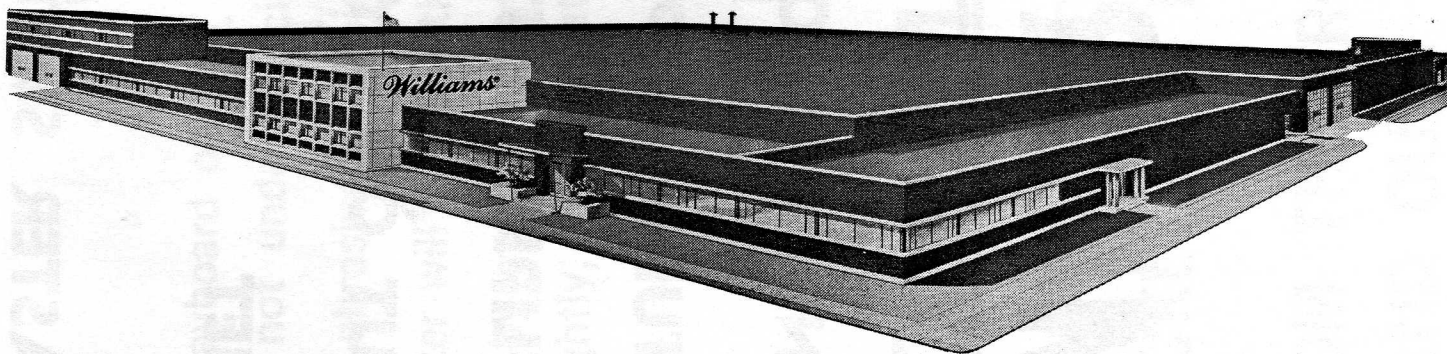


Instruction Manual

for

SMART SET



Williams[®] 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.

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.**

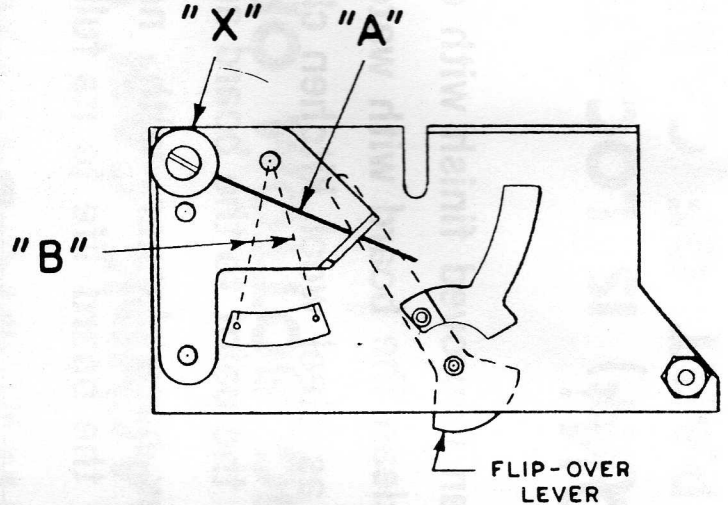
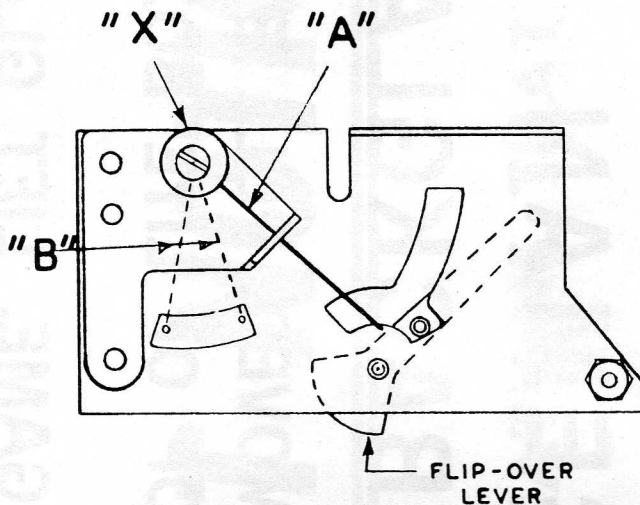
INSTRUCTIONS FOR ALTERING COIN CHUTES EQUIPPED WITH A FLIP-OVER DEVICE.

FOR 1 COIN - FOR 1 PLAY

OR 2 COINS - FOR 1 PLAY

FIGURE 1

FIGURE 2



1 COIN - FOR 1 PLAY (FIGURE 1):

Wire form "A" should be in position as shown in Figure 1. Flip-over lever should rebound from wire form "A" and return to position shown in Figure 1 everytime a coin is inserted. All coins pass over the coin trip switch wire "B".

2 COINS - FOR 1 PLAY (FIGURE 2):

Wire form "A" should be in position as shown in Figure 2 (see note). Flip-over lever should alternate from side to side. 1st coin should go to cash box without actuating coin trip switch wire "B", 2nd coin should pass the coin trip switch wire "B" and returns flip-over to position as shown in Figure 2.

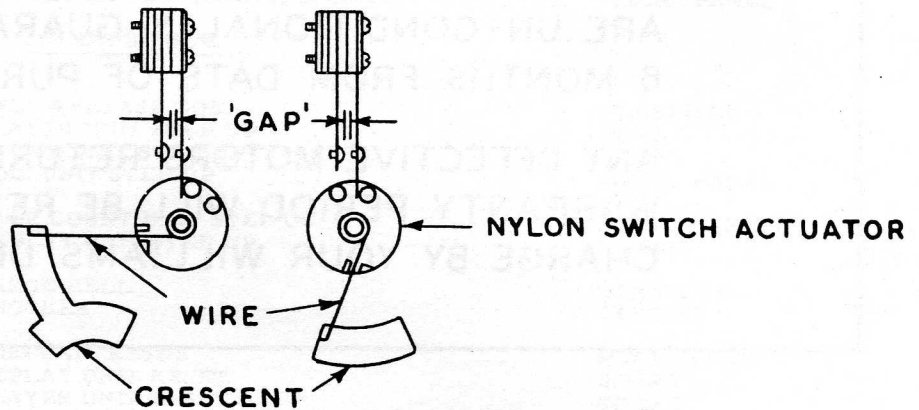
NOTE:

To change from 1 coin play to 2 coin play or vice versa - loosen screw "X" and move screw, bushing & wire form "A" to position as required - shown in Figure 1 position as required - shown in Figure 1 or Figure 2.

When using 1 coin for 1 play, wire form "A" should not under any circumstances be allowed to enter the "Banana" slot and cause binding of flip-over lever.

INSTRUCTIONS FOR COIN TRIP SWITCH ADJUSTMENT

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



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

or

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

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.

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 FOR "SMART SET"

UNIT NAME	CONTACT DISC	WIPER ASSEMBLY	RATCHET GEAR ASSEMBLY	MOTORS
REPLAY	-----	-----	A-6400	SCORE MOTOR 14A-7805 (60 CYCLE)
BALL COUNT	C-6932	C-6520	A-6402-5	
NO. MATCH	C-6417	C-6521	A-6403	14A-7806 (50 CYCLE)
PLAYER	C-6417	C-6521	A-6405-3	
COIN	C-6896	C-6520	A-6402-3	WHEEL MOTOR 14A-7853 (50 CYCLE)
WHEEL	C-6417	C-6520	B-6833	
0-9	B-6297	A-6294	3C-7128	
TENS	-----	-----	3C-7128	
HUNDREDS	B-6297	A-6294	3C-7128	
THOUSANDS	B-6297	A-6294	3C-7128	
BONUS	B-6297	A-6294	3C-7128	
ADVANCE	B-6297	A-6294	3C-7128	

