SEEBURG 222

Double Channel

Service Manual & Parts Catalog

SEEBURG

SELECT-O-MATIC "160", MODEL 222

and

SELECT-O-MATIC "100", MODEL 220

This manual is made up of pages selected from a universal manual that covers all Seeburg Units. The original page numbering system has been retained for convenience in reference.

-INDEX-

DESCRIPTION 1

SPECIFICATIONS 2

ADJUSTMENTS:
- Coin Switches 1376
- Dual Pricing Unit 16002
- Electrical Selector Model 220 3124
- Model 222 3117
- Half Dollar Unit 16028
- Mechanism 2427
- Single Pricing Unit, SPU1 16010
- Single Pricing Unit, SPU1H 16014
- Step Switch 16031

ASSEMBLY DATA
- Cam and Gear Segment 2430
- Clamp Arm 2432
- Clutch 2433
- Transfer Arm 2432
- Turntable, Shaft and Gear 2431

LUBRICATION CHART 2468A

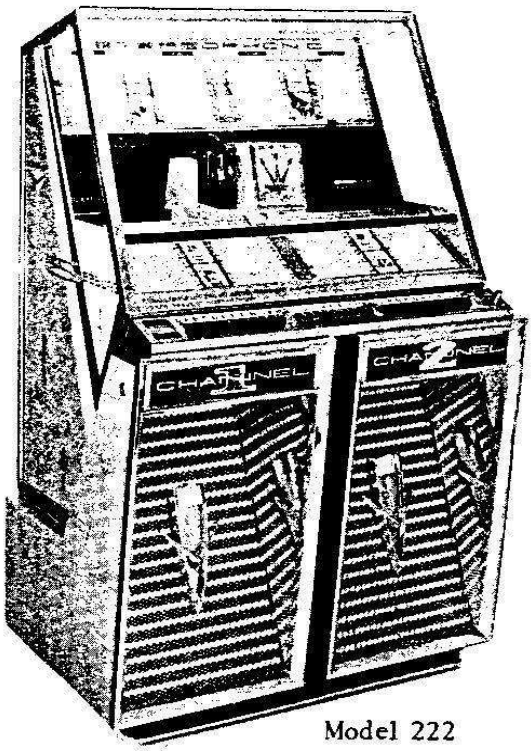
TROUBLE SHOOTING CHARTS 155

DIAGRAMS:
- Amplifier 4068
- Electrical Selector 3122, 3126
- Mechanism 2468B
- Power Distribution 1377
- Read-Out Circuits 1381
- Remote Speakers 7051
- Remote Volume Control 8023
- Step Switch 13013, 16034
- T ormat Junction Unit 13013
- Tormat Memory Unit 2470B, 2470C
- Tormat Selector Unit 13012
- Trip Circuit 1382
- Write-In Circuits 1378, 1379

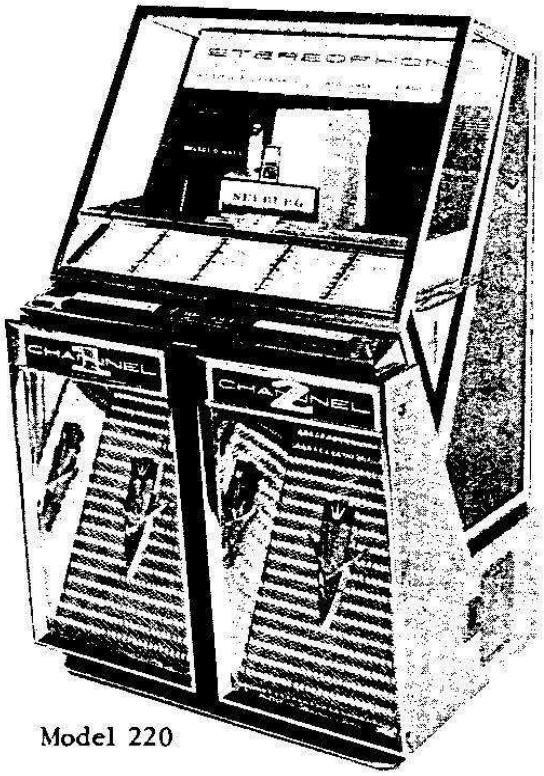
PARTS LIST:
- Amplifier 4067, 4070
- Cabinet Model 222 ..... 1376E
- Model 220 ..... 1376A
- Dual Pricing Unit(DPU1 and DPU5) .. 16007
- Electrical Selector Model 222 ..... 3122A
- Model 220 ..... 3126A
- Half Dollar Unit (HDU1) 16029
- Mechanisms Model 222 ..... 2427G-1
- Model 220 ..... 2427G-2
- Remote Control Stepper Unit (RCSU2) 13014A
- Remote Volume Control (RSVC1) 8023
- Selector Key Panel Model 222 ..... 1376J
- Model 220 ..... 1376I
- 5012
- 6016
- 3014A

SEEBURG

SELECT-O-MATIC MODELS 220 AND 222



Model 222



Model 220

The Select-O-Matic "160" Models 222DH and 222DHR and the Select-O-Matic "100" Models 220S and 220SR are coin operated phonographs for selective playing of 45 r.p.m., 7-inch, stereophonic records. The two basic models – 222 and 220 – differ mainly in the record capacity and in the resultant title strip arrangement and selector key panel. The Model 222 provides for 160 selections; the Model 220 is for 100 selections. Other differences are significant only in the coin and remote control facilities that are supplied as standard equipment. Either basic model may be modified for individual requirements by substitution or addition of appropriate coin equipment, Pricing Unit and remote control facilities.

The 160-selection Models 222DH and 222DHR have as standard equipment, dual pricing and 5-, 10-, 25-, and 50-cent coin operation. The Model 222DH operates only from its electrical selector; the Model 222DHR includes full facilities for remote control operation from 3-wire Wall-O-Matics.

The 100-selection Models 220S and 220SR have as standard equipment, single selection pricing and 5-, 10-, 25-cent coin operation. The Model 220S operates only from its electrical selector; the Model 220SR may be used with remote control, 3-wire Wall-O-Matics.

The titles for the records are displayed on standard size dual title strips and are exposed for viewing. They are back-lighted by the fluorescent lamps that also illuminate the mechanism, selection keys and the speaker grille.

The lid glass through which the mechanism and the record program are viewed is hinged and opens for changing records and title strips. With the lid open, access may be had to a Service Switch, a Manual Credit Switch, Popularity Meter and a Selection Counter. The Service and Credit Switches are for control of the mechanism when servicing the instrument.

The Popularity Meter is part of the mechanism and indicates the number of times (up to 40) each record has been played. The Selection Counter is part of the Credit System and totals the number of selections made. The counter total includes selections made through remote control Wall-O-Matics as well as those made at the instrument.

A Seeburg Stereophonic Magnetic Pickup with one-fifth ounce stylus pressure assures long record life and high quality reproduction unaffected by temperature or humidity conditions.

A dual channel, stereophonic, high fidelity audio amplifier connects to two permanent magnet type speakers in the cabinet and has terminal strips for connecting external speakers for stereo reproduction. Automatic volume

compensation provides uniform volume level and controls both amplifier channels to avoid blasting due to loud records. The volume control is a dual section type to synchronize the volume of both amplifier channels. Provision is made for plug-in connection of a remote volume control.

A Tormat Selector Unit is the power distribution and control circuit junction for the phonograph. It has sockets for plug-in connections for the mechanism, cabinet lighting and some of the control circuits. It also provides mounting space for a Remote Control Stepper Unit or Tormat Junction Unit. The former is used when Wall-O-Matics are used for remote selection control as well as electrical selector operation. The Junction Unit is used when electrical selector operation only is desired.

The Tormat Selector Unit and the audio amplifier are mounted on the rear cabinet door. The door is hinged at the side to give access to the cabinet interior and to tubes, plugs, tone controls, and all connections.

A selection cancel switch, is operated by a push button on the back of the rear door. A remote cancel switch may be connected to terminals on the selection receiver where a switching link is located to permit either the remote cancel switch, the included switch or both to be used.

SPECIFICATIONS

Power Requirements:

117 volts A.C., 60 cycles

	STAND BY	OPERATING
Model 222 (with R6SU2)	133 watts	255 watts
Model 220 (with RCSU2)	100 watts	255 watts

Cabinet Lighting:

Upper cabinet Lamp (Model 222 only) 25-watt, 25-inch, Cool White Fluorescent (FS25 starter)

Lower Cabinet Lamp - Same as above

Cabinet Key Number: F264

Select-O-Matic Mechanism

Model 222 .....Type 160ST2
Model 220 ..... Type 145ST4

Tormat Memory Assembly

Model 222 .....Type 160TM1
Model 220.....Type 100TM3

Record Capacity

Model 222.....80 records (160 selections)
Model 220.....50 records (100 selections)

Record Type.....45 rpm

7-inch diameter, 1.5-inch center hole, stereophonic or lateral monophonic

Pickup.....Seeburg Stereophonic High Fidelity Magnetic

Phonograph Speakers:

2 - 12" permanent magnet, extended range

Finish.....Silver Gray Oriental Walnut

Coin Equipment:

Model 222 - 5-, 10-, 25-, and 50 cent rejector, Dual Pricing Unit, DPU1, and Half-Dollar Unit, HDU1.

Model 220 - 5-, 10-, and 25-cent rejector, Single Pricing Unit, SPU1.

Audio Amplifier.....Type SHFA1

13-tube, 4 transistor, high fidelity, stereophonic dual channel, constant voltage type with automatic volume compensation and transistorized equalizer stages.

Tormat Electrical Selector

Model 222 .....Type TES162
Model 220 .....Type TES103

Tormat Selector Unit..... .....Type TSU1

With Remote Control Stepper Unit, Type RCSU2, or Tormat Junction Unit, Type TJU2.

Remote Control:

Seeburg, 3-wire "Wall-O-Matic"
Nominal operating voltage 25

Power Source....Remote Control Stepper Unit or Auxiliary Power Supply Type PS6-1Z

Maximum number of Wall-O-Matics powered by Remote Control Stepper Unit.....6

Maximum number of Wall-O-Matics powered by each added auxiliary power supply.....6

Remote Speakers: .....Twin Stereo Type TW1-8

Transistors.....4-Type 2N109

Tubes:

4 - 6973	1 - 5U4G-GB
7 - 12AX7	2 - 2050
2 - 6BJ6	1- 6X4
2 - 0A2	

Fuses:

1 - 5 amp. Type MTH
1 - 2 amp. Type MDL
1 - 3.2 amp.Type N3-2/10
1 - 5 amp. Pig-Tail Fuse, Type GJV
(used on Select-O-Matic Mechanism)

Dimensions:

Height.....	55-3/4	Inches
Width.....	32-1/2	Inches
Depth.....	27	Inches
Net Weight.....	343	Pounds
Shipping Weight.....	393	Pounds

TROUBLE SHOOTING CHARTS

45 RPM

SELECT-O-MATIC

Models 101-161-201-220-222

INDEX

Coins and Credits ..... 156 – 162
Slug Rejector, Coin Switches, Electric Selector, Single Pricing Unit, Dual Pricing Unit

Selection System ..... 163 – 172
Selection Receiver, Electrical Selector, Credit Units

Mechanism ..... 173 - 181

Sound System 183
Amplifier, Speaker, Pickup, Mute Switches

SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. Rejects coins.	Coins sometimes fail to go through to cash box.	(a) Dirt or foreign matter in rejector.	Clean rejector.
		(b) Incorrect adjustments in rejector.	Adjust rejector.
		(c) Bind in scavenger cable keeping rejector gates open.	Remove, straighten, and lubricate scavenger wire.
2. Coins drop through to cash box. Unable to select. "Select" light fails to come on.	Coins occasionally drop through to cash box without establishing credits.	(a) Incorrect alignment of rejector and coin switch levers. Coins drop between levers.	Seat rejector fully into mounting frame. Align switch levers.
		(b) Dirty or incorrectly adjusted coin switches.	Clean and/or adjust coin switches.
	SINGLE PRICING UNIT	(c) Excessive spring pressure or poor contact on one of six credit switches.	Replace U-shaped spring or entire credit switch assembly.
	SINGLE PRICING UNIT	(d) Bind in credit solenoid plunger or gummed plunger.	Remove, clean and polish credit solenoid plungers. Clean solenoid coil sleeve.
	DUAL PRICING UNIT	(e) Bind in credit solenoid linkage or pawl.	Clean and lubricate linkage and pawl.
	DUAL PRICING UNIT	(f) One add solenoid or subtract solenoid pawl hanging on credit wheel.	Check for insufficient overtravel of all solenoids.
	All coins fail to turn on credit light and energize latch bar solenoid.	(g) Coin switch plug not seated in socket.	Replace plug and seat firmly in socket.
		(h) "Y" contacts of timing relay not closing.	Clean and adjust contacts.
		(i) Timing relay continuously energized by partially depressed button or mechanical binds in Electrical Selector keeping Hold Switch closed.	Release button and/or correct cause of bind.
		(j) Timing relay continuously energized by incorrectly adjusted Hold Switch in Electrical Selector.	Adjust switch for 1/32" gap (when buttons are released.)
(Continued)	*(Continued)*		

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 2. Coins drop through to cash box. Unable to select. "Select" light fails to come on.	*(Continued)* All coins fail to turn on credit light and energize latch bar solenoid. SINGLE PRICING UNIT	(k) Open circuit wiring or bad solder connection in credit circuit.	Check wiring and connections. See diagram – In Service Manual.
		(l) Timing relay continuously energized by "W" contact in pricing unit.	Clear bind in cancel plunger linkage and/or adjust "W" contacts.
		(m) Open circuit at wiper contact and collector ring of credit switch assembly.	Clean and adjust contact and collector ring.
		(n) Open circuit at ground connection (bearing) of credit switch assembly.	Clean, lubricate bearing with graphite.
		(o) Credit switch assembly binds and stops with switches out of line with credit plungers.	Check mechanical adjustments of credit and cancel unit. Check for binds and worn parts.
	DUAL PRICING UNIT	(p) Timing relay continuously energized by "H" or "C" contact in pricing unit.	Adjust contacts.
		(q) Open circuit through credit wheel in pricing unit.	Adjust wiper contacts.
		(r) Credit wheel jammed at no credit position.	Locate cause and repair. See service manual for adjustments.
	Only one type of coin fails to establish credits - others work every time.	*See 2 (a), (b), (d), (e) and (k) Above. . . . . .*	
		(s) Open credit solenoid.	Replace solenoid.
		(t) Shorted condenser across credit solenoid.	Replace condenser. See schematic in service manual.
3. Free credits.	Continuous free credits. Select light stays on.	(a) Coin hangs on coin switch.	Adjust and check coin switch.
(Continued)	*(Continued)*	(b) Coin hangs at bottom of rejector, keeps coin switch closed.	Check coin exits of rejector with new coins. Remove burrs or obstruction causing coins to hang.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 3. Free credits.	*(Continued)* Continuous free credits. Select light stays on.	(c) Coin switch incorrectly adjusted, - contacts stay closed.	Adjust and check contact gaps and pressures.
	SINGLE PRICING UNIT	(d) Credit switch fails to reset.	Adjust reset bracket in credit and cancel unit so it resets all credit switches.
	DUAL PRICING UNIT	(e) Subtract solenoid pawl not engaging credit wheel.	Locate cause and repair. Refer to service manual for adjustment.
	Able to select by pressing number and letter buttons.	(f) Pricing tab in stepper in wrong position.	Set tab to proper position.
4. Too many credits for coins deposited.	SINGLE PRICING UNIT	(a) Reset pawl occasionally fails to engage next ratchet tooth of credit switch assembly.	Adjust cancel solenoid position and pawl arm stop for correct pawl stroke.
		(b) Credit switches jump to ON position when cancel coil operates, - credit switch pressure too light.	Replace U - shaped spring in switch or entire credit switch assembly.
		(c) Credit switch occasionally fails to reset.	Adjust reset bracket in credit and cancel unit so it resets all credit switches.
		(d) Coin switches improperly adjusted. Switches "bounce".	Clean and adjust coin switches. Refer to service manual.
	DUAL PRICING UNIT 25¢ coin occasionally gives seven or more credits.	(e) Incorrect Add 6 Drive adjustments. Credit Wheel driven too far.	Adjust as shown in service manual. Check especially, - Coil Position adjustment and Pawl Stop adjustment.
	10¢ coin occasionally gives three or more credits.	(f) Incorrect Add 2 Drive adjustments. Credit Wheel driven too far.	Adjust as shown in service manual. Check especially, - Coil Position adjustment and Pawl Stop adjustment.
(Continued)	*(Continued)*		

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued)	*(Continued)*		
4. Too many credits for coins deposited.	5¢ coin occasionally gives two or more credits	(g) Incorrect Add 1 Drive adjustments. Credit Wheel driven too far.	Adjust as shown in service manual. Check especially, - Coil Position adjustment and Pin Stop No. 2 adjustment.
DUAL PRICING UNIT	Add solenoids actually add proper number of credits but Subtract Solenoids occasionally fail to subtract enough credits for selections made.	(h) Incorrect adjustment of Subtract Solenoids or solenoid linkages, or, bind in pawl pivots.	Check Subtract Solenoid adjustments as shown in service manual and adjust as required. Check especially Drive Pin entry, Coil Position, and Pin Stop No. 2 adjustments. Check for binds in pawl pivots.
5. Not enough credits for coin deposited.	SINGLE PRICING UNIT	(a) "Machine gun" action, "S" contact blade vibrates when selection is made taking off additional credits.	Tighten screws holding switch stack. Adjust "S" contact roller blade for pressure against cam and adjust S, T and U contact gaps as shown in service manual.
		(b) Credit switch jumps to OFF position when cancel coil operates. Credit switch pressure too light.	Replace U - shaped spring in switch - or entire credit switch assembly.
DUAL PRICING UNIT	25¢ coin occasionally gives only five (or less) credits.	(c) Incorrect adjustment of Credit Wheel Stop, Detent, or Add 6 Drive.	Check adjustments of Credit Wheel Stop, Detent, and Add 6 Drive. Check especially Detent pressure Pawl Spring pressure, Drive Pin clearance, and Coil position. Make adjustments as required.
		(d) Incorrect adjustment of 25¢ coin switch.	Clean and adjust 25¢ coin switch.
	10¢ coin occasionally gives only one credit.	(e) Incorrect Add 2 Drive adjustment.	Adjust as shown in service manual.
		(f) Incorrect adjustment of 10¢ coin switch.	Clean and adjust 10¢ coin switch.
(Continued)	5¢ coin occasionally fails to establish credit. *(Continued)*	(g) Incorrect Add 1 Drive adjustment.	Adjust as shown in service manual.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 5. Not enough credits for coin deposited. DUAL PRICING UNIT	*(Continued)* 5¢ coin occasionally fails to establish credit.	(h) Incorrect adjustment of 5¢ coin switch.	Clean and adjust 5¢ coin switch.
	Add Solenoids actually add proper number of credits for coins deposited but Subtract Solenoids occasionally take off too many credits when selections are made.	(i) Incorrect adjustment of Subtract Solenoids or solenoid drives.	Check Subtract Solenoid adjustments and correct as required. Check especially Pin Stop No. 2 adjustments and Coil Position adjustments.
6. Occasionally fails to take off all credits. (See also (4h) above) DUAL PRICING UNIT	10¢ credit established then 10¢ selection is made. Occasionally fails to take off both credits, leaves 5¢ credit.	(a) Contacts F and G, in Dual Credit Unit, dirty or incorrectly adjusted.	Clean contacts and adjust.
		(b) Open circuit wiring associated with contacts F and G.	Check solder connections and wiring to contacts F and G.
	15¢ credit established then 15¢ selection is made. Occasionally fails to take off all three credits, - leaves 10¢ or 5¢ worth of credits.	(c) Contacts A and B, in Dual Credit Unit, dirty or incorrectly adjusted.	Clean contacts and adjust.
		(d) Open circuit wiring associated with contacts A and B.	Check solder connections and wiring to contacts A and B.
7. "Machine gun" action. Takes off all credits.	Takes off all credits when a letter and a number are held down at the same time.	(a) "Z" contacts in timing relay fail to make.	Clean and adjust "Z" contacts.
		(b) Defective wiring or solder connection in hold switch circuit.	Check complete hold switch circuit. See schematic in service manual.
8. Credit light does not light. *(Continued)*	Credit system works properly. *(Continued)*	(a) Credit bulb burned out.	Replace bulb.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 8. Credit light does not light.	*(Continued)* Credit system works properly.	(b) Pricing unit tab loose or in wrong position.	Replace tab properly.
		(c) Pricing unit credit light circuit open.	Check credit lamp circuit. See schematic in service manual.
9. Four credits for 50¢ all other coins work OK.	SPU 1-H	(a) Dirty or incorrectly adjusted switches in SPU 1-H.	Clean and adjust switches as shown in service manual.
	HDU and SPU-1	(b) Z contact of HDU-1 dirty or incorrectly adjusted.	Clean and adjust contacts as shown in service manual.
10. 50¢ fails to give any credits, other coins work OK.		(a) 50¢ coin switch dirty or incorrectly adjusted.	Clean and adjust 50¢ coin switch.
	HDU-1	(b) Dirty or incorrectly adjusted switches in HDU-1.	Clean and adjust all switches in HDU-1 as shown in service manual.
11. Free credits HDU-1 installed in phonograph (Also see 3 above).	HDU-1 Motor runs continuously.	(a) "U", "V", or "Z" contacts in HDU-1 fail to open.	Adjust contacts as shown in service manual.
12. Letter and number buttons stick in latched position.	Credit lamp is on.	(a) Stepper stuck in advanced position.	Free stepper. Lubricate and adjust as shown in service manual.
		(b) Stepper pricing unit tab loose or in wrong position.	Replace tab properly.
(Continued)	*(Continued)*	(c) Cancel start circuit open through stepper.	Clean and adjust contacts. See schematic in service manual.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 12. Letter and number buttons stick in latched position.	*(Continued)* Credit lamp is on.	(d) Cancel start circuit open in electric selector.	Check start circuit. See schematic in service manual.
	Credit lamp is off.	(a) Electric selector latch bar solenoid is residual.	Replace latch bar solenoid.
		(b) Electric selector latch bar mechanism binding.	Locate cause and repair.
13. Credit light on. Buttons fail to latch.	Selections can be made if letter and number buttons are pressed at the same time.	(a) Electric selector pricing tab loose or in wrong position.	Replace tab properly.
		(b) Electric selector latch bar mechanism binding.	Locate cause and repair.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. All selections "dead".	Carriage scans twice and stops without playing selected records.	Models 101, 161, 201 See Troubleshooting Procedure Pages 165-168 Models 22 and 222 See Troubleshooting Procedure Pages 169-172	
2. Plays all "singles" but occasionally (or always) fails to play "EP's"; (or, plays all "EP's" but fails on "singles").	Carriage plays all "singles" OK but when "EP" selection is made carriage occasionally (or always) scans twice and stops without stopping to pick up EP selection.	(a) Write-in switch in pricing unit dirty or incorrectly adjusted.	Clean Write-in switches in pricing unit and adjust contact pressure as shown in service manual.
3. One selection fails to play; other 199 selections play OK.	Carriage scans twice and stops without stopping to pick up this selection.	(a) Dirty contact rivet on Tormat Memory Unit.	Use clean cloth and Carbon Tet. to clean contact rivets. DO NOT USE ABRASIVES.
	Stops OK for all other selections and plays them.	(b) Incorrect timing of Detent Switch, or, incorrect alignment of Tormat Memory Unit and Contact Plunger Block. (Sparking occurs on contact block plungers when carriage scans.)	Clean Detent Switch and adjust as shown in service manual. Check Tormat Memory Unit and Contact Plunger Block adjustments as shown in service manual.
		(c) Open read-out loop in Tormat Memory Unit. (Open circuit from contact rivet to contact bar.)	Check with ohmmeter from contact rivet to contact bar. If read-out loop is open, replace Tormat Memory Unit.
4. Plays only left sides of records or, plays only right sides of records.	Carriage does not stop to pick up any selected right sides of records (or vice versa); scans twice and stops. Plays all selected left sides OK.	(a) RS contacts (or LS) on Reversing switch dirty or incorrectly adjusted.	Clean Contacts and adjust.
		(b) Open circuit from RS contacts (or LS) of Reversing Switch to R (or L) contact on Contact Plunger Block. Check for broken pigtail wire on contact block.	Trace circuit and correct as required.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
5. Carriage "occasionally" scans twice and stops without playing any selected records.		(a) *Intermittent failure of* write-in, read-out, or trip.	If sparking occurs on contact block plungers see 3b above. Repeat each test of 1 above as many *times as necessary to locate trouble.* (Especially G, H, and J tests)
6. Carriage plays extra selection in letter or number series when a selection is made. EXAMPLE: (Several A selections play when any A selection is made)	Record rejects when selection is made.	(a) "N" or "R" contact of timing relay No. 2 not making good contact in rest position.	Clean and adjust contacts.
		(b) Electric selector or memory unit shorted to ground.	Locate short with ohmmeter and repair. See write in schematic in service manual. (Tests G, H, J, K, and L of 1 above may be used to locate trouble)
		(c) Stepper Plug Not Properly Seated In TSU (Models 22 and 222)	Seat Plug
7. Carriage plays all selections except one number series or one letter series.	Carriage scans twice and stops when defective series is selected.	(a) Electric selector switch or plug connection associated with defective letter or number is open.	Check circuit with ohmmeter and repair. See schematic in service manual.
8. Carriage plays every selection regardless which selection is made.		(a) Memory unit output plug is not properly seated in the pulse amplifier.	Seat plug so outer shell is making good contact.

SEEBURG

TORMAT SELECTION SYSTEM TROUBLESHOOTING PROCEDURE
for
SELECT-O-MATIC MODELS 101, 161 and 201

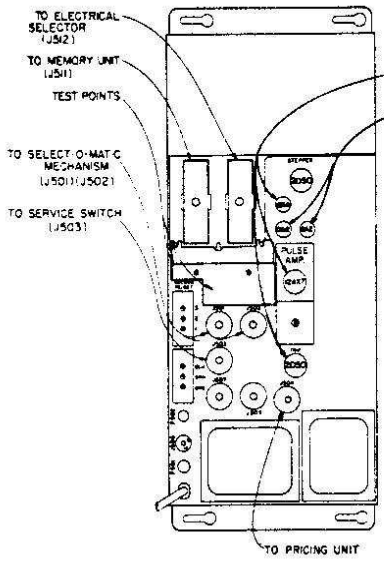
(NOTE) This procedure must be followed carefully without bypassing steps. Each test hinges on having conducted a previous test. This permits the procedure results to dictate the trouble remedy).

TROUBLE: Mechanism scans when selections are made but does not trip on ANY selected record.

TOOLS REQUIRED: 2 jumper wires, a Seeburg Test Lamp and a flashlight battery.

PROCEDURE: Open the back door and inspect the following:

– A TEST –



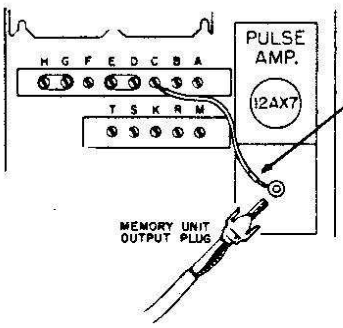
1. Check that all plugs are properly seated.
2. Check that all tubes are lighted.
3. Check for purple glow inside both OA2 tubes. *(no glow can be caused by a weak 6X4 tube)*

IF A LOOSE PLUG OR BAD TUBE IS FOUND AND CORRECTED, CHECK NORMAL OPERATION OF THE PHONOGRAPH.

IF NO TROUBLE IS FOUND, ESTABLISH SEVERAL FREE CREDITS ON THE PHONOGRAPH AND PERFORM B TEST. *(Be sure the service switch is in the play position for all tests)*

(NOTE) After any trouble is located and repaired, remove jumpers, connect links to normal, replace all plugs and check the phonograph for normal operation)

– B TEST –

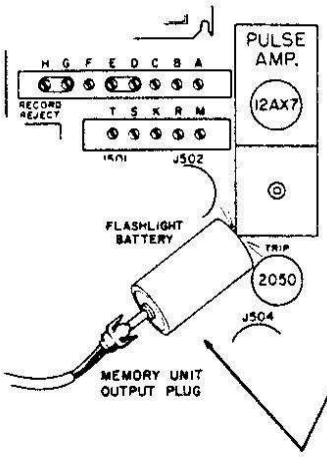


1. Remove cover from the test terminals.
2. Remove the memory unit output plug from the pulse amplifier.
3. Connect one end of a jumper wire to "C", leaving other end free.
4. Make any selection and while mechanism is scanning, momentarily connect the free end of the jumper wire to the input of the pulse amplifier. *(Make connection down inside socket)* Mechanism should immediately trip.

IF MECHANISM TRIPS Reject record, allow mechanism to scan to stop. PERFORM C TEST..

IF MECHANISM DOES NOT TRIP Use M TEST to pinpoint trouble.

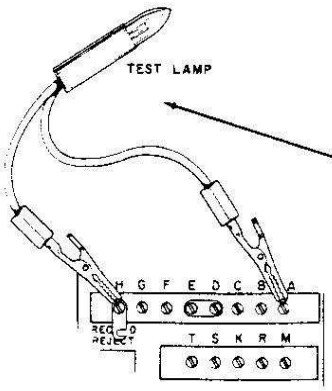
– C TEST –



1. Remove jumper wire from "C".
2. Momentarily connect the tip of the memory unit output plug to the tip of a good flashlight battery with the case of the battery held against the corner of the pulse amplifier. *(This is the same as making all selections on the tormat)*
3. Replace memory unit output plug into pulse amplifier.
4. Make any selection. When selection is made, mechanism should immediately trip and play.
5. Reject record and note if next record plays. *(If desired, all records could be played)*

IF MECHANISM TRIPS ON AT LEAST TWO RECORDS Pull out memory unit output plug, reject record, allow mechanism to scan to stop and replace plug. Use G TEST to pinpoint trouble.

IF MECHANISM SCANS OR PLAYS ONLY ONE RECORD Use D TEST to pinpoint trouble.



– D TEST (READ OUT) –

(Be sure service switch is in play position for all tests)

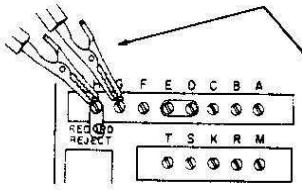
1. Remove mechanism access door on rear of cabinet.
2. Open link between "G & H". *(Turn off power while moving link)*
3. Connect the Seeburg Test Lamp between "H" and "A". Lamp should glow brightly. *(Be sure power is on)*

IF LAMP GLOWS BRIGHTLY PERFORM E TEST

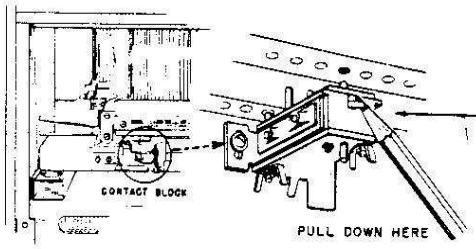
IF LAMP IS DIM OR DOES NOT LIGHT

1. Pull out service switch plug from selection receiver. If lamp now glows brightly, REPLACE OR REPAIR SERVICE SWITCH OR CABLE.

   If lamp does not light after service switch plug is pulled, REPLACE SELECTION RECEIVER. *(Read out circuit is defective)*



– E TEST (READ OUT) –



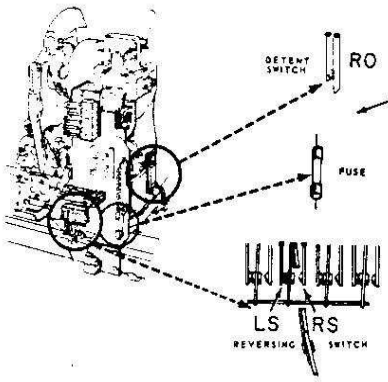
1. Connect the test lamp between "G" and "H".
2. Make any selection. As mechanism scans, lamp should flash at each record space.
3. As mechanism scans back away from A1, pull down on outside plunger of contact block. Lamp should go out while plunger is held down.

IF LAMP CONTINUES TO FLASH WHEN PLUNGER IS PULLED DOWN Check for short to ground in carriage RO circuit.

IF LAMP REMAINS STEADILY ON AS MECHANISM SCANS Check for short to ground from RO contact to plug.

IF LAMP IS DIM OR NOT LIGHTED AS MECHANISM SCANS Check for open fuse, sticky plungers, broken wires in carriage RO circuit.

IF LAMP FLASHES AT EACH RECORD SPACE AND GOES OUT WHILE PLUNGER IS HELD DOWN PERFORM F TEST.

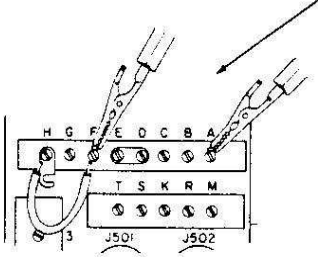


– F TEST (READ OUT) –

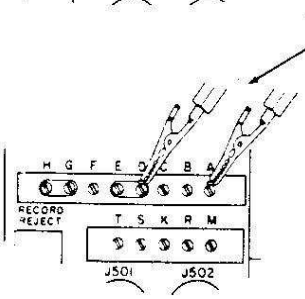
1. With "G" and "H" open, connect test lamp between "F" and "A".
2. Momentarily connect a jumper wire between "H" and "F". Lamp should flash when connection is made.

IF LAMP FLASHES — REPLACE TORMAT MEMORY UNIT (Defective output)

IF LAMP DOES NOT FLASH — REPLACE SELECTION RECEIVER (Defective read out electronics)



– G TEST (WRITE IN) –

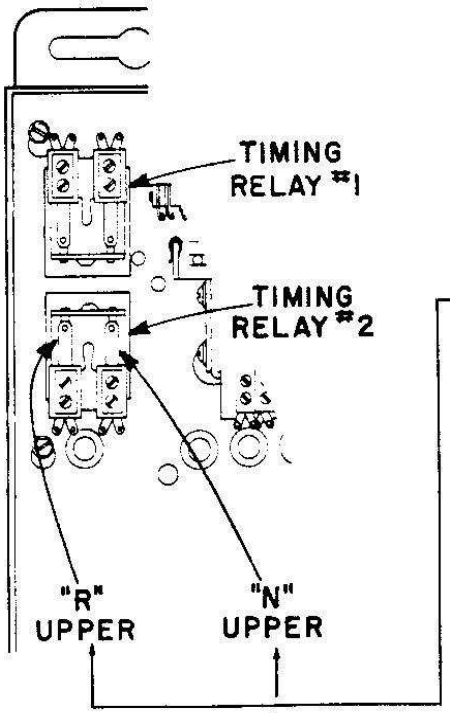


1. Connect a Seeburg Test Lamp between "D" and "A". Lamp should not glow. If lamp glows, PERFORM J TEST.
2. While watching lamp, make any selection. Lamp should not flash.

IF LAMP FLASHES — PERFORM H TEST

IF LAMP DOES NOT FLASH — PERFORM J TEST

– H TEST (WRITE IN) –



1. Connect the test lamp between "K" and "A".
2. While watching lamp, make any selection.
   IF LAMP FLASHES — PERFORM TEST #1A BELOW
   IF LAMP DOES NOT FLASH — PERFORM TEST #1C BELOW

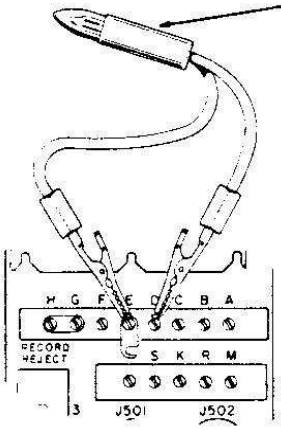
TEST #1A Connect test lamp between "R" and "A".
Make any selection while watching lamp.
IF LAMP FLASHES — PERFORM TEST #1B BELOW
IF LAMP DOES NOT FLASH — CLEAN "R" CONTACT-TIMING RELAY #2

TEST #1B Connect test lamp between "M" and "A".
Make any selection while watching lamp.
IF LAMP FLASHES REPLACE TORMAT MEMORY UNIT (Open ground)
IF LAMP DOES NOT FLASH REPLACE ELECTRIC SELECTOR (Open circuit pin #31 or defective starting switch)

TEST #1C Connect test lamp between "S" and "A".
Make any selection while watching lamp.
IF LAMP FLASHES — REPLACE TORMAT MEMORY UNIT (Open circuit pin #31)
IF LAMP DOES NOT FLASH — PERFORM TEST #1D BELOW

TEST #1D Connect test lamp between "T" and "A".
Make any selection while watching lamp.
IF LAMP FLASHES — REPLACE ELECTRIC SELECTOR (Open circuit pin #32 or defective starting switch)
IF LAMP DOES NOT FLASH CLEAN "N CONTACT – TIMING RELAY #2.

– J TEST (WRITE IN) –



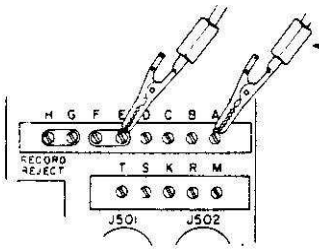
1. Open link between "D" and "E".
2. Connect test lamp between "D" and "E". Lamp should show a dim glow.
3. Pull out pricing unit plug from selection receiver while watching lamp. Lamp brilliance should not change. (Replace pricing unit plug)
   IF LAMP DIMS WHEN PRICING UNIT PLUG IS PULLED
   REPLACE PRICING UNIT (write in contacts shorted)

   IF LAMP REMAINS BRIGHT AFTER PULLING PRICING UNIT – PLUG REPLACE SELECTION RECEIVER (Either shorted diode or shorted "P" contact – timing relay #2)

   IF LAMP DOES NOT LIGHT REPLACE SELECTION RECEIVER (Defective write in electronics)

   IF LAMP GLOWS DIMLY AS IT SHOULD PERFORM K TEST.

– K TEST (WRITE IN) –



1. Connect link between "E" and "F".
2. Connect test lamp between "E" and "A".
3. While watching lamp, make any selection. Lamp should flash.

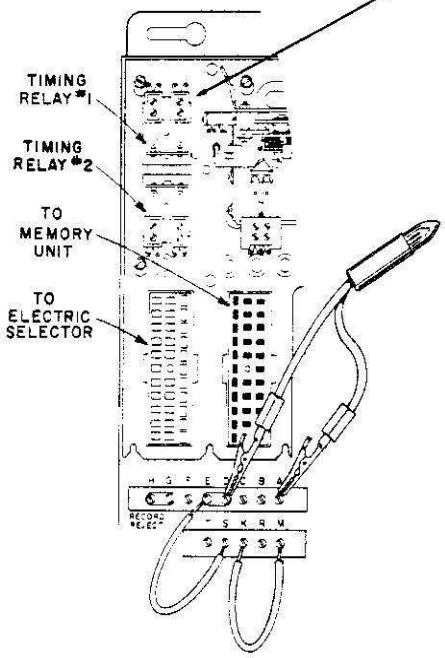
IF LAMP FLASHES PERFORM L TEST

IF LAMP DOES NOT FLASH

1. Press and release timing relay #1 while watching lamp.

IF LAMP FLASHES REPLACE PRICING UNIT (open write in contacts)

IF LAMP DOES NOT FLASH REPLACE SELECTION RECEIVER (Defective write in circuit)



– L TEST (WRITE IN) –

1. Remove electric selector 33 pin plug from selection receiver.
2. Connect link to "D" and "E". (Tighten screws)
3. Connect a jumper wire from "D" to "S".
4. Connect another jumper wire from "K" to "M".
5. Press and release timing relay #1. Mechanism should scan to selection V0 and play it. *****

IF SELECTION V0 PLAYS***** REPLACE ELECTRIC SELECTOR (Shorted to ground)

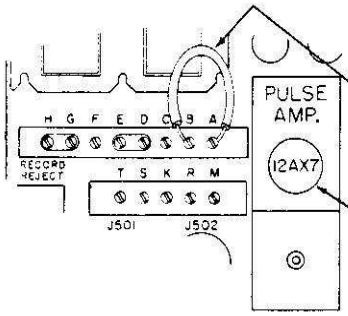
IF NO SELECTION PLAYS

1. Remove memory unit 33 pin plug from selection receiver.
2. With both jumper wires connected as above, connect test lamp between "E" and "A".
3. Press and release timing relay #1.

IF LAMP FLASHES REPLACE MEMORY UNIT (Shorted to ground)

IF LAMP DOES NOT FLASH REPLACE SELECTION RECEIVER (Write in wiring shorted)

*****MODEL 161 SELECTION V8 – MODEL 101 SELECTION K10



– M TEST (TRIP) –

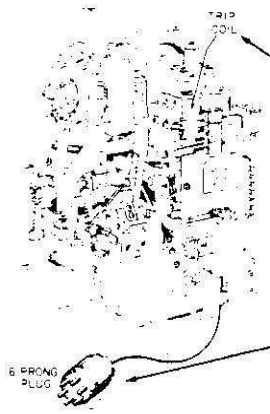
1. Remove jumper wire from "C" and connect to "A".
2. Make any selection. While mechanism is scanning, momentarily connect free end of jumper wire to "B". Mechanism should trip.

IF MECHANISM TRIPS

1. Install new 12AX7 tube in pulse amplifier.
2. Replace memory unit output plug into pulse amplifier and check normal operation of the phonograph.
3. If phonograph does not select, REPLACE SELECTION RECEIVER. (Pulse amplifier or circuit defective)

IF MECHANISM DOES NOT TRIP

1. Install new 2050 tube in selection receiver.
2. Repeat trip test. If mechanism does not now trip, check mechanism trip coil and circuit.



SEEBURG

TORMAT SELECTION SYSTEM TROUBLESHOOTING PROCEDURE
for
SELECT-O-MATIC MODELS 22 and 222

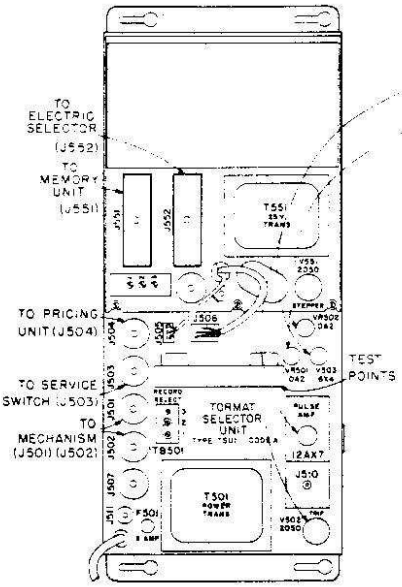
NOTE) This procedure must be followed carefully without bypassing steps. Each test hinges on having conducted a previous test. This permits the procedure results to dictate the trouble remedy).

TROUBLE: Mechanism scans when selections are made but does not trip on ANY selected record.

TOOLS REQUIRED: 2 jumper wires, a Seeburg Test Lamp and a flashlight battery.

PROCEDURE: Open the back door and inspect the following:

– A TEST –



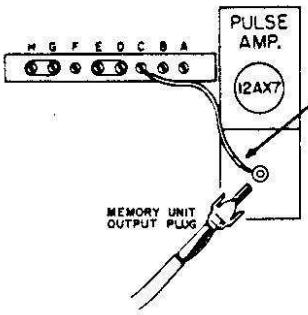
1. Check that all plugs are properly seated.
2. Check that all tubes are lighted.
3. Check for purple glow inside both OA2 tubes. *(no glow can be caused by a weak 6X4 tube)*

   IF A LOOSE PLUG OR BAD TUBE IS FOUND AND CORRECTED, CHECK NORMAL OPERATION OF THE PHONOGRAPH.

   IF NO TROUBLE IS FOUND, ESTABLISH SEVERAL FREE CREDITS ON THE PHONOGRAPH AND PERFORM B TEST. *(Be sure the service switch is in the play position for all tests)*

(NOTE) After any trouble is located and repaired, remove jumpers, connect links to normal, replace all plugs and check the phonograph for normal operation)

– B TEST –

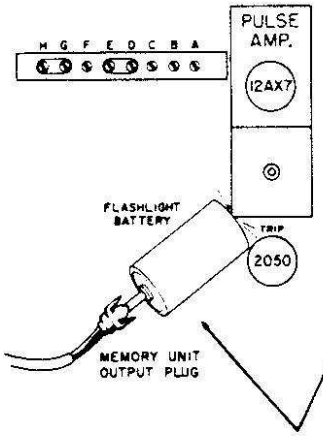


1. Remove cover from the test terminals.
2. Remove the memory unit output plug from the pulse amplifier.
3. Connect one end of a jumper wire to "C", leaving other end free.
4. Make any selection and while mechanism is scanning, momentarily connect the free end of the jumper wire to the input of the pulse amplifier. *(Make connection down inside socket)* Mechanism should immediately trip.

   IF MECHANISM TRIPS Reject record, allow mechanism to scan to stop. PERFORM C TEST..

   IF MECHANISM DOES NOT TRIP Use M TEST to pinpoint trouble.

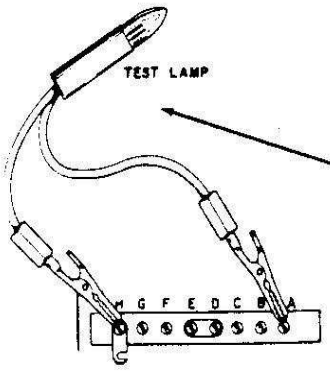
– C TEST –



1. Remove jumper wire from "C".
2. Momentarily connect the tip of the memory unit output plug to the tip of a good flashlight battery with the case of the battery held against the corner of the pulse amplifier. *(This is the same as making all selections on the tormat)*
3. Replace memory unit output plug into pulse amplifier.
4. Make any selection. When selection is made, mechanism should immediately trip and play.
5. Reject record and note if next record plays. *(If desired, all records could be played)*

   IF MECHANISM TRIPS ON AT LEAST TWO RECORDS Pull out memory unit output plug, reject record, allow mechanism to scan to stop and replace plug. Use G TEST to pinpoint trouble.

   IF MECHANISM SCANS OR PLAYS ONLY ONE RECORD Use D TEST to pinpoint trouble.



– D TEST (READ OUT) –

(Be sure service switch is in play position for all tests)

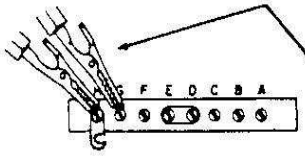
1. Remove mechanism access door on rear of cabinet.
2. Open link between "G & H". *(Turn off power while moving link)*
3. Connect the Seeburg Test Lamp between "H" and "A". Lamp should glow brightly. *(Be sure power is on)*

IF LAMP GLOWS BRIGHTLY PERFORM E TEST

IF LAMP IS DIM OR DOES NOT LIGHT

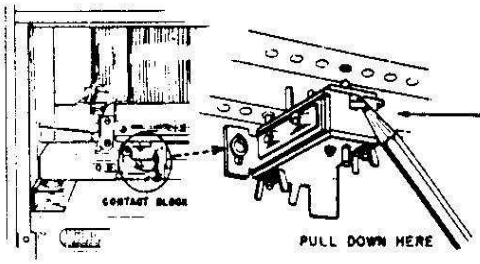
1. Pull out service switch plug from selection unit. If lamp now glows brightly, REPLACE OR REPAIR SERVICE SWITCH OR CABLE.

   If lamp does not light after service switch plug is pulled, REPLACE SELECTION UNIT. *(Read out circuit is defective)*



– E TEST (READ OUT) –

1. Connect the test lamp between "G" and "H".
2. Make any selection. As mechanism scans, lamp should flash at each record space.
3. As mechanism scans back away from A1, pull down on outside plunger of contact block. Lamp should go out while plunger is held down.

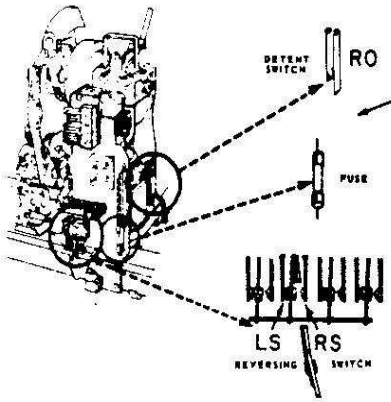


IF LAMP CONTINUES TO FLASH WHEN PLUNGER IS PULLED DOWN Check for short to ground in carriage RO circuit.

IF LAMP REMAINS STEADILY ON AS MECHANISM SCANS Check for short to ground from RO contact to plug.

IF LAMP IS DIM OR NOT LIGHTED AS MECHANISM SCANS Check for open fuse, sticky plungers, broken wires in carriage RO circuit.

IF LAMP FLASHES AT EACH RECORD SPACE AND GOES OUT WHILE PLUNGER IS HELD DOWN PERFORM F TEST.

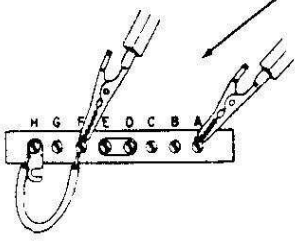


– F TEST (READ OUT) –

1. With "G" and "H" open, connect test lamp between "F" and "A".
2. Momentarily connect a jumper wire between "H" and "F". Lamp should flash when connection is made.

IF LAMP FLASHES — REPLACE TORMAT MEMORY UNIT (Defective output)

IF LAMP DOES NOT FLASH — REPLACE SELECTION UNIT. (Defective read out electronics)

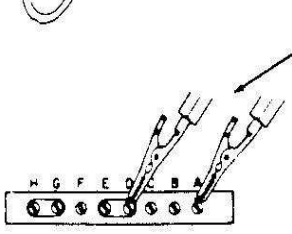


– G TEST (WRITE IN) –

1. Connect a Seeburg Test Lamp between "D" and "A". Lamp should not glow. If lamp glows, PERFORM J TEST.
2. While watching lamp, make any selection. Lamp should not flash.

IF LAMP FLASHES — PERFORM H TEST

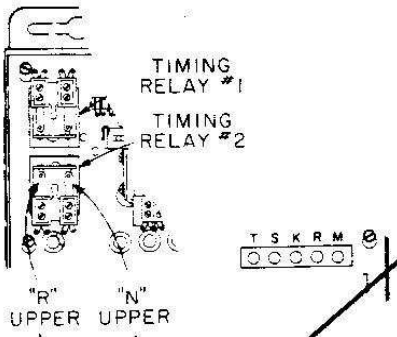
IF LAMP DOES NOT FLASH — PERFORM J TEST



– H TEST (WRITE IN) –

1. Connect the test lamp between "K" and "A".
2. While watching lamp, make any selection.

IF LAMP FLASHES — PERFORM TEST #1A BELOW
IF LAMP DOES NOT FLASH — PERFORM TEST #1C BELOW

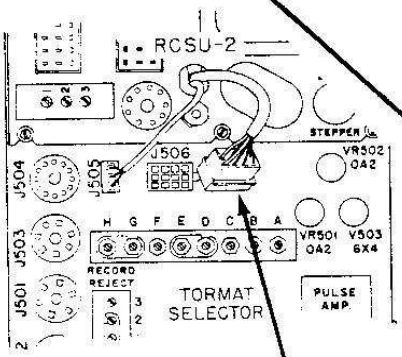


TEST #1A Connect test lamp between "R" and "A". Make any selection while watching lamp.
IF LAMP FLASHES — PERFORM TEST #1B BELOW
IF LAMP DOES NOT FLASH — CLEAN "R" CONTACT-TIMING RELAY #2

TEST #1B Connect test lamp between "M" and "A". Make any selection while watching lamp.
IF LAMP FLASHES REPLACE TORMAT MEMORY UNIT (Open ground)
IF LAMP DOES NOT FLASH REPLACE ELECTRIC SELECTOR (Open circuit pin #31 or defective starting switch)

TEST #1C Connect test lamp between "S" and "A". Make any selection while watching lamp.
IF LAMP FLASHES — REPLACE TORMAT MEMORY UNIT (Open circuit pin #31)
IF LAMP DOES NOT FLASH — PERFORM TEST #1D BELOW

TEST #1D Connect test lamp between "T" and "A". Make any selection while watching lamp.
IF LAMP FLASHES — REPLACE ELECTRIC SELECTOR (Open circuit pin #32 or defective starting switch)
IF LAMP DOES NOT FLASH CLEAN "N CONTACT – TIMING RELAY #2.



– J TEST (WRITE IN) –

1. Open link between "D" and "E".
2. Connect test lamp between "D" and "E". Lamp should show a dim glow.
3. Pull out pricing unit plug from selection unit while watching lamp. Lamp brilliance should not change. *(Replace pricing unit plug)*

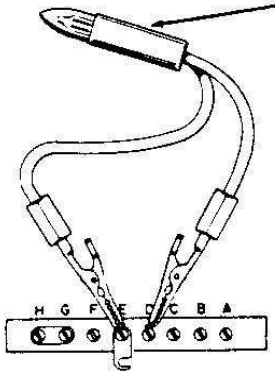
IF LAMP DIMS WHEN PRICING UNIT PLUG IS PULLED REPLACE PRICING UNIT (write in contacts shorted)

IF LAMP REMAINS BRIGHT AFTER PULLING PRICING UNIT PLUG

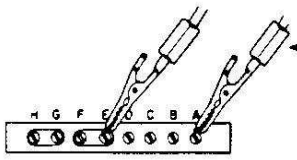
1. Pull out stepper plug from selection unit. If lamp dims, check for shorted P contact.
2. If lamp does not dim when stepper plug is pulled, replace selection unit. (Shorted diode)

IF LAMP DOES NOT LIGHT REPLACE SELECTION UNIT (Defective write-in electronics)

IF LAMP GLOWS DIMLY AS IT SHOULD PERFORM K TEST.



– K TEST (WRITE IN) –



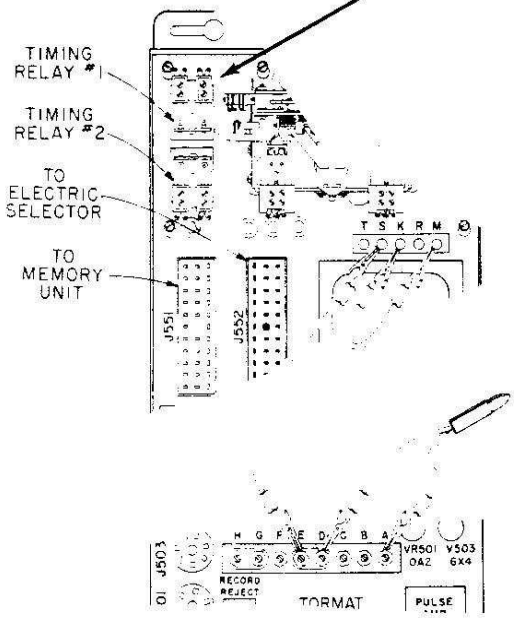
1. Connect link between "E" and "F".
2. Connect test lamp between "E" and "A".
3. While watching lamp, make any selection. Lamp should flash.

IF LAMP FLASHES PERFORM L TEST
IF LAMP DOES NOT FLASH

1. Press and release timing relay #1 while watching lamp.

IF LAMP FLASHES REPLACE PRICING UNIT (open write in contacts)

IF LAMP DOES NOT FLASH REPLACE SELECTION UNIT (Defective write in circuit)



– L TEST (WRITE IN) –

1. Remove electric selector 33 pin plug from RCSU2.
2. Connect link to "D" and "E". (Tighten screws)
3. Connect a jumper wire from "D" to "S".
4. Connect another jumper wire from "K" to "M".
5. Press and release timing relay #1. Mechanism should scan to selection V 8 and play it. *****

IF SELECTION V8 PLAYS***** REPLACE ELECTRIC SELECTOR (Shorted to ground)

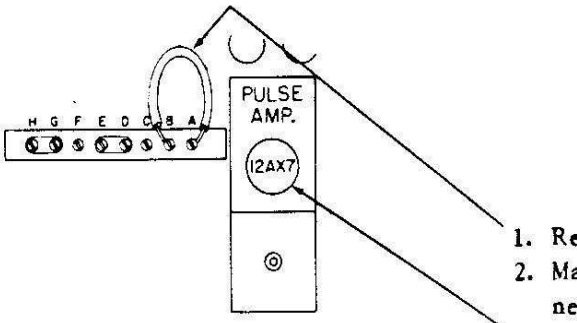
IF NO SELECTION PLAYS

1. Remove memory unit 33 pin plug from selection receiver.
2. With both jumper wires connected as above, connect test lamp between "E" and "A".
3. Press and release timing relay #1.

IF LAMP FLASHES REPLACE MEMORY UNIT (Shorted to ground)

IF LAMP DOES NOT FLASH REPLACE SELECTION UNIT (Write in wiring shorted)

***** MODEL 22 SELECTION K10



– M TEST (TRIP) –

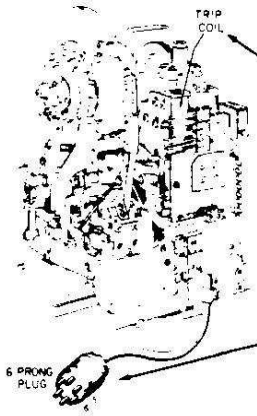
1. Remove jumper wire from "C" and connect to "A".
2. Make any selection. While mechanism is scanning, momentarily connect free end of jumper wire to "B". Mechanism should trip.

IF MECHANISM TRIPS

1. Install new 12AX7 tube in pulse amplifier.
2. Replace memory unit output plug into pulse amplifier and check normal operation of the phonograph.
3. If phonograph does not select, REPLACE SELECTION UNIT (Pulse amplifier or circuit defective)

IF MECHANISM DOES NOT TRIP

1. Install new 2050 tube in selection unit.
2. Repeat trip test. If mechanism does not now trip, check mechanism trip coil and circuit.



SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. Motor fails to run.	Play Control Switch is closed but motor does not run.	(a) Play Control Switch contacts not making.	Clean and adjust contacts.
		(b) Reversing Switch contacts not making.	Clean and adjust G, H, J, and K contacts.
		(c) Faulty Reversing Switch.	Repair or replace. Adjust switch and brackets as shown in service manual.
		(d) "O" contacts not making. (Motor runs if started by hand.)	Clean and adjust "O" contacts.
		(e) Defective motor condenser.	Replace condenser.
		(f) Broken motor coupling or loose set screws. (Motor runs but does not drive mechanism.)	Replace coupling or tighten screws as required.
		(g) Bind in motor.	Remove bind and lubricate bearings or replace motor as required.
		(h) Bind in mechanism. Check by carefully turning motor shaft. DO NOT FORCE AND DO NOT TURN FLYWHEEL BY HAND.	Check for foreign matter that may have fallen into mechanism. Check for normal clearances and lubrication of gears, cams, shafts, etc.
		(i) Open motor winding.	Repair or replace motor.
		(j) Open wiring or solder connection in motor circuit.	Check motor circuit and repair. See schematic in service manual.
	Motor fails to run because Play Control does not operate when selections are made.	(k) Service Switch lever in OFF position.	Move to PLAY position.
		(l) Play Control Add Solenoid fails to operate due to failure of D or I contacts in pricing unit.	Clean and adjust D or I contacts in pricing unit.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued)	*(Continued)*		
1. Motor fails to run.	Motor fails to run because Play Control does not operate when selections are made.	(m) Play Control Add Solenoid operates OK but contacts fail to close.	Clean contacts or make correct adjustments.
2. Carriage occasionally (or always) scans *only once* instead of twice when selection is made.	Scans once and stops. Occasionally fails to play all selections made then plays "left over" selections when another selection is made.	(a) Sticking Play Control pawls.	Check pawls for possible binds.
		(b) Scan subtract switch on carriage making poor contact.	Clean and adjust contacts.
3. Carriage scans continuously.	Plays selections OK but never stops scanning.	(a) Play Control contacts staying closed due to incorrect adjustment, or, ratchet sticking.	Adjust contacts. Clean and lubricate ratchet.
		(b) Scan subtract switch on carriage not closing.	Clean and adjust contacts.
		(c) Open circuit from subtract switch to subtract solenoid.	Trace circuit and repair. See schematics in service manual.
4. Fuse blows occasionally during reversal of motor.	Phonograph inoperative.	(a) Reversing switch contacts incorrectly adjusted.	Clean and adjust G, H, J, and K contacts for proper "break before make".
5. "Motor runs slow."	Motor sluggish; slow while scanning and while playing resulting in "poor tone."	(a) Lack of lubrication.	Lubricate motor bearings and mechanism.
		(b) Bind in motor bearings.	Clean and lubricate or replace motor.
		(c) Bind in mechanism.	Lubricate bearings, gears, and clutch assembly. Check end play on flywheel shaft, drive worm, and on clutch shaft.
		(d) Partially shorted motor winding.	Replace motor.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 5. "Motor runs slow."	"Motor slow" while playing but normal while scanning.	(e) "O" contacts in Cam Switch closed in play position.	Adjust contacts.
		(f) Poor clamping of record due to burr or dirt in flywheel hole. (Motor actually runs at normal speed but record turns slowly.)	Remove burr or dirt from flywheel hole to allow normal clamping of records.
6. Motor sluggish or late in reversing.	Motor speed appears normal but is sluggish in reversing. Carriage hits rubber bumpers at ends of base.	(a) "O" contacts in cam switch not closing in scan position.	Clean and adjust contacts.
		(b) Reversing switch operates too late or rubber bumpers incorrectly adjusted.	Adjust Rubber Bumpers and Reversing Switch Brackets.
		(c) Motor starting condenser defective.	Replace condenser.
7. Noisy mechanism.	Whirring noises from general area of motor.	(a) Motor coupling set screws loose and hitting carriage casting.	Tighten set screws.
		(b) Oil cups of motor touching carriage casting.	Turn motor so cups don't touch.
	Whirring or chattering noises while carriage scans.	(c) Excessive end play in drive worm, flywheel shaft, or clutch shaft.	Adjust thrust screws for .002" end play. Avoid binding.
		(d) Selection playing indicator chattering.	Check for loose parts. Clean guides.
	Ticking noises while scanning or playing.	(e) Clutch 1, 2, 3, or 4 adjustments incorrect.	Adjust as shown in service manual.
		(f) Bind in cam shaft bearings prevents clutch from dropping freely into play position.	Clean and lubricate bearings.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 7. Noisy mechanism.	Scraping noise. Records rub magazine or transfer arm while playing.	(g) Badly warped record.	Replace record.
		(h) Magazine misaligned.	Adjust Magazine and Transfer Arm (If Magazine or Transfer Arm is moved, be sure to adjust Memory Unit and Contact Plunger Block.)
		(i) Transfer Arm raises too high.	Adjust Transfer Arm.
8. Carriage does not stop to pick up selected records.	Scans twice and stops.	See Trouble Shooting Chart, – Selection System.	
9. Carriage stops and picks up selected records but does not play them.	Puts records back without playing them. Scans twice and stops.	(a) Clutch No. 4 adjustment set too far in.	Adjust clutch No. 4 as shown in service manual.
10. Plays same record repeatedly without scanning.	Puts record back into magazine then immediately brings it up and plays it again.	(a) Badly warped record fails to return fully into magazine space.	Replace with good record.
		(b) Bind or incorrect adjustment in Safety Lever.	Clean and lubricate Safety Lever.
11. Record on flywheel fails to trip off.	Trip Solenoid fails to trip at end of record.	(a) Lint accumulation around tip of needle.	Remove lint and check for proper Pickup Lifting and Brush Position adjustments.
		(b) Needle worn, chipped, or loose in mounting.	Replace needle.
		(c) Bad record; cut-off groove defective.	Replace with good record.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 11. Record on flywheel fails to trip off.	*(Continued)* Trip Solenoid fails to trip at end of record.	(d) Trip switch pressure "too heavy".	Adjust trip switch.
		(e) Trip switch "cut-off" adjustment incorrect.	Adjust trip switch. (Note: – If actuator is moved be sure to adjust Reset Plate.)
		(f) Nylon trip lever binding.	Clean nylon pivots and align supporting lug to eliminate bind.
		(g) Faulty Trip Switch.	Repair or replace switch.
		(h) Pickup cradle pivots binding.	Adjust pivot to eliminate binds.
		(i) Pickup out of balance.	Adjust pickup balance.
		(j) Pickup needle pressure too light.	Adjust needle pressure.
		(k) "V" contacts not making.	Clean and adjust "V" contacts.
		(l) Erratic failure of Trip Tube.	Replace faulty Trip tube in Tormat Selection Receiver.
		(m) Erratic open in Trip Solenoid or in trip solenoid circuit.	Check trip solenoid, mechanism cable, and "trip-off" circuit and repair as required. See schematics in service manual.
	Trip solenoid energized but mechanism fails to unclamp or return record to magazine.	(n) Bind in clutch.	Clean and lubricate clutch (use Seeburg Special Purpose Oil) or remove bind as required.
		(o) Bind in trip mechanism or dash pot.	Locate and eliminate bind.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
12. Flywheel turns but no action. Motor runs continuously.	Carriage stops at selected record but does not bring it up. "Sits and Spins".	(a) Carriage cable tangled or "hung up" on obstruction.	Straighten cable or remove obstruction as required.
		(b) Selection Playing Indicator binding.	Clean guides; remove bind as required.
		(c) Guide Rollers bind on gear rack.	Check and adjust.
		(d) Bind in Clutch, Trip Mechanism, or carriage rollers.	Eliminate bind and lubricate.
		(e) Clutch 1 adjustment screw down too far.	Adjust Clutch 1.
	Carriage fails to scan after returning record to magazine. Clutch does not drop into scan position.	(f) Safety plunger fails to move out of way of clutch link because of bind.	Clean and lubricate plunger. Check for bind (Use Seeburg Special Purpose Oil.)
		(g) Bind in Clutch or Trip Mechanism.	Eliminate bind and lubricate.
13. Carriage "skips" one position past correct selection.	Plays wrong selection.	(a) Bind in clutch.	Clean and lubricate clutch; use Seeburg Special Purpose Oil.
		(b) Bind in Trip Mechanism or sluggish dash pot.	Remove bind and lubricate Trip Mechanism or replace dash pot as required.
		(c) Clutch 1 adjustment down too far or Clutch 2 out too far.	Check and adjust Clutch 1 and 2.
14. Record incorrectly clamped against flywheel. Centering pin failed to enter record hole.	Record fails to play and fails to trip off.	(a) Transfer Arm fails to bring record up fully to clamping position due to bent magazine separator, or, due to misalignment of Magazine and Transfer Arm.	Check Transfer Arm action in all record spaces to insure proper transfer of all records. Remove binds or make adjustments as required.
		(b) Transfer Arm 2 adjustment incorrect.	Adjust Transfer Arm 2.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
15. Pickup fails to land properly at beginning of record.	Needle falls off edge of record or lands in too far.	(a) Undersized or off-standard record.	Replace with good record.
		(b) Needle landing adjustment incorrect.	Adjust as shown in service manual.
	Needle lands at random positions anywhere from beginning to end of record.	(c) Pickup lock adjustment incorrect fails to lock pickup cradle in scan position.	Adjust lock adjustment.
16. Pickup skids in at beginning of record.	Pickup skids across first few grooves or across record to trip off.	(a) Needle worn, chipped, or loose in mounting.	Replace needle.
		(b) Trip switch reset plate down too far resulting in "booster action".	Replace needle.
		(c) Pickup badly out of balance.	Adjust pickup balance.
17. Record starts over after playing part way.	Needle skids back toward start of record after playing part way.	(a) Needle worn, chipped, or loose in mounting.	Adjust pickup balance.
		(b) Pickup badly out of balance.	Adjust pickup balance.
		(c) Needle pressure adjustment too light.	Adjust needle pressure.
18. Early trip-off.	Trips before end of record.	(a) Cut-off adjustment incorrect.	Adjust record cut-off and reset plate position.
		(b) Trip switch pressure too light. Switch trips due to vibration.	Adjust trip switch pressure.
		(c) Pickup badly out of balance.	Adjust pickup balance.
		(d) Needle pressure adjustment too light.	Adjust needle pressure.
		(e) Off-standard records with longer than normal playing surface.	If necessary, adjust trip switch actuator and reset plate to compensate for off-standard records, or, replace records.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
19. Pickup gets "hung-up" on brush bracket due to magnetic attraction.	Fails to play record. Fails to trip off.	(a) Pickup cartridge too close to brush bracket when shifting. Magnetic attraction causes it to "hang-up".	Loosen brush bracket screws and move bracket toward back, farther away from pickup cartridge.
20. Pickup gets "hung-up" along playing surface of record.	Needle plays same groove over and over. Small section of playing surface wears out.	(a) Record groove faulty; broken.	Replace record.
		(b) Pickup does not clear brush while playing.	Adjust brush clearance.
		(c) Pickup fails to unlock fully for playing of records.	Adjust pickup release.
		(d) Pickup cradle pivots too tight.	Adjust pivots to eliminate bind.
		(e) Pickup out of balance.	Adjust pickup balance.
		(f) Needle pressure adjustment too light.	Adjust needle pressure.
21. Excessive record wear.	Records wear faster than normal.	(a) Worn or chipped needle.	Replace needle.
		(b) Incorrect needle pressure.	Adjust needle pressure.
		(c) Pickup cradle pivots too tight.	Adjust pivots to eliminate binds.
		(d) Pickup out of balance.	Adjust pickup balance.
		(e) Excessive dust or dirt on records. Bad records; poor record material.	Wipe records with clean damp cloth. Replace bad records.
22. Pickup "chatters" while shifting.	Pickup does not shift smoothly from side to side.	(a) Pickup cradle shaft dirty or gummy.	Clean and lubricate pickup cradle shaft.
		(b) Pickup return adjustment too tight.	Adjust return adjustment.
		(c) Pickup locking screw in too far. Screw tip drags along crank while shifting.	Adjust locking screw.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
23. Pickup arm is not reset properly after playing record.	Pickup hangs up on brush when resetting.	(a) Pickup return adjustment incorrect.	Adjust return adjustment.
		(b) Pickup lifts too far off record after playing.	Adjust for correct pickup lift.
24. Needle scrapes across record when pickup resets.	Records scratched.	(a) Pickup fails to lift from record before resetting.	Adjust for pickup lift.
		(b) Pickup out of balance.	Adjust pickup balance.
		(c) Pickup arm roller binding.	Clean and lubricate roller at base of pickup arm.
25. Pickup hits flywheel or stripper plate when lifting off of record.	Possible damage to needle or pickup cartridge.	(a) Pickup lifts too far off record after playing.	Adjust for correct pickup lift.
26. Excessive lint accumulation on needles.	Distorted sound.	(a) Brushes incorrectly adjusted and fail to clean needles.	Check pickup lift and brush clearance adjustments and correct as required.
		(b) Excessive lint and dust from records.	Remove lint from needles. Wipe records with clean damp cloth.
27. Popularity meter fails to work.	No indication of record popularity.	(a) C, SC, or IC contacts fail to make.	Clean and adjust contacts.
		(b) Open circuit or open solenoid.	Trace and repair or replace solenoid. See schematic in service manual.
		(c) Mechanical bind or incorrect adjustment.	Remove bind or adjust.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. No sound from any speakers.	Models 101, 161, 201 See Trouble Shooting Procedure Page 188		
2. Distorted sound or no sound from one side of pickup-other side normal.	Mechanism operation normal.	(a) Needle chipped, broken, or missing.	Replace needle.
		(b) Dirt accumulated on stylus. g.	Clean carefully. Check Pickup Lifting and Brush Position adjustments as shown in service manual.
		(c) Armature assembly not fully seated in bottom of pickup cartridge slot.	Slide armature assembly fully into slot.
3. Intermittent sound.	Volume drops and returns suddenly.	(a) See Sound System troubleshooting procedure - Repeat tests until trouble is located (1 above).	
		(b) Open or high resistance pickup coil.	Replace pickup cartridge if necessary. D.C. resistance of 246796 pickup should be approximately 1800 ohms.
	Volume drops and returns slowly.	(c) Tube loose in socket.	Check socket pin connections and form lugs for good contact. Seat tube firmly in socket.
		(d) Defective tube.	Check AVC 12AX7 tube and 6BJ6 tube.
		(e) Loose connection in amplifier.	Locate and repair.
		(f) Squelch switch for automatic volume compensator	Clean and adjust MS contacts.
		(g) Open circuit to squelch switch.	Check cable, plug, and socket connections from MS contacts into amplifier.
4. Low volume.	Volume low at all times.	(a) Defective tube.	Replace.
		(b) Volume control not turned up or shorted.	Adjust control or remove short.
(Continued)	*(Continued)*		

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 4. Low volume	*(Continued)* Volume low at all times.	(c) Armature assemblies not fully seated in bottom of pickup cartridge slots.	Slide armature assemblies fully into slots.
		(d) See Sound System 3, f and g above.	
		(e) Remote volume control plug or dummy plug loose, or plug connection loose.	Seat plug firmly. Check connections in volume control plug or dummy plug.
		(f) Broken wire or short in remote volume control wiring.	Trace and correct.
		(g) Speaker volume switch set too low.	Set switch as required.
		(h) Short at remote speaker connection terminal strip.	Remove short.
		(i) Short in remote speaker or remote speaker wiring.	Trace and correct.
		(j) 8 ohm remote speaker connected to CV terminal strip.	Replace with Seeburg CV type speaker.
		(k) Open or high resistance pickup coil.	Replace pickup cartridge if necessary. D.C. resistance of 246796 pickup should be approximately 1800 ohms.
		(l) Loose connection or faulty part in amplifier.	Check and repair or replace amplifier.
5. Sound fades.	Volume dies down as record plays.	See Sound System 3 above.	
6. Howl or squeal.	High pitched squeal.	(a) Defective tube. (especially 6BJ6)	Replace tube.
		(b) Loose connection or faulty part in amplifier.	Check and repair or replace amplifier.
(Continued)	Low pitched rumble. *(Continued)*	(c) Defective tube. (especially 6BJ6)	Replace tube.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued)	*(Continued)*		
6. Howl or squeal.	Low pitched rumble.	(d) Chassis tie down bolts on mechanism not loosened or shipping blocks not removed.	Loosen bolts and remove shipping blocks.
		(e) Chassis tie-down bolts touching edges of holes in chassis base.	Center bolts in holes.
7. Hum.	Steady hum from speakers. Sound otherwise normal.	(a) Defective tube.	Replace tube.
		(b) Defective filter condenser in amplifier.	Replace condenser.
		(c) Remote volume control cable or speaker wiring near neon tube transformer or wiring.	Re-route or shield wiring.
		(d) One side of pickup wire grounded to carriage.	Trace and repair.
		(e) Open or high resistance pickup coil.	Replace pickup cartridge if necessary. D.C. resistance of 246796 pickup should be approximately 1800 ohms.
8. Poor tone.	Music slow or wavering.	See Mechanism.	
		(a) Record not clamped fully due to burrs or dirt in flywheel hole.	Remove burrs or dirt from flywheel hold.
		(b) Badly warped record or eccentric hole in record.	Replace record.
		(c) Loose motor coupling or motor mounting.	Tighten set screws and mounting clamps.
		(d) Motor bearings or flywheel shaft bearings dry or gummed.	Clean and lubricate.
		(e) Drive grommets in flywheel loose, broken, or stiff.	Replace grommets.
(Continued)	*(Continued)*		

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued)	*(Continued)*		
8. Poor tone.	Music distorted.	(f) Excessive end play in flywheel shaft drive worm.	Adjust thrust screw for .002" end play.
		(a) Dirty, worn, or chipped needles.	Clean or replace as required.
		(b) Worn or dirty records.	Replace worn records. Wipe dirt off records with clean damp cloth.
		(c) Defective tube.	Replace tube.
		(d) Open or high resistance pickup coil.	Replace pickup cartridge. Normal D.C. resistance of 246796 pickup should be approximately 1800 ohms.
		(e) Volume control defective.	Replace volume control.
		(f) Remote volume control plug or dummy plug loose, or loose connection in plug.	Seat plug firmly. Check connections in plug.
		(g) Broken wire or short in remote volume control wiring.	Trace and correct.
		(h) Short across remote speaker connection terminal lugs in amplifier.	Remove short.
		(i) Short circuit in remote speaker or remote speaker wiring.	Trace and correct.
		(j) 8 ohm remote speaker connected to amplifier.	Replace with Seeburg CV type speaker.
		(k) Speaker voice coil not centered.	Replace speaker.
		(l) Speaker cone damaged.	Replace speaker.
(Continued)	*(Continued)*		

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 8. Poor tone.	*(Continued)* Music distorted.	(m) Pickup arm cradle pivots binding.	Adjust pivots as shown in service manual.
	All bass notes. No highs.	(n) Open circuit to 8" speakers.	Trace and repair.
	No bass notes. Only middle and high frequency notes heard.	(o) Open circuit to 12" speakers.	Trace and repair.
9. Clicks, hum or other noises from speaker while changing records.	Noises from speaker while carriage is transferring records or scanning.	(a) Mute circuit open.	Trace circuit and repair.
		(b) Mute switches not closing.	Clean and adjust mute switches M, MA and MB as shown in service manual.
10. No sound from remote speakers.	Phonograph speakers normal or low volume with poor tone.	(a) Open or short circuit in remote speaker or remote speaker wiring.	Trace and correct. Check connections at amplifier terminal strip.

SEEBURG

SOUND SYSTEM TROUBLESHOOTING PROCEDURE

MODELS 101, 161 and 201

(NOTE) This procedure must be followed carefully without bypassing steps. Each test hinges upon having conducted a previous test. Careful adherence to procedure will quickly locate any trouble.

TROUBLE: Records turn with pickup on record but no sound from any speakers.

PROCEDURE: Make several selections and make sure records turn with pickup on record for all checks and tests. Set the volume control to ¾ position. Open the back door and inspect the following.

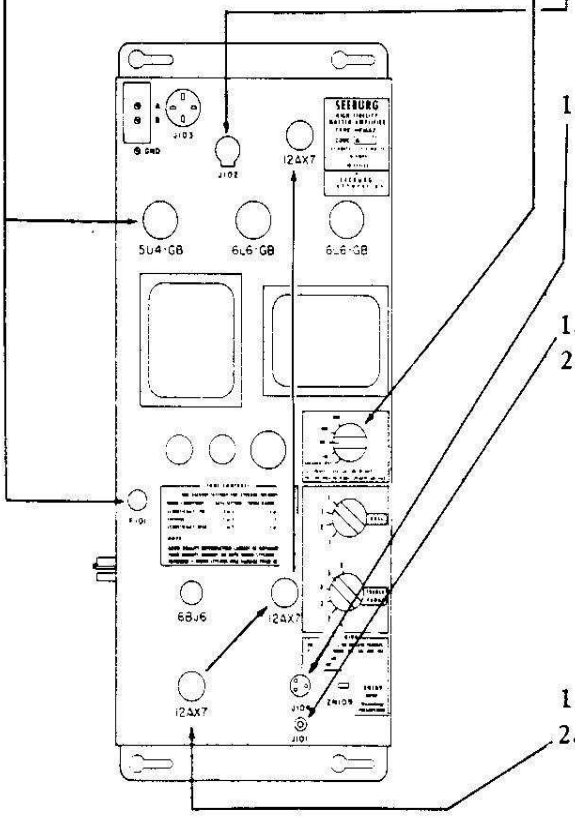
1. Check if 5U4 tube is lighted.

   IF NOT LIGHTED Replace either 2 amp fuse or 5U4 tube;

   IF LIGHTED Proceed as follows:

2. Inspect all tubes in the amplifier to see they are lighted.
3. Inspect all plugs and tubes to see they are properly seated.
4. Inspect remote speaker wires, if any, for shorts.

   IF NO TROUBLE IS FOUND Perform A test.



– A TEST –

1. Turn speaker switch to "speaker test". A loud hum should be heard.

   IF HUM IS HEARD Return switch to original setting and perform B test.

   IF NO HUM IS HEARD Check for open or short circuit to phonograph speakers.

– B TEST –

1. Remove remote volume control plug and replace dummy plug. (If remote volume is not used, perform C test.)

   IF SOUND COMES THROUGH Locate and repair short in remote volume control or cable.

   IF NO SOUND COMES THROUGH Perform C test.

– C TEST –

1. Remove mechanism mute-squelch plug from amplifier.

   IF SOUND COMES THROUGH Adjust mechanism mute switches

   IF NO SOUND COMES THROUGH Perform D test.

– D TEST –

1. Remove the mechanism pickup plug from the amplifier.
2. Touch the end of a piece of solder or bare wire down inside the pickup socket while holding end of solder or wire. Speakers should hum loudly.

   IF HUM IS HEARD Check for open circuit from the mechanism pickup to the pickup plug.

   IF NO HUM IS HEARD Perform E test.

– E TEST –

1. Replace pickup plug into amplifier input.
2. Check each of the three 12AX7 tubes by replacing with a new tube. (Allow time for tube to warmup and be sure record is turning.)

   IF NO SOUND COMES THROUGH AFTER CHECKING TUBES Replace the amplifier.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. No sound from any speakers.	Removing mute-squelch plug from amplifier remedies trouble.	(a) Mute switches for both channels defective.	Adjust mute switches as shown in Service Manual.
	Removing mute-squelch plug from amplifier does not remedy trouble.	(b) Open amplifier fuse.	Replace fuse. Check for intermittent short in 5U4 tube.
		(c) Defective 5U4 tube.	Replace tube.
		(d) Shorted power supply filter capacitor.	Repair or replace amplifier.
2. Distorted sound or low volume on one side of pickup, other side normal.		(a) Defective stylus.	Replace stylus and balance the amplifier.
		(b) Pickup cradle binding.	Locate cause of bind and repair.
		(c) One winding of pickup open.	Replace defective pickup.
3. One channel is weak or dead.	No stereo. Cannot balance the amplifier.	See Trouble Shooting Procedure Page 190.	
4. Hum		See No. 7. 101, 161, 201 Trouble Chart Page 185.	
5. Poor tone.		See No. 8. 101, 161, 201 Trouble Chart Page 185 and 186.	
6. Low volume some records.	Other records normal volume.	(a) Squelch contact on mechanism dirty.	Clean and adjust mechanism MS contact.
		(b) Defective 6BJ6 tube in each channel.	Replace both 6BJ6 tubes.

SEEBURG

STEREO SOUND SYSTEM TROUBLESHOOTING PROCEDURE for SELECT-O-MATIC MODELS 222 and 220

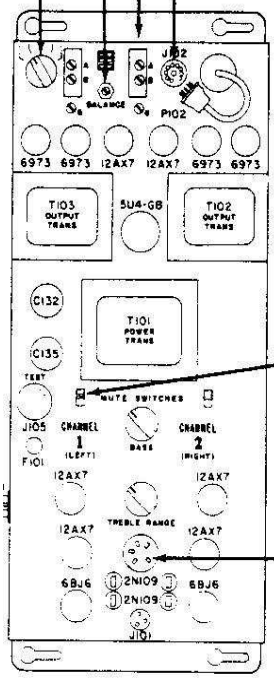
(NOTE) This procedure must be followed carefully without bypassing steps. Each test hinges upon having completed a previous test. Careful adherence to procedure will quickly locate any trouble.

TROUBLE: Stereo records sound the same as monaural records. (One channel defective)

PROCEDURE: Place the Seeburg Stereo Test Record in the phonograph magazine and select the test record side. Follow instructions on the test record.

IF BALANCE CAN BE MADE Phonograph is normal. (Be sure stereo records are in the magazine)

IF BALANCE CANNOT BE MADE Set the balance control to mid position and perform A test.



A TEST

1. Turn speaker switch to "speaker test". Check that both speakers hum.

IF BOTH SPEAKERS HUM Return speaker test switch to the original position and perform B test. Perform C test if no RSVC-1 is used.

IF ONLY ONE SPEAKER HUMS Locate and repair defective speaker or circuit to the speaker. Return controls to original settings and balance the amplifiers using the test record.

B TEST

1. Remove the remote volume control plug from the amplifier and insert the local volume control plug. Set the local control to 3/4 position and repeat balance test using test record.

IF BALANCE CAN BE MADE Locate and repair defect in RSVC-1.

IF BALANCE CANNOT BE MADE Set Balance control to mid position and perform C test.

C TEST

1. Select several monaural (Standard) records. With the phonograph playing, operate channel 1 mute switch, noting if the sound is muted while the switch is operated.

IF SOUND IS WEAK OR DEAD Perform D test. Perform E test if no remote speakers are used. (Channel 2 is defective)

IF SOUND CONTINUES IN CHANNEL 2 Perform H test.

D TEST

1. Remove one wire from channel 2 speaker terminals. With phonograph playing operate channel 1 mute switch, noting if sound is muted.

IF SOUND IS WEAK OR DEAD Replace speaker wire and perform E test.

IF SOUND CONTINUES IN CHANNEL 2 Locate and repair short in channel 2 remote speaker wiring. After repairing, balance amplifiers using test record.

E TEST

1. With the phonograph playing, remove the mute-squelch plug from the amplifier.
2. Operate channel 1 mute switch, noting if sound is muted.

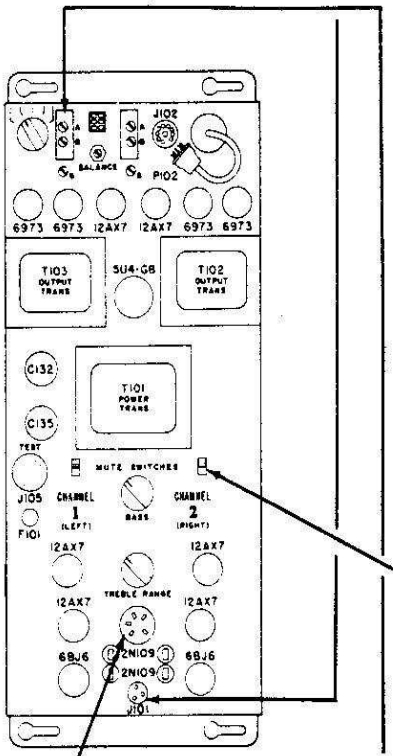
IF SOUND IS WEAK OR DEAD Replace mute-squelch plug and perform F test.

IF SOUND CONTINUES IN CHANNEL 2 Adjust the 6 mute switches on the mechanism. After adjusting switches, replace mute-squelch plug and balance amplifiers using the test record.

F TEST

1. Remove the mechanism pickup plug from the amplifier.
2. Connect a short piece of solder between pins No.1 and No.2 of the pickup socket.
3. With the record turning, touch the solder and note that speakers hum.
4. While touching solder, operate channel 1 mute switch, noting if hum is muted.
   IF HUM IS WEAK OR DEAD Perform G test.
   IF HUM CONTINUES IN CHANNEL 2 Check for defective pickup or defective circuit between the pickup and the pickup input plug. After correcting trouble, balance the amplifiers using the test record.

G TEST



1. Replace mechanism pickup plug into amplifier. (Remove solder)
2. Remove a 12AX7 tube from channel 1.
3. While record is turning, substitute each of the 12AX7 tubes in channel 2 with the good 12AX7 tube removed from channel 1. Allow time for tube to warm up.
4. If the phonograph starts playing after replacing one of the 12AX7 tubes, install a new 12AX7 tube in channel 1 and balance the amplifiers, using the test record.
5. If the phonograph does not play after trying all three 12AX7 tubes turn off power, remove the 6973 tubes from channel 1 and install in channel 2. Turn on power.
   IF THE PHONOGRAPH PLAYS Install new 6973 tubes in channel 1, replace the 12AX7 tube in channel 1, and balance the amplifiers using the test record.
   IF THE PHONOGRAPH DOES NOT PLAY Replace the amplifier. Balance the new amplifier using the test record.

H TEST

1. With a record playing, operate channel 2 mute switch, noting if the sound is muted while the switch is operated.

   IF SOUND IS WEAK OR DEAD Perform J test. Perform K test if no remote speakers are used. (Channel 1 is defective)
   IF SOUND CONTINUES IN CHANNEL 1 Recheck previous tests made.

J TEST

1. Remove one wire from channel 1 speaker terminals.
2. With phonograph playing, operate channel 1 mute switch, noting if sound mutes.

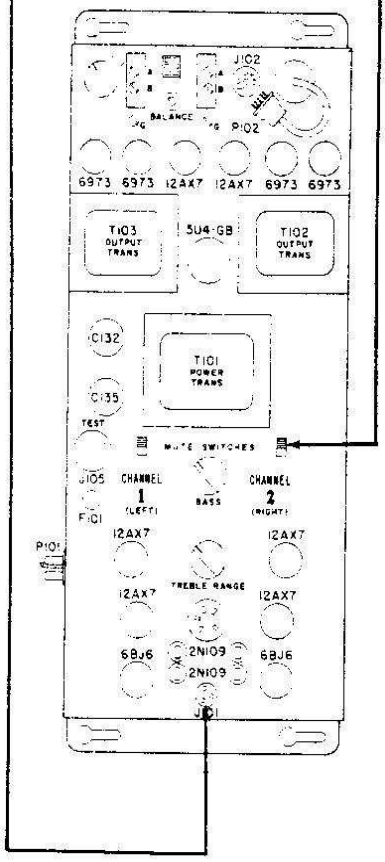
   IF SOUND IS WEAK OR DEAD Replace speaker wire and perform K test.
   IF SOUND CONTINUES IN CHANNEL 1 Locate and repair short in channel 1 remote speaker wires. After repairing, balance amplifiers using the test record.

K TEST

1. With phonograph playing, remove the mute-squelch plug from the amplifier.
2. Operate channel 2 mute switch, noting if sound is muted.

   IF SOUND IS WEAK OR DEAD Replace the mute-squelch plug. Perform L test.
   IF SOUND CONTINUES IN CHANNEL 1 Adjust the 6 mute switches on the mechanism. After adjusting switches, replace the mute-squelch plug and balance the amplifiers using the test record.

L TEST



1. Remove the mechanism pickup plug from the amplifier.
2. Connect a short piece of solder between pins No. 1 and No.2 of the pickup socket.
3. With a record turning, touch the solder and note that speakers hum.
4. While touching solder, operate channel 2 mute switch, noting if hum mutes.

IF HUM IS WEAK OR DEAD Perform M test.

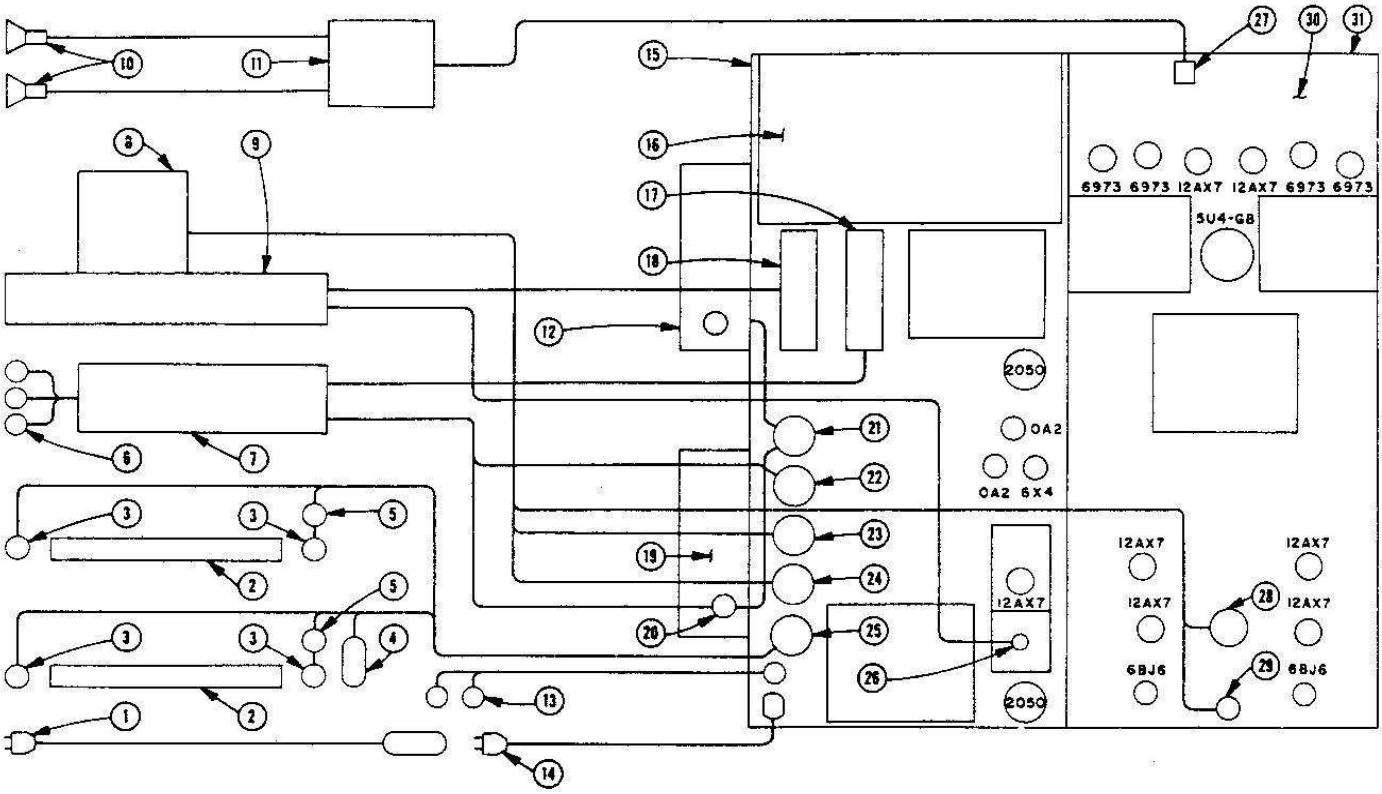
IF HUM CONTINUES IN CHANNEL 1 Check for defective pickup or defective circuit between the pickup and the pickup input plug. After correcting trouble, balance amplifiers using the test record.

M TEST

1. Replace mechanism pickup plug into amplifier. (Remove solder)
2. Remove a 12AX7 tube from channel 2.
3. While a record is turning, substitute each of the 12AX7 tubes in channel 1 with the good 12AX7 tube removed from channel 2. Allow time for warm up.
4. If the phonograph starts playing after replacing one of the 12AX7 tubes, install a new 12AX7 tube in channel 2 and balance the amplifiers using the test record.
5. If the phonograph does not play after trying all three 12AX7 tubes turn off power, remove the 6973 tubes from channel 2 and install in channel 1. Turn on power.

IF THE PHONOGRAPH PLAYS Install new 6973 tubes in channel 2, replace the 12AX7 tube in channel 2, and balance the amplifiers using the test record.

IF THE PHONOGRAPH DOES NOT PLAY Replace the amplifier. Balance the new amplifier using the test record.

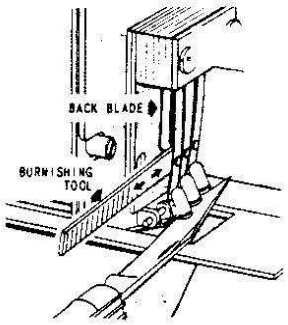


Cabinet Cabling Diagram

PARTS LIST

Item	Part No.	Part Name
1	402152	Line Cord and Outlet Assembly
2	409084	Flourescent Lamp
3	407352	Flourescent Lamp Socket
4	409947	Ballast
5	407353	Starter Socket
6	411102	Credit Light Cable Assembly
7	411005	"TES103" Tormat Electrical Selector (222)
	411010	TES103 Tormat Electrical Selector (220)
8	248212	"160ST2" Select-O-Matic Mechanism (222)
	249007	"145ST4" Select-O-Matic Mechanism (220)
9	304900	"160TM1" Tormat Memory Assembly (222)
	304701	"100TM3" Tormat Memory Assembly (220)
10	481232	Speaker
11	503601	"SN400-1" Network
12	450510	"DPU-1" Dual Pricing Unit (222)
13	481229	Grille Light Cable & Plug Assy.
14	307152	Line Cord
15	307130	"TSU1" Tormat Selection Unit
16	307030	"RCSU2" R.C. Stepper Unit (222 DHR - 220 SR)
	307090	"TJU2" Tormat Junction Unit (222 DH - 220 S)
	411201	Matrix Cable & Plug Assy. (220)
	411098	Matrix Cable & Plug Assy. (222)
17	410573	33 Prong Socket
	304729	Cable Assembly (220)
	304924	Cable Assembly (222)
18	304662	33 Prong Plug
19	450700	"DHU1" Half Dollar Unit (222)
	400450	"SPU1" Single Pricing Unit (220)
20	411100	Control Cable Assembly
21	410708	12 Prong Plug
22	408258	7 Prong Plug
23	65323	6 Prong Plug
24	249936	11 Prong Plug
25	10895	A.C. Plug
26	304732	Cable Assembly
	246957	Plug (Single Prong)
27	481236	Speaker Cable Assembly
	481205	Cap (AMP 480084)
	941750	Contact (AMP 42641)
28	F200241	Plug (Five Prong Plug)
29	250938	Plug (Three Prong)
30	305641	Volume Control Assembly
	305634	Plug (9 prong)
31	305600	"SHFA1" Amplifier

COIN SWITCHES



CLEANING

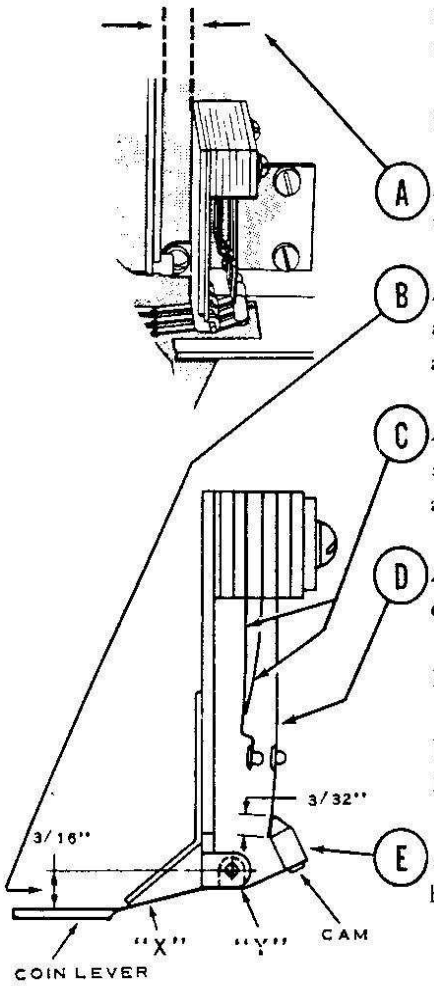
Clean the switch contacts carefully with carbon tetrachloride using a No. 2 camel hair brush.

