

16-574-103
December 1989

Whirlwind™

Operator's Handbook

presenting:

**Game Audits
Game Adjustments
Game Switches & Locations
Game Lamps & locations
Solenoids/Flashers & Locations
Playfield Parts**

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Game Audit Table

Whirlwind Audit Table

Audit Item (Lower)	Descriptive Phrase (Upper Display)	Audit Item Value (Lower Display)
AU 01	LEFT COINS (chute next to coin door hinge)	432
02	CENTER COINS	0
03	RIGHT COINS	398
04	PAID CREDITS	830
05	TOTAL PLAYS	
06	TOTAL FREE (Total Free Plays)	
07	PERCENT FREE (% Free Plays)	
08	REPLAY AWARDS	
09	PERCENT REPLAY (% Replay Awards)	
10	SPECIAL AWARDS	
11	PERCENT SPECIAL (% Special Awards)	
12	MATCH AWARDS	
13	HSTD (High Score to Date) CREDITS	
14	PERCENT HSTD (% HSTD Credits)	
15	EXTRA BALLS	
16	PERCENT EX. BALL (% Extra Balls)	
17	AV. BALL TIME (Average Time in Seconds)	
18	MINUTES OF PLAY (Minutes of Play)	
19	BALLS PLAYED	
20	REPLAY1 AWARDS	
21	REPLAY2 AWARDS	
22	REPLAY3 AWARDS	
23	REPLAY4 AWARDS	
24	1 PLAYER GAMES	
25	2 PLAYER GAMES	
26	3 PLAYER GAMES	
27	4 PLAYER GAMES	
28	BURN IN CYCLES	
29	MILLION PLUS'S (# of times for Million Plus)	
30	1 MILLION SHOT (# of '1 Million' Shots)	
31	ALL MULTIBALLS (# of times for Multi-Ball)	
32	QUICK MULTIBALLS (# of 'Quick Multi-Ball' plays)	
33	CELLAR MULTIBALL (# of 'Cellar Multi-Ball' plays)	
34	1st EX. BALL LIT (# of times '1st Extra Ball' lamp was lit)	
35	2nd EX. BALL LIT (# of times '2nd Extra Ball' lamp was lit)	
36	CELLAR E. BALL LIT (# of times 'Cellar Extra Ball' lamp was lit)	
37	CELLAR SPEC. AWD. (# of SPECIALS via Cellar)	
38	SUPER CELLAR AWD. (# of 'Super Cellar' awards)	
39	H.S. RESET COUNTER	
40	0.0-0.4 MIL. SCORE (# of games <500K)	
41	0.5-0.9 MIL. SCORE (# of games ≥500K, <1M)	
42	1.0-1.4 MIL. SCORE (# of games ≥1M, <1.5M)	
43	1.5-1.9 MIL. SCORE (# of games ≥1.5M, <2.0M)	
44	2.0-2.9 MIL. SCORE (# of games ≥2.0M, <3.0M)	
45	3.0-3.9 MIL. SCORE (# of games ≥3.0M, <4.0M)	
46	4.0-4.9 MIL. SCORE (# of games ≥4.0M, <5.0M)	
47	5.0-5.9 MIL. SCORE (# of games ≥5.0M, <6.0M)	
48	6.0-7.9 MIL. SCORE (# of games ≥6.0M, <8.0M)	
49	8.0-9.9 MIL. SCORE (# of games ≥8.0M, <10.0M)	
50	10M - 99.9MIL. SCORE (# of games ≥10M, <99.9M)	
51	AV. MIN. GAME TIME (Average Game in Minutes)	
52	LEFT DRAINS	
53	RIGHT DRAINS	
54	MINUTES ON	

NOTE: 1. The numbers shown in this column for items 1 through 4 are examples. Entries for all items depend on the amount of play; thus, they will vary from location to location.

