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Service Manual

**MODEL 459•100 SELECTION
MODEL 460•160 SELECTION**

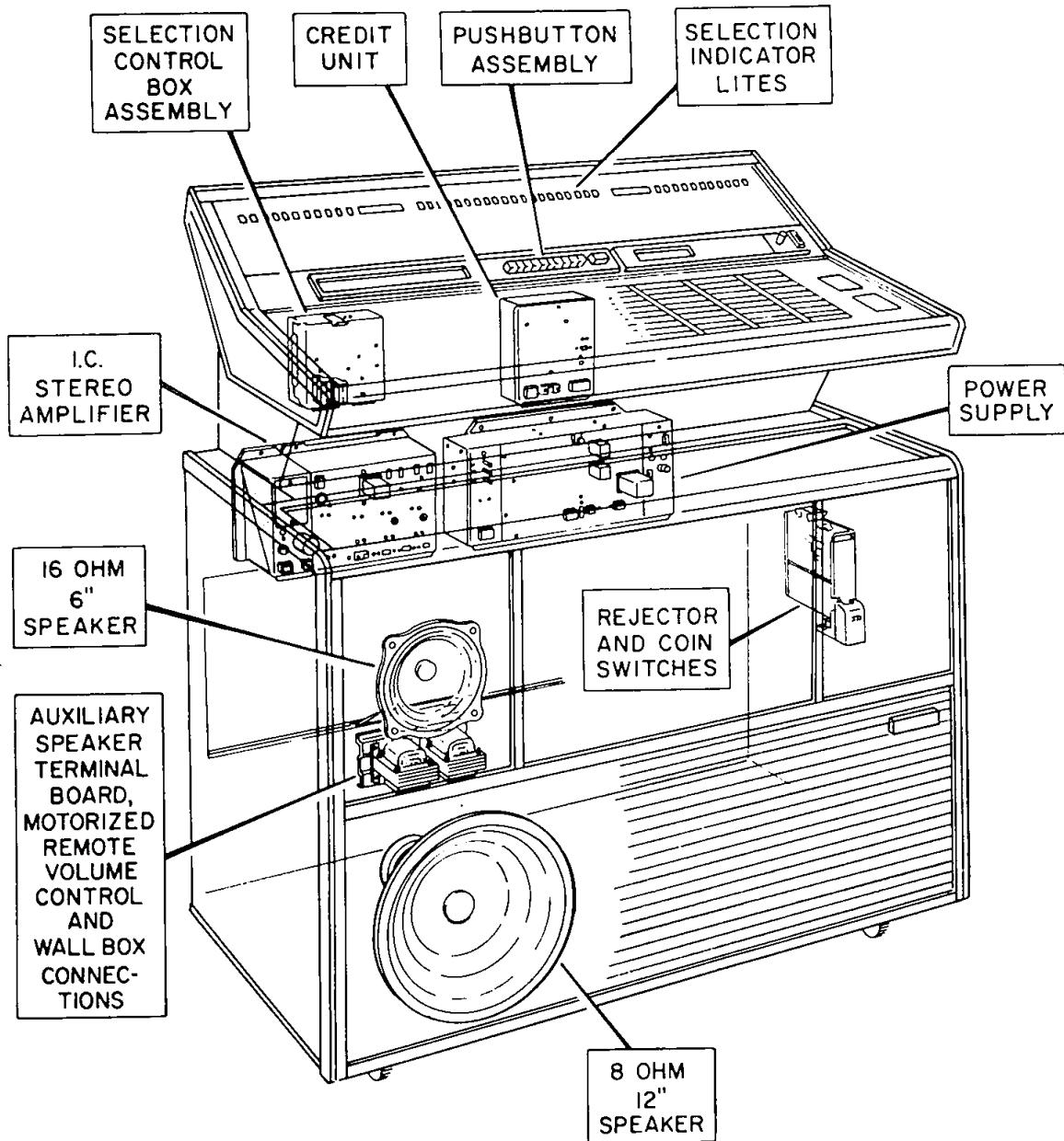
Phonographs



SERVICE INFORMATION—DOMESTIC

MODEL ... PHONOGRAPH—MODEL ... PHONOGRAPH, RELATED ACCESSORIES AND KITS

| MODEL NO. | PHONOGRAPHS | SERVICE MANUAL "SM" | INSTALLATION INSTRUCTION "I" | WIRING DIAGRAM "WD" | PARTS CATALOG "PC" | DESCRIPTION OF OPERATION | USED ON PHONO MODEL |
|--------------------|--|---------------------|---|---------------------|---------------------|--------------------------|---------------------|
| 459 | 100 SELECTION PHONO | #49812 | — | #49811 | #49813 | SEE "SM" #49812 | |
| 460 | 160 SELECTION PHONO | #49812 | — | #49811 | #49813 | | |
| ACCESSORIES | | | | | | | |
| 506 | WALL BOX (160-100) | #47939 | — | #48226 | SEE "SM" #47939 | SEE "SM" #47939 | 459 460 |
| 1769 | RECEIVER | #47359 | #48267 | #47361-1 | SEE "SM" #47359 | SEE "SM" #47359 | 459 460 |
| 1635 | UTILITY FLAT WALL SPEAKER | — | LABEL | — | — | — | 459 460 |
| 1636 | DELUXE FLAT WALL SPEAKER | — | LABEL | — | — | — | 459 460 |
| 1637 | CORNER SPEAKER | — | LABEL | — | — | — | 459 460 |
| 1638 | CEILING SPEAKER (LESS BACK BOX) | — | LABEL | — | — | — | 459 460 |
| 1639 | BACK BOX (FOR CEILING SPEAKER) | — | LABEL | — | — | — | 459 460 |
| KITS | | | | | | | |
| 1989-2 | MONEY COUNTER-PHONO | — | #45592-2 | SEE "I" #45592-2 | SEE "I" #45592-2 | SEE "I" #45592-2 | 459 460 |
| 1995-2 | MONEY COUNTER-WALL BOX | — | #44056-2 | SEE "I" #45592-2 | SEE "I" #45592-2 | SEE "I" #45592-2 | 459 460 |
| 2121 | AUXILIARY WALL BOX POWER SUPPLY | — | #45362 | SEE "I" #45362 | — | SEE "I" #45362 | 459 460 |
| 2130 | MICROPHONE | — | #46268 | SEE "I" #46268 | SEE "I" #46268 | SEE "I" #46268 | 459 460 |
| 2149 | BAR BRACKET (WALL BOX) | — | #48609 | — | — | — | 459 460 |
| 2152 | 33/45 CONVERSION KIT | — | #48180 | — | — | — | 459 460 |
| 2155 | LP PRICING KIT-WALL BOX | — | #49627 | #48227 | SEE "I" #49627 | SEE "SM" #47939 | 459 460 |
| 2156-1 | MOTORIZED VOLUME CONTROL (WITH ON-OFF SWITCH) | — | #49794 | SEE "I" #49794 | SEE "I" #49794 | — | 459 460 |
| 2160 | SECURITY CASH BOX | — | Purchased—Safeguard Coin Box Inc. Instruction Included (Will Not Accommodate Dollar Acceptor Kit 2162) | | | | 459 460 |
| 2162 | DOLLAR ACCEPTOR KIT (NRI #34-04-005-004) | — | #49657-1 | SEE "I" #49657-1 | SEE "I" 49657-1 | — | — 460 |
| 2166 | LP PRICING KIT-PHONO | #49812 | #50222 | SEE "WD" #49811 | — | SEE "SM" #49812 | |
| 2169 | 2115-1 CONVERSION TO 2156 MOT. VOL. CONT. | — | #49771 | — | — | — | 459 460 |
| 2171 | "L" PAD | — | #49798 | — | — | — | 459 460 |
| 2172 | MULTI PRICING ADAPTER-PHONO | — | #50184 | SEE "I" #50184 | SEE "I" #50184 | SEE "I" #50184 | 459 460 |
| 2173 | MOTORIZED VOLUME CONTROL (WITHOUT ON-OFF SWITCH) | — | #50104 | SEE "I" #50104 | SEE "I" #50104 | — | 459 460 |



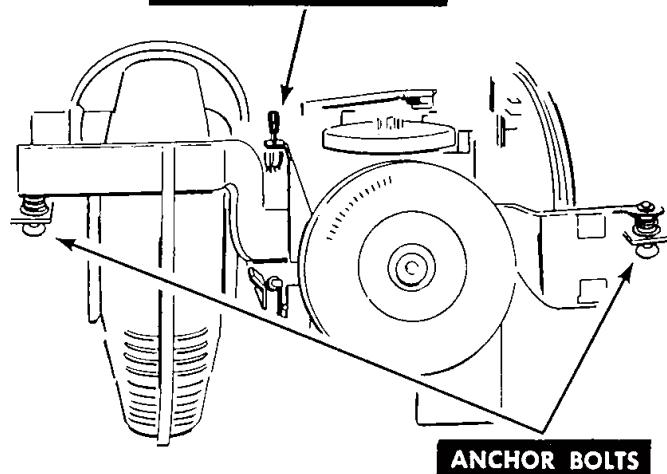


GENERAL INFORMATION

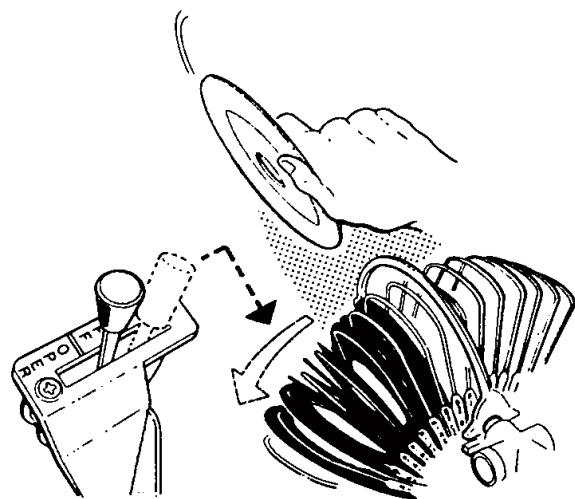
This instruction manual covers the service procedure and operational cycle of Rock-Ola's line of coin operated phonographs both 100 and 160 selection models. The operational cycle of both models is basically the same and where differences between 100 and 160 selection cycles occur, these are noted in this manual.

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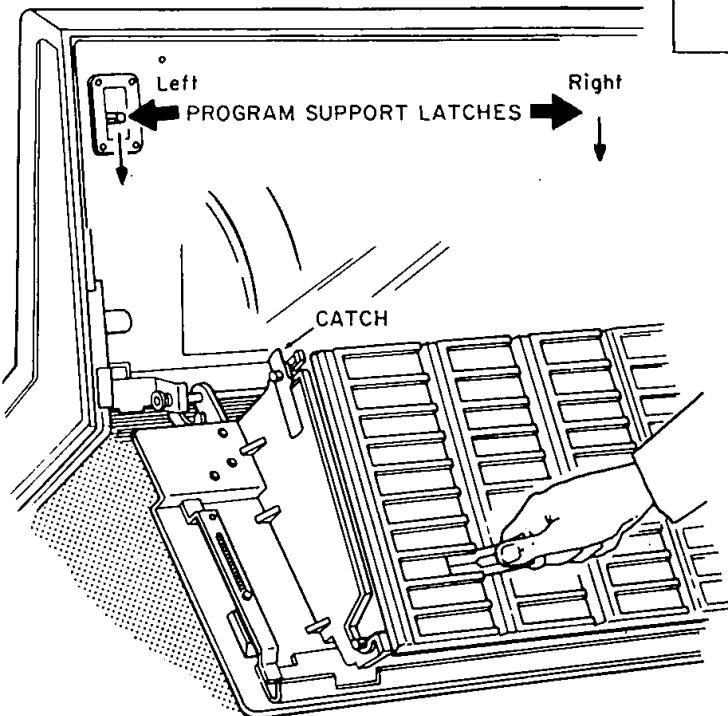
SERVICE SCAN SWITCH**MECHANISM ANCHOR BOLTS**

The four anchor bolts must be unscrewed to about 3/8" below their chassis seats before operating the phonograph.

**SERVICE SCAN SWITCH**

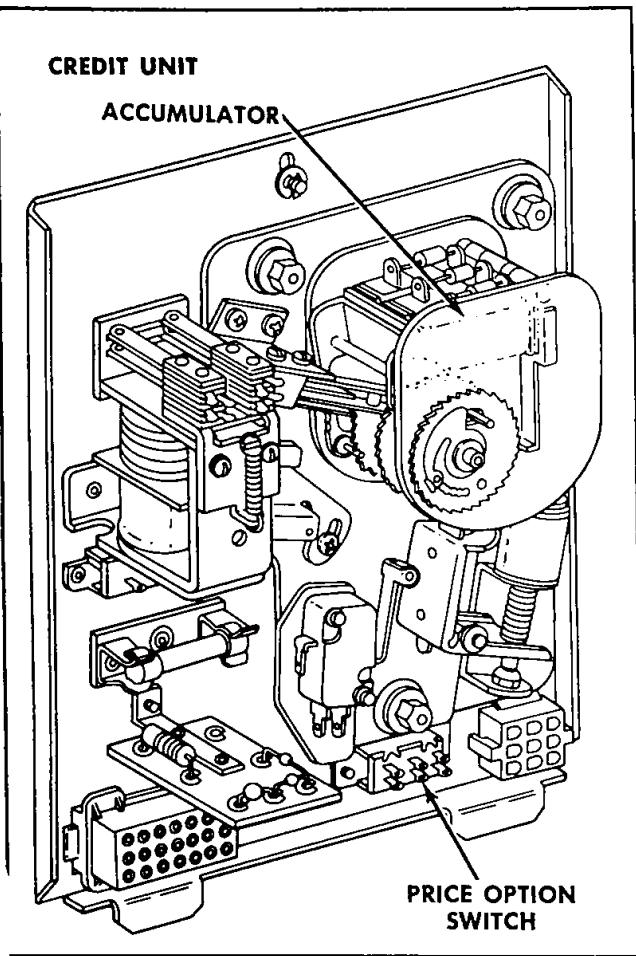
The phono service scan switch may be used at any time to stop the mechanism at any point of its operation. When servicing is complete, the switch must be left in the "operate" position or the mechanism will not function.

Moving the service scan switch to the "scan" position causes the magazine to rotate. Releasing the switch will stop the magazine in any position convenient for insertion or removal of records.

**INSERTION OF TITLE STRIPS**

With dome door open, place the left and right hand over the corresponding program support latches. With the index finger of each hand pull down on the program latches and with both hands allow assembly to swing downward. Title strips may now be inserted.

Program holder can be removed by releasing the top left and right catch and lifting assembly from the pivot brackets.



CREDIT SYSTEM—DOMESTIC

General Information

The credit system has a 4 coin rejector designed to operate on nickels, dimes, quarters and half-dollars. The system is preset to accept quarters and half-dollars only. Dimes and nickels are rejected.

As standard equipment, the quarter pricing ratchet, part no. 44947-A, permits a 2-3-3-3 credit arrangement upon insertion of more than 1 quarter to a total of 11 credits for 4 quarters. The 4th quarter credit value can be adjusted to accumulate additional bonus credits from 4 to 7 to a total of 15 credits for 4 quarters.

The credit system can be modified to a 1-2-2-2 quarter credit arrangement, or nickel, dime, quarter and half-dollar operation by replacing the original quarter ratchet with one to suit your requirements. These ratchets, 1-2-2-2 type part no. 50122-A, and standard type part no. 31258-1A are supplied with the phono and stored in the cash box. See page 9 for ratchet installation procedure.

The phono when shipped has the Price Option Switch set to a 10¢ base, and the accumulator is adjusted so that quarters and half-dollars have the following credit value.

Standard Play Records

Quarter — 2 Plays
2 Quarters
or
Half-Dollar — 5 Plays
4 Quarters — 11 Plays

PRICING OPTION FOR NICKEL, DIME, QUARTER AND HALF-DOLLAR OPERATION

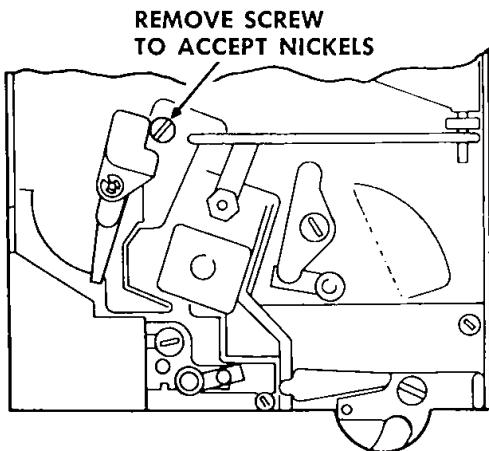
To modify the credit system to:

2 Nickels or 1 Dime — 1 Play
1 Quarter — 3 Plays
Half-Dollar — 7 Plays

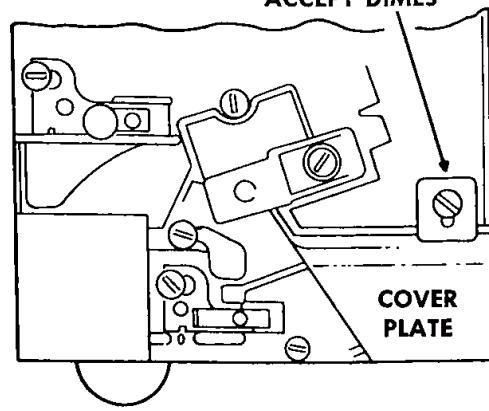
replace original quarter pricing ratchet with standard type part no. 31258-A, then proceed as follows:

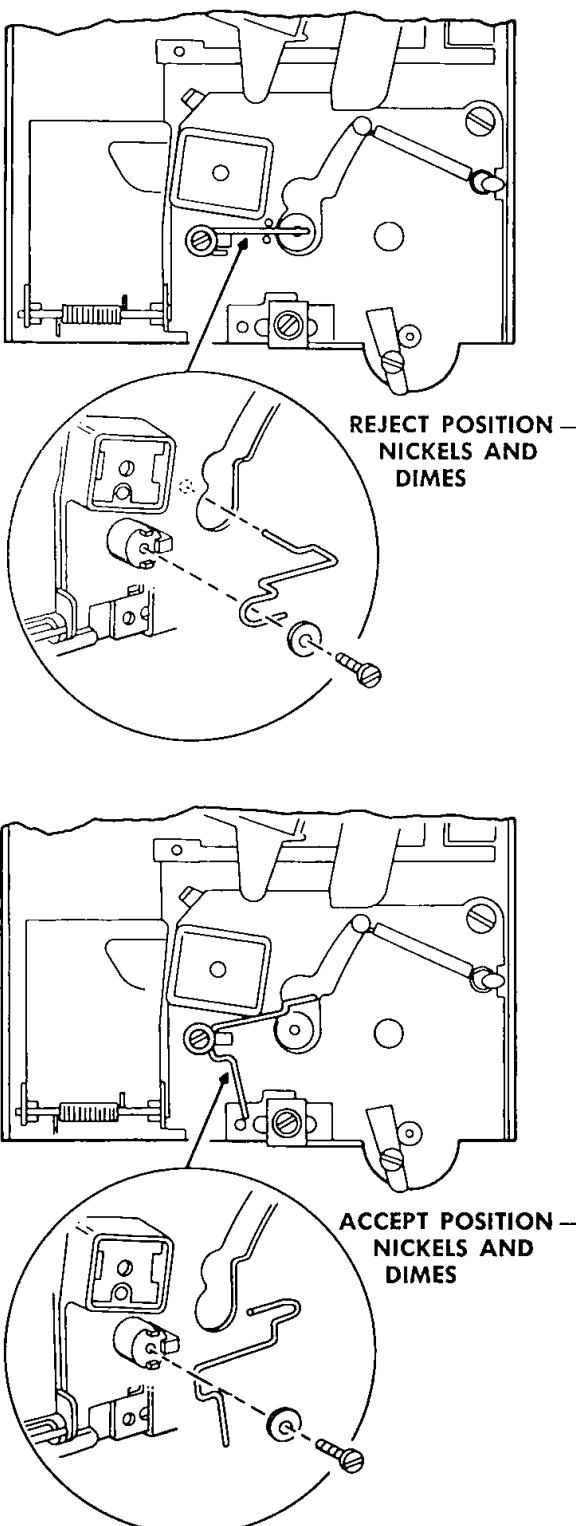
1. Remove rejector.
2. Adjust rejector to accept nickels and dimes as illustrated.

NATIONAL REJECTOR



RAISE BLOCK ABOVE COVER PLATE TO ACCEPT DIMES



COIN ACCEPTORS


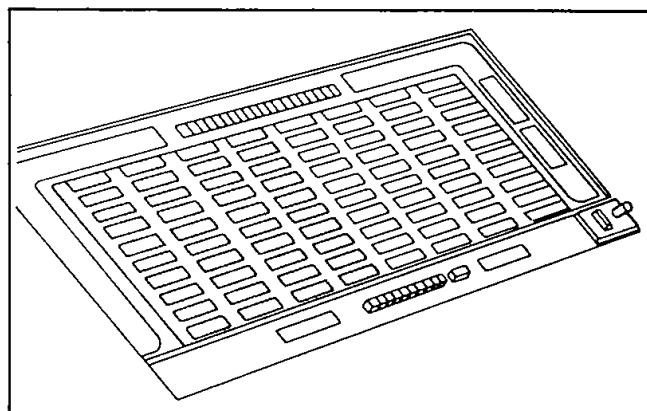
3. Lift and advance the center 50¢ ratchet wafer pin to the "7" credit hole position. See Accumulator Pricing Adjustments, Page 9.
4. Lift and advance the outer 25¢ ratchet wafer pin to the "3" credit hole position.
5. Replace original pricing card with new included in the cash box. For other pricing combinations, the proper pricing cards are available as a service item.

OPTIONAL PRICING EQUIPMENT

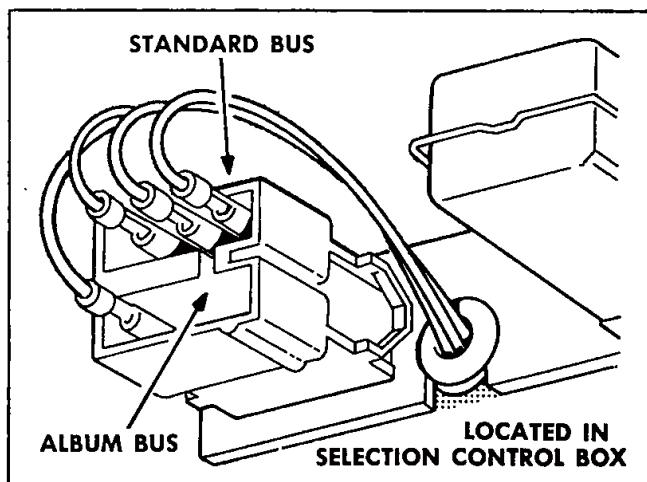
Multi Pricing Adapter Kit #2172 (100-160)

The Multi Pricing Adapter permits a bonus credit arrangement upon insertion of 2 or more quarters.

LP Pricing Kit No. 2166 (100-160)
33-1/3—45 RPM Conversion Kit No. 2152 (100)

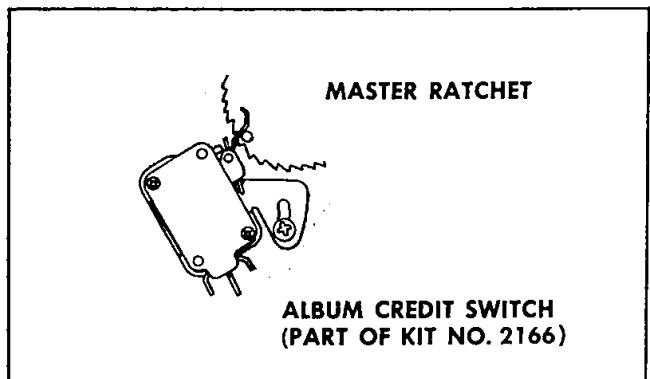


The LP and 33-1/3 — 45 RPM Kits provide for programming Album records to a quarter price base. Album records may be programmed in the first four program sections in the phonograph, in any sequence, in banks of 20 selections.





Album credit check-off is controlled by a switch arrangement mounted in the Selection Control assembly. Each pricing tab is identified to a program section of 20 selections. Connecting the price tabs to "Standard" and "Album" bus bars makes it possible to have two different rates of credit removal.



Whenever 2 or more credits are established, the master ratchet releases the Album credit switch. This sets up the circuit to remove Album selection credits.

If the LP Pricing Kit is added to the phonograph as received from the factory, then the Album and Standard record selections will have the following credit values:

Standard and Album Records — 33-1/3 — 45 RPM

Quarter — 2 Singles or 1 Album
Half-Dollar — 5 Singles or 2 Album plus 1 Single

If the phonograph is adjusted for nickel, dime, quarter and half-dollar operation to a 1-3-7 credit combination, then the Album and Standard record selections will have the following credit values:

Standard and Album Records — 33-1/3 — 45 RPM

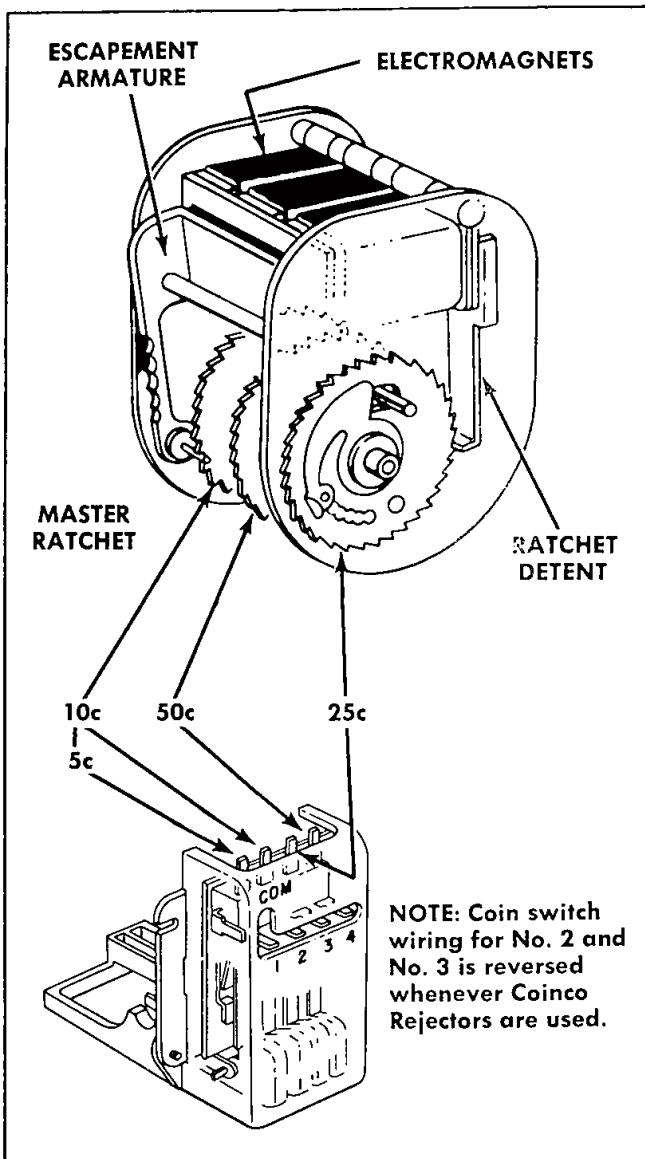
Dime or two Nickels — 1 Single
Quarter — 3 Singles or 1 Album
Half-Dollar — 7 Singles or 2 Album plus 1 Single

Dollar Bill Acceptor Kit No. 2162 — Phono (160)
Dollar Bill Acceptor Kit No. 2161 — Console (160)

Dollar Bill Acceptor Kits are available for 160 selection models only.

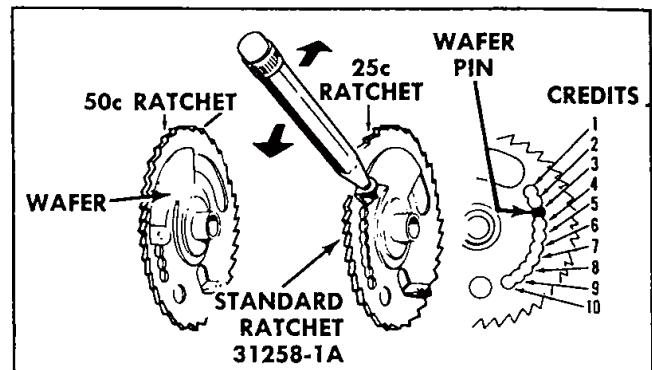
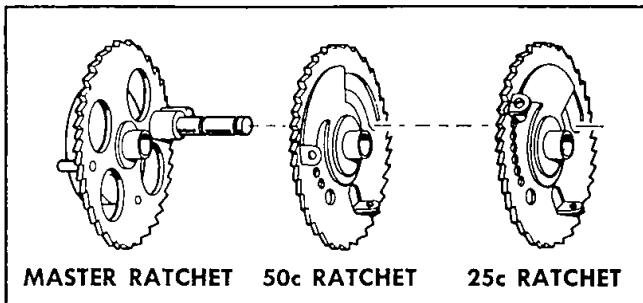
See Page 2 for additional Accessories and Kits.

ACCUMULATOR ASSEMBLY AND PRICING ADJUSTMENTS



The accumulator assembly is designed to accumulate any number of credits up to 26 plays maximum. After a coin strikes one of the four coin switches located below the slug rejector, a D.C. circuit is completed to the proper electro magnet. During the short period the electro magnet remains energized, the corresponding armature ratchet detent and the ratchet escapement armature are drawn to the pole-piece of the electro magnet. The ratchet detent locks the hub and ratchet assembly and releases the escapement armature stud.

This sequence is repeated for every coin dropped. The circuit is such that both the 5¢ and 10¢ coin switch operate the master ratchet. The 50¢ coin switch operates the center ratchet, and the 25¢ coin switch operates the outer ratchet.



The stud which is staked to the master ratchet extends through the center and outer ratchet discs. It will be noted that the openings in these two ratchets are adjustable. These openings determine the amount of plays that can be accumulated on the master ratchet wheel. Various incentive coin combinations can be made by making proper adjustment.

To change credit values for a quarter and half-dollar coin, adjust the center and outer ratchet by lifting the adjustable wafer with a pointed tool, moving each wafer to a credit hole suitable for your requirements.

QUARTER PRICING RATCHET INSTALLATION PROCEDURE

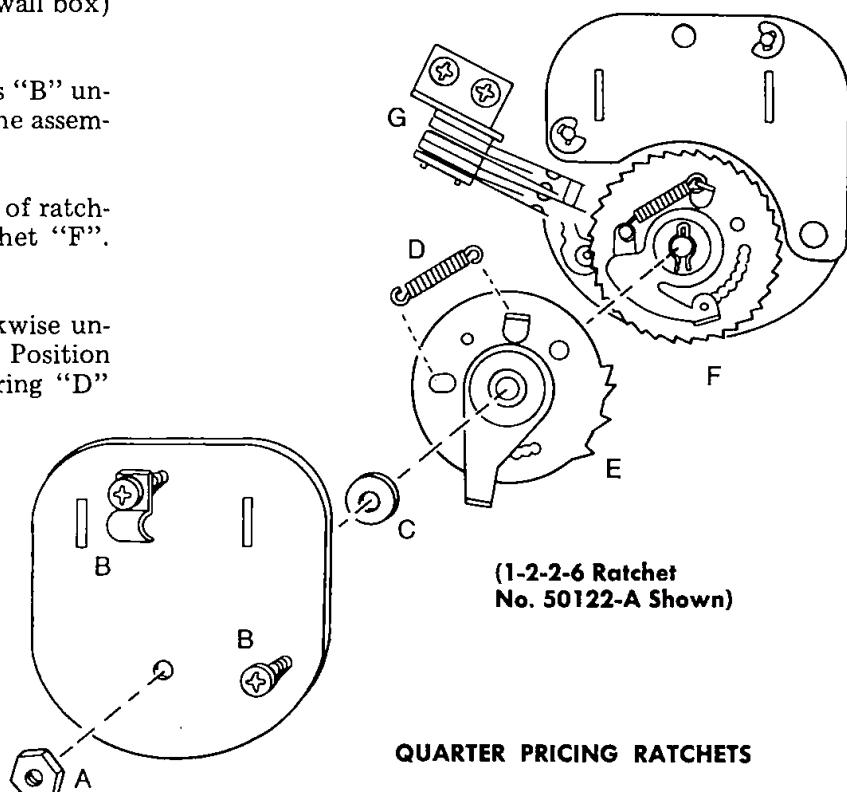
Note: Remove Credit Unit from phono (wall box) for ease of ratchet installation.

Step 1. Remove nut "A". Loosen 2 screws "B" until the top frame plate is free of the assembly.

Step 2. Remove steel washer "C" from top of ratchet. Remove spring "D" and ratchet "F". Save "C" and "D".

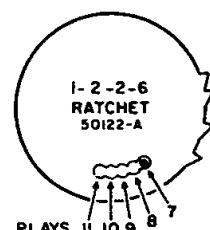
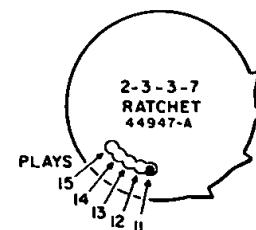
Step 3. Rotate accumulator ratchets clockwise until the credit switches "G" open. Position new ratchet as shown. Attach spring "D" and replace steel washer "C".

Step 4. Replace top frame plate and tighten with screws "B" and nut "A".



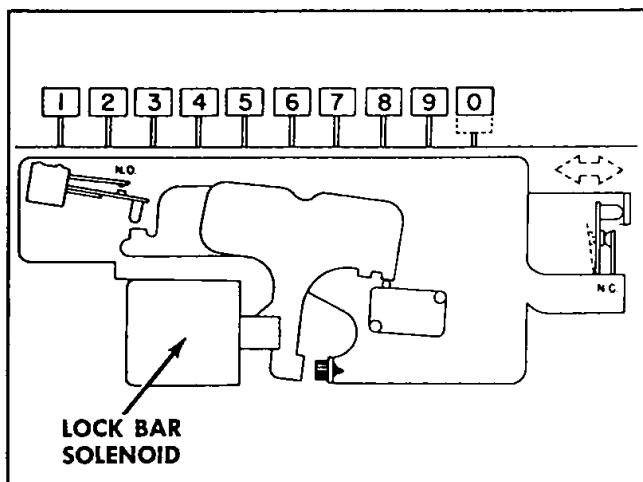
QUARTER PRICING RATCHETS

See top of page
for standard
ratchet adjustment





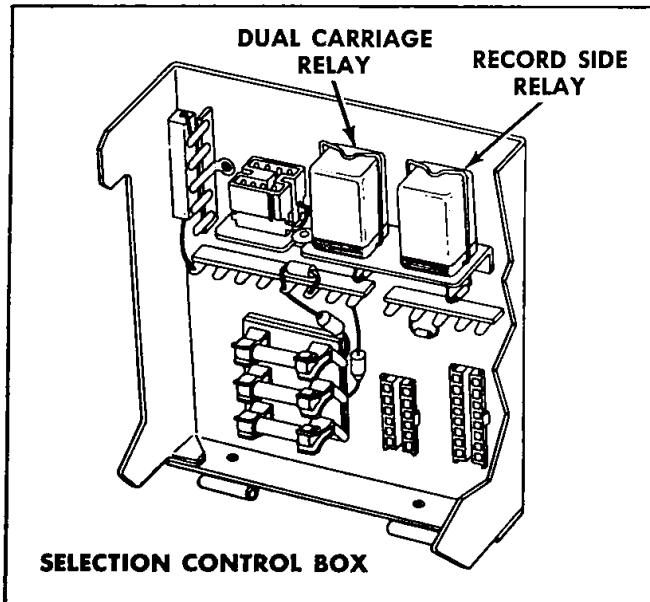
COMPONENTS...WHAT THEY DO



LOCKBAR SOLENOID

After coins are dropped into the phonograph and credits added on the accumulator master ratchet, the Lockbar Solenoid will energize on the up stroke of the 2nd Digit selection number button.

Its purpose is to keep the depressed 3rd Digit number button "locked" during the sequence the selector lever is being moved into "play" position.



RECORD SIDE RELAY

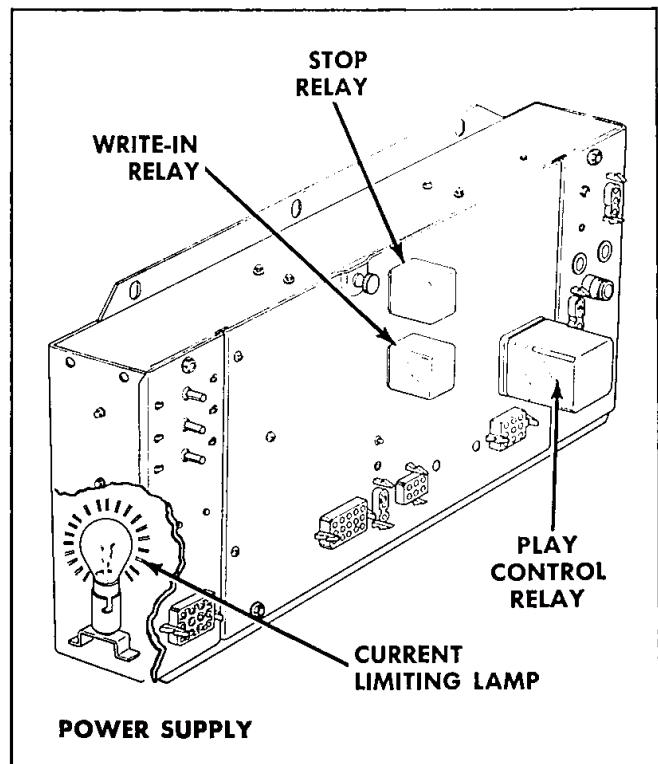
This relay energizes whenever the No. 1 button is pressed for the 1st Digit number. The transferred relay contacts connect circuits to the "A" bands on the selector Write-In P.C. Board indicating that the top side of the record has to be played.

DUAL CARRIAGE RELAY (Used on 160 Selection Models Only)

Since the 160 selection phonograph uses two Write-In Carriage assemblies 180 degrees apart, only the one that reaches the "live" selection circuit first must be permitted to operate. The isolating circuits are controlled by the Dual Carriage Relay.

3rd Digit selection circuits that involve button numbers "0" to "3", the relay is not activated and circuits remain connected to the selector sector to play records in the "0" to "3" segment group only.

Button numbers "4" to "7" activate the relay and the transferred relay contacts connect circuits to play records in the "4" to "7" segment group only.

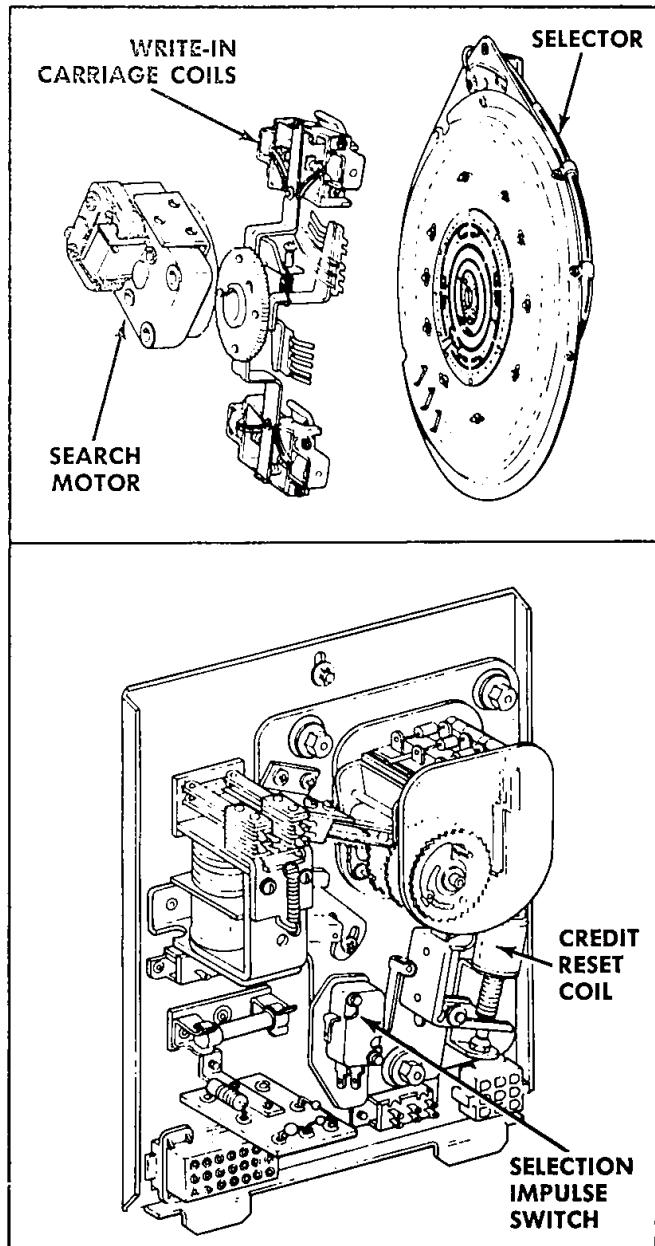


WRITE-IN RELAY

After completion of a selection, the push-button Latch switch closes and operates the Write-In Relay. This starts the A.C. Search Motor which rotates carriage wipers around the selector segments and contacts looking for a "live" selection circuit.

STOP RELAY

When the "live" contact and segment is located, the Stop Relay operates, applying D.C. voltage to the A.C. Search Motor thru a Current Limiting Lamp causing the A.C. motor to brake. At the same time power is applied to the Wobble Plate Solenoid and Credit Reset Coil.



CREDIT RESET COIL

The stroke of the Credit Reset Armature engages one tooth on the master ratchet, removing one credit while at the same time operates the Selection Impulse Switch.

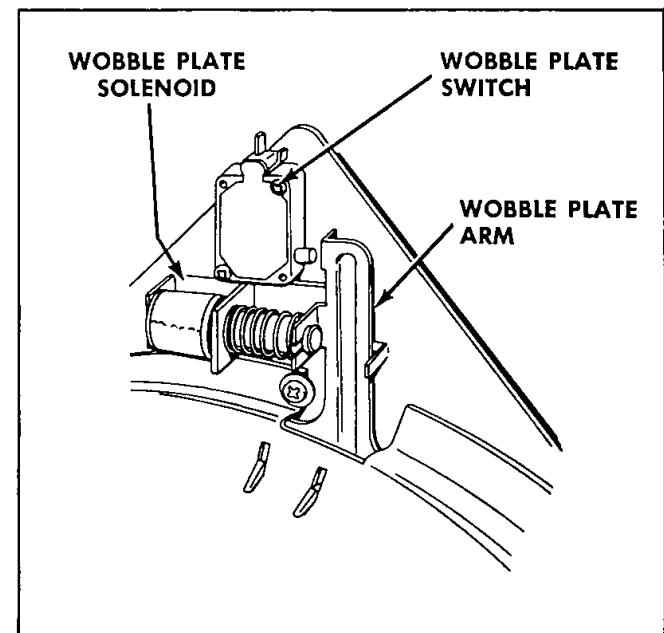
SELECTION IMPULSE SWITCH

This switch completes circuits to the Write-In Carriage Coil and Delay Relay. The operated Carriage Coil moves the selector lever "play" position.

DELAY RELAY

Although a circuit is completed to this relay, the network is such that the "pull-in" is delayed for a short time to insure a "fat" pulse for a firm operation of the Credit Reset Coil and Carriage Coil.

After the Delay Relay energizes, the 3rd Digit number button is released and all circuit switches and relays return to standby and ready for the next selection.



WOBBLE PLATE SOLENOID

The same pulse that moved the selector lever into "play" position, also energizes the Wobble Plate Solenoid which pulls the Wobble Plate Arm against the Wobble Plate Switch.