Burnish by inserting a burnishing tool between the contacts, raising the switch lever with a knife blade as shown. *Never use a file or sandpaper for contact cleaning.*

COIN LEVER ALIGNMENT

The coin switch levers should be parallel and centered with the openings of their respective coin exits in the slug rejector. Lateral play of the lever should be taken into account when checking the position of the switch levers.

SWITCH ADJUSTMENT



A Adjust the coin switch mounting so the bracket is vertical and parallel with the vertical edge of the slug rejector frame.

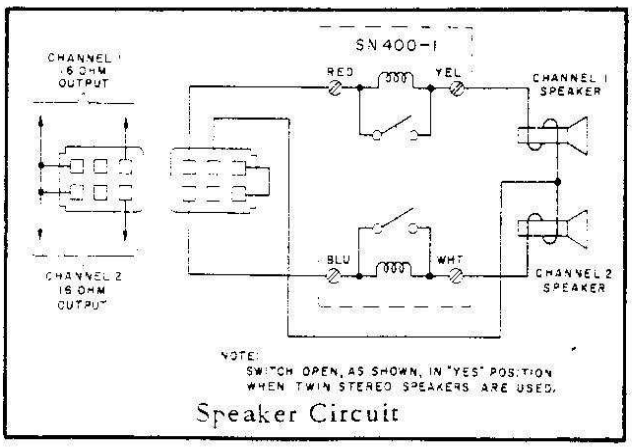
B Adjust the coin levers so they are parallel with the bottom edge of the rejector and are bearing against the bracket at "X". The ends of the levers should be approximately 3/16" below the level of the lever pivot, "Y".

C Adjust short blade and bracer for 1/32" to 3/64" contact gap (all switches) with short blade bearing against tip of bracer at approximately 2 to 3 grams (measured at contact point).

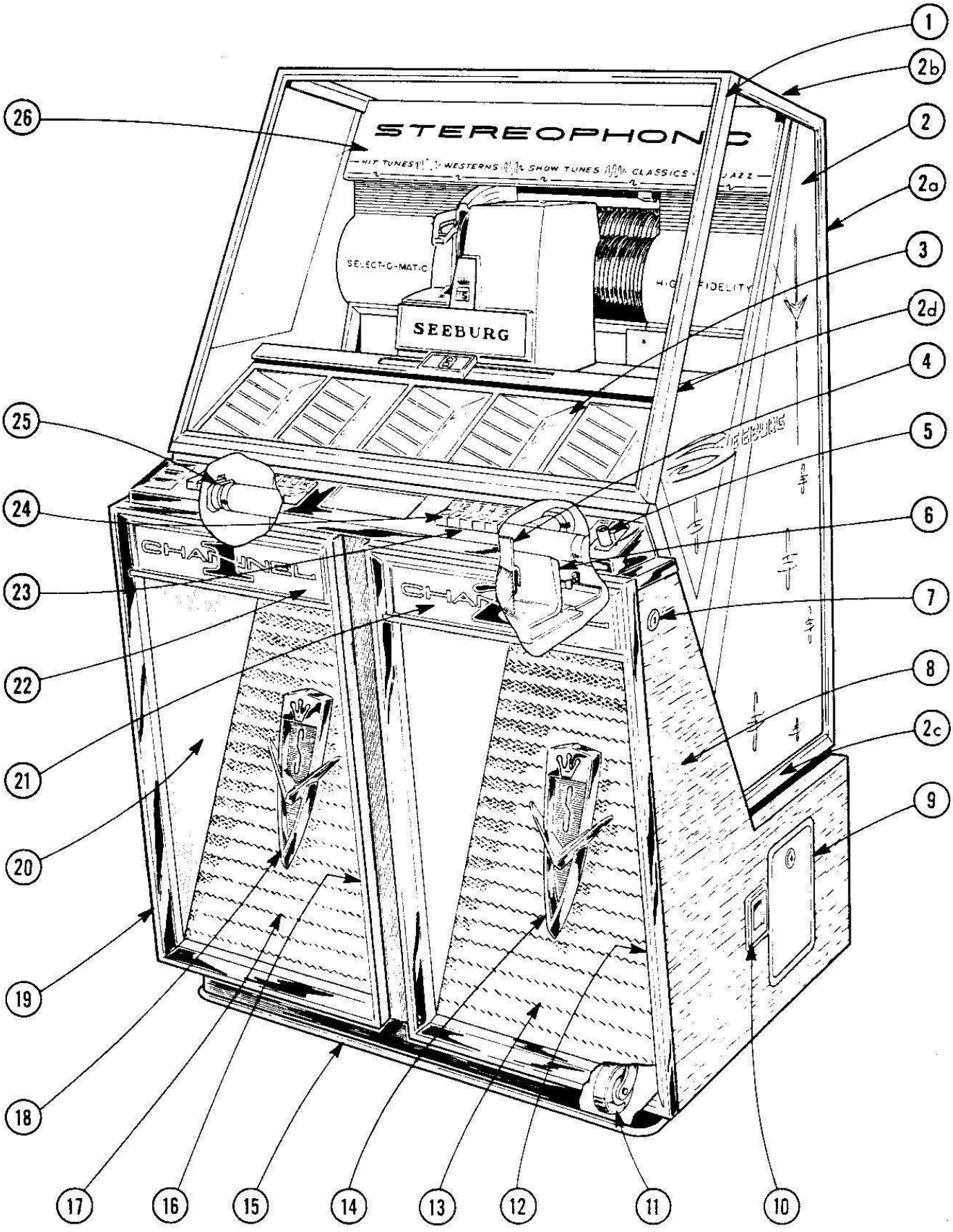
D Adjust the long blade so it bears against the cam, as measured at the switch contact:

Nickel switch	- 10 to 14 grams	Nickel switch (equipped slug rejector)	- 5 to 7 grams (with flipper
Dime switch	- 5 to 7 grams	Quarter switch	- 12 to 16 grams
Half Dollar switch	- 12 to 16 grams	(not shown)	

E Adjust the switch actuating cams to be tilted as shown and overlap the switch blade approximately 3/32".



Speaker Circuit

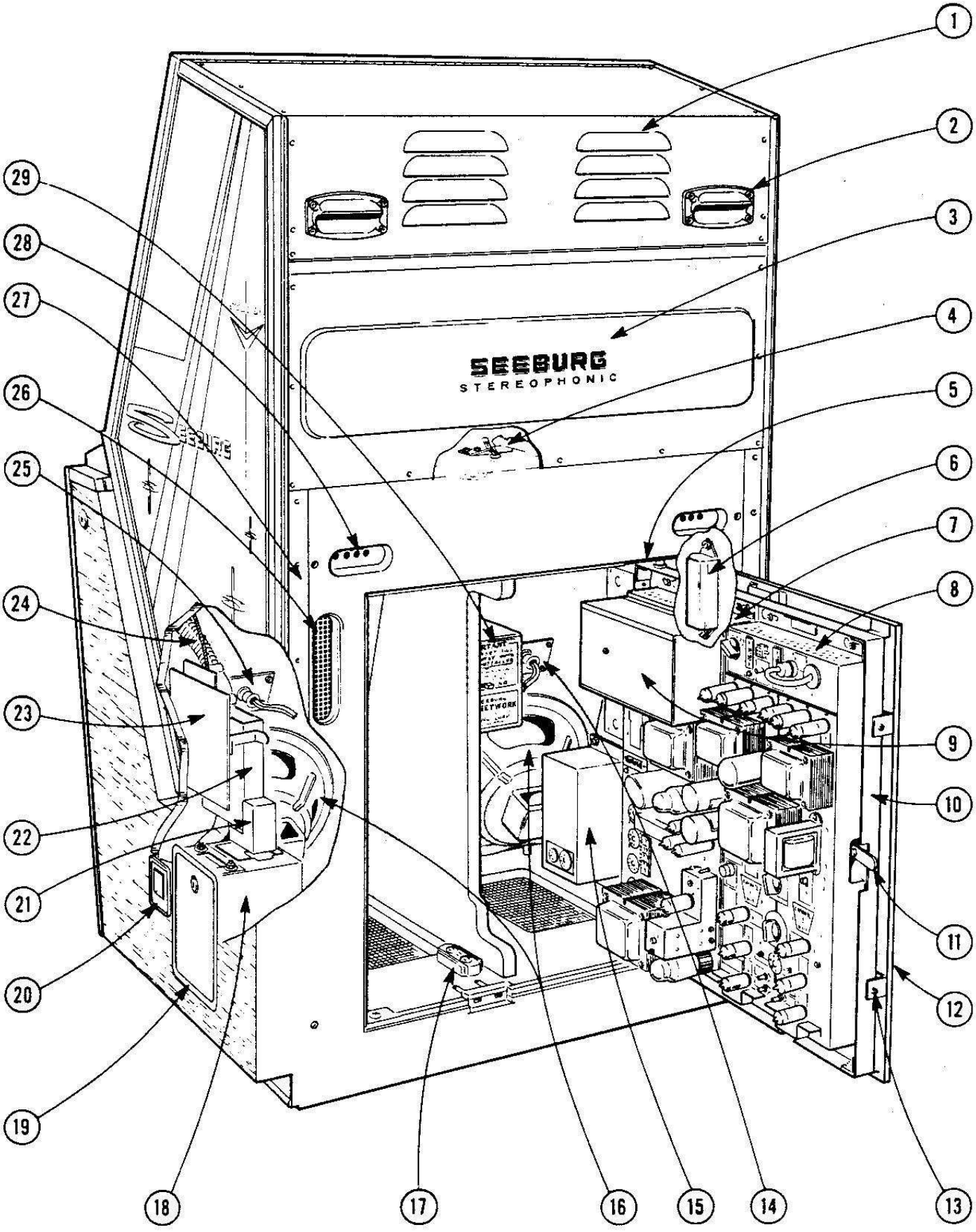


Front View 220 Cabinet Assembly

1376A

CABINET PARTS LIST (Front View)

Item	Part No.	Part Name
1	482046	Cabinet Lid Assembly
	481261	Cabinet Lid Glass
	480378	Cabinet Lid Frame Top
	480411	Cabinet Lid Frame Side - R.H.
	480412	Cabinet Lid Frame Side - L.H.
	481101	Cabinet Lid Frame Bottom Assy.
	480784	Clip
	480414	Lid Hinge
	480730	Lid Support Assembly
	480423	Lid Lock Catch Assembly - R.H.
	480424	Lid Lock Catch Assembly - L.H.
	480433	Hinge Tapping Strip
2	481207	Side Glass - L.H.
	480346	Side Glass Trim - L.H.
	480457	Side Glass Gasket
	480348	Cabinet Side Top - L.H.
	481124	Cabinet Side Top Support - R.H.
2a	481126	Cabinet Side Rear - R.H.
	480345	Side Glass Trim - R.H.
2b	480347	Cabinet Side Top - R.H.
	481125	Cabinet Side Top Support - L.H.
	481127	Cabinet Side Rear - L.H.
2c	481131	Cabinet Side Bottom - R.H.
	480600	Cabinet Side Plate Assembly - R.H.
2d	481133	Cabinet Side Front - R.H.
	481132	Cabinet Side Bottom - L.H.
	480601	Cabinet Side Plate Assembly - L.H.
	481134	Cabinet Side Front - L.H.
	481200	Side Glass Channel
	481201	Side Glass Channel
	481202	Side Glass Channel
3	481103	Program Frame & Rail Riveted Assembly
	480416	Program Frame Assembly - Side R.H.
	482148	Program Holder Assembly (A-B)
	482149	Program Holder Assembly (C-D)
	482150	Program Holder Assembly (E-F)
	482151	Program Holder Assembly (G-H)
	482152	Program Holder Assembly (J-K)
	480417	Program Frame Assembly - Side L.H.
4	480678	Selector Key Diffuser
5	409271	Scavenger Wire & Plunger Assembly
	480449	Drop Slot
	482110	Pricing Window
	409274	Scavenger Housing
	480252	Coin Window (Model S)
	480241	Credit Window
	401223	Plunger Return Spring
6	481318	Grille Shelf
7	481241	Lid Lock Assembly - R.H.
	481242	Lid Lock Assembly - L.H.
8	481050	Cabinet
	481397	Decal
9	481115	Cash Box Door Frame
	481116	Cash Door Assembly
	481117	Cash Box Door
	406340	Cash Box Lock Assembly
	406094	Cash Box Reinforcing Angle
	406095	Lock Reinforcing Channel
10	481118	Slug Receptacle Assembly
11	402588	Caster (For Alternate See 409362) (Use With Caster Socket 405774)
	405774	Caster Socket (Use Only With Caster 402588)
	409362	Caster (Alternate For 402588) (Use With Caster Socket 409363)
12	481393	Grille Side Trim Assembly - R.H. (Right Side)
	481219	Grille Trim Cap
	480360	Trim Retainer
13	481551	Grille Screen - R.H.
14	481403	Grille Ornament Assembly - R.H.
	481226	Grille Ornament
	481401	Grille Ornament Insert - R.H. (Blue)
	481406	Grille Ornament Color Reflector - R.H.
	481319	Grille Ornament Retainer Casting
	53426	Light Seal
	481395	Grille Ornament Stud
	481413	Grille Ornament Stud
	481396	Grille Ornament Light Seal
	905659	Tinnerman - Zip On
15	480366	Base Trim
16	481214	Grille Side Trim Assembly - R.H. (Left Side)
17	481552	Grille Screen - L.H.
	481213	Scrim Cloth
	53406	3/8 Wide X 3/16 Adhesive Coated Sponge Rubber
18	481404	Grille Ornament Assembly - L.H.
	481226	Grille Ornament
	481402	Grille Ornament Insert - L.H. (Red)
	481407	Grille Ornament Color Reflector - L.H.
19	481223	Grille Frame Casting
	961005	Sems
20	481215	Grille Side Trim Assembly - L.H.
21	481309	Selector Ornament No. 2
	481312	Selector Ornament Retainer
	903209	Speed Nut (Tinnerman C10592-017-4)
22	481308	Selector Ornament No. 1
	53116	1/2" Wide Masking Tape - Black
23	482200	Selector Panel Assembly
24	482204	Selector Key (Set of 10)
	482205	Selector Key (Set of 10)
25	405138	25 Watt Fluorescent Light Starter
	409084	25 Watt Fluorescent Light 28" Cool White
	480722	Lower Program Light Cable Assembly (For Alternate See 480723)
	480723	Lower Program Light Cable Assembly (For Alternate See 480722)
	407352	Fluorescent Lamp Socket
	407353	Fluorescent Starter Socket
	407365	Fluorescent Lamp Ballast, Single, 25 W. 60 Cycle (For Alternate See 407367)
	407367	Fluorescent Lamp Ballast, Single, 25 W. 60 Cycle (For Alternate See 407365)
	481328	AC Plug Assembly
26	482045	Upper Display Panel

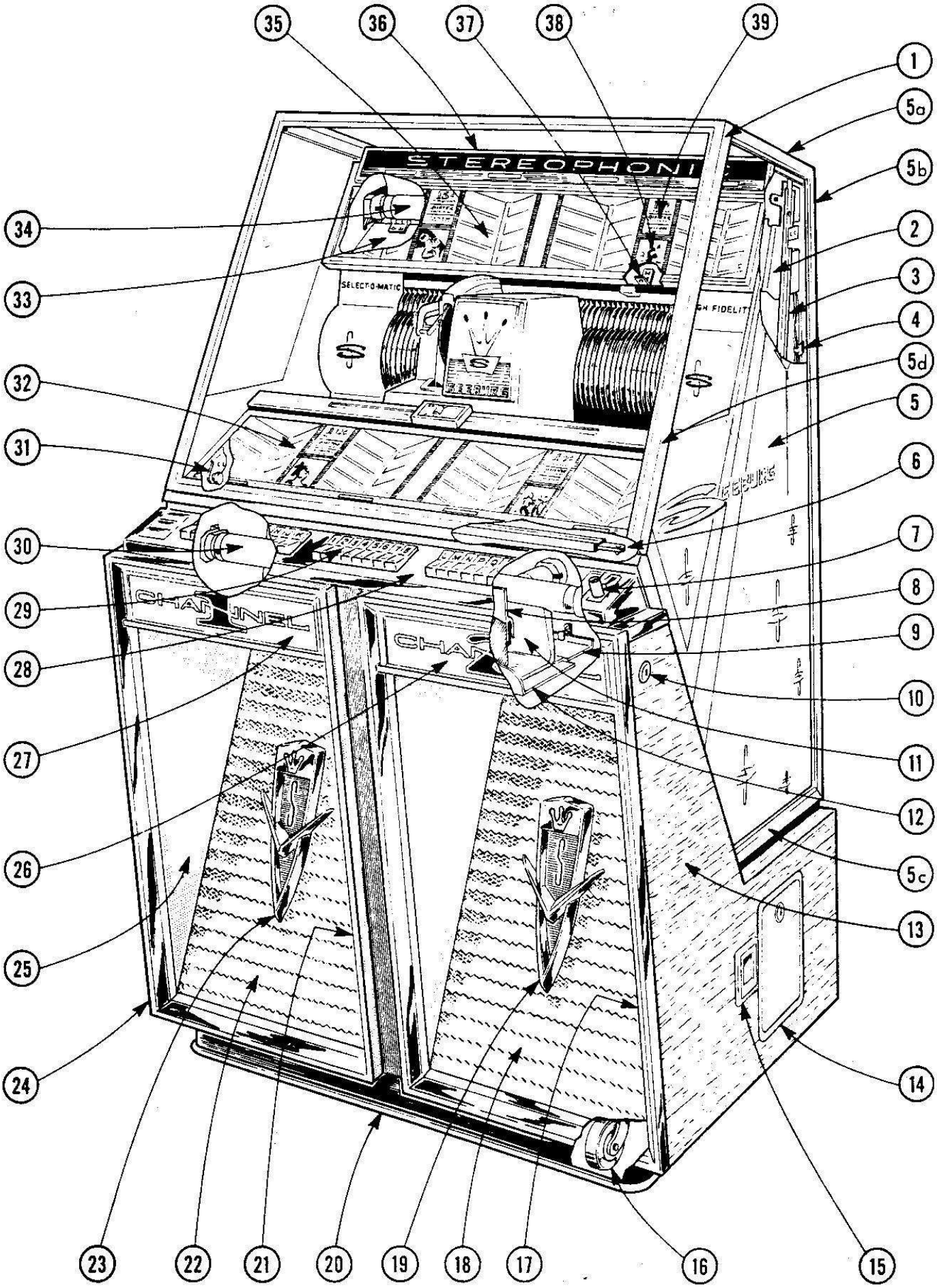


Rear View - 220 Cabinet Assembly

1376C

CABINET PARTS LIST (Rear View)

Item	Part No.	Description
1	482043	Back Panel Welded Assembly
	960718	6-32 X 1/4 Acorn Hex Washer H. Self Tapping Screw
2	409613	Cabinet Handle
	921162	Flatwasher
	915533	Sems
	922120	Flatwasher (Special)
3	481086	Access Panel Assy.
	960670	No. 6 X 1/2 Sheet Metal Screw
	480451	Clip (Tinnerman C22112-017)
4	480639	Access Panel Latch Spring
	960946	No. 8 X 1/2 Sheet Metal Screw
	480640	Access Panel Release Cable
5	409217	Upper Back Door Pivot Plate
	475018	Lower Back Door Pivot Plate
6	407365	Fluorescent Lamp Ballast, Single, 25 Watt, 60 Cycle
	407367	Fluorescent Lamp Ballast, Single, 25 Watt, 60 Cycle (Alt.)
7	307130	Type "TSU1" Tormat Selection Unit
8	305600	Type "SHFA1" Hi Fi Amplifier
9	307090	Type "TJU2" Tormat Junction Unit (220S)
	307030	Type "RCSU2" Remote Control Stepper Unit (220SR)
10	481293	Electronic Door Frame Assy.
11	481410	Door Lock Rear Assembly
12	481287	Back Cover Assy.
13	960980	8-32 X 1/4 Self Tapping Screw
14	481228	Grille Light Mtg. Plate
15	400450	Type "SPU1" Single Pricing Unit (Set For 10¢ Play)
16	481232	12" Speaker - Utah (Use in Pairs, Do Not Intermix)
	481233	12" Speaker - Jensen (Alternate) (Use In Pairs, Do Not Intermix)
	481236	Speaker Cable Assembly
17	402152	Line Cord & Outlet Assembly
18	481160	Cash Box Assembly
	404659	Cash Bag
19	481115	Cash Box Door Frame
	481116	Cash Door Assembly
	481117	Cash Box Door
	406340	Cash Box Lock Assembly
	406094	Cash Box Reinforcing Angle
	406095	Lock Reinforcing Channel
20	481118	Slug Receptacle Assembly
21	401905	Coin Switch Cover Welded Assy.
	401897	Coin Switch and Cable Assembly
22	401912	Slug Rejector (With Flipper)
23	401879	Leveling Plate Riveted Assembly
	401892	Coin Chute Clamp Casting
	401889	Coin Chute Mtg. Bracket Welded Assy.
	401893	Scavenger Slide
	401894	Scavenger Slide Shoulder Screw
	401932	Hinge Plate
24	401965	Coin Chute
25	481228	Grille Light Mtg. Plate
	16076	No. 63 Lamp (Clear)
	960946	No. 8 X 1/2 Sheet Metal Screw
	481229	Grille Light Cable & Plug Assembly
	481230	Grille Light Cable & Plug Assembly (Alt.)
26	409218	Vent Screen
27	481137	Rear Corner Trim Plate
28	481098	Rear Door Hand Hole Shield
29	503601	Type "SN1" Network

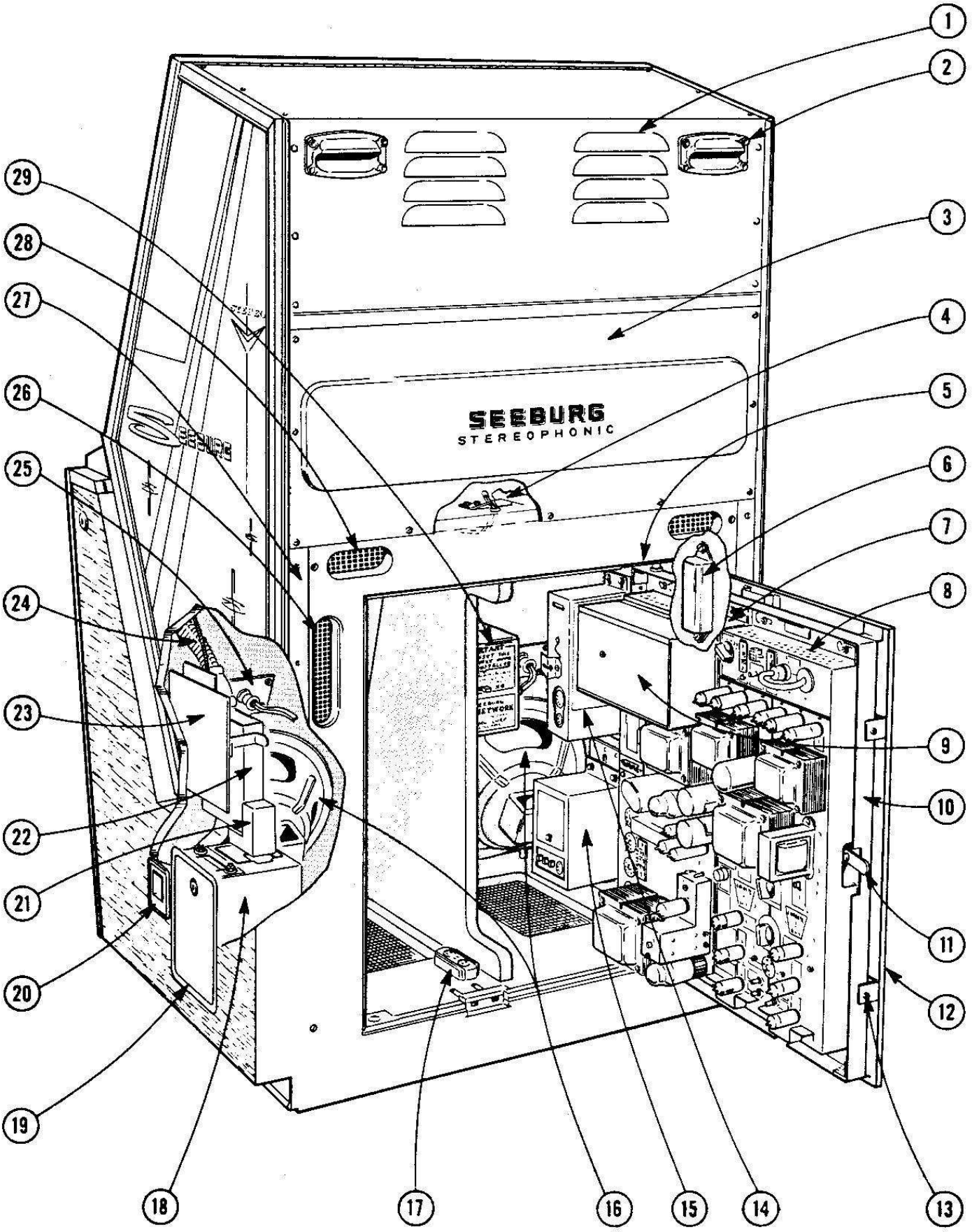


Front View - 222 Cabinet Assembly

1376F

CABINET PARTS LIST (Front View)

Item	Part No.	Part Name
1	481259	Cabinet Lid Assembly
	481261	Cabinet Lid Glass
	480378	Cabinet Lid Frame Top
	480411	Cabinet Lid Frame Side - R.H.
	480412	Cabinet Lid Frame Side - L.H.
	480662	Cabinet Lid Frame Bottom Assy.
	480414	Lid Hinge
	480433	Hinge Tapping Strip
2	480632	Program Pivot Bracket Assy. - L.H.
	480631	Program Pivot Bracket Assy. - R.H.
	481250	Program Glass
	480140	Program End Casting - R.H.
	480141	Program End Casting - L.H.
	480380	Top Program Rail
	480658	Center Program Rail Assy.
	480659	Bottom Program Rail Assy.
3	480335	Diagonal Brace - R.H.
	480336	Diagonal Brace - L.H.
4	480784	Clip
5	481206	Side Glass - R.H.
	481207	Side Glass - L.H.
	481203	Filler Trim - R.H.
	481204	Filler Trim - L.H.
	480345	Side Glass Trim - R.H.
	480346	Side Glass Trim - L.H.
5a	480347	Cabinet Side Top - R.H.
	480348	Cabinet Side Top - L.H.
	481124	Cabinet Side Top Support - R.H.
	481125	Cabinet Side Top Support - L.H.
5b	481126	Cabinet Side Rear - R.H.
	481127	Cabinet Side Rear - L.H.
5c	481131	Cabinet Side Bottom - R.H.
	481132	Cabinet Side Bottom - L.H.
5d	481133	Cabinet Side Front - R.H.
	481134	Cabinet Side Front - L.H.
	480600	Cabinet Side Plate Assy. - R.H.
	480601	Cabinet Side Plate Assy. - L.H.
	480457	Side Glass Gasket
	481200	Side Glass Channel
	481201	Side Glass Channel
	481202	Side Glass Channel
6	480730	Lid Support Assembly
7	409271	Scavenger Wire & Plunger Assy.
	409274	Scavenger Housing
	401223	Plunger Return Spring
8	480678	Selector Key Diffuser
9	481318	Grille Shelf
10	484241	Lid Lock Assembly - R.H.
	481242	Lid Lock Assembly - L.H.
11	481310	Light Guide (Selector Ornament)
12	481314	Support Riveted Assembly
	480218	Selector Support Bracket Assy. - R.H.
	480219	Selector Support Bracket Assy. - L.H.
	481315	Front Lower Support
13	481060	Cabinet
	481397	Decal
14	481115	Cash Box Door Frame
15	481118	Slug Receptacle Assembly
16	402598	Caster (Use With Caster Socket 405774)
	405774	Caster Socket (Use Only With Caster 402588)
	409362	Caster (Use With Caster Socket 409363)
	409363	Caster Socket (Use Only With Caster 409362)
17	481393	Grille Side Trim Assy. - R.H. (Right Side)
	481219	Grille Trim Cap
	480360	Trim Retainer
18	481551	Grille Screen - R.H.
	481213	Scrim Cloth
19	481403	Grille Ornament Assembly - R.H.
	481226	Grille Ornament
	481401	Grille Ornament Insert - R.H. (Blue)
	481406	Grille Ornament Color Reflector - R.H.
	481319	Grille Ornament Retainer Casting
	53426	Light Seal
	481395	Grille Ornament Stud
	481413	Grille Ornament Stud
	481396	Grille Ornament Light Seal
	905659	Tinnerman - Zip On
20	480366	Base Trim
21	481214	Grille Side Trim Assy. - R.H.(Left Side)
22	481552	Grille Screen - L.H.
23	481404	Grille Ornament Assembly - L.H.
	481226	Grille Ornament
	481402	Grille Ornament Insert - L.H. (Red)
	481407	Grille Ornament Color Reflector - L.H.
24	481223	Grille Frame Casting
	960955	No. 8 X 5/8 Washer Hd. Screw
	960946	No. 8 X 1/2 Sheet Metal Screw
	914426	8-32 X 3/8 Washer H.M.S.
	961005	Sems
25	481215	Grille Side Trim Assembly - L.H.
	481219	Grille Trim Cap
	480360	Trim Retainer
26	481309	Selector Ornament No. 2
	481312	Selector Ornament Retainer
	903209	Speed Nut (Tinnerman C10592-017-4)
27	481308	Selector Ornament No. 1
	481312	Selector Ornament Retainer
	903209	Speed Nut (Tinnerman C1052-017-4)
28	481300	Selector Panel Assembly
	480445	Drop Slot
	480254	Coin Window
	480241	Credit Window
29	480212	Selector Key (Set of 20)
	480213	Selector Key (Set of 8)
30	480722	Lower Program Light Cable Assy.
	480723	Lower Program Light Cable Assy. (Alt.)
	409084	25 Watt Fluorescent Light, 28" Cool-White
	405138	25 Watt Fluorescent Light Starter
31	480423	Lid Lock Catch Assembly - R.H.
	480424	Lid Lock Catch Assembly - L.H.
32	480448	Program Frame & Rail Riveted Assy.
	480416	Program Frame Assembly Side - R.H.
	480417	Program Frame Assembly Side - L.H.
	480421	Program Support Rail & Pin Assembly
	481264	Program Glass (Lower)
	481265	Program Holder Assembly (1-1)
	481266	Program Holder Assembly (2-2)
	481267	Program Holder Assembly (3-3)
	481268	Program Holder Assembly (4-4)
	481350	Classification Heading (Hit Tunes)
	481353	Classification Heading (Rhythm & Blues)
	481351	Classification Heading (Country & Western)
	481385	Pricing Windows - Lower - 10¢ (Half Dollar)
	481360	Cartoon - Girl Vocalist
	481361	Cartoon - Dancers
33	480652	Light Shield Assembly
34	480724	Upper Program Light Cable Assembly
	480725	Upper Program Light Cable Assembly (Alt.)
	409084	25 Watt Fluorescent Light, 28" Cool-White
	405138	25 Watt Fluorescent Light Starter
35	481248	Upper Program Assembly
	481251	Program Holder Assembly (5-5)
	481252	Program Holder Assembly (6-6)
	481253	Program Holder Assembly (7-7)
	481254	Program Holder Assembly (8-8)
36	481370	Program Heading Glass
	481355	Classification Heading (Stereo)
	481356	Classification Heading (Show Tunes)
	481352	Classification Heading (All Time Favorites)
	481357	Classification Heading (Jazz)
37	480660	Angle Bracket (Tinnerman C-8599-632)
38	481363	Cartoon - Girl Listening
	481362	Cartoon - Wind Instruments
39	481384	Pricing Windows - Upper - 15¢ (Half Dollar)



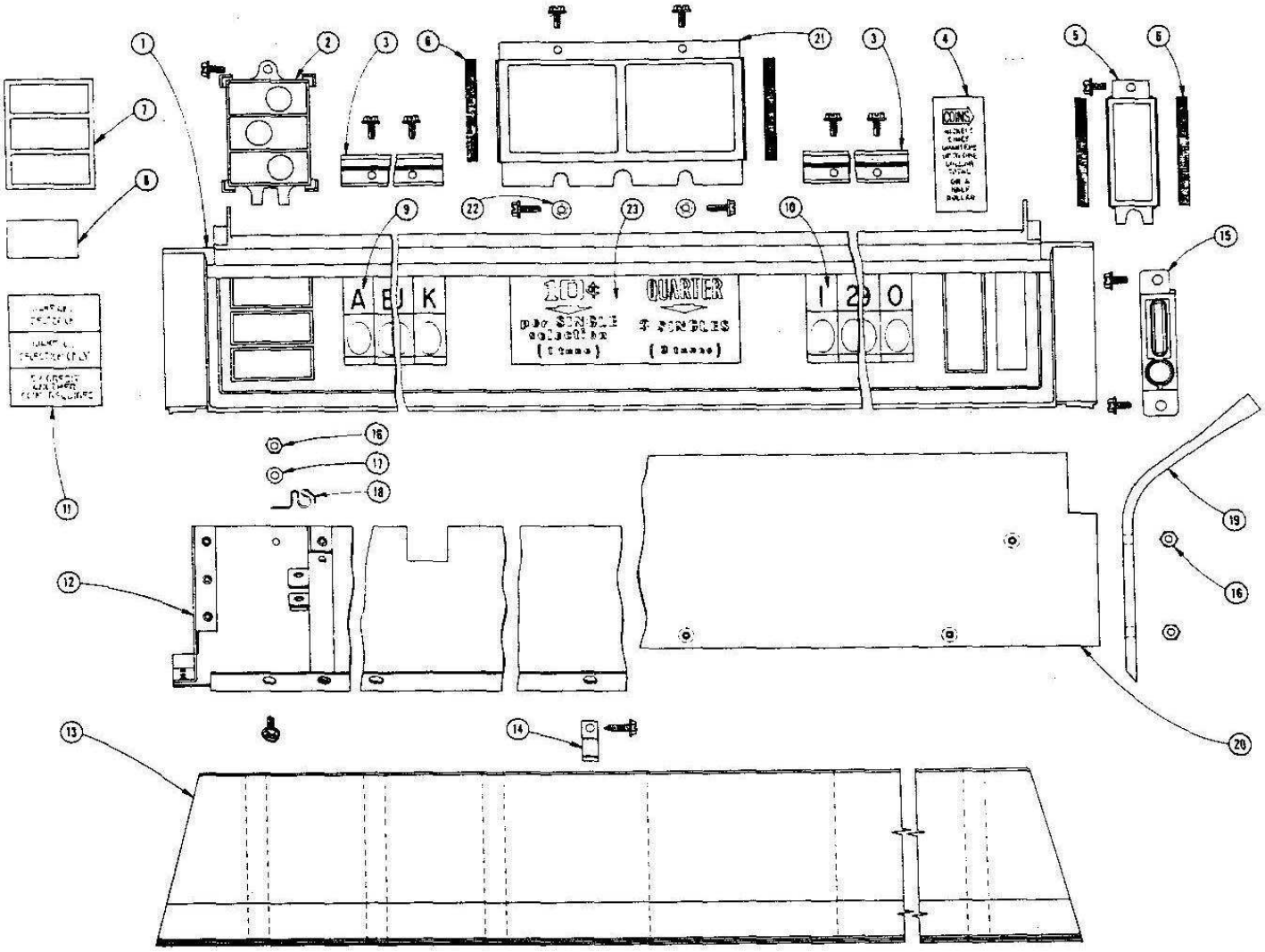
Rear View - 222 Cabinet Assembly

1376G

CABINET PARTS LIST (Rear View)

Item	Part No.	Description
1	481209	Back Panel Welded Assy.
	960718	6-32 X 1/4 Acorn Hex Washer H. Self Tapping Screw
2	409613	Cabinet Handle
	921162	Flatwasher
	915533	Sems
	922120	Flatwasher (Special)
3	481086	Access Panel Assy.
	960670	No.6 X 1/2 Sheet Metal Screw
	480451	Clip (Tinnerman C22112-017)
4	480639	Access Panel Latch Spring
	960946	No.8 X 1/2 Sheet Metal Screw
	480640	Access Panel Release Cable
5	409217	Upper Back Door Pivot Plate
	475018	Lower Back Door Pivot Plate
6	409947	Fluorescent Lamp Ballast, Dual 25 Watt, 60 Cycle
	409945	Fluorescent Lamp Ballast, Dual 25 Watt, 60 Cycle (Alternate)
7	307130	Type "TSU1" Tormat Selection Unit
8	305600	Type "SHFA1" Hi Fi Amplifier
9	307030	Type "RCSU2" Remote Control Stepper Unit (222 DHR)
	307090	Type "TJU2" Tormat Junction Unit (222DH)
10	481293	Electronic Door Frame Assy.
11	481410	Door Lock Rear Assy.
12	481287	Back Cover Assy.
13	960980	8-32 X 1/4 Self Tapping Screw
14*	450510	Type "DPU1" Dual Pricing Unit
15**	450700	Type "HDU1-56" Half Dollar Unit
†	400450	Type "SPU1" Single Pricing Unit
††	400454	Type "SPU1-H Single Pricing Unit (Half Dollar)
16	481232	12" Speaker - Utah (Use in Pairs, (Do Not Intermix)
	481233	12" Speaker - Jensen (Alternate) (Use in Pairs, Do Not Intermix)
	481236	Speaker Cable Assy.
17	402152	Line Cord & Outlet Assy.
18	481160	Cash Box Assembly
	404659	Cash Bag
19	481115	Cash Box Door Frame
	481116	Cash Door Assembly
	481117	Cash Box Door
	406340	Cash Box Lock Assy.
	406094	Cash Box Reinforcing Angle
	406095	Lock Reinforcing Channel
20	481118	Slug Receptacle Assy.
21	401905	Coin Switch Cover Welded Assy.
	401931	Coin Switch and Cable Assy.
22	401929	Slug Rejector (No Flipper)
23	401879	Leveling Plate Riveted Assy.
	401892	Coin Chute Clamp Casting
	401889	Coin Chute Mtg. Bracket Welded Assy.
	401893	Scavenger Slide
	401894	Scavenger Slide Shoulder Screw
	401932	Hinge Plate
24	401995	Coin Chute
25	481228	Grille Light Mtg. Plate
	16076	No. 63 Lamp (Clear)
	960946	No. 8 X 1/2 Sheet Metal Screw
	481229	Grille Light Cable & Plug Assy.
	481230	Grille Light Cable & Plug Assy. (Alt.)
26	409218	Vent Screen
27	481128	Rear Corner Trim Plate
28	480630	Hand Hole Screen
29	503601	Type "SN-1" Network

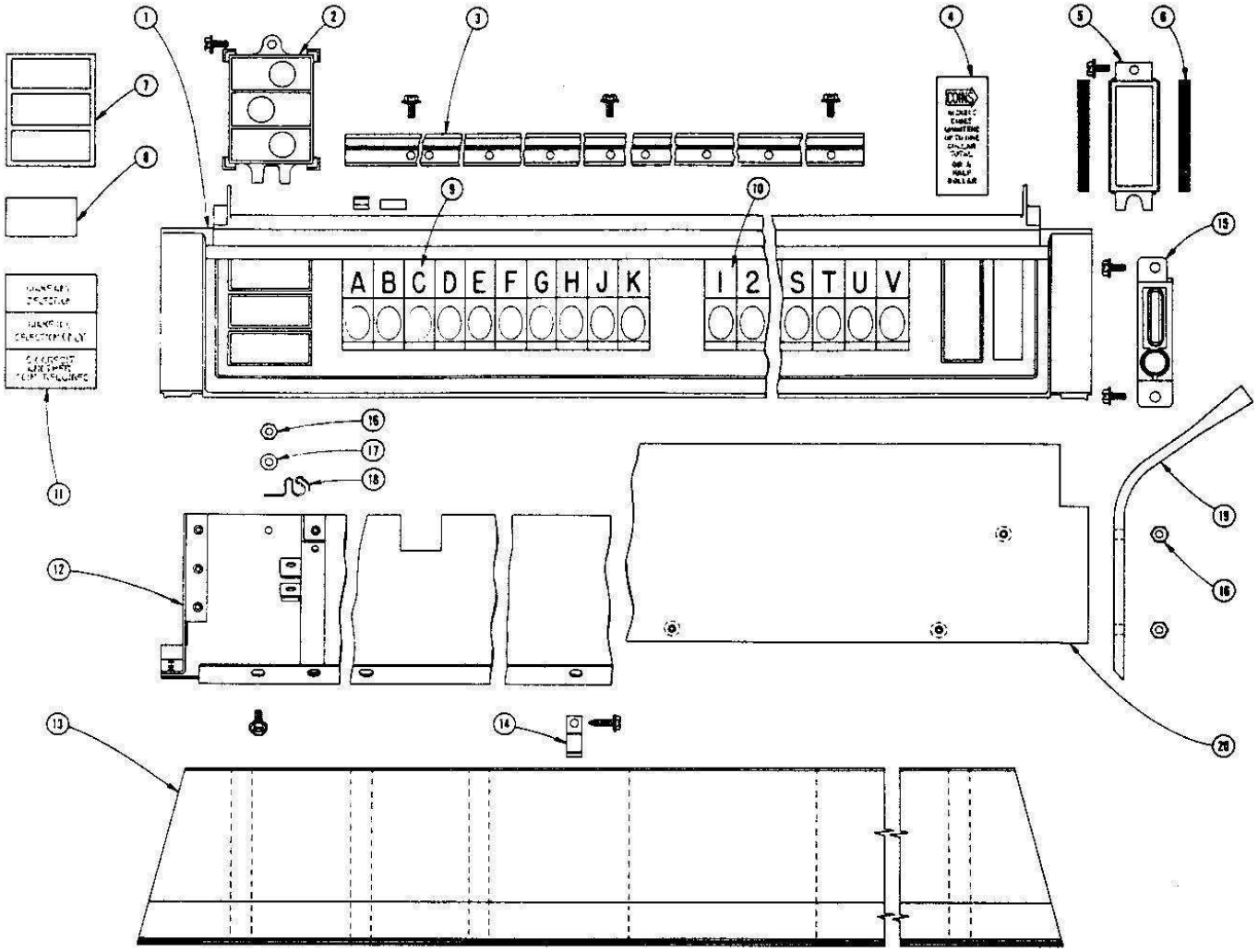
* Used On Models 222D, 222DR, 222DH and 222DHR
** Used On Models 222DH and 222DHR
† Used On Models 222S, 222SR, 222SH and 222SHR
†† Used On Models 222SH and 222SHR



Selector Key Panel Assembly

PARTS LIST

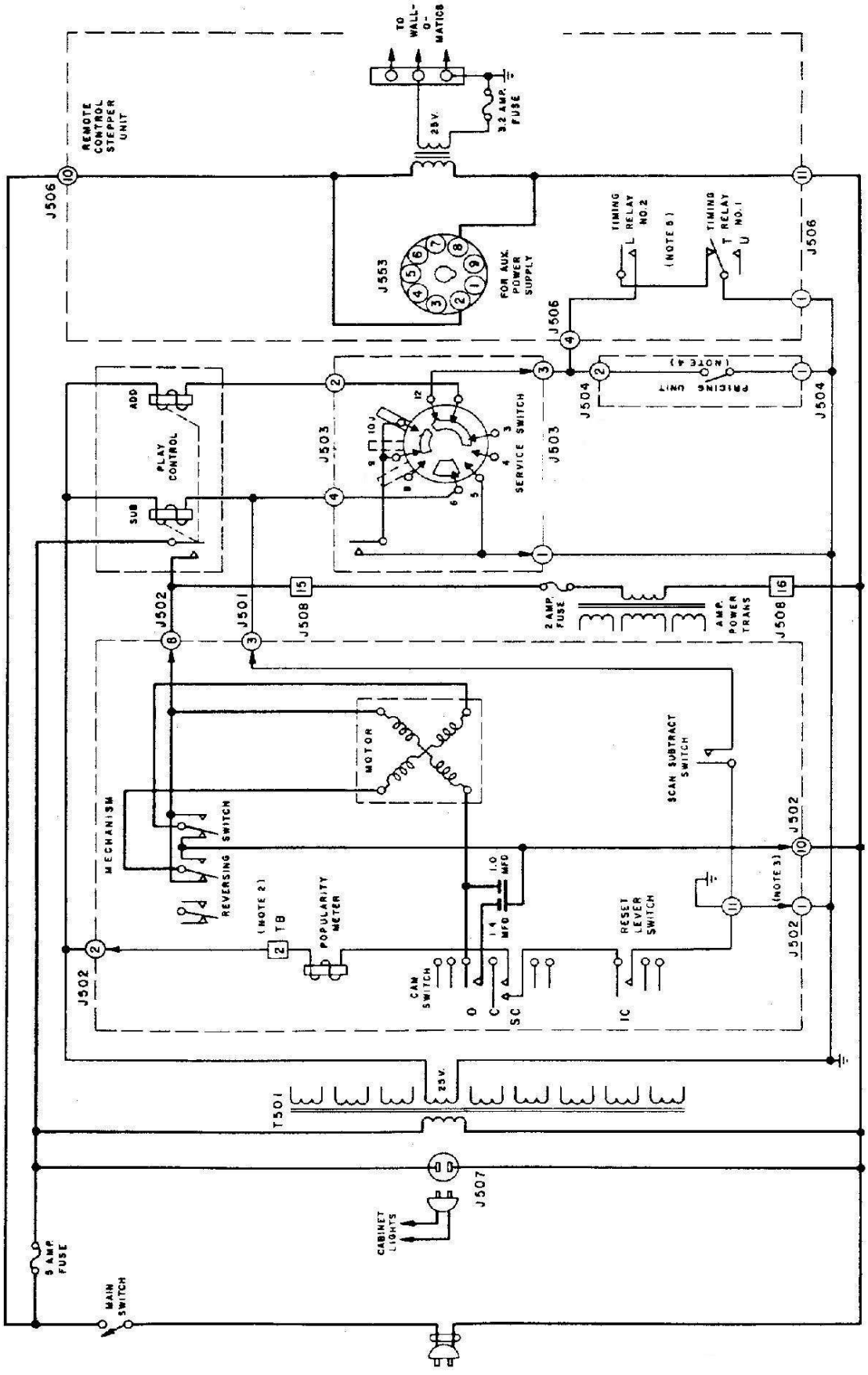
Item	Part No.	Part Name
1	481089	Selector Panel
2	480103	Credit Window Box (Casting)
	961008	8-32 Self Tapping Screw
3	481109	Selector Key Bearing Strip
	961008	8-32 X 3/8 Self Tapping Screw
4	480252	Coin Window
5	480216	Coin Window Bracket
	961008	8-32 X 3/8 Self Tapping Screw
6	53403	1/8 X 1/4 Wide Adhesive Coated Sponge Rubber
7	480214	Credit Window Gasket
8	480215	Credit Window Diffuser
9	482204	Selector Key (Set of 10)
	410225	Spring Clip (Key)
	410226	Selector Key Stop
	54013	Cement (Marbon RS-268)
	410336	Selector Key Spring
	410337	Selector Key Spring - R.H.
	410338	Selector Key Spring - L.H.
10	480508	Selector Key (Set of 10)
11	480241	Credit Window
12	481314	Support Riveted Assembly
13	481318	Grille Shelf
14	480606	Tinnerman Clip
15	480449	Drop Slot
16	901682	8-32 Keps Hex Nut
17	920914	Flatwasher
18	481327	Cable Clamp
19	481310	Light Guide (Selector Ornament)
20	481316	Light Guide Support Plate & Stud Assembly
21	481080	Pricing Window Retainer
22	481112	Spacer
	961025	8-32 X 1/2 Self Tapping Screw, Type 23
23	482110	Pricing Information Window



Selector Key Panel Assembly

PARTS LIST

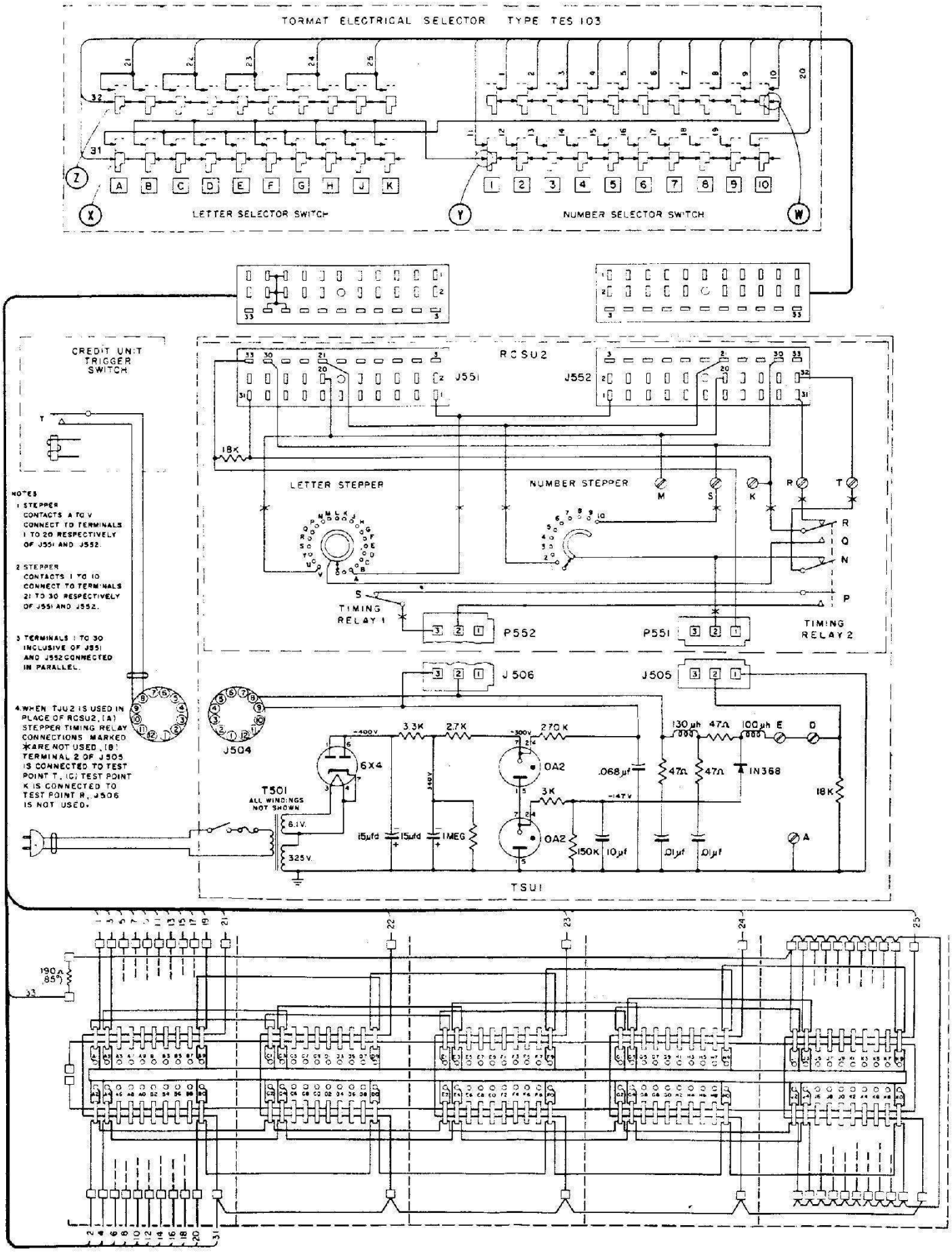
Item	Part No.	Part Name
1	481149	Selector Panel
2	480103	Credit Window Box (Casting)
	961008	8-32 X 3/8 Self Tapping Screw
3	480138	Selector Key Bearing Strip
	961008	8-32 X 3/8 Self Tapping Screw
4	480254	Coin Window
5	480216	Coin Window Bracket
	961008	8-32 X 3/8 Self Tapping Screw
6	53403	1/8 X 1/4 Wide Adhesive Coated Sponge Rubber
7	480214	Credit Window Gasket
8	480215	Credit Window Diffuser
9	480212	Selector Key (Set of 20)
	410225	Spring Clip (Key)
	410226	Selector Key Stop
	54013	Cement (Marbon RS-268)
	410336	Selector Key Spring
	410337	Selector Key Spring - R.H.
	410338	Selector Key Spring - L.H.
10	480213	Selector Key (Set of 8)
11	480241	Credit Window
12	481314	Support Riveted Assembly
13	481318	Grille Shelf
14	480606	Tinnerman Clip
15	480445	Drop Slot
16	901682	8-32 Keps Hex Nut
17	920914	Flatwasher
18	481327	Cable Clamp
19	481310	Light Guide (Selector Ornament)
20	481316	Light Guide Support Plate & Stud Assembly



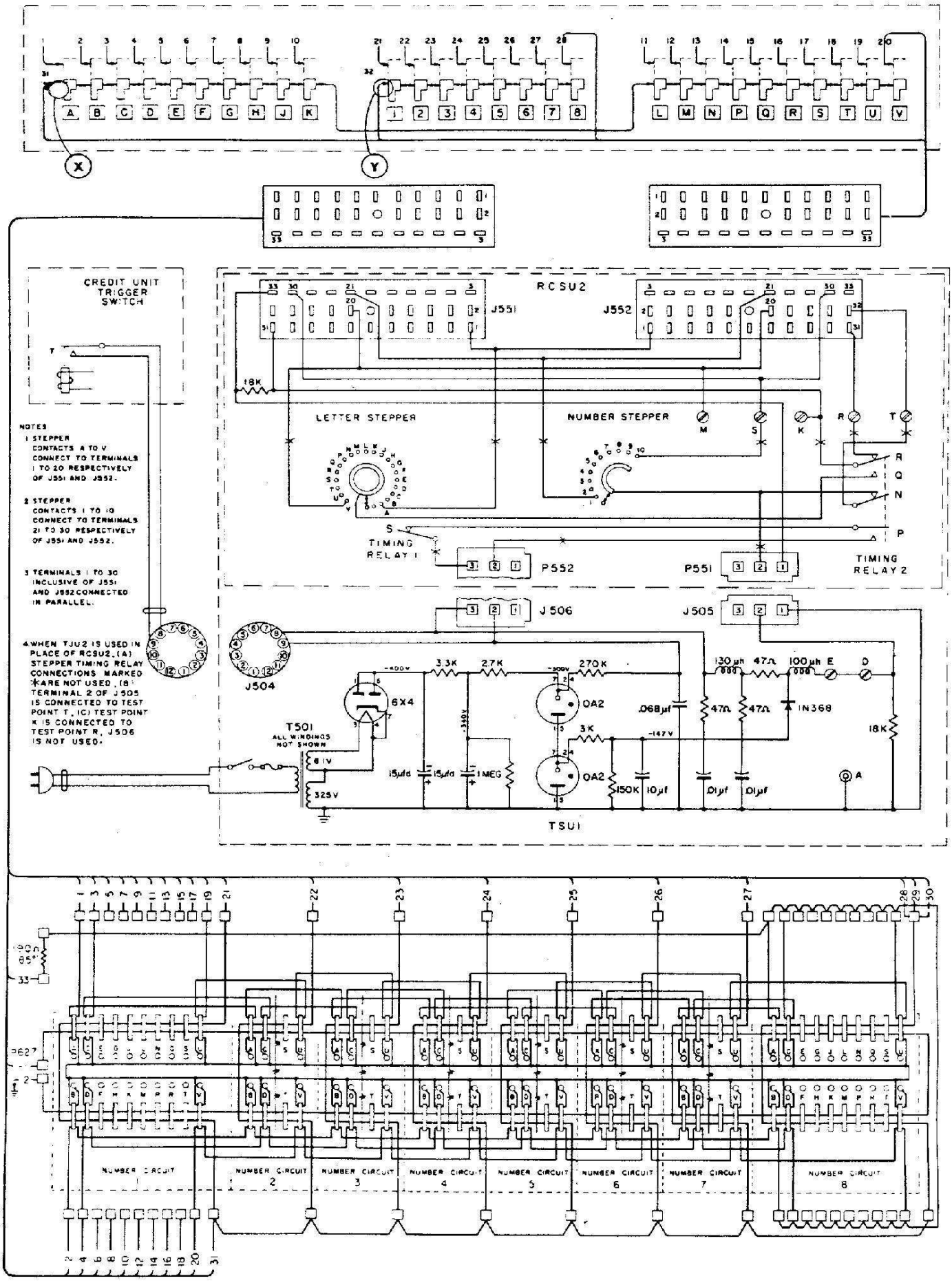
1. (2) THIS SYMBOL INDICATES A SOCKET IN THE SELECTION RECEIVER. NUMERAL IN CIRCLE IS NUMERAL OF CONTACT OR TERMINAL NUMBER. ARROW INDICATES MATING PLUG TERMINAL.
2. [2] THIS SYMBOL INDICATES A TERMINAL OF THE TERMINAL STRIP ON MECHANISM CARRIAGE. NUMERAL IN BOX IS TERMINAL NUMBER. TERMINAL NUMBERING BEGINS WITH 1 AT BOTTOM OF STRIP.
3. CARRIAGE GROUND CONNECTION BELOW TERMINAL STRIP.
4. CIRCUIT MOMENTARILY CLOSED WHEN SELECTION IS MADE AT ELECTRICAL SELECTOR.
5. CIRCUIT MOMENTARILY CLOSED THROUGH L AND T WHEN SELECTION IS MADE BY REMOTE OPERATION.

Power and Control Wiring

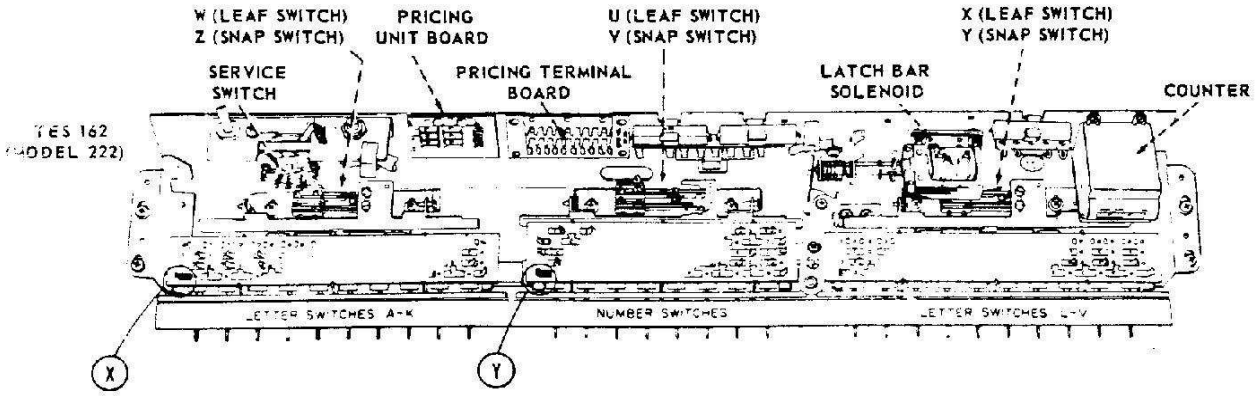
WRITE-IN CIRCUITS, Model 220

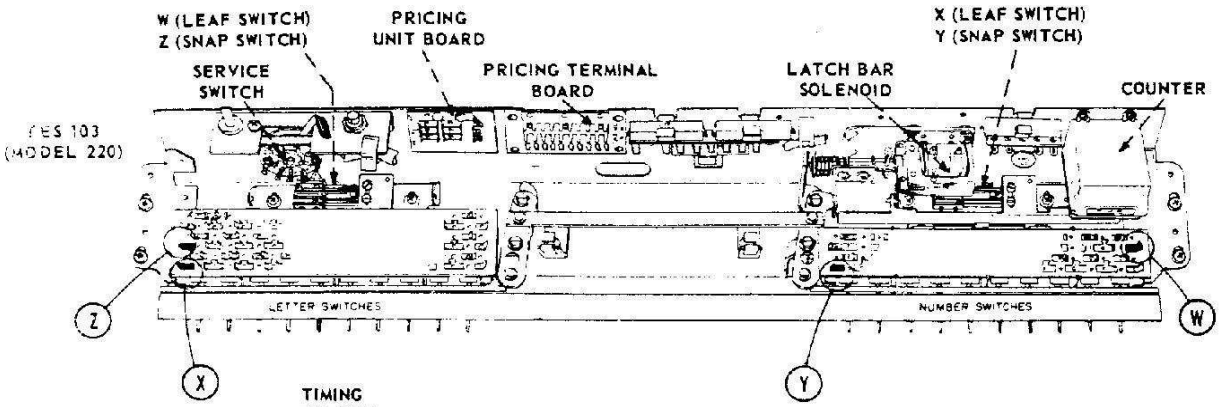


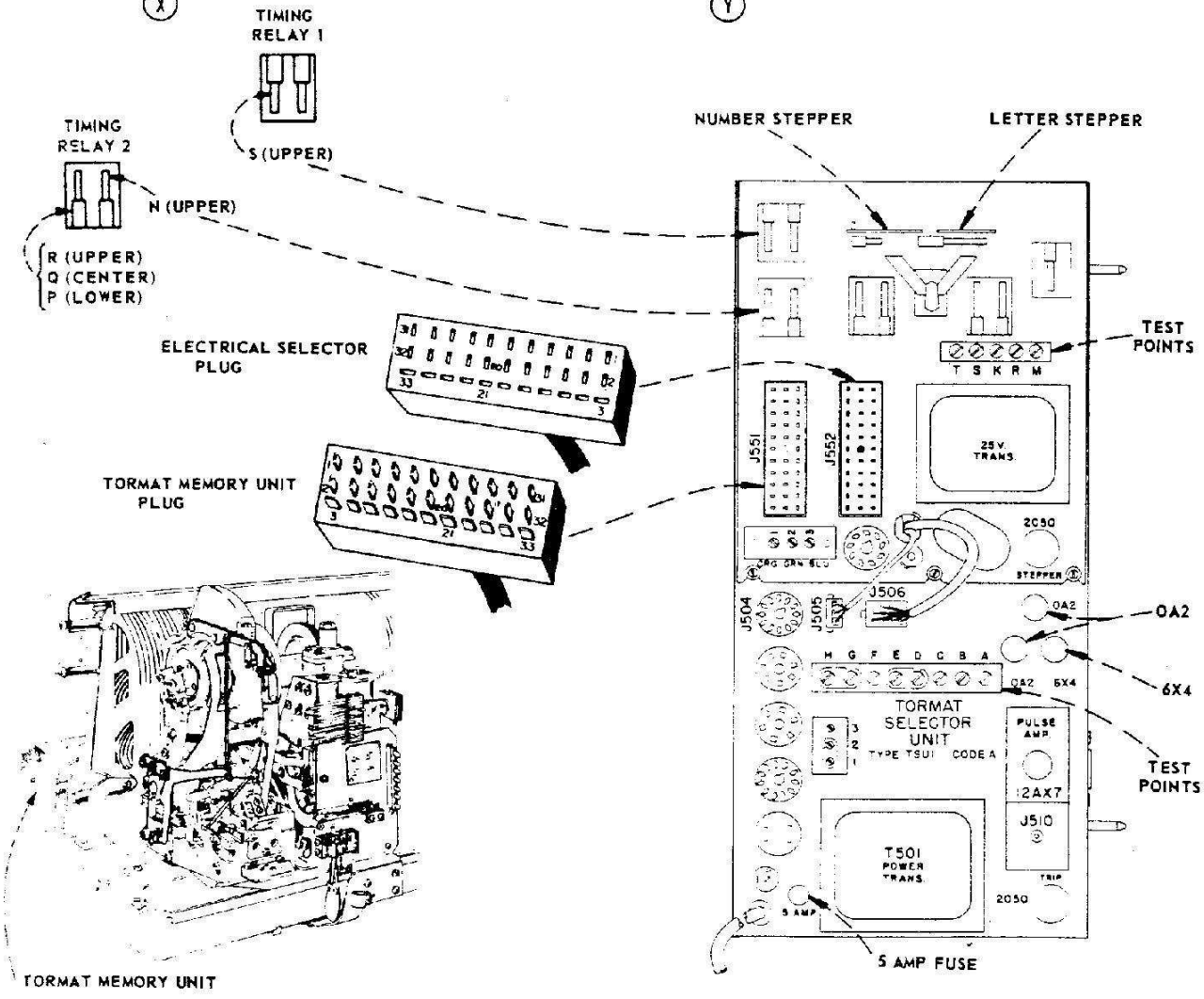
WRITE-IN CIRCUITS, Model 222



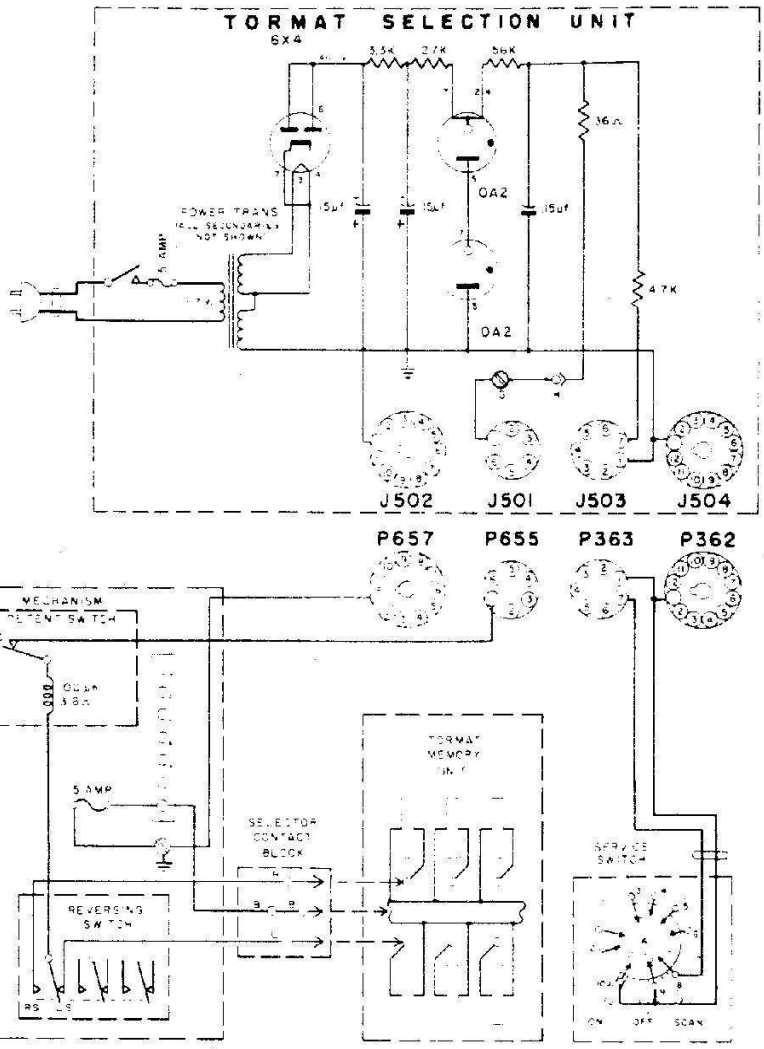
WRITE-IN CIRCUIT COMPONENTS, Models 220 and 222

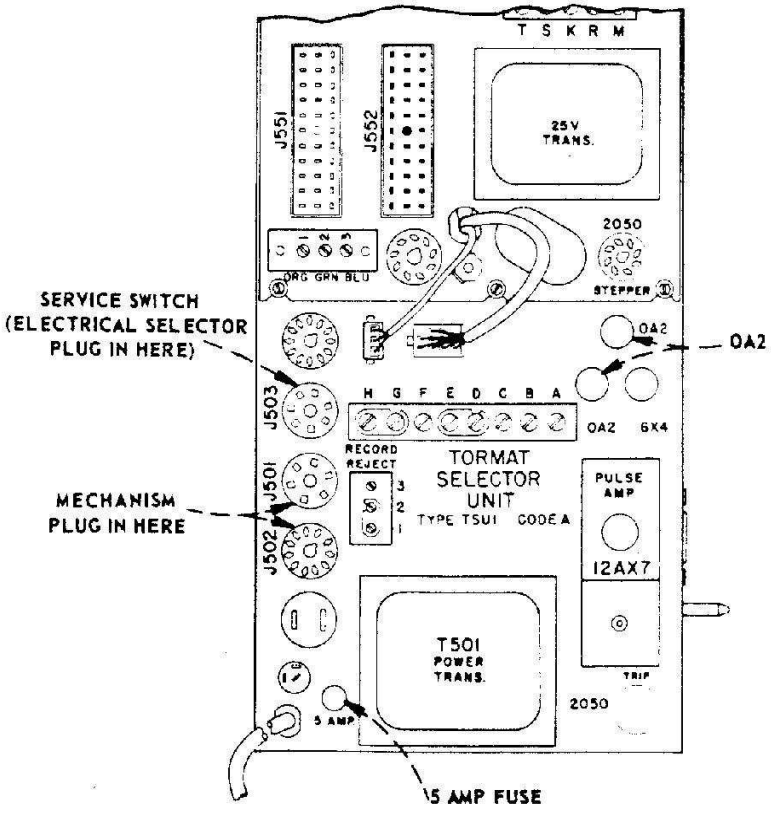


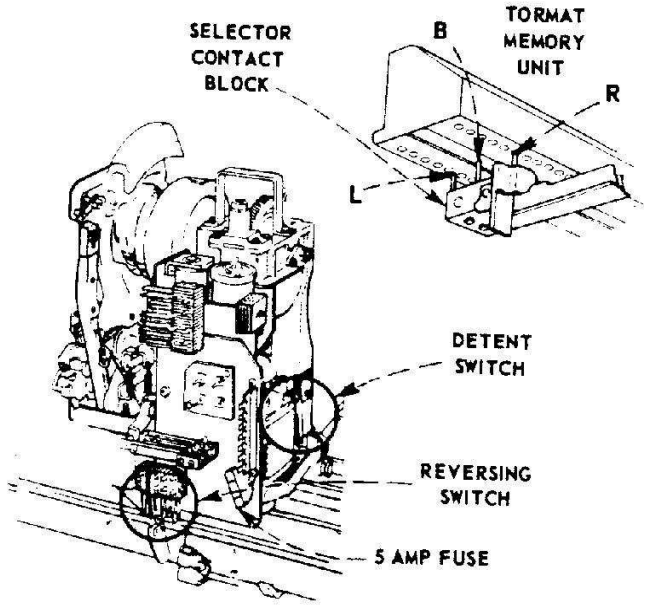




READ-OUT CIRCUIT, Models 220 and 222

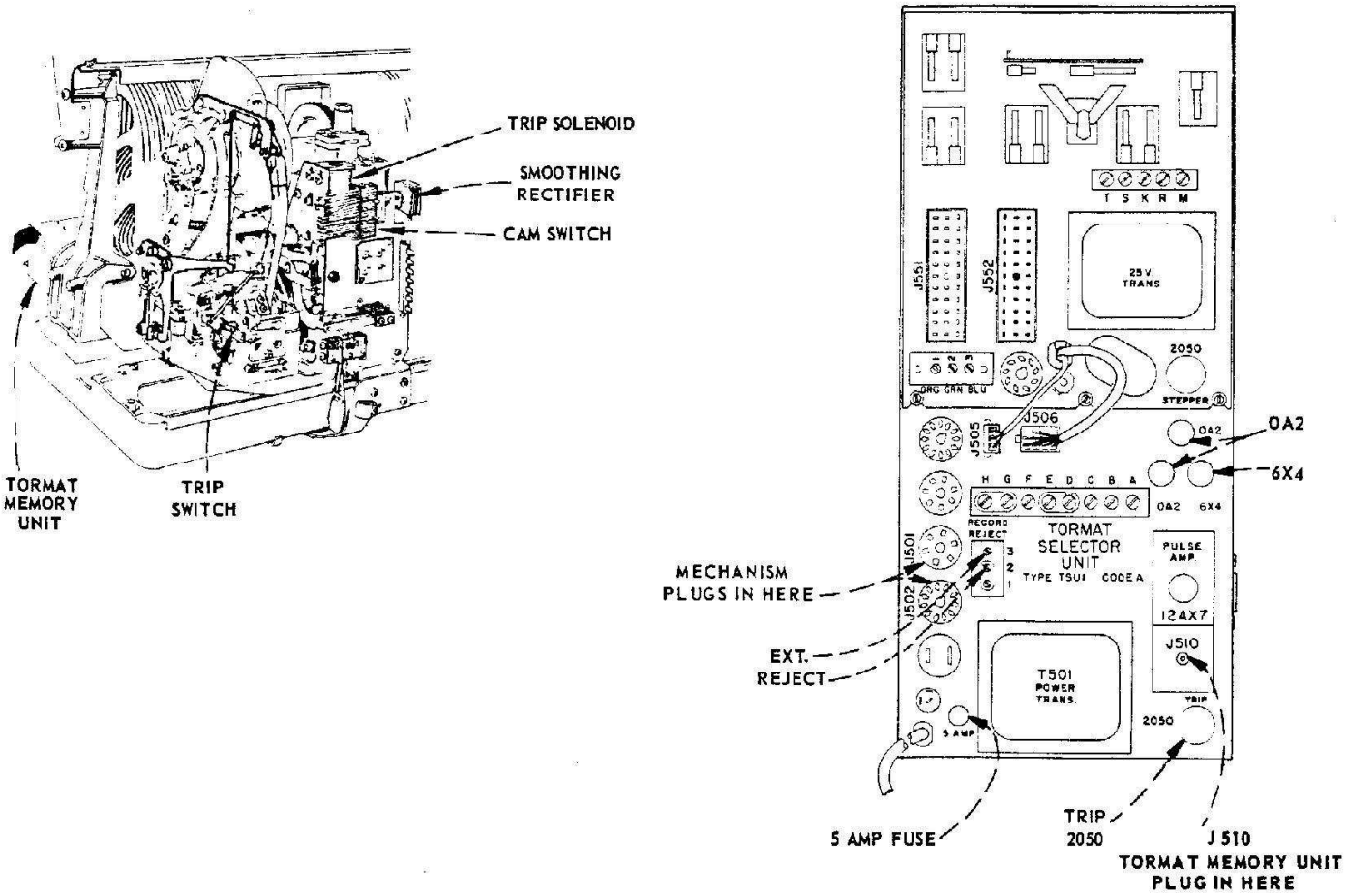






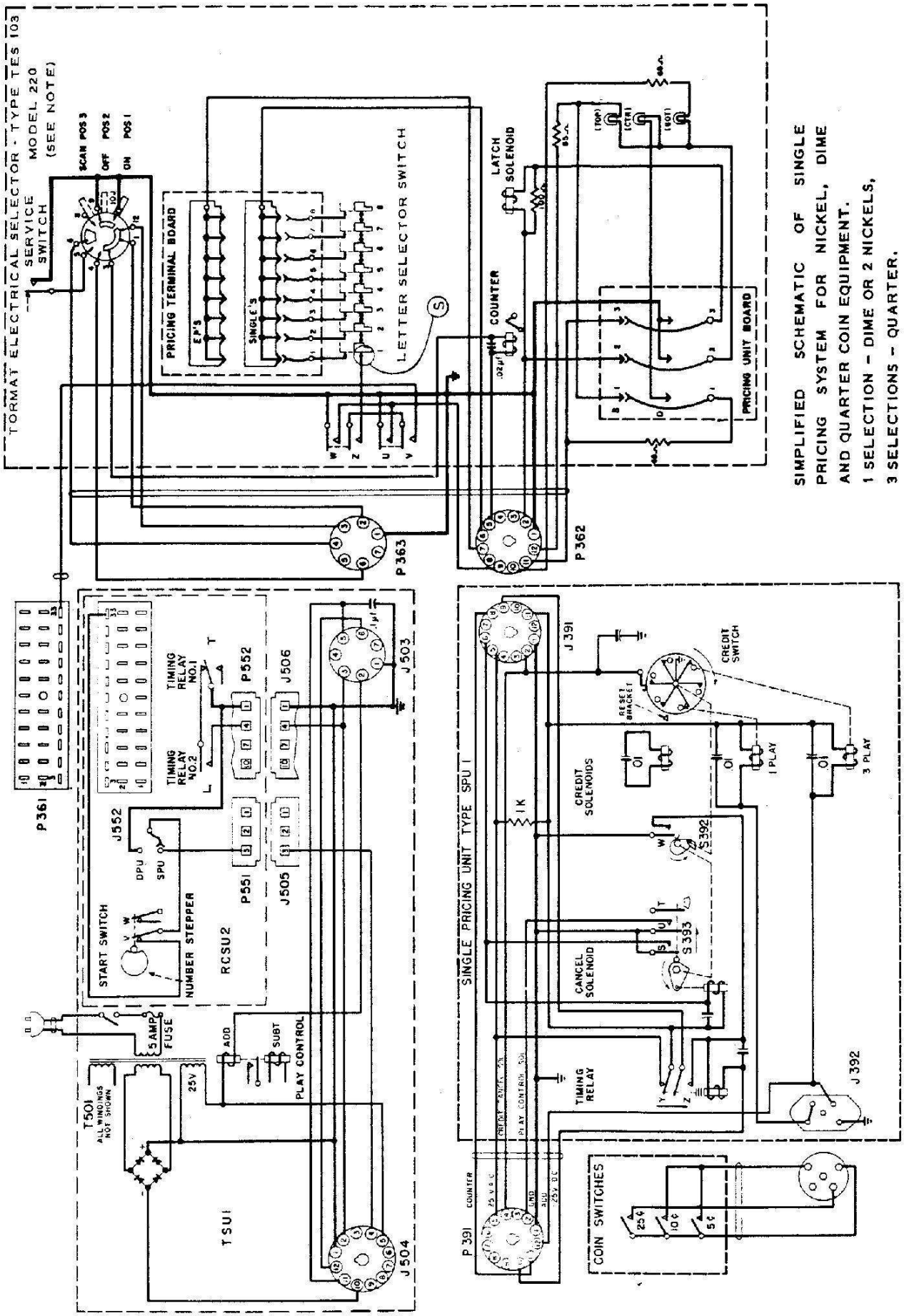
1381

TRIP & SENSING CIRCUITS, Models 220 and 222



SELECT-O-MATIC MODELS 220 AND 222

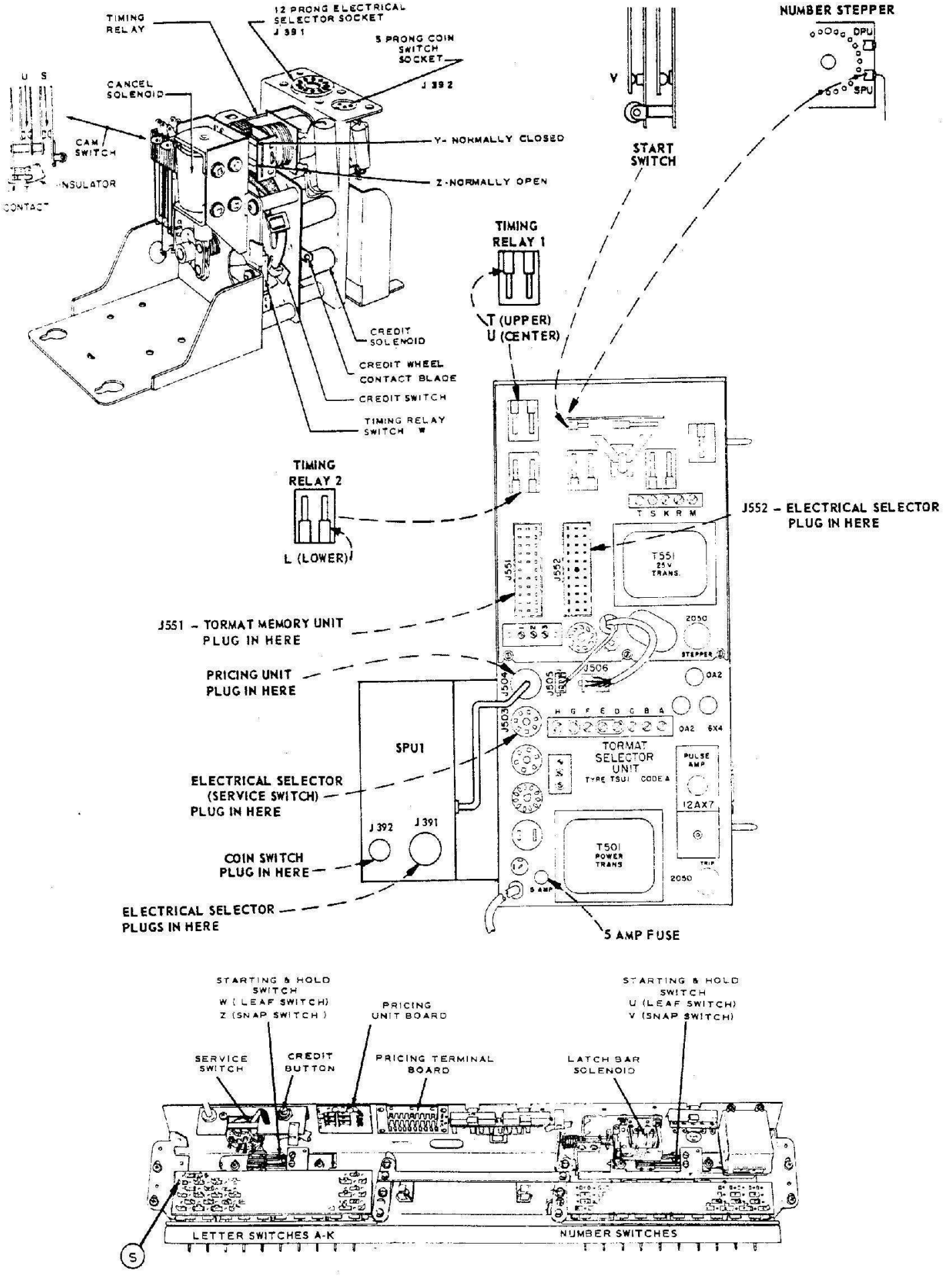
CREDIT SYSTEM WITH SINGLE PRICING UNIT (SPU1)



SIMPLIFIED SCHEMATIC OF SINGLE PRICING SYSTEM FOR NICKEL, DIME AND QUARTER COIN EQUIPMENT.
1 SELECTION - DIME OR 2 NICKELS,
3 SELECTIONS - QUARTER.

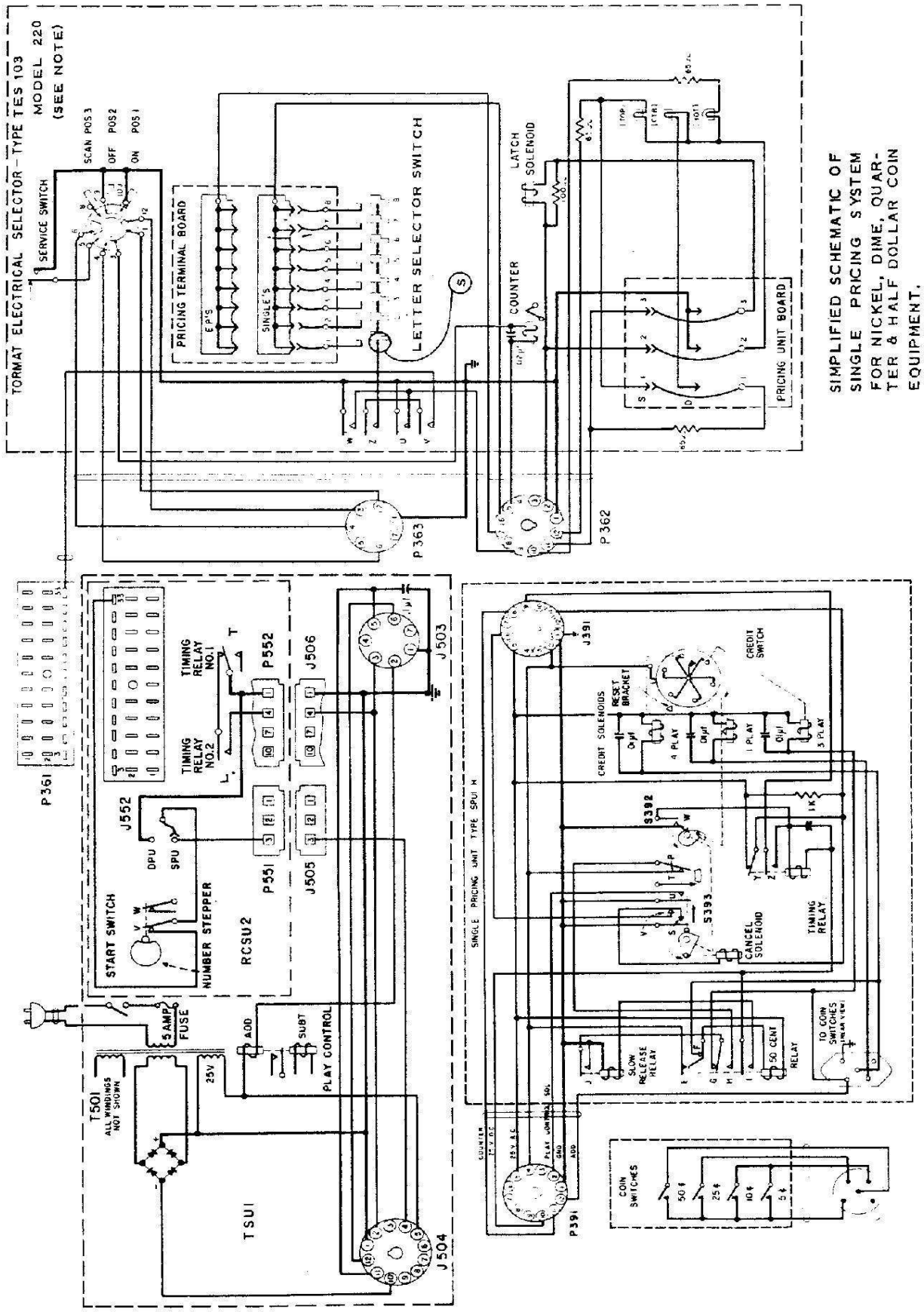
NOTE: ALL CIRCUITS AS SHOWN FOR MODELS 220 AND 222 EXCEPT ELECTRICAL SELECTOR TYPE TES 162 IS USED WITH MODEL 222.

CREDIT SYSTEM



SELECT-O-MATIC MODELS 220 AND 222

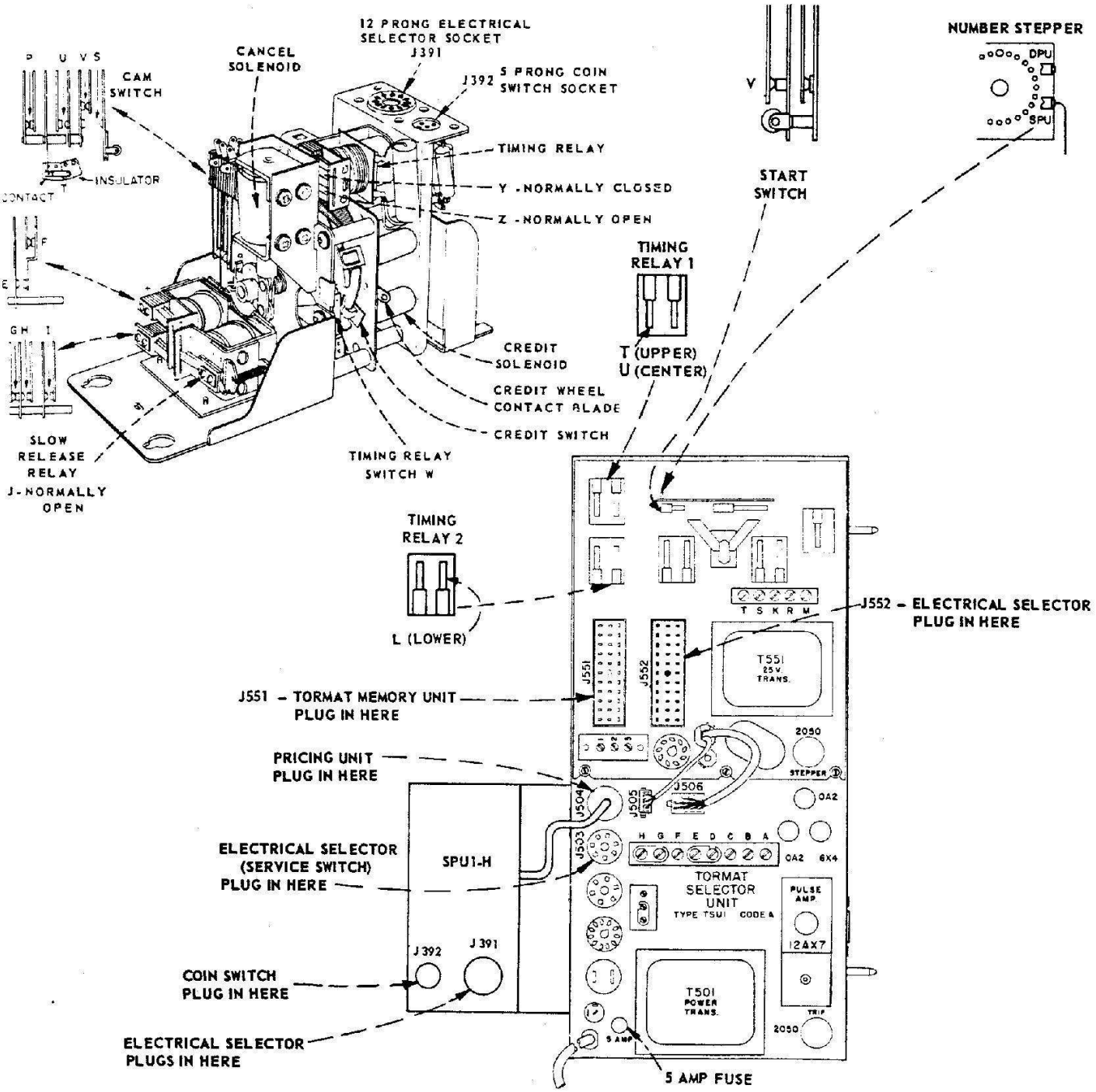
CREDIT SYSTEM WITH SINGLE PRICING UNIT (Type SPU1H)

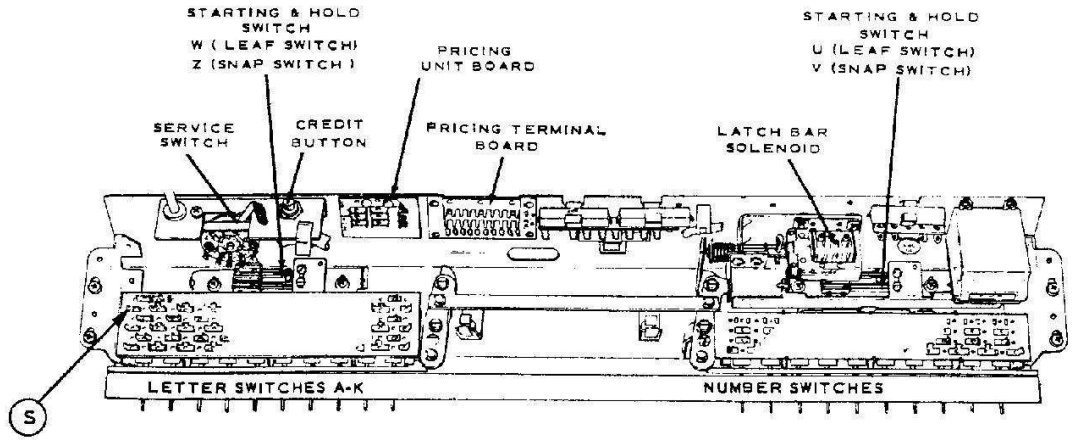


SIMPLIFIED SCHEMATIC OF SINGLE PRICING SYSTEM FOR NICKEL, DIME, QUARTER & HALF DOLLAR COIN EQUIPMENT.
1 SELECTION – DIME OR 2 NICKELS,
3 SELECTIONS – QUARTER,
7 SELECTIONS – HALF DOLLAR.

NOTE: ALL CIRCUITS AS SHOWN FOR MODELS 220 AND 222 EXCEPT ELECTRICAL SELECTOR TYPE TES 162 IS USED WITH MODEL 222.

