

Instruction Manual for **BLUE CHIP**



Williams® ELECTRONICS

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THE SEEBURG CORPORATION OF DELAWARE

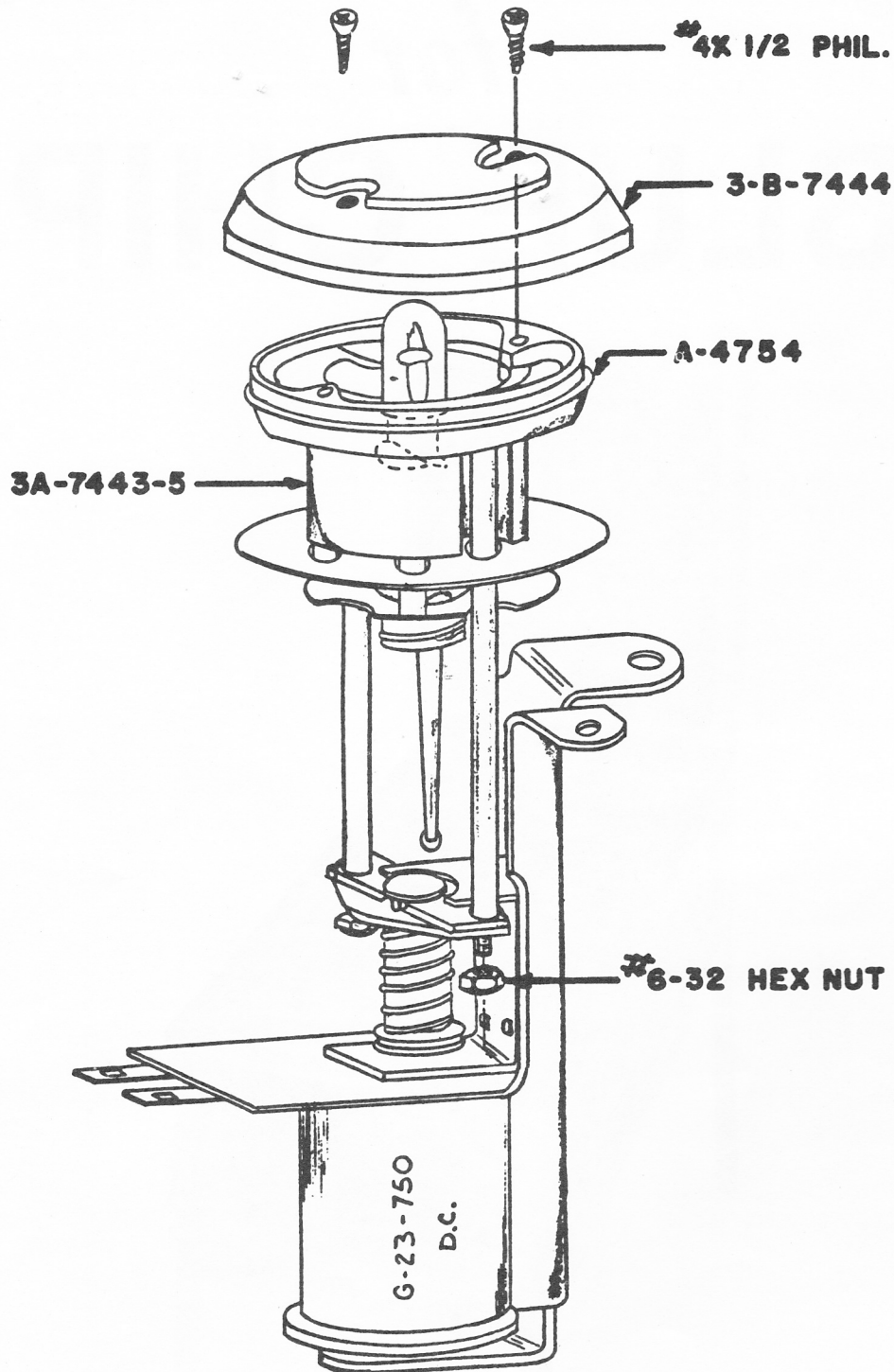
3401 N. California Ave.
(312) 267-2240

NOV.
1976

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

B-7894

**NEW STYLE JET BUMPER ASSEMBLY
(WITH MORE EASILY REMOVABLE RODS AND RING)**



TO EASILY REPLACE METAL RING ASS'Y

- 1. REMOVE (2) 4X 1/2 PHILLIPS SCREWS.**
- 2. REMOVE BUMPER CAP (3-B-7444).**
- 3. REMOVE (2) #6-32 HEX ELASTIC STOP NUTS.**
- 4. PULL METAL RING ASS'Y (A-4754) UP AND OUT.**
- 5. REPLACE METAL RING ASS'Y, NUTS, BUMPER CAP, AND SCREWS.**

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.

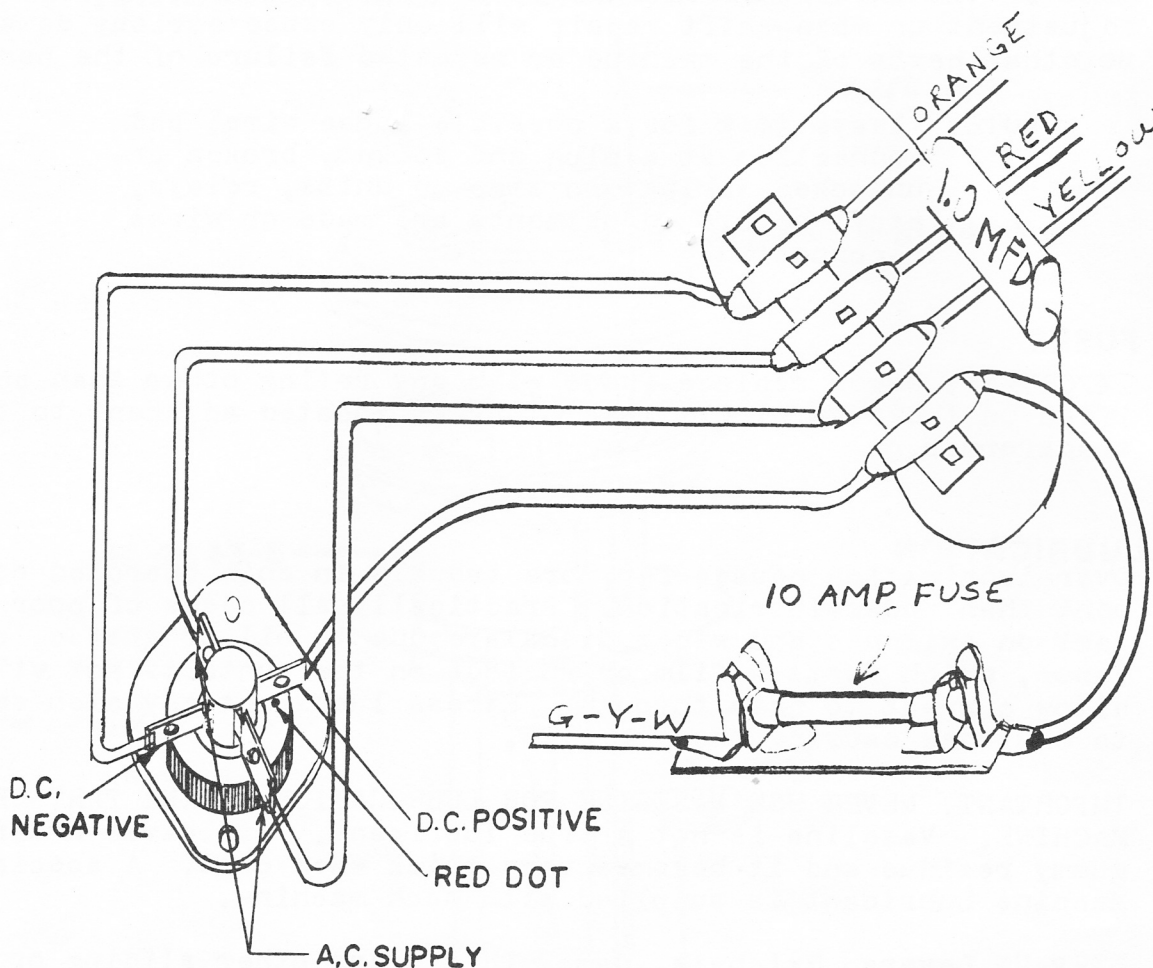
STEP-UP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with special Coin Machine Lubricant (supplied with machine) not oftener than every six months. The bakelite discs (biscuits) on the Motor Units and Step-up Units will require lubrication with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

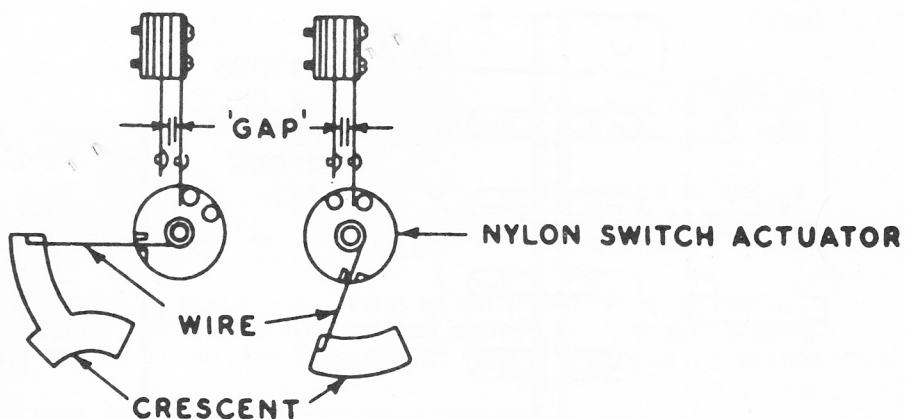
THE BRIDGE RECTIFIER SHOULD PRACTICALLY NEVER NEED REPLACING, AS IT IS RATED WELL OVER THE VOLTAGE AND CURRENT REQUIREMENTS OF THE COMPONENTS IT SUPPLIES.

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.

