

# Instruction Manual for **PAT HAND**

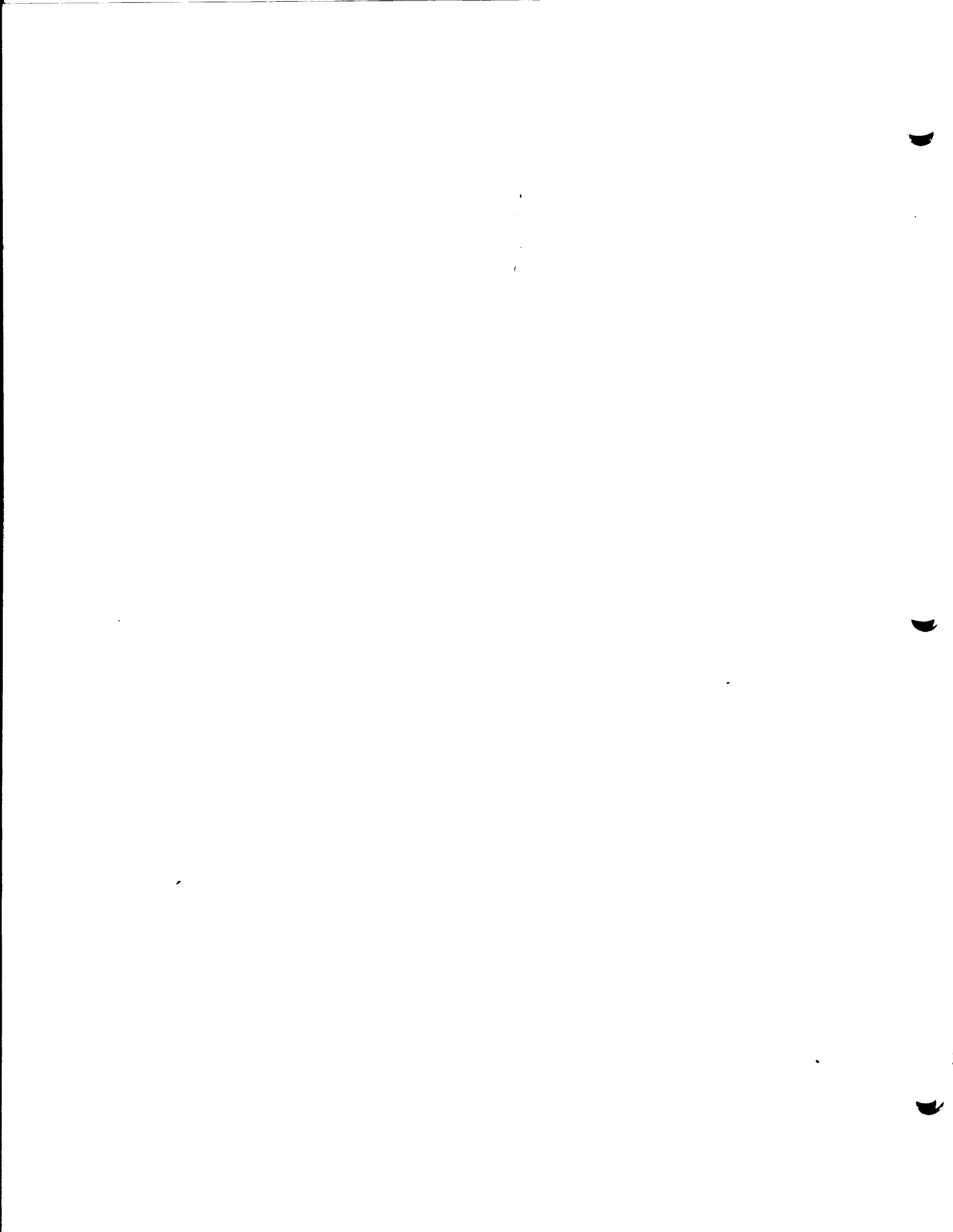


 **Williams**® ELECTRONICS, INC.

3401 N. California Ave.  
Phone 267-2240

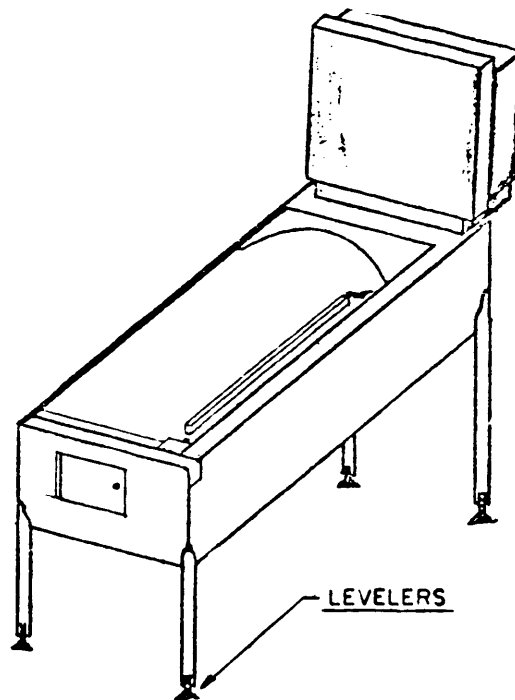
MAY  
1975

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



## IMPORTANT NOTICE

DUE TO THE NATURE OF THIS GAME  
IT IS MOST IMPORTANT THAT THE  
GAME BE LEVELED PROPERLY.



IF THE GAME IS SCORING TOO HIGH  
(TOO LIBERAL) ADJUST LEVELERS SO  
THAT PLAYFIELD PITCHES SLIGHTLY  
TO THE RIGHT.

IF THE GAME IS SCORING TOO LOW  
(TOO CONSERVATIVE) ADJUST THE  
LEVELERS SO THAT PLAYFIELD  
PITCHES SLIGHTLY TO THE LEFT.

# PAT HAND

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## 4 PLAYER

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GAME OPERATES AS FOLLOWS:

MAKING ACE, KING, QUEEN, JACK, 10 LITES TOP  
ROLLOVER BUTTONS TO SCORE 1,000 POINTS.

MAKING ACE, KING ETC.--2ND TIME--DOUBLES  
BONUS VALUE.

MAKING ACE, KING ETC.--3RD TIME--LITES TARGET  
SPECIAL LITE AND RIGHT BOTTOM (INSIDE) ROLLOVER  
SPECIAL LITE.

HITTING LIT TARGET WHEN TARGET SPECIAL IS  
LIT, SCORES 1 CREDIT OR EXTRA BALL.

MAKING RIGHT BOTTOM (INSIDE) ROLLOVER, WHEN  
LIT "SPECIAL", SCORES 1 CREDIT OR EXTRA BALL.

MAKING 4 JOKERS--SCORES EXTRA BALL.

1 CREDIT FOR EACH PLAYER MATCHING LAST TWO  
NUMBERS ON SCORE REELS TO LIT NUMBER THAT APPEARS  
ON BACK GLASS WHEN GAME IS OVER.

MAXIMUM 1 EXTRA BALL PER BALL IN PLAY.

TILT PENALTY---BALL IN PLAY.

TILT DOES NOT DISQUALIFY PLAYER.

## SEQUENCE OF OPERATION

### RESET CYCLE

CREDIT RELAY 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.

SWITCHES ON CREDIT RELAY WILL OPEN CIRCUIT TO COIN LOCK-OUT COIL, PULSE CREDIT UNIT RESET COIL, AND 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.

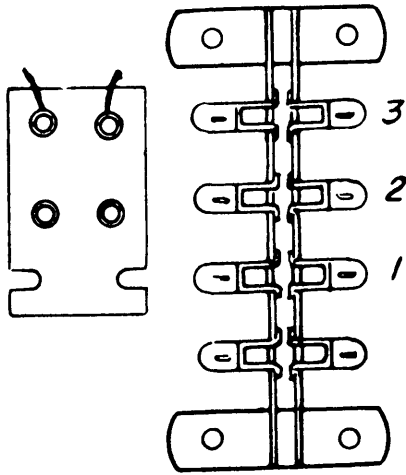
SWITCHES ON BONUS RELAY WILL RUN SCORE MOTOR, HOLD RESET RELAY IN AND PULSE BONUS UNIT RESET COIL, (BONUS RELAY IS HELD IN BY ZERO SWITCH ON BONUS UNIT).

WHEN BONUS RELAY DROPS OUT, OUTHOLE RELAY IS ENERGIZED THRU WIPER FINGERS ON BONUS UNIT AND CAM SWITCH 6B FORWARD.

SWITCHES ON OUTHOLE RELAY WILL RUN SCORE MOTOR, ENERGIZE BOTH 115 VOLT RESET COILS ON RELAY BANK, PULSE BONUS UNIT S.U. COIL, AND PULSE BALL RELEASE COIL TO PROPEL BALL TOWARD PLUNGER.

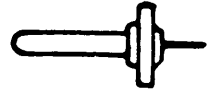
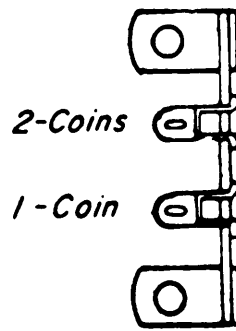
# ADJUSTMENTS ON MECHANISM PANEL

## 10¢ Adjustment



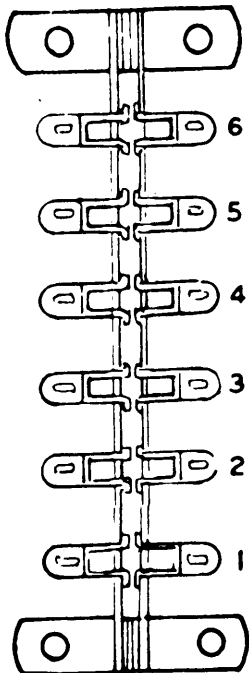
PROVIDES  
1, 2 OR  
3 PLAYS  
FOR ONE  
COIN.

## 5¢ Adjustment

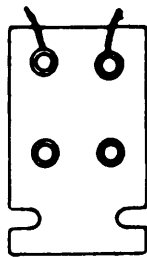


IN "2 COINS FOR  
1 PLAY", CIRCUIT  
TO COIN RELAY  
PASSES THRU SW.  
ON ALTERNATOR  
UNIT.