"SMART SET" COIL CHART

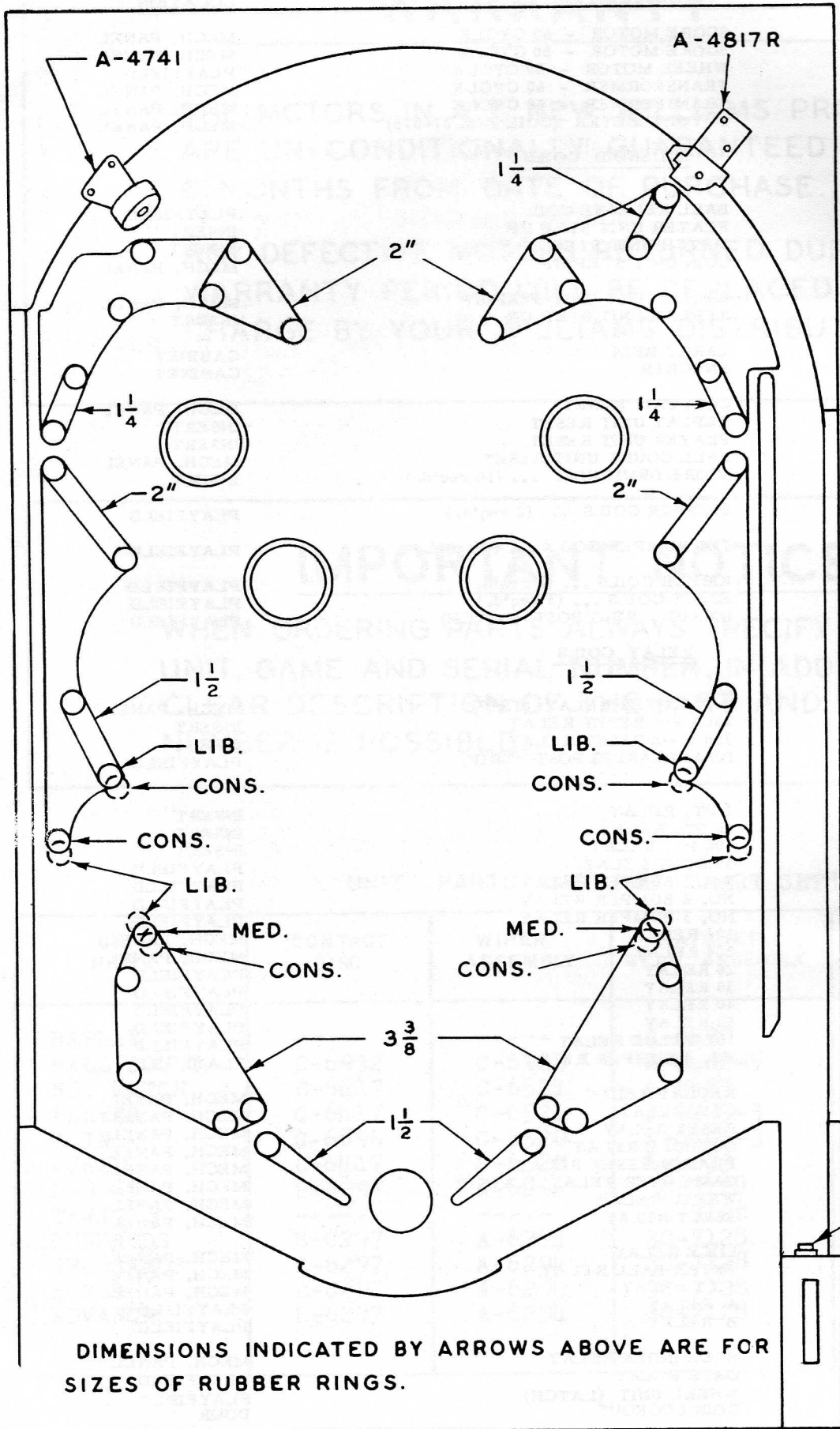
NOTICE:

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
14 A 7853	WHEEL MOTOR - 50 CYCLE	PLAYFIELD
15 A 6771	TRANSFORMER - 60 CYCLE	MECH. PANEL
15 A 6773	TRANSFORMER - 50 CYCLE	MECH. PANEL
B 6396	24 VOLT METER (COIL #XM 27-675)	MECH. PANEL
<u>SOLENOID COILS</u>		
A 22-550	BALL RELEASE COIL PLAYER UNIT STEP UP MATCH UNIT STEP UP COIN UNIT STEP UP	PLAYFIELD INSERT INSERT MECH. PANEL
A 23-600	BALL COUNT UNIT STEP UP REPLAY UNIT STEP UP	MECH. PANEL INSERT
A2-23-750	LARGE BELL KNOCKER	CABINET CABINET
B 26-800	COIN UNIT RESET REPLAY UNIT RESET PLAYER UNIT RESET BALL COUNT UNIT RESET SCORE DRUM UNIT ... (16 req'd.)	MECH. PANEL INSERT INSERT MECH. PANEL INSERT
FL 21-375/ 28-400	FLIPPER COILS ... (2 req'd.)	PLAYFIELD
G 22-550	JET BUMPER COILS ... (4 req'd.)	PLAYFIELD
G 23-750	KICKER COILS ... (2 req'd.) EJECT COILS ... (3 req'd.) DISAPPEARING POST (LATCH)	PLAYFIELD PLAYFIELD PLAYFIELD
<u>RELAY COILS</u>		
M 29-1000	GAME OVER RELAY (TRIP) 1st & 2nd RESET RELAY 3rd & 4th RESET RELAY DISAPPEARING POST (TRIP)	MECH. PANEL INSERT INSERT PLAYFIELD
M 29-1100	1 PT. RELAY 10 PT. RELAY 100 PT. RELAY TARGET RELAY NO. 1 BUMPER RELAY NO. 2 BUMPER RELAY NO. 3 BUMPER RELAY 10¢ RELAY 25¢ RELAY 20 RELAY 30 RELAY 40 RELAY 50 RELAY 10X VALUE RELAY NO. 4 BUMPER RELAY	INSERT INSERT INSERT PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
Z 27-1000	REPLAY RELAY COIN RELAY RESET RELAY OUTHOLE RELAY PLAYER RESET RELAY GAME OVER RELAY (LATCH) WHEEL RELAY EJECT RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1150	LOCK RELAY EXTRA BALL RELAY TILT RELAY A RELAY B RELAY	MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD
Z 28-1200	BALL INDEX RELAY GATE RELAY WHEEL UNIT (LATCH) COIN LOCKOUT	MECH. PANEL PLAYFIELD PLAYFIELD DOOR
M 1-31-1500		
XM 27-675		

"SMART SET" — 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.



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-6305	2" I.D.
23A-6308	3 3/8" I.D.
23A-6505	1 1/2" I.D.

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.

"SMART SET"

WHEEL LITES ARE CONTROLLED BY WHEEL UNIT. WHEEL UNIT MOTOR RUNS CONTINUOUSLY UNTIL GAME IS OVER. WHEEL RELAY IS ENERGIZED BY LEFT AND RIGHT SIDE EJECT POCKETS, AND BOTTOM ROLLOVERS. SWITCHES ON THE WHEEL RELAY WILL:

1. OPEN CIRCUIT TO WHEEL UNIT LATCH COIL, WHICH ALLOWS THE ARMATURE TO DROP OUT AND ENGAGE THE RATCHET ON THAT UNIT.
2. ENERGIZE 20, 30, 40 OR 50 RELAY, DEPENDING ON POSITION OF WHEEL UNIT.
3. RUNS SCORE MOTOR.

DIRECTLY BELOW THE WHEEL LITES ARE FOUR COLOR LITES---YELLOW, GREEN, BLUE AND RED. THESE LITES ARE CONTROLLED BY THE NUMBER MATCH UNIT. WHEN WHEEL RELAY IS ENERGIZED, WHEEL LITES STOP. IF COLOR POSITION WHICH WHEEL LITE STOPS ON MATCHES ONE OF THE COLOR LITES, THE "10 TIMES VALUE RELAY" ENERGIZES TO CHANGE THE SCORING FROM TENS TO HUNDREDS.

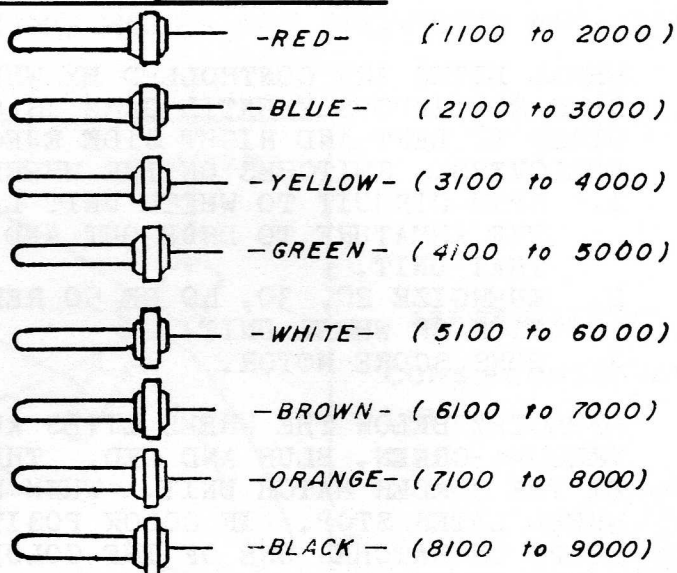
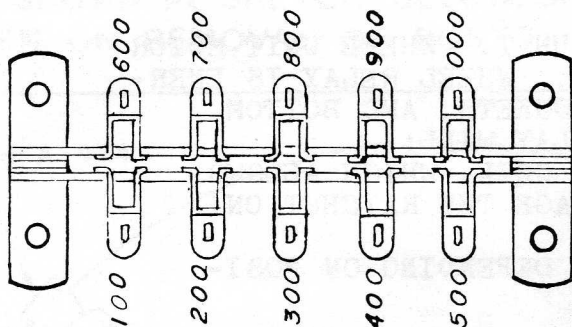
STOPPING THE WHEEL LITES ON 20 AWARDS AN EXTRA BALL. FOR HI-SCORE AND NUMBER MATCH AWARDS, SEE EXPLANATION OF "ADJUSTMENT JACKS" ON PAGES 8 AND 9.

LITING THE LETTERS "A" AND "B" WILL OPEN THE GATE AND LITE JET BUMPERS FOR INCREASED VALUE.

SERVICE SUGGESTIONS:

1. Lights are out, game is inoperative:
 - a. Check A.C. cord and plugs for breaks, cuts or other damage.
 - b. Check fuses, located behind cash box.
 - c. Check master switch, located under front of cabinet.
 - d. Check plugs and jacks for proper installation.
2. Lights are out, game operates:
 - a. Check two switches on Lock Relay: Blue-Yellow-White to Green-Yellow-White, and Brown-Yellow-White to Green-Yellow-White.
 - b. Check 10 AMP fuse-Blue wire, and 15 AMP fuse-Brown wire.
3. Lights are on, but all coins are rejected:
 - a. If Coin Lockout Coil (located on front door) is not energized, check the Last Position Break Switch on Replay Unit: Black and Black-Red. Check switch on Index Cam; Green-Red and Yellow. Check switch on Reset Relay; Green-Red and White-Gray.
 - b. If Coin Lockout Coil is energized, check the wire forms actuated by the armature on this coil. Then check the slug rejector.
4. Game resets but Game Over Relay trips immediately:
 - a. Check switch on Lock Relay Blu-Red and Yellow.
 - b. Check Ball Count Unit Reset Coil.
 - c. Check Ball Count Unit wiper fingers for proper resetting.

