

Instruction Manual for **LITTLE CHIEF**



 **Williams**[®] ELECTRONICS, INC.

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Phone 267-2240

SEPT.
1975

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

I. 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.

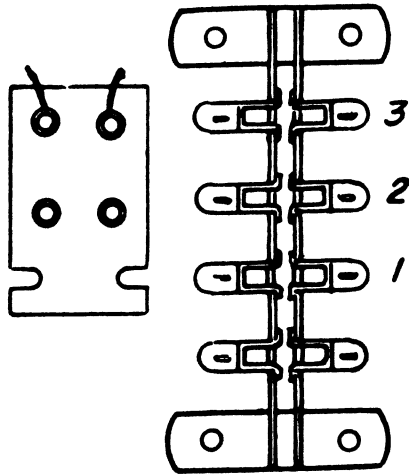
Solenoid Plungers should not have a lubricant of any kind. Should there be a sluggish tendency or if plungers are sticking, the parts should be cleaned with a solvent and flaked graphite applied on reassembly.

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.

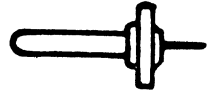
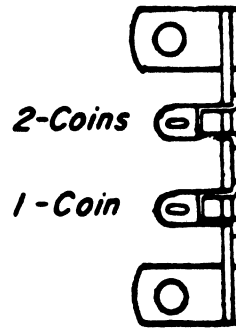
ADJUSTMENTS ON MECHANISM PANEL

10¢ Adjustment



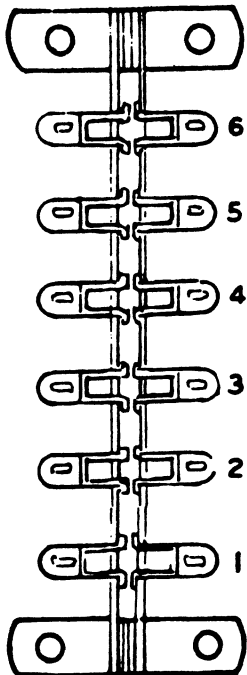
PROVIDES
1, 2 OR
3 PLAYS
FOR ONE
COIN.

5¢ Adjustment

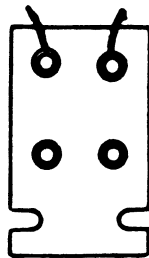


IN "2 COINS FOR
1 PLAY", CIRCUIT
TO COIN RELAY
PASSES THRU SW.
ON ALTERNATOR
UNIT.

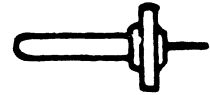
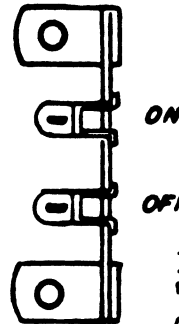
25¢ Adjustment



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



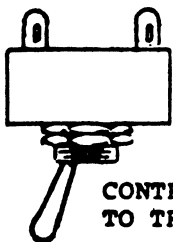
Motor Service Jack



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

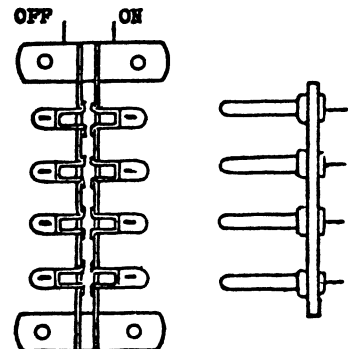
MASTER ON-OFF SW.

(Located under front of
Cabinet)



CONTROLS POWER
TO TRANSFORMER

1 COIN - 1 PLAY
2 COINS - 3 PLAYS 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.

ADJUSTMENTS IN BACKBOX

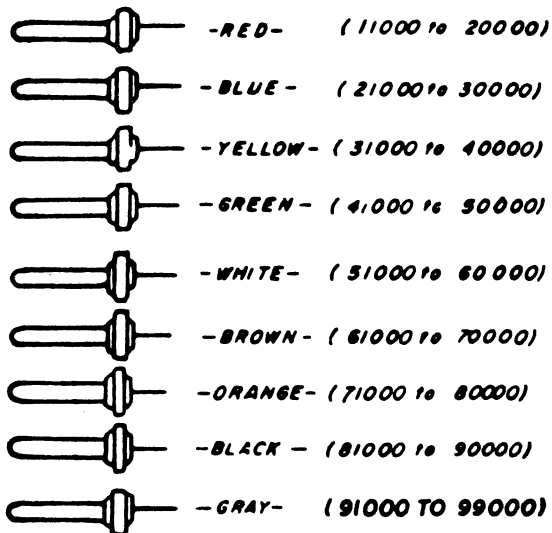
Hi-Score Adjustment

-
- 1000 6000
- 2000 7000
- 3000 8000
- 4000 9000
- 5000 0000

Insert plugs into 10 Point Female at desired positions.

Examples:

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



PLAY ADJUSTMENT

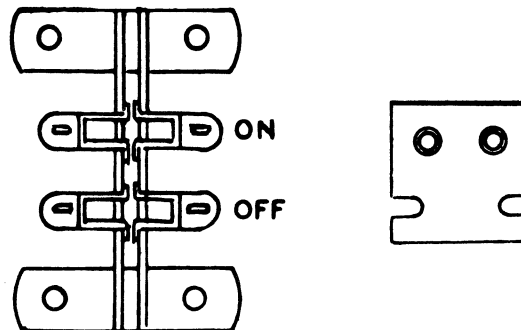


CREDIT

IN CREDIT POSITION: MAKING RIGHT SIDE ROLLOVER SWITCH WHEN "EXTRA SPECIAL RELAY" IS ENERGIZED, OR MAKING HI-SCORES WILL AWARD A CREDIT.

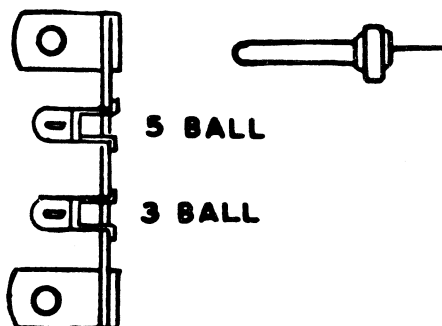
IN EXTRA BALL POSITION: THE ABOVE WILL ENERGIZE THE EXTRA BALL RELAY. (NOTE: WITH "SPECIAL RELAY" ENERGIZED, MAKING LEFT BOTTOM OUTSIDE OR RIGHT BOTTOM OUTSIDE ROLLOVER, WHEN LIT, WILL ALWAYS ENERGIZE EXTRA BALL RELAY.

NUMBER MATCH ADJUSTMENT



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



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

SUGGESTED SCORE CARDS

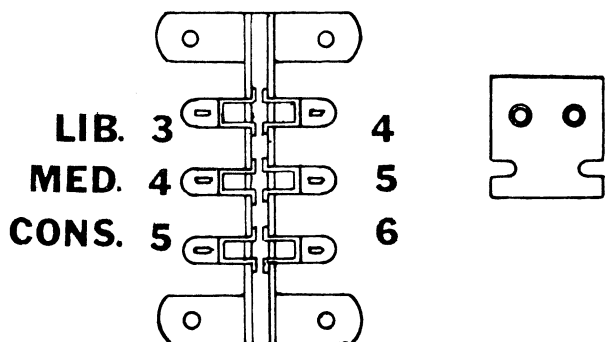
REPLAY

3 BALL...458-30 5 BALL...458-18

EXTRA BALL

3 BALL...458-69 5 BALL...458-71

EJECT HOLE ADJ.

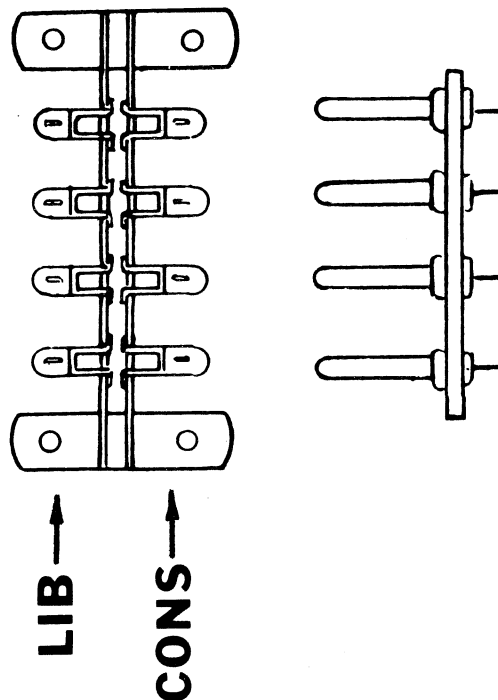


IN LIBERAL POSITION: SPECIAL RELAY IS ENERGIZED WHEN EJECT ADVANCE UNIT REACHES 3--- EXTRA SPECIAL RELAY IS ENERGIZED WHEN THAT UNIT REACHES 4.

IN MEDIUM POSITION: SPECIAL RELAY PULLS IN AT 4, AND EXTRA SPECIAL RELAY AT 5.

IN CONSERVATIVE POSITION: SPECIAL RELAY AT 5, AND EXTRA SPECIAL RELAY AT 6.

ADVANCE BONUS ADJ.



IN LIBERAL POSITION: THE "ADVANCE BONUS" LITES AT RIGHT TOP STAND-UP SWITCH AND LEFT SIDE TARGET SWITCH ARE ALWAYS LIT.

