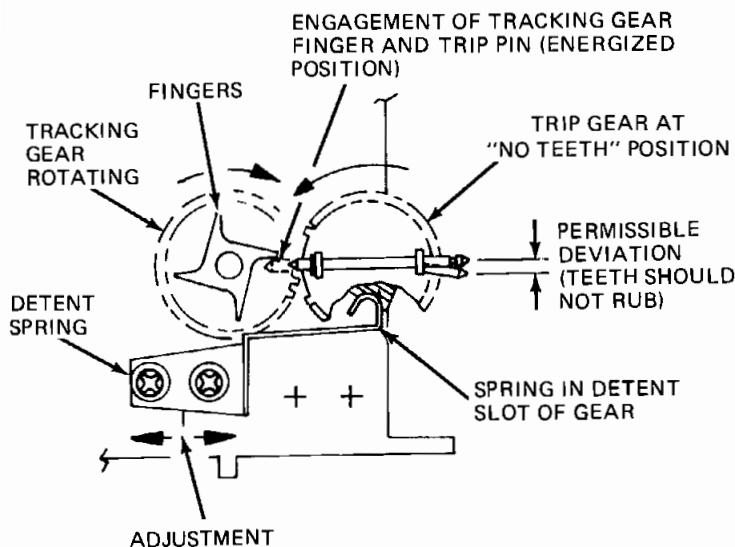


Figure 10b.

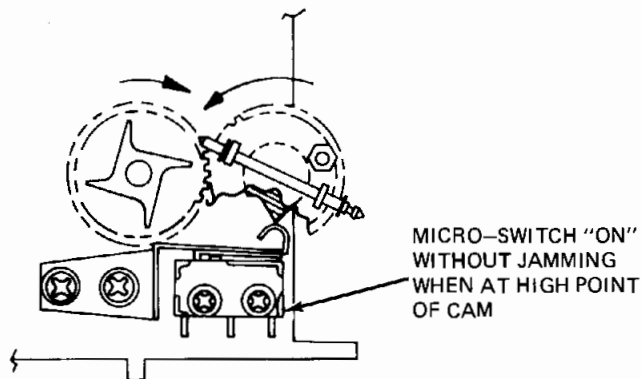


Figure 10c.

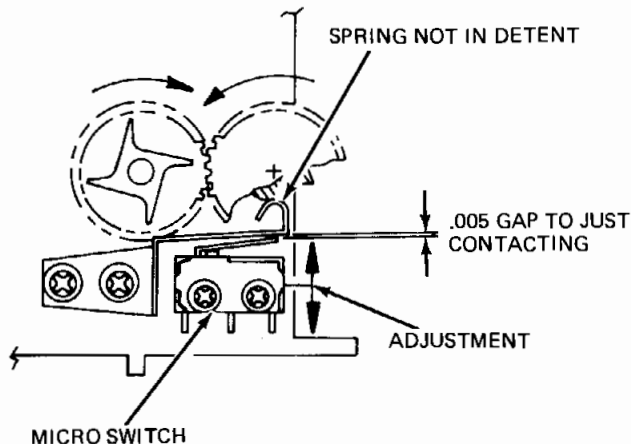


Figure 10d. Detent spring/microswitch adjustment

8. PHOTOCELL SENSITIVITY

A. Reason for Adjustment

To assure a proper pick-up of the tone arm when at the end of record. (Reference Figure 3.)

B. Pre-Condition

None

C. Required Disassembly

Stages 1 through 4

D. Method of Adjustment

The sensitivity control (VR1) on the P.C. board should be adjusted to permit the solenoid to be activated 8 times during one normal shut off cycle.

Have the ST-8 operating at 33 1/3 RPM, the arm in the "up" position, and the carriage at the extreme right hand position. Start with the control in approximately the center of its range. Using a small piece of dark paper or cardboard, (it must not be able to transfer light) sequentially cover the small hole in the photocell receptacle and count the number of times the solenoid will activate before shut off occurs. The sensitivity control should be turned clockwise until the solenoid can be activated 8 times prior to shut off. This adjustment is normally near the center of the range of the control.

CAUTION

All tests are invalid if the device used to cover the hole in the photocell allows light to come through. The black cartridge gauge supplied with the ST-8 can be used for this purpose.

9. MOTOR ALIGNMENT

A. Reason for Adjustment

To position the motor pulley so it is perfectly parallel with the platter belt surface.

B. Pre-Condition

None

NOTE

A special 7 inch test platter is required to make this adjustment. Test platters are available from Harman Kardon.

C. Disassembly

Stages 1 and 2

D. Method of Adjustment (Refer to figure 3) (Use Tool No. 7)

Set up unit with 7" test platter in place of regular platter. Install belt. Run at 33-1/3 speed and observe belt position on motor pulley. Start with both adjustment screws not touching the motor housing. Turn whichever screw is required to cause the belt to ride exactly in the center of the motor pulley. Turn the second screw to just touch the motor housing but not add any additional tension to the motor.

10. SPEED ADJUSTMENT (COARSE)

The coarse speed adjustment, if required, should be adjusted so that proper strobe indication occurs with the 45 and 33-1/3 speed adjustments in the approximate mechanical center.

A. Reason for Adjustment

To ensure that the proper speed range can be obtained by adjustment of the 45 and 33-1/3 speed controls. (Refer to Figure 3.)

B. Pre-Condition

Be absolutely certain that this adjustment is made with the belt in the center of the motor pulley and not riding on either side of the hub.

C. Disassembly

Stages 1 and 2. Then replace platter on spindle and replace belt.

D. Method of Adjustment

Set both fine speed controls at their approximate mechanical centers. Adjust the coarse speed adjustments so the proper strobe indication occurs.

11. RESTRICTOR ARM ADJUSTMENT

A. Reason for Adjustment

To allow the tone arm to be properly recaptured into the notch of the restrictor arm from any normal angles of record grooves. (Refer to Figure 3.)

B. Pre-Condition

The cartridge/tone arm must be correctly shimmed (if necessary). See owners manual.

C. Disassembly

None

D. Method of Adjustment (Use Tool No. 4)

Loosen restrictor nut slightly. Position the restrictor arm so that the top surface is horizontal. Make sure the restrictor rod is tight, then tighten the nut while holding the restrictor arm.

12. CONVERSION OF ST-8 MULTIVOLTAGE UNITS

A. Reason for Adjustment

To convert unit to required voltage and frequency. (Refer to Figure 3.)

B. Pre-Condition

Line cord removed from socket.

C. Required Disassembly

Stages 1 and 2

D. Method of Adjustment

1. Locate multivoltage plug (Figure 3) and remove from socket. Reorient by aligning arrow to desired voltage. Reinsert into socket.
2. Locate strobe mirror and select appropriate black fishpaper mask for 50 or 60Hz operation. The 60Hz mask should cover the outer portion of mirror. The 50Hz mask should cover inside portion of mirror.
3. Replace the line cord, or select adapter for appropriate wall outlet.
4. Select appropriate fuse from the following table.

Frequency	110/117 VAC	200/240 VAC
50 Hz	2/10 A-250V	1/10 A-250V
60 Hz	2/10 A-250V	1/10 A-250V

13. CARRIAGE ASSEMBLY REMOVAL

A. Reason for Adjustment

To facilitate repair and/or replacement of component parts of carriage assembly.

B. Pre-Condition

Remove counterweight and tone arm.

C. Disassembly

Stages 1 through 4

D. Method of Removal (Use Tools No. 1 & 6)

Locate Terminal Strip TB1 on Figure 3. Unsolder five tone arm signal leads (red, green, yellow, white and black). Referring to Figure 11, loosen set screw and remove pulley (317), belt (145), retaining ring (162), washers (177), washer (339) and then remove slide rod (106). Loosen two set screws and remove tracking shaft pulley (104), drive belt (108), spacer (331), washer (183). Remove two screws and washers (222, 182) and remove tracking shaft support (113). Carefully slide carriage assembly off tracking shaft.

