

Volume 7509 PR



SERVICE INSTRUCTIONS AND PARTS LIST

CARAMATE[®] PROJECTORS

SINGER
EDUCATION DIVISION

CARAMATE PROJECTORS

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INTRODUCTION

This manual has been prepared as a guide for service and maintenance of the CARAMATE PROJECTOR. Obvious procedures are not stated. The parts list clearly describes the difference between the models.

SECTION I

PRINCIPLES OF OPERATION

The CARAMATE PROJECTOR IS designed to accept CAROUSEL* trays of 80 or 140 slides, or CAROUSEL stack holder, synchronized with a standard 2 track monaural tape cassette. The visual program is synchronized to the audio by recorded cue pulses at program points where slide advancement is desired. Audio is recorded on the lower track and advances are placed on the upper track. Consequently, only one side of the tape can be used.

NOTE: The CARAMATE is not designed to be operated with tapes prepared for 50 Hz. systems.

FEATURES

*T. M. EASTMAN KODAK CO.

OPERATING VOLTAGE: 117V 60 Hz. (domestic)
PROJECTION LAMP: 150 watt (CAR type)
(DFF type) longer life

2 x 2 slides

PROJECTION LENS: 45mm f/3.5

MAGNIFICATION FACTOR: 1:7.15

OPERATING SPECIFICATIONS:

(ANSI-PH 7.4 proposed standard).

AUDIO PROGRAM:

MONAURAL: tracks 1 & 2 combined, lower half.
LEVEL: Nominally -4+3db ref. to signal of -6db.
relative to 250 nWb/m.

FILM ADVANCE

MONAURAL: Tracks 3 & 4 combined (upper half)

ADVANCE PULSE: 1000 Hz. +5%

CUE DURATION: 0.45 ± .07 sec.

CUE SPACING: 1.5 sec. min. between start of
two adjacent cue pulses.

CUE LEVEL: -6db +3db min. ref. at -6db relative
to 250 nWb/m at 315 Hz.

STOP PULSE: 150 Hz. +5%

STOP PULSE DURATION: 0.5 ± .25 sec. for

advance and program stop pulse.
STOP PULSE CUE SPACING: 2.0 sec. min. between
the end of one pulse and start of another.

SECTION II

SERVICE PROCEDURES

A. GENERAL

This section includes an operation check and a trouble and a remedy chart.

B. OPERATION CHECK

1. PLAYBACK MODEL

Connect power cord to grounded AC wall outlet.
Load projector with a programmed CAROUSEL
slide tray and tape cassette.

a. Depress "POWER" button. Orange lens
should light indicating PROJECTION lamp is
lighted.

b. Depress "PLAY" button, program should begin.

c. Adjust "FOCUSING" knob to achieve best
overall focus on screen.

d. Adjust "VOLUME" control for comfortable
listening level.

e. Depress "HOLD" button, the same slide
should hold as long as the button is depressed.
This does not affect tape transport.

f. Depress "STOP/EJECT" button lightly, tape
should stop.

g. Depress "FORWARD" button, tape should ad-
vance rapidly.

h. Depress "STOP/EJECT" button lightly, tape
should stop.

j. Depress "ADVANCE" button, CAROUSEL tray
should advance.

k. Depress "SELECT" button fully, CAROUSEL,
tray may be rotated to a desired slide or returned
to "O" and removed.

2. RECORD AND PLAYBACK MODEL

Connect power cord to grounded AC wall outlet.
Load projector with preloaded CAROUSEL slide
tray and insert a blank tape cassette (with record
tabs in place or tape over tab knock out) into cas-
sette holder. With microphone switch in the "OFF"
position, plug microphone into projector.

a. Depress "POWER" button. Orange lens should
light, indicating PROJECTION lamp is lighted.

b. Depress "PLAY & RECORD" buttons at the
same time. Move the microphone switch to the
"ON" position, tape should begin. After making
test commentary, move microphone switch to the
"OFF" position, tape should stop.

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c. Depress "STOP/EJECT" button lightly to stop the tape. Remove the microphone.

d. Depress "REWIND" button, tape should rewind.

e. With microphone removed, depress "PLAY" & "RECORD" buttons simultaneously. Program should begin with test commentary. Depress "ADVANCE" button as required for placement of cue pulse. After test commentary has been cued, depress "REWIND" button to rewind the tape. Reset the CAROUSEL tray to the beginning. NOTE: Depress "STOP" button before using the "REWIND or FORWARD.

f. Depress "PLAY" button, slides should automatically advance in synchronization with the test commentary.

g. Repeat Steps B.1. c through B.1. k.

3. SP PLAYBACK MODEL

a. Repeat Steps B.1 through B.1. d.

b. Set lamp switch to desired position.

c. If a 150 Hz. signal is sensed the tape will stop and the picture will remain on the screen until the RESTART button is depressed.

d. The "STOP" indicator should light, indicating the tape has stopped.

e. Depress "RESTART" button, program should restart.

f. Repeat Steps B.1. c through B.1. k.

4. SP RECORD & PLAYBACK MODEL

a. Repeat Steps B.2 through B.2. d.

b. Make sure microphone is removed so that previous recorded audio will not be affected.

c. Depress "PLAY & RECORD" buttons at the same time. This will erase any cue pulses on the second track but will not affect the audio recording.

d. Listening to your commentary depress and hold "ADVANCE" button for approximately .5 sec. for each slide advance wanted. This will place the 1000 Hz. advance pulse on the upper track.

e. Depress and hold "RESTART" button for approximately .5 sec. to create the STOP pulse. The stop indicator will not light up. When the tape stops interrupt the audio a second or two before the stop pulse is applied to the tape. This will prevent voice run down.

f. Depress the "STOP/EJECT" button lightly to stop the tape.

g. Depress the "REWIND" button, tape should rewind.

h. Depress the "STOP/EJECT" button fully to remove the cassette.

C. TROUBLE AND REMEDY

The purpose of the following table is to list commonly encountered troubles and to indicate corrective repairs and adjustments. Disassemble only as far as needed for repair. Before disassembly, check for loose or missing screws or parts that are binding because of misalignment or lack of lubrication. Electrical trouble shooting will be facilitated by referring to the wiring and schematic diagrams.

The table is divided into three sections. Section One covers Projector Electrical problems, while Section Two covers Projector Mechanical problems. Section Three covers Audio Mechanical problems. Use Schematic diagram in conjunction with the trouble shooting procedures. The schematic diagram indicates typical AC signal and DC bias voltages for cases requiring more extensive circuit analysis.

TRouble	PROBABLE CAUSE	REMEDY
1. PROJECTOR, ELECTRICAL		
a. Unit dead	Power Cord (P1) defective	Replace
	Motorformer defective	Replace
	Switch (S5) defective	Replace (Sec. II, Para. G.5)
b. Motor runs but lamp does not light.	Projection Lamp (L-1) defective	Replace
c. Projection lamp does not light on HI or LOW	Switch (S-7) defective	Replace
	Projection Lamp (L-1) defective	Replace

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TROUBLE	PROBABLE CAUSE	REMEDY
d. Screen illumination weak or low	Projection Lamp (L-1) defective	Replace
e. Cue pulse not recording in record mode	Switch (S-4) out of adjustment	Adjust (Sec. II, Para. G.5)
2. PROJECTOR MECHANICAL		
a. Screen illuminated when no slide is in projector	Shutter out of adjustment	Adjust (Sec. II, Para. G.6)
b. Screen is not illuminated when slide is in projector, projection lamp O.K.	Shutter out of adjustment	Adjust (Sec. II, Para. G.6.b)
c. Shutter fails to open or close intermittently.	Shutter out of adjustment	Adjust (Sec. II, Para. G.6.b)
d. Screen illumination weak or low	Projection lens, mirrors or projection screen dirty.	Clean (Sec. II, Para. D.3)
e. Projected image not centered on screen	Primary mirror out of adjustment	Adjust (Sec. II, Para. G.5)
	Defective slide not dropping	Remount Slide
f. Projector does not cycle	Solenoid (SO-1) out of alignment hanging up slide arm	Adjust (Sec. II, Para. F.5)
	Clutch spring broken	Replace
	Slides jammed	Remove jammed slides and check for damaged mounts
	Slide clamp interference at top of frame	Adjust (Sec. II, Para. G.6.b)
g. CAROUSEL tray will not rotate when "SELECT" button is depressed	Lifter out of adjustment	Adjust (Sec. II, Para. G.6.a)
h. CAROUSEL tray will not advance	Index arm jammed or broken	Replace
	Old style index link	Replace p/n 43741-P1 (Code F4AA)
	Tray defective - broken index stud or bottom pan warped.	Replace tray
j. Projector continues to cycle	Grease or oil on escapement lever	Replace
k. Noisy operation	Worm gear dry or dirty	Clean and lubricate
3. AUDIO		
a. No tape drive in play or record mode	Fast Forward arm spring or pinch roller spring defective	Replace
b. Take up reel does not turn although tape feeds past capstan	Fast Forward arm spring loose or disconnected	Replace
	Grease or oil on idler or hub of flywheel	Clean with alcohol

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TROUBLE	PROBABLE CAUSE	REMEDY
c. Take up spindle fails (weak take up), especially when reel is full	Cassette defective	Test with another cassette. Replace if necessary
	Grease or oil on Fast Forward arm or flywheel surface	Clean
	Low take up torque	Repair
d. No "FAST FORWARD" but capstan revolves	Cassette defective	Test with another cassette. Replace if necessary
	Rewind idler rollers, fast forward idler roller, or flywheel slipping due to oil on surface	Clean
	Drive belt loose or oily	Clean or replace
	Motor defective	Replace
e. Wow or Flutter	Cassette defective	Test with another cassette. Replace if necessary
	Pinch roller surfaces dirty	Clean (Sec. II, Para. D.2)
	Flywheel or pinch roller bearings dirty	Clean (Sec. II, Para. D.2)
	Dirty capstan, rotates slow	Clean (Sec. II, Para. D.2)
	Pinch roller spring defective	Replace
	Drive Rollers worn or nicked	Replace
	Drive belt loose or worn	Replace
f. Playback O.K., sound distorted or missing, cue signal weak	Microphone defective	Replace
	Record & Playback head connections open or intermittently open	Replace
	Transistor (TR-5, TR-6) defective	Replace
	Drive motor defective	Replace
	Faulty power supply (D-9)	Replace
	Record & playback head dirty or scratched	Clean (Sec. II, Para. D.1) or replace
g. Noisy playback	Loose wire or cold solder joint	Resolder
	Dirty volume control	Clean
	Take up torque low	Replace tape deck assembly
h. Cassette tape damaged by unit	Amplifier defective	Replace
	Magnetic head defective	Replace
j. No audio circuit	Magnetic head out of alignment	Adjust (Sec. II, Par. G.8)
	Volume control dirty or defective	Clean or replace
	Amplifier defective	Repair (refer to schematic)
k. Low audio output		

D. CLEANING

1. To clean the recording or playback heads, use a commercial tape or moisten a clean cotton swab with denatured (ISOPROPYL) alcohol only. DO NOT use any sharp objects that will scratch or mark the head.
2. Clean the rollers, belts, and flywheel surfaces with a clean cotton swab moistened with alcohol only. The unit should be running while cleaning these parts.
3. Mirrors, lens and projection screen should be cleaned with a soft, lint-free cloth or use lens cleaning tissue paper. DO NOT USE any type of lens cleaning solutions or silicone lens tissues.

E. MATERIALS

Materials required are listed in the following table. The stock numbers of material available from EDUCATION SYSTEMS are included. If no number is given, the product is commercially available and not supplied by EDUCATION SYSTEMS.

39479-P9	2 oz.	DC-44 Light consistency silicone grease (Dow Corning Corp., Midland, Michigan)
39479-P16	4 oz.	Extreme Pressure Lube #3 (Evans Product Co.)
Local Purchase		Tun-O-Lube (Chemtronics Inc., Brooklyn, N.Y.)
Local Purchase		5W-30 Oil (Pennzoil Co., Oil City Pa.)
Local Purchase		Dry Neolube (Huron Industries, Port Huron, Michigan)
39479-P14	2 oz	Versalube Plus G-322L (General Electric Co., Waterford, N.Y.)
Local Purchase		Denatured (ISOPROPYL) alcohol

F. DISASSEMBLY and REASSEMBLY

1. SIDE PANELS

All repairs or internal adjustments require the removal of one or both side panels.

To remove either side panel (after the screws have been removed) slide the panel upwards until it clears the retaining channels. The right side panel (4 Fig. 11 or 5 Fig. 38) is coupled to the tape mechanism. Remove this panel carefully to avoid damage to the wire harness. The left side panel (1 Fig. 11 or 31 Fig. 40) has no attachments and can be removed freely. Disconnect the wire harness at the coupling (38301 EARLY or 44361 CURRENT).

2. DRIVE BELT (Figure 1)

To avoid damaging drive belt rotate fan slowly and lift belt over one blade at a time as fan revolves. NOTE: DO NOT remove the fan unless necessary. The fan is a press fit on the motorformer shaft and

secured with a grip ring.

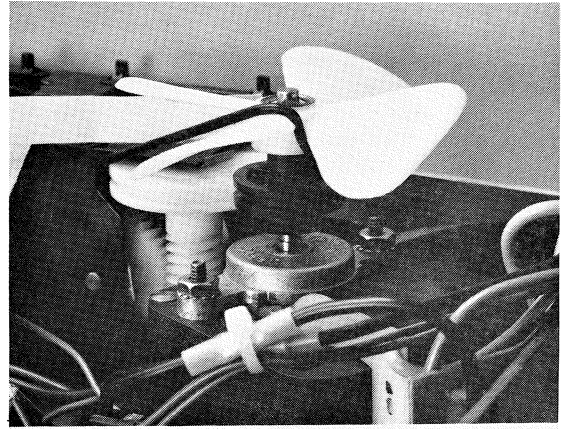


Figure 1. Drive Belt

3. FRONT CONDENSER (Figure 2)

- a. Early units. Swing lens retainer clip 90° and remove 1 or 2 retaining clips (one each side) holding lens in place. Use heavy curved tweezers to slide clips off.
- b. Current units have a retaining screw only. When replacing lens make sure lens is seated in slot at bottom and tabs of lens are into slots of mechanism assembly.

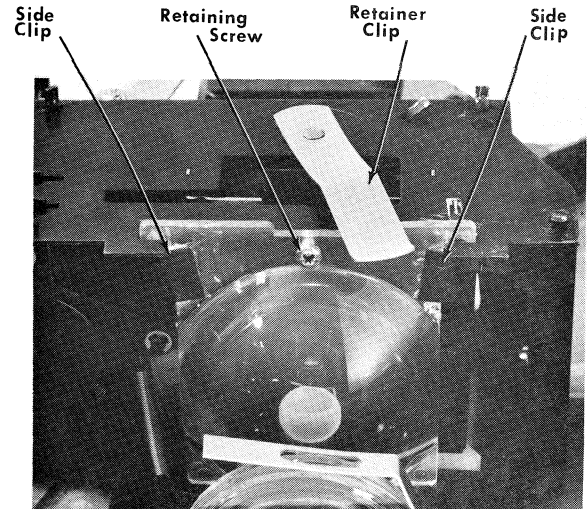


Figure 2. Front Condensing Lens

4. MECHANISM ASSEMBLY

- a. Remove two baffle clips (Early units) or one clip and brace (Current units). NOTE: When reassembling secure brace before replacing drive belts.
- b. Move projection lens forward and press actuator clamp lever (next to projection lens) back to remove baffle.
- c. When reassembling mechanism into housing, make sure washer (28 Fig. 14) is placed over edge of mechanism (at the rear).

5. MECHANISM DISASSEMBLY

NOTE: The clip (4 Fig. 19) is the retainer that secures the worm gear and shaft to the mechanism complete. All other parts will be removed from the shaft in the order given. When reassembling, make sure the parts are reassembled on the shaft in the reverse order. The end of the shaft must be inserted into its mounting hole in the mechanism complete before inserting the retaining clip.

NOTE: Recommended service of this assembly should be limited to belt and clutch spring replacement; i.e., disassembly of items 1 through 11 and 23 through 28 and 30. Do not remove cover (19) or cams (29). An exchange through a Singer Education System Service Branch is available.

Before tightening the screws to secure solenoid to mechanism chassis, make sure escapement lever is in maximum travel position and solenoid plunger is fully depressed.

6. PRIMARY MIRROR ASSEMBLY (Fig. 3)

Before removing mirror mount assembly, check the mirror setting (space between mirror and housing hub) with feeler gages. When reassembling, reset mirror to original setting, only a minor adjustment will be needed later. See Para G. 5.

Replacement Spacing

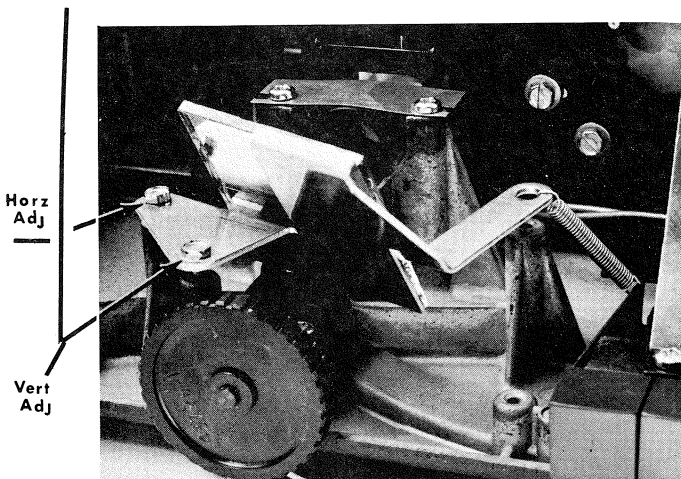


Figure 3. Primary Mirror

7. SPEAKER (Caramate models only)

When reassembling the speaker, the four spring nuts must be firmly seated.

G. ADJUSTMENTS

1. LOGIC LEVER AND MICROPHONE JACK (Figure 12 and Figure 39)

Adjust position of logic lever (15 Fig. 12 or 26 Fig. 26) forward or backward to close circuit when microphone plug is inserted into microphone jack.

Circuit must break when microphone plug is removed. Position adjustment is made by loosening two screws (16 Fig. 12 or 27 Fig. 26) and moving lever as required.

2. POWER SWITCH (Figure 15 and Figure 28)

Position the power switch assembly (12) to fully depress the switch when the power button is depressed. Allow for slight overtravel beyond the point at which the switch is heard to click "ON" or "OFF". Adjustment is made by loosening the single mounting screw (13) holding the switch assembly and adjusting the switch assembly as required.

3. ADVANCE BUTTON CIRCUIT SWITCH (Figure 15 and Figure 28) RECORD ONLY

Form switch bracket (15) to permit contacts to close (both touching) when the "ADVANCE" button is depressed. When the button is released the circuit should open (contacts not touching).

4. PULLEY ALIGNMENT

Align drive belt groove on motorformer pulley to attain parallelism within 1/16". Position of motorformer pulley can be adjusted by wedging beneath the pulley which is a press fit on the shaft.

5. PRIMARY MIRROR ADJUSTMENT (Figure 15 and Figure 28)

Adjust primary mirror assembly (1) horizontal or vertical by raising or lowering mirror mount screws (2) to center the projected image on the viewing screen. Project a 2 x 2 write on slide after having drawn a line 1/8" (3mm) from each edge, use this slide as a master to locate center.

6. CAM AND LIFTER

a. Depress "SELECT" button to elevate slide lifter (43722-G2) to the top of its cycle (highest point). The top of the lifter finger should be between 0.093 to 0.113" (2.36 to 2.87mm) above the slide tray rests. To obtain this dimension, push lightly on the mechanism at point "A" (figure 6). Check this dimension with a drill rod (twist drill) of this diameter range on top of mechanism assembly next to lifter pad.

b. Form clamp legs lightly so both legs just touch at point "B" (Figure 9).

c. Make a test slide approximately 0.015 to 0.020 inches thick (use 1/2 of cardboard folded type slide mount). Insert the slide and run it through a complete cycle. The shutter should open. Repeat cycle without slide, the shutter not open. If the shutter does not perform as specified, bend point "A" (tab on slide clamp, figure 4) to accomplish this performance standard.

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7. MAGNETIC HEAD ADJUSTMENT

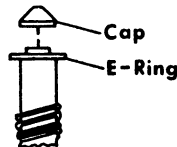
Remove plug (18 Fig. 12 or 41 Fig. 26) for access to adjusting screw (6 Fig. 24). Raise or lower the spring loaded screw (6) until the magnetic head is at a 90° angle to the playing tape (until maximum sound is heard). Replace plug.

H. SERVICE NOTES:

1. TAPE DECK SPINDLE CAPS (40 Fig. 21)

Should a cap come off replace using a small amount of cement (Duco or equal).

If cap is lost replace with a new cap or use an E Ring (251-15) in place of cap.

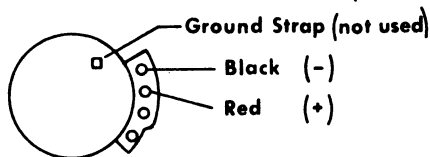


2. CARRYING CASE HANDLE

(P/N 43051-G1) Insta-Load handle fits Caramate case.

3. TAPE DRIVE MOTOR (3 Fig. 22)

The tape drive motor is now furnished with an electronic governor (VO-2110-5003) and the head wires are not assembled. To correct use #22 AWG wire and connect as sketched below.

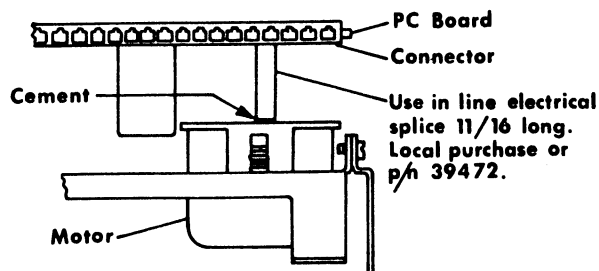


4. MOTORFORMER MOUNTING (Prior to Code E5AU) (10 Fig. 15)

When remounting motorformer projector prior to E5AU use screw (43786-P1) grommet (265-H) and washer (#8 split) this will reduce grommet compression and improve dampening effect.

5. AMPLIFIER TERMINAL SUPPORT

It is advisable to add support at the terminal connector to reduce flex and possible cracking of the amplifier board....especially if the unit or side panel is to be shipped.



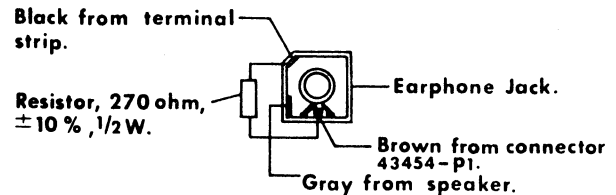
6. CARAMATE 150 HZ. MODIFICATION

See Service Bulletin #96

7. VOLUME CONTROL-EARPHONE (Prior to Code H4AE)

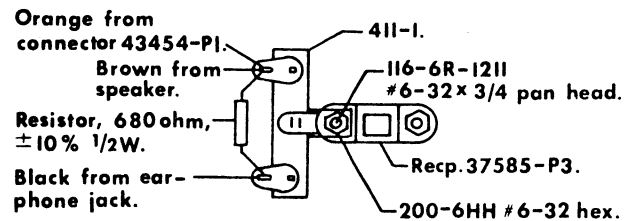
Increased control of the volume when using ear-phones can be attained with the following modifications.

A. Assemble resistor (402-27-1-2) to the ear-phone jack as follows.....



B. Attach Terminal Strip (411-1 with Resistor (402-68-1-2) attached to the receptacle (37858-P3) as shown below.

Replace screw securing receptacle with screw 116-6R-12H and rewire as shown in sketch below.



8. REPLACE TAPE DECK HEAD (ALPS)

To replace IKEJIRI head (1 Fig. 24) with ALPS head the circuits should be changed as follows in order to lower primary stages amplification, and to reduce signal to noise ratio.

A. PLAYBACK MODEL (Circuit Board-Fig. 33, 43919)

Change resistor R-20 from 6.8 ohm to 18K ohm.
Change resistor R-16 from 43 ohm to 270 ohm.
Change resistor R-41 from 39K ohm to 82K ohm.
Change resistor R-44 from 1.5 ohm to 270 ohm.
Change capacitor C-2 from 68mfd to 47 mfd.
Remove capacitor C-35 (100 mfd 6.8)

B. RECORD & PLAYBACK MODEL (Circuit Board (Fig. 33-43920-G1)

Make all changes as recorded for Playback Model.

(A) above plus the following.

Change resistor R-32 from 27K ohm to 39K ohm.

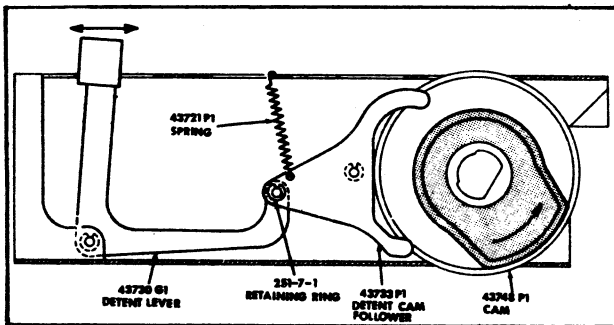


Figure 4. TRAY LOCATOR-CAM #1

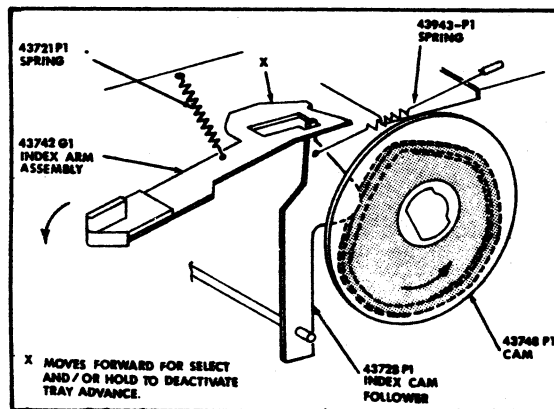


Figure 5. TRAY INDEX-CAM #2

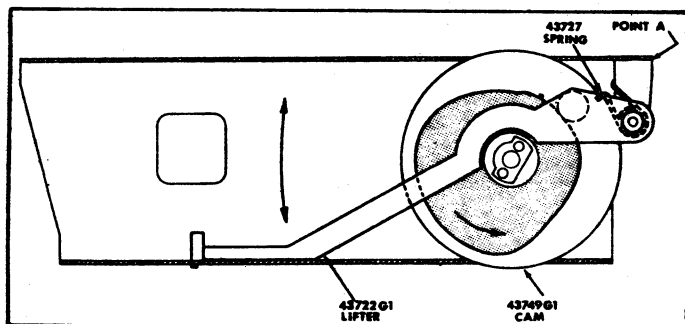


Figure 6. SLIDE LIFTER-CAM #3

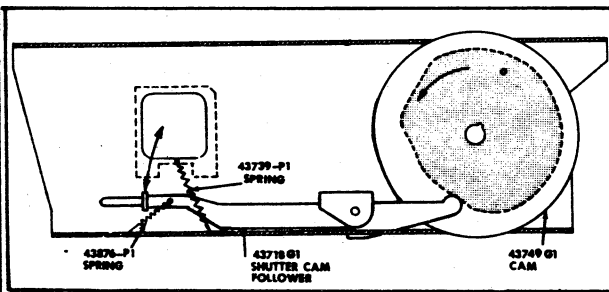


Figure 7. SHUTTER-CAM #4

SEQUENCE OF OPERATION

NOTE: These schematics show the mechanism in rest position, before the start of an advance cycle.

1. The motor runs continuously, its rotation is transferred to the worm gear, then to the drive gear with clutch spring arbor. Clutch spring is held relaxed and cam stack remains stationary.
2. Advance happens when solenoid or advance button pulls escapement (Fig. 8) and allows clutch spring to tighten on the drive gear arbor and drive through one cycle as follows.
 - a. Shutter cam #4 (Fig. 7) causes its follower to lift and close shutter and then catch on point "A" (Fig. 9) and hold shutter closed if a slide does not drop in at end of cycle.
 - b. At the same time, tray index cam #2 (Fig. 5) starts to move index arm into position but comes to dwell until slide is lifted.
 - c. The tray locator controlled by cam #1 (Fig. 4) starts to pull back.
 - d. Slide is ejected by lifter arm and cam #3 (Fig. 6). The slide clamps do not start to open until the slide is 50% up and well into the tray slots.
3. At mid cycle, the locator is back, then the index arm can complete tray advance. The slide lifter is up, holding slides in tray as it advances.
4. At the end of cycle, the locator moves out and locks the tray. The slide lifter lowers allowing next slide to drop by gravity. Shutter cam follower allows slide clamp to swing against slide, and shutter opens as cam follower completes its cycle.

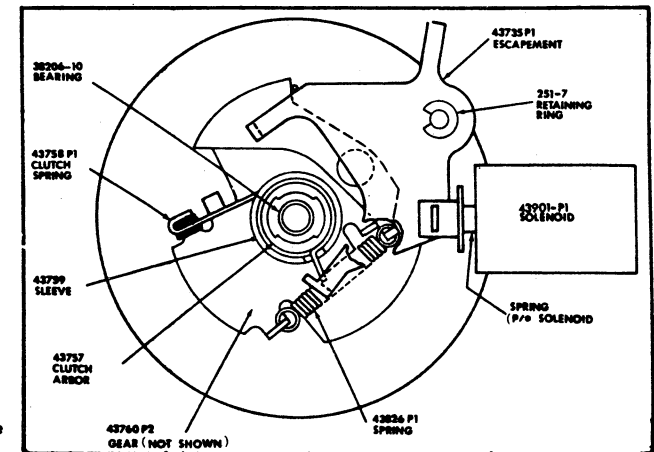


Figure 8. CAM DRIVE ASSEMBLY

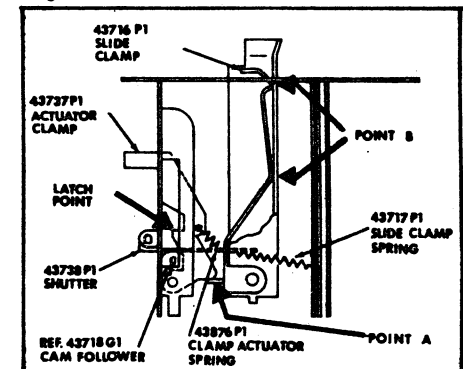


Figure 9. SHUTTER

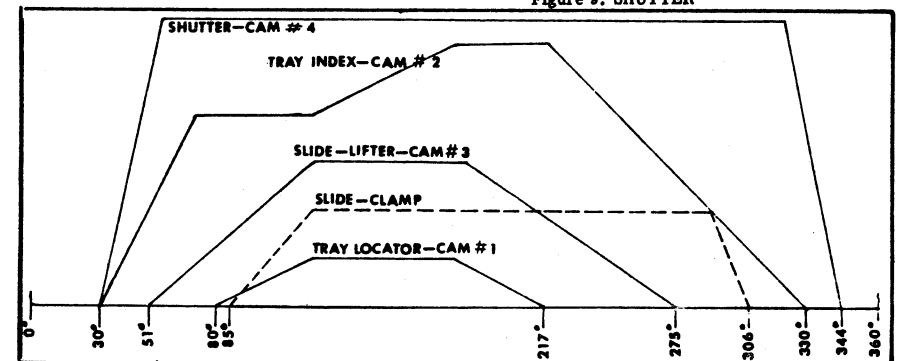


Figure 10. CAM TIMING

CARAMATE PROJECTORS

ILLUSTRATED PARTS LIST

To aid in the repair and replacement of component parts, breakdown of assemblies and subassemblies are arranged in disassembly order. The relationship of the assemblies, subassemblies and detail parts is shown by indent. All parts common to a given assembly, or subassembly, are indented one space and listed directly under the item.

The column titled "Figure and Index No." contains the index number in disassembly order of the items illustrated. Do not use the figure or index number in correspondence --- specify the catalog or part number and name.

The column titled "Description" lists item nomenclature on the drawing. The code "AR" will indicate the quantity is "as required" to meet dimensional or performance characteristics. The code "NHA" will indicate part is not available; procure "next higher assembly". The code "LP" indicates "Local Purchase". The code "NA" indicates part "Not Available"; procure next higher assembly.

PROJECTOR LISTINGS

CARAMATE

8805	PLAYBACK	117V	60Hz
8806	RECORD & PLAYBACK MODEL	117V	60Hz
8807	PLAYBACK	220V	50Hz
8808	RECORD & PLAYBACK	220V	50Hz
8855	S. P. -PLAYBACK	117V	60Hz
8856	S. P. -RECORD-PLAYBACK	117V	60Hz

CARAMATE II

8835	PLAYBACK	117V	60Hz
8836	RECORD & PLAYBACK	117V	60Hz
8837	PLAYBACK	220V	50Hz
8838	RECORD & PLAYBACK	220V	50Hz
8865	S. P. -PLAYBACK	117V	60Hz
8866	S. P. -RECORD & PLAYBACK	117V	60Hz
8867	S. P. -PLAYBACK	220V	50Hz
8868	S. P. -RECORD & PLAYBACK	220V	50Hz

CARAMATE PROJECTORS

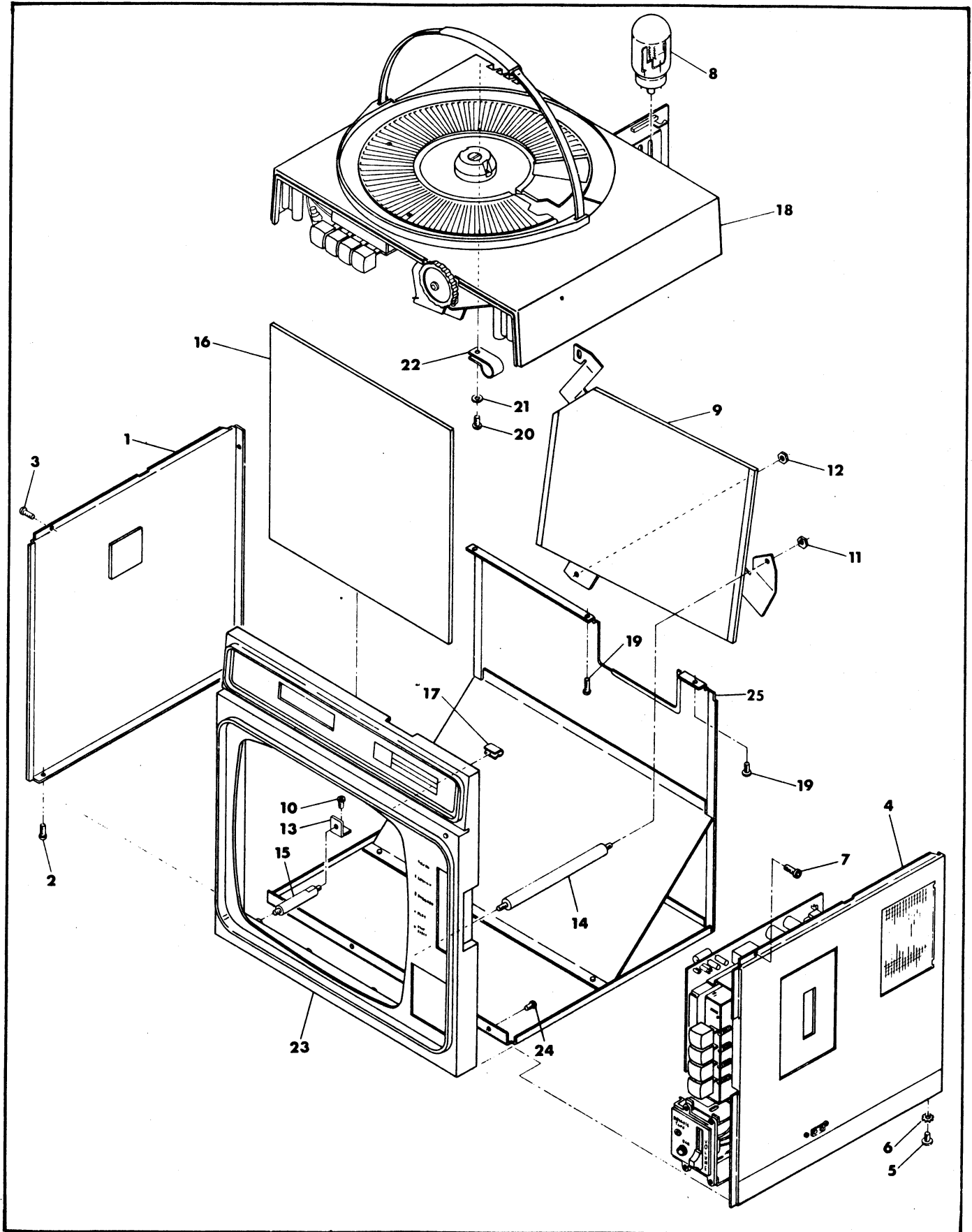


Figure 11. PROJECTOR COMPLETE

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	CATALOG NUMBERS							
				8805	8806	8807	8808	8835	8836	8837	8838
11-	43700-G1	PROJECTOR COMPLETE, Playback (117V 60 Hz)	REF	x							
	43700-G2	PROJECTOR COMPLETE, Record & Playback (117V 60 Hz)	REF		x						
	43700-G3	PROJECTOR COMPLETE, Playback (Export) (220V 50 Hz)	REF			x					
	43700-G4	PROJECTOR COMPLETE, Record & Playback (Export) (220V 50 Hz)	REF				x				
	44560-G1	PROJECTOR COMPLETE, Playback (117V 60 Hz)	REF					x			
	44560-G2	PROJECTOR COMPLETE, Record & Playback (117V 60 Hz)	REF						x		
	44560-G3	PROJECTOR COMPLETE, Playback (Export) (220V 50 Hz)	REF							x	
	44560-G4	PROJECTOR COMPLETE, Record & Playback (Export) (220V 50 Hz)	REF								x
-1	43823-G1	. PANEL ASSEMBLY, Left (Use 43823-G2)	1	x	x	x	x				
	43823-G2	. PANEL ASSEMBLY, Left.	1					x	x	x	x
ATTACHING PARTS											
-2	121-4R-4H	. SCREW, Thread Forming, No. 4 x 1/4, Pan hd	2	x	x	x	x	x	x	x	x
-3	125-4R-5L	. SCREW, Thread Forming, No. 4 x 5/16, Oval hd. . . .	1	x	x	x	x	x	x	x	x