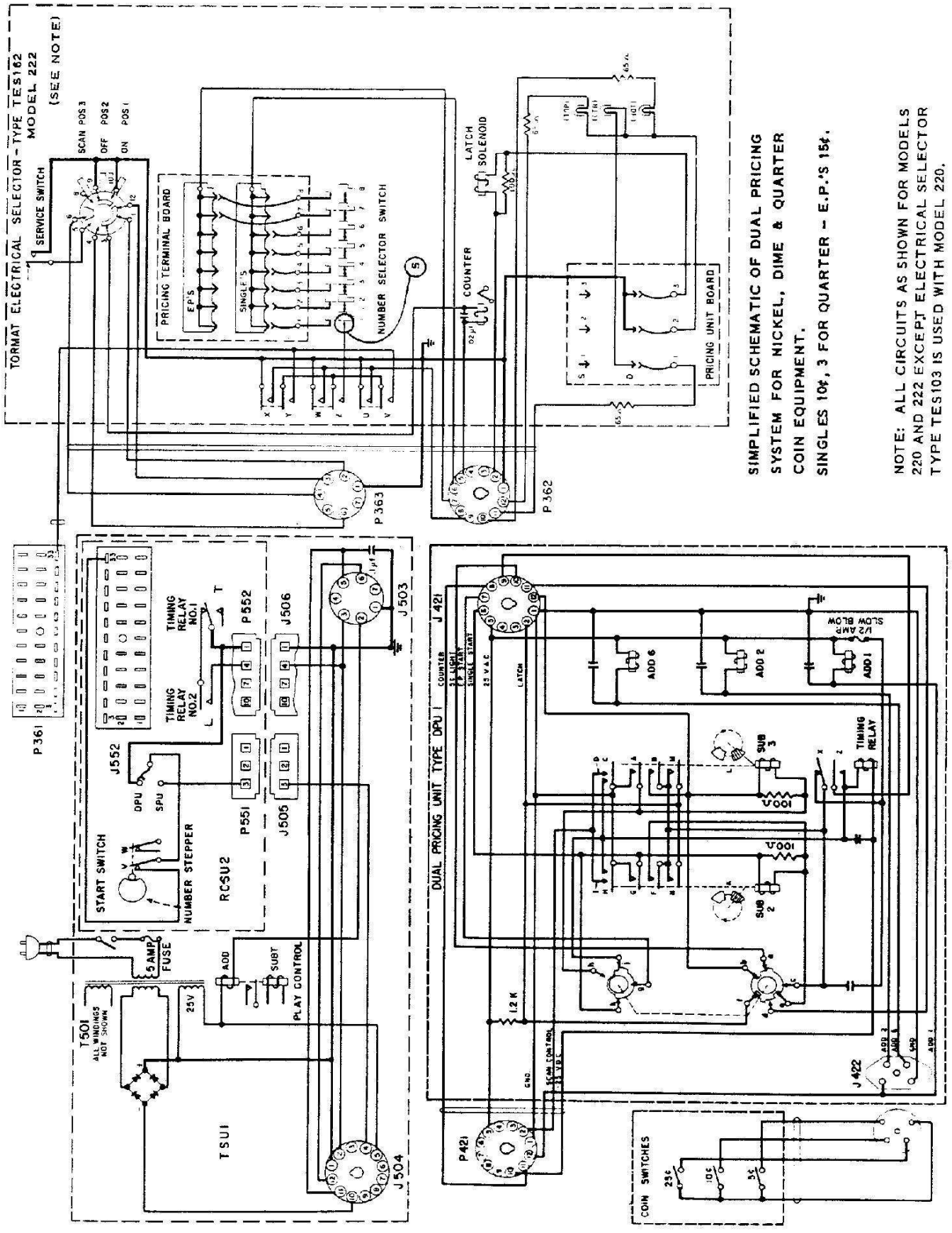
CREDIT SYSTEM



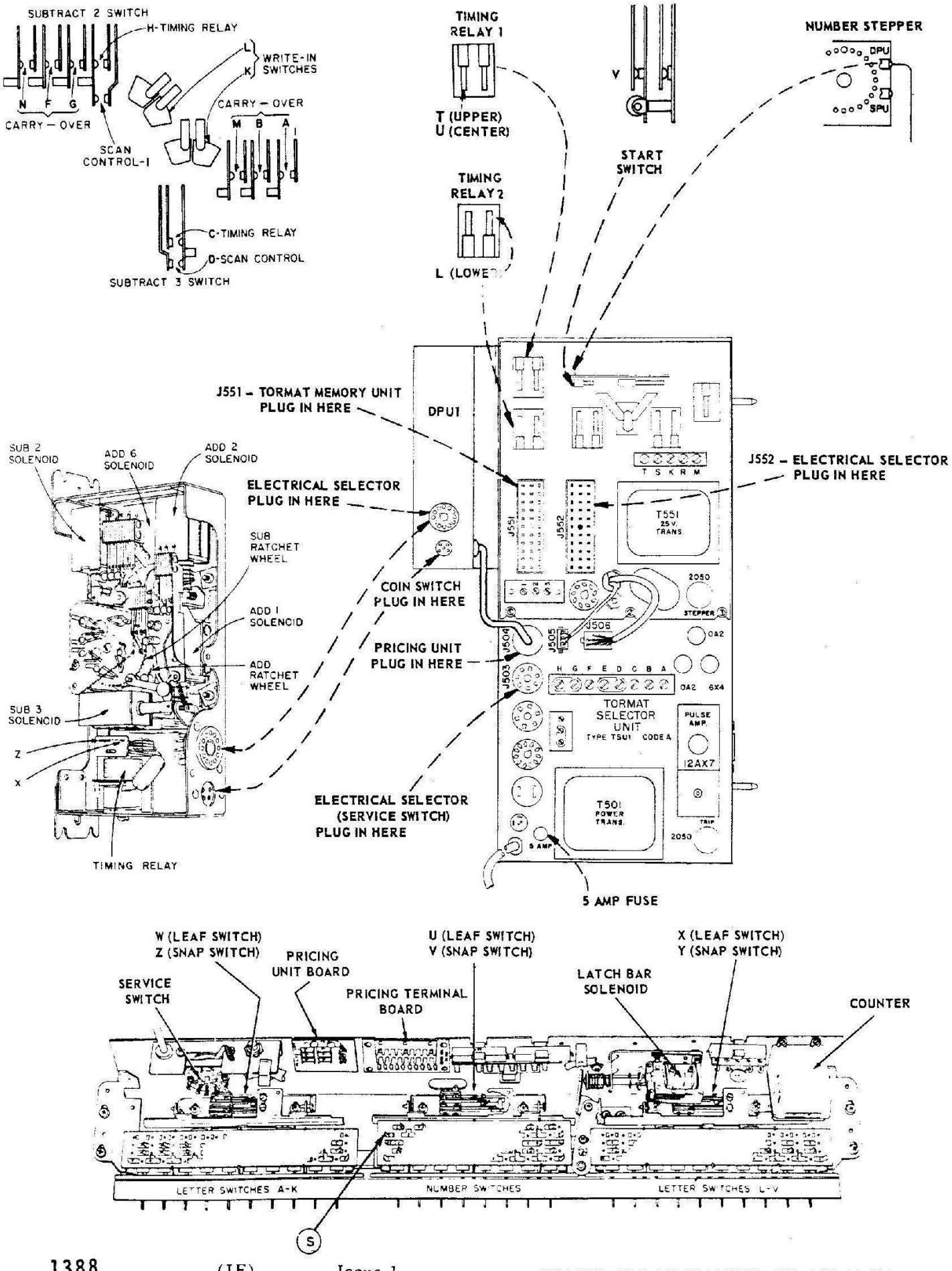


SELECT-O-MATIC MODELS 220 AND 222

CREDIT SYSTEM WITH DUAL PRICING UNIT (Type DPU1)

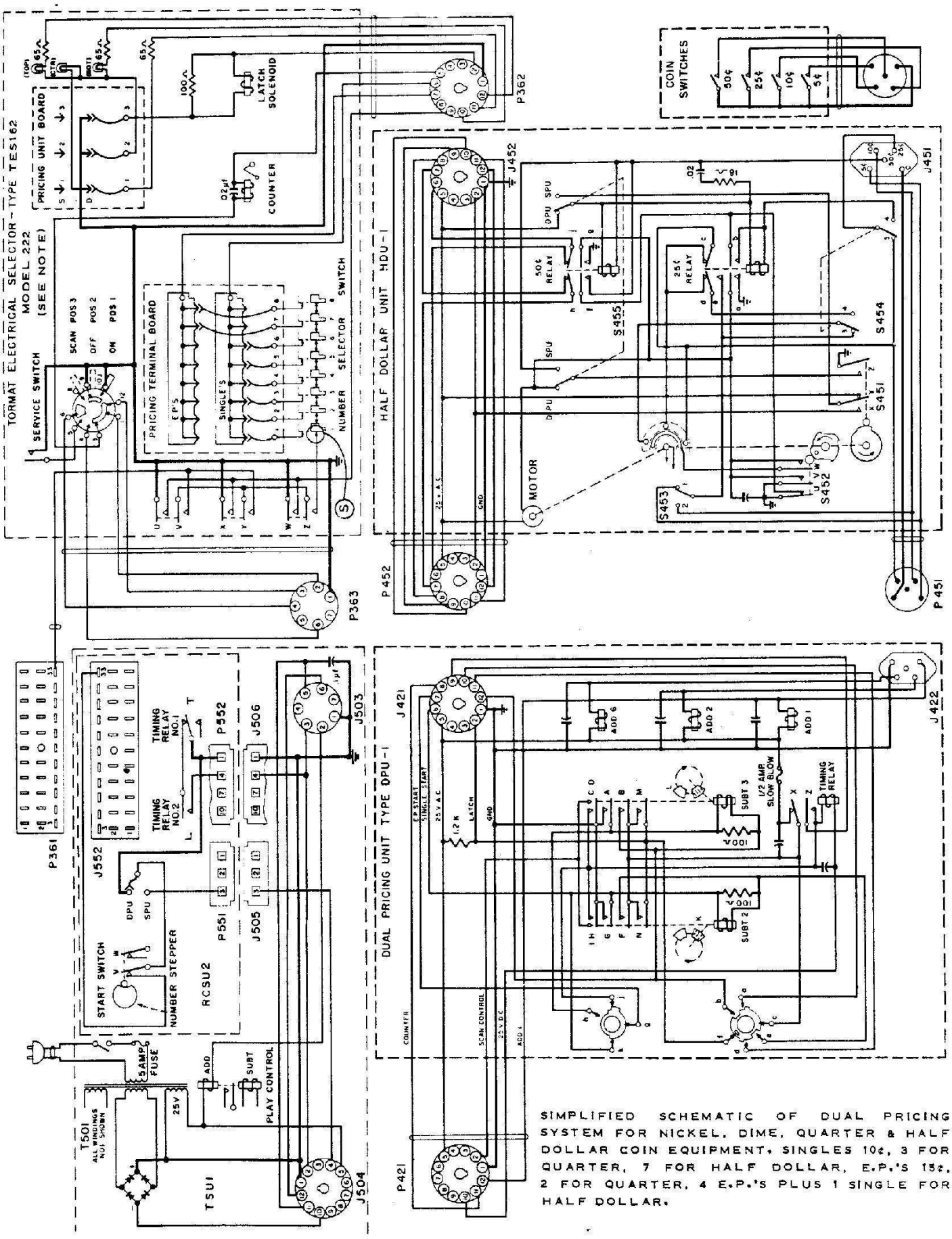


CREDIT SYSTEM



SELECT-O-MATIC MODELS 220 AND 222

CREDIT SYSTEM WITH DUAL PRICING UNIT (DPU1) AND HALF DOLLAR UNIT (HDU1)

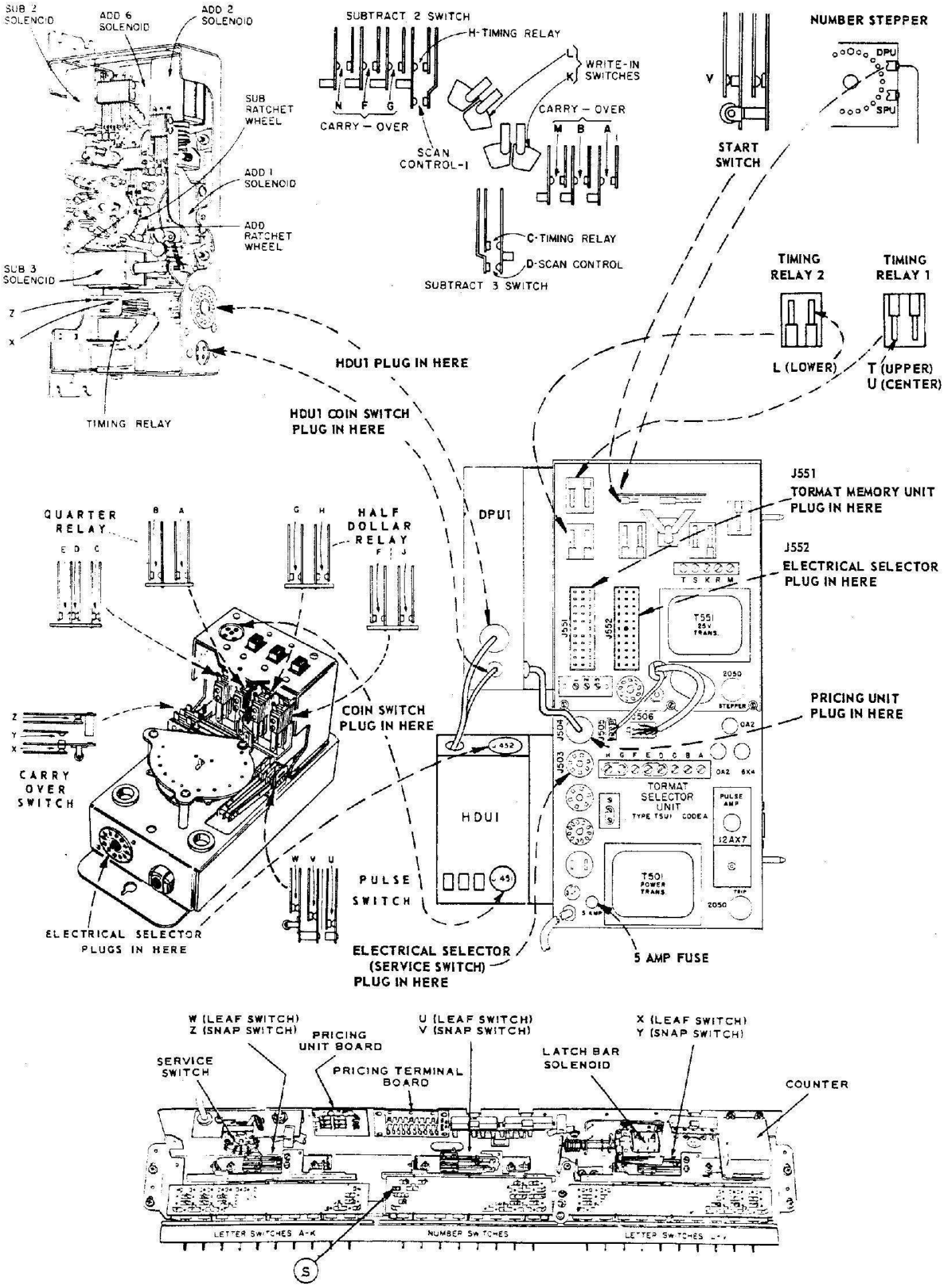


SIMPLIFIED SCHEMATIC OF DUAL PRICING SYSTEM FOR NICKEL, DIME, QUARTER & HALF DOLLAR COIN EQUIPMENT. SINGLES 10¢, 3 FOR QUARTER, 7 FOR HALF DOLLAR, E.P.'S 15¢, 2 FOR QUARTER, 4 E.P.'S PLUS 1 SINGLE FOR HALF DOLLAR.

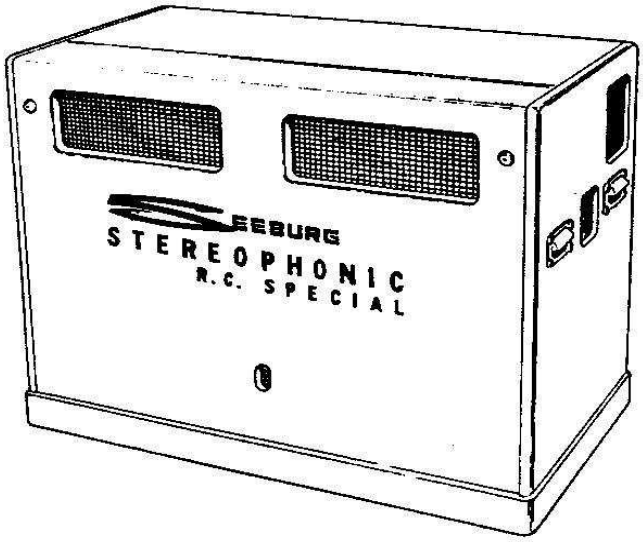
NOTE: ALL CIRCUITS AS SHOWN FOR MODELS 220 AND 222 EXCEPT ELECTRICAL SELECTOR TYPE TES103 IS USED WITH MODEL 220.

1389

CREDIT SYSTEM



SEEBURG SELECT-O-MATIC "160", MODEL H222



SPECIFICATIONS

Power Requirements

117 volts A. C., 60 cycles
Standby (without Wall-O-Matics) - 75 watts
Operating (without Wall-O-Matics) - 200 watts

Cabinet Lighting

Cabinet Lamp - 15 watt, 18-inch Cool White Fluorescent (FS25 starter)

Cabinet Key Number F264

Finish ..... wood, multi-color charcoal grey

Select-O-Matic Mechanism ..... Type 160ST3

Format Memory Assembly ..... Type 160TM2

Record Capacity ..... 80 records (160 selections)

Record Type ..... 45 rpm
7-inch diameter, 1.5 inch center hole

Pickup ..... Seeburg Stereophonic High Fidelity Magnetic

Audio Amplifier ..... Type SHFA1
13-tube, 4 transistor, high fidelity, stereophonic dual channel, constant voltage type with automatic volume compensation and transistorized equalizer stages.

Format Selector Unit ..... Type TSU2

Remote Control

Seeburg, 3-wire "Wall-O-Matic" Nominal operating voltage 25

Power Source ..... Remote Control Stepper Unit or Auxiliary Power Supply Type PS6-1Z

Maximum number of Wall-O-Matics powered by Remote Control Stepper Unit 6

Maximum number of Wall-O-Matics powered by each added auxiliary power supply 6

Remote Speakers

TW1-8C1 and TW1-8C2 - - Twin Stereo Speakers for Wall Type
TC1-8C1 and TC1-8C2 - - Twin Stereo Speakers for Corner Installation
TR1-8C1 and TR1-8C2 - - Twin Stereo Speakers for Recessed Type Installation

Transistors 4-Type 2N109

Tubes

4 - 6973	1 - 5U4G-GB
7 - 12AX7	2 - 2050
2 - 6BJ6	1 - 6X4
2 - OA2	

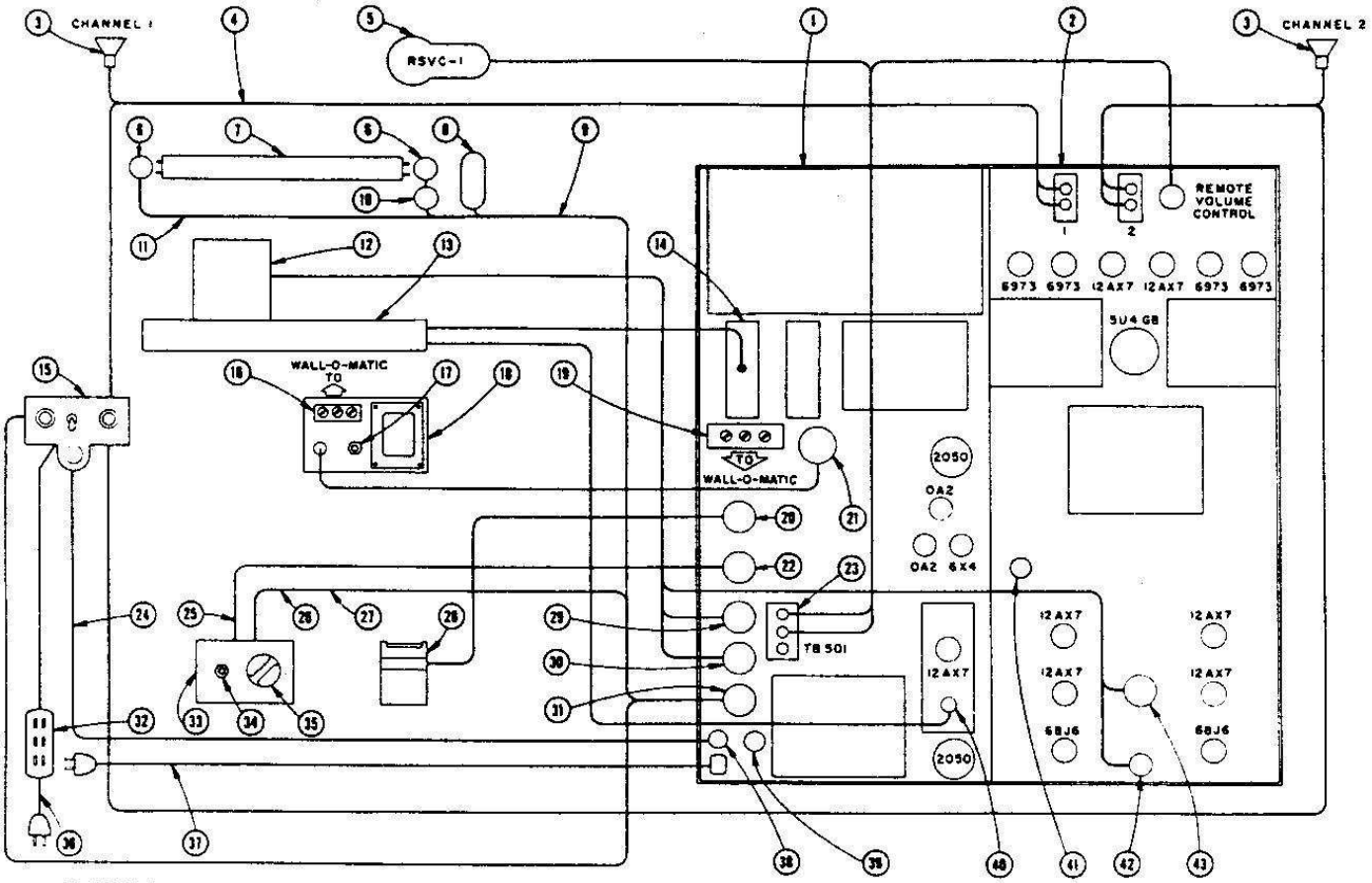
Fuses

1 - 5 amp. Type MTH
1 - 2 amp. Type MDL
1 - 3.2 amp. Type N3-2/0
1 - 5 amp. Pig-Tail Fuse, Type GJV
(used on Select-O-Matic Mechanism)

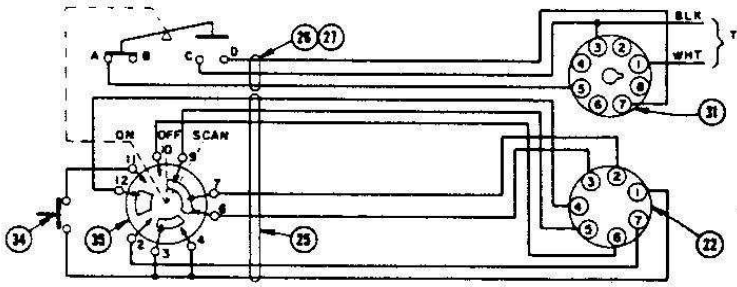
Dimensions

Height ..... 28 7/16 inches
Width ..... 32 9/16 inches
Depth ..... 25 1/2 inches
Net Weight ..... 223 Pounds
Shipping Weight ..... 263 Pounds
Record Weight:
80 Records, Approx. ..... 4.8 Pounds

The Select-O-Matic "160" Hide-Away Model H-222 is similar in most operational respects to Model 222. The Service data for the Model 222 applies.



Cabinet Cabling Diagram



Service Switch Schematic

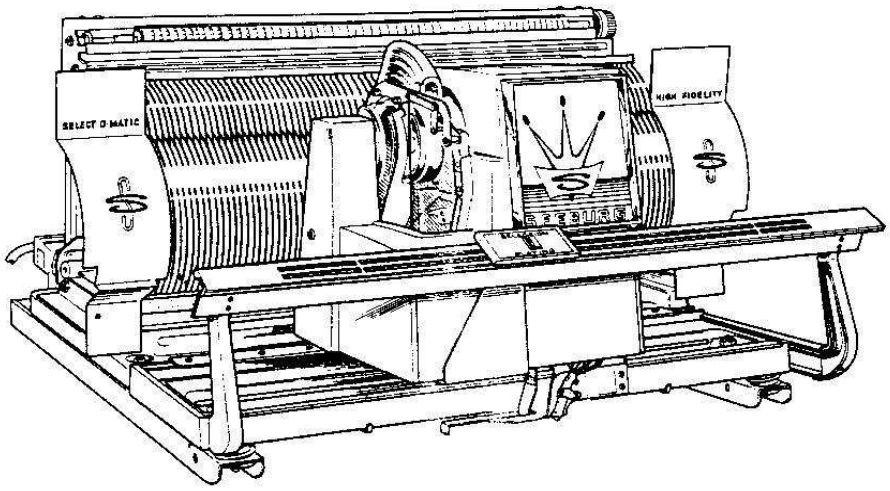
Item	Part No.	Part Name
1	307132	Type "TSU2" Tormat Selector Unit
2	305600	Type "SHFA1" Hi Fi Amplifier
3	405346	Speaker
4	475158	Speaker Cable Assembly
5	503881	Type "RSVC1" Remote Stereo Vol.Cont.
6	408628	Light Socket
7	408652	15 W. Fluorescent Light (Cool White) (GE No. F-15T8CW)
8	409546	20 W. Fluorescent Ballast (For Alternate See 409548)
	409548	20 W. Fluorescent Ballast (Alternate for 409546)
9	475047	Light Socket Cable Assembly (For Alternate See 475048)
	475048	Light Socket Cable Assembly (Alternate For 475047)
10	407353	Starter Socket
	405138	25 Watt Lamp Starter
11	475046	Light Socket Cable & Bracket Assey.
12	248214	Type "160ST3" Select-O-Matic Mech.
13	304900	Type "160TM1" Tormat Memory Assey.
14	304924	Cable Assembly
	304662	33 Prong Plug
15	475150	Toggle Light Switch Assembly
16	305309	3 Lug Terminal Board
17	303697	3.2 Amp. Slow Blowing Fuse
18	14243	Type "PSG-1Z" Power Supply
19	303362	3 Lug Terminal Strip

Item	Part No.	Part Name
20	410708	12 Prong Plug
21	14219	Power Plug & Cable Assembly
	12069	9 Prong Plug
22	408258	Plug
23	305447	3 Lug Terminal Board Assembly
24	475050	Pilot Light & Plug Assembly
25	409364	Cable Assembly (For Alt. See 409365)
	409365	Cable Assembly(For Alt. See 409364)
26	475065	Cabinet Light Switch & Motor Cont. Cable & Plug Assembly
27	475066	Cabinet Light Switch & Motor Cont. Cable
28	475022	Counter Wired Assembly
29	84223	6 Prong Socket
30	303253	11 Prong Socket
31	400695	8 Prong Plug
32	F-7867	Three Way Receptacle
33	475055	Service Switch Bracket
34	600023	Manual Trip Switch
35	475057	Service Switch
36	402781	Line Cord
37	307152	Line Cord
38	303555	3 Prong Miniature Socket
39	602411	5 Amp. Type 3AG Fuse
40	303630	Single Prong Socket
41	303087	2 Amp. Slow Blowing Fuse
42	12034	3 Prong Socket
43	84283	5 Prong Socket

SEEBURG

SELECT-O-MATIC MECHANISM

TYPE 160ST2, TYPE 160ST3



The Select-O-Matic Mechanism, Type 160ST2, is used in the stereophonic Select-O-Matic "160" Model 222. The Type 160ST3 mechanism is used in the Select-O-Matic 160 remote control hide-away Model H222. The adjustments and service information shown in the following pages, 2429 through 2470, apply to these mechanisms as indexed below.

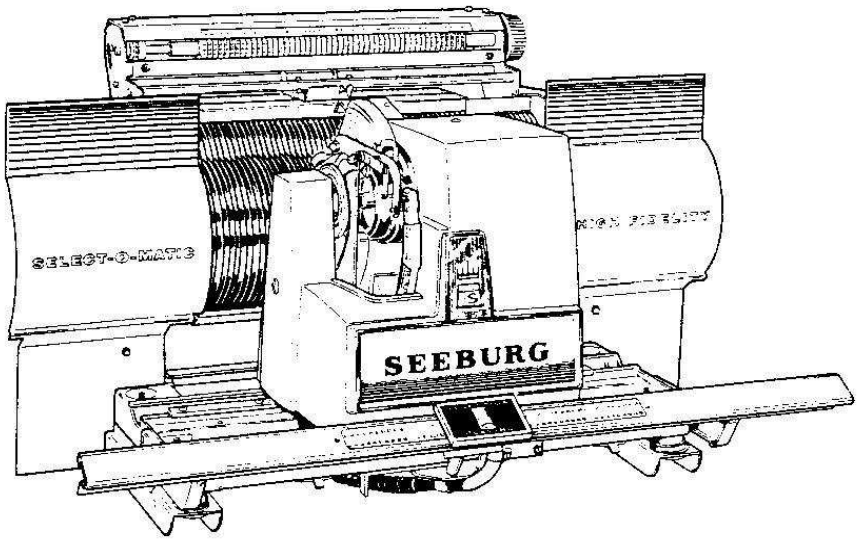
– ADJUSTMENT INDEX –

Adjustment Preface 2429
Installation of Cam Assembly, Detent Arm and Gear Segment 2430
Turntable, Shaft and Gear Installation 2431
Installation of Clamp and Transfer Arms 2432
Clutch and Housing Assembly Instructions 2433
Clutch 1 2434
Clutch 2 2435
Clutch 3 2436
Clutch 4 2437
Trip Solenoid 1 2438
Safety Lever 1 2439
Guide Roller 1 2440
Clamp Arm 1 2441
Magazine 2442
Transfer Arm 1 2443
Transfer Arm 2 2444
Tormat Memory Unit Position 2445
Contact Plunger Block 1 2446
Contact Plunger Block 2 2446
Pickup 1 2447
Pickup 2 2448
Pickup 3 2449
Pickup 4 2450
Pickup 5 2451
Pickup 6 2452
Pickup 7 2453
Pickup 8 ..... 2454A
Pickup 9 2454
Pickup 10 2455
Pickup 11 2456
Pickup 12 2457
Pickup 13 2458
Selection Playing Indicator 2459
Popularity Meter 2460
Play Control Subtract Switch 2461
Detent Switch 2462
Rubber Bumpers 2463
Reversing Switch 1 2464
Reversing Switch 2 2465
Cam Switch 2466A
Clutch and Reset Lever Switches 2466B
Lubrication Chart 2468A
Mechanism Schematic 2468B
Wiring Diagram, Tormat Memory Unit .. 2470B

SEEBURG

SELECT-O-MATIC MECHANISM

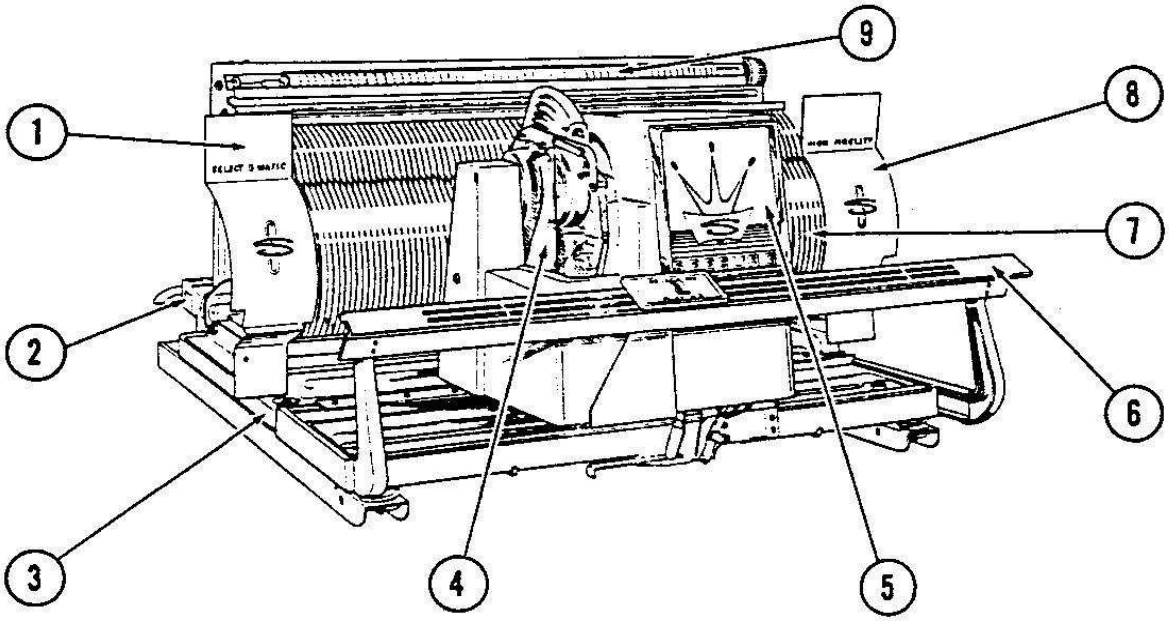
TYPE 145ST4



The Select-O-Matic Mechanism, Type 145ST4, is used in the stereophonic Select-O-Matic "100" Model 220. The adjustments and service information shown in the following pages, 2429 through 2470, apply to these mechanisms as indexed below.

- ADJUSTMENT INDEX -

Adjustment Preface 2429
Installation of Cam Assembly, Detent Arm and Gear Segment 2430
Turntable, Shaft and Gear Installation 2431
Installation of Clamp and Transfer Arms 2432
Clutch and Housing Assembly Instructions 2433
Clutch 1 2434
Clutch 2 2435
Clutch 3 2436
Clutch 4 2437
Trip Solenoid 1 2438
Safety Lever 1 2439
Guide Roller 1 2440
Clamp Arm 1 2441
Magazine 2442
Transfer Arm 1 2443
Transfer Arm 2 2444
Tormat Memory Unit Position 2445
Contact Plunger Block 1 2446
Contact Plunger Block 2 2446
Pickup 1 2447
Pickup 2 2448
Pickup 3 2449
Pickup 4 2450
Pickup 5 2451
Pickup 6 2452
Pickup 7 2453
Pickup 8 ..... 2454A
Pickup 9 2454
Pickup 10 2455
Pickup 11 2456
Pickup 12 2457
Pickup 13 2458
Selection Playing Indicator 2459
Popularity Meter 2460
Play Control Subtract Switch 2461
Detent Switch 2462
Rubber Bumpers 2463
Reversing Switch 1 2464
Reversing Switch 2 2465
Cam Switch 2466A
Clutch and Reset Lever Switches 2466B
Lubrication Chart 2468A
Mechanism Schematic 2468B
Wiring Diagram, Tormat Memory Unit .. 2470B



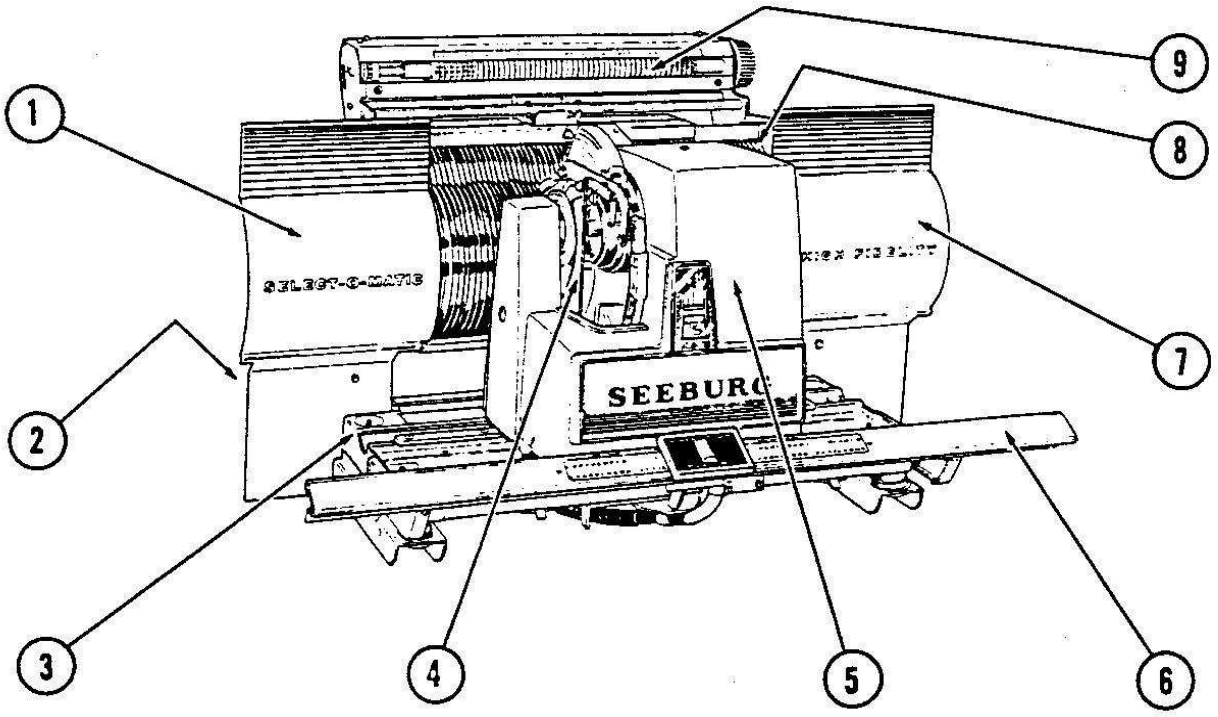
MECHANISM TYPE 160ST2

For

Model 222

PARTS LIST

Item	Part No.	Part Name	Item	Part No.	Part Name
1	248255	Magazine End Trim, L.H.	6	248389	Selection Playing Indicator Assy. (Page 2427G-17)
	248259	Magazine End Trim Mounting Bracket, Lower Left Hand	7	247140	Magazine Filler
	961025	8-32 X ½ Slotted Ind. Hex Washer Hd. Self Tapping Screw		900810	Nut - Tinnerman
	913017	6/32 X ¼ Acorn Hex Washer H.M.S.		960670	No. 6 X ½ Slotted Ind. Hex Washer
	901160	6-32 Keps Hex Nut		925321	Lock Washer
2	304900	Tormat Memory Unit (Page 2427G-22)		920840	Flatwasher
3	248193	Base Assembly (Page 2427G-19)		961183	10-32 X 5/16 Hex. Washer H.S.T.S.
4	249266	Carriage Assembly (Page 2427G-7 to 2427G-10)	8	248254	Magazine End Trim, R.H.
5	248395	Carriage Cover Assembly		248258	Magazine End Trim Mounting Bracket, Lower R.H.
	248396	Carriage Cover		961025	8-32 X ½ Self Tapping Screw
	248262	Escutcheon		913017	6-32 X ¼ Acorn Hex Washer H.M.S.
	248398	Carriage Cover Escutcheon Insert		901160	6-32 Keps Hex Nut
	988233	Grommet	9	———	Popularity Meter Dial & Shaft Assy. (Page 2427G-13)
	905650	Retainer - Tinnerman		248230	Popularity Meter Actuator Assy. (Page 2427G-15)
	248188	Shoulder Screw			
	914681	8-32 X ¾ Phillips Truss H.M.S.			



MECHANISM TYPE 145ST4

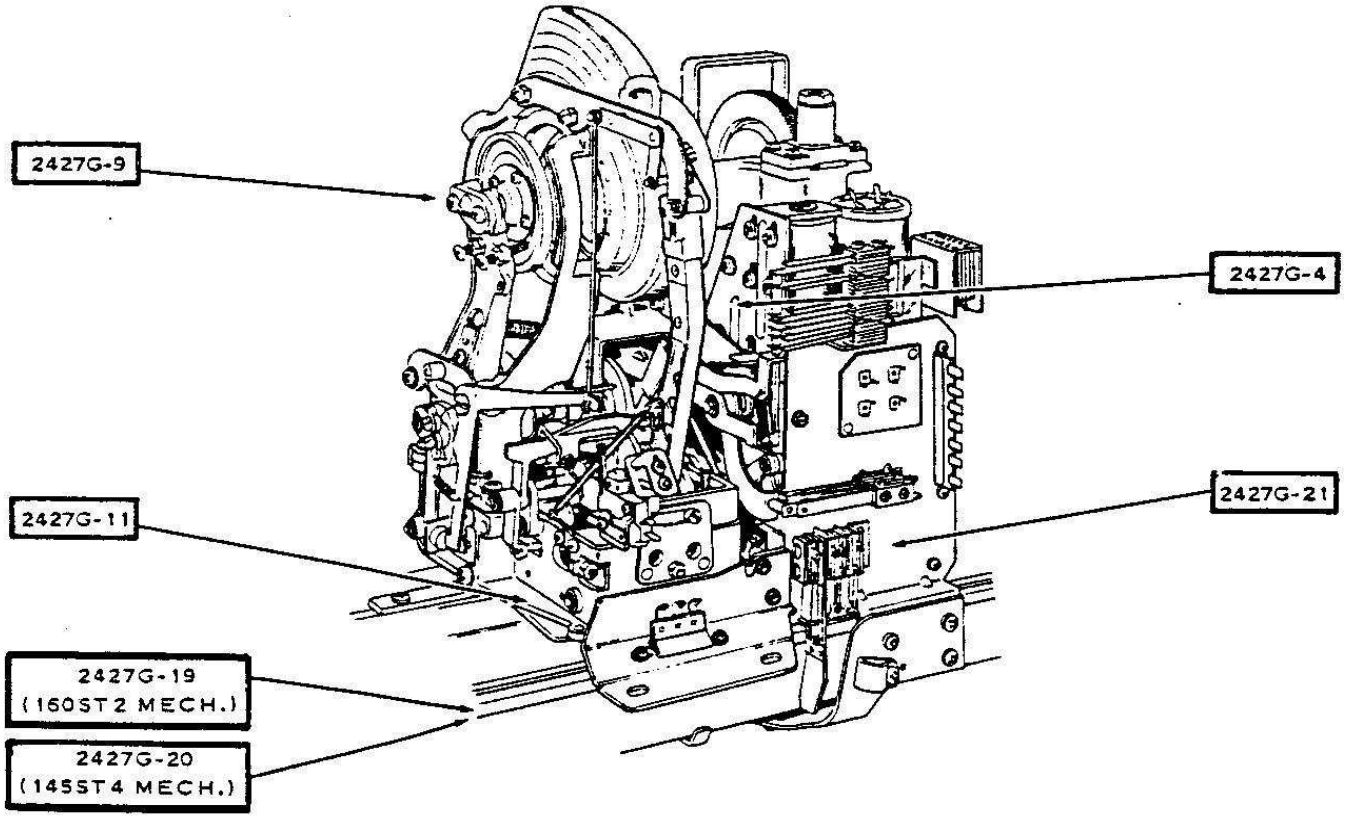
For

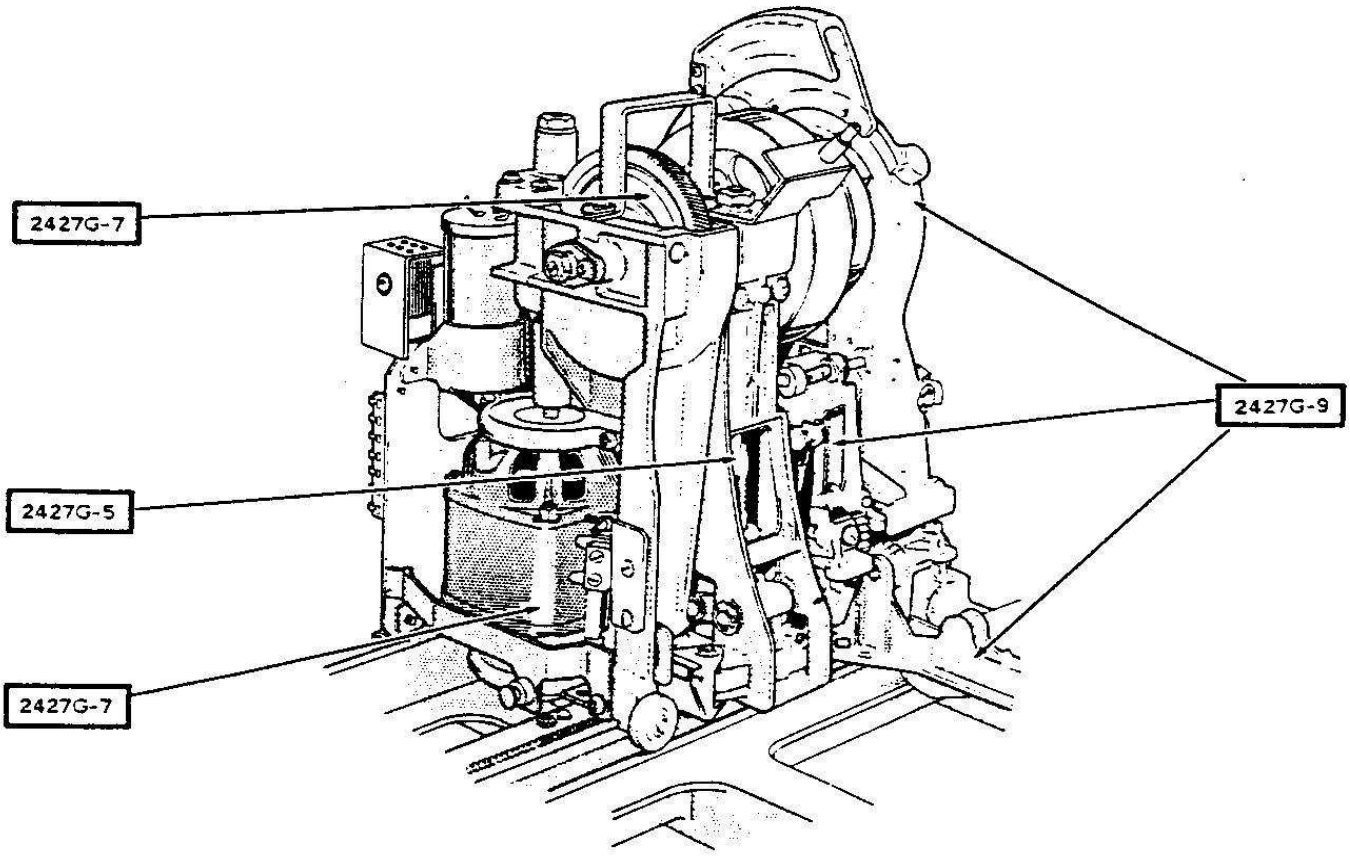
Model 220

PARTS LIST

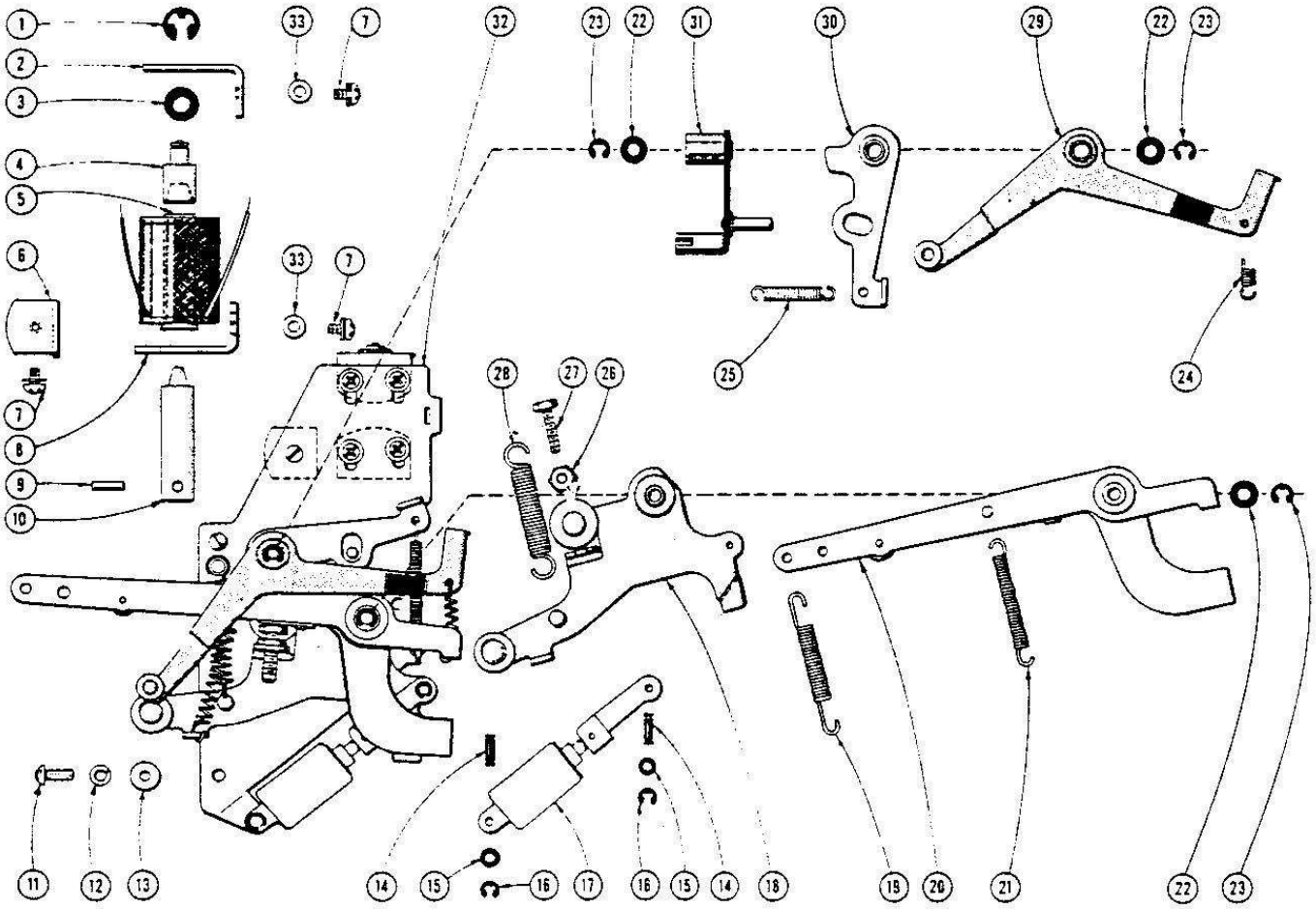
Item	Part No.	Part Name
1	249331	Magazine End Trim, L.H.
	248259	Magazine End Trim Mounting Bracket, Lower L.H.
	961025	8-32 X ½ Self Tapping Screw
	913017	6-32 X ¼ Acorn Hex. Washer H.M.S.
	901160	6-32 Keps Hex Nut
2	304701	Tormat Memory Unit (Page 2427G-22)
3	249040	Base Assembly (Page 2427G-20)
4	249266	Carriage Assembly (Page 2427G-7 to 2427G-10)
5	249382	Carriage Cover Assembly
	249383	Carriage Cover
	249384	Escutcheon Insert Assembly
	903101	Zip-on Nut - Tinnerman
	914681	8-32 X ⅜ Phillips Truss H.M.S.
	248188	Shoulder Screw
6	249291	Selection Playing Indicator (Page 2427G-18)
7	249330	Magazine End Trim R.H.
	248258	Magazine End Trim Mounting Bracket, Lower, R.H.
	961025	8-32 X ½ Self Tapping Screw
	913017	6-32 X ¼ Acorn Hex Washer H.M.S.
	901160	6-32 Keps Hex Nut
8	247140	Magazine Filler
	900810	Nut - Tinnerman
	960670	No. 6 X ½ Slotted Ind. Hex Washer
	925321	Lock Washer
	920840	Flatwasher
	961183	10-32 X 5/16 Self Tapping Screw
9	——	Popularity Meter Dial & Shaft Assembly (Page 2427G-13)
	248230	Popularity Meter Actuator Assembly (Page 2427G-15)

CARRIAGE ASSEMBLY PARTS INDEX
ENCLOSED NUMERIALS INDICATE PAGE NUMBERS





2427G-3



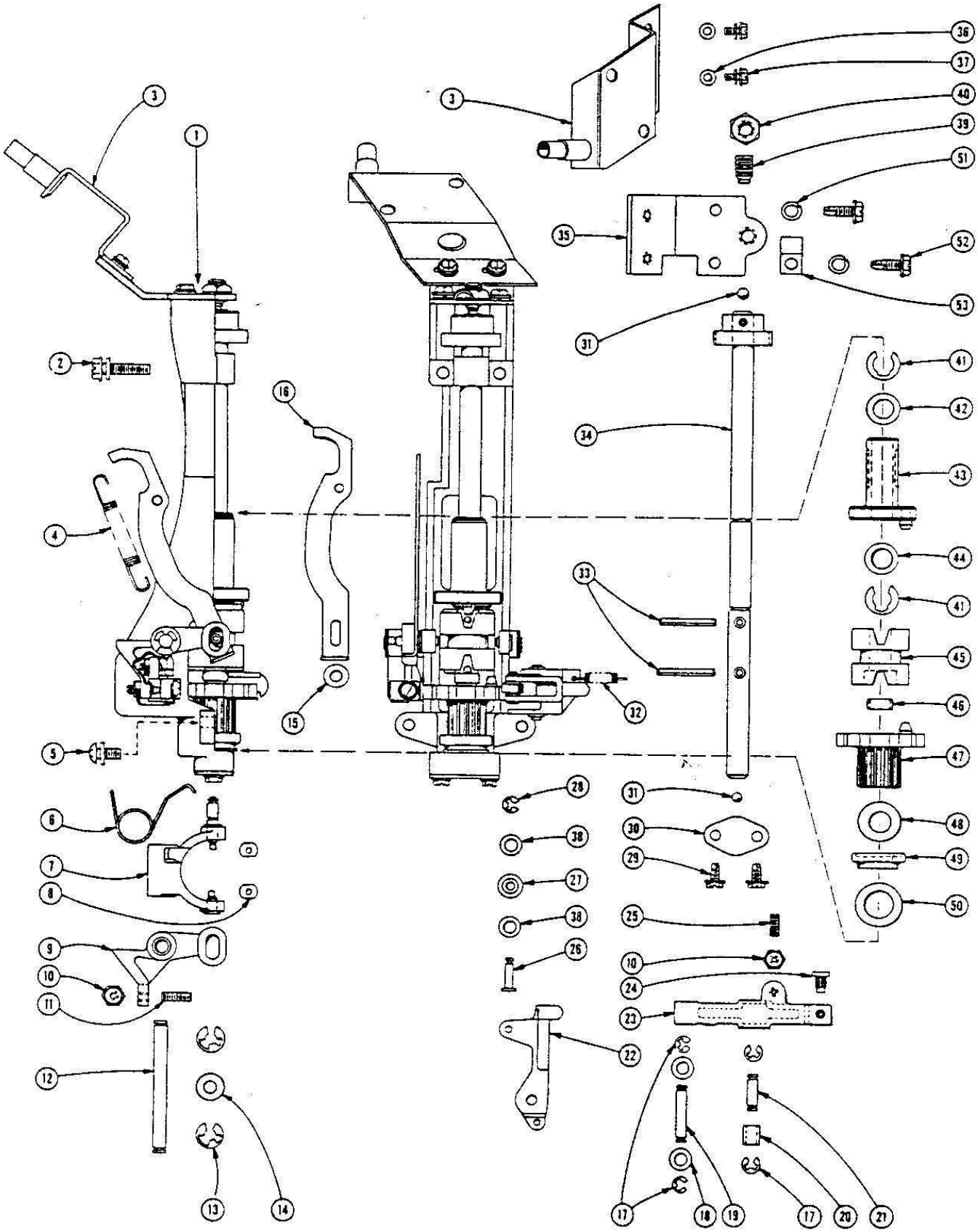
TRIP MECHANISM ASSEMBLY - Part No. 247520

PARTS LIST

Item	Part No.	Part Name
1	S229220	Retaining Ring
2	245575	Solenoid Bracket - Top
3	400602	Rubber Washer
4	245576	Plug Assembly
5	247510	Solenoid
6	245582	Trip Plate Support Bracket
7	914188	8-32 x 1/4 Sems Fastener
8	245579	Solenoid Bracket - Bottom
9	952250	5/32 x 7/16 Roll Pin
10	245581	Plunger
11	914375	8-32 x 3/8 Phillips Pan H.M.S.
12	925401	No. 8 Lock Washer
13	921015	Flat Washer
14	245523	Dash Pot Pivot Pin
15	920600	Flat Washer
16	125448	Retaining Ring
17	245595	Dash Pot Assembly
18	245588	Reset Lever & Roller Assembly
19	245248	Clutch Spring
20	245525	Clutch Shifting Lever Assembly
21	245573	Clutch Shifting Lever Spring
22	921061	Flat Washer
23	R231163	Snap Washer
24	247214	Switch Lever Spring
25	245552	Latch Lever Spring
26	901660	8-32 Hexagon Nut
27	245557	Adjustment Screw
28	245550	Reset Lever Spring
29	245539	Switch Lever Assembly
30	245593	Latch Lever Assembly
31	245545	Trip Lever Assembly
32	245583	Mounting Plate
33	920910	Flat Washer

SELECT-O-MATIC MECHANISM, Type 160ST2 and 145ST4

Select-O-Matic "160", Model 222 and "100", Model 220.

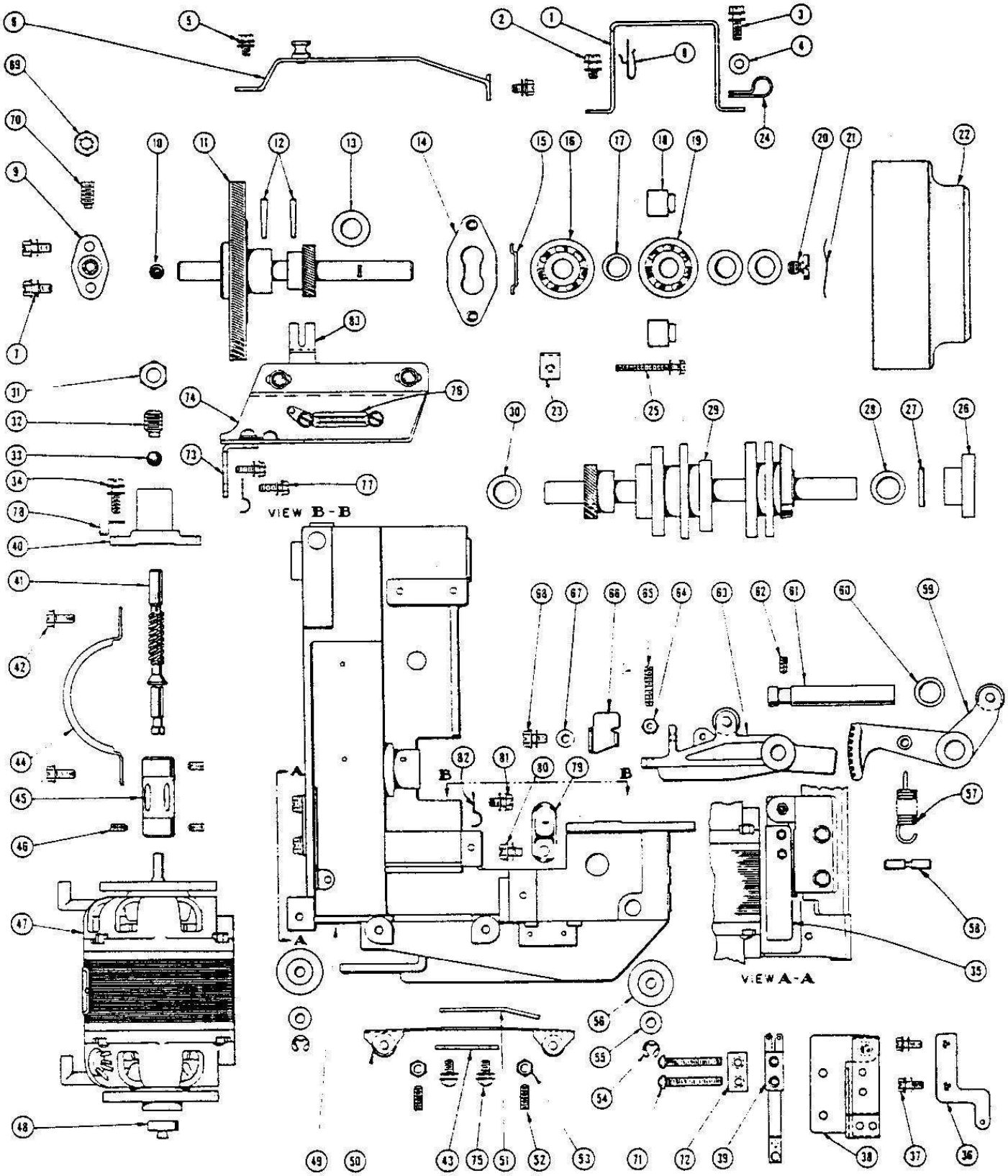


CLUTCH ASSEMBLY - Part No. 249400

2427G-5

PARTS LIST for CLUTCH ASSEMBLY

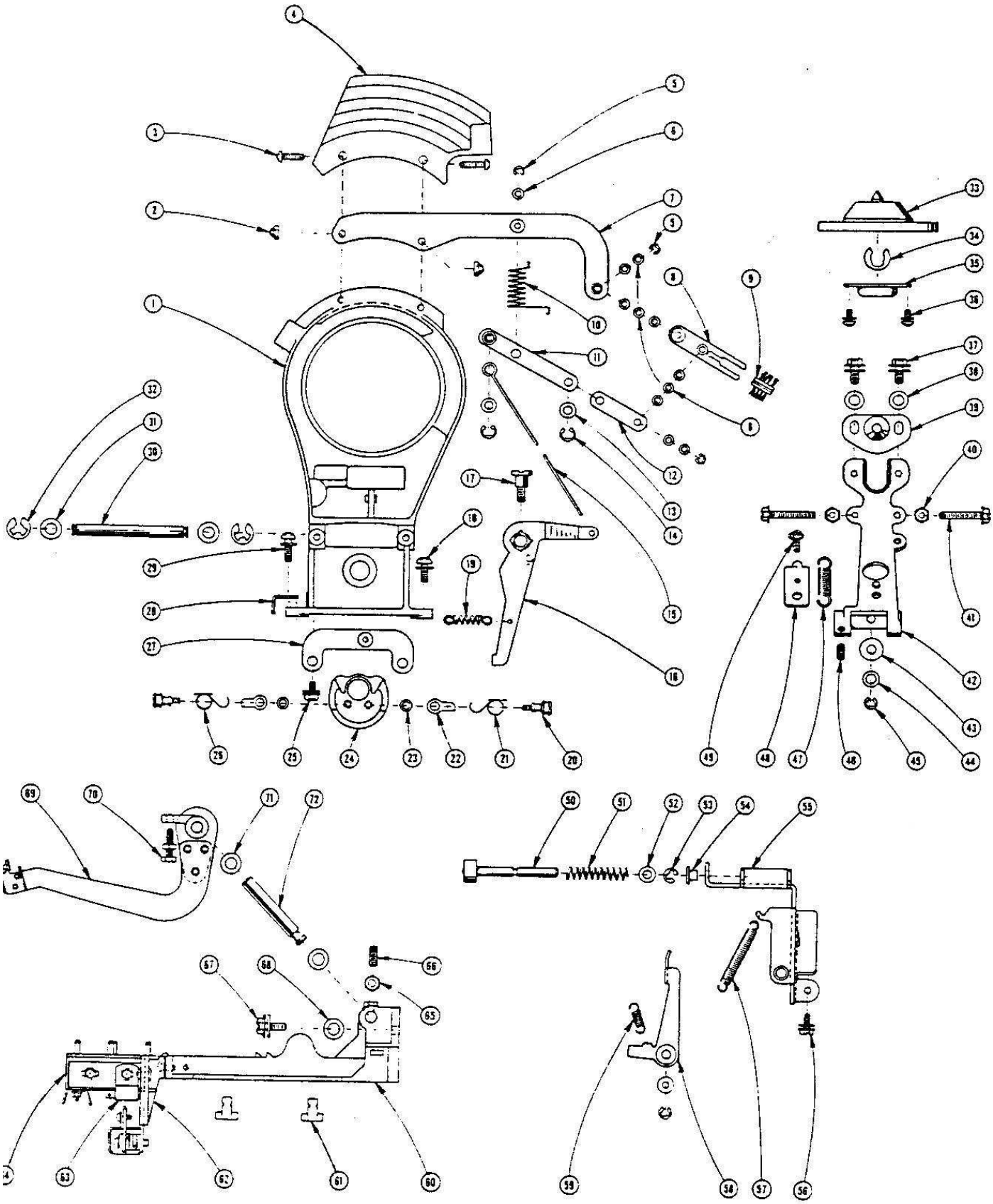
Item	Part No.	Part Name
1	245406	Clutch Housing Assembly
2	915809	Sems 10-32 x 7/8
3	248218	Drive Tube & Bracket Assembly
4	245248	Clutch Spring
5	915578	Sems 10-32 x 1/2
6	A250141	Detent Arm Retarding Spring
7	245408	Clutch Yoke Assembly
8	A250529	Bearing Block
9	245427	Clutch Yoke Lever
10	901660	8-32 Hex Nut Steel-Cad
11	918634	8-32 x 5/8 Oval Point Slotted Head Set Screw
12	A250516	Clutch Yoke Shaft
13	S229220	Snap Washer
14	921551	Flatwasher, Spring Steel Blue
15	921065	Flatwasher, Steel Blue
16	245426	Connecting Link
17	R231163	Snap Washer
18	921061	Flatwasher, Spring Steel Blue
19	249409	Detent Arm Pivot Pin
20	A250518	Detent Arm Roller
21	A250519	Detent Arm Roller Pin
22	249407	Detent Switch Actuator Arm
23	A250506	Clutch Detent Arm
24	246438	Detent Arm Stud
25	918612	8-32 x ½ Oval Point Slotted Headless Set Screw, black ox.
26	245413	Worm Blank Assembly
27	247414	Roller
28	125448	Retaining Ring
29	961001	8-32 x 5/16 Indented Hex Washer Hd. Self Tapping Screw
30	245424	Thrust Plate
31	A250125	.1875 ± .0001 Steel Ball
32	247214	Spring
33	952241	Spiral Pin
34	247627	Shaft & Gear Assembly
	245411	Clutch Shaft
	247625	Helical Gear
	952170	Roll Pin
35	249402	Bracket – Thrust Screw
36	920735	Flatwasher
37	913026	Sems
38	920600	Flatwasher
39	918970	Socket Head Set Screw
40	904403	5/16 Hex Nut, Steel Cad
41	A250507	Snap Washer
42	922175	Flatwasher, Spring Steel Blue
	922170	Flatwasher, Spring Steel Blue
	922165	Flatwasher, Spring Steel Blue
43	247626	Worm – Clutch Shaft
44	922175	Flatwasher, Spring Steel Blue
45	249403	Clutch Member
46	245418	Pinion Spacer
47	247609	Pinion Assembly
48	245421	Thrust Washer – Upper
49	245422	Spacer – Clutch Shaft
50	245423	Thrust Washer – Lower
51	925492	Kantlink Lockwasher
52	961182	10-32 x ½ Slot. Indt. Hex. Wash. Hd. S.T.S.
53	402098	Cable Clamp



CARRIAGE FRAME ASSEMBLY - Part No. 249266

PARTS LIST for CARRIAGE FRAME ASSEMBLY

Item	Part No.	Part Name
1	246157	Carriage Cover Bracket - Top
2	914188	Sems 8-32 X ¼
3	914542	Sems 8-32 X ½
4	920840	Flatwasher, Steel-Cad
5	914188	Sems 8-32 X ¼
6	246353	Guide Stud & Bracket Assy.
7	961008	Sems 8-32 X 3/8
8	201058	Cable Clamp
9	247226	Thrust Screw Casting
10	250125	Steel Bal.1875 ±.0001 Diam.
11	249370	Turntable Shaft & Gear Assy.
	245046	Turntable Shaft
	249318	Turntable Shaft - Worm Gear
	247354	Turntable Shaft - Helical Gear
12	951790	3/0 X ¾ Taper Pin
13	922272	Flatwasher Spring Steel Blue
	922271	
	922270	
14	245467	Drive Arm Assembly
15	245055	Drive Arm Locating Washer
16	245056	Ball Bearing
17	245057	Ball Bearing Spacer
18	245464	Drive Bushing
19	245056	Ball Bearing
20	245058	Bearing Retainer Screw
21	924705	Spring Washer
22	245060	Turntable - Finished
23	245479	Turntable Retainer
24	602190	Cable Clamp
25	913717	Sems 6-32 X 1-3/8
26	247377	Brake Cam
27	952180	1/8 Diam. X ⅜ Roll Pin
28	922600	Flatwasher
	922601	
	922602	
	922603	
29	249371	Cam & Gear Assembly
30	250064	Thrust Washer - Cam Shaft
31	904403	5/16 - 24 Hex Nut
32	918971	Set Screw
33	245180	Steel Ball, .250±.0001 Dia.
34	914542	Sems 8-32 X ½
35	249237	Detent Switch Cover
	900720	5-40 Hex Nut
36	249236	Spring Anchor Bracket
37	913122	Sems 6-32 X 5/16
38	249232	Detent Switch Bracket Assy.
39	249235	Detent Switch
40	245026	Bearing Bracket Assembly
41	245044	Turntable Shaft Worm
42	961008	Sems 8-32 X 3/8
43	245299	Spacer (Guide Roller Spring)
44	250111	Clamp Bracket
45	245083	Motor Coupling Assembly
46	918532	8-32 X 3/16 Unbrako Knurled Cup Point Socket Head Set Screw
47	250251	Motor (Bodine)
	250278	Motor (Westinghouse)
48	245086	Motor Support Plug
49	245021	Carriage Frame Assembly
50	245031	Guide Roller & Spring Assembly
51	245965	Guide Roller Leaf Spring
52	918612	8-32 X ½ Oval Point Slotted Headless Set Screw
53	901660	8-32 Hex Nut
54	R231163	Snap Washer
55	921061	Flatwasher Spring Steel Blue
56	245082	Carriage Roller
57	245080	Gear Segment Spring
58	245081	Spring Pin
59	245041	Gear Segment Assembly
60	922170	Flatwasher Spring Steel Blue
	922165	Flatwasher Spring Steel Blue
	922160	Flatwasher Steel Blue
61	245043	Shaft
62	918751	10-32 X ¼ Cup Point Allen Head Set Screw
63	245037	Detent Arm Lever Assembly
64	902360	10-32 Hex Nut
65	918830	10-32 X ⅜ Oval Point Slotted Headless Set Screw
66	245040	Adjustment Plate
67	920840	Flatwasher
68	914188	Sems 10-32 X ¼
69	903801	¼ - 20 Hex Nut
70	918921	Set Screw
71	912696	5-40 X 1-1/8 Phillips R.H.M.S.
72	200028	Tapping Plate
73	248289	Angle Bracket
74	248288	Mounting Indicator Drive Bracket
	914110	Sems 8-32 X ¼
75	914332	8-32 X 3/8
76	305112	Terminal Strip
	913026	Sems 6-32 X ¼
	940755	Solder Lug
77	914425	Sems 8-32 X 3/8
78	941670	Hook
79	F-1960	Cable Clamp
80	914188	Sems 8-32 X ¼
81	914425	Sems 8-32 X 3/8
82	402098	Clamp
83	248251	Indicator Drive Bracket (For Mech.Type 160ST2)
	249133	Indicator Drive Bracket (For Mech.Type 145ST4)
	920935	Washer
	914188	Sems 8-32 X ¼



CARRIAGE FRAME

2427G-9

PARTS LIST for CARRIAGE FRAME

STRIPPER PLATE ASSEMBLY

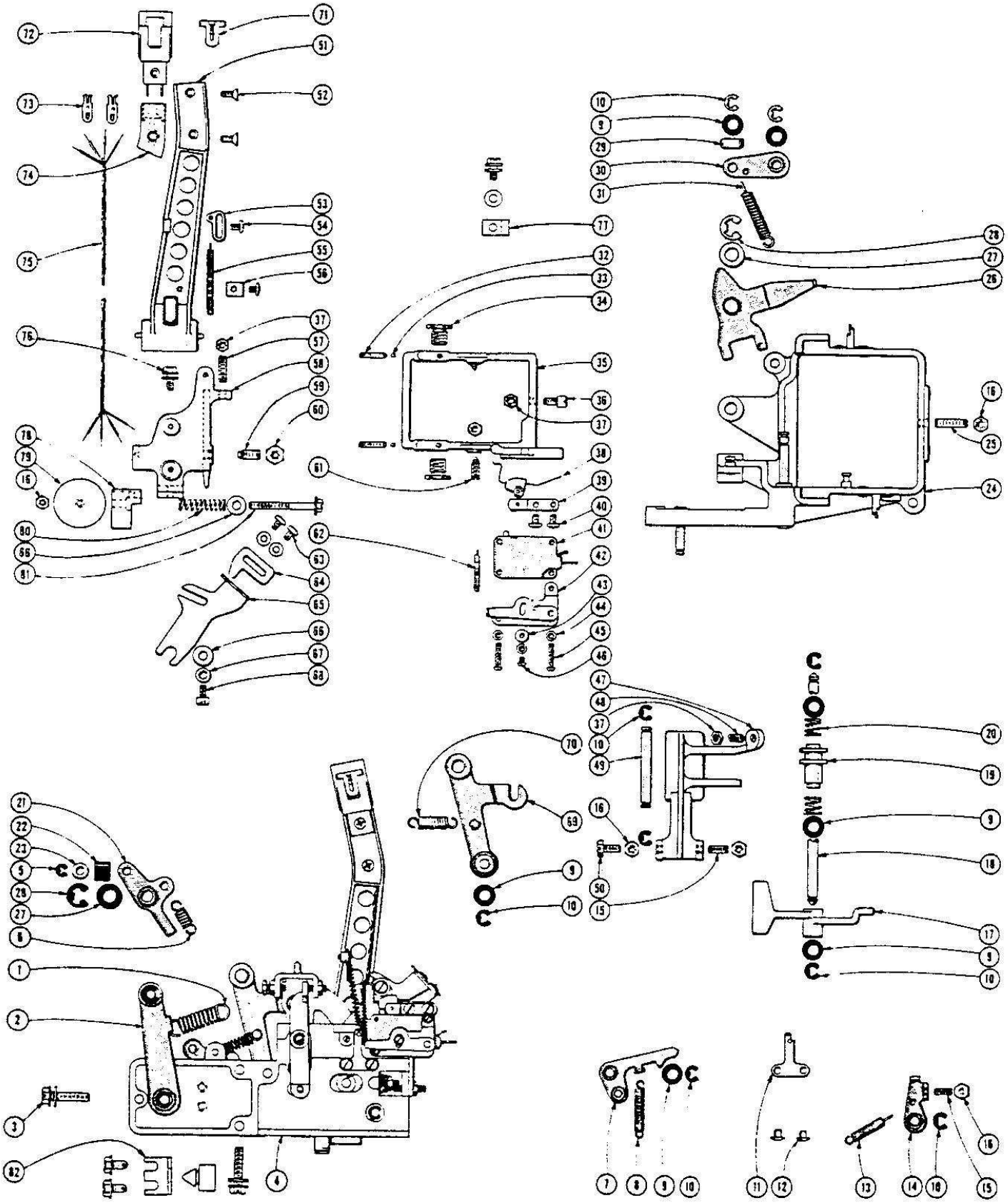
Item	Part No.	Part Name	Item	Part No.	Part Name
1	249372	Stripper Plate	26	249396	Pawl Spring (Use with 249387)
2	901725	Nut	27	245976	Carriage Cover Bracket - Left
3	961023	8-32 X ½ Phil. R.H. Self Tap Screw Type 1	28	245134	Transfer Arm Stop
			29	915578	Sems
4	248385	Stripper Plate Top	30	245354	Shaft
5	125448	Retaining Ring	31	921550	Flatwasher, Spring Steel
6	920600	Flatwasher	32	S229220	Retaining Ring
7	248371	Brush Mtg. Plate & Bushing Assy.	33	245072	Record Clamp Disc Assembly
8	248381	Brush Blade & Stud Assy.	34	250507	Snap Washer
9	245858	Brush	35	250235	Clamp Disc Cover
10	248206	Spring	36	911649	Sems
11	248375	Pivot Link & Stud Assy.	37	914425	Sems
12	248384	Connecting Link	38	920902	Flatwasher
13	921061	Flatwasher, Spring Steel	39	249379	Pivot Pin & Block Assembly
14	125402	Retaining Ring	40	901660	8-32 Hex Nut
15	245862	Brush Arm Link	41	914818	8-32 X 1" Slotted Indented Hex Washer H.M.S.
16	245850	Bell Crank Lever & Hub Assy.			
17	245391	Shoulder Screw	42	249375	Clamp Arm & Centering Pin Assy.
18	915548	Sems	43	245038	Roller
19	245392	Spring	44	921081	Flatwasher, Spring Steel
20	249388	Pawl Screw (Use with 249387)	45	R231163	Snap Washer
21	249389	Pawl Spring (Use with 249387)	46	918520	8-32 X 3/16 Cup Point Allen Head Set Screw
22	249387	Pawl (For Alt. See 245859)			
23	249390	Pawl Spacer (Use with 249387)	47	245079	Clamp Arm Spring
24	245373	Brake Cam	48	245070	Clamp Arm Spring Plate
25	914188	Sems	49	961008	8-32 X 3/8 Self Tap Screw

SAFETY TRIP ASSEMBLY

Item	Part No.	Part Name	Item	Part No.	Part Name
50	245098	Plunger	55	245088	Safety Trip Bracket Assy.
51	245100	Plunger Spring	56	914188	Sems
52	921061	Flatwasher	57	245102	Detent Arm Spring
53	R231163	Snap Washer	58	245094	Safety Trip Lever
54	986362	Eyelet	59	245103	Safety Trip Lever Spring

CONTACT AND TRANSFER ARM ASSEMBLIES

Item	Part No.	Part Name	Item	Part No.	Part Name
60	248055	Contact Arm	67	921180	Flatwasher
61	249263	Cable Clip	68	915622	Sems
62	249147	Contact Block Mtg. Brkt.	69	248177	Transfer Arm & Pinion Assy.
63	602190	Cable Clamp	70	245557	Adjustment Screw
64	249148	Contact Plunger Block Assy.	71	921553	Flatwasher, Spring Steel-Blue
65	901660	8-32 Hex Nut	72	245109	Transfer Arm Shaft
66	918590	8-32 X 7/16 Cup Point Socket H.S.S.			



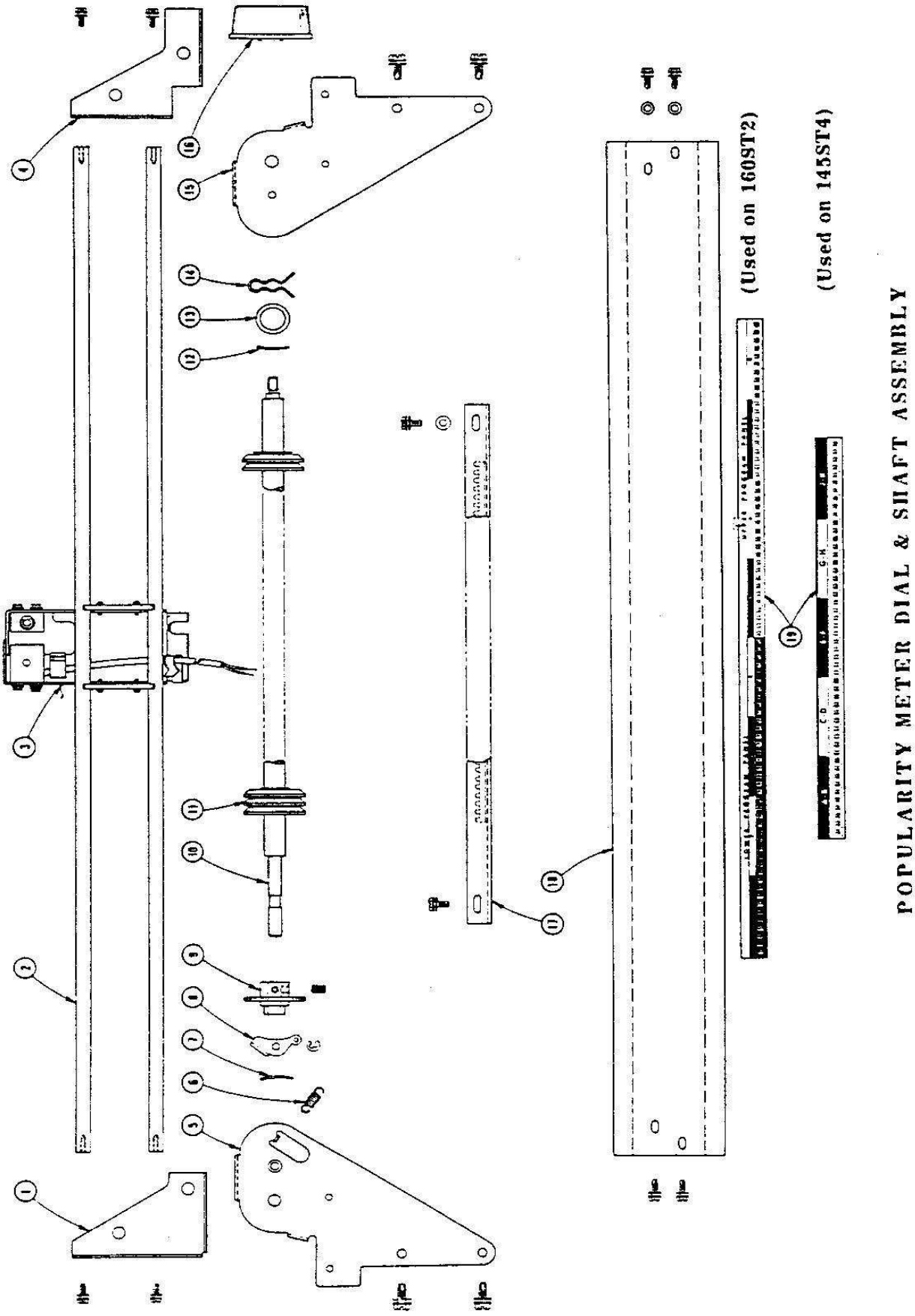
PICKUP ARM FRAME ASSEMBLY - Part No. 246824

PARTS LIST for PICKUP ARM FRAME ASSEMBLY

Item	Part No.	Part Name
1	245243	Brake Cam Lever Spring
2	245111	Brake Cam Lever
	245157	Brake Cam Roller
3	915749	10-32 X ¾ Sems Fastener
4	249725	Pickup Arm Assembly
5	125448	Retaining Ring
6	245782	Drive Crank Spring
7	245720	Pickup Arm Lock Lever
8	245792	Lock Lever Spring
9	921061	Flatwasher, Spring Steel-Blue
10	R231163	Retaining Ring (Truarc 5133-15)
11	245825	Pickup Arm Spring Lug
12	980680	1/8 X 7/32 Tub. Rivet, Steel-Cad
13	245773	Lock Lever Detent Spring
14	245719	Lock Lever Detent
15	918372	6-32 X 3/8 Slotted Head Set Screw
16	901102	6-32 Hex Nut
17	245711	Lock Lever Control Crank
18	245728	Control Fork Hinge Pin
19	245729	Shifting Collar
20	245791	Spring (Compression)
	921061	Flatwasher, Spring Steel-Blue
21	245721	Drive Crank
22	245745	Drive Crank Roller
23	920600	Flatwasher
24	246824	Pickup Arm Frame Assembly
25	918421	6-32 X 5/8 Slotted Head Set Screw
26	245725	Cradle Actuator Lever
27	921551	Flatwasher, Spring Steel-Blue
28	S229220	Retaining Ring
29	245740	Detent Roller (Pickup Shift)
30	245722	Detent Lever
31	245764	Spring-Detent Lever
32	918210	5-40 X 3/8 Socket Head Set Screw
33	245772	Lock Plug
34	245737	Adjusting Bushing
35	245771	Cradle & Pin Assembly
36	245726	Support Pin
37	901631	8-32 Hex Nut
38	245714	Trip Switch Lever Assembly
39	245724	Support Lug
40	911713	4-40 X ¼ Phillips P.H.M.S.
41	245816	Trip Switch
42	245818	Adjusting Lever & Plate Assembly
43	920360	Flatwasher
44	925062	1102 Lockwasher
45	910616	2-56 X ½ Phillips Pan H.M.S.
46	910414	2-56 X 1/8 Phillips Pan H.M.S.
47	245709	Control Fork
48	918642	8-32 X ¾ Slotted Head Set Screw
49	245732	Cradle Pressure Pin
50	913228	Slotted Hex Head Mounting Screw
51	249726	Pickup Arm & Roller Assembly
52	911836	4-40 X 3/8 Phillips F.H.M.S.
53	245715	Pickup Arm Spring Clip
54	911712	4-40 X ¼ Phillips P.H.M.S.
55	247782	Pickup Arm Spring
56	245823	Wire Retainer
57	918612	8-32 X ½ Slotted Head Set Screw
58	245779	Pickup Arm Cradle & Pin Assy.
59	245805	Set Screw
60	902360	10-32 Hex Nut
61	245777	Pivot Screw
62	245817	Trip Switch Balance Spring
63	911587	4-40 X 1/8 Phillips Pan H.M.S.
	920601	Flatwasher
64	245783	Trip Switch Actuator Plate
65	245723	Trip Switch Actuator
66	920661	Flatwasher
67	925321	1106 Lockwasher
68	913020	6-32 X ¼ Socket Head Cap Screw
69	245766	Control Lever & Roller Assembly
70	245769	Control Lever Spring
71	249731	Seeburg Armature Assy. with Sapphire (Optional with 249732)
	249732	Seeburg Armature Assy. with Diamond (Optional with 249731)
72	249730	Magnetic Pickup
73	941320	Contact Lug
74	249720	Pickup Cartridge Socket
75	249738	Pickup Lead
76	913234	Sems
77	249049	Armite Clamp
	920805	Flatwasher
	913026	Sems
78	249724	Pickup Arm Weight
79	245820	Pickup Arm Counterweight
80	245821	Lock Spring
81	913706	6-32 X 1¼ Slot. Ind .Hex. Wash.H.M.S.
82	245857	Bumper Bracket
	305445	Rubber Bumper
	961001	Sems 8-32 X 5/16 Slotted Ind. H.W.H. Self Tapping

SELECT-O-MATIC MECHANISM, Type 160ST2 and 145ST4

Select-O-Matic "160", Model 222 and "100", Model 220.



POPULARITY METER DIAL & SHAFT ASSEMBLY

(Used on 160ST2)

(Used on 145ST4)

2427G-13

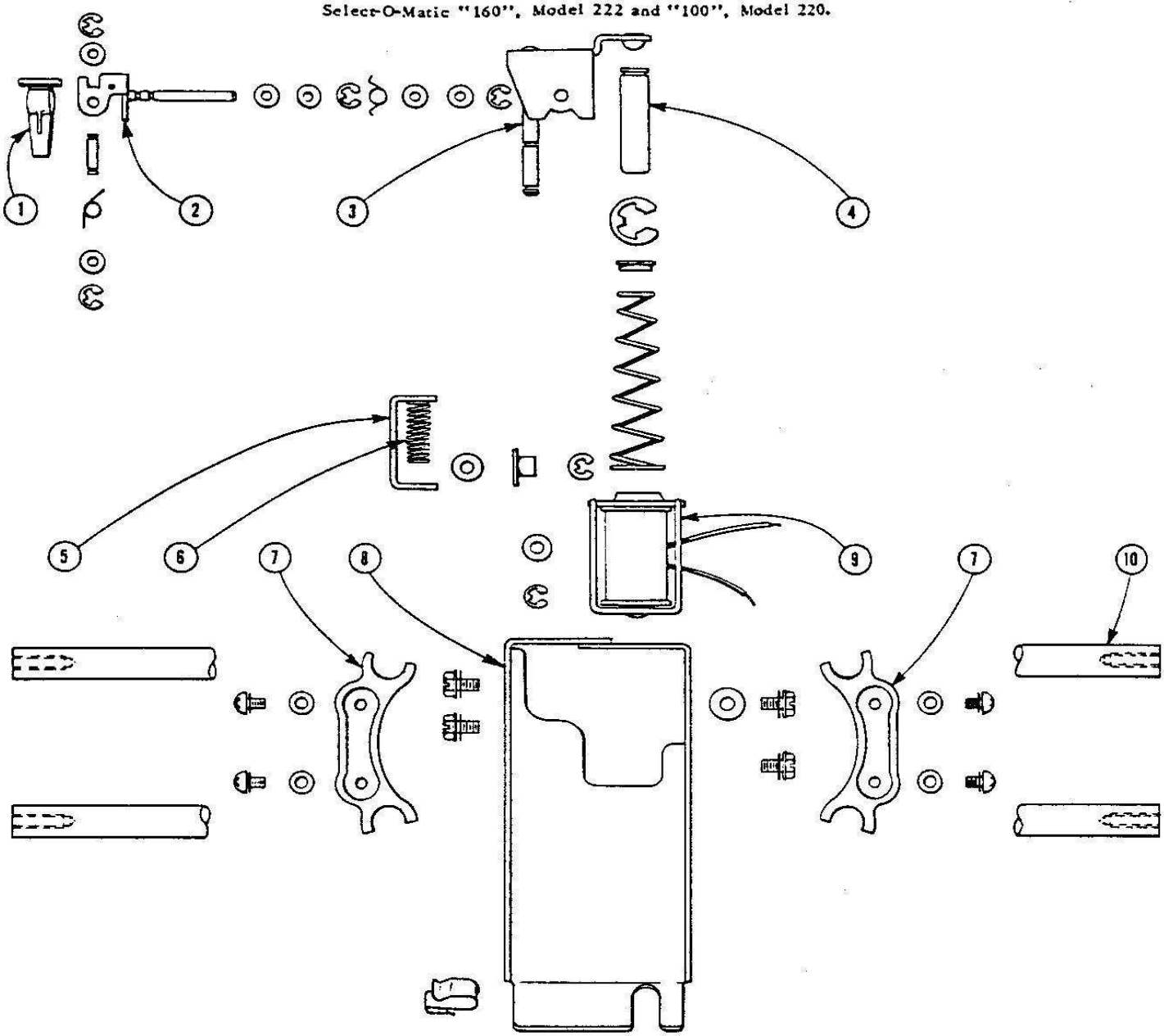
POPULARITY METER DIAL & SHAFT ASSEMBLY

PARTS LIST

Item	Part No.	Part Name
1	248257	Magazine End Trim Mounting Bracket, Upper, L.H.
	914425	Sems 8-32 X 3/8
2	248229	Indicator Guide Shaft (Used on 160ST2)
	249297	Indicator Guide Shaft (Used on 145ST4)
	914425	Sems 8-32 X 3/8
3	248230	Popularity Meter Actuator Assembly
4	248256	Magazine End Trim Mounting Bracket, Upper, R.H.
	914425	Sems 8-32 X 3/8
5	248225	Popularity Meter Support Bracket & Stud Assembly, L.H.
	961198	Sems 12-24 X 1/2
6	245673	Pawl Spring
7	924723	Spring Washer
8	247246	Reset Pawl
	R-231163	Retaining Ring
9	248224	Reset Ratchet
	918755	10-32 X 1/4 Unbrako Knurled Cup Point Socket Head Set Screw, Steel Blue
10	248223	Popularity Meter Dial Shaft (Used on 160ST2)
	249296	Popularity Meter Dial Shaft (Used on 145ST4)
11	248005	Popularity Meter Dial
12	924704	Spring Washer
13	922952	Flatwasher, Spring Steel Blue
14	248002	Dial Retaining Spring
15	248227	Popularity Meter Support Bracket, R.H.
	248228	Popularity Meter Support Bracket, L.H.
	961198	Sems 12-24 X 1/2
16	248287	Knob
17	248232	Stop Angle Dial & Stop Assembly (160ST2)
	249274	Stop Angle Dial & Stop Assembly (145ST4)
	920840	Flatwasher
	914425	Sems 8-32 X 3/8
18	248234	Light Shield (Used on 160ST2)
	249278	Light Shield (Used on 145ST4)
	920840	Flatwasher
	961005	Sems
19	248360	Number Strip (Used on 160ST2)
	248361	Number Strip (Used on 160ST2)
	249277	Number Strip (Used on 145ST4)

SELECT-O-MATIC MECHANISM, Type 160ST2 and 145ST4

Select-O-Matic "160", Model 222 and "100", Model 220.



POPULARITY METER ACTUATOR ASSEMBLY - Part No. 248230

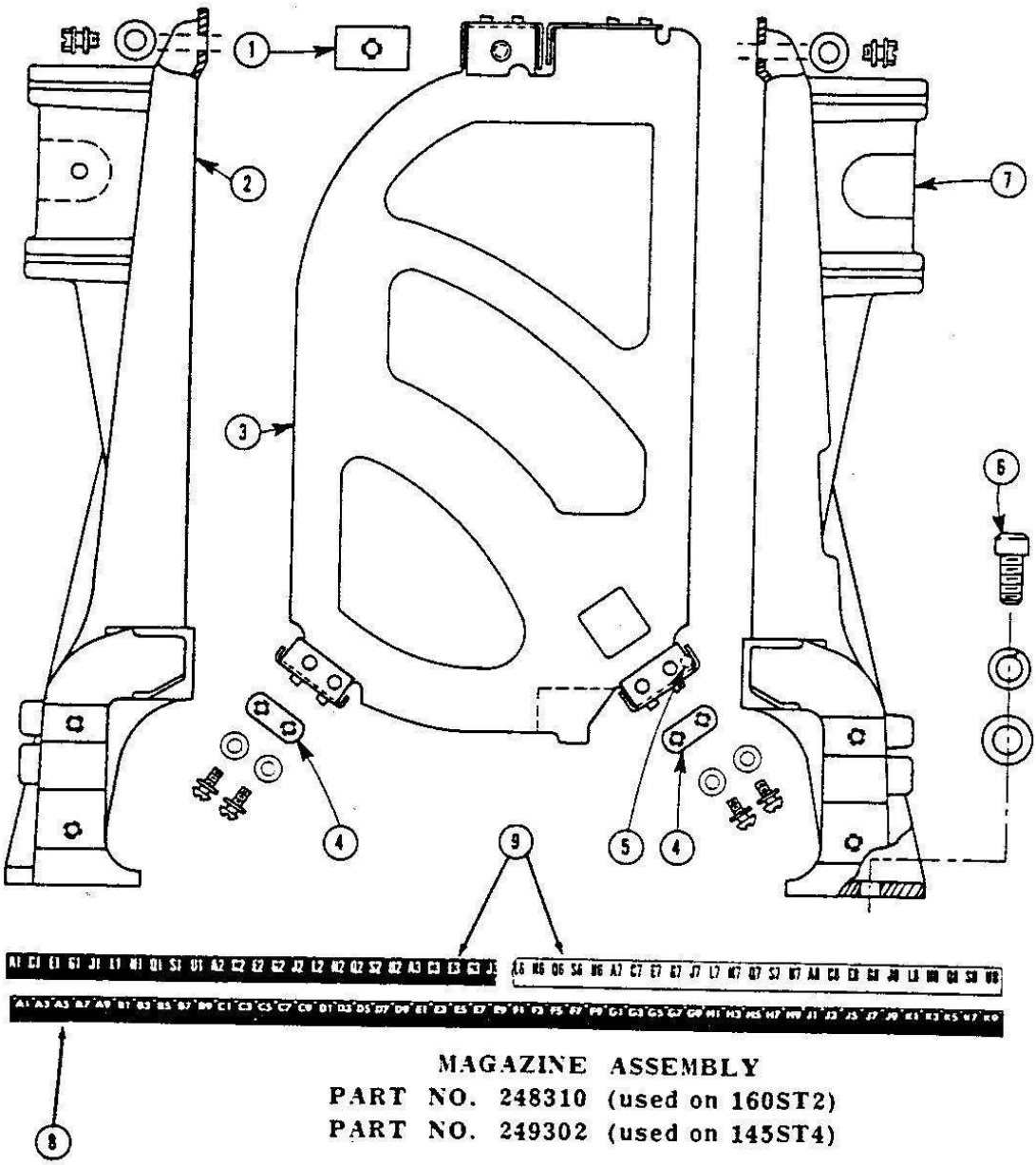
PARTS LIST

Item	Part No.	Part Name
1	247158	Pawl
	247159	Pawl Spring
	247147	Pawl Bearing Pin
	920600	Flatwasher
	125448	Retaining Ring
2	249118	Pawl Retainer & Pin Assembly
	920600	Flatwasher
	247146	Pawl Centering Spring
	920600	Flatwasher
	125448	Retaining Ring
3	249114	Drive Bracket & Rivet Assembly
4	248153	Solenoid Plunger
5	249077	Dial Drive Bearing Bracket
	921061	Flatwasher
	R231163	Retaining Ring
	913026	Sems 6-32 X ¼
	986362	Eyelet
6	249120	Drive Spring
7	249076	Slider
	920600	Flatwasher
	911713	Sems 4-40 X ¼
8	248231	Actuator Frame
	248186	Cable Clamp
9	249121	Solenoid & Staked Frame Assy.
	986450	Eyelet
	248278	Solenoid Plunger Spring
	125452	Retaining Ring
	920812	Flatwasher
	913026	Sems 6-32 X ¼
10	248229	Indicator Guide Shaft (Used on Mechanism Type 160ST2)
	249297	Indicator Guide Shaft (Used on Mechanism Type 145ST4)

2427G-15

SELECT-O-MATIC MECHANISM, Type 160ST2 and 145ST4

Select-O-Matic "160", Model 222 and "100", Model 220.