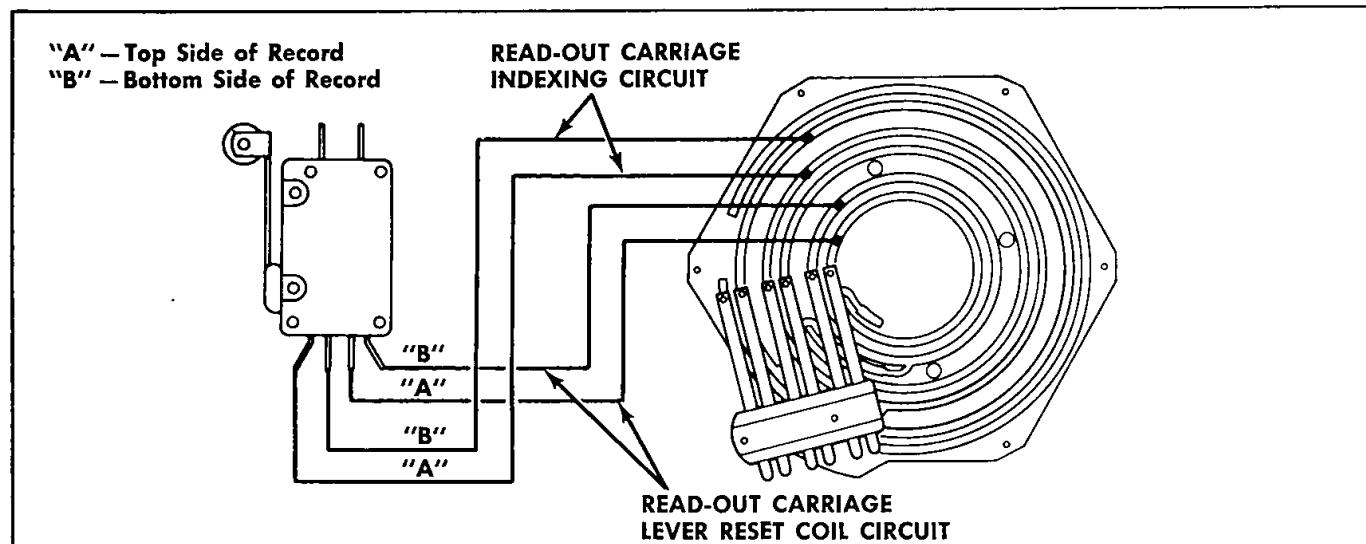
WOBBLE PLATE SWITCH

This switch operates the Play Control Relay in the power supply.



PLAY CONTROL RELAY

Turns on the Turntable Motor and Magazine Motor. Record Magazine, Selection Lite Wipers and Read-Out Carriage start to rotate.



A-B SNAP SWITCHES

These switches connect circuits to the selector Read-Out P.C. Board to allow indexing when the gripper arm is in the position to play the correct record side. At the same time the proper Read-Out Carriage Coil must operate to return the selector lever to its original standby position.

The snap switches are actuated by an extended arm that moves up or down every 360 degree rota-

tion of the record magazine.

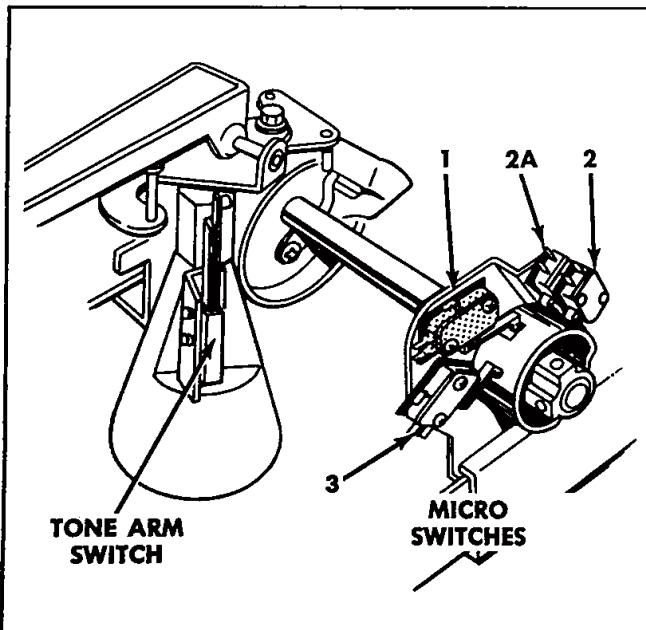
When the arm is down, the switch roller is disengaged from the arm, thereby connecting circuits to the printed circuit disc to play the "A", or top side of the record.

When arm is up, the switches transfer circuits to play the "B", or bottom side of the record.

No. 1 MICRO SWITCH (Safety Switch)

Machine in standby position, the No. 1 micro switch lever is seated in the cam groove. This sets up a circuit to operate the magazine motor when a selection is registered on the selector.

During the process of placing the record on the turntable, the rotating cam shaft operates this switch first. The transferred switch has two functions:



1. Disconnects the magazine motor circuit to assure that this motor does not operate during the gripper motor operation of placing the record on the turntable.
2. Connects a circuit to the Gripper Reverse Relay for a latter operating sequence.

No. 2 MICRO SWITCH

No. 2 Micro Switch followed by No. 2A operate next.

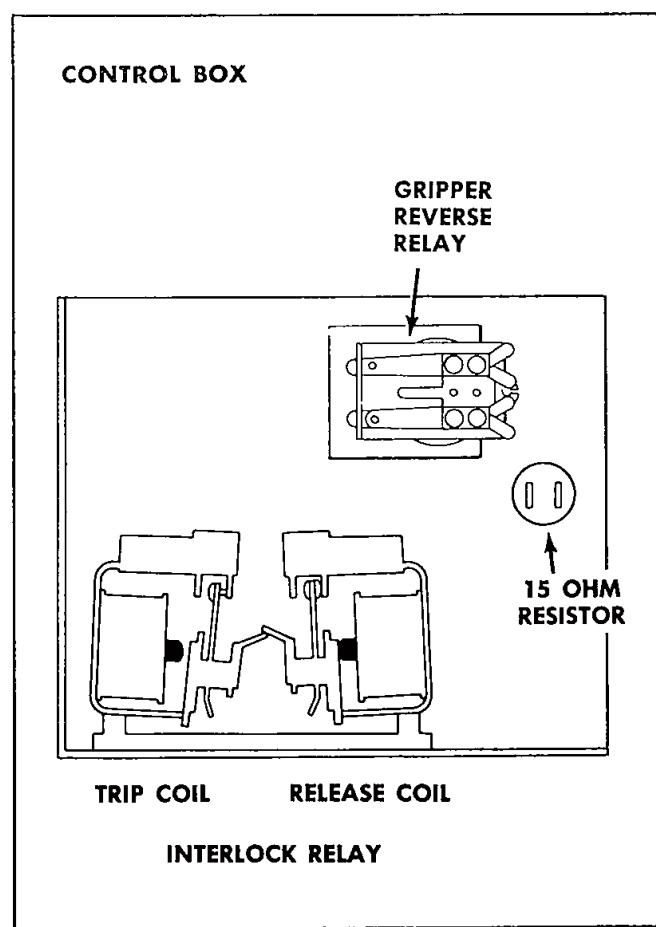
No. 2 Micro Switch disconnects the gripper motor circuit allowing a secondary circuit to power the gripper motor thru a 15 ohm resister. Gripper motor slows down to advance the tone arm smoothly towards the record. At the same time the transferred No. 2 Micro operates the electrical Counter for one count.

No. 2A MICRO SWITCH

The operation of Micro 2A opens the Counter circuit and operates the Read-Out Carriage Coil, resetting the selector lever to its original position.

No. 3 MICRO SWITCH

When No. 3 Micro operates, the Interlock Relay in the Control Box resets to its original position causing the Read-Out Carriage Coil to relax, and the Gripper Motor to dynamically brake. At the same time Mute Relay in the amplifier relaxes and music cycle begins.



INTERLOCK RELAY

This relay is located in the Control Box, is a mechanical latching type, having two coils termed "trip" and "release". In normal position (prior to indexing), the "trip" armature is relaxed and the "release" armature is mechanically latched down with neither coil being energized. In this position the contacts on the "trip" armature are open and the forward contacts on the "release" armature are closed and connect the D.C. power motor circuits.

The "trip" coil operates when the Read-Out Carriage contact strikes a selector lever in "play" position. Interlock contacts transfer causing a dynamic brake on the Magazine Motor and applying power to the Gripper Motor.

This device remains in this position until No. 3 Micro Switch is operated at which time the "release" coil is energized. This short circuits the Gripper Motor causing it to stop. The Interlock Relay is now reset for the next selection cycle.

TONE ARM SWITCH

The Tone Arm Switch closes when the tone arm reaches the record cut-off groove. This operates the Gripper Reverse Relay which starts the record return cycle.

GRIPPER REVERSE RELAY

This relay is also located in the Control Box. With no power on the coil, the Gripper Motor runs in the direction to place the record on the turntable.

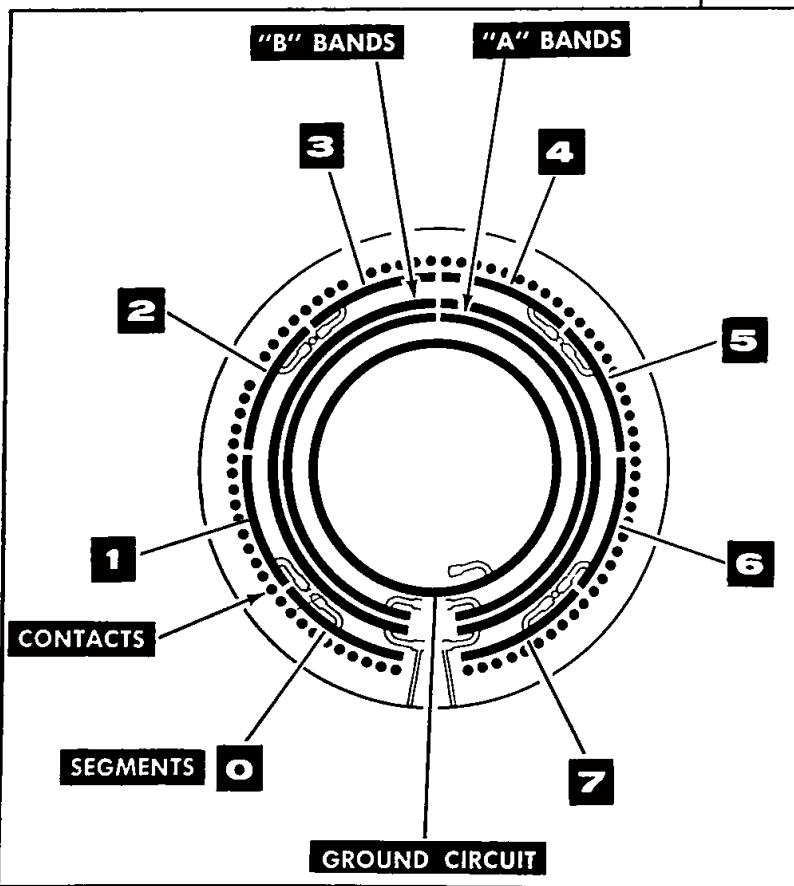
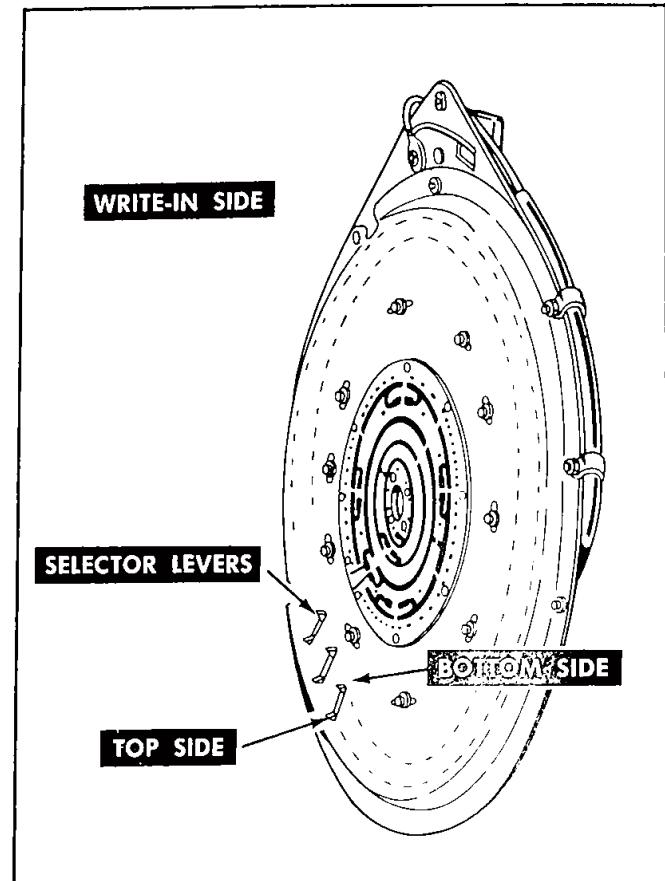
When the relay coil is energized by the tripping of the Tone Arm Switch, the transferred contacts reverse the direction of the Gripper Motor to return the record to the magazine.



Just how the Rock-Ola phonograph accomplishes the request of its customers will be discussed in two selection phases: . . . Write-In; and Read Out.

We will first explain the write-in selection phase. On the write-in side of the selector assembly, each lever represents a musical selection. There are either 100 or 160 levers depending on the phonograph model.

The outer lever of each set of two represents the top side of the record; the inner lever, the bottom side.



When a customer makes a selection, circuits are connected to the printed circuit disc to pin point a specific record selection. On the disc are eighty contacts; . . . (50 contacts on 100 selection models) . . . Each contact represents one record. (Not record side)

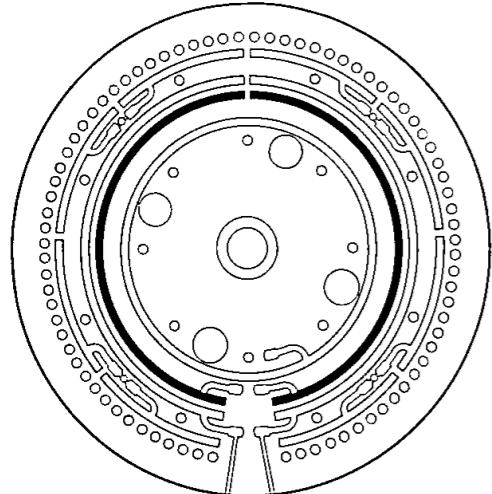
The next ring is a band broken into eight segments; . . . (five segments on 100 selection models) . . . Each segment encompasses with it ten contacts.

The next bands relate to the side of the record: "A", the top side; and "B" the bottom.

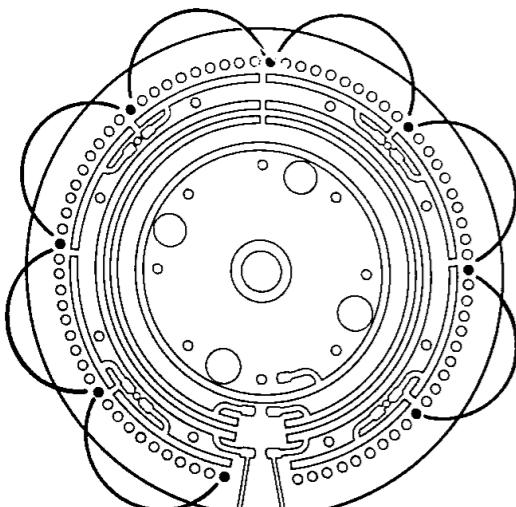
The innermost band is a common ground circuit for the carriage hammer coils.

As mentioned previously, each contact represents one record. Since each record side has a musical selection, they are represented by pushbuttons No.1 and No.2 which is the 1st digit of 3 numerals assigned to each selection.

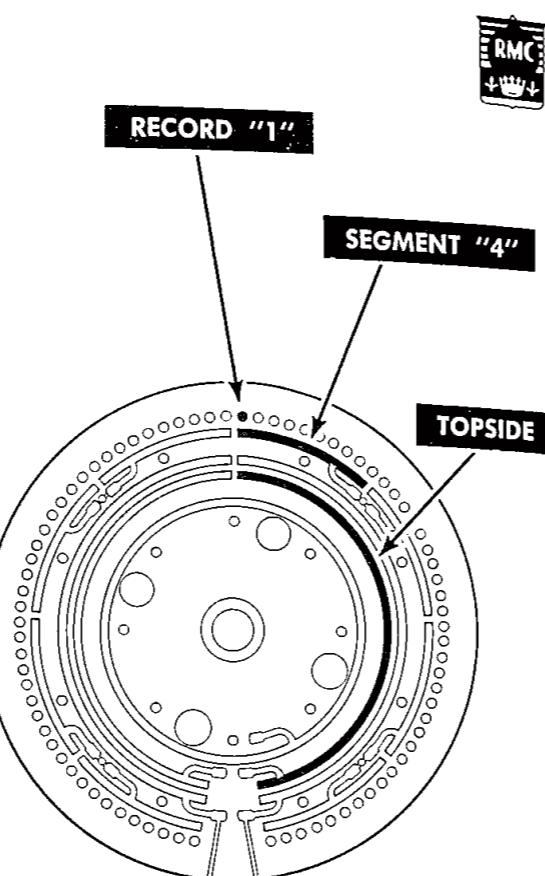
For example: Pushbutton No.1 represents the top side of the record, and No.2, the bottom side.



Now, when the 1st digit is pressed, as "1", a circuit is connected to the "A" bands indicating that the top side of the record has to be played.



The pressing of the 2nd digit, as "0", connects a circuit to the 1st contact of each segment, refining our selection to one of ten.



When the 3rd digit is pressed, as "4", designates the segment in which the record is located.

The 3rd digit then completes our selection, giving segment "4", record "1", top side, . . . eliminating all other choices.

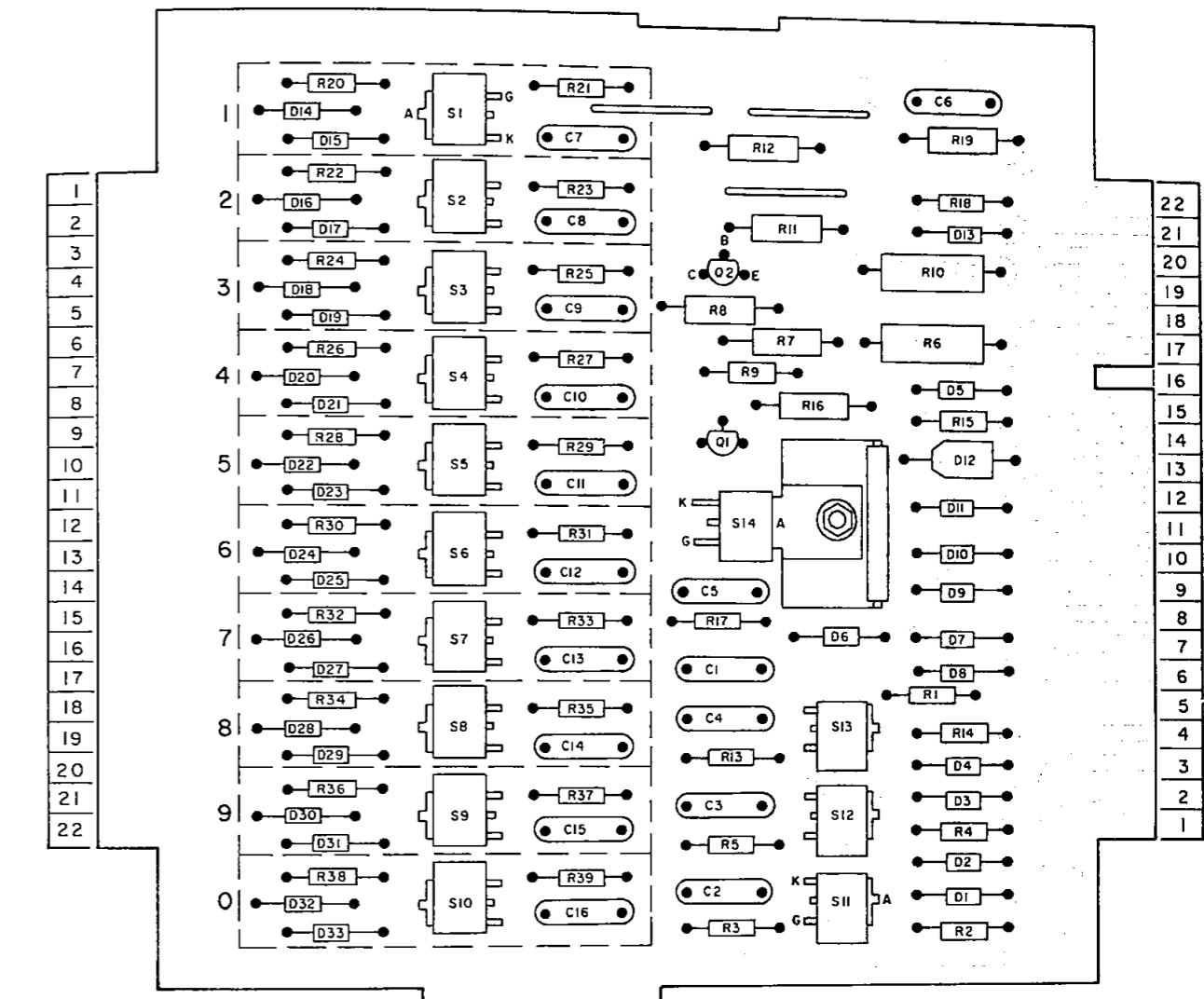
Note that the "A" and "B" bands which represent the record sides, are divided into semi-circles. This arrangement is only for 160 selection phonographs.

If the 3rd digit of the record selection involves number "0" to "3", only the left band is activated.

If the 3rd digit of the record selection involves number "4" to "7", the right band is activated.

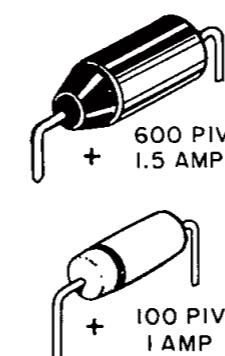
Since the carriage arm has a carriage on each end, contact with the selected lever is always within 180 degrees. This speeds up selection time.

100 selection models use only one write-in carriage, the bands are complete circles.

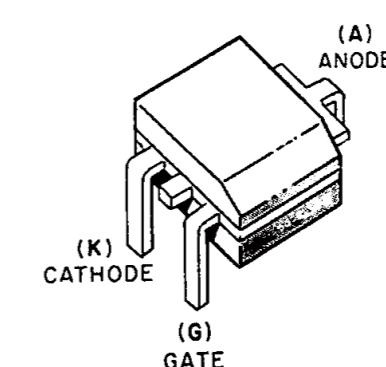


SELECTION CONTROL P.C. BOARD
(SERVICE REFERENCE)

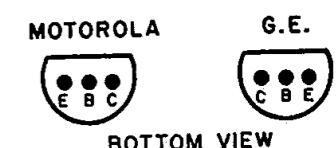
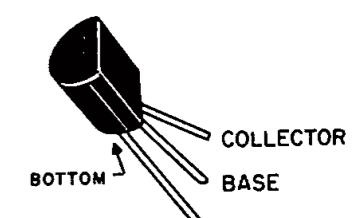
DIODES

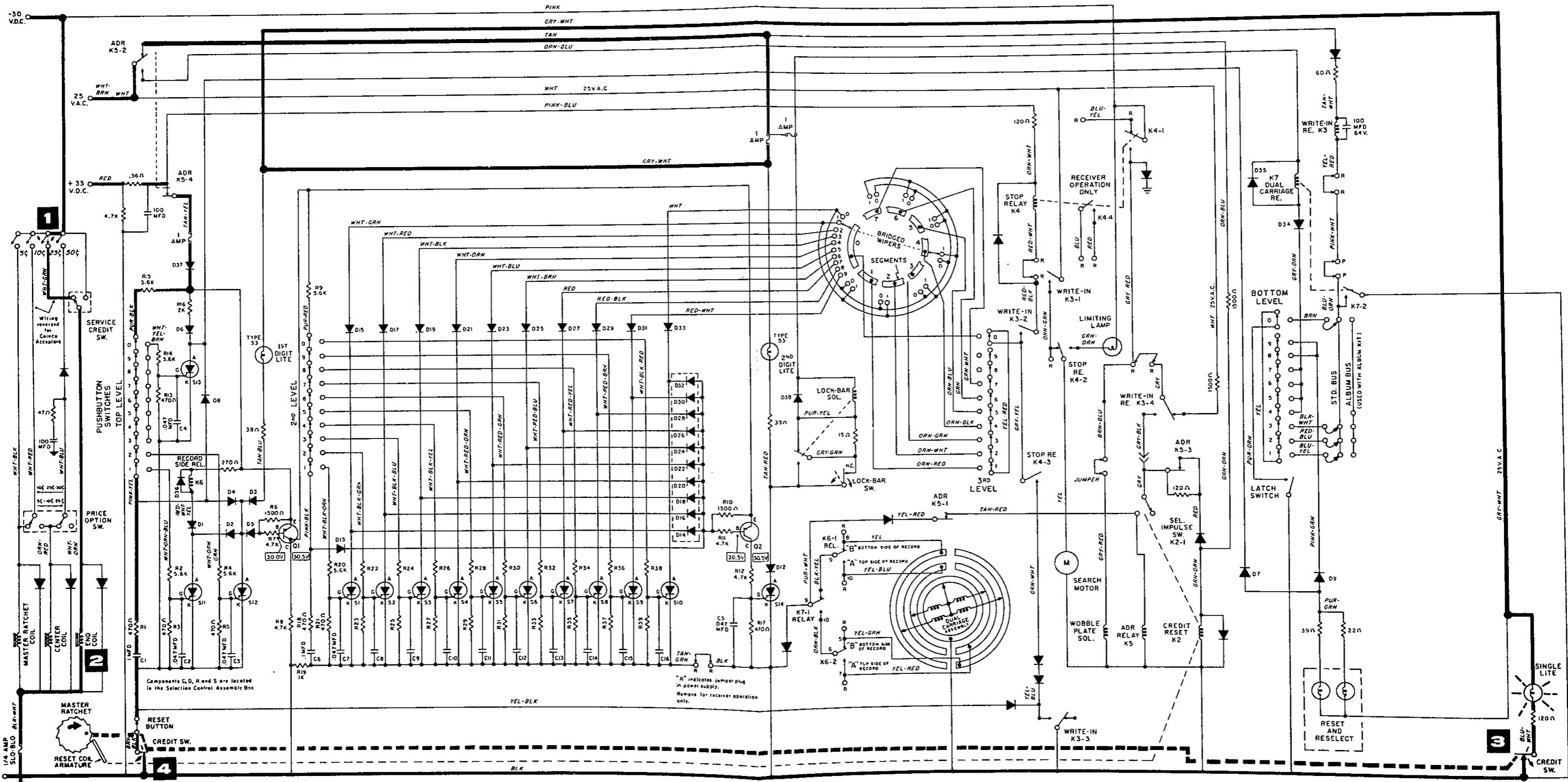


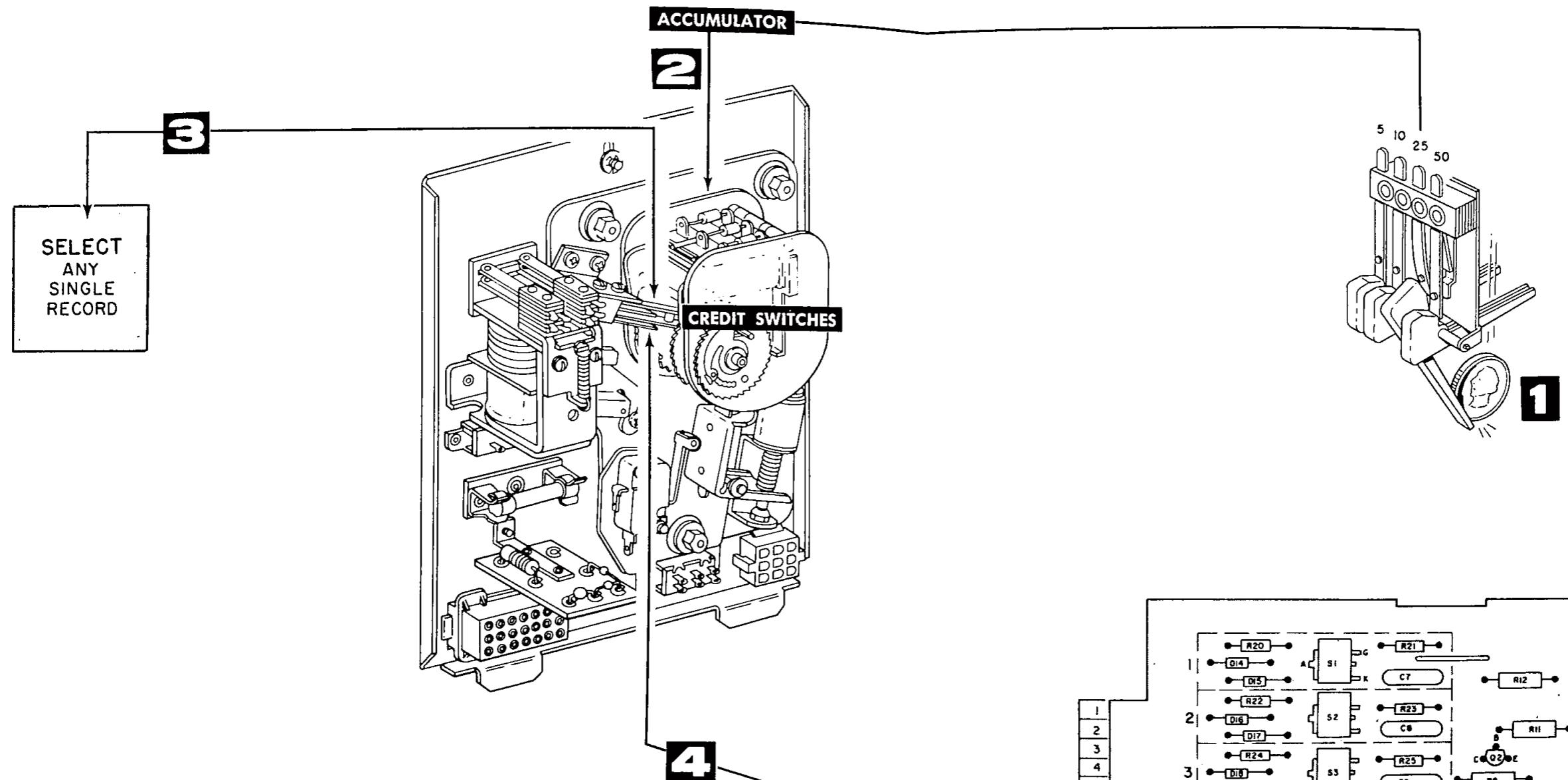
SCR S1 thru S13



TRANSISTORS Q1 and Q2



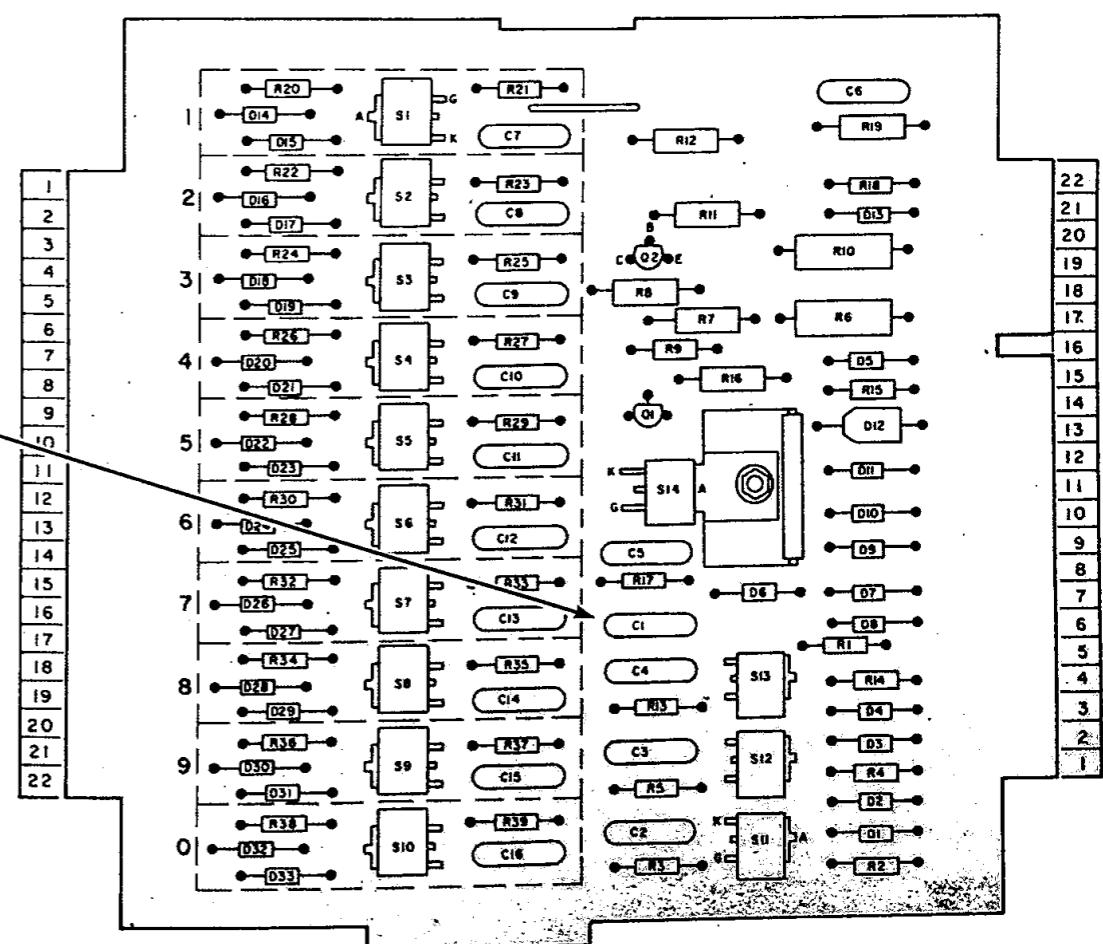




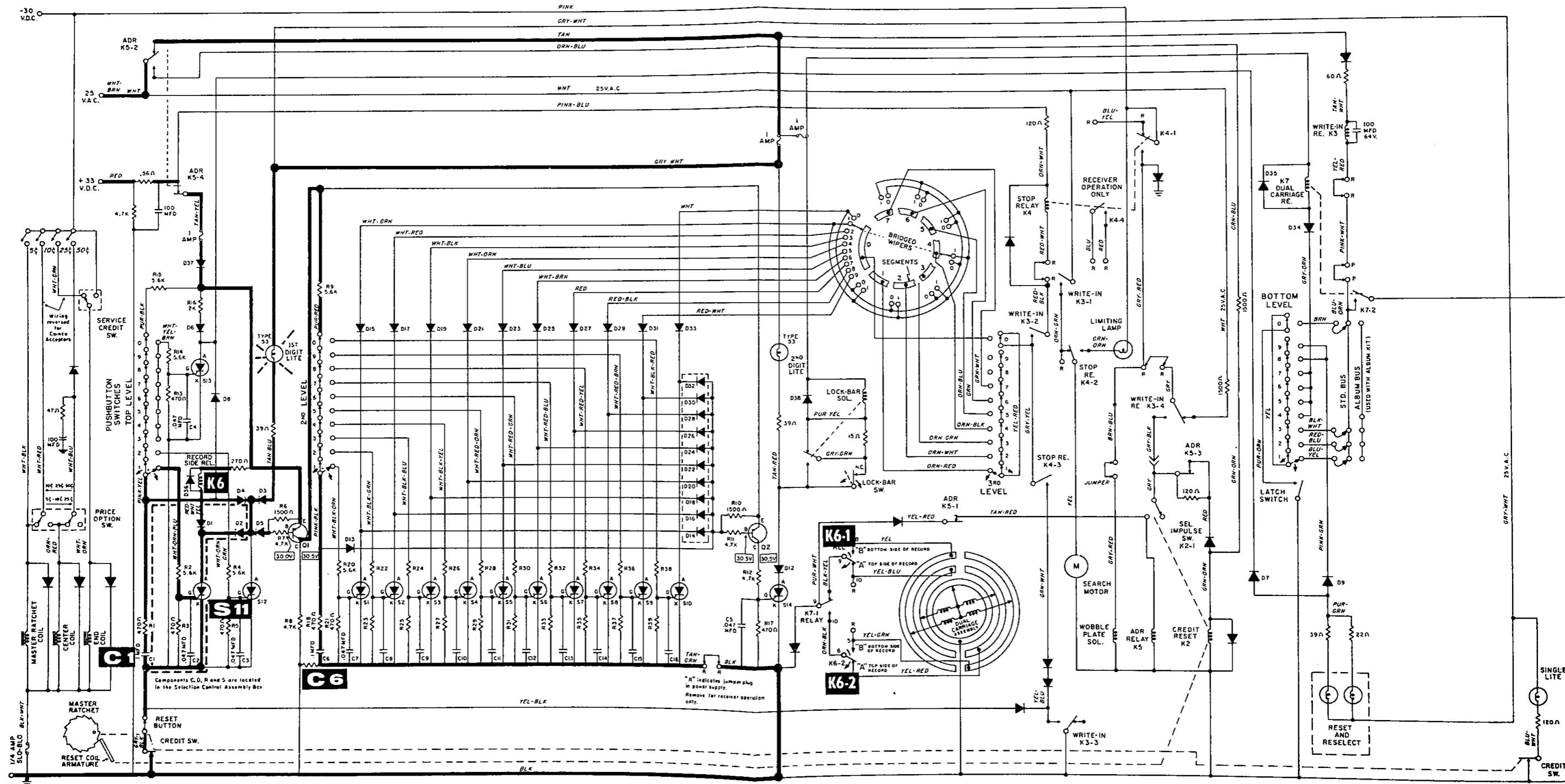
**SEQUENCE No. 1
25¢ COIN REGISTERED**

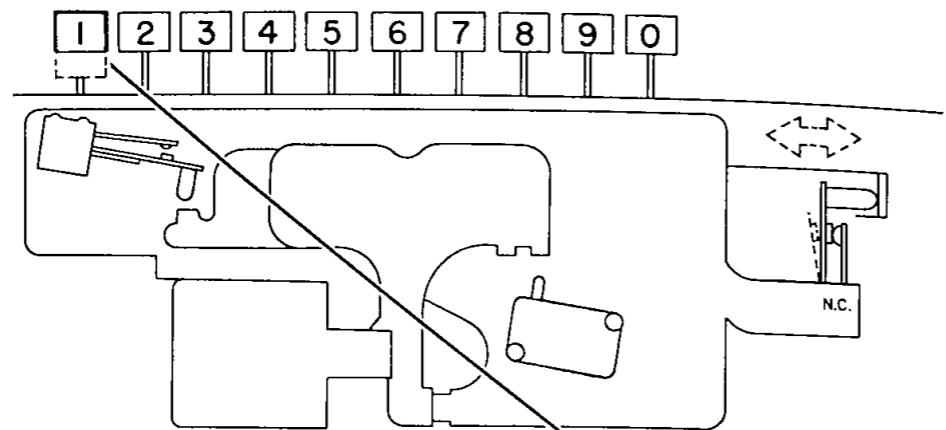
- 1 25¢ coin pulses Coin Switch.
- 2 Related Electromagnet operates ... Master Ratchet escapes 2 teeth.

Credit Switches **3** & **4** close, ... **3** lites the "Singles" select lite, ... **4** charges Capacitor C1 which is the trigger for the 1st Digit circuit.



SELECTION CONTROL P.C. BOARD





STANDARD SELECTION EXAMPLE

SEQUENCE No. 2 1st DIGIT PUSHBUTTON PRESSED

The 1st Digit of any selection relates to the record side. No.1 pushbutton connects "Top Side" record selections. No.2 pushbutton connects "Bottom Side" record selections.

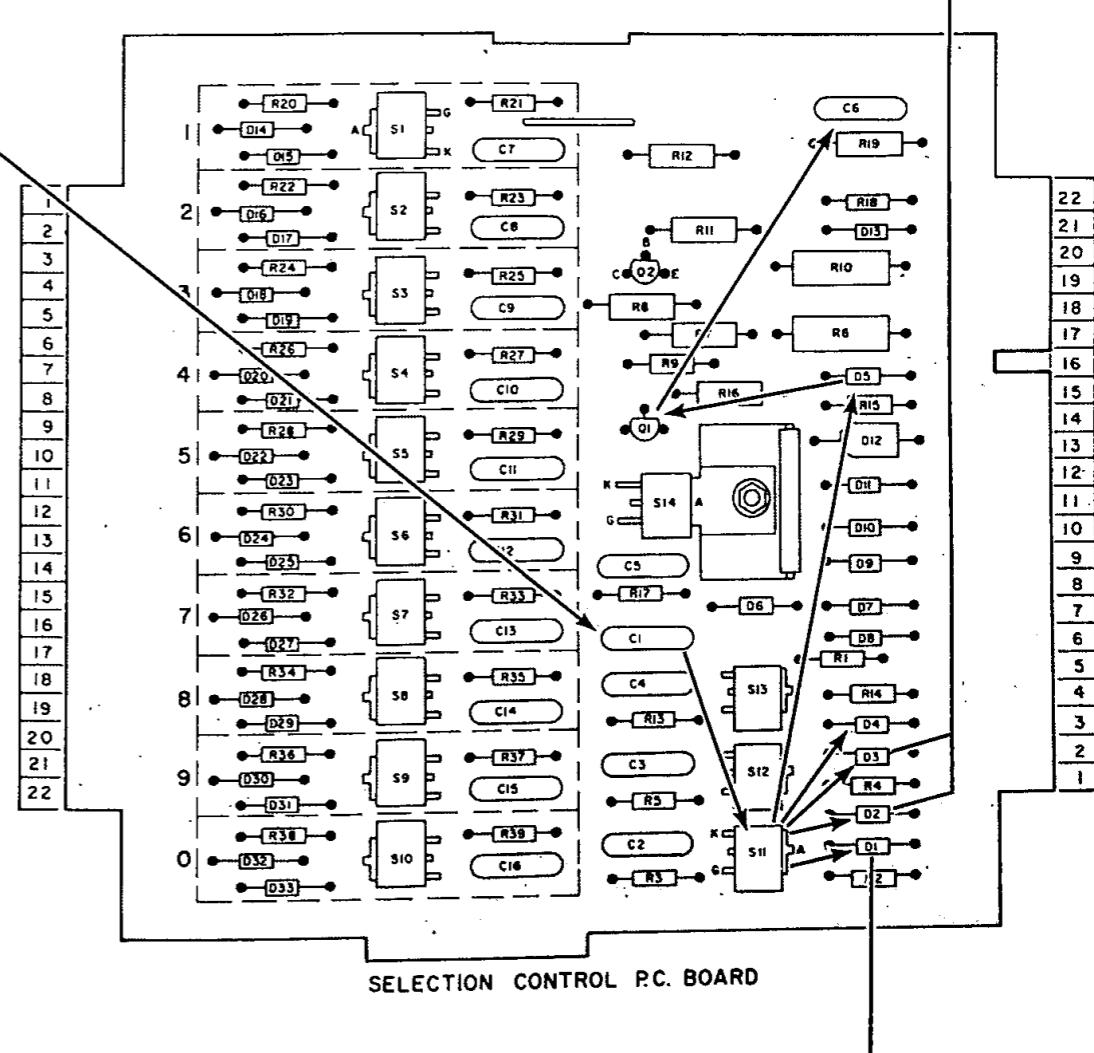
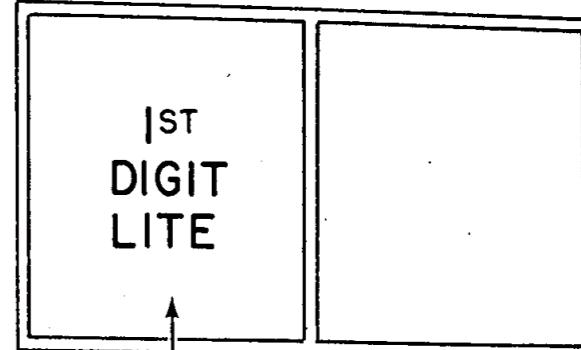
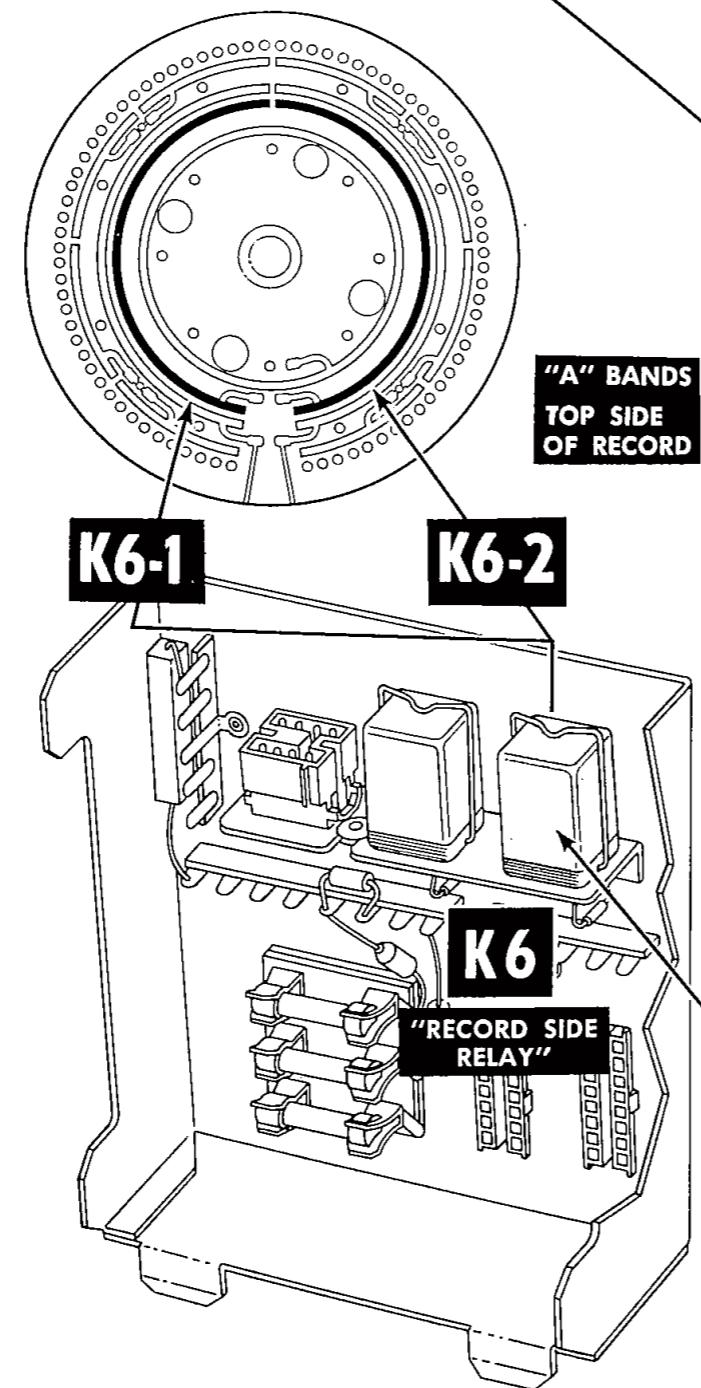
(Digit numbers "3" thru "0" if pressed result in a "no go" condition and cause the "Reset and Reselect" lamp to flash. See next sequence for illustration.)