-4	43931-G1	. PANEL COMPLETE, Right (Figure 12).	1	x		x					
	43931-G2	. PANEL COMPLETE, Right	1		x		x				
	43931-G5	. PANEL COMPLETE, Right	1					x		x	
	43931-G6	. PANEL COMPLETE, Right	1						x		x
ATTACHING PARTS											
-5	121-4R-4H	. SCREW, Thread Forming, No. 4 x 1/4, Pan hd	2	x	x	x	x	x	x	x	x
-6	220-4	. WASHER, LOCK (External Tooth)	2	x	x	x	x	x	x	x	x
-7	125-4R-5L	. SCREW, Thread Forming, No. 4 x 5/16 Oval hd. . . .	1	x	x	x	x	x	x	x	x

-8	37922-P1	. LAMP, Projection (CAR type)	1	x	x	x	x	x	x	x	x
-9	43848-G1	. MIRROR ASSEMBLY, Secondary (Figure 13)	1	x	x	x	x	x	x	x	x
ATTACHING PARTS											
-10	121-4R-4H	. SCREW, Thread Forming, No. 4 x 1/4 Pan hd	1	x	x	x	x	x	x	x	x
-11	201-10HX	. NUT, Machine 10-32, Hex	2	x	x	x	x	x	x	x	x
-12	201-6HX	. NUT, Machine 6-32, Hex	1	x	x	x	x	x	x	x	x
-13	43798	. SUPPORT	1	x	x	x	x	x	x	x	x

-14	43854-P1	. SPACER, Mirror . (5-21/32")	2	x	x	x	x				
	43854-P2	. SPACER, Mirror . (6-9/64")	2					x	x	x	x
-15	43800	. SPACER, Mirror	1	x	x	x	x	x	x	x	x
-16	43846	. SCREEN, Viewing	1	x	x	x	x	x	x	x	x
ATTACHING PARTS											
-17	43847	. CLIP	4	x	x	x	x	x	x	x	x

-18	43701-G1	. HOUSING COMPLETE (Replace w/44561-G1) Fig. 14 .	1	x							
	43701-G2	. HOUSING COMPLETE (Replace w/44561-G2)	1		x						
	43701-G3	. HOUSING COMPLETE (Replace w/44561-G3)	1			x					
	43701-G4	. HOUSING COMPLETE (Replace w/44561-G4)	1				x				
	44561-G1	. HOUSING COMPLETE	1					x			
	44561-G2	. HOUSING COMPLETE	1						x		
	44561-G3	. HOUSING COMPLETE	1							x	
	44561-G4	. HOUSING COMPLETE	1								x
ATTACHING PARTS											
-19	140-6R-5X	. SCREW, Thread Forming, No. 6 x 5/16 Pan hd	6	x		x		x		x	
	140-6R-5X	. SCREW, Thread Forming, No. 6 x 5/16 Pan hd	5		x		x		x		x
-20	140-6R-7X	. SCREW, Thread Forming, No. 6 x 7/16 Pan hd	1		x		x		x		x
-21	38473-7X	. WASHER, Flat 0.375 x 0.146 x 0.042	1		x		x		x		x
-22	267-2	. CLAMP, Wire	1		x		x		x		x

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	CATALOG NUMBERS							
				8805	8806	8807	8808	8835	8836	8837	8838
11-23	43844-G3	. BEZEL COMPLETE	1	x		x					
	43844-G4	. BEZEL COMPLETE	1		x		x				
	44566-G1	. BEZEL COMPLETE	1					x			
	44566-G2	. BEZEL COMPLETE	1						x		
ATTACHING PARTS											
-24	137-6R-6X	. SCREW, Thread Forming, No. 6 x 3/8 Pan hd.....	4	x	x	x	x	x	x	x	x
---***---											
-25	43836-G2	. PANEL COMPLETE, Rear (Figure 16)	1	x	x						
	43836-G4	. PANEL COMPLETE, Rear.....	1			x	x				
	44567-G1	. PANEL COMPLETE, Rear.....	1					x	x		
	44567-G2	. PANEL COMPLETE, Rear.....	1							x	x
	43879-P1	. MICROPHONE SET (not shown)	1		x		x	x		x	x

NOTES

CARAMATE PROJECTORS

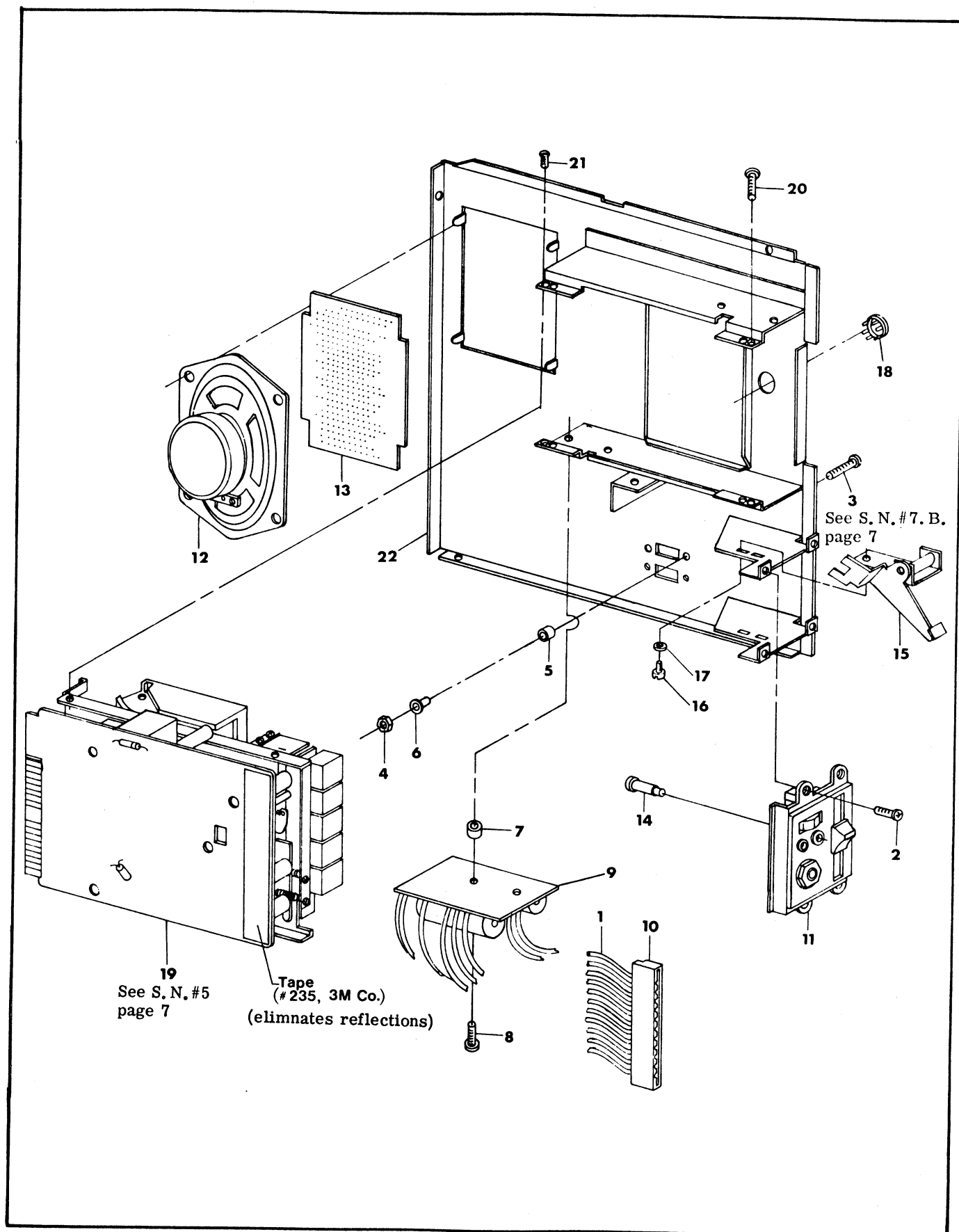


Figure 12. RIGHT PANEL COMPLETE

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS							
				43931-G1	43931-G2	43931-G5	43931-G6				
12-	43931-G1	PANEL COMPLETE, Right (Cat. 8805, 8807)	REF	x							
	43931-G2	PANEL COMPLETE, Right (Cat. 8806, 8808)	REF		x						
	43931-G5	PANEL COMPLETE, Right (Cat. 8835, 8837)	REF			x					
	43931-G6	PANEL COMPLETE, Right (Cat. 8836, 8838)	REF				x				
-1		. HARNESS ASSEMBLY	NA	x							
		. HARNESS ASSEMBLY	NA		x						
		. HARNESS ASSEMBLY	NA			x					
		. HARNESS ASSEMBLY	NA				x				
		ATTACHING PARTS									
-2	131-2R-4X	. SCREW, Thread Cutting, No. 2 x 1/4 Pan hd	4	x	x	x	x				
-3	116-6R-10H	. SCREW, Machine, 6-32 x 5/8 Pan hd	2	x	x	x	x				
-4	200-6HX	. NUT, Machine, 6-32 Hex	2	x	x	x	x				
-5	32090-21	. SPACER, Tubular	2	x	x	x	x				
-6	37610	. SPACER, Flanged.	2	x	x	x	x				
-7	41086-17	. SPACER, Tubular	2	x	x	x	x				
-8	131-4R-8X	. SCREW, Thread Cutting, No. 4 x 1/2 Pan hd	2	x	x	x	x				

-9	43898-G2	. . BOARD ASSEMBLY (Figure 30).	1	x	x	x	x				
-10	43454-P1	. . CONNECTOR (accepts terminal 43457-P1)	1	x	x	x	x				
-11	43930-G1	. . PANEL ASSEMBLY (Figure 17) Playback	1	x							
	43930-G2	. . PANEL ASSEMBLY. Record & Playback.	1		x						
	43930-G3	. . PANEL ASSEMBLY. II Playback.	1			x					
	43930-G4	. . PANEL ASSEMBLY. II Record & Playback	1				x				
-12	43834-P1	. SPEAKER	1	x	x						
-13	43833-P1	. GRILL, Speaker	1	x	x						
-14	43928	. STUD, Logic Switch Lever	1		x		x				
-15	43827-G2	. LEVER COMPLETE, Logic (Starting Code K3N)	1		x		x				
		ATTACHING PARTS									
-16	137-4R-4X	. SCREW, Thread Cutting No. 4 x 1/4 Pan hd	2		x		x				
-17	220-4	. WASHER, Lock (External Teeth).	1				x				

-18	42677-P4	. PLUG	1	x	x	x	x				
-19*	43816-G4	. COMPONENT SET (Figure 18) Playback	1	x		x					
**	43816-G5	. COMPONENT SET, Play & Record	1		x		x				
		ATTACHING PARTS									
-20	137-4R-4X	. SCREW, Thread Cutting No. 4 x 1/4 Pan hd	2	x	x	x	x				
-21	131-6R-4X	. SCREW, Thread Cutting No. 6 x 1/4 Pan hd	2	x	x	x	x				

-22	43931-G3	. PANEL ASSEMBLY, Right.	1	x	x						
	43931-G4	. PANEL ASSEMBLY, Right.	1			x	x				
	44556-P1	. . SWITCH (not shown)	1			x	x				

*NOTE: Playback Models prior to date code J3M used 43816-G1 Component Set. This (43816-G1) set is not available, use as indicated above with adapter 44346-G2.

**All Record & Playback Models prior to date code K3N used 43816-G2 component set. This (43816-G2) set is not available, use as indicated above with adapter 44346-G2.

44346-G1 Adapter Complete - adapts early amplifier to current Caramates starting with Date Code H4AB
 44346-G2 Adapter Complete - adapts current plug in amplifier to early Caramate prior to Date Code H4AB

38298 Terminal - used in connector cap on early Caramates prior to Date Code H4AB

*44360-P1 Terminal, Tubular - used with Terminal 44360-P2 below and used in connector cap on current Caramates after Date Code H4AB

*44360-P2 Terminal, Pin - used with above in connector cap on current Caramates after Date Code H4AB

*Requires use of Molex #HT-2285 Extractor in repair (Order Singer #44360-PLA)

CARAMATE PROJECTORS

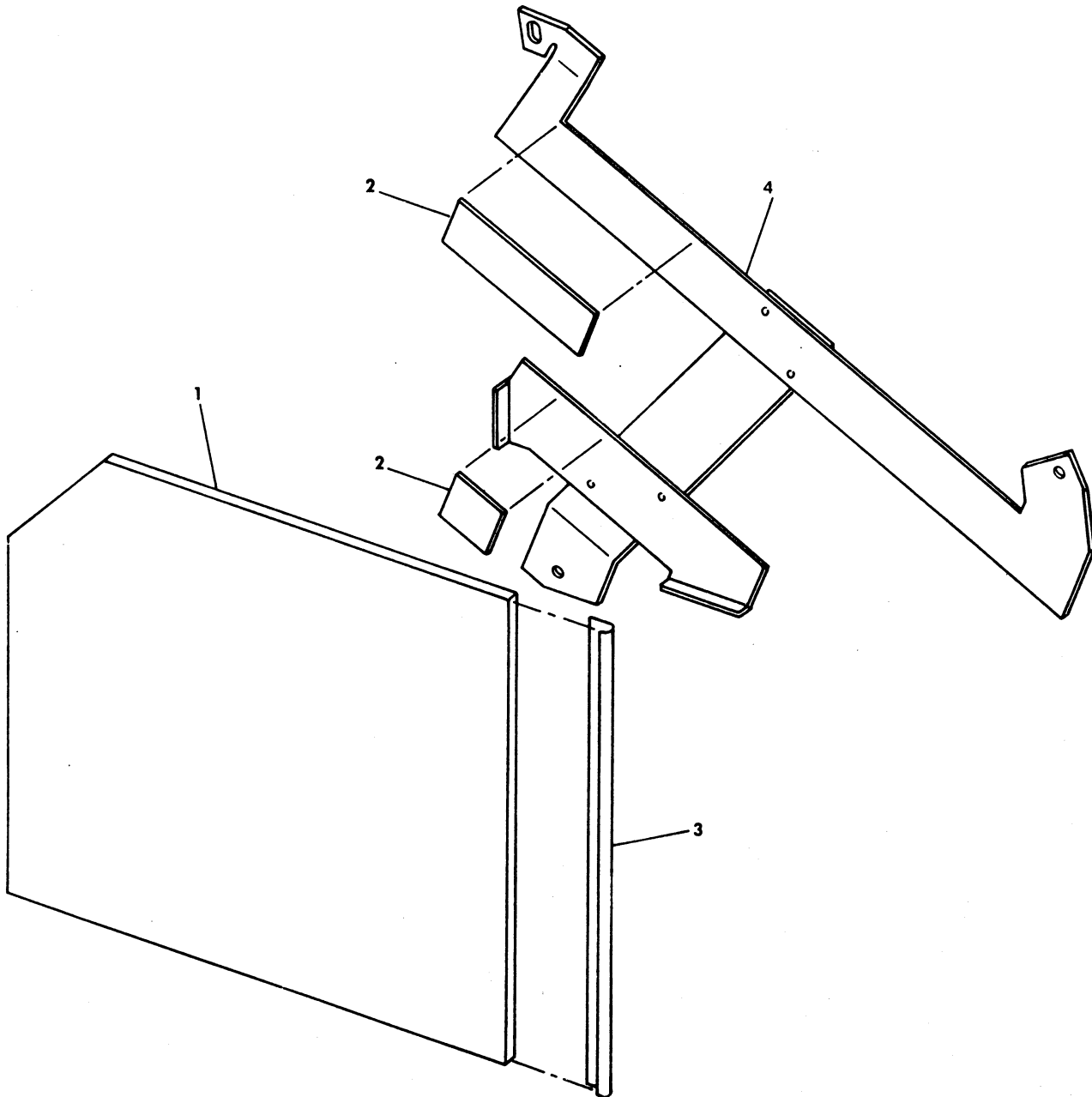


Figure 13. SECONDARY MIRROR ASSEMBLY

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS									
				1	2	3	4	5	43848-G1				
13-	43848-G1	MIRROR ASSEMBLY, Secondary	REF	x									
-1	43849-P1	. MIRROR	1	x									
		ATTACHING PARTS											
-2	43848-P2	. TAPE (Double coated Foam tape, 3M#4016).....	LP	x									

-3	43848-P5	. TAPE (Photo Marking Tape, 3M#235).....	LP	x									
-4	43850-G1	. BRACKET	1	x									

NOTES

CARAMATE PROJECTORS

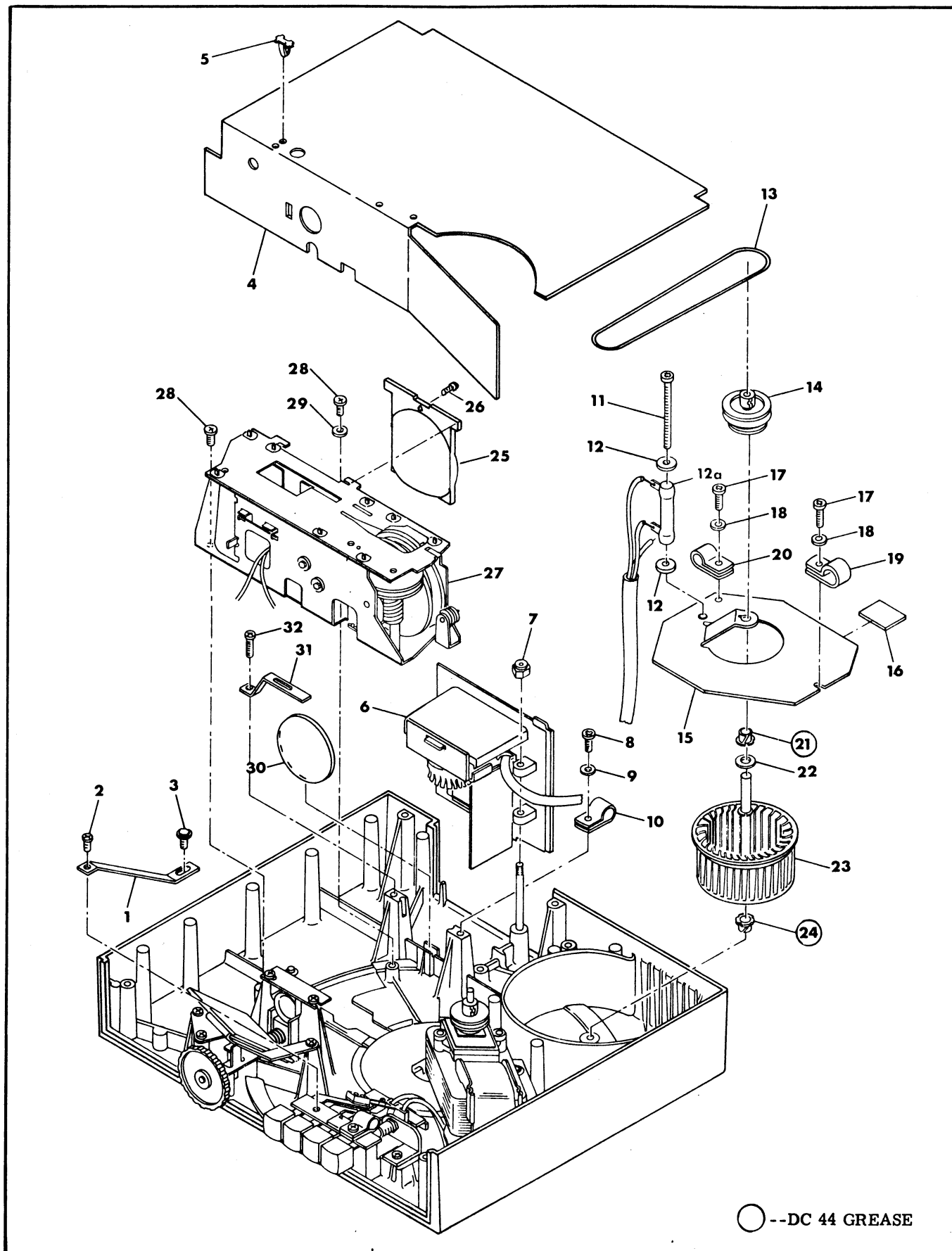


Figure 14. HOUSING COMPLETE (Stage 1)

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS									
				43701-G1	43701-G2	43701-G3	43701-G4	44561-G1	44561-G2	44561-G3	44561-G4		
14-	43701-G1	HOUSING COMPLETE (Stage I) cat. 8805	REF	x									
	43701-G2	HOUSING COMPLETE (Stage I) cat. 8806	REF		x								
	43701-G3	HOUSING COMPLETE (Stage I) cat. 8807 Export ..	REF			x							
	43701-G4	HOUSING COMPLETE (Stage I) cat. 8808 Export ..	REF				x						
	44561-G1	HOUSING COMPLETE (Stage I) cat. 8835	REF					x					
	44561-G2	HOUSING COMPLETE (Stage I) cat. 8836	REF						x				
	44561-G3	HOUSING COMPLETE (Stage I) cat. 8837 Export ..	REF							x			
	44561-G4	HOUSING COMPLETE (Stage I) cat. 8838 Export ..	REF								x		
-1	44042-P1	. SUPPORT, Mechanism	1	x	x	x	x	x	x	x	x	x	
		ATTACHING PARTS											
-2	140-6R-7X	. SCREW, Thread Forming No. 6 x 7/16, Pan hd ..	1	x	x	x	x	x	x	x	x	x	
-3	40921-9X	. SCREW, Self Threading, Hex hd	1	x	x	x	x	x	x	x	x	x	

-4	43896-P1	. BAFFLE	1	x	x	x	x	x	x	x	x	x	
		ATTACHING PARTS											
-5	43877	. CLIP	1	x	x	x	x	x	x	x	x	x	

-6	43857-G2	. DOOR COMPLETE, Lamp	1	x	x			x	x				
	43857-G4	. DOOR COMPLETE, Lamp	1			x	x				x	x	
		ATTACHING PARTS											
-7	203-3	. NUT, Stop No. 8-32	1	x	x	x	x	x	x	x	x	x	
-8	140-6R-7X	. SCREW, Thread Forming No. 6 x 7/16, Pan hd ..	1	x	x	x	x	x	x	x	x	x	
-9	38473-7X	. WASHER, Flat 0.375 x 0.146 x 0.042	1	x	x	x	x	x	x	x	x	x	
-10	267-4	. CLAMP, Wire	1	x	x	x	x	x	x	x	x	x	
-11	116-6R-36H	. SCREW, Machine No. 6-32 x 2 1/4, Pan hd	1	x	x			x	x				
-12	41846-16	. WASHER, Flat 0.435 x 0.150 x 0.062	2	x	x								
	41846-16	. WASHER, Flat 0.435 x 0.150 x 0.062	1					x	x				

	43857-G3	. BRACKET ASSEMBLY, Socket	1	x	x	x	x	x	x	x	x	x	
-12a	43888-P1	. RESISTOR (10 ohm 12 Watt ±5%) (R-70)	1	x	x								
-13	43893	. BELT, Blower Drive	1	x	x	x	x	x	x	x	x	x	
-14	43784-G2	. PULLEY ASSEMBLY, Driven. 1.320 Dia.	1	x	x	x	x						
	43784-G4	. PULLEY ASSEMBLY, Driven. 1.410 Dia.	1							x	x	x	x
-15	43762-G1	. PLATE ASSEMBLY, Blower Wheel (use 44562-P1)	1	x	x	x	x						
	44562-P1	. PLATE, Blower Wheel	1					x	x	x	x		
		ATTACHING PARTS											
-16	39474-P14	. TAPE (3M 4308)	LP	x	x	x	x						
-17	140-6R-8X	. SCREW, Thread Forming No. 6 x 1/2, Pan hd ..	2	x	x	x	x	x	x	x	x	x	
-18	38473-7X	. WASHER, Flat 0.375 x 0.146 x 0.042	2	x	x	x	x	x	x	x	x	x	
-19	267-7	. CLAMP, Wire	1	x	x	x	x	x	x	x	x	x	
-20	267-2	. CLAMP, Wire	1	x	x	x	x	x	x	x	x	x	

-21	38206-10	. BEARING	1	x	x	x	x						
-22	41846-15	. WASHER, Flat 0.375 x 0.187 x 0.032	1	x	x	x	x	x	x	x	x	x	
-23	42855-G3	. WHEEL ASSEMBLY, Blower	1	x	x	x	x	x	x	x	x	x	
-24	38206-10	. BEARING	1	x	x	x	x	x	x	x	x	x	
-25	43793-P1	. LENS, Front Condensing	1	x	x	x	x	x	x	x	x	x	
		ATTACHING PARTS											
-26	140-4R-4X	. SCREW, Thread Forming No. 4 x 1/4, Pan hd ..	1	x	x	x	x	x	x	x	x	x	

-27	43707-G1	. MECHANISM COMPLETE, (Figure 19)	1	x	x	x	x	x	x	x	x	x	
		ATTACHING PARTS											
-28	140-6R-5H	. SCREW, Thread Forming No. 6 x 5/16, Pan hd ..	3	x	x	x	x	x	x	x	x	x	
-29	38473-7X	. WASHER, Flat 0.375 x 0.146 x 0.042	1	x	x	x	x	x	x	x	x	x	

-30	43887-P1	. LENS, Rear Condensing	1	x	x	x	x	x	x	x	x	x	
		ATTACHING PARTS											
-31	43792-P1	. RETAINER	1	x	x	x	x	x	x	x	x	x	
-32	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd ..	1	x	x	x	x	x	x	x	x	x	

CARAMATE PROJECTORS

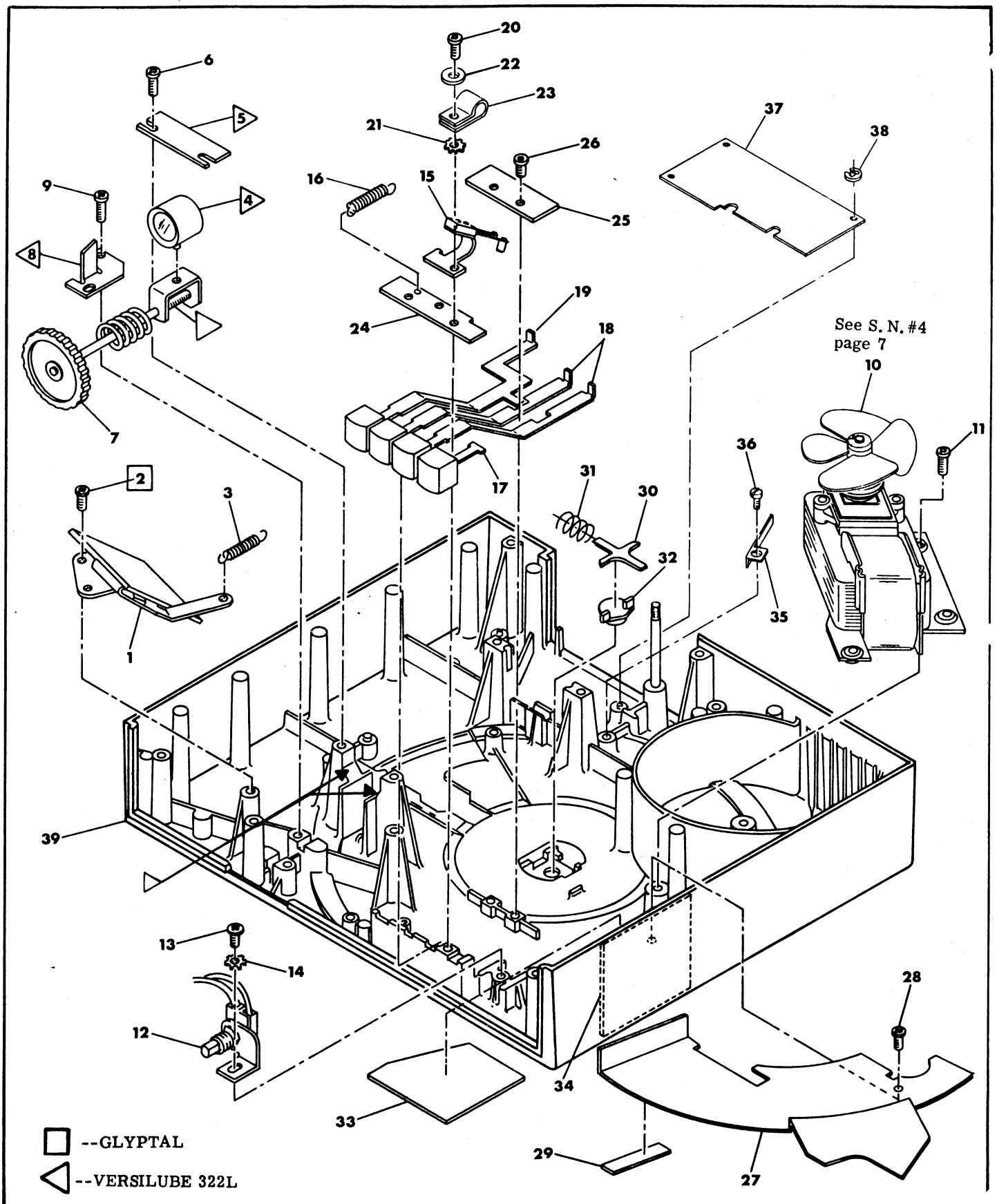


Figure 15. HOUSING COMPLETE (Stage II)

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY								
				43701-G1	43701-G2	43701-G3	43701-G4	44561-G1	44561-G2	44561-G3	44561-G4
15-1	43804-G1	. MOUNT ASSEMBLY, Primary Mirror ATTACHING PARTS	1	x	x	x	x	x	x	x	
-2	40921-8X	. SCREW	2	x	x	x	x	x	x	x	
-3	44365-P1	. SPRING -----	1	x	x	x	x	x	x	x	
-4	43799-P1	. LENS, Objective ATTACHING PARTS	1	x	x	x	x	x	x	x	
-5	43802	. RETAINER	1	x	x	x	x	x	x	x	
-6	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd . . . -----	2	x	x	x	x	x	x	x	
-7	43794-G3	. DRIVER AND KNOB ASSEMBLY ATTACHING PARTS	1	x	x	x	x	x	x	x	
-8	43803-P1	. RETAINER, Focusing Shaft	1	x	x	x	x	x	x	x	
-9	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd . . . -----	2	x	x	x	x	x	x	x	
-10	44039-G1	. MOTORFORMER COMPLETE (117V 60 Hz)	1	x	x						
	44039-G2	. MOTORFORMER COMPLETE (220V 50 Hz)	1			x	x				
	44039-G5	. MOTORFORMER COMPLETE (117V 60 Hz)	1					x	x		
	44039-G6	. MOTORFORMER COMPLETE (220V 50 Hz)	1							x	x
	44385-G1	. . FAN ASSEMBLY, Shaft Hole Diameter .182 . . .	1	x	x	x	x				
	44385-G2	. . FAN ASSEMBLY, Shaft Hole Diameter .218 . . .	1					x	x	x	x
	257-4-1	. . RING, Retaining	1	x	x	x	x	x	x	x	x
	43784-G1	. . PULLEY ASSEMBLY, (Shaft Diameter .181) . . .	1	x	x	x	x				
	43784-G3	. . PULLEY ASSEMBLY, (Shaft Diameter .218) . . .	1					x	x	x	x
	265-11	. . GRQMMET ATTACHING PARTS	3	x	x	x	x	x	x	x	x
-11	43786-P2	. SCREW, Motor Mount -----	3	x	x	x	x	x	x	x	x
-12	43779-G2	. SWITCH ASSEMBLY, Power	1	x	x	x	x				
	43779-G1	. SWITCH ASSEMBLY, Power ATTACHING PARTS	1					x	x	x	x
-13	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd . . .	1	x	x	x	x	x	x	x	x
-14	220-6	. WASHER, Lock (External Teeth) -----	1	x	x	x	x	x	x	x	x
-15	43776-G1	. SWITCH ASSEMBLY	1		x	x		x		x	
-16	43902-P1	. SPRING, Control Bar	2	x	x	x	x	x	x	x	x
-17	43734-G1	. BAR, Switch	1	x	x	x	x	x	x	x	x
-18	43734-G2	. BAR, Select	2	x	x	x	x	x	x	x	x
-19	43734-G3	. BAR, Hold ATTACHING PARTS	1	x	x	x	x	x	x	x	x
-20	140-6R-7X	. SCREW, Thread Forming No. 6 x 7/16, Pan hd . . .	2	x	x	x	x	x	x	x	x
-21	220-6	. WASHER, Lock (External Teeth)	1	x	x	x	x	x	x	x	x
-22	38473-7X	. WASHER, Flat 0.375 x 0.146 x 0.042	1	x	x	x	x				
-23	267-2	. CLAMP, Wire	1	x	x	x	x				
-24	43775	. RETAINER, Bar	1	x	x	x	x	x	x	x	x
-25	43774	. RETAINER, Switch Bar	1	x	x	x	x	x	x	x	x
-26	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd . . . -----	2	x	x	x	x	x	x	x	x
-27	43912-P1	. DEFLECTOR, Force Field ATTACHING PARTS	1	x	x	x	x	x	x	x	x
-28	125-4R-5L	. SCREW, Thread Forming No. 4 x 5/16, Pan hd . . .	2	x	x	x	x	x	x	x	x
-29	43701-P12	. TAPE (No. 4016 - 3M Co.) -----	LP	x	x	x	x	x	x	x	x
-30	43809	. LATCH, Slide Tray	1	x	x	x	x	x	x	x	x
-31	43810	. SPRING, Latch Tray	1	x	x	x	x	x	x	x	x
-32	43811-P1	. CAM, Tray Latch	1	x	x	x	x	x	x	x	x
-33	44357	. INSULATOR	1	x	x	x	x				
-34	44358	. INSULATOR	1	x	x	x	x	x	x	x	x
-35	44387-P1	. BAFFLE, Light	1	x	x	x	x	x	x	x	x

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS									
				43701-G1	43701-G2	43701-G3	43701-G4	44561-G1	44561-G2	44561-G3	44561-G4		
		ATTACHING PARTS											
15-36	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd -----	1	x	x	x	x	x	x	x	x	x	
-37	44572-P1	. SHIELD	1	x				x	x	x	x		
		ATTACHING PARTS											
-38	257-3-1	. RING, Retaining -----	3					x	x	x	x		
-39	43702-G2	. HOUSING ASSEMBLY, Upper	NHA	x	x	x	x						
	43702-G5	. HOUSING ASSEMBLY, Upper	NHA					x	x	x	x		
	43886-G1	. . HANDLE ASSEMBLY	1	x	x	x	x	x	x	x	x	x	
	189-4-6	. . ROLL PIN, Handle	2	x	x	x	x	x	x	x	x	x	
	43706	. . POST	1	x	x	x	x	x	x	x	x	x	
	116-6R-3H	. . SCREW, Machine 6-32 x 3/16, Pan hd	1	x	x	x	x	x	x	x	x	x	

NOTES

CARAMATE PROJECTORS

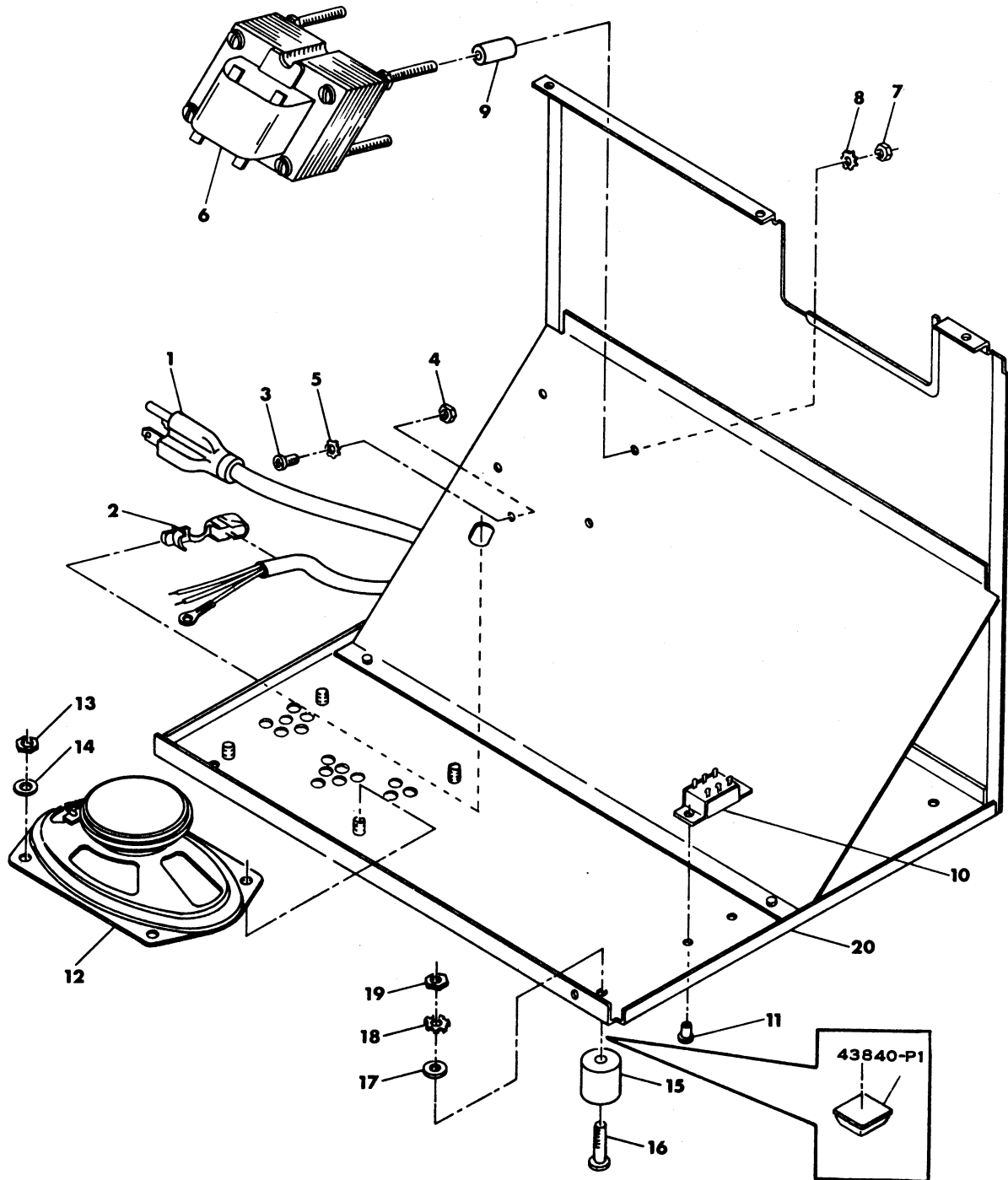


Figure 16. REAR PANEL COMPLETE

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS							
				43836-G2	43836-G4	44567-G1	44567-G2				
16-	43836-G2	PANEL COMPLETE, Rear (cat. 8805, 8806).....	REF	x							
	43836-G4	PANEL COMPLETE, Rear (cat. 8807, 8808) Export	REF		x						
	44567-G1	PANEL COMPLETE, Rear (cat. 8835, 8836).....	REF			x					
	44567-G2	PANEL COMPLETE, Rear (cat. 8837, 8838) Export	REF				x				
-1	43842-P1	. CORD, Power	1	x		x					
	43969-G2	. CORD, Power . Export	1		x		x				
-2	243-1	. BUSHING, Strain Relief	1	x	x	x	x				
-3	116-6R-4X	. SCREW, Machine No. 6-32 x 1/4, Pan hd.	1	x	x	x	x				
-4	200-6HX	. NUT 6-32, Hex	1	x	x	x	x				
-5	220-6	. WASHER, Lock (External Teeth)	1	x	x	x	x				
-6	43889-P1	. TRANSFORMER	1		x		x				
		ATTACHING PARTS									
-7	200-10HX	. NUT 10-24, Hex	4		x		x				
-8	220-10	. WASHER, Lock (External Teeth)	4		x		x				
-9	41086-11	. SPACER	4		x		x				
		-----***-----									
-10	43904-P1	. SWITCH	1		x		x				
		ATTACHING PARTS									
-11	175-6-9H	. RIVET	2		x		x				
		-----***-----									
-12	43834-P1	. SPEAKER	1			x	x				
		ATTACHING PARTS									
-13	200-8HX	. NUT 8-32, Hex	4			x	x				
-14	220-8	. WASHER, Lock (External Teeth)	4			x	x				
		-----***-----									
-15	43840-P1	. FOOT, Square	4	x	x						
	44568	. FOOT	4			x	x				
		ATTACHING PARTS									
-16	116-8R-12X	. SCREW, Machine 8-32 x 3/4, Pan hd.	4			x	x				
-17	33500-18X	. WASHER, Flat 0.625 x 0.178 x 0.064	4			x	x				
-18	220-8	. WASHER, Lock (External Teeth)	4			x	x				
-19	200-8HX	. NUT 8-32, Hex	4			x	x				
		-----***-----									
-20		. PANEL ASSEMBLY	NHA	x	x	x	x				