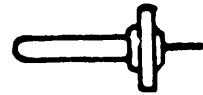
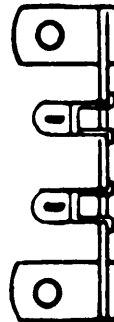
## 25¢ Adjustment



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



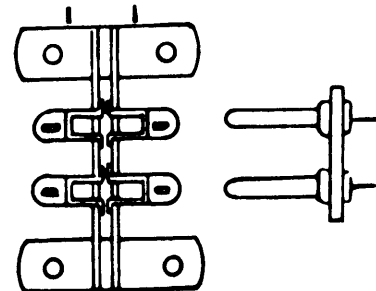
## Motor Service Jack



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

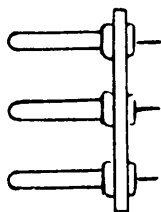
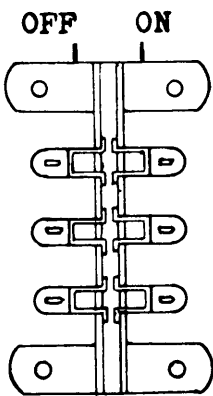
## No. of Balls Adjustment

3 BALL                      5 BALL



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

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

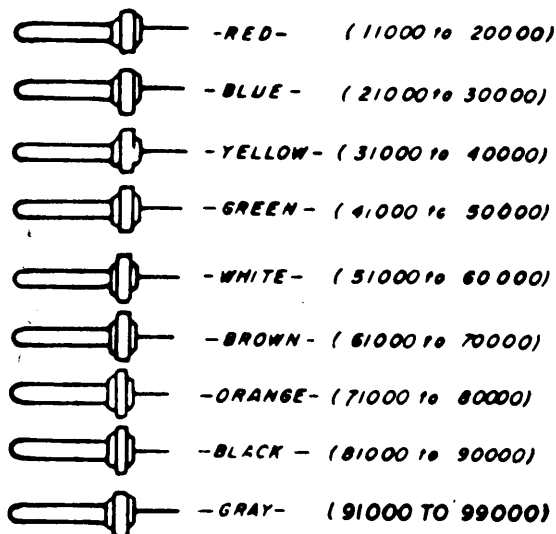
█

1000 <input type="checkbox"/>	6000 <input type="checkbox"/>
2000 <input type="checkbox"/>	7000 <input type="checkbox"/>
3000 <input type="checkbox"/>	8000 <input type="checkbox"/>
4000 <input type="checkbox"/>	9000 <input type="checkbox"/>
5000 <input type="checkbox"/>	0000 <input type="checkbox"/>

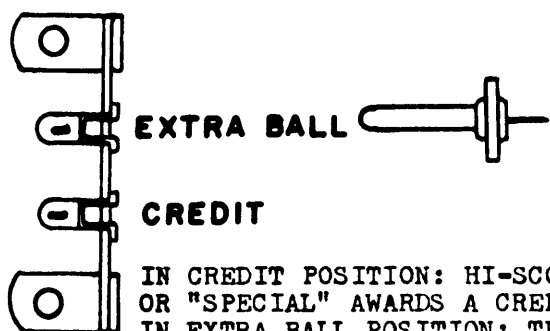
Insert plugs into 10 Point Female at desired positions.

Examples:

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

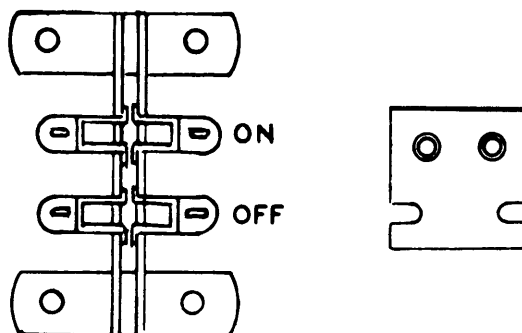


## PLAY ADJUSTMENT



IN CREDIT POSITION: HI-SCORES OR "SPECIAL" AWARDS A CREDIT. IN EXTRA BALL POSITION: THEY WILL ENERGIZE EXTRA BALL RE. (TRIPPING NO. 1 THRU NO. 4 JOKER RELAYS WILL ALWAYS ENERGIZE EXTRA BALL RELAY).

## NUMBER MATCH ADJUSTMENT

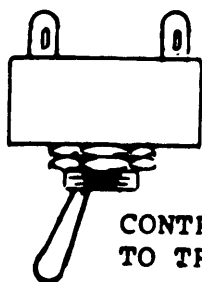


IN "ON" POSITION, A NUMBER MATCH LITE WILL APPEAR WHEN GAME IS OVER. TO AWARD CREDIT, WHEN NUMBER IS MATCHED, "PLAY" ADJUSTMENT MUST BE IN CREDIT POSITION.

IN "OFF" POSITION, NUMBER MATCH IS INOPERATIVE.

## MASTER ON-OFF SW.

*(Located under front of Cabinet)*



CONTROLS POWER TO TRANSFORMER

## SUGGESTED SCORE CARDS

### REPLAY

3BALL...457-2

5BALL...457-1

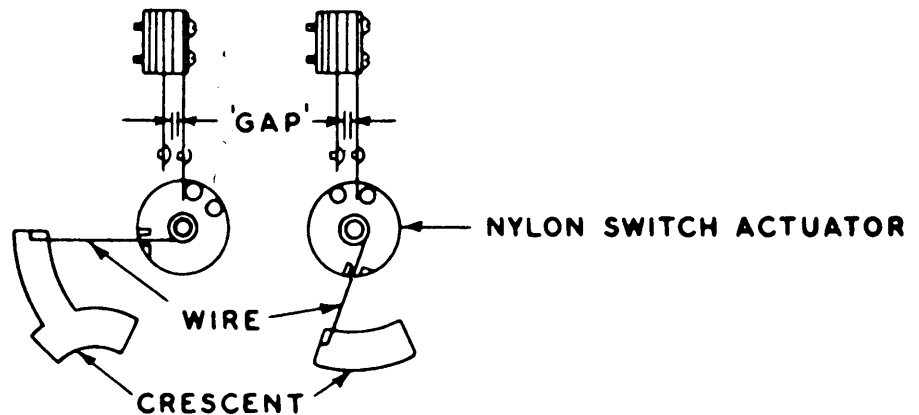
### EXTRA BALL

3BALL...457-33

5BALL...457-39

# 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.

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### POWER TRANSFORMER:

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

### LEG LEVELERS:

ARE PROVIDED FOR TWO PURPOSES - 1ST TO LEVEL GAME ON LOCATION, 2ND TO INCREASE PITCH FOR GAME PERCENTAGING. IF IT IS DESIRED TO SPEED UP PLAY AND DECREASE SCORES, RAISE REAR LEG LEVELERS TO INCREASE PITCH.



## 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.

## **CAUTION!**

The playboard on this machine has an improved finish with excellent wearing properties. Do not under any circumstances clean the board with water, water soap solutions or harsh abrasives. Avoid such things as steel wool, kitchen cleansers or abrasive hand soap. Water will weaken the adhering of the paint to the board and abrasives shorten the board life by many thousand plays. A wax base cleaner with negligible abrasive qualities used lightly, but frequently, will extend the board life to its full capabilities.

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## **SERVICEMAN TO REMOVE BACKGLASS:**

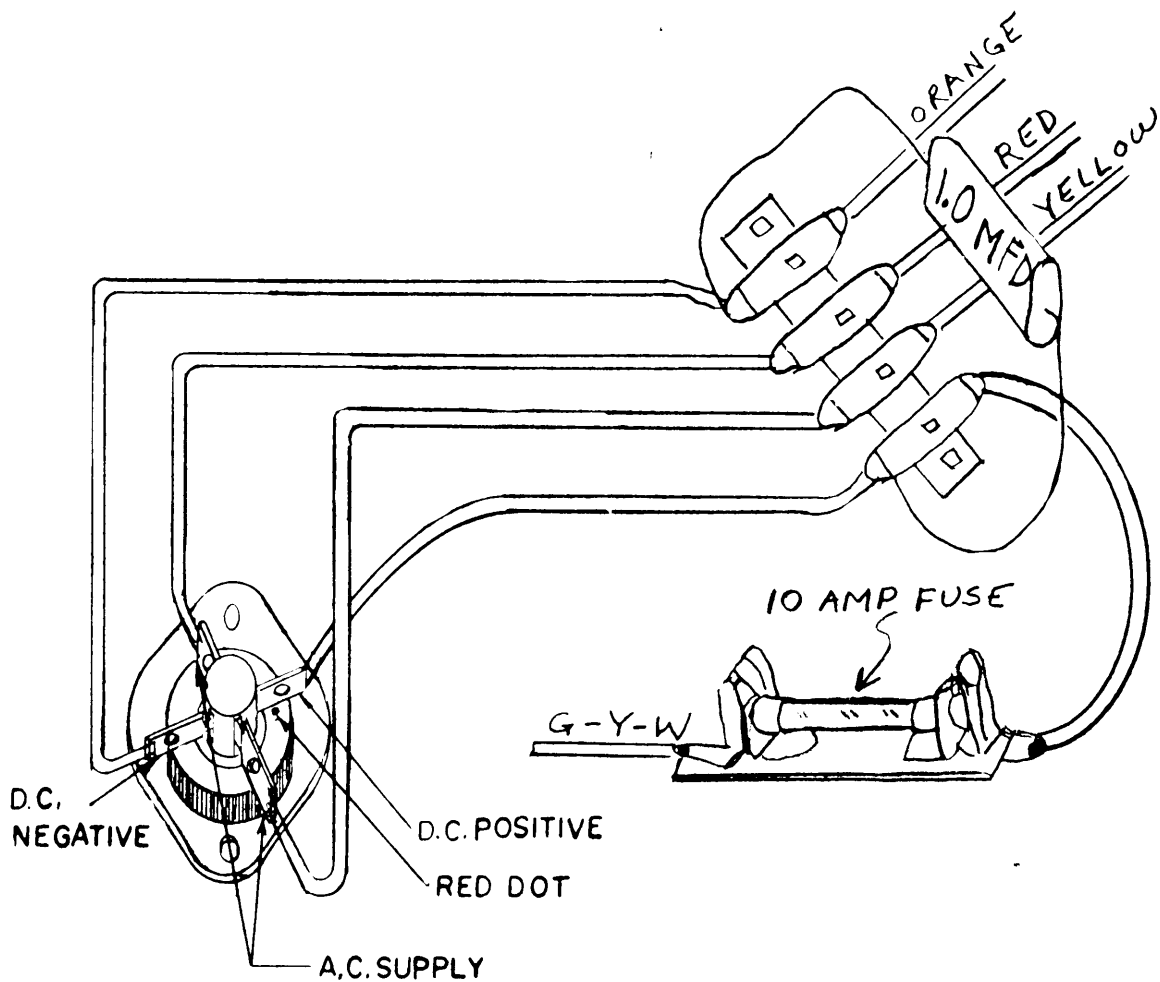
- **WITH BACK DOOR REMOVED, PULL BACK ON BRACKETS AT INSIDE TOP OF LITE BOX.**
- **FROM THE FRONT OF GAME, LIFT GLASS UP AND OUT.**

# **IMPORTANT NOTICE**

**KINDLY INFORM LOCATIONS THAT  
DISPLAY LIGHTS ARE LIT WHEN MASTER  
SWITCH IS TURNED ON. ALSO, THE BOTTOM  
CABINET KICK-OFF SWITCH HAS BEEN  
ELIMINATED.**