ADJUSTMENTS IN BACKBOX



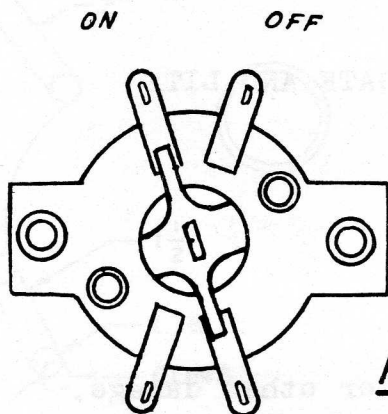
Hi-Score Adjustment

Insert plugs into 10 Point Female at desired positions.

Examples:

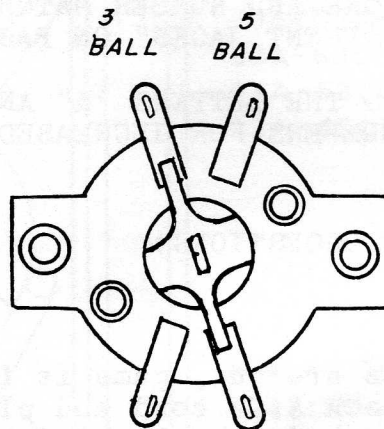
Yellow wire into 300 position scores at 3300.

Yellow wire into 000 position scores at 4000.



Number Match Adjustment

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.

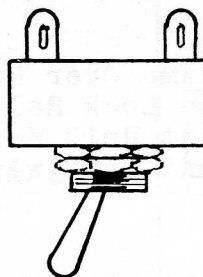


No. of Balls Adjustment

This switch changes 3 Ball to 5 Ball play, or vice versa.

(Located under front of Cabinet)

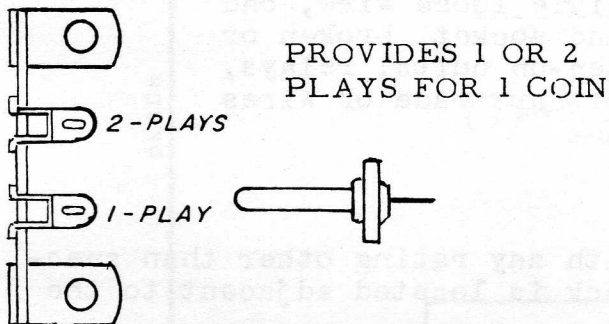
Master On-Off Switch



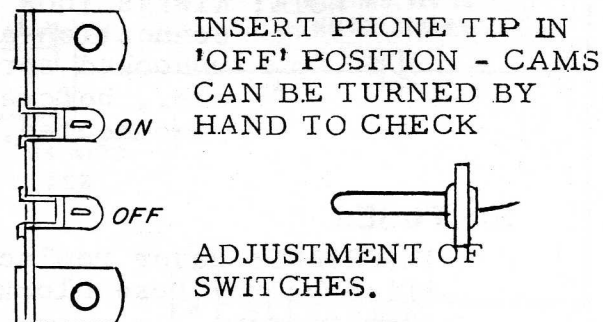
CONTROLS POWER TO TRANSFORMER

ADJUSTMENTS ON MECHANISM PANEL

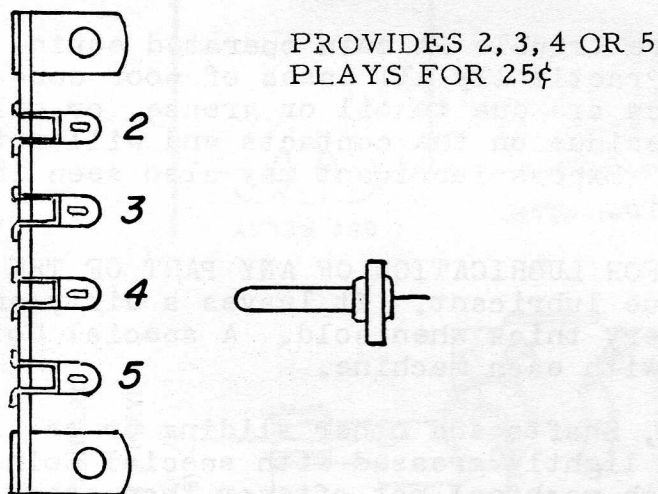
10¢ Adjustment



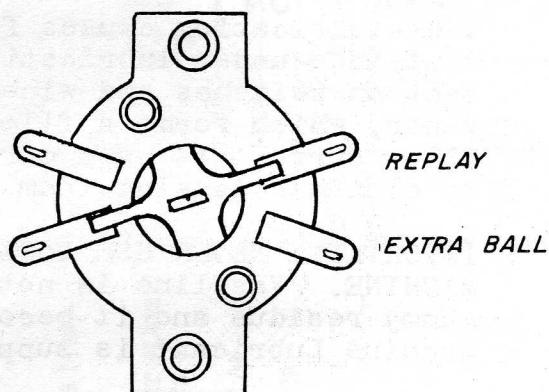
Motor Service Jack



25¢ Adjustment



Extra Ball Jack Adj.



IN REPLAY POSITION: NUMBER MATCH
AND HI-SCORES, AS INDICATED, AWARD
REPLAY. IN EXTRA BALL POSITION:
HI-SCORES AWARD EXTRA BALL.

POWER TRANSFORMER:

LOCATED ON MECHANISM PANEL. IT IS EQUIPPED WITH A SECONDARY TAP. IF YOUR GAME IS ON LOCATION WITH EXTREMELY LOW LINE VOLTAGE, REMOVE LEAD FROM LUG MARKED 24 VOLTS AND SOLDER TO ALTERNATE LUG MARKED "HIGH". THIS WILL BOOST SECONDARY VOLTAGE APPROXIMATELY 2-3 VOLTS.

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 LEG LEVELERS TO INCREASE PITCH.

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.

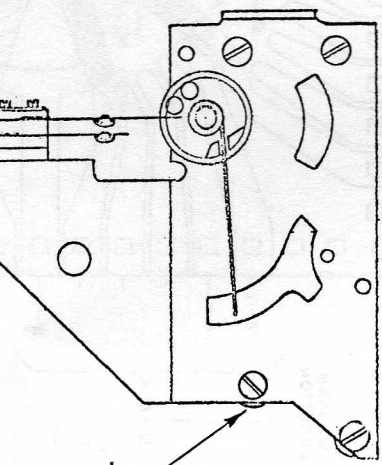
STEP-UP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with special Coin Machine Lubricant (supplied with machine) not oftener than every six months. The bakelite discs (biscuits) on the Motor Units and Step-up Units will require lubrication with 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.

4. RELAY and SWITCH ADJUSTMENT

Where relay adjustments are called for, before bending blades, in all cases, on any machine, make certain that the screws holding the switch stacks are down very tightly. This is suggested because the plastic spacers in the switch stacks have occasionally shrunk by drying out, causing a poor adjustment.

CONVERTING FROM (10¢-25¢) PLAY TO (2/25¢ - 2/25¢) PLAY
 REPLACE 10¢ COIN CHUTE WITH 25¢ COIN CHUTE.
 REPLACE 10¢ COIN INSERT PLATE WITH (1A-4215) 25¢ COIN INSERT
 PLATE.
 REPLACE 10¢ IDENTIFICATION PLATE WITH (16C-8640-100) 2 PLAYS-
 QUARTER.
 REPLACE 10¢ COIN SWITCH WITH 25¢ COIN SWITCH (3M-3)



REMOVE MACHINE SCREW AND
 SPACER IN "COIN TRIP AND
 SWITCH ASSEMBLY "B-6853,
 TO ALLOW QUARTER TO PASS THRU.

