

# Instruction Manual FOR FAN-TAS-TIC



**Williams**® ELECTRONICS, INC.  
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# "FAN-TAS-TIC"

## 4 PLAYER

ANY OF THE (3) EJECT POCKETS WILL RUN THE SPINNER UNIT. CAPTIVE BALL (IN SPINNER UNIT) WILL THEN FALL INTO ONE OF TWELVE HOLES TO SCORE THE FOLLOWING:

(1.) "STAR" SWITCH WILL SCORE 500 POINTS AND LITE UP ONE STAR. LITING 3 STARS ALLOWS SAME PLAYER TO "SHOOT AGAIN".

(2.) "3,000" SWITCH SCORES 3,000 POINTS.

(3.) "OPENS GATE" SWITCH SCORES 500 POINTS AND OPENS RIGHT BOTTOM GATE.

(4.) "ADVANCE BONUS TO TOP" SWITCH WILL STEP UP BONUS UNIT TO TOP (10,000).

(5.) "LITES A & B LANES" SWITCH WILL LITE UP LEFT AND RIGHT SIDE LANES TO SCORE 3,000 POINTS.

(6.) "BONUS" SWITCH SCORES THE LIT BONUS VALUE.

(7.) "DOUBLE BONUS" SWITCH SCORES TWICE THE LIT BONUS VALUE.

(8.) "TRIPLE BONUS" SWITCH SCORES THREE TIMES THE LIT BONUS VALUE.

LIT BONUS VALUE IS ADVANCED BY MAKING ROLLOVER BUTTONS OR TARGETS MARKED "ADVANCE BONUS".

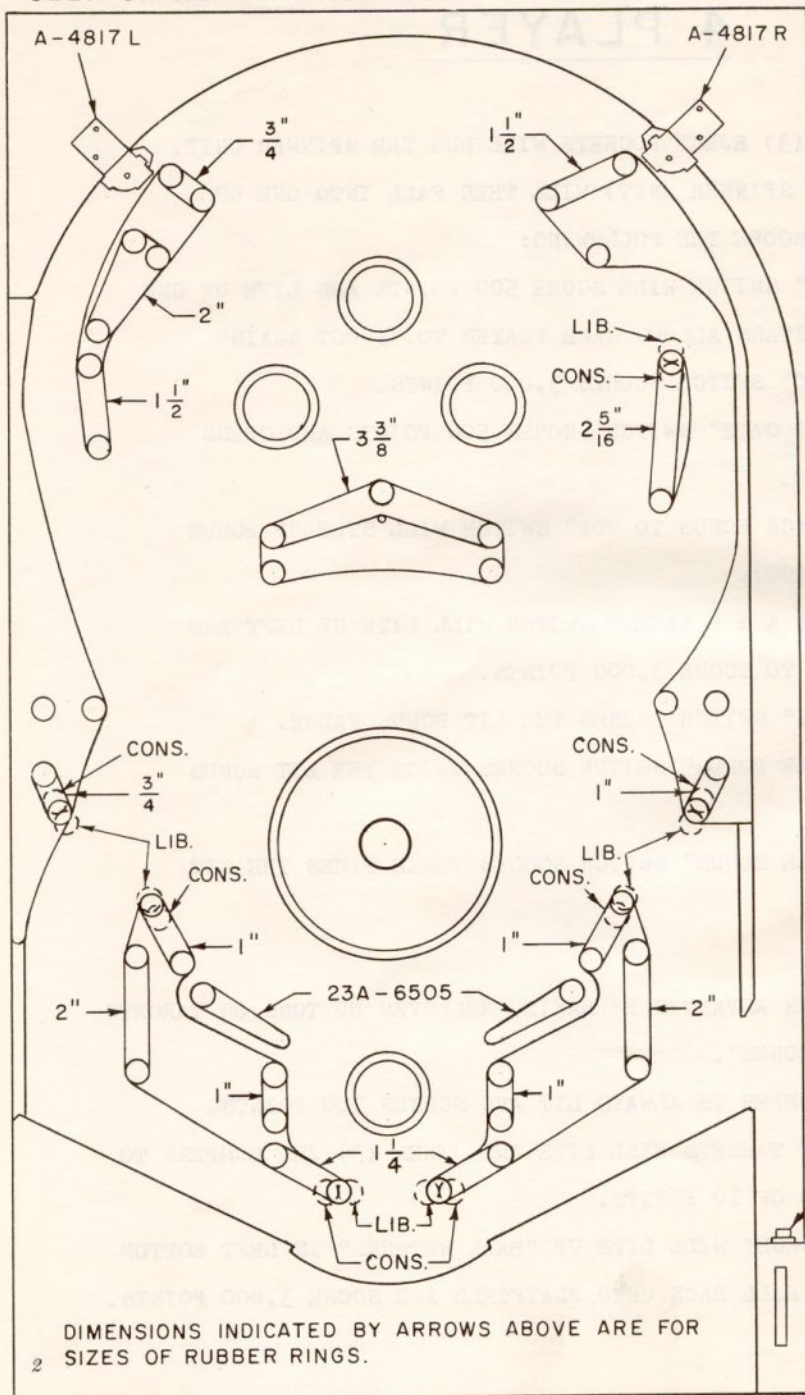
TOP CENTER JET BUMPER IS ALWAYS LIT AND SCORES 100 POINTS.

TOP LEFT OR RIGHT TARGETS WILL LITE THE OTHER (3) JET BUMPERS TO SCORE 100 INSTEAD OF 10 POINTS.

HITTING CENTER TARGET WILL LITE UP "BALL RETURNS" IN LEFT BOTTOM OUTLANE, TO KICK BALL BACK ONTO PLAYFIELD AND SCORE 3,000 POINTS.

# "FAN-TAS-TIC" — POST ADJUSTMENT SHEET

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



ABBREVIATIONS :  
 CONS. — CONSERVATIVE  
 LIB. — LIBERAL

RUBBER RING NUMBERS :

23A-6300	5/16" I. D.
23A-6301	3/4" I. D.
23A-6302	1" I. D.
23A-6303	1 1/4" I. D.
23A-6304	1 1/2" I. D.
23A-6305	2" I. D.
23A-6306	2 5/16" I. D.
23A-6308	3 3/8" I. D.

A-4817 L & R BALL GATE ASS

23A-6327 BALL SHOOTER RUBBER TIP

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

## 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.

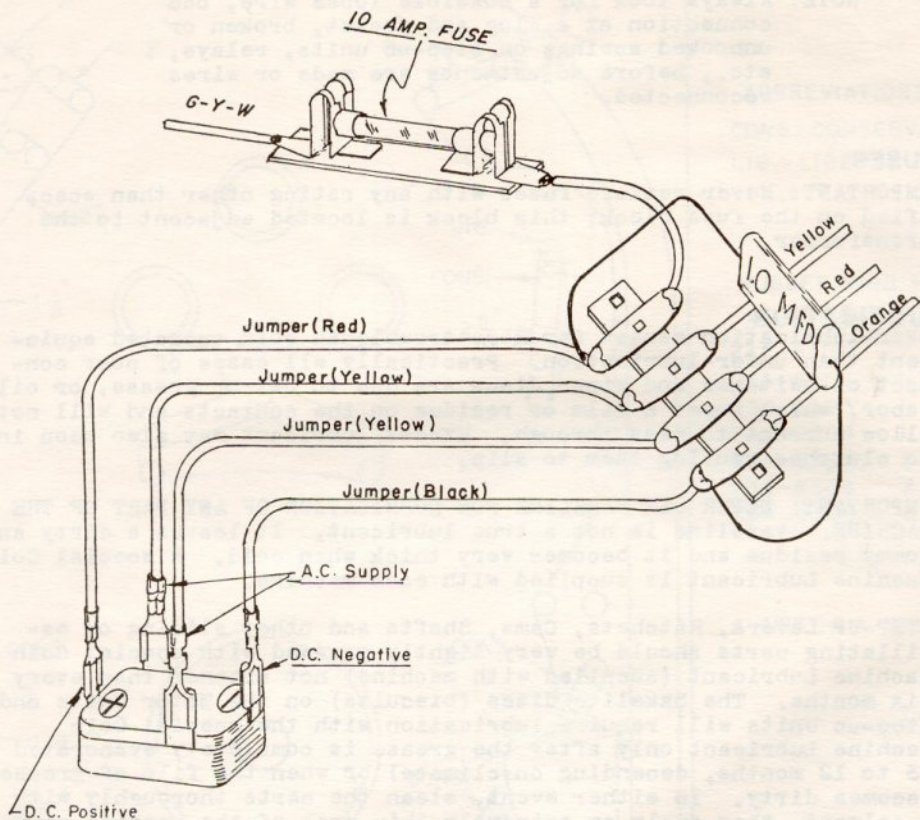
STEP-UP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with special Coin Machine Lubricant (supplied with machine) not oftener than every six months. The bakelite discs (biscuits) on the Motor Units and Step-up Units will require lubrication with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

## SILICON BRIDGE RECTIFIER



THE FUNCTION OF THE RECTIFIER AND CAPACITOR IS TO CONVERT THE ALTERNATING CURRENT (A.C.) TO DIRECT CURRENT (D.C.), SUPPLYING D.C. TO THE BUMPERS, KICKERS ETC.

