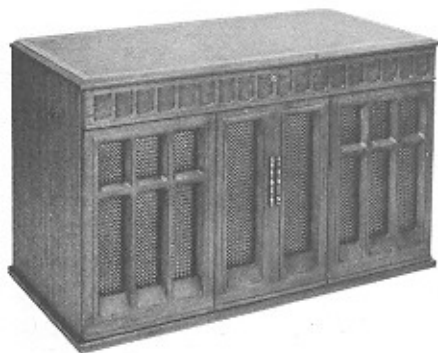




# CTI-1 phonograph

## SERVICE MANUAL

## PARTS CATALOG



### WARRANTY

Rowe extends to the original operator of this equipment the following warranty:

All parts are guaranteed to be free of defects in material and workmanship. Rowe agrees to repair or replace any part which proves defective without charge, f.o.b. factory as follows:

	MOVING PARTS	NON-MOVING PARTS
Search Unit	5 years	5 years
Record Changer	5 years	2 years
Other Components	5 years	1 year

In the case of parts supplied to Rowe as components, Rowe extends the same warranty period as extended by the original manufacturer.

The above warranty applies provided that all parts of the machine have been serviced properly as recommended in the service manual, and provided the alleged defective part, upon examination by Rowe, shall prove to be thus defective. This warranty will not apply to any machine or any part thereof which has been subjected to any accident, abuse, or misuse.

ROWE INTERNATIONAL, INC., EXTENDS NO WARRANTY, EXPRESS OR IMPLIED, TO PURCHASERS OR USERS OF ITS PRODUCTS EXCEPT AS HEREIN SET FORTH, WHETHER BY OPERATION OF LAW OR OTHERWISE.

PART NO. 201 17425  
PUBLISHED JAN. 1974

Printed in USA



**Rowe international, inc.**

A SUBSIDIARY OF TRIANGLE INDUSTRIES, INC.  
78 TROY HILLS RD., WHIPPANY, N. J. 07981, TEL. (801) 887-0400, CABLE: ROWENCO

**GENERAL**

DEPTH . . . . .	25 in.
WIDTH . . . . .	52-3/4 in.
HEIGHT . . . . .	32-13/16 in.
NET WEIGHT . . . . .	345 lbs.
POWER REQUIREMENTS . . . . .	115 vac, 50/60 Hz., 350 watts

**RECORD CHANGER MECHANISM**

CAPACITY . . . . .	100 records
RECORD SIZE . . . . .	7 inches
SPEED . . . . .	33 and 45 rpm

**CREDIT AND PRICING SYSTEM**

ACCUMULATOR TYPE CREDIT UNIT--DOLLAR BILLS OPTIONAL

COINS ACCEPTED. . . . .	Nickels Dimes Quarters Half-Dollars
TOTAL CREDIT ACCUMULATIONS . . . . .	\$3.00
PRICING. . . . .	See pricing chart

**SOUND SYSTEM**

CARTRIDGE

TYPE . . . . .	Shure Dynetic variable reluctance
FREQUENCY RESPONSE. . . . .	20 to 20,000 Hz
CHANNEL SEPARATION. . . . .	25 db @ 1,000 Hz
NOMINAL COMPLIANCE. . . . .	$7.5 \times 10^{-6}$ cm/dyne
TRACKING FORCE . . . . .	4 grams
OUTPUT . . . . .	7 mv.
STYLUS . . . . .	0.7 mil, diamond

PREAMPLIFIER AND AMPLIFIER

POWER OUTPUT PER CHANNEL . . . . .	25 watts rms (70-volt output)
SIGNAL INPUT FOR FULL UNDISTORTED OUTPUT . . . . .	0.8 to 1.1 volts
MINIMUM INPUT IMPEDANCE . . . . .	100K ohms
DISTORTION AT FULL OUTPUT. . . . .	less than 2% @1,000 Hz
FREQUENCY RESPONSE. . . . .	20 to 20,000 Hz - 3 db
HUM AND NOISE . . . . .	60 db from signal level
AVC CONTROL RANGE . . . . .	40 db
TREBLE CONTROL . . . . .	12 db/octave 10,000 Hz full 6,000 Hz moderate 3,000 Hz low
BASS CONTROL . . . . .	Compensates for bass loss at low volume levels 12 db per octave

## SELECTION SYSTEM

CAPACITY . . . . . 200 selections

## TRANSFORMER PACKAGE (100 WATT AMPLIFIER ONLY; INTEGRAL PART OF 50 W AMPLIFIER)

POWER LEVELS FOR PHONOGRAPH SPEAKERS. . . . . 0.4, 2, 7.5, 30 watts  
 PROVIDES 70-VOLT LINE FOR EXTENSION SPEAKERS

SPEAKER SYSTEM	LOW FREQUENCY	MID FREQUENCY	HIGH FREQUENCY
SPEAKER DIAMETER . . . . .	10 inches	6 inches	3 inches
VOICE COIL DIAMETER . . . . .	1-1/2 inches	1 inch	9/16 inch
IMPEDANCE . . . . .	9 ohms	10 ohms	10 ohms
CROSSOVER . . . . .	300 Hz	5,000 Hz	
SYSTEM FREQUENCY RESPONSE . . . . .	50 to 17,000 Hz		

## LIGHTING

FRONT DOOR (Title Strip Area) . . . . . Fluorescent, 40 watts, 48 inches,  
 (T-12), 714-00601  
 CREDIT WINDOW . . . . . Incandescent, No. 757, (2) 28V,  
 201-50562

## FUSES AND CIRCUIT BREAKERS

### JUNCTION BOX

120 VAC CIRCUIT . . . . . 2 Amp Circuit Breaker, 715-00733  
 120 VAC CIRCUIT . . . . . 10 Amp Circuit Breaker, 715-00734  
 30 VDC CIRCUIT . . . . . 2 Amp Circuit Breaker, 715-00733

### AMPLIFIER

Stereo 50W  
 120 VAC CIRCUIT . . . . . 2 amp, Circuit Breaker, 715-00733  
 Stereo 100W (OPTIONAL)  
 120 VAC CIRCUIT . . . . . 3.2 amp, GMZ, 200-11445  
 B+ CIRCUIT . . . . . 2 amp, AGC, (2), 701-00720

CREDIT UNIT . . . . . 6/10 amp, MDL Slo-Blo, 703-00721

**Record of Revision or Change**

Rowe International, Inc. issues bulletins describing equipment and manual changes. Use the space provided below to record changes that affect this manual.

NUMBER	DESCRIPTION	DATE INCORPORATED

## SECTION 4 - TROUBLESHOOTING

### INTRODUCTION

This section contains troubleshooting charts listing probable trouble causes and corrective procedures. Seventeen sequence of operation schematic diagrams plus a complete, detailed explanation of the operation of each Phonograph component are included to aid in isolating and correcting equipment malfunctions easily and rapidly. Use the instructions in this section in conjunction with the adjustment and repair and replacement instructions in Section 5 - Maintenance to isolate and correct Phonograph malfunctions.

### TROUBLESHOOTING CHARTS

It is important to troubleshoot logically so that effort is not wasted in removing and replacing the wrong parts. Most failures are caused by minor defects, such as loose connections or dirty contacts. Check the following before replacing any parts:

- a. Check that all plugs are firmly seated in their receptacles.
- b. Check that connector pins are not bent, broken, or pushed through the back of the connector or receptacle when mated.
- c. Check that wires are not broken at connector pins.
- d. Check that the area of the search unit and credit unit commutator boards that mate with harness edge connectors are clean and intact. Make sure that the connectors are firmly seated.
- e. Check that commutator segments are clean and that all wiper blades are properly positioned on their respective commutator segments.

The possible malfunctions of the Phonograph, their probable causes and remedies are listed in tables 4-1 through 4-3. The TROUBLE column contains specific failures. Each failure has one or more corresponding causes in the PROBABLE CAUSE column. If more than one probable cause and remedy are listed for a particular trouble, perform the procedures in the REMEDY column in the order listed.

TABLE 4-1. CREDIT AND SELECTION SYSTEM TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Valid coins fail to pass through slug rejector into cash box. Coins remain jammed in rejector.	Dirt or foreign matter clogging coin passages in rejector.	Refer to coin rejector service manual for cleaning procedure. Clean in accordance with instructions.
	Scavenger binding, rejector out of adjustment.	Refer to coin rejector service manual for adjustment procedure.
Valid coins pass through rejector into coin box but credit is not established.	Coin switch contacts dirty, bent, or broken.	Adjust coin switches. Check for bent or broken contacts. Clean contacts.
	Incorrect alignment of slug rejector or coin switches. Coins drop between switch levers.	Be sure that slug rejector is firmly clamped in place. Adjust coin switches as necessary.

TABLE 4-1. CREDIT AND SELECTION SYSTEM TROUBLESHOOTING (CONTINUED)

TROUBLE	PROBABLE CAUSE	REMEDY
Valid coins pass through rejector into coin box but credit is not established. (continued)	Credit coil plunger binding.	Check credit coil plunger for binding due to dirt. Check coil windings for continuity.
	Blown 0.6A fuse in credit unit.	Check for binding coin switch.
	Coin switch connector not seated.	Check that connector is firmly seated. Check for broken wire in common line.
Valid coins are accepted but credit lamp does not light.	Lamp burned out.	Replace lamp. Check for broken wires.
	Broken wiper blade on credit unit wiper arm assembly.	Replace wiper blade. Check that credit unit edge connector is firmly seated.
Coins accepted; credits not registered properly-credit unit fuse blows.	Coin hanging up on coin switch. Coin switch not opening.	Check for jammed coin. Free binding coin switch.
	Coin switch contacts closed by metallic foreign matter.	Clean contacts and replace fuse.
Continuous free play. Credit light remains on.	Credit coil plunger binding in raised position.	Free credit coil plunger. Replace credit coil if necessary.
	Cancel coil burned out.	Check cancel coil for continuity. Check for burned appearance. Replace defective coil.
	Cancel circuit open.	Check credit cancel coil.
More than normal number of credits established for coin deposited.	Appropriate stop coil not being energized.	Check for intermittent open circuits, loose wires, or poor solder connections.
	Appropriate stop coil plunger sticking.	Manually actuate plunger to check for free operation. Clean or replace plunger or spring if necessary.
	Improper credit set-up.	Check pricing against credit and pricing chart. See page 2-9
Valid coins accepted; credits are established, pushbuttons do not latch in.	Latch coil not operating. Select pulse and latch relay R1 not picking up.	Check coil for continuity. Check relay contacts for closure. Replace relay or coil if necessary.
	Select pulse and latch relay R1 contacts broken, dirty, or out of adjustment. R1 not picking up after credit is established.	Clean and adjust relay contacts.
	Open circuit between credit unit and select pulse and latch relay R1. R1 not picking up after credit is established.	Check for open circuit. Refer to sequence of operation, page 4-7.

TABLE 4-1. CREDIT AND SELECTION SYSTEM TROUBLESHOOTING (CONTINUED)

TROUBLE	PROBABLE CAUSE	REMEDY
Pushbuttons latch in, but release prematurely; no selection played.	Select pulse and latch relay R1 time delay circuit giving short pulse.	Check diode on selector assembly. Check relay R1 for dirt between core and armature. Replace parts if necessary.
Pushbuttons latch in; no further action.	Open circuit to search unit motor.	Check wiring. See page 4-32.
Pushbuttons latch in, search unit motor starts, but runs continuously.	Open circuit in selector assembly, wiring from pushbutton switches to search unit printed board segments.	Check wiring against selector assembly wiring diagram. See page 4-29.
	Contacts on mechanism control relay R dirty, broken, or out of adjustment.	Check mechanism control relay R for proper operation. Replace if necessary. This relay is nonrepairable.
Selection is registered, magazine rotates one complete scan cycle and stops. No record is played.	No circuit through stop switch.	Check wiring to stop switch. See page 4-26.
	Selected pin not pushed far enough; select coil not properly positioned.	Check inside and outside row select coils for proper operation. Adjust select coil arm assembly. See page 5-27.
Wrong selection is played every time.	Search unit select coil arm assembly out of adjustment.	Adjust search unit select coil arm assembly. Check search unit wiper adjustment. See page 5-25.
	Stop switch out of adjustment.	Check stop switch alignment. See page 5-6.
	Stop switch gear not properly installed.	Check stop switch gear alignment. See page 5-6.
One particular letter or number, in combination with all letters and numbers, will not register.	Open circuit in the particular letter or number wiring.	Check for dirt on search unit commutator board or wiper contacts. Clean with alcohol, if necessary. To locate the open circuit, make 20 selections in the following order: A1, B1, C2, D2, E3, F3, G4, H4, J5, K5, L6, M6, N7, P7, Q8, R8, S9, T9, U0, V0. This test combination will determine which letter or number has an open circuit.
Search unit motor energized but does not run.	Search unit gears binding.	Check for dirt or foreign matter lodged in gear teeth. Check backlash adjustment. See page 5-20.
	Tip of select coil plunger hung up on side of pin, excessive backlash causing select coil arm overtravel.	Adjust search unit gears for proper backlash. See page 5-20.

TABLE 4-1. CREDIT AND SELECTION SYSTEM TROUBLESHOOTING (CONTINUED)

TROUBLE	PROBABLE CAUSE	REMEDY
Only one selection is made but two selections play.	Select coil plunger hitting two adjacent pins; select coil arms out of adjustment, or overtravel caused by excessive gear backlash.	Adjust select coil arm assembly. (See page 5-27.) Adjust search unit gears for backlash. (See page 4-20).
50-cent coin establishes only 25-cent credit (50¢ bonus relay being used).	50¢ bonus relay not picking up, or picking up and dropping out prematurely.	Replace 50¢ bonus relay. Check that relay is firmly seated in socket.

TABLE 4-2. RECORD CHANGER MECHANISM TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
All selections register properly but magazine does not rotate.	Scan Assembly not operating.	Check scan coil for open, check for binding linkage.
	Scan switch defective or out of adjustment.	Check scan switch for proper operation, adjust switch position.
	Diode D-1 open.	Check by shorting across diode.
	Cam switch CS2 faulty or out of adjustment.	Check switch for proper operation or adjust switch position.
	Magazine detent coil open or binding detent linkage.	Check coil for continuity, free linkage.
	Relay contact 1 & 9 faulty.	Check relay, replace if necessary.
	Detent switch faulty or out of adjustment.	Check switch for proper operation or adjust switch position.
	Magazine motor faulty or drive gears binding.	Check motor and gear train for proper operation.
Scan linkage operates, magazine one complete scan cycle and stops - no record is played. Stop switch jumps pins.	No circuit through step switch.	Check stop switch and wipers on back of stop switch.
	Diode D-2 defective.	Check diode.
	Short circuit in 50 MFD capacitor.	Check capacitor resistance.
	Faulty mech. relay. (R)	Replace relay.
	CS5 cam switch defective or out of adjustment.	Check cam switch for proper operation - replace if necessary, adjust switch position.
	Short circuit on common side of magazine detent coil.	Check detent coil circuit.



TABLE 4-2. RECORD CHANGER MECHANISM TROUBLESHOOTING (CONTINUED)

TROUBLE	PROBABLE CAUSE	REMEDY
Magazine stops at proper selection, but record transfer assembly does not operate. Relay (R) picked up.	Open circuit to transfer motor.	Check relay contacts 6 and 10, 7 and 11, for proper operation.
	Defective transfer motor.	Check motor, replace if necessary.
Transfer arm stops in mid travel between magazine and turntable. Phono power is on.	Cam switch CS2 faulty or out of adjustment.	Check for proper operation of switch. Replace if necessary. Adjust as required.
	Open circuit breaker in junction box.	Check for short or overload condition. After correcting the condition, reset circuit breaker.
Transfer arm moves each selection record from magazine to turntable and back without being played, all other functions normal.	Diode D-3 shorted.	Check for short.
	Short circuit in cancel line, cut off switch or automatic cancel circuit.	Check for short.
	Cam switches CS4 or CS5 faulty or out of adjustment.	Check switches - adjust or replace if necessary.
	Needle height improperly adjusted.	Adjust height of needle.
Wrong side of record plays; selection is improperly registered.	Center slip ring wiper broken or out of adjustment.	Adjust or replace.
	Left side switch in stop switch assembly faulty.	Check left side switch - replace if necessary.
	Toggle switch coil open or linkage binding.	Check coil and linkage. Replace or free if necessary.
	Diode D-3 open.	Check diode.
	Cam switch CS4 faulty or out of adjustment.	Check switch, replace or adjust if necessary.
	Mechanism relay (R) contacts 5 and 9, not making connection.	Check relay - replace if necessary.
Wrong record played, selection is properly registered.	Stop switch gear out of adjustment.	Align 200 mark on stop switch gear with step in search unit mounting bracket. See page 5-6.
	Stop switch out of alignment.	Align stop switch. See page 5-6.
Selections play over and over, pins not being reset.	Slip ring wipers No. 2 or 3 broken or out of adjustment.	Adjust or replace slip ring wiper blade assembly.
	Cam switch CS3 or CS4 faulty or out of adjustment.	Check switches - replace or adjust if necessary.
	Reset pawl out of adjustment.	Adjust reset pawl. See page 5-5.
Magazine scans continuously after last selection is played.	Detent coil plunger binding or detent assembly out of adjustment.	Manually operate plunger to check that the detent pawl locks the detent wheel. Adjust or replace if necessary.
	Scan switch faulty or out of adjustment.	Check switches, repair or replace if necessary.

TABLE 4-3. SOUND SYSTEM TROUBLESHOOTING

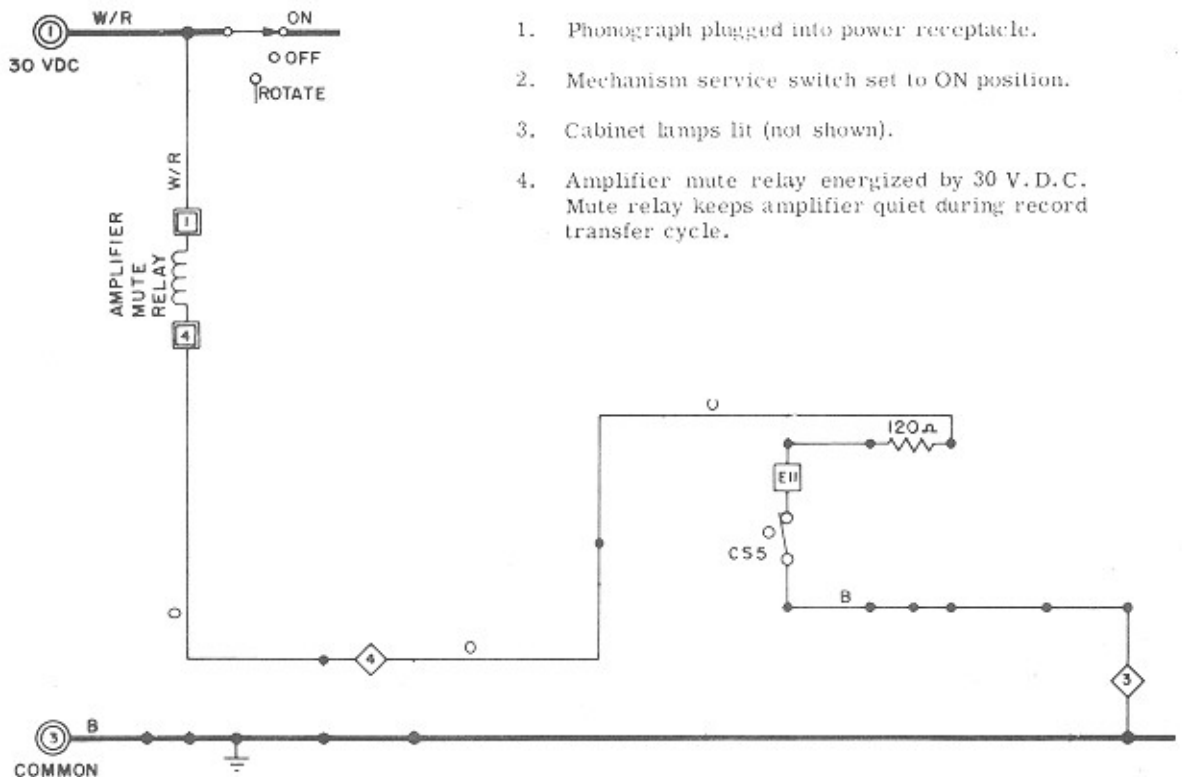
TROUBLE	PROBABLE CAUSE	REMEDY
No sound. Phonograph mechanical operation normal.	Blown amplifier fuse. (100W)	Check for short or overload condition which caused fuse to blow. Replace fuse after this condition is corrected. (100W)
	Open circuit breaker in amplifier (50W)	Check for short or overload condition. After correcting the condition, reset circuit breaker.
	Faulty mute relay.	Check operation of mute relay; replace if necessary. This relay is non-repairable.
	Cartridge leads broken or shorted.	Check that both cartridge leads are intact and that all connectors and plugs are firmly seated.
Partial or distorted sound.	Damaged stylus.	Carefully check stylus, replace if necessary.
	Incorrect remote speaker hookup.	Check remote speaker connections. See page 2-6.
	Defective output transistors or tubes in either channel.	Check output transistors or tubes. Replace if defective. See page 5-31/5-32
	Partial short in local or remote volume control. Incorrect speaker hookup. Incorrect remote volume control hookup.	Check volume control and speaker connections as shown in sound system connection diagram. See page 2-6.
Low volume apparent in one channel.	Cartridge defective.	Replace cartridge if necessary. Check by substituting a cartridge that is known to be good.
	Faulty preamplifier board.	Replace preamplifier board.
	Faulty driver board. (Solid-State Models Only)	Replace driver board.
	Balance control not properly adjusted.	Adjust balance control for equal sound from each stereo channel. See page 2-3.
Constant high volume, cannot be adjusted at volume control.	Short in volume control circuit.	Check wiring. See sound system connection diagram. See page 2-6.
Excessive record scratch evident through speakers.	Scratched or worn records.	Replace records.
	Damaged stylus.	Check stylus force. Replace stylus.
	Treble range control set too high for condition of records.	Reduce treble range control setting. See page 2-3.
Intermittent sound. Amplifier cycles on and off. (Solid-State Models Only)	Overheated output transistors cause heat sensitive semi-conductors on heat sink to clamp amplifier input.	Check for shorted or partially shorted speaker lines.
		Check for component failure that may cause high heat dissipation in output stages.
Excessive hum-low volume.	Broken shield on cartridge leads.	Be sure that shielding or wires are not broken at any point between the cartridge and amplifier input plug.
	7868 tube failure.	Replace tube.

## SEQUENCE OF OPERATION

If the trouble is not listed in Tables 4-1 through 4-3, or is not corrected by performing the procedure in the REMEDY column, refer to the seventeen sequence of operation schematic diagrams. Each diagram is a partial simplified schematic of the phonograph schematic diagram, figure 4-1. Only the circuits under discussion for the particular sequence are shown. The accompanying text on each diagram explains circuit operation.

If an open circuit or loose connection is suspected, wiring can be traced using the wiring diagrams. Wiring diagrams and schematic diagrams can be found immediately following the sequence of operation diagrams.



### ① STANDBY

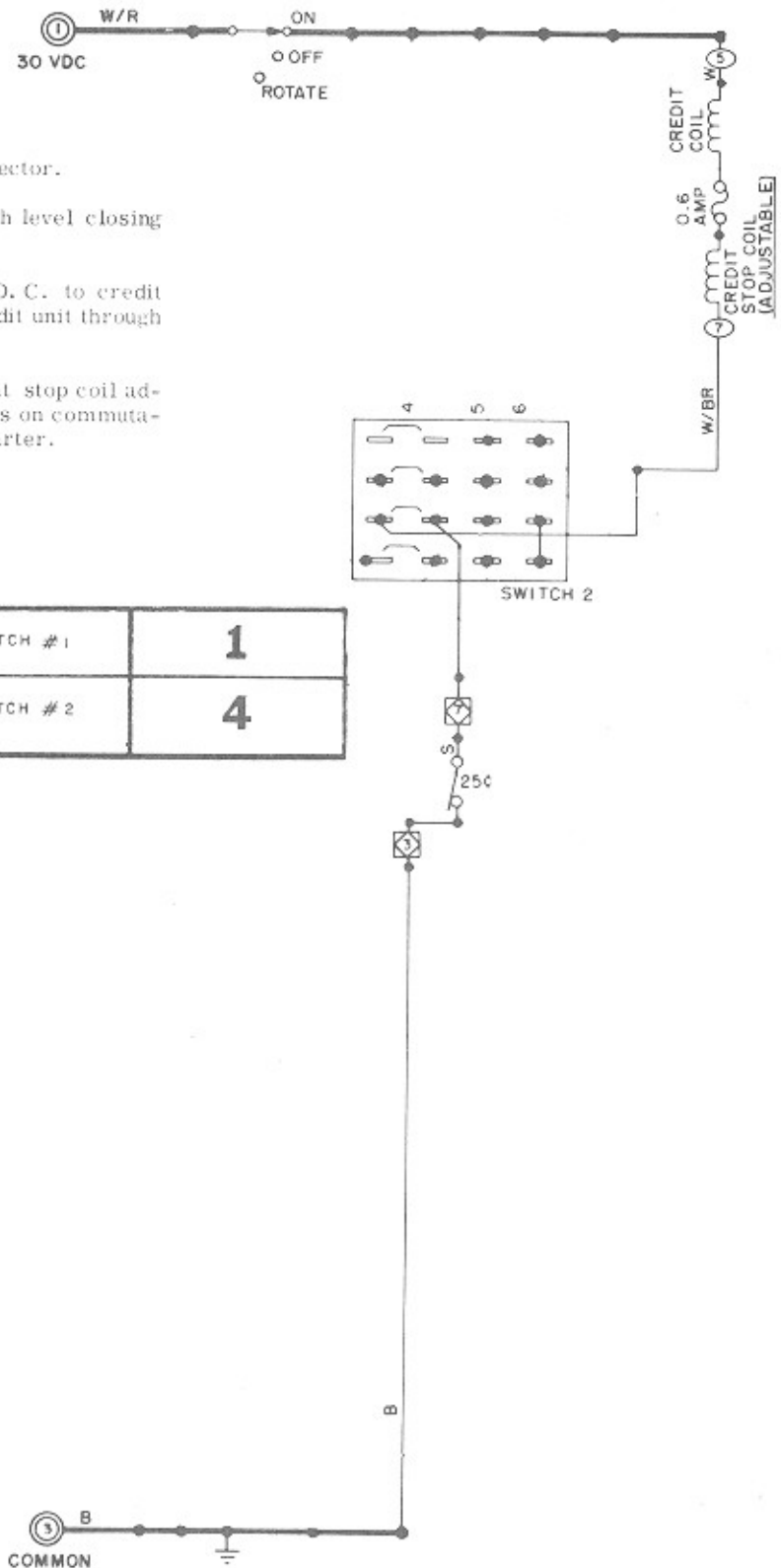


1. Phonograph plugged into power receptacle.
2. Mechanism service switch set to ON position.
3. Cabinet lamps lit (not shown).
4. Amplifier mute relay energized by 30 V.D.C. Mute relay keeps amplifier quiet during record transfer cycle.

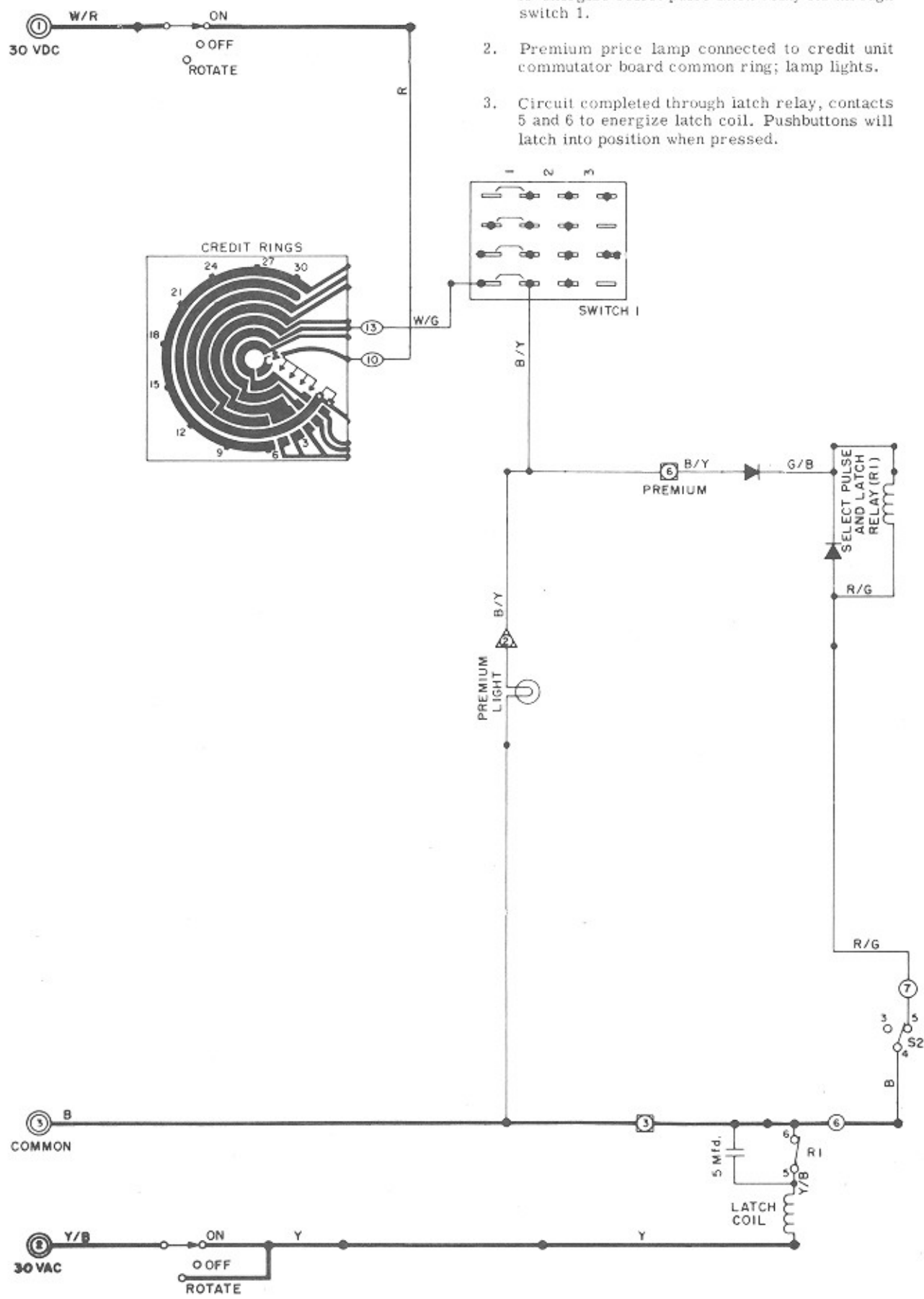
## 2 CUSTOMER INSERTS QUARTER

1. Quarter passes through slug rejector.
2. Quarter operates 25¢ coin switch level closing 25¢ coin switch.
3. The coin switch applies 30 V.D.C. to credit coil and credit stop coil in credit unit through pricing switch.
4. Credit coil and adjustable credit stop coil advance credit wiper arm two steps on commutator board corresponding to a quarter.

PRICE SWITCH SETTINGS		SWITCH #1	1
SW 1			
SW 2			
		SWITCH #2	4

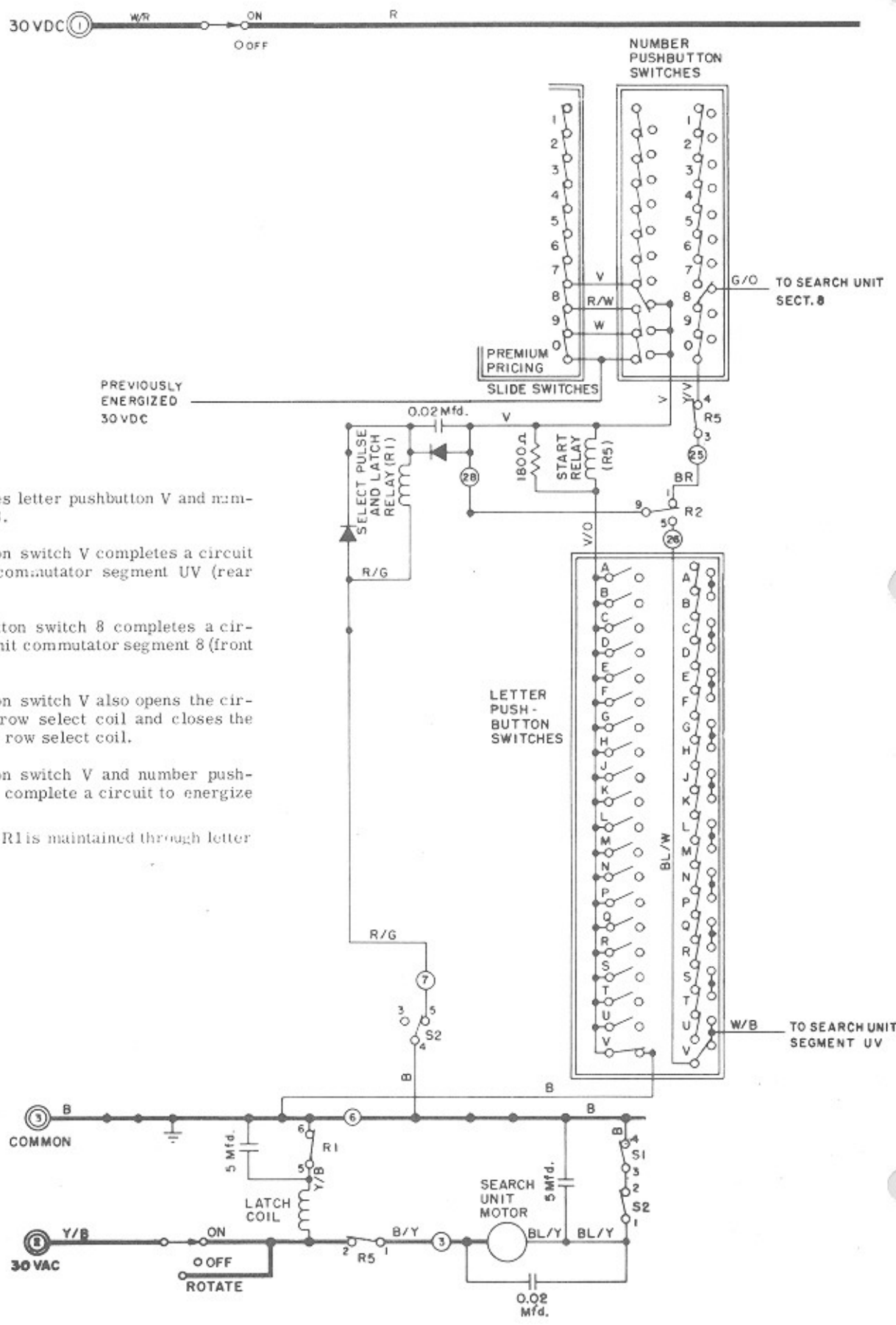


### 3 CREDIT ESTABLISHED



1. Wiper assembly completes a circuit from the 25¢ two-step credit ring to the 30 V. D. C. ring to energize select pulse latch relay R1 through switch 1.
2. Premium price lamp connected to credit unit commutator board common ring; lamp lights.
3. Circuit completed through latch relay, contacts 5 and 6 to energize latch coil. Pushbuttons will latch into position when pressed.

# 4 CUSTOMER MAKES FIRST SELECTION

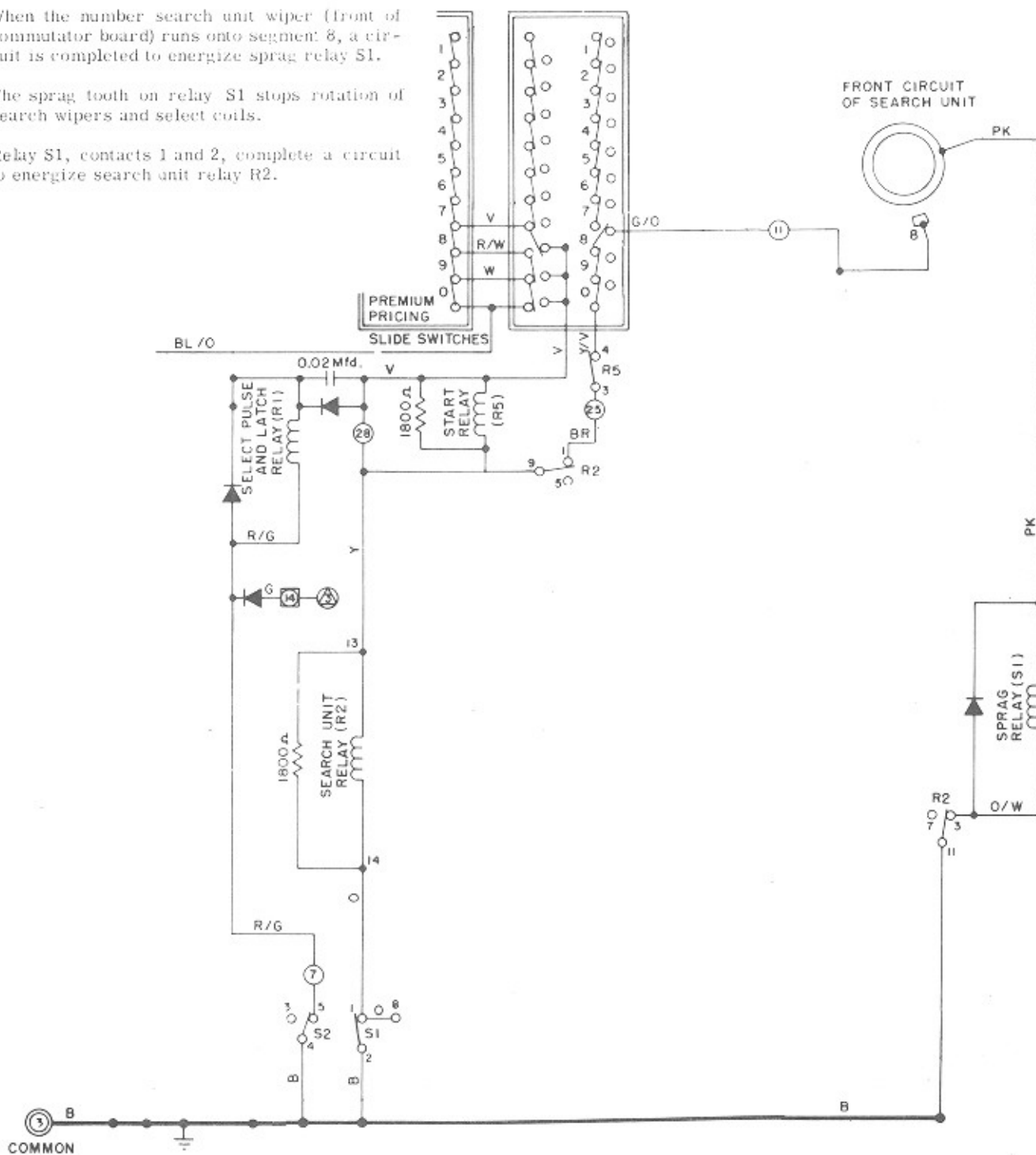


1. Customer pushes letter pushbutton V and number pushbutton 8.
2. Letter pushbutton switch V completes a circuit to search unit commutator segment UV (rear side of board).
3. Number pushbutton switch 8 completes a circuit to search unit commutator segment 8 (front side of board).
4. Letter pushbutton switch V also opens the circuit to outside row select coil and closes the circuit to inside row select coil.
5. Letter pushbutton switch V and number pushbutton switch 8 complete a circuit to energize start relay R5.
6. Circuit to relay R1 is maintained through letter switch bank.

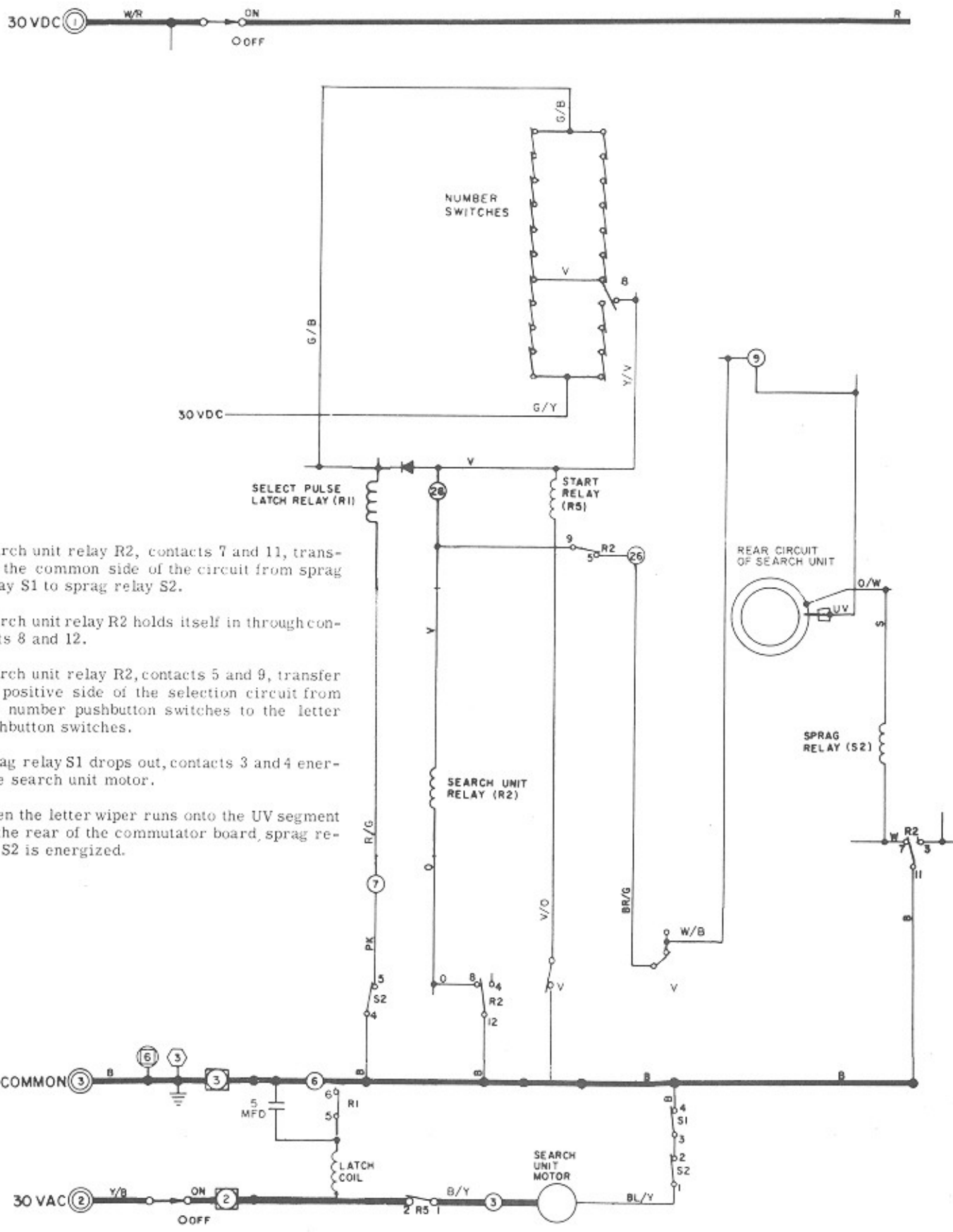
## 5 SEARCH WIPERS LOCATE NUMBER



1. When the number search unit wiper (front of commutator board) runs onto segment 8, a circuit is completed to energize sprag relay S1.
2. The sprag tooth on relay S1 stops rotation of search wipers and select coils.
3. Relay S1, contacts 1 and 2, complete a circuit to energize search unit relay R2.



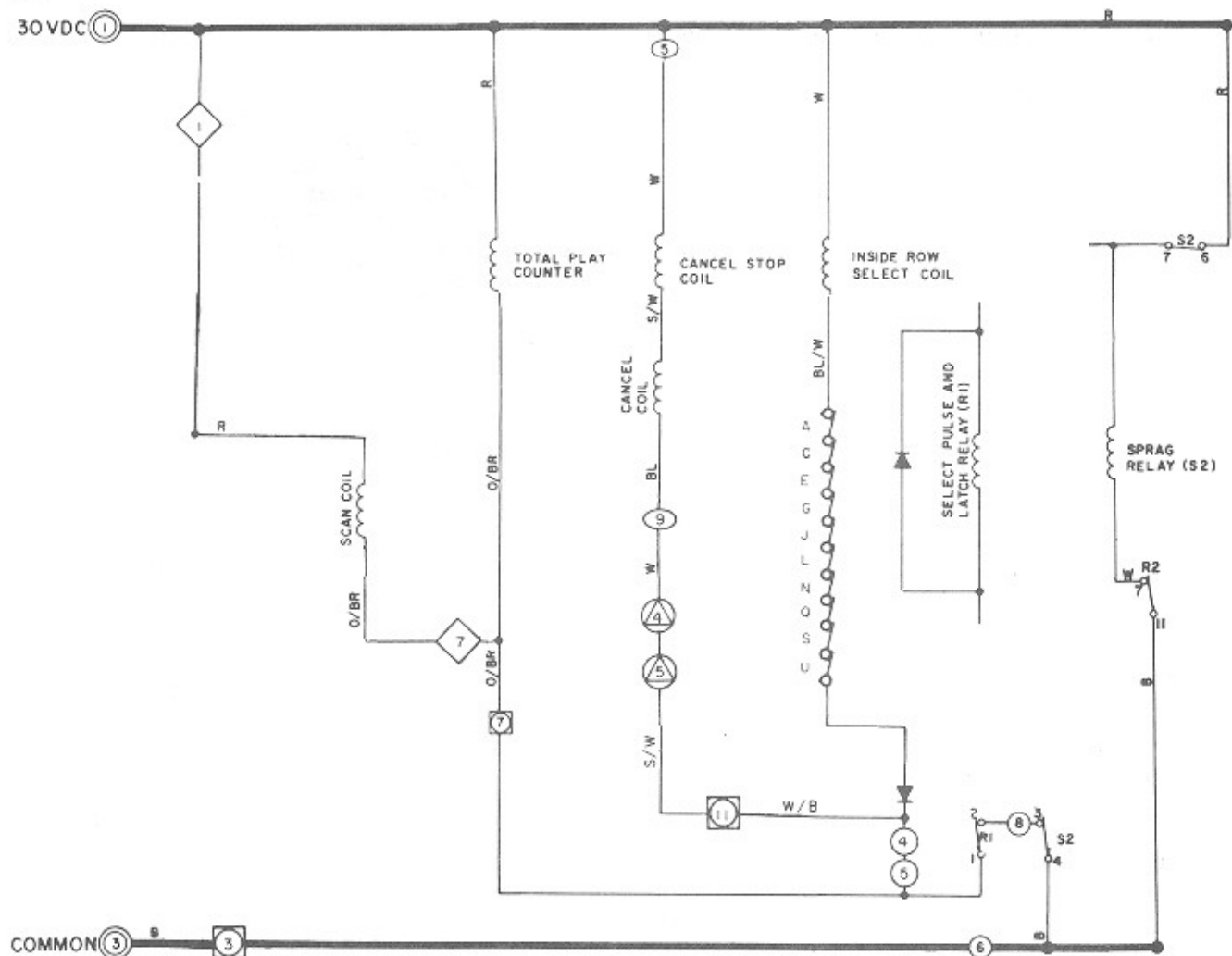
# 6 SEARCH CONTINUES



1. Search unit relay R2, contacts 7 and 11, transfer the common side of the circuit from sprag relay S1 to sprag relay S2.
2. Search unit relay R2 holds itself in through contacts 8 and 12.
3. Search unit relay R2, contacts 5 and 9, transfer the positive side of the selection circuit from the number pushbutton switches to the letter pushbutton switches.
4. Sprag relay S1 drops out, contacts 3 and 4 energize search unit motor.
5. When the letter wiper runs onto the UV segment on the rear of the commutator board, sprag relay S2 is energized.