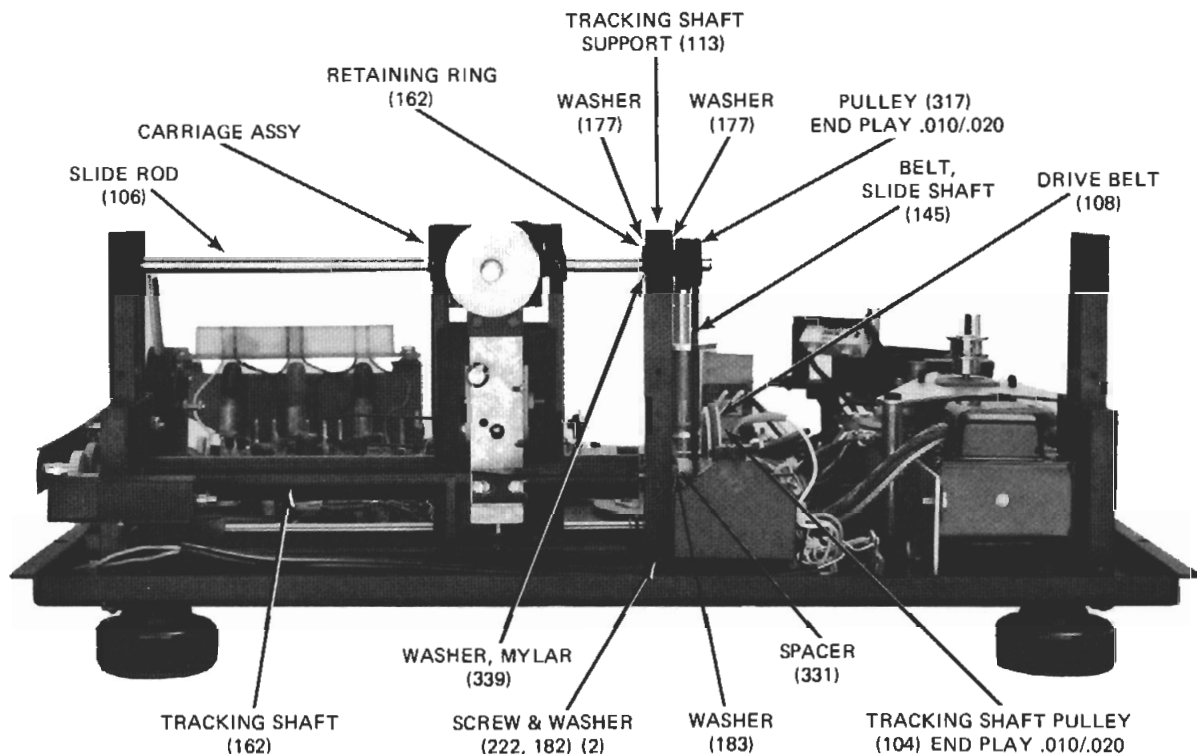


Figure 11. Carriage Assembly Removal

14. CABLE CAPACITANCE MATCHING

A. Reason for Adjustment

To match ST-8 cable capacitance as closely as possible to cartridge manufacturer recommendation.

B. Pre-Condition

Determine cable capacitance recommended by manufacturer.

C. Required Disassembly

Stages 1 and 2

D. Method of Adjustment

Locate Terminal Strip TB1 on Figure 3. The signal cable pairs are terminals 1 and 2, and 5 and 6. The existing cable capacitance for each channel is approx. 110 pf. Add the difference in capacitance (Manufacturers recommendation less 110 pf) across each pair of terminals (1-2 and 5-6).

15. LIFT SWITCH ADJUSTMENT

A. Reason for Adjustment

To assure switch makes and breaks contact in the correct cue mode.

B. Pre-Condition

1. Stop bar adjusting screw and lift pin adjustment must be set.
2. Tone arm/cartridge must be properly balanced and weighted.

C. Required Disassembly

Stage 1 through 3

D. Method of Adjustment

1. Install platter, mat and drive belt.
2. With a record on the platter, and the unit connected to speakers, cue the tone arm down. The sound should come on slightly after the stylus contacts the record (within 1/4 to 1 revolutions of the platter). Cue the arm up. Place the blade of a screwdriver (or H/K Tool 62235249A) in the switch bracket slot(s) and deform bracket in appropriate direction. Do not bend leafs on switch:
 - a. If sound comes on too late, decrease lifter gap.
 - b. If sound comes on too soon, increase lifter gap.
3. If the switch contacts are not closed when the tone arm is cued up, and a gap exists between the lift bracket and the switch lifter, the leafs should be individually bent so that the contacts are closed. Proceed from step 2.

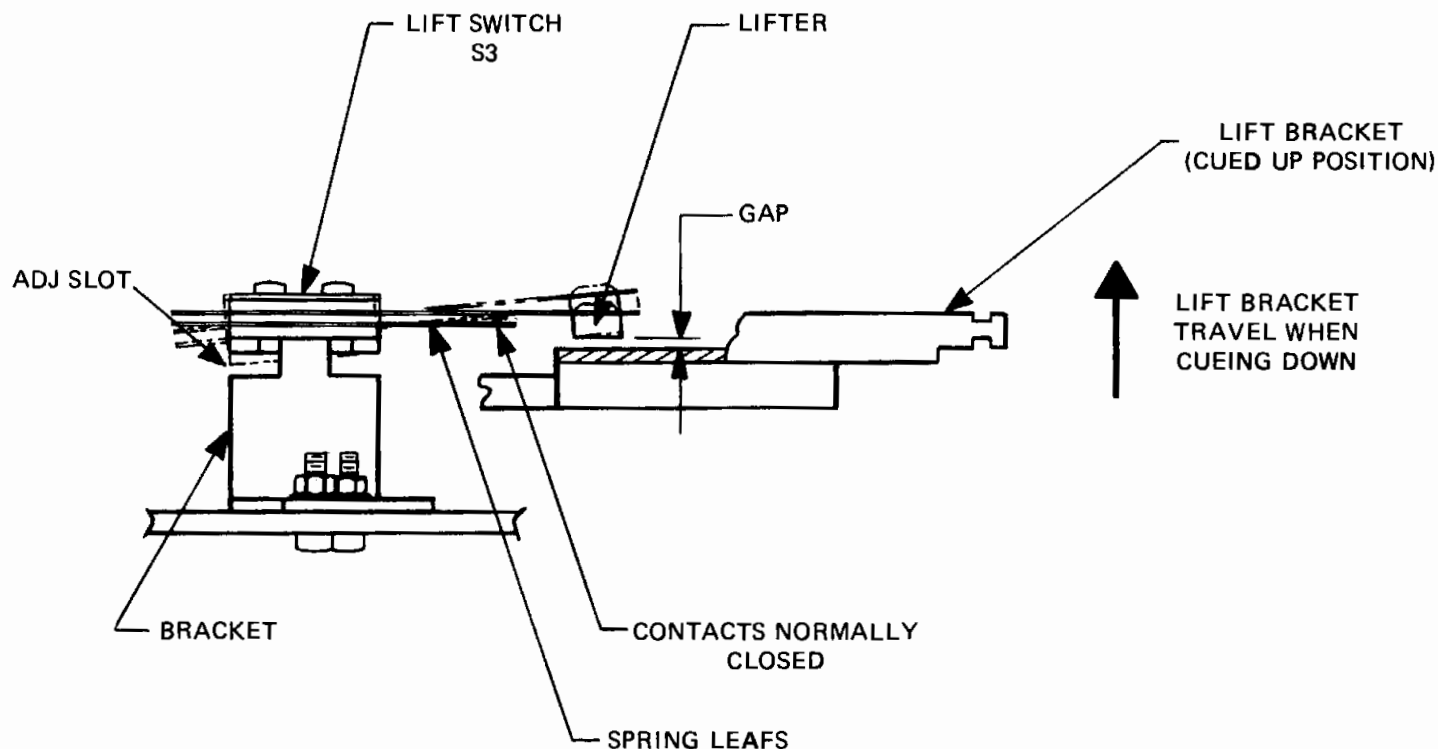


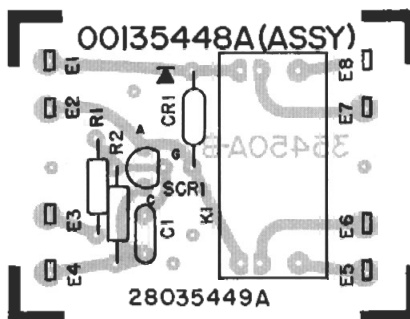
Figure 12. Lift switch adjustment

MUTE BOARD ASSEMBLY PARTS LIST

CIRCUIT REF. NO.	H/K PART NO.	DESCRIPTION
	00135448A	Mute PC Board Assy
RESISTOR, FIXED		
R1	34211245	120K, 1/4W, ±5%
R2	34212235	22K, 1/4W, ±5%
DIODE		
CR1	41629338	1N914 Signal
CAPACITOR, FIXED		
C1	30232962	MyI .0039 UF, 100V, ICC EM
REED RELAY		
*K1	13032134	Omron Type Lab 2S-C
RECTIFIER, SIL CONT		
*SCR1	42935454A	MOT 2N5060

