

Instruction Manual for **HOT TIP**

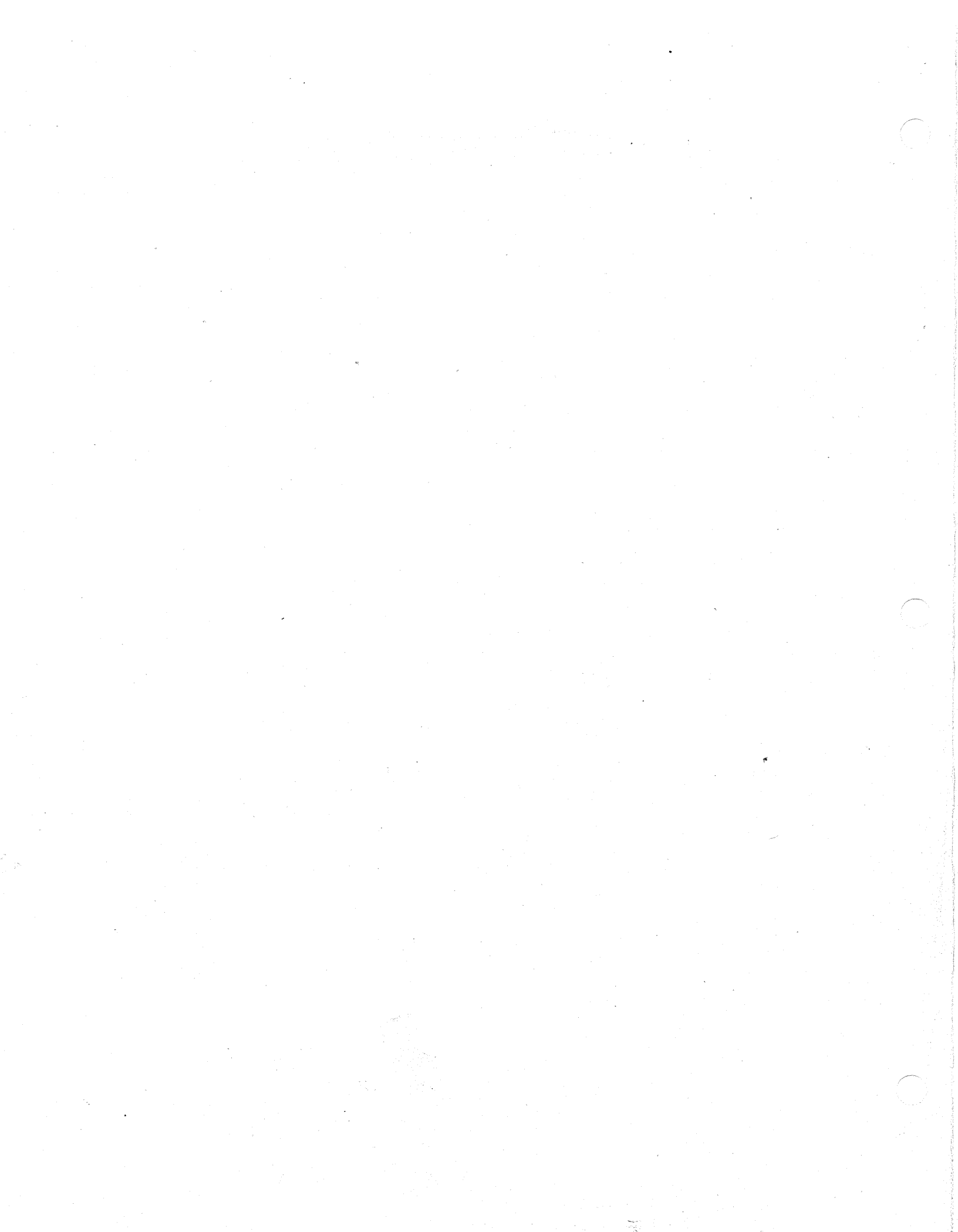


 **Williams**[®] ELECTRONICS, INC.
A SUBSIDIARY OF
THE SEEBURG CORPORATION OF DELAWARE

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



"HOT TIP"

GAME OPERATES AS FOLLOWS:

MAKING HOT TIP DROP TARGETS THE FIRST TIME LIGHTS SPINNER AND NO. 1 HORSESHOE.

MAKING HOT TIP DROP TARGETS THE SECOND TIME LIGHTS SIDE EJECT HOLE FOR POSSIBLE EXTRA BALL, ALSO DROP TARGET VALUE CHANGES FROM 100 TO 1,000 AND LIGHTS NO. 2 HORSESHOE.

MAKING HOT TIP DROP TARGETS A THIRD TIME LIGHTS REMAINING HORSESHOE, WHICH IN TURN CHANGES VALUE OF DROP TARGETS FROM 1,000 TO 10,000 AND LIGHTS SPECIAL OUT LANE ALTERNATELY FOR SPECIAL.

NOTE: OPTIONAL ADJUSTMENT JACK FOR LIBERAL AND CONSERVATIVE TARGET ADJUSTMENT WHICH TIES NO. 1 AND NO. 2 HORSESHOES TOGETHER.

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.

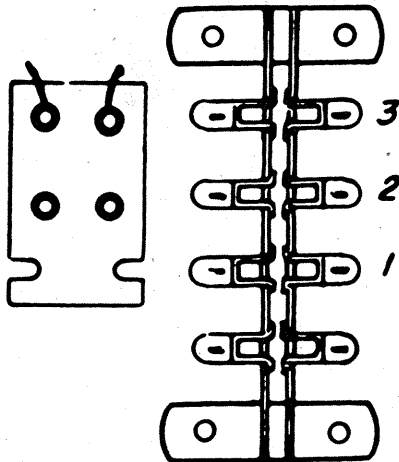
Solenoid Plungers should not have a lubricant of any kind. Should there be a sluggish tendency or if plungers are sticking, the parts should be cleaned with a solvent and flaked graphite applied on reassembly.

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.

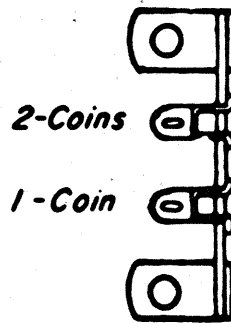
ADJUSTMENTS ON MECHANISM PANEL

10¢ Adjustment



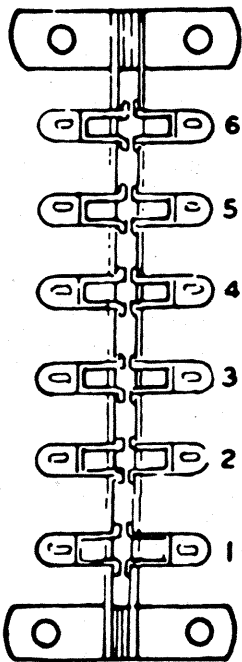
PROVIDES
1, 2 OR
3 PLAYS
FOR ONE
COIN.

5¢ Adjustment



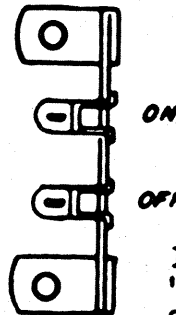
IN "2 COINS FOR
1 PLAY", CIRCUIT
TO COIN RELAY
PASSES THRU SW.
ON ALTERNATOR
UNIT.

25¢ Adjustment



PROVIDES 1, 2, 3, 4, 5
OR 6 PLAYS FOR 25¢.

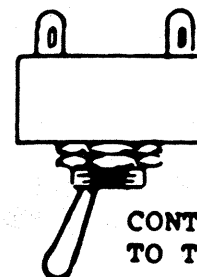
Motor Service Jack



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

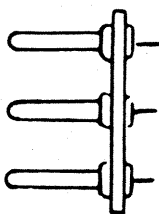
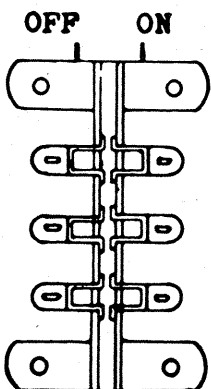
MASTER ON-OFF SW.

(Located under front of
Cabinet)



CONTROLS POWER
TO TRANSFORMER

1 COIN- 1 PLAY
2 COINS- 3 PLAYS



IN "ON" POSITION, 10¢
ADJUSTMENT MUST BE IN #2 PO-
SITION & 25¢ ADJUSTMENT MUST
BE IN #6 POSITION. FIRST
COIN ADVANCES CREDIT UNIT 1
STEP. SECOND COIN WILL AD-
VANCE CREDIT UNIT 2 STEPS.
IN "OFF" POSITION, 25¢
ADJUSTMENT AND/OR 10¢ AD-
JUSTMENT SHOULD BE PUT IN
PROPER POSITION.

ADJUSTMENTS IN BACKBOX

Hi-Score Adjustment

PLUG IN RED
WIRE FOR SCORES
110,000 TO 200,000

10,000 60,000

PLUG IN BLUE
WIRE FOR SCORES
210,000 TO 300,000

20,000 70,000

PLUG IN YELLOW
WIRE FOR SCORES
310,000 TO 400,000

30,000 80,000

40,000 90,000

PLUG IN GREEN
WIRE FOR SCORES
410,000 TO 500,000

PLUG IN GRAY
WIRE FOR SCORES
910,000 TO 990,000

PLUG IN WHITE
WIRE FOR SCORES
510,000 TO 600,000

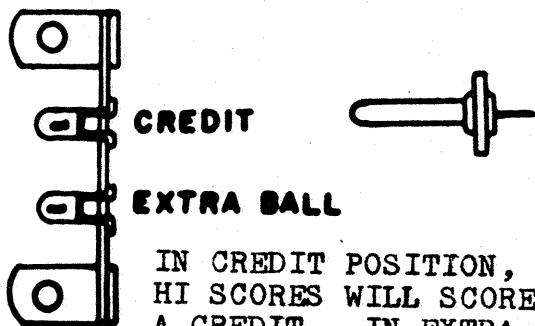
PLUG IN BROWN
WIRE FOR SCORES
610,000 TO 700,000

PLUG IN ORANGE
WIRE FOR SCORES
710,000 TO 800,000

PLUG IN BLACK
WIRE FOR SCORES
810,000 TO 900,000

EXAMPLE: BLUE WIRE INTO 10,000 POSITION SCORES AT 210,000
OR BLUE WIRE INTO 00,000 POSITION SCORE AT 300,000.

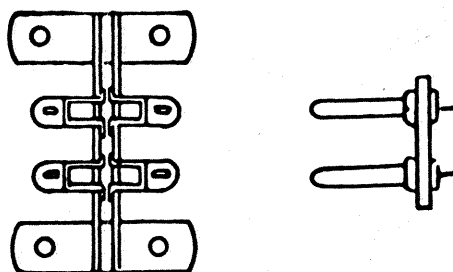
PLAY ADJUSTMENT



IN CREDIT POSITION,
HI SCORES WILL SCORE
A CREDIT. IN EXTRA
BALL POSITION, AN EX-
TRA BALL IS AWARDED
WHEN DESIRED SCORE
IS OBTAINED.

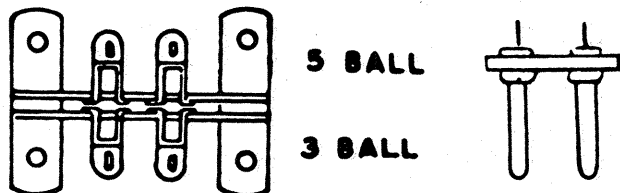
NUMBER MATCH ADJUSTMENT

ON OFF



IN "ON" POSITION, A NUMBER MATCH LITE
WILL APPEAR WHEN GAME IS OVER. TO AWARD
CREDIT, WHEN NUMBER IS MATCHED, "PLAY"
ADJUSTMENT MUST BE IN CREDIT POSITION.
IN "OFF" POSITION, NUMBER MATCH IS
INOPERATIVE.

