UNIVERSAL INDUSTRIES, Inc.

CHICAGO 40, ILLINOIS

5 STAR

CATALOG NO.

PART I

GENERAL INFORMATION

PART II

MAINTENANCE AND ADJUSTMENT

PART III

SERVICE INFORMATION

PART IV

CONTROL DATA

UNIVERSAL INDUSTRIES, INC. 5 STAR

PART LOCATION INDEX

PART NAME	MOUNTED ON	LOCATION IN MACHINE
ARM, Scanner Release	Spinner Unit	Mechanism Board
ARM, Score Release	Spinner Unit	Mechanism Board
ARM, Sequence Release	Spinner Unit	Mechanism Board
BaLL LIFT ASSEMBLY	Right Front	Cabinet
BALL LIFT MOTOR	Ball Lift Assembly	Cabinet
BALL ROLL-OVER SWITCHES	Underside	Playboard
BALL SHOOTER SWITCH	Underside	Playboard
CAMS	Spinner Unit	Mechanism Board
COIL, Ball Kicker	Underside	Playboard
COIL, Scanner Release	Spinner Unit	Mechanism Board
COIL, Score Release	Spinner Unit	Mechanism Board
COIL, Sequence Release	Spinner Unit	Mechanism Board
COIL, Shuffle	Underside	Playboard
FUSES	Front	Mechanism Board
PLUG, "Cross" "X" Adjustment	left Front	Mechanism Board
PLUG, "X" Adjustment	Left Front	Mechanism Board
PLUG, Vertical	Left Front	Mechanism Board
RELAY, Ball Lift	Right Front	Cabinet
RELAY, Card Stepup		Mechanism Board
RELAY, Coin Lockout		Mechanism Board
RELAY, Diagonal #1	Left Center	Lite Box Insert
RELAY, Diagonal #2	Left Center	Lite Box Insert
RELAY, Horizontal	Left Center	Lite Box Insert
RELAY, Kicker	Underside	Playboard
RELAY, Payout		Mechanism Board
RELAY, 100-Payout		Mechanism Board
RELAY, Replay-Reset, Latch #1		Mechanism Board
RELAY, Replay-Reset, Latch #2		Mechanism Board
RELAY, Star		Mechanism Board
RELAY, Start		Mechanism Board
RELAY, Tilt		Mechanism Board
RELAY, Vertical	Left Center	Insert
RELAY, #2, #3, #4, #6 & #8		Mechanism Board
SPINNER UNIT		Mechanism Board
SWITCH, Ball Carry-over	Ball Lift Assembly	Cabinet
SWITCH, Ball Lift	Right Front Underside	Cabinet
SWITCH, BAll Roll-over	Underside	Playboard
SWITCH, Ball Shooter	Spinner Unit	Mechanism Board

PART LOCATION INDEX (Con'd)

PART NAME	MOUNTED ON	LOCATION IN MACHINE
SWITCH, Cam	Spinner Unit	Mechanism Board
SWITCH, Coin	Slug Rejector Unit	Front Cabinet Door
SWITCH, Main On-Off	Right Front Underside	Cabinet Ledge
SWITCH, Merchant's Replay	Center	Lite Box Insert
SWITCH, Merchant's Reset	Right Front Underside	Cabinet Ledge
SWITCH, Playboard Ball	Front Underside	Playboard
SWITCH, Replay	Left Front Side	Cabinet
SWITCH, Scanner Release	Spinner Unit	Mechanism Board
SWITCH, Score Release	Spinner Unit	Mechanism Board
SWITCH, Sequence Release	Spinner Unit	Mechanism Board
SWITCH, Tilt, Plumb	Left Front Side	Cabinet
SWITCH, Tilt, Slam		Lite Box Insert
STEPUP UNIT, Ball Counter		Lite Box Insert
STEPUP UNIT, Card		Mechanism Board
STEPUP UNIT, Card Scoring Selector		Mechanism Board
STEPUP UNIT, Replay, 0-900		Lite Box Insert
STEPUP UNIT, Replay, 1-99		Lite Box Insert
STEPUP UNIT, Score counter		Mechanism Board

SECTION L

GENERAL INFORMATION

INSTALLATION:

1-1 After uncrating the 5-STAR GAME, set the Lite Box in place and attach it to the cabinet with the two bolts supplied with the machine.

1-2 Draw the cables thru the opening between the Cabinet and the lite Box and insert them in their respective sockets. INSERT THE PLUGS STRAIGHT AND FIRMLY FOR GOOD CONTACT.

1-3 Install Leg Levelers under each corner of the Cabinet and adjust until the machine is level crosswise and lengthwise. Check for the proper playboard slant by placing a level crosswise on the Top Glass or under the front edge of the Cabinet and lengthwise on the Mechanism Shelf or under the bottom edge at the side of the Cabinet.

> IMPORTANT: Level the Machine carefully Improper Playboard slant will affect the action of the ball and also the scoring.

1-4 The five balls may be placed in the machine by removing the Front Door and inserting the balls, one at a time, into the short trough leading from the Return Trough on the front of the Playboard to the Ball Lift Assembly. This trough is located under the Ball Shooter at the right front corner of the machine.

> WARNING
>
> ALWAYS STORE MACHINE IN UPRIGHT POSITION
> Failure to do so may cause oil from the motors, etc. to seep into other parts. This may seriously damage parts or impair operation of the machine.

POWER SUPPLY

1-5 Plug the Service Cord into a good 110-120 Volt, 60 Cycle, A.C. Line. AVOID OVERLOADED LINES, OLD EXTENSION CORDS, ETC. Low voltage will cause incorrect operation.

1-6 Direct Current or another frequency, such as 25 or 30 Cycle, requires a Converter Unit of at least 300 to 400 Watt Capacity operating continuously.

DIRECT CURRENT OPERATION

L-7 For safety reasons, all controls and lamps of the device are operated on low voltage supplied by a transformer requiring the use of 300 to 400 Watt converter for direct current operation.

1-8 Input voltage to the converter should be suitable to the local line. Output must be 110-120 Volts 50 to 60 Cycle A.C. Capacity. must be 300 Watts minimum. The converter must operate continuously.

WARNING

Many direct current lines are not sufficient capacity to handle a converter. Trouble will be experienced if the line voltage drops too low.

SCORE CARDS

1-9 Several types of Score Cards are furnished with each machine. Be sure to change them, if necessary, to the desired type of operation. A chart giving the Scoring information is supplied with the machine.

TO TURN OUT LITES

1-10 The Switch to turn out the Lites on the machine is located under the ledge beneath the front door of the Cabinet at the right side of the machine.

REPLAY SWITCHES

1-11 When free plays are not played off, the Merchants Reset Button should be depressed by the location attendant. This will reset the Replay Register Unit to Zero and record the number of unused replays on the Meter. This button is located at the back of the ledge under the Front Door of the Cabinet.