CARAMATE PROJECTORS

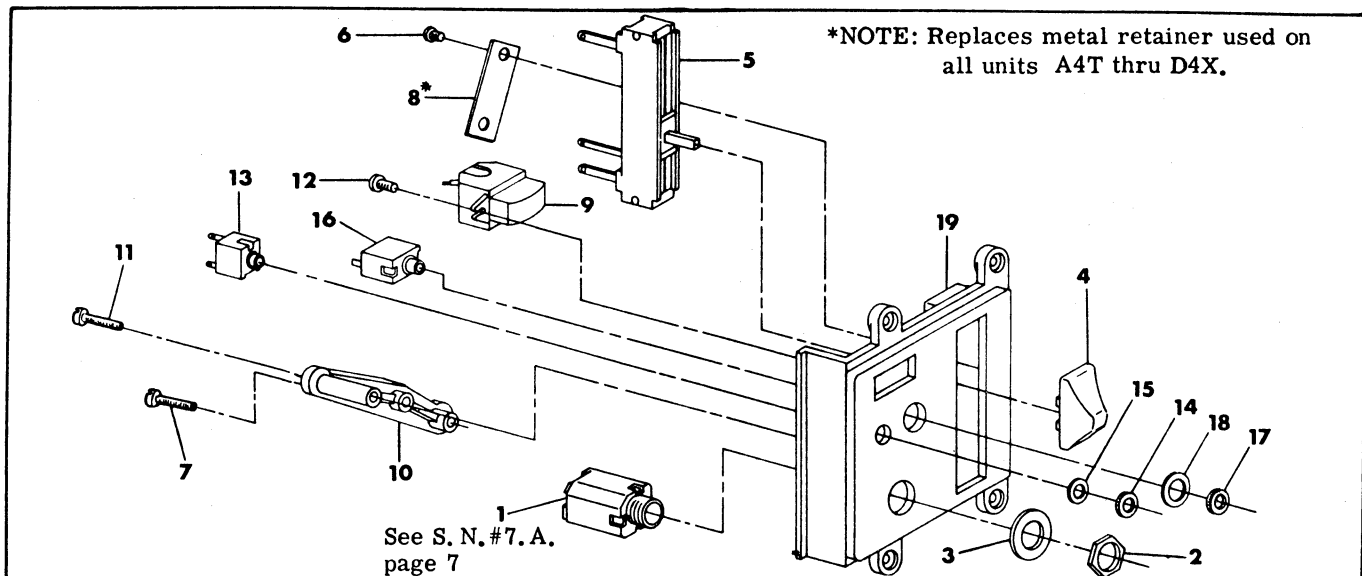


Figure 17. CONTROL PANEL ASSEMBLY

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS													
				43930-G1	43930-G2	43930-G3	43930-G4										
17-	43930-G1	PANEL ASSEMBLY, Control (Cat. 8805, 8807) (P) . .	REF	x													
	43930-G2	PANEL ASSEMBLY, Control (Cat. 8806, 8808) (PR) .	REF		x												
	43930-G3	PANEL ASSEMBLY, Control (Cat. 8835, 8837) (P) . .	REF			x											
	43930-G4	PANEL ASSEMBLY, Control (Cat. 8836, 8838) (PR) .	REF					x									
-1	43926-G1	. JACK ASSEMBLY, Earphone	1	x	x	x	x										
		ATTACHING PARTS															
-2	42563-P3	. NUT	1	x	x	x	x										
-3	42563-P4	. WASHER	1	x	x	x	x										
		-----***----															
-4	43878-P1	. CAP	1	x	x	x	x										
-5	43929-G1	. RESISTOR ASSEMBLY	1	x	x	x	x										
		ATTACHING PARTS															
-6	137-4R-4X	. SCREW, Thread Cutting No. 4 x 1/4, Pan hd	2	x		x											
	137-4R-4X	. SCREW, Thread Cutting No. 4 x 1/4, Pan hd	1		x		x										
-7	121-4R-10X	. SCREW, Thread Cutting No. 4 x 5/8, Pan hd	1		x		x										
-8	43825*	. RETAINER	1	x	x	x	x										
		-----***----															
-9	43925-G1	. VU-METER ASSEMBLY	1		x		x										
		ATTACHING PARTS															
-10	43944-P1	. BRACKET	1		x		x										
-11	121-4R-12X	. SCREW, Thread Cutting No. 4 x 3/4, Pan hd	1		x		x										
-12	137-4R-4X	. SCREW, Thread Cutting No. 4 x 1/4, Pan hd	1		x		x										
		-----***----															
-13	43927-G1	. JACK ASSEMBLY, Remote Control	1	x	x	x	x										
		ATTACHING PARTS															
-14	43832-P3	. NUT	1	x	x	x	x										
-15	43832-P4	. WASHER	1	x	x	x	x										
		-----***----															
-16	43924-G1	. JACK ASSEMBLY, Microphone	1		x		x										
		ATTACHING PARTS															
-17	43831-P3	. NUT	1		x		x										
-18	43831-P4	. WASHER	1		x		x										
		-----***----															
-19	43815-P3	. PANEL	1	x													
	43815-P2	. PANEL	1		x												
	43815-P5	. PANEL	1				x										
	43815-P4	. PANEL	1								x						

CARAMATE PROJECTORS

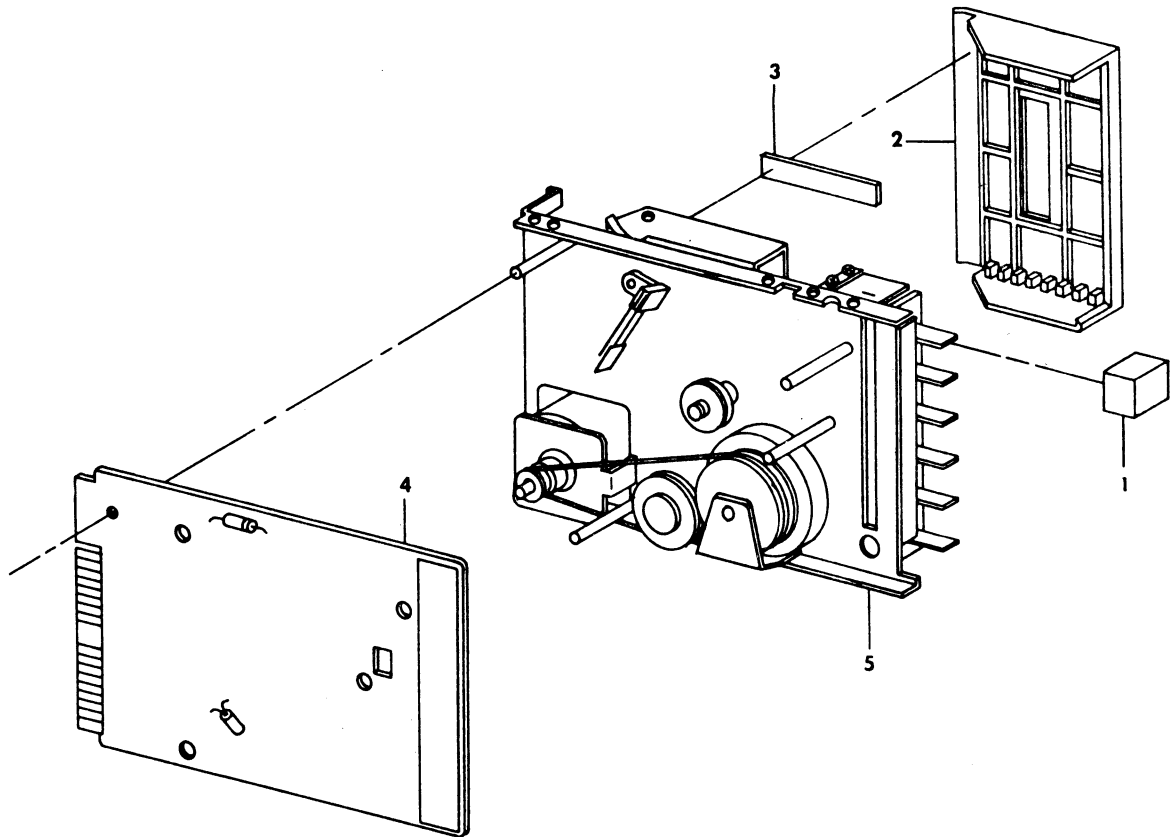


Figure 18. COMPONENT SET ASSEMBLY

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS							
				1	2	3	4	5			
18-	43816-G1*	COMPONENT SET ASSEMBLY (Prior to J3M Code)...	NA	x							
	43816-G2**	COMPONENT SET ASSEMBLY (Prior to K3N Code)...	NA		x						
	43816-G4*	COMPONENT SET ASSEMBLY (Starting Code J3M)...	REF			x					
	43816-G5**	COMPONENT SET ASSEMBLY (Starting Code K3N)...	REF				x				
-1	43772	. BUTTON, Push.	4	x		x					
	43772	. BUTTON, Push.	5		x		x				
-2	44037-G1	. DOOR ASSEMBLY, Cassette.	1	x	x	x	x				
		ATTACHING PARTS									
-3		. TAPE (double face)(No. 4032 - 3M Co.)	LP	x	x	x	x				

	43883-G1	. COMPONENT SET.	NA	x							
	43884-G1	. COMPONENT SET.	NA		x						
	43917-P1	. COMPONENT SET.	REF			x					
	43918-G1	. COMPONENT SET.	REF				x				
-4	43855-P1	. BOARD, Circuit (Figure 31)	NA	x							
	43835-P1	. BOARD, Circuit (Figure 32)	NA		x						
	43919-P1	. BOARD, Circuit (Figure 33)	REF			x					
	43920-P1	. BOARD, Circuit (Figure 33)	REF				x				
-5	43817-G1	. TAPE DECK COMPLETE (Figure 21 & 22).	NA	x							
	43817-G2	. TAPE DECK COMPLETE (Figure 21 & 22).	NA		x						
	43817-G3	. TAPE DECK COMPLETE (Figure 21 & 22).	REF			x					
	43817-G4	. TAPE DECK COMPLETE (Figure 21 & 22).	REF				x				
		NOTE *Used on Playback Models									
		**Used on Record & Playback									

CARAMATE PROJECTORS

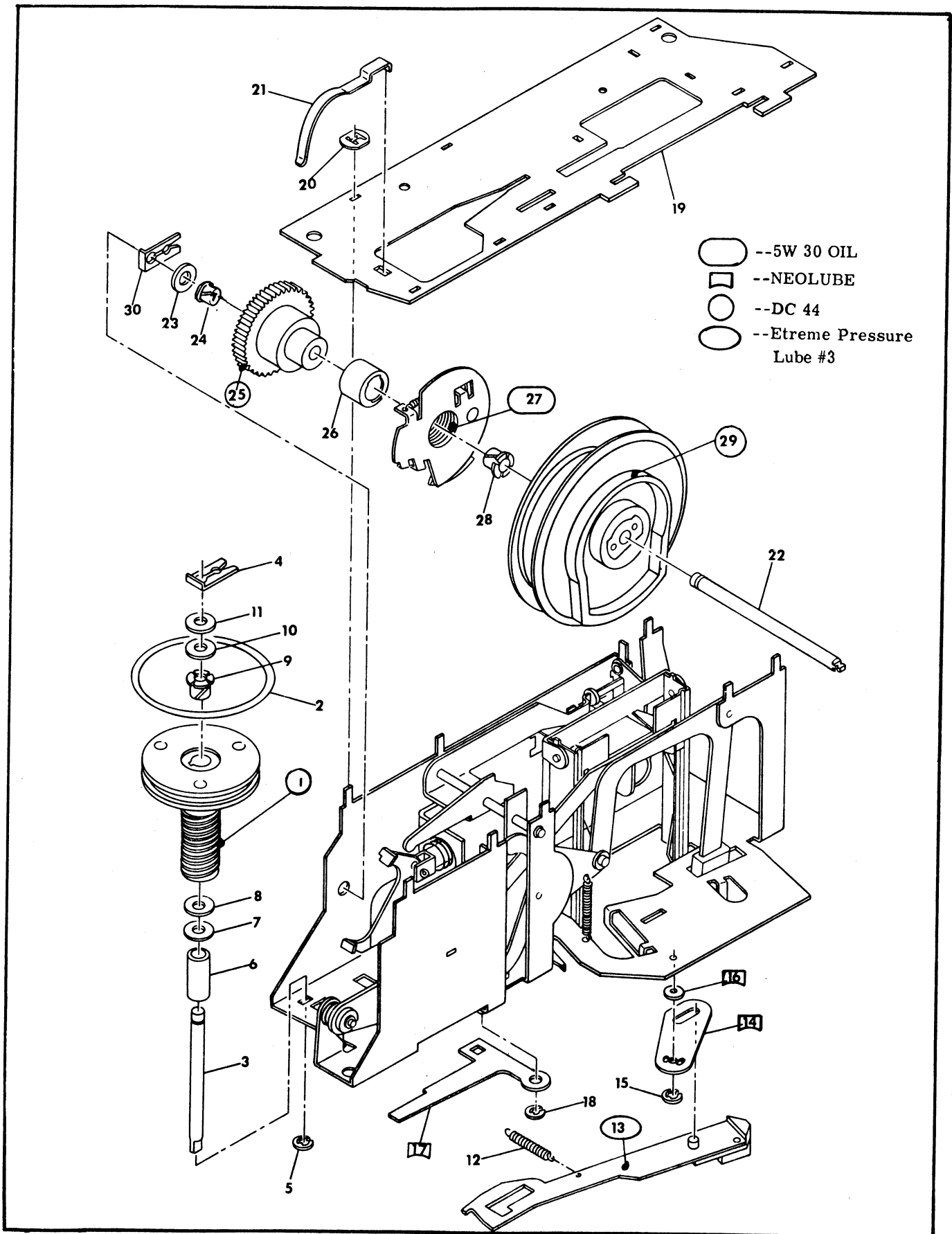


Figure 19. MECHANISM COMPLETE (Stage I)

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS									
				43707-G1									
19-	43707-G1	MECHANISM COMPLETE (Stage I)	REF	x									
-1	43763-P2	. WORM	1	x									
-2	43892	. BELT	1	x									
-3	43747-P3	. SHAFT	1	x									
		ATTACHING PARTS											
-4	43761	. CLIP	1	x									
-5	251-7-1	. RING, Retaining	1	x									

-6	428-B4-14	. TUBING	1	x									
-7	35473-51	. WASHER, Flat 0.375 x 0.192 x 0.031	1	x									
-8	30473-10	. WASHER, Flat 0.375 x 0.188 x 0.008	1	x									
-9	38206-10	. BEARING	1	x									
-10	42934-P3	. WASHER	1	x									
-11	30473-10	. WASHER, Flat 0.375 x 0.188 x 0.008	1	x									
-12	43721-P1	. SPRING	1	x									
-13	43742-G1	. ARM ASSEMBLY, Index	1	x									
-14*	44392-P1	. LINK, Index	1	x									
		ATTACHING PARTS											
-15	251-7-1	. RING, Retaining	1	x									
-16	41846-6	. WASHER, Flat 0.312 x 0.134 x 0.013	1	x									

-17	43746-P2	. LEVER, Escapement	1	x									
		ATTACHING PARTS											
-18	251-7-1	. RING, Retaining	1	x									

-19		. COVER, Frame Mechanism	NA	x									
		ATTACHING PARTS											
-20	39299	. NUT, Spring	9	x									

-21		. SPRING, Compensating	NA	x									
-22	43747-P2	. SHAFT	1	x									
-23	224-19	. WASHER, Spring	1	x									
-24	38206-10	. BEARING	1	x									
-25	43760-P2	. GEAR	1	x									
-26	43759	. SLEEVE	1	x									
-27	43752-G2	. RELEASE COMPLETE, Overload	1	x									
-28	43964	. BEARING	1	x									
-29		. CAM ASSEMBLY	NA	x									
		ATTACHING PARTS											
-30	43761	. CLIP	1	x									

Exploded view shown for reference only. DO NOT remove items 19, 21 and 29; Other parts can be serviced without removing the above items.													
*NOTE: Revised at Code F4AA for more reliable indexing with 140 slide tray..													

CARAMATE PROJECTORS

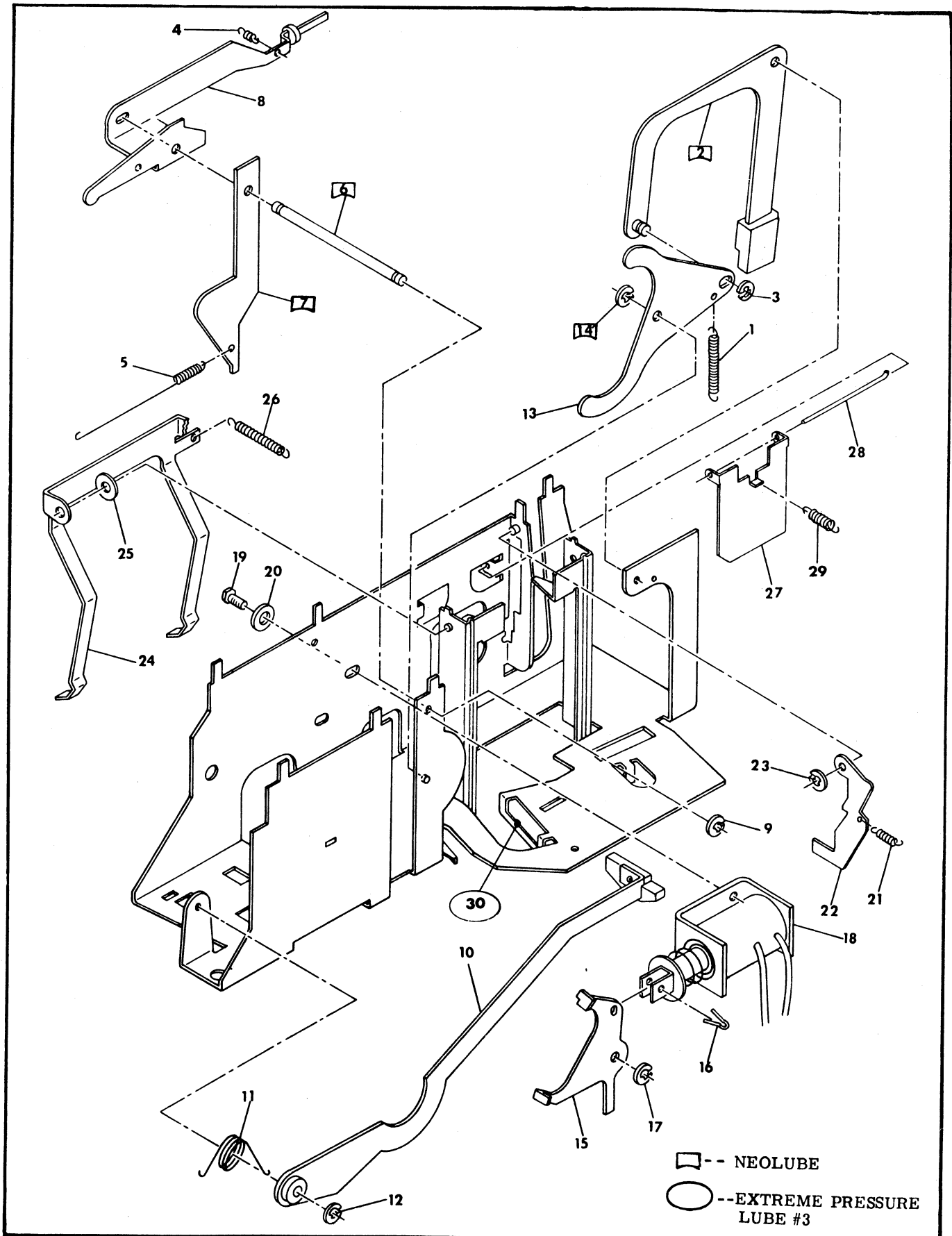


Figure 20. MECHANISM ASSEMBLY COMPLETE (Stage II)

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS									
				43707-G1									
20-		MECHANISM COMPLETE (Stage II)											
-1	43721-P1	. SPRING	1	x									
-2		. LEVER ASSEMBLY, Detent	NA	x									
		ATTACHING PARTS											
-3	251-7-1	. RING, Retaining	2	x									

-4	43876-P1	. SPRING, Clamp Actuator	1	x									
-5	43943-P1	. SPRING, Index Follower	1	x									
-6		. SHAFT, Cam Follower	NA	x									
-7		. FOLLOWER, Index Cam	NA	x									
-8		. FOLLOWER ASSEMBLY, Shutter Arm	NA	x									
		ATTACHING PARTS											
-9	251-7-1	. RING, Retaining	2	x									

-10		. LIFTER ASSEMBLY	NA	x									
-11	44054	. SPRING, Lifter	1	x									
		ATTACHING PARTS											
-12	251-7-1	. RING, Retaining	1	x									

-13		. FOLLOWER, Detent Cam	NA	x									
		ATTACHING PARTS											
-14	251-7-1	. RING, Retaining	1	x									

-15		. ESCAPEMENT	NA	x									
		ATTACHING PARTS											
-16		. PIN, Cotter	NA	x									
-17	251-7-1	. RING, Retaining	1	x									

-18		. SOLENOID	NA	x									
		ATTACHING PARTS											
-19		. SCREW, Machine, 6-32 x 3/16 Hex hd	NA	x									
-20		. WASHER, Flat 0.375 x 0.144 x 0.040	NA	x									

-21	43876-P1	. SPRING, Actuator Clamp	1	x									
-22	43737-P1	. CLAMP, Actuator	1	x									
		ATTACHING PARTS											
-23	251-7-1	. RING, Retaining	1	x									

-24		. CLAMP, Slide	NA	x									
-25		. WASHER, Flat 0.250 x 0.128 x 0.010	NA	x									
-26	43717-P1	. SPRING, Slide Clamp	1	x									
-27		. SHUTTER	NA	x									
-28		. PIVOT, Shutter	1	x									
-29	43739-P1	. SPRING, Shutter	1	x									
-30		. FRAME ASSEMBLY, Mechanism	NA	x									
		Exploded view shown for reference only. Dis- assemble only those parts shown for replacement, if required.											

CARAMATE PROJECTORS

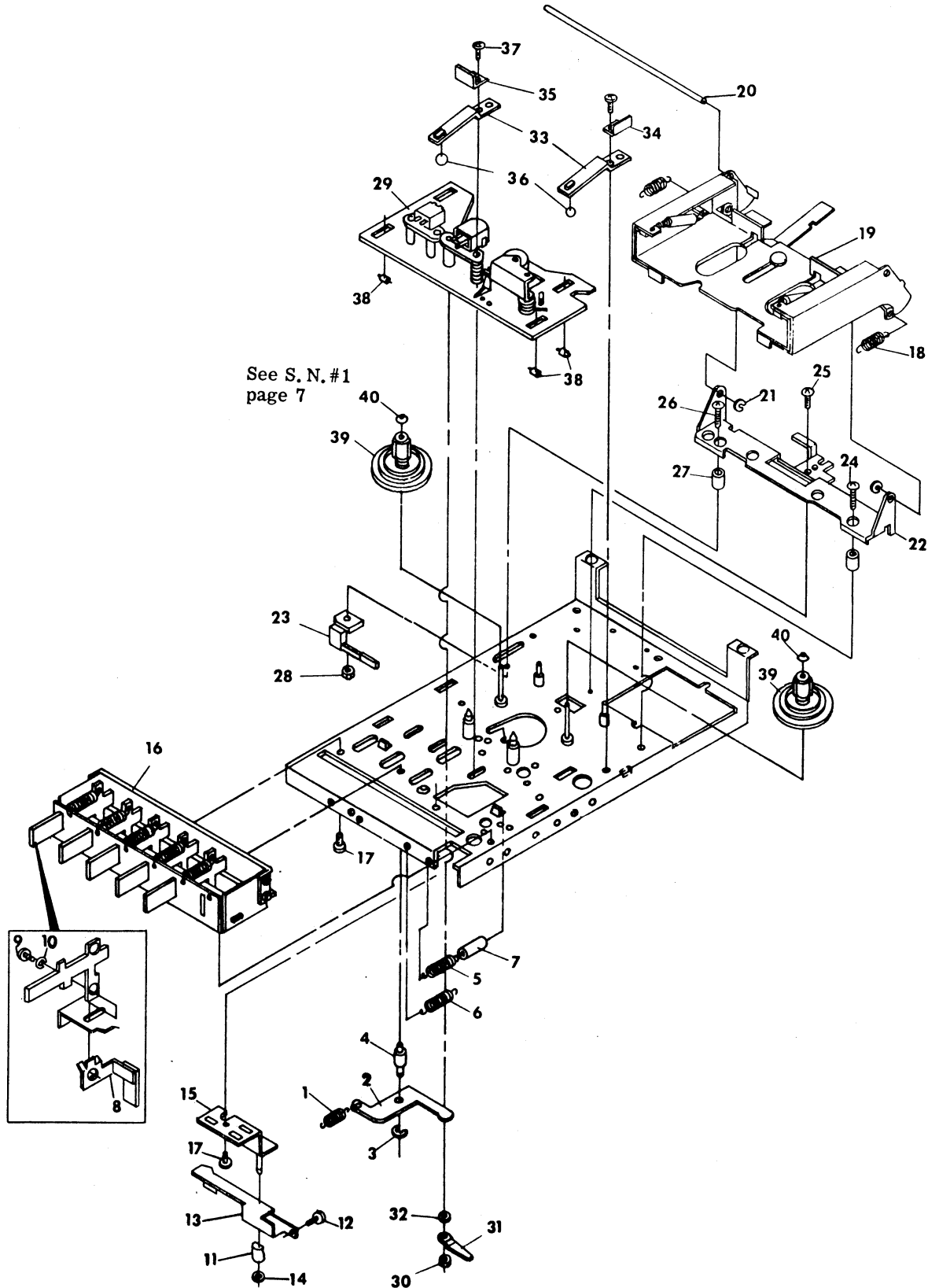


Figure 21. TAPE DECK ASSEMBLY(Stage 1)

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS					
				1	2	3	4	5	
21-	43817-G1	TAPE DECK ASSY. (early) Playback	NA						
	43817-G2	TAPE DECK ASSY. (early) Record & Playback	NA						
	43817-G3	TAPE DECK ASSY. (current) Playback & SP Playback	REF						
	43817-G4	TAPE DECK ASSY. (current) Record & Playback	REF						
	43817-G5	TAPE DECK ASSY. S P Record & Playback	REF						
-1	VO-2110-4014	. SPRING, Rewind Action Plate	1	x	x	x	x	x	
-2	VO-2110-1025	. PLATE, Rewind Action	1	x	x	x	x	x	
		ATTACHING PARTS							
-3	259-7	. RING, Retaining, 2.3 mm	1	x	x	x	x	x	

-4	VO-2110-2014	. SHAFT, Rewind Action Plate	1	x	x	x	x	x	
-5	VO-2110-4008	. SPRING, Head Panel	1	x	x	x	x	x	
-6	VO-2110-4010	. SPRING, Hook Plate	1	x	x	x	x	x	
-7	VO-2110-4024	. TUBE	2	x	x	x	x	x	
-8	43817-P101	. ANGLE ASSEMBLY, R & P Switch.	1	x					
		ATTACHING PARTS							
-9	160-20D4	. SCREW, Machine M2.0 x 4 pan hd.	1		x		x		
-10	230-4	. WASHER, Spring M2.0	1		x		x		

-11	43817-P114	. ACTUATOR, Program Switch	1				x	x	
		ATTACHING PARTS							
-12	160-20D5	. SCREW, Machine M 2 x 5 pan hd.	1				x	x	

-13	43817-P113	. LEVER, Program Switch Actuator.	1				x	x	
		ATTACHING PARTS							
-14	259-10	. RING, Retaining, M 2.5.	1				x	x	

-15	43817-P112	. HOLDER, Switch Lever	NA				x	x	
-16		. PUSH LEVER ASSEMBLY (Figure 23)	NA	x	x	x	x	x	
		ATTACHING PARTS							
-17	160-26D4	. SCREW, Machine, M 2.6 x 4 pan hd.	3	x	x	x	x	x	

-18	VO-2110-4006	. SPRING, Cassette Holder	2	x	x	x	x	x	
-19	VO-2110-9009	. HOLDER ASSEMBLY	1	x	x	x	x	x	
		ATTACHING PARTS							
-20	VO-2110-2001	. SHAFT, Cassette Holder	1	x	x	x	x	x	
-21	259-8	. RING, Retaining M 1.5	2	x	x	x	x	x	

-22	43817-P85	. HINGE, Cassette Holder	1	x	x	x	x	x	
-23	VO-2110-5004	. SWITCH, Leaf	1	x	x	x	x	x	
		ATTACHING PARTS							
-24	160-26D8	. SCREW, Machine, M 2.6 x 8 pan hd.	1	x	x	x	x	x	
-25	160-26D3	. SCREW, Machine, 2.6 x 3 pan hd	1	x	x	x	x	x	
-26	160-26D12	. SCREW, Machine, M 2.6 x 12 pan hd.	1	x	x	x	x	x	
-27	VO-2110-2021	. SPACER.	2	x	x	x	x	x	
-28	161-26H	. NUT M 2.6	1	x	x	x	x	x	

-29		. PANEL ASSEMBLY, Head (Figure 24)	NA	x	x	x	x	x	
		ATTACHING PARTS							
-30	161-26H	. NUT, M 2.6	1	x	x	x	x	x	
-31	VO-2110-1028	. RETAINER, Idler Arm	1	x	x	x	x	x	
-32	42276-8	. WASHER, Flat 0.194 x 0.111 x 0.017	1	x	x	x	x	x	
-33	VO-2110-1011	. RETAINER (A), Headpanel.	2	x	x	x	x	x	
-34	VO-2110-1007	. SPRING, Hanger (B)	1	x	x	x	x	x	
-35	VO-2110-1006	. SPRING, Hanger (A)	1	x	x	x	x	x	
-36	300-15	. BALL, Steel M 3	2	x	x	x	x	x	
-37	160-26D3	. SCREW, Machine, M 2.6 x 3 pan hd	2	x	x	x	x	x	

-38	VO-2110-2019	. ROLLER, Headpanel.	4	x	x	x	x	x	
-39	VO-2110-9004	. REEL ASSEMBLY	2	x	x	x	x	x	
		ATTACHING PARTS							
-40	VO-2110-3008	. CAP, Reel.	2	x	x	x	x	x	

CARAMATE PROJECTORS

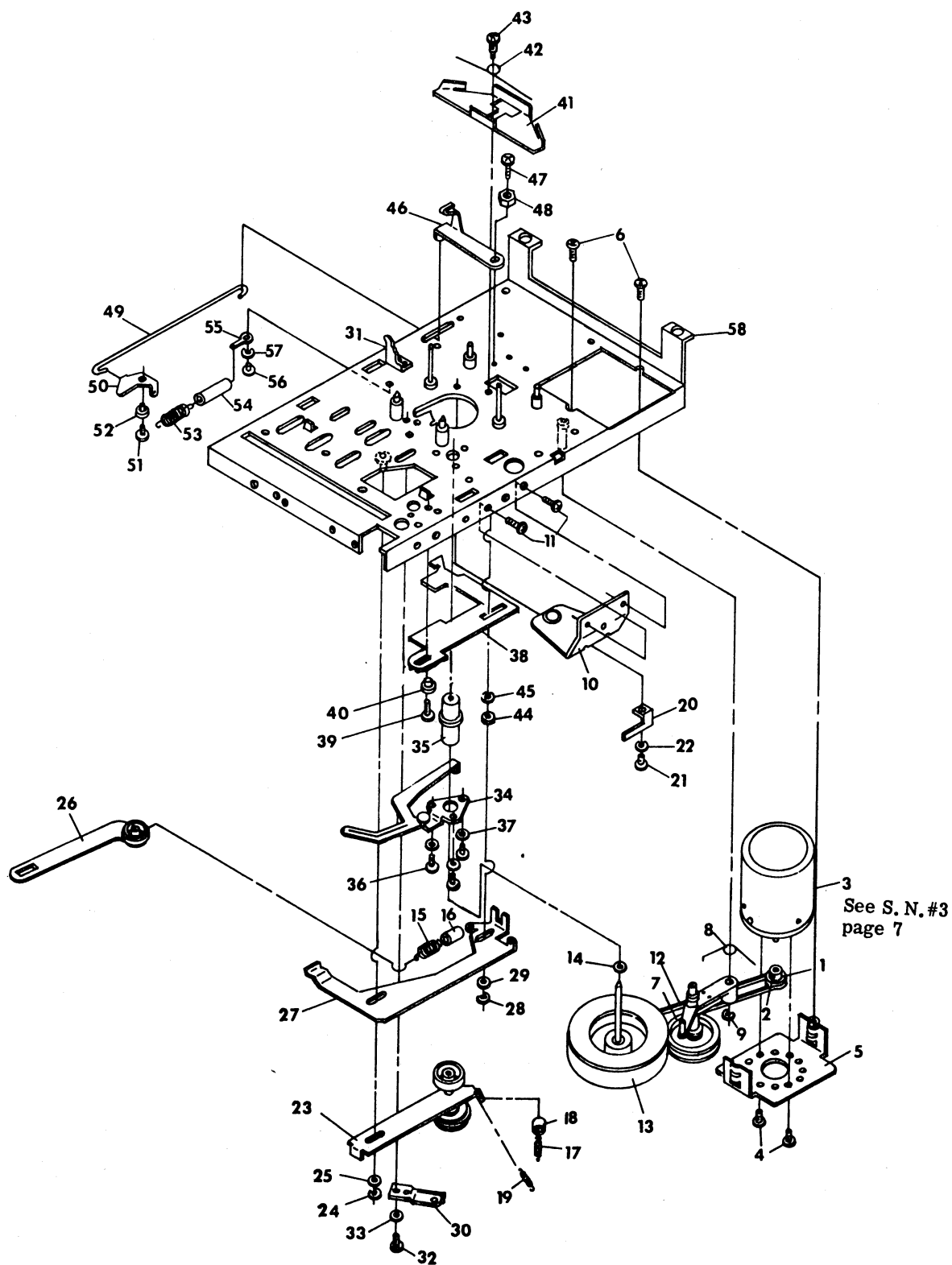


Figure 22. TAPE DECK ASSEMBLY (Stage 2)

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS									
				43817-G1	43817-G2	43817-G3	43817-G4	43817-G5					
		TAPE DECK ASSEMBLY (Stage II) Cont.											
22-1	VO-2110-2016	. PULLEY, Motor p/o item 3	1	x	x	x	x	x					
		ATTACHING PARTS											
-2	160-1762	. SCREW M1.7 x 2, hex hd p/o item 3	1	x	x	x	x	x					

-3	VO-2110-5003	. MOTOR	1	x	x	x	x	x					
		ATTACHING PARTS											
-4	160-26D3	. SCREW M2.6 x 3, pan hd	2	x	x	x	x	x					

-5	VO-2110-1030	. BRACKET, Motor	1	x	x	x	x	x					
		ATTACHING PARTS											
-6	160-26D6	. SCREW M2.6 x 6, pan hd	2	x	x	x	x	x					

-7	VO-2110-9001	. SLIPCLUTCH ASSEMBLY	1	x	x	x	x	x					
-8	VO-2110-4009	. SPRING, Slipclutch	1	x	x	x	x	x					
		ATTACHING PARTS											
-9	259-3	. RING, Retaining M1.9	1	x	x	x	x	x					

-10	VO-2110-1022	. FLYWHEEL SUPPORT	1	x	x	x	x	x					
		ATTACHING PARTS											
-11	160-26D4	. SCREW M2.6 x 4, pan hd	2	x	x	x	x	x					

