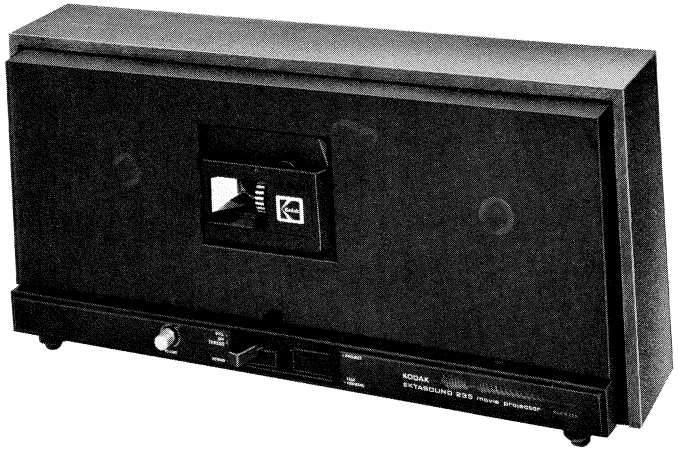
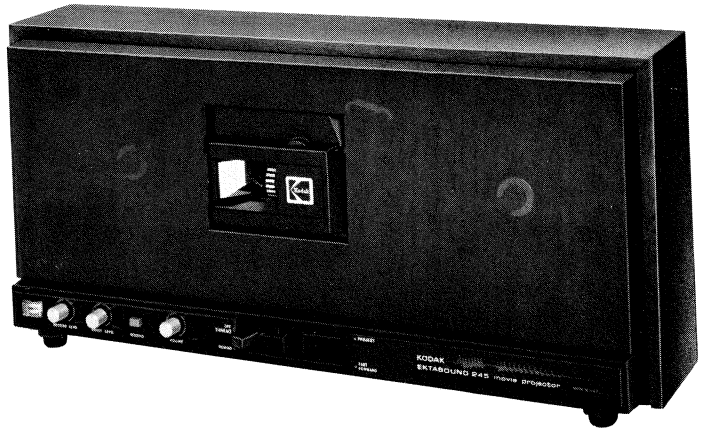
SERVICE MANUAL NO. 775335

KODAK EKTASOUND 235 and 245 Movie Projectors





GENERAL INFORMATION

The *KODAK EKTASOUND* 245 Movie Projector records and plays back sound super 8 movies; the *KODAK EKTASOUND* 235 Movie Projector plays back only. Except where noted, the information in this manual applies to both projectors.

Power Service Required - 110 to 125 volts, 60 Hz

Projection Lamp - 80-watt, 30-volt, ANSI Code DFE projection lamp

Lenses - *KODAK* Projection *EKTANAR* Lens, 22mm f/1.5 or VARIO-KIPTAGON Lens, 15 to 30mm f/1.3

Projection Speeds - 18 or 24 frames per second

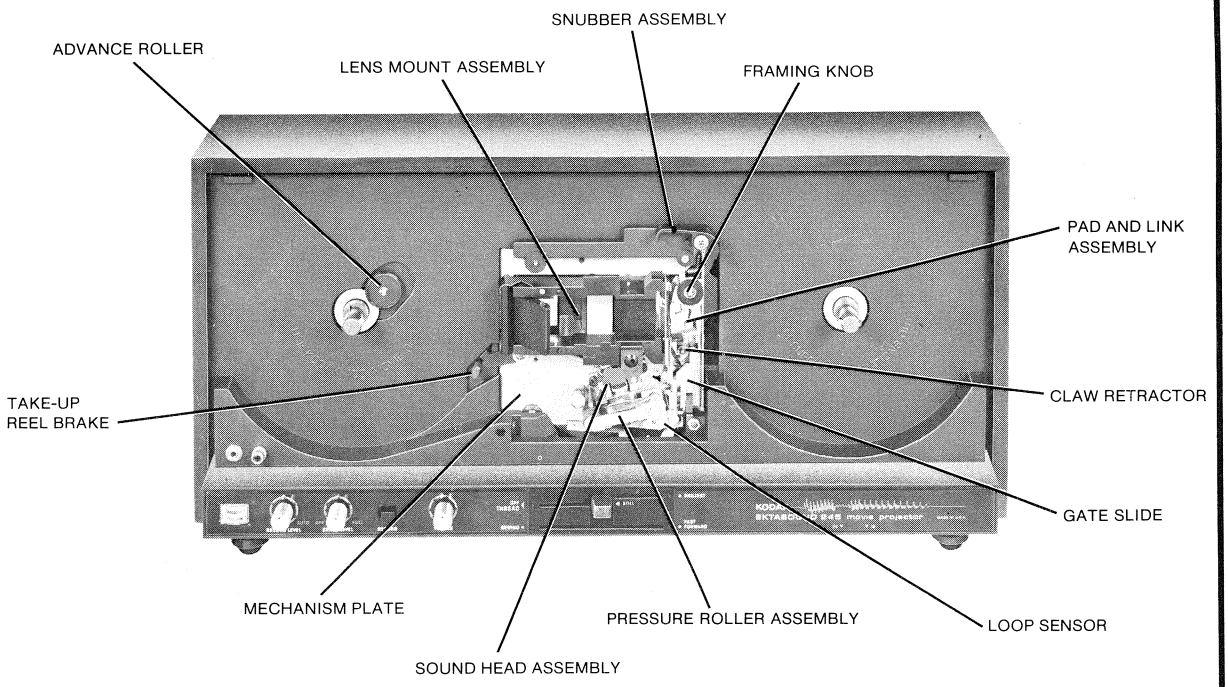
Amplifier - Transistorized 3-watt music power output

External Speaker/Headphone Jack - Switches from built-in speaker to 8- to 16-ohm external speaker or headphones with ¼-inch plug

Microphone Jack (*EKTASOUND* 245 Movie Projector) - Accepts low-impedance (200 to 600 ohms) microphone with ⅛-inch plug to record sound

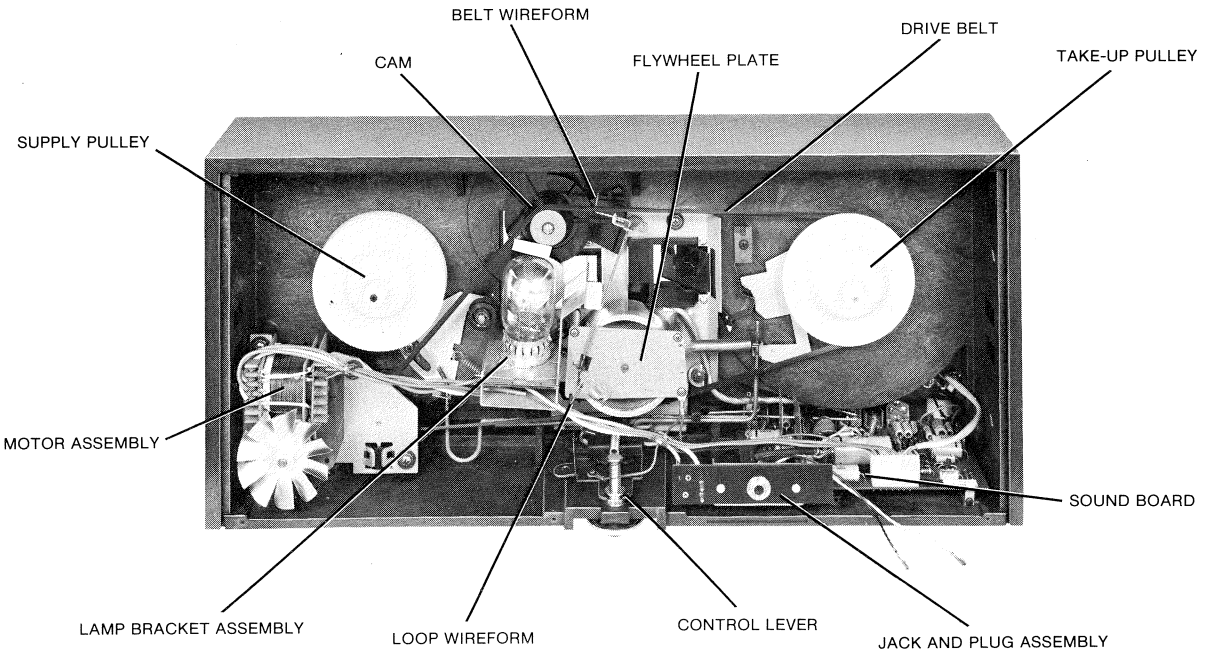
Phono Jack (*EKTASOUND* 245 Movie Projector) - Accepts phono plug to record sound from output of phonograph or tape recorder

SEE ILLUSTRATIONS INSIDE THIS PAGE FOR LOCATION OF PARTS AND ASSEMBLIES.



(To reach parts shown, move PROJECTION MIRROR to position shown in Figure 1. Then remove LENS COVER by sliding it toward TAKE-UP SPINDLE, lift out lens, and remove FILM TRACK COVER by pulling it out at lower left edge.)

FIGURE 2



(To reach parts shown, remove three screws at base of back cover, disconnect leads to speaker, and lift off cover.)

FIGURE 3

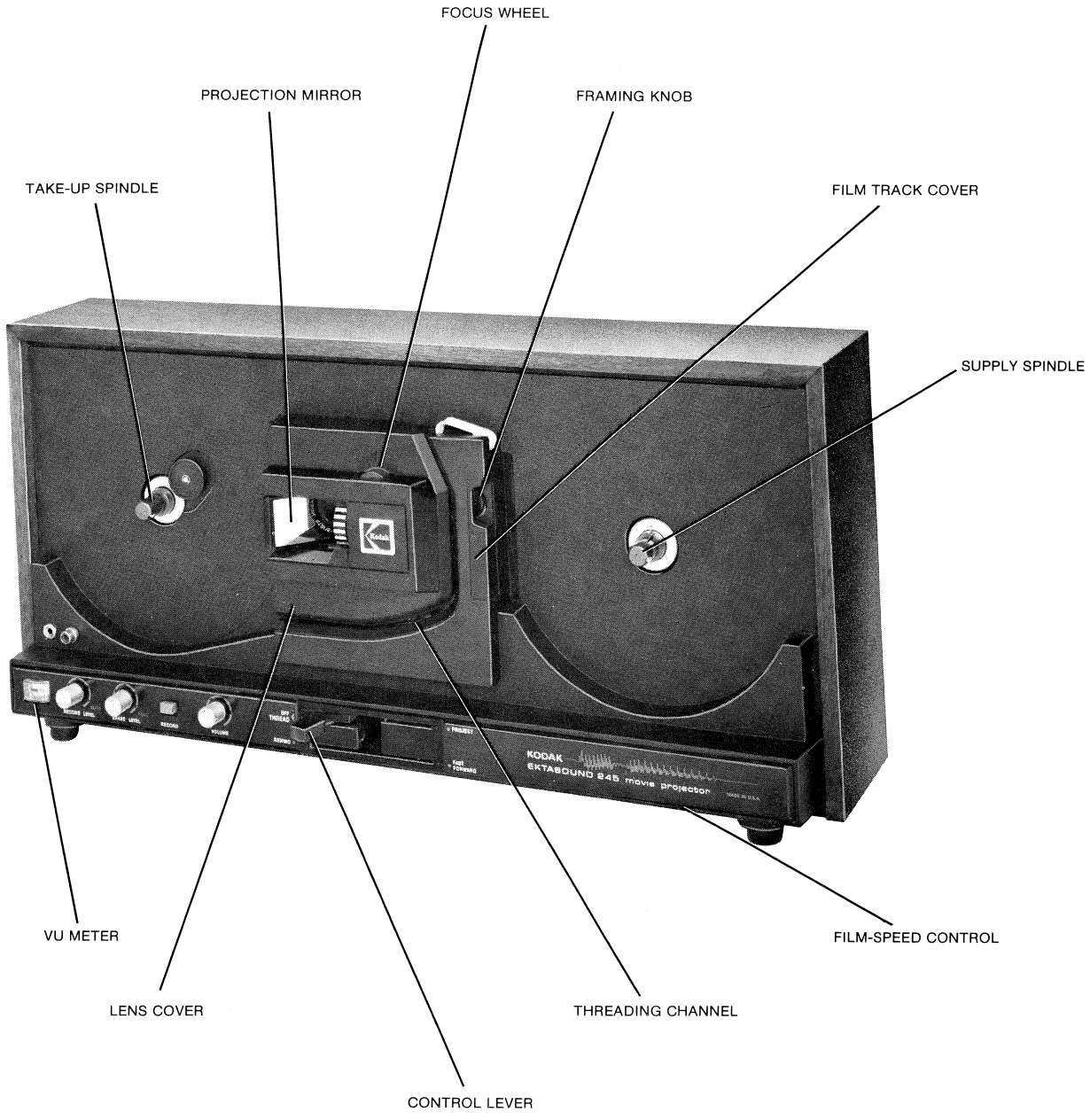

FOCUS WHEEL
PROJECTION MIRROR
FRAMING KNOB
TAKE-UP SPINDLE
FILM TRACK COVER
SUPPLY SPINDLE
KODAK
EKTASOUND 245 movie projector
VU METER
LENS COVER
THREADING CHANNEL
FILM-SPEED CONTROL
CONTROL LEVER

FIGURE 1

TABLE OF CONTENTS

PROJECTOR OPERATION

See Figure 1 inside front cover for identification of projector controls.

THREADING

1. Move CONTROL LEVER, Figure 1, to OFF/THREAD.

NOTE: On the *EKTASOUND* 245 Movie Projector, turn erase level knob fully counterclockwise to OFF to prevent accidental erasure.

2. Place reel of film, perforated edge out, on SUPPLY SPINDLE.

3. Draw film through THREADING CHANNEL, insert end in slot on take-up reel, and rotate reel clockwise to take up slack.

PROJECTING

Forward Projection:

1. Move control lever to PROJECT.

2. While projector is running, move FILM-SPEED CONTROL to 18 or 24 fps.

3. Focus image by rotating FOCUS WHEEL and center image on screen by rotating FRAMING KNOB.

4. Adjust volume control to desired level.

Still Projection:

Move control lever to STILL to show a single frame of film. (Screen image will be slightly darker because heat shield will move between lamp and film.)

Fast Forward:
Move control lever to FAST FORWARD to advance film quickly.

REWINDING

1. If film is attached to supply reel, move control lever to REWIND and rewind film through threading channel.

2. If all film is on take-up reel, guide film over LENS COVER, attach film end to supply reel, and rotate reel a few turns counterclockwise. Then move control lever to REWIND.

RECORDING (*EKTASOUND* 245 Movie Projector)

1. Turn erase level knob to FULL.

2. Thread projector with magnetic-striped film and insert microphone, phonograph, or tape recorder into proper jack.

3. Set recording level automatically by turning record level knob fully clockwise until it clicks into AUTO position.

Or set recording level manually by moving control lever to STILL, speaking into microphone (or playing phonograph or tape recorder), and turning record level knob until VU METER needle just touches red scale.

4. Record: With control lever in STILL, pull out on lever and move it to PROJECT; immediately push in record button (it glows red when engaged).

NOTE: The record button cannot be depressed until the control lever is pulled out and moved to PROJECT; then the record button must be pushed in to record.

RECORDING SOUND ON SOUND (*EKTASOUND* 245 Movie Projector)

1. Follow same procedure as "Recording" except set erase level knob at middle of its range.

2. Make a test recording and play it back to check erase level and record level settings.

3. Adjust erase level and record level until sound is satisfactory.

TEST EQUIPMENT AND TEST FILMS

TEST EQUIPMENT

Item	Specifications
Audio Signal Source	Output of 100 Hz to 5000 Hz at 10 microvolts to 1 volt rms
Oscilloscope	Calibrated vertical input, vertical amplifier response of dc to 30,000 Hz, and calibrated horizontal sweep that can be triggered internally and externally
Audio Voltmeter	Capable of measuring to 10,000 Hz and with full scales ranging from 1 millivolt to 10 volts
Flutter Meter	Capable of measuring drift and flutter to NAB and DIN specifications
Variable-Speed Stroboscope	Capable of measuring speeds to 3500 rpm

TEST FILMS

Part No.	Description
762024	Super 8 Registration Test Film, 50-foot roll
762056	Super 8 Scratch Test Film, 50-foot roll
762236	Super 8 Unrecorded Magnetic Test Film, 50-foot roll
763135	Super 8 Magnetic Multi-Purpose Test Film, 50-foot roll

REPLACEMENTS

See Figures 2 and 3 on front cover foldout for location of parts and assemblies.

LOOP SENSOR, WIREFORMS, AND FLYWHEEL

To remove:

1. Loosen screw on LOOP SENSOR, Figure 2, and remove sensor.

2. Remove LOOP WIREFORM, BELT WIREFORM, and connecting spring, Figure 3.

3. Unhook spring and remove three screws from FLYWHEEL PLATE.

NOTE: One screw connects ground wire to plate.

4. Remove flywheel and associated parts as required.

To replace:

1. Install parts in reverse order.

2. Adjust loop sensor. See page 12.

SOUND HEAD ASSEMBLY

To remove:

1. Remove two large screws holding SOUND HEAD ASSEMBLY to MECHANISM PLATE, Figure 2.

NOTE: Do not remove two small screws holding bracket to top of sound head. These screws hold sound head in proper alignment.

2. Lift assembly out and unsolder sound cable leads from sound head.

To replace:

Connect sound cable leads to sound head as shown, Figure 4, and install assembly. Sound head is aligned and needs no adjustment.

PRESSURE ROLLER ASSEMBLY

To remove:

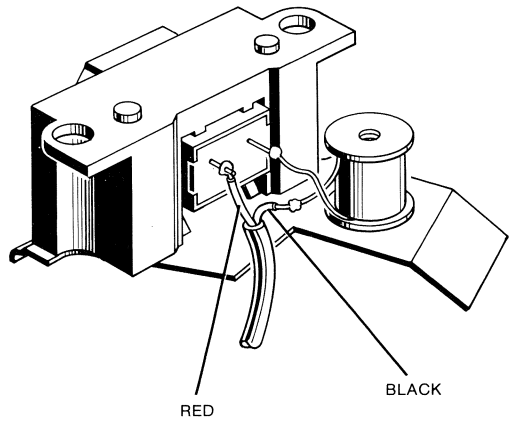
1. Set projector in STILL position.

2. Loosen screw on LOOP SENSOR, Figure 2, and remove sensor.

3. Remove retainer holding PRESSURE ROLLER ASSEMBLY.

4. Remove and replace pressure roller parts as required, Figure 5.

EKTASOUND 235



EKTASOUND 245

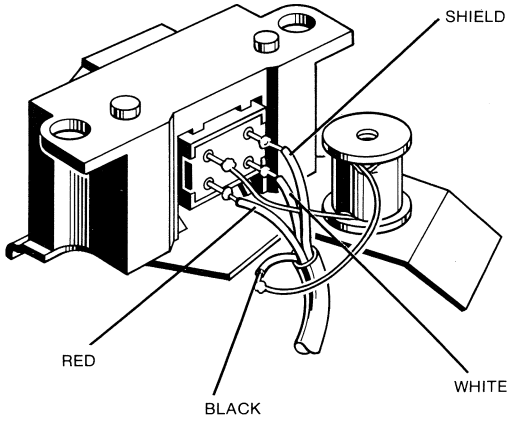


FIGURE 4

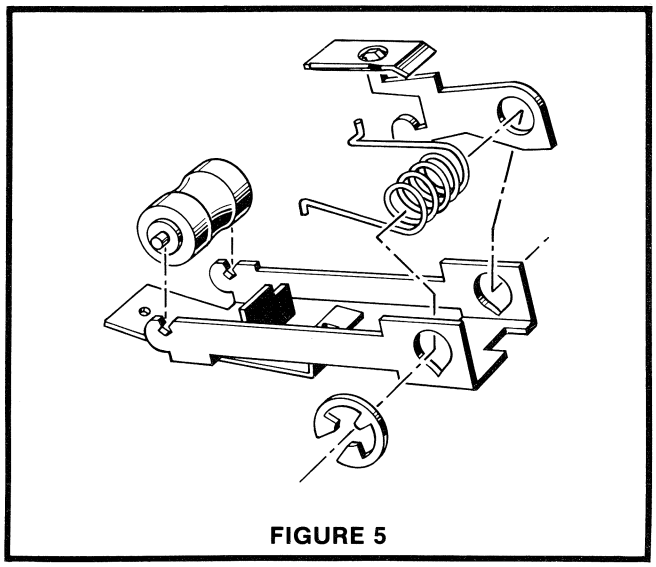


FIGURE 5

To replace:

1. Engage assembly in slot on control plate, hold sound pad horizontal, and push on retainer.

2. Install loop sensor and adjust. See page 12.

SAFETY SHUTTER, HEAT SHIELD, AND CAM

To remove:

1. Remove two screws holding LAMP BRACKET ASSEMBLY and move assembly away from CAM, Figure 3.

2. Remove retainer holding SAFETY SHUTTER, Figure 6, and lift off spring and safety shutter.

3. Remove heat shield under safety shutter by removing screw.

4. Remove DRIVE BELT, Figure 3, and adjusting nut from cam; pull off cam.

To replace:

1. Install parts in reverse order.

2. Set claw protrusion and check for evenness of illumination. See page 13.

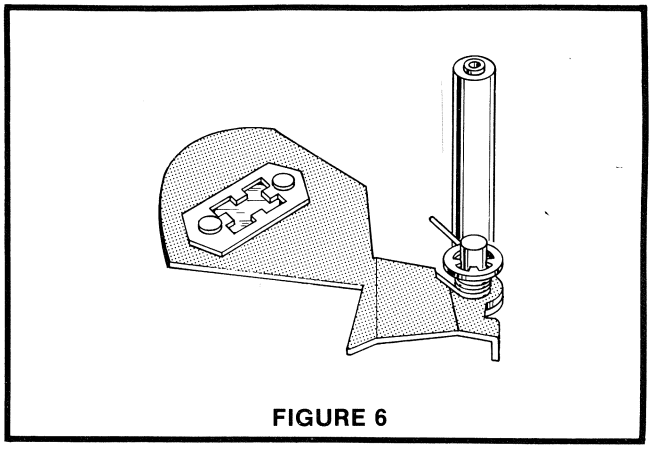


FIGURE 6

CLAW RETRACTOR

To remove:

1. Set projector in STILL position.

2. Remove retainer on CLAW RETRACTOR, Figure 2, and lift out spring and retractor.

To replace:

1. Install claw retractor and spring as shown, Figure 7.

2. Set claw protrusion by adjusting claw retractor. See page 13.

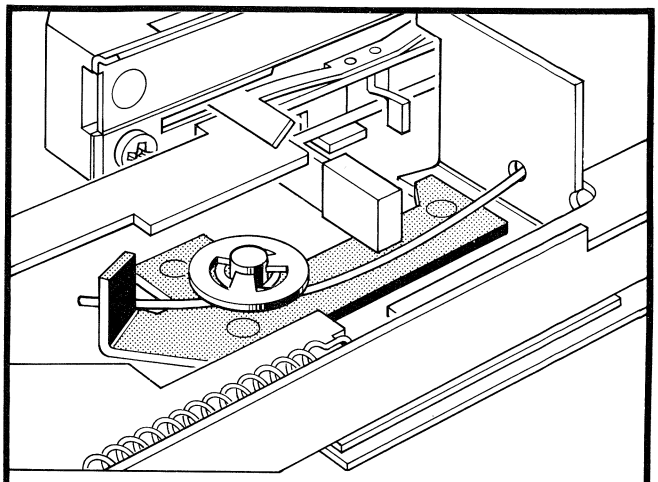


FIGURE 7

PAD AND LINK, LENS MOUNT, AND GATE AND CLAW ASSEMBLIES

To remove:

1. Set projector in STILL position.

2. Remove retainer on FRAMING KNOB, Figure 2, and lift off knob.

3. Unhook spring attached to PAD AND LINK ASSEMBLY and remove assembly.

4. Remove two large screws holding SOUND HEAD ASSEMBLY to MECHANISM PLATE and move assemly away from LENS MOUNT ASSEMBLY.