* Recommended Spares

Mute Circuit Board Assembly



PC BOARD ASSEMBLY PARTS LIST

CIRCUIT REF. NO.	H/K PART NO.	DESCRIPTION	CIRCUIT REF. NO.	H/K PART NO.	DESCRIPTION
	00134450A	PC Board Assembly			
CAPACITOR, FIXED			R6, R26, R36,	33214731	47 K, 1/4W ±10%
C1, C2, C6, C7	30233465	Film 0.1 UF, 100 V ±10%	R39, R62		
C3	30418317	Disc, .001 UF, 100 V ±10%	R7, R10, R18	33212231	22 K, 1/4W ±10%
C4	31530719	Lytic, 470 UF, 25V	R27, R30		
C5	31819180	Lytic, 100 UF, 16 V	R9, R29	33211221	1.2 K, 1/4W ±10%
			R11, R32	33213331	33 K, 1/4W ±10%
DIODE			R12, R31	33316801	68 Ω, 1/2W ±10%
*CR1-4	41629338	1N914 Signal	R13, R33	33211025	1 K, 1/4W ±5%
CR9, CR11			R15, R35, R49	33216811	680 Ω, 1/4W ±10%
*CR5-8, CR12	41020618	Rectifier 2A, 100 V	R16	33211521	1.5 K, 1/4W ±10%
*CR10	42030720	Zener, 8.2 V ±5% 1N756A	R17	33315601	56 Ω, 1/2W ±10%
			R19, R47, R48	33211041	100 K, 1/4W ±10%
INTEGRATED CIRCUIT			R42, R43	33211841	180 K, 1/4W ±10%
*1C1, 1C2	43130725	Optical Coupler, MOT 4N27	R37, R40, R54	33214721	4.7 K, 1/4W ±10%
			R50	33215611	560 Ω, 1/4W ±10%
TRANSISTOR			R51	33218205	82 Ω, 1/4W ±5%
*Q1, Q3	43030721	Siemens BC309C	R52	33214715	470 Ω, 1/4W ±5%
*Q2, Q9	43027872	Siemens BC239C	R53	33216821	6.8 K, 1/4W ±10%
*Q3, Q10	43030722	Siemens BC238C	R59	33212711	270 Ω, 1/4W ±10%
*Q4, Q11-14	43027722	GP, PNP	R61	33214711	470 Ω, 1/4W ±10%
Q17, Q20			R64, R65	33212261	22 Meg, 1/4 W ±10%
*Q5, Q6, Q16	43025972	GP, NPN	R63	33313311	330 Ω, 1/2W ±10%
Q18-19, Q21					
*Q7, Q22	42732586	RCA 2N6292	RESISTOR, VARIABLE		
*Q15	43030724	MOT MJE 171	*VR1	21630716	25 K, ±30%, Centralab TSC1BB253C
RESISTOR, FIXED			LAMPHOLDER		
R1, R21, R45	33212251	2.2 Meg, 1/4 W ±10%	XDS1-3	61230717	AE PC16-526
R2, R14, R22, R34	33211031	10 K, 1/4W ±10%			
R46, R56, R57, R60			HARDWARE		
R3, R8, R20	33211021	1K, 1/4W ±10%	Use with	89935478A	Washer, Compression
R23, R28, R38			Q15	89935479A	Insulator, Mica
R41, R44, R55, R58					
R4, R24	33213321	3.3K, 1/4W ±10%			
R5, R25	33215621	5.6K, 1/4W ±10%			

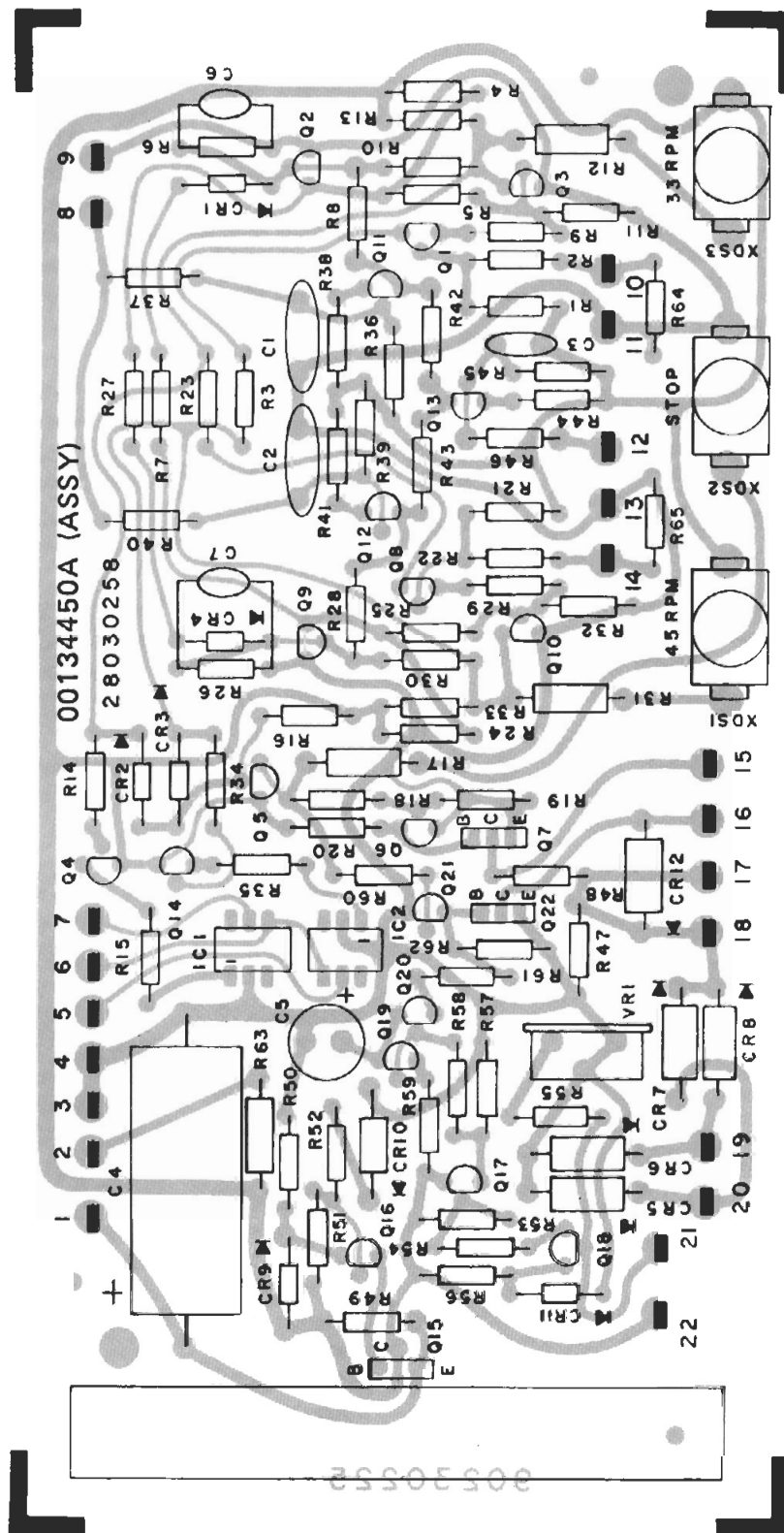
* Recommended Spares

REPLACEMENT PARTS LIST ORDER NOTE:

To speed handling of your order be sure to include both the model and serial numbers that appear on the bottom of the base, in addition to the quantity, part number and part description of the items ordered. Orders from independent dealers, independent servicemen, and retail customers will be shipped on a cash-in-advance basis. Harman-Kardon reserves the right to substitute equivalent parts for those originally installed in this unit. All parts should be ordered from Harman-Kardon, 55 Ames Court, Plainview, L.I., N.Y. 11803, Att: Parts Department.