IN CONSERVATIVE POSITION: THE 'A' RELAY MUST BE ENERGIZED TO LITE THE RIGHT TOP STAND-UP SWITCH. 'B' RELAY MUST BE ENERGIZED TO LITE UP THE OTHER.

" LITTLE CHIEF "

GAME OPERATES AS FOLLOWS:

MAKING "A" AND "B" OPENS GATE AND LITES TOP CENTER ROLLOVER LANE.

KICKOUT HOLE LITES DOUBLE AND ADVANCES KICKOUT HOLE VALUE.

TOP CENTER ROLLOVER LANE, WHEN LIT, LITES DOUBLE AND ADVANCES KICKOUT HOLE VALUE.

WHEN KICKOUT HOLE VALUE ADVANCES TO "3" (ADJUSTABLE TO "4" OR "5"), TWO BOTTOM SPECIAL ROLLOVER LANES LITE, ALTERNATELY, FOR EXTRA BALL.

WHEN KICKOUT HOLE VALUE ADVANCES TO "4" (ADJUSTABLE TO "5" OR "6"), EXTRA SPECIAL ROLLOVER LANE LITES FOR CREDIT (ADJUSTABLE TO EXTRA BALL).

WHEN GATE IS OPEN (WHEN "A" AND "B" ARE MADE), BALL GOING OUT THRU GATE SCORES ACCUMULATED BONUS. IT RESETS BONUS TO 1,000, RESETS "A" AND "B" AND OPENS "DOUBLE" RELAY.

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 1 & 2 AND 3 & 4 RESET RELAYS, AND ENERGIZE BONUS RELAY.

SWITCHES ON 1 & 2 AND 3 & 4 RESET RELAYS, WILL PULSE THE (16) 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).

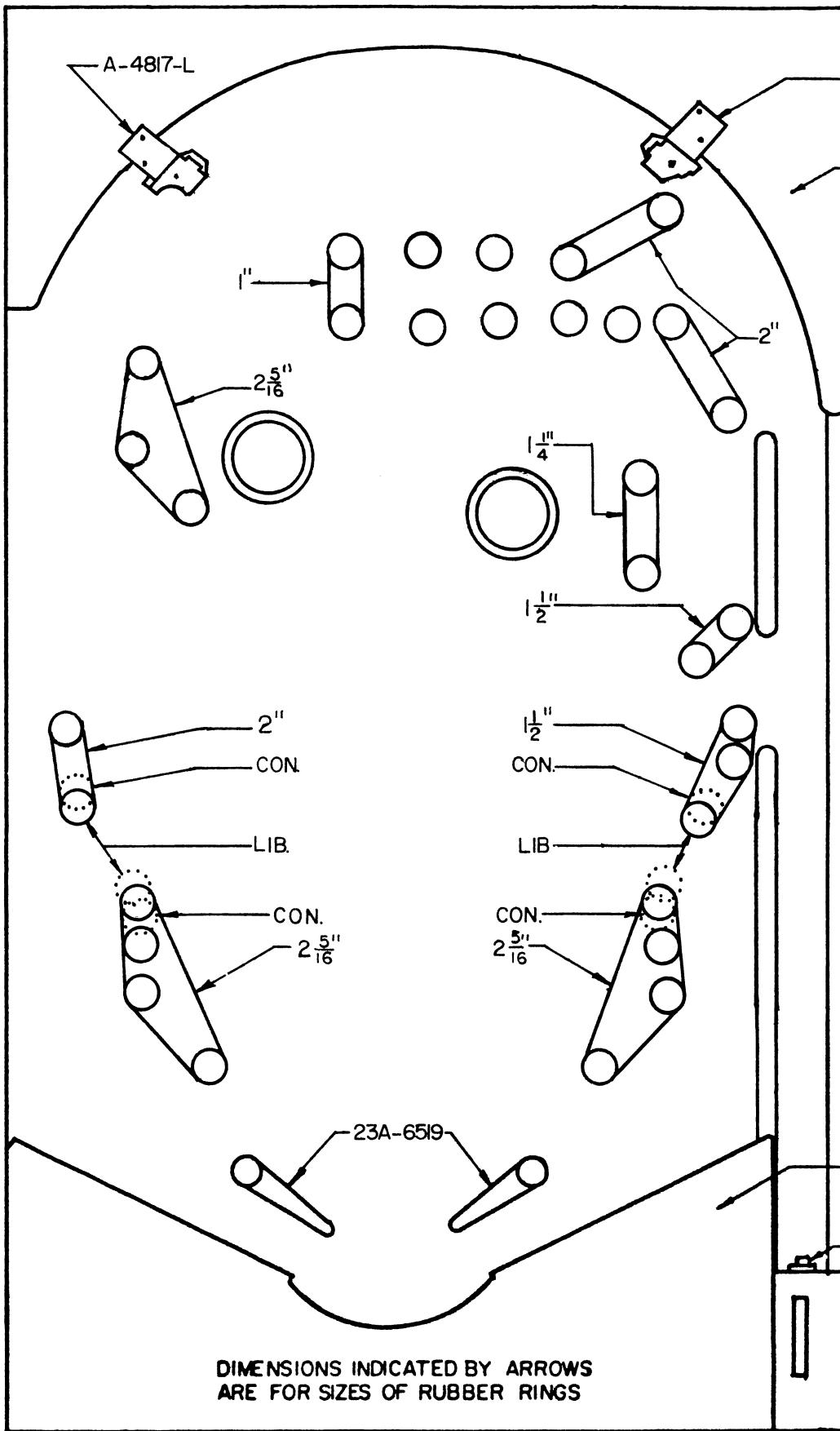
WHEN BONUS RELAY DROPS OUT, OUTHOLE RELAY IS ENERGIZED THRU ZERO SWITCH ON BONUS UNIT AND INDEX CAM SWITCH D.

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

"LITTLE CHIEF"

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-R
BALL GATE ASSEMBLY

IC-2852-456
TOP ARCH

ABBREVIATIONS:
CON. - CONSERVATIVE
LIB. - LIBERAL

RUBBER RING NUMBERS:

23A-6300	5/16" I.D.
23A-6302	1" I.D.
23A-6303	1 1/4" I.D.
23A-6304	1 1/2" I.D.
23A-6305	2" I.D.
23A-6306	2 5/16" I.D.
23A-6519	1 1/2" I.D.

GLASS SIZE 21x43

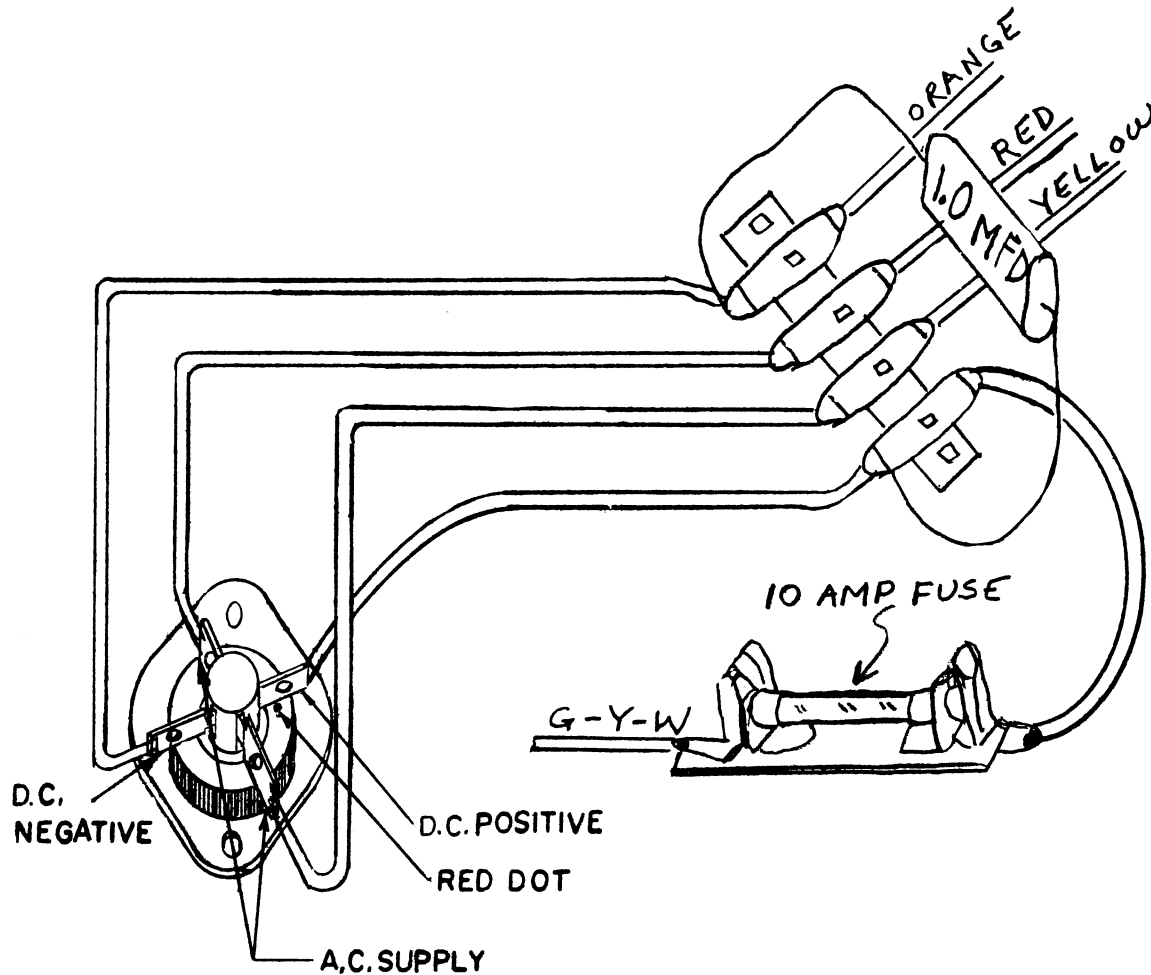
BALL DIAMETER 1 1/16"

ID-5573
BOTTOM ARCH

23A-6327
BALL SHOOTER RUBBER TIP

DIMENSIONS INDICATED BY ARROWS
ARE FOR SIZES OF RUBBER RINGS

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.

