

# MARS TREK



## INSTRUCTION MANUAL

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 **Sonic**

PARLA - MADRID - SPAIN

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# MARS TREK

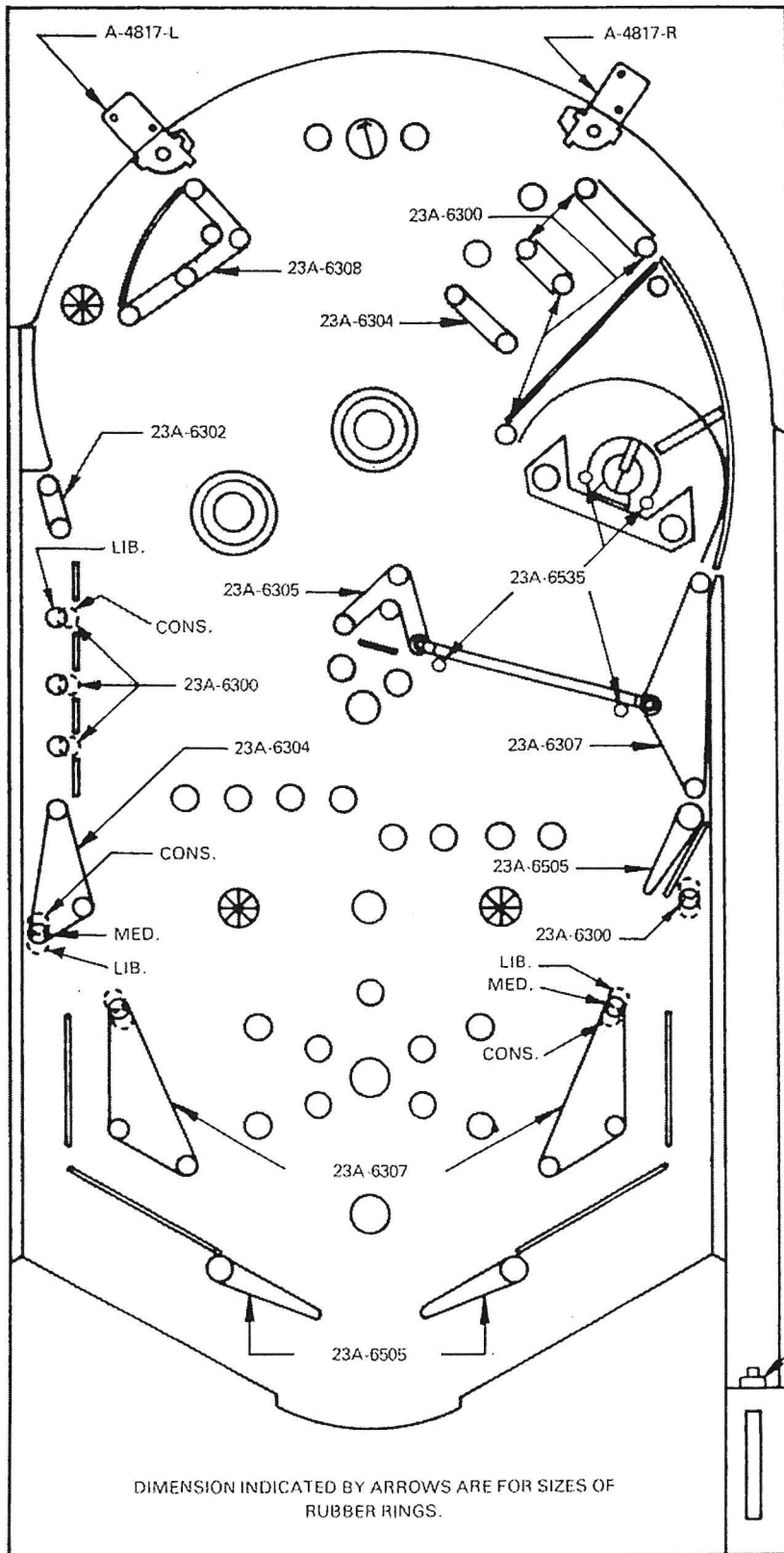
—4 PLAYER—

## INSTRUCTIONS

- 1) MAKING «E» & «K» LITES DOUBLE BONUS.
- 2) MAKING «MARS» TARGETS SCORE 10.000 POINTS.
- 3) MAKING «TREK» CENTER TARGER SCORE 10.000 POINTS.
- 4) BONUS ON 50.000 PT. POSITION LITES EXTRA BALL.
- 5) PASSING BALL THROUGH RUN-WAY GIVES EXTRA BALL WHEN LIT.
- 6) MAKING «MARS TREK» OBTAINS SPECIAL.

# —«MARS TREK»— POST ADJUSTMENT SHEET

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



### RUBBER RINGS NUMBERS:

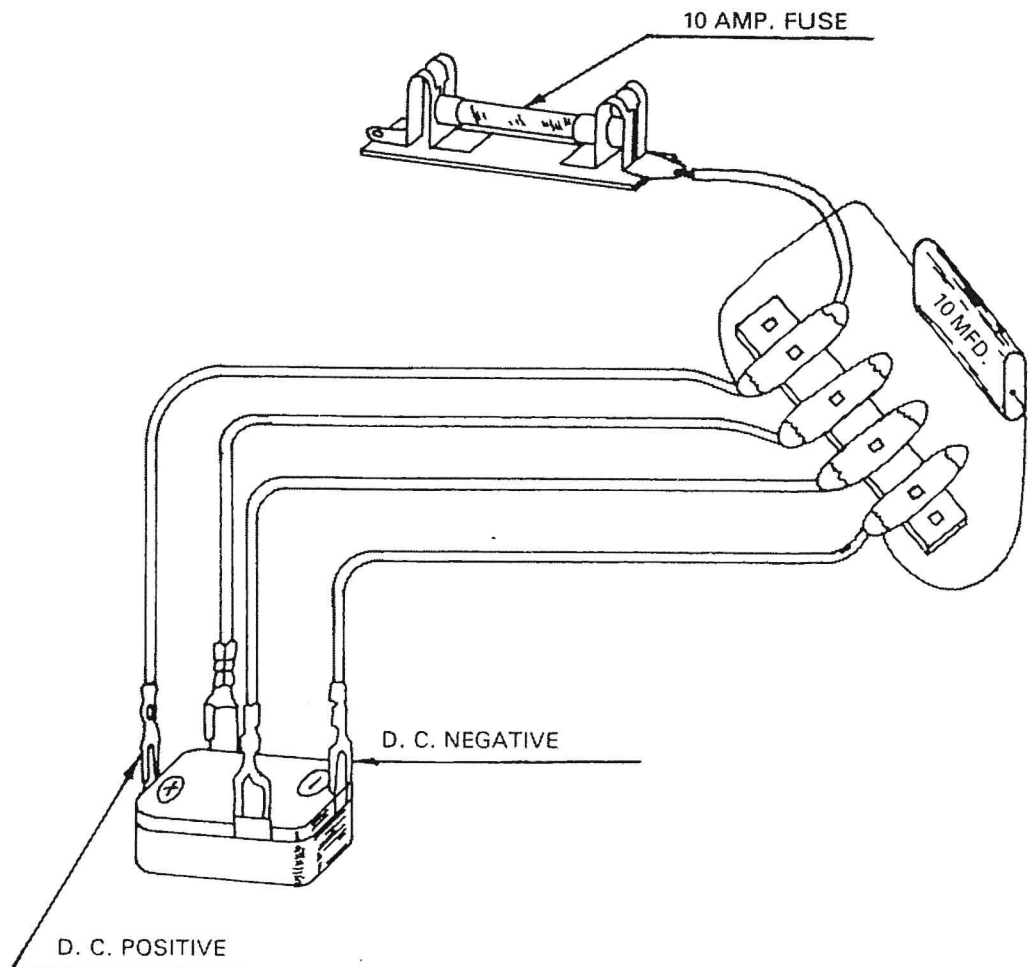
23A-6300	5/16"	I.D.
23A-6302	1"	I.D.
23A-6304	1-5/8	I.D.
23A-6305	2"	I.D.
23A-6307	2-7/8	I.D.
23A-6308	3-1/2	I.D.
23A-6535		
23A-6505		

### ABBREVIATIONS:

LIB. — LIBERAL  
 MED. — MEDIUM  
 CONS. — CONSERVATIVE

23A-6327 BALL SHOOTER  
 RUBBER TIP.

## 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.

## 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.

## 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 becomes dirty. In either event, clean the parts thoroughly with a solvent, then apply an extremely thin coat of the special grease.

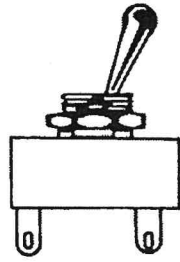
Solenoid Plungers should not have a lubricant of any kind.