THE BRIDGE RECTIFIER SHOULD PRACTICALLY NEVER NEED REPLACING, AS IT IS RATED WELL OVER THE VOLTAGE AND CURRENT REQUIREMENTS OF THE COMPONENTS IT SUPPLIES.

IF, HOWEVER, THE 15 AMP 24 VOLT FUSE ON THE MECHANISM PANEL OPENS, IT COULD BE DUE TO A FAULTY RECTIFIER. DISCONNECT THE A.C. INPUT TO RECTIFIER, REPLACE FUSE, AND RECHECK.

IF THE 10 AMP FUSE LOCATED NEXT TO THE RECTIFIER OPENS, CHECK ALL D.C. COMPONENTS I.E. BUMPERS, KICKERS ETC. FOR SHORTS.

"FAN-TAS-TIC" COIL CHART

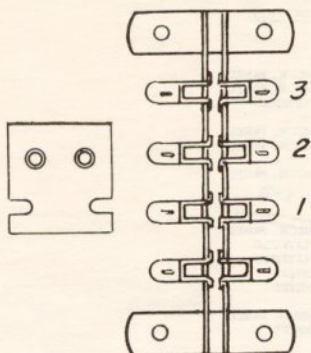
NOTICE:

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

NUMBER	DESCRIPTION	LOCATION
<u>MOTORS &amp; TRANSFORMERS</u>		
14 A-7883	CONTROL MOTOR - 60 CYCLE	MECH. PANEL
14 A-7884	CONTROL MOTOR - 50 CYCLE	MECH. PANEL
14 A-7808	SPINNER UNIT MOTOR - 50 CYCLE (ALL GAMES)	PLAYFIELD
15 A-6771	TRANSFORMER - 60 CYCLE	MECH. PANEL
15 A-6782-1	TRANSFORMER - 50 CYCLE	MECH. PANEL
B 6396	24 VOLT METER	MECH. PANEL
<u>SOLENOID COILS</u>		
A 22-550	COIN UNIT STEP UP BONUS UNIT STEP UP BALL RELEASE COIL NUMBER MATCH STEP UP PLAYER UP UNIT STEP UP	MECH. PANEL PLAYFIELD PLAYFIELD INSERT INSERT
A 23-600	BALL COUNT UNIT STEP UP REPLAY UNIT STEP UP	MECH. PANEL INSERT
A1-22-550	BALL RETURN COIL	PLAYFIELD
A2-23-750	KNOCKER LARGE BELL	CABINET CABINET
B 26-800	BALL COUNT UNIT RESET COIN UNIT RESET ALTERNATOR UNIT STEP UP BONUS UNIT RESET REPLAY UNIT RESET PLAYER UP UNIT RESET	MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD INSERT INSERT
B1-26-800	SCORE DRUM UNITS ... (16 req'd.)	INSERT
FL 21-375/ 28-400	FLIPPERS ... (2 req'd.)	PLAYFIELD
G 23-750	D.C. JET BUMPER COILS ... (4 req'd.) EJECT COILS ... (3 req'd.)	PLAYFIELD PLAYFIELD
M 29-900	1-2 RESET RELAY 3-4 RESET RELAY	INSERT INSERT
M 29-1000	GAME OVER RELAY TRIP	MECH. PANEL
M 29-1100	5¢ RELAY 10¢ RELAY 25¢ RELAY BONUS UNIT COMPLETE RESET COIL SPIN RELAY ADVANCE RELAY BONUS RELAY DOUBLE BONUS RELAY TRIPLE BONUS RELAY A & B SET UP RELAY GATE SET UP RELAY STAR SET UP RELAY BONUS ADVANCE RELAY 50 PT. RELAY 3,000 RELAY 10 POINT 100 POINT RELAY 1,000 POINT RELAY	MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD INSERT INSERT INSERT INSERT
M 30-1300	A & B ROLLOVER RELAY BALL RETURN RELAY	PLAYFIELD PLAYFIELD
M 36-5500	DELAY RELAY	PLAYFIELD
M1-31-1500	COIN LOCKOUT COIL	FRONT DOOR
XM 27-675	TOTAL PLAY METER COIL	MECH. PANEL
Z 27-1000	EJECT RELAY COIN RELAY GAME OVER RELAY LATCH OUTHOLE RELAY PLAYER RESET RELAY REPLAY RELAY RESET RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1150	EXTRA BALL RELAY TILT RELAY GATE RELAY BALL INDEX RELAY	MECH. PANEL MECH. PANEL PLAYFIELD MECH. PANEL
Z 28-1200	NO. 1 STAR RELAY NO. 2 STAR RELAY ON BUMPER RELAY	MECH. PANEL MECH. PANEL PLAYFIELD
Z 29-1250	LOCK RELAY	MECH. PANEL

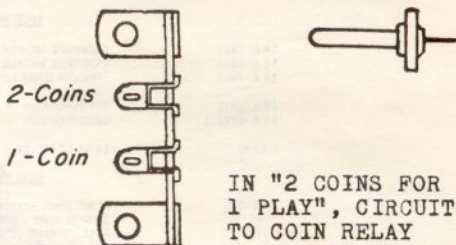
# ADJUSTMENTS ON MECHANISM PANEL

## 10¢ Adjustment



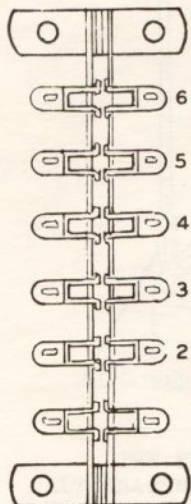
PROVIDES  
1, 2 OR  
3 PLAYS  
FOR ONE  
COIN.

## 5¢ Adjustment



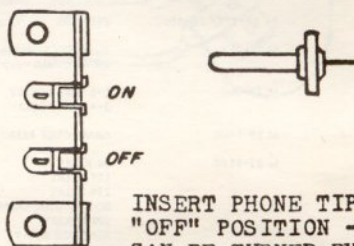
IN "2 COINS FOR  
1 PLAY", CIRCUIT  
TO COIN RELAY  
PASSES THRU SW.  
ON ALTERNATOR  
UNIT.

## 25¢ Adjustment



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

## Motor Service Jack



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

## SUGGESTED SCORE CARD

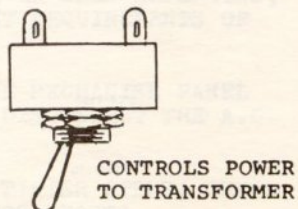
REPLAY

5 BALL-----387-1

3 BALL-----387-2

## MASTER ON-OFF SW.

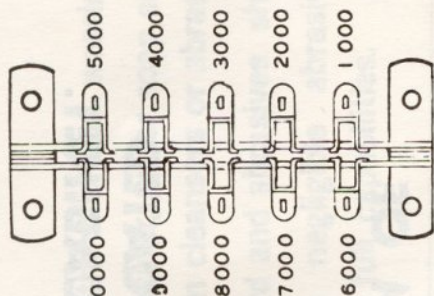
(Located under front of  
Cabinet)



CONTROLS POWER  
TO TRANSFORMER

# ADJUSTMENTS IN BACKBOX

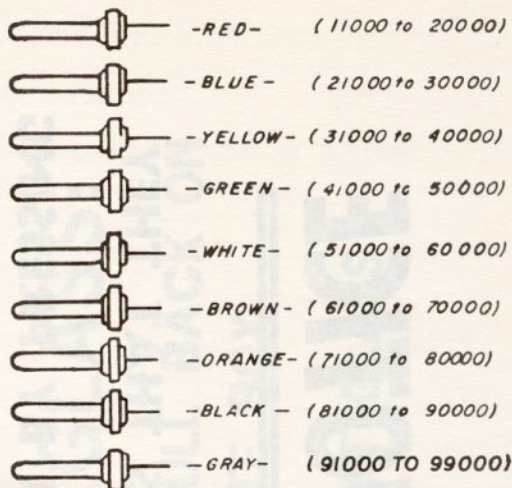
## Hi-Score Adjustment



Insert plugs into 10 Point Female at desired positions.