No. of Balls Adjustment



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

SUGGESTED SCORE CARDS

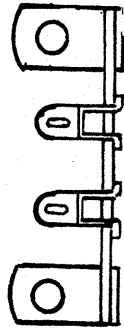
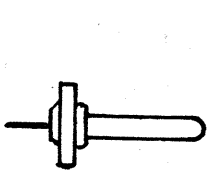
CREDIT

5 BALL.. 474-13 3 BALL.. 474-12 OR
474-30

EXTRA BALL

5 BALL. 474-43 3 BALL.. 474-41

FEATURE ADJ



LIB.

WHEN "HOT TIP" DROP TARGETS ARE MADE THE FIRST TIME, BOTH NO. 1 AND NO. 2 HORSESHOES LIGHT.
(RECOMMENDED FOR 3 BALL).

CONS.

WHEN "HOT TIP" DROP TARGETS ARE MADE ONLY ONCE, NO. 1 HORSESHOE LIGHTS. YOU MUST THEN MAKE "HOT TIP" DROP TARGETS AGAIN IN ORDER TO LIGHT NO. 2 HORSESHOE.
(RECOMMENDED FOR 5 BALL).

SEQUENCE OF OPERATION

RESET CYCLE

CREDIT UNIT RESET COIL IS ENERGIZED BY SWITCH ON RESET RELAY, THRU SCORE MOTOR INDEX CAM SWITCH A, CREDIT BUTTON, ZERO SWITCH ON CREDIT UNIT, AND SWITCH ON GAME-OVER RELAY OR COIN UNIT LAST POSITION BREAK SWITCH.

END-OF-STROKE SWITCH ON CREDIT UNIT RESET COIL WILL ENERGIZE COIN RELAY.

SWITCHES ON COIN RELAY WILL RUN SCORE MOTOR, TRIP GAME-OVER RELAY, AND ENERGIZE RESET RELAY.

SWITCHES ON RESET RELAY WILL OPEN CIRCUITS TO PLAYFIELD SWITCHES AND OUTHOLE RELAY, RUN SCORE MOTOR, ENERGIZE RESET COILS ON COIN UNIT-BALL COUNT UNIT-PLAYER UNIT AND GAME-OVER RELAY, PULSE NO. 1, NO. 2 AND NO. 3 RESET RELAYS, AND ENERGIZE BONUS RELAY.

SWITCHES ON NO. 1, NO. 2 AND NO. 3 RESET RELAYS, WILL PULSE THE (20) SCORING DRUM UNITS UNTIL THEY REACH ZERO.

SWITCHES ON BONUS RELAY WILL RUN SCORE MOTOR, HOLD RESET RELAY IN AND PULSE BONUS UNIT RESET COIL, (BONUS RELAY IS HELD IN BY ZERO SWITCH ON BONUS UNIT).

WHEN BONUS RELAY DROPS OUT, OUTHOLE RELAY IS ENERGIZED THRU ZERO SWITCH ON BONUS UNIT AND INDEX CAM SWITCH C.

SWITCHES ON OUTHOLE RELAY WILL RUN SCORE MOTOR, PULSE BONUS UNIT S.U. COIL, AND PULSE BALL RELEASE COIL TO PROPEL BALL TOWARD PLUNGER.

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.

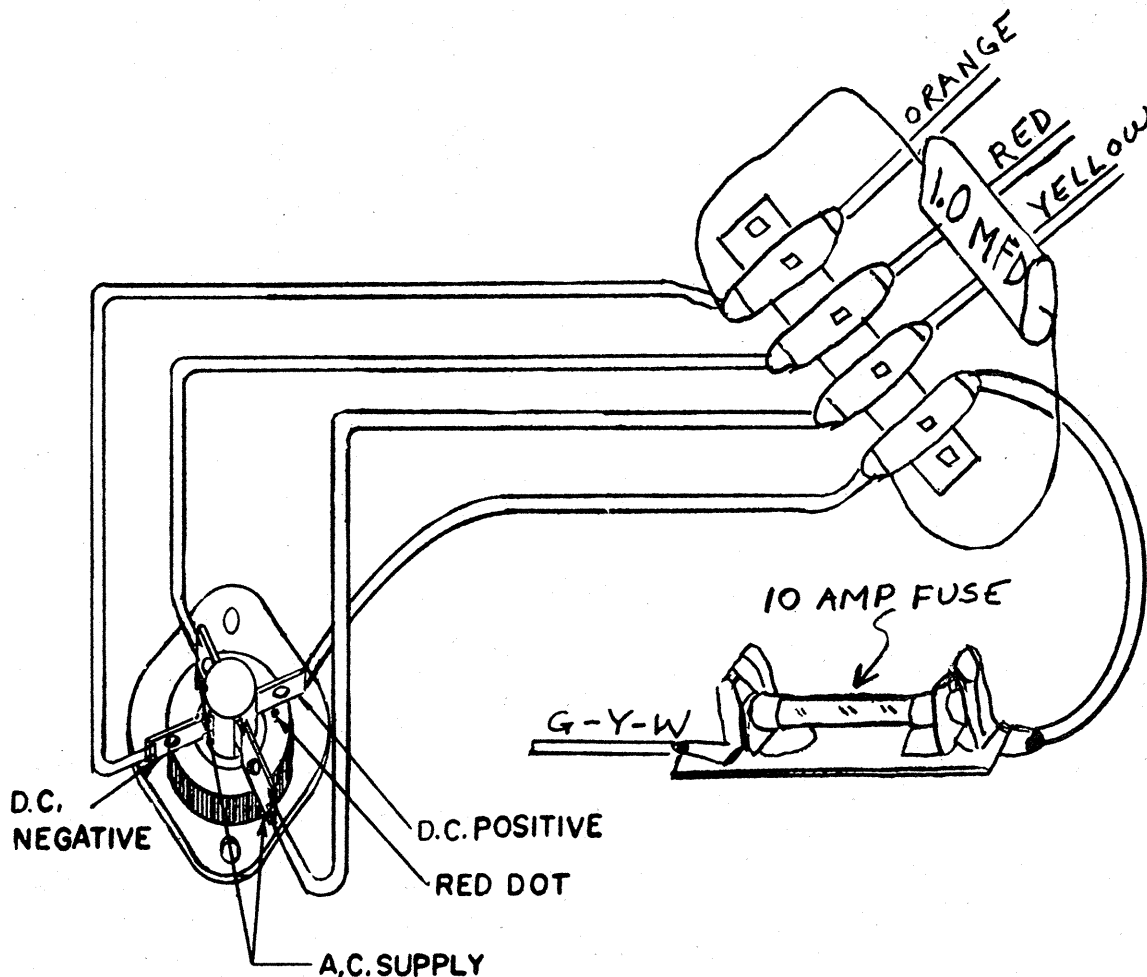
IMPORTANT NOTICE

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	
PLAYER	C-6417	C-6521-9	A-6404-3	
COIN	C-6414	B-7456-9	A-6402-3	
BONUS	C-6417	B-7456-20	A-6402-10/35	
10 POINT	B-7253	A-6294	3C-7272	
100 POINT	-----	-----	3C-7272	
1000 POINT	-----	-----	3C-7272	
10,000 POINT	B-7253	A-6294	3C-7272	SCORE MOTOR
100,000 POINT	B-7253	A-6294	3C-7272	14A-7883 (60 HERTZ)
ALTERNATOR	-----	-----	A-7567	14A-7884 (50 HERTZ)
(RIGHT SIDE)	B-7568	A-7614		
NO. MATCH			A-7548-1	
(LEFT SIDE)	B-7569	A-7615		
(RIGHT SIDE)	B-7568	A-7614		
TOP EJECT			A-7595	
(LEFT SIDE)	B-7569	A-7615		

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.

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.**

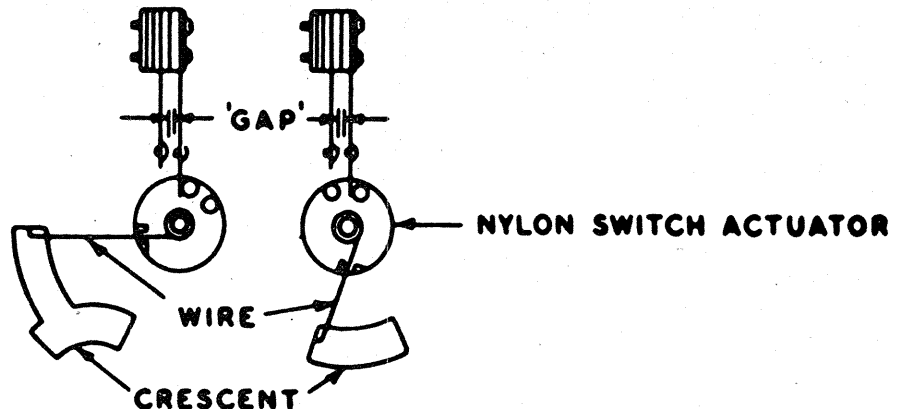
IMPORTANT NOTICE

**KINDLY INFORM LOCATIONS THAT THEY
CAN TURN DISPLAY LIGHTS ON BY FLIPPING
MASTER SWITCH ON.**

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

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:

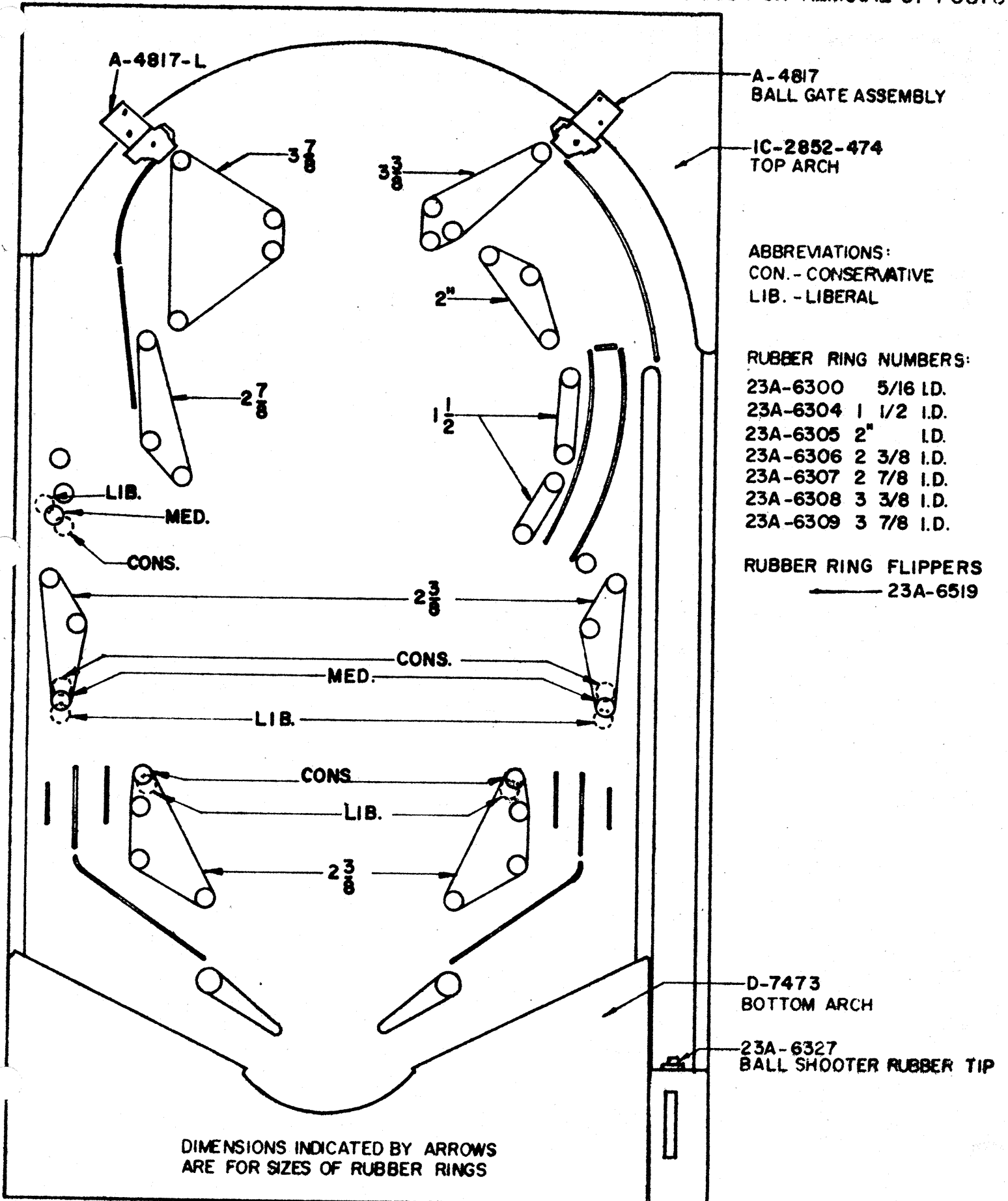
LOCATED ON MECHANISM PANEL, IT IS EQUIPPED WITH A SECONDARY TAP. IF YOUR GAME IS ON LOCATION WITH EXTREMELY LOW LINE VOLTAGE, REMOVE LEAD FROM LUG MARKED 24 VOLTS AND SOLDER TO ALTERNATE LUG MARKED "HIGH". THIS WILL BOOST SECONDARY VOLTAGE APPROXIMATELY 2-3 VOLTS.