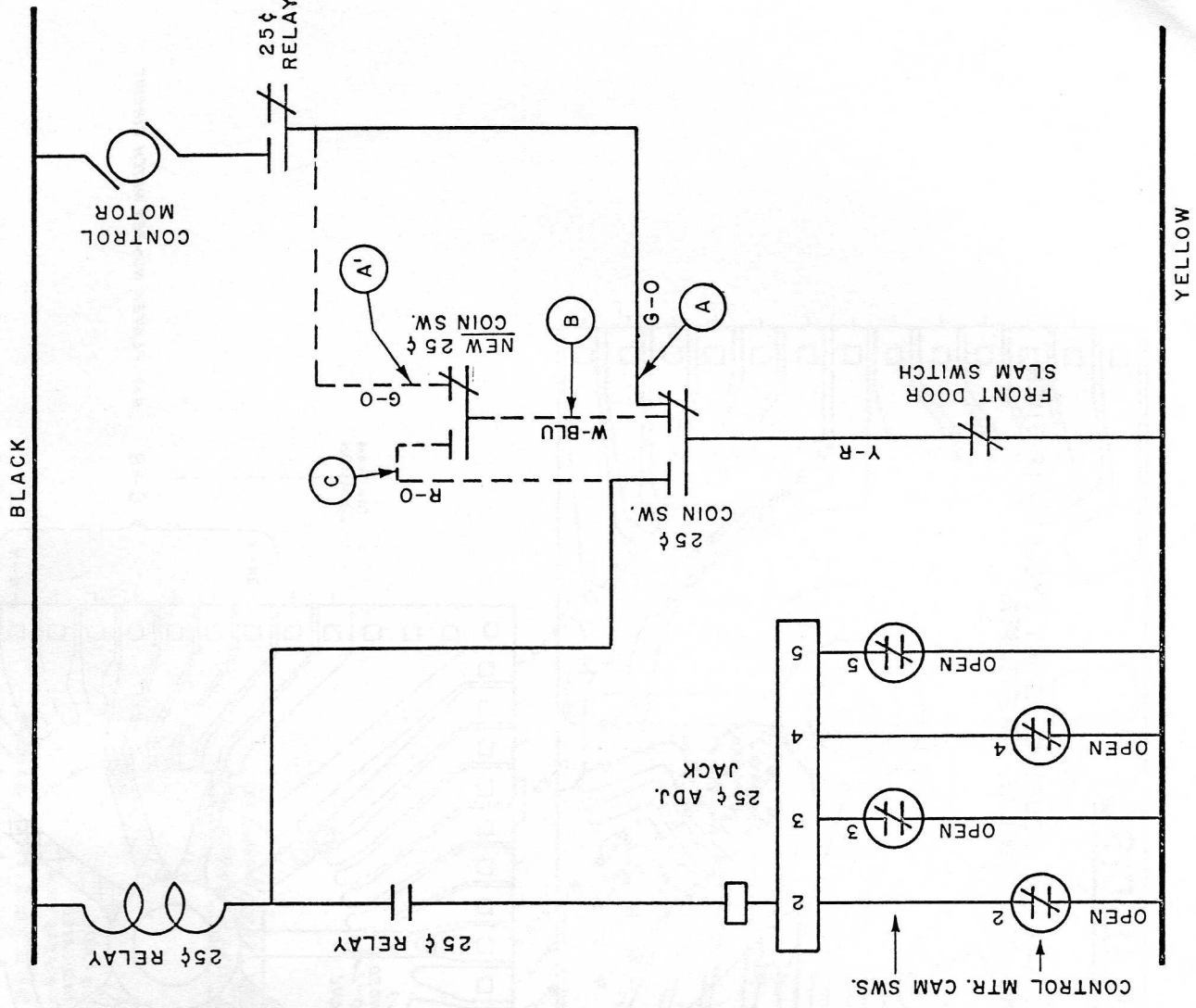
B-6853 COIN TRIP & SWITCH ASS'Y.

TO CONVERT FROM (5¢ 5¢ - 10¢ - 25¢) TO (2/25¢ - 2/25¢)

REPLACE (5¢ 5¢) COIN TRIP AND SWITCH ASSEMBLY WITH B-6853 (10¢)
 COIN TRIP AND SWITCH ASSEMBLY.
 REPLACE 5¢ COIN CHUTE WITH 25¢ COIN CHUTE.
 REPLACE 5¢ COIN INSERT PLATE WITH (1A-4215) 25¢ COIN INSERT PLATE.
 REPLACE 5¢ IDENTIFICATION PLATE WITH (16C-8640-100) 2 PLAYS -
 QUARTER.
 MAKE CHANGES ON B-6853 "COIN TRIP AND SWITCH ASSEMBLY" AS
 SHOWN ABOVE.
 USE PART NO. 16A-8636 (DUMMY COIN ENTRY COVER) ON CENTER
 CHUTE.

WIRING INSTRUCTIONS

AT ORIGINAL 25¢ COIN SWITCH, UNSOLDER GREEN-ORANGE
 WIRE (A) AND TAPE IT. REMOVE TAPE FROM WHITE-BLUE WIRE
 AND SOLDER IN ITS PLACE.
 AT NEW 25¢ COIN SWITCH, REMOVE TAPE FROM GREEN-ORANGE,
 WHITE-BLUE AND RED-ORANGE WIRES AND SOLDER AS SHOWN BY
 DOTTED LINES (A), (B) AND (C).
 INSERT 25¢ ADJUSTMENT JACK INTO "2 PLAYS FOR QUARTER" POSITION.



BALL COUNT UNIT DISC

THIS UNIT RESET 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.*

DIAGRAM
LOCATION

TRIPS GAME OVER RELAY
IN 5 BALL GAME.

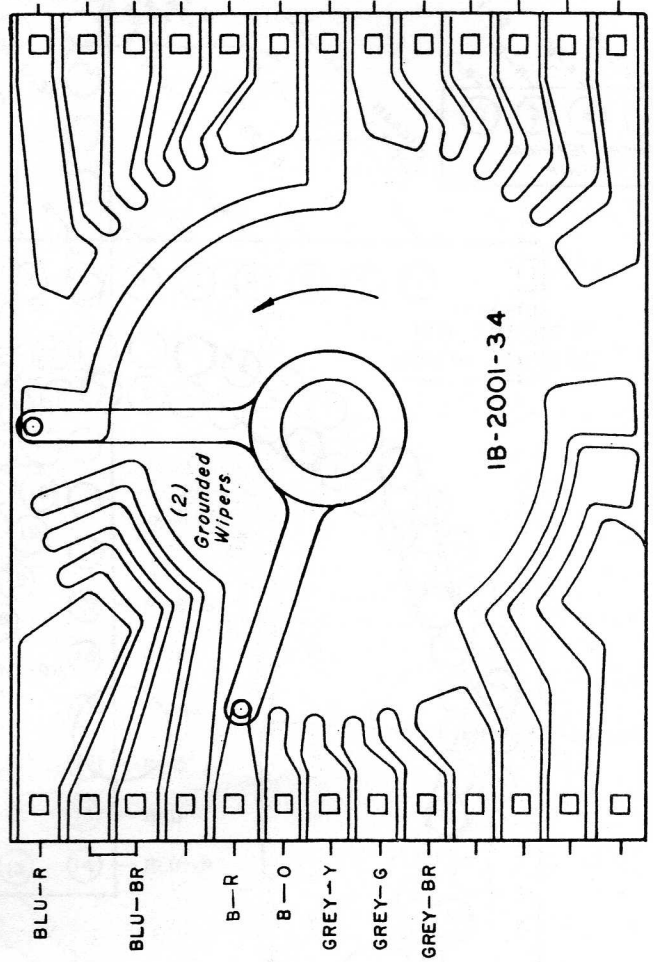
D-17

TRIPS GAME OVER RELAY
IN 3 BALL GAME.

D-17

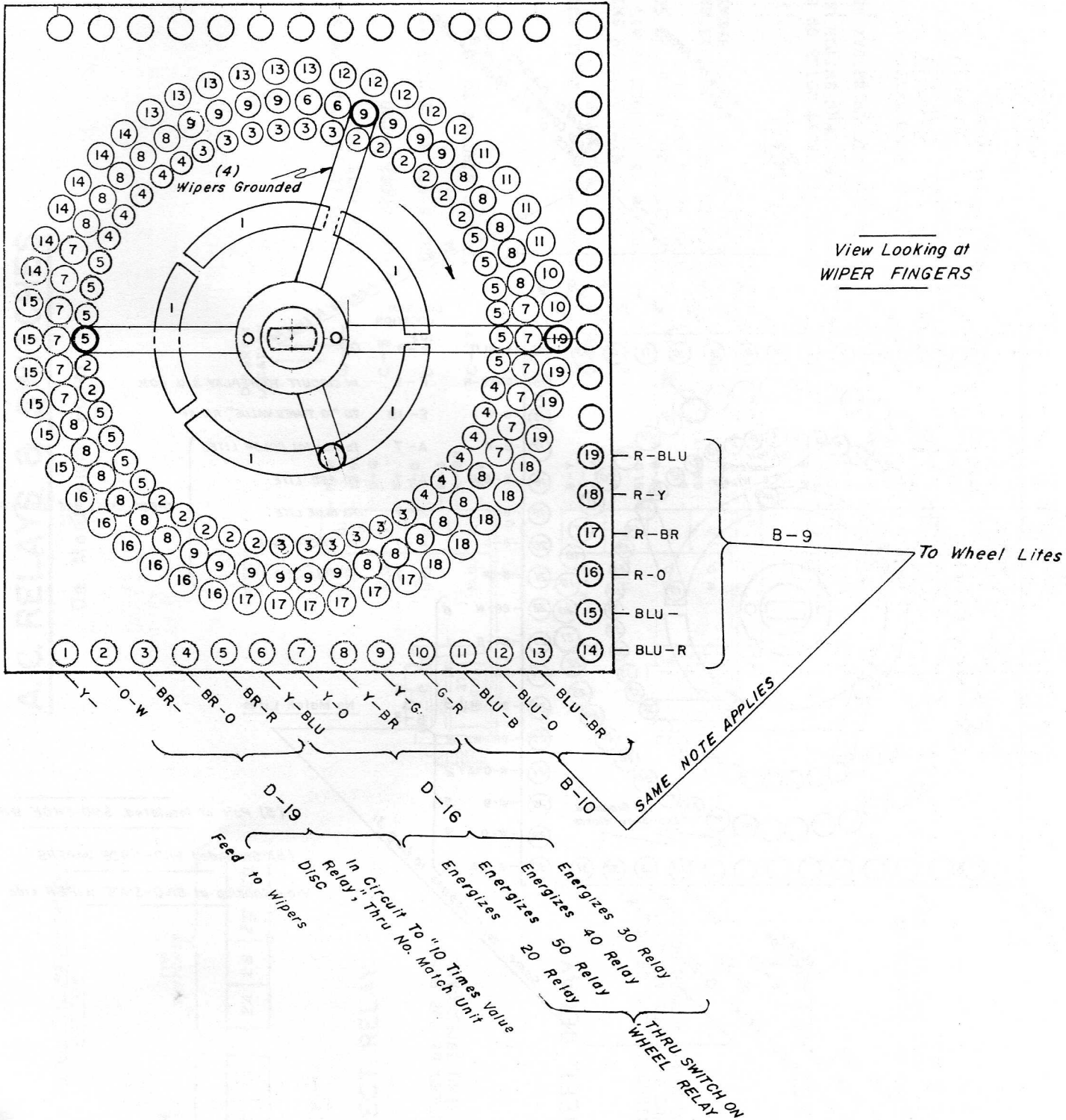
1
2
3
4
5

BALL IN PLAY LITES



WHEEL MOTOR UNIT DISC

DURING PLAY, THIS MOTOR RUNS CONTINUOUSLY. THE "WHEEL UNIT LATCH COIL" IS HELD IN UNTIL "WHEEL RELAY" IS ENERGIZED.