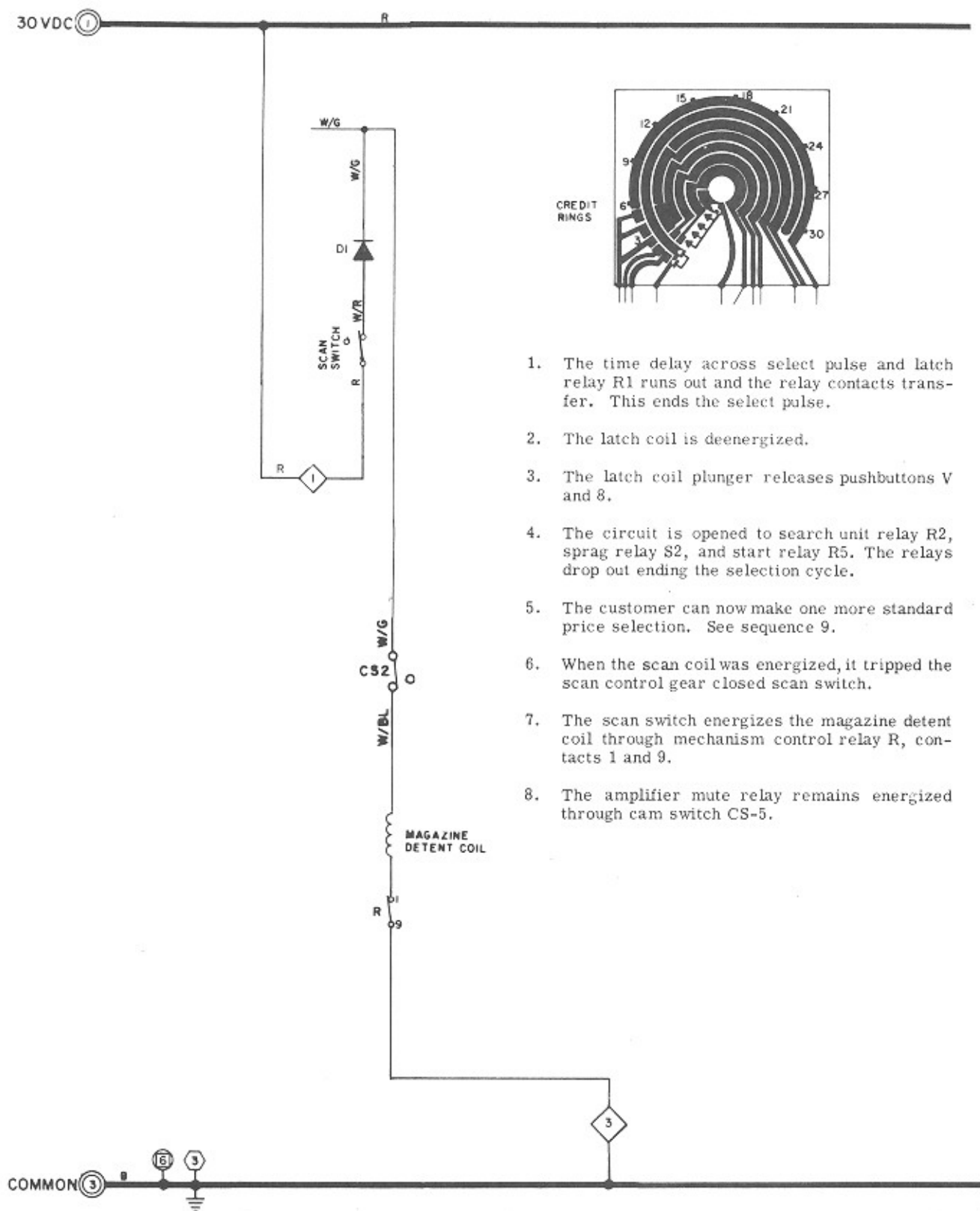


## 7 SELECTION REGISTERED, CREDIT REMOVED, AND SCAN CONTROL OPERATED



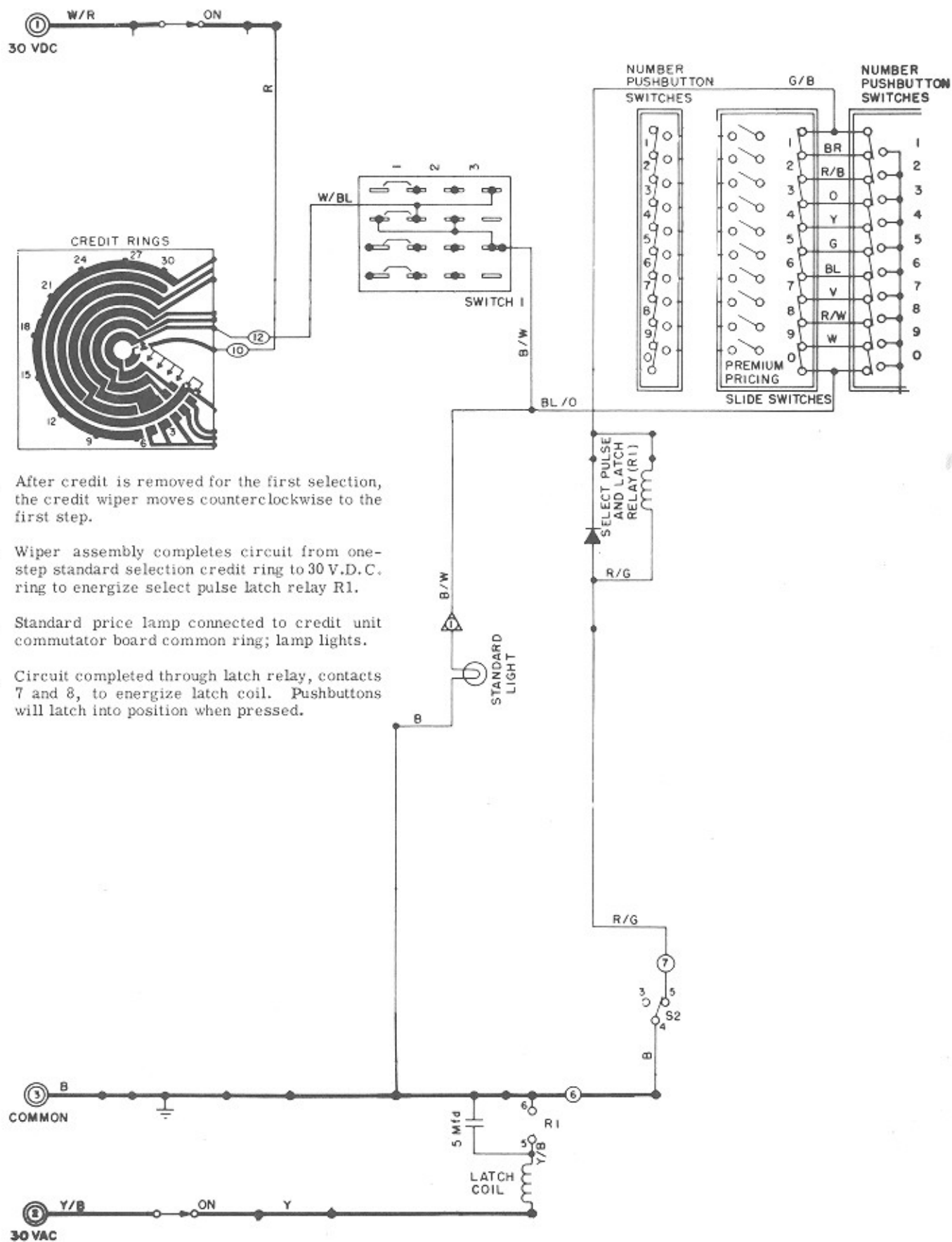
1. Sprag relay S2 locks the search wipers and select coils in place with the select coils aligned with pins representing selections U8 and V8.
2. Sprag relay S2, contacts 1 and 2, deenergize search unit motor.
3. Sprag relay S2 holds itself in through contacts 6 and 7.
4. Sprag relay S2, contacts 3 and 4, deenergize select pulse and latch relay R1.
5. Select pulse and latch relay R1, contacts 1 and 2, complete a circuit to common to energize scan coil, credit cancel coil and credit cancel stop coil in credit unit, inside row select coil, and total play counter.
6. Inside row select coil pushes pin into select position on the credit unit pinwheel assembly.
7. Credit cancel coil drives the credit wiper arm counterclockwise one step leaving credit for one standard selection.
8. Select pulse and latch relay R1 is held closed for a short time after being deenergized due to a diode connected across the coil. This time delay determines the length of the select pulse to the scan coil, credit cancel coil in the credit unit, and inside row select coil. During this time, search unit relay R2 and start relay R5 are held closed through the letter wiper and pushbutton circuit.

## 8 PUSHBUTTONS UNLATCH AND RECORD CHANGER STARTS



1. The time delay across select pulse and latch relay R1 runs out and the relay contacts transfer. This ends the select pulse.
2. The latch coil is deenergized.
3. The latch coil plunger releases pushbuttons V and 8.
4. The circuit is opened to search unit relay R2, sprag relay S2, and start relay R5. The relays drop out ending the selection cycle.
5. The customer can now make one more standard price selection. See sequence 9.
6. When the scan coil was energized, it tripped the scan control gear closed scan switch.
7. The scan switch energizes the magazine detent coil through mechanism control relay R, contacts 1 and 9.
8. The amplifier mute relay remains energized through cam switch CS-5.

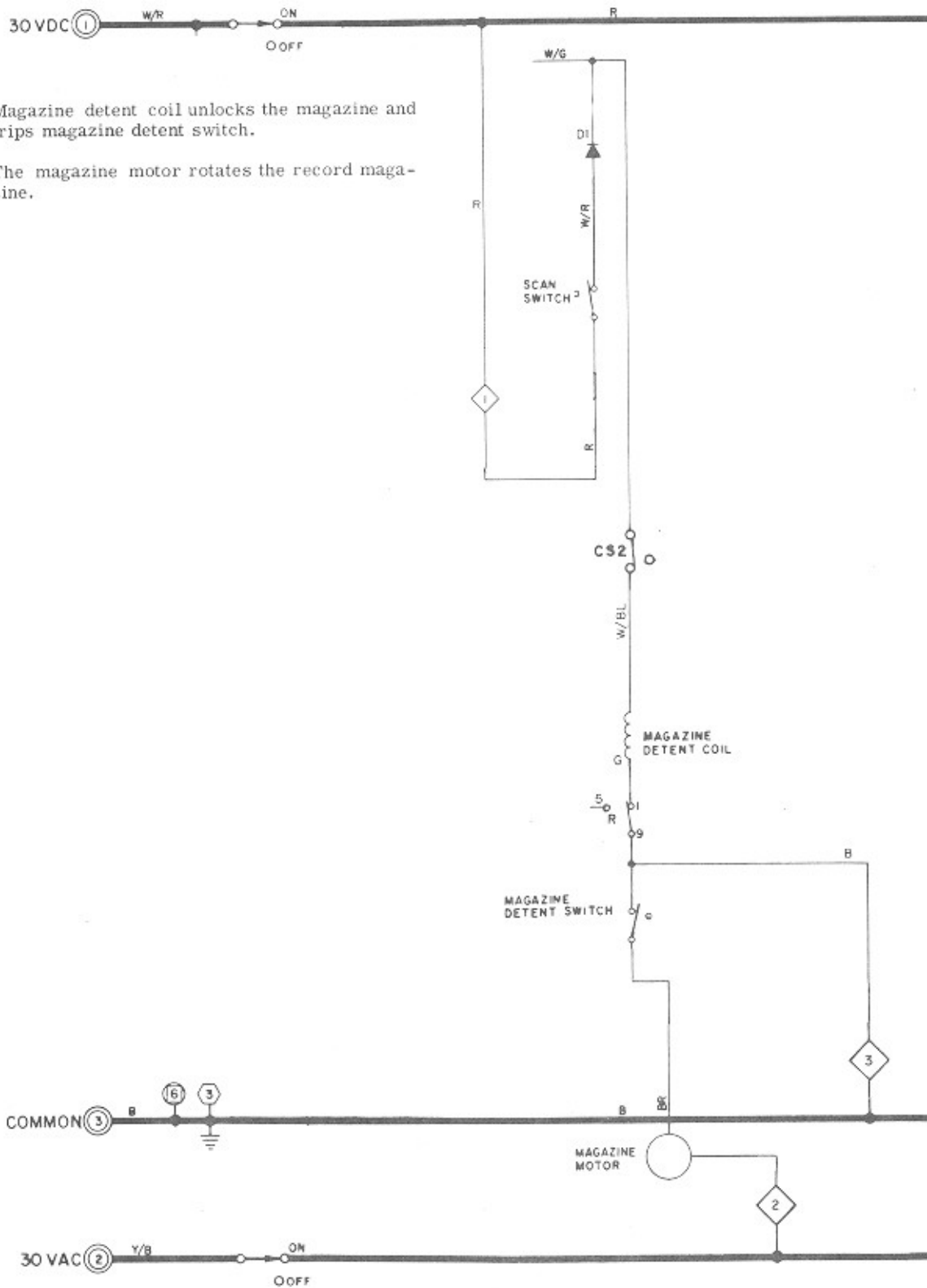
## 9 CUSTOMER MAKES SECOND SELECTION



1. After credit is removed for the first selection, the credit wiper moves counterclockwise to the first step.
2. Wiper assembly completes circuit from one-step standard selection credit ring to 30 V.D.C. ring to energize select pulse latch relay R1.
3. Standard price lamp connected to credit unit commutator board common ring; lamp lights.
4. Circuit completed through latch relay, contacts 7 and 8, to energize latch coil. Pushbuttons will latch into position when pressed.

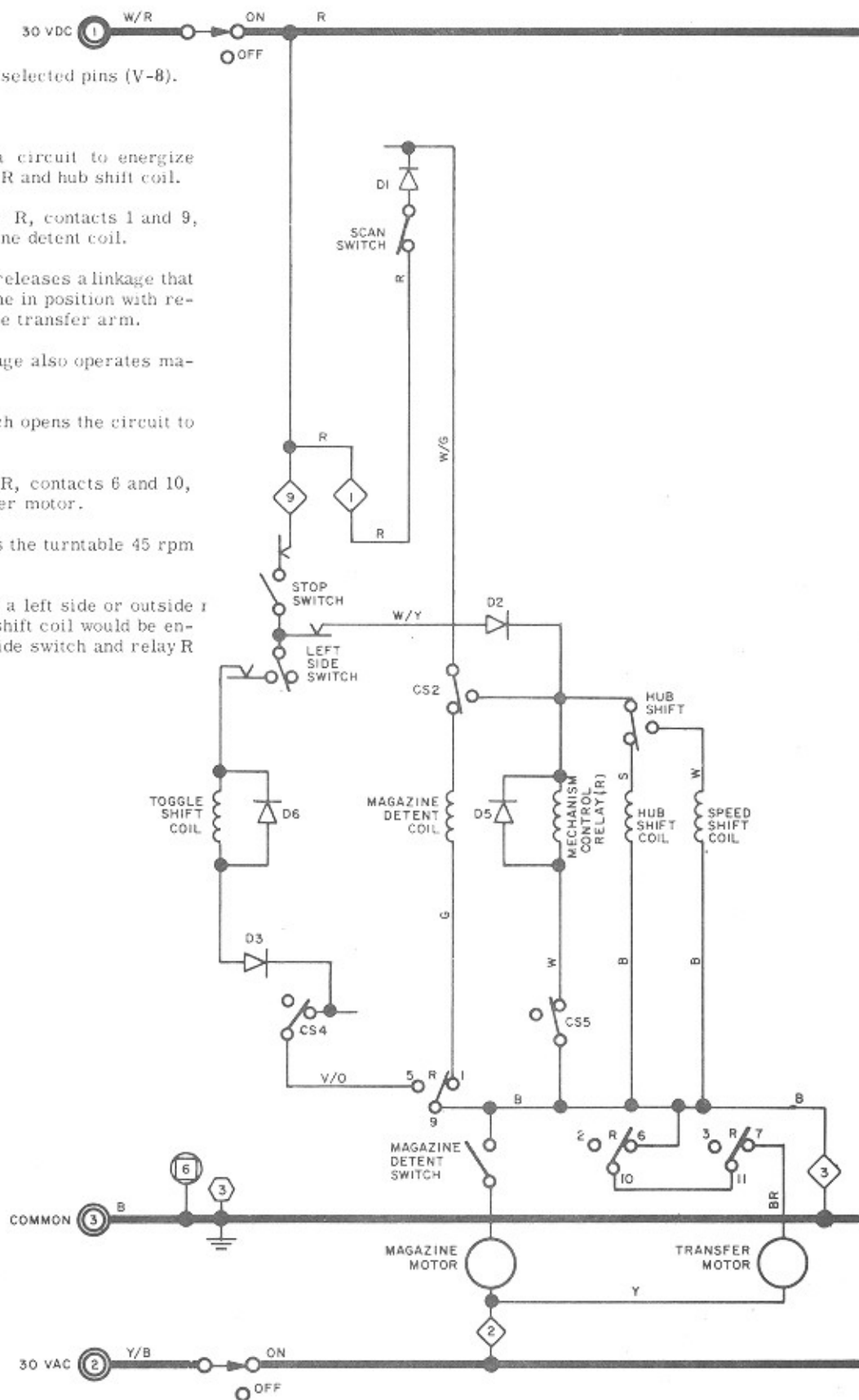
# 10 RECORD MAGAZINE ROTATES

1. Magazine detent coil unlocks the magazine and trips magazine detent switch.
2. The magazine motor rotates the record magazine.



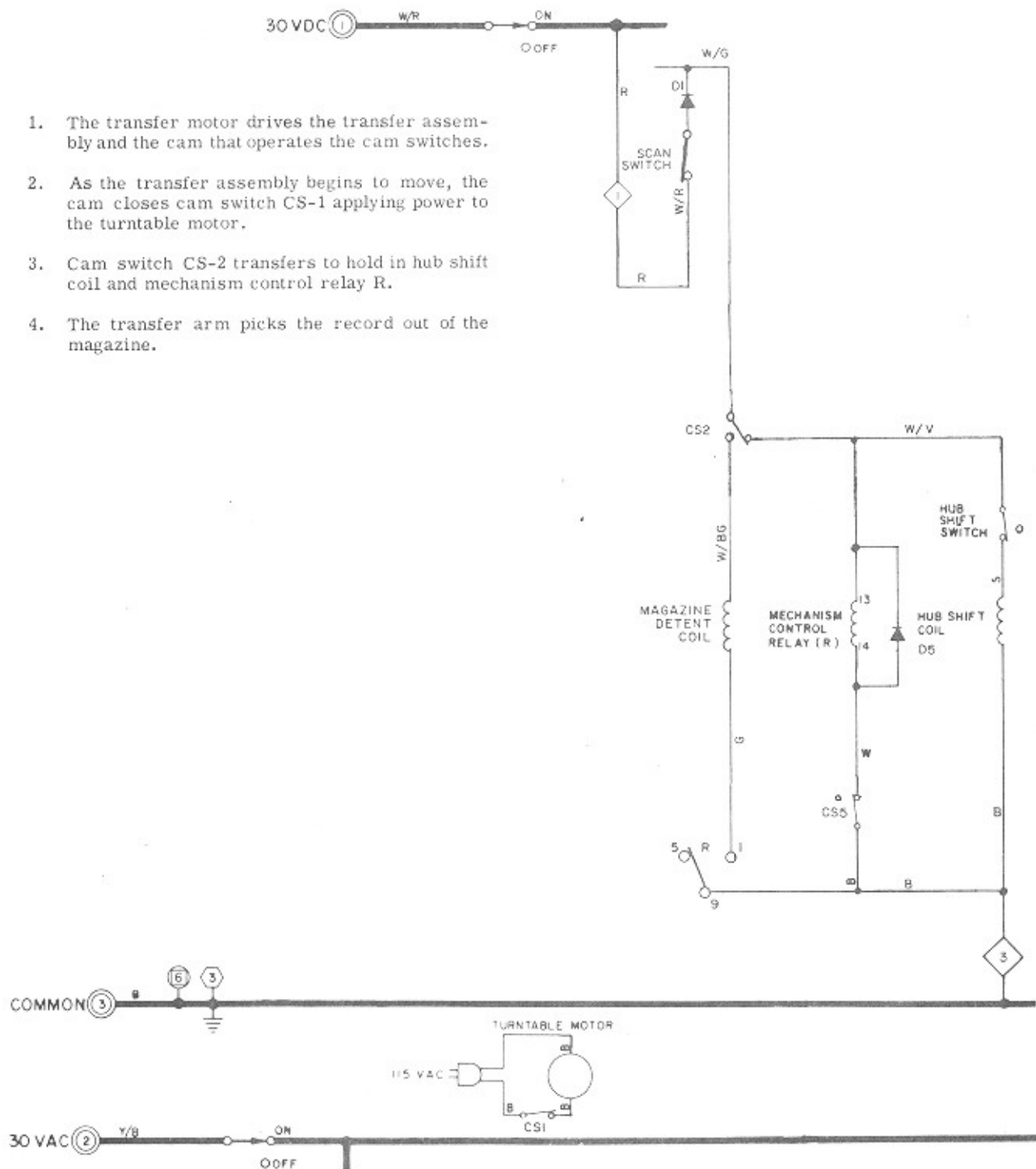
# 11 STOP SWITCH PAWL HITS SELECTED PIN-TRANSFER MOTOR STARTS

1. Inside row stop pawl hits selected pins (V-8).
2. Stop switch operates.
3. Stop switch completes a circuit to energize mechanism control relay R and hub shift coil.
4. Mechanism control relay R, contacts 1 and 9, open deenergizing magazine detent coil.
5. The magazine detent coil releases a linkage that locks the record magazine in position with record UV-8 aligned with the transfer arm.
6. Magazine detent coil linkage also operates magazine detent switch.
7. The magazine detent switch opens the circuit to the magazine motor.
8. Mechanism control relay R, contacts 6 and 10, 11 and 7, energize transfer motor.
9. The hub shift coil raises the turntable 45 rpm hub.
10. If the selection had been a left side or outside row selection, the toggle shift coil would be energized through the left side switch and relay R contacts 5 and 9.



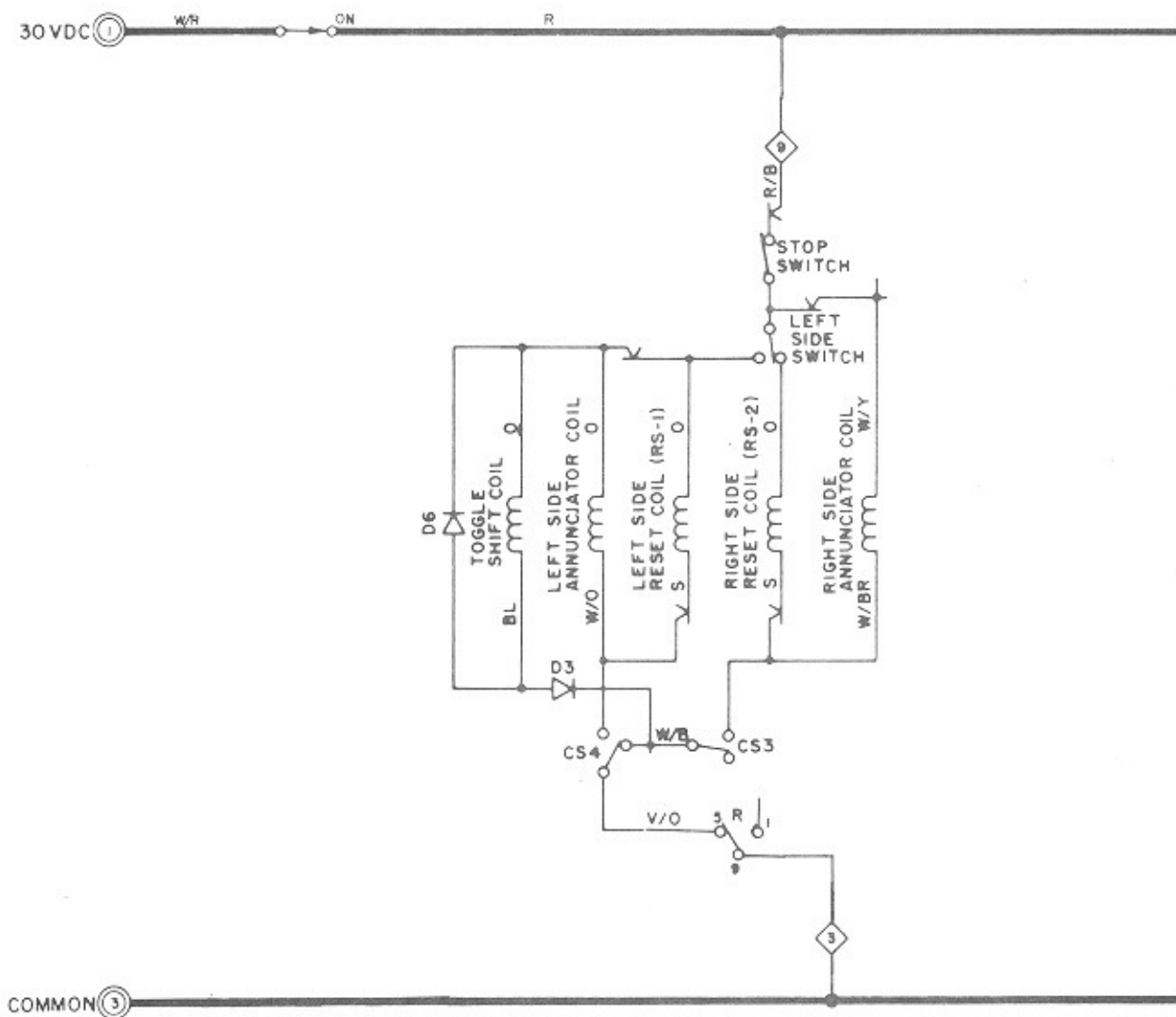
## 12 RECORD PICKED UP

1. The transfer motor drives the transfer assembly and the cam that operates the cam switches.
2. As the transfer assembly begins to move, the cam closes cam switch CS-1 applying power to the turntable motor.
3. Cam switch CS-2 transfers to hold in hub shift coil and mechanism control relay R.
4. The transfer arm picks the record out of the magazine.



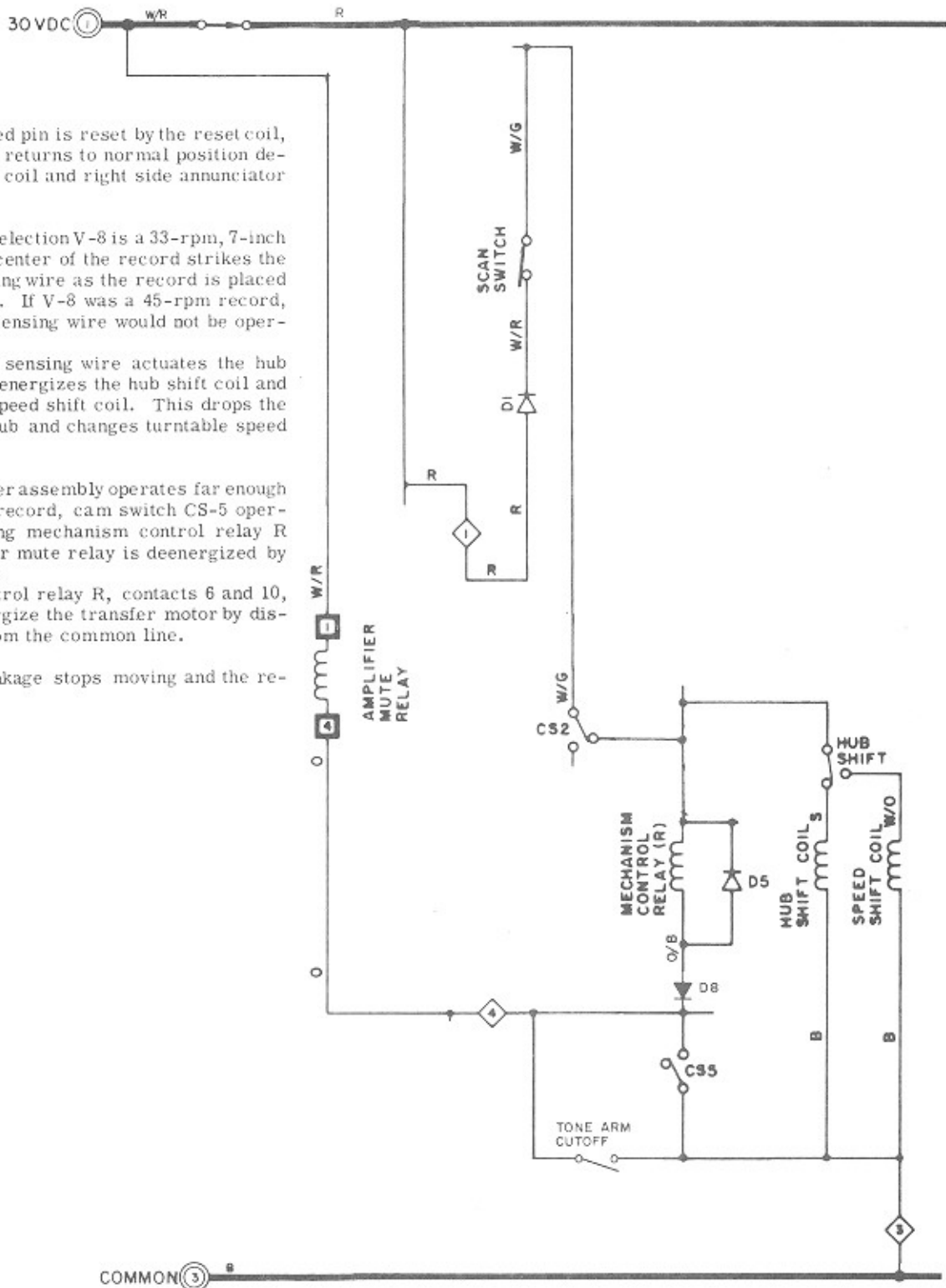
### 13 RECORD APPROACHES TURNTABLE

1. As the transfer motor continues to operate, cam switch CS-3 closes.
2. Cam switch CS-3 operates right side annunciator coil and right side reset coil.
3. Right side reset coil plunger resets pin V-8 in the search unit pinwheel assembly.
4. A short time later, cam switch CS-3 opens and cam switch CS-4 transfers to the position opposite that shown.
5. At this time, if selection had been left hand, the toggle shift coil would be deenergized and the left side reset and annunciator coils would be operated by cam switch CS-4.



## 14 RECORD PLACED ON TURNTABLE

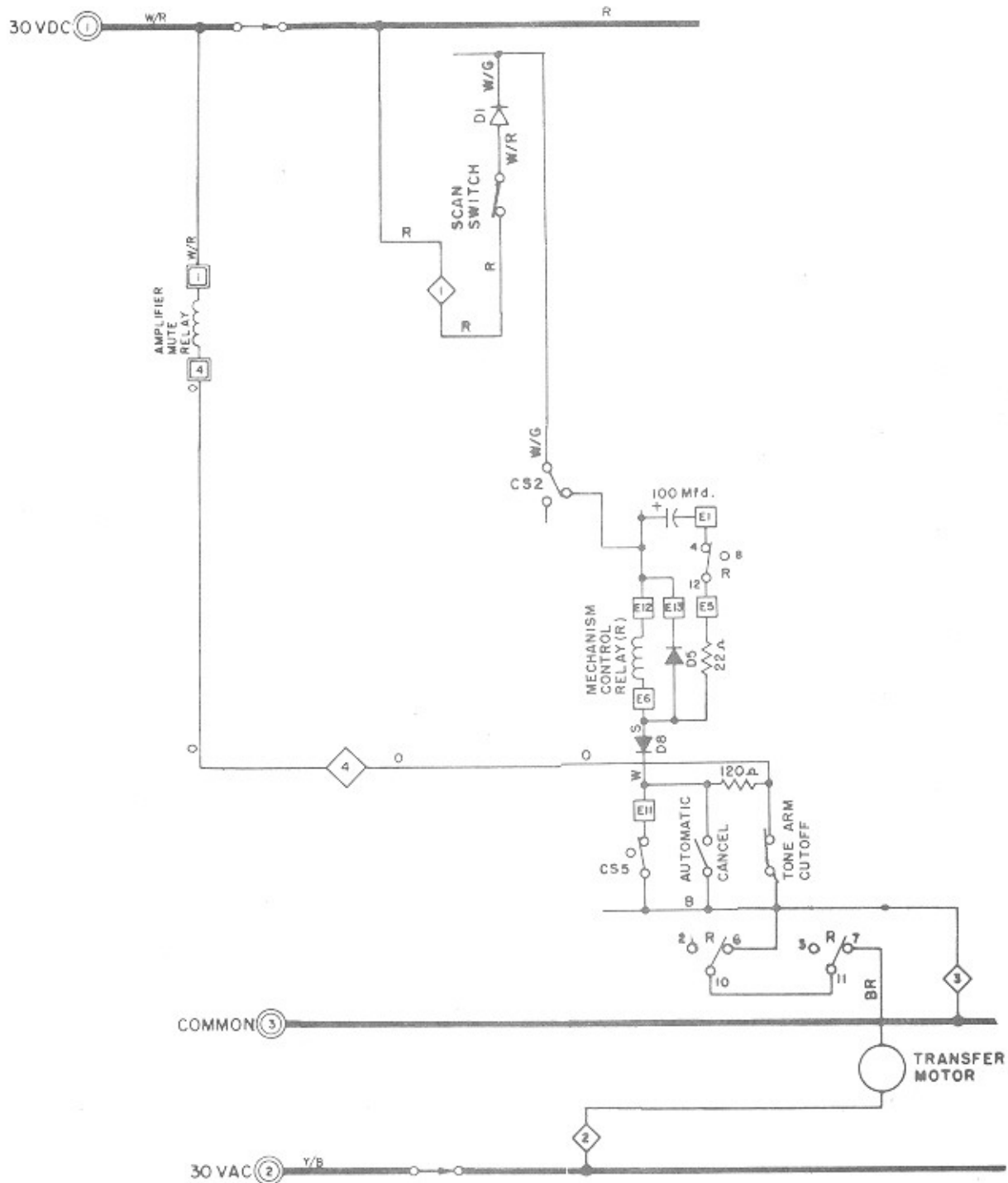
1. When the selected pin is reset by the reset coil, the stop switch returns to normal position deenergizing reset coil and right side annunciator coil.
2. Assuming that selection V-8 is a 33-rpm, 7-inch LP record, the center of the record strikes the hub switch sensing wire as the record is placed on the turntable. If V-8 was a 45-rpm record, the hub switch sensing wire would not be operated.
3. The hub switch sensing wire actuates the hub switch which deenergizes the hub shift coil and energizes the speed shift coil. This drops the large 45-rpm hub and changes turntable speed to 33-1/3 rpm.
4. When the transfer assembly operates far enough to release the record, cam switch CS-5 operates deenergizing mechanism control relay R and the amplifier mute relay is deenergized by tone arm cutoff.
5. Mechanism control relay R, contacts 6 and 10, 7 and 11, deenergize the transfer motor by disconnecting it from the common line.
6. The transfer linkage stops moving and the record plays.



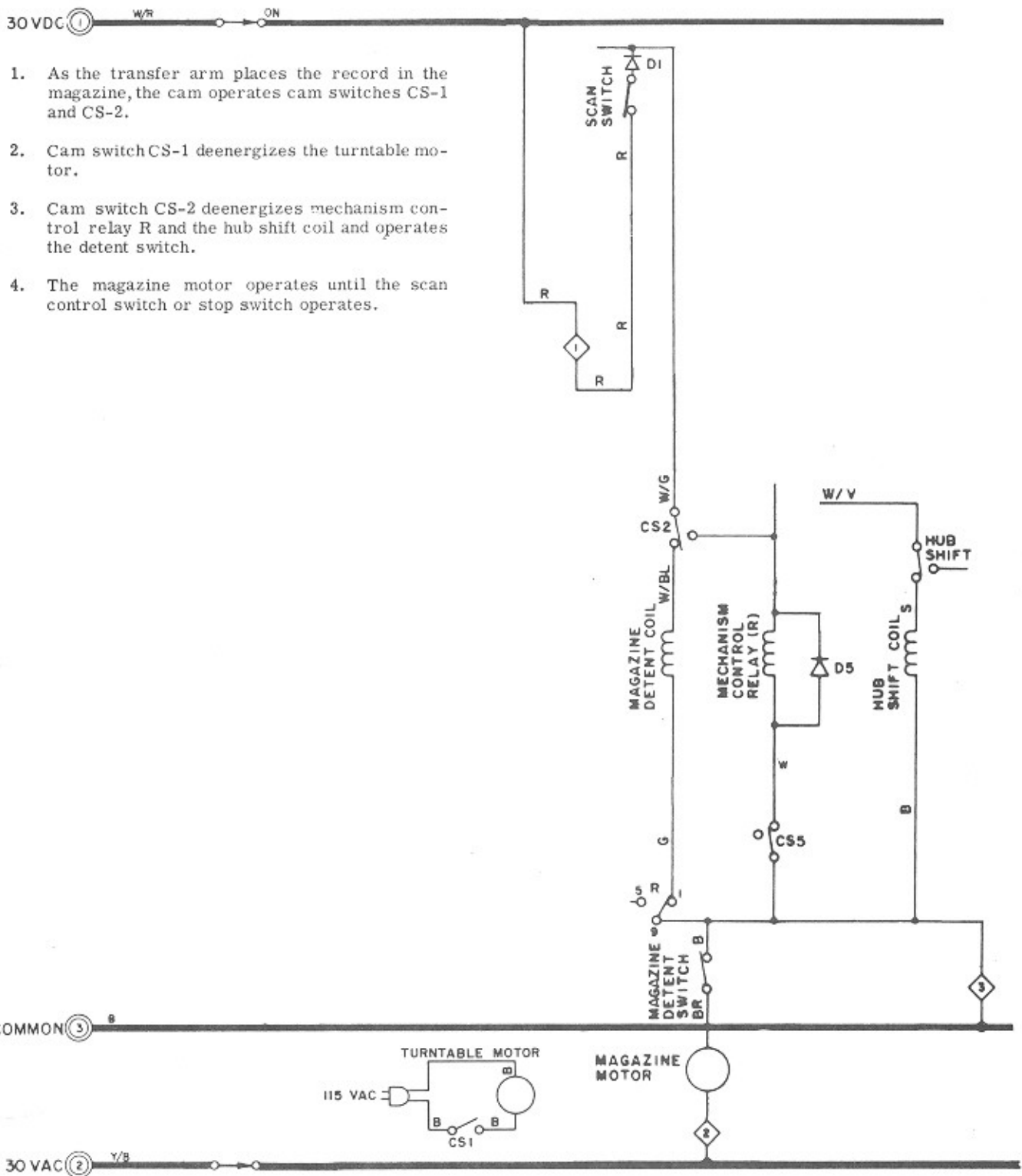


15 RECORD ENDS

1. When the magnet on the underside of the tone arm operates the tone arm cutoff switch, as the tone arm tracks into the cutoff groove, the amplifier mute relay and mechanism control relay R are energized. The parallel capacitor and series resistor in the mechanism control relay circuit is to delay the pickup of the mechanism.
2. Mechanism control relay contacts 6 and 10, 7 and 11, complete a circuit to common to energize the transfer motor.

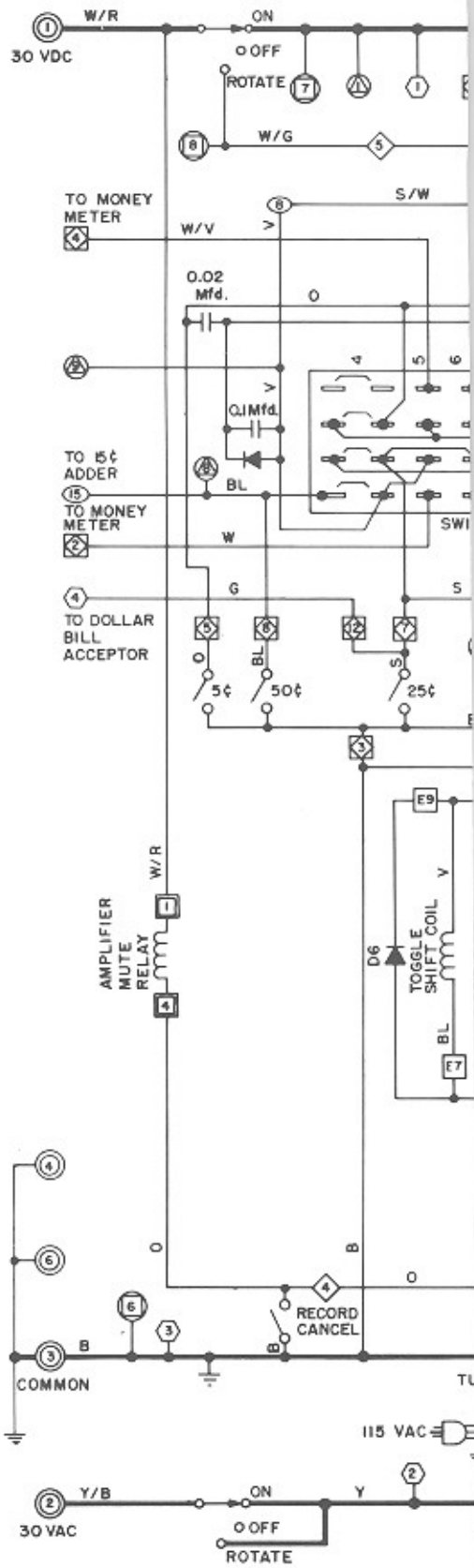


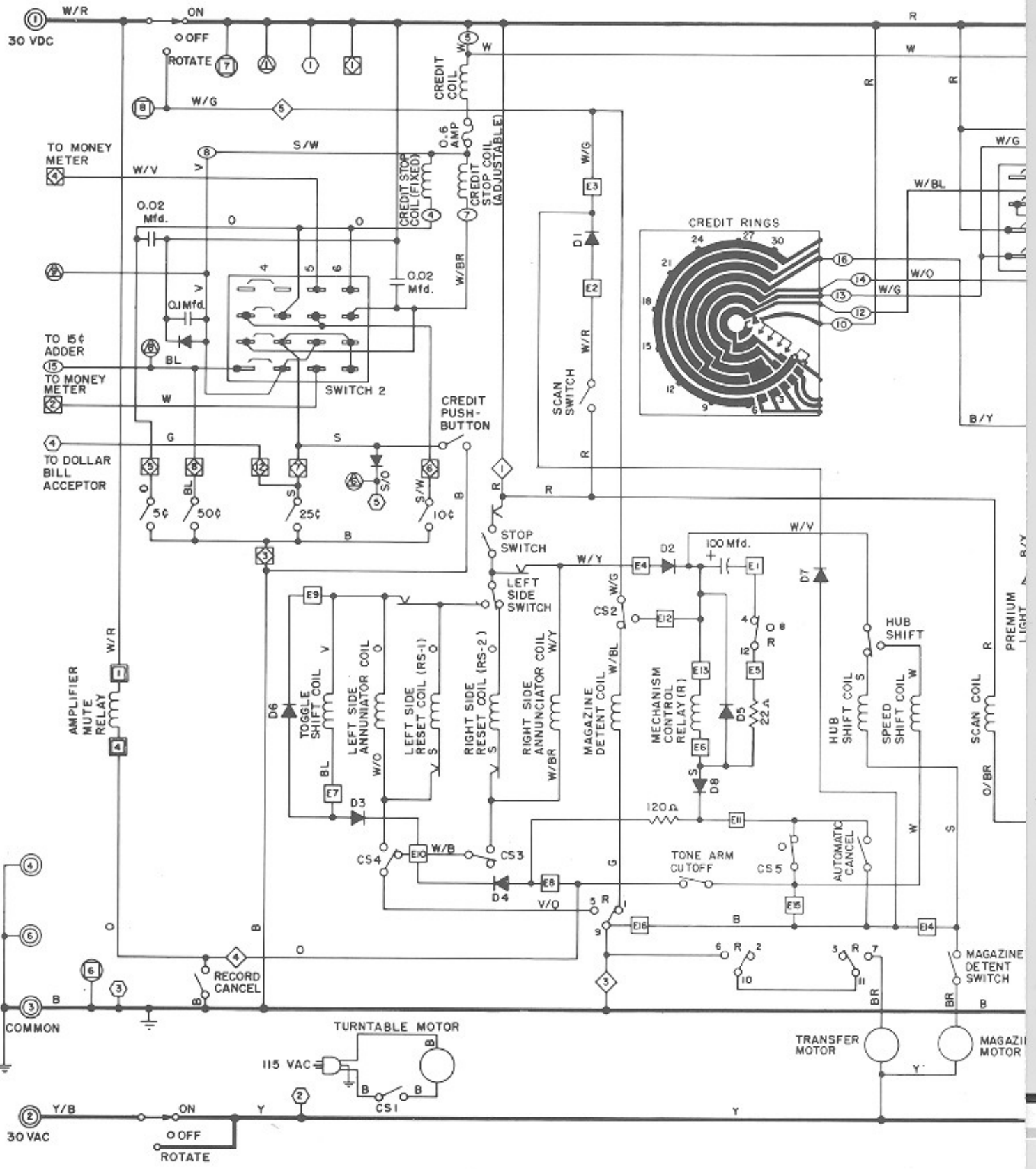
# 16 RECORD REPLACED IN MAGAZINE, MAGAZINE SCANS

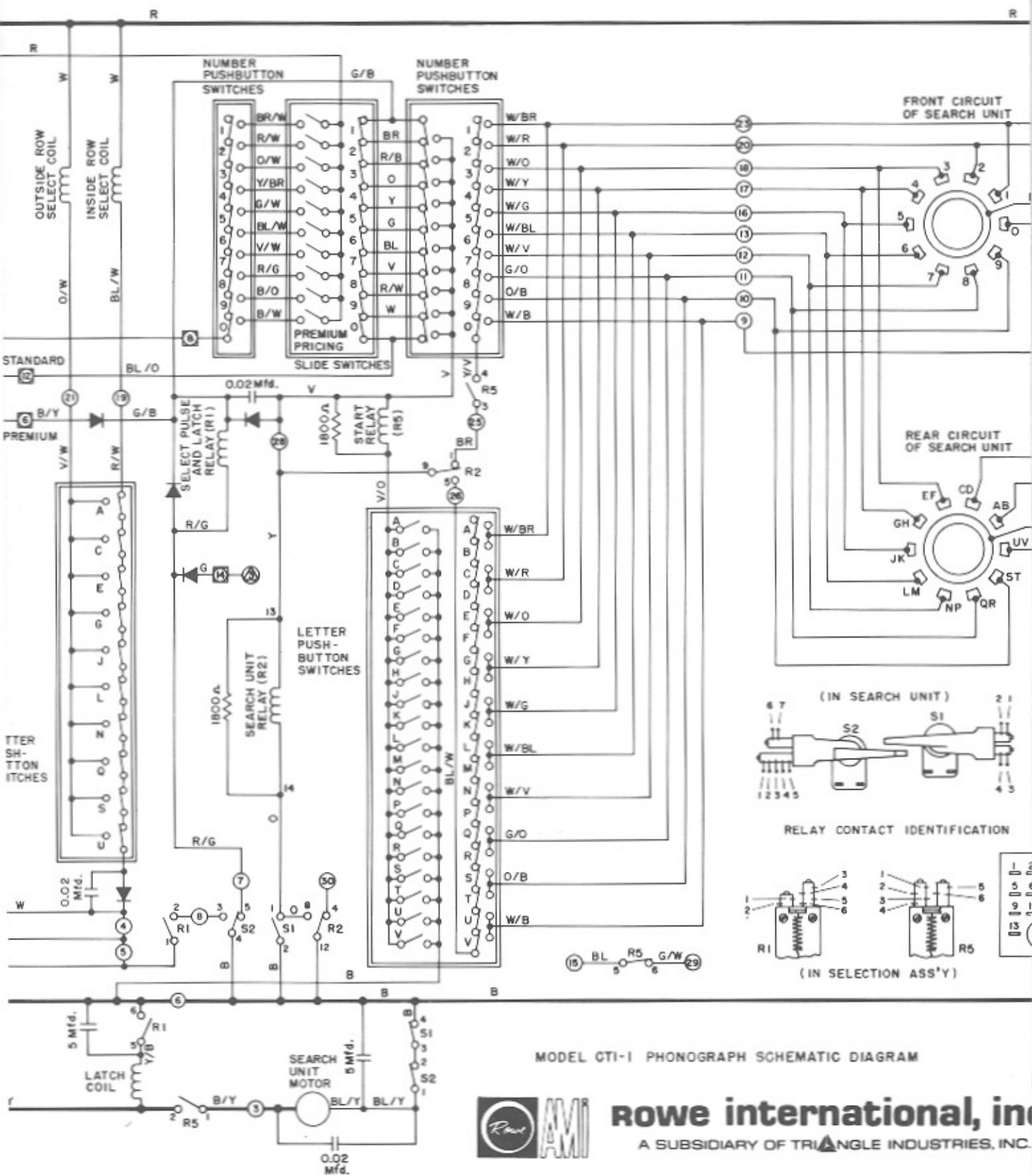


1. As the transfer arm places the record in the magazine, the cam operates cam switches CS-1 and CS-2.
2. Cam switch CS-1 deenergizes the turntable motor.
3. Cam switch CS-2 deenergizes mechanism control relay R and the hub shift coil and operates the detent switch.
4. The magazine motor operates until the scan control switch or stop switch operates.