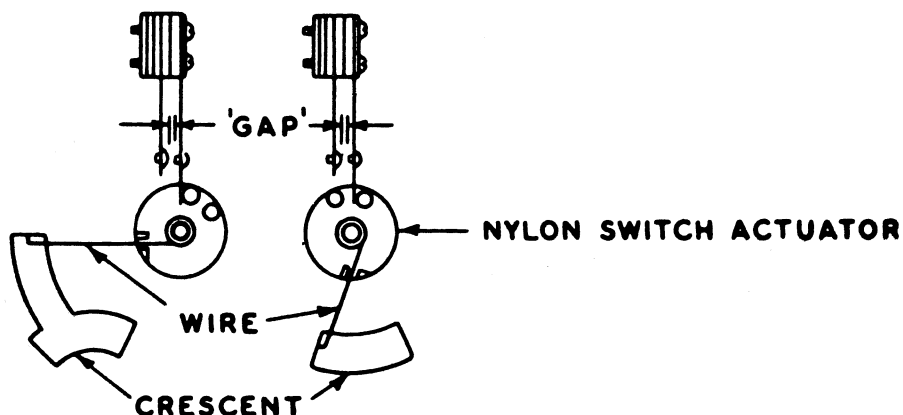
THE BRIDGE RECTIFIER SHOULD PRACTICALLY NEVER NEED REPLACING, AS IT IS RATED WELL OVER THE VOLTAGE AND CURRENT REQUIREMENTS OF THE COMPONENTS IT SUPPLIES.

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.

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 PRESSING LEFT FLIPPER BUTTON. MACHINE CAN STILL BE SHUT OFF BY TAPPING BOTTOM OF CABINET.

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

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	
(RIGHT SIDE)	B-7568	A-7614		
NO. MATCH			A-7548-1	SCORE MOTOR
(LEFT SIDE)	B-7569	A-7615		
PLAYER	C-6417	C-6521	A-6404-3	14A-7883 (60 CYCLE)
COIN	C-6414	B-7456-9	A-6402-3	
BONUS	C-6417	B-7456-50	A-6402-10	14A-7884 (50 CYCLE)
10 POINT	B-7253	A-6294	3C-7272	
100 POINT	-----	-----	3C-7272	
1000 POINT	B-7253	A-6294	3C-7272	
10000 POINT	B-7253	A-6294	3C-7272	
ALTERNATOR	-----	-----	3C-7272	
EJECT ADVANCE	SAME AS	NO. MATCH		

" LITTLE CHIEF " COIL CHART

NOTICE:

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

NUMBER	DESCRIPTION	LOCATION
<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	COIN UNIT STEP UP BONUS UNIT STEP UP BALL RELEASE COIL PLAYER UNIT STEP UP	MECH. PANEL PLAYFIELD PLAYFIELD INSERT
A 23-600	BALL COUNT UNIT STEP UP CREDIT UNIT STEP UP	MECH. PANEL INSERT
A2-23-750	KNOCKER	CABINET
A2-26-1300	TRIPLE CHIMES COILS . . . (3 req'd.)	CABINET
B1-26-800	SCORE DRUM UNITS . . . (16 req'd.) BALL COUNT UNIT RESET COIN UNIT RESET CREDIT UNIT RESET PLAYER UNIT RESET BONUS UNIT RESET	INSERT MECH. PANEL MECH. PANEL INSERT INSERT PLAYFIELD
FL 20-300/ 28-400	FLIPPERS . . . (2 req'd.)	PLAYFIELD
G 23-750	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
M 29-900	1 - 2 RESET RELAY 3 - 4 RESET RELAY	INSERT INSERT
M 29-1000	GAME OVER RELAY TRIP	MECH. PANEL
M 29-1100	10¢ RELAY 25¢ RELAY 10 POINT RELAY 100 POINT RELAY 1,000 POINT RELAY 50 POINT RELAY ADVANCE RELAY EJECT UNIT RESET RELAY GATE BONUS CONTROL RELAY	MECH. PANEL MECH. PANEL INSERT INSERT INSERT PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
M 30-1300	GATE RELAY SPECIAL RELAY EXTRA SPECIAL RELAY COIN SET UP RELAY	PLAYFIELD PLAYFIELD PLAYFIELD MECH. PANEL
M 30-1400 M1-31-1500 XM 27-675	CHANGE RELAY COIN LOCKOUT RELAY TOTAL PLAY METER COIL	PLAYFIELD FRONT DOOR CABINET
XS 28-1000	ALTERNATOR UNIT EJECT ADVANCE UNIT NUMBER MATCH UNIT	MECH. PANEL PLAYFIELD INSERT
Z 27-1000	COIN RELAY RESET RELAY PLAYER RESET RELAY OUTHOLE RELAY GAME OVER RELAY LATCH BONUS RELAY EJECT RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD
Z 28-1150	"A" RELAY "B" RELAY DOUBLE BONUS RELAY BALL INDEX RELAY TILT RELAY EXTRA BALL RELAY	PLAYFIELD PLAYFIELD PLAYFIELD MECH. PANEL MECH. PANEL MECH. PANEL
Z 29-1250	LOCK RELAY	MECH. PANEL

JACK LAYOUT

GAME LITTLE CHIEF

POSITION PANEL-INSERT SIZE 24

JACK LAYOUT

GAME LITTLE CHIEF

POSITION PANEL-INSERT SIZE 20

1	FEED	Bⓐ
2	"	Rⓐ
3	COIN LOCKOUT	B/R-4
4	CREDIT UNIT RESET	W/O
5	"	" W/BLU
6	"	" W/BR-1
7	KNOCKER	B/W
8	RESETRE.	BLU/BR1
9	BALL COUNT/BLU/ U. STEP UP	R-1
10	NO.1 BALL LITE	W/B-5
11	FEED	BRⓐ
12	3-4 RESETRE	B/BLU

1	R/Y-1 BALLCONT	S.U.
2	R/G-1	" "
3	Y/BR	PLAYER S.U.
4	G/Y	PLAYER U. RESET
5	GRY/Y-4	EXT. BALL RE.
6	B/O-1	1-2 RESET RE.
7	GRY	CREDIT U.
8	Yⓐ	FEED
9	W/G-4	SHOOT AGAIN LITE
10	B/Y-6	NO.2 BALL LITE
11	O/R-5	S. CHIME
12	B/G-3	L. CHIME

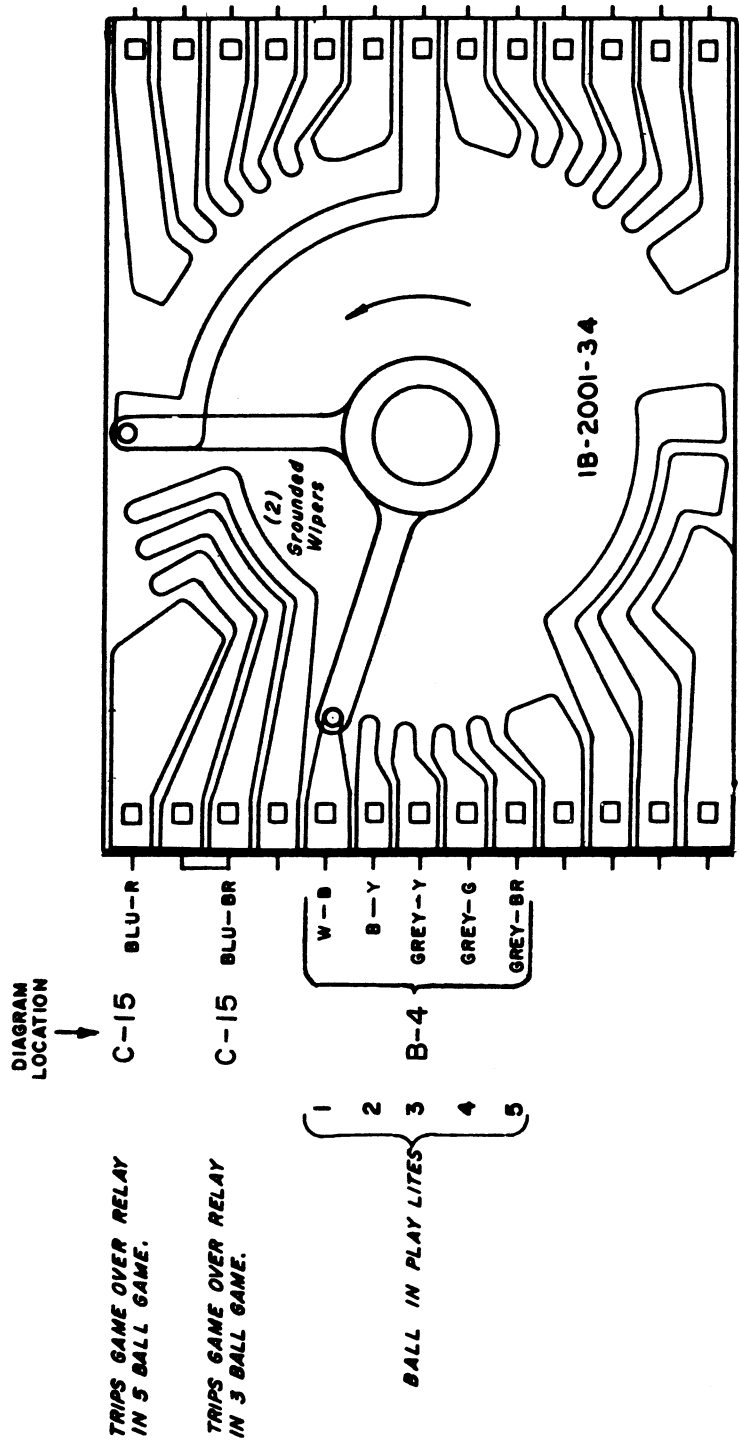
1	NO.3 BALL LITE	GRY/Y-1
2	1ST. PLAYER MATCH	BLU-2
3	2ND.	" " R/BR-2
4	3RD.	" " BR/O
5	4TH	" " BR/Y-5
6	CREDIT U. S.U.	GRY/B-2
7	N. CHIME	O-2
8	TILT LITE	BLU/B-2
9	BALL IND. RE.	BR/G-4
10	COIN RE.	G/W