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:

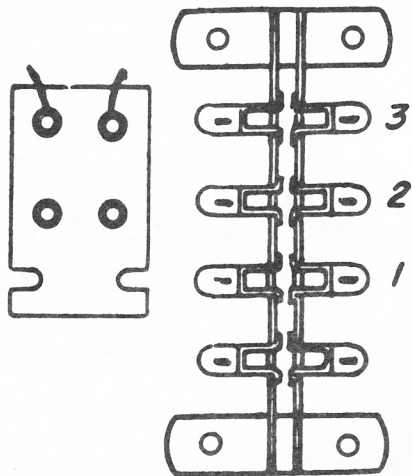
LOCATED ON MECHANISM PANEL, IT IS EQUIPPED WITH A SECONDARY TAP. IF YOUR GAME IS ON LOCATION WITH EXTREMELY LOW LINE VOLTAGE, REMOVE LEAD FROM LUG MARKED 24 VOLTS AND SOLDER TO ALTERNATE LUG MARKED "HIGH". THIS WILL BOOST SECONDARY VOLTAGE APPROXIMATELY 2-3 VOLTS.

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.

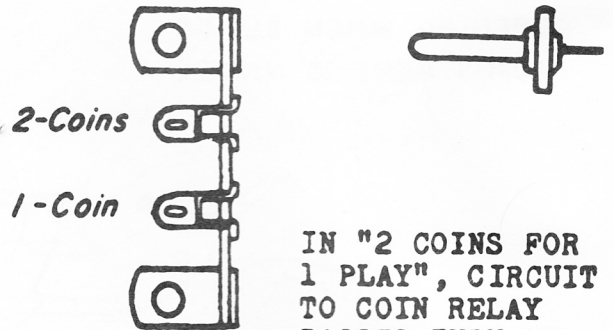
ADJUSTMENTS ON MECHANISM PANEL

10¢ Adjustment



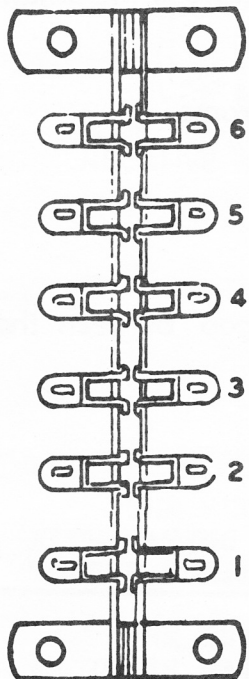
PROVIDES
1, 2 OR
3 PLAYS
FOR ONE
COIN.

5¢ Adjustment

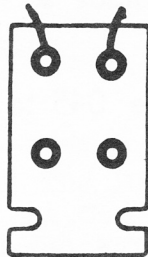


IN "2 COINS FOR
1 PLAY", CIRCUIT
TO COIN RELAY
PASSES THRU SW.
ON ALTERNATOR
UNIT.

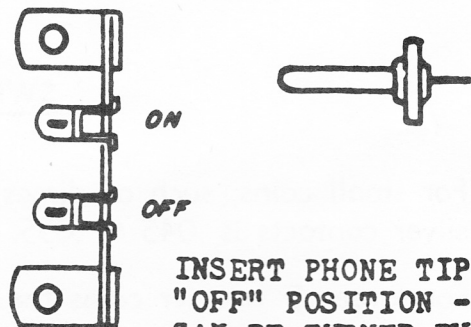
25¢ Adjustment



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

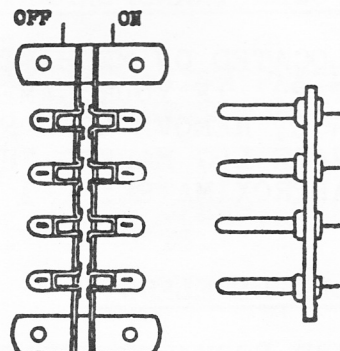


Motor Service Jack



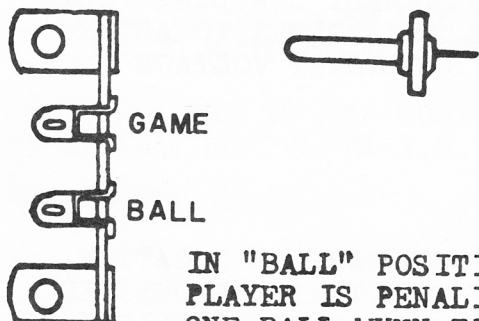
INSERT PHONE TIP IN
"OFF" POSITION - CAMS
CAN BE TURNED BY HAND
TO CHECK ADJUSTMENT OF
SWITCHES.

1 COIN - 1 PLAY
2 COINS - 3 PLAYS ADJ.



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

TILT ADJ.



IN "BALL" POSITION,
PLAYER IS PENALIZED
ONE BALL WHEN TILTING
THE GAME.

IN "GAME" POSITION, PLAYER
IS PENALIZED THE ENTIRE GAME.

ADJUSTMENTS IN BACKBOX

Hi-Score Adjustment

PLUG IN PURPLE
WIRES FOR SCORES
10,000 TO 100,000

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

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

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

10,000 60,000

20,000 70,000

30,000 80,000

40,000 90,000

50,000 00,000

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

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

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

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

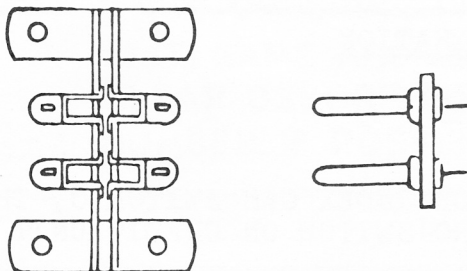
PLUG IN GRAY
WIRE FOR SCORES
910,000 TO 990,000

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

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

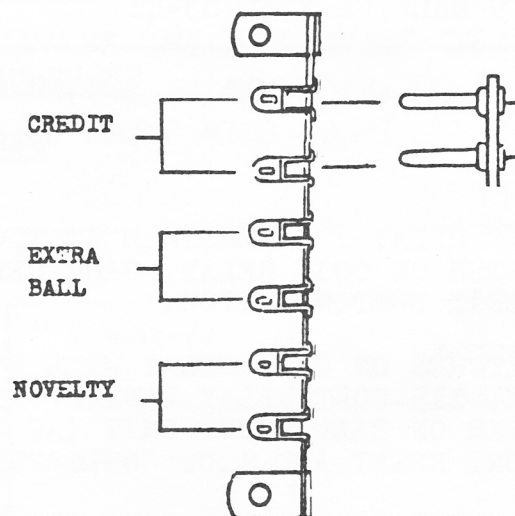
NUMBER MATCH ADJUSTMENT

ON OFF

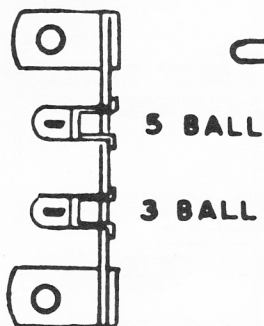


IN "ON" POSITION, A CREDIT IS SCORED IF LAST TWO DIGITS IN POINT SCORE ARE IDENTICAL TO NUMBER MATCH LIFE. IN "OFF" POSITION, NUMBER MATCH IS INOPERATIVE.

PLAY ADJUSTMENT



No. of Balls Adjustment



Plug changes 3 to 5 ball play,
or vice versa.

IN CREDIT POSITION: LEFT BOTTOM (OUTSIDE) ROLLOVER, RIGHT BOTTOM (OUTSIDE) ROLLOVER OR RIGHT EJECT POCKET, WHEN LIT FOR 'SPECIAL', WILL SCORE A CREDIT. ALSO, HI-SCORES AND NUMBER MATCHED SCORE A CREDIT.

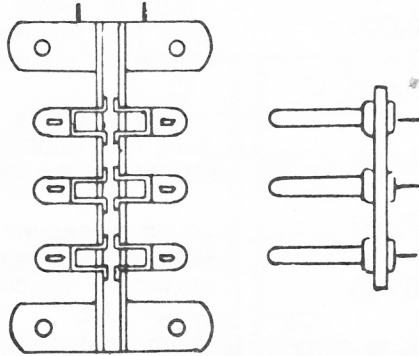
IN EXTRA BALL POSITION: ALL OF THE ABOVE WILL PULSE THE BALL COUNT UNIT S.U. COIL. NOTE: NUMBER MATCH ADJUSTMENT SHOULD BE IN "OFF" POSITION.

IN NOVELTY POSITION: LEFT BOTTOM (OUTSIDE) ROLLOVER, RIGHT BOTTOM (OUTSIDE) ROLLOVER OR RIGHT EJECT POCKET, WHEN LIT FOR 'SPECIAL', WILL PULSE THE 100,000 POINT DRUM UNIT.

LOCATED ON PLAYFIELD

"SPECIAL" ADJUSTMENT

CONS. LIBERAL



IN LIBERAL POSITION, NO.1 THRU NO.6 RELAYS ON RELAY BANK MUST BE TRIPPED TO ENERGIZE SPECIAL RELAY WHICH, IN TURN, LITES LEFT AND RIGHT BOTTOM (OUTSIDE) ROLLOVERS FOR "SPECIAL".

IN CONSERVATIVE POSITION, NO.1 THRU NO.8 RELAYS MUST BE TRIPPED TO ENERGIZE SPECIAL RELAY.

SUGGESTED SCORE CARDS

CREDIT PLAY

5 BALL PLAY...463-1

3 BALL PLAY...463-25

EXTRA BALL PLAY

5 BALL PLAY...463-41

3 BALL PLAY...463-37

SEQUENCE OF OPERATION

RESET CYCLE

COIN RELAY IS ENERGIZED AT SCORE MOTOR INDEX CAM SWITCH C, THRU SWITCH ON COIN RELAY, GAME RELAY, ZERO SWITCH ON CREDIT UNIT AND CREDIT BUTTON SWITCH.

SWITCHES ON COIN RELAY WILL ENERGIZE GAME-OVER RELAY, RESET RELAY, 115 VOLT RELAY BANK RESET COIL, GAME RELAY LATCH COIL THRU WIPER ON BALL COUNT UNIT (AT ZERO POSITION), AND PULSE BALL COUNT RESET AND S.U. COILS THRU SWITCH D ON GAME RELAY.

SWITCHES ON RESET RELAY WILL RUN SCORE MOTOR, PULSE SCORE RESET RELAY THRU SCORE MOTOR IMPULSE CAM SWITCH, AND ENERGIZE BONUS RELAY THRU ZERO SWITCH ON BONUS UNIT.

SWITCHES ON SCORE RESET RELAY WILL PULSE 5 SCORE DRUM UNITS UNTIL THEY REACH ZERO.