No. MATCH UNIT DISC

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

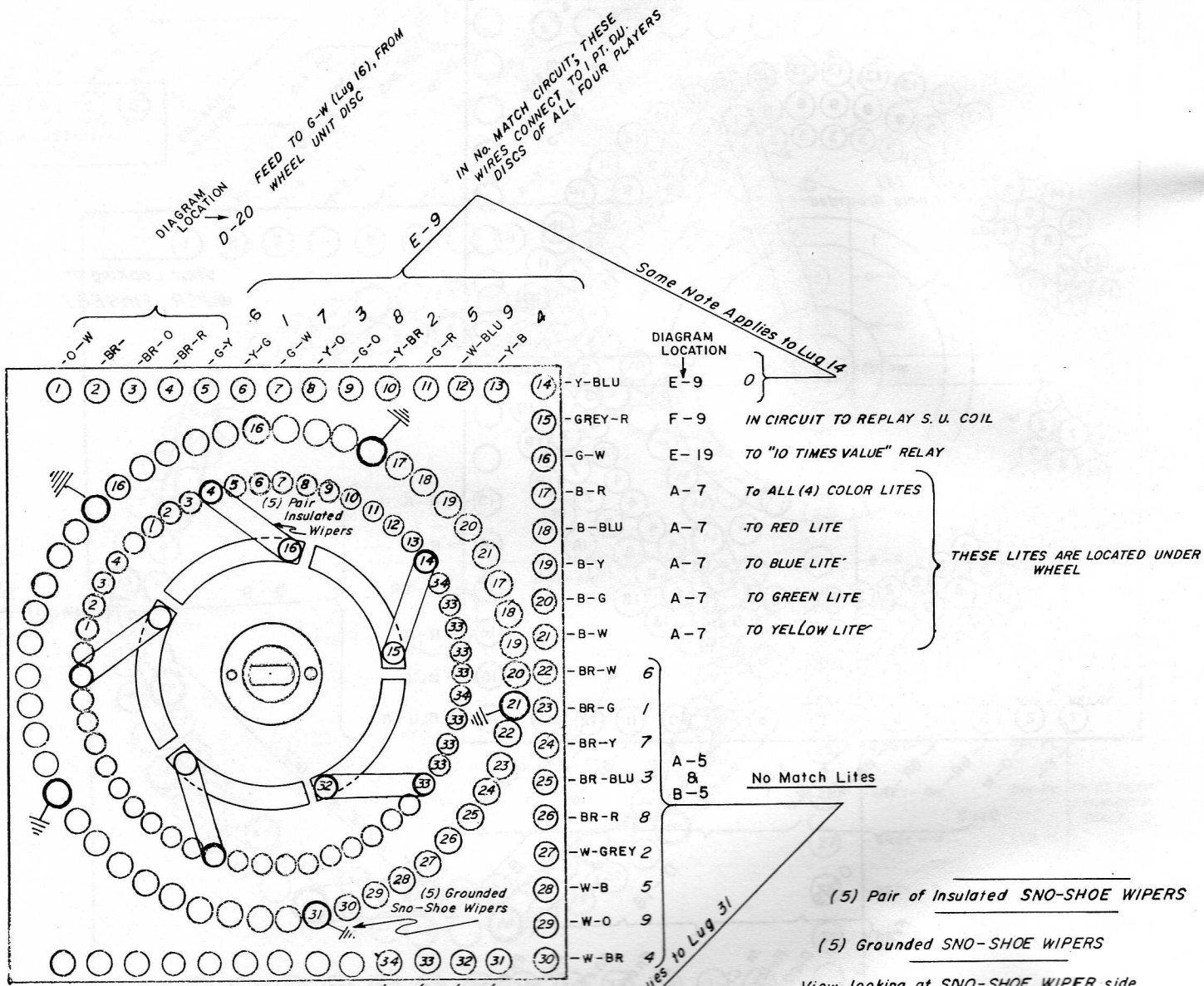


DIAGRAM LOCATION D-20
FEED TO G-W (Lug 16), FROM WHEEL UNIT DISC

E-9
IN NO. MATCH CIRCUIT, THESE WIRES CONNECT TO 1 PT. DU. DISCS OF ALL FOUR PLAYERS

Some Note Applies to Lug 14

THESE LITES ARE LOCATED UNDER WHEEL

No Match Lites

(5) Pair of Insulated SNO-SHOE WIPERS

(5) Grounded SNO-SHOE WIPERS

View looking at SNO-SHOE WIPER side

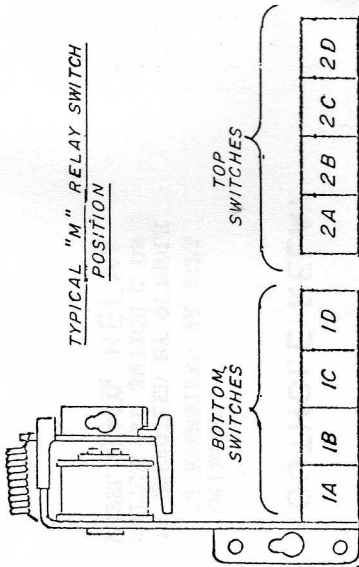
DIAGRAM LOCATION E-22
E-22
D-22

Some Note Applies to Lug 31

TO 100 POINT RELAY COIL
TO 10 POINT RELAY COIL
FEED TO W-R & BR-Y, FROM SW. ON EJECT RELAY

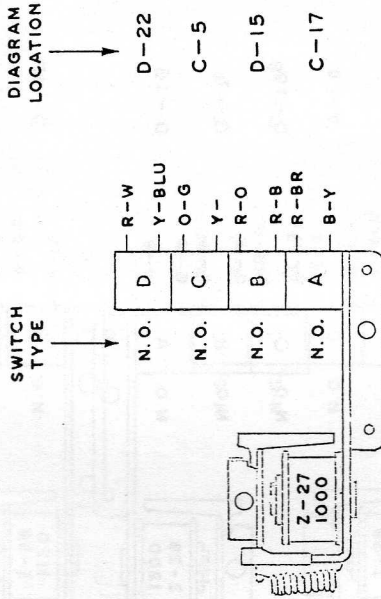
A. C. RELAYS & SWITCHES

On Mechanism Panel



EJECT RELAY

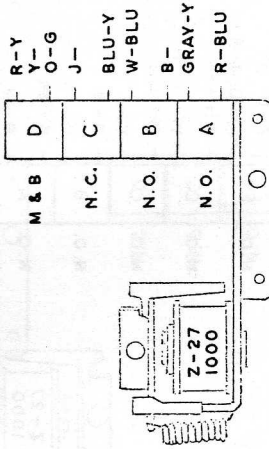
IS ENERGIZED BY TOP EJECT SWITCH, THRU INDEX CAM SWITCH B.



PULSES 10 POINT OR 100 POINT RELAY, THRU NO. MATCH UNIT DISC.
 RUNS SCORE MOTOR.
 PULSES TOP EJECT COIL AT CAM SWITCH 1A.
 IN HOLD CIRCUIT TO THIS RELAY.

WHEEL RELAY

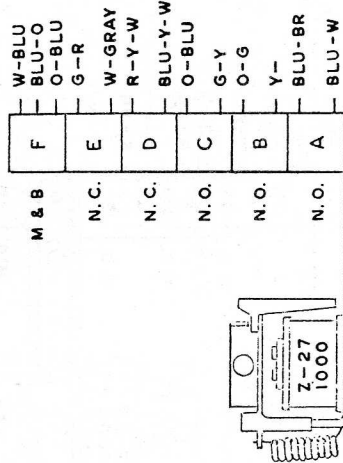
IS ENERGIZED BY LEFT OR RIGHT SIDE EJECT SWITCHES AND LEFT BOTTOM OR RIGHT BOTTOM ROLL-OVERS.



OPENS CIRCUIT TO WHEEL UNIT LATCH COIL AND RUNS SCORE MOTOR.
 IN SERIES WITH OUTHOLE SWITCH--IN CIRCUIT TO OUTHOLE RELAY.
 ENERGIZES 20, 30, 40 OR 50 RELAY, THRU WHEEL UNIT DISC.
 IN HOLD CIRCUIT TO THIS RELAY, THRU SWITCHES ON 20, 30, 40 AND 50 RELAYS.

RESET RELAY

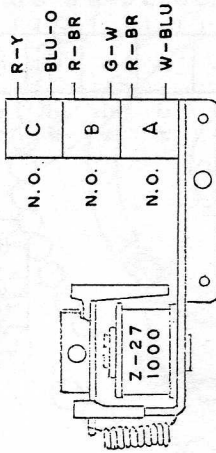
IS ENERGIZED BY SWITCH C ON COIN RELAY, THRU SWITCH B ON GAME-OVER RELAY.



