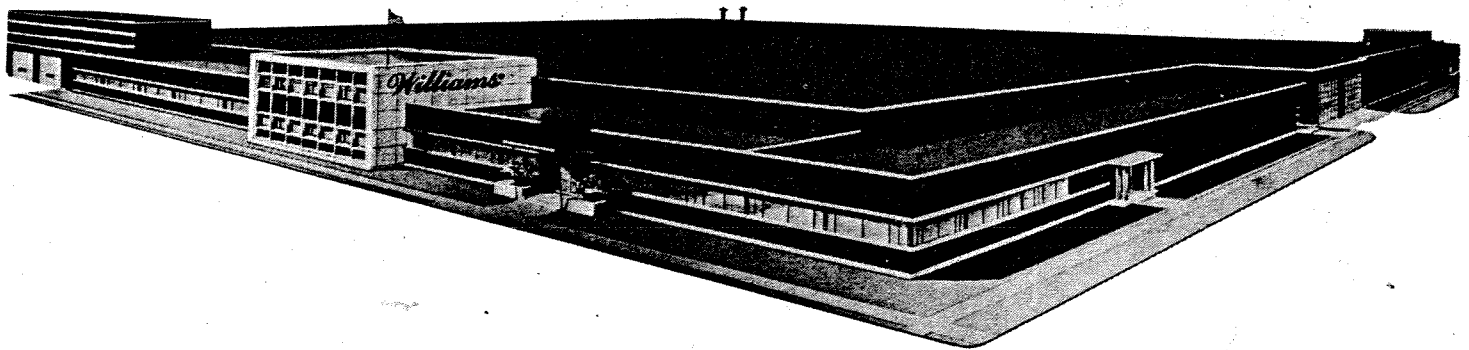


# Instruction Manual

*for*

# STARDUST



*Williams*<sup>®</sup> ELECTRONICS, INC.  
SUBSIDIARY OF THE SEEBURG CORPORATION

3401 N. California Ave.  
Phone 267-2240

Chicago, Ill. 60618, U.S.A.  
Cable Address: Wilcoin

# **IMPORTANT NOTICE**

**KINDLY INFORM LOCATIONS THAT THEY  
CAN TURN DISPLAY LIGHTS ON BY PRESSING  
LEFT FLIPPER BUTTON. MACHINE CAN STILL  
BE SHUT OFF BY TAPPING BOTTOM OF  
CABINET.**

**MASTER SWITCH (ON-OFF) IS LOCATED  
UNDERNEATH FRONT PART OF CABINET.**

# **CAUTION!**

The playboard on this machine has an improved finish with excellent wearing properties. Do not under any circumstances clean the board with water, water soap solutions or harsh abrasives. Avoid such things as steel wool, kitchen cleansers or abrasive hand soap. Water will weaken the adhering of the paint to the board and abrasives shorten the board life by many thousand plays. A wax base cleaner with negligible abrasive qualities used lightly, but frequently, will extend the board life to its full capabilities.

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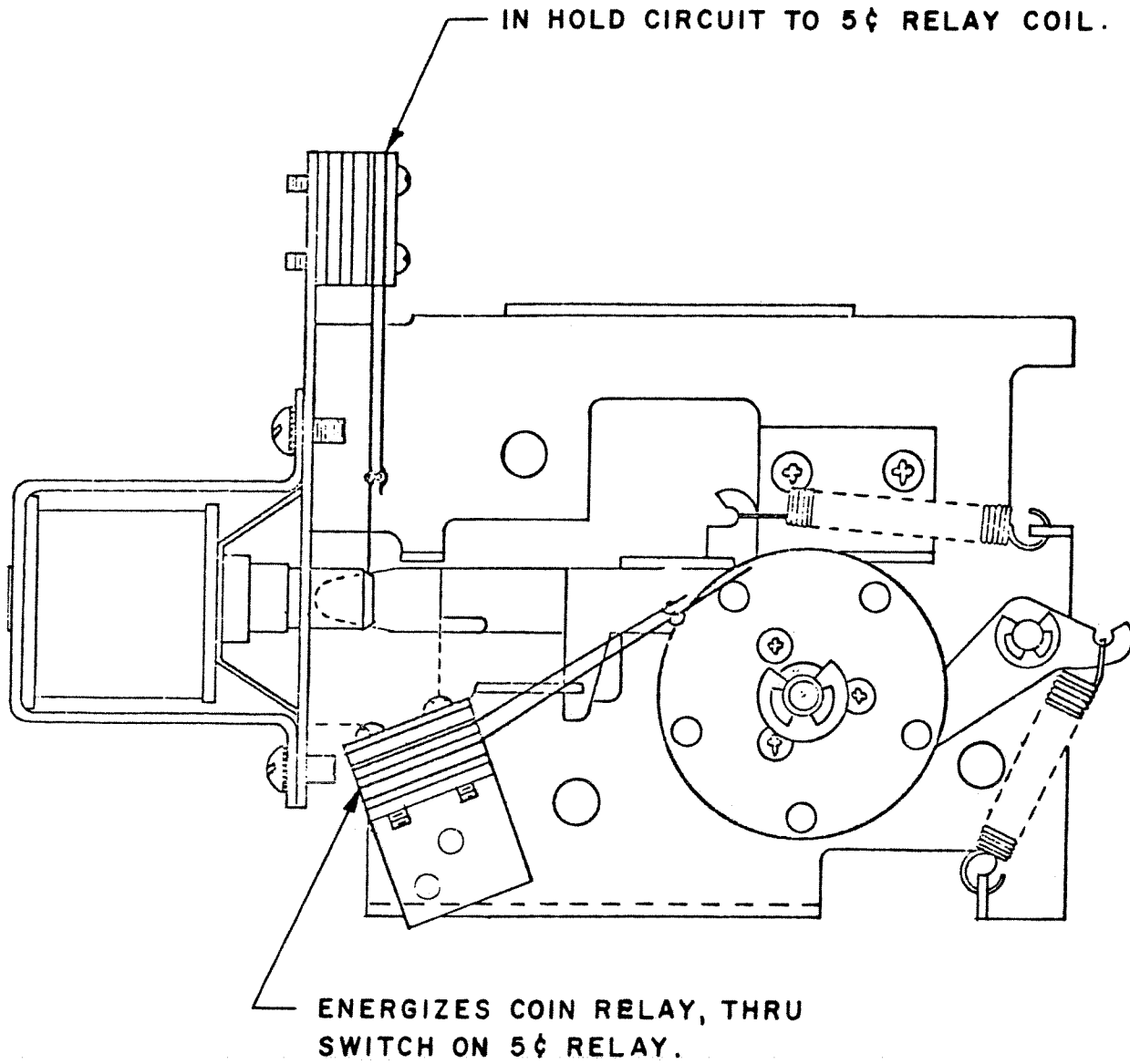
- ## **SERVICEMAN**
- ### **TO REMOVE BACKGLASS:**
- WITH BACK DOOR REMOVED, PULL BACK ON BRACKETS AT INSIDE TOP OF LITE BOX.**
  - FROM THE FRONT OF GAME, LIFT GLASS UP AND OUT.**

*Whelbstone generator*

# ALTERNATOR UNIT

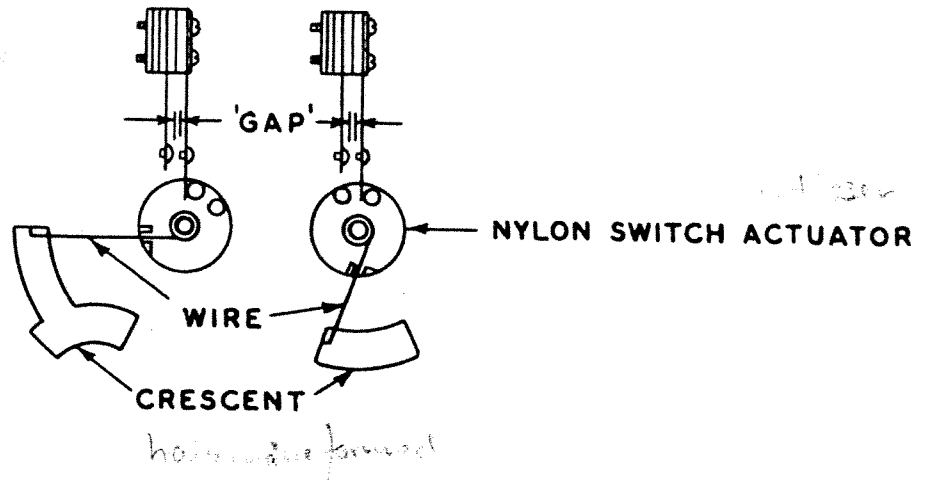
LOCATED ON MECHANISM PANEL.

*for advance*  
USED IN CONJUNCTION WITH 5¢ RELAY FOR "2 COINS - 1 PLAY" FEATURE.



# INSTRUCTIONS FOR COIN TRIP SWITCH ADJUSTMENT

WIRE SHOULD BE IN CONTACT WITH END OF CRESCENT OPENING WHEN BLADE *blades* ADJUSTMENT IS MADE.



Long blade should be in contact with nylon switch actuator and have a maximum overtravel of 1/32.

*overlapping?*

or

Using a gram gauge, tension of long blade should not exceed 10 grams.

*note spending*

## SWITCH ADJUSTMENT

1. For small coins, such as dimes, adjust short blade so that the 'gap' between the silver contacts is .045 to .055.
2. For larger & heavier coins the 'gap' should be .045 to .060.
3. Do not adjust 'gap' closer than .040.

## THE POWER TRANSFORMER,

located on panel. Is equipped with a secondary tap. If your game is on location with extremely low line voltage, remove lead from lug marked 24 volt and solder to alternate lug marked "HIGH". This will increase secondary voltage for proper operation.

## LEG LEVELERS,

are provided for two purposes - 1st to level game on location, 2nd to increase pitch for game percentaging. If it is desired to speed up play and decrease scores, raise rear legs to increase pitch.

*low pitch*

# WARRANTY

THE MOTORS IN ALL NEW WILLIAMS PRODUCTS ARE UN-CONDITIONALLY GUARANTEED FOR 6 MONTHS FROM DATE OF PURCHASE.

ANY DEFECTIVE MOTORS RETURNED DURING THE WARRANTY PERIOD WILL BE REPLACED FREE OF CHARGE BY YOUR WILLIAMS DISTRIBUTOR.