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

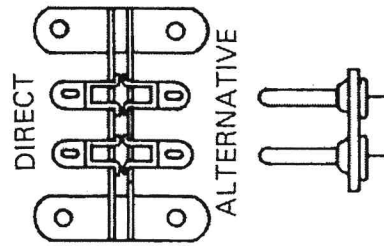
BEFORE ADJUSTING SWITCHES, MAKE CERTAIN THE SCREWS HOLDING THE SWITCH STACKS ARE DOWN TIGHTLY. BAKELITE SPACERS IN THE SWITCH STACKS, DUE TO EXCESSIVE MOISTURE, HAVE OCCASIONALLY SHRUNK BY DRYING OUT, CAUSING POOR ADJUSTMENT.

**MASTER ON-OFF SW.**  
(LOCATED ON CABINET)



CONTROLS POWER TO TRANSFORMER.

**SPECIAL ADJUSTMENT**  
(LOCATED ON PLAYFIELD)

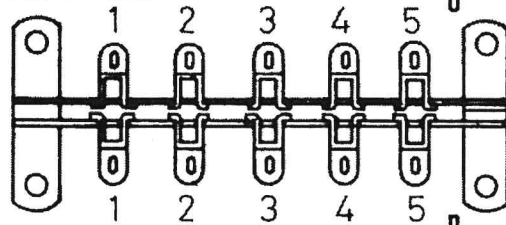


THE SPECIAL CAN BE DIRECT OR ALTERNATIVE ACCORDING TO POSITION OF JACK.

**NO. 1 & 2 COIN SW. ADJUSTMENT JACK**

(LOCATED ON MECHANISM PANEL)

NO. 1 COIN SW. ADJUSTMENT



NO. 2 COIN SW. ADJUSTMENT



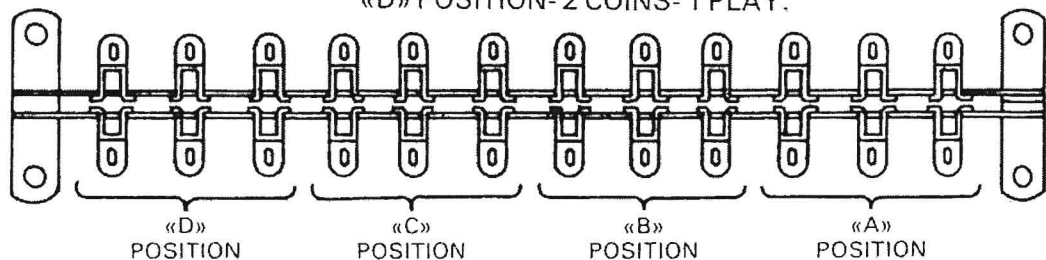
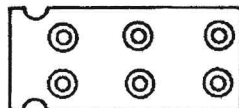
1 TO 5 PLAYS GIVEN ACCORDING TO POSITION OF JACK BY EACH ONE OF BOTH ADJUSTMENTS.

**GENERAL COIN SW. ADJUSTMENT**

(LOCATED ON MECHANISM PANEL)

THE FOLLOWING COMBINATIONS CAN BE OBTAINED ACCORDING TO POSITION OF JACK:

- «A» POSITION- 1 TO 5 PLAYS.
- «B» POSITION- 6 TO 10 PLAYS.
- «C» POSITION- 1 COIN- 1 PLAY  
2 COINS- 3 PLAYS
- «D» POSITION- 2 COINS- 1 PLAY.



# ADJUSTMENTS IN BACKBOX

## POINT SCORE ADJUSTMENT

PLUG IN RED WIRE FOR SCORES  
110.000 200.000

10000   60000

PLUG IN WHITE WIRE FOR SCORES  
510.000 600.000

20000   70000

PLUG IN BLUE WIRE FOR SCORES  
210.000 300.000

30000   80000

PLUG IN BROWN WIRE FOR SCORES  
610.000 700.000

40000   90000

PLUG IN YELLOW WIRE FOR SCORES  
310.000 400.000

50000   00000

PLUG IN ORANGE WIRE FOR SCORES  
710.000 800.000

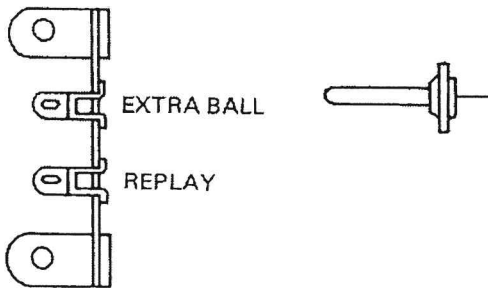
PLUG IN GREEN WIRE FOR SCORES  
410.000 500.000

PLUG IN GREY WIRE FOR SCORES  
910.000 990.000

PLUG IN BLACK WIRE FOR SCORES  
810.000 900.000

EXAMPLE BLUE INTO 10.000 POSITION SCORES AT 210.000  
OR BLUE WIRE INTO 00.000 POSITION SCORES AT 300.000

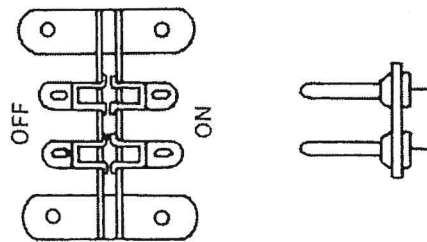
## EXTRA BALL ADJ. JACK



IN REPLAY POSITION:  
HI-SCORES, NUMBER MATCH & "SPECIAL"  
WILL AWARD REPLAYS.

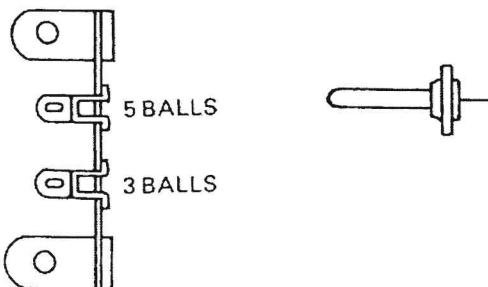
IN EXTRA BALL POSITION:  
HI SCORES, NUMBER MATCH & "SPECIAL"  
WILL AWARD EXTRA BALLS.

## NO. MATCH ADJ. JACK



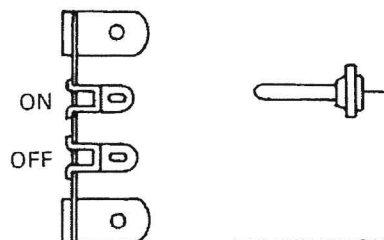
IN "ON" POSITION A NUMBER MATCH  
LITE WILL APPEAR WHEN GAME IS OVER CHED EXTRA  
BALL ADJUSTMENT JACK MUST BE IN REPLAY POSI-  
TION NUMBER MATCH IS INOPERATIVE.

## NO. OF BALLS ADJ.



THIS JACK CHANGES 3 BALLS TO  
5 BALLS PLAY OR VICEVERSA.

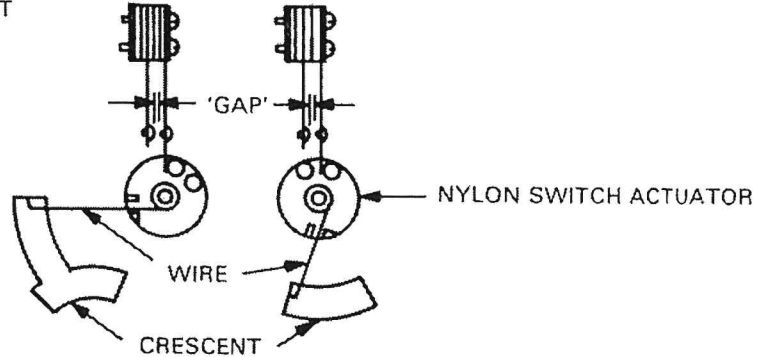
## MOTOR SERVICE JACK (Located on Mech. Panel)



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

# 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 over-travel of 1/32.

Using a gram gauge, tension of long blade or 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.

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## 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.



## WARRANTY

THE MOTORS IN ALL NEW SONIC 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 SONIC 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 PART LIST

Unit name	Contact disc	Wiper Ass'y	Ratchet gear ass'y	Motors
Coin	1B-2001-995	B-7456-985	3A-9969-3	
Ball count	1B-2001-34	B-7456-988	3A-9969-5	
Bonus	1B-3635-3	B-7456-986	3A-9969-10	
Credit			A-6400-1	
Player	1B-3635-3	C-6521-20	A-6404-3	Score motor
No. match	1B-3635-3	B-7456-985	3A-9969-50A	14A-7884 (50 Hz.) 14A-7883 (60 Hz.)
100 points	B-7253	A-6294	3C-7272	
1.000 points			3C-7272	
10.000 points	B-7253	A-6294	3C-7272	
100.000 points	B-7253	A-6294	3C-7272	

## «MARS TREK» COIL CHART

NOTICE: This game operates 24 Volts. When ordering replacement, transformer, motors, coil or Meters...  
Make sure to specify correct part number.

