

WhirlwindTM

Operator's Handbook

presenting:

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

Williams[®] 
ELECTRONICS GAMES, INC.

Game Audit Table

Whirlwind Audit Table

Audit Item (Lower)	Descriptive Phrase (Upper Display)	Audit Item ¹ 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	10 (%)		
02	FIXED REPLAY ¹	SCORES		
03	REPLAY START (or REPLAY LEVEL 1) ¹	6,000,000		8,000,000
04	REPLAY LEVELS (or REPLAY LEVEL 2) ¹	01 (or OFF)		02
05	(REPLAY LEVEL 3) ¹	(see text)		
06	(REPLAY LEVEL 4) ¹	(see text)		
07	REPLAY AWARD	Credit		
08	SPECIAL AWARD	Credit		
09	MATCH FEATURE	10 %	8%	7%
10	BALLS / GAME	03		
11	TILT WARNING	03	01	
12	MAXIMUM EX. BALL	06	03	
13	MAXIMUM CREDITS	10	20	30
14	HIGHEST SCORES	On		
15	BACKUP HI. SCR.1	6,000,000		6,000,000
16	BACKUP HI. SCR. 2	5,500,000		7,500,000
17	BACKUP HI. SCR. 3	5,000,000		7,000,000
18	BACKUP HI. SCR. 4	4,500,000		6,500,000
19	HI. SCR.1 CREDITS	01		01
20	HI. SCR.2 CREDITS	01		00
21	HI. SCR.3 CREDITS	01		00
22	HI. SCR.4 CREDITS	01		00
23	H. S. RESET EVERY	3,000		1000
24	FREE PLAY	NO		
25	U.S.A. 2 COINAGE (4 COINS 3 PLAYS) ^{2,3,4}	USA 2	French 1	German 2
26	LEFT UNITS	01	02	06
27	CENTER UNITS	04	10	12
28	RIGHT UNITS	01	20	30
29	UNITS/ CREDIT	01	05	05
30	UNITS/ BONUS	00	20	00
31 - 58	MINIMUM UNITS	00	00	00
59	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:

- Automatic Replay percentage value range is adjustable from 5 to 25%, via the Credit Button. Item 02 permits changing the factory setting value for Replay Start Level (valid for next 50 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.
- Phrase in parentheses is Factory Setting. Phrase appears in player displays. Press Credit Button to change setting of the game pricing of item 24.
- To change country OR coinage setting, press Credit button to obtain 24 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.
- Refer to Pricing Table and text describing these items.
- Special Preset Adjustment, whose effects are noted in the Game Adjustment text.
- Entries in Factory Setting columns for French and W. German games show only differences from entries in first (US / Can.) column.