1-12 A special switch is provided on the back of the insert in the Lite Box for advancing the number of replays showing when the Operator desires to demonstrate the game.

1-13 The Replay Button for the players use is located on the front of the Cabinet in the Upper left hand corner.

METER LOCATION AND PURPOSE

1-14 REPLAY METER - The Replay Meter can be seen upon opening the door of the machine. This meter registers the accumulated number of Free Plays unused when the machine is reset or turned off.

PART II

MAINTENANCE AND ADJUSTMENT

GENERAL

2-1 NEVER EXPERIMENT with any of the mechanism. Locate any trouble through use of the Wiring Diagrams or Operating and Servicing Information supplied with the machine, then check for proper adjustment of the units involved before making any changes. Improper adjustment or make-shift repair will only cause serious damage to other parts of the machine or repeated failure of the part.

NOTE: Always look for a possible loose wire, bad connection at a plug and socket, loose or bent coin in the mechanism, broken or unhooked springs on setups, relays, etc., before adjustments are made or wires reconnected.

FUSES

2-2 IMPORTANT: Never replace Fuses with any size higher than designated below. To do so would only invite damage to more intricate and vital parts of the machine. All Fuses are located on the front edge of the Mechanism Board.

2-3 The 10 ampere fuse protects the 110 Volt input circuit.

2-4 The 20 ampere fuse, White-black to White-red, protects the 6 Volt lamp circuit.

2-5 The 15 ampere fuse, connected from Red-White to Red wires, protects the main or 30 Volt circuit in the machine.

LUBRICATION

2-6 Over-lubrication causes far more trouble in coin operated equipment than under-lubrication. Practically all cases of poor contact on switches and wiper discs are due to oil or grease, or oil vapor, which forms a film or residue on the contacts and will not allow current to pass through. Excess lubricant may also seep into clutches causing them to slip.

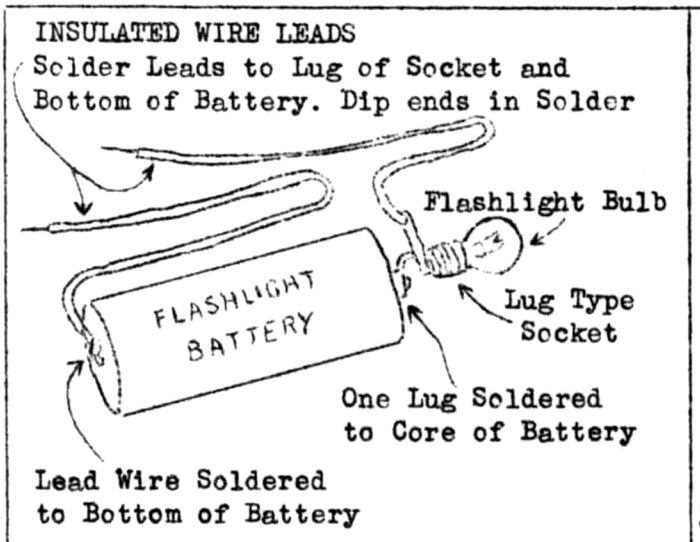
2-7 IMPORTANT: NEVER USE VASELINE FOR LUBRICATION OF ANY PART OF THE MACHINE. Vaseline is not a true lubricant. It leaves a dirty and gummy residue and it becomes very thick when cold. A special Coin Machine Lubricant is supplied with each machine.

2-8 MOTOR BEARINGS should be lubricated as described on the tag attached to each motor.

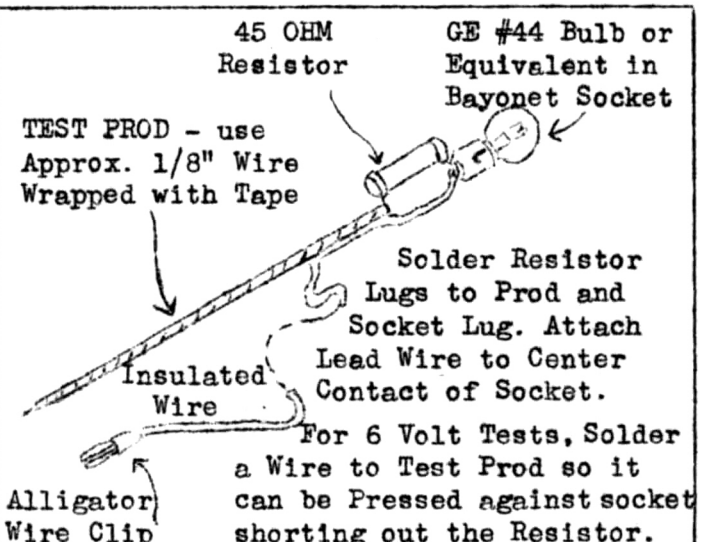
2-9 All rotating parts on the Spinner Mechanism operate on Oilite. Bearings which should never require re-oiling. However, should the mechanism be torn down at any time, these bearings should be saturated with No. 10 motor oil before reassembly.

2-10 STEPUP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with Lubriplate or the special Coin Machine Lubricant (supplied with the game) not oftener than every six months. CONTACT BLADES, DISCS or RINGS in the Spinner Mechanism and Stepup Units will require lubrication with the special Coin Machine Lubricant only after the grease is completely evaporated (3 to 12 months, depending on climate) or when the film of grease becomes dirty. In either event, clean the parts thoroughly with Benzol, Naphtha, White Gasoline or Carbon Tetrachloride, then apply an extremely thin coat of the special grease with a fine camel's-hair brush.

2-11 Solenoid Plungers should not have a lubricant of any kind. Should there be a sluggish tendency or if plungers are sticking, the parts should be cleaned with a solvent and flaked graphite applied in reassembly.



BATTERY TEST LITE



TEST PROD

CONTINUITY CHECKS

2-12 Continuity of coils, contacts, wire connections, etc. may be checked with an Ohmeter or several types of Test Lites. If regular test equipment is not available, an efficient Test Lite may be made from a few miscellaneous parts as shown in the above sketch. The following paragraphs describe this equipment and give information that will prove helpful to the service man.

2-13 Several types of Test Lites are shown in the preceding sketch.

(a) The Battery Test Lite should be used only with all current in the machine turned OFF. When the leads from this Lite are placed across the wires leading to the Coils, Switches, etc., the bulb will light if there is contact throught the unit being checked. If the bulb does not light, there is a break in the circuit. However, only open circuits on coils may be located by this method since shorted coils will also show contact thru the coil. If a short is suspected use the Test Prod (Paragraph 2-13 (b) to check the coil.

(b) The Test Prod must be used with current turned ON. The clip on the end of the lead wire may be attached to any common ground in the machine. This would be Black Wire for 6 to 30 Volts Tests. The Prod end of the tester may then be touched to various connections or contact points in the circuit being checked. Using the tester in this manner leaves the service man with one hand free to manually operate relays or other units.