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.

HOT TIP 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



A-4817
BALL GATE ASSEMBLY

IC-2852-474
TOP ARCH

ABBREVIATIONS:
CON. - CONSERVATIVE
LIB. - LIBERAL

RUBBER RING NUMBERS:

23A-6300	5/16 I.D.
23A-6304	1 1/2 I.D.
23A-6305	2" I.D.
23A-6306	2 3/8 I.D.
23A-6307	2 7/8 I.D.
23A-6308	3 3/8 I.D.
23A-6309	3 7/8 I.D.

RUBBER RING FLIPPERS
—— 23A-6519

D-7473
BOTTOM ARCH

23A-6327
BALL SHOOTER RUBBER TIP

DIMENSIONS INDICATED BY ARROWS
ARE FOR SIZES OF RUBBER RINGS

JACK LAYOUT

GAME HOT-TIP

POSITION PAN.-PLAYF. SIZE 22

FEED	Bⓐ	1
"	Rⓐ	2
MOTOR RUN	%G	3
RESETRE.	BLU/BR/	4
BONUSU.RESET	GRY/W/	5
"	%W-1	6
EJECT COILS	G/W-3	7
EJECT & OUTHOLE RE.	R/BR	8
BONUS RE.	R/B-4	9
"	GRY/BLU-4	10
"	GRY/G-4	11

B/BLU-1 OTHOLE RE.	1
% "HOT" TARGET RESET	2
Y/G-2 " "	3
G/O-3 "TIP" TARGET RESET	4
GRY BONUS UNIT Y-2 STEP UP	5
R/O-3 " "	6
BLU/W-4 BALL RELEASE	7
Y/R-3 TILT RE.	8
W/BR-4 " "	9
W/G-4 SHOOT AGAIN LITE	10
Yⓐ FEED	11

JACK LAYOUT

GAME HOT-TIP

POSITION PAN.-PLAYF. SIZE 20

NO.1 RE.	G/B-2	1
"	W/GRY-5	2
"	GRY/O-2	3
NO.2 RE.	GRY/B-1	4
NO.3 RE.	Y/BLU-3	5
L.FLIPPER	R/W-5ⓐ	6
R.FLIPPER	BR/W-5ⓐ	7
CAPTIVE BALLRE.	R/BLU-2	8
TILT RE.	-G-	9
"	-	10

R/Y/Wⓐ FEED	1
O/BLU-1 5.000PT.RE.	2
Y/B-5 EXT.BALLRE.	3
BR/R.LANE TARGET R/B RE.	4
B/BLU-3 10.000PT.RE	5
GRY/BR-3 " "	6
W/G-6 " "	7
BLUⓐ LIFE FEED	8
-	9
-	10

JACK LAYOUT

GAME HOT-TIP

POSITION PAN.-INSERT SIZE 22

FEED	B@	BLU/R-1	BALL COUNT UNIT STEP UP
"	R@	R/Y-1	"
COIN UNIT RESET	G/W	R/G-1	"
"	R/BR	R/W	"
"	W/BLU	G/Y	PLAYER UNIT RESET
"	W/O	Y/BR	PLAYER UNIT STEP UP
COIN LOCKOUT	B/R-4	GRY	CREDIT UNIT STEP UP
KNOCKER	B/W	GRY/BR	"
NO.2 RESET RE.	B/O	BR/O	"
NO.3 RESET RE.	B/BLU	BR/Y-6	"
RESET RE.	BLU/BR-1	BLU/Y-3	PLAYER LITES

JACK LAYOUT

GAME HOT-TIP

POSITION PAN.-INSERT SIZE 20

CREDIT UNIT STEP UP	B/W-1	Y@ FEED
"	"	O/R-5 S.CHIME
"	R/BR-2	O-2 M. "
"	BLU-2	B/G-3 L. "
GAME OVER RE. TRIP	BLU/R-4	W/BR-4 BALL IND. RE.
"	BLU/Y-5	BR/G-4 " "
"	BLU/BR-4	GRY/Y-4 EXTRA BALL RE.
DRUM UNITS FEED	W/O-5	BLU/B-2 TILT LITE
GAME OVER LITE	GRY/O-1	BR@ LITES-FEED
		—

JACK LAYOUT

GAME HOT-TIP

POSITION PLAF. - INSERT SIZE 12.

JACK LAYOUT

GAME HOT-TIP

POSITION PAN. - INSERT SIZE 10

NO.1 RE.	GRY/O-2
NO.2 RE.	BR/R-3
EXTRA BALL RE.	Y/B-5
TOP EJECT UNIT	O/B-2
SHOOT AGAIN LITES	W/G-4
CREDIT LITE	GRY/Y-3

1	R/O 10.00PT.RE.
2	BR/Y 1.00PT.RE.
3	W/R 100PT.RE.
4	G/B 10PT.RE.
5	R/W-3 100PT.RE.
6	GRY/BR CREDIT UNIT STEP UP

BALL COUNT LITES	W/B-5
" "	B/Y-6
" "	GRY/Y-1
" "	GRY/G-2
" "	GRY/BR-2

1	GRY/W-3	LITES
2	Y/G-1	2 " "
3	O/W	3 " "
4	O/R-3	4 " "
5	—	

"HOT TIP" COIL CHART

NOTICE:

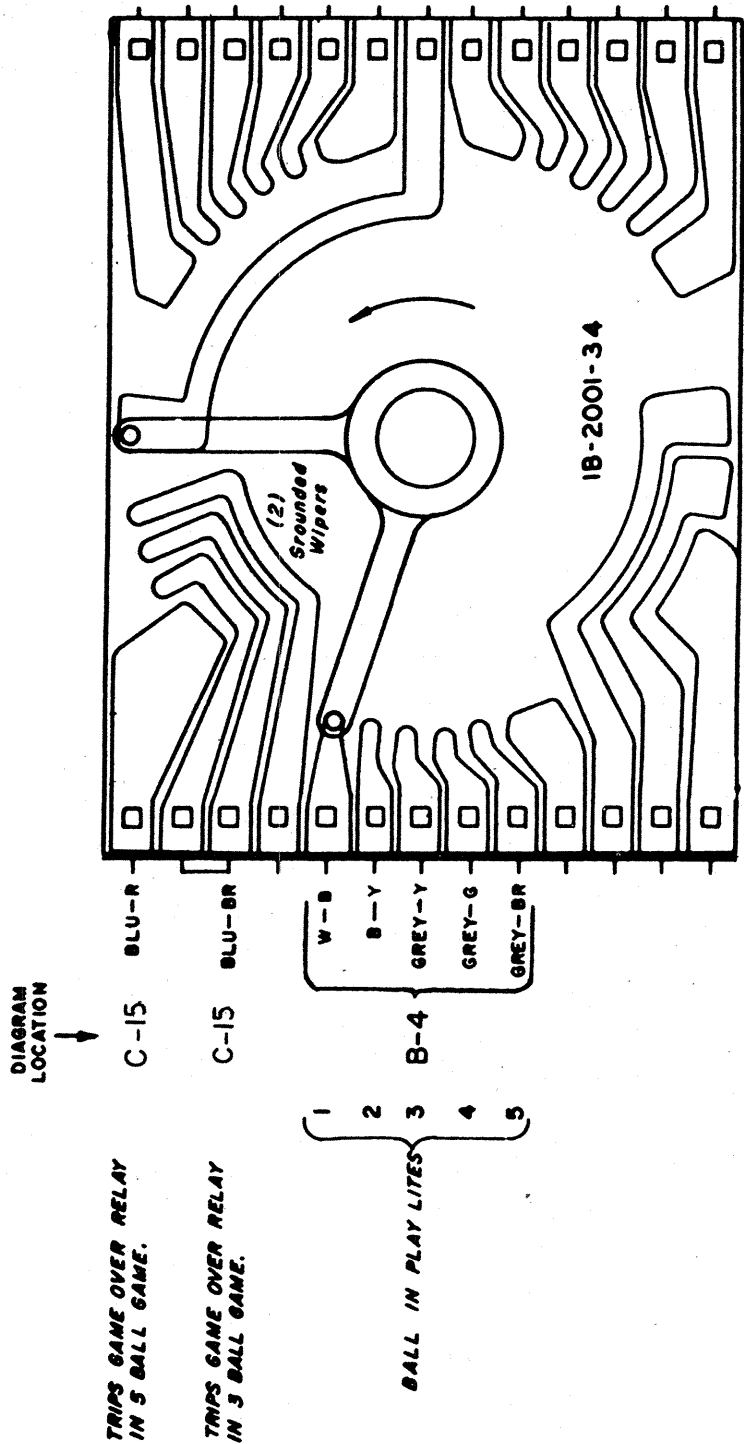
THIS GAME OPERATES ON 24 VOLTS. WHEN ORDERING REPLACEMENT TRANSFORMERS, MOTORS, COILS OR METERS ... MAKE SURE TO SPECIFY CORRECT PART NUMBERS.