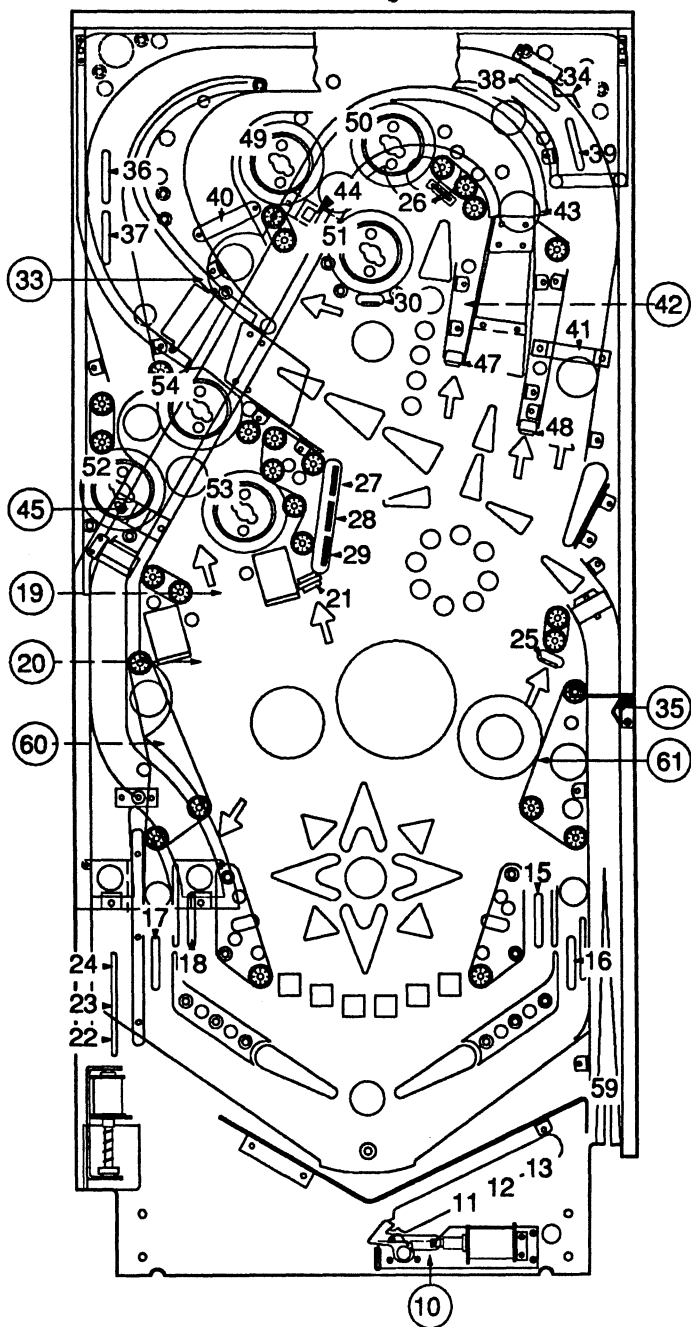
Game Switches Matrix

WHEELWIND Switch-Matrix Table

COLUMN \ ROW	1 Q45 GRN-BRN 1J8-1	2 Q46 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
1 WHT- BRN 1J10-9	Plumb Bob Tilt 1		Left Outlane 17	Right Standup 25	Enter Left Ramp 33	Spinner 41	Top Jets (left) 49	Flipper Right 57
2 WHT- RED 1J10-8	C Side Power A/C 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 WHT- ORN 1J10-7	Game Start 3	Ball Trough #1 (left) 11	Right Cellar 19	M 3-Bank Dr Tgt (lwr) 27	L Ramp Score (bot) 35	TR Eject 43	Top Jets (bot) 51	Shooter Lane 59
4 WHT- YEL 1J10-6	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 WHT- GRN 1J10-5	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 WHT- BLU 1J10-3	Left Coin Chute 6		Left Lock 1 (lwr) 22	Middle Standup 30	Right Loop (top) 38		Btm Jets (top) 54	
7 WHT- VIO 1J10-2	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 WHT- GRY 1J10-1	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