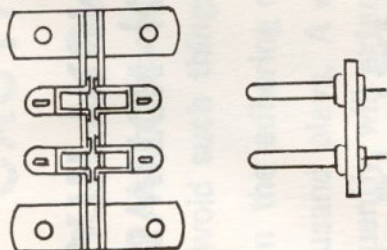
Examples:

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



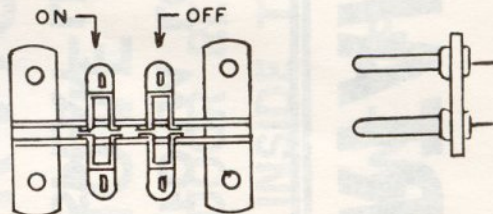
## No. of Balls Adjustment

3 BALL — 5 BALL



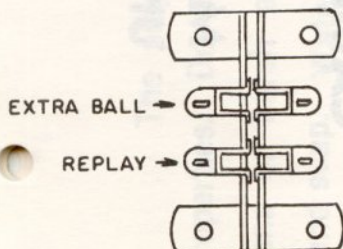
THIS JACK CHANGES 3 BALL TO 5 BALL PLAY OR VICE VERSA.

## NUMBER MATCH ADJUSTMENT



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.

## Extra Ball Jack Adj.



IN REPLAY POSITION... HI-SCORES AND NUMBER MATCH AWARD REPLAYS.

IN EXTRA BALL POSITION... HI-SCORE AWARDS AN EXTRA BALL AND NUMBER MATCH SHOULD BE IN "OFF" POSITION.



# **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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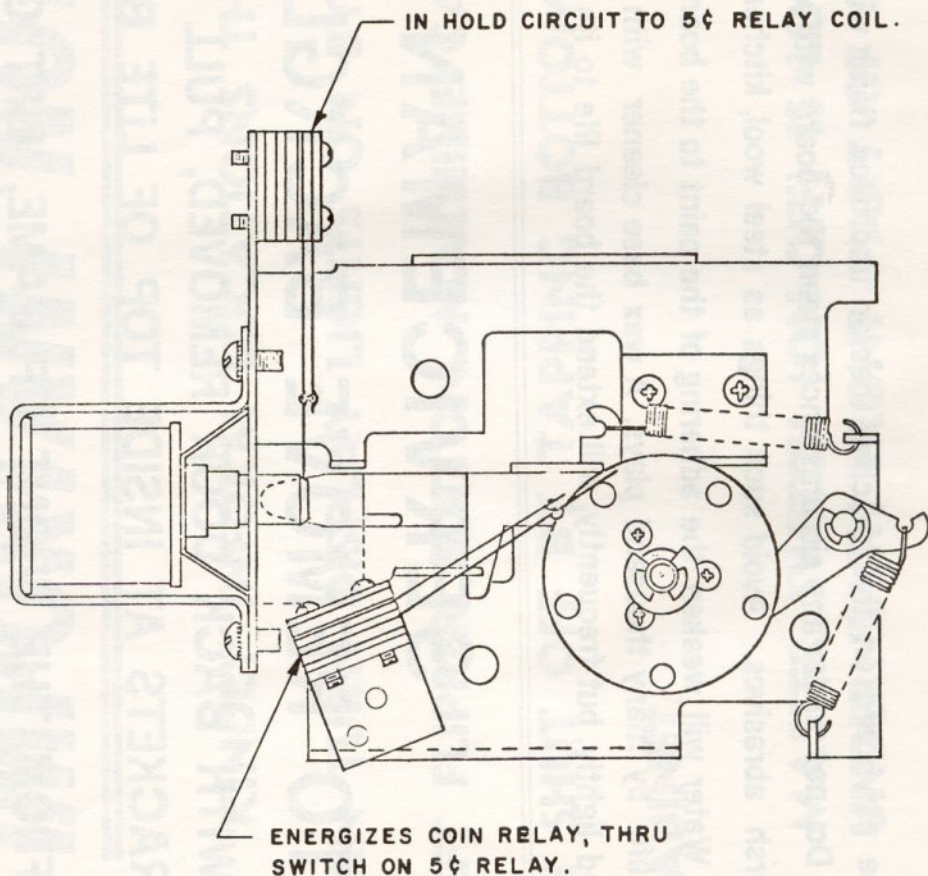
## **SERVICEMAN TO REMOVE BACKGLASS:**

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

# ALTERNATOR UNIT

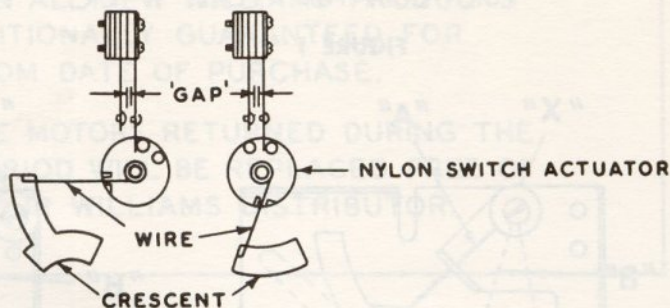
LOCATED ON MECHANISM PANEL.

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 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.

## 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.

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

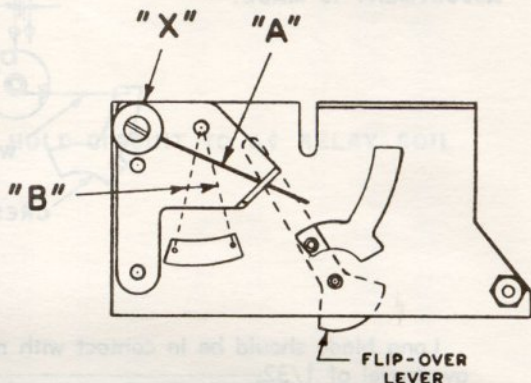
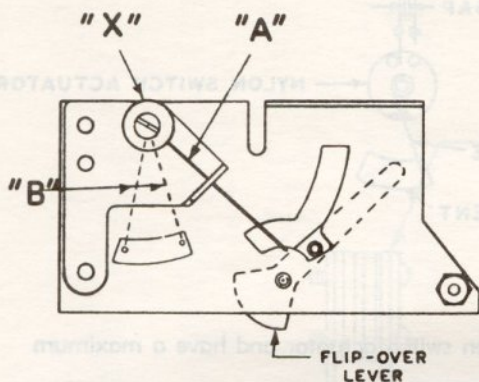
FOR 1 COIN - FOR 1 PLAY

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.

# 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-6414	B-7456-6	A-6402-5	
NO. MATCH	C-6414	B-7456-2	A-6401	
PLAYER	C-6417	C-6521	A-6405-3	
COIN	C-6414	B-7456-9	A-6402-3	14A-7805 (60 CYCLE)
BONUS	C-6417	B-7456-21	A-6402-10	SCORE MOTOR
10 POINT	B-7253	A-6294	3C-7272	14A-7806 (50 CYCLE)
100 POINT	-----	-----	3C-7272	SCORE MOTOR
1000 POINT	B-7253	A-6294	3C-7272	
10000 POINT	B-7253	A-6294	3C-7272	
ALTERNATOR	-----	-----	3C-7272	

# 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.

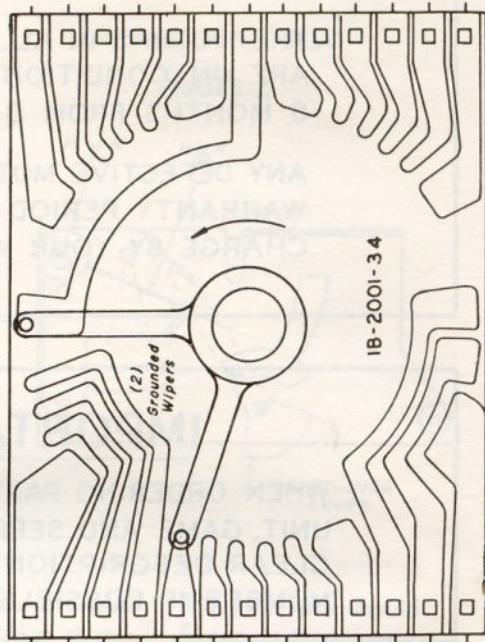
DIAGRAM LOCATION

TRIPS GAME OVER RELAY IN 5 BALL GAME.