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>LOCATION</u>
<u>MOTORS & TRANSFORMERS</u>		
14 A-7883	CONTROL MOTOR - 60 CYCLE	MECH. PANEL
14 A-7884	CONTROL MOTOR - 50 CYCLE	MECH. PANEL
15 A-6771	TRANSFORMER - 60 CYCLE	MECH. PANEL
15 A-6782-1	TRANSFORMER - 50 CYCLE	MECH. PANEL
5 A-8867	24 VOLT METER	MECH. PANEL
<u>SOLENOID COILS</u>		
A 22-500	PLAYER UP UNIT STEP UP	INSERT
A 22-550	COIN UNIT STEP UP BALL RELEASE COIL BONUS UNIT STEP UP	MECH. PANEL PLAYFIELD PLAYFIELD
A7 22-550	DROP "HOT & TIP" TARGET RESET ... (2 req'd.)	PLAYFIELD
A 23-600	CREDIT UNIT STEP UP BALL COUNT UNIT STEP UP	INSERT MECH. PANEL
A 2-23-750	KNOCKER	CABINET
A 2-26-1300	TRIPLE CHIME COILS ... (3 req'd.)	CABINET
B 1-26-800	SCORE DRUM UNITS ... (20 req'd.) CREDIT UNIT RESET PLAYER UP UNIT RESET BALL COUNT UNIT RESET BONUS UNIT RESET COIN UNIT RESET	INSERT INSERT INSERT MECH. PANEL PLAYFIELD MECH. PANEL
FL 20-300/ 28-400	FLIPPERS ... (2 req'd.)	PLAYFIELD
G 23-750	EJECT COILS ... (2 req'd.)	PLAYFIELD
G 23-750 D.C.	D.C. JET BUMPER COIL D.C. KICKER COILS ... (2 req'd.)	PLAYFIELD PLAYFIELD
M 28-700	GAME OVER RELAY TRIP	MECH. PANEL
M 29-900	NO. 3 SCORE RESET RELAY	INSERT
M 29-1000	NO. 1 SCORE RESET RELAY NO. 2 SCORE RESET RELAY	INSERT INSERT
M 29-1100	10¢ RELAY 25¢ RELAY 10 POINT RELAY 100 POINT RELAY 1,000 POINT RELAY 10,000 POINT RELAY ADVANCE BONUS RELAY BONUS RELAY TOP EJECT RELAY LEFT SIDE EJECT RELAY RIGHT LANE TARGET RELAY "HOT-TIP" TARGET RESET RELAY 5,000 POINT RELAY	MECH. PANEL MECH. PANEL INSERT INSERT INSERT INSERT INSERT PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
M 30-1300	COIN SET UP RELAY	MECH. PANEL
M 30-1400	CHANGE RELAY	PLAYFIELD
MX 31-1500	COIN LOCKOUT COIL	FRONT DOOR
XS 28-1000	ALTERNATOR UNIT NUMBER MATCH UNIT TOP EJECT UNIT	MECH. PANEL INSERT PLAYFIELD
Z 27-1000	COIN RELAY RESET RELAY PLAYER RESET RELAY OUTHOLE RELAY GAME OVER LATCH RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1150	BALL INDEX RELAY TILT RELAY EXTRA BALL RELAY DOUBLE BONUS RELAY NO. 1 RELAY NO. 2 RELAY NO. 3 RELAY	MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
Z 28-1200	CAPTIVE BALL RELAY	PLAYFIELD
Z 29-1250	LOCK RELAY	MECH. PANEL

BALL COUNT UNIT DISC

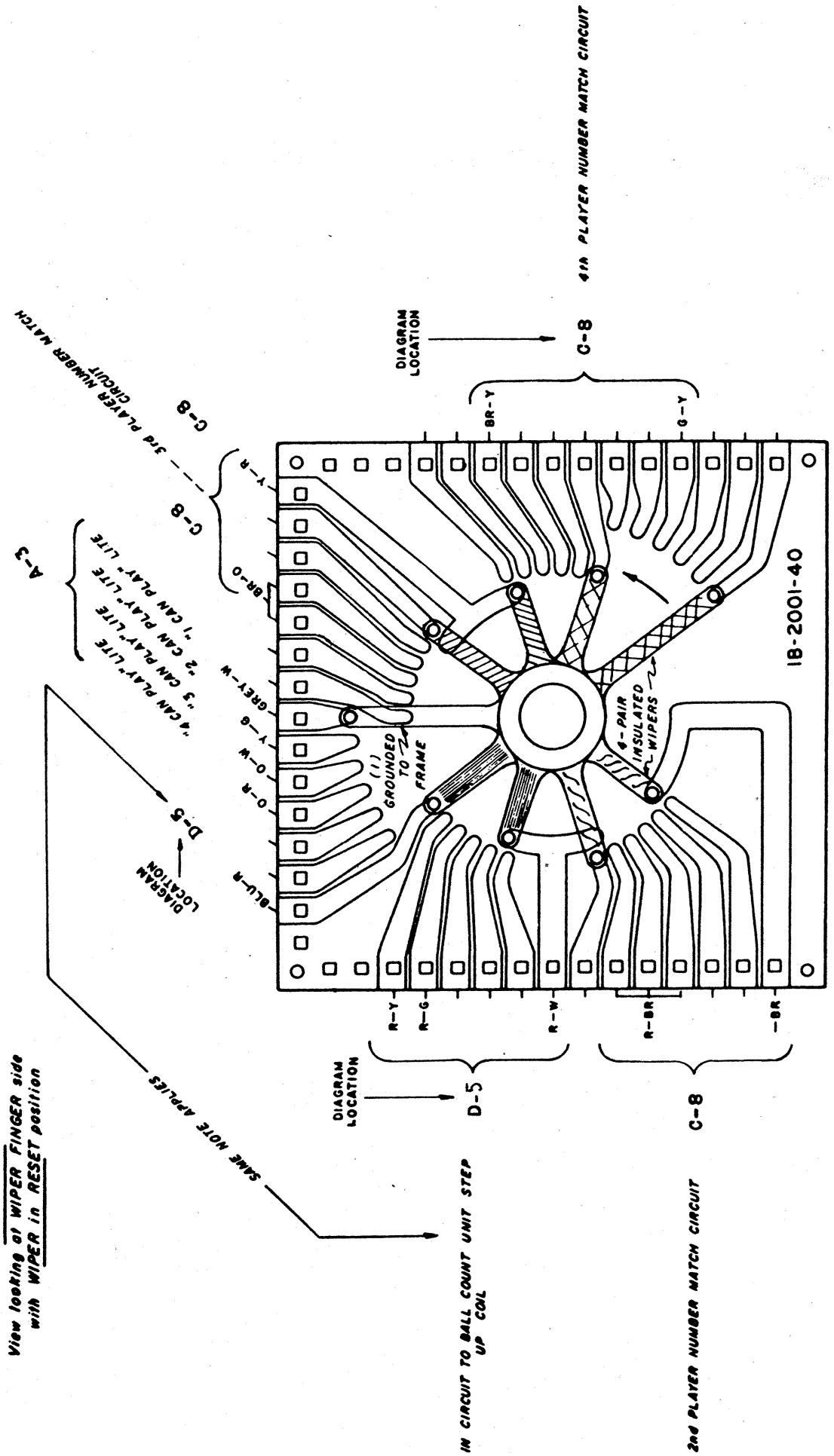
THIS UNIT RESETS AT THE START OF A NEW GAME, (DURING RESET CYCLE). IT ADVANCES ONE STEP EACH TIME THE LAST PLAYER COMPLETES HIS TURN.

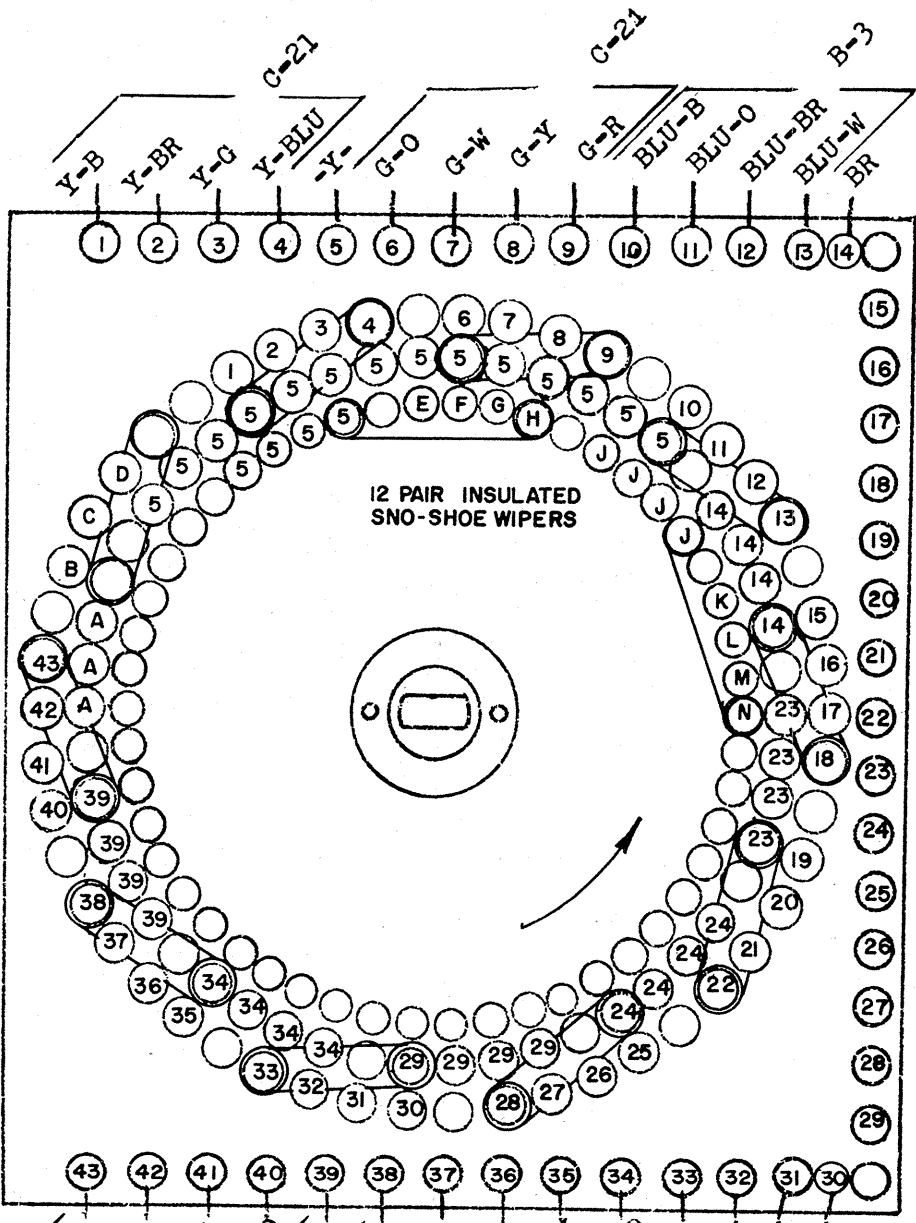
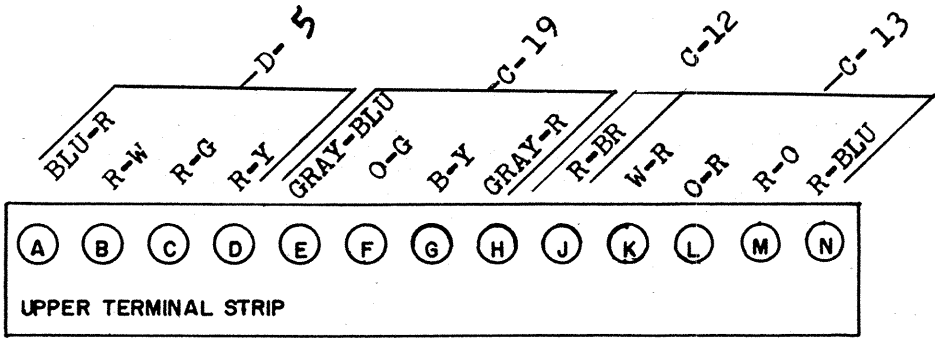
View looking at WIPER FINGER side with WIPER in ZERO position.



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.





