

Program Description I

Program Title ***** PINBALL WIZZARD *****

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Program Description, Equations, Variables For those familiar with pinball games, the scoring items in this game will not be unknown to them. However, for the rest of us, a little explanation is in order, especially the way HP-97/67 indicates the scores.

In this game, there are 8 different devices that affect scoring, sometimes producing increased scoring on other items, and will be referred to by name, as on a real machine. Each scoring device is given a code number and will be displayed to the right of the decimal point during a double pause, with the score just made on that device, to the left of the point. Device "1" is actually two star roll-overs (circular buttons at the top of the game board), which alternately set the display from 1 place to 9 places and back again. When set to 9 places (a lot of zeros showing) devices #'s 2, 3, 4, 5 & 6 will score 10 times more than their normal amounts as described below. Also, each time the "ball" rolls over device 1, 10 points are added to the players score. Device "2" is 2 top roll over slots, which either score 10 or 100, depending on whether the SPECIAL (DSP 9) is on. Devices # "3" are two mushroom or 'thumper-bumpers'. When the ball strikes these, it can bounce between them, up to 10 times, thus totaling as much as 1000 or as little a 100 when struck. With the SPECIAL lit, the amount is multiplied by 10. Device "4" is a spinner gate, which can spin from 1 to 25 revolutions, scoring 50 or 500 points per spin, again depending on the SPECIAL being lit or not. Devices number "5" are kick-out holes, where the ball drops in and is then kicked back out, scoring 50 or 500. Devices # "6" are two Out-Hole Bonus Advances, which add 1000 points to the Out Bonus, and add an immediate 10 or 100 to the players score. Device "7" consists of 5 Drop Targets. Each time a ball strikes device 7, a target is "dropped" and 10 points are scored. If device 7 is struck 5 times (all targets down) the player gets 100 or 1000 points to score, an extra ball, and all targets are reset, to try again. Device "8" is merely two sling shot bumpers and scores 10 points each time they are struck. When a zero shows up, the ball has dropped out through the Out-Hole, and all the Bonus points are added, 1000 at a time, --(cont. on next page)

Operating Limits and Warnings This program is meant to be left running during play, utilizing the active keyboard, during the pause mode, to perform the operations. Should, at any time, the user accidentally "jam (halt)" a running program by inadvertently pressing a key, or pressing in a response too late, the results will usually be a loss of points when R/S is pressed to restart the game. All accumulated points are unaffected.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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to the players score, which is flashed on the screen for each 1000 point Bonus added to it. If the SPECIAL was lit when the ball dropped out, the player receives double the accumulated Out-Bonus. When the display pauses twice, showing the score, with either 1 or all zeros trailing it, the Bonus Scoring is at an end. The next item to be flashed on the display is the balls remaining to play, or the final score (if the game is over) with no trailing zeros.

The real action comes when a negative number appears on the display. This can either be -1, -2, or -3. When the player sees a "-1", it means the ball has reached the left flipper. The player must immediately press the left flipper button (key "1") to put the ball in play, or it drops out through the Out-Hole. Likewise, a "-3" means the ball is at the right flipper, requiring the user to key in number "3" during the 1 second pause.

If a "-2" shows up, it means both flippers will miss, but the player has the option of "tilting" the machine, by keying in a "2" from the keyboard. The problem with tilting is that the user only has a 50-50 chance of putting the ball back in play. If he should succeed, the usual scoring is seen, however, if he fails, the Out-Bonus accumulated is not added onto the score and the ball is lost. If any balls remain in the game, they are displayed immediately, or the final score is displayed, if there were no balls remaining.

START UP:

After initialization (required only once) the display will flash "0". During a pause, the player presses key "A" labeled "25¢" and a quarter is deducted from his cash register (no pun intended), R₂. On an HP-67 the display is paused for 5 seconds, showing the number of games remaining. (Each quarter adds 2 more games to the ones remaining). On an HP-97, the number of games is printed. The display then goes back to flashing the last score made. It is during one of these pauses that key "C" can be pressed to view the amount of money spent so far. The display returns to flashing the score.

When key "B" is pressed, a game is deducted from the number remaining, which is again displayed or printed. Now, all trailing zeros (to the right of the point) are blanked out, and the number of balls to be played are shown. (The current standard today is 3 balls per game). This number is continually flashed until the player shoots the ball, which is accomplished by pressing either the "0" or "." key, which ever the user feels more comfortable doing. Now the scoring starts. As long as a "." or a "0" was used during the pause to "shoot" the ball, the program prevents the ball from dropping right out (a zero coming up). It will not prevent a negative number from showing up, however, so the player should be on his guard.

Play continues until the ball is lost and the game is over when all 3 balls have been lost. This is signified by the continual flashing of the final score with the display set to zero places.

Free games are received for each 50,000 points accumulated at the end of the game. A free ball is received each time the 5 Drop-Targets are hit, as described above, on the previous page.

Good luck.

Program Description II

Sketch(es) How some possible scoring looks:

900.3

900 points made on the thumper-bumpers (device #3)

9000.300000

9000 points made on device #3, because SPECIAL was on (extra "0")

10.7

10 points made on a Drop Target (device #7)

100.7

100 points made on a Drop Target because all 5 targets are down. An extra ball has been added to the player's remaining ones.

Sample Problem(s) Lets have a game and see how it works: Load program, sides 1 and 2. Initialize with seed: .1541790869

RTN R/S 0.

Drop in a quarter for 2 games:

A

2 ***

(flashed on display) 0.

Ready for game one:

B (# of games)--

1 ***

3 balls are shown: (flashed on display) 3.

Shoot first ball:

50.5

First score made in kick out hole (50.5) then, 10.10000000
 the next gives 10 points and lights SPECIAL. The 100.60000000
 advance roll over is hit next (100.6) adding an add- -2.0000000000
 itional 1000 to the out bonus. Finally a -2 comes up 160.00000000
 but we let the ball drop, giving us 160 plus double 1160.000000
 the out bonus of 2000, or 4000+ 160. This is flashed 2160.000000
 twice more, and the number 2 is now flashed to show 3160.000000
 ball 2 is ready to be shot. 4160.000000