TRIPS GAME OVER RELAY IN 3 BALL GAME.

1  
2  
3  
4  
5

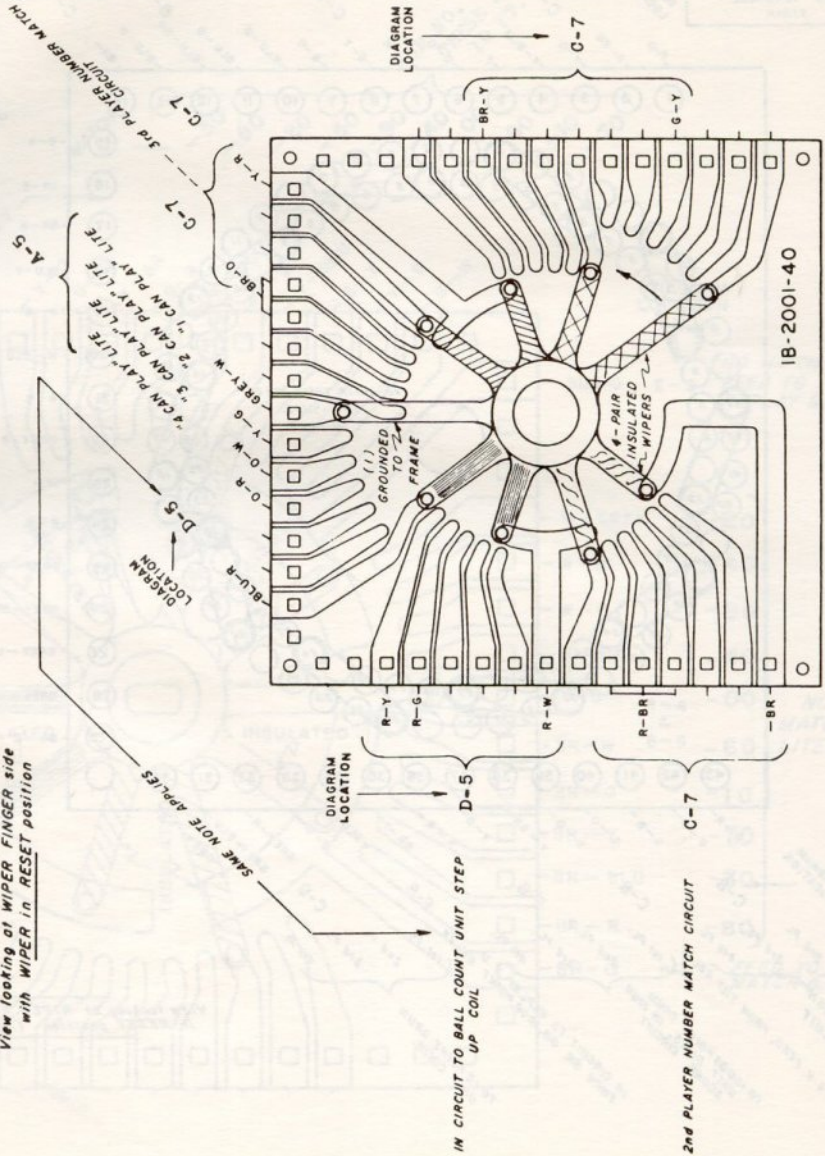
BALL IN PLAY LITES



# COIN S. U. 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



IN CIRCUIT TO BALL COUNT UNIT STEP UP COIL

2nd PLAYER NUMBER MATCH CIRCUIT

4th PLAYER NUMBER MATCH CIRCUIT

PLAYER UNIT DISC  
TINNY MATCH ON  
THIS UNIT ADVANCES ONE STEP  
EACH TIME THE TEN POINT RELAY  
IS PULSED



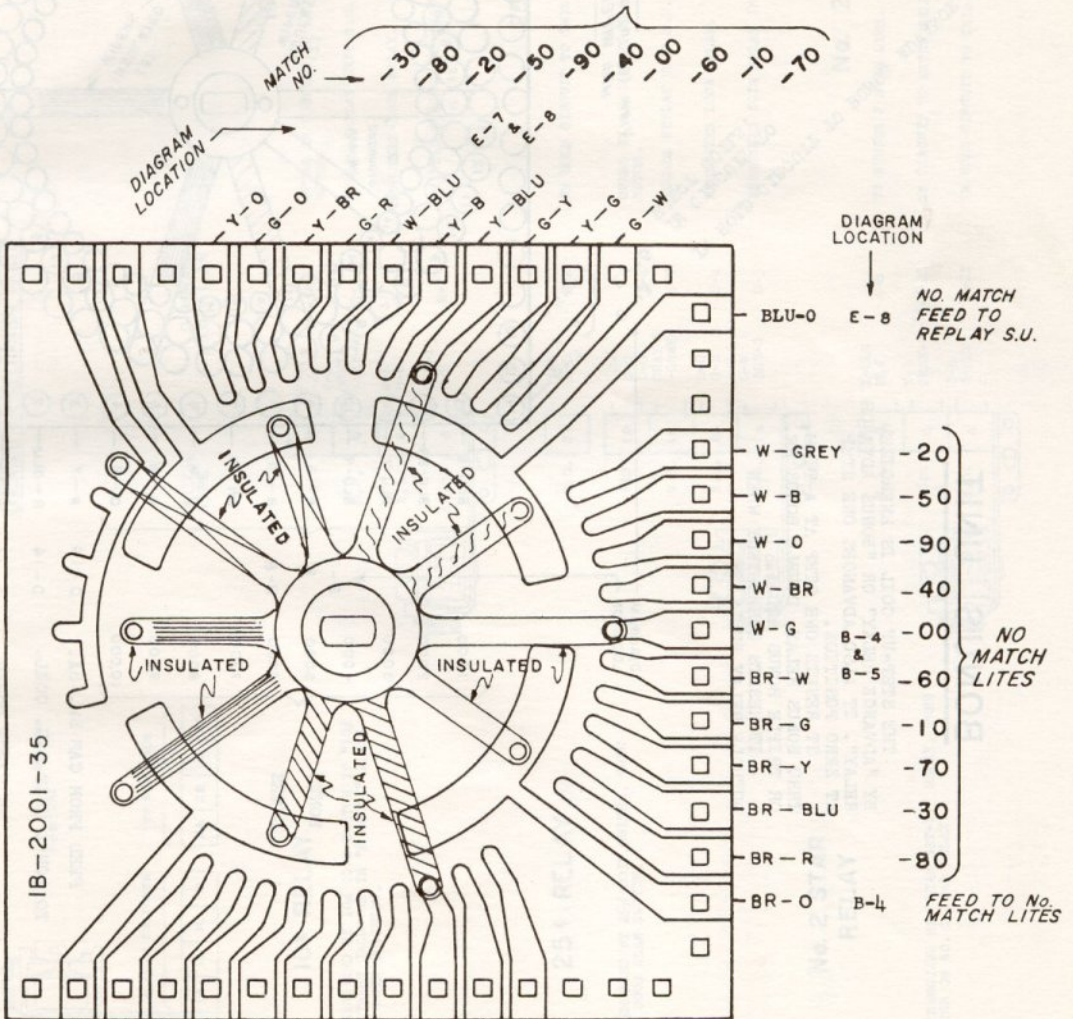


# No. MATCH UNIT

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

VIEW LOOKING AT  
WIPER FINGER SIDE

IN NO. MATCH CIRCUIT,  
THESE WIRES COME FROM  
10 PT. D.U. DISC.



# BONUS UNIT

THE STEP-UP COIL IS ENERGIZED BY "ADVANCE RELAY" OR "BONUS ADVANCE RELAY". IT ALSO ADVANCES ONE STEP AT ZERO POSITION. IT RESETS ONE STEP AT A TIME, THRU BONUS RELAY, DOUBLE BONUS RE., OR TRIPLE BONUS RELAY. IT RESETS COMPLETELY WHEN OUTHOLE RELAY PULLS IN.

IN HOLD CIRCUIT TO BONUS ADVANCE RELAY.

IN CIRCUIT TO EJECT COILS.