SWITCHES ON BONUS RELAY WILL RUN SCORE MOTOR, HOLD RESET RELAY IN, PULSE BONUS UNIT RESET COIL AND OPEN CIRCUIT TO OUTHOLE RELAY.

BONUS RELAY DROPS OUT WHEN ZERO SWITCH ON BONUS UNIT OPENS. NOW WHEN THE SCORE MOTOR REACHES INDEX POSITION, OUTHOLE RELAY WILL ENERGIZE THRU ANOTHER ZERO SWITCH ON BONUS UNIT.

SWITCHES ON OUTHOLE RELAY WILL RUN SCORE MOTOR AND ENERGIZE 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.

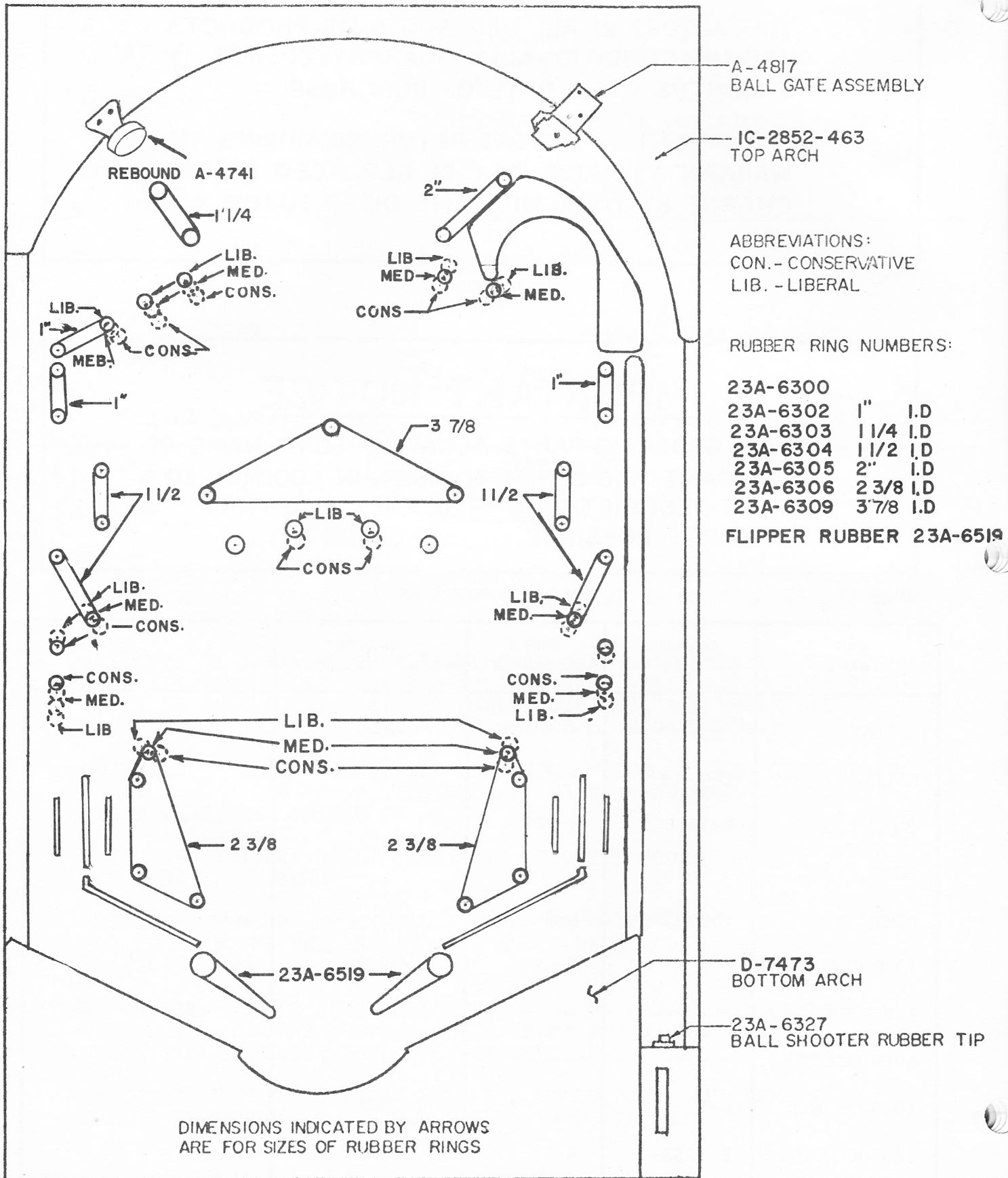
UNIT PARTS LIST

UNIT NAME	CONTACT DISC	WIPER ASSEMBLY	RATCHET GEAR ASSEMBLY	MOTORS
REPLAY	-----	-----	A-6400	
BALL COUNT	C-6414	B-7456-44	A-6402-10	
(RIGHT SIDE)	B-7568	A-7614	A-7595	
NO. MATCH	B-7569	A-7615		
(LEFT SIDE)				
BONUS	C-6417	B-7456-20	A-6402-10	SCORE MOTOR
10 POINT	B-7253	A-6294	3C-7272	14A-7883 (60 HERTZ)
100 POINT	-----	-----	3C-7272	14A-7884 (50 HERTZ)
1000 POINT	-----	-----	3C-7272	
10000 POINT	B-7253	A-6294	3C-7272	
100000 POINT	B-7253	A-6294	3C-7272	
ALTERNATOR	-----	-----	A-7567	

BLUE CHIP

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.



"BLUE CHIP" COIL CHART

NOTICE:

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

<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
B 6396	24 VOLT METER	MECH. PANEL
<u>SOLENOID COILS</u>		
A 22-550	BONUS UNIT STEP UP BALL RELEASE COIL BALL COUNT STEP UP	PLAYFIELD PLAYFIELD INSERT
A 23-600	CREDIT UNIT STEP UP	INSERT
A2-23-750	KNOCKER	CABINET
A2-26-1300	TRIPLE CHIME COILS ... (3 req'd.)	CABINET
B1-26-800	SCORE DRUM UNITS ... (5 req'd.) BALL COUNT RESET CREDIT UNIT RESET BONUS UNIT RESET	INSERT INSERT INSERT PLAYFIELD
D1-24-1400	RELAY BANK RESET	PLAYFIELD
FL 20-300/ 28-400	FLIPPERS ... (2 req'd.)	PLAYFIELD
A 23-750	CENTER EJECT COIL	PLAYFIELD
G 23-750 D.C.	D.C. JET BUMPER COILS ... (2 req'd.) D.C. KICKER COILS ... (2 req'd.)	PLAYFIELD PLAYFIELD
G 24-800	RIGHT EJECT COIL	PLAYFIELD
M 29-1000	GAME RELAY TRIP	MECH. PANEL
M 29-1100	10¢ RELAY 25¢ RELAY 10 POINT RELAY 100 POINT RELAY 1,000 POINT RELAY 10,000 POINT RELAY SCORE RESET RELAY ADVANCE RELAY 5,000 POINT RELAY BONUS RELAY SPINNER RELAY	MECH. PANEL MECH. PANEL INSERT INSERT INSERT INSERT INSERT PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
M 30-1300	COIN SET UP RELAY	MECH. PANEL
M 36-5500 D.C.	DELAY RELAY	PLAYFIELD
M X-31-1500	COIN LOCKOUT COIL	FRONT DOOR
S 27-500	NO. 1 RELAY NO. 2 RELAY NO. 3 RELAY NO. 4 RELAY NO. 5 RELAY NO. 6 RELAY NO. 7 RELAY NO. 8 RELAY SPECIAL RELAY	PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
XM 27-675	TOTAL PLAY METER COIL	MECH. PANEL
XS 28-1000	ALTERNATOR UNIT NUMBER MATCH UNIT	MECH. PANEL INSERT
Z 27-1000	COIN RELAY RESET RELAY OUTHOLE RELAY GAME RELAY LATCH CENTER EJECT RELAY RIGHT EJECT RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1150	CHANGE RELAY DOUBLE BONUS RELAY BALL INDEX RELAY TILT RELAY GAME OVER RELAY	PLAYFIELD PLAYFIELD MECH. PANEL MECH. PANEL 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.

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.**

JACK LAYOUT

GAME BLUE CHIP

POSITION PAN - P.F. SIZE 20

JACK LAYOUT

GAME BLUE CHIP

POSITION PAN - P.F. SIZE 18

1	FEED	-B-
2	"	-R-
3	MOTOR RUN	0/G
4	RESET RE.	BLU/RR-1
5	FEED	-Y-
6	EJECT RE.	G/W-2
7	EJECT RE.	BR/0
8	EJECT COIL	0/BLU-1
9	FEED	R/YW
10	REJECT RE	BR/B-1
PAN = PANEL		
P.F. = PLAYFIELD		
INS. = INSERT		

1	TILT RE.	W/BR-2
2	"	Y/R-3
3	DOUBLE BONUS RE.	W/GRY-3
4	5000 RE.	R/BR.
5	1000 PT. RE.	GRY/Y-1
6	"	BLU/R-1
7	"	GRY/W-3
8	LITE FEED	BLU.
9	BONUS SU.	GRY/B-1
INS. = INSERT		

1	B/W-J L-FLIPPER
2	BR/W-J R-
3	BLU/O-1 CREDIT UNIT
4	BLU/W-J BALL RELEASE
5	-W-LITE FEED
6	B-(P) BANK RESET
7	GRY/R-1 R-EJECT COIL
8	O-(P) BANK RESET
9	BLANK
(P) = PLASTIC	

JACK LAYOUT

GAME BLUE CHIP

POSITION PAN-INS. SIZE 24

JACK LAYOUT

GAME BLUE CHIP

POSITION PAN-INS. SIZE 8

FEED	-B-	1	R/BLU CREDIT RESET
"	-R-	2	B/Y
COIN LOCKOUT	W/GRY	3	GRY/B BALL COUNT S.U.
"	W/O	4	O/R-1 BALL COUNT RESET
"	B/R-3	5	W/BR-3 SCORE RESET
COIN FE.	R/O-1	6	GRY. CREDIT UNIT S.U.
"	W/R-1	7	GRY/O-1 PLAY ADJ. JACK
"	R/W-1	8	R/B-5 " " "
RESET FE.	BLU/BR-1	9	R/BR-4 " " "
KNOCKER	B/W	10	W/G " " "
FEED	-Y-	11	B/G-2 LARGE CHUTE
CREDIT SU	GRY/Y	12	O-3 MED. " "

