

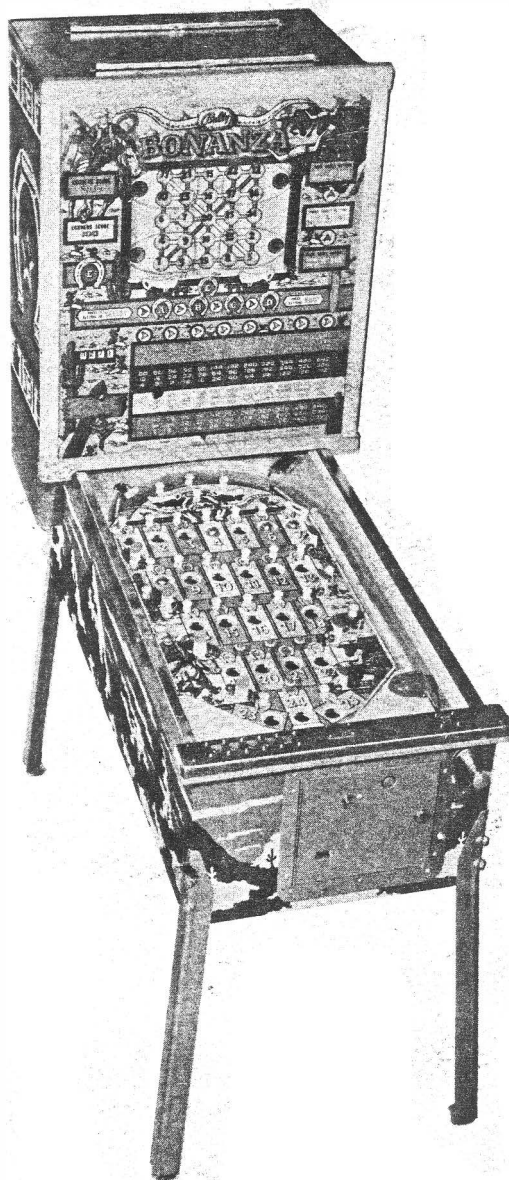
GAME 1085

WINTER 76

Bally

BONANZA

SERVICE MANUAL & PARTS GUIDE



Bally

MANUFACTURING CORPORATION

2640 Belmont Avenue • Chicago, Illinois, 60618, U.S.A.

TELEPHONE (312) 267-6060/TELEX NO. 253076/CABLE ADDRESS: BALFAN

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MAINTENANCE & SERVICE SUGGESTIONS

To maintain a Game in good working order the game should be kept as clean as possible. Starting with the Coin Chute, for a great deal of Dirt, Metallic Coin Dust, and sticky beverages collect here. An aerosol type de-greaser or contact cleaner can be used, however all parts must be wiped off with a clean cloth to remove any residue & dissolved scum, especially on electrical contacts & printed Circuit Disc.

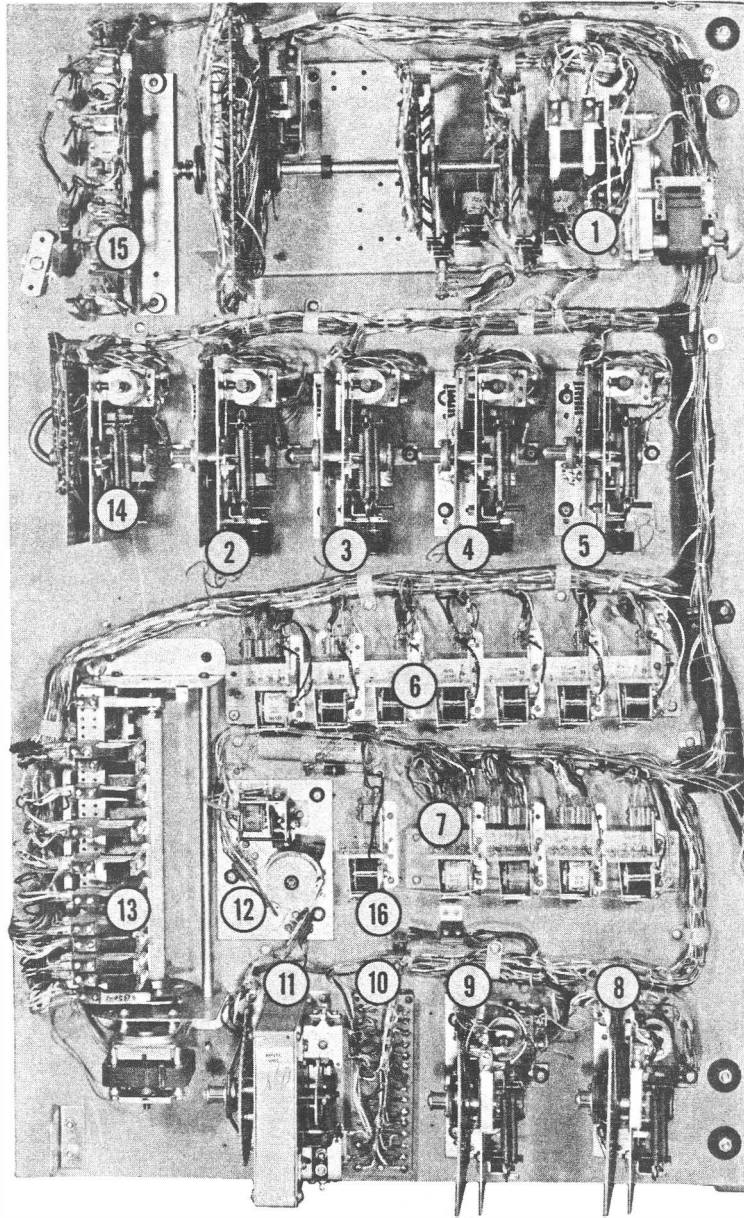
Keeping the Bottom Cabinet and Back Cabinet free and clear of extra loose parts, screws, nuts, and switch blades, eases trouble shooting; for broken or loose parts often turn up at the bottom of the cabinets making the troubled area easier to identify and correct.

Proper adjustments on Sw. Blades and Wipers should be maintained for proper electrical conduction and machine timing. Overly bent Sw. Blades will break off at the base. Wiper blades under too much pressure will cut through printed circuit discs. Wiper assemblies especially those assembled with multiple fibre discs are very susceptible electrical arcing when covered with even a thin coat of dirt & oil. Arcing will cause carbon traces to build up which will burn a hole through the fibre plates. Arcing shorts are hard to trace and play havoc with a circuit. Arcing can be checked for by giving discs and wipers a physical check.

Also check fibre cams for worn lobes or worn locking notches. In conclusion a clean machine is easier to maintain and keep in service.

CODE	
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
M.B.B.	MAKE BEFORE BREAK
S.P.D.T.	SINGLE POLE DOUBLE THROW

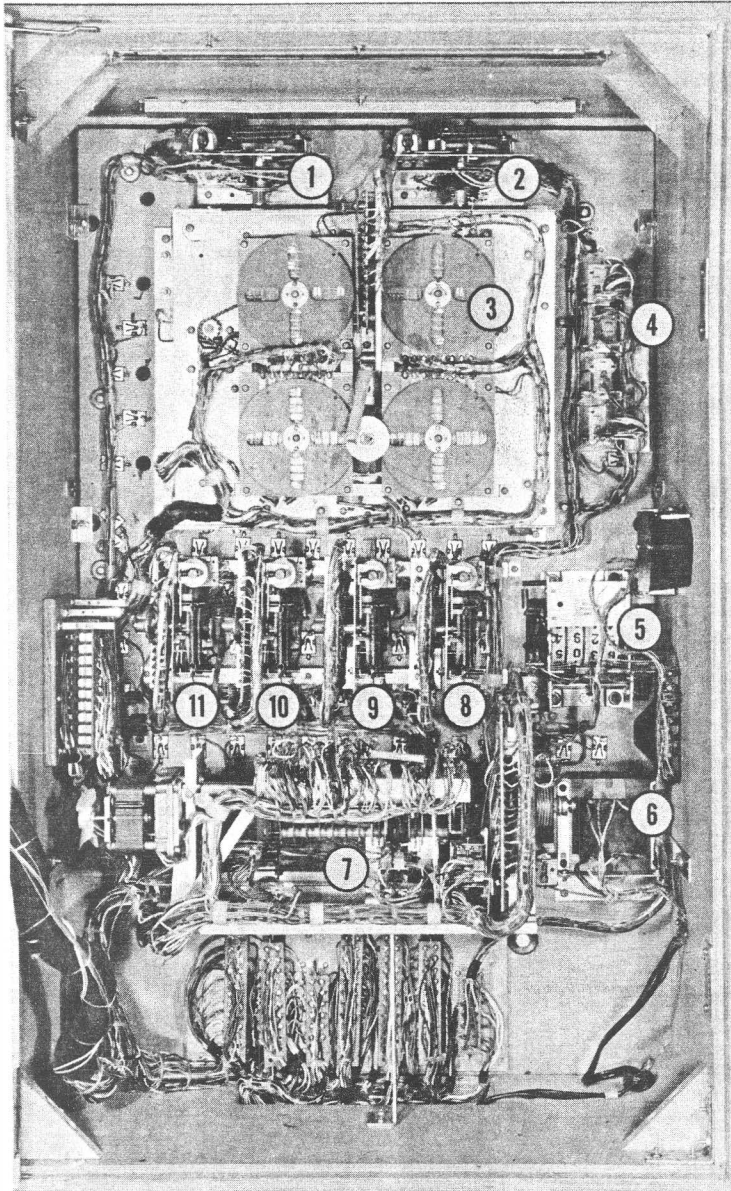
BACK DOOR ASSEMBLY



Index No.	Part No.	Description	Page No.
11	AS-1020-64	Program Unit Assm.	18
2	AS-797-399	Red Replay Counter	28 29
3	AS-797-399	Yel. Replay Counter	
4	AS-797-399	Grn. Replay Counter	
5	AS-797-399	Blue Replay Counter	
6	E-300-739	7 Relay Bank	22 23
7	E-300-861	4 Relay Bank	19
8	AS-1022-156	Scrambler Unit	34
9	AS-1110-56	Timer Unit	31
10	AS-2518-19	Diode Printed Cir. Board	38
11	AS-873-51	Reflex Unit	38
12	AS-1237-10	Corner Replay Counter	40 41
13	AS-2409-39	7 Trip Bank	24 25
14	AS-1358-27	Coin Counter	30
15	E-300-784	Search Bank	21
16	AS-2659-505	Motor Relay	38

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

BACK CABINET ASSEMBLY

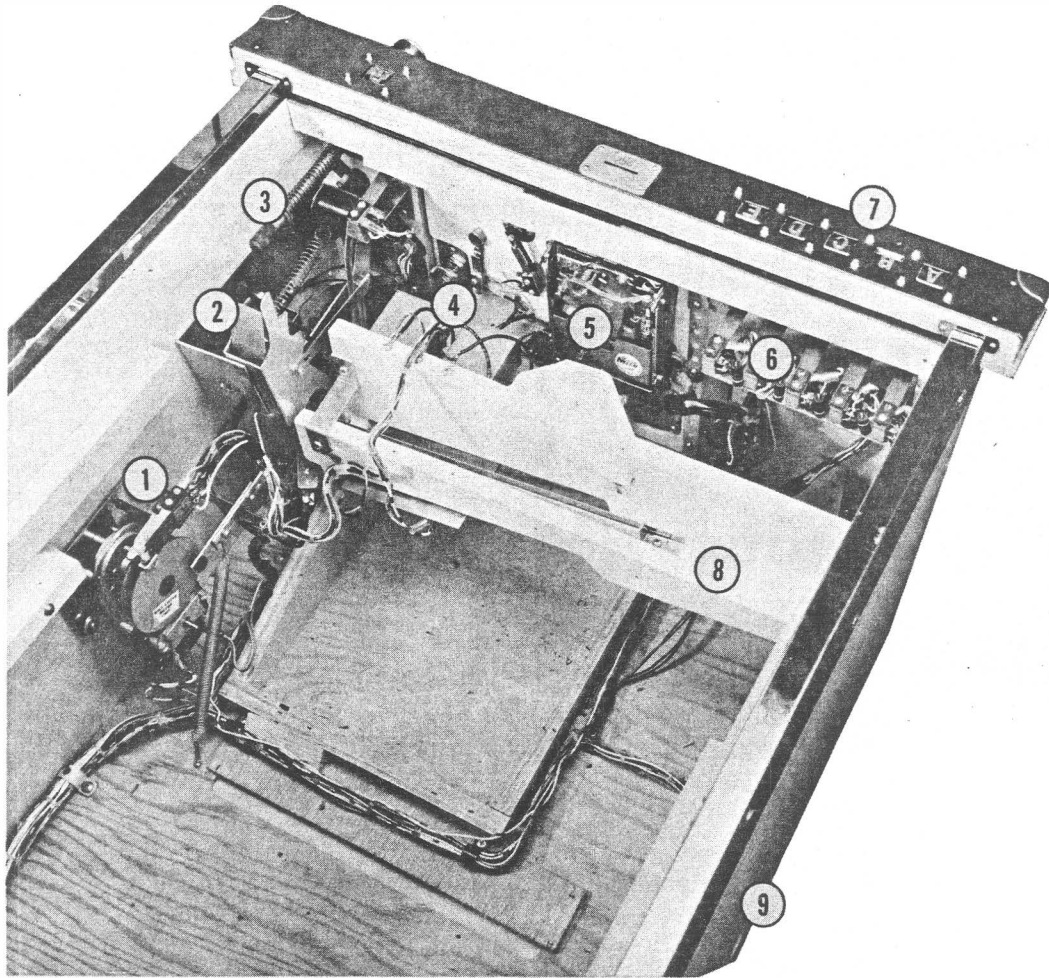


1085 BONANZA BACK CABINET

Index No.	Part No.	Description	Page No.
1	AS-827-576	Selection Feature Unit	33
2	AS-827-643	Magic Square Feature	32
3	AS-2867	Magic Squares Unit	7 11
4	E-300-737	4 Relay Bank	20
5	AS-473-54	Replay Register	29
6	E-122-103	Transformer	38
7	AS-798-123	Control Unit	13 17
8	AS-1148-38	Blue Score Counter	26 27
9	AS-1148-38	Green Score Counter	
10	AS-1148-38	Yellow Score Counter	
11	AS-1148-37	Red Score Counter	

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

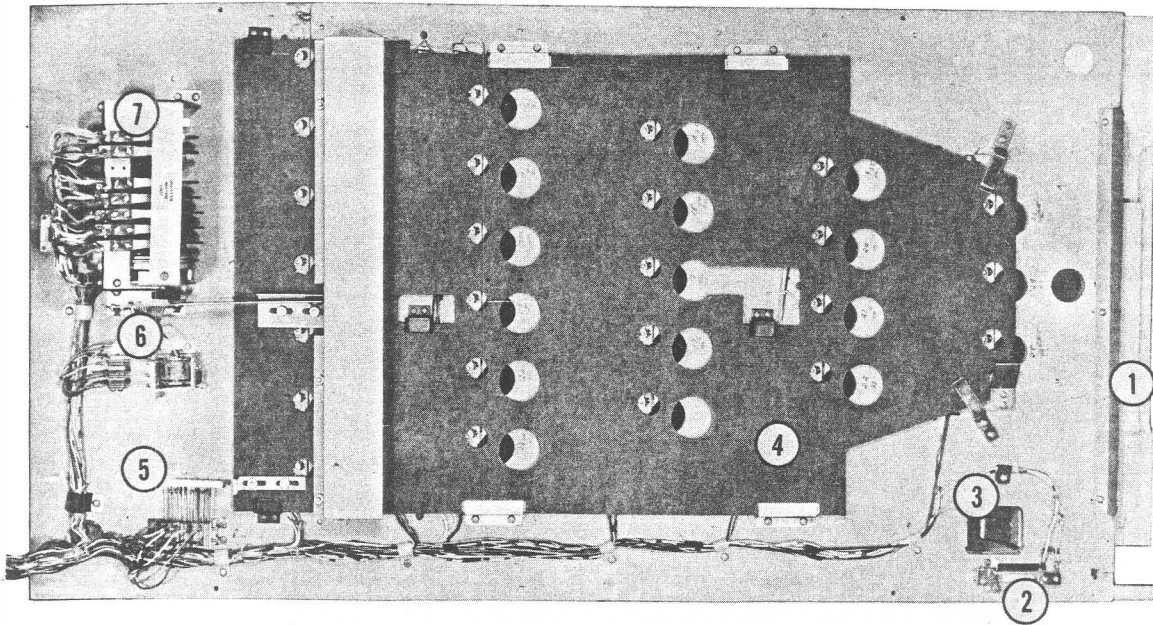
FRONT CABINET ASSEMBLY



Index No.	Part No.	Description	Page No.
1	AS-1139-33	Ball Lifter Motor Assy.	36
2	AS-186-11	Ball Lifter Assy.	37
3	AS-187-17	Ball Shooter Assy.	43
4	E-130-10	Coin, Key Meter	37
5	M-1400-Coin	Slug Rejector	37
6	AS-982-1133	Sw. & Brkt. Assy.	37
7	AS-1305-63	Front Molding Assy.	43
8	AS-1145-52	Ball Trough & Sw. Assy.	37
9	M-281-58	Lock	37
	AS-982-673	Sw. & Brkt. Assembly	37
	AS-982-671	Sw. & Brkt. Assembly (2 Sw.)	

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

PLAYFIELD PANEL

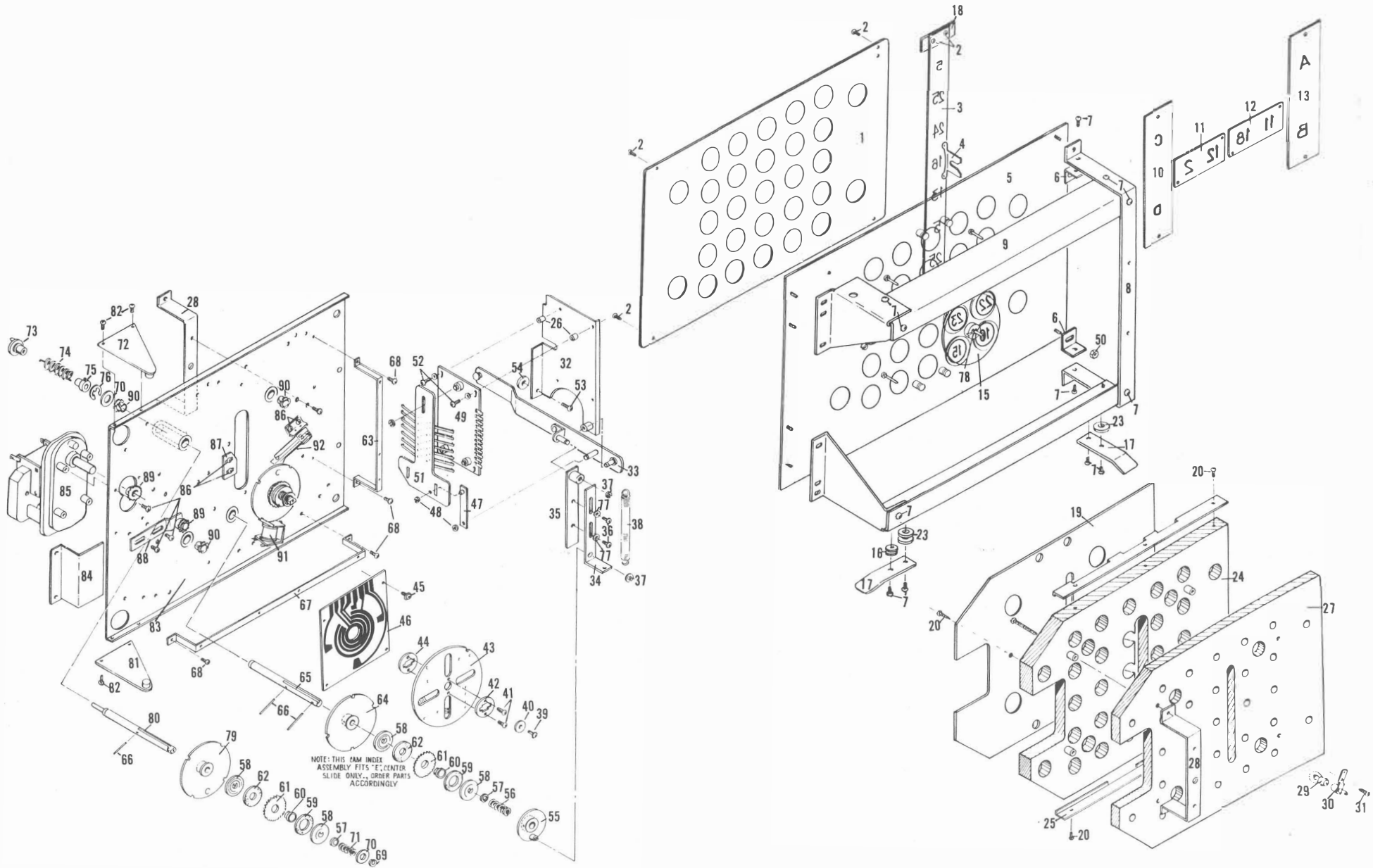


PANEL

Index No.	Part No.	Description	Page No.
1	CA-1100-9	Arch Bottom	43
2	ASW-A1-30	Ball Runway Sw.	36
3	C-153	Red Plastic Cover	
4	AS-1433-16	Shutter Assembly	
5	AS-982-1138	Panel Switches	
6	AS-2659-266	"G" Relay Assembly	36
7	AS-232-95	Shutter Motor Assy.	35