ENERGIZES RESET COILS ON BALL COUNT AND COIN UNITS, THRU SWITCH ON COIN RELAY.
 OPENS CIRCUIT TO REPLAY RELAY.
 IN SERIES WITH SWITCH A ON GAME-OVER RELAY.
 IN CIRCUIT TO PLAYER UNIT RESET COIL.
 RUNS SCORE MOTOR.
 IN HOLD CIRCUIT TO THIS RELAY, THRU (16) DRUM UNIT ZERO POSITION SWITCHES.

REPLAY RELAY

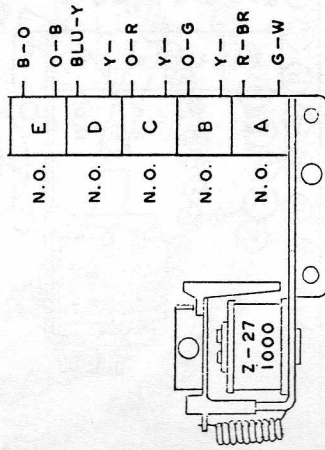
IS ENERGIZED BY REPLAY BUTTON WHEN ONE OR MORE CREDITS ARE AVAILABLE ON REPLAY UNIT.



PULSES REPLAY UNIT RESET COIL, THRU CAM SWITCH 1C.
 ENERGIZES COIN RELAY.
 IN HOLD CIRCUIT TO THIS RELAY.

COIN RELAY

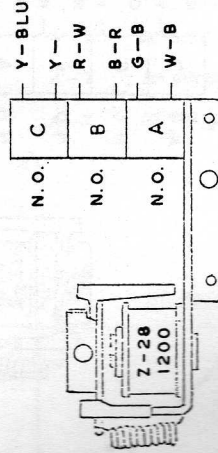
IS ENERGIZED BY COIN SWITCH OR BY REPLAY RELAY.



ENERGIZES LOCK RELAY.
 ENERGIZES GAME-OVER RELAY (TRIP COIL), THRU PLAYER UNIT OR BALL COUNT UNIT ZERO SWITCHES.
 ENERGIZES RESET RELAY, THRU SWITCH B ON GAME-OVER RELAY.
 RUNS SCORE MOTOR.
 IN HOLD CIRCUIT TO THIS RELAY.

BALL INDEX RELAY

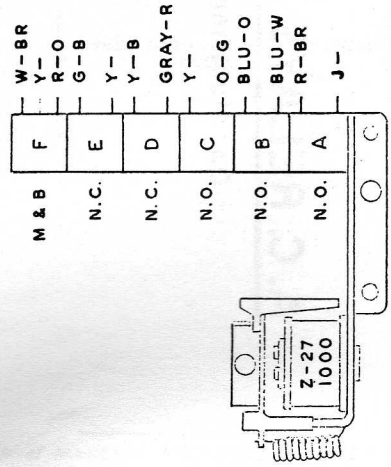
IS ENERGIZED BY SWITCH D ON TILT RELAY. IT IS ALSO ENERGIZED BY 1 POINT, 10 POINT OR 100 POINT RELAY, THRU SWITCH C ON EXTRA BALL RELAY.



IN SERIES WITH SWITCH A ON EXTRA BALL RELAY.
 IN SERIES WITH SWITCH C ON PLAYER RESET RELAY.
 IN HOLD CIRCUIT TO THIS RELAY.

OUTHOLE RELAY

IS ENERGIZED BY OUTHOLE SWITCH AND SWITCH C ON WHEEL RELAY.

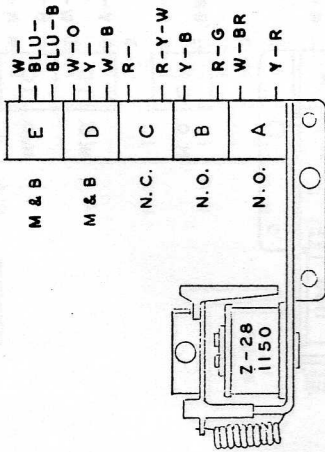


IN HOLD CIRCUIT TO TILT RELAY--ALSO IN SERIES WITH SWITCH B ON BALL INDEX RELAY.
 IN SERIES WITH SWITCH A ON BALL INDEX RELAY.
 ENERGIZES TARGET RELAY, THRU SWITCH A ON INDEX CAM.
 RUNS SCORE MOTOR.
 PULSES BALL RELEASE COIL AT CAM SWITCH 3C.
 IN HOLD CIRCUIT TO THIS RELAY.

TILT RELAY

IS ENERGIZED BY TILT SWITCHES.

DIAGRAM LOCATION

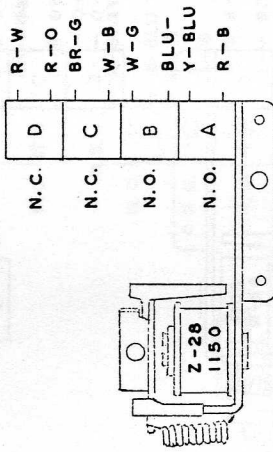


OPENS CIRCUIT TO PLAYFIELD LITES AND MAKES TO "TILT" LITE.
 IN HI-SCORE CIRCUIT TO REPLAY S.U. COIL---ALSO ENERGIZES BALL INDEX RELAY.
 OPENS CIRCUITS TO ALL PLAYFIELD SWITCHES EXCEPT OUTHOLE AND EJECT SWITCHES.
 ENERGIZES TARGET RELAY WHEN POST IS UP.

IN HOLD CIRCUIT TO THIS RELAY.

EXTRA BALL RELAY

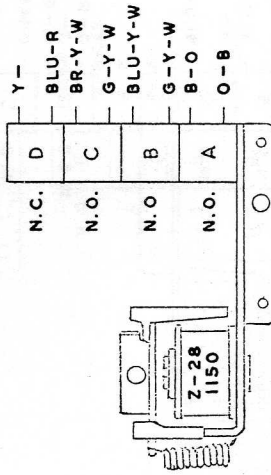
IS ENERGIZED BY SWITCH 1B ON "20" RELAY. IT IS ALSO ENERGIZED BY HI-SCORE CIRCUIT, THRU "REPLAY-EXTRA BALL" ADJUSTMENT JACK.



IN SERIES WITH SWITCH B ON BALL INDEX RELAY.
 ENERGIZES BALL INDEX RELAY, THRU SWITCH ON 1, 10 OR 100 POINT RELAY.
 TO "SHOOT AGAIN" LITES.
 IN HOLD CIRCUIT TO THIS RELAY.

LOCK RELAY

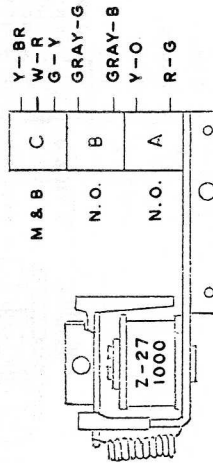
IS ENERGIZED BY 10¢ RELAY, 25¢ RELAY, COIN RELAY OR LEFT FLIPPER SWITCH.



ENERGIZES GAME-OVER RELAY (TRIP COIL).
 6 VOLTS TO LITES, FROM TRANSFORMER.
 6 VOLTS TO LITES, FROM TRANSFORMER.
 IN HOLD CIRCUIT TO THIS RELAY.

PLAYER RESET RELAY

IS ENERGIZED BY BALL COUNT UNIT END-OF-STROKE SWITCH.



TO PLAYER UP UNIT STEP-UP OR RESET COILS.
 IN NO. MATCH CIRCUIT TO REPLAY S.U. COIL.
 IN HOLD CIRCUIT TO THIS RELAY.

GAME-OVER RELAY (INTERLOCK)

LATCH COIL IS PULSED BY SCORE MOTOR CAM SWITCH 1C, THRU SWITCHES ON COIN RELAY AND RESET RELAY.

TRIP COIL IS PULSED BY WIPER FINGERS ON BALL COUNT UNIT OR BY SWITCH D ON LOCK RELAY. ALSO, DURING RESET CYCLE, BY SWITCH D ON COIN RELAY.

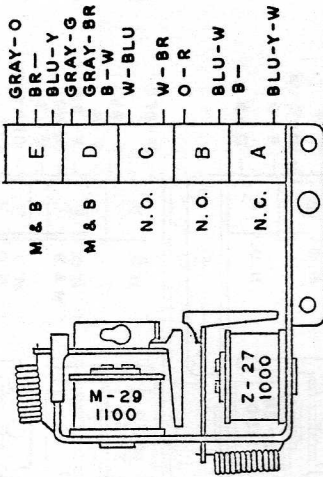
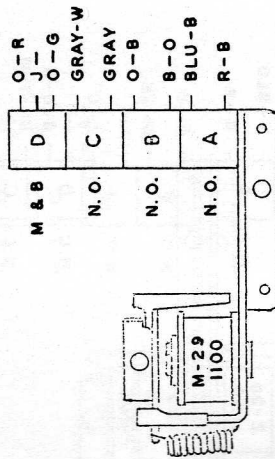


DIAGRAM LOCATION

A-4 TO PLAYER UP LITES---ALSO TO GAME-OVER AND NO. MATCH LITES.
E-8 OPENS HI-SCORE CIRCUIT AND MAKES IN NO. MATCH CIRCUIT.
D-3 IN CIRCUIT TO REPLAY RELAY, THRU REPLAY BUTTON.
D-6 IN SERIES WITH SWITCH C ON COIN RELAY.
F-17 OPENS CIRCUITS TO ALL PLAYFIELD SWITCHES.