BALL INDEX RE.	-O-	1	BLANK
TKT LITE	Y/BR-4	2	W/O-3 NO. MATCH LITES
GAME OVER RE.	BR/R	3	BR. LITE FEED
SMALL CHIME	O/R-5	4	BLANK

JACK LAYOUT

GAME BLUE CHIP

POSITION PF-INS SIZE 10

BLANK	1	W/R 100 PT. RE.
BLANK	2	G/B 10 PT. RE.
BLANK	3	O/B-2 CHANGE RE.
10,000 PT RE.	4	R/B-3 CREDIT LITE
1,000 PT RE	5	BLANK

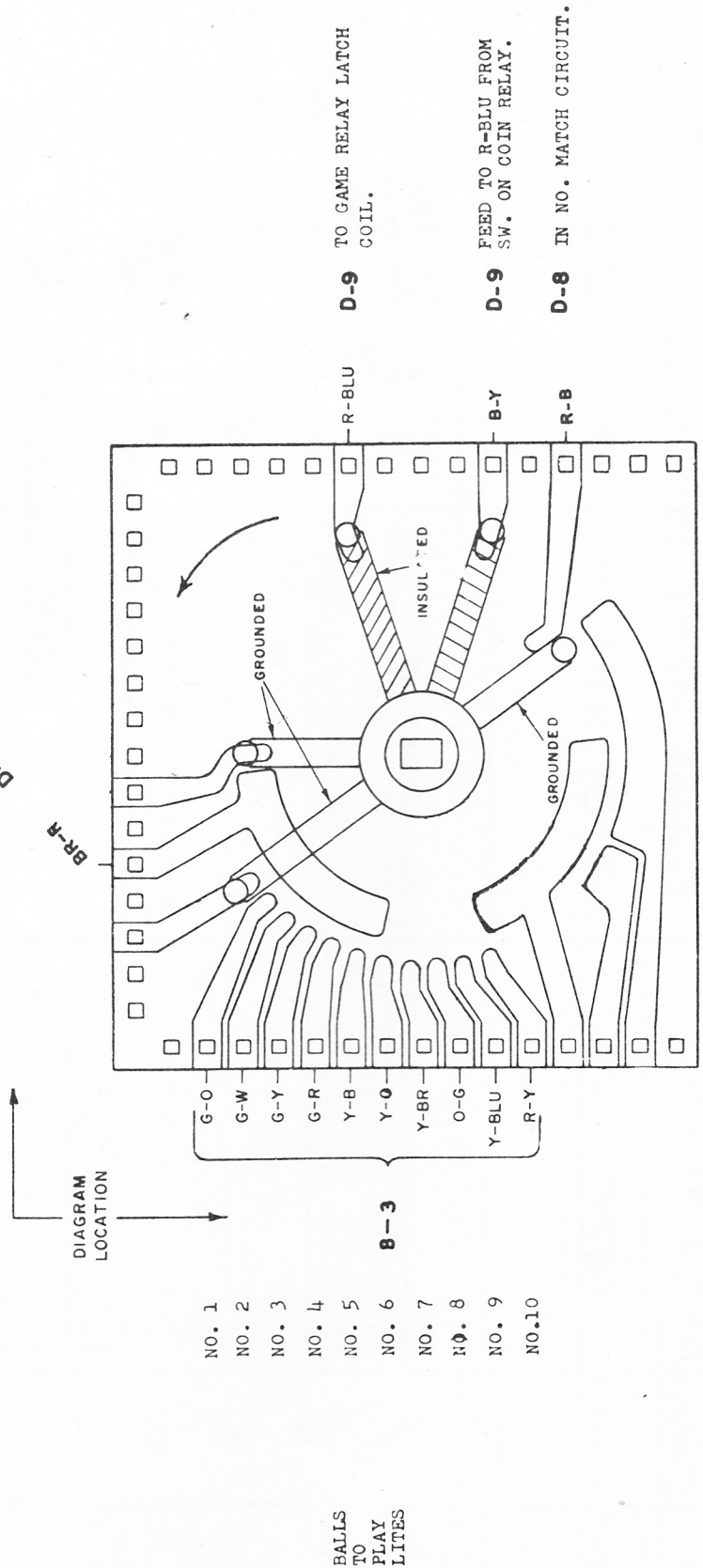
BALL COUNT UNIT DISC

DURING RESET CYCLE, THIS UNIT RESETS TO ZERO AND THEN ADVANCES 3 OR 5 STEPS. DURING PLAY, IT RESETS ONE STEP EACH TIME THE BALL MAKES OUTHOLE SWITCH.

IF 'CREDIT-EXTRA BALL-NOVELTY' JACK (PLAY ADJUSTMENT) IS IN EXTRA BALL POSITION, BALL COUNT UNIT WILL ADVANCE BY:
 1. RIGHT EJECT RELAY, THRU SWITCH ON SPECIAL RELAY.
 2. LEFT OR RIGHT BOTTOM OUTSIDE ROLL-OVER, WHEN LIT, THRU SWITCH ON SPECIAL RE.

VIEW LOOKING AT WIPER FINGERS, WITH WIPER IN RESET POSITION.

D-10 IN HOLD CIRCUIT TO D-10 GAME-OVER RELAY.



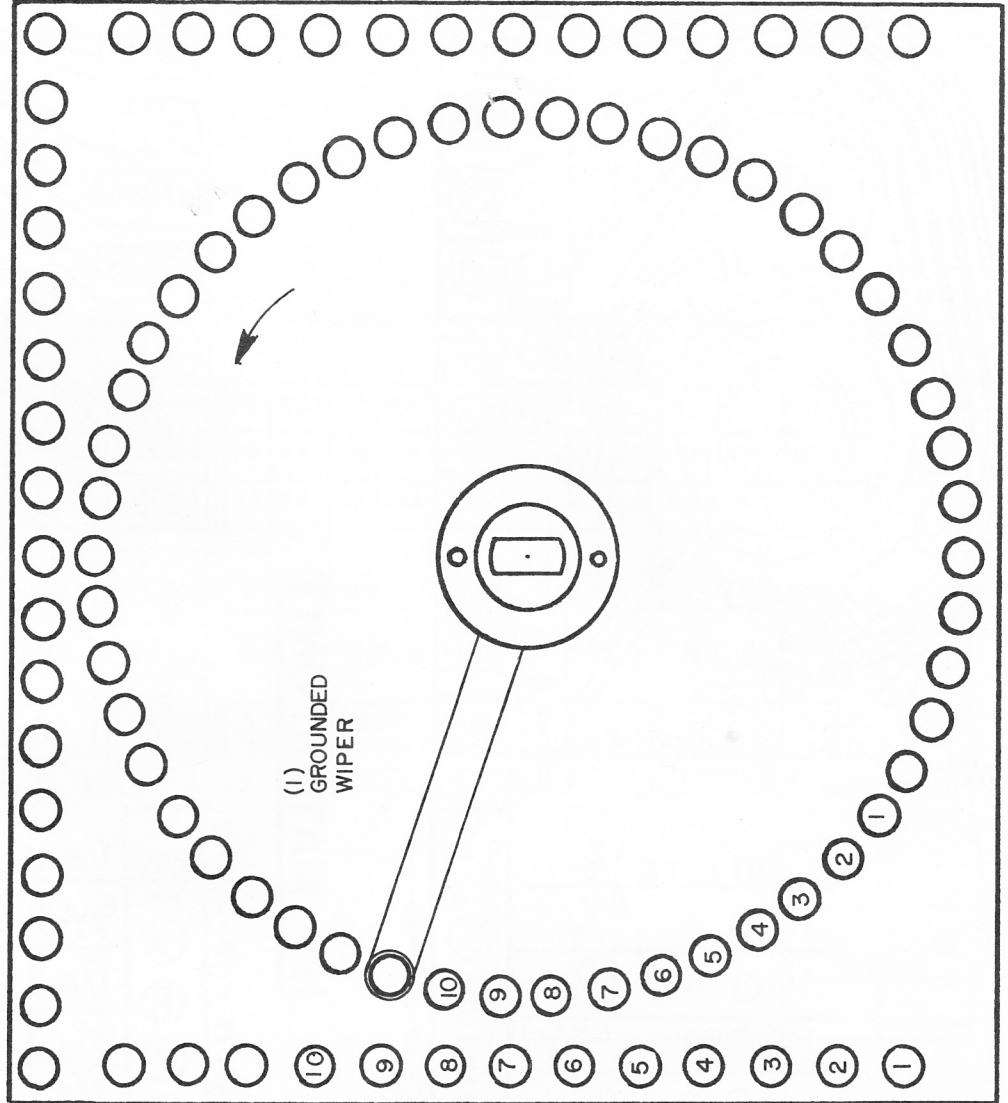
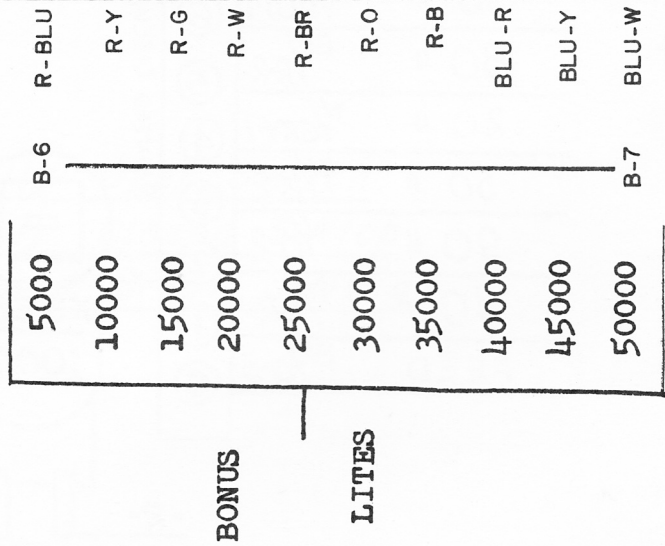
BALLS TO PLAY LITES

