

# Bally

# Silver Sails

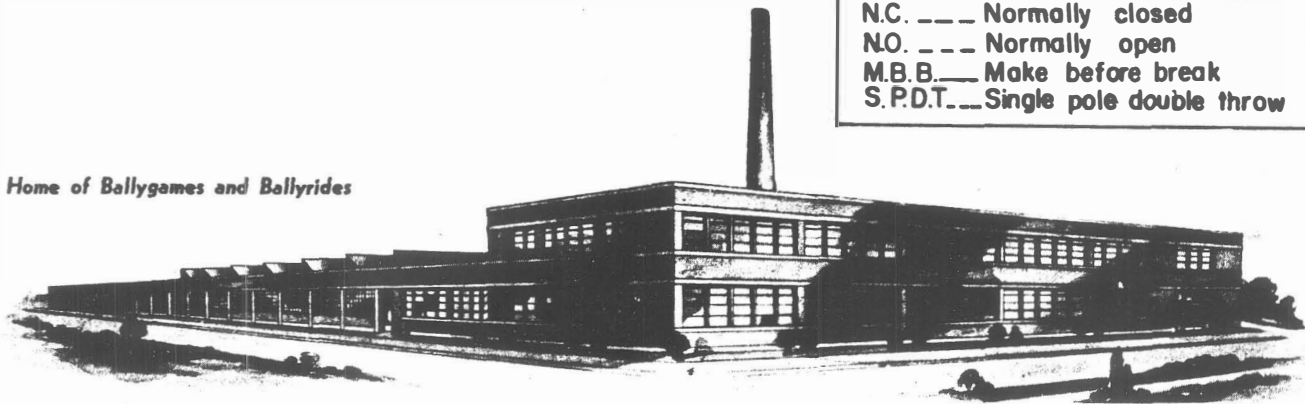
## OPERATING INSTRUCTIONS AND PARTS CATALOG

Part Numbers are marked on illustrations  
and a list of miscellaneous parts appears  
on back cover.

**FOR QUICKEST SERVICE  
STATE CORRECT PART NUMBER  
WHEN ORDERING PARTS**

Code	
N.C. ---	Normally closed
N.O. ---	Normally open
M.B.B. ---	Make before break
S.P.D.T. ---	Single pole double throw

*Home of Ballygames and Ballyrides*



# TIMER UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

THRU WIPERS (D). "PRESS BUTTONS NOW" LITE AT 4<sup>TH</sup> STEP. (DIAG. K-1)

THRU WIPER (A). TIMER UNIT STEP-UP 0 TO 4<sup>TH</sup> STEP. (DIAG. H-8)

FEED FOR WIPERS (A) & (B)

THRU WIPER (B). SHUTTER MOTOR TO CLOSE SHUTTER. (DIAG. H-8)

THRU WIPERS (C). SELECT BEFORE 4<sup>TH</sup> BALL LOCKOUT RELAY. (DIAG. C-11)

THRU WIPERS (C). SELECT BEFORE 5<sup>TH</sup> BALL LOCKOUT RELAY. (DIAG. C-11)

THRU WIPERS (D). "PRESS BUTTONS NOW" LITE AT 5<sup>TH</sup> STEP. (DIAG. K-1)

THRU WIPER (A). TIMER UNIT STEP-UP, 4<sup>TH</sup> TO 5<sup>TH</sup> STEP. (DIAG. H-8)

FEED 14-1

27-4

43-2

21-3

18-3

83-6

78-7

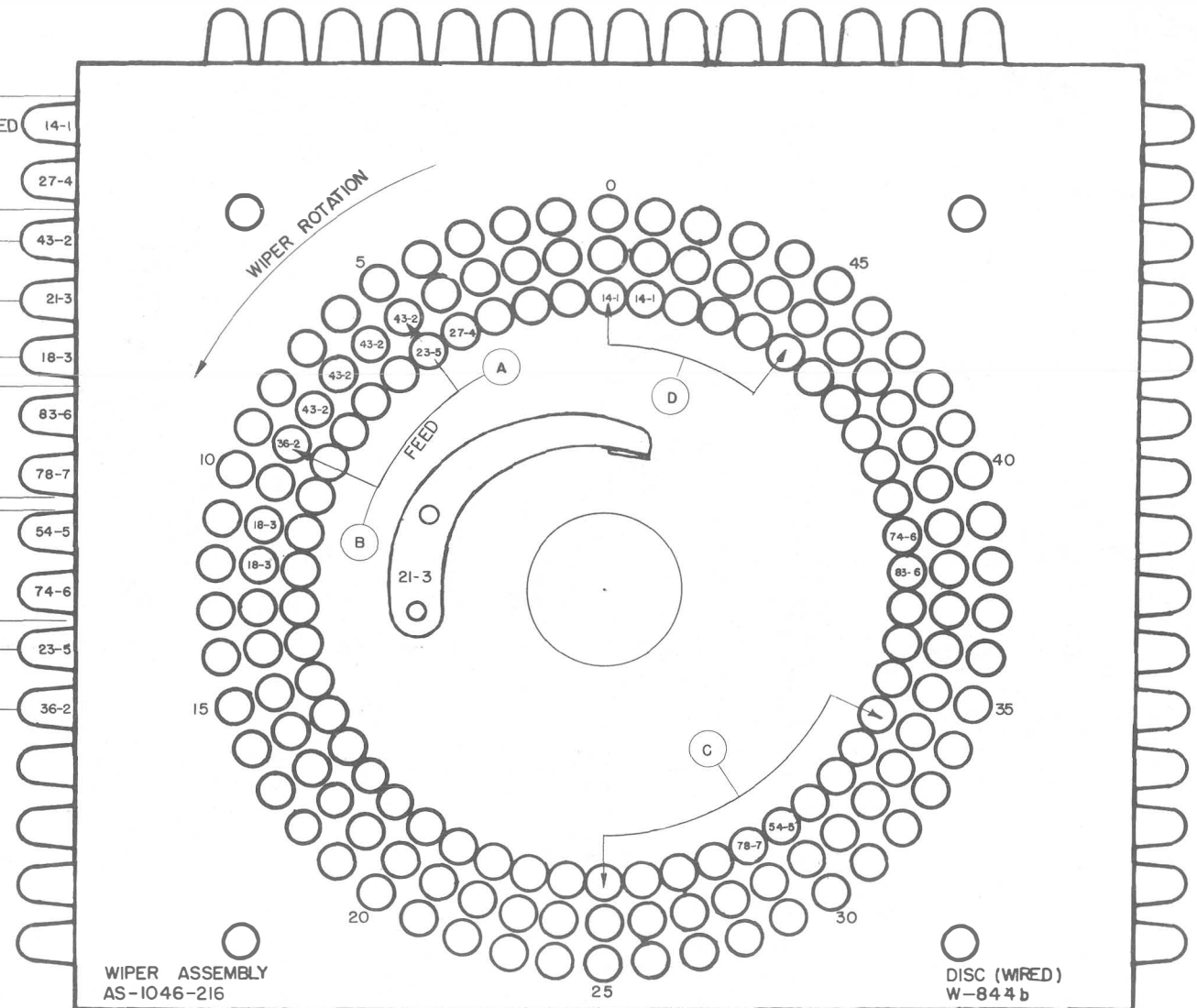
54-5

74-6

23-5

36-2

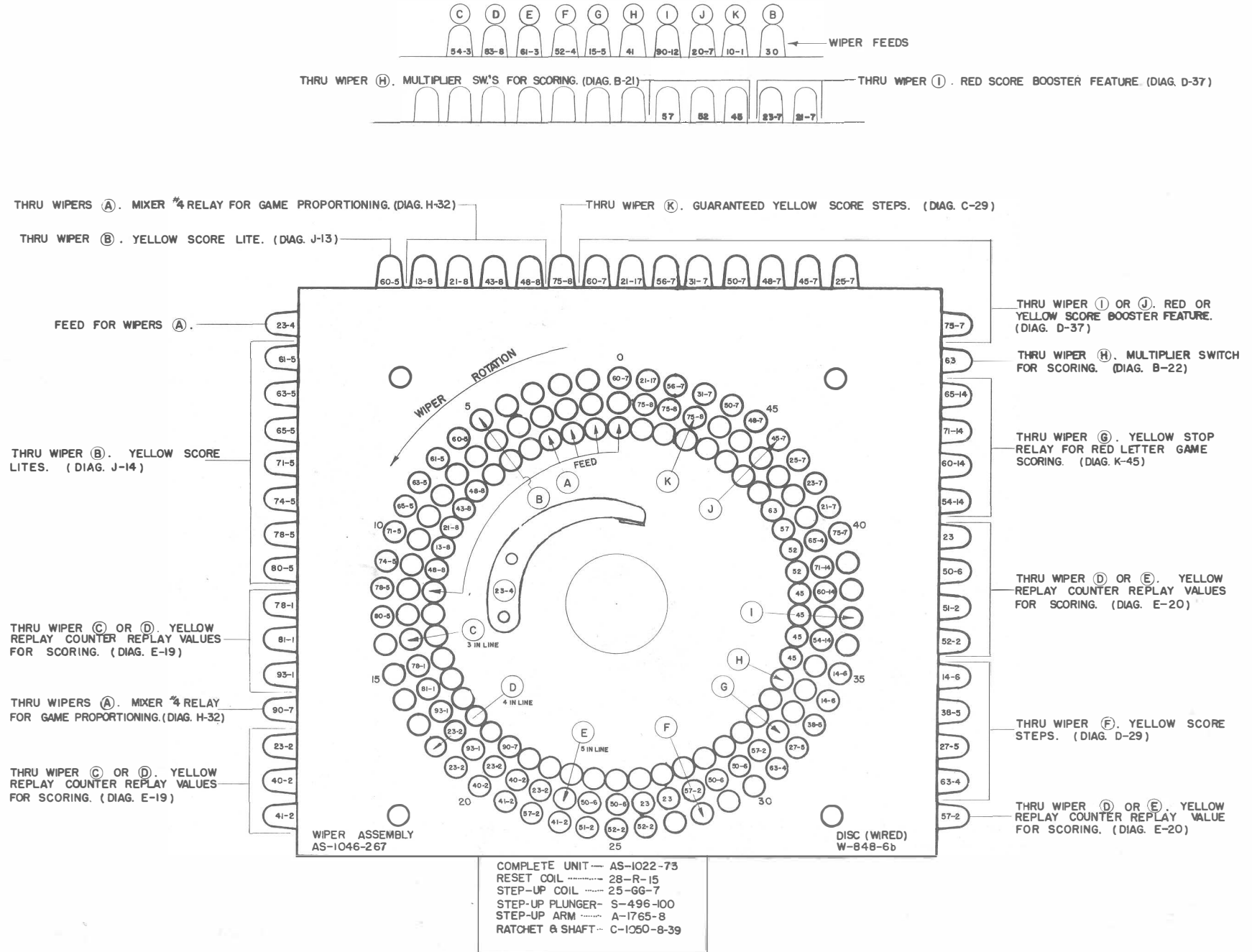
WIPER ASSEMBLY  
AS-1046-216

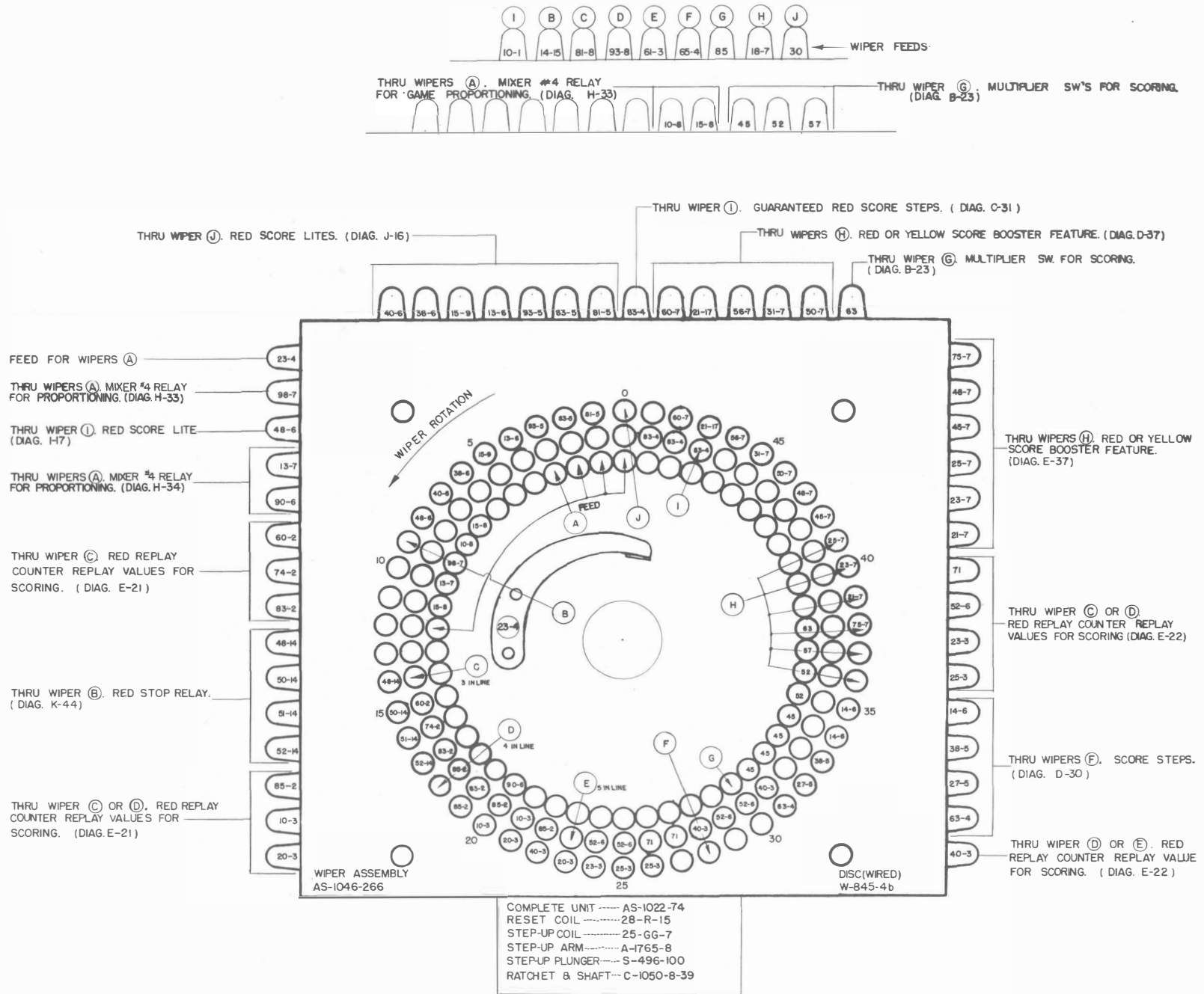


COMPLETE UNIT----- AS-1110-29  
 RESET COIL ----- 28-R-15  
 STEP-UP COIL ----- 25-GG-7  
 STEP-UP PLUNGER---- S-496-100  
 STEP-UP ARM----- A-1765-4  
 RATCHET & SHAFT--- C-1050-8-43