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

## 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.

# 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

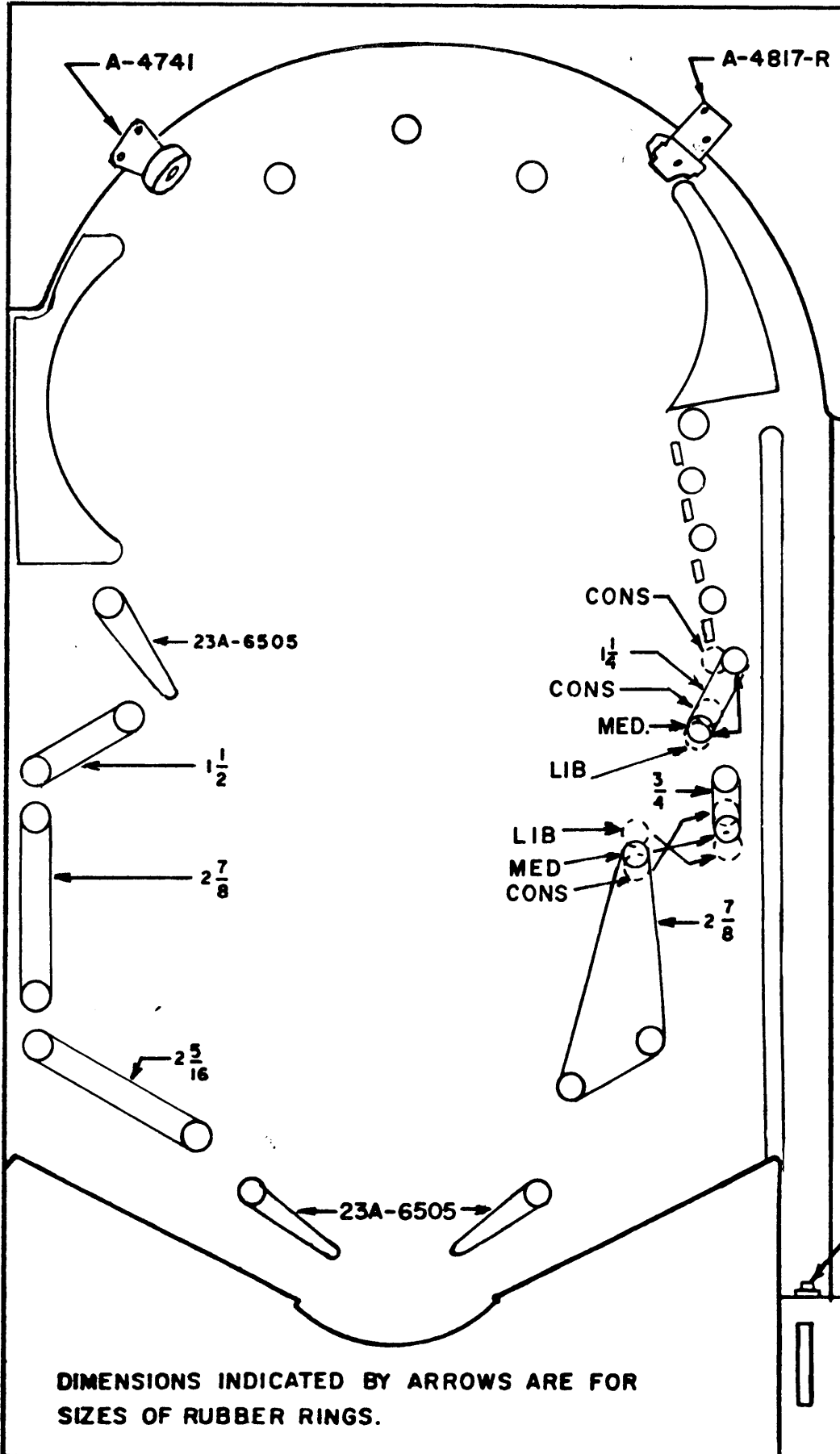
WHEN ORDERING PARTS ALWAYS SPECIFY NAME OF  
UNIT, GAME AND SERIAL NUMBER, IN ADDITION TO A  
CLEAR DESCRIPTION OF THE PART AND PART  
NUMBER IF POSSIBLE.

### 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	SCORE MOTOR
PLAYER	C-6417	C-6521	A-6404-3	14A-7883
NO. MATCH	C-6417	C-6521	A-6403	(60) CYCLE
COIN	C-6414	B-7456-9	A-6402-3	14A-7884
BONUS	C-6417	B-7456-49	A-6402-10	(50) CYCLE
TENS	B-7253	A-6294	3C-7272	
HUNDREDS	-----	-----	3C-7272	
THOUSANDS	B-7253	A-6294	3C-7272	
10 THOUSANDS	B-7253	A-6294	3C-7272	
ALTERNATOR	-----	-----	3C-7272	

# "PAT HAND" - POST ADJUSTMENT SHEET

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



**ABBREVIATIONS:**  
 CONS.-CONSERVATIVE  
 LIB.-LIBERAL  
 MED.-MEDIUM

**RUBBER RING NUMBERS:**

23A-6300	5/16	I.D.
23A-6303	1 1/4	I.D.
23A-6307	2 7/8	I.D.
23A-6308	3 3/8	I.D.
23A-6306	2 5/16	I.D.
23A-6304	1 1/2	I.D.
23A-6301	3/4	I.D.

"PAT HAND" 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
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	CABINET
<u>SOLENOID COILS</u>		
A 22-550	BALL RELEASE COIL BONUS UNIT STEP UP COIN UNIT STEP UP PLAYER UNIT STEP UP	PLAYFIELD PLAYFIELD MECH. PANEL INSERT
A 23-600	NUMBER MATCH STEP UP BALL COUNT UNIT STEP UP CREDIT UNIT STEP UP	INSERT MECH. PANEL INSERT
A2-23-750	KNOCKER	CABINET
A2-26-1300	CHIME COILS ... (3 req'd.)	CABINET
B1-26-800	SCORE DRUM UNIT ... (16 req'd.) BALL COUNT UNIT RESET COIN UNIT RESET BONUS UNIT RESET PLAYER UNIT RESET CREDIT UNIT RESET	INSERT MECH. PANEL MECH. PANEL PLAYFIELD INSERT INSERT
FL 20-300/ 28-400	FLIPPERS ... (3 req'd.)	PLAYFIELD
G 23-750 D.C.	JET BUMPER COILS ... (2 req'd.) AUTOMATIC KICKER	PLAYFIELD PLAYFIELD
M 29-900	1 - 2 SCORE RESET RELAY 3 - 4 SCORE RESET RELAY	INSERT INSERT
M 29-1000	GAME OVER RELAY TRIP	MECH. PANEL
M 29-1100	10¢ RELAY 25¢ RELAY 10 PT. RELAY 100 PT. RELAY 1,000 PT. RELAY 10 TO ACE RESET RELAY 3,000 PT. RELAY 50 PT. RELAY ADVANCE RELAY BONUS RELAY	MECH. PANEL MECH. PANEL INSERT INSERT INSERT PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
M 30-1300	COIN SET UP RELAY	MECH. PANEL
M1-31-1500	COIN LOCKOUT COIL	FRONT DOOR
XM 27-675	TOTAL PLAY METER COIL	CABINET
XS 28-1000	ALTERNATOR UNIT	MECH. PANEL
Z 27-1000	GAME OVER RELAY (LATCH) OUTHOLE RELAY COIN RELAY RESET RELAY CREDIT RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1150	TILT RELAY EXTRA BALL RELAY BALL INDEX RELAY	MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1200	PLAYER RESET RELAY	MECH. PANEL
Z 29-1250	LOCK RELAY	MECH. PANEL
D1-24-1400	BANK RESET COIL - 10 TO ACE	PLAYFIELD
D1-24-1600	BANK RESET COIL - 4 JOKER	PLAYFIELD
S 27-500	BANK TRIP COILS ... (12 req'd.)	PLAYFIELD

# JACK LAYOUT

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GAME PAT HAND

GAME PAT HAND

POSITION PAN - P.F. SIZE 22

POSITION PAN - P.F. SIZE 20

1	FEED	W-3 BONUS RE.
2	"	BLU-2 OUTHOLE RE.
3	"	BR/O 3000 RE.
4	EX-BALL RE.	BLU W-3 BALL RELEASE
5	SHOOT AGAIN	Y/R-2 TILT RE.
6	LITE	-Y- FEED
7	BONUS RESET	O/R-5 STALL CHIME (P)
8	"	W- FEED
9	"	Y/BR-5 BONUS S.U.
10	FEED	BLU/Y/W-1 FEED
11	SETUP RE.	O/BLU-1 SETUP RE.
PAN = PANEL		P.F. = PLAYFIELD

1	1 TOV BANK RESET	BLU/BR-1 RESET RE.
2	FEED	W/BR-4 TILT RE.
3	1000 PT. RE.	O/G SCORE MOTOR
4	"	R/W-5 L. FLIPPER
5	"	BR/W-5 R- "
6	BANK RESET	R/W-4 RESET RE.
7	"	Y/BLU-2 OUTHOLE RE.
8	RESET RE.	GAY/BR CREDIT S.U.
9	BANK RESET	BR/BR-3 BONUS RE.
10	S.P.K. RE.	BR/O-4 NO. MATCH S.U.

PAN = PANEL

(P) = PLASTIC



# JACK LAYOUT

GAME PAT HAND

POSITION PAN - INS. SIZE 22

1	FEED	-B-
2	"	-R-
3	COIN LOCKOUT	B/R-4
4	CREDIT RE.	W/O
5	"	W/BR-7
6	"	W/BLU-5
7	KNOCKER	B/W
8	RESET RE.	BLU/BR-1
9	BALL COUNT S.U.	BLU/R-1
10	NO.1 BALL LITE	W/BR-5
11	FEED	BR
PAN. = PANEL		
INS. = INSERT		