**FOR THIS SECTION, SELECT VIEW(TOP TOOL  
BAR),THEN CLICK ON PAGE LAYOUT,THEN  
FACING**



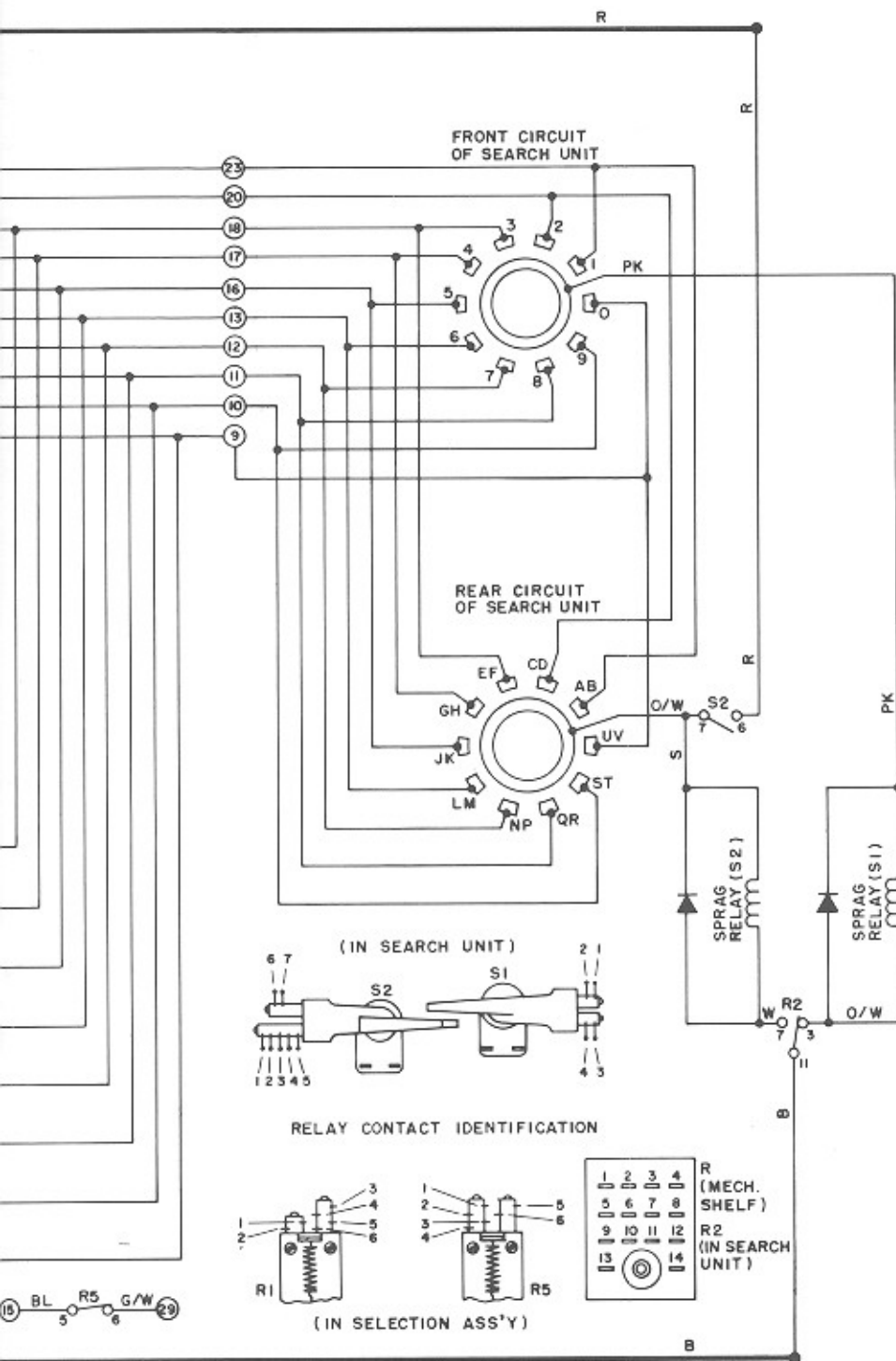




MODEL CTI-1 PHONOGRAPH SCHEMATIC DIAGRAM



**rowe international, inc**  
 A SUBSIDIARY OF TRIANGLE INDUSTRIES, INC.



**CONNECTOR IDENTIFICATION**

- 50¢ BONUS PLUG
- MECHANISM TERMINAL BOARD TERMINALS
- MAIN PHONO HARNESS TO MECHANISM
- SEARCH UNIT EDGE CONNECTOR
- MAIN HARNESS TO SELECTOR ASS'Y
- CREDIT UNIT EDGE CONNECTOR
- COIN SWITCHES TO MAIN HARNESS
- MAIN HARNESS TO DOLLAR BILL ACCEPTOR
- AMPLIFIER
- JUNCTION BOX
- STOP SWITCH SLIP RINGS
- CAM SWITCH (MECH.)
- WALL BOX POWER SUPPLY

**WIRE COLOR CODE**

- B - BLACK
- BL - BLUE
- BR - BROWN
- G - GREEN
- O - ORANGE
- PK - PINK
- R - RED
- S - SLATE
- V - VIOLET
- W - WHITE
- Y - YELLOW

EL CTI-1 PHONOGRAPH SCHEMATIC DIAGRAM

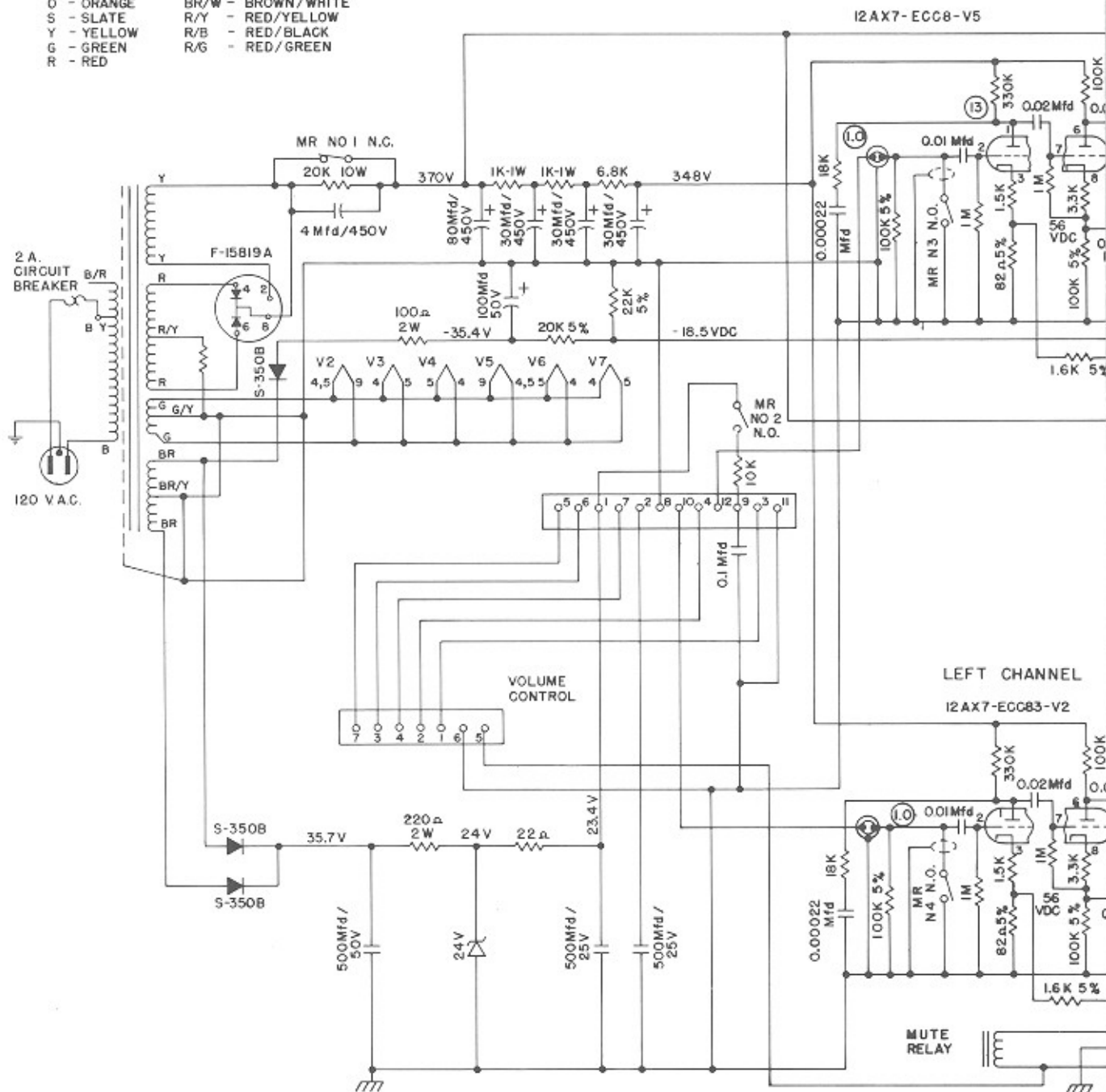
**Rowe international, inc.**  
A SUBSIDIARY OF TRIANGLE INDUSTRIES, INC.

FIGURE 4-1. CTI-1 PHONOGRAPH SCHEMATIC DIAGRAM

STEREO POWER AMPLIFIER  
SCHEMATIC DIAGRAM

WIRE COLOR CHART

BL - BLUE	W - WHITE
BR - BROWN	G/W - GREEN/WHITE
B - BLACK	BL/W - BLUE/WHITE
O - ORANGE	BR/W - BROWN/WHITE
S - SLATE	R/Y - RED/YELLOW
Y - YELLOW	R/B - RED/BLACK
G - GREEN	R/G - RED/GREEN
R - RED	



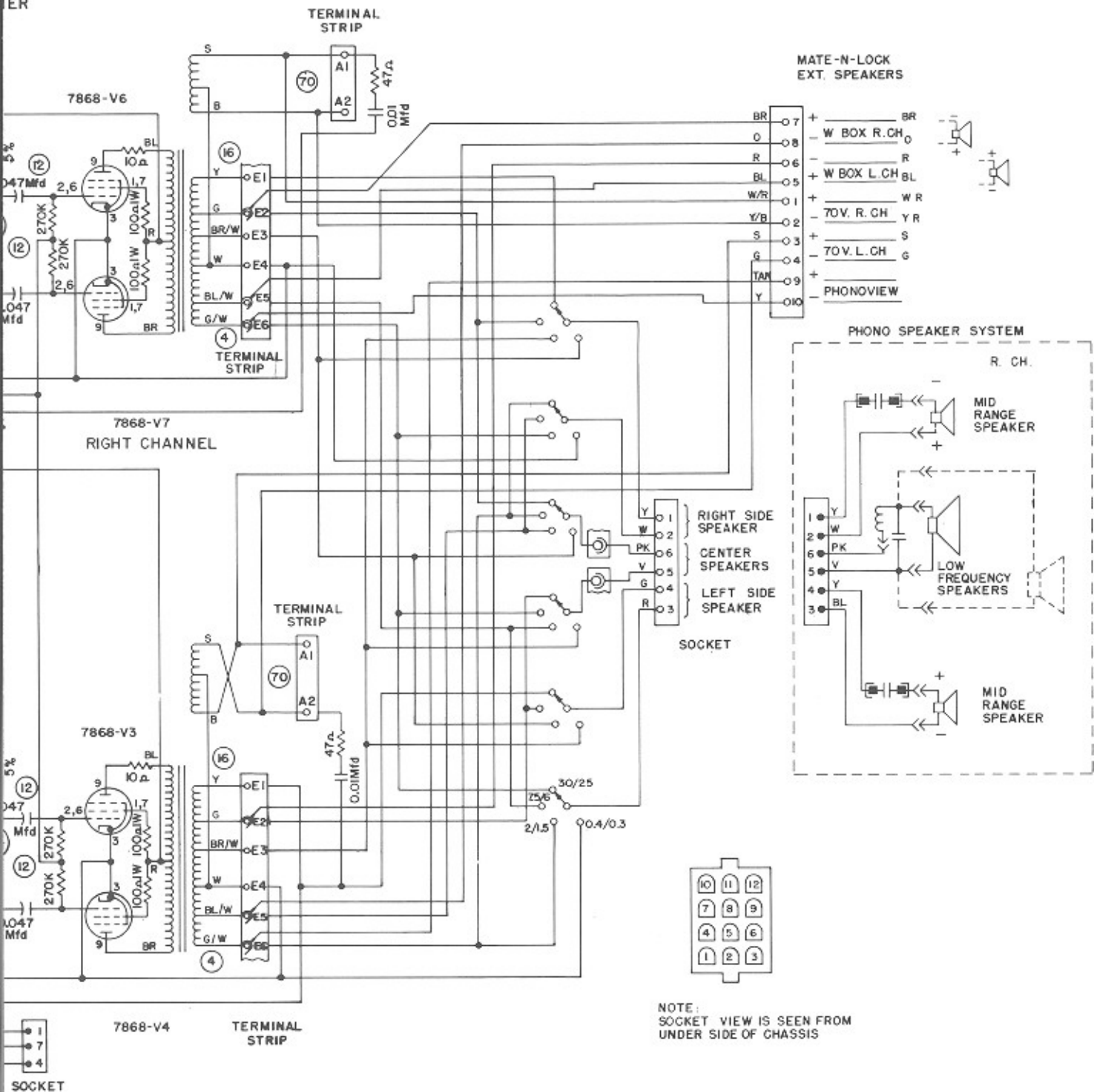
D.C. VOLTAGE READINGS

		PIN #1	PIN #2	PIN #3	PIN #4	PIN #5	PIN #6	PIN #7	PIN #8	PIN #9
V1	5U4GB		370		320 VAC		320 VAC		370	
V2	I2AX7-ECC83	130	0	1.0			277	-	60	
V3	7868	370	-16.2	0			-16.2	370		369
V4	7868	370	-16.2	0			-16.2	370		369
V5	I2AX7-ECC83	130	0	1.0			277	-	60	
V6	7868	370	-16.2	0			-16.2	370		369
V7	7868	370	-16.2	0			-16.2	370		369

NOTE:

UNLESS OTHERWISE SPECIFIED,  
WITH A 20,000 Ω  
LINE VOLTAGE TO  
D.C. MEASUREMENT  
SIGNAL VOLTAGES  
SIGNAL INPUT TO  
CAPACITANCE IS IN  
RESISTANCE IS IN  
CAPACITOR VOLTAGE  
RESISTORS ARE IN  
POWER LEVEL SW

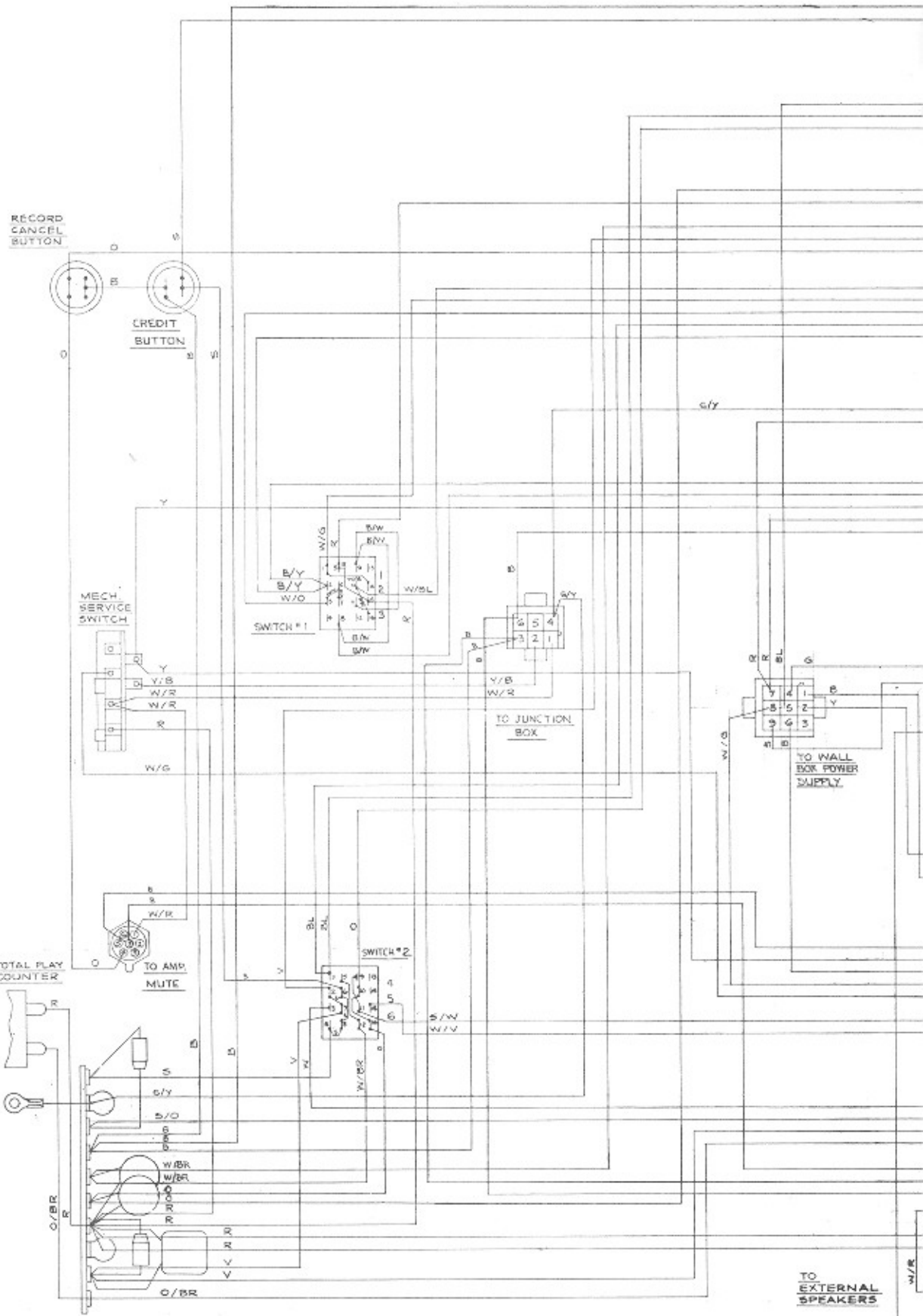




NOTE:  
 SOCKET VIEW IS SEEN FROM  
 UNDER SIDE OF CHASSIS

ALL VOLTAGES INDICATED, D.C. VOLTAGES ARE MEASURED TO CHASSIS  
 RMS PER VOLT METER WITH NO SIGNAL INPUT.  
 ALL VOLTAGES ARE 120 VOLTS.  
 ALL MEASUREMENTS TAKEN WITH NO OTHER UNIT PLUGGED INTO THE R-2620  
 ALL VOLTAGES ARE ENCIRCLED (1.0) AND ARE MEASURED TO GROUND WITH AN A.C. V.T.V.M.  
 ALL MEASUREMENTS ARE AT 1,000 CPS.  
 ALL CAPACITORS ARE IN MFD UNLESS OTHERWISE INDICATED.  
 ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE INDICATED.  
 ALL POWER RATINGS 500V, MINIMUM UNLESS OTHERWISE INDICATED.  
 ALL TOLERANCES ARE 1/2 WATT AND 10% TOLERANCE UNLESS OTHERWISE INDICATED.  
 ALL SWITCHES SHOWN IN MAXIMUM POWER POSITION.

R-4359A-Q-2 (D)



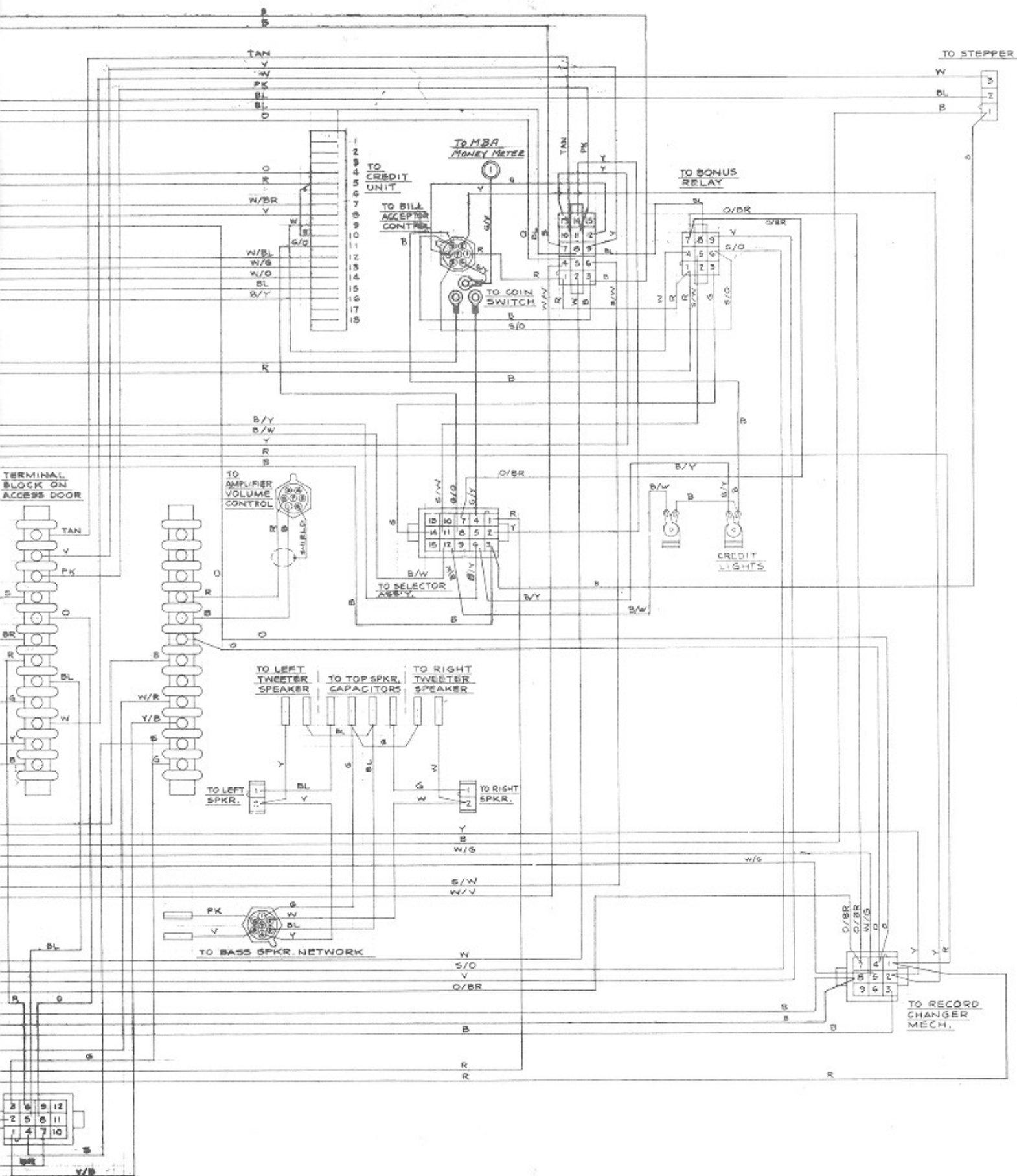
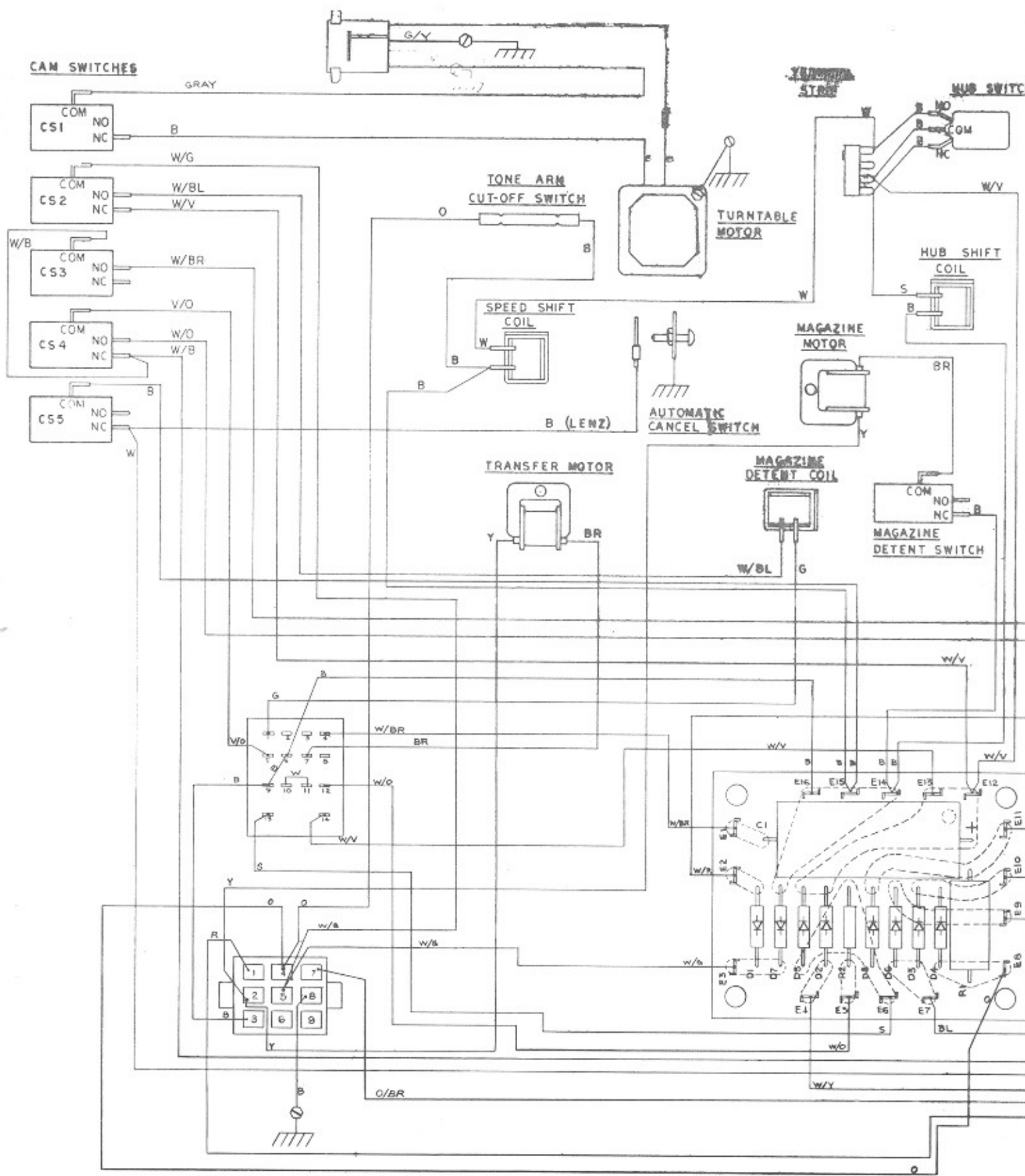
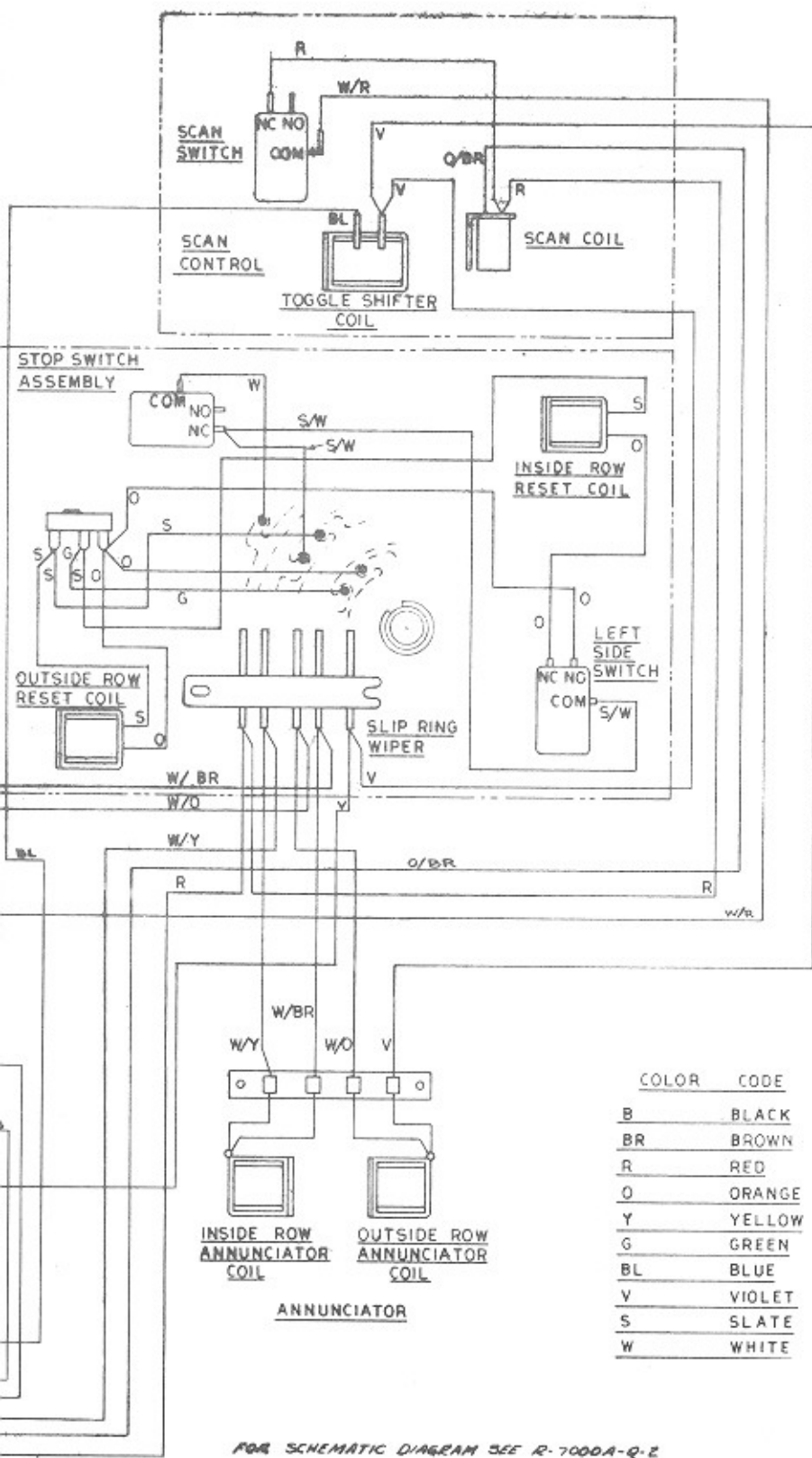


FIGURE 4-3. PHONOGRAPH HARNESS WIRING DIAGRAM





COLOR	CODE
B	BLACK
BR	BROWN
R	RED
O	ORANGE
Y	YELLOW
G	GREEN
BL	BLUE
V	VIOLET
S	SLATE
W	WHITE

*IN ALL TWO COLOR WIRES, THE FIRST COLOR IS THE BASIC COLOR OF THE WIRE AND THE SECOND COLOR IS THE STRIPE OR HASH MARK.*

*EXAMPLE:  
W/R IS WHITE WIRE WITH RED MARKING.*

FIGURE 4-4. RECORD CHANGER WIRING DIAGRAM

601-03758

## Pre-Amplifier Assembly (2 Wire Volume C)

COMPONENT REF DESIGNATION	DESCRIPTION	ROWE PART NO.
C1R, C1L	Capacitor, Mylar, 0.47 MFD, 100V	701-00240
C2R, C2L	Capacitor, Mylar, 0.022 MFD, 100V	702-00241
C3R, C3L	Capacitor, Mylar, 0.012 MFD, 100V	703-00241
C4R, C4L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C5R, C5L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C6R, C6L	Capacitor, Electrolytic, 5MFD, 25V	702-00233
C7R, C7L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C8R, C8L	Capacitor, Mylar, 0.022 MFD, 100V	704-00240
C9R, C9L	Capacitor, Mylar, 0.01 MFD, 100V	707-00240
C10R, C10L	Capacitor, Ceramic Disc, 0.0022 MFD, 100V	703-00224
C11R, C11L	Capacitor, Ceramic Disc, 0.001 MFD, 100V	702-00224
C12R, C12L	Capacitor, Ceramic Disc, 0.0018 MFD, 100V	712-00224
C13R, C13L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C14R, C14L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C15R, C15L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C16R, C16L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C17R, C17L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C18R, C18L	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C19R, C19L	Capacitor, Mylar, 0.0047 MFD, 100V	716-00240
C20R, C20L	Capacitor, Mylar, 0.01 MFD, 100V	707-00240
C21R, C21L	Capacitor, Mylar, 0.033 MFD, 100V	710-00240
C22R, C22L	Capacitor, Ceramic Disc, 0.0047 MFD, 100V	704-00224
C23R, C23L	Capacitor, Electrolytic, 5 MFD, 25V	702-00233
C24	Capacitor, Tantalum, 47 MFD, 15V	702-00251
C25	Capacitor, Tantalum, 33 MFD, 4V	Alternate 702-00250 701-00251
C26	Capacitor, Electrolytic, 100 MFD, 25V	Alternate 706-00233
C27	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
C28	Capacitor, Electrolytic, 5 MFD, 25V	702-00233
C29	Capacitor, Mylar, 0.1 MFD, 100V	702-00240
D1R, D1L	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D2R, D2L	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D3R, D3L	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D4R, D4L	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D5	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D6	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D7	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D8	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D9	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D10	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D11	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D12	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D13	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D14	Diode, Silicon, (G.E. & ITT No. CD-8502)	707-00350
D15	Diode, Germanium (1N191, ITT, Sylvania, Gen'l Instr.)	701-00351
R1R, R1L	Resistor, Carbon, 5.6K $\pm$ 5%, 1/2 W	718-00106
R2R, R2L	Resistor, Carbon, 2.2 Meg, 1/2 W	704-00102
R3R, R3L	Resistor, Carbon, 27 K, 1/2 W	724-00104
R4R, R4L	Resistor, Carbon, 10 K, 1/2 W	713-00102
R5R, R5L	Resistor, Carbon, 15 K $\pm$ 5%, 1/2 W	716-00106
R6R, R6L	Resistor, Carbon, 1.8 Meg, 1/2 W	708-00121
R7R, R7L	Resistor, Carbon, 4.7K, 1/2 W	708-00104
R8R, R8L	Resistor, Carbon, 3.9K $\pm$ 5%, 1/2 W	725-00104
R9R, R9L	Resistor, Carbon, 560 Ohm $\pm$ 5%, 1/2 W	703-00104
R10R, R10L	Resistor, Carbon, 120 K, 1/2 W	703-00106
R12R, R12L	Resistor, Carbon, 1 Meg, 1/2 W	706-00102
R13R, R13L	Resistor, Carbon, 1 Meg, 1/2 W	706-00102

# Control)

COMPONENT REF.  
DESIGNATION

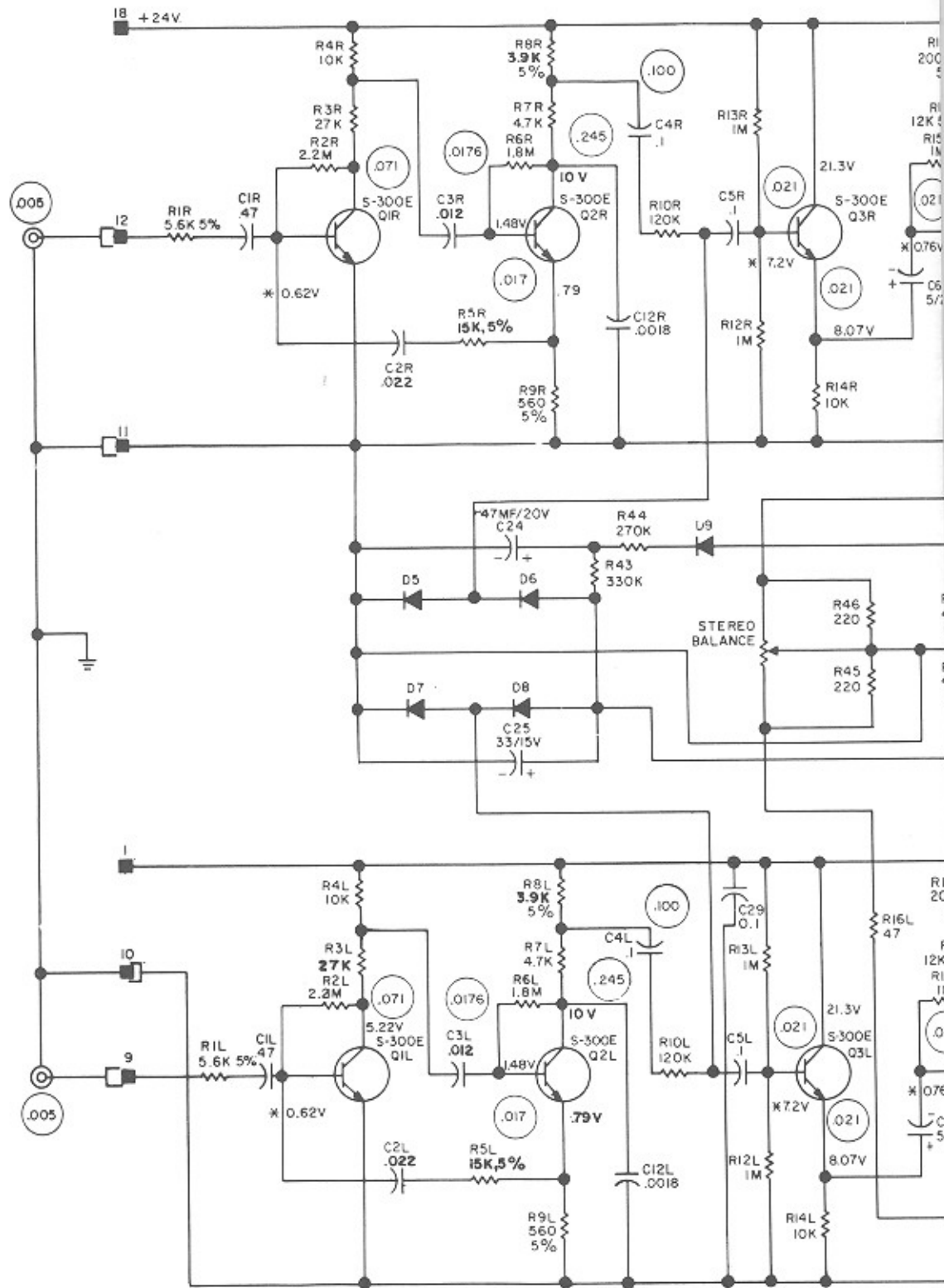
DESCRIPTION

ROWE  
PART NO.