- 15 O-R
- 16 BR-B
- 17 BR-W
- 18 BLU-Y
- 19 W-G
- 20 W-BLU
- 21 B-G
- 22 GREY-B
- 23 -W-
- 24 R-G
- 25 GREY-O
- 26 GREY-BR
- 27 GREY-W
- 28 GREY-G
- 29 BR-O

PLAYER

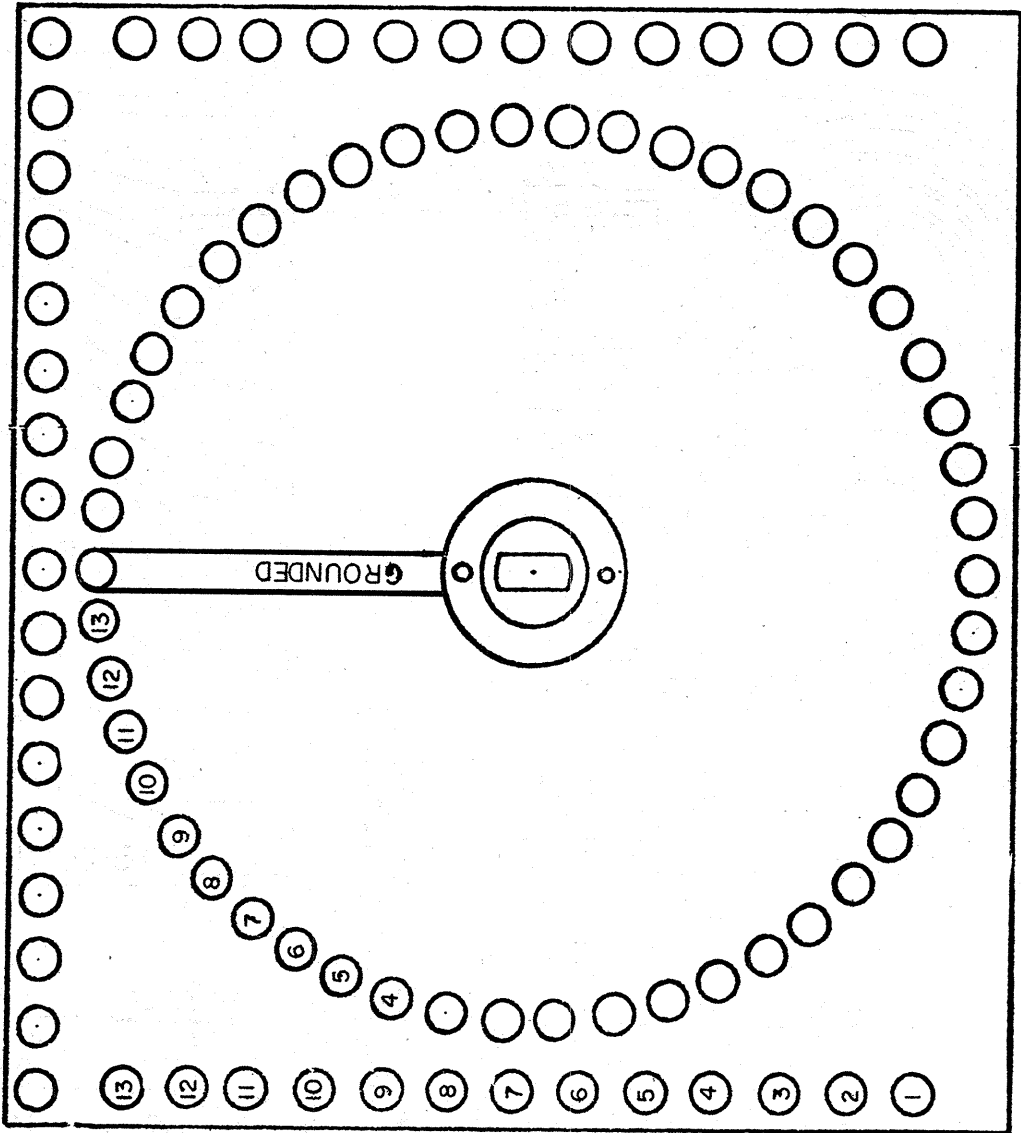
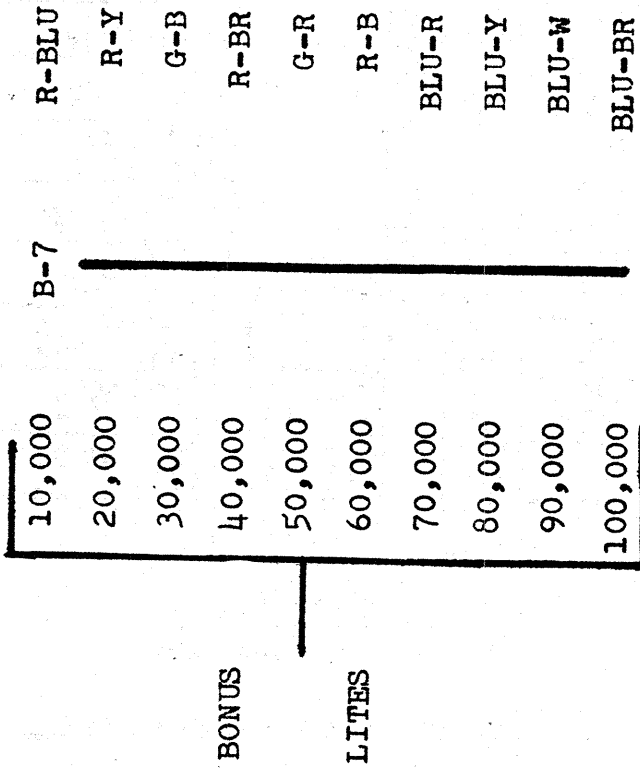
UNIT DISC

PLAYER UNIT DISC

LUG		LUG	
1	IN CIRCUIT TO 100 POINT RELAY THRU 9TH POS. SWS. ON CORRESPOND- ING 10-PT. DRUM UNITS.	30	TO 10 POINT DRUM UNIT COILS.
2		31	
3		32	
4		33	
5	FEED TO 6 V. A 24 V.	34	IN CIRCUIT TO CREDIT S.U. THRU SW. ON 1000 POINT RELAY.
6	IN CIRCUIT TO 1000 PT. RELAY, THRU 9TH POS. SWS. ON 100 POINT DRUM UNITS.	35	TO 100,000 POINT DRUM UNIT DISCS IN HIGH SCORE CIRCUIT.
7		36	
8		37	
9		38	
10	"PLAYER UP LITES"	39	24 V. FEED FROM TILT RELAY.
11		40	TO 10,000 PT. DRUM UNIT DISCS IN HIGH SCORE CIRCUIT.
12		41	
13		42	
14	43		
15	TO 10,000 POINT DRUM UNIT COILS.	A	IN CIRCUIT TO BALL COUNT S.U. COIL AFTER LAST PLAYER COM- PLETES HIS TURN.
16		B	
17		C	
18		D	
19	TO 1000 POINT DRUM UNIT COILS.	E	IN CIRCUIT TO 10,000 POINT RE- LAY, THRU 9TH POSITION SWITCHES ON 1,000 POINT DRUM UNITS.
20		F	
21		G	
22		H	
23	TO SWITCH ON 1000 POINT RELAY.	J	TO SWITCH ON 10,000 POINT RELAY.
24	TO SWITCH ON 100 POINT RELAY.	K	IN CIRCUIT TO 100,000 POINT DRUM UNIT COILS, THRU 9TH POSI- TION SWITCHES ON 10,000 POINT DRUM UNITS.
25	TO 100 POINT DRUM UNIT COILS.	L	
26		M	
27		N	
28			
29	TO SWITCH ON 10 POINT RELAY.		

BONUS UNIT

THIS UNIT STEPS UP EACH TIME THE ADVANCE RELAY, LEFT SIDE EJECT RELAY, TOP EJECT RELAY IS PULSED. THE RESET COIL IS ENERGIZED BY BONUS RELAY, THRU DOUBLE BONUS RELAY AND SCORE MOTOR SWITCHES.



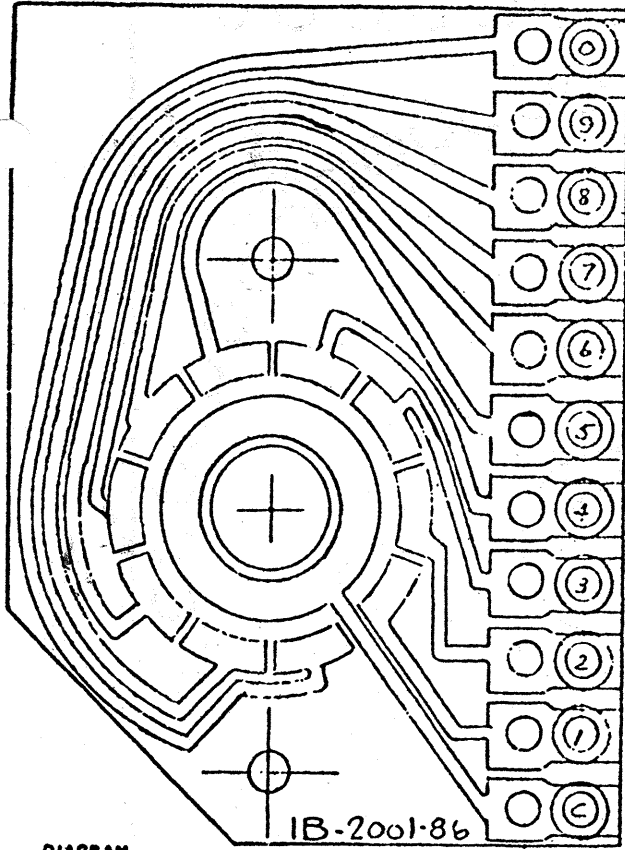
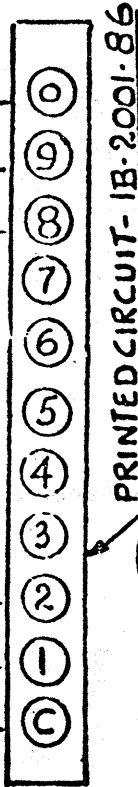


DIAGRAM LOCATION

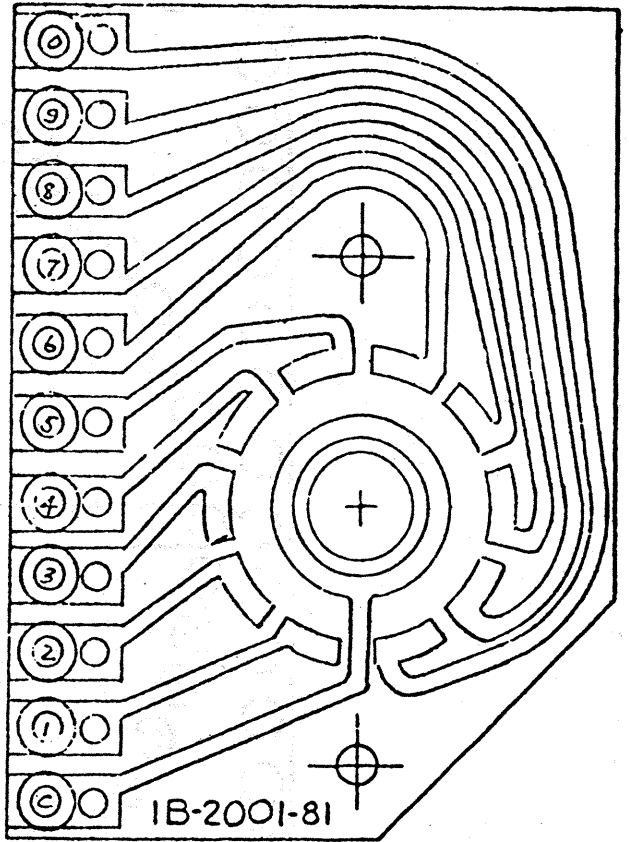


B-5

00 LITE	W/G
60 "	BR/W
10 "	BR/G
70 "	BR/Y
30 "	BR/BLU
80 "	BR/R
20 "	W/GRY
50 "	W/B
90 "	W/O
40 "	W/BR
FEED	-Y-



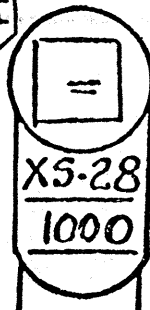
No. MATCH UNIT



PRINTED CIRCUIT- IB-2001-81

0	Y/BLU	00-MATCH
9	G/Y	60 "
8	Y/G	10 "
7	G/W	70 "
6	Y/R	30 "
5	G/O	80 "
4	Y/BR	20 "
3	G/R	50 "
2	W/BLU	90 "
1	Y/B	40 "
C	GRY/R	FEED