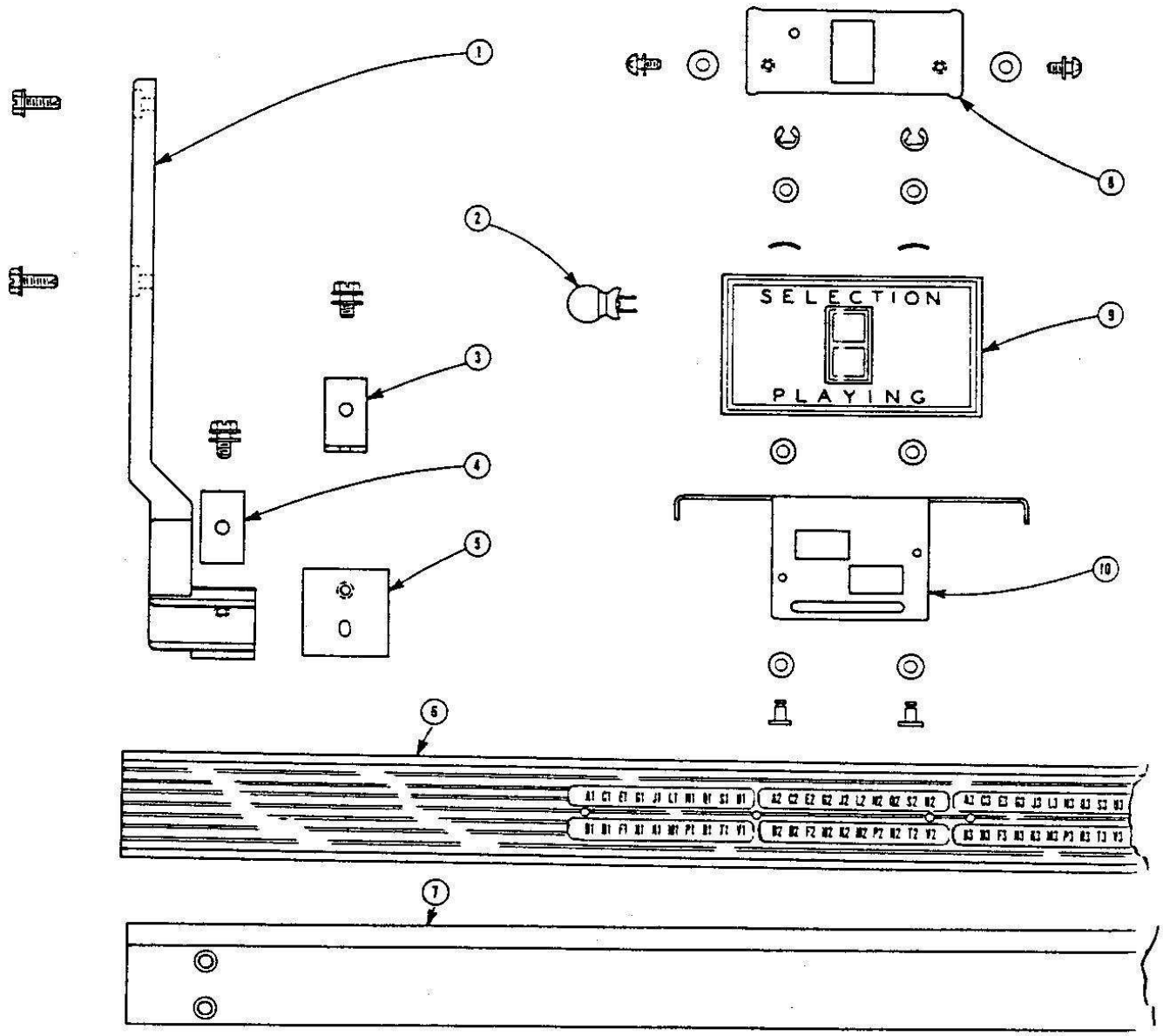


MAGAZINE ASSEMBLY

PART NO. 248310 (used on 160ST2)
PART NO. 249302 (used on 145ST4)

PARTS LIST

Item	Part No.	Part Name
1	247446	Tapping Plate
	921191	Flatwasher
	915533	Sems
2	249347	Magazine Support Bracket, L.H.
3	248335	Separator & Channel Assembly
4	245313	Tapping Plate
	920805	Flatwasher
	913175	Sems
5	248336	Record Cushion
6	916491	¼-20 X ⅜ Socket H. Cap Screw
	925583	¼ Kantlink Lockwasher
	921555	Flatwasher
7	249348	Magazine Support Bracket, R.H.
8	249261	Number Strip (220)
9	248345	Number Strip (222)
	248346	Number Strip (222)



SELECTION PLAYING INDICATOR ASSEMBLY

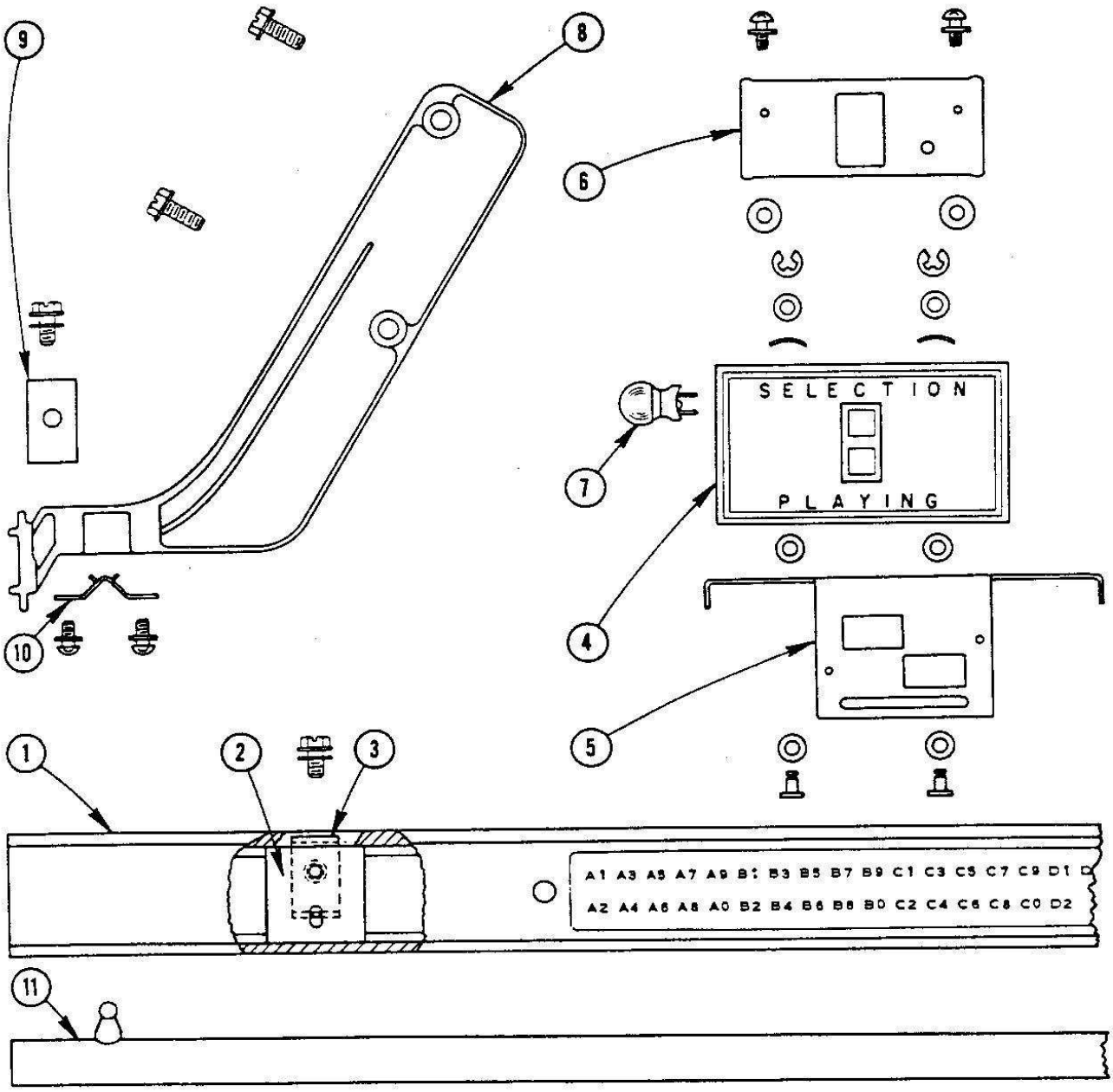
Part No. 248389 (Use on 160ST2)

PARTS LIST

Item	Part No.	Part Name
1	248241	Play Indicator Mting.Brkt. L.H. (Finished)
	961008	8-32 X 3/8 Slotted Ind.Hex Washer H. Self Tapping Screw Type 23, Steel-Cad
	248240	Play Indicator Mting. Brkt,R.H.(Finished)
	961008	8-32 X 3/8 Slotted Indented Hex Washer H. Self Tapping Screw, Type 23, Steel-Cad
2	249198	Indicator Lamp
3	249176	Stop Angle
	914188	Sems 8-32 X 1/4.
4	249195	Clamp Plate
	914188	Sems 8-32 X 1/4
5	249175	Stop Plate
6	248248	Indicator Channel Assy.
7	248250	Light Shield
	912992	6-32 X 1/4 Phillips Flat H.M.S. Steel-Cad
8	249177	Drive Plate
	245543	Spacer
	911750	Sems 4-40 X 5/16
9	249188	Indicator Mounting Bracket Riveted Asst
	248392	Indicator Escutcheon
	249179	Master Script
	54039	Cement
	924724	Spring Washer
	920600	Flatwasher
	125448	Retaining Ring
10	248390	Indicator, Bracket & Shutter Assembly
	248391	Mounting Brkt & Escutcheon Assembly
	248106	Guide Stud
	249172	Shutter
	920639	Washer (Nylon)

SELECT-O-MATIC MECHANISM, Type 160ST2 and 145ST4

Select-O-Matic "160", Model 222 and "100", Model 220.



SELECTION PLAYING INDICATOR - Part No. 249291 (Used on 145ST4)

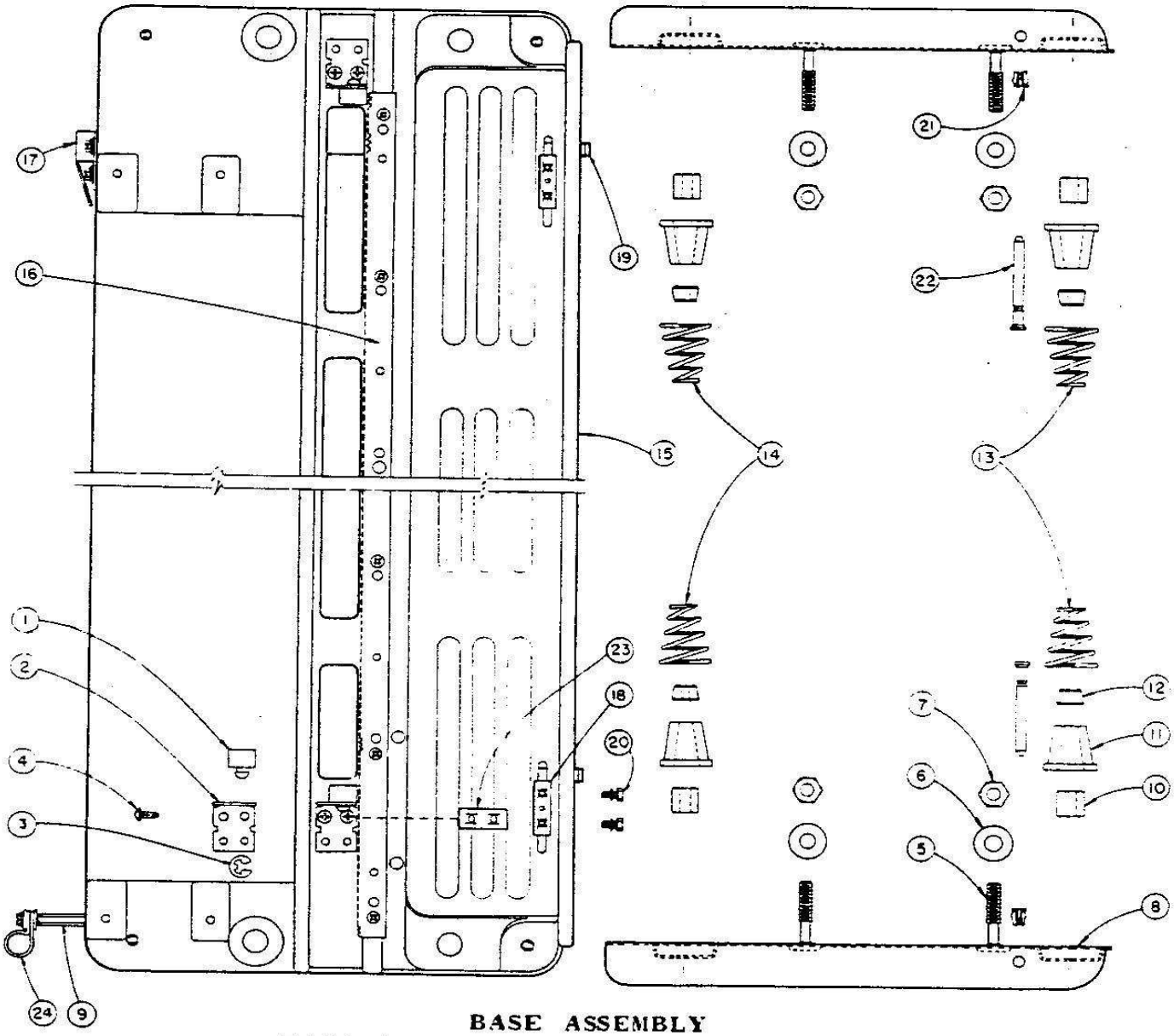
PARTS LIST

Item	Part No.	Part Name
1	249135	Indicator Channel Assy.
	249137	Number Strip
2	249175	Stop Plate
3	249176	Stop Angle
	914188	Sems 8-32 X ¼ Slotted, Ind. Steel-Cad.
4	248391	Mounting Brkt & Escutcheon Assy.
	248392	Indicator Escutcheon
	249188	Indicator Mting. Bracket Riveted Assy.
	249179	Master Script
	54039	Cement
	924724	Spring Washer
	920600	Flatwasher
	125448	Retaining Ring
5	249172	Shutter
	248106	Guide Stud
	920639	Washer (Nylon)
6	249177	Drive Plate
	245543	Spacer
	911750	Sems 4-40 X 5/16 Phillips Pan.H.M.S.
7	249198	Indicator Lamp
8	249182	Play Indicator Mting. Bracket, L.H.
	961008	8-32 X 3/8 H.M.S. Hex, Slotted, Indented Self Tapping Screw
	249183	Play Indicator Mting. Bracket, R.H.
9	249195	Clamp Plate
	914188	Sems 8-32 X ¼ Slotted, Ind.H.M.S. Hex.
10	409778	Catch
	911750	Sems 4-40 X 5/16 Sems Phill.Pan.H.M.S.
11	249239	Light Shield & Stud Assembly

2427G-18

SELECT-O-MATIC MECHANISM, Type 160ST and 145ST4

Select-O-Matic "160", Model 222 and "100", Model 220.



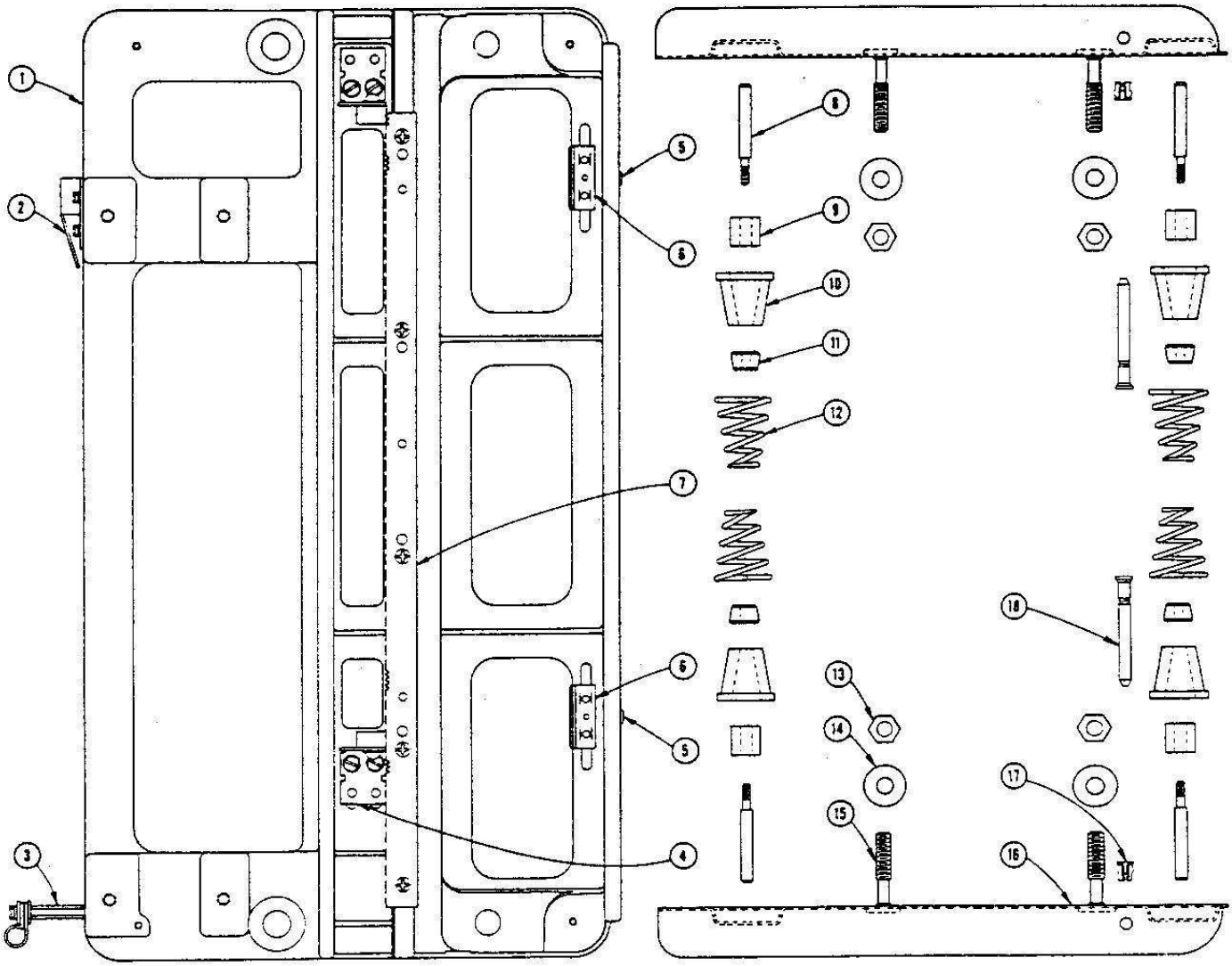
BASE ASSEMBLY
PART NO. 248193 (Use on Mechanism 160ST2)

PARTS LIST

Item	Part No.	Part Name	Item	Part No.	Part Name
1	245291	Rubber Bumper	14	245267	Chassis Mounting Spring (Rear)
2	247016	Stop Bracket	15	248192	Base
3	229220	Retaining Ring	16	247012	Gear Rack Assy. (Laminated)
4	961121	No. 10 X 3/8 Phillips B.H. Sheet Metal Screw	17	249065	Switch Actuator
				920805	Flatwasher
5	916698	Weld Bolt		960757	Sems
6	922135	Flatwasher	18	902395	Speed Nut
7	904300	5/16-18 Hex Nut	19	247028	Reversing Switch Stop
8	247194	Shock Mount Channel Assy.	20	914425	Sems
9	247045	Spacer Stud	21	248161	Speed Clip
	920935	Washer	22	480530	Chassis Lock Pin
10	247104	Felt Plug	23	901561	Twin Speed Nut
11	247046	Chassis Mounting Spring Plug	24	600158	Cable Clamp
12	245117	Spring Retainer		920914	Flatwasher
13	245116	Chassis Mounting Spring		914425	Sems

SELECT-O-MATIC MECHANISM, Type 145ST4

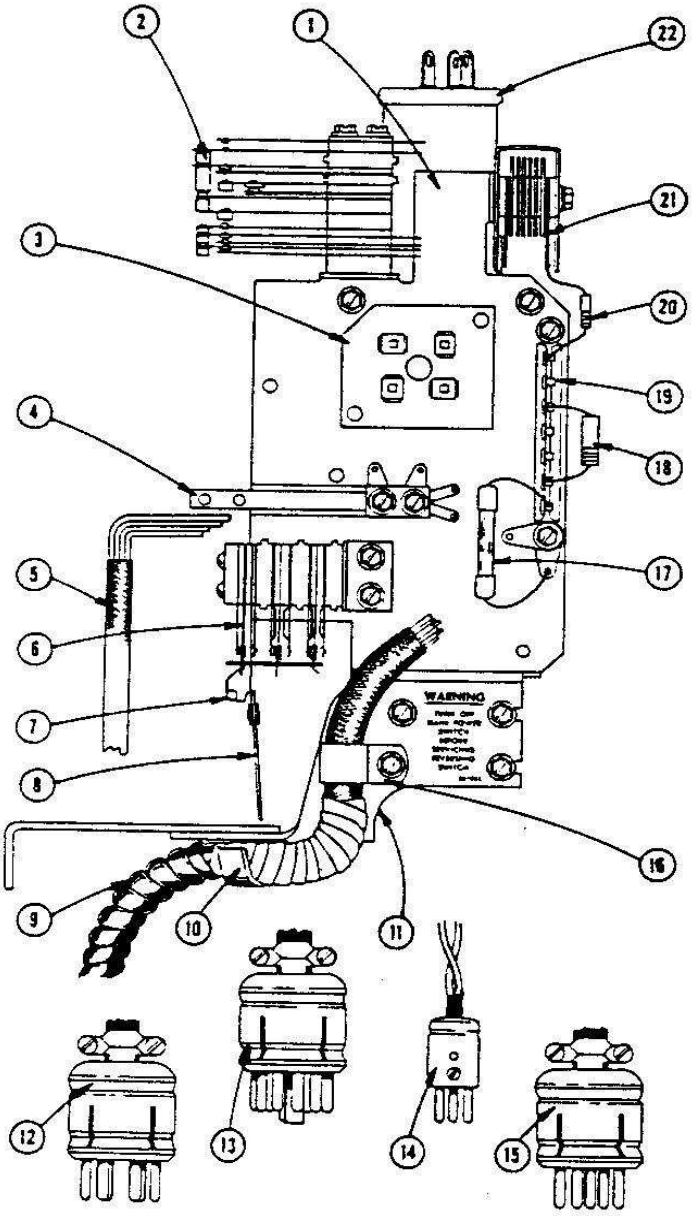
Select-O-Matic "160", Model 222 and "100", Model 220.



BASE ASSEMBLY - Part No. 249040 (Used on 145ST4)

PARTS LIST

Item	Part No.	Part Name
1	249040	Base Assembly
2	249065	Switch Actuator
3	247045	Spacer Stud
	920935	Flatwasher
	602377	Cable Clamp
	920914	Flatwasher
	914425	Sems
4	247016	Stop Bracket
	902395	Speed Nut (Twin Type)
	961121	No. 10 X 3/8 Phillips Binding H. Sheet Metal Screw
	245291	Rubber Bumper
	229220	Retaining Ring
5	246327	Reversing Switch Stop
	914425	Sems
6	901561	Twin Speed Nut
7	249059	Gear Rack Assembly (Laminated)
	914356	8-32 X 3/8 Phillips B.H.M.S.
8	247048	Spring Mounting Screw
9	247104	Felt Plug
10	247046	Chassis Mounting Spring Plug
11	245117	Spring Retainer
12	245116	Chassis Mounting Spring
13	904300	5/16 - 18 Hex Nut
14	922135	Flatwasher
15	916698	Weld Bolt
16	247194	Shock Mount Channel Assembly
	249243	Channel & Clip Assembly, L.H.
	249242	Channel & Clip Assembly, R.H.
	247191	Shock Mount Channel
17	248161	Speed Clip
18	480530	Chassis Lock Pin

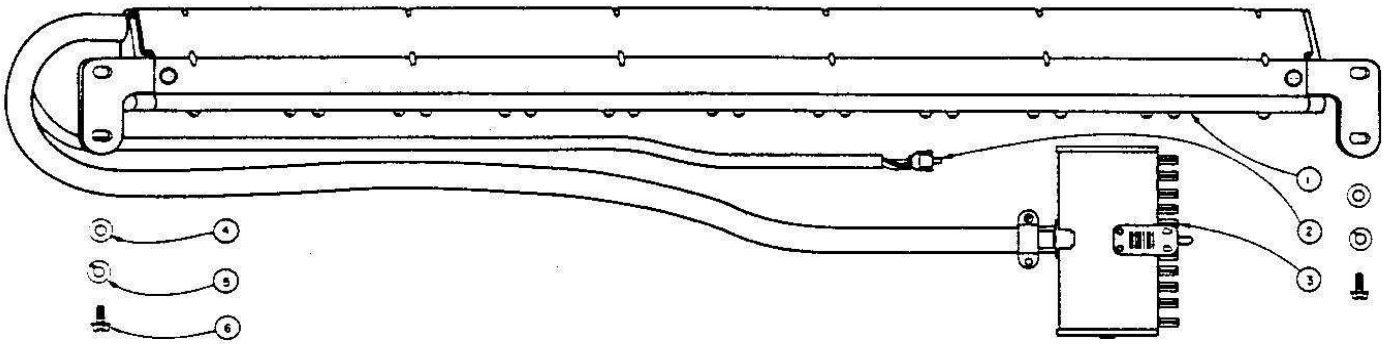


SWITCH PLATE ASSEMBLY

Part No. 249905

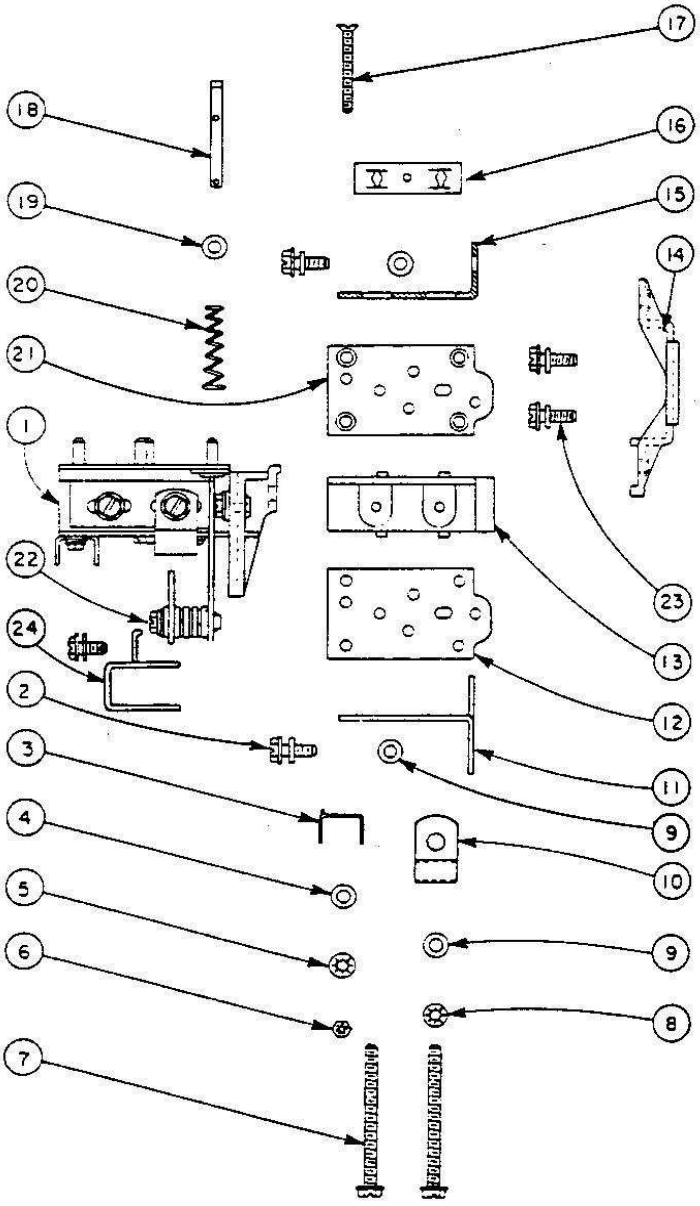
PARTS LIST

Item	Part No.	Part Name
1	249910	Switch Plate Riveted Assembly
2	249938	Cam Switch
	912791	5-40 X2 Slotted Ind. Hex Washer H.M.S., Steel-Cad.
	400597	Tension Plate
3	245909	Terminal Board
4	249939	Clutch & Reset Lever Switch
	912756	5-40 X 1-1/2 Slotted Ind. Hex Washer H.M.S., Steel-Cad
	400597	Tension Plate
5	249919	Internal Cable
6	247846	Reversing Switch Assembly
	245908	Reversing Switch Bracket
	913026	Sems
7	245948	Spring
8	247833	Actuator Blade Assembly
	245961	Bakelite Tie Strip
9	249945	Cable Covering
10	249924	Cable Clamp
	914188	Sems
	914542	Sems
11	248052	Cable Support Brkt. & Label Assy.
	247851	Warning Label
12	65323	6 Prong Plug
	408259	Shell & Liner
	247855	Clamp Filler
	53111	½" Wide ACB Acetate Cloth Tale-Blk.
13	249936	11 Prong Plug
	408259	Shell & Liner
14	250938	Three Prong Plug
15	F200241	Five Prong Plug Assembly
	407266	Plug
	408259	Shell & Liner
16	602377	Cable Clamp
17	247850	Pig-Tail Fuse
18	82752	2200 OHM Resistor, 1W., 10%
19	305113	Terminal Strip
	925321	1106 Lockwasher, Steel Nickel
	940630	Solder Lug
	913026	Sems 1106Lockwasher Steel-Cad 6-32 X ¼ Slotted Ind. Hex Washer H.M.S.
20	82413	120 OHM Resistor, ½ W., 10%
21	247843	Selenium Rectifier
	249922	Rectifier Shield
	920840	Flatwasher, Steel-Cad
	913642	Sems
22	86321	Motor Condenser
	245917	Condenser Strap
	913026	Sems



TORMAT MEMORY UNIT

TYPE 160TM1 (used on 160ST2), Part No. 304900
TYPE 100TM3 (used on 145ST4), Part No. 304701



CONTACT PLUNGER BLOCK
Part No. 249004

TORMAT MEMORY UNIT PARTS LIST

Item	Part No.	Part Name
1	304705	Ground Contact Bar (Used on 100TM3)
	304780	Ground Contact Bar (Used on 160TM1)
	960326	No. 4 X 9/16 Mounting Screws
2	246957	One Pin Connector
3	304662	Plug (33 Prong)
4	921180	Flatwasher
5	925492	Lockwasher (Kantink)
6	915534	10-32 X 3/8 Slot. Ind. Hex. Wash. H.M.S.

CONTACT PLUNGER BLOCK PARTS LIST

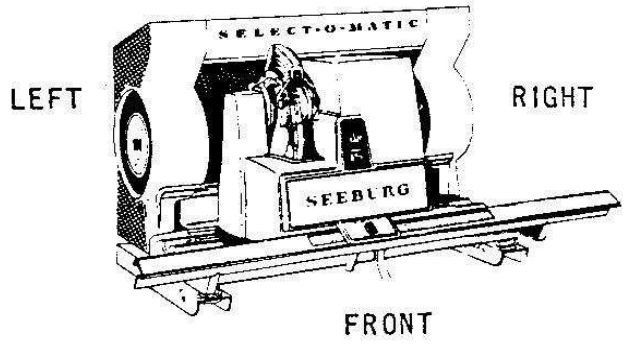
Item	Part No.	Part Name
1	249148	Contact Plunger Block Assembly
2	913175	Sems
3	940410	Solder Lug
4	920601	Flatwasher
5	925160	1104 Lockwasher
6	900550	4-40 Hex Nut
7	913792	6-32 x 1¾ Slot. Ind. Hex. Wash. H.M.S.
8	925321	1106 Lockwasher
9	920805	Flatwasher
10	602190	Cable Clamp
11	249045	Contact Block Adjustment Bracket, L. H.
12	249151	Contact Plunger Bearing Plate, Bottom
13	249150	Contact Plunger Block
14	249147	Contact Block Mounting Bracket
15	247167	Contact Block Adjustment Bracket, R. H.
16	900814	Speed Nut
17	912125	4-40 x 1" Phillips Flat H.M.S.
18	247161	Contact Plunger
19	920600	Flatwasher
20	247162	Contact Plunger Spring
21	249152	Contact Plunger Bearing Plate, Top
22	248127	Scan Subtract Switch
	400597	Tension Plate
23	912603	5-40 x ¼ Slot. Ind. Hex. Wash. H.M.S.
24	248128	Switch Cover
	913026	Sems

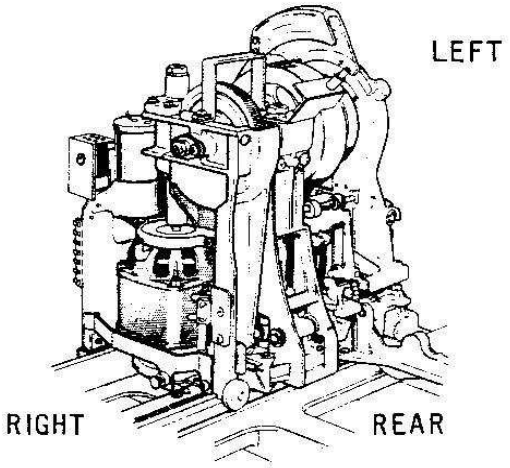
2427G-22

PREFACE

The adjustments for the 45 r.p.m. Select-O-Matic Mechanisms are given on the following pages. Each adjustment is associated with a step-by-step procedure which, if followed, will result in correct adjustment and normal operation. These individual adjustments may be made in any sequence but they are, in some instances, dependent on or affected by others. Because of this, they are arranged in a sequence which may be followed from page to page if a completely misadjusted mechanism is to be placed in operating condition. If an individual adjustment is to be checked or made, careful attention should be given to notes indicating dependent adjustments.

Reference is made in these adjustment outlines to the FRONT, REAR, LEFT and RIGHT of the mechanism in order to locate adjusting screws and various mechanical parts. Unless otherwise specified, these are defined as viewed from the front of the cabinet. Reference is also made to right side and left side playing of a record. Right side of a record is defined as viewed from the front of the complete instrument and is played with counter-clockwise rotation of the mechanism flywheel. Left side of a record is defined as viewed from the front of the instrument and is played with clockwise rotation of the flywheel. Counter-clockwise and clockwise rotation of the flywheel are defined as viewed from the left side of the mechanism. These references are used whether the mechanism is in or out of the cabinet.





The operation cycle of the mechanism follows a definite sequence in playing a record. This sequence includes the following:

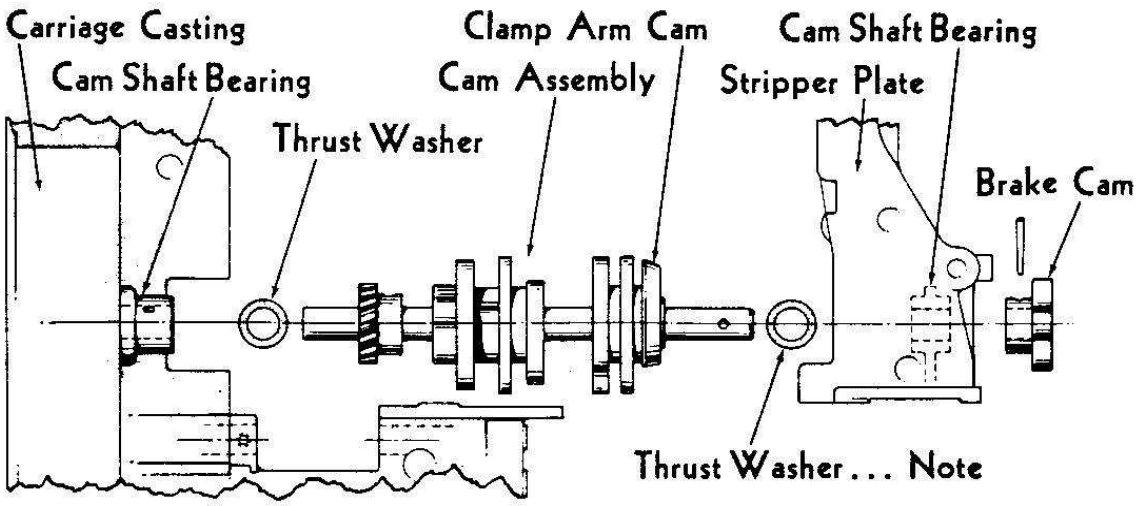
SCAN – in which the carriage assembly travels from side to side on the mechanism base.

TRANSFER – in which the record is transferred from the magazine to the playing position or from the playing position to the magazine.

PLAYING – in which the record is clamped to the turntable and is played.

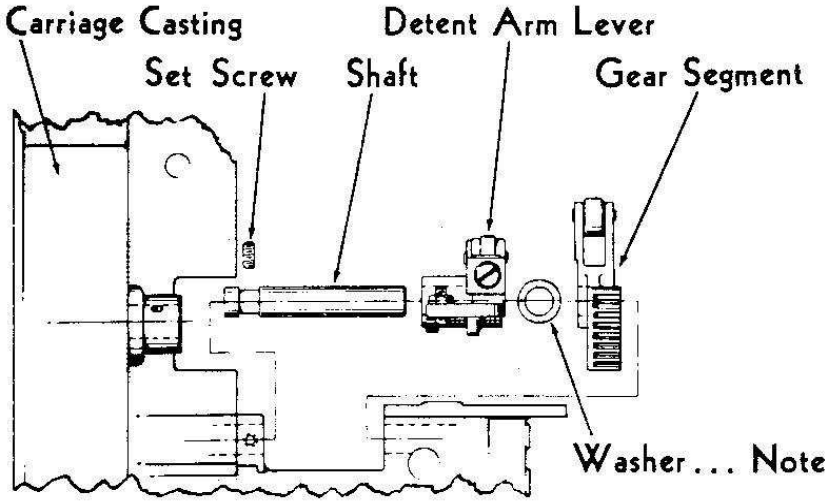
These terms SCAN - TRANSFER - PLAYING are also used to describe the position of the clutch, cams and levers of the carriage assembly whether or not the motor is in operation.

INSTALLATION of CAM ASSEMBLY, DETENT ARM & GEAR SEGMENT



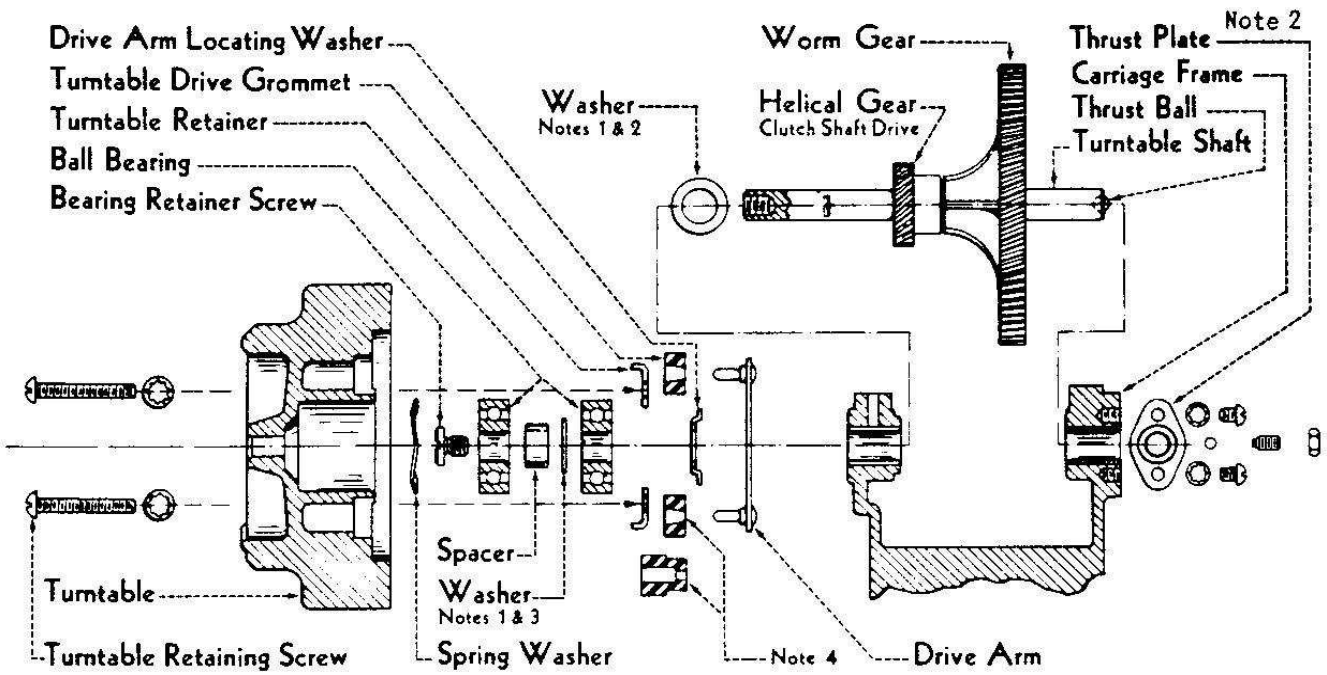
Note: Washers, Part No. 922603 (.020"), 922600 (.005"), 922601 (.010"), 922602 (.015") should be selected and installed between the Clamp Arm Cam and the Thrust Washer so the end play of the Cam Assembly is .003" to .010".

After the proper washers have been installed, the cam assembly should be checked by manual rotation, a full turn in either direction without evidence of binds.



Note: Washers, Part No. 922170 (.015"), 922165 (.010"), 922160 (.005") should be selected and installed between the Detent Arm Lever and the Gear Segment so the end play is .003" to .010".

TURNTABLE, SHAFT, and GEAR INSTALLATION



Note 1: ..... Washer Part No. 922270 - .005" thick
" " " 922271 - .010" "
" " " 922272 - .015" "

Note 2: ..... Select Washers and install between Clutch Shaft Drive Gear and left Turntable Shaft Bearing so end play of Turntable Shaft is .003" to .007". When thrust plate has screw for adjusting end play of shaft, use one No. 922272 washer and adjust for .003" to .007" end play with screw.

Note 3: ..... Select Washers and install between Spacer and Ball Bearing so end play of Turntable on the Shaft is a maximum of .015". To check this, hold Turntable Shaft firmly against the Thrust Plate, by pressing against the Worm Gear, and move the Turntable to the right in a direction parallel to the Turntable Shaft. The Spring Washer must always take out the end play by returning the Turntable to the left when released.

Note 4: ..... Turntable Drive Grommet with tapered center hole is to be installed with small end of tapered hole toward the Drive Arm. When assembled correctly, the part number, which is molded on the end with the large end of the center hole, will not be visible.

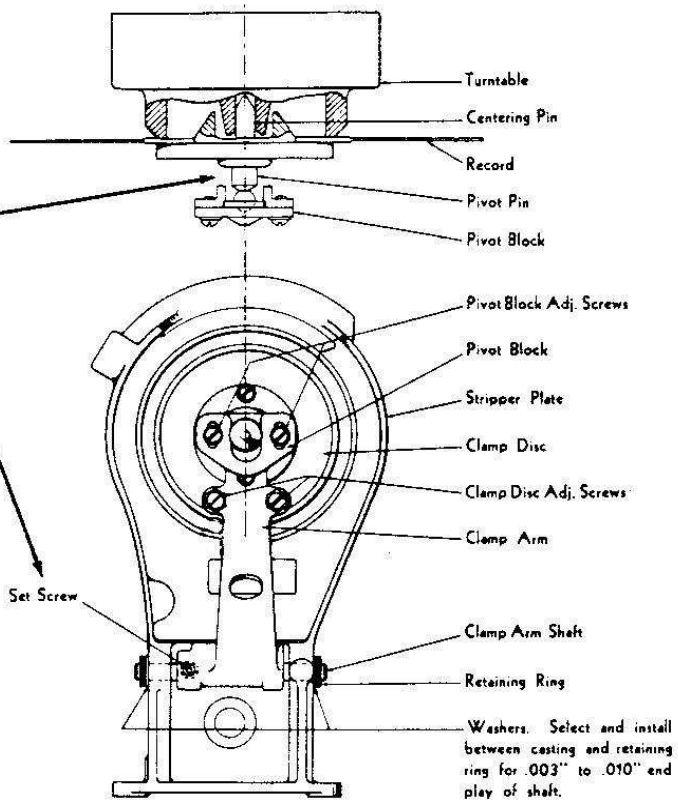
Drive Grommets with "step" should be installed with the small diameter end toward the Drive Arm.

Lubrication: The Gears should have a light coating of Stanodrip #29 (Standard Oil Co) oil. Do not use more oil than will adhere to the Gears. The felt wick in the Thrust Screw for the Turntable Worm (which meshes with the Worm Gear) must be placed in the hole in the screw so it is in contact with the Thrust Ball. The wick should be saturated with Stanodrip #29 oil.

INSTALLATION of CLAMP & TRANSFER ARMS

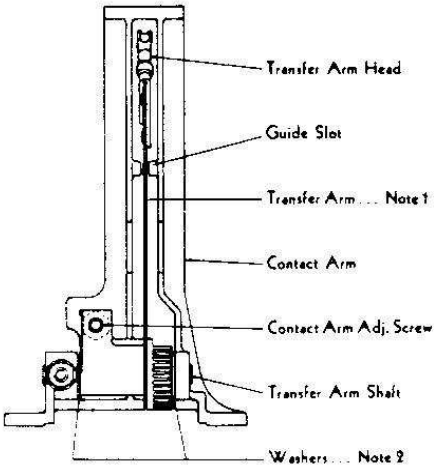
With the Set Screw loose and a Record clamped on the Turntable, adjust the horizontal position of the Clamp Arm so the Center Line through the Pivot Pin forms a right angle with the Clamp Disc and Record.

When installation is complete, readjust Clamp Arm. Refer to Clamp Arm Adjustments.

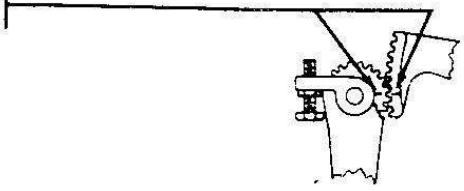


Note 1: Transfer Arm should be straight and should form a right angle with the Transfer Arm Shaft.

Note 2: Washers, Part No. 921551 (.015"), 921550 (.010"), 921552 (.020"), 921553 (.031") should be selected and placed at both ends of the Transfer Arm hub so the Arm falls in the center of the Guide Slot in the Contact Arm and so the end play of the Arm is .003" to .007". There must be at least one washer at each end of the hub.

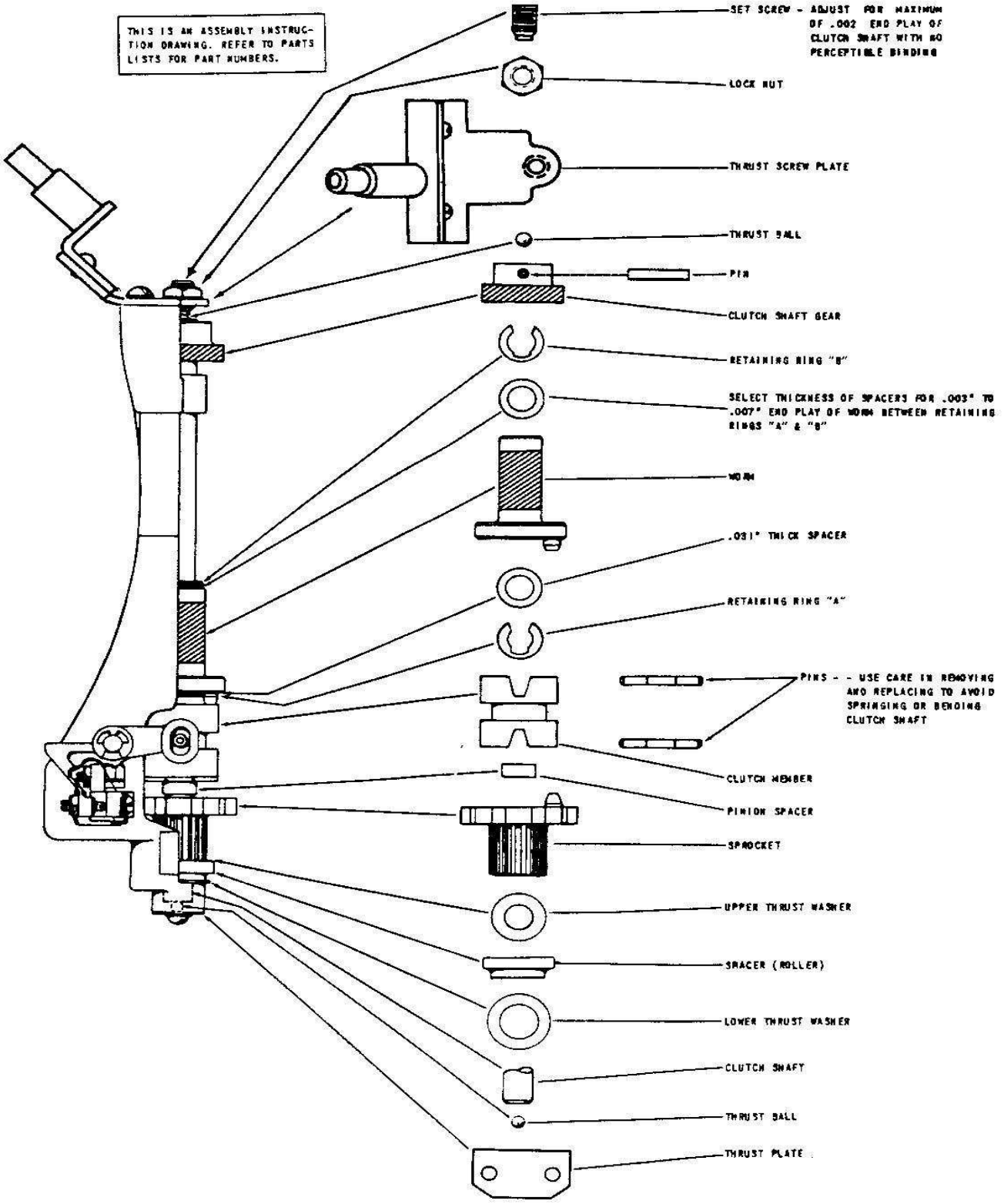


Note 3: When installing assembly on carriage, mechanism and Transfer Arm should be in SCAN position with reference marks aligned as shown.



When installation is complete, readjust Transfer Arm. Refer to Transfer Arm Adjustments.

CLUTCH & HOUSING ASSEMBLY INSTRUCTIONS

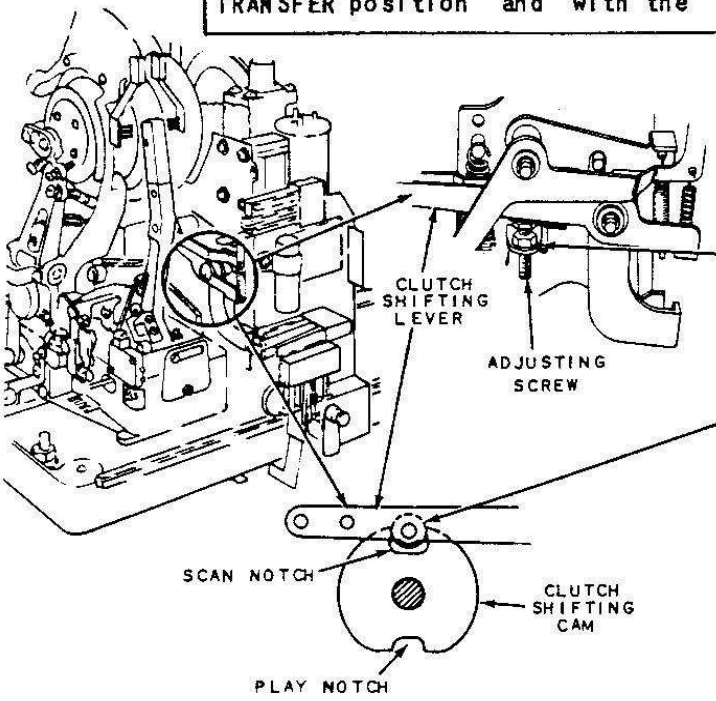


BE SURE CLUTCH WORM AND CAM SHAFT DRIVE GEAR ARE CORRECTLY MESHED BEFORE TIGHTENING CLUTCH ASSEMBLY MOUNTING SCREWS.

2433

"CLUTCH I" - - CLUTCH LIFTING ADJUSTMENT

This adjustment controls the amount of vertical clutch travel and results in full engagement of the Clutch with the Worm Pin in TRANSFER position and with the Sprocket Pin in SCAN position

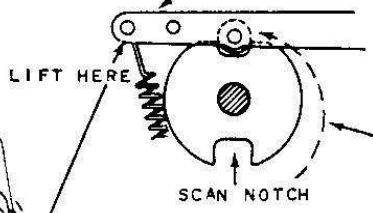


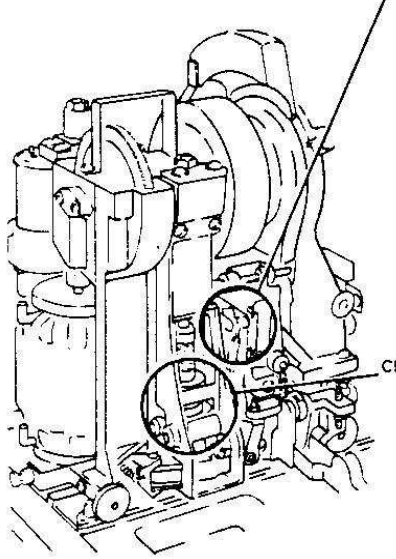
(A) Scan Carriage to front of *U0-V0 or K9-K0 record space. Leave it in SCAN position.

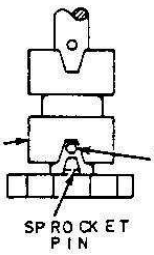
(B) Loosen lock nut and turn Adjusting Screw down to limit.

(C) Check Clutch Shifting Lever Roller position. The Roller should be in the SCAN Notch.

If the Roller is not in the SCAN Notch, turn the motor shaft until the Roller enters fully into the notch. If the Roller enters the PLAY Notch, it may be necessary to manually lift the Clutch Shifting Lever and - -
turn the motor shaft until the Roller is on the high part of its cam. When the Roller is on the high part of the cam, release the Lever but continue turning the motor shaft until the Roller fully enters the SCAN Notch.

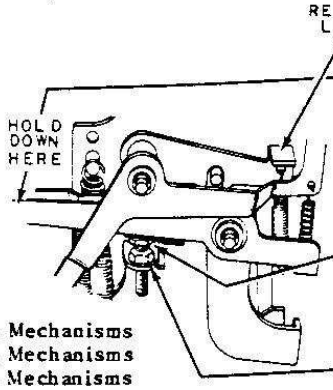






(D) Check Trip Mechanism position. The Trip Mechanism should be latched with Release Lever down to limit.

(E) Check Clutch position. Clutch should be all the way down against Drive Pin and engaged with Sprocket Pin.



(F) While manually holding Clutch Shifting Lever down - -

turn Adjusting Screw UP until screw head just touches Clutch Shifting Lever.

(G) Tighten Lock Nut.

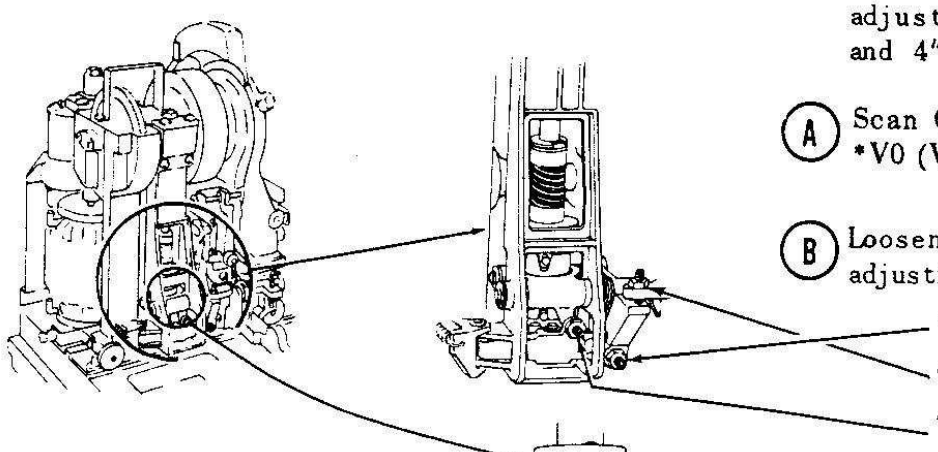
* U0-V0 for 200 Selection Mechanisms
U8-V8 for 160 Selection Mechanisms
K9-K0 for 100 Selection Mechanisms

"CLUTCH 2" - - SPROCKET CLEARANCE AND DETENTING ADJUSTMENT

This adjustment establishes correct clearance between the Detent Roller and the Sprocket Teeth when the mechanism is Scanning. It results in clearance between roller and Sprocket Teeth which allows 1/16" movement at end of the Detent Arm.

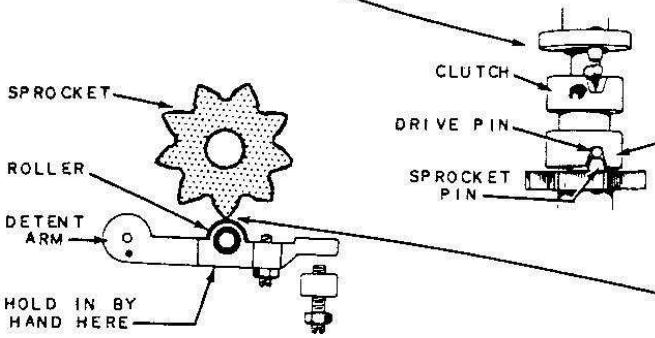
NOTE 1: - "Clutch 1" adjustment should be correct before making this adjustment.

NOTE 2: - If "Clutch 2" adjustment is changed in any way, "Clutch 3 and 4" should be re-adjusted. "Clutch 2, 3 and 4" are related to an extent that a change of "Clutch 2" can cause damaging strains at adjusting screws for "Clutch 3 and 4".



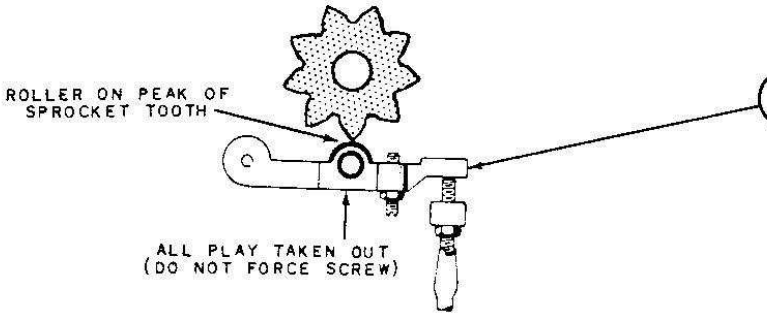
(A) Scan Carriage to right end beyond *V0 (V8 or K0) position.

(B) Loosen lock nuts and turn these adjusting screws out to the limit;

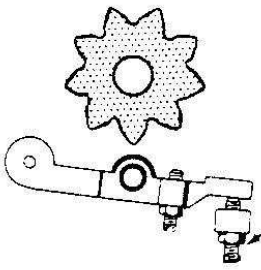


(C) Mechanism should still be in SCAN position, beyond *V0 (V8 or K0) with Clutch all the way down (against lower Drive Pin) and engaged with Sprocket Pin.

(D) Hold Detent Arm in lightly by hand and turn motor shaft until Detent Arm Roller reaches peak of a Sprocket Tooth.



(E) With Detent Roller lined up with peak of Sprocket Tooth, turn adjusting screw in carefully, a little at a time, until there is no "in and out" play between Detent Arm Roller and peak of Sprocket Tooth. (This is the starting point for correct adjustment.)



(F) Now, back out, the screw 2 turns and tighten the lock nut. This establishes correct clearance.

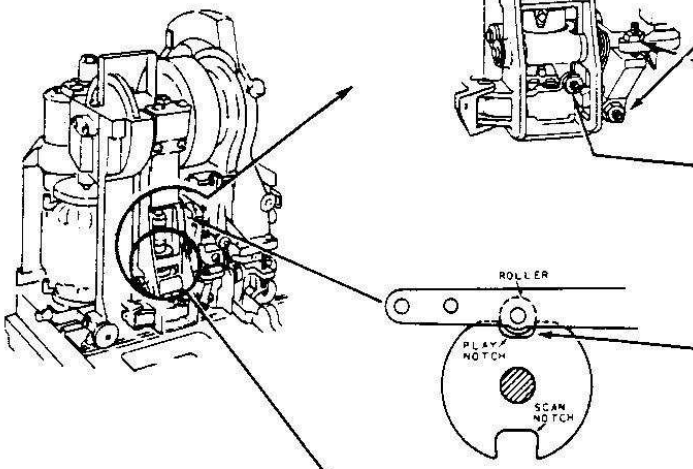
(G) After this adjustment has been made, adjust "Clutch 3 and 4" as shown on following pages.

* V0 for 200 Selection Mechanisms
V8 for 160 Selection Mechanisms
K0 for 100 Selection Mechanisms

2435

"CLUTCH 3" - - DETENT LOCKING ADJUSTMENT

This adjustment insures proper locking of the carriage while a record is playing. The adjustment takes out all rotational motion of the sprocket resulting in a minimum of lateral play in the carriage.



NOTE: - "Clutch 2" adjustment should be correct before making this adjustment.

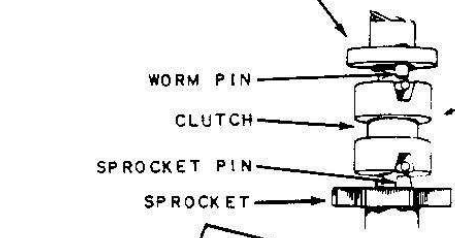
(A) Loosen Lock Nuts and turn these adjusting screws out to the limit:

"Clutch 3"

"Clutch 4"

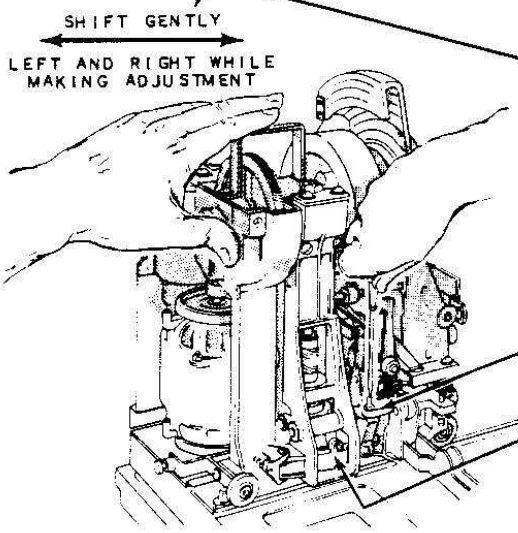
(B) Place Mechanism in *V0 (V8 or K0) PLAY position. Be sure mechanism is fully in PLAY position.

Clutch Shifting Lever Roller should be down in PLAY Notch, - - - and - - -



Clutch should be somewhere below the Worm Pin and above the Sprocket Pin.

Note side play in Carriage and rotational motion in Sprocket when Carriage is shifted to left and right by hand. This is due to "Clutch 3" screw being out too far.

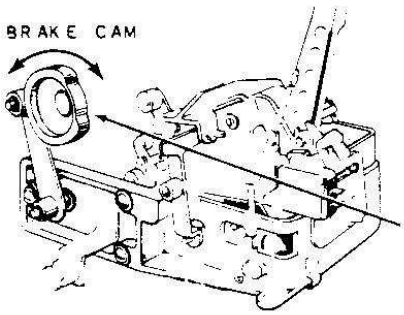


(C) While gently shifting Carriage to Left and Right by hand, - - -

turn "Clutch 3" adjusting screw carefully downward - - -

until all rotational motion is just taken out of Sprocket. Tighten "Clutch 3" Lock Nut.

(D) After this adjustment has been made, adjust "Clutch 4" as shown on the following page.



CAUTION: - Note that when adjustment is completed there is no more rotational motion in Sprocket but Carriage still has a slight amount of side play. This is a normal condition due to required gear clearances.

Do not force adjusting screw.

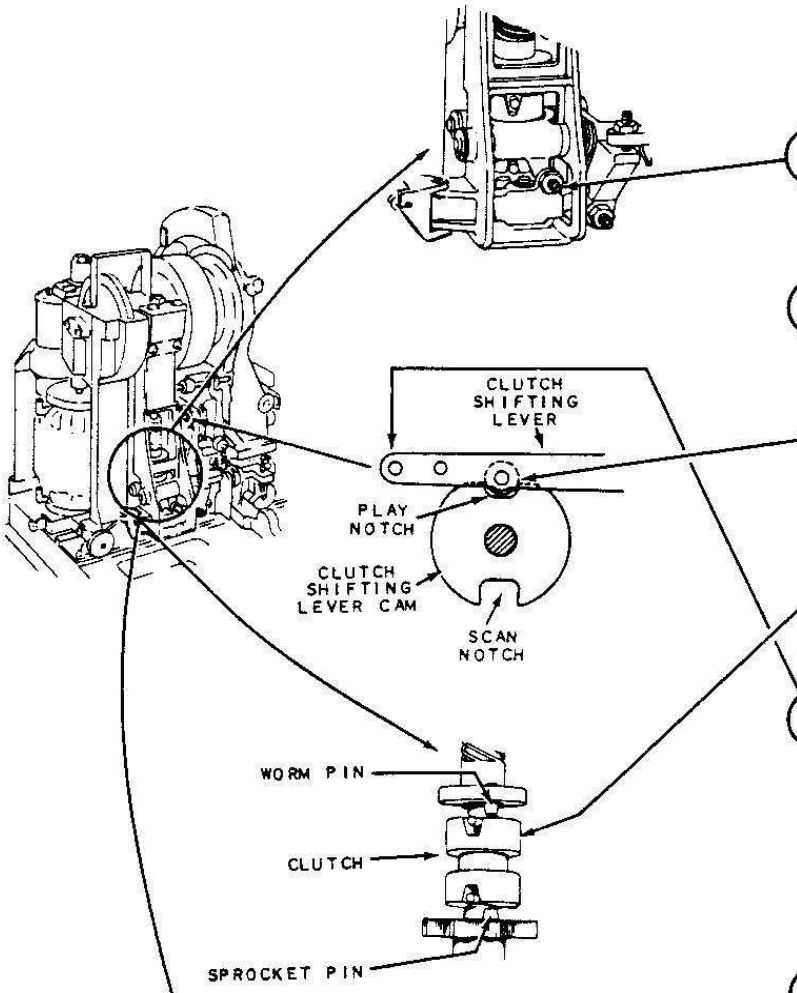
Turning the screw down too far will set up severe strains in the levers and will cause the Cam Assembly to bind when entering PLAY position. When adjustment is completed, check for freedom of action of Cam Assembly by turning Brake Cam by hand in both directions. Cam should have a slight amount of rotational play.

* V0 for 200 Selection Mechanisms
V8 for 160 Selection Mechanisms
K0 for 100 Selection Mechanisms

"CLUTCH 4" - - CLUTCH PLAY POSITION ADJUSTMENT

This adjustment establishes the playing position of the Clutch. This results in 1/64" clearance between the Clutch and the Worm Pin in PLAY position.

NOTE: - Before making this adjustment "Clutch 2 and 3" should be correct.



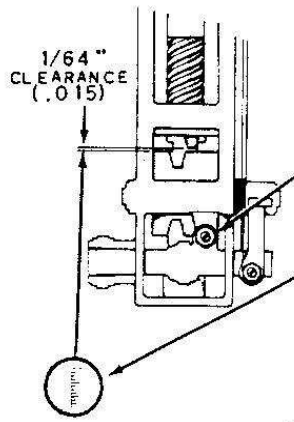
(A) "Clutch 4" adjusting screw should be turned out to the limit.

(B) Place mechanism in *V0 (V8 or K0) PLAY position. Be sure mechanism is fully in PLAY position.

Clutch Shifting Lever Roller should be down in PLAY notch, - - - and - - -

Clutch should be below the Worm Pin and above the Sprocket Pin.

(C) Press downward on end of Clutch Shifting Lever. (This insures that the Clutch has moved to its farthest downward travel before making the adjustment.)



(D) Turn adjusting screw inward until there is 1/64" (.015) clearance between the bottom of the Worm Pin and the top of the Clutch.

(E) Tighten Lock Nut.

NOTE: - Clutch should drop freely, (to 1/64" clearance) every time mechanism enters PLAY position. If Clutch does not drop freely into full PLAY position it may hit Worm Pin as it rotates. This can be caused by "Clutch 3" being too tight or by binds in the Clutch and the Clutch Shifting Lever.

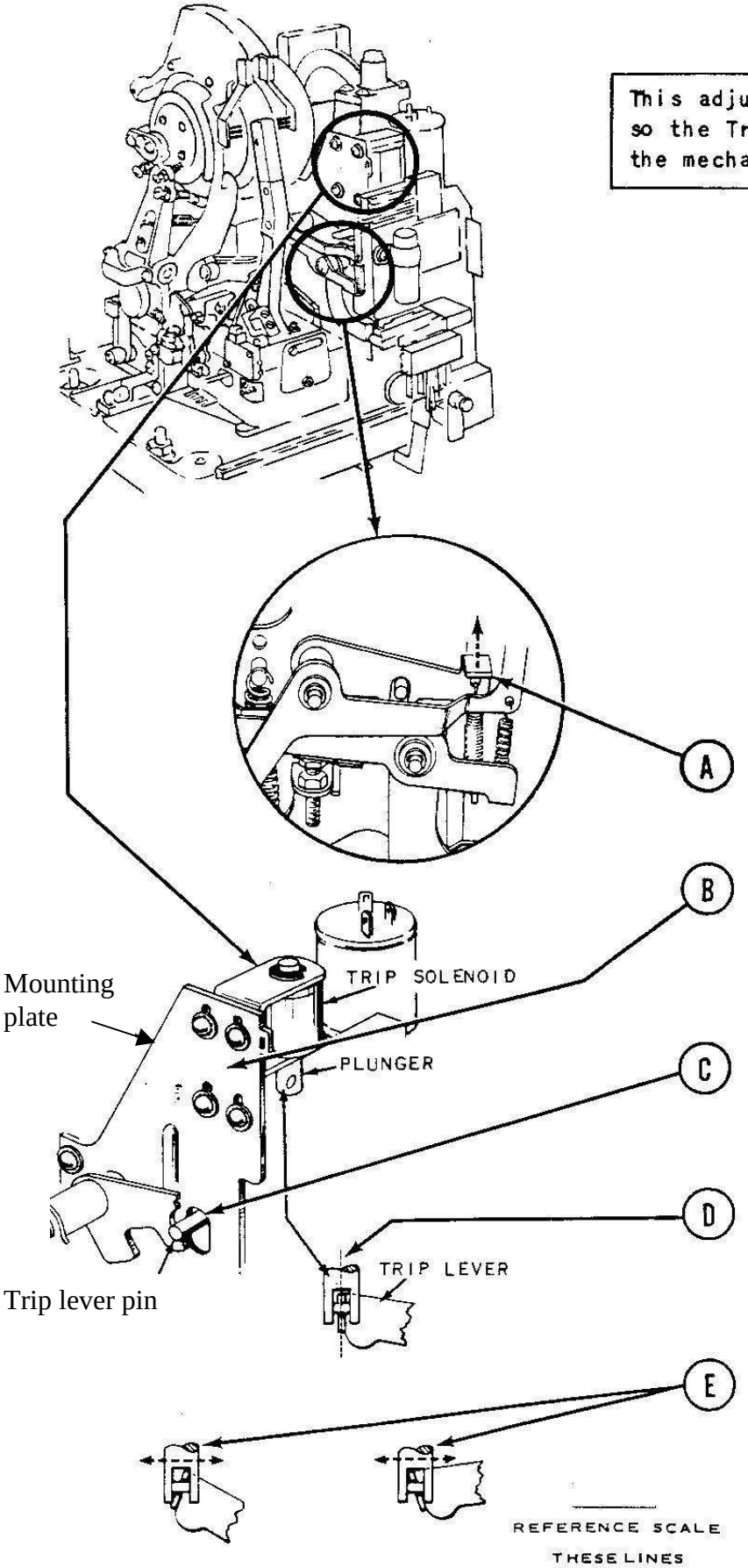
REFERENCE SCALE
THESE LINES 1/64" APART ACTUAL SIZE

* V0 for 200 Selection Mechanisms
V8 for 160 Selection Mechanisms
K0 for 100 Selection Mechanisms

2437

"TRIP SOLENOID I" - - TRIP SOLENOID POSITION

This adjustment positions the Trip Solenoid so the Trip Lever is raised enough to cause the mechanism to "trip".



A. Trip the mechanism by manually lifting the Release Lever.

B. Loosen four screws holding Trip Solenoid Brackets and - - -

adjust the vertical position of the Solenoid so the Trip Lever Pin clears the upper edge of the Mounting Plate Hole not less than 1/64" when the Solenoid Plunger is in the fully raised position.

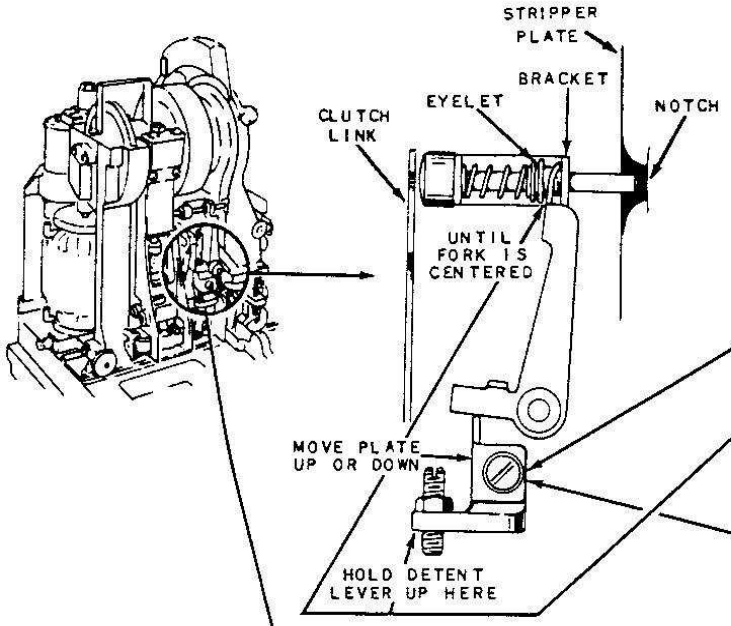
C. Adjust the horizontal position of the Solenoid so the forked end of the Trip Lever, when vertical, is centered in the plunger slot.

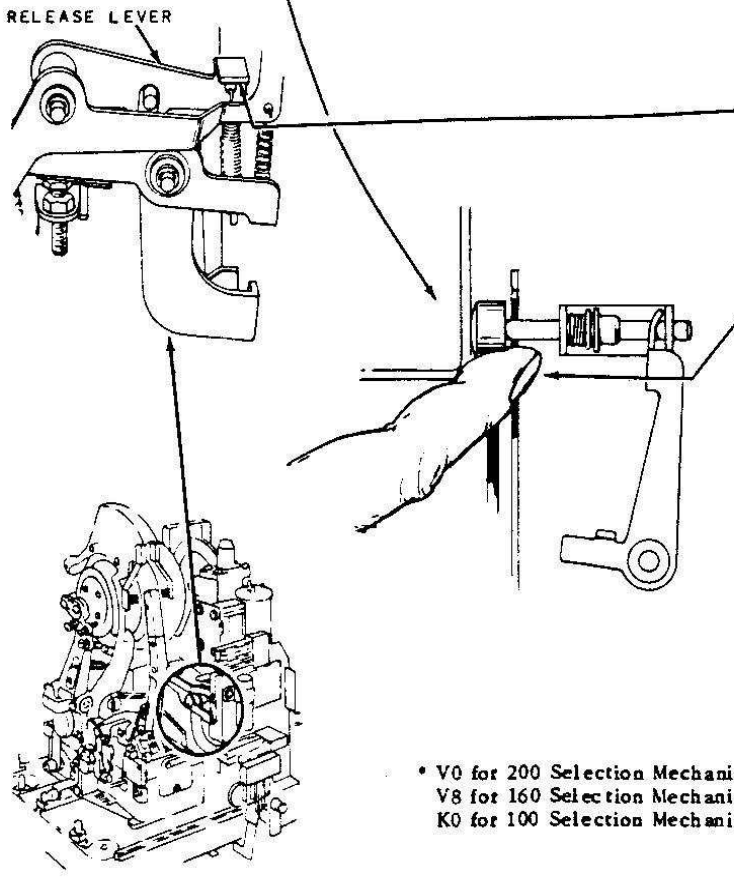
D. To avoid binds the Plunger must have horizontal play when the Trip Lever is in either extreme up or down position.

E. The upper and lower brackets holding the Solenoid should be square with the coil.

"SAFETY LEVER I" - - SAFETY LEVER POSITION

This adjustment establishes the correct position of the Safety Lever and results in proper travel of the Safety Plunger when the mechanism is entering PLAY or SCAN position.





(A) Scan Carriage to right end beyond *V0 (V8 or K0) and turn off power.

(B) To adjust Safety Lever, - - -

1. Mechanism should still be in SCAN position.
2. Loosen screw.
3. While holding Detent Arm Lever up by hand, move Adjustment Plate up or down until top forked end of Safety Lever is approximately centered between eyelet and bracket.
4. Tighten screw.

(C) To check Safety Assembly for binds,

1. Trip the mechanism by manually lifting the Release Lever.
2. Pull Plunger all the way over to the left (as shown) and release slowly to right. Plunger should return freely without binds.

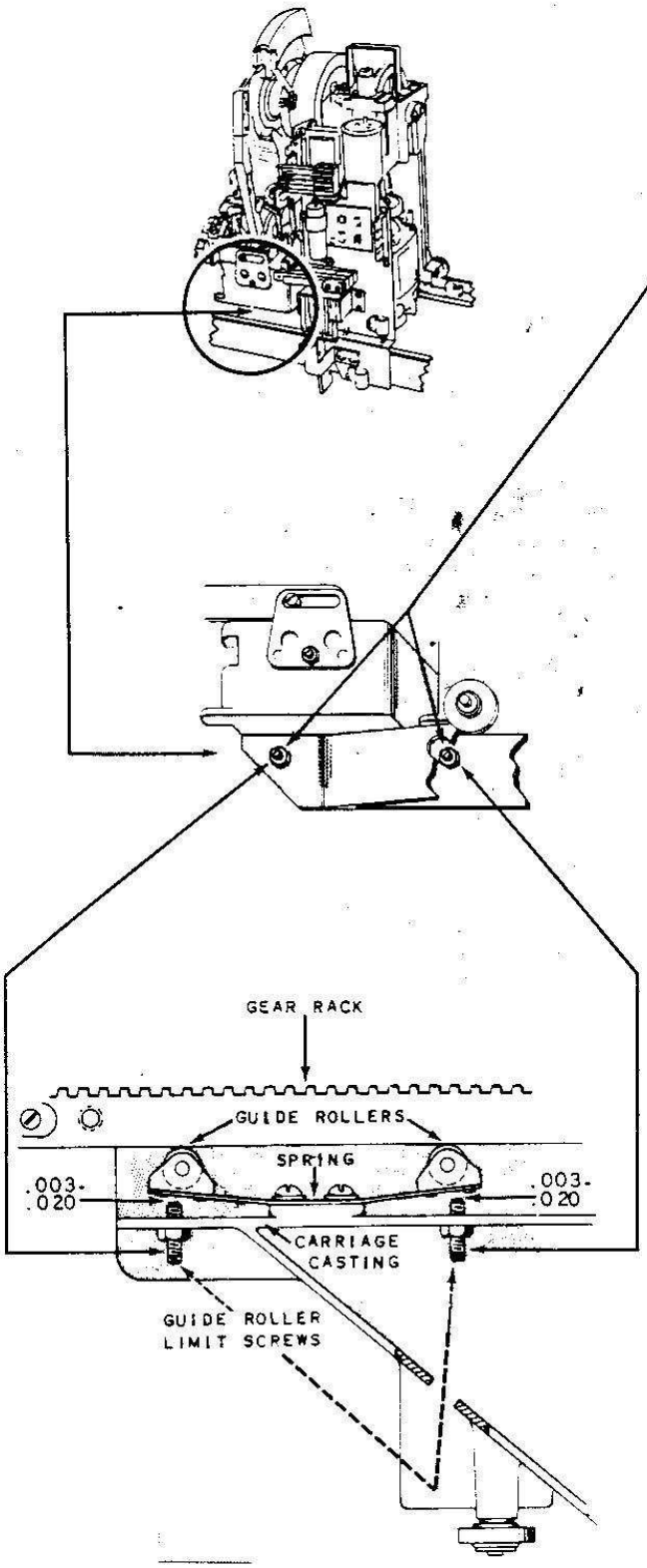
(D) To test for correct safety operation, - - hold the edge of a thin record across the Stripper Plate Notch and run mechanism slowly through SCAN. Hook on Clutch link should catch on large end of Plunger and record should be returned to PLAY position.

* V0 for 200 Selection Mechanisms
V8 for 160 Selection Mechanisms
K0 for 100 Selection Mechanisms

2439

"GUIDE ROLLERS 1" - - CARRIAGE GUIDE ROLLER ADJUSTMENTS

This adjustment limits the front to back play of the Carriage.



(A) Front and back play of Carriage on rack should be limited to .003 to .020 by position of Guide Roller Limit Screws.

(B) To adjust Guide Roller Limit Screws - - -

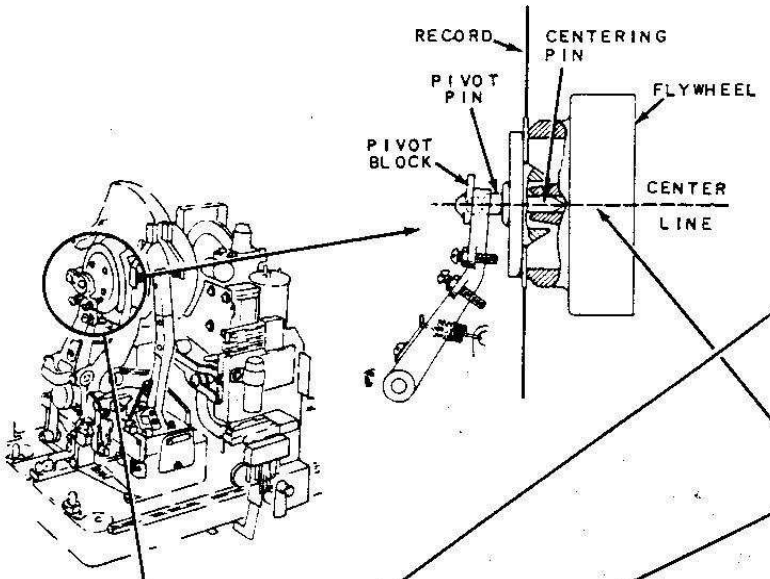
1. Loosen Lock Nuts.
2. Carefully turn screws in, all the way, until all front and back play of Carriage is taken out. (DO NOT FORCE SCREWS)
3. When all front and back play is taken out, back out each screw 1/2 turn. (This will result in approximately .015 clearance.)
4. Tighten Lock Nuts.

(C) Check for play along the entire Gear Rack. Back out each screw an additional 1/4 turn if necessary to avoid binding.

(D) To check Guide Roller Spring pressure, - push left side of Carriage toward the rear and release slowly. Repeat with right side of Carriage. Spring pressure on each side should be great enough to fully reset the Carriage to its normal forward positions.

"CLAMP ARM 1" - - PIVOT PIN ALIGNMENT

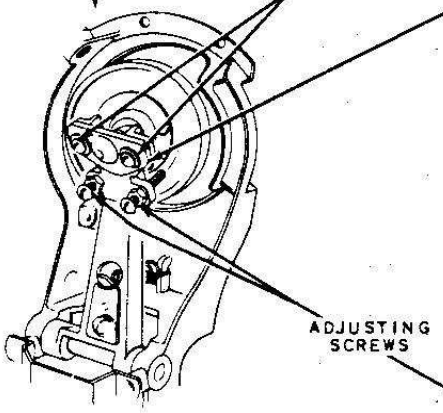
This adjustment establishes proper alignment of the Pivot Pin with the Centering Pin and the hole in the Flywheel Shaft.



(A) Place mechanism in PLAY position with a record clamped on the Flywheel.

(B) Loosen Pivot Block Screws.

(C) Move Pivot Block, up or down, until center line of Pivot Pin is in line with or 1/32" above the center line of the Flywheel Shaft, and tighten screws.

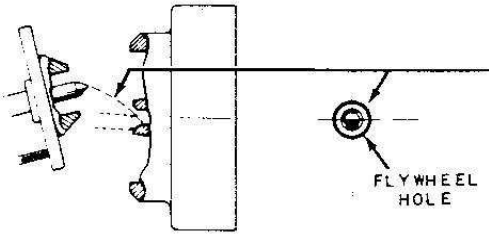


"CLAMP ARM 2" - - CENTERING PIN POSITION

This adjustment establishes the Centering Pin position allowing it to enter freely into the hole of the Flywheel Shaft when a record is being clamped.

NOTE: - "Clamp Arm 1" adjustment should be correct before making this adjustment.

(A) Loosen lock nuts and adjust both screws as required so - - -

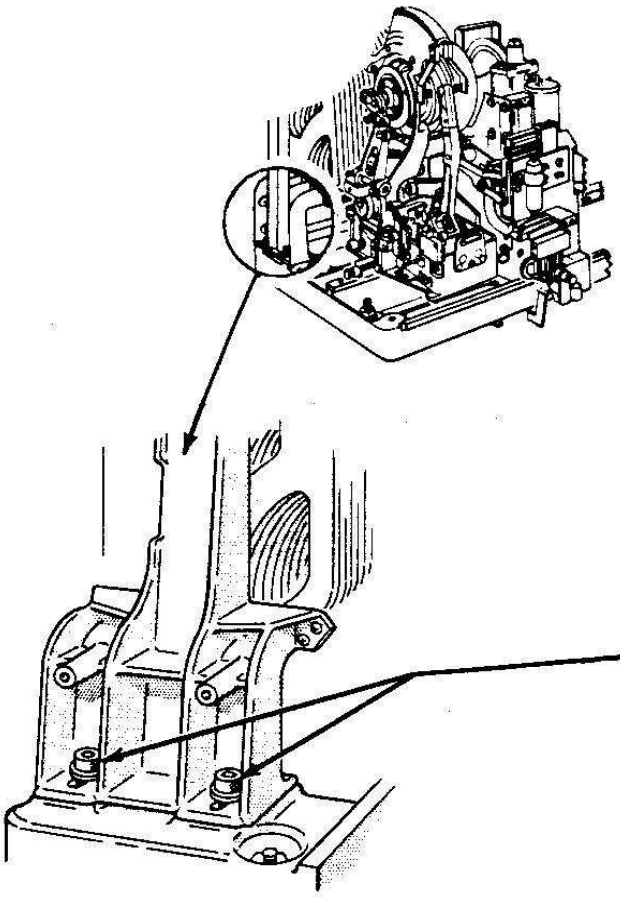


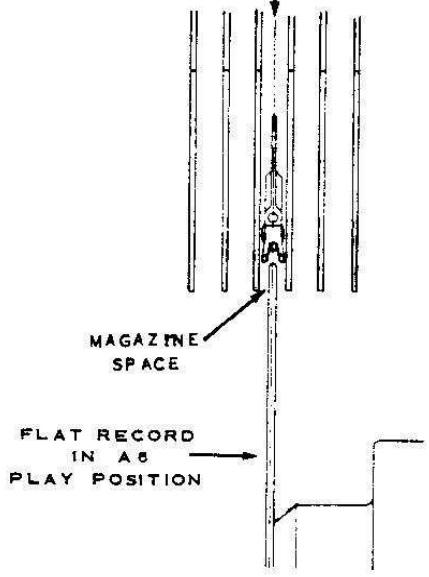
(B) Tip of Centering Pin enters Flywheel hole as shown.

(C) Tighten Lock Nuts.

"MAGAZINE - - HORIZONTAL POSITION"

This adjustment establishes the horizontal Magazine position so that when a record is in Play position it is approximately centered with its magazine space.





(A) Place a FLAT record in PLAY position near the center of the magazine. (Be sure the record is FLAT – not warped, not dished.)

(B) Loosen the cap screws holding both ends of the Magazine to the Base.

(C) Shift the entire Magazine to Left or Right until the record is in the center of the Magazine Space.

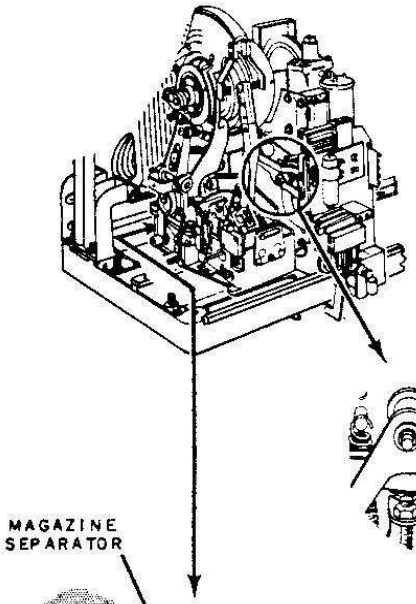
(D) Tighten cap screws. (Be sure the screws are tight.)

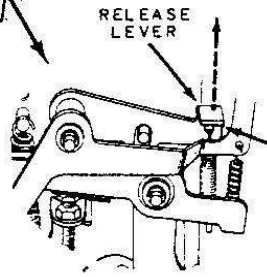
NOTE: - If the Magazine position is changed be sure to check

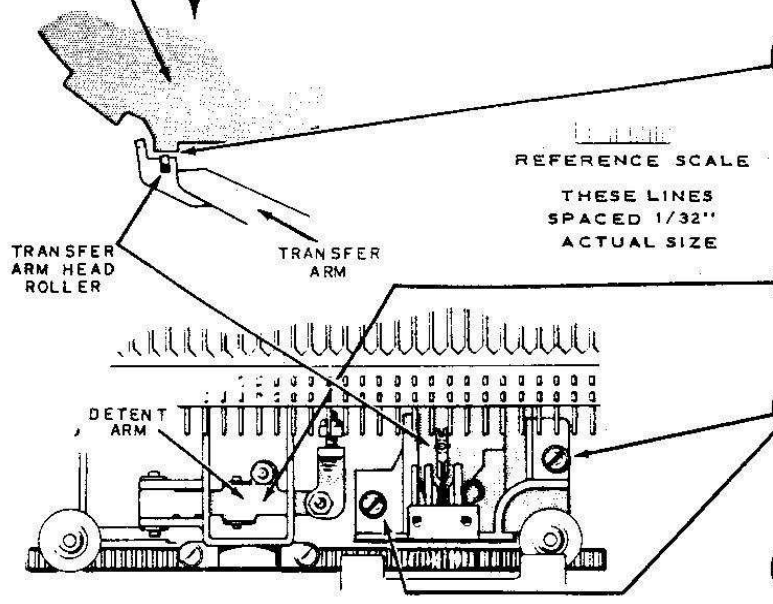
"Transfer Arm 1"
"Contact Plunger Block 1 & 2"
"Tormat Memory Unit Position"
"Selection Playing Indicator"

"TRANSFER ARM 1" - - ALIGNMENT TO MAGAZINE

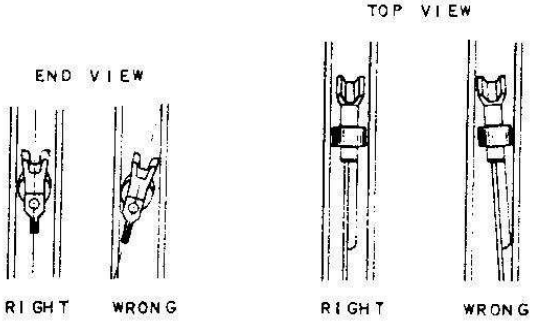
This adjustment establishes the lateral position of the Transfer Arm so the Transfer Arm Head will be centered in the magazine space when a record is transferred.







REAR VIEW WITH TORMAT MEMORY UNIT REMOVED



NOTE: The Magazine horizontal position adjustment should be correct before making this adjustment.

The Tormat Memory Unit should be removed for convenience in making this adjustment. This can be done by removing its four mounting screws.

(A) Scan the mechanism to a position near the center of the magazine and turn off power.

(B) Trip the mechanism by manually lifting the Release Lever.

(C) Turn motor shaft until Roller in Transfer Arm Head is approximately 1/32" below the projections on the lower edges of the Magazine Separators.

(D) Push in on Detent Arm to take out Carriage Side Play.

(E) Loosen two screws holding Contact Arm Casting to Carriage Casting and - - -

(F) Shift Contact Arm Casting to left or right until Transfer Arm Head is centered in the space. Tighten screws.

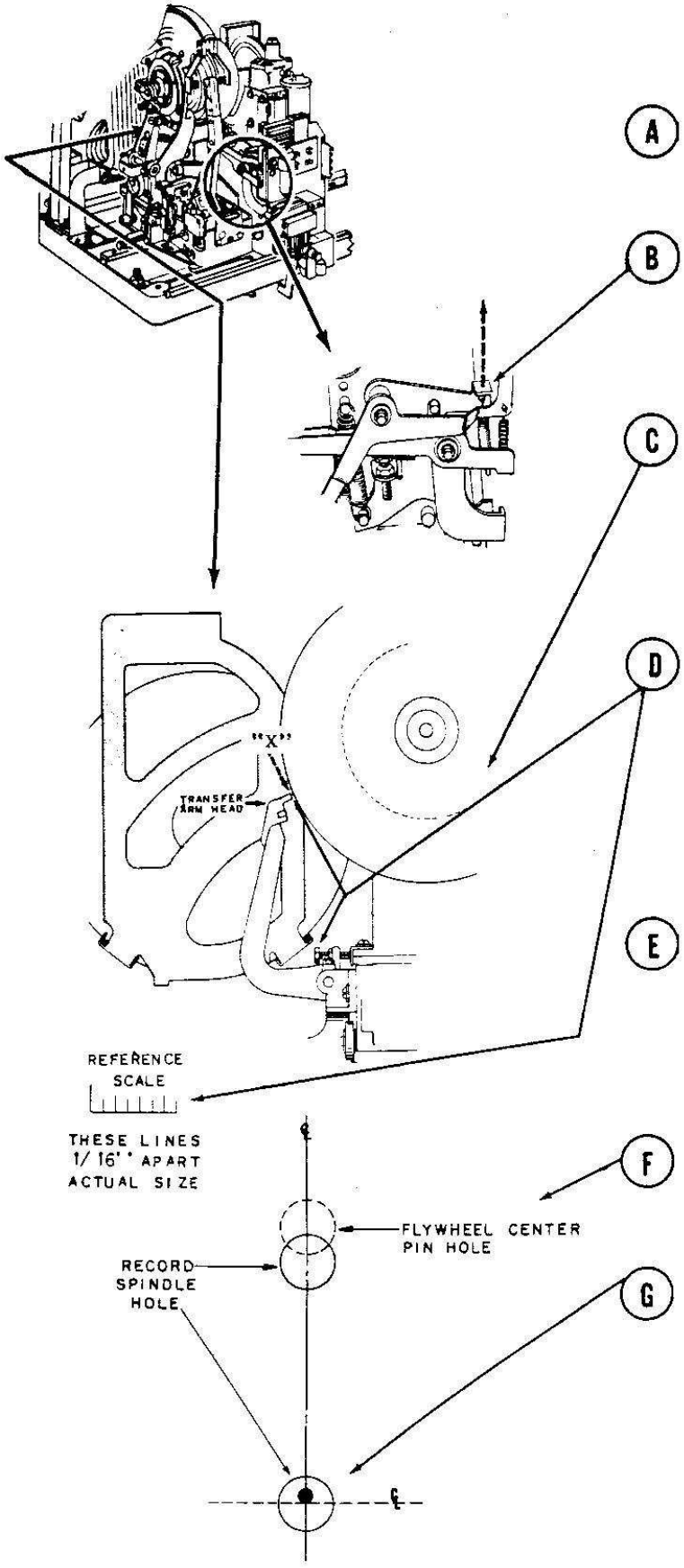
(G) When the Transfer Arm enters the space, the Transfer Arm Head should be parallel to the Magazine Separators as shown. Straighten Arm if necessary to correct Transfer Arm Head alignment.

NOTE: -After making this adjustment be sure to check and adjust - "Contact Plunger Block 1 & 2" and "Tormat Memory Unit Position."

2443

"TRANSFER ARM 2" – – PLAY POSITION CLEARANCE

This adjustment establishes the travel of the Transfer Arm so that records will be properly clamped to the Flywheel by the Clamp Arm.



NOTE: CLAMP ARM 1 & 2 ADJUSTMENTS MUST BE CORRECT BEFORE MAKING THIS ADJUSTMENT..

A — Scan the carriage to the Left, stopping it *one position to the LEFT of A1* so the Transfer Arm will come up outside the magazine.

B — Trip the mechanism by manually lifting the Release Lever.

For mechanisms designed for playing 45 rpm. records only (clamp arm lifts record from transfer arm head).

C — Place a normal size *45 rpm. record in position on the Transfer Arm Head. Turn motor shaft until record is brought up and clamped in PLAY position. (Transfer Arm and record should come up just outside of the Magazine one position to the left of A1.)

D — Adjust screw for 1/16" clearance between edge of record and tips of the Transfer Arm Head at "X".

For mechanisms designed to play intermixed 45 and 33-1/3 rpm. records. (Transfer arm moves away from record after clamp arm clamps it.)

E — Place a normal size *33-1/3 rpm. record (with 5/16" spindle hole) in position on the Transfer Arm head and turn motor shaft until record is at its maximum raised position. This will be at a point where the Clamp Arm just starts moving toward the record.

F — Adjust screw so record spindle hole is exactly aligned, vertically, with the centering pin hole in the fly wheel and - - - - - -

G — - - - - - -the record ramp should be positioned so the tip of the centering pin enters the record spindle hole in line with or 1/32" above the horizontal center line of the record hole.

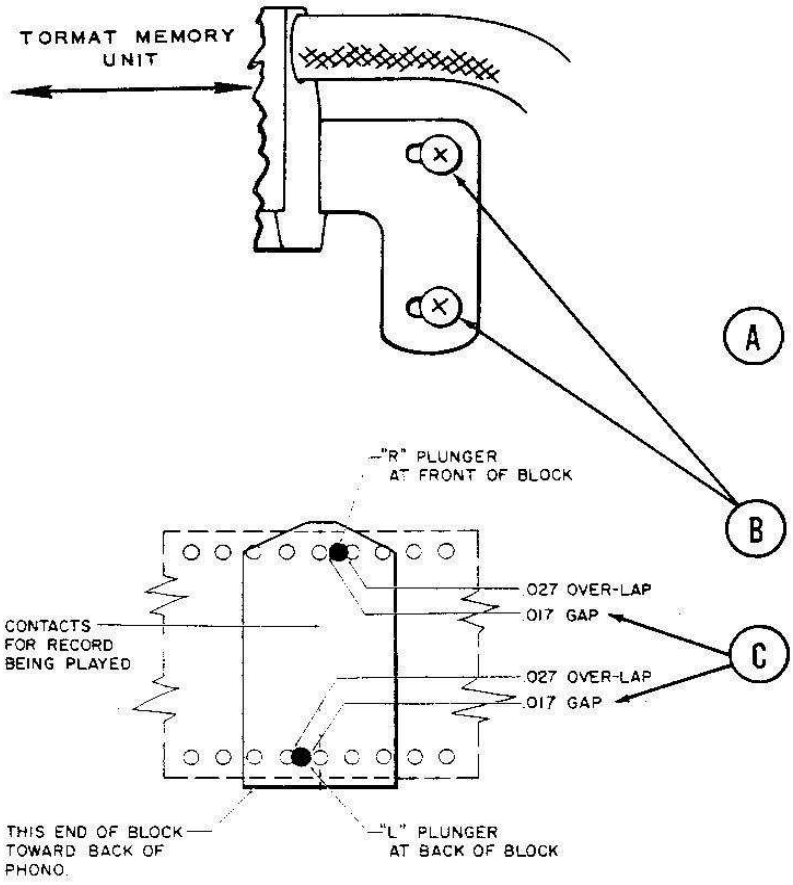
After the record has been clamped, the Transfer Arm moves downward so there is about ¼" clearance at "X" in play position.

*DIAMETER OF A NORMAL SIZE 45 RPM. RECORD IS 6-7/8" ± 1/32"

"TORMAT MEMORY UNIT POSITION"

This adjustment positions the Tormat Memory Unit so the contact plungers and Tormat contacts will be correctly aligned for tripping the mechanism at the selected record.