-12	VO-2110-3001	. BELT, Drive	1	x	x	x	x	x					
-13	VO-2110-3003	. FLYWHEEL	1	x	x	x	x	x					
-14	42276-10	. WASHER, Plastic	2	x	x	x	x	x					
-15	VO-2110-4011	. SPRING, Rewind Arm	1	x	x	x	x	x					
-16	VO-2110-4023	. TUBE, Plastic	1	x	x	x	x	x					
-17	VO-2110-4013	. SPRING, Fast Forward Arm	1	x	x	x	x	x					
-18	VO-2110-4022	. TUBE, Plastic	1	x	x	x	x	x					
-19	VO-2110-4012	. SPRING, Timing	1	x	x	x	x	x					
-20	VO-2110-1032	. SPRING PLATE, Fast Forward Idler Arm	1	x	x	x	x	x					
		ATTACHING PARTS											
-21	160-26D3	. SCREW M2.6 x 3, pan hd	1	x	x	x	x	x					
-22	230-10	. WASHER, Spring M2.6	1	x	x	x	x	x					

-23	VO-2110-9002	. ARM ASSEMBLY, Fast Forward Idler	1	x	x	x	x	x					
		ATTACHING PARTS											
-24	259-8	. RING, Retaining M1.5	1	x	x	x	x	x					
-25	42276-10	. WASHER, Plastic	1	x	x	x	x	x					

-26	VO-2110-9003	. ARM ASSEMBLY, Rewind Idler	1	x	x	x	x	x					
-27	VO-2110-1020	. PLATE, Brake Release	1	x	x	x	x	x					
		ATTACHING PARTS											
-28	259-8	. RING, Retaining M1.5	1	x	x	x	x	x					
-29	VO-2110-3005	. WASHER, Plastic	1	x	x	x	x	x					

-30	VO-2110-1026	. RETAINER, Idler Arm	1	x	x	x	x	x					
-31	VO-2110-1021	. GUIDE, Cassette	1	x	x	x	x	x					
		ATTACHING PARTS											
-32	160-26D3	. SCREW M2.6 x 5, pan hd	1	x	x	x	x	x					
-33	230-10	. WASHER, Spring, M2.6	1	x	x	x	x	x					

-34	VO-2110-9010	. LEVER ASSEMBLY B, Fast Forward	1	x	x	x	x	x					
-35	VO-2110-2023	. BEARING, Flywheel	1	x	x	x	x	x					
		ATTACHING PARTS											
-36	160-20D5	. SCREW M2 x 5, pan hd	3	x	x	x	x	x					
-37	230-11	. WASHER, Spring M2	3	x	x	x	x	x					

-38	VO-2110-1029	. HOOK PLATE	1	x	x	x	x	x					
		ATTACHING PARTS											
-39	160-30D5	. SCREW M3 x 5, pan hd	1	x	x	x	x	x					

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS							
				43817-G1	43817-G2	43817-G3	43817-G4	43817-G5			
		TAPE DECK ASSEMBLY (Stage II) Cont.									
22-40	VO-2110-2017	. SPACER, Hook Plate -----***-----	1	x	x	x	x	x			
-41	VO-2110-1019	. BRAKE	1	x	x	x	x	x			
-42	VO-2110-4007	. SPRING, Brake	1	x	x	x	x	x			
-43	VO-2110-2018	. SHAFT, Brake	1	x	x	x	x	x			
		ATTACHING PARTS									
-44	161-26H	. NUT M2.6	1	x	x	x	x	x			
-45	230-10	. WASHER, Spring M2.6	1	x	x	x	x	x			
		-----***-----									
-46	VO-2110-1018	. LEVER, Wrong Eraser Prevent	1		x		x	x			
		ATTACHING PARTS									
-47	160-26D5	. SCREW M2.6 x 5, pan hd	1		x		x	x			
-48	VO-2110-2008	. SPACER	1		x		x	x			
		-----***-----									
-49	VO-2110-2007	. ROD, Connecting	1		x		x	x			
-50	VO-2110-1017	. LATCH, Wrong eraser prevent	1		x		x	x			
		ATTACHING PARTS									
-51	160-26D4	. SCREW M2.6 x 4	1		x		x	x			
-52	VO-2110-2008	. SPACER	1		x		x	x			
		-----***-----									
-53	VO-2110-4003	. SPRING	1		x		x	x			
-54	VO-2110-4021	. TUBE, Plastic	1		x		x	x			
		ATTACHING PARTS									
-55	VO-2110-4019	. LUG	1		x		x	x			
-56	160-26D3	. SCREW M2.6 x 3, pan hd	1		x		x	x			
-57	230-10	. WASHER, Spring	1		x		x	x			
		-----***-----									
-58	VO-2110-1001	. CHASSIS	NA	x	x	x	x	x			

CARAMATE PROJECTORS

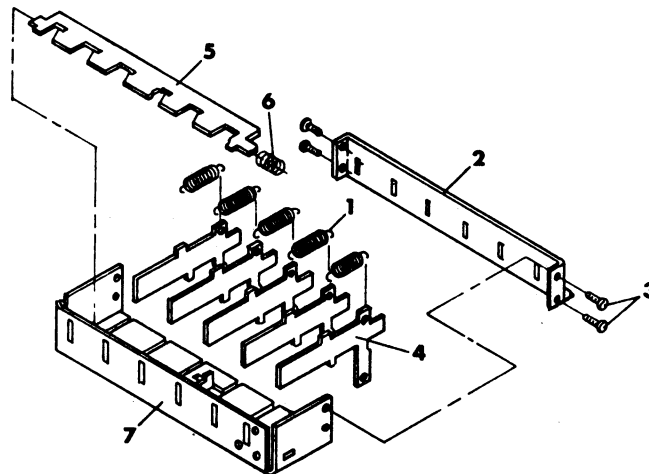


Figure 23. PUSH LEVER ASSEMBLY

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS									
		1 2 3 4 5											
23-		PUSH LEVER ASSEMBLY (playback)	REF	x									
		PUSH LEVER ASSEMBLY (playback & record)	REF	x									
-1	VO-2110-4001	. SPRING, Push Lever.	4	x									
	VO-2110-4001	. SPRING, Push Lever.	5		x								
-2	VO-2110-33	. FRAME (B), Push Lever	1	x	x								
		ATTACHING PARTS											
-3	160-26D3	. SCREW, Machine, M 2.6 x 3 pan hd.	4	x	x								

-4	VO-2110-1003	. PUSH LEVER	4	x									
	VO-2110-1003	. PUSH LEVER	5		x								
-5	VO-2110-1004	. PLATE, Push Lever.	1	x	x								
-6	VO-2110-1005	. SPRING	1	x	x								
-7	VO-2110-1002	. FRAME, Push Lever.	1	x	x								

CARAMATE PROJECTORS

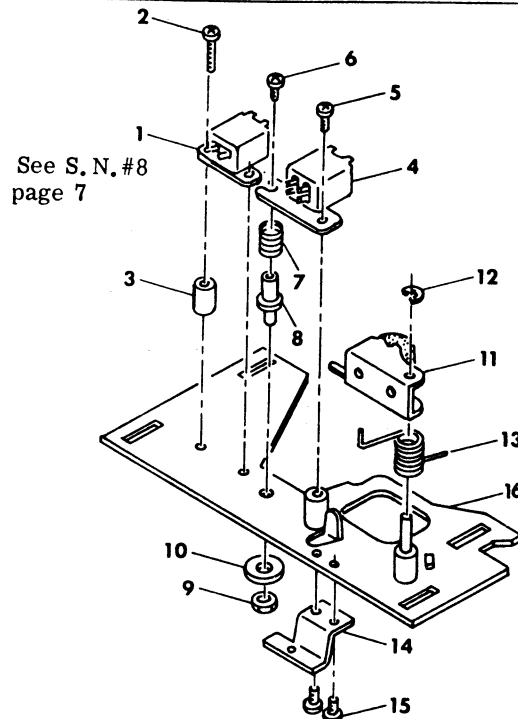


Figure 24. HEAD PANEL ASSEMBLY

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS							
				1	2	3	4	5	Playback (E)	Play & Record (E)	Playback (C)
24-		HEAD PANEL ASSEMBLY--Playback (Early)	REF	x							
		HEAD PANEL ASSEMBLY--Record & Playback(Early)	REF		x						
		HEAD PANEL ASSEMBLY--Playback (Current)	REF			x					
		HEAD PANEL ASSEMBLY--Record & Playback(Current)	REF				x				
-1	VO-2110-5002	.HEAD Dummy (H 52400)	1	x							
		.HEAD, Erase (IKEJIRI NO. E-49)	1		x						
		.HEAD Dummy (IKEJIRI No. ME-32)	1			x					
		ATTACHING PARTS									
-2	160-20D11	.SCREW, Machine , M2 x 11 pan hd	2	x	x	x	x				
-3	VO-2110-2005	.STUD, Erase Head.	2	x	x	x	x				

-4	VO-2110-5001	.HEAD, Record & Play (R-483)	1	x	x						
	VO-2110-5001	.HEAD, Record & Play (R-484)	1				x	x			
		ATTACHING PARTS									
-5	160-20D3	.SCREW, Machine , M2 x 3, pan hd	1	x	x	x	x				
-6	160-20D5	.SCREW, Machine , M2 x 5, pan hd	1	x	x	x	x				

-7	VO-2110-4002	.SPRING, R & P Head	1	x	x	x	x				
-8	VO-2110-2004	.STUD, R & P Head	1	x	x	x	x				
		ATTACHING PARTS									
-9	161-20H	.NUT, Thin	1	x	x	x	x				
-10	VO-2110-1013	.WASHER, Flat (order with nut above)	1	x	x	x	x				

-11	VO-2110-9005	.ROLLER ASSEMBLY, Pinch	1	x	x	x	x				
		ATTACHING PARTS									
-12	259-3	.RING, Retaining ,2M	1	x	x	x	x				

-13	VO-2110-4004	.SPRING, Pinch Roller	1	x	x	x	x				
-14	VO-2110-1010	.BRACKET, Head Panel	1	x	x	x	x				
		ATTACHING PARTS									
-15	160-26D3	.SCREW, Machine M2.6 x 3 , pan hd	2	x	x	x	x				

-16	VO-210-9006	.PANEL, Head	REF	x	x	x	x				

CARAMATE PROJECTORS

SECTION IV

CARAMATE SP AND CARAMATE II SP

CARAMATE PROJECTORS

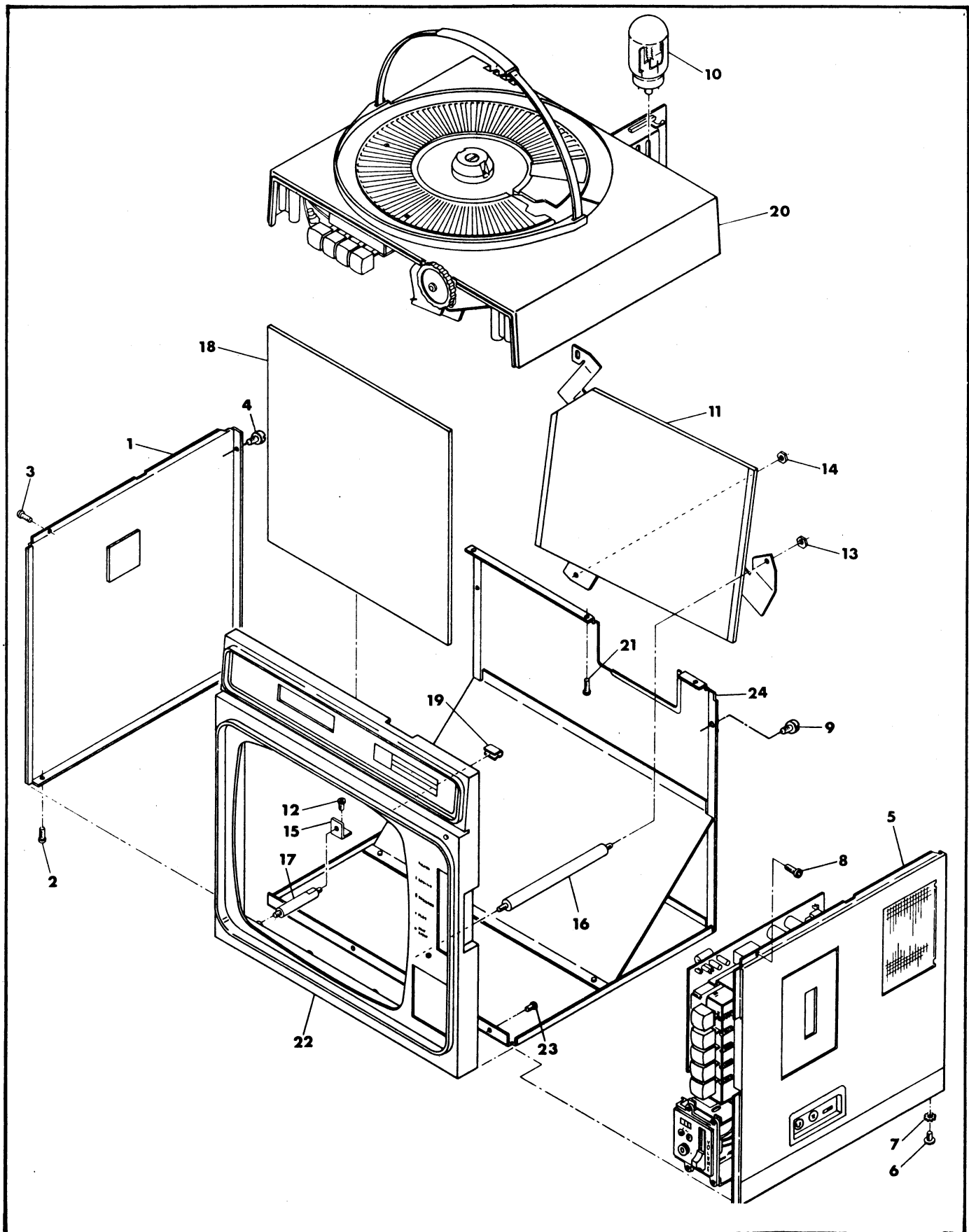


Figure 25. SP PROJECTOR COMPLETE

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	CATALOG NUMBERS					
				8855	8856	8865	8866	8867	8868
25	44390-G1	PROJECTOR COMPLETE, SP Playback 117V 60 Hz . . .	REF	x					
	44390-G2	PROJECTOR COMPLETE, Record & Playback SP 117V 60 Hz	REF		x				
	44571-G1	PROJECTOR COMPLETE, Caramate II SP Playback 117V 60 Hz	REF			x			
	44571-G2	PROJECTOR COMPLETE, Caramate II SP Record & Playback 117V 60 Hz	REF				x		
	44571-G3	PROJECTOR COMPLETE, Caramate II SP Playback (Export) 220V 50 Hz	REF					x	
	44571-G4	PROJECTOR COMPLETE, Caramate II SP Record & Playback (Export) 220V 50 Hz	REF						x
-1	43823-G1	. PANEL ASSEMBLY, Left	1	x	x				
	43823-G2	. PANEL ASSEMBLY, Left	1			x	x	x	x
		ATTACHING PARTS							
-2	121-4R-4X	. SCREW, Thread Forming, No. 4 x 1/4 Pan hd	2	x	x	x	x	x	x
-3	125-4R-5L	. SCREW, Thread Forming, No. 4 x 5/16 Oval Hd.	1	x	x	x	x	x	x
-4	121-4R-4H	. SCREW, Thread Forming, No. 4 x 1/4 Pan hd	1	x	x	x	x	x	x

-5	44412-G1	. PANEL COMPLETE, Right (Figure 26).	1	x					
	44412-G2	. PANEL COMPLETE, Right.	1		x				
	44412-G3	. PANEL COMPLETE, Right.	1			x		x	
	44412-G4	. PANEL COMPLETE, Right.	1				x		x
		ATTACHING PARTS							
-6	121-4R-4X	. SCREW, Thread Forming, No. 4 x 1/4 Pan hd	2	x	x	x	x	x	x
-7	220-4	. WASHER, Lock (External Teeth)	2	x	x	x	x	x	x
-8	125-4R-5L	. SCREW, Thread Forming No. 4 x 5/16 Oval hd.	1	x	x	x	x	x	x
-9	121-4R-4H	. SCREW, Thread Forming No. 4 x 1/4 Pan hd.	1	x	x	x	x	x	x

-10	37922-P1	. LAMP, Projection (CAR type).	1	x	x	x	x	x	x
-11	43848-G1	. MIRROR ASSEMBLY, Secondary (Figure 13)	1	x	x	x	x	x	x
		ATTACHING PARTS							
-12	121-4R-4X	. SCREW, Thread Forming No. 4 x 1/4 Pan hd.	1	x	x	x	x	x	x
-13	201-10HX	. NUT, Machine 10-32 Hex	2	x	x	x	x	x	x
-14	200-6HX	. NUT, Machine 6-32, Hex	1	x	x	x	x	x	x
-15	43798	. SUPPORT.	1	x	x	x	x	x	x

-16	43854-P1	. SPACER, Mirror	2	x	x				
	43854-P2	. SPACER, Mirror	2	x	x	x	x	x	x
-17	43800	. SPACER, Mirror	1	x	x	x	x	x	x
-18	43846	. SCREEN, Viewing.	1	x	x	x	x	x	x
		ATTACHING PARTS							
-19	43847	. CLIP.	4	x	x	x	x	x	x

-20	44517-G1	. HOUSING COMPLETE (Figures 27-28)	1	x	x				
	44517-G2	. HOUSING COMPLETE	1			x			
	44517-G3	. HOUSING COMPLETE	1				x		
	44517-G4	. HOUSING COMPLETE	1					x	
	44517-G5	. HOUSING COMPLETE	1						x
		ATTACHING PARTS							
-21	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16 Pan hd	6	x		x		x	
	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16 Pan hd	5		x		x		x

-22	43844-G5	. BEZEL COMPLETE	1	x					
	43844-G6	. BEZEL COMPLETE	1		x				
	44566-G3	. BEZEL COMPLETE	1			x		x	
	44566-G4	. BEZEL COMPLETE	1				x		x
		ATTACHING PARTS							
-23	137-6R-6X	. SCREW, Thread Forming No. 6 x 3/8 Pan hd.	4	x	x	x	x	x	x

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	CATALOG NUMBERS							
				8855	8856	8857	8858	8859	8860	8861	8862
25-24	43836-G2	. PANEL COMPLETE, Rear (Figure 16)	1	x	x						
	44567-G1	. PANEL COMPLETE, Rear	1			x	x				
	44567-G2	. PANEL COMPLETE, Rear	1					x	x		
	43897-P1	. MICROPHONE SET (not shown)	1		x		x		x		

NOTES

CARAMATE PROJECTORS

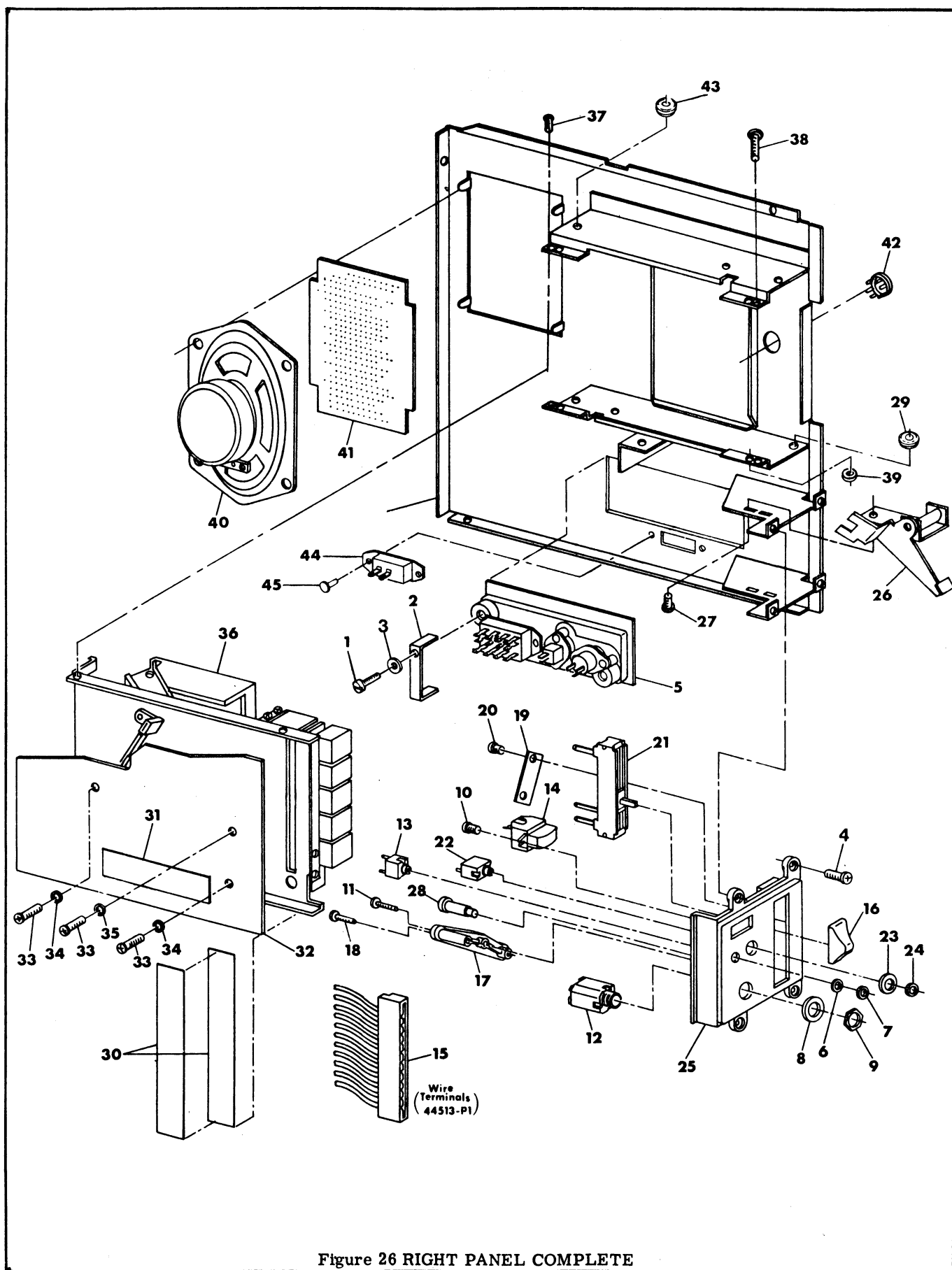


Figure 26 RIGHT PANEL COMPLETE

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS							
				44412-G1	44412-G2	44412-G3	44412-G4				
26-	44412-G1	PANEL COMPLETE, Right (SP Playback Model 8855) .	REF	x							
	44412-G2	PANEL COMPLETE, Right (SP Record & Playback Model 8856).	REF		x						
	44412-G3	PANEL COMPLETE, Right (SP II Playback Model 8865 & 8867).	REF			x					
	44412-G4	PANEL COMPLETE, Right (SP II Record & Playback Model 8866 & 8868).	REF				x				
		. HARNESS ASSEMBLY	NA	x		x					
		. HARNESS ASSEMBLY	NA		x		x				
		ATTACHING PARTS									
-1	121-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd	2	x	x	x	x				
-2	44417	. CLIP.	2	x	x	x	x				
-3	38473-7X	. WASHER, Flat 0.375 x 0.146 x 0.042.	2	x	x	x	x				
-4	131-2R-4X	. SCREW, Thread Cutting No. 2 x 1/4 Pan hd.	4	x	x	x	x				

-5	44413-G3	.. PANEL ASSEMBLY, Control.	1	x	x	x	x				
		.. HARNESS ASSEMBLY, Control Panel	NA	x		x					
		.. HARNESS ASSEMBLY, Control Panel	NA		x		x				
		ATTACHING PARTS									
-6	43832-P4	.. WASHER	1	x	x	x	x				
-7	43832-P3	.. NUT	1	x	x	x	x				
-8	42563-P4	.. WASHER	1	x	x	x	x				
-9	42563-P3	.. NUT	1	x	x	x	x				
-10	137-4R-4X	.. SCREW, Thread Cutting No. 4 x 1/4, Pan hd	1		x		x				
-11	121-4R-12X	.. SCREW, Thread Forming No. 4 x 3/4, Pan hd	1		x		x				

-12	42563-P6	... JACK, Earphone	1	x	x	x	x				
-13	43832-P2	... JACK, Remote Control	1	x	x	x	x				
-14	43822-P1	... VU METER.	1		x		x				
-15	44512-P1	... CONNECTOR (15 Circuit).	1	x	x	x	x				
-16	43878-P1	.. CAP	1	x	x	x	x				
	44529-G1	.. RESISTOR ASSEMBLY	NA	x		x					
	44528-G1	.. RESISTOR AND JACK ASSEMBLY	NA		x		x				
		ATTACHING PARTS									
-17	43944-P1	.. BRACKET	1		x		x				
-18	121-4R-10X	.. SCREW, Thread Forming No. 4 x 5/8, Pan hd	1		x		x				
-19	43825	.. RETAINER.	1	x	x	x	x				
-20	137-4R-4X	.. SCREW, Thread Cutting No. 4 x 1/4, Pan hd	2	x		x					
	137-4R-4X	.. SCREW, Thread Cutting No. 4 x 1/4, Pan hd	1		x		x				

-21	44386-P1	... RESISTOR.	1	x	x	x	x				
-22	43831-P2	... JACK.	1		x		x				
		ATTACHING PARTS									
-23	43831-P4	.. WASHER	1		x		x				
-24	43831-P3	.. NUT.	1		x		x				

	44506-P5	... CONNECTOR (4 Circuit) Not Shown.	1	x		x					
	44506-P2	... CONNECTOR (6 Circuit) Not Shown.	1		x		x				
-25	43815-P3	.. PANEL	1	x		x					
	43815-P2	.. PANEL	1		x		x				
-26	43827-G2	. LEVER COMPLETE, Logic	1		x		x				
		ATTACHING PARTS									
-27	137-4R-5X	. SCREW, Thread Cutting No. 4 x 1/4, Pan hd	2		x		x				
	220-4	. WASHER, Lock (External Tooth.	2		x		x				

-28	43928	. STUD	1		x		x				
-29	44534	. GROMMET.	1	x	x	x	x				
-30	44412-P6	. TAPE (No. 235-3M Co.) Dull Black Photo Tape). . . .	LP	x	x	x	x				

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS							
				44412-G1	44412-G2	44412-G3	44412-G4				
26-31	44412-P36	. TAPE (Electrical Black).....	LP								
-32	44399-G1	. BOARD, Circuit (Figure 34).....	LP	x		x	x				
	44410-G1	. BOARD ASSEMBLY, Circuit (Figure 35).....	1		x		x				
		ATTACHING PARTS									
-33	160-30D6X	. SCREW, Thread Cutting M3 x 6, Flat hd.....	3	x	x	x	x				
-34	221-5	. WASHER, Lock (Internal Teeth).....	2	x	x	x	x				
-35	221-5	. WASHER, Lock (Internal Teeth).....	1	x		x					
	43260-5	. WASHER, Flat 0.285 x 0.125 x 0.031.....	1		x		x				

-36	44401-G1	. TAPE DECK ASSEMBLY (Figure 29).....	1	x		x					
	44409-G1	. TAPE DECK ASSEMBLY.....	1		x		x				
		ATTACHING PARTS									
-37	131-6R-4X	. SCREW, Thread Cutting No. 6 x 1/4, Pan hd.....	2	x	x	x	x				
-38	137-4R-5X	. SCREW, Thread Cutting No. 4 x 5/15, Pan hd.....	2	x	x	x	x				
-39	220-4	. WASHER, Lock (External Teeth).....	1	x	x	x	x				

-40	43834-P1	. SPEAKER.....	1	x	x						
-41	43833-P1	. GRILLE.....	1	x	x						
-42	42677-P4	. PLUG.....	1	x	x	x	x				
-43	44534	. GROMMET.....	1	x	x	x	x				
-44	44556-P1	. SWITCH.....	1			x	x				
		ATTACHING PARTS									
-45	175-6-74	. RIVET.....	2			x	x				

-46	44411-P1	. PANEL, Right.....	1	x	x						
	44411-P2	. PANEL, Right.....	1			x	x				

NOTES

CARAMATE PROJECTORS

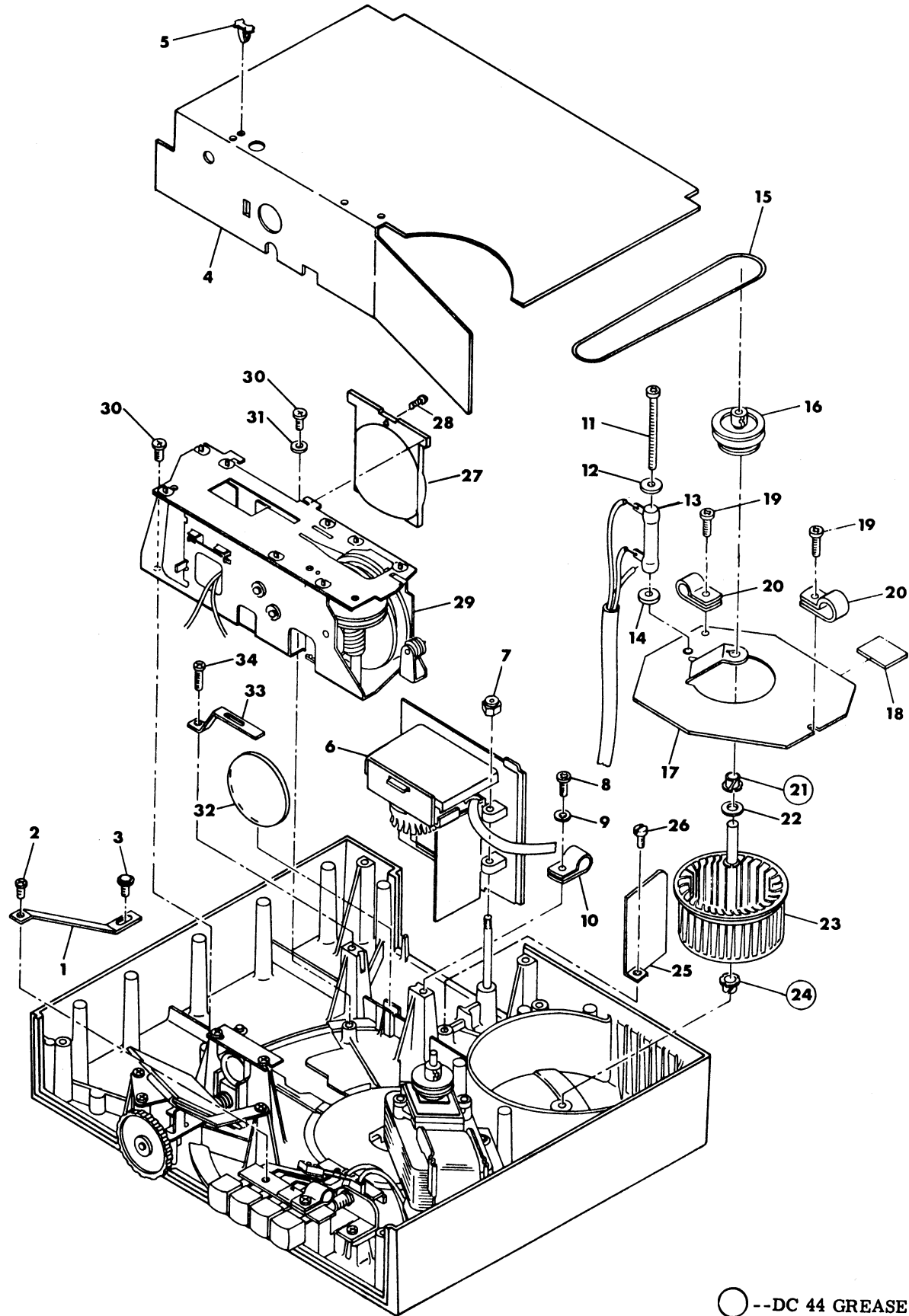


Figure 27. HOUSING COMPLETE (Stage 1)

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	CATALOG NUMBERS					
				8855, 8856	8865	8866	8867	8868	
		STAGE I							
27-	44517-G1	HOUSING COMPLETE, Upper (SP)	REF	x					
	44517-G2	HOUSING COMPLETE, Upper (SP-II) Playback	REF		x				
	44517-G3	HOUSING COMPLETE, Upper (SP-II) Record & Playback	REF			x			
	44517-G4	HOUSING COMPLETE, Upper (SP-II) Playback	REF				x		
	44517-G5	HOUSING COMPLETE, Upper (SP-II) Record & Playback	REF					x	
-1	44042-P1	. SUPPORT, Mechanism	1	x	x	x	x	x	
		ATTACHING PARTS							
-2	140-6R-7X	. SCREW, Thread Forming No. 6 x 7/16, Pan hd	1	x	x	x	x	x	
-3	40921-9X	. SCREW, Support	1	x	x	x	x	x	
		----***----							
-4	43896-P1	. BAFFLE	1	x	x	x	x	x	
		ATTACHING PARTS							
-5	43877	. CLIP	1	x	x	x	x	x	
		----***----							
-6	43857-G5	. DOOR COMPLETE, Lamp	1	x	x	x	x	x	
	43857-G7	. DOOR COMPLETE	1				x	x	
		ATTACHING PARTS							
-7	203-3	. NUT, Stop No. 8-32	1	x	x	x	x	x	
-8	140-6R-7X	. SCREW, Thread Forming No. 6 x 7/16, Pan hd	1	x	x	x	x	x	
-9	38473-7X	. WASHER, Flat 0.375 x 0.146 x 0.042	1	x	x	x	x	x	
-10	267-4	. CLAMP, Wire	1	x	x	x	x	x	
-11	116-6R-36X	. SCREW, Machine 6-32 x 2-1/4, Pan hd	1	x	x	x			
-12	41846-16	. WASHER, Flat 0.435 x 0.150 x 0.062	1	x	x	x			
		ATTACHING PARTS							
	43857-G3	. BRACKET ASSEMBLY, Socket	1	x	x	x	x	x	
-13	43888-P1	. RESISTOR (10 ohm, 12 watt ±5% (R-70)	1	x	x	x			
-14	41846-16	. WASHER, Flat 0.435 x 0.150 x 0.062	1	x					
-15	43893	. BELT, Blower Drive	1	x	x	x	x	x	
-16	43784-G2	. PULLEY ASSEMBLY, Driven (1.320 Dia.)	1	x	x	x	x	x	
	43784-G4	. PULLEY ASSEMBLY, Driven (1.410 Dia)	1		x	x	x	x	
-17	43762-G1	. PLATE ASSEMBLY, Blower Wheel (use 44562-P1)	1	x					
	44562-P1	. PLATE, Blower Wheel	1		x	x	x	x	
		ATTACHING PARTS							
-18	39474-P14	. TAPE, (3M #4308)	LP	x					
-19	140-6R-7X	. SCREW, Thread Forming No. 6 x 7/16, Pan hd	3	x	x	x	x	x	
-20	44539	. CLAMP, Wire	2	x	x	x	x	x	
		----***----							
-21	38206-10	. BEARING	1	x					
-22	41846-15	. WASHER, Flat 0.375 x 0.187 x 0.032	1	x	x	x	x	x	
-23	42855-G3	. WHEEL ASSEMBLY, Blower	1	x	x	x	x	x	
-24	38206-10	. BEARING	1	x	x	x	x	x	
-25	44387-P1	. BAFFLE, Light	1	x	x	x	x	x	
		ATTACHING PARTS							
-26	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd	1	x	x	x	x	x	
-27	43793-P1	. LENS, Front Condensing	1	x	x	x	x	x	
		ATTACHING PARTS							
-28	140-4R-4X	. SCREW, Thread Forming No. 4 x 1/4, Pan hd	1	x	x	x	x	x	
		----***----							
-29	43707-G1	. MECHANISM COMPLETE (Figures 19 & 20).	1	x	x	x	x	x	
		ATTACHING PARTS							
-30	140-6R-5X	. SCREW, Thread Forming No. 6 x 6/16, Pan hd	3	x	x	x	x	x	
-31	38473-7X	. WASHER, Flat 0.375 x 0.146 x 0.042	1	x	x	x	x	x	
		----***----							
-32	43887-P1	. LENS, Rear Condensing	1	x	x	x	x	x	
		ATTACHING PARTS							
-33	43792-P1	. RETAINER	1	x	x	x	x	x	
-34	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd	1	x	x	x	x	x	

CARAMATE PROJECTORS

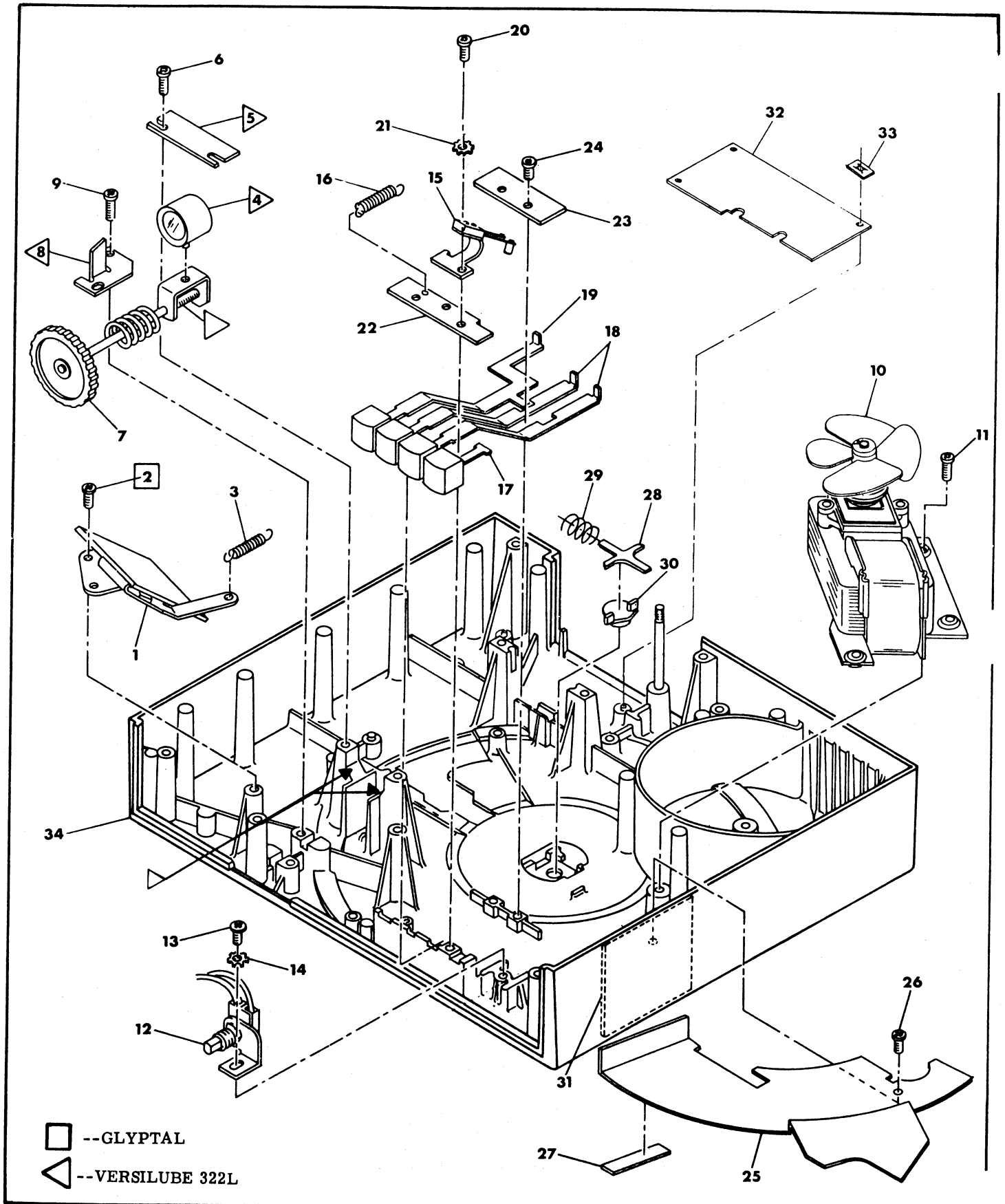


Figure 28. HOUSING COMPLETE (Stage II)