1	GRY/W-3	1-CAN PLAY
2	Y/G-1	2- " "
3	O/W	3- " "
4	O/R-3	4- " "
5	R/W	BALLCOURT S.U.
6	BLU/R-4	G.O. RE. TRIP
7	BLU/Y-5	" "
8	R/O-3	NO. MATCH U. S.U.
9	GRY/G-2	NO. 4. BALL LITE
10	GRY/BR-2	NO. 5. " "

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 ADVANCE RELAY IS ENERGIZED.

ALSO, AFTER THIS UNIT HAS BEEN RESET TO ZERO, THE STEP-UP COIL IS ENERGIZED ONCE BY SCORE MOTOR CAM SWITCH 3A, THRU SWITCH ON OUTHOLE RELAY.

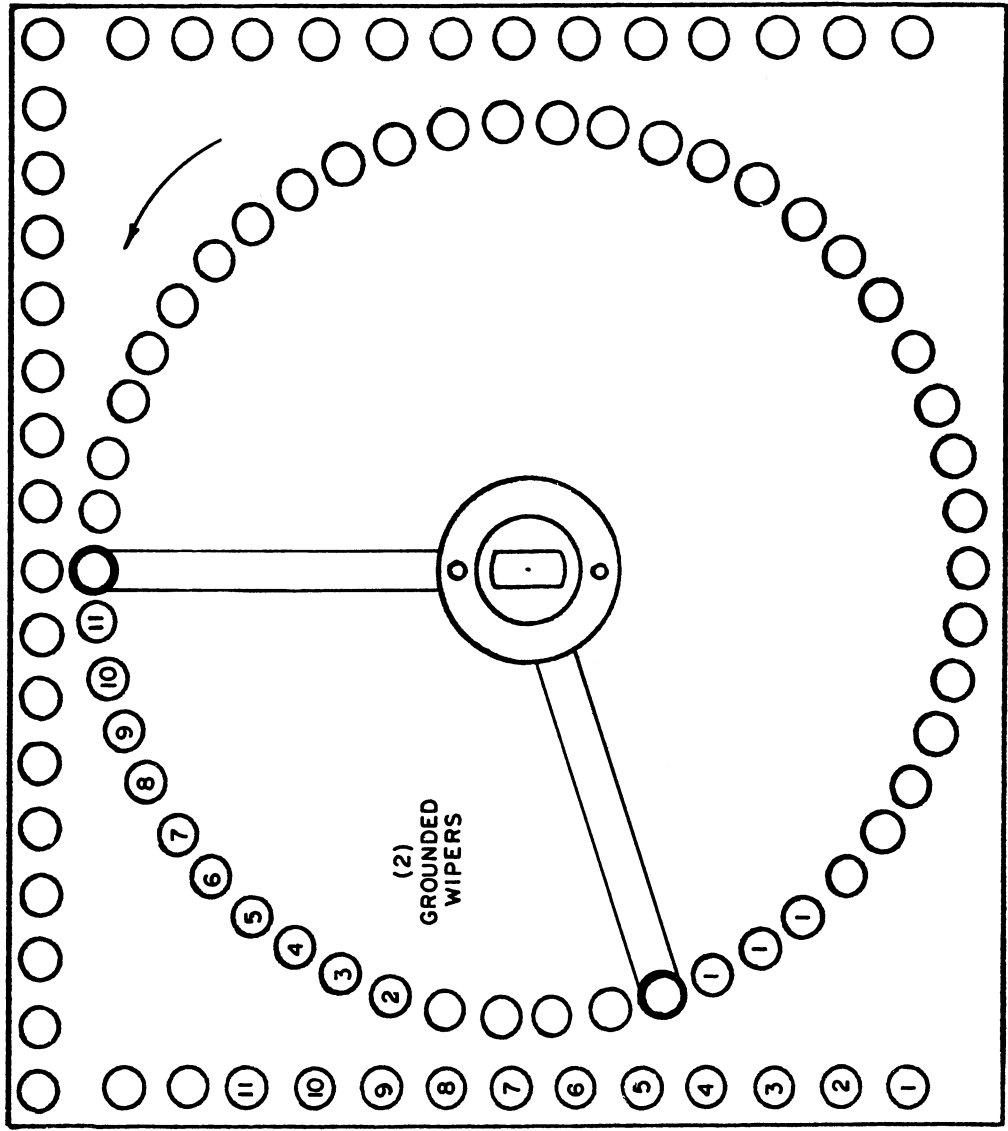
THE RESET COIL IS ENERGIZED BY BONUS RELAY, THRU DOUBLE BONUS RELAY AND SCORE MOTOR CAM SWITCH 3D OR 5B AND IMPULSE CAM SWITCH C.

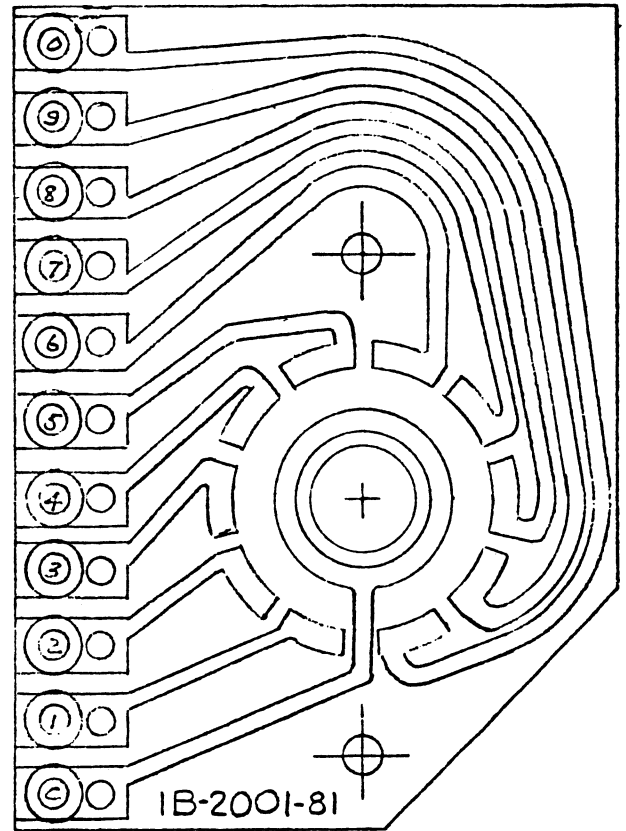
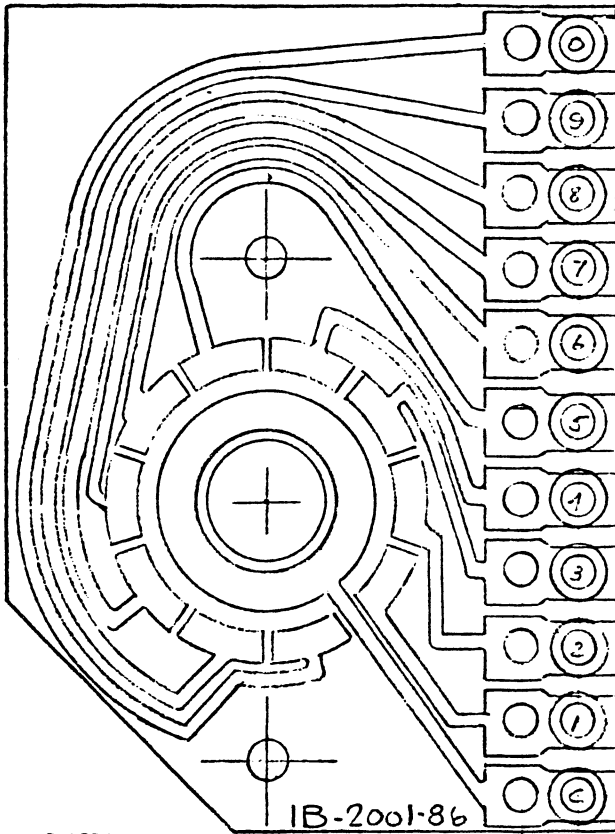
1000	R-BLU	(B-7)
2000	R-Y	
3000	R-W	
4000	R-BR	
5000	G-R	
6000	R-B	
7000	BLU-R	
8000	BLU-Y	
9000	BLU-W	
10000	BLU-BR	(B-8)
	GRAY-R	(C-15)