# YELLOW SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

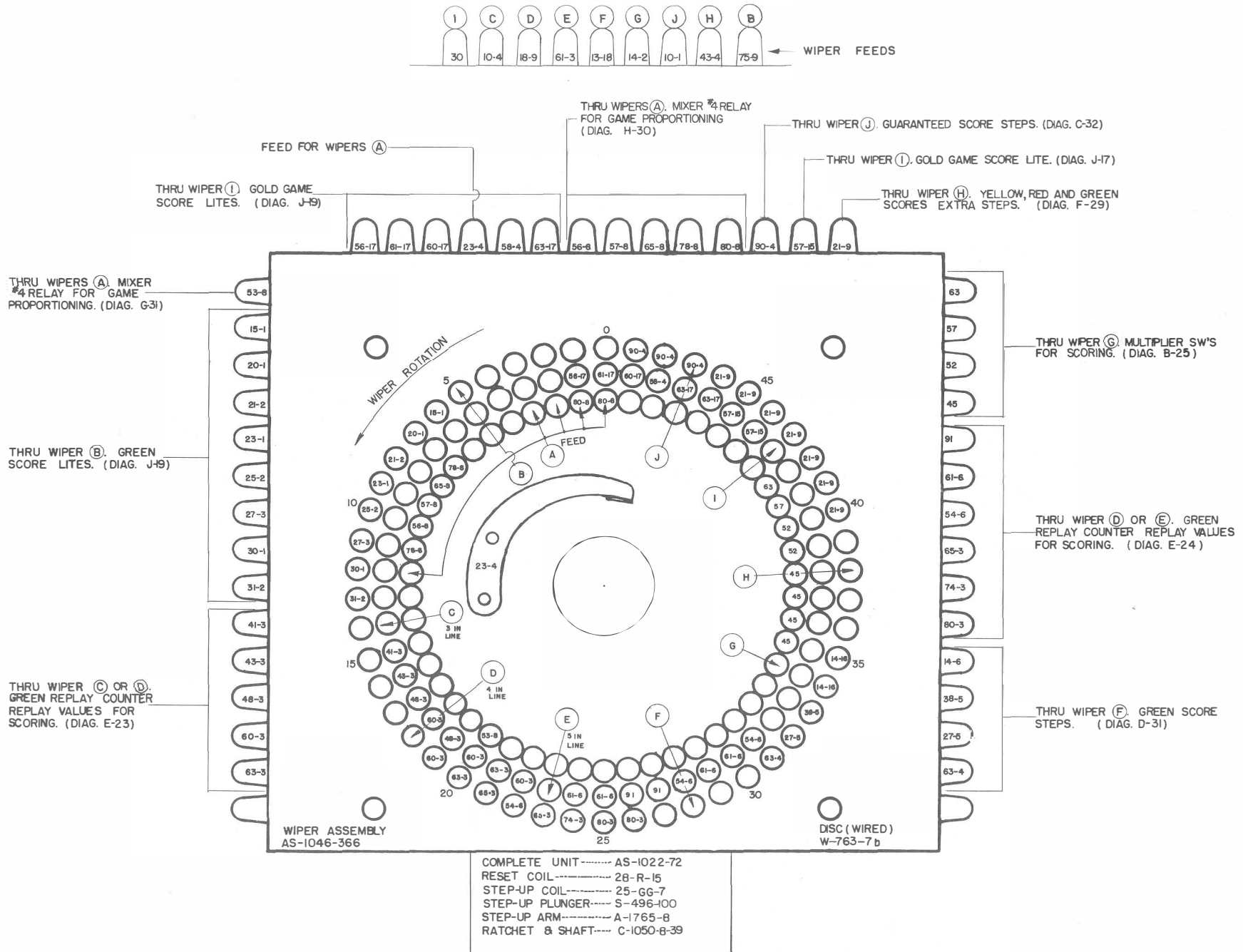






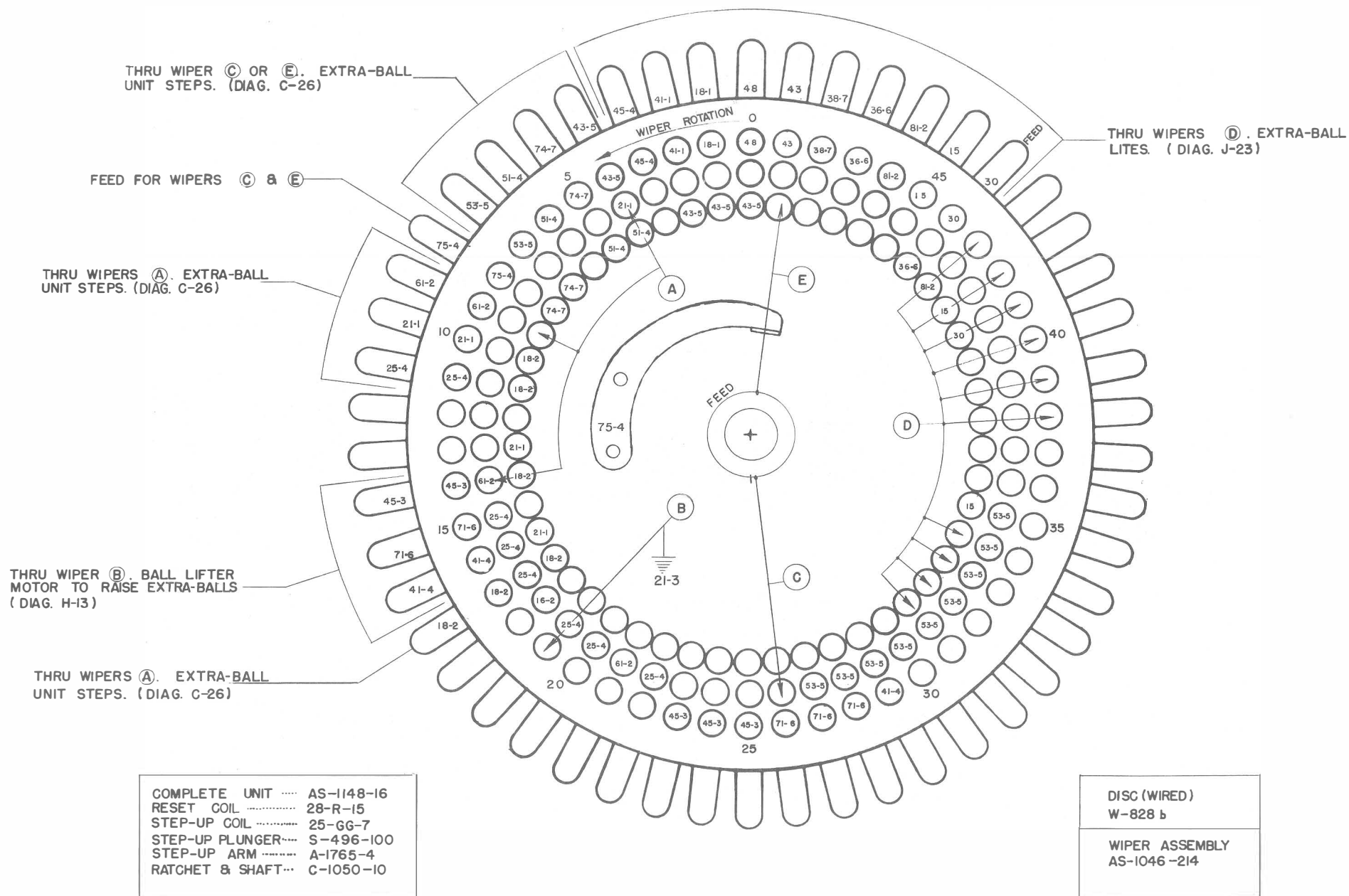
# GREEN SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



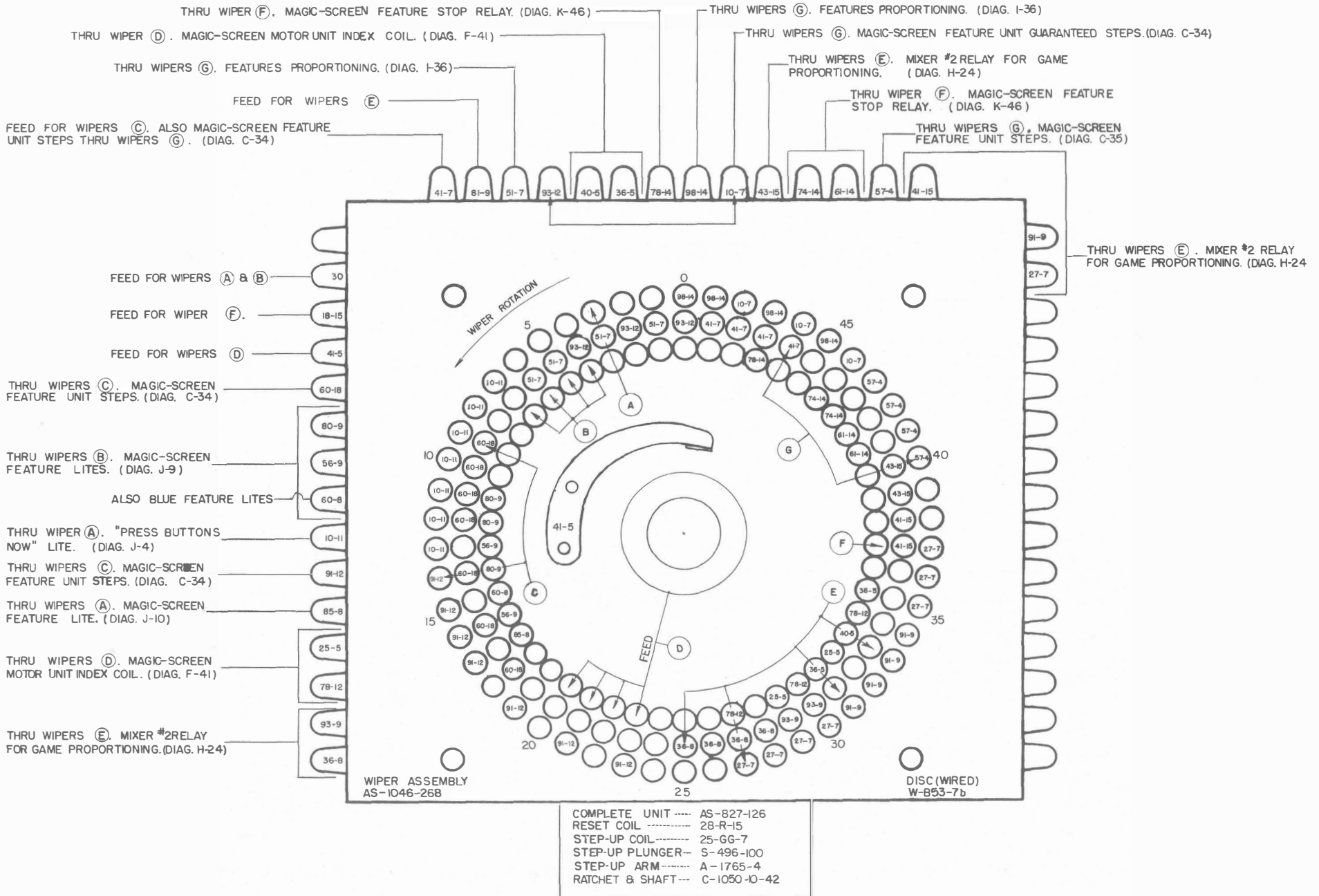
# EXTRA BALL UNIT viewed from BUTTON or WIPER side

10 step unit. Wipers shown in zero or reset position



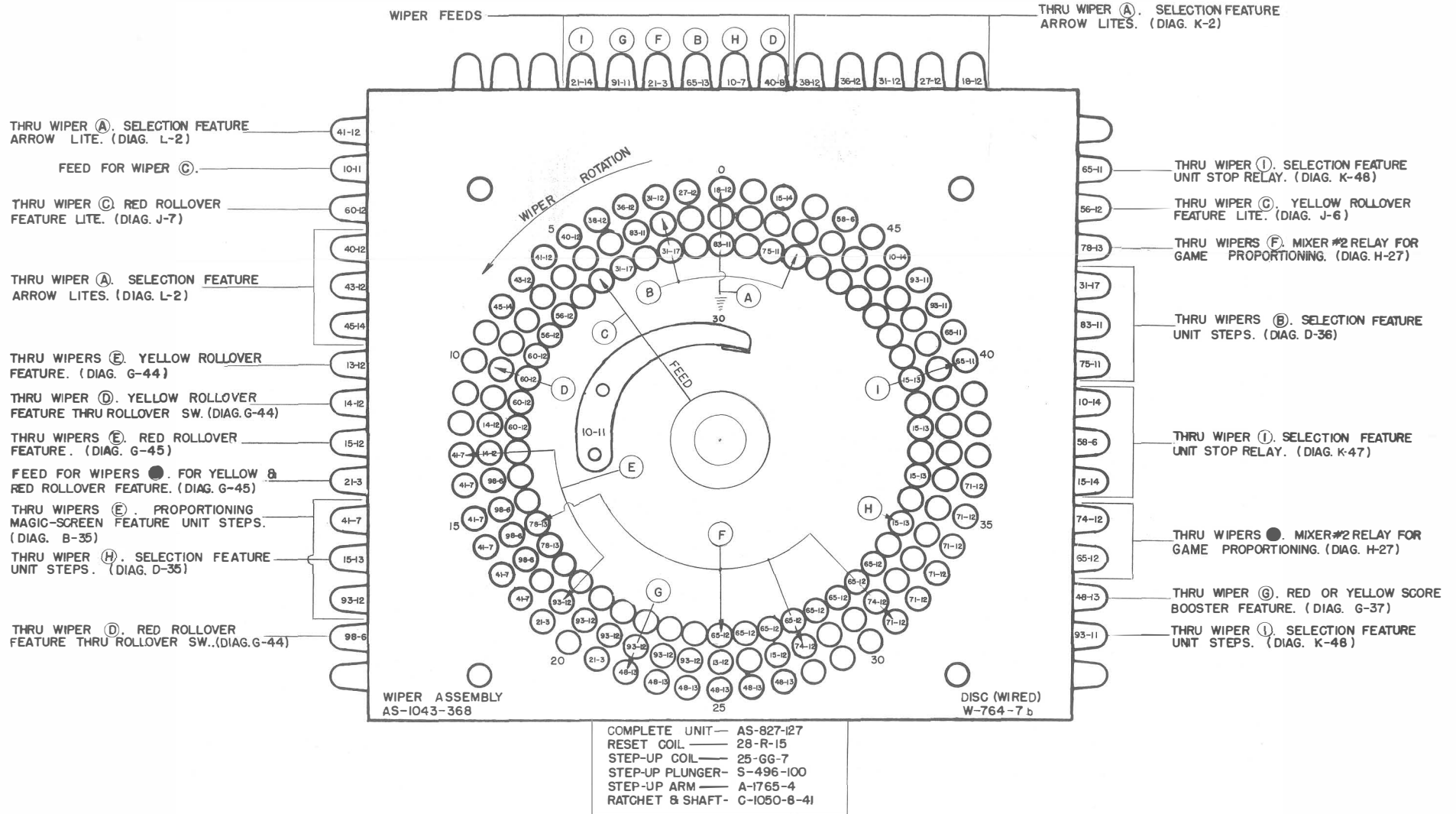
# MAGIC SCREEN FEATURE UNIT viewed from BUTTON or WIPER side

10 step unit. Wipers shown in zero or reset position



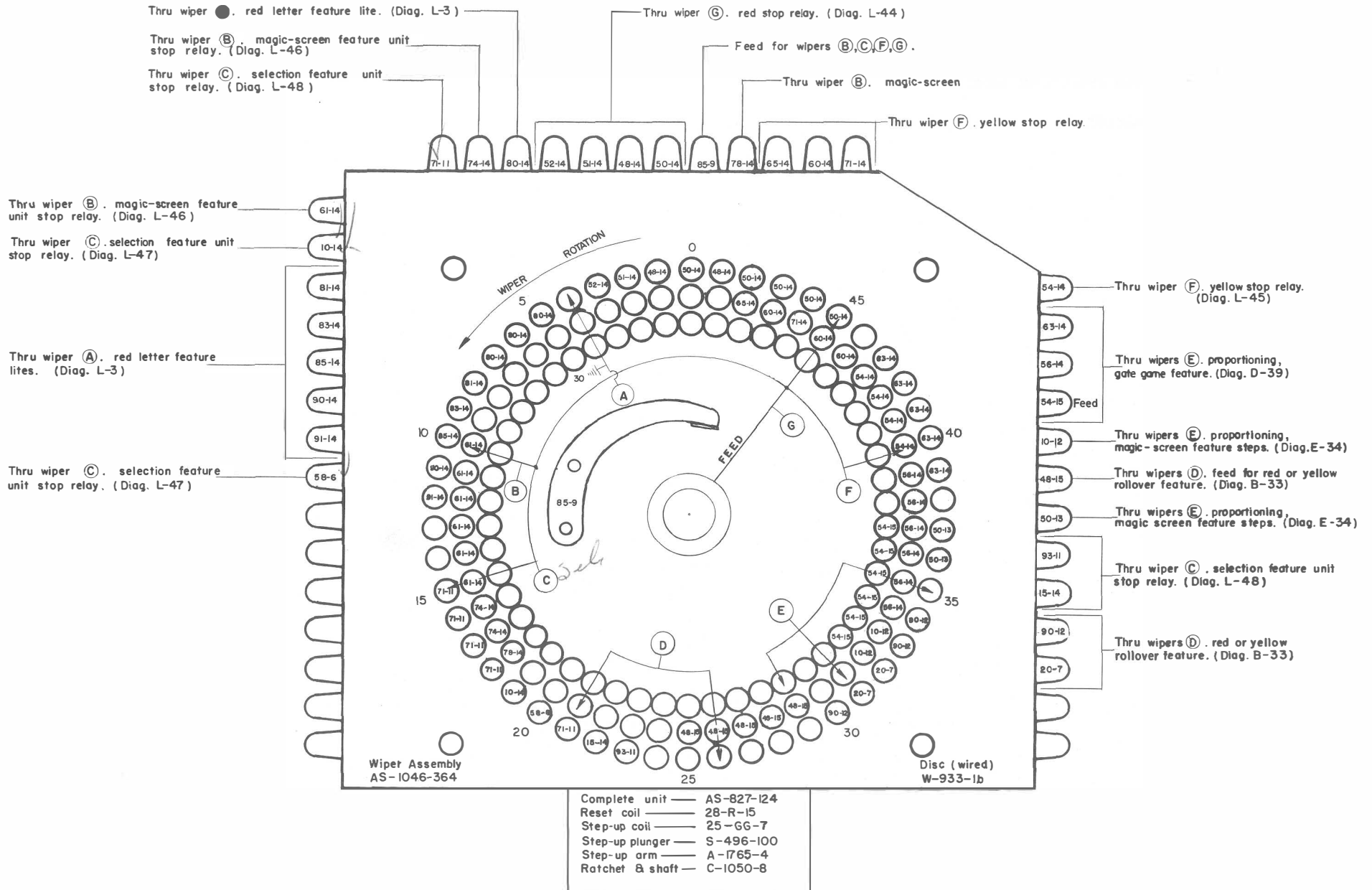
# SELECTION FEATURE UNIT viewed from BUTTON or WIPER side