# JACK LAYOUT

GAME PAT HAND

POSITION PAN - INS. SIZE 20

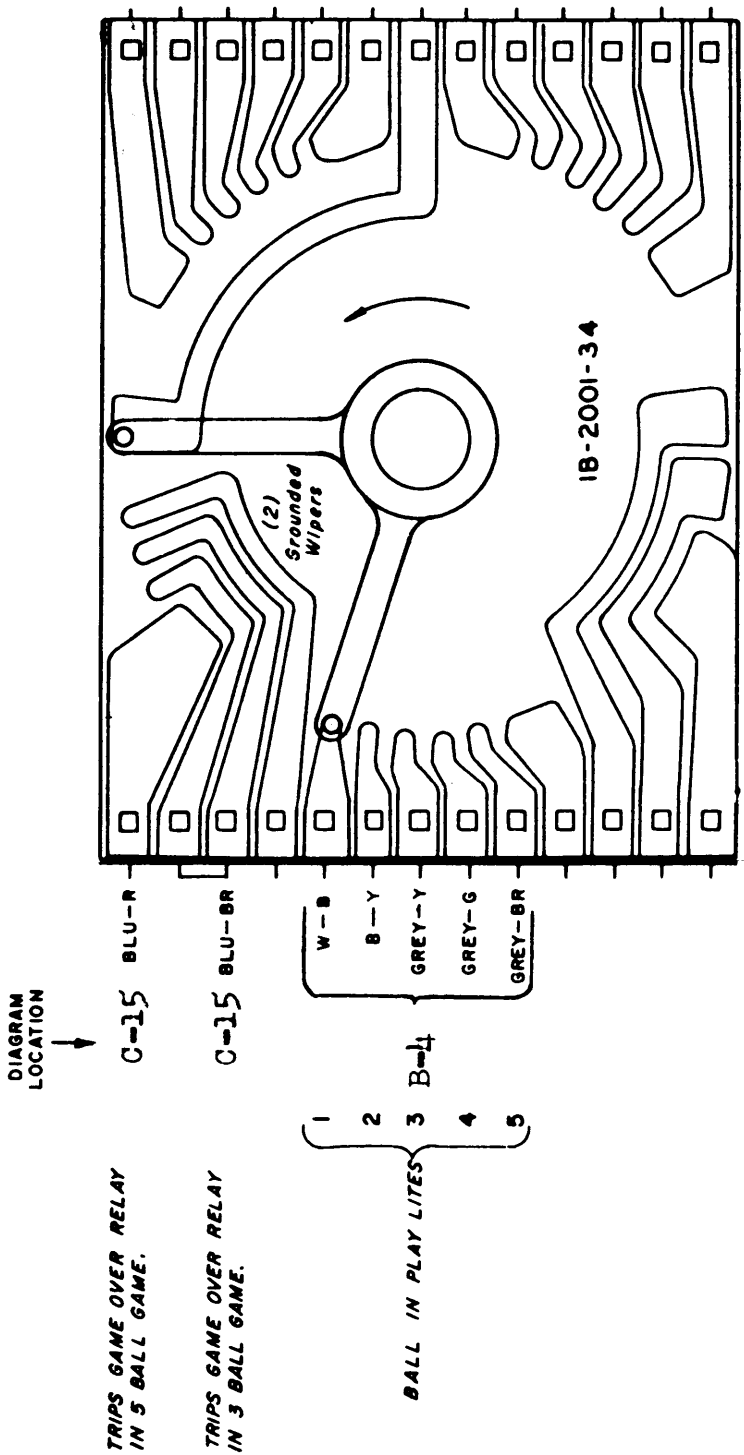
1	NO.3 BALL LITE	GRY/Y-1
2	1ST. PLAYER MATCH	BLU-2
3	2ND. PLAYER MATCH	R/BR-2
4	3RD. PLAYER MATCH	BR/O-1
5	4TH. PLAYER MATCH	BR/Y-5
6	CREDIT S.U.	GRY/R-2
7	LARGE CHIME	R/G-3
8	TILT LITE	BLU/R-3
9	BALL IND. RE.	BR/G-4
10	CREDIT UNIT RESET	R/Y
INS. = INSERT		



# 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.

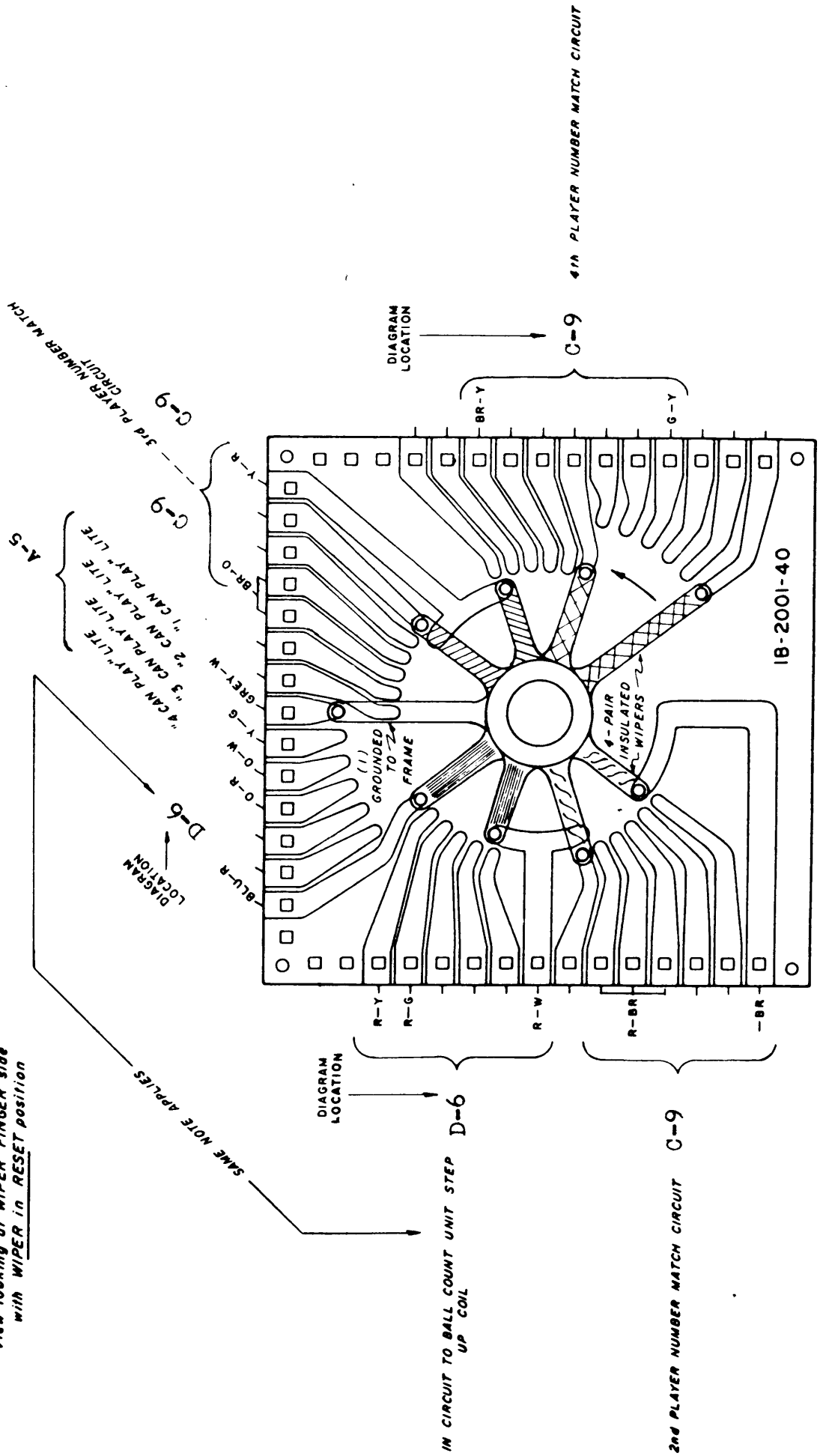
View looking at WIPER FINGER side with WIPER in ZERO position.



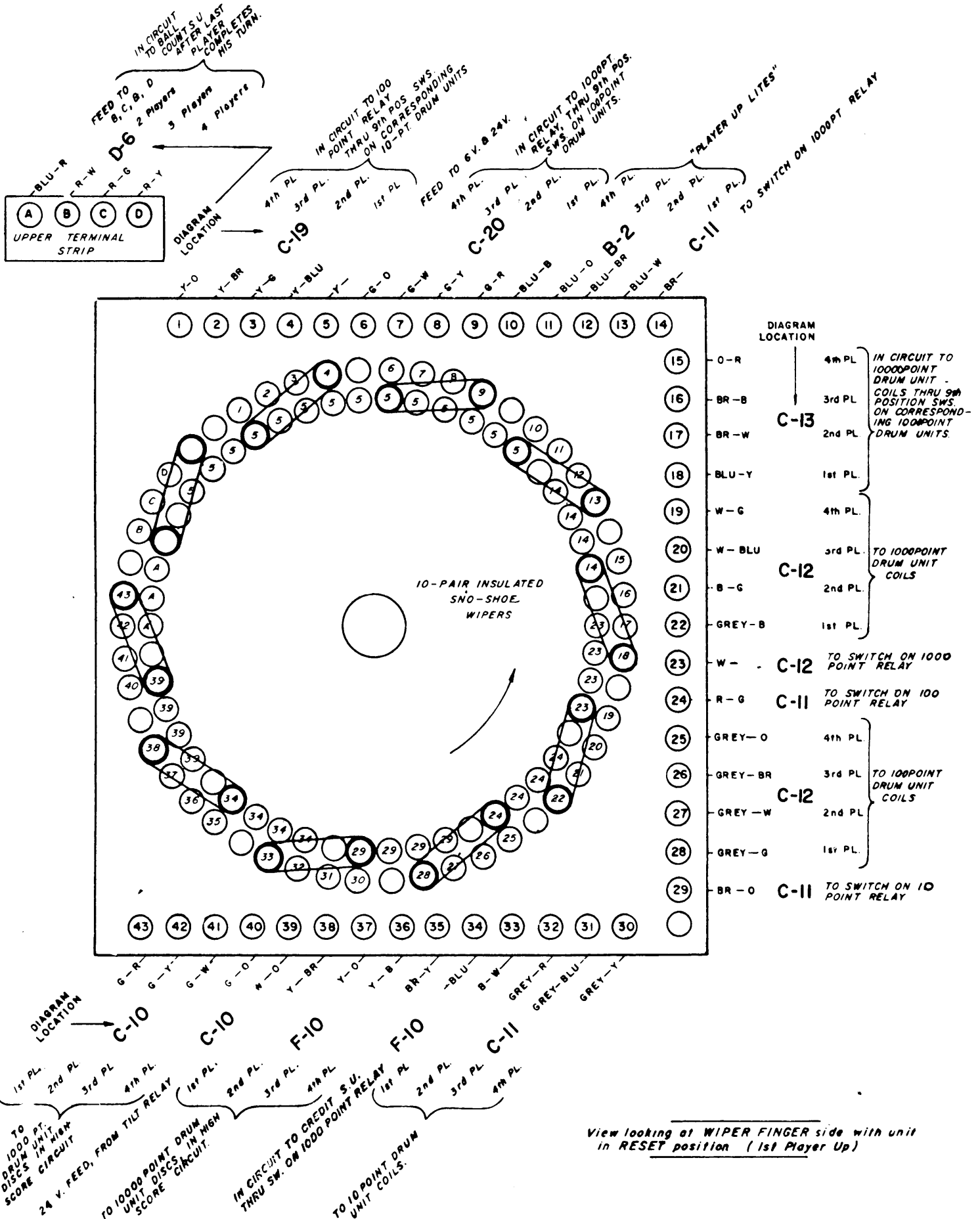
# COIN S. U. DISC

THIS UNIT RESETS AT START OF A GAME (DURING RESET CYCLE). IT THEN ADVANCES ONE STEP EACH TIME THE COIN RELAY IS PULSED.