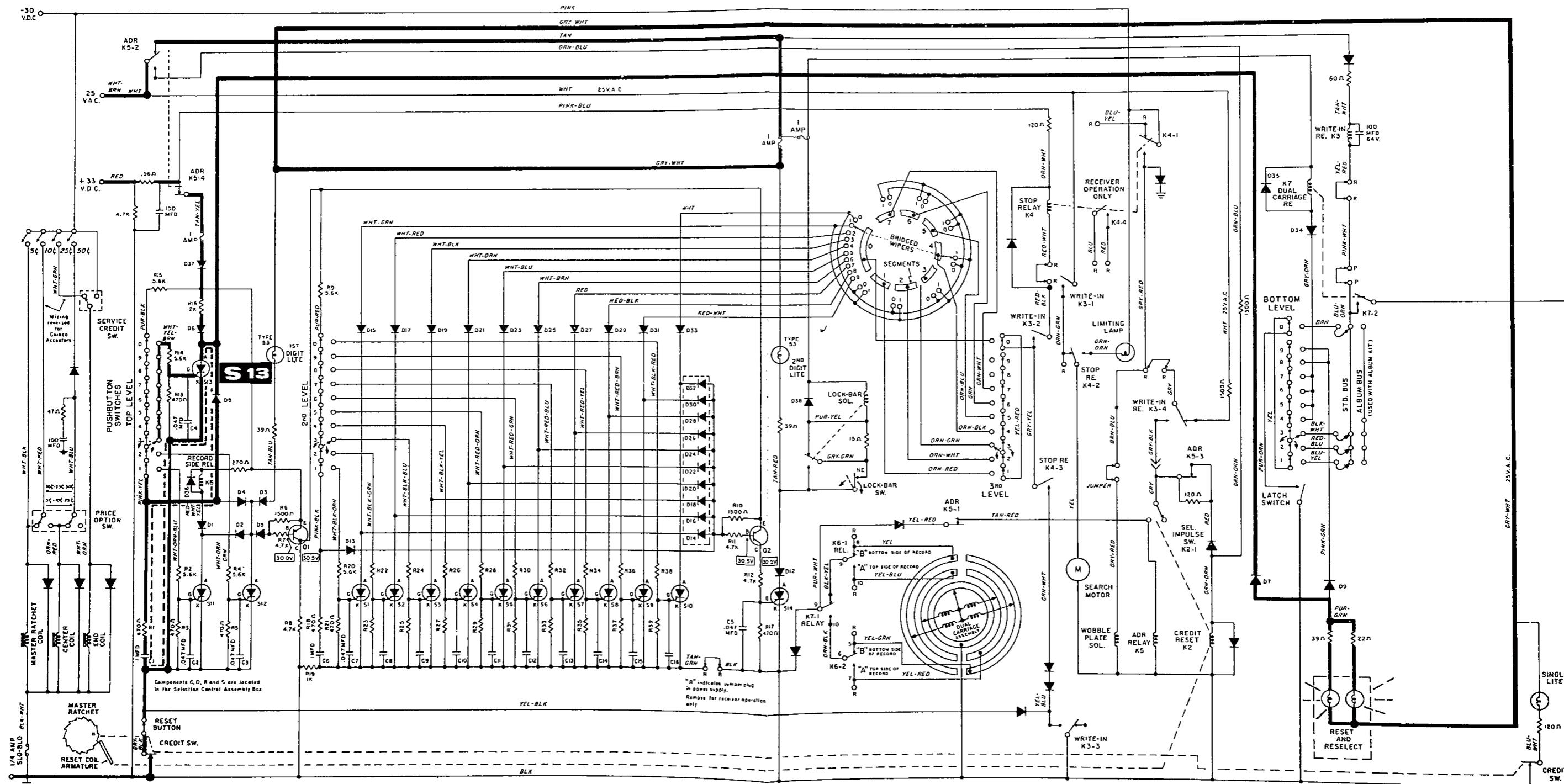
The pressing of No.1 pushbutton switch connects Capacitor C1 which provides the pulse to trigger the gate of S11 causing it to conduct. Record Side Relay **K6** energizes thru D1 . . . Transferred relay contacts **K6-1** & **K6-2** connect circuits to the "A" bands on the selector P.C. Board indicating that the top side of the record is to be played.

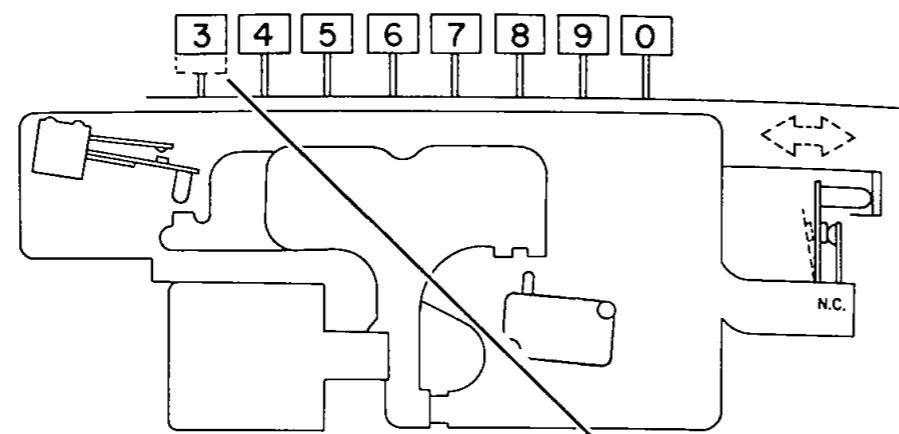
1st Digit lite turns "on" thru D2 and D3.

The conducting SCR (in this case S11), D2 and D4 now clamps the voltage at the pushbutton switch end of R1 to 2 volts; this value is too low to trigger any other SCR in the 1st Digit circuit on subsequent pushbutton operations.

Transistor Q1 turns "on" via D5 supplying a positive charge to Capacitor C6 when the pushbutton is released.







**RESET
AND
RESELECT**

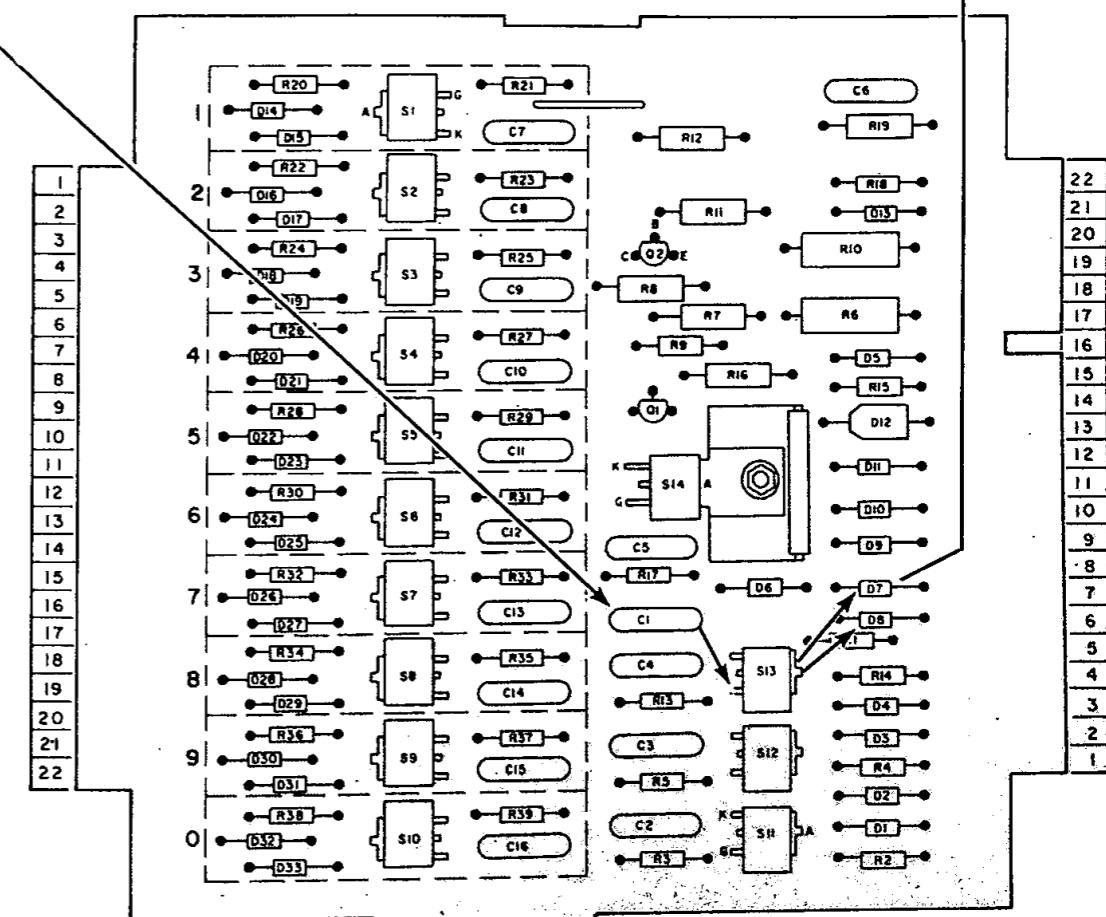
**SEQUENCE No. 3
INCORRECT 1st DIGIT
NUMBER PRESSED**

As mentioned previously, Digit numbers from "3" thru "0" if pressed, result in a "no go" condition.

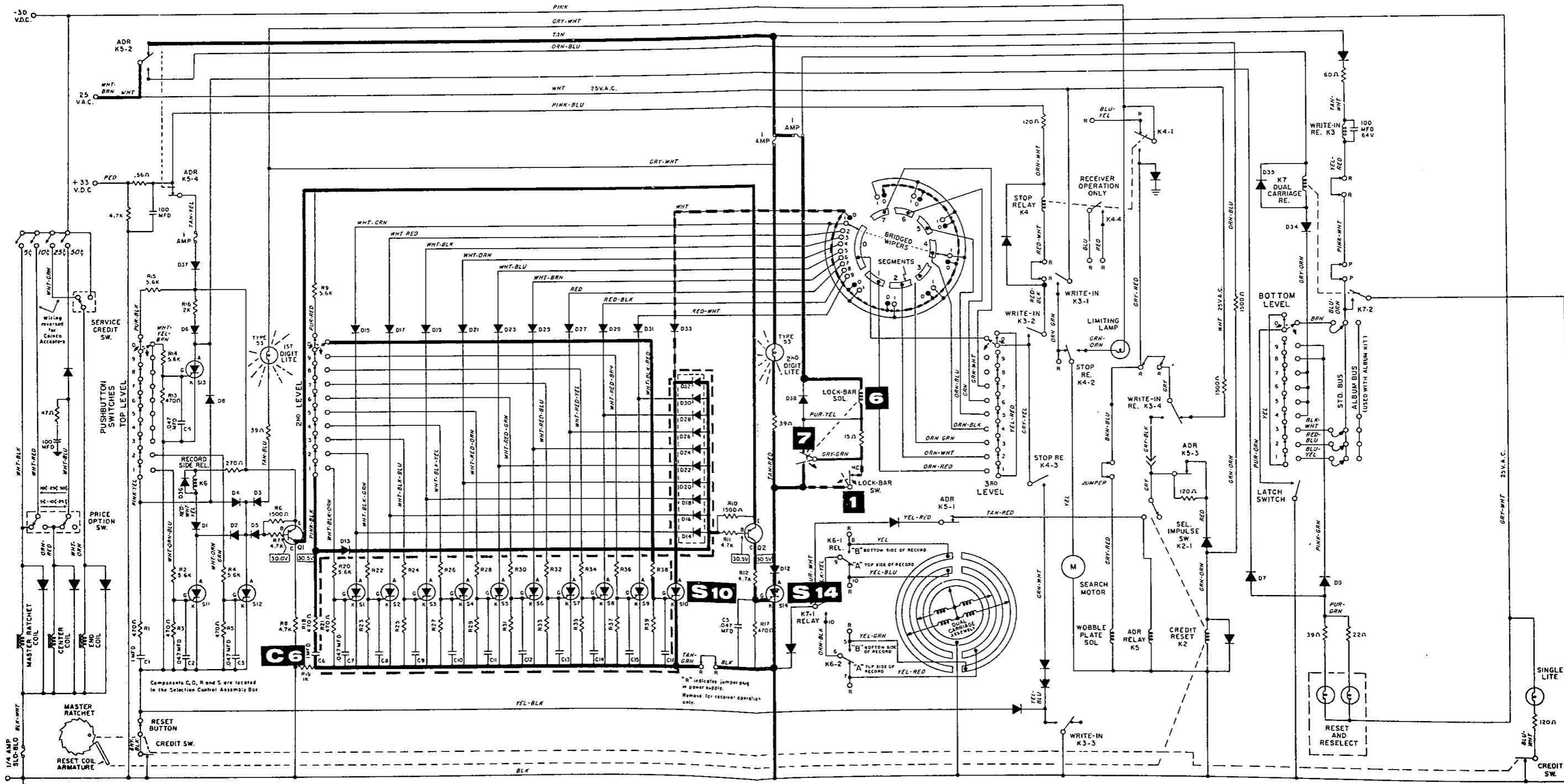
Capacitor C1 now triggers the S13 gate allowing current flow thru D7 causing the "Reset & Reselect" lites to flash.

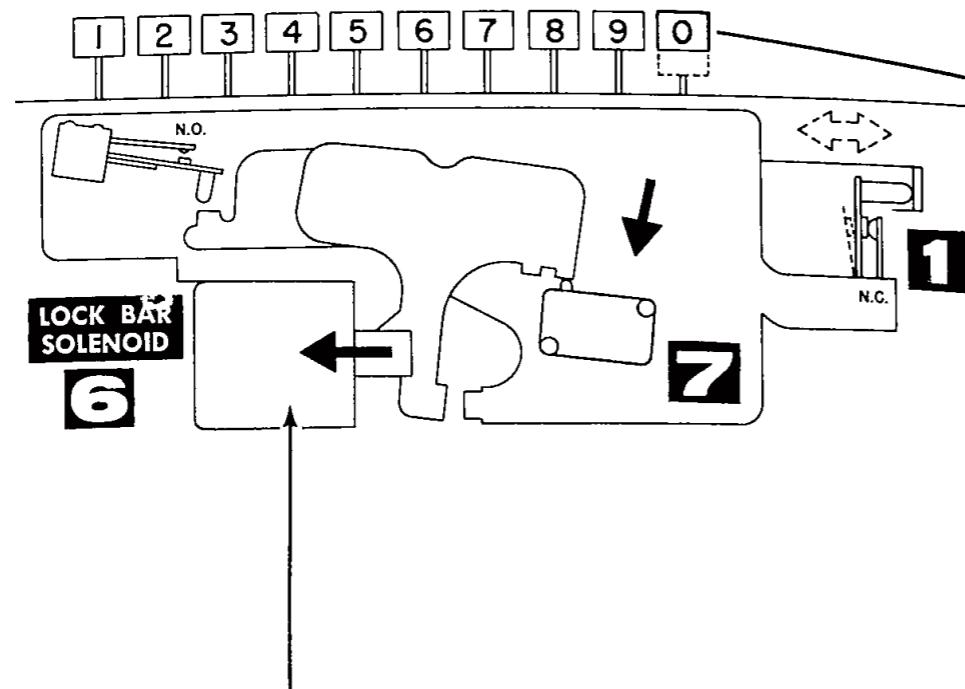
The conducting SCR (in this case S13), D8 now clamps the voltage at the pushbutton end of R1 to about 2 volts; this value is too low to trigger any other SCR in the 1st Digit circuit on subsequent pushbutton operations.

When the Reset Button is depressed all SCR'S in the 1st Digit circuit are turned off, thus resetting the system to starting conditions.



SELECTION CONTROL PC. BOARD





1ST
DIGIT
LITE 2ND
DIGIT
LITE

SEQUENCE No. 4
2nd DIGIT NUMBER PRESSED

The 2nd Digit of a selection relates to a record. (Not record side)

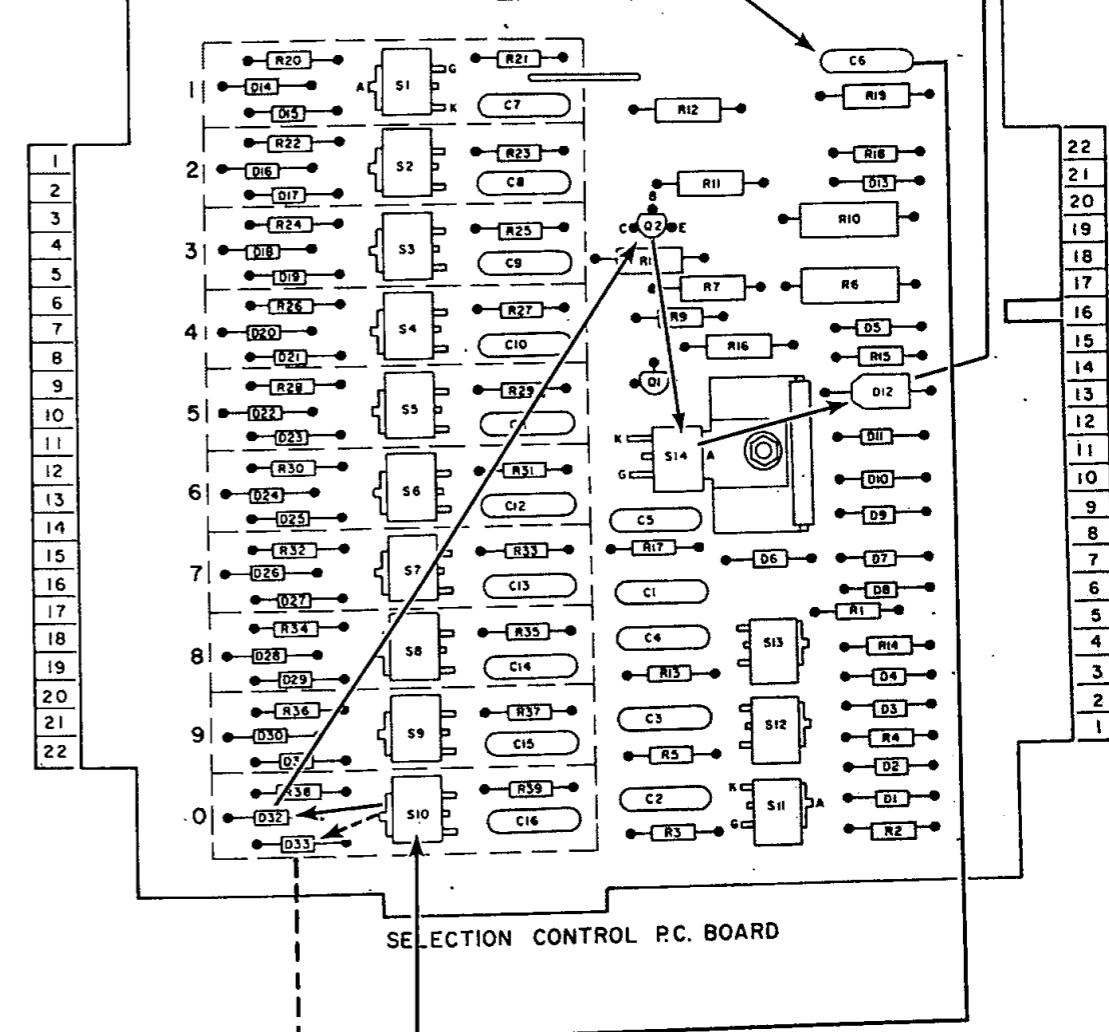
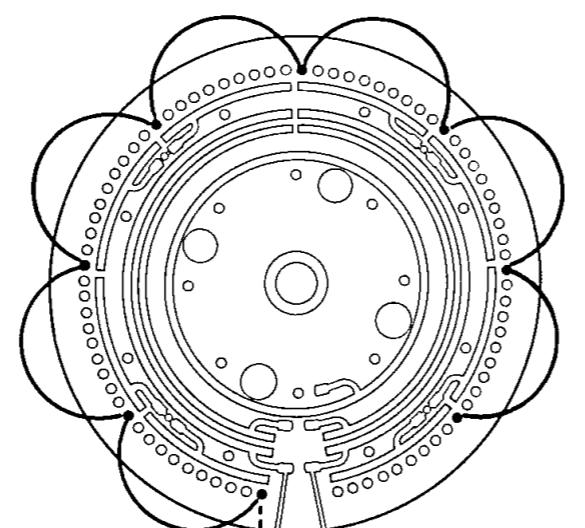
Pressing the 2nd Digit, as "0", Capacitor C6 now triggers S10 which results in the following:

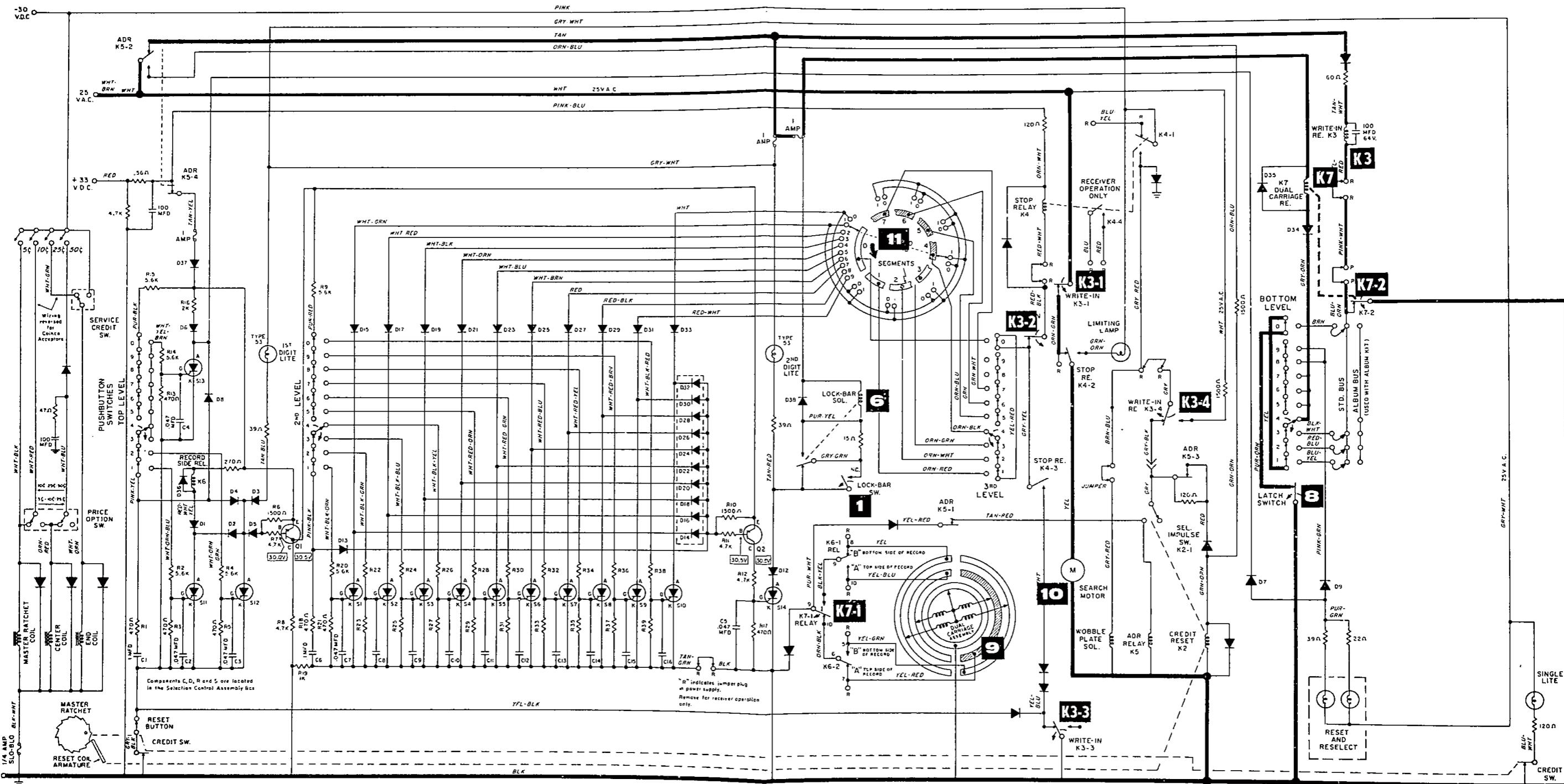
Transistor Q2 turns "on" via D32; this triggers S14 which operates the 2nd Digit Lite thru D12.

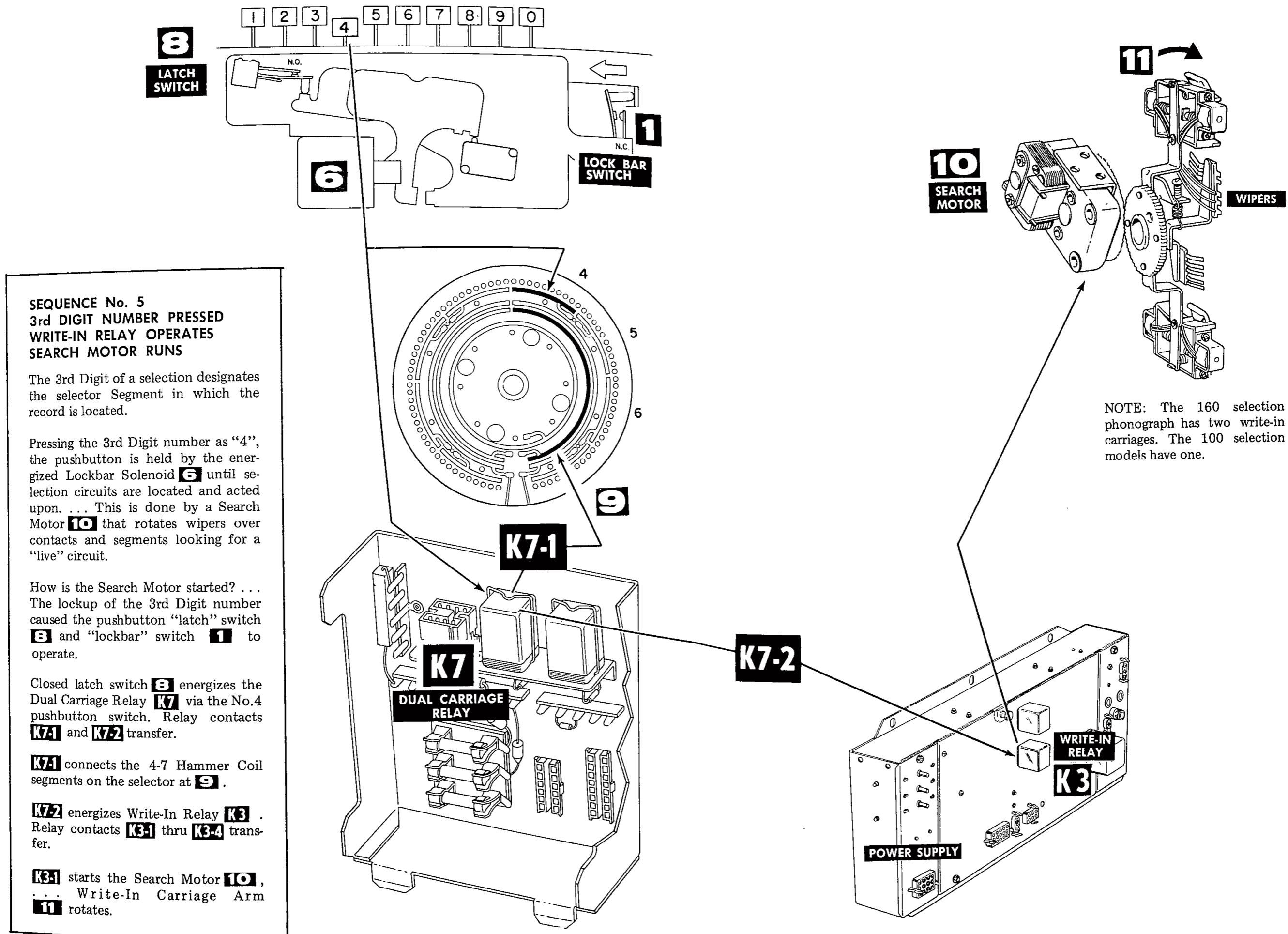
When the pushbutton switch is released, the Lockbar Solenoid **6** is energized thru Lockbar Switch No. **1**. The solenoid is then held by its own holding circuit No. **7**.

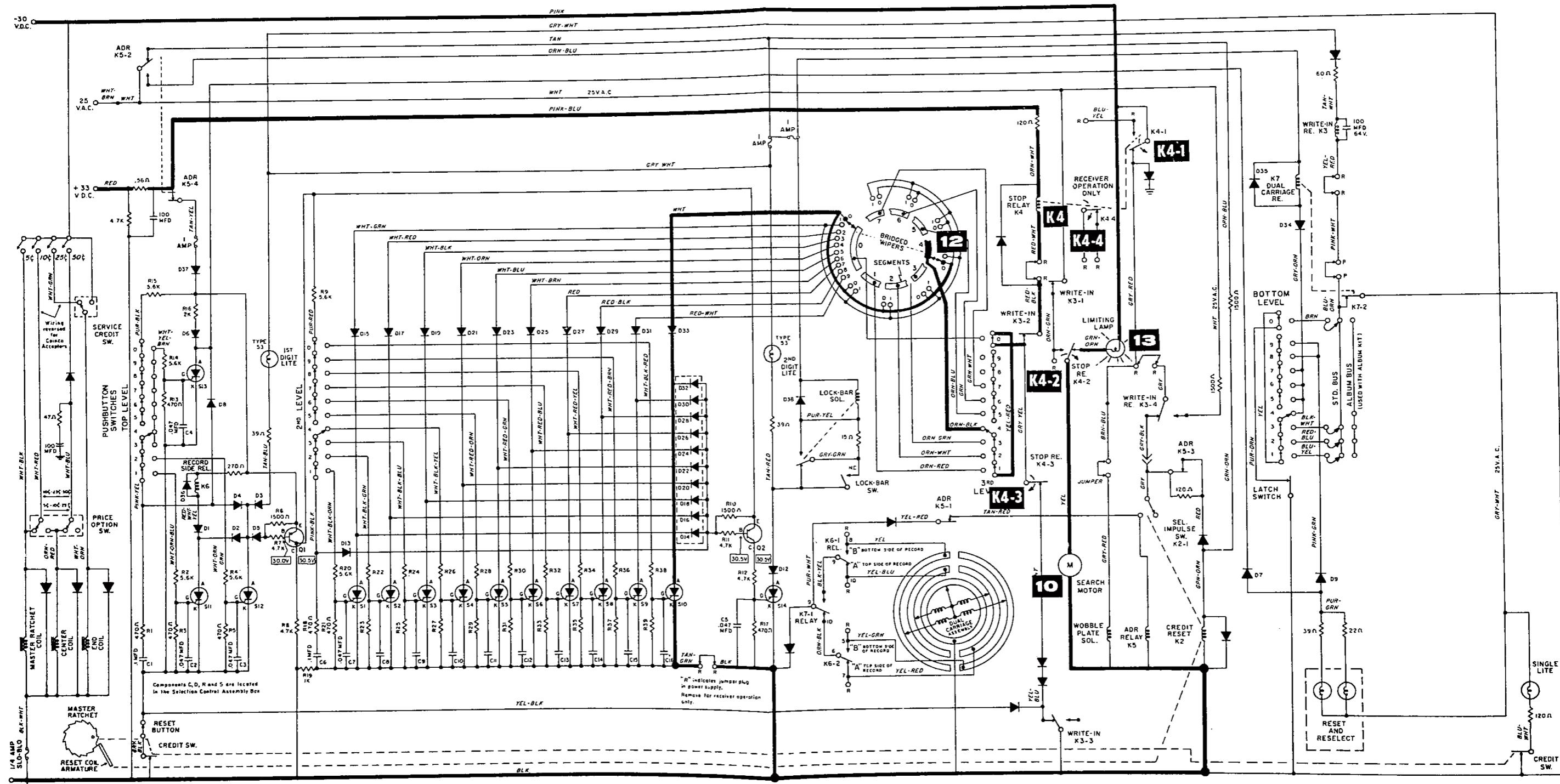
D13 clamps a 2 volt potential at the switch end of R21; this value is too low to trigger any other SCR in the 2nd Digit circuit on the subsequent pushbutton operation.

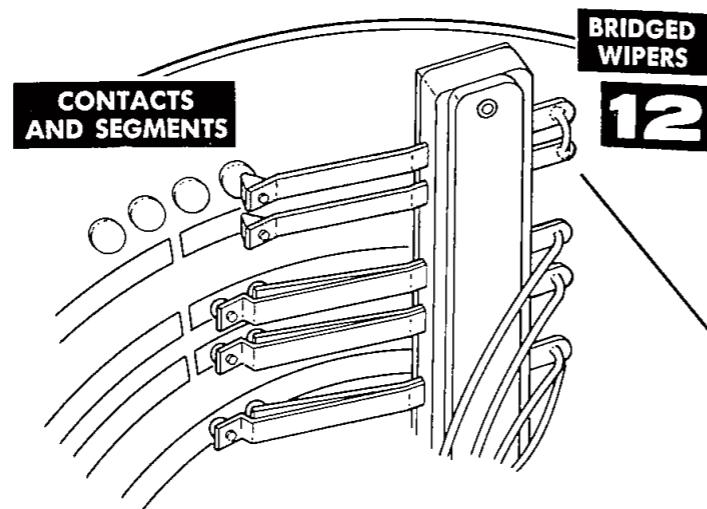
D33 connects a "ready" circuit to the 1st contact in each segment of the selector P.C. board.









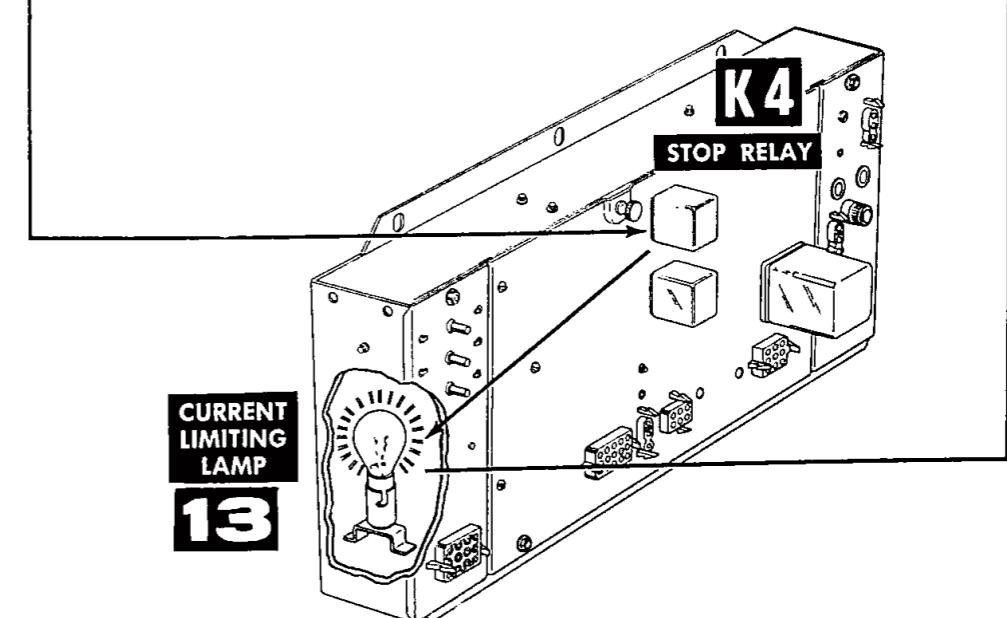
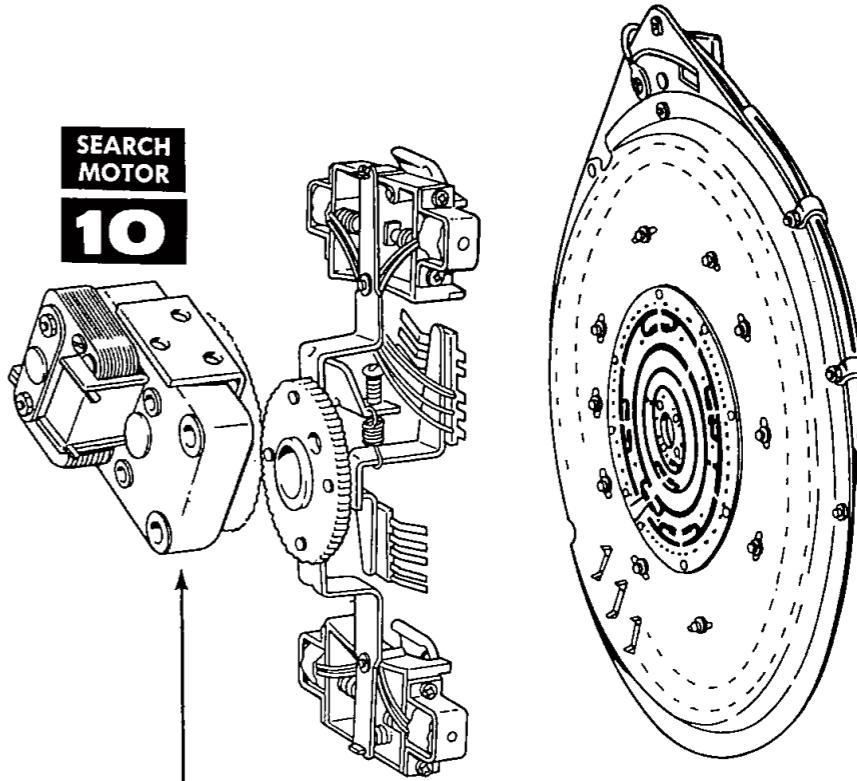


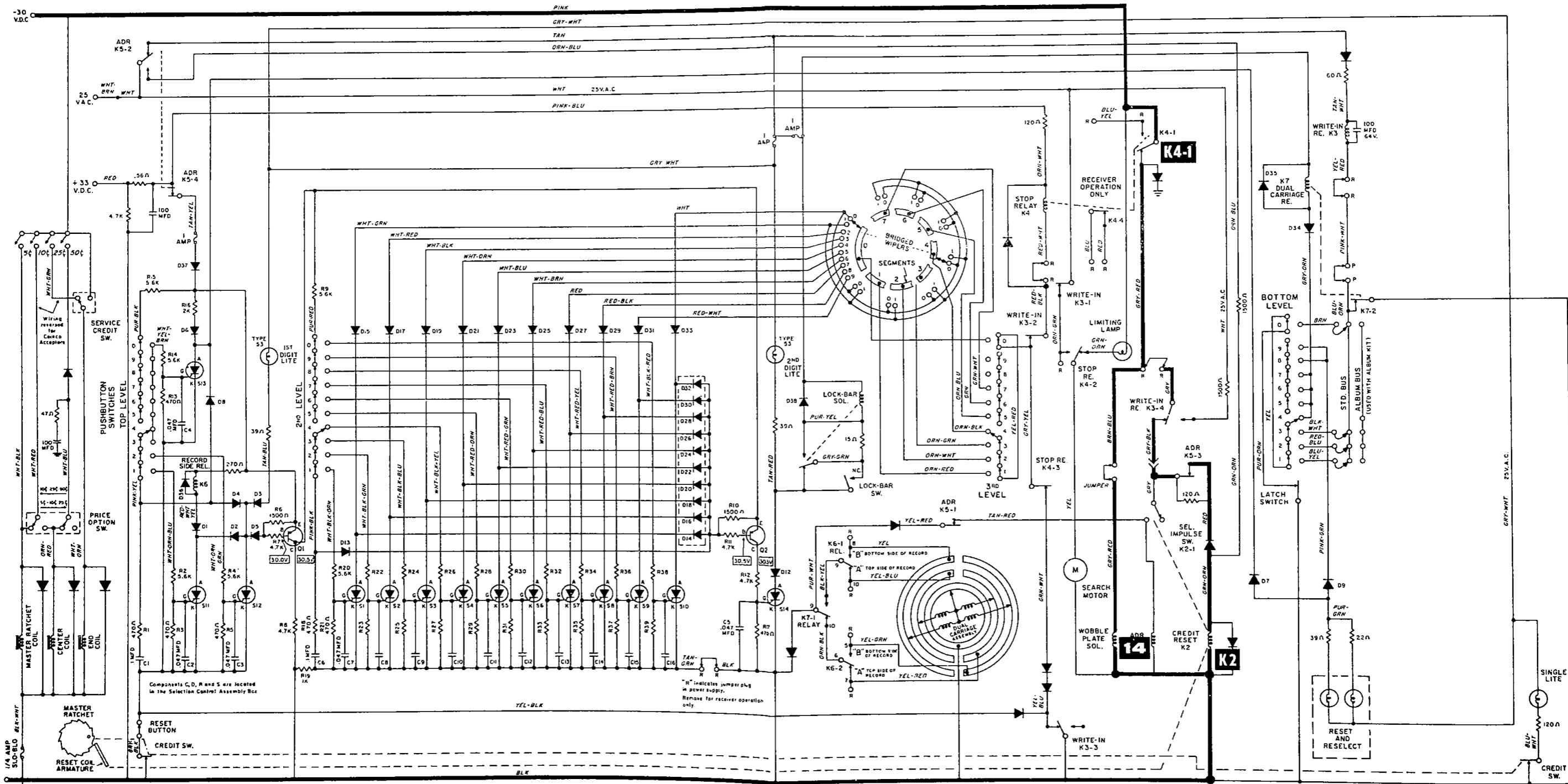
SEQUENCE No. 6
WRITE-IN CARRIAGE
SCANS AND INDEXES

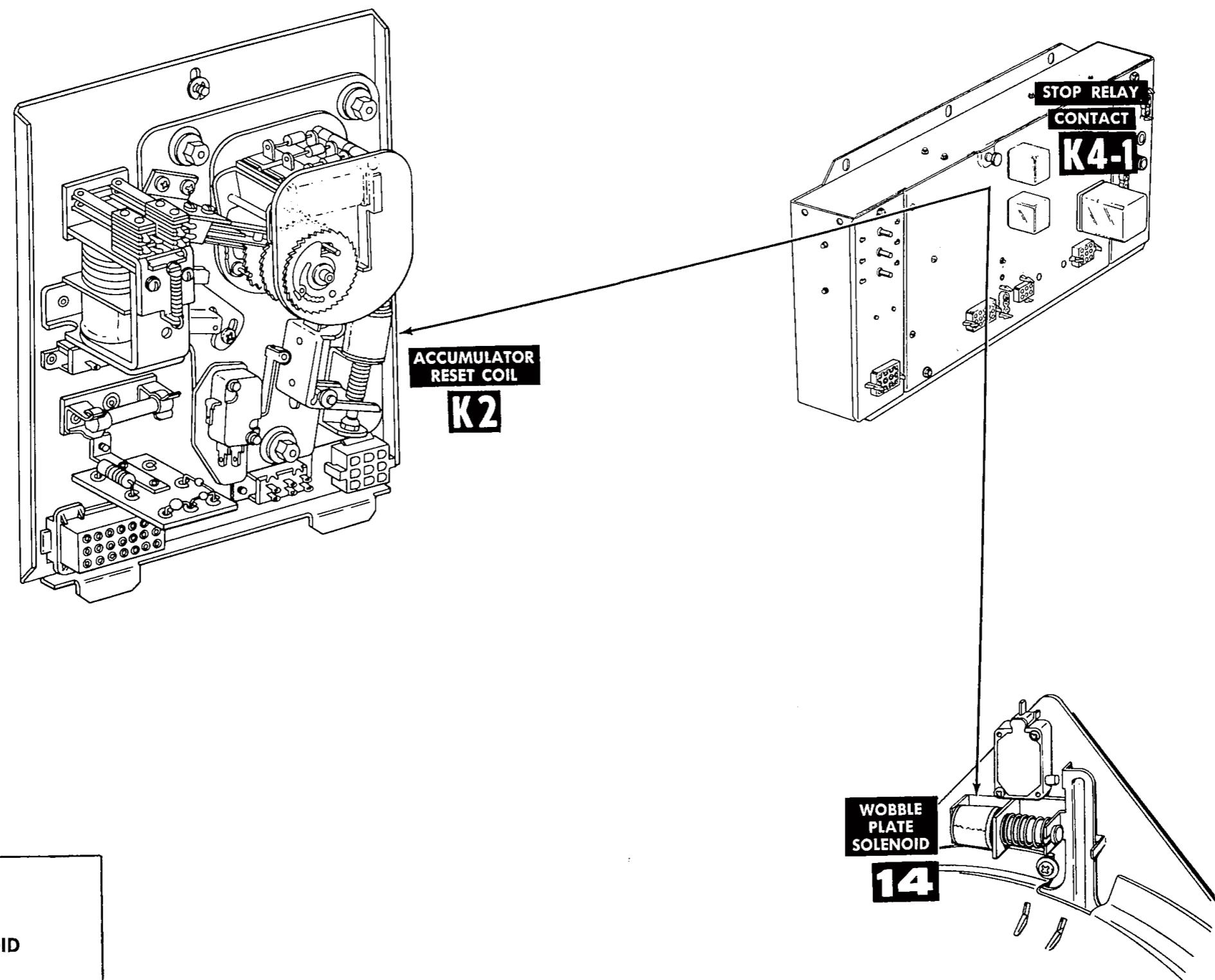
As the carriage wipers scan, bridged wiper **12** locates the "live" contact and segment... this operates stop relay **K4**. Stop relay contacts **K4-1** thru **K4-4** transfer.