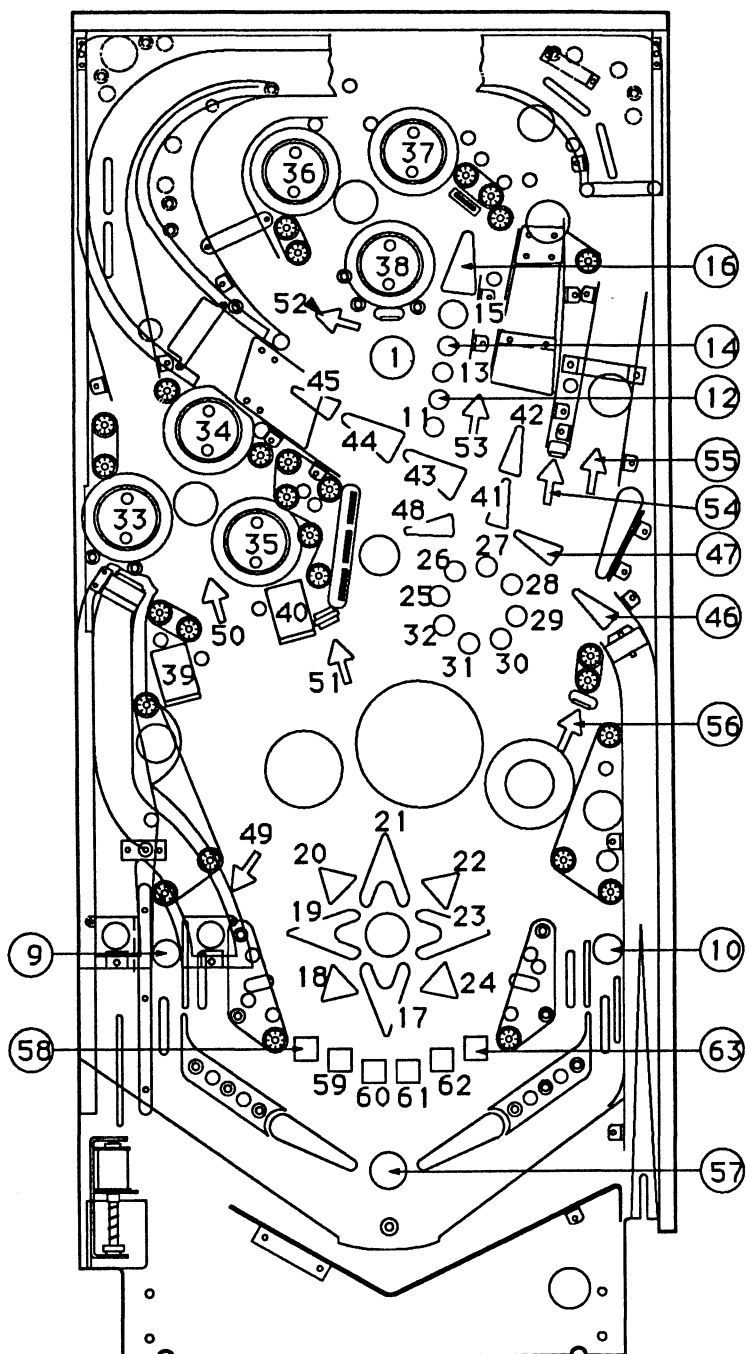


Game Lampe Matrix

WHEELWIND Lamp-Matrix Table

COLUMN ROW	1 Q86 YEL-BRN 1J7-1	2 Q84 YEL-RED 1J7-2	3 Q82 YEL-ORN 1J7-3	4 Q80 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9
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 Flight 35	L Ramp Million Plus 43	Left Standup 51	3X 59
Q83 4 RED- YEL 1J6-5	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 1J6-6	3-Bank 100K (Backglass) 5	Top Drop 100K 13	N Arrow 21	Toll 5 29	Top Jets Flight 37	L Ramp Release 45	L Return Lane 53	5X 61
Q85 6 RED- BLU 1J6-7	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 1J6-8	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 1J6-9	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