View looking at WIPER FINGER side with WIPER in RESET position



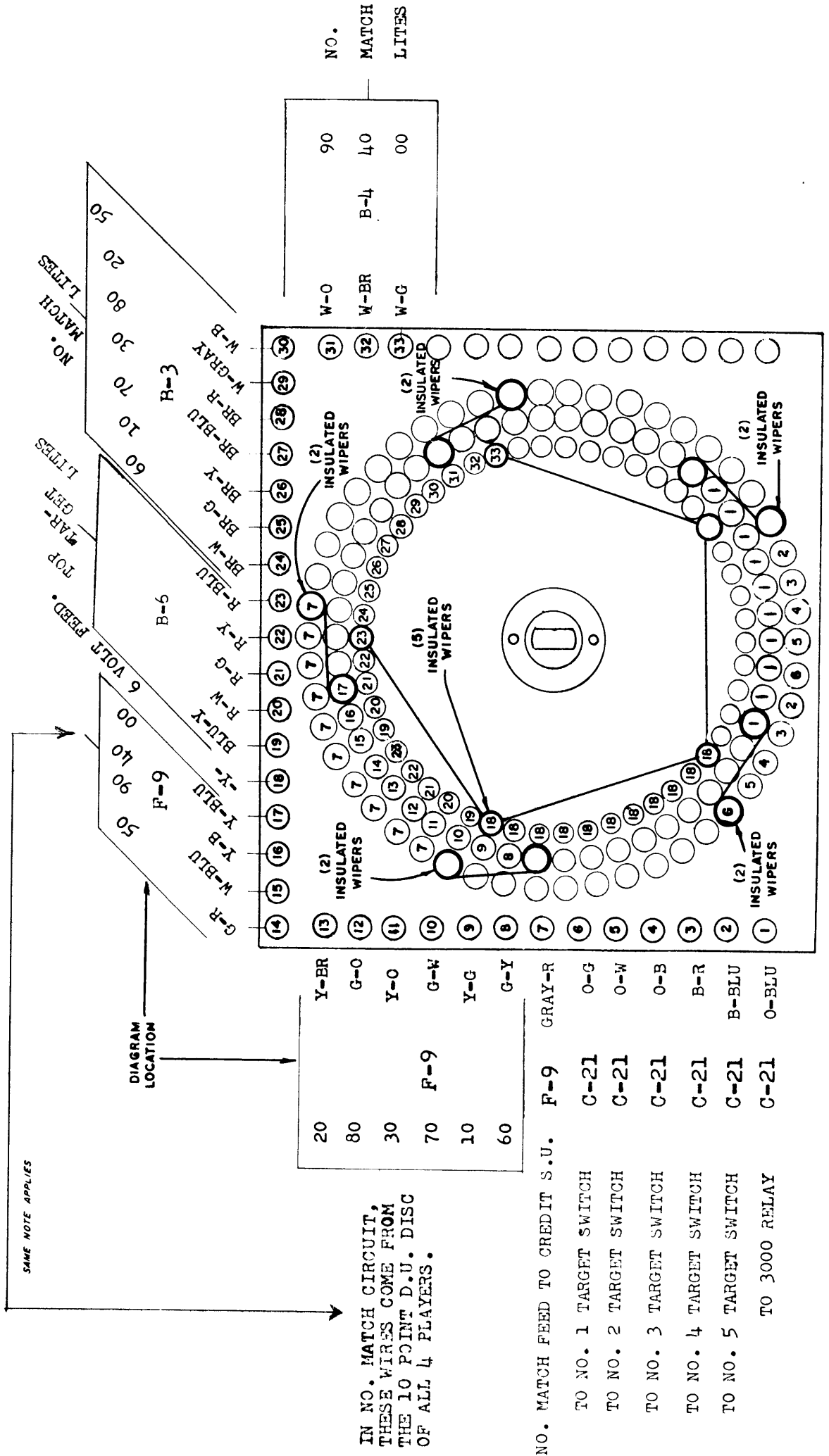
# PLAYER UNIT DISC



# No. MATCH UNIT

THIS IS A NON-RESETTING, CONTINUOUS STEPPING UNIT. IT ADVANCES EACH TIME THE 100 POINT RELAY IS PULSED.

VIEW LOOKING AT WIPER FINGER SIDE



IN NO. MATCH CIRCUIT, THESE WIRES COME FROM THE 10 POINT D.U. DISC OF ALL 4 PLAYERS.

SAME NOTE APPLIES

# BONUS UNIT

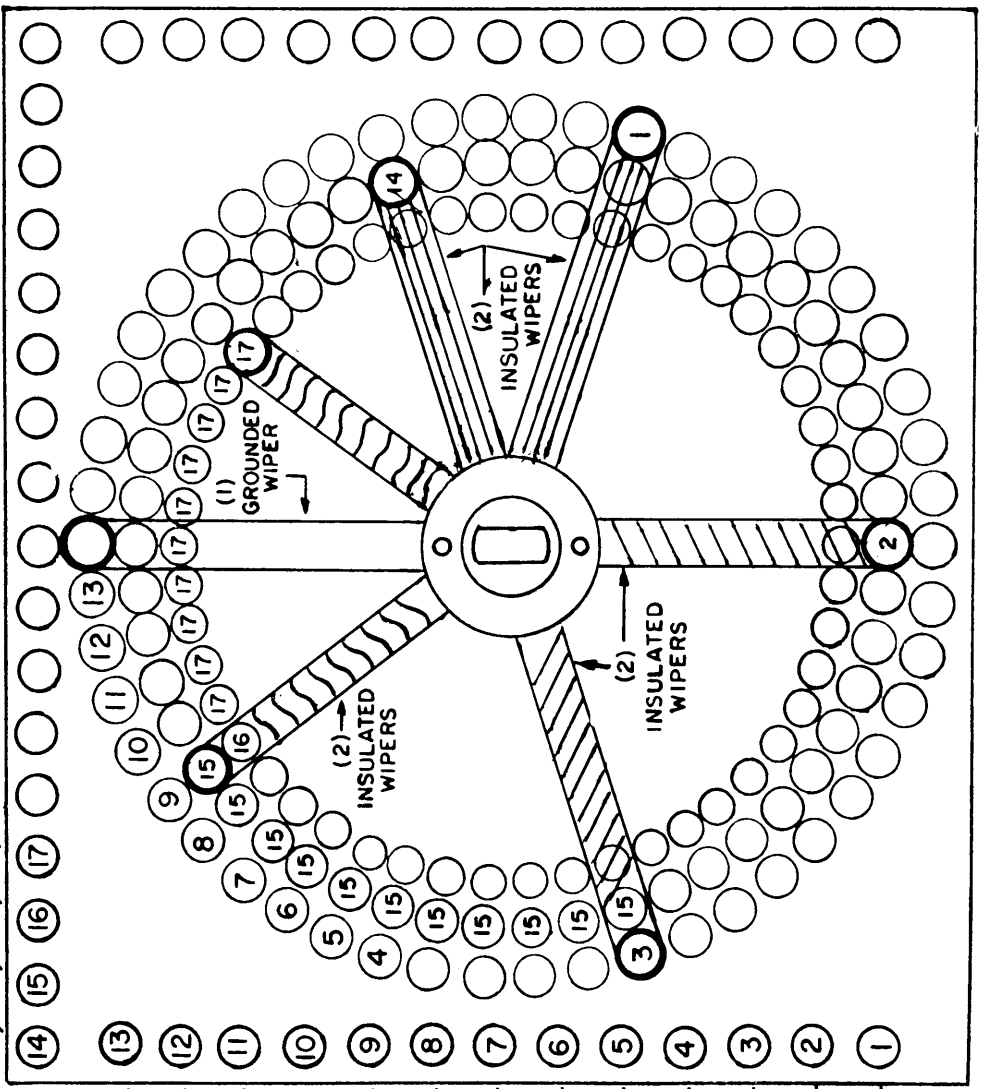
THIS UNIT STEPS UP EACH TIME THE ADVANCE RELAY IS ENERGIZED.

ALSO, AFTER THIS UNIT HAS BEEN RESET TO ZERO, THE STEP-UP COIL IS ENERGIZED ONCE BY SCORE MOTOR CAM SWITCH 6A, THRU BONUS UNIT WIPER FINGERS.

THE RESET COIL IS ENERGIZED BY BONUS RELAY, THRU DOUBLE BONUS RELAY AND SCORE MOTOR CAM SWITCH 4A OR IMPULSE CAM SWITCH A.

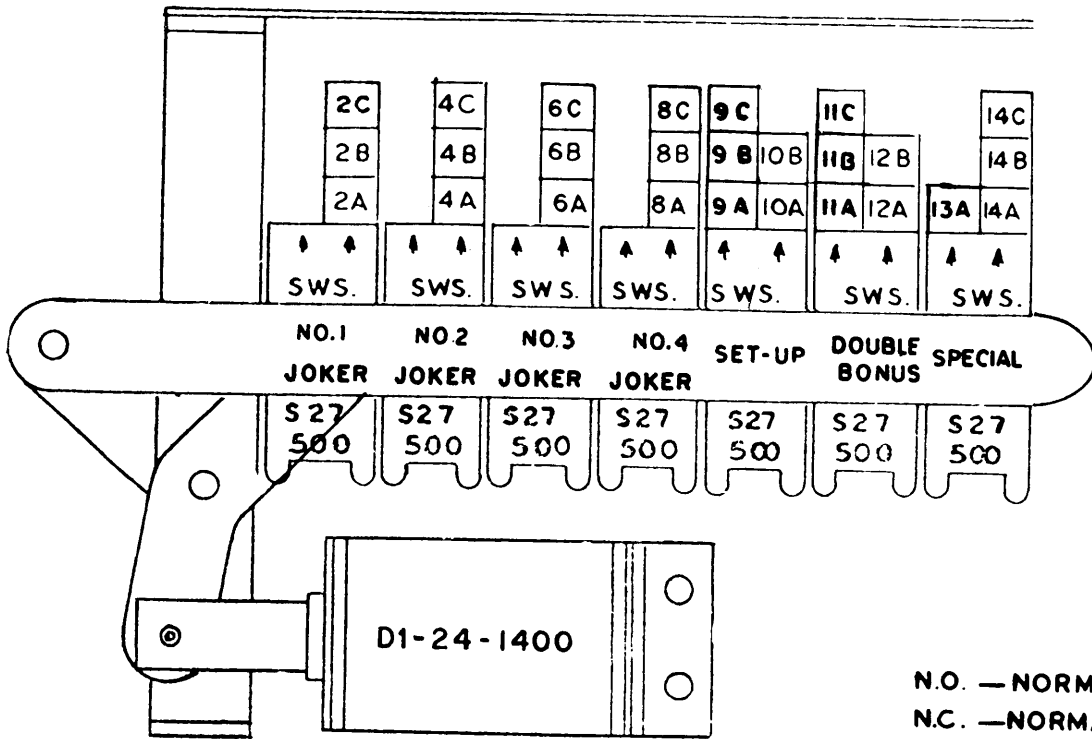
DIAGRAM LOCATION

SEE #1 (B-BLU) FROM ADVANCE RELAY.  
 SEE #1 (B-BLU) FROM 100 POINT RELAY.  
 D-15 TO 100 POINT RELAY.  
 G-8 D-18 TO 100 POINT RELAY.  
 W-R D-18 TO 100 POINT RELAY.  
 B-Y D-15 TO 100 POINT RELAY.  
 Y-BLU D-15 TO 100 POINT RELAY.