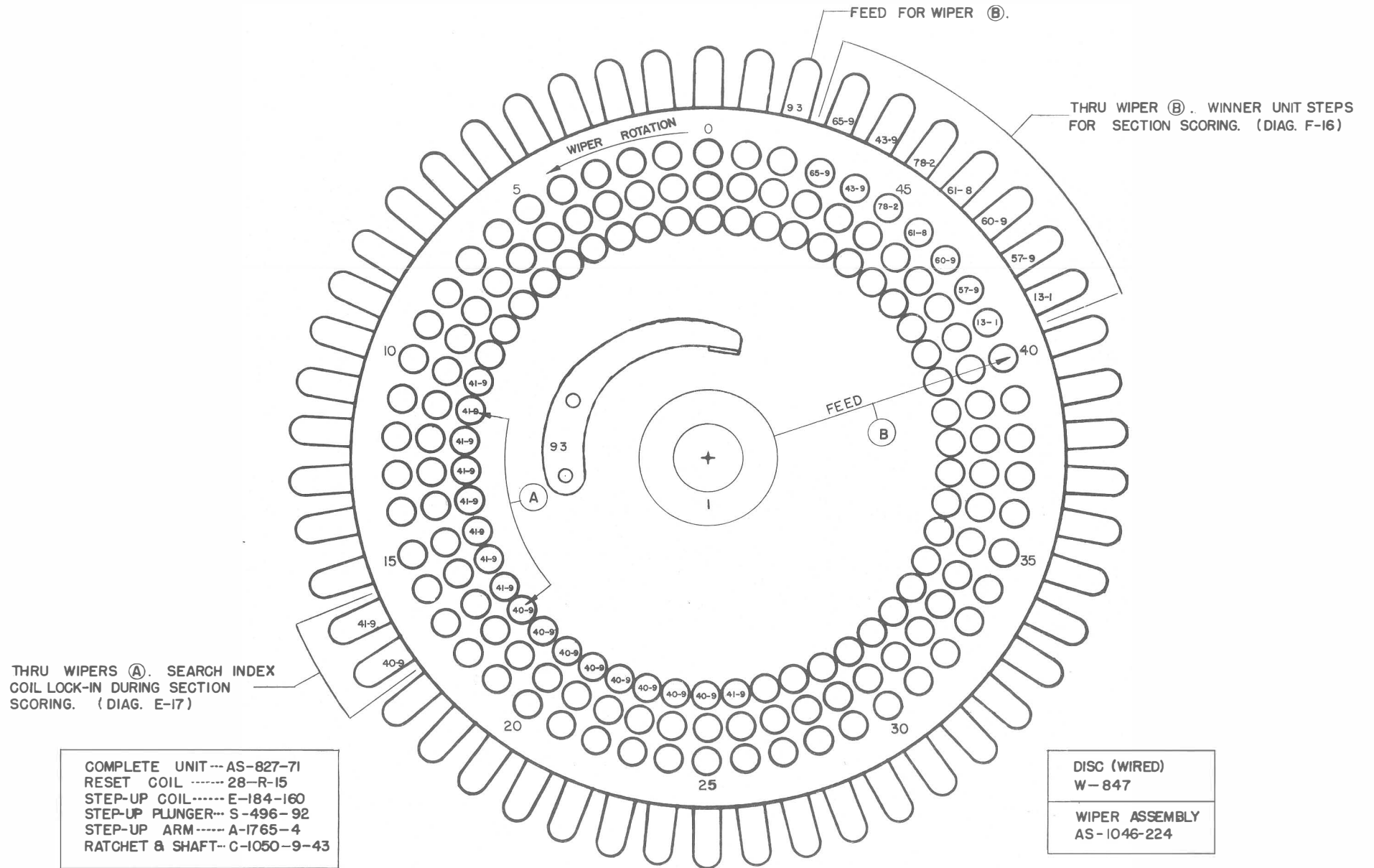
8 step unit. Wipers shown in zero or reset position



# RED LETTER FEATURE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position





THRU WIPERS (A). SEARCH INDEX COIL LOCK-IN DURING SECTION SCORING. (DIAG. E-17)

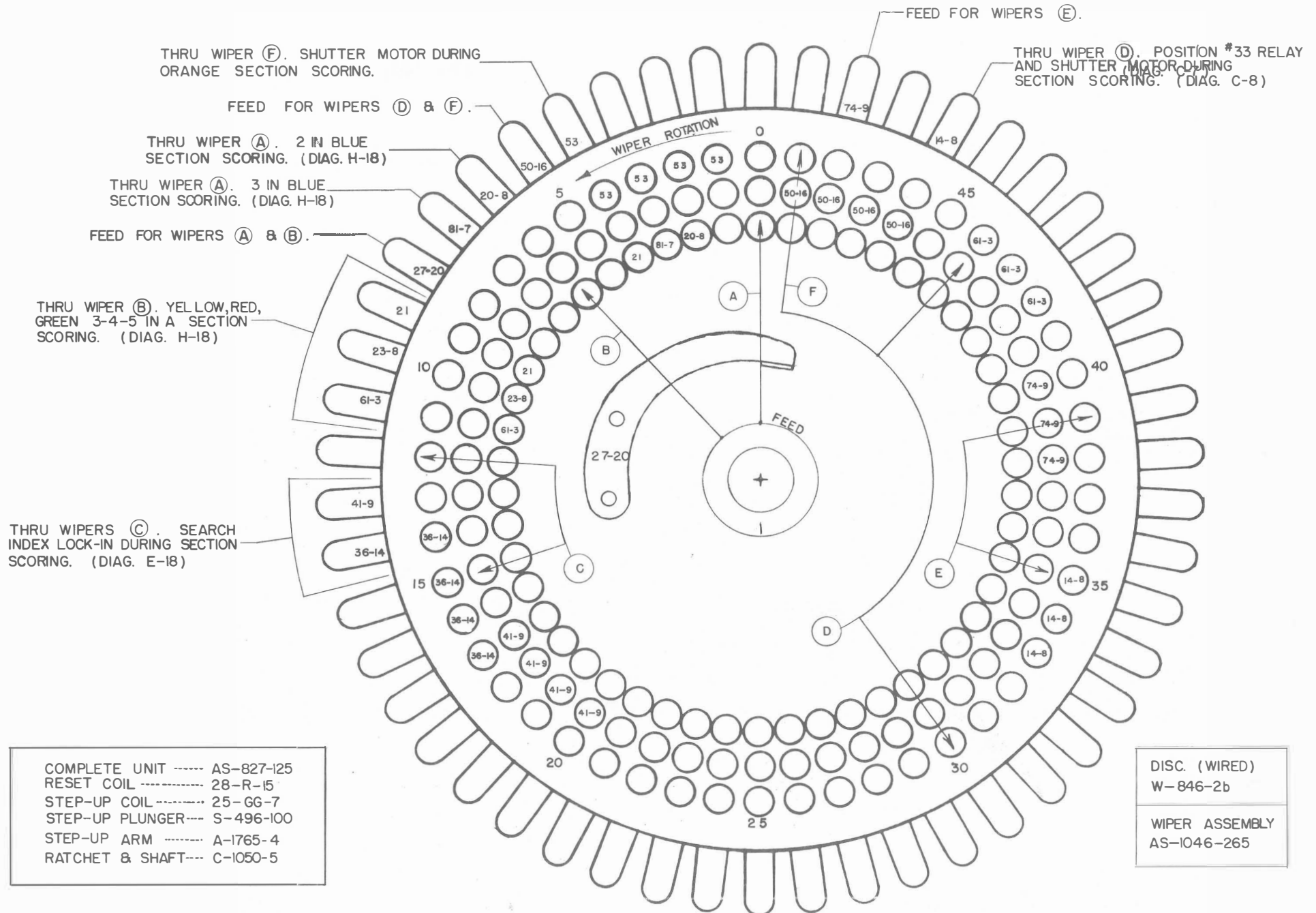
THRU WIPER (B). WINNER UNIT STEPS FOR SECTION SCORING. (DIAG. F-16)

- COMPLETE UNIT---AS-827-71
- RESET COIL .....28-R-15
- STEP-UP COIL.....E-184-160
- STEP-UP PLUNGER...S-496-92
- STEP-UP ARM.....A-1765-4
- RATCHET & SHAFT--C-1050-9-43

- DISC (WIRED)
- W-847
- WIPER ASSEMBLY
- AS-1046-224

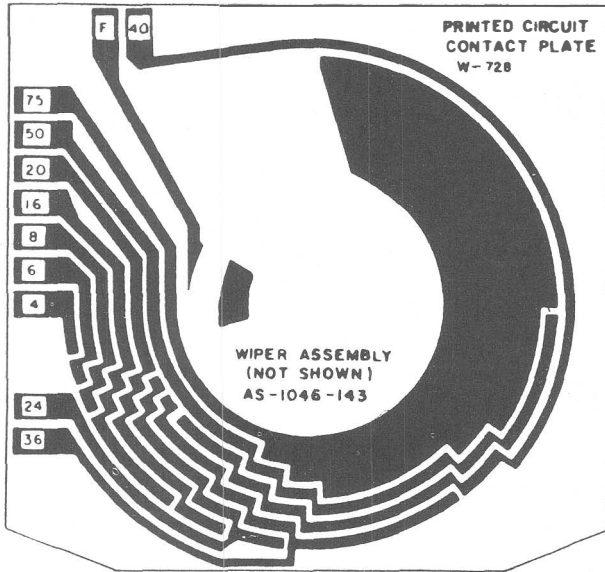
# WINNER UNIT viewed from BUTTON or WIPER side

5 step unit. Wipers shown in zero or reset position

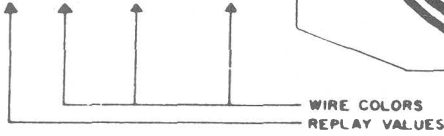


# REPLAY COUNTER viewed from WIPER side 3 used (see code box at left)

LUG	YELLOW REPLAY COUNTER	RED REPLAY COUNTER	GREEN REPLAY COUNTER
50	57-2	40-3	54-6
75	50-6	52-6	61-6
F	23	71	91
36	51-2	23-3	74-3
24	41-2	20-3	65-3
20	40-2	10-3	63-3
16	23-2	85-2	60-3
8	93-1	83-2	48-3
6	81-1	74-2	43-3
4	78-1	60-2	41-3
40	52-2	25-3	80-3



- Complete Unit - AS-797-36
- Reset Coil - 28-R-15
- Step-up Coil - 25-GG-7
- Step-up Plunger - S-496-116
- Step-up Arm - A-1765-4
- Ratchet & Shaft - C-100



CAM SWITCHES THAT PULSE YELLOW, GREEN & RED REPLAY COUNTER STEP-UP COILS								
	SW 13A	SW 13A	SW 13A	SW 13A	SW 12A	SW 12 A	SW 11 A	SW 10A
<b>5 IN LINE</b>	75 	75 	96 	96 	200 	300 	450 	600 
<b>4 IN LINE</b>	16 	20 	24 	50 	96 	144 	240 	480 
<b>3 IN LINE</b>	4 	6 	8 	16 	32 	64 	120 	192 

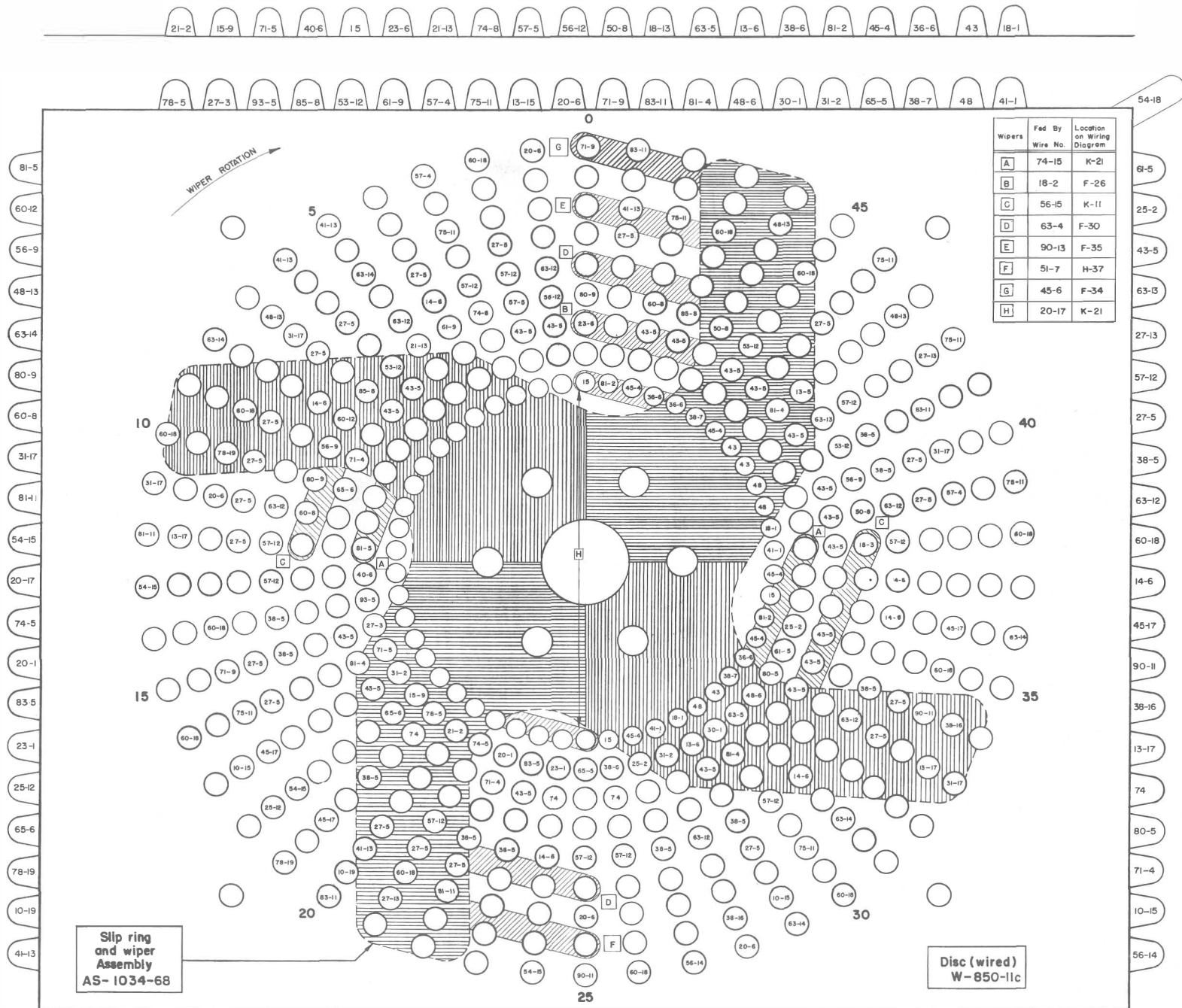
LARGE NUMBERS ARE REPLAY SCORES SHOWN ON BACK GLASS.  
 NUMBERS IN SHADED CIRCLES INDICATE WHICH PORTION OF  
 REPLAY CIRCUIT STRIP  
 IS EFFECTIVE FOR A PARTICULAR REPLAY SCORE.

EXAMPLE: ON A 3-IN-LINE SCORE OF **64** REPLAYS  
 THE CIRCUIT IS EFFECTIVE THRU THE REPLAY CIRCUIT STRIP

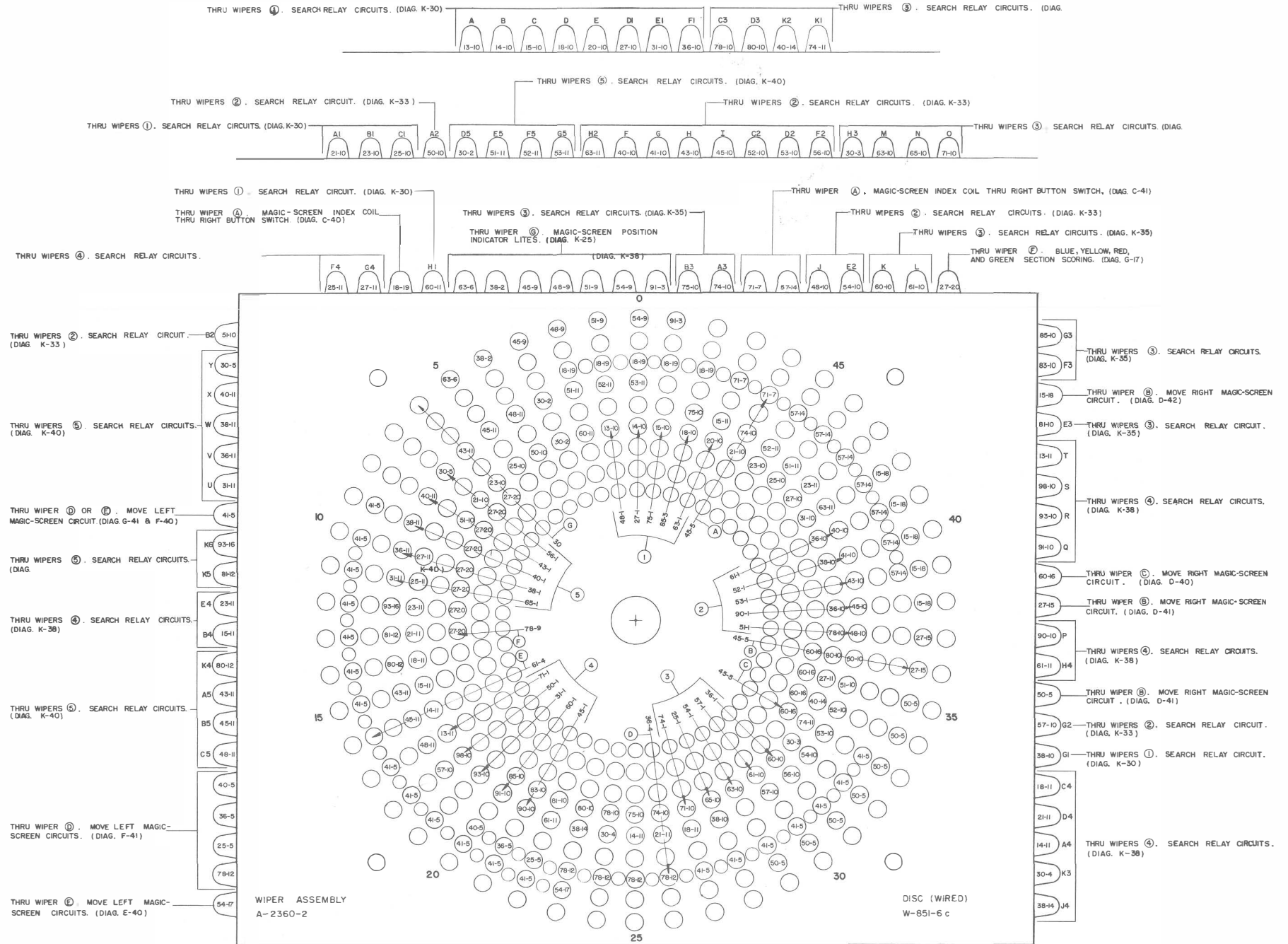
NOTE: 96 VALUE REPLAY SCORES ARE EFFECTIVE THRU THE OPEN AT 96 SWITCH.