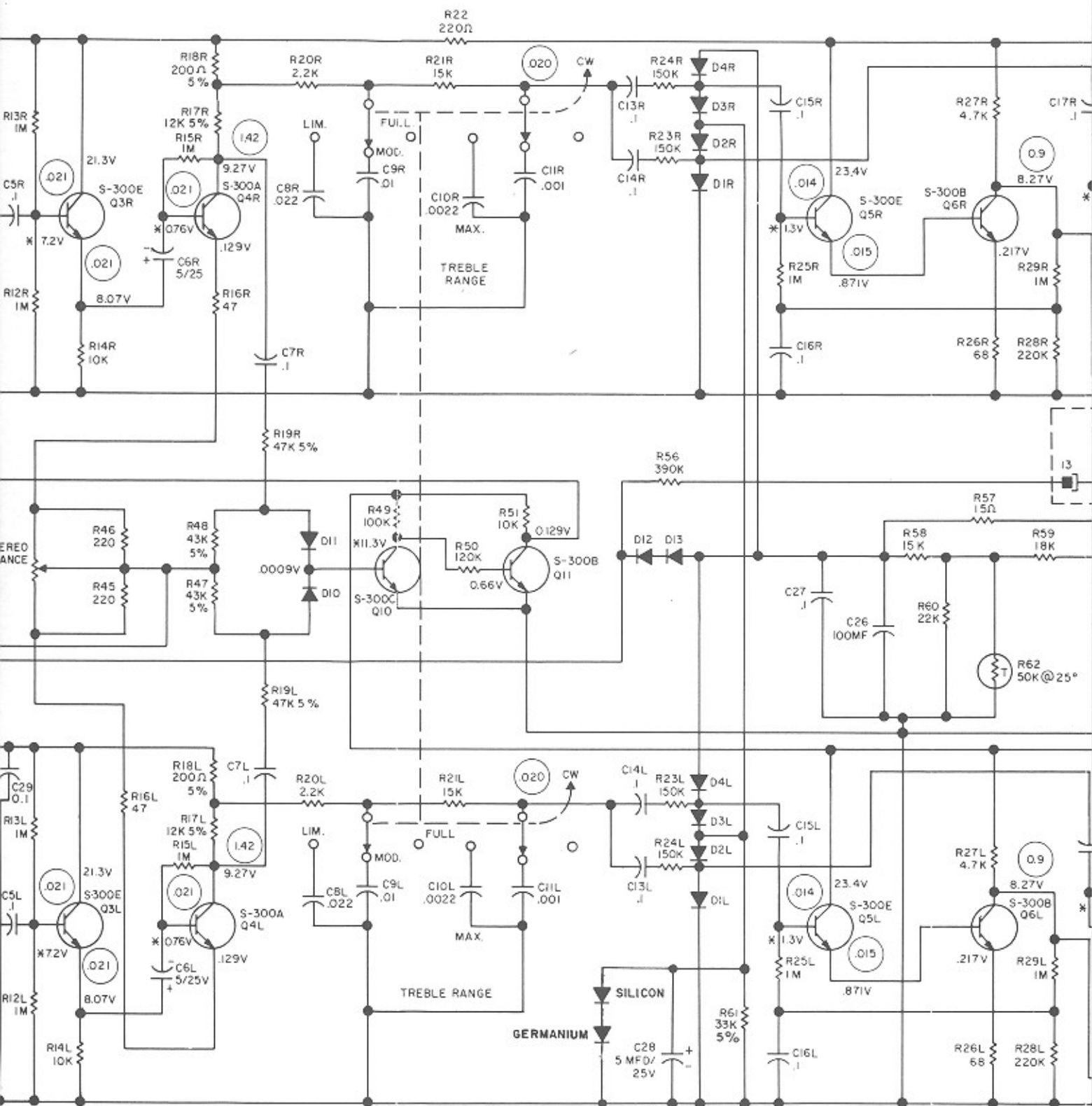
R14R, R14L	Resistor, Carbon, 10 K, 1/2 W	713-00102
R15R, R15L	Resistor, Carbon, 1 Meg, 1/2 W	706-00102
R16R, R16L	Resistor, Carbon, 47 Ohm, 1/2 W	708-00120
R17R, R17L	Resistor, Carbon, 12 K 5%, 1/2 W	714-00107
R18R, R18L	Resistor, Carbon, 200 Ohm $\pm 5\%$ , 1/2 W	701-00109
R19R, R19L	Resistor, Carbon, 47 K $\pm 5\%$ , 1/2 W	701-00102
R20R, R20L	Resistor, Carbon, 2.2 K, 1/2 W	710-00102
R21R, R21L	Resistor, Carbon, 15 K, 1/2 W	708-00106
R22	Resistor, Carbon, 220 Ohm, 1/2 W	711-00106
R23R, R23L	Resistor, Carbon, 150 K, 1/2 W	702-00102
R24R, R24L	Resistor, Carbon, 150K, 1/2 W	702-00102
R25R, R25L	Resistor, Carbon, 1 Meg, 1/2 W	706-00102
R26R, R26L	Resistor, Carbon, 68 Ohm, 1/2 W	719-00102
R27R, R27L	Resistor, Carbon, 4.7 K 1/2 W	708-00104
R28R, R28L	Resistor, Carbon, 220 K, 1/2 W	707-00102
R29R, R29L	Resistor, Carbon, 1 Meg, 1/2 W	706-00102
R30R, R30L	Resistor, Carbon, 1 Meg, 1/2 W	706-00102
R31R, R31L	Resistor, Carbon, 68 Ohm, 1/2 W	719-00102
R32R, R32L	Resistor, Carbon, 4.7 K, 1/2 W	708-00104
R33R, R33L	Resistor, Carbon, 1 Meg, 1/2 W	706-00102
R34R, R34L	Resistor, Carbon, 220 K, 1/2 W	707-00102
R36R, R36L	Resistor, Carbon, 150 K, 1/2 W	702-00102
R38R, R38L	Resistor, Carbon, 270K, 1/2 W	704-00107
R39R, R39L	Resistor, Carbon, 33 K, 1/2 W	707-00106
R41R, R41L	Potentiometer, Linear, 10K (Stackpole No.20C; CTS No. X-201) with Resistor, Carbon, 6.8K, 1/2W	705-00400 718-00104
R42R, R42L	Resistor, Carbon, 4.7K, 1/2 W	708-00104
R43	Resistor, Carbon, 330K, 1/2 W	712-00102
R44	Resistor, Carbon, 270 K, 1/2 W	704-00107
R45, R46	Resistor, Carbon, 220 Ohm, 1/2 W	711-00106
R47, R48	Resistor, Carbon, 43K $\pm 5\%$ , 1/2 W	722-00120
R49	Resistor, Carbon, 100 K, 1/2 W	718-00102
R50	Resistor, Carbon, 120 K, 1/2 W	703-00106
R51	Resistor, Carbon, 10 K, 1/2 W	713-00102
R52	Potentiometer, Linear, 200 Ohm	200-13023
R56	Resistor, Carbon, 390 K, 1/2 W	722-00106
R57	Resistor, Carbon, 15 Ohm, 1/2 W	702-00120
R58	Resistor, Carbon, 15 K, 1/2 W	708-00106
R59	Resistor, Carbon, 18 K, 1/2 W	708-00102
R60	Resistor, Carbon, 22 K, 1/2 W	711-00104
R61	Resistor, Carbon, 33 K $\pm 5\%$ , 1/2 W	714-00106
R62	Thermistor, 51 K @ 25° C (Keystone Carbon Co. No.RL2006-26900-150-S2)	701-00370
Q1R, Q1L	Transistor, Silicon, NPN(Sprague Elec. TZ-1205; Motorola SPS 1481; G.E. X32B4683)	705-00300
Q2R, Q2L	Transistor, Silicon, NPN(Sprague Elec. TZ-1205; Motorola SPS 1481; G.E. X32B4683)	705-00300
Q3R, Q3L	Transistor, Silicon, NPN(Sprague Elec. TZ-1205; Motorola SPS 1481; G.E. X32B4683)	705-00300
Q4R, Q4L	Transistor, Silicon, NPN (G.E. X3284680; Motorola SPS6978)	701-00300
Q5R, Q5L	Transistor, Silicon, NPN (G.E. X3284680; Motorola SPS6978)	705-00300
Q6R, Q6L	Transistor, Silicon, NPN (See Q1R)	705-00300
Q7R, Q7L	Transistor, Silicon, NPN (See Q1R)	705-00300
Q8R, Q8L	Transistor, Silicon, NPN (G.E. X3284682; Motorola SPS6979)	702-00300
Q9R, Q9L	Transistor, Silicon, NPN (G.E. X3284686; Motorola SPS6980)	703-00300
Q10	Transistor, Silicon, NPN (G.E. X3284686; Motorola SPS6980)	703-00300
Q11	Transistor, Silicon, NPN (See Q8R)	702-00300

## Miscellaneous Parts

Switch, Rotary, 4 Pole, 3 Position, Non-Shorting(Treble Range Control)	200-13024
Switch, Rotary, 2 Pole, 3 Position, Non-Shorting, (Stereo Balance)	200-13025
Circuit Board, Pre-Amplifier	601-03788



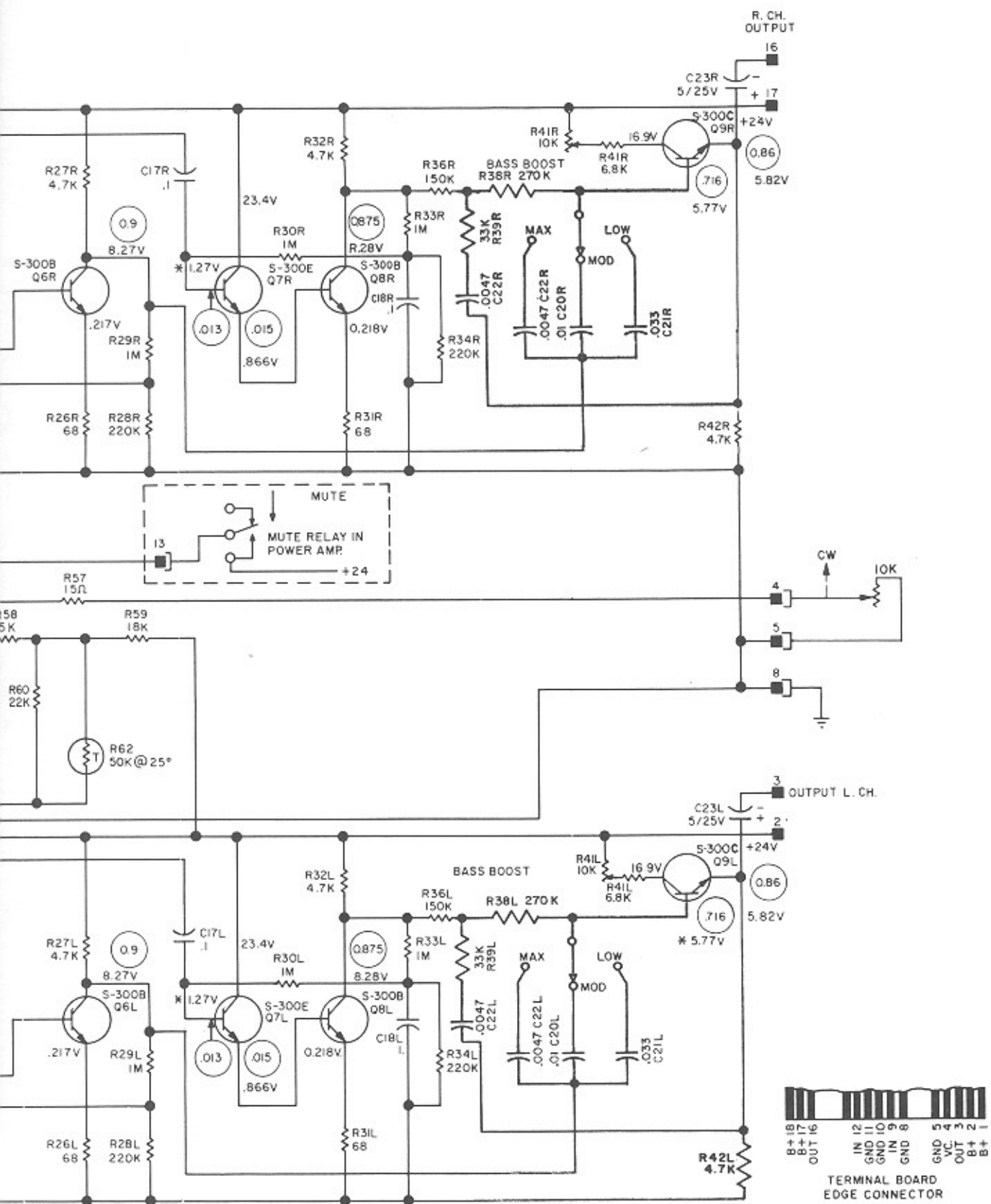




NOTES:

1. CAPACITOR RATINGS ARE 100V UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTORS ARE 1/2 WATT AND 10% TOLERANCE UNLESS OTHERWISE SPECIFIED.
3. CAPACITOR VALUES ARE IN MFD. UNLESS OTHERWISE SPECIFIED.
4. AC SIGNAL VOLTAGES (CIRCLED) ARE MEASURED TO CHASSIS WITH AN AC VTVM.
5. THE SIGNAL FREQUENCY IS 1KC, VOLUME CONTROL AT MAX.

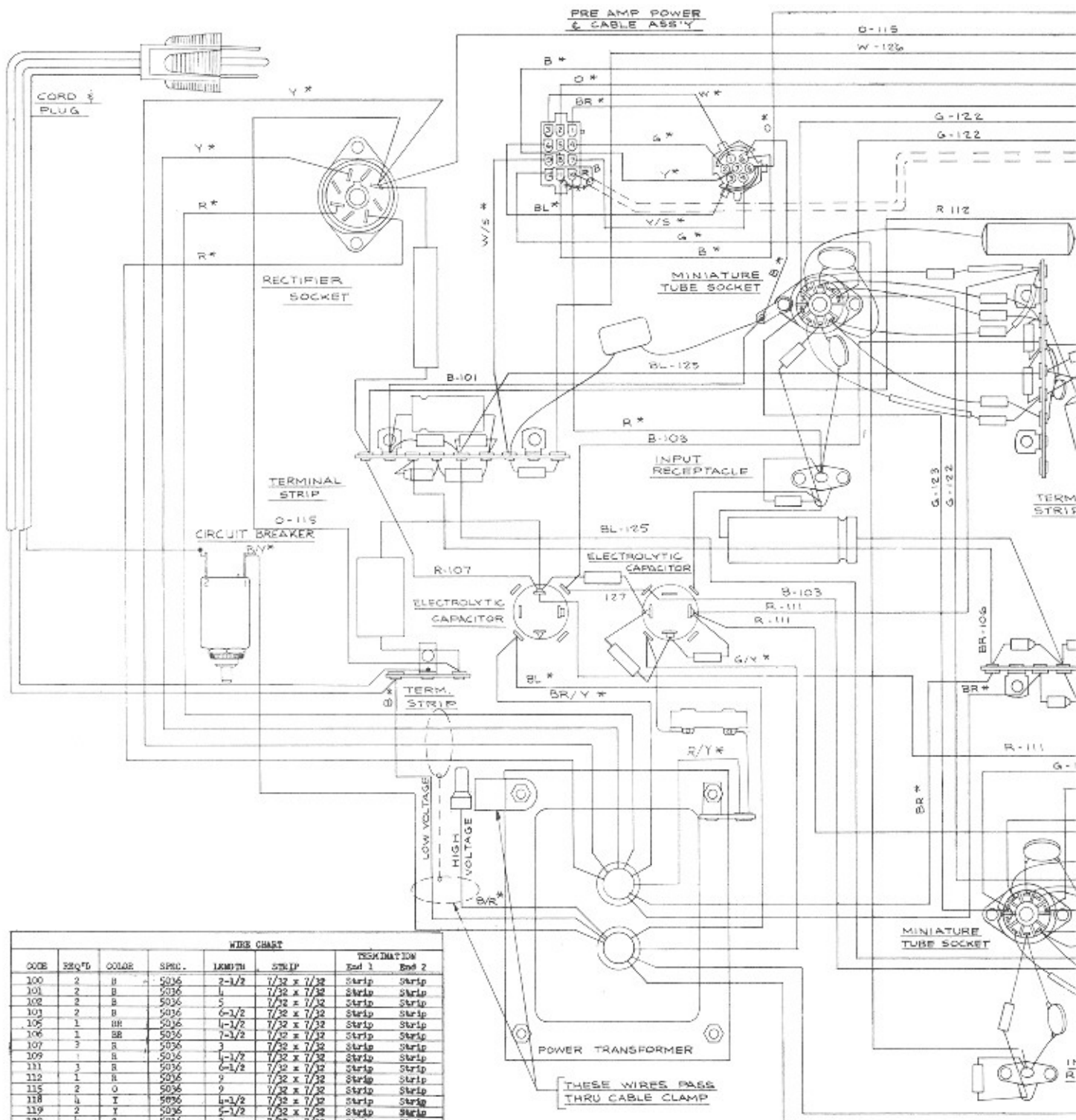
6. TREBLE RANGE CONTROL AT FULL AND E
7. DC VOLTAGES ARE AS INDICATED BY AN I APPROXIMATE FOR A 20,000 OHMS
8. NO INPUT SIGNAL.
9. \* INDICATES VOLTAGE SEVERELY A WITH 20,000 OHMS PER VOLT M



RANGE CONTROL AT FULL AND BOOST CONTROL AT MOD.  
 GAGES ARE AS INDICATED BY AN 11 MEGOHM VTVM AND ARE  
 APPROXIMATE FOR A 20,000 OHMS PER VOLT METER.  
 SIGNAL.  
 OUTPUT VOLTAGE SEVERELY AFFECTED BY LOADING  
 BY 20,000 OHMS PER VOLT METER.

FIGURE 4-5. PREAMPLIFIER SCHEMATIC DIAGRAM





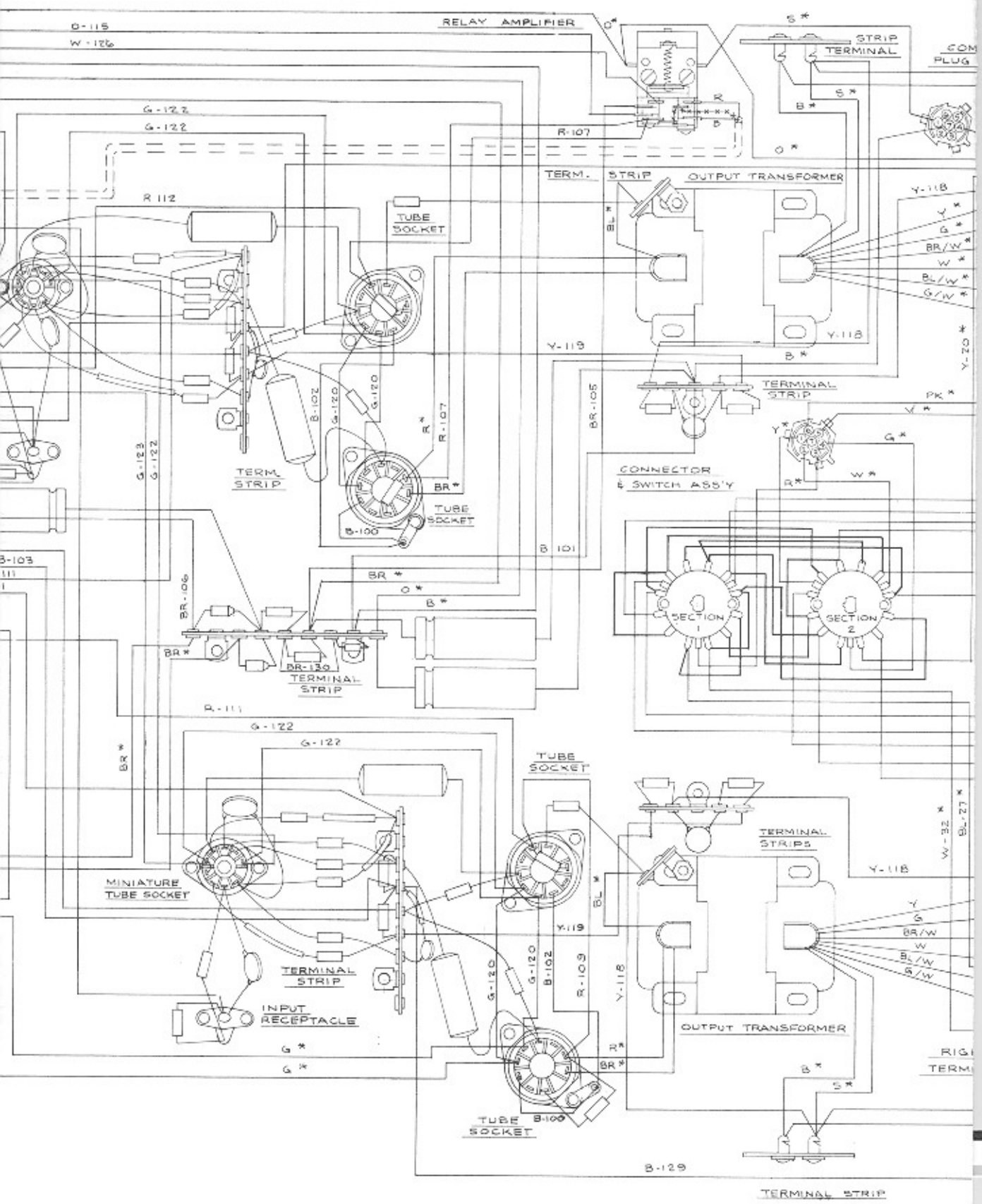
WIRE CHART

CODE	SQ#	COLOR	SPEC.	LENGTH	STRIP	TERMINATION	
						End 1	End 2
100	2	B	5036	2-1/2	7/32 x 7/32	Strip	Strip
101	2	B	5036	4	7/32 x 7/32	Strip	Strip
102	2	B	5036	5	7/32 x 7/32	Strip	Strip
103	2	B	5036	6-1/2	7/32 x 7/32	Strip	Strip
105	1	BR	5036	4-1/2	7/32 x 7/32	Strip	Strip
106	1	BR	5036	7-1/2	7/32 x 7/32	Strip	Strip
107	3	R	5036	3	7/32 x 7/32	Strip	Strip
109	1	B	5036	1-1/2	7/32 x 7/32	Strip	Strip
111	3	R	5036	6-1/2	7/32 x 7/32	Strip	Strip
112	1	R	5036	9	7/32 x 7/32	Strip	Strip
115	2	O	5036	9	7/32 x 7/32	Strip	Strip
118	4	T	5036	4-1/2	7/32 x 7/32	Strip	Strip
119	2	T	5036	5-1/2	7/32 x 7/32	Strip	Strip
120	4	O	5036	3	7/32 x 7/32	Strip	Strip
122	5	O	5036	6	7/32 x 7/32	Strip	Strip
123	1	O	5036	6	3/8 x 3/8	Strip	Strip
125	2	BL	5036	8-1/2	7/32 x 7/32	Strip	Strip
126	1	W	5036	8	7/32 x 7/32	Strip	Strip
129	2	B	5036	8-3/4	7/32 x 7/32	Strip	Strip
130	1	BL	5036	2	7/32 x 7/32	Strip	Strip
1	1	BR	5040	1	7/32 x 7/32	3-285 J	Strip
1	1	W/S	5040	2	7/32 x 7/32	3-285 A	Strip
1	1	BR	5040	10	7/32 x 7/32	3-285 A	Strip
1	1	BR	5040	10	7/32 x 7/32	3-285 A	Strip
1	1	O	5040	10	7/32 x 7/32	3-285 A	Strip
1	1	S	5040	3-1/2	7/32 x 7/32	3-285 J	Strip
1	1	O	5040	3-1/2	7/32 x 7/32	3-285 J	Strip
1	1	O	5040	8	7/32 x 7/32	3-285 J	Strip
127	1	Bare	5032	1-1/2			
		Shield	Spec.		See	See	
	1	R	5002	7-1/2	See	Process	Information
	2	B	5040		1/2 x 1/4	For Use with Cable	
	1	R	5040	4	1/2 x 1/4	For Use with Cable	
	1	O	5040	9	1/2 x 1/4	For Use with Cable	

COLOR CODE

- B BLACK
- BR BROWN
- R RED
- O ORANGE
- Y YELLOW
- G GREEN
- BL BLUE
- V VIOLET
- S SLATE
- W WHITE
- PK PINK
- TAN
- B/R BLACK/RED
- B/Y BLACK/YELLOW
- BR/Y BROWN/YELLOW
- BR/W BROWN/WHITE
- R/Y RED/YELLOW
- Y/B YELLOW/BLACK
- Y/S YELLOW/SLATE
- G/Y GREEN/YELLOW
- G/W GREEN/WHITE
- W/R WHITE/RED
- W/S WHITE/SLATE

\*\*\*\*\* SHIELD



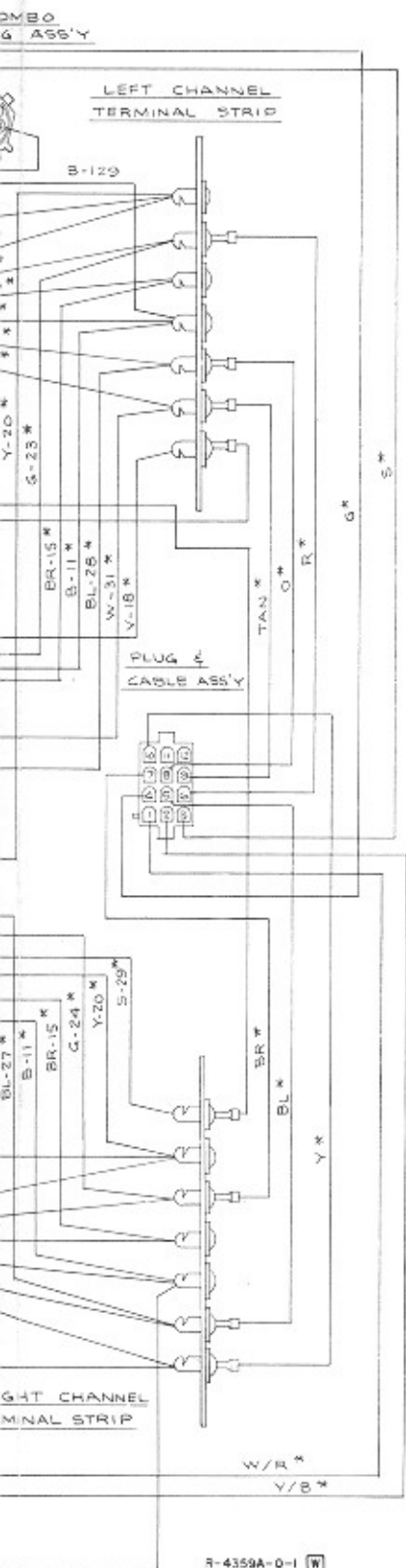
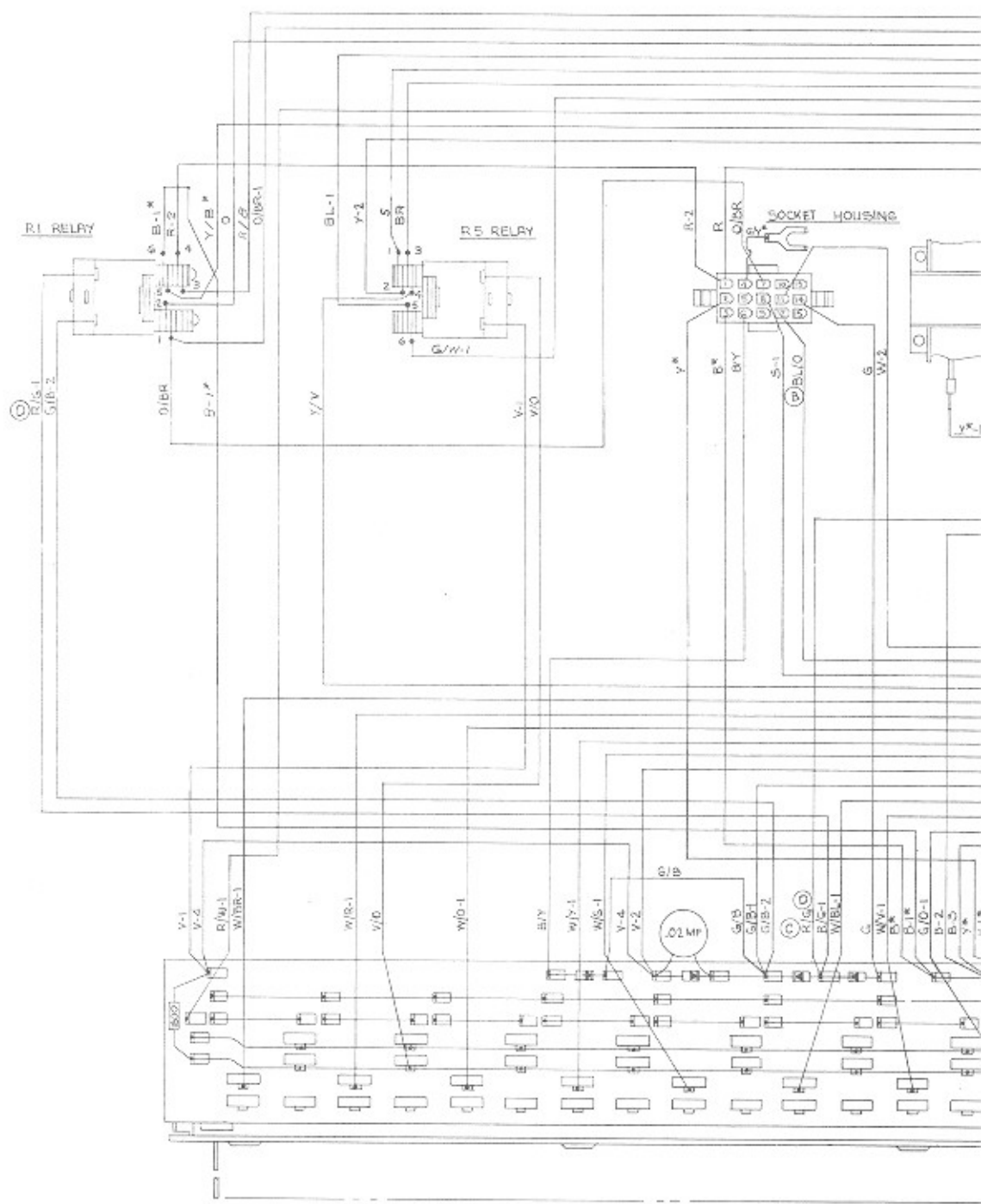


FIGURE 4-6. 50 WATT POWER AMPLIFIER WIRING DIAGRAM





PUSH BUTTON SWITCH-LETTER



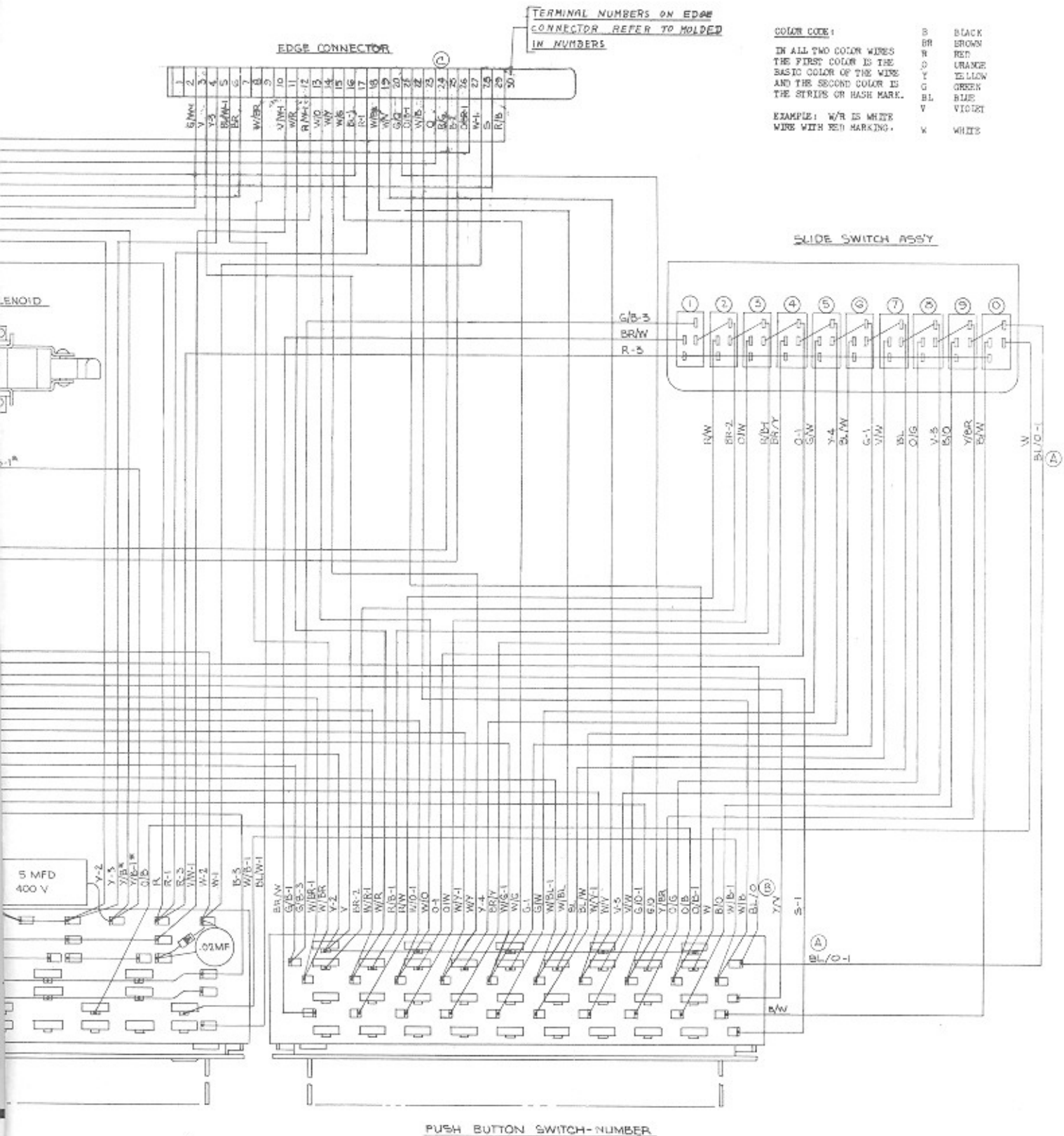
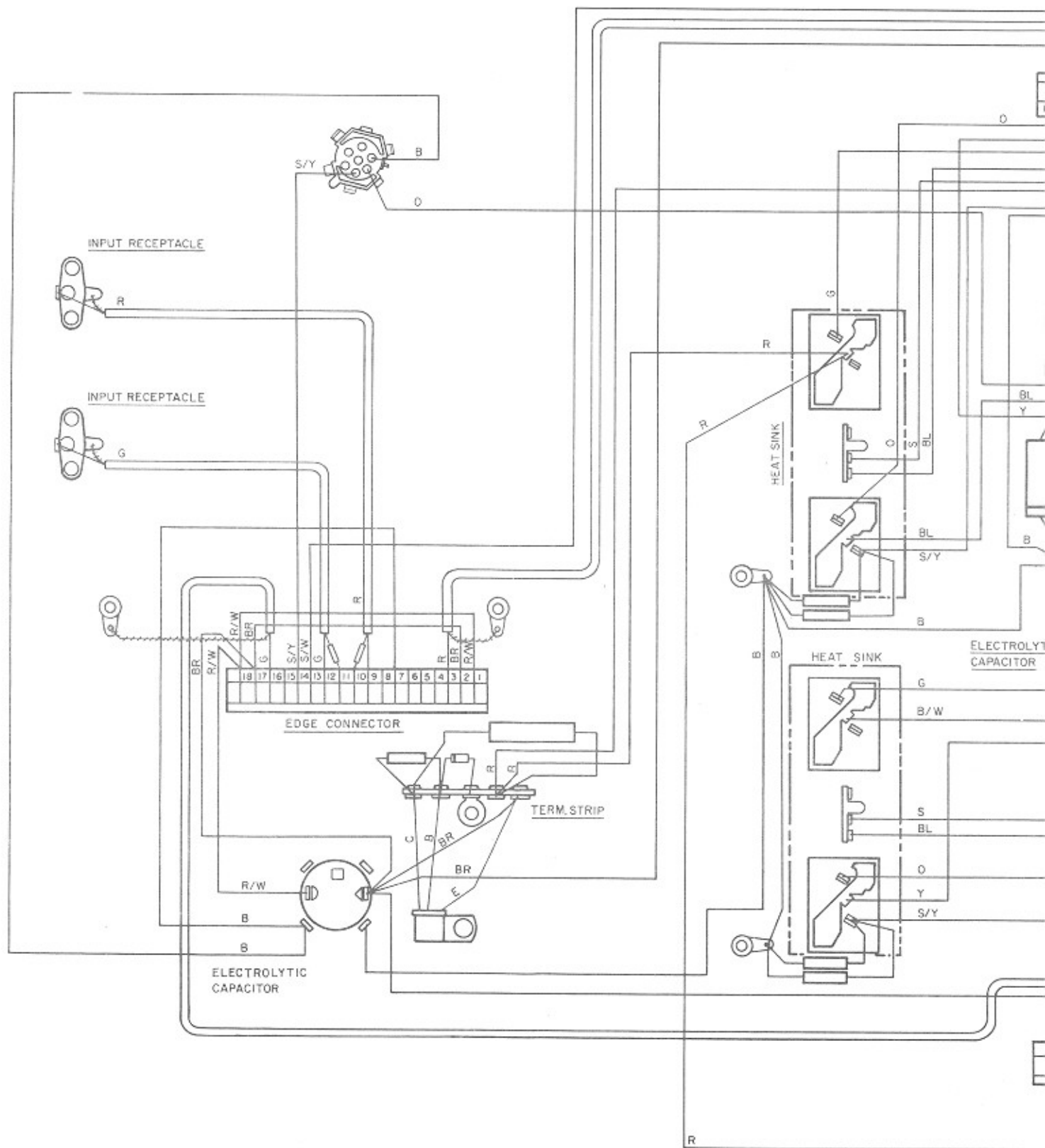


FIGURE 4-7. SELECTOR ASSEMBLY WIRING DIAGRAM



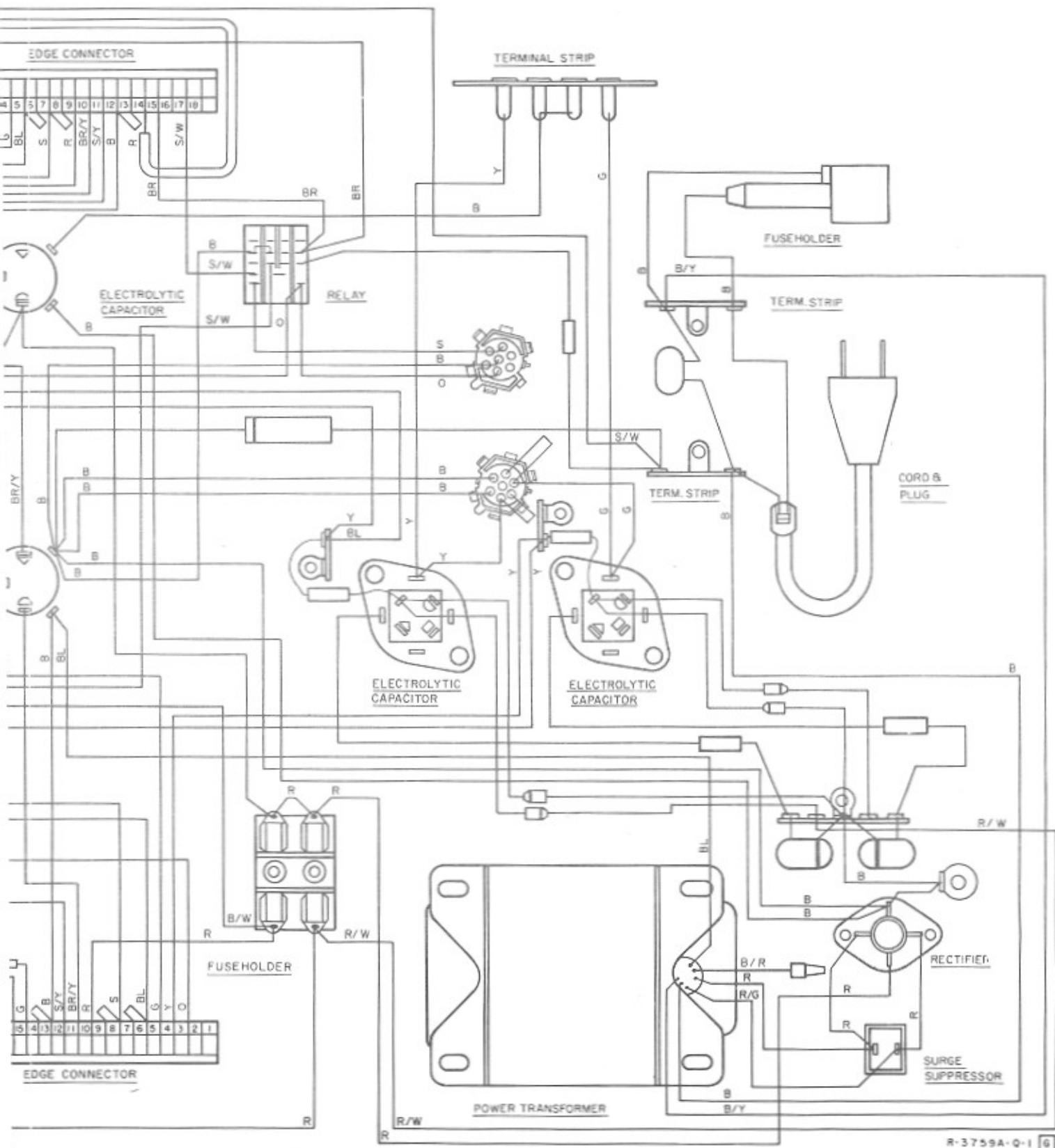
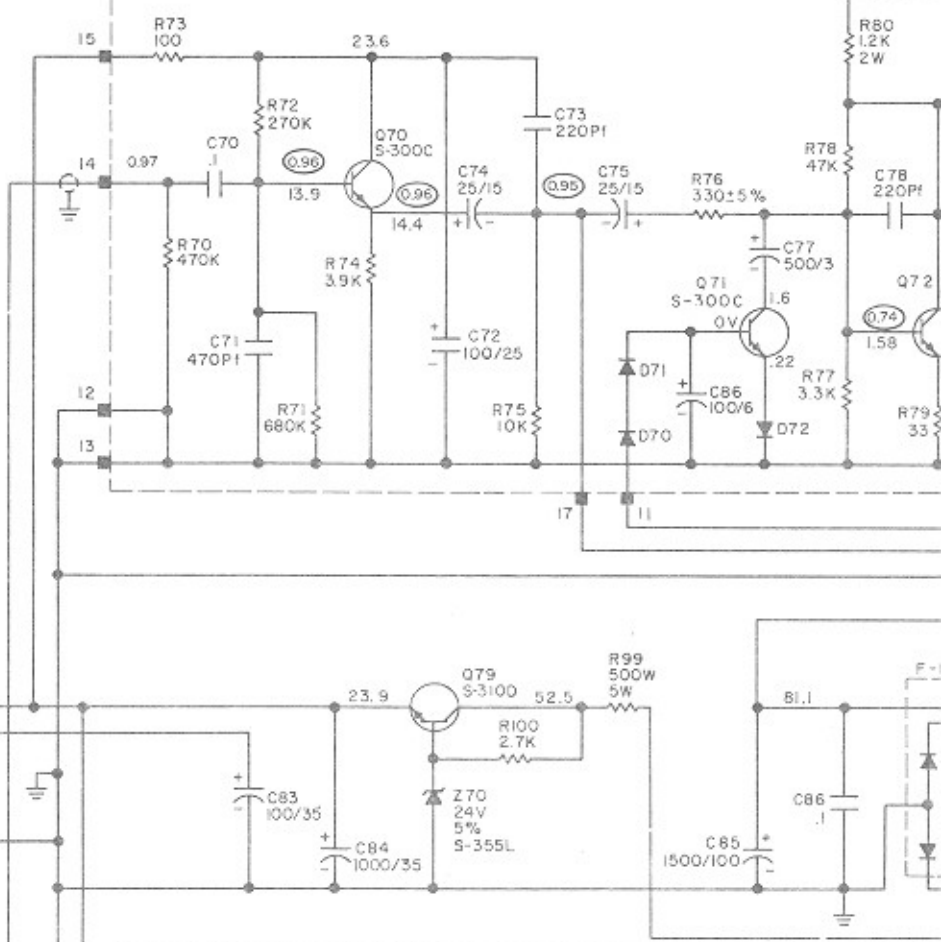
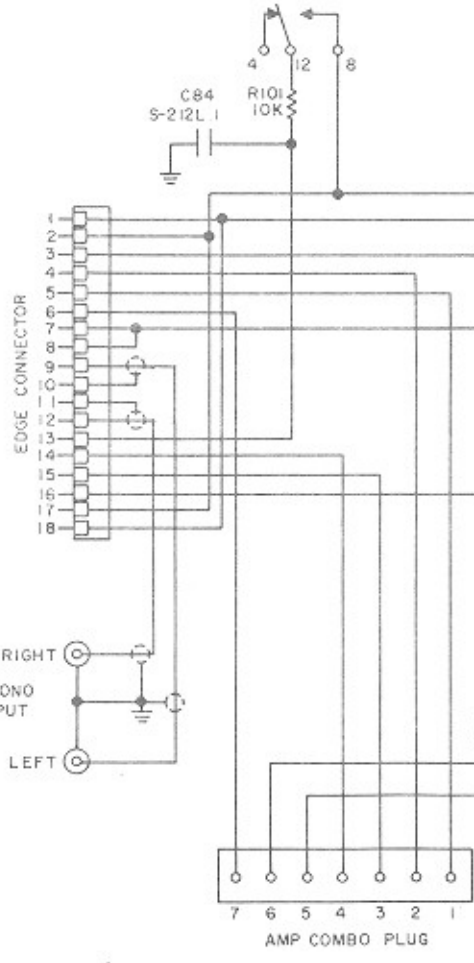
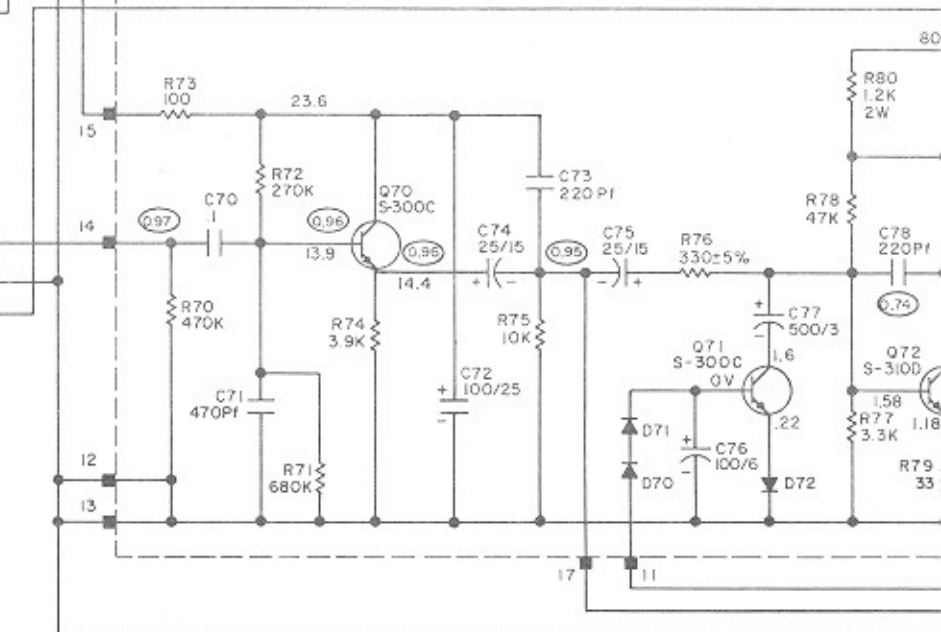


FIGURE 4-8. 100 WATT POWER AMPLIFIER WIRING DIAGRAM

40I-5702 DRIVER



40I-5702 DRIVER



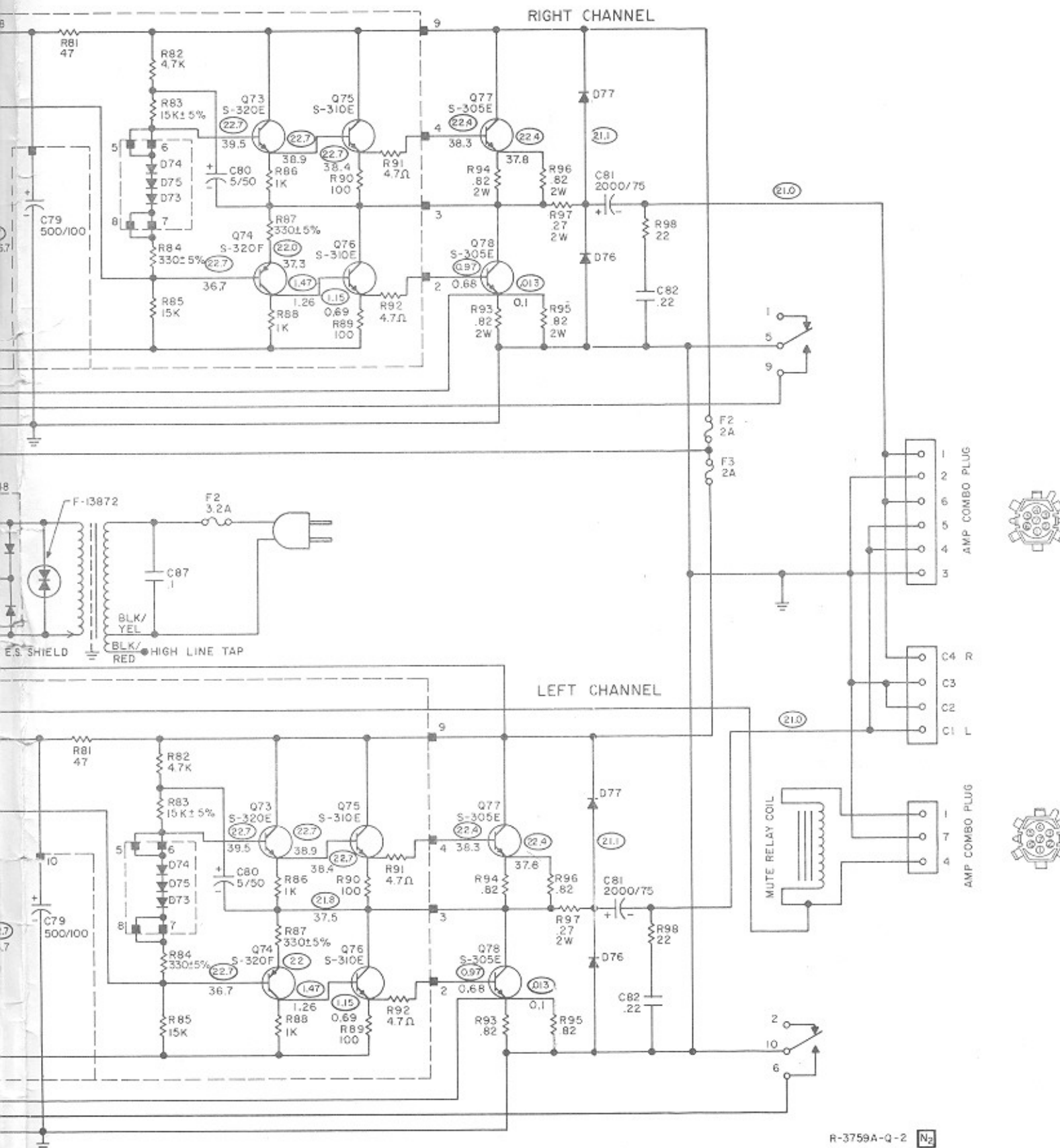
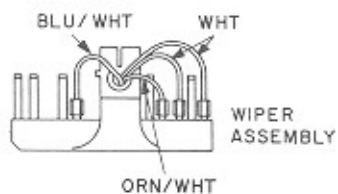
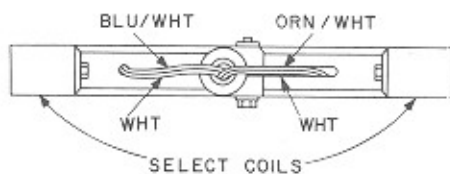
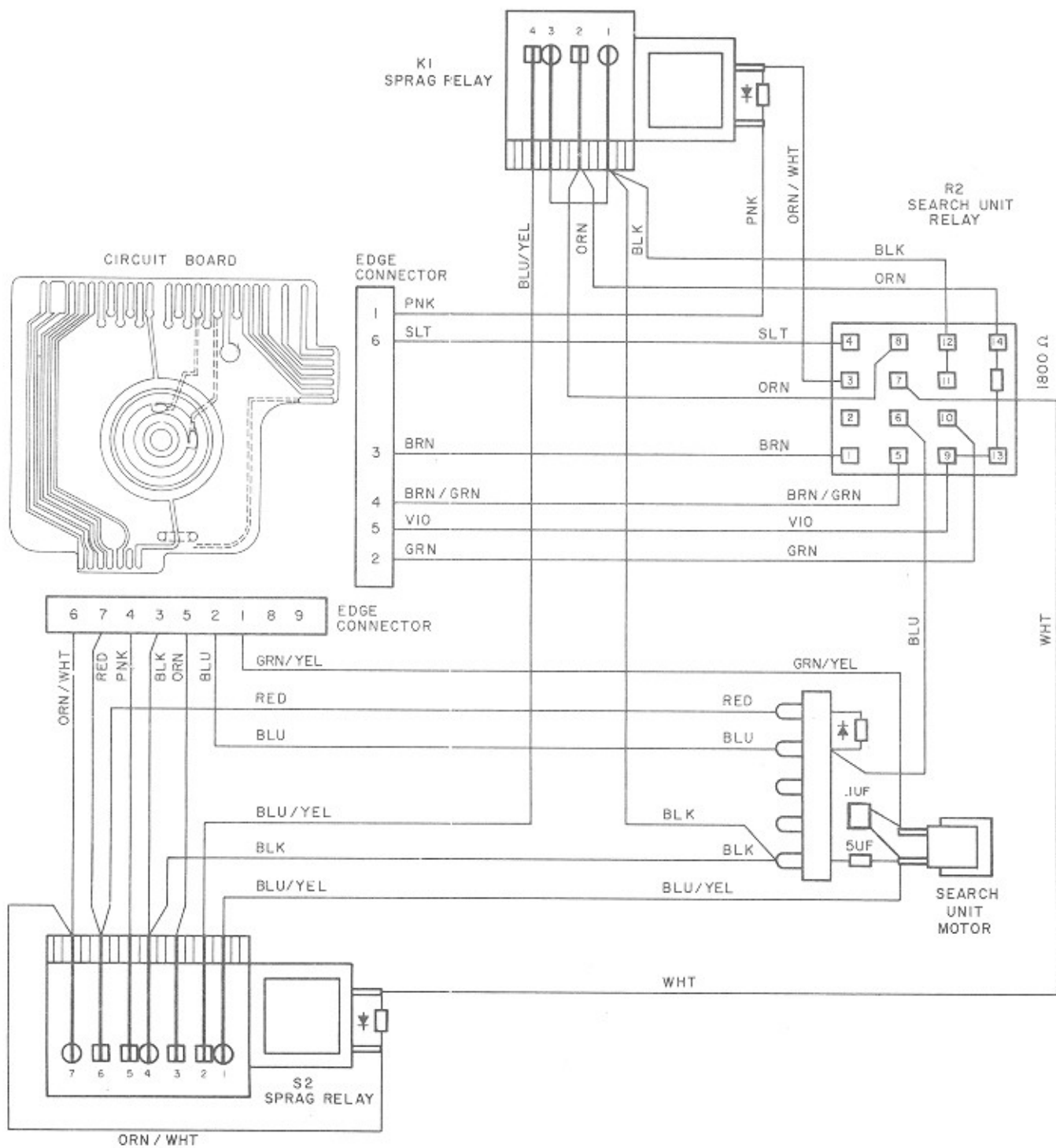
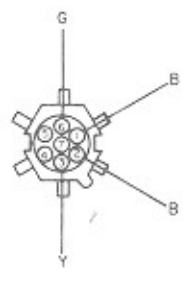
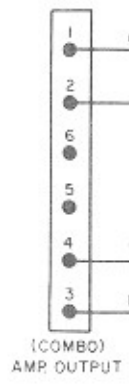