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FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	CATALOG NUMBERS					
				8855, 8856	8865	8866	8867	8868	
		HOUSING COMPLETE STAGE II							
28-1	43804-G1	. MOUNT ASSEMBLY, Primary Mirror	1	x	x	x	x	x	
		ATTACHING PARTS							
-2	40921-8X	. SCREW, Self Threading No. 8 x 6-32, Pan hd	2	x	x	x	x	x	
-3	44365-P1	. SPRING	1	x	x	x	x	x	

-4	43799-P1	. LENS, Objective	1	x	x	x	x	x	
		ATTACHING PARTS							
-5	43802	. RETAINER	1	x	x	x	x	x	
-6	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd . . .	2	x	x	x	x	x	

-7	43794-G3	. DRIVER AND KNOB ASSEMBLY	1	x	x	x	x	x	
		ATTACHING PARTS							
-8	43803-P1	. RETAINER, Focusing Shaft	1	x	x	x	x	x	
-9	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd . . .	2	x	x	x	x	x	

-10	44039-G4	. MOTORFORMER COMPLETE (117V, 60 Hz)	1	x					
	44039-G8	. MOTORFORMER COMPLETE (117V, 60 Hz)	1		x	x			
	44391-G1	. MOTORFORMER COMPLETE (230V, 50 Hz)	1				x	x	
	44385-G1	. . FAN ASSEMBLY, (Shaft Hole Diameter .182)	1	x					
	44385-G2	. . FAN ASSEMBLY, (Shaft Hole Diameter .218)	1		x	x	x	x	
	43784-G1	. . PULLEY ASSEMBLY, (Shaft Hole Diameter .181) . .	1	x					
	43784-G3	. . PULLEY ASSEMBLY, (Shaft Hole Diameter .218) . .	1		x	x	x	x	
	265-11	. . GROMMET	3	x	x	x	x	x	
	257-4-1	. . RING, Retaining	1	x	x	x	x	x	
		ATTACHING PARTS							
-11	43786-P2	. SCREW, Motor Mount	3	x	x	x	x	x	

-12	43779-G1	. SWITCH ASSEMBLY, Power	1	x	x	x	x	x	
		ATTACHING PARTS							
-13	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd . . .	1	x	x	x	x	x	
-14	220-6	. WASHER, Lock (External Teeth)	1	x	x	x	x	x	

-15	43776-G1	. SWITCH ASSEMBLY	1	x		x		x	
-16	43902-P1	. SPRING, Control Bar	2	x	x	x	x	x	
-17	43734-G1	. BAR, Switch	1	x	x	x	x	x	
-18	43734-G2	. BAR, Select	2	x	x	x	x	x	
-19	43734-G3	. BAR, Hold	1	x	x	x	x	x	
		ATTACHING PARTS							
-20	140-6R-7X	. SCREW, Thread Forming No. 6 x 7/16, Pan hd . . .	2	x	x	x	x	x	
-21	220-6	. WASHER, Lock (External Teeth)	1	x	x	x	x	x	
-22	43775	. BAR, Retainer	1	x	x	x	x	x	
-23	43774	. RETAINER, Switch Bar	1	x	x	x	x	x	
-24	140-6R-5X	. SCREW, Thread Forming No. 6 x 5/16, Pan hd . . .	2	x	x	x	x	x	

-25	43912-P1	. DEFLECTOR, Force Field	1	x	x	x	x	x	
		ATTACHING PARTS							
-26	125-4L-5L	. SCREW, Thread Forming No. 4 x 5/16, Pan hd . . .	2	x	x	x	x	x	
-27	44517-P28	. TAPE (No. 4016 - 3M Co.)	LP	x	x	x	x	x	

-28	43809	. LATCH, Slide Tray	1	x	x	x	x	x	
-29	43810	. SPRING, Tray Latch	1	x	x	x	x	x	
-30	43811-P1	. CAM, Tray Latch	1	x	x	x	x	x	
-31	44358	. INSULATOR	1	x	x	x	x	x	
-32	44572-P1	. SHIELD, Heat	1		x	x	x	x	
		ATTACHING PARTS							
-33	257-3-1	. RING, Retaining	3		x	x	x	x	

-34	43702-G2	. HOUSING ASSEMBLY, Upper	NA	x					
	43702-G5	. HOUSING ASSEMBLY, Upper	NA		x	x	x	x	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	CATALOG NUMBERS					
				1	2	3	4	5	
28-34	43886-G1 189-4-6 43706 116-6R-3H	. . HANDLE ASSEMBLY ROLL PIN, Handle POST SCREW, Machine 6-32 x 3/16, Pan hd	1						
			2	x	x	x	x	x	
			1	x	x	x	x	x	
			1	x	x	x	x	x	
			1	x	x	x	x	x	

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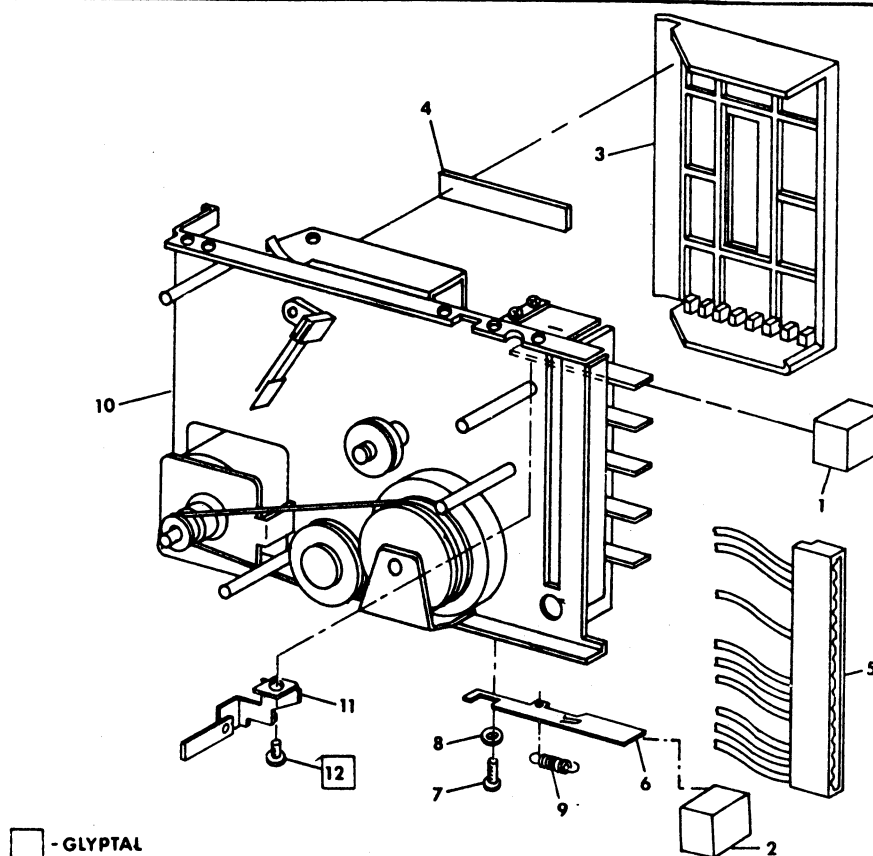


Figure 29. SP-TAPE DECK ASSEMBLY

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS									
				1	2	3	4	5	4410-G1	4409-G1			
29-	44401-G1	TAPE DECK ASSEMBLY (SP) Playback	REF	x									
	44409-G1	TAPE DECK ASSEMBLY (SP) Record & Playback .	REF	x									
-1	43772-P1	. BUTTON	4	x									
	43772-P1	. BUTTON	5			x							
-2	43772-P2	. BUTTON	1	x	x								
-3	44037-G1	. DOOR ASSEMBLY, Cassette	1	x	x								
		ATTACHING PARTS											
-4		. TAPE (dbl face) No. 4032 - 3M Co.	LP	x	x								

-5		. HARNESS, Tape Deck	NA	x									
		. HARNESS, Tape Deck	NA			x							
-6	44407-P1	. ACTUATOR	1	x	x								
		ATTACHING PARTS											
-7	140-4R-3X	. SCREW, Thread Forming No. 4 x 3/16, Pan hd. .	2	x	x								
-8	220-4	. WASHER, Lock	2	x	x								

-9	44408-P1	. SPRING	1	x	x								
	44431	. LAMP (not shown)	1	x	x								
	431B3-16	. TUBING	1	x	x								
-10	43817-G3	. TAPE DECK (Fig. 21 and 22)	1	x									
	43817-G6	. TAPE DECK	1			x							
-11	44435-G1	. BRACKET ASSEMBLY	1			x							
-12	116-1-3H	. SCREW, Machine 1/64 x 3/16, Pan hd	1			x							
	43817-G5	. TAPE DECK MECHANISM (Fig. 21 and 22) . .	NA			x							

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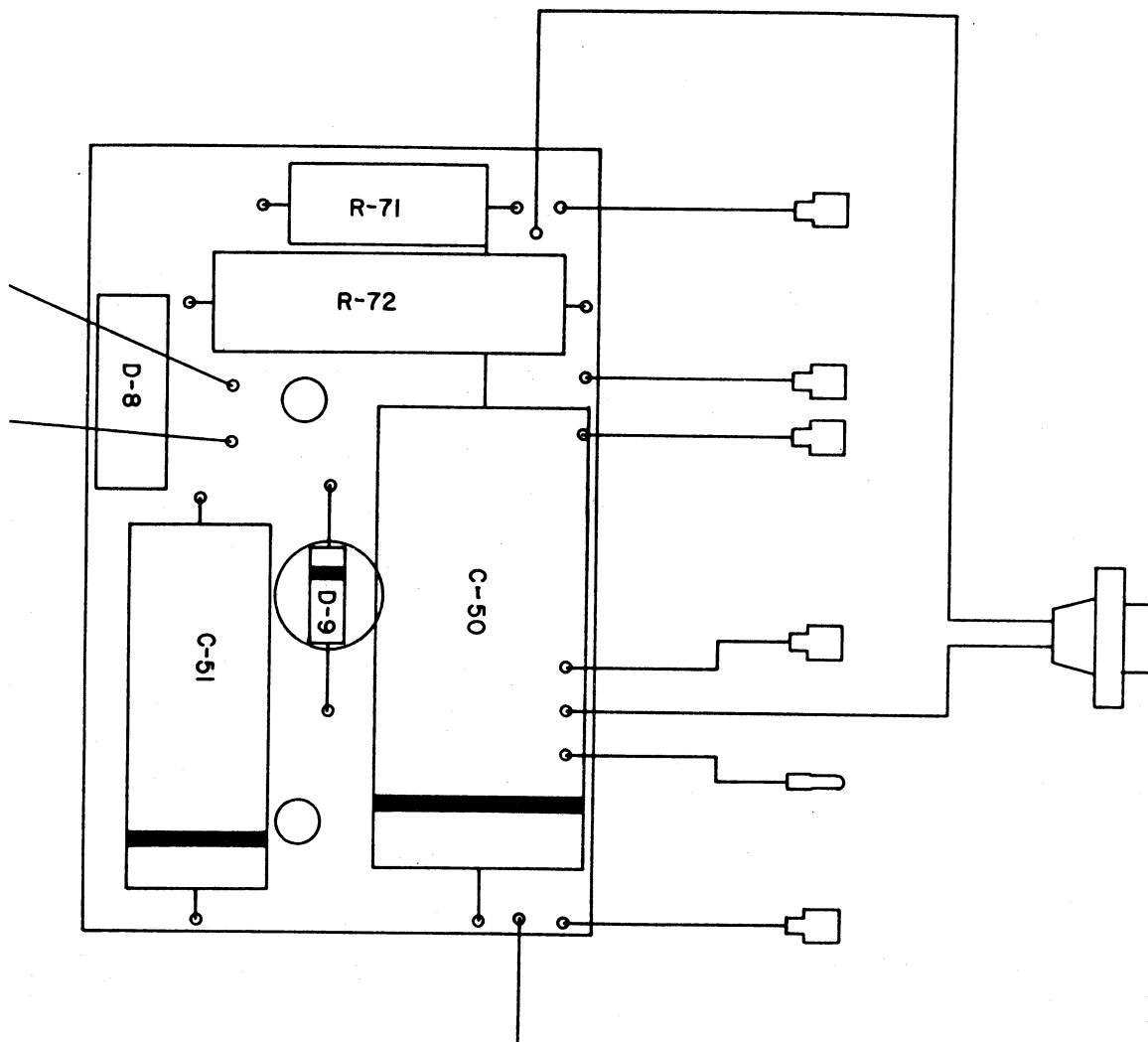


Figure 30. POWER SUPPLY BOARD ASSEMBLY

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS									
		1 2 3 4 5		43898-G2									
30-	43898-G2	BOARD ASSEMBLY, Power Supply.....	REF	x									
	C-50	. CAPACITOR, 1000 mfd, 25V	LP	x									
	C-51	. CAPACITOR, 1000 mfd, 10V.....	LP	x									
	D-9	. DIODE, Zener (IN5343A).....	LP	x									
	D-8	. DIODE, Bridge.....	LP	x									
	R-71*	. RESISTOR, 3.3 ohm±20%, 2W.....	LP	x									
	R-72	. RESISTOR, 100 ohm±5%, 5W	LP	x									
	37585-P3	. RECEPTACLE.....	1	x									
	43897-P1	. BOARD.....	1	x									
		*NOTE: For proper solenoid action on units with Bomax motors, remove resistor (R-71) and replace with a jumper wire across the void.											

NOTES

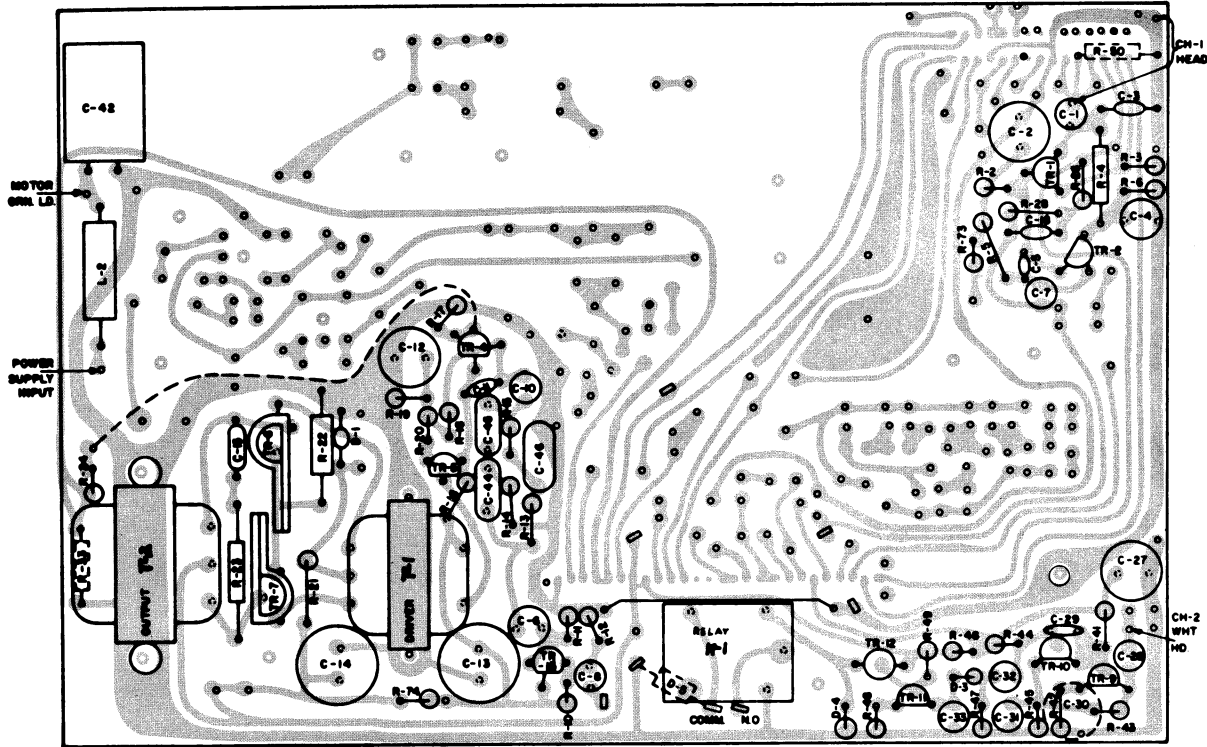


Figure 31. AMPLIFIER CIRCUIT BOARD (Prior to code J3M)

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	QTY	PART NUMBERS					
		1 2 3 4 5		43855-G1					
31-	43855-G1	BOARD, Circuit (Playback Model- Cat. 8805-8807)	NA	x					
-C-1		. CAPACITOR 1 mfd, 25V.	LP	x					
-C-2		. CAPACITOR 330 mfd, 6.3V.	LP	x					
-C-3		. CAPACITOR .001 mfd, 25V.	LP	x					
-C-4		. CAPACITOR 33 mfd, 10V.	LP	x					
-C-5	41904-P15	. CAPACITOR 47 pfd, 50V.	LP	x					
-C-6	44030-P9	. CAPACITOR 33 mfd, 10V.	LP	x					
-C-7		. CAPACITOR 10 mfd, 16V.	LP	x					
-C-8	44030-P9	. CAPACITOR 10 mfd, 16V.	LP	x					
-C-10		. CAPACITOR 10 mfd, 16V.	LP	x					
-C-11		. CAPACITOR .001 mfd, 50V.	LP	x					
-C-12		. CAPACITOR 330 mfd, 6.3V.	LP	x					
-C-13		. CAPACITOR 470 mfd, 10V.	LP	x					
-C-14	44030-P9	. CAPACITOR 470 mfd, 10V.	LP	x					
-C-15		. CAPACITOR 0.1 mfd, 50V.	LP	x					
-C-18		. CAPACITOR .0068 mfd, 25V.	LP	x					
-C-27		. CAPACITOR 330 mfd, 6.3V.	LP	x					
-C-28		. CAPACITOR 10 mfd, 16V.	LP	x					
-C-29		. CAPACITOR 330 mfd, 6.3V.	LP	x					
-C-30		. CAPACITOR 330 mfd, 6.3V.	LP	x					
-C-31	44030-P9	. CAPACITOR 22 mfd, 6.3V.	LP	x					
-C-32		. CAPACITOR 10 mfd, 16V.	LP	x					
-C-33	44030-P9	. CAPACITOR 4.7 mfd, 16V.	LP	x					
-C-42		. CAPACITOR 470 mfd, 10V.	LP	x					
-C-44		. CAPACITOR .047 mfd, 25V.	LP	x					
-C-45		. DIODE047 mfd, 25V.	LP	x					
-C-46		. DIODE0.1 mfd, 25V.	LP	x					
-D-1	D-IS-1209	. DIODE	LP	x					
-D-3	D-IS-426	. DIODE	LP	x					
-D-4	D-SR-1K-2	. DIODE	LP	x					
-D-5	D-SR-1K-2	. DIODE	LP	x					
-L-2	44509	. MOTOR FILTER COIL	1	x					

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FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS							
				43355-C1							
		Figure 31. AMPLIFIER CIRCUIT BOARD (cont.)									
-TR-1	TR-2SC900	TRANSISTOR	LP	x							
-TR-2	TR-2SC945	TRANSISTOR	LP	x							
-TR-4	TR-2SC945	TRANSISTOR	LP	x							
-TR-5	TR-2SC945	TRANSISTOR	LP	x							
-TR-6	TR-2SD261	TRANSISTOR	LP	x							
-TR-7	TR-2SD261	TRANSISTOR	LP	x							
-TR-9	TR-2SC945	TRANSISTOR	LP	x							
-TR-10	TR-2SC900	TRANSISTOR	LP	x							
-TR-11	TR-2SC945	TRANSISTOR	LP	x							
-TR-12	TR-2SB136	TRANSISTOR	LP	x							
-TR-15	TR-2SC945	TRANSISTOR	LP	x							
-K-1	VO-0940-0001	RELAY	1	x							
-R-2		RESISTOR 22K ohm, 1/4W 5%	LP	x							
-R-3		RESISTOR 390 ohm, 1/4W 5%	LP	x							
-R-4		RESISTOR 510K ohm, 1/4W 10%	LP	x							
-R-5		RESISTOR 3.9K ohm, 1/4W 10%	LP	x							
-R-6		RESISTOR 1.5K ohm, 1/4W 10%	LP	x							
-R-8		RESISTOR 10K ohm, 1/4W 5%	LP	x							
-R-9		RESISTOR 100K ohm, 1/4W 10%	LP	x							
-R-10		RESISTOR 100K ohm, 1/4W 10%	LP	x							
-R-11		RESISTOR 100K ohm, 1/4W 5%	LP	x							
-R-12		RESISTOR 4.7K ohm, 1/4W 10%	LP	x							
-R-13		RESISTOR 120K ohm, 1/4W 10%	LP	x							
-R-14		RESISTOR 51K ohm, 1/4W 10%	LP	x							
-R-15		RESISTOR 120K ohm, 1/4W 10%	LP	x							
-R-16		RESISTOR 12K ohm, 1/4W 5%	LP	x							
-R-17		RESISTOR 43 ohm, 1/4W 10%	LP	x							
-R-18		RESISTOR 120K ohm, 1/4W 10%	LP	x							
-R-19		RESISTOR 220 ohm, 1/4W 5%	LP	x							
-R-20		RESISTOR 100 ohm, 1/4W 5%	LP	x							
-R-21		RESISTOR 1.5K ohm, 1/4W 10%	LP	x							
-R-22		RESISTOR 1 ohm, 1/4W 10%	LP	x							
-R-23		RESISTOR 43 ohm, 1/4W 5%	LP	x							
-R-24		RESISTOR 15 ohm, 1/4W 5%	LP	x							
-R-26		RESISTOR 22K ohm, 1/4W 5%	LP	x							
-R-28		RESISTOR 470 ohm, 1/4W 5%	LP	x							
-R-33		RESISTOR 150 ohm, 1/4W 10%	LP	x							
-R-41		RESISTOR 15K ohm, 1/4W 10%	LP	x							
-R-42		RESISTOR 43 ohm, 1/4W 5%	LP	x							
-R-43		RESISTOR 220K ohm, 1/4W 10%	LP	x							
-R-44		RESISTOR 4.7K ohm, 1/4W 5%	LP	x							
-R-45		RESISTOR 2.2K ohm, 1/4W 10%	LP	x							
-R-46		RESISTOR 1K ohm, 1/4W 10%	LP	x							
-R-47		RESISTOR 4.7K ohm, 1/4W 5%	LP	x							
-R-48		RESISTOR 47 ohm, 1/4W 10%	LP	x							
-R-49		RESISTOR 2.2K ohm, 1/4W 10%	LP	x							
-R-50		RESISTOR 68 ohm, 1/4W 10%	LP	x							
-R-73		RESISTOR 1K ohm, 1/4W 10%	LP	x							
-R-74		RESISTOR 68 ohm, 1/4W 10%	LP	x							
-T-2	VO-0680-0003	TRANSFORMER, Output	1	x							
-T-1	VO-0680-0002	TRANSFORMER, Drive	1	x							
	Vo-6201-5101	BOARD	NA	x							

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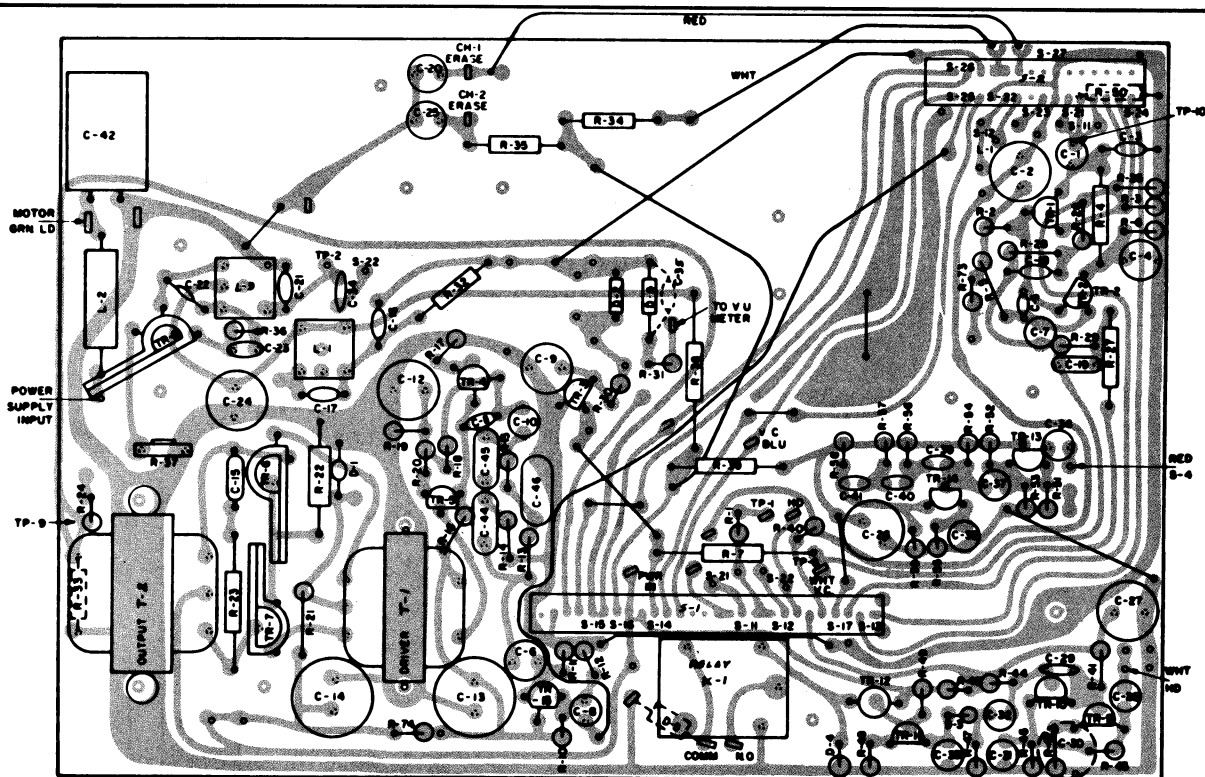


Figure 32. AMPLIFIER CIRCUIT BOARD , R & P MODEL (Prior to code K3N)

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION					PART NUMBERS									
		1	2	3	4	5	QTY	43835-P1								
32-	43835-P1	BOARD, Circuit (R & P Model - prior to Code K3N) .					NA	x								
-C-1		. CAPACITOR 1 mfd, 25V					LP	x								
-C-2		. CAPACITOR 330 mfd, 6.3V 10%					LP	x								
-C-3		. CAPACITOR .001 mfd, 50V 10%					LP	x								
-C-4		. CAPACITOR 33 mfd, 6.3V 10%					LP	x								
-C-5	41904-P15	. CAPACITOR 47 pfd, 50V 10%					LP	x								
-C-6		. CAPACITOR 33 mfd, 10V 10%					LP	x								
-C-7	44030-P9	. CAPACITOR 10 mfd, 16V 10%					LP	x								
-C-8	44030-P9	. CAPACITOR 10 mfd, 16V 10%					LP	x								
-C-9		. CAPACITOR 33 mfd, 6.3V 10%					LP	x								
-C-10	44030-P9	. CAPACITOR 10 mfd, 16V 10%					LP	x								
-C-11		. CAPACITOR .001 mfd, 50V 10%					LP	x								
-C-12		. CAPACITOR 330 mfd, 6.3V 10%					LP	x								
-C-13		. CAPACITOR 470 mfd, 10V 10%					LP	x								
-C-14		. CAPACITOR 470 mfd, 10V 10%					LP	x								
-C-15		. CAPACITOR 0.1 mfd, 50V 10%					LP	x								
-C-16		. CAPACITOR .0015 mfd, 50V 10%					LP	x								
-C-17		. CAPACITOR .001 mfd, 50V 10%					LP	x								
-C-18		. CAPACITOR .0068 mfd														
-C-19		. CAPACITOR .05 mfd, 25V 10%					LP	x								
-C-20		. CAPACITOR 47 mfd, 6.3V 10%					LP	x								
-C-21		. CAPACITOR .0022 mfd, 50V 20%					LP	x								
-C-22		. CAPACITOR .01 mfd, 50V 20%					LP	x								
-C-23		. CAPACITOR .001 mfd														
-C-24		. CAPACITOR 330 mfd, 6.3V 10%					LP	x								
-C-25		. CAPACITOR 47 mfd, 6.3V 10%					LP	x								
-C-26		. CAPACITOR 330 mfd, 6.3V 10%					LP	x								
-C-27		. CAPACITOR 330 mfd, 6.3V 10%					LP	x								
-C-28	44030-P9	. CAPACITOR 10 mfd, 16V 10%					LP	x								
-C-29		. CAPACITOR 330 pfd, 50V 20%					LP	x								

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FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS							
				43835-P1							
32-		Figure 32. AMPLIFIER CIRCUIT BOARD (cont.)									
-C-30		. CAPACITOR 330 mfd, 6.3V 10%	LP	x							
-C-31		. CAPACITOR 22 mfd, 6.3V 10%	LP	x							
-C-32	44030-P9	. CAPACITOR 10 mfd, 16V 10%	LP	x							
-C-33		. CAPACITOR 4.7 mfd, 16V 10%	LP	x							
-C-34		. CAPACITOR 100 pfd, 10%	LP	x							
-C-35		. CAPACITOR .033 mfd, 25V 10%	LP	x							
-C-36	44030-P9	. CAPACITOR 10 mfd, 16V 10%	1	x							
-C-37	44030-P9	. CAPACITOR 10 mfd, 16V 10%	1	x							
-C-38		. CAPACITOR 4.7 mfd, 16V 10%	LP	x							
-C-39		. CAPACITOR .015 mfd, 25V 10%	LP	x							
-C-40		. CAPACITOR .015 mfd, 25V 10%	LP	x							
-C-41		. CAPACITOR .015 mfd, 25V 10%	LP	x							
-C-42		. CAPACITOR 470 mfd, 10V 10%	LP	x							
-C-44		. CAPACITOR .047 mfd, 25V 10%	LP	x							
-C-45		. CAPACITOR .047 mfd, 25V 10%	LP	x							
-C-46		. CAPACITOR 0.1 mfd, 25V 10%	LP	x							
-D-1	D-1S-1209	. DIODE	1	x							
-D-2	D-1S-426	. DIODE	1	x							
-D-3	D-1S-426	. DIODE	1	x							
-D-4	D-SR-1K-2	. DIODE	1	x							
-D-5	D-SR-1K-2	. DIODE	1	x							
-D-6	D-1S-426	. DIODE	1	x							
-TR-1	TR-2SC900	. TRANSISTOR	1	x							
-TR-2	TR-2SC945	. TRANSISTOR	1	x							
-TR-3	TR-2SC945	. TRANSISTOR	1	x							
-TR-4	TR-2SC945	. TRANSISTOR	1	x							
-TR-5	TR-2SC945	. TRANSISTOR	1	x							
-TR-6	TR-2SD261	. TRANSISTOR	1	x							
-TR-7	TR-2SD261	. TRANSISTOR	1	x							
-TR-8	TR-2SD261	. TRANSISTOR	1	x							
-TR-9	TR-2SC945	. TRANSISTOR	1	x							
-TR-10	TR-2SC900	. TRANSISTOR	1	x							
-TR-11	TR-2SC945	. TRANSISTOR	1	x							
-TR-12	TR-2SB136	. TRANSISTOR	1	x							
-TR-13	TR-2SC945	. TRANSISTOR	1	x							
-TR-14	TR-2SC945	. TRANSISTOR	LP	x							
-TR-15	TR-2SC945	. TRANSISTOR	LP	x							
-K-1	VO-0940-0001	. RELAY	1	x							
-R-1		. RESISTOR 10 ohm, 1/4W 5%	LP	x							
-R-2		. RESISTOR 22K ohm, 1/4W 5%	LP	x							
-R-3		. RESISTOR 390 ohm, 1/4W 5%	LP	x							
-R-4		. RESISTOR 510K ohm, 1/4W 10%	LP	x							
-R-5		. RESISTOR 3.9K ohm, 1/4W 10%	LP	x							
-R-6		. RESISTOR 1.5K ohm, 1/4W 10%	LP	x							
-R-7		. RESISTOR 12K ohm, 1/4W 10%	LP	x							
-R-8		. RESISTOR 10K ohm, 1/4W 10%	LP	x							
-R-9		. RESISTOR 1K ohm, 1/4W 10%	LP	x							
-R-10		. RESISTOR 100K ohm, 1/4W 10%	LP	x							
-R-11		. RESISTOR 100K ohm, 1/4W 10%	LP	x							
-R-12		. RESISTOR 4.7K ohm, 1/4W 5%	LP	x							
-R-13		. RESISTOR 120K ohm, 1/4W 10%	LP	x							
-R-14		. RESISTOR 51K ohm, 1/4W 10%	LP	x							
-R-15		. RESISTOR 120K ohm, 1/4W 10%	LP	x							
-R-16		. RESISTOR 12K ohm, 1/4W 10%	LP	x							
-R-17		. RESISTOR 43 ohm, 1/4W 5%	LP	x							
-R-18		. RESISTOR 120K ohm, 1/4W 10%	LP	x							
-R-19		. RESISTOR 220 ohm, 1/4W 10%	LP	x							
-R-20		. RESISTOR 100 ohm, 1/4W 5%	LP	x							
-R-21		. RESISTOR 1.5K ohm, 1/4W 10%	LP	x							

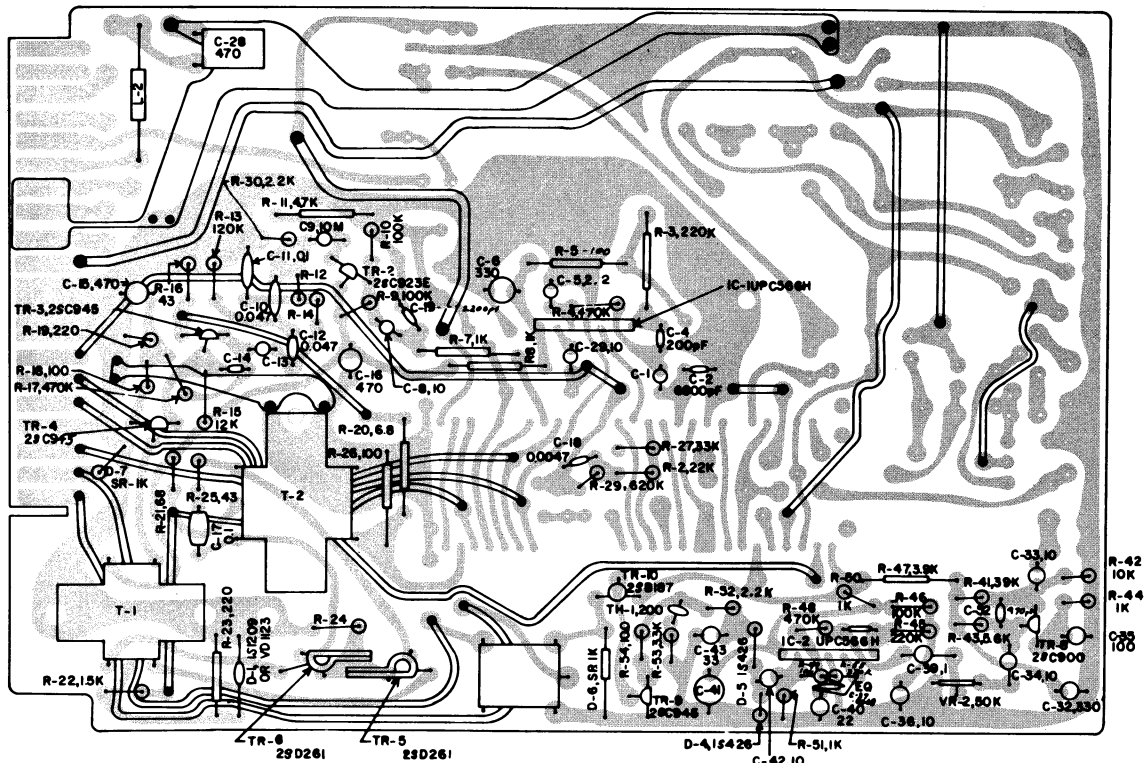
CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS									
				43835-P1									
32-		Figure 32. AMPLIFIER CIRCUIT BOARD (cont.)											
-R-22		. RESISTOR 1 ohm, 1W 10%	LP	x									
-R-23		. RESISTOR 43 ohm, 1/4W 5%	LP	x									
-R-24		. RESISTOR 15K ohm, 1/4W 5%	LP	x									
-R-25		. RESISTOR 1K ohm, 1/4W 10%	LP	x									
-R-26		. RESISTOR 22K ohm, 1/4W 5%	LP	x									
-R-27		. RESISTOR 22K ohm, 1/4W 5%	LP	x									
-R-28		. RESISTOR 470 ohm, 1/4W 10%	LP	x									
-R-29		. RESISTOR 33K ohm, 1/4W 10%	LP	x									
-R-30		. RESISTOR 10K ohm, 1/4W 10%	LP	x									
-R-31		. RESISTOR 1K ohm, 1/4W 10%	LP	x									
-R-32		. RESISTOR 27K ohm, 1/4W 10%	LP	x									
-R-32		. RESISTOR 150 ohm, 1/4W 10%	LP	x									
-R-34		. RESISTOR 150 ohm, 1/4W 10%	LP	x									
-R-35		. RESISTOR 150 ohm, 1/4W 10%	LP	x									
-R-36		. RESISTOR 27K ohm, 1/4W 10%	LP	x									
-R-37		. RESISTOR Semi Fixed 200 ohm 1/4 W 10%	LP	x									
-R-38		. RESISTOR 100 ohm, 1W 10%	LP	x									
-R-39		. RESISTOR 560 ohm, 1/4W 10%	LP	x									
-R-40		. RESISTOR 47 ohm, 1/4W 10%	LP	x									
-R-41		. RESISTOR 15K ohm, 1/4W 10%	LP	x									
-R-42		. RESISTOR 43 ohm, 1/4W 5%	LP	x									
-R-43		. RESISTOR 220K ohm, 1/4W 10%	LP	x									
-R-44		. RESISTOR 4.7K ohm, 1/4W 5%	LP	x									
-R-45		. RESISTOR 2.2K ohm, 1/4W 10%	LP	x									
-R-46		. RESISTOR 1K ohm, 1/4W 10%	LP	x									
-R-47		. RESISTOR 4.7K ohm, 1/4W 5%	LP	x									
-R-48		. RESISTOR 47 ohm, 1/4W 10%	LP	x									
-R-49		. RESISTOR 2.2K ohm, 1/4W 10%	LP	x									
-R-50		. RESISTOR 68 ohm, 1/4W 10%	LP	x									
-R-51		. RESISTOR 3.9K ohm, 1/4W 10%	LP	x									
-R-52		. RESISTOR 47K ohm, 1/4W 10%	LP	x									
-R-53		. RESISTOR 47K ohm, 1/4W 10%	LP	x									
-R-54		. RESISTOR 2.2K ohm, 1/4W 10%	LP	x									
-R-55		. RESISTOR 1K ohm, 1/4W 10%	LP	x									
-R-56		. RESISTOR 4.7K ohm, 1/4W 5%	LP	x									
-R-57		. RESISTOR 4.7K ohm, 1/4W 5%	LP	x									
-R-58		. RESISTOR 22K ohm, 1/4W 5%	LP	x									
-R-59		. RESISTOR 10K ohm, 1/4W 10%	LP	x									
-R-73		. RESISTOR 1K ohm, 1/4W 10%	LP	x									
-R-74		. RESISTOR 68 ohm, 1/4W 10%	LP	x									
-S-1	VO-0970-0001	. SWITCH, Logic (Program Track)	1	x									
-S-2	VO-0970-0002	. SWITCH, Logic (P/R)	1	x									
-T-1	VO-0680-0002	. TRANSFORMER, Driver	1	x									
-T-2	VO-0680-0003	. TRANSFORMER, Output	1	x									
-L-3	VO-0650-0003	. TRANSFORMER, Bias (1114)	1	x									
-L-2	44509	. COIL, Motor Filter	1	x									
-L-1	VO-0650-0004	. COIL, Motor Filter (1115)	1	x									
	VO-6201-5101	. BOARD	NA	x									