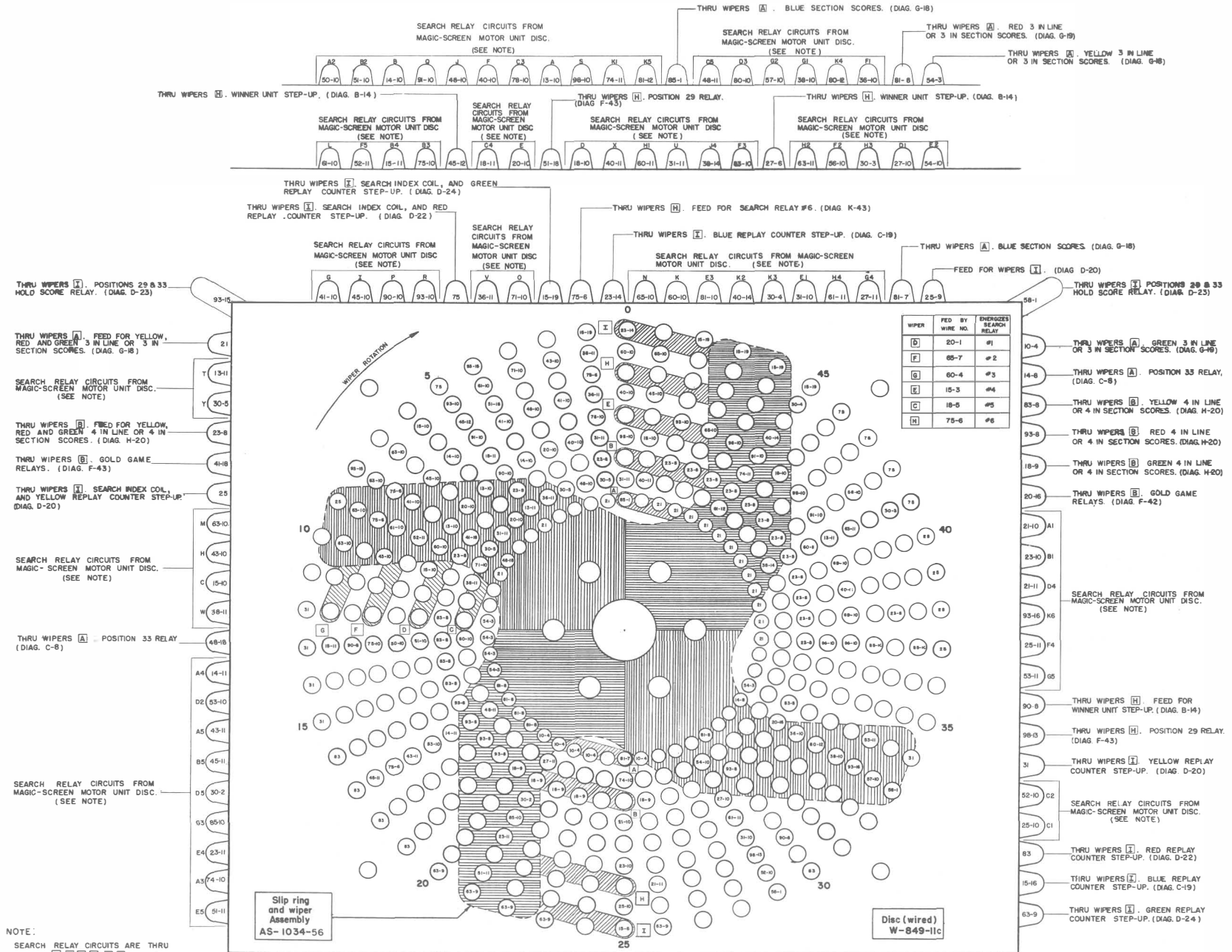
# SPOTTING DISC viewed from BUTTON or WIPER side



# MAGIC SCREEN UNIT viewed from BUTTON or WIPER side



# SEARCH DISC viewed from BUTTON or WIPER side



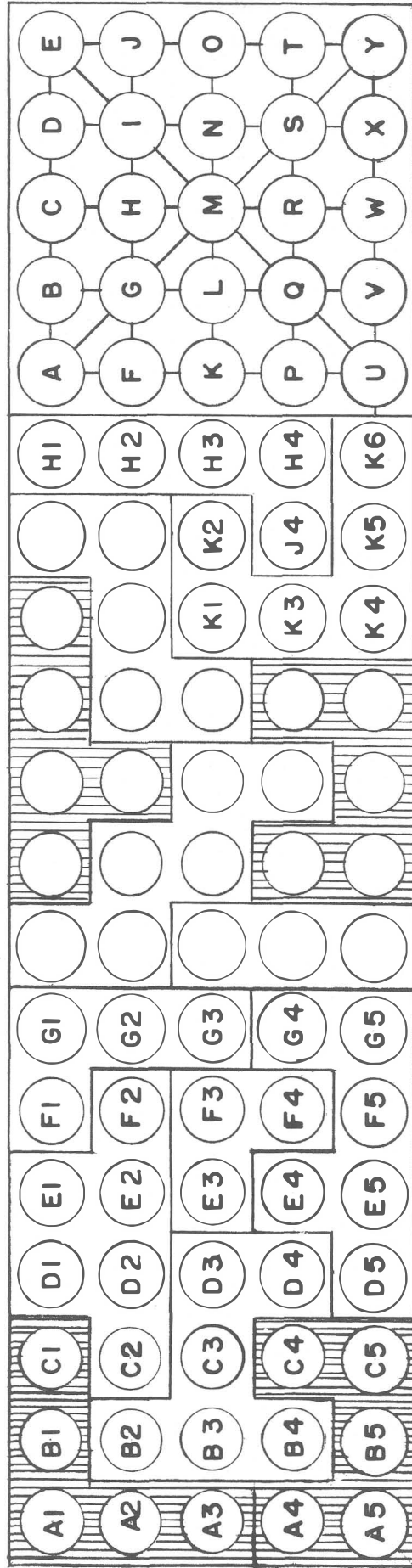
### SEARCH POSITIONS CHART

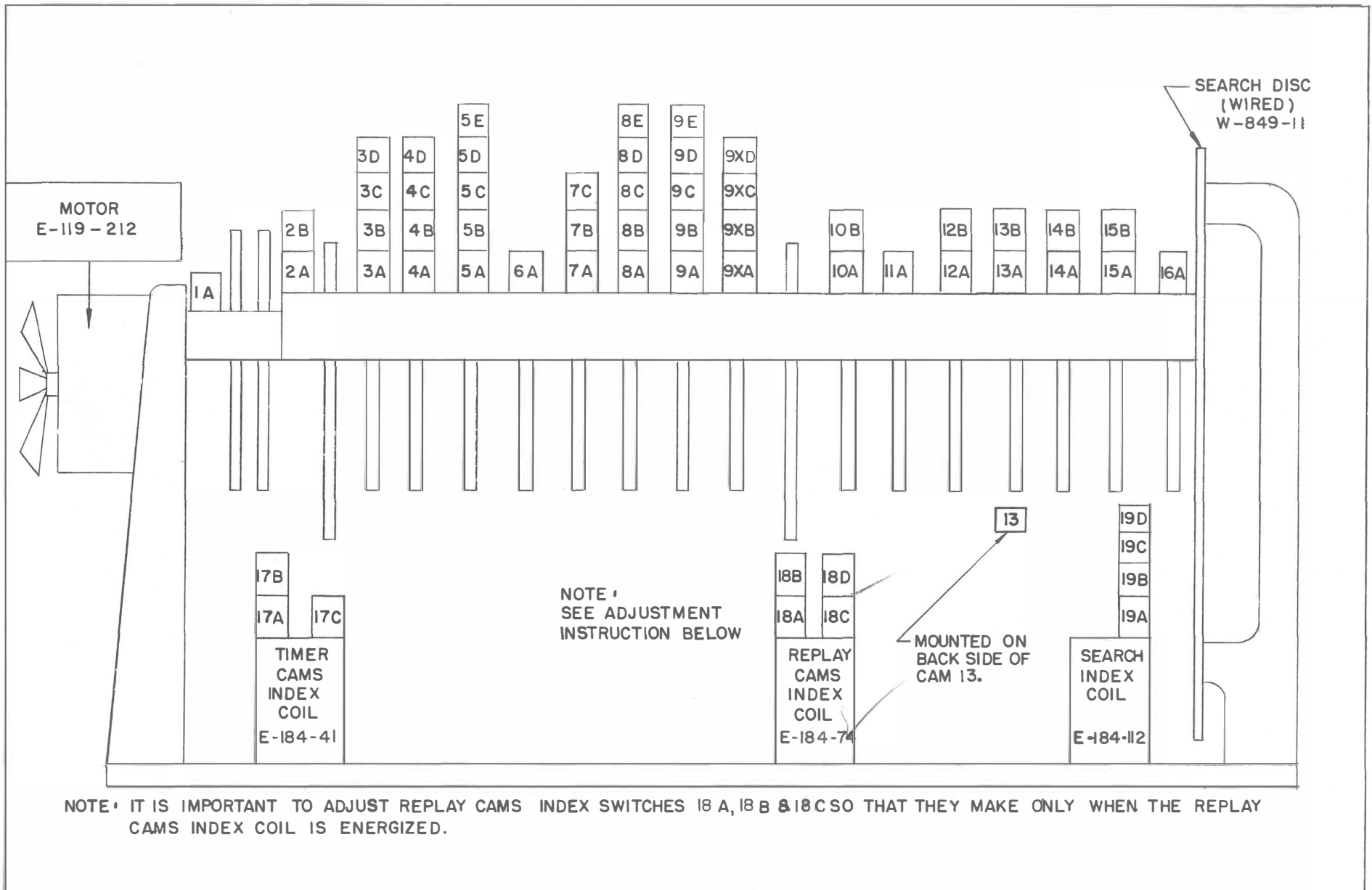
	RED WIPER AT POSITION	WIPER D ROW 4 SEARCH RE. # 1	WIPER F ROW 6 SEARCH RE. # 2	WIPER G ROW 8 SEARCH RE. # 3	WIPER E ROW 5 SEARCH RE. # 4	WIPER C ROW 2 SEARCH RE. # 5	WIPER H ROW 7 SEARCH RE. # 6
6 NO. GREEN SECTION	1	B2	B3	B4	C3	D3	D4
	2						
	3						
	4						
RED SUPER SECTION	5	A4	A5	B5	C4	C5	
	6						
	7						
YELLOW SECTION	8						
	9	D5	E4	E5	F5	G4	G5
	10						
	11						
YELLOW SUPER SECTION	12						
	13	A1	B1	C1	A2	A3	
	14						
	15						
RED SECTION	16						
	17	D1	E1	C2	D2	E2	F2
	18						
	19						
4 NO. GREEN SECTION	20						
	21	F1	G1	G2	G3		
	22						
	23						
BLUE SECTION	24						
	25	E3	F3	F4			
	26						
	27						
ORANGE SECTION (RED LETTER GAME SCORES)	28						
	29	H1	H2	H3	H4	J4	
	30						
	31						
PURPLE SECTION (GOLDEN GAME SCORES)	32						
	33	K1	K2	K3	K4	K5	K6
	34						
	35						
YELLOW	36						
	37	D	I	N	S	X	
	38	A	F	K	P	U	
	39	U	V	W	X	Y	
RED	40	F	G	H	I	J	
	41	E	J	O	T	Y	
	42	B	G	L	Q	V	
	43	P	Q	R	S	T	
GREEN	44	A	B	C	D	E	
	45	E	I	M	Q	U	
	46	A	G	M	S	Y	
	47	K	L	M	N	O	
	48	C	H	M	R	W	
	49						
	50						

ROTATION OF SEARCH DISC WIPERS FROM 50 TO 1



MAGIC - SCREEN LAYOUT





# CONTROL UNIT CAM SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 18

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A N.O.	G-9	65-2 36-9	Brown-White Yellow-Brown	Pulses timer unit step-up coil after 5th ball is shot.
2A N.O.	1-3	90-5 30	Gray Yellow	Pulses reflex play magnet coil, replay register reset coil and total plays meter when playing coins and replays.
2B N.O.	F-37	61-7 10-2	Brown-Red Red	Energizes red or yellow score booster feature trip relay.
3A N.C.	I-4	48-2 18-20	Green-Black Red-Black	Opens circuit to start relay.
3B S.P.D.T.	B-18	93-7 98-4 91-7	Gray-Yellow Gray-Black Gray-Red	Directs circuit to replay meter or total plays meter.
3C S.P.D.T.	C-49	60-13 57-13 21-3	Brown White-Orange Blue-Red	Directs circuit to energize and lock-in play scores relay.
3D S.P.D.T.	C-47	74-16 81-13 21-3	Orange-Green Black-Red Blue-Red	Directs circuit to energize and lock-in play features relay.
4A N.O.	1-48	30 98-1	Yellow Gray-Black	Energizes spotting cams index coil.
4B N.O.	F-47	30 56-5	Yellow White-Brown	Energizes score extra step index coil.
4C N.O.	D-5	27-9 80-2	Blue-Orange Black	Pulses coin meter (when coin meter is used).
4D S.P.D.T.	G-5	13-9 90-9 14-5	Red-Yellow Gray Red-Green	Opens start circuit and completes a circuit to energize tilt relay, when coin switch closed too long.
5A N.O.	G-9	65-2 83-1	Brown-White Black-Yellow	Completes a circuit to reset timer unit when playing for extra-balls.
5B N.O.	B-26	21-1 38-4	Blue-Red Yellow-Black	Pulses extra ball unit step-up coil for guaranteed step circuit.
5C N.O.	D-27	91-6 78-4	Gray-Red Orange-Black	Energizes anti-cheat relay coil.
5D N.O.	G-32	85-4 10-7	Black-White Red	Pulses magic-screen feature unit and selection feature unit step-up coils for guaranteed step circuit.
5E N.C.	D-47	21-3 40-15	Blue-Red Green	Opens lock-in circuit for features lock relay and scores lock relay.
6A N.C.	1-29	51-5 75-5	White-Red Orange-White	Opens circuit for game features during play cycle.
7A N.O.	D-28	54-12 10-1	White-Green Red	Pulses yellow, red and green score unit step-up coils for single steps.
7B N.O.	D-46	21-3 43-14	Blue-Red Green-Yellow	Energizes play features lock relay when playing for features only, or play scores lock relay when playing for scores only.
7C N.O.	G-29	60-6 63-4	Brown Brown-Yellow	Pulses yellow, red and green score unit step-up coils for single steps.

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
8A N.O.	B-27	25-4 38-4	Blue-White Yellow-Black	Pulses extra-ball unit step-up coil for single steps.
8B N.O.	F-36	61-7 18-7	Brown-Red Red-Black	Energizes red or yellow score booster feature trip relay.
8C N.O.	G-38	27-13 20-6	Blue-Orange Blue	Energizes OK feature trip relay.
8D N.O.	G-30	56-11 63-4	White-Brown Brown-Yellow	Pulses yellow, red, and green score unit step-up coils for single steps, when playing for scores only.
8E N.O.	D-28	54-12 91-5	White-Green Gray-Red	Pulses yellow, red, and green score unit step-up coils for single steps, when playing for scores only.
9A Alt.	D-26	43-5 74-7	Green-Yellow Orange-Green	Proportioning circuit for extra-ball unit steps.
9B Alt.	C-34	41-7 93-12	Green-Red Gray-Yellow	Proportioning circuit for magic-screen feature unit steps.
9C Alt.	C-37	90-12 10-2 20-7	Gray Red Blue	Proportioning circuit for red or yellow score booster feature.
9D Alt.	H-28	15-7 54-8	Red-White White-Green	Proportioning circuit for extra-ball unit steps.
9E Alt.	D-32	13-18 51-17	Red-Yellow White-Red	Proportioning circuit for green score unit steps.
Alt. 9XA N.O.	G-38	25-12 14-13	Blue-White Red-Green	Proportioning circuit for super blue feature.
Alt. 9XB N.O.	C-36	50-17 15-13	White Red-White	Proportioning circuit for selection feature unit steps.
Alt. 9XC N.C.	G-36	91-11 48-13	Gray-Red Green-Black	Proportioning circuit for red or yellow score booster feature.
Alt. 9XD N.O.	C-38	20-6 52-16	Blue White-Blue	Proportioning circuit for OK feature.
12.1 MULT. 10A N.O.	A-22	63 70	Brown-Yellow Orange	Pulses yellow, red and green replay counter unit step-up coils when scoring with yellow, red and green scores at 8th step.
12.1 MULT. 10B N.O.	B-19	23-17 27-17	Blue-Yellow Blue-Orange	Pulses blue replay counter coil when scoring 600 for blue section score.
6.1 MULT. 11A N.O.	A-22	57 70	White-Orange Orange	Pulses yellow, red and green replay counter units when scoring with yellow, red and green scores at 7th step.
4.1 MULT. 12A N.O.	A-21	52 70	White-Blue Orange	Pulses yellow, red and green replay counter unit step-up coils when scoring with red, yellow and green scores at 5th or 6th step.
4.1 MULT. 12B N.O.	B-20	10-16 27-17	Red Blue-Orange	Pulses blue replay counter unit coil when scoring 300 for blue section score.