Game Adjustment Table

Whirlwind Game Adjustment Table

Adjustment Item (Lower)	Descriptive Phrase (Upper Display)	Factory Setting 6 (Lower)		
		Domestic (US/Can.)	French	W. Ger./European
Ad 01	AUTO REPLAY ¹ or FIXED REPLAY ¹	10 (%)		
02	REPLAY START (or REPLAY LEVEL 1) ¹	SCORES 6,000,000		8,000,000
03	REPLAY LEVELS (or REPLAY LEVEL 2) ¹	01 (or OFF)		02
04	(REPLAY LEVEL 3) ¹	(see text)		
05	(REPLAY LEVEL 4) ¹	(see text)		
06	REPLAY AWARD	Credit		
07	SPECIAL AWARD	Credit		
08	MATCH FEATURE	10 %	8%	7%
09	BALLS / GAME	03		
10	TILT WARNING	03	01	
11	MAXIMUM EX. BALL	08	03	
12	MAXIMUM CREDITS	10	20	30
13	HIGHEST SCORES	On		
14	BACKUP HI. SCR.1	8,000,000		8,000,000
15	BACKUP HI. SCR. 2	5,500,000		7,500,000
16	BACKUP HI. SCR. 3	5,000,000		7,000,000
17	BACKUP HI. SCR. 4	4,500,000		6,500,000
18	HI. SCR.1 CREDITS	01		01
19	HI. SCR.2 CREDITS	01		00
20	HI. SCR.3 CREDITS	01		00
21	HI. SCR.4 CREDITS	01		00
22	H. S. RESET EVERY	3,000		1000
23	FREE PLAY	NO		
24	U.S.A. 2 COINAGE (4 COINS 3 PLAYS) ^{2,3,4}	USA 2	French 1	German 2
25	LEFT UNITS	01	02	08
26	CENTER UNITS	04	10	12
27	RIGHT UNITS	01	20	30
28	UNITS/ CREDIT	01	05	05
29	UNITS/ BONUS	00	20	00
30	MINIMUM UNITS	00	00	00
31 - 58	Game-specific Play / Coinage Adjustments (detailed in text, the Game-specific Adjustments Setting Table and the Difficulty Setting Comparison Table)			
59 ⁵	INSTALL ADDABALL	NO		
60 ⁵	INSTALL 5-BALL	NO		
61 ⁵	INSTALL NOVELTY	NO		
62 ⁵	INSTALL EX. EASY	NO		
63 ⁵	INSTALL EASY	NO		
64 ⁵	INSTALL MEDIUM	NO		
65 ⁵	INSTALL HARD	NO		
66 ⁵	INSTALL EX. HARD	NO		
67	AUTO BURN-IN	NO		
68	CLEAR COINS	NO		
69	CLEAR AUDITS	NO		
70	INSTALL FACTORY	NO		

NOTES:

1. **Automatic Replay** percentage value range is adjustable from 5 to 20%, via the Credit Button. Item 02 permits changing the factory setting value for Replay Start Level (valid for next 30 games played). Item 03 permits setting up to four replay levels, with values as detailed in text describing item 03. For **Fixed Replay Scores**, set Auto Replay value to 1 less than 5(%) via the Credit Button. Go to items 02, 03, 04, and 05; install their replay level scores. Turn off any replay level by setting 00 as its value.
2. Phrase in parentheses is **Factory Setting**. Phrase appears in player displays. Press Credit Button to change setting of the game pricing of item 24.
3. To change country OR coinage setting, press Credit button to obtain 04 Standard Settings, followed by a Custom Setting. The Custom Setting activates items 25 through 30. When a Standard Setting is used, items 25 through 30 are set automatically, and cannot be changed.
4. Refer to Pricing Table and text describing these items.
5. Special Preset Adjustment, whose effects are noted in the Game Adjustment text.
6. Entries in Factory Setting columns for French and W. German games show only differences from entries in first (US / Can.) column.