10¢ RELAY

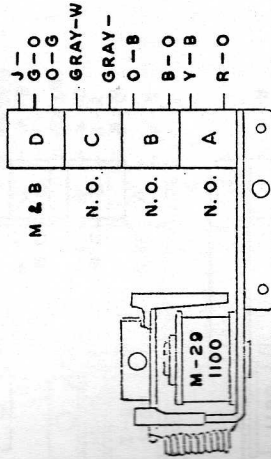
IS ENERGIZED BY 10¢ COIN SWITCH IF 10¢ ADJUSTMENT JACK IS IN "2 PLAYS" POSITION.



C-5 IN CIRCUIT TO KNOCKER COIL--- ALSO RUNS SCORE MOTOR.
D-8 PULSES REPLAY S.U. COIL, THRU IMPULSE CAM SWITCH B.
E-15 ENERGIZES LOCK RELAY.
E-2 IN HOLD CIRCUIT TO THIS RELAY.

25¢ RELAY

IS ENERGIZED BY 25¢ COIN SWITCH.

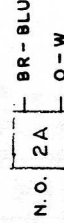


C-5 IN CIRCUIT TO KNOCKER COIL--- ALSO RUNS SCORE MOTOR.
D-8 PULSES REPLAY S.U. COIL, THRU IMPULSE CAM SWITCH B.
E-14 ENERGIZES LOCK RELAY.
E-2 IN HOLD CIRCUIT TO THIS RELAY.

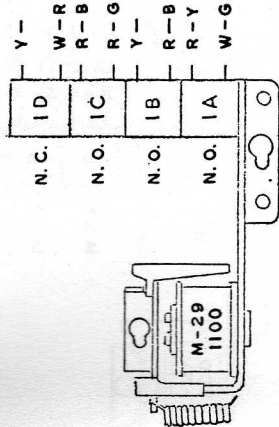
LOCATED ON PLAYFIELD

20 RELAY

IS ENERGIZED BY SWITCH B ON WHEEL RELAY.



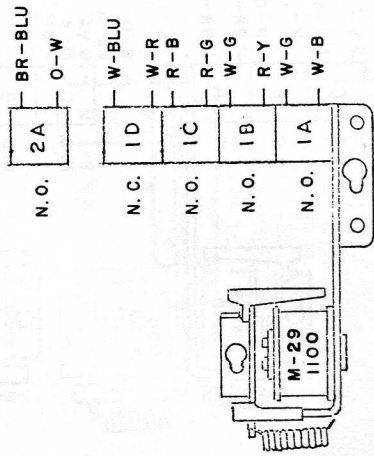
E-16 IN HOLD CIRCUIT TO THIS RELAY.



C-16 IN SERIES WITH SWITCH 1D ON 30 RELAY.
D-14 PULSES (2) SIDE EJECT COILS, AT CAM SWITCH 4A.
C-19 ENERGIZES EXTRA BALL RELAY.
D-21 IN CIRCUIT TO 10 POINT OR 100 POINT RELAY.

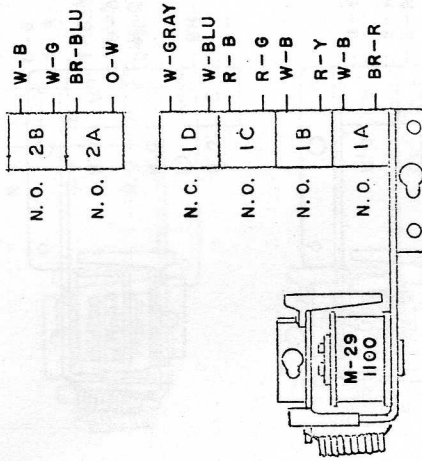
30 RELAY

IS ENERGIZED BY SWITCH B ON WHEEL RELAY.



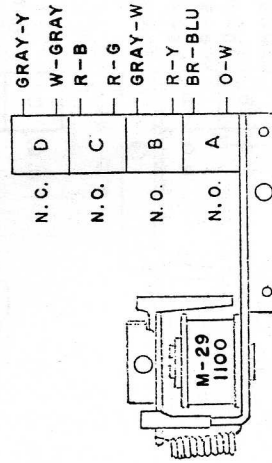
40 RELAY

IS ENERGIZED BY SWITCH B ON WHEEL RELAY.



50 RELAY

IS ENERGIZED BY SWITCH B ON WHEEL RELAY.



"A" RELAY

IS ENERGIZED BY LEFT TOP ROLL-OVER OR LEFT TOP TARGET.

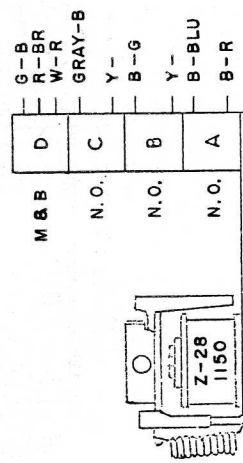


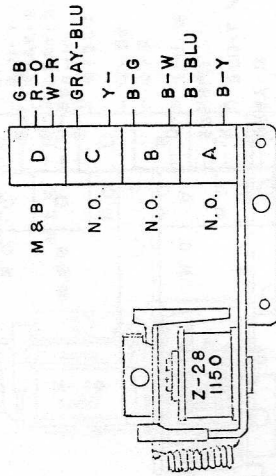
DIAGRAM LOCATION

- E-16 IN HOLD CIRCUIT TO THIS RELAY.
- D-16 IN SERIES WITH SWITCH 1D ON 40 RELAY.
- D-15 PULSES (2) SIDE EJECT COILS AT CAM SWITCH 4A.
- D-22 IN CIRCUIT TO 10 POINT OR 100 POINT RELAY.
- D-22 IN CIRCUIT TO 10 POINT OR 100 POINT RELAY.
- C-22 IN CIRCUIT TO 10 POINT OR 100 POINT RELAY.
- E-16 IN HOLD CIRCUIT TO THIS RELAY.
- D-16 IN SERIES WITH SWITCH D ON 50 RELAY.
- D-15 PULSES (2) SIDE EJECT COILS AT CAM SWITCH 4A.
- D-22 IN CIRCUIT TO 10 POINT OR 100 POINT RELAY.
- D-22 IN CIRCUIT TO 10 POINT OR 100 POINT RELAY.
- E-16 IN SERIES WITH SWITCH A ON WHEEL RELAY.
- D-15 PULSES (2) SIDE EJECT COILS AT CAM SWITCH 4A.
- C-21 IN CIRCUIT TO 10 POINT OR 100 POINT RELAY.
- E-16 IN HOLD CIRCUIT TO THIS RELAY.
- D-23 IN CIRCUIT TO 1 POINT OR 10 POINT RELAY.
- B-10 TO LEFT TOP AND RIGHT BOTTOM JET BUMPER LITES---ALSO LEFT TOP ROLLOVER LITE.
- C-21 IN SERIES WITH SWITCH B ON "B" RELAY.
- E-20 IN HOLD CIRCUIT TO THIS RELAY.

DIAGRAM LOCATION
↓

"B" RELAY

IS ENERGIZED BY RIGHT TOP ROLLOVER OR RIGHT TOP TARGET.



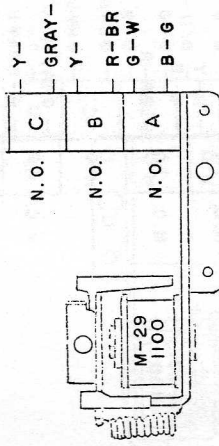
IN CIRCUIT TO I POINT OR LO POINT RELAY.
TO RIGHT TOP AND LEFT BOTTOM JET BUMPER LITES---ALSO TO RIGHT TOP ROLLOVER LITE.
TO GATE RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

D-23
B-11
E-21
E-20

NO. 1 BUMPER RELAY

IS PULSED BY LEFT TOP JET BUMPER SWITCH.

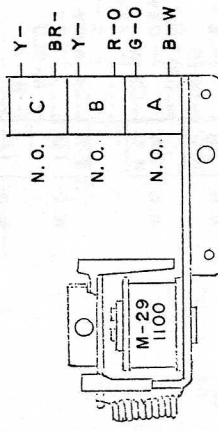


ENERGIZES LEFT TOP JET BUMPER COIL.
IN SERIES WITH SWITCH D ON "A" RELAY.
IN HOLD CIRCUIT TO THIS RELAY.

C-4
C-23
D-24

NO. 2 BUMPER RELAY

IS PULSED BY RIGHT TOP JET BUMPER SWITCH.

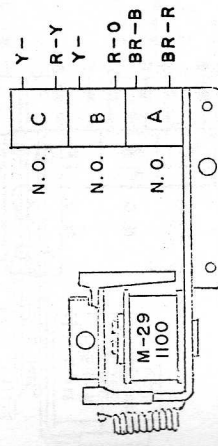


ENERGIZES RIGHT TOP JET BUMPER COIL.
IN SERIES WITH SWITCH D ON "B" RELAY.
IN HOLD CIRCUIT TO THIS RELAY.

C-4
C-23
D-24

NO. 3 BUMPER RELAY

IS PULSED BY LEFT BOTTOM JET BUMPER SWITCH.