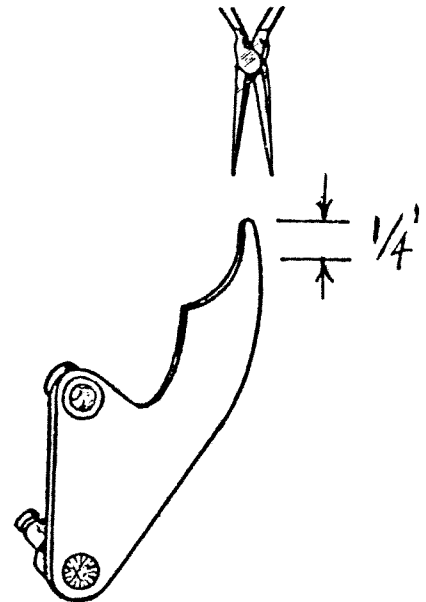
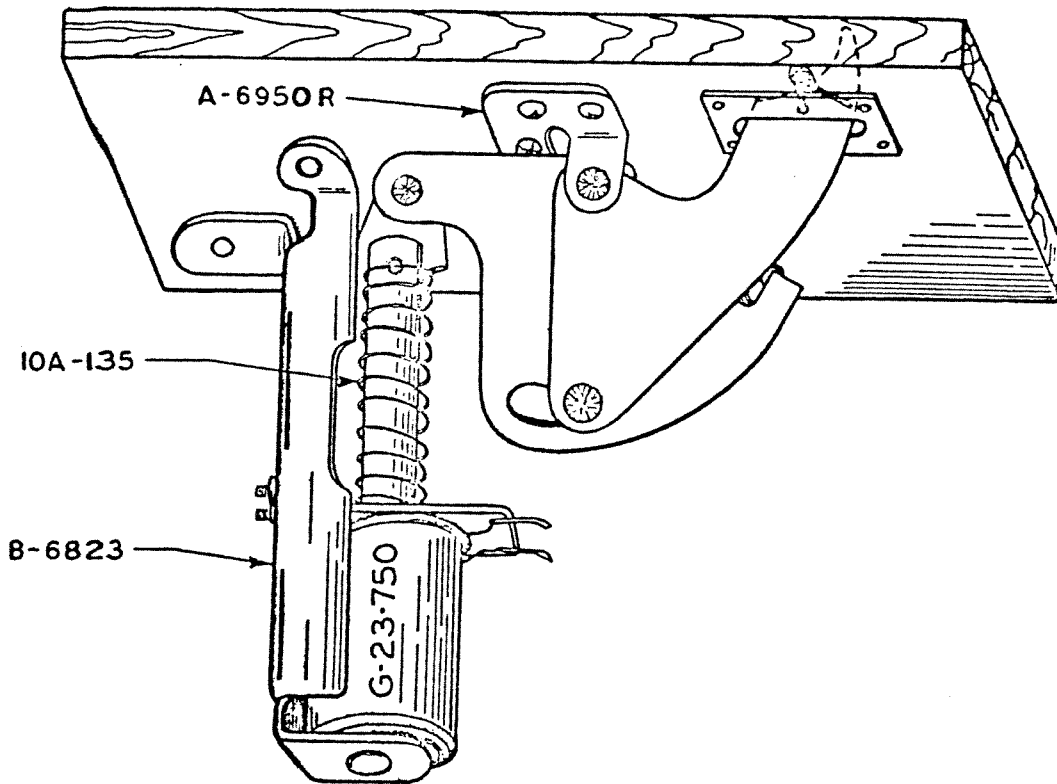
## IMPORTANT NOTICE

WHEN ORDERING PARTS ALWAYS SPECIFY NAME OF UNIT, GAME AND SERIAL NUMBER, IN ADDITION TO A CLEAR DESCRIPTION OF THE PART AND PART NUMBER IF POSSIBLE.

### UNIT PARTS LIST

UNIT NAME	CONTACT DISC	WIPER ASSEMBLY	RATCHET GEAR ASSEMBLY	MOTORS
REPLAY	-----	-----	A-6400	
BALL COUNT	C-6932	C-6520	A-6402-5	
NO. MATCH	C-6417	C-6520	A-6401	
PLAYER	C-6417	C-6521	A-6405-3	
COIN	C-6896	C-6520	A-6402-3	14A-7805 (60 CYCLE) SCORE MOTOR
BONUS	C-6417	C-6520	A-6402-10	
10 POINT	B-7253	A-6294	3C-7272	14A-7806 (50 CYCLE) SCORE MOTOR
100 POINT	-----	-----	3C-7272	
1000 POINT	B-7253	A-6294	3C-7272	
10000 POINT	B-7253	A-6294	3C-7272	
ADVANCE	A-7195	A-6294	3C-7272	
ALTERNATOR	-----	-----	3C-7272	

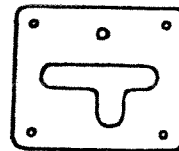
# BALL EJECT CAM UNIT



TO CHANGE DIRECTION OF BALL,  
WHEN EJECTED, GRASP "BALL EJECT CAM"  
WITH LONG-NOSED PLIERS (APPROXIMATELY  
1/4") AND BEND SLIGHTLY.

BENDING TO THE LEFT WILL CHANGE  
DIRECTION OF EJECTED BALL SLIGHTLY  
TO THE RIGHT, AND VICE-VERSA.

CAUTION  
IF BEND IS TOO GREAT, IT MAY  
CAUSE A BIND WHEN "BALL EJECT CAM"  
IS RESTING IN PART #3A-6015G-6.



3A-6015G-6

"STAR DUST" COIL CHART

NOTICE:

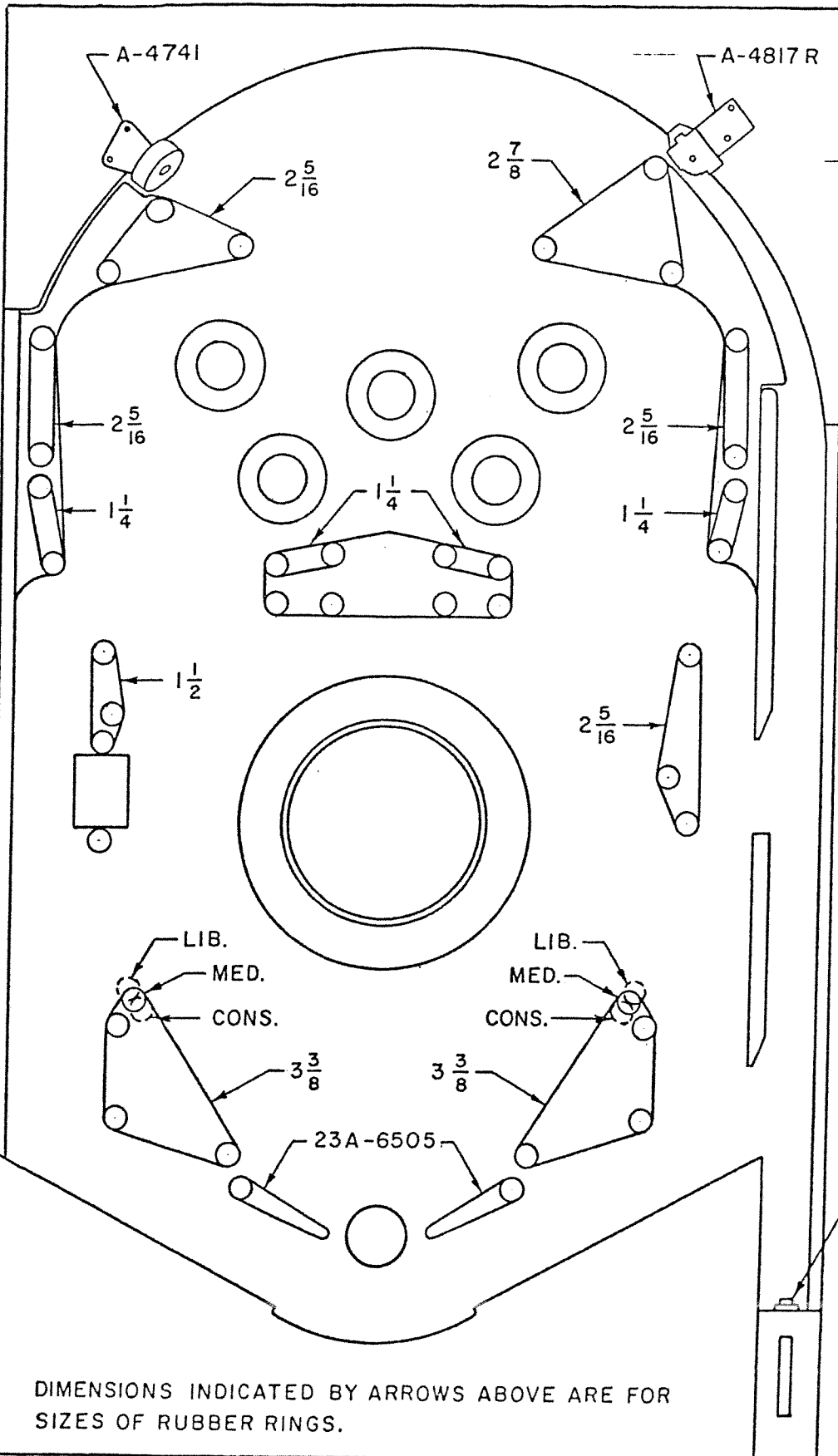
THIS GAME OPERATES ON 24 VOLTS. WHEN ORDERING REPLACEMENT TRANSFORMERS, MOTORS, COILS OR METERS ... MAKE SURE TO SPECIFY CORRECT PART NUMBER.