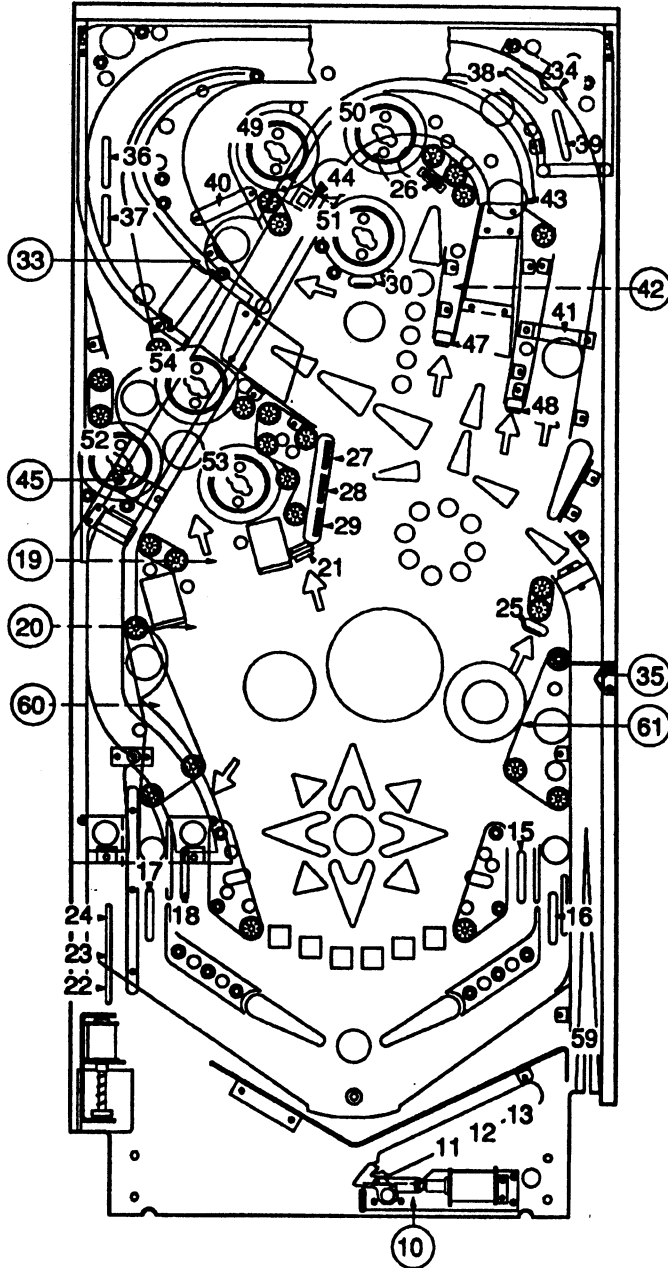
Game Switches Matrix

WHEELWIND Switch-Matrix Table

COLUMNS	1 Q48	2 Q49	3 Q44	4 Q48	5 Q43	6 Q47	7 Q42	8 Q46
ROW	GRN-BRN 1JB-1	GRN-RED 1JB-2	GRN-ORN 1JB-3	GRN-YEL 1JB-4	GRN-BLK 1JB-5	GRN-BLU 1JB-7	GRN-VIO 1JB-8	GRN-GRY 1JB-9
1	Plumb Bob Tilt 1		Left Outlane 17	Right Standup 25	Enter Left Ramp 33	Spinner 41	Top Jets (left) 49	Flipper Right 57
2	C Side Power AC Relay 2	Outhole 10	Left Return Lane 18	Top Sngl Drop Target 26	L Ramp Score (top) 34	Right Ramp Down 42	Top Jets (right) 50	Flipper Left 58
3	Game Start 3	Ball Trough #1 (left) 11	Right Cellar 19	M 3-Bank Dr Tgt (MID) 27	L Ramp Score (bot) 35	TR Eject 43	Top Jets (bot) 51	Shooter Lane 59
4	Right Coin Chute 4	Ball Trough #2 (mid) 12	Left Cellar 20	M 3-Bank Dr Tgt (mid) 28	Left Loop (top) 36	R Ramp Score (top) 44	Btm Jets (left) 52	Left 110 Point 60
5	Center Coin Chute 5	Ball Trough #3 (right) 13	Left Standup 21	M 3-Bank Dr Tgt (top) 29	Left Loop (bot) 37	R Ramp Score (bot) 45	Btm Jets (right) 53	Right 110 Point 61
6	Left Coin Chute 6		Left Lock 1 (lwr) 22	Middle Standup 30	Right Loop (top) 38		Btm Jets (top) 54	
7	Slam Tilt 7	Right Return Lane 15	Left Lock 2 (mid) 23		Right Loop (bot) 39	L Standup (R Ramp) 47	BL Kicker ("sling") 55	
8	High Score Reset 8	Right Outlane 16	Left Lock 3 (top) 24		Inner Loop 40	R Standup (R Ramp) 48	BR Kicker ("sling") 56	