Number	Description	Location
14A-7884	Score Motor 50 Hz.	Mech. Panel.
15A-6782-1	Transformer 50 Hz.	Mech. Panel
14A-7883	Score Motor 60 Hz.	Mech. Panel
15A-6771	Transformer 60 Hz.	Mech. Panel
<b>«SOLENOID COILS»</b>		
M-29-900	1-2 Score Reset 3-4 Score Reset	Insert Insert
M-29-1000	Game Over Re. (Trip)	Mech. Panel
M-29-1100	No. 1 Coin Re. No. 2 Coin Re. Reset Re. Auxiliary Special Re. Right Eject Re. Top Eject Re. Bonus Re. Auxiliary Right Eject Re. 5,000 Pt. Re. Advance Bonus Re. 100 Pt. Re. 1000 Pt. Re. 10000 Pt. Re.	Mech. Panel Mech. Panel Mech. Panel Playfield Playfield Playfield Playfield Playfield Playfield Playfield Insert Insert Insert
M-30-1300	Coin Set Up Re.	Mech. Panel
M-31-1500	Coin Lockout	Front Door
Z-27-1000	Game Over Re. (Latch) Player Reset Re. No. 3 Coin Re. Credit Re. Out Hole Re.	Mech. Panel Mech. Panel Mech. Panel Mech. Panel Mech. Panel
Z-28-1150	Tilt Re. Ball Index Re. Extra Ball Re. 1 Alternator Re. 2 Alternator Re.	Mech. Panel Mech. Panel Mech. Panel Playfield Playfield
Z-29-1250	Lock Re.	Mech. Panel
A-22-550	Coin Unit S. U. Ball Count Unit S. U. Player Unit S. U. Ball Release Bonus Unit S. U.	Mech. Panel Mech. Panel Insert Playfield Playfield
A-23-600	Credit Unit S. U.	Insert
	No. Match Unit	Insert
A2-23-750	Knocker	Cabinet

Number	Description	Location
A2-26-1300	Small Chime Medium Chime Large Chime	Cabinet Cabinet Cabinet
B-26-800	Credit Unit Reset Coin Unit Reset Ball Count Unit Reset Player Unit Reset Bonus Unit Reset	Insert Mech. Panel Mech. Panel Insert Playfield
B1-26-800	100 Pt. D. U. (4) 1000 Pt. D. U. (4) 10000 Pt. D. U. (4) 100000 Pt. D. U. (4)	insert Insert insert Insert
D1-24-1600	Bank Reset	Playfield
F1-20-300/28-400	Right Flipper (2) Left Flipper	Playfield Playfield
G-23-750	Right Eject Hole Top Eject Hole	Playfield Playfield
G-23-750 D. C.	Center Bumper Top Bumper Left Kicker Right Kicker	Playfield Playfield Playfield Playfield
S-27-500	«M» Re. «A» Re. «R» Re. «S» Re. «R» Top Roll Over Re. «T» Top Roll Over Re. «E» Re. «K» Re. Double Bonus Re. Special Re.	Playfield Playfield Playfield Playfield Playfield Playfield Playfield Playfield Playfield Playfield
XM-27-675	Total Playmeter	Mech. Panel

## **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.

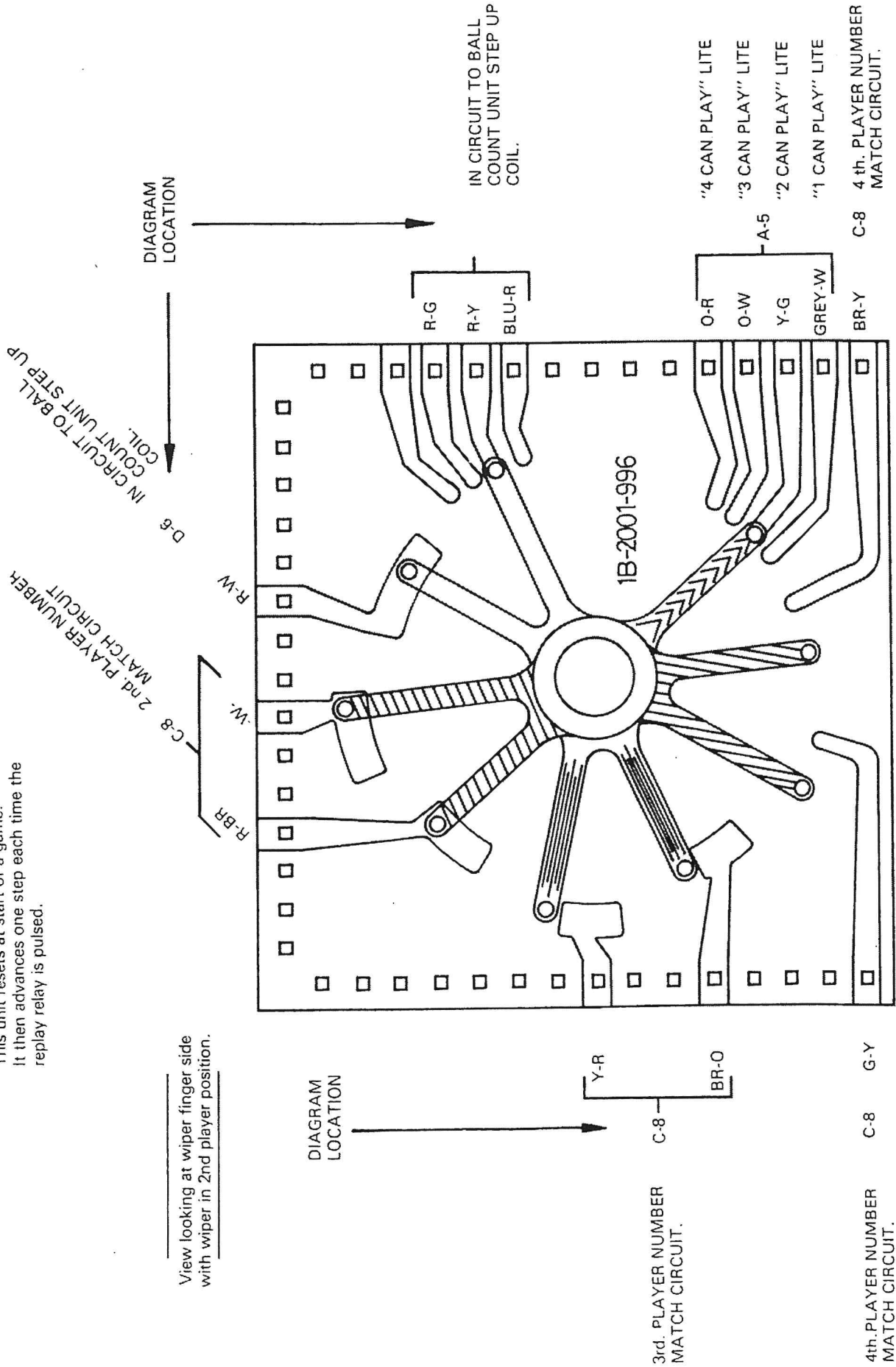
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## **SERVICEMAN TO REMOVE BACKGLASS:**