NUMBER	DESCRIPTION	LOCATION
14 A 7805	SCORE MOTOR - 60 CYCLE	MECH. PANEL
14 A 7806	SCORE MOTOR - 50 CYCLE	MECH. PANEL
15 A 6771	TRANSFORMER - 60 CYCLE	MECH. PANEL
15 A 6782-1	TRANSFORMER - 50 CYCLE	MECH. PANEL
B 6396	PLAY METER (COIL XM 27-675)	MECH. PANEL
<u>SOLENOID COILS</u>		
A 22-550	MATCH UNIT STEP UP BALL RELEASE COIL	INSERT PLAYFIELD
	PLAYER UNIT STEP UP COIN UNIT STEP UP	INSERT MECH. PANEL
A 23-600	BALL COUNT UNIT STEP UP REPLAY UNIT STEP UP BONUS UNIT STEP UP	MECH. PANEL INSERT PLAYFIELD
A2-23-750	LARGE BELL KNOCKER	CABINET CABINET
B1 26-800 B 26-800	SCORE DRUM UNIT ... (16 req'd.) PLAYER UNIT RESET REPLAY UNIT RESET BONUS UNIT RESET BALL COUNT UNIT RESET COIN UNIT RESET ALTERNATOR UNIT ADVANCE STEP UP	INSERT INSERT INSERT PLAYFIELD MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD
FL 21-375/28-400	FLIPPER COILS ... (2 req'd.)	PLAYFIELD
G 22-550	JET BUMPER COILS ... (5 req'd.)	PLAYFIELD
G 23-750	KICKER COILS ... (2 req'd.) DISAPPEARING POST (LATCH COIL) EJECT COIL ... (2 req'd.)	PLAYFIELD PLAYFIELD PLAYFIELD
<u>RELAY COILS</u>		
M1-31-1500	COIN LOCKOUT	DOOR
M 29-1000	DISAPPEARING POST (TRIP) 1st & 2nd SCORE RESET RELAY 3rd & 4th SCORE RESET RELAY GAME OVER RELAY	PLAYFIELD INSERT INSERT MECH. PANEL
M 29-1100	10 POINT RELAY 100 POINT RELAY 1,000 POINT RELAY 500 RELAY 5,000 RELAY 5¢ RELAY 10¢ RELAY 25¢ RELAY BONUS RELAY DOUBLE BONUS RELAY TRIPLE BONUS RELAY BONUS UNIT ESCAPEMENT COIL POST RELAY ADVANCE RELAY NO. 1 BUMPER RELAY NO. 2 BUMPER RELAY NO. 3 BUMPER RELAY NO. 4 BUMPER RELAY NO. 5 BUMPER RELAY	INSERT INSERT INSERT PLAYFIELD PLAYFIELD MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
Z 27-1000	PLAYER RESET RELAY OUTHOLE RELAY RESET RELAY REPLAY RELAY EJECT RELAY COIN RELAY GAME OVER RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1150	GATE RELAY ... (3 req'd.) TILT RELAY EXTRA BALL RELAY	PLAYFIELD MECH. PANEL MECH. PANEL
Z 28-1200	BALL INDEX RELAY	MECH. PANEL
M 30-1400	ON YELLOW RELAY ON GREEN RELAY	PLAYFIELD PLAYFIELD
Z 29-1250	LOCK RELAY	MECH. PANEL



# "STARDUST" - POST ADJUSTMENT SHEET

TO MAKE GAME MORE "CONSERVATIVE" OR "LIBERAL" - MOVE POSTS 3/16" AS SHOWN IN SKETCH BELOW. SPOTTING HOLES ARE PROVIDED AND CAN BE SEEN ON REMOVAL OF POSTS.



*for conservative.*

ABBREVIATIONS:

- CONS.-CONSERVATIVE
- LIB.-LIBERAL
- MED.-MEDIUM

RUBBER RING NUMBERS:

- 23A-6300 5/16 I.D.
- 23A-6303 1 1/4 I.D.
- 23A-6304 1 1/2 I.D.
- 23A-6306 2 5/16 I.D.
- 23A-6307 2 7/8 I.D.
- 23A-6308 3 3/8 I.D.

23A-6505 FLIPPER RUBBER RING

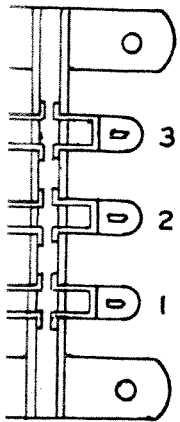
A-4741 REBOUND ASS'Y.  
A-4817R BALL GATE ASS'Y.

23A-6327 BALL SHOOTER RUBBER TIP

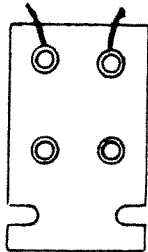
DIMENSIONS INDICATED BY ARROWS ABOVE ARE FOR SIZES OF RUBBER RINGS.

# ADJUSTMENTS ON MECHANISM PANEL

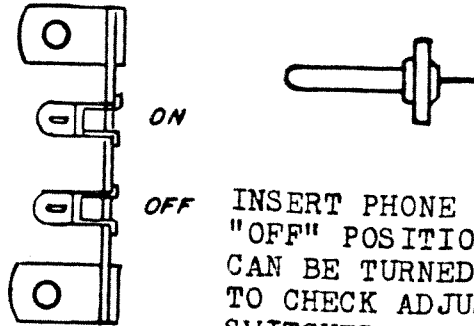
## 10¢ Adjustment



PROVIDES  
1, 2 OR  
3 PLAYS  
FOR ONE  
COIN.

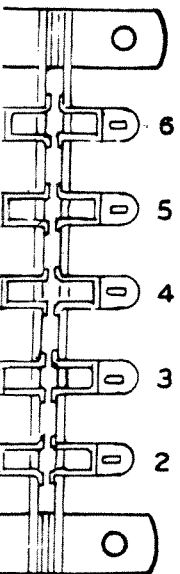


## Motor Service Jack

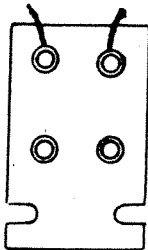


INSERT PHONE TIP IN  
"OFF" POSITION - CAMS  
CAN BE TURNED BY HAND  
TO CHECK ADJUSTMENT OF  
SWITCHES.

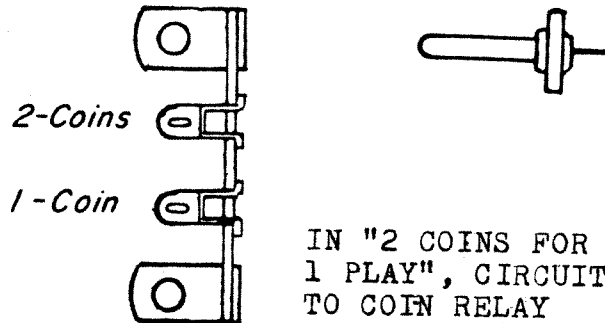
## 25¢ Adjustment



PROVIDES 2, 3, 4, 5  
OR 6 PLAYS FOR 25¢.

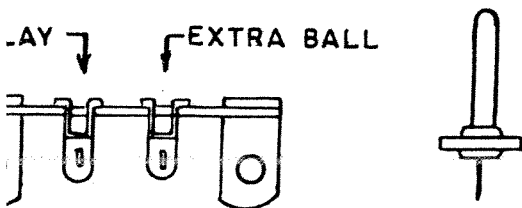


## 5¢ Adjustment



IN "2 COINS FOR  
1 PLAY", CIRCUIT  
TO COIN RELAY  
PASSES THRU SW.  
ON ALTERNATOR  
UNIT.

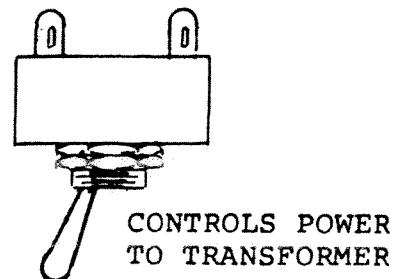
## Extra Ball Jack Adj.



IN REPLAY POSITION, HI SCORES  
AND NUMBER MATCH AWARD REPLAYS.  
IN EXTRA BALL POSITION--- SEE  
EXPLANATION OF EXTRA BALL RELAY  
CIRCUIT.

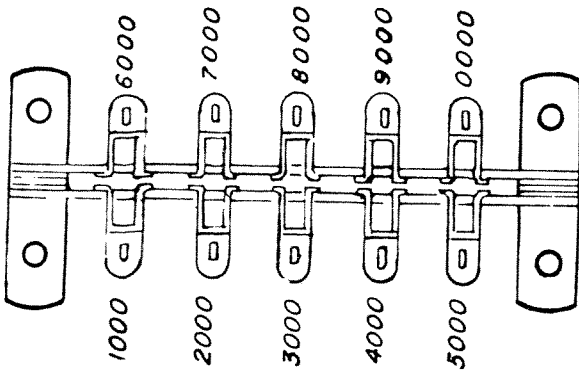
## MASTER ON-OFF SW.

(Located under front of  
Cabinet)



CONTROLS POWER  
TO TRANSFORMER

## ADJUSTMENTS IN BACKBOX

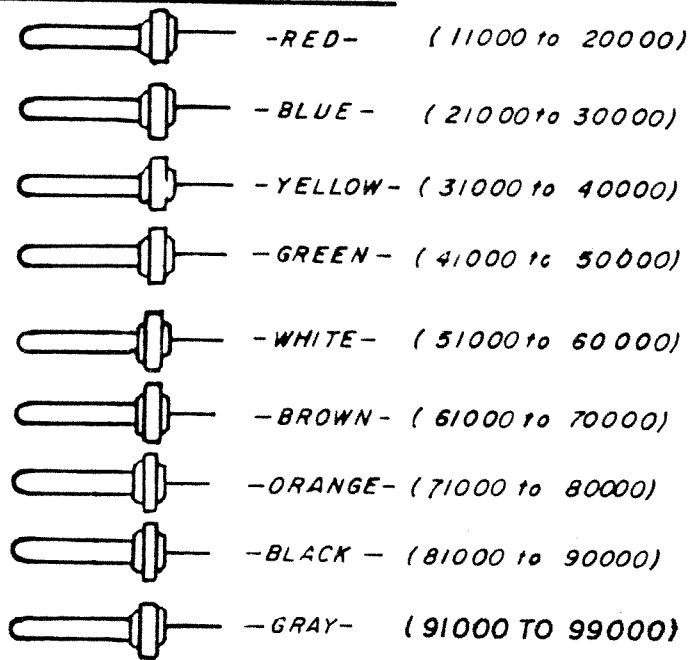


### HI-Score Adjustment

Insert plugs into 10 Point Female at desired positions.

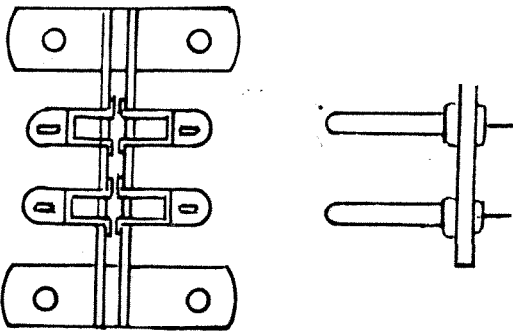
Examples:

Yellow wire into 3000 position scores at 33000.  
 Yellow wire into 0000 position scores at 40000.



### No. of Balls Adjustment

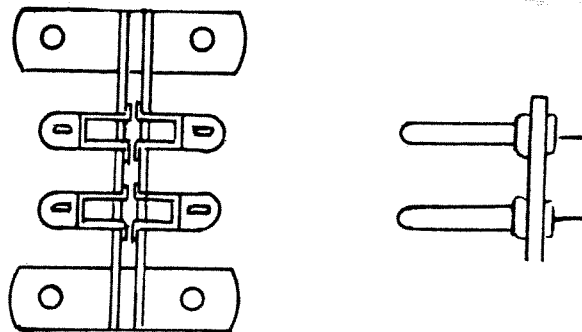
3 BALL ——— 5 BALL



THIS JACK CHANGES 3 BALL TO 5 BALL PLAY OR VICE VERSA.

### NUMBER MATCH ADJUSTMENT

ON ——— OFF



In 'ON' position, a number match lite will appear when game is over. To award replays, when number is matched, Extra Ball Adjustment Jack must be in 'Replay' position. In 'Off' position, Number Match is inoperative.