FIGURE 4-9. 100 WATT POWER AMPLIFIER SCHEMATIC DIAGRAM



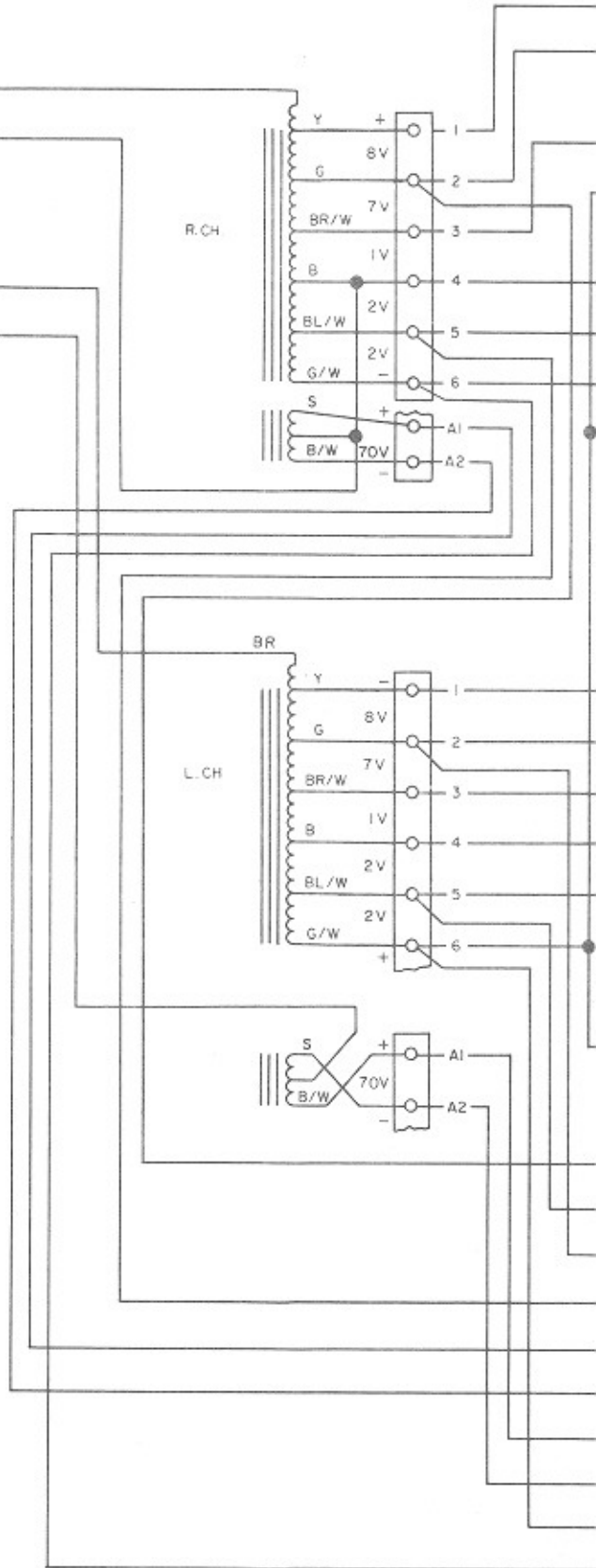
R-4158A-Q-1 A

FIGURE 4-10. SEARCH UNIT WIRING DIAGRAM

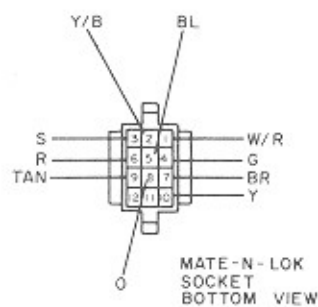
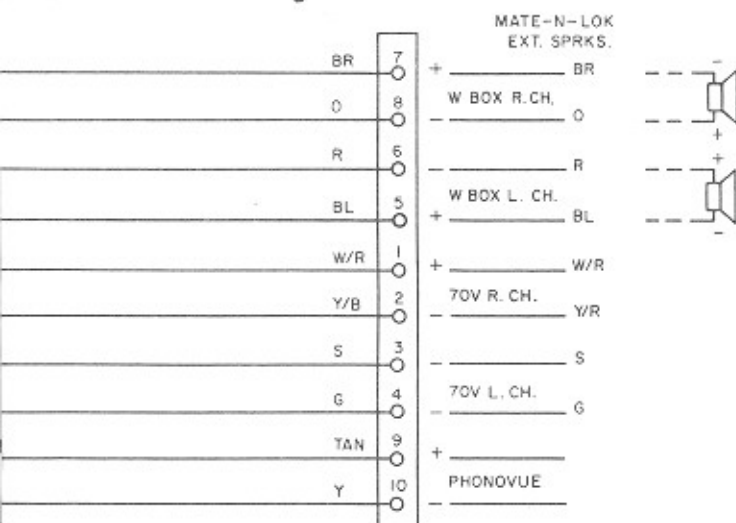
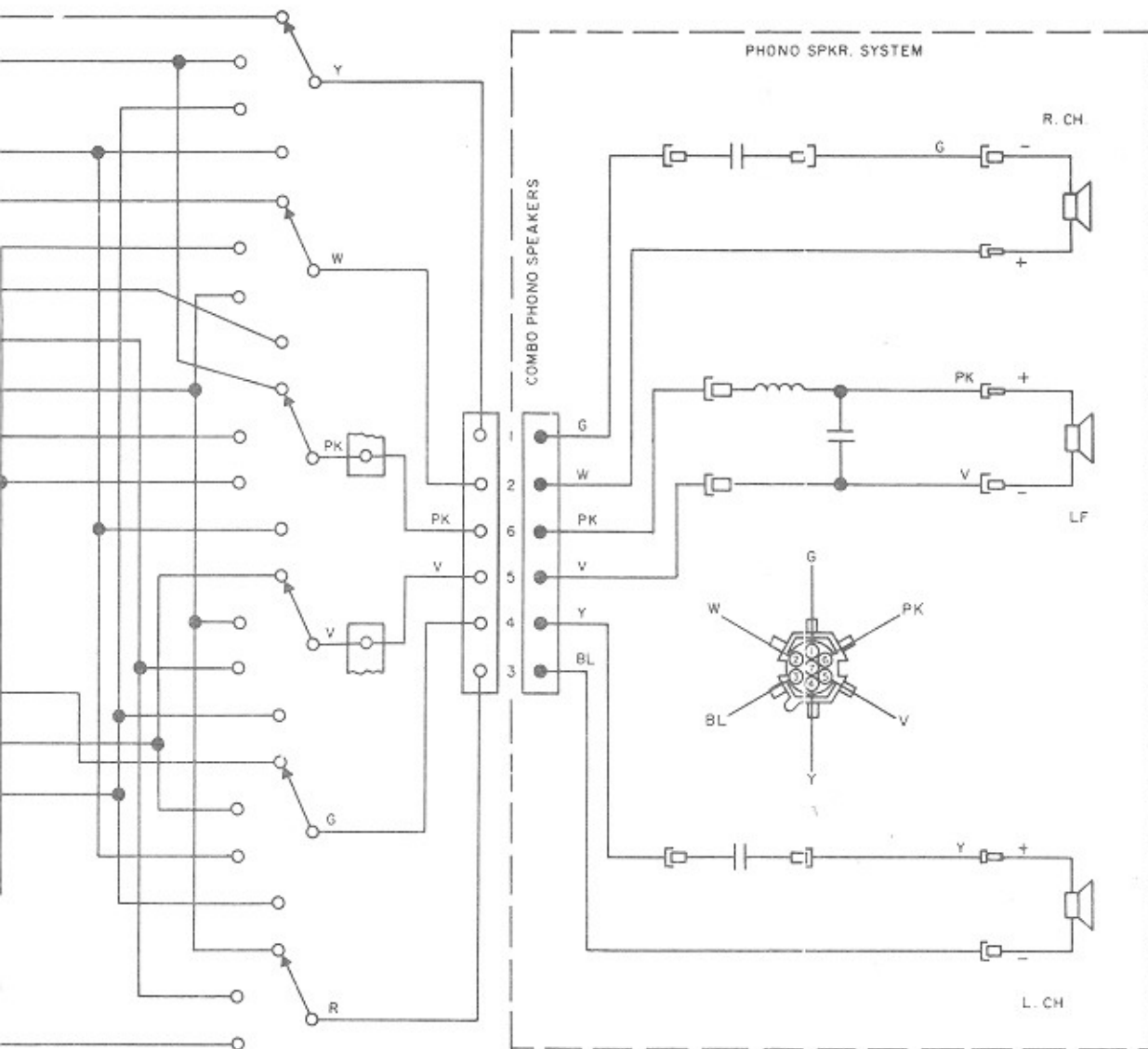


R. CH

L. CH

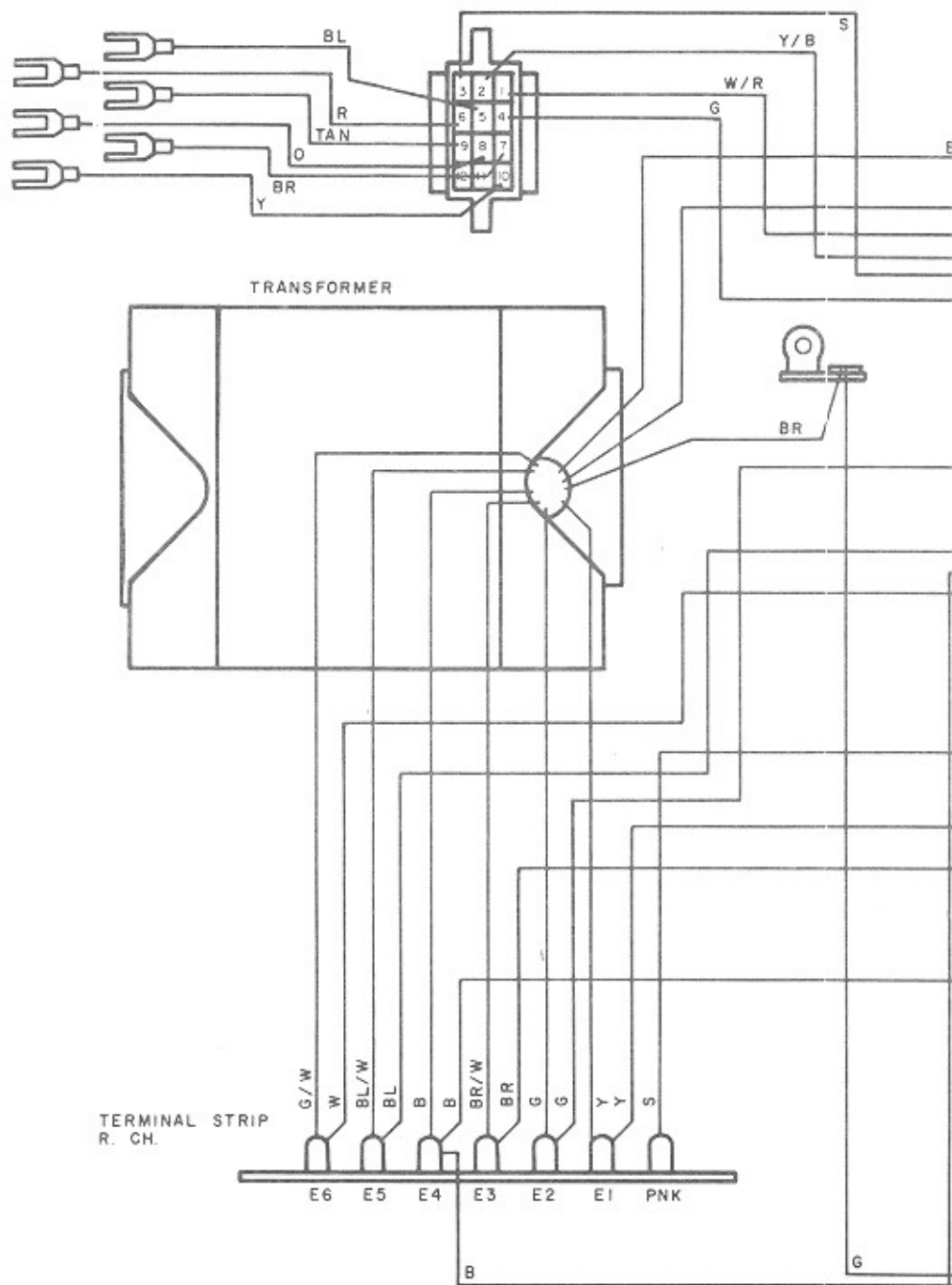




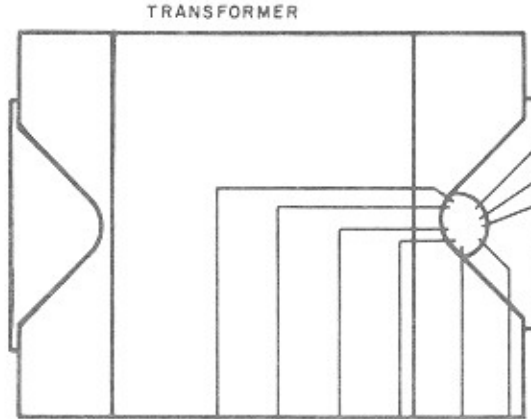
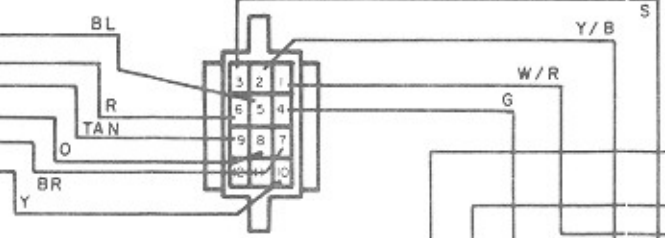
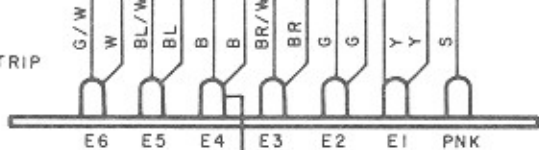


(50W)L-5770A-0-2 REL  
 (100W)R-3774A-0-2 REL

FIGURE 4-11. TRANSFORMER PACKAGE SCHEMATIC DIAGRAM



TERMINAL STRIP  
R. CH.



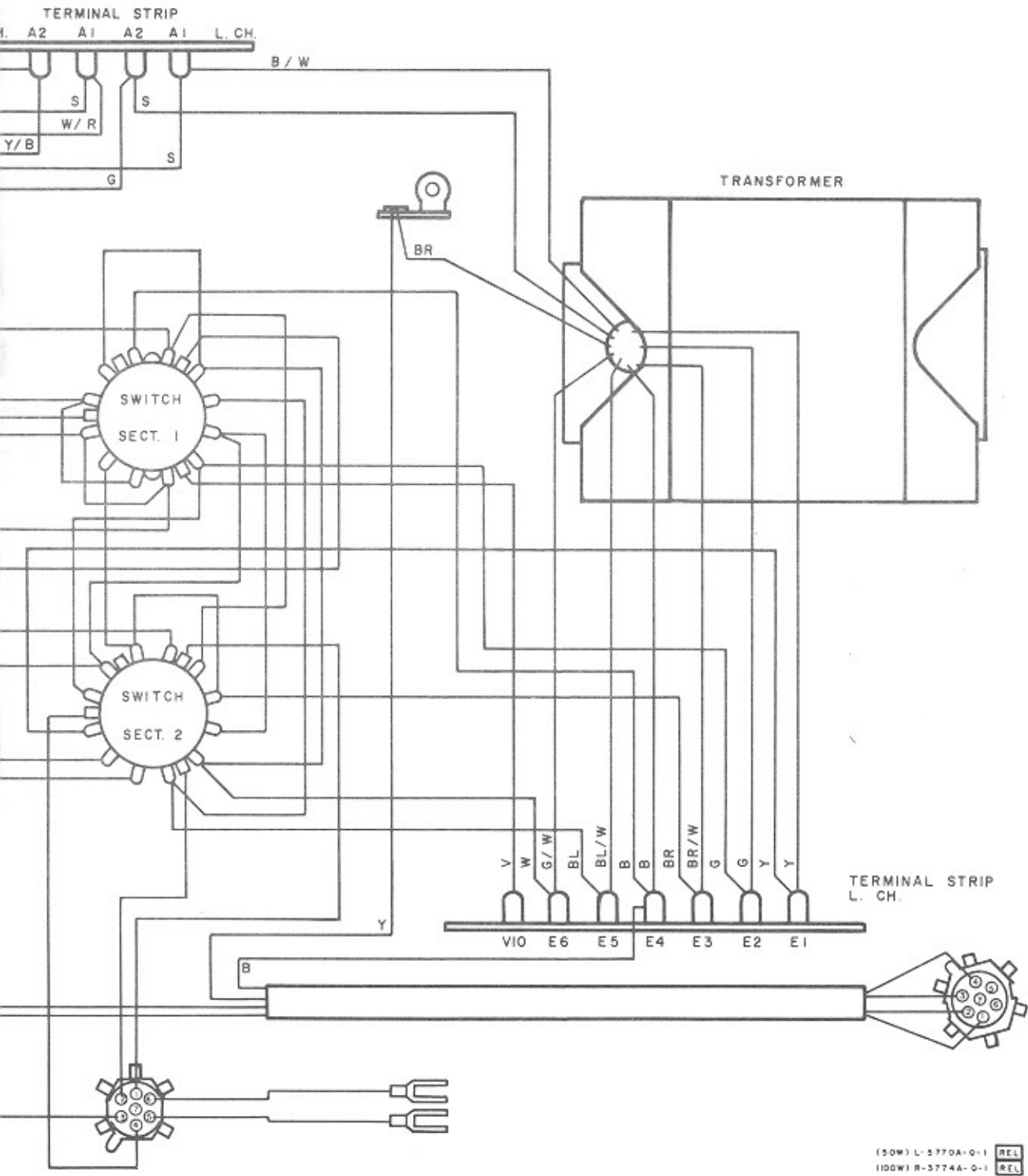


FIGURE 4-12. TRANSFORMER PACKAGE WIRING DIAGRAM

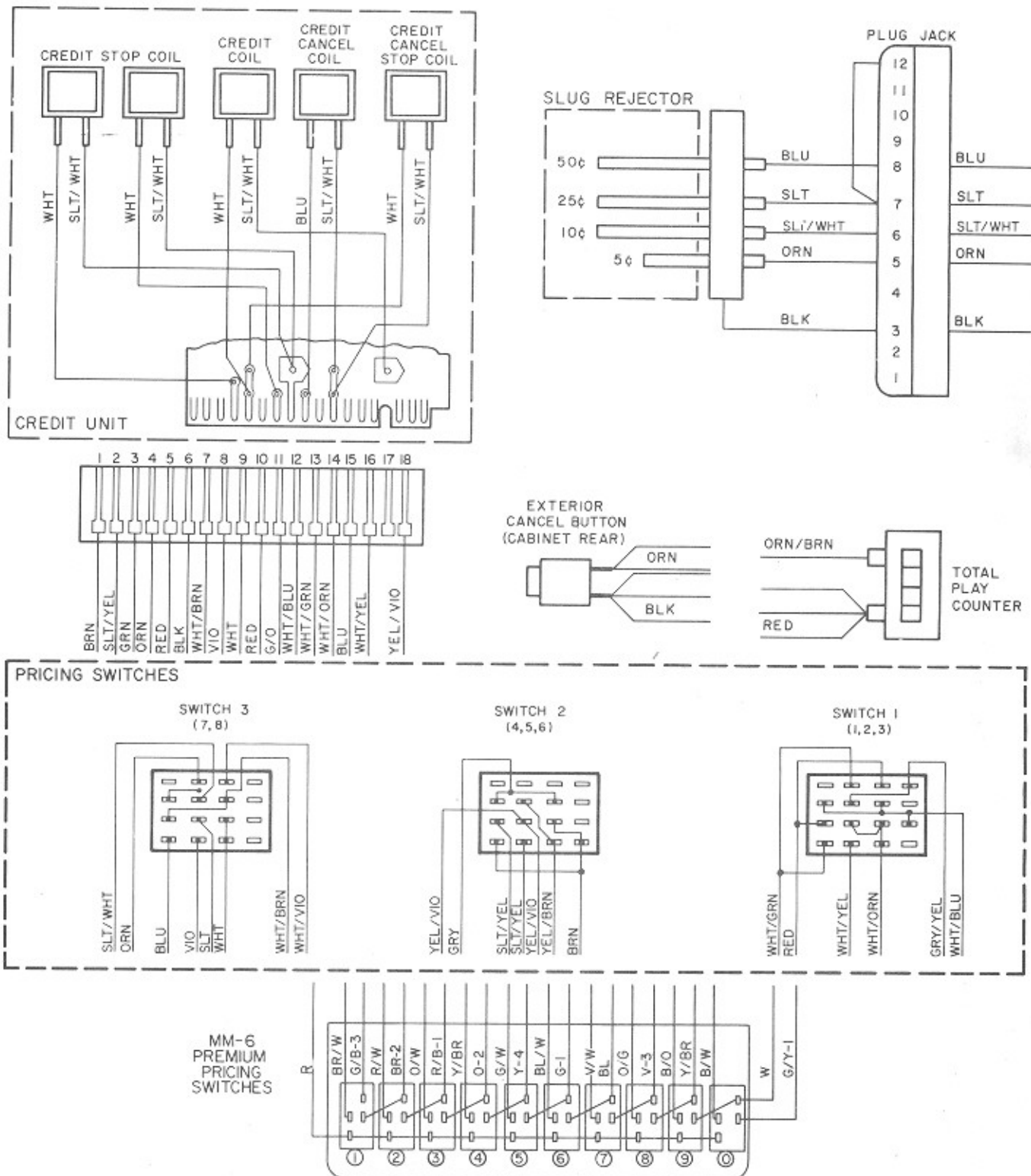
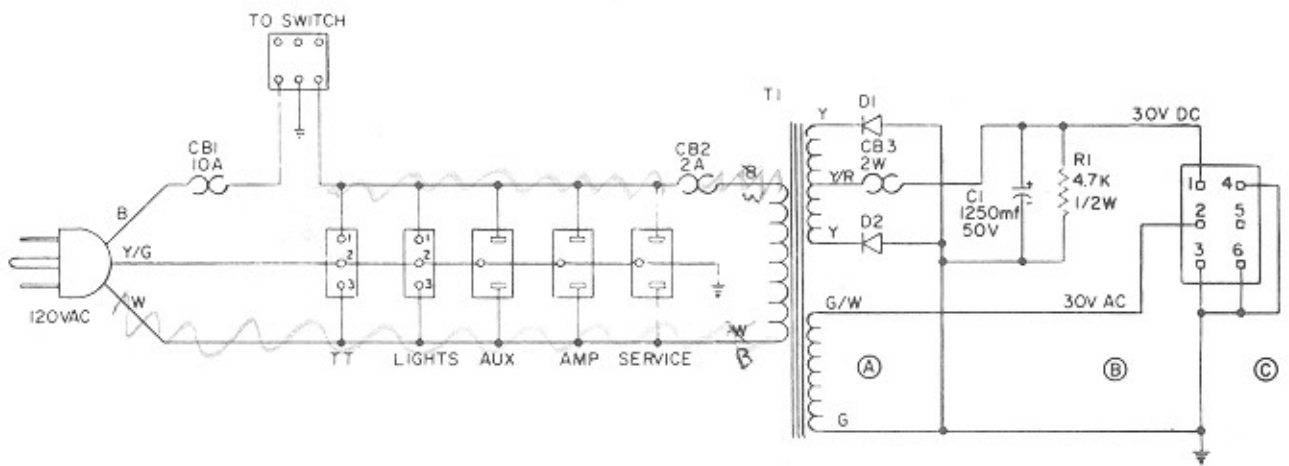


FIGURE 4-13. CREDIT AND PRICING SYSTEM WIRING DIAGRAM



L-6703A-Q-2 [C]

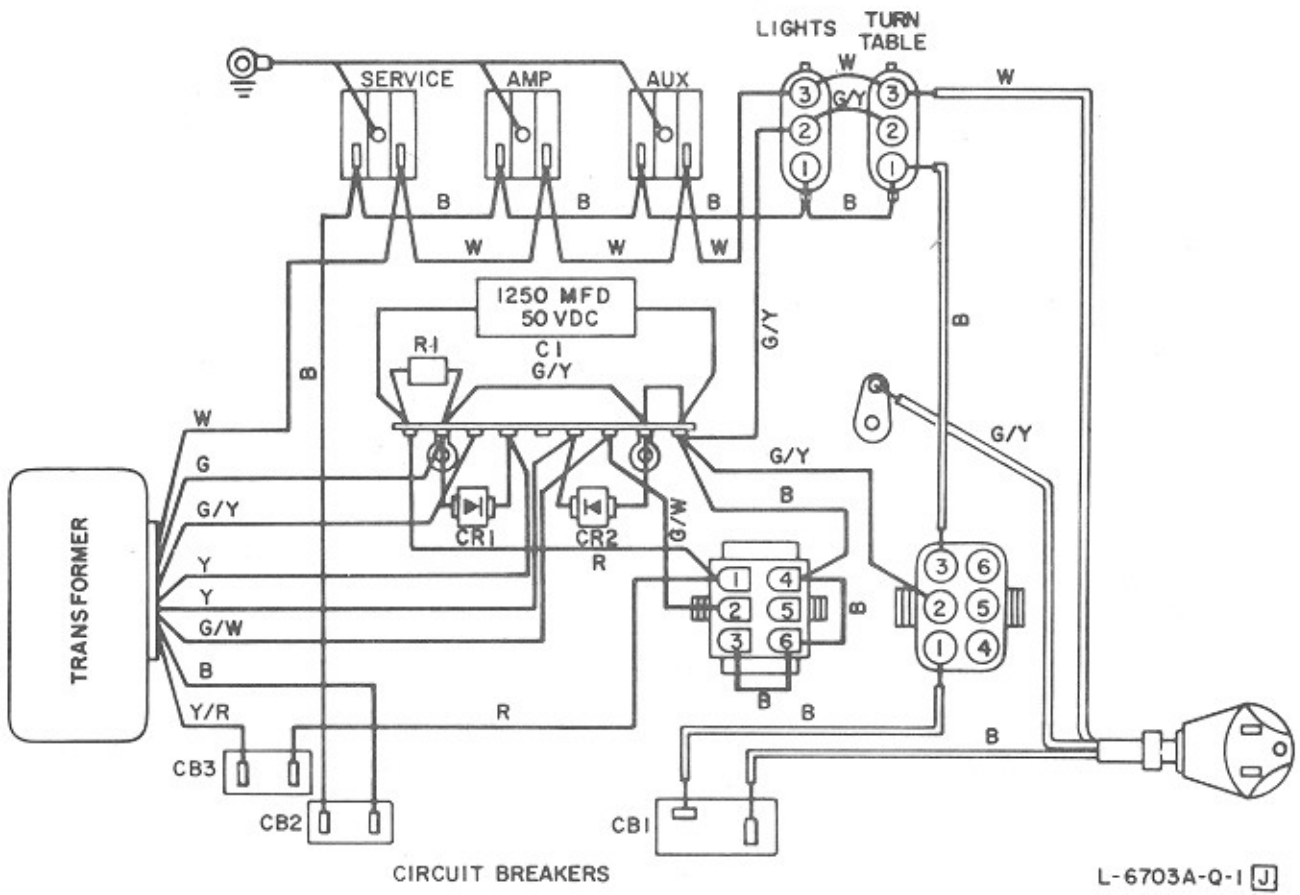


FIGURE 4-14. JUNCTION BOX WIRING DIAGRAM AND SCHEMATIC

## PRINCIPLES OF OPERATION

The following paragraphs contain a brief explanation of phonograph operation. Use this text in conjunction with the troubleshooting charts and sequence of operation diagrams to isolate and correct malfunctions.

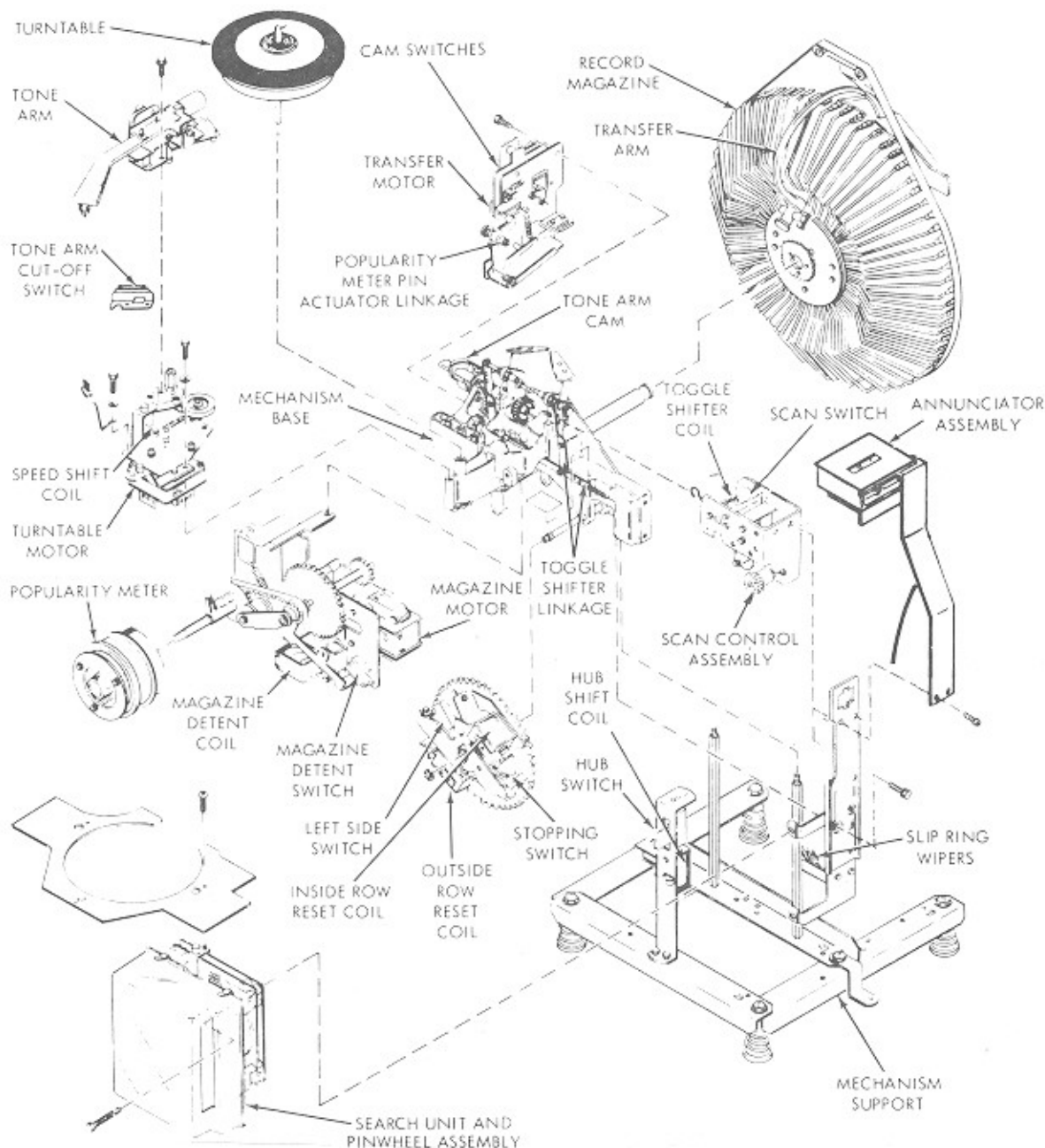
### JUNCTION BOX

The junction box distributes 100-volt power to phonograph components and supplies 30-volt dc power required for phonograph operation. Power is controlled by toggle switch S1 located on the access door at the rear of the cabinet. 100-volt electrical receptacles provide for fluorescent lighting, the turntable motor, accessories, and service equipment. Service outlet J1 is not controlled by the power switch and has power at all times. This primary power circuit is protected by a 10-amp circuit breaker.

30-volt dc is applied to the phonograph wiring harness through a 6-circuit receptacle. Each secondary circuit is protected by a 2-amp circuit breaker.

### RECORD CHANGER MECHANISM

The record changer mechanism holds 100 records and plays selections on command from the selection system. Identification and location of each major component is shown below. The purpose and description of each component is explained in the following paragraphs.



RECORD CHANGER MECHANISM MAJOR COMPONENTS

**Popularity Meter.** The popularity meter indicates the number of times each record selection is played. The meter consists of 100 2-1/8" long pins. The meter can register a total of 30 plays for each record. An integral plastic ring indicates 10 and 20 count points.

**Annunciator Assembly.** The annunciator assembly indicates the letter and number of the selection being played. It is mounted on the annunciator bracket located on the front of the record changer mechanism. The annunciator consists of a geared letter wheel, a geared number wheel and a solenoid-operated shutter mechanism.

**Magazine, Belt and Transfer Arm.** The record magazine stores 100 7-inch 33 or 45 rpm records in a circular cage. A seamless belt around the cage keeps records in position when they are at the bottom of the gripper bow bracket, above the cage. The rollers permit the transfer arm to clear the belt when removing and returning records to the magazine and also maintain belt tension.

**Scan Control Assembly.** The scan control assembly contains a scan coil, a micro-switch and a mechanical linkage. The assembly is mounted on the search unit bracket. When the scan coil is energized, the scan switch closes and the magazine motor starts. The scan control assembly also controls the length of scanning after all selections have played.

**Search Unit and Pinwheel Assembly.** The search unit and pinwheel assembly is a component of the selection system. It pushes pins on a pinwheel assembly that correspond to record selections. Refer to the selection system description for a complete explanation of search unit components and operation.

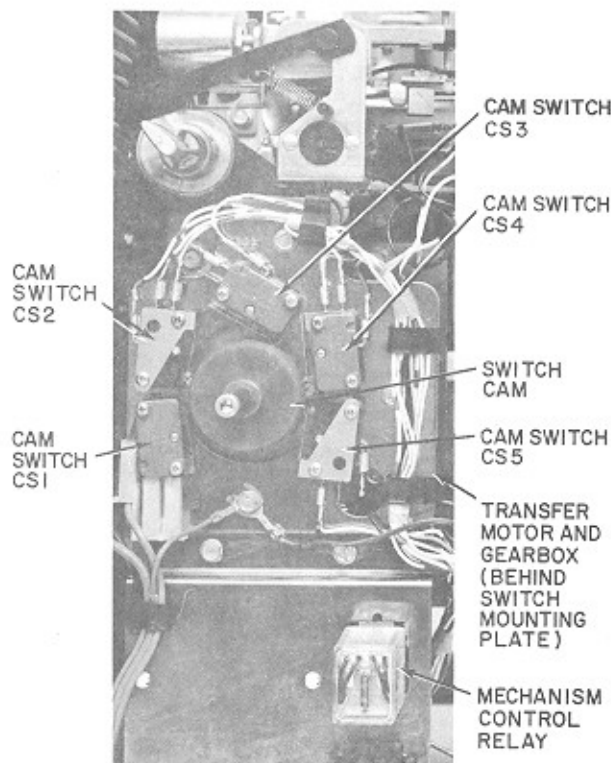
**Stop Switch Assembly.** The stop switch assembly causes the record magazine to stop at the desired selection, determines which side of the record is to be played, and starts the transfer motor. It is mounted on the right side of the record changer mechanism directly behind the search unit.

**Magazine Motor and Detent Assembly.** This assembly operates the record magazine and popularity meter and locks the magazine in position. It is located at the center of the record changer mechanism, directly under the record transfer arm. The magazine motor and gear box, located behind the mounting plate, rotates the gears that operate the record magazine, stop switch gear, and popularity meter drive. The solenoid operated detent assembly locks the magazine in position.

**Cam Switch and Motor Assembly.** (See Figure)  
The cam switch and motor assembly consists of the transfer motor and gear box, a switch cam, and five cam switches. A nylon cam operates cam switches CS-1 through CS-5. The function of each switch is described in Table 4-4.

SWITCH	FUNCTION
CS-1	Controls turntable motor.
CS-2	Magazine motor interlock during record transfer stops record transfer in magazine.
CS-3	Operates outside row reset coil.
CS-4	Operates toggle shift and inside row reset coil holding circuit for cancel button.
CS-5	Stops record transfer over turntable.

TABLE 4-4. CAM SWITCH FUNCTIONS



CAM SWITCH AND MOTOR ASSEMBLY COMPONENTS

**Tone Arm Assembly.** The tone arm assembly plays records after they are positioned on the turntable by the record transfer arm. The tone arm contains a stereo cartridge with a diamond stylus that is designed to track at four to five grams pressure. The stylus plugs into the cartridge for easy replacement. A seven-pin receptacle on the tone arm assembly mates with a plug to connect the cartridge to the preamplifier via 4-conductor shielded cable.

**Turntable Motor and Plate Assembly.** The turntable motor and plate assembly consists of the turntable motor and associated components necessary to rotate the turntable. The turntable motor rotates a rubber idler wheel, mounted on a spring-loaded idler arm. The idler wheel contacts the inner rim of the record turntable. The turntable has heavy mass to reduce wow and flutter. Its upper surface is a rubberized pad to prevent records from slipping and to avoid record damage.

**Automix.** Automix operation enables the phonograph to play both 33 and 45 rpm records in any order. Automix components consist of a speed shift coil, a hub shift coil and a trip wire and switch on the turntable hub.

## SELECTION SYSTEM

The selection system provides a means for the customers to choose desired selections after credit is established. The selection system consists of a selector assembly and a search unit. The purpose and description of each selection system component is explained in the following paragraphs.

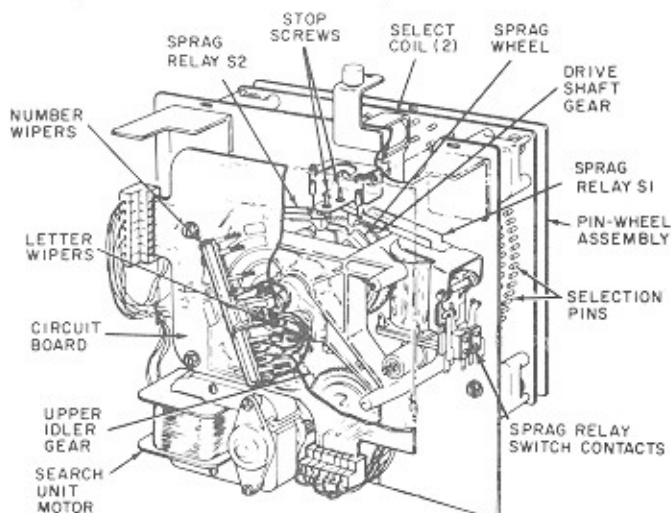
**Selector Assembly.** (See figure below) The selector assembly is located above the title panel. It contains two pushbutton switch banks, a latch coil, a select pulse and latch relay, and a start relay. The pushbutton switch banks are designated A through V (no I, no O), and 1 through 0. Each pushbutton completes a circuit to a corresponding search unit commutator segment.

The latch coil mechanically latches the pushbutton switches until the search unit pushes a pin in the pinwheel assembly. Select pulse and latch relay R1 controls power to the latch coil. A delay in relay drop out due to a diode in parallel with the relay coil determines the length of the select pulse to the search unit. The select pulse permits the scan coil, credit cancel coil, and select coil to operate.

Start relay R5 completes the circuit to the search unit when both a number and letter pushbutton are

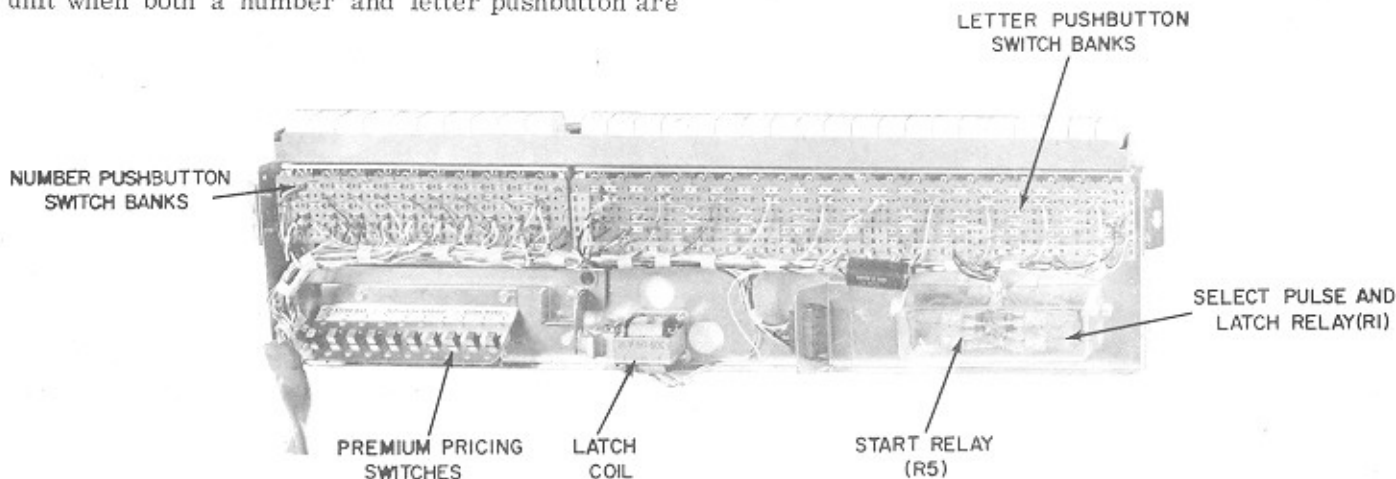
operated. It also performs an interlock function in the number pushbutton circuit.

**Search Unit.** (See figure below) The search unit pushes pins that correspond to record selections. These pins are detected by the record changer mechanism stop switch pawl. The search unit is located on the record changer mechanism right side. The front side of the search unit printed circuit board represents the 10 numbers in the phonograph selection system. The rear side represents the 20 letters.



SEARCH UNIT MAJOR COMPONENTS

The search unit motor drives search wipers, a sprag wheel, drive gears, and select coil arm assembly. The motor is energized after the letter and number pushbuttons are latched on the selector assembly. When a selection is made, the search unit motor rotates the number and letter wipers on the circuit board. Each wiper searches the commutator board until the wiper blades find the hot segments that represent the desired selection. When the number wiper runs onto the "hot" segment, sprag relay S1 is energized. Sprag relays S1 and S2 keep the wiper assemblies from moving beyond the "hot" segments.



SELECTOR ASSEMBLY COMPONENTS



When relay S1 is energized, the large tooth at the end of the relay armature engages a notch in the sprag wheel, quickly stopping the wiper assembly. The hot side of the selection circuit is then transferred from the number side of the circuit board to the letter side by search unit relay R2.

The letter wiper continues to rotate a short distance on the rear of the board. When the letter wiper runs onto the "hot" segment sprag relay S2 is energized. Relay S2 operates in a similar manner to S1, quickly stopping the letter wiper on the commutator segment. Relay S2 also deenergizes the search unit motor and energizes one of the two select coils that have been positioned by the pinwheel assembly.