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

# COIN UNIT

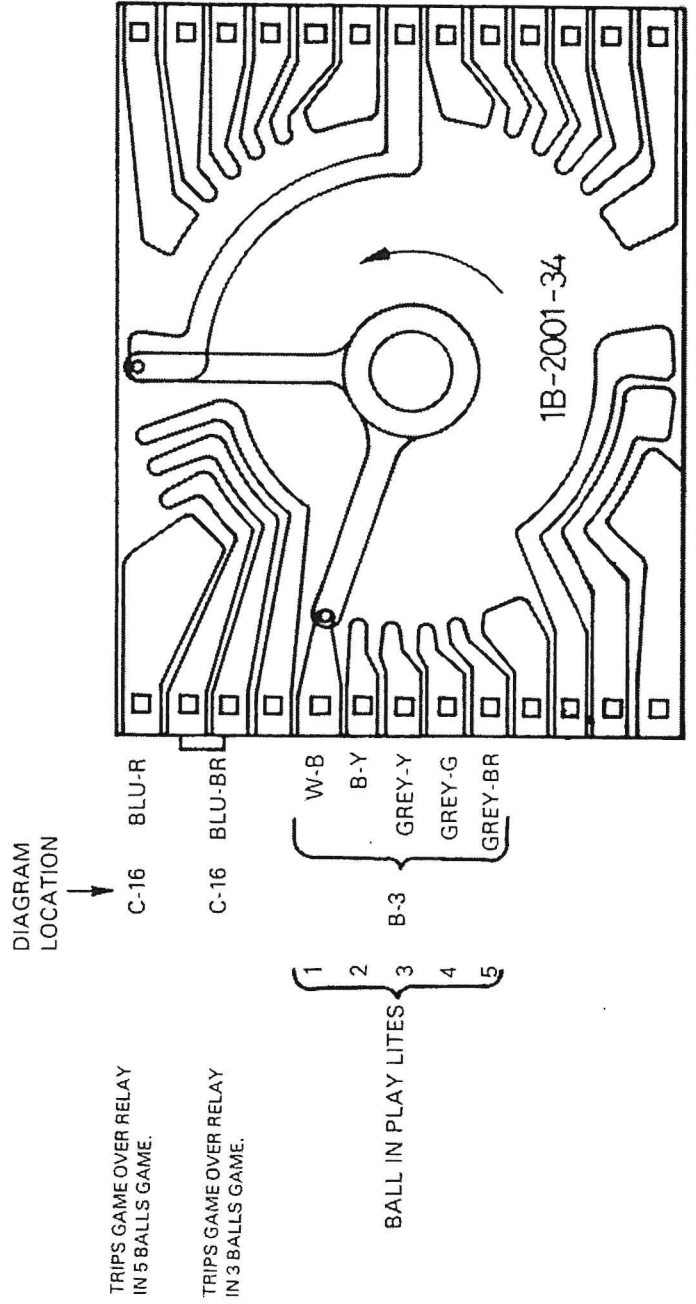
This unit resets at start of a game. It then advances one step each time the replay relay is pulsed.



# 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.

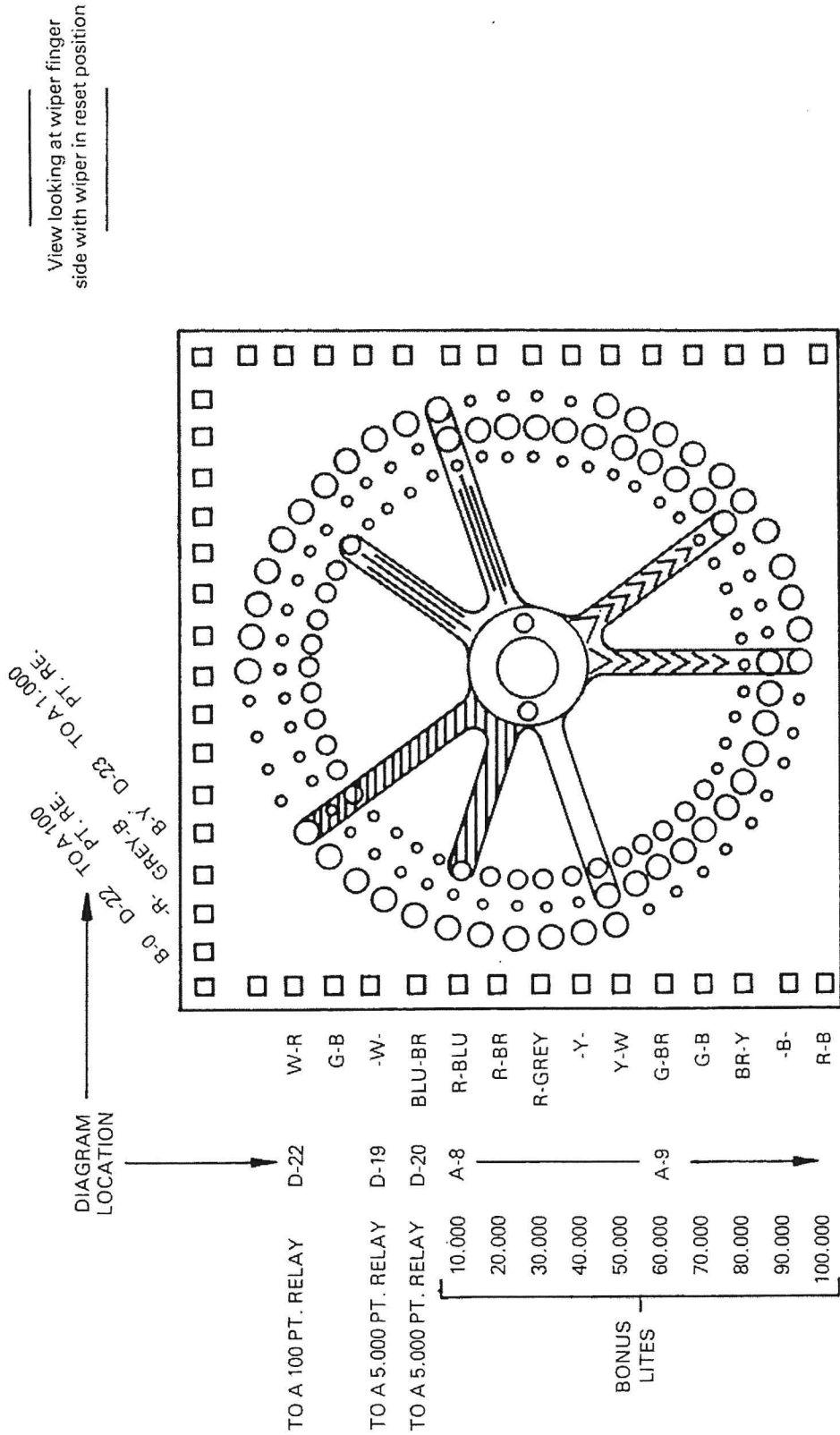
View looking at WIPER FINGER side  
with WIPER in ZERO position.



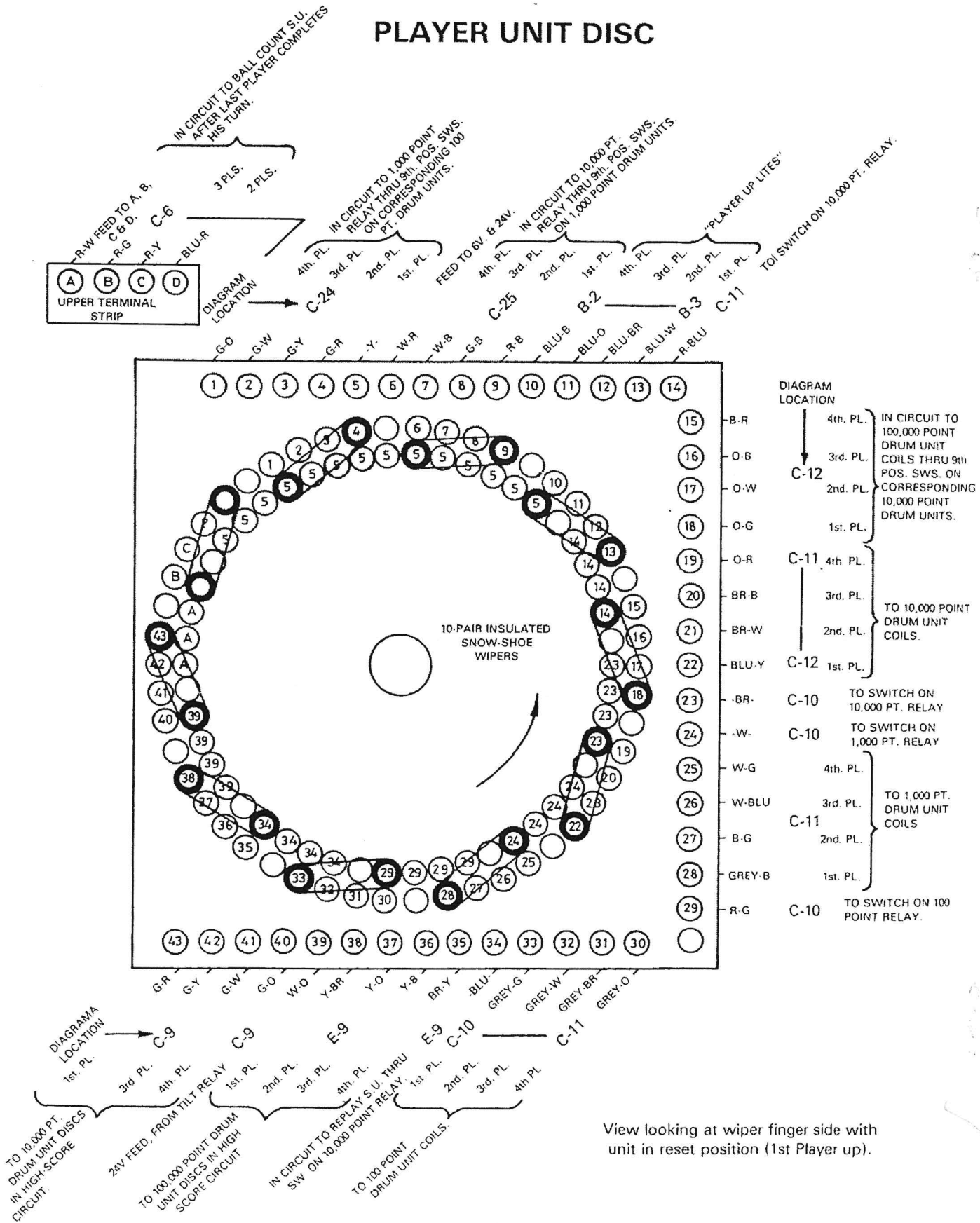
# BONUS UNIT

THIS UNIT STEPS UP EACH TIME THE BONUS ADVANCE RELAY IS PULSED. ALSO BY 5,000 PT. & AUXILIARY RIGHT EJECT RELAYS THRU 3-C SCORE MOTOR CAM SWITCH & BY OUT HOLE RE. THRU 2-C SCORE MOTOR CAM SW.