BONUS
LITES

IN CIRCUIT TO
BALL INDEX RELAY

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





No. MATCH UNIT

PRINTED CIRCUIT- IB-2001-86

PRINTED CIRCUIT- IB-2001-81

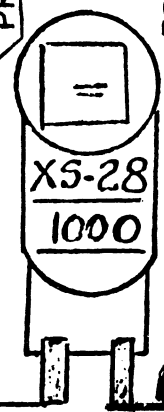
DIAGRAM LOCATION
↓

B-5

00 LITE	W/G-3	12
60 "	BR/W-4	11
10 "	BR/G-3	10
70 "	BR/Y-2	9
30 "	BR/BLU-2	8
80 "	BR/R-2	7
20 "	W/GRY-3	6
50 "	W/B-3	5
90 "	W/O-3	4
40 "	W/BR-5	3
FEED	Y-	2
		1
		C

Y/BLU	00-MATCH	12
G/Y-3	60 "	11
Y/G	10 "	10
G/W-2	70 "	9
Y/O	30 "	8
G/O-2	80 "	7
Y/BR-2	20 "	6
G/R-1	50 "	5
W/BLU-2	90 "	4
Y/B-1	40 "	3
GRY/R-4	FEED	2
		1
		C

E-8



DRIVE SPRING 10A-324-1

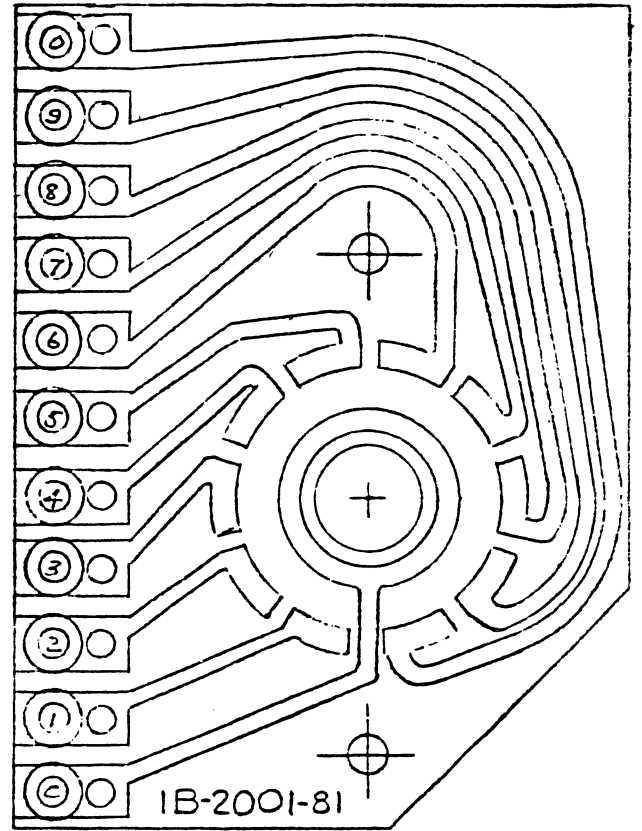
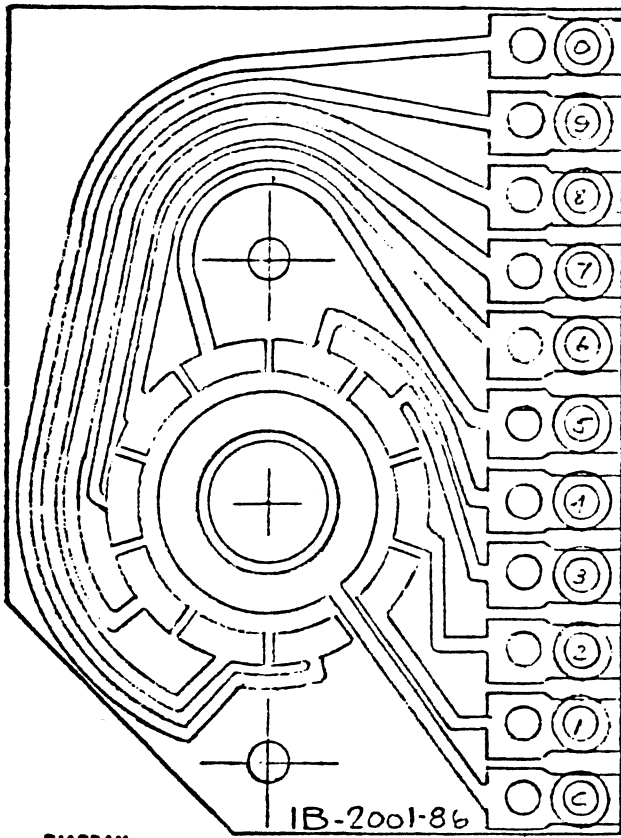
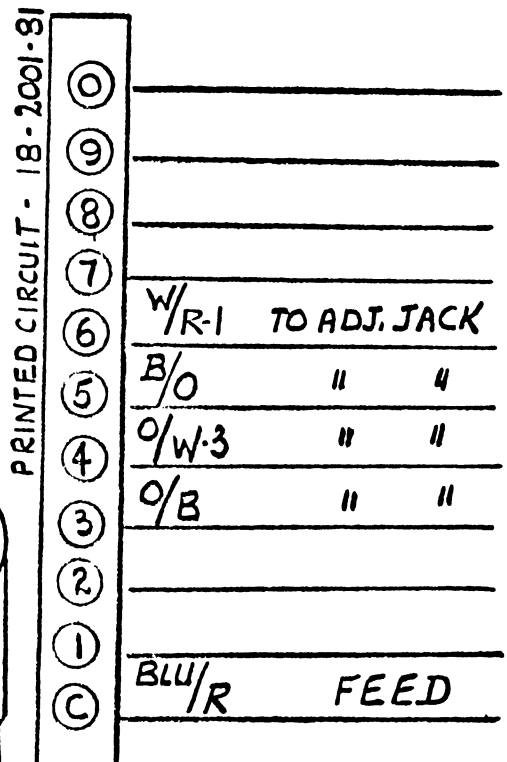
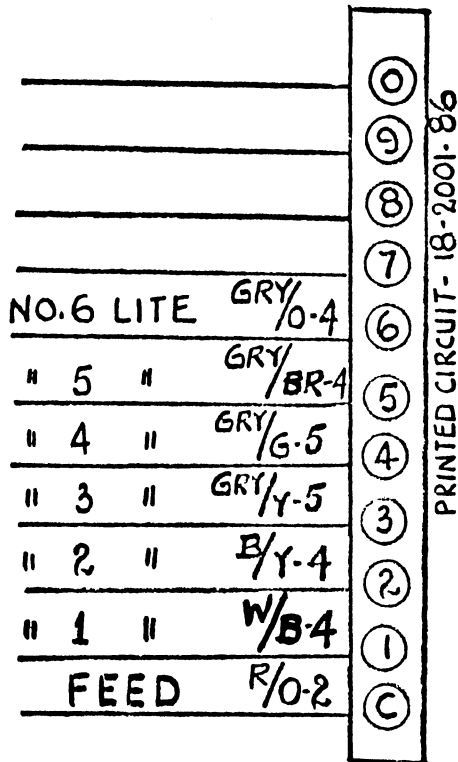


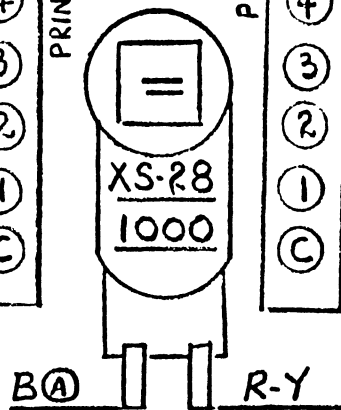
DIAGRAM LOCATION
↓

**EJECT ADVANCE
DRUM UNIT**



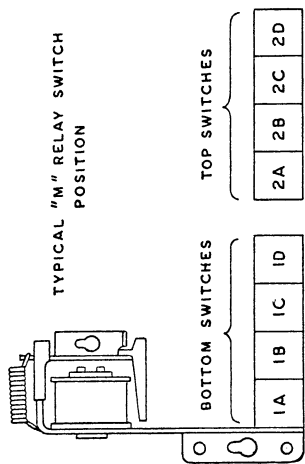
B-6

C-17



- PRINTED CIRCUIT IB-2001-86
- IB-2001-81
- DRIVE SPRING 10A-324-1

RELAYS & SWITCHES LOCATED ON MECHANISM PANEL



LOCK

IS ENERGIZED WHEN POWER IS SUPPLIED TO TRANSFORMER.