2-14 If a particular Coil on a Relay, Solenoid, etc., is not energized, place the clip end of the Test Prod on the Black lead to the coil. Touch the Test Prod to the opposite lead of the Coil. If the bulb lights but the Relay Coil, or other unit being checked, is not energized, then the coil is faulty and must be replaced.

2-15 Wiper contacts may be checked by placing the Test Prod Clip on the common ground wire for the circuit (Black for 6 or 30 Volt) and checking the solder lugs of the Contact Discs as follows:

(a) Use the Test Prod to locate the "hot" wires leading into the Disc.

(b) Check the Wiring Diagram for the wire colors of the contacts opposite the hot leads.

(c) Place the Test Prod on the contacts, thus located, and turn the Wipers or Wiper disc of the unit by hand.

The Test Lite should light before one revolution of the wiper is completed.

2-16 Broken Wires may be located by placing the leads of the Battery Test Lite on each end of the wire in question. If the bulb fails to light, a break in the circuit is indicated.

RELAY ADJUSTMENTS

2-17 All relays are adjusted at the factory and should require little or no servicing in the field. Should a Relay fail to actuate the Unit or Lights to which its Switches are connected, the difficulty might possiby be due to dirty Switch Contacts, loose wires or a broken wire between the Relay and other Units.

NOTE: DO NOT make any adjustments to the Relay itself until all other possibilities in the troublesome circuit have been checked.

2-18 The Gap between the Coil and the Armature of the Relay should be approximately 3/64 of an inch. This allows for about 3/32 of an inch movement at the end of the Armature into which the switch blades are inserted. The Gap may be adjusted (if necessary) by bending the Armature Stop Arm.

CAUTION

The Armature Stop Arm on all Relays is carefully adjusted at the factory. Do not change this adjustment unless absolutely necessary.

2-19 The Armature Spring should have enough tension to bring the Armature up against the Armature Stop Arm when the Relay is not energized. SEE THAT PRESSURE, FROM POORLY ADJUSTED SWITCHES, IS NOT AFFECTING THE ARMATURE BEFORE ATTEMPTING ADJUSTMENTS ON THE SPRING.

2-20 If a Relay "chatters" or "hums" but does not pull in, check to see that Switches, located on it, are not out of adjustment and causing too much tension on the armature or that a burr on top of the Relay Coil is not interferring with action of the Armature. Burrs on the Core of the Coil may be removed with a small contact file.

2-21 The Continuity of a Relay Coil may be checked with an Ohmeter or, if one is not available, see Paragraph 2-14 for use of Test Prod.

SWITCH ADJUSTMENTS * GENERAL

2-22 The majority of switches used in Universal Machines are composed of a series of blades and spacers built up with normally open and, or normally closed contacts as required to perform the specific function for which the switch is intended. These switches may be actuated by Relays, Solenoids, or by mechanical movement of other parts of the machine. However, the adjustment of the switch contacts and blades remain fairly constant, as shown in the following paragraphs.

2-23 With the exception of a few cases, in which special adjustment instructions are given, all blade type switches should have at least 1/32" gap between the contact points when open and should follow through for at least 1/32" beyond the point at which the contacts close. This follow through action provides a wiping motion between the contacts, keeping them clean and insuring good contact between the points.

2-24 When adjusting blade type switches, first adjust the blade actuated by other parts of the machine with relation to the part it contacts and then set the gap and follow through. Specific instructions pertaining to each switch are given where necessary, in other paragraphs and may be found by referring to the index.

CAUTION

NEVER BEND BLADES SHARPLY, at the spacers or otherwise. Sharp bends tend to straighten out slightly, with use, and will weaken the blade. Blades Should be formed by a stroking action over the entire length of the blade, using a blade tool or duck bill pliers.

SWITCH ADJUSTMENTS * ROLLOVER

2-25 The Rollover Switches are located on the Roll Down Panel under the Playboard. These switches are operated by a wire form that extends up into the channel and is depressed by the ball as it rolls down to the trap at the front of the Playboard.

2-26 Be sure that the Rollover Switches do not put enough tension on the wire form to cause the ball to hang up at that point. However, if the tension against the wwire form is too light the wire may bounce when it snaps back up causing a double impulse to register on the Ball Counter Unit.

2-27 When the proper tension is set on the Rollover Switch blades (see above paragraphs) the contacts should be adjusted for approximately 1/32 gap and 1/32 follow-thru.

SWITCH ADJUSTMENTS - RELAY

2-28 GENERAL - Unless special instructions are given, all blade type switches mounted on relays should be adjusted according to the instructions for General Switch Adjustments as given in Paragraphs 2-22, 2-23, and 2-24.

SWITCH ADJUSTMENTS - PUSHBUTTON

2-29 Switch Contacts, that are operated by Push Bottons, should be adjusted so that they close when the button is half way down. The Switch Blade that contacts the Push Button should have sufficient tension to hold the button in place against the cabinet.

2-30 Push Button Switches should have at least 1/32" gap between the contact points, when open, so they will not vibrate closed during play.

SWITCH ADJUSTMENTS - TILT

2-31 SLAM TILT switch is the blade type switch with one blade weighted, located on the back of the insert panel in the Lite Box. Rough handling of the machine will cause the weighted blade to vibrate, closing the switch contacts and Tilting the mechanism. The gap between points on this switch may be set as close as desired (depending on how rough the Players treat the machine). Average gap for this type of switch is approximately 1/16". However, closer settings will soon discourage rough players.

2-32 THE PENDULUM TILT, located inside the Front Door of the cabinet, is suspended so that the pendulum and the ring may be set, as desired, by loosening the thumb screw and sliding the weight up or down the Pendulum stem.

SWITCH ADJUSTMENTS - BALL SHOOTER

2-33 The Ball Shooter Switch is located directly ahead of the Ball Shooter Plunger on the playboard and is operated by

the weight of the Ball resting on the small wire form that protrudes through the Playboard. Be sure the wire form is not rubbing the sides of the opening and that its movement is great enough to operate the switch. Also, check to see that the wire form is not bent back far enough to be struck by the plunger during the play. The contacts on this switch should have at least 1/32" gap and 1/32" follow-through.

STEPUP UNIT-ADJUSTMENTS

2-34 The DRIVE ARM, that moves the ratchet on the Stepup Units, should not ride more than half way up the slope of the second tooth on its return stroke. This arm should never need adjustment, however it can be changed by bending the arm slightly.

CAUTION

Excess bending of the Drive Arm will cause it to break. Check all other points thoroughly before attempting adjustments at this point.

2-35 The Drive Adjustment Screw, at the solenoid end of the Drive arm, should be adjusted so that, after the unit has advanced two or three positions, there is very little play in the ratchet when manually turned in reset direction..

2-36 Tension on the Return Spring of a Stepup Ratchet can be set or checked by the following procedure:

(a) Set the Unit in "0" Position.