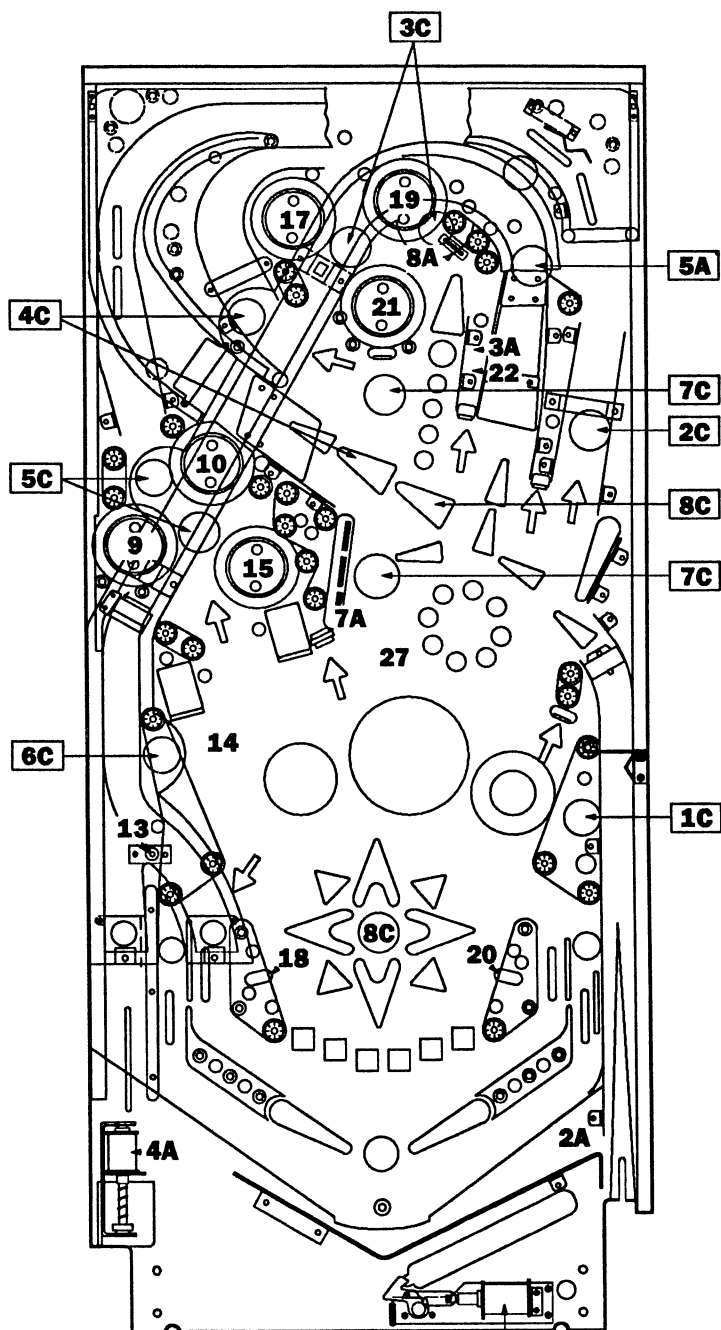
Solenoids/Flashers Table

Whitetail Solenoid Table

Sol. No.	Function	Solenoid Type	Wire Color	Connections		Driver Timer	Solenoid Part Number Flasher Type (a- Bypass, b- P-Field, b-Bk. Panel)
				CPU Bd	Playfield/Cabinet		
01A ³	Outboard Kicker	Switched	Vio-Bm	1P11-1	5J1-4; 5J4-9 (A)	Q33	AE-23-500
01C ³	Bottom Right Flasher	Switched	Bk-Bm	(Gry-Bm)	5J5-9 (C)	Q33	#906/#89 flashlamps 1p
02A ³	Shooter Lane feeder	Switched	Vio-Rd	1P11-3	5J1-7; 5J4-8 (A)	Q25	AE-23-500
02C ³	Spinner Flasher	Switched	Bk-Rd	(Gry-Rd)	5J5-8 (C)	Q25	#906/#89 flashlamps 1p
03A ³	Right Ramp Up	Switched	Vio-Orn	1P11-4	5J1-6; 5J4-7 (A)	Q32	SM-26-500-DC
03C ³	Ramp T/T Jet Flashers	Switched	Bk-Orn	(Gry-Orn)	5J5-7 (C)	Q32	#906/#89 flashlamps 2p
04A ³	Left Loading Kicker	Switched	Bk-Yel	1P11-5	5J1-5; 5J4-8 (A)	Q24	AE-23-500
04C ³	Ramp T/M/I Flashers	Switched	Bk-Yel	(Gry-Yel)	5J5-5 (C)	Q24	#906/#89 flashlamps 1p, 1g
05A ³	Top Elect	Switched	Vio-Gm	1P11-8	5J1-4; 5J4-8 (A)	Q31	AE-23-500
05C ³	Ramp B/M/B Jet Flashers	Switched	Bk-Gm	(Gry-Gm)	5J5-4 (C)	Q31	#906/#89 flashlamps 2p
06A ³	Knocker	Switched	Vio-Blu	1P11-7	5J1-3; 5J4-4 (A)	Q23	AE-23-500
06C ³	Ramp Bottom Flasher	Switched	Bk-Blu	(Gry-Blu)	5J5-3 (C)	Q23	#906 flashlamps 1p
07A ³	3-Bank Drop Target Reset	Switched	Vio-Bk	1P11-8	5J1-2; 5J4-2 (A)	Q30	AE-26-1200
07C ³	3-Dr Tgt M Target Flashers	Switched	Bk-Vio	(Gry-Vio)	5J5-2 (C)	Q30	#906/#89 flashlamps 1p, 1b
08A ³	1-Bank Drop Target Reset	Switched	Vio-Gry	1P11-9	5J1-1; 5J4-1 (A)	Q22	AE-23-500
08C ³	P M/C Compass Flashers	Switched	Bk-Gry	(Gry-Bk)	5J5-1 (C)	Q22	#906/#89 flashlamps 2p