The select coil plunger pushes one of the pins in the pinwheel assembly, corresponding to the chosen selection. The pinwheel assembly contains two rows of 100 1/2-inch long pins, mounted in a circular pattern. The inside row corresponds to right side selections while the outside row corresponds to left side selections. The pin is reset by a reset coil, mounted on the record changer mechanism stop switch.

The stop screws provide an adjustment of the clearance between the armature teeth of their respective sprag relays and the sprag wheel high points when the relays are deenergized.

## CREDIT AND PRICING SYSTEM

The credit and pricing system validates coins deposited in the phonograph coin slot and establishes credit for record play. The system consists of a

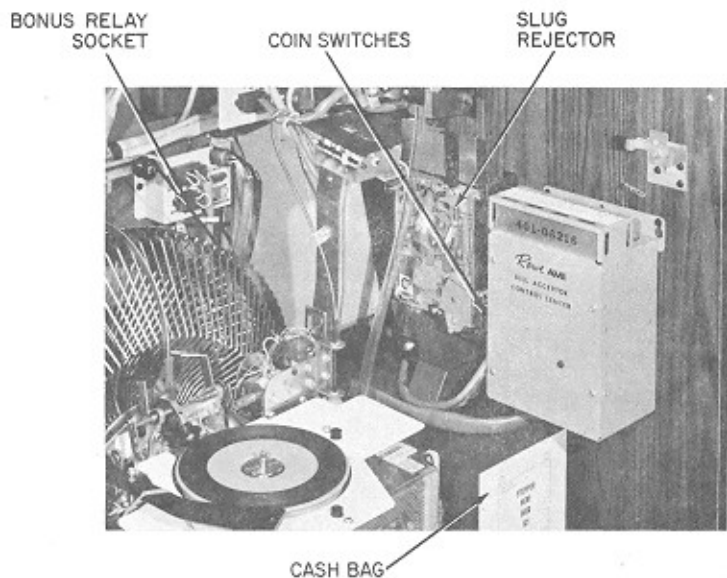
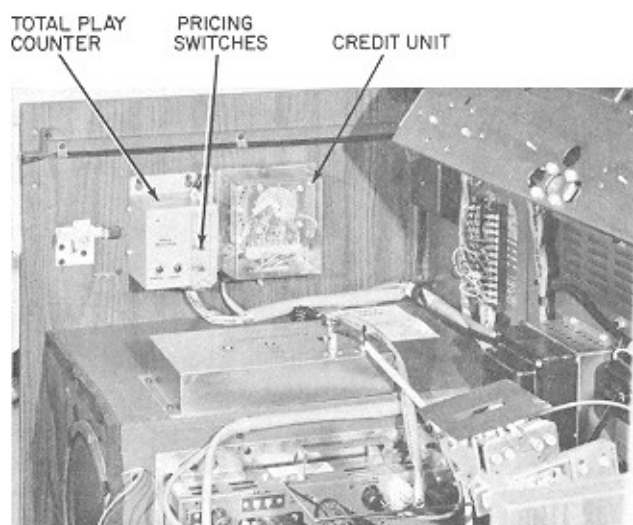
slug rejector and coin switches, pricing switches, a credit unit, and a total play counter. The identification and location of each component is shown in figure below. The purpose and description of each major component is explained in the following paragraph.

**Slug Rejector and Coin Switches.** The slug rejector takes good coins and rejects slugs and bad coins. It takes nickels, dimes, quarters and half-dollars.

The coin switches establish credit in the credit unit. They are located at the bottom of the slug rejector. They are operated by the coins as they fall into the cash box. A good coin moves the switch lever, closing the switch and completing a circuit to the credit unit commutator board.

**Pricing Switches.** The two pricing switches permit the phonograph to operate with various pricing combinations. The two slide-type pricing switches are located on the service control console. Switch positions 1 through 6 are marked on the panel adjacent to the switches with switch #1 marked 1, 2, and 3; switch #2 marked 4, 5, and 6.

A mechanism service switch mounted on the service panel enables the record changer mechanism to be scanned independently of the selection system for service and maintenance. A bonus relay and 15¢ price adapter are required for some special pricing combinations.



CREDIT AND PRICING SYSTEM COMPONENTS

**Credit Unit.** (See figure below). The credit unit is actuated by the coin switches and registers the value of coins deposited. It is operated by means of solenoids. Credit information is given to the phonograph electrical control system by contact wiper and commutator board. Clockwise rotation of the contact wiper accumulates credit and counter-clockwise rotation removes credit.

Credits are accumulated when the credit coil is energized by a coin switch (See page 4-9). A pawl engages the front credit wheel and credit stop arm and rotates them clockwise. This rotation is limited when the stop arm engages a "stop screw" or "stop coil" plunger.

Stop screw allows 2 through 9 steps.

Fixed credit stop coil allows 1 step.

Adjustable credit stop coil allows 2, 3 or 4 steps.

The front credit wheel, rear cancel wheel, and contact wiper assembly are mounted on the same shaft and rotate together.

Credits are removed when the cancel coil is energized by making a selection (See page 4-13). A pawl engages the cancel wheel and cancel stop arm and rotates both counterclockwise. The rotation is limited when the stop arm engages a "stop screw" or cancel "stop coil" plunger.

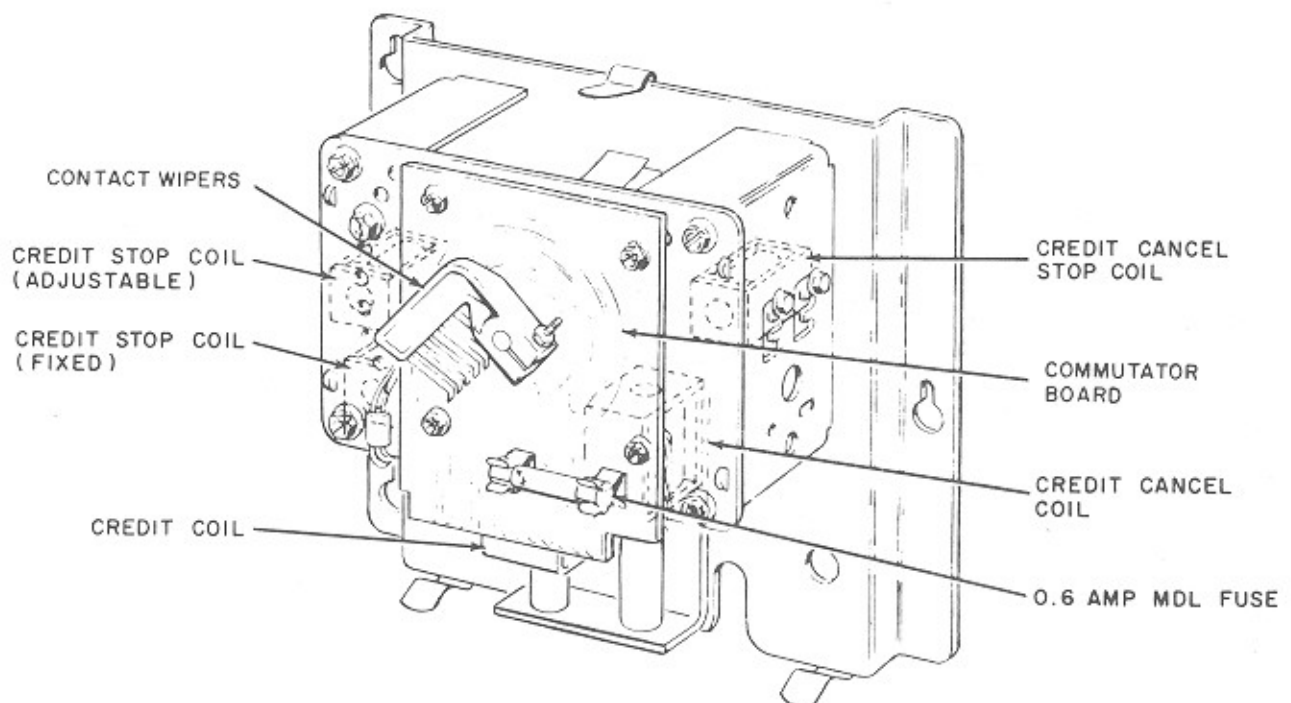
Stop screw allows 1 through 6 steps.

Adjustable cancel stop coil allows 1, 2 or 3 steps.

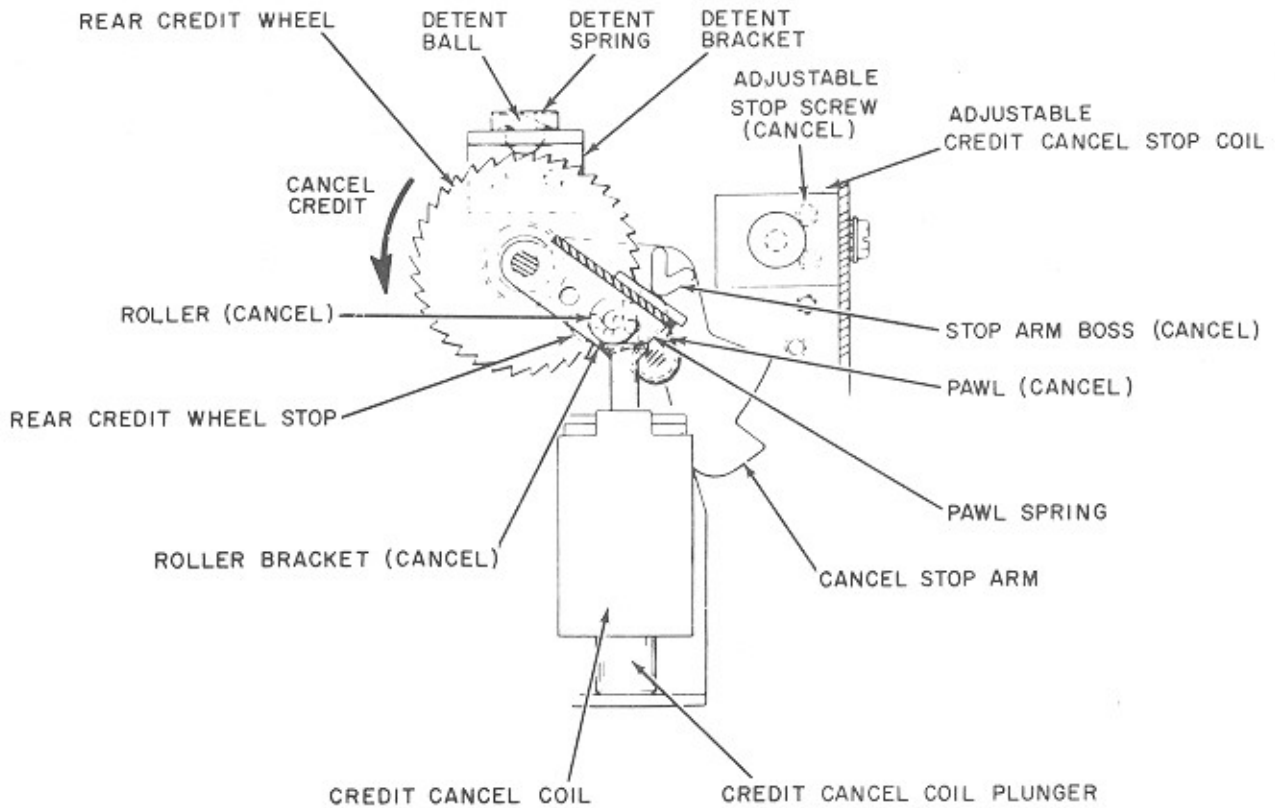
The cancel wheel, credit wheel and contact wiper are mounted on the same shaft and are rotated together.

The contact wipers operate credit lights on phonograph. They also tell the phonograph selection system if enough coins have been deposited to allow a standard price selection or a premium price selection.

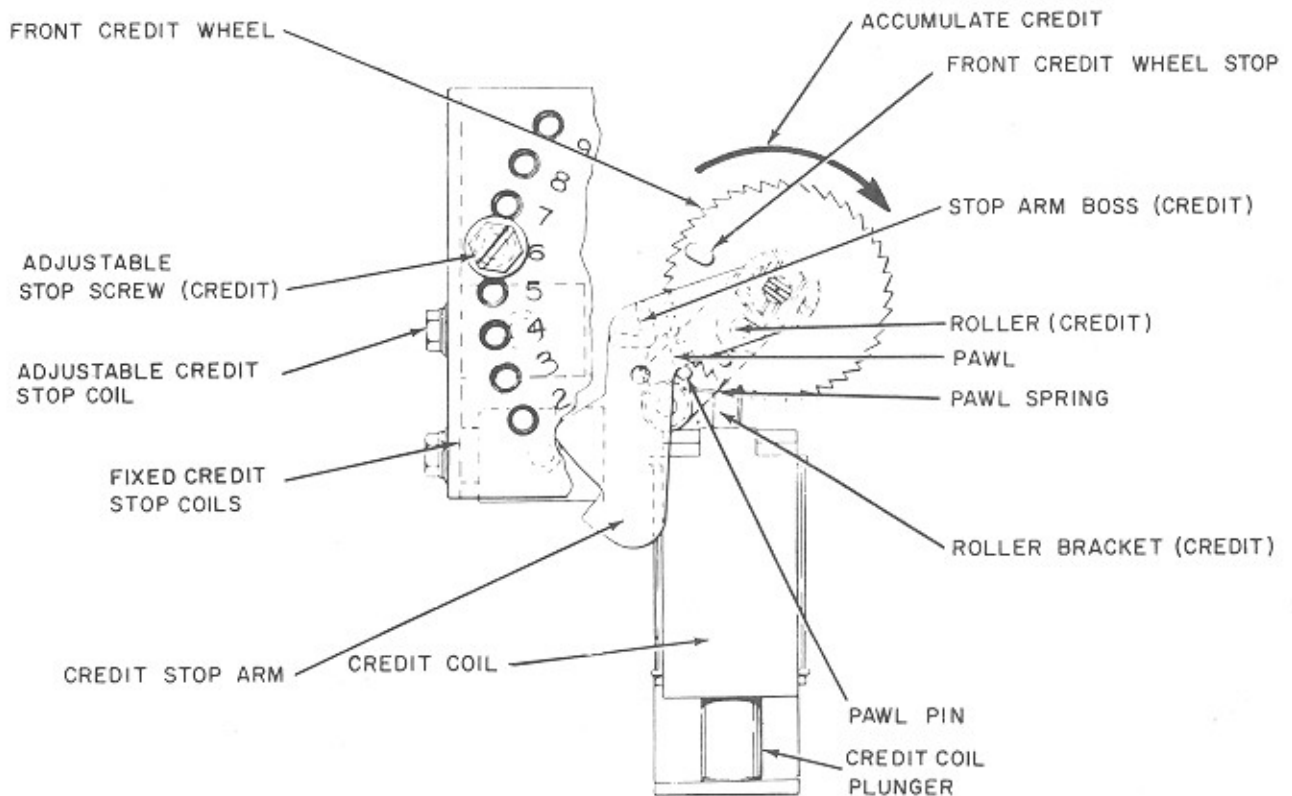
See page 2-8 for complete instructions on price changing.



CREDIT UNIT COMPONENTS



**FRONT CREDIT WHEEL AND RELATED PARTS**



**REAR CREDIT WHEEL AND RELATED PARTS**

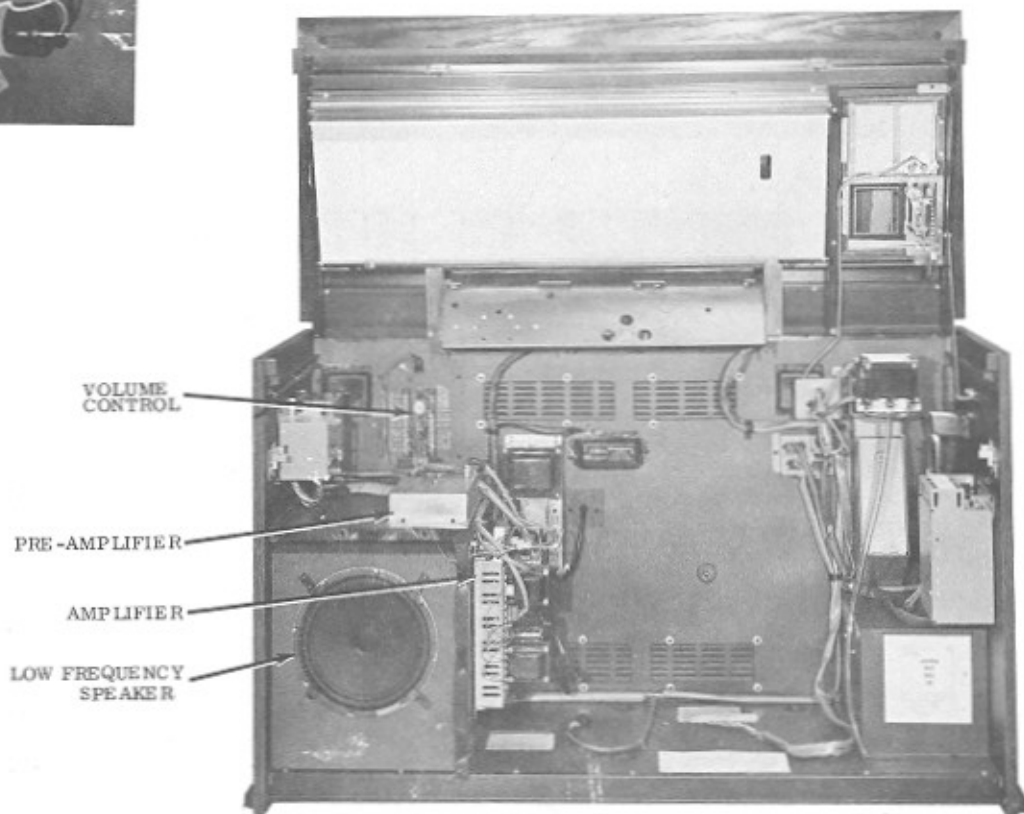
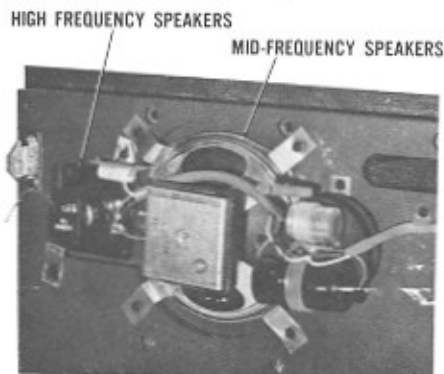
## SOUND SYSTEM

The phonograph sound system translates stylus vibration into electrical voltage, amplifies the voltage and the speaker converts it into sound. The sound system consists of a stylus and cartridge, a stereo preamplifier and amplifier unit, a speaker system, and a volume control. Identification and location of each major component is shown in figure below. The purpose and description of each major component is explained in the following paragraphs.

**Stylus and Cartridge.** The stylus and cartridge convert mechanical movement into equivalent electrical voltage. The unit is mounted on the record changer

tone arm. This output voltage is transmitted through shielded cable to the preamplifier.

**Preamplifier and Amplifier.** (See page 4-46). The preamplifier and amplifier units amplify phonograph cartridge output and drive the speaker system. The latest concepts in silicon transistor circuitry are designed into the 50-watt stereo system. It delivers a full 25 watts rms power per channel. Its wide frequency response and low distortion assure good record reproduction. The unit incorporates automatic volume control (AVC) and automatic quality control (AQC).



SOUND SYSTEM COMPONENTS

The output stage is coupled to the speakers. Treble range and bass boost controls are provided on the preamplifier chassis to compensate for differences in room acoustics. A mute relay silences the amplifier while a record is being transferred to or from the turntable.

Preamplifier circuitry is completely solid state for durability and long service life. Protection is included for voltage transients, excessive heat, and accidental shorting of speaker leads.

#### Preamplifier

The preamplifier board is the same for both the 50 and 100 watt amplifiers. The preamplifier board, however, is a part of the 50 watt preamplifier assembly mounted in the rear of cabinet, while it is a component part mounted on the 100 watt power amplifier.

The preamplifier amplifies the phonograph cartridge ac output voltage to drive the power amplifier. The preamplifier consists of two identical, independent audio channels. Right channel component designations end in the letter R, while left channel components end in the letter L. Treble range and bass boost controls are provided to enable adjustment of frequency contour. All components are mounted on a single printed circuit board.

#### 50W Hybrid Amplifier

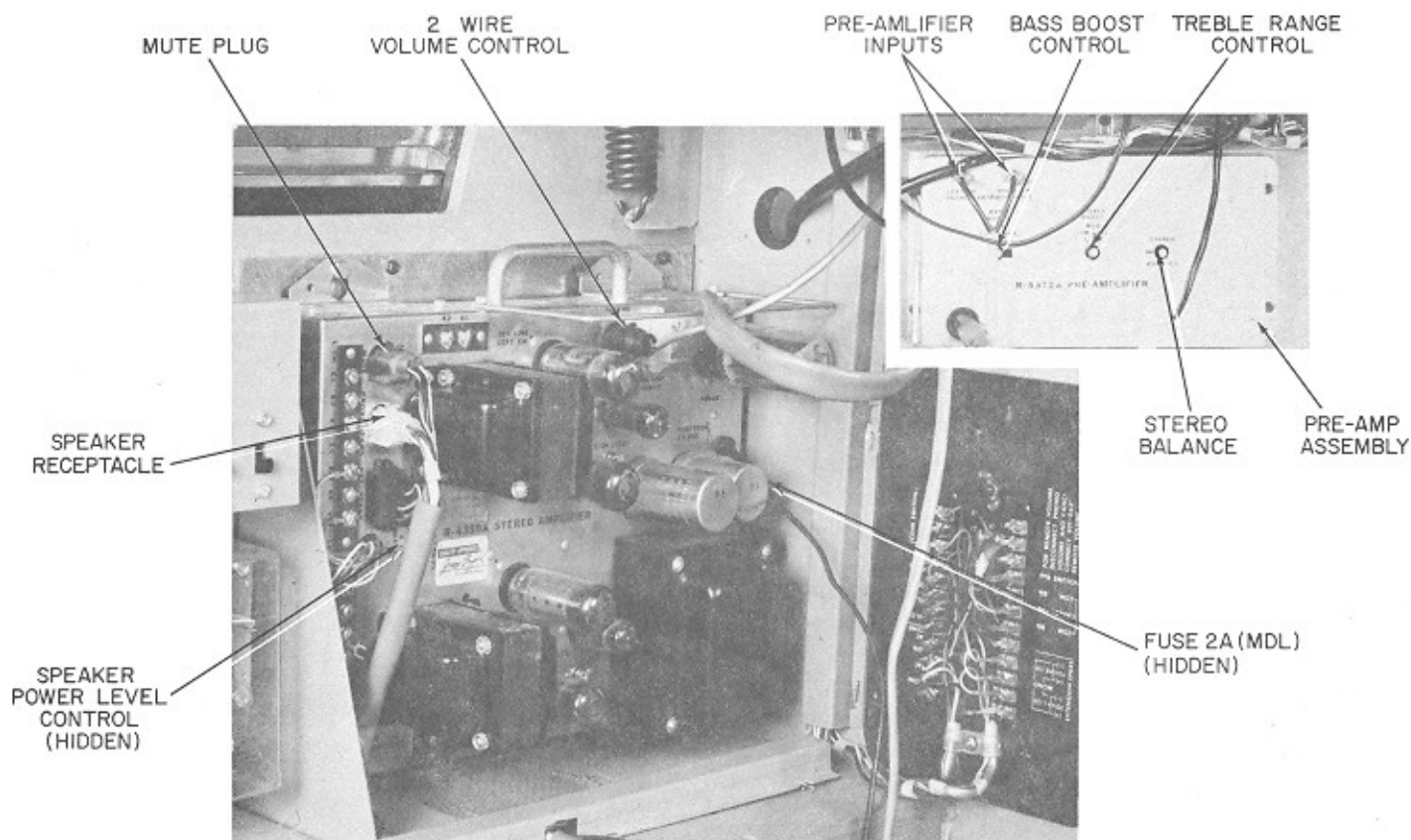
The 50W hybrid power amplifier uses one solid state full wave rectifier, two 12AX7A twin triodes and four 7868 beam power tubes. The rectifier in the power supply provides dc plate voltages. The 12AX7A serves as both a driver and phase inverter for the 7868 output tubes which operate as a class AB push-pull amplifier.

THIS SOLIDSTATE RECTIFIER IS INTERCHANGEABLE WITH 5U4GB TUBE IN THIS MODEL. HOWEVER, DO NOT USE SOLID STATE RECTIFIER IN OLDER MODELS WITHOUT THE ADDITION OF 150 OHM, 10 WATT RESISTOR.

To supply the 24-volts for the transistorized preamplifier, a separate regulated circuit is included in the power supply. Diodes D902 and D903 rectify voltage from the power transformer secondary winding while zener diode Z901 maintains constant voltage to the printed circuit board regardless of load.

#### 100W Power Amplifier. (Optional)

The 100 watt amplifier power supply uses a full wave bridge type rectifier system. The bridge rectifier is normally connected to the 59 volt winding of the power transformer. In installations where the line



PREAMPLIFIER AND AMPLIFIER

voltage exceeds 125 volts, one end of the primary transformer lead should be connected to the "high line tap" which gives a 10% reduction in voltage. A surge suppressor is connected across the rectifier input to limit line transient voltages.

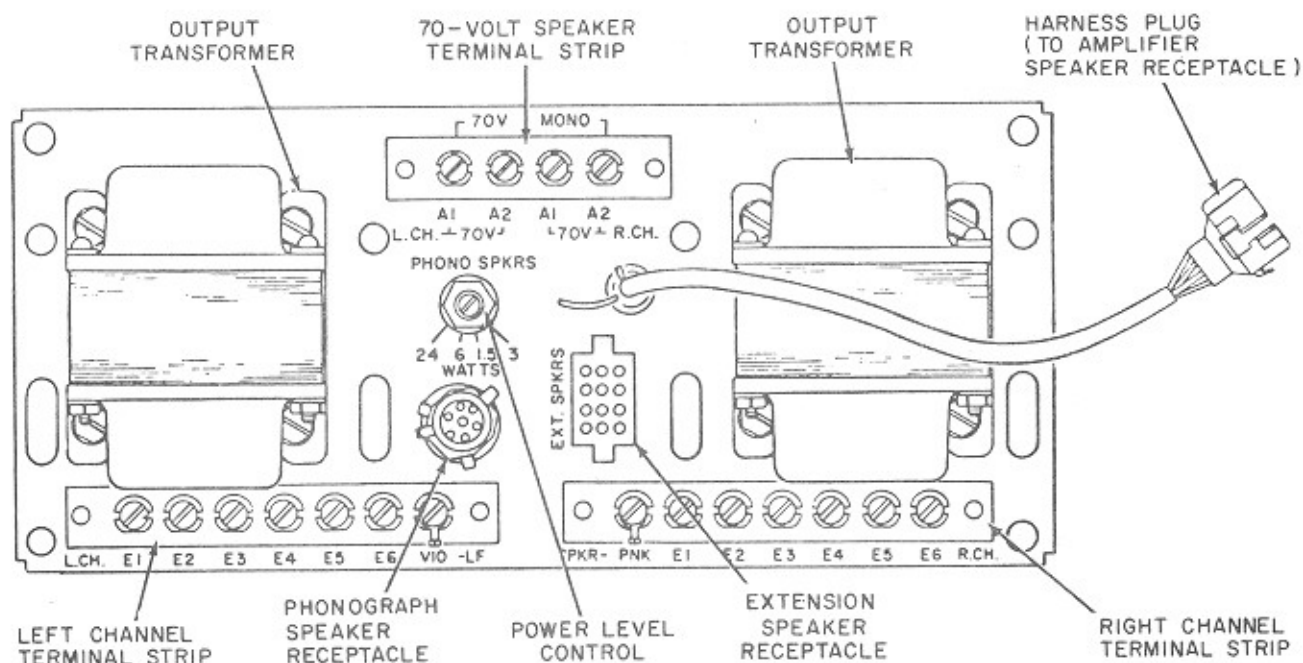
**Output Transformer Package (100W) (Optional)** (See figure below). The transformer package enables the amplifier to operate 70-volt speaker lines for extension speakers, and provides Rowe/AMI Stereo Sound. The package consists of two output transformers, a power level control, and associated parts, mounted on a single chassis. The chassis sits on the floor of the cabinet, left of the mechanism. The unit is elec-chassis sits on the floor of the cabinet to the left of the record changer mechanism. The unit is electrically connected between the amplifier and speaker system. Output transformer secondary connections are brought out to terminal strips to allow operation with low-impedance extension speakers as well as the recommended 70-volt extension speakers. A 4-

position switch, at the center of the chassis, controls phonograph speaker level relative to extension speaker level.

**Speaker System.** The speaker system consists of one 10-inch low frequency speakers, two 6-inch mid-range speakers, two 3-inch tweeters for high frequencies, and coupling capacitors.

The 10-inch, heavy duty speakers are mounted in separate duct-tuned enclosures at the bottom of the cabinet. The 6-inch mid-range speakers and the 3-inch tweeters are mounted at the top of the cabinet.

**Two-Wire Volume Control.** A Rowe/AMI first, the two-wire volume control simplifies large, complex installations and saves cost. Redesigned preamplifier circuitry permits remote volume control operation using two unshielded wires. Any wires can be used - there are no special requirements for conductor size or shielding.



TRANSFORMER ACCESSORY PACKAGE

## SECTION 5 - MAINTENANCE

### GENERAL

This section contains cleaning, lubrication, adjustment, and repair and replacement procedures for the phonograph. Cleaning and lubrication procedures should be performed at regular intervals. Adjustment and repair and replacement procedures should be performed only when necessary.

### PREVENTIVE MAINTENANCE

#### CLEANING

In addition to cleaning the cabinet exterior each time the location is visited, clean the cabinet interior every three to six months, as required. Keeping the cabinet interior clean reduces dust, resulting in increased record and component life. Always clean the phonograph cabinet prior to lubrication.

a. Use a vacuum cleaner, if available, to remove heavy dust deposits.

#### WARNING

Use solvents in a well-ventilated area only; do not use solvents of any type on plastic parts.

b. Use a clean, lint-free cloth saturated in denatured alcohol to clean mechanical parts.

c. Clean electrical parts using a clean, dry cloth or camel's hair brush.

d. Clean the slug rejector as specified in the applicable slug rejector manual.

e. Clean the credit unit and search unit commutator boards with alcohol. Remove caked-on dirt using a pencil eraser or light abrasive cleaner.

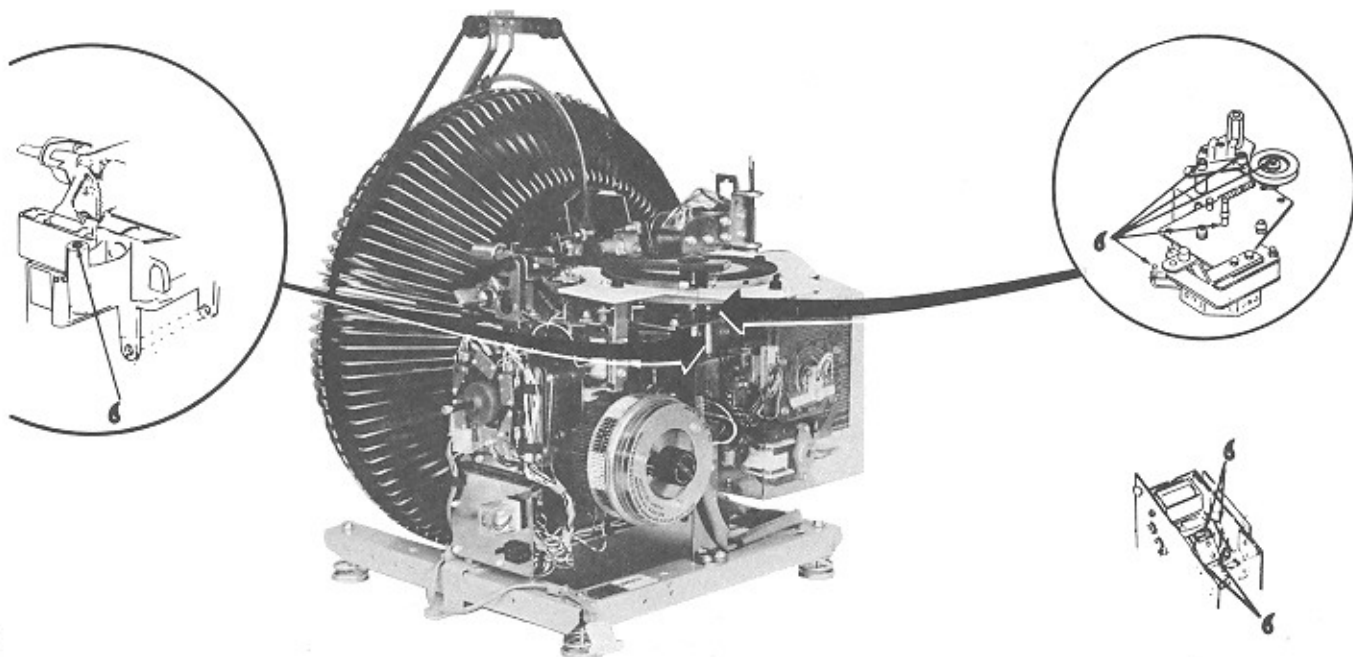
#### FIVE-YEAR LUBRICATION

Your phonograph requires lubrication only twice a decade - every five years - to maintain smooth, trouble-free operation. Lubricate the credit unit and record changer mechanism as shown:

🔧 One Drop F-1379 Light Machine Oil

Do Not Over-Lubricate

Do Not Use Oil or Grease on Solenoid Plungers



CREDIT UNIT

## ADJUSTMENTS

Phonograph adjustments are listed in Table 5-1. Amplifier adjustments are contained in Section 2. Perform adjustments when indicated by troubleshooting procedure, Section 4.

TABLE 5-1. PHONOGRAPH ADJUSTMENTS

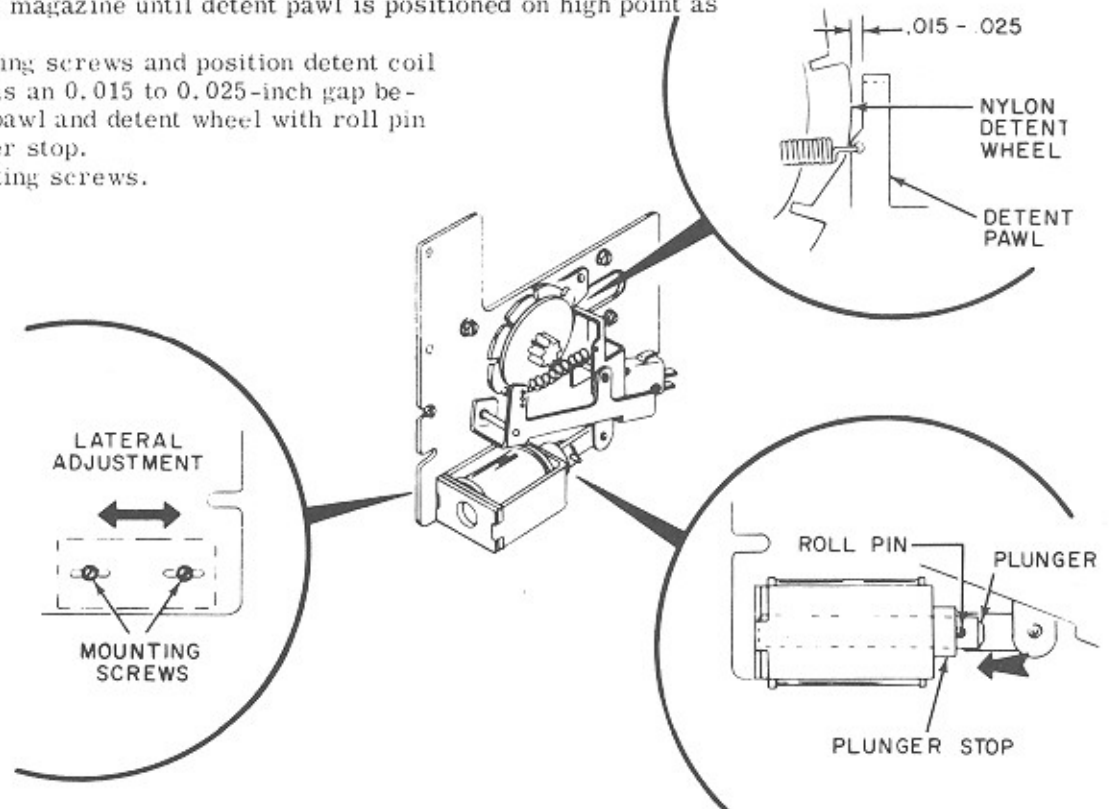
<u>ADJUSTMENT</u>	<u>PAGE</u>
<u>RECORD CHANGER MECHANISM</u>	
Magazine Motor and Detent Assembly	5-3
Cam Switch	5-4
Stop Switch	5-5
Sector Gear	5-8
Tone Arm Cam	5-9
Cam and Trunnion Drive Gear	5-10
Toggle Shifter Link	5-10
Record Magazine Transfer Arm Support	5-11
Magazine Belt	5-12
Aligning Magazine Stopping Position with Transfer Arm	5-13
Popularity Meter Alignment	5-14
Scan Control	5-15
Tone Arm	5-16
Automix	5-19
<u>SEARCH UNIT</u>	
Search Unit Gear	5-20
Sprag Relay	5-22
Search Wiper	5-25
Select Coil	5-27
<u>CREDIT AND PRICING SYSTEM</u>	
Coin Switch	5-28
Credit Unit	5-29



## MAGAZINE MOTOR AND DETENT ASSEMBLY ADJUSTMENTS

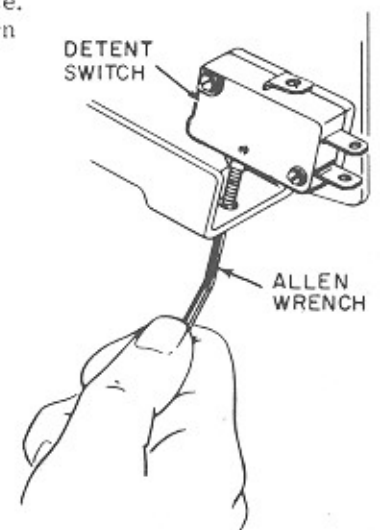
Obtain 0.015 to 0.025 — inch gap between detent pawl and high point of detent wheel.

- Release detent pawl from detent wheel.
- Rotate record magazine until detent pawl is positioned on high point as shown.
- Loosen mounting screws and position detent coil so that there is an 0.015 to 0.025-inch gap between detent pawl and detent wheel with roll pin against plunger stop.
- Tighten mounting screws.



### Adjust magazine detent switch.

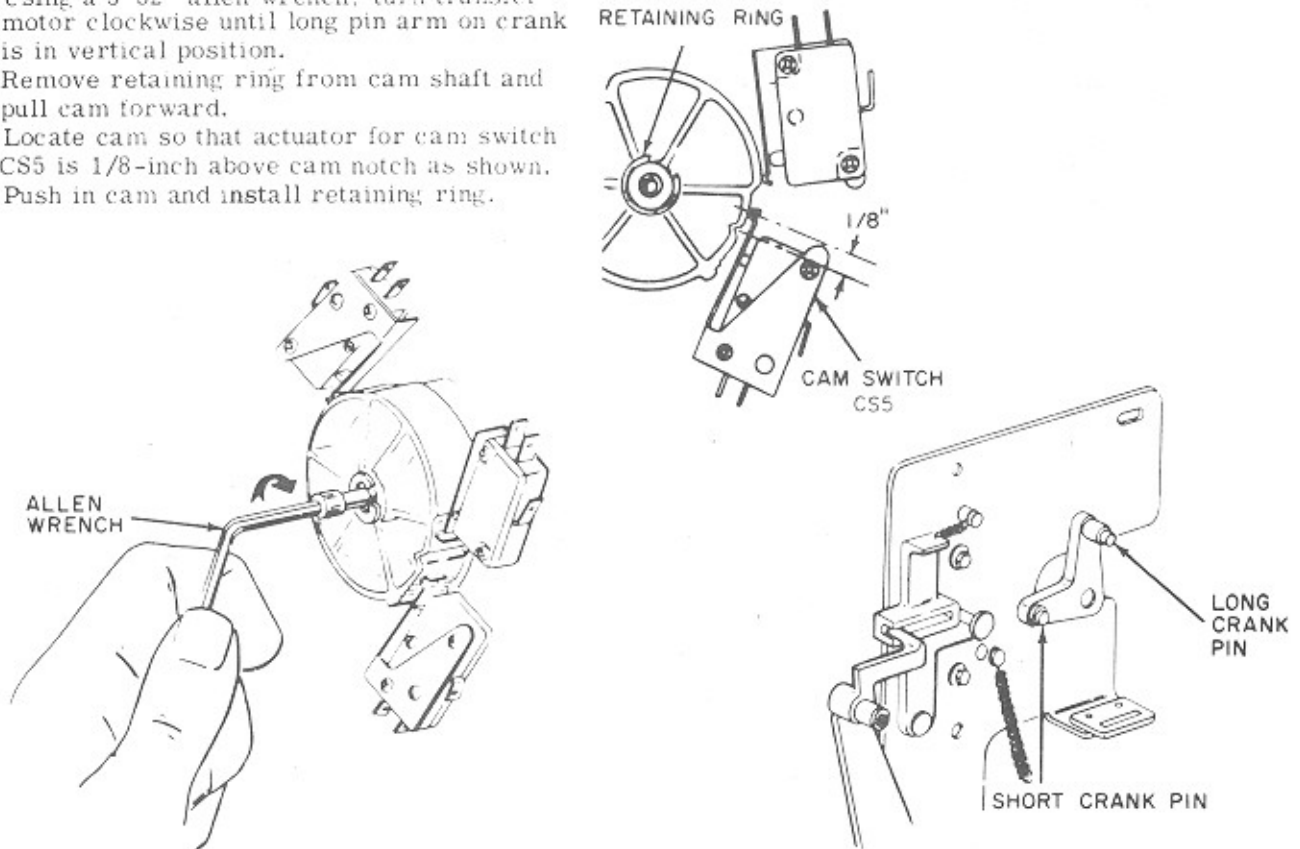
- Rotate detent wheel until pawl is seated in notch, locking wheel in place.
- Turn detent switch actuating screw in until switch just clicks, then turn screw in  $1/2$  turn more for stable adjustment.



## CAM SWITCH ADJUSTMENTS

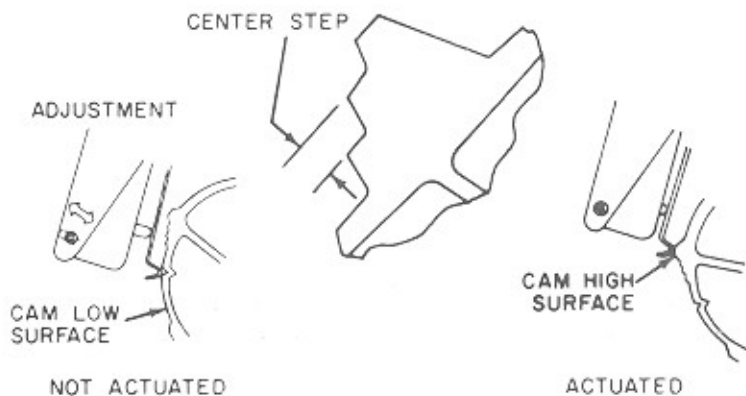
### Locate Cam in Proper Position

- Using a 5/32" allen wrench, turn transfer motor clockwise until long pin arm on crank is in vertical position.
- Remove retaining ring from cam shaft and pull cam forward.
- Locate cam so that actuator for cam switch CS5 is 1/8-inch above cam notch as shown.
- Push in cam and install retaining ring.



### Check and Adjust Cam Switch Operation

- Check that each cam switch operates (on and off) center cam step.
- To adjust a switch, loosen mounting screw closest to actuator end and move switch housing accordingly.
- Tighten mounting screw and recheck operation.

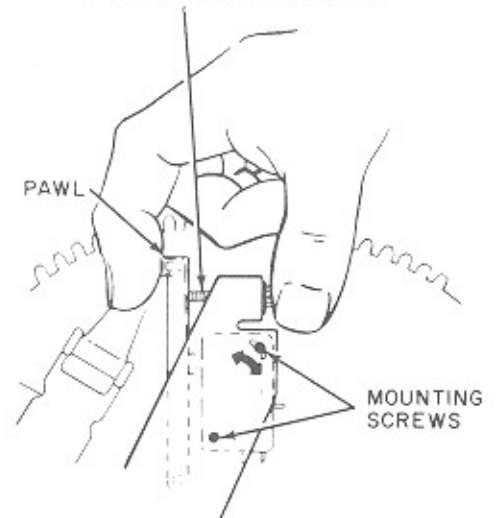
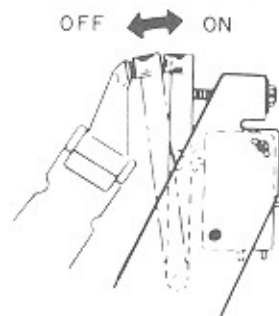


## STOP SWITCH ASSEMBLY ADJUSTMENTS

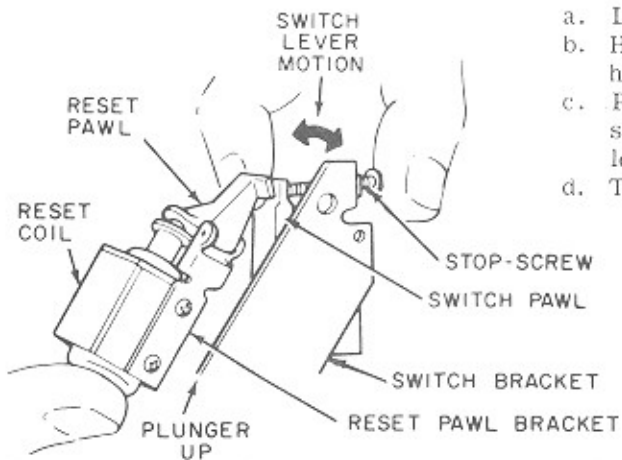
### Adjust left side switch.

- Hold pawl against stop screw using thumb and fore-finger.
- Loosen mounting screw nearest stop screw and move switch against pawl as far as it will go.
- Tighten mounting screw.
- Release pawl and stop screw, check that switch releases.
- If switch does not release, loosen mounting screw and adjust switch position so that it actuates and releases as pawl is moved back and forth.