(b) Unhook the Return Spring and let it unwind until all tension is released.

(c) Wind up the spring between 3 and 4 turns and fasten in place again.

ROTARY DISC-WIPER PIN TENSION

2-37 Spring loaded Wiper Pins should move freely. Pigtail wires between pins should be looped so that they lay parallel with the rotary disc on which the pins are mounted. If the wire rubs the disc or the pins, it will interfere with movement of the pins causing contact failures.

ROTARY DISC-WIPER BLADE TENSION

2-38 Rotary Disc Wiper Blades should have enough tension to keep the wipers in contact with the Stationary Disc when the Rotary Disc is pulled all the way back on its shaft.

STEPUP UNIT - WIPER BLADE TENSION

2-39 Where blade type Wiper Arms are used the Wiper Arm should have sufficient tension to follow the Stationary Plate for at least 1/16" when the plate is pulled toward the metal base of the unit.

SWITCH NUMBERING SYSTEM

2-40 When Switches on the Relays, Cams, etc. in a Universal Machine are referred to by number, the switch number is determined by its position in the Switch Assembly. Starting at the base plate on which the Switch Assembly is mounted, the switches are numbered according to position. The set of contacts mearest the Base Plate is Switch 1, the next set is Switch 2, etc.

INDEX

PART III--SERVICE INFORMATION

SECTION III

SERVICE INFORMATION

WHAT TO DO IF:

GAME DOES NOT OPERATE - LIGHTS OUT

3-1 Check the service outlet to which the game is connected for current turned "ON" and for good tight connection of the plug in the outlet.

3-2 Check the "ON-OFF" Switch under the front ledge of the Cabinet for current "ON".

3-3 Check Service Cord to machine for cuts or damage.

3-4 Check the Fuses located on the back of the Mechanism Board in the Cabinet.

3-5 Check all multiple plugs for clean tight connection, especially those on the cable between the Mechanism Board and the Lite Box.

3-6 Check the switches on the Tilt Relay for good contact and adjustment.

GAME DOES NOT OPERATE - LIGHTS ON

3-7 Check 15 ampere Fuse Red-white to Red wire on the back of the Mechanism Board.

3-8 Check Tilt Relay, Switches for good contact.

3-9 Close the Start Relay manually. If the game still does not operate, check the switches on the Start Relay for good contact and adjustment.

3-10 Insert a coin in the game and check to see that the Start Relay pulls in. If the relay does not pull in, check the continuity of the Relay coil and operate the coin trip wire manually. If the contacts to the Coin Switch and to the Relay Coil are good and the coil is not faulty, the game should start.

NOTE: SEE PART II FOR ADJUSTMENT DETAILS

BALL COUNTER DOES NOT ADVANCE

3-11 Check Ball Rollover Switches for good contact when the Ball is dropped into the pocket. These switches are located on the underside of the Playboard.

3-12 Check Wire Forms on Ball Rollover Switches, be sure they are not binding in the openings in the Roll-down Panel.

3-13 Check the Stepup Coil on the Ball Counter Unit for Continuity (See paragraph 2-14).

BALL COUNTER DOES NOT RESET

3-14 Check Reset Coil on the Ball Counter Unit for continuity (See paragraph 2-14).

3-15 Check Cam 3 Switch 1, Start Relay Switch 2 and the Ball Counter Stepup "0" Switch for good contact and adjustment.

3-16 If the Ball Counter Unit seems to bind or operate too slowly check the mechanical adjustment of the unit as outlined in paragraphs 2-34 to 2-36.

BALL COUNTER LIGHT OR LIGHTS OUT

3-17 Check for good clean contact between the Wipers and the Disc on the Ball Counter Unit.

3-18 Check for bad bulbs in the Lite Box Insert behind the numbers.

ADDITIONAL CARD OR CARDS PLAYED DO NOT REGISTER

3-19 Check Start Relay Switch 2, Card Stepup Relay Switch 1 and Cam 6 Switch 2 for proper contact and adjustment.

3-20 Check Card Stepup Wiper Arms and Cam 2 Switch 1 for good clean and adjustment.

3-21 If the Card Stepup Relay does not pull in, check the coil for continuity (see paragraph 2-14). Also check the continuity of the coil on the Card Stepup Unit.

3-22 If the above checks do not locate or correct the trouble, check to see that the Spinner Motor operates when the Replay Button is pressed. The Spinner Motor is fed by Switch 1 on the Scanner Release Arm and will not complete its cycle to register additional cards played if dirt or improper adjustment of this switch prevents the contacts from closing. Also check to see that the Start Relay and Scanner Release coil pull in to close the Scanner Release Arm Switch 1.

NOTE: SEE PART II FOR ADJUSTMENT DETAILS

CARD SELECTIONS DO NOT RESET

3-23 Check the Ball Counter Stepup "0" Switch, Cam 3 Switch 1 and Start Relay Switch 2 for proper contact and adjustment.

3-24 Check the coil on the Card Stepup Unit. (See paragraph 2-14).

3-25 If the Card Stepup tends to bind or seems stiff check the mechanical adjustment of the unit as outlined in paragraph 2-34 to 2-36.

GAME RESETS AFTER 5th. CARD IS PLAYED

3-26 Check Card Stepup Unit Wipers contacts for proper alignment with contact rivets on the Stationary Disc.

3-27 Check the Wiper Arms on the Ball Counter Stepup Unit for proper contact and adjustment.

CARD SELECTOR UNIT DOES NOT ADVANCE

3-28 Check Wipers on Ball Counter Stepup for good contact in the 5th position.

3-29 Check Cam 6 Switch 1 for good contact and adjustment.

3-30 Check Card Selector Stepup Coil for continuity.

SCORE COUNTER STEPUP UNIT DOES NOT RESET; Check-

3-31 Wipers on Ball Counter Stepup Unit (5th Position).

3-32 Switch on Cam 6 Switch 1.

3-33 Score Counter Stepup "0" Switch.

3-34 Score Counter Stepup Unit Reset coil for continuity.

REPLAY UNITS DO NOT RESET; Check-

3-35 On replays:-

a. Start Relay Switch 4.

b. 0-900 Replay Stepup "0" Switch.

c. 1-99 Replay Stepup Reset Coil for continuity.

d. Wipers on 1-99 Replay Stepup Unit.

NOTE: SEE PART II FOR ADJUSTMENT DETAILS

e. 1-99 Replay Stepup E.O.S. Switch.

f. 0-900 Replay Stepup Reset Coil for continuity.

3-36 On Merchant's Reset: Check-

a. Tilt Relay Switch 2

b. Scanner Cams Release Switch 2.

c. Sequence Cams Release Switch 2.

d. Score Relay Switch 4.

e. 0-900 Replay Stepup "0" Switch.

f. Replay Reset Relay Switch 1.

g. Cam 8 Switch 1.

h. 0-900 Replay Stepup "0" Switch.

i. 1-99 Replay Stepup Reset Coil.

j. Wipers on 0-900 & 1-99 Replay Stepup Units.

k. 1-99 Replay Stepup E.O.S. Switch.

l. 0-900 Replay Stepup Reset Coil.