09	Bot Jets (left)	Controlled	Bm-Bk	1P12-1	5J2-9; 5J6-9; 2J4-3	Q17	AE-23-500
10	Bot Jets (top)	Controlled	Bm-Rd	1P12-2	5J2-8; 5J6-8; 2J4-5	Q9	AE-23-500
11	Up Playfield G I Relay	Controlled	Bm-Orn	1P12-4	5J2-6; 5J6-7; 2J4-6	Q16	5580-12145-00 4b
12	A/C Select Relay	Controlled	Bm-Yel	1P12-5	5J2-5	Q8	5580-06555-01 5
13	Drum	Controlled	Bm-Bm	1P12-6	5J2-4; 5J6-5	Q15	
14	Under Pfd Kicking	Controlled	Bm-Blu	1P12-8	5J2-4; 5J6-2	Q14	AE-23-500
15	Bot Jets (right)	Controlled	Bm-Vio	1P12-9	5J2-2; 5J6-2	Q14	5580-12145-00 4b
16	Left Playfield / Bbox G I Relay	Controlled	Bm-Gry	1P12-9	5J2-1; 5J6-1	Q8	
17	Top Left Jet Bumper	Special #1	Bm-Bm	1P19-7	5J3-7; 5J7-7	Q75	AE-23-500
18	Left Kicker (rolling)	Special #2	Bu-Rd	1P19-4	5J3-6; 5J7-6	Q71	AE-26-1500
19	Top Right Jet Bumper	Special #3	Bu-Orn	1P19-3	5J3-3; 5J7-3	Q73	AE-23-500
20	Right Kicker (rolling)	Special #4	Bu-Yel	1P19-8	5J3-4; 5J7-4	Q69	AE-26-1500
21	Top Lower Jet Bumper	Special #5	Bu-Gm	1P19-8	5J3-2; 5J7-2	Q77	AE-23-500
22	R Ramp Down	Special #6	Bu-Bk	1P19-9	5J3-1; 5J7-1	Q78	#908 flashlamps 2p
23	B P Lightning (L) Flashers	Snd Orl 1					
24	Blower Motor	Snd Orl 2					
25	B P Thunder (M) Flasher	Snd Orl 3					
26	B P Thunder (R) Flasher	Snd Orl 4					
27	Spin Wheels Motor/Relay	Snd Orl 5					
-	Right Flipper	-	Om-Vio	1P19-1	2J5-5; 2J10-7	-	#908 flashlamps 2p
			[Blu-Vio] 2		[2J10-1; 2J8-1] 9		#908 flashlamps 2p
-	Lower Right Flipper	-	Bk-Yel] 2	1P19-2	2J5-4; 2J10-8	-	14-7055 / 5580-06555-01 4a
			Om-Gry] 2		[2J10-1; 2J8-1] 9		FL11630/50VDC
-	Upper Right Flipper	-	[Blu-Gry] 2	1P19-2	2J5-4; 2J10-8	-	FL11630/50VDC
					[2J10-2; 2J8-4]		FL11630/50VDC
-	Lower Left Flipper	-					