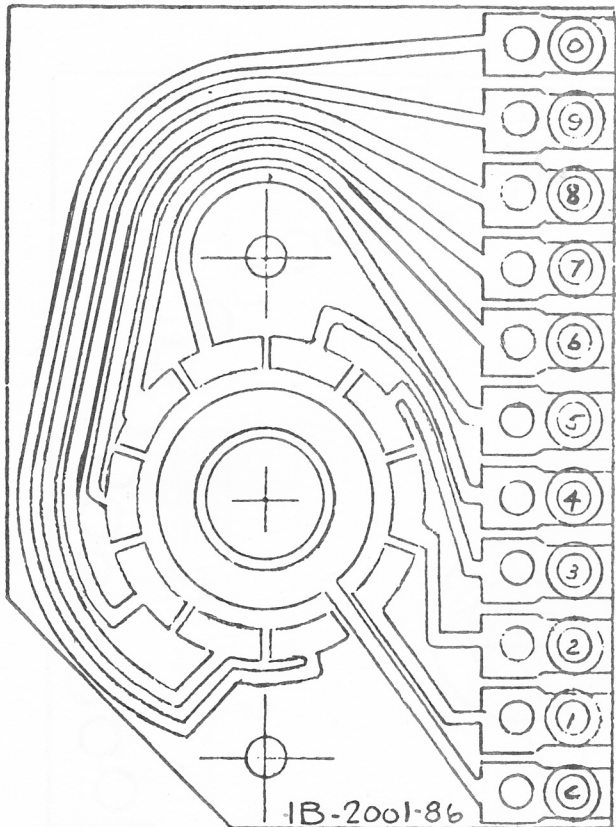
BONUS UNIT

THIS UNIT RESETS ONE STEP AT A TIME (WHEN COLLECTING BONUS) THRU SWITCHES ON BONUS RELAY AND DOUBLE BONUS RELAY.

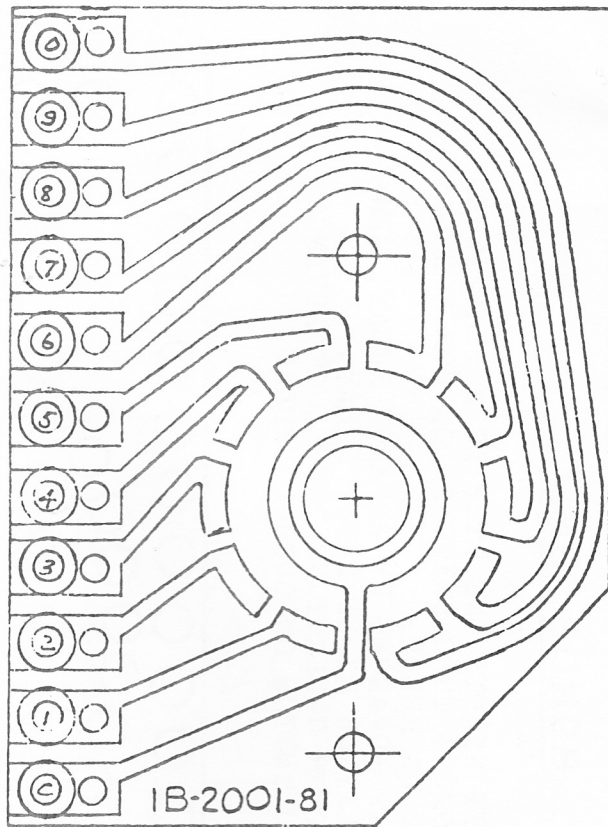
THIS UNIT ADVANCES BY ADVANCE RELAY, CENTER EJECT RELAY OR RIGHT EJECT RELAY. ALSO, AFTER COLLECTING BONUS, IT ADVANCES ONE STEP THRU SWITCH ON OUTHOLE RELAY.

VIEW LOOKING AT WIPER FINGER WITH WIPER IN RESET POSITION.





IB-2001-86



IB-2001-81

DIAGRAM LOCATION



No. MATCH UNIT

B-4

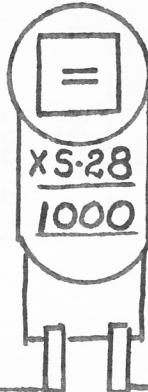
00 LITE	W/G-1	⑩
60 "	BR/W-1	⑨
10 "	BR/G-1	⑧
70 "	BR/Y-1	⑦
30 "	BR/BLU-1	⑥
80 "	BR/R-2	⑤
20 "	W/GRY-1	④
50 "	W/B-2	③
90 "	W/O-2	②
40 "	W/BR	①
FEED	BR/O-3	⑥

PRINTED CIRCUIT - IB-2001-86

PRINTED CIRCUIT - IB-2001-81

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

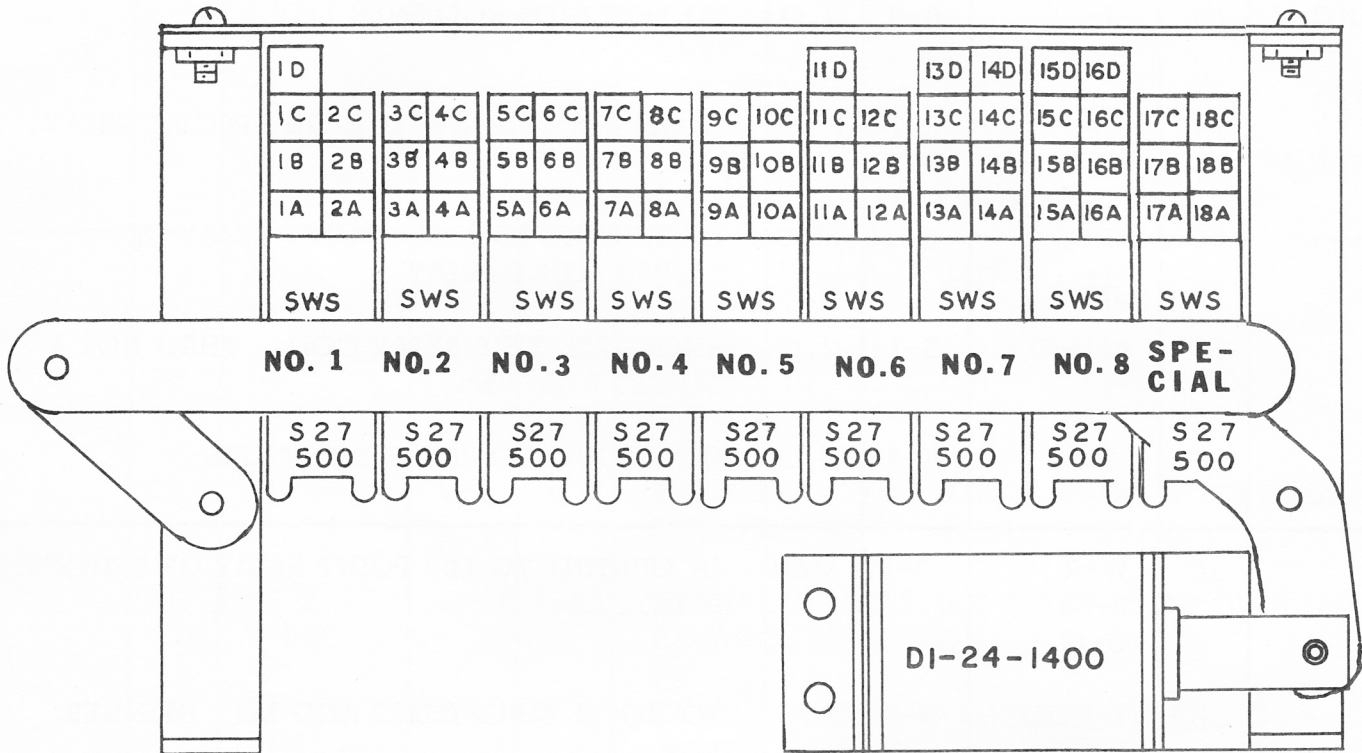
D-8



-R- B-R-2

DRIVE SPRING 10A-324-1

RELAY BANK SWS.



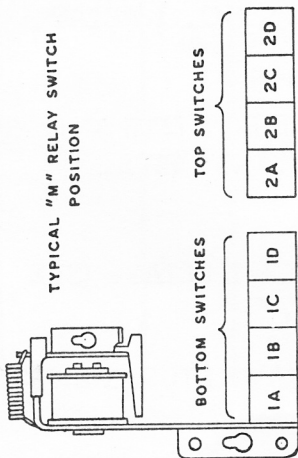
N.O. — Normally Open Switch
N.C. — Normally Closed Switch
M & B — Make and Break Switch

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
NO. 1 RELAY	1D	Y-R -Y-	B-7	N.O.	TO NO. 1 TARGET LITE
	1C	O-W -J-	C-14	N.O.	IN SERIES WITH SWITCH 7B ON NO. 4 RELAY.
	1B	-J- G-W	B-9	N.O.	TO LEFT SIDE ROLLOVER LITE.
	1A	-J- -J-	E-14	N.O.	IN SERIES WITH SWITCH ON SPECIAL RELAY.
	2C	BR-Y -J- -J-	D-15	M&B	IN CIRCUIT TO 1,000 POINT RELAY OR 10,000 POINT RELAY.
	2B	BLU-O -J-	E-14	N.C.	ENERGIZES THIS RELAY COIL, THRU NO. 1 TARGET SWITCH.
	2A	-J- -J-	A-9	N.O.	IN CIRCUIT TO RIGHT EJECT LITE.
NO. 2 RELAY	3C	W-R R-BR O-G	D-17	M&B	IN CIRCUIT TO 100 POINT RELAY OR SPINNER RELAY.
	3B	Y-BLU Y	B-7	N.O.	TO NO. 2 TARGET LITE AND LEFT SPINNER LITE.
	3A	-J- -J-	E-14	N.O.	IN SERIES WITH SWITCH 1A ON NO. 1 RELAY.
	4C	BR-Y -J- -J-	D-15	M&B	IN CIRCUIT TO 1,000 OR 10,000 POINT RELAY.
	4B	BLU-B -J-	E-14	N.C.	ENERGIZES THIS RELAY COIL, THRU NO. 2 TARGET SWITCH.
	4A	-J- -J-	B-9	N.C.	IN SERIES WITH SWITCH 2A ON NO. 1 RELAY.
NO. 3 RELAY	5C	BLU-W -J-	C-14	N.O.	IN SERIES WITH SWITCH 11C ON NO. 6 RELAY.
	5B	Y-G -Y-	B-8	N.O.	TO NO. 3 TARGET LITE