### SUGGESTED SCORE CARDS

5 BALL PLAY 401-13

3BALL PLAY 401-4

#### ON NOVELTY PLAY

5 BALL EXTRA BALL 401-24

3 BALL EXTRA BALL 401-19

## 1. GENERAL

NEVER EXPERIMENT with any of the mechanism. Locate any trouble with the aid of Wiring Diagrams or Operating & 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, broken or unhooked springs on step-up units, relays, etc., before adjustments are made or wires reconnected.

## 2. FUSES

IMPORTANT: Never replace fuses with any rating other than specified on the fuse block; this block is located adjacent to the transformer.

## 3. LUBRICATION

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.

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.

STEP-UP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with special Coin Machine Lubricant (supplied with machine) not oftener than every six months. The bakelite discs (biscuits) on the Motor Units and Step-up 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 a solvent, then apply an extremely thin coat of the special grease.

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 on reassembly.

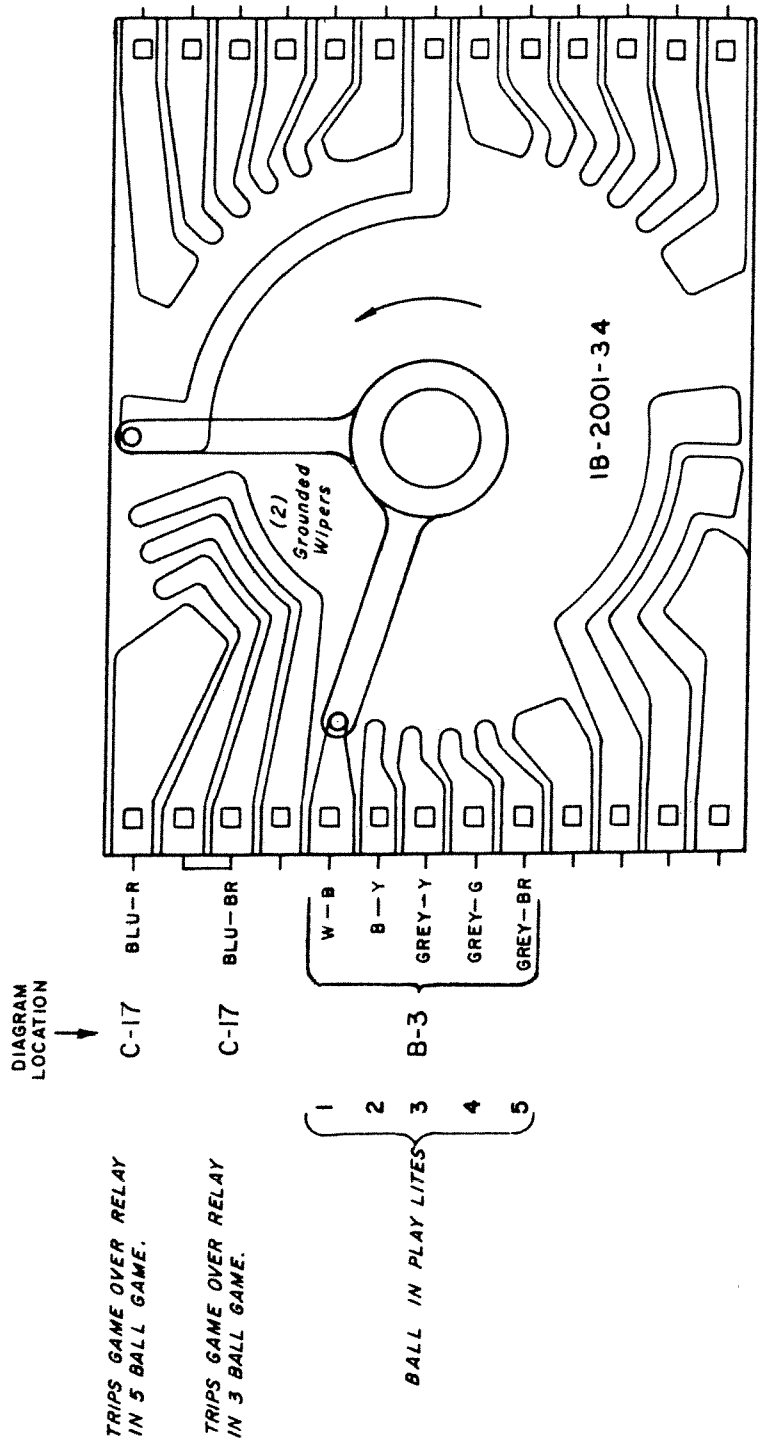
## SWITCH ADJUSTMENT

BEFORE ADJUSTING SWITCHES, MAKE CERTAIN THE SCREWS HOLDING THE SWITCH STACKS ARE DOWN TIGHTLY. BAKELITE SPACERS IN THE SWITCH STACKS, DUE TO EXCESSIVE MOISTURE, HAVE OCCASIONALLY SHRUNK BY DRYING OUT, CAUSING POOR ADJUSTMENT.

# BALL COUNT UNIT DISC

THIS UNIT RESETS AT THE START OF A NEW GAME, (DURING RESET CYCLE). IT ADVANCES ONE STEP EACH TIME THE LAST PLAYER COMPLETES HIS TURN.

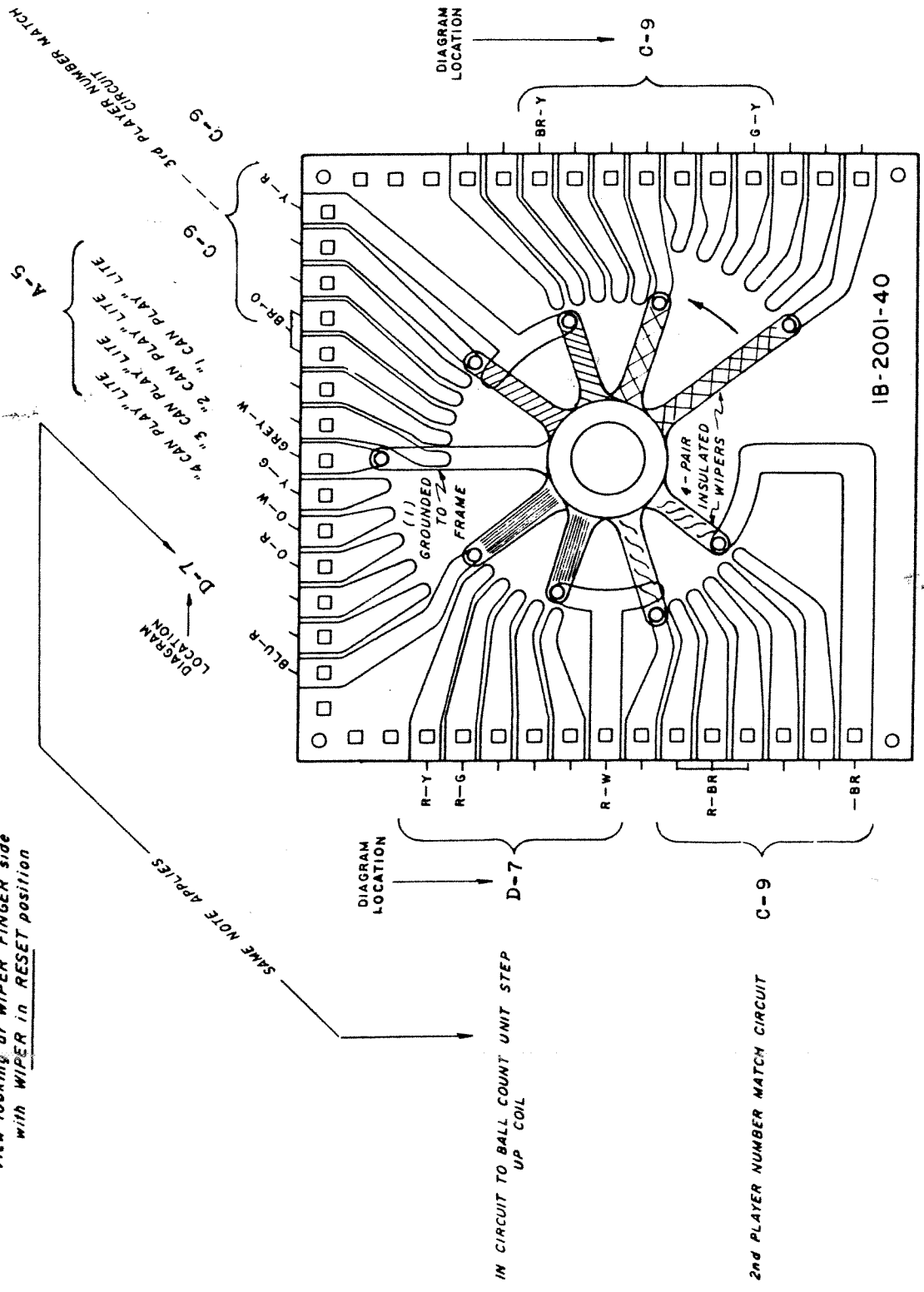
View looking at WIPER FINGER side  
with WIPER in ZERO position.



Low S.V. Disc

THIS UNIT RESETS AT START OF  
 A GAME (DURING RESET CYCLE).  
 IT THEN ADVANCES ONE STEP EACH  
 TIME THE COIN RELAY IS PULSED.