NOTE: Do not remove two small screws holding bracket to top of sound head. These screws hold sound head in proper alignment.

5. Remove projection lamp and move HEAT SHIELD to remove LENS MOUNT SCREWS, Figure 8.

6. Unhook spring from claw arm on lens mount assembly and remove assembly, being careful not to bend SIDE GUIDES, Figure 9.

7. Remove two screws on lens mount assembly to remove gate and claw assembly.

To replace:

1. Install lens mount assembly as shown, Figure 9, being careful not to bend side guides.

2. Install pad and link assembly and framing knob as shown, Figure 10.

3. Set claw protrusion and check framing. See page 13.

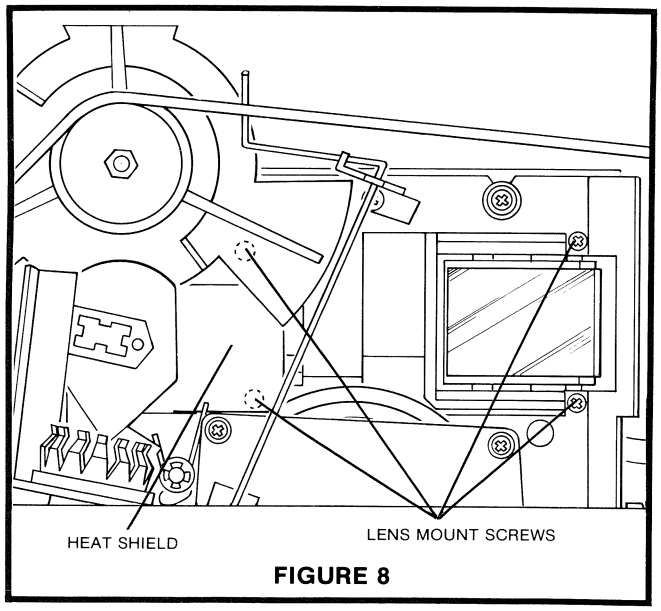


FIGURE 8

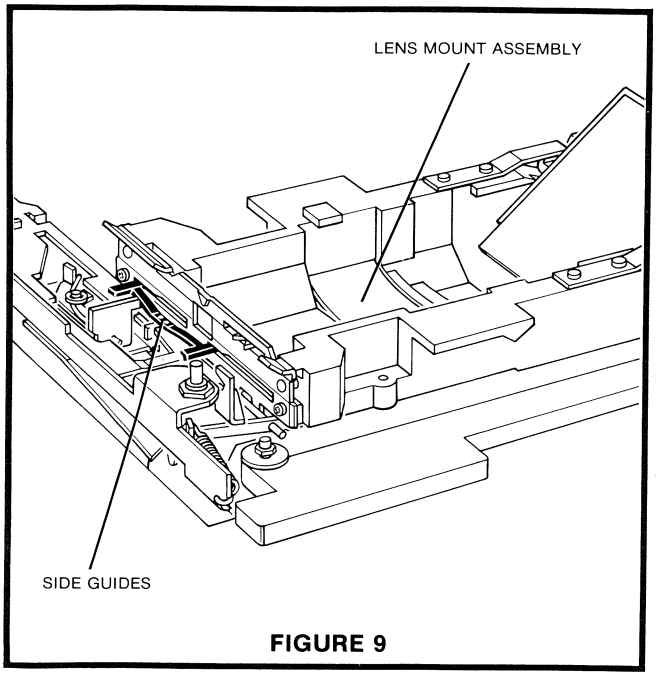


FIGURE 9

MECHANISM ASSEMBLY

To remove:

1. Remove SNUBBER ASSEMBLY, Figure 2, and hex head nut below snubber.

2. Remove two large screws holding SOUND HEAD ASSEMBLY to MECHANISM PLATE.

NOTE: Do not remove two small screws holding bracket to top of sound head. These screws hold sound head in proper alignment.

3. Remove hex head nut holding clip at lower edge of GATE SLIDE.

4. Remove screw holding TAKE-UP REEL BRAKE and lift off brake.

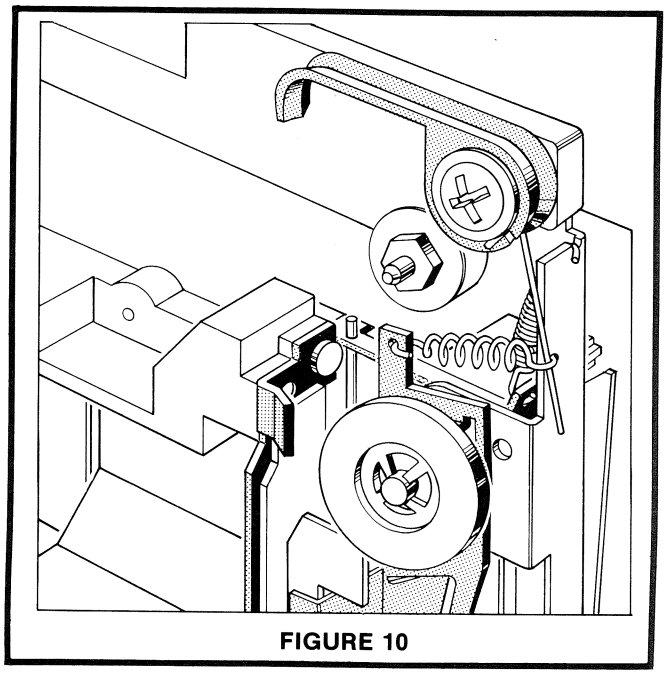


FIGURE 10

5. Remove control knob, spring, and screw attached to CONTROL LEVER, Figure 3, and slide lever out of case.

NOTE: Screw holds ground wire and bracket to control lever.

6. Unhook spring and remove screw holding ground wire to FLYWHEEL PLATE.

7. Remove two screws holding LAMP BRACKET ASSEMBLY and move assembly away from mechanism.

8. Remove DRIVE BELT from CAM and TAKE-UP PULLEY.

9. Remove three SCREWS holding mechanism assembly, Figure 11, pull sound cable out of mechanism, and lift mechanism assembly out of case.

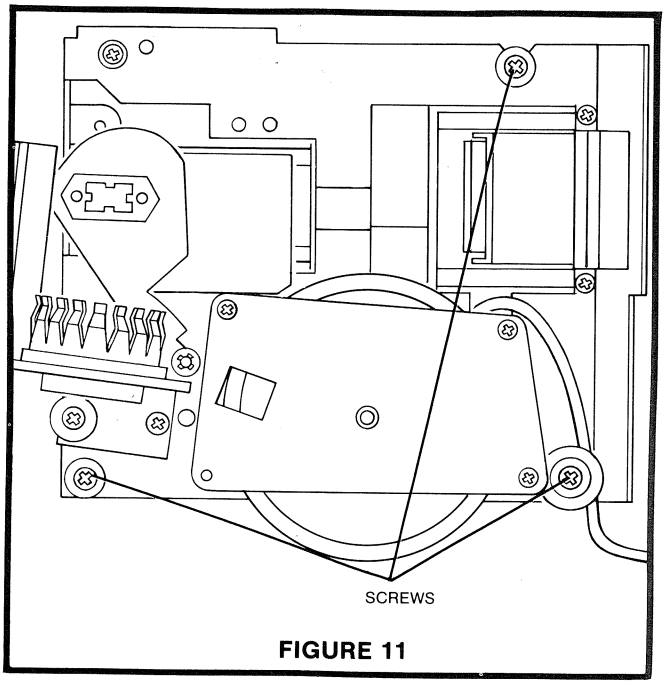


FIGURE 11

To replace:

1. Install mechanism assembly in reverse order.

2. To connect sound cable leads to sound head, see Figure 4.

3. Check evenness of illumination. See page 13.

CONTROL PLATE AND GATE SLIDE

To remove:

1. Remove mechanism assembly. See page 9.

2. Remove retainer holding PRESSURE ROLLER ASSEMBLY, Figure 12, and lift out assembly.

3. Remove screw holding CONTROL PLATE and remove plate.

4. Remove pad and link assembly and lens mount assembly. See page 8.

5. Remove retainer on CLAW RETRACTOR, Figure 12, and lift out spring and retractor.

6. Unhook spring on GATE SLIDE and remove slide.

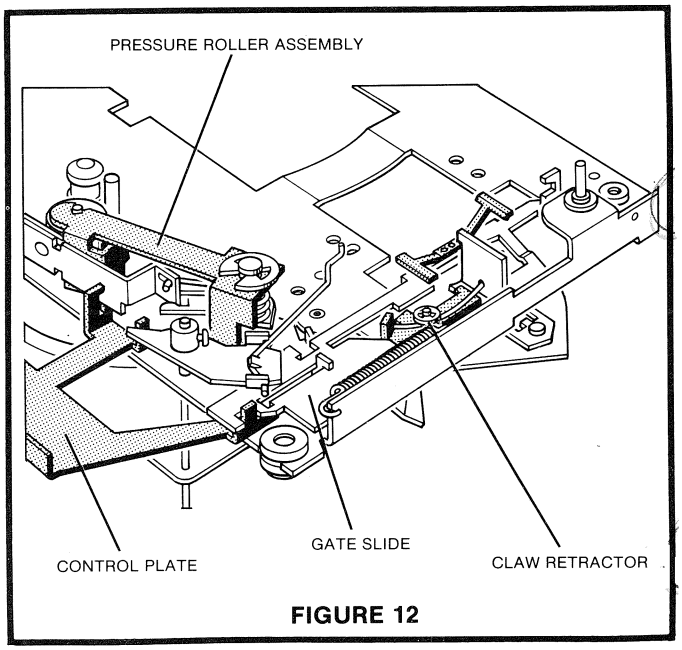


FIGURE 12

To replace:

1. Install gate slide, claw retractor, control plate, and pressure roller assembly as shown.

2. Install lens mount assembly and pad and link assembly. See page 8.

3. Install mechanism assembly. See page 9.

4. Set claw protrusion, check framing, and check evenness of illumination. See page 13.

DRIVE BELT AND MOTOR BELT

To remove:

1. Disconnect wires from LAMP BRACKET ASSEMBLY, Figure 3.

2. Remove screw holding ground wire to FLYWHEEL PLATE.

3. Remove DRIVE BELT from CAM and TAKE-UP PULLEY.

4. Remove four screws holding MOTOR ASSEMBLY to case and lift out assembly.

5. Remove MOTOR BELT and DRIVE BELT, Figure 13.

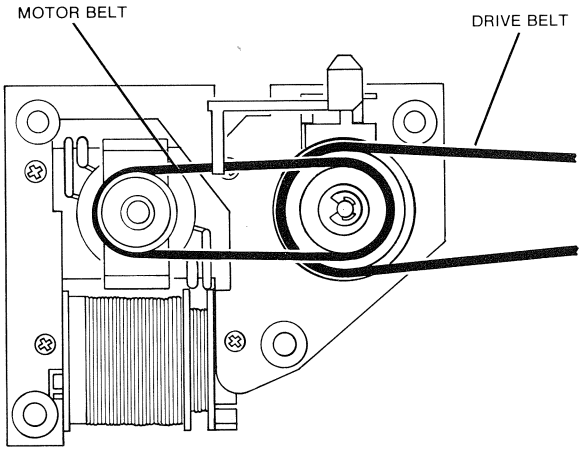


FIGURE 13

To replace:

1. Install belts on motor assembly, keeping shiny side of drive belt against pulley.

2. Locate motor assembly on posts and fasten screws.

3. Install drive belt on cam and take-up pulley.

4. Connect ground wire to flywheel plate with screw.

5. Connect wires to lamp bracket assembly. See wiring diagrams, pages 25 and 27.

MOTOR ASSEMBLY

To remove:

1. Remove DRIVE BELT from CAM and TAKE-UP PULLEY, Figure 3.

2. Disconnect wires from MOTOR ASSEMBLY.

3. Remove four screws holding motor assembly to case and lift out assembly.

4. Remove MOTOR BELT and DRIVE BELT, Figure 13.

5. Remove and replace MOTOR, IDLER PULLEY, and SPEED SHIFT LEVER as required, Figure 14.

To replace:

1. Install belts on motor assembly, keeping shiny side of drive belt against pulley.

2. Locate motor assembly on posts and fasten screws.

3. Install drive belt on cam and take-up pulley.

4. Connect wires to motor assembly. See wiring diagrams, pages 25 and 27.

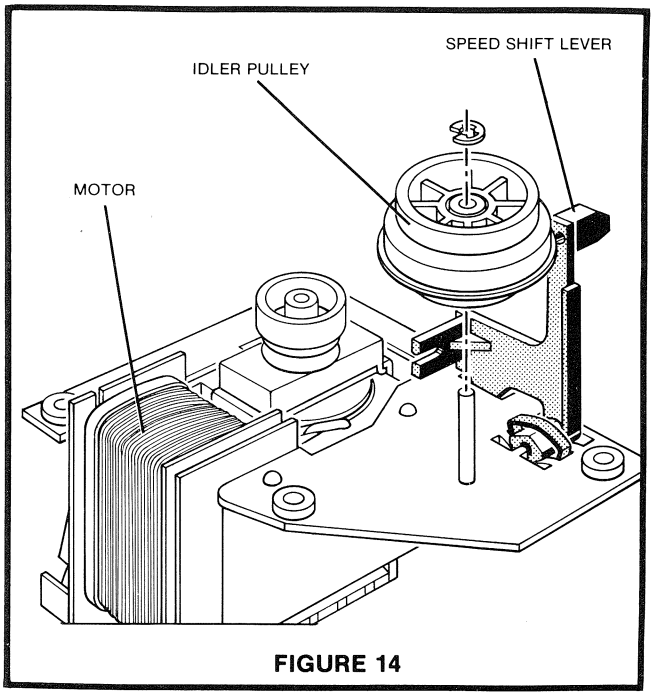


FIGURE 14

PULLEYS, SPINDLES, LEVERS, AND LINKS

To remove:

1. Set projector in STILL position.

2. Remove screws on SUPPLY PULLEY and TAKE-UP PULLEY, Figure 3, and remove pulleys and spindles.

3. Remove ADVANCE ROLLER, Figure 2.

4. Remove ADVANCE LEVER, REWIND LEVER, and BRAKE LEVER, Figure 15.

5. Remove control knob, spring, and screw attached to CONTROL LEVER, Figure 3, and slide lever out of case.

NOTE: Screw holds ground wire and bracket to control lever.

6. Remove TAKE-UP LINK and SUPPLY LINK, Figure 15. Leave RECORD INTERLOCK LINK on *EKTASOUND* 245 Movie Projector in place.

To replace:

1. Install links, supply link first.

2. Install other parts in reverse order.

SOUND BOARD AND RECORD INTERLOCK LINK (*EKTASOUND* 245 Movie Projector)

To remove:

1. Set projector in FORWARD position.

2. Pull off control knobs on front of projector.

3. Remove two large screws holding SOUND HEAD ASSEMBLY to MECHANISM PLATE, Figure 2, lift assembly out, and unsolder sound cable leads from sound head.

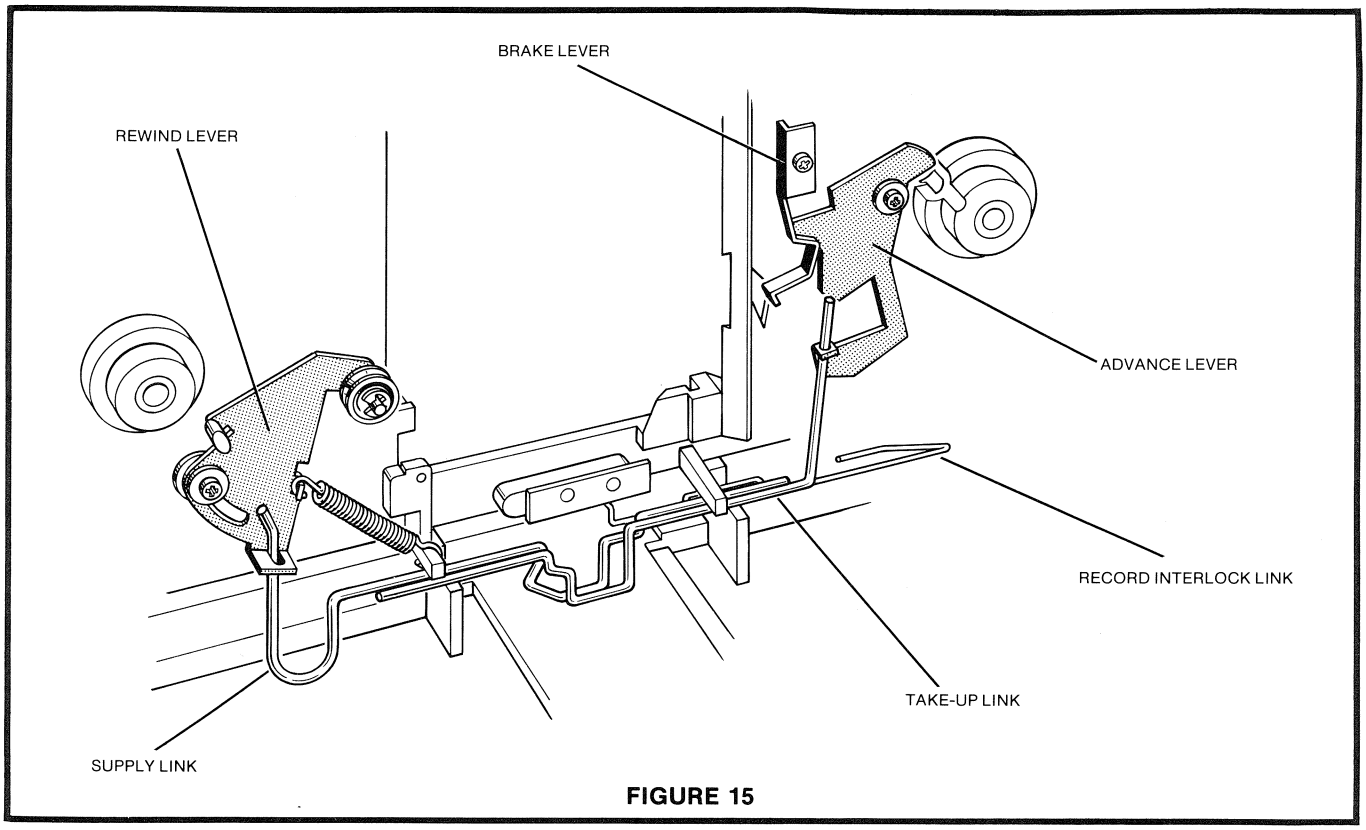


FIGURE 15

NOTE: Do not remove two small screws holding bracket to top of sound head. These screws hold sound head in proper alignent.

4. Loosen screw on mechanism plate holding sound cable, and pull cable out of mechanism.

5. Unplug connections to SOUND BOARD, Figure 3, and remove clip holding board to case.

6. Remove two screws holding JACK AND PLUG ASSEMBLY and move assembly out of case.

7. Unsolder sound board leads from VU meter.

8. Push RECORD INTERLOCK LINK, Figure 15, away from sound board and remove sound board from case.

9. Remove link by carefully working it out of case.

To replace:

1. Slide link into place behind control plate as shown, Figure 15.

2. With link positioned on sound board switch as shown, Figure 16, install sound board in case, keeping sound cable over post.

3. Install other parts in reverse order.

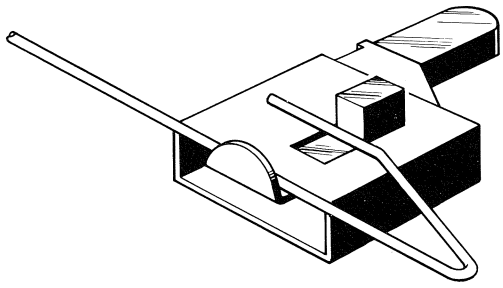


FIGURE 16

4. To connect sound cable leads to sound head, see Figure 4.

SOUND BOARD (*EKTASOUND* 235 Movie Projector)

To remove:

1. Pull off volume control knob on front of projector.

2. Remove two large screws holding SOUND HEAD ASSEMBLY to MECHANISM PLATE, Figure 2, lift assembly out, and unsolder sound cable leads from sound head.

NOTE: Do not remove two small screws holding bracket to top of sound head. These screws hold sound head in proper alignment.

3. Loosen screw on mechanism plate holding sound cable, and pull cable out of mechanism.

4. Unplug connections to SOUND BOARD, Figure 3, and remove clip holding board to case.

5. Remove two screws holding JACK AND PLUG ASSEMBLY, move assembly out of case, and remove sound board.

To replace:

1. Install parts in reverse order.

2. To connect sound cable leads to sound head, see Figure 4.

SURROUND

To remove:

1. Remove four screws holding MOTOR ASSEMBLY, Figure 3, and move assembly away from edge of case.

2. Pull out staples holding surround to case.

To replace:

1. Use ½-inch staples to attach surround.

2. Locate motor assembly on posts and fasten screws.

ADJUSTMENTS

See Figures 2 and 3 on front cover foldout for location of parts and assemblies.

LOOP SENSOR

1. Set projector in PROJECT position.

2. Push top of BELT WIREFORM, Figure 3, back toward CAM as far as it will go. Hold wireform in this position and adjust LOOP SENSOR so that bottom edge of sensor just touches CONTROL PLATE as shown, Figure 17.

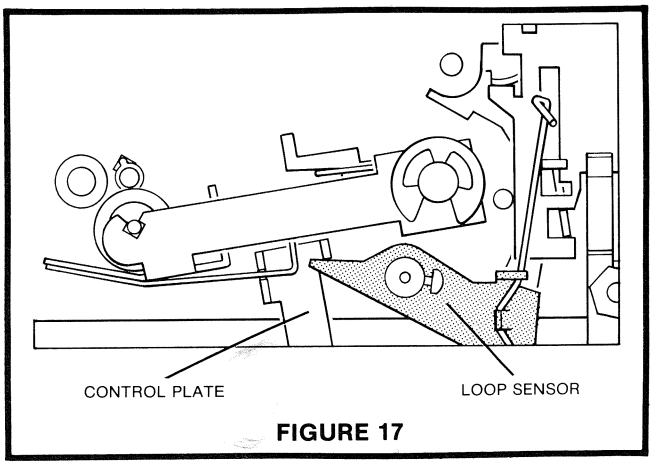


FIGURE 17

CLAW PROTRUSION

Claw protrusion should be .020 to .040 inch above aperture plate rails. To set claw protrusion, adjust claw retractor as follows:

1. Set projector in STILL position.

2. Turn nut on CAM, Figure 3, until nut is flush with top of post.

3. Rotate cam until CLAW SHOE is centered on CLAW RETRACTOR and CAM is in position shown, Figure 18.

4. Set projector in FAST FORWARD position.

5. Watch claw shoe and tighten nut on cam until claw shoe clicks into place on claw retractor; then tighten nut ¼ turn more. Do not push down on cam while tightening nut.

FRAMING

Minimum framing should be .015 inch above and below nominal image position in PROJECT position. To adjust framing, turn eccentric under FRAMING KNOB, Figure 2, with ½-inch wrench.