NOTE TO WARRANTY STATIONS

Items marked with an asterisk (*) are recommended spare parts stock. Printed circuit board assembly numbers are shown for reference only. Harman-Kardon does not normally supply assembled printed circuit boards.



PC Board Assembly

OVERALL MECHANICAL PARTS LIST
(Referenced to Figure 13)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	64500301C	Baseplate	52	60130284	Bracket, Motor Mtg
2	61433883	Turntable Mat	*53	61230736	Neon Strobe Light (DS2)
3	62933909	Platter	54	64500401	Light Bracket
*4	61433164A	Belt, Turntable	55	62635308A	Bracket, Speed Control
5	61630239B	Dust Cover	*56	01934416A	Knob & Variable Resistor Assy (VR1, VR2)
6	67030830	Lockplate	*57	61030214	Mirror, Strobe
7	62500101B	Cover L.H.	58	61830751	Mask, Strobe (Export)
8	61632884A	Level	59	61830742	Mask, Strobe
9	61834312A	Shield, level	60	65427580	Voltage Block (Export)
10	67034291A	Retainer, level	61	10130734	Transformer (T1)
11	62534649B	Cover, R.H.	62	10130155	Transformer (T1) (Export)
12	60134957B	Top Plate, Rear	63	60130731	Bracket, Transformer
*13	61430746	Pad, Foam	*64	25534545A	Switch, lever (S2) (Export)
14	64500601C	Top Plate, Front	*65	25534508A	Switch, lever (S2)
15	61600301B	Grommet, Cue lever	66	63200301	Knob, Switch
16	60630121	Retainer, Cue Grommet	67	64500701	Cover, Switch
17	61030149	Window, Strobe	68	61630119	Housing, Switch
18	61630293B	Grommet, Resistor Knob	*69	45031015	Fuse, 1/10A, 3AG 250V (F1) Export
19	62930167	Adaptor 1.50 I.D. (38mm)	*70	45030817	Fuse, .2A, 3AG, 250V (F1)
20	62535375A	Side wall	71	65430519	Fuse Holder
21	65031714	Terminal Strip TB2	72	65030973	Terminal Strip 4 Pos (TB3)
22	67035334A	Free Stop Hinge Assy	*73	30434414A	Capacitor, .01UF (C1, C2)
23	61635333A	Shim, Hinge	74	62031486	Isolator
24	00134450A	P.C. Board Assy	75	61600401	Foot, Mounting
*25	46530750	Lamp (Blue) 45(DSI)	76	63500101	Adaptor, Foot
*26	46530748	Lamp (Red) Stop (DS2)	77	61434512A	Grip Sleeve
*27	46530749	Lamp (Green) 33-1/3 (DS3)	78	53035453A	Line Cord
28	61630170	Housing, Touch Control	79	53030949	Line Cord (Export)
29	60130169	Bracket, Support	80	61430856	Grommet, Strain Relief
30	79030114	Screw, Shoulder	81	53031873	Phono Cable (Audio)
31	85030115	Flatwasher	82	61431884	Grommet
32	85030302	Flatwasher	83	67031885	Clamp
33	64530171	Contact, Touch Control	84	61629713	Standoff
34	88531496	Eyelet	85	65611705	Ground Lug
35	60130185B	Bracket, Cue Cam	86	61415863	Rubber Channel
36	64833315A	Shaft, Cam	87	87230118	Standoff, Top Plate
37	61600501	Cam, Cueing	88	63230178	Lever, Cue Cam
38	60430181	Shaft, Linkage, Cam	89	60130289	Plate Mtg., Carriage
39	85030244	Flatwasher, linkage	90	60430144	Guide Rod
40	60130183	Linkage, Cue Lever	91	60335081A	Rod, Release
41	60334079A	Spring, Compression	92	64535379A	Lift Bracket
42	60431593	Bearing Rod	93	60430143	Tracking Shaft
43	64532225A ¹	Shield, Rear	94	60130301	Locknut Plate
44	64535344A ¹	Shield, Front	95	60830127	Gear, Tracking
45	61934330A	Airpot	96	60834804A	Gear, Trip
46	01930006	Spindle & Bearing Assy	97	64800301	Shaft, Linkage Gear
47	60130294	Retainer, Bearing	98	60400301A	Trip Pin
48	01930007	Hub & Post Assy	99	64833169A	Post, Spring
49	60130174	Plate, Motor Mtg.-Upper	*100	25033782A	Switch, Subminiature (S1)
50	01730001	Motor & Pulley Assy			
51	60130256	Plate, Motor Mtg. Lower			

OVERALL MECHANICAL PARTS LIST (continued)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
101	60334556A	Spring, Extension	152	61630109	Sleeve, Gram Weight
102	64800201	Bearing Post	153	64500801	Cover, Cartridge
103	61635307A	Support, R.H.	154	61631718	Clamp, Cover
104	60835321A	Pulley, Tracking Shaft	155	60431728	Adjusting Screw, Stop Bar
105	64533777A	Detent Spring	156	01935446A	Wire & Receptacle Assy
106	60435374A	Slide Rod	157	61829901	Shield, Fish Paper
107	61631342	Support, L.H.	158	62021307	Felt Pad
*108	61434533A	Belt, Tracking	159	60433304	Lift Pin
109	86530233	Spacer, Rod	160	60433119A	Adjustment Screw, Tracking
110	01830016	Solenoid Assy (L1)	161	60332007	Wire Guide, Audio
111	64535318A	Bracket, Trip Solenoid	162	67030808	Retaining Ring
112	74834750	Screw, Hex Hd 4-40x5/16 Type F	163	67035068A	Retainer, Push on
113	61635306A	Support, Tracking Shaft	164	67030807	Retaining Ring
114	63535339A	Bracket, LED & Photocell	165	67030801	Retaining Ring,
115	61834514A	Cover, Photo Cell	166	67032260	Retaining Ring
*116	01930044	Photo Cell Wired Assy (V1)	167	67030828	Retaining Ring
117	61634097A	Receptacle, Photocell	168	67030812	Retaining Ring
*118	01934610A	LED Wired Assy (LED1)	169	67030813	Retaining Ring
119	61635134A	Cover, Roller	170	67030815	Retaining Ring
120	61930271	Counterweight,	171	67030818	Retaining Ring
121	61430303	O Ring	172	85430806	Curved Washer
122	01934471A	Roller Base Riveting Assy	173	85431410	Curved Washer
123	60630126	Spring, Band	174	85431586	Curved Washer
124	60132455	Interruptor, Photocell	175	85434482	Curved Washer
125	60431594	Insert, Lift Pin	176	85030884	Flat Washer #3
126	62634509A	Pivot Bracket	177	85035014	Flat Washer
127	61634433A	Roller, Tone Arm	178	60335076A	Spring, Comp.
128	60430272	Rod, Counterweight	179	85033891	Flat Washer #6
129	60130156	Receptacle, Connector	180	85033757	Flat Washer #4 Blk
130	65735077A	Ground Lug, Tone Arm	181	85030236	Flat Washer
131	57500201A	Cable Assy, Roller	182	85033748	Flat Washer, #8
132	62635319B	Stop Bar, Cue Lift	183	85033946	Flat Washer
133	61630134	Bracket, Tracking Roller	184	85030845	Flat Washer #4
134	60630137	Spring, Tracking Roller	185	85034739A	Flat Washer #2
135	60400501	Tracking Roller	186	79335217	Screw, Pan Hd 3-48 x 1/2
136	61131575	Bearing			Type 23
137	62635440A	Carriage	187	85133742	Lock Washer, Split #6
138	64535343A	Bracket, Switch	188	89934713	Lock Washer, Split #2
139	26535467A	Switch, Mute	189	85230804	Lock Washer, Int. Tooth 3/8
140	61135376A	Guide, Carriage	190	85134737A	Lock Washer, Split #2 Blk
141	64535342A	Restrictor, Tone Arm	191	85231487	Lock Washer, Int. Tooth
142	84031027	Nut, Restrictor	192	80633749	Nut, Hex, Keps 6-32
143	60434513A	Rod, Restrictor	193	80634034	Nut, Hex, Keps 4-40 Blk
144	61430743	Grommet, Eccentric	194	89934712	Nut, Hex 2-64
145	61435011	Belt, Slide Shaft	195	80119587	Nut, Hex, Thin 3/8-32
146	61134954	Slide Bushing	196	80134738A	Nut, Hex 2-56
147	57530106	Cable Assy, Tone Arm	197	80619403	Nut, Hex, Keps 4-40
148	61730102	Tone Arm Tube	198	81134464	Nut, Lock, Acorn 6-32
149	61630101	Mtg Plate, Cartridge	199	80130860	Nut, Hex 4-40
150	84034087A	Lock Nut, Tone Arm	200	84034016A	Nut, Jam, Counterweight
151	61730276	Gram Weight	201	84034015A	Nut, Jam, Receptacle