REPLAY METER DOES NOT ADVANCE; Check--

3-37 Cam 8 Switch 2.

3-38 Replay Reset Relay Switch 5.

3-39 Replay Meter for continuity.

REPLAY STEPUP (0-900) DOES NOT ADVANCE--1-99 UNIT ADVANCES

3-40 Manually step up the 1-99 Replay S.U. Unit to 99th position then close Switch 2 on Score Relay, Switch 3 on Cam 8 & 1-99 Replay S.U. E.O.S. Switch. If the 0-900 Replay S.U. Unit does not stepup, check the Wipers on 1-99 Replay S.U. Unit and Coil on 0-900 Replay S.U. Unit. If a test Prod (See paragraph 2-14) is available, the best method for this test is to clip the lead of the test Prod to the ground wire (heavy black wire) and check the continuity by touching the rod or the test Prod to the Black-white wire on Switch 2 of the Score Relay and on all other connections thru the circuit to the 0-900 Replay S.U. Coil as descreibed on Replay Stepup Circuit chart No. 2 in this manual. The Test Prod will lite up to the point at which the circuit is faulty.

NOTE: SEE PART II FOR ADJUSTMENT DETAILS

BALL KICKER FAILS TO OPERATE:

3-41 Check Ball Kicker Relay Switch 1 and Ball Kicker Switch for proper adjustment and contact.

3-42 Check Ball Kicker Coil and Ball Kicker Relay coil for continuity.

BALL DOES NOT RISE TO SHOOTING POSITION:

3-43 If at start of game, the Ball does not rise to shooting position, check to see if Balls have been released from Playboard; if not, check Start Relay Switch 2 and Ball Counter Stepup "0" Switch 1 for proper adjustment and contact. Also check Shuffle Coil for continuity.

3-44 If Balls have been released from Playboard, but the Ball does not rise to shooting position; check Start Relay Switch 3, Ball Counter "0.S. Switch, Ball Shooter Switch and Ball Lift Relay Switch 2 for proper adjustments and contact. Also check Ball Lift Relay Coil for continuity.

3-45 If 1st Ball rises to shooting position, but remaining Balls do not, check Cam 3 Switch 2 for proper adjustment and contact.

GAME SCORES IMPROPERLY

3-46 Check the operation of the Scoring Circuit as outlined in paragraph 4-33 of this manual. Separate sketches of this circuit are also given as Circuit Drawings No. 4 and 5 in Part IV.

3-47 If the game scores 80 where it should score 50 or 100, check the "100 Score Relay", particularly the relay coil for continuity.

GAME CONTINUES TO SCORE WITHOUT STOPPING

3-48 Check Score Relay Switch 2 for proper contact and adjustment.

3-49 Check to see that the Score Counter Stepup Unit advances. If the Unit does not advance check the coil on the Unit for continuity.

3-50 In cases where the Game should have registered a score of 2 to 20 inclusive, check the contacts and adjustment of Cam 8 Switch 4, Horizontal Relay Switch 5, Vertical Relay Switch 4, No. 3 Relay Switch 4, No. 4 Relay Switch 4, Star Relay Switch 5, Diagonal No. 1 Relay Switch 1 and Diagonal No. 2 Relay Switch 1. In the case of 2 and/or 3 score,

NOTE: SEE PART II FOR ADJUSTMENT DETAILS

also check the "Red" Score Adjustment Plug located behind the Spinner Unit on the Mechanism Board.

3-51 In cases where the Game should register a score of 50 on the "Cross" (+) win or 100 on the "Ex" (X), check the Score Relay Switch 2, Cam 9 Switch 1 and the Score Counter Stepup Coil. Also check the "Blue" and "Yellow" Score Adjustment Plugs, located behind the Spinner Unit, for good contact.

3-52 In cases where the Game should register a score of 100 on the "Cross" win or 200 on the "Ex" win, check the Score Relay Switch 2, Cam 11 Switch 1 and the Score Counter Stepup Coil. Also Check the "Blue" and "Yellow" Score Adjustment Plugs, located behind the Spinner Unit, for good contact.

GAME SCORES TOO MANY REPLAYS

3-53 Check the Playboard Ball switches on the underside of the Playboard. If one of these switches stick in a closed position or is shorted across the wires or contacts, the corresponding relay for this pocket will remain energized and the game would record replays not earned.

NOTE

If only the contact leading to the Relay is stuck, the fault would not be shown on the Back Glass since the contacts for the light may open normally.

3-54 Also check the adjustment and contacts of the Playboard Ball Switches. All contacts on this group of switches should open and close at the same time and should have approximately 1/32 gap and 1/32 follow thru. Contacts should be clean and smooth.

3-55 Check the Shuffle Gate on the front edge of the Playboard. It should be straight and level. If the Gate is bowed at the center or loose, the balls may roll too far forward and will rest only partially on the Ball Switch. The Switch would then only be closed part way and may close some of the contacts in the switch stack while others remain open. This could cause the corresponding relay to be closed for scoring while the contacts to the light in back glass are open.

PART 1V

CONTROL DATA

GENERAL INFORMATION

4-1 This Section contains information, charts and diagrams which will prove helpful to the serviceman in following the various electrical circuits and mechanical actions of the machine. A separate index is provided on Page 4-1 for your convenience in locating this information rapidly.

CAM SWITCH FUNCTIONS & WIRE COLORS

4-2 Cam 1 Switch 1

Red to Red-White wire resets replay reset relay.

4-3 Cam 1 Switch 2

Red to Blue-White resets tilt relay.

4-4 Cam 2 Switch 1

White to Orange-Green energizes Card Stepup Relay. This Circuit steps up Card Stepup Unit to next #1 position.

4-5 Cam 3 Switch 1

Gray-Green to Blue-Black resets Ball Counter & Card Scoring Selector Units.

4-6 Cam 3 Switch 2

Red to Blue-Black operates Ball lift motor for 1st Ball.

4-7 Cam 5 Switch 1

Black-Yellow to Yellow-Black energizes Scanner Circuit on Card Selector Stepup.

4-8 Cam 6 Switch 1

Red-Yellow to Gray steps up Card Selector Stepup Unit and resets Score Counter Stepup Unit in series with Ball Counter Stepup Unit (5th Position)

4-9 Cam 6 Switch 2

Red-Yellow to Orange-Black steps up Card Stepup Relay in series with Start Relay Switch 2 at start of game.

4-10 Cam 8 Switch 1

Brown to Yellow-Green energizes 1-99 and 0-900 Replay Stepup Units reset circuits.

4-11 Cam 8 Switch 2

Brown to Brown-Yellow operates Replay Meter Thru Latch #1 Replay Reset Relay Switch 5.