EVENNESS OF ILLUMINATION

1. Loosen two screws holding LAMP BRACKET ASSEMBLY, Figure 3, to case.

2. Rotate assembly and observe light output on a white, matte screen.

3. When illumination is balanced, tighten screws.

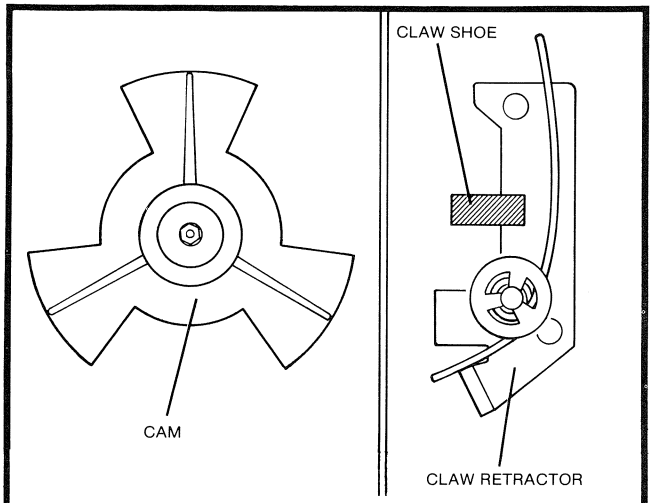


FIGURE 18

LUBRICATION

General Area	Lubrication Point	Lubricant
Framing Knob	Base and shank of stud	Plastilube #1 with 12% Moly (Pt. No. 763003)
Claw Retractor	Between retractor, stud, and mechanism plate; gate slide contact points	
Gate Slide	Claw retractor and control plate contact points; between gate slide and mechanism plate	
Safety Shutter	Between shutter, stud, mechanism plate, and gate slide	
Control Plate	Gate slide and mechanism plate contact points	
Claw	Claw shoe and two cam followers	
Cam	All surfaces; face of cam bearing	
Belt Wireform	Flywheel plate, bracket, and loop wireform contact points	
Loop Wireform	Belt wireform contact point; wireform holes on flywheel plate and mechanism plate	
Case	Link contact points (in slot, between guide posts, and bottom of case)	

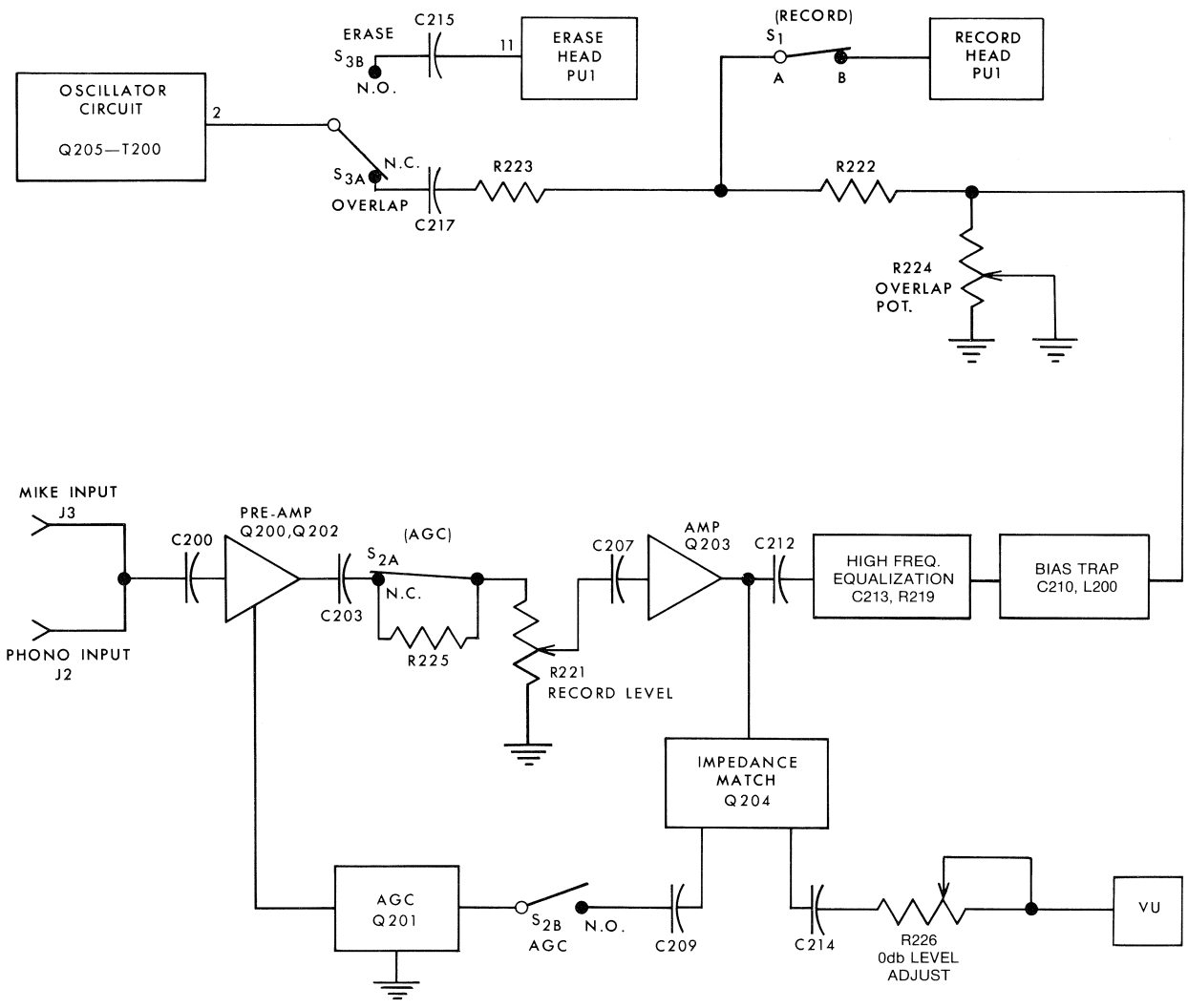
General Area	Lubrication Point	Lubricant
Links	All contact surfaces of record link, take-up link, and supply link	Plastilube #1 with 12% Moly (Pt. No. 763003)
Take-Up Spindle	Between spindle and sleeve	
Rewind Lever	Between supply link, case, rewind roller, and pivot	
Advance Lever	Between take-up link, advance roller stud, pivot, and brake lever	
Take-Up Reel Brake	Between brake and brake lever	
Elevation Nut	Between nut, control lever, and spring	
Control Lever	Between lever, stud, nut, links, and control plate; at on-off switch contact point	
Lamp Bracket	On lamp ejector where it contacts lamp	
Cam	Shutter shaft; between metal and nylon washers under cam	Anderol L 465 Oil * (Pt. No. 787806)
Motor	Idler pulley	
Cam	Between adjusting nut and large metal washer	SAE #20 Oil (Pt. No. 763001)
Control Lever	Between lever and control panel on projector front	
Supply Spindle	Between spindle and sleeve	Dow Corning F33 Grease (Pt. No. 787808)
Claw	Claw and shaft	NYE Rheolube with 10% Moly (Pt. No. 787811)
Lens	Barrel	Plastilube #1 (Pt. No. 763002)

* Must be used on parts indicated; must not be used anywhere else in projector.

SOUND SYSTEM

SEQUENCE OF OPERATION

When projector is operating properly, sequence of operation will occur as follows:



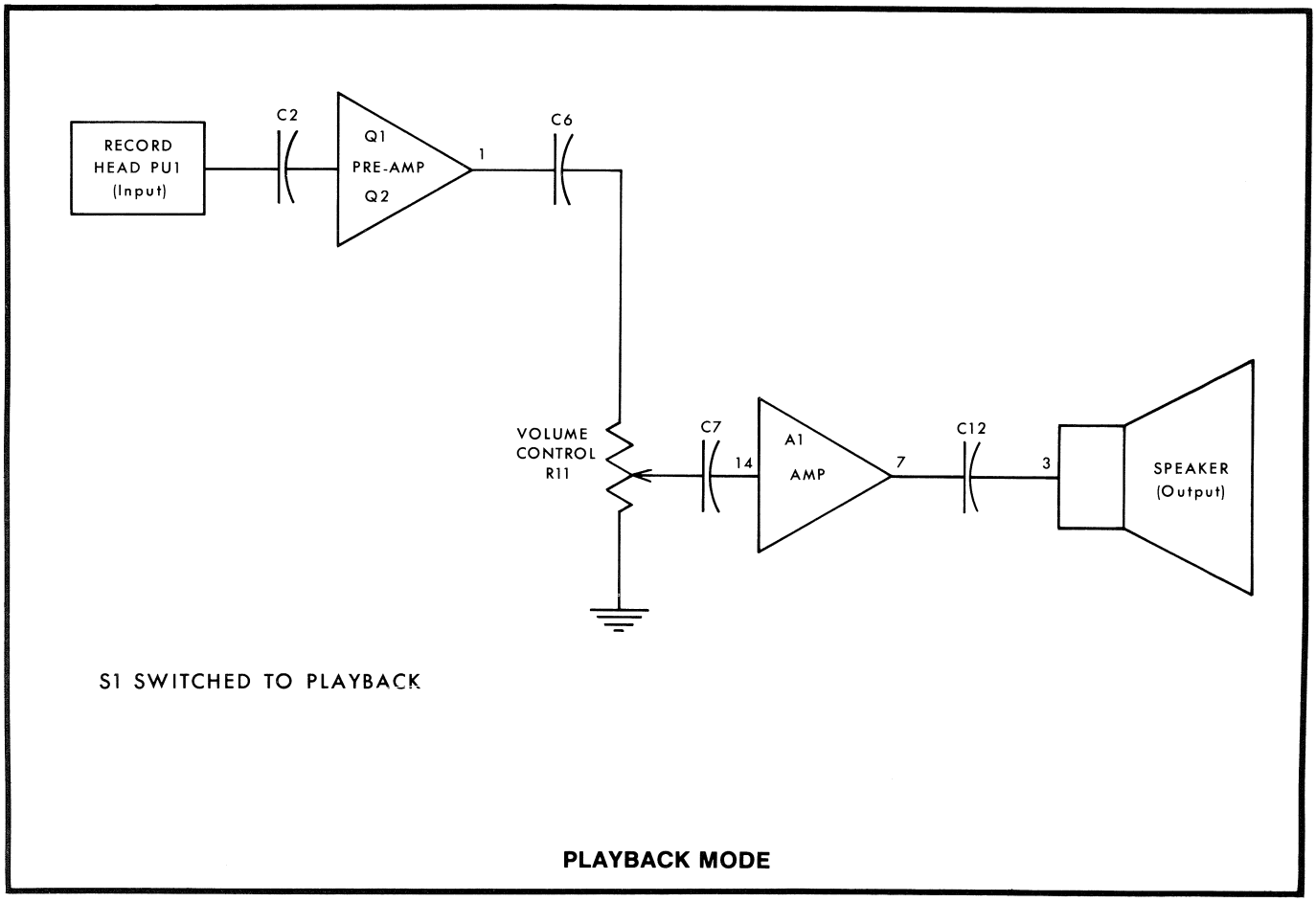
S1—RECORD/PB SWITCH

S2—AGC SWITCH

S3—RECORD/ERASE-OVERLAP SWITCH

NOTE: THE RECORD HEAD IS THE PLAYBACK INPUT AND RECORD OUTPUT.

RECORD MODE



PLAYBACK MODE

COMPONENT FUNCTIONS

System	Components	Functions
Playback	A1	Amplifier
	C1	RF filter (also matches preamplifier impedance to record head)
	C2, C6, C7, & C12	Coupling capacitors
	C3	Filter (minimizes audio variations in feedback)
	C5, C3, C8 & R10	Ripple filters
	C9	High frequency filter
	C10	Feedback capacitor (determines high frequency roll off of A1)
	Q1 & Q2	Preamplifier
	R1	Bias feedback resistor
	R4 & C4	Equalization feedback circuit
	R7 & R8	Feedback circuit (determines preamplifier gain of A1)
	R15	Current limiter

System	Components	Functions
Record (manual)	C200, C203, C207, C212, & C217	Coupling capacitors
	C201	Filter (minimizes audio variations in feedback)
	L200 & C210	Bias trap
	C213 & R219	Equalization circuit
	C218	Load for record head (full erase)
	C220	Feedback capacitor (prevents oscillations at high frequencies)
	Q200 & Q202	Preamplifier
	Q203	Power amplifier
	Q205	Bias oscillator
	R32	Dropping resistor (attenuates phono input)
	R201	Bias feedback resistor
	R204	Feedback resistor (prevents audio distortion)
	R221	Volume control
	R224	Overlap control
	R228	Load resistor (simulates microphone)
Automatic Gain Control	C202 & C209	Coupling capacitors
	C205 & R207	RC circuit (provides bias for Q201)
	CR200	Rectifier
	R225	Dropping resistor (replaces bypassed R221)
VU Meter	C214	Coupling capacitor
	C221	Filter capacitor (dampens meter movement)
	CR201	Rectifier
	Q204	Emitter follower
	R226	Variable resistor (calibrates VU meter)

PLAYBACK SYSTEM CHECKS

Make following checks with Super 8 Magnetic Multi-Purpose Test Film (Pt. No. 763135); locate test sections on film by referring to chart, opposite. When an 8-ohm load is indicated, connect an 8-ohm, 2-watt resistor in place of speaker.

Flutter:

Using flutter section of film, total flutter should not exceed 0.3 NAB (.55 DIN), weighted.

Power Output and Signal-to-Noise Ratio:

Using signal test section of film and an oscilloscope across an 8-ohm load, adjust volume control to point where clipping is no longer observed. Voltage across load should be 4 volts minimum. With film removed, voltage should be .25 volt maximum.

To minimize noise, adjust hum-bucking coil in sound head assembly. If coil is cylindrical, turn setscrew slug to make adjustment; if coil is spherical, rotate coil to make adjustment.

Frequency Response:

Using frequency response section of film, adjust volume control for 1-volt output at 400 Hz across an 8-ohm load. Output at other frequencies should be as follows:

Frequency (Hz)	Output (db)
400	0 Reference
100	-6 to +1
3000	-3 to +5
5000	-5 to +3

RECORD SYSTEM CHECKS

To make db readings on VU meter, refer to Figure 19. When an 8-ohm load is indicated, connect an 8-ohm, 2-watt resistor in place of speaker.

VU Meter:

Thread projector with Super 8 Magnetic Multi-Purpose Test Film (Pt. No. 763135). Using signal test section of film (see chart, opposite), adjust volume control for 2.5-volt output across an 8-ohm load. Leave volume control at this setting and replace film with Super 8 Unrecorded Magnetic Test Film (Pt. No. 762236). Record a 400 Hz, 500-millivolt signal through the phono jack with record level adjusted for 0 db on VU meter. When recording is played back, output level should be 2.5 volts +1 volt -.5 volt.

To adjust meter, see page 20.

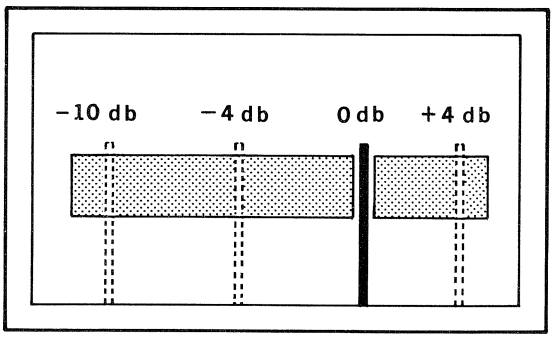
Record/Playback Frequency Response:

Thread projector with Super 8 Unrecorded Magnetic Test Film (Pt. No. 762236). With a 400 Hz, 500-millivolt signal in the phono jack, adjust record level for -10 db on VU meter and record the following frequencies at a constant 500-millivolt input: 400 Hz, 100 Hz, 3000 Hz,

SUPER 8 MAGNETIC MULTI-PURPOSE TEST FILM (PT. NO. 763135)

Test Purpose	Frequency (Hz)	Length of Recording (seconds)*
Start of Test	3000	1
—	0	6
Signal Test	400	12
Signal-to-Noise	0	15
Multi-Frequency Reference	400	12
—	0	2
Frequency Response	100	10
—	0	2
Frequency Response	3000	10
—	0	2
Flutter	3000	12
—	0	2
Frequency Response	5000	10
—	0	2
Multi-Frequency Response	400	8
—	0	2
Voice Sample	Voice	11
Music Sample	Wide-Band Music	22
End of Test	0	8

*Normal times. Total should not exceed 149 seconds.



VU METER SCALE

FIGURE 19

and 5000 Hz. Play back the recording and adjust volume control for a 1-volt output at 400 Hz across an 8-ohm load. Output at other frequencies should be as follows:

Frequency (Hz)	Output (db)
400	0 Reference
100	-6 to +2
3000	-4 to +6
5000	-6 to +6

Automatic Gain Control (AGC):

Record Level - With record level knob turned fully clockwise to AUTO and a 400 Hz, 3.5-millivolt signal into the microphone jack, VU meter should read 0 db ±4 db.

Record Level/Input Level Transfer Characteristics - Using Super 8 Unrecorded Magnetic Test Film (Pt. No. 762236), turn record level knob fully clockwise to AUTO and record a 400 Hz, 10-millivolt signal and a 400 Hz, 100-microvolt signal through the microphone jack. Play back the recording and adjust volume control during 10-millivolt section for a 2.5-volt output across an 8-ohm load; output level during 100-microvolt section should be -12 db ±4 db.

Overlap Recording:

Thread projector with Super 8 Unrecorded Magnetic Test Film (Pt. No. 762236). With a 400 Hz, 500-millivolt signal in the phono jack, adjust record level for 0 db on VU meter and record three sections of film with erase level set as follows:

Section 1 - Erase level knob turned fully clockwise to FULL.

Section 2 - Erase level knob turned clockwise as far as it will go without clicking into FULL.

Section 3 - Erase level knob turned fully counterclockwise to OFF.

Play back the recording and check as follows:

Section 1 - Adjust volume control for a 2.5-volt output across 8-ohm load (0 db reference).

Section 2 - Output level should be 1 db ±1 db.

Section 3 - With output changed to speaker loading and volume control turned fully clockwise, there should be no audible trace of 400 Hz signal and maximum erase output level should be -6 db ±3 db.

Overlap Erasing:

Thread projector with film upon which a 400 Hz signal has been recorded. Adjust record level for 0 db on VU meter and run projector as follows to produce four sections of film:

Section 1 - Projector in playback; erase level knob turned fully clockwise to FULL.

Section 2 - Projector in record; erase level knob turned fully counterclockwise to OFF.

Section 3 - Projector in record; erase level knob turned clockwise as far as it will go without clicking into FULL.

Section 4 - Projector in record; erase level knob turned fully clockwise to FULL.

Play back the recording and check as follows:

Section 1 - Adjust volume control for a 2.5-volt output across 8-ohm load (0 db reference).

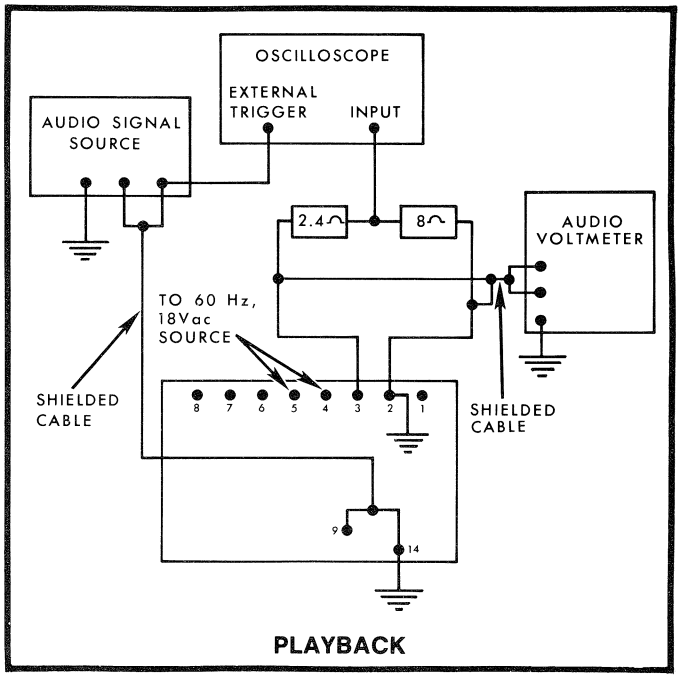
Section 2 - Output level should be 0 db ±1 db.

Section 3 - Output level should be -10 db ±4 db.

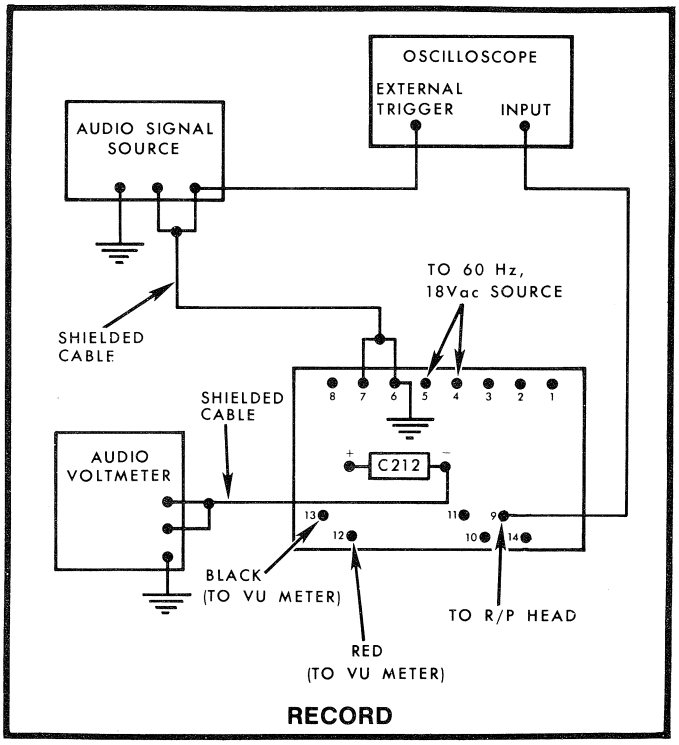
Section 4 - With output changed to speaker loading and volume control turned fully clockwise, there should be no audible trace of 400 Hz signal.

SOUND BOARD ADJUSTMENTS AND TEST POINTS

For minimum 60 Hz noise, connect test equipment to sound board as shown:



PLAYBACK

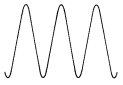


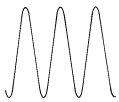
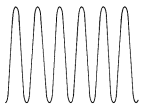
RECORD

VU Meter Calibration:
Connect test equipment as shown, with an audio voltmeter connected to negative side of C212. Apply a 400 Hz, 960-millivolt signal to phono jack and adjust record level for 960 millivolts on audio voltmeter. Then adjust R226 for 0 db on VU meter.

Bias Peaking Adjustment:
Turn erase level knob clockwise as far as it will go without clicking into FULL. Connect an oscilloscope to Pin 9 and adjust L200 and T200 for a minimum output of 58 volts peak-to-peak.

Test Points:
The chart that follows shows waveforms that should be obtained at each test point on the schematics (see pages 25 and 27). Make tests under the conditions indicated and check waveforms for distortion.

Test Point	Conditions	Waveform
1	60 Hz, 18 V input to Pins 4 and 5	 200 mV P-P, 120 Hz (25 V dc reference)
2	400 Hz, 1 mV input to Pins 9 and 14; volume control set for 4 V rms output	 11.3 V P-P, 400 Hz
3	400 Hz, 1 mV input to Pins 9 and 14; volume control set for 4 V rms output	 20 mV P-P, 400 Hz
4	400 Hz, 1 mV input to Pins 9 and 14; volume control set for 4 V rms output	 4 V P-P, 400 Hz
5	400 Hz, 600 mV input to phono jack; record switch pushed in; record level knob turned clockwise as far as it will go without clicking into AUTO	 45 mV P-P, 400 Hz
6	400 Hz, 600 mV input to phono jack; record switch pushed in; record level knob turned fully clockwise to AUTO	 300 mV P-P, 400 Hz
7	400 Hz, 600 mV input to phono jack; record switch pushed in; record level knob turned clockwise as far as it will go without clicking into AUTO	 4.4 V P-P, 400 Hz
8	400 Hz, 600 mV input to phono jack; record switch pushed in; record level knob turned fully clockwise to AUTO	 3.8 V P-P, 400 Hz

Test Point	Conditions	Waveform
9	400 Hz, 600 mV input to phono jack; record switch pushed in; record level adjusted to point where clipping no longer observed	 18 V P-P, 400 Hz
10	400 Hz, 20 mV input to phono jack; record switch pushed in; record level knob turned clockwise as far as it will go without clicking into AUTO	 1.6 V P-P, 400 Hz
11	400 Hz, 600 mV input to phono jack; record switch pushed in; record level knob turned fully clockwise to AUTO	 3.6 V P-P, 400 Hz
12	400 Hz, 600 mV input to phono jack; record switch pushed in; record level adjusted to point where clipping no longer observed	 6 V P-P, 400 Hz
13	No input; record switch pushed in; erase level knob turned fully clockwise to FULL	 10 V P-P, 30 KHz
14	No input; record switch pushed in; erase level knob turned fully clockwise to FULL	 60 V P-P, 30 KHz
15	No input; record switch pushed in; erase level knob turned fully clockwise to FULL	 2.2 V P-P, 30 KHz
16	No input; record switch pushed in; erase level knob turned clockwise as far as it will go without clicking into FULL	 60 V P-P, 30 KHz
17	No input; record switch pushed in; erase level knob turned fully counterclockwise to OFF	 9 V P-P, 30 KHz
18	No input; record switch pushed in; erase level knob set at middle of its range of travel	 30 V P-P, 30 KHz
19	No input; record switch pushed in; erase level knob turned fully clockwise to FULL	 60 V P-P, 30 KHz

SPECIFICATIONS AND STANDARDS

NOTE: See "Projector Operation" on page 6 for instructions on threading, projecting, and recording sound.