NOTE: If for any reason the Tormat Memory Unit is removed from the mechanism the Contact Plunger Block adjustments must be checked and, if necessary, corrected before making the Tormat adjustment. This may be done with a preliminary lateral adjustment of the unit by placing the mechanism at A1 and mounting it on the magazine with rear plunger just touching contact rivet for adjacent selection (to the left of the contact for A1).



NOTE 1: The Tormat Memory Unit and the Contact Plunger Block positions are related so each must be checked if any one is changed.

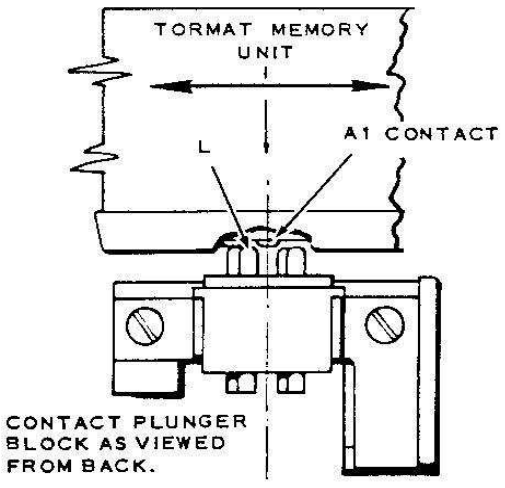
NOTE 2: Check "Clutch 3" for minimum carriage side play also check "Magazine" and "Transfer Arm 1" adjustments before making this adjustment.

A — Place the mechanism in PLAY position at a record space near the center of the magazine and turn off power.

B — Loosen the two mounting screws at each end of the Memory Unit.

C — Adjust the lateral position of the Unit so the R and L contact plungers are, respectively, to the right and left of the contacts associated with the record being "played". The contacts and plungers will be separated by approximately 1/64" (.017) as shown and the gap should be the same for each.

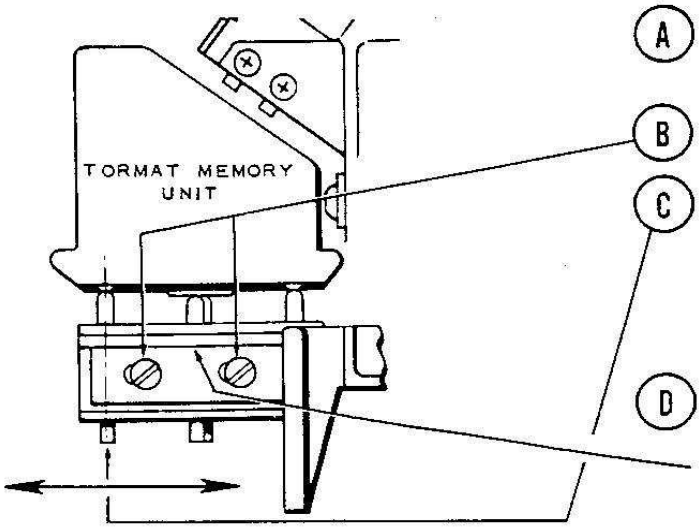
Place mechanism in PLAY position at the end record spaces of the magazine, then check the positions of the plungers relative to the Memory Unit contacts. The gaps between the plungers and the end contacts should be approximately .017" as in C (above) and should be equal. Exactly equal separation at both end positions is not necessary but if it is not equal, shift the Memory Unit, as required, so variation of gap is equally divided at each end of the magazine.



"CONTACT PLUNGER BLOCK 1" – – HORIZONTAL POSITION

This adjustment positions the Contact Plunger Block horizontally (front to back) and determines proper alignment of the contact plunger and the Tormat contact rivets.

NOTE : The Tormat Memory Unit and the Contact Plunger Block positions are related so each must be checked if any one is changed.



REFERENCE SCALE

THESE LINES SPACED 1/16" ACTUAL SIZE

(A) Place the mechanism in Play position near the center of the record magazine and turn off power.

(B) Loosen adjustment screws.

(C) Adjust contact plunger block in horizontal direction as indicated so that the contact plunger is exactly centered on the contact rivet of the Tormat Unit.

(D) Securely tighten adjusting screws.

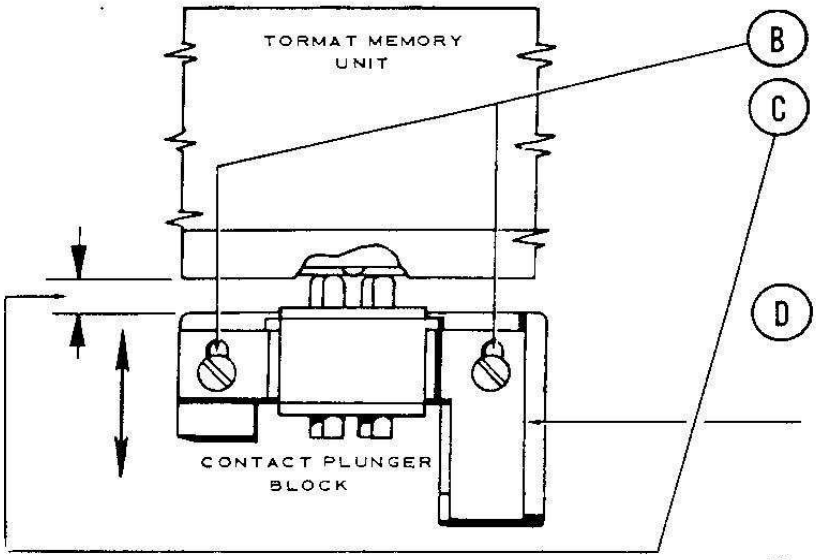
NOTE: Edge of bracket must be against flange on casting during adjustment and tightening of screws.

(E) Check adjustment at the end record positions of the magazine.

"CONTACT PLUNGER BLOCK 2" – – VERTICAL POSITION

This adjustment positions the Contact Plunger Block vertically to assure proper contact pressure and movement of the plungers.

NOTE : The Tormat Memory Unit and the Contact Plunger Block positions are related so each must be checked if any one is changed.



(A) Place the mechanism at in Play position near the center of the record magazine and turn off power.

(B) Loosen adjustment screws.

(C) Adjust Contact Plunger Block in vertical direction so that the top surface of the contact plunger bearing plate is ¼" from the surface of the Tormat Memory Unit.

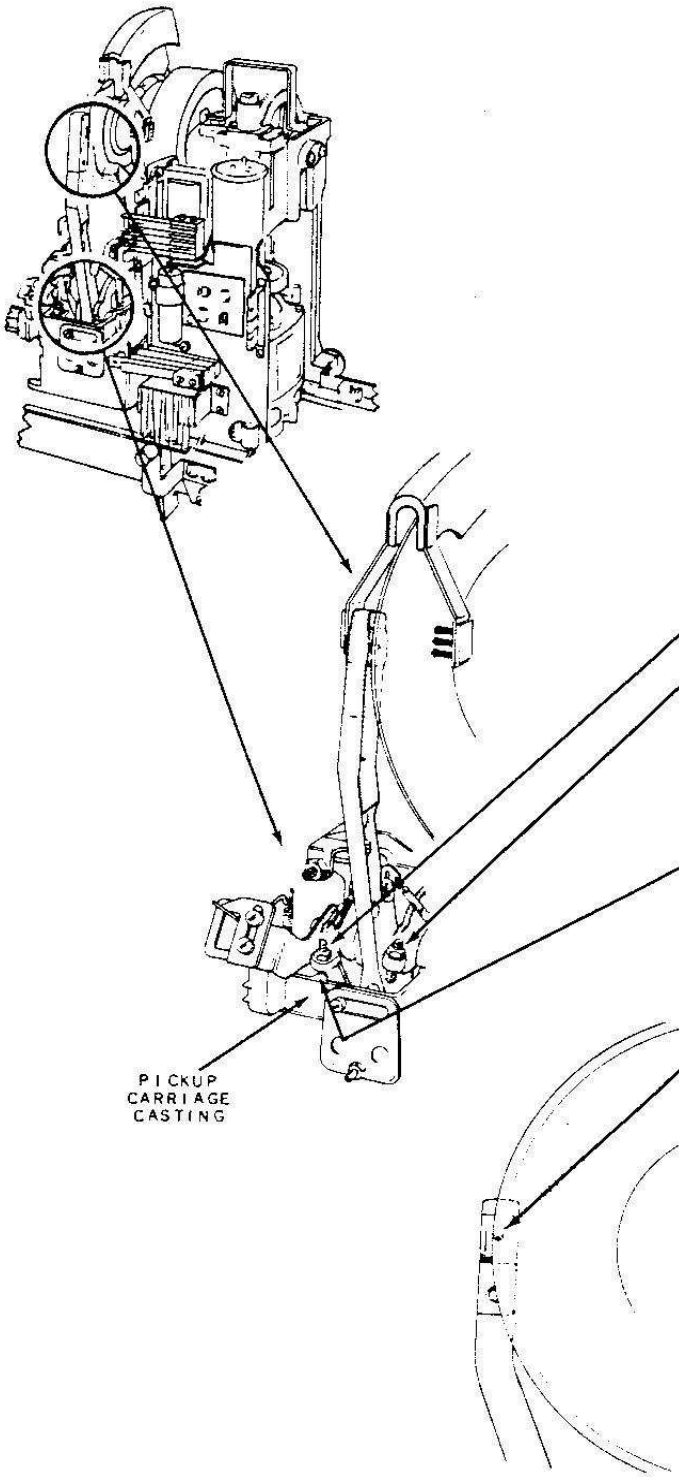
(D) Securely tighten adjusting screws.

NOTE: Edge of bracket must be against flange on casting during adjustment and tightening of screws.

(E) Check adjustment at the end record positions of the magazine.

"PICKUP 1" - - NEEDLE LANDING ADJUSTMENT

This adjustment establishes the point of landing of the needle on the record at the beginning of Play. It should be made so the needle lands half way between the edge of the record and the first playing groove.



(A) Select the Left side of a normal* record (preferably a transparent type) and place the record and the mechanism in Left Side PLAY position.

(B) Loosen Lock Nuts on - - - "Pickup 1" and - - - "Pickup 2". Turn Adjusting Screw out to limit. (" Pickup 2" Adjusting Screw is loosened to avoid possibility of binds in the levers when the mechanism is later returned to SCAN.)

(C) Hold Adjusting Screw down against casting and adjust so - - -

(D) - - needle is halfway between outer edge of record and the playing grooves. (If transparent type record is used, point where needle touches can be seen through the record.)

(E) Tighten "Pickup 1" Lock Nut.

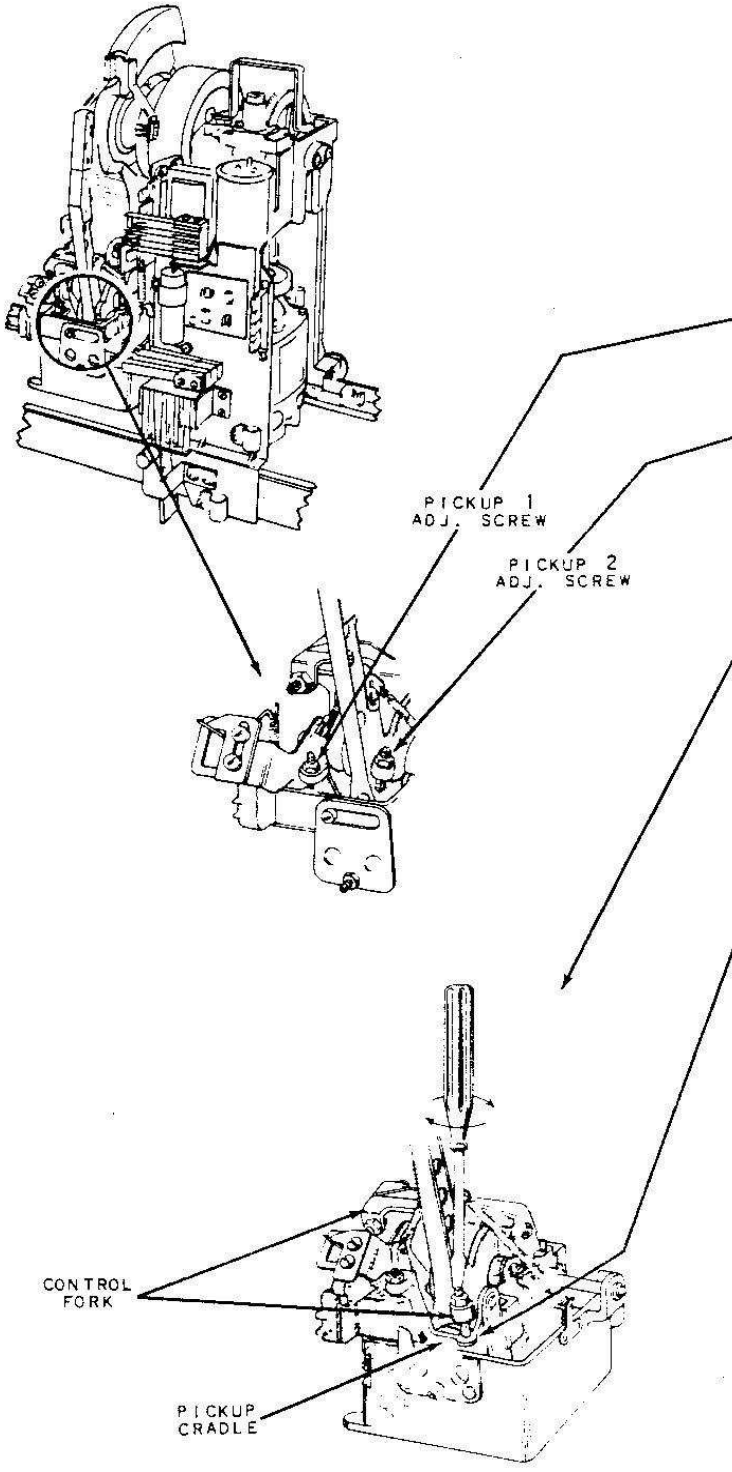
(F) Select the Right side of the same record and check for proper needle landing at the beginning of Right Side PLAY.

(G) After this adjustment had been made, adjust "Pickup 2" as shown on the following page.

*Normal diameter for 45 R.P.M. records is 6-7/8 ± 1/32.

PICKUP 2 - - PICKUP RETURN ADJUSTMENT

This adjustment results in proper return of the Pickup Arm to SCAN position and allows enough play between the Cradle and the Adjusting Screw to avoid binds.



NOTE: - "Pickup 1" adjustment should be correct before making this adjustment.

(A) Place mechanism in SCAN position with Pickup Arm on Left Side. "Pickup 1" Adjusting Screw should be against the casting.

(B) Loosen Lock Nut and turn "Pickup 2" Adjusting Screw out to limit.

(C) Insert screw driver in screw slot. Push straight down on screw with screw driver, then release. Note clearance between screw and cradle and note the up and down play in the Control Fork.

(D) While gently pushing down and releasing the screw with screw driver, turn screw down carefully, a little at a time, until all the up and down play is just taken out.

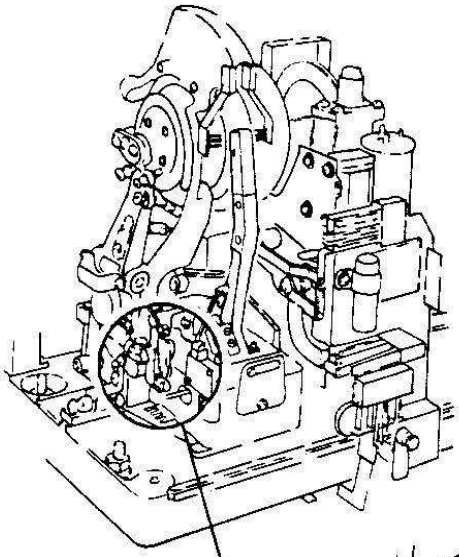
(E) Back out screw 1/4 turn from the above position and tighten Lock Nut. (This allows a small amount of clearance under the screw and a slight amount of up and down play in the Control Fork.)

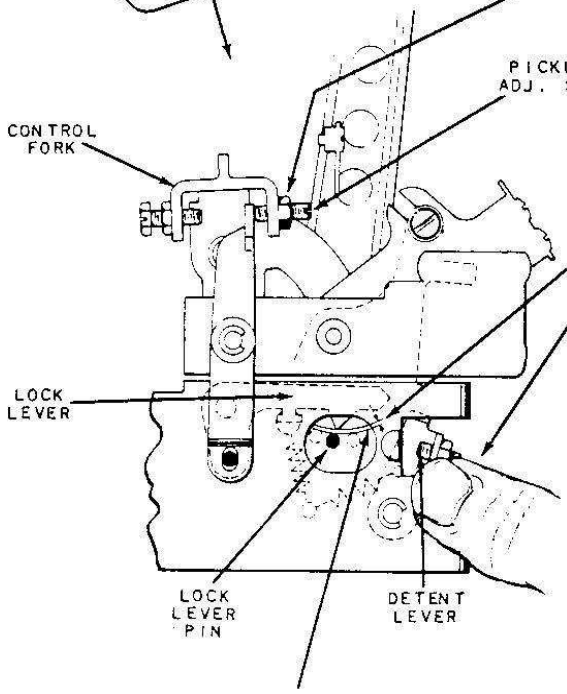
(F) Place mechanism in Right side PLAY position then return it to SCAN with Pickup Arm on Right Side. Check for equivalent up and down play of Control Fork with Pickup Arm on Right side.

CAUTION: If "Pickup 2" Adjusting Screw is down too far (no up and down play in Control Fork) it may place a bind on the Levers and interfere with proper Pickup shifting action. A check for proper shifting of Pickup can be made by alternately selecting and playing several Right and Left sides of records. Each time Pickup shifts it should move smoothly all the way over to its Right or Left position.

"PICKUP 3" - - PICKUP RELEASE ADJUSTMENT

This adjustment establishes 1/32" clearance between the path of the Lock Lever Pin and the lower projection of the Lock Lever when the mechanism is in PLAY position.





REFERENCE SCALE
THESE LINES
SPACED 1/32"
- ACTUAL SIZE

(A) Place mechanism in Left Side PLAY position.

(B) Loosen Lock Nut - - and while holding Detent Lever away from the Lock Lever, - - -

(C) adjust screw so that the lower projection of the Lock Lever and the Lock Lever Pin clear by 1/32" when the Pin is moved past the Lever.

(D) Tighten Lock Nut.

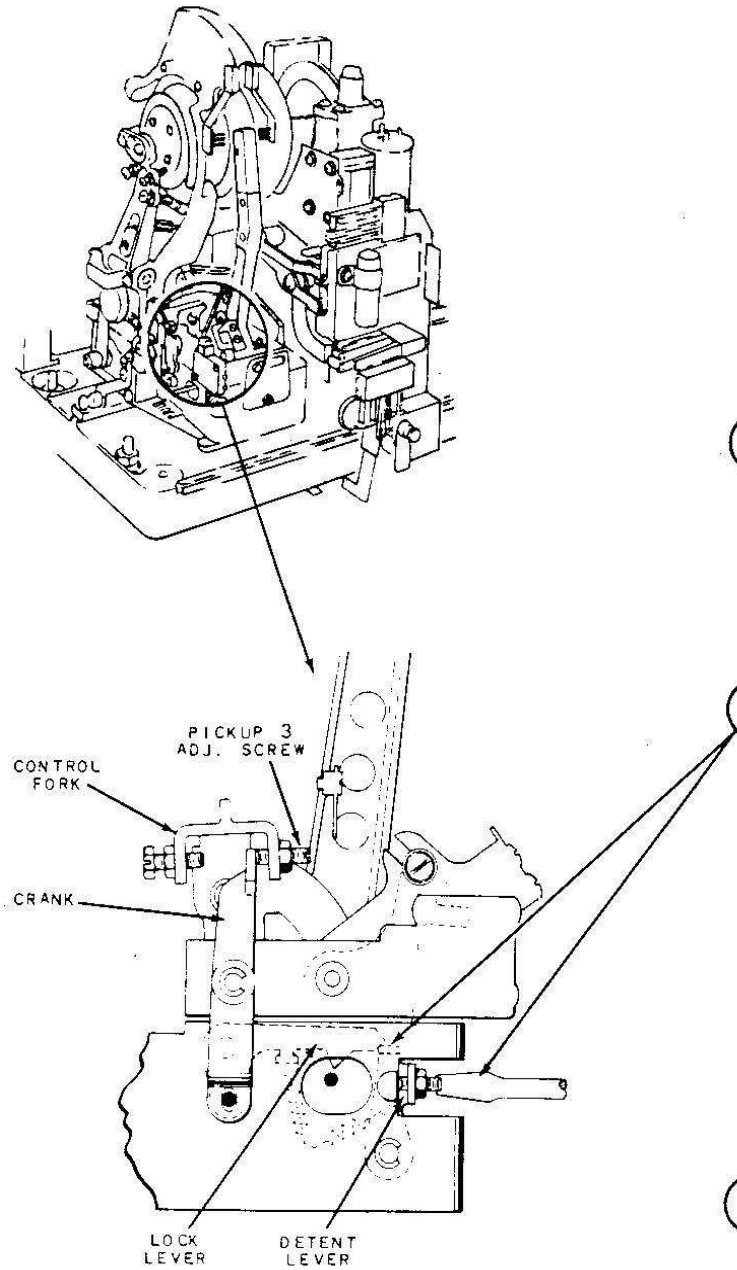
(E) Place mechanism in Right side PLAY position. While holding Detent Lever away from Lock Lever, move Pickup Arm in along record and again check for required 1/32" clearance.

If clearance is not approximately the same in both Right and Left side PLAY positions, check Lock Lever Pin alignment. Straighten Pin, if necessary.

NOTE: - This adjustment should be followed by "Pickup 4" adjustment.

"PICKUP 4" - - DETENT LEVER ADJUSTMENT

This adjustment establishes the Detent Lever position so that it just touches the lower slope of the end of the Lock Lever when the mechanism is in PLAY position.



NOTE: - "Pickup 3" adjustment should be correct before making this adjustment.

(A) Place mechanism in Right side PLAY position.

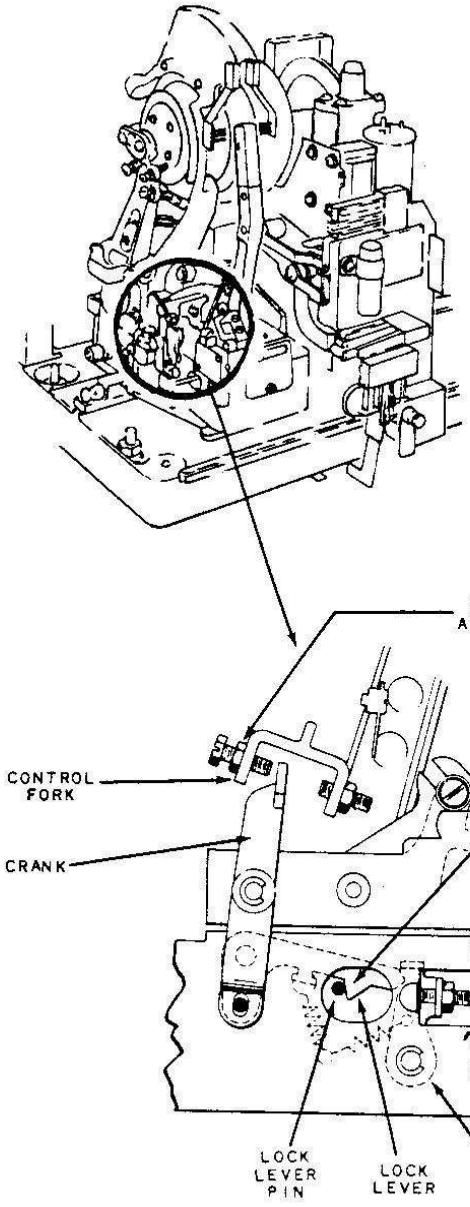
(B) Loosen Lock Nut and adjust the screw until Detent Lever just touches lower slope of Lock Lever, as shown. *The Detent Lever should meet the Lock Lever approximately half way along the lower slope. If the edge of the Detent Lever is above or below the lower slope of the Lock Lever, check "Pickup 3" adjustment.*

(C) Tighten Lock Nut.

(D) To check - - manually pull top of Control Fork away from Crank. The Detent Lever should hold the Lock Lever and the Crank from moving.

"PICKUP 5" - - PICKUP LOCKING ADJUSTMENT

This adjustment establishes 1/32" clearance between the tip of "Pickup 5" adjusting screw and the upper end of the Crank to insure correct locking of the Pickup Assembly in SCAN position.



REFERENCE SCALE

THESE LINES
SPACED 1/32"
ACTUAL SIZE

NOTE: - "Pickup 4" adjustment should be correct before making this adjustment.

(A) Place mechanism in SCAN position with Pickup Arm and Cradle fully reset on Left side.

(B) Lock Lever should be engaged with Lock Lever Pin. Pull Detent Lever out of way, if necessary, to allow Lock Lever to drop against pin.

(C) Loosen Lock Nut and adjust screw so that clearance between the Crank and the tip of the screw is 1/32'' to 1/16''. Note reference scale.

(D) Tighten Lock Nut.

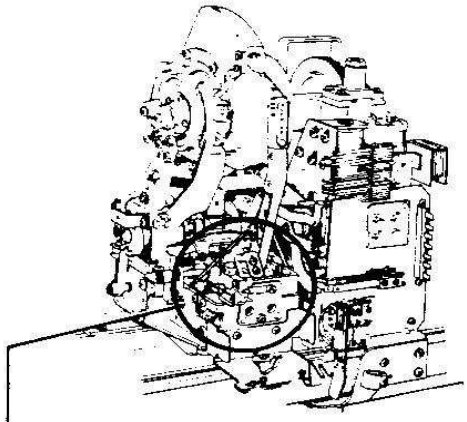
(E) Check adjusting screw clearance by selecting Right side of a record. Screw tip should not touch Crank while shifting.

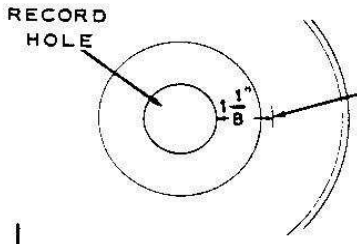
(F) Check resetting action - - by returning mechanism to Right side SCAN position. Lock Lever should be returned to Lock position against Pin and clearance between screw tip and Crank should be 1/32".

2451

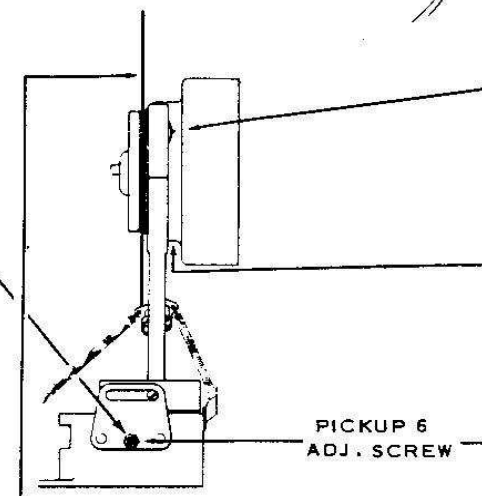
"PICKUP 6" - - PICKUP ARM STOP

This adjustment limits the inward travel of the Pickup Arm so the Pickup Cartridge cannot move in far enough to hit the Flywheel.



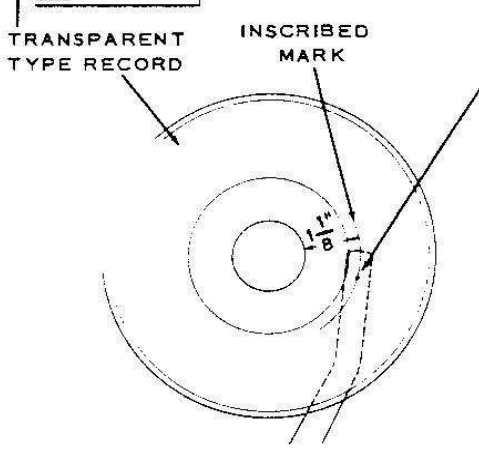


(A) Inscribe a mark on a record 1-1/8" away from the edge of hole. Use a transparent type record if available.



(B) Place mechanism in Right side PLAY position with inscribed record on Flywheel. Turn off power.

(C) Move Pickup Arm in as far as possible toward Flywheel.

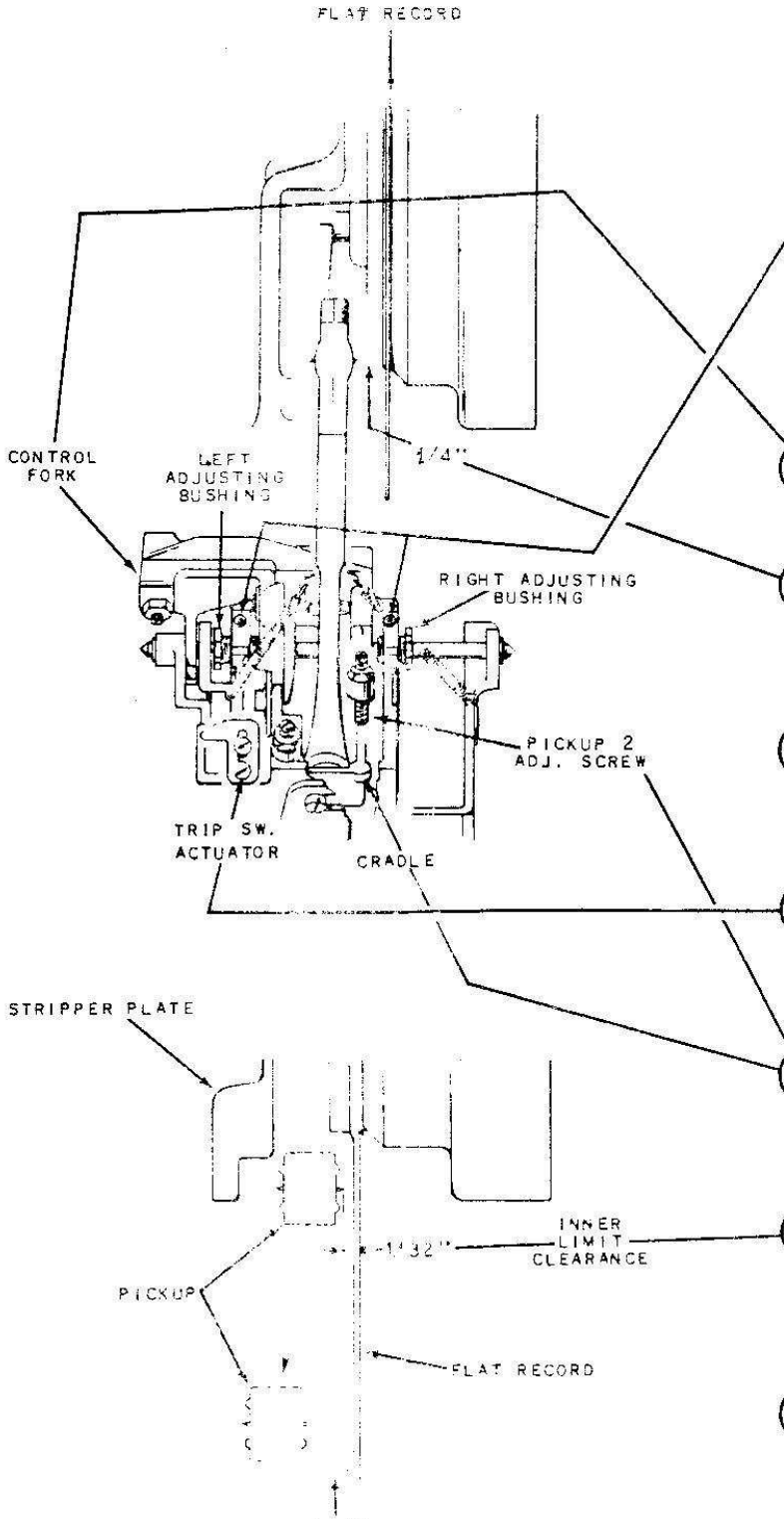


(D) Loosen Lock Nut and adjust screw so that needle cannot move in toward Flywheel any farther than the inscribed mark, as shown.

(E) Tighten Lock Nut.

"PICKUP 7" - - PICKUP LIFTING ADJUSTMENTS

This adjustment establishes correct Pickup lifting action and clearance between the needle and record when the Pickup is lifted and returned to its rest position.



1/4" center limit clearance

NOTE: - "Pickup 6" adjustment should be correct before making this adjustment.

(A) Place mechanism in Left side PLAY position with a flat record clamped on Flywheel. Turn off power and loosen both socket head set screws holding Adjusting Bushings.

(B) Pull Control Fork forward to the limit of its travel and - - -

(C) adjust Left Adjusting Bushing for 1/4" clearance between record and needle.

(D) Release Control Fork and move Pick-up toward center of Flywheel to limit of its travel.

(E) Hold Pickup in this position by pressing inward lightly on Trip Switch Actuator.

(F) Pull Control Fork down lightly until "Pickup 2" adjusting screw just touches Cradle.

(G) In this position of the Pickup Arm and Control Fork the needle should be a minimum of 1/32" from the record.

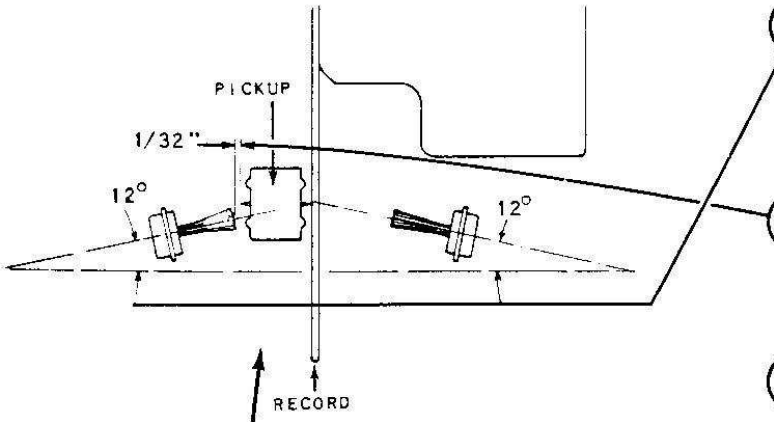
(H) Repeat above for Right side PLAY position using Right Adjusting Bushing to make adjustment.

(J) Tighten both set screws.

2453

"PICKUP 8" - - BRUSH POSITION ADJUSTMENTS

This adjustment establishes 1/32" clearance between the outer needle and the Brush while a record is being played.



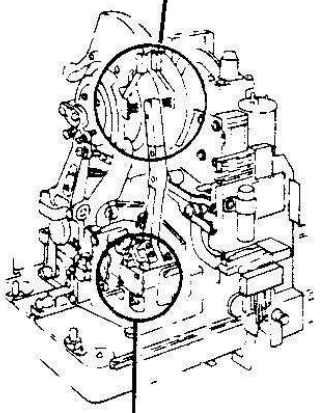
(A) The Brush Mounting Brackets are set so the bristles "point" approximately 12 degrees toward record center.

(B) The Brackets should be formed so the outer needle clears the brush by 1/32" while a record is played.

(C) Check for correct clearance on both Right and Left sides.

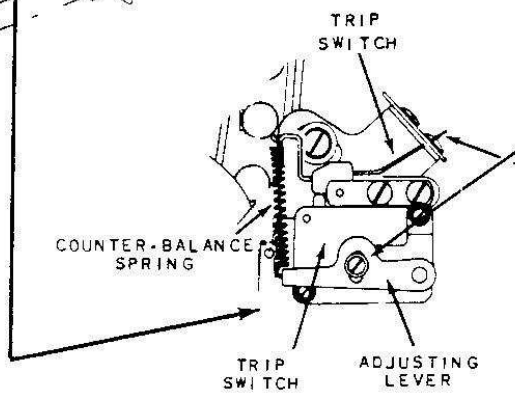
"PICKUP 9" - - TRIP SWITCH PRESSURE ADJUSTMENT

This adjustment establishes the pressure required to operate the Trip Switch at 1 to 2 grams as measured at the end of the Trip Lever.



REFERENCE SCALE

THESE LINES SPACED 1/32" ACTUAL SIZE

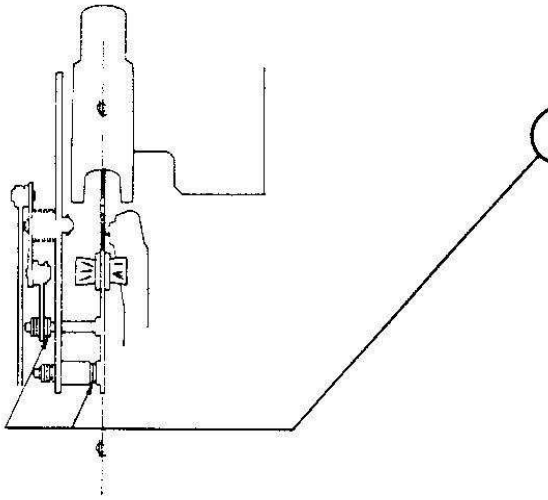


(A) Loosen screw and adjust Counter-balance Spring by moving Adjusting Lever up or down.

Pressure required to trip the Switch should be 1 to 2 grams as measured with a gram scale at this point.

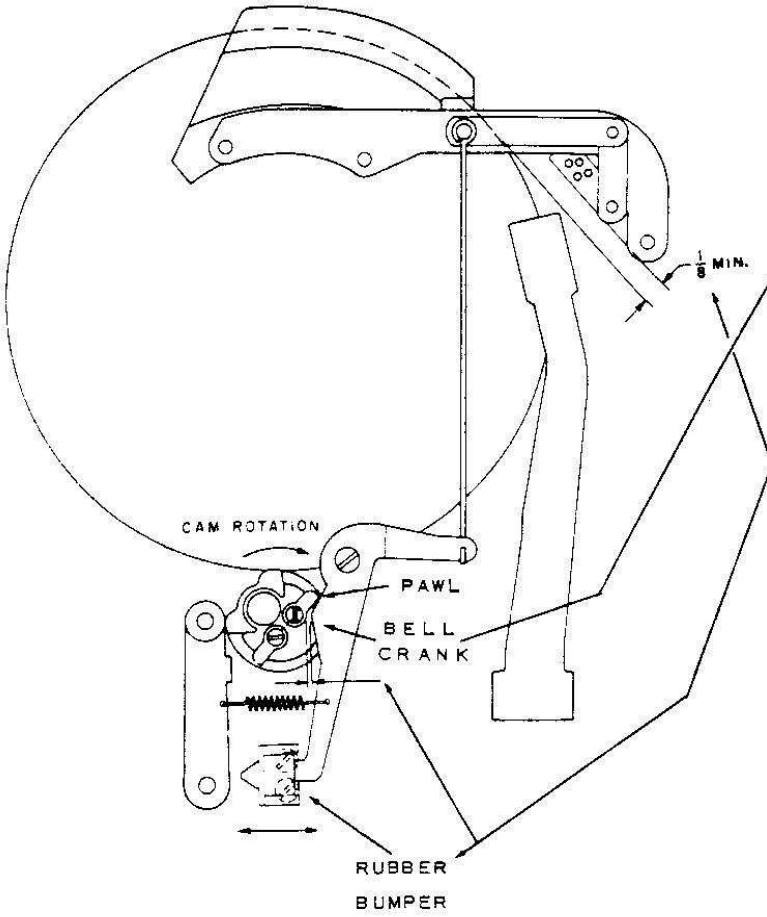
"PICKUP 8" - - BRUSH ADJUSTMENTS (Stereo Pickup)

This adjustment positions the brush for correct operation and clearance.



(A) Place mechanism in PLAY position. Use washer (Part No. 920600) as required to center blade with record. Quantity of washers should be equal on both studs.

(B) With mechanism in SCAN position, manually operate the release lever to trip.



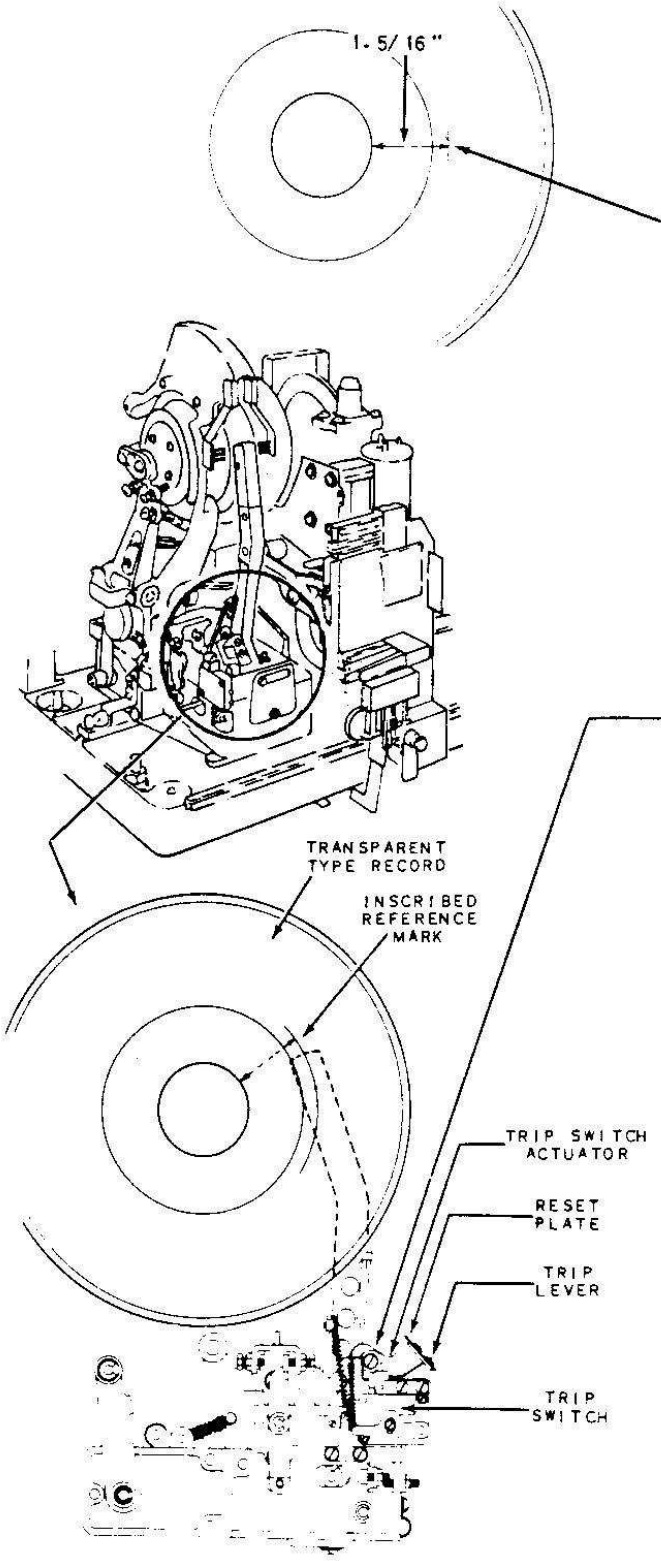
(C) Turn motor coupling manually so pawl on brake cam is rotated clockwise until adjacent to lobe on bell crank as shown.

(D) Position rubber bumper so that (as cam rotates in direction shown) bell crank does not touch hub of pawl. 1/64" maximum clearance allowable.

(E) With rubber bumpers adjusted, as in (D) and with record in PLAY position, clearance between brush blade and record must be not less than 1/8".

"PICKUP 10" - - "RECORD CUT-OFF" (TRIP SWITCH ACTUATOR ADJUSTMENT)

This adjustment establishes the "Record Cut-off" position and results in tripping of the mechanism when the needle has reached a point 1-5/16" from the edge of the hole in the record.



NOTE: - "Pickup 9" adjustment should be correct before making this adjustment.

(A) Inscribe a line on a record 1-5/16" away from edge of hole as shown. (Use a transparent type record if available.)

(B) Place mechanism in Right side PLAY position with inscribed record clamped on Flywheel. Turn off power.

(C) Loosen screw and position Trip Switch Actuator so that Trip Switch will operate when needle reaches inscribed mark.

(DO NOT BEND TRIP LEVER TO MAKE ADJUSTMENT.)

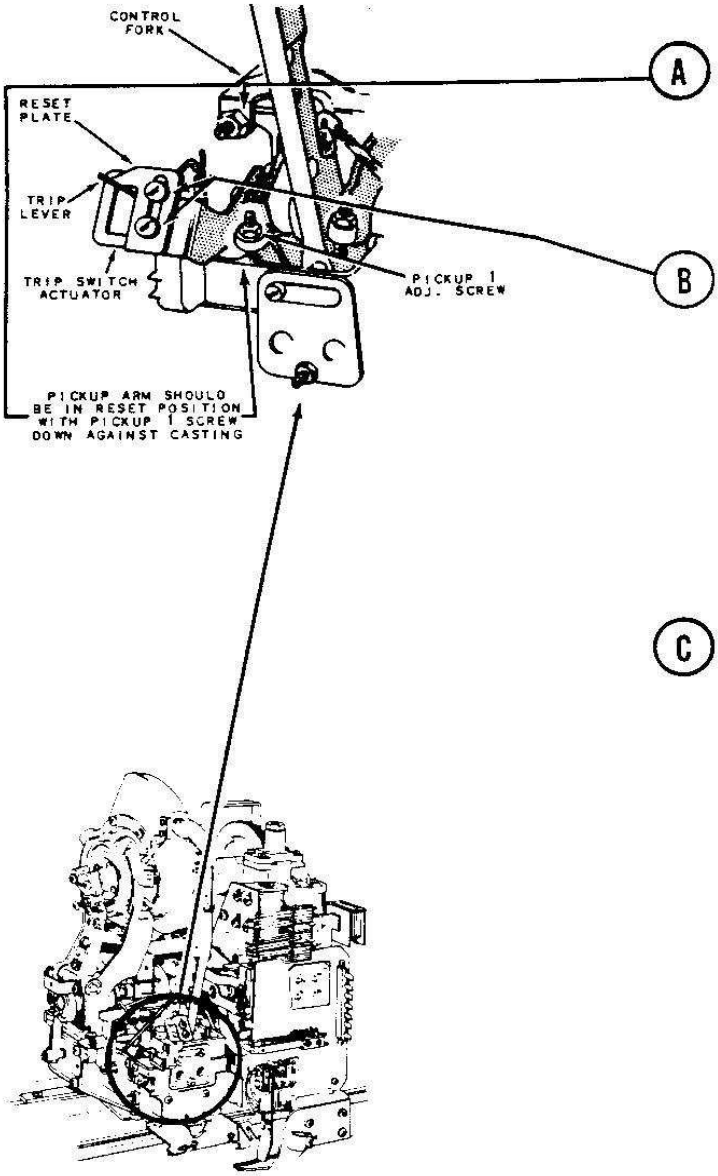
(D) Tighten screw and check for normal operation by playing several Left and Right sides of records.

NOTE: - If the position of the Trip Switch actuator is changed be sure to readjust and check "Pickup 11".

"PICKUP 11" - - TRIP SWITCH RESET ADJUSTMENT

This adjustment results in proper resetting of the Trip Switch when the Pickup Arm returns to its rest position.

NOTE: – "Pickup 9 and 10" adjustments should be correct before making this adjustment.



(A) Place mechanism in PLAY position and pull Control Fork down until Pickup Arm is in its reset position.

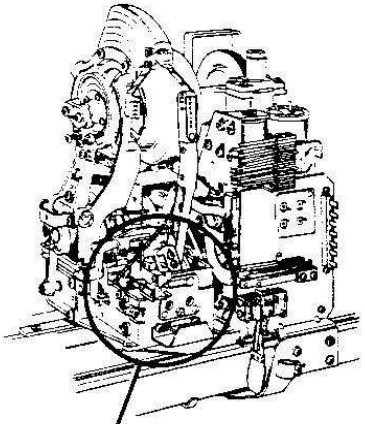
(B) In this position loosen screws and adjust Reset Plate so Trip Switch is fully reset.

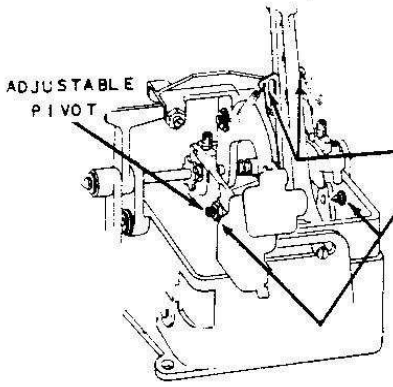
When adjusted correctly the Trip Switch should be reset but the Trip Lever should not apply any upward pressure against the reset plate.

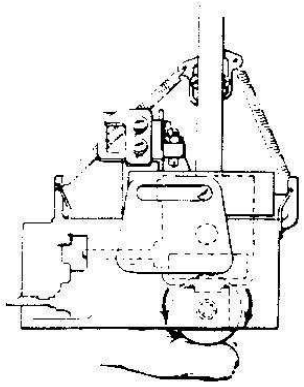
(C) Check by releasing Control Fork. Needle should land properly on record without "Booster" action from Trip Lever.

"PICKUP 12" - - PICKUP BALANCE ADJUSTMENT

This Adjustment results in proper balancing of the Pickup Arm and Cradle Assembly and assures maximum record and needle life.







NOTE: Before making this adjustment:

1. Check Cradle Pivots for binds. There should be no play but the Arm and Cradle should move freely on the Pivots.
2. Check Pickup lead to be sure it hangs freely below Cradle and does not touch the carriage or at any place along the base casting.

(A) Place mechanism in PLAY position with a record clamped on Flywheel and turn off power.

(B) Remove both Needle Pressure Springs.

(C) Adjust the position of the pickup arm counter-weight so the arm is "in balance" at the record cut-off groove and at a point 1" in from the outer edge of the record.

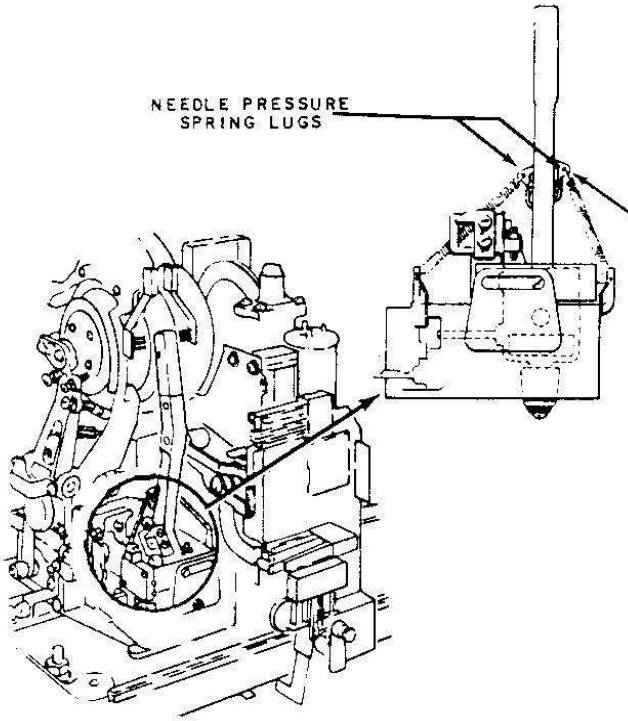
Check the balance by holding the pickup 1/8" to 1/4" from the record, releasing carefully, and observing the DIRECTION in which it moves. Ignore the slow movement toward or away from the record surface. There should be no <u>in or out</u> movement (toward or away from the record center). In or out movement indicates that the pickup arm is not "in balance" at the point of check and requires adjustment of the counter-weight position.

(D) Replace needle pressure springs and check "Pickup 13" Adjustment.

2457

"PICKUP 13" - - NEEDLE PRESSURE ADJUSTMENTS

This adjustment establishes the needle pressure at 5 to 6½ grams* for either Right or Left sides. Correct pressures result in proper tracking and in a minimum of needle and record wear.

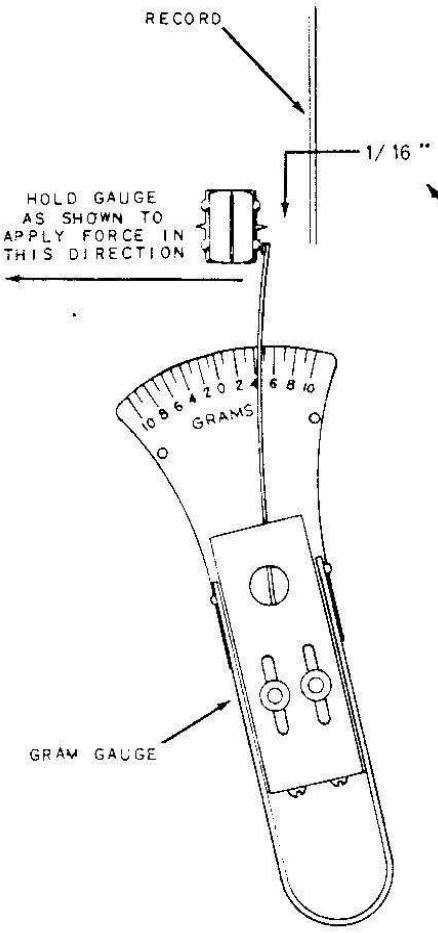


(A) Place mechanism in Left side PLAY position with a flat record clamped on the Flywheel.

(B) Turn off power so record is not turning.

(C) Adjust position of Pressure Spring Lug on Right side of Pickup Arm so that needle pressure is 5 to 6½ grams.*

(D) Repeat same procedure on Right side PLAY position by adjusting the Pressure Spring Lug on Left side of the Pickup Arm for 5 to 6½ grams * needle pressure.



NOTE: - For accurate adjustment needle pressure should be measured with a gram gauge as follows:

(1) Place the tip of the gauge spring against the Pickup case at the "Bump" next to the needle tip and lift the Pickup so the needle is about 1/4" from the record.

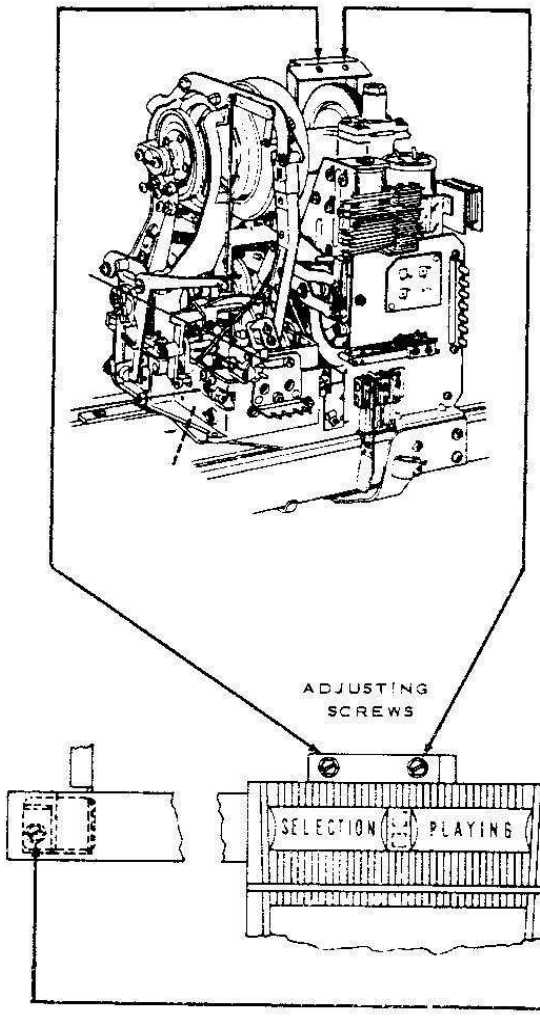
(2) Slowly relax the force of the gauge against the Pickup so the needle moves toward the record.

(3) Stop the inward movement when the needle is about 1/16" from the record and read indicated pressure on gauge. Pressure should be between 5 and 6½ grams. * .

* Stylus Force should be 4½ to 5½ grams with stereo pickup, Part No. 249730.

"SELECTION PLAYING INDICATOR"

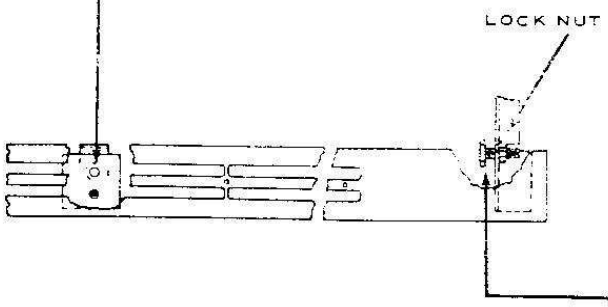
This adjustment aligns the Selection Playing Indicator with mechanism playing position.



A Loosen adjusting screws and laterally position indicator, bracket and shutter assembly so that indicator escutcheon lines up with carriage cover plate escutcheon. Tighten screws.

B Loosen adjusting screws (one on each end of the indicator channel) and with the mechanism in *B5 (or †F2) record playing position, adjust the channel so that the selection number is in the center of the bottom viewing window. Tighten screws.

C With the indicator shutter shifted to the left and the mechanism in *B1 (or † A2) record playing position, loosen the retaining screw and adjust stop angle so *B1 (or † A2) is clearly visible.

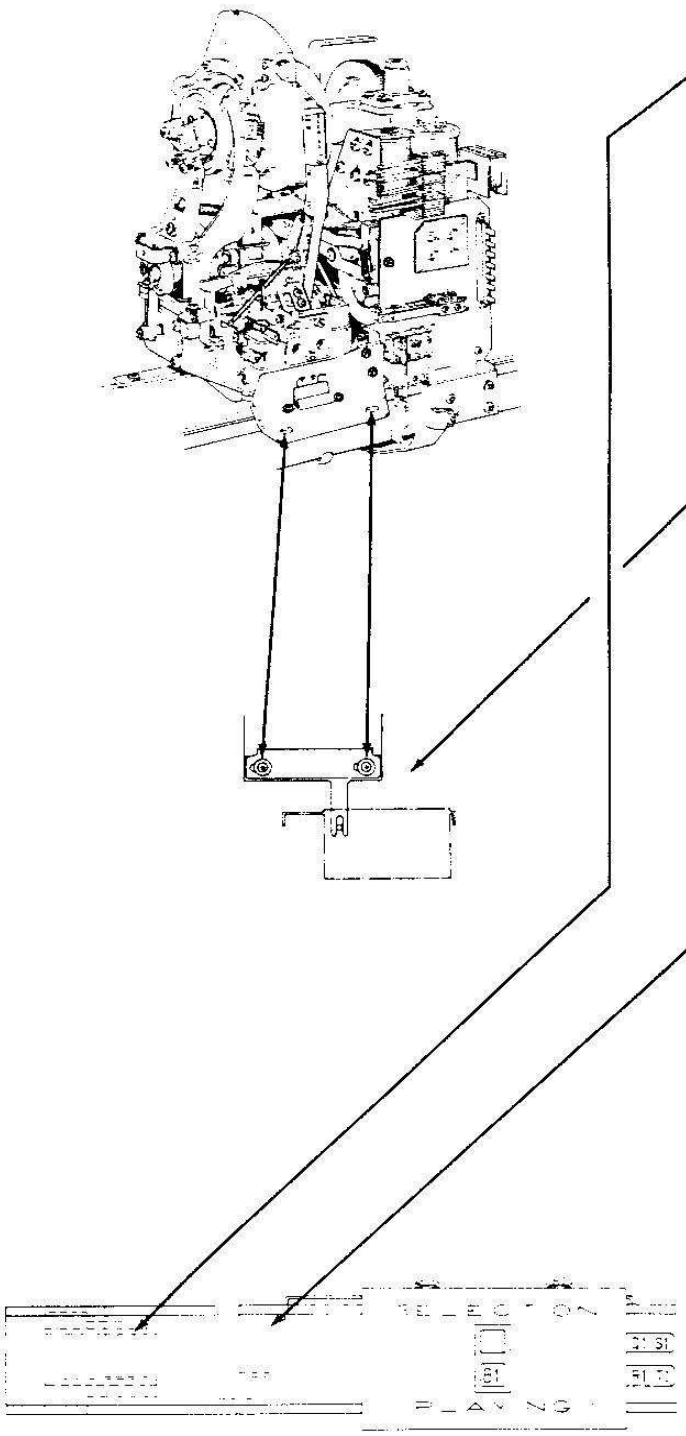


D With the indicator shifted to the right and the mechanism in *U8 (or † K9) record playing position, adjust the actuator screw so that *U8 (or † K9) is is clearly visible. Tighten lock nut.

*160 SELECTION MECHANISM
†100 SELECTION MECHANISM

"SELECTION PLAYING INDICATOR"

This adjustment aligns the Selection Playing Indicator with mechanism playing position.



(A) Loosen adjusting screws (one on either end of the indicator channel) and position channel so that it is centrally located with respect to the mechanism base. Tighten screws.

(B) With the mechanism in *B6 (or †F2) record playing position, adjust the indicator, bracket and shutter assembly so that "F2" is in the center of the bottom viewing window of the indicator escutcheon.

(C) With the indicator shutter shifted to the left and the mechanism in *B1 (or †A2) record playing position, loosen the retaining screw and adjust the stop angle so *B1 (or †A2) is clearly visible.

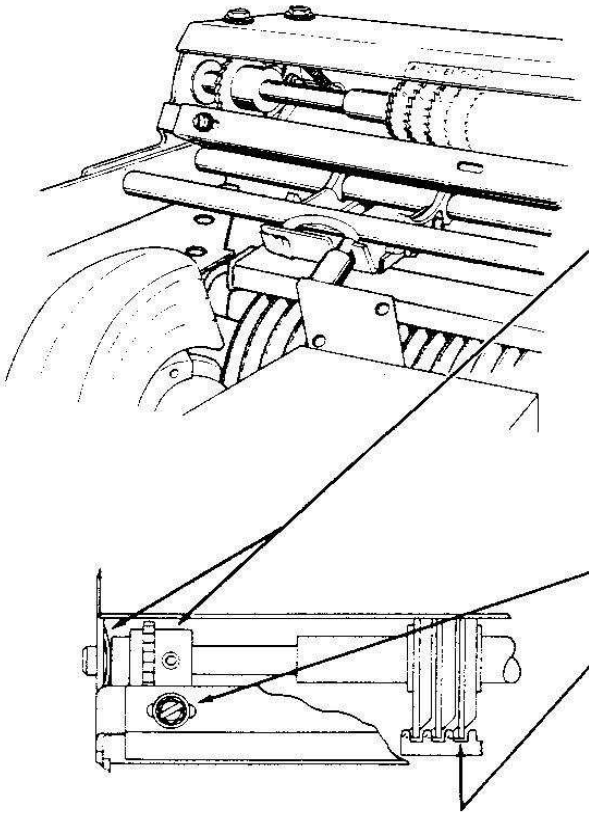
(D) Repeat adjustment (C) with mechanism in play position for the record at the right end of the magazine for right hand shutter positioning.

* 200 and 160 Selection Mechanisms

† 100 Selection Mechanism

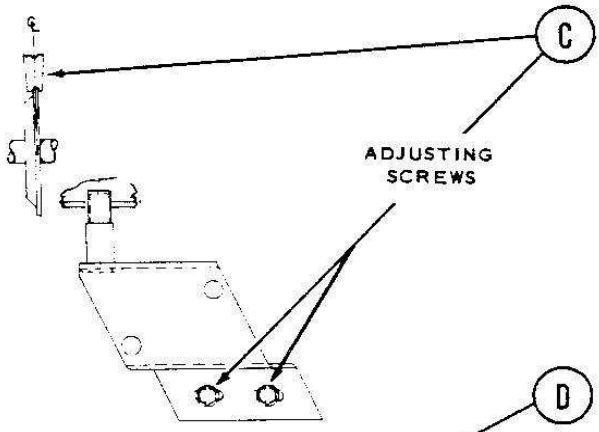
"POPULARITY METER" – DIAL ADJUSTMENT

This adjustment gives proper positioning of dials and operating Solenoid Assembly.

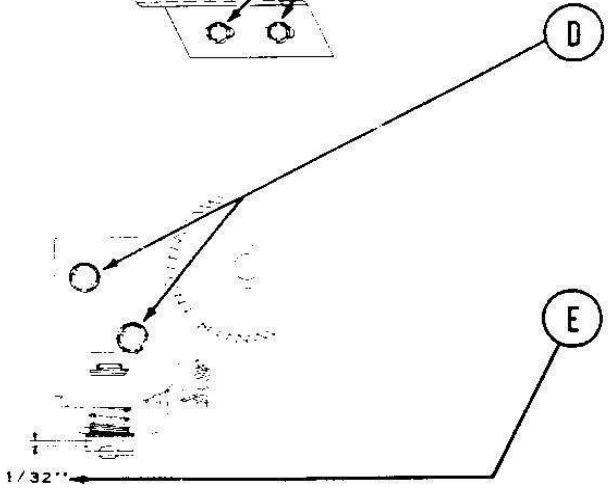


A. Position ratchet wheel on dial and shaft assembly so that spring washer is compressed and wheel is centered on pawl. Tighten set screws.

B. Loosen screws on each end of dial stop strip and adjust so that the dials are exactly centered in the notches in the dial stop. Tighten screws.



C. With the mechanism in play position at A1, adjust actuator assembly laterally to have centerline of pawl in line with centerline of full width of tooth of A1 dial.

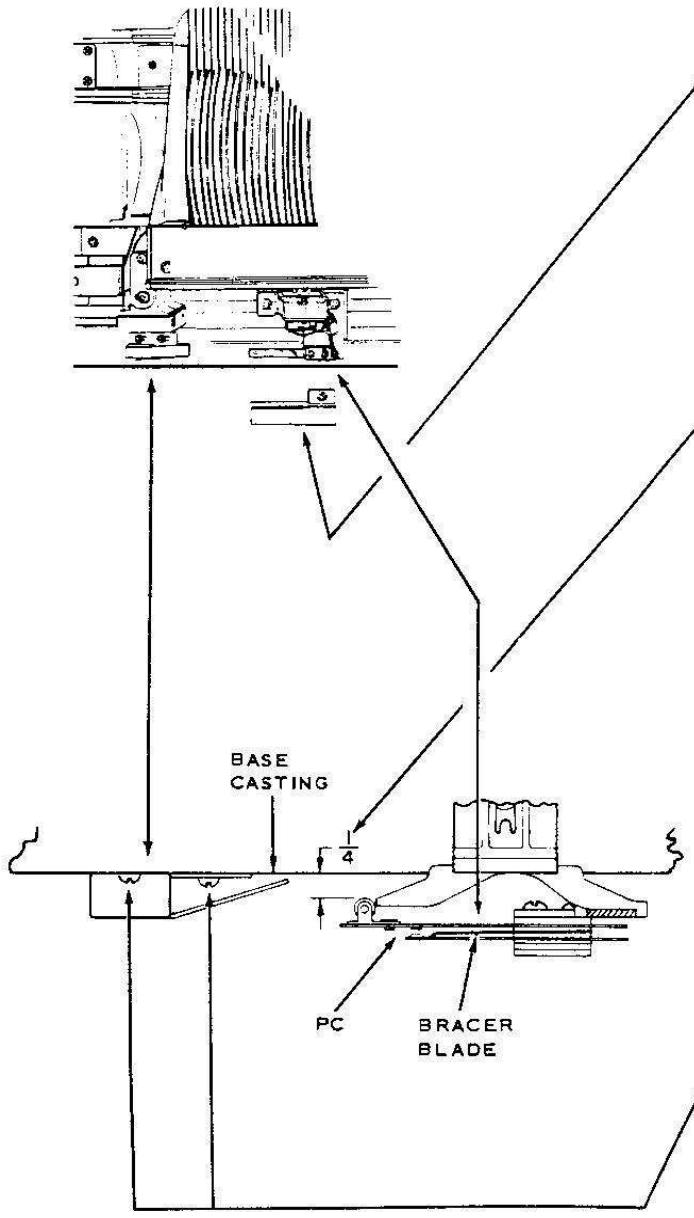


D. Loosen the two screws holding solenoid frame.

E. Hold the solenoid plunger in the energized position and position the assembly so that their remains 1/32 clearance between the top of the plunger and the actuator. Tighten screws.

"PLAY CONTROL SUBTRACT SWITCH"

This adjustment positions the switch actuator and determines contact gap and pressure.



(A) Remove switch cover.

Position mechanism carriage so that switch roller is clear of actuator bracket.

(C) Adjust blade with roller so that the roller is ¼ inch away from base casting.

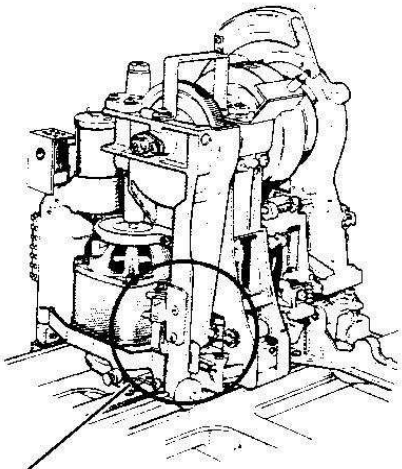
(D) Adjust bracer blade so that it bears against its associated contact blade with a minimum of 1½ ounce force.

(E) Adjust contact gap of switch "PC" to be 1/32 of an inch.

(F) Position mechanism carriage in play position for the record at the right end of the magazine. Loosen switch actuator retaining screws and position subtract switch actuator so that its sloping ramp just touches the roller on switch "PC". Tighten screws.

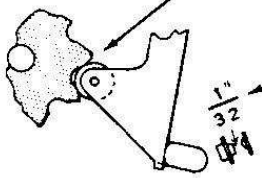
NOTE: – When switch cover is replaced, make certain that switch blades and roller bracket do not touch cover and that cover does not strike switch actuator as mechanism is scanning.

"DETENT SWITCH" – CONTACT GAP AND PRESSURE ADJUSTMENT

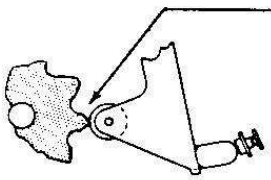


(A) Remove cover from switch stack.

(B) Place phonograph service switch in "OFF" position and turn motor coupling manually until actuator roller is engaged as shown.

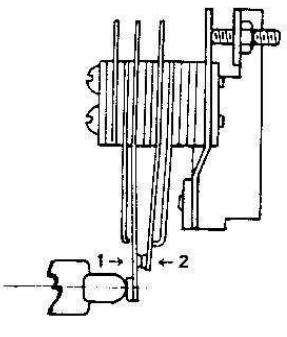


(C) Form bracer blades for a 1/32" contact gap between blades 1 and 2. Maintain a bracer blade follow of at least .015" for each bracer blade. *NOTE: Do not bend contact blades in making this adjustment; bend only the bracer blades.*



(D) Turn motor coupling so that actuator roller is on peak of sprocket tooth.

(E) Position Detent Switch on its mounting bracket so its actuator arm engages the center of the nylon fibre lift on the detent switch blade.

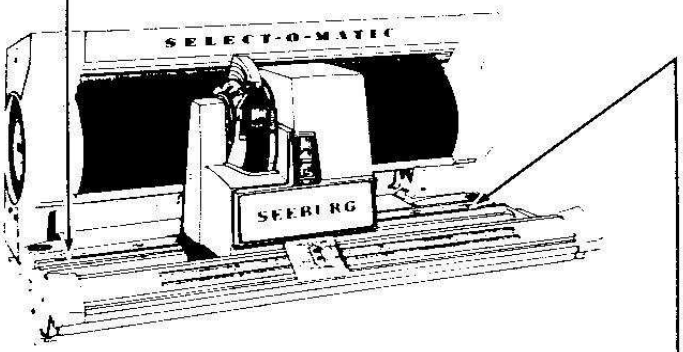


(F) Loosen hex nut on adjusting screw and turn the screw clockwise until switch contacts are open. Back off screw until contacts are just closed. Complete adjustment by continuing to turn the screw counter-clockwise 1 turn exactly. Tighten hex nut without turning screw. Contact pressure should now be 2 ounces minimum.

"RUBBER BUMPERS"

This adjustment positions the rubber bumpers so the lateral carriage movement is limited to avoid damaging of the reversing switch and contact plunger block.

NOTE : The Reversing Switch Bracket Adjustment MUST BE CORRECT before making this adjustment.



(A) Loosen screw holding bumper and move bracket as far as it will go toward the center of the base.

(B) Select *B1 or †A2 and turn off power when selection is playing.

(C) Make a reference mark on the base casting to indicate the record position of the carriage.

(D) Return mechanism to Scan and turn motor shaft manually until the mechanism has moved 3/8" to the Left of the reference mark made on the base. (This point is 1/16" past the position at which the reversing switch should operate.)

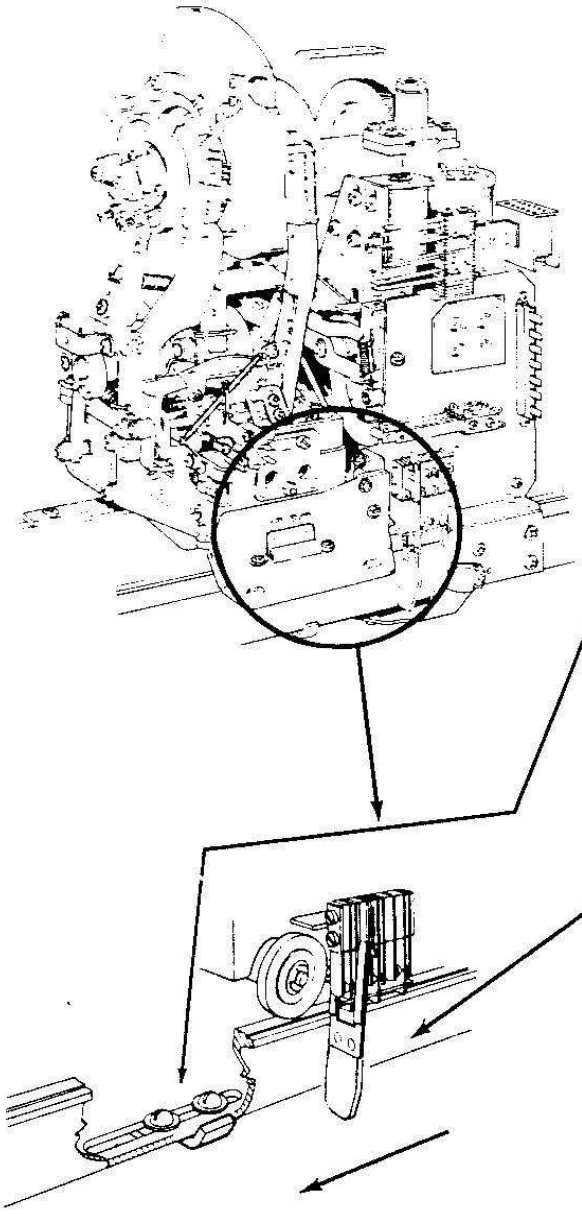
(E) Scan the carriage out of the way to the right being careful not to move the bracket, and tighten the bracket holding screws.

(F) Using the procedure above, adjust the right bumper by using the selection playing position at the right hand end of the magazine for references and move the bumper 5/16" to the right.

* 200 or 160 Selection Mechanisms
† 100 Selection Mechanisms

"REVERSING SWITCH 1" - - SWITCH BRACKETS

This adjustment positions the Reversing Switch Brackets so the Switch operates when the carriage is 5/16" past the end record positions.



REFERENCE SCALE

THESE LINES SPACED 1/16" ACTUAL SIZE

(A) Loosen screws holding left Reversing Switch Bracket and move Bracket all the way to the left.

(B) Select *B1 or †A2 and turn off power when selection is playing.

(C) Make a reference mark on the base casting to indicate the record position of the carriage.

(D) Return mechanism to SCAN and turn the motor shaft manually until the mechanism has moved 5/16" to the LEFT of the reference mark made on the base

Reversing Switch Lever should still be to the left.

(E) Move the Bracket slowly and carefully to the right until it is at the point where the reversing switch operates.

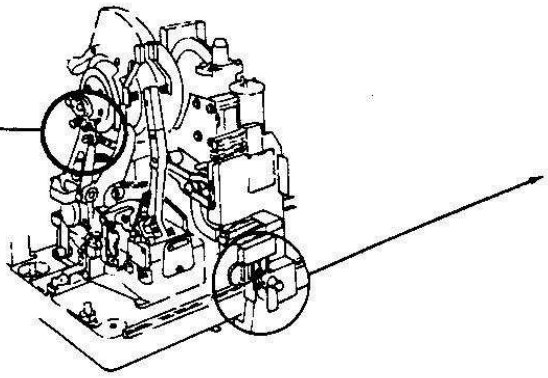
(F) Scan the carriage out of the way to the right, being careful not to move the Bracket, and tighten the bracket holding screws.

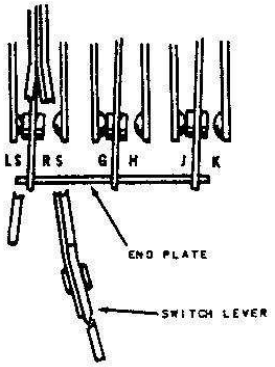
(G) Adjust the RIGHT Reversing Switch Bracket so the Switch operates when the carriage is 5/16" to the RIGHT of the record position at the right hand end of the magazine.

See "Reversing Switch 2" for contact gap adjustment.

* 200 or 160 Selection Mechanisms
† 100 Selection Mechanisms

"REVERSING SWITCH 2" – – CONTACT GAP & PRESSURE ADJUSTMENTS





CONTACTS	CONTACT GAPS	CONTACT FUNCTIONS*
L S	1/32" clearance when Switch Lever is to Left.	Connects L contact of Contact Plunger Block for Left Side Selections.
R S	1/32" clearance when Switch Lever is to Right.	Connects R contact of Contact Plunger Block for Right Side Selections.
G & J	1/32" gaps at instant H and K Just Open.	These contacts closed so motor turns for SCANNING to RIGHT and for PLAYING LEFT SIDES.
H & K	1/32" gaps at instant G and J Just Open.	These contacts closed so motor turns for SCANNING to LEFT and for PLAYING RIGHT SIDES.

*See Schematic Diagram for Circuit.

ADJUSTMENT PROCEDURE

CAUTION: TURN OFF POWER!! 117 volts on G-H and J-K contacts.

A. Move Switch Lever to Left.

B. Adjust LS for 1/32" gaps.

C. Push bakelite End Plate slowly to Left. At instant H and K just break, G and J must have 1/32" gaps.

D. Move Switch Lever to Right.

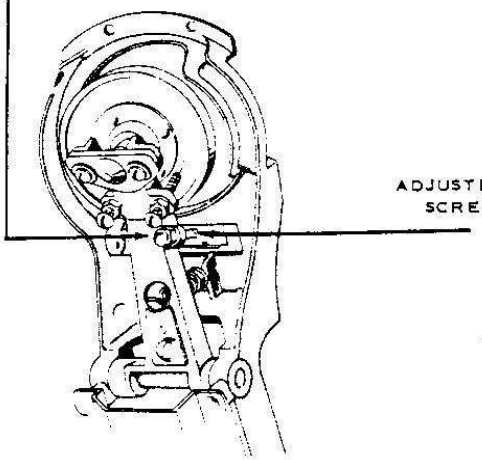
E. Adjust RS for 1/32" gaps.

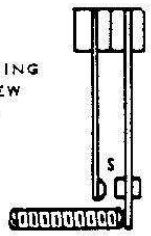
F. Push bakelite End Plate slowly to Right. At instant G and J just break, H and K must have 1/32" gaps.

ALL CONTACTS MUST HAVE 25 GRAMS (1 OZ) MINIMUM PRESSURE WHEN CLOSED.

"CLAMP ARM SWITCH" – – CONTACT GAP & BLADE PRESSURE ADJUSTMENT

This switch controls power relay in the Auto-Speed Unit when intermixed 33-1/3 and 45 rpm. records are played.





CLAMP ARM SWITCH (SHOWN IN PLAY POSITION) WITH 45 RPM. RECORDS.

ADJUSTMENTS

"S" contact has 1/32" gap in play position with standard 45 RPM. record clamped on turntable and is closed in SCAN position and when 33-1/3 RPM. record is being played.

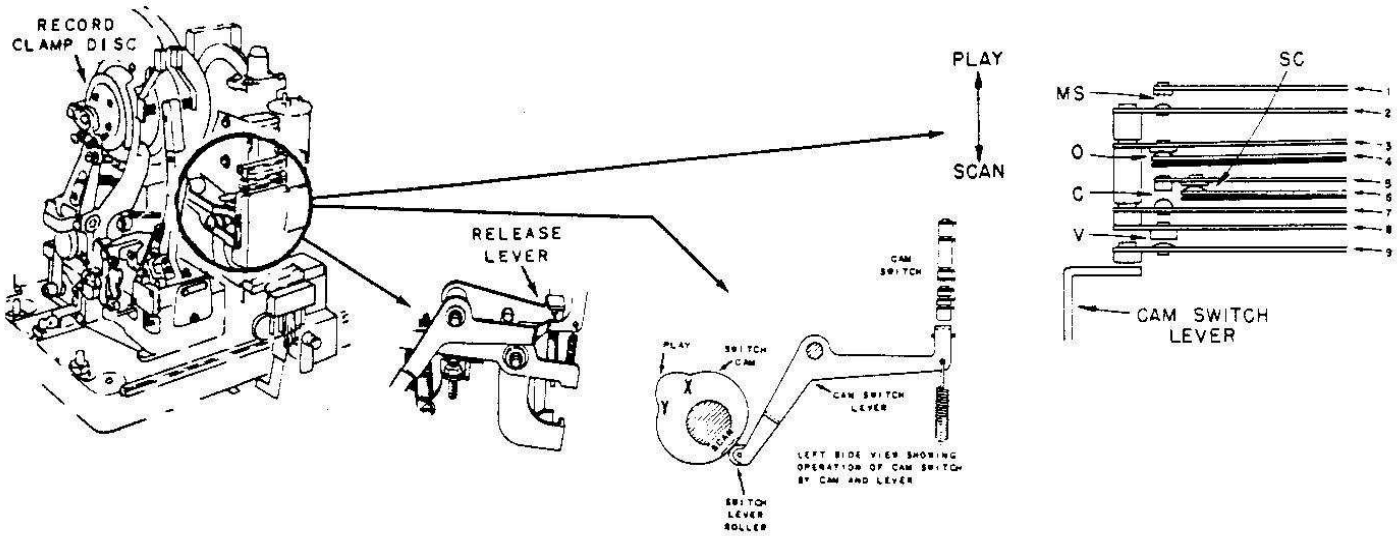
CONTACT MUST HAVE 25 GRAMS (1 OZ) MINIUMUM PRESSURE WHEN CLOSED.

REFERENCE SCALE

THESE LINES SPACED 1/32" ACTUAL SIZE

2465

"CAM SWITCH"– CONTACT GAP AND PRESSURE ADJUSTMENTS



CONTACTS	CONTACT GAP	CONTACT FUNCTIONS
MS	1/16" gap in SCAN position. Starts to close when pickup approaches ecord. Closed in PLAY position.	Squelch circuit for use with Automatic Volume Compensator.
O	3/64" gap in PLAY position. Closed in TRANSFER and SCAN.	Adds 1.4 mfd condenser to motor circuit during TRANSFER and SCAN.
SC	1/64" gap in PLAY position. Closed in SCAN position.	Part of popularity meter solenoid circuit. Just before the mechanism enters Play position the C and SC contacts "Make and Break" controlling the pulse to the popularity meter solenoid.
C	1/32" gap in SCAN and during most of TRANSFER. Starts to close when record Clamp Disc first engages the turntable.	
V	1/32" gap in SCAN and during most of TRANSFER. Starts to close when record Clamp Disc first engages the turntable.	Trip Solenoid Circuit. Completes all circuits which can operate Trip Solenoid in PLAY position.

ADJUSTMENT PROCEDURE

1 Place mechanism in Scan Position and TURN OFF POWER.

2 Trip mechanism by lifting Release Lever and manually turn motor shaft until record Clamp Disc first engages the Turntable. (This places cam so Switch Lever Roller is at position X.)

- **A** Bias blade 9 down tight against Switch Lever. (1½ oz pressure).
- **B** Bias blade 7 against blade 8 and adjust for 1/32" gap in V Contacts.
- **C** Bias blade 3 down so fiber lift touches blade 7 with O Contacts closed. (1½ oz. pressure). V Contacts should still have 1/32" gap.
- **D** With SC Contacts closed (1½ oz. pressure) adjust for 1/32" gap in C Contacts.

3 Turn motor shaft until mechanism is fully in PLAY position. (This places cam so Switch Lever Roller is on Play position "Peak).

- **A** Adjust blade 4 for 3/64" gap in O Contacts.
- **B** Adjust blade 6 for 1/64" gap in SC Contacts.

4 Trip mechanism by lifting Release Lever and manually turn motor shaft until Clamp Disc begins movement away from Turntable. (This places cam so Switch Lever Roller is at position Y).

- **A** Check for 1/32" gap in C Contacts with SC closed. (1½ oz. pressure).
- **B** Check to see that blade 9 bears against Switch Lever.
- **C** Check for 1/32" gap in V Contacts.

5 Trip and operate mechanism until it is in SCAN position.

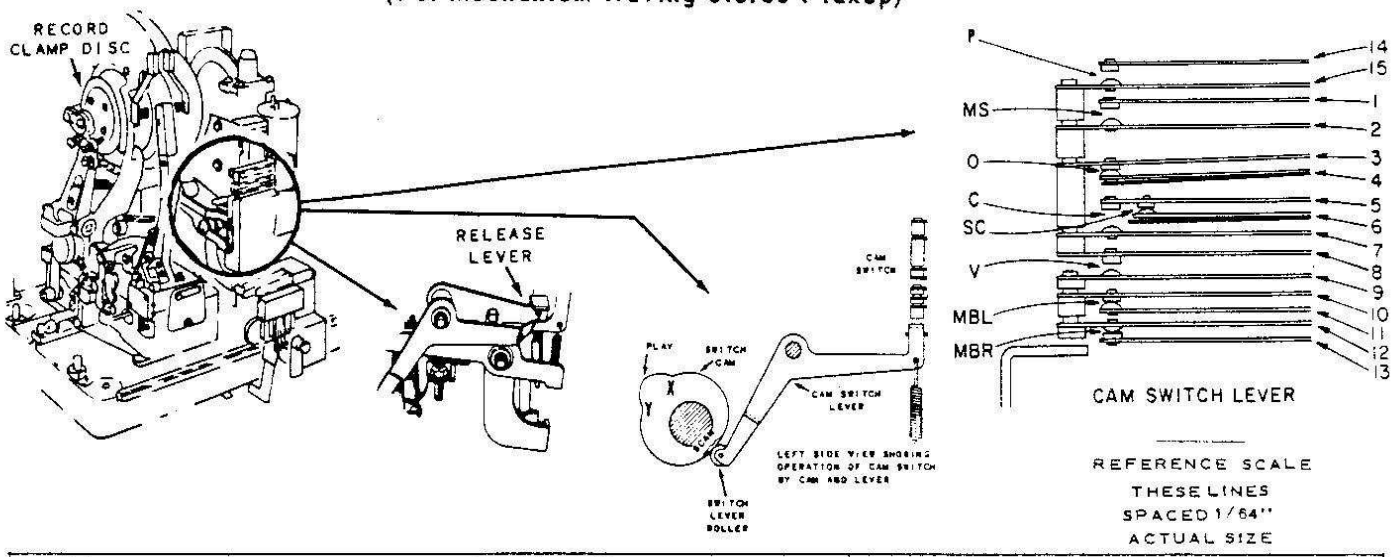
- **A** Adjust blade 2 so fibre lift bears lightly against blade 3.
- **B** Adjust blade 1 for 1/16" gap between MS contacts.

REFERENCE SCALE
THESE LINES SPACED 1/64" ACTUAL SIZE

SELECT-O-MATIC MECHANISM ADJUSTMENTS

"CAM SWITCH" - CONTACT GAP AND PRESSURE ADJUSTMENTS

(For Mechanism Having Stereo Pickup)



CONTACTS	CONTACT GAP	CONTACT FUNCTIONS
MBL MBR	1/64" gap in play position. Closed during SCAN and part of transfer cycle.	Part of mute circuit. Maintains muting action of both channels of amplifier, during SCAN and part of transfer operation.
MS	1/16" gap in SCAN position. Starts to close when pick-up approaches record. Closed in PLAY position.	Squelch circuit for use with Automatic Volume Compensator.
O	3/64" gap in PLAY position. Closed in TRANSFER and SCAN.	Adds 1.4 mfd. condenser to motor circuit during TRANSFER and SCAN.
SC C	1/64" gap in PLAY position. Closed in SCAN position. 1/32" gap in SCAN and during most of TRANSFER. Starts to close when record Clamp Disc first engages the turntable.	Part of popularity meter solenoid circuit. Just before the mechanism enters PLAY position the C and SC contacts "Make and Break" controlling the pulse to the popularity meter solenoid.
V	1/32" gap in SCAN and during most of TRANSFER. Starts to close when record Clamp Disc first engages the turntable.	Trip Solenoid Circuit. Completes all circuits which can operate Trip Solenoid in PLAY position.
P	1/32" gap in SCAN. Closed only in PLAY.	In series with clamp arm switch, it completes power relay circuit in Auto-Speed Unit.

ADJUSTMENT PROCEDURE

1. Place mechanism in Scan Position and TURN OFF POWER.

2. Trip mechanism by lifting Release Lever and manually turn motor shaft until record Clamp Disc first engages the Turntable. (This places cam so Switch Lever Roller is at position X.)

   A. Bias Fiber lift of blade 12 against switch lever. (1½ ounce pressure)

   B. Bias fiber lift of blade 10 against blade 13.

   C. Bias blade 9 against blade 10.

   D. Bias blade 7 against blade 8 and adjust for 1/32" gap at V contacts.

   E. Bias blade 3 down so fiber lift touches blade 7 with 0 contacts closed (1½ ounce pressure). V contacts should still have 1/32" gap.

   F. With SC contacts closed (1½ ounce pressure) adjust for 1/32" gap in C contacts.

3. Turn motor shaft until mechanism is fully in PLAY position (this places cam so switch Lever Roller is on PLAY position peak).

   A. Adjust blade 13 for 1/64" gap in MBR contacts.

   B. Adjust blade 11 for 1/64" gap in MBL contacts.

   C. Adjust blade 4 for 3/64" gap in 0 contacts.

   D. Adjust blade 6 for 1/64" in SC contacts.

4. Trip mechanism by lifting Release Lever and manually turn motor shaft until clamp disc begins movement away from turntable. (This places cam so Switch Lever Roller is at position Y.)

   A. Check for 1/32" gap in C contacts with SC closed (1½ ounce pressure).

   B. Check to see that blade 12 bears against Switch Lever.

   C. Check for 1/32" gap in V contacts.

5. Trip and operate mechanism until it is in SCAN position.

   A. Adjust blade 2 so fiber lift bears lightly against blade 3.

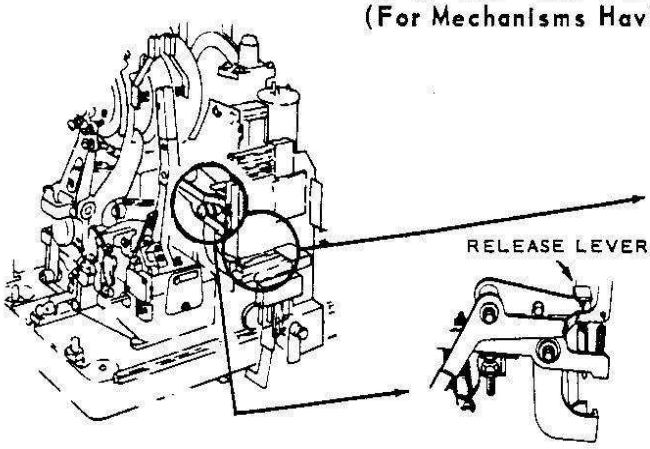
   B. Adjust blade 1 for 1/16" gap between MS contacts.

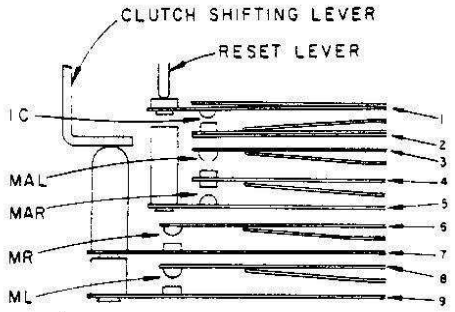
   C. Adjust blade 15 so its lift bears against blade 2.

   D. Adjust blade 14 so there is 1/32" gap between P contacts.

"CLUTCH and RESET LEVER SWITCHES" CONTACT GAP and PRESSURE ADJUSTMENT

(For Mechanisms Having Stereo Pickup)





NOTE: "Clutch 1" to "4" Mechanical Adjustments must be correct before adjusting these switches.

CONTACTS	CONTACT GAPS	CONTACT FUNCTIONS
I C	3/64" gap when mechanism trips. Closed in SCAN and PLAY positions.	Part of Popularity Meter Solenoid Circuit. Allows operation of Solenoid when mechanism is transferring into PLAY position but prevents "Extra" operation when mechanism is transferring out of PLAY position.
M A L M A R	1/64" gap in PLAY position. Closed in Tripped position.	Part of Mute Circuit. Mutes both channels in Amplifier at end of record at instant Trip Solenoid is operated.
M L M R	1/64" gap in PLAY position. Closed during Transfer cycles.	Part of Mute Circuit. Maintains Muting action during entire Transfer cycle.

ADJUSTMENT PROCEDURE

REFERENCE SCALE
THESE LINES SPACED 1/64" ACTUAL SIZE

Place mechanism in SCAN position and TURN OFF POWER.

Trip by manually lifting Release Lever. While mechanism is in this position:

A Bias blade 1 to within 1/16" of Reset Lever.

B Bias blade 5 so its fibre lift is against blade 1.

C Bias blade 2 against bracer blade and adjust blade 2 for 1/16" gap between IC contacts.

Reset mechanism by pressing down on Release Lever.

A Bias blade 4 against bracer blade and adjust blade 4 for 1/64" gap between MAR contacts.

B Bias blade 3 against bracer blade and adjust blade 3 for 1/64" gap between MAL contacts.

Trip mechanism by lifting Release Lever and turn motor shaft manually until mechanism is in PLAY Position.

A Bias blade 7 so its fibre lift bears against Clutch Shifting Lever with 7 ounce pressure.

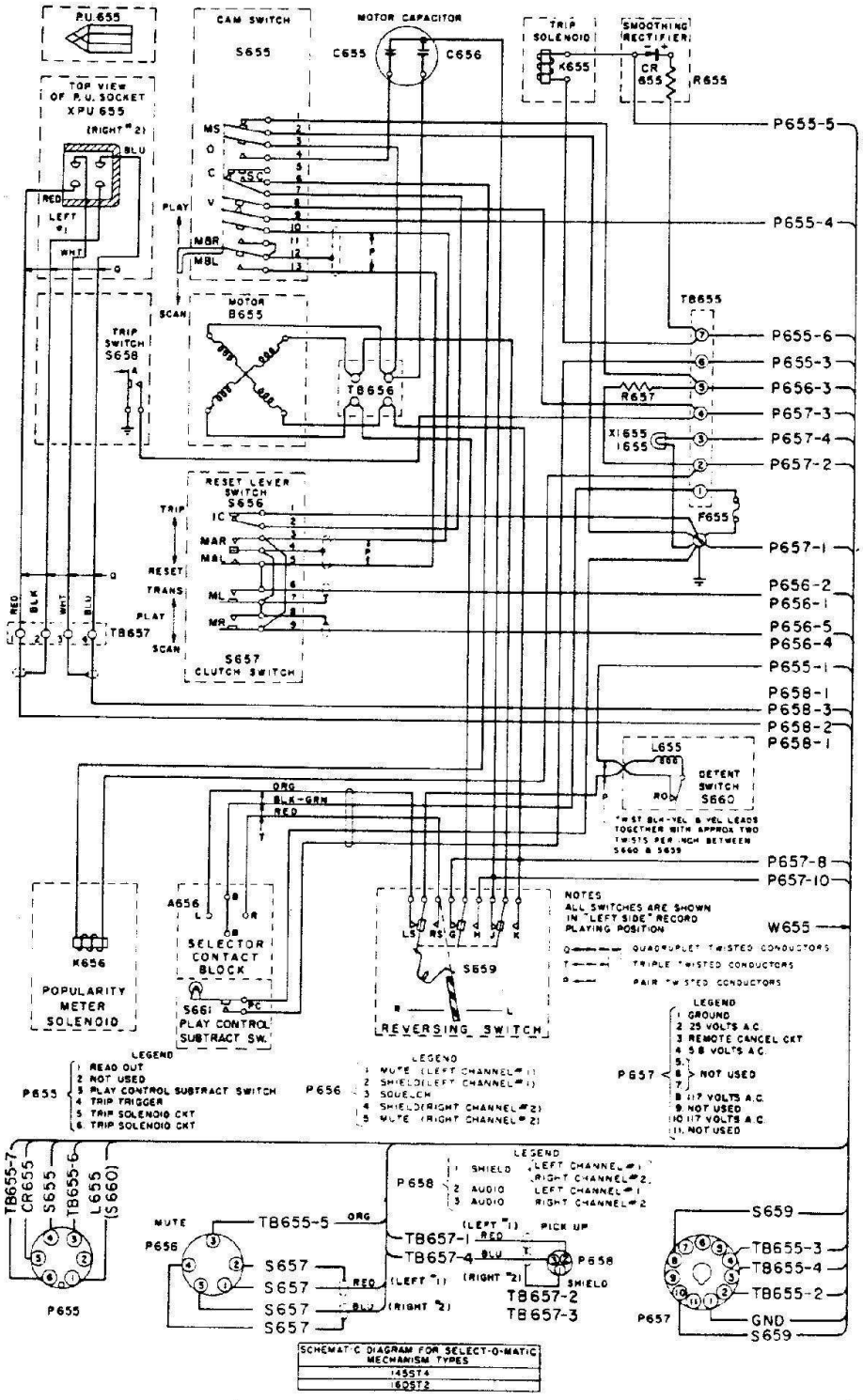
B Bias blade 6 against its bracer blade and adjust bracer blade for 1/64" gap between MR contacts.