OVERALL MECHANICAL PARTS LIST (continued)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
202	84035050	Nut 4-36	236	72132185	Screw. Set #4-40X1/4 Cup pt
203	79635020A	Screw Hex Wshr Hd 6-32 x 5/16 Type 23	301	01934309B	Cover Assy
204	70635136	Screw. Truss Hd. 4-40X5/16	302	01934447B	Top Plate Assy, Front
205	77833890	Screw, Pan Hd. 6-32X3/8	303	67034921A	Retaining Ring
206	79734445	Screw, Pan Hd. Taprite 6-32 X 5/16	304	01934446B	Top Plate Assy, Rear
207	77630917	Screw, Hex Hd. 6-32 X 5/16 Type 23	305	01934757A	Cam & Lever Assy
208	71833143	Screw, Hex Hd. 6-32X5/16	306	01930010	Housing & Contact Assy.
209	77830776	Screw, Pan Hd. 4X0.7X8MM	307	01934758A	Foot & Pad Assy
210	75830777	Screw, Pan Hd. 4-40X3/8 Type F	308	01930036	Counterweight Assy
211	78931210	Screw, Pan Hd. 2-56X1/8	309	01934467A	Roller & Base Assy
212	79131151A	Screw, Hex Hd. 6X5/16 Type 25	310	01934462B	Carriage/Roller Assy
213	70930459	Screw, Rd Hd. 4-40X3/8	311	61735206A	Collar, Rod
214	77800101A	Screw, Pan Hd. 6-32X5/16	312	01935088A	Tracking Roller Brkt Assy
215	77833743	Screw, Pan Hd. 4-40X5/16	313	01934633A	Pivot Bracket Assy
216	78733745	Screw, Hex Hd. 6-32X3/8 Type 23	314	01934463B	Carriage Assy
217	78733753	Screw, Hex Hd. 4-40X3/16 Type 23	315	01934743B	Stop Bar Assy
218	78733755	Screw, Hex Hd. 4-40X1/4 Type 23	316	01634448A	Tone Arm Assy
219	77834456	Screw, Pan Hd. 3X0.5 X6.4MM	317	60835320A	Pulley, Slide Shaft
220	77833751	Screw, Pan Hd. 2-56X1/4	318	67535013	Plug, Hole
221	79633747	Screw, Hex Washer Hd. 6-32X1/2 Type 23	319	61635089A	Cover, Solenoid
222	79633746	Screw, Hex Washer Hd. 6-32X3/8 Type 23	320	85333582	Lockwasher, Ext Tooth #6
223	77633750	Screw, Hex Hd. 6-32X1/4 Type 23	321	64535214A	Header Plate
224	79433756	Screw. Hex Hd. 4-40X7/16 Type 23	322	70218670	Screw Pan Hd. 4-40X
225	70930918	Screw, Round Hd. 1-72X1/8	323	61435207A	Pad, Dampener
226	79230937	Screw, Pan Hd. 4-40X1/4 Type F	324	61435209A	Dampener
227	77834740A	Screw, Pan Hd. 2-56X3/4	325	01935231A	Trip Gear Assy
228	71930931	Screw, Hex Hd. 6-32 X 3/16	326	85035226A	Washer, Flat
229	77831589	Screw, Pan Hd. 4-40 X 3/8	327	61635211B	Edging, Dust Cover
230	70818675	Screw, Rd Hd. 4-40 X 1-1/8	328	61635168B	Edging, Plate
231	77830910	Screw, Pan Hd 4-40X3/16	329	61435337A	Damper, Guide
232	85434920A	Wave Spring Washer	330	61635305A	Roller Cue Guide
233	65231715	Terminal Strip (TB1)	331	86532811	Spacer, Pulley
234	61432696	Screw Tip Cover	332	61130130	Bushing
235	72134478	Screw, Set #6-32X7/16 Oval pt	333	00135448A	Mute Circuit Board Assy
			334	01930024B	Dust Cover Assy
			335	01934444B	Side Wall Assy
			336	01935336A	Tracking Shaft Support Assy
			337	01935338A	R.H. Support Assy
			338	85019824	Washer, Flat
			339	85519349	Washer, Mylar
			340	70219614	Screw Pan Hd. 4-40X1/4
			341	78730929	Screw Hex Hd. 4-40X3/16 Type 23