GENERAL CONDITIONS (POWER CORD DISCONNECTED)

Dust Cover:

Should be possible to remove and replace cover without damage.

Lens Cover:

Should be held in place securely; should be possible to remove and replace cover without damage.

Film Track Cover:

Should be held in place securely; should not cause snubber or framing knob to bind.

Lamp Door:

Should be possible to remove and replace door without damage.

Focus Knob:

Should not bind; should move lens through its full range of travel.

Projection Mirror:

Should be clean and free from imperfections; should rotate easily and be held in each of its two detent positions securely.

Supply Spindle:

Should accept Kodak reels regardless of driving key orientation; should detent into all three positions.

Film Contact Surfaces:

All surfaces over which film passes (including snubber, aperture plate, rewind guide, pressure pad, sound head, and pressure roller) should be free from imperfections which could damage film.

Dielectric Strength:

Projector must withstand 900 volts rms, 60 Hz applied between shorted prongs of power cord and projector frame for one minute.

Claw Protrusion:

Should be .020 to .040 inch above aperture rails. (Protrusion is set by claw retractor adjustment; if claw retractor has been properly adjusted, claw protrusion will be correct.)

Pressure Pad Force:

Should be 6 ounces minimum and 8 ounces maximum on push-pull scale when one thickness of film is in gate.

GENERAL OPERATION

Control Lever:

Should operate easily to and from all five positions without binding.

Elevation Wheel:

Action should be smooth and without binds; wheel should not slip while projector is running.

Mechanism:

Should be free-running, with no excessive noise or roughness.

Aperture Edges:

Should be square and free from burrs and dirt when aperture image is focused on screen and no film is in projector.

Side Guide Force:

Should be 1.5 to 3.5 ounces against film when measured on push-pull scale during forward and still projection. In rewind, all side guide forces should be removed from film.

Projection Speed:

At 110 to 125 volts, 60 Hz, speed should be 1080 rpm ± 60 rpm at 18 fps and 1440 rpm ±60 rpm at 24 fps. To measure speed, use a stroboscope on the claw.

Take-Up Reel Tension:

Should be ¾ ounce ±¼ ounce during forward projection. To measure, attach a push-pull scale to a length of film wound around take-up reel.

OPERATION WITH FILM

NOTE: Chart, opposite, explains use of Super 8 Registration Test Film

Steadiness:

Using Super 8 Registration Test Film (Pt. No. 762024), vertical unsteadiness should not exceed .001 inch and horizontal unsteadiness should not exceed .0005 inch during forward projection.

Travel Ghost:

Maximum acceptable travel ghost is 25% of frame width (top or bottom) when film is projected on a 30 x 40-inch screen and viewed at 13 feet in a darkened room. (If zoom lens is on projector, set lens at wide angle.)

Framing:

Using Super 8 Registration Test Film (Pt. No. 762024), minimum framing should be .015 inch above and below nominal image position in forward projection. Slight focus shift during framing is permissible.

Aperture Squaring (Focus Balance):

Using Super 8 Registration Test Film (Pt. No. 762024), maximum out-of-squareness at best center focus should not exceed three "a's" difference. (If zoom lens is on projector, set lens at wide angle.)

Aperture Centering:

Using Super 8 Registration Test Film (Pt. No. 762024), nominal image position should be within .003 inch of nominal aperture size border on film.

SUPER 8 REGISTRATION TEST FILM (PT. NO. 762024)

Steadiness:

Measure with solid border lines (.001 inch thick) or four wedges that taper from .002 inch to 0 inch thick.

Framing:

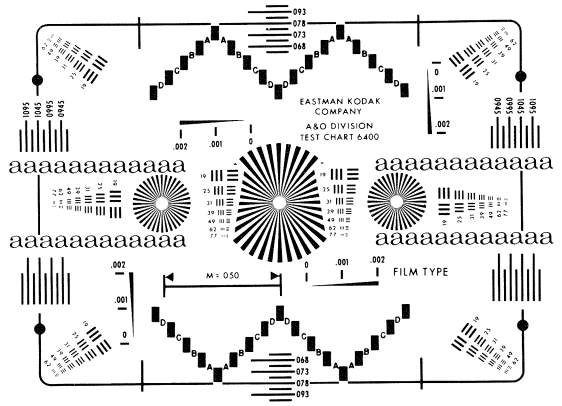
Measure with lines and blocks at frame edges, both top and bottom. Longer lines are .005 inch apart; blocks are .007 inch high.

Aperture Squaring:

Check by counting number of "a's" at each side of frame.

Aperture Centering:

Measure with lines at frame edges; longer lines are .005 inch apart. The outline border is the nominal aperture size.



Film Scratching:

After 50 passes in forward projection and rewind, Super 8 Scratch Test Film (Pt. No. 762056) should exhibit no consistent or repeated scratches in the projected area due to the projector.

Still Projection:

With a new lamp and line voltage of 125 volts, there should be no objectionable embossing of Super 8 Registration Test Film (Pt. No. 762024) after one minute of still projection.

Fast Forward:

Pressure pad and sound pressure roller should open and film should move rapidly to take-up reel in fast forward. When control lever is moved to still position, brake should stop take-up reel without spilling film. Maximum time for transferring a full, 400-foot reel of film from reel to reel in fast forward should be 60 seconds.

Rewind:

Pressure pad and sound pressure roller should open and film should move rapidly to supply reel in rewind. When control lever is moved to still position, brake should stop supply reel without spilling film. Maximum time for transferring a full, 400-foot reel of film from reel to reel in rewind should be 60 seconds.

SOUND SYSTEM - PLAY BACK

Sound Head and Pressure Roller:

Sound gate pressure pad force should be 3 ounces ± ½ ounce when measured at link with push-pull scale during forward projection.

Volume Control:

Should adjust amplifier gain smoothly and continuously, without audible noise in speaker.

Flutter:

Using flutter section of Super 8 Magnetic Multi-Purpose Test Film (Pt. No. 763135), total flutter should not exceed 0.3 NAB (.55 DIN), weighted.

Power Output and Signal-to-Noise Ratio:

Using signal test section of Super 8 Magnetic Multi-Purpose Test Film (Pt. No. 763135), minimum output without clipping should be 4 volts. With volume control set at output level of 4 volts, remove test film: maximum voltage should be .25 volt.

Frequency Response:

Using frequency response section of Super 8 Magnetic Multi-Purpose Test Film (Pt. No. 763135), adjust volume control for 1-volt output at 400 Hz. Output at other frequencies should be as follows:

Frequency (Hz)	Output (db)
400	0 Reference
100	-6 to +1
3000	-3 to +5
5000	-5 to +3

Noise:

There should be no objectionable "pop" through the speaker when moving control lever from one position to another.

SOUND SYSTEM - RECORDING

NOTE: To make db readings on VU meter, refer to Figure 19.

VU Meter:

Using signal test section of Super 8 Magnetic Multi-Purpose Test Film (Pt. No. 763135), adjust volume control for 2.5-volt output. Leave volume control at this setting and replace film with Super 8 Unrecorded Magnetic Test Film (Pt. No. 762236). Record a 400 Hz, 500-millivolt signal through the phono jack with record level adjusted for 0 db on VU meter. When recording is played back, output level should be 2.5 volts +1 volt -.5 volt.

Record/Playback Frequency Response:

Thread projector with Super 8 Unrecorded Magnetic Test Film (Pt. No. 762236). With a 400 Hz, 500-millivolt signal in the phono jack, adjust record level for -10 db on VU meter and record the following frequencies at a constant 500-millivolt input: 400 Hz, 100 Hz, 3000 Hz, and 5000 Hz. Play back the recording and adjust volume control for 1-volt output at 400 Hz. Output at other frequencies should be as follows:

Frequency (Hz)	Output (db)
400	0 Reference
100	- 6 to +2
3000	- 4 to +6
5000	- 6 to +6

Automatic Gain Control:

Record Level - With record level knob turned fully clockwise to AUTO and a 400 Hz, 3.5-millivolt signal in the microphone jack, VU meter should read 0 db ±4 db.

Record Level/Input Level Transfer Characteristics - Using Super 8 Unrecorded Magnetic Test Film (Pt. No. 762236), turn record level knob fully clockwise to AUTO and record a 400 Hz, 10-millivolt signal and a 400 Hz, 100-microvolt signal through the microphone jack. Play back the recording and adjust volume control during 10-millivolt section for 2.5-volt output; output level during 100-microvolt section should be -12 db ± 4 db.

Overlap Recording:

Thread projector with Super 8 Unrecorded Magnetic Test Film (Pt. No. 762236). With a 400 Hz, 500-millivolt signal in the phono jack, adjust record level for 0 db on VU meter and record three sections of film with erase level set as follows:

Section 1 - Erase level knob turned fully clockwise to FULL.

Section 2 - Erase level knob turned clockwise as far as it will go without clicking into FULL.

Section 3 - Erase level knob turned fully counterclockwise to OFF.

Play back the recording and check as follows:

Section 1 - Adjust volume control for a 2.5-volt output (0 db reference).

Section 2 - Output level should be 1 db ±1 db.

Section 3 - With output changed to speaker loading and volume control turned fully clockwise, there should be no audible trace of 400 Hz signal and maximum erase output level should be -6 db ±3 db.

Overlap Erasing:

Thread projector with film upon which a 400 Hz signal has been recorded. Adjust record level for 0 db on VU meter and run projector as follows to produce four sections of film:

Section 1 - Projector in playback; erase level knob turned fully clockwise to FULL.

Section 2 - Projector in record; erase level knob turned fully counterclockwise to OFF.

Section 3 - Projector in record; erase level knob turned clockwise as far as it will go without clicking into FULL.

Section 4 - Projector in record; erase level knob turned fully clockwise to FULL.

Play back the recording and check as follows:

Section 1 - Adjust volume control for a 2.5-volt output (0 db reference).

Section 2 - Output level should be 0 db ± 1 db.

Section 3 - Output level should be -10 db ±4 db.

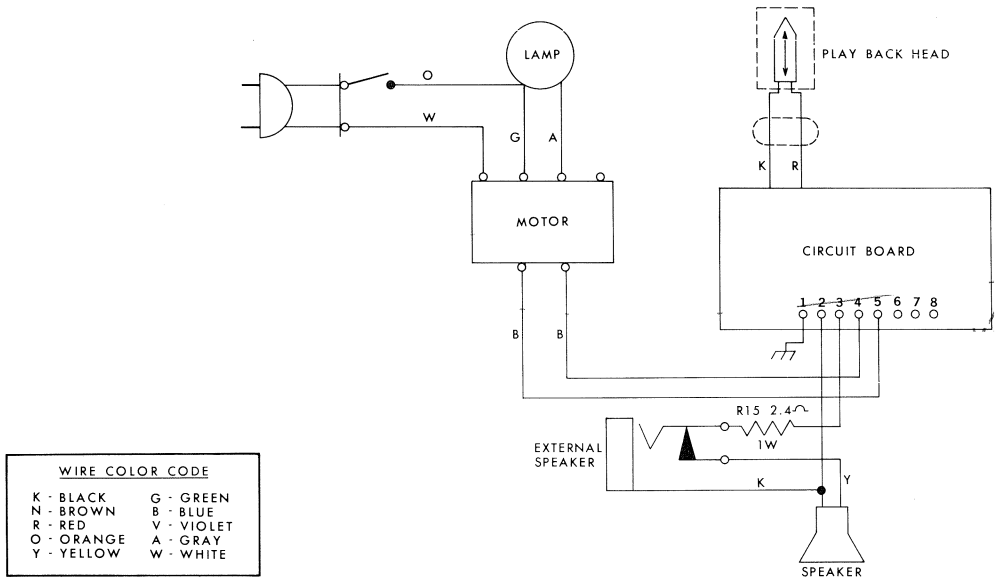
Section 4 - With output changed to speaker loading and volume control turned fully clockwise, there should be no audible trace of 400 Hz signal.

WIRING DIAGRAM

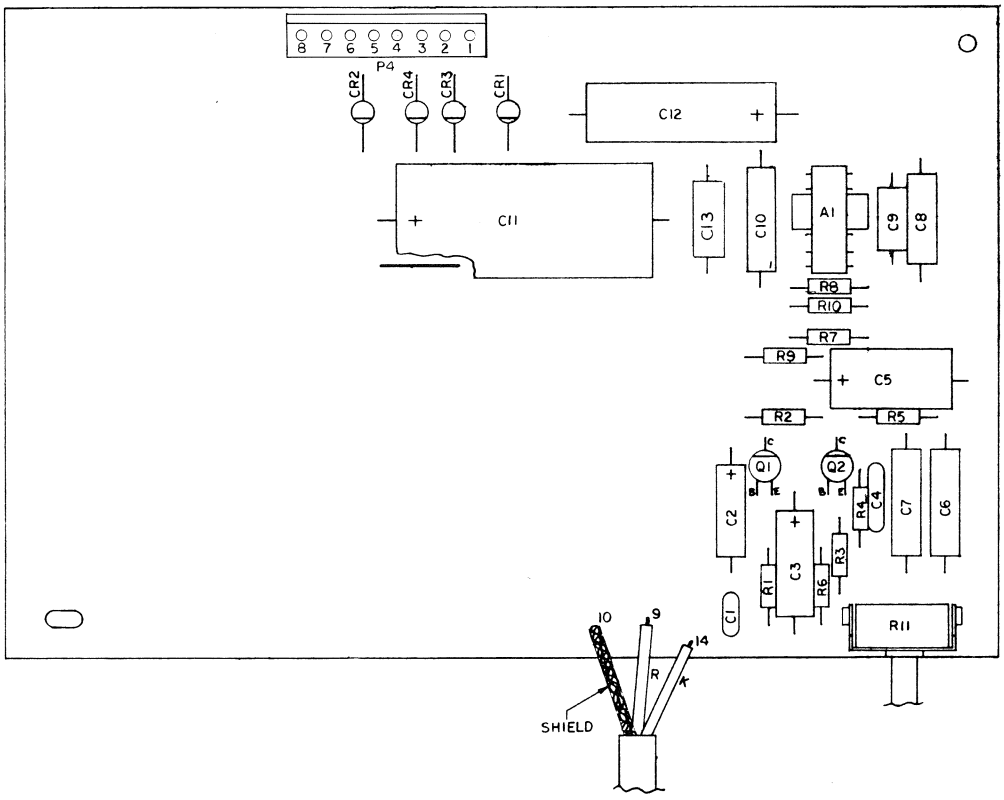
COMPONENT LAYOUT DIAGRAM

SCHEMATIC DIAGRAM

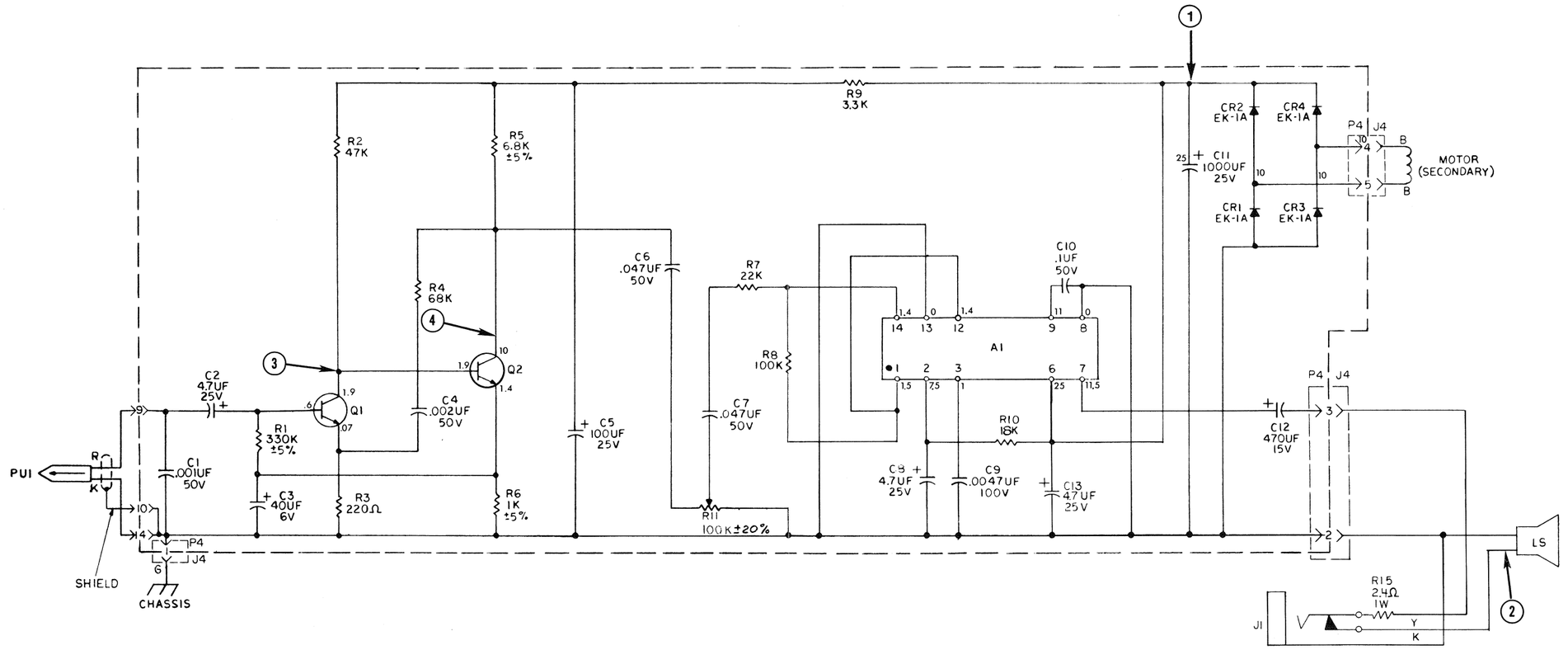
KODAK EKTASOUND 235 Movie Projector



Wiring Diagram - KODAK EKTASOUND 235 Movie Projector



Component Layout - KODAK EKTASOUND 235 Movie Projector



NOTES:

1. **ALL RESISTORS ARE ± 10%, ¼ WATT UNLESS OTHERWISE SPECIFIED.**
2. **NUMBERS 1, 2, 3, 4, 5, 9, 10, AND 14 ARE PRINTED CIRCUIT BOARD TERMINATIONS.**
3. **DC VOLTAGES ARE READ WITH RESPECT TO CHASSIS GROUND, WITH A 150 MICROVOLT, 400 HZ SIGNAL APPLIED TO PLAYBACK HEAD.**

◯ = **TEST POINTS (SEE PAGES 20 AND 21).**

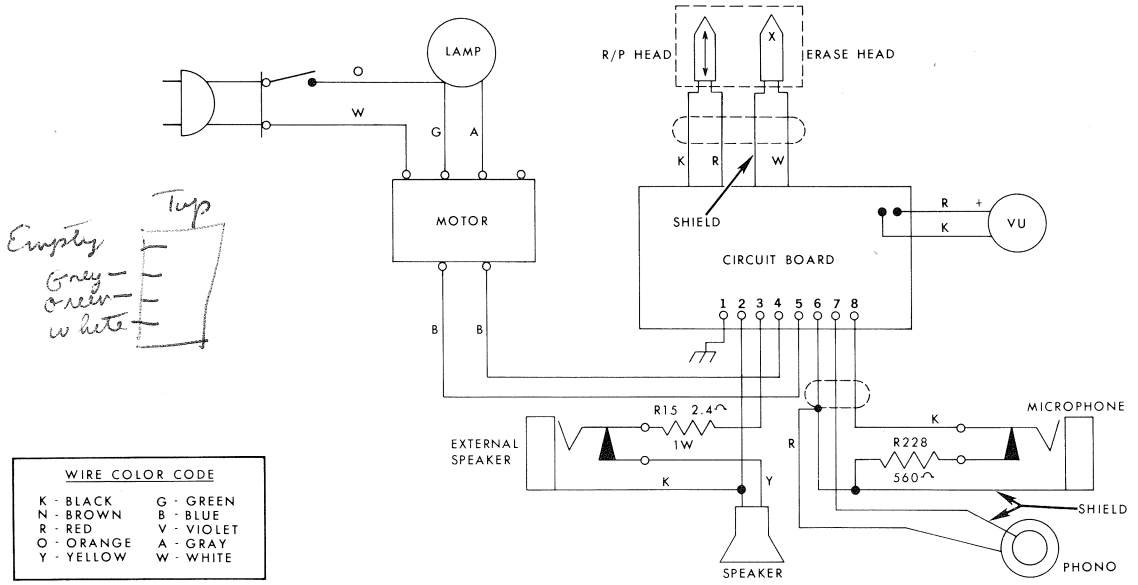
Schematic Diagram - KODAK EKTASOUND 235 Movie Projector