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

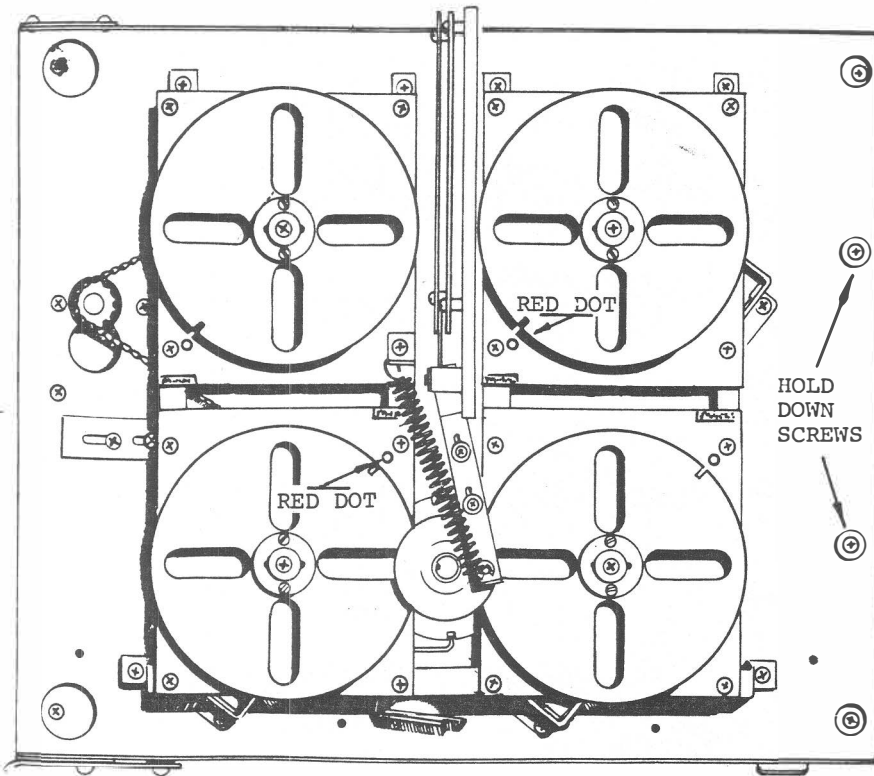
MAGIC SQUARES EXPLODED PARTS



MAGIC SQUARES EXPLODED PARTS

Index No.	Part No.	Description	No. Req.	Index No.	Part No.	Description	No. Req.
1	P-1761	Face Plate	1	44	P-258-23	Key Washer	4
2	LSPR-00632-1102	Screw	4	45	MSPR-632-1204	Screw	16
3	C-842	Vertical Number Strip	1	46	W-923-454	Contact Plate	4
4	P-1846	Fork	1	47	A-3802	Wiper Link	1
5	P-1757	Display Base Plate	1	48	P-2891-3	"E" Ring	2
6	P-6665-48	L Bracket	2	49	W-1173	Contact Plate	1
7	LSPR-01032-1108	Screw	13	50	N-1032-2112	Nut	1
8	P-1790	Leg Bracket	1	51	A-1371-146	Wiper Arm	1
9	P-1788	Tie Brace (Top)	1	52	LSPR-832-1110	Screw	4
10	C-842-3	Vertical Letter Strip (C & D)	1	53	LSPR-832-1206	Screw	2
11	C-842-2	Horizontal Number Strip (12 & 2)	1	54	P-801-184	Washer	3
12	C-842-1	Horizontal Number Strip (11 & 18)	1	55	A-800-189	"E" Drive Disc & Hub	1
13	C-842-4	Vertical Letter Strip (A & B)	1	56	SP-200-99	Spring	1
14	P-1788-1	Tie Brace (Bottom)	1	57	P-801-2	Washer	1
15	A-3820	"A" Disc (19, 4, 1 & 9)	1	58	P-163-25	Clutch Washer	10
	A-3820-1	"B" Disc (22, 23, 10 & 15)	1	59	P-801-598	Leather Clutch Washer	5
	A-3820-2	"C" Disc (8, 6, 20 & 14)	1	60	C-537-22	Nylinder	5
	A-3820-3	"D" Disc (3, 17, 21 & 7)	1	61	P-7745-6	Drive Sprocket	5
16	P-801-238	Washer	5	62	P-801-599	Leather Clutch Washer	5
17	P-1805	Cam Plate	2	63	P-7090-2	Leg Bracket	4
18	P-1973-378	Stop Plate	1	64	A-800-188	Index Cam	1
19	M-1423-4	Plastic Overlay	1	65	S-1472-6	"E" Drive Shaft	1
20	SAPR-00600-1106	Screw	12	66	P-1637-22	Roll Pin	6
21	P-6665-493	Top Guide Rail	1	67	P-1790-3	Leg Bracket	4
22	LSPR-1032-1128	Screw	4	68	LSPR-832-1103	Screw	10
23	P-801-184	Washer	3	69	P-448-6	Snap Washer	4
24	CA-967-8	Aux. Insert Overlay	1	70	P-801-2	Washer	8
25	P-6665-497	Bottom Guide Rail	1	71	SP-200-199	Compression Spring	4
26	M-1514-12	Plastic Spacer	4	72	A-3799-1	Hinge (Top)	1
27	AS-2883	Insert Assembly with Sockets	1	73	A-3808	Coupler	4
28	P-1790-1	Leg Bracket	2	74	SP-200-200	Spring	4
29	E-125-47	Bulb 1464 17V	25	75	S-1302	Collar	4
30	E-120-84	Socket	29	76	P-2891-8	"E" Ring	4
Note: 4	Corner Bulbs A,B,C,D No. 55	Bulb	4	77	PW-8-12	Washer	2
31	SAPR-00600-1107	Screw	29	78	P-2891-4	"E" Ring	4
32	P-1837	Pivot Arm Plate	1	79	A-800-187	Index Cam & Hub	4
33	A-3803	Pivot Arm	1	80	S-1472-7	"A,B,C,D" Shaft	4
34	P-6665-516	Pivot Arm Link	1	81	A-3799	Hinge (Bottom)	1
35	A-3844-1	Link & Hub	1	82	LSPR-632-1104	Screw	4
36	LSPR-632-1204	Screw	2	83	A-3798	Hinged Base Plate	1
37	P-2891-6	"E" Ring	1	84	P-2624	Chain Guard	1
38	SP-100-330	Spring	1	85	E-119-468	Motor	1
39	LSPR-832-1103	Screw	4	86	LSPR-00832-1204	Screw	18
40	PW-8-12	Washer	4	87	P-1973-387	Guide Plate	1
41	MSSR-440-1204	Screw	8	88	A-3804	Idler Bracket	1
42	P-258-38	Key Washer	4	89	S-1201-3	Sprocket	2
43	AS-2870	Wiper Board	4	90	C-537-9	Nylinder	8
				91	AS-2517-28	Index Coil (A,B,C,D)	4
					AS-2517-27	Index Coil "E"	1
				92	AS-982-1123	Sw. & Brkt. Assy.	5

MAGIC SQUARES MAINTENANCE



WIPER DISC REPLACEMENTS

When replacing A, B, C, D wipers, position all wiper discs in the home positions, so index pins are breaking contact of homing switches. (Home position wiper discs will have the index notch positioned next to red dot and or part no. on contact plate, see illustration).

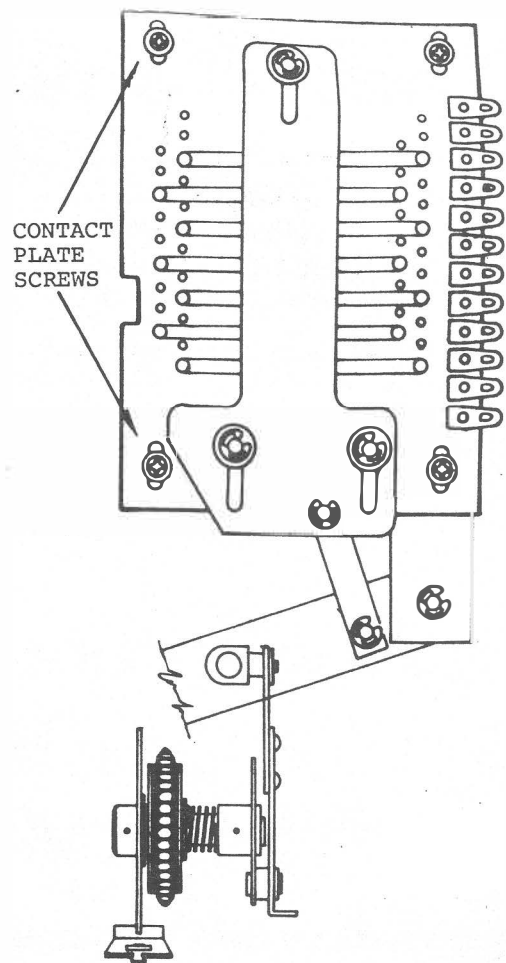
COUPLER PIN ASSEMBLY & PLEXIGLASS NUMBER DISC ALIGNMENT

Index A, B, C & D wipers to home positions. With "E" wiper drive arm (vertical center arm) indexed in downward position. (Fig. A) Turn off power to game. Remove (2) Phillips Head Hold Down screws (Right edge of unit) (see illustration). Swing out hinged unit and remove white plastic insert. Next remove 4 Phillips Head Screws, which will enable access to coupler pin assemblies, just behind wooden inserts.

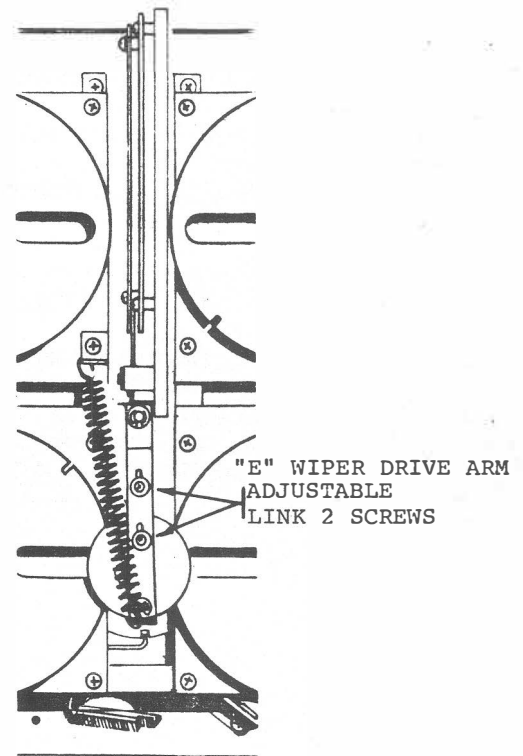
In a homed position all 4 coupler pins should be at a 12:00 o'clock position, See Illustration. If adjustment necessary, loosen set screw (via 1/16" Allen Wrench) and adjust. Reverse procedure for assembly.

"E" LINK ARM & CONTACT PLATE ADJUSTMENTS

Index "E" center vertical number strip to bottom position (top center number in magic squares unit should be "5"). Loosen the 4 contact plate screws and also the 2 screws in adjustable link. Center



wiper contact points to corresponding contact points on plate by sliding plate up or down, then tighten 4 screws. Next adjust numbers on "E" plexiglass strip to perspective panel holes, tighten 2 screws in adjustable link., again top number in "E" strip should be "5".



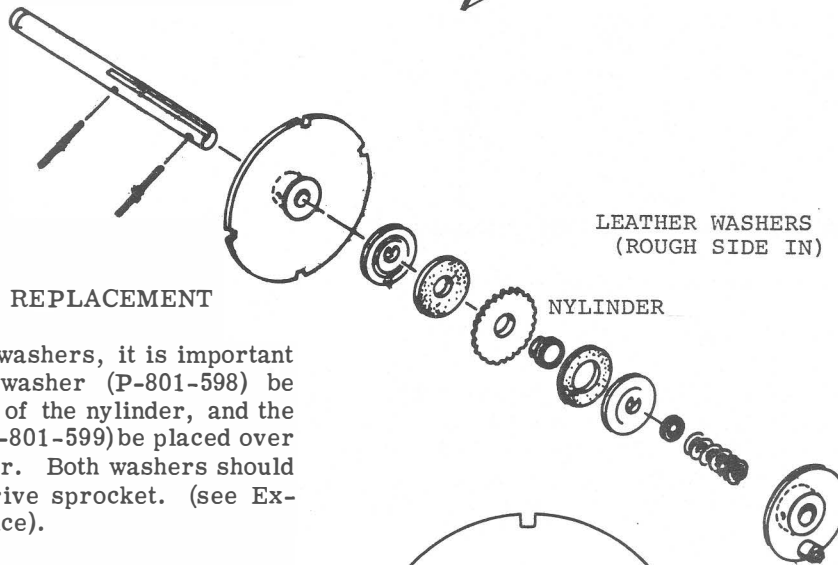
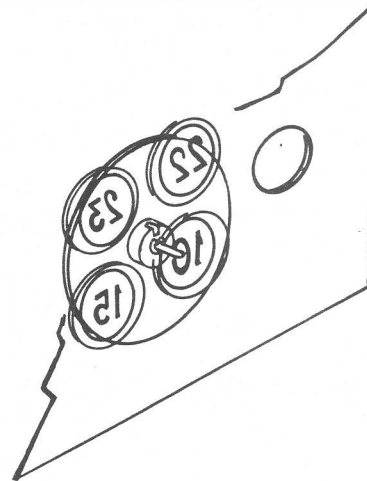
ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

MAGIC SQUARES MAINTENANCE

LUBRICATION

The mounting posts for the plexiglass number discs should always have a touch of lubricating grease.

Clutch washers also require lubrication, and when necessary, "Neatsfoot Oil" should be applied. Dry clutches causes loss of clutch action and binding, this is hard on motor unit. Upon replacement of old clutches the new ones should be first soaked in "Neatsfoot Oil", wiped clean of excess oil, then installed.

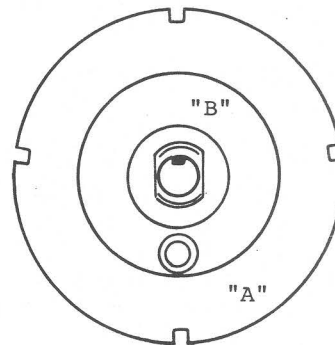


CLUTCH WASHER REPLACEMENT

In replacing leather clutch washers, it is important that the large hole clutch washer (P-801-598) be placed over the large end of the nylon cylinder, and the small hole clutch washer (P-801-599) be placed over the small end of the nylon cylinder. Both washers should face, rough side to the drive sprocket. (see Exploded Drawing for Reference).

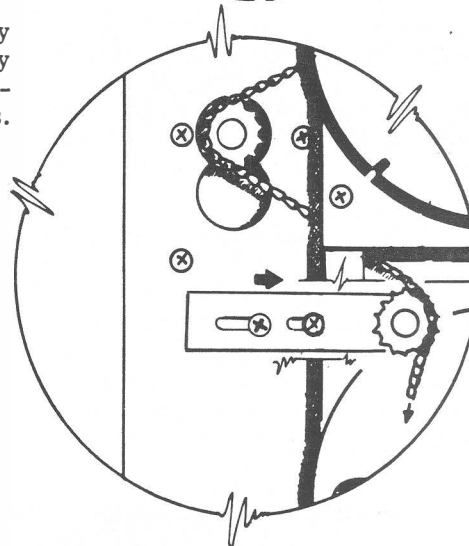
"E" DISC & SHAFT RE-ASSEMBLING

Drive Stud "A" must be positioned at farthest point from shaft key-way "B" as shown in illustration. (If assembled wrong, 180° off centerline "E" numbers will not index properly).



DRIVE CHAIN ADJUSTMENT

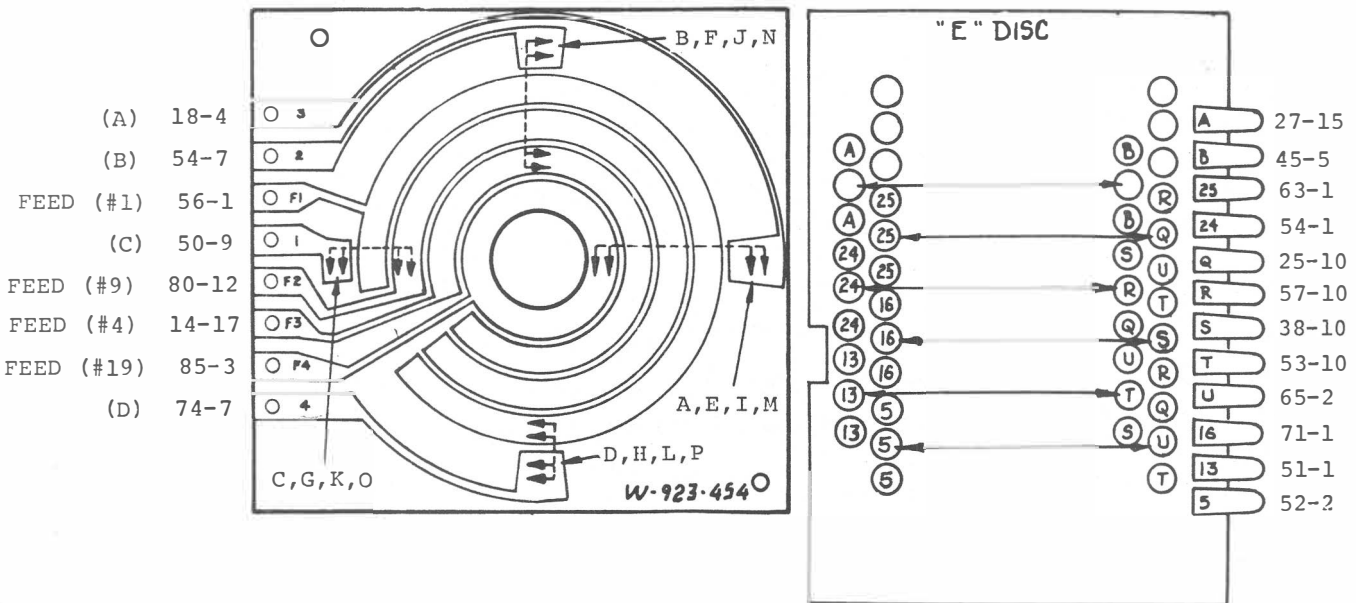
Adjustment is made when the idler gear assembly screws are loosened and assembly is moved gently to the right. Adjust chain while drive motor is running, this will insure needless slack between gears. Avoid over tightening chain, this will cause needless wear and stretch.



MAGIC SQUARE UNIT

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
MAGIC SQ. Motor	E-119-468	D-2	21-16 50-16	Blue White	Energized by Motor Re. Sws. Controls movements of Magic Square Unit.
"A" Index Coil	FD-31-2100	J-8	70 13-5	Orange Red-Yellow	Energized thru "A" Select Button Sw. & Magic Sq. Control Circuit.
Homing Sw. N.O.	ASW-C2-34	M-11	13-5 58-3	Red-Yellow White-Black	Completes Circuit to "A" Index Coil while resetting.
"B" Index Coil	FD-31-2100	J-8	70 48-5	Orange Green-Black	Energized thru "B" Select Button Sw. & Magic Sq. Control Circuit.
Homing Sw. N.O.	ASW-C2-34	M-10	48-5 83-11	Green-Black Black-Yellow	Completes circuit to "B" Index Coil while resetting.
"C" Index Coil	FD-31-2100	J-8	70 81-7	Orange Black-Red	Energized thru "C" Select Button Sw. & Magic Sq. Control Circuit.
Homing Sw. N.O.	ASW-C2-34	M-11	81-7 40-13	Black-Red Green	Completes Circuit to "C" Index Coil while resetting.
"D" Index Coil	FD-31-2100	J-9	70 31-19	Orange Yellow-Red	Energized thru "D" select button sw. and magic sq. control circuit.
Homing Sw. N.O.	ASW-C2-34	M-11	31-19 57-14	Yellow-Red White-Orange	Completes circuit to "D" Index Coil while resetting.
"E" Index Coil	FD-31-2100	J-9	70 45-5	Orange Green-White	Energized thru "E" select button sw. and magic sq. control circuit.