C Bias fiber lift of blade 9 against fiber lift of blade 7.

D Bias blade 8 against bracer blade for 1/64" gap between ML contacts.

PARTS LIST

Item	Part No.	Part Name
A656	249148	Contact Block
B655	250251	Motor Assembly
C655	86321	(1.4 MFD) Motor Capacitor
C656		(1.0 MFD)
CR655	247843	Selenium Rectifier
F655	247850	Fuse - 5 Amp.
I655	249198	Indicator Lamp
K655	247510	Trip Solenoid
K656	249122	Pop. Meter Solenoid
L655	303702	Choke, 100 μh
P655	65319	Six Prong Plug
P656	F200241	Five Prong Plug
P657	250942	Eleven Prong Plug
P658	250938	Three Prong Plug
PU655	249730	Magnetic Pickup
R655	82413	120 OHM, ½W. ±10% Resistor
R657	82752	2,200 OHM, 1 W. ± 10% Resistor
S655	249938	Cam Switch
S656	249939	Reset Lever Switch
S657		Clutch Switch
S658	245816	Trip Switch
S659	247846	Reversing Switch
S660	249235	Detent Switch
S661	248127	Play Control Subtract Switch
TB655	305112	Terminal Strip
TB656	245909	Motor Terminal Strip
TB657	245755	Terminal Strip
XI655	249193	Lamp Socket
XPU655	249727	PU Cartridge Socket
W655	249941	Control Cable

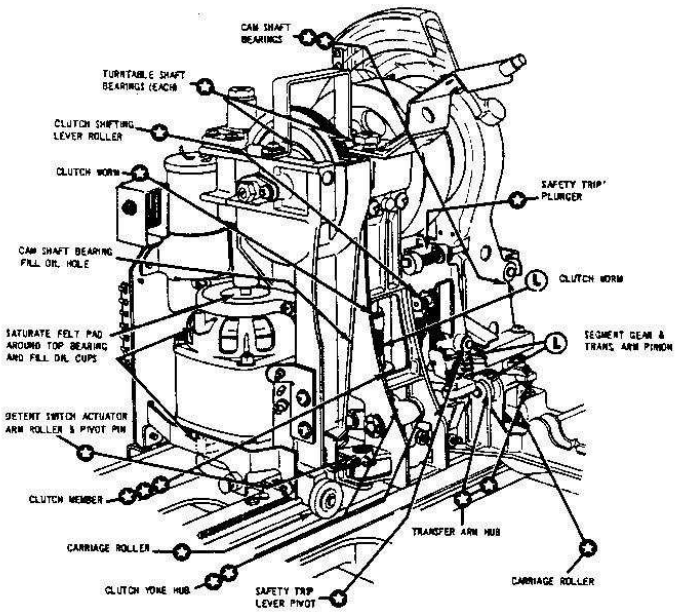


Schematic of Mechanism With Stereo Pickup

LUBRICATION CHART

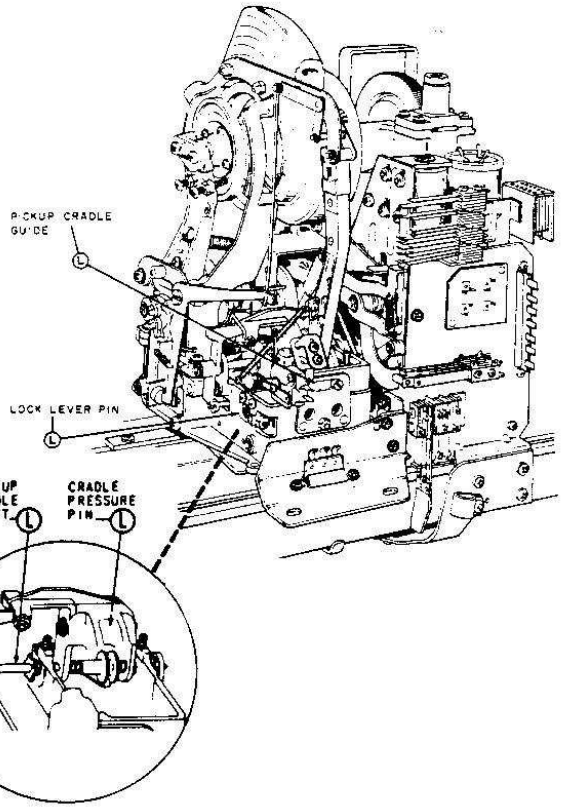
(Mechanism with Stereo Pickup)

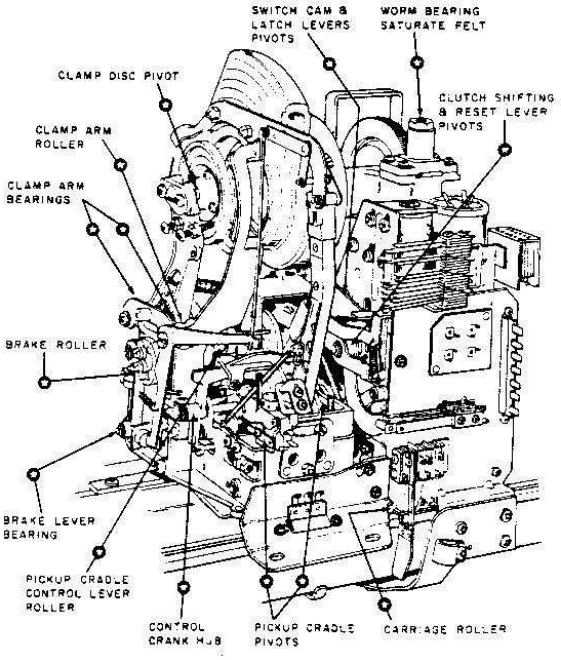
OIL ALL ROLLER PIVOT BEARINGS – 1 OR 2 DROPS



USE AERO LUBRIPLATE** SPARINGLY EVERY (L) SIX MONTHS . . .

USE SEEBURG SPECIAL PURPOSE OIL * EVERY SIX MONTHS IN AMOUNT SHOWN . . . 1 DROP FOR EACH (O)

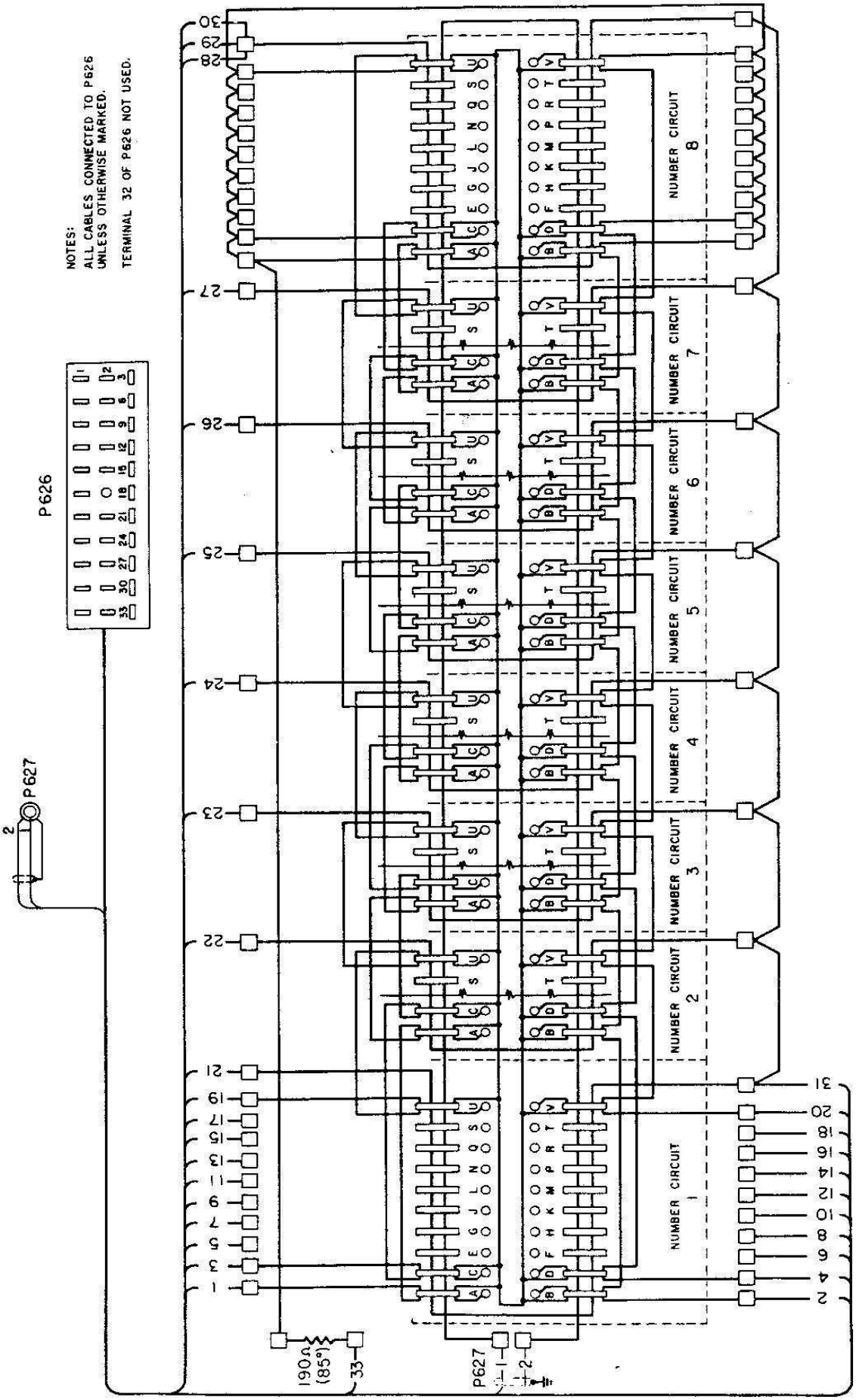




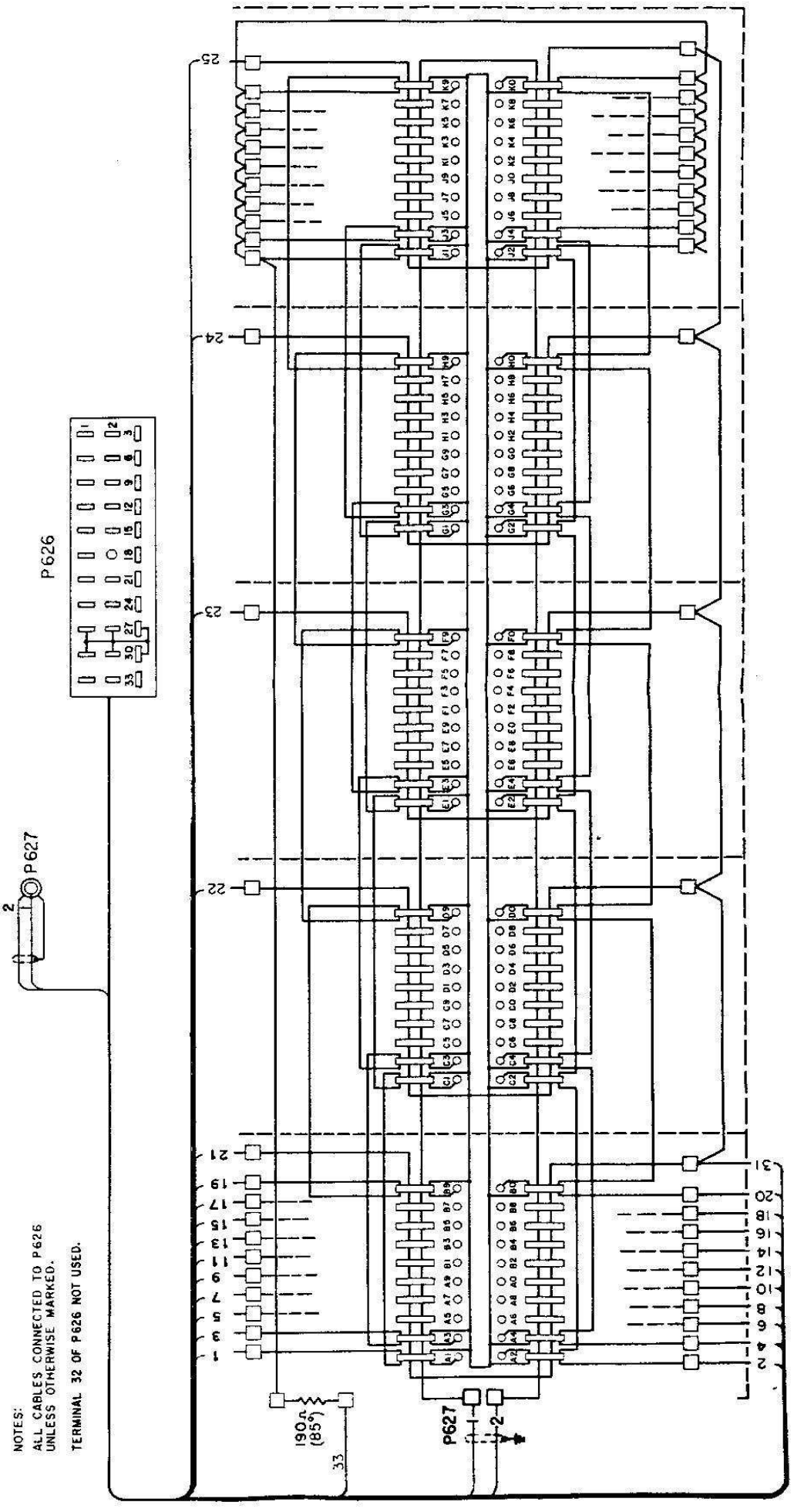
* SEEBURG SPECIAL PURPOSE OIL NO. 53014 MAY BE OBTAINED FROM YOUR SERVICE PARTS DEPARTMENT AT YOUR DISTRIBUTOR.

** AERO LUBRIPLATE MAY BE OBTAINED FROM YOUR SERVICE PARTS DEPARTMENT AT YOUR DISTRIBUTOR.

2468A



WIRING DIAGRAM - TORMAT MEMORY UNIT, TYPE 160TMU

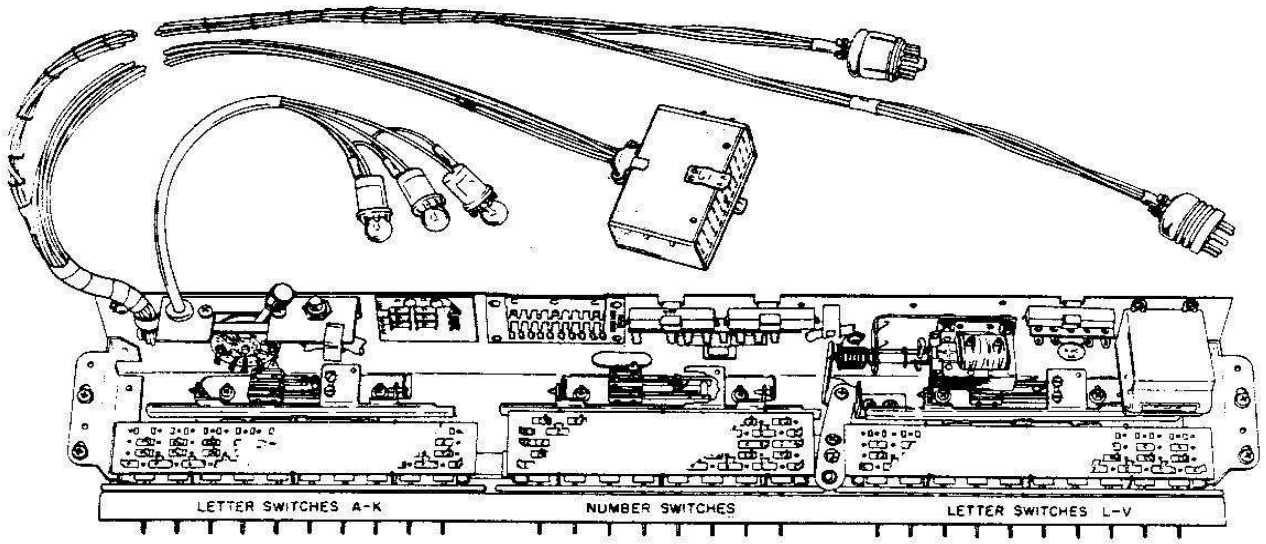


WIRING DIAGRAM – TORMAT MEMORY UNIT, TYPE 100TMU

SEEBURG

TORMAT ELECTRICAL SELECTOR

TYPE TES161 and TES221



The Tormat Electrical Selectors, Types TES161 and TES221, are part of the Seeburg Tormat Selection System and Credit System which includes the Tormat Memory Unit on the Select-O-Matic Mechanism and the Tormat Selection Receiver. They are designed for use with the Select-O-Matic Models 161 and 201 respectively. The two types differ only in their Number Selection Switches and the connections made to terminals in the 33-contact plugs with which selection circuits are connected to the complete selection system. All adjustments and service data on the following pages applies to both types.

The principal functions of the Selector is to connect a letter and a number circuit of the Tormat Memory Unit into a selection write-in circuit and to complete a circuit that initiates the operational sequence of the system. These functions are performed when two of the selection switches are operated by pressing a lettered selector key and a numbered key.

The component parts of the Selector are assembled on a steel frame and are protected by a steel cover. All electrical connections to the associated Tormat Memory Unit and to the Selection Receiver are made with a 12-contact plug, a 7-contact plug, and a 33-contact plug that connect to sockets in the units with which it is associated.

The principal component parts of the Selector include the service switch, three selection switch assemblies, a latch bar operating solenoid, three credit indicating lights, a selection pricing terminal board, a pricing unit board and three switch groups each of which has two pairs of contacts. There is also a counter which totals the number of selections made with remote control Wall-O-Matics as well as those made with the Electrical Selector.

The credit indicating lights are extended on their connecting leads so they illuminate the selection and credit information windows that are in the cabinet frame casting at the right of the selector key panel. They are 6-volt lamps operated at 25 volts through resistors and connect to an add and subtract credit switch that is part of the Selection Pricing Unit in the phonograph. A different light is turned on to indicate when selections can be made in accordance with the selections pricing unit being used.

The three selection switches in the Type TES221 Selector each incorporate a latch bar and ten selector switches. These switch assemblies are not interchangeable. The two associated with the lettered keys and circuits are identical in contact arrangement and dimensions but their latch bars are not the same. The switch assembly associated with the numbered keys and circuits differs from the

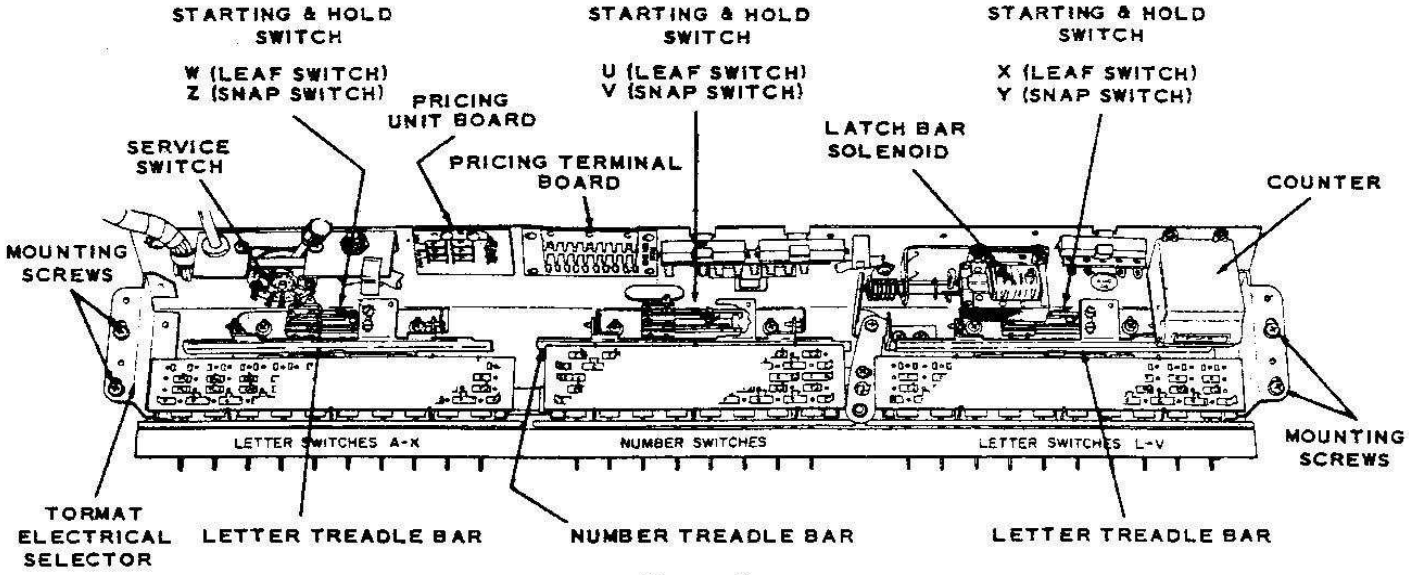


Figure 2.

"letter switches" in that it includes contacts and circuits for starting the operation sequence as well as control of circuits of the Tormat Memory Unit.

The A-K and L-V Letter Selection Switches in the Type TES161 are, respectively, the same as the A-K and L-V used in the Type TES221. The Number Selection Switch in the Type TES161 has eight individual selector switches instead of ten as in the Type TES221.

The latch bar function is to hold a selection switch (and selector key) in the pressed-in position when a selection is being made and to release it when the selection operation sequence is completed. The bars in the two letter switch assemblies are coupled end-to-end so they operate as a single continuous bar. The latch bar of the number switch is independent of the letter switches but the bars in both letter and number switches are linked to and controlled by the latch bar solenoid. The linkage between the solenoid and the bars is spring biased so the bar position permits free in and out movement of the selection switches when the solenoid is not energized. When the solenoid is energized, the bars move to a position in which they will hold a pressed-in switch in the operated position however, the bars are designed so a latched-in switch will be released if another switch in same number or letter switch group is pressed in. The solenoid is energized when credits are set up in the phonograph Pricing Unit.

The shafts or stems of the selector switches extend through the switch frame. They operate a treadle bar when a selector key is pressed and the treadle bar, in turn, operates a switch group consisting of a spring-leaf switch and a snap-action, over-center switch. One of the three switch groups is associated with each of the three selection switches and operates when a selector key is pressed. The three spring-leaf switches in the two switch groups are parallel connected and are part of a timing relay holding circuit that is completed through interlocking contacts on the relay when any one of the selector keys is pressed. These switches are the Hold Switches, contacts U, X and W.

The snap-action switches are the Starting Switches, contacts V, Y and Z. The Y and Z contacts are operated by the Letter Selection switches and are parallel connected so one or the other closes whenever a Letter selector key is pressed. The Z contact is closed by pressing any Number selector key and is in series with the parallel-connected Y and Z contacts. These contacts are part of a circuit that includes a Subtract Solenoid in a Dual Pricing Unit or, with a Single Pricing Unit, a Cancel Solenoid. When a letter key and a number key are pressed, the starting switches complete the circuit to the solenoid which, when energized, closes switch contacts that control the power to the Tormat Memory Unit, the selection counter and the timing relay. They also close, momentarily, the circuit for a play control add solenoid that, in turn, controls, through a play control unit, the power to the phonograph amplifier and the mechanism motor.

The pricing terminal board consists of two

ten-point terminal strips and ten flexible leads. One end of each of the leads connects to the start switches through one of the ten numbered selector switches and has at its other end a push-on terminal for easy and simple connection to either of the two terminal strips marked "EP" and "Singles". By choice of terminal strip connection any group of twenty record selections can be "sold" for either two prices when a Dual Pricing Unit is in use. If a Single Pricing Unit is being used, the leads are connected to the "Singles" strip.

The credit light and "starting" circuits of the selection system are not the same for Dual and Single Pricing Units. These circuits are terminated at the pricing unit board and are connected to suit the Pricing Unit with which the phonograph is equipped.

REMOVAL OF SELECTOR

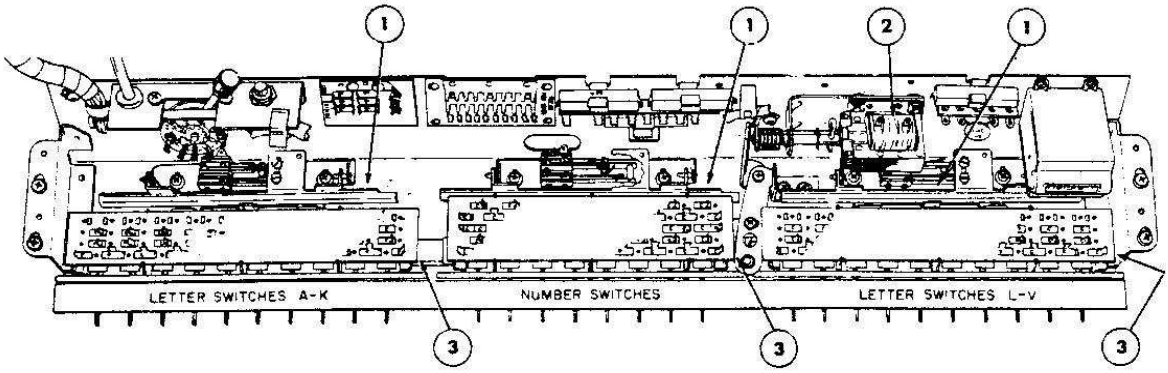
All adjustments of the mechanical linkage except Adjustment No. 2, all switch adjustments and all circuits of the Selector are accessible for inspection and service without removing it from the cabinet. The entire unit may, be removed for any service and for Adjustment No. 2 by pulling out the connecting plugs at the ends of the cable and taking out the screws that are back of the selector key panel at each end of the Selector frame.

When replacing the Selector in the cabinet it should be fastened securely with the mounting screws. It should be positioned so there is a minimum of clearance between the ends of the selection switch shafts and the back of the selector keys. If, however, it is too far toward the keys the selection switches may not return far enough to the released position to open the timing relay circuit that is operated by the Hold Switches. If it is too far from the keys, the keys will be loose and may settle.

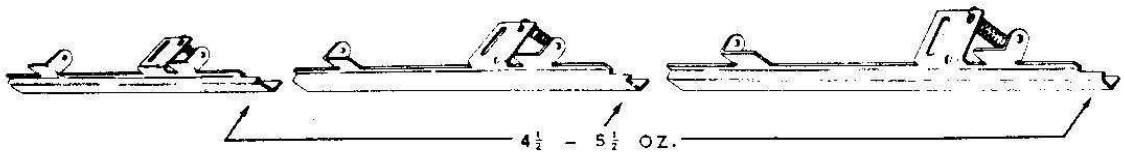
LUBRICATION

Oil all pivots with one drop of Seeburg No. 53014 Select-O-Matic Special Purpose Oil. Use Aero Lubriplate sparingly on the surfaces of the latch levers where they bear on solenoid plunger and the latch bars. *(Aero Lubriplate and No. 53014 Oil is available from your Seeburg Distributor.)*

SPRING ADJUSTMENTS

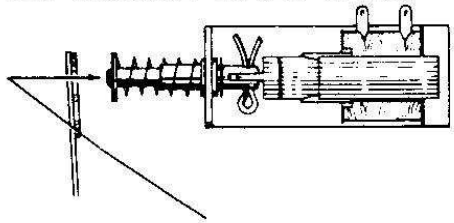


(1) TREADLE BAR SPRINGS



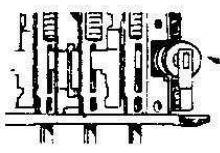
FORCE TO MOVE TREADLE BARS FROM NORMAL REST POSITION(AGAINST RUBBER STOPS).

(2) LATCH RELEASE LEVER SPRING



RESTRAIN MOVEMENT OF NUMBER RELEASE LEVER — FORCE TO START MOVEMENT OF SOLENOID ARMATURE IS THEN 5 TO 7 OZ.

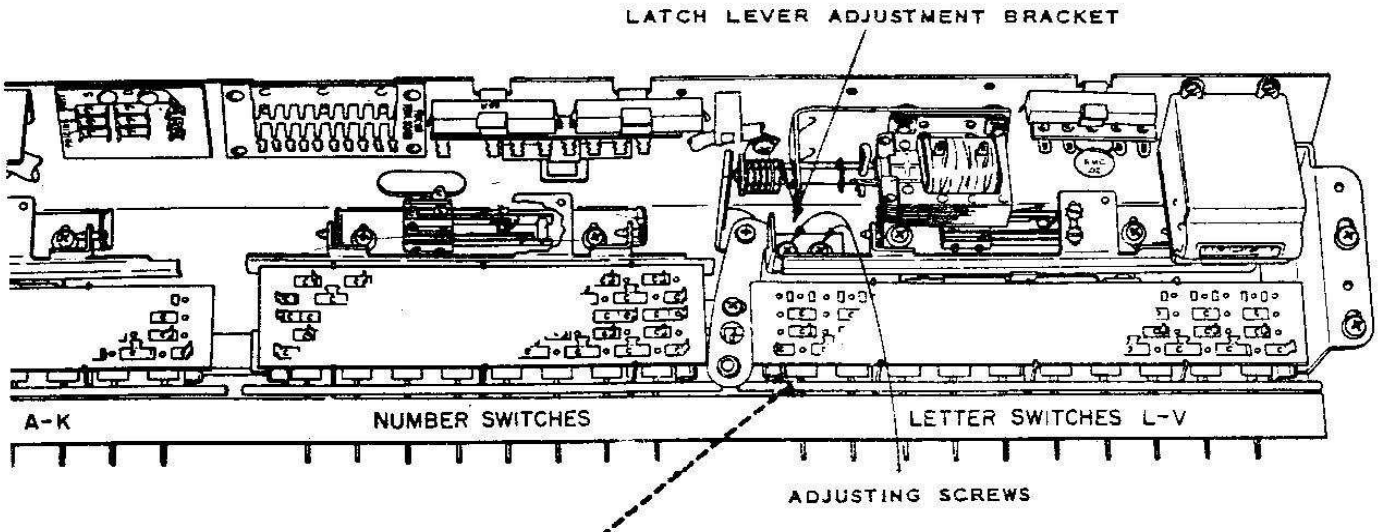
(3) LATCH BAR SPRING

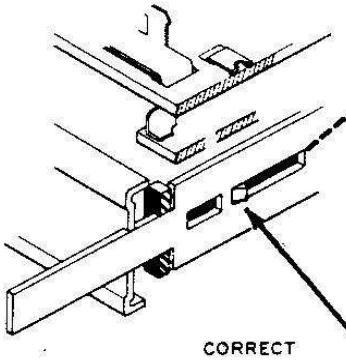


6 TO 7 OUNCES HERE TO START MOVEMENT.

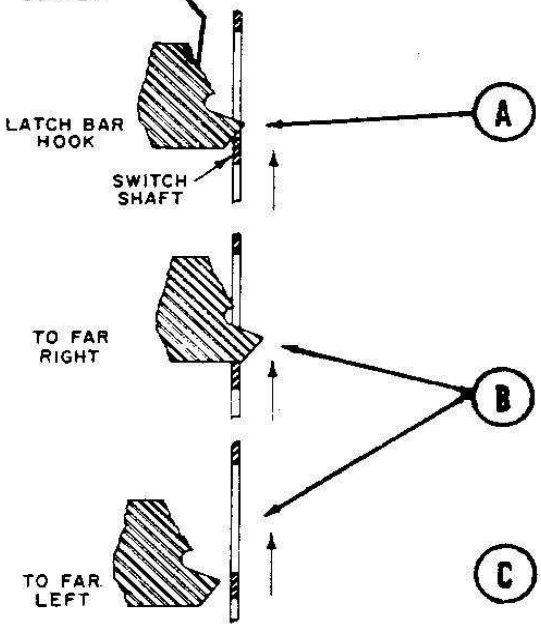
ADJUSTMENT NO. 1 – LETTER SWITCH L-V

This adjustment positions the latch bar in the L-V LETTER selector switch so that when credits are established, the selector switches will latch in the pressed-in position but permit change of selection by operating another switch in the L-V group.





NOTE: When making this adjustment the latch bar solenoid must be in the energized position, all linkage and bars must be free to move without binding and there should be a gap between the latch release lever and the end of the latch bar solenoid plunger rod.



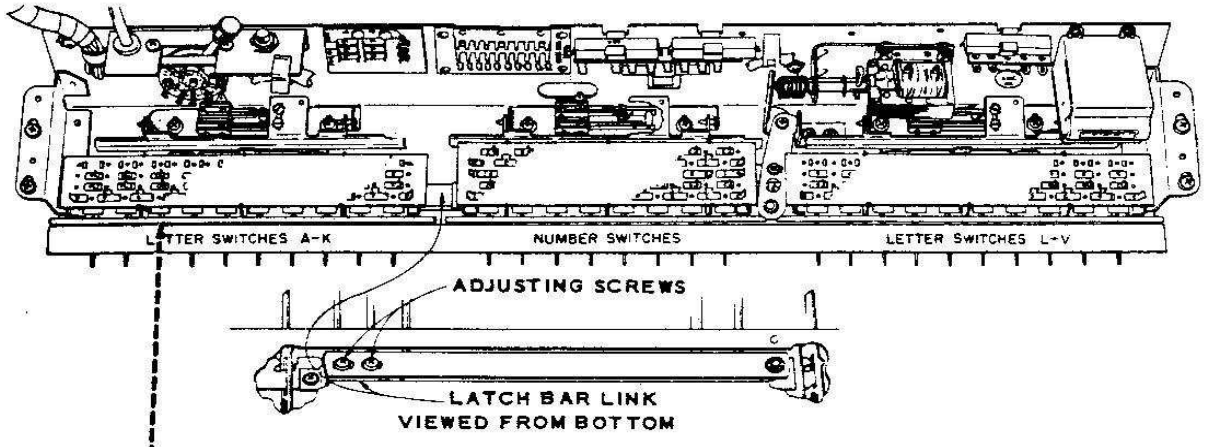
A Loosen the two screws holding the latch lever adjustment bracket and position the bracket so the tips of the latch bar hooks extend 1/64" through the openings in the selector switch shafts. The bars and shafts may be seen through openings in the bottom of the Selector frame.

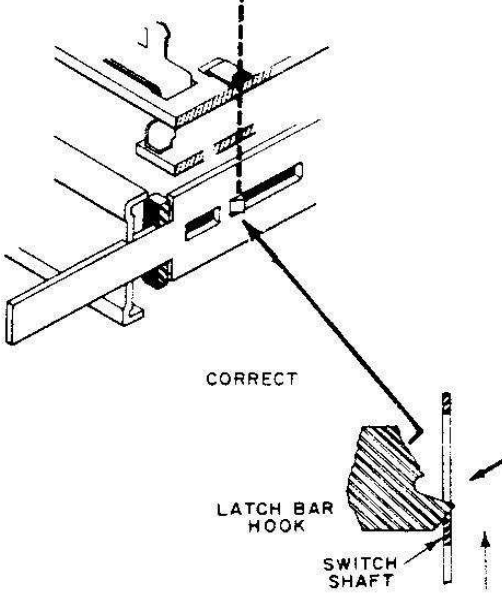
B If the bracket is too far to the right, the selector keys will be locked out. If the bracket is too far to the left, the selector keys will not latch or the latching will be erratic.

C After the correct position of the bracket has been made, the bracket holding screws must be securely tightened.

ADJUSTMENT NO. 2 – LETTER SWITCH A-K

This adjustment positions the latch bar of the A-K LETTER SWITCH so these lettered selector switches will operate in the same manner provided for the L-V LETTER SWITCH in Adjustment No. 1. The adjusting link is accessible through a hole in the bottom of the Selector frame.





NOTE: Before making this adjustment, Adjustment No. 1 must be correct, the latch bar solenoid must be in the energized position, all linkage and bars must be free to move without binding and there should be a gap between the release lever and the end of the latch bar solenoid plunger rod.

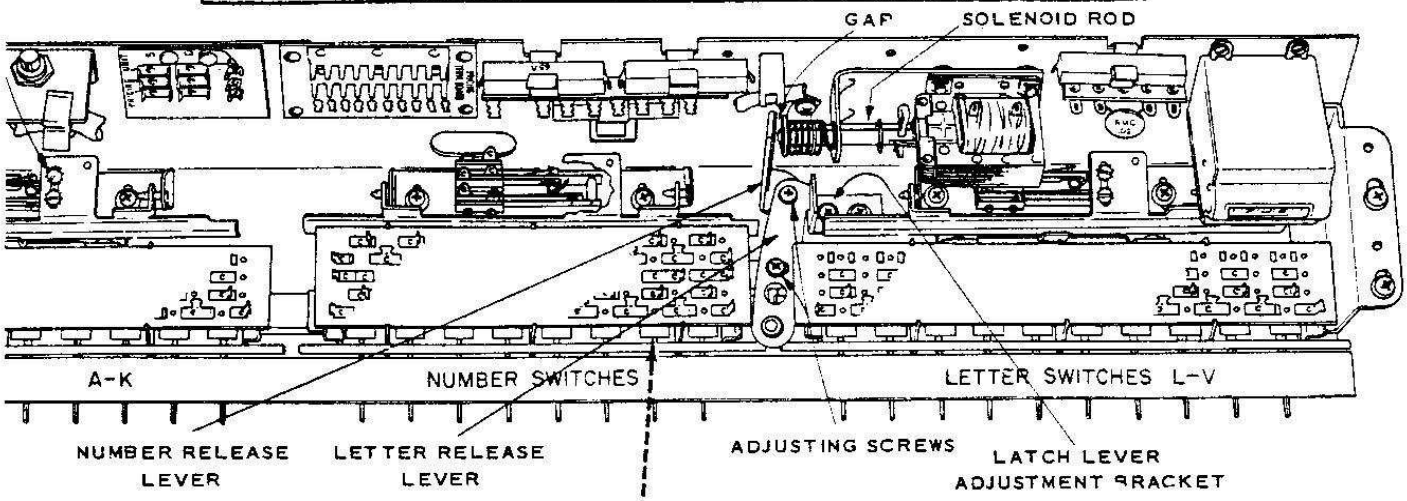
(A) Loosen the screw in the latch bar link between the A-K and the L-V letter switches and position the A-K switch latch bar so the tips of the latch bar locks extend 1/64" through the openings in the selector switch shafts.

(B) Securely tighten the adjusting screw.

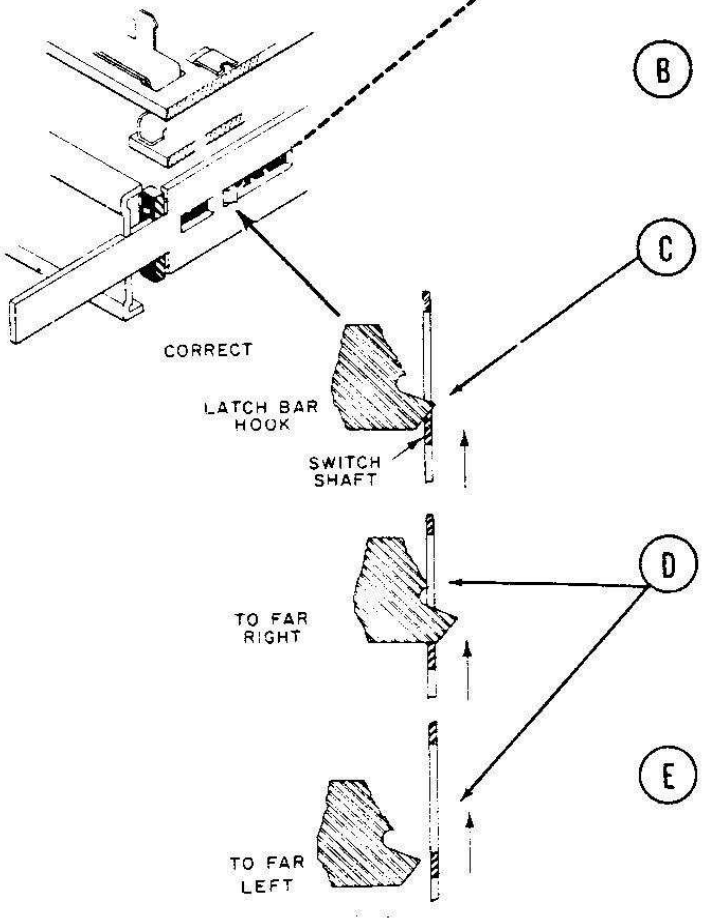
(C) Check this adjustment by pressing a lettered switch in the A to K group and one in the L to V group while manually holding the latch bar solenoid in the energized position, then slowly release the solenoid. Both lettered switches should release at the same time. If the A-K latch bar is too far to the lift, the switch in the A-K group will release first; if the A-K latch bar is too far to the right, the switch in the L-V group will release first.

ADJUSTMENT NO. 3 – NUMBER SWITCH

This adjustment positions the latch bar in the NUMBER selector switch so that when credits are established, the numbered selector switches will latch in the pressed-in position but permit change of selection by operating another numbered switch.



NOTE: When making this adjustment the latch bar solenoid must be in the energized position, all linkage and bars must be free to move without binding and adjustments No. 1 and No. 2 must be correct.



(A) The two screws that hold the number latch lever to the letter latch lever should be loosened just enough to permit the levers to be shifted.

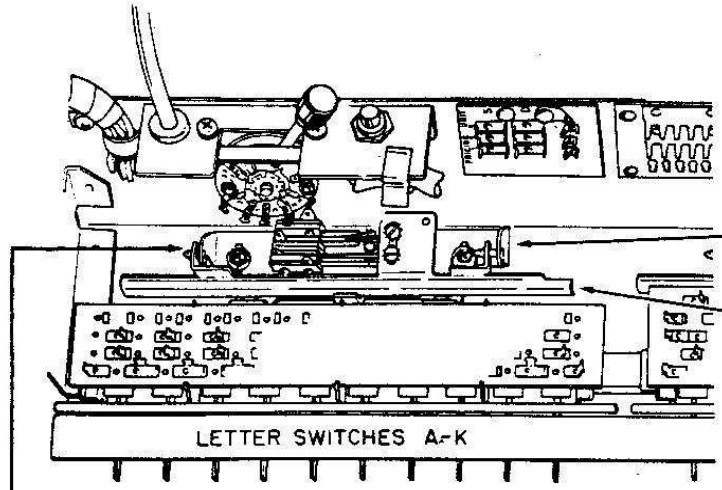
(B) Insert and hold in place a shim 1/64" to 1/16" thick (a single thickness of match book cover) between the letter latch lever and the tip of the latch bar solenoid rod.

(C) While holding the letter latch lever against the latch lever adjustment bracket and the number latch lever against the shim and the solenoid rod, position the number latch lever so the tips of the latch bar hooks of the NUMBER selector switches extend 1/64" through the openings in the selector switch shafts.

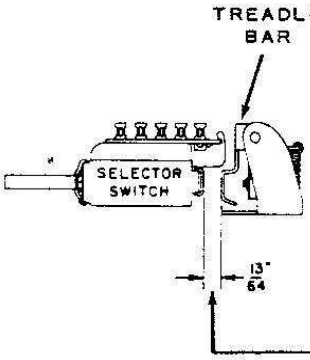
(D) If the forward end of the number latch lever is too far to the right, the selector keys will be locked out. If the lever is too far to the left, the selector keys will not latch or the latching will be erratic.

(E) When the correct position for the latch lever has been established, the two screws that hold the letter and number levers together should be securely tightened and the shim removed.

TREADLE BAR AND SWITCH ADJUSTMENTS

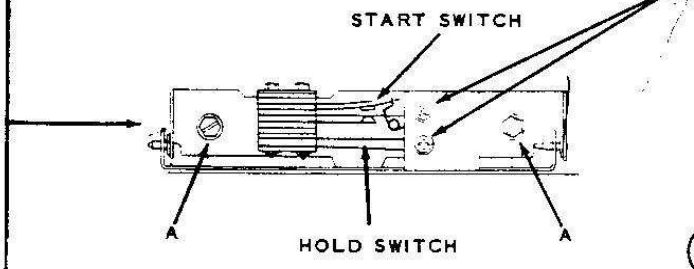


NOTE: All treadle bars should move freely on their pivots to rest against the rubber bumpers and should have a small amount of end play.



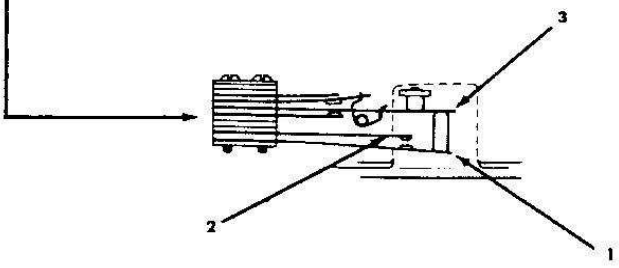
(A) With the treadle bar against the rubber bumper in the treadle bar adjusting plate, position the plate (Screws A) so there is 13/64" (.203") separation between the treadle bar and the frame of the selector switch. Use the shank of a No. 6 (.204") or No. 7 (.201") or a 13/64" twist drill for a spacing gage.

The timing of operation of the snap action Start Switches is adjusted by positioning the brackets for the entire switch assembly. DO NOT ADJUST BY BENDING THE SNAP ACTION SWITCH BLADES.



(B) Loosen the bracket holding screws, B, and position the switches so the Start Switch contacts close when the selector switches have approximately 1/32" more travel before latching by latch bars.

With all selector switches released:

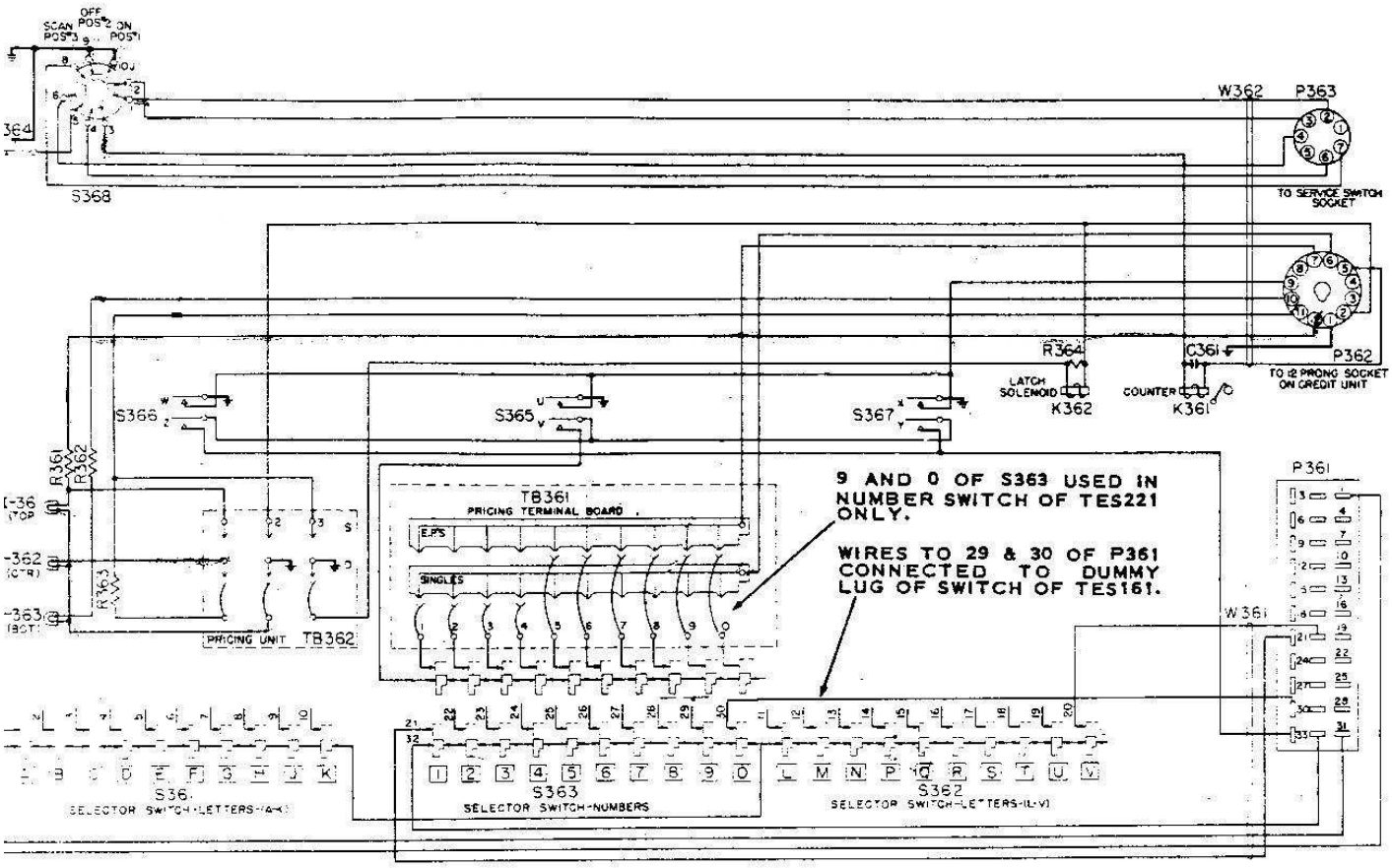


(C) Adjust Blade No. 1 so its fibre lift bears against Blade No. 3 approximately 2 oz. (50 grams).

(D) Adjust Blade No. 2 for 1/64" to 1/32" contact gap.

(E) Readjust force of Blade No. 1 against Blade No. 3 so Blade No. 2 moves approximately blade thickness (1/64") when contacts close.

(F) Check operation: Hold Switch must close before Start Switch closes and open after Start Switch opens.

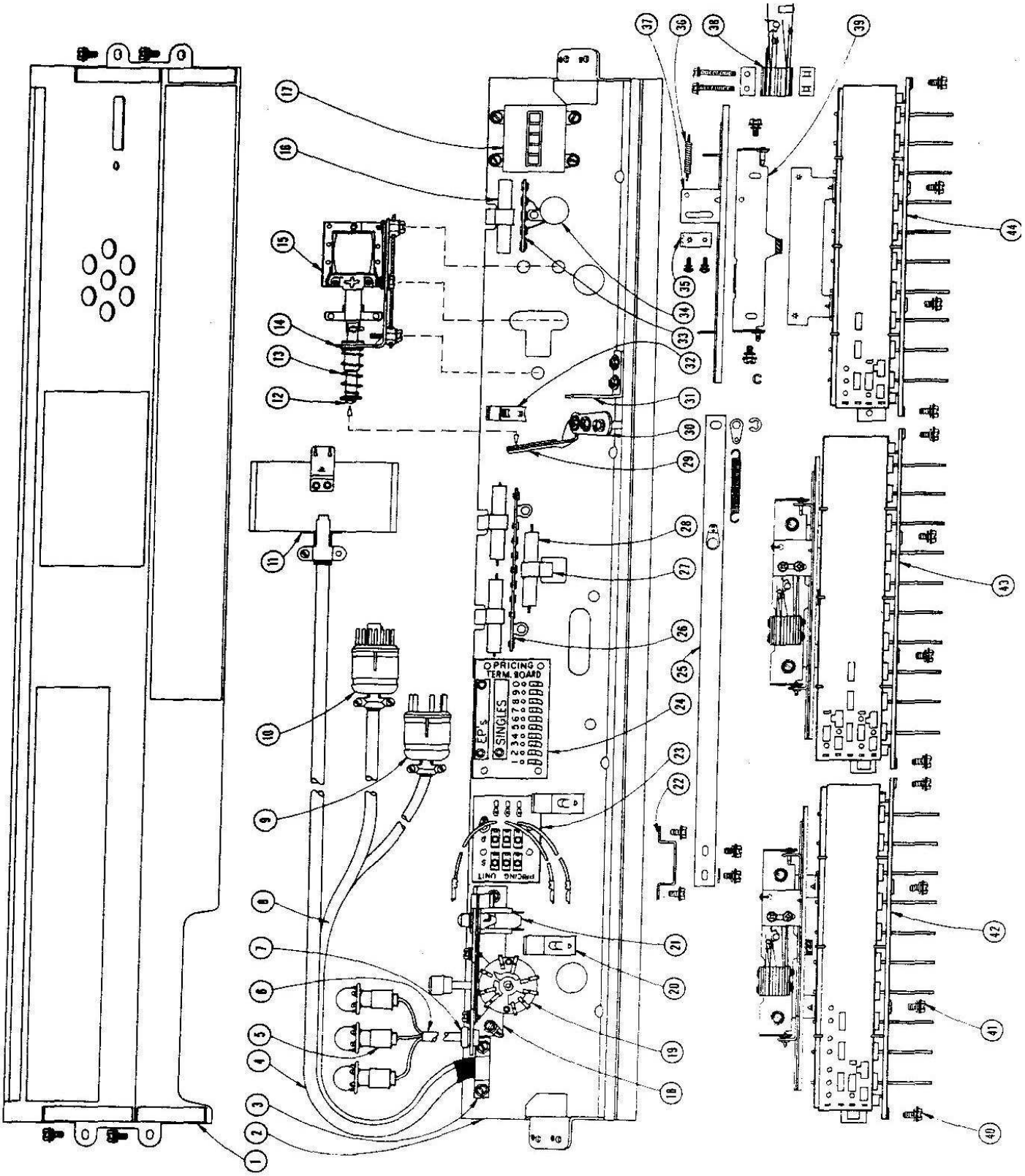


Schematic Diagram

PARTS LIST

Item	Part No.	Part Name
C361	86259	.02 Ceramic Condenser
I361	410823	Credit Lamp Socket Assembly
I362	410823	Credit Lamp Socket Assembly
I363	410823	Credit Lamp Socket Assembly
	505173	Panel Lamp No. 55
K361	411082	Counter Assembly
K362	410684	Latch Solenoid
P361	410573	Socket Assembly
P362	410708	Plug, 12 Prong
P363	408258	Plug, 7 Prong
R361	81178	Resistor 65 Ohm 10 W.
R362	81178	Resistor 65 Ohm 10 W.
R363	81178	Resistor 65 Ohm 10 W.
R364	81183	Resistor 100 Ohm 10 W.

Item	Part No.	Part Name
S361	411066	Selector Switch (A-K)
S362	411067	Selector Switch (L-V)
S363	411155	Selector Switch (Number) (TES221)
S363	411068	Selector Switch (Number) (TES161)
S364	410486	Credit Switch
S365	411073	Snap Switch
S366	411073	Snap Switch
S367	411073	Snap Switch
S368	411136	Service Switch
T361	411134	Pricing Term. Bd. Assembly
TB362	410938	Pricing Unit Term. Board Assembly
W361	411099	Matrix Cable
W362	411101	Control Cable



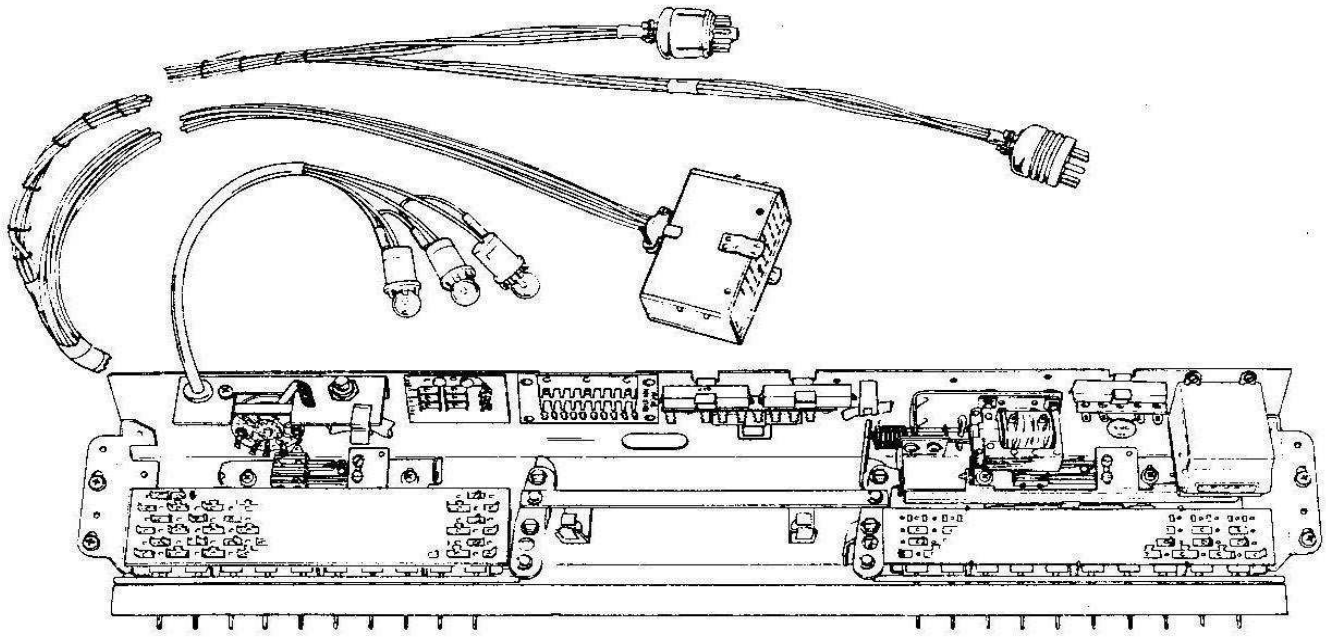
3122A

PARTS LIST

Item	Part No.	Part Name
1	411112	Cover Welded Assembly (161)
	411163	Cover Welded Assembly (221)
	411135	Label (Service Switch)
	411115	Label (Adjustment)
	411117	Label
	410927	Label (For Use With "SPU1" or "DPU1")
	410705	Cable Clamp
2	411050	Selector Frame Riveted Assembly (161)
	411150	Selector Frame Riveted Assembly (221)
3	410704	Cable Clamp
	960733	1106 Lockwasher, Steel-Cad.
4	411099	Matrix Cable
5	410823	Credit Lamp Socket Assembly
	410851	Button Head Contact (For Alternate See 410713)
	410713	Contact Rivet (Alternate For 410851)
	410601	Label – Top (No. 1)
	410602	Label – Center (No. 2)
	410603	Label – Bottom (No. 3)
6	411102	Credit Light Cable Assembly
	52004	Tubing – Black
7	302343	Strain Relief
8	411100	Control Cable Assembly
9	408258	7-Prong Plug
10	410708	12-Prong Plug
	408259	Cap & Liner
11	411098	Matrix Cable & Plug Assembly
	410573	33-Contact Socket Assembly
12	411094	Solenoid Rod
	951620	Cotter Pin, Steel-Cad. (1/8 x 3/4 long)
	125403	Retaining Ring (Truarc 5133-25)
	921564	Flatwasher, Steel-Cad.
13	411095	Solenoid Spring
14	411090	Latch Solenoid Bracket Assembly
	411091	Latch Solenoid Mounting Bracket
	411092	Solenoid Bracket Bushing
	988161	Grommet
	450738	Spacer
15	410684	Latch Solenoid Assembly
	900803	Tinnerman Speed Nut
	920661	Flatwasher, Steel-Cad.
	913511	1106 Lockwasher, Steel-Cad.
16	81183	100 Ohm W. W. Ceramic Resistor, 10 W.
17	411082	Counter Assembly
	960733	1106 Lockwasher, Steel-Cad.
18	411057	Service Switch Bracket
	960733	1106 Lockwasher, Steel-Cad.
	940630	Solder Lug
19	411136	Service Switch
	913026	1106 Lockwasher, Steel-Cad.
	408396	Service Switch Insulator
20	411096	Cable Clamp
21	410486	Manual Credit Switch
	407239	Knob
22	913026	1106 Lockwasher, Steel-Cad.
23	410934	Pricing Unit Terminal Board Assembly
	410938	Pricing Unit Terminal Board Riveted Assem.
	410936	Terminal Board
	940311	Taper Tab Solder Lug
	980550	.125 Diam. x 1/8 Tub. Rivet, Steel-Cad.
	941241	Solder Lug
	246933	Solderless Connector
	980650	.125 Diam. x 3/16 Tub. Rivet, Steel-Cad.
24	410645	Pricing Terminal Board Riveted Assembly
	410646	Terminal Board
	303513	Taper Tab Terminal Strip
	980550	.125 Diam. x 1/8 Tub. Rivet Steel-Cad.
	941241	Solder Lug
	980650	.125 Dia. x 3/16 Tub. Rivet, Steel-Cad.
	410596	Label (EP)
	410595	Label (Single)
	246933	Solder Less Connector
25	411080	Latch Bar Link (Adjustable) (161)
	411156	Latch Bar Link (Adjustable) (221)
	913026	1106 Lockwasher, Steel-Cad.
	941110	Solder Lug
	245583	Spring
	301374	Retaining Ring
	920661	Flatwasher, Steel-Cad.
26	411058	Terminal Strip
	980600	.125 Diam. x 5/32 Tub. Rivet, Steel-Cad.
27	410705	Cable Clamp
	411060	Cable Assembly
	53301	Lacing Cord (As Required)
28	81178	65 Ohm W. W. Ceramic Resistor, 10 W.
29	411088	Latch Lever (Number)
30	411085	Latch Lever (L-V)
	411086	Latch Lever Hub
	411087	Latch Lever Assembly (Number)
	301374	Retaining Ring
31	411128	Latch Lever Adjusting Bracket
	960733	1106 Lockwasher, Steel-Cad.
	921112	Flatwasher
32	411097	Cable Clamp
33	303365	Terminal Strip
	980600	.125 Diam. x 5/32 Tub. Rivet, Steel-Cad.
34	86259	.02 Mfd. Ceramic Capacitor, $^{+80\%}_{-20\%}$
35	411076	Switch Adjustment Bracket
	411077	Switch Lift (Insulator)
	920551	Flatwasher
	911713	1104 Lockwasher, Steel-Cad.
	920551	Flatwasher
36	411078	Treadle Bar Spring
37	411074	Treadle Bar
	125448	Retaining Washer
38	411073	Snap Switch Assembly
	400597	Tension Plate
	912643	5-40 x 7/8 Slotted Hex Washer
	900726	Twin Speed Nut
39	411069	Treadle Bar Adjustment Plate Assembly
	411070	Treadle Bar Adjustment Plate
	411071	Treadle Bar Pivot Pin
	411072	Treadle Bar Pivot Pin (Long)
	53411	3/8 Wide x 1/16 Thk. Stickeron
40	914302	1108 Lockwasher Steel-Cad.
41	913026	1106 Lockwasher
42	411063	Selector Switch & Snap Switch Assembly (A-K)
43	411065	Selector Switch & Snap Switch Assem. (Number) (161)
	411155	Selector Switch & Snap Switch Assem. (Number) (221)
	411068	Selector Switch & Bracket Assembly
44	411064	Selector Switch & Snap Switch Assem. (L-V)
	411067	Selector Switch & Bracket Assembly
	411079	Treadle Bar Support Bracket

SEEBURG

TORMAT ELECTRICAL SELECTOR, Type TES 103



The tormat Electrical Selector, Type TES103, is part of the Seeburg Tormat Selection System. The principal functions of the Selector are to connect a letter and a number circuit of the Tormat Memory Unit of the System into a selection write-in circuit and to complete a circuit that initiates the operational sequence of the system. These are performed when operating a lettered selector key and a numbered key.

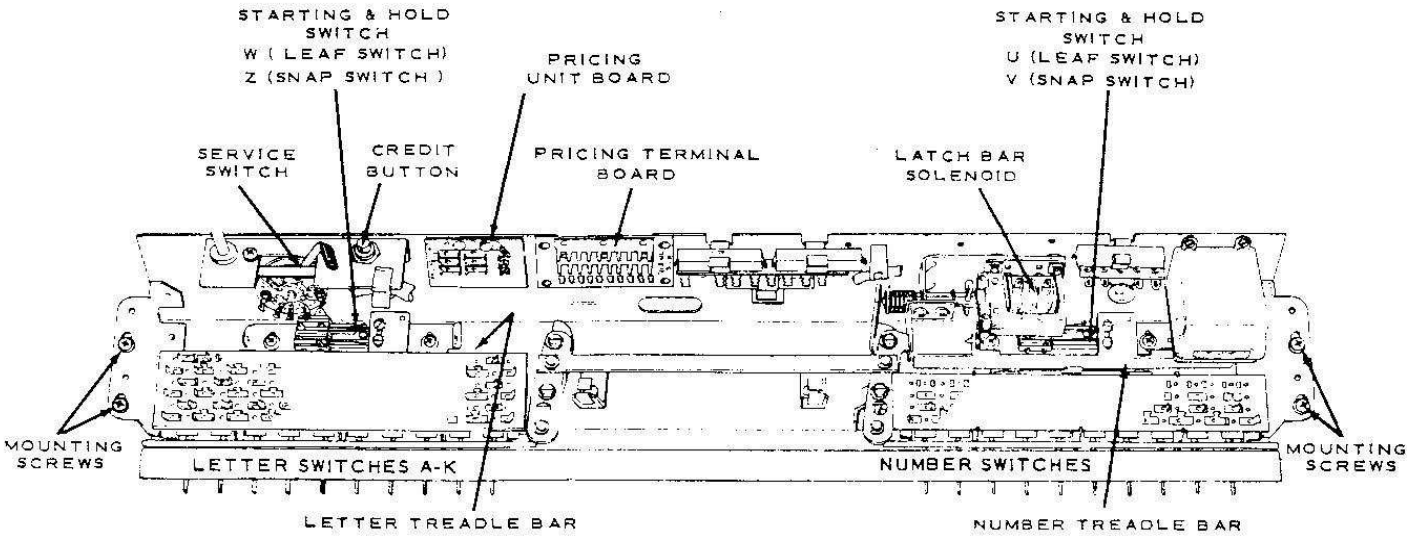
The principal component parts of the Selector include the service switch, two selection switch assemblies, a latch bar operating solenoid, three credit indicating lights, a selection pricing terminal board, a pricing unit board and two switch groups each of which has two pairs of contacts. There is also a counter which totals the number of selections made with remote control Wall-O-Matics as well as those made with the Electrical Selector.

The credit indicating lights are extended on their connecting leads so they illuminate the selection and credit information windows that are in the phonograph. They are 6-volt lamps operated at 25 volts through resistors. A different light is turned on to indicate when selections can be made in accordance with the selection pricing unit being used.

The latch bar function is to hold in a selection switch (and selector key) when a selection is being made and to release it when the selection is complete. The solenoid is energized where credits are set up in the phonograph pricing unit.

The shafts or stems of the selector switches operate a treadle bar when a selector key is pressed and the treadle bar, in turn, operates a switch group consisting of a spring-leaf switch and a snap-action, over-center switch. One of the switch groups is associated with each of the selection switches. The spring-leaf switches are parallel connected and are part of a timing relay holding circuit that is completed through interlocking contacts on the relay when any selector key is pressed. These switches are the Hold Switches, contacts U and W.

The snap-action switches are the Starting Switches, contacts V and Z. The Z contacts close whenever a Letter selector key is pressed. The V contacts are closed by pressing any Number selector key and are in series with the contacts. These contacts are part of a circuit that includes a Subtract, or Cancel Solenoid in the phonograph Pricing Unit. When a letter key and a number key are pressed, the starting switches complete the circuit to the solenoid

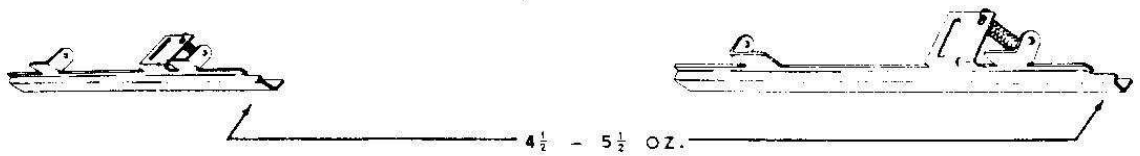


which, when energized, closes switch contacts that control the power to the Tormat Memory Unit, the selection counter and the timing relay. They also close, monentarily, the circuit for a play control add solenoid that, in turn, controls, through a play control unit, the power to the phonograph amplifier and the mechanism motor.

The pricing terminal board consists of two ten-point terminal strips and five flexible leads. One end of each of the leads connects to the start switches through one of the numbered selector switches and, has at its other end, a push-on terminal for easy and simple connection to either of the two terminal strips marked "EP" and "Singles". By choice of terminal strip connection any group of twenty record selections can be "sold" for either of two prices when a Dual Pricing Unit is in use. If a Single Pricing Unit is being used, the leads are connected to the "Singles" strip.

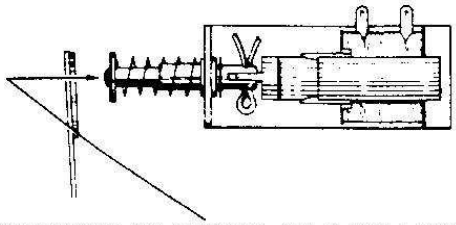
The credit light and "starting" circuits of the selection system are not the same for Dual and Single Pricing Units. These circuits are terminated at the Pricing Unit Board and are connected to suit the Pricing Unit with which the phonograph is equipped.

TREADLE BAR SPRINGS



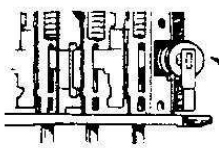
FORCE TO MOVE TREADLE BARS FROM NORMAL REST POSITION(AGAINST RUBBER STOPS).

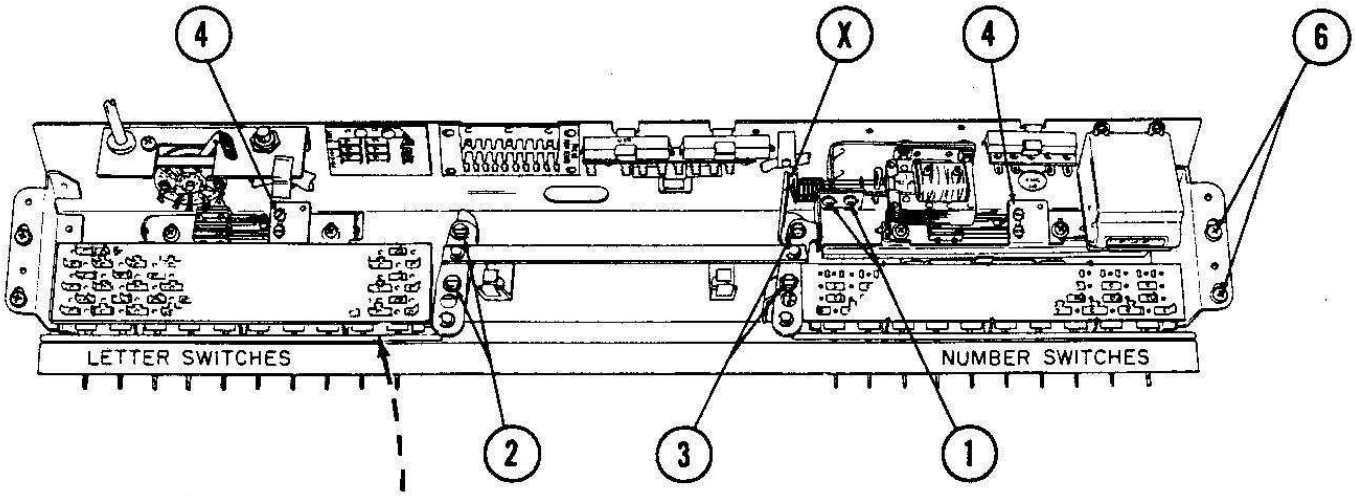
LATCH RELEASE LEVER SPRING



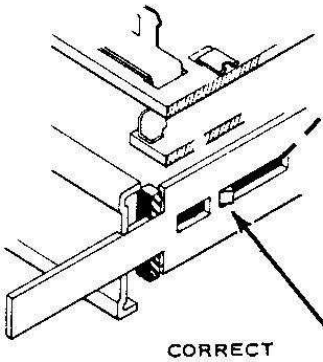
RESTRAIN MOVEMENT OF NUMBER RELEASE LEVER – FORCE TO START MOVEMENT OF SOLENOID ARMATURE IS THEN 5 TO 7 OZ.

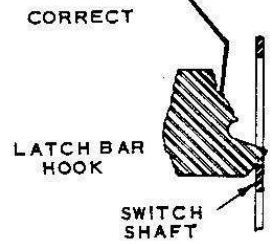
LATCH BAR SPRING





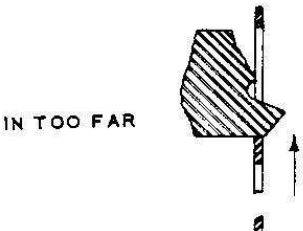
NOTE: Adjustments 1, 2 and 3 to be made in sequence with latch bar solenoid in energized position.





1 Adjust latch lever bracket position for latch bar engagement of NUMBER SWITCHES.

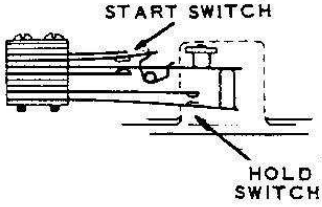
2 Adjust letter switch lever position for latch bar engagement of LETTER SWITCHES.



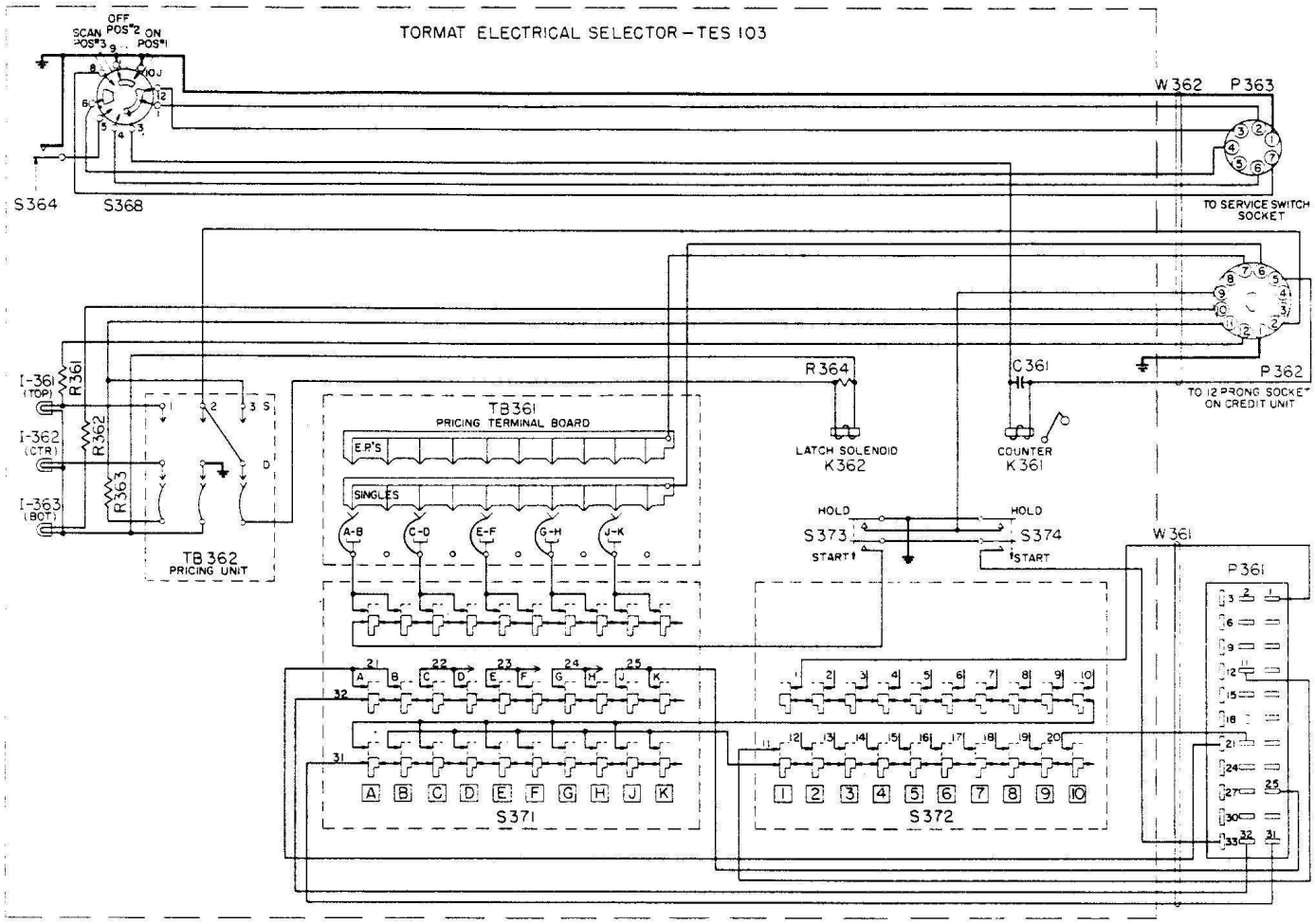
3 Adjust number switch latch lever for 1/32" minimum gap at X with solenoid energized.

4 Adjust snap action START SWITCHES by positioning the brackets for the entire switch stack. START SWITCH should close when the selector switches have approximately 1/32" more travel before latching by latch bars.

5 Adjust Hold Switch by bending blades AFTER Start Switch has been correctly set. Hold Switch to close before Start Switch closes and open after Start Switch opens. Contact gap 1/64" to 1/32".



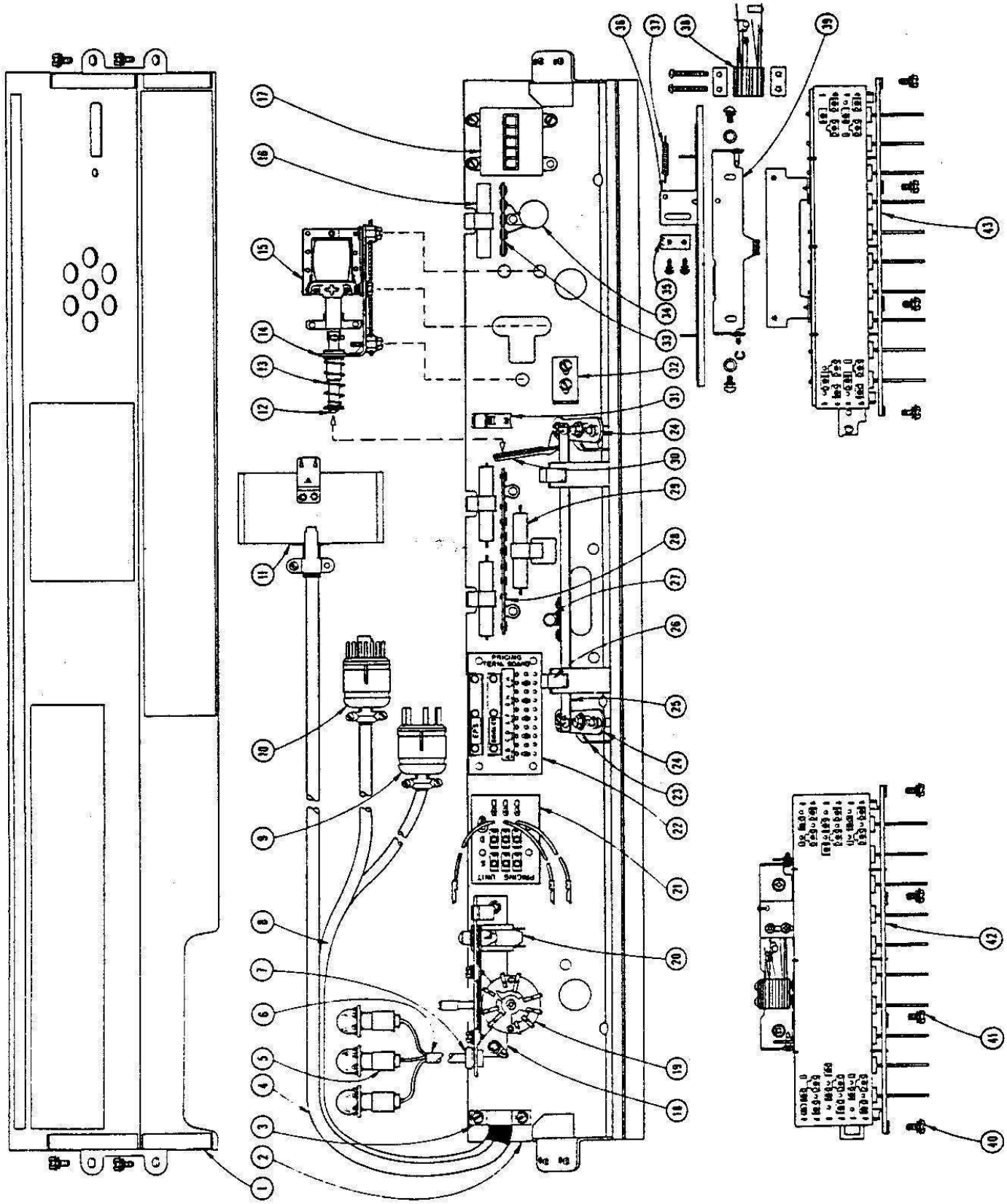
6 Loosen two mounting screws at each end to position Selector so selection switches release fully with minimum clearance between ends of switch shafts and backs of selector keys.



PARTS LIST

Item	Part No.	Part Name
C361	86259	.02 MFD Ceramic
I361	410823	Credit Lamp Socket Assembly
I362	410823	Credit Lamp Socket Assembly
I363	410823	Credit Lamp Socket Assembly
K361	411082	Counter Assembly
K362	410684	Latch Solenoid
P361	410608	Socket Assembly
P362	410708	12 Prong Plug
P363	408258	7 Prong Plug
R361	81178	65 OHM 10 Watt
R362	81178	65 OHM 10 Watt
R363	81178	65 OHM 10 Watt

Item	Part No.	Part Name
R364	81183	100 OHM 10 Watt
S364	410486	Credit Switch
S365	411078	Snap Switch
S366	411073	Snap Switch
S368	411136	Service Switch
S371	411206	Selector Switch (Letters)
S372	411207	Selector Switch (Number)
TB361	411227	Pricing Terminal Board Assembly
TB362	410934	Pricing Unit Terminal Board Assy.
W361	411209	Matrix Cable
W362	411101	Control Cable



3126A

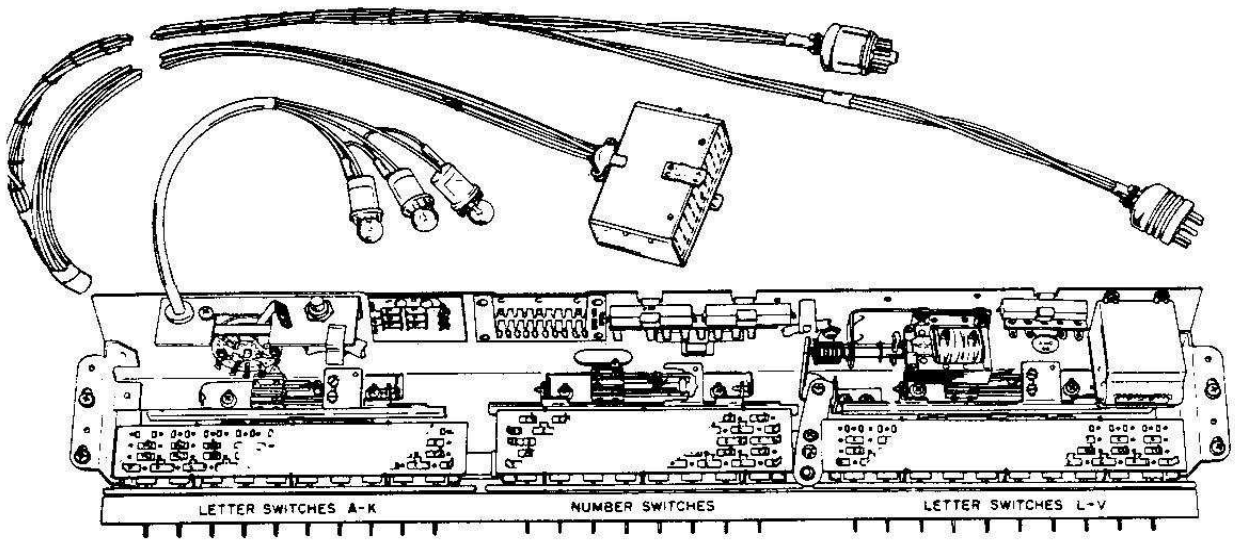
PARTS LIST

Item	Part No.	Part Name
1	411112	Cover Welded Assy.
	960755	6-32 X 3/8 Self Tapping Screw
	411135	Label (Service Switch)
	411219	Label (Adjustment)
	411231	Label (Pricing Systems)
	411232	Label (Pricing Unit Switchboard)
2	411211	Selector Frame Riveted Assy.
3	411238	Cable Clamp
	960733	Sems
4	411209	Matrix Cable
5	410823	Credit Lamp Socket Assy.
	410851	Button Head Contact (For Alternate See 410713)
	410713	Contact Rivet (Alternate For 410851)
	410601	Label Top No. 1
	410602	Label Center No. 2
	410603	Label Bottom No. 3
	505173	No. 55 Panel Light
6	411102	Credit Light Cable Assy.
7	302343	Strain Relief
8	411100	Control Cable Assy.
9	408258	7 Prong Plug
10	410708	12 Prong Plug
	408259	Cap and Liner
11	411201	Matrix Cable and Plug Assy.
	410573	33 Contact Socket Assembly
12	411094	Solenoid Rod
	951620	1/8 X 3/4 Cotter Pin
	125403	Retaining Ring (Truarc 5133-25)
	921564	Flatwasher
13	411095	Solenoid Spring
14	411090	Latch Solenoid Bracket Assy.
	411091	Latch Solenoid Mounting Bracket
	411092	Solenoid Bracket Bushing
	988161	Grommet
	450738	Spacer
15	410684	Latch Solenoid Assy.
	900803	Tinnerman Speed Nut
	920661	Flatwasher
	913511	Sems
	913234	Sems
16	81183	100 OHM WW Ceramic Resistor, 10 Watt
	410705	Cable Clamp
17	411082	Counter Assy.
	960733	Sems
18	411057	Service Switch Bracket
	940630	Solder Lug (Shakeproof 2104-06-00)
	960733	Sems
19	411136	Service Switch
	913026	Sems
	408396	Service Switch insulator
20	410486	Manual Credit Switch
	925812	1224-2 Internal Lockwasher
21	410934	Pricing Unit Terminal Board Assy.
	410938	Pricing Unit Terminal Board Riveted Assy.
	410936	Terminal Board
	940311	Taper Tab Solder Lug
	980550	.125 Diam. X 1/8 Tub. Rivet
	941241	Solder Lug
	246933	Solderless Connector
	980650	.125 Diam. X 3/16 Tub. Rivet
22	411227	Pricing Terminal Board Assy.
	410646	Terminal Board
	303513	Taper Tab Terminal Strip
	980650	.125 Diam. X 3/16 Tub. Rivet
	410596	Label (EP)
	410595	Label (Single)
	246933	Solderless Connector
	980550	.125 Diam. X 1/8 Tub. Rivet
	941241	Solder Lug
23	411200	Latch Lever (Letters)
	913026	Sems
	920661	Flatwasher
24	411202	Latch Lever Staked Assy.
	301374	Retaining Ring (Truarc 5311-18)
	920661	Flatwasher
25	411204	Latch Lever Link
	301374	Retaining Ring (Truarc 5133-18)
26	410705	Cable Clamp
	411229	Cable Assy.
27	410717	Terminal Strip
	980600	.125 Diam. X 5/32 Tub. Rivet
28	411058	Terminal Strip
	980600	.125 Diam. X 5/32 Tub. Rivet
29	81178	65 OHM W.W. Ceramic Resistor, 10W.
	410705	Cable Clamp
30	411087	Latch Lever Assy. (Number)
	913026	Sems
31	411097	Cable Clamp (Tinnerman C22901-020)
32	411128	Latch Lever Adjusting Bracket
	920661	Flatwasher
	960733	Sems
33	303365	Terminal Strip
	980600	.125 Diam. X 5/32 Tub. Rivet
34	86259	.02 MFD Ceramic Capacitor $^{+80\%}_{-20\%}$
35	411076	Switch Adjustment Bracket
	411077	Insulator Switch Lift
	920551	Flatwasher
	911713	Sems
36	411074	Treadle Bar
	125448	Retaining Washer (Truarc 5133-12)
37	411078	Treadle Bar Spring
38	411073	Snap Switch Assy.
	400597	Tension Plate
	912630	5-40 X 7/8 R.H.M.S.
	200028	Switch Lock Plate
39	411069	Treadle Bar Adjustment Plate Assy.
	920551	Flatwasher
	911713	Sems
	125448	Retaining Washer (Truarc 5133-12)
40	914302	Sems
41	913026	Sems
42	411214	Selector Switch & Snap Switch (Letters)
	411206	Selector Switch & Bracket (Letters)
43	411215	*Selector Switch & Snap Switch (Numbers)*
	411207	*Selector Switch & Bracket (Numbers)*

SEEBURG

TORMAT ELECTRICAL SELECTOR

TYPE TES162



This Electrical Selector is the same as the Type TES161 except in the shape of the operating lever of the service switch and direction of cable entry to the frame. All service data and adjustments for the Type TES161, pages 3115 to 3122 inclusive, apply to this Selector.

SEEBURG

STEREO HIGH FIDELITY AMPLIFIER,

Type SHFA1

This is a dual channel stereo, low distortion, wide frequency range, constant-voltage type amplifier. It is part of the Seeburg stereophonic sound system that also includes the Seeburg stereo pickup, one or more pairs of Seeburg twin stereo speakers and two speakers and low-pass networks in the phonograph.

The two output signals of the low impedance magnetic pickup of the Select-O-Matic mechanism are connected to the amplifier through the input socket and have a nominal signal level for each channel of three millivolts. Both signals are independently amplified, one in the left channel; one in the right channel. Each channel is complete with a speaker and with tone controls and volume control mechanically linked to provide equal and simultaneous positioning.

The output transformer of each channel has a low and high impedance secondary. The low impedance winding drives one of the 16-ohm phonograph speakers to which it is connected through a low-pass network. Connections to this load are through the speaker socket, J104. The high impedance secondary is a 70-volt, C.V. output that terminates at A and B of one of the remote speaker terminal strips. This output drives one of the side channels of one or more external stereo speakers that have, in their cabinets, a high-pass network.

The total output power for each channel can be divided between the phonograph speaker and the external stereo speakers by positioning the Select-O-Matic Speaker Switch in the phonograph and the loading taps on the external speakers. The Speaker Switch, by means of taps on the low impedance output winding, controls both channels simultaneously. It is calibrated in watts with reference to the power delivered at full output by each output transformer to a 16-ohm phonograph speaker.

The total load of a phonograph speaker as indicated on the Speaker Switch and the load of external speakers must not be greater than 20 watts for each channel.

In the "Test" position of the Speaker Switch, the phonograph speakers are connected to one side of the 6-volt tube heater circuit for a hum test at approximately 3 volts.

Automatic volume compensation is incorporated in this amplifier to compensate for variations in the average volume levels of different records. It makes possible a volume control setting for normal records without danger of blasting or high volume due to exceptionally loud records. A 6BJ6 tube is used for compensation control in each channel. Use of AVC is optional and may be suspended by removal of both 6BJ6 tubes.

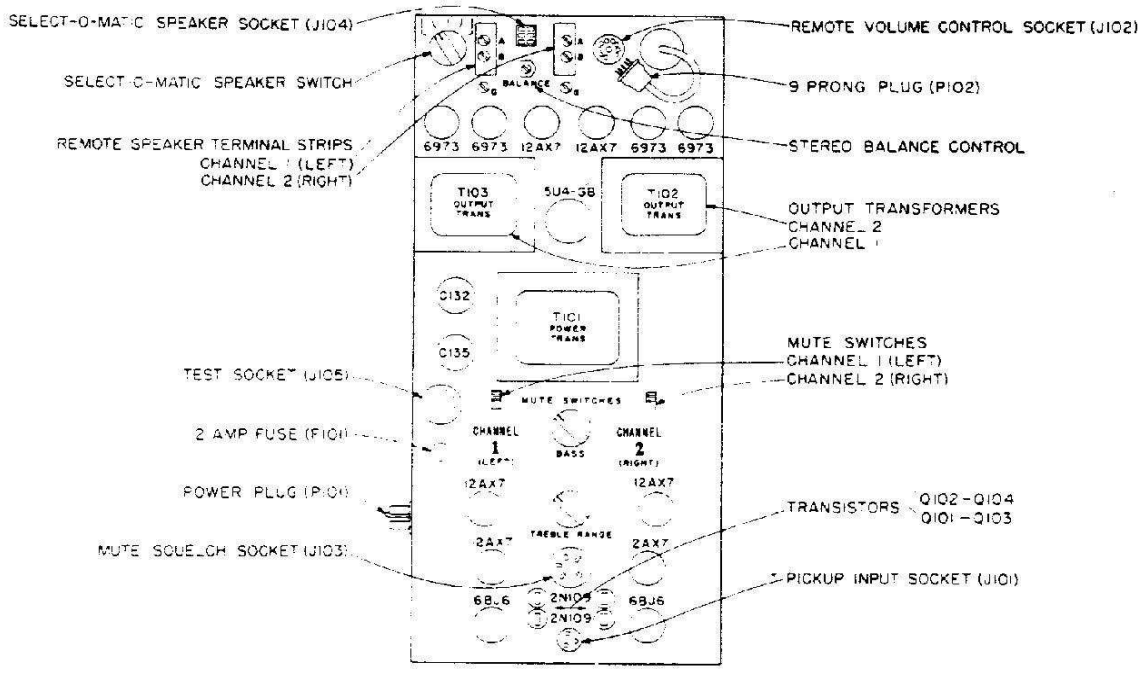


Figure 1

4065

The selenium rectifiers, CR101 and CR102, have two functions. They rectify the output of the AVC amplifiers of each channel for variable grid bias for the 6BJ6 control tubes and also rectify 25 volts supplied from the control circuits of the Select-O-Matic mechanism for squelch operation.

The squelch voltage from the mechanism is applied only when a record is not being played.

The volume control adjusts the level of sound from the Select-O-Matic speaker and the remote speakers. It is located on the amplifier so it is accessible at the back of the cabinet. Connections for the control are made through a socket and plug on the amplifier chassis. A remote volume control may be used by replacing the plug with the 9-prong plug of a remote volume control, Type RSVC-1.

Heater current for the amplifier tubes is supplied at 6.3 volts from the Selection Receiver. Plate current for the tubes is from an included plate supply transformer and 5U4GB rectifier. Current for the transistors and bias for the 6973 output tubes is supplied through the rectifier, C103, and a three-section filter.