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

DIAGRAM LOCATION

C-13

E-15

R-0

Y-B

B-Y

- 1000
  - 2000
  - 3000
  - 4000
  - 5000
  - 6000
  - 7000
  - 8000
  - 9000
  - 10,000
- BONUS
- LITES

B-7

B-8

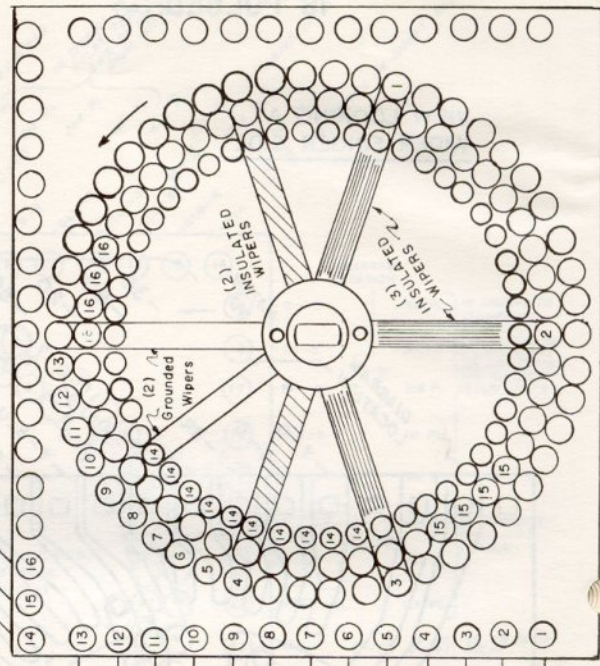
B-8

- BLU-B
- BLU-BR
- BLU-Y
- BLU-R
- R-B
- B-G
- BR-B
- R-W
- O-W
- O-B
- R-Y
- R-BLU
- R-BR

FEED FROM CAM SW. 6A.

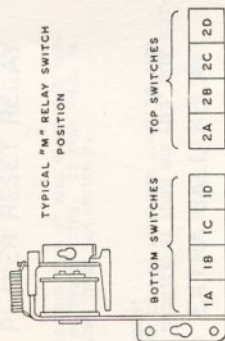
TO BONUS UNIT S.U. COIL.

TO EJECT COILS.



## RELAYS & SWITCHES

LOCATED ON MECHANISM PANEL

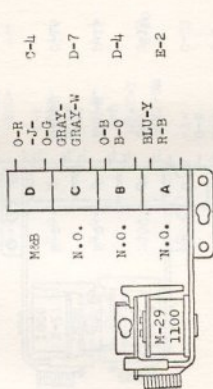


### 10¢ RELAY

IS ENERGIZED BY 10¢ COIN SWITCH IF "10¢ ADJUSTMENT JACK" IS IN "2" OR "3" PLAYS FOR 1 COIN POSITION.

### 10¢ RELAY

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

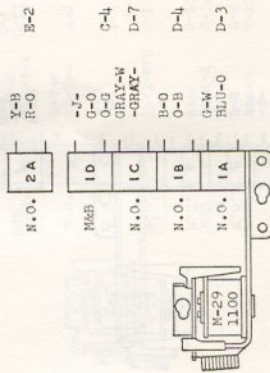


### 25¢ RELAY

IS ENERGIZED BY 25¢ COIN SWITCH, THRU FRONT DOOR SLAM SWITCH.

### 25¢ RELAY

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

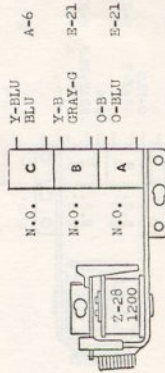


### No. 2 STAR RELAY

IS ENERGIZED BY "STAR SET-UP" RELAY, THRU SWITCH ON NO. 1 STAR RELAY.

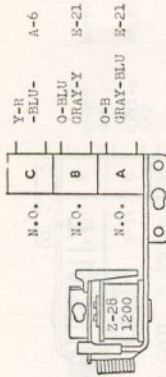
### No. 2 STAR RELAY

TO NUMBER 2 STAR LITE.  
 IN CIRCUIT TO EXTRA BALL RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY.



## No. 1 STAR RELAY

IS ENERGIZED BY "STAR SET-UP" RELAY, AT SCORE MOTOR CAM SWITCH 1.C.



## No. 1 STAR RELAY

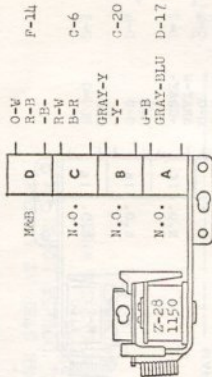
TO NUMBER 1 STAR LITE.

IN CIRCUIT TO NO. 2 STAR RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

## BALL INDEX RELAY

IS ENERGIZED BY 10 POINT, 100 POINT OR 1,000 POINT RELAY, THRU SWITCH ON EXTRA BALL RELAY, ALSO BY TILT RELAY.



## BALL INDEX RELAY

IN CIRCUIT TO EJECT COILS.

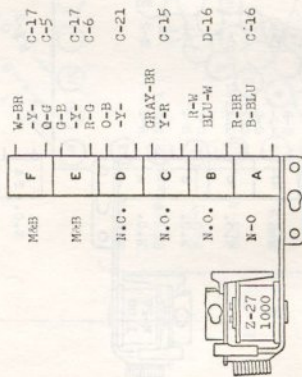
IN CIRCUIT TO BALL COUNT S.U. COIL---ALSO IN SERIES WITH SWITCH C ON PLAYER RESET RELAY.

IN SERIES WITH SWITCH A ON EXTRA BALL RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

## OUTHOLE RELAY

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



## OUTHOLE RELAY

OPENS IN HOLD CIRCUIT TO TILT RELAY AND CLOSSES TO RUN SCORE MOTOR.

OPENS IN HOLD CIRCUIT TO BALL INDEX RELAY AND CLOSSES IN SERIES WITH SWITCH E ON EXTRA BALL RELAY.

IN HOLD CIRCUIT TO NO. 1 & NO. 2 STAR RELAYS, BALL RETURN RE., A & B ROLLOVER RE. AND ON BUMPER RE.

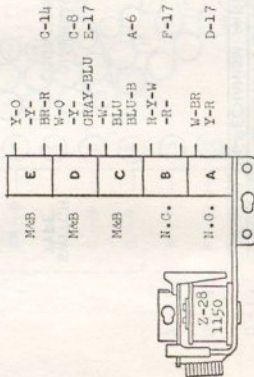
IN CIRCUIT TO BONUS UNIT RESET COIL.

ENERGIZES BALL RELEASE COIL, THRU SCORE MOTOR CAM SWITCH 4A.

IN HOLD CIRCUIT TO THIS RELAY.

## TILT RELAY

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



## TILT RELAY

OPENS CIRCUIT TO EJECT RELAY AND CLOSSES TO EJECT COILS.

OPENS SCORING CIRCUITS TO SCORE DRUMS AND CLOSSES TO BALL INDEX RELAY.

OPENS IN CIRCUIT TO PLAYFIELD LITES AND CLOSSES TO TILT LITE.

OPENS ALL SCORING CIRCUITS.

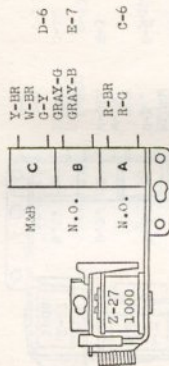
HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON OUTHOLE RELAY.

## PLAYER RESET RELAY

OPENS IN CIRCUIT TO PLAYER UNIT S.U. COIL AND CLOSSES TO PLAYER UNIT RESET COIL.

IN NUMBER MATCH CIRCUIT TO REPLAY UNIT S.U. COIL.

HOLD CIRCUIT TO THIS RELAY, THRU INDEX CAM SWITCH B.



## PLAYER RESET RELAY

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

## EXTRA BALL RELAY

IN CIRCUIT TO BALL INDEX RELAY.

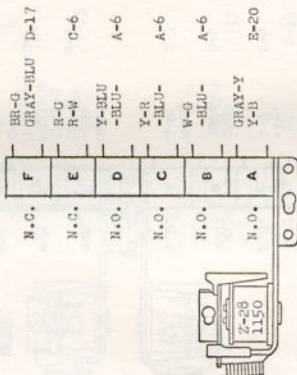
IN SERIES WITH SWITCH C ON BALL INDEX RELAY.

TO "NO. 2 STAR" LITE.