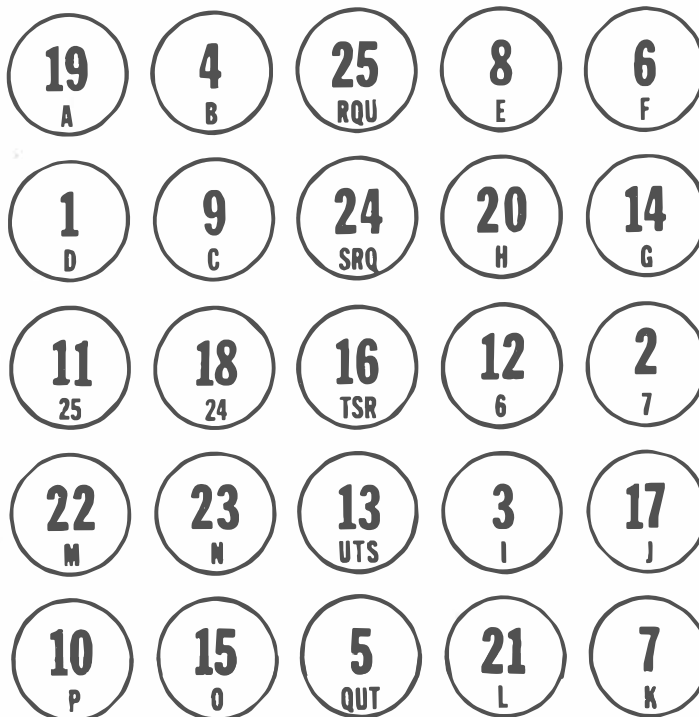
DISC POSITIONS	DISC LIGHT & PANEL SWITCH WIRINGS			
	"A"	"C"	"D"	"B"
1	(C) 50-9	(G) 56-10	(K) 14-10	(O) 21-10
2	(B) 54-7	(F) 27-10	(J) 13-10	(N) 20-10
3	(A) 18-4	(E) 54-10	(I) 51-10	(M) 18-10
4	(D) 74-7	(H) 36-10	(L) 15-10	(P) 23-10
F1	(#1) 56-1	(#20) 74-1	(#21) 75-1	(#10) 43-1
F2	(#9) 80-12	(#14) 40-1	(#7) 25-1	(#15) 48-1
F3	(#4) 14-17	(#6) 65-1	(#17) 38-1	(#23) 61-1
F4	(#19) 85-3	(#8) 83-10	(#3) 31-1	(#22) 27-1



ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

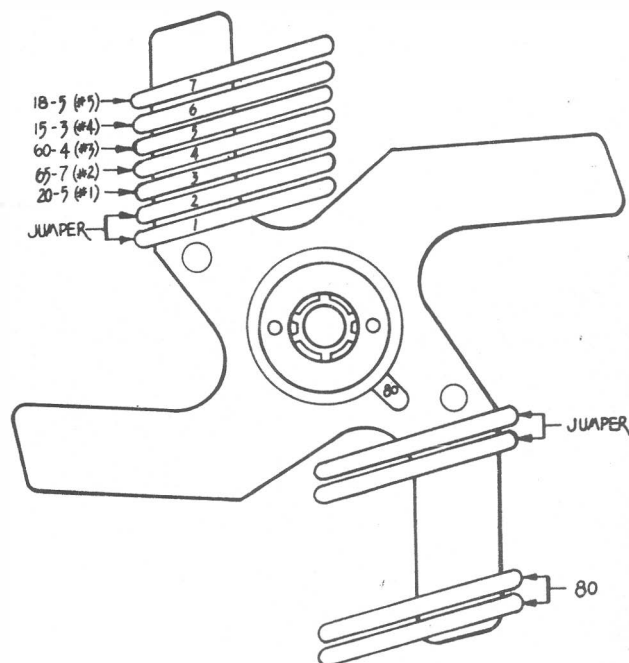
C. U. SEARCH DISC WIPER UNIT & POSITIONS CHART

PICTORIAL CARD HOLE REFERENCE



Winners Read Across

WIPER POSITION	WIPER 1	WIPER 2	WIPER 3	WIPER 4	WIPER 5
1					
2					
3					
4	A	F	P	K	
5					
6	A	F	P	K	
7					
8	F	H	S	N	P
9					
10	A	C	S	I	K
11					
12	F	G	7	J	K
13					
14	E	H	6	I	L
15					
16	Q	R	S	T	U
17					
18	B	C	24	N	O
19					
20	A	D	25	M	P
21					
22	P	O	U	L	K
23					
24	M	N	T	I	J
25					
26	25	26	S	6	7
27					
28	D	C	R	H	G
29					
30	A	B	Q	E	F



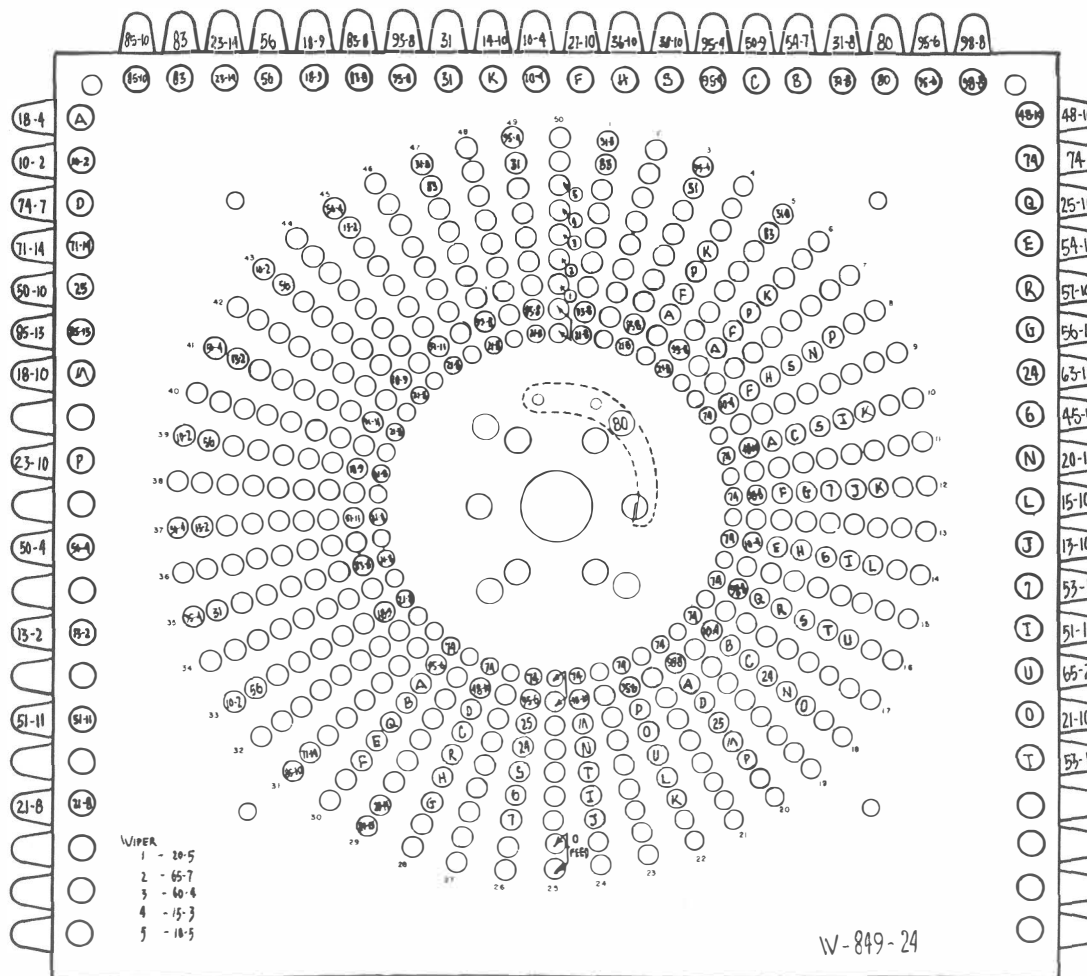
ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

CONTROL DISC ASSEMBLY

- | | |
|--|---|
| <p>21-8 Cir. Wiper Fd. from Search Relay Sws. (Q-21)
 51-11 Cir. Wiper Fd. to Green Score Disc (P-35)
 13-2 Cir. Fd. to Green Replay Cntr. Step-Up Coil (M-37)
 18-10 Circuit Fd. from Magic Square Lites and Discs (H-56)
 and all numbers listed here are the same function as 18-10
 23-10, 50-10, 74-7, 18-4, 14-10, 27-10, 36-10, 38-10, 50-9,
 54-7, 25-10, 54-10, 57-10, 56-10, 63-11, 45-1, 20-10, 15-10,
 13-10, 53-1, 51-10, 65-2, 21-10, 53-10</p> <p>85-13 Cir. Fd. to C.U. Cam 12 (X8) Sw. (M-19)
 71-14 Cir. Fd. to C.U. Cam 14 (X4) Sw. (M-18)
 10-2 Cir. Fd. from Blue Replay Cntr. (Open at 96 Sw.) (N-23)
 85-10 Cir. Fd. from CO-1 Trip Sw. (Q-18)
 83 Cir. Fd. to Red Replay Step-Up Coil (N-27)</p> | <p>23-14 Cir. Fd. from CO-2 Trip Sw. (N-19)
 56 Cir. Fd. to Blue Replay Cntr. Step-Up Coil (M-32)
 18-9 Cir. Fd. to Blue Score Wiper (P-30)
 83-8 Cir. Fd. to Yellow Score Wiper (P-21)
 93-8 Cir. Fd. to Red Score Wiper (P-25)
 31 Cir. Fd. to Yellow Replay Cntr. Step-Up (N-23)
 10-4 Cir. Fd. to Blue Score Wiper (P-28)
 95-4 Cir. Fd. from Yellow Replay Cntr. (Open at 96) Sw. (N-23)
 31-8 Cir. Fd. from Red Replay Cntr. (Open at 96) Sw. (N-27)
 80 Wiper Fd. Cir. from C.U. Pulse Circuit (N-12)
 95-6 Cir. Fd. to Red Score Wiper (P-24)
 98-8 Cir. Fd. to Green Score Wiper (P-33)
 48-10 Cir. Fd. to Yellow Score Wiper (P-20)
 74 Disc Fd. Cir. from Search Relay Switches (Q-38)</p> |
|--|---|

Note: Abbreviations

- Fd. - Feed
- Cir. - Circuit
- Cntr. - Counter
- C.U. - Control Unit



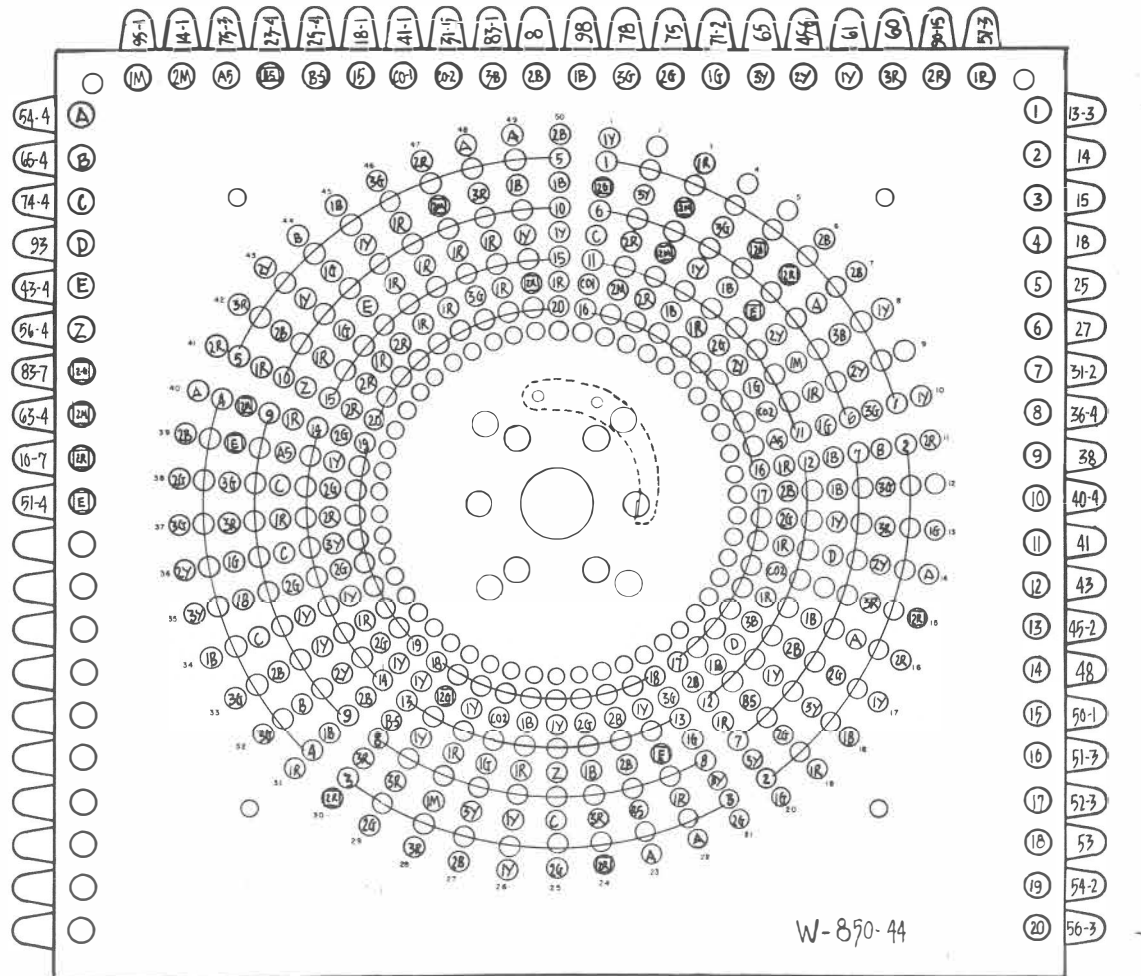
PROGRAM DISC ASSEMBLY

SEE PAGE 18 FOR PROGRAM ASSEMBLY

Note: Abbreviations

Fd. - Feed
 Cir. - Circuit
 Cntr. - Counter
 C.U. - Control Unit

- | | | | |
|------|--|-------|---|
| 51-4 | Cir. Fd. to "E" Trip Sw. (L-46) | 98 | Cir. Fd. to Scrambler Disc Wiper (O-54) |
| 63-4 | Cir. Fd. to C.U. Cams 6 & 7 (N-44) | 78 | Cir. Fd. to 3 Step Relay (O-53) |
| 25-4 | Cir. Feeds through Reflex Relay Sws. (P-44) | 75 | Cir. Fd. to 2 Step Relay (O-53) |
| | And all numbers listed here are the same | 71-2 | Cir. Fd. to Scrambler Disc Wiper (O-52) |
| | function as 25-4 - 10-7, 83-7, 56-4, 43-4, 93, | 65 | Cir. Fd. to 3 Step Relay (O-52) |
| | 74-4, 65-4, 54-4, 95-1, 14-1, 75-3, 23-4, 41-1 | 45-6 | Cir. Fd. to 2 Step Relay (O-51) |
| 18-1 | Cir. Fd. to Cam #6 Relay Sw. | 61 | Cir. Fd. to Scrambler Disc Wiper (O-51) |
| 31-5 | Cir. Fd. to CO-2 Trip Sw. (N-41) | 60 | Cir. Fd. to 3 Step Relay (O-51) |
| 83-1 | Cir. Fd. to 3 Step Relay (O-54) | 90-15 | Cir. Fd. to 2 Step Relay (N-50) |
| | | 57-3 | Cir. Fd. to Scrambler Disc Wiper (O-50) |



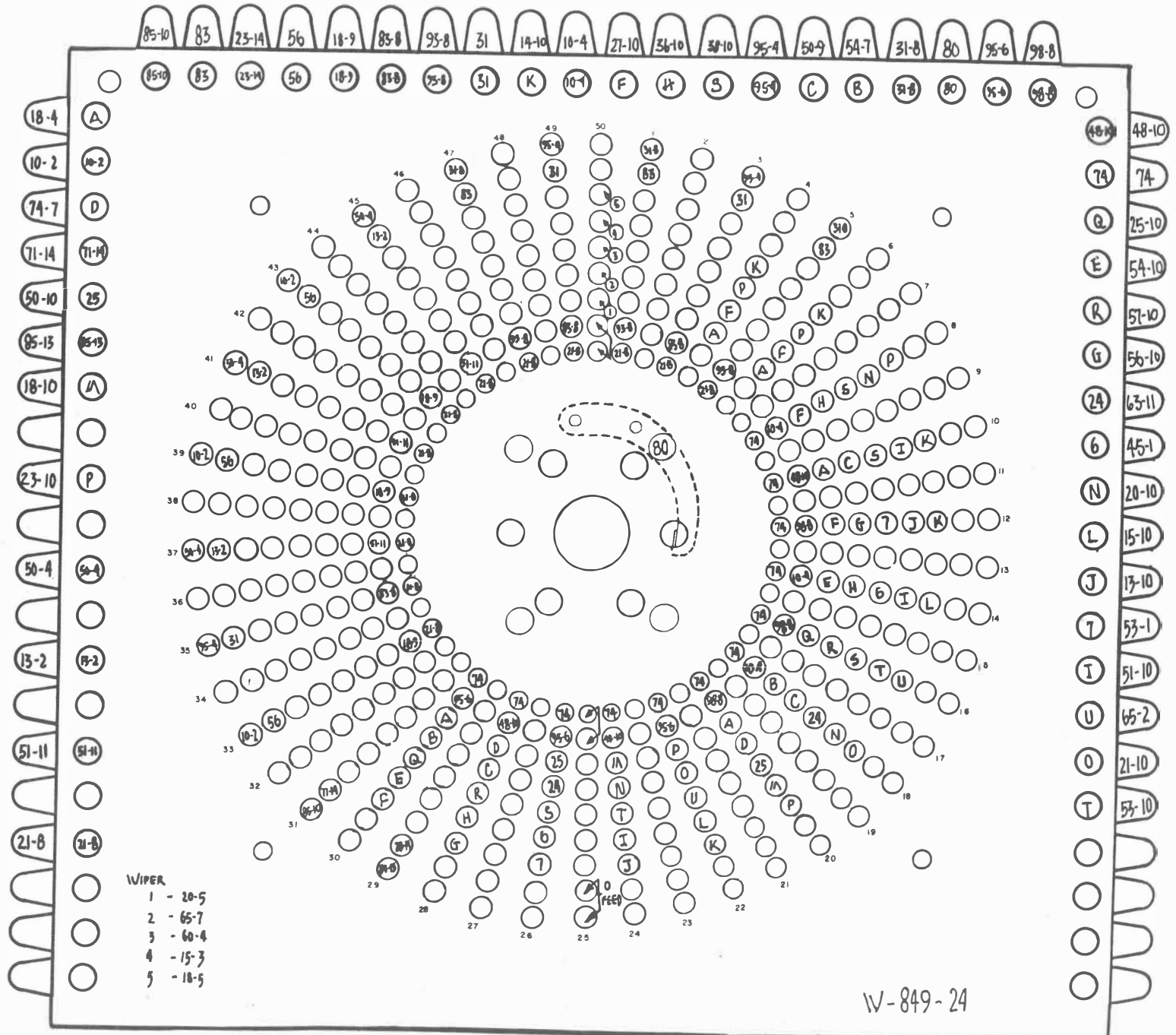
CIRCUIT FEEDS FROM COIN
 COUNTER DISC (P-44)

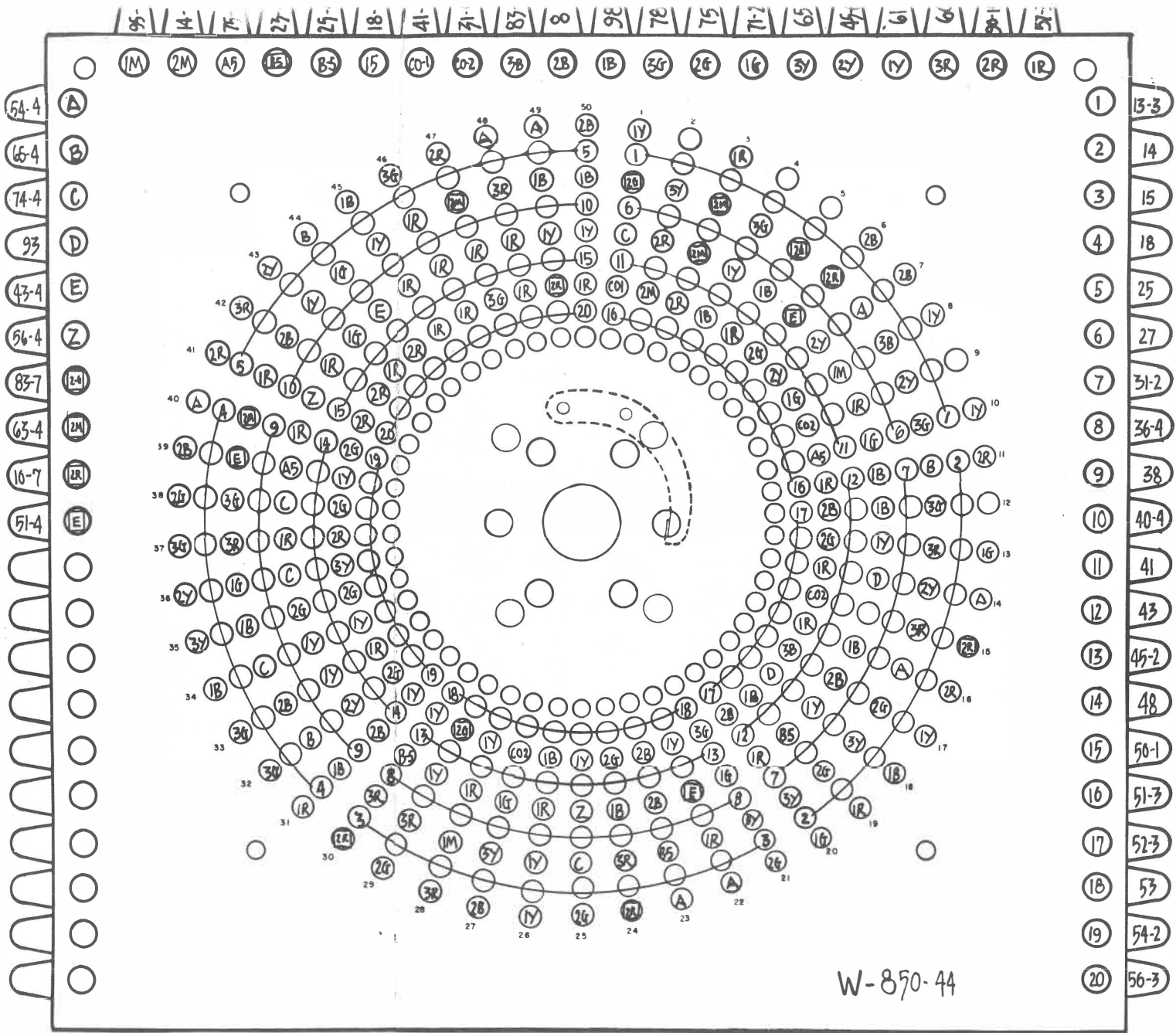
85-13 Cir. Fd. to C.U. Cam 12 (X8) Sw. (M-19)
 71-14 Cir. Fd. to C.U. Cam 14 (X4) Sw. (M-18)
 10-2 Cir. Fd. from Blue Replay Cntr. (Open at 96 Sw.) (N-32)
 85-10 Cir. Fd. from CO-1 Trip Sw. (Q-18)
 83 Cir. Fd. to Red Replay Step-Up Coil (N-27)

80 Cir. Fd. from Red Replay Cntr. (C)
 95-6 Wiper Fd. Cir. from C.U. Pulse Ci
 98-8 Cir. Fd. to Red Score Wiper (P-24)
 48-10 Cir. Fd. to Green Score Wiper (P-
 74 Cir. Fd. to Yellow Score Wiper (P
 Disc Fd. Cir. from Search Relay S

Note: Abbreviations

Fd. - Feed
 Cir. - Circuit
 Cntr. - Counter
 C.U. - Control Unit

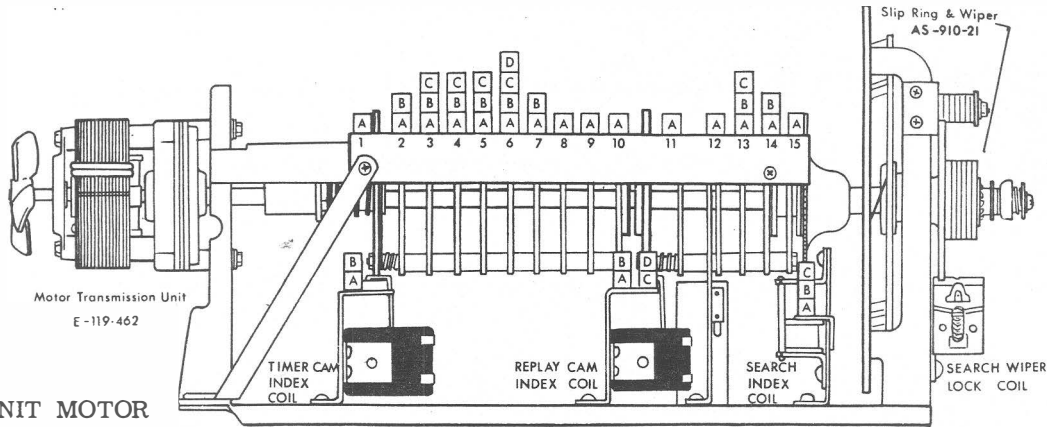




W-850-44

CIRCUIT FEEDS FROM COIN
COUNTER DISC (P-44)

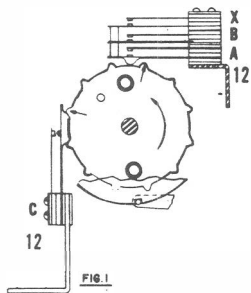
CONTROL UNIT ASSEMBLY



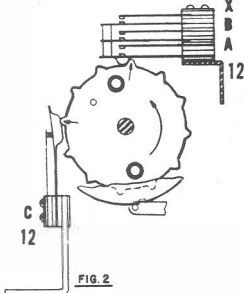
CONTROL UNIT MOTOR

- E-119-462 50/60 Cy. 23.4 R. P. M. Domestic
- E-119-370 50 Cy. only 25 R. P. M. Belgium

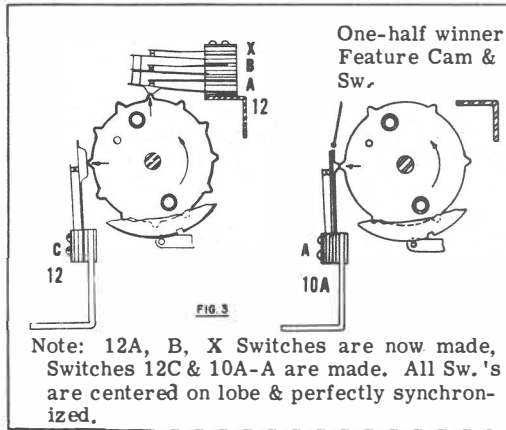
The correct adjustment & synchronization of the Switches controlled by Cam No.'s 10A & 12 is vitally important to the Replay Counter Circuit. Out of adjustment Back Switches (12-C & 10A-A) can cause the four Replay Counters to become overloaded & burn out (affects the Printed Circuit Disc). Figure 3 shows these Cam Switches in a proper "Made" position. The Back Switches are adjustable. Note that the 12-C switch closes first & opens last. Cam Switch 12X is used for our testing purposes only.