View looking at WIPER FINGER side  
 with WIPER in RESET position



Low S.V. Disc

# PLAYER UNIT DISC

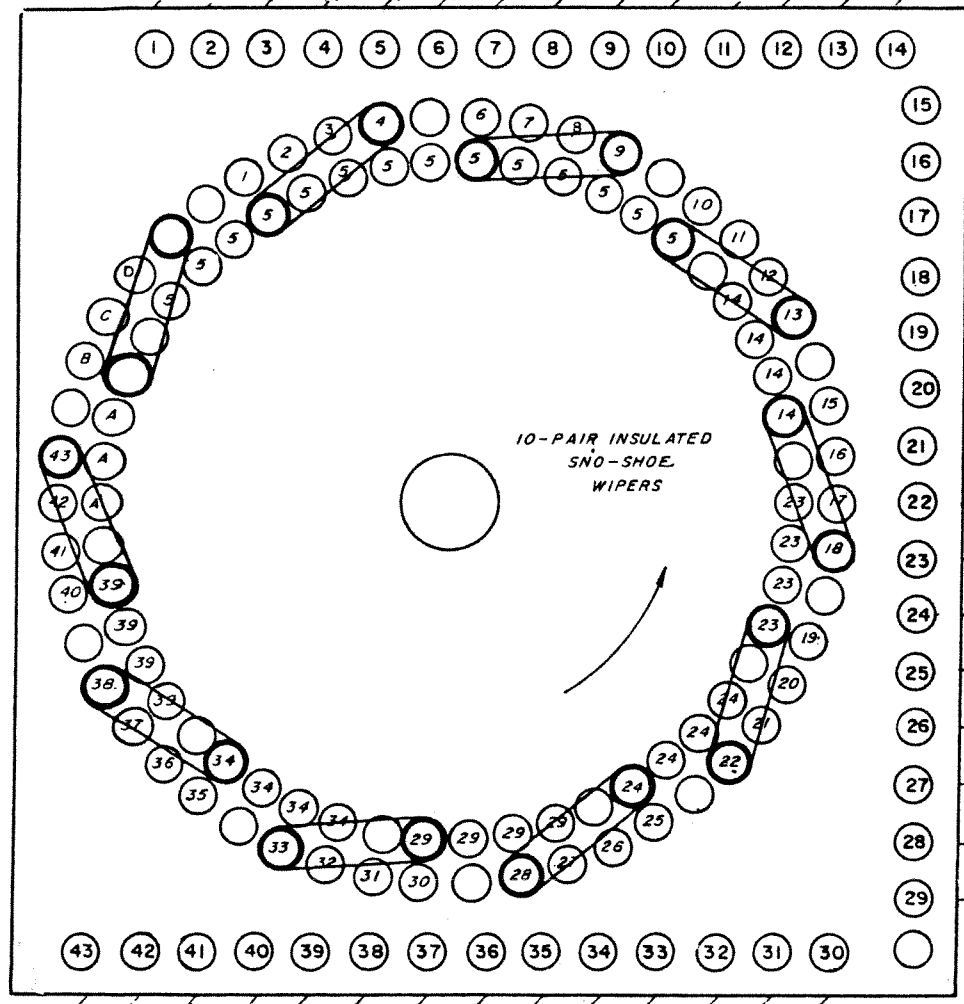
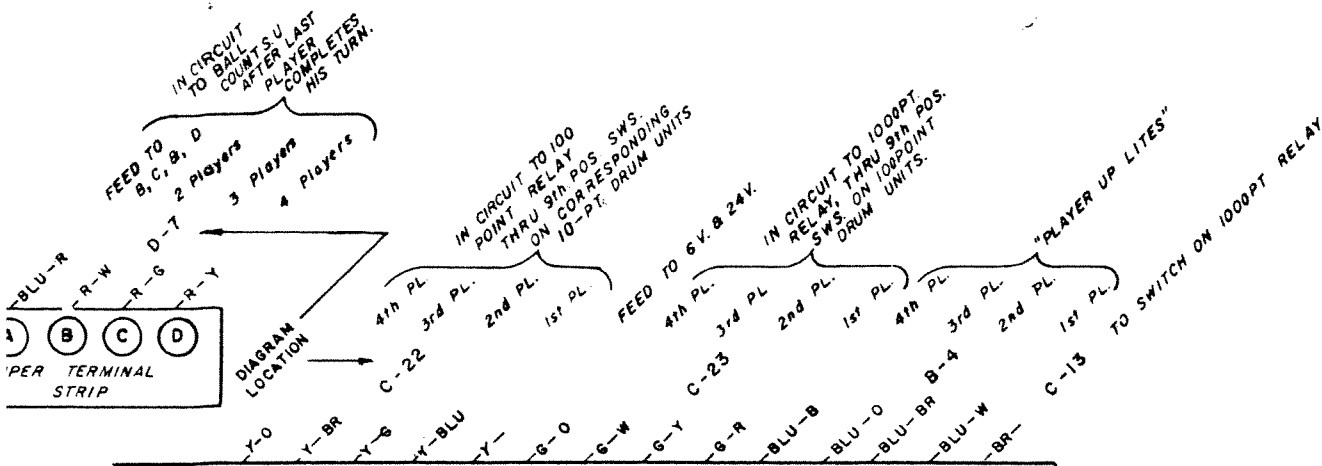
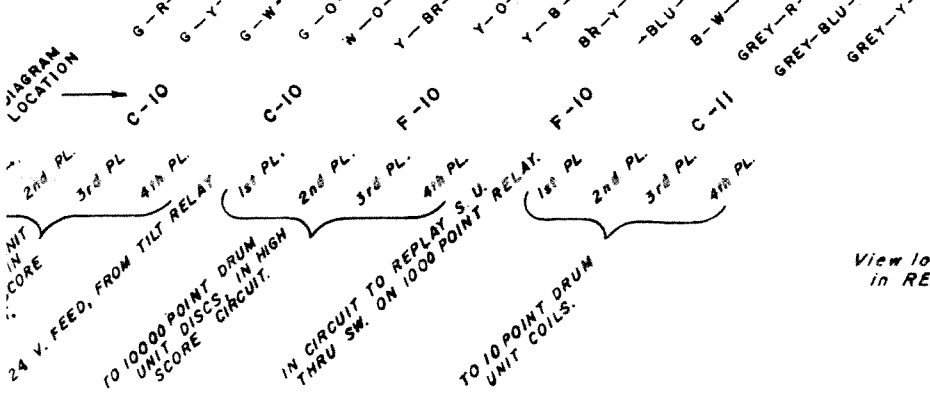


Diagram Location	Player Position	Description
O-R	4th PL.	IN CIRCUIT TO 1000POINT DRUM UNIT - COILS THRU 9th POSITION SWS. ON CORRESPONDING 100POINT DRUM UNITS.
BR-B	3rd PL.	
BR-W	2nd PL.	
BLU-Y	1st PL.	
W-G	4th PL.	TO 1000POINT DRUM UNIT COILS
W-BLU	3rd PL.	
B-G	2nd PL.	
GREY-B	1st PL.	TO SWITCH ON 1000 POINT RELAY
W-	C-12	
R-G	C-12	TO SWITCH ON 100 POINT RELAY
GREY-O	4th PL.	TO 100POINT DRUM UNIT COILS
GREY-BR	3rd PL.	
GREY-W	2nd PL.	
GREY-G	1st PL.	
BR-O	C-11	TO SWITCH ON 100 POINT RELAY



View looking at WIPER FINGER side with unit in RESET position (1st Player Up)





# NO. MATCH UNIT DISC

THIS UNIT ADVANCES ONE STEP EACH TIME THE 10 POINT RELAY IS PULSED.

VIEW LOOKING AT WIPER FINGER SIDE

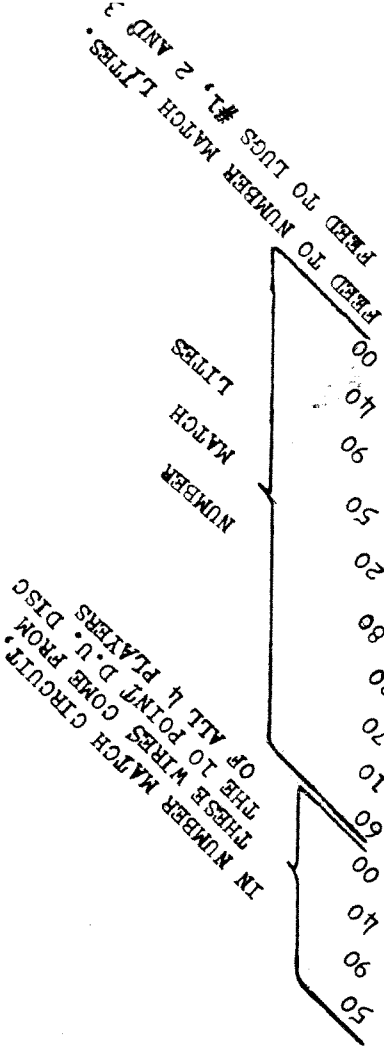
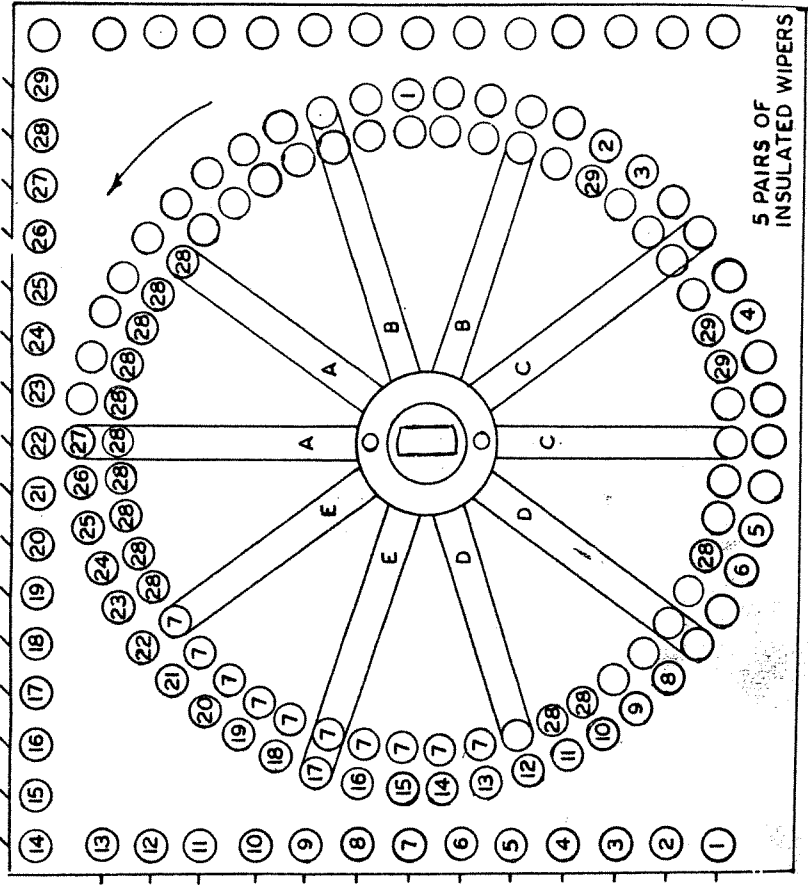


DIAGRAM LOCATION

B-4  
D-19

B-4

E-9



20  
80  
30  
70  
10  
60

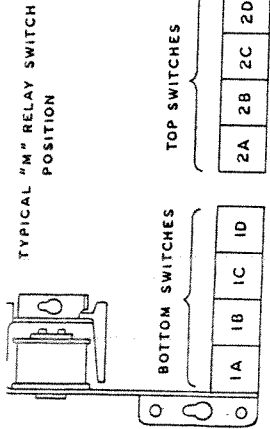
IN NUMBER MATCH CIRCUIT, THESE WIRES COME FROM THE 10 POINT D.U. DISC OF ALL 4 PLAYERS.

NUMBER MATCH FEED TO REPLAY S.U.

- #9 POSITION
- #5 POSITION
- #1 POSITION
- #9 POSITION
- #5 POSITION
- #1 POSITION

"EXTRA BALL WHEN LIT" LITES

N CIRCUIT TO EXTRA BALL RELAY, THRU ADVANCE UNIT DISC.