E-8

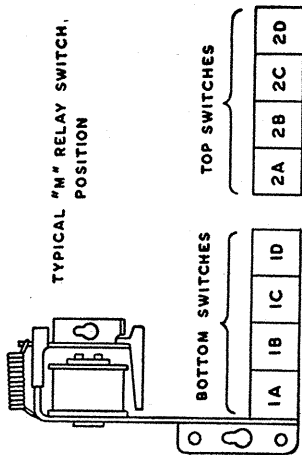


-R- R-O

DRIVE SPRING 10A-324-1

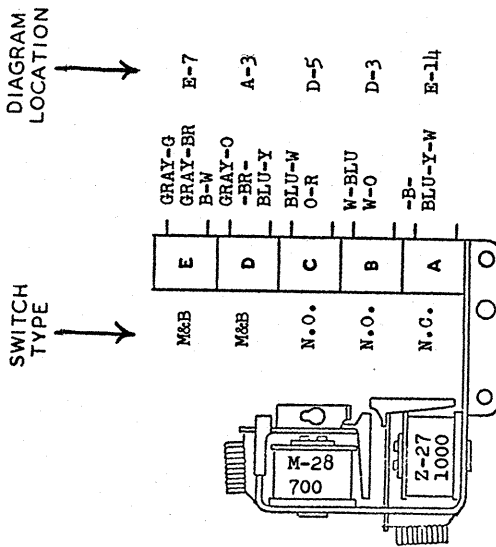
RELAYS & SWITCHES

(ON MECHANISM PANEL)



GAME - OVER

LATCH COIL IS ENERGIZED BY SCORE MOTOR CAM SWITCH 1A, THRU SWITCHES ON COIN RE-TRIP COIL IS ENERGIZED BY COIN RELAY, THRU A ZERO SWITCH ON PLAYER UNIT OR BALL COUNT UNIT---ALSO BY LOCK RELAY OR WIPER FINGER ON BALL COUNT UNIT DISC.



OPENS IN HI-SCORE CIRCUITS AND CLOSSES IN NUMBER MATCH CIRCUITS TO "CREDIT EXTRA BALL" ADJUSTMENTS.

OPENS TO "PLAYER UP" AND "BALL IN PLAY" LITES, & CLOSSES TO NO. MATCH AND GAME OVER LITES.

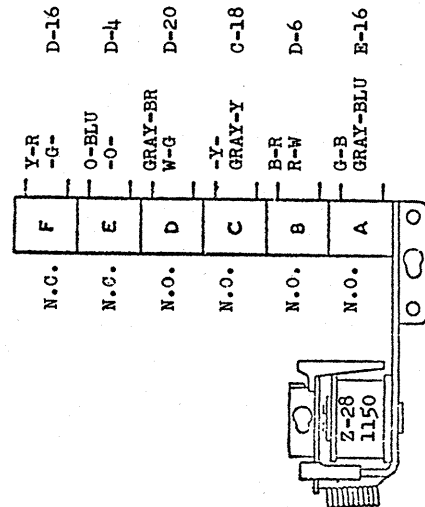
IN CIRCUIT TO RESET RELAY, THRU SWITCH ON COIN RELAY.

IN CIRCUITS TO CREDIT UNIT RESET COIL.

OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

BALL INDEX

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



IN SERIES WITH SPINNER SWITCH AND TILT RELAY.

IN SERIES WITH SWITCH "A" ON COIN SET-UP RELAY.

IN SERIES WITH DOUBLE BONUS RELAY.

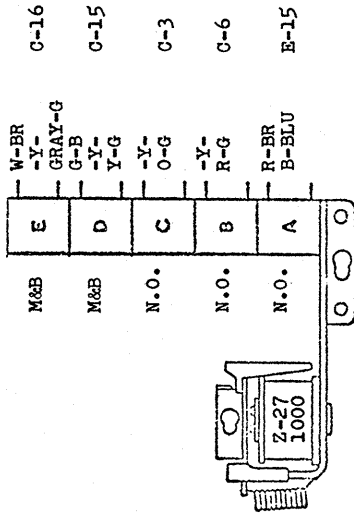
IN HOLD CIRCUIT TO EXTRA BALL RELAY.

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

IN HOLD CIRCUIT TO THIS RELAY.

OUTHOLE

IS ENERGIZED BY OUTHOLE SWITCH, THRU BONUS UNIT ZERO SWITCH



C-16 OPENS IN CIRCUIT TO TILT RELAY AND CLOSES TO PULSE BALL RELEASE COIL AND BONUS S.U. COIL.

C-15 OPENS IN HOLD CIRCUIT TO NO. 1 RELAY AND CLOSES TO TARGET RESET COILS.

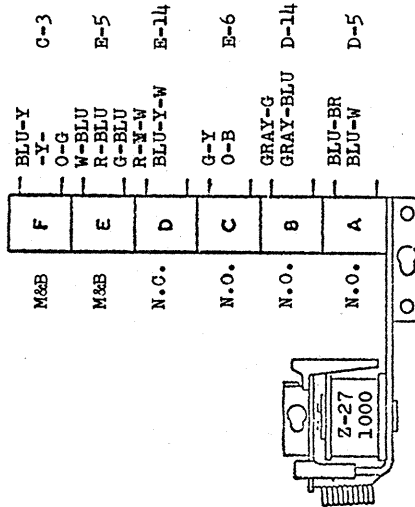
C-3 RUNS SCORE MOTOR.

O-6 IN SERIES WITH EXTRA BALL RELAY.

E-15 IN HOLD CIRCUIT TO THIS RELAY.

RESET

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



G-3 OPENS CIRCUIT TO CREDIT UNIT RESET COIL AND CLOSES TO RUN SCORE MOTOR.

E-5 OPENS IN CIRCUIT TO COIN UNIT S.U. COIL AND CLOSES TO RESET COILS ON COIN BALL COUNT AND GAME-OVER.

E-14 OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

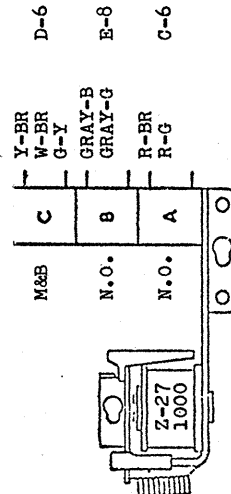
E-6 IN CIRCUIT TO PLAYER UNIT RESET COIL.

D-14 IN CIRCUIT TO BONUS RELAY.

D-5 IN HOLD CIRCUIT TO THIS RELAY.

PLAYER RESET

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



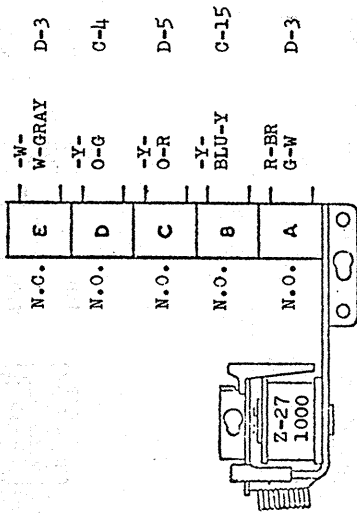
D-6 OPENS IN CIRCUIT TO PLAYER UNIT S.U. COIL AND CLOSES TO PLAYER UNIT RESET COIL.

E-8 IN NUMBER MATCH CIRCUIT TO CREDIT UNIT S.U. COIL.

C-6 HOLD CIRCUIT TO THIS RELAY, THRU SCORE MOTOR INDEX CAM SWITCH "B".

COIN

IS ENERGIZED BY COIN SWITCH OR CREDIT UNIT RESET COIL END-OF-STROKE SWITCH.



OPENS CIRCUIT TO COIN LOCKOUT COIL.

RUNS SCORE MOTOR.

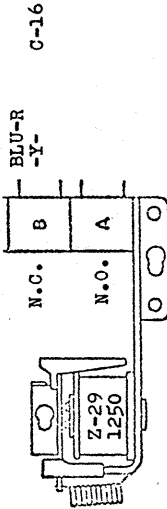
ENERGIZES RESET RELAY, THRU SWITCH ON GAME-OVER RELAY.

ENERGIZES GAME-OVER RELAY TRIP COIL, THRU BALL COUNT UNIT OR PLAYER UNIT ZERO SWITCHES.

IN HOLD CIRCUIT TO THIS RELAY.

LOCK

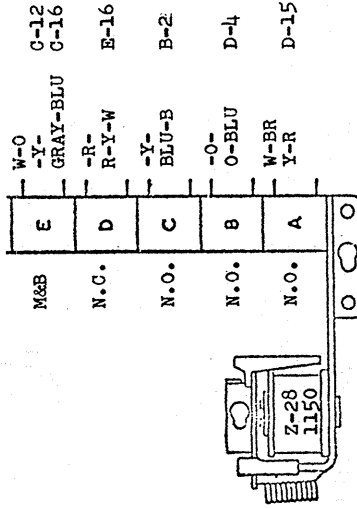
IS ENERGIZED WHEN POWER IS SUPPLIED TO TRANSFORMER.



ENERGIZES GAME-OVER RELAY TRIP COIL.

TILT

IS ENERGIZED BY PLUMB BOB TILT, BALL ROLLDOWN TILT OR PLAYFIELD VIBRATION TILT SWITCH.



OPENS IN HI-SCORE CIRCUITS AND ALL (20) SCORE DRUM COILS, AND CLOSSES TO ENERGIZE BALL INDEX RELAY.

OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

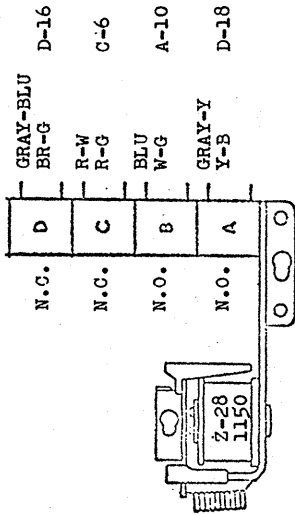
TO "TILT" LITE.

IN SERIES WITH SWITCH "A" ON COIN SET-UP RELAY.

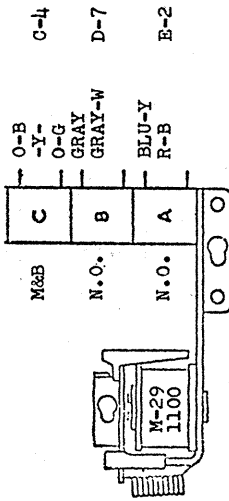
HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON OUTHOLE RELAY.

EXTRA BALL

IS ENERGIZED BY LEFT OR RIGHT BOTTOM ROLL-OVER. THRU CHANGE RELAY AND SET-UP RELAY
 ---ALSO, IF ADJUSTMENT JACK IS IN "EXTRA BALL" POSITION, BY HI-SCORES.