K4-2 Disconnects A.C. power to the search motor **10** and connects it to a D.C. source thru the current limiting lamp **13**.

This action brakes the motor, stopping the rotation of the carriage assembly.

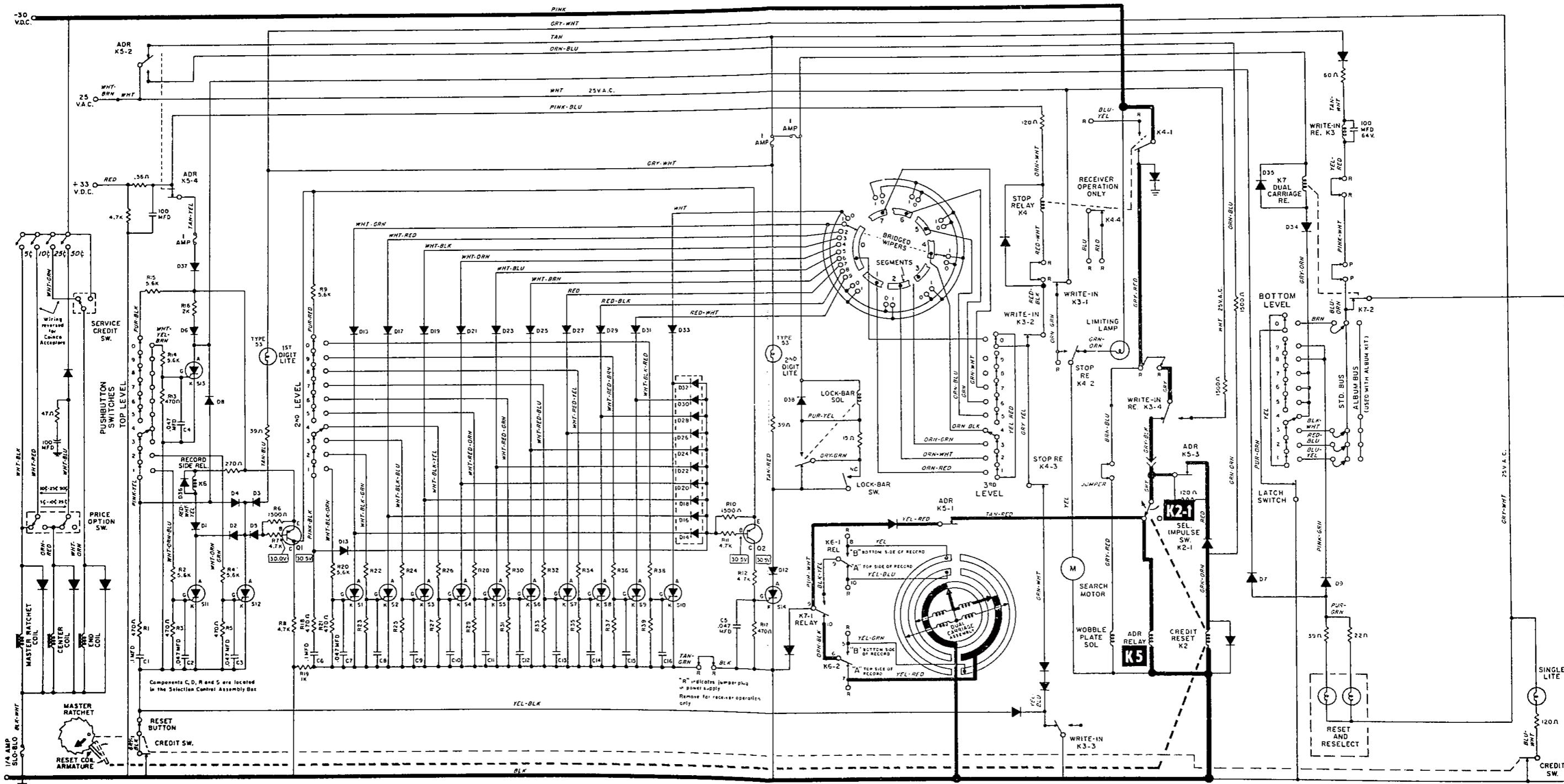


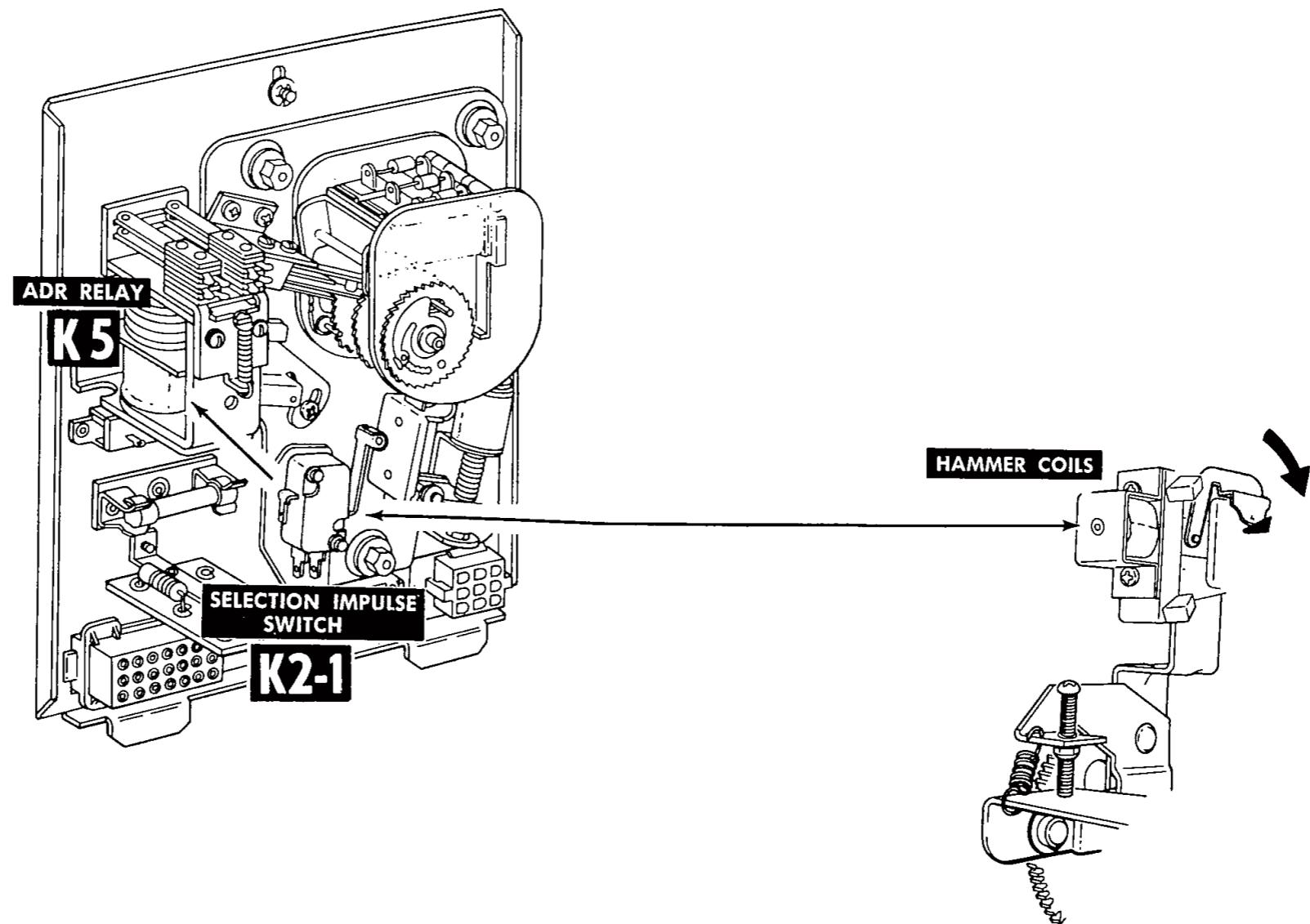




SEQUENCE No. 7
ACCUMULATOR RESET COIL
AND WOBBLE PLATE SOLENOID
OPERATE

During the braking sequence of the search motor, stop relay contact **K4-1** operates the accumulator reset coil **K2**,
...and wobble plate solenoid **14**.



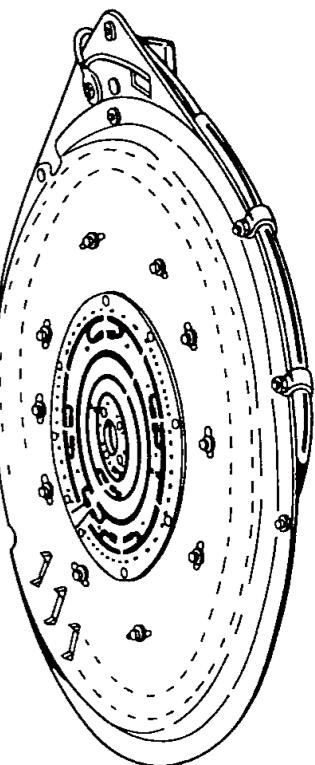


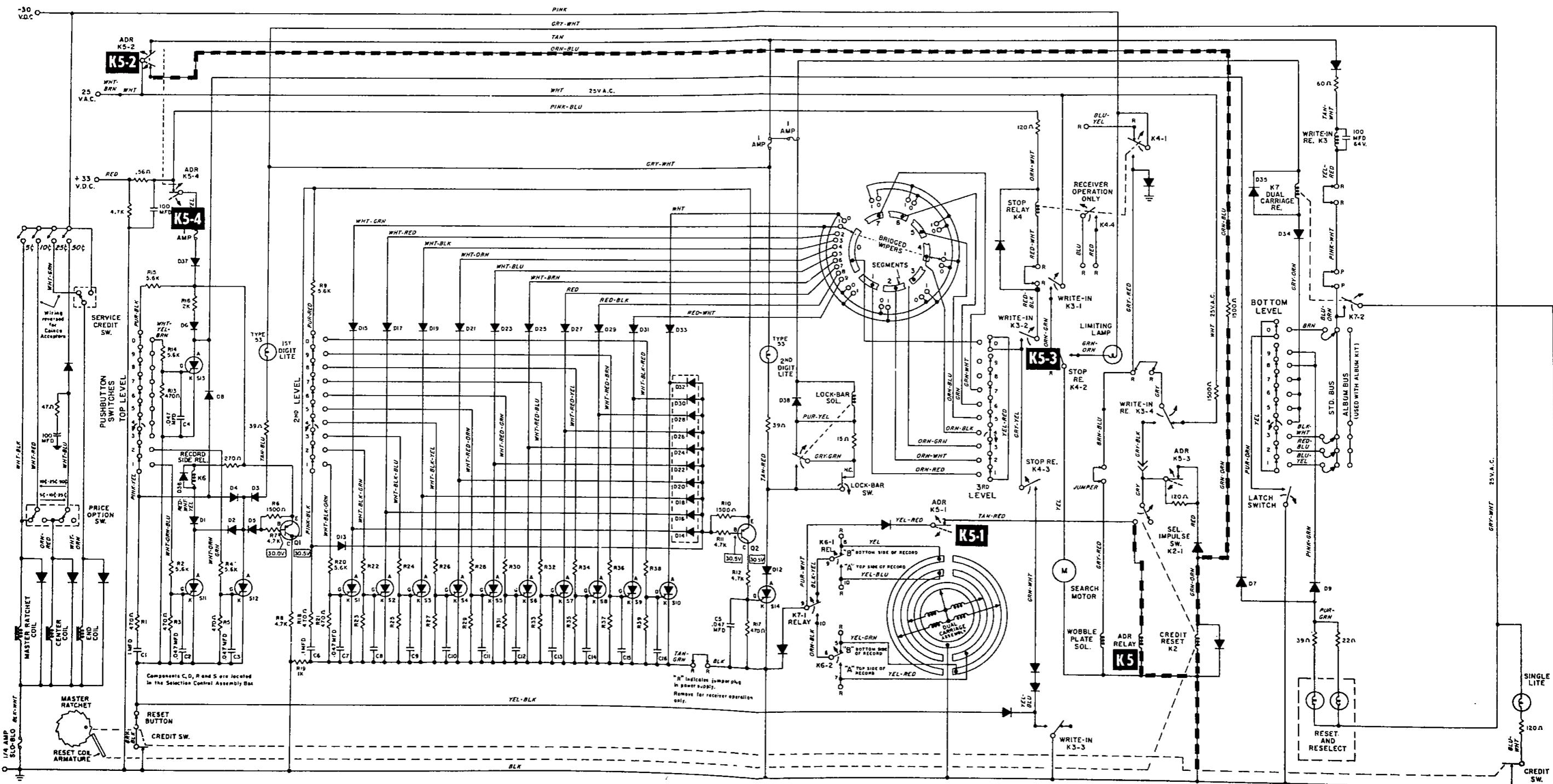
SEQUENCE No. 8
SELECTION LEVER MOVED
INTO PLAY POSITION—
ADR RELAY OPERATES

The operation of the Credit Reset Coil causes the armature to remove one credit from the master ratchet. . . At the same time, the stroke of the armature operates the Selection Impulse Switch **K2-1** which provides power to the Carriage Hammer Coil and ADR (Attract Delay Relay).

The operated Carriage Hammer Coil moves the selector lever into "play" position.

The ADR, because of its construction, the pull-in is momentarily delayed to assure a "fat" pulse to the Carriage Hammer Coil.





**SEQUENCE No. 9
COMPLETION OF FIRST
SELECTION SEQUENCE**

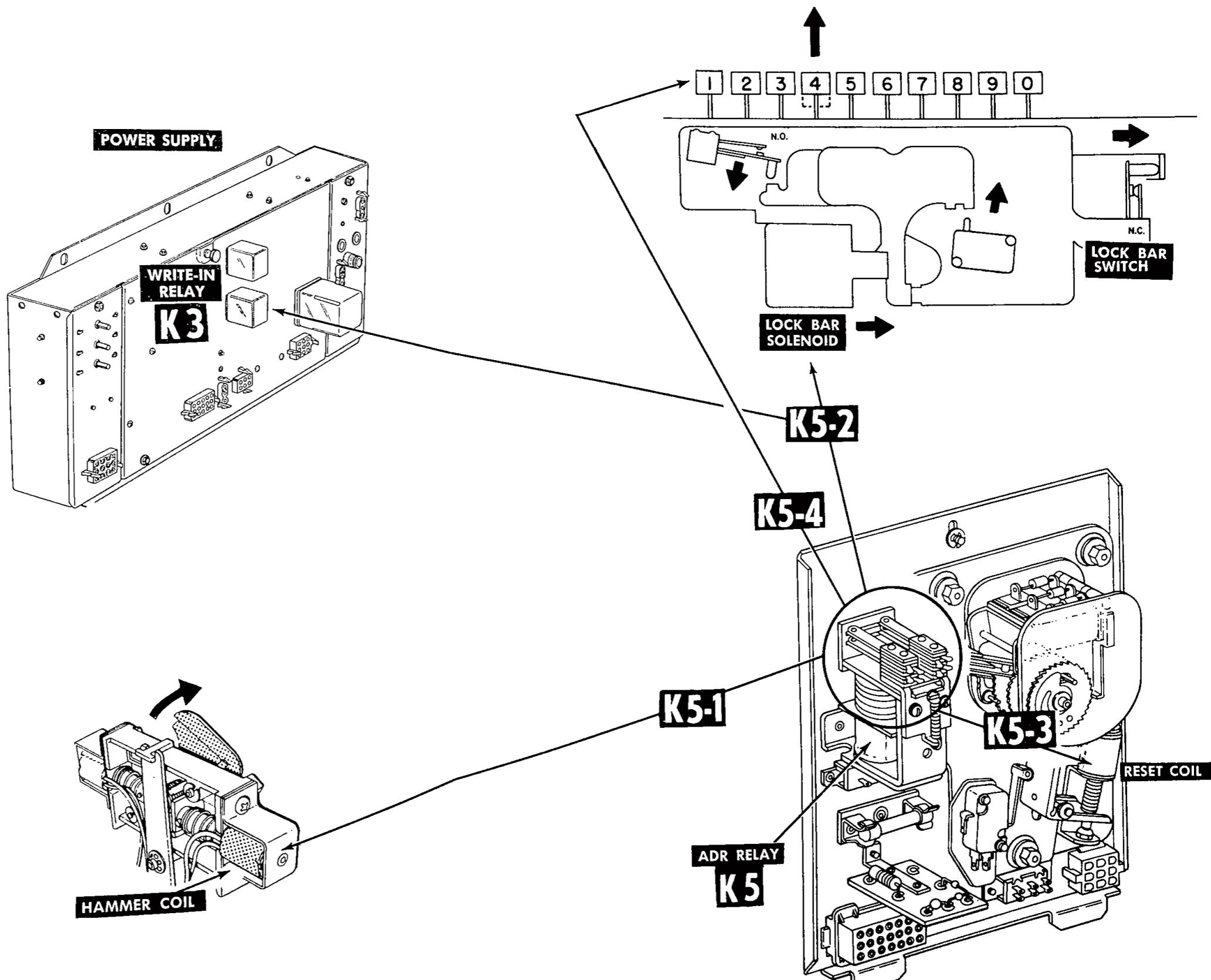
When the ADR relay **K5** pulls in, relay contacts **K5-1**, **K5-2**, **K5-3**, **K5-4** transfer.

- K5-1** Disconnects power to the Carriage Hammer Coil.
- K5-4** Disconnects power to the selection system.
- K5-3** Disconnects D.C. power to the Credit Reset Coil, Selection Impulse Switch relaxes.
- K5-2** The open back contact disconnects power to the Write-In Relay and Lock Bar Solenoid. Lock Bar Solenoid de-energizes, releasing the 3rd Digit push-button.

The closed forward contact supplies a small A.C. discharge current to the Credit Reset Relay **K2** to prevent coil plunger from sticking.

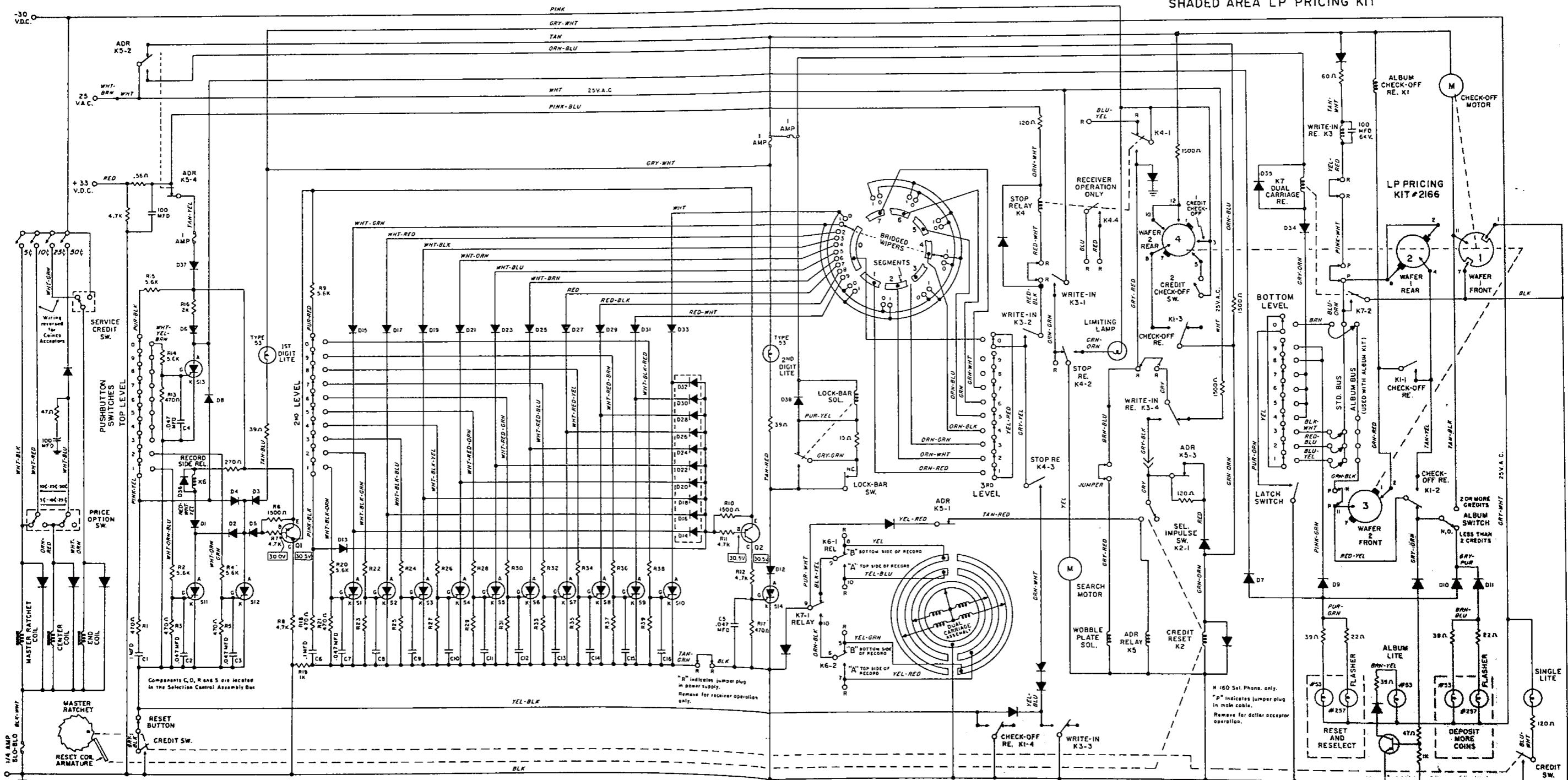
Since all selection circuits have now returned to standby, the ADR relay de-energizes, relay contacts return to their original positions.

If additional credits remain, the phono is ready to accept other selections.

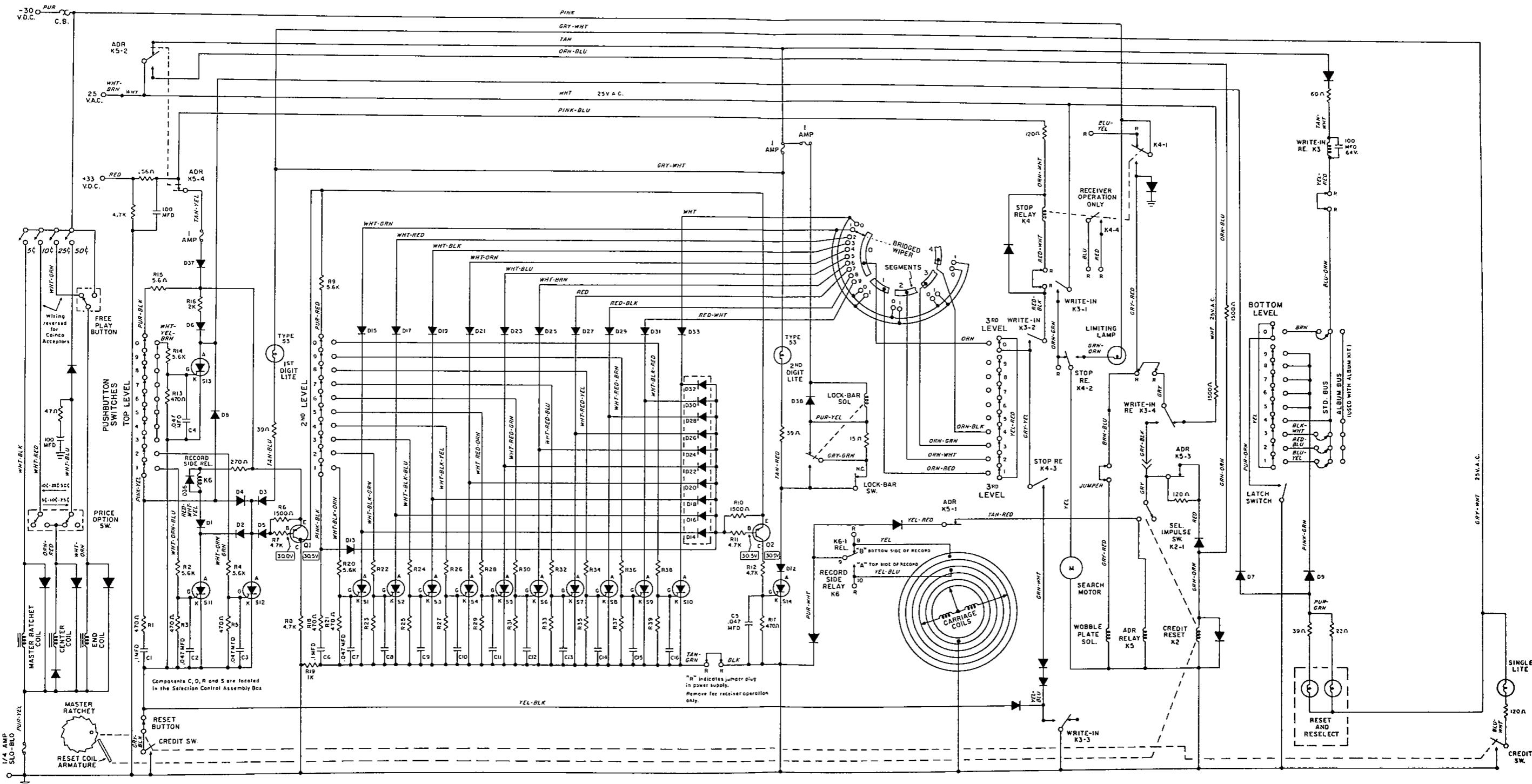




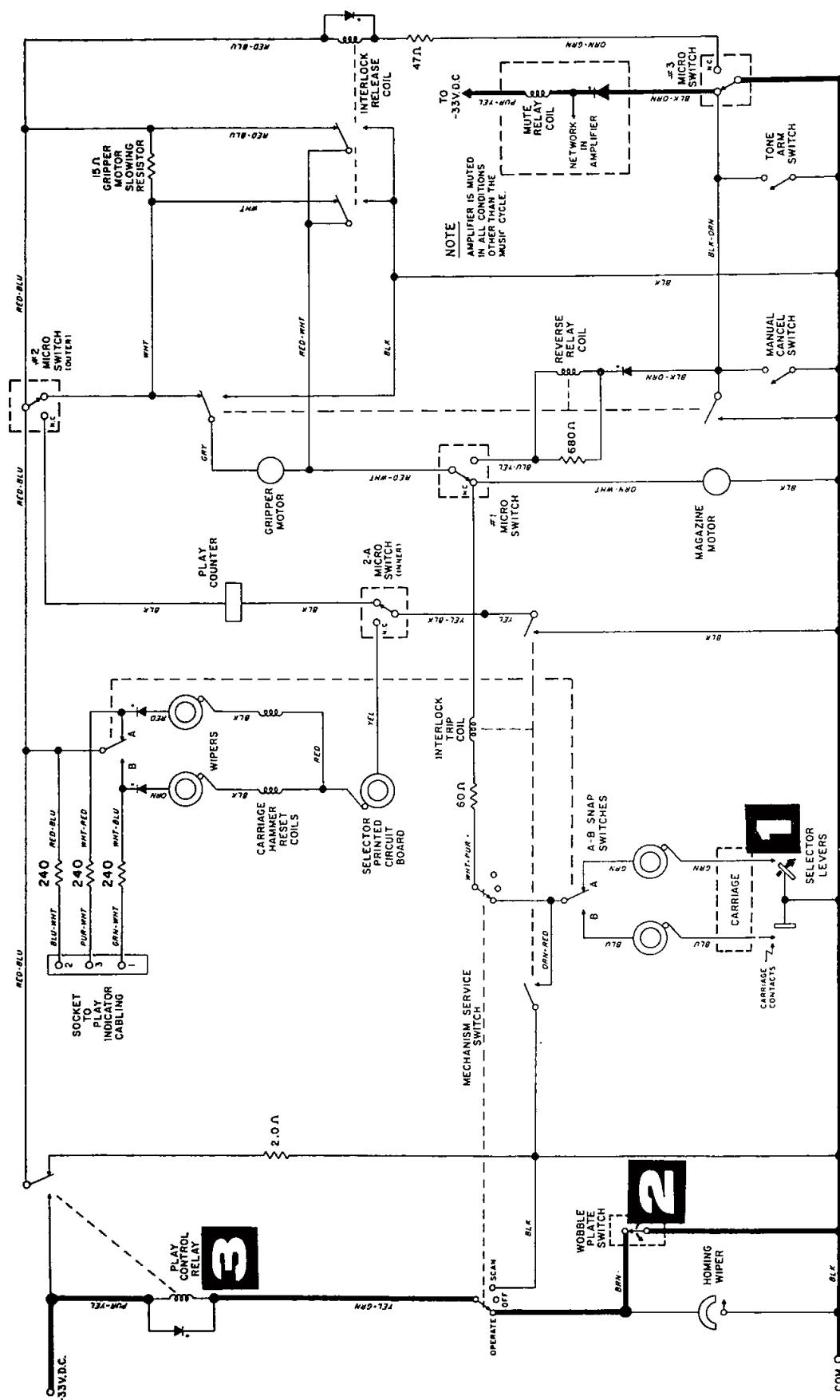
SHADED AREA LP PRICING KIT



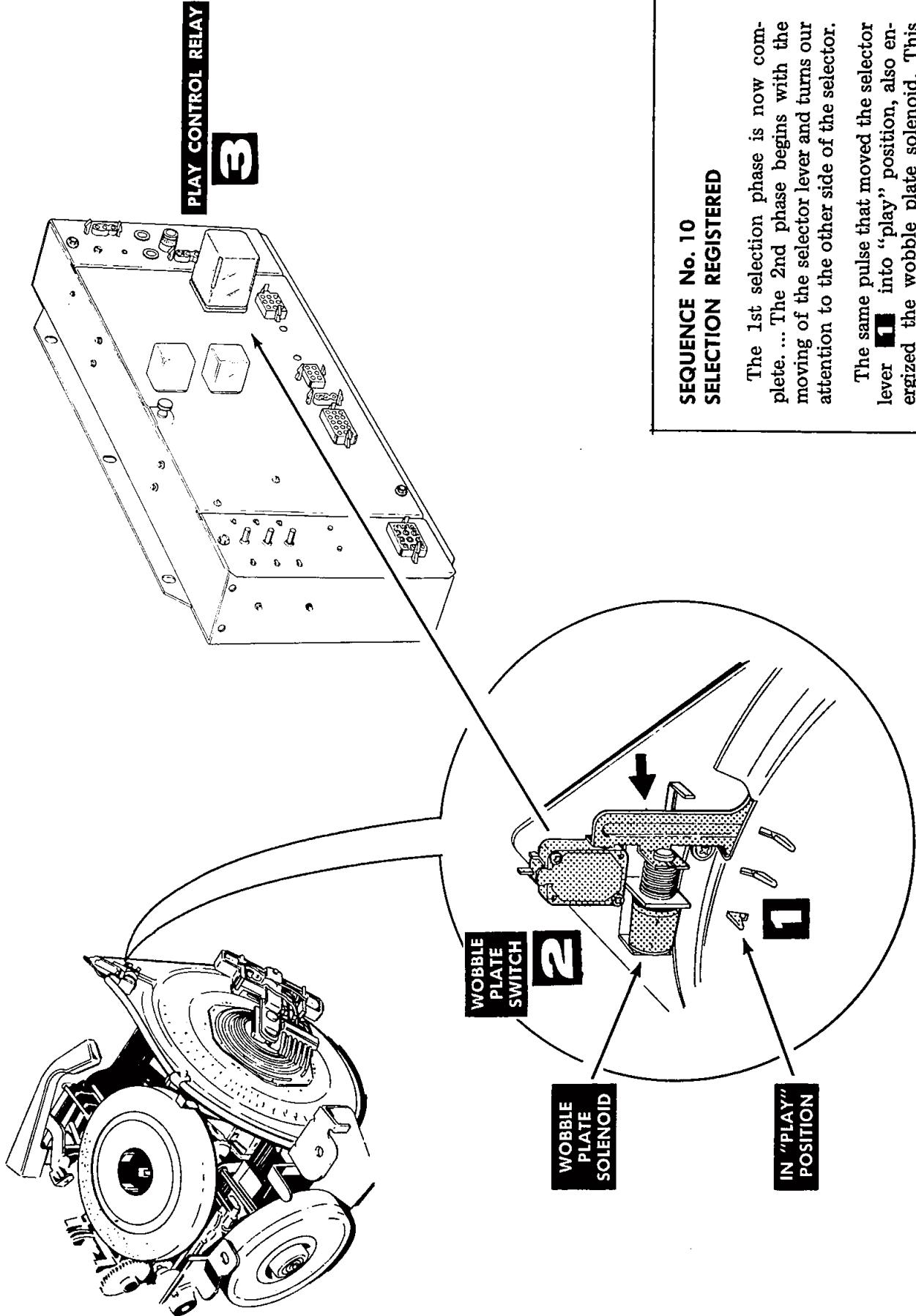
160 SELECTION SCHEMATIC WITH LP PRICING KIT #2166
SEE PAGE 36 FOR CYCLE OF OPERATION



100 SELECTION SCHEMATIC



SEQUENCE No. 10 - SELECTION REGISTERED

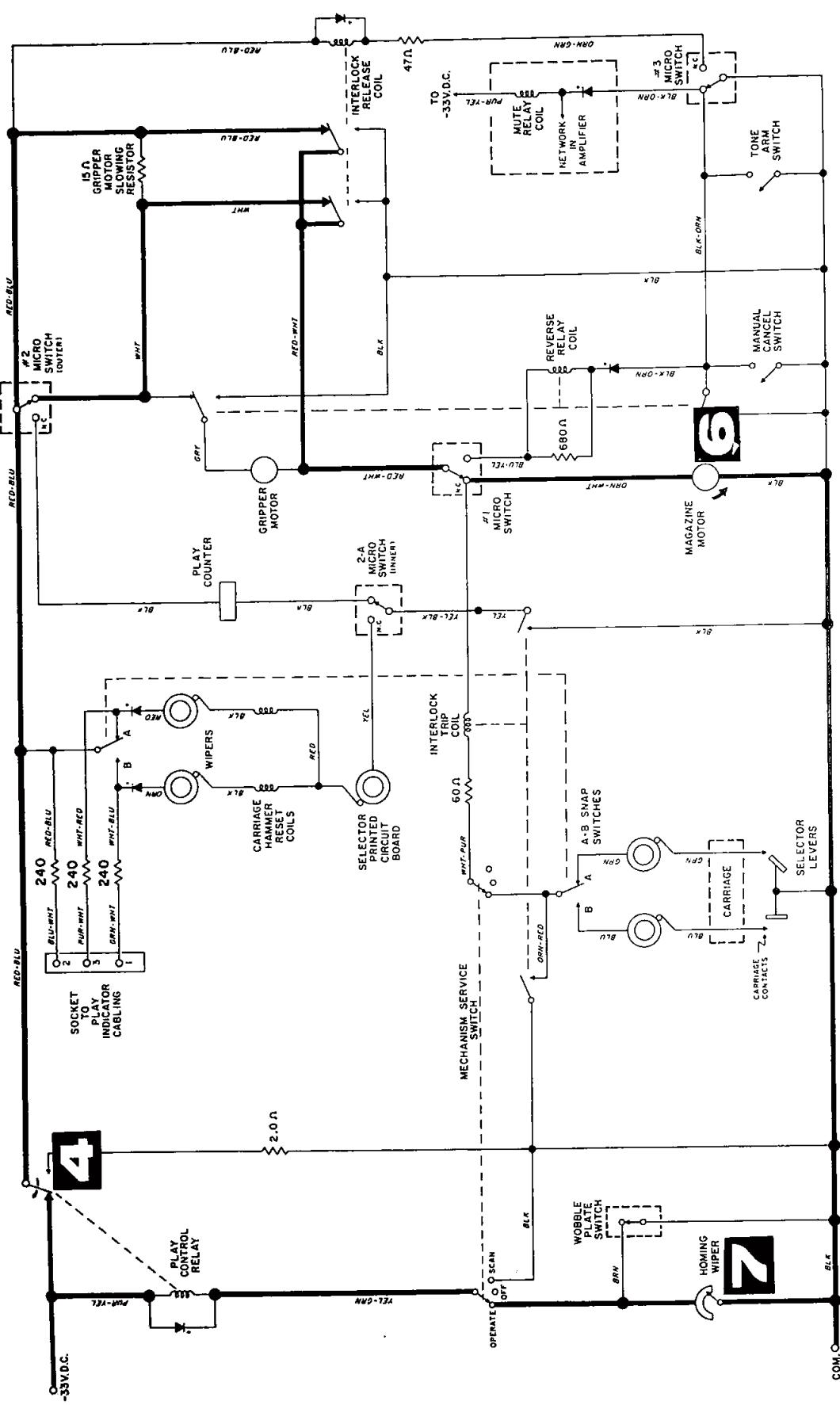


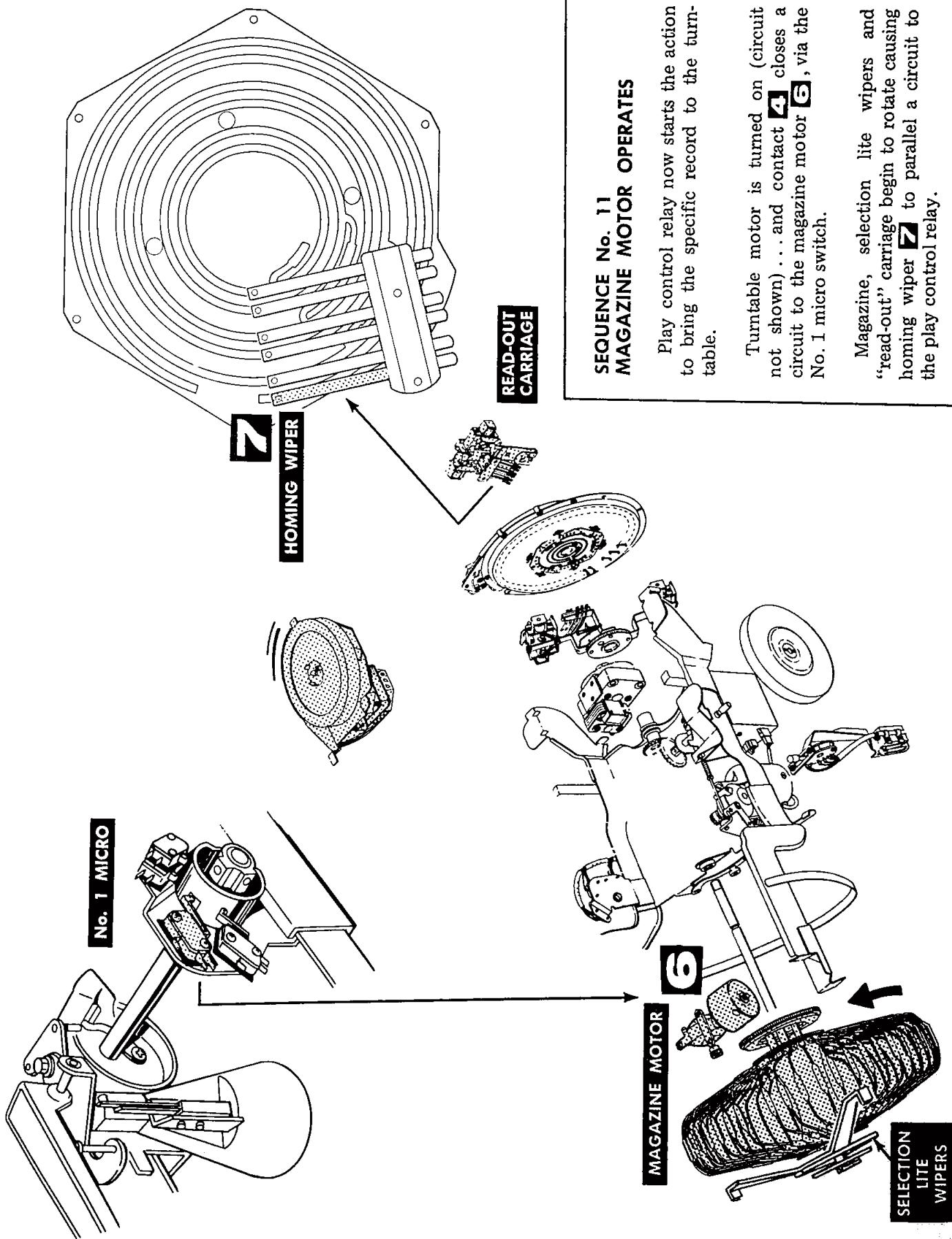
**SEQUENCE No. 10
SELECTION REGISTERED**

The 1st selection phase is now complete. ... The 2nd phase begins with the moving of the selector lever and turns our attention to the other side of the selector.