CONCLUDED ON NEXT PAGE

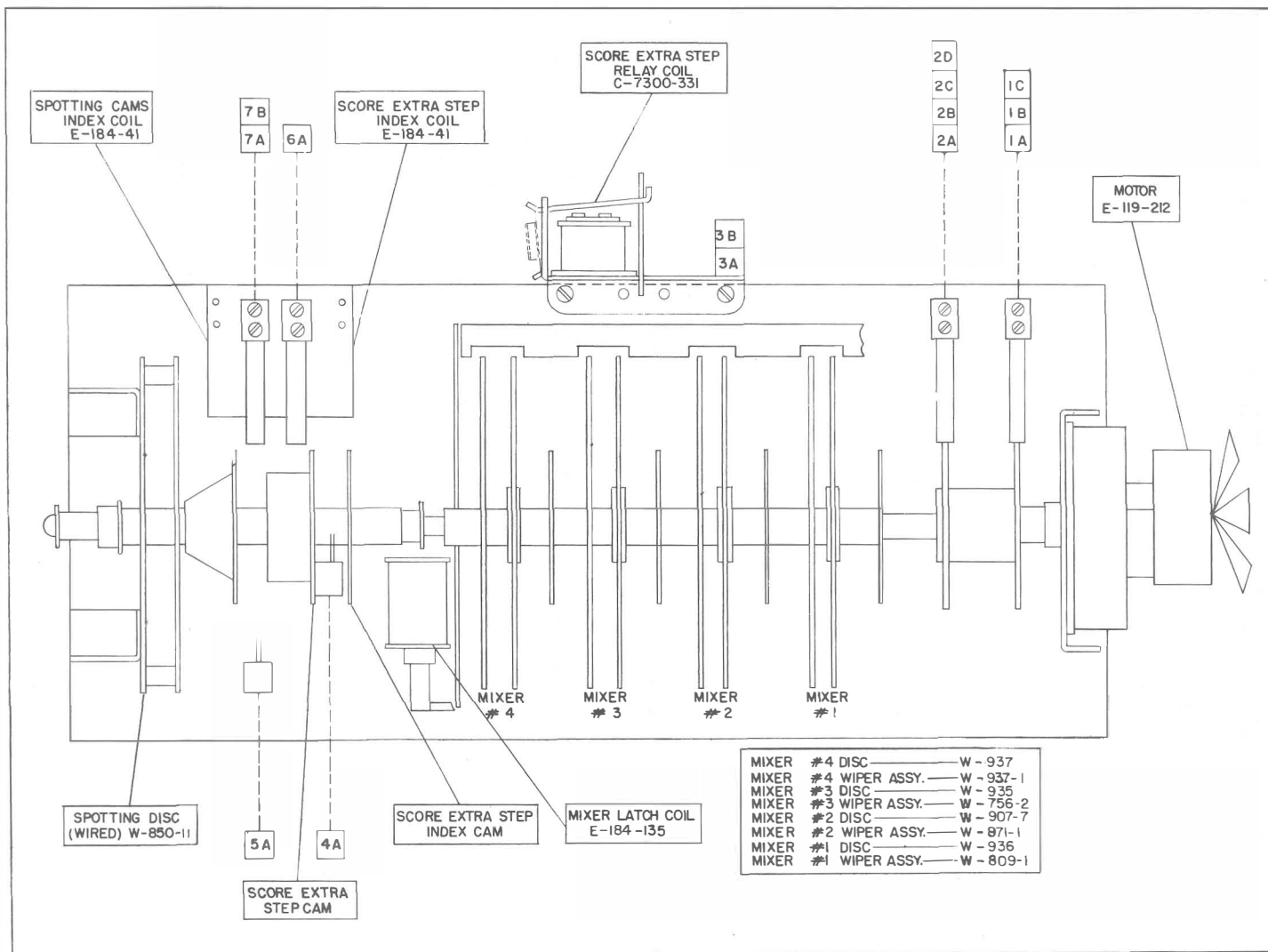
# CONTROL UNIT CAM SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 18

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1.1 MULT. 13A N.O.	A-20	45 70	Green-White Orange	Pulses yellow, red and green replay counter unit step-up coils when scoring with yellow, red and green scores at 1st, 2nd, 3rd or 4th step.
13B N.O.	D-17	80 48-4	Black Green-Black	Pulses replay register unit step-up coil, reflex unit replay magnet coil, and replay meter when scoring.
BACKSIDE 13 N.O.	H-17	21-3 27	Blue-Red Blue-Orange	Completes in-line or section replay scoring lock-in circuit, see control unit pictorial view for important adjustment instructions.
14A N.C.	I-15	18 14	Red-Black Red-Green	In series with in-line and section scoring circuit.
14B N.C.	C-8	27-2 90-2	Blue-Orange Gray	Opens timer unit step-up circuit while scoring.
CHANGE-OVER 15A S.P.D.T.	H-17	56 18 54	White-Brown Red-Black White-Green	Directs in-line or section scoring circuit.
CHANGE-OVER 15B S.P.D.T.	E-15	80 51-8 41-9	Black White-Red Green-Red	Directs circuit to energize search index coil for in-line or section scoring.
16A N.O.	I-48	31-6 21-3	Yellow-Red Blue-Red	Pulses sequence unit and winner unit reset coils.
TIMER CAMS INDEX COIL	A-6	93-2 70	Gray-Yellow Orange	Energized thru start relay circuit and releases timer cams for cycle.
17A N.O.	H-2	20P 60P	Blue(Plastic) Brown(Plastic)	Completes a circuit to control unit and mixer-spotting unit motors.
17B N.C.	G-5	27-9 71-2	Blue-Orange Orange-Red	Opens circuit to coin lockout magnet coil.
17C N.C.	F-12	13 30	Red-Yellow Yellow	Opens circuit to red button relay, and extra ball trip relays.

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY CAMS INDEX COIL	A-17	40-4 70	Green Orange	Energized by search index switch 19B when a score is made and releases replay cams to register score.
18A N.O.	G-18	27 80	Blue-Orange Black	In series with in-line or section scoring lock-in circuits. See control unit pictorial view for adjustment instructions of switches 18A, 18B, 18C
18B N.O.	H-15	14 18	Red-Green Red-Black	Same function as switch 18A
18C N.O.	F-18	80 36-14	Black Yellow-Brown	In series with section scoring lock-in circuit.
18D N.C.	B-16	91-8 15-2	Gray-Red Red-White	Opens direct 50 volt pull-in circuit to search index coil, coil then holds in thru resistor.
SEARCH INDEX COIL	A-16	15-2 70	Red-White Orange	Energized for all types of scoring and stops search wipers at proper position to record scores.
19A N.O.	E-43	98-13 10-9	Gray-Black Red	Completes circuit to position 29 relay for red letter game scoring.
19B N.O.	C-16	58-2 40-4	White-Black Green	Completes circuit to replay cams index coil.
19C N.O.	H-18	54 91-16	White-Green Gray-Red	In series with all section scoring circuits.
19D N.O.	C-8	21-6 48-18	Blue-Red Green-Black	Completes circuit to position 33 relay for gold section scoring.
SEARCH INDEX LOCK MAGNET COIL	A-40	23-16 70	Blue-Yellow Orange	(Not shown on pictorial view) Energized by front rail "R" button and releases search wipers to search for scores.
SEARCH WIPER CAM 20A N.C.	H-41	14-4 20-2	Red-Green Blue	Opens circuit to magic-screen buttons during search for scores.
SEARCH WIPER CAM 20B N.C.	C-5	83-3 13-16	Black-Yellow Red-Yellow	Opens start relay circuit during search for scores.
SEARCH WIPER CAM 20C N.C.	D-40	52-9 23-16	White-Blue Blue-Yellow	Opens circuit to search index lock magnet coil.



# MIXING AND SPOTTING UNIT ASSEMBLY NUMBERS CORRESPOND TO SWITCH CHART BELOW



## MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

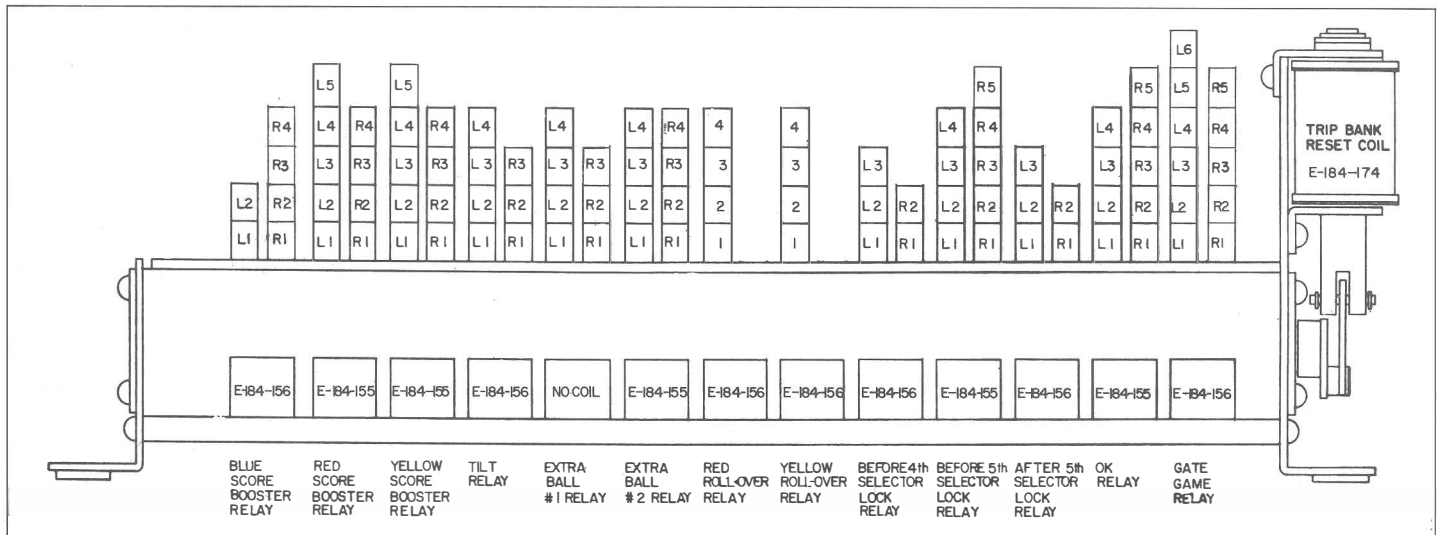
CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
16 PULSE 1A N.O.	G-34	98-14 45-6	Gray-Black Green-White	Steps feature units and energizes feature relays, when circuit complete thru spotting disc and other factors.
16 PULSE 1B N.O.	D-4	75-2 53-7	Orange-White White-Yellow	Resets replay register unit, when replay reset relay is energized.
16 PULSE 1C N.O.	J-1	90 10-11	Gray Red	Flashes "Press Buttons Now" lite, when magic screen feature, OK feature, or Golden game feature is in play.
16 PULSE 2A N.O.	G-15 G-15	52-8 93	White-Blue Gray-Yellow	Steps sequence unit and winner unit, when searching for section scores.
16 PULSE 2B N.O.	B-26 B-26	78 38-4	Orange-Black Yellow-Black	Steps extra ball unit, when circuit complete thru spotting disc and other factors.
16 PULSE 2C N.O.	F-32 F-32	61-12 36-7	Brown-Red Yellow-Brown	Steps score units, feature units, and energizes feature relays, when scoring red letter games.
16 PULSE 2D N.O.	B-18	80-16 40-16	Black Green	Resets blue replay counter unit.

# MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 21

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SCORE EXTRA STEP RELAY COIL	A-9	43-6 70	Green-Yellow Orange	Energized by score unit step-up arm switches.
3A N.O.	C-9	43-6 81-3	Green-Yellow Black-Red	Completes lock-in circuit to this relay.
3B N. O.	D-28	50-4 51-6	White White-Red	Completes circuit for score unit multiple steps.
SCORE EXTRA STEP PULSE SWITCH 4A N.O.	E- 28	43-4 50-4	Green-Yellow White	Pulses score units for multiple steps.
SQUARE PIN SWITCH 5A N.C.	D- 10	13-5 21-3	Red-Yellow Blue-Red	Opens score extra step relay lock-in circuit.
SCORE EXTRA STEP INDEX COIL	E-50	56-5 70	White-Brown Orange	Energized by control unit cam switch 4B during each play cycle.
6A N.O.	C-10	13-5 81-3	Red-Yellow Black-Red	Completes score extra step relay lock-in circuit.
SPOTTING CAMS INDEX COIL	I-50	98-1 70	Gray-Black Orange	Energized by control unit cam switch 4A during each play cycle.
7A N.O.	J-11	56-15 27-16	White-Brown Blue-Orange	Flashes all features lites during red or green button play.
7B N.O.	J-21	30 13-4	Yellow Red-Yellow	Flashes all score lites during red or blue button play. Also Also flashes extra-ball lites during yellow button play.

## TRIP RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 23



# TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 22

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BLUE SCORE BOOSTER RELAY COIL	A-39	51-19 70	White-Red Orange	Energized thru spotting disc when circuit complete thru other factors. Also energized by switch on super blue relay.
L1 N.C.	B-38	51-19 51-19	White-Red White-Red	Opens circuit to coil
L2 S.P.D.T.	L-11	18-4 60-8 61-9	Red-Black Brown Brown-Red	Directs lite circuit for blue features.
R1 N.C.	E-34	71-9 74-19	Orange-Red Orange-Green	Proportioning, magic screen feature steps.
R2 N.C.	H-27	54-8 36-19	White-Green Yellow-Brown	Proportioning, score steps, and extra ball feature steps.
R3 S.P.D.T.	D-19	75-14 85-1 83-13	Orange-White Black-White Black-Yellow	Directs blue replay counter circuit.
R4 S.P.D.T.	B-19	10-16 15-16 23-17	Red Red-White Blue-Yellow	Same function as switch R3.
RED SCORE BOOSTER RELAY COIL	B-37	90-12 10-5	Gray Red	Energized thru spotting disc, when circuit complete thru other factors. Also energized thru red letter unit disc for red letter games.
L1 N.C.	F-35	41-13 93-13	Green-Red Gray-Yellow	Proportioning, magic screen feature steps.
L2 N.O.	J-7	54-7 80-9	White-Green Black	Lites red super section feature lite.
L3 S.P.D.T.	D-30	65-4 63-7 52-4	Brown-White Brown-Yellow White-Blue	Proportioning, red or yellow score steps.
L4 N.C.	L-8	43-7 21-13	Green-Yellow Blue-Red	Opens circuit to flash yellow score booster feature lite.
L5 N.C.	H-24	78-11 27-7	Orange-Black Blue-Orange	Opens a circuit to mixer #2 relay.
R1 N.C.	B-37	53-6 10-5	White-Yellow Red	Opens circuit to coil. Also opens circuit to yellow score booster feature coil.
R2 N.O.	C-14	13-1 45-12	Red-Yellow Green-White	Completes a circuit to step winner unit.
R3 S.P.D.T.	C-30	83-4 25-14 75-8	Black-Yellow Blue-White Orange-Black	Proportioning, red or yellow score steps.
R4 N.C.	D-36	36-13 15-13	Yellow-Brown Red-White	Proportioning, selection feature unit steps.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
YELLOW SCORE BOOSTER RELAY COIL	B-37	20-7 10-5	Blue Red	Energized thru spotting disc, when circuit complete thru other factors. Also thru red letter feature disc for red letter games.
L1 N.C.	D-35	93-13 91-12	Gray-Yellow Gray-Red	Proportioning, magic - screen feature steps.
L2 N.O.	J-8	43-7 80-9	Green-Yellow Black	Lites yellow super section feature lite.
L3 S.P.D.T.	D-30	52-4 31-9 65-4	White-Blue Yellow-Red Brown-White	Proportioning, red or yellow score steps.
L4 N.C.	L-8	54-17 18-13	White-Green Red-Black	Opens circuit to flash red score booster feature lite.
L5 N.C.	D-36	50-17 36-13	White Yellow-Brown	Proportioning, selection feature steps.
R1 N.C.	A-37	53-6 70	White-Yellow Orange	Opens circuit to coil. Also opens circuit to red score booster feature coil.
R2 N.O.	C-15	13-1 27-6	Red-Yellow Blue-Orange	Completes a circuit to step winner unit.
R3 S.P.D.T.	C-30	75-8 38-9 83-4	Orange-White Yellow-Black Black-Yellow	Proportioning, red or yellow score steps.
R4 N.C.	I-24	81-9 78-11	Black-Red Orange-Black	Opens a circuit to mixer #2 relay.
TILT RELAY COIL	A-12	14-5 70	Red-Green Orange	Energized by inertia tilts, plumb-Bob tilt, and anti-cheat coin switch circuit.
L1 N.C.	H-39	40-8 93-3	Green Gray-Yellow	Open magic screen motor circuit and search circuit.
L2 N.C.	M-28	10 23-18	Red Blue-Yellow	Open 17 Volt circuit.
L3 S.P.D.T.	I-7	21-3 30 45-8	Blue-Red Yellow Green-White	Opens circuit to coil. Also opens playing circuits, and completes circuit to close shutter, when game tilted with shutter open.
L4 S.P.D.T.	M-27	38 54-2 91-2	Yellow-Black White-Green Gray-Red	Opens 6 volt circuit, and lites tilt lite.
R1 N.C.	G-2	60P 30A	Brown(Plastic) Yellow(Plastic)	Opens circuit to control unit and mixer - spotting unit motors.
R2 N.O.	F-13	57-6 85-7	White-Orange Black-White	Completes a circuit to red button relay
R3 N.O.	B-4	83-3 13-16	Black-Yellow Red-Yellow	Completes a circuit to start relay.