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
NO. 3 RELAY	5A	-J- -J-	D-14	N.O	IN SERIES WITH SWITCH 3A ON NO. 2 RELAY.
	6C	BR-Y -J- GRAY-BR	D-15	M&B	IN CIRCUIT TO 1,000 OR 10,000 POINT RELAY.
	6B	W-G -J-	E-14	N.C	ENERGIZES THIS RELAY COIL, THRU NO. 3 TARGET SWITCH.
	6A	-J- -Y-	B-9	N.O	IN SERIES WITH SWITCH 4A ON NO. 2 RELAY AND SWITCH 11B ON NO. 6 RELAY.
NO. 4 RELAY	7C	Y-BR -Y-	B-8	N.O	TO NO. 4 TARGET LITE.
	7B	-J- R-Y	D-14	N.O	IN CIRCUIT TO DOUBLE BONUS RELAY.
	7A	-J- -Y-	B-8	N.O	IN SERIES WITH SWITCH 1B ON NO. 1 RELAY AND SWITCH 9A ON NO. 5 RELAY.
	8C	BR-Y B-BLU -J-	C-16	M&B	IN CIRCUIT TO 1,000 POINT RELAY OR ADVANCE RELAY.
	8B	W-O -J-	E-14	N.C	ENERGIZES THIS RELAY COIL, THRU NO. 4 TARGET SWITCH.
	8A	-J- -J-	D-14	N.O	IN SERIES WITH SWITCH 5A ON NO. 3 RELAY.
NO. 5 RELAY	9C	W-R R-O O-G	D-17	M&B	IN CIRCUIT TO 100 POINT RELAY OR SPINNER RELAY.
	9B	Y-O -Y-	B-8	N.O	TO NO. 5 TARGET LITE AND RIGHT SPINNER LITE.
	9A	-J- -J-	B-8	N.O	IN SERIES WITH SWITCH 12A ON NO. 6 RELAY.
	10C	BR-Y -J- -J-	D-16	M&B	IN CIRCUIT TO 1,000 POINT RELAY OR ADVANCE RELAY.

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
NO. 5 RELAY	10B	BR-R -J-	E-15	N.C.	ENERGIZES THIS RELAY COIL, THRU NO. 5 TARGET SWITCH.
	10A	-J- -J-	D-14	N.O.	IN SERIES WITH SWITCH 8A. ON NO. 4 RELAY.
NO. 6 RELAY	11D	Y-B -Y-	B-8	N.O.	TO NO. 6 TARGET LITE.
	11C	R-Y -J-	D-14	N.O.	IN CIRCUIT TO DOUBLE BOUNDS RELAY.
	11B	W-G -J-	B-9	N.O.	TO RIGHT SIDE ROLLOVER LITE.
	11A	-J- R-G	C-14	N.O.	IN SERIES WITH SWITCH 10A ON NO. 5 RELAY.
	12C	BR-Y -J- R-W	D-16	M&B	IN CIRCUIT TO 1,000 POINT RELAY OR ADVANCE RELAY.
	12B	BR-O -J-	E-15	N.C.	ENERGIZES THIS RELAY COIL, THRU NO. 6 TARGET SWITCH.
	12A	G-O -J-	A-8	N.O.	TO 4-5-6 TARGET LITES.
NO. 7 RELAY	13D	BR-BLU GRAY-B	E-10	N.C.	IN CIRCUIT TO BONUS UNIT. S.U. COIL.
	13C	-J- BLU-R	C-15	N.C.	IN SERIES WITH SWITCH 2C ON NO. 1 RELAY.
	13B	-J- BLU-B	D-7	N.O.	IN SERIES WITH SWITCH 18A ON SPECIAL RELAY
	13A	-J- R-G	C-14	N.O.	IN SERIES WITH SWITCH 11A ON NO. 6 RELAY.
	14D	W-BR -J-	A-9	N.C.	IN CIRCUIT TO RIGHT EJECT LITE
	14C	BR-B -J-	E-15	N.C.	ENERGIZES THIS RELAY COIL, THRU NO. 7 TARGET SWITCH.

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
NO. 7 RELAY	14B	G-R -Y-	B-8	N.O.	TO NO. 7 TARGET LITE
	14A	-J- W-BLU	B-9	N.O.	IN SERIES WITH SWITCH 16A ON NO. 8 RELAY.
NO. 8 RELAY	15D	BR-BLU GRAY-B	E-10	N.C.	IN CIRCUIT TO BONUS UNIT S.U. COIL.
	15C	-J- BLU-R	C-15	N.C.	IN SERIES WITH SWITCH 2C ON NO. 1 RELAY.
	15B	-J- BLU-O	C-7	N.O.	IN SERIES WITH SWITCH 13B ON NO. 7 RELAY.
	15A	-J- -Y-	C-14	N.O.	IN SERIES WITH SWITCH 13A ON NO. 7 RELAY.
	16D	W-BR -J-	A-9	N.C.	IN CIRCUIT TO RIGHT EJECT LITE.
	16C	O-R -J-	E-15	N.C.	ENERGIZES THIS RELAY COIL, THRU NO. 8 TARGET SWITCH.
	16B	G-Y -Y-	B-8	N.O.	TO NO. 8 TARGET LITE.
	16A	-J- W-O	A-9	N.O.	TO RIGHT EJECT "SPECIAL LITE.
SPEC. RELAY	17C	BR-BLU GRAY-B	E-10	N.C.	IN CIRCUIT TO BONUS UNIT S. U. COIL.
	17B	O-BLU O-W	C-16	N.C.	CONNECTS LEFT BOTTOM (OUTSIDE) ROLLOVER TO RIGHT BOTTOM (OUTSIDE) ROLLOVER SWITCH.
	17A	BLU-R -J-	C-15	N.C.	IN SERIES WITH SWITCH 2C ON NO. 1 RELAY.
	18C	W-BR -J- W-BLU	A-9	M&B	OPENS IN CIRCUIT TO RIGHT EJECT LITE AND CLOSSES TO RIGHT EJECT "SPECIAL" LITE.
	18B	-J- -J-	E-14	N.C.	IN CIRCUIT TO ENERGIZE SPECIAL RELAY. (SEE SWITCH 15A ON NO. 8 RELAY.
	18A	BLU-B GRAY-R	D-7	N.O.	IN "SPECIAL" CIRCUIT TO "PLAY ADJUSTMENT" JACK.



COIN SET-UP

IS ENERGIZED BY 25¢ RELAY, THRU "1 COIN" JACK & 2 COINS = 3 PLAYS ADJUSTMENT JACK".

10¢

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

25¢

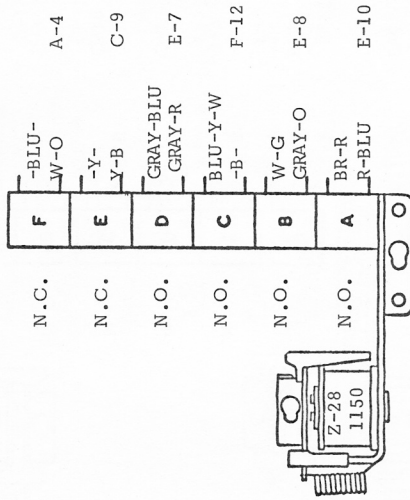
IS ENERGIZED BY 25¢ COIN SWITCH, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.

RELAYS & SWITCHES LOCATED ON MECHANISM PANEL

SWITCH TYPE	DIAGRAM LOCATION	
M&B	C	OPENS IN CIRCUIT TO 25¢ RELAY AND CLOSES TO 10¢ RELAY.
N.O.	B	IN CIRCUIT TO COIN LOCKOUT COIL.
N.O.	A	IN HOLD CIRCUIT TO THIS RELAY.
N.C.	D	IN HOLD CIRCUIT TO "COIN SET-UP" RELAY.
N.O.	C	RUNS SCORE MOTOR.
N.O.	B	PULSES CREDIT UNIT S. U. COIL, THRU IMPULSE CAM SWITCH B.
N.O.	A	IN HOLD CIRCUIT TO THIS RELAY.
N.O.	2B	ENERGIZES COIN RELAY, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.
N.O.	2A	IN HOLD CIRCUIT TO THIS RELAY.
N.O.	1D	PULSES CREDIT UNIT S. U. COIL, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.
N.O.	1C	PULSES CREDIT UNIT S. U. COIL, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.
N.O.	1B	RUNS SCORE MOTOR.
N.O.	1A	ENERGIZES COIN SET-UP RELAY, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.

GAME OVER

IS ENERGIZED BY COIN RELAY. IT THEN HOLDS IN BY WIPERS ON BALL COUNT UNIT OR BY ZERO SWITCH ON BALL COUNT UNIT.



OPENS CIRCUIT TO NUMBER MATCH LITES AND GAME-OVER LITE.
IN SERIES WITH SWITCH A ON GAME RELAY.
IN SERIES WITH SWITCH C ON TILT RELAY.

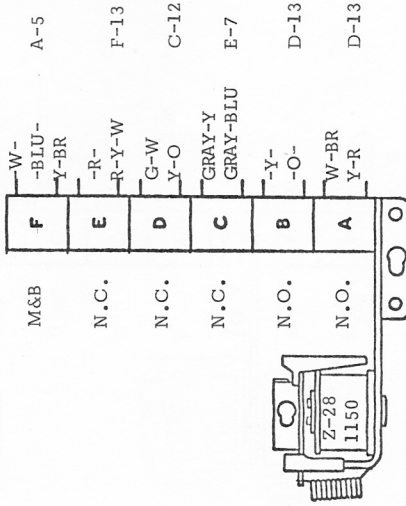
OPENS CIRCUITS TO PLAYFIELD SWITCHES.

IN HI-SCORE & NO. MATCH CIRCUITS.

IN HOLD CIRCUIT TO THIS RELAY.

TILT

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



OPENS TO PLAYFIELD LITES AND CLOSES TO TILT LITE.

OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

OPENS CIRCUIT TO BONUS RELAY AND OUTHOLE RELAY.

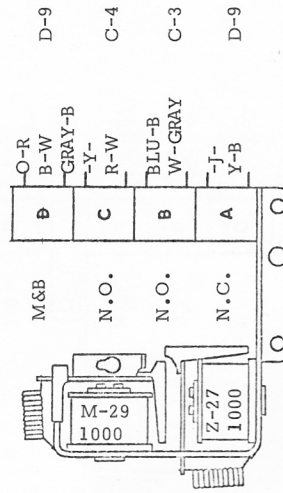
IN "SPECIAL" CIRCUIT TO "PLAY ADJUSTMENT JACK".