*Recommend Spares

¹Not on all units

316 ** { 147
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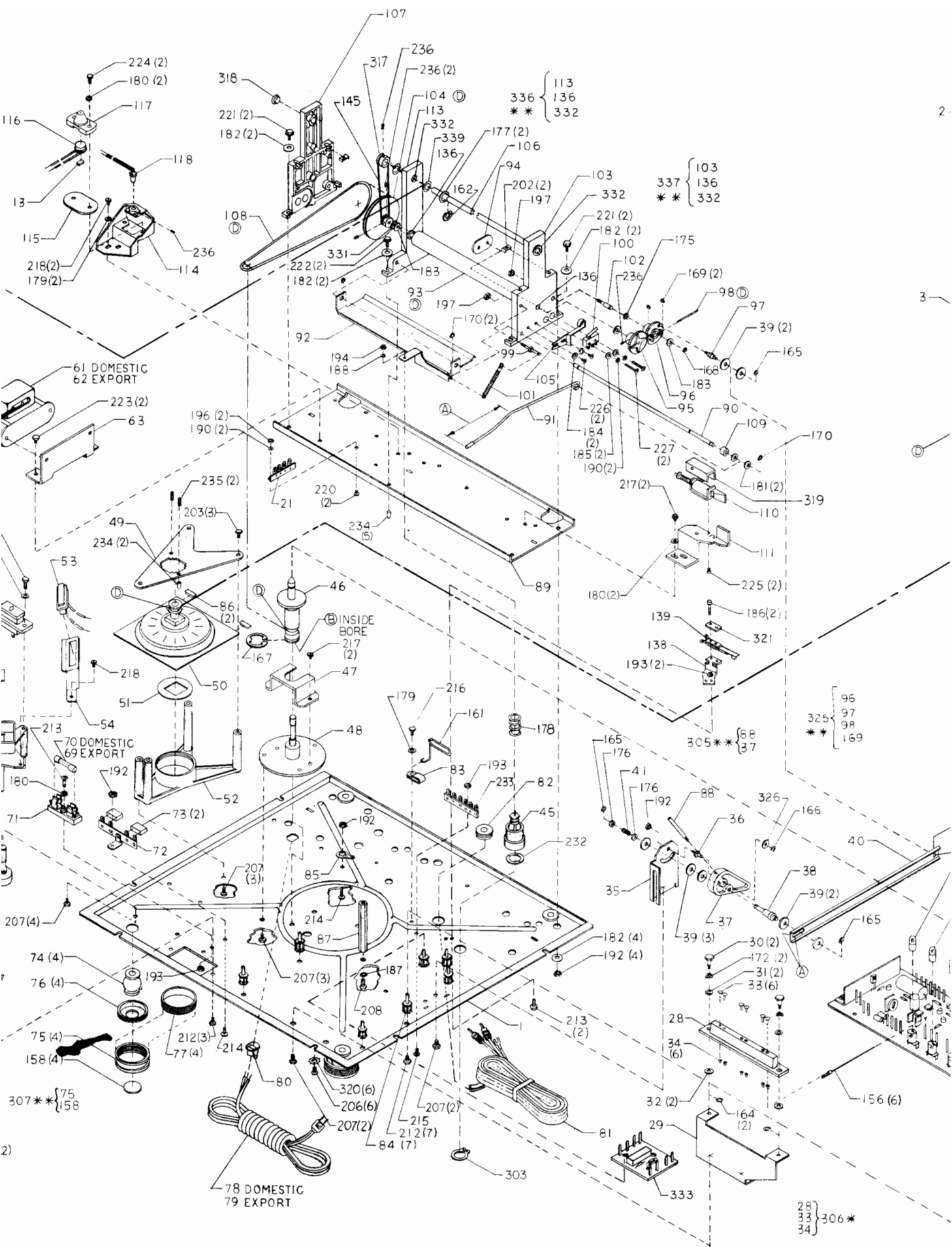
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180 (2)
60

59 DOMESTIC
58 EXPORT

65 DOMESTIC
64 EXPORT

- NOTES: UNLESS OTHERWISE SPECIFIED;
1. NUMBER IN BRACKETS DESIGNATES QUANTITY USED IN THAT ASSEMBLY.
2. --- DESIGNATES MECHANICAL CONNECTION BETWEEN SUB-ASSEMBLIES.
3. NON-SPECIAL ADHESIVES, TAPE, GREASE, ETC. ARE NOT DESIGNATED.
* 4. ITEMS SHOWN ARE NORMALLY INSEPARABLE, AND ARE SUPPLIED ASSEMBLED ONLY.
5. LUBRICATION POSITIONS:
 ④ GREASE; H/K PART NO. 62400401A.
 ⑤ LUBRICANT; H/K PART NO. 62400101A.
6. AREAS MARKED ⑥ TO BE KEPT FREE OF GREASE, OIL, DIRT, ETC.
** 7. ITEMS IN BRACKETS ARE AVAILABLE AS SUB-ASSEMBLIES.
8. WHEN ORDERING PARTS REFER TO MODEL NUMBER, SERIAL NUMBER, PART NUMBER, DESCRIPTION AND QUANTITY.