4-12 Cam 8 Switch 3

Black-White to White Black energizes 1-90 & 0-900 Replay Stepup Units Stepup Circuits.

4-13 Cam 8 Switch 4

Black-White to Blue impulses Score Counter Stepup Circuit for Replay Stepup of From 2 thru 20.

4-14 Cam 9 Switch 1

Blue-Yellow to White-Red impulses Score Counter Stepup circuit for 50/100 Replay Stepup.

4-15 Cam 11 Switch 1

Blue-white to White-Red impulses Score Counter Stepup Circuit for 100/200 Replay Stepup.

CAM RELEASE SWITCH FUNCTIONS

4-16 Sequence Cams Release Switches

Switch 1 operates Spinner Motor
Switch 2 one of series of switches operating as safety circuit to insure proper scoring.

4-17 Scanner Cam Release Switches

Switch 1 operates Spinner Motor
Switch 2 see "Seq. Cams Release Switch 2"

4-18 Score Cam Release Switch

Switch 1 operates Spinner Motor
Switch 2 Completes circuit for Card Scanning and stops scanning during scoring.

RELAY SWITCH FUNCTIONS

4-19 Start Relay

Switch 1 Lock-in switch for Start Relay
Switch 2 Starts reseting of game at start of game.

Switch 3 resets Tilt Relay & Energizes step-down circuit for "1-99 & "0-900 Replay Units."

4-20 Tilt Relay

Switch 1 lites Tilt lite when relay is de-energized, and energizes all lites except display lights.

Switch 2 energizes circuit for playboard ball switches and relays, Diagonal #1 & #2, Horizontal & Vertical Relays.

Switch 3 lock-in switch for Tilt Relay, & energizes circuits for "Score" & "100 Score Relays".

4-21 Latch #1 Replay Reset Relay

Switch 1 energizes Replay Button Switch.

Switch 2 energizes Merchant's Reset Button Switch.

Switch 3 opens circuit to Latch #1 Replay Reset Relay while relay is locked in.

Switch 4 energizes Score Cams Release Coil on Merchant's Replay Reset.
Switch 5 Energizes Replay Meter

4-22 Latch #2 Replay Reset Relay

Serves as a lock-in for Latch #1 Replay Reset Relay. When Latch #2 Coil is energized, it releases the lock-in latch.

4-23 Card Step-up Relay

Switch 1 energizes Card Stepup Unit Coil.

4-24 Score Relay

Switch 1 energizes Spinner Motor.

Switch 2 energizes Score Counter Stepup Circuit.

Switch 3 energizes Score Cams Release Coil.

Switch 4 opens start circuit while scoring. See "Seq. Cams Release Relay Switch 2".

Switch 5 opens circuit to Scanner Cams Release Coil, in series with Switch 2 on Score Cams Release.

4-25 Kicker Relay

Switch 1 energizes Kicker Coil.

4-26 100 Score Relay

Switch 1 energizes Wiper on Score Counter Unit for "Cross" ( ) win.

4-27 Horizontal Relay

Switch 1 one of series of switches that energizes 100 Score Relay.

Switch 2 energizes Wiper on Score Counter Unit for 3 score.

Switch 3 energizes Wiper on Score Counter Unit for 20 score.

Switch 4 in series & in parellel with other switches that energize score counter stepup coil.

4-28 Vertical Relay

Switch 1 one of series of switches that energizes 100 score relay.

Switch 2 energizes Wiper on Score Counter Unit for 2 score.

Switch 3 one of series of switches that energizes Wiper on Score Counter Unit for 20 score.

Switch 4 one of series of switches that energizes Wiper on Score Counter unit for 20 score.

Switch 5 in series & in parellel with other switches that energize score counter stepup coil.

4-29 Diagonal #1 Relay

Switch 1 energizes Wiper on Score Counter S. U. Unit in series with Switch 1 of Diagonal #2 Relay for "X" win. Also in series with switch 2 of "100 score relay" in case of 200 score win.

Switch 2 energizes Wiper on score counter S.U. Unit in series with switch 4 of Vertical Relay and switch 2 of "100 score relay" for 20 score win.

Switch 3 energizes Wiper on Score Counter S. U. Unit in series with switch 3 of Horizontal Relay & switch 2 of "100 Score Relay" for 20 score win.

Switch 4 energizes Wiper on Score Counter S. U. Unit for 5 score win.

Switch 5 energizes Score Counter S. U. Coil thru series of other switches. (Refer to chart on "Replay S. U. Circuit.")

4-30 Diagonal #2 Relay

Switch 1 energizes wiper on Score Counter S. U. Unit in series with switch 1 of Diagonal #1 Relay for "X" win. Also in series with switch 2 of "100 Score Relay" in case of 200 score win.

Switch 2 energizes Wiper on Score Counter S. U. Unit in series with switch 4 of Vertical Relay & switch 2 of "100 Score Relay" for 20 score win.

Switch 3 energizes Wiper on score counter S. U. unit in series with switch 3 of Horizontal Relay & Switch 2 of "100 Score Relay" for 20 score win.

Switch 4 energizes Wiper on Score Counter S. U. Unit in parellel with switch 4 of Diagonal #1 Relay 5 score win.

Switch 5 energizes Score Counter S. U. Coil thru series of other switches. (Refer to chart on "Replay S. U. Circuit.")

4-31 Ball Lift Relay

Switch 1 lock-in circuit for Ball Lift Relay.

Switch 2 operates Ball Lift Motor in series with switch 3 of Start Relay & in parellel with Ball carry-over switch which is located on the Ball Lift Unit and actuated by Ball Lift Motor Cam.

4-32 No.'s 2, 3, 4, 6, 8 and Star Relays

The Switches on any one of these Relays are connected in series with similar switches on the other Relays and serve to complete the circuit to the Horizontal, Vertical Diagonal #1 and Diagonal #2 Relays. The Switches are fed thru the Card Selector Stepup Unit and are energized only for the cards that are being played during each game.

NOTE: The numbers used to identify each of the above relays are not related to the Pocket Numbers on the Playboard. They indicate only position on the card and are energized by a different Pocket Switch for each card. Any Pocket numbers shown in Playing Card Position indicated below will energize the unit corresponding to that position.