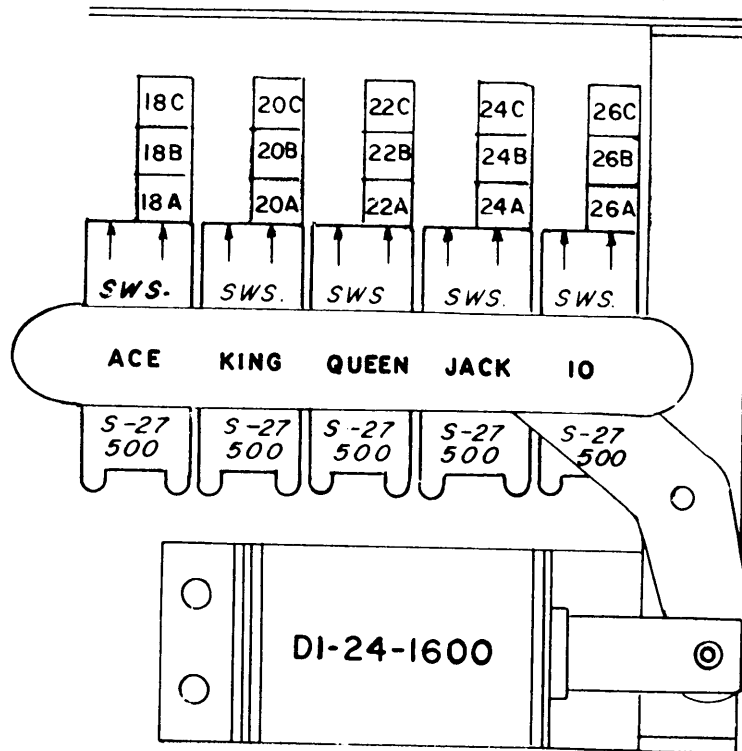


1000	A-7	R-Y-
2000		R-G-
3000		R-W-
4000		R-BR-
5000		R-O-
6000		R-B-
7000		-BLU-
8000		BLU-R-
9000		O-W-
10,000	A-8	BLU-B-
TO BONUS UNIT S.U. COIL		
THRU CAM SWITCH 6A.		
D-14		
PULSES OUTHOLE RELAY		
AT CAM SWITCH 6B.		
D-15		

# RELAY BANK SWS.



N.O. — NORMALLY OPEN SWITCH  
 N.C. — NORMALLY CLOSED SWITCH  
 M&B — MAKE AND BREAK SWITCH

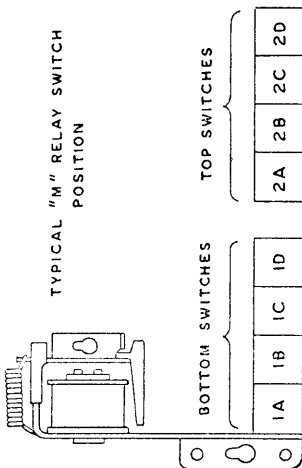




RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
NO. 1 JOKER RELAY	2C	-J- R-W BR-Y	E-21	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 1,000 POINT RELAY. (WHEN MAKING NO. 1 JOKER SWITCH).
	2B	-Y- -J-	C-16	N.O.	IN SERIES WITH SWITCH 4B ON NO. 2 RELAY.
	2A	-W- Y-G	A-8	N.O.	TO JOKER LITE.
NO. 2 JOKER RELAY	4C	-J- R-BR BR-Y	E-21	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 1,000 POINT RELAY. (WHEN MAKING NO. 2 JOKER SW.).
	4B	-J- -J-	C-16	N.O.	IN SERIES WITH SWITCH 6B ON NO. 3 JOKER RELAY.
	4A	-W- Y-BR	A-8	N.O.	TO JOKER LITE.
NO. 3 JOKER RELAY	6C	-J- R-O BR-Y	E-21	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 1,000 POINT RELAY. (WHEN MAKING NO. 3 JOKER SW.).
	6B	-J- -J-	D-16	N.O.	IN SERIES WITH SWITCH 8B ON NO. 4 JOKER RELAY.
	6A	-W- Y-O	A-8	N.O.	TO JOKER LITE.
NO. 4 JOKER RELAY	8C	-J- R-B BR-Y	E-21	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 1,000 POINT RELAY. (WHEN MAKING NO. 4 JOKER SW.).
	8B	Y-B -J-	E-16	N.O.	ENERGIZES EXTRA BALL RELAY. (SEE SWITCH 2B ON NO. 1 JOKER RELAY).
	8A	-W- GRAY-R	A-8	N.O.	TO JOKER LITE.
SET-UP RELAY	9C	W-R B-W BR-Y	D-19	M&B	OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSES TO 1,000 POINT RELAY. (5 TOP ROLLOVER BUTTONS).
	9B	G-B B-G W-R	D-18	M&B	OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSES TO 100 POINT RELAY. (TOP OR BOTTOM JET BUMPER).

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
SET-UP RELAY	9A	-J- Y-BLU	D-17	N.O.	IN SERIES WITH SWITCH 12B ON DOUBLE BONUS RELAY.
	10B	BLU-O -J-	E-17	N.C.	CIRCUIT TO COIL ON THIS RELAY, THRU SWITCH ON "10 TO ACE RESET RELAY".
	10A	-W- W-G	A-9	N.O.	TO (2) JET BUMPER LITES AND (5) TOP ROLLOVER BUTTON LITES.
DOUBLE BONUS RELAY	11C	-O- O-B GRAY-Y	D-19	M&B	IN CIRCUIT TO 1,000 POINT RELAY (WHEN COLLECTING BONUS).
	11B	R-B BLU-R R-BLU	D-13	M&B	IN CIRCUIT TO BONUS UNIT RESET COIL. (WHEN COLLECTING BONUS).
	11A	-J- Y-O	D-17	N.O.	IN SERIES WITH SWITCH 14C ON SPECIAL RELAY.
	12B	-J- -J-	E-17	N.C.	IN CIRCUIT TO COIL ON THIS RELAY, THRU SWITCH ON "10 TO ACE RESET RELAY".
	12A	-W- W-B	A-9	N.O.	TO DOUBLE BONUS LITES.
SPECIAL RELAY	13A	BR-Y R-BR GRAY-BR	D-8	M&B	OPENS TO 1,000 POINT RELAY AND CLOSES TO SCORE CREDIT OR EXTRA BALL. (WHEN MAKING RIGHT BOTTOM (INSIDE) ROLLOVER).
	14C	-J- -J-	E-17	N.C.	IN CIRCUIT TO COIL ON THIS RELAY, THRU SWITCH ON "10 TO ACE RESET RELAY".
	14B	GRAY-BR BLU-B	D-8	N.O.	PULSES CREDIT UNIT OR EXTRA BALL RELAY, THRU SWITCH ON 3,000 RELAY.
	14A	-W- W-GRAY	A-9	N.O.	TO TARGET "SPECIAL" LITE AND RIGHT BOTTOM ROLLOVER "SPECIAL" LITE.
ACE RELAY	18C	-J- BLU-R G-B	E-17	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 10 POINT RELAY. (WHEN MAKING ACE ROLLOVER BUTTON SW.).
	18B	G-R -W-	A-8	N.C.	TO ACE ROLLOVER BUTTON LITE.
	18A	G-O -J-	C-16	N.O.	IN SERIES WITH SWITCH 20A ON KING RELAY.

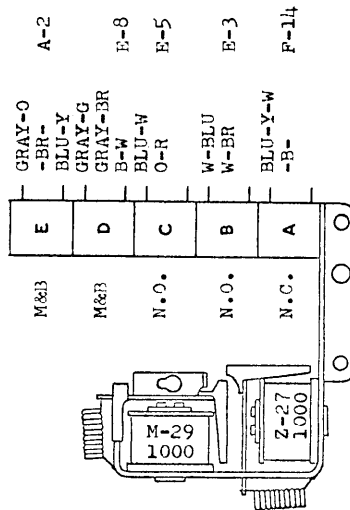
RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
KING RELAY	20C	-J- BLU-Y G-B	E-17	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 10 POINT RELAY. (WHEN MAKING KING ROLLOVER BUTTON SW.).
	20B	G-Y -W-	A-8	N.C.	TO KING ROLLOVER BUTTON LITE.
	20A	-J- -J-	D-16	N.O.	IN SERIES WITH SWITCH 22A ON QUEEN RELAY.
QUEEN RELAY	22C	-J- BLU-B G-B	E-18	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 10 POINT RELAY. (WHEN MAKING QUEEN ROLLOVER BUTTON SW.).
	22B	W-BLU -W-	A-9	N.C.	TO QUEEN ROLLOVER BUTTON LITE.
	22A	-J- -J-	D-16	N.O.	IN SERIES WITH SWITCH 24A ON JACK RELAY.
JACK RELAY	24C	-J- BLU-BR G-B	E-18	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 10 POINT RELAY. (WHEN MAKING JACK ROLLOVER BUTTON SW.).
	24B	G-W -W-	A-9	N.C.	TO JACK ROLLOVER BUTTON LITE.
	24A	-J- -J-	E-16	N.O.	IN SERIES WITH SWITCH 26A ON 10 RELAY.
"10" RELAY	26C	-J- BLU-0 G-B	E-18	M&B	ENERGIZES COIL ON THIS RELAY AND THEN PULSES 10 POINT RELAY. (WHEN MAKING 10 ROLLOVER BUTTON SW.).
	26B	G-0 -W-	A-9	N.C.	TO 10 ROLLOVER BUTTON LITE.
	26A	-J- R-Y	E-16	N.O.	ENERGIZES "10 TO ACE RESET RELAY". (SEE SWITCH 18A ON ACE RELAY).



# RELAYS & SWITCHES (ON MECHANISM PANEL)

SWITCH TYPE →

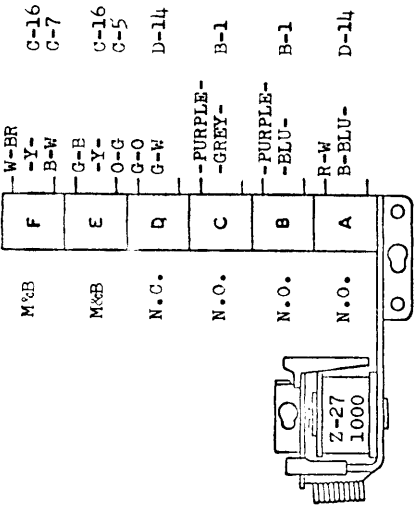
DIAGRAM LOCATION →



## GAME-OVER

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

OPENS TO "PLAYER UP" LITES AND CLOSES TO "GAME OVER" AND "NUMBER MATCH" LITES.  
OPENS IN HI-SCORE CIRCUITS AND CLOSES IN NUMBER MATCH CIRCUITS-"CREDIT-EXTRA BALL" ADJUSTMENT.  
CIRCUIT TO RESET RELAY, THRU SWITCH ON COIN RELAY.  
IN CIRCUIT TO CREDIT RELAY.  
OPENS CIRCUITS TO PLAYFIELD SWITCHES.