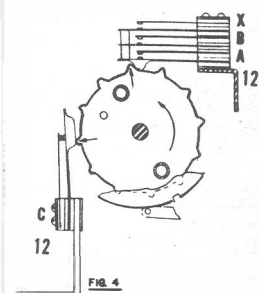
Replay Cam 12 shown in a normal indexed position. Switches 12 A, B, C are open.



Cam 12 starting to rotate. Switches out of indexed pos. Switches A & B are open, Switch C is closed.



Note: 12A, B, X Switches are now made, Switches 12C & 10A-A are made. All Sw.'s are centered on lobe & perfectly synchronized.



Cam #12 Switches A & B are now open again, however Switch C is still closed. After this cycle Cam & Switches return to the Fig. 1 position (open).

This entire sequence is repeated throughout the scoring cycle.

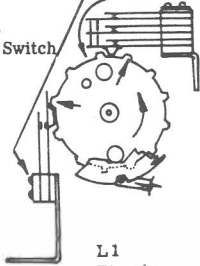
ADJUSTMENT PROCEDURES

Adjust Height and Switch so that the entire bent part of Switch Blade fits between Cam Lobes firmly on Cam & at Cam Center.

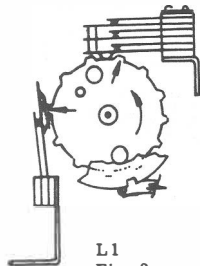
With Replay Cam Index Pin in Index Cam Notch. Replay Cam Index must be adjusted in so that switches are positioned between Cam Lobes as shown.

3/4 of Space from last Lobe

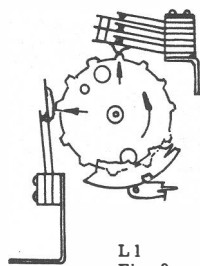
Cam #13 Back Up Switch



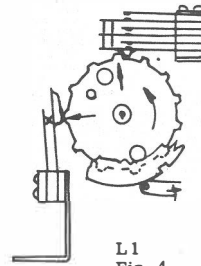
L1 Fig. 1



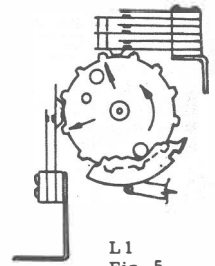
L1 Fig. 2



L1 Fig. 3



L1 Fig. 4



L1 Fig. 5

Replay Cams shown in their normal Indexed Positions. Switches are Open. Arrows point to Lobes that will actuate Switches.

Replay Cams shown starting to Rotate they are now out of their Indexed Positions. Switches 1G, 2G & 3G are Open Switch L1 is now Closed.

Switches 1G, 2G & 3G are now Closed. Switch L1 is still closed.

Switches 1G, 2G & 3G are now Open again. Switch L1 is still closed.

All Switches are now Open again. Same as in Fig. 1. This sequence is repeated thruout Replay Scoring Cycle.

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

CONTROL UNIT FUNCTION CHART

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
CONTROL UNIT Motor	E-119-462	D-1	20-16 50-16	Blue White	Energized thru Replay Reset Re. Sws. and Timer Cams Index Sws.
#1 Pin Sw/. N. C.	ASW-C2-28	E-14	25-9 30	Blue-White Yellow	Opens Circuit to Multi-Play Re.
#2 Cam A. N. O.	ASW-C1-3	F-12	48-2 30	Green-Black Yellow	Opens Coining Circuit
#2 Cam B. T.	ASW-C3-3	M-17	93-7 98-4 91-7	Grey-Yellow Grey-Black Grey-Red	Transfers feed from total play meter to total replay meter.
#3 Cam A. N. O.	ASW-C1-3	E-22	20-4 21-3	Blue Blue-Red	Pulses Flash Index Circuit.
#3 Cam B. N. C.	ASW-C2-4	R-39	60-8 45-13	Brown Green-White	Opens Circuit to Program Control and Scrambler Wiper Feed.
#3 Cam C. T.	ASW-C3-2	E-13	14-5 13-9 50 J	Red-Green Red-Yellow White	Pulses tilt trip thru Coin Sw. (anti-cheat circuit)
#3 Cam D. Lug	ASW-AO-9	D-13	10-5	Red	Adjustment for single play per coin.
#3 Cam E. Lug			15-13	Red-White	Adjustment for multi-play per coin.
#4 Cam A. N. O.	ASW-C1-3	E-16	80-2 27-9	Black Blue-Orange	Pulses coin meter.
#4 Cam B. N. O.	ASW-C1-8	E-22	98-3 21-3	Grey-Black Blue-Red	Pulses Reflex Factor Index Coil.
#4 Cam C. N. C.	ASW-C2-4	C-7	52-11 95-2	White-Blue Grey-White	Opens circuit to reflex relays.
#5 Cam A. N. O.	ASW-C1-3	D-23	41-5 98-3	Green-Red Grey-Black	Pulses Reflex Factor Index Coil.
#5 Cam B. N. O.	ASW-C1-8	C-5	57-4 30	White-Orange Yellow	Pulses coin counter step-up coil.
#5 Cam C. N. O.	ASW-C1-8	F-4	78-4 30	Orange-Black Yellow	Pulses anti cheat re.
#6 Cam A. N. O.	ASW-C1-52	O-55	98-7 83-3	Grey-Black Black-Yellow	Pulses green and blue score unit step-up coils.
#6 Cam B. N. O.	ASW-C1-8	O-54	85-4 83-3	Black-White Black-Yellow	Pulses all scores re. and red and yellow score unit step-up coils.
#6 Cam C. N. O.	ASW-C1-8	C-31	65-8 21-3	Brown-White Blue-Red	Pulses Cam #6 Re.
#6 Cam D. N. O.	ASW-C1-8	M-44	58-2 63-4	White-Black Brown-Yellow	Pulses Magic Sq. Fea. Unit step-up coil.
#6 Cam E. N. O.	ASW-C1-8	M-45	58-2 95-1	White-Black Grey-White	Pulses Magic Sq. Fea. Unit step-up coil.
#7 Cam A. N. O.	ASW-C1-3	O-57	90-2 20-7	Grey Blue	Pulses selected score unit step-up coils when #1 reflex re. is energizer.
#7 Cam B. N. O.	ASW-C1-8	D-9	80-9 30	Black Yellow	Pulses reflex play magnet.
#7 Cam C. N. O.	ASW-C1-8	M-44	58-2 63-4	White-Black Brown-Yellow	Pulses magic sq. fea. unit step-up coil.
#8 Cam A. N. O.	ASW-C1-3	P-58	90-2 91-4	Grey Grey-Red	Pulses selected score unit step-up coils.
#8 Cam B. N. O.	ASW-C1-8	M-48	51-4 48-11	White-Red Green-Black	Pulses "E" Trip.
#9 Cam A. N. O.	ASW-C1-3	P-59	90-2 93-2	Grey- Grey-Yellow	Pulses selected score unit step-up coils when 3 step re. is energized.
#9 Y Cam N. O.	ASW-C1-46	M-61	43-15 57-1	Green-Yellow White-Orange	(Back Sw.)(Alternating trip sw. change features. completes circuit to alt. trip.
#10 Cam A. N. O.	ASW-C1-3	N-14	36-13 30	Yellow-Brown Yellow	Controls amount of replays placed on replay reg. S. U.
Lug	ASW-AO-3	D-9			Resistor Lug
Lug	ASW-AO-3	P-17	21-3	Blue-Red	

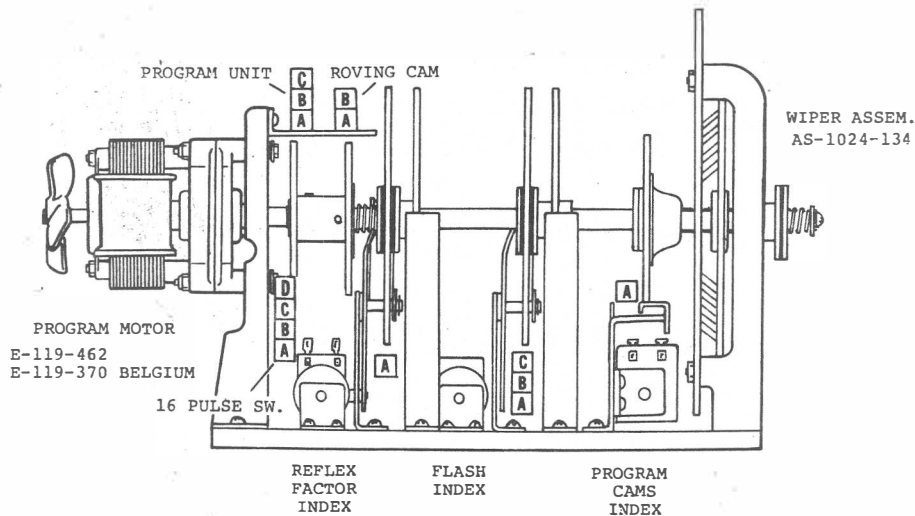
ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

CONTROL UNIT FUNCTION CHART

Switch/Control	Part No.	Location on Diagram	Wire No.	Wire Color	Function
#11 Cam (X16) N. O.	ASW-C1-4	K-25	70 61-4	Orange Brown-Red	(Multiplier) during winner, pulses corresponding replay counter.
#11 Y Cam (X2) N. O.	ASW-C1X-21	K-24	70 52	Orange White-Blue	(Multiplier) during winner, pulses corresponding replay counter.
#12 Cam A(X8) N. O.	ASW-C1-3	K-25	70 63	Orange Brown-Yellow	(Multiplier) during winner, pulses corresponding replay counter.
#12 Cam B. N. O.	ASW-C1-8	L-19	27-17 85-13	Blue-Orange Black-White	(Multiplier) during CO-2 winner pulses corner replay counter S. U.
#13 Cam (X1) A. N. O.	ASW-C1-3	K-23	70 45	Orange Green-White	(Multiplier) during winner, pulses corresponding replay counter.
#13 Cam (X1) B. N. O.	ASW-C1-8	N-16	41-4 80	Green-Red Black	During winner, pulses replay reg. step-up coil, reflex replay mag., and total replay meter.
#13 Cam (X1) C. N. O.	ASW-C1-46	Q-16	23-13 21-3	Blue-Yellow Blue-Red	(Back Sw.) completes circuit for replay reg. & reflex replay mag. step up.
#14 Cam (X4) A. N. O.	ASW-C1-3	K-24	70 57	Orange White-Orange	(Multiplier) during winner, pulses corresponding replay counter.
#14 Cam (X4) B. N. O.	ASW-C1-8	M-19	27 J 27-17 71-14	Blue-Orange Blue-Orange	(Multiplier) during CO-1 winner pulses corner replay counter S. U.
#14 Cam (X4) C. N. O.	ASW-C1-8	M-19	2	Blue-Orange	(Extra Sw.)
#15 Cam N. O.	ASW-C1-4	Q-37	48-4 90	Green-Black Grey	(Close At Index) Completes circuit to make winner search possible.
SEARCH WIPER Lock Mag.	FD-30-1300	J-7	70 23-17	Orange Blue-Yellow	Energized thru "R" button sw. after 4th ball is shot.
Wiper Cam Sw. A. N. C.	ASW-C1-16	P-8	61-11 10-13	Brown-Red Red	Opens Circuit to search lock magnet.
B. N. C.	ASW-C1-17	B-12	13-12 53-13-	Red-Yellow White-Yellow	Opens Circuit to Start Re.
TIMER CAMS Index A. N. O.	BF-27-1250	A-16	70 61-7	Orange Brown-Red	Energized thru start re. circuit when shutter is open.
B. N. C.	ASW-A1-43	F-2	20-16 60-16	Blue Brown	Completes circuit to control unit & program unit motors.
B. N. C.	ASW-A2-18	E-15	98-6 27-9	Grey-Black Blue-Orange	Opens circuit to coin lockout coil.
REPLAY CAMS Index Coil A. N. O.	CF-28-1025	J-13	70 40-19	Orange Green	Energized thru winner search circuit.
B. N. C.	ASW-A1-11	Q-37	48-4 90	Green-Black Grey	Completes replay scoring lock-in circuit.
C. N. O.	ASW-A1-27	C-23	36-9 27-2	Yellow-Brown Blue-Orange	Opens circuit to timer step-up coil.
D. N. C.	ASW-A1-56	O-16	80 23-13	Black Blue-Yellow	Completes replay scoring circuit.
D. N. C.	ASW-A2-29	N-12	80 78-14	Black Orange-Black	Opens direct circuit to search index and allows coil to remain energized thru resistor.
C. U. SEARCH Index Coil A. LUG	E-29-950	J-12	70 J 70	Orange Orange	Energizes thru winner circuit and stops stops search disc wipers when winner is detected.
B. N. O.	ASW-A1-69	N-13	40-19 80	Green Black	Completes circuit to replay cams Index Coil.
C. N. C.	ASW-A2-28	B-12	53-13 51-8	White-Yellow White-Red	Opens circuit to start re. coil.
SEARCH SLIP-RING			20-5 65-7 60-4		Energizes #1 Search Relay when fed. Energizes #2 Search Relay when fed. Energizes #3 Search Relay when fed.
			15-3		Energizes #4 Search Relay when fed.
			18-5		Energizes #5 Search Relay when fed.

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

PROGRAM ASSEMBLY



Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
PROGRAM MOTOR	E-119-462	D-3	20-16 50-16	Blue White	Operates unit through Replay Reset Re. & Timer Cams Index Sws.
PROGRAM Index Coil*	BF-27-1250	A-21	70	Orange	Energized thru B-4 Sw. & holds in until 5th ball is shot.
A. N. C.	ASW-A2-64	C-21	14-3 14 J	Red-Green Red-Green	Opens direct circuit to this Coil allowing feed thru Resistor.
FLASH INDEX Coil	CR-28-1100	A-22	70	Orange	Energized thru C. U. Cam #3 Sw.
A. N. O.	ASW-A1-24	F-30	20-4	Blue	
B. N. O.	ASW-C1-40	F-43	30	Yellow	Completes Circuit to Flasher Disc Wiper.
C. N. O.	ASW-C1-40	G-43	13-4	Yellow	Completes Circuit to flasher disc Wiper and Flasher Disc.
			81-6	Black-Red	Completes Circuit to Flasher Disc Wiper and Flasher Disc
REFLEX FACTOR Index Coil	CR-28-1100	A-23	70	Orange	Energized thru C. U. Cams #4 and #5 Sws.
A. N. O.	ASW-A1-124	D-22	56-6	White-Brown	
			41-5	Green-Red	Lock in Circuit for this Index Coil.
			98-3	Grey-Black	

PROGRAM 16 PULSE CAM TOP SWS.

A. N. O.	ASW-C1X-1	D-10	53-7 75-2	White-Yellow Orange-White	Pulses Replay Reg. Reset Coil
B. N. O.	ASW-C1X-2	M-21	38-9 30	Yellow-Black Yellow	Pulses Corner Replay Counter Step-Up during Homing Procedure.
C. N. O.	ASW-C1X-2	H-34	48-12 23-11	Green-Black Blue-Yellow	Pulses select now and press "ABC DE" Buttons lites.

PROGRAM ROVING CAM

A. N. O.	ASW-C1X-1	D-25	27-2 85-8	Blue-Orange Black-White	Pulses Timer Unit Step-Up Coil after 5th Ball is shot.
B. N. C.	ASW-C2-15	C-23	56-6 41-5	White-Brown Green-Red	Pulses reflex factor index coil.

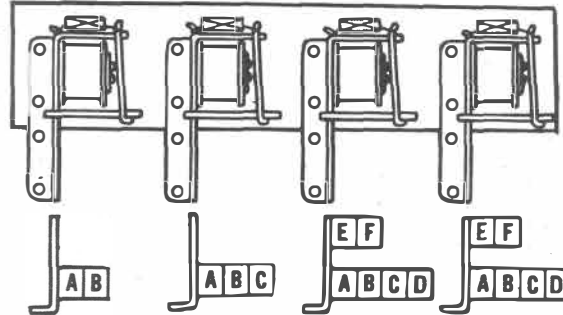
PROGRAM 16 PULSE CAM

A. N. O.	ASW-C1X-1	L-46	58-2 61-2	White-Black Brown-Red	Pulses Magic Sq. Fea. Unit Step Up Coil.
B. N. O.	ASW-C1X-2	L-43	80-7 81-2	Black Black-Red	Pulses Selection Unit Step Up Coil.
C. N. O.	ASW-C1X-2	H-33	83-4 13-11	Black-Yellow Red-Yellow	Pulses Coin Lite.
D. N. O.	ASW-C1X-2	N-61	57-1 75-10	Orange-White Orange-White	PULSES ALT. TRIP RELAY

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

4 RELAY BANK

BALL LIFT CAM #6 #1 REFLEX #2 REFLEX

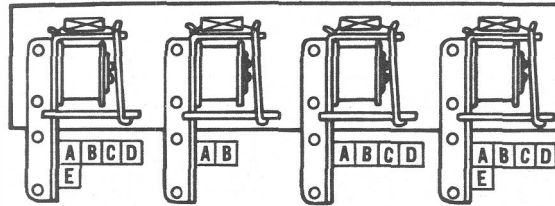


Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
BALL LIFT RELAY	G-32-2500	A-20	70 81-3	Orange Black-Red	Energized when Ball closes Ball Lifter Sw.
A. N. O.	ASW-R1-3	D-30	91-1 36-3	Grey-Red Yellow-Brown	Completes Circuit to Ball Lifter Motor.
B. N. C.	ASW-R2-5	M-5	75-5 78-7	Orange-White Orange-Black	Opens Circuit to B-5 Trip
CAM #6 RELAY	G-31-2000	A-31	70 65-8	Orange Brown-White	Energized through C. U. Cam #6 Switch.
A. N. O.	ASW-R1-3	M-42	80-7 18-1	Black Red-Black	Completes Circuit to Selection Fea. Unit Step-Up.
B. N. O.	ASW-R1-3	M-49	51-4 53-2	White-Red White-Yellow	Completes Circuit to "E" Trip Sw. and Gong.
C. N. O.	ASW-R1-3	N-60	48-7 91-3	Green-Black Grey-Red	Completes Circuit to Gong.
#1 REFLEX RELAY	G-32-2500	A-7	70 52-11	Orange White-Blue	Energized through Reflex Control Circuit.
A. N. O.	ASW-R1-3	N-46	50-7 65-4	White Brown-White	Completes Circuit to Magic Square Fea. Disc.
B. N. O.	ASW-R1-3	O-46	71-3 74-4	Orange-Red Orange-Green	Completes Circuit to Magic Square Fea. Disc.
C. N. O.	ASW-R1-3	N-43	78-2 75-3	Orange-Black Orange-White	Completes Circuit to Selection Fea. Unit Disc.
D. N. O.	ASW-R1-3	O-47	45-3 93	Green-White Grey-Yellow	Completes Circuit to Magic Square Fea. Disc.
E. N. O.	ASW-R1-3	P-48	81-8 56-4	Black-Red White-Brown	Completes Circuit from Reflex Factor Disc to Z on Program Disc.
F. T.	ASW-R3-6	P-57	91-4 21-3 20-7	Grey-Red Blue-Red Blue	Opens Circuit to C. U. Cam #8-Sw. Closes Circuit to C. U. Cam #7 Sw. for Score Step-Up.
#2 REFLEX RELAY	G-32-2500	A-8	70 52-11	Orange White-Blue	Energized thru Reflex Control Circuit
A. T.	ASW-R3-6	N-47	31-5 43-4 51-4	Yellow-Red Green-Yellow White-Red	Opens CO-2 Trip Circuit and closes "E" Trip re. circuit.
B. T.	ASW-R3-6	N-41	41-1 36-6 31-5	Green-Red Yellow-Brown Yellow-Red	Opens CO-1 Trip re. Circuit and closes CO-2 Trip re. Circuit.
C. T.	ASW-R3-6	O-44	95-1 14-1 63-4	Grey-White Red-Green Brown-Yellow	Transfers Program 2M Feed from C. U. Cam #6 to C. U. Cams #6 & #7 Sws.
D. T.	ASW-R3-6	O-53	78 83-7 75	Orange-Black Black-Yellow Orange-White	Transfers feed through Diode Board from 3 Step re. to 2 Step Re.
E. T.	ASW-R3-6	N-42	18-1 25-4 23-4	Red-Black Blue-White Blue-Yellow	Transfers feed from Cam #6 re. Sw. to select fea. unit disc.
F. T.	ASW-R3-6	O-50	60 10-7 90-15	Brown Red Grey	Transfers feed through Diode Board from 3 Step re to 2 Step re.