WIRING DIAGRAM

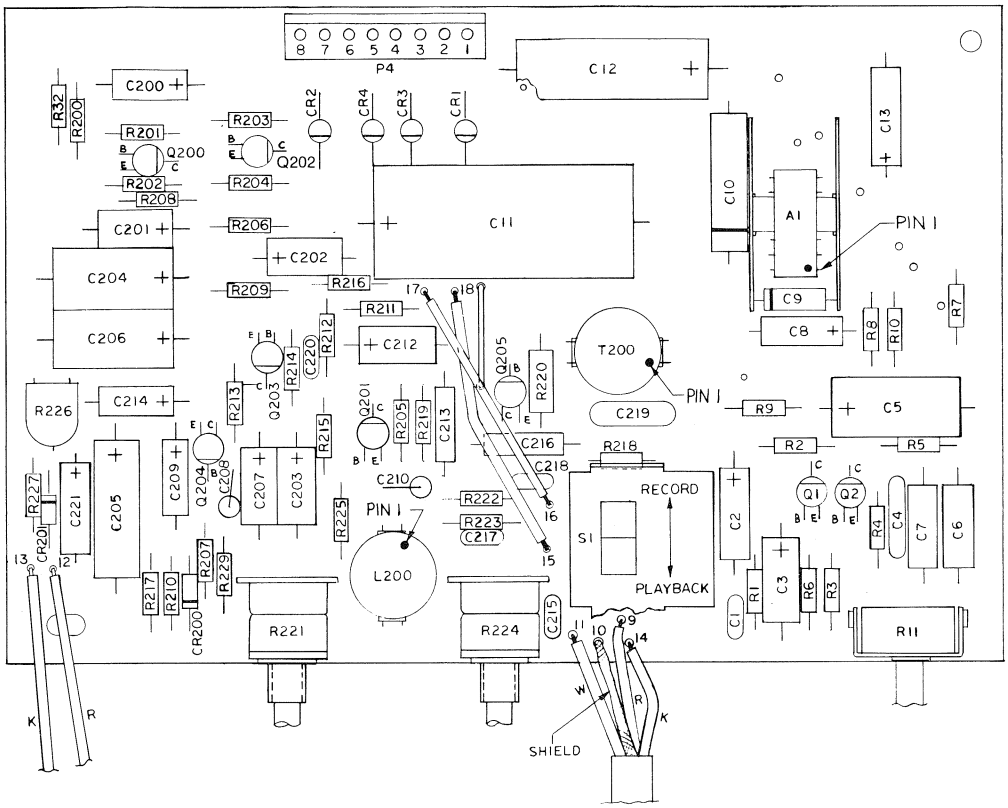
COMPONENT LAYOUT DIAGRAM

SCHEMATIC DIAGRAM

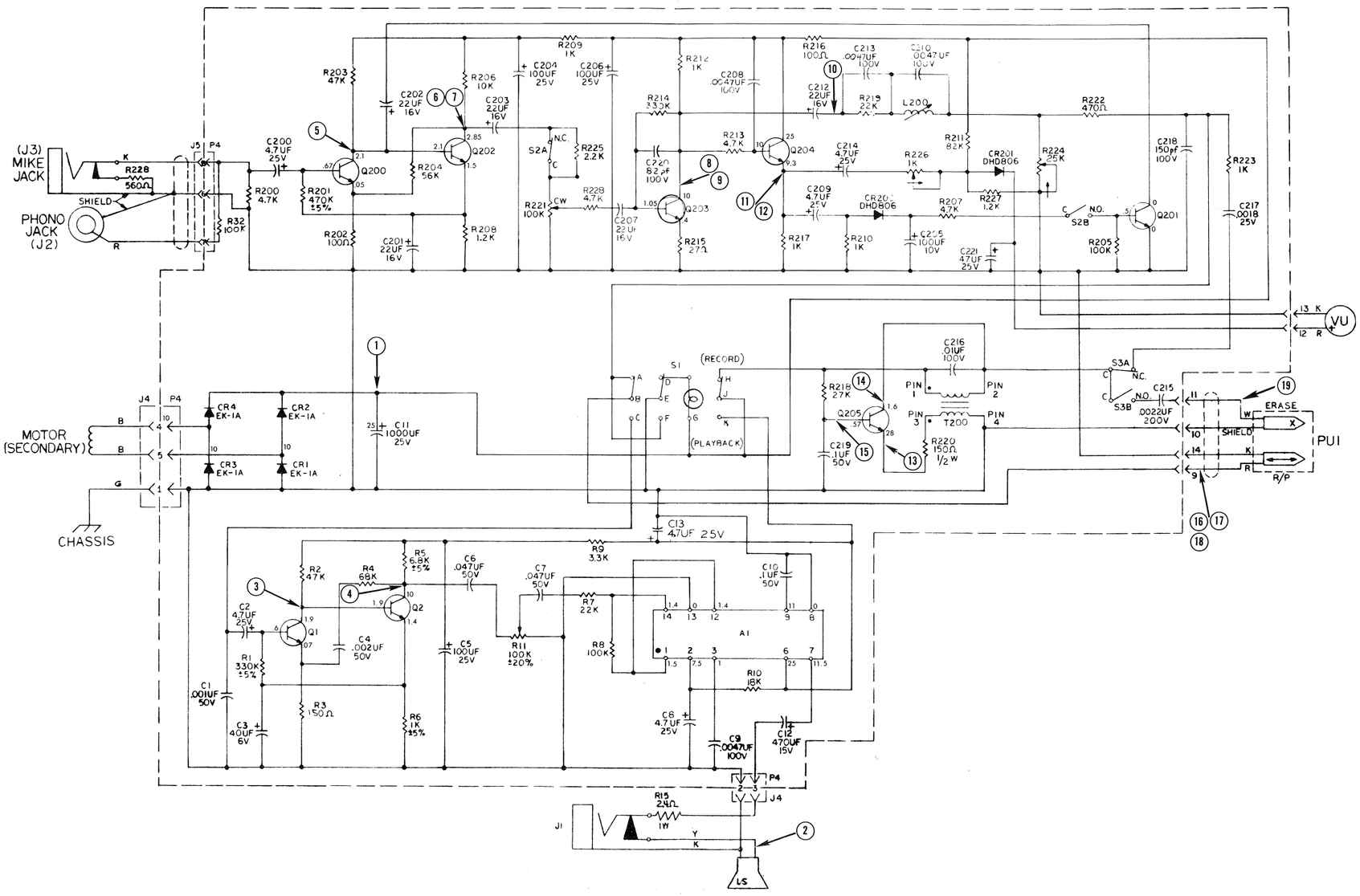
KODAK EKTASOUND 245 Movie Projector



Wiring Diagram - KODAK EKTASOUND 245 Movie Projector



Component Layout - KODAK EKTASOUND 245 Movie Projector



NOTES:

1. ALL RESISTORS ARE ± 10%, ¼ WATT UNLESS OTHERWISE SPECIFIED.
2. NUMBERS 1 THROUGH 14 ARE PRINTED CIRCUIT BOARD TERMINATIONS.
3. S2 IS ON REAR OF R221 AND SHOWN IN MANUAL RECORD POSITION.
4. S3 IS ON REAR OF R224 AND SHOWN IN OVERLAP RECORD POSITION.
5. DC VOLTAGES ARE READ WITH RESPECT TO CHASSIS GROUND.
6. RECORD SECTION VOLTAGES ARE READ WITH A 20 MILLIVOLT, 400 HZ SIGNAL APPLIED TO PHONO JACK.
7. PLAY BACK SECTION VOLTAGES ARE READ WITH A 150 MICROVOLT, 400 HZ SIGNAL APPLIED TO PLAYBACK HEAD.

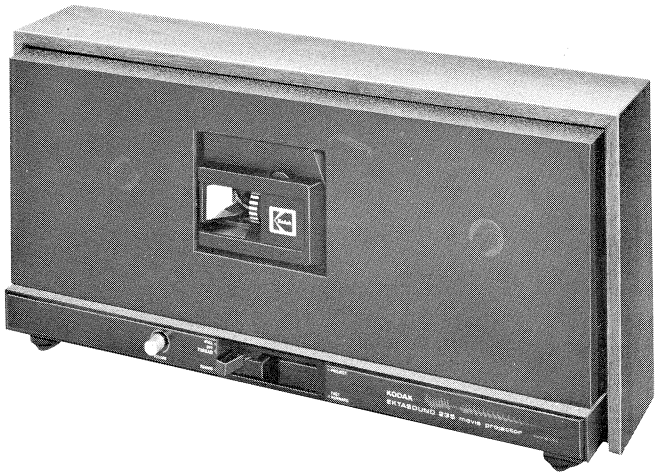
◯ = TEST POINTS (SEE PAGES 20 AND 21).

Schematic Diagram - KODAK EKTASOUND 245 Movie Projector

OCTOBER 1973

PARTS LIST NO. 775334

KODAK EKTASOUND 235 and 245 Movie Projectors



Order parts from

Eastman Kodak Company, Central Parts Service
800 Lee Road, Rochester, New York 14650

Order by PART NUMBER

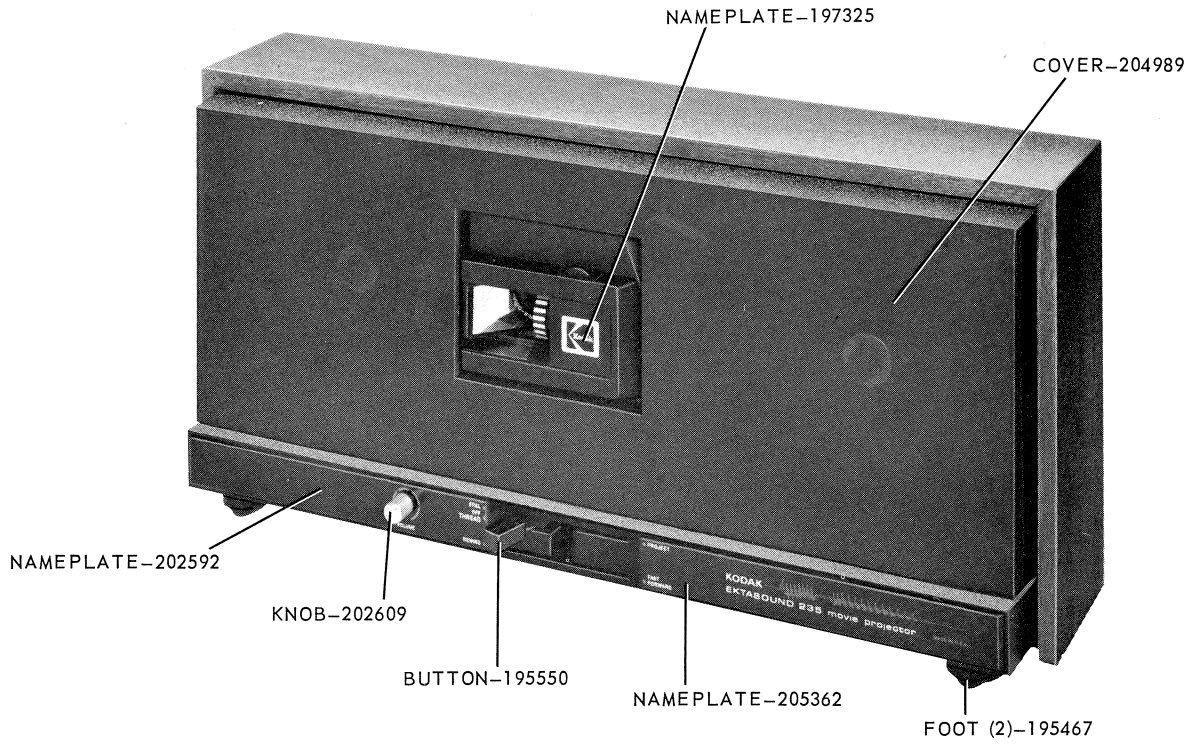


FIGURE 1 (MODEL 235 ONLY)

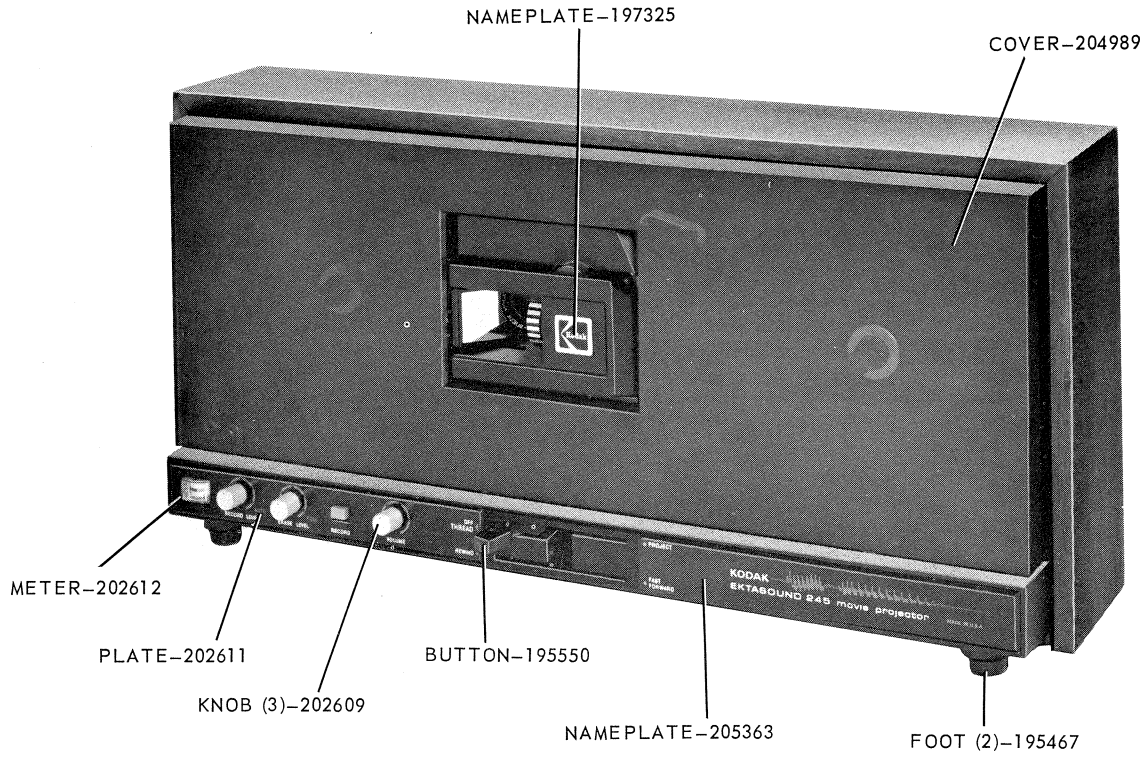


FIGURE 2 (MODEL 245 ONLY)

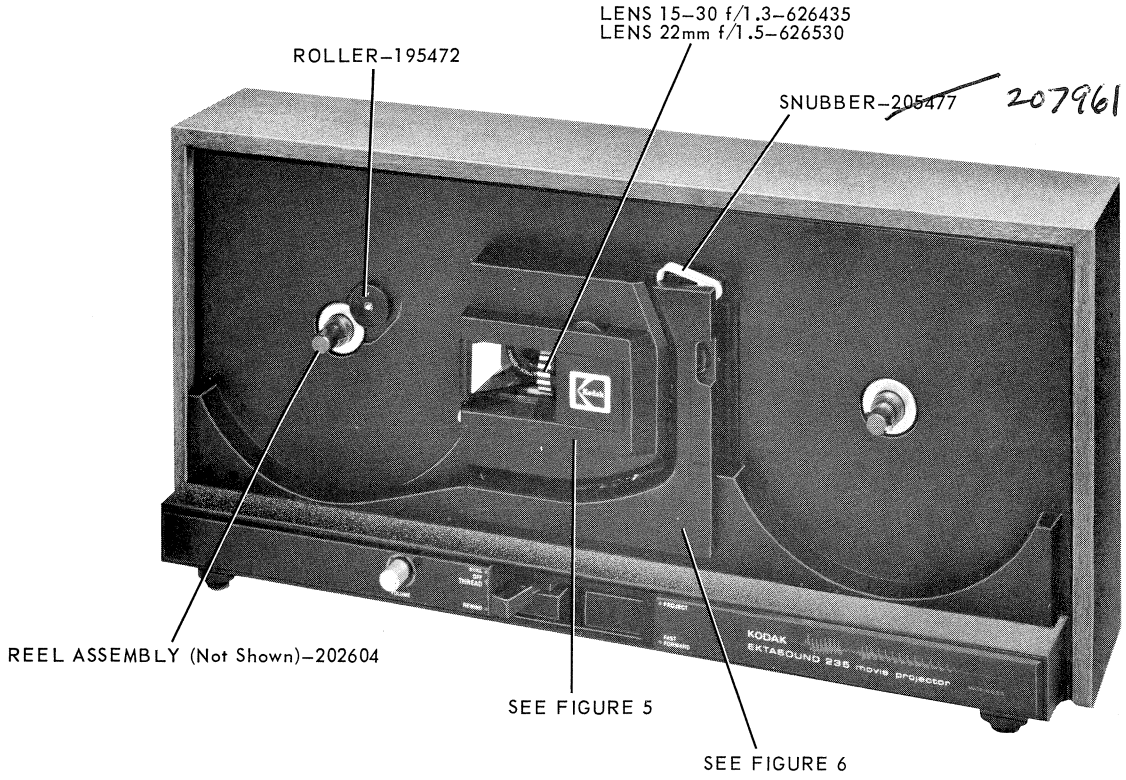


FIGURE 3 (MODEL 235 ONLY)

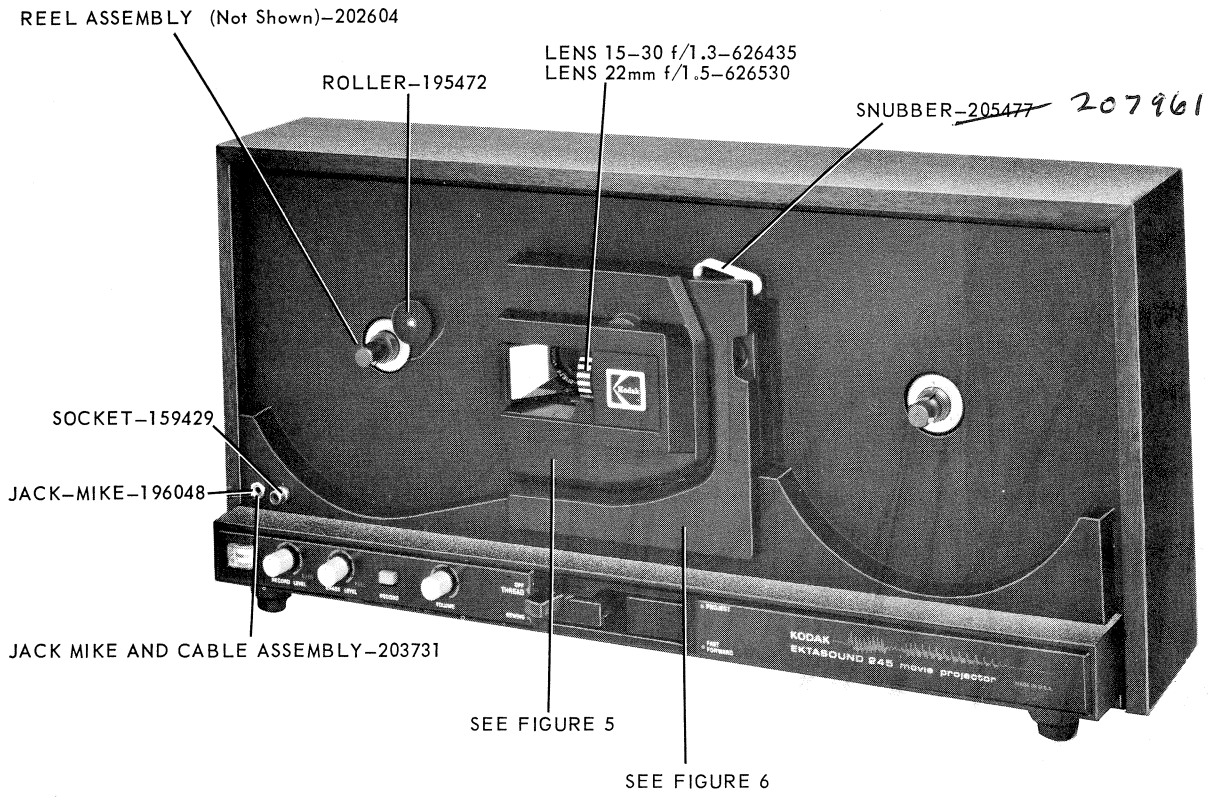


FIGURE 4 (MODEL 245 ONLY)