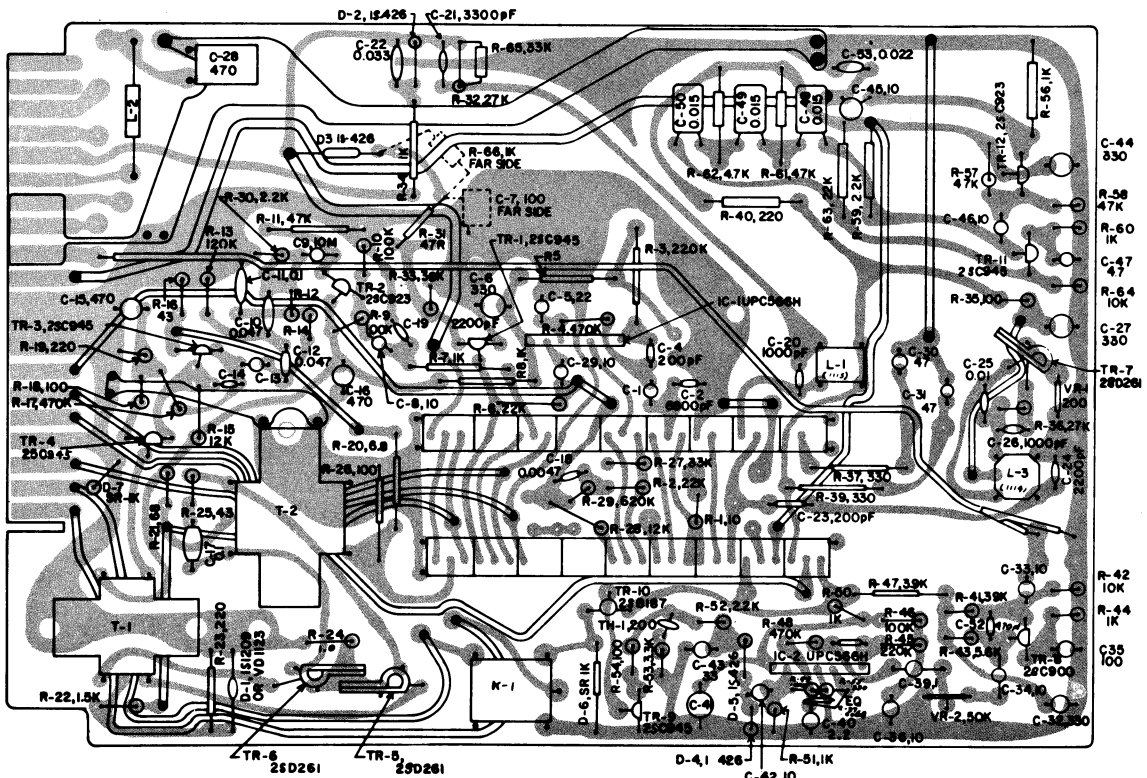
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CIRCUIT BOARD (Playback) Starting code J3M 43919-G1



CIRCUIT BOARD (Play & Record) Starting code K3N 43920-G1

Figure 33. AMPLIFIER CIRCUIT BOARD ASSEMBLY

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS									
				43919-G1	43920-G1								
33-	43919-G1	BOARD, Circuit (Playback Model Starting Code J3M).	REF	x									
	43920-G1	BOARD, Circuit (R & P Model Starting Code K3N)...	REF	x									
-C-1		. CAPACITOR 1 mfd, 10V	LP	x	x								
-C-2		. CAPACITOR 6800 pfd, 10V	LP	x	x								
-C-4		. CAPACITOR 200 pfd, 10V	LP	x	x								
-C-5		. CAPACITOR 2.2 mfd, 10V	LP	x	x								
-C-6		. CAPACITOR 330 mfd, 10V	LP	x	x								
-C-7		. CAPACITOR 100 mfd, 10V	LP	x	x								
-C-8		. CAPACITOR 10 mfd, 10V	LP	x	x								
-C-9		. CAPACITOR 10 mfd, 10V	LP	x	x								
-C-10		. CAPACITOR .047 mfd, 10V	LP	x	x								
-C-11		. CAPACITOR 1 mfd, 10V	LP	x	x								
-C-12		. CAPACITOR .047 mfd, 10V	LP	x	x								
-C-13		. CAPACITOR 1 mfd, 10V	LP	x	x								
-C-14		. CAPACITOR 1000 pfd, 10V	LP	x	x								
-C-15		. CAPACITOR 470 mfd, 10V	LP	x	x								
-C-16		. CAPACITOR 470 mfd, 10V	LP	x	x								
-C-17		. CAPACITOR 0.1 mfd, 10V	LP	x	x								
-C-18		. CAPACITOR .0047 mfd	LP	x	x								
-C-19		. CAPACITOR 2200 pfd, 10V	LP	x	x								
-C-20		. CAPACITOR 1000 pfd, 10V	LP	x									
-C-21		. CAPACITOR 3300 pfd, 10V	LP	x									
-C-22		. CAPACITOR .033 mfd, 10V	LP	x									
-C-23		. CAPACITOR 200 pfd, 10V	LP	x									
-C-24		. CAPACITOR 2200 pfd, 10V	LP	x									
-C-25		. CAPACITOR .01 mfd, 10V	LP	x									
-C-26		. CAPACITOR 1000 pfd, 10V	LP	x									
-C-27		. CAPACITOR 330 mfd, 10V	LP	x									
-C-28		. CAPACITOR 470 mfd, 10V	LP	x	x								
-C-29		. CAPACITOR 10 mfd, 10V	LP	x	x								
-C-30		. CAPACITOR 47 mfd, 10V	LP	x	x								
-C-31		. CAPACITOR 47 mfd, 10V	LP	x	x								
-C-32		. CAPACITOR 330 mfd, 10V	LP	x									
-C-33		. CAPACITOR 10 mfd, 10V	LP	x	x								
-C-34		. CAPACITOR 10 mfd, 10V	LP	x	x								
-C-35		. CAPACITOR 100 mfd, 10V	LP	x	x								
-C-36		. CAPACITOR 10 mfd, 10V	LP	x	x								
-C-37		. CAPACITOR .0068 mfd, 10V	LP	x	x								
-C-39		. CAPACITOR 1 mfd, 10V	LP	x	x								
-C-40		. CAPACITOR 2.2 mfd, 10V	LP	x	x								
-C-41		. CAPACITOR 470 mfd, 10V	LP	x	x								
-C-42		. CAPACITOR 10 mfd, 10V	LP	x	x								
-C-43		. CAPACITOR 33 mfd, 10V	LP	x	x								
-C-44		. CAPACITOR 330 mfd, 10V	LP	x									
-C-45		. CAPACITOR 10 mfd, 10V	LP	x									
-C-46		. CAPACITOR 10 mfd, 10V	LP	x									
-C-47		. CAPACITOR 4.7 mfd, 10V	LP	x									
-C-48		. CAPACITOR .015 mfd, 10V	LP	x									
-C-49		. CAPACITOR .015 mfd, 10V	LP	x									
-C-50		. CAPACITOR .015 mfd, 10V	LP	x									
-C-51		. CAPACITOR 200 pfd, 10V	LP	x	x								
-C-52		. CAPACITOR 470 pfd, 10V	LP	x	x								
-C-53		. CAPACITOR .022 mfd, 10V	LP	x	x								
-L-3	VO-0650-0003	. TRANSFORMER, Bias OSC (1114)	LP	x	x								
-L-2	44509	. COIL, Motor (1115)	1	x	x								
-L-1	VO-0650-0004	. COIL, Bias Trap	1	x									
-D-1	D-1S-1209	. DIODE	LP	x	x								
-D-2	D-1S-426	. DIODE	LP	x	x								
-D-3	D-1S-426	. DIODE	LP	x									

CARAMATE PROJECTORS

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS									
				43919-G1	43920-G1								
33-		Figure 33 Circuit Board (continued)											
-D-4	D-1S-426	. DIODE	LP	x	x								
-D-5	D-1S-426	. DIODE	LP	x	x								
-D-6	D-SR-1K	. DIODE	LP	x	x								
-D-7	D-SR-1K	. DIODE	LP	x	x								
-IC-1	IC-UPC-566H	. CIRCUIT, Integrated	LP	x	x								
-IC-2	IC-UPC-566H	. CIRCUIT, Integrated	LP	x	x								
-R-1		. RESISTOR 10 ohm, 1/4W 5%	LP	x									
-R-2		. RESISTOR 22K ohm, 1/4W 5%	LP	x	x								
-R-3		. RESISTOR 220K ohm, 1/4W 5%	LP	x	x								
-R-4		. RESISTOR 470K ohm, 1/4W 5%	LP	x	x								
-R-5		. RESISTOR 100K ohm, 1/4W 5%	LP	x	x								
-R-6		. RESISTOR 22K ohm, 1/4W 5%	LP	x									
-R-7		. RESISTOR 1K ohm, 1/4W 5%	LP	x	x								
-R-8		. RESISTOR 1K ohm, 1/4W 5%	LP	x	x								
-R-9		. RESISTOR 100K ohm, 1/4W 5%	LP	x	x								
-R-10		. RESISTOR 100K ohm, 1/4W 5%	LP	x	x								
-R-11		. RESISTOR 4.7K ohm, 1/4W 5%	LP	x	x								
-R-12		. RESISTOR 220K ohm, 1/4W 5%	LP	x	x								
-R-13		. RESISTOR 120K ohm, 1/4W 5%	LP	x	x								
-R-14		. RESISTOR 220K ohm, 1/4W 5%	LP		x								
-R-15		. RESISTOR 12K ohm, 1/4W 5%	LP	x	x								
-R-16		. RESISTOR 43 ohm, 1/4W 5%	LP	x	x								
-R-17		. RESISTOR 470K ohm, 1/4W 5%	LP	x	x								
-R-18		. RESISTOR 100 ohm, 1/4W 5%	LP	x	x								
-R-19		. RESISTOR 220 ohm, 1/4W 5%	LP	x	x								
-R-20		. RESISTOR 6.8K ohm, 1/4W 5%	LP	x	x								
-R-21		. RESISTOR 68 ohm, 1/4W 5%	LP	x	x								
-R-22		. RESISTOR 1.5K ohm, 1/4W 5%	LP	x	x								
-R-23		. RESISTOR 220 ohm, 1/4W 5%	LP	x	x								
-R-24		. RESISTOR 1 ohm, 1/4W 5%	LP	x	x								
-R-25		. RESISTOR 43 ohm, 1/4W 5%	LP	x	x								
-R-26		. RESISTOR 100 ohm, 1/4W 5%	LP	x	x								
-R-27		. RESISTOR 33K ohm, 1/4W 5%	LP	x	x								
-R-28		. RESISTOR 12K ohm, 1/4W 5%	LP		x								
-R-29		. RESISTOR 620K ohm, 1/4W 5%	LP	x	x								
-R-30		. RESISTOR 2.2K ohm, 1/4W 5%	LP	x	x								
-R-31		. RESISTOR 47K ohm, 1/4W 5%	LP		x								
-R-32		. RESISTOR 27K ohm, 1/4W 5%	LP		x								
-R-33		. RESISTOR 39K ohm, 1/4W 5%	LP		x								
-R-34		. RESISTOR 1K ohm, 1/4W 5%	LP		x								
-R-35		. RESISTOR 100 ohm, 1/4W 5%	LP		x								
-R-36		. RESISTOR 27K ohm, 1/4W 5%	LP		x								
-R-37		. RESISTOR 330 ohm, 1/4W 5%	LP		x								
-R-39		. RESISTOR 330 ohm, 1/4W 5%	LP		x								
-R-40		. RESISTOR 220 ohm, 1/4W 5%	LP		x								
-R-41		. RESISTOR 39K ohm, 1/4W 5%	LP	x	x								
-R-42		. RESISTOR 10K ohm, 1/4W 5%	LP	x	x								
-R-43		. RESISTOR 5.6K ohm, 1/4W 5%	LP	x	x								
-R-44		. RESISTOR 1K ohm, 1/4W 5%	LP	x	x								
-R-45		. RESISTOR 220K ohm, 1/4W 5%	LP	x	x								
-R-46		. RESISTOR 100K ohm, 1/4W 5%	LP	x	x								
-R-47		. RESISTOR 3.9K ohm, 1/4W 5%	LP	x	x								
-R-48		. RESISTOR 470K ohm, 1/4W 5%	LP	x	x								
-R-49		. RESISTOR 10K ohm, 1/4W 5%	LP	x	x								
-R-50		. RESISTOR 1K ohm, 1/4W 5%	LP	x	x								
-R-51		. RESISTOR 1K ohm, 1/4W 5%	LP	x	x								
-R-52		. RESISTOR 2.2K ohm, 1/4W 5%	LP	x	x								
-R-53		. RESISTOR 3.3K ohm, 1/4W 5%	LP	x	x								
-R-54		. RESISTOR 100 ohm, 1/4W 5%	LP	x	x								

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FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5	QTY	PART NUMBERS									
				43919-G1	43920-G1								
33-		Figure 33 Circuit Board (continued)											
-R-55		. RESISTOR 330K ohm, 1/4W 5%	LP	x									
-R-56		. RESISTOR 1K ohm, 1/4W 5%	LP	x									
-R-57		. RESISTOR 47K ohm, 1/4W 5%	LP	x									
-R-58		. RESISTOR 47K ohm, 1/4W 5%	LP	x									
-R-59		. RESISTOR 2.2K ohm, 1/4W 5%	LP	x									
-R-60		. RESISTOR 1K ohm, 1/4W 5%	LP	x									
-R-61		. RESISTOR 4.7K ohm, 1/4W 5%	LP	x									
-R-62		. RESISTOR 4.7K ohm, 1/4W 5%	LP	x									
-R-63		. RESISTOR 22K ohm, 1/4W 5%	LP	x									
-R-64		. RESISTOR 10K ohm, 1/4W 5%	LP	x									
-R-65		. RESISTOR 33K ohm, 1/4W 5%	LP	x									
-R-66		. RESISTOR 1K ohm, 1/4W 5%	LP	x									
-S-1		. SWITCH.	LP	x									
-S-2		. SWITCH.	LP	x									
-TH-1		. THYRATRON THERMISTER	1	x	x								
	VO-0940-0001	. RELAY	1	x	x								
-T-1	VO-0680-0002	. TRANSFORMER, Input.	1	x	x								
-T-2	VO-0680-0004	. TRANSFORMER, Output	1	x	x								
-TR-1	TR-2SC945	. TRANSISTOR	LP	x									
-TR-2	TR-2SC923	. TRANSISTOR	LP	x	x								
-TR-3	TR-2SC945	. TRANSISTOR	LP	x	x								
-TR-4	TR-2SC945	. TRANSISTOR	LP	x	x								
-TR-5	TR-2SD261	. TRANSISTOR	LP	x	x								
-TR-6	TR-2SD261	. TRANSISTOR	LP	x	x								
-TR-7	TR-2SD261	. TRANSISTOR	LP	x									
-TR-8	TR-2SC900	. TRANSISTOR	LP	x	x								
-TR-9	TR-2SC945	. TRANSISTOR	LP	x	x								
-TR-10	TR-2SB187	. TRANSISTOR	LP	x	x								
-TR-11	TR-2SC945	. TRANSISTOR	LP	x	x								
-TR-12	TR-2SC923	. TRANSISTOR	LP	x	x								
-VR-1		. POTENTIOMETER, 200 ohm.	LP	x									
-VR-2		. POTENTIOMETER, 50K ohm.	LP	x	x								
	VO-6205-5102	. BOARD, Circuit	NA	x	x								
		SEE SCHEMATIC											
		P/N 43921-J (Playback) - Page 74											
		P/N 43922-N (Play & Record) - Page 76											
		P/N 43933-E (Playback) - (Export) - Page 77											
		P/N 43935-E (Play & Record - (Export)											
		- Page 79											

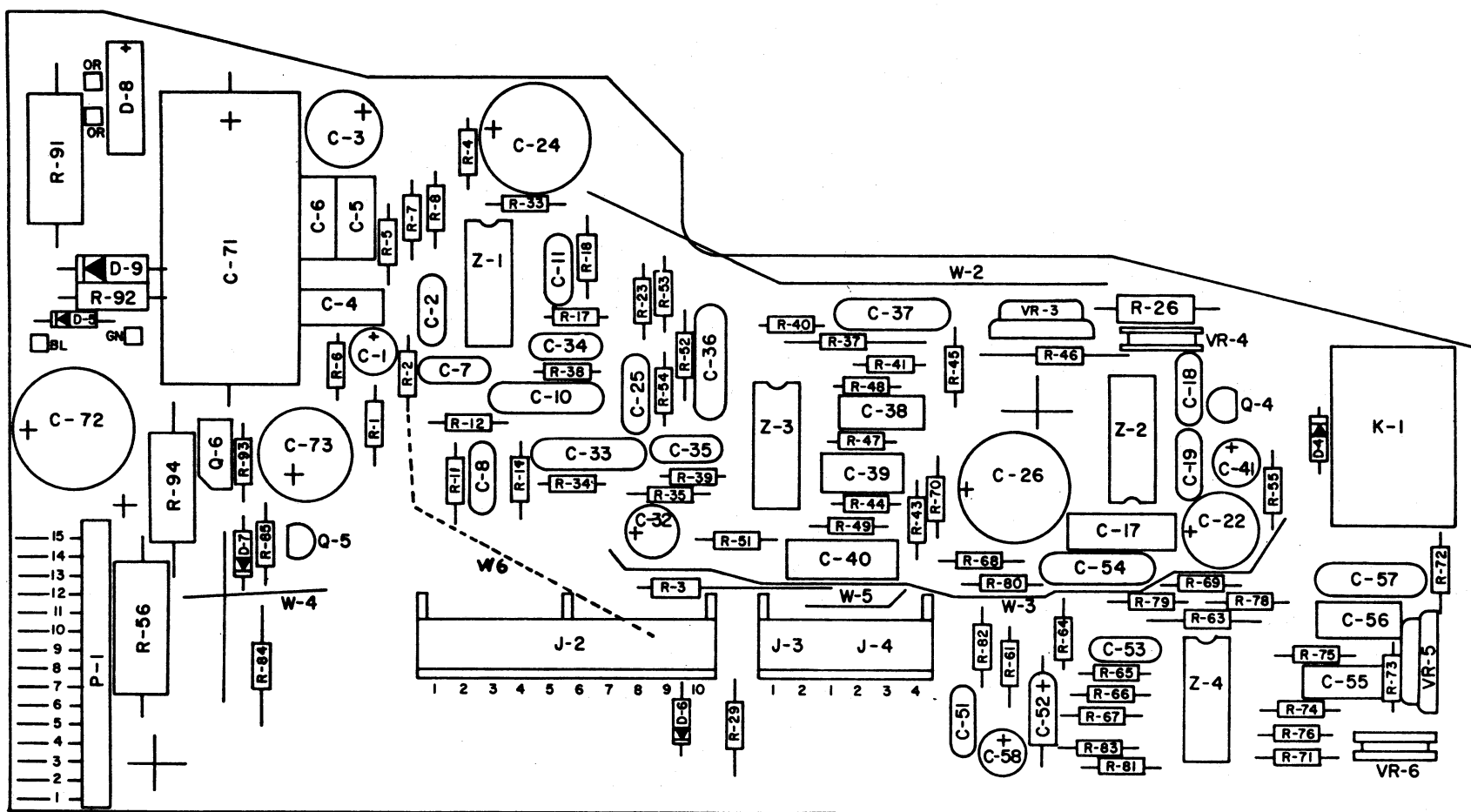


Figure 34. CIRCUIT BOARD (SP Playback)

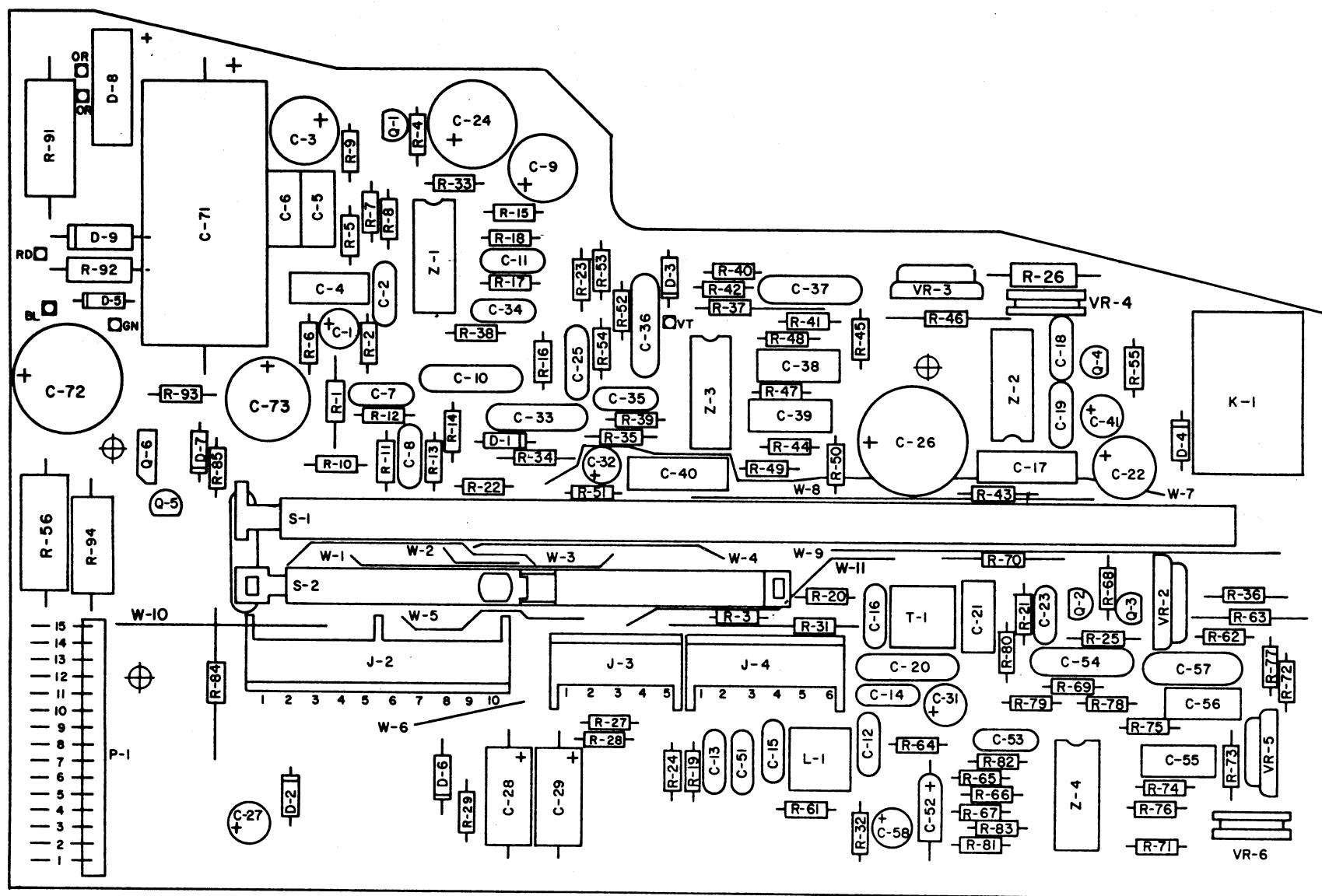
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34-	44399-G1	BOARD ASSEMBLY, Circuit (Playback SP)	-R7	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W
-C1		. CAPACITOR, 1 μ f 16V	-R8	. RESISTOR, 120,000 ohm $\pm 5\%$ 1/4W
-C2		. CAPACITOR, 47 μ $\pm 10\%$	-R11	. RESISTOR, 3,330 ohm $\pm 5\%$ 1/4W
-C3		. CAPACITOR, 220 μ f 16V	-R12	. RESISTOR, 27,000 ohm $\pm 5\%$ 1/4W
-C4		. CAPACITOR, .01 μ f 100V	-R14	. RESISTOR, 33,000 ohm $\pm 5\%$ 1/4W
-C5		. CAPACITOR, .01 μ f 100V	-R17	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W
-C6		. CAPACITOR, .01 μ f 100V	-R18	. RESISTOR, 120,000 ohm $\pm 5\%$ 1/4W
-C7		. CAPACITOR, 4700pf $\pm 10\%$	-R23	. RESISTOR, 2.7 ohm $\pm 5\%$ 1/4W
-C8		. CAPACITOR, 4700pf $\pm 10\%$	-R26	. RESISTOR, 10 ohm $\pm 10\%$ 1/2W
-C10		. CAPACITOR, .22mfd 16V	-R29	. RESISTOR, 270 ohm $\pm 5\%$ 1/4W
-C11		. CAPACITOR, 47pf $\pm 10\%$	-R33	. RESISTOR, 1,000,000 ohm $\pm 5\%$ 1/4W
-C17		. CAPACITOR, .068 μ f 100V	-R34	. RESISTOR, 3,300 ohm $\pm 5\%$ 1/4W
-C18		. CAPACITOR, 180pf $\pm 10\%$	-R35	. RESISTOR, 18,000 ohm $\pm 5\%$ 1/4W
-C19		. CAPACITOR, 33pf $\pm 10\%$	-R37	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W
-C22		. CAPACITOR, 100 μ f 16V	-R38	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W
-C24		. CAPACITOR, 470mfd 16V	-R39	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W
-C25		. CAPACITOR, .1mfd 16V	-R40	. RESISTOR, 68,000 ohm $\pm 5\%$ 1/4W
-C26		. CAPACITOR, 1000mfd 16V	-R41	. RESISTOR, 180,000 ohm $\pm 5\%$ 1/4W
-C32		. CAPACITOR, 1 μ f 16V	-R43	. RESISTOR, 68,000 ohm $\pm 5\%$ 1/4W
-C33		. CAPACITOR, .22mfd 16V	-R44	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W
-C34		. CAPACITOR, 180pf $\pm 10\%$	-R45	. RESISTOR, 120,000 ohm $\pm 5\%$ 1/4W
-C35		. CAPACITOR, 180pf $\pm 10\%$	-R46	. RESISTOR, 2,000 ohm $\pm 5\%$ 1/4W
-C36		. CAPACITOR, .22mfd 16V	-R47	. RESISTOR, 220,000 ohm $\pm 5\%$ 1/4W
-C37		. CAPACITOR, .22 mfd 16V	-R48	. RESISTOR, 470,000 ohm $\pm 5\%$ 1/4W
-C38		. CAPACITOR, .0068 μ f 100V	-R49	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W
-C39		. CAPACITOR, .0068 μ f 100V	-R51	. RESISTOR, 38,000 ohm $\pm 5\%$ 1/4W
-C40		. CAPACITOR, .068 μ f 100V	-R52	. RESISTOR, 220,000 ohm $\pm 5\%$ 1/4W
-C41		. CAPACITOR, 22 μ f 10V	-R53	. RESISTOR, 33,000 ohm $\pm 5\%$ 1/4W
-C51		. CAPACITOR, 2200pf $\pm 10\%$	-R54	. RESISTOR, 10,000 ohm $\pm 5\%$ 1/4W
-C52		. CAPACITOR, 5 μ f 10V	-R55	. RESISTOR, 22,000 ohm $\pm 5\%$ 1/4W
-C53		. CAPACITOR, 180pf $\pm 10\%$	-R56	. RESISTOR, 3.3 ohm $\pm 5\%$ 1/4W
-C54		. CAPACITOR, .22mfd 16V	-R61	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W
-C55		. CAPACITOR, .047 μ f 100V	-R63	. RESISTOR, 1,500,000 ohm $\pm 5\%$ 1/4W
-C56		. CAPACITOR, .047 μ f 100V		
-C57		. CAPACITOR, .047 μ f 100V		
-C58		. CAPACITOR, 10mfd 16V		
-C71		. CAPACITOR, 1000mfd 25V		
-C72		. CAPACITOR, 1000mfd 16V		
-C73		. CAPACITOR, 470mfd 16V		
-D3	44522-P2	. DIODE (IN3064)		
-D4	40875-P1	. DIODE (JEDEC IN2069)		
-D5	40875-P1	. DIODE (JEDEC IN2069)		
-D6	44522-P2	. DIODE (IN3064)		
-D7	44522-P1	. DIODE (IN949)		
-D8	39324-P5	. DIODE, Bridge		
-D9	39331-P6	. DIODE, Zener (IN5350B)		
-J2	44507-P3	. CONNECTOR		
-J3	44507-P2	. CONNECTOR		
-J4	44507-P2	. CONNECTOR		
-K1	44514-P1	. RELAY		
-P1	44511-P1	. CONNECTOR		
-Q4	44519-P1	. TRANSISTOR (MPS-A13)		
-Q5	44519-P1	. TRANSISTOR (MPS-A13)		
-Q6	44518-P1	. TRANSISTOR (D40C1)		
-R1		. RESISTOR, 3,300 ohm $\pm 5\%$, 1/4W		
-R2		. RESISTOR, 47,000 ohm $\pm 5\%$, 1/4W		
-R3		. RESISTOR, 4,700 ohm $\pm 5\%$, 1/4W		
-R4		. RESISTOR, 470 ohm $\pm 5\%$, 1/4W		
-R5		. RESISTOR, 330,000 ohm $\pm 5\%$, 1/4W		
-R6		. RESISTOR, 12,000 ohm $\pm 5\%$, 1/4W		

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34-R64		. RESISTOR, 330, 000 ohm $\pm 5\%$ 1/4W
-R65		. RESISTOR, 470, 000 ohm $\pm 5\%$ 1/4W
-R66		. RESISTOR, 220, 000 ohm $\pm 5\%$ 1/4W
-R67		. RESISTOR, 220, 000 ohm $\pm 5\%$ 1/4W
-R68		. RESISTOR, 33, 000 ohm $\pm 5\%$ 1/4W
-R69		. RESISTOR, 180, 000 ohm $\pm 5\%$ 1/4W
-R70		. RESISTOR, 180, 000 ohm $\pm 5\%$ 1/4W
-R71		. RESISTOR, 330, 000 ohm $\pm 5\%$ 1/4W
-R72		. RESISTOR, 120, 000 ohm $\pm 5\%$ 1/4W
-R73		. RESISTOR, 2, 000 ohm $\pm 5\%$ 1/4W
-R74		. RESISTOR, 220, 000 ohm $\pm 5\%$ 1/4W
-R75		. RESISTOR, 470, 000 ohm $\pm 5\%$ 1/4W
-R76		. RESISTOR, 390, 000 ohm $\pm 5\%$ 1/4W
-R78		. RESISTOR, 68, 000 ohm $\pm 5\%$ 1/4W
-R79		. RESISTOR, 100, 000 ohm $\pm 5\%$ 1/4W
-R80		. RESISTOR, 33, 000 ohm $\pm 5\%$ 1/4W
-R81		. RESISTOR, 330, 000 ohm $\pm 5\%$ 1/4W
-R82		. RESISTOR, 100, 000 ohm $\pm 5\%$ 1/4W
-R83		. RESISTOR, 12, 000 ohm $\pm 5\%$ 1/4W
-R84		. RESISTOR, 47, 000 ohm $\pm 5\%$ 1/4W
-R85		. RESISTOR, 12, 000 ohm $\pm 5\%$ 1/4W
-R91		. RESISTOR, 15 ohm $\pm 5\%$ 1/4W
-R92		. RESISTOR, 820 ohm $\pm 5\%$ 1/4W
-R93		. RESISTOR, 1, 200 ohm $\pm 5\%$ 1/4W
-R94		. RESISTOR, 22 ohm $\pm 5\%$ 1/4W
-VR3	40761-P12	. POTENTIOMETER
-VR4	44515-P1	. POTENTIOMETER
-VR5	40761-P12	. POTENTIOMETER
-VR6	44515-P1	. POTENTIOMETER
-W1		. JUMPER AWC
-W2		. JUMPER AWC
-W3		. JUMPER AWC
-W4		. JUMPER AWC
-W5		. JUMPER AWC
-W6		. JUMPER AWC added for better signal / noise ratio at Code G5AY
-Z1	44295-P1	. QUAD AMPLIFIER (LM 3900)
-Z2	44296-P1	. POWER AMPLIFIER
-Z3	44295-P1	. QUAD AMPLIFIER (LM 3900)
-Z4	44295-P1	. QUAD AMPLIFIER (LM 3900)

NOTES



CARAMATE PROJECTORS

Figure 35. CIRCUIT BOARD ASSEMBLY (SP Record & Playback)