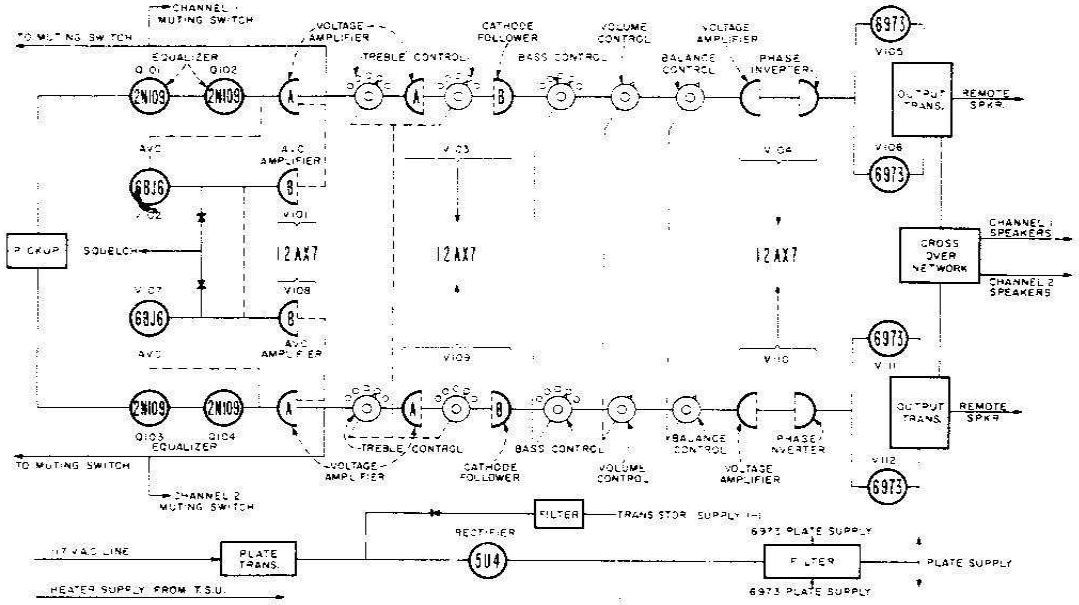
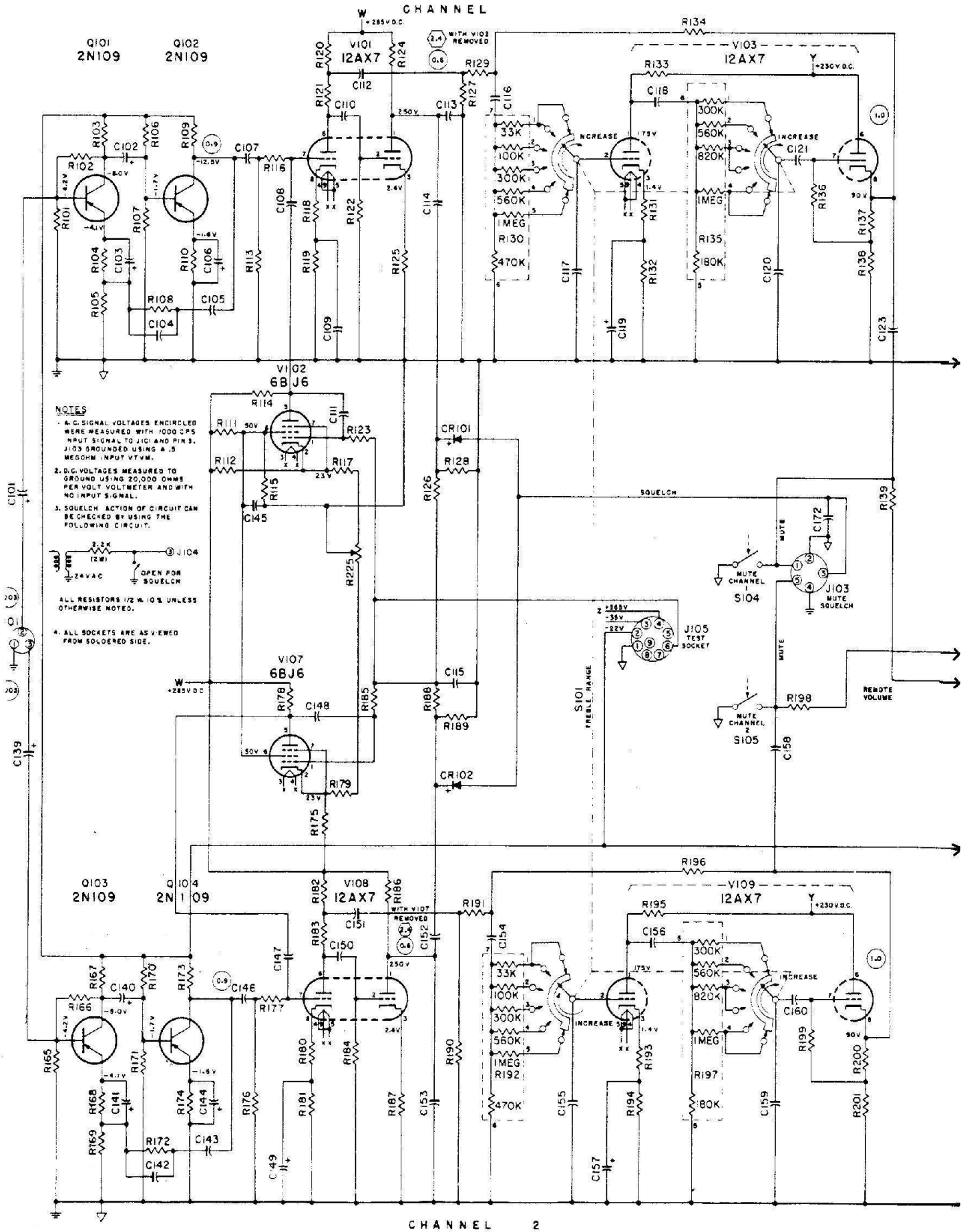
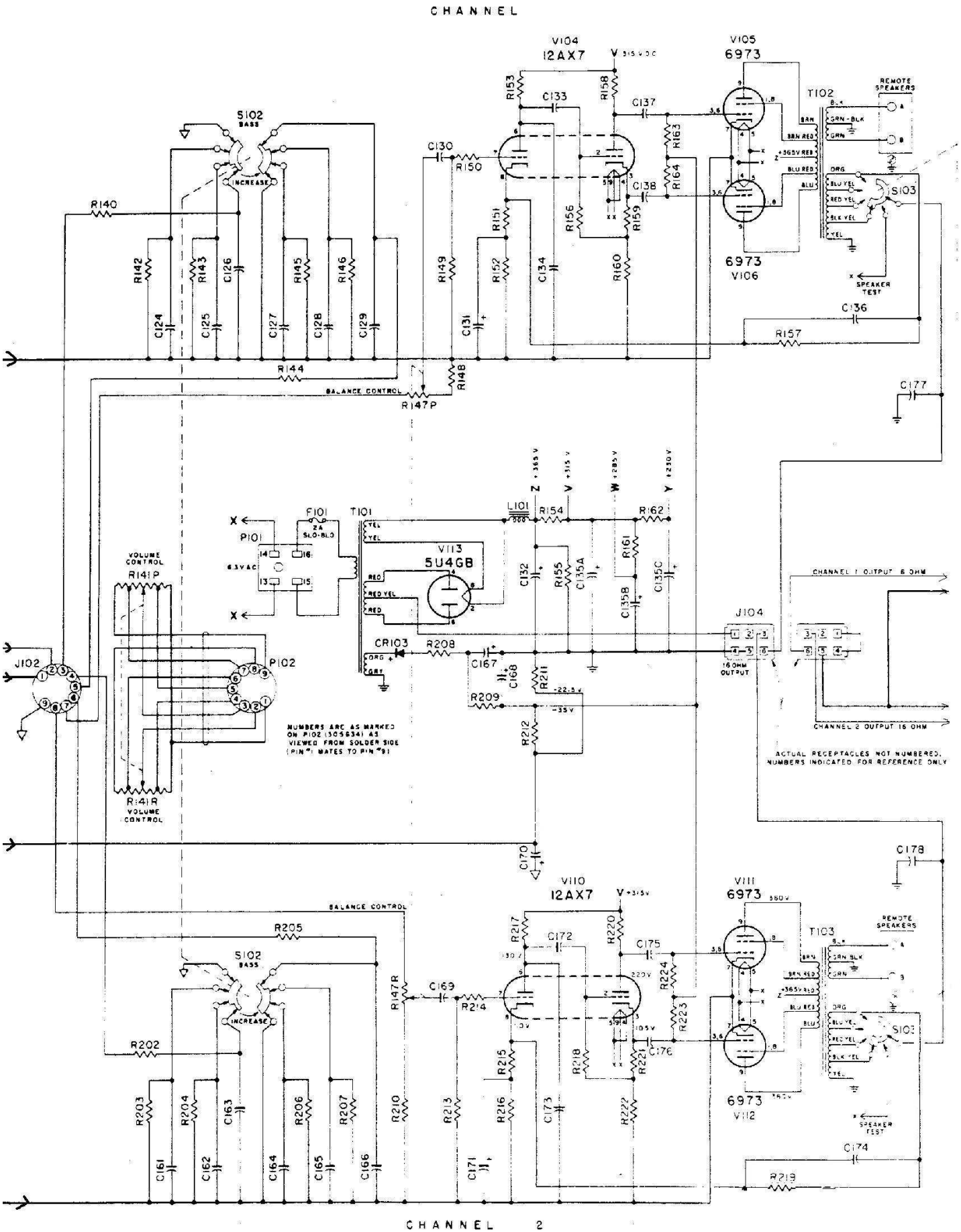


Figure 2 Block Diagram

Item	Part No.	Part Name			
C101	87657	4 MFD		15	V. Lytic
C102	87657	4 MFD		15	V. Lytic
C103	87659	50 MFD		6	V. Lytic
C104	86309	1000 MMF	±10%	500	V. Ceramic
C105	86212	.01 MFD		400	V.
C106	87670	200 MFD		6	V. Lytic
C107	86235	.05 MFD	±20%	200	V. Paper
C108	86300	.22 MFD	±20%	400	V. Paper
C109	87659	50 MFD		6	V. Lytic
C110	86213	.005 MFD	±10%	400	V. Paper
C111	86212	.01 MFD	±10%	400	V. Paper
C112	86140	.05 MFD	+30% −10%	400	V. Paper
C113	86270	680 MMFD	±10%	500	V. Ceramic
C114	86212	.01 MFD	±10%	400	V. Paper
C115	86318	1 MFD	±10%	200	V. Paper
C116	86207	.001 MFD	±10%	200	V Paper
C117	86268	470 MFD	±10%	500	V. Ceramic
C118	86213	.005 MFD	±10%	400	V. Paper
C119	87659	50 MFD		6	V. Lytic
C120	86243	150 MMFD	±10%	500	V. Ceramic
C121	86213	.005 MFD	±10%	400	V. Paper
C122	86313	.01 MFD	±20%	500	V. Ceramic
C123	86297	.5 MFD	±10%	200	V. Paper
C124	86303	.15 MFD	±10%	50	V. Mylar
C125	86303	.15 MFD	±10%	50	V. Mylar
C126	86303	.15 MFD	±10%	50	V. Mylar
C127	86303	.15 MFD	±10%	50	V. Mylar
C128	86303	.15 MFD	±10%	50	V. Mylar
C129	86303	.15 MFD	±10%	50	V. Mylar
C130	86212	.01 MFD		400	V. Paper
C131	87659	50 MFD		6	V. Lytic
C132	87667	90 MFD		500	V. Lytic
C133	86140	.05 MFD	+30% −10%	400	V. Paper
C134	86241	33 MFD		500	V. Ceramic
C135A		40 MFD		450	V. Lytic
C135B	87666	30 MFD		450	V. Lytic
C135C		30 MFD		450	V. Lytic
C136	86243	150 MMF		500	V. Ceramic
C137	86146	.05 MFD	+30% −10%	600	V. Paper
C138	86146	.05 MFD	+30% −10%	600	V. Paper
C139	87657	4 MFD		15	V. Lytic
C140	87657	4 MFD		15	V. Lytic
C141	87659	50 MFD		6	V. Lytic
C142	86309	1000 MMFD		500	V. Ceramic
C143	86212	.01		400	V. Paper
C144	87670	200 MFD		6	V. Lytic
C145	86140	.05 MFD		400	V. Paper
C146	86235	.05 MFD	±20%	200	V. Paper
C147	86300	.22 MFD	±20%	400	V. Paper
C148	86212	.01 MFD	±10%	400	V. Paper
C149	87659	50 MFD		6	V. Lytic
C150	86213	.005 MFD	±10%	400	V. Paper
C151	86140	.05 MFD	+30% −10%	400	V. Paper
C152	86212	.01 MFD	±10%	400	V. Paper
C153	86270	680 MMFD	±10%	500	V. Ceramic
C154	86207	.001 MFD	±10%	200	V. Paper
C155	86268	470 MMFD	±10%	500	V. Ceramic

Item	Part No.	Part Name			
C156	86213	.005 MFD	±10%	400	V. Paper
C157	87659	50 MFD		6	V. Lytic
C158	86297	.5 MFD	±10%	200	V. Paper
C159	86243	150 MMFD	±10%	500	V. Ceramic
C160	86213	.005 MFD	±10%	400	V. Paper
C161	86303	.15 MFD	±10%	50	V. Mylar
C162	86303	.15 MFD	±10%	50	V. Mylar
C163	86303	.15 MFD	±10%	50	V. Mylar
C164	86303	.15 MFD	±10%	50	V. Mylar
C165	86303	.15 MFD	±10%	50	V. Mylar
C166	86303	.15 MFD	±10%	50	V. Mylar
C167	87668	20 MFD		75	V. Lytic
C168	87669	65 MFD		40	V. Lytic
C169	86212	.01 MFD		400	V. Paper
C170	87669	65 MFD		40	V. Lytic
C171	87659	50 MFD		6	V. Lytic
C172	86140	.05 MFD	+30% −10%	400	V. Paper
C173	86241	33 MMFD		500	V. Ceramic
C174	86243	150 MMF		500	V. Ceramic
C175	86146	.05 MFD	+30% −10%	600	V. Paper
C176	86146	.05 MFD	+30% −10%	600	V. Paper
C177	86313	.01 MFD	±20%	500	V. Ceramic
C178	86313	.01 MFD	±20%	500	V. Ceramic
CR101					
CR102	309115	Selenium Diode (AVC)			
CR103	305636	Selenium Diode Bias			
F101	303087	Fuse 2A SLO BLO			
J101	12034	Input			
J102	84305	Remote Vol. Socket			
J103	84283	Mute Squelch (5 Pin)			
J104	305632	Output 941750 Contacts (5)			
	941750				
J105	84311	Test			
L101	305615	Choke			
P101	300007	Pwr. Input			
P102	305634	Plug - 9 Pin Cap 305633			
Q101-104					
	308950	2N109			
R101	82637	15K	±5%	½	Watt
R102	82637	15K	±5%	½	Watt
R103	82637	15K	±5%	½	Watt
R104	82630	6.8K	±5%	½	Watt
R105	82618	100K	±5%	½	Watt
R106	82616	220K	±5%	½	Watt
R107	82697	20K	±5%	½	Watt
R108	82640	20K	±5%	½	Watt
R109	82637	15K	±5%	½	Watt
R110	82670	2.7K	±5%	½	Watt
R111	82454	330K	±10%	½	Watt
R112	82847	68K	±5%	2	Watt
R113	82456	470K	±10%	½	Watt
R114	82698	150K	±5%	½	Watt
R115	82447	82K	±10%	½	Watt
R116	82616	220K	±5%	½	Watt
R117	82610	6.2K	±5%	½	Watt
R118	82421	560K	±10%	½	Watt
R119	82422	680K	±10%	½	Watt
R120	82635	.12K	±5%	½	Watt
R121	82640	27K	±5%	½	Watt
R122	82460	1.0 MEG	±10%	½	Watt
R123	82470	6.8 MEG	±10%	½	Watt


CHANNEL
Q101 2N109
Q102 2N109
V101 12AX7
V102 6BJ6
V103 12AX7
V107 6BJ6
V108 12AX7
V109 12AX7
Q103 2N109
Q104 2N109
NOTES
1. A.C. SIGNAL VOLTAGES ENCIRCLED WERE MEASURED WITH 1000 CPS INPUT SIGNAL TO J101 AND PIN 3, J103 GROUNDED USING A .5 MEGOHM INPUT VTVM.
2. D.C. VOLTAGES MEASURED TO GROUND USING 20,000 OHMS PER VOLT VOLTMETER AND WITH NO INPUT SIGNAL.
3. SQUELCH ACTION OF CIRCUIT CAN BE CHECKED BY USING THE FOLLOWING CIRCUIT.
ALL RESISTORS 1/2 W 10% UNLESS OTHERWISE NOTED.
4. ALL SOCKETS ARE AS VIEWED FROM SOLDERED SIDE.
SQUELCH
MUTE CHANNEL 1 S104
MUTE CHANNEL 2 S105
J103 MUTE SQUELCH
J105 TEST SOCKET
S101 TREBLE RANGE
REMOTE VOLUME
CHANNEL 2


CHANNEL
V104
12AX7
V105
6973
V106
6973
T102
REMOTE SPEAKERS
S102
BASS
INCREASE
S103
SPEAKER TEST
R140
R142
R143
C126
R145
R146
C124
C125
C127
C128
C129
R144
R148
R147P
BALANCE CONTROL
C130
R150
R153
C133
R158
C137
R163
R164
C138
R151
R156
R159
R152
C134
R160
R149
C131
C136
R157
C177
P101
T101
L101
R154
R162
V113
5U4GB
C132
R155
C135A
R161
C135B
C135C
J104
CHANNEL 1 OUTPUT 8 OHM
CHANNEL 2 OUTPUT 16 OHM
16 OHM OUTPUT
CR103
R208
C167
C168
R211
R209
R212
VOLUME CONTROL
R141P
R141R
J102
P102
NUMBERS ARE AS MARKED ON P102 (505634) AS VIEWED FROM SOLDER SIDE (PIN "1" MATES TO PIN "9")
ACTUAL RECEPTACLES NOT NUMBERED. NUMBERS INDICATED FOR REFERENCE ONLY
C170
C178
V110
12AX7
V111
6973
V112
6973
T103
REMOTE SPEAKERS
S102
BASS
INCREASE
S103
SPEAKER TEST
BALANCE CONTROL
R205
R202
R203
R204
C163
R206
R207
C161
C162
C164
C165
C166
R147R
C169
R214
R210
R213
R216
C171
R215
R218
C173
R217
C172
R220
C175
R224
R223
C176
R221
R222
C174
R219
CHANNEL 2

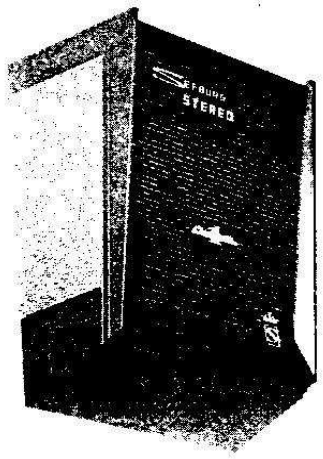
4069

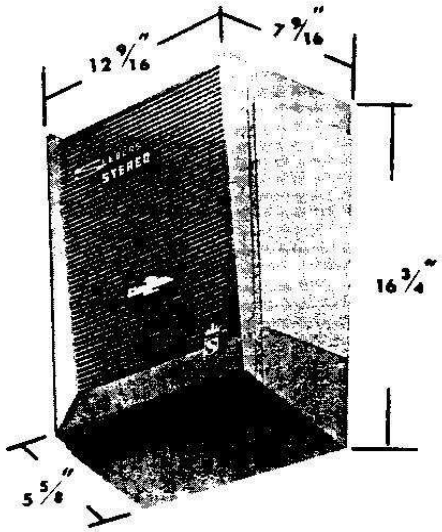
Item	Part No.	Part Name		
R124	82793	68K	± 5%	½ Watt
R125	82630	6.8K	± 5%	½ Watt
R126	82470	6.8 MEG	±10%	½ Watt
R127	82449	120K	±10%	½ Watt
R128	82506	22 MEG	±10%	½ Watt
R129	82666	100K	± 5%	½ Watt
R130	82891	Pec. 6 Resistors		
R131	82798	360	± 5%	½ Watt
R132	82425	1.2K	±10%	½ Watt
R133	82695	56K	± 5%	½ Watt
R134	82691	200K	± 5%	½ Watt
R135	82890	Pec. 5 Resistors		
R136	82464	2.2 MEG	±10%	½ Watt
R137	82421	560	±10%	½ Watt
R138	82446	68K	±10%	½ Watt
R139	82418	330	±10%	½ Watt
R140	82425	1.2K	±10%	½ Watt
R141	305624	Dual Volume Control		
R142	82426	7.5K	±10%	½ Watt
R143	82631	1.5K	± 5%	½ Watt
R144	82425	1.2K	±10%	½ Watt
R145	82424	1.0K	±10%	½ Watt
R146	82430	3.3K	±10%	½ Watt
R147	305623	Dual Balance Pot.		
R148	82437	12K	±10%	½ Watt
R149	82456	470K	±10%	½ Watt
R150	82440	22K	±10%	½ Watt
R151	82659	330	± 5%	½ Watt
R152	82433	5.6K	±10%	½ Watt
R153	82667	470K	± 5%	½ Watt
R154	81198	3000	±10%	10 Watt
R155	81199	25K	±10%	10 Watt
R156	82457	560K	±10%	½ Watt
R157	82629	5.6K	± 5%	½ Watt
R158	82789	390K	± 5%	½ Watt
R159	82433	5.6K	±10%	½ Watt
R160	82789	390K	± 5%	½ Watt
R161	82701	2.7K	±10%	1 Watt
R162	82439	18K	±10%	½ Watt
R163	82667	470K	± 5%	½ Watt
R164	82667	470K	± 5%	½ Watt
R165	82637	15K	± 5%	½ Watt
R166	82637	15K	± 5%	½ Watt
R167	82637	15K	± 5%	½ Watt
R168	82630	6.8K	± 5%	½ Watt
R169	82618	100	± 5%	½ Watt
R170	82616	220K	± 5%	½ Watt
R171	82697	20K	± 5%	½ Watt
R172	82640	27K	± 5%	½ Watt
R173	82637	15K	± 5%	½ Watt
R174	82670	2.7K	± 5%	½ Watt
R175	82847	68K	± 5%	2 Watt
R176	82456	470K	±10%	½ Watt
R177	82616	220K	± 5%	½ Watt
R178	82698	150K	± 5%	½ Watt
R179	82610	6.2K	± 5%	½ Watt
R180	82421	560	±10%	½ Watt
R181	82422	680	±10%	½ Watt
R182	82635	12K	± 5%	½ Watt
R183	82640	27K	± 5%	½ Watt
R184	82460	1 MEG	±10%	½ Watt
R185	82470	6.8 MEG	±10%	½ Watt
R186	82793	68K	± 5%	½ Watt

Item	Part No.	Part Name		
R187	82630	6.8K	± 5%	½ Watt
R188	82470	6.8 MEG	±10%	½ Watt
R189	82506	22 MEG	±10%	½ Watt
R190	82449	120K	±10%	½ Watt
R191	82666	100K	± 5%	½ Watt
R192	82891	Pec. 6 Resistors		
R193	82798	360	± 5%	½ Watt
R194	82425	1.2K	±10%	½ Watt
R195	82695	56K	± 5%	½ Watt
R196	82691	200K	± 5%	½ Watt
R197	82890	Pec. 5 Resistors		
R198	82418	330	±10%	½ Watt
R199	82464	2.2 MEG	±10%	½ Watt
R200	82421	560	±10%	½ Watt
R201	82446	68K	±10%	½ Watt
R202	82425	1.2K	±10%	½ Watt
R203	82426	7.5K	± 5%	½ Watt
R204	82631	1.5K	± 5%	½ Watt
R205	82425	1.2K	±10%	½ Watt
R206	82424	1.0K	±10%	½ Watt
R207	82430	3.3K	±10%	½ Watt
R208	82408	47	±10%	½ Watt
R209	82631	7.5K	± 5%	½ Watt
R210	82437	12K	±10%	½ Watt
R211	82444	47K	±10%	½ Watt
R212	82431	3.9K	±10%	½ Watt
R213	82456	470K	±10%	½ Watt
R214	82440	22K	±10%	½ Watt
R215	82659	330	± 5%	½ Watt
R216	82433	5.6K	±10%	½ Watt
R217	82667	470K	± 5%	½ Watt
R218	82457	560K	±10%	½ Watt
R219	82629	5.6K	± 5%	½ Watt
R220	82789	390K	± 5%	½ Watt
R221	82433	5.6K	±10%	½ Watt
R222	82789	390K	± 5%	½ Watt
R223	82667	470K	± 5%	½ Watt
R224	82667	470K	± 5%	½ Watt
R225	305674	1500 Tap Resistor		
S101	305621	Treble Switch 4P6T		
S102	305622	Bass Switch 4P4T		
S103	305625	Speaker Switch 2P5T		
S104	305635	Mute Left Switch		
S105	305635	Mute Right Switch		
T101	305619	Power Transformer		
T102	305617	Audio Output		
T103	305618	Audio Output		
TB101-102				
	602815	Terminal Board		
V101, V103				
	308120	12AX7		
V102	308603	6BJ6		
V104	308120	12AX7		
V105 - 106				
	308026	6973		
V107	308603	6BJ6		
V108 - 109				
	308120	12AX7		
V110	308120	12AX7		
V111 - 112				
	308026	6973		
V113	308506	5U4GB		

SEEBURG

SEEBURG TWIN STEREOPHONIC SPEAKERS
Type TW1-8C1, TW1-8C2, TC1-8C1 and TC1-8C2





SPECIFICATIONS

Size	8 inch.
Type	Constant Voltage, 70-Volt line
Power Rating	16 watts (each) (Taps at 16, 8, 4 and 1 watts)
Net Weight	17 Pounds (2 speakers)
Shipping Weight	22 Pounds (2 speakers)

The Seeburg Twin Stereophonic Speakers are specifically designed to be used in pairs. Each speaker carries its own channel indentification. The TW1-8C1 and TW1-8C2 speakers illustrated above are intended for wall installation. The TC1-8C1 and TC1-8C2 are for corner mounting. The wall type TW1-8C1 and TW1-8C2 may be converted for corner mounting with the Type "CA1" Corner Adapter.

INSTALLATION

Locate the speaker mounting holes as shown *in Figure 3.* Use a plumb line or level to insure vertical alignment. Allow a minimum of 2" beyond the 1 7/8" dimension to provide ceiling clearance. Screw in the No. 8 wood screws (provided) allowing about 1/2 inch clearance between the heads and the wall. Place the cabinet into position and, allowing the screw heads to enter the slots in the back, move the cabinet downward until the screw shanks are wedged in the slots.

Connection to the speaker is made at the terminal board located at the top of the cabinet. The 70-volt CV line output terminals of the amplifier are connected by means of suitable speaker cable. To select the desired power output, move the SPEAKER WATTS link to the proper terminal. Refer to the Stereo Phonograph Installation Manual for placement and connections of complete speaker system.

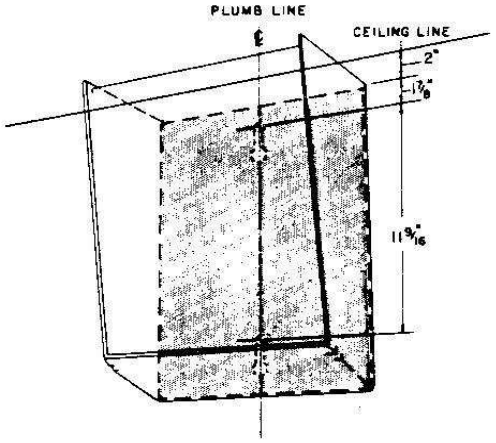
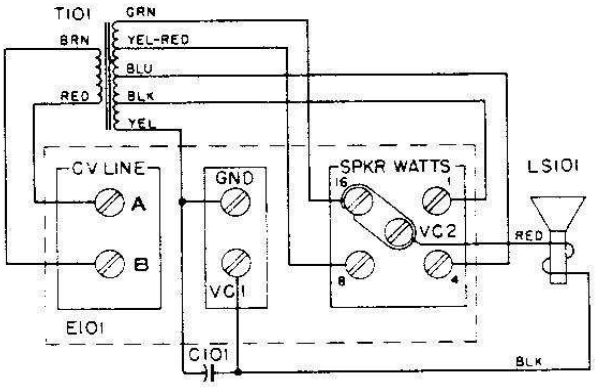


Figure 3. Speaker Mounting



PARTS LIST

Part No.	Part Name
502830	SPEAKER HOUSING
502848	TRANSFORMER (T101)
502850	TERMINAL PANEL (E101)
87671	CONDENSER (C101)
502842	8 INCH SPEAKER
502851	SPEAKER HOUSING BACK

7051

SEEBURG

CORNER ADAPTER, Type "CA1"

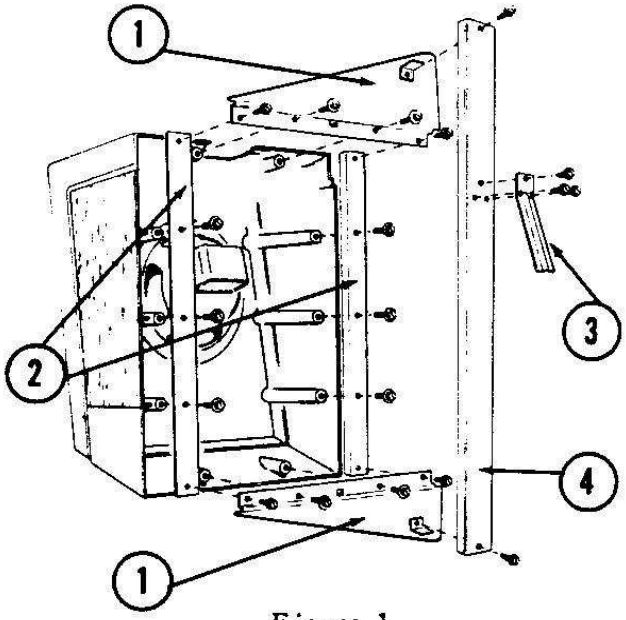


Figure 1

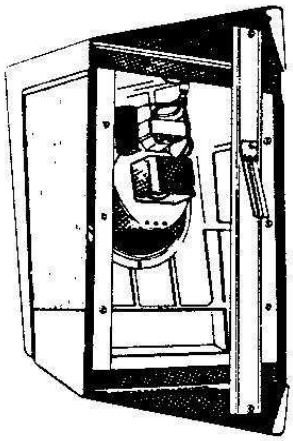


Figure 2

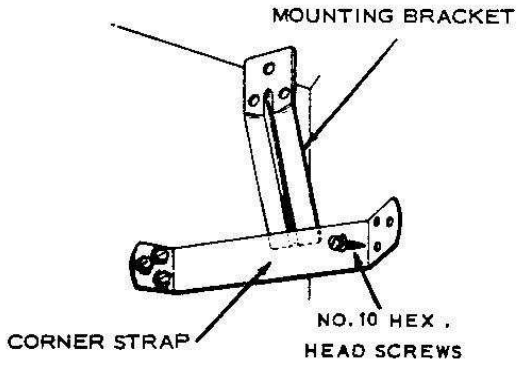


Figure 3

PARTS LIST

Item No.	Part No.	Description
1	502874	End Plate Assembly
2	502872	Side Rail
3	502726	Mounting Bracket
4	502877	Channel
-	502718	Corner Strap
-	502880	Mounting Screw Kit
-	960980	8-32 X1/4 Slotted Indent. Hex Washer H. Self Tap. Screw

The Seeburg Corner Adapter, Part No. 502881 is to be used in converting the TW1 series Seeburg Twin Stereo Speakers so they are the same as type TC1-8C1 and TC1-8C2 for corner mounting.

The adapter is shipped disassembled as a package of 2 each and must be put together as shown in *Figure 1.*

The speaker housing back is then removed and the corner adapter screwed in its place *(Figure 2).*

Attach the mounting strap to the wall with the No. 10 self tapping screws (two different lengths are provided). A minimum of 11 inches should be allowed between the ceiling and the top of the mounting strap to insure sufficient clearance so that the cabinet may be lifted high enough for the cabinet hanger to clear the mounting strap *(Figure 3).*

SEEBURG

REMOTE STEREO VOLUME CONTROL, Type RSVC-1

The Remote Stereo Volume Control, Type RSVC-1 is an accessory which may be used with the Seeburg Stereophonic Select-O-Matic phonograph to remotely control the volume of both channels and to cancel selections. Although equipped with 60 feet of cable, as much as 100 feet may be used with no appreciable loss in frequency response.

INSTALLATION INSTRUCTIONS

1. Determine location for the Remote Volume Control and Control and best routing for the cable, keeping in mind appearance and possibility of physical damage to the cable as well as convenience of control.

2. Open the back door of the phonograph. Replace the 9-prong local volume control plug in the amplifier with the 9-prong plug on the cable of the remote volume control.

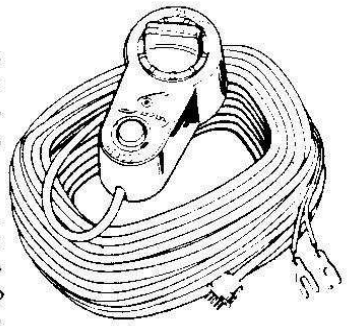
3. Connect the two spade lugs of the cable to the number 2 and 3 terminals, respectively, of the remote record cancel terminal strip on the Tormat Selection Unit. If it is desirable to deactivate the phonograph cancel button, open the jumper between terminals 1 and 2.

4. Arrange the cable from the plug so it feeds through the cable clamp and passes through the notch in bottom rear of the cabinet.

5. Fasten the cable to the wall of the cabinet with one of the clamps, allowing enough slack cable in the cabinet to avoid strain on the cable or plugs.

6. Lay the cable from the cabinet to the Remote Volume Control, passing the cable loosely over pipes and through necessary holes in walls and floors.

7. If the control box is to be permanently attached, remove the bottom plate by unscrewing the center bolt, and fastening with No. 8 wood screws. Then remount control box to the plate.

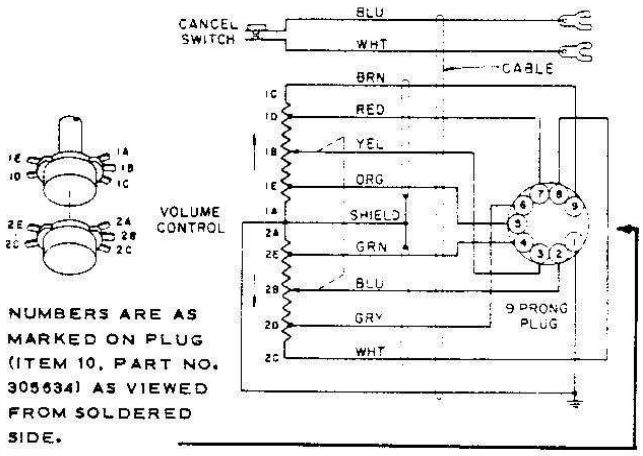


If portable usage is desired, press the three rubber feet supplied into the holes in the bottom plate.

8. Fasten the cable securely, starting at the control with a clamp adjacent to the control box. Take up excess cable as it is fastened.

9. When the cable is installed, excess cable can be coiled or folded in the cabinet. Leave enough slack to permit moving the phonograph from the wall for maintenance and cleaning.

10. If it is necessary to disconnect the Control to pass the cable through holes in walls or floors, prepare it as shown in Figure A and reconnect it according to the diagram. Solder all connections. *Do not use acid core solder or acid solder flux.*



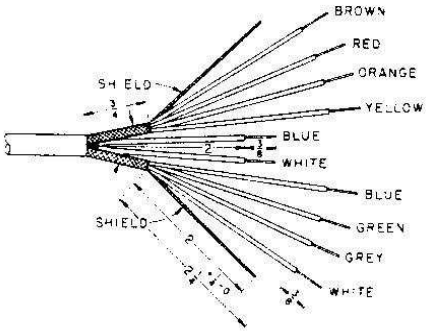
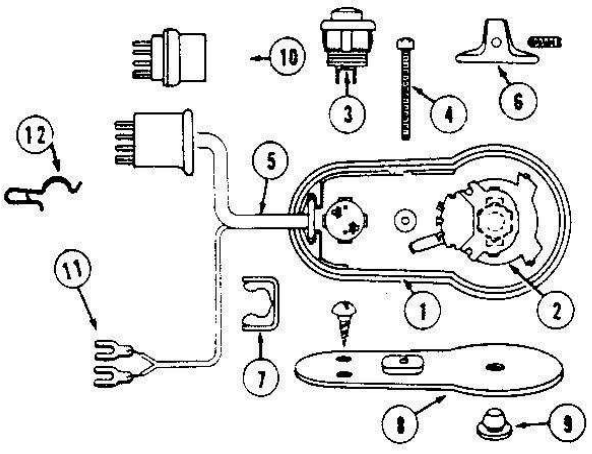


Figure A.



PARTS LIST

Item	Part No.	Part Name
1	503999	Control Box Assembly
	503884	Control Box
2	503990	Volume Control
	941722	Solder Lug
	925712	Lock Washer
	904801	Nut
3	503885	Selection Cancel Button
4	913675	6-32 x 1-3/16 Ph.H.M.S.
5	503993	Cable Assembly
6	503988	Knob
	918580	Set Screw
7	503991	Strain Relief
8	503995	Bottom Plate Assembly
	402098	Cable Clamp (10)
	971170	No. 8x5/8 R.H. Wood Screws (13)
9	503183	Rubber Feet (3)
	503994	Cable Only
10	305634	9-Prong Plug (Replaceable)
11	940490	Spade Lug
12	409974	Cable Clamp

SEEBURG

TORMAT SELECTOR UNITS, TYPES TSU1, TSU2, TSU3, TSU4 & TSU5

The Tormat Selector Units, Types TSU1, TSU2, TSU3, TSU4 and TSU5 are the power distribution center and junction for control circuits of Select-O-Matic phonographs. The Type TSU1, TSU3 or TSU5 is used with conventional phonographs having Electrical Selector only or Electrical Selector in combination with remote control. The Type TSU2 or TSU4 is used with the R.C. Special (Hideaway) Model where no Electrical Selector is used and differs from the TSU1, TSU3 and TSU5 in the primary power distribution as shown in the diagrams. The TSU1 and TSU2 are equipped with a three-screw terminal strip for connecting the remote record cancel circuits associated with remote volume control of the phonographs. In the TSU3, TSU4 and TSU5, this three-screw terminal strip is replaced with a four-screw strip that provides for connecting the remote cancel circuits and for a DC power take-off for operation of a motor-driven volume control.

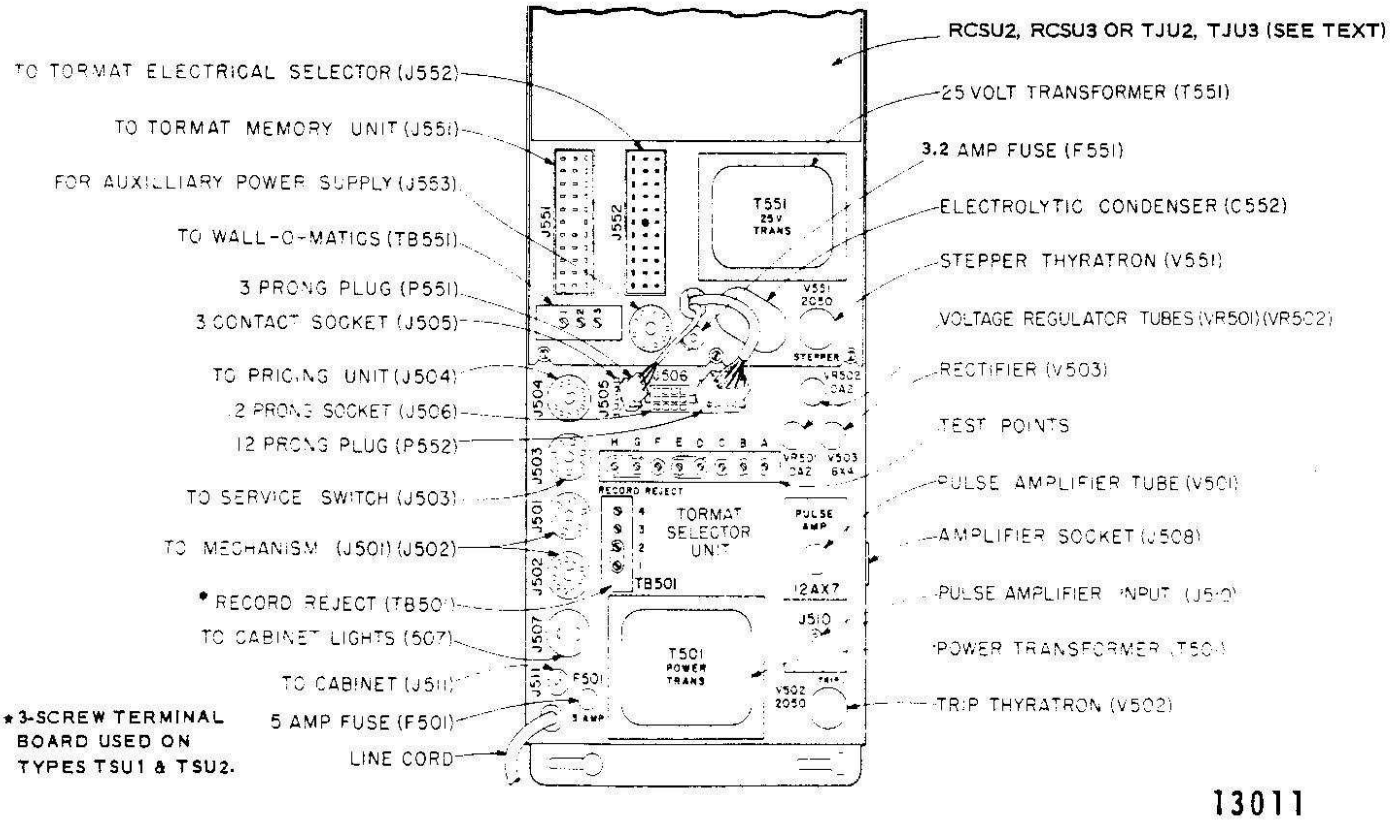
Power is supplied to the Unit through a line cord and main switch and is distributed at line voltage or from the secondaries of a transformer to the electrical units of the complete phonograph. All connections between the Tormat Selector Units and other units within the phonograph cabinet are made with plugs that are keyed by shape or number of contacts so they cannot be incorrectly connected. Units external to the phonograph cabinet are connected to the Unit by means of screw-type terminal strips.

A Tormat Junction Unit, Type TJU2 or TJU3, or a Remote Control Stepper Unit, Type RCSU2 or RCSU3, is used with the Tormat Selector Unit. The Tormat Junction Unit is used when the Selector Unit is in a phonograph that is to be operated only from an Electrical Selector and without provision for remote control operation. It includes sockets for connection of the Electrical Selector and the Tormat Memory Unit of the phonograph selection system and some of the selection system test points.

The Type TJU2 has a terminal strip with a movable link that is positioned as required to permit use of single (SPU) or dual (DPU) pricing units in the phonograph. The Type TJU3 is permanently wired for the "DPU" connection and can be used only with the Universal Pricing Unit, the dual pricing units or the Type CAU1 credit accumulator.

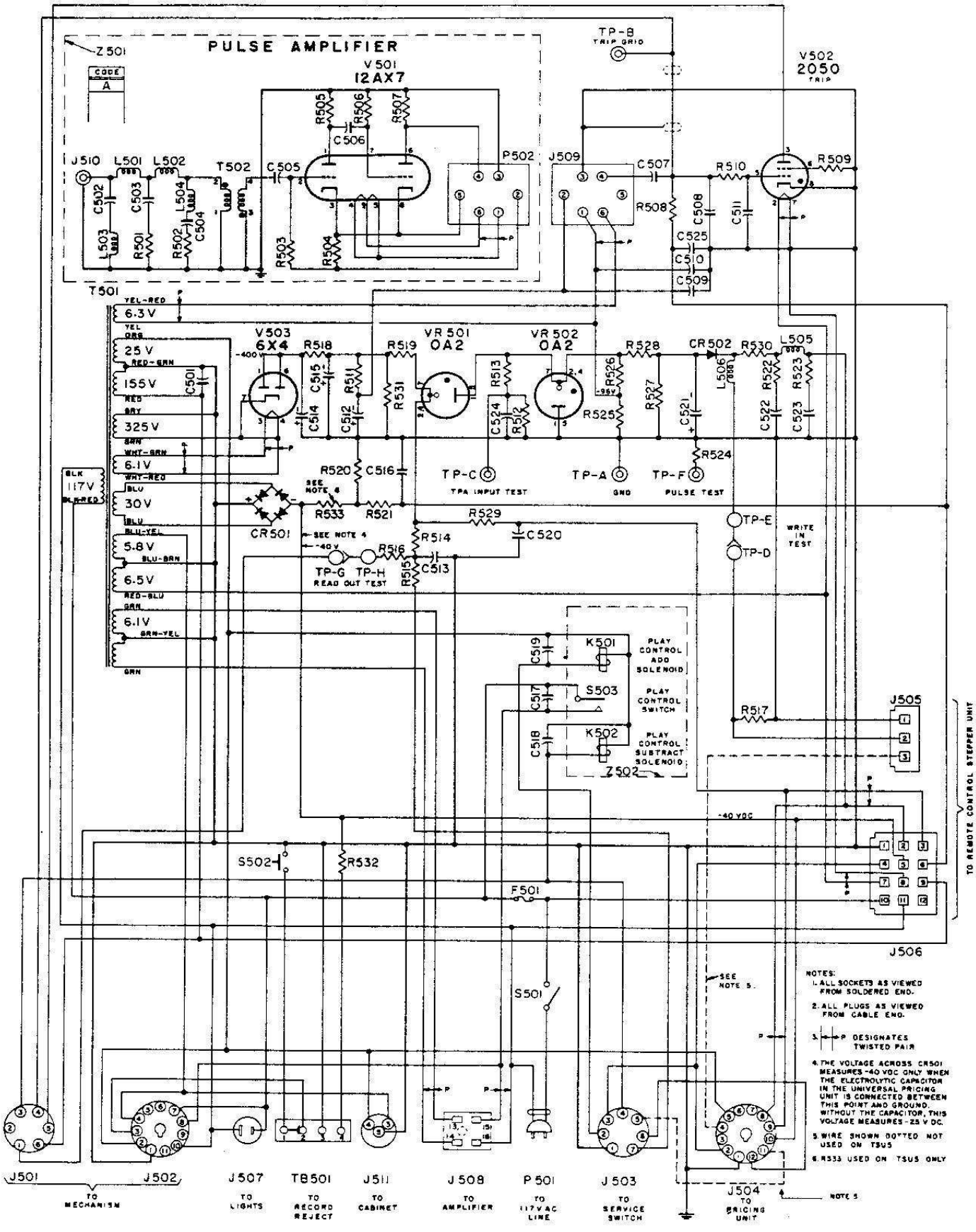
The Type RCSU2 is similarly equipped with a movable connection for SPU or DPU use and, like the TJU3, the RCSU3 is permanently wired for the "DPU" connection.

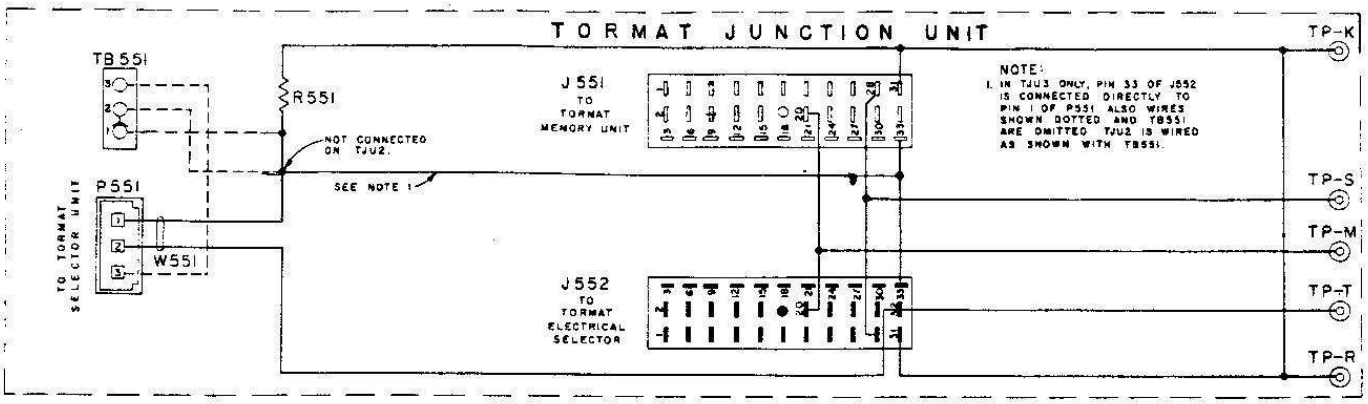
The Remote Control Stepper Unit is used with the TSU1, TSU2, TSU3, TSU4 or TSU5, whenever Electrical Selector and/or remote control operation is employed. It includes the connections, test points and pricing unit connections associated with the Tormat Junction Unit and, additionally, the steppers, Wall-O-Matic power supply and stepper control circuits necessary for full remote control selection. The Junction Unit or the Stepper Unit is mounted on the Selector Unit chassis with screws and all interconnections are made with plugs. A three-prong plug is used with the Junction Unit. The Stepper Unit has a 3-prong and a 12-prong plug for connections.

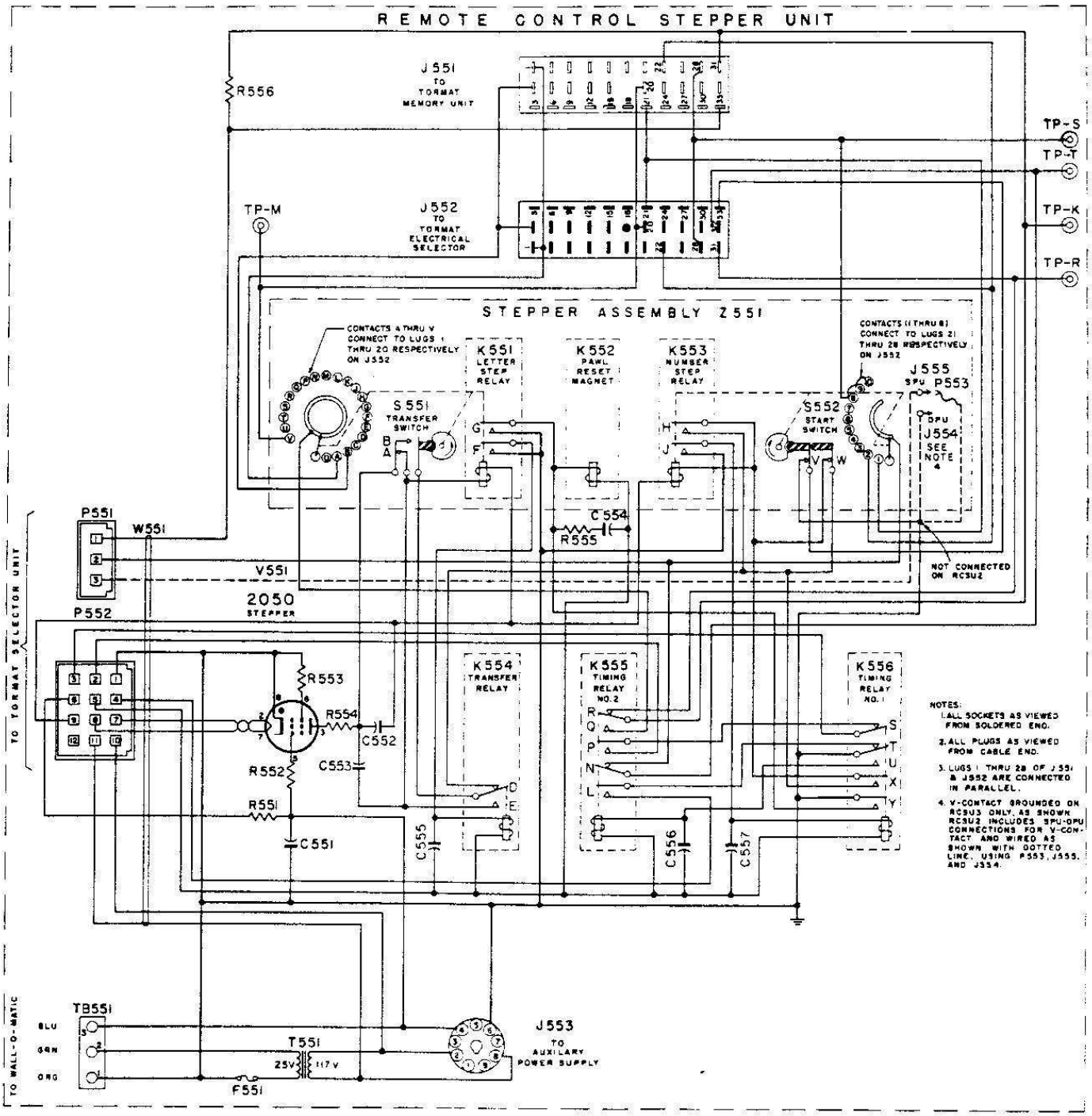


★3-SCREW TERMINAL BOARD USED ON TYPES TSU1 & TSU2.

13011

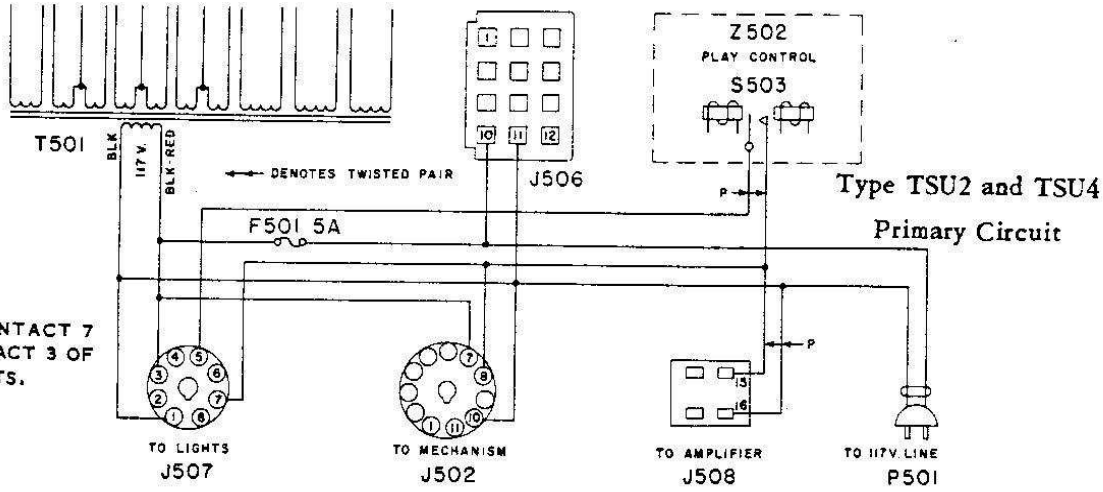

PULSE AMPLIFIER
Z501
CODE A
V501 12AX7
V502 2050 TRIP
TP-8 TRIP GRID
P502
J509
J510
L501
L502
T502
C505
C506
C507
R505
R506
R507
R508
R509
R510
C508
C509
C510
C511
C525
T501
YEL-RED 6.3V
YEL
ORG 25 V
RED-GRN 155V
RED
GRY 325V
GRN
WHT-GRN 6.1V
WHT-RED
BLU 30V
BLU
BLU-YEL 5.8V
BLU-BRN 6.5V
RED-BLU
GRN 6.1V
GRN-YEL
GRN
BLK 117V BLK-RED
V503 6X4
VR501 0A2
VR502 0A2
CR501
CR502
L505
L506
R511
R512
R513
R514
R515
R516
R517
R518
R519
R520
R521
R522
R523
R524
R525
R526
R527
R528
R529
R530
R531
R532
R533
C501
C512
C513
C514
C515
C516
C517
C518
C519
C520
C521
C522
C523
C524
TP-C TPA INPUT TEST
TP-A GND
TP-F PULSE TEST
TP-E
TP-D
WRITE IN TEST
TP-G TP-H READ OUT TEST
SEE NOTE 4
-40 V
K501 PLAY CONTROL ADD SOLENOID
S503 PLAY CONTROL SWITCH
K502 PLAY CONTROL SUBTRACT SOLENOID
Z502
J505
J506
TO REMOTE CONTROL STEPPER UNIT
-40 VDC
S502
F501
S501
SEE NOTE 5
NOTES:
1. ALL SOCKETS AS VIEWED FROM SOLDERED END.
2. ALL PLUGS AS VIEWED FROM CABLE END.
3. P DESIGNATES TWISTED PAIR
4. THE VOLTAGE ACROSS CR501 MEASURES -40 VDC ONLY WHEN THE ELECTROLYTIC CAPACITOR IN THE UNIVERSAL PRICING UNIT IS CONNECTED BETWEEN THIS POINT AND GROUND. WITHOUT THE CAPACITOR, THIS VOLTAGE MEASURES -25 V DC.
5. WIRE SHOWN DOTTED NOT USED ON TSU5
6. R533 USED ON TSU5 ONLY
J501 TO MECHANISM
J502
J507 TO LIGHTS
TB501 TO RECORD REJECT
J511 TO CABINET
J508 TO AMPLIFIER
P501 TO 117 V AC LINE
J503 TO SERVICE SWITCH
J504 TO PRICING UNIT
NOTE 5


TORMAT JUNCTION UNIT
TB551
R551
P551
W551
TO TORMAT SELECTOR UNIT
NOT CONNECTED ON TJU2.
SEE NOTE 1
J551 TO TORMAT MEMORY UNIT
J552 TO TORMAT ELECTRICAL SELECTOR
NOTE:
1. IN TJU3 ONLY, PIN 33 OF J552 IS CONNECTED DIRECTLY TO PIN 1 OF P551. ALSO WIRES SHOWN DOTTED AND TB551 ARE OMITTED. TJU2 IS WIRED AS SHOWN WITH TB551.
TP-K
TP-S
TP-M
TP-T
TP-R


REMOTE CONTROL STEPPER UNIT
R556
J551 TO TORMAT MEMORY UNIT
J552 TO TORMAT ELECTRICAL SELECTOR
TP-M
TP-S
TP-T
TP-K
TP-R
STEPPER ASSEMBLY Z551
CONTACTS A THRU V CONNECT TO LUGS 1 THRU 20 RESPECTIVELY ON J552
CONTACTS 1 THRU 8 CONNECT TO LUGS 21 THRU 28 RESPECTIVELY ON J552
K551 LETTER STEP RELAY
K552 PAWL RESET MAGNET
K553 NUMBER STEP RELAY
S551 TRANSFER SWITCH
S552 START SWITCH
J555 SPU P553
OPU J554 SEE NOTE 4
C554
R555
NOT CONNECTED ON RCSU2
P551
W551
V551
2050 STEPPER
P552
TO TORMAT SELECTOR UNIT
R553
R554
C552
R552
C553
R551
C551
K554 TRANSFER RELAY
K555 TIMING RELAY NO. 2
K556 TIMING RELAY NO. 1
C555
C556
C557
NOTES:
1. ALL SOCKETS AS VIEWED FROM SOLDERED END.
2. ALL PLUGS AS VIEWED FROM CABLE END.
3. LUGS 1 THRU 28 OF J551 & J552 ARE CONNECTED IN PARALLEL.
4. V-CONTACT GROUNDED ON RCSU3 ONLY. AS SHOWN RCSU2 INCLUDES SPU-OPU CONNECTIONS FOR V-CONTACT AND WIRED AS SHOWN WITH DOTTED LINE, USING P553, J555, AND J554.
TB551
BLU
GRN
ORG
T551
25V
117 V
F551
J553 TO AUXILARY POWER SUPPLY
TO WALL-O-MATIC

13013

TORMAT SELECTOR UNITS, Types TSU1, TSU2, TSU3, TSU4 & TSU5



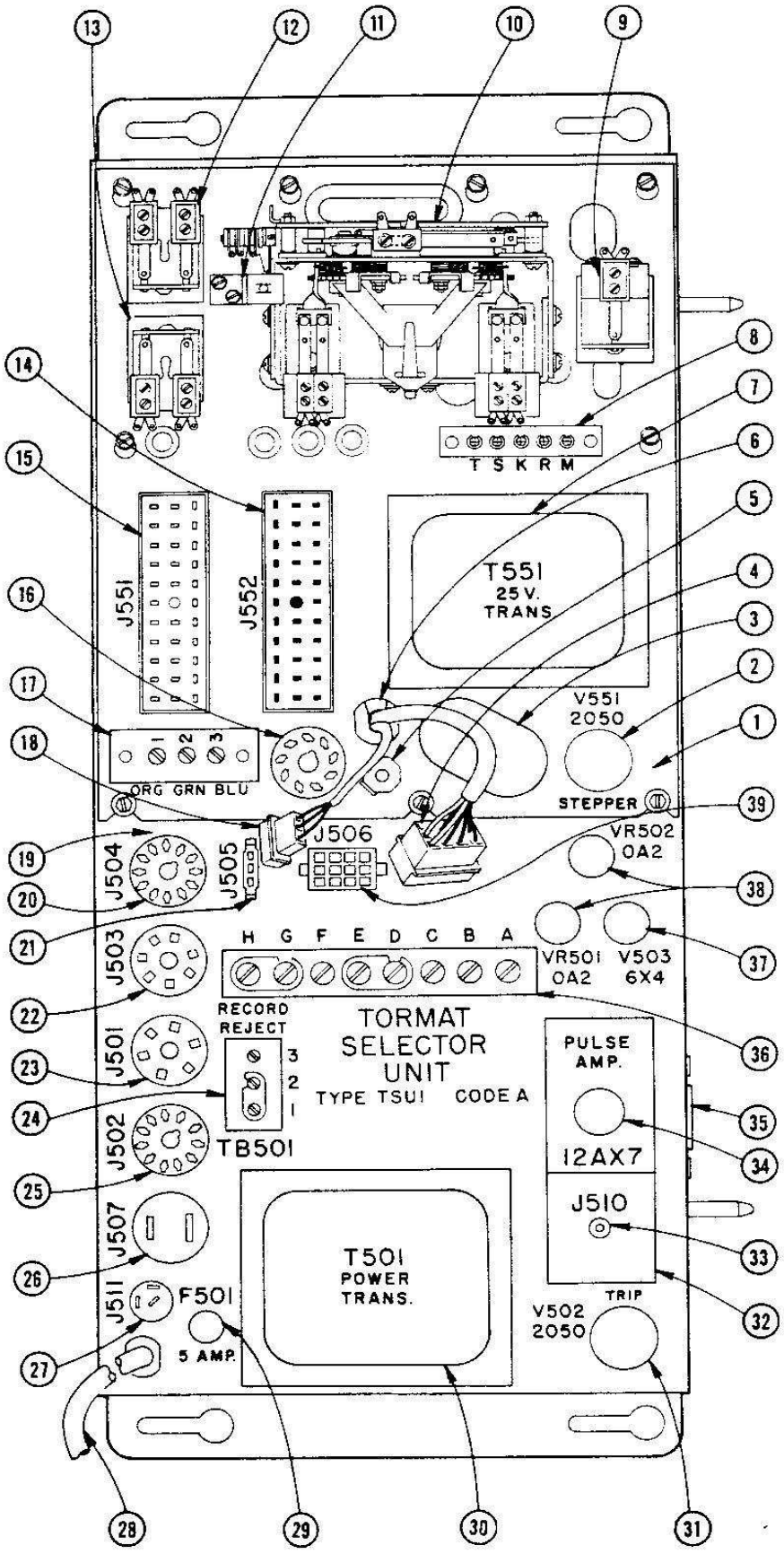
Type TSU2 and TSU4
Primary Circuit

NOTE:
JUMPER FROM CONTACT 7 OF J502 TO CONTACT 3 OF CODE A TSU2 UNITS.

Parts List (for Pages 13012 and 13013)

Item	Part No.	Description
C501	86154	0.02 Mfd 600 V. Paper
C502	86253	360 Mmf ±10% 500 V. Ceramic
C503	86252	1200 Mmf ±10% 500 V. Ceramic
C504	86253	360 Mmf ±10% 500 V. Ceramic
C505	86251	3000 Mmf 500 V. Ceramic
C506	86030	0.05 Mfd ±10% 400 V. Paper
C507	86248	0.15 Mfd ±10% 200 V. Paper
C508	86235	0.05 Mfd 200 V. Paper
C509	86251	3000 Mmf 500 V. Ceramic
C510	86313	0.01 Mfd 500 V. Ceramic
C511	86255	2000 Mmf 500 V. Ceramic
C512	87637	10 Mfd 450 V. Lytic
C513	86296	0.15 Mfd ±10% 600 V. Paper
C514	87635	15 Mfd 450 V. Lytic
C515	87635	15 Mfd 450 V. Lytic
C516	87571	25 Mfd 50 V. Lytic
C517	86317	0.01 Mfd 1400 V. Ceramic
C518	86313	0.01 Mfd 500 V. Ceramic
C519	86313	0.01 Mfd 500 V. Ceramic
C520	86295	0.068 Mfd ±10% 600 V. Paper
C521	87636	10 Mfd 150 V. Lytic
C522	86313	0.01 Mfd 500 V. Ceramic
C523	86313	0.01 Mfd 500 V. Ceramic
C524	86252	1200 Mmf ±10% 500 V. Ceramic
C525	86251	3000 Mmf 500 V. Ceramic
C551	86235	0.05 Mfd 200 V. Paper
C552	86320	5 Mfd 300 V. Paper
C553	86250	5000 Mmfd 1000 V. Ceramic
C554	87611	300 Mfd 50 V. Lytic
C555	86235	0.05 Mfd 200 V. Paper
C556	86235	0.05 Mfd 200 V. Paper
C557	86235	0.05 Mfd 200 V. Paper
CR501	400587	Selenium Rectifier
CR502	309385	Silicon Rectifier
	303696	Alternate: IN368 Germanium Diode
F501	602411	5 Amp Fuse Type MTH
F551 ■	303713	3.2 Amp. Fuse Type GMQ 3-2/10
J501	84223	6 Prong Socket
J502	84318	11 Prong Socket
J503	84282	7 Prong Socket
J504	201275	12 Prong Socket
J505	307154	3 Contact Socket
J506	307147	12 Contact Socket
J507 ▲	11401	2 Prong Socket A.C.
J508	301020	4 Prong Socket
J509	301034	6 Prong Socket (Small)
J510	300152	Single Prong Socket
J511	303555	3 Prong Miniature Socket
J551	303528	33 Prong Socket
J552	303529	33 Prong Plug
J553	84244	9 Prong Socket
J554	●940311	Taper Tab Lug
J555	●940311	Taper Tab Lug
K501	303739	Play Control Add Solenoid
K502	303743	Play Control Subt. Solenoid
K551	303941	Letter Step Relay
K552	303944	Pawl Reset Magnet
K553	303940	Number Step Relay
K554	303074	Transfer Relay
K555	303764	Timing Relay No. 2
K556	303762	Timing Relay No. 1
L501	303602	16μh Choke ±5%
L502	303602	16μh Choke ±5%
L503	303600	11μh Choke ±5%
L504	303600	11μh Choke ±5%
L505	303603	130μh Choke ±5%
L506	303702	100μh Choke ±5%
P501	307152	Line Cord & Plug Assem.
P502	303599	6 Prong Plug
P551	307049	3 Contact Plug
P552	307048	12 Contact Plug
P553	●246933	Taper Tab Receptacle
R501	82409	56 Ohms ±10% ½W.
R502	82409	56 Ohms ±10% ½W.
R503	82444	47,000 Ohms ±10% ½W.
R504	82610	6,200 Ohms ±5% ½W.
R505	82456	470,000 Ohms ±10% ½W.
R506	82469	5.6 Megohm ±10% ½W.
R507	82640	27,000 Ohms ±5% ½W.
R508	82460	1.0 Megohm ±10% ½W.
R509	82440	22,000 Ohms ±10% ½W.
R510	82456	470,000 Ohms ±10% ½ W.
R511	82695	56,000 Ohms ±5% ½W.
R512	82449	120,000 Ohms ±10% ½W.
R513	82464	2.2 Megohm ±10% ½ W.
R514	82837	56,000 Ohms ±10% 2W.
R515	82432	4,700 Ohms ±10% ½W.
R516	82993	36 Ohms ±5% ½W.
R517	82439	18,000 Ohms ±10% ½W.
R518	81194	3,300 Ohm Fuse Resistor ±10% 5W.
R519	82836	2,700 Ohms ±10% ½W.
R520	82432	4,700 Ohms ±10% ½W.
R520 ‡	82430	3,300 Ohms ±10% ½W.
R521	82456	470,000 Ohms ±10% ½W.
R522	82617	47 Ohms ±5% ½W.
R523	82617	47 Ohms ±5% ½W.
R524	82437	12,000 Ohms ±10% ½W.
R525	82454	330,000 Ohms ±10% ½W.
R526	82451	180,000 Ohms ±10% ½W.
R527	82698	150,000 Ohms ±5% ½W.
R528	82611	3,000 Ohms ±5% ½W.
R529	82998	270,000 Ohms ±10% 1W.
R530	82617	47 Ohms ±5% ½W.
R531	82460	1 Meg. ±10% ½W.
R532	81217	120 Ohms ±10% 10 W.
R532	‡81201	250 Ohms ±10% 5 W.
R533	‡82427	1800 Ohms ±10% ½W.
R551	●● 82439	18,000 Ohms ±10% ½W.
R551	●† 82448	100,000 Ohms ±10% ½W.
R552	82436	10,000 Ohms ±10% ½W.
R553	82440	22,000 Ohms ±10% ½W.
R554	82838	100 Ohms ±10% 2 W.
R555	82403	18 Ohms ±10% ½W.
R556	82439	18,000 Ohms ±10% ½W.
S501	303112	Toggle Switch, S.P.S.T.
S502	410486	Reject Switch
S503	303749	Play Control Switch
S551	303547	Transfer Switch
S552	303794	Start Switch
T501	307150	Power Transformer
T502	303457	Pulse Transformer
T551	307074	25 V. Transformer
TB501	●● 305447	3-Screw Terminal Board
TB501	††307326	4- Screw Terminal Board
TB551	*307105	3-LugBinding Post Assembly
TB551	†305309	3-Screw Terminal Board
V501	308120	12AX7 Vacuum Tube
V502	308003	2050 Thyratron
V503	308626	6 x 4 Vacuum Tube
V551	308003	2050 Thyratron
VR501	308005	OA2 Voltage Regulator Tube
VR502	308005	OA2 Voltage Regulator Tube
W551	●307047	Cable Assembly
W551	*307104	Cable Assembly
W551	†307127	Cable Assembly
W551	●307146	Cable Assembly
Z501	303590	Pulse Amplifier Unit
Z502	303720	Play Control Assembly
Z551	●303765	Stepper Assembly
Z551	†307029	Stepper Assembly

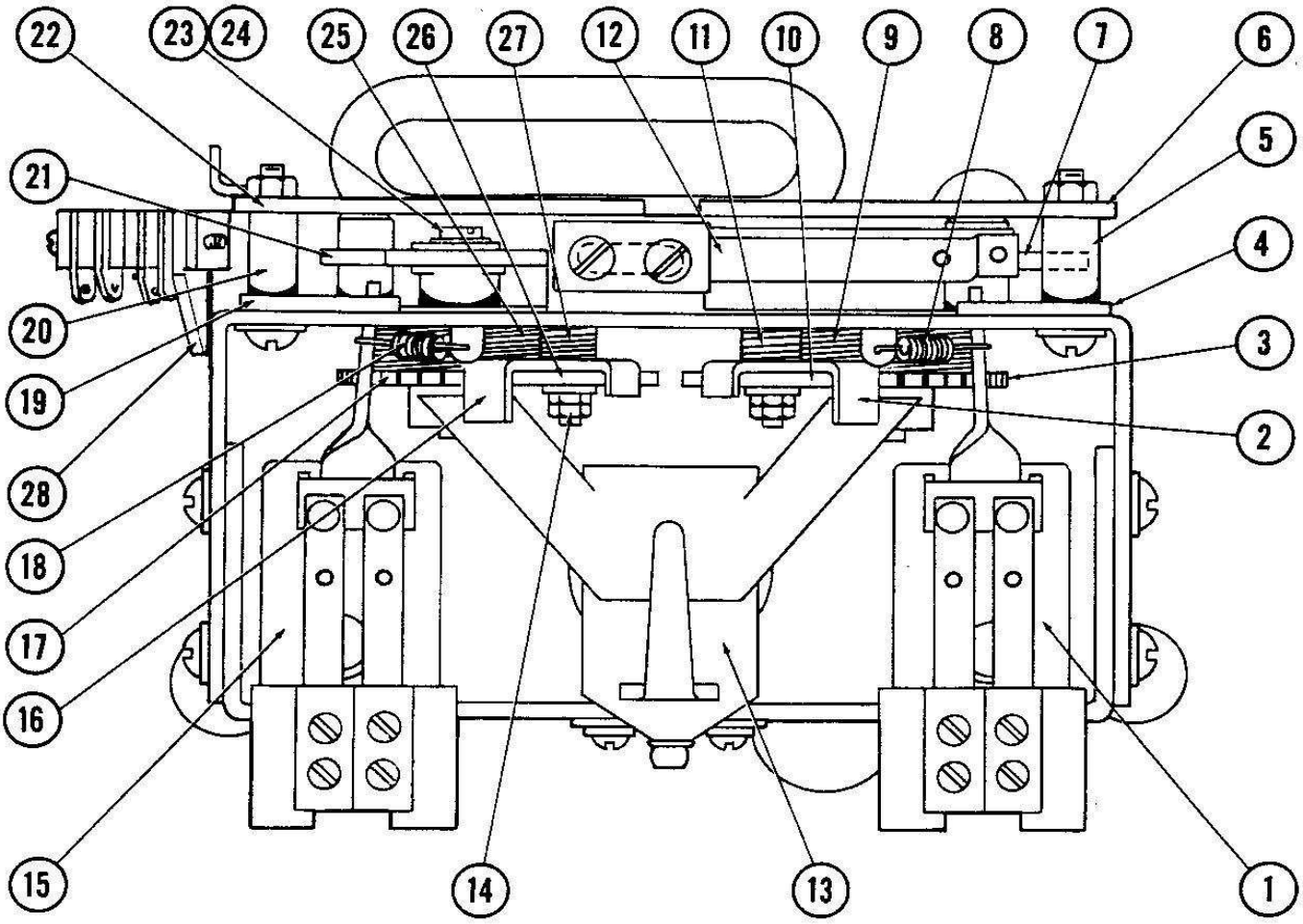
▲ PART NO. 84306 - 8 PRONG SOCKET USED ON TYPE TSU2 & TSU4
■ PART NO. 303697 - USED ON RCSU2 CODE A
* USED ON TJU2
● USED ON TJU3
● USED ON RCSU2
† USED ON RCSU3
●● USED ON TSU1 & TSU2
†† USED ON TSU3 & TSU4
‡ USED ON TSU5



PARTS LIST

Item	Part No.	Part Name
1	307030	Type "RCSU2" Remote Control Stepper Unit
2	308003	Type 2050 Tube
	84292	8 Prong Socket
3	86320	5 MFD Paper Cond.,300V., 10%
	901100	6-32 Hex Nut
	925321	1106 Lockwasher
4	307048	12 Contact Plug
5	303697	3.2 Amp. Fuse
	303692	Fuse Holder
6	602828	Strain Relief Bushing
7	307074	25 Volt Transformer
	925421	1108 Lockwasher, Steel-Cad.
	901660	8-32 Hex Nut
8	307046	5 Lug Terminal Board
9	303074	Transfer Relay
	914425	Sems
10	303765	Stepper Assembly
	10848	Cup Washer
	988290	Rubber Grommet
	925321	Lockwasher
	901100	6-32 Hex Nut
11	303386	Cover Support Brkt. Assy.
	307065	Stepper Cover Assy.(Not Shown)
	960730	6-32 X 5/16 Self Tapping Screw
	303969	Instruction Label (Cover)
	307066	Tone Control Setting Label
12	303762	Timing Relay No. 1
	914425	Sems
13	303764	Timing Relay No. 2
	914425	Sems
14	303529	33 Prong Plug
15	303528	33 Prong Socket
16	84244	9 Prong Socket
17	305309	3 Lug Terminal Board
18	307049	3 Contact Plug
19	307130	Type "TSU1" Tormat Selector Unit
	307132	Type "TSU2" Tormat Selector Unit
20	201275	12 Prong Socket
21	307154	3 Contact Socket
22	84282	7 Prong Socket
23	84223	6 Prong Socket
24	305447	3 Lug Terminal Board Assy.
25	303253	11 Prong Socket
26	11401	AC Socket (Light) Used on TSU1
	84306	8 Prong Socket (Used on TSU2)
27	303555	3 Prong Miniature Socket
28	307152	Line Cord
	602828	Strain Relief Bushing
29	602411	5 Amp. Fuse
	300061	Fuse Receptacle
	925812	Lockwasher
30	307150	Power Transformer
	925421	Lockwasher
	901660	8-32 Hex Nut
31	308003	Type 2050 Tube
32	303590	Pulse Amplifier Assy.
	914188	Sems
	301034	6 Prong Socket
33	300152	Single Prong Socket
34	308120	Type 12AX7 Tube
	84304	Noval Socket
35	301020	4 Prong Socket
36	307147	8 Lug Terminal Board Assy.
37	308626	Type 6X4 Tube
38	308005	Type 0A2 Tube
	84303	7 Pin Miniature Socket (Alternate for 84295)
39	307153	12 Contact Socket

13014A



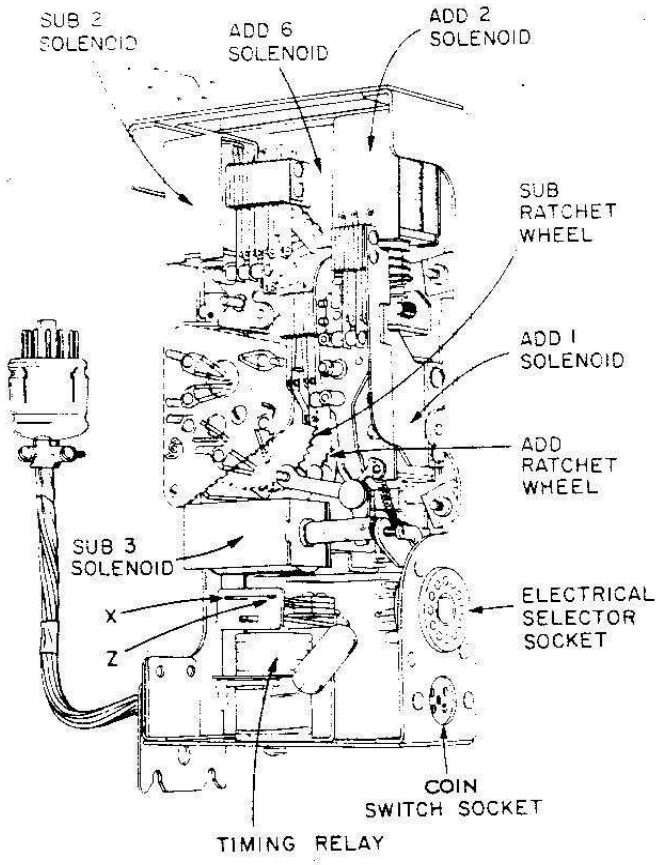
PARTS LIST

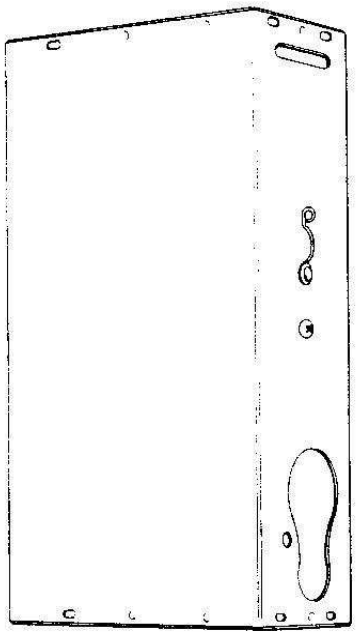
Item	Part No.	Part Name
1	303941	Letter Stepper Relay Assy.
	303943	Stepper Magnet & Frame Assembly (Letter)
	303100	Armature Assy. (Letter)
	303102	Tail Spring
	303908	Left Stepper Switch (Cont. G)
	303909	Right Stepper Switch (Cont. F)
	910960	Switch Mounting Screws (3-48 X ½ R.H.M.S.)
	303176	Switch Mounting Bracket
2	303177	Dog Operating Link
3	303179	Ratchet & Shaft (Letter)
4	303187	Pawl Gate
5	303188	Contact Plate Spacer
6	303789	Contact Plate Assy. (Letter)
7	303071	Contactor Assy. (Letter)
	303184	Contactor Mounting Washer
	303183	Contactor Mounting Screw (6-32 X 5/16 B.H.M.S.)
8	303106	Pawl Return Spring
9	303104	Return Spring (Letter Stepper)
10	303181	Dog
11	303107	Dog Return Spring (Letter)
12	303548	Transfer Switch Assembly
	303117	Transfer Switch Bracket
	303182	Transfer Switch Mting. Screws (5-40 X 9/16 R.H.M.S.)
	303547	Transfer Switch (Contacts A & B)
	303189	Transfer Switch Retainer Plate
	400597	Transfer Switch Tension Plate
13	303944	Magnet (Reset)
	303103	Tail Spring (Reset)

Item	Part No.	Part Name
	303185	2-56 Hex Nuts
	303186	No. 2 Washers (Under Nuts)
15	303940	Number Stepper Relay Assy.
	303942	Stepper Magnet & Frame Assy. (Number)
	303101	Armature Assy. (Number)
	303102	Tail Spring
	303908	Left Stepper Switch (Contact J)
	303909	Right Stepper Switch (Contact H)
	910960	Switch Mounting Screws (3-48 X ½ R.H.M.S.)
	303176	Switch Mounting Bracket
16	303178	Dog Operating Link
17	303538	Ratchet & Shaft (Number)
18	303106	Pawl Return Spring
19	303187	Pawl Gate
20	303188	Contact Plate Spacer
21	303766	Contactor Assembly (Number)
22	303767	Contact Plate Assembly (Number)
23	303184	Contactor Mounting Washer
24	303183	Contactor Mting. Screw (6-32 X 5/16 B.H.M.S.)
25	303537	Return Spring (Number Stepper)
26	303181	Dog
27	303108	Dog Spring (Group)
28	303794	Start Switch (Contacts V & W)
	303626	Start Switch Mounting Brkt.
	910990	Start Switch Mounting Screws (3-48 X 5/8 R.H.M.S.)
	450259	Switch Retainer Plate
	450260	Switch Tension Plate

SEEBURG

DUAL PRICING UNIT
TYPE DPU1 and DPU5





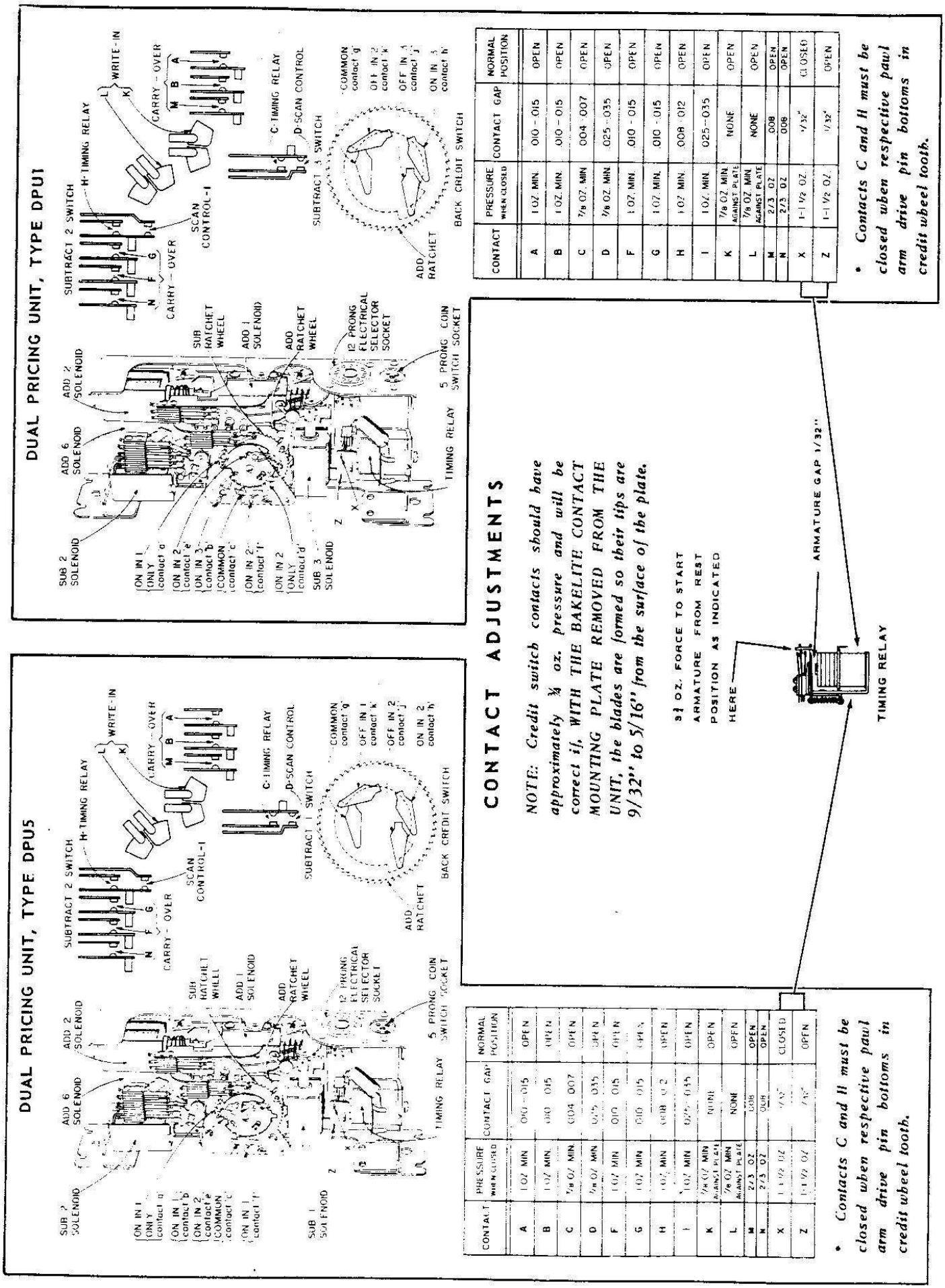
Credit Unit Cover

The Dual Pricing Units are part of the Tormat Memory System for making selections at either of two pricing rates for coins deposited at the phonograph. Their function is to store credit for the coins deposited, cancel the credit as it is used for selections and to control the selection system write-in current pulse. They include an add-and-subtract credit switch, three credit solenoids, two subtract solenoids, a timing relay and two switch groups that are operated by the subtract solenoids. Power for operation is taken from a Selection Receiver or Power and Control Unit with which it is associated and to which it is connected with a cable and plug.

The credit switch is a rotary, wafer type having two switch sections and two ratchets. The credit solenoids add credits by driving the switch counter-clockwise with pawls that engage the back ratchet when the solenoids are energized. The credit solenoids are energized through the nickel, dime and quarter coin switches (in the phonograph cabinet) and add, respectively, one, two and six credits. A total of twenty-four credits may be accumulated. A ½ ampere slo-blo fuse, included in some units, fuses the credit coils for overload protection in event that a credit solenoid is continuously energized.

Operation of either subtract solenoid drives the credit switch clockwise with one or the other operating each time a selection is made. The DPU1 has subtract-2 and subtract-3 solenoids that cancel, respectively, two and three credits; the DPU5 has subtract-2 and subtract-1 solenoids that cancel, respectively, two and one credits. The credit switch is moved one, two or three credits toward the "no-credit" position canceling the equivalent credits. Whether the subtract-2 or -3 (or the subtract-1 or -2) solenoid operates for a particular selection is determined by the arrangement of connections at a pricing terminal board in the electrical selector of the phonograph.

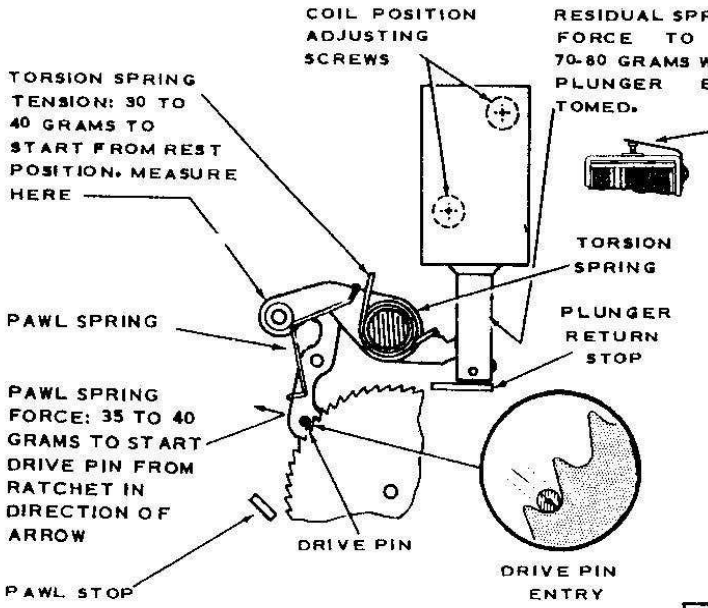
The switch groups associated with the two subtract solenoids operate a selection counter, complete the selection write-in circuit of the Memory System, and interlock the solenoid operation to assure full operating strokes. The timing relay controls the duration of solenoid operation by interrupting the power after a predetermined time interval.



CONTACT	PRESSURE WHEN CLOSED	CONTACT GAP	NORMAL POSITION
A	1 OZ. MIN.	.010 - .015	OPEN
B	1 OZ. MIN.	.010 - .015	OPEN
C	7/8 OZ. MIN	.004 - .007	OPEN
D	7/8 OZ. MIN	.025 - .035	OPEN
F	1 OZ. MIN.	.010 - .015	OPEN
G	1 OZ. MIN.	.010 - .015	OPEN
H	1 OZ. MIN.	.008 - .012	OPEN
I	1 OZ. MIN.	.025 - .035	OPEN
K	7/8 OZ. MIN AGAINST PLATE	NONE	OPEN
L	7/8 OZ. MIN AGAINST PLATE	NONE	OPEN
M	2/3 OZ.	.008	OPEN
N	2/3 OZ.	.006	OPEN
X	1-1 1/2 OZ.	1/32"	CLOSED
Z	1-1 1/2 OZ.	1/32"	OPEN

DUAL PRICING UNIT, TYPE DPU5
SUB 2 SOLENOID
ADD 6 SOLENOID
ADD 2 SOLENOID
SUBTRACT 2 SWITCH
H-TIMING RELAY
WRITE-IN
CARRY-OVER
SCAN CONTROL-1
SUB RATCHET WHEEL
ADD 1 SOLENOID
ADD RATCHET WHEEL
12 PRONG ELECTRICAL SELECTOR SOCKET
5 PRONG COIN SWITCH SOCKET
TIMING RELAY
C-TIMING RELAY
D-SCAN CONTROL
SUBTRACT 1 SWITCH
COMMON contact 'g'
OFF IN 1 contact 'k'
OFF IN 2 contact 'j'
ON IN 2 contact 'h'
ADD RATCHET
BACK CREDIT SWITCH
SUB 1 SOLENOID
ON IN 1 ONLY contact 'a'
ON IN 2 contact 'e'
COMMON contact 'c'
ON IN 1 contact 'f'
• Contacts C and H must be closed when respective pawl arm drive pin bottoms in credit wheel tooth.

ADD 6 (25¢) DRIVE ADJUSTMENT



A. With wheel stop against stop pin, adjust stop pin position so ADD 6 drive pin enters ratchet without striking or rubbing the sides of the teeth.

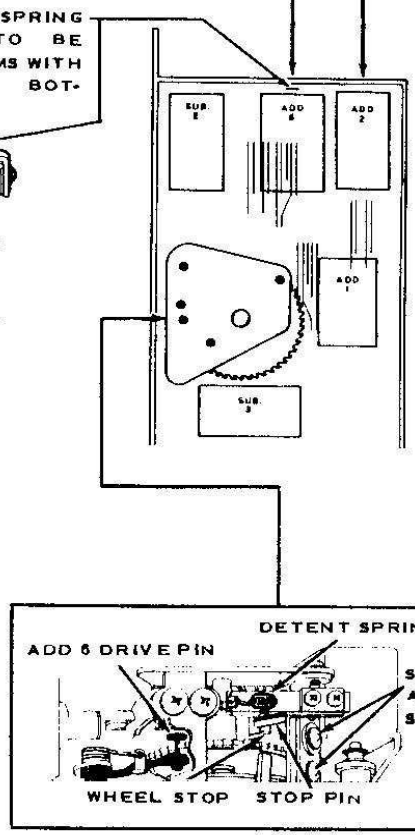
B. Loosen the two screws holding the coil.

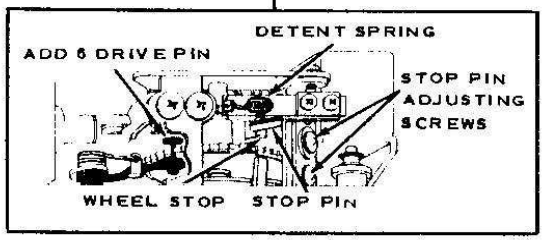
C. Operate the plunger manually by applying force at the end of the plunger *(not the levers)* so it is fully seated.

D. Position the coil so the plunger operation will move the wheel six teeth and be fully detented. Tighten screws holding the coil.

E. Adjust pawl stop for minimum play in wheel when plunger is fully seated.

F. Adjust plunger return stop position for clearance between the drive pin and the tips of the ratchet teeth. The tips should pass without rubbing but the clearance must not be more than .010".





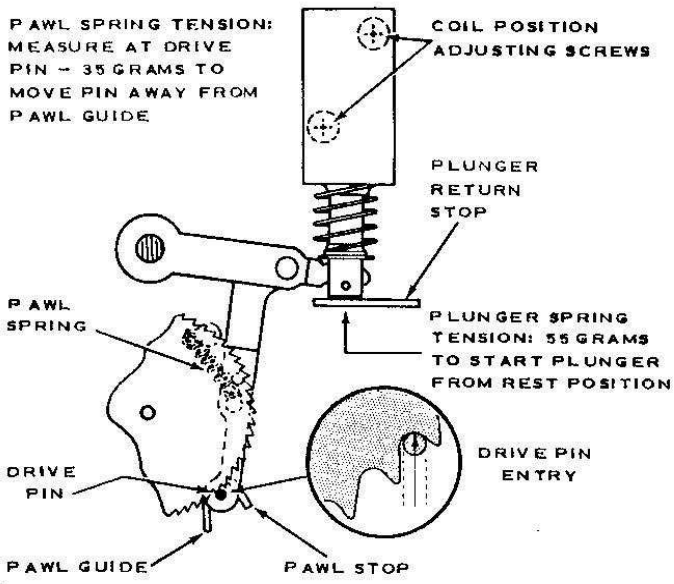
WHEEL STOP AND DETENT ADJUSTMENT

A. With wheel stop against stop pin, adjust stop pin position so ADD 6 drive pin enters ratchet without striking or rubbing the sides of the teeth.

Entry of all drive pins and the detent spring position adjustments are effected by the stop pin position and should be checked if a change is made.

B. Adjust position and force of detent spring so roller is *in full detent* when wheel stop is against stop pin and roller pressure against wheel is 150 to 160 grams (5½ oz.)

ADD 2 (10¢) DRIVE ADJUSTMENT



A. Adjust pawl guide so drive pin enters ratchet without striking or rubbing the sides of the teeth.

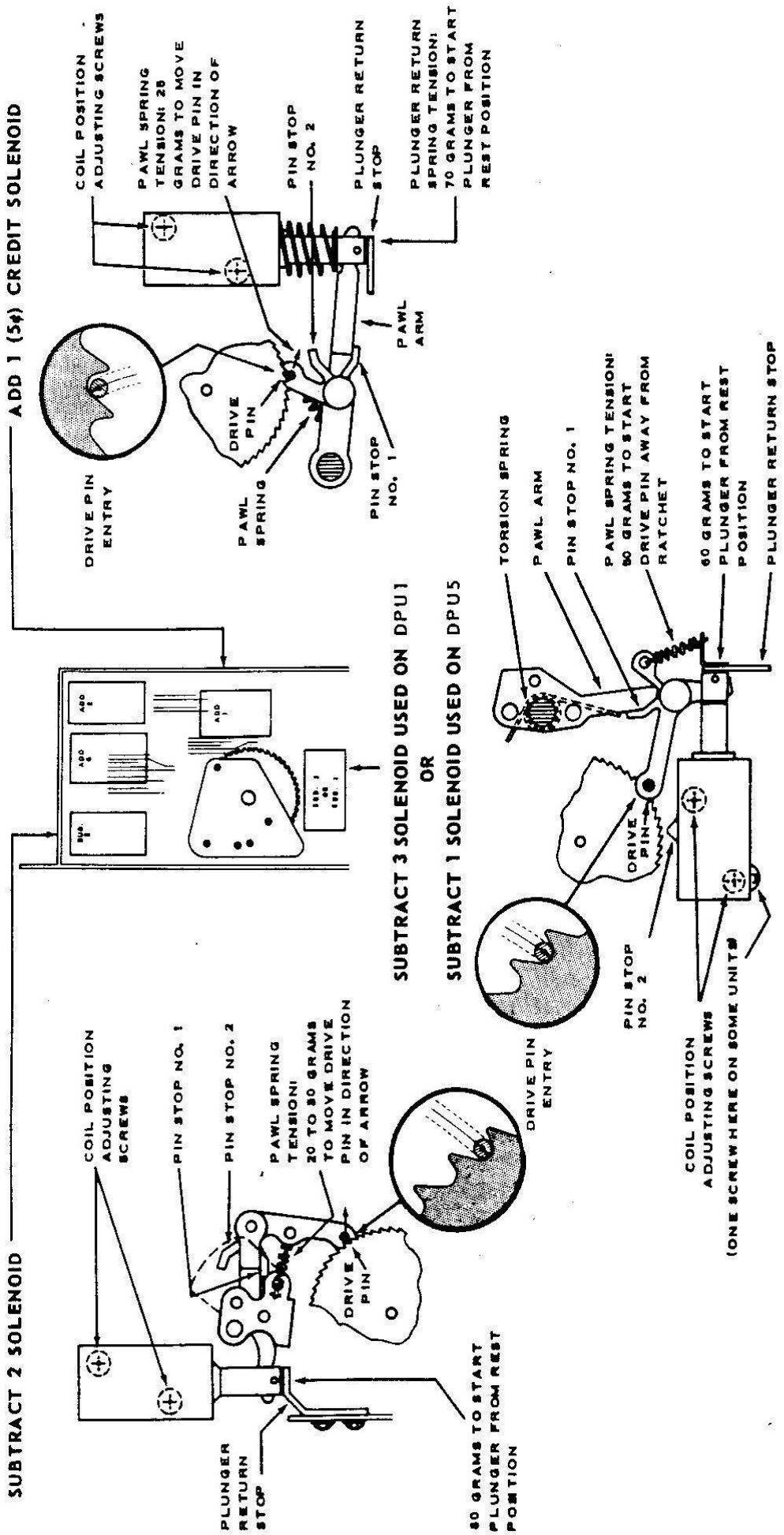
B. Loosen the two screws holding the coil.

C. Operate the plunger manually by applying force at the end of the plunger *(not the levers)* so it is fully seated.

D. Position the coil so the plunger operation will move the wheel two teeth and be fully detented. Tighten screws holding the coil.