THE RESET COIL IS ENERGIZED BY BONUS RE. THRU DOUBLE BONUS RE., 5-A & 2-B SCORE MOTOR CAM SW., ALSO BY RIGHT EJECT RE. THRU IMP. B SCORE MOTOR CAM SW.



# PLAYER UNIT DISC



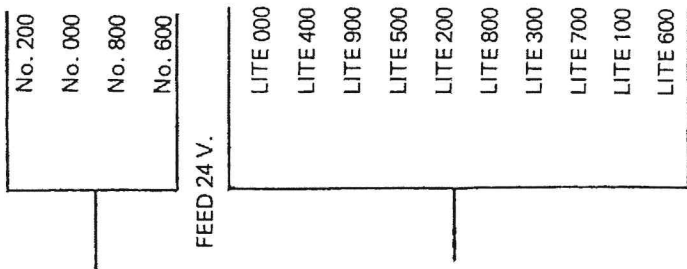
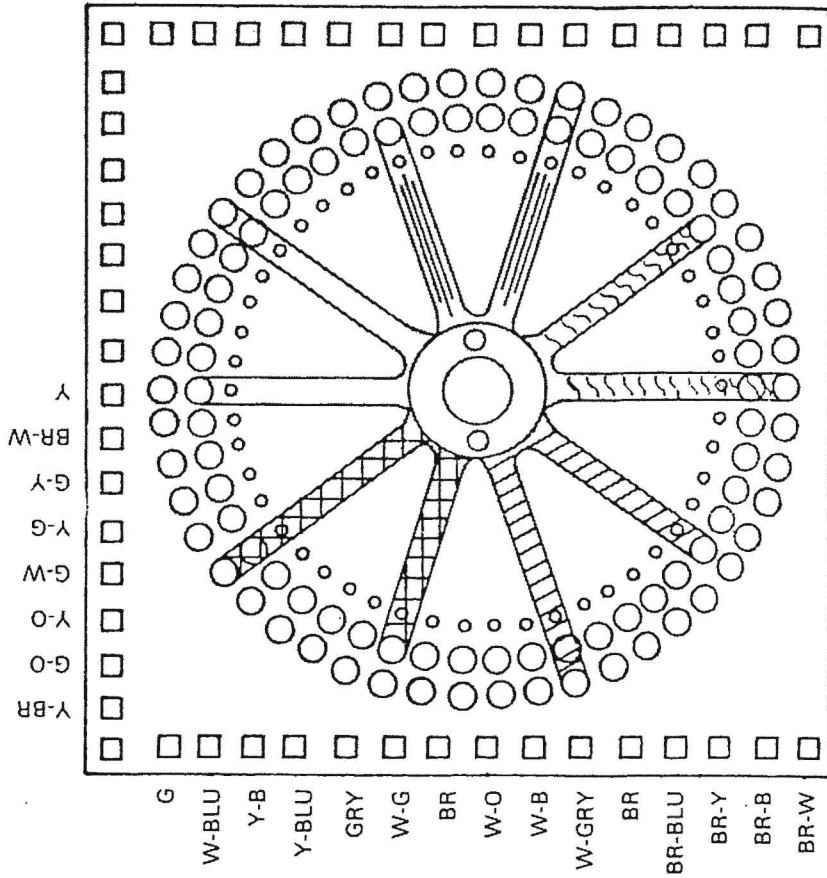
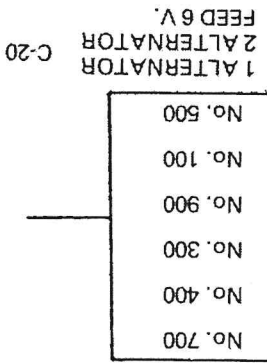


# No. MATCH UNIT

DIAGRAM  
LOCATION

E-9  
E-10

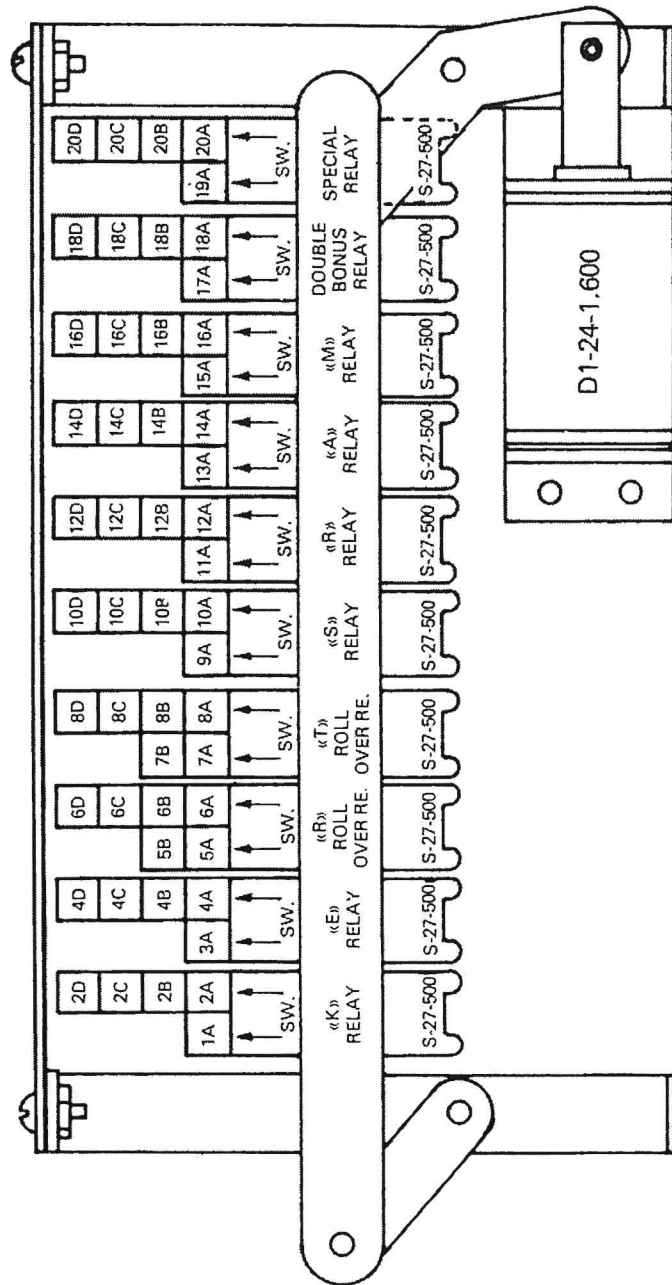
This unit steps up thru  
score motor.



E-9  
E-10

B-5  
B-6

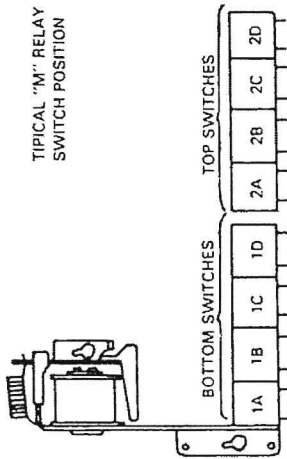
# BANK RELAYS



Relay	Sw.	Wire Colors	Diag. Loc.	Type	Switch Operation
«T» ROLL OVER	7A	-J- BLU-Y	A-7	N. O.	Activates Center Targets Lite.
	7B	O-B -J-	E-21	N. C.	Open circuit to this Relay.
	8A	-J- -J-	C-15	N. O.	In circuit to Auxiliary Special Re.
	8B	G-B Y-W	B-8	N. C.	Activates «T» Top Lite.
	8C	BR-Y -J-      O-G	C-23	M. & B.	Closed.- Pulses to 1.000 Pt. Re. Open.- In circuit to 10.000 Pt. Re.
	8D	B-O -Y- GREY-BLU	B-10	M. & B.	Closed.- Activates «T» Target Lite. Open.- Activates «T» Lites.
«S»	9A	O-G -Y-	E-21	N. C.	Open circuit to this Relay.
	10A	-J- -J-	D-15	N. O.	In circuit to Auxiliary Special Re.
	10B	-J- Y-B	A-7	N. O.	In circuit to Side Targets Lite.
	10C	BR-Y -J- GREY-O	E-23	M. & B.	Closed.- Pulses to 1.000 Pt. Relay. Open.- In circuit to 10.000 Pt. Re.
	10D	B-W -B-      -Y-	B-10	M. & B.	Closed.- Activates «S» Target Lite. Open.- Activates «S» Lite.
«R»	11A	-O- -J-	E-21	N. C.	Open circuit to this Relay.
	12A	-J- -J-	D-15	N. O.	In circuit to Auxiliary Special Re.
	12B	-J- -J-	B-7	N. O.	In circuit to Side Targets Lite.
	12C	BR-Y -J-      -J-	E-23	M. & B.	Closed.- Pulses to 1.000 Pt. Re. Open.- In circuit to 10.000 Pt. Re.
	12D	O-G -BR-      -Y-	B-10	M. & B.	Closed.- Activates «R» Target Lite. Open.- Activates «E» Lite.