ENERGIZES BALL INDEX RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

GAME

LATCH COIL IS ENERGIZED BY COIN RELAY, THRU WIPER FINGERS ON BALL COUNT UNIT. TRIP COIL IS ENERGIZED BY BALL INDEX RELAY OR GAME OVER RELAY.



OPENS IN CIRCUIT TO BALL COUNT S.U. COIL AND CLOSES TO BALL COUNT RESET COIL.

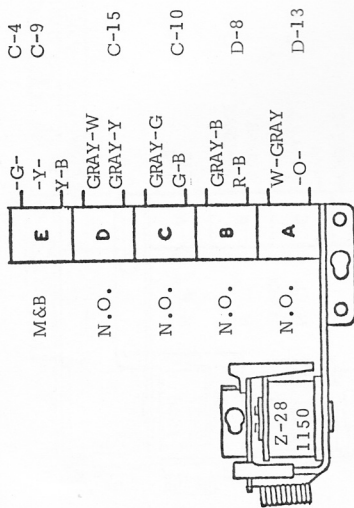
IN HOLD CIRCUIT TO COIN RELAY.

IN CIRCUIT TO COIN RELAY OR COIN LOCKOUT COIL, THRU REPLAY UNIT ZERO SWITCH.

IN CIRCUIT TO GAME RELAY TRIP COIL.

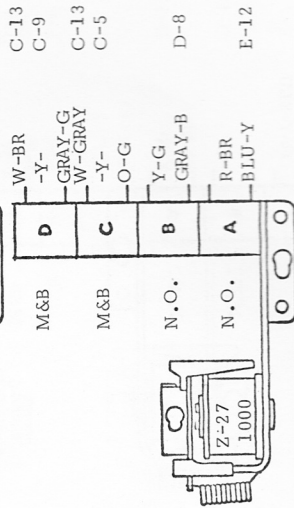
BALL INDEX

IS ENERGIZED BY 10, 100, 1000, or 10,000 POINT RELAYS. ALSO BY TILT RELAY.



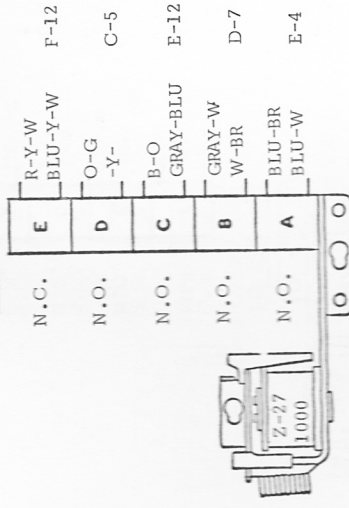
OUTHOLE

IS ENERGIZED BY OUTHOLE SWITCH, THRU ZERO SWITCH ON BONUS UNIT AND NORMALLY CLOSED SWITCH ON BONUS RELAY.



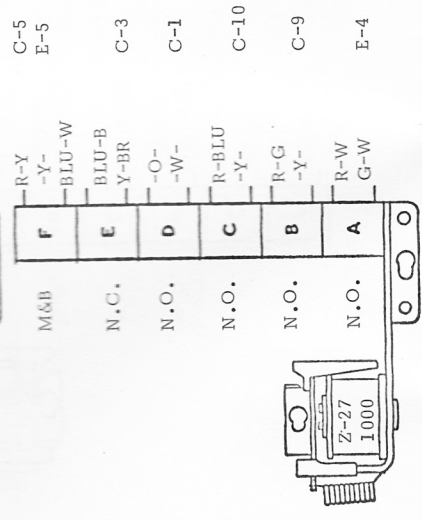
RESET

IS ENERGIZED BY COIN RELAY.



COIN

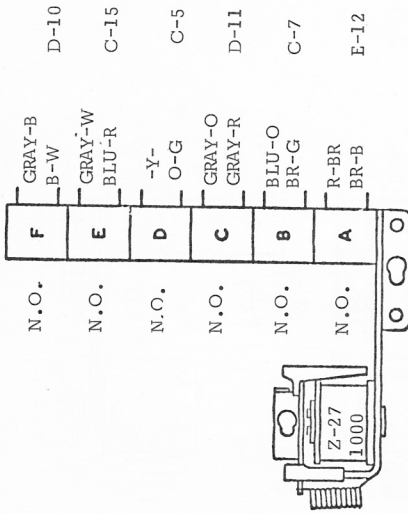
IS ENERGIZED BY CREDIT BUTTON, THRU ZERO SWITCH ON CREDIT UNIT. ALSO, BY COIN SWITCH, ALSO BY 25¢ RELAY, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.



- C-4 OPENS IN HOLD CIRCUIT TO COIN SET-UP RELAY AND CLOSES TO GAME RELAY TRIP COIL.
- C-9 IN SERIES WITH SWITCH 1A ON BONUS RELAY.
- C-15 IN CIRCUIT TO BALL COUNT UNIT RESET COIL.
- C-10 IN SERIES WITH SWITCH B ON OUTHOLE RELAY.
- D-8 IN HOLD CIRCUIT TO RHIS RELAY.
- D-13 OPENS IN CIRCUIT TO TILT RELAY AND CLOSES TO BALL COUNT UNIT RESET AND BONUS UNIT S.U. COILS.
- C-13 OPENS IN HOLD CIRCUITS TO BALL INDEX & DOUBLE BONUS RELAYS AND CLOSES TO RUN SCORE MOTOR.
- C-5 IN NUMBER MATCH CIRCUIT
- D-8 IN HOLD CIRCUIT TO THIS RELAY.
- E-12 OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.
- F-12 RUNS SCORE MOTOR.
- C-5 IN CIRCUIT TO BONUS RELAY.
- E-12 PULSES SCORE RESET RELAY, THRU IMPULSE CAM SWITCH B.
- D-7 IN HOLD CIRCUIT TO RHIS RELAY.
- E-4 OPENS IN CIRCUIT TO KNOCKER COIL AND CLOSES TO ENERGIZE RESET RELAY.
- C-5 OPENS CIRCUIT TO COIN RELAY AND COIN LOCKOUT COIL.
- E-5 ENERGIZES 115 VOLT RELAY BANK RESET COIL THRU CAM SWITCH 2C.
- C-3 ENERGIZES GAME OVER RELAY.
- C-1 IN CIRCUITS TO BALL COUNT S.U., BALL COUNT RESET AND CREDIT UNIT RESET COILS. ALSO, GAME RELAY LATCH COIL.
- C-10 IN HOLD CIRCUIT TO THIS RELAY.
- C-9
- E-4

RIGHT EJECT

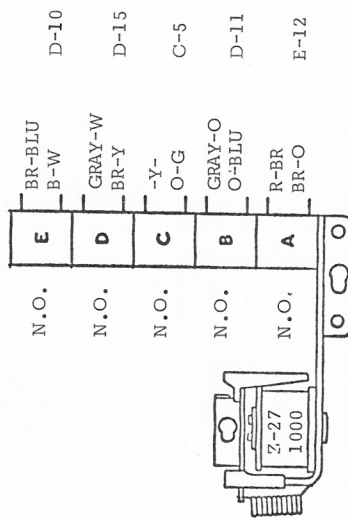
IS ENERGIZED BY RIGHT EJECT SWITCH, THRU DELAY RELAY AND SCORE MOTOR INDEX CAM SWITCH D.



D-10 IN CIRCUIT TO PULSE BONUS S. U. COIL.
 C-15 IN CIRCUIT TO PULSE 1,000 OR 10,000 POINT RELAY.
 C-5 RUNS SCORE MOTOR.
 D-11 ENERGIZES RIGHT EJECT COIL, THRU SCORE MOTOR CAM SWITCH 4B.
 C-7 IN "SPECIAL CIRCUIT" TO 'PLAY ADJUSTMENT' JACK.
 E-12 IN HOLD CIRCUIT TO THIS RELAY.

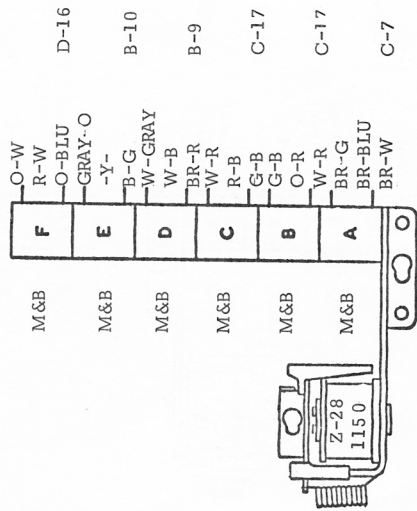
CENTER EJECT

IS ENERGIZED BY CENTER EJECT SWITCH, THRU DELAY RELAY AND SCORE MOTOR INDEX CAM SWITCH D.



D-10 IN CIRCUIT TO PULSE BONUS UNIT S. U. COIL.
 D-15 PULSE 1,000 POINT RELAY.
 C-5 RUNS SCORE MOTOR.
 D-11 PULSE CENTER EJECT COIL, THRU CAM SWITCH 4B.
 E-12 IN HOLD CIRCUIT TO THIS RELAY.