TO "NO. 1 STAR" LITE.

TO "SHOOT AGAIN" AND "NO. 3 STAR" LITES.

IN HOLD CIRCUIT TO THIS RELAY.



## EXTRA BALL RELAY

IS ENERGIZED BY "STAR SET-UP" RELAY, THRU SWITCH ON "NO. 2 STAR" RELAY. CLOSURE ALSO BY HI-SCORE CIRCUIT THRU "REPLAY-EXTRA BALL" ADJUSTMENT JACK.

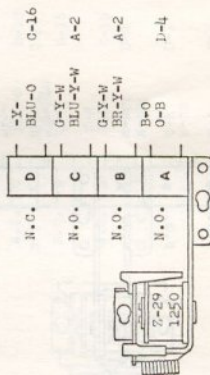
## LOCK RELAY

ENERGIZES GAME-OVER RELAY (TRIP COIL).

6 VOLTS FROM TRANSFORMER TO LITES.

6 VOLTS FROM TRANSFORMER TO LITES.

IN HOLD CIRCUIT TO THIS RELAY.



## LOCK RELAY

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

## EJECT RELAY

OPENS IN CIRCUIT TO BONUS UNIT S.U. AND CLOSSES IN CIRCUIT TO EJECT COILS.

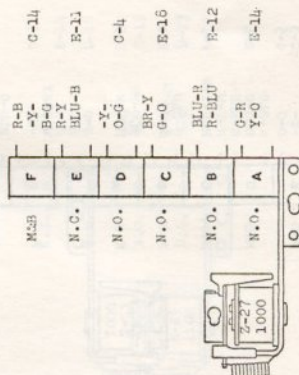
IN CIRCUIT TO SPIN RELAY, THRU (2) EJECT POCKET SWITCHES.

RUNS SCORE MOTOR.

PULSES 1,000 POINT RELAY, THRU BONUS, DOUBLE BONUS OR TRIPLE BONUS RELAYS.

IN CIRCUIT TO ALL RELAYS WHICH ARE PULLED IN BY SPINNER UNIT SWITCHES.

IN HOLD CIRCUIT TO THIS RELAY.

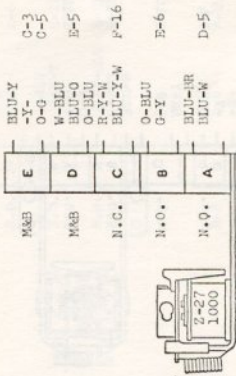


## EJECT RELAY

IS ENERGIZED BY SPIN RELAY, THRU SCORE MOTOR CAM SWITCH 1E.

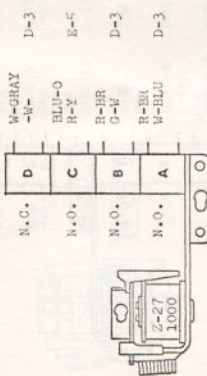
## RESET RELAY

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



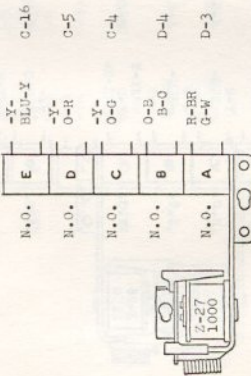
## REPLAY RELAY

IS ENERGIZED BY REPLAY BUTTON, THRU ZERO SWITCH ON REPLAY UNIT.



## COIN RELAY

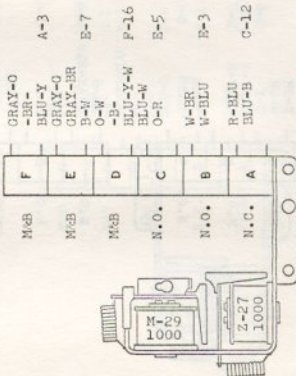
IS ENERGIZED BY REPLAY RELAY OR COIN SWITCH.



## GAME OVER RELAY

INTERLOCK

LATCH COIL IS PULSED BY SCORE MOTOR CAM SWITCH 1A, THRU SWITCHES ON COIN RELAY UNIT. TRIP COIL IS ENERGIZED BY COIN RELAY, LOCK RELAY OR WIPER ON BALL COUNT UNIT.



## RESET RELAY

OPENS IN CIRCUIT TO REPLAY RELAY AND CLOSSES TO RUN SCORE MOTOR.

OPENS IN CIRCUIT TO COIN UNIT S.U. AND CLOSSES TO RESET COILS ON COIN, BALL COUNT & GAME OVER.

OPENS ALL SCORING CIRCUITS ON PLAYFIELD.

IN CIRCUIT TO PLAYER UNIT RESET COIL.

IN HOLD CIRCUIT TO THIS RELAY, THRU (16) DRUM UNIT ZERO SWITCHES.

## REPLAY RELAY

OPENS CIRCUIT TO COIN LOCKOUT COIL.

IN CIRCUIT TO REPLAY UNIT RESET COIL.

ENERGIZES COIN RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

## COIN RELAY

TRIPS GAME-OVER RELAY, THRU BALL COUNT OR PLAYER UNIT ZERO SWITCH.

ENERGIZES RESET RELAY, THRU SWITCH C ON GAME-OVER RELAY.

RUNS SCORE MOTOR.

ENERGIZES LOCK RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

## GAME OVER RELAY

OPENS TO PLAYER UP LITES AND CLOSSES TO NUMBER MATCH AND GAME-OVER LITES.

OPENS IN HI-SCORE CIRCUIT AND CLOSSES IN NUMBER MATCH CIRCUIT.

OPENS CIRCUITS TO PLAYFIELD SWITCHES AND CLOSSES IN CIRCUIT TO TRIP COILS.

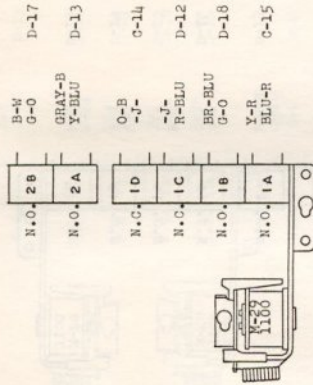
IN SERIES WITH SWITCH D ON COIN RELAY.

IN CIRCUIT TO REPLAY RELAY.

IN DELAY CIRCUIT TO SPIN RELAY. (IN SERIES WITH SWITCH 1C ON TRIPLE BONUS RELAY).

## TRIPLE BONUS RELAY

IS ENERGIZED BY TRIPLE BONUS SWITCH ON SPINNER UNIT, THRU SWITCH B ON EJECT RELAY.



D-17 IN CIRCUIT TO 1,000 POINT RELAY, THRU SWITCH C ON EJECT RELAY.

D-13 HOLD CIRCUIT TO THIS RELAY, THRU BONUS UNIT ZERO SWITCH.

C-14 IN SERIES WITH SWITCH 1D ON DOUBLE BONUS RELAY. (ORIGINATES AT CAM SWITCH 4D).

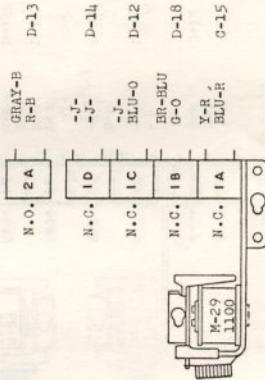
D-12 IN SERIES WITH SWITCH 1C ON DOUBLE BONUS RELAY.

D-18 PULSE 1,000 POINT RELAY, THRU SWITCH ON EJECT RELAY.

C-15 IN CIRCUIT TO BONUS UNIT RESET COIL.

## DOUBLE BONUS RELAY

IS ENERGIZED BY DOUBLE BONUS SWITCH ON SPINNER UNIT, THRU SWITCH B OR EJECT RELAY.



D-13 HOLD CIRCUIT TO THIS RELAY, THRU BONUS UNIT ZERO SWITCH.

D-14 IN SERIES WITH SWITCH D ON BONUS RELAY.

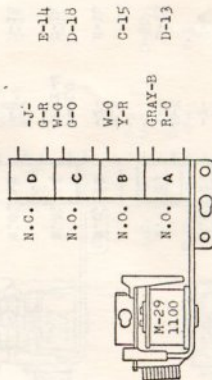
D-12 IN SERIES WITH SWITCH A ON DELAY RELAY.

D-18 PULSES 1,000 POINT RELAY, THRU SWITCH ON EJECT RELAY.

C-15 IN CIRCUIT TO BONUS UNIT RESET COIL.