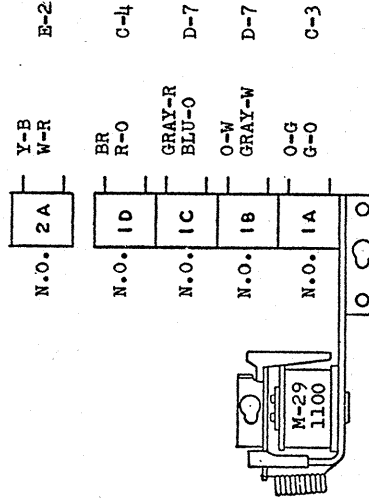
IN CIRCUIT TO BALL INDEX RELAY.
 IN SERIES WITH SWITCH "D" ON BALL INDEX RELAY.
 TO "SHOOT AGAIN" LITES.
 IN HOLD CIRCUIT TO THIS RELAY.



CLOSED, RUNS SCORE MOTOR, OPEN-HOLDS COIN SET UP RELAY.
 PULSES CREDIT UNIT S.U. COIL, THRU IMPULSE CAM SWITCH.
 IN HOLD CIRCUIT TO THIS RELAY.

10¢

IS ENERGIZED BY 10¢ COIN SWITCH, THRU 10¢ ADJUSTMENT JACK---ALSO BY 25¢ COIN SWITCH, THRU COIN SET-UP RELAY IF "2 COINS FOR 3 PLAYS" ADJUSTMENT IS IN "ON" POSITION.



IN HOLD CIRCUIT TO THIS RELAY.

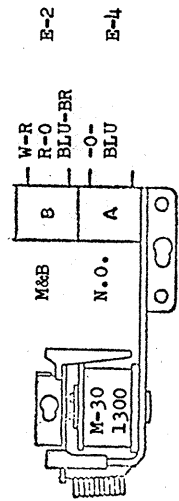
ENERGIZES COIN SET-UP RELAY, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.

PULSES CREDIT UNIT S.U. COIL OR COIN RELAY, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.
 PULSES CREDIT UNIT S.U. COIL, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT.

RUNS SCORE MOTOR, THRU 25¢ COIN SWITCH.

25¢

IS ENERGIZED BY 25¢ COIN SWITCH.



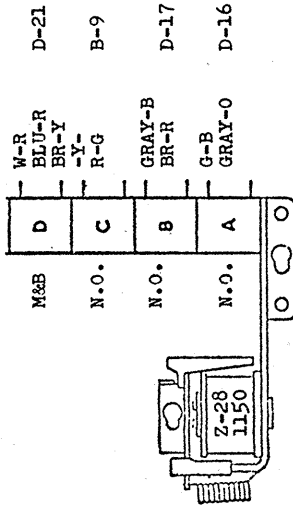
OPENS IN CIRCUIT TO 25¢ RELAY AND CLOSSES TO 10¢ RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

COIN SET UP

IS ENERGIZED BY 25¢ RELAY, ONLY IF "2 COINS FOR 3 PLAYS" ADJUSTMENT IS IN "ON" POSITION.

LOCATED ON PLAYFIELD



NO.1

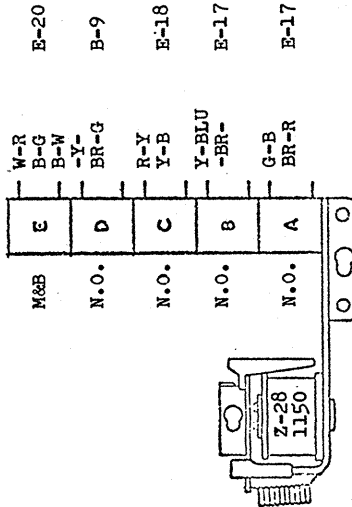
IS ENERGIZED BY "HOT TIP" TARGET RESET RELAY THRU MOTOR CAM SWITCH 4B.

OPENS TO 100 PT. RELAY, CLOSES IN SERIES WITH SWITCH "C" OF NO. 3 RELAY.

IN SERIES WITH NO. 1 LITE.

IN CIRCUIT TO ENERGIZE NO. 2 RELAY.

IN HOLD CIRCUIT FOR THIS RELAY.



NO.2

IS ENERGIZED BY MOTOR CAM SWITCH 3D THRU NO. 1 RELAY SWITCH.

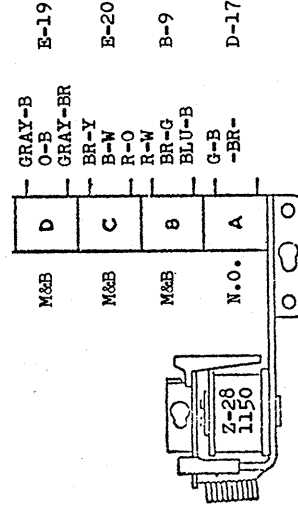
OPENS TO 100 PT. RELAY, CLOSES TO SWITCH "C" ON NO. 3 RELAY.

IN SERIES WITH NO. 1 LITE.

IN CIRCUIT TO ENERGIZE EXTRA BALL RELAY.

IN CIRCUIT TO ENERGIZE NO. 3 RELAY.

IN HOLD CIRCUIT FOR THIS RELAY.



NO.3

IS ENERGIZED BY "HOT TIP" TARGET RESET RELAY THRU MOTOR CAM SWITCH 2C AND NO. 2 RELAY SWITCH.

OPEN ENERGIZE ADVANCE BONUS RELAY, CLOSE TO PLAY ADJUSTMENT JACK.

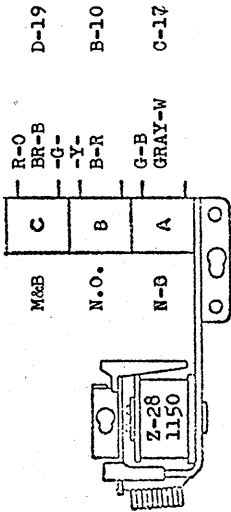
CLOSE ENERGIZE 10,000 PT. RELAY, OPEN ENERGIZE 1,000 PT. RELAY.

OPEN FOR 1000 PT. LITE, CLOSE FOR NO. 3 LITE.

IN HOLD CIRCUIT TO THIS RELAY.

CAPTIVE BALL

IS ENERGIZED BY TOP EJECT UNIT THRU TOP EJECT RELAY SWITCH.



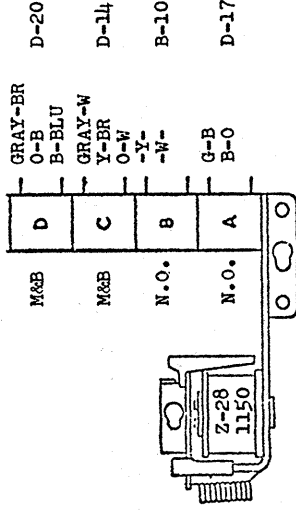
D-19 OPEN TO TOP EJECT UNIT, CLOSE TO ENERGIZE R. LANE TARGET RELAY.

B-10 IN SERIES WITH CAPTIVE BALL LITE.

C-17 IN HOLD CIRCUIT TO THIS RELAY.

DOUBLE BONUS

IS ENERGIZED BY TOP EJECT RELAY THRU TOP EJECT UNIT.



D-20 OPEN IN SERIES WITH BALL INDEX RELAY, CLOSE IN SERIES WITH BONUS RELAY.

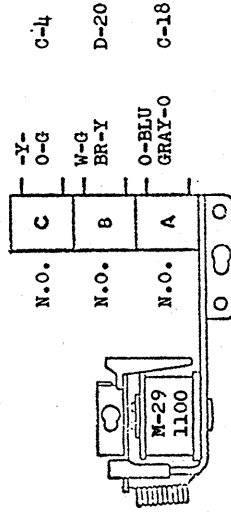
D-14 OPENS TO 25¢ & 10¢ RELAY, CLOSURES IN SERIES TO 3-C & 5-B SWITCHES.

B-10 IN SERIES WITH DOUBLE BONUS LITE.

D-17 IN HOLD CIRCUIT TO THIS RELAY.

5000

IS ENERGIZED BY LEFT AND RIGHT BOTTOM INSIDE ROLL OVER SWITCHES.



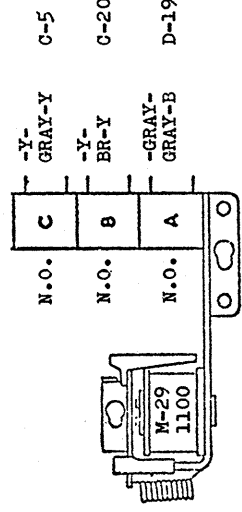
C-4 RUNS SCORE MOTOR.

D-20 IN SERIES WITH RIGHT LANE TARGET SWITCH.

C-18 IN HOLD CIRCUIT TO THIS RELAY.

ADVANCE BONUS

IS ENERGIZED BY RIGHT TOP TARGET SWITCH, CAPTIVE BALL ROLLOVER SWITCH, LEFT AND RIGHT BOTTOM OUTSIDE ROLLOVER SWITCHES.



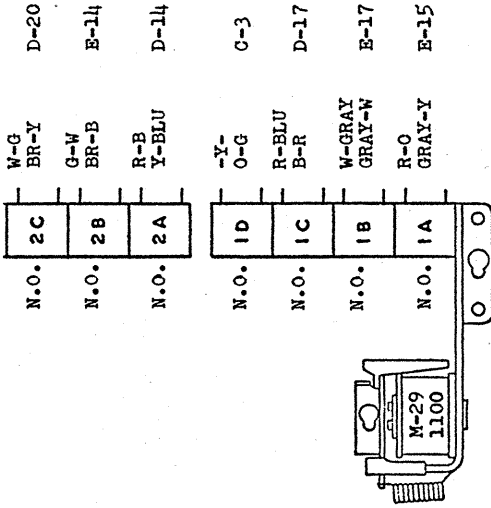
C-5 IN CIRCUIT TO ENERGIZE BONUS UNIT STEP UP.

C-20 IN CIRCUIT TO ENERGIZE 1000 PT. RELAY.

D-19 IN HOLD CIRCUIT FOR THIS RELAY.

TOP EJECT

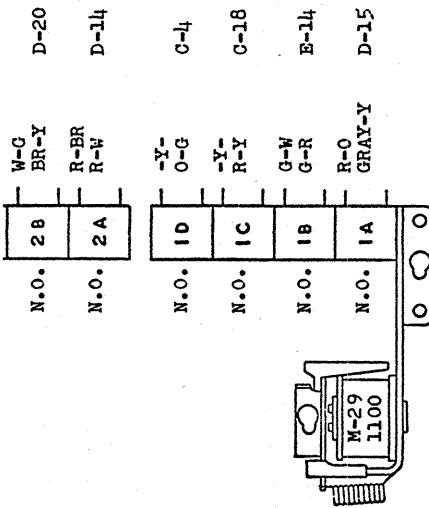
IS ENERGIZED BY TOP EJECT SWITCH.



IN CIRCUIT TO ENERGIZE 1000 PT. RELAY.
 IN SERIES WITH THE COIN RELAY.
 IN HOLD CIRCUIT FOR THIS RELAY.
 RUNS SCORE MOTOR
 GOES TO TOP EJECT UNIT.
 IN CIRCUIT TO ENERGIZE CAPTIVE BALL RELAY.
 IN CIRCUIT TO ADVANCE BONUS STEP UP.

LEFT SIDE EJECT

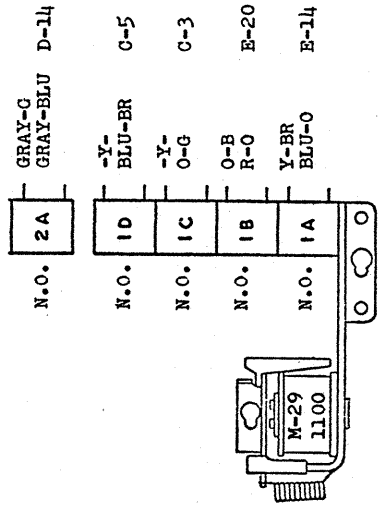
IS ENERGIZED BY LEFT SIDE EJECT SWITCH.