NOTE: DO NOT TRY TO ADJUST STOP-SCREW  
IT IS FACTORY ADJUSTED



### Adjust reset coil.

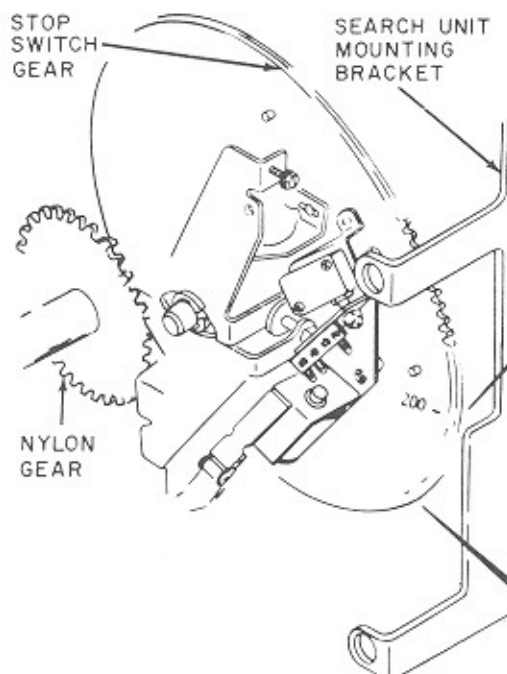


- Loosen screws holding reset pawl bracket.
- Hold reset coil plunger flush with bottom of coil, and hold left side switch pawl against stop screw.
- Position reset pawl bracket so tips of reset pawl and switch pawl will just miss each other as stopping switch lever is pivoted through its entire range of motion.
- Tighten screws and recheck switch operation.

## STOP SWITCH ASSEMBLY ADJUSTMENTS (CONTINUED)

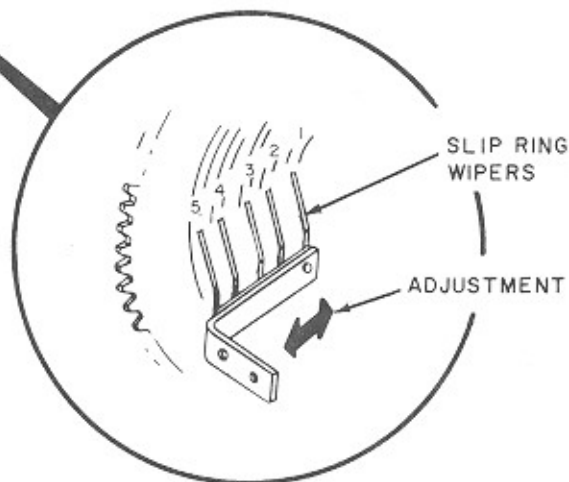
Align stop switch.

1. Lock magazine at selection A1. (Rotate the magazine until selection A1 is at top center. Engage the detent, locking the magazine in place.)



2. Mesh the stopping switch gear with the large nylon gear so that the 200 index mark on the stopping gear is in line with the step on the search unit mounting bracket.

3. Check to see that the slip ring wipers are properly aligned with their respective slip rings. If necessary loosen the slip ring wiper assembly mounting screw and move the entire assembly horizontally until the ends of the wipers are tracking in the center of the rings.



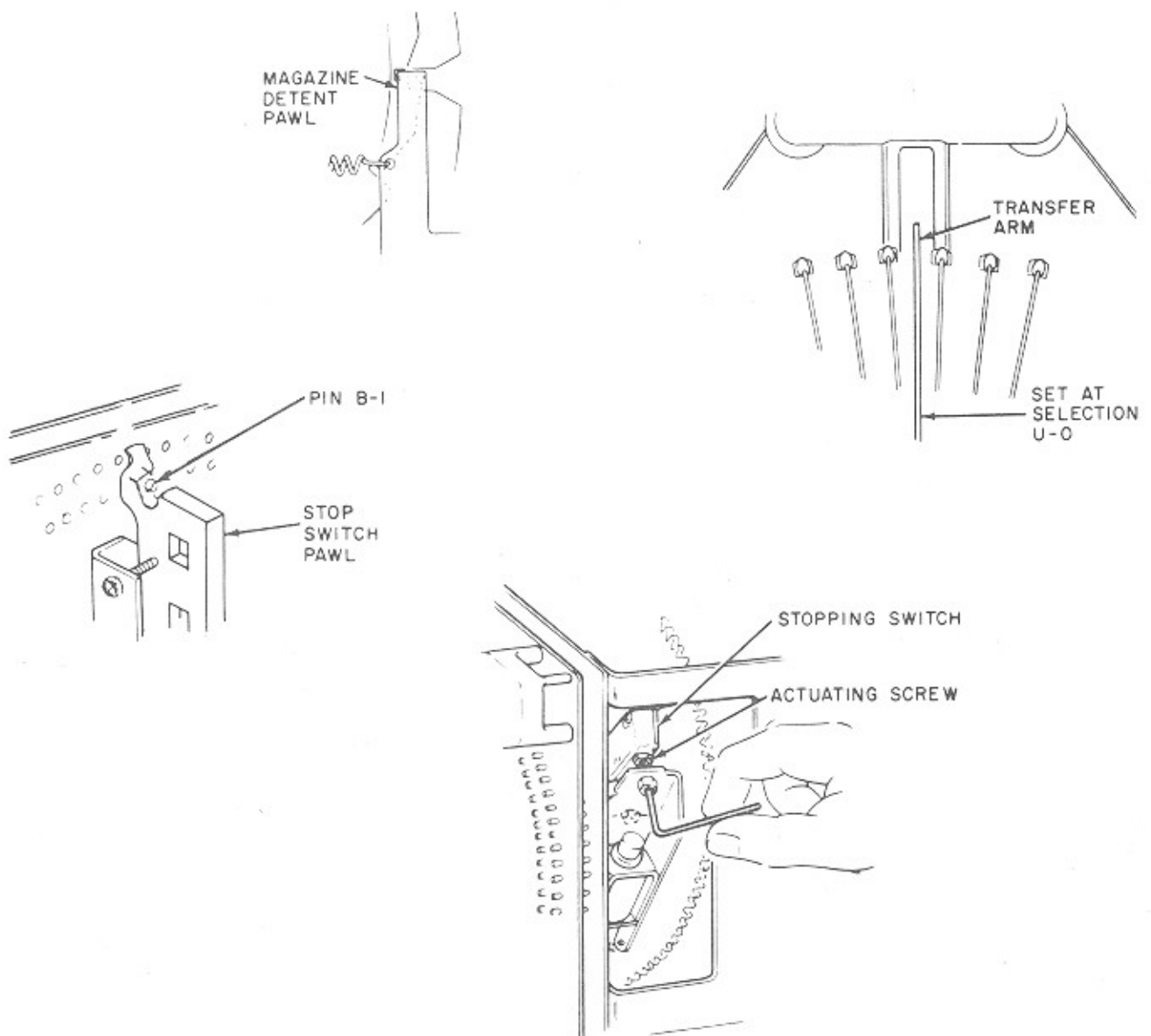
**NOTE:** When installing a replacement stop switch be sure to perform the procedures on the following page.

## STOP SWITCH ASSEMBLY ADJUSTMENTS (CONTINUED)

### Adjust stop switch actuating screw.

NOTE: This adjustment requires that the search unit is properly adjusted

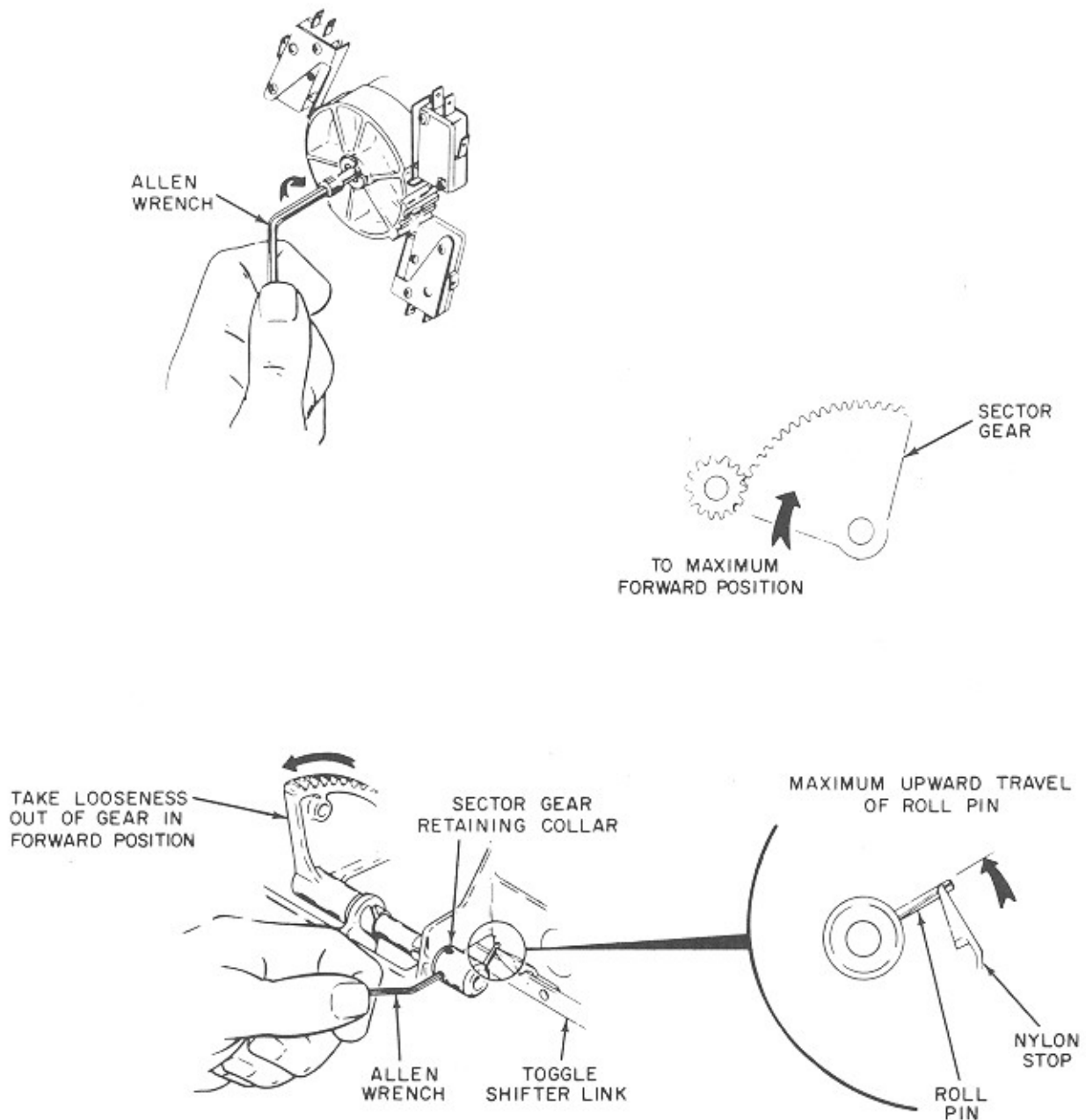
- Manually rotate record magazine and lock in position at selection U-O.
- Manually set search unit at pin B1.
- Locate stop switch pawl on pin B1 as shown.
- Back stopping switch actuating screw out past the point where switch clicks (releases).
- Turn stopping switch actuating screw in until switch just clicks (actuates); then turn screw in 1-2/3 turns further.
- Turn on mechanism service switch and cycle record changer at least twice to check stopping switch adjustment.



## SECTOR GEAR ADJUSTMENTS

### Adjust the Sector Gear Retaining Collar

- Using a 5/32-inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum up, or forward position.
- Set retaining collar so that roll pin is flush with top surface of toggle shifter link nylon stop. Take all looseness out of sector gear in forward direction.
- Check that there is no end play in sector gear shaft.

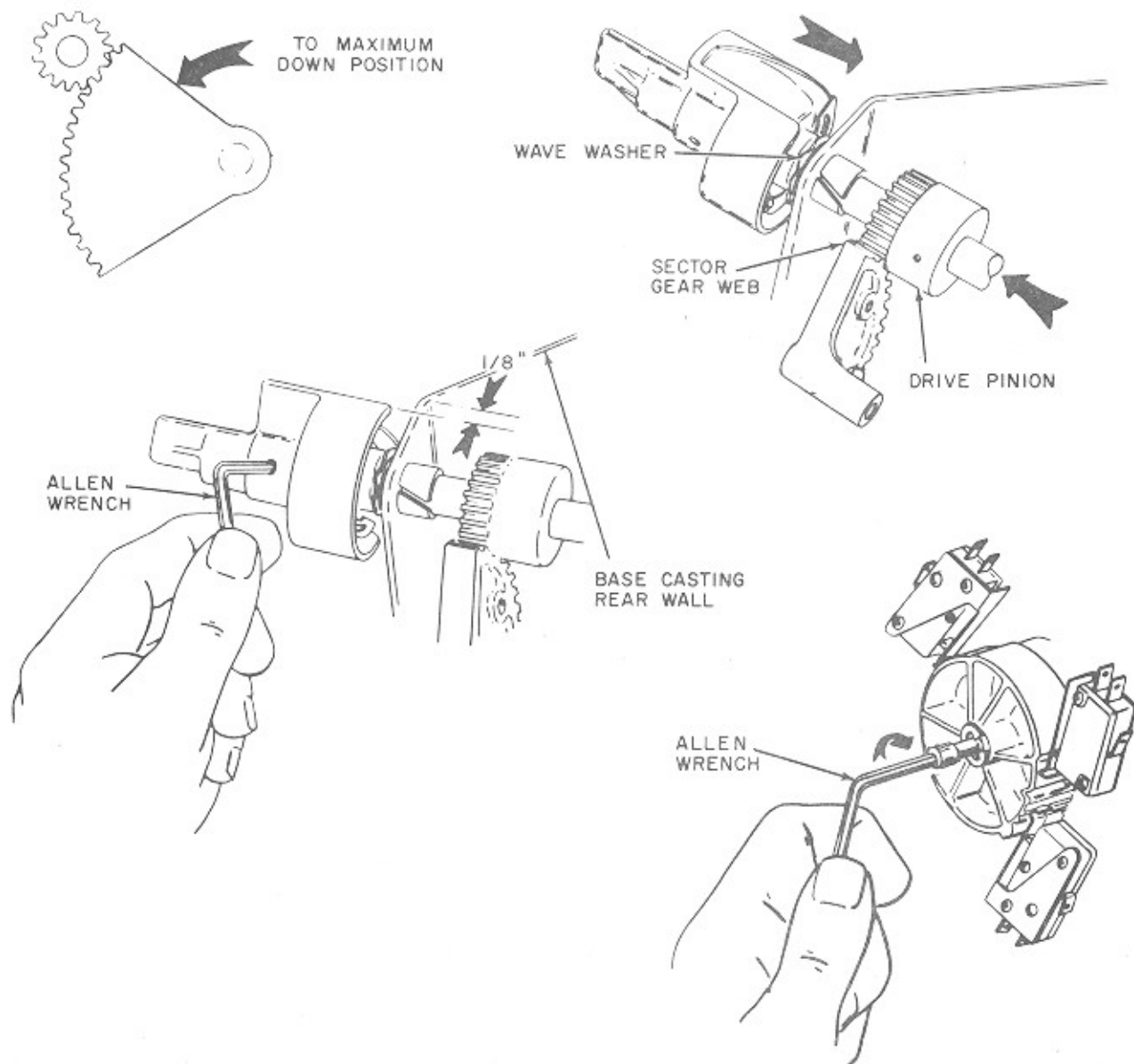


## TONE ARM CAM ADJUSTMENTS

### Adjust Tone Arm Cam.

- Using a 5/32-inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum down position. Remove all looseness in upward direction.
- Loosen allen screws and position tone arm cam so straight cutout in cam surface is 1/8-inch from base casting rear wall front surface plane. Use a 1/8-inch allen wrench to gauge this distance.
- Remove end play from shaft and tighten allen screws.

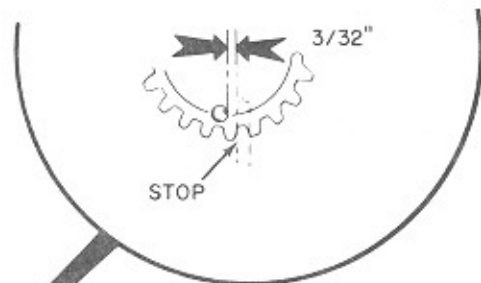
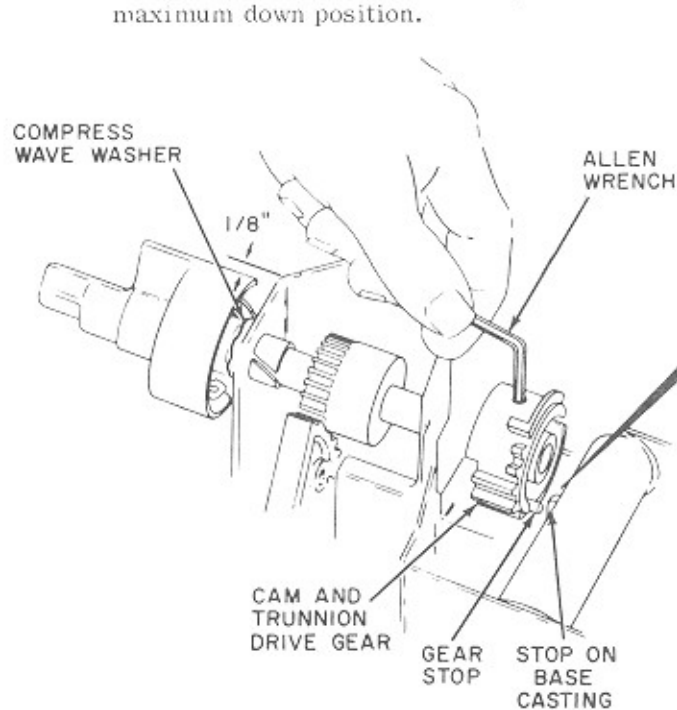
NOTE: Pinion gear teeth must not ride on sector gear web.



## CAM AND TRUNNION DRIVE GEAR ADJUSTMENT

### Adjust Cam and Trunnion Drive Gear.

- Using a 5/32-inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum down position.

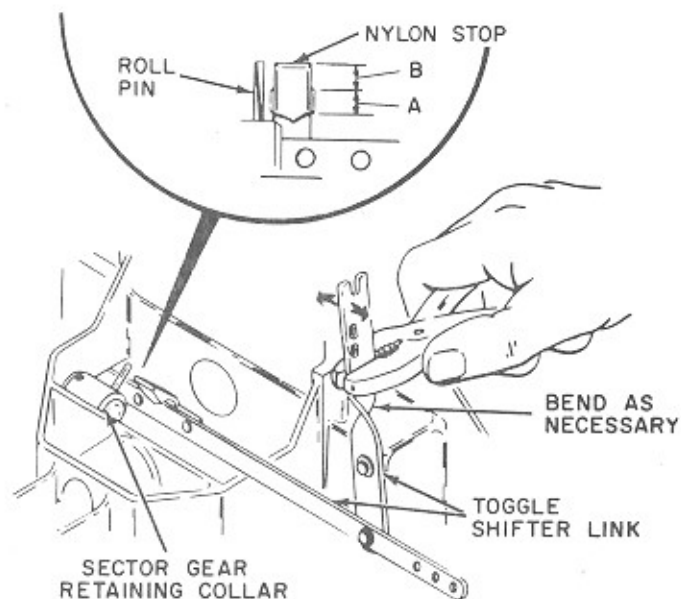


- Loosen allen-head setscrew.
- Position cam and trunnion drive gear so there is a 3/32-inch gap between gear stop and base casting stop front surface.
- Make sure that wave washer is compressed, that drive gear clears sector gear web, and that shaft has no end play.
- Tighten setscrew.

## TOGGLE SHIFTER LINK ADJUSTMENT

### Adjust Toggle Shifter Link.

- Bend toggle shifter link vertical member so sector gear retaining collar roll pin will contact nylon stop in area "A", but not area "B" as transfer motor cycles.
- Check adjustment with toggle shifter pins in both positions.

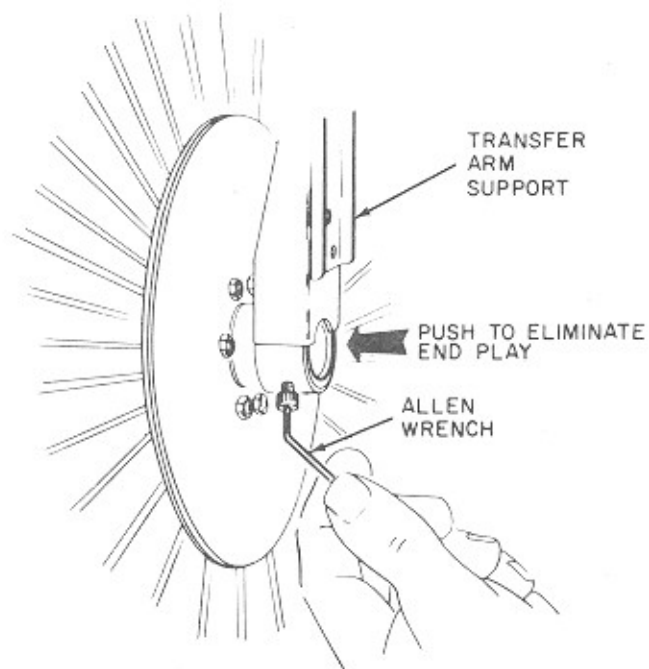
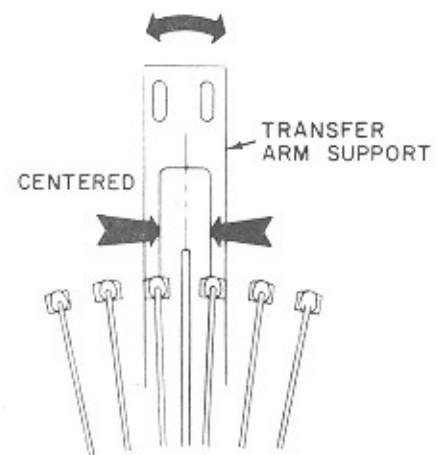
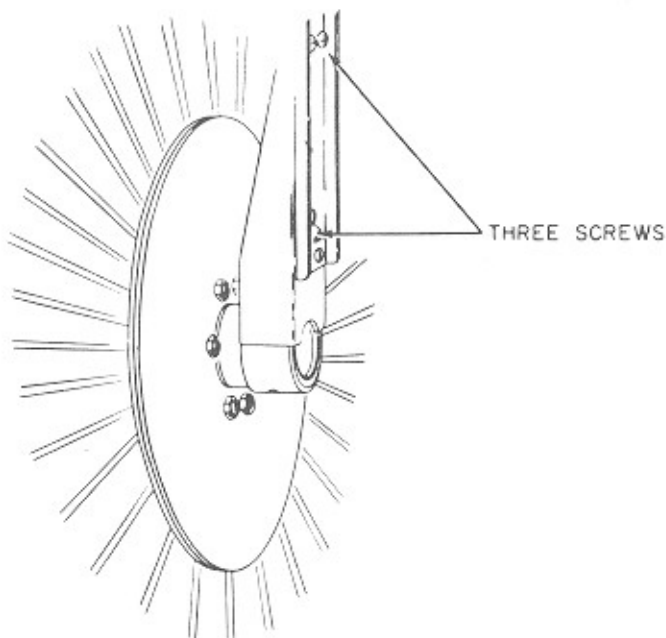




## RECORD MAGAZINE TRANSFER ARM SUPPORT ADJUSTMENT

Eliminate Magazine End Play and Center Transfer Arm Support.

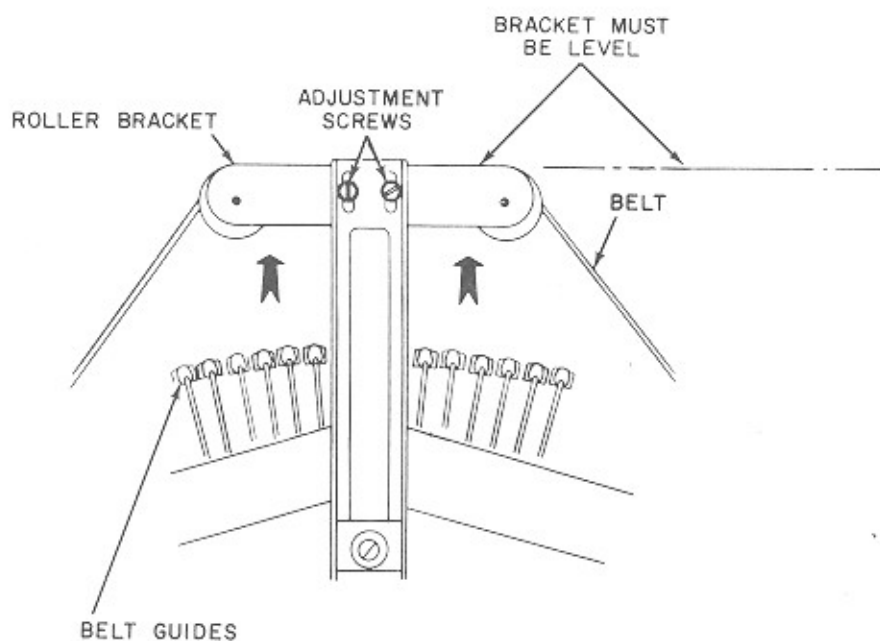
- Loosen setscrews in transfer arm support.
- Push transfer arm support onto magazine shaft to eliminate end play and adjust it so transfer arm will not rub on either side of opening.
- Tighten setscrews.
- If slight adjustment is necessary after setscrews are seated, loosen three screws on rear of transfer arm support, adjust, and tighten screws.



## MAGAZINE BELT ADJUSTMENT

### Tighten Magazine Belt.

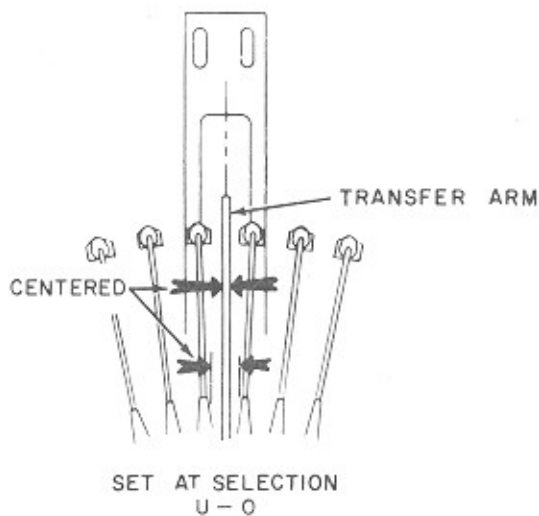
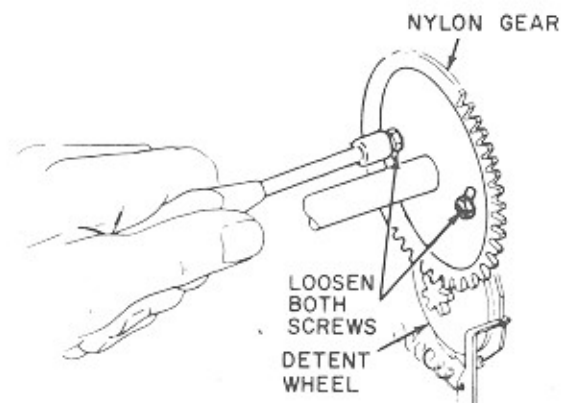
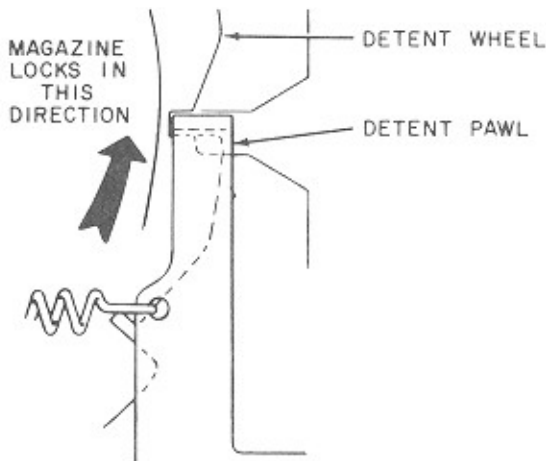
- Loosen two adjustment screws shown.
- Raise bracket to tighten belt around magazine.
- Check that belt rides evenly in center of belt guides, all the way around the magazine.



## ALIGNING MAGAZINE STOPPING POSITION WITH TRANSFER ARM

### Align Stopping Position of Magazine with Transfer Arm.

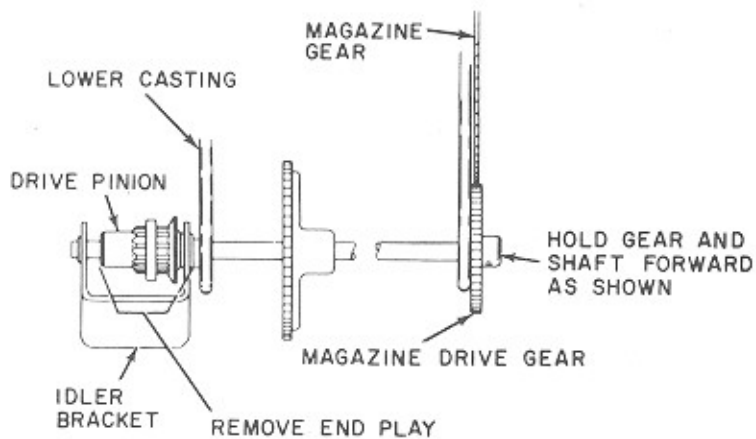
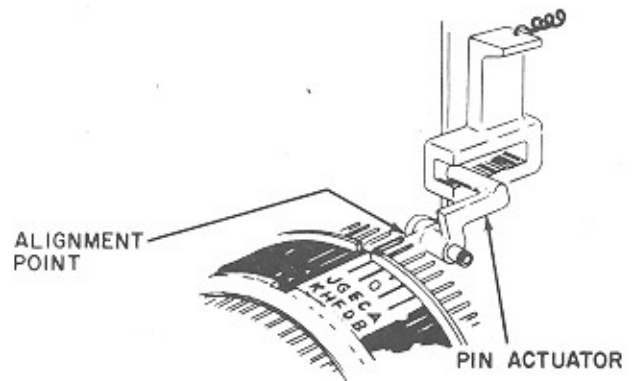
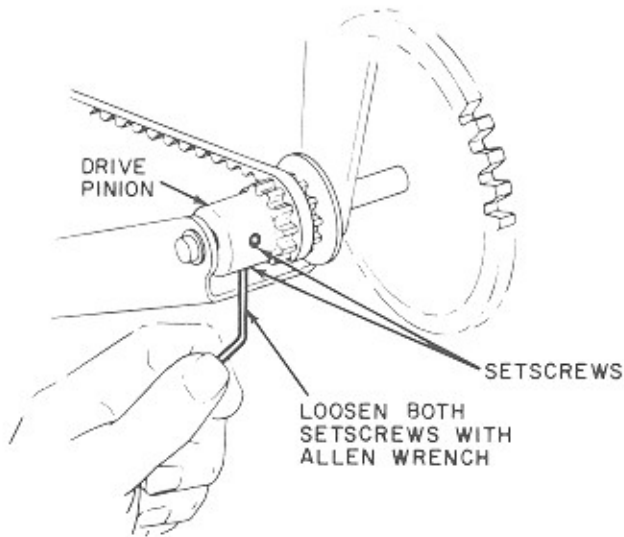
- Rotate magazine until selection is at top center. Allow magazine detent to engage and lock magazine in place.
- Loosen two screws in large nylon gear.
- With detent wheel locked, move magazine until transfer arm is centered in record slot.
- Tighten two screws in large nylon gear securely.



## POPULARITY METER ALIGNMENT

### Align Popularity Meter.

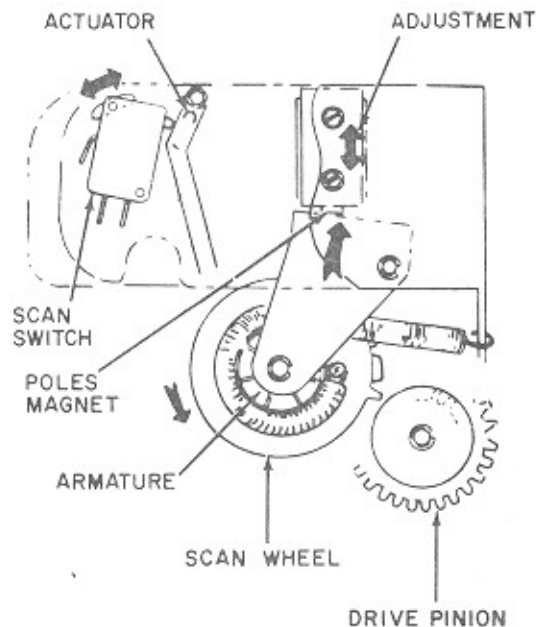
- Remove popularity meter.
- Loosen setscrews in popularity meter drive pinion.
- Release magazine detent. Rotate magazine until selection U-O is at top center.
- Allow detent to engage, locking magazine in place.
- Install popularity meter and rotate until pin marked U-O is centered over pin actuator.
- Be sure that crank is properly aligned and that popularity meter is all the way on the shaft.
- Remove all end play. Tighten two setscrews.



## SCAN CONTROL ADJUSTMENTS

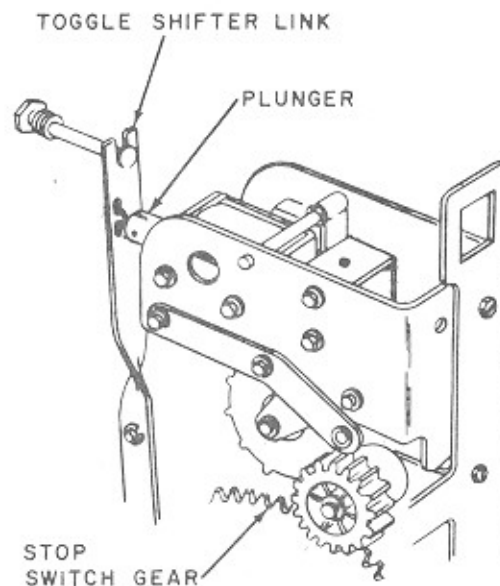
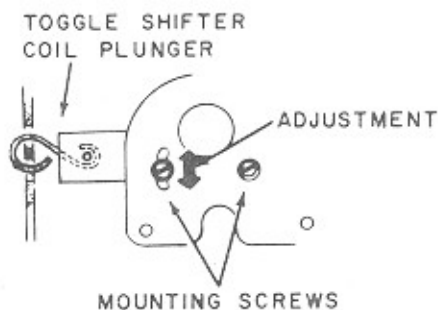
### Adjust Scan Control.

- Rotate magazine until scan wheel is in maximum counterclockwise position as shown.
- Loosen scan switch top mounting screw.
- Move switch against actuator until switch has operated, and switch button is almost bottomed.
- Tighten top mounting screw.
- With armature held against magnet pole pieces, scan wheel should barely clear drive pinion. Rotate scan wheel one full turn to check this adjustment.



### Adjust Toggle Shifter Coil.

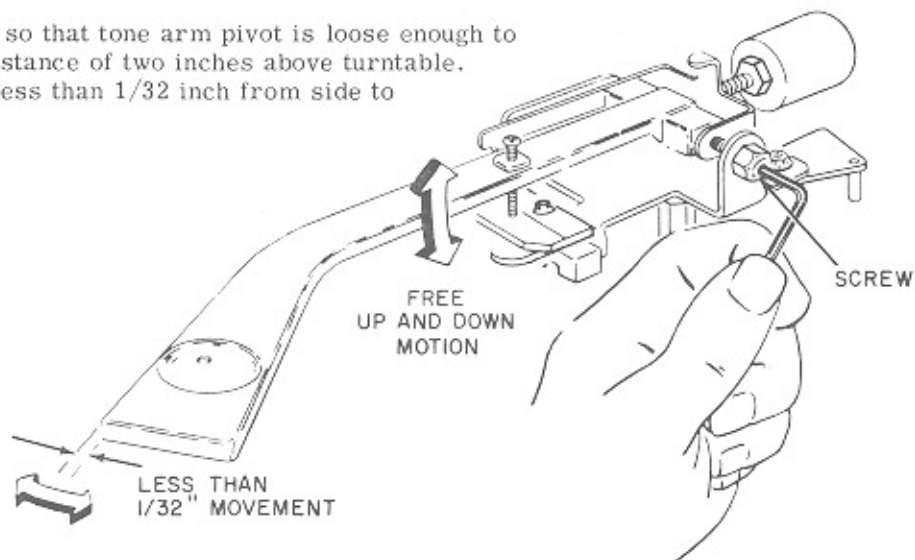
- Loosen two mounting screws for toggle shifter coil.
- Adjust coil until it is level and plunger mover freely in and out.
- Make sure that drive pinion is meshed properly with stop switch gear.
- Tighten two screws.



## TONE ARM ADJUSTMENTS

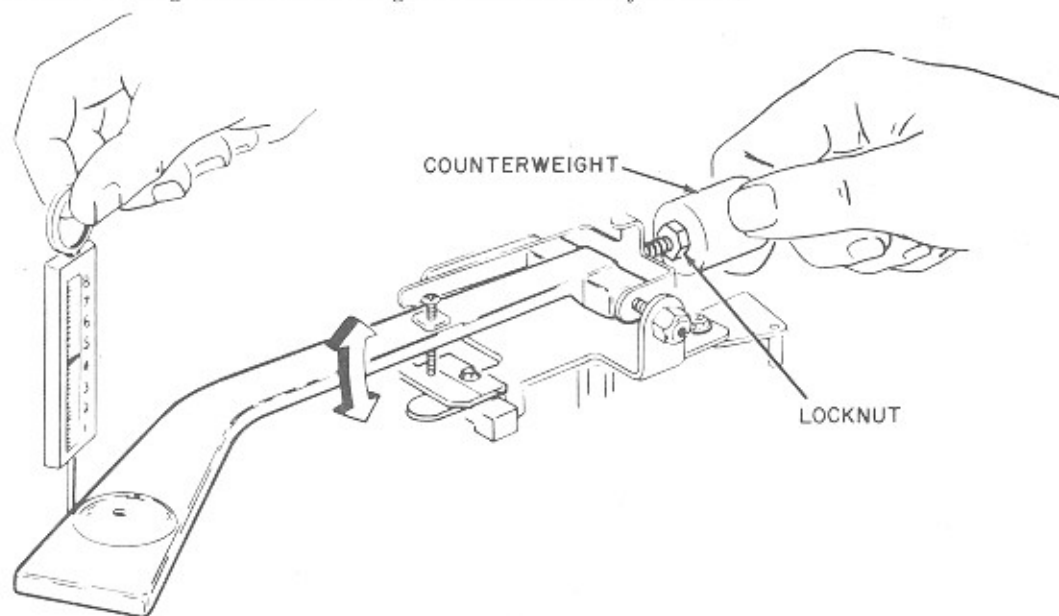
### Adjust Vertical Pivot.

- Adjust tone arm pivot screw so that tone arm pivot is loose enough to move free vertically for a distance of two inches above turntable.
- Check that tone arm moves less than  $1/32$  inch from side to side.



### Set Stylus Force.

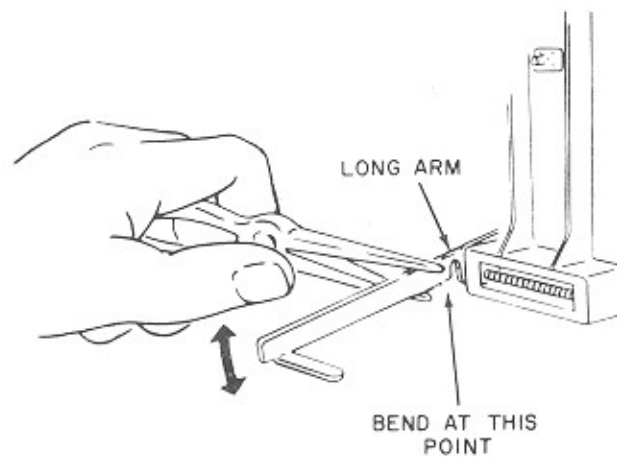
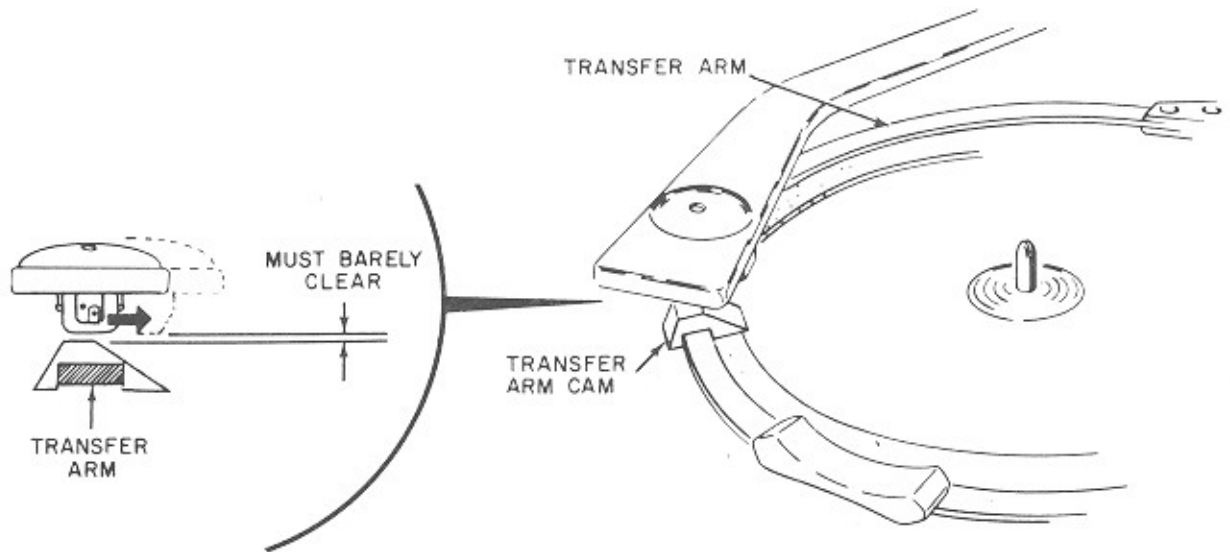
- Loosen lock nut.
- Attach a suitable gram gauge to tone arm as shown. Adjust counterweight for 4 to 5 grams pressure.
- Tighten lock nut against counterweight and recheck adjustment.



## tone arm adjustments (CONTINUED)

### Set Stylus Clearance.

- Operate transfer assembly to place transfer arm next to tone arm.
- Stylus must barely clear transfer arm as tone arm swings over it. Adjust clearance by bending long arm of tone arm rest, as necessary, at point shown.

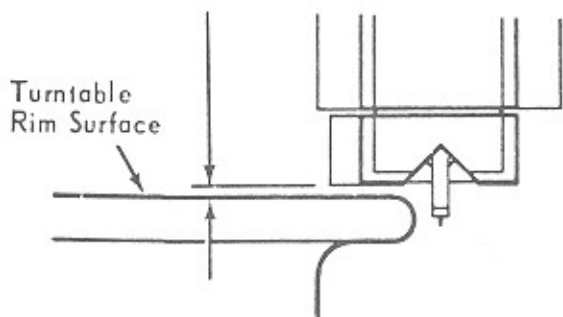


## TONE ARM ADJUSTMENTS (CONTINUED)

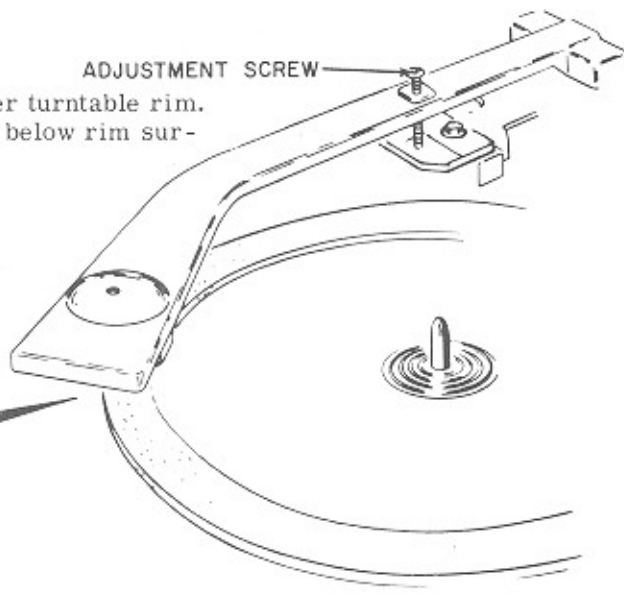
### Set Stylus Height.

- Operate transfer assembly to position tone arm over turntable rim.
- Turn adjustment screw until stylus tip is  $1/32$  inch below rim surface with tone arm in play position.

$1/64$  to  $1/32$  Inch

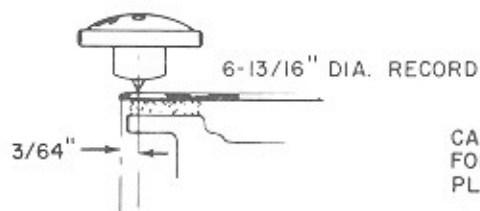


ADJUSTMENT SCREW

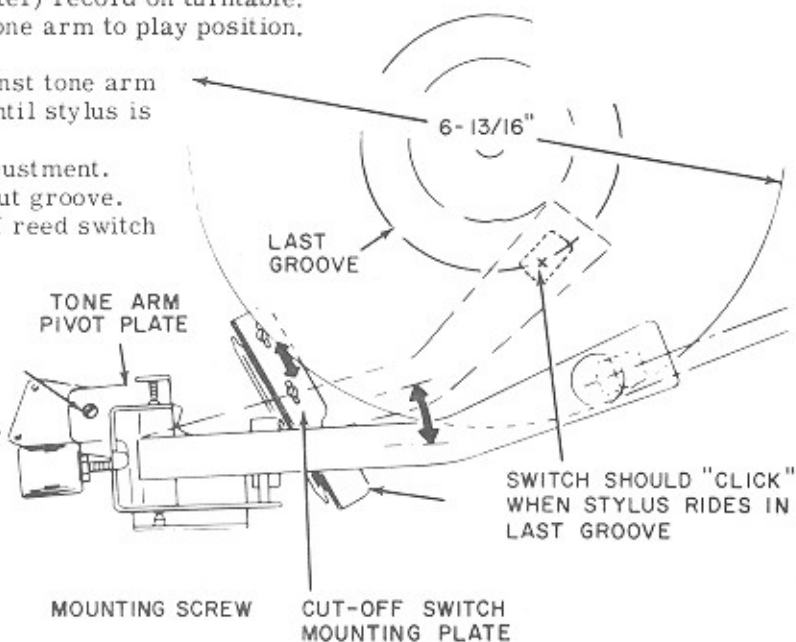


### Set Stylus Setdown Position and Tone Arm Cutoff Switch.

- Place undersize ( $6-13/16$ -inch diameter) record on turntable.
- Operate transfer assembly to bring tone arm to play position.
- Loosen mounting screw.
- While holding cam follower plate against tone arm cam, move tone arm, as required, until stylus is  $3/64$ -inch from record edge.
- Tighten mounting screw and check adjustment.
- Locate tone arm stylus in record cutout groove.
- Loosen two mounting screws on cutoff reed switch mounting plate.
- Position mounting plate, as necessary, until reed switch is closed. The magnet on the under side of the tone arm operates the cutoff switch. Adjust switch so it operates before stylus enters "closed" record groove.