## BONUS RELAY

IS ENERGIZED BY BONUS SWITCHES ON SPINNER UNIT, THRU SWITCH B ON EJECT RELAY.



E-14 IN HOLD CIRCUIT TO EJECT RELAY.

D-18 PULSES 1,000 POINT RELAY, THRU IMPULSE CAM SWITCH D AND SWITCH ON EJECT RELAY.

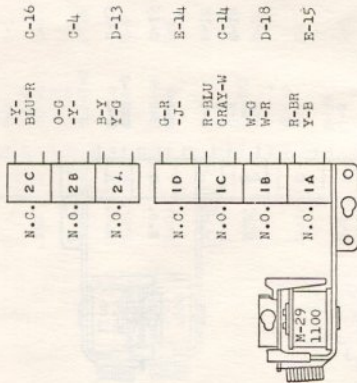
C-15 PULSES BONUS UNIT RESET COIL, THRU IMPULSE CAM SWITCH C.

D-13 HOLD CIRCUIT TO THIS RELAY, THRU ZERO SWITCH ON BONUS UNIT.



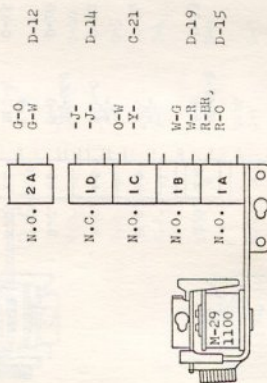
## BONUS ADVANCE RELAY

IS ENERGIZED BY BONUS ADVANCE SWITCH ON SPINNER UNIT, THRU SWITCH B ON EJECT RELAY.



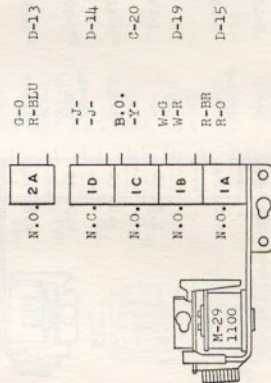
## A & B SET-UP RELAY

IS ENERGIZED BY A & B SET-UP SWITCH ON SPINNER UNIT, THRU SWITCH B ON EJECT RELAY.



## GATE SET-UP RELAY

IS ENERGIZED BY GATE SET-UP SWITCH ON SPINNER UNIT, THRU SWITCH B ON EJECT RELAY.



IN SERIES WITH SWITCH 1B ON SPIN RELAY.

RUNS SCORE MOTOR.

IN HOLD CIRCUIT TO THIS RELAY.

IN HOLD CIRCUIT TO EJECT RELAY. (SEE SWITCH 1D ON 3,000 RELAY).

PULSES BONUS UNIT S.U., THRU IMPULSE CAM SWITCH B.

PULSES 100 POINT RELAY, THRU IMPULSE CAM SWITCH D.

IN CIRCUIT TO EJECT COILS, THRU 10TH POSITION ON BONUS UNIT DISC.

HOLD CIRCUIT TO THIS RELAY, THRU SCORE MOTOR CAM SWITCH 5B.

IN SERIES WITH SWITCH 1D ON BONUS ADVANCE RELAY.

ENERGIZES A & B ROLLOVER RELAY.

PULSES 100 POINT RELAY, THRU IMPULSE CAM SWITCH D.

IN CIRCUIT TO EJECT COILS.

HOLD CIRCUIT TO THIS RELAY, THRU SCORE MOTOR CAM SWITCH 5B.

IN SERIES WITH SWITCH 1D ON "A & B SET-UP" RELAY.

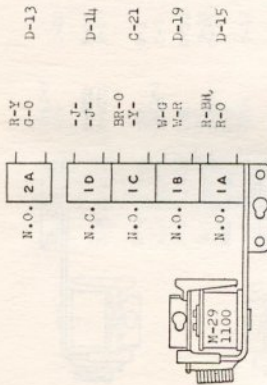
ENERGIZES GATE RELAY.

PULSES 100 POINT RELAY, THRU IMPULSE CAM SWITCH D.

IN CIRCUIT TO EJECT COILS.

## STAR SET-UP RELAY

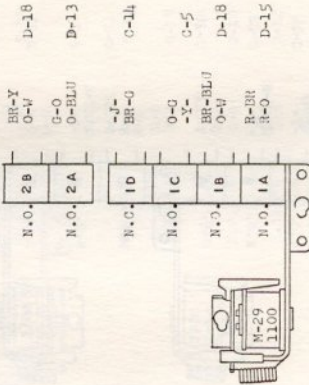
IS ENERGIZED BY STAR SET-UP SWITCHES ON SPINNER UNIT, THRU SWITCH B ON EJECT RELAY. IT THEN HOLDS IN UNTIL SCORE MOTOR CAM SWITCH 5B OPENS.



HOLD CIRCUIT TO THIS RELAY, THRU SCORE MOTOR CAM SWITCH 5B.  
 IN SERIES WITH SWITCH 1D ON GATE SET-UP RELAY.  
 IN CIRCUITS TO EXTRA BALL, NO. 1 AND NO. 2 STAR RELAYS.  
 PULSES 100 POINT RELAY, THRU IMPULSE CAM SWITCH D.  
 IN CIRCUIT TO EJECT COILS.

## 3000 RELAY

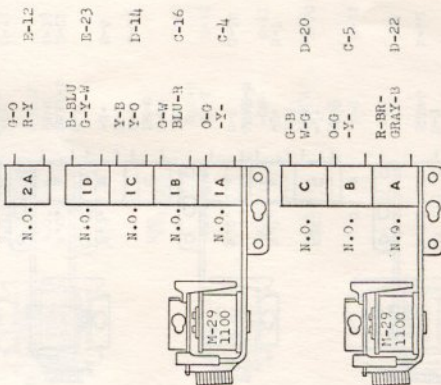
IS ENERGIZED BY 3,000 SWITCHES ON SPINNER UNIT, THRU SWITCH B ON EJECT RELAY.



PULSES 1,000 POINT RELAY, THRU CAM SWITCH 3B.  
 HOLD CIRCUIT TO THIS RELAY, THRU SCORE MOTOR CAM SWITCH 5B.  
 IN SERIES WITH SWITCH 1D ON STAR SET-UP RELAY. (FROM BONUS UNIT ZERO SWITCH).  
 RUNS SCORE MOTOR.  
 IN CIRCUIT TO 1,000 POINT RELAY.  
 IN CIRCUIT TO EJECT COILS.

## SPIN RELAY

IS ENERGIZED BY EJECT POCKET SWITCHES, THRU NORMALLY CLOSED SWITCH ON EJECT RELAY. IT ALSO IS ENERGIZED BY EJECT POCKET SWITCHES, THRU SWITCH ON DELAY RELAY.



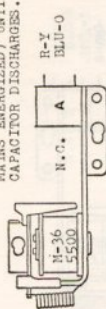
HOLD CIRCUIT TO THIS RELAY, THRU SCORE MOTOR CAM SWITCH 5B.  
 ENERGIZES DELAY RELAY.  
 ENERGIZES EJECT RELAY, THRU SCORE MOTOR CAM SWITCH 1A.  
 RUNS SPINNER UNIT MOTOR, THRU SWITCH 2C ON BONUS ADVANCE RELAY.  
 RUNS SCORE MOTOR.  
 PULSES 10 POINT RELAY, THRU IMPULSE CAM SWITCH D.  
 RUNS SCORE MOTOR.  
 IN HOLD CIRCUIT TO THIS RELAY.

## 50 POINT RELAY

IS ENERGIZED BY (1) ROLLOVER BUTTON SWITCHES, (2) CENTER TARGET SWITCH, OR ADVANCE RELAY.

## DELAY RELAY

IS ENERGIZED WHEN TRANSISTOR (2P-4J401) IS CONDUCTING (AND THEREFORE DELAY RELAY SWITCH 1D ON SPIN RELAY CAUSES TRANSISTOR TO CONDUCT AND ALSO CHARGES CAPACITOR (50MFD-50V.))

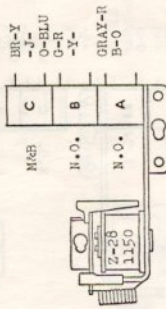


E-12

IN CIRCUIT TO SPIN RELAY. (SEE SWITCH A ON GAMB-OVER RELAY).

## GATE RELAY

IS ENERGIZED BY GATE SET-UP RELAY.