BL = Bottom Left BR = Bottom Right TR = Top Right

Game Switches Playfield Locations

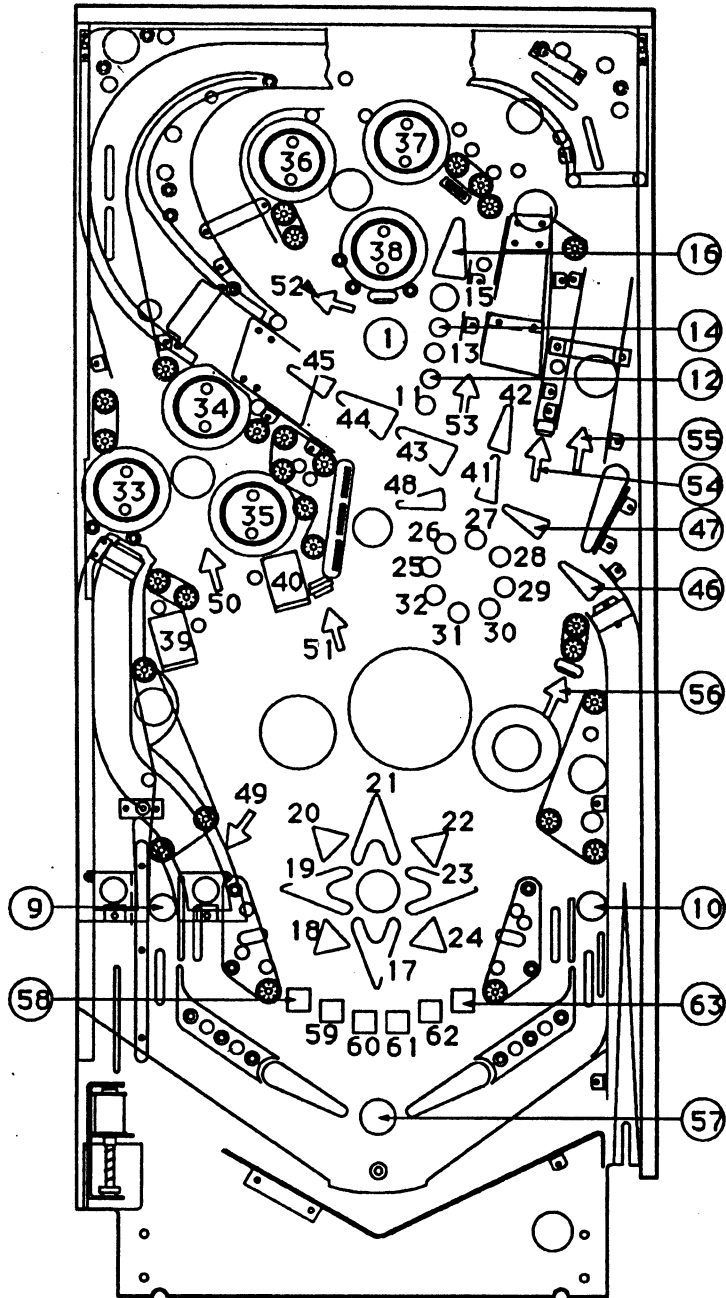


Game Lamps Matrix

WHEELWIND Lamp-Matrix Table

COLUMN ROW	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-5	6 Q56 YEL-BLU 1J7-6	7 Q54 YEL-VIO 1J7-7	8 Q52 YEL-GRY 1J7-8
Q80 1 RED- BRN 1J6-1	Middle Standup 1	Left Outlane 9	S Arrow 17	Toll 1 25	Btm Jets Left 33	R Ramp Lock 41	L Return Lane 49	Shoot Again 57
Q81 2 RED- BLK 1J6-2	Up Jets On (Backglass) 2	Right Outlane 10	S W Arrow 18	Toll 2 26	Btm Jets Top 34	R Ramp Double 42	Left Loop 50	2X 58
Q82 3 RED- ORN 1J6-3	250K (Backglass) 3	Top Drop 50K 11	W Arrow 19	Toll 3 27	Btm Jets Right 35	L Ramp Million Plus 43	Left Standup 51	3X 59
Q83 4 RED- YEL 1J6-4	Ex. Ball On (Backglass) 4	Top Drop 75K 12	N W Arrow 20	Toll 4 28	Top Jets Left 36	L Ramp Million 44	Inner Loop Arrow 52	4X 60
Q84 5 RED- GRN 1J6-5	3-Bank 100K (Backglass) 5	Top Drop 100K 13	N Arrow 21	Toll 5 29	Top Jets Right 37	L Ramp Release 45	L Return Lane 53	5X 61
Q85 6 RED- BLU 1J6-6	500K (Backglass) 6	Top Drop 150K 14	N E Arrow 22	Toll 30 30	Top Jets Btm 38	Skill Shot Right 46	R Ramp R Sindup 54	6X Lites Ex. Ball 62
Q86 7 RED- VIO 1J6-7	Lite Million (Backglass) 7	Top Drop Quick 15	E Arrow 23	Toll 20 31	L Cellar Arrow 39	Skill Shot Mid 47	Right Loop 55	6X Lites Special 63
Q87 8 RED- GRY 1J6-8	Low Jets On (Backglass) 8	Top Drop Ex. Ball 16	S E Arrow 24	Toll 10 32	R Cellar Arrow 40	Skill Shot Left 48	Right Standup 56	Right Spinner 64