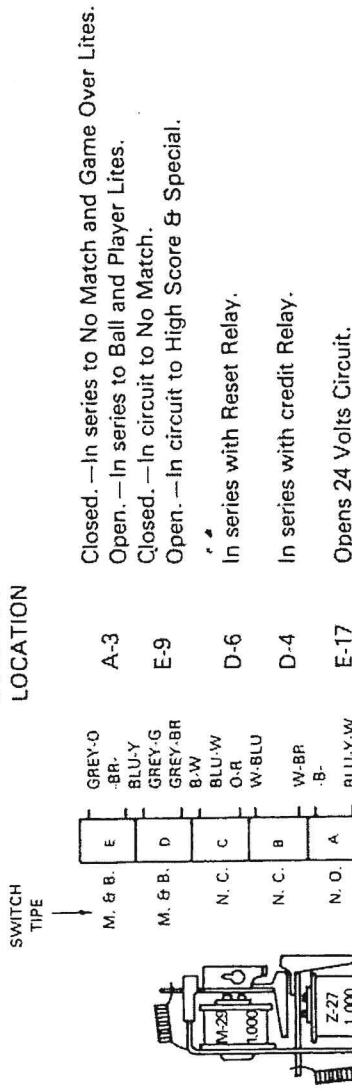
Relay	Sw.	Wire Colors	diag. Loc.	Type	Switch operation
«A»	13A	O-R -J-	E-20	N. C.	Open circuit to this Relay.
	14A	-J- -J-	D-15	N. O.	In circuit to Auxiliary Special Re.
	14B	-J- -J-	B-7	N. O.	In circuit to Side Targets Lite.
		BR-Y -J- -J-	D-23	M. & B.	Closed.- Pulses to 1,000 Pt. Re. Open.- In circuit to 10,000 Pt. Re.
	14D	G-W G-B -Y-	B-9	M. & B.	Closed.- Activates «A» Target Lite. Open.- Activates «A» Lite.
«M»	15A	BR-B -J-	E-20	N. C.	Open circuit to this Relay.
	16A	Y-O -J-	E-15	N. O.	In circuit to Auxiliary Special Re.
	16B	-J- -W-	B-7	N. O.	In circuit to Side Targets Lite.
	16C	BR-Y -J- O-BLU	C-23	M. & B.	Closed.- Pulses to 1,000 Pt. Re. Open.- In circuit to 10,000 Pt. Re.
	16D	-G- G-BR -Y-	B-9	M. & B.	Closed.- Activates «M» Target Lite. Open.- Activates «M» Lite.
SPECIAL	17A	-J- R-W	E-15	N. C.	open circuit to this Relay.
	18A	G-BR Y-O	B-7	N. O.	Activates Left Special R. O. Lite.
	18B	Y-W -PURPLE-	B-8	N. O.	Activates Right Special R. O. Lite.
	18C	B-Y Y-BLU	E-15	N. C.	Open circuit to Auxiliary Special Re.
	18D	GREY-O B-W -R-	E-15	M. & B.	Closed.- Pulses to 10,000 Pt. Re. Open.- Pulses to Credit Unit.
DOUBLE BONUS	19A	-J- -J-	D-15	N. C.	Open circuit to this Relay.
	20A	R-GREY -W-	B-7	N. O.	Activates Double Bonus Lite.
	20B	BR-Y -J- GREY-O	E-23	M. & B.	Closed.- Pulses to 10,000 Pt. Re. Open.- Pulses to 1,000 Pt. Re.
	20C	-G- O-W GREY-BR	C-16	M. & B.	Closed.- Pulses to 10,000 Pt. Re. Open.- Pulses to 10,000 Pt. Re.
	20D	G-W G-R Y-B	D-15	M. & B.	Closed.- Pulses to Bonus Unit Reset Coil. Open.- Pulses to Bonus Unit Reset Coil.

# A.C. RELAYS & SWITCHES



## LOCATED ON MECH. PANEL

### DIAGRAM LOCATION



Closed. — In series to No Match and Game Over Lites.  
 Open. — In series to Ball and Player Lites.  
 Closed. — In circuit to No Match.  
 Open. — In circuit to High Score & Special.  
 In series with Reset Relay.  
 In series with credit Relay.  
 Opens 24 Volts Circuit.

## GAME OVER

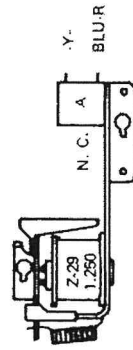
The latch coil is energized by Reset Re. Thru 1-A, 2-A Score motor cam Switches and Player Reset, Coin, Extra Ball, Ball Index & Out Hole Re. The trip coil is energized directly by lock Re; & by Player Unit or Ball Count Unit Open at Zero Switches thru Coin Relay.

## LOCK

Is automatically energized when machine is Plugged in.

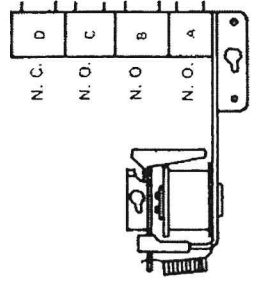
## BALL INDEX

Is energized by Tilt Relay.  
 Also by 100 PT. 1,000 PT & 10,000 PT. Relay thru Extra Ball Relay



Pulses to Game Over Relay Trip Coil.

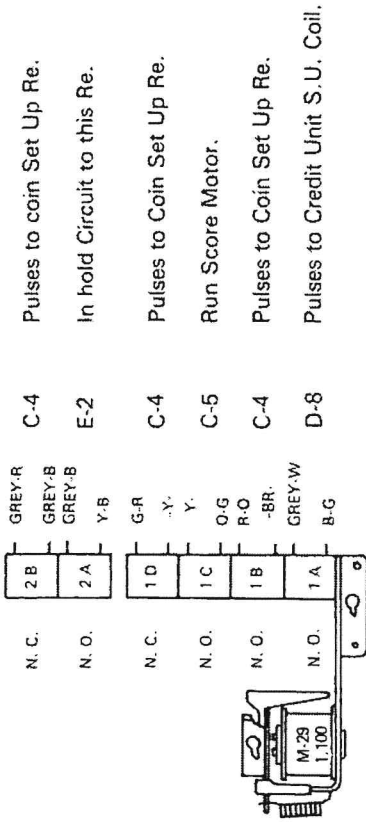
C-18



In hold circuit to Coin Set Up Re.  
 In circuit to Player Unit Reset and Step Up.  
 Pulses to 10,000 Pt. Re.  
 In hold circuit to this relay.

### NO. 1 COIN

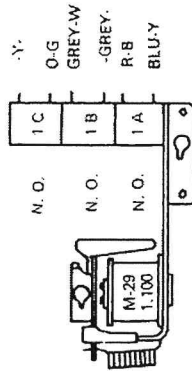
Is energized by No. 1 Coin Switch, & Coin set Up Relay.



- C-4 Pulses to coin Set Up Re.
- E-2 In hold Circuit to this Re.
- C-4 Pulses to Coin Set Up Re.
- C-5 Run Score Motor.
- C-4 Pulses to Coin Set Up Re.
- D-8 Pulses to Credit Unit S. U. Coil.

### NO. 2 COIN

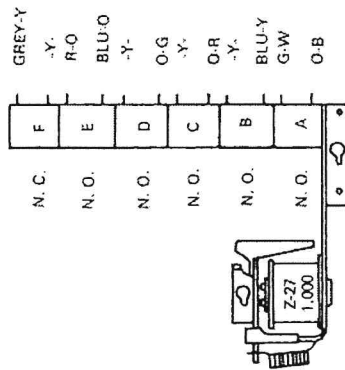
Is energized by No. 2 Coin Switch.