CAM  
FOLLOWER  
PLATE

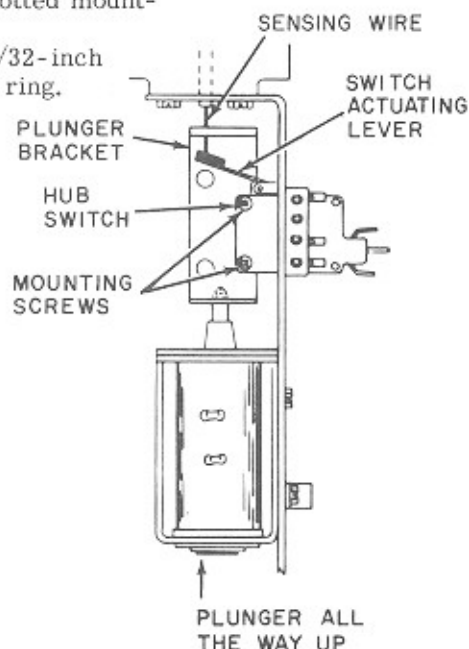
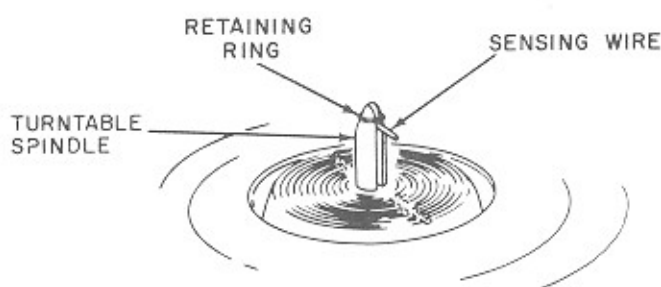




## AUTOMIX ADJUSTMENTS

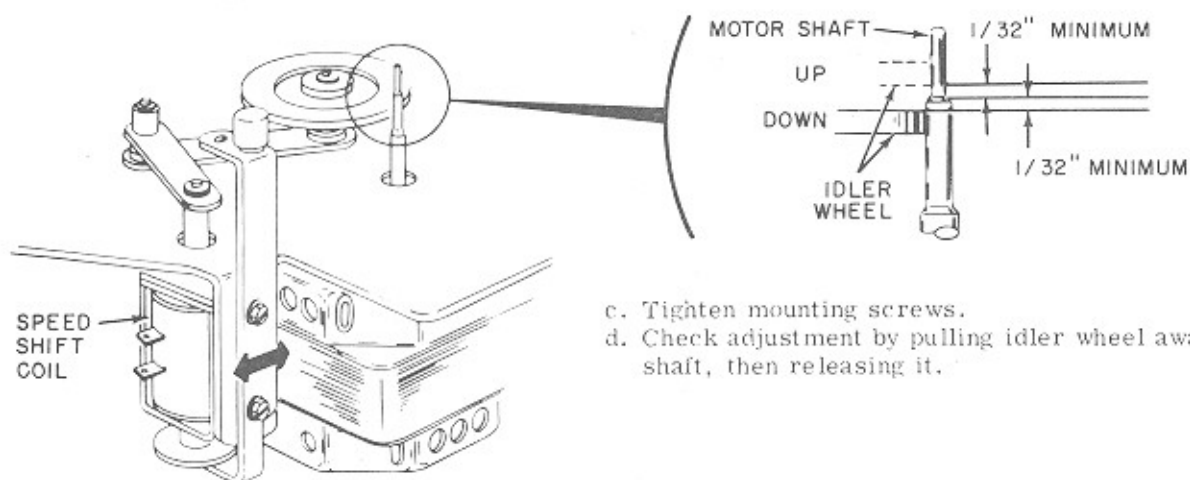
### Obtain 1/32-inch Gap between Sensing Wire and Turntable Spindle Retaining Ring.

- Loosen mounting screws and move hub switch down as far as slotted mounting holes will allow.
- While holding plunger all the way up, raise hub switch until a 1/32-inch gap exists between sensing wire and turntable spindle retaining ring.
- Tighten switch mounting screws.



### Adjust Speed Shift Coil so that Idler Wheel Rim Clears Motor Shaft Step by at Least 1/32 inch.

- Loosen speed shift coil mounting screws.
- Adjust speed shift coil so that idler wheel rim clears motor shaft step by at least 1/32 inch in both full up and full down coil plunger position. The coil frame will pivot slightly about the top mounting screw hole, just enough to allow up and down adjustment of the idler linkage.

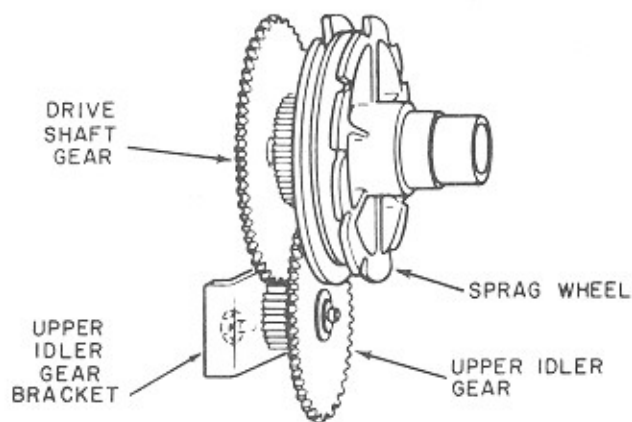
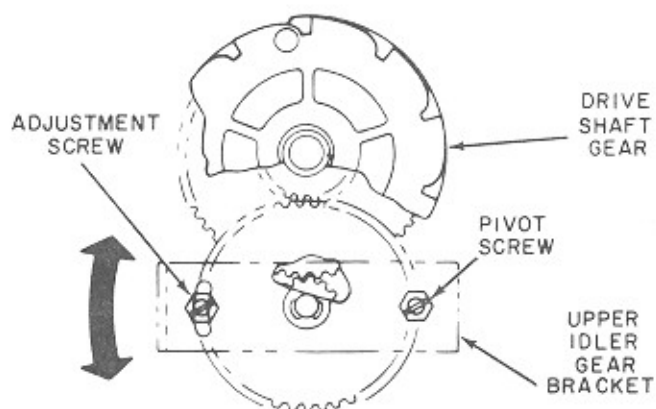


- Tighten mounting screws.
- Check adjustment by pulling idler wheel away from motor shaft, then releasing it.

## SEARCH UNIT GEAR ADJUSTMENT

### Mesh Drive Shaft Gear, Upper Idler Gear, and Sprag Wheel Pinion.

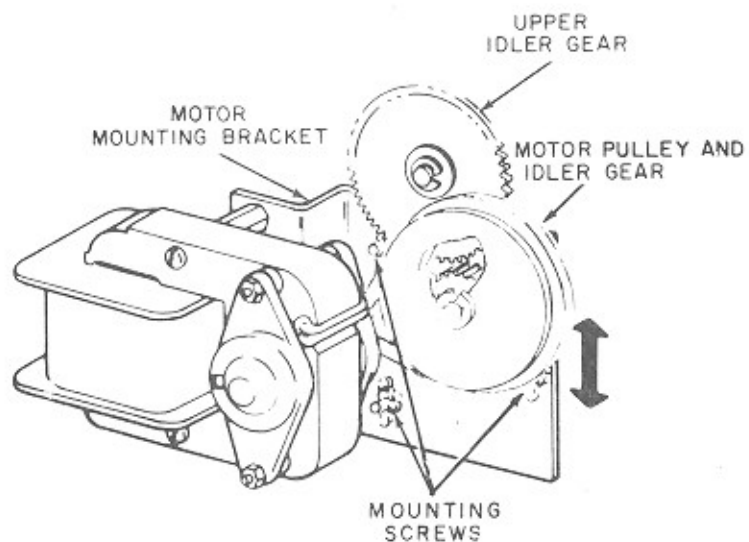
- a. Loosen upper idler gear bracket pivot screw and adjustment screw.
- b. Pivot bracket, as shown, until all gears move freely with a minimum of backlash.
- c. Tighten screws and recheck adjustment.



## SEARCH UNIT GEAR ADJUSTMENTS (CONTINUED)

### Align Motor Idler Gear To Upper Idler Gear.

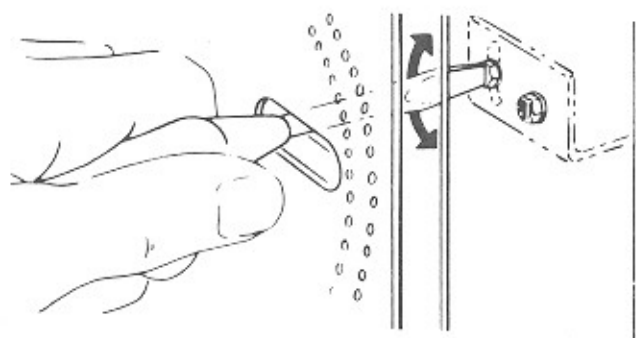
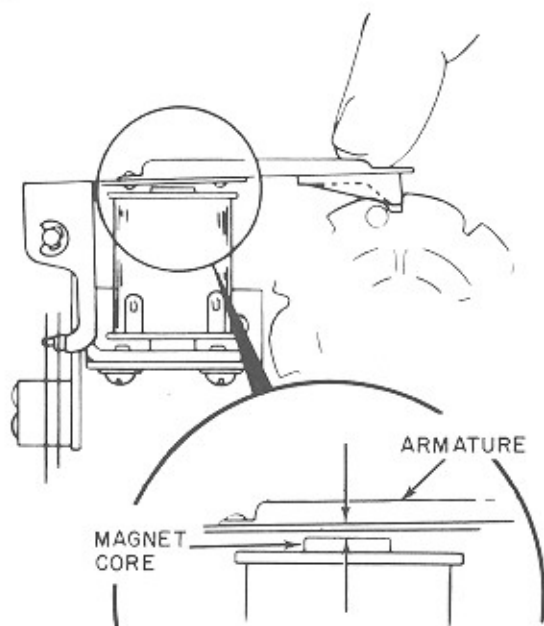
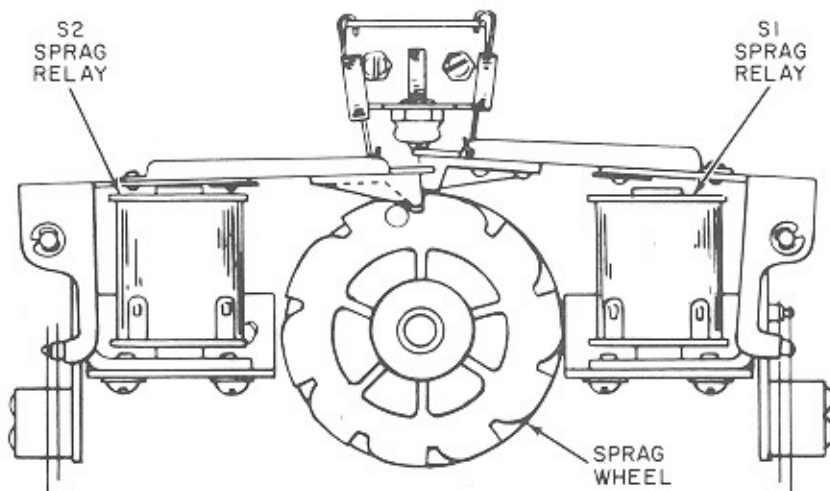
- Loosen three motor mounting screws in motor mounting bracket.
- Move motor assembly as shown until motor meshes with upper idler gear without binding and with minimum backlash.
- Tighten screws and recheck adjustment.



## SPRAG RELAY ADJUSTMENTS

### Adjust Sprag Relay Core Gap.

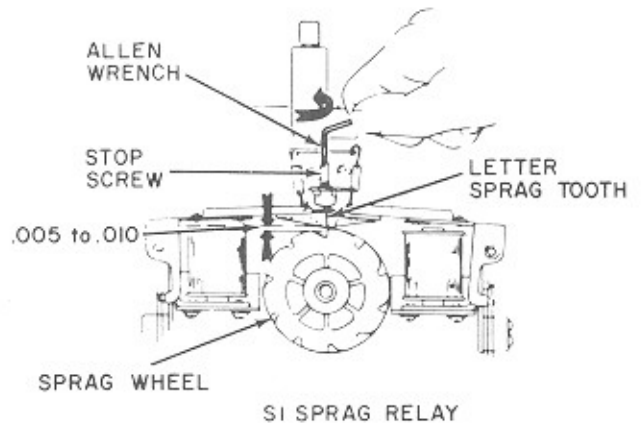
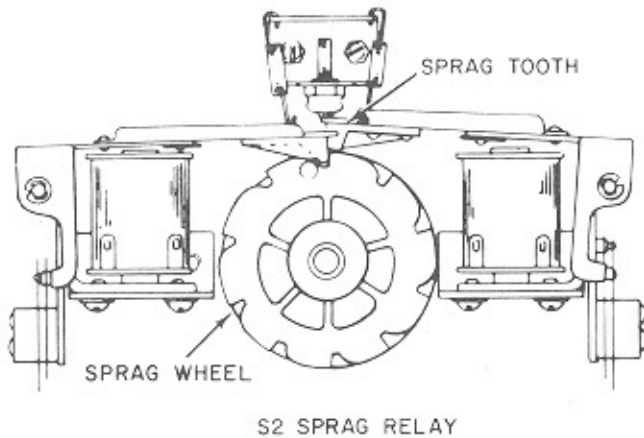
- Bottom sprag relay S2 tooth in any one sprag wheel notch.
- While holding tooth in notch, check clearance between sprag relay armature and magnet core. A piece of ordinary bond paper should just pass through this gap.
- To adjust clearance, loosen sprag relay mounting and pivot screws and move relay as required.
- Tighten screws and recheck adjustment.
- Repeat steps a through d to adjust sprag relay S1.



## SPRAG RELAY ADJUSTMENTS (CONTINUED)

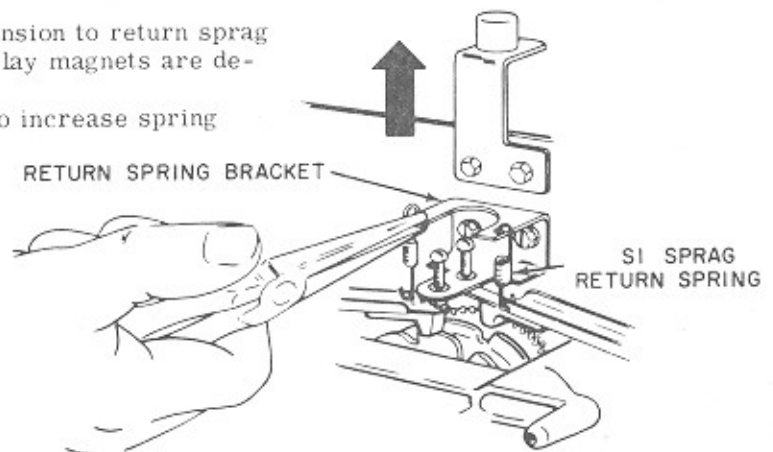
### Adjust Sprag Tooth-To-Wheel Clearance.

- Align sprag relay S2 tooth with high point on sprag wheel.
- Turn in stop screw until sprag relay tooth binds against sprag wheel. Do not force sprag wheel around when checking binding.
- Back stop screw off 1/4-turn for 0.005- to 0.010- inch clearance as shown.
- Repeat steps a through c to adjust sprag relay S1 for 0.018- to 0.030- inch clearance.



### Adjust Return Spring Force.

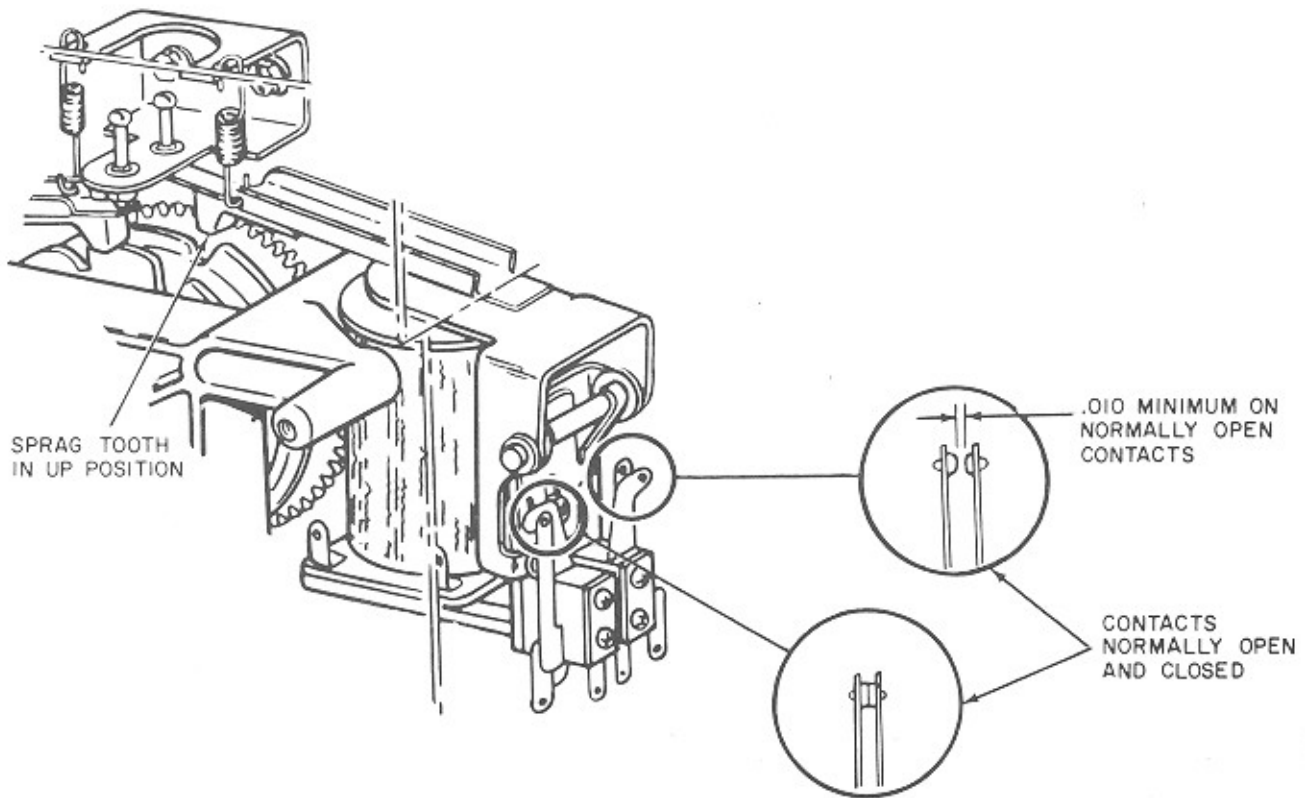
- Check that return springs have enough tension to return sprag relay armatures to rest position when relay magnets are de-energized.
- Bend return spring bracket, as shown, to increase spring tension. Do not bend S1 arm more than 1/16 inch; do not bend S2 arm more than 1/64 inch.
- If proper tension cannot be obtained, replace return spring.



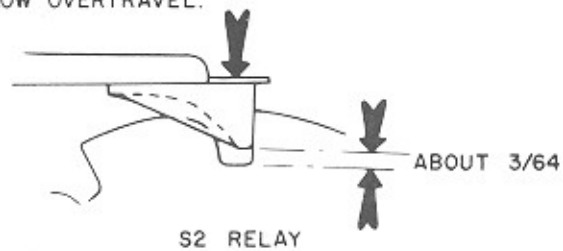
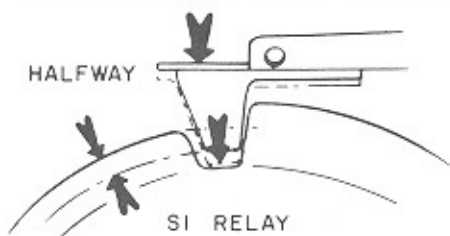
## SPRAG RELAY ADJUSTMENTS (CONTINUED)

### Adjust Relay Contact Make and Break Position.

- Slowly bottom sprag relay S1 tooth in a sprag wheel detent while observing relay contacts.
- Check that contacts make before break halfway down into detent. Bend contact arms as required.
- Repeat steps a. and b. for sprag relay S2. The contacts should make and break about  $3/64$  inch from detent bottom.



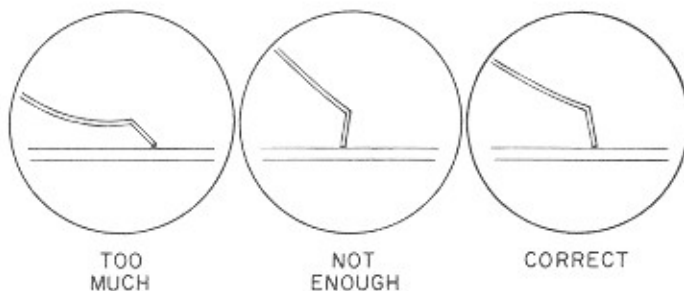
CONTACT SHOULD MAKE OR BREAK AT THIS POINT OF DOWNWARD TRAVEL OF TOOTH INTO NOTCH TO ALLOW OVERTRAVEL.



## SEARCH WIPER ADJUSTMENTS

### Adjust Wiper Blade Contact Force.

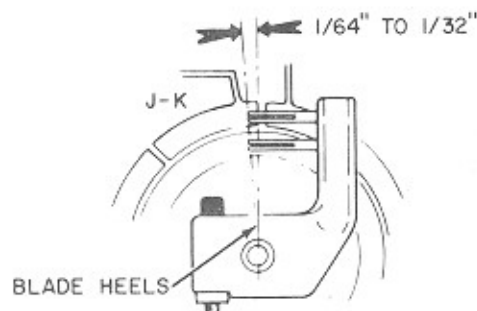
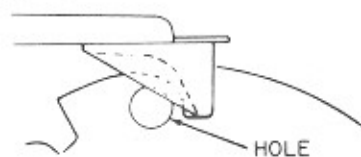
- Loosen wiper arm hub setscrew and back wiper arm assembly away from commutator board.
- Move wiper arm assembly toward board until blades just touch segments, then move wiper arm assembly toward circuit board  $1/16$ - to  $1/32$ -inch. The blades should be formed as shown.
- Check wiper position on segments, then tighten hub setscrew.



### Position Inside (Letter) Wiper on Commutator Board.

- Bottom sprag relay S2 tooth in sprag wheel notch closest to sprag wheel hole.
- Check that outer wiper on inside circuit board is positioned on segment J-K. Segment J-K is located to the left of the board top center (facing the circuit board back side).
- If wiper arm and wipers of inside circuit board are not properly aligned as shown, loosen hub setscrew, and while holding sprag relay S2 tooth in position as in step a, rotate wiper arm assembly to align wipers.
- Tighten setscrew.

NOTE: When changing position of wiper arm assembly, be sure to maintain proper contact pressure.

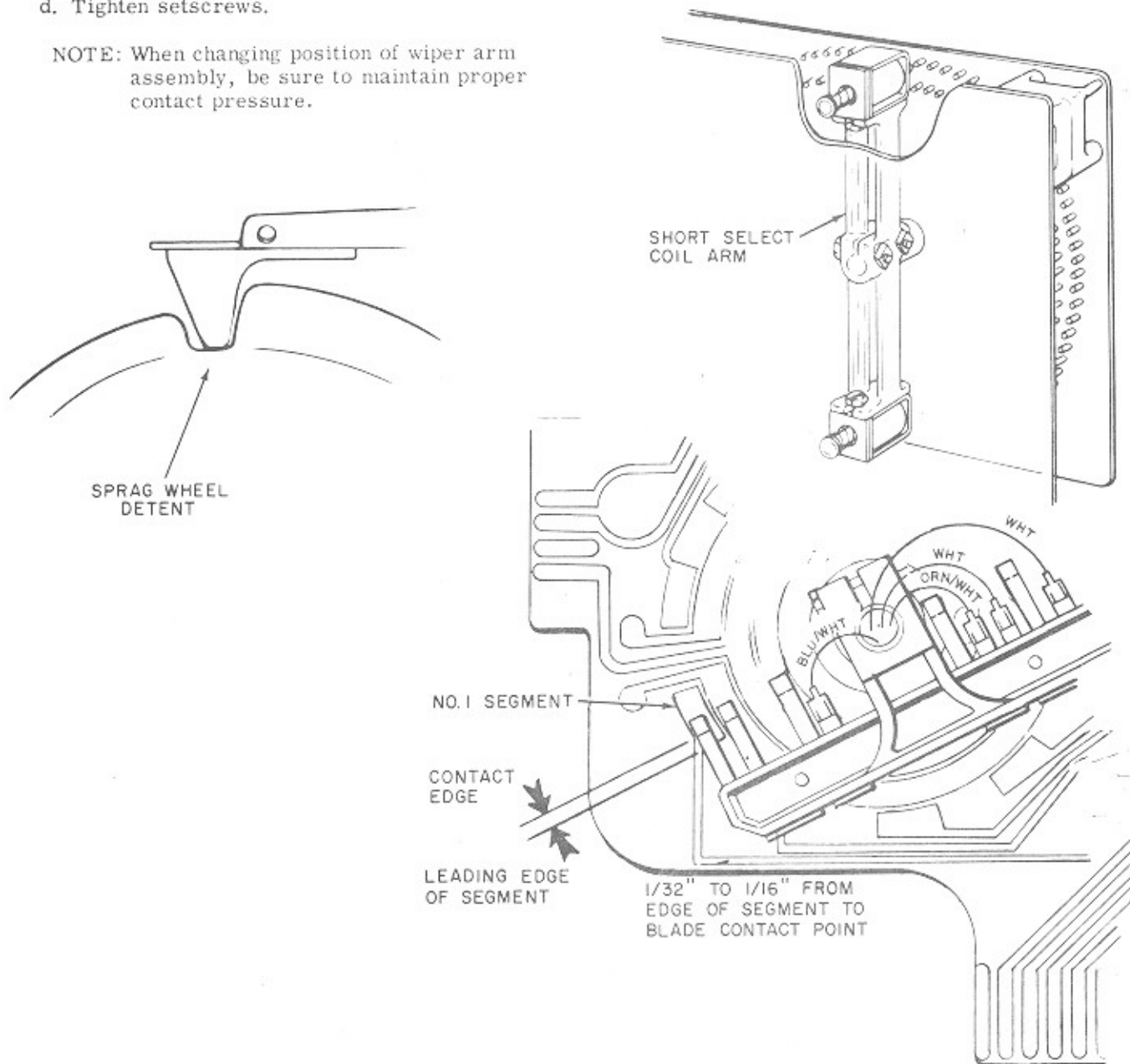


## SEARCH WIPER ADJUSTMENTS (CONTINUED)

Position Outside (Number) on Commutator Board.

- Bottom sprag relay S1 tooth in sprag wheel notch. Check that short select coil arm is up.
- Check that wiper arm side with three blades on it is positioned on segment 1, as shown.
- If adjustment is necessary, loosen the hub setscrew and, while holding sprag relay S1 tooth in position as in step a, rotate wiper arm assembly to align wipers.
- Tighten setscrews.

NOTE: When changing position of wiper arm assembly, be sure to maintain proper contact pressure.

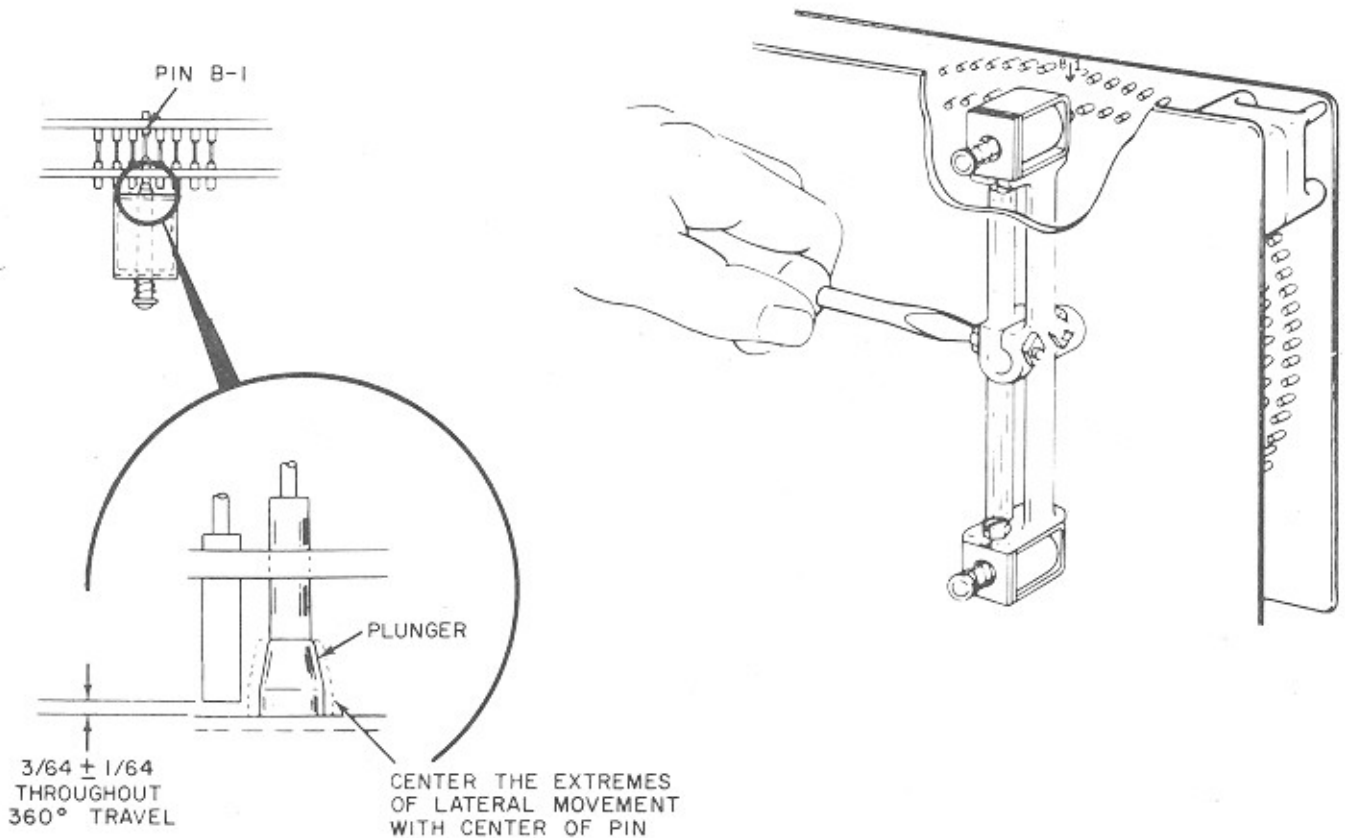
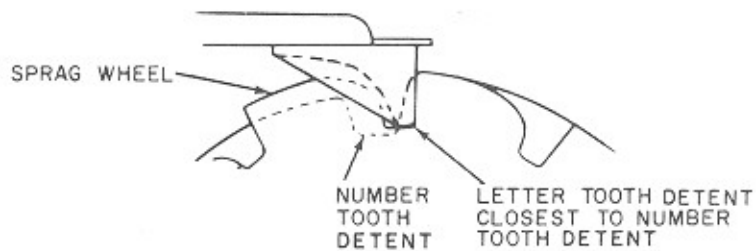




## SELECT COIL ADJUSTMENTS

### Plunger-To-Pin Alignment.

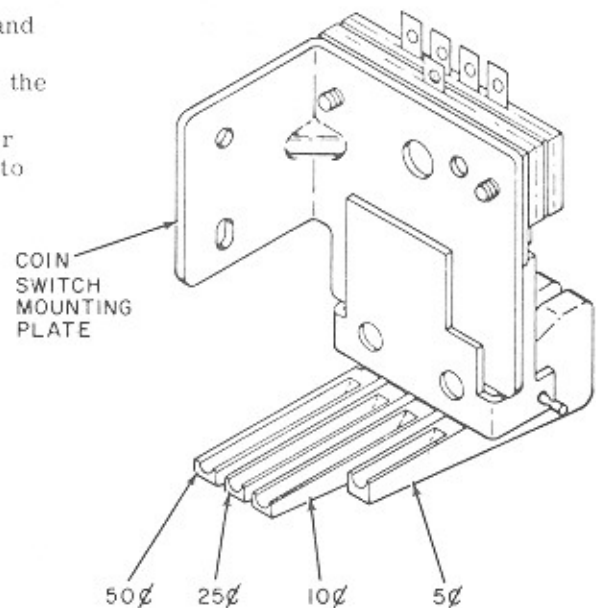
- Bottom sprag relay S1 (numbers) tooth in any number detent.
- Bottom sprag relay S2 (letters) tooth in sprag wheel detent closest to the chosen number detent.
- Push out the pins above B-1 to facilitate viewing.
- Check that select coil plunger on short select coil arm is aligned with pin B-1 on pinwheel assembly.
- If adjustment is required, loosen select coil arm assembly mounting screws just enough to center plunger over pin B-1 without moving forward or back along drive shaft.
- Check for a clearance of  $3/64 \pm 1/64$  inch between the coil frames and pins for 360-degree select coil arm travel.



## COIN SWITCH ADJUSTMENTS

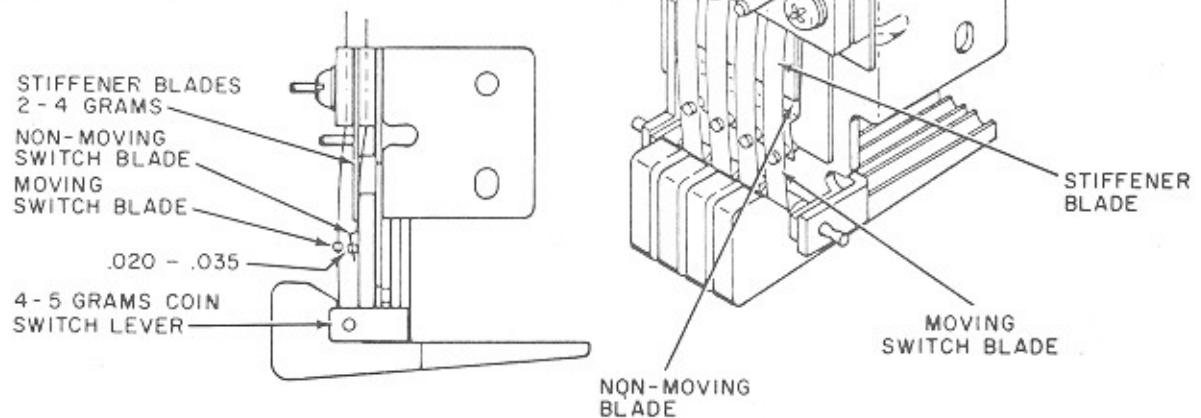
### Operational Check.

- Hold plastic coin switch lever in normal position and drop a coin through slug rejector.
- When the coin comes to rest on the lever, release the lever slowly.
- Check that the weight of the coin operates the lever enough to close the coin switch and allow the coin to fall free.
- Repeat steps a, b, and c for other three levers.



### Contact Pressure and Gap.

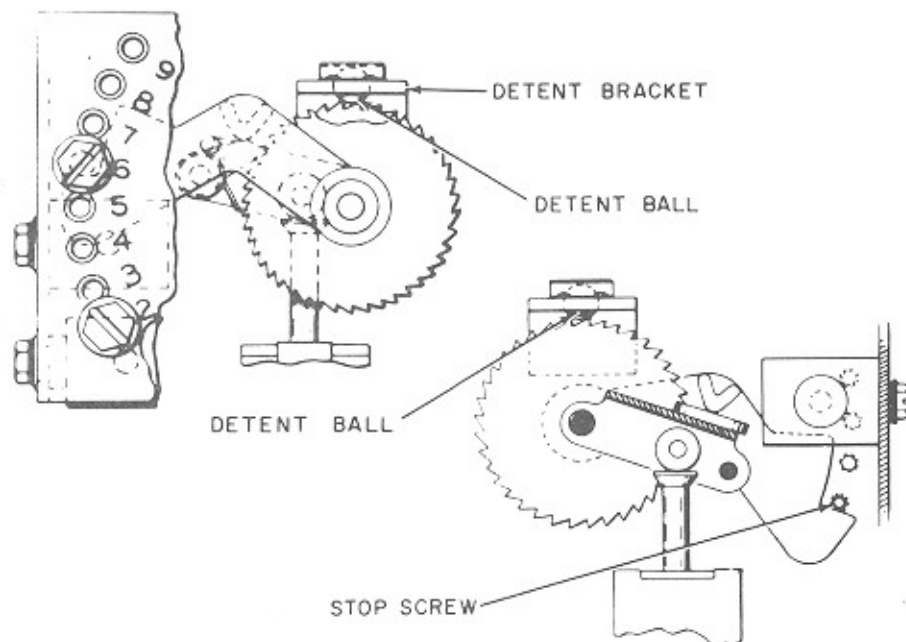
- Check that each moving switch blade pushes against its lever with 4- to 5-grams force to hold lever against cushion.
- Check that each non-moving blade pushes against its stiffener blade with 2- to 4- grams force.
- Adjust contact pressure by bending contact blade near fiber insulator.
- Check that gap between contacts at each switch is 0.020 to 0.035-inch (about 1/32).
- Adjust gap by bending stiffener blade.



## CREDIT UNIT ADJUSTMENTS

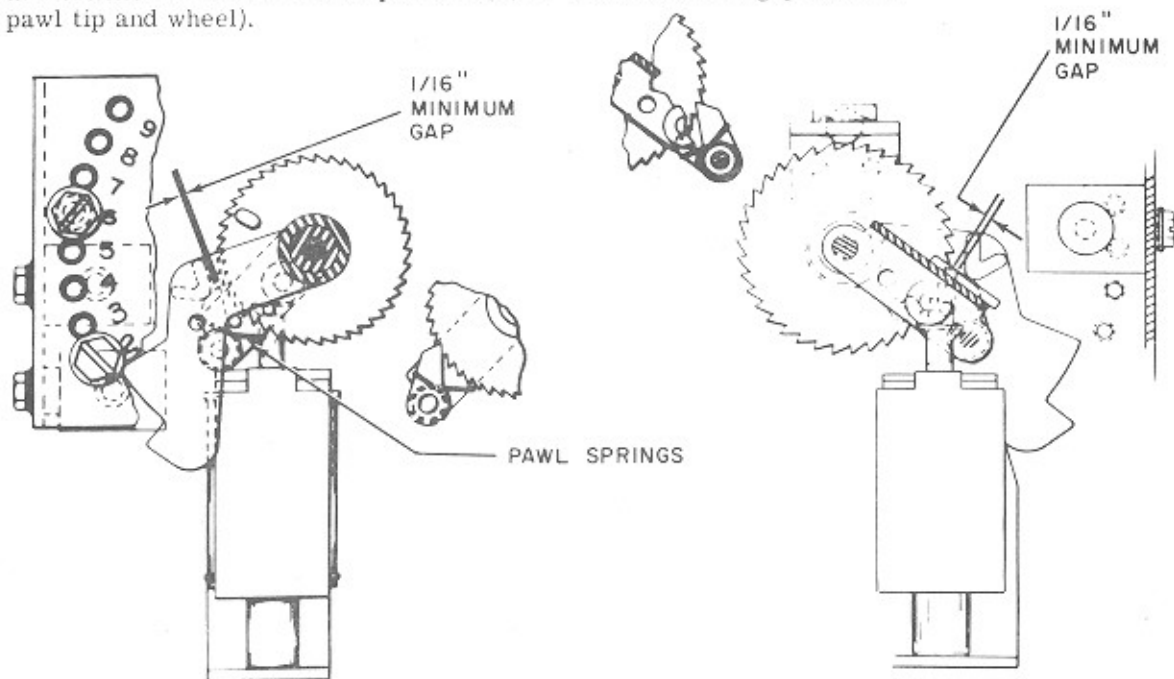
### Adjust Detent Bracket

- Loosen two screws holding detent bracket to credit unit back plate.
- Push credit or cancel coil plunger upward until corresponding stop arm strikes its stop screw or stop coil plunger.
- Adjust detent bracket until detent ball is seated between teeth. Check that there is no under travel.
- Tighten screws to secure bracket.



### Adjust Pawl Springs

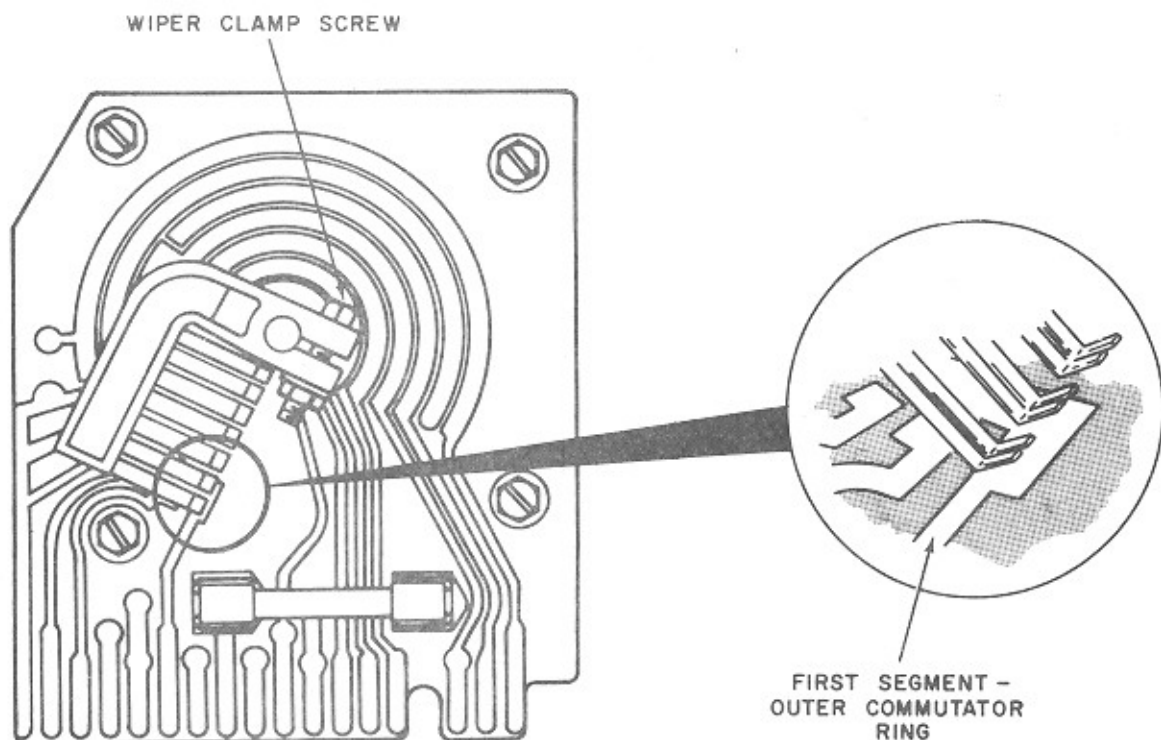
- Check that pawl springs provide about 4 grams force between pawl tips and credit wheel when assembly has lifted far enough to permit engagement of pawl and wheel.
- Check that this force provides positive engagement and yet permits roller and bracket to return to rest position (1/16-inch minimum gap between pawl tip and wheel).



## CREDIT UNIT ADJUSTMENTS (CONTINUED)

### Adjust Wiper Assembly

- a. Loosen wiper clamp screw and remove wiper assembly from shaft.
- b. Sight along profile of blades to make sure that all blade tips lie in the same plane (even with each other).
- c. Bend blades as required.
- d. Slide wiper assembly onto shaft with clamping screw just tight enough to hold it in position.
- e. Push wiper assembly down shaft until wipers just touch commutator board.
- f. Continue to slide wiper assembly about 1/16-inch more, until wiper is flush with end of shaft. Do not tighten screw.
- g. While holding credit unit in normal operating position, rotate credit wheel counterclockwise as far as it will go. This is home position.
- h. Rotate wiper assembly on shaft until blade heels line up with first segment leading edge as shown.
- i. Check wiper force again as in step f.
- j. Tighten wiper clamp screw to hold wiper assembly in this position.
- k. Check wipers for tracking on their respective commutator rings.



## REPAIR AND REPLACEMENT

Most of the repair and replacement procedures for the phonograph are of an obvious nature and may be performed without the use of special tools and techniques. Before attempting to perform any repair or replacement of parts, check for obvious faults as described on page 4-1.

When replacing a part, use only the correct ROWE part. Refer to the Parts Catalog section manual for correct ROWE part number and description. Order all parts from your authorized ROWE Distributor.

### TESTING TRANSISTORS

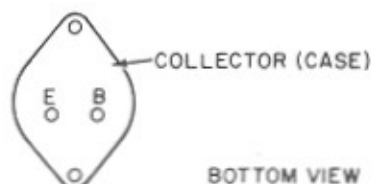
Test transistors using a volt-ohm-milliammeter as follows:

- Set the meter function switch to OHMS and the range switch to a medium scale (such as X10 on Simpson 260).
- Connect ohmmeter to transistor leads to check NPN silicon transistors as follows:

#### NOTE

Some meters use the black or negative lead as the positive lead for ohms scale, Triplet being one of these.

- |                |                |                                |
|----------------|----------------|--------------------------------|
| + to emitter   | - to collector | - no reading                   |
| + to collector | - to emitter   | - no reading                   |
| + to base      | - to collector | - low reading (about 500 ohms) |
| + to collector | - to base      | - no reading                   |
| + to emitter   | - to base      | - no reading                   |
| + to base      | - to emitter   | - low reading (about 500 ohms) |



TO3  
POWER TRANSISTOR



TO5  
DRIVER TRANSISTOR

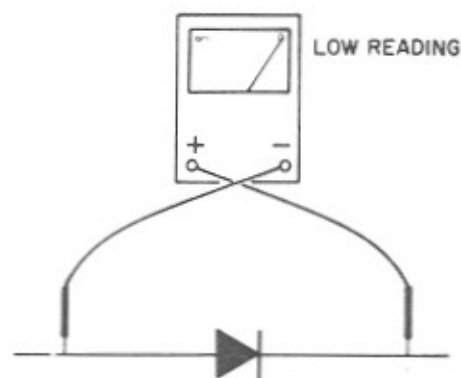
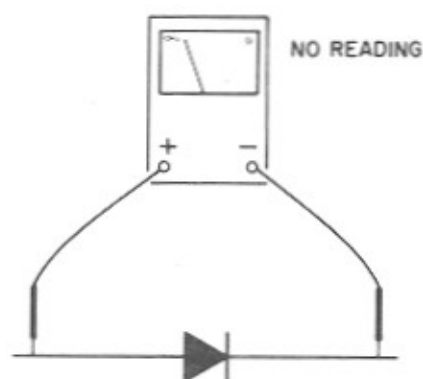
TRANSISTOR LEAD LOCATION

- With positive meter lead on collector and negative lead on emitter, touch base to collector. Check that the meter shows a low reading to indicate that the transistor is conducting.
- All previous tests indicate a good transistor. Any deviation from these conditions indicates a defective transistor.
- For PNP transistors, reverse the polarities and proceed as in the previous steps.

Test silicon diodes as follows:

- Set the meter function switch to OHMS and the range switch to a medium scale.
- Connect the diode as shown.

CONNECTIONS MAY VARY WITH VARIOUS TYPES OF METERS. THE IMPORTANT THING TO REMEMBER IS THAT THE DIODE SHOULD INDICATE NO READING WITH THE LEADS CONNECTED ONE WAY AND A LOW READING WHEN CONNECTED IN THE OPPOSITE POLARITY.



DIODE TEST HOOKUP