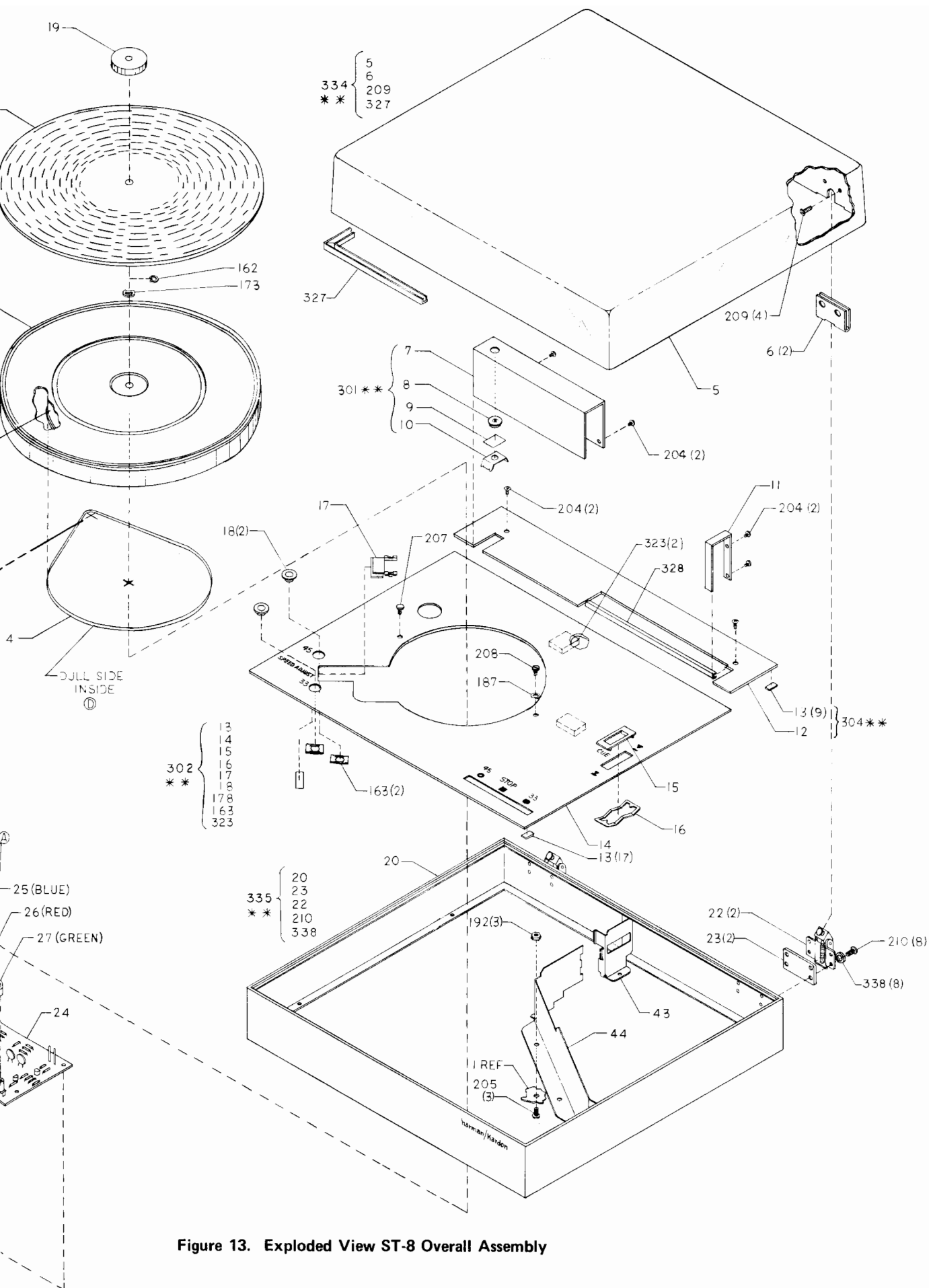
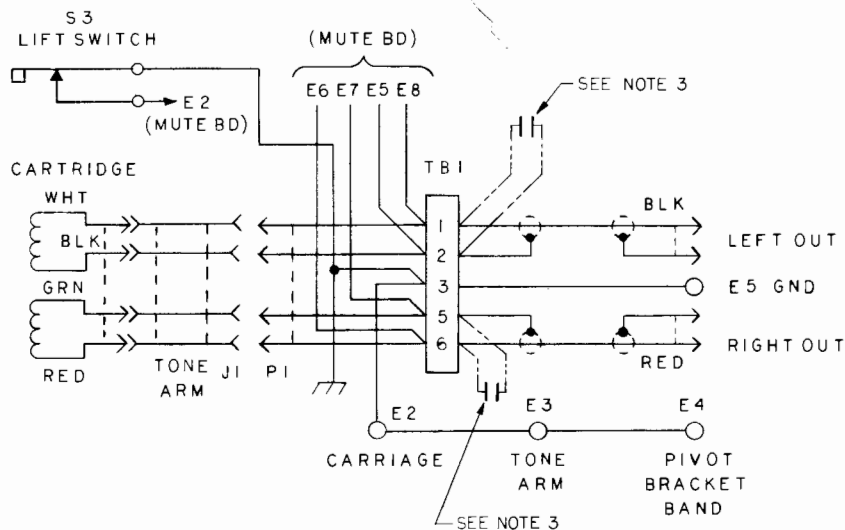
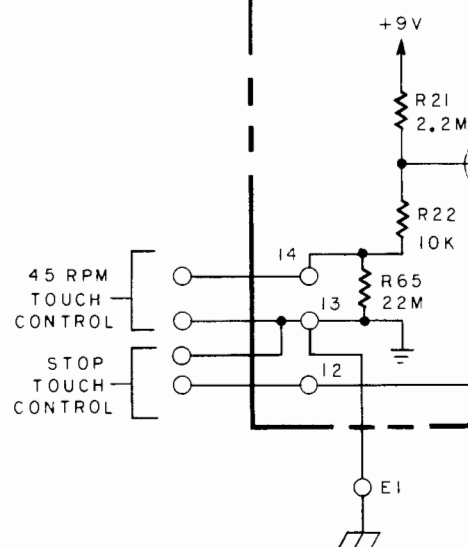
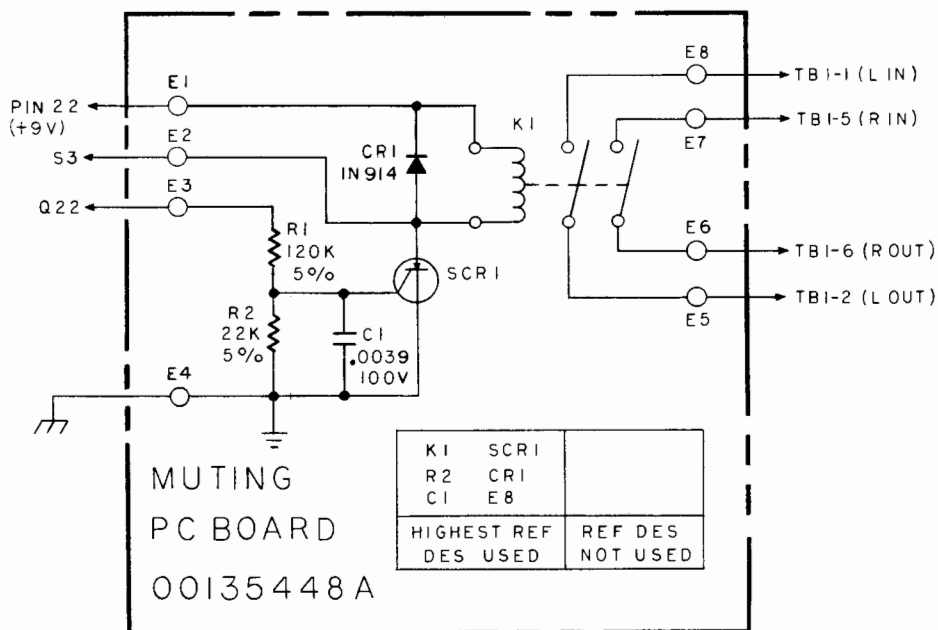
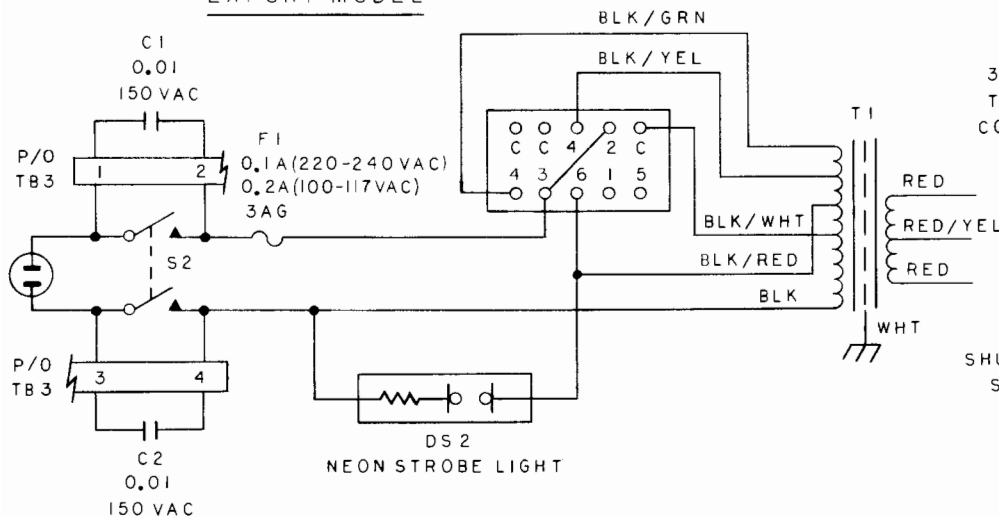