CONTINUED ON NEXT PAGE

# TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 22

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
EXTRA BALL #1 RELAY				Trips with extra ball #2 relay.
L1 N.C.	E-27	85-4 91-6	Black-White Gray-Red	Opens circuit to anti-cheat relay.
L2 N.O.	G-9	83-1 71-8	Black-Yellow Orange-Red	Completes circuit to reset timer unit when playing extra balls.
L3 S.P.D.T.	E-26	85-4 30 61-2	Black-White Yellow Brown-Red	Opens anti-cheat relay circuit and score steps circuit, and completes extra-ball steps circuit.
L4 S.P.D.T.	G-28	60-6 56-6 18-2	Brown White-Brown Red-Black	Opens score steps circuit, and completes extra-ball steps circuit.
R1 N.C.	J-11	27-16 81-6	Blue-Orange Black-Red	Opens circuit to flash other features lites.
R2 S.P.D.T.	I-27	75-5 15-7 45-2	Orange-White Red-White Green-White	Opens circuit for score steps, and completes circuit for extra-ball steps.
R3 N.O.	F-5	50-2 58-5	White White-Black	Completes a circuit to start relay.
EXTRA BALL #2 RELAY	A-13	40-17 70	Green Orange	Energized thru yellow button when circuit complete thru other factors.
L1 N.C.	B-13	40-17 40-17	Green Green	Opens circuit to coil.
L2 N.C.	D-14	91-1 38-3	Gray-Red Yellow-Black	Completes circuit to ball lifter motor.
L3 S.P.D.T.	D-6	14-3 61 98-2	Red-Green Brown-Red Gray-Black	Directs circuit to shutter motor or mixer latch and timer cams index coils.
L4 S.P.D.T.	K-21	31-5 13-4 20-17	Yellow-Red Red-Yellow Blue	Opens score lites flash circuit, and flashes extra-ball lites.
R1 N.C.	I-28	45-2 85-16	Green-White Black-White	Opens circuit for other game features.
R2 N.O.	J-27	21-4 50-9	Blue-Red White	Completes extra-balls feature lite circuit.
R3 N.O.	H-28	36-19 56-6	Yellow-Brown White-Brown	Completes extra-balls step circuit.
R4 S.P.D.T.	H-30	63-15 80-8 78-8	Brown-Yellow Black Orange-Black	Directs circuit to mixer #4 relay.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RED ROLL-OVER TRIP RELAY	A-45	25-13 70	Blue-White Orange	Energized directly thru selection feature disc or by red roll-over button, thru selection feature disc.
1 N.C.	B-45	25-13 25-13	Blue-Yellow Blue-Yellow	Opens circuit to coil.
2 N.O.	H-41	93-3 21-12	Gray-Yellow Blue-Red	Completes circuit to move magic-screen.
3 S.P.D.T.	J-1	51-12 90 52-13	White-Red Gray White-Blue	Directs flash of press buttons now lite, before 4th, before 5th after 5th ball.
4 S.P.D.T.	J-5	31-8 10-11 53-12	Yellow-Red Red White-Yellow	Directs feature lite circuit before 4th, before 5th, after 5th ball.
YELLOW ROLLOVER RELAY COIL	A-44	38-13 70	Yellow-Black Orange	Energized directly thru selection feature disc. Also by yellow roll-over button, thru selection feature disc.
1 N.C.	B-44	38-13 38-13	Yellow-Black Yellow-Black	Opens circuit to coil.
2 N.O.	G-40	93-3 98-3	Gray-Yellow Gray-Yellow	Completes circuit to move magic screen.
3 S.P.D.T.	J-1	50-12 51-12 23-5	White White-Red Blue-Yellow	Directs flash of "Press Buttons Now" lite, before 4th or before 5th ball.
4 S.P.D.T.	K-5	57-5 31-8 74-8	White-Orange Yellow-Red Orange-Green	Directs feature lite circuit, before 4th or before 5th ball.
BEFORE 4th BALL SELECTION LOCK RELAY COIL	A-11	83-6 70	Black-Yellow Orange	Energized thru timer disc when 4th ball is shot.
L1 N.C.	B-11	83-6 83-6	Black-Yellow Black-Yellow	Opens circuit to coil.
L2 S.P.D.T.	H-40	98-3 93-3 53-18	Gray-Black Gray-Yellow White-Yellow	Directs circuit from magic-screen buttons to (R) collect scores button.
L3 N.O.	H-8	36-2 43-2	Yellow-Brown Green-Yellow	Completes circuit to step timer unit from 4th to 5th step.
R1 N.C.	K-1	27-4 50-12	Blue-Orange White	Opens "Press Buttons Now Lite" flash circuit.
R2 N.O.	D-16	51-8 23-13	White-Red Blue-Yellow	Completes circuit to search index coil.

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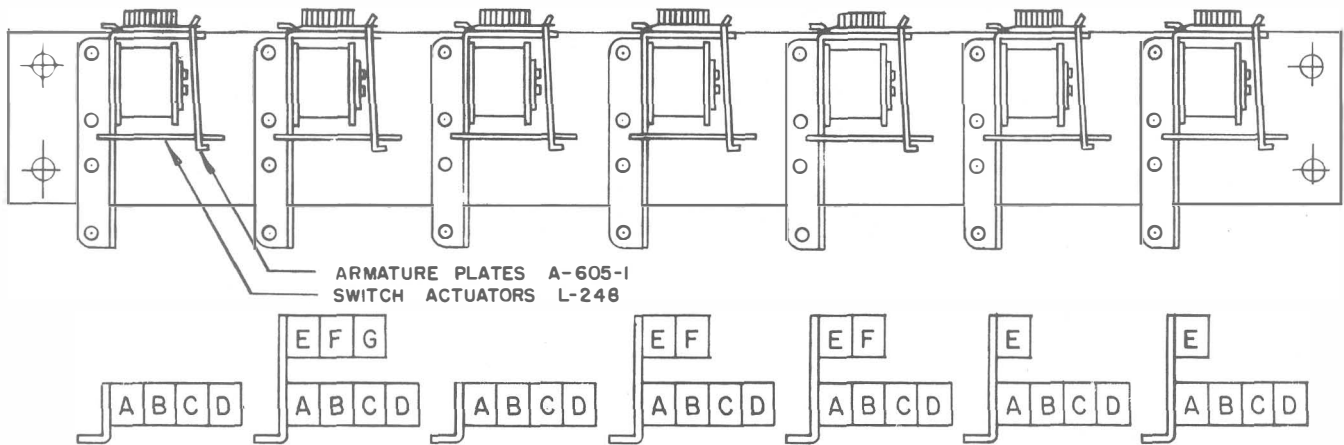
# TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 22

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BEFORE 5th BALL SELECTOR LOCK RELAY COIL	A-11	74-6 70	Orange-Green Orange	Energized thru timer unit disc when 5th ball is shot.
L1 N.C.	B-11	74-6 74-6	Orange-Green Orange-Green	Opens circuit to coil.
L2 N.O.	C-13	40-17 31-18	Green Yellow-Red	Completes circuit to extra-ball trip relays.
L3 N.O.	E-5	58-5 18-6	White-Black Red-Black	Completes circuit to start relay.
L4 S.P.D.T.	L-1	14-1 48-12 53-2	Red-Green Green-Black White-Yellow	Directs flash of "Press Buttons Now Lite" before 4th, before 5th or after 5th ball.
R1 N.C.	L-6	52-12 56-12	White-Blue White-Brown	Opens yellow rollover panel lite circuit.
R2 N.C.	C-44	13-12 38-13	Red-Yellow Yellow-Black	Opens circuit to yellow rollover trip relay.
R3 N.O.	G-10	54-11 71-8	White-Green Orange-Red	Completes a circuit to reset timer unit, thru "R" button.
R4 N.O.	F-9	78-6 27-2	Orange-Black Blue-Orange	Completes timer unit set-up circuit.
R5 N.C.	H-40	98-3 21-12	Gray-Black Blue-Red	Opens circuit to magic-screen buttons.
AFTER 5th BALL SELECTOR LOCK RELAY COIL	A-11	98-11 70	Gray-Black Orange	Energized when 6th ball (1st extra-ball) is shot.
L1 N.C.	G-42	21-12 14-4	Blue-Red Red-Green	Opens circuit to magic-screen buttons.
L2 N.C.	C-45	15-12 25-13	Red-White Blue-White	Opens circuit to red rollover trip relay.
L3 N.C.	K-1	53-2 52-13	White-Yellow White-Blue	Opens "Press Buttons Now Lite" flash circuit.
R1 N.C.	A-11	98-11 98-11	Gray-Black Gray-Black	Opens circuit to coil.
R2 N.C.	L-7	41-8 60-12	Green-Red Brown	Opens red rollover panel lite circuit.
OK FEATURE RELAY COIL	B-39	52-16 85-13	White-Blue Black-White	Energized thru spotting disc when circuit complete thru other factors.
L1 N.C.	A-39	85-13 61-16	Black-White Brown-Red	Open circuit to this coil. Also opens circuit to gate game feature trip relay.
L2 N.O.	L-9	50-8 30	White Yellow	Completes circuit to "OK" feature lite.
L3 S.P.D.T.	B-41	18-19 57-14 71-7	Red-Black White-Orange Orange-Red	Directs circuit to magic-screen motor unit index coil.
L4 N.C.	I-26	54-13 65-12	White-Green Brown-White	Opens a circuit to mixer #2 relay.
R1 N.C.	H-27	45-19 74-12	Green-White Orange-Green	Opens a circuit to mixer #2 relay.
R2 N.O.	J-6	10-11 30	Red Yellow	Completes a circuit to "Press Buttons Now Lite" select before 4th, before 5th, after 5th, yellow or red rollover lites.
R3 S.P.D.T.	C-42	15-18 98-12 27-15	Red-White Gray-Black Blue-Orange	Directs circuit to magic-screen index coil, move right motor winding, and right button relay.
R4 N.C.	I-26	56-13 21-3	White-Brown Blue-Red	Opens a circuit to mixer #2 relay.
R5 N.C.	F-35	83-11 90-11	Black-Yellow Gray	Opens a circuit for selection feature steps.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
GATE GAME FEATURE RELAY COIL	B-39	54-15 85-13	White-Green Black-White	Energized thru spotting disc when circuit complete thru other factors.
L1 N.C.	H-26	43-13 65-12	Green-Yellow Brown-White	Opens a circuit to mixer #2 relay.
L2 N.O.	B-8	21-6 18-18	Blue-Red Red-Black	Completes circuit to energize position 33 relay.
L3 N.O.	D-42	98-12 27-15	Gray-Black Blue-Orange	Completes circuit to magic-screen index coil, move right motor, and right button relay.
L4 N.O.	J-5	30 10-11	Yellow Red	Completes a circuit to "Press Buttons Now" lite and select before 4th, before 5th, after 5th, red or yellow rollover lites.
L5 N.O.	J-8	30 13-15	Yellow Red-Yellow	Completes circuit to "gate game" feature lite.
L6 S.P.D.T.	G-42	83-16 53-18 41-18	Black-Yellow White-Yellow Green-Red	Directs circuit to position 29 relay or gold game relays (3).
R1 N.C.	A-39	70 61-16	Orange Brown-Red	Opens circuit to OK feature and gate game feature trip relays.
R2 N.O.	B-41	71-7 57-14	Orange-Red White-Orange	Completes a circuit to magic-screen motor unit index coil.
R3 N.C.	H-25	45-19 53-13	Green-White White-Yellow	Opens a circuit to mixer #2 relay.
R4 N.C.	G-26	78-13 20-11	Orange-Black Blue	Opens a circuit to mixer #2 relay.
R5 N.C.	G-25	56-13 57-11	White-Brown White-Orange	Opens a circuit to mixer #2 relay.

# 7 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 27



Name	Position 33 Re.	Position 29 Re.	Super Blue Re.	Play Features Re	Features Lock Re.	Play Scores Re.	Scores Lock Re.
Coil turns & wire gauge	1800 # 33	1800 # 33	2300 # 33	2300 # 33	2300 # 33	2300 # 33	2300 # 33
Coil resistance (nominal)	65 Ω	65 Ω	85 Ω	85 Ω	85 Ω	85 Ω	85 Ω
Operating voltage	50 v.	50 v.	50 v.	50 v.	50 v.	50 v.	50 v.
Test voltage	37 v.	37 v.	37 v.	37 v.	38 v.	37 v.	37 v.
Extension spring load	CLEAR	GREEN	CLEAR	CLEAR	YELLOW	CLEAR	CLEAR
Sw. actuator stroke	3/32	3/32	3/32	3/32	3/32	3/32	3/32
Additional information			Thermaleze wire or equivalent No wrap on coil		Thermaleze wire or equivalent No wrap on coil		Thermaleze wire or equivalent No wrap on coil

SPRING CODE		
COLOR	PART NO.	LOAD
CLEAR	SP-199-13	13 oz. at 15/16
BLUE	SP-199-14	21 oz. at 15/16
YELLOW	SP-199-15	15 oz. at 15/16
RED	SP-199-16	9 oz. at 15/16
GREEN	SP-199-17	17 oz. at 15/16

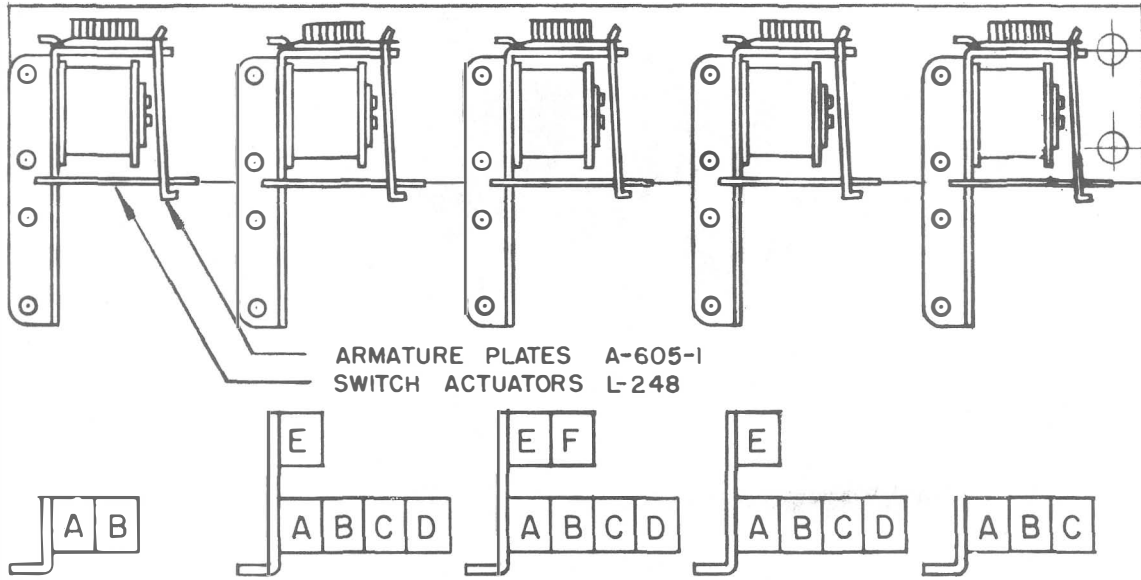
# 7 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 26

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
POSITION 33 RELAY COIL	A-8	27-14	Blue-Orange	Energized thru search disc when circuit complete thru other factors. (Purple section scoring)
A N.O.	B-8	14-3 27-14	Red-Green Blue-Orange	Completes a circuit to shutter motor.
B N.O.	D-43	20-16 93-15	Blue Gray-Yellow	Completes circuit to gold game relays (3).
C N.O.	A-7	18-20 27-14	Red-Black Blue-Orange	Completes lock-in circuit to this relay.
D N.C.	C-16	58-2 75-15	White-Black Orange-White	Opens circuit to replay cams index coil.
POSITION 29 RELAY COIL	B-43	38-15 10-9	Yellow-Black Red	Energized thru search disc when circuit complete thru other factors. (orange section scoring)
A N.C.	H-48	43-19 13-2	Green-Yellow Red-Yellow	Opens green score unit and red letter feature unit reset circuit.
B N.C.	G-29	83-9 18-16	Black-Yellow Red-Black	Opens regular game features circuit.
C N.C.	B-32	74-13 15-4	Orange-Green Red-White	Opens regular green score unit step-up circuit.
D N.O.	D-44	63-8 10-9	Brown-Yellow Red	Completes lock-in circuit to this relay.
E N.O.	F-33	25-18 61-12	Blue-White Brown-Red	Completes circuit for guaranteed scores and feature of red letter games.
F N.O.	M-44	85-9 30	Black-White Yellow	Completes circuit to stop relays as scores and features advance to guaranteed level.
G N.O.	C-7	14-3 53	Red-Green White-Yellow	Completes a circuit to shutter motor.
SUPER BLUE RELAY COIL	A-39	31-15 31-15	Yellow-Red Yellow-Red Jumper	Energized thru spotting disc when circuit complete thru other factors.
A N.O.	G-39	45-19 38-16	Green-White Yellow-Black	Completes a circuit to blue score booster trip relay.
B M.B.B.	E-39	21-3 31-15 45-19	Blue-Red Yellow-Red Green-White	Completes lock-in circuit, and opens pull-in circuit to this relay.
C S.P.D.T.	L-11	13-13 61-9 63-13	Red-Yellow Brown-Red Brown-Yellow	Directs circuit from blue 3 score 600 feature lite, to blue 2 scores 600 feature lite.
D N.O.	G-18	20-8 81-7	Blue Black-Red	Completes circuit for 2 in blue section replay scoring.
PLAY FEATURES RELAY COIL	B-47	61-13 31-15	Brown-Red Yellow-Red	Energized by green play features button when playing for features only.
A S.P.D.T.	K-12	36-15 30 23-15	Yellow-Brown Yellow Blue-Yellow	Directs circuit from yellow button play lite, red button play lite, blue button play lite, to green button play lite.
B N.O.	C-46	43-14 53-14	Green-Yellow White-Yellow	Completes circuit to features lock relay.
C N.O.	G-36	27-13 10-15	Blue-Orange Red	Completes circuit to OK feature.
D N.O.	B-48	81-13 61-13	Black-Red Brown-Red	Completes lock-in circuit to this relay.
E N.C.	A-29	70 71-13	Orange Orange-Red	Opens yellow, red, and green score unit step-up circuit.
F N.C.	K-21	74-15 31-5	Orange-Green Yellow-Red	Opens yellow, red, and green score lites flash circuit.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
FEATURES LOCK RELAY COIL	B-46	53-14 31-15	White-Yellow Yellow-Red	Energized by control unit cam switch 7B when play features relay is energized.
A N.O.	B-46	40-15 53-14	Green White-Yellow	Completes lock-in circuit to this relay.
B N.O.	F-34	74-19 50-13	Orange-Green White	Completes circuit for magic-screen feature unit steps.
C N.O.	I-38	13-17 48-13	Red-Yellow Green-Black	Completes circuit for red or yellow score booster feature.
D N.O.	G-35	45-6 90-13	Green-White Gray	Completes circuit for all features.
E N.C.	H-29	21-3 63-15	Blue-Red Brown-Yellow	Opens a circuit to mixer #4 relay.
F N.O.	H-30	56-8 23-4	White-Brown Blue-Yellow	Completes a circuit to mixer #4 relay.
PLAY SCORES RELAY COIL	B-49	65-15 31-15	Brown-White Yellow-Red	Energized by blue play scores button when playing for scores only.
A S.P.D.T.	K-12	51-15 36-15 21-15	White-Red Yellow-Brown Blue-Red	Directs circuit from yellow button play lite, and red button play lite, to blue button play lite.
B N.O.	D-28	91-5 10-1	Gray-Red Red	Completes circuit for 1st 3 yellow, red, and green score steps.
C N.O.	C-47	43-14 93-14	Green-Yellow Gray-Yellow	Completes circuit to energize scores lock relay.
D N.O.	C-49	57-13 65-15	White-Orange Brown-White	Completes lock-in circuit to this relay.
E N.C.	J-11	81-6 30	Black-Red Yellow	Opens features flash circuit.
SCORES LOCK RELAY COIL	B-47	93-14 31-15	Gray-Yellow Yellow-Red	Energized by control unit cam switch 7B when play scores relay is energized.
A N.O.	B-47	40-15 93-14	Green Gray-Yellow	Completes lock-in circuit for this relay.
B N.O.	G-30	60-6 56-11	Brown White-Brown	Completes circuit for yellow, red, and green score steps.
C N.O.	F-30	63-12 38-5	Brown-Yellow Yellow-Black	Completes circuit for yellow, red, and green score steps.
D N.O.	F-30	57-12 27-5	White-Orange Blue-Orange	Completes circuit for yellow, red, and green score steps.
E N.C.	H-28	85-16 20-12	Black-White Blue	Opens features circuit.