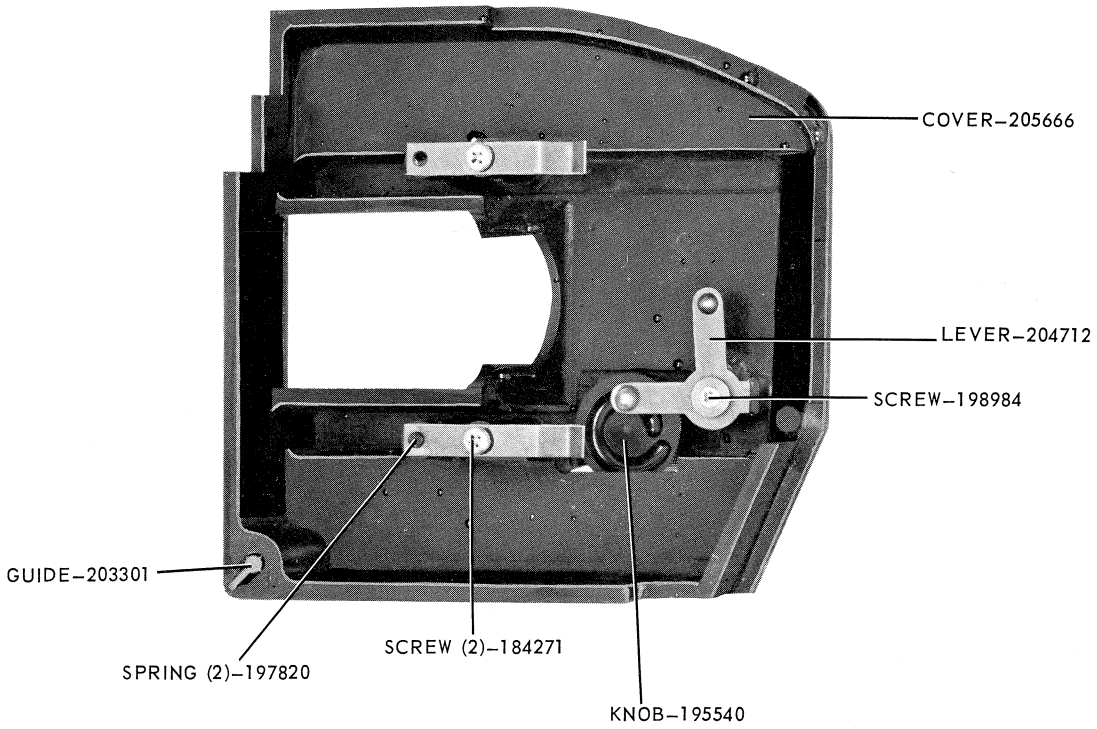


FIGURE 5

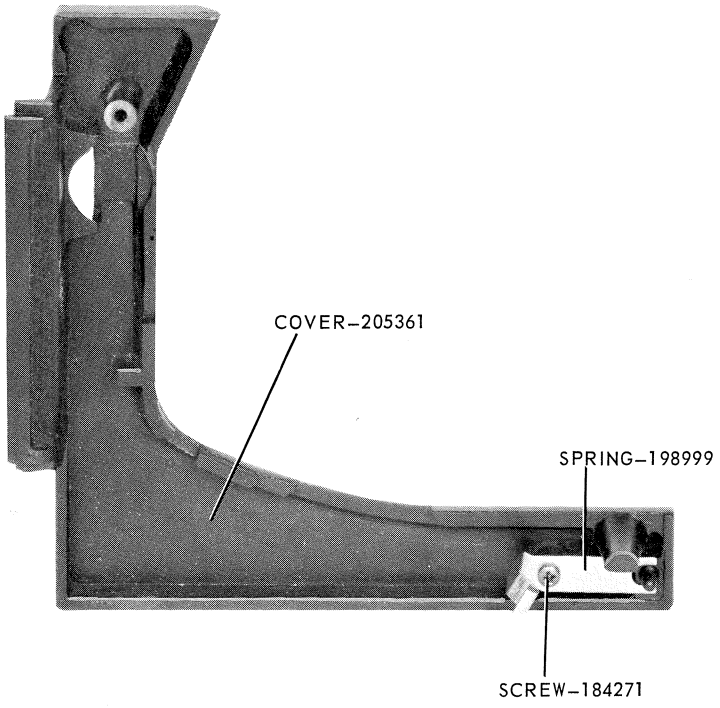


FIGURE 6

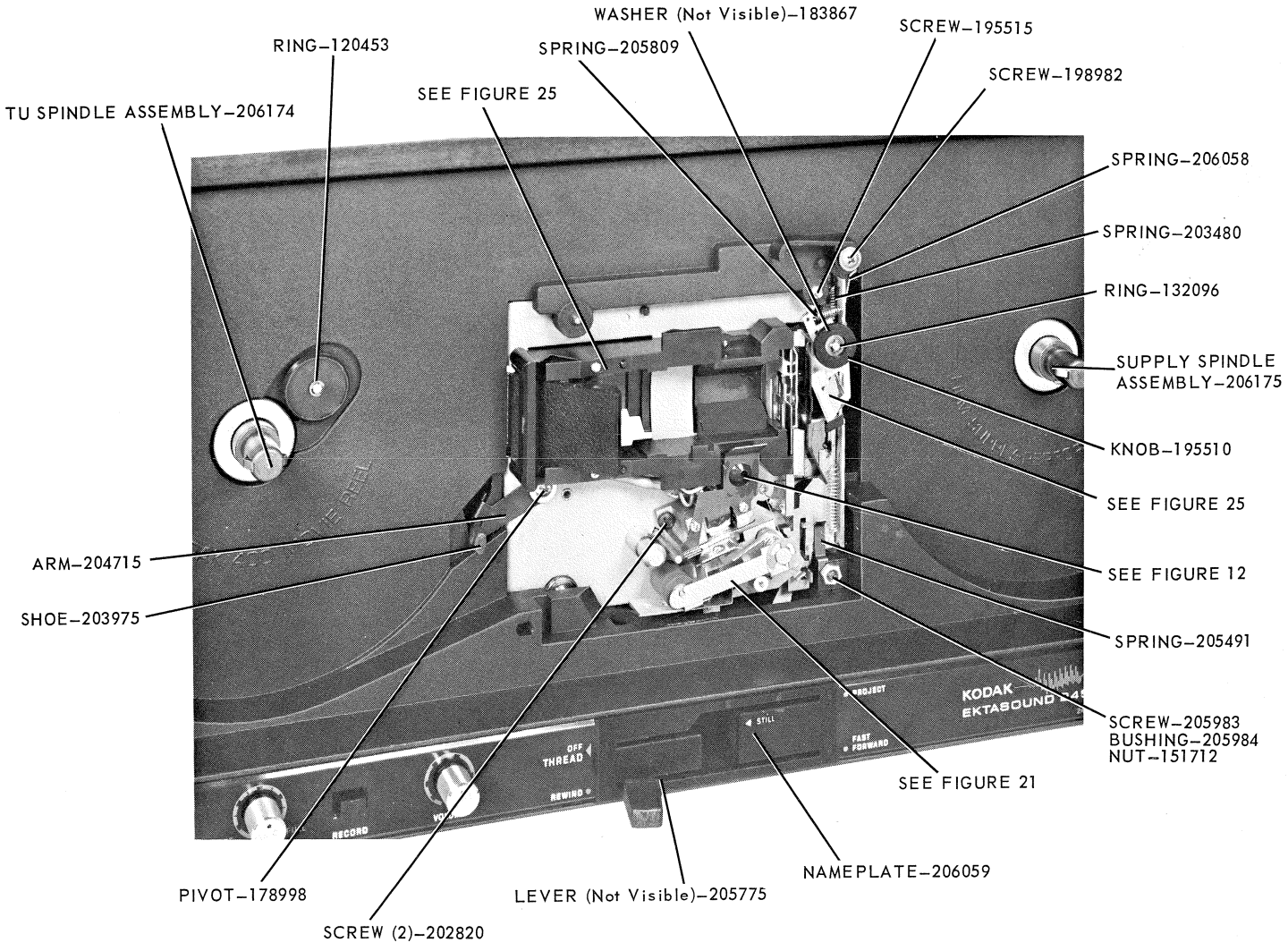


FIGURE 7

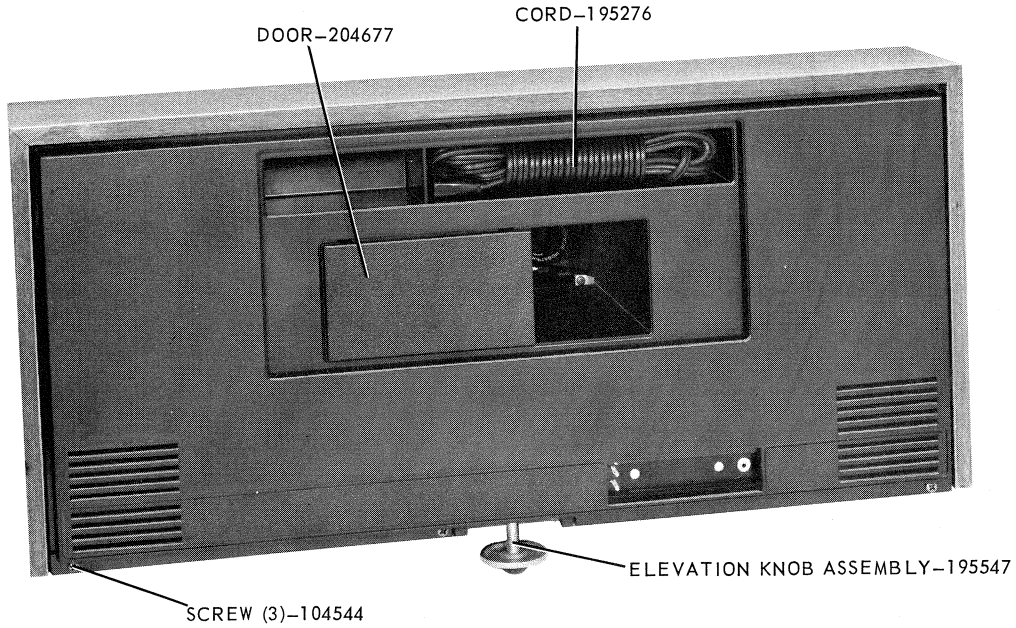


FIGURE 8

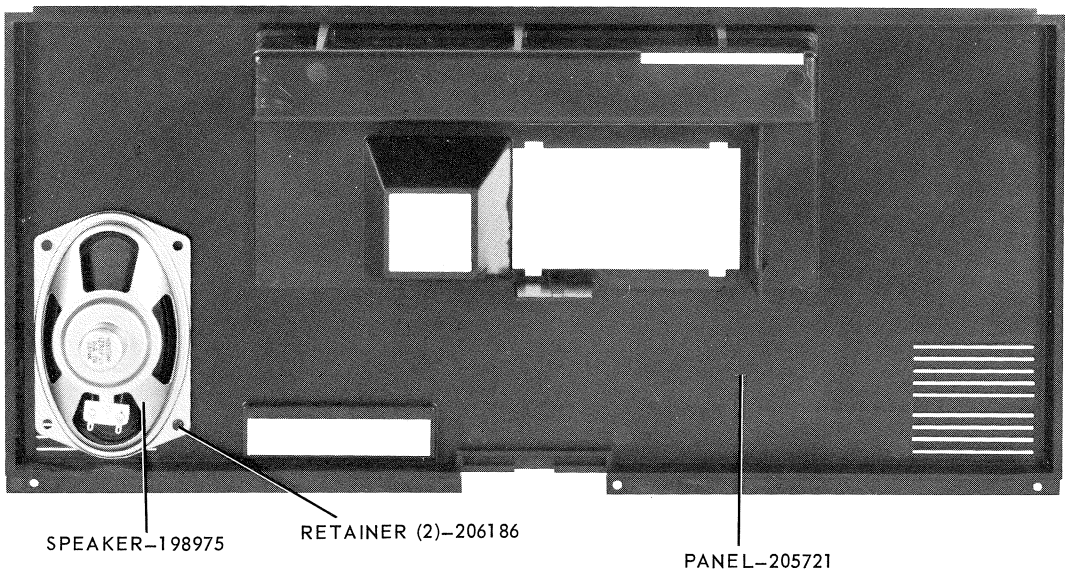


FIGURE 9

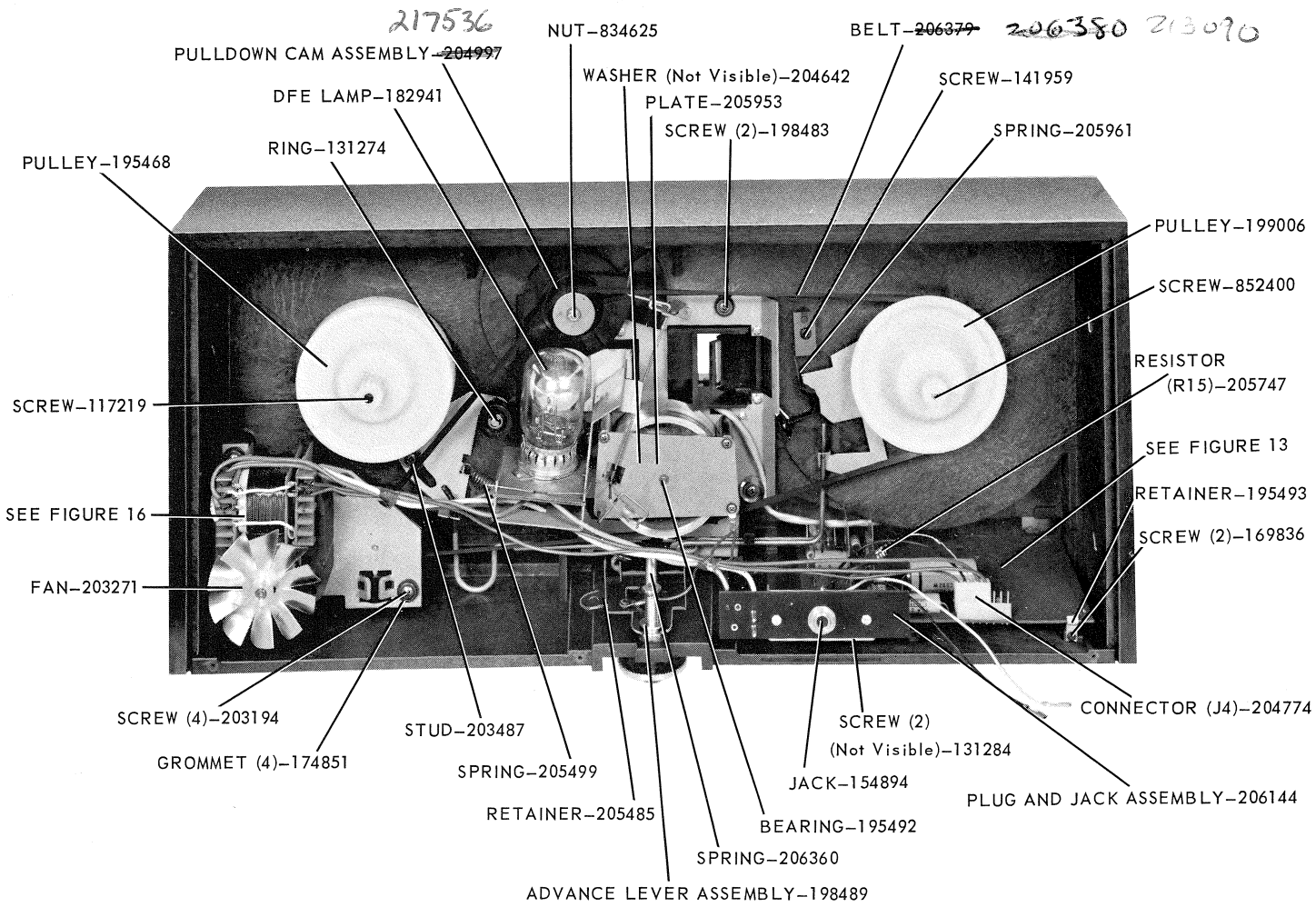


FIGURE 10 (MODEL 235 ONLY)

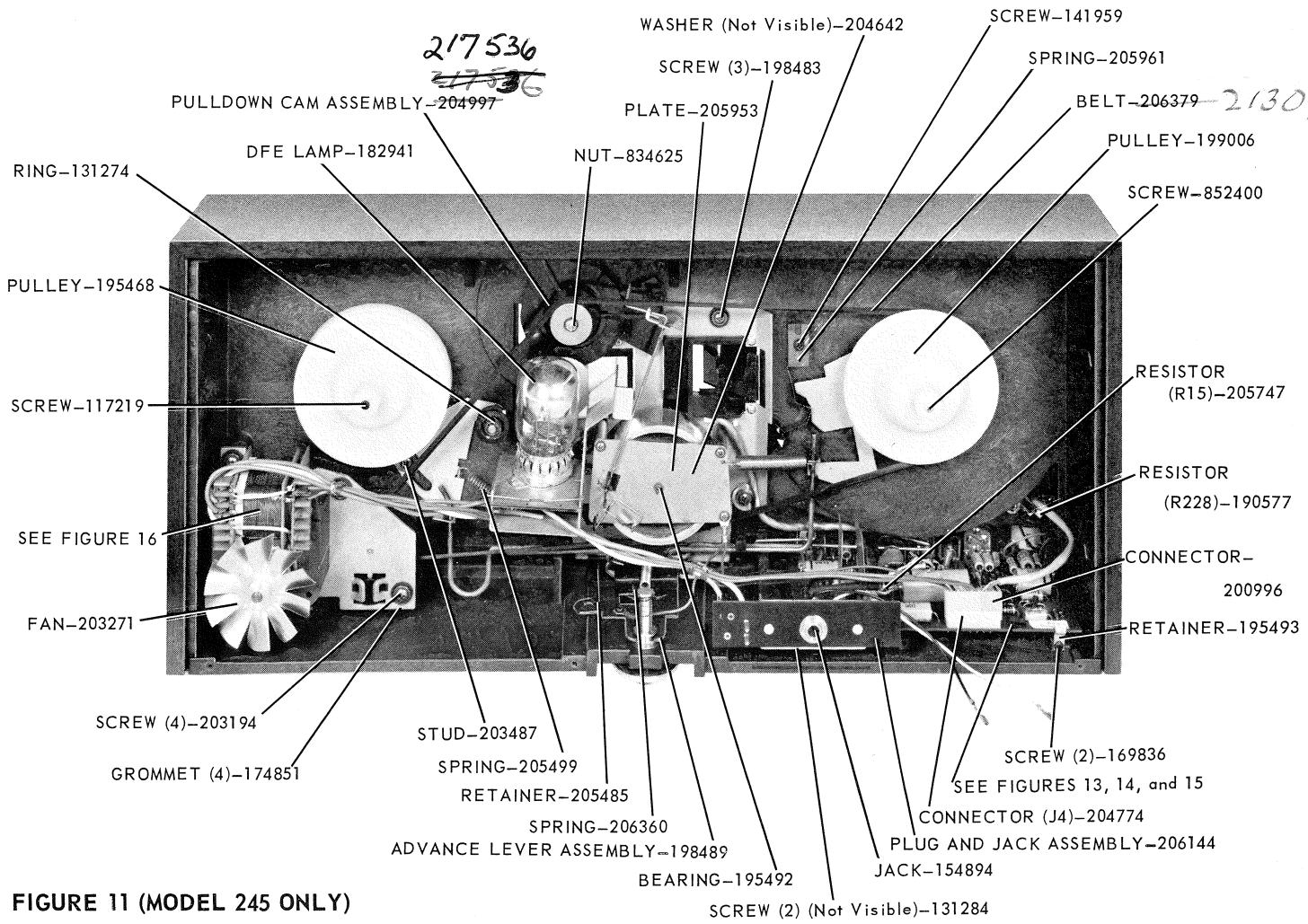
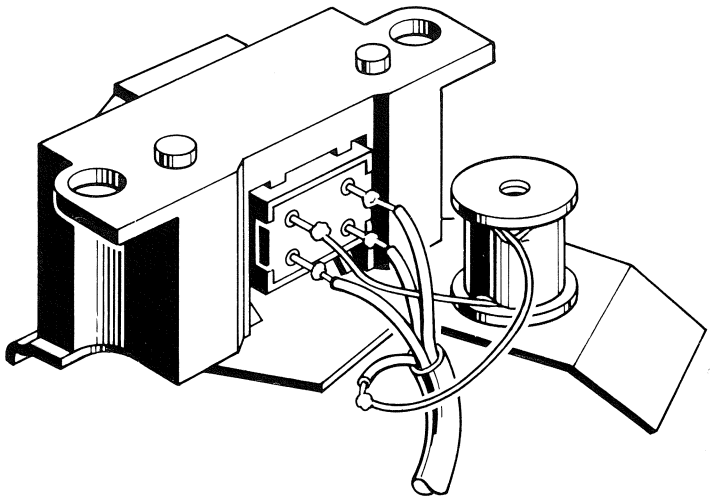


FIGURE 11 (MODEL 245 ONLY)



SOUND HEAD ASSEMBLY (MODEL 235)–195479
FIGURE 12 SOUNDHEAD ASSEMBLY (Not Shown – Model 245)–204777

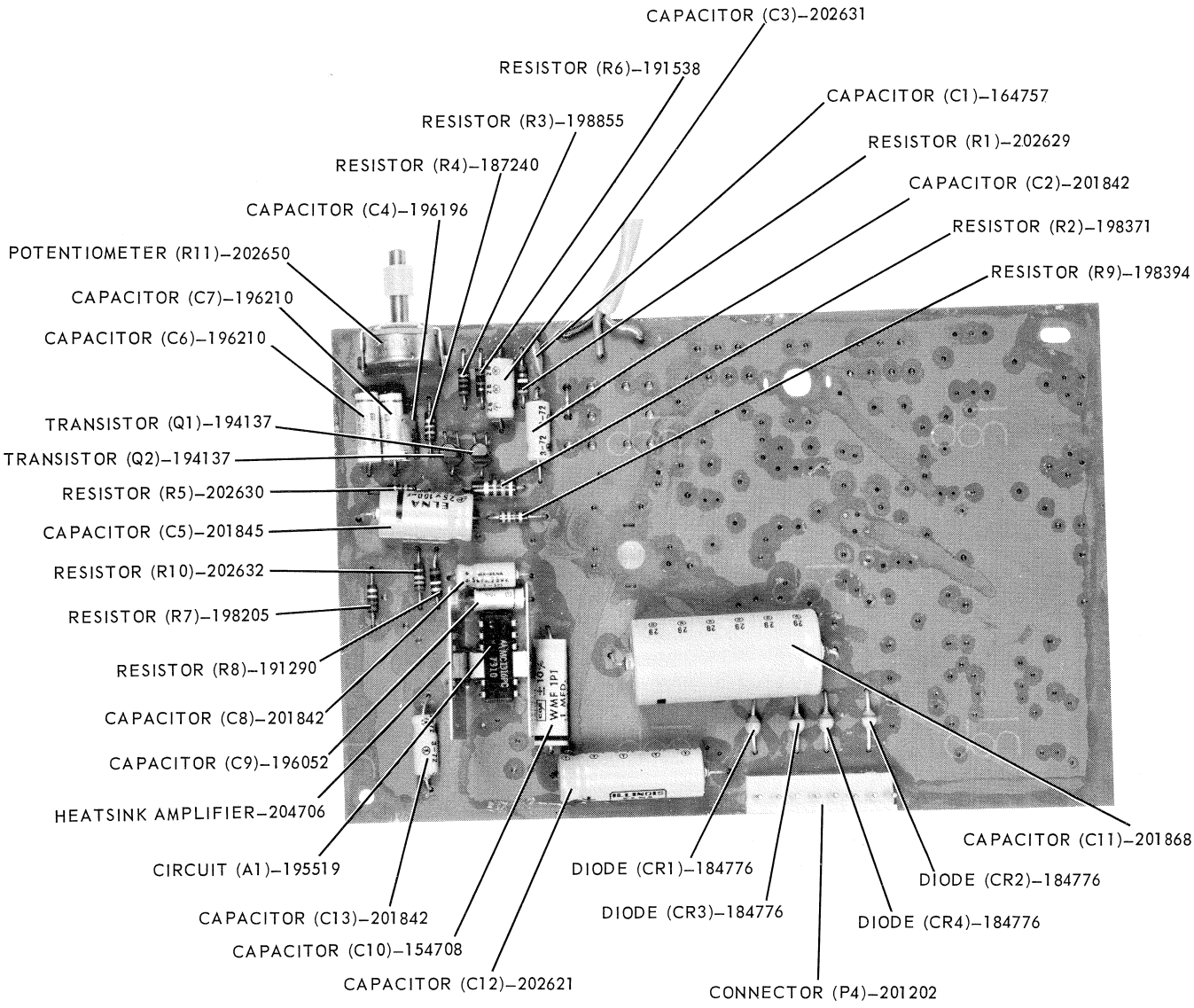
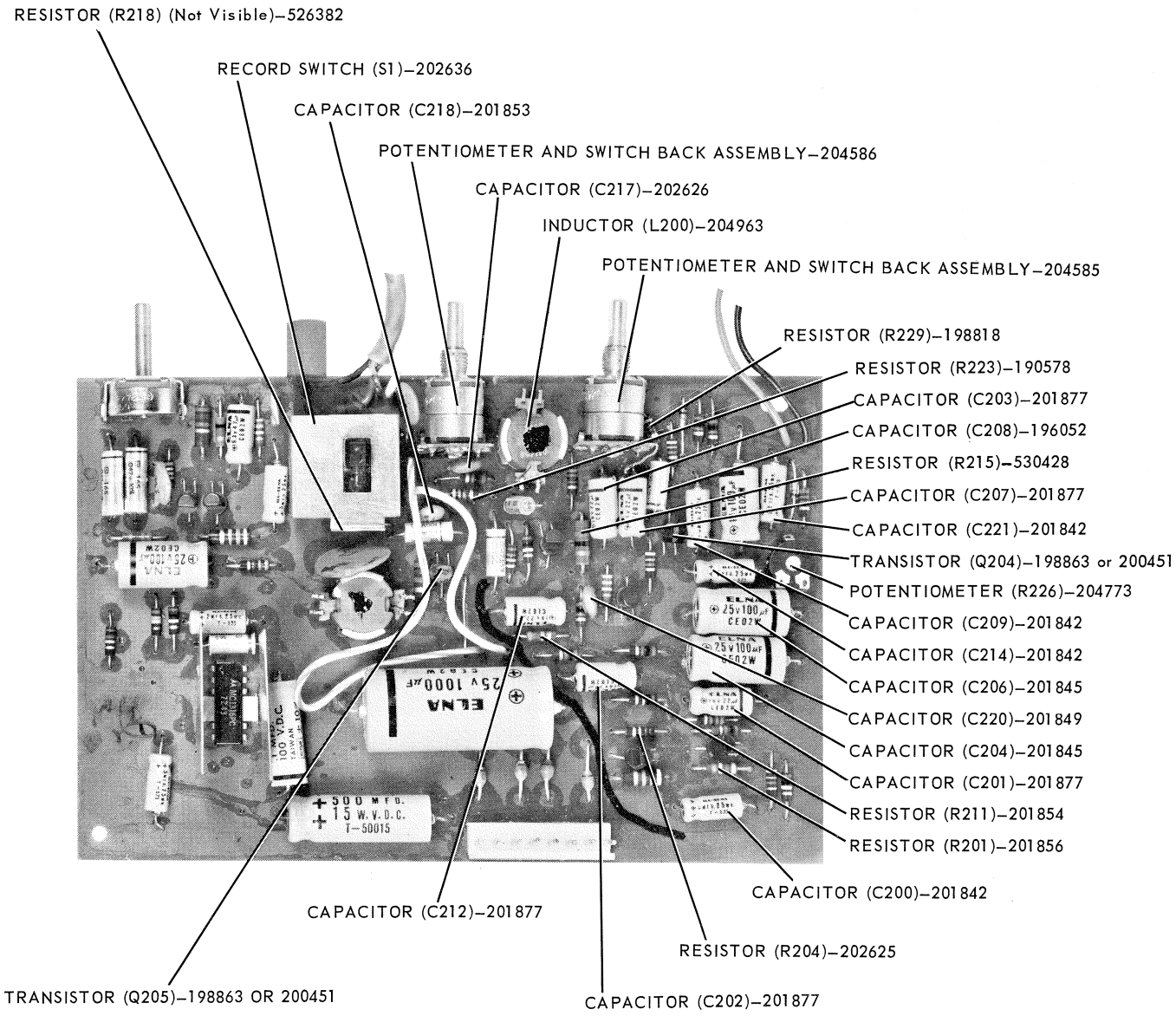
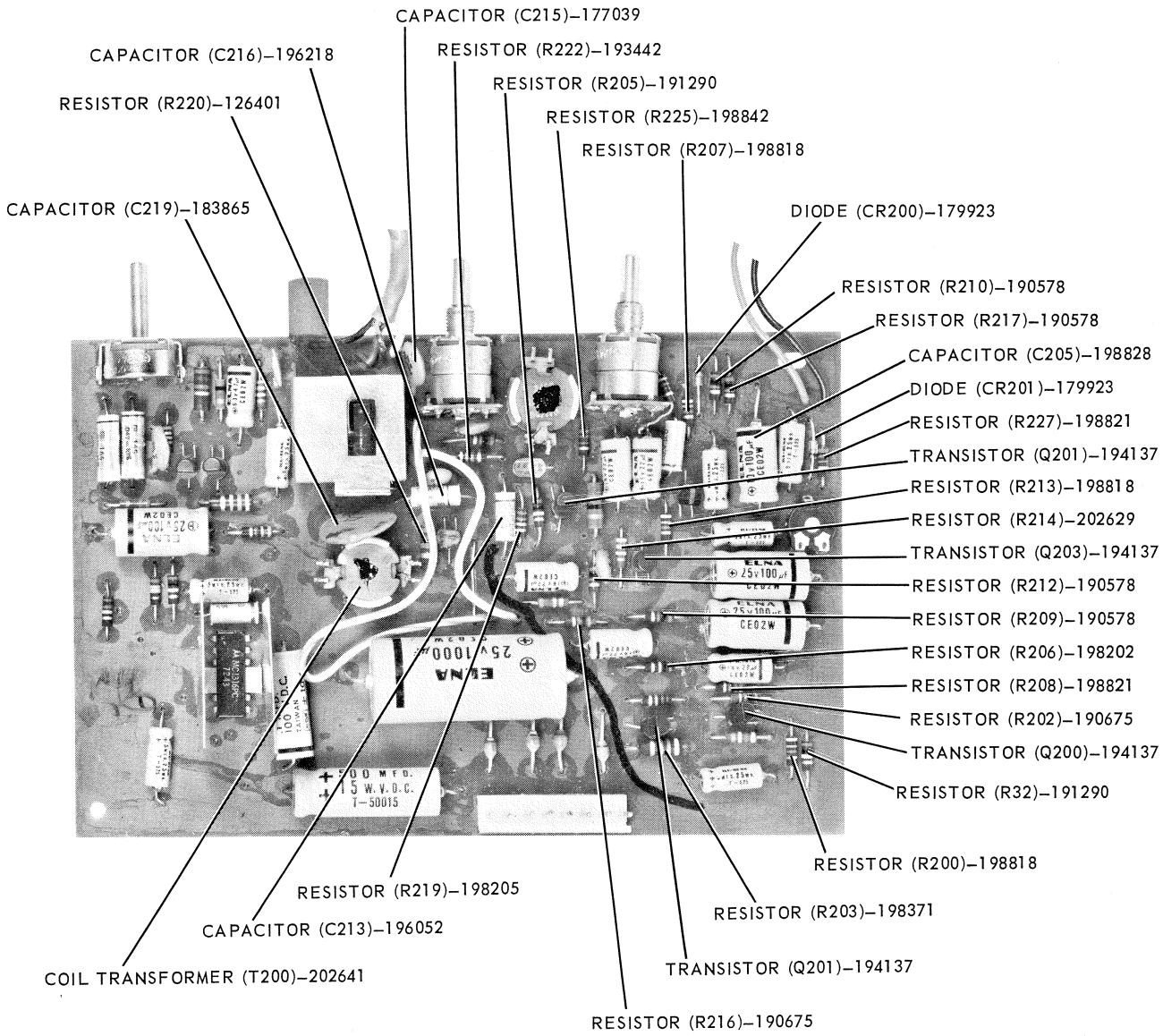


FIGURE 13 PLAYBACK PRINTED CIRCUIT BOARD ASSEMBLY (MODEL 235)–204778



For additional Component references (Model 245) see Figures 13 and 15.