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

4 RELAY BANK

REPLAY START MULTI-PLAY ANTI-CHEAT

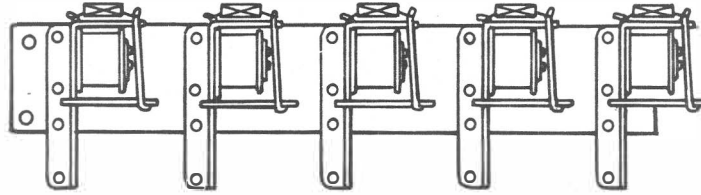


Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
REPLAY RESET	G-30-1500	A-11	70 75-2	Orange Orange-White	Energized through anti-cheat Re. and Replay Register Sw.
A. N. O.	ASW-R1-3	E-11	75-2 56-2	Orange-White White-Brown	Completes Circuit to replay reset re.
B. N. O.	ASW-R1-3	E-2	20-16 60-16	Blue Brown	Opens Circuit to C. U. and Program Unit Motors.
C. N. C.	ASW-R2-5	M-15	50-11 30	White Yellow	Opens Circuit to Replay Reg. Reset.
D. N. C.	ASW-R2-5	C-12	61-8 10-5	Brown-Red Red	Opens Circuit to Start Re.
E. T.	ASW-R3-6	D-10	80-9 98-5 53-7	Black Grey-Black White-Yellow	Transfers Replay Reg. Reset Feed from C. U. #7 Cam Sw. to 16 Pulse Cam Sw.
START	G-32-2500	A-12	70 98-10	Orange Grey-Black	Energized whenever game is coined thru coin Sw. or front door button.
A. N. O.	ASW-R1-8	D-16	13-12 48-2	Red-Yellow Green-Black	Completes Circuit to Shutter Motor (if shutter closed); to Timer Cams Index thereafter.
B. N. O.	ASW-R1-3	C-16	13-12 10-10	Red-Yellow Red	Completes Circuit to Start Relay.
MULTI-PLAY	G-32-2500	A-14	70 15 J	Orange Red-White	Pulsed by Coin Sw. if game is set for multi-play per coin.
A. N. O.	ASW-R1-8	E-14	15-13 25-9	Red-White Blue-White	Completes Circuit to Multi-Play Re.
B. N. O.	ASW-R1-3	D-13	10-5 95	Red Grey-White	Completes Circuit to start Re.
C. N. C.	ASW-R2-5	C-10	45-9 98-5	Green-White Grey-Black	Opens Circuit to Replay Reg. Reset Coil.
D. T.	ASW-R3-6	M-13	41-4 75-9 36-13	Green-Red Orange-White Yellow-Brown	Transfers Replay Reg. Reset Feed from C. U. Cam #13 Sw. to C. U. Cam #10 Sw.
A. C. RELAY	G-32-2500	A-4	70 78 J	Orange Orange-Black	Energized through C. U. Cam #5 Sw. or Replay Key
A. N. O.	ASW-R1-8	E-5	78 J 30 78-4	Orange-Black Yellow Orange-Black	Completes Circuit to A. C. Re.
B. N. O.	ASW-R1-3	H-49	80-1 51-7	Black White-Red	Completes Circuit to Magic Square Lites and Search Re.
C. N. C.	ASW-R2-5	E-17	14-14 30	Red-Green Yellow	Opens Circuit to Red Score Unit "Open at Zero" Sw.
D. T.	ASW-R3-6	E-12	75-2 56-2 50-2	Orange-White White-Brown White	Transfers feed from replay reset re. to start re.
E. T.	ASW-R3-6	I-47	91-2 36-17 40	Grey-Red Yellow-Brown Green	Transfers feed from tilt lite to score and Arrow Lites.

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

5 SEARCH BANK

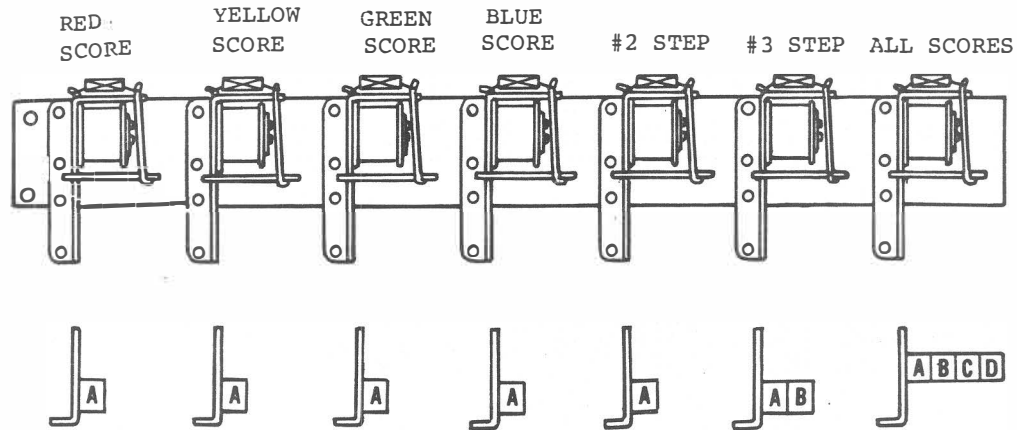
SEARCH 5 SEARCH 4 SEARCH 3 SEARCH 2 SEARCH 1



Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
#1 RELAY	G-28-76	I-64 I-65	10-1 20-5	Red Blue	Energized through 20-5 on Search Disc.
A. N. O.	ASW-R1-8	P-38	74 38-11	Orange-Green Yellow-Black	Completes Circuit to Search Disc.
B. N. O.	ASW-R1-8	M-39	21-8 40-5	Blue-Red Green	Completes Circuit to Search Disc, and Corner Counter Circuit.
C. N. O.	ASW-R1-8	N-40	41-6 40-5	Green-Red Green	Completes Circuit to Search Re. #5 Sw.
#2 RELAY	G-28-750	I-65 I-66	10-1 65-7	Red Brown-White	Energized through 65-7 on Search Disc.
A. N. O.	ASW-R1-8	Q-38	38-11 31-11	Yellow-Black Yellow-Red	Completes Circuit to #1 & #4 Search Re. Sws.
B. N. O.	ASW-R1-8	O-39	85-1 31-11	Black-White Yellow-Red	Completes Circuit to #4 Search Re. Sw.
#3 RELAY	G-28-750	I-66 I-67	10-1 60-4	Red Brown	Energized through 60-4 on Search Disc.
A. N. O.	ASW-R1-8	Q-33	48-4 31-11	Green-Black Yellow-Red	Completes Circuit to #2 & #4 Relay Sws.
#4 RELAY	G-28-750	I-67 I-68	10-1 15-3	Red Red-White	Energized through 15-3 on Search Disc.
A. N. O.	ASW-R1-8	P-38	74 38-11	Orange-Green Yellow-Black	Completes Circuit to Search Disc.
B. N. O.	ASW-R1-8	Q-39	36-18 31-11	Yellow-Brown Yellow-Red	Completes Circuit to #5 Search Relay Sw.
C. N. O.	ASW-R1-8	N-39	40-5 85-1	Green Black-White	Completes Circuit to #1 & #5 Search Relay Sws.
#5 RELAY	G-28-750	I-68 I-69	10-1 18-5	Red Red-Black	Energized through 18-5 on Search Disc.
A. N. O.	ASW-R1-8	P-39	74 36-18	Orange-Green Yellow-Brown	Completes Circuit to Search Disc.
B. N. O.	ASW-R1-8	N-39	21-8 40-5	Blue-Red Green	Completes Circuit to Search Disc, and Corner Counter Sw.
C. N. O.	ASW-R1-8	N-40	61-3 41-6	Brown-Red Green-Red	Completes Circuit to "5 in Line" Score Unit Wipers.

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

7 RELAY BANK



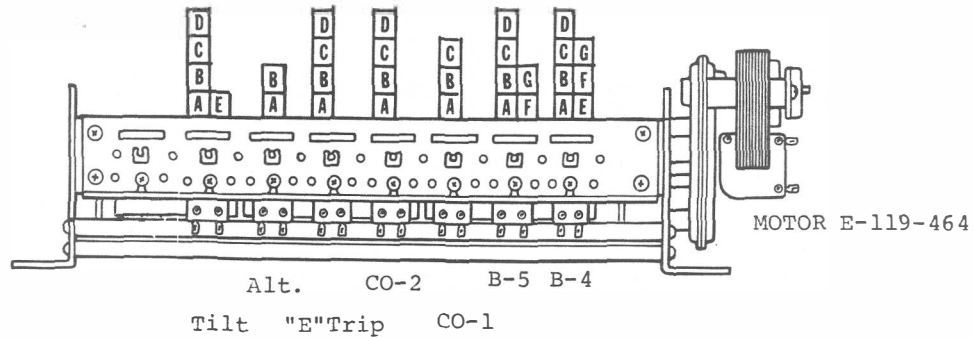
Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
RED SCORE	G-32-2500	J-50 K-49	70 54-5	Orange White-Green	Energized through Scrambler Unit, Disc & Program Disc Control Circuit.
A. N.O.	ASW-R1-7	N-57	15-6 90-2	Red-White Grey	Completes Circuit to Red Score Unit Step Up Coil and Gong.
B. LUG		K-49	21-3 54-5	Blue-Red	Residual Resistor 8200 Ohms 1/2 Watt
YELLOW SCORE	G-32-2500	J-51 K-50	70 56-5	Orange White-Brown	Energized through Scrambler Unit Disc, & Program Disc Control Circuit.
A. N.O.	ASW-R1-7	O-58	18-2 90-2	Red-Black Grey	Completes Circuit to Yellow Score Unit Step-Up Coil and Gong.
B. LUG		K-50	21-3 56-5	Blue-Red	Residual Resistor 8200 Ohms 1/2 Watt
GREEN SCORE	G-32-2500	J-52 K-52	70 57-6	Orange White-Orange	Energized through Scrambler Unit Disc, & Program Disc Control Circuit.
A. N.O.	ASW-R1-7	N-58	20-2 90-2	Blue Grey	Completes Circuit to Green Score Unit Step-Up Coil & Gong.
B. LUG		K-52	21-3 57-6	Blue-Red	Residual Resistor 8200 Ohms 1/2 Watt.
BLUE SCORE	G-32-2500	J-53 K-53	70 58-5	Orange White-Black	Energized through Scrambler Disc, & Program Disc Control Circuit.
A. N.O.	ASW-R1-7	O-59	23-6 90-2	Blue-Yellow Grey	Completes Circuit to Blue Score Unit Step-Up Coil & Gong.
B. LUG		K-53	21-3 58-5	Blue-Red	Residual Resistor 8200 Ohms 1/2 Watt.
#2 STEP RE.	G-32-2500	J-54 K-54	70 52-4	Orange White-Blue	Energized thru Program Disc Control Circuit.
A. N.O.	ASW-R1-7	Q-58	91-4 21-3	Grey-Red Blue-Red	Completes Score Unit Step-Up Circuit through C. U. Cam #8 Sw.
B. LUG		K-54	21-3 58-5	Blue-Red	Residual Resistor 8200 Ohms 1/2 Watt.
#3 STEP	G-32-2500	J-54 K-54	70 53-3	Orange White-Yellow	Energized thru Program Disc Control circuit.
A. N.O.	ASW-R1-7	Q-59	93-2 21-3	Grey-Yellow Blue-Red	Completes Score Unit Step-Up Circuit thru C. U. Cam #9 Sw.
B. N.O.	ASW-R1-3	P-58	91-4 21-3	Grey-Red Blue-Red	Completes Score Unit Step-Up Cam #9 Sw.
C. LUG		K-54	21-3 53-3	Blue-Red White-Yellow	Residual Resistor 8200 Ohms 1/2 Watt

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

7 RELAY BANK

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
ALL SCORE	G-30-1500	J-55 K-54	70 85-4	Orange Black-White	Energized from C. U. Cam #6 Sw. through Coin Counter Unit Disc.
A. N. O.	ASW-R1-7	K-56	15-6 85-4	Red-White Black-White	Completes Circuit to Red Score Unit Step-Up and Gong.
B. N. O.	ASW-R1-3	K-56	18-2 85-4	Red-Black Black-White	Completes Circuit to Yellow Score Unit Step-Up Coil and Gong.
C. N. O.	ASW-R1-3	L-56	20-2 98-7	Blue Grey-Black	Completes Circuit to Green Score Unit Step-Up Coil & Gong.
D. N. O.	ASW-R1-3	M-56	23-6 98-7	Blue-Yellow Grey-Black	Completes Circuit to Blue Score Unit Step-Up Coil and Gong.
E. LUG		K-54	21-3 85-4	Blue-Red Black-White	Residual Resistor 8200 Ohms 1/2 Watt

7 TRIP BANK



Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
TILT TRIP	D-27-425	A-20	70 14-5	Orange Red-Green	Energized by Inertia, Plumb-Bob, or Anti-Cheat Tilt Circuits.
A. N. C.	ASW-B-2	I-49	51-7 10-1	White-Red Red	Opens 17V Circuit
B. N. C.	ASW-B-2	E-3	20-16 81-16	Blue Black-Red	Opens Circuit to control and program unit motors.
C. T.	ASW-B-3	F-18	21-3 30 45-8	Blue-Red Yellow Green-White	Opens Circuit to this re. coil, also opens game playing circuit, score & feature circuit, winner circuit, & completes circuit to close shutter.
D. T.	ASW-B-3	I-48	36-17 18-15 91-2	Yellow-Brown Red-Black Grey-Red	Opens circuit to score and fea. lites & completes circuit to tilt lite.
E. N. O.	ASW-B-1	B-11	13-12 61-8	Red-Yellow Brown-Red	Completes circuit to start re.
ALT. TRIP	D-27-425	J-61	70 43 J	Orange Green-Yellow	Energized through magic square fea. unit disc when 16 pulse cam sw. & c. u. cam #9 back sw. are closed.
A. N. C.	ASW-B-2	K-61	43-15 43 J	Green-Yellow Green-Yellow	Opens circuit to this relay coil
B. T.	ASW-B-3	O-48	50-3 56-4 58-4	White White-Brown White-Black	Transfers feed from "Z" on Program Disc from Magic Square fea. open at Top Sw. to "E" Trip Sw.
"E" TRIP	D-27-425	J-47	70 51 J	Orange White-Red	Energized through Program Disc Control Circuit during coining of Game.
A. N. C.	ASW-B-2	K-47	51-4 51 J	White-Red White-Red	Opens circuit to this relay coil.
B. N. O.	ASW-B-1	G-44	30 50-8	Yellow White	Completes circuit to "E" Lite.
C. N. O.	ASW-B-1	N-9	52-9 90-4	White-Blue Grey	Completes circuit to move "E" Line.
D. T.	ASW-B-3	N-48	48-11 58-4 14-1	Green-Black White-Black Red-Green	Opens "E" Trip circuit and completes magic square feature unit step-up circuit.

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

7 TRIP BANK

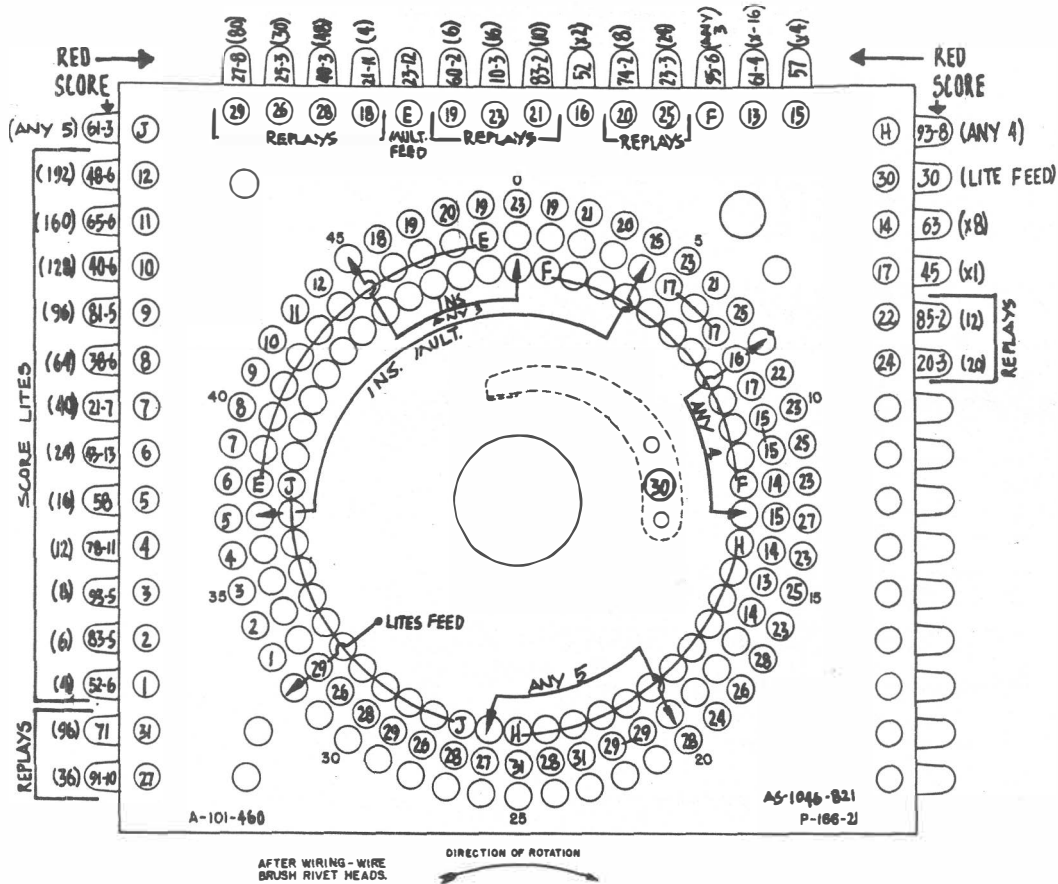
Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
CO -2 TRIP	D-27-425	J-41	70 31 J	Orange Yellow-Red	Energized through Program Disc Control Circuit during Coining of Game.
A. N. C.	ASW-B-2	K-41	31-5 31 J	Yellow-Red Yellow-Red	Opens Circuit to this Relay Coil.
B. N. C.	ASW-B-2	L-42	41-1 56-8	Green-Red White-Brown	Opens circuit to CO-1 Trip Re. Coil.
C. N. O.	ASW-B-1	F-45	30 90-3	Yellow Grey	Completes circuit to CO-2 Fea. Lite.
D. N. O.	ASW-B-1	N-19	23-14 15-5	Blue-Yellow Red-White	Completes Circuit to Search Disc.
CO - 1 TRIP	D-27-425	J-42	70 56 J	Orange White-Brown	Energized through program disc control circuit during coining.
A. N. C.	ASW-B-2	K-42	56 56 J	White-Brown White-Brown	Opens Circuit to this Relay Coil.
B. N. O.	ASW-B-1	G-44	30 61-19	Yellow Brown-White	Completes Circuit to CO-1 Lite.
C. N. O.	ASW-B-1	O-19	85-10 15-5	Black-White Red-White	Completes Circuit to 85 - 10 on Search Disc.
B - 5 TRIP	D-27-425	J-5	70 75 J	Orange Orange-White	Energized through Program Disc Control Circuit during coining.
A. N. C.	ASW-B-2	K-5	75-5 75 J	Orange-White Orange-White	Opens Circuit to this Relay Coil.
B. N. C.	ASW-B-2	O-9	90-4 98-2	Grey Grey-Black	Opens before 5th Ball Circuit to move magic squares.
C. N. C.	ASW-B-2	H-34	74-8 23-5	Orange-Green Blue-Yellow	Opens circuit to B-5 Lite.
D. N. C.	ASW-B-2	D-21	14-3 25-8	Red-Green Blue-White	Opens Circuit to Program Index Coil.
E. N. O.	ASW-B-1	E-25	85-8 50-5	Black-White White	Completes Timer Unit Step-Up Circuit.
F. N. O.	ASW-B-1	G-35	53-12 48-12	White-Yellow Green-Black	Completes circuit to select now & press "A B C D E" Buttons, Lites.
B - 4 TRIP	D-27-425	J-4	70 83 J	Orange Black-Yellow	Energized thru timer disc ball count circuit when 4th ball is shot.
A. N. C.	ASW-B-2	M-4	83-6 83 J	Black-Yellow Black-Yellow	Opens circuit to this relay coil.
B. N. C.	ASW-B-2	G-35	57-5 27-4	White-Orange Blue-Orange	Opens before 4th Ball Circuit to press now lites.
C. N. C.	ASW-B-2	Q-40	18-7 60-8	Red-Black Brown	Opens Scrambler Unit Disc Feed Circuit.
D. N. C.	ASW-B-2	O-8	90-4 95-3	Grey Grey-White	Opens Circuit to magic square unit feature disc and "E" trip re. sw.
E. N. O.	ASW-B-1	O-7	53-18 61-11	White-Yellow Brown-Red	Completes circuit to "R" Button for winner search.
F. N. O.	ASW-B-1	E-24	43-2 36-2	Green-Yellow Yellow-Brown	Completes Timer Unit Step-Up Circuit from 4th to 5th Steps.
G. N. O.	ASW-B-1	E-21	25-8 21-3	Blue-White Blue-Red	Completes Circuit to Program Index Coil.
CARRYOVER CAM SW. N. O.	ASW-B-20	C-6	90-10 30	Grey Yellow	Completes Circuit to Trip Bank Reset Motor.
MOTOR	E-119-464	A-6	70 90-10	Orange Grey	Energized thru shutter cam #6 Sw.

RED, YEL., BLUE, GRN. SCORE UNIT DISCS

SCORE DISC WIRES

WIRE NUMBERS TOP OF DISC

BLUE	71-6	80-3	54-6	75-11	36-1	41-3	63-3	48-3	52	43-3	74-3	10-4	61-4	57
GREEN	74-9	57-9	60-9	63-12	90-7	41-9	27-6	40-9	52	36-14	90-8	98-8	61-4	57
YELLOW	50-6	52-2	57-2	60-6	71-19	78-1	40-2	93-1	52	81-1	51-2	48-10	61-4	57



NOTE: NUMBERS IN PARENTHESIS ARE SCORE VALUES.