Game Lamps Playfield Locations



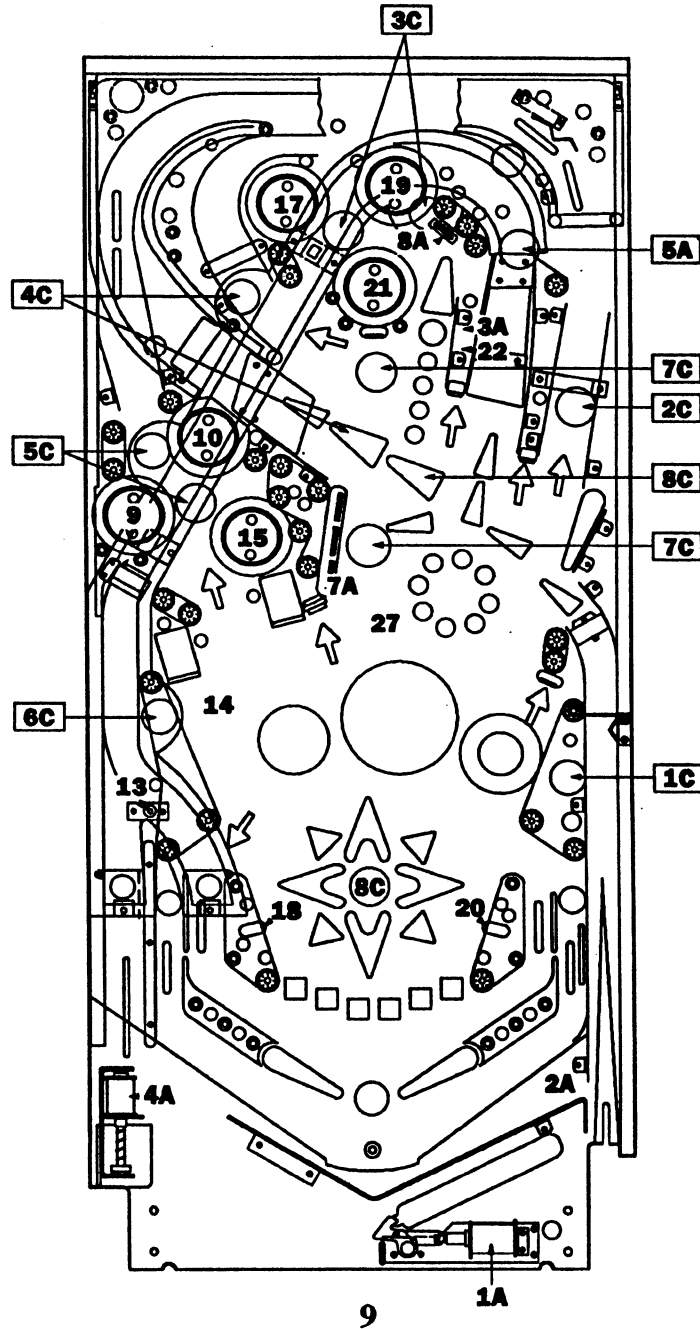
Solenoids/Flashers Table

Whitworth Solenoid Table

Sol. No.	Function	Solenoid Type	Wire Color	Connections		Driver Trans	Solenoid Part Number Flashlamp Type AE Flash: 2-Dial; 3-B; 3-D; 4-D
				CPU Bd	Phys/Rel/Cal/Rel		
01A3	Outfitter Kick	Switched	Vo-Bm	1P11-1	SJ1-9; SJ4-9 (A)	C33	9006989 flashlamps 1p
01C3	Bottom Right Flasher	Switched	Br-Bm	(Gy-Bm)	SJ5-9 (C)	C33	9006989 flashlamps 1p
02A3	Shooter Lane Indicator	Switched	Vo-Red	1P11-3	SJ1-7; SJ4-9 (A)	C25	9006989 flashlamps 1p
02C3	Spinner Flasher	Switched	Br-Red	(Gy-Red)	SJ5-9 (C)	C25	9006989 flashlamps 1p
03A3	Right Ramp Up	Switched	Vo-Orn	1P11-4	SJ1-4; SJ4-7 (A)	C32	9006989 flashlamps 2p
03C3	Ramp TT Jet Flashers	Switched	Br-Orn	(Gy-Orn)	SJ5-7 (C)	C32	9006989 flashlamps 2p
04A3	Left Locking Kickback	Switched	Vo-Yel	1P11-5	SJ1-5; SJ4-9 (A)	C34	9006989 flashlamps 1p, 1p
04C3	Ramp T/M/M Flashers	Switched	Br-Yel	(Gy-Yel)	SJ5-9 (C)	C34	9006989 flashlamps 1p, 1p
05A3	Top Eject	Switched	Vo-Gm	1P11-6	SJ1-4; SJ4-9 (A)	C31	9006989 flashlamps 2p
05C3	Ramp B/M/B Jet Flashers	Switched	Br-Gm	(Gy-Gm)	SJ5-4 (C)	C31	9006989 flashlamps 2p
06A3	Kicker	Switched	Vo-Bu	1P11-7	SJ1-3; SJ4-4 (A)	C23	9006989 flashlamps 1p
06C3	Ramp Bottom Flasher	Switched	Br-Bu	(Gy-Bu)	SJ5-3 (C)	C23	9006989 flashlamps 1p
07A3	S-Shaft Drop Target Reset	Switched	Vo-Bk	1P11-8	SJ1-2; SJ4-2 (A)	C30	9006989 flashlamps 1p, 1p