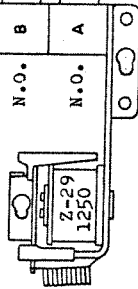
**RELAYS & SWITCHES**  
LOCATED ON MECHANISM PANEL

SWITCH TYPE      DIAGRAM LOCATION

**LOCK RELAY**

IS ENERGIZED BY LEFT FLIPPER BUTTON OR 5¢, 10¢, 25¢ OR COIN RELAYS.

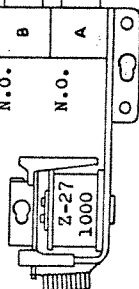
N.C.	BLU-R -Y-	C-17	ENERGIZES GAME-OVER RELAY (TRIP COIL).
N.O.	G-Y-W BLU-Y-W	A-2	6 VOLTS FROM TRANSFORMER TO LITES.
N.O.	G-Y-W BR-Y-W	A-2	6 VOLTS FROM TRANSFORMER TO LITES.
N.O.	B-O O-B	D-4	HOLD CIRCUIT TO THIS RELAY, THRU CABINET BOTTOM KICKOFF SWITCH.



**EJECT RELAY**

IS ENERGIZED BY (2) EJECT POCKET SWITCHES, THRU INDEX GAM SWITCH C.

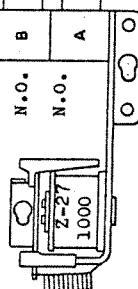
M&B	B-BLU G-R	D-19	OPENS IN A HOLD CIRCUIT TO EXTRA BALL RELAY AND CLOSES TO BALL INDEX RELAY.
N.O.	GREY-Y -Y-	C-15	IN CIRCUIT TO THE RELAY AS INDICATED BY ARROW ON ADVANCE UNIT.
N.O.	BR-O		
N.O.	-Y- O-G	G-6	RUNS SCORE MOTOR.
N.O.	-BR- BR-Y	D-21	PULSES 1000 POINT RELAY, THRU SWITCHES ON (3) BONUS RELAYS.
N.O.	R-BR -W-	C-16	CIRCUIT TO 500 RELAY, THRU N.C. SWITCHES ON (3) BONUS RELAYS.
N.O.	O-BLU R-Y	E-14	IN HOLD CIRCUIT TO THIS RELAY.



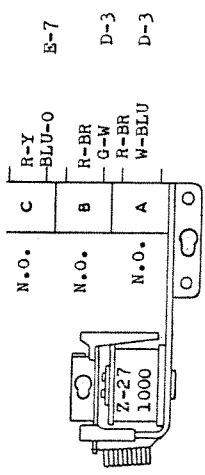
**RESET RELAY**

IS ENERGIZED BY SWITCH D ON COIN RELAY.

M&B	BLU-Y -Y- O-G	C-4 C-6	OPENS IN CIRCUIT TO REPLAY RELAY AND CLOSES TO RUN SCORE MOTOR.
M&B	M-BLU BLU-O	E-7	OPENS IN CIRCUIT TO COIN UNIT S.U. AND CLOSES TO RESET COILS ON COIN, BALL COUNT AND GAME OVER.
N.G.	R-Y-W BLU-Y-W	F-16	IN SERIES WITH SWITCH A ON GAME-OVER RELAY.
N.O.	G-Y O-BLU	E-7	IN CIRCUIT TO PLAYER UNIT RESET COIL.
N.O.	BLU-BR BLU-W	D-6	IN HOLD CIRCUIT TO THIS RELAY.

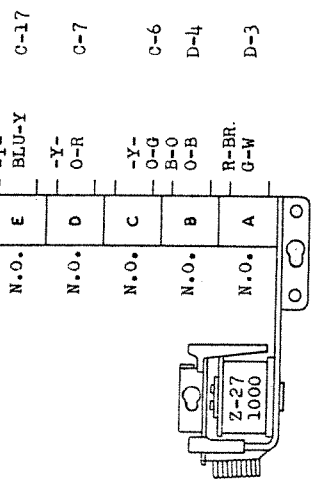


ENERGIZES REPLAY UNIT RESET COIL AT CAM SWITCH 1D.  
 ENERGIZES COIN RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY.



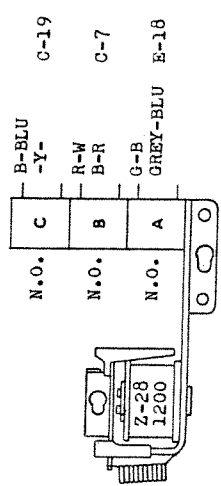
### COIN RELAY

IS ENERGIZED BY REPLAY RELAY OR COIN SWITCH.



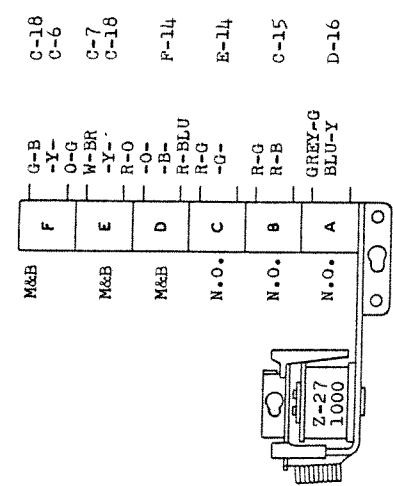
### BALL INDEX RELAY

IS ENERGIZED BY 10 POINT, 100 POINT OR 1000 POINT RELAY, THRU SWITCH C ON EXTRA BALL RELAY.  
 IT IS ALSO ENERGIZED BY TILT RELAY.



### OUTHOLE RELAY

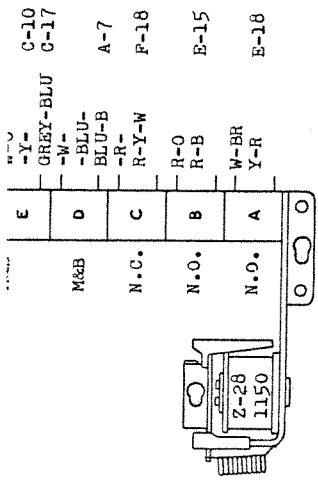
IS ENERGIZED BY OUTHOLE SWITCH, THRU INDEX CAM SWITCH C.



OPENS IN HOLD CIRCUIT TO BALL INDEX RELAY AND CLOSES TO RUN SCORE MOTOR.  
 OPEN IN HOLD CIRCUIT TO TILT RELAY AND CLOSES IN SERIES WITH SWITCH B ON EXTRA BALL RELAY.  
 OPENS CIRCUIT TO (2) EJECT COILS AND CLOSES TO BONUS UNIT ESCAPEMENT COIL.  
 ENERGIZES BONUS UNIT ESCAPEMENT COIL AT SCORE MOTOR  
 ENERGIZES DOWN POST COIL.  
 IN HOLD CIRCUIT TO THIS RELAY.

*TILT RELAY*

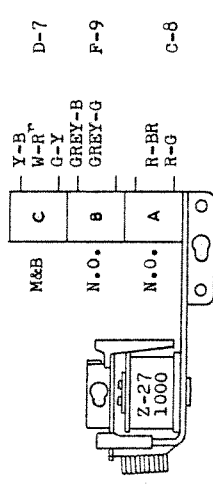
IS ENERGIZED BY PLUMB BOB TILT, BALL ROLL-DOWN TILT OR PLAYFIELD VIBRATION TILT SWITCH.



OPENS IN HI-SCORE CIRCUIT TO REPLAY S.U. AND CLOSES TO BALL INDEX RELAY.  
 OPENS IN CIRCUIT TO PLAYFIELD LITES AND CLOSES TO TILT LITE.  
 OPENS ALL SCORING CIRCUITS.  
 ENERGIZES DOWN POST COIL.  
 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON OUTHOLE RELAY.

### PLAYER RESET RELAY

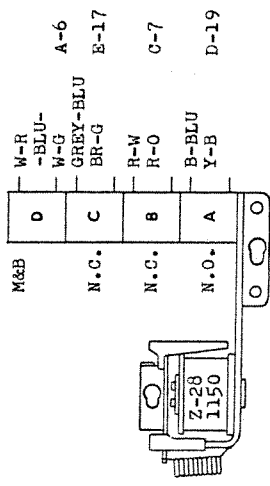
IS ENERGIZED BY BALL COUNT UNIT END-OF-STROKE SWITCH. IT THEN HOLDS IN THRU INDEX CAM SWITCH B.



OPENS IN CIRCUIT TO PLAYER UNIT S.U. COIL AND CLOSES TO PLAYER PLAYER UNIT RESET COIL.  
 IN NUMBER MATCH CIRCUIT TO REPLAY S.U.  
 HOLD CIRCUIT TO THIS RELAY, THRU INDEX CAM SWITCH B.

### EXTRA BALL RELAY

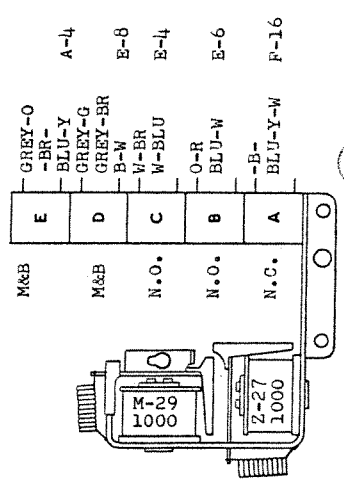
IS ENERGIZED BY HI-SCORE CIRCUIT, THRU "REPLAY-EXTRA BALL" ADJUSTMENT JACK. ALSO BY EJECT RELAY, THRU ADVANCE UNIT DISC AND NUMBER MATCH UNIT DISC.



OPENS TO (3) "EXTRA BALL WHEN LIT" LITES, AND CLOSES TO "SHOOT AGAIN" LITES.  
 IN CIRCUIT TO BALL INDEX RELAY.  
 IN SERIES WITH SWITCH B ON BALL INDEX RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY.

### GAME OVER RELAY INTERLOCK

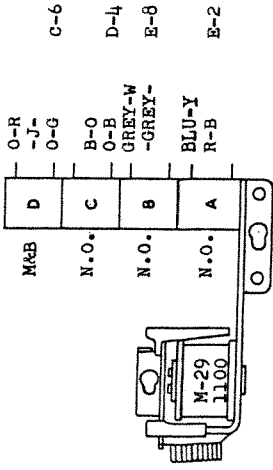
LATCH COIL IS PULSED BY SCORE MOTOR CAM SWITCH ID. THRU SWITCHES ON COIN RELAY AND RESET RELAY. TRIP COIL IS ENERGIZED BY COIN RELAY, LOCK RELAY OR WIPER ON BALL COUNT UNIT.