FIGURE 14 PLAYBACK/RECORD PRINTED CIRCUIT ASSEMBLY (MODEL 245)–204772



PLAYBACK/RECORD PRINTED CIRCUIT ASSEMBLY (Model 245)–204772

For additional Component references (Model 245) see Figures 13 and 14.

FIGURE 15

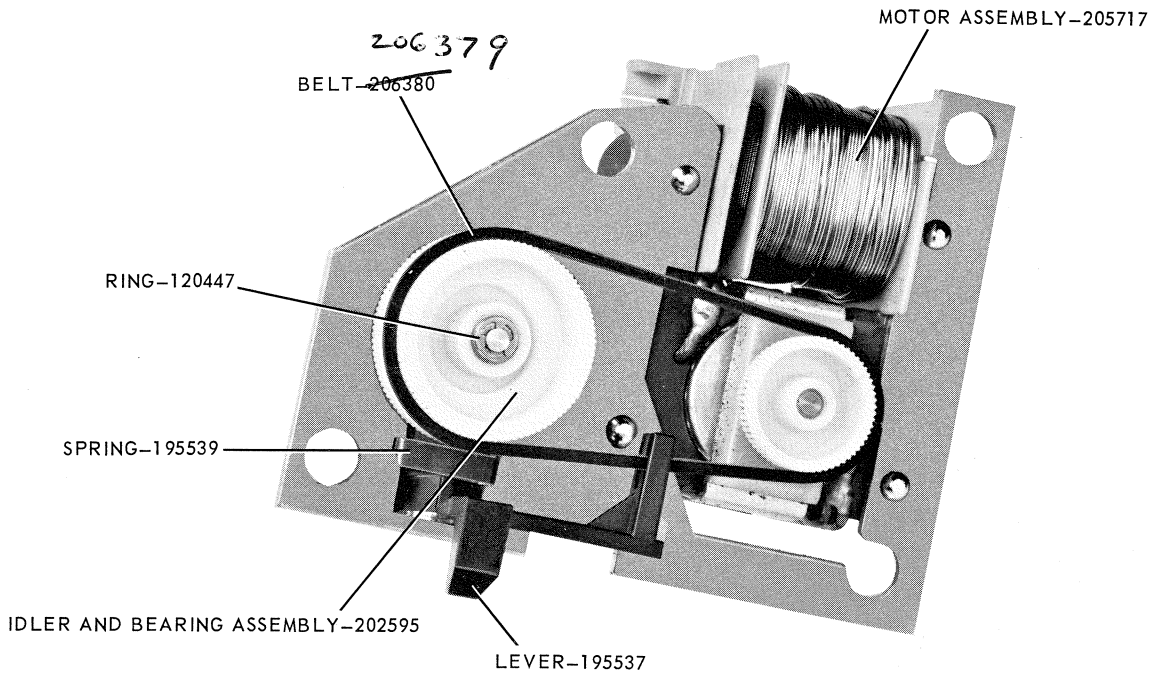


FIGURE 16

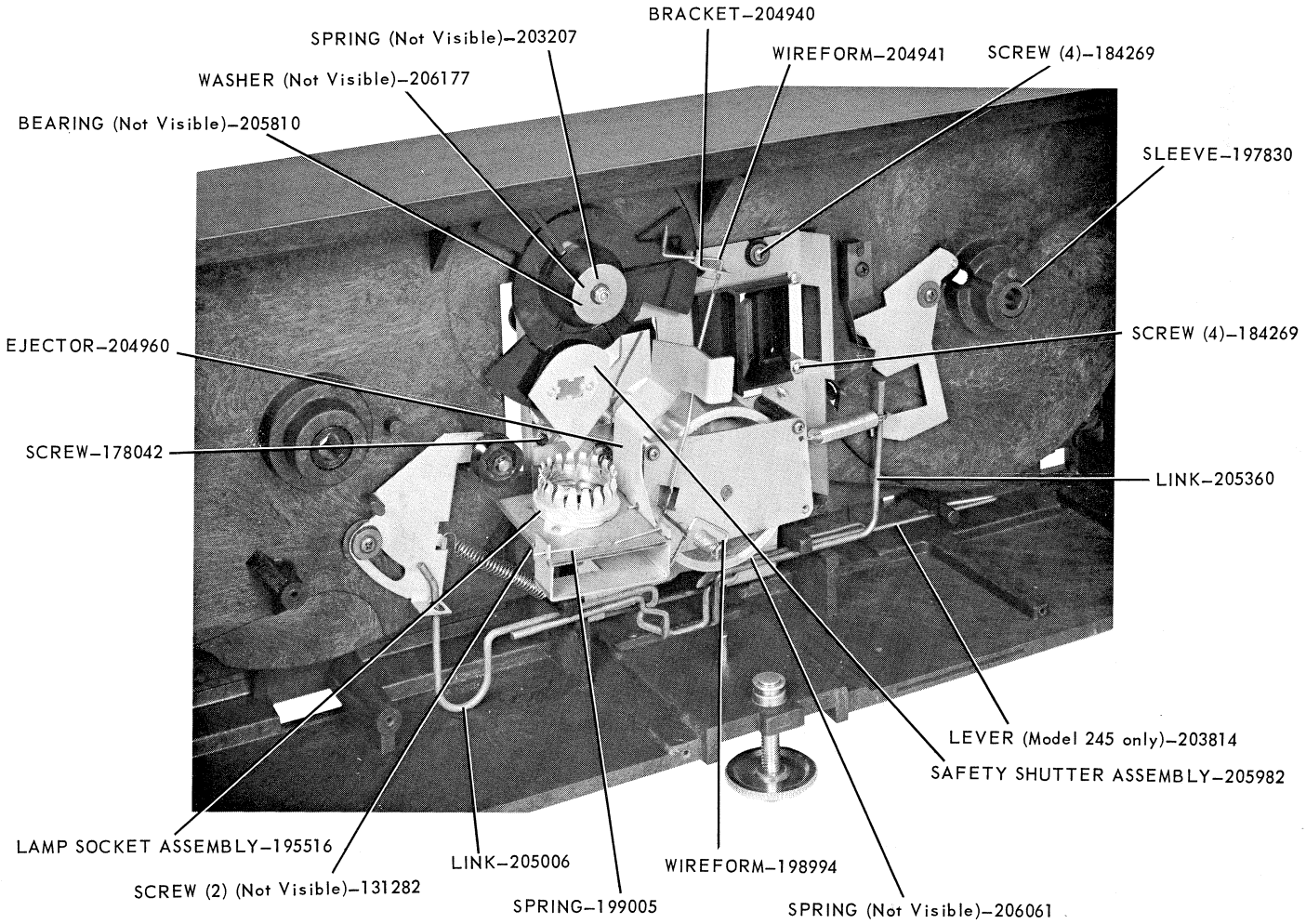


FIGURE 17

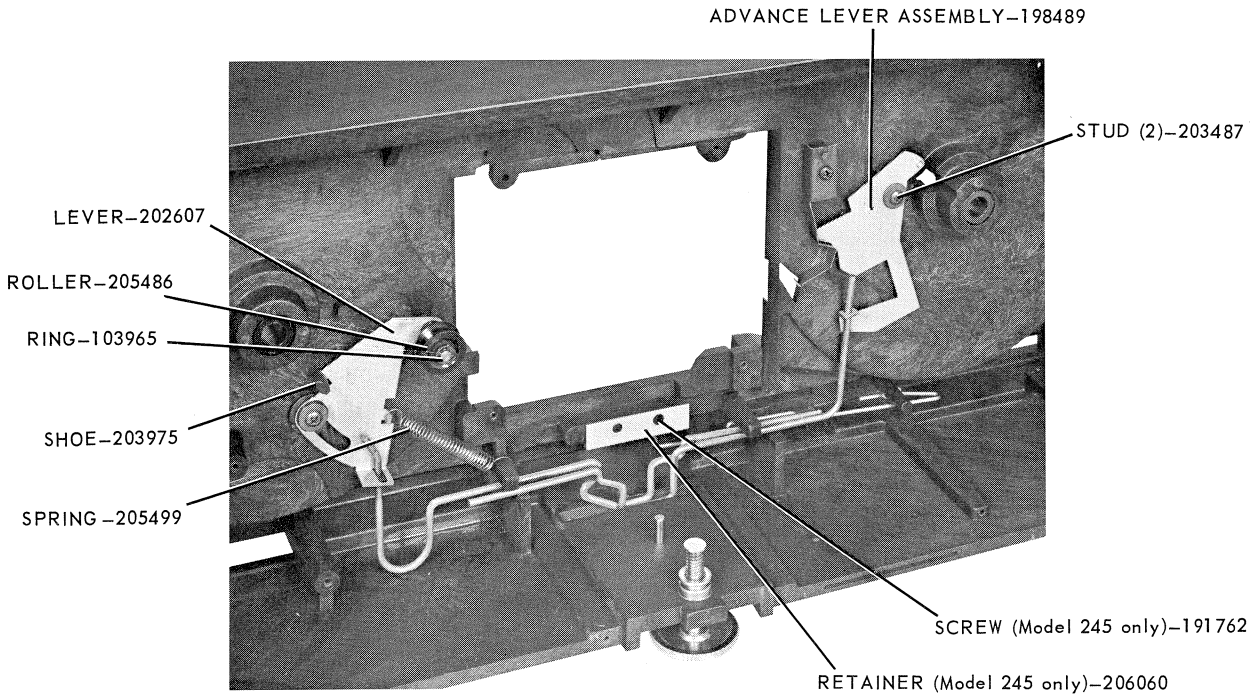


FIGURE 18

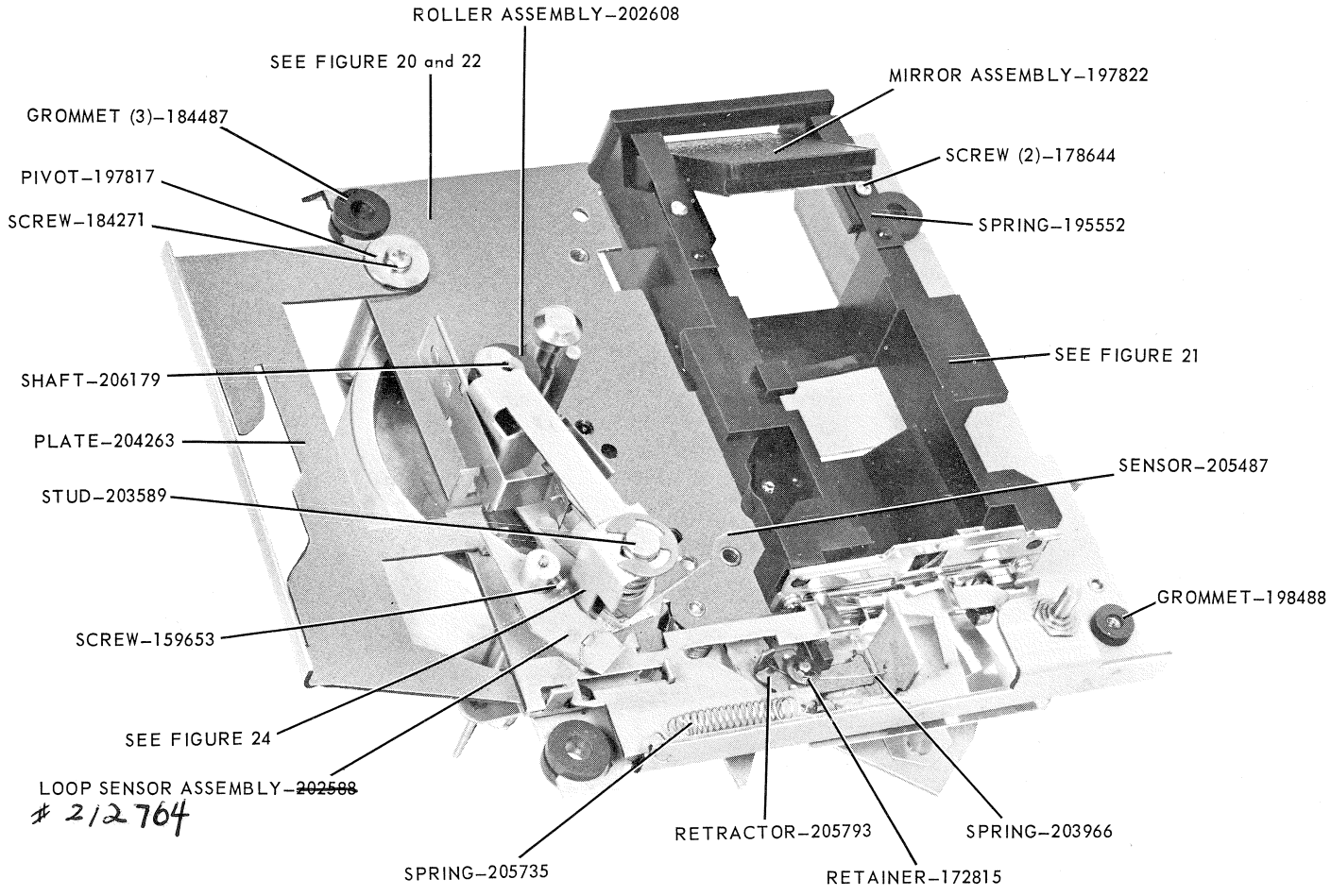


FIGURE 19

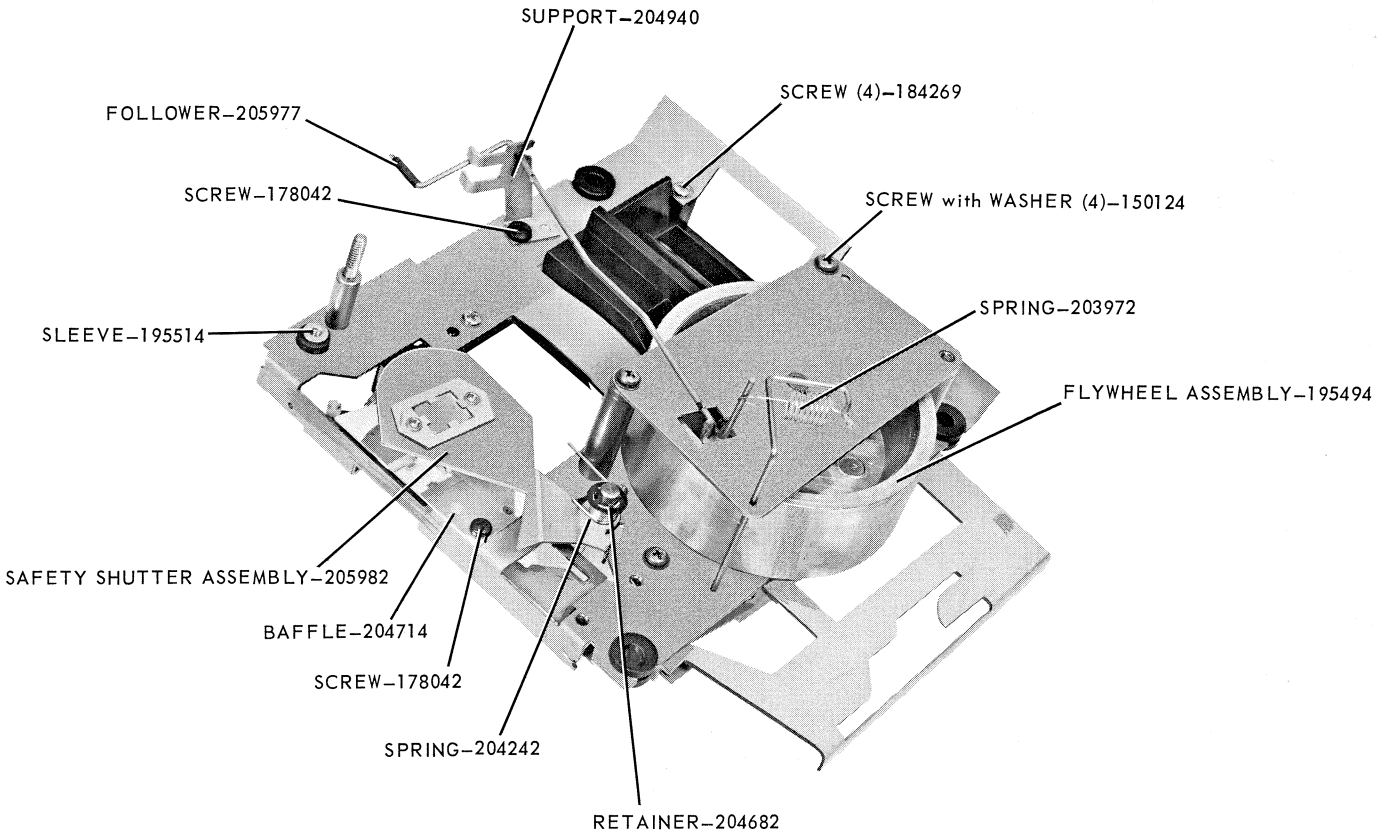


FIGURE 20

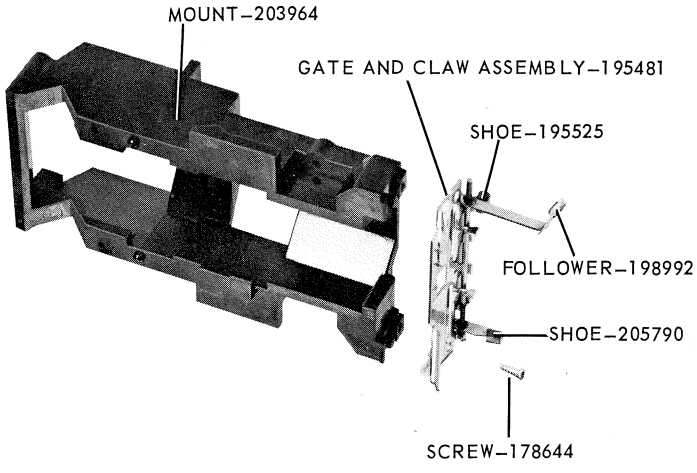


FIGURE 21

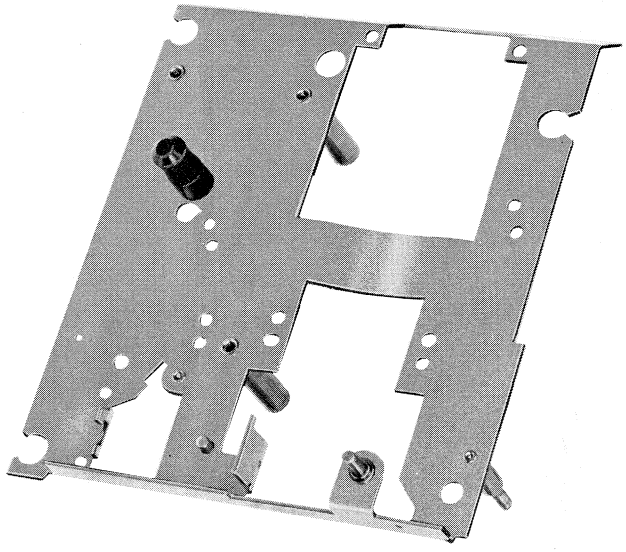


FIGURE 22 CAM PLATE ASSEMBLY–195489

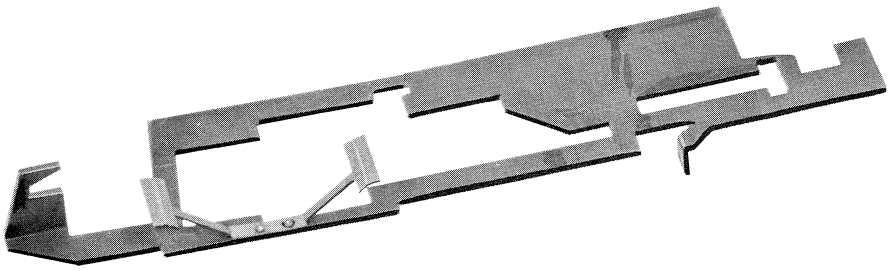


FIGURE 23 GATE SLIDE ASSEMBLY–197825

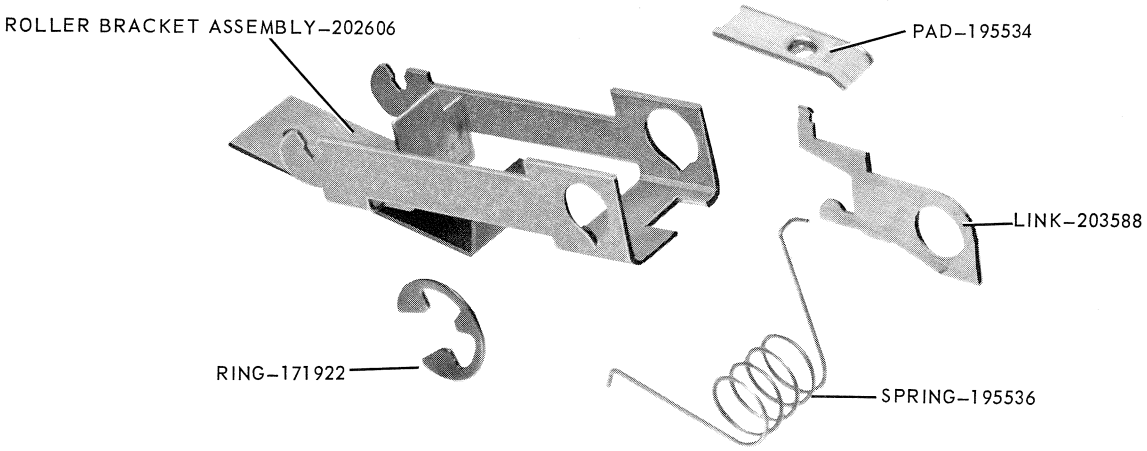


FIGURE 24

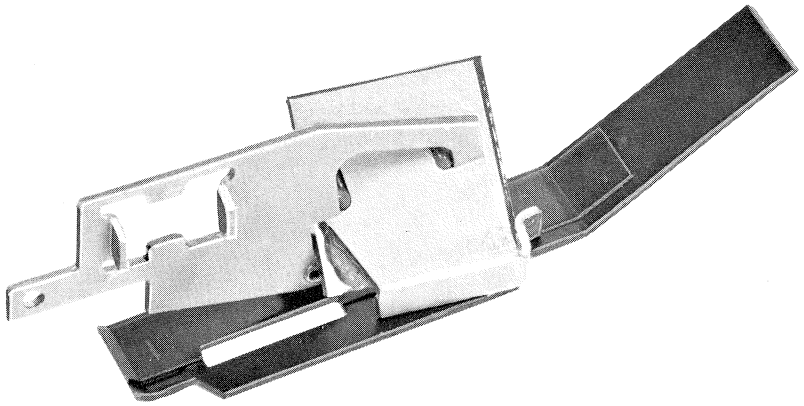


FIGURE 25 PIC PAD LINK ASSEMBLY–195502

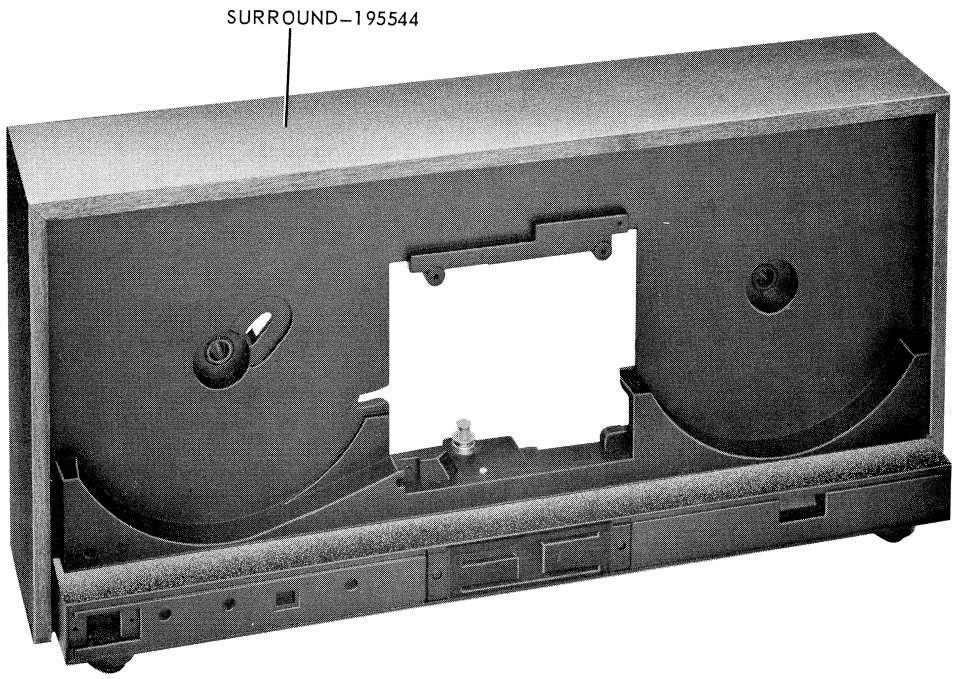


FIGURE 26

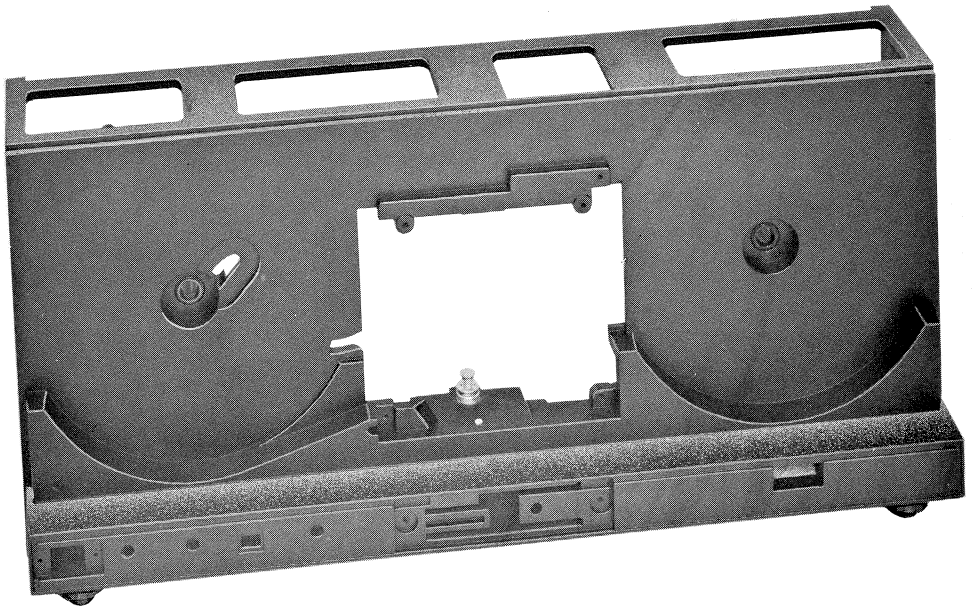


FIGURE 27 CASE ASSEMBLY–195511

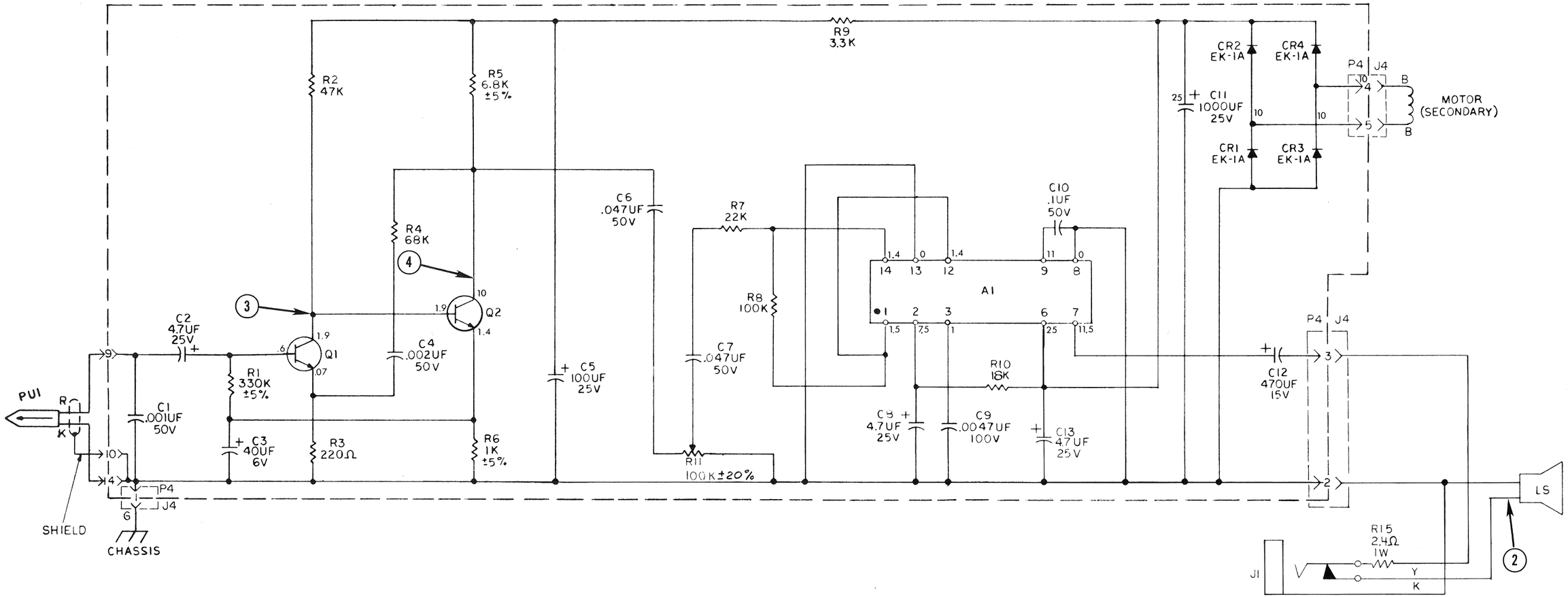


FIGURE 28 Schematic Diagram – KODAK EKTASOUND 235 Movie Projector

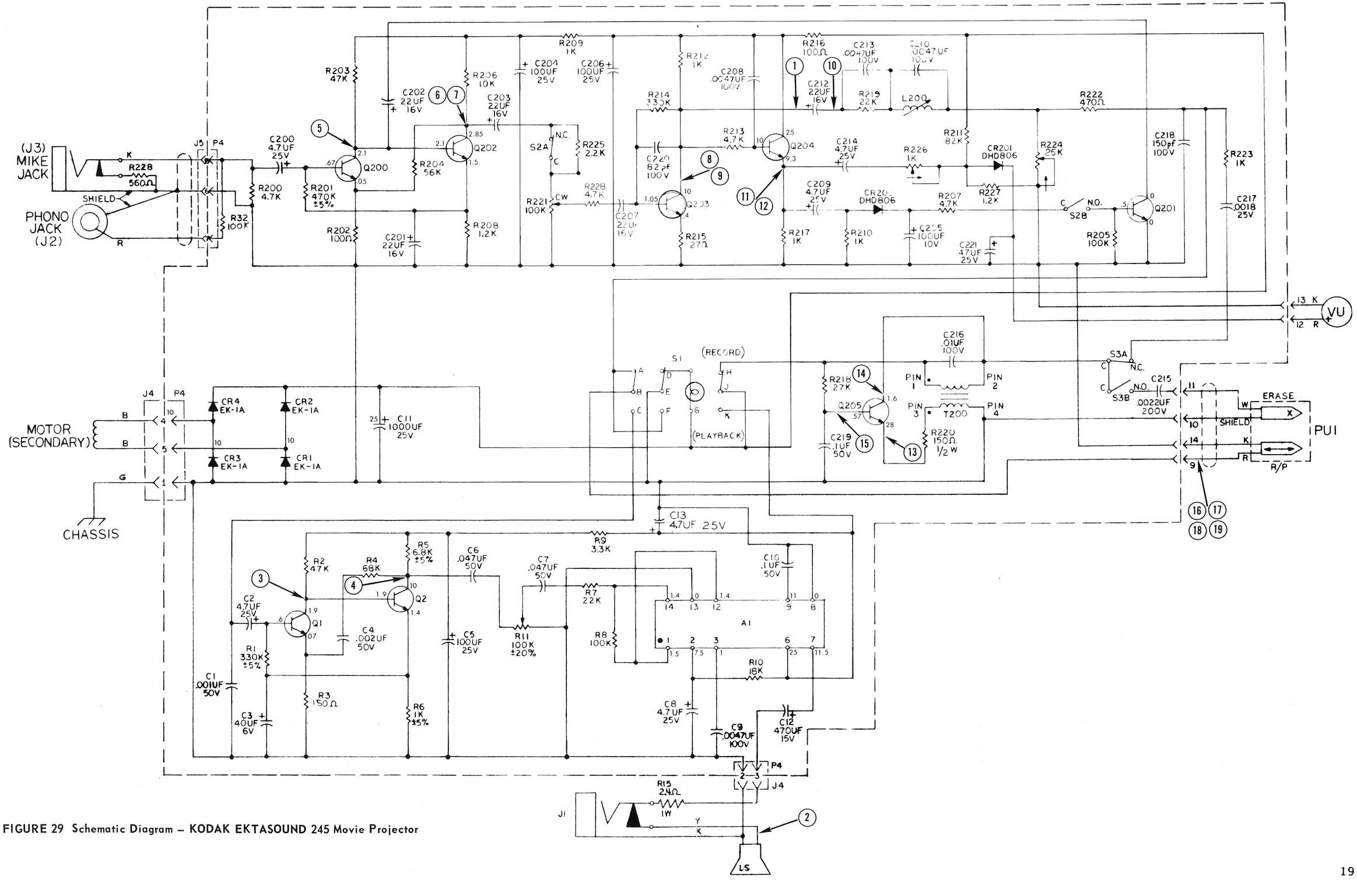


FIGURE 29 Schematic Diagram – KODAK EKTASOUND 245 Movie Projector

PART NO.			DESCRIPTION	FIG.
103965	X	X	Ring - Retaining (*Truarc No. 5133-18)	18
104544	X	X	Screw - Tap., Type B, No. 6 x 7/16, pan hd	8
117219	X	X	Screw - Tap., Type B, No. 4 x 5/16, pan hd	10,11
120447	X	X	Ring - Retaining (*Truarc No. 5133-15)	16
120453	X	X	Ring - Retaining (*Truarc No. 5133-12)	7
126401		X	Resistor (R220)	15
131274	X	X	Ring - Retaining (*Truarc No. 5133-18)	10,11
131282	X	X	Screw - Tap., Type F, 6-32 x 1/4, pan hd	17
131284	X	X	Screw - Tap., Type F, 6-32 x 1/2, pan hd	10,11
132096	X	X	Ring - Retaining (*Truarc No. 5105-12)	7
141959	X	X	Screw - Tap., Type B, No. 6 x 5/16, pan hd	10,11
150124	X	X	Fastener, Mach. Screw, 4-40 x 3/16, pan hd, with lock washer	20
151712	X	X	Locknut (*Palnut No. 6R32)	7
154708	X	X	Capacitor (C10)	13
154894	X	X	Jack - Speaker	10,11
159429		X	Socket	4
159653	X	X	Screw - Mach., 2-56UNC-2A x 5/32, pan hd	19
164757	X	X	Capacitor (C1)	13
169836	X	X	Screw - Tap., Type B, No. 4 x 5/16, min hd	10,11
171922	X	X	Ring - Retaining (*Truarc No. 5133-25)	24
172815	X	X	Ring - Retainer (*Truarc No. 5105-9)	19
174851	X	X	Grommet - Motor	10,11
177039		X	Capacitor (C215)	15
178042	X	X	Screw - Tap., 4-40 x 3/16 pan hd	17,20
178644	X	X	Screw - Tap., Type BF, No. 2 x 1/4 EK min. hd	19,21
178998	X	X	Pivot	7
179923		X	Diode (CR200), CR201)	15
182941	X	X	Lamp - DFE	10,11
183865		X	Capacitor (C219)	15
183867	X	X	Washer - Bowed	7
184269	X	X	Screw - Tap., Type BF, No. 4 x 5/16 pan hd	17,20
184271	X	X	Screw - Tap., Type BF, No. 4 x 1/4 pan hd	5,6,19
184487	X	X	Grommet - Mechanism plate	19
184776	X	X	Diode (CR1, CR2, CR3, CR4)	13
187240	X	X	Resistor (R4)	13
190577		X	Resistor (R228)	11
190578		X	Resistor (R209, R210, R212, R217, R223)	14,15
190675		X	Resistor (R202, R216)	15
191290	X	X	Resistor (R8, R32, R205)	13,15
191538	X	X	Resistor (R6)	13
191762		X	Screw - Tap., Type B, No. 4 x 1/4 ft. hd	18
193442		X	Resistor (R222)	15
194137	X	X	Transistor (Q1, Q2, Q200, Q201, Q203,)	13,15
195276	X	X	Cord - Plug	8
195467	X	X	Foot-Projector	1,2
195468	X	X	Pulley - Supply spindle	10,11
195472	X	X	Roller - Advance	3,4
195479	X		Sound Head Assembly	12
195481	X	X	Gate and Claw Assembly	21
195489	X	X	Cam Plate Assembly	22
195492	X	X	Bearing - Flywheel	10,11
195493	X	X	Retainer - Board	10,11
195494	X	X	Flywheel Assembly	20
195502	X	X	Pic Pad Link Assembly	25
195510	X	X	Knob - Frame	7
195511	X	X	Case Assembly	27
195514	X	X	Sleeve - Grommet mounting	20
195515	X	X	Screw - Mechanism	7
195516	X	X	Lamp Socket Assembly	17

PART NO.			DESCRIPTION	FIG.
195519	X	X	Circuit - Integrated (A1)	13
195525	X	X	Shoe - Claw	21
195534	X	X	Pad - Sound	24
195536	X	X	Spring - Sound pad	24
195537	X	X	Lever - Speed selector	16
195539	X	X	Spring - Speed shift	16
195540	X	X	Knob - Focus	5
195544	X	X	Surround	26
195547	X	X	Elevation Knob Assembly	8
195550	X	X	Button - Shift	1,2
195552	X	X	Spring - Mirror mount	19
196048		X	Jack - Mike	4
196052	X	X	Capacitor (C9, C208, C213)	13,14,15
196196	X	X	Capacitor (C4)	13
196210	X	X	Capacitor (C6, C7)	13
196218		X	Capacitor (C216)	15
197240	X	X	Resistor (R4)	13
197325	X	X	Nameplate - Top cover	1,2
197817	X	X	Pivot - Control plate	19
197820	X	X	Spring - Lens cover	5
197822	X	X	Mirror Assembly	19
197825	X	X	Gate Slide Assembly	23
197830	X	X	Sleeve - Spindle	17
198202		X	Resistor (R206)	15
198205	X	X	Resistor (R7, R219)	13,15
198371	X	X	Resistor (R2, R203)	13,15
198394	X	X	Resistor (R9)	13
198483	X	X	Screw - Mechanism	10,11
198488	X	X	Grommet - Mechanism plate	19
198489	X	X	Advance Lever Assembly	10,11,18