CARAMATE PROJECTORS

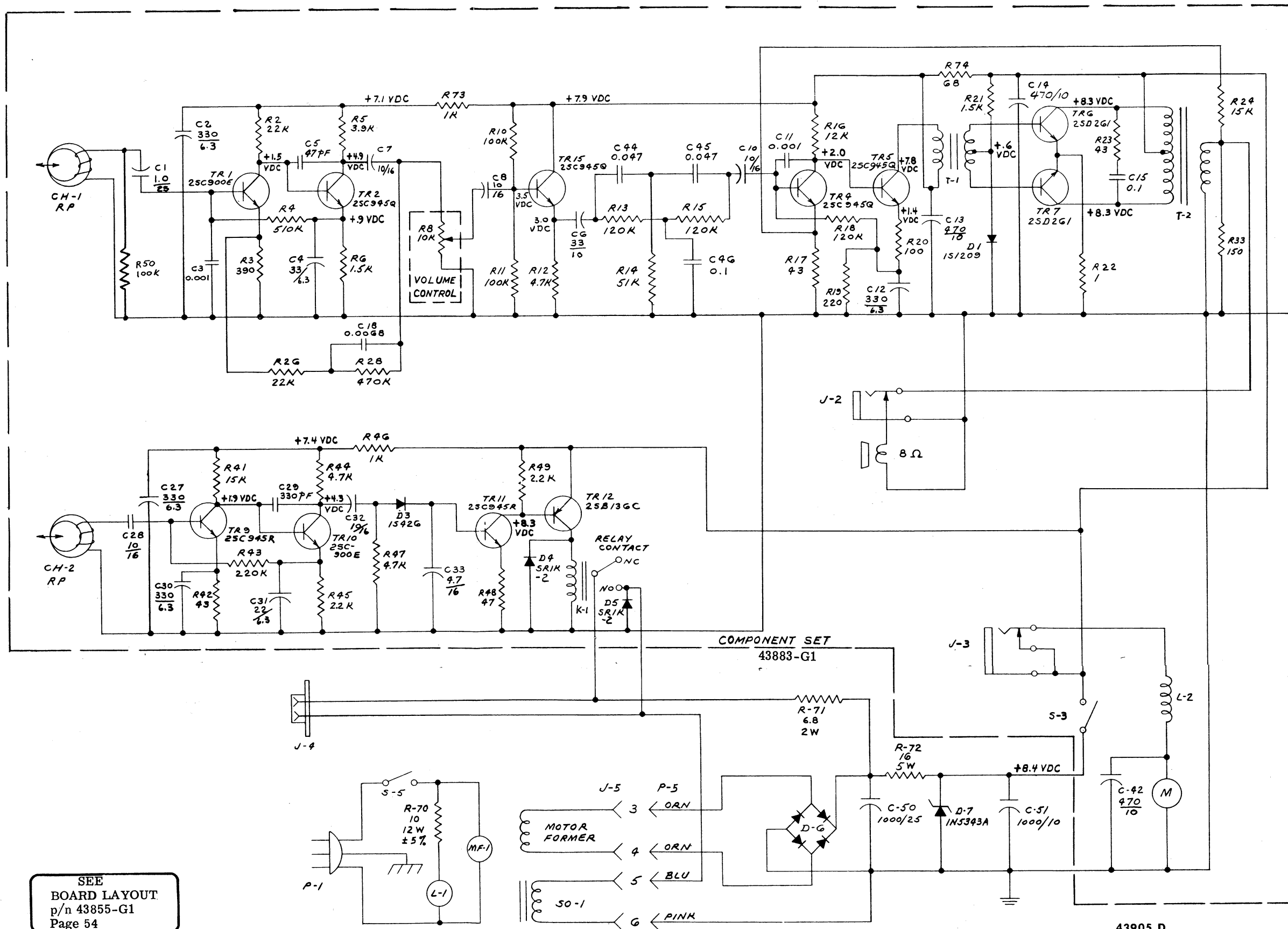
35-	44410-G1	BOARD ASSEMBLY, Circuit (SP, R & P)	-L1	44516-P2	INDUCTOR
-C1		CAPACITOR, 1 μ f 16V	-P1	44511-P1	CONNECTOR
-C2		CAPACITOR, 47pf 16V	-Q1	42721-P1	TRANSISTOR (MPS 6514)
-C3		CAPACITOR, 220 μ f 16V	-Q2	42721-P1	TRANSISTOR (MPS 6514)
-C4		CAPACITOR, .01 μ f 100V	-Q3	44294-P1	TRANSISTOR (JEDEC IN4400)
-C5		CAPACITOR, .01 μ f 100V	-Q4	44519-P1	TRANSISTOR (MPS A13)
-C6		CAPACITOR, .01 μ f 100V	-Q5	44519-P1	TRANSISTOR (MPS A13)
-C7		CAPACITOR, 4700pf $\pm$ 10%	-Q6	44518-P1	TRANSISTOR (D40C1)
-C8		CAPACITOR, 4700pf $\pm$ 10%	-R1		RESISTOR, 3300 ohm $\pm$ 5% 1/4W
-C9		CAPACITOR, 100 μ f 16V	-R2		RESISTOR, 47,000 ohm $\pm$ 5% 1/4W
-C10		CAPACITOR, .22mfd 16V	-R3		RESISTOR, 4700 ohm $\pm$ 5% 1/4W
-C11		CAPACITOR, 47pf $\pm$ 10%	-R4		RESISTOR, 470 ohm $\pm$ 5% 1/4W
-C12		CAPACITOR, 1,000pf $\pm$ 10%	-R5		RESISTOR, 330,000 ohm $\pm$ 5% 1/4W
-C13		CAPACITOR, 300pf $\pm$ 10%	-R6		RESISTOR, 12,000 ohm $\pm$ 5% 1/4W
-C14		CAPACITOR, 180pf $\pm$ 10%	-R7		RESISTOR, 330,000 ohm $\pm$ 5% 1/4W
-C15		CAPACITOR, 180pf $\pm$ 10%	-R8		RESISTOR, 120,000 ohm $\pm$ 5% 1/4W
-C16		CAPACITOR, 2200pf $\pm$ 10%	-R9		RESISTOR, 68,000 ohm $\pm$ 5% 1/4W
-C17		CAPACITOR, .068 μ f 100V	-R10		RESISTOR, 6800 ohm $\pm$ 5% 1/4W
-C18		CAPACITOR, 180pf $\pm$ 10%	-R11		RESISTOR, 3300 ohm $\pm$ 5% 1/4W
-C19		CAPACITOR, 33pf $\pm$ 10%	-R12		RESISTOR, 27,000 ohm $\pm$ 5% 1/4W
-C20		CAPACITOR, .22mfd 16V	-R13		RESISTOR, 22,000 ohm $\pm$ 5% 1/4W
-C21		CAPACITOR, .01 μ f 100V	-R14		RESISTOR, 33,000 ohm $\pm$ 5% 1/4W
-C22		CAPACITOR, 100 μ f 16V	-R15		RESISTOR, 6800 ohm $\pm$ 5% 1/4W
-C23		CAPACITOR, 1000pf $\pm$ 10%	-R16		RESISTOR, 1000 ohm $\pm$ 5% 1/4W
-C24		CAPACITOR, 470mfd 16V	-R17		RESISTOR, 330,000 ohm $\pm$ 5% 1/4W
-C25		CAPACITOR, .1mfd 16V	-R18		RESISTOR, 120,000 ohm $\pm$ 5% 1/4W
-C26		CAPACITOR, 1000mfd 16V	-R19		RESISTOR, 27,000 ohm $\pm$ 5% 1/4W
-C27		CAPACITOR, 5 μ f 25V	-R20		RESISTOR, 680 ohm $\pm$ 5% 1/4W
-C28		CAPACITOR, 22 μ f 10V	-R21		RESISTOR, 18,000 ohm $\pm$ 5% 1/4W
-C29		CAPACITOR, 22 μ f 10V	-R22		RESISTOR, 33 ohm $\pm$ 5% 1/4W
-C31		CAPACITOR, 10mfd 16V	-R23		RESISTOR, 2.7 ohm $\pm$ 5% 1/4W
-C32		CAPACITOR, 1 μ f 16V	-R24		RESISTOR, 1000 ohm $\pm$ 5% 1/4W
-C33		CAPACITOR, .22mfd 16V	-R25		RESISTOR, 120 ohm $\pm$ 10% 1/4W
-C34		CAPACITOR, 180pf $\pm$ 10%	-R26		RESISTOR, 10 ohm $\pm$ 10% 1/2W
-C35		CAPACITOR, 180pf $\pm$ 10%	-R27		RESISTOR, 680 ohm $\pm$ 5% 1/4W
-C36		CAPACITOR, .22mfd 16V	-R28		RESISTOR, 680 ohm $\pm$ 5% 1/4W
-C37		CAPACITOR, .22mfd 16V	-R29		RESISTOR, 270 ohm $\pm$ 5% 1/4W
-C38		CAPACITOR, .0068 μ f 200V	-R31		RESISTOR, 2700 ohm $\pm$ 5% 1/4W
-C39		CAPACITOR, .0068 μ f 200V			
-C40		CAPACITOR, .0068 μ f 200V			
-C41		CAPACITOR, 22 μ f 10V			
-C51		CAPACITOR, 2200pf $\pm$ 10%			
-C52		CAPACITOR, 5 μ f 10V			
-C53		CAPACITOR, 180pf $\pm$ 10%			
-C54		CAPACITOR, .22mfd 16V			
-C55		CAPACITOR, .047 μ f 100V			
-C56		CAPACITOR, .047 μ f 100V			
-C57		CAPACITOR, .047 μ f 100V			
-C58		CAPACITOR, 10mfd 16V			
-C71		CAPACITOR, 1000mfd 25V			
-C72		CAPACITOR, 1000mfd 16V			
-C73		CAPACITOR 470mfd 16V			
-D1	44522-P2	DIODE (IN3064)			
-D2	44522-P2	DIODE (IN3064)			
-D3	44522-P2	DIODE (IN3064)			
-D4	40875-P1	DIODE (JED IN2069)			
-D5	40875-P1	DIODE (JED IN2069)			
-D6	44522-P2	DIODE (IN3064)			
-D7	44522-P1	DIODE (IN949)			
-D8	39324-P5	DIODE, Bridge			
-D9	39331-P6	DIODE, Zener (IN5305B)			
-J2	44507-P3	CONNECTOR			
-J3	44507-P1	CONNECTOR			
-J4	44507-P2	CONNECTOR			
-K1	44514-P1	RELAY			

CARAMATE PROJECTORS

35-R32	. RESISTOR, 270 ohm $\pm 5\%$ 1/4W	-R69	. RESISTOR, 180,000 ohm $\pm 5\%$ 1/4W
-R33	. RESISTOR, 1,000,000 ohm $\pm 5\%$ 1/4W	-R70	. RESISTOR, 180,000 ohm $\pm 5\%$ 1/4W
-R34	. RESISTOR, 3300 ohm $\pm 5\%$ 1/4W	-R71	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W
-R35	. RESISTOR, 18,000 ohm $\pm 5\%$ 1/4W	-R72	. RESISTOR, 120,000 ohm $\pm 5\%$ 1/4W
-R36	. RESISTOR, 10,000 ohm $\pm 5\%$ 1/4W	-R73	. RESISTOR, 2000 ohm $\pm 5\%$ 1/4W
-R37	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W	-R74	. RESISTOR, 220,000 ohm $\pm 5\%$ 1/4W
-R38	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W	-R75	. RESISTOR, 470,000 ohm $\pm 5\%$ 1/4W
-R39	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W	-R76	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W
-R40	. RESISTOR, 68,000 ohm $\pm 5\%$ 1/4W	-R77	. RESISTOR, 180,000 ohm $\pm 5\%$ 1/4W
-R41	. RESISTOR, 180,000 ohm $\pm 5\%$ 1/4W	-R78	. RESISTOR, 68,000 ohm $\pm 5\%$ 1/4W
-R42	. RESISTOR, 220,000 ohm $\pm 5\%$ 1/4W	-R79	. RESISTOR, 180,000 ohm $\pm 5\%$ 1/4W
-R43	. RESISTOR, 68,000 ohm $\pm 5\%$ 1/4W	-R80	. RESISTOR, 33,000 ohm $\pm 5\%$ 1/4W
-R44	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W	-R81	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W
-R45	. RESISTOR, 120,000 ohm $\pm 5\%$ 1/4W	-R82	. RESISTOR, 100,000 ohm $\pm 5\%$ 1/4W
-R46	. RESISTOR, 2000 ohm $\pm 5\%$ 1/4W	-R83	. RESISTOR, 12,000 ohm $\pm 5\%$ 1/4W
-R47	. RESISTOR, 220,000 ohm $\pm 5\%$ 1/4W	-R84	. RESISTOR, 47,000 ohm $\pm 5\%$ 1/4W
-R48	. RESISTOR, 470,000 ohm $\pm 5\%$ 1/4W	-R85	. RESISTOR, 12,000 ohm $\pm 5\%$ 1/4W
-R49	. RESISTOR, 390,000 ohm $\pm 5\%$ 1/4W	-R91	. RESISTOR, 15 ohm $\pm 5\%$ 1/4W
-R50	. RESISTOR, 180,000 ohm $\pm 5\%$ 1/4W	-R92	. RESISTOR, 820 ohm $\pm 5\%$ 1/4W
-R51	. RESISTOR, 68,000 ohm $\pm 5\%$ 1/4W	-R93	. RESISTOR, 1200 ohm $\pm 5\%$ 1/4W
-R52	. RESISTOR, 220,000 ohm $\pm 5\%$ 1/4W	-R94	. RESISTOR, 22 ohm $\pm 5\%$ 1/4W
-R53	. RESISTOR, 33,000 ohm $\pm 5\%$ 1/4W	-S1 44510-P2	. SWITCH, Record
-R54	. RESISTOR, 10,000 ohm $\pm 5\%$ 1/4W	-S2 44521-P1	. SWITCH
-R55	. RESISTOR, 22,000 ohm $\pm 5\%$ 1/4W	-T1 44516-P1	. INDUCTOR
-R56	. RESISTOR, 3.3 ohm $\pm 10\%$ 1/4W	-VR-2 40761-P13	. POTENTIOMETER
-R61	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W	-VR-3 40761-P12	. POTENTIOMETER
-R62	. RESISTOR, 5600 ohm $\pm 5\%$ 1/4W	-VR-4 44515-P1	. POTENTIOMETER
-R63	. RESISTOR, 1,500,000 ohm $\pm 5\%$ 1/4W	-VR-5 40761-P12	. POTENTIOMETER
-R64	. RESISTOR, 330,000 ohm $\pm 5\%$ 1/4W	-VR-6 44515-P1	. POTENTIOMETER
-R65	. RESISTOR, 470,000 ohm $\pm 5\%$ 1/4W	-W1	. JUMPER AWG
-R66	. RESISTOR, 220,000 ohm $\pm 5\%$ 1/4W	-W2	. JUMPER AWG
-R67	. RESISTOR, 220,000 ohm $\pm 5\%$ 1/4W	-W3*	. JUMPER AWG 22
-R68	. RESISTOR, 33,000 ohm $\pm 5\%$ 1/4W	-W4	. JUMPER AWG
		-W5	. JUMPER AWG
		-W6	. JUMPER AWG 22
		-W7	. JUMPER AWG
		-W8	. JUMPER AWG
		-W9	. JUMPER AWG
		-W10	. JUMPER AWG
		-W11	. JUMPER AWG
		-Z1 44295-P1	. QUAD AMPLIFIER (LM 3900)
		-Z2 44296-P2	. POWER AMPLIFIER
		-Z3 44295-P1	. QUAD AMPLIFIER (LM 3900)
		-Z4 44295-P1	. QUAD AMPLIFIER (LM 3900)
		44523-P1	. BOARD CIRCUIT

* NOTE: Revised at Code F4AA for more reliable indexing with 140 slide trav

CARAMATE PROJECTORS



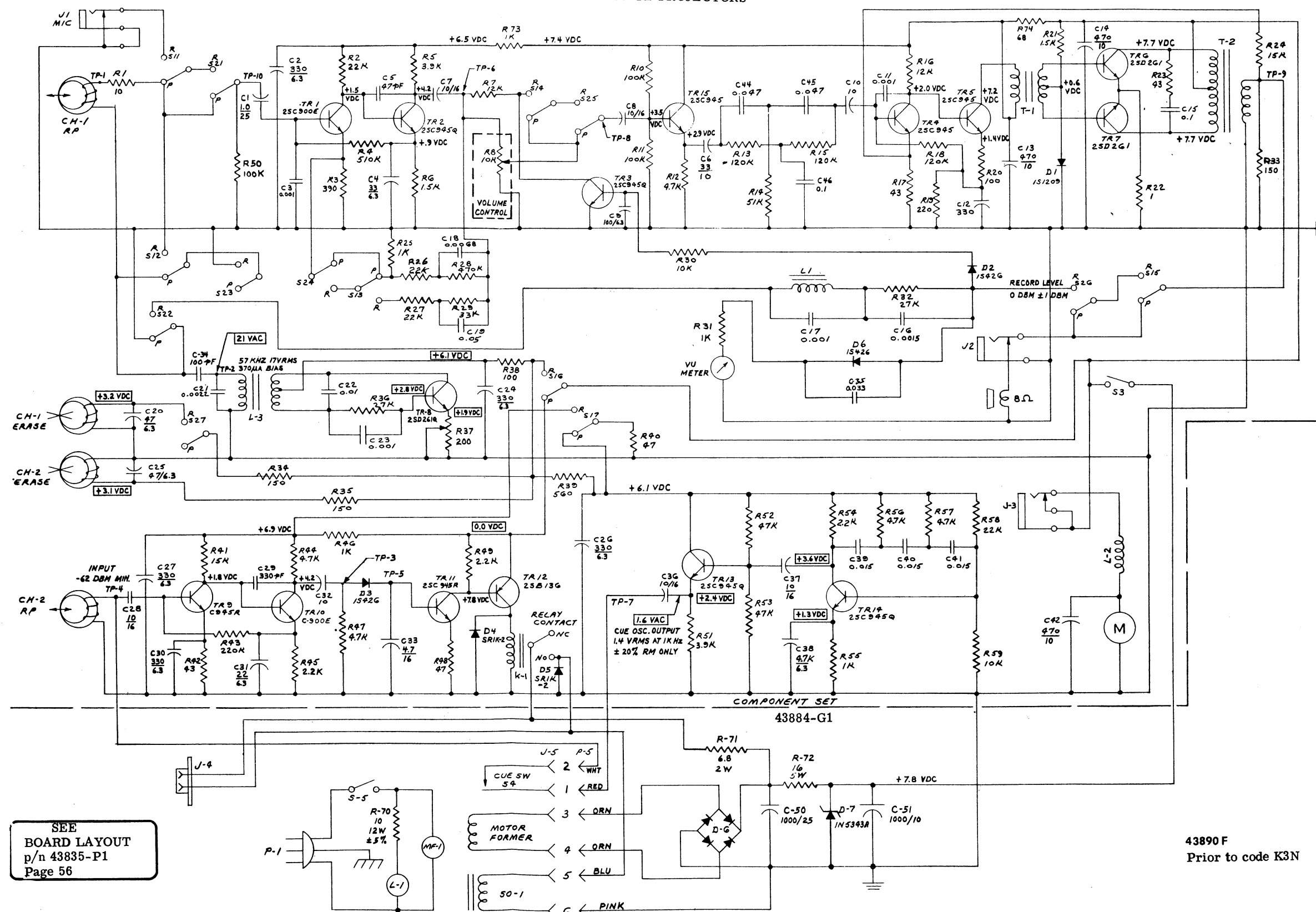


Figure 37. PROJECTOR SCHEMATIC DIAGRAM (Cat. 8806)

CARAMATE PROJECTORS

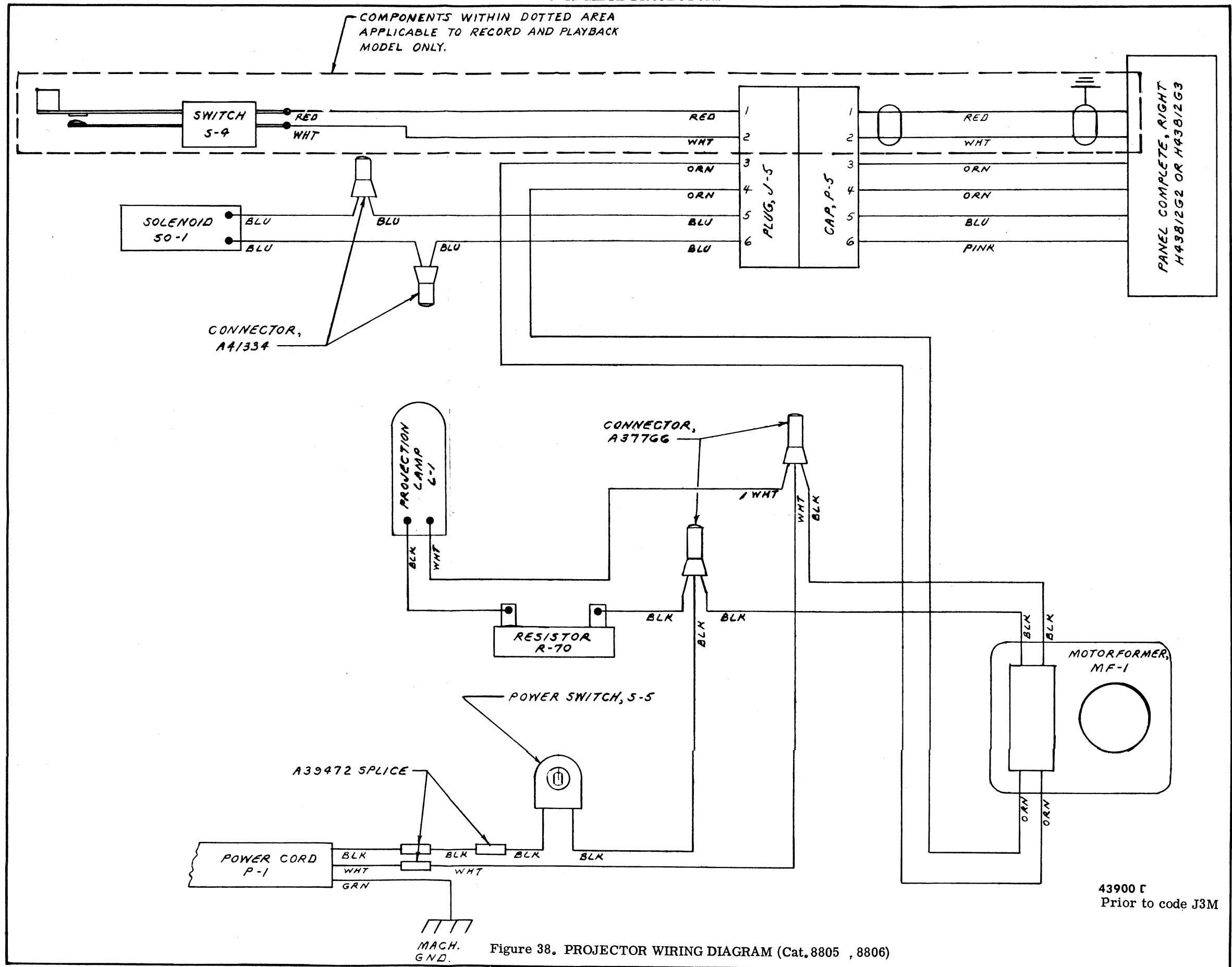


Figure 38. PROJECTOR WIRING DIAGRAM (Cat. 8805 , 8806)

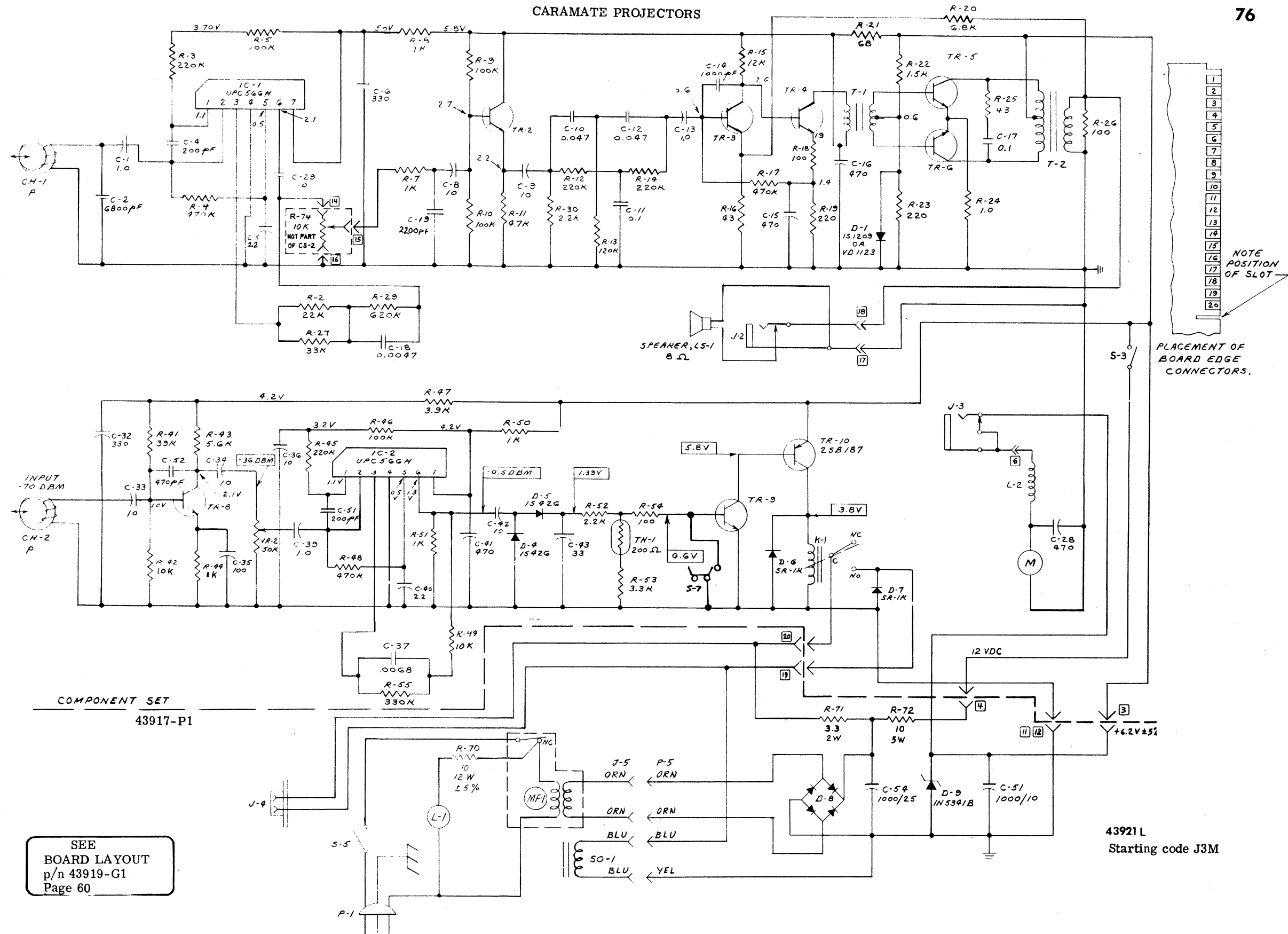


Figure 39. PROJECTOR SCHEMATIC DIAGRAM (Cat. 8805, 8835) PLAYBACK

CARAMATE PROJECTORS

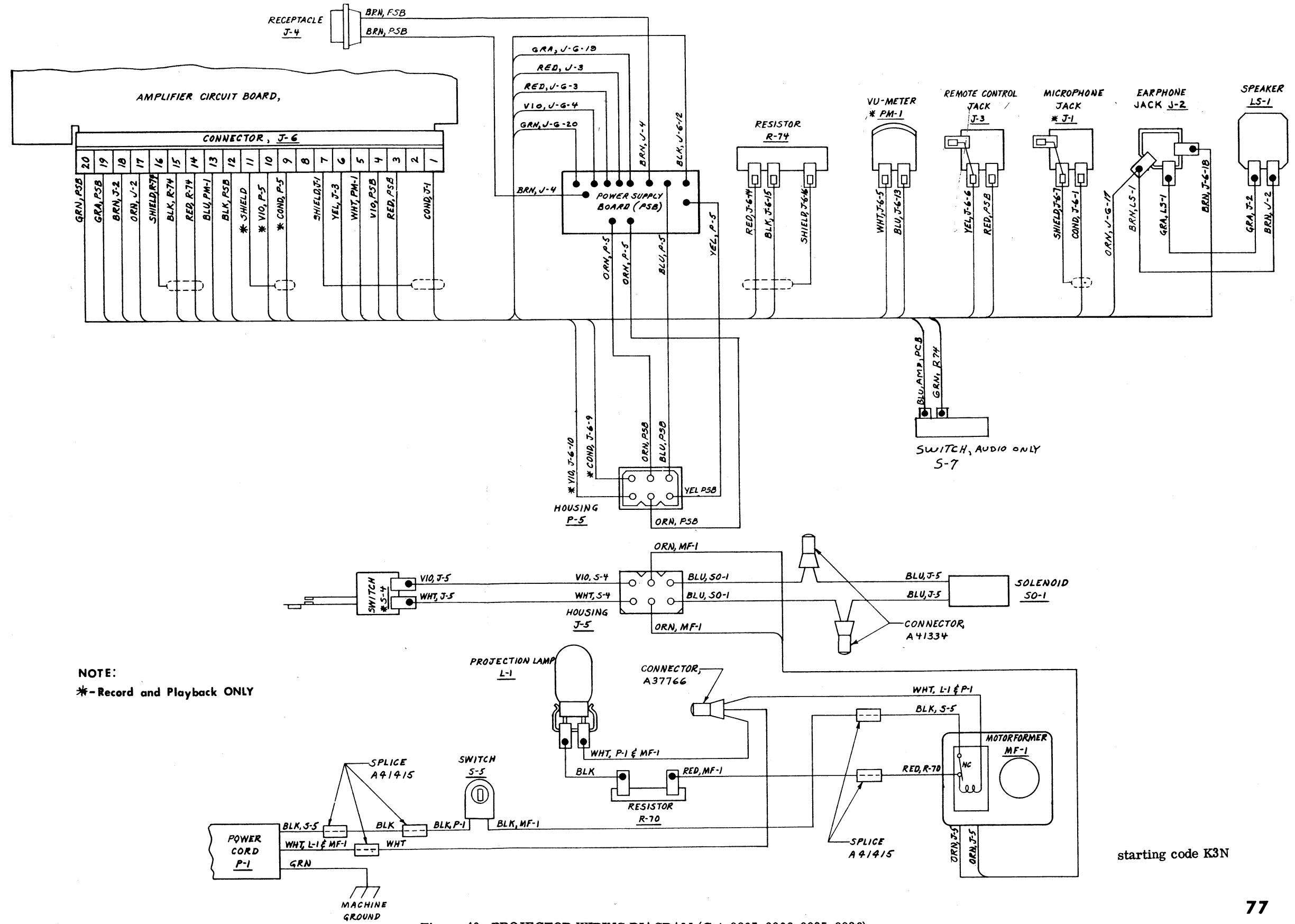


Figure 40. PROJECTOR WIRING DIAGRAM (Cat. 8805, 8806, 8835, 8836)

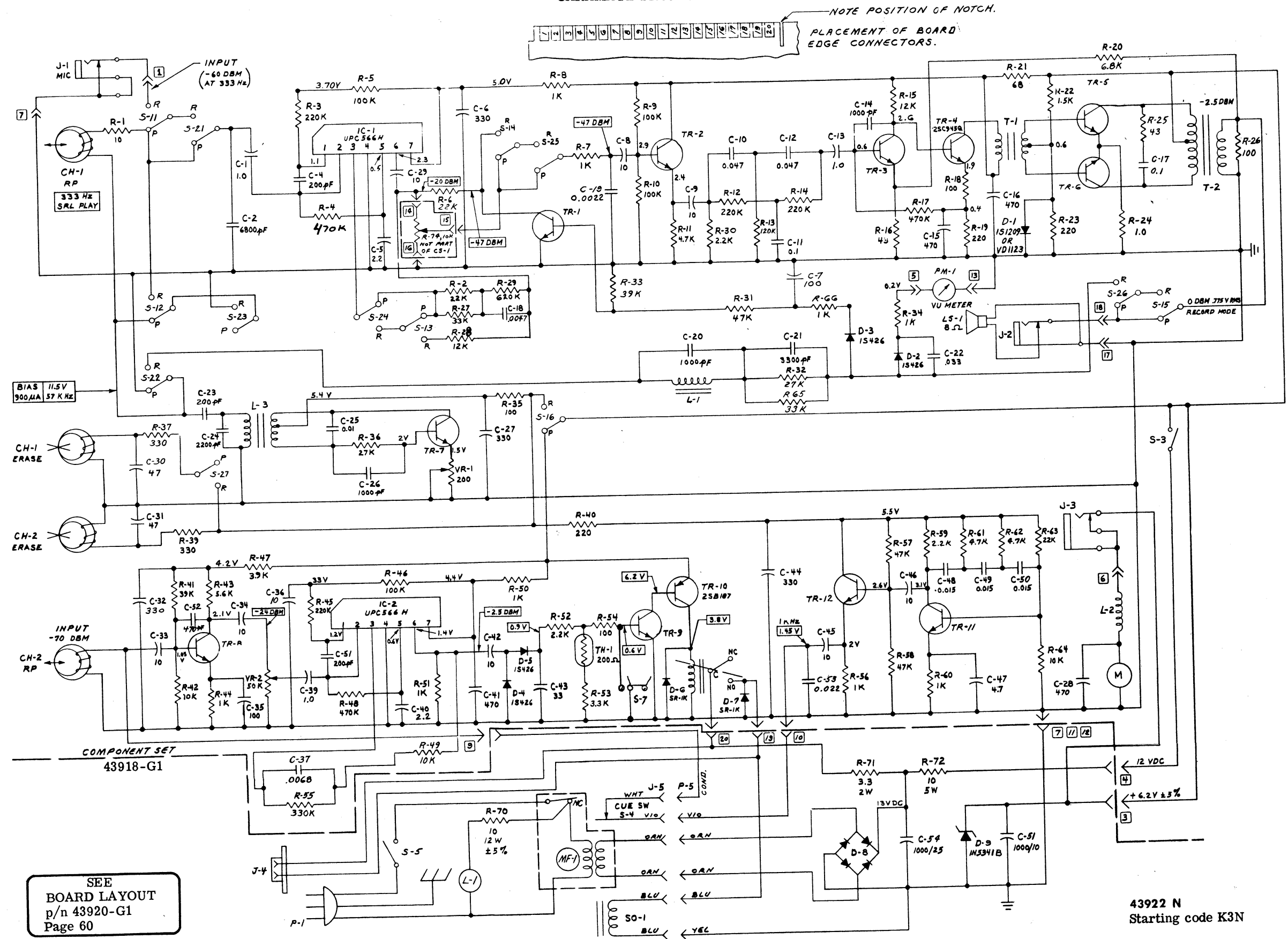
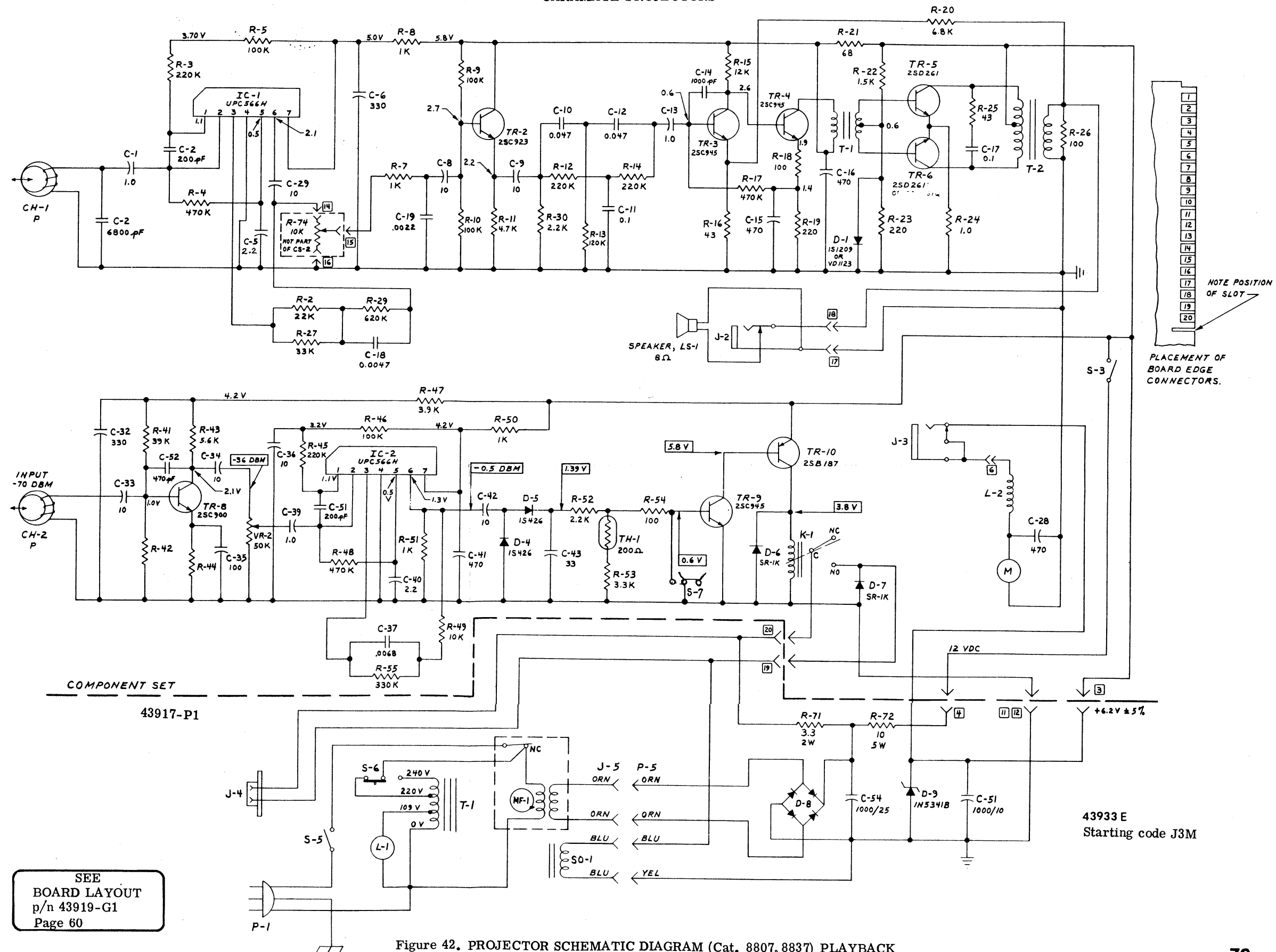