OPENS TO PLAYER UP LITES, AND CLOSES TO NUMBER MATCH AND GAME-OVER LITES.  
 OPENS IN HI-SCORE CIRCUIT AND CLOSES IN NUMBER MATCH CIRCUIT.  
 IN CIRCUIT TO REPLAY RELAY.  
 ENERGIZES RESET RELAY, THRU SWITCH D ON COIN RELAY.  
 OPENS ALL CIRCUITS TO PLAYFIELD SWITCHES.

## 10¢ RELAY

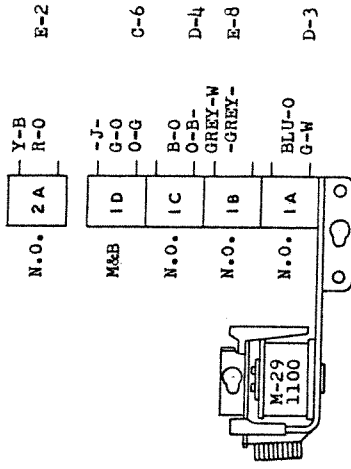
IS ENERGIZED BY 10¢ COIN SWITCH, IF 10¢ ADJUSTMENT JACK IS IN "2 PLAYS" OR "3 PLAYS" POSITION.



OPENS IN CIRCUIT TO KNOCKER COIL AND CLOSES TO RUN SCORE MOTOR.  
 ENERGIZES LOCK RELAY.  
 PULSES REPLAY UNIT S.U. COIL, THRU IMPULSE CAM SWITCH B.  
 IN HOLD CIRCUIT TO THIS RELAY.

## 25¢ RELAY

IS ENERGIZED BY 25¢ COIN SWITCH.

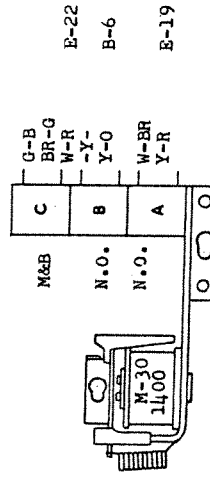


IN HOLD CIRCUIT TO THIS RELAY.  
 OPENS IN CIRCUIT TO KNOCKER COIL AND CLOSES TO RUN SCORE MOTOR.  
 ENERGIZES LOCK RELAY.  
 PULSES REPLAY UNIT S.U. COIL, THRU IMPULSE CAM SWITCH B.  
 ENERGIZES COIN RELAY WHEN GAME IS ADJUSTED TO "6 PLAYS FOR 25¢."

## LOCATED ON PLAYFIELD

## ON GREEN RELAY

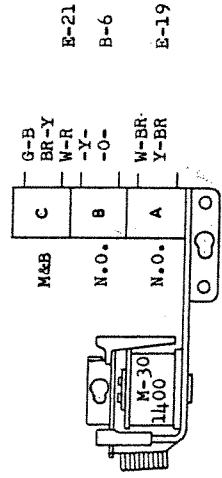
IS ENERGIZED BY RIGHT TOP TARGET SWITCH.



OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSES TO 100 POINT RELAY.  
 TO LEFT BOTTOM AND RIGHT TOP JET BUMPER LITES.  
 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH E ON OUTHOLE RELAY.

## ON YELLOW RELAY

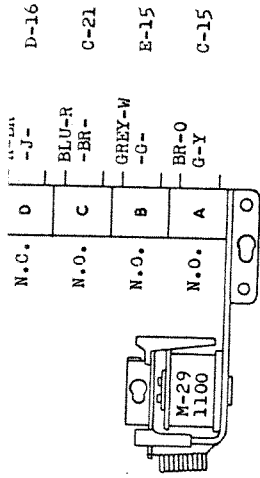
IS ENERGIZED BY LEFT TOP TARGET SWITCH.



OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSES TO 100 POINT RELAY.  
 TO RIGHT BOTTOM AND LEFT TOP JET BUMPER LITES.  
 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH E ON OUTHOLE RELAY.

IS ENERGIZED AT CAM SWITCH 5A, THRU EJECT  
RELAY AND ADVANCE UNIT DISC.

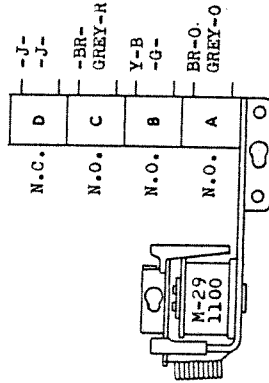
*Bonus Relay*



D-16 IN SERIES WITH SWITCH B ON EJECT RELAY.  
C-21 IN SERIES WITH SWITCH C ON EJECT RELAY.  
E-15 PULSES SINGLE RESET COIL ON BONUS UNIT.  
C-15 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH E ON EJECT RELAY.

### DOUBLE BONUS RELAY

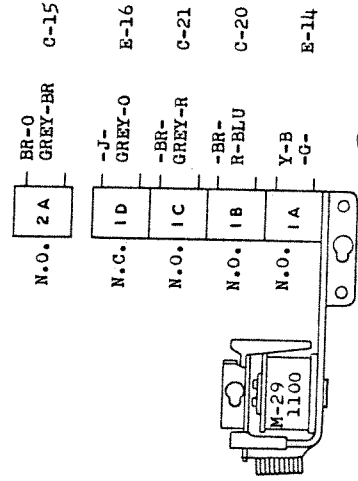
IS ENERGIZED BY CAM SWITCH 5A, THRU EJECT  
RELAY AND ADVANCE UNIT DISC.



D-16 IN SERIES WITH SWITCH B ON EJECT RELAY.  
C-21 IN SERIES WITH SWITCH C ON EJECT RELAY.  
E-15 PULSES SINGLE RESET COIL ON BONUS UNIT.  
C-15 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH E ON EJECT RELAY.

### TRIPLE BONUS RELAY

IS ENERGIZED BY CAM SWITCH 5A, THRU EJECT  
RELAY AND ADVANCE UNIT DISC.

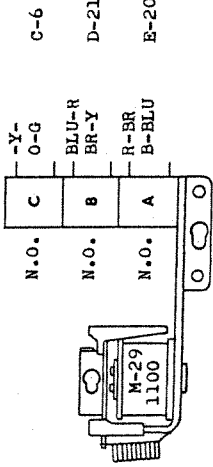


C-15 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH E ON EJECT RELAY.  
E-16 IN SERIES WITH SWITCH B ON EJECT RELAY.  
C-21 IN SERIES WITH SWITCH C ON EJECT RELAY.  
C-20 IN SERIES WITH SWITCH C ON EJECT RELAY.  
E-14 PULSES SINGLE RESET COIL ON BONUS UNIT.

## 5000 RELAY

IS ENERGIZED BY:

1. RIGHT SIDE ROLLOVER SWITCH, THRU RIGHT GATE RELAY.
2. RIGHT BOTTOM ROLLOVER SWITCH, THRU RIGHT BOTTOM GATE RELAY.
3. LEFT SIDE ROLLOVER SWITCH, THRU LEFT GATE RELAY.



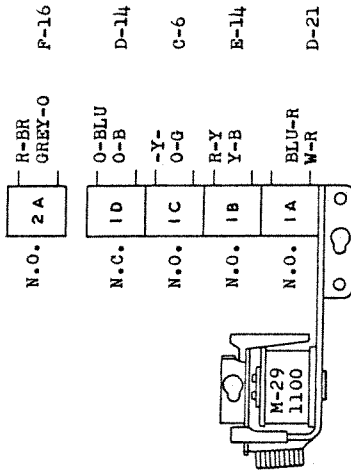
C-6 RUNS SCORE MOTOR.

D-21 PULSES 1000 POINT RELAY, THRU IMPULSE CAM SWITCH C.

E-20 IN HOLD CIRCUIT TO THIS RELAY.

## 500 RELAY

IS ENERGIZED BY EJECT RELAY, THRU SWITCHES ON BONUS RELAY, DOUBLE BONUS RELAY AND TRIPLE BONUS RELAY.



F-16 HOLD CIRCUIT TO THIS RELAY.

D-14 IN SERIES WITH SWITCH A ON EJECT RELAY.

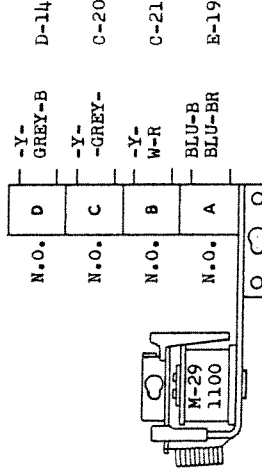
C-6 RUNS SCORE MOTOR.

E-14 PULSES (2) EJECT COILS AT CAM SWITCH 4D.

D-21 PULSES 100 POINT RELAY THRU IMPULSE CAM SWITCH C.

## ADVANCE RELAY

IS PULSED BY (2) CENTER TARGET SWITCHES AND (4) TOP STAND-UP SWITCHES.



D-14 ENERGIZES BONUS UNIT S.U. COIL.

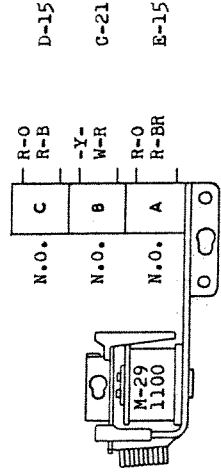
C-20 ENERGIZES ADVANCE UNIT COIL.

C-21 PULSES 100 POINT RELAY.

E-19 HOLD CIRCUIT TO THIS RELAY, THRU BONUS UNIT END-OF-STROKE SWITCH.

## POST RELAY

IS ENERGIZED BY (2) ROLLOVER BUTTON SWITCHES.

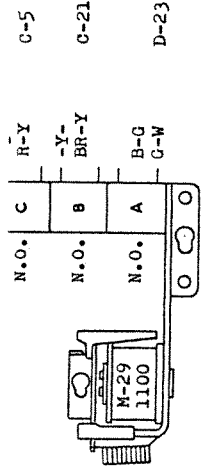


D-15 ENERGIZES DOWN POST COIL.

C-21 PULSES 100 POINT RELAY.

E-15 HOLD CIRCUIT TO THIS RELAY, THRU POST UNIT END-OF-STROKE SWITCH.

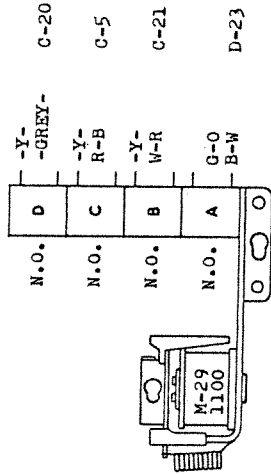
PULSES RIGHT BOTTOM JET BUMPER COIL.  
 IN SERIES WITH SWITCH C ON "ON YELLOW" RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY.



IS ENERGIZED BY RIGHT BOTTOM JET BUMPER SWITCH.