IN CIRCUIT TO ENERGIZE 1000 PT. RELAY.
 IN HOLD CIRCUIT TO THIS RELAY.
 RUNS SCORE MOTOR.
 IN SERIES WITH NO. 2 RELAY SWITCH "C".
 IN CIRCUIT TO ENERGIZE LEFT SIDE EJECT COIL.
 IN CIRCUIT TO ENERGIZE BONUS UNIT STEP UP COIL.

BONUS

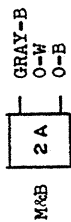
IS ENERGIZED BY BONUS UNIT SWITCH.



IN HOLD CIRCUIT FOR THIS RELAY.
 IN SERIES WITH RESET RELAY.
 RUNS SCORE MOTOR.
 IN CIRCUIT TO ENERGIZE 10,000 PT. RELAY.
 IN CIRCUIT TO ENERGIZE BONUS UNIT RESET.

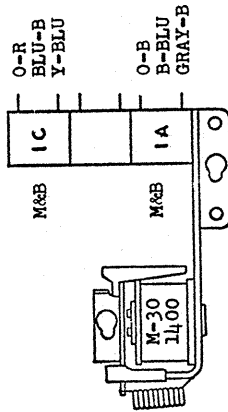
CHANGE

IS ENERGIZED BY TOP EJECT UNIT ALTERNATOR SWITCH.



D-19

OPENS FOR LEFT BOTTOM (OUTSIDE) ROLL SWITCH, CLOSES FOR NO. 3 RELAY.

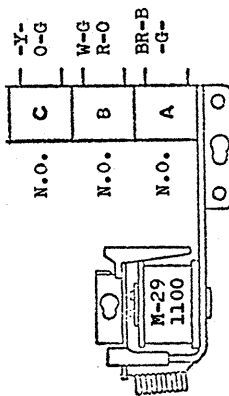


B-10

OPENS FOR RIGHT BOTTOM (OUTSIDE) ROLL OVER LITE, CLOSES FOR LEFT BOTTOM (OUTSIDE) ROLL OVER LITE.

D-19

CLOSES FOR RIGHT BOTTOM (OUTSIDE) ROLL OVER SWITCH, OPENS FOR NO. 3 RELAY.



C-4

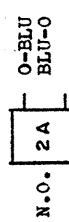
RUNS SCORE MOTOR

D-20

IN SERIES WITH TOP EJECT UNIT.

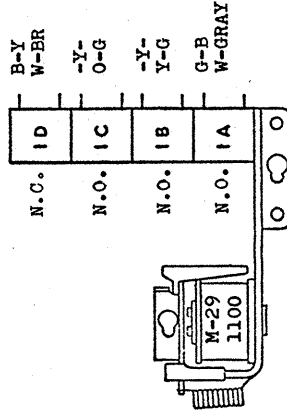
D-19

IN HOLD CIRCUIT FOR THIS RELAY.



D-18

IN HOLD CIRCUIT FOR THIS RELAY.



C-20

IN SERIES WITH DROP TARGET SWITCHES.

C-4

RUNS SCORE MOTOR.

C-15

IN CIRCUIT FOR OUTHOLE RELAY.

D-16

IN SERIES WITH BALL INDEX RELAY.

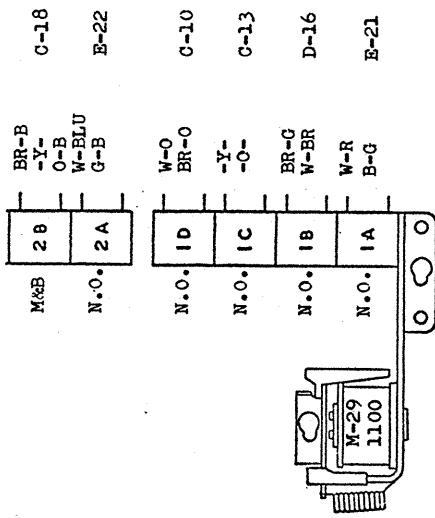
RIGHT LANE TARGET

IS ENERGIZED BY RIGHT LANE TARGET SWITCH THRU CAPTIVE BALL RELAY SWITCH.

HOT TIP TARGET RESET

IS ENERGIZED BY ALL LEFT AND RIGHT SIDE DROP TARGET SWITCHES.

LOCATED IN BACK-BOX

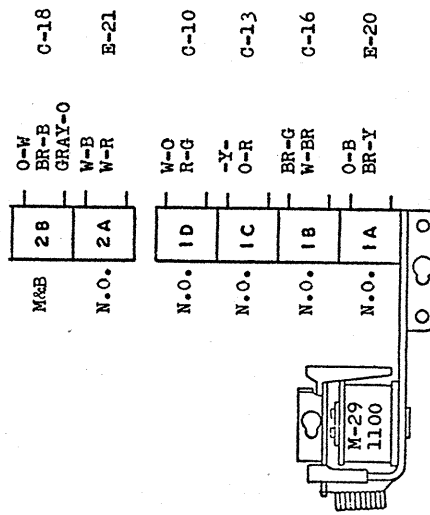


10 POINT

IS ENERGIZED BY THE (5) STAND UP AND (2) KICKER SWITCHES.

BR-B
-Y-
O-B
W-BLU
G-B
C-18
E-22
W-O
BR-O
-Y-
-O-
C-10
C-13
BR-G
W-BR
D-16
W-R
B-G
E-21

OPENS TO 100 PT. RELAY, CLOSSES TO TOP EJECT UNIT.
IN HOLD CIRCUIT FOR THIS RELAY.
IN SERIES TO PLAYER UNIT.
IN CIRCUIT FOR MEDIUM CHIME.
IN SERIES WITH EXTRA BALL R RELAY.
IN SERIES WITH 100 PT. RELAY.



100 POINT

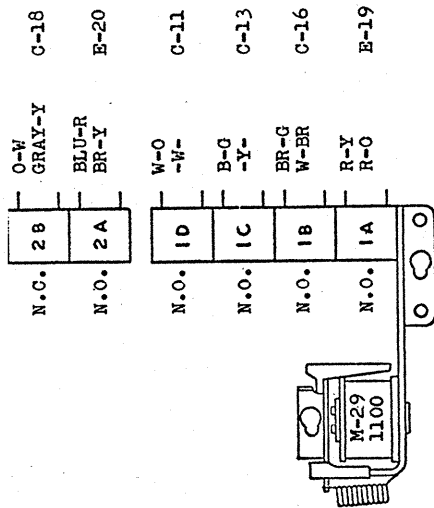
IS ENERGIZED BY (6) DROP TARGET SWITCHES, AND SPINNER SWITCH.

O-W
BR-B
GRAY-O
W-B
W-R
C-18
E-21
W-O
R-G
-Y-
O-R
C-10
C-13
BR-G
W-BR
C-16
O-B
BR-Y
E-20

OPENS TO 1000 PT. RELAY, CLOSSES TO NUMBER MATCH UNIT COIL.
IN HOLD CIRCUIT FOR THIS RELAY.
IN CIRCUIT TO PLAYER UNIT.
IN CIRCUIT TO ENERGIZE SMALL CHIME COIL.
IN SERIES WITH EXTRA BALL RELAY.
IN SERIES WITH 9TH POSITION SWITCHES.

1000 POINT

IS ENERGIZED BY 5,000 PT. RELAY, TOP EJECT RELAY, LEFT SIDE EJECT RELAY, ADVANCE BONUS RELAY SWITCHES AND JET BUMPER SWITCH.



IN SERIES WITH EXTRA BALL RELAY.

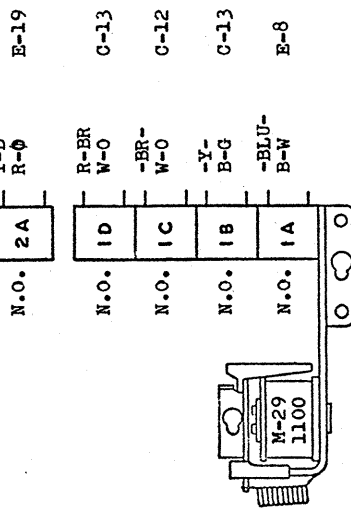
IN HOLD CIRCUIT FOR THIS RELAY.

IN SERIES WITH PLAYER UNIT.

IN CIRCUIT TO ENERGIZE LARGE CHIME

IN SERIES WITH EXTRA BALL RELAY.

IN SERIES WITH 9TH POSITION SWITCHES.



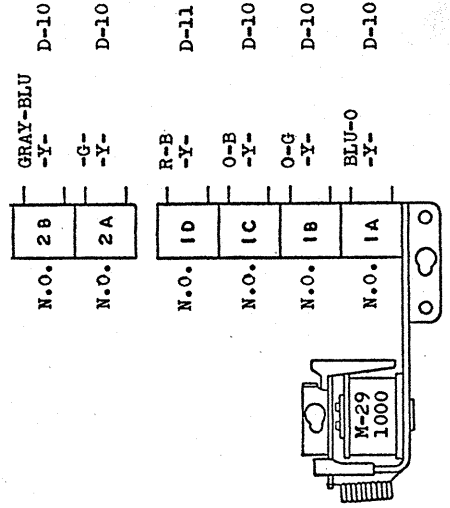
IN HOLD CIRCUIT FOR THIS RELAY.

IN SERIES WITH PLAYER UNIT.

IN SERIES WITH PLAYER UNIT AND TILT RELAY SWITCH "E".

IN CIRCUIT TO ENERGIZE LARGE CHIME.

IN SERIES WITH PLAYER UNIT AND GAME OVER RELAY SWITCH "E".



2ND PLAYER 10 PT. DRUM UNIT.

1ST PLAYER 10 PT. DRUM UNIT.

2ND PLAYER 100 PT. DRUM UNIT.

PLAYER 100 PT. DRUM UNIT.

4TH PLAYER 10 PT. DRUM UNIT.

3RD PLAYER 10 PT. DRUM UNIT.

10,000 POINT

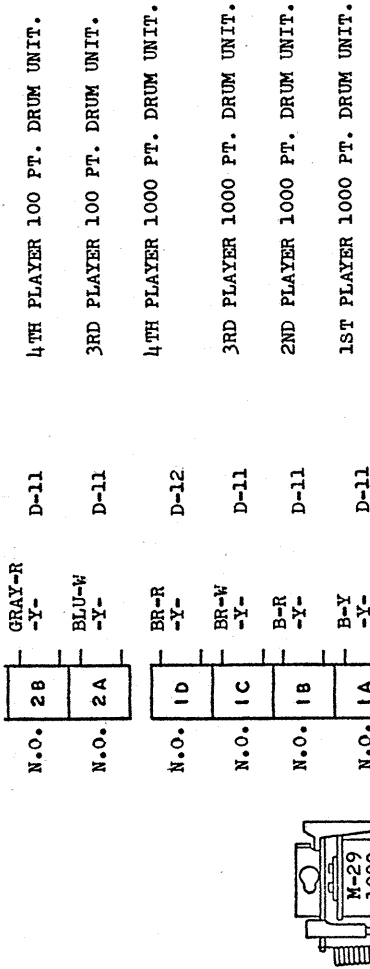
IS ENERGIZED BY RIGHT LANE TARGET SWITCH AND MOTOR CAM SWITCH THRU BALL INDEX RELAY AND BONUS RELAY SWITCHES.

NO. 1 RESET

IS PULSED BY "HOT TIP" TARGET RESET RELAY SWITCH THRU MOTOR CAM SWITCH 4B.

NO. 2 RESET

IS PULSED SAME AS NO. 1 RESET RELAY.



NO. 3 RESET

IS PULSED SAME AS NO. 2 RESET RELAY THRU NO. 2 RELAY SWITCH.