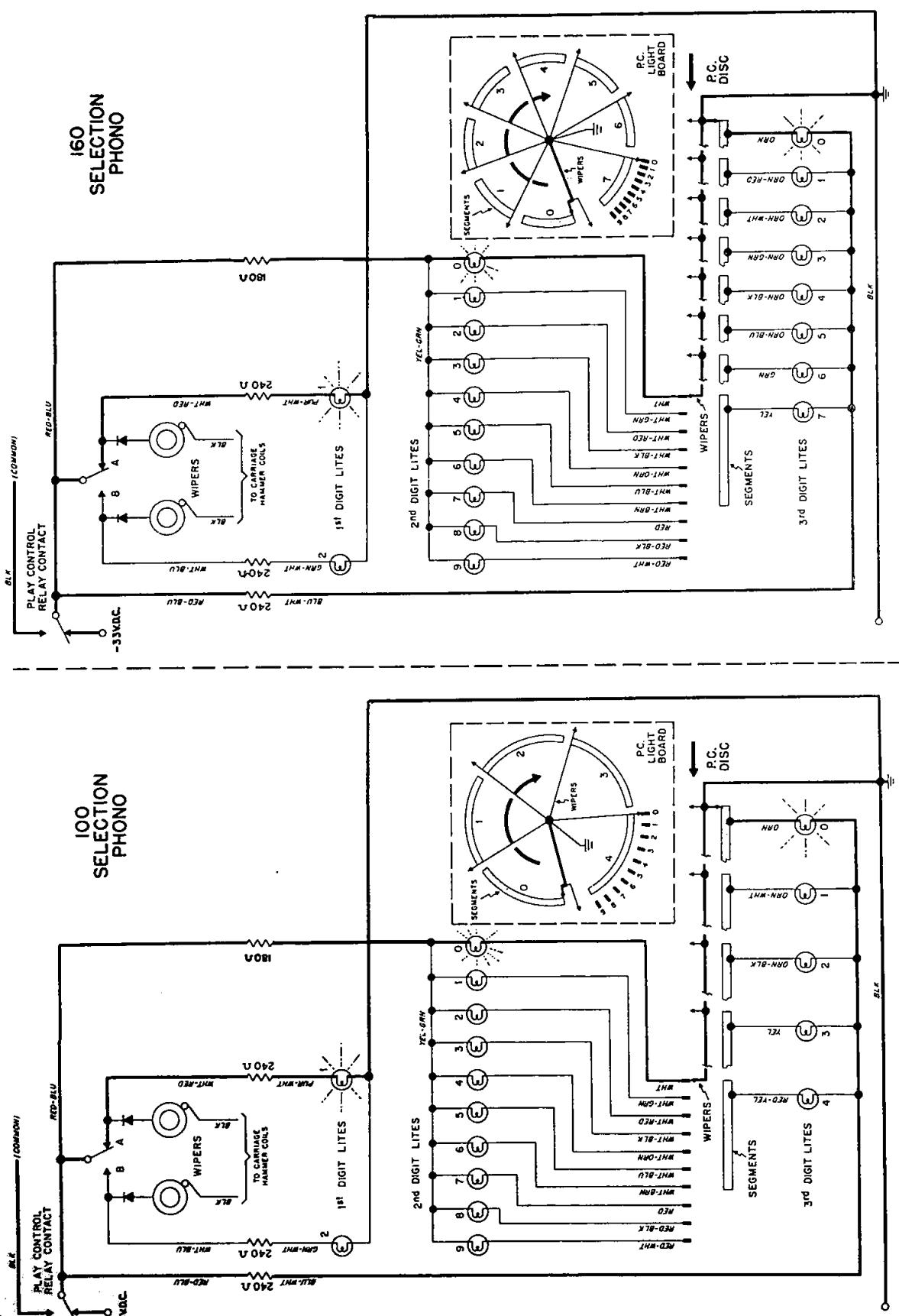
The same pulse that moved the selector lever **1** into "play" position, also energized the wobble plate solenoid. This pulls the wobble plate arm against the wobble plate switch **2**, ... play control relay **3** energizes.

SEQUENCE No. 11—MAGAZINE MOTOR OPERATES

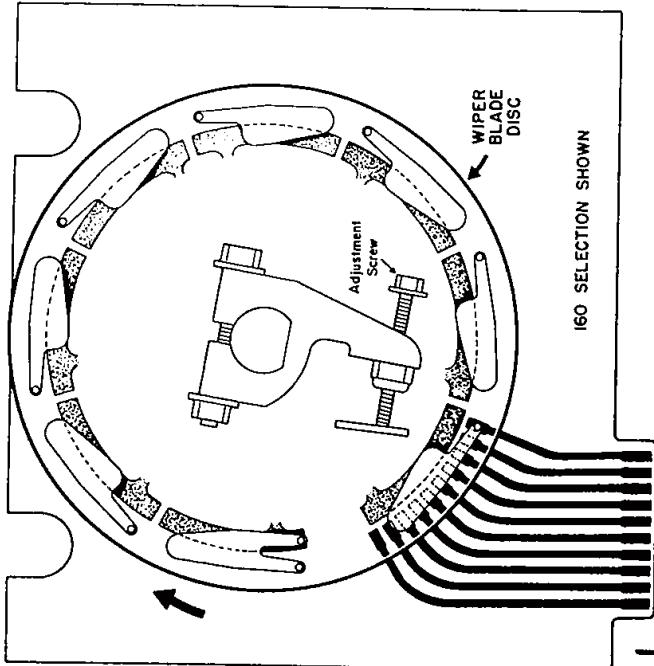




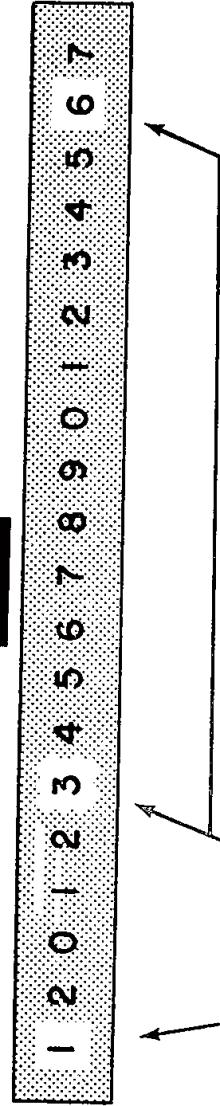
SEQUENCE No. 12 — SELECTION INDICATOR LITES "FLASH"



P.C. LITE BOARD



LITE BOX



**SELECTION INDICATOR
LITE ADJUSTMENT**

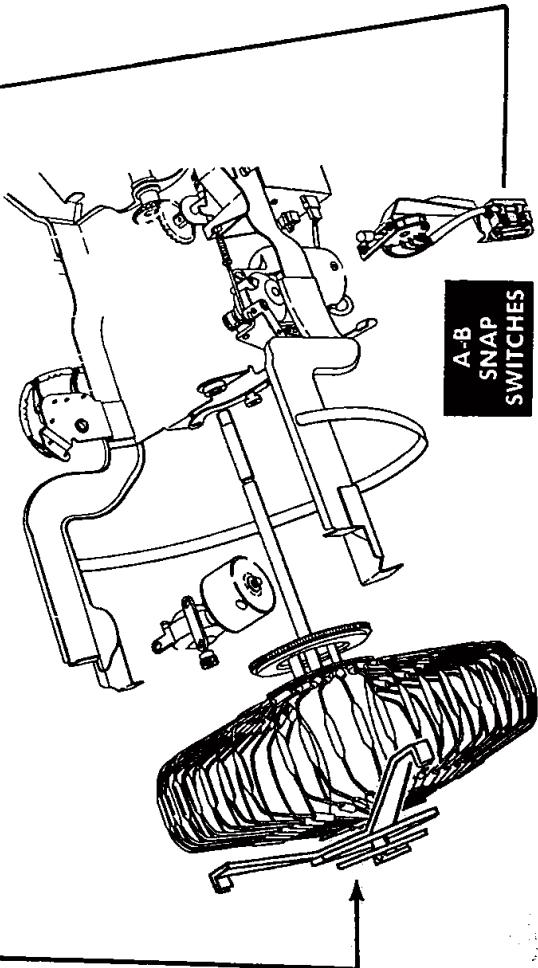
Do not adjust wiper blade disc until Read-Out Carriage adjustment has been checked as outlined on Page 67.

To adjust wiper blade disc, select record selection 100. When music cycle begins, remove record from turntable. Scan switch remains in "Operate" position.

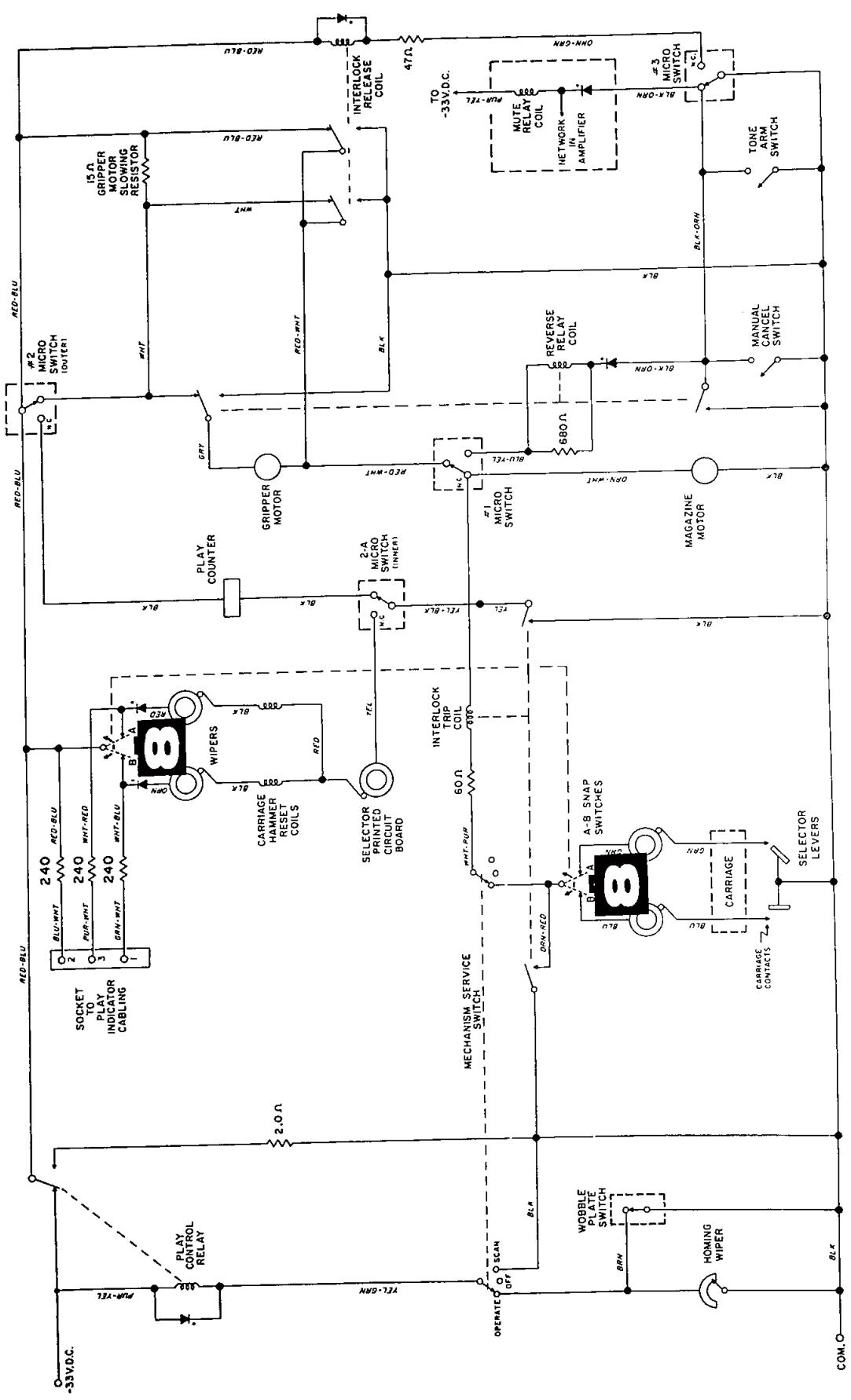
Move wiper disc adjustment screw "in" or "out" to compensate for printed circuit wiper misalignment to lite selection 100.

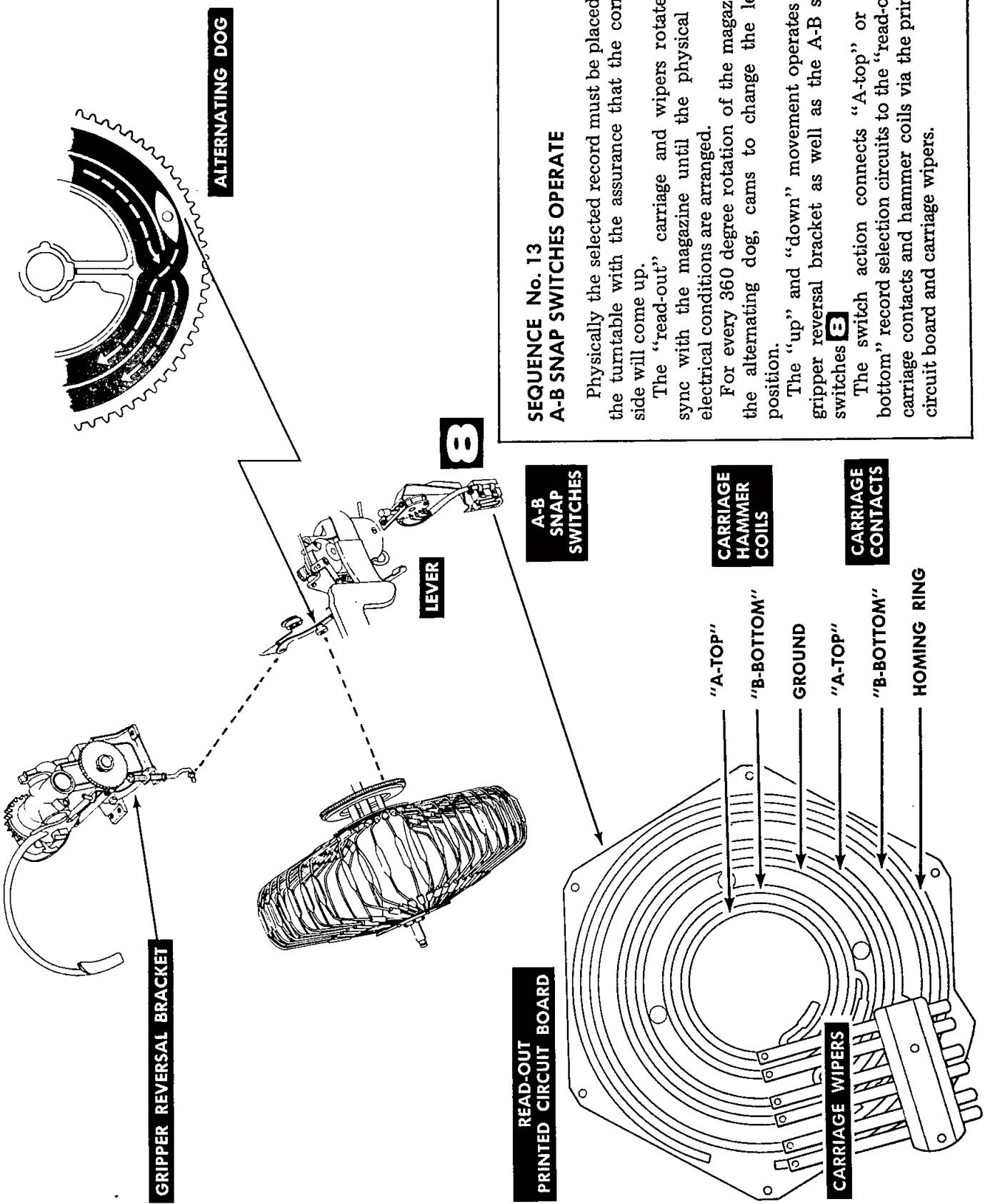
**SEQUENCE No. 12
SELECTION INDICATOR LITES "FLASH"**

During the magazine rotation, selection lite wipers scan segments and contacts which cause the selection indicator lites to flash intermittently.



SEQUENCE No. 13 — A-B SNAP SWITCHES OPERATE





**SEQUENCE No. 13
A-B SNAP SWITCHES OPERATE**

Physically the selected record must be placed on the turntable with the assurance that the correct side will come up.

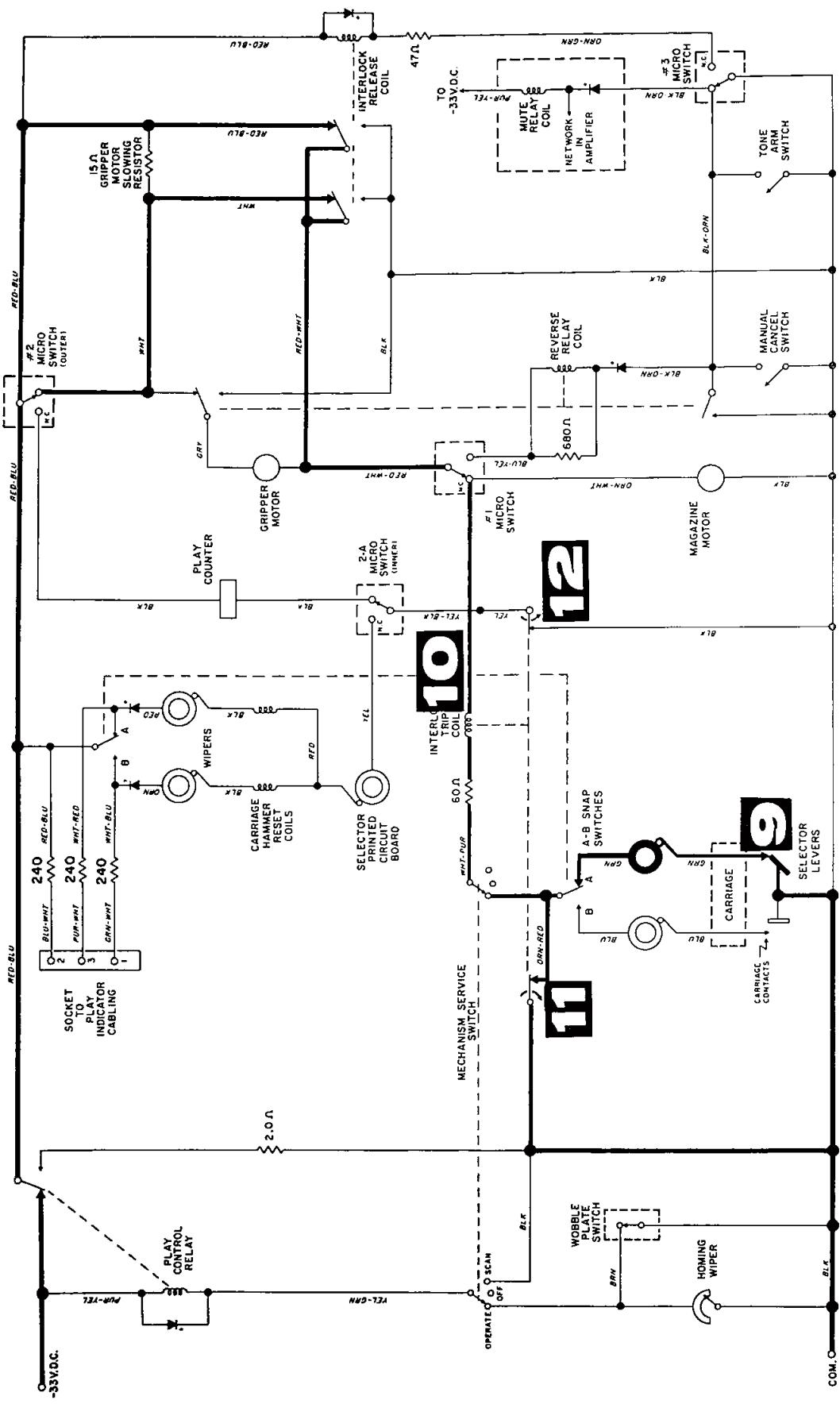
The "read-out" carriage and wipers rotate in sync with the magazine until the physical and electrical conditions are arranged.

For every 360 degree rotation of the magazine, the alternating dog, cams to change the lever position.

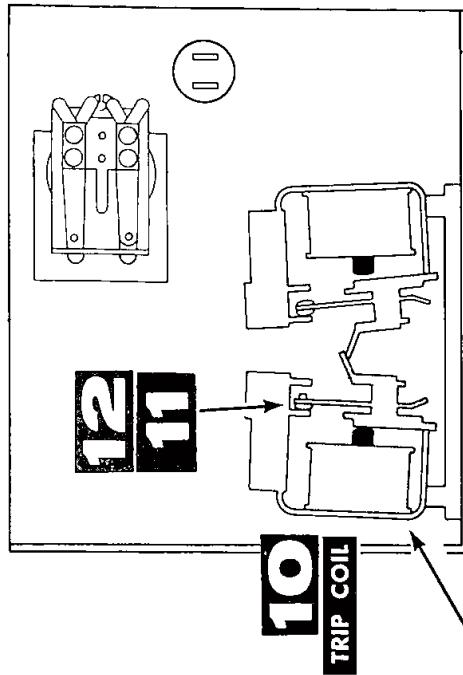
The "up" and "down" movement operates the gripper reversal bracket as well as the A-B snap switches **E**.

The switch action connects "A-top" or "B-bottom" record selection circuits to the "read-out" carriage contacts and hammer coils via the printed circuit board and carriage wipers.

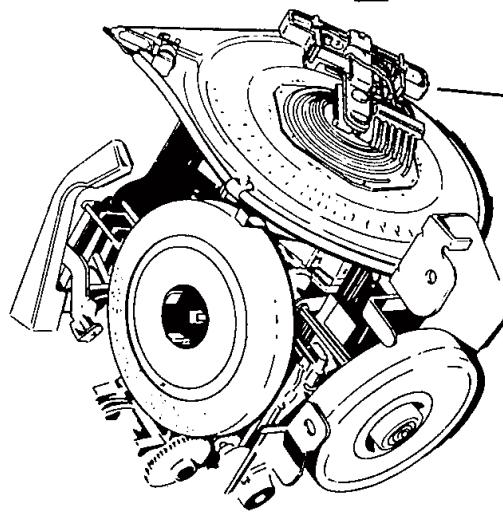
SEQUENCE No. 14 — CARRIAGE TRIPS INTERLOCKS INTERLOCK RELAY



CONTROL BOX

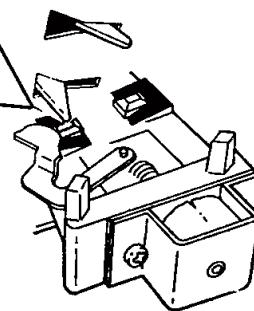


READ-OUT CARRIAGE



9

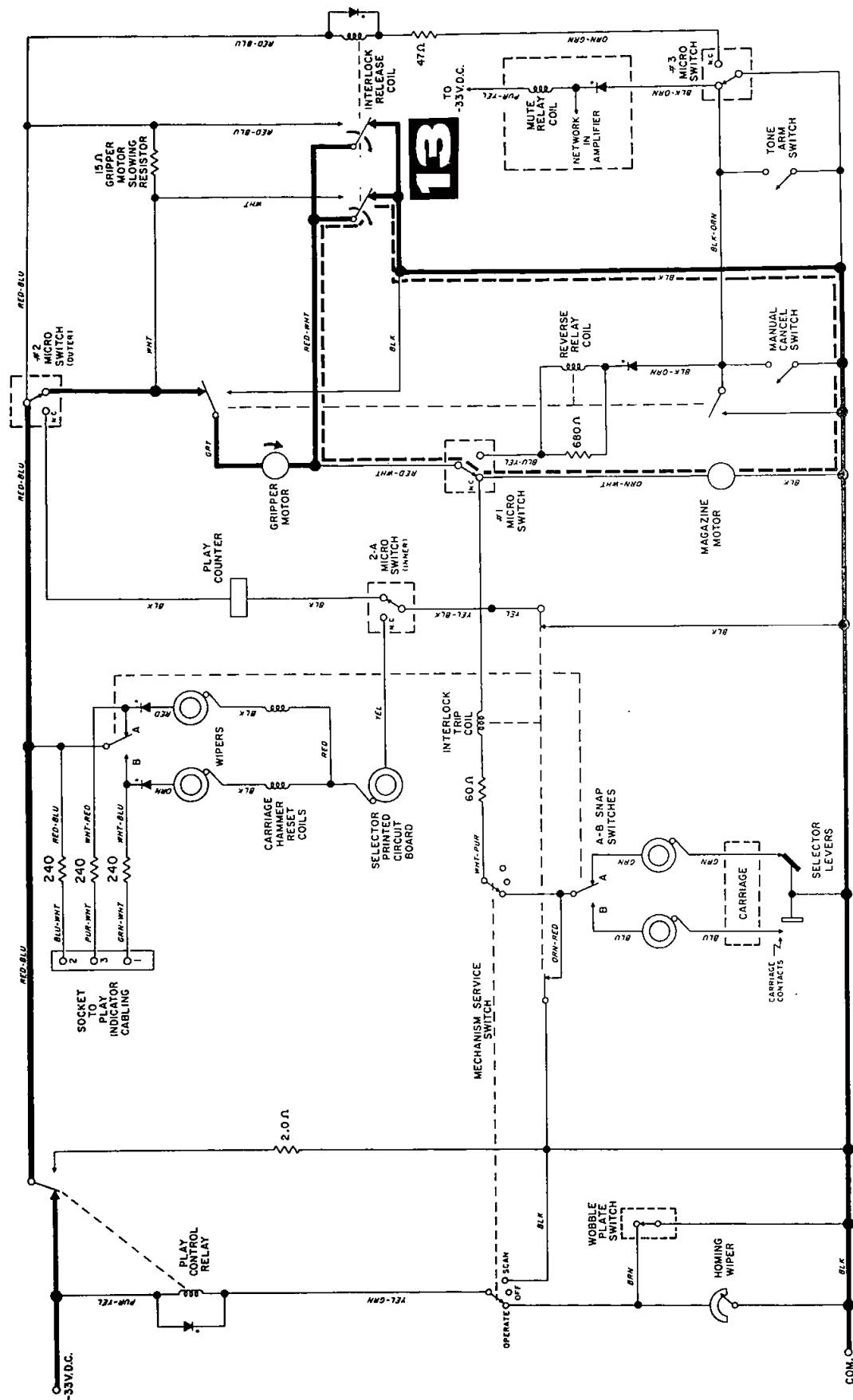
**CARRIAGE
CONTACT**



**SEQUENCE No. 14
CARRIAGE TRIPS INTERLOCK RELAY**

When the mechanism has completed conditions for the physical transfer of the correct selection to the turntable, . . . the striking of the selector lever by the "read-out" carriage contact **9**, completes a circuit to the interlock trip coil **10**. Contacts **11** & **12** transfer.

Contact **11** provides a holding circuit for positive locking of the trip coil.

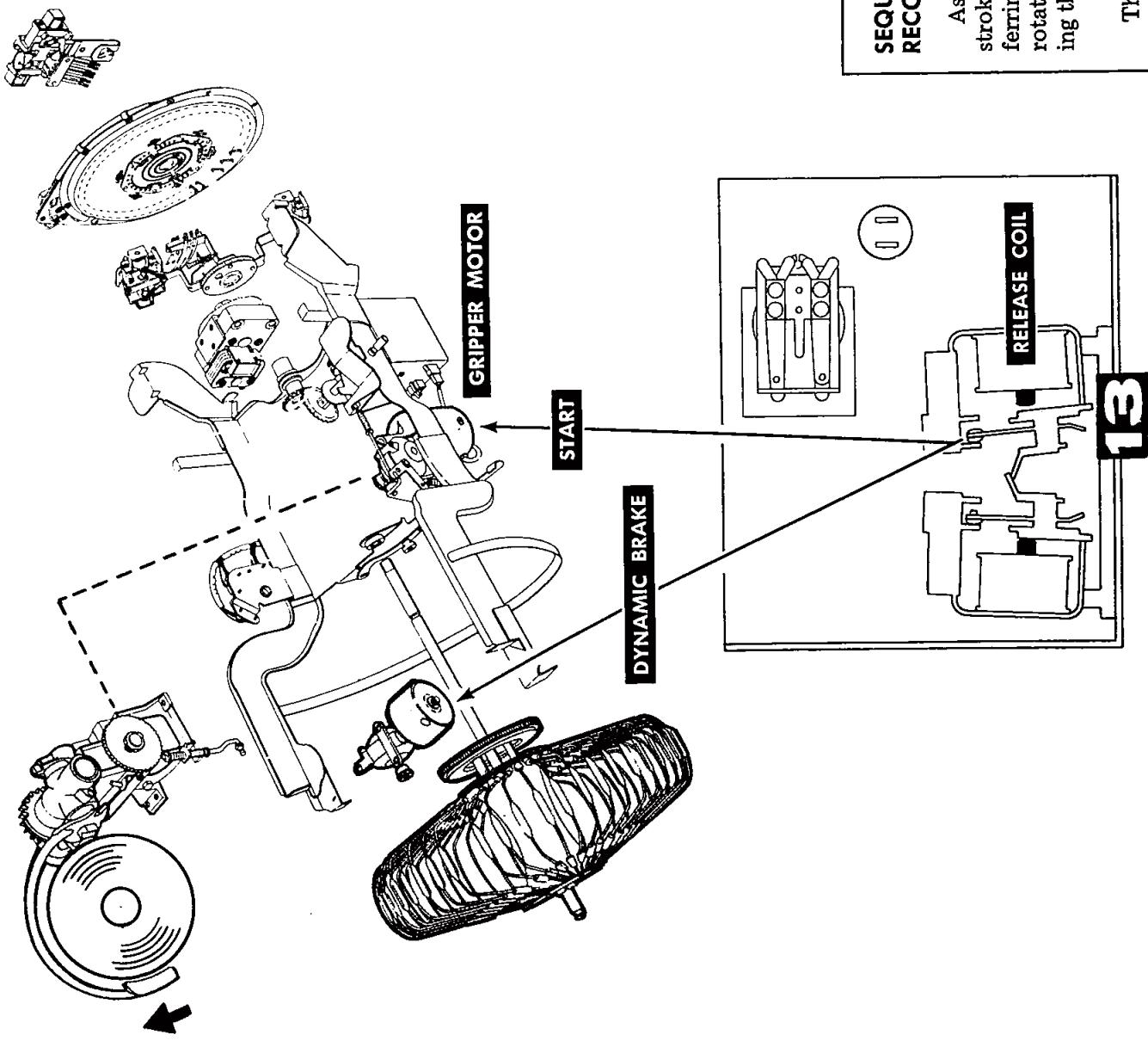


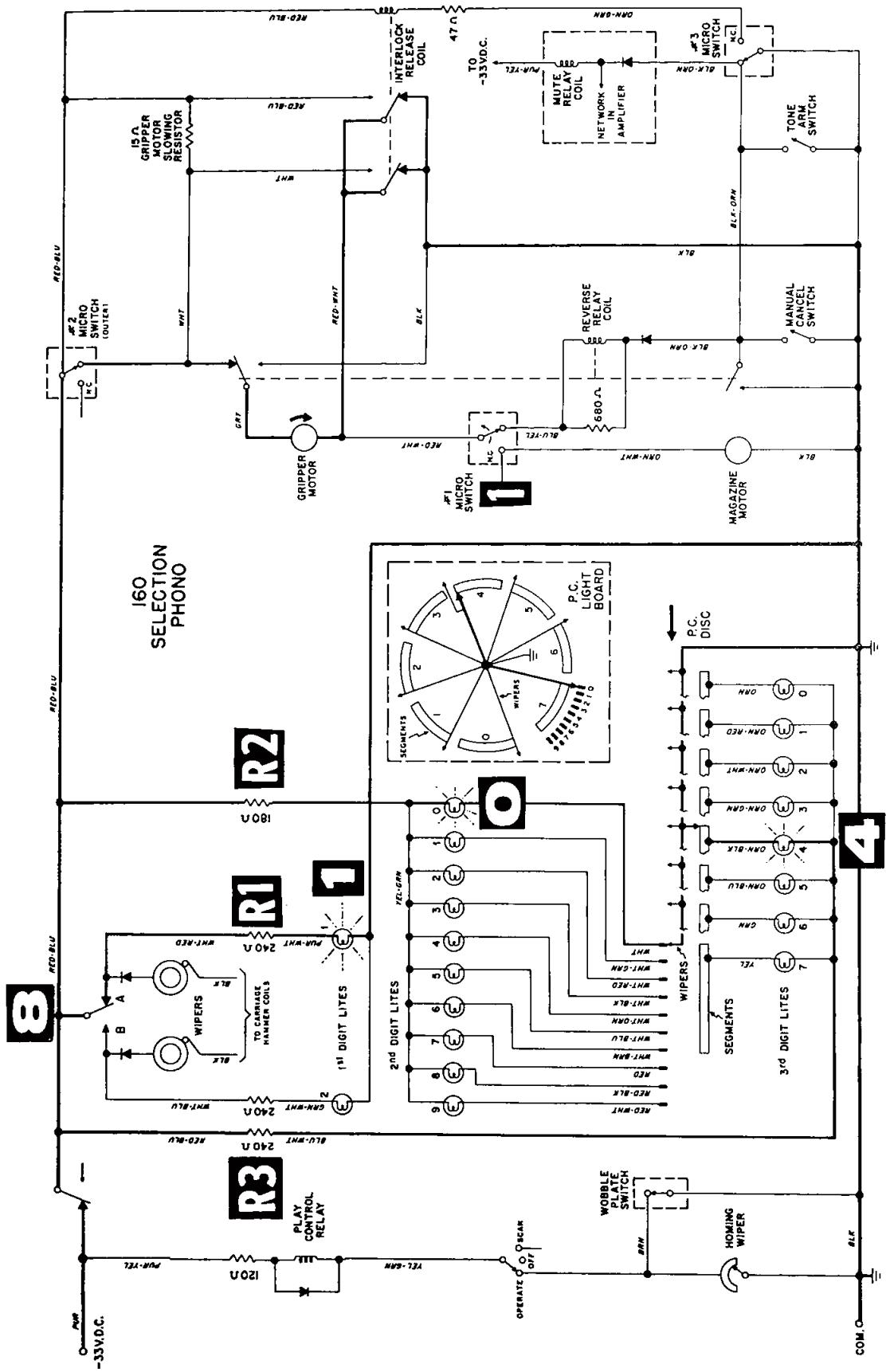
SEQUENCE No. 15 — RECORD INDEXED

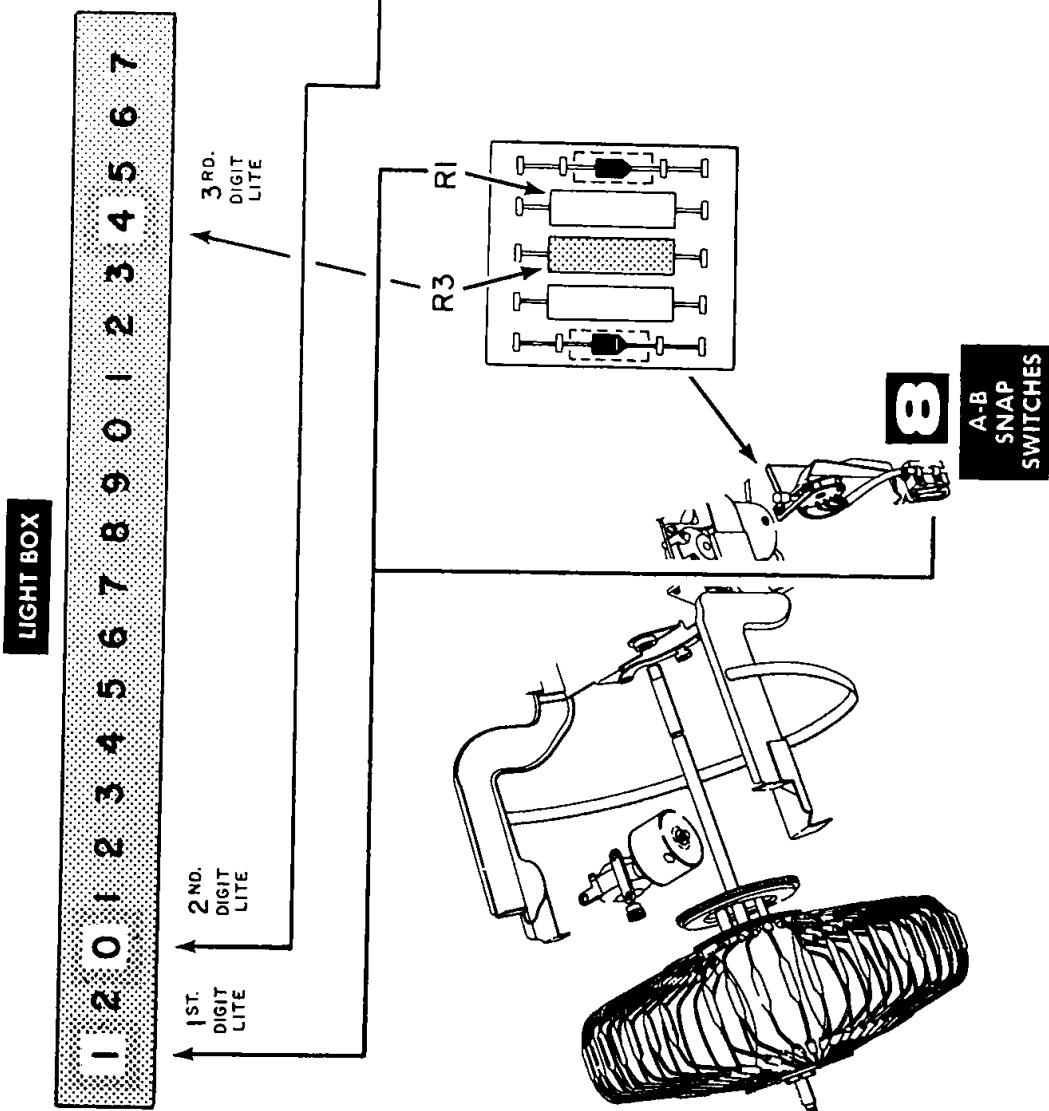
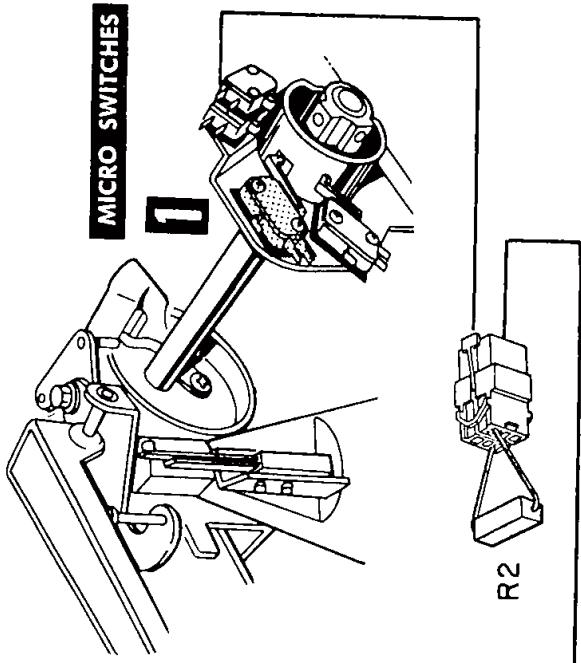
**SEQUENCE No. 15
RECORD-INDEXED**

As the trip coil armature completes its stroke, release coil armature relaxes, transferring contacts **F3**. dynamically braking the rotation of the record magazine . . . and starting the gripper motor.

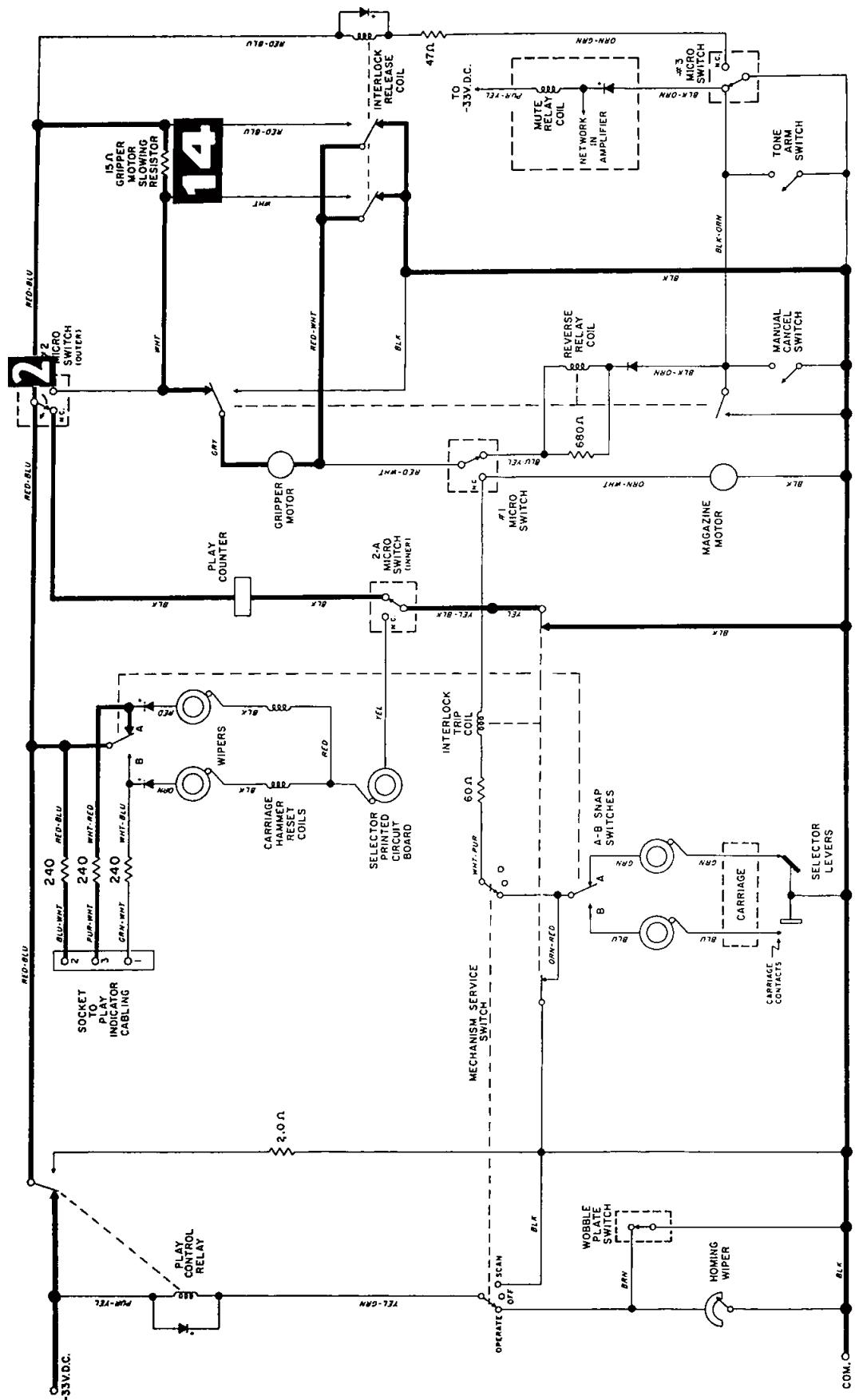
This operates the gripper arm whose jaws grasp the record.