BALL INDEX

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

OUTHOLE

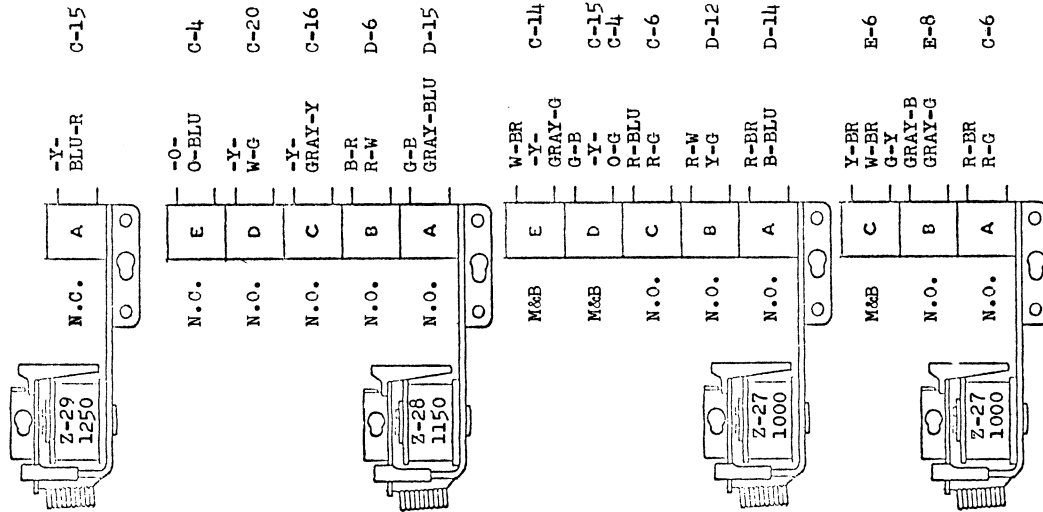
IS ENERGIZED BY ZERO SWITCH ON BONUS UNIT, THRU SWITCH ON BONUS RELAY.

PLAYER RESET

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

SWITCH TYPE →

DIAGRAM LOCATION →



ENERGIZES GAME-OVER RELAY TRIP COIL.

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

IN CIRCUIT TO PULSE 1,000 POINT RELAY (WHEN COLLECTING BONUS).

IN SERIES WITH SWITCH 'A' ON 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.

OPENS IN HOLD CIRCUIT TO TILT RELAY AND CLOSSES TO PULSE BONUS UNIT S.U. AND BALL RELEASE COILS.

OPENS IN HOLD CIRCUIT TO BALL INDEX, DOUBLE BONUS AND GATE BONUS CONTROL RELAYS, AND CLOSSES TO RUN SCORE MOTOR.

IN SERIES WITH SWITCH 'D' ON EXTRA BALL RELAY.

IN SERIES WITH SWITCH D ON GATE BONUS CONTROL RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

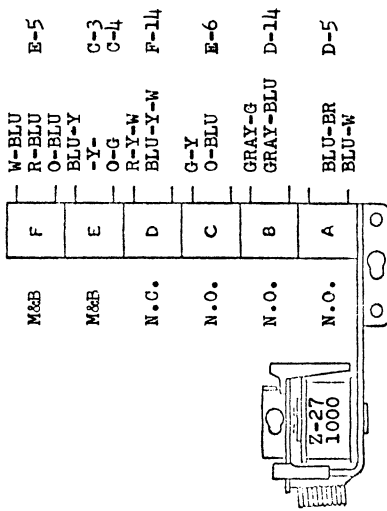
OPENS IN CIRCUIT TO PLAYER UNIT S.U. COIL AND CLOSSES TO PLAYER UNIT RESET COIL.

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

HOLD CIRCUIT TO THIS RELAY, THRU SCORE MOTOR INDEX CAM SWITCH C.

RESET

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



OPENS IN CIRCUIT TO COIN UNIT S.U. COIL AND CLOSSES TO RESET COILS ON COIN, BALL COUNT AND GAME-OVER.
 OPENS CIRCUIT TO CREDIT UNIT RESET COIL AND CLOSSES TO RUN SCORE MOTOR.
 OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

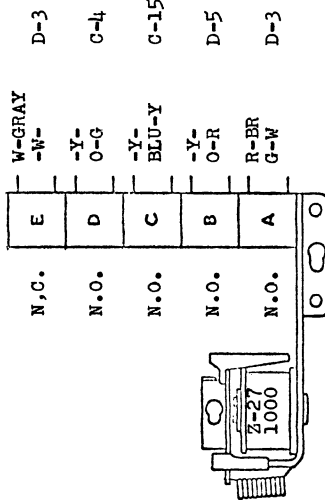
IN CIRCUIT TO PLAYER UNIT RESET COIL.

ENERGIZES BONUS RELAY, THRU ZERO SWITCH ON BONUS UNIT.

IN HOLD CIRCUIT TO THIS RELAY.

COIN

IS ENERGIZED BY COIN SWITCH OR CREDIT UNIT RESET COIL END-OF-STROKE SWITCH--- ALSO BY 5¢ COIN SWITCH, THRU SWITCH ON ALTERNATOR UNIT---ALSO BY 25¢ RELAY IF GAME IS ADJUSTED TO "1 PLAY FOR 25¢" OR "6 PLAYS FOR 25¢".



OPENS CIRCUIT TO COIN LOCKOUT COIL.

RUNS SCORE MOTOR.

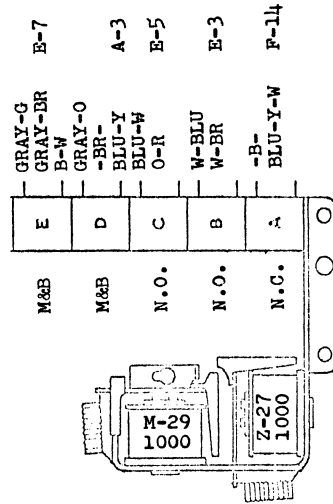
ENERGIZES GAME-OVER RELAY TRIP COIL, THRU BALL COUNT UNIT OR PLAYER UNIT ZERO SWITCHES.

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

IN HOLD CIRCUIT TO THIS R RELAY.

GAME-OVER

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



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

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

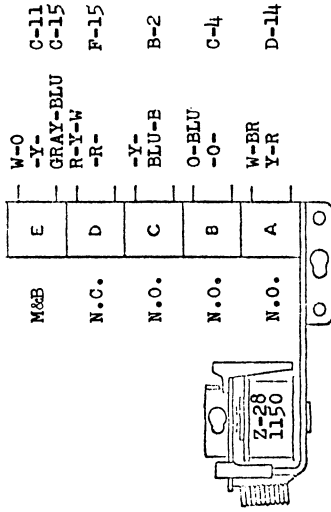
IN CIRCUIT TO RESET RELAY, THRU SWITCH ON COIN RELAY.

IN CIRCUIT TO CREDIT UNIT RESET COIL.

OPENS CIRCUITS TO PLAYFIELD SWITCHES.

TILT

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



OPENS IN HI-SCORE CIRCUITS AND ALL (16) SCORE DRUM COILS, AND CLOSSES TO ENERGIZE BALL INDEX RELAY.

OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

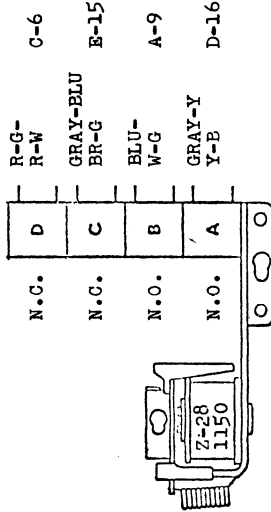
TO "TILT" LITE.

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 OUT-SIDE ROLLOVER WHEN LIT FOR SPECIAL. ALSO, WITH ADJUSTMENT JACK IN EXTRA BALL POSITION, BY RIGHT SIDE ROLLOVER WHEN LIT FOR EXTRA SPECIAL---AND BY HI-SCORE CIRCUIT.



IN SERIES WITH SWITCH 'B' ON BALL INDEX RELAY.

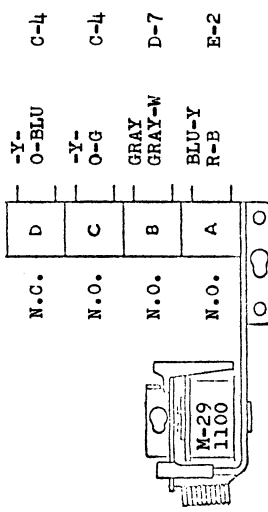
IN CIRCUIT TO BALL INDEX RELAY.

TO "SHOOT AGAIN" LITES.

IN HOLD CIRCUIT TO THIS RELAY.

10¢

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



IN HOLD CIRCUIT TO COIN SET-UP RELAY.

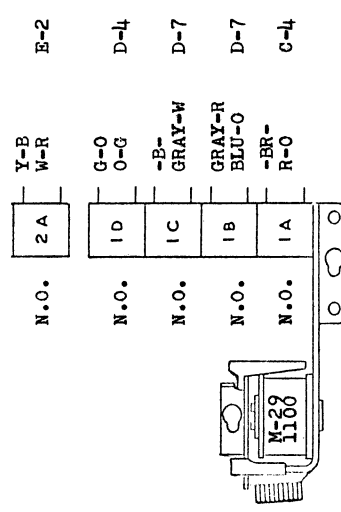
RUNS SCORE MOTOR.

PULSES CREDIT UNIT S.U. COIL, THRU IMPULSE CAM SWITCH B.

IN HOLD CIRCUIT TO THIS RELAY.

25¢

IS ENERGIZED BY 25¢ COIN SWITCH.



IN HOLD CIRCUIT TO THIS RELAY.

RUNS SCORE MOTOR, THRU 25¢ COIN SWITCH.

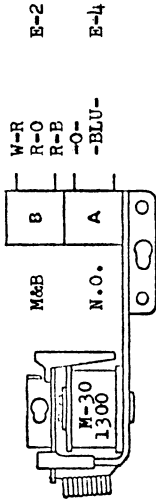
PULSES CREDIT UNIT S.U. COIL, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.

IN CIRCUIT TO CREDIT UNIT S.U. OR COIN RELAY, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.