07C3	S-D/T/M Target Flashers	Switched	Br-Vio	(Gy-Vio)	SJ5-2 (C)	C30	9006989 flashlamps 1p, 1p
08A3	S-Shaft Drop Target Reset	Switched	Vo-Gy	1P11-9	SJ1-1; SJ4-1 (A)	C22	9006989 flashlamps 2p
08C3	P/M/Compass Flashers	Switched	Br-Gy	(Gy-Bk)	SJ5-1 (C)	C22	9006989 flashlamps 2p
09	Bot Jets (left)	Controlled	Br-Bk	1P12-1	SJ2-4; SJ4-4; SJ4-3	O17	AE-23-800
10	Bot Jets (top)	Controlled	Br-Red	1P12-2	SJ2-4; SJ4-4; SJ4-3	O8	AE-23-800
11	Upper Phys/Rel G I Relay	Controlled	Br-Orn	1P12-4	SJ2-4; SJ4-4; SJ4-3	O16	5590-12145-00 4a
12	A/C Select Relay	Controlled	Br-Yel	1P12-5	SJ2-5	O8	5590-05555-01 5
13	Overer	Controlled	Br-Gm	1P12-6	SJ2-4; SJ4-3	O7	AE-23-800
14	Under P/M Notch	Controlled	Br-Bu	1P12-7	SJ2-4; SJ4-3	O14	AE-23-800
15	Bot Jets (right)	Controlled	Br-Vio	1P12-9	SJ2-1; SJ4-1	O8	5590-12145-00 4a
16	Low Phys/Rel / Eject G I Relay	Controlled	Br-Gy	1P12-9	SJ2-1; SJ4-1	O8	5590-12145-00 4a
17	Top Left Jet Bumper	Special #1	Br-Bm	1P19-7	SJ2-7; SJ7-7	O75	AE-23-800
18	Left Kicker (left)	Special #2	Br-Red	1P19-4	SJ2-4; SJ7-4	O71	AE-23-1500
19	Top Right Jet Bumper	Special #3	Br-Orn	1P19-3	SJ2-3; SJ7-3	O73	AE-23-800
20	Right Kicker (right)	Special #4	Br-Yel	1P19-6	SJ2-4; SJ7-4	O69	AE-23-1500
21	Top Lower Jet Bumper	Special #5	Br-Gm	1P19-8	SJ2-3; SJ7-2	O77	AE-23-800
22	R Ramp Down	Special #6	Br-Bk	1P19-9	SJ2-1; SJ7-1	O79	9006 flashlamps 2p
23	B P Lighting (L) Flashers	Special #7	Br-Orn	1P19-9	SJ2-1; SJ7-1	O79	9006 flashlamps 2p