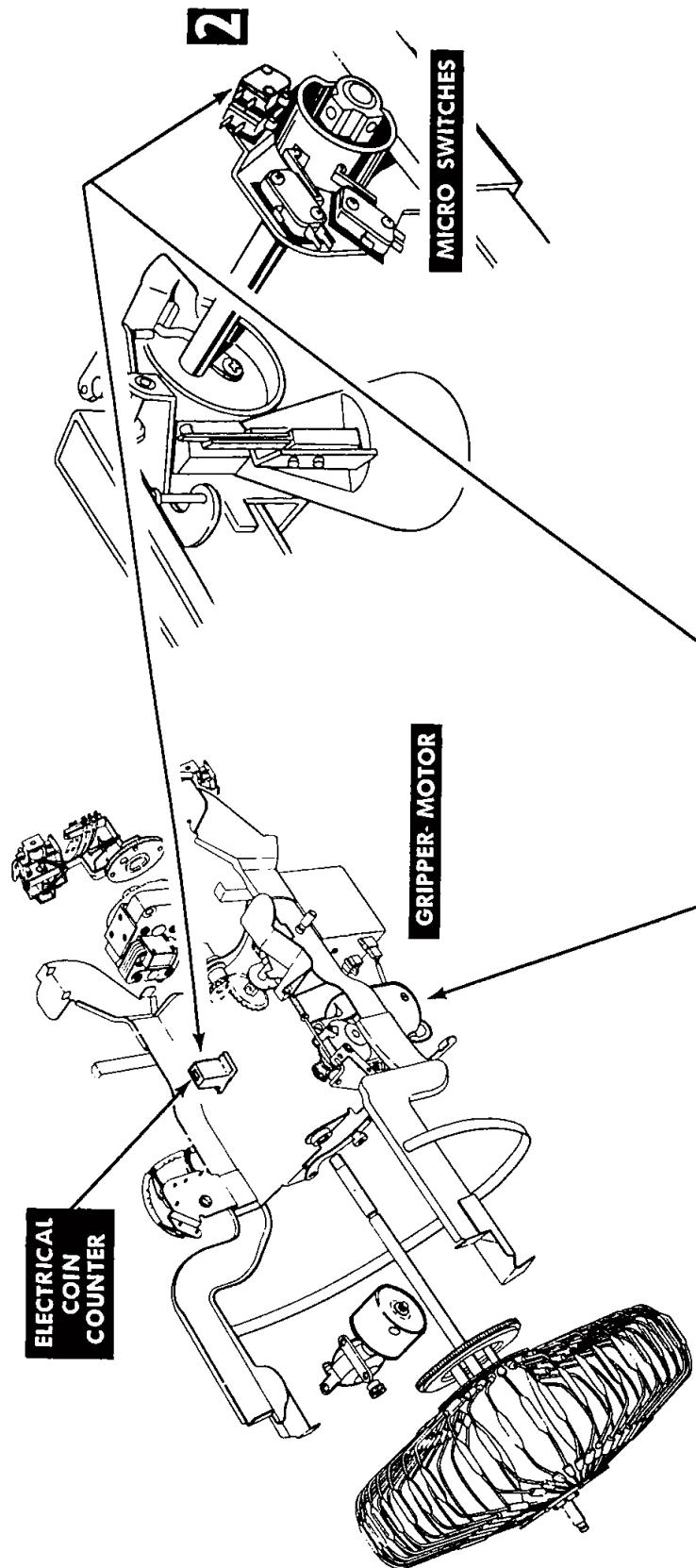






SEQUENCE No. 17 — MICRO SWITCH No. 2 TRANSFERS





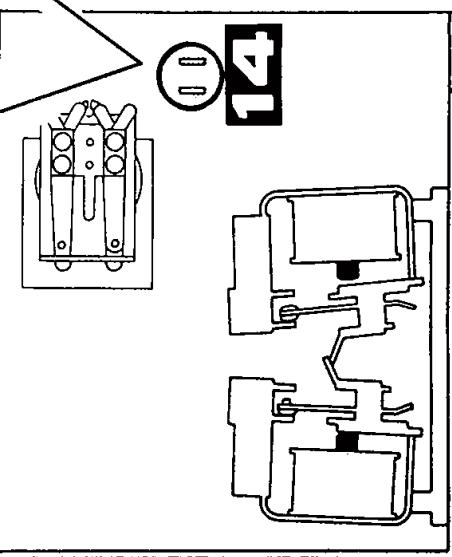
**SEQUENCE No. 17
MICRO SWITCH No. 2 TRANSFERS**

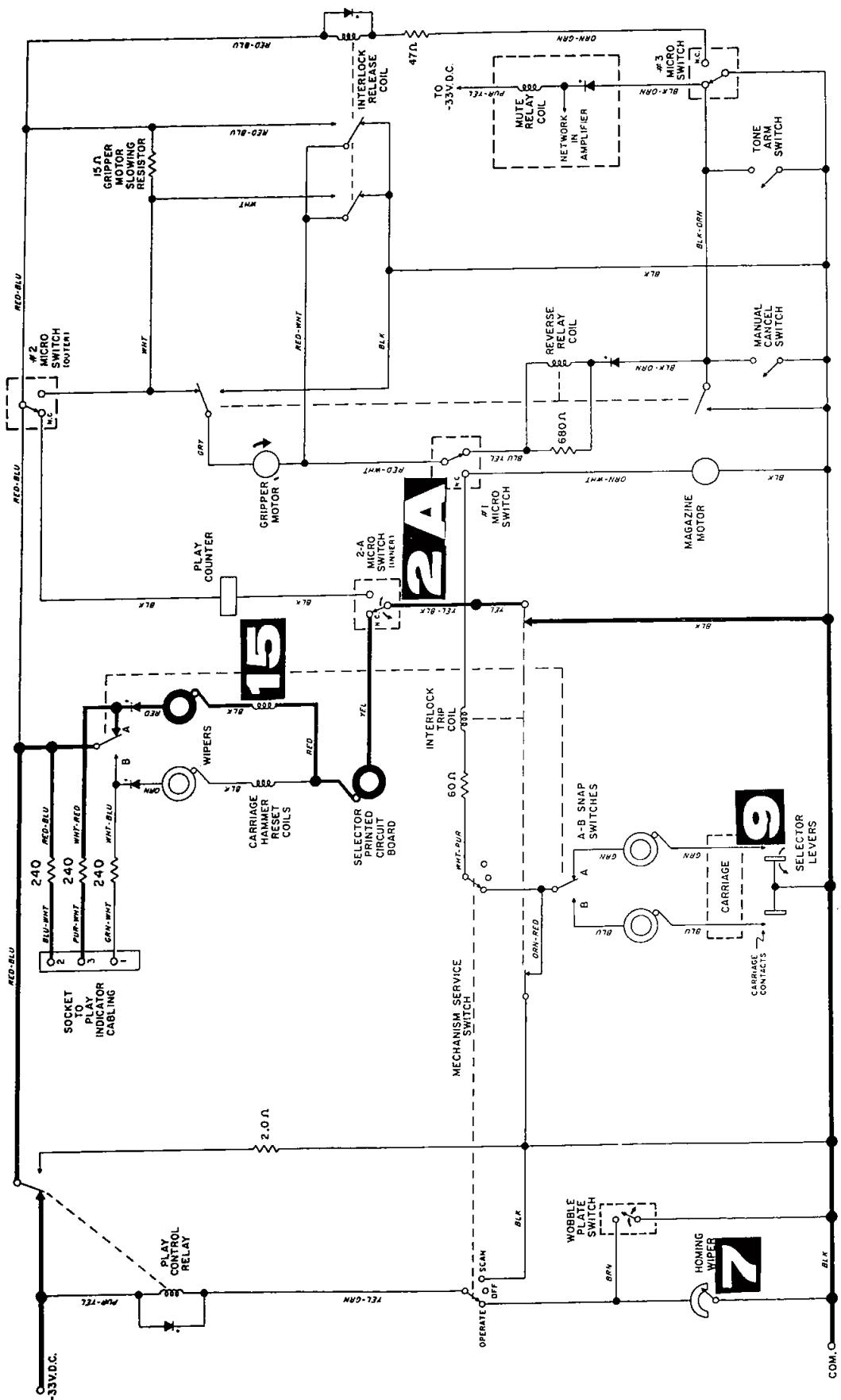
Micro 2 followed by Micro 2A operate next.

Micro 2 operates the electrical counter which registers one count... At the same time the gripper motor circuit is switched thru a 15 ohm resistor **14** reducing the speed of the motor.

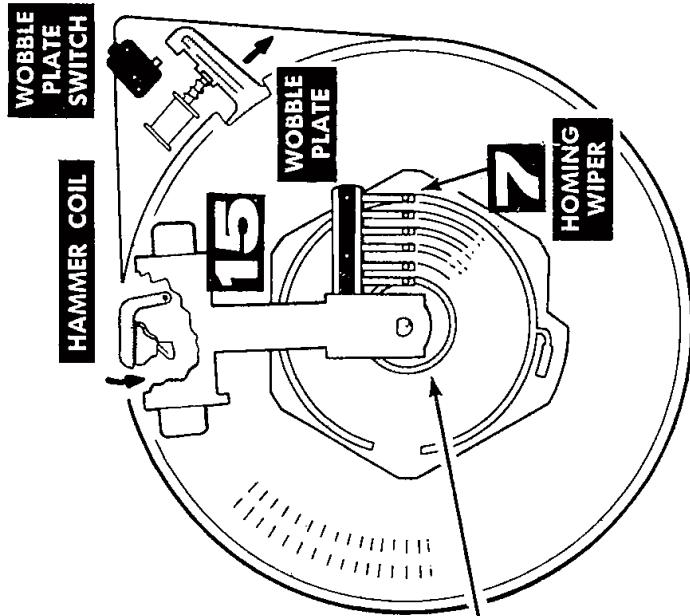
This causes the tone arm to advance smoothly towards the turntable.

14





SEQUENCE No. 18 - MICRO SWITCH No. 2A TRANSFERS—SELECTION LEVER RESETS

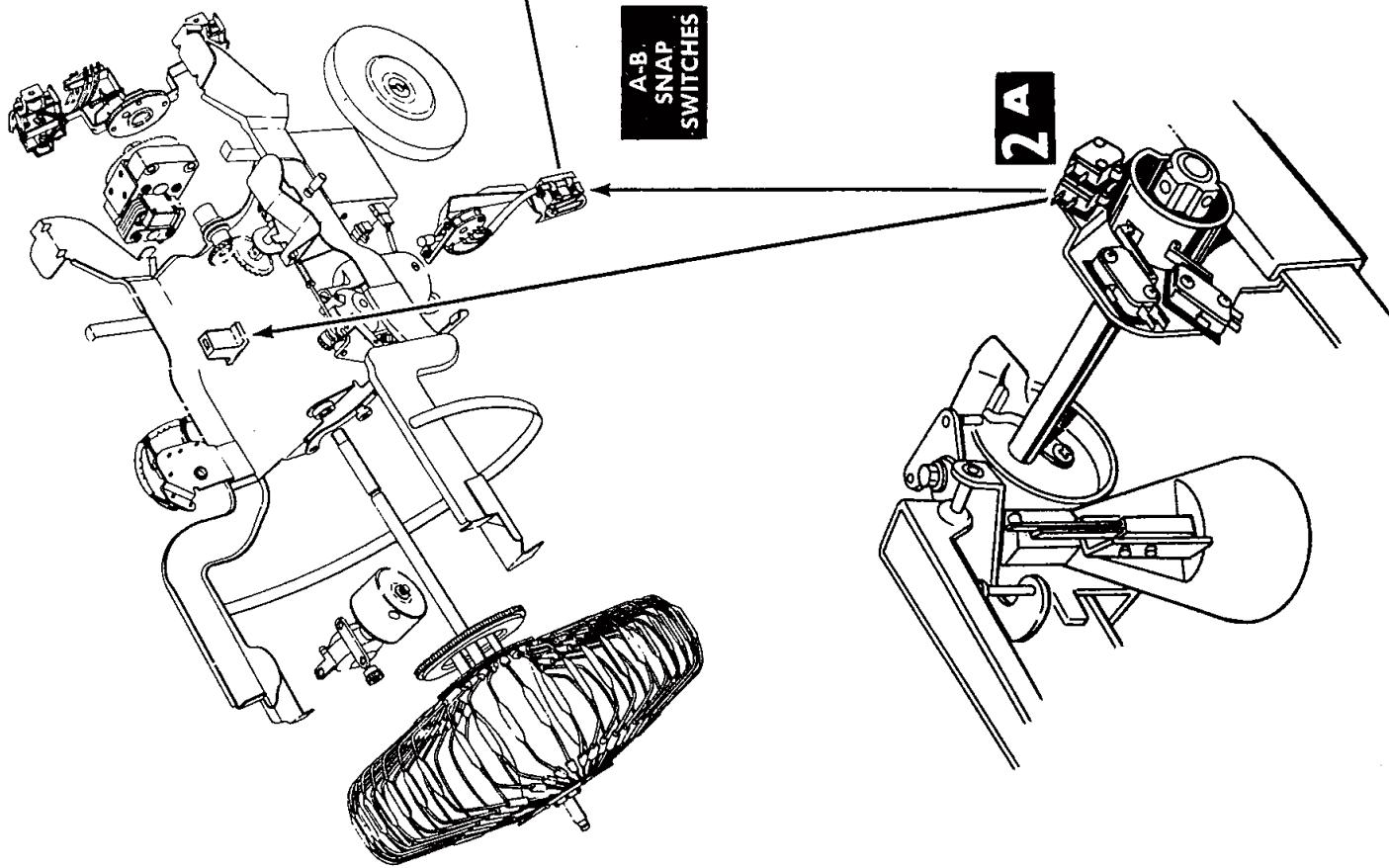


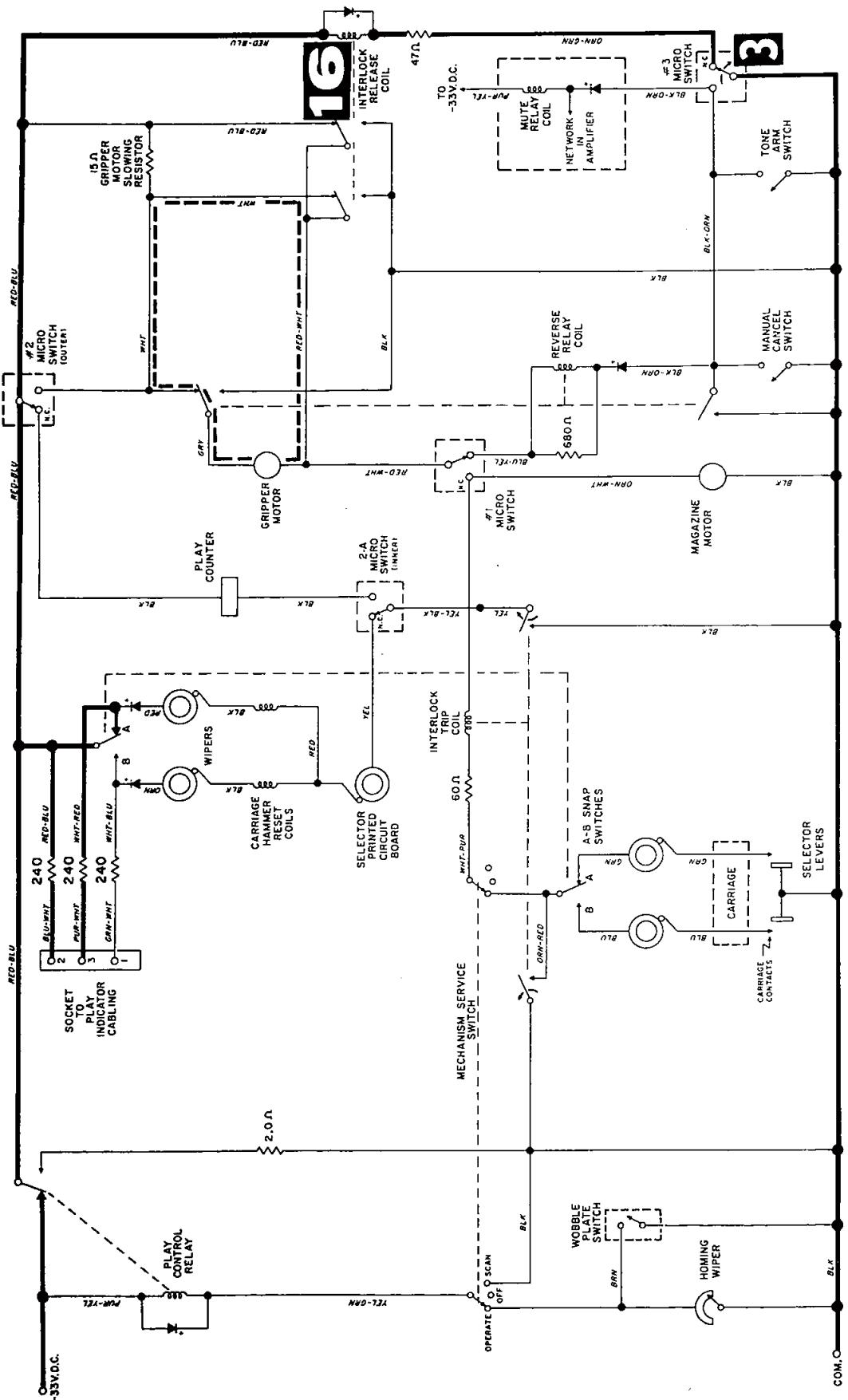
**SEQUENCE No. 18
MICRO SWITCH No. 2A TRANSFERS—
SELECTION LEVER RESETS**

The subsequent operation of Micro 2A opens the counter circuit and energizes the carriage hammer coil **15**, resetting the selector lever **3**.

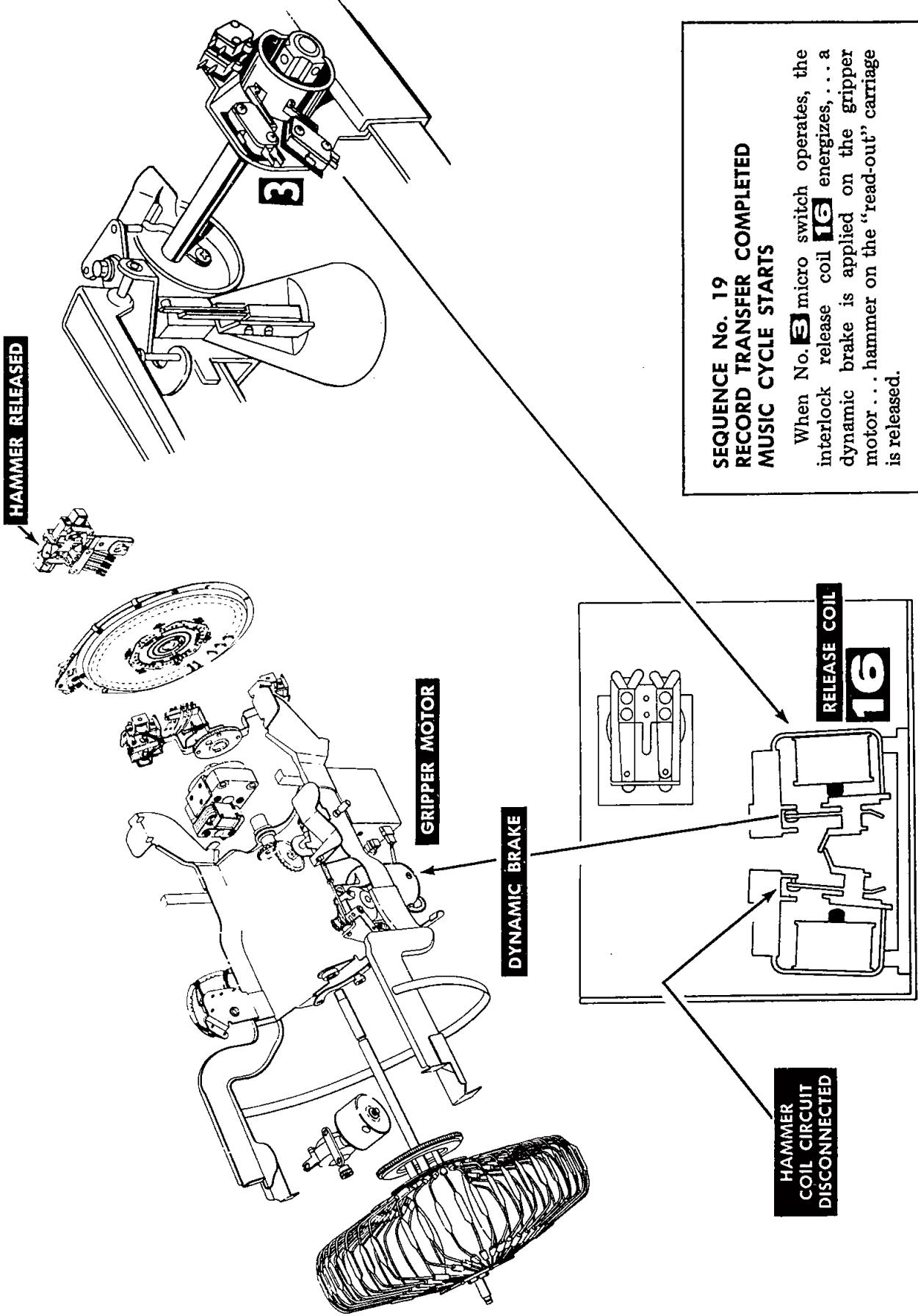
If no other selections are registered, the wobble plate is restored to its original position, releasing the wobble plate switch.

Mechanism circuits are now kept operative thru homing wiper **7**.





SEQUENCE No. 19 – RECORD TRANSFER COMPLETED – MUSIC CYCLE STARTS

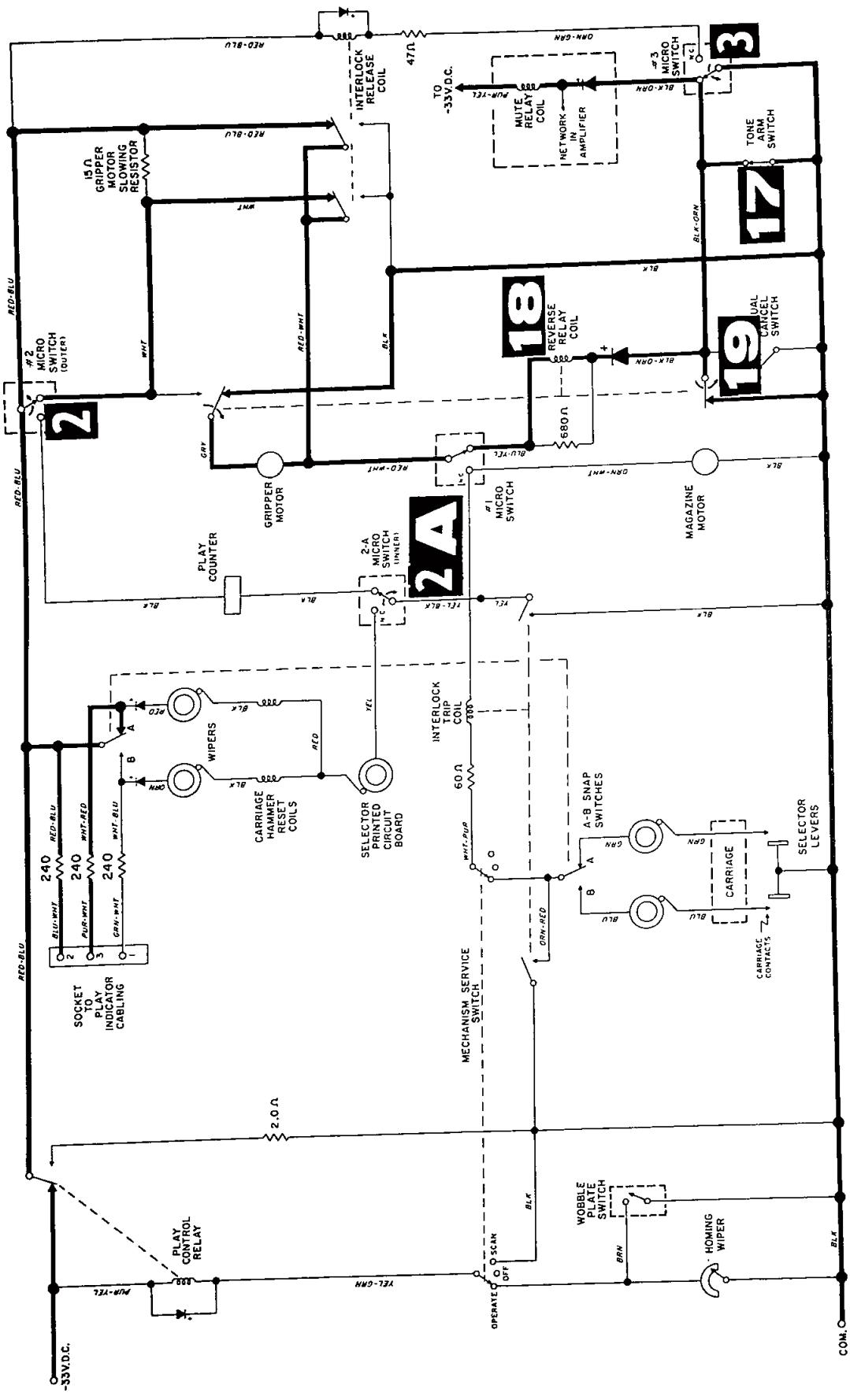


**SEQUENCE No. 19
RECORD TRANSFER COMPLETED
MUSIC CYCLE STARTS**

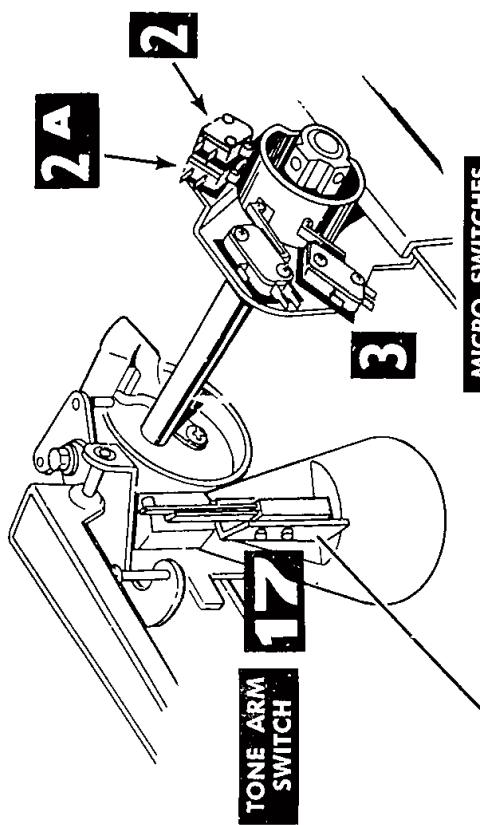
When No. **E** micro switch operates, the interlock release coil **16** energizes, . . . a dynamic brake is applied on the gripper motor . . . hammer on the "read-out" carriage is released.

At this point, the tone arm is fed mechanically into the record, amplifier mute relay relaxes and the music cycle starts.





SEQUENCE No. 20 – MUSIC CYCLE ENDS



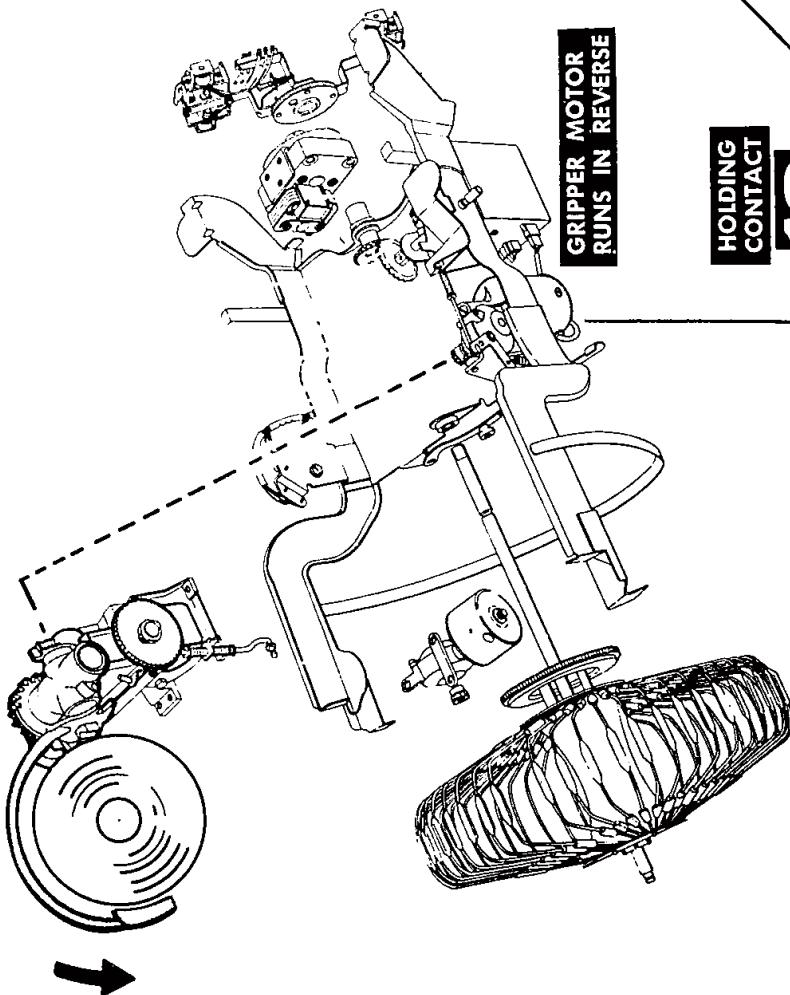
SEQUENCE No. 20 MUSIC CYCLE ENDS

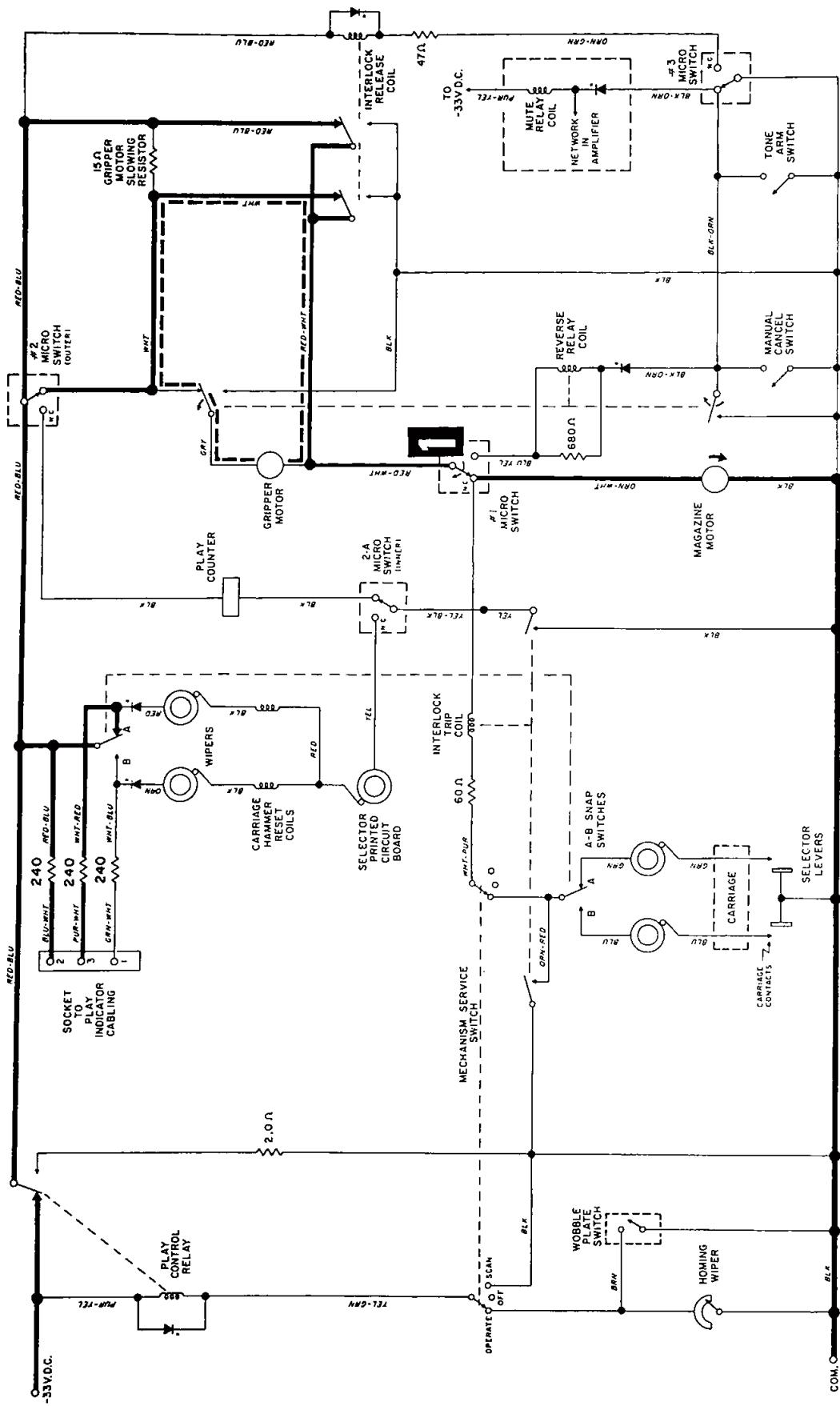
As record play is ended, the tone arm moves into the record cut-off groove, closing tone arm switch **17**. . . reverse relay **15** energizes and "held" thru its own contact **12**.

This causes the gripper motor to operate in reverse and proceeds to return the record to the magazine.

During the reverse rotation of the cam shaft, No. **3**, No. **2** and No. **2A** micro switches return to their original positions.

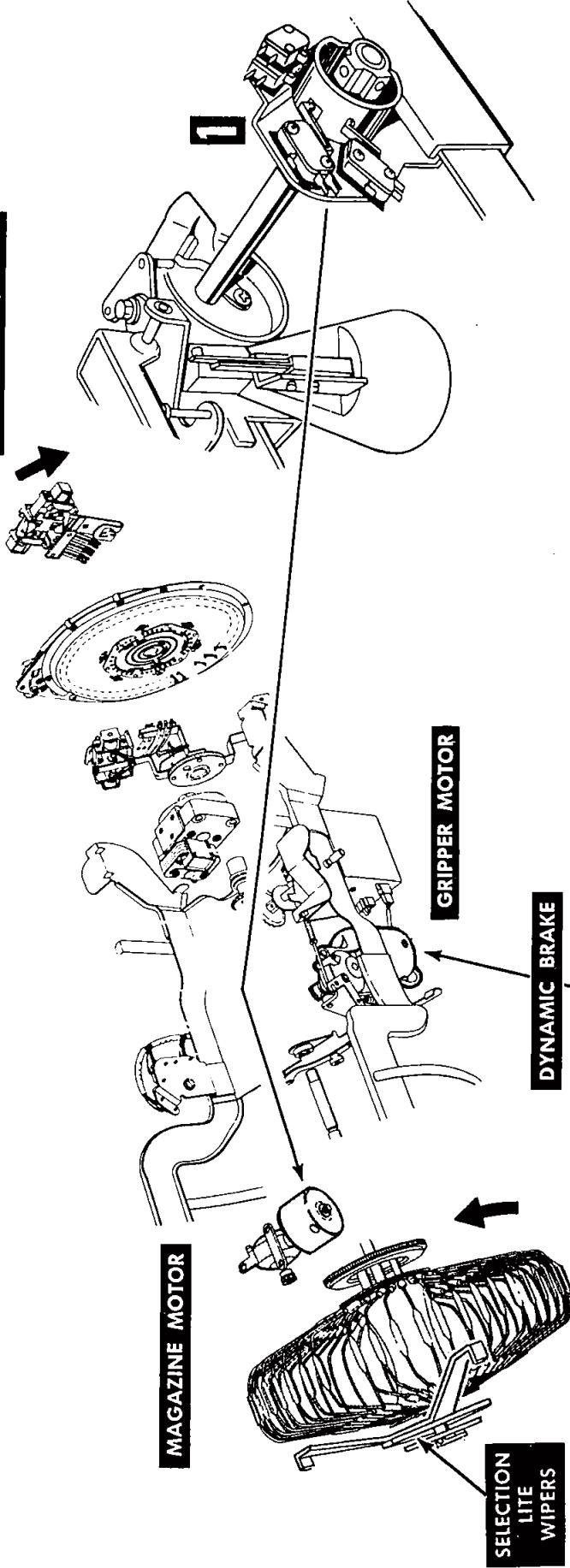
Micro No. **3** mutes the sound system thru the network provided in the amplifier.





SEQUENCE NO. 21 - RECORD RETURNED TO MAGAZINE

READ-OUT CARRIAGE

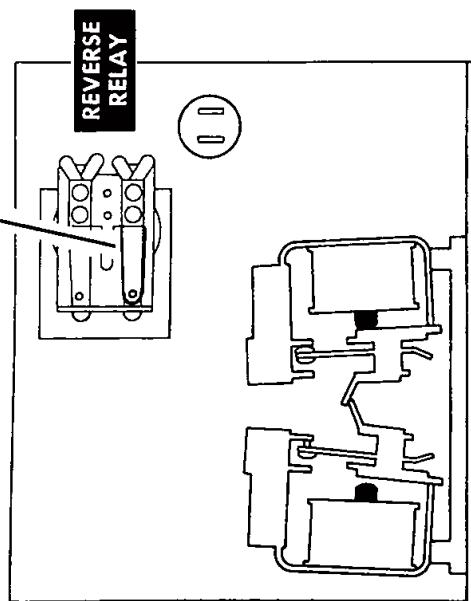


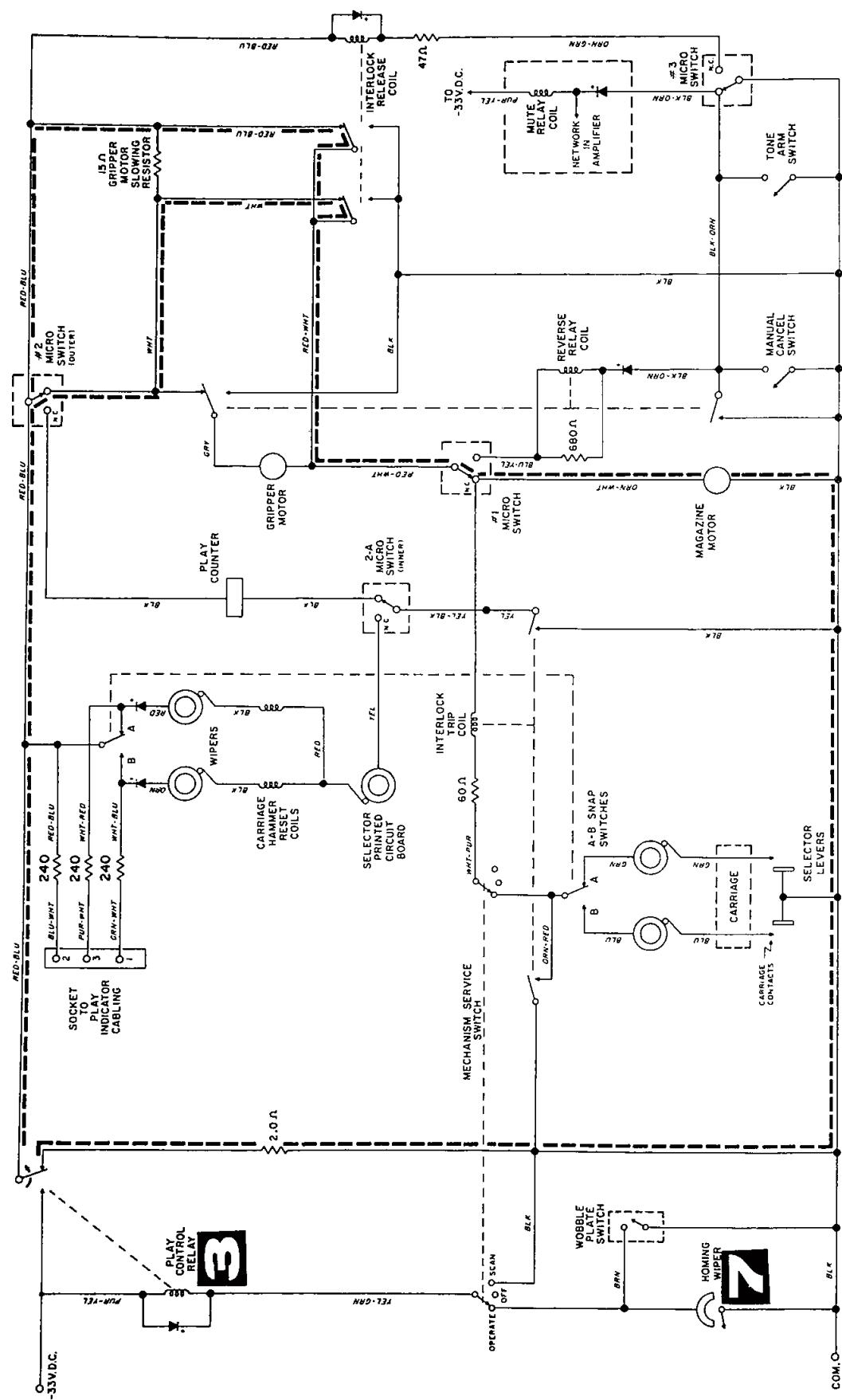
**SEQUENCE No. 21—
RECORD RETURNED TO MAGAZINE**

As the gripper jaws begin to release the record into the magazine, No. 1 micro switch is cammed to its original position.

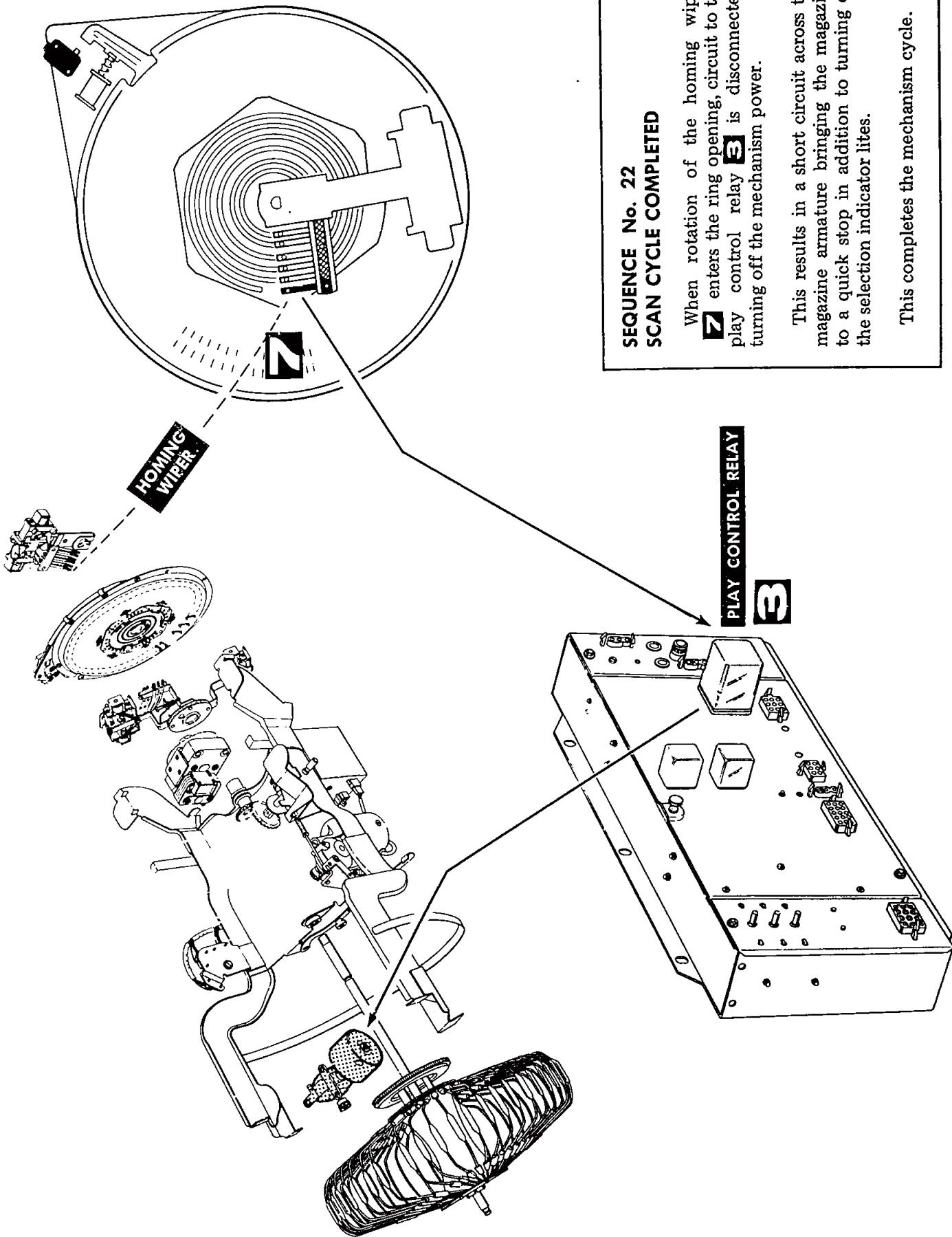
Reverse relay relaxes and places a dynamic brake on the gripper motor . . . at the same time, a circuit is again completed to the magazine motor causing the motor to run.