Figure 41. PROJECTOR SCHEMATIC DIAGRAM (Cat. 8806, 8836) RECORD & PLAYBACK

CARAMATE PROJECTORS



SEE
BOARD LAYOUT
p/n 43919-G1
Page 60

43933 E
Starting code J3M

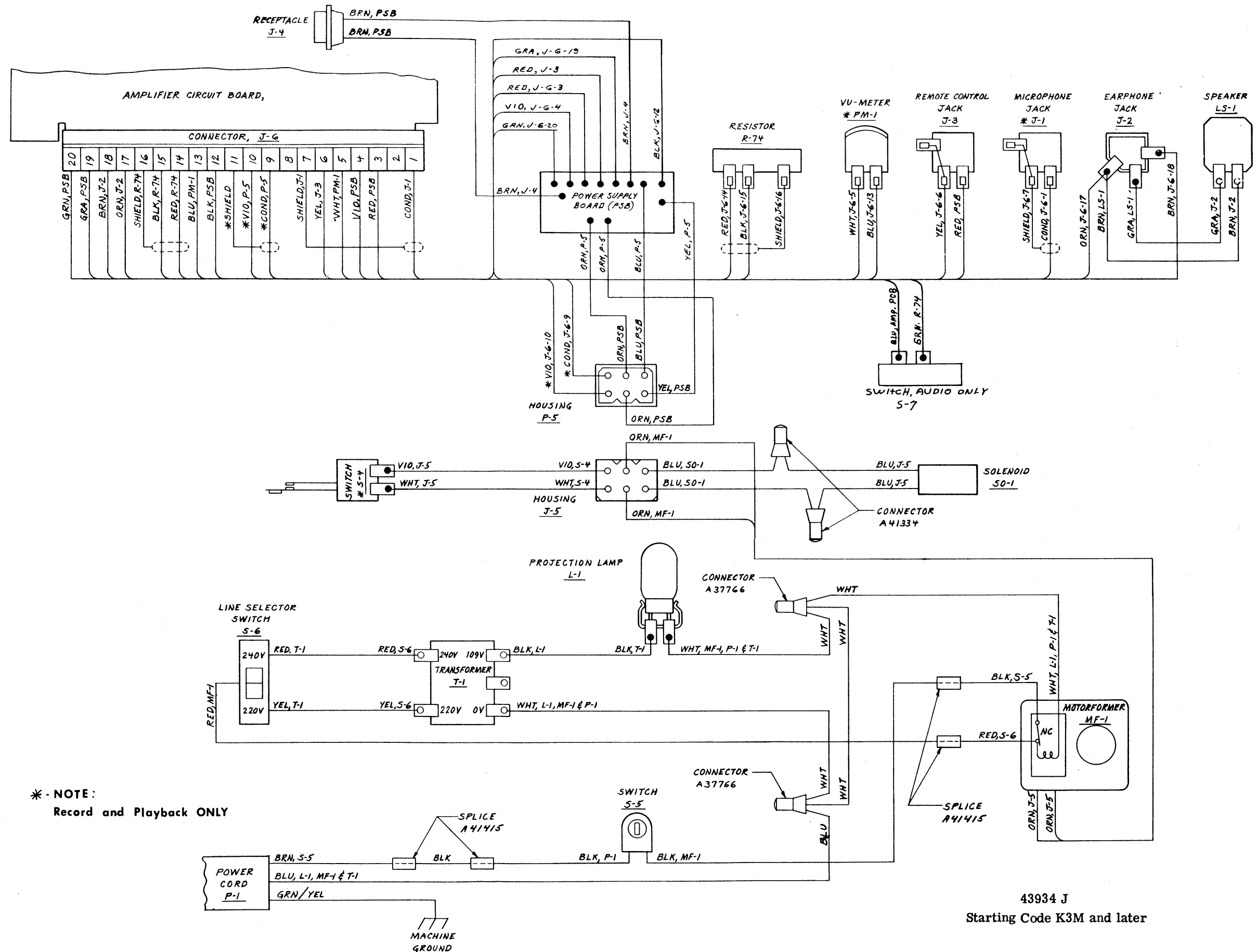
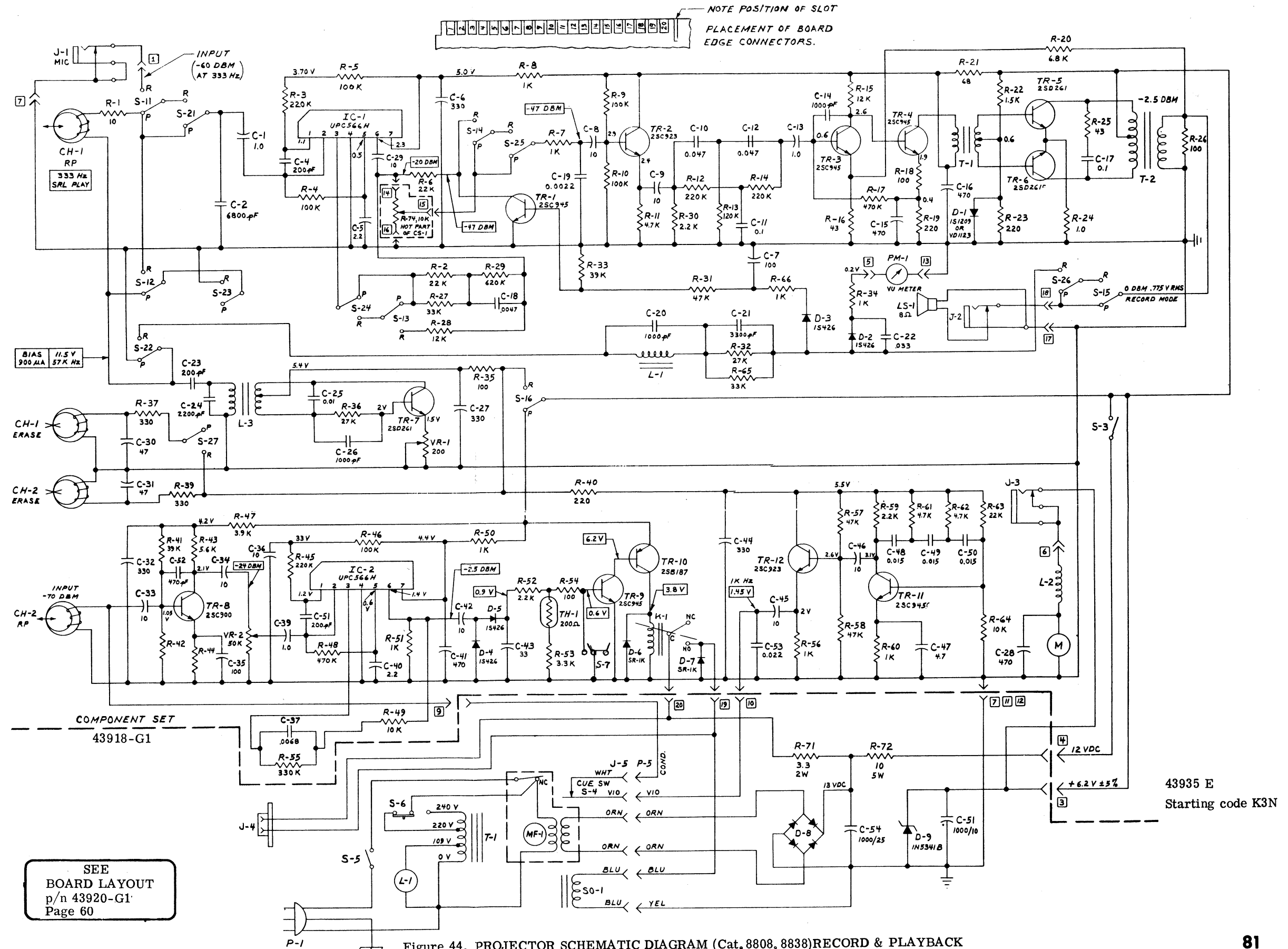
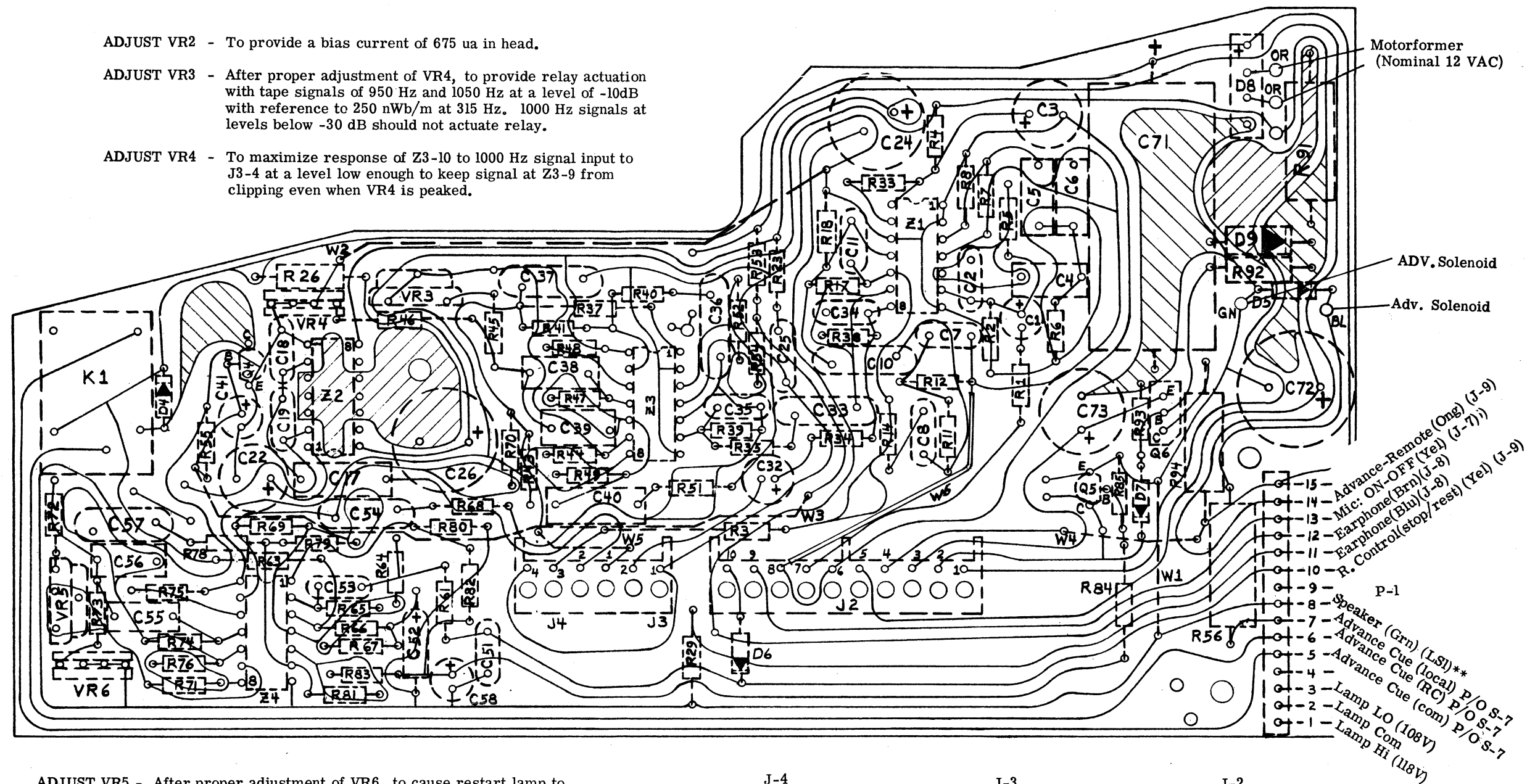


Figure 43. PROJECTOR WIRING DIAGRAM (Cat. 8870, 8808, 8837, 8838)

CARAMATE PROJECTORS





ADJUST VR5 - After proper adjustment of VR6, to cause restart lamp to come on and tape motor to stop in response to tape signals of 142 Hz and 158 Hz at a level of -10dB with reference to 250 nWb/m at 315 Hz. 150 Hz signals at levels below -30dB should not cause above response.

ADJUST VR6 - To maximize response of Z4-10 to 150 Hz input to J3-4 at a level low enough to keep signal at Z3-9 from clipping even when VR6 is peaked.

ADJUST T1 - Such that bias frequency, when measured at head is 57K Hz.

ADJUST L1 - To minimize bias signal at junction of C13 and L1.

J-4

2-Vol. Con. (Blk)(VR-1)**
3-Vol. Con. (Red)(VR-1)**
4-Vol. Con. (Shield)(VR-1)**

J-3

1-R/P Head (Shield) (Hi)
2-R/P Head (cond) (Hi)

J-2

1-Tape Run (Brn) (S-5)
2-SP-Pilot Lamp (Blu) (DS-2)
3-Tape Motor (cond) (M-1)
4-Tape Motor (Shield) (M-1)
5-SP-Pilot Lamp (Ong) (DS-2)
-Restart (Ong) (S-4)
6-R/P Head (Shield) (Hi)
9-Tape Run (Yel) (S-5)
10-Restart (Blk) (S-4)

Figure 45. SP Playback Circuit Board Wiring Pictorial Diagram (Cat. 8855, 8865 & 8867)

44537

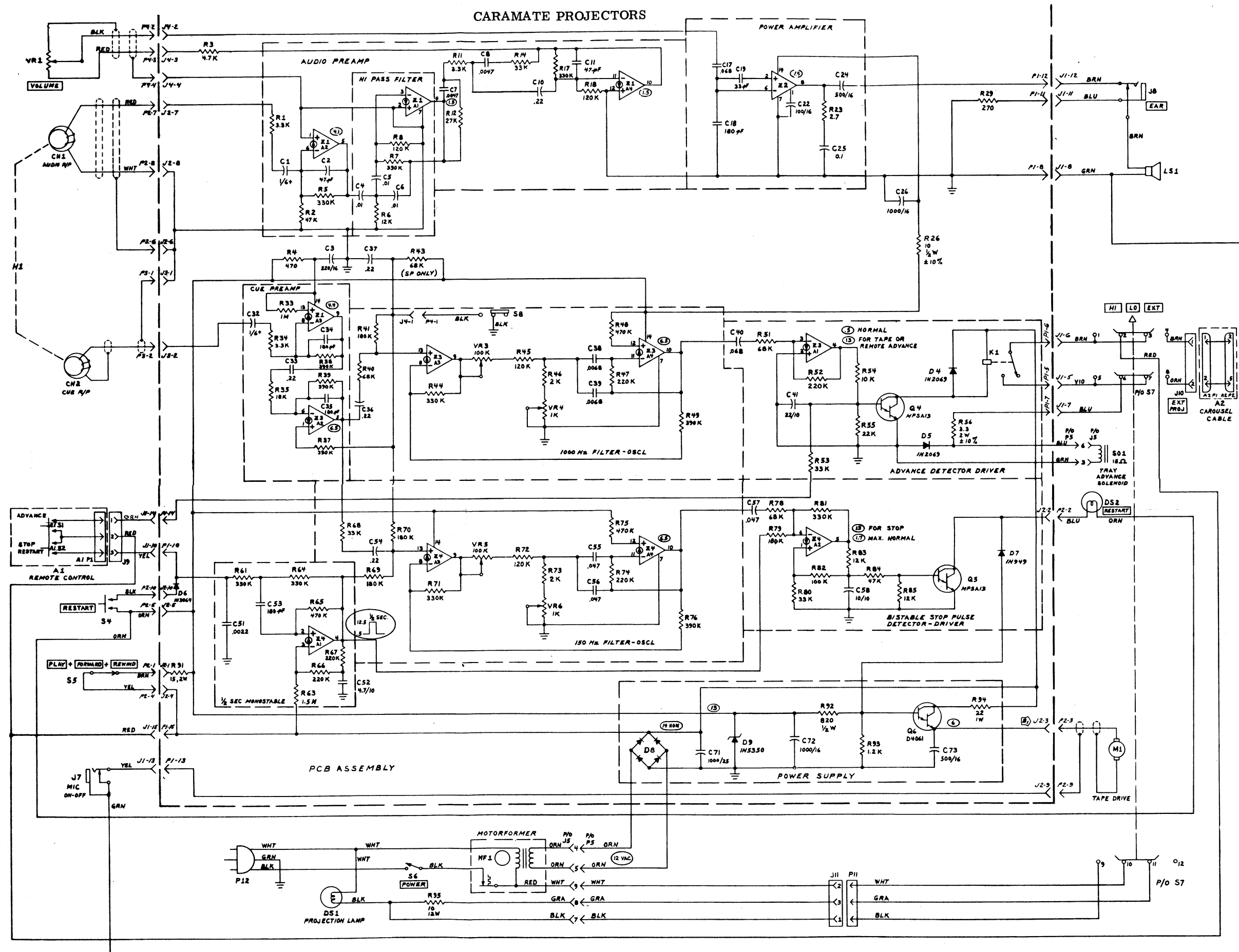
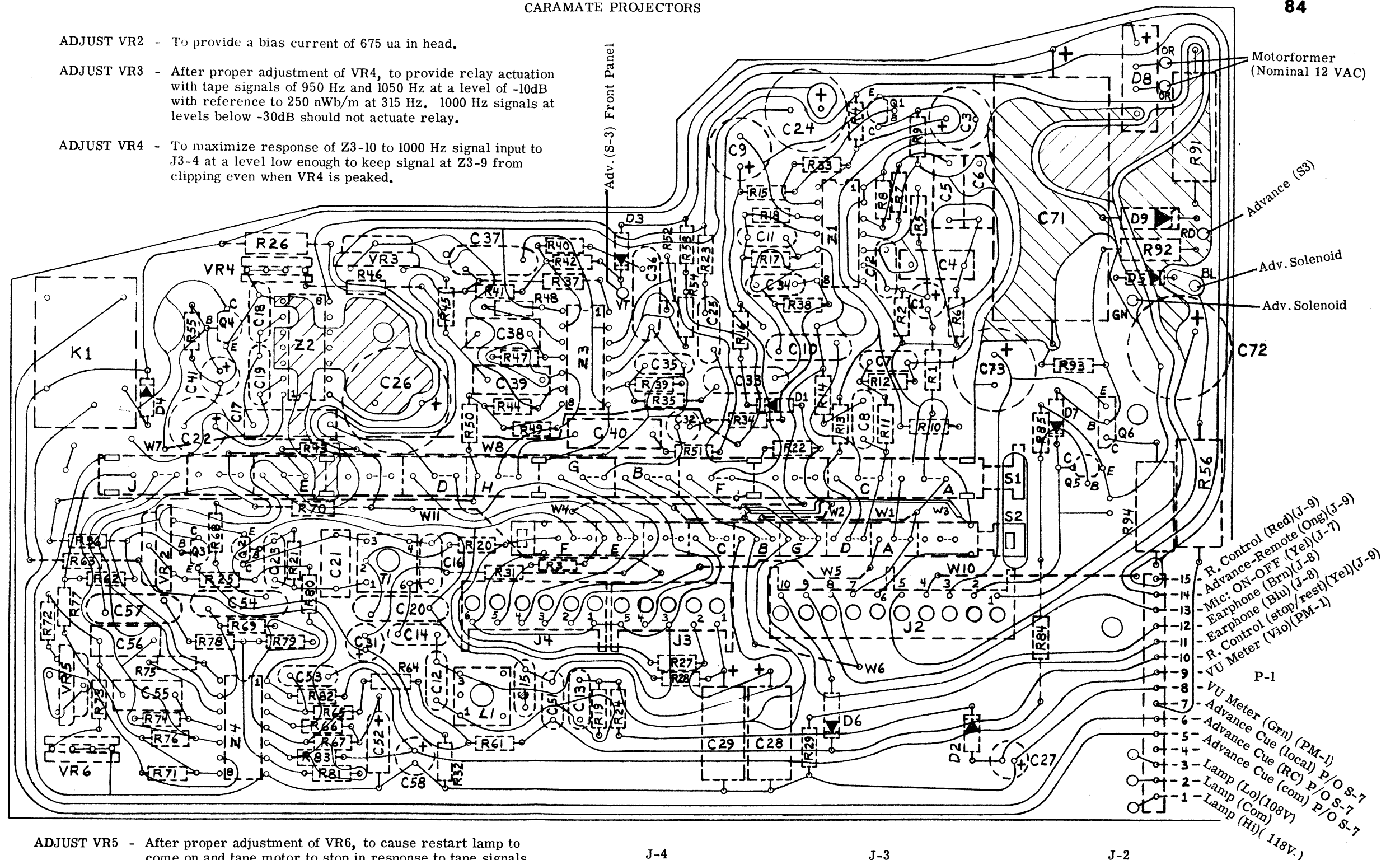


Figure 46. PROJECTOR SCHEMATIC DIAGRAM (Cat. 8855, 8865) SP PLAYBACK

- ADJUST VR2 - To provide a bias current of 675 ua in head.
- ADJUST VR3 - After proper adjustment of VR4, to provide relay actuation with tape signals of 950 Hz and 1050 Hz at a level of -10dB with reference to 250 nWb/m at 315 Hz. 1000 Hz signals at levels below -30dB should not actuate relay.
- ADJUST VR4 - To maximize response of Z3-10 to 1000 Hz signal input to J3-4 at a level low enough to keep signal at Z3-9 from clipping even when VR4 is peaked.



CARAMATE PROJECTORS

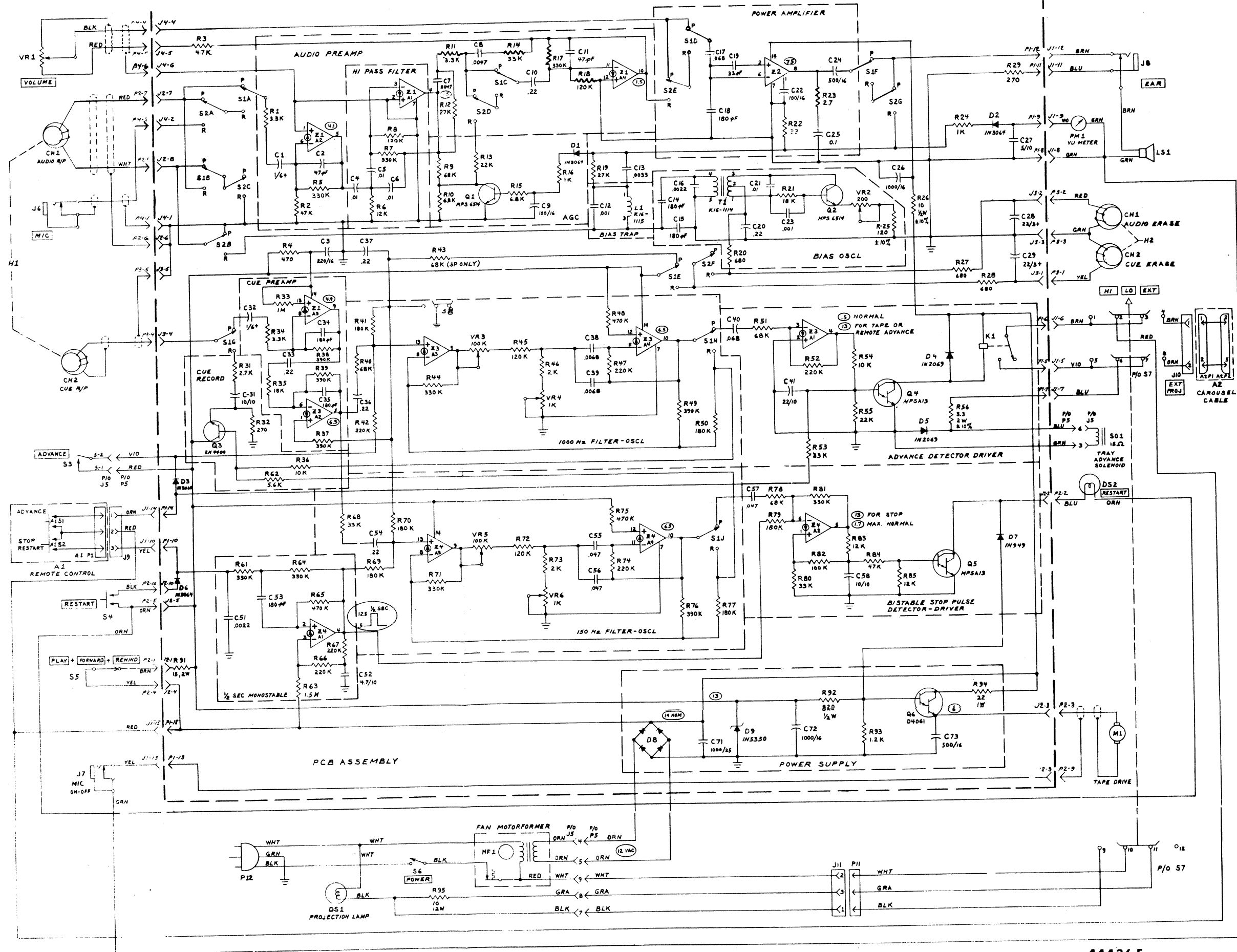
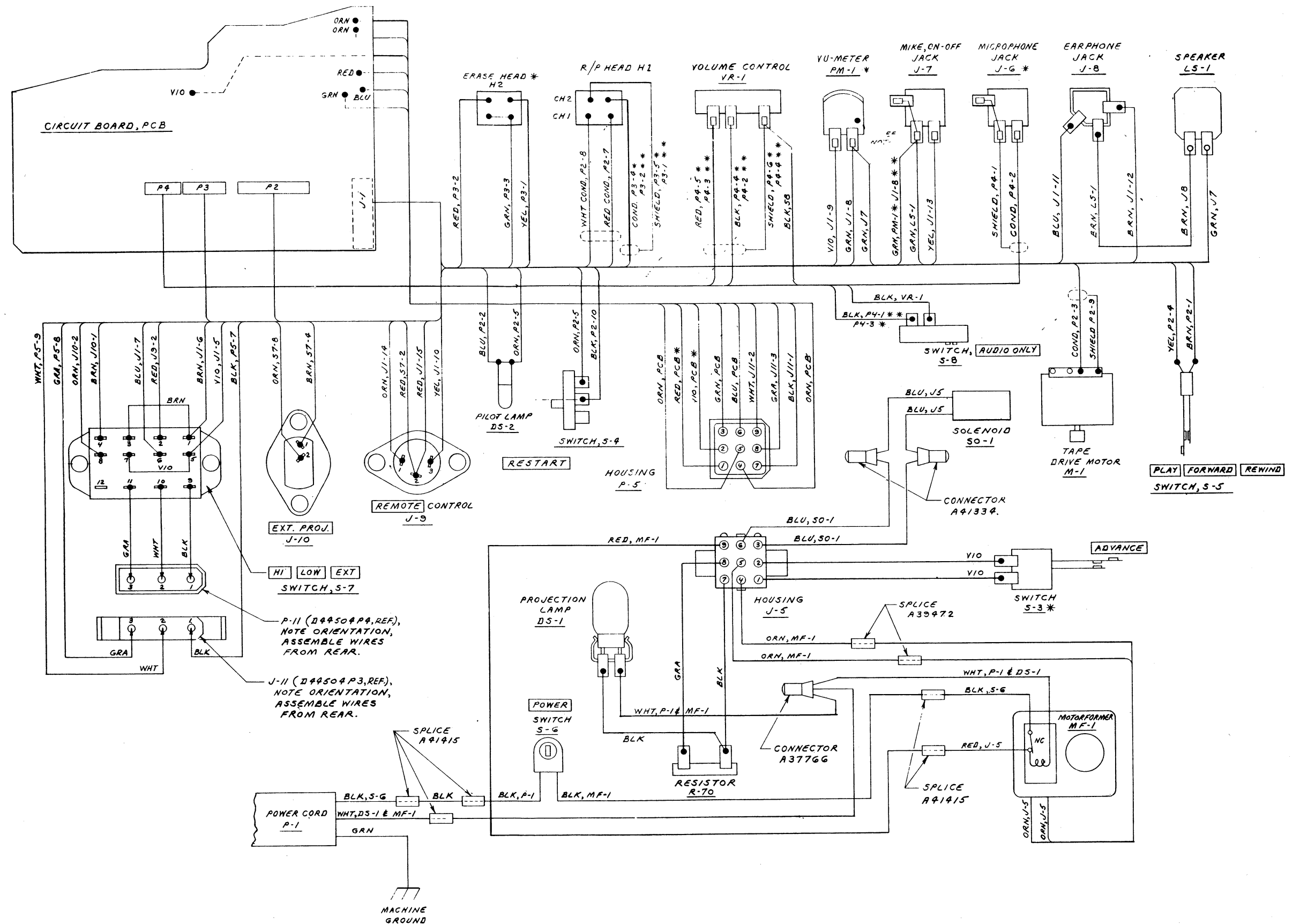


Figure 48. PROJECTOR SCHEMATIC DIAGRAM (Cat. 8856, 8866) SP RECORD & PLAYBACK



44403 E

Figure 49. PROJECTOR WIRING DIAGRAM (Cat. 8855, 8856, 8865, 8867) SP RECORD & PLAYBACK

CARAMATE PROJECTORS

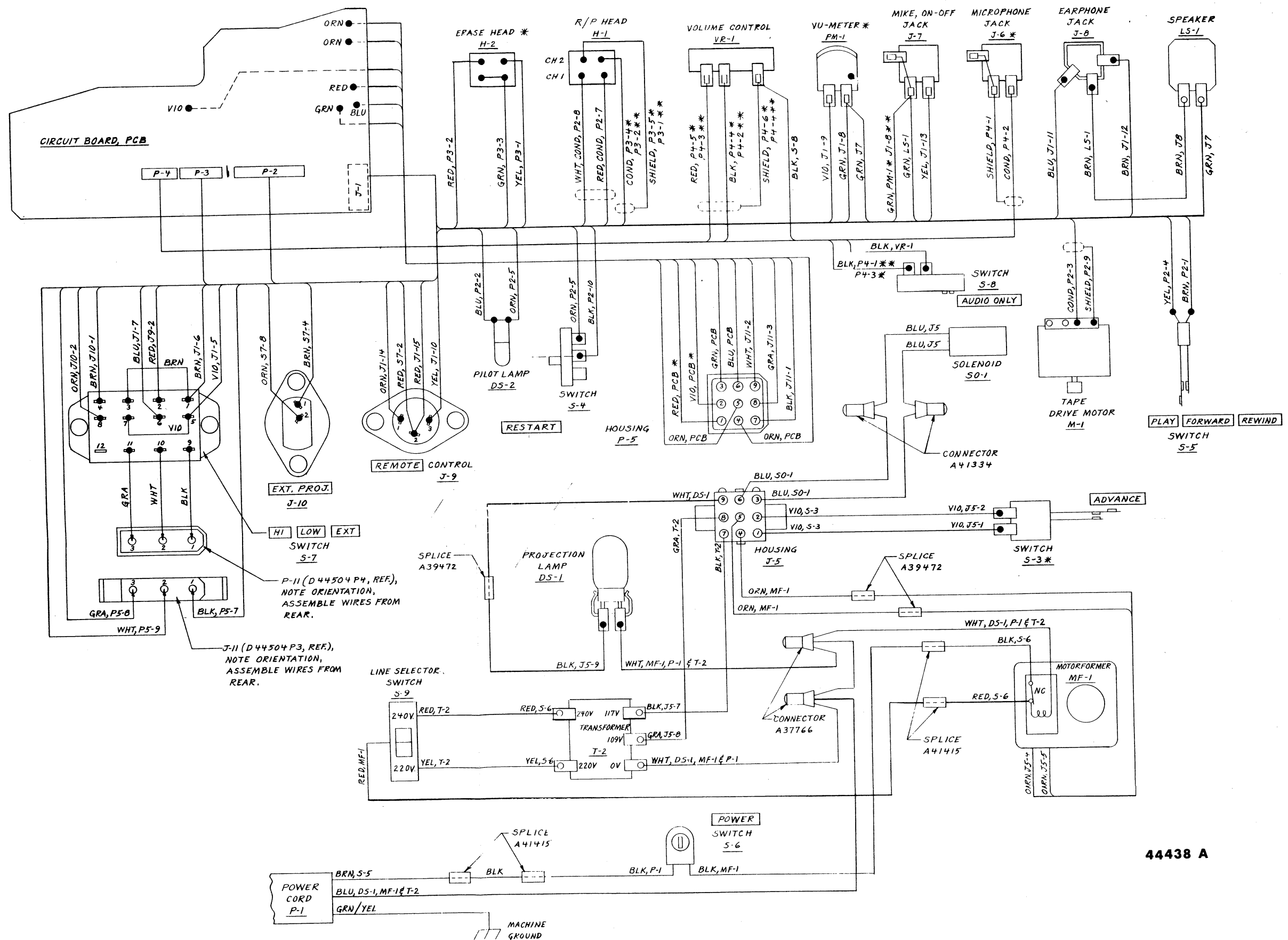


Figure 50. PROJECTOR WIRING DIAGRAM (Cat. 8867, 8867) SP PROJECTOR (EXPORT)

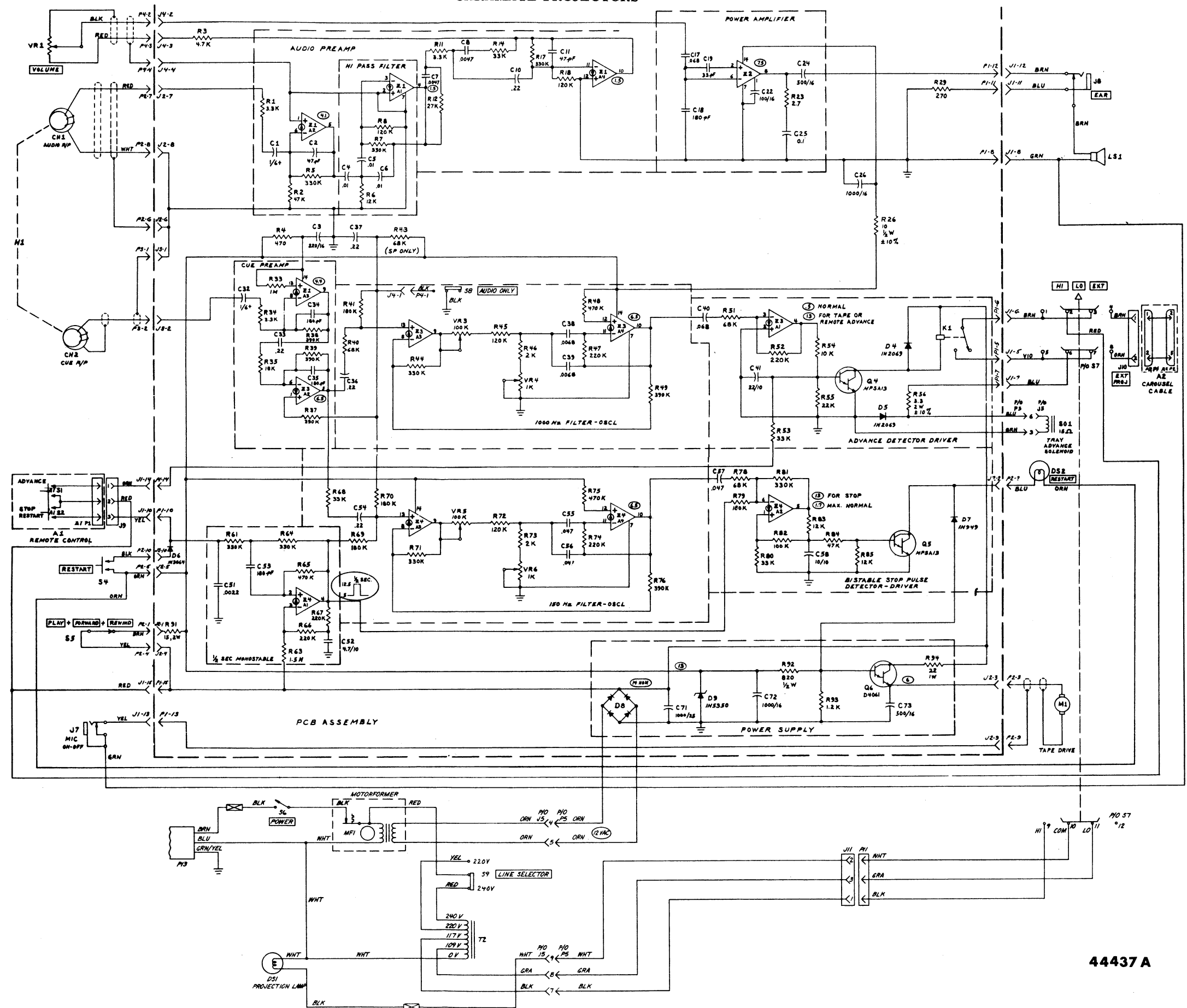
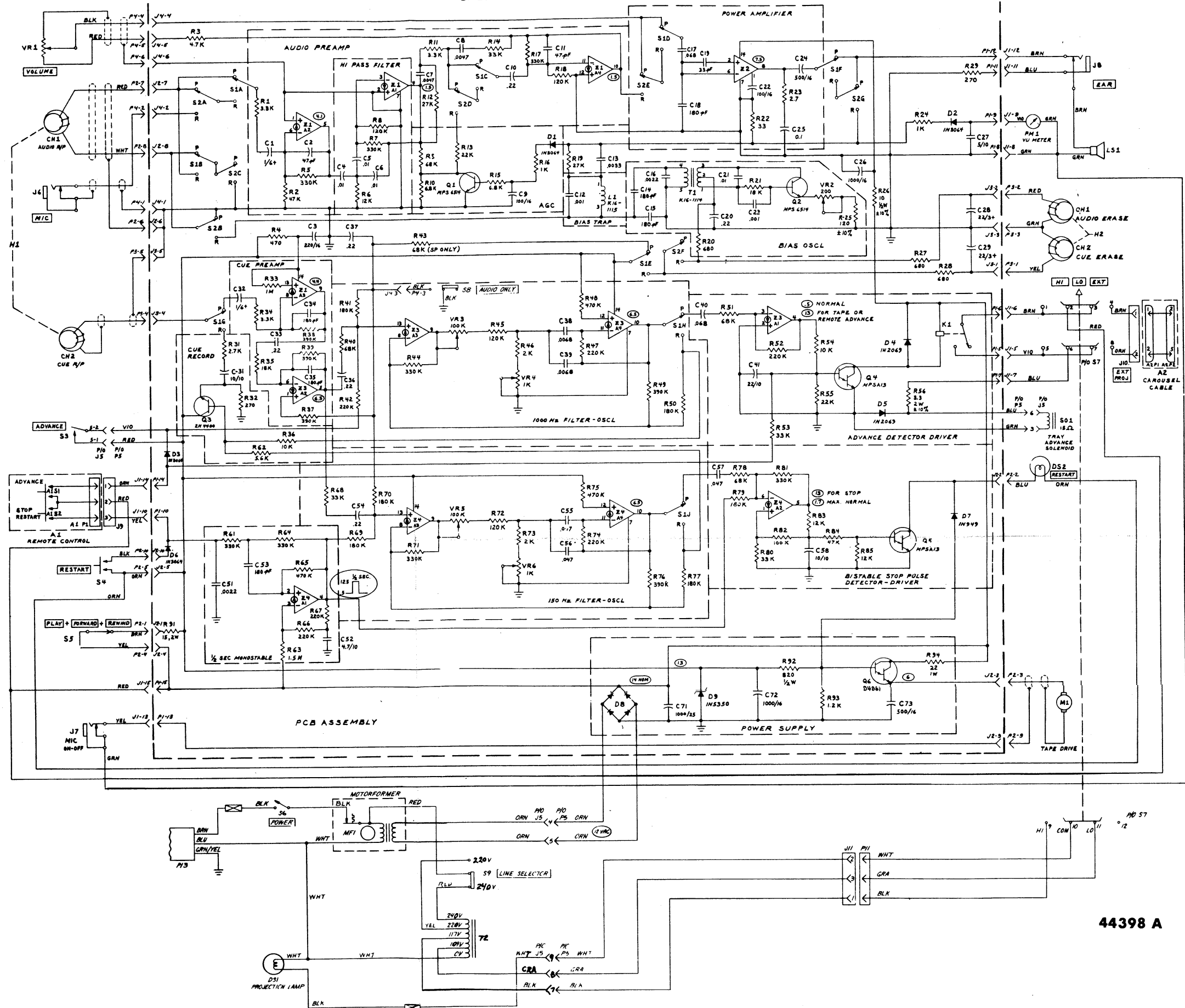


Figure 51. PROJECTOR SCHEMATIC DIAGRAM (Cat. 8867) SP PLAYBACK (EXPORT)

44437 A

CARAMATE PROJECTORS



44398 A

Figure 52. PROJECTOR SCHEMATIC DIAGRAM (Cat. 8868) SP RECORD & PLAYBACK (EXPORT)