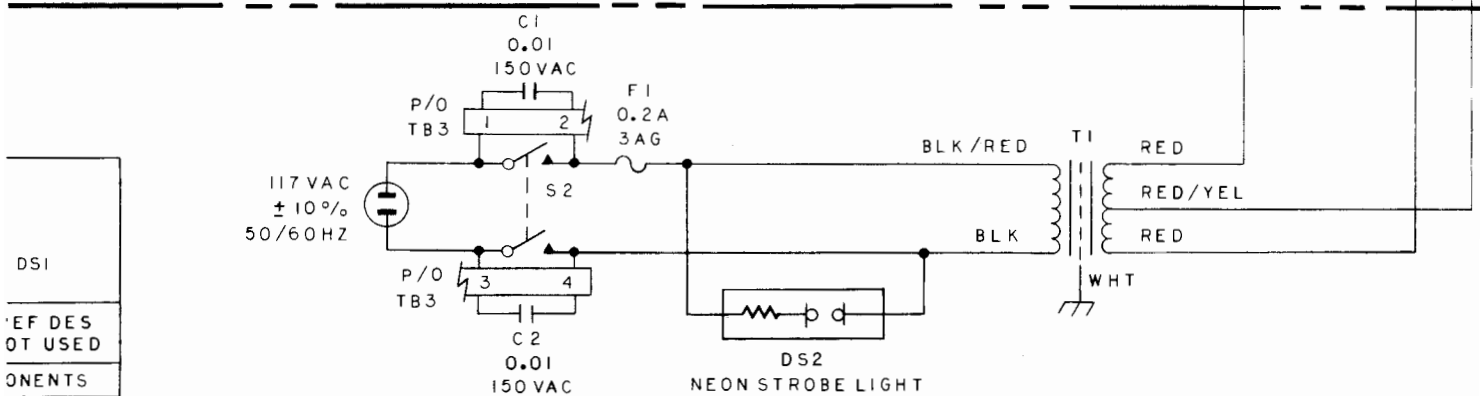
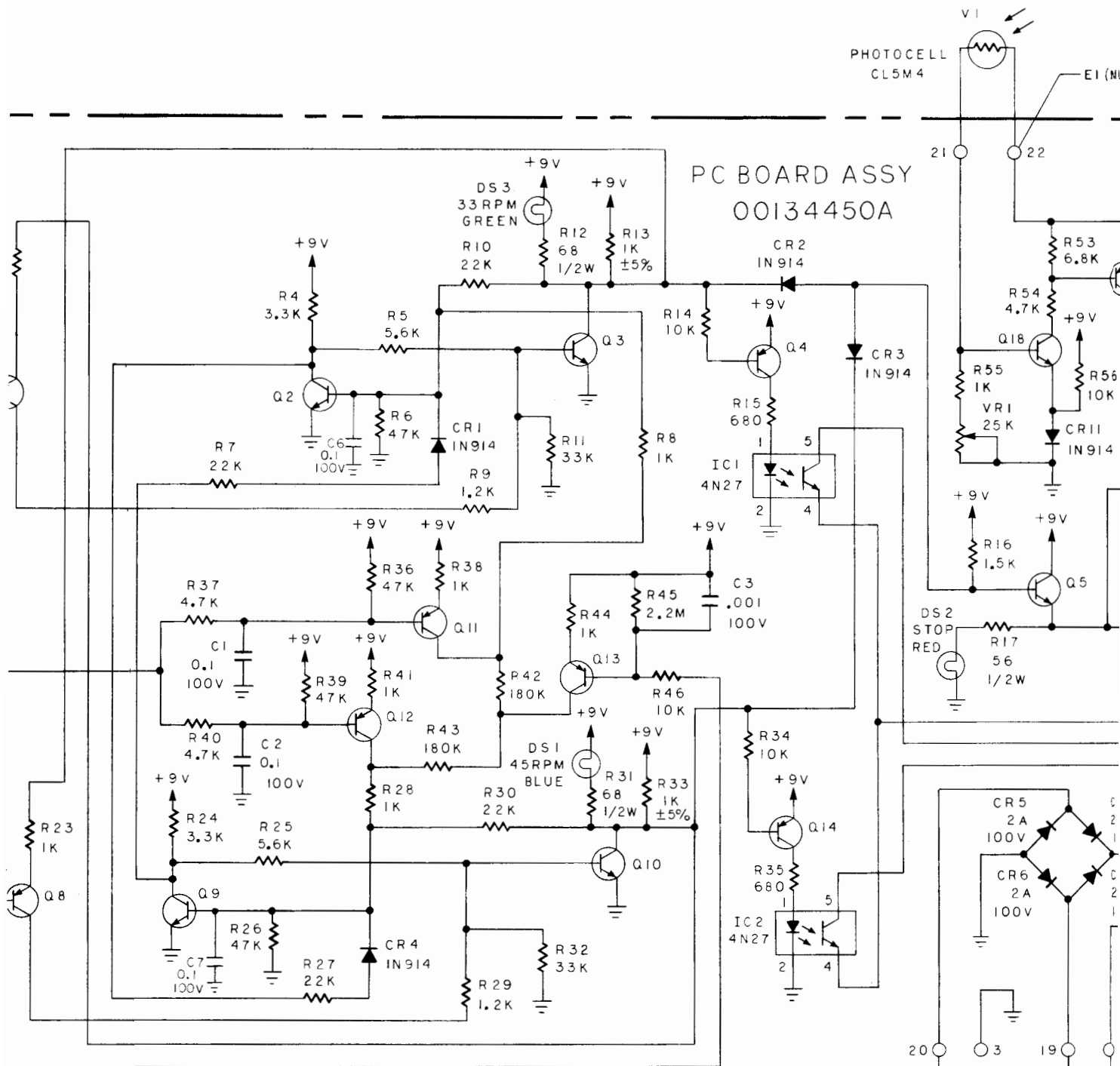
Figure 13. Exploded View ST-8 Overall Assembly



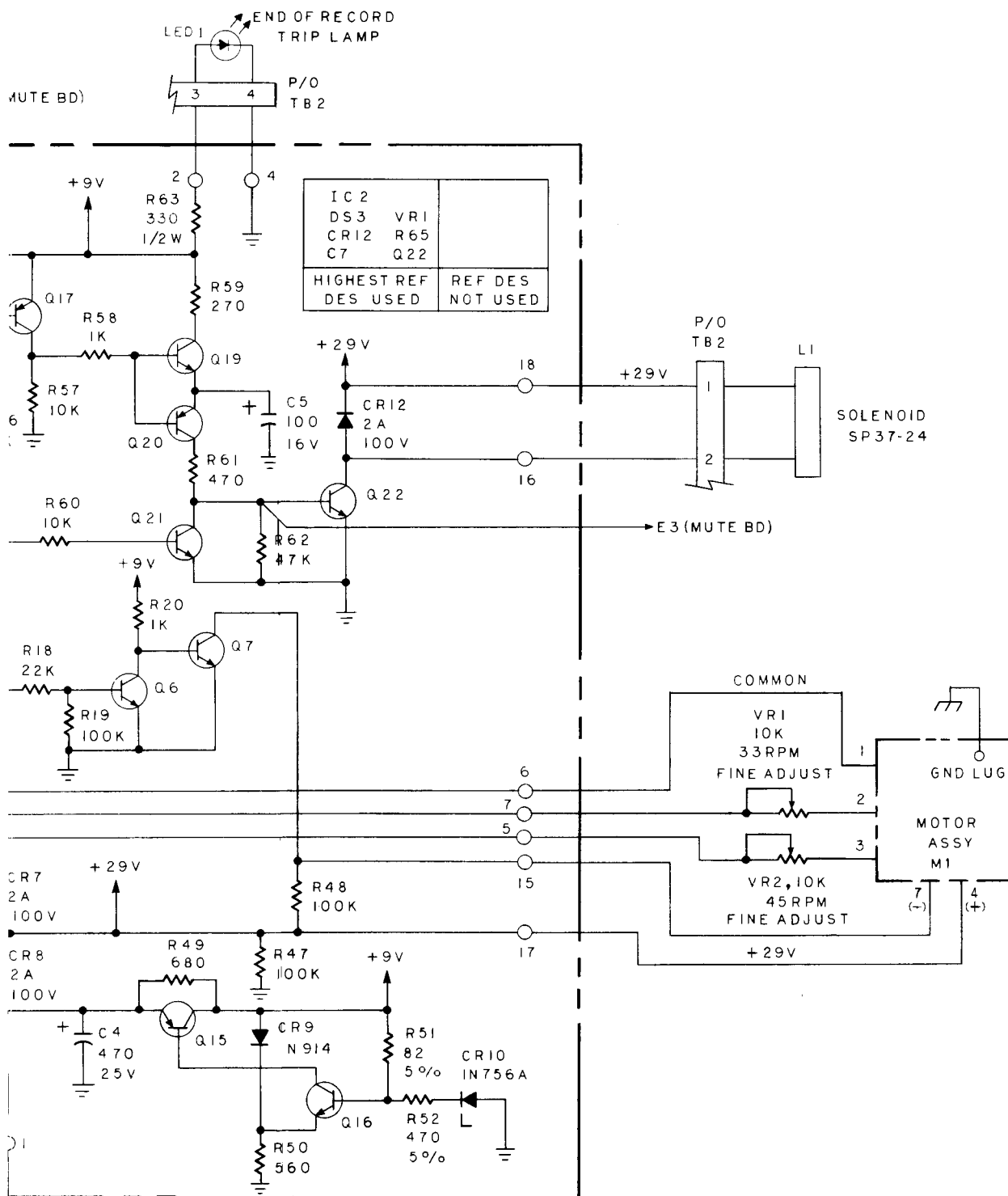
EXPORT MODEL



MI	LED1	
L1	VR2	
F1	V1	
E4	TB3	
DS2	T1	
C2	S3	
HIGHEST REF	DES USED	R
DES USED		N
CHASSIS COMP		



DS1
EF DES
OT USED
ONENTS



NOTES: UNLESS OTHERWISE SPECIFIED

1 ALL CAPACITOR VALUES IN MICROFARADS.

2 ALL RESISTOR VALUES IN OHMS, $\pm 10\%$, 1/4 W.

3 CABLE MATCHING CAPACITANCE-SEE ADJUSTMENT 14.

Figure 14. System Schematic Diagram

METER: WESTON 4444 DVM

*The light condition is simulated by end of record lamp, LED 1, being on and unobstructed. The dark condition is simulated by obstructing the light emitted by LED 1 by placing a sheet of dense material over the Photocell, V1, aperture.



1. All capacitor values in microfarads
2. All resistor values in ohms (1/4 W).
3. Schematic is shown for reference only. Parts are not supplied by H/K. Circuit board is an integral part of the motor and is supplied as an assembly only.
4. * These components are enclosed within motor housing.

Drive Motor P.C. Board Schematic