SCORE DISC WIRES

WIRE NUMBER LEFT SIDE

BLUE	GREEN	YELLOW
61-3	61-3	61-3
50-12	36-8	80-5
43-9	75-6	51-12
41-7	31-7	78-5
52-8	80-8	90-1
27-3	27-11	74-5
25-2	25-7	71-5
61-12	23-7	31-17
23-1	20-6	65-5
81-18	18-6	83-18
21-2	15-7	63-5
20-1	14-4	61-5
15-7	13-7	60-5
91	54	23
95-10	98-14	90-13

SCORE DISC WIRES

WIRE NUMBERS RIGHT SIDE

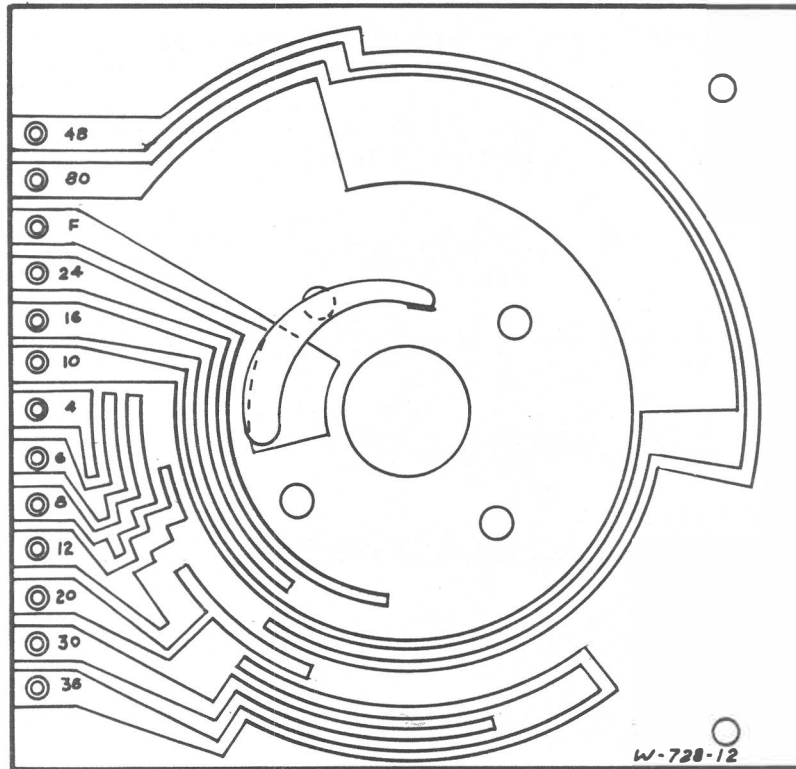
YELLOW	GREEN	BLUE
83-8	51-11	18-3
30	30	30
63	63	63
45	45	45
23-2	48-9	60-3
41-2	13-1	65-3

ALWAYS GIVE MOEEL AND PART NO. WHEN ORDERING SERVICE PARTS

RED, YEL., BLUE, & GREEN SCORE UNITS

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
RED SCORE Step-Up Coil	B-25-925	J-57	70 15-6	Orange Red-White	Energized through Control Circuit during coining of game.
RED SCORE Reset Coil	G-28-1100	D-33	70 78-3	Orange Orange-Black	Energized thru Shutter Cam #6 Sw.
A. N. C.	ASW-U2	E-17	45-8 14-14	Green-White Red-Green	Completes Circuit to close shutter if scores don't reset when game's coined.
YELLOW SCORE Step-Up Coil	B-25-925	J-58	70 18-2	Orange Red-Black	Energized thru control circuit during coining of game.
YELLOW SCORE Reset Coil	C-28-1100	D-33	70 78-3	Orange Orange-Black	Energized thru Shutter Cam #6 Sw.
GREEN SCORE Step-Up Coil	B-25-925	J-58	70 20-2	Orange Blue	Energized thru Control Circuit during coining of game.
GREEN SCORE Reset Coil	C-28-1100	B-33	70 78-3	Orange Orange-Black	Energized thru Shutter Cam #6 Sw.
BLUE SCORE Step-Up Coil	B-25-925	J-59	70 23-6	Orange Blue-Yellow	Energized thru Control Circuit during coining of game.
BLUE SCORE Reset Coil	C-28-1100	C-33	70 78-3	Orange Orange-Black	Energized thru Shutter Cam #6 Sw.

REPLAY COUNTERS RED, YEL., BLUE, GRN.



WIRE NO.	YEL.	RED	BLUE	GRN.
48	57-2	40-3	54-6	60-9
80	50-6	27-8	71-6	74-9
F	23	71	91	54
24	51-2	23-3	74-3	90-8
16	40-2	10-3	63-3	27-6
10	93-1	83-2	48-3	40-9
4	60-6	21-11	75-11	63-12
6	78-1	60-2	41-3	41-9
8	81-1	74-2	43-3	36-14
12	23-2	85-2	60-3	48-9
20	41-2	20-3	65-3	13-1
30	52-2	25-3	80-3	57-9
36	90-13	91-10	95-10	98-14

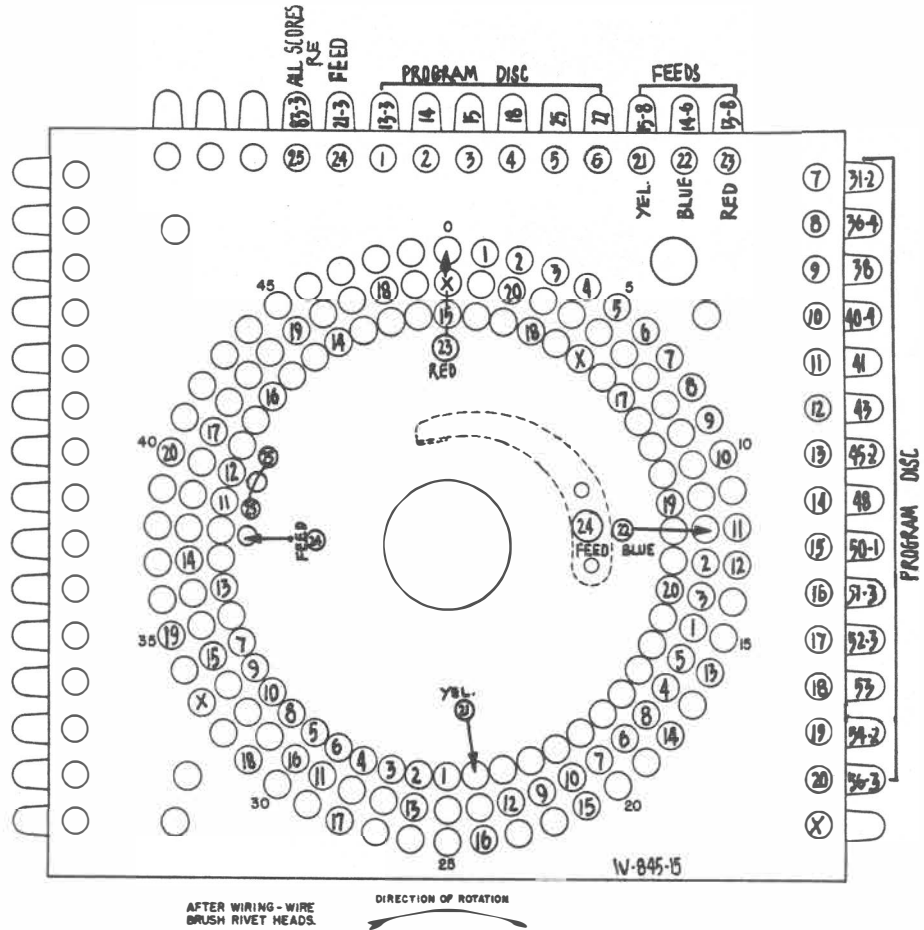
ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

REPLAY COUNTERS RED, YEL., BLUE, & GRN.

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
RED REPLAY CENTER S. U. Coil	B-25-925	M-27	83 23-12	Black-Yellow Blue-Yellow	Energized thru Winner Circuit during 3-4-5 in Line.
RED REPLAY Center R. S. Coil	C-28-1100	B-33	70 85 J	Orange Black-White	Energized thru Shutter Cam #3 Sw.
A. N. C. Open @ "O"	ASW-U2	B-32	85-5 85 J	Black-White Black-White	Opens circuit to Red Replay Counter Reset Coin.
B. N. C. Open @ 96	ASW-U1	N-27	31-8 71	Yellow-Red Orange-Red	Opens Circuit to Replay Counter S. U. through Search Disc.
YELLOW REPLAY Cntr. S. U. Coil	B-25-925	M-23	31 71-19	Yellow-Red Orange-Red	Energized thru Winner Circuit during 3-4-5 in Line.
YELLOW REPLAY Cntr. R. S. Coil	C-28-1100	B-33	70 85-J	Orange Black-White	Energized thru Shutter Cam #3 Sw
A. N. C. Open @ "O"	ASW-U2	B-32	85-5 85 J	Black-White Black-White	Open Circuit to Replay Counter Reset Coil.
B. N. C. Open @ 96	ASW-U1	N-23	95-4 23	Grey-White Blue-Yellow	Opens Circuit to Replay Counter S. U. through Search Disc.
GREEN REPLAY Cntr. S. U. Coil	B-25-925	M-37	13-2 90-7	Red-Yellow Grey	Energized thru Winner Circuit during 3-4-5 in Line.
GREEN REPLAY Cntr. R. S. Coil	C-28-1100	B-33	70 85 J	Orange Black-White	Energized thru Shutter Cam #3 Sw.
A. N. C. Open @ "O"	ASW-U2	B-32	85-5 85 J	Black-White Black-White	Opens Circuit to Replay Counter Reset Coil.
B. N. C. Open @ 96	ASW-U1	N-37	50-4 54	White White-Green	Opens Circuit to Replay Counter S. U. through Search Disc.
BLUE REPLAY Cntr. S. U. Coil	B-25-925	M-32	56 36-1	White-Brown Yellow-Brown	Energized thru Winner Circuit during 3-4-5 in Line.
BLUE REPLAY Cntr. R. S. Coil	C-28-1100	J-33	70 85 J	Orange Black-White	Energized thru Shutter Cam #3 Sw.
A. N. C. Open @ "O"	ASW-U2	J-32	85-5 85 J	Black-White Black-White	Opens Circuit to Replay Counter Reset Coil.
B. N. C. Open @ 96	ASW-U1	N-32	10-2 91	Red Grey-Red	Opens Circuit to Replay Counter S. U. through Search Disc.
REPLAY REG. Step-Up Coil	A-26-1100	J-13	70 80-19	Orange Black	Energized thru winner circuit during 3-4-5 in Line.
REPLAY REG. Reset Coil	A-27-1100	A-10	70 45-9	Orange Green-White	Energized thru Shutter Cam #3 Sw.
A. T.	ASW-R3-3	F-12	56-2 48-2 27-9	White-Brown Green-Black Blue-Orange	Transfers feed from Coin Sw. to Front Door Replay Button.
B. N. C.	ASW-R2-5	D-12	10-5 63-2	Red Brown-Yellow	Completes Circuit to Replay Reset Relay.

COIN COUNTER DISC

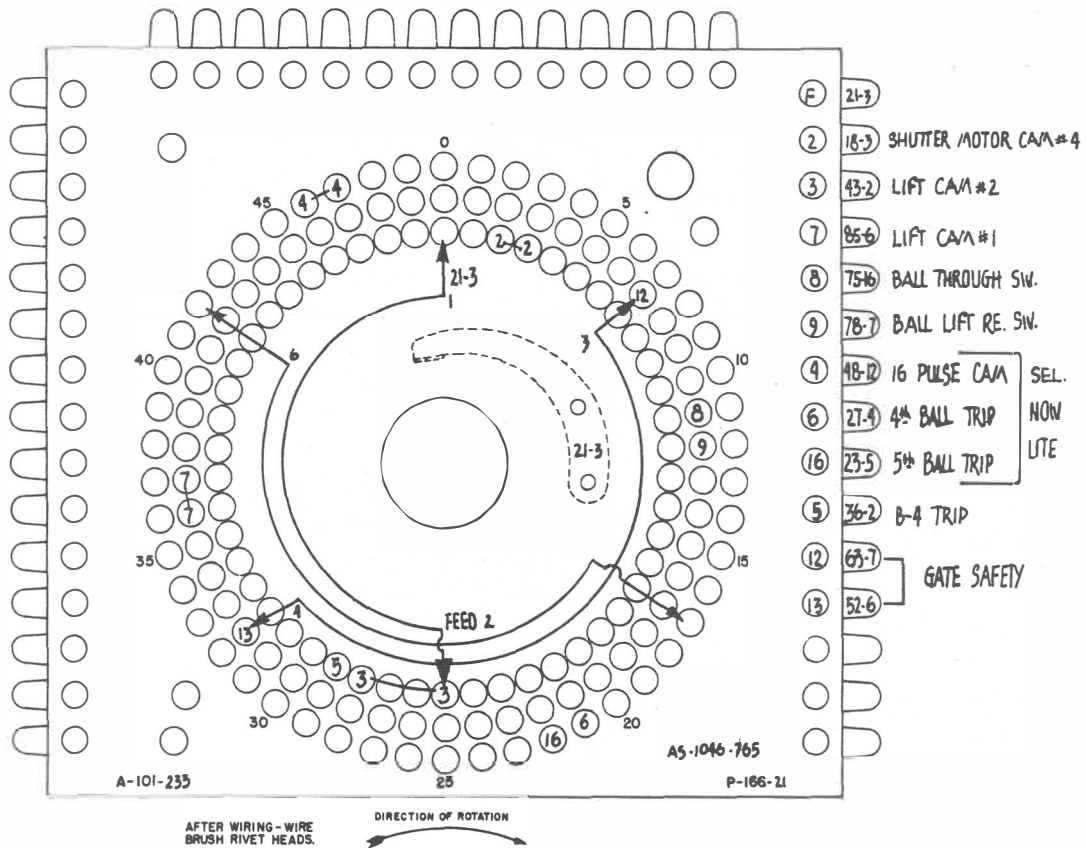
Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
COIN COUNTER Step-Up Coil	B-25-925	A-5	70 57-4	Orange White-Orange	Energized through C. U. Cam #5 Sw. Sw. during coining of game.
COIN COUNTER Reset Coil	C-28-1100	C-33	70 78-3	Orange Orange-Black	Energized thru Shutter Cam #6 Sw.
A. N. O. Closed @ Top	ASW-U1-8	G-33	52-13 83-4	White-Blue Black-Yellow	Completes circuit to 16 Pulse Cam Sw. which flashed coin lite.
B. N. C. Open @ Top	ASW-U2-6	C-12	51-8 61-8	White-Red Brown-Red	Opens Circuit to Start Re.
C. N. C. Open @ Top	ASW-U2-5	C-15	91-13 98-6	Grey-Red Grey-Black	Opens Circuit to Coin Lockout.



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TIMER DISC

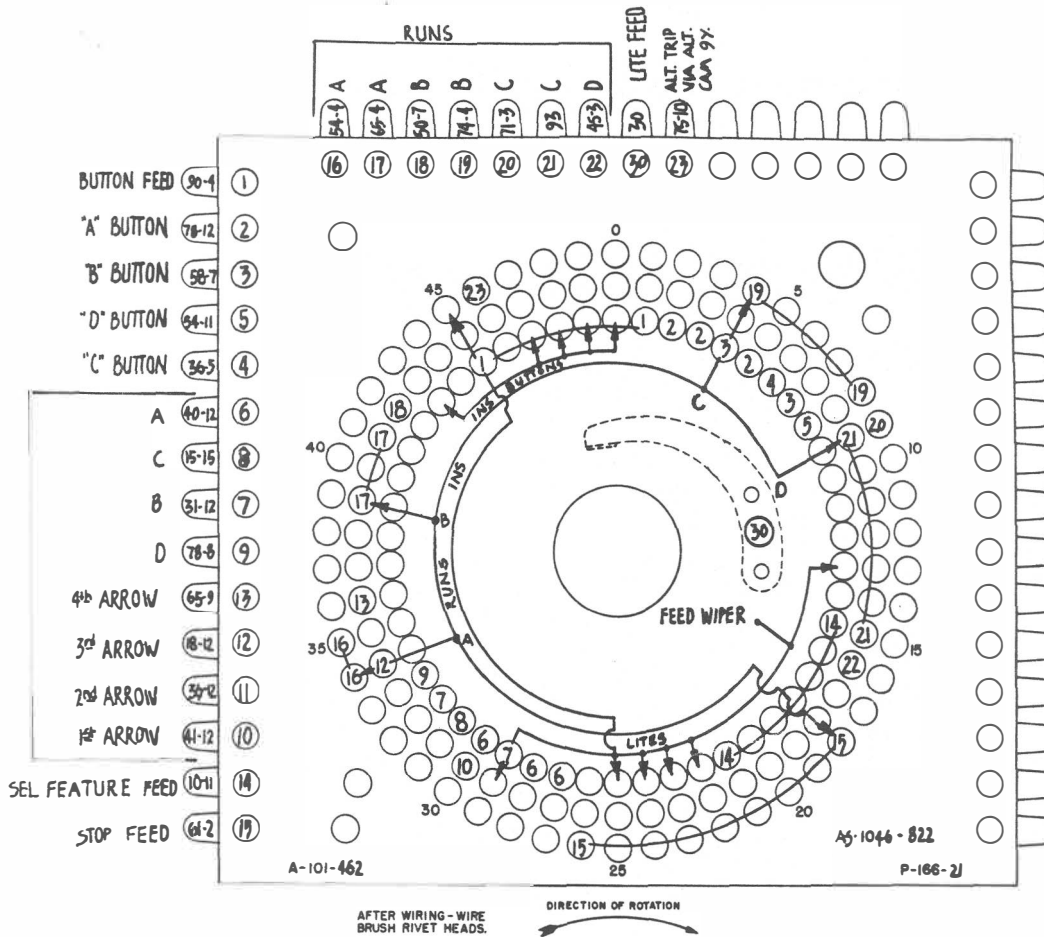
Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
TIMER Step-Up Coil	B-25-925	A-23	70 36 J	Orange Yellow-Brown	Energized thru Timer Disc Count Circuit for first 5 steps, then thru 1 Pulse Cam Sw. for remaining steps.
TIMER Reset Coil	C-28-1100	A-26	70 71 J	Orange Orange-Red	Energized thru Shutter Cam #6 Sw. and "R" Button.
A. N. C. Open at "O"	ASW-U2-5	B-26	71 J 71-8	Orange-Red Orange-Red	Opens Circuit to Timer Reset Coil.
B. N. C. Open at "O"	ASW-U2-2	E-27	90-9 30	Grey Yellow	Opens Circuit to Lifter Start Re.
C. N. C. Open @ Top	ASW-U2-6	E-3	81-16 60-16	Black-Red Brown	Opens circuit to Control Unit and Program Unit Motors.
D. N. C. Open @ Top	ASW-U2-4	B-23	36-9 36 J	Yellow-Brown Yellow-Brown	Opens circuit to Timer Step-Up.
Open At "O" N. C.	ASW-U2	C-29	38-3 91-1	Yellow-Black Grey-Red	Opens circuit to Ball Lifter Motor.



ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

MAGIC SQUARES STEPPER

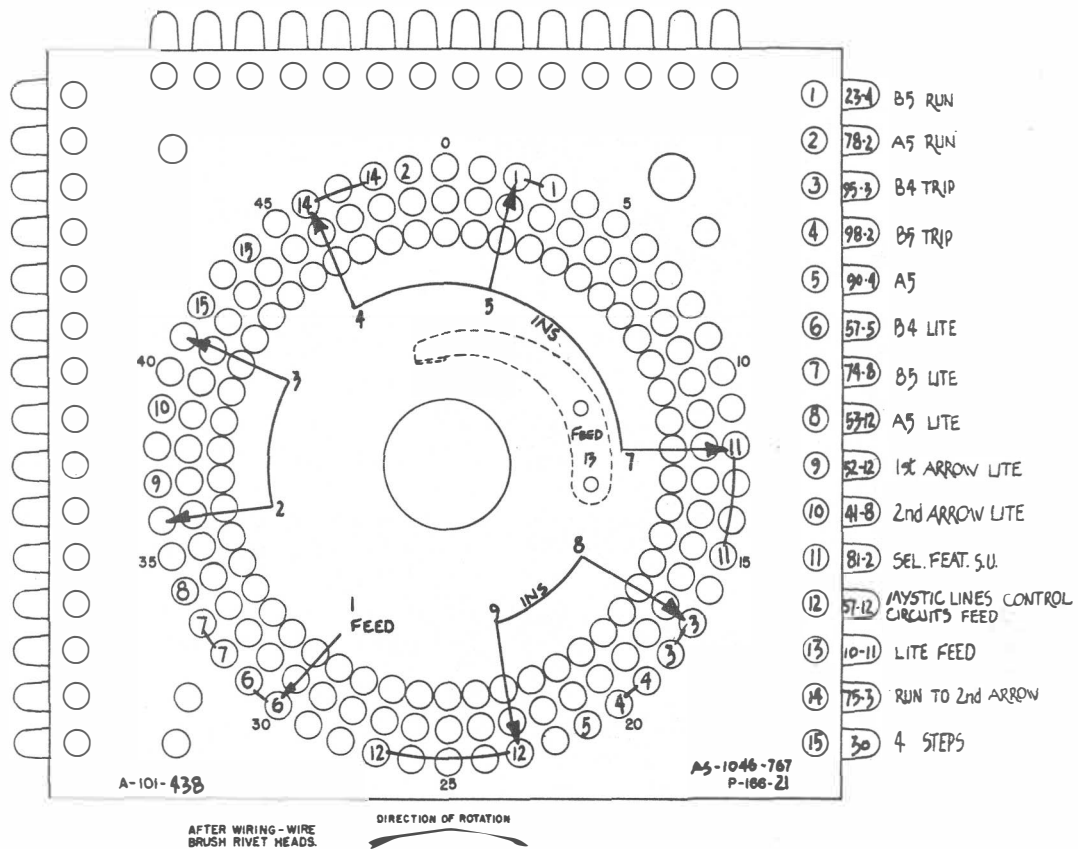
Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
MAGIC SQ. Step-Up Coil	B-25-925	J-45	70 58-2	Orange White-Black	Energized thru Program Disc Control Circuit during coining of game.
MAGIC SQ. Reset Coil	C-28-1100	B-33	70 85-5	Orange Black-White	Energized thru Shutter Cam #3 Sw.
A. T.	ASW-U3	N-49	14-1 50-3 53-2	Red-Green White White-Yellow	Transfers feed from #2 Reflex Re. Sw. to Cam #6 Re. Sw.



ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

SELECTION FEATURE DISC

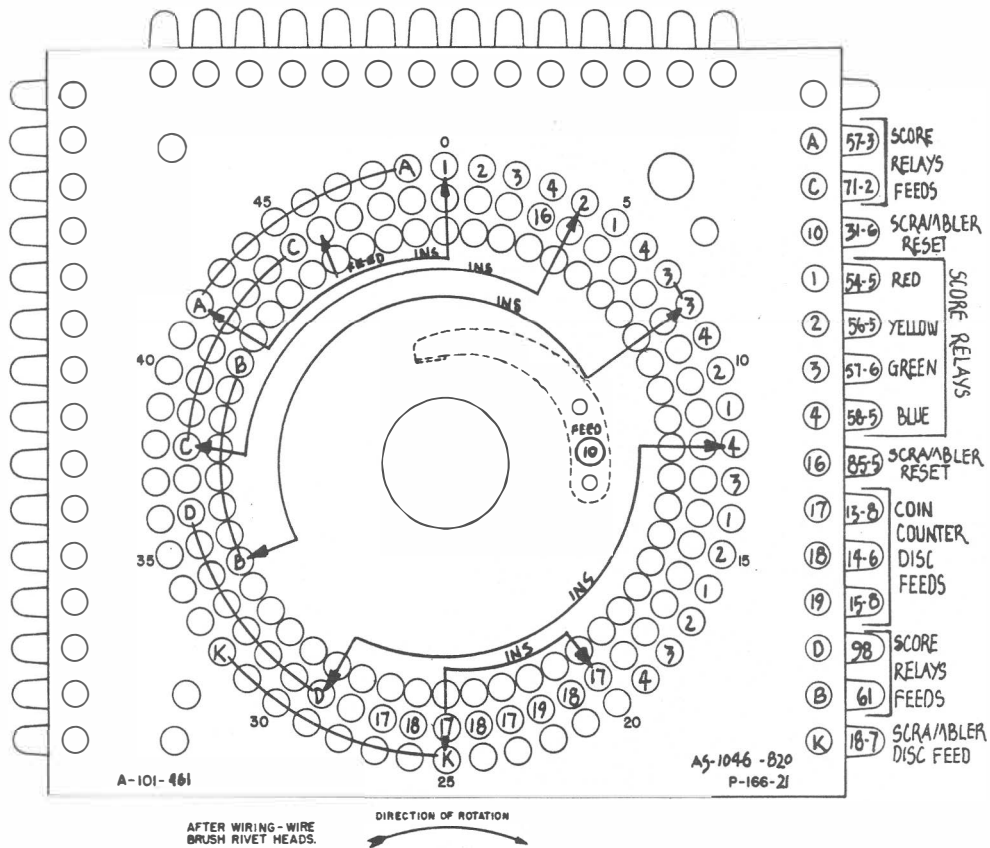
Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
SELECTION Step-Up Coil	B-25-925	J-42	70	Orange	Energized thru Program Disc Control Circuit.
SELECTION Reset Coil.	C-28-1100	B-33	70	Orange	Energized thru Shutter Cam #3 Sw.
			85-5	Black-White	



ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

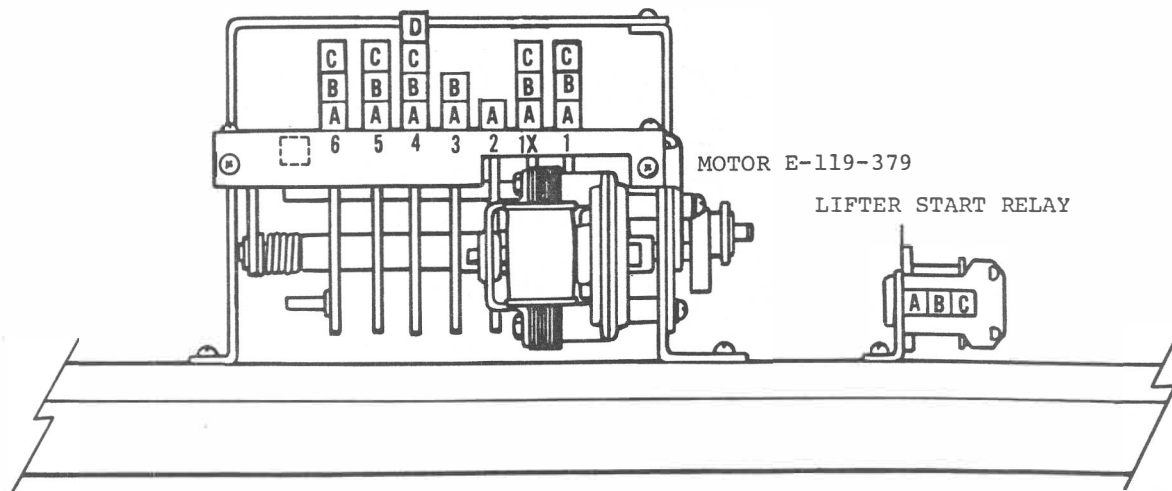
SCRAMBLER DISC

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
SCRAMBLER Step-Up Coil	B-25-925	A-34	70 78-3	Orange Orange-Black	Energized thru Shutter Cam #6 Sw.
SCRAMBLER Reset Coil	C-28-1100	A-35	70 31-6	Orange Yellow-Red	Energized thru Shutter Cam #3 Sw. when Scrambler Unit stepped to top.
A. N.O. Closed @ "O"	ASW-U1	B-35	31-6 85-5	Yellow-Red Black-White	Completes Circuit from Shutter Cam #3 Sw. to Scrambler reset coil.



ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

PANEL SHUTTER MOTOR UNIT PANEL LIFTER START RELAY



Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
SHUTTER Motor	E-119-379	A-17	70 53-5	Orange White-Yellow	Energized thru start re. circuit or anti-cheat circuit.
CAM #1 A. N. O.	ASW-C1-27	F-17	53-5 30	White-Yellow Yellow	(Carry Over) completes circuit to shutter motor.
Cam #1 B. N. C.	ASW-C2-15	B-16	61-7 48-13	Brown-Red Green-Black	Opens circuit to timer cams index, while shutter is opening or closing.
Cam #1 C. N. C.	ASW-C2-2	R-36	45-13 21-3	Green-White Blue-Red	Opens circuit to program control circuit while shutter is opening or closing.
CAM #1X A. N. O.	ASW-C1-27	F-33	30 52-13	Yellow White-Blue	Completes coin lite circuit, when shutter is open.
Cam #1X B. N. C.	ASW-C2-15	E-25	50-5 21-3	White Blue-Red	When shutter is closed, completes after 5th ball timer step-up circuit, also enables timer to reset thru "R" Button.
Cam #1X C. N. C.	ASW-C2-2	K-15 Q-35	90 21-3	Grey Blue-Red	When shutter is open, sw. opens winner circuit.
Cam #2 A. N. O.	ASW-C1-27	E-29	36-3 31-3	Yellow-Brown Yellow-Red	When shutter is open, completes circuit to Ball Lift Motor.
Cam #3 A. N. O.	ASW-C1-27	C-32	85-5 30	Black-White Yellow	When Shutter opens, completes path to Unit Reset Coils.
Cam #3 B. N. O.	ASW-C1-28	C-6	90-10 30	Grey Yellow	When Shutter opens, pulses trip bank reset motor.
CAM #4 A. N. O.	ASW-C1-27	Q-8	10-15 21-3	Red Blue-Red	When shutter closes, completes circuit to Magic Sq. control Circuit; & Search Lock Circuit to be used after 4th Ball is shot.
Cam #4 B. N. O.	ASW-C1-28	Q-4	15-11 21-3	Red-White Blue-Red	When shutter is closed completes timer circuit to B-4 & B-5 trips.
Cam #4 C. N. C.	ASW-C2-15	E-18	18-3 45-8	Red-Black Green-White	When shutter is open, completes circuit to shutter motor. Will close shutter if game is tilted.
Cam #4 D. N. C.	ASW-C2-2	D-18	18-3 53-5	Red-Black White-Yellow	When shutter is open, completes circuit to run shutter motor thru timer disc.

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

SHUTTER MOTOR & SWITCHES

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
CAM #5 A. T.	ASW-C3-8	B-16	53-5 10-10 48-13	White-Yellow Red Green-Black'	When Shutter is closed, completes start re. circuit to shutter motor, when shutter is open, completes start re. circuit to timer cams Index Coil
Cam #5 B. N. C.	ASW-C2-15	D-27	31-4 90-9	Yellow-Red Grey	When shutter is open, completes lock-in circuit to lifter start re.
Cam #5 C. N. C.	ASW-C2-2	L-21	80-11 38-9	Black Yellow-Black	When shutter is open, completes homing circuit to corner replay counter step up.
CAM #6 A. N. O.	ASW-C10-5	E-26	74-11 30	Orange-Green Yellow	When shutter opens, pulses timer reset coil.
Cam #6 B. N. O.	ASW-C10-1	C-32	78-3 30	Orange-Black Yellow	When shutter opens, pulses Red, Yellow Blue score unit resets also pulses coin counter reset and scrambler step up.
Cam #6 C. N. O.	ASW-C10-1	C-5	90-10 30	Grey Yellow	When shutter opens, pulses trip bank reset motor.
BALL LIFT Motor	E-119-339	A-29	70 38-3	Orange Yellow-Black	Energized thru Lifter start re. sw. & ball lift re. sw. if 4th ball isn't raised or timer has stepped at least once.
Cam #1 A. N. O.	ASW-C1X	C-29	91-1 30	Grey-Red Yellow	Completed ball lifter motor carryover circuit.
Cam #1 B. N. C.	ASW-C2-15	O-4	85-6 65-13	Black-White Brown-White	Opens Circuit to B-4 and B-5 Trip Relays during ball lift cycle.
Cam #1 C. N. C.	ASW-C2-2	C-25	74-11 98-9	Orange-Green Grey-Black	Opens Timer Reset Circuit during Ball Lift Cycle.
Cam #2 A. N. O.	ASW-C1X	D-23	27-2 43-2	Blue-Orange Green-Yellow	Completes Timer Unit Step-Up Circuit (1st thru 5th Step).
SHUTTER SWS. A. N. C.	ASW-C1-29	D-14	91-13 98-6	Grey-Red Grey-Black	Completes Circuit to Coin Lockout Coil when Shutter is Closed.
Shutter Sws. B. N. C.	ASW-C1-29	C-13	51-8 61-8	White-Red Brown-Red	When Shutter is closed, completes circuit to start re. coil ready for coining pulse.
Shutter Sws. C. C. W. O.	ASW-C111-3	O-10 O-11 O-10 O-11 O-10 O-11	21-3 27-15 83-11 57-14 40-13 58-3	Blue-Red Blue-Orange Black-Yellow White-Orange Green White-Black	When shutter is open completes circuit to Magic Sq. Index "E" coil until "E" is homed. Same as above for "B" Same as above for "C" Same as above for "D" Same as above for "E"
BALL GATE N. C.	ASW-A2-71	D-27	36 31-4	Yellow-Brown Yellow-Red	Opens Circuit to Lifter Start Re.
BALL RUNWAY N. O.	ASW-A1-30	D-28	38-8 30	Yellow-Black Yellow	Completes Lifter start re. Sw.
LIFTER START Re. A. N. O.	G-32-2500 ASW-R1-8	A-27 C-27	70 38 J 36 38-8	Orange Yellow-Black Yellow-Brown Yellow-Black	Energized thru ball runway sw. Completes lifter start re. Lock in Circuit.
B. N. C.	ASW-R2-5	P-4	65-13 15-11	Brown-White Red-White	Opens Circuit to B-4 & B-5 Trip Re.
C. N. C.	ASW-R2-5	E-29	31-3 21-3	Yellow-Red Blue-Red	Opens Circuit to Ball Lifter Motor.

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

FRONT CABINET SWITCH ASSEMBLIES & COIL CHART

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
BALL TROUGH Sw. #1 N. C.	ASW-A2-62	N-4	83-6 75-16	Black-Yellow Orange-White	Completes Circuit to B-4 Trip
BALL TROUGH Sw. #5 N. O.	ASW-A1-20	C-30	38-3 91-1	Yellow-Black Grey-Red	Completes Circuit to Ball Lifter Motor.
BALL LIFTER Sw. N. O.	ASW-A1-7	E-20	81-3 21-3	Black-Red Blue-Red	Completes circuit to ball lifter sw.
MANUAL LIFT Button A. N. O.	ASW-A2-9	D-29	91-1 36-3	Grey-Red Yellow-Brown	Completes Circuit to Ball Lifter Motor.
B. N. C.	ASW-A1-26	D-28	31-4 30	Yellow-Red Yellow	Opens Lifter start re. Lock-in Circuit.
TOGGLE SW. N. O.	E-108-57	E-1	10-16 83-16	Red Black-Yellow	Completes 117V Circuit
"R" BUTTON A. N. O.	ASW-A11-4	N-7	23-17 53-18	Blue-Yellow White-Yellow	Completes circuit to Search Lock Magnet after 4th ball is shot.
"R" Button B. N. O.	ASW-A11-4	D-25	98-9 85-8	Grey-Black Black-White	Completes Timer reset circuit after 5th ball is shot.
"A" Button D. N. O.	ASW-A1-24	N-8	78-12 13-5	Orange-Black Red-Yellow	Completes "A" Index Coil Circuit thru Magic Sq. Control Circuit.
"B" Button D. N. O.	ASW-A1-24	N-8	58-7 48-5	White-Black Green-Black	Completes "B" Index Coil Circuit. thru Magic Sq. Control Circuit.
"C" Button D. N. O.	ASW-A1-24	N-8	81-7 36-5	Black-Red Yellow-Brown	Completes "C" Index Coil Circuit thru Magic Sq. control circuit.
"D" Button D. N. O.	ASW-A1-24	N-9	54-11 31-19	White-Green Yellow-Red	Completes "D" Index Coil Circuit thru Magic Squares Control Circuit.
"E" Button D. N. O.	ASW-A1-24	N-9	52-9 45-5	White-Blue Green-White	Completes "E" Index Coil Circuit thru Magic Squares Control Circuit.
COIN LOCK-Out Mag.	M-37-2700	A-15	70 91-13	Orange Grey-Red	Energized thru Coin Counter Sw. & Shutter Sw. when Shutter is closed.
COIN SW. T.	AS-277-105	E-13	27-19 13-9 95	Blue-Orange Red-Yellow Grey-White	Completes start re. circuit and Anti-Cheat tilt circuit.
PLAY BUTTON Sw. N. O.	ASW-A1-37	D-7	63-2 50-2	Brown-Yellow White	Completes start re. circuit if replay Reg. is stepped at least once.
FRONT DOOR Sw. N. C.	ASW-A1-15	J-17	70 40-7	Orange Green	Completes Meter Circuits.
BACK DOOR Sw. N. C.	ASW-A1-16	K-17	40-7 98-4	Green Grey-Black	Completes Meter Circuits.
GONG	CB-30-2000	J-60	70 48-7	Orange Green-Black	Energized thru Program Control Circuit.
TOTAL REPLAY Meter	E-130-10	H-8	41-4 93-7	Green-Red Grey-Yellow	Energized thru C. U. Cam Sw. #13.
TOTAL PLAY Meter	E-130-10	H-8	80-9 91-7	Black Grey-Red	Energized thru C. U. Cam #7 Sw.
COIN METER	E-130-10	A-9	70 80-2	Orange Black	Energized thru C. U. Cam #4 Sw.
KEY METER	E-130-10	J-15	70 63-10	Orange Brown-Yellow	Energized thru Key Sws.
FRONT DOOR Lite Sw. N. O.	ASW-M2-6	F-47	30 93-6	Yellow Grey-Yellow	Completes Meter illumination lite circuit.
KEY SWS. A. N. O.	ASW-B1	A-12	98-10 13-12	Grey-Black Red-Yellow	Opens Start re. circuit.
Key Sws. B. N. C.	ASW-B2	J-14	63-10 80-19	Brown-Yellow Black	Completes Circuit Key Meter Circuit.
Key Sws. C. N. C.	ASW-B2	F-5	78-4 30	Orange-Black Yellow	Completes Anti-Cheat re. circuit.
Key Sws. D. N. C.	ASW-B2	D-19	14-5 21-3	Red-Green Blue-Red	Completes Tilt re. circuit
Key Sws. E. N. C.	ASW-B2	L-15	93-3 50-11	Grey-Yellow White	Completes Path to Replay Reg. Step-Up and Key Meter.

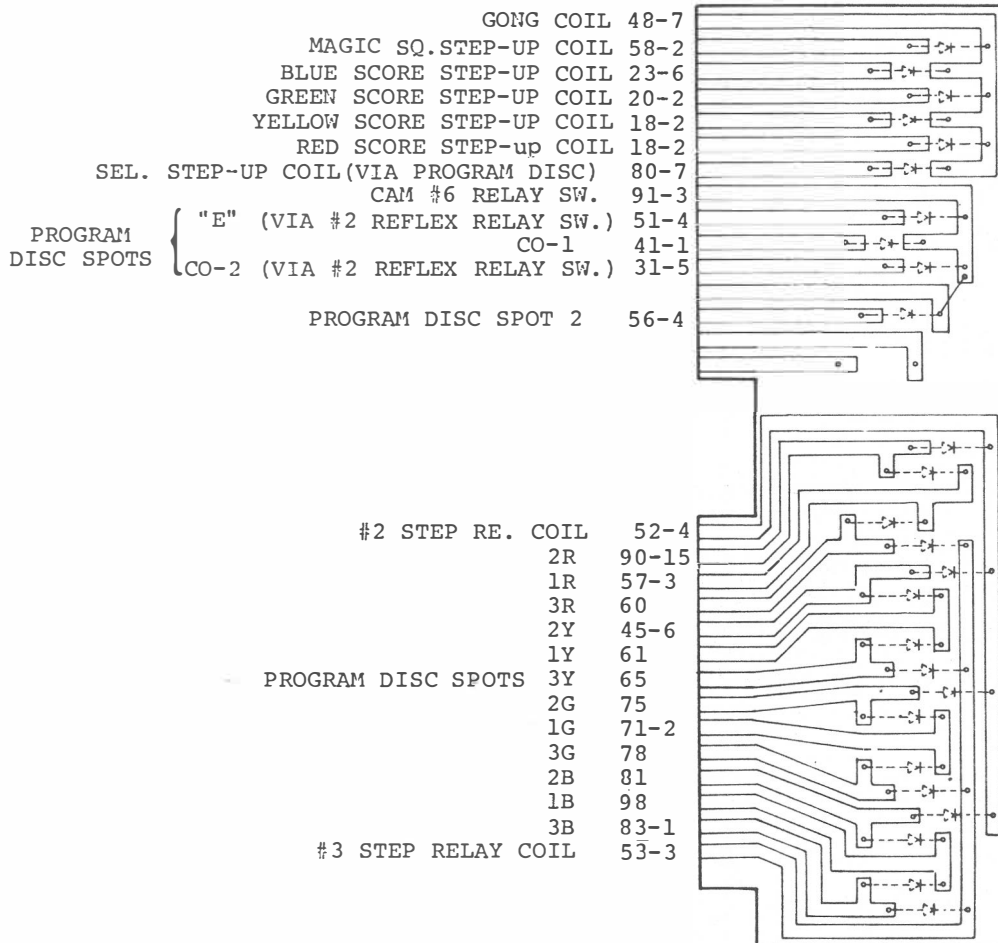
ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

SWITCH ASSEMBLIES & COIL CHART

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
REFLEX Play Mag.	EA-32-1550	A-9	70 80-9	Orange Black	Steps Reflex everytime game is coined
REFLEX Replay Mag.	EA-30-1150	J-16	70 41-4	Orange Green-Red	Steps Reflex Unit everytime C. U. Cam #13 Sw. pulses replay register.
WATCH SW. T.	ASW-C3-6	K-13	75-9 80-19 93-3	Orange-White Black Grey-Yellow	End of Stroke on Key Sw. transfers Replay Reg. feed from C. U. Cam #13 Sw. to 30.
TRANSFORMER E-122-103		E-3 F-49	78-6 51 30 21-5 30	Orange-Black White-Red Yellow Blue-Red Yellow	
DC MOTOR Relay	G-38-8000	J-6	70 25-6J	Orange Blue-White	Delay re. controlling magic sq. unit motor energized by "ABCDE" select button sws. or shutter sws.
A. N. O.	ASW-R1X-1	E-3	60-16	Brown	Completes circuit to Magic Sq. Unit Motor.
B. N. O.	ASW-R1X-1	E-3	21-16	Blue-Red	

DIODE MOUNTING BOARD

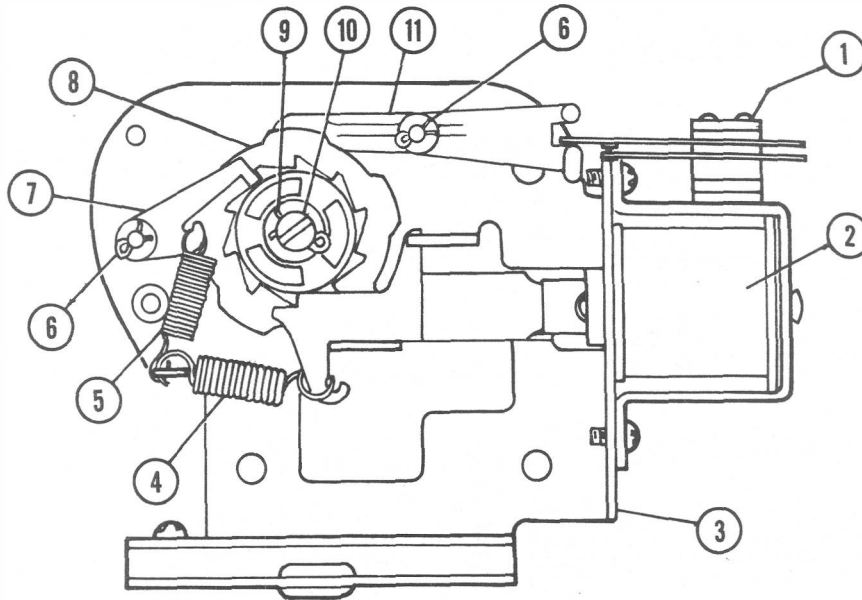
REPLACEMENT DIODE IN4007 1 AMP



ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

ALTERNATOR UNIT

NOTE: ALTERNATOR UNIT USED ON EXPORT GAMES.