### NO. 2 BUMPER RELAY

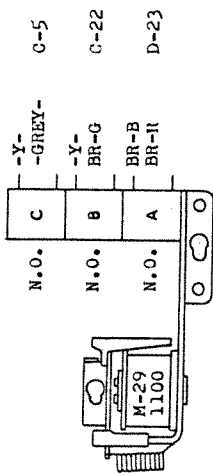
IS ENERGIZED BY CENTER JET BUMPER SWITCH.



ENERGIZES ADVANCE UNIT S.U. COIL.  
 PULSES CENTER JET BUMPER COIL.  
 PULSES 100 POINT RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY.

### NO. 3 BUMPER RELAY

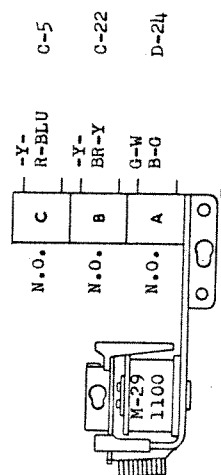
IS ENERGIZED BY RIGHT TOP JET BUMPER SWITCH.



PULSE RIGHT TOP JET BUMPER COIL.  
 IN SERIES WITH SWITCH C ON "ON GREEN" RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY.

### NO. 4 BUMPER RELAY

IS ENERGIZED BY LEFT TOP JET BUMPER SWITCH.

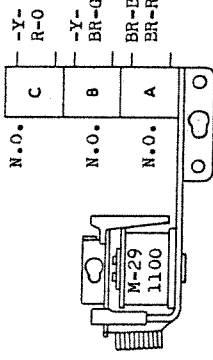


PULSES LEFT TOP JET BUMPER COIL.  
 IN SERIES WITH SWITCH C ON "ON YELLOW" RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY.



### NO. 3 BUMPER RELAY

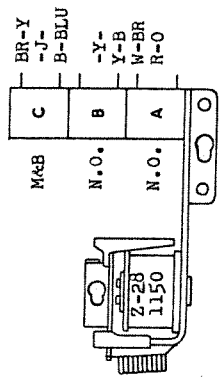
IS ENERGIZED BY LEFT BOTTOM JET BUMPER SWITCH.



- C-5 PULSES LEFT BOTTOM JET BUMPER COIL.
- C-22 IN SERIES WITH SWITCH C ON "ON GREEN" RELAY.
- D-24 IN HOLD CIRCUIT TO THIS RELAY.

### LEFT GATE RELAY

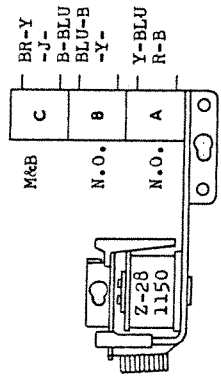
IS ENERGIZED BY WIPER ON ADVANCE UNIT DISC, THRU SWITCH E ON EJECT RELAY.



- E-20 OPENS IN CIRCUIT TO 1000 POINT RELAY AND CLOSES TO 5000 POINT RELAY.
- B-9 TO LEFT GATE LITE.
- C-18 IN HOLD CIRCUIT TO THIS RELAY.

### RIGHT BOTTOM GATE RELAY

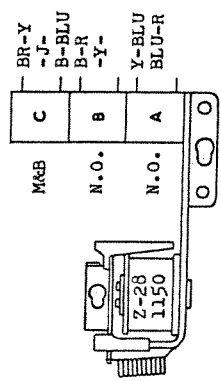
IS ENERGIZED BY WIPER ON ADVANCE UNIT DISC, THRU SWITCH E ON EJECT RELAY.



- E-20 OPENS IN CIRCUIT TO 1000 POINT RELAY AND CLOSES TO 5000 POINT RELAY.
- B-9 TO RIGHT BOTTOM GATE LITE.
- C-18 HOLD CIRCUIT TO THIS RELAY, THRU TROUGH SWITCH.

### RIGHT GATE RELAY

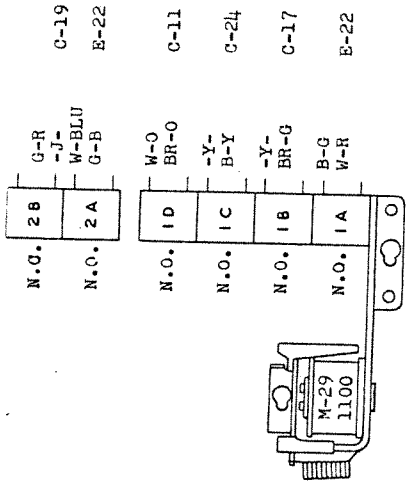
IS ENERGIZED BY WIPER ON ADVANCE UNIT DISC, THRU SWITCH E ON EJECT RELAY.



- E-20 OPENS IN CIRCUIT TO 1000 POINT RELAY AND CLOSES TO 5000 POINT RELAY.
- B-9 TO RIGHT GATE LITE.
- C-18 HOLD CIRCUIT TO THIS RELAY, THRU TROUGH SWITCH.

### 10 POINT RELAY

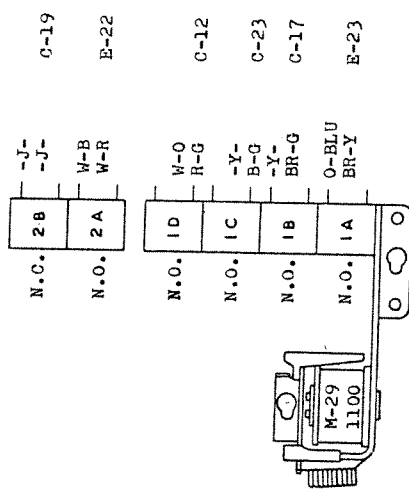
IS PULSED BY KICKER SWITCHES, STANDUP SWITCHES, NO. 1, 3, 4 OR 5 BUMPER RELAYS.



IN SERIES WITH SWITCH F ON EJECT RELAY.  
 C-19  
 E-22  
 IN HOLD CIRCUIT TO THIS RELAY.  
 PULSES 10 POINT DRUM UNITS, THRU PLAYER UNIT DISC.  
 ENERGIZES NO. MATCH UNIT S.U. COIL.  
 C-11  
 C-24  
 C-17  
 E-22  
 IN SERIES WITH SWITCH C ON EXTRA BALL RELAY.  
 PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCHES ON 10 POINT DRUM UNITS.

### 100 POINT RELAY

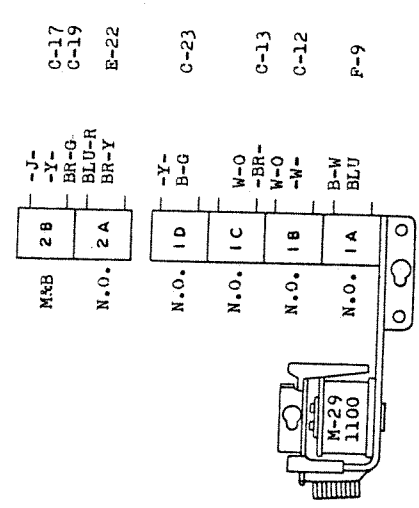
IS PULSED BY ADVANCE RELAY, POST RELAY, 500 RELAY, NO. 2 BUMPER RELAY AND BY NO. 1, 3, 4 OR 5 BUMPER RELAYS WHEN CORRESPONDING JET BUMPER ARE LIT.



IN SERIES WITH SWITCH 2B ON 10 POINT RELAY.  
 C-19  
 E-22  
 IN HOLD CIRCUIT TO THIS RELAY.  
 PULSES 100 POINT DRUM UNITS, THRU PLAYER UNIT DISG.  
 C-12  
 PULSES LARGE BELL COIL.  
 C-23  
 C-17  
 E-23  
 IN SERIES WITH SWITCH C ON EXTRA BALL RELAY.  
 PULSES 1000 POINT RELAY, THRU 9TH POSITION SWITCHES ON 100 POINT DRUM UNITS.

### 1000 POINT RELAY

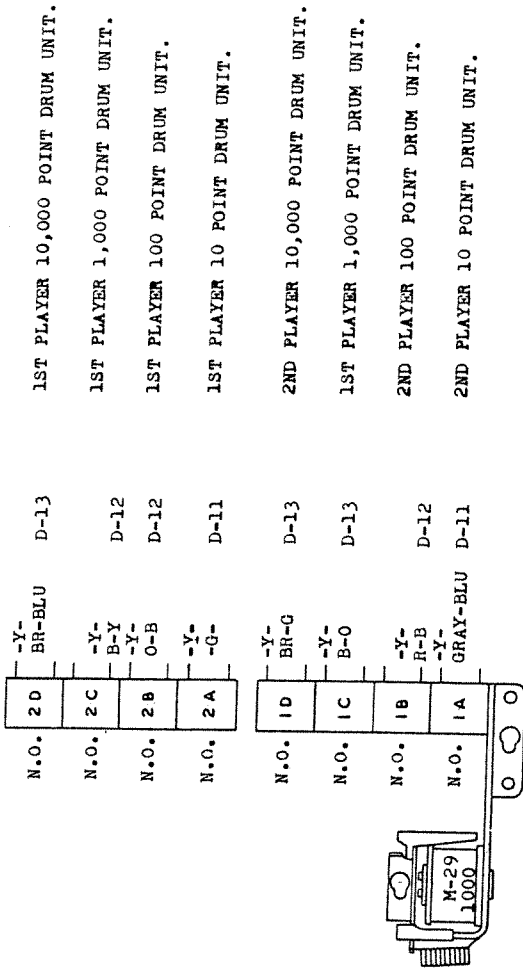
IS PULSED BY 5000 RELAY; LEFT SIDE, RIGHT SIDE AND RIGHT BOTTOM ROLLOVER SWITCHES AS INDICATED ON PLAYFIELD-----AND WHEN COLLECTING BONUS, DOUBLE BONUS OR TRIPLE BONUS.



OPENS IN SERIES WITH SWITCH 2B ON 100 POINT RELAY, AND CLOSES TO BALL INDEX RELAY.  
 C-17  
 C-19  
 E-22  
 IN HOLD CIRCUIT TO THIS RELAY.  
 PULSES LARGE BELL COIL.  
 C-23  
 PULSES 10,000 POINT DRUM UNITS, THRU 9TH POSITION SWITCHES ON 1000 POINT DRUM UNITS.  
 C-13  
 C-12  
 F-9  
 PULSES 1000 POINT DRUM UNITS, THRU PLAYER UNIT DISC.  
 IN HI-SCORE CIRCUIT TO REPLAY S.U. COIL.

## 1-2 RESET RELAY

IS PULSED BY 2ND IMPULSE CAM SWITCH A, THRU SWITCH A ON RESET RELAY.



## 3-4 RESET RELAY

IS PULSED BY 1ST IMPULSE CAM SWITCH A, THRU SWITCH A ON RESET RELAY.