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

COIN SET - UP

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



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

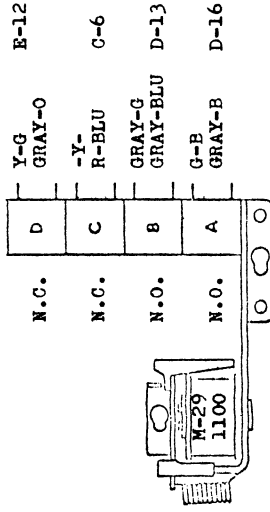
IN HOLD CIRCUIT TO THIS RELAY.

E-2

E-4

GATE BONUS CONTROL

IS ENERGIZED BY RIGHT SIDE BALL TROUGH SWITCH, THRU SWITCH ON GATE RELAY.



IN CIRCUIT TO "EJECT UNIT RESET RELAY".

IN SERIES WITH SWITCH 'C' ON OUTHOLE RELAY.

ENERGIZES BONUS RELAY, THRU ZERO SWITCH ON BONUS UNIT.

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

E-12

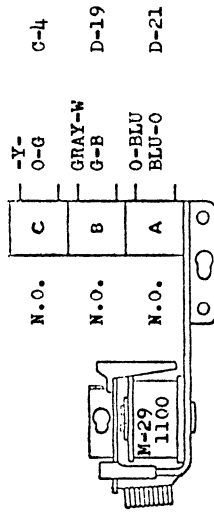
C-6

D-13

D-16

50 POINT

IS ENERGIZED BY (2) ROLLOVER BUTTON SWITCHES AND (4) STAND-UP SWITCHES.



RUNS SCORE MOTOR.

PULSES 10 POINT RELAY.

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

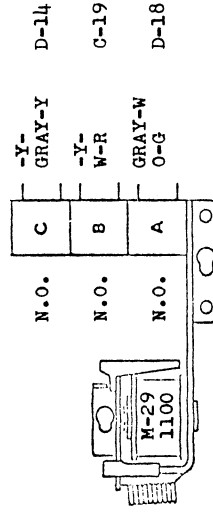
C-4

D-19

D-21

ADVANCE

IS ENERGIZED BY:
 A. (3) TOP ROLLOVER SWITCHES.
 B. (4) BOTTOM ROLLOVER SWITCHES.
 C. RIGHT SIDE ROLLOVER SWITCH.
 D. LEFT SIDE ROLLOVER SWITCH.
 E. RIGHT TOP STAND-UP, WHEN LIT.
 F. LEFT BOTTOM TARGET, WHEN LIT.



ENERGIZES BONUS UNIT S.U. COIL.

PULSES 100 POINT RELAY.

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

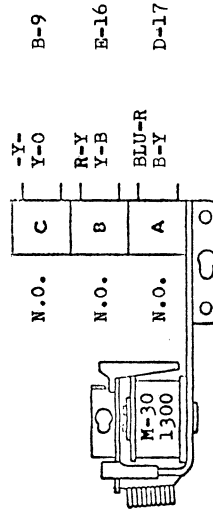
D-14

C-19

D-18

SPECIAL

IS ENERGIZED BY WIPERS ON EJECT ADVANCE UNIT, THRU "EJECT HOLE ADJUSTMENT JACK".



IN SERIES WITH SWITCH 'B' ON CHANGE RELAY.

IN CIRCUIT TO ENERGIZE EXTRA BALL RELAY.

HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON "EJECT UNIT RESET RELAY".

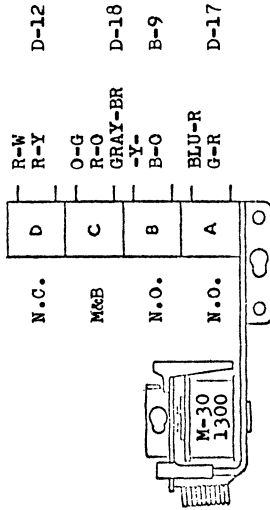
B-9

E-16

D-17

EXTRA SPECIAL

IS ENERGIZED BY WIPERS ON EJECT ADVANCE UNIT, THRU "EJECT HOLE ADJUSTMENT JACK"



IN CIRCUIT TO EJECT ADVANCE UNIT S.U. COIL.

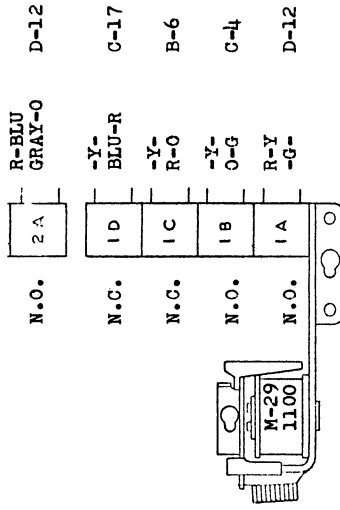
OPENS IN CIRCUIT TO ADVANCE RELAY AND CLOSSES IN CIRCUIT TO "CREDIT -EXTRA BALL" ADJUSTMENT JACK.

TO "EXTRA SPECIAL" LITE.

HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON "EJECT UNIT RESET RELAY"

EJECT UNIT RESET

IS ENERGIZED BY OUTHOLE RELAY, THRU SWITCH ON "GATE BONUS CONTROL RELAY".



HOLD CIRCUIT TO THIS RELAY, THRU ZERO SWITCH ON EJECT ADVANCE UNIT.

IN CIRCUIT TO SPECIAL RELAY AND EXTRA SPECIAL RELAY.

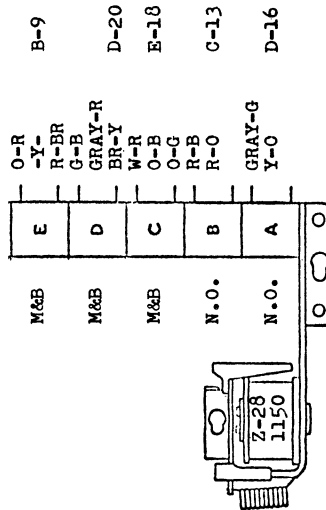
IN CIRCUIT TO (6) EJECT LITES.

RUNS SCORE MOTOR.

PULSES EJECT ADVANCE UNIT S.U. COIL.

"B"

IS ENERGIZED BY (2) "B" ROLLOVER SWITCHES.



OPENS TO (2) 'B' ROLLOVER LITES AND CLOSSES TO BOTTOM SIDE ROLLOVER BUTTON LITE.

OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSSES TO 1,000 POINT RELAY.

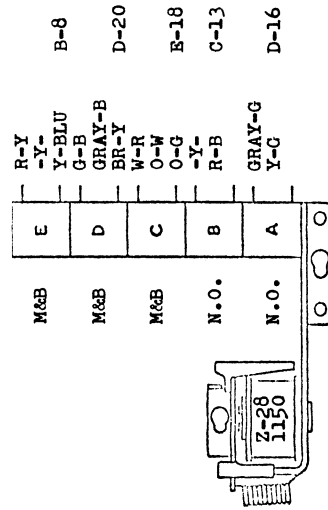
OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSSES TO ADVANCE RELAY.

IN CIRCUIT TO GATE RELAY AND EJECT RELAY.

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

"A"

IS ENERGIZED BY (2) "A" ROLLOVER SWITCHES.



OPENS TO (2) 'A' ROLLOVER LITES AND CLOSSES TO TOP SIDE ROLLOVER BUTTON LITE.

OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSSES TO 1,000 POINT RELAY.

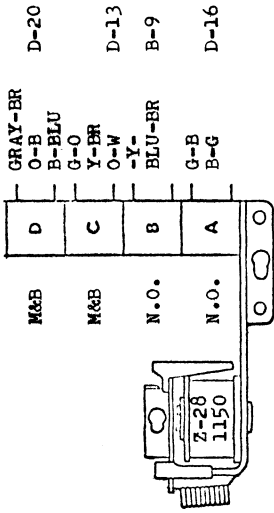
OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSSES TO 1,000 POINT RELAY.

IN SERIES WITH SWITCH 'B' ON "B" RELAY.

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

DOUBLE BONUS

IS ENERGIZED BY EJECT RELAY.

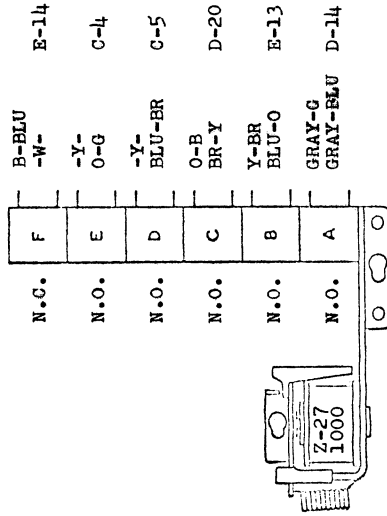


IN SERIES WITH SWITCH 'C' ON BONUS RELAY (WHEN COLLECTING BONUS).
 IN SERIES WITH SWITCH 'B' ON BONUS RELAY.
 TO DOUBLE BONUS LITE.

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

BONUS

IS ENERGIZED BY GATE BONUS CONTROL RELAY, RESET RELAY OR OUTHOLE SWITCH.



OPENS CIRCUIT TO OUTHOLE RELAY.

RUNS SCORE MOTOR.

IN HOLD CIRCUIT TO RESET RELAY.