- C-5 Run Score Motor.
- D-8 Pulses to Credit Unit S. U. Coil.
- E-3 In hold circuit to this Relay.

### NO. 3 COIN

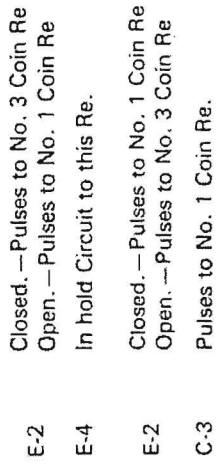
Is energized by No. 3 Coin Switch & Coin Set Up Relay.



- C-4 Pulses to Coin Set Up Re
- C-4 Pulses to Coin Set Up Re
- C-5 Run Score Motor
- C-6 Pulses to Reset Relay.
- C-19 Pulses to Game Over Relay (trip Coil).
- D-3 In hold Circuit to this Relay.

### COIN SET UP

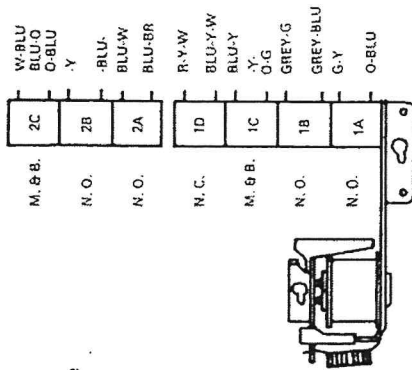
Is energized by No. 1 Coin Re & No. 3 Coin Re.



- E-2 Closed. — Pulses to No. 3 Coin Re  
Open. — Pulses to No. 1 Coin Re  
In hold Circuit to this Re.
- E-4 Closed. — Pulses to No. 1 Coin Re  
Open. — Pulses to No. 3 Coin Re  
Pulses to No. 1 Coin Re.
- C-3

## RESET

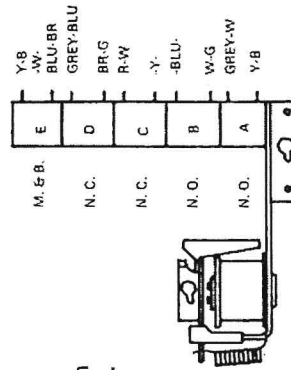
Is energized by No. 3 Coin Relay thru Game Over Relay.



E-6 Closed. — Pulses to Coin Unit Step Up coil.  
 Open. — Pulses to Coin Unit Reset, Game Over Re, (latch) and Ball Count Unit Reset.  
 B-1 Pulses Reset Bank coil.  
 D-6 In hold circuit to this relay.  
 E-17 Opens 24 Volts circuit.  
 C-3 Closed. — In circuit to Credit Relay and Coin LockOut coil.  
 C-5 Open. — Run Score Motor.  
 D-17 Pulses to Bonus Relay.  
 E-7 Pulses to Player Unit Reset.

## EXTRA BALL

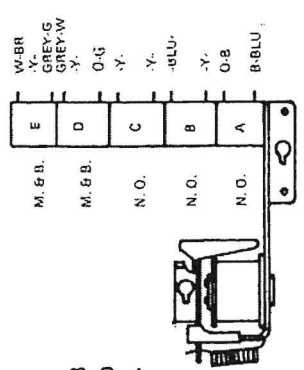
Is energized by No. 2 Coin Relay and No. 1 Coin Relay thru Impulses -C Score Motor cam switch.



E-19 Closed. — Pulses to Extra Ball Relay.  
 Open. — Pulses to 5,000 PT. Relay.  
 E-19 Pulses to Ball Index Relay.  
 C-7 In circuit to Player Unit Reset and Step Up.  
 A-6 Activates Extra Ball lites.  
 D-19 In hold circuit to this relay.

## OUT HOLE

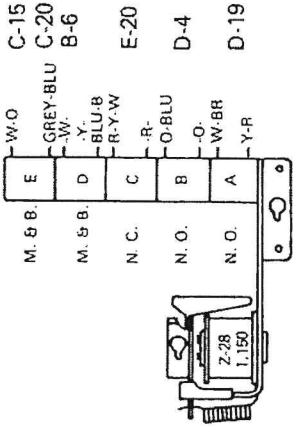
Is energized by Game Over Relay. Also by Index-B Score Motor cam switch thru Bonus Unit zero position switch, R. Eject Relay and Bonus Relay.



C-19 Closed. — Pulses to ball Index Relay and Tilt Relay.  
 C-18 Open. — Pulses to Ball Release and Bonus Unit Step Up.  
 C-19 Closed. — Pulses to Ball Index Relay and Extra Ball Relay.  
 C-6 Open. — Run Score Motor.  
 C-7 In circuit to Player Unit Reset and Step Up.  
 B-1 Pulses Reset Bank coil.  
 E-17 In hold circuit to this relay.

## TILT

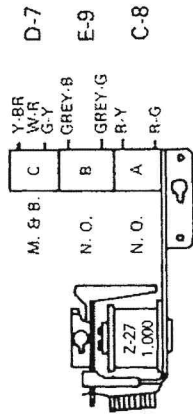
Is energized by tilt switches thru 3-E Score motor cam SW.



C-15 Closed. — In circuit to Player Unit.  
 C-20 Open. — Pulses to Ball Index Re.  
 B-6 Closed. — Opens playfield combination lites circuit.  
 Open. — Activates tilt lite.  
 E-20 Opens 24 Volts circuit.  
 D-4 In hold circuit to Coin sep Up Re.  
 D-19 In hold circuit to this Relay.

## PLAYER RESET

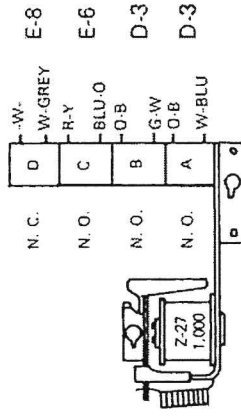
Is energized by Ball Count Unit end of Stroke Switch.



D-7 Closed. — Pulses to Player Unit Step Up Coil.  
 Open. — Pulses to Player Unit Reset Coil.  
 E-9 In No. Match Circuit.  
 C-8 In hold circuit to this relay.

## CREDIT

Is energized by Credit button thru Game Over & Reset Relays & Ind. A. Score motor Cam SW.

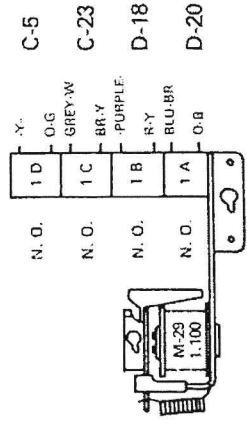


E-8 Pulses to Coin Lockout.  
 E-6 Pulses to Credit Unit Reset Coil.  
 D-3 Pulses to No. 3 Coin Re.  
 D-3 In Hold circuit to this Re.

## LOCATED ON PLAYFIELD

### 5,000 PT.

Is energized by Left Top R. O. Button, «R» & «T» R. O., Left & Right Inside R. O. sws. & Top Eject Re.

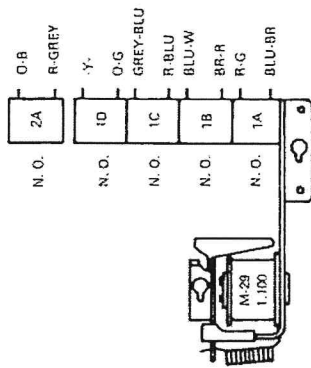


C-5 Run Score Motor.  
 C-23 Pulses to 1,000 Pt. Re.  
 D-18 Pulses to Bonus Unit S. U. Coil.  
 D-20 In hold circuit to this Relay.



### TOP EJECT

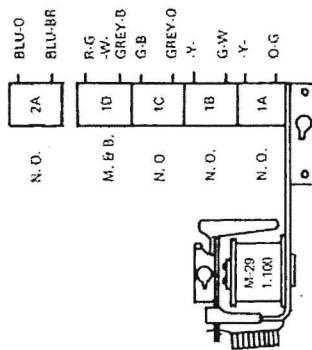
Is energized by Top Eject Switch.



- C-16 In hold circuit to this Relay.
- C-5 Activates Motor.
- D-12 Pulses to «T» & «R» Top R. O. Re.
- C-16 Pulses to Top Eject Coil.
- C-20 Pulses to 5.000 Pt. Re.

### RIGHT EJECT

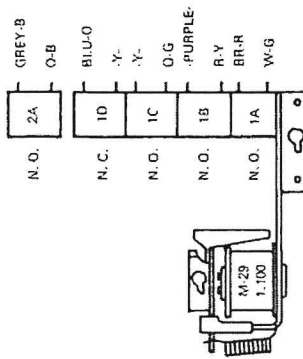
Is energized by Right Eject Sw.