FEEDS Star Relay Sw.3 No. 2 Relay Sw.1 No. 4 Relay Sw.3	ENERGIZES No. 4 Relay	ENERGIZES No. 6 Relay
ENERGIZES NO. 2 RELAY	ENERGIZES STAR RELAY	FEEDS Star Relay Sw.1 No. 6 Relay Sw.2
ENERGIZES NO. 3 RELAY	FEEDS No. 3 Relay Sw. 3 Star Relay Sw. 2	ENERGIZES NO. 8 RELAY
PLAYING CARD		

4-33 SCORING CIRCUIT CHECK STEPS

A. The Scoring Circuit on the 5-Star game operates thru the card Selector Unit and the Card Stepup. As each card is played, the Card Stepup advances one position closing additional contacts on the Card Stepup Disc which feed the contacts on one side of the Card Selector Disc. At the end of each game, the Card Selector Unit automatically advances thru five positions (one for each possible card played) in a scanning action that allows any winning combinations on each card to be registered on the Replay Unit. In normal operation, the scanning action takes place so rapidly that any check of these units would be difficult. The following paragraphs, however, give the procedure for setting up and checking the game manually.

b. Light all five Cards on the Lite Box as in normal play.

c. Remove the Front Door and the Back Door of the cabinet.

d. Advance the Card Selector Unit one step manually. This places the Unit in the scanning position for Card No. 1.

e. Reach under the Playboard, thru the Front Door, and manually close the Playboard Ball Switches lighting numbers 2, 3, 4, Star 6 and 8 one at a time. The Playboard Ball Switches are located along the front edge of the under side of the Playboard. When checking Card No. 1 in this manner, the No. 2 Relay should close when the No. 2 Switch is closed and each of the other switches should close the corresponding Relay. Numbers 1, 5 and 7, however, are not connected to Relays and will not cause any action in the machine other than to light that number on the Back Glass.

NOTE

The numbers on the card and the Relay numbers correspond only in testing Card No. 1. On all other cards the same position on the card will actuate the relay regardless of the number placed in that position. See Paragraph 4-32 for further information.

f. If the Relays are not energized when the Playboard Ball Switch is closed, check the Wiper Contacts on the Card Selector and Card Stepup Units for good contact. Also check the Playboard Ball Switch and the Relay Coil of the combination being checked.

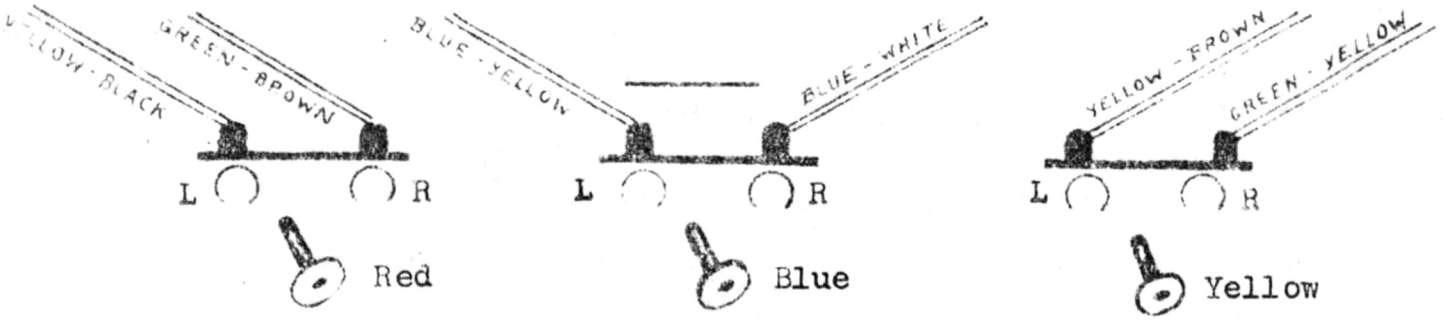
g. With the Game set up as outlined in the preceding paragraphs a thru e, advance the Card Selector Unit one more position (2 positions from "0"). This places the Unit in scanning position for Card No. 2.

h. Manually close the Playboard Ball Switch corresponding to the Star Pocket. This should cause the Star to light on the Back Glass and the Star Relay should pull in.

i. Advance the Card Selector Unit one step at a time and check the action of the Star Relay at each step. This will provide a check on the contact of the Wiper Arms on the Card Selector and Card Stepup Units. These Units should be checked for good wiper contact if the Star Relay fails to pull in at any position.

NOTE

It is not necessary to check the action of the other Relays on each card. If the Playboard Ball Switches and Relay Coils operate properly on Card No. 1, they will operate for all other Cards.

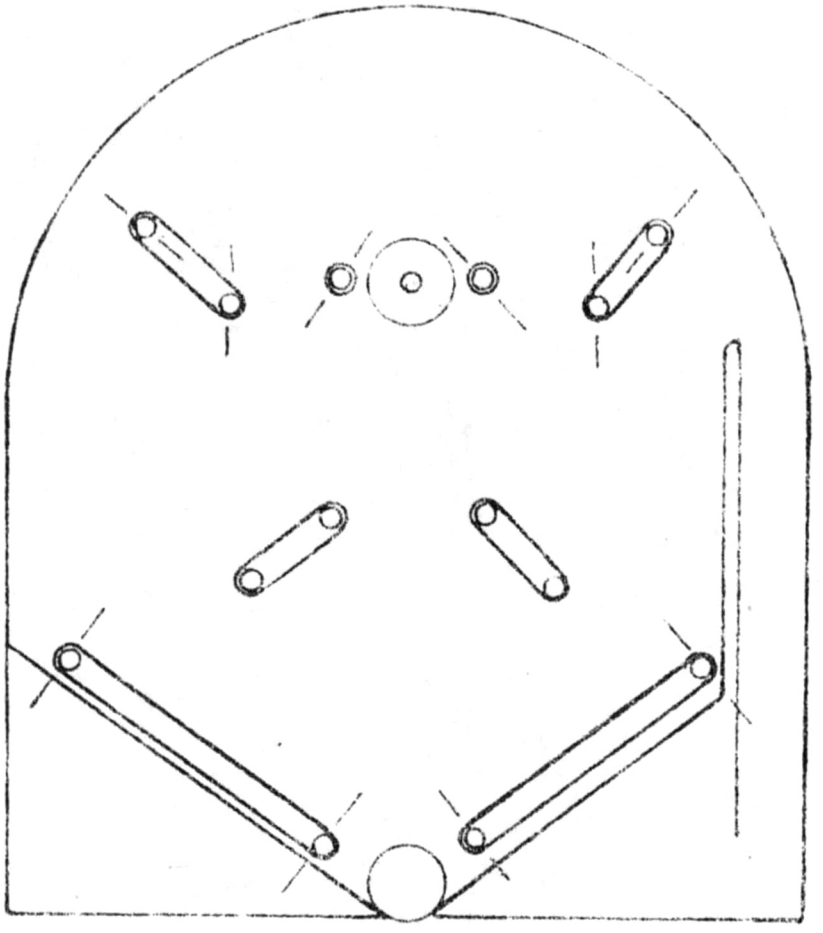


The above plugs are located directly behind the Spinner Unit on the Mechanism Board and may be identified by the color of the Phone tip.

See Chart below for settings.