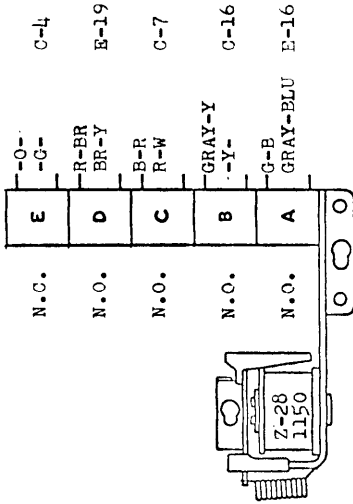
## OUTHOLE

IS ENERGIZED BY CAM SWITCH 6B, THRU WIPER FINGERS ON BONUS UNIT (IN ZERO POSITION).

OPENS IN CIRCUIT TO TILT RELAY AND CLOSES IN SERIES WITH SWITCH D ON EXTRA BALL RELAY.  
OPENS IN HOLD CIRCUIT TO BALL INDEX RELAY AND CLOSES TO RUN SCORE MOTOR.  
IN CIRCUIT TO ENERGIZE BONUS RELAY, THRU OUTHOLE SWITCH.  
ENERGIZES "1 TO 4 JOKER" RELAY BANK RESET COIL, THRU SCORE MOTOR CAM SWITCH 2D. (115 VOLTS).  
ENERGIZES "10 TO ACE" RELAY BANK RESET COIL, THRU CAM SWITCH 3B. (115 VOLTS).  
HOLD CIRCUIT TO THIS RELAY, THRU CAM SWITCH 5B.

## BALL INDEX

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



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

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

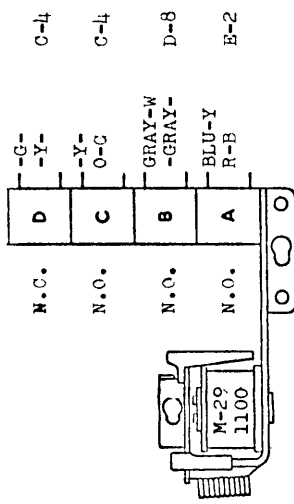
IN CIRCUIT TO BALL COUNT S.U. COIL---ALSO IN SERIES WITH SWITCH C ON PLAYER RESET RELAY.

IN SERIES WITH SWITCH A ON EXTRA BALL RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

## 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.

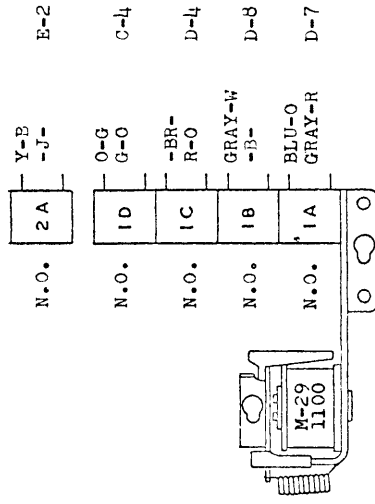
RUNS SCORE MOTOR.

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

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.

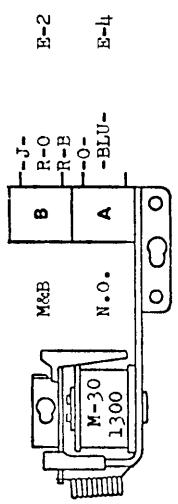
ENERGIZES COIN SET-UP RELAY, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.

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.

## COIN SET-UP

IS ENERGIZED BY 25¢ RELAY, ONLY IF "1 COIN FOR 1 PLAY - 2 COINS FOR 3 PLAYS" ADJUSTMENT JACK IS IN "ON" POSITION.

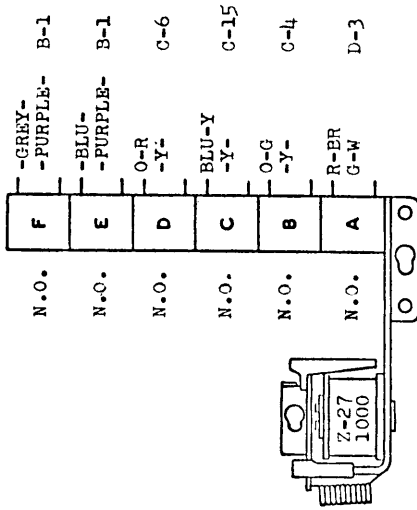


OPENS TO 25¢ RELAY AND CLOSURES TO 10¢ RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

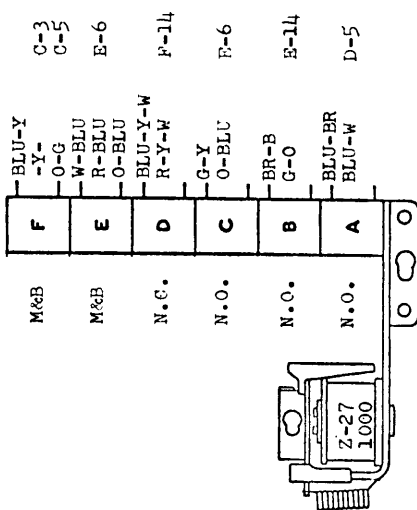
### COIN

IS ENERGIZED BY COIN SWITCH OR CREDIT RELAY--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¢".



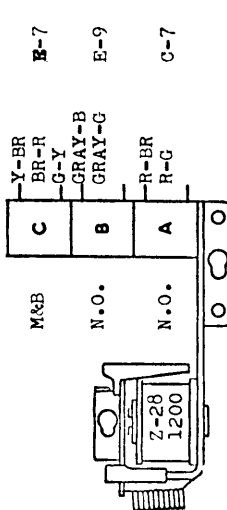
### RESET

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



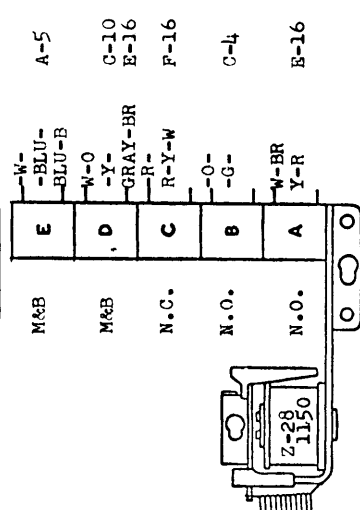
### PLAYER RESET

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



### TILT

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



ENERGIZES "1 TO 4 JOKER" RELAY BANK RESET COIL, THRU CAM SWITCH 2D. (115 VOLTS).

ENERGIZES "10 TO ACE" RELAY BANK RESET COIL, THRU CAM SWITCH 3B. (115 VOLTS).

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

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

RUNS SCORE MOTOR.

IN HOLD CIRCUIT TO THIS RELAY.

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

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

OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

IN CIRCUIT TO PLAYER UNIT RESET COIL.

ENERGIZES BONUS RELAY, THRU SCORE MOTOR INDEX CAM SWITCH D.

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.

OPENS TO MOST PLAYFIELD LITES AND CLOSSES TO TILT LIFE.

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

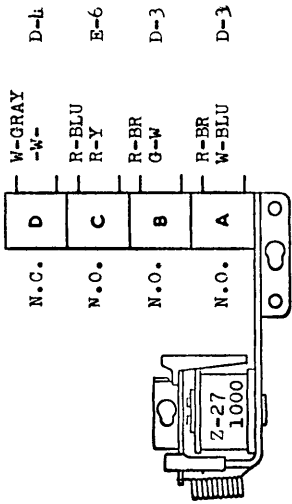
OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

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

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

## CREDIT

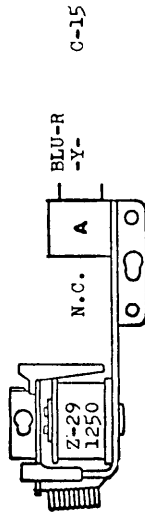
IS ENERGIZED BY CREDIT BUTTON, THRU ZERO SWITCH ON CREDIT UNIT.



D-4 OPENS CIRCUIT TO COIN LOCKOUT COIL.  
 E-6 PULSES CREDIT UNIT RESET COIL AT SCORE MOTOR CAM SWITCH 1D.  
 D-3 ENERGIZES COIN RELAY.  
 D-3 IN HOLD CIRCUIT TO THIS RELAY.

## LOCK

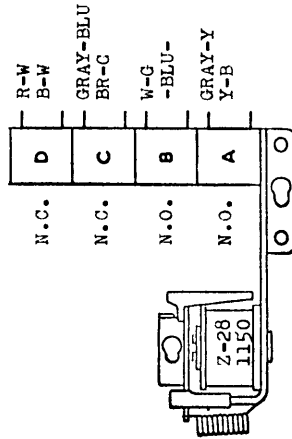
IS ENERGIZED WHEN POWER IS SUPPLIED TO TRANSFORMER.



C-15 ENERGIZES GAME OVER RELAY TRIP COIL.

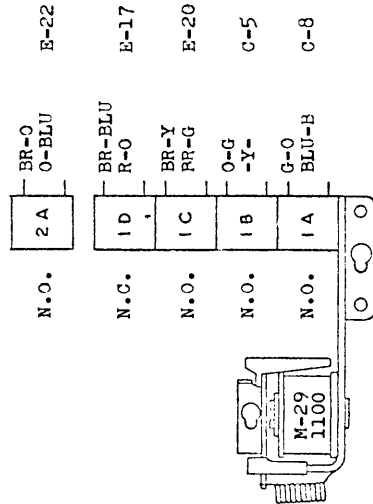
## EXTRA BALL

IS ENERGIZED BY SERIES CIRCUIT FROM "NO. 1 JOKER" RELAY THRU NO. 2, 3, AND 4 JOKER RELAYS---ALSO, THRU "PLAY ADJUSTMENT JACK", BY HI-SCORE AND "SPECIAL" CIRCUITS



C-7 IN SERIES WITH SWITCH C ON BALL INDEX RELAY.  
 E-15 IN CIRCUIT TO BALL INDEX RELAY.  
 A-5 TO SHOOT AGAIN LITES.  
 E-16 IN HOLD CIRCUIT TO THIS RELAY.