Magazine, selection lite wipers and "read-out" carriage start to rotate. Indicator lites "flash" across selection lite box.





SEQUENCE №. 22 – SCAN CYCLE COMPLETED



**SEQUENCE No. 22
SCAN CYCLE COMPLETED**

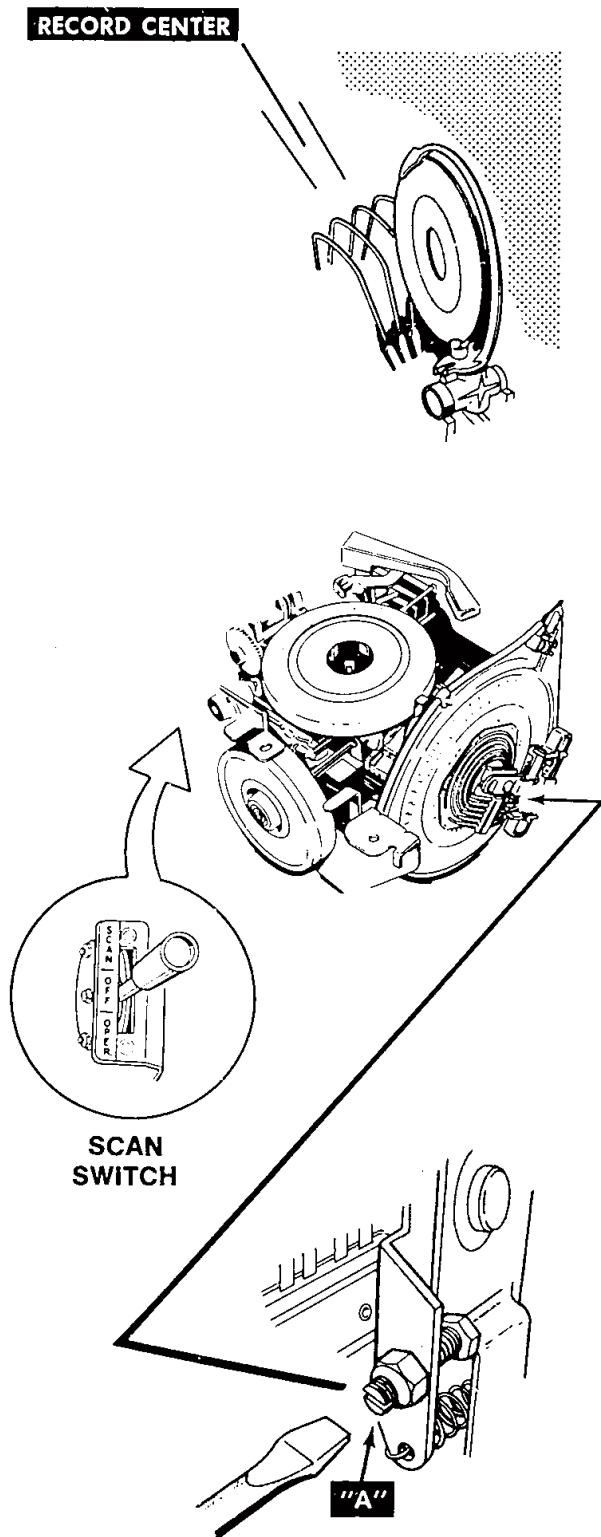
When rotation of the homing wiper switch **7** enters the ring opening, circuit to the play control relay **3** is disconnected, turning off the mechanism power.

This results in a short circuit across the magazine armature bringing the magazine to a quick stop in addition to turning off the selection indicator lights.

This completes the mechanism cycle.



ADJUSTMENT SECTION

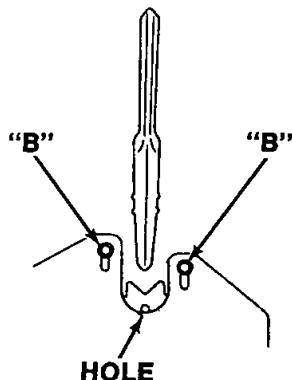


READ-OUT CARRIAGE ADJUSTMENT

Record must be in correct pick-up position for removal by the gripper jaws.

1. Select record 100.... Allow record to be placed on the turntable.
2. Cancel record.... As record starts to enter record slot, shut-off mechanism power by moving Scan Switch to "off".
3. Note record alignment between left and right separators with respect to center.
4. To adjust, turn screw "A".... Right turn, record alignment will advance to the right; ... left turn, to the left. Re-check adjustment by repeating the above procedure.
IF CARRIAGE ADJUSTMENT OK, proceed to the next step.
5. Repeat the above procedure only this time stop the mechanism just before the Gripper Arm strikes the Rear Gripper Arm Rest.
6. Observe the "V" alignment between the Gripper and Gripper Arm Rest, they should be in perfect alignment.
7. To adjust, loosen 2 screws "B". Allow hole to be visible above the edge of plate before retightening screws.

GRIPPER ARM REST ADJUSTMENT



REAR OF MAGAZINE

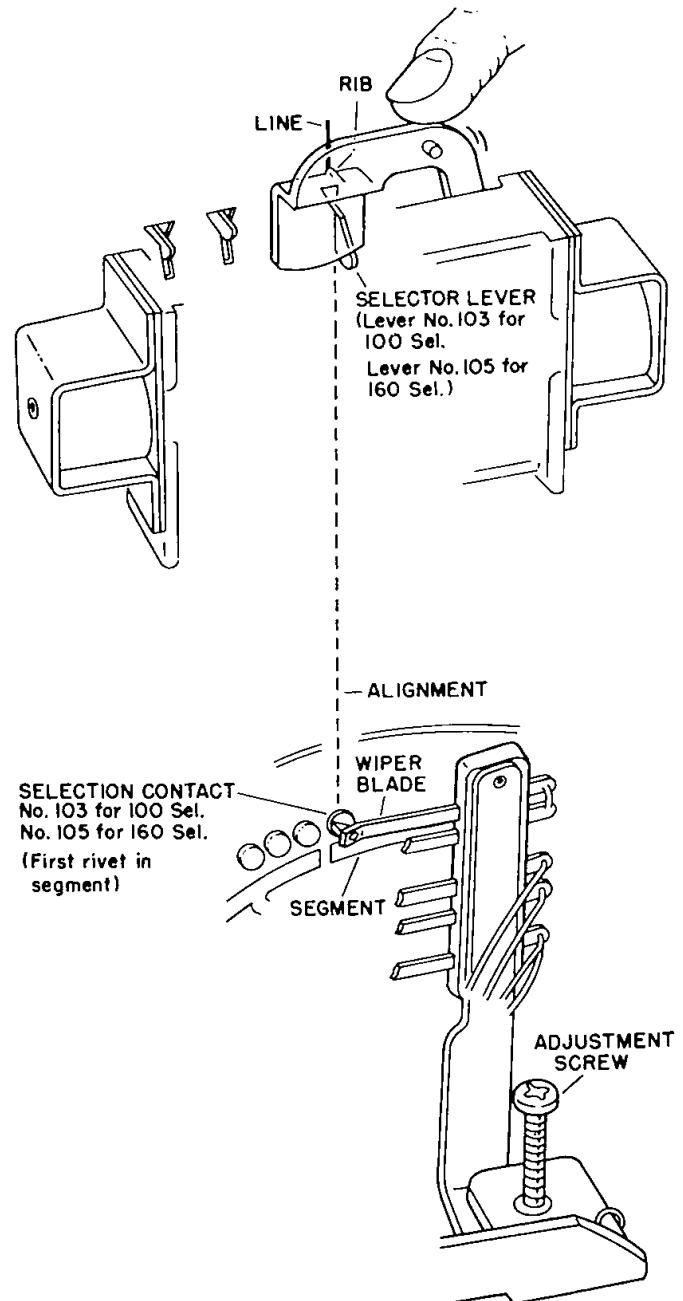


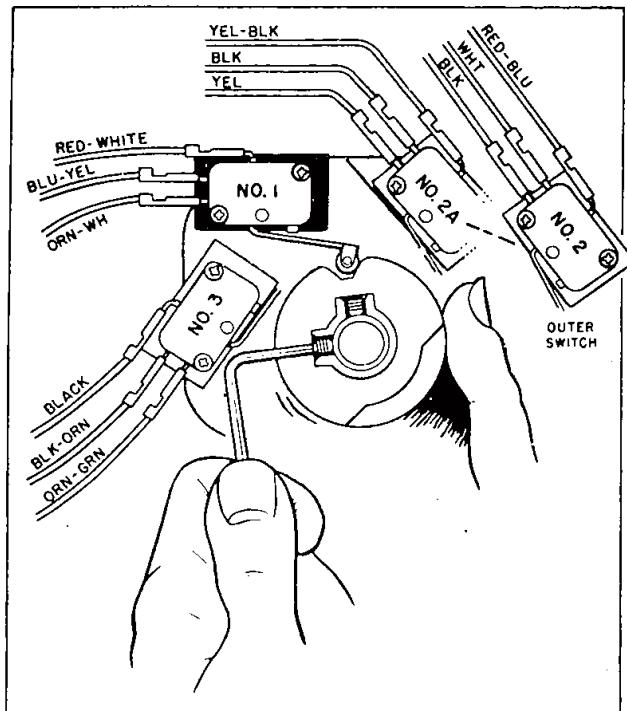
WRITE-IN CARRIAGE ADJUSTMENT

Write-In Carriage adjustment is as follows:

1. Manually, rotate Write-In Carriage until Carriage Hammer is over selection;
103 for 100 selection phono, or
105 for 160 selection phono.
2. Push down on the Carriage Hammer and align the "rib" mark with the selector lever, or "line" mark if provided above the selector lever slot.
3. At this point, the top wiper blade contact should be set on the leading edge of the 1st. rivet contact in that segment as shown in the illustration.
4. To adjust, move adjustment screw "out" to advance the wiper blade contact, or "in" to move it back until the vertical alignment of the "hammer" and "rivet contact" shown in the illustration is achieved.

Since the 160 selection phonograph has two Write-In Carriages, adjust the opposite carriage in the same manner.



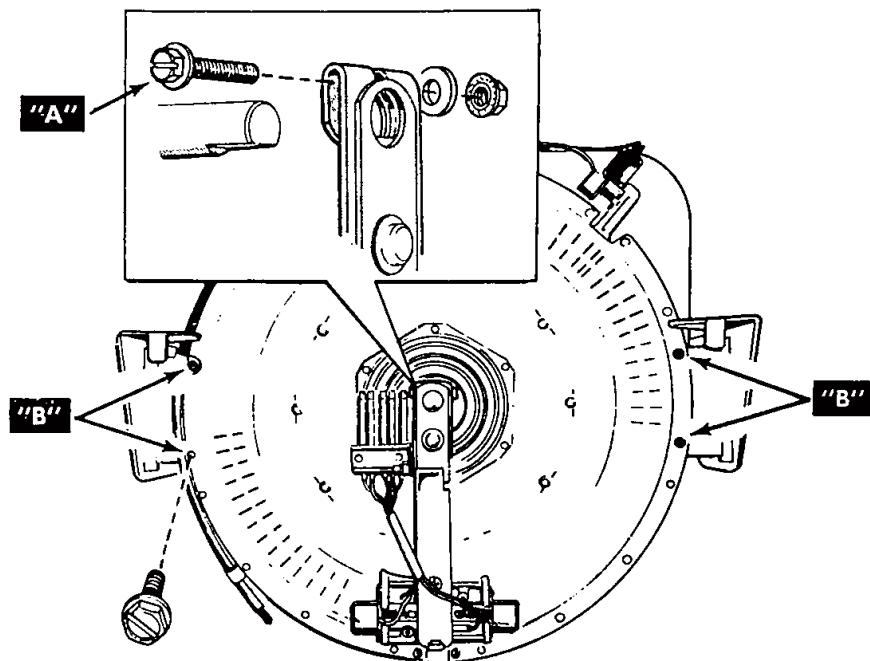


MICRO SWITCH AND CAM ADJUSTMENT

Cycle of the record mechanism is controlled by the operation of three micro switches actuated in the proper sequence by a rotating cam shaft.

To adjust, phonograph must be in stand-by position (gripper arm over record magazine), and the service scan switch moved to "off".

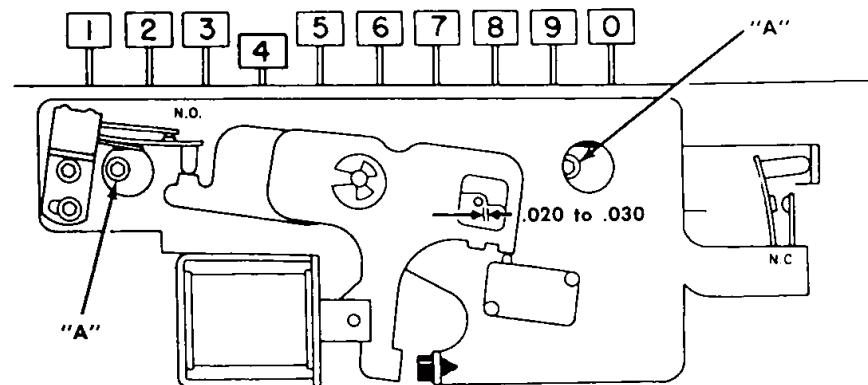
1. Rotate the knurled end of the gripper motor shaft clockwise until a jam occurs.
2. At this point, the No. 1 switch roller must be in the cam groove and in contact with the back drop-off. If the roller is cammed out, loosen the two cam set screws and rotate the cam until the proper position is obtained.



SELECTOR REMOVAL

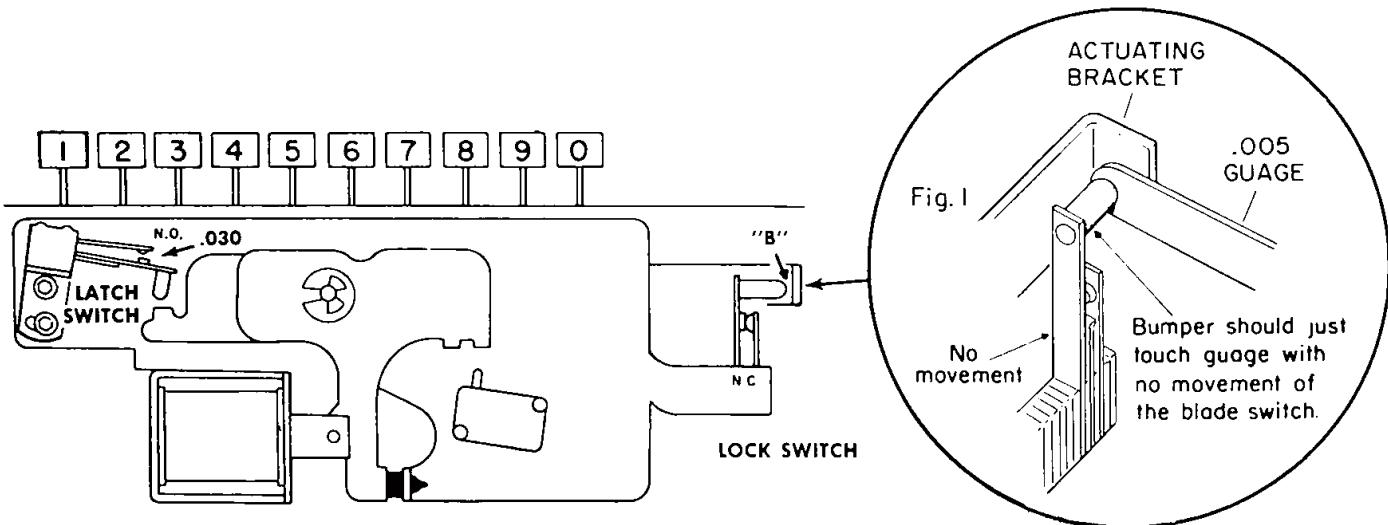
To remove selector assembly from the mechanism, remove lock nut, two washers and carriage bolt "A" from the Read-Out Carriage Assembly. Pull off the carriage assembly from the shaft and set aside.

Disconnect the selector cable at the Jones Plug and Socket connection. Remove the four selector mechanism chassis mounting screws "B". Selector is now free for removal.



PUSHBUTTON LOCKING ADJUSTMENT

With an energized solenoid and pushbutton pressed in fully, the lockbar bracket should have approximately $1/32"$ (.020-.030) overtravel between the rocker cam and chrome pin. If adjustment necessary, loosen two screws "A" and adjust accordingly.



LATCH AND LOCK BAR SWITCH ADJUSTMENT

With a solenoid de-energized, the normally open Latch Switch blades should have a $1/32"$ (.030) air gap.

Lock Switch bumper should have a minimal air gap between the bumper and actuating bracket at "B". (See Fig. 1)

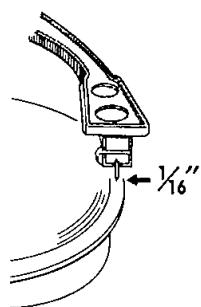
The normally closed Lock Switch blades should move its own thickness before they open.

With an energized solenoid and pushbutton latched, normally open Latch Switch blades should now be closed with an overtravel of at least the thickness of its own switch blade.

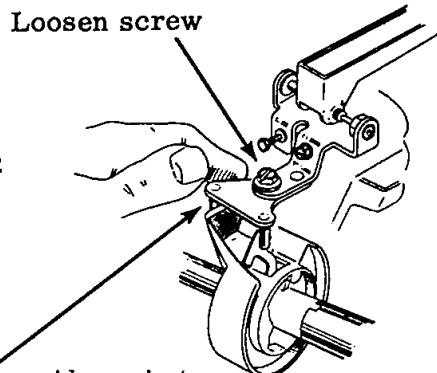
All switch brackets are adjustable to obtain correct switch positions.

TONE ARM ADJUSTMENTS

NEEDLE SET-DOWN



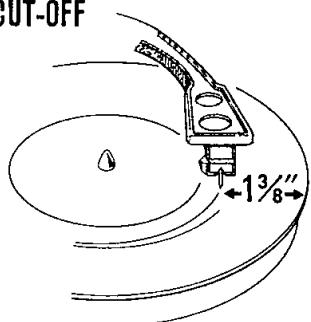
Stop mechanism just before needle lands on record. Needle must be at least $\frac{1}{16}$ " in from record edge.



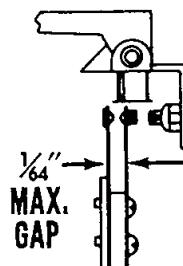
To adjust:

Hold outer pin guide against cam and move Tone Arm "in" or "out"—Tighten screw.

RECORD CUT-OFF



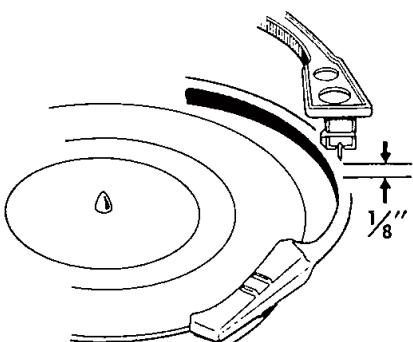
Cut-off position is 1-3/8" from record edge.



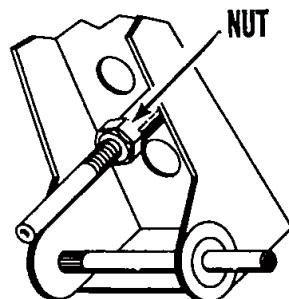
To adjust:

Move adjustment screw to obtain proper gap.

NEEDLE CLEARANCE ABOVE GRIPPER ARM



On even numbered selections the tone arm needle passes over the bow of the gripper arm. Needle clearance must be $\frac{1}{8}$ ".

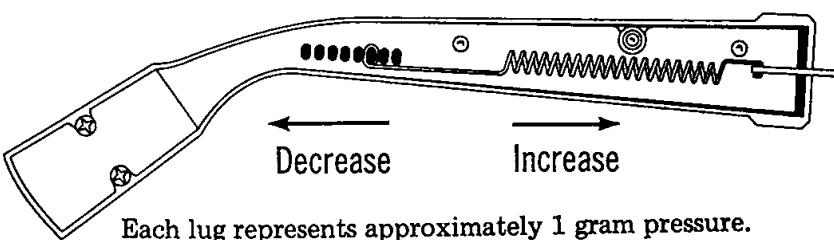


To adjust:

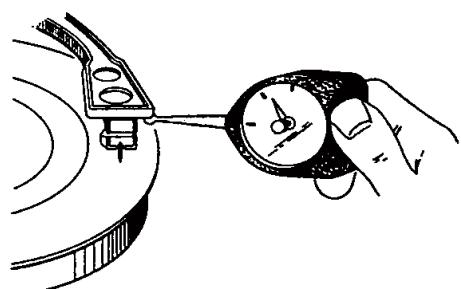
Loosen nut. Raise or lower adjustment screw for needle clearance. Tighten nut.

TONE ARM GRAM PRESSURE ADJUSTMENT

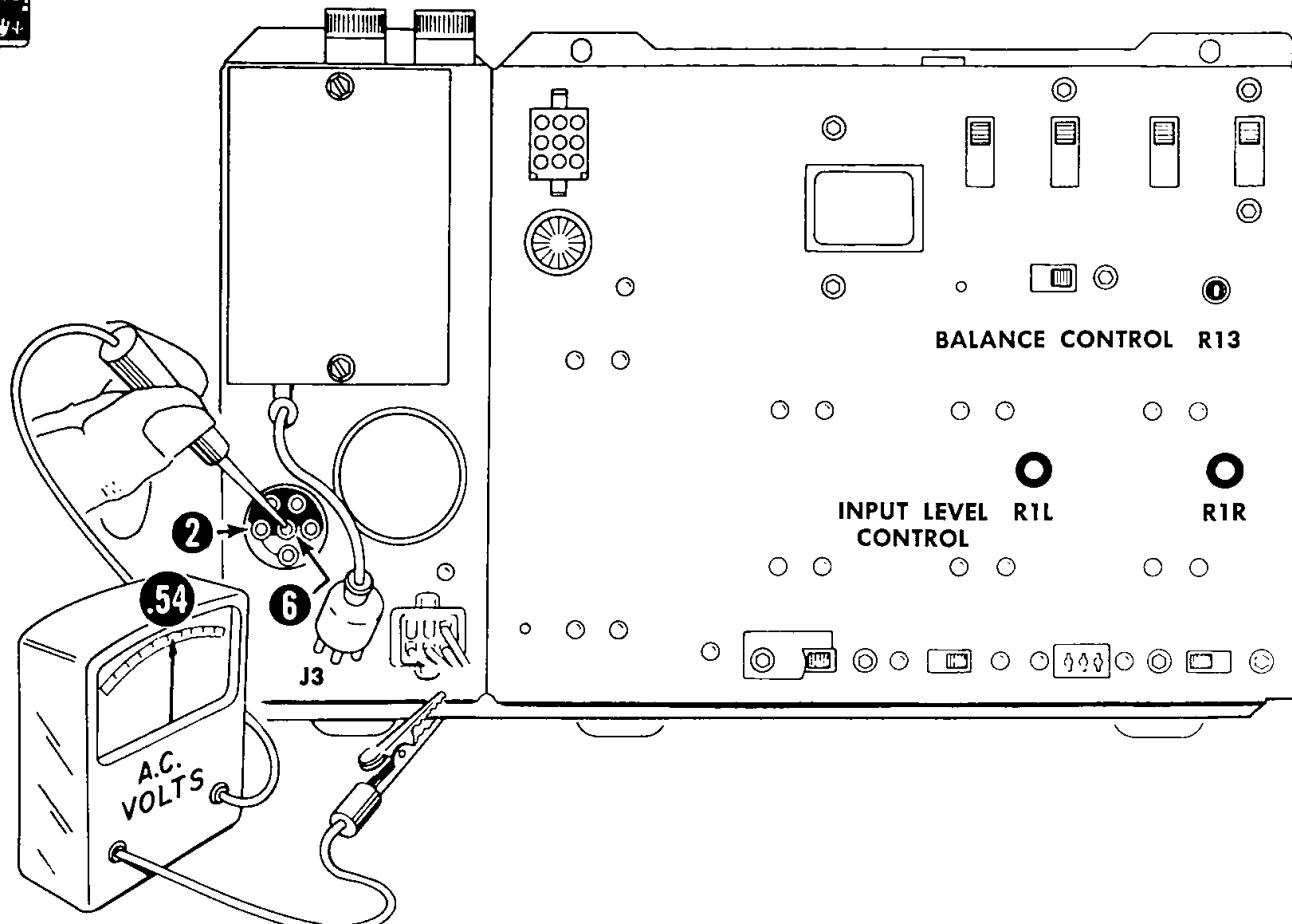
Magnetic—3 to 5 Grams



Each lug represents approximately 1 gram pressure.



Needle pressure reading is taken at the point of contact of the needle on the record.



SOUND SYSTEM ADJUSTMENTS

INPUT LEVEL ADJUSTMENTS (R1L and R1R)

Input level adjustments R1L & R1R are located on the amplifier chassis. These controls are set at the factory and should only be re-adjusted whenever the cartridge has been replaced or the amplifier has been serviced.

A R.M.C. Stereo Test Record #1001 and a voltmeter of at least 1000 ohms per volt are required to adjust these controls.

PROCEDURE: Turn A.V.C. switch to "Test" and tone controls to maximum. Also turn the "Stereo-Mono" switch to "Stereo" and remove the molded plug (J3) from the volume control socket.

Connect the A.C. voltmeter leads to pin #6 of the volume control socket and chassis ground.

Play Band #2 (Right Channel) of test record. Turn input level adjustment R1R until meter reads .54 volts.

Do same to input level adjustment R1L except use pin #2 in volume control socket and play Band #1 (Left Channel) of the test record.

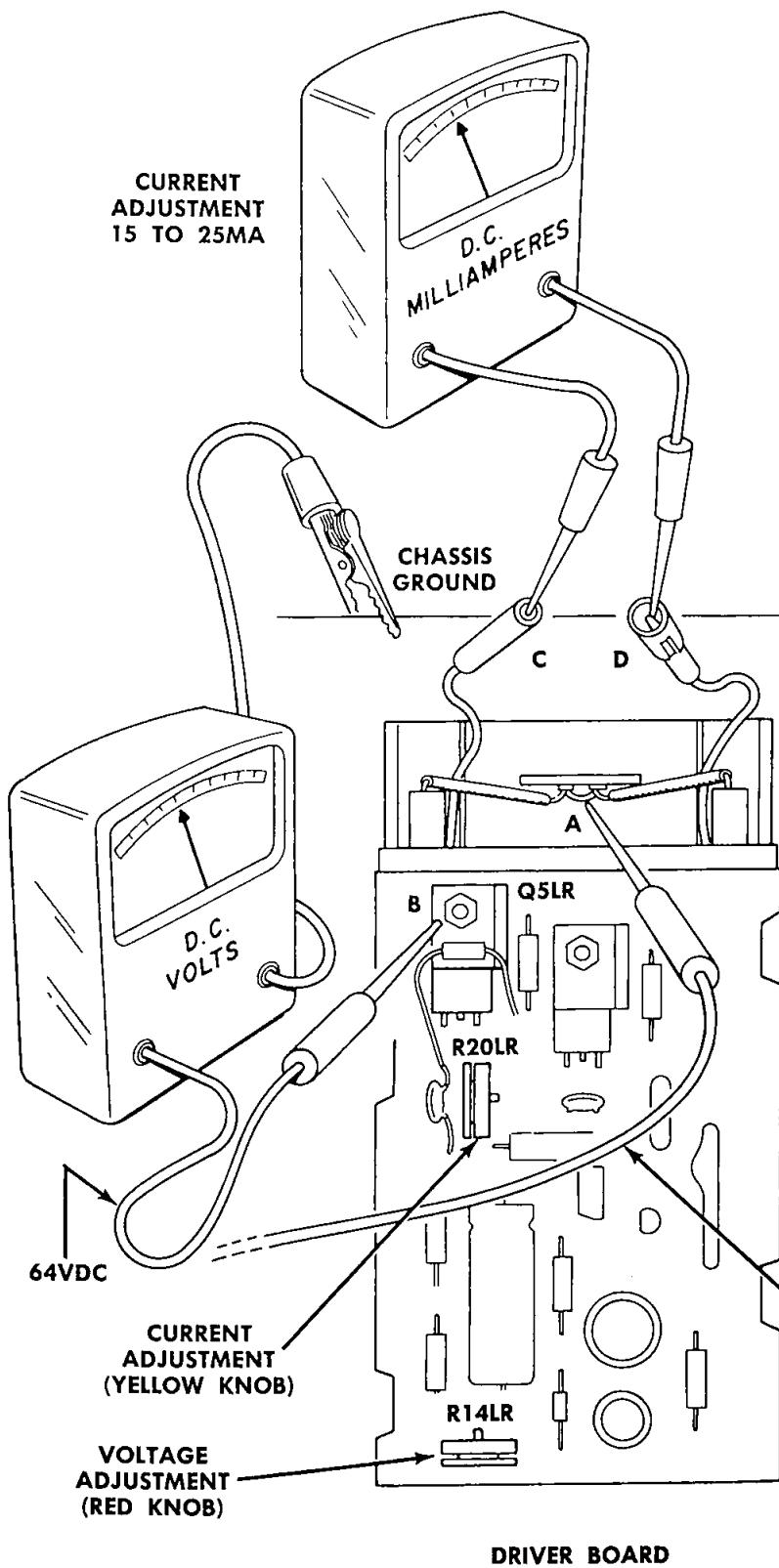
BALANCE CONTROL (R13)

The balance control adjustment R13 is also located on the amplifier chassis, and is set at the factory for equal outputs from Left and Right channel and should only be re-adjusted if the amplifier has been serviced. Use the same test record and an A.C. voltmeter of at least 1000 ohms per volt to adjust this control.

PROCEDURE: Be sure input levels are properly adjusted. Turn A.V.C. switch to "On" and Bass and Treble controls to maximum.

Turn the "Stereo-Mono" to "Stereo" and make certain the phono speakers are connected to the #4 position on the Speakers Terminal Board.

Play Band #3 (Right and Left) of the test record. Connect A.C. voltmeter alternately across the 12" door speakers. The equal voltage reading should be approximately 12.5. If this is not the case, reset control until outputs are identical.



BIAS CONTROLS (R14LR and R20LR)

These controls (2 per channel) are set at the factory and should only be re-adjusted if the output transistors or driver circuit have been serviced.

A D.C. Millimeter (0-100) and a D.C. Voltmeter of at least 1000 ohms per volt are required.

PROCEDURE: With amplifier power "on", voltage and current meters should be connected in the bias circuits as shown.

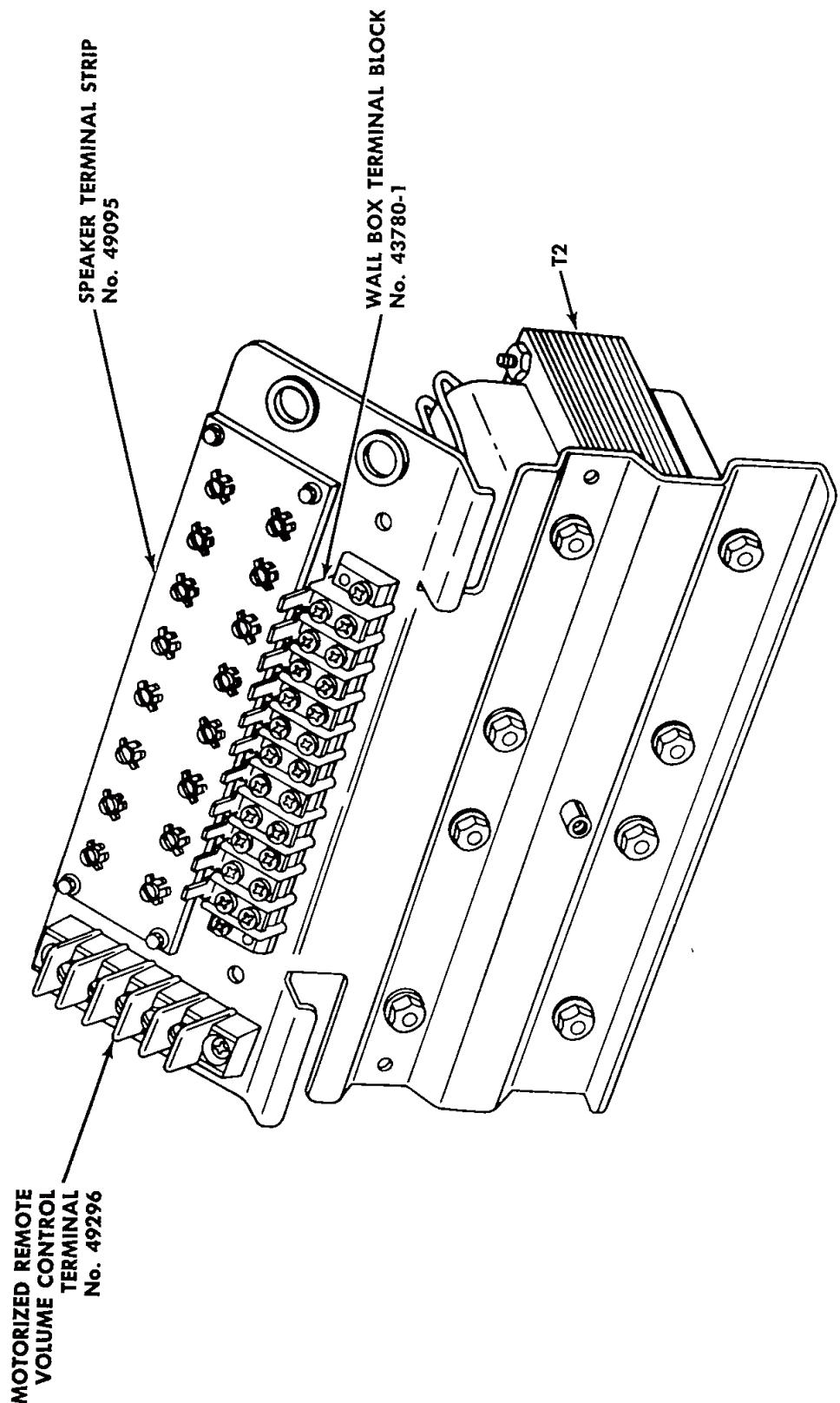
The voltage at "A" (64 V.D.C.) should be half of voltage "B" (32 V.D.C.).

Adjust pot R14LF for left channel until voltage points at "A" and "B" are achieved.

For current adjustment disconnect the 1 circuit connector on the heat sink. Check current reading at points "C" and "D" and adjust pot R20LR until the current reading of 15 to 25 MA is reached.

Follow the same procedure for right channel Driver.

Caution: Be sure to reconnect the 1 circuit connector "C" & "D" before operating amplifier.



AUDIO DISTRIBUTION ASSEMBLY
No. 48595-A



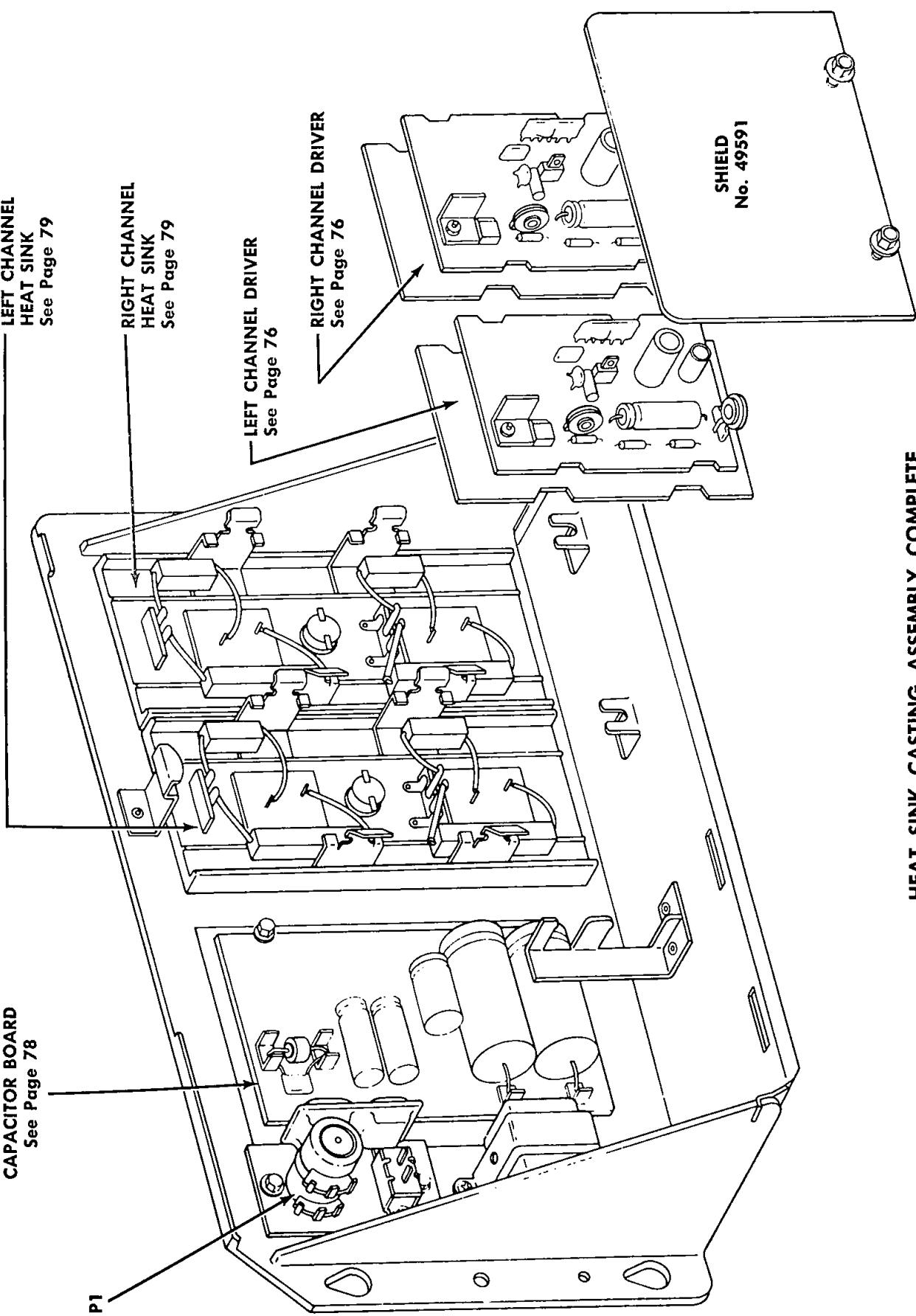
LEFT CHANNEL
HEAT SINK
See Page 79

RIGHT CHANNEL
HEAT SINK
See Page 79

LEFT CHANNEL DRIVER
See Page 76

RIGHT CHANNEL DRIVER
See Page 76

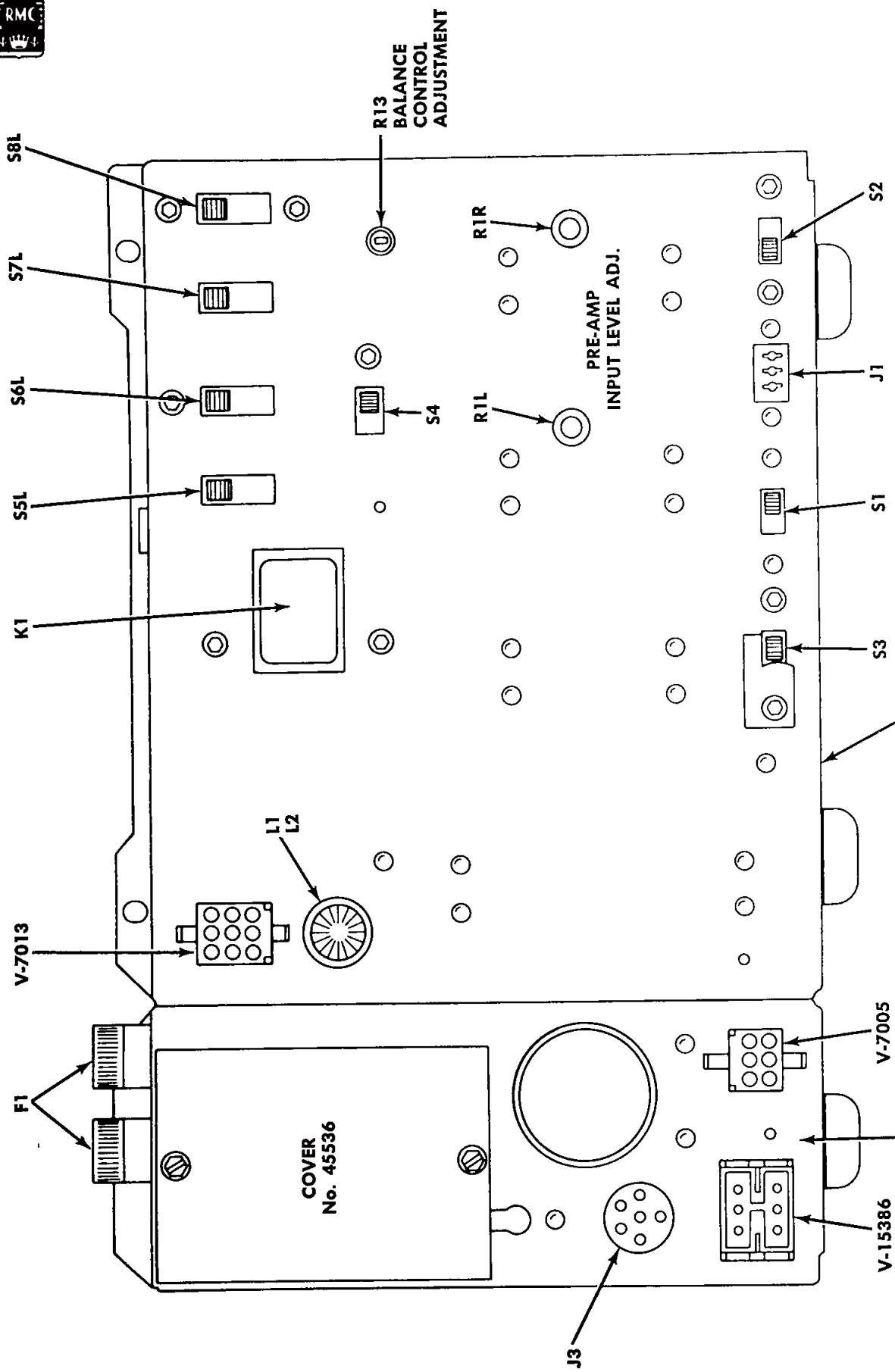
SHIELD
No. 49591

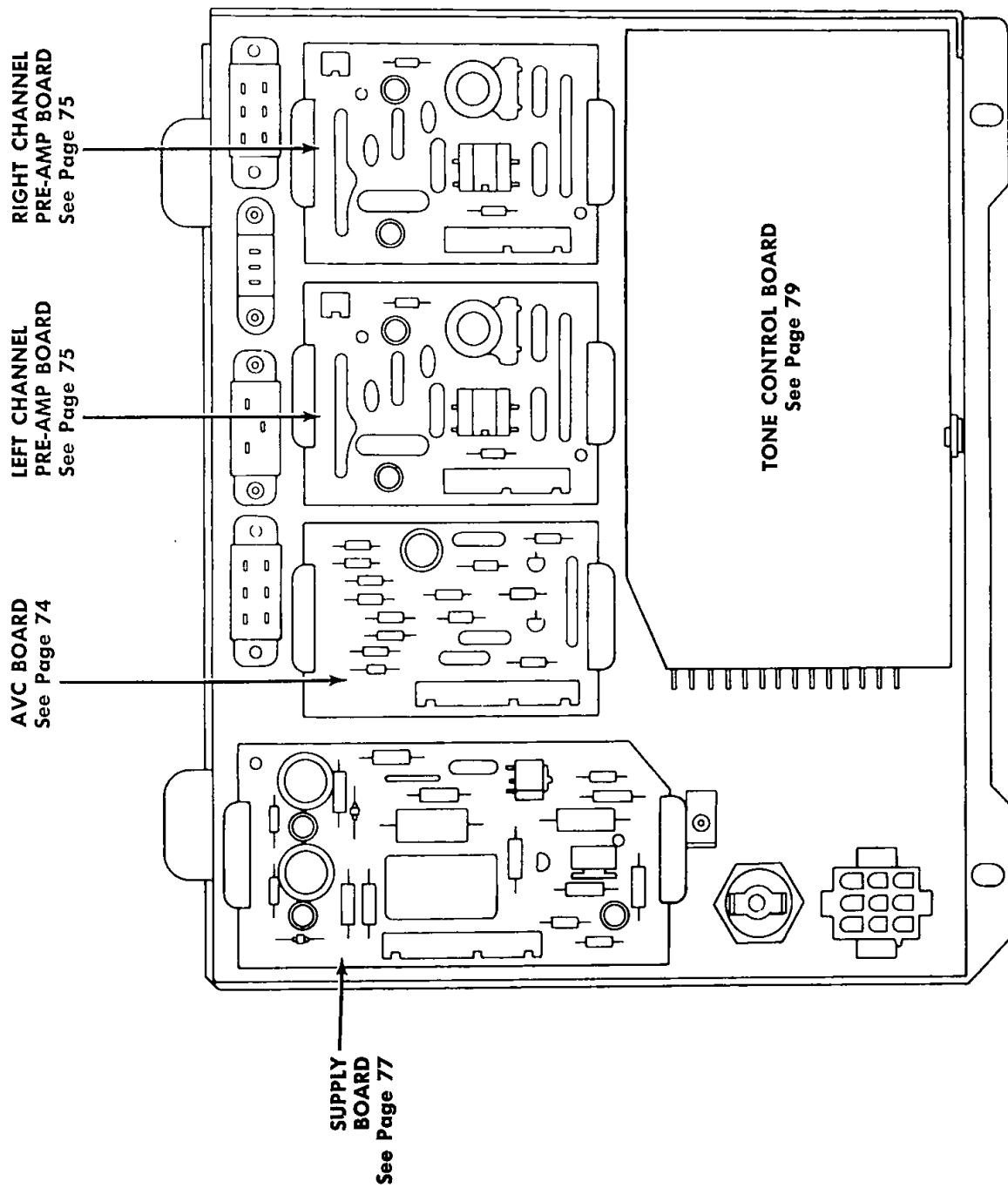


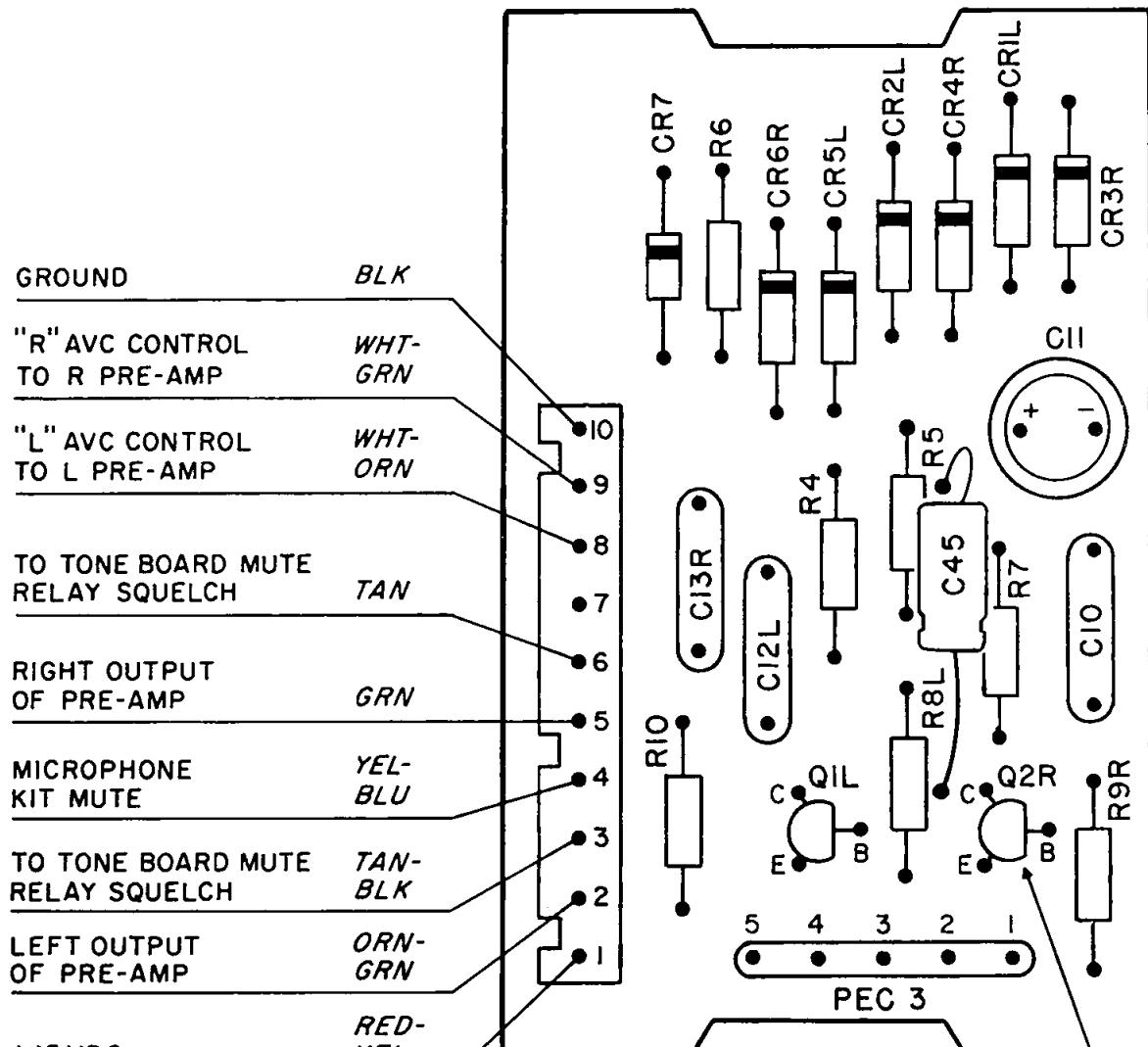
CAPACITOR BOARD
See Page 78

P1

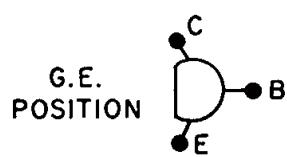
HEAT SINK CASTING ASSEMBLY COMPLETE
No. 49190-1A