24	Bottom Kicker (R) Flasher	Special #8	Br-Red	1P19-9	SJ2-1; SJ7-1	O79	9006 flashlamps 2p
25	B P Target (R) Flasher	Special #9	Br-Yel	1P19-9	SJ2-1; SJ7-1	O79	9006 flashlamps 2p
26	B P Target (L) Flasher	Special #10	Br-Gm	1P19-9	SJ2-1; SJ7-1	O79	9006 flashlamps 2p
27	Spin Wheels Motor/Relay	Special #11	Br-Bk	1P19-9	SJ2-1; SJ7-1	O79	9006 flashlamps 2p
-	Lower Right Flipper	Special #12	Orn-Vio	1P19-1	2J10-2; 2J10-7	-	FL1163050VDC
-	Upper Right Flipper	Special #13	Brk-Yel 2	1P19-2	2J10-1; 2J10-18	-	FL1163050VDC
-	Left Flipper	Special #14	Orn-Gy 2	1P19-2	2J10-1; 2J10-18	-	FL1163050VDC
-	Lower Left Flipper	Special #15	Brk-Gy 2	1P19-2	2J10-1; 2J10-18	-	FL1163050VDC

Notes: 1. Wire colors, except Upper Orn-Vio and Orn-Gy, are ground connections (to coil terminal with unbranded end of diode). Flipper Orn-Vio and Orn-Gy wires cannot be CPU Board to Flipper switch. 2. Flipper connections shown in brackets are from Upper switch to Flipper coil. 3. "A" diodes are pulsed, when Sol. 12 is de-energized; "C" diodes are pulsed, with Sol. 12 energized. Wire colors in brackets are those from respective A and C terminals corresponding to the J1-terminal connections listed for the Aux Power Driver Bl, which controls the device pulsed by Sol. 12. 4. Relay is mounted on Relay Bl, (4th pin C-1198B-1; (M) pin C-1198B-1; (M) pin C-1198B-1; (M) pin C-1198B-1. 5. Relay is mounted on Aux Power Driver Bl, D-1237 in the backbox.