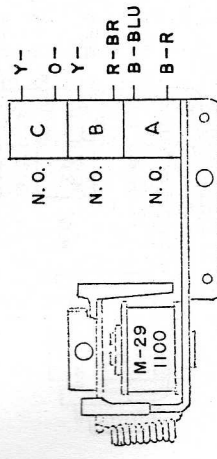


ENERGIZES LEFT BOTTOM JET BUMPER COIL.
IN SERIES WITH SWITCH D ON "B" RELAY.
IN HOLD CIRCUIT TO THIS RELAY.

C-4
C-23
D-25

NO. 4 BUMPER RELAY

IS PULSED BY RIGHT BOTTOM JET BUMPER SWITCH.



ENERGIZES RIGHT BOTTOM JET BUMPER COIL.
IN SERIES WITH SWITCH D ON "A" RELAY.
IN HOLD CIRCUIT TO THIS RELAY.

C-4
C-23
D-25

10 TIMES VALUE RELAY

IS ENERGIZED BY WIPER FINGERS ON NUMBER MATCH UNIT DISC.

ALSO BY A CIRCUIT FROM THE WHEEL UNIT DISC TO THE NUMBER MATCH UNIT DISC.

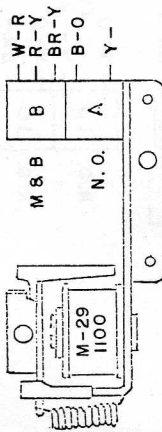


DIAGRAM LOCATION

E-21

IN CIRCUIT TO 10 POINT OR 100 POINT RELAY.

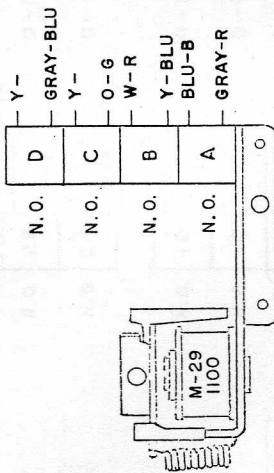
B-10

TO "10 TIMES VALUE" LITE.

TARGET RELAY

IS ENERGIZED BY SWITCH D ON OUTHOLE RELAY OR BY (2) SIDE TARGET (DOWN POST) SWITCHES.

ALSO BY SWITCH B ON TILT RELAY.



C-15

ENERGIZES POST LATCH COIL.

C-5

RUNS SCORE MOTOR.

D-22

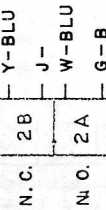
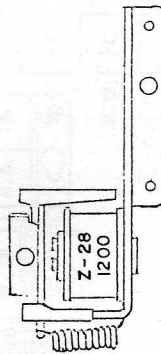
PULSES 10 POINT RELAY, THRU IMPULSE CAM SWITCH C.

C-15

IN HOLD CIRCUIT TO THIS RELAY.

GATE RELAY

IS ENERGIZED BY SWITCH B ON "A" AND "B" RELAYS. THIS RELAY OPENS GATE AT RIGHT BOTTOM OF PLAYFIELD.



E-19

IN SERIES WITH SWITCH A ON EXTRA BALL RELAY.

E-23

IN HOLD CIRCUIT TO THIS RELAY.

LOCATED IN BACK-BOX

1 POINT RELAY

IS PULSED BY NO. 1, 2, 3 OR 4 BUMPER RELAYS, STANDUP SWITCHES OR KICKER SWITCHES.

C-11

PULSES 1 POINT DRUM UNITS, THRU DISC ON PLAYER UNIT.

C-25

ENERGIZES NUMBER MATCH S.U. COIL.

C-18

ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.

E-23

PULSES 10 POINT RELAY, THRU 9TH POSITION SWITCHES ON 1 POINT DRUM UNITS.

10 POINT RELAY

IS PULSED BY 20, 30, 40 OR 50 RELAYS, EJECT RELAY, TARGET RELAY, OR BUMPER RELAYS.

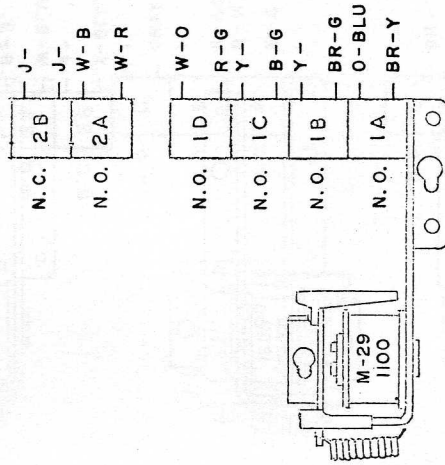


DIAGRAM LOCATION

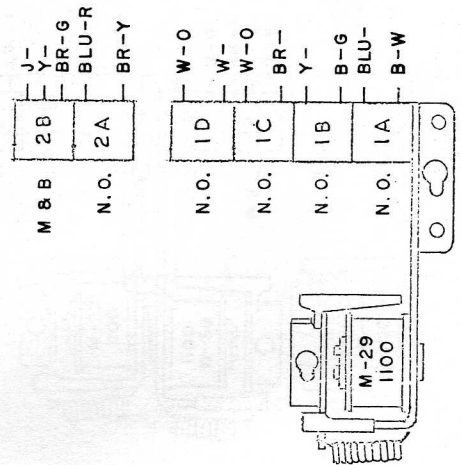


- D-19 IN SERIES WITH SWITCH 2B ON 1 POINT RELAY.
- E-23 IN HOLD CIRCUIT TO THIS RELAY.
- C-12 PULSES 10 POINT DRUM UNITS, THRU DISC ON PLAYER UNIT.
- D-25 PULSES LARGE BELL COIL.
- C-18 ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.
- E-24 PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCHES ON 10 POINT DRUM UNITS.

100 POINT RELAY

IS PULSED BY 20, 30, 40 OR 50 RELAYS, THRU SWITCH B ON "10 TIMES VALUE" RELAY.

ALSO BY EJECT RELAY, TARGET RELAY, LEFT TOP ROLLOVER, RIGHT TOP ROLLOVER, AND TOP ROLLOVER BUTTON SWITCH.

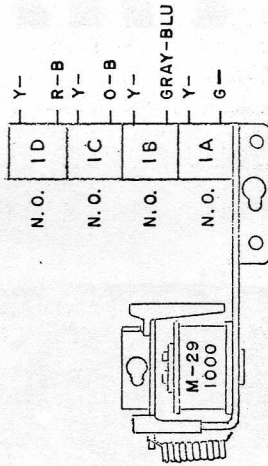
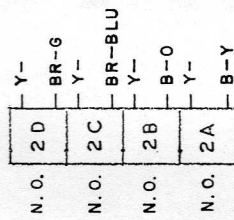


- C-19 IN SERIES WITH SWITCH 2B ON 10 POINT RELAY----
- C-18 ALSO IN CIRCUIT TO BALL INDEX RELAY.
- E-23 IN HOLD CIRCUIT TO THIS RELAY.
- C-13 PULSES 100 POINT DRUM UNITS, THRU DISC ON PLAYER UNIT.
- C-14 PULSES 1000 POINT DRUM UNITS, THRU 9TH POSITION SWITCHES ON 100 POINT DRUM UNITS.
- C-25 PULSES LARGE BELL COIL.
- F-9 IN HI-SCORE CIRCUIT TO REPLAY S.U. COIL.

1ST & 2ND PLAYER RESET RELAY

IS PULSED BY IMPULSE CAM
SWITCH D, THRU SWITCH A OF
RESET RELAY.

DIAGRAM
LOCATION

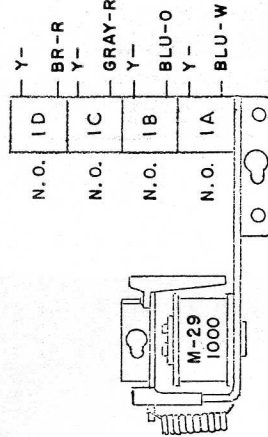
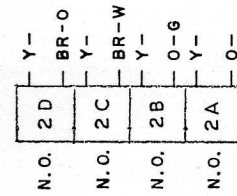


D-14 2ND PLAYER 1000 POINT DRUM UNIT.
 D-13 1ST PLAYER 1000 POINT DRUM UNIT.
 D-13 2ND PLAYER 100 POINT DRUM UNIT.
 D-13 1ST PLAYER 100 POINT DRUM UNIT.
 D-12 2ND PLAYER 10 POINT DRUM UNIT.
 D-12 1ST PLAYER 10 POINT DRUM UNIT.
 D-11 2ND PLAYER 1 POINT DRUM UNIT.
 D-11 1ST PLAYER 1 POINT DRUM UNIT.

THESE DRUM UNITS ARE
PULSED, DURING RESET
CYCLE, THRU ZERO SW.
ON THAT UNIT.

3RD & 4TH PLAYER RESET RELAY

IS PULSED BY IMPULSE CAM
SWITCH A, THRU RESET RE-
LAY SWITCH A.



D-14 3RD PLAYER 1000 POINT DRUM UNIT.
 D-13 3RD PLAYER 100 POINT DRUM UNIT.
 D-12 4TH PLAYER 1 POINT DRUM UNIT.
 D-14 4TH PLAYER 1000 POINT DRUM UNIT.
 D-13 4TH PLAYER 100 POINT DRUM UNIT.
 D-13 4TH PLAYER 10 POINT DRUM UNIT.
 D-12 3RD PLAYER 1 POINT DRUM UNIT.
 D-12 3RD PLAYER 10 POINT DRUM UNIT.

THESE DRUM UNITS ARE
PULSED, DURING RESET
CYCLE, THRU ZERO SW.
ON THAT UNIT.