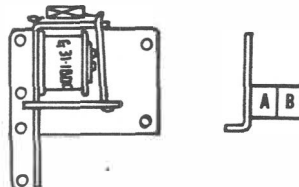


ALTERNATOR PARTS LIST

Description	Part No.
1 Switch	ASW-M100-1
2 Coil	CT-28-1100
3 Base Plate	A-2214-30
4 Extension Spring	SP-100-80
5 Extension Spring	SP-100-276
6 Hair Pin	M-254
7 Holding Pawl	C-708
8 Ratchet - 10 Tooth - 5 Lobes	C-704-2
9 Hair Pin	M-254
10 Pin	S-2028
11 Rocker Arm	C-703-1

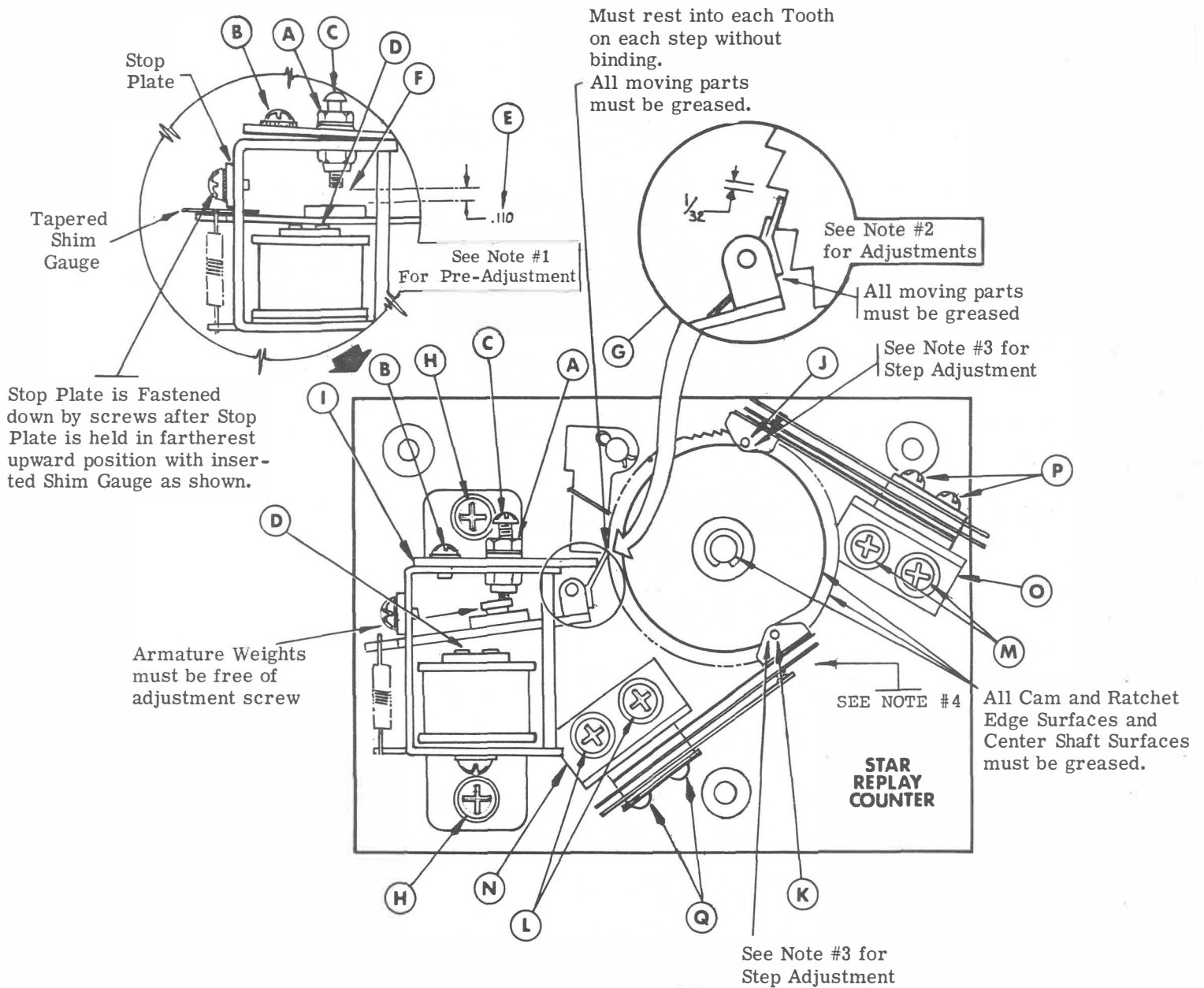
Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
ALT. UNIT Belgium	CD-29-1600	A-22	70 13-50	Orange Red-Yellow	Energized thru Alt. Re. Sw.
A. N.C.	ASW-M100-1	E-14	60-50 25-30	Brown Blue-White	Open Start Re. Coil Circuit

ALT. RELAY Belgium	G-31-1800	A-13	70 95-50	Orange Grey-White	Energized thru Coin Sw. Circuit
A. N.O.	ASW-R1-3	F-14	27-9 60-50	Blue-Orange Brown	Completes Start Re. Coil Circuit
B. N.O.	ASW-R1-3	E-22	13-50 30	Red-Yellow Yellow	Completes Alt. Unit Coil Circuit.



ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

CORNER REPLAY COUNTER ADJUSTMENTS



Note #1: Magnet Assembly Pre-Adjustment

- (1) Loosed Lock Nut (A)
 - (2) Loosen Lock Screw (B)
 - (3) Loosen Adjustment Screw (C)
 - (4) While holding the Armature Assy. down to the Coil (D), place the .110 Gauge (E) between the Adjustment Screw (C), and the Armature Assy. as shown at (F) (Screw must clear weights).
 - (5) Tighten down the Screw (C) until the Gauge (E) cannot be removed (do not force).
 - (6) Loosen the Screw (C) slowly until the Gauge (E) may be removed (F) with the feel of rubbing of both the Armature and the Adjustment Screw (C) when removed
 - (7) Tighten Lock Nut (A)
 - (8) Remove the Gauge (E) and recheck the adjustments
- Note: Adjustments may be altered slightly for the Adjustment of the Pawl into the Teeth of the Ratchet (G)

CONTINUED

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

CORNER REPLAY COUNTER

Note #2: Magnet Assembly Adjustment

- (1) Loosen both Screws (M)
- (2) Loosen Lock Nut (A)
- (3) Adjust the Height of the Magnet Assy. so that upon the Stepping of the Pawl into the Tooth of the ratchet, approximately 1/32 spacing will be visible between the Pawl and the Ratchet Tooth as shown for (G). If done properly, approximately 1/64 free play of the Pawl at rest in the Ratchet Tooth will be visible when the Ratchet is moved by hand.
- (4) Tighten the Screws (H)
- (5) Slide the Stop (I) to rest against the Pawl (do not force). The Pawl should rest against the Stop and Ratchet only.
- (6) Tighten Lock Screw (B)
- (7) Tighten Lock Nut (A)
- (8) Step Up the Magnet Assy. electrically and check to see that the Stepping is all the way into each tooth without missing any steps.
- (9) Recheck all adjustments and re-adjust if necessary. Recheck all adjustments play of the Pawl at rest in the Ratchet Tooth will be visible when the ratchet is moved by Hand.

Note #3: Step Adjustment

- (1) Loosen all the Screws at (L) (Q) (M) and (P).
- (2) Pull back the Switch (J) and Switch Bracket (O) all the way away from the Ratchet Assy., and tighten down the Screws (M).
- (3) While holding the Armature down to the Coil (D), spin the Ratchet so that the Switch Roller (J) will be in the Cam Slot, or near as possible to the Cam Slot.
- (4) Move back the Switch (J) or Switch Bracket (O) toward the Ratchet (if need be) so that the Switch Roller (J) will just barely drop into the Cam Slot (but cleanly), and tighten down the Screws (P).
- (5) Adjust the Switch (J) (See Note #4).
- (6) Step the Ratchet 25 Steps.
- (7) Push the Switch (K) and Switch Bracket (N) all the way toward the Ratchet Assy., and tighten down the Screws (L).
- (8) Move the Switch (K) or Switch Bracket (N) (if need be) so that the Switch Roller (K) will just barely (but cleanly) drop into the Cam Slot, and tighten down the Screws (Q).
- (9) Adjust the Switch (K) (See Note #4).
- (10) Re-check all adjustments.

Note #4: Switch Adjustment

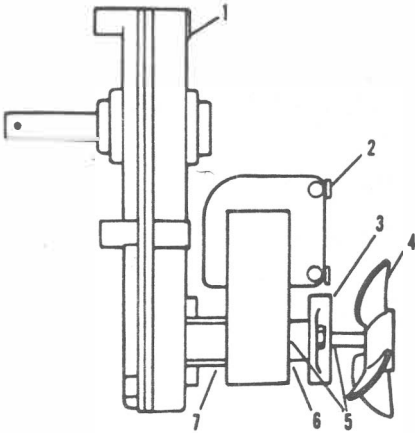
- (1) The lower switch leaf rollers must make at the bottom of the Cam Slot, and on the outer Cam edge without excess bowing of the Switch Leaf, and with the Cam at the Center of the Leaf Rollers.
- (2) The Switch Lifter must ride on the Lower Switch Leaf at all times without excess bowing of the Switch Leaf.
- (3) All All
- (3) All Switches must make on the 3rd or 4th Step from the Starting Point in the Cam Slot.

Switch/Coil	Part No.	Location on Diagram	Wire No.	Wire Color	Function
CORNER REPLAY Cntr. S. U. Coil	EA-30-1150	J-19	70 27-17	Orange Blue-Orange	Energized thru Winner Circuit during Corner Winner.
HOMING CAM Sw. N. O.	ASW-C1-6	L-20	27-17 80-11	Blue-Orange Black	Completes Circuit to 16 Pulse Reset
OPEN @ 25	ASW-C1-6	P-19	15-5 21-8	Red-White Blue-Red	Completes Circuit to Search Disc through CO-1 or CO-2 Trip Sws.

MOTOR PARTS GUIDE

CONTROL UNIT MOTOR E-119-462

Index No.	Part No.	Description	No. Req.
1	GC3-4023-1	Transmission Unit	1
2	ASS-4023-1	Stator Unit	1
3	ABB-1010-00	Bearing & Brkt. Assy.	1
4	S-1011-01	Fan	1
Note: Order Index No.'s 5 - 7 as a unit			
5	AR3-4023-1	Rotor & Shaft Unit	1
6	W-1014-03	Rotor Shaft Washer	1
7	W-1017-25	Rotor Shaft Washer	1
	W-1016-03	Rotor Shaft Washer	1
	W-1016-12	Rotor Shaft Washer	3

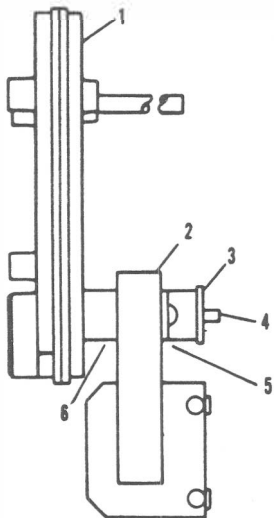


TRIP BANK RELAY MOTOR E-119-464

Index No.	Part No.	Description	No. Req.
1	GC2-2543-1	Transmission Unit	1
2	AS2-2543-1	Stator Unit	1
3	ABB-1010-01	Bearing & Brkt. Assy.	1
Note: Order Index No.'s 4 - 6 as a unit			
4	AR2-2543-1	Rotor & Shaft Unit	1
5	W-1015-03	Rotor Shaft Washer	1
6	W-1014-03	Rotor Shaft Washer	1
	W-1014-09	Rotor Shaft Washer	3

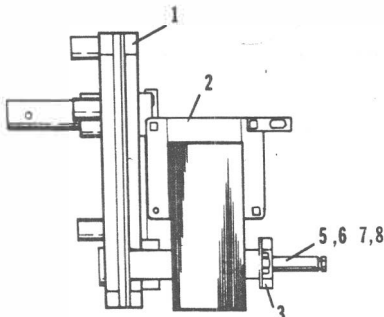
PANEL SHUTTER MOTOR E-119-379

Index No.	Part No.	Description	No. Req.
1	GC2-1725-1	Transmission Unit	1
2	AS2-1725-1	Stator Unit	1
3	ABB-2010-01	Bearing & Brkt. Assy.	1
Note: Order Index No.'s 4 - 6 as a unit			
4	AR2-1725-1	Rotor & Shaft Unit	1
5	W-1015-03	Rotor Shaft Washer	1
6	J-1011-60	Shaft Shim Spring	1



BALL LIFTER MOTOR E-119-339

Index No.	Part No.	Description	No. Req.
1	GC2-1743-1	Transmission Unit	1
2	AS2-1743-1	Stator Unit	1
3	ABB-1010-1	Bearing & Brkt. Assy.	1
Note: Order Index No.'s 4 - 6 as a unit			
4	AR2-1743-1	Rotor & Shaft Unit	1
5	W-1015-03	Rotor Shaft Washer	1
6	J-1011-60	Shaft Shim Spring	1



Index No.	Part No.	Description	No. Req.
1	G2-4049-1	Transmission Unit	1
2	AS2-4049-1	Stator Unit	1
3	ABB-1010-02	Bearing Brkt. Assy.	1
4	F-1010-00	Fan	1
5	AR2-4049-1	Rotor & Shaft Assy.	1
6	W-1014-09	Rotor Shaft Washer	2
7	W-1014-03	Rotor Shaft Washer	1
8	W-1017-20	Rotor Shaft Washer	1

Note: Order No.'s 5 - 8 as a unit

BONANZA PARTS GUIDE

FRONT CABINET ASSY.

Part No.	Description
CA-1119-51	Front Cabinet
M-281-58	Lock (Replay Switch)
AS-982-673	Top Replay Switch
AS-982-671	Bottom Replay Sw.
A-1533	Coin Slide Assy.
AS-186-11	Ball Lifter Assy.
AS-187-17	Ball Shooter Assy.
A-100-7	Knob & Shooter Rod
SP-243	Compression Spring 1"
SP-200-24	Compression Spring 6"
R-108-3	Shooter Tip
P-2891-8	Retaining Ring
E-108-57	Game On-Off Sw.
A-2618	Legs
M-106-1	Leg Bolt (8)
M-163-4	Leg Adjuster
N3-816-1110	Leg Adj. Nut
A-2790-59	Cash Box
P-3089-55	Cash Box Cover
P-921-39	Chrome Glass Molding - Lf.
P-921-40	Chrome Glass Molding - Rt.
G-213	Top Glass
CA-439-28	Ball Return Panel

FRONT DOOR ASSEMBLY

Part No.	Description
AS-2041-82	Front Door Assy. (Complete)
M-281-54	Lock
A-254-117	Hinge Assy.
M-1400-Series	Slug Rejector (Specify Coin Denomination)
AS-2517-14	Coin Lockout Assy. Coin Sw. & Wire Assy.
P-6431-Series	Coin Guide Spacer (Specify Coin Denomination)
P-6694-Series	Coin Guide (Specify Coin Denomination)
A-1729-16	Push Button Assy. (replay)
P-800-2	Washer
P-2891-7	Retaining Ring
ASW-A1-15	Replay Switch
ASW-A1-27	Tilt Switch

BACK DOOR ASSEMBLY

Part No.	Description
CA-120-53	Back Door (Painted)
P-2335-48	Hinge (2)
M-281-24	2 Lock Set
P-758-31	Lock Cam (2)

FRONT MOLDING ASSY.

Part No.	Description
AS-1305-63	Front Molding Assy. (Complete)
P-2210-Coin	Coin Drop Plate
A-1272-23	"A" Button & Pin Assy.
A-1272-24	"B" Button & Pin Assy.
A-1272-25	"C" Button & Pin Assy.
A-1272-26	"D" Button & Pin Assy.
A-1272-27	"E" Button & Pin Assy.
A-1272-29	"R" Button & Pin Assy.
A-2719-4	Coin Slide Assy.
SP-200-111	Button Compression Spring
P-801-214	Washer (Buttons)
P-448-6	Snap Washers (Buttons)

PLAYFIELD PANEL

Part No.	Description
CA-2042-177	Panel Assembly (complete w/all units installed)
CA-638-93	Panel
CA-1100-8	Arch Bottom
CA-1103	Arch Guide Strip
CA-1104-2	Arch Top
CA-529-17	Shutter
C-326-9	Light Shield Post (8) (white)
E-125-2	Light Bulb #47 (8)
M-170	Rebound Coil Spring (8)
SP-112-1	Short Panel Spring (4)
SP-112	Long Panel Spring (8)
S-1071-84	Panel Pins (29)
C-119-21	Red Bumper Post (4)
R-243-2	Red Bumper Rubber (4)
C-119-23	Yellow Bumper Post (30)
R-243	Yellow Bumper Rubber (26)
R-135	Double Bumper Rubber (2)
R-115-30	Rebound Rubber - Top
C-153	Red Plastic Ball Lift Cover

BACK CABINET

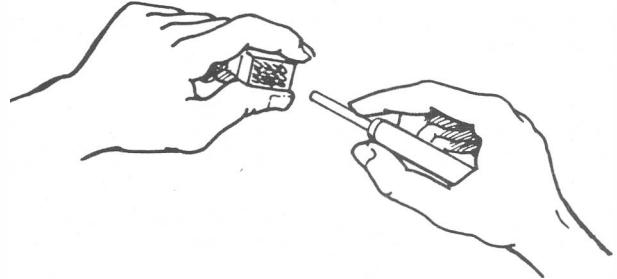
Part No.	Description
G-292-42	Back Glass
CA-1120-52	Back Cabinet (Painted)
M-281-74	Lock (Back Glass)
E-126-63	Cord Set
A-3400-227	Wood Insert & Light Socket Assy.
E-125-5	Light Bulb No. 55 (100)

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS

MAINTENANCE & SERVICE

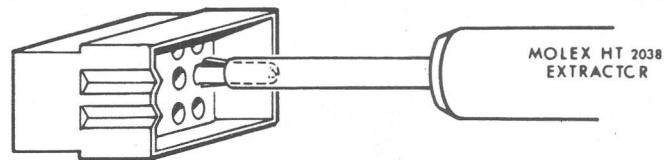
MOLEX HT 2038 EXTRACTOR & PIN

NOTE: The Molex Pin Extractor Tool enables easy service of the Molex Plug, Pins both male and female are removable. Holding Extractor Tool as shown in Illustration, placing Forefinger over shaft as to hold it from turning (as shown), push Shaft over Pin giving Tool a slight twist allowing the Pin Fins to compress easily, thus enabling the Pin to be pushed through Nylon Housing.

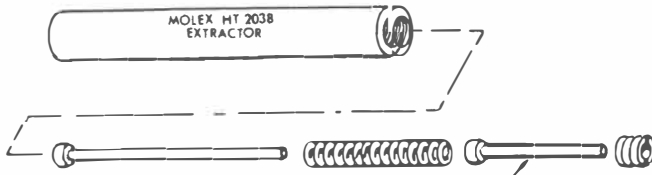
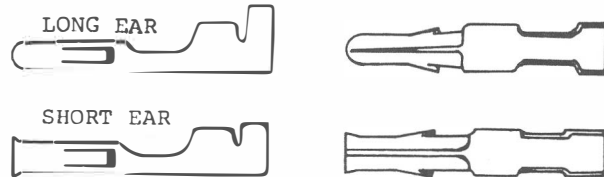


	BALLY NO.	MOLEX NO.	TYPE
FEMALE	E-663-2	02-09-1104	1190
FEMALE	E-663-4	02-09-1119	1381
MALE	E-661-2	02-09-2103	1189
MALE	E-661-4	02-09-2118	1380

TYPE 1189-90 LONG EAR
 TYPE 1380-81 SHORT EAR
 HAND CRIMPING TOOL HT-1031



NOTE: REPLACEMENT ITEMS CAN BE ORDERED THRU BALLY DIST. OR NEAREST MOLEX REP. IN COUNTRY OF USE.



REPLACEMENT PART HT 1010-232

**DEPOSIT COIN
TO START NEW GAME**

TO LIGHT ADDED FEATURES
AND ADVANCE SCORES
DEPOSIT ADDITIONAL COINS

TO PLAY REPLAYS
SIMPLY PRESS RED BUTTON
WITHOUT DEPOSITING COINS

WHEN GAME IS COMPLETED
PRESS R BUTTON

FOR AMUSEMENT ONLY
No Prizes or Gambling Permitted

BONANZA

SHOOT TO LIGHT ADJOINING NUMBERS
CONNECTED BY
RED, YELLOW, GREEN OR BLUE LINES

RED LINE SCORES

5-IN-LINE 80 80 96 96 96 144 192 240 320 384 480 640
 4-IN-LINE 12 16 24 32 36 64 96 128 192 240 320 384
 3-IN-LINE 4 6 8 12 16 24 40 64 96 128 160 192

GREEN LINE SCORES

5-IN-LINE 80 80 96 96 96 144 192 240 320 384 480 640
 4-IN-LINE 12 16 24 32 36 64 96 128 192 240 320 384
 3-IN-LINE 4 6 8 12 16 24 40 64 96 128 160 192

YELLOW LINE SCORES

5-IN-LINE 80 80 96 96 96 144 192 240 320 384 480 640
 4-IN-LINE 12 16 24 32 36 64 96 128 192 240 320 384
 3-IN-LINE 4 6 8 12 16 24 40 64 96 128 160 192

BLUE LINE SCORES

5-IN-LINE 80 80 96 96 96 144 192 240 320 384 480 640
 4-IN-LINE 12 16 24 32 36 64 96 128 192 240 320 384
 3-IN-LINE 4 6 8 12 16 24 40 64 96 128 160 192

ONLY HIGHEST SCORE PER COLOR SCORES

BONANZA

ALWAYS GIVE MODEL AND PART NO. WHEN ORDERING SERVICE PARTS