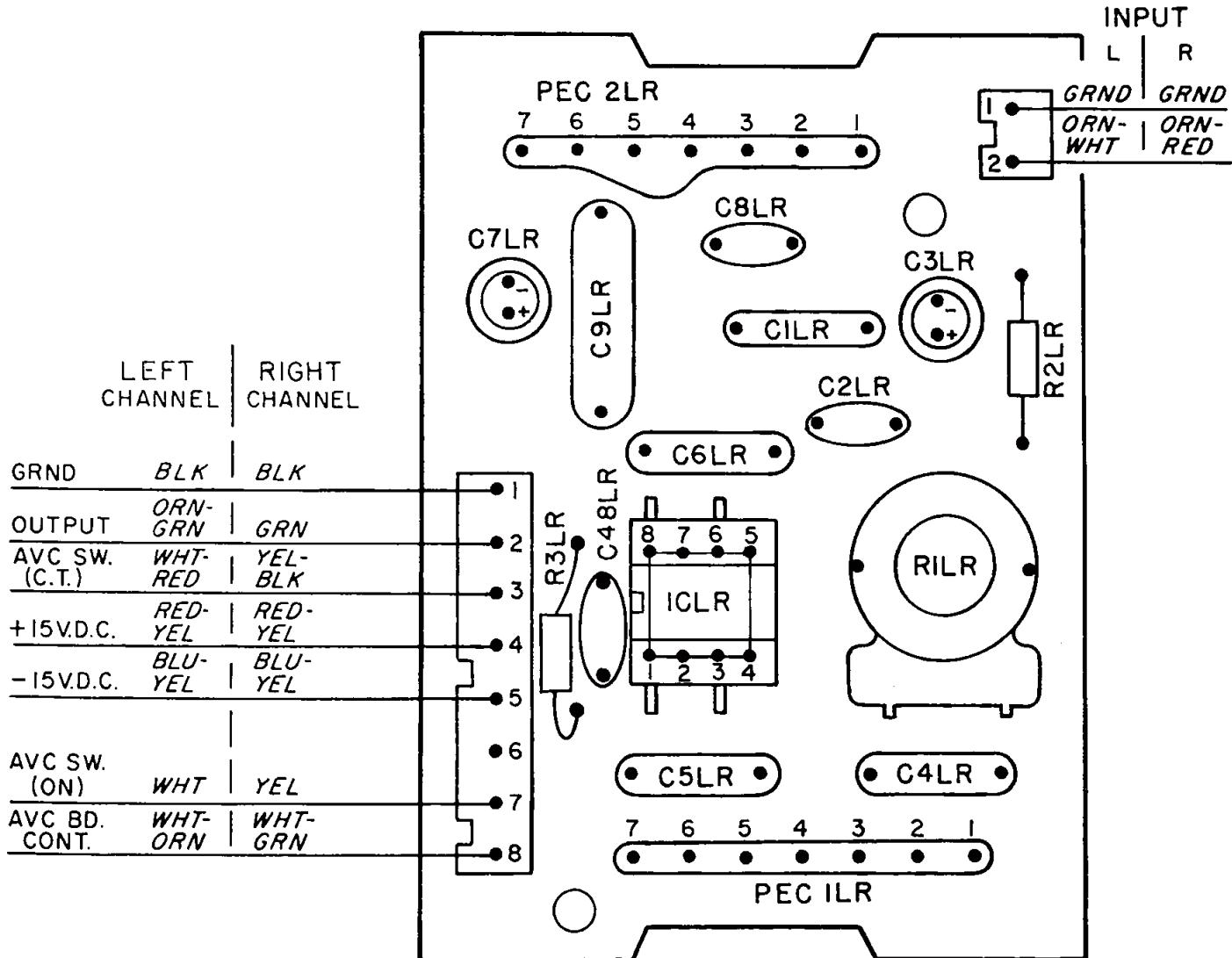




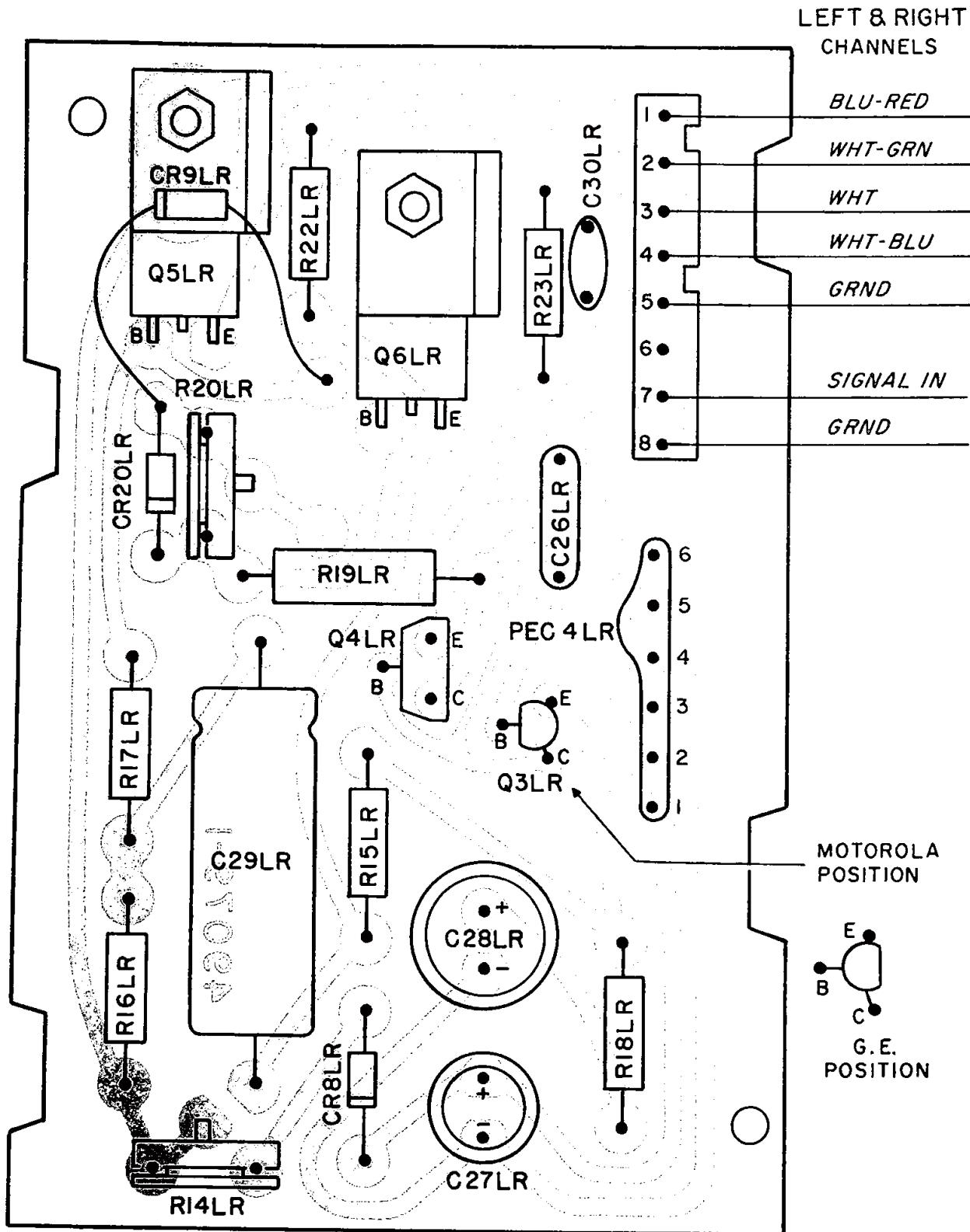


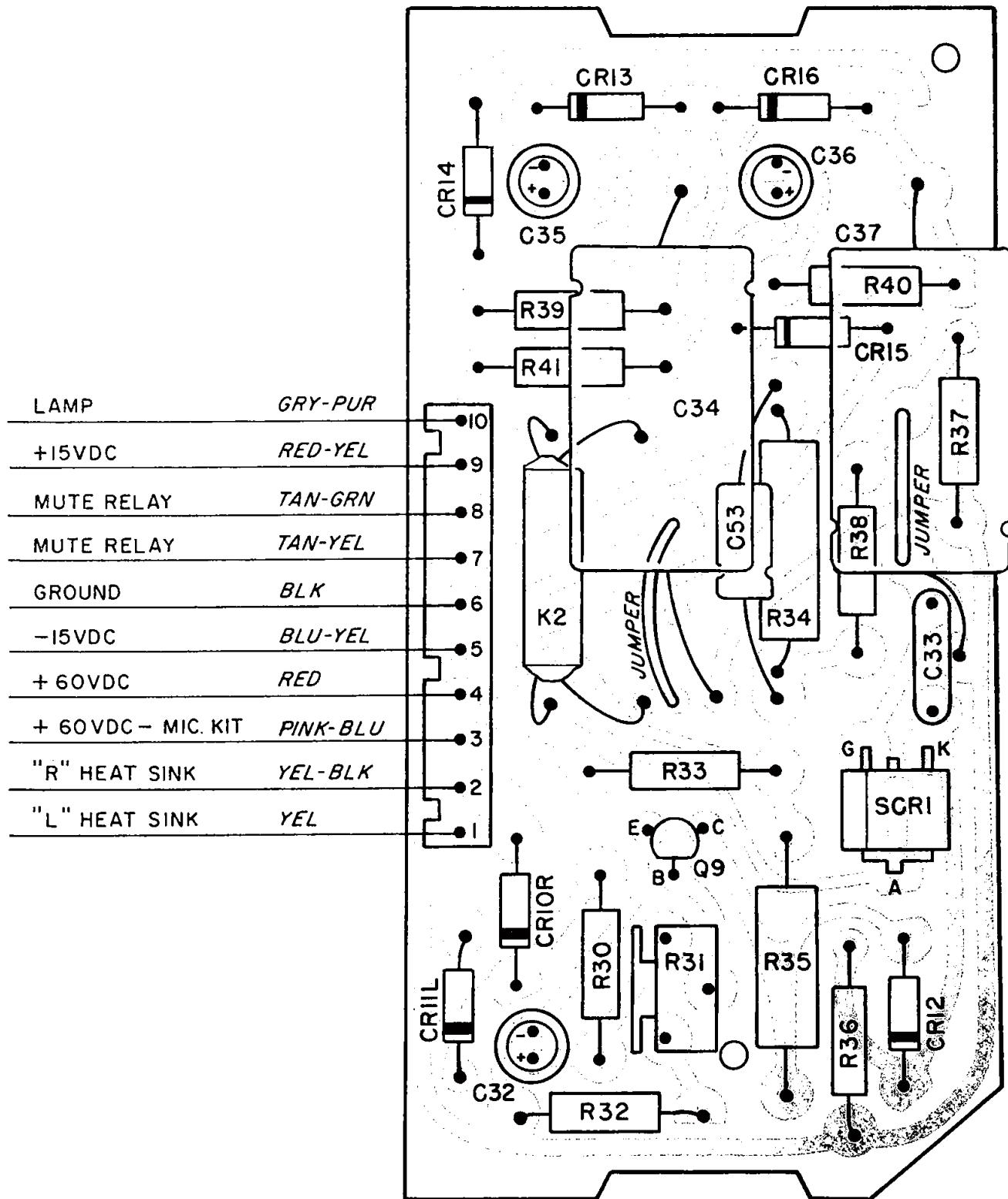
MOTOROLA POSITION



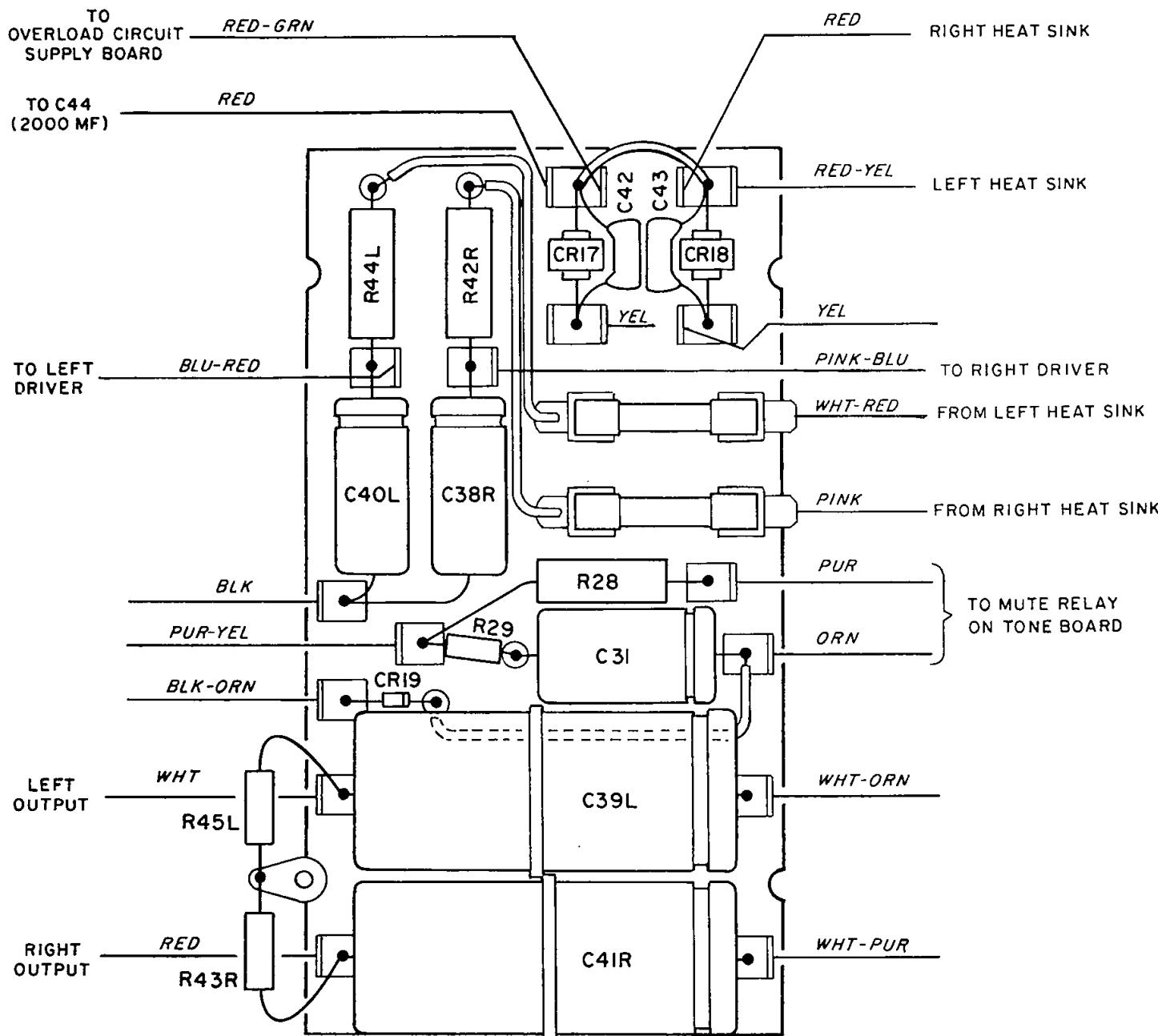


PRE-AMP P.C. BOARD
49130-IA

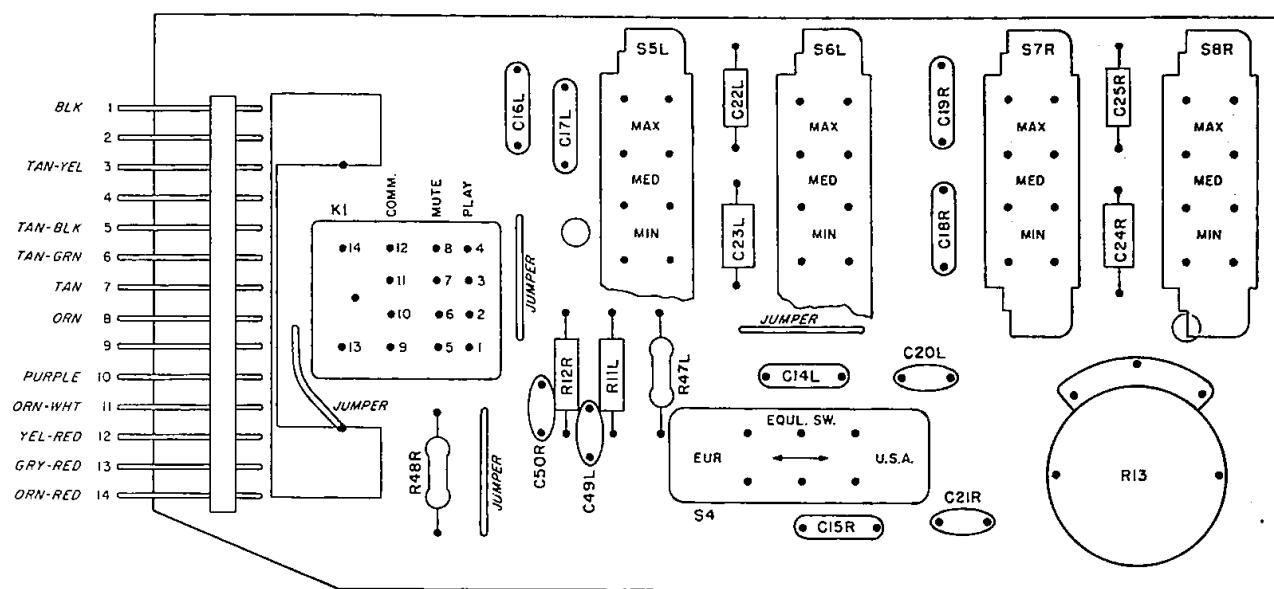




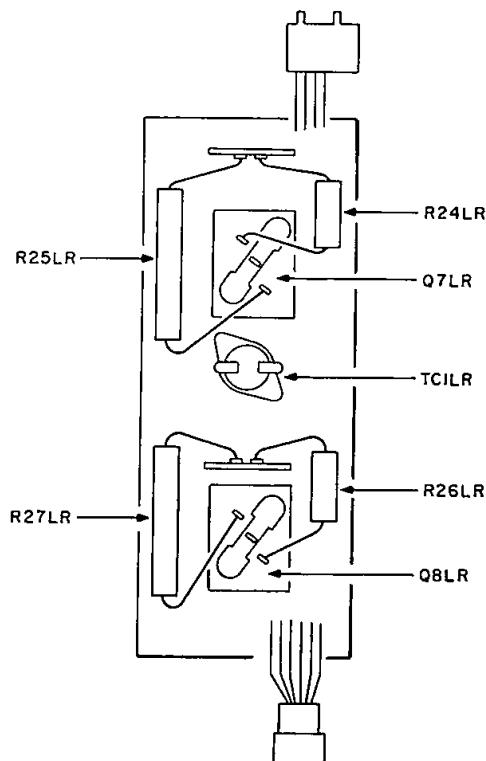
SUPPLY P.C. BOARD
49150-2A



CAPACITOR BOARD No. 49155-1A



TONE CONTROL P.C. BOARD
49145-IA



HEAT SINK ASSEMBLY L-R
NO. 49180-IA



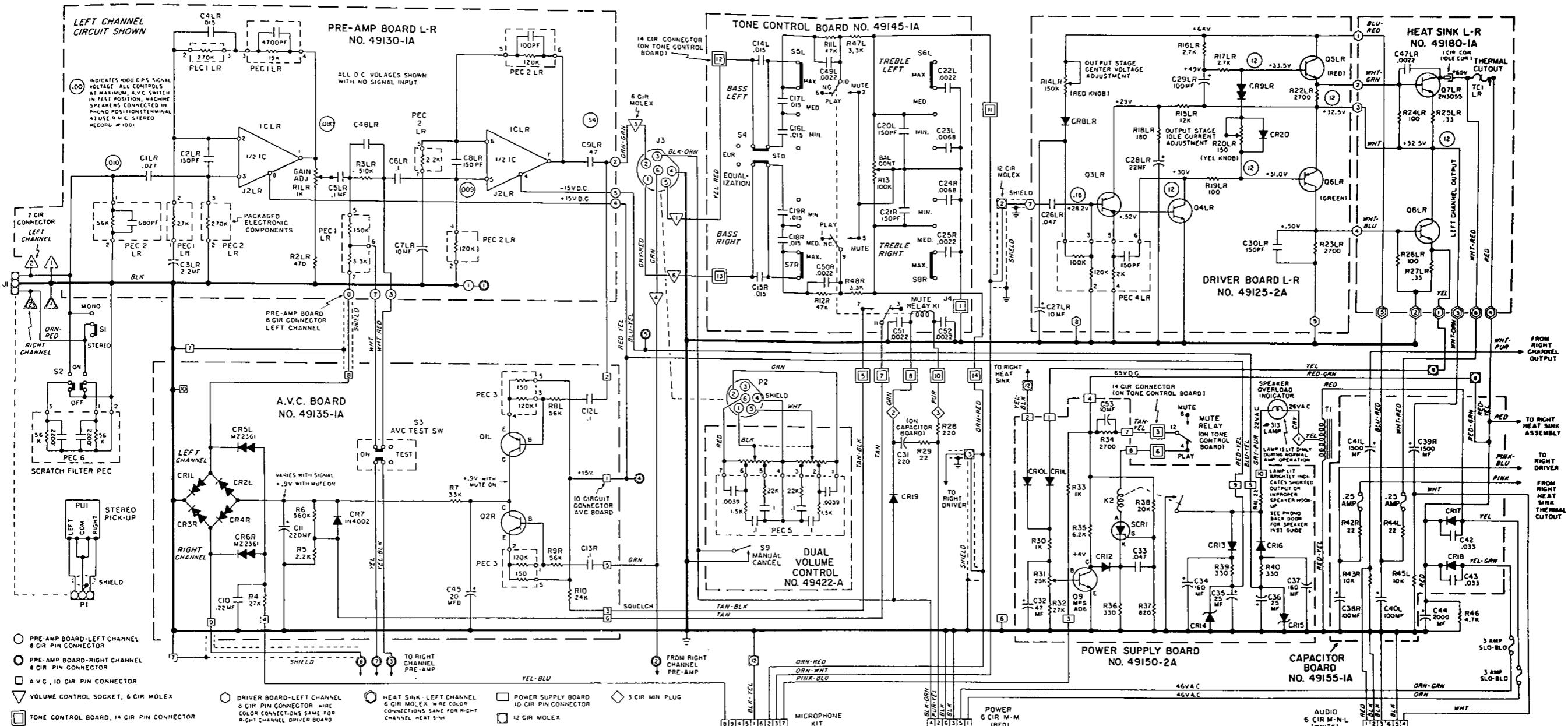
STEREO AMPLIFIER No. 48350-1A PARTS LIST
(L and R denotes Left and Right Channel)

| Item | Description | Part No. | Item | Description | Part No. |
|---------|-----------------------|----------|---------|---------------------------|----------|
| | CAPACITORS | | | | |
| C1 L&R | .027 mf 250V | 48949 | C51 | .0022 mf Ceramic Disc | 50104 |
| C2 L&R | 150 pf Ceramic Disc | 45789 | C52 | .0022 mf Ceramic Disc | 50104 |
| C3 L&R | 2.2 mf 25V | 49146 | C53 | 10 mf 63V | 50105 |
| C4 L&R | .015 mf 250V | 48947 | | | |
| C5 L&R | .1 mf 250V | 47421 | | | |
| C6 L&R | .1 mf 250V | 47421 | | | |
| C7 L&R | 10 mf 25V | 48938 | R1 L&R | 1K Min. P.C. Control | 49272 |
| C8 L&R | 150 pf Ceramic Disc | 45789 | R2 L&R | 470 ohm 1/4W | 49264 |
| C9 L&R | .47 mf 100V | 48951 | R3 L&R | 510 1/4W | 49265 |
| C10 | .22 mf 100V | 48941 | R4 | 27K 1/4W | 49269 |
| C11 | 220 mf 10V | 49271 | R5 | 2.2K 1/4W | 48042 |
| C12 L | .1 mf 250V | 47421 | R6 | 560K 1/4W | 49266 |
| C13 R | .1 mf 250V | 47421 | R7 | 33K 1/4W | 49268 |
| C14 L | .015 mf 63V | 48947 | R8 L | 56K 1/4W | 49267 |
| C15 R | .015 mf 63V | 48947 | R9 R | 56K 1/4W | 49267 |
| C16 L | .015 mf 63V | 48947 | R10 | 24K 1/4W | 42270 |
| C17 L | .015 mf 63V | 48947 | R11 L | 47K | 13015 |
| C18 R | .015 mf 63V | 48947 | R12 R | 47K | 13015 |
| C19 R | .015 mf 63V | 48947 | R13 | 1K Min. P.C. Control | 43522 |
| C20 L | 150 pf | 45789 | R14 L&R | 150K Min. P.C. Control | 49284 |
| C21 R | 150 pf | 45789 | R15 L&R | 12K | 32206 |
| C22 L | 2200 pf 63V | 49286 | R16 L&R | 2.7K | 13182 |
| C23 L | 6800 pf 63V | 49287 | R17 L&R | 2700 ohm 10% | 13182 |
| C24 R | 6800 pf 63V | 49287 | R18 L&R | 180 ohm 1W | 49692 |
| C25 R | 2200 pf 63V | 49286 | R19 L&R | 100 ohm 1W | 35329 |
| C26 L&R | .047 mf 250V | 47422 | R20 L&R | 150 ohm Min. P.C. Control | 50107 |
| C27 L&R | 10 mf 75V | 49279 | R21 | Not Used | |
| C28 L&R | 22 mf 75V | 49278 | R22 L&R | 2700 ohm 10% | 13182 |
| C29 L&R | 100 mf 70V | 49285 | R23 L&R | 2700 ohm 10% | 13182 |
| C30 L&R | 150 pf Ceramic Disc | 45789 | R24 L&R | 100 ohm 5W 10% | 36846 |
| C31 | 220 mf 63V | 48942 | R25 L&R | .33 ohm 10W 10% | 49297 |
| C32 | 47 mf 6.3V | 49414 | R26 L&R | 100 ohm 5W 10% | 36846 |
| C33 | .047 mf 250V | 47422 | R27 L&R | .33 ohm 10W 10% | 49297 |
| C34 | 160 mf 64V | 44892 | R28 | 220 ohm 1W 10% | 35326 |
| C35 | 25 mf 25V | 49601 | R29 | 22 ohm | 14234 |
| C36 | 25 mf 25V | 49601 | R30 | 1K 10% | 16224 |
| C37 | 160 mf 64V | 44892 | R31 | 25K Min. P.C. Control | 49416 |
| C38 R | 100 mf 70V | 49285 | R32 | 27K 10% | 15403 |
| C39 L | 1500 mf 60V | 49142 | R33 | 1K 10% | 16224 |
| C40 L | 100 mf 70V | 49285 | R34 | 2700 ohm 2W | 50106 |
| C41 R | 1500 mf 60V | 49142 | R35 | 6200 ohm 1W | 49412 |
| C42 | .033 mf 400V | 49417 | R36 | 330 ohm | 38673 |
| C43 | .033 mf 400V | 49417 | R37 | 820 ohm | 46943 |
| C44 | 2000 mf 75V | 48928 | R38 | 20K 10% | 49411 |
| C45 | 20 mf 16V | 48038 | R39 | 1200 ohm | 46249 |
| C46 L&R | 470 pf | 33762 | R40 | 1200 ohm | 46249 |
| C47 L&R | 2200 pf | 30578 | R41 | 15 ohm 1W | 39671 |
| C48 L&R | 150 pf Ceramic Disc | 45789 | R42 R | 22 ohm 2W 10% | 49298 |
| C49 L | .0022 mf Ceramic Disc | 50104 | R43 R | 10K 10% | 13388 |
| C50 R | .0022 mf Ceramic Disc | 50104 | | | |



STEREO AMPLIFIER No. 48350-1A PARTS LIST — Continued
(L and R denotes Left and Right Channel)

| Item | Description | Part No. | Item | Description | Part No. |
|---------|-------------------------------------|----------|----------|----------------------------------|----------|
| | RESISTORS (Continued) | | | SWITCHES | |
| R44 L | 22 ohm 2W 10% | 49298 | S1 | Slide Switch DPDT | 49302 |
| R45 L | 10K 10% | 13388 | S2 | Slide Switch DPDT | 49302 |
| R46 | 2W 10% | 49719 | S3 | Slide Switch DPDT | 49302 |
| R47 L | 2.3K 10% | 18660 | S4 | 2 Pole 2 Pos. Switch | 49281 |
| R48 R | 3.3K 10% | 18660 | S5 L | 2 Pole 3 Pos. Switch | 49280 |
| | DIODES AND RECTIFIERS | | S6 R | 2 Pole 3 Pos. Switch | 49280 |
| CR1 L | AVC Diode | 49141 | S7 L | 2 Pole 3 Pos. Switch | 49280 |
| CR2 L | AVC Diode | 49141 | S8 R | 2 Pole 3 Pos. Switch | 49280 |
| CR3 R | AVC Diode | 49141 | S9 | Momentary Push Switch | 44772 |
| CR4 R | AVC Diode | 49141 | | MISCELLANEOUS | |
| CR5 L | Reference Diode | 49140 | TC1 LR | Thermostat | 49295 |
| CR6 R | Reference Diode | 49140 | F1 | Fuse Holder | 47837 |
| CR7 | 100 PRV 1 Amp Sil. Rect. | 46497 | L1 | Lamp Holder with Lens | 49318 |
| CR8 L&R | 100 PRV 1 Amp Sil. Rect. | 46497 | L2 | Type #313 Bulb | ST-3059 |
| CR9 L&R | Reference Diode | 49140 | J1 | 3 Pin Socket | 44927 |
| CR10 R | 100 PRV 1 Amp Sil. Rect. | 46497 | J2 L&R | IC Socket — 8 Pin | 49273 |
| CR11 L | 100 PRV 1 Amp Sil. Rect. | 46497 | J3 | 6 Prong Min. Soc. (Ret. ST-9817) | 18634 |
| CR12 | 100 PRV 1 Amp Sil. Rect. | 46497 | J4 | Mute Relay Socket (not shown) | 49282 |
| CR13 | 100 PRV 1 Amp Sil. Rect. | 46497 | K1 | Mute Relay | 43561 |
| CR14 | 15V 1W Zener Diode | 46617 | K2 | Relay 2PDT-24V | 48213 |
| CR15 | 15V 1W Zener Diode | 46617 | P1 | Dual Input Cable Assembly | 49546-A |
| CR16 | 100 PRV 1 Amp Sil. Rect. | 46497 | P2 | 6 Pin Molded Plug & Cable | 49294 |
| CR17 | 6 Amp 200V Rectifier | 49293 | PEC1 L&R | Pre Amp Circuit | 48937 |
| CR18 | 6 Amp 200V Rectifier | 49293 | PEC2 L&R | Pre Amp Circuit | 48940 |
| CR19 | 100 PRV 1 Amp Sil. Rect. | 46497 | PEC3 | AVC Circuit | 48936 |
| CR20 | 100 PRV 1 Amp Sil. Rect. | 46497 | PEC4 L&R | Driver Circuit | 48943 |
| | INTEGRATED CIRCUIT COMPONENT | | PEC5 | Volume Control | 44715 |
| | | | PEC6 | Scratch Filter Circuit | 48946 |
| | | | PU1 | Magnetic Cartridge (M44MR) | 43467 |
| IC L&R | Dual Integrated Circuit | 48934 | | AMPLIFIER CONNECTORS | |
| | TRANSISTORS | | | 2 Circuit Post Housing | 49289 |
| Q1 L | MPSA56 | 47831 | | 2 Circuit Post Connector | 49274 |
| Q2 R | MPSA56 | 47831 | | 3 Circuit Min. Plug | 49144 |
| Q3 L&R | MPSA56 | 47831 | | 6 Circuit Min. Plug | 48102 |
| Q4 L&R | MPSU05 | 49139 | | 6 Circuit Min. Receptacle | 48153 |
| Q5 L&R | Power Tab Transistor N.P.N. | 48929 | | 6 Circuit Post Housing | 49319 |
| Q6 L&R | Power Tab Transistor P.N.P. | 48932 | | 8 Circuit Post Housing | 49290 |
| Q7 L&R | Power Transistor N.P.N. | 48931 | | 8 Circuit Post Connector | 49275 |
| Q8 L&R | Power Transistor N.P.N. | 48931 | | 10 Circuit Post Housing | 49291 |
| Q9 | Transistor MPS-A06 | 49415 | | 10 Circuit Post Housing | 49276 |
| | TRANSFORMERS | | | 12 Circuit Min. Plug | 48109 |
| T1 | Autoformer 50 V.C.T. | 49300 | | 12 Circuit Min. Receptacle | 48104 |
| T2 L&R | Speaker Output Transformers | 49096 | | 14 Circuit Post Housing | 49292 |
| | | | | 14 Circuit Right Angle Connector | 49277 |
| | | | | Pin (Min. Plug) | 48116 |
| | | | | Socket (Min. Receptacle) | 48114 |

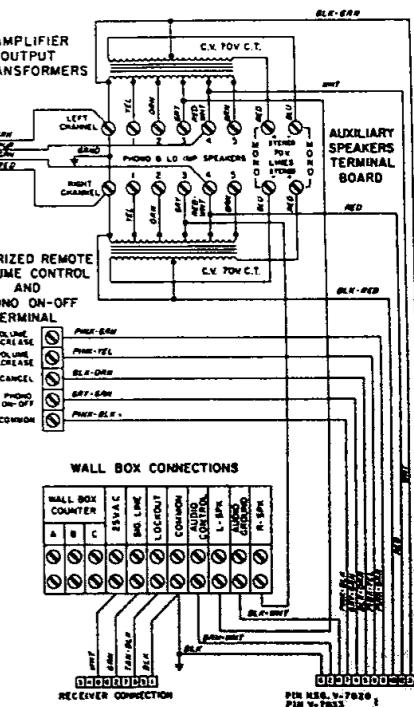


SERVICE AND REPLACEMENT OF COMPONENTS

If trouble should occur that cannot be corrected in the field, the defective unit should be checked with a D.C. V.T.V.M., A.C. V.T.V.M., oscilloscope and audio generator.

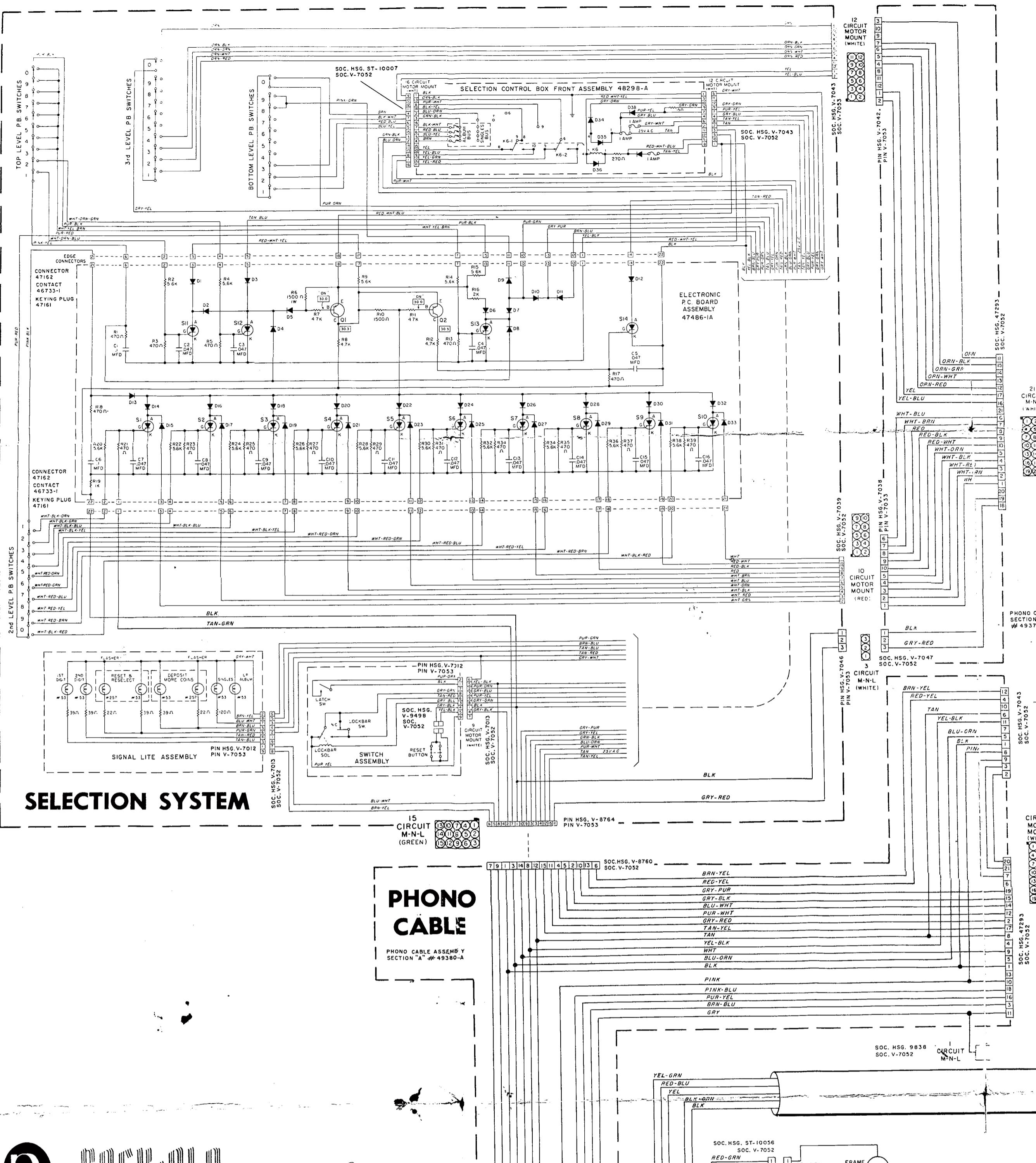
All voltages shown on the schematic are with 120 A.C. volt line.

Note: All D.C. voltages are measured with respect to chassis ground. The amplifier power is supplied thru the amplifier cable (red plug).



MODEL 459

100 SELECTION PHONOGRAPH



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TELEPHONE: (312) 638-7600



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