Notes: 1. Wire colors, except flipper Om-Vio and Om-Gry, are ground connections (to coil terminal with unbanded end of diode). Flipper Om-Vio and Om-Gry wires connect from CPU Board to flipper switch. 2. Flipper connections shown in brackets are from flipper switch to flipper coil. 3. "A" circuits are pulsed, when Sd. 12 is de-energized; "C" circuits are pulsed, with Sd. 12 energized. Wire colors in brackets are those from respective A and C terminals corresponding to the J1-terminal connection listed for the Aux Power Driver Bd, which controls the device pulling by Sd. 12. 4. Relay is mounted on Relay Bd, (4a) pin C-11909-1; (4b) C-11902-1. 5. Relay is mounted on Aux Power Driver Bd, D-12247 in the backbox.

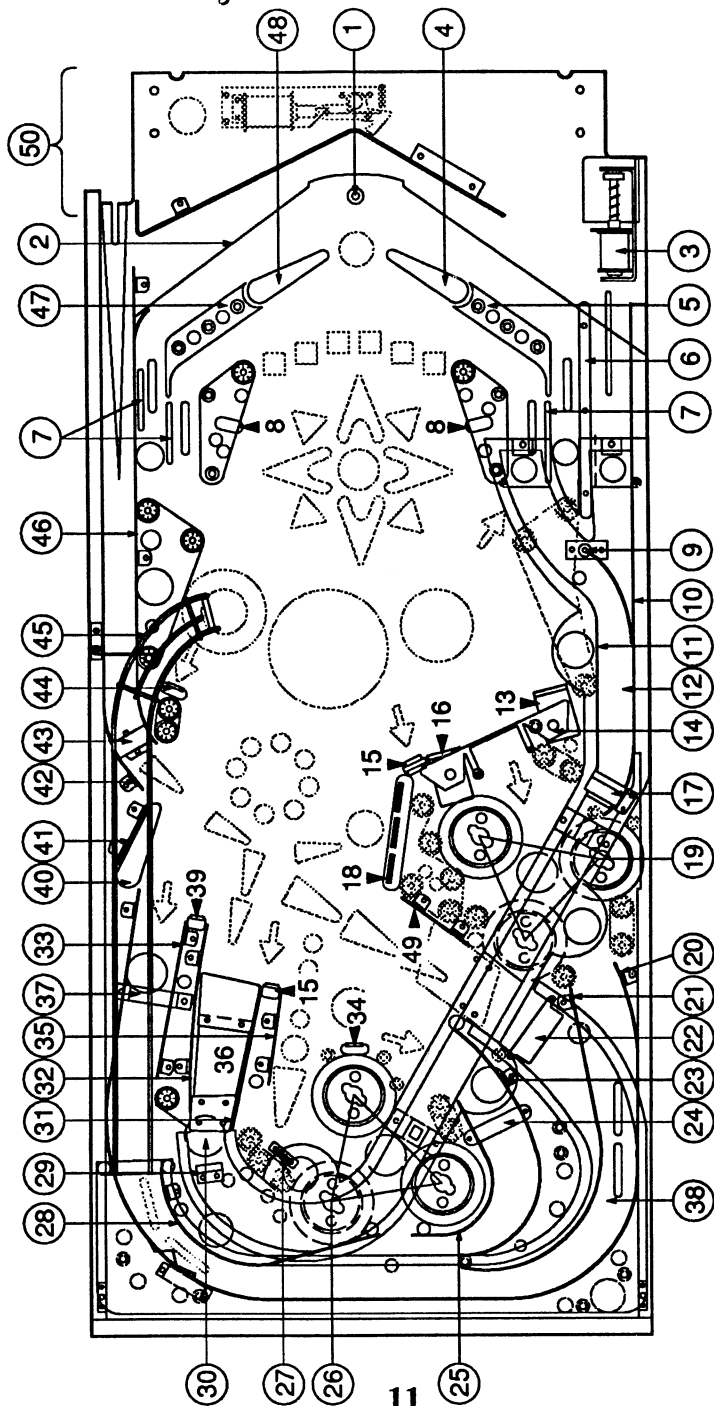
Solenoids/Flashers Playfield Locations



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 Opto 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	R 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-13399	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-11696-5	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 Cellar Loop	39	B-12583-4	R Ramp (Oblong Red) Standup Target
a)	B-13225	Cellar Kickback Assembly	40	C-11626-R-3	Upper Right Flipper Assembly
14	B-13377	Cellar 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 Cellar 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-11696-15	R (Round Orange) Standup Target
a)	C-13205-1	Yellow Jet Bumper	45	D-13191	Wire Chute Assembly
19	B-9414-2	Bumper Coil/Bracket Assembly	46	C-13317	Ball Guide Assembly
a)	B-9415-1	Ball Guide Assembly	47	A-13274-R	Right Flipper Return Frame
20	D-13384	Ball Guide Assembly	48	C-11626-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)	12-6785	Switch Actuating Wire	d)	01-3569-1	Ball Trough (runway)
25	B-13333	Ball Guide Assembly	e)	01-5575	Bottom Arch Mounting Bracket
26	B-9414-3	Red Jet Bumper	f)	B-8039-2	Outhole Kicker Assembly
a)	B-9415-1	Bumper Coil/Bracket Assembly			

Playfield Parts Locations



WARNINGS & NOTICES

WARNING

FOR SAFETY AND RELIABILITY, WILLIAMS ELECTRONICS GAMES does not recommend or authorize any substitute parts or modifications of WILLIAMS' equipment. Use of non-WILLIAMS' parts, or modifications of game circuitry, may adversely affect game play, or may cause injuries.

SUBSTITUTE PART OR EQUIPMENT MODIFICATIONS may void FCC Type Acceptance.

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WARNING

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

WARNING

FCC STICKER. Check the back of your ~~Whirlwind~~ game to verify that an FCC-certification sticker was attached to your game at the factory.

All games that leave WILLIAMS' plants have been tested and found to comply with FCC Rules. Because the sticker is proof of this fact, legal repercussions to the owner and distributor of the game may result, if the sticker is missing. If you receive any WILLIAMS game, manufactured after December 1982, that has no FCC sticker, call WILLIAMS for advice or write us a note on your Game Registration Card. Be sure that the card bears your game's serial number.

RF Interference Notice

CABLE HARNESS PLACEMENTS and ground strap routing on this game have been designed to keep RF radiation and conduction within levels accepted by the FCC Rules.

TO MAINTAIN THESE LEVELS, reposition harnesses and reconnect ground straps to their original placements, if they become disconnected during maintenance.

Notice

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Chicago, IL 60618

WARNING:

**Transport this game ONLY
with hinged backbox DOWN!**