- E-16 In hold circuit to this Relay.
- D-17 Closed. — Pulses to Out Hole Re.  
Open. — Pulses to Auxiliary Right Eject Re.  
Pulses to 10.000 Pt. Re.
- D-17 Pulses to 10.000 Pt. Re.
- C-16 Pulses to Bonus Unit Reset Coil.
- C-5 Activates Motor.

### AUXILIARY RIGHT EJECT

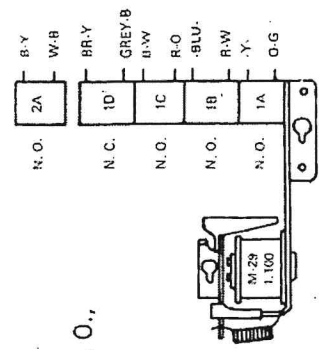
Is energized by Right Eject Re.



- E-17 In hold circuit to this Relay.
- D-16 Pulses to Right Eject Re.
- C-5 Activates Motor.
- D-18 Pulses to Bonus Unit S. U. Coil.
- C-16 Pulses to Right Eject Coil.

### AUXILIARY SPECIAL

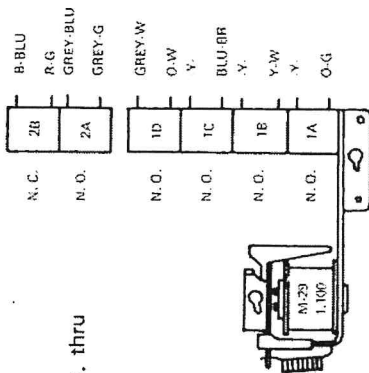
Is energized by «R» Top R. O., «T» Top R. O., «M», «A», «R», «S», «E» & «K» Relays.



- E-15 In hold circuit to this Relay.
- D-23 Pulses to 1.000 Point Re.
- C-15 In No. Match Circuit.
- E-15 Pulses to Special Re.
- C-4 Run Score Motor.

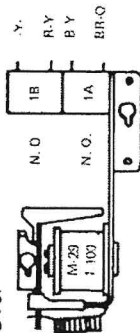
## BONUS

Is energized by Reset Re. & by Hole Sw. thru Bonus Unit Zero Position Switch.



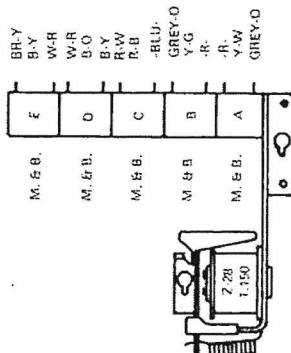
## ADVANCE BONUS

Is energized by Left & Right Side Roll Over Switch.



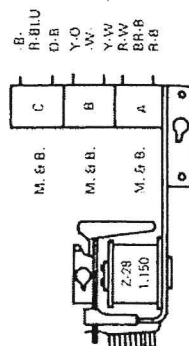
## 1 ALTERNATOR

Is energized by No. Match Unit Switch.



## 2 ALTERNATOR

Is energized by No. Match Unit Switch.



- D-18 Pulses to Out Hole Re.
- C-17 In hold circuit to this Relay.
- C-24 Pulses to 10,000 Pt. Re.
- C-6 Pulses to Reset Re.
- C-16 Pulses to Bonus Unit Reset Coil.
- C-5 Activates Score Motor.

- C-18 Pulses to Bonus Unit S. U. Coil.
- D-22 In hold circuit to this Re.

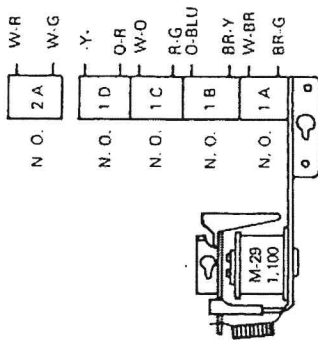
- E-22 Closed. — Pulses to 100 Pt. Re.  
Open. — Pulses to 1,000 Pt. Re.
- E-22 Closed. — Pulses to 1,000 Pt. Re.  
Open. — Pulses to 100 Pt. Re.
- B-9 Closed. — Activates Right Spinning Target Lite.  
Open. — Activates Left Spinning Target Lite.
- D-15 Closed. — Pulses to 10,000 Pt. Re.  
Open. — Pulses to 10,000 Pt. Re.
- D-15 Closed. — Pulses to 10,000 Pt. Re.  
Open. — Pulses to 10,000 Pt. Re.

- D-21 Closed. — Pulses to «R» Top R. O. Re.  
Open. — Pulses to «T» top R. O. Re.
- B-8 Closed. — Activates C. Bumper, Sepecial on R. O., «E» & «R» Lites.  
Open. — Activates Top Bumper, «R» & «E» Special R. O. Lites.
- D-21 Closed. — Pulses to «E» Re.  
Open. — Pulses to «K» Re.

# LOCATED IN BACKBOX

## 100 POINTS

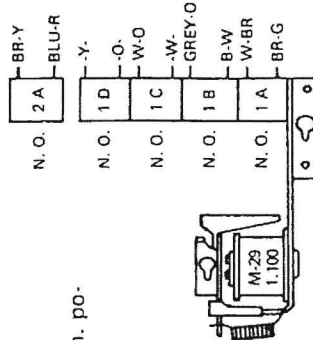
Is energized by Roll Over Button & Bumper Switches.



- D-25 In hold circuit to this Relay.
- C-17 Pulses to Small Chime Coil.
- C-12 Pulses to 100 PT. D.U.
- E-26 Pulses to 1,000 PT. Relay.
- D-19 Pulses to Ball Index Relay.

## 1,000 POINTS

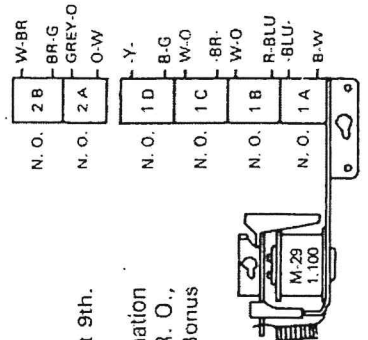
Is energized by 100 PT. D.U. closes at 9th. position SW. thru 100 PT. Re.



- D-27 In hold circuit to this relay.
- C-17 Pulses to Medium Chime Coil.
- C-13 Pulses to 1,000 Pt. D.U.
- E-28 Pulses to 10,000 PT. Relay.
- D-20 Pulses to Ball Index Relay.

## 10,000 POINTS

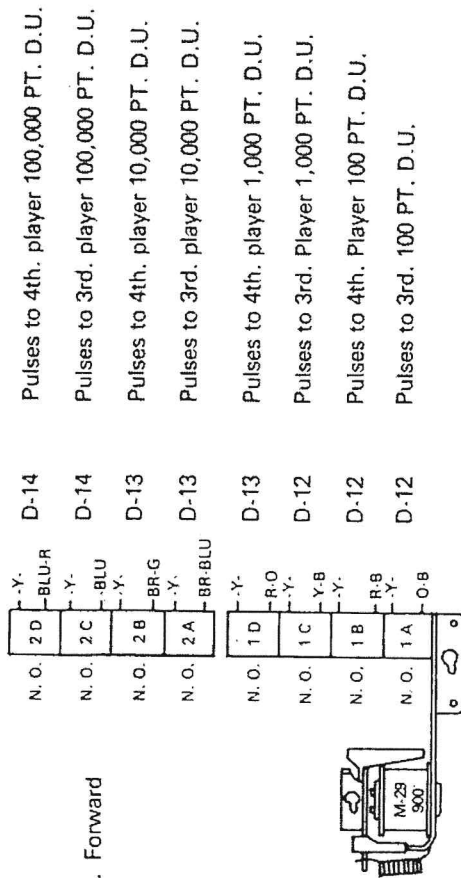
Is energized by 1,000 PT. D. U. Closed at 9th. position Sw. Thru 1,000 PT. Re.  
Also by MARS & TREK Targets Combination thru «M», «A», «R», «S», «T», & «R» Top R. O., «E» Relays; & by Bonus Re. thru Double Bonus & Reset Re.



- D-18 Pulses to Ball Index Re.
- E-24 In hold Circuit to this Relay.
- C-17 Pulses to Large Chime Coil.
- C-13 Pulses to 10,000 PT. D.U.
- C-14 Pulses to 100,000 PT. D.U.
- E-10 Pulses to Credit Unit.

## 1-2 SCORE RESET

Is energized by Reset Re. thru Imp. Forward  
A. Score motor cam Switch.



## 3-4 SCORE RESET

Is energized by Reset Re thru Imp. A Score  
motor cam Switch.