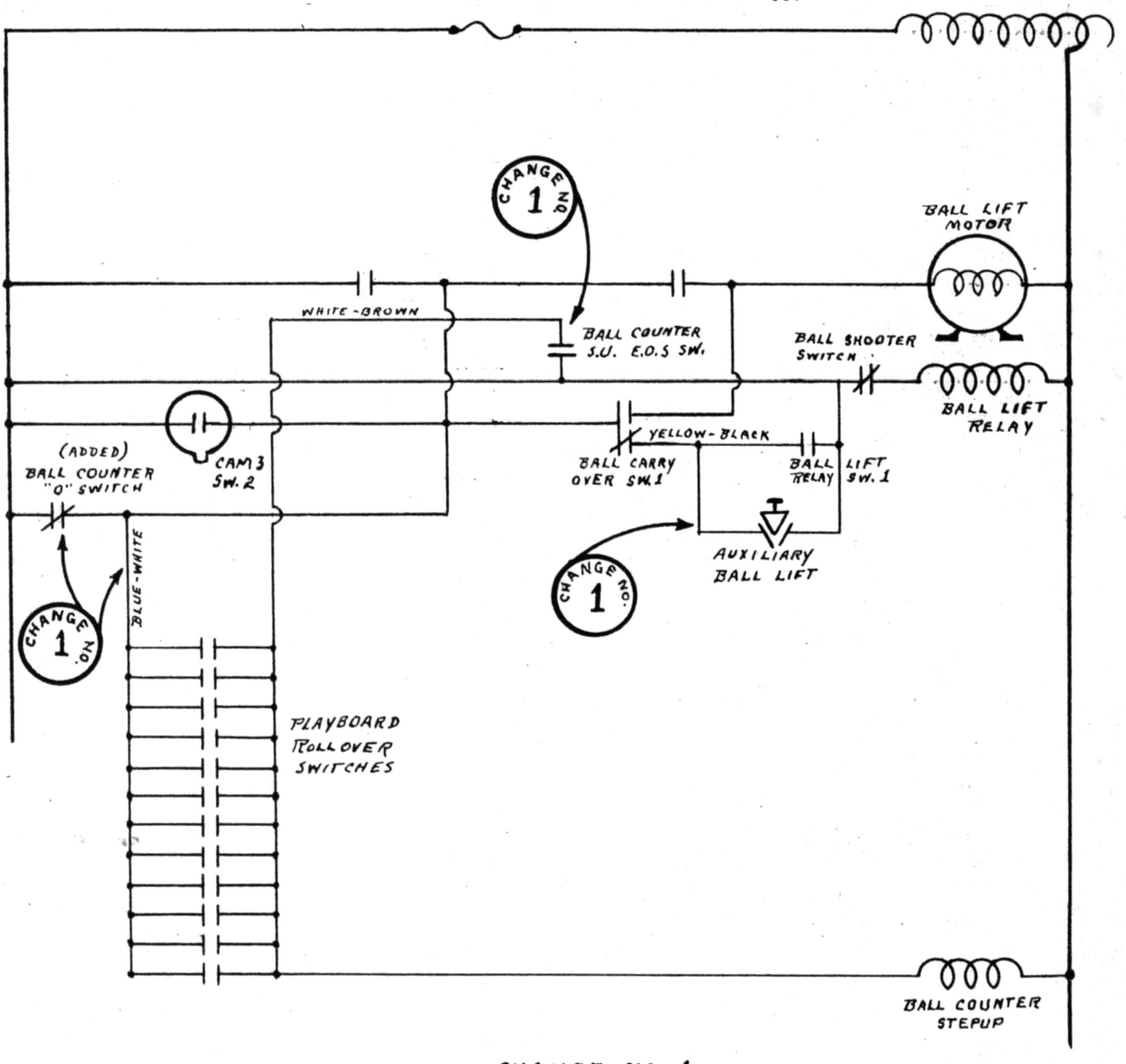
PLUG POSITIONS			SCORING		
Red	Blue	Yellow	Vertical	+	×
L			2		
R			3		
	L	L		50	50
	L	R		50	100
	R	L		100	100
	R	R		100	200

NOTE: Be sure Plugs are firm in their sockets.

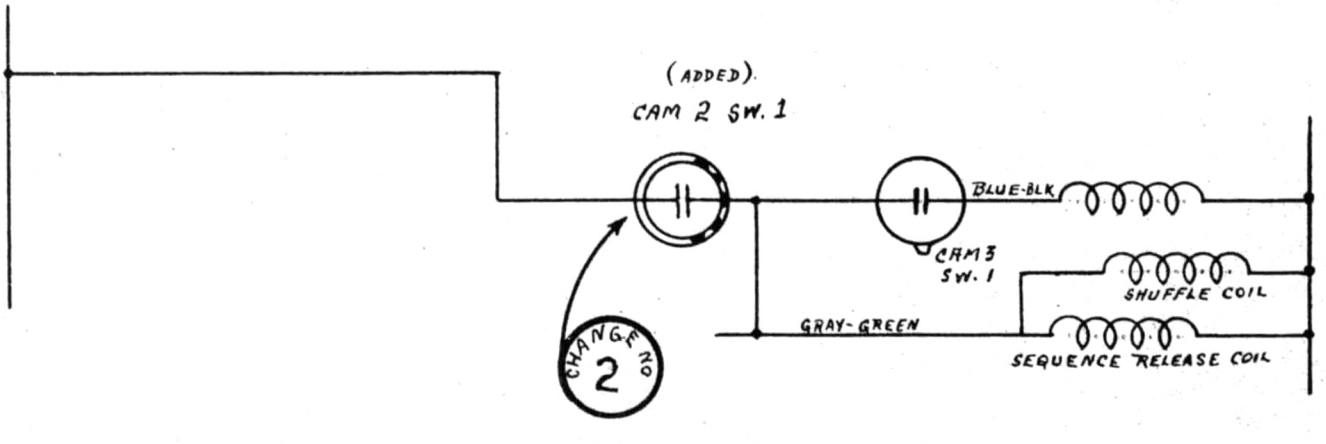


PLAYBOARD BUMPER ADJUSTMENTS

UNIVERSAL IND. INC. No. 541 ENGINEERING CHANGE
6-15-1951



CHANGE NO. 1
MACHINE SERIAL NO. 1807 & OVER



CHANGE NO. 2

SCORING

Any Vertical Row 2
" Horizontal Row 3
" Diagonal Row 5
" 2 (Rows on one of cards played) 20
+ (Cross) 100
X (x) 200

Only PLAYED cards score.
Use REPLAY button when Replays show on Backboard

AUXILIARY BALL LIFTER BUTTON UNDER FRONT OF CABINET

541 R 77

SCORING

Any Vertical Row 3
" Horizontal Row 3
" Diagonal Row 5
" 2 (Rows on one of cards played) 20
+ (Cross) 50
X (x) 100

Only PLAYED cards score. Replays show on backboard
Use REPLAY button when

AUXILIARY BALL LIFTER BUTTON UNDER FRONT OF CABINET

541 R 80