198818		X	Resistor (R200, R207, R213, R229)	14,15
198821		X	Resistor (R208, R227)	15
198828		X	Capacitor (C205)	15
198842		X	Resistor (R225)	15
198855	X	X	Resistor (R3)	13
198863		X	Transistor (Q204, Q205)	14
198975	X	X	Speaker	9
198982	X	X	Screw - Snubber	7
198984	X	X	Screw - Focus lever	5
198992	X	X	Follower - Cam	21
198994	X	X	Wire form - Loop	17
198999	X	X	Spring	6
199005	X	X	Spring - Lamp ejector	17
199006	X	X	Pulley - TU Spindle	10,11
200451		X	Transistor (Q204, Q205)	14
200996		X	Connector - Mike and phono	11
201202	X	X	Connector (P4)	13
201842	X	X	Capacitor (C2, C8, C13, C200, C209, C214, C221)	13,14
201845	X	X	Capacitor (C5, C204, C206)	13,14
201849		X	Capacitor (C220)	14
201853		X	Capacitor (C218)	14
201854		X	Resistor (R211)	14
201856		X	Resistor (R201)	14
201868	X	X	Capacitor (C11)	13
201877		X	Capacitor (CR201, C202, C203, C207, C212)	14
202588	X	X	Loop Sensor Assembly	19
202592	X		Nameplate	1
202595	X	X	Idler and Bearing Assembly	16
202604	X	X	Reel Assembly	3,4
202606	X	X	Roller Bracket Assembly	24
202607	X	X	Lever - Stud assembly	18

PART NO.			DESCRIPTION	FIG.
202608	X	X	Roller Assembly	19
202609	X	X	Knob - Volume	1,2
202611		X	Plate - Control	2
202612		X	Meter	2
202621	X	X	Capacitor (C12)	13
202625		X	Resistor (R204)	14
202626		X	Capacitor (C217)	14
202629	X	X	Resistor (R1, R214)	13,15
202630	X	X	Resistor (R5)	13
202631	X	X	Capacitor (C3)	13
202632	X	X	Resistor (R10)	13
202636		X	Record Switch (S1)	14
202641		X	Coil Transformer	15
202650	X	X	Potentiometer (R11)	13
202820	X	X	Fastener, Tap., 6-32 x 1/4 pan hd with lock washer	7
203194	X	X	Screw - Motor mounting	10,11
203207	X	X	Spring - Spiral cam	17
203271	X	X	Fan - Motor	10,11
203301	X	X	Guide - Film	5
203480	X	X	Spring - Claw	7
203487	X	X	Stud - Lever	10,11,18
203588	X	X	Link - Pad	24
203589	X	X	Stud - Pressure roller bracket	19
203731		X	Jack Mike and Cable Assembly	4
203814		X	Lever - Record switch	17
203964	X	X	Mount - Lens	21
203966	X	X	Spring - Skip pawl	19
203972	X	X	Spring - Wire form	20
203975	X	X	Shoe - Brake	7,18
204242	X	X	Spring - Shutter	20
204263	X	X	Plate - Control	19
204585		X	Potentiometer and Switch Back Assembly	14
204586		X	Potentiometer and Switch Back Assembly	14
204642	X	X	Washer - Flywheel	10,11
204677	X	X	Door - Lamp	8
204682	X	X	Retainer	20
204706	X	X	Heat Sink Amplifier	13
204712	X	X	Lever - Focus	5
204714	X	X	Baffle - Light	20
204715	X	X	Arm - Brake	7
204772		X	Playback/Record Printed Circuit Assembly	14,15
204773		X	Potentiometer (R226)	14
204774	X	X	Connector (J4)	10,11
204777		X	Sound Head Assembly	12
204778	X		Playback Printed Circuit Board Assembly	13
204940	X	X	Bracket - Belt guide	17,20
204941	X	X	Wire form - Belt adjusting	17
204960	X	X	Ejector - Lamp	17
204963		X	Inductor (L200)	14
204989	X	X	Cover - Dust	1
204997	X	X	Pulldown Cam Assembly	10,11
205006	X	X	Link - Supply	17
205360	X	X	Link - Take-up	17
205361	X	X	Cover - Track	6
205362	X		Nameplate	1
205363		X	Nameplate	2
205477	X	X	Snubber	3,4
205485	X	X	Retainer - Advance lever	10,11
205486	X	X	Roller	18
205487	X	X	Sensor - Loop	19
205491	X	X	Spring - Slide tension	7

PART NO.			DESCRIPTION	FIG.
205499	X	X	Spring - Brake	10,11,18
205666	X	X	Cover - Lens	5
205717	X	X	Motor Assembly	16
205721	X	X	Panel - Back	9
205735	X	X	Spring - Gate slide	19
205747	X	X	Resistor (R15)	10,11
205775	X	X	Lever - Control	7
205790	X	X	Shoe - Retractor	21
205793	X	X	Retractor	19
205809	X	X	Spring - Gate	7
205810	X	X	Bearing - Spiral cam	17
205953	X	X	Plate - Flywheel	10,11
205961	X	X	Spring - Brake	10,11
205977	X	X	Follower - Belt	20
205982	X	X	Safety Shutter Assembly	17,20
205983	X	X	Screw - Slide tension	7
205984	X	X	Bushing	7
206058	X	X	Spring - Snubber	7
206059	X	X	Nameplate - Panel	7
206060		X	Retainer - Lever	18
206061	X	X	Spring	17
206144	X	X	Plug and Jack Assembly	10,11
206174	X	X	TU Spindle Assembly	7
206175	X	X	Supply Spindle Assembly	7
206177	X	X	Washer - Cam thrust	17
206179	X	X	Shaft - Roller	19
206186	X	X	Retainer - Speaker	9
206360	X	X	Spring - Detent	10,11
206380 ~~206379~~	X	X	Belt - Pulley	10,11
206379 ~~206380~~	X	X	Belt - Motor	16
526382		X	Resistor (R218)	14
530428		X	Resistor (R215)	14
626435	X	X	Lens - 15-30, f/1.3	3,4
626530	X	X	Lens, 22mm, f/1.5	3,4
834625	X	X	Nut - Cam	10,11
852400	X	X	Screw - Spindle	10,11

*The manufacturer's name and part number shown in parentheses are being used by Kodak at this time for replacement parts. In an emergency, customers may be able to purchase this part locally in a minimum of time. There may be other manufacturers' parts with identical specifications which may be suitable.

Customer Equipment Services Division
EASTMAN KODAK COMPANY • ROCHESTER, N. Y. 14650

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