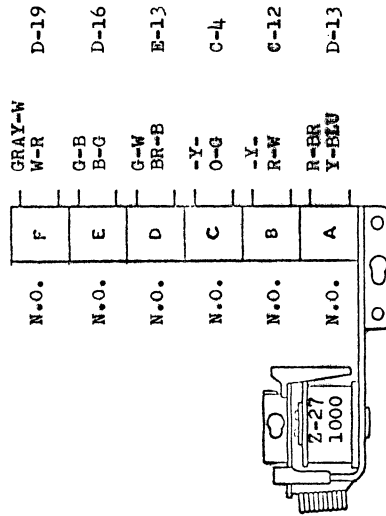
IN CIRCUIT TO 1,000 POINT RELAY. (WHEN COLLECTING BONUS).

IN CIRCUIT TO BONUS UNIT RESET COIL.

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

EJECT

IS ENERGIZED BY EJECT HOLE SWITCH OR BY TOP CENTER ROLLOVER SWITCH.



PULSES 100 POINT RELAY.

ENERGIZES DOUBLE BONUS RELAY.

ENERGIZES EJECT COIL AT SCORE MOTOR CAM SWITCH 4C.

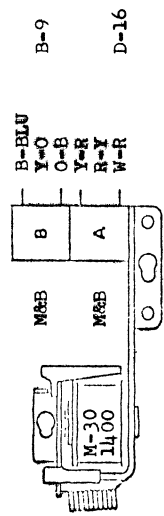
RUNS SCORE MOTOR.

IN SERIES WITH SWITCH 'D' ON EXTRA SPECIAL RELAY.

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

CHANGE

IS ENERGIZED BY NUMBER MATCH UNIT ALTERNATOR SWITCH.



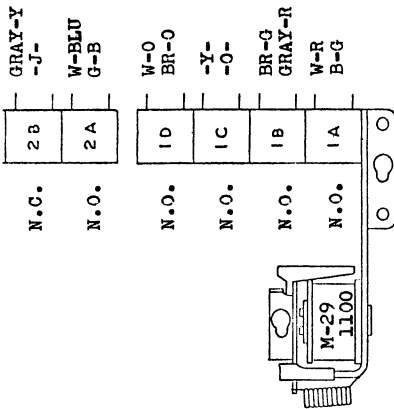
OPENS TO RIGHT BOTTOM OUTSIDE ROLLOVER LITE AND CLOSSES TO LEFT BOTTOM OUTSIDE ROLLOVER LITE.

IN SERIES WITH SWITCH 'B' ON SPECIAL RELAY.

10 POINT

IS PULSED BY:

- 50 POINT RELAY.
- (2) KICKER SWITCHES.
- TOP SIDE ROLLOVER BUTTON, THRU SW. ON 'A' RELAY.
- BOTTOM SIDE ROLLOVER BUTTON, THRU SW. ON 'B' RELAY.

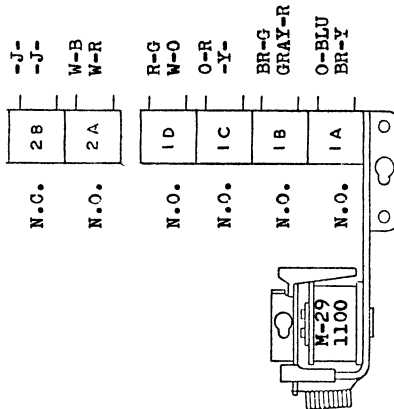


- C-16 IN SERIES WITH SWITCH 'A' ON EXTRA BALL RELAY.
- E-20 IN HOLD CIRCUIT TO THIS RELAY.
- C-10 PULSES 10 POINT DRUM UNITS, THRU PLAYER UNIT DISC.
- C-13 PULSES MEDIUM CHIME COIL.
- D-15 ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.
- E-19 PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCHES ON 10 POINT DRUM UNITS.

100 POINT

IS PULSED BY:

- ADVANCE RELAY.
- (2) JET BUMPER SWS.
- EJECT RELAY.
- RIGHT TOP STAND-UP SW., THRU "ADVANCE BONUS ADJ. JACK".
- LEFT BOTTOM TARGET SWITCH, THRU "ADVANCE BONUS ADJ. JACK".

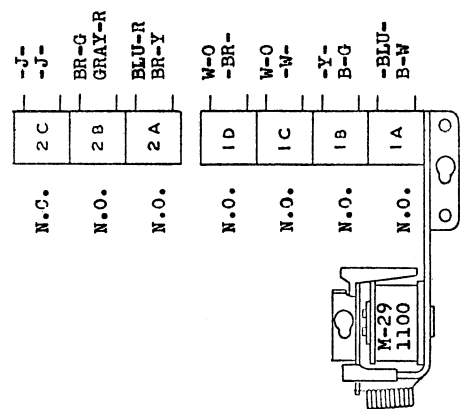


- C-16 IN SERIES WITH SWITCH 2B ON 10 POINT RELAY.
- E-19 IN HOLD CIRCUIT TO THIS R RELAY.
- C-10 PULSES 100 POINT DRUM UNITS, THRU PLAYER UNIT DISC.
- C-12 PULSES SMALL CHIME COIL.
- D-15 ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.
- E-20 PULSES 1,000 POINT RELAY, THRU 9TH POSITION SWITCHES ON 100 POINT DRUM UNITS.

1000 POINT

IS PULSED BY:

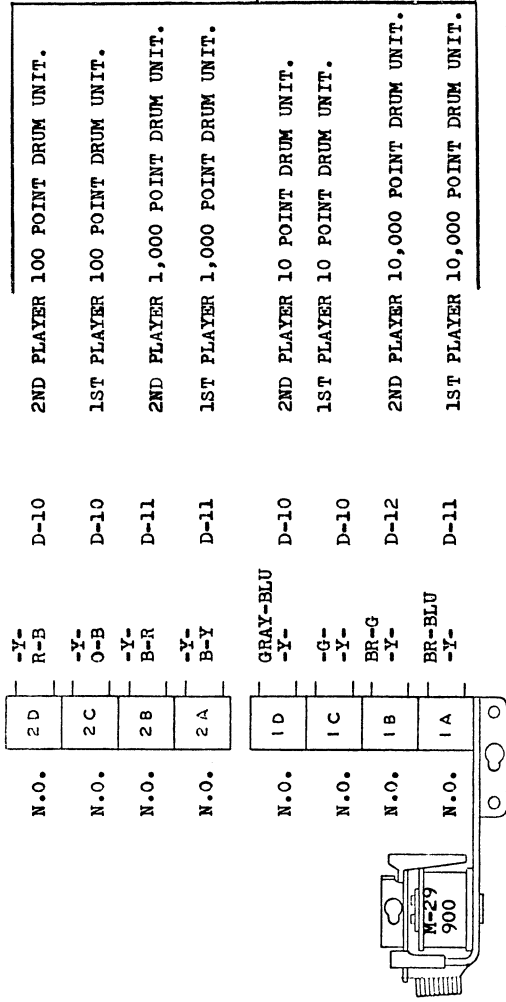
- TOP SIDE ROLLOVER BUTTON, THRU SW. ON 'A' RELAY.
- BOTTOM SIDE ROLLOVER BUTTON, THRU SW. ON 'B' RELAY.
- BONUS RELAY, WHEN COLLECTING BONUS.



- C-16 IN SERIES WITH SWITCH 2B ON 100 POINT RELAY.
- D-15 ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.
- E-20 IN HOLD CIRCUIT TO THIS RELAY.
- C-11 PULSES 10,000 POINT DRUM UNITS, THRU 9TH POSITION SWITCHES ON 1,000 POINT DRUM UNITS.
- C-11 PULSES 1,000 POINT DRUM UNITS, THRU PLAYER UNIT DISC.
- C-13 PULSES LARGE CHIME COIL.
- F-8 IN HI-SCORE CIRCUIT TO "CREDIT-EXTRA BALL" ADJUSTMENT JACK.

1 1/2 RESET

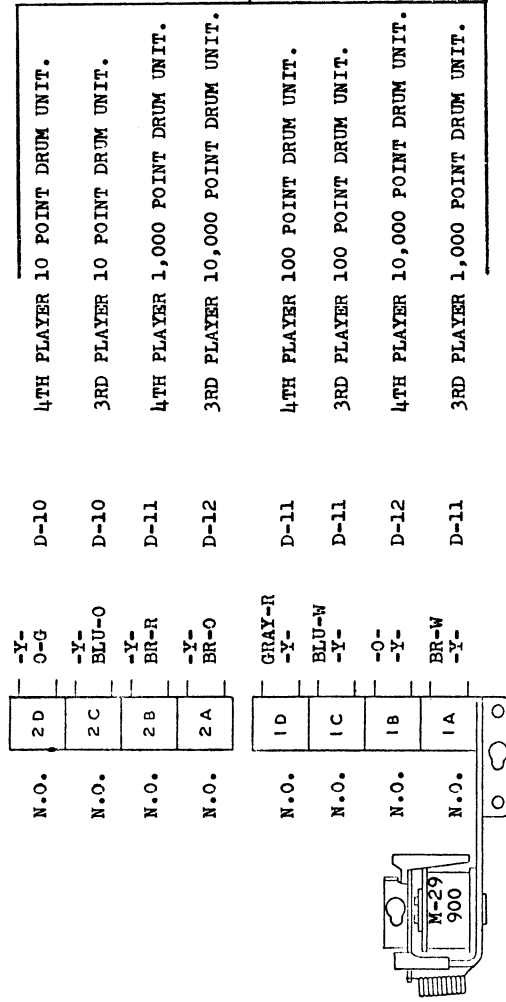
IS PULSED BY "FORWARD IMPULSE CAM" SWITCH 'A', THRU SWITCH 'A' ON RESET RELAY.



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

3 3/4 RESET

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



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