E. Adjust pawl stop for minimum play in wheel when plunger is fully seated.

F. Adjust plunger return stop position for clearance between the drive pin and the tips of the ratchet teeth. The tips should pass without rubbing but the clearance must not be more than .010".



SUBTRACT 2; SUBTRACT 3 OR SUBTRACT 1; ADD 1 DRIVE ADJUSTMENTS

A. Adjust pin stop No. 1 so the drive pin enters the ratchet without striking or rubbing the sides of the teeth.

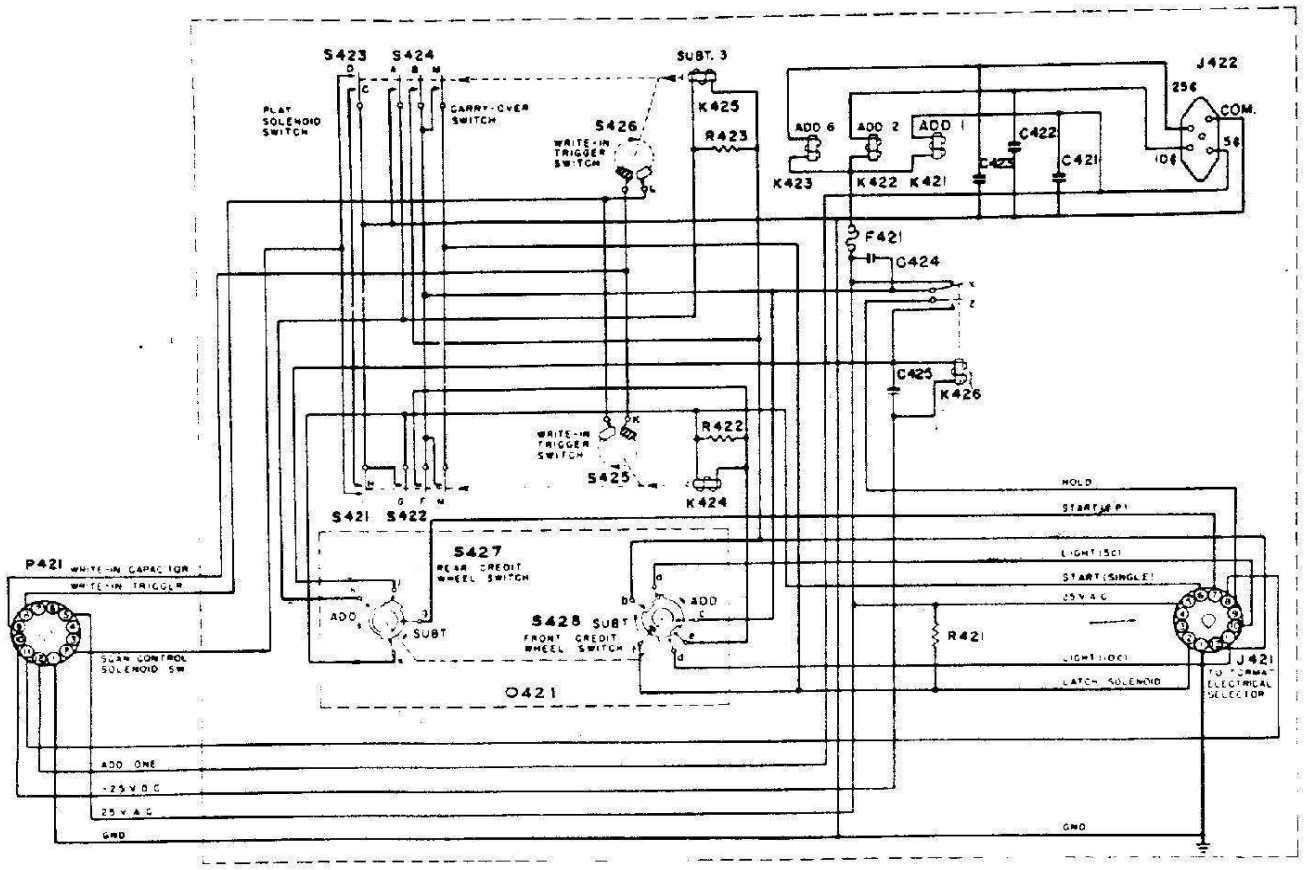
B. Adjust the plunger return stop position for clearance between the drive pin and the tips of the ratchet teeth. The tips should pass without rubbing but the clearance must not be more than .010".

C. Loosen the two screws holding the coil.

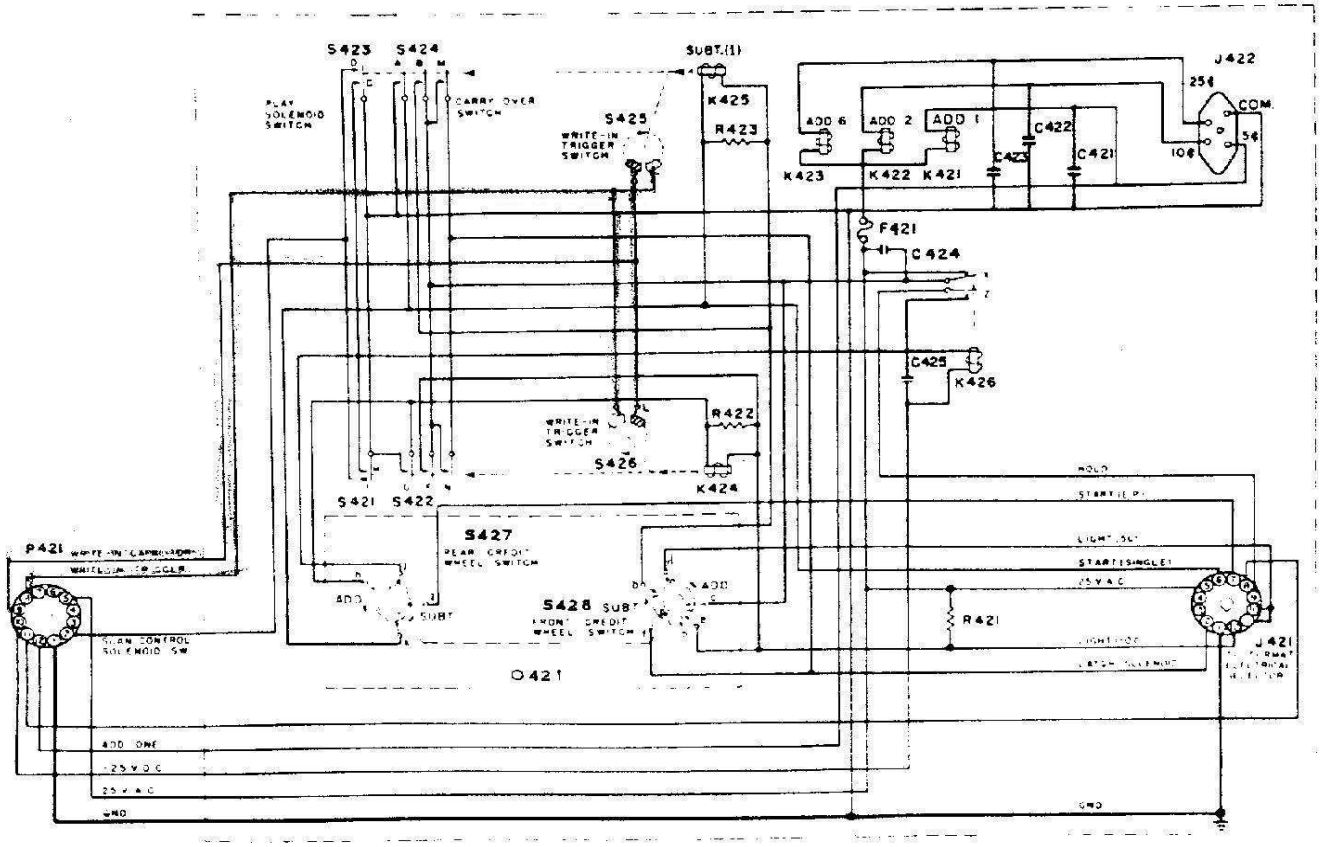
D. Operate the plunger manually by applying force at the end of the plunger *(not the levers)* so it is fully seated.

E. Position the coil so the plunger operation will move the wheel the required number of teeth and will be in full detent. Tighten screws holding the coil.

F. Adjust pin stop No. 2 for minimum play in wheel when plunger is fully seated.



Schematic Diagram - DPU1

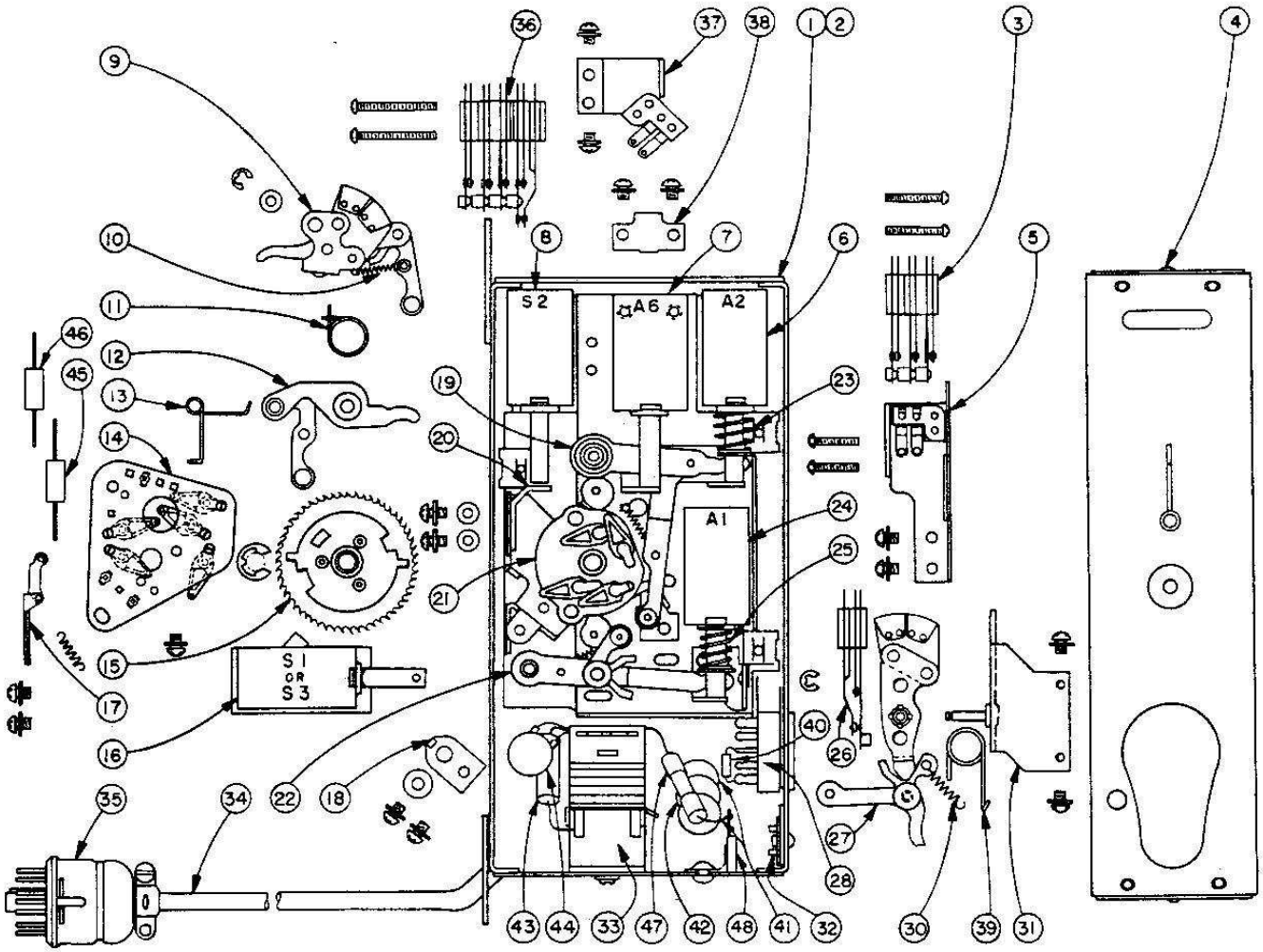


Schematic Diagram - DPU5

PARTS LIST for DPU1 and DPU5

Item	Part No. (DPU1)	Part No. (DPU5)	Part Name
C421	86258	86258	.04 Mfd. 500 v. Ceramic
C422	86259	86259	.02 Mfd. 500 v. Ceramic
C423	86258	86258	.04 Mfd. 500 v. Ceramic
C424	86259	86259	.02 Mfd. 500 v. Ceramic
C425	86142	86142	.1 Mfd. 200 v. Paper
F421	450683	450683	Fuse (½ Amp. Slo-Blo)
J421	201275	201275	12 Prong Socket
J422	450735	450735	5 Prong Socket (Small)
K421	450184	450184	Add One (1) Solenoid
K422	450182	450182	Add Two (2) Solenoid
K423	450186	450186	Add Six (6) Solenoid
K424	450190	450190	Subtract Two (2) Solenoid
K425	450288	–	Subtract Three (3) Solenoid
	–	450158	Subtract One (1) Solenoid
K426	450280	450280	Timing Relay
P421	410707	410707	12 Prong Plug
R421	82707	82707	1200 Ohm ± 10% 1 w.
R422	82838	82838	100 Ohm ± 10% 2 w.
R423	82838	82838	100 Ohm ± 10% 2 w.
S421	450628	450628	Scan Solenoid Switch
S422	450150	450150	Carry-Over Switch
S423	450628	450630	Switch
S424	450150	450211	Carry-Over Switch
S425	450255	450255	Write-In Switch
		450339	Contact Segment Assembly
S426	450255	450272	Write-In Switch
	–	450132	Contact Segment Assembly
S427	450089	450334	Rear Credit Wheel Switch Assembly
S428	450140	450342	Front Credit Wheel Switch Assembly
0421	450562	450562	Credit Wheel Assembly

DUAL PRICING UNIT, TYPE DPU1 and DPU5



Dual Credit Unit Assemblies

PARTS LIST

Item	Part No.	Part Name
1	* 450510	COMPLETE UNIT
	† 450512	COMPLETE UNIT
2	450022	MOUNTING PLATE STAKED ASSEMBLY
3	* 450150	CARRY-OVER SWITCH
	† 450211	CARRY-OVER SWITCH
	450259	TAPPED PLATE
	450260	TENSION PLATE
	910991	3-48 X 5/8 PHILLIPS R.H.M.S.
4	* 450617	COVER ASSEMBLY
	† 450636	COVER ASSEMBLY
5	* 450254	SWITCH MOUNTING BRACKET ASSEMBLY (SUB 3)
	† 450344	SWITCH MOUNTING BRACKET ASSEMBLY (SUB 1)
	912882	SEMS
6	450182	COIL & BRACKET ASSEMBLY (ADD 2)
	450075	SOLENOID PLUNGER ASSEMBLY
	912882	SEMS
7	450186	CREDIT COIL & BRACKET ASSEMBLY (ADD 6)
	450074	SOLENOID PLUNGER ASSEMBLY
	912882	SEMS
8	450190	CANCEL COIL & BRACKET ASSEMBLY (SUB 2)
	450075	SOLENOID PLUNGER ASSEMBLY
	912882	SEMS
9	450132	CANCEL ARM ASSEMBLY (SUB 2)
	125448	RETAINING RING
	921112	WASHER
10	450096	SPRING
11	450130	TORSION SPRING
12	450121	CREDIT ARM ASSEMBLY (ADD 6)
13	450131	SPRING - TORSION
14	* 450140	CONTACT PLATE ASSEMBLY
	† 450342	CONTACT PLATE ASSEMBLY
	912968	SEMS
15	450562	CREDIT WHEEL ASSEMBLY
	125403	RETAINING RING
16	* 450186	COIL & BRACKET ASSEMBLY (SUB 3)
	† 450336	CANCEL COIL & BRACKET ASSEMBLY (SUB 1)
	912882	SEMS
	* 450075	SOLENOID PLUNGER ASSEMBLY
	† 450348	SOLENOID PLUNGER ASSEMBLY
17	450465	DETENT ROLLER ASSEMBLY
	450464	DETENT SPRING ONLY
	910821	3-48 X 3/16 PHILLIPS P.H.M.S.
18	450566	STOP PIN PLATE ASSEMBLY
	920739	FLAT WASHER
	912968	SEMS
19	450111	CREDIT ARM ASSEMBLY (ADD 2)
	450129	SPRING
20	450102	PLUNGER STOP BRACKET (SUB 2)
	912859	SEMS
21	450089	TERMINAL BOARD ASSEMBLY
22	450085	CREDIT ARM ASSEMBLY (ADD 1)
	450096	SPRING
23	450329	SPRING
24	450184	COIL & BRACKET ASSEMBLY (ADD 1)
	450075	SOLENOID PLUNGER ASSEMBLY
	912882	SEMS
25	450329	SPRING
26	* 450628	SWITCH
	† 450630	SWITCH
	450259	TAPPED PLATE
	450260	TENSION PLATE
	911011	3-48 X 3/4 PHILLIPS R.H.M.S.
27	* 450105	CANCEL ARM ASSEMBLY (SUB 3)
	† 450339	CANCEL ARM ASSEMBLY (SUB 1)
28	201275	12 PRONG SOCKET
30	450129	SPRING
31	* 450037	PIVOT BRACKET ASSEMBLY
	† 450332	PIVOT BRACKET ASSEMBLY
	912882	SEMS
32	450735	5 PRONG SOCKET
33	450280	TIMING RELAY
	914225	SEMS
34	450612	CABLE ASSEMBLY
35	410708	12 PRONG PLUG ASSEMBLY
36	450150	SWITCH (CARRY-OVER)
	450630	SWITCH
	911073	3-48 X 1-1/4 PHILLIPS R.H.M.S.
37	450261	SWITCH MOUNTING BRACKET ASSEMBLY (SUB 2)
	912882	SEMS
38	450318	RESIDUAL SPRING
	912810	6-32 X 1/8 PHILLIPS R.H.M.S.
	450317	RESIDUAL PIN
	925342	FLAT WASHER
39	450281	TORSION SPRING
40	82707	1200 OHM 1 W RESISTOR
41	86259	.02 CERAMIC CONDENSER
42	86258	.04 CERAMIC CONDENSER
43	86142	.1 MFD. 200 V CONDENSER
44	86259	.02 MFD. CERAMIC CONDENSER
45 & 46	82838	100 OHM 2 W. RESISTOR
47	450683	½ AMP. SLO-BLO FUSE
48	400697	TERMINAL STRIP
	940420	TERMINAL LUG
	980650	.125" DIA. TUBULAR RIVET

* USED ON TYPE DPU1

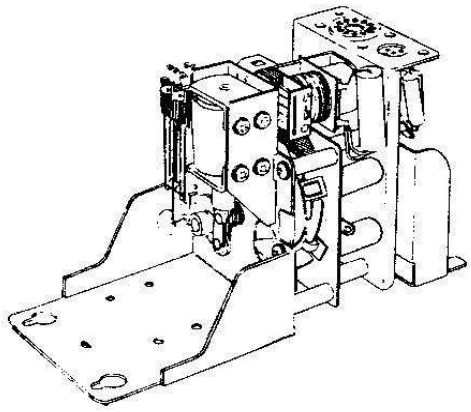
† USED ON TYPE DPU5

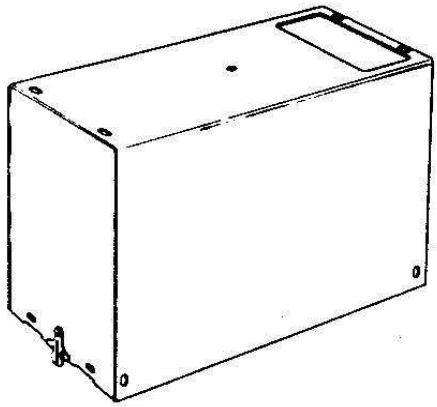
(JE) *Issue 1* 16007

SEEBURG

SINGLE PRICING UNIT

Type SPU1





Pricing Unit Cover

The Single Pricing Unit, Type SPU1, is a part of the Tormat Selection System for making selections for nickels, dimes and quarters deposited at the phonograph. Its function is to store credit for coin deposited, cancel the credit as it is used for selections and to control the selection system write-in current pulse. Power for operation is taken from a Selection Receiver or Power and Control Unit with which it is associated and to which it is connected with a cable and plug.

The principle parts of the unit are three credit solenoids, a cancel solenoid, two cam operated switch groups and a timing relay. These may be identified in *Figure 2.*

The credit switch is a "wheel" supporting six equally spaced snap-action switches which are parallel connected and terminate at a collector ring and the grounded frame of the unit. The snap-action switches are closed by the plungers of the credit solenoids. Closing any one of them establishes "credit" so selections can be made. Each time a selection is made, the cancel solenoid in the Unit advances the credit switch one sixth turn. It is advanced, therefore, one position – the distance between the snap-action switches – for each selection made.

A reset bracket is mounted on the assembly so a snap-action switch moves past it each time a selection is made. When a snap-action switch that has been turned "on" (by a credit solenoid plunger) passes the bracket, it is engaged by the bracket and reset to the "off" position.

A Pricing Unit associated with selection pricing of one play for five cents, two plays for ten cents, and six plays for a quarter will have a credit coil connected to a 5-cent, a 10-cent and a quarter coin switch in the phonograph so there is a "5¢ solenoid", a "10¢ solenoid" and a "25¢ solenoid".

The 5¢ solenoid is mounted so its plunger turns on the snap-action switch which is one position from the reset bracket. Because the switch will be opened with one operation of the cancel solenoid, one credit is set up when a 5¢ coin is deposited.

The 10¢ solenoid turns on the snap-action switch which is two positions from the reset bracket allowing two selections to be made before the switch is reset.

The 25¢ solenoid is six positions from the reset bracket and will turn on a snap-action switch permitting six selections to be made.

If selection pricing other than described above, the credit coils may be shifted to other positions with respect to the reset bracket. The unit is designed so the coil positions and the reset bracket position can be arranged for any combination of credits, up to six, for any of the three coins.

The cancel solenoid plunger is linked to one of the switch cams so the cam is rotated approximately 60 degrees when the solenoid is energized. This cam is pinned to a shaft which drives the other of the two switch cams.

A pawl on the second cam engages a ratchet on the credit switch and moves it one position each time the solenoid plunger operates.

The timing relay operates at approximately 25 volts d.c. and is loaded with copper slugs that delay starting of its armature from the rest position. The delay is introduced to control the time the contacts in the switch groups are closed.

The switch contact functions are detailed in the table on Page 16011.

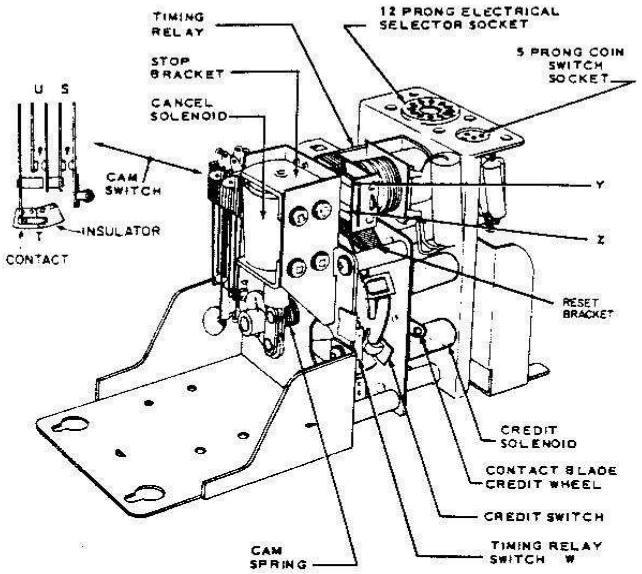


Figure 2.

MECHANICAL ADJUSTMENTS

1. The Pawl Arm Stop limits the rotation of the credit switch when the Cancel Solenoid plunger returns to normal rest position. It should be adjusted so the credit switch rotates far enough to allow the Lock Pawl to fall into the ratchet and have approximately 1/64'' overtravel. The adjustment must be checked at all six positions of the credit wheel and the ratchet. After adjustment, set the locknut tight. *See Figure 3.*

2. Adjust the position of the Cancel Solenoid Stop Bracket so the Cancel Pawl overtravels the ratchet teeth approximately 1/32'' when the solenoid plunger bottoms against the Stop. Set the Stop mounting screws firmly after adjustment. *See Figure 4.*

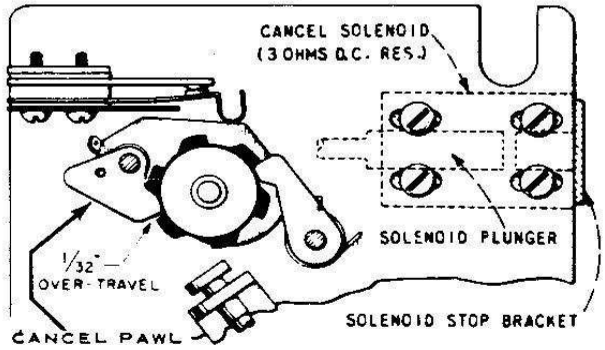


Figure 4.

3. Set the end of the Cam Spring in the first hole in the panel. The Cam Spring may be identified in *Figure 2.* Check operation by closing all snap-action credit switches and allow the Cam Spring to rotate the switches past the reset bracket. This should be checked slowly to determine if the Spring pressure is adequate to reset the switches without benefit of inertia. If more spring pressure is required, move to the second hole and repeat the test. Use the lowest spring pressure (consistent with positive operation) to insure minimum wear and optimum low voltage operation.

4. The pressure of the credit wheel contact blade against the ring on the credit switch should be approximately 2½ oz. Excessive pressure will result in excessive wear and sluggish rotary action of the credit switch.

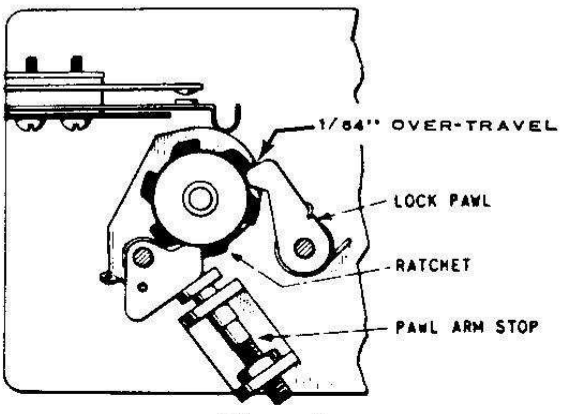


Figure 3.

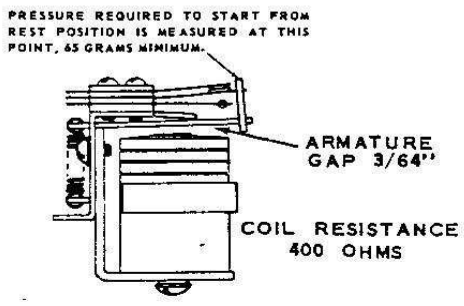
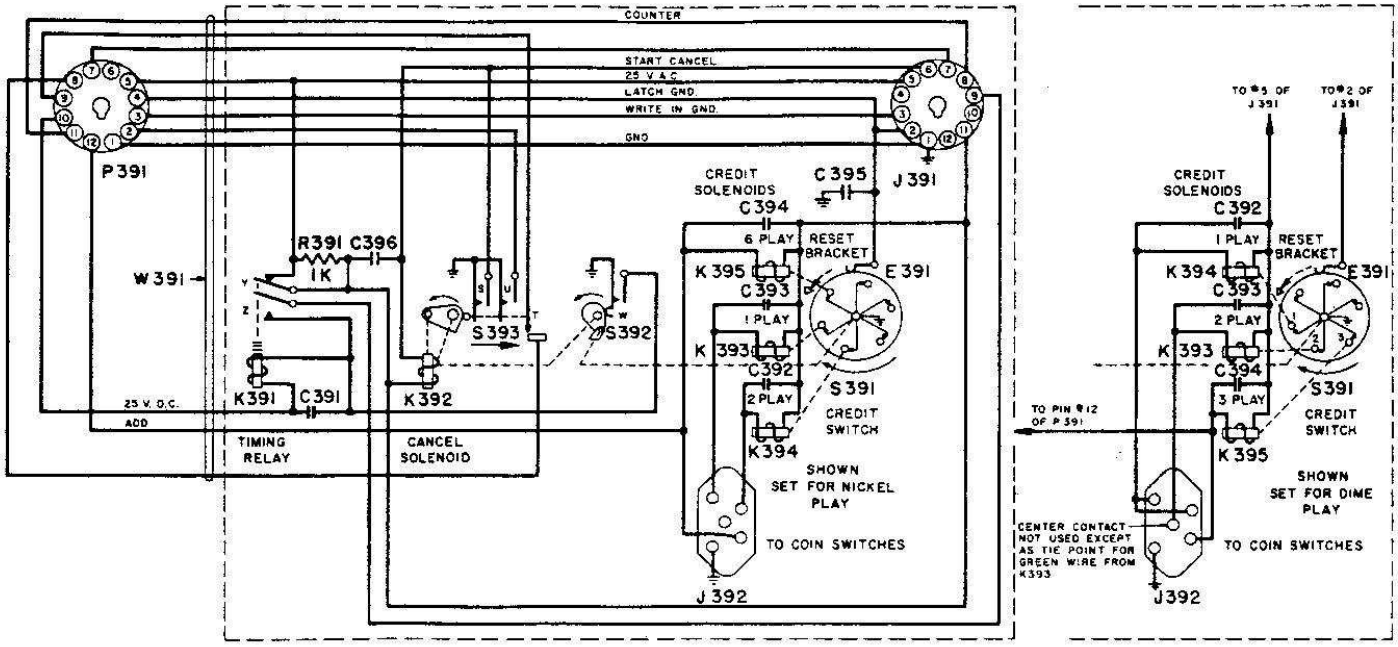


Figure 5.



Schematic Diagram

PARTS LIST (For Schematic Diagram)

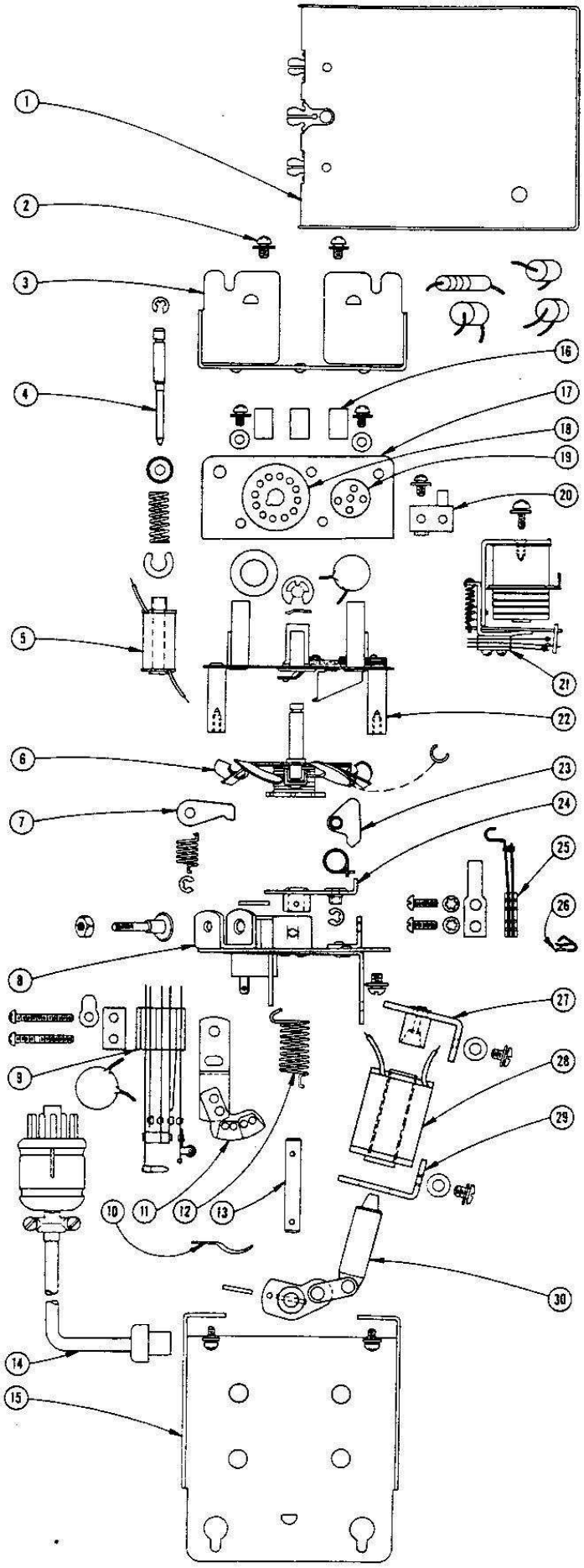
Item	Part No.	Part Name
C391	86235	Condenser .05 – 200 V.
C392	86236	Condenser .01 – 200 V.
C393	86236	Condenser .01 – 200 V.
C394	86236	Condenser .01 – 200 V.
C395	86314	Condenser, Ceramic .05 100 V.
C396	86258	Condenser, Ceramic .04
E391	400507	Wiper Switch Assembly
E392	400460	Write-In Segment Assembly
J391	201275	Socket (12 Prong)
J392	450735	Socket (5 Pin)
K391	450280	Relay Assembly
K392	400685	Cancel Solenoid

Item	Part No.	Part Name
K393	400484	Credit Solenoid 5¢
K394	400485	Credit Solenoid 10¢
K395	400486	Credit Solenoid 25¢
O391	400548	Pawl Assembly
O392	400932	Cam Assembly
P391	410707	Plug Assembly 12 Prongs
R391	82746	Resistor 1 W. 1000 Ohms
S391	400665	Rotary Credit Switch Assembly
S392	400589	Timing Relay Switch
S393	400472	Cam Switch
W391	400481	Cable & Plug Assembly

SWITCH	CONTACT	PRESSURE	CONTACT GAP	NORMAL POSITION	FUNCTION
CAM SWITCH	S	3½ oz.	1/64"	OPEN	Carry-Over Contact For Cancel Solenoid.
	T	2/3 oz.	.040" ON INSULATOR	OPEN	Selection Write-In Pulse Trigger Switch.
	U	1 oz.	1/64"	OPEN	Operates Phonograph Selection Counter And Play-Control Add Solenoid.
TIMING RELAY	Y	1-1½ oz.	1/32"	CLOSED	Completes 25-Volt Circuit To Cancel And Credit Solenoids And Electrical Selector Latch Bar Solenoid.
	Z	1-1½ oz.	1/32"	OPEN	Timing Relay Interlock.
SWITCH	W	2/3 oz.	3/64"	OPEN	Operates Timing Relay.

Contact Operation & Gap Adjustment

16011

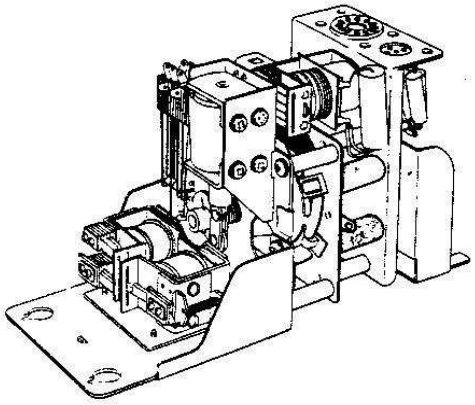


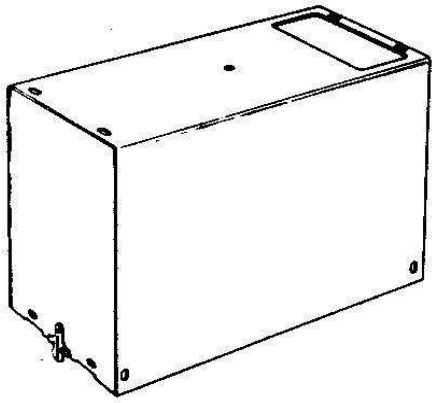
PARTS LIST

Item	Part No.	Part Name
1	400597	Tension Plate
2	914110	Sems
3	400470	Mounting Bracket Riveted Assem.
4	400672	Solenoid Plunger Assembly
	400673	Plunger Core
	505239	Solenoid Pin
	400658	Compression Spring
	400603	Cup Washer
	R-231163	Retaining Ring
5	400485	Credit Solenoid
6	400665	Rotary Credit Switch Assembly
7	400682	Lock Pawl & Shaft Assembly
	400543	Lock Pawl
	400683	Lock Pawl Shaft
	400545	Lock Pawl Spring
	R-231163	Retaining Ring
8	400677	Front Panel Riveted Assembly
9	400472	Cam Switch Assembly
	912653	5-40 x 1" Phillips R.H.M.S.
	400597	Tension Plate
10	F-1960	Cable Clamp
11	400460	Write-In Segment & Bracket Assem.
	450262	Insulator
	450263	Contact Segment
	450295	Insulating Segment
	940030	Lug
	980171	Tub. Rivet
12	400557	Cam Spring
13	400929	Rotary Switch Shaft
14	400481	Cable & Plug Assembly
15	400482	Mounting Bracket – Top
	914110	Sems
16	400670	Spacer
17	400467	Socket Panel Assembly
18	201275	Socket (12 Contact)
19	450735	5 Pin Socket
20	400657	Terminal Strip
21	450280	Relay Assembly
22	400466	Coin Solenoid Panel Assembly
23	400553	Pawl & Pin Assembly
24	400549	Pawl Arm & Hub Assembly
25	400589	Timing Relay Switch
26	400972	Spring Clip
27	400958	Solenoid Bracket & Stop Assem.
28	400685	Solenoid Cancel
29	400570	Solenoid Bracket
30	400931	Cam & Plunger Assembly

SEEBURG

SINGLE PRICING UNIT
Type SPU1H





Pricing Unit Cover

The Single Pricing Unit, Type SPU1H, is a part of the Tormat Selection System for making selections for nickels, dimes, quarters and half dollars deposited at the phonograph. Its function is to store credit for coins deposited, cancel the credit as it is used for selections and to control the selection system write-in current pulse. Power for operation is taken from a Selection Receiver or Power and Control Unit with which it is associated and to which it is connected with a cable and plug.

The principle parts of the unit are three credit solenoids, a cancel solenoid, two cam operated switch groups, a timing relay, an a.c. operated "50¢ relay" and a d.c. operated "slow release relay". These may be identified in *Figure 2.*

The credit switch is a "wheel" supporting six equally spaced snap-action switches which are parallel connected and terminate at a collector ring and the grounded frame of the unit. The snap-action switches are closed by the plungers of the credit solenoids. One solenoid is operated by the nickel and dime operated coin switches, one by the quarter coin switch, one by the 50-cent switch. Closing any one of the snap-action switches establishes "credit" so selections can be made. Each time a selection is made, the cancel solenoid in the Unit advances the credit switch one sixth turn. It is advanced, therefore, one position – the distance between the snap-action switches – for each selection made.

A reset bracket is mounted on the assembly so a snap-action switch moves past it each time a selection is made. When a snap-action switch that has been turned "on" (by a credit solenoid plunger) passes the bracket, it is engaged by the bracket and reset to the "off" position.

The "nickel and dime" is mounted so its plunger turns on the snap-action switch which is one position from the reset bracket. Because the switch will be opened with one operation of the cancel solenoid, one credit is set up when a 10¢ coin or two nickels are deposited. (The slug rejector in the phonograph is equipped with a tilting lever that permits only alternate nickels to operate the "nickel coin switch".)

The "quarter solenoid" is three positions from the reset bracket and will turn on a snap-action switch permitting three selections to be made.

The "half dollar solenoid" is four positions from the reset bracket and is parallel connected to the a.c. operated "50-cent relay". It turns on the snap-action switch that is four positions from the reset bracket permitting four selections to be made. When the fourth selection has been made, the snap-action switch is opened but the 50¢ relay and the slow release relay then operate to energize the quarter solenoid to permit three additional selections so there are a total of seven for the 50-cent coin.

The cancel solenoid plunger is linked to one of the switch cams so the cam is rotated approximately 60 degrees when the solenoid is energized. This cam is pinned to a shaft which drives the other of the two switch cams. A pawl on the second cam engages a ratchet on the credit switch and moves it one position each time the solenoid plunger operates.

The timing relay operates at approximately 25 volts d.c. and is loaded with copper slugs that delay starting of its armature from the

rest position. The delay is introduced to control the time the contacts in the switch groups are closed.

The switch groups contact functions are detailed in the table on Page 16017.

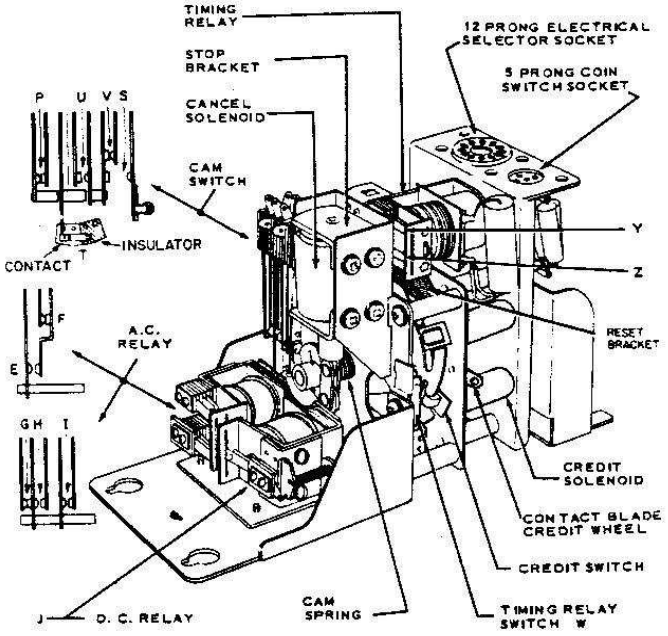


Figure 2.

MECHANICAL ADJUSTMENTS

1. The Pawl Arm Stop limits the rotation of the credit switch when the Cancel Solenoid plunger returns to normal rest position. It should be adjusted so the credit switch rotates far enough to allow the Lock Pawl to fall into the ratchet and have approximately 1/64" overtravel. The adjustment must be checked at all six positions of the credit wheel and the ratchet. After adjustment, set the locknut tight. *See Figure 3.*

2. Adjust the position of the Cancel Solenoid Stop Bracket so the Cancel Pawl overtravels the ratchet teeth approximately 1/32" when the solenoid plunger bottoms against the Stop. Set the Stop mounting screws firmly after adjustment. *See Figure 4.*

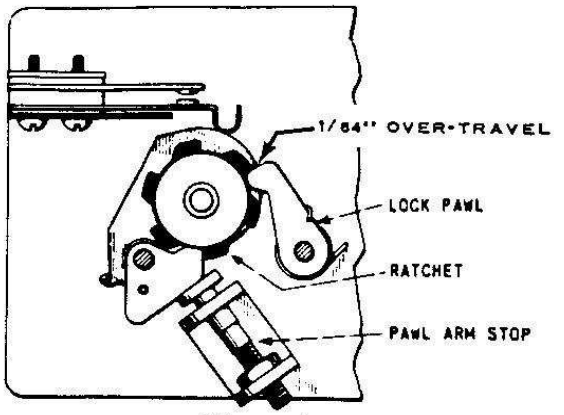


Figure 3.

3. Set the end of the Cam Spring in the first hole in the panel. The Cam Spring may be identified in *Figure 2.* Check operation by closing all snap-action credit switches and allow the Cam Spring to rotate the switches past the reset bracket. This should be checked slowly to determine if the Spring pressure is adequate to reset the switches without benefit of inertia. If more spring pressure is required, move to the second hole and repeat the test. Use the lowest possible spring pressure (consistent with positive operation) to insure minimum wear and optimum low voltage operation.

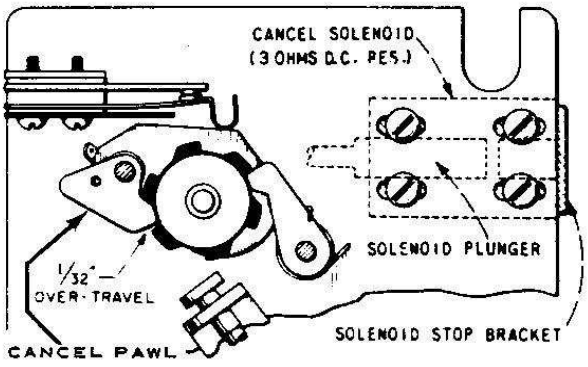
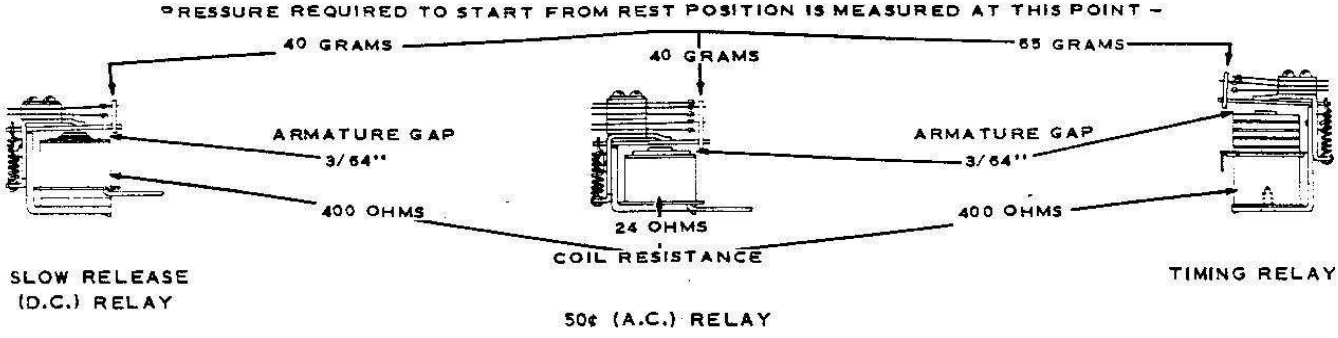
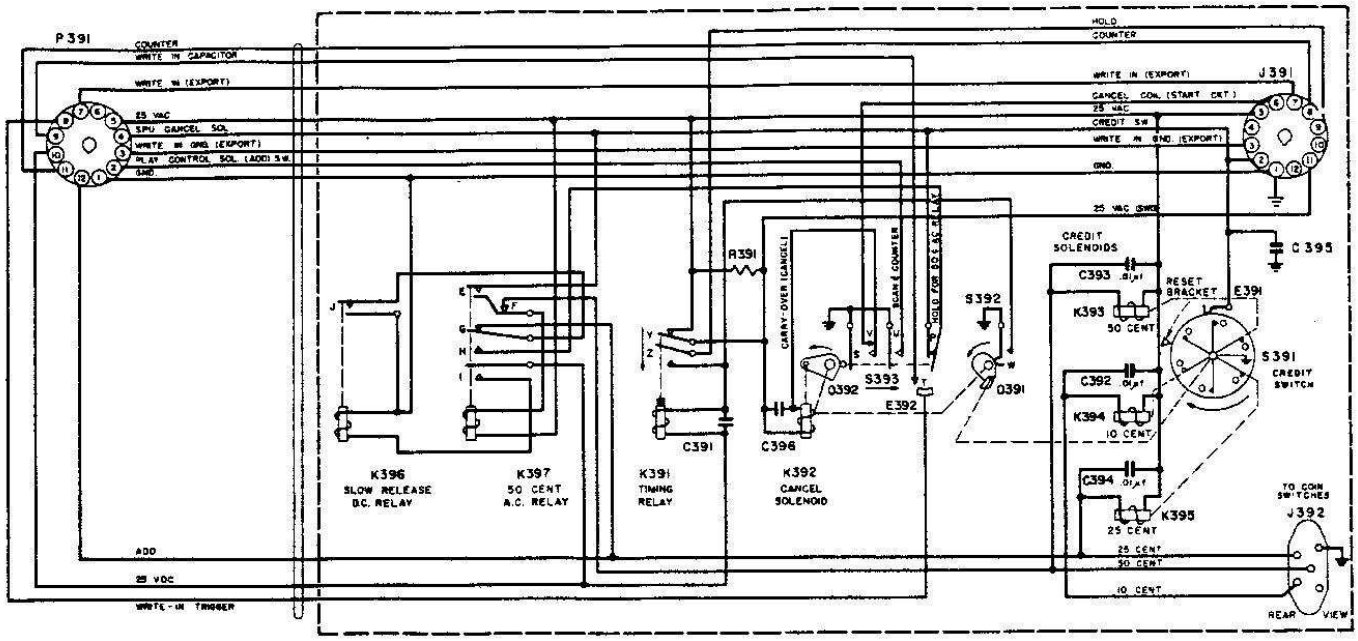


Figure 4.

4. The pressure of the credit wheel contact against the ring on the credit switch should be approximately 2½ oz. Excessive pressure will result in excessive wear and sluggish rotary action of the credit switch.



SINGLE PRICING UNIT, TYPE SPU1-H



Schematic Diagram

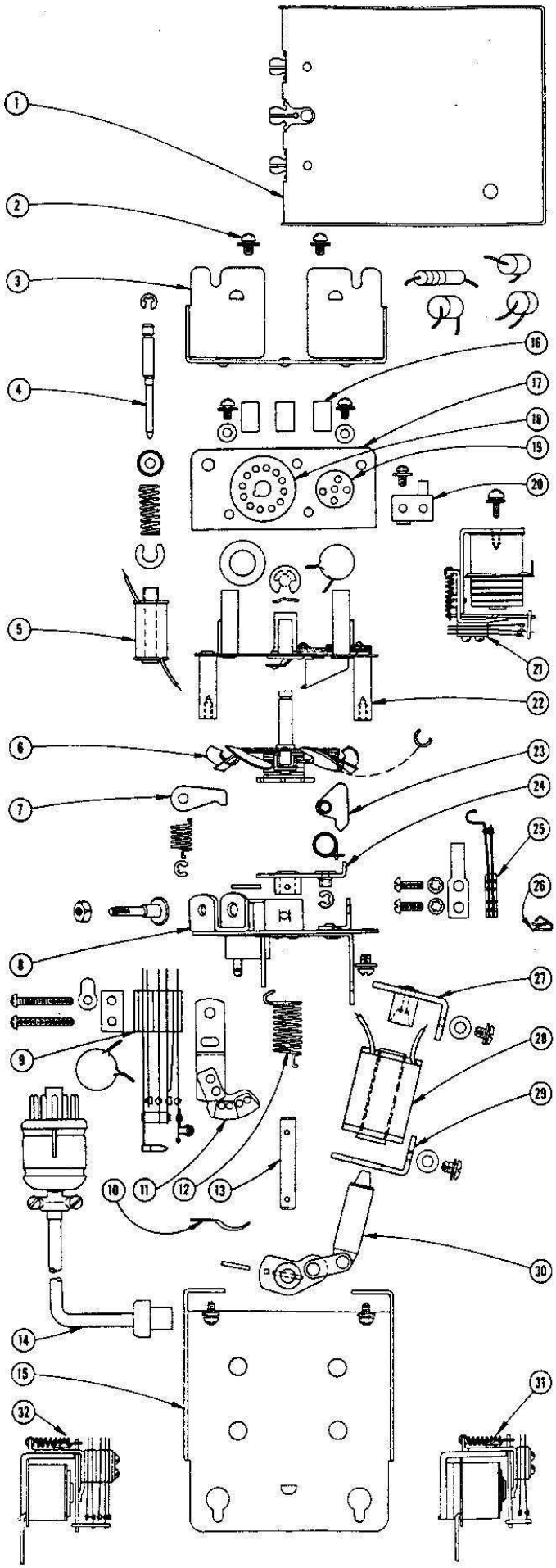
PARTS LIST (Schematic Diagram)

Item	Part No.	Part Name
C391	86235	CONDENSER .05 – 200 V.
C392	86236	CONDENSER .01 – 200 V.
C393	86236	CONDENSER .01 – 200 V.
C394	86236	CONDENSER .01 – 200 V.
C395	86314	CONDENSER, CERAMIC .05 MFD. 100 V.
C396	86258	CONDENSER, CERAMIC .04
E391	400507	WIPER SWITCH ASSEMBLY
E392	400460	WRITE-IN SEGMENT ASSEMBLY
J391	201275	SOCKET (12 PRONG)
J392	450735	SOCKET (5 PIN)
K391	450280	RELAY ASSEMBLY
K392	400685	CANCEL SOLENOID
K393	400484	CREDIT SOLENOID
K394	400485	CREDIT SOLENOID
K395	400486	CREDIT SOLENOID
K396	400448	RELAY (D.C.)
K397	400446	RELAY (A.C.)
O391	400548	PAWL ASSEMBLY
O392	400932	CAM ASSEMBLY
P391	410707	PLUG ASSEMBLY
R391	82746	RESISTOR 1W. 1000 OHM
S391	400665	ROTARY CREDIT SWITCH ASSEMBLY
S392	400589	TIMING RELAY SWITCH ASSEMBLY
S393	400435	CAM SWITCH

SWITCH	CONTACT	PRESSURE	CONTACT GAP	NORMAL POSITION	FUNCTION
CAM SWITCH	S	3½ oz.	1/64"	OPEN	Carry-Over Contact For Cancel Solenoid.
	T	2/3 oz.	.040" ON INSULATOR	OPEN	Selection Write-In Pulse Trigger Switch.
	U	1 oz.	1/64"	OPEN	Operates Phonograph Selection Counter And Play Control Add Solenoid.
	V	1 oz.	.010"	CLOSED	Completes Circuit To Cancel Solenoid From Electrical Selector Starting Switches.
	P	3/4 oz.	1/64"	CLOSED	Hold Contact For 50¢ Relay. In Series With H.
TIMING RELAY	Y	1-1½ oz.	1/32"	CLOSED	Completes 25-Volt Circuit To Cancel And Credit Solenoids And Electrical Selector Latch Bar Solenoid.
	Z	1-1½ oz.	1/32"	OPEN	Timing Relay Interlock. In Series With Hold Switches In Electrical Selector.
SWITCH	W	2/3 oz.	3/64"	OPEN	Operates Timing Relay.
50¢ A. C. RELAY	G	2/3 oz.	1/64"	CLOSED	In Series With J On Slow Release Relay. Operates 25¢ Credit Solenoid.
	H	2/3 oz.	1/64"	OPEN	Hold Contact For 50¢ Relay. In Series With P.
	I	2/3 oz.	1/64"	OPEN	Operates Slow Release Relay.
	E	2/3 oz.	.010"	OPEN	Hold Contact For 50¢ Relay.
	F	1 oz.	.008"	CLOSED	Completes Circuit From 50¢ Coin Switch To 50¢ Relay Coil.
SLOW RELEASE D. C. RELAY	J	1 oz.	1/32"	OPEN	In Series With G On 50¢ Relay. Operates 25¢ Credit Solenoid.

Contact Operation & Gap Adjustment

16015



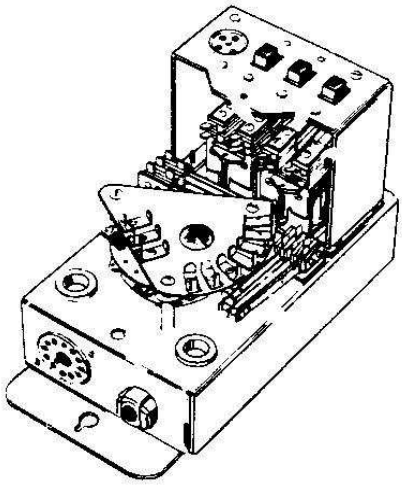
PARTS LIST

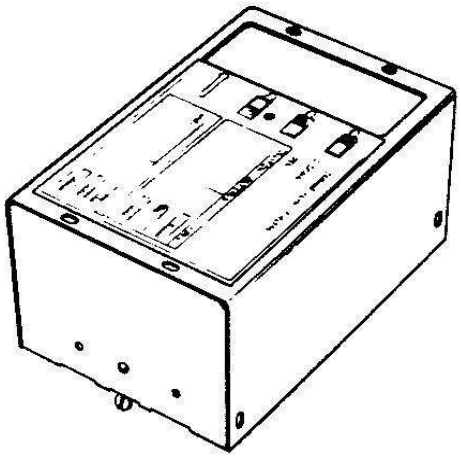
Item	Part No.	Part Name
1	400597	Tension Plate
2	914110	Sems
3	400470	Mounting Bracket Riveted Assem.
4	400672	Solenoid Plunger Assembly
	400673	Plunger Core
	505239	Solenoid Pin
	400658	Compression Spring
	400603	Cup Washer
	R-231163	Retaining Ring
5	400485	Credit Solenoid
6	400665	Rotary Credit Switch Assembly
7	400682	Lock Pawl & Shaft Assembly
	400543	Lock Pawl
	400683	Lock Pawl Shaft
	400545	Lock Pawl Spring
	R-231163	Retaining Ring
8	400677	Front Panel Riveted Assembly
9	400472	Cam Switch Assembly
	912653	5-40 x 1" Phillips R.H.M.S.
	400597	Tension Plate
10	F-1960	Cable Clamp
11	400460	Write-In Segment & Bracket Assem.
	450262	Insulator
	450263	Contact Segment
	450295	Insulating Segment
	940030	Lug
	980171	Tub. Rivet
12	400557	Cam Spring
13	400929	Rotary Switch Shaft
14	400481	Cable & Plug Assembly
15	400482	Mounting Bracket – Top
	914110	Sems
16	400670	Spacer
17	400467	Socket Panel Assembly
18	201275	Socket (12 Contact)
19	450735	5 Pin Socket
20	400657	Terminal Strip
21	450280	Relay Assembly
22	400466	Coin Solenoid Panel Assembly
23	400553	Pawl & Pin Assembly
24	400549	Pawl Arm & Hub Assembly
25	400589	Timing Relay Switch
26	400972	Spring Clip
27	400958	Solenoid Bracket & Stop Assem.
28	400685	Solenoid Cancel
29	400570	Solenoid Bracket
30	400931	Cam & Plunger Assembly
31	400448	Slow Release D. C. Relay
32	400446	50¢ A. C. Relay

SEEBURG

HALF DOLLAR UNIT

Type HDU1





Half Dollar Unit Cover

The Half Dollar Unit, Type HDU1, is designed for use with 5-10-25-cent Single or Dual Pricing Units to add half-dollar coin operation to these Units and provide for convenient flexibility of selection pricing. It does not alter, in any way, the selection operation or credit storage principle of the Pricing Unit with which it is associated; it supplements only the coin switch operation by setting up in the Pricing Unit, credits having value more than that given by two quarters, when a 50-cent coin switch is operated.

The Half Dollar Unit connections in a phonograph are made with cables and plugs as indicated in *Figure 2*. A coin switch plug and a 12-prong plug and cables attached to the Half Dollar Unit are used to replace, respectively, the phonograph coin switch plug and electrical selector plug in the Pricing Unit. The phonograph coin switch plug and electrical selector plug, then, are inserted in the sockets in the Half Dollar Unit.

The fundamental operation of the Half Dollar Unit is associated with a motor driven switch. The switch makes contact with six individual contacts that can be connected to the credit

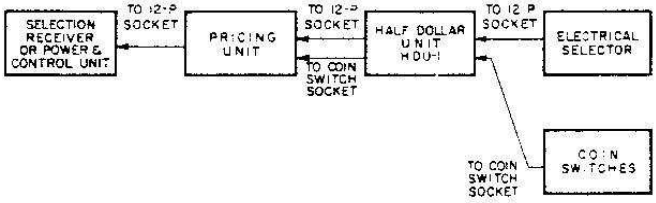


Figure 2.

coils in the associated Pricing Unit. The motor is started by closing a 50-cent or 25-cent coin switch and the subsequent operation results in establishing the desired credits. The credit coils that are energized in the operation are determined by the positions of three switches on the Half Dollar Unit *(Figure 3)* and by leads that are part of the pricing terminal board in the Unit. There are also two relays – a 25-cent relay and a 50-cent relay that function for control of the motor and are associated with the 25 and 50-cent coin switches of the phonograph. The operation of these relays, like the motor, is determined by the positions of the three switches.

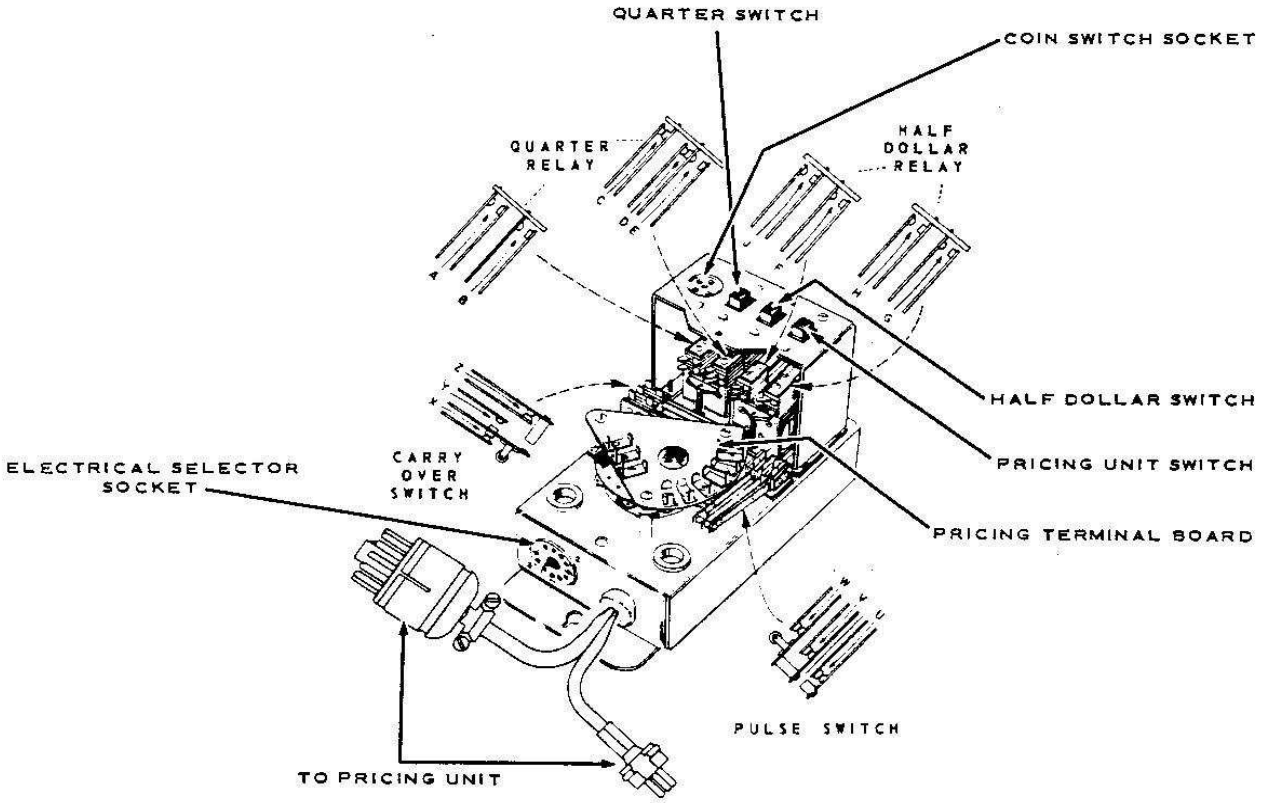


Figure 3.

TYPICAL CREDIT OPERATION WITH VARIOUS SWITCH POSITIONS ARE AS FOLLOWS:

OPERATION WITH DUAL PRICING UNIT, TYPE DPU1

1. Selection Pricing:

   Singles 10-cents/3 for quarter/7 for half
   EP Albums 15-cents/2 for quarter/4 for half plus one single

   Switch positions on Half Dollar Unit

   Pricing Unit switch on position DPU1
   Half Dollar switch on position 2
   Quarter switch on position 3

In this arrangement and with these switch positions, the 5-cent, 10-cent and 25-cent credit solenoids of the Pricing Unit connect through the Half Dollar Unit to, respectively, the 5-cent, 10-cent and quarter coin switches and their operation is not altered by the use of the Unit. Operation with a 50-cent coin results in operation of the 50-cent relay and the HDU motor and totaling in the DPU credits for seven 10-cent selections or any combination of selections equal to a 70-cent credit.

If the Half Dollar switch is set to position 1 (instead of 2), the total half-dollar credit will be equal to 65 cents instead of 70 cents.

2. Selection Pricing:

   Singles 10-cents/4 for quarter/9 for half
   EP Albums 15-cents/2 (plus 1 single) for quarter/6 for half

   Switch positions on Half Dollar Unit:

   Pricing Unit switch on DPU1
   Half Dollar switch on 2
   Quarter switch on 4

The 5-cent and 10-cent credit solenoids of the DPU connect through the HDU to, respectively, the 5-cent and 10-cent coin switches. Their operation is not modified in any way by

HDU. Operation with a quarter energizes the 25-cent relay, starts the HDU motor and results in a total credit in the DPU for four 10-cent selections or any combination of selections equal to a 40-cent credit. Operation with a half dollar energizes the 50-cent relay, starts the motor and results in a total credit in the DPU for nine 10-cent selections or any combination of selections equal to a 90-cent credit.

If the Half Dollar switch is set to position 1, there will be a total credit equal to 35 cents instead of 40 cents when a quarter coin is used but 50-cent operation is not affected because the switch is not used in the cycle of operation in which a 50-cent coin is involved.

OPERATION WITH SINGLE PRICING UNIT, TYPE SPU1

3. Selection Pricing:

All selections 10-cents/3 for quarter/7 for half

Pricing Unit credit solenoid positions:

10-cent coil in 1-credit position
25-cent coil in 3-credit position

Coin switch connections (in SPU1):

25-cent coin switch terminal to 25-cent coil
5-cent and 10-cent terminals of coin switch socket connected together and to 10-cent coil. (Diverter used on slug rejector so alternate nickels operate 5-cent coin switch.)

Switch positions on Half Dollar Unit:

Pricing Unit switch on SPU1
Half Dollar switch on 1
Quarter switch on 3

The 5-cent, 10-cent and quarter coin switches connect to their associated credit solenoids in the SPU1. Their operation is not modified by connection through the HDU. Operation with half-dollar coin energizes the 50-cent relay and starts the HDU motor. The motor operates until the rotary switch closes its first contact at which time a 25-cent credit is set up in the SPU. When the credit is established, the motor stops and remains idle until the credits have been used (three 10-cent selections). On completion of the third selection, the 50-cent relay again operates, the motor starts and drives the switch to another contact. When the switch is at this contact, three more credits are set up in the SPU. Again the relay releases and the motor stops to remain idle until the second group of three selections has been made. When these selections have been made, the motor and relay again operate and the switch moves to another contact. In this third operation of the motor, one more credit is set up, bringing the total of 10-cent selection credits to seven (three-plus-three-plus-one) for a half dollar.

4. Selection Pricing:

All selections 10-cents/4 for quarter/9 for half

Single Pricing Unit credit solenoid positions:

10-cent coil in 1-credit position
25-cent coil in 4-credit position

Coin switch connections (in SPU1) same as in 3.

Switch positions on Half Dollar Unit:

Pricing Unit switch on SPU1
Half Dollar switch on 1
Quarter switch on 3

Operation with all coins is the same as for 10-cents/3 for quarter/7 for half as detailed in 3 except that the 25-cent credit solenoid in the SPU1 is in the 4-credit position and will give 4 credits each time it is energized. This results in 4 credits for a quarter and 9 for a half dollar.

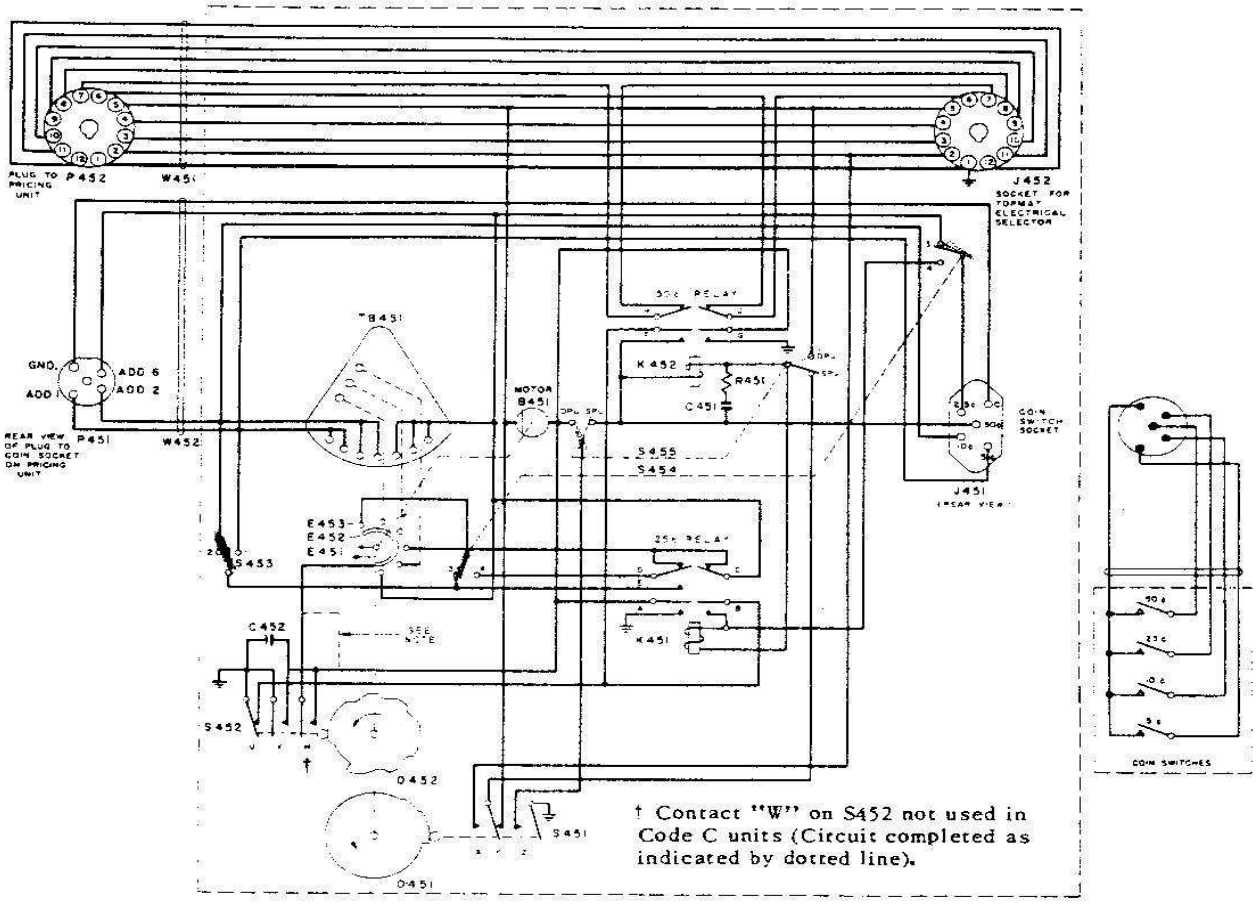
Additional bonus credits for half-dollar operation may be established by using connecting leads at the terminal board in the Unit. There are three flexible leads and seven connecting terminals that are identified by color. Two of the terminals are marked green and connect to the add-1 credit solenoid of a Dual Pricing Unit; to the 5-cent credit solenoid of a Single Pricing Unit. Two terminals are yellow and connect to the add-2 credit solenoid of a DPU; to the 10-cent credit solenoid of an SPU. Three terminals are marked with red and connect to the add-6 solenoid of the DPU; to the 25-cent credit solenoid of an SPU. If one of the three leads is connected to a "green terminal", one additional credit will be established each time the motor drives the rotary switch through a cycle of operation. If a lead is connected to a "red terminal", an additional 25-cent credit will be set up with each operation of the HDU motor. The leads and terminals may be used in any desired combination of credits.

CONTACT GAP ADJUSTMENT

RELAY CONTACTS	RELAY PULLED IN	RELAY DROPPED OUT	CONTACT FUNCTIONS ON HDU-1
A	CLOSED 20 GRAMS	OPEN .015 MIN.	MOTOR CIRCUIT
B	CLOSED 20 GRAMS	OPEN .015 MIN.	RELAY INTERLOCK IN SERIES WITH "U" ON PULSE SWITCH
C	OPEN .015 MIN.	CLOSED 20 GRAMS	ADD 6 CIRCUIT CONNECTS 25¢ CREDIT COIL OF PRICING UNIT TO "W" (PULSE SWITCH)
D	OPEN .015 MIN.	CLOSED 20 GRAMS	ADD 6 CIRCUIT (FINAL 6 CREDITS)
E	CLOSED 20 GRAMS	OPEN .015 MIN.	ADD 2 CIRCUIT CONNECTS 10¢ OR 5¢ CREDIT COIL OF PRICING UNIT THRU QUARTER SWITCH TO "W" CONTACT
F	CLOSED 20 GRAMS	OPEN .015 MIN.	RELAY INTERLOCK IN SERIES WITH "U" ON PULSE SWITCH
G	CLOSED 20 GRAMS	OPEN .015 MIN.	MOTOR CIRCUIT
H	OPEN .015 MIN.	CLOSED 20 GRAMS	OPENS EP CIRCUIT DURING 50¢ CREDIT OPERATION
J	OPEN .015 MIN.	CLOSED 20 GRAMS	OPENS SINGLES CIRCUIT DURING 50¢ CREDIT OPERATION

SWITCH CONTACTS	ON LOW PART OF CAM	ON INTERMEDIATE PART OF CAM	ON HIGH POINT OF CAM	
U	CLOSED 15 GRAMS (MIN)	CLOSED 15 GRAMS	OPEN .010 GAP	INTERLOCK CIRCUIT FOR 50¢ AND 25¢ RELAYS (OPENS ONLY BY LOBE "A" ON PULSE CAM)
V *	CLOSED 15 GRAMS (MIN)	OPEN .005 GAP (MIN)	OPEN	MOTOR CIRCUIT
W *	CLOSED 15 GRAMS (MIN)	OPEN .015 GAP	OPEN	OPERATES CREDIT COILS IN PRICING UNIT (IN CONJUNCTION WITH MOTOR DRIVEN SWITCH IN HDU)
X	CLOSED 25 GRAMS (MIN)	OPEN 1/64 GAP	OPEN 1/32 TO 3/64 GAP	COMPLETES 25 V. TO 50¢ RELAY ON SPU OPERATION
Y	OPEN 3/64 GAP	OPEN 1/64 GAP	CLOSED 15 GRAMS	IN 25 V. CIRCUIT TO 25¢ AND 50¢ RELAYS
Z	CLOSED 10 GRAMS (MIN)	CLOSED 10 GRAMS (MIN)	OPEN 3/64 GAP	GROUND CIRCUIT FOR 25¢ AND 50¢ RELAYS PARALLELS "G" IN 50¢ AND "A" CONTACTS IN 25¢ OPERATION ENABLES MOTOR TO COMPLETE CYCLE

* NOTE: 'W' MUST OPEN BEFORE 'V'.

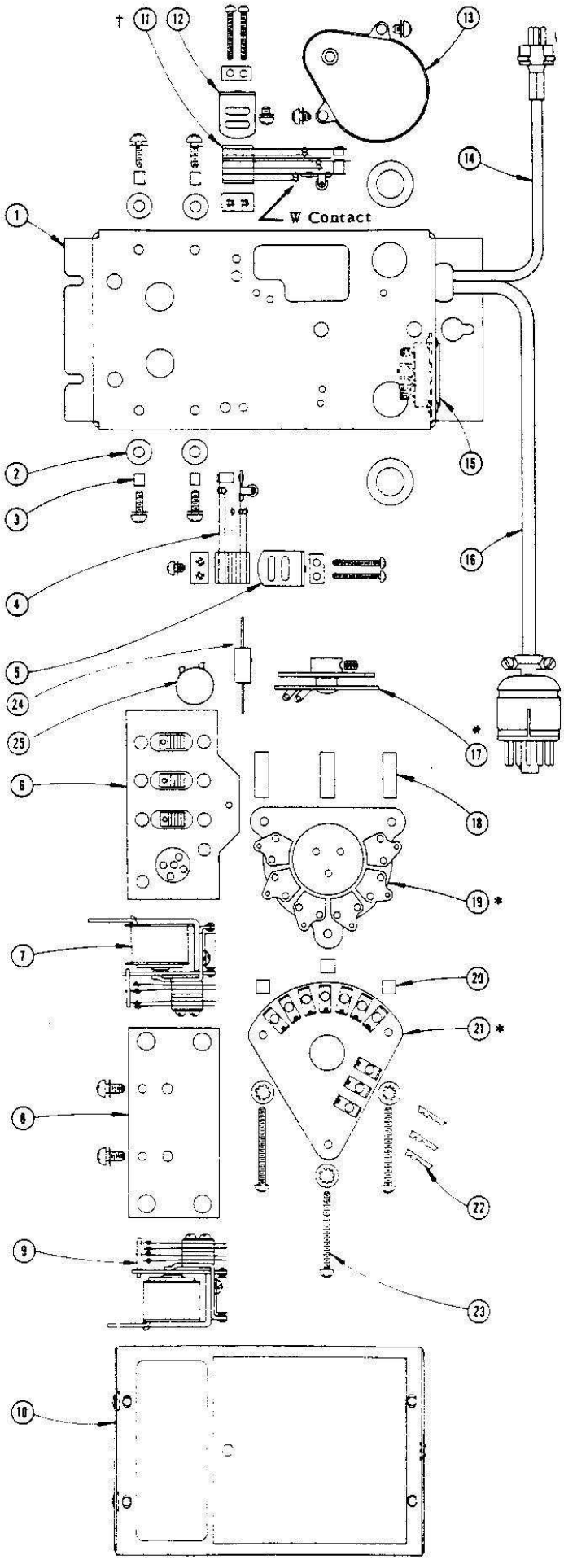


Schematic diagram

PARTS LIST

Item	Part No.	Part Name
B451	450710	Timing Motor
C451	86259	Condenser .02 $\pm^{60\%}_{20\%}$ 500 V. Ceramic
C452	86259	Condenser .02 $\pm^{60\%}_{20\%}$ 500 V. Ceramic
E451	450715	Contact Finger Assembly
E452	450721	Contact Ring
E453	450719	Contact Segment *
J451	450735	Coin Switch Socket
J452	201275	Socket (12 Pin)
K451	450729	Relay (Quarter)
K452	450730	Relay (Half Dollar)
O451	Carry-Over Cam *	Part No. 450712-Rotor Assy-Code A Units
O452	Pulse Cam *	Part No. 450782-Rotor Assy-Code B Units
P451	450736	Coin Switch Plug
P452	410707	Plug (12 Pin)
R451	82403	Resistor 18 ±10% ½ W.
S451	450726	Carry Over Switch
S452	450727	Pulse Switch-Code A & B Units
†	450789	Pulse Switch-Code C Units
S453	450733	Slide Switch
S454	450734	Slide Switch
S455	450734	Slide Switch
T B451	450722	Terminal Board Assembly*
W451	450753	Cable Assembly
W452	450737	Cable Assembly (Coin)

*See Notes Page 16030



Item		Part No.	Part Name
1		450706	Mounting Base Riveted Assembly
		988325	Grommet
		602828	Strain Relief Clamp
2		988161	Grommets
3		450738	Spacer
4		450726	Carryover Switch Assembly
		450259	Tapped Plate
		450260	Tension Plate
		911031	3-48 x 7/8 Phillips R.H.M.S.
5		450709	Switch Mounting Bracket
		912882	Sems
6		450731	Switch Bracket Riveted Assembly
		450733	Slider Switch
		450734	Slider Switch
		450735	5 Pin Socket
7		450730	Relay (50¢)
		914225	Sems
8		450728	Relay Mounting Plate
9		450729	Relay (25¢)
		914225	Sems
10		450743	Cover Assembly
		912959	Sems
11	†	450727	Pulse Switch-Code A & B Units
		450789	Pulse Switch-Code C Units
		450259	Tapped Plate
		450260	Tension Plate
		911031	3-48 x 7/8 Phillips R.H.M.S.
12		450709	Switch Mounting Bracket
		912882	Sems
13		450710	Motor
14		450737	Coin Cable & Plug Assembly
		450736	5 Prong Plug
15		201275	12 Pin Socket
16		450739	Power Cable Assembly
		410708	12 Prong Plug
17	*	450712	Rotor Assembly-Code A Units
		450782	Rotor Assembly-Code B Units
		918341	6-32 x ¼ Socket H. Cup Point Set Screw
18		450724	Spacer (Long)
19	*	450718	Segment Plate Assembly-Code A Units
		450784	Segment Plate Assembly-Code B Units
20		450725	Spacer (Short)
21	*	450722	Terminal Board Assembly
22		246933	Taper Tab Connector
23		913715	6-32 x 1-3/8 Phillips R.H.M.S.
		925342	1206 Lockwasher
24		82403	18 Ohm ± 10% ½ W.
25		86259	.02 MFD 500 V. Ceramic Condenser
		400697	Terminal Strip (Not Shown)

* Item 17; Code A Pulse Cam has 7 Lobes
Code B & C Pulse Cam has 4 Lobes
Item 19; Code A Units have 6 Contact Segments
Code B & C Units have 3 Contact Segments
Item 21; Not used in Code B & C Units
† Item 11; Code A & B switches have 3 pairs of contacts
Code C switches have 2 pairs of contacts
(W Contact omitted)

SEEBURG

REMOTE CONTROL STEPPER UNIT, Type RCSU2

The Remote Control Stepper Unit type RCSU2 is part of the Seeburg Remote Control system for making selections from Remote Wall-O-Matics. It becomes a part of the Tormat Selector Units types TSU1 and TSU2 whenever Electrical Selector and/or Remote Control operation is employed. It includes service test points and Pricing Unit connections, the steppers, Wall-O-Matic power supply and stepper control circuits necessary for full remote control selection. The Stepper Unit is mounted on the Selector Unit chassis with screws and all interconnections are made with 3-prong and 12-prong plugs and sockets.

STEP SWITCH ASSEMBLY ADJUSTMENTS

RATCHET RETURN SPRING

The return spring tension for the Letter step switch will be correct if the spring is wound three full turns when the switch is in the rest position.

The return spring tension for the Number step switch will be correct if the spring is wound two full turns when the switch is in the rest position.

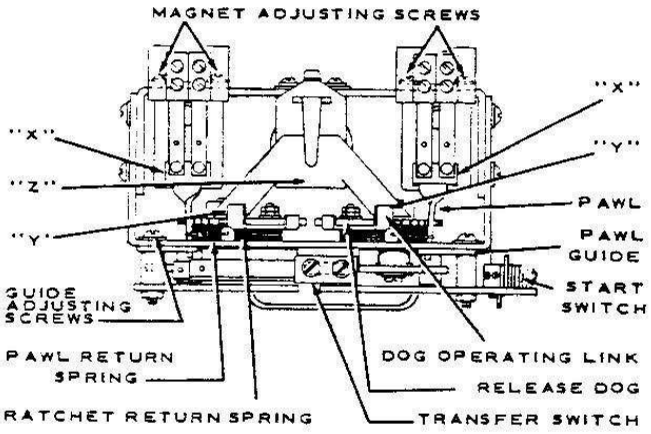


Figure 1.

STEP RELAY MAGNET POSITION

Adjust the step relay magnet vertically so the ratchet wheel tooth will over-ride the end of the release dog .010" to .020" when the armature is seated. *Figure 2*

Figure 2.

With the pawl against the upper edge of the pawl guide opening, the clearance between the ratchet teeth and the pawl should not be less than .005".

PAWL GUIDE AND RETURN SPRING

Adjust the pawl guides so the pawls will strike the bottom of the ratchet teeth when the pawl engages the ratchet. *Figure 3.* The adjustment must be made so there will be a .004" to .010" gap between the pawl and the guide at the bottom of the stroke. *Figure 4.*

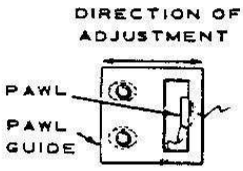


Figure 3.

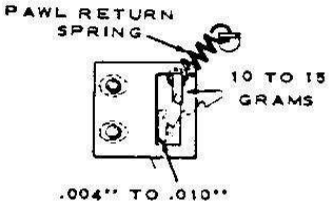


Figure 4.

The pawl return spring tension should require 10 to 15 grams (1/2 oz.) force to start the pawl from the side of the guide. Measure this force at the spring with the pawl in the rest position.

STEP MAGENT TAIL SPRINGS

The tail spring force, measured at the front of the bridge on the step magnet armature ("X", *Figure 1*) should be 50 to 75 grams (1-3/4 to 2-1/2 oz.) to just close the switch contacts (when the contacts are correctly adjusted).

CONTACT PLATE SWITCH BLADES

The switch blades should have 10 to 35 grams force against the contacts. The force will be approximately correct if the blades are formed so their tips extend 5/32" above the contact assembly when the plates are removed. *Figure 5.*

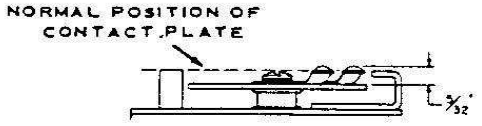


Figure 5.

16031

CONTACT PLATE POSITION

Each contact plate should be positioned so the outer blade of the step switch is approximately centered on the lowest contact (on the contact plate) when the stud on the side of the ratchet wheel is against the stop on the stepper frame and so the blade is approximately centered on each successive contact as it is advanced, step by step, through its full movement. The mounting holes at the corners of the contact plates are slotted to permit this adjustment.

RESET MAGNET POSITION

Adjust the reset magnet vertically so the release dogs engage the ratchet teeth with the armature extension clearing the dimples ("Y", *Figure 1*) on the dog operating links 1/64" when the magnet is energized. *Figure 6.*

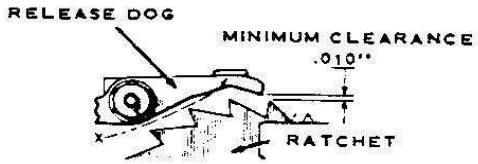


Figure 6.

The armature travel must be sufficient to permit the release dogs to clear the ratchet teeth .010" minimum when the magnet is not energized.

The tabs on the release dog operating links which engage the dogs and couple them to the reset magnet should not bind tightly but should not permit more than .005" free travel between the dogs and the links.

RESET MAGNET TAIL SPRING

The force applied to the end of the reset magnet armature ("Z", *Figure 1*) to start it from the rest position should be 100 to 140 grams (3-1/2 to 5 oz.)

RELEASE DOG SPRINGS

An upward force of 15 to 25 grams (1/2 to 3/4 oz.) applied at the dimple on the release dog operating links ("Y", *Figure 1*) should start the dogs from seated position. This force will be approximately correct if the springs are wound 1/2 to 3/4 turn.

TRANSFER SWITCH POSITION

Adjust the position of the switch on the mounting bracket so the roller is in the notch of the contactor assembly disc and the first operation of the step magnet causes no change of the roller blade. The second operation of the step magnet should raise the roller to the outer diameter of the disc. The flanges of the roller should not drag on the disc and the roller bracket should not strike the switch contact plate.

(a) With the step switch in the rest position so the roller is in the notch of the contactor disc, adjust the lower blade for 1/2 to 3/4 oz.

(b) Adjust contact "B" gap 1/64".

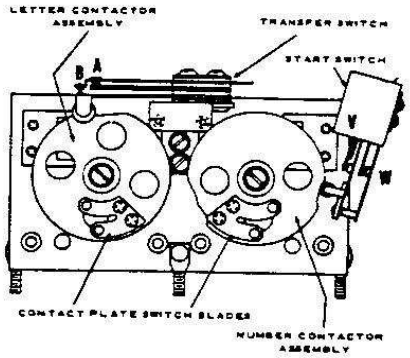


Figure 7.

(c) Adjust contact "A" force 1 oz.

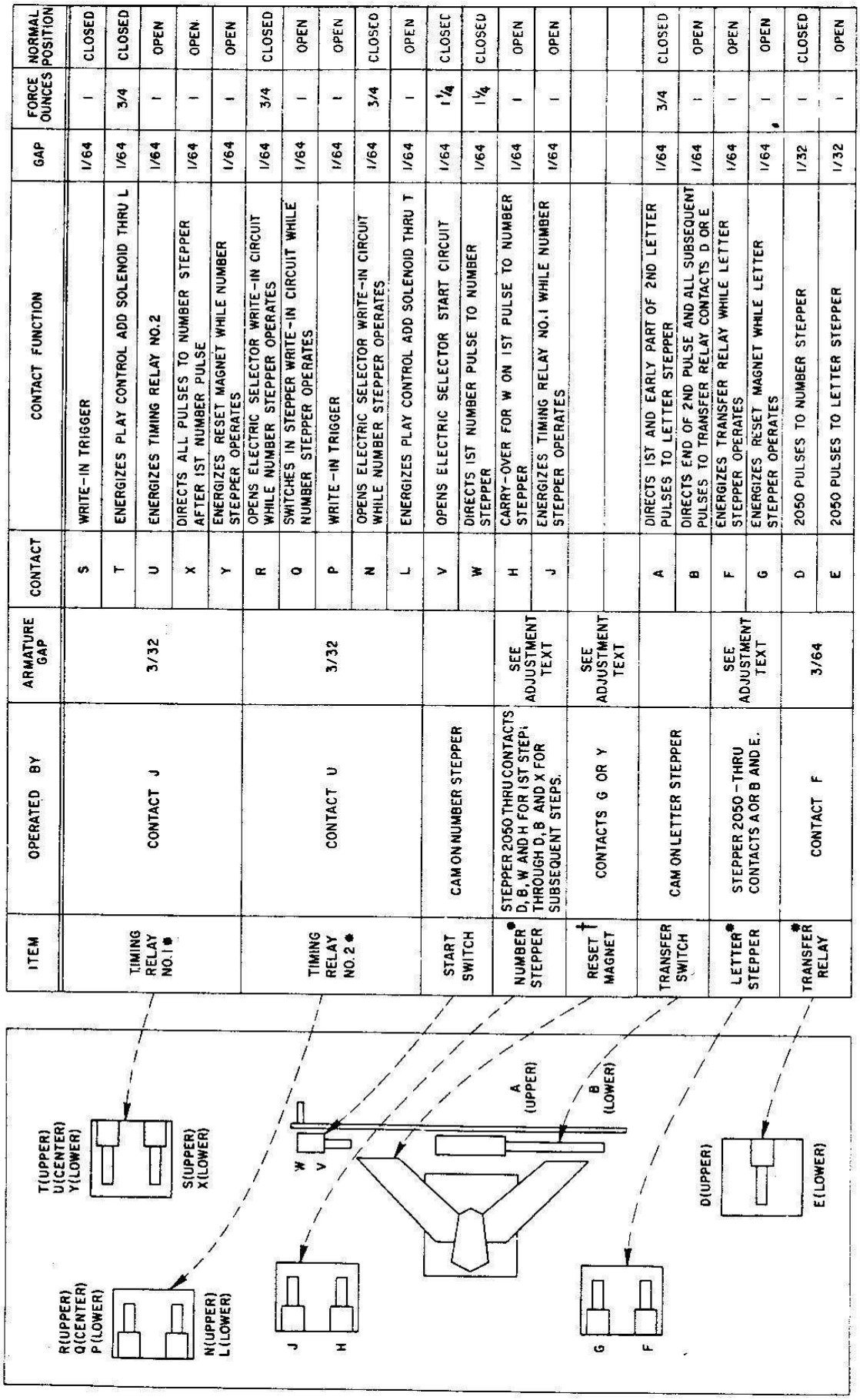
(d) The second operation of the step magnet should result in closing contact "B" with 1 oz. force and opening contact "A" 1/64" to 1/32" gap.

LUBRICATION

Lubricate with a drop of *Seeburg No. 53014 Special Purpose Oil:*

1. Pawl Pivots and sliding surfaces of the pawls on the step relay armatures.
2. Pawl guides at area of contact with pawls.
3. Step switch shaft bearings.
4. Roller on roller blade of transfer switch.
5. Relay hinges.

ITEM	OPERATED BY	ARMATURE GAP	CONTACT	CONTACT FUNCTION	GAP	FORCE OUNCES	NORMAL POSITION
TIMING RELAY NO.1 *	CONTACT J	3/32	S	WRITE-IN TRIGGER	1/64	1	CLOSED
			T	ENERGIZES PLAY CONTROL ADD SOLENOID THRU L	1/64	3/4	CLOSED
			U	ENERGIZES TIMING RELAY NO.2	1/64	1	OPEN
			X	DIRECTS ALL PULSES TO NUMBER STEPPER AFTER 1ST NUMBER PULSE	1/64	1	OPEN
			Y	ENERGIZES RESET MAGNET WHILE NUMBER STEPPER OPERATES	1/64	1	OPEN
TIMING RELAY NO.2 *	CONTACT U	3/32	R	OPENS ELECTRIC SELECTOR WRITE-IN CIRCUIT WHILE NUMBER STEPPER OPERATES	1/64	3/4	CLOSED
			Q	SWITCHES IN STEPPER WRITE-IN CIRCUIT WHILE NUMBER STEPPER OPERATES	1/64	1	OPEN
			P	WRITE-IN TRIGGER	1/64	1	OPEN
			N	OPENS ELECTRIC SELECTOR WRITE-IN CIRCUIT WHILE NUMBER STEPPER OPERATES	1/64	3/4	CLOSED
			L	ENERGIZES PLAY CONTROL ADD SOLENOID THRU T	1/64	1	OPEN
START SWITCH	CAM ON NUMBER STEPPER		V	OPENS ELECTRIC SELECTOR START CIRCUIT	1/64	1¼	CLOSED
			W	DIRECTS 1ST NUMBER PULSE TO NUMBER STEPPER	1/64	1¼	CLOSED
NUMBER * STEPPER	STEPPER 2050 THRU CONTACTS D, B, W AND H FOR 1ST STEP; THROUGH D, B AND X FOR SUBSEQUENT STEPS.	SEE ADJUSTMENT TEXT	H	CARRY-OVER FOR W ON 1ST PULSE TO NUMBER STEPPER	1/64	1	OPEN
			J	ENERGIZES TIMING RELAY NO.1 WHILE NUMBER STEPPER OPERATES	1/64	1	OPEN
RESET † MAGNET	CONTACTS G OR Y	SEE ADJUSTMENT TEXT					
TRANSFER SWITCH	CAM ON LETTER STEPPER		A	DIRECTS 1ST AND EARLY PART OF 2ND LETTER PULSES TO LETTER STEPPER	1/64	3/4	CLOSED
			B	DIRECTS END OF 2ND PULSE AND ALL SUBSEQUENT PULSES TO TRANSFER RELAY CONTACTS D OR E	1/64	1	OPEN
LETTER * STEPPER	STEPPER 2050-THRU CONTACTS A OR B AND E.	SEE ADJUSTMENT TEXT	F	ENERGIZES TRANSFER RELAY WHILE LETTER STEPPER OPERATES	1/64	1	OPEN
			G	ENERGIZES RESET MAGNET WHILE LETTER STEPPER OPERATES	1/64	1	OPEN
TRANSFER * RELAY	CONTACT F	3/64	D	2050 PULSES TO NUMBER STEPPER	1/32	1	CLOSED
			E	2050 PULSES TO LETTER STEPPER	1/32	1	OPEN



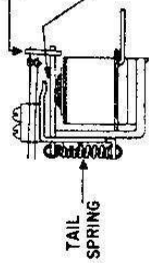
TAIL SPRING FORCES

TIMING RELAY NO.1	1-1/4 OZ
TIMING RELAY NO.2	1-1/2 OZ
TRANSFER RELAY	1-2/3 OZ

D.C. COIL RESISTANCE

* ——— 500 OHMS

† ——— 325 OHMS



RELAY ADJUSTMENTS

16033

Parts List

Item	Part No.	Description	Item	Part No.	Description	Item	Part No.	Description
C551	86235	0.05 Mfd. 200 V. Paper	K551	303941	Letter Step Relay	R554	82838	100 Ohms ±10% ½ Watt
C552	86320	5 Mfd. 300 V. Paper	K552	303944	Pawl Reset Magnet	R555	82403	18 Ohms ±10% ½ Watt
C553	86250	5000 Mmfd. 1000 V. Ceramic	K553	303940	Number Step Relay	R556	82439	18,000 Ohms ±10% ½ Watt
C554	87611	300 Mfd. 50 V. Lytic	K554	303074	Transfer Relay	S551	303547	Transfer Switch
C555	86235	0.05 Mfd. 200 V. Paper	K555	303764	Timing Relay No. 2	S552	303794	Start Switch
C556	86235	0.05 Mfd. 200 V. Paper	K556	303762	Timing Relay No. 1	T551	307074	25 V. Transformer
C557	86235	0.05 Mfd. 200 V. Paper				TB551	305309	Terminal Board
F551	★ 303713	3.2 Amp. Fuse Type GMQ 3-2/10	P551	307049	3 Contact Plug			
J551	303528	33 Prong Socket	P552	307048	12 Contact Plug	V551	308003	2050 Thyratron
J552	303529	33 Prong Plug	P553	▲ 246933	Taper Tab Receptacle	W551	▲ 307047	Cable Assembly
J553	84244	9 Prong Socket	R551	82448	100,000 Ohms ±10% ½ Watt	W551	†307127	Cable Assembly
J554	▲ 940311	Taper Tab Lug	R552	82436	10,000 Ohms ±10% ½ Watt	Z551	▲ 303765	Stepper Assembly
J555	▲ 940311	Taper Tab Lug	R553	82440	22,000 Ohms ±10% ½ Watt	Z551	†307021	Stepper Assembly

▲ used on RCSU2 ★ Part No. 303697 used on RCSU2, Code A † used on RCSU3