# (VERTICAL) 5 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 29



Name	Right Button Re.	Replay Reset Re.	Anti-cheat Re.	Start Re.	Red Button Re.
Coil turns & wire gauge	2300 #33	2300 #33	2300 #33	1800 #33	2000 #33
Coil resistance (nominal)	85 Ω	85 Ω	85 Ω	65 Ω	75 Ω
Operating voltage	50 v.	50 v.	50 v.	50 v.	50 v.
Test voltage	37 v.	37 v.	39 v.	32 v.	32 v.
Extension spring load	CLEAR	YELLOW	YELLOW	YELLOW	CLEAR
Sw. actuator stroke	3/32	3/32	3/32	3/32	3/32
Additional information			Thermaleze wire or equivalent No wrap on coil		Thermaleze wire or equivalent No wrap on coil

SPRING CODE		
COLOR	PART NO.	LOAD
CLEAR	SP-199-13	13 oz at 15/16
BLUE	SP-199-14	21 oz. at 15/16
YELLOW	SP-199-15	15 oz. at 15/16
RED	SP-199-16	9 oz. at 15/16
GREEN	SP-199-17	17 oz. at 15/16



# (VERTICAL) 5 RELAY BANK SWITCH CHART

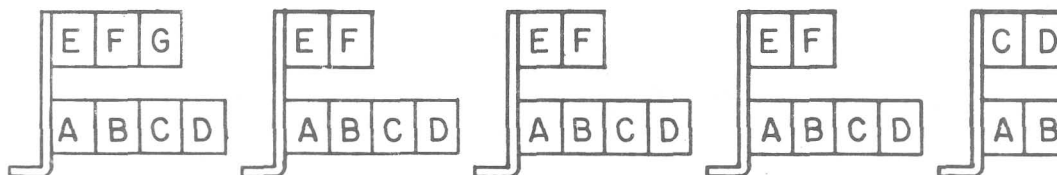
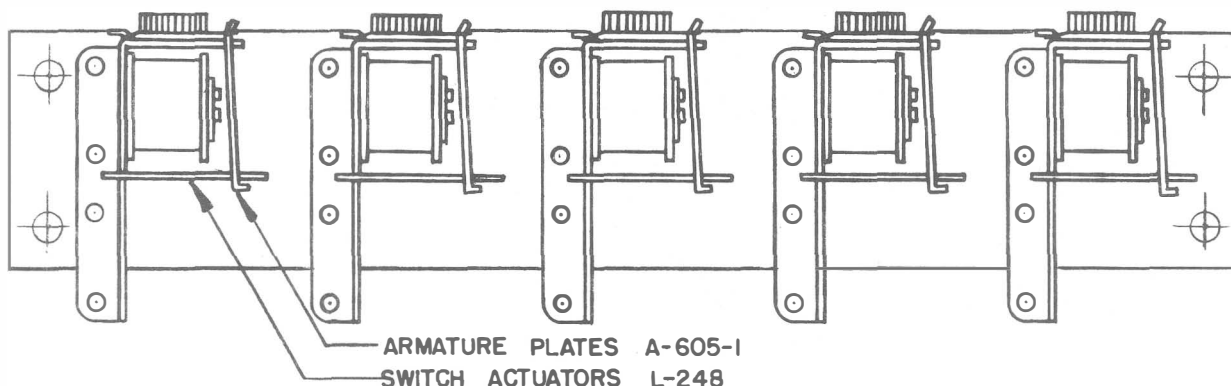
FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 28

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RIGHT BUTTON RELAY COIL	A-42	45-5 70	Green-White Orange	Energized by right button switch when circuit complete thru other factors.
A S.P.D.T.	C-43	48-5 25-6 45-5	Green-Black Blue-White Green-White	Directs move left or right magic-screen motor circuit. Also lock-in circuit for this relay.
B N.C.	F-43	31-16 36-4	Yellow-Red Yellow-Brown	Opens move left magic-screen index coil circuit.
REPLAY RESET RELAY COIL	A-4	75-2 70	Orange-White Orange	Energized when anti-cheat relay drops out.
A S.P.D.T.	C-4	90-5 41-6 53-7	Gray Green-Red White-Yellow	Directs replay register reset circuit thru control unit cam switch 2A, or mixer-spotting 16 pulse switch 1B.
B N.O.	G-1	20P 60P	Blue(Plastic) Brown(Plastic)	Completes circuit to control unit and mixer-spotting unit motors.
C N.O.	G-4	56-2 75-2	White-Brown Orange-White	Completes lock-in circuit for this relay.
D N.C.	C-4	13-9 83-3	Red-Yellow Black-Yellow	Opens start relay circuit.
E N.O.				Not used.
ANTI-CHEAT RELAY COIL	A-27	78-4 70	Orange-Black Orange	Energized by control unit cam switch 5C. Stays energized during play.
A S.P.D.T.	G-4	75-2 56-2 50-2	Orange-White White-Brown White	Opens start relay circuit and completes circuit to replay reset relay, when this relay drops out.
B N.O.	M-28	20-4 80-1	Blue Black	Opens 17 volt circuit when this relay drops out.
C N.O.	E-27	78-4 30	Orange-Black Yellow	Completes lock-in circuit to this relay when energized.
D N.C.	I-7	14-14 30	Red-Green Yellow	Completes circuit to close shutter when this relay drops out while shutter is open.
E S.P.D.T.	M-26	91-2 38 40	Gray-Red Yellow-Black Green	Opens 6 volt lite circuit and completes circuit to tilt lite, when relay drops out.
F N.C.	F-13	57-6 85-7	White-Orange Black-White	Completes a circuit to red button relay when this relay drops out.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
START RELAY COIL	A-5	13-16 70	Red-Yellow Orange	Energized each play (coins or replays).
A N.C.	B-26	75-4 78	Orange-White Orange-Black	Opens extra-ball unit step-up circuit.
B N.C.	G-29	18-16 85-12	Red-Black Black-White	Opens features circuit.
C N.O.	F-6	48-2 13-16	Green-Black Red-Yellow	Completes lock-in circuit to this relay. Also in series with function of switch D.
D N.O.	E-6	10-10 13-16	Red Red-Yellow	Completes circuit to shutter motor, mixer latch, and timer cams index coils.
E N.C.	A-43	70 38-15	Orange Yellow-Black	Opens circuit to gold game relays and position 29 relay.
RED BUTTON RELAY COIL	B-12	85-7 91-15	Black-White Gray-Red	Energized thru front door red button switch, tilt relay switch, or anti-cheat relay switch.
A S.P.D.T.	B-6	93-2 98-2 14-3	Gray-Yellow Gray-Black Red-Green	Directs circuit from mixer latch and timer cams index coils to shutter motor.
B S.P.D.T.	L-14	21-4 51-15 25-15	Blue-Red White-Red Blue-White	Opens circuit to extra-balls feature lite and completes circuit to red scores and features lite.
C N.O.	D-12	57-6 27-8	White-Orange Blue-Orange	Completes lock-in circuit to this relay.

# (HORIZONTAL) 5 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 31



Name	GOLD GAME #1 RE.	GOLD GAME #2 RE.	GOLD GAME #3 RE.	GOLD STRIPE RE.	MIXER #2 RE.
Coil turns & wire gauge	2300 #33	2300 #33	2300 #33	2300 #33	2300 #33
Coil resistance (nominal)	85 Ω	85 Ω	85 Ω	85 Ω	85 Ω
Operating voltage	50v.	50v.	50v.	50v.	50v.
Test voltage	37v.	37v.	37v.	37v.	37v.
Extension spring load	RED	RED	RED	CLEAR	YELLOW
Sw actuator stroke	3/32	3/32	3/32	3/32	3/32
Additional information	NOTE: Thermaleze wire or equivalent No wrap on coil.	SEE NOTE	SEE NOTE	SEE NOTE	SEE NOTE

## SPRING CODE

COLOR	PART NO.	LOAD
CLEAR	SP-199-13	13 oz. at 15/16
BLUE	SP-199-14	21oz. at 15/16
YELLOW	SP-199-15	15oz. at 15/16
RED	SP-199-16	9 oz. at 15/16
GREEN	SP-199-17	17oz. at 15/16

# (HORIZONTAL) 5 RELAY BANK SWITCH CHART

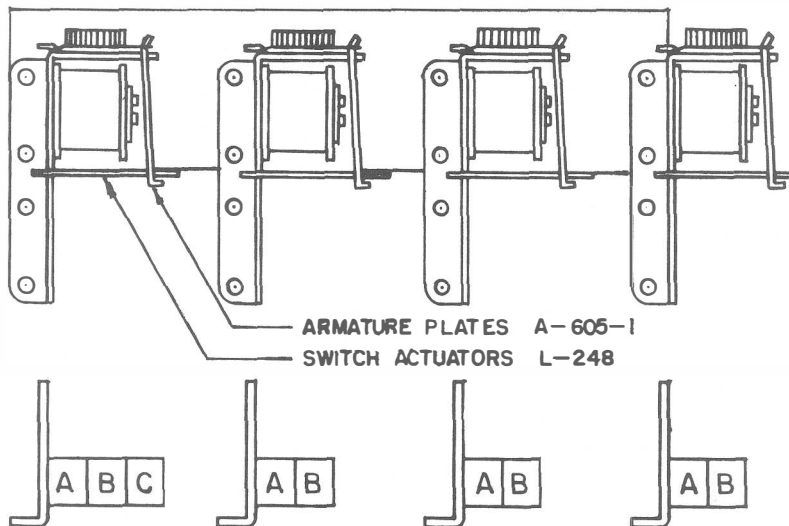
LETTERS CORRESPOND TO SWITCH CHART ON PAGE 30

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
GOLD GAME RELAY #1 COIL	B-43	38-15 93-15	Yellow-Black Gray-Yellow	Energized thru search disc when scoring in purple section.
A N.C.	H-28	83-9 20-12	Black-Yellow Blue	Opens features circuit.
B N.O.	D-43	30 93-15	Yellow Gray-Yellow	Completes lock-in circuit to this relay, and gold game relays #2 and #3.
C N.O.	B-42	71-7 57-14	Orange-Red White-Orange	Completes a circuit to magic-screen motor unit index coil.
D N.O.	D-41	98-12 27-15	Gray-Black Blue-Orange	Completes a circuit to magic-screen motor unit index coil, move right magic-screen motor and right button relay.
E N.C.	I-18	56 58	White-Brown White-Black	Opens in line scoring circuit.
F N.C.	D-40	41-5 54-17	Green-Red White-Green	Opens magic-screen motor unit homing circuit.
G N.O.	J-5	10-11 30	Red Yellow	Completes a circuit to "Press Buttons Now" lite, select before 4th ball, 5th ball, after 5th ball, red or yellow rollover lites.
GOLD GAME RELAY #2 COIL	B-43	38-15 93-15	Yellow-Black Gray-Yellow	Energized thru search disc when scoring in purple section.
A S.P.D.T.	G-17	78-9 91-16 74-9	Orange-Black Gray-Red Orange-Green	Opens regular yellow, red, green, and blue section scoring circuits, and completes circuit for gold section scoring.
B S.P.D.T.	D-20	25-9 80 63-9	Blue-White Black Brown-Yellow	Opens search index circuit for in line scoring, and completes search index circuit for gold game scoring.
C N.O.	J-12	36-17 30	Yellow-Brown Yellow	Completes circuit to 3 in any gold section feature lite, and golden game panel lite.
D N.O.	D-41	50-5 60-16	White Brown	Completes a circuit to magic-screen motor unit index coil, move right magic-screen motor, and right button relay.
E N.C.	F-43	51-18 83-16	White-Red Black-Yellow	Opens position 29 relay circuit.
F N.C.	G-47	85-5 43-17	Black-White Green-Yellow	Opens green score unit and red letter feature unit reset circuit.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
GOLD GAME RELAY #3 COIL	B-43	38-15 93-15	Yellow-Black Gray-Yellow	Energized thru search disc when scoring in purple section.
A N.O.	B-15	13-1 81-15	Red-Yellow Black-Red	Completes a circuit to step winner unit, when gold stripe relay is energized.
B N.O.	D-15	13-1 52-18	Red-Yellow White-Blue	Completes a circuit to step winner unit, when gold stripe relay is energized.
C N.C.	I-4	30 18-20	Yellow Red-Black	Opens start circuit and position 33 relay lock-in circuit.
D N.C.	J-18	30 75-9	Yellow Orange-White	Opens circuit to green score lites.
E N.O.	C-24	15-19 63-9	Red-White Brown-Yellow	Completes golden game replay scoring circuits.
F N.C.	D-13	31-18 25-8	Yellow-Red Blue-White	Opens extra-ball trip relays circuit.
GOLD STRIPE RELAY COIL	A-36	57-16 80-15	White-Orange Black	Energized thru spotting disc when circuit complete thru other factors.
A N.O.	K-12	30 10-17	Yellow Red	Completes circuit to 2 in striped gold section indicator arrow lite.
B N.O.	K-12	36-17 38-17	Yellow-Brown Yellow-Black	Completes circuit to 2 in striped gold section feature lite.
C N.O.	D-15	45-12 52-18	Green-White White-Blue	Completes a circuit to step winner unit.
D N.O.	B-15	27-6 81-15	Blue-Orange Black-Red	Completes a circuit to step winner unit.
E M.B.B.	C-36	78-19 57-16 21-3	Orange-Black White-Orange Blue-Red	Opens pull in circuit, and completes lock-in circuit for this relay.
F N.C.	D-32	13-18 51-17	Red-Yellow White-Red	Opens a circuit for green score steps.
MIXER #2 RELAY COIL	A-28	27-7 70	Blue-Orange Orange	Energized thru mixer #2 disc when circuit complete thru other factors. Relay proportions score steps, extra-ball steps, blue booster, and super blue features.
A N.O.	E-28	85-4 54-12	Black-White White-Green	Completes circuit for 1st 3 steps of yellow, red, and green scores, when playing for scores only.
B N.O.	H-28	15-7 56-6	Red-White White-Brown	Completes circuit for yellow, red, and green score steps. Also for extra-ball steps, when playing extra-balls.
C N.O.	F-39	14-13 45-19	Red-Green Green-White	Completes circuit for super blue feature. (2 in blue section scores 600).
D N.O.	D-39	38-16 51-19	Yellow-Black White-Red	Completes circuit for blue booster feature. (3 in blue section scores 600).

# 4 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 33



Name	MAGIC - SCREEN FEATURE UNIT STOP RE.	YELLOW SCORE STOP RE.	RED SCORE STOP RE.	SELECTION FEATURE UNIT STOP RE.
Coil turns & wire gauge	2300 # 33	2300 # 33	2300 # 33	2300 # 33
Coil resistance (nominal)	85 Ω	85 Ω	85 Ω	85 Ω
Operating voltage	50 V.	50 V.	50 V.	50 V.
Test voltage	37 V.	37 V.	37 V.	37 V.
Extension spring load	CLEAR	CLEAR	CLEAR	CLEAR
Sw actuator stroke	3/32	3/32	3/32	3/32
Additional information				
COIL PART NO.	C-7300-331	C-7300-331	C-7300-331	C-7300-331

SPRING CODE		
COLOR	PART NO.	LOAD
CLEAR	SP-199-13	13 OZ. AT 15/16
BLUE	SP-199-14	21 OZ. AT 15/16
YELLOW	SP-199-15	15 OZ. AT 15/16
RED	SP-199-16	9 OZ. AT 15/16
GREEN	SP-199-17	17 OZ. AT 15/16

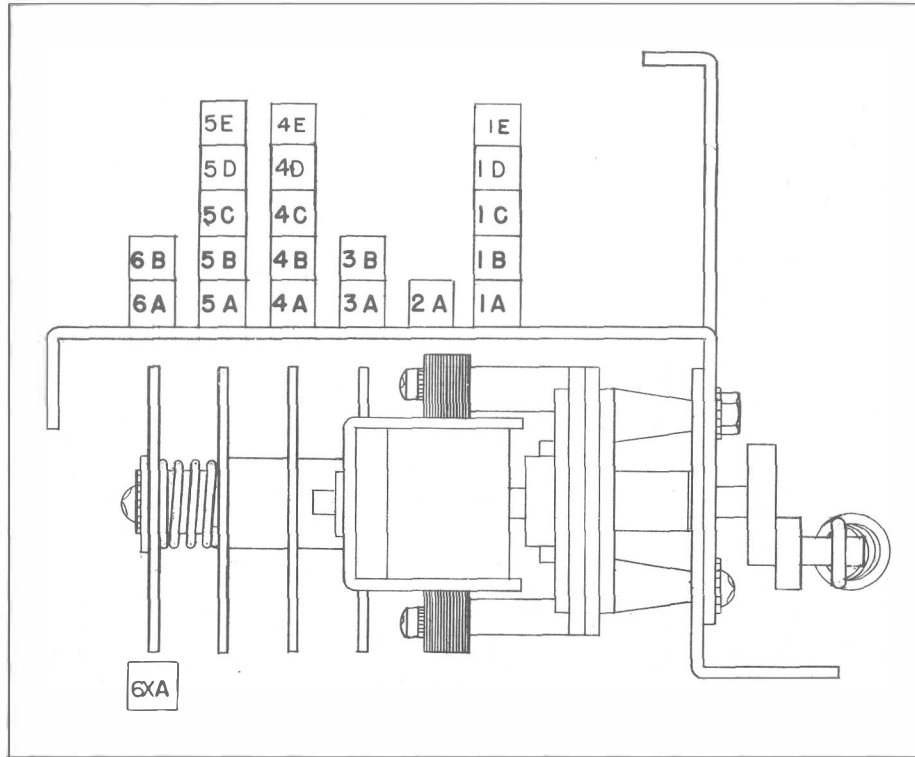
# 4 RELAY BANK SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 32