O-13

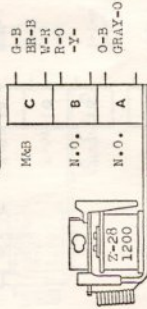
OPENS IN CIRCUIT TO 1,000 POINT RELAY AND CLOSSES TO ENERGIZE 3,000 RELAY.

TO RIGHT BOTTOM ROLLOVER LIFE.

HOLD CIRCUIT TO THIS RELAY, THRU TROUGH SWITCH.

## ON BUMPER RELAY

IS ENERGIZED BY LEFT TOP OR RIGHT TOP TARGET SWITCH.



D-19

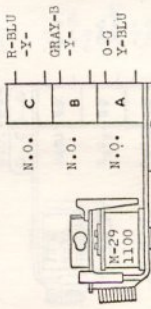
OPENS TO 10 POINT RELAY AND CLOSSES TO 100 POINT RELAY.

TO (3) JET BUMPER LITES.

HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON OUTHOLE RELAY.

## ADVANCE RELAY

IS ENERGIZED BY LEFT OR RIGHT CENTER TARGET SWITCH, AND BY (2) ROLLOVER BUTTON SWITCHES.



O-14

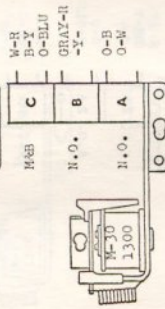
ENERGIZES BONUS UNIT S.U. COIL.

ENERGIZES 50 POINT RELAY.

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

## A 8 B ROLLOVER RELAY

IS ENERGIZED BY A & B SET-UP RELAY.



O-13

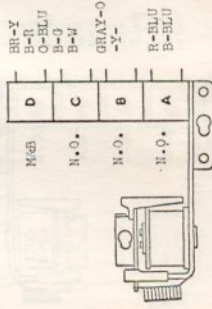
OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSSES TO ENERGIZE 3,000 RELAY.

TO LEFT & RIGHT TOP ROLLOVER LITES.

HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON OUTHOLE RELAY.

## BALL RETURN RELAY

IS ENERGIZED BY CENTER TARGET SWITCH.



O-13

OPENS IN CIRCUIT TO 1,000 POINT RELAY AND CLOSSES TO ENERGIZE 3,000 RELAY.

ENERGIZES BALL RETURN COIL, THRU LEFT BOTTOM ROLLOVER SWITCH.

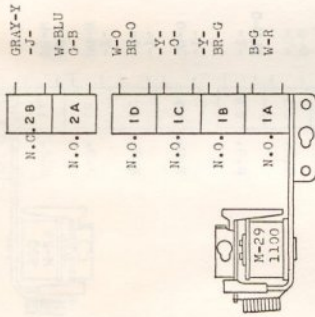
TO LEFT BOTTOM ROLLOVER LIFE.

IN HOLD CIRCUIT TO THIS RELAY.

## 10 POINT RELAY

IS PULSED BY:

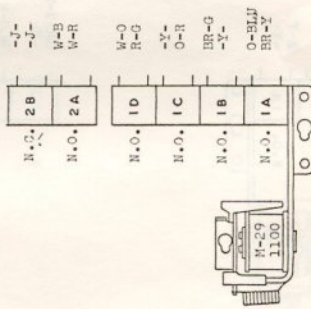
1. LEFT AND BOTTOM JET BUMPER SWITCH, THRU SWITCH ON "ON BUMPER RELAY".
2. STAND-UP SWITCHES.
3. 50 POINT RELAY, THRU IMPULSE CAM SWITCH D.



## 100 POINT RELAY

IS PULSED BY:

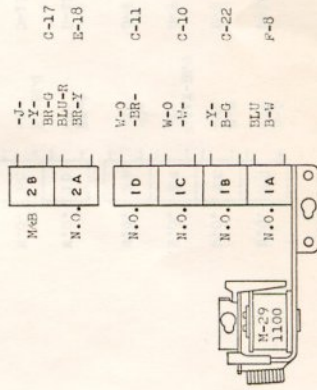
1. TOP JET BUMPER SWITCH.
2. LEFT & RIGHT TOP TARGET SWITCHES.
3. BONUS ADVANCE RELAY.
4. A & B SET-UP RELAY.
5. STAR SET-UP RELAY.
6. STAR SET-UP RELAY.
7. LEFT & RIGHT TOP ROLLOVER SWITCH, THRU SWITCH ON A & B ROLLOVER RELAY.



## 1000 POINT RELAY

IS PULSED BY:

1. 5,000 RELAY.
2. TRIPLE BONUS, DOUBLES BONUS AND BONUS RELAYS.
3. LEFT BOTTOM ROLLOVER SWITCH.



C-20 IN HOLD CIRCUIT TO EXTRA BALL RELAY.

E-20 IN HOLD CIRCUIT TO THIS RELAY.

C-9 PULSES 10 POINT DRUM UNITS, THRU PLAYER UNIT DISC.

D-22 ENERGIZES MEDIUM CHIME COIL AND NUMBER MATCH S.U.

C-17 ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.

E-19 PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCHES ON 10 POINT DRUM UNITS.

C-20 IN SERIES WITH SWITCH 2B ON 10 POINT RELAY.

E-19 IN HOLD CIRCUIT TO THIS RELAY.

C-10 PULSES 100 POINT DRUM UNITS, THRU PLAYER UP DISC.

D-22 ENERGIZES SMALL CHIME COIL.

C-17 ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.

E-19 PULSES 1,000 POINT RELAY, THRU 9TH POSITION SWITCHES ON 100 POINT DRUM UNITS.

C-17 CLOSERS TO ENERGIZE BALL INDEX RELAY, AND OPENS IN SERIES CIRCUIT WITH SWITCH 2B ON 100 POINT RELAY.

E-18 IN HOLD CIRCUIT TO THIS RELAY.

C-11 PULSES 10,000 POINT DRUM UNITS, THRU 9TH POSITION SWITCHES ON 1,000 POINT DRUM UNITS.

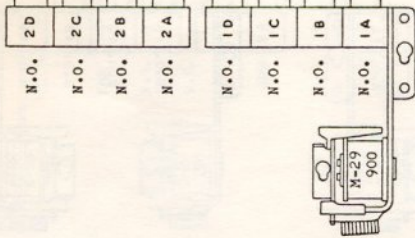
C-10 PULSES 1,000 POINT DRUM UNITS THRU PLAYER UP DISC.

C-22 ENERGIZES LARGE CHIME COIL.

F-8 IN HI-SCORE CIRCUIT TO REPLAY S.U. OR EXTRA BALL RELAY.

### 1-2 RESET RELAY

IS PULSED BY IMPULSE CAM SW. E, THRU SWITCH A ON RESET RELAY.

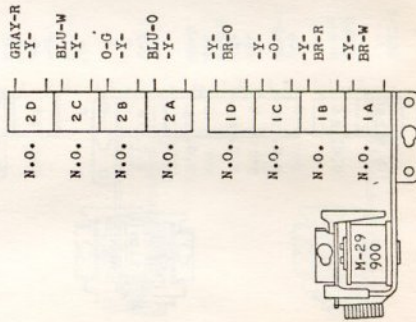


THESE SWITCHES PULSE THE INDICATED DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

D-10	2ND PLAYER 100 POINT DRUM UNIT.
D-9	1ST PLAYER 100 POINT DRUM UNIT.
D-9	2ND PLAYER 10 POINT DRUM UNIT.
D-9	1ST PLAYER 10 POINT DRUM UNIT.
D-11	2ND PLAYER 10,000 POINT DRUM UNIT.
D-11	1ST PLAYER 10,000 POINT DRUM UNIT.
D-10	2ND PLAYER 1,000 POINT DRUM UNIT.
D-10	1ST PLAYER 1,000 POINT DRUM UNIT.

### 3-4 RESET RELAY

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



THESE SWITCHES PULSE THE INDICATED DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

D-10	4TH PLAYER 100 POINT DRUM UNIT.
D-10	3RD PLAYER 100 POINT DRUM UNIT.
D-9	4TH PLAYER 10 POINT DRUM UNIT.
D-9	3RD PLAYER 10 POINT DRUM UNIT.
D-11	3RD PLAYER 10,000 POINT DRUM UNIT.
D-11	4TH PLAYER 10,000 POINT DRUM UNIT.
D-10	4TH PLAYER 1,000 POINT DRUM UNIT.
D-10	3RD PLAYER 1,000 POINT DRUM UNIT.