Solenoids/Flashers Playfield Locations



Playfield Parts Listing

Item Part No.	Description	Item Part No.	Description
1	02-4003 Post	27	C-13312-1 1-Bank Drop Target
a)	23-6300 Rubber	a)	C-13311 1-Bank Optic Board
2	12-6842 Bottom Arch Fence	28	C-13332 Ball Guide Assembly
3	B-13269 Left LOCK Kickback	29	01-9522 Eject Hole Ball Deflector
4	C-11626-L-3 Lwr Left Flipper Assembly	30	B-9361-R Top Right Eject Hole
a)	20-9250-6 Lg Flipper Paddle & Shaft	a)	B-9362-L-1 Coil & Bracket Assembly
5	A-13274-L Left Flipper Return Frame	b)	03-7351-1-9 Tr Red Plastic Ball Seat
6	01-9521 Ball Guide	31	B-13351 R Ramp L Entry Ball Guide
7	12-6466-10 Wireform	32	B-13369 R Ramp R Entry Ball Guide
8	B-12665 Kicker Arm ("Sling") Assembly	33	B-13320 Ball Guide Assembly
a)	B-11203-R-1 Coil & Bracket Assembly	34	B-1686-5 Mid (Round White) Standup Target
9	B-13280 Diverter Arm & Shaft Assembly	35	A-13359 Ball Guide Assembly
a)	B-13276 Diverter Actuator Assembly	36	B-13233 Lifting Ramp Assembly
10	C-13318 Ball Guide Assembly	37	B-13339 Spinner Assembly
11	B-13319 Ball Guide Assembly	a)	12-6780 Switch Actuator Wire
12	R-13190 Right Ramp Assembly	38	R13129 Left Ramp Assembly
13	B-13349 Left Celler Loop	39	B-12563-4 R Ramp (Oblong Red) Standup Target
a)	B-13225 Celler Kickback Assembly	40	C-1626-R-3 Upper Right Flipper Assembly
14	B-13377 Celler Sign Bridge Assembly	a)	20-9250-6 Flipper Arm on Shaft
15	B-12583-6 Oblong Yellow Standup Target	41	A-13385 Ball Guide Assembly
16	B-13350 Right Celler Loop & Runway	42	D-13383 Ball Guide Assembly
17	A-8244-L One-way Ball Gate	43	A-8244-R One-way Ball Gate
18	C-11223-1 3-Bank Drop Target	44	B-1696-15 R (Round Orange) Standup Target
a)	C-13205-1 3-Bank Optic Board	45	D-13191 Wire Chute Assembly
19	B-9414-2 Yellow Jet Bumper	46	C-13317 Right Flipper Return Frame
a)	B-9415-1 Bumper Coil/Bracket Assembly	47	A-13274-R Ball Guide Assembly
20	D-13364 Ball Guide Assembly	48	C-1626-R-3 Lower Right Flipper Assembly
21	C-13335 Ball Guide Assembly	a)	20-9250-6 Flipper Arm on Shaft
22	A-12506 Ball Gate Assembly	49	A-13360 Ball Guide Assembly
a)	12-6824 Gate Wire	50	Parts below are located beneath Bottom Arch:
23	C-13334 Ball Guide Assembly	a)	B-8623 Upper Trough Baffle Assembly
24	A-13376 Ball Gate Assembly	b)	C-8235 Lower Trough Baffle Assembly
a)	12-6505 Gate Wire	c)	12-6542 Baffle Wire
b)	12-6786 Switch Actuating Wire	d)	01-3568-1 Ball Trough (runway)
25	B-13333 Ball Guide Assembly	e)	01-5675 Bottom Arch Mounting Bracket
26	B-9414-3 Red Jet Bumper	f)	B-8038-2 Outhole Kicker Assembly
a)	B-9415-1 Bumper Coil/Bracket Assembly		

Playfield Parts Locations