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
MAGIC SCREEN FEATURE UNIT STOP RELAY COIL	J-46	18-15 70	Red-Black Orange	Energized thru red letter feature disc, and magic-screen feature disc, when position 29 relay is energized. (For red letter games scoring).
A S.P.D.T.	D-33	52-5 41-14 45-15	White-Blue Green-Red Green-White	Opens circuit for stepping magic-screen feature unit, and completes circuit for other guaranteed features of a red letter game.
B N.C.	B-36	15-13 78-15	Red-White Orange-Black	Opens regular selection feature unit step-up circuit.
C N.O.	K-48	65-11 71-11	Brown-White Orange-Red	Energized thru selection feature, and red letter feature discs, completes a circuit to energize selection feature unit stop relay.
YELLOW SCORE STOP RELAY COIL	J-45	15-15 70	Red-White Orange	Energized thru red letter feature disc, and yellow score disc when position 29 relay is energized. (For red letter games scoring).
A S.P.D.T.	D-33	56-3 40-13 41-14	White-Brown Green Green-Red	Opens circuit for stepping yellow score unit, and completes circuit for other guaranteed features of a red letter game.
B N.C.	B-34	52-5 93-12	White-Blue Gray-Yellow	Opens regular magic-screen feature unit step-up circuit.
RED SCORE STOP RELAY COIL	J-44	14-15 70	Red-Green Orange	Energized thru red letter feature disc, and red score disc when position 29 relay is energized. (For red letter game scoring).
A S.P.D.T.	E-33	81-16 36-7 40-13	Black-Red Yellow-Brown Green	Opens circuit for stepping red score unit, and completes circuit for other guaranteed features of a red letter game.
B N.C.	B-31	13-3 81-16	Red-Yellow Black-Red	Opens regular red score unit step-up circuit.
SELECTION FEATURE UNIT STOP RELAY COIL	J-47	21-14 70	Blue-Red Orange	Energized thru red letter feature disc, and selection feature disc when position 29 relay is energized. (For red letter game scoring).
A S.P.D.T.	B-33	78-15 45-15 48-15	Green-Black Green-White Green-Black	Opens circuit for stepping selection feature unit, and completes circuit for other guaranteed features of a red letter game.
B N.C.	F-37	61-7 91-11	Brown-Red Gray-Red	Opens regular circuit for energizing red or yellow score booster relay.

# SHUTTER MOTOR PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART



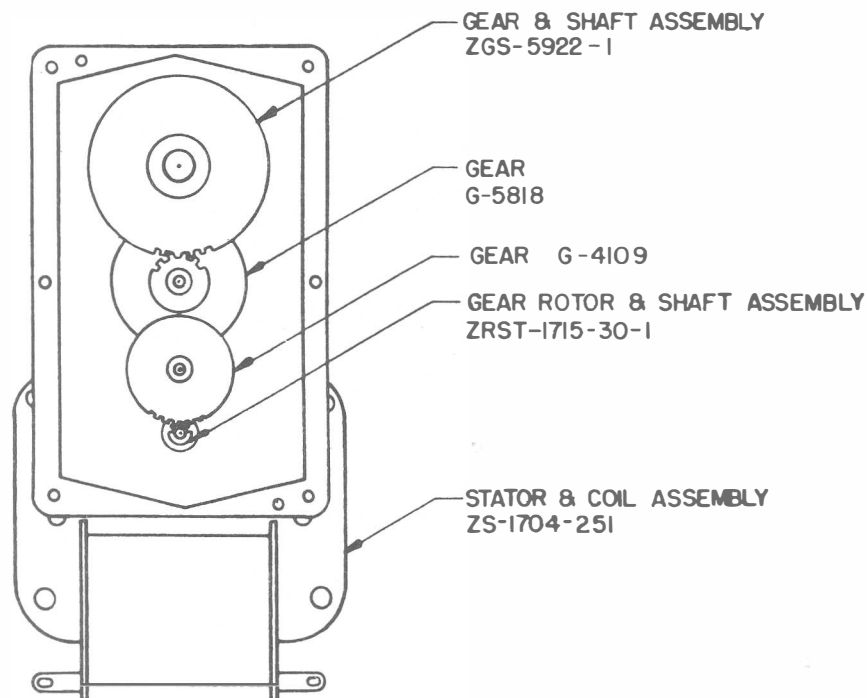
# SHUTTER MOTOR CAM SWITCH CHART

FOR POSITION OF SWITCHES SEE PICTORIAL VIEW AT LEFT

CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	I-14	21-3 14	Blue-Red Red-Green	When shutter is closed, completes in-line or section replay scoring circuit.
1B	N.O.	G-6	14-3 30	Red-Green Yellow	Completes shutter motor carry-over circuit.
1C	N.C.	I-9	21-3 98-8	Blue-Red Gray-Black	When shutter is closed, completes timer unit step-up circuit after shooting 5th ball. Also completes timer unit reset circuit when playing extra balls.
1D	N.O.	G-44	30 63-8	Yellow Brown-Yellow	Completes lock-in circuit to position 29 relay.
1E	N.C.	I-35	21-3 90-3	Blue-Red Gray	When shutter is closed, completes circuit for scores and features when scoring red letter games.
2A	N.C.	F-14	31-3 36-3	Yellow-Red Yellow-Brown	When shutter is closed, completes ball lifter motor circuit.
3A	N.O.	F-47	30 85-5	Yellow Black-White	Resets selection feature, green replay counter, red replay counter, yellow replay counter, extra-ball, green score, and red letter feature units.
3B	N.O.	H-2	20P 70P	Blue- (Plastic) Orange- (Plastic)	Resets trip relay bank.
4A	N.O.	F-7	14-3 18-3	Red-Green Red-Black	When shutter is open, completes circuit to close shutter when game is tilted.
4B	N.C.	I-38	21-3 40-8	Blue-Red Green	When shutter is closed, completes circuit to move magic-screen, collect scores, energize selector lock relays, and energize red or yellow rollover trip relays.
4C	N.O.	H-7	45-8 18-3	Green-Black Red-Black	When shutter is open, completes circuit to close shutter when game is tilted.
4D	N.C.	I-11	40-8 10-13	Green Red	When shutter is closed, completes circuit to energize select before 5th and select after 5th lockout relays.
4E	N.O.	F-43	30 63-8	Yellow Brown-Yellow	Completes lock-in circuit to position 29 relay.
5A	N.C.	H-9	98-8 65-2	Gray-Black Brown-White	When shutter is closed, same function as switch 1C.
5B	N.O.	F-46	91-4 31-4	Gray-Red Yellow-Red	When shutter is open completes lock-in circuit to lifter start relay.
5C	N.O.	G-31	85-12 98-14	Black-White Gray-Black	When shutter is open, completes circuit for features.
5D	N.O.	C-18	80-16 30	Black Yellow	When shutter is open, completes circuit to reset blue replay counter unit.
5E	S.P.D.T.	E-6	61 10-10 93-2	Brown-Red Red Gray-Yellow	Directs circuits to shutter motor, and mixer latch, and timer cams index coils.
6XA	N.C.	A-13	91-15 70	Gray-Red Orange	This switch mounted on bracket under cam 6. Open only during shutter cycle, completes circuit to red button relay.
6A	N.O.	H-9	71-8 30	Orange-Red Yellow	Resets timer unit.
6B	N.O.	H-47	78-3 30	Orange-Black Yellow	Resets magic-screen feature, yellow score, and red score unit.

## SHUTTER MOTOR

(MOTOR PART NO. E-119-99)



**NOTE:**

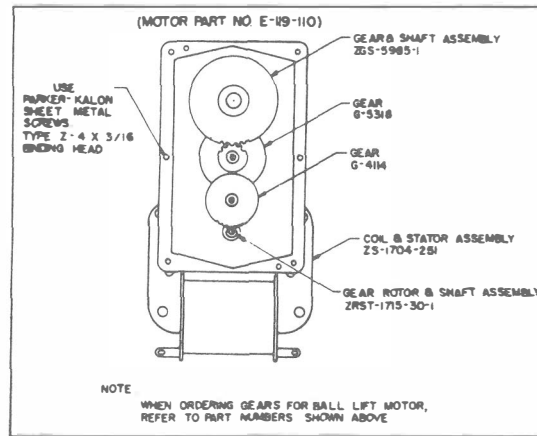
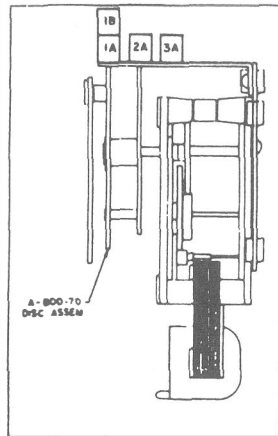
WHEN ORDERING GEARS FOR SHUTTER MOTOR,  
REFER TO PART NUMBERS SHOWN ABOVE.

## ANTI-CHEAT COIN SWITCH CIRCUIT

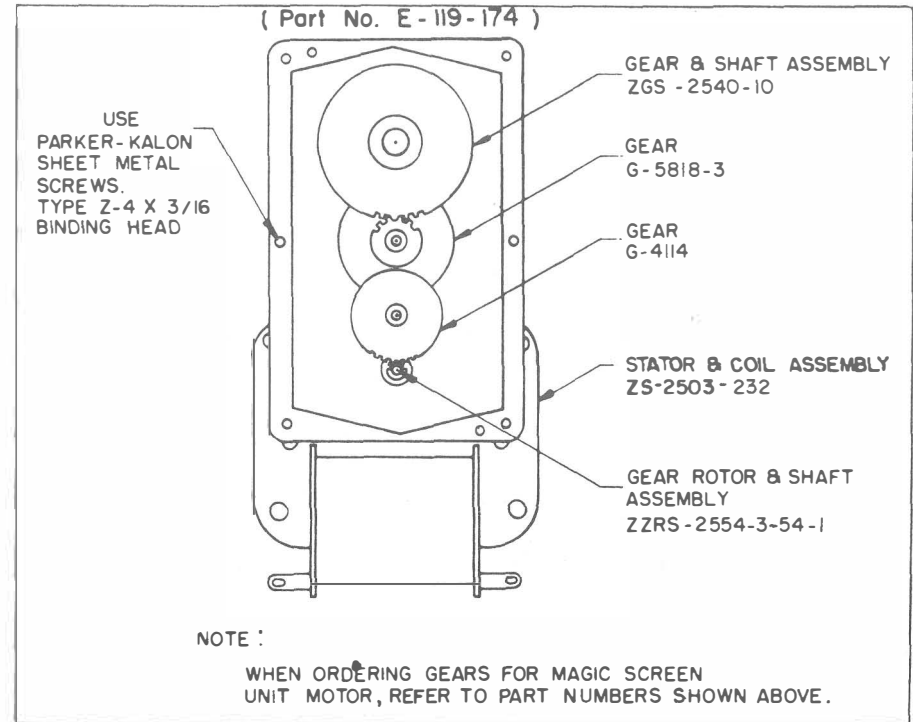
The coin switch gives a very short pulse, when operated by a coin. With this circuit, the game will tilt if the pulse is not as short as from a coin, so that operating the coin switch with wire, strings, etc., usually results in a tilt.

The circuit is completed thru control unit cam switch #4D (on wiring diagram at G-5).

## BALL LIFT MOTOR PICTORIAL VIEW



## MAGIC SCREEN UNIT MOTOR



## BALL LIFT MOTOR CAM SWITCH CHART FOR POSITION OF SWITCHES SEE PICTORIAL VIEW

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	G-11 15-6 85-6	Red-White Black-White	(Safety circuit) for before 5th selector lock trip relay.
1B	N.O.	G-14 91-1 30	Gray-Red Yellow	Completes carry-over circuit to ball lift motor.
2A	N.O.	F-8 27-2 43-2	Blue-Orange Green-Yellow	Completes circuit to energize timer unit step-up coil.
3A	N.O.	H-11 21-3 83-7	Blue-Red Black-Yellow	Completes circuit to energize before 4th selector lock relay, thru timer unit disc.

## MAGIC SCREEN UNIT PARTS

PART No.	NAME
AS-1809-5	Complete Magic Screen Unit assembly
W-851-6	Contact plate
26-GG-10	Coil
S-1065-14	Core plug
AS-1846-1	Index Arm and plunger assembly
P-163-32	Key Washer
M-943	Ladder Chain
P-801-310	Leather Washer
E-119-174	Motor
S-496-152	Plunger only for AS-1846-1





CABINET				PANEL					
24		22		8		24		24	
20-2	57-14	13	45-3	57-13	74-16	14-3	61	10-10	52-12
25-8	71-2	14-5	48-2	60-13	75-13	25-1	71-1	14	57-1
27-8	78-7	15-6	50-2	61-13	81-13	31-1	74-1	15-6	61-4
30	80-2	18-6	54-5	65-15		36-3	75-13	18-3	63-1
31-16	81	21-3	63-2			40-8	78-3	21-3	65-1
40-7	85-13	27-2	70			41-5	80-16	25-18	70
45-16	90-5	31-4	71-6			43-1	81	30	71-8
48-4	91-7	36-3	80-6			45-8	85-3	36-1	75-1
50-16	93-7	38-3	85-7			51-1	90-1	40-1	80-6
52-9	98-11	41-4	90-9			53-1	91-15	41-4	85-5
53-18	20P	43-2	91-1			54-1	93-2	45-1	98-6
54-11	90P					60-1	98-12	50-1	

PANEL		TRANSFORMER		FRONT DOOR	
22		10		20	
13-12	50-5	20	81	13	61-13
14-12	52-1	30	20P	14-5	63-2
15-12	56-1	54-2	50P	18-6	70
18-20	61-1	70	90P	21-3	71-2
20	63-8	80-1		25-8	74-16
27-1	65-2			27-8	75-13
31-4	85-12			40-7	80-13
38-1	91-4			48-2	85-7
41-8	98-14			50-2	90-9
45-16	20P			57-13	
48-1	70P				

PLUG SHEET FOR SILVER SAILS

## MISCELLANEOUS RELAYS SWITCH CHART

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
POSITION 29 & 33 HOLD SCORES RE-LAY COIL	C-23	38-15 58-1	Yellow-Black White-Black	Energized thru search disc when scoring in purple section.
A N.C.	C-16	80 75-15	Black Orange-White	Opens circuit to replay cams index coil.
MIXER #4 RELAY COIL	A-32	23-4 70	Blue-Yellow Orange	Energized thru mixer #4 disc when circuit complete thru other factors. Relay proportions all features.
A N.C.	I-29	45-2 51-5	Green-White White-Red	Opens features circuit.
LIFTER START RE-LAY COIL	A-45	38-3 70	Yellow-Black Orange	Energized by ball runway switch.
A N.C.	H-11	10-13 15-6	Red Red-White	Completes circuit to before 5th and after 5th selector lock-out relays, when relay drops out.
B N.C.	G-14	41-4 31-3	Green-Red Yellow-Red	Completes circuit to ball lifter motor, when relay drops out.
C N.O.	D-45	36 38-8	Yellow-Brown Yellow-Black	Completes lock-in circuit for this relay.

# MISCELLANEOUS PARTS

## Back Cabinet Assembly:

Part No.	Name of Part
G-292-19	Back glass
M-281-14	Lock and keys (2) Keyed alike
E-122-69	Transformer

## Back Door Assembly:

M-281-24	Lock and keys (2) keyed alike
SW-100-106	Lock switch
E-300-115	Search relay bank assembly

## Front Cabinet Assembly:

M-168-15	Ball
AS-187-17	Ball shooter assembly
AS-1835	Ball shooter housing
A-100-7	Ball shooter rod
SP-200-24	Ball shooter spring (long)
SP-243	Ball shooter spring (short)
R-108-3	Ball shooter tip
P-711-1	Cigarette holder
P-1900-47	Coin box
A-2304-2	Coin box cover
E-130-10	Counter — 48 volt
A-2618	Legs
M-106-1	Leg bolt
M-163-4	Leg adjuster
A-1729-6	Push button
P-2768-15	Ring—blue
G-213	Top glass 21" x 40"
E-108-57	Toggle switch

## Front Door Assembly:

A-1538-3	Armature plate (AS-277-50)
A-1729-6	Button—metal
E-101-45	Coil for coin lock out
AS-277-50	Coin switch assembly 5¢ or 10¢
CA-567-138	Front door only

## Front Door Assembly (Continued):

Part No.	Name of Part
AS-2041-12	Front door assembly (Specify 5¢ or 10¢)
A-254-33	Hinge and bracket
M-281-6	Lock and keys
E-108-14	Micro switch for coin switch assembly 5¢ or 10¢
P-2768-5	Ring—red
P-2768-6	Ring—yellow
P-2768-16	Ring—green
P-2768-7	Ring for M-281-6
M-280-15	Slug rejector 5¢
M-280-16	Slug rejector 10¢

## Front Moulding Assembly:

A-2359-2	Coin slide 5¢ or 10¢
AS-1305-25	Front moulding assembly complete
A-1272-29	"R" Button
A-1272-30	Right Button
A-1272-31	Left Button
P-2210-8	5¢ plate
P-2210-9	10¢ plate
P-2210-112	Plate—Moulding
CA-1119-2	Front moulding only

## Panel Assembly:

AS-1315	Ball Gate and Switch Assembly
C-326-9	Light Shield post
R-115-4	Rebound Rubber
M-170	Rebound spring—double post
C-387-1	Roll over button—red
C-387-2	Roll over button—yellow
R-243	Rubber ring for yellow post
R-243-2	Rubber ring for red post

Bally pin game lubricant now available in one half-pint  
(8 Oz.) containers with plastic spout and screw cap.