## LOCATED ON PLAYFIELD



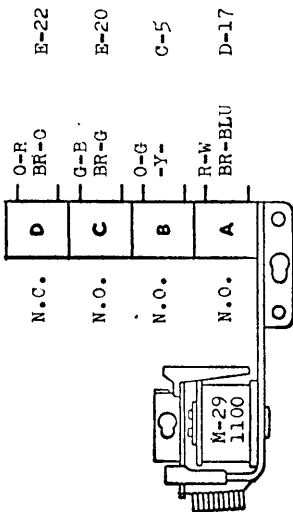
E-22 HOLD CIRCUIT TO THIS RELAY, THRU SCORE MOTOR CAM SWITCH 3C.  
 E-17 OPENS CIRCUIT TO 50 POINT RELAY.  
 E-20 PULSES 1,000 POINT RELAY, THRU IMPULSE CAM SWITCH E.  
 C-5 RUNS SCORE MOTOR.  
 C-8 IN SERIES WITH SWITCH 14B ON SPECIAL RELAY.

## 3000

IS ENERGIZED BY NO. 1, 2, 3, 4 OR 5 TARGET SWITCHES, THRU NUMBER MATCH S.U. DISC.

### 50 POINT

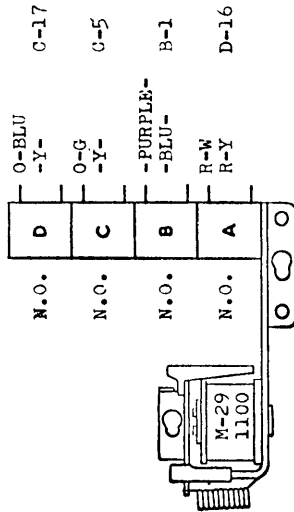
IS ENERGIZED BY (5) TOP TARGET SWITCHES, THRU NORMALLY CLOSED SWITCH ON 3,000 RELAY.



E-22 OPENS CIRCUIT TO NUMBER MATCH UNIT S.U. COIL.  
 E-20 PULSES 10 POINT RELAY, THRU IMPULSE CAM SWITCH B.  
 O-5 RUNS SCORE MOTOR.  
 D-17 IN HOLD CIRCUIT TO THIS RELAY.

### 10 TO ACE RESET

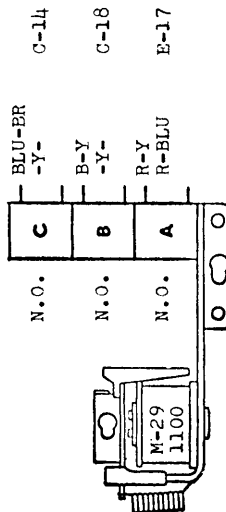
IS ENERGIZED, AT SCORE MOTOR INDEX CAM SWITCH D, BY SERIES CIRCUIT THRU ACE, KING, QUERN, JACK AND 10 RELAYS.



C-17 IN CIRCUIT TO FNERGIZE SET-UP RELAY, DOUBLE BONUS RELAY AND THEN SPECIAL RELAY.  
 C-5 RUNS SCORE MOTOR.  
 B-1 ENERGIZES "10 TO ACE" RELAY BANK RESET COIL, THRU CAM SWITCH 3B. (115 VOLTS).  
 D-16 IN HOLD CIRCUIT TO THIS RELAY.

### ADVANCE

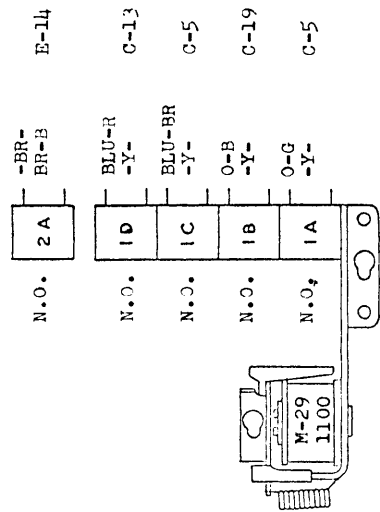
IS ENERGIZED BY (5) SIDE ROLLOVER BUTTON SWITCHES.



C-14 ENERGIZES BONUS UNIT S.U. COIL.  
 C-18 PULSES 10 POINT OR 100 POINT RELAY, THRU BONUS UNIT DISC.  
 E-17 HOLD CIRCUIT TO THIS RELAY, THRU BONUS UNIT END-OF-STROKE SWITCH.

### BONUS

IS ENERGIZED, AT INDEX CAM SWITCH D, BY RESET RELAY OR BY OUTHOLE SWITCH THRU OUTHOLE RELAY.



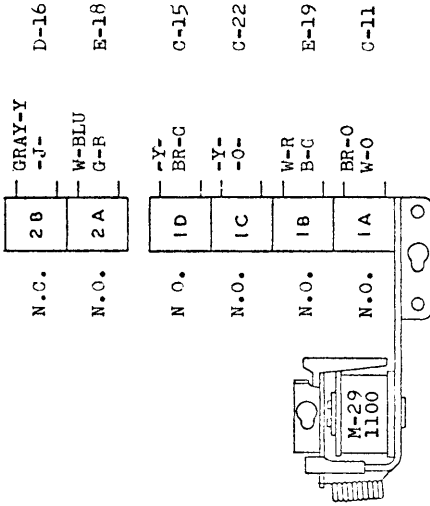
E-14 HOLD CIRCUIT TO THIS RELAY, THRU BONUS UNIT ZERO SWITCH.  
 C-13 IN SERIES WITH SWITCH 11B ON DOUBLE BONUS RELAY.  
 C-5 IN HOLD CIRCUIT TO RESET RELAY.  
 C-19 IN SERIES WITH SWITCH 11C ON DOUBLE BONUS RELAY.  
 C-5 RUNS SCORE MOTOR.



**LOCATED IN BACKBOX**

**10 POINT**

- IS ENERGIZED BY:
1. ADVANCE RELAY, THRU BONUS UNIT DISC.
  2. 50 POINT RELAY.
  3. TOP OR BOTTOM JET BUMPER, THRU SET-UP RELAY.
  4. ACE, KING, QUEEN, JACK OR 10 ROLLOVER BUTTONS.
  5. RIGHT BOTTOM KICKER SWITCH.



IN HOLD CIRCUIT TO EXTRA BALL R ELAY.

IN HOLD CIRCUIT TO THIS RELAY.

ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.

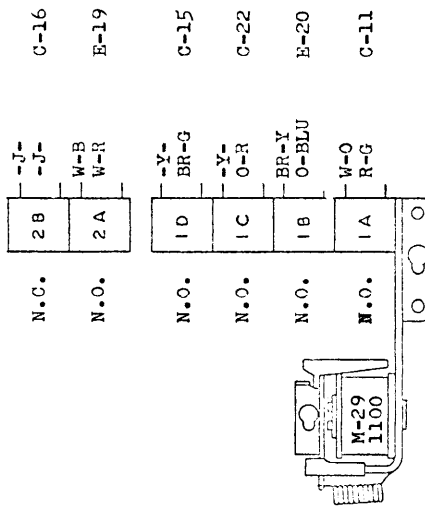
PULSES MEDIUM CHIME COIL.

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

PULSES 10 POINT DRUM UNITS, THRU PLAYER UNIT DISC.

**100 POINT**

- IS PULSED BY:
1. TOP OR BOTTOM JET BUMPER, THRU SWITCH ON SET-UP RELAY.
  2. (5) TOP ROLLOVER BUTTONS, THRU ANOTHER SWITCH ON SET-UP RELAY.



IN SERIES WITH SWITCH 2B ON 10 POINT RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.

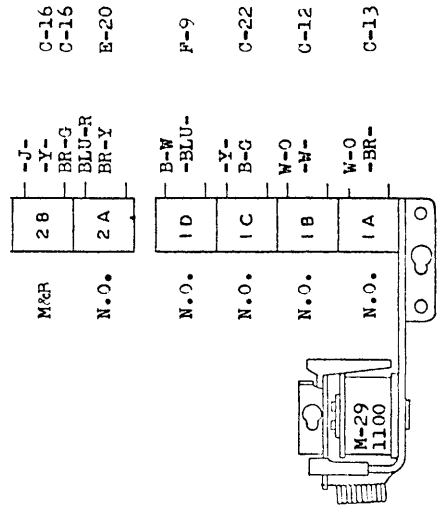
PULSES SMALL CHIME COIL AND NUMBER MATCH UNIT S.U. COIL.

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

PULSES 100 POINT DRUM UNITS, THRU PLAYER UNIT DISC.

**1000 POINT**

- IS PULSED BY:
1. (5) TOP ROLLOVER BUTTONS, THRU SWITCH ON SET-UP RELAY.
  2. BONUS RELAY, THRU DOUBLE BONUS RELAY (WHEN COLLECTING BONUS).
  3. 3,000 RELAY.
  4. RIGHT BOTTOM ROLLOVER SWITCH.
  5. NO. 1, NO. 2, NO. 3 OR NO. 4 JOKER SWITCH.



OPENS IN SERIES WITH SWITCH 2B ON 100 POINT RELAY AND CLOSSES TO ENERGIZE BALL INDEX RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

IN HI-SCORE CIRCUIT TO CREDIT UNIT S.U. OR EXTRA BALL RELAY.

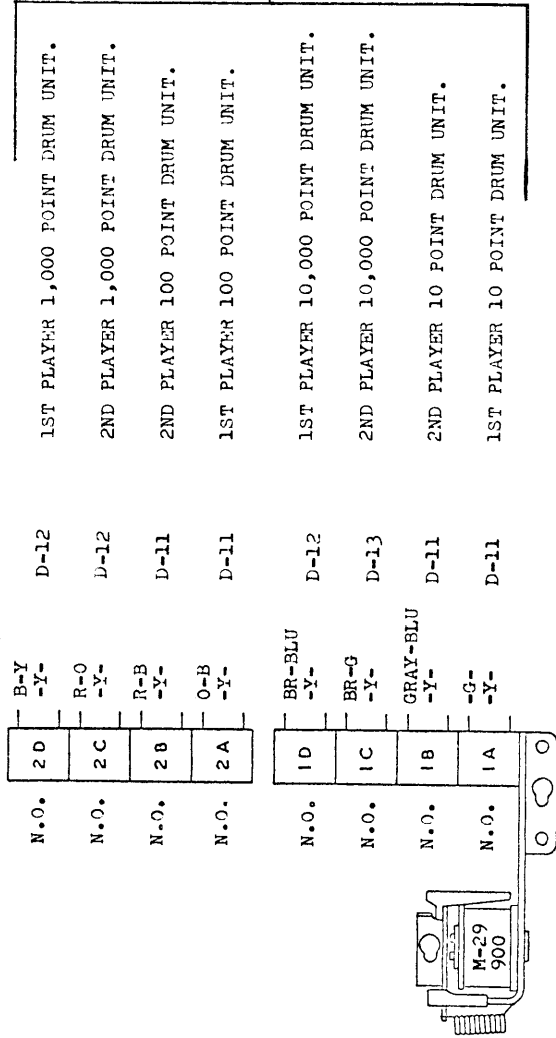
PULSES LARGE CHIME COIL.

PULSES 1,000 POINT DRUM UNITS, THRU PLAYER UNIT DISC.

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

### 142 RESET

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



### 344 RESET

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