ON PLAYFIELD



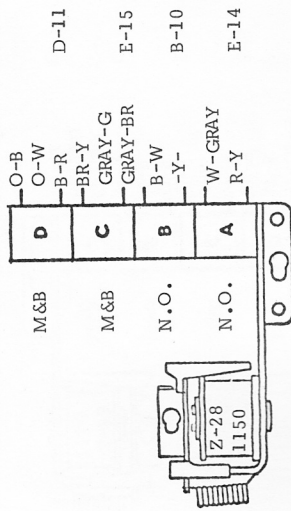
D-16 IN CIRCUIT TO ADVANCE RELAY.
 B-10 OPENS TO RIGHT JET BUMPER LITE AND CLOSSES TO LEFT JET BUMPER LITE.
 B-9 OPENS TO LEFT BOTTOM ROLLER LITE, AND CLOSSES TO RIGHT BOTTOM ROLLER LITE.
 C-17 OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSSES TO 10 POINT RELAY. (FROM RIGHT JET BUMPER SWITCH)
 C-17 OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSSES TO 100 POINT RELAY. (FROM LEFT JET BUMPER SWITCH.)
 C-7 OPENS TO LEFT BOTTOM (OUTSIDE) ROLLER, AND CLOSSES TO RIGHT BOTTOM (OUTSIDE) ROLLER. (IN SPECIAL CIRCUIT)

CHANGE

IS ENERGIZED BY NUMBER MATCH UNIT ALTERNATOR SWITCH

DOUBLE BONUS

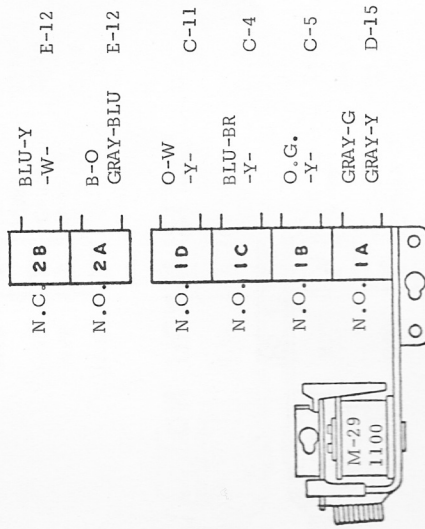
IS ENERGIZED BY LEFT SIDE ROLLOVER SWITCH, THRU NO. 1 AND NO. 4 RELAYS. ALSO BY RIGHT SIDE ROLLOVER SW., THRU NO. 3 AND NO. 6 RELAYS.



IN CIRCUIT TO BONUS UNIT RESET COIL.
 OPENS TO 1,000 POINT RELAY AND CLOSES TO 10,000 POINT RELAY (WHEN COLLECTING BONUS) TO DOUBLE BONUS LITE.
 IN HOLD CIRCUIT TO THIS RELAY.

BONUS

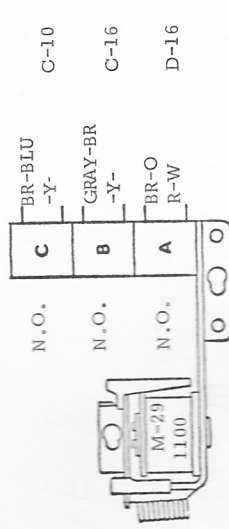
IS ENERGIZED BY RESET RELAY, THRU ZERO SWITCH ON BONUS UNIT. ALSO BY OUTHOLE SWITCH, THRU ANOTHER ZERO SWITCH ON BONUS UNIT.



IN CIRCUIT TO ENERGIZE OUTHOLE RELAY.
 IN HOLD CIRCUIT TO THIS RELAY.
 IN SERIES WITH SWITCH D ON DOUBLE BONUS RELAY.
 IN HOLD CIRCUIT TO RESET RELAY.
 RUNS SCORE MOTOR.
 IN SERIES WITH SWITCH C ON DOUBLE BONUS RELAY.

ADVANCE

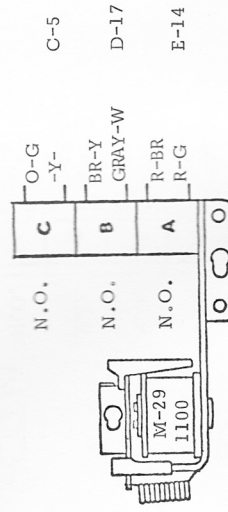
IS ENERGIZED BY LEFT OR RIGHT ROLLOVER SW. ALSO BY LEFT BOTTOM OR RIGHT BOTTOM (OUTSIDE) ROLLOVER SWITCHES. ALSO BY NOS. 4, 5 OR 6 TARGET SWITCHES WHEN NO. 4, 5 & 6 RELAYS ARE TRIPPED.



ENERGIZES BONUS UNIT S. U. COIL.
 ENERGIZES 10,000 POINT RELAY.
 IN HOLD CIRCUIT TO THIS RELAY.

5000

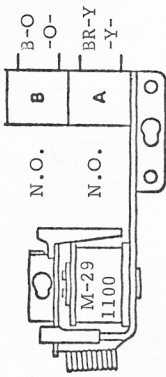
IS ENERGIZED BY LEFT OR RIGHT BOTTOM (INSIDE) ROLLOVER SWITCH.



RUNS SCORE MOTOR.
 PULSES 1,000 POINT RELAY.
 IN HOLD CIRCUIT TO THIS RELAY.

SPINNER

IS ENERGIZED BY LEFT SPINNER SWITCH, WHEN NO. 2 RELAY IS TRIPPED --- OR BY RIGHT SPINNER SWITCH, WHEN NO. 5 RELAY IS TRIPPED.



C-20

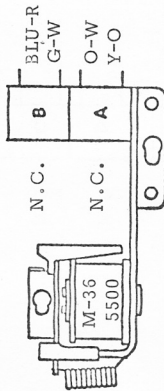
ENERGIZES DELAY RELAY.

C-17

PULSES 1,000 POINT RELAY.

DELAY

IS ENERGIZED BY SPINNER RELAY



C-12

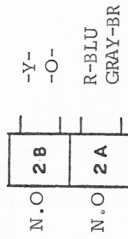
OPENS CIRCUIT TO RIGHT EJECT RELAY AND CENTER EJECT RELAY.

C-12

IN CIRCUIT TO BONUS RELAY AND OUTHOLE RELAY.

10,000 POINT

IS PULSED BY RIGHT EJECT RELAY, ADVANCE RELAY, AND BONUS RELAY THRU SWITCH ON DOUBLE BONUS RELAY.



D-13

ENERGIZES BALL INDEX RELAY.

C-15

IN HOLD CIRCUIT TO THIS RELAY.

C-11

PULSES LARGE CHIME COIL.

C-6

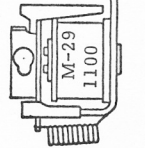
PULSES 100,000 POINT DRUM UNIT, THRU 9TH POSITION SWITCH ON 10,000 POINT DRUM UNIT.

C-6

PULSES 10,000 POINT DRUM UNIT COIL.

C-8

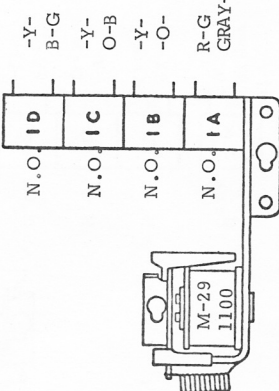
IN HIGH SCORE CIRCUIT TO 'PLAY ADJUSTMENT JACK'.



BLU-BR
BR-Y

F-18

IN HOLD CIRCUIT TO THIS RELAY.



C-11

PULSES LARGE CHIME COIL.

C-6

PULSES 1,000 POINT DRUM UNIT COIL.

D-13

ENERGIZES BALL INDEX RELAY.

C-16

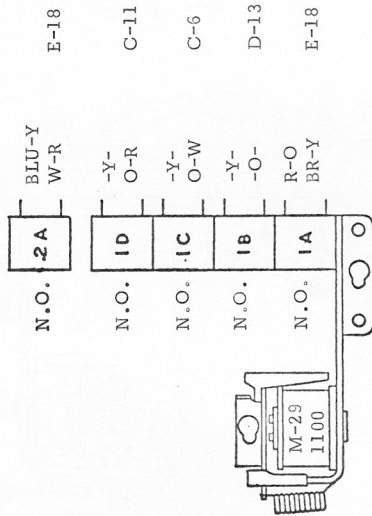
PULSES 10,000 POINT RELAY, THRU 9TH POSITION SWITCH ON 1,000 POINT DRUM UNIT.

1,000 POINT

IS PULSED BY BONUS RELAY, CENTER EJECT RELAY, RIGHT EJECT RELAY, SPINNER RELAY, 5000 RELAY AND NO. 1 THRU NO. 8 TARGET SWITCHES.

100 POINT

IS PULSED BY LEFT AND RIGHT SPINNER SWITCHES AND LEFT & RIGHT JET BUMPER SWS.



IN HOLD CIRCUIT TO THIS RELAY.

PULSES SMALL CHIME COIL.

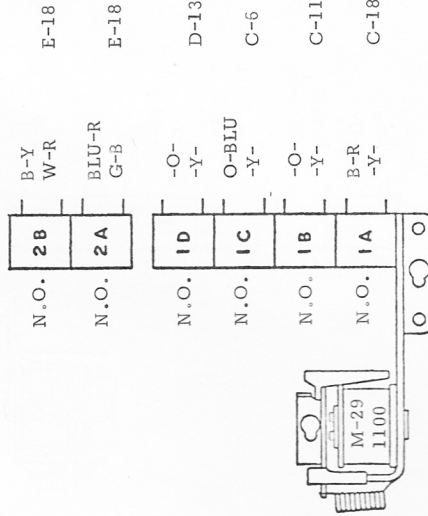
PULSES 100 POINT DRUM UNIT COIL.

ENERGIZES BALL INDEX RELAY.

PULSE 1,000 POINT RELAY, THRU 9TH POSITION SWITCH ON 100 POINT DRUM UNIT

10 POINT

IS PULSED BY KICKER SWS., STAND-UP SWS., AND LEFT AND RIGHT JET BUMPER SWS.



PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCH ON 10 P OINT DRUM UNIT.

IN HOLD CIRCUIT TO THIS RELAY.

ENERGIZES BALL INDEX RELAY,

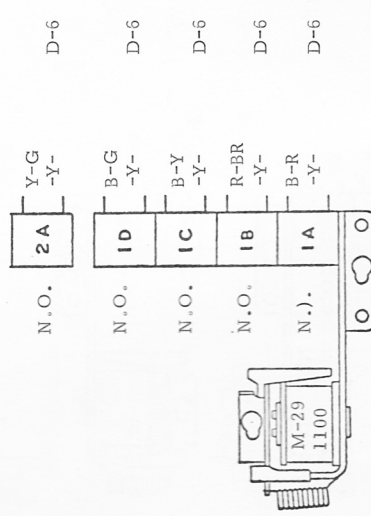
PULSES 10 POINT DRUM UNIT COIL.

PULSE MEDIUM CHIME COIL.

ENERGIZES NUMBER MATCH S.U. COIL.

SCORE RESET

IS PULSED BY SCORE MOTOR IMPLUSE CAM SW. B, THRU SWITCH ON RESET RELAY.



PULSES 100,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 10,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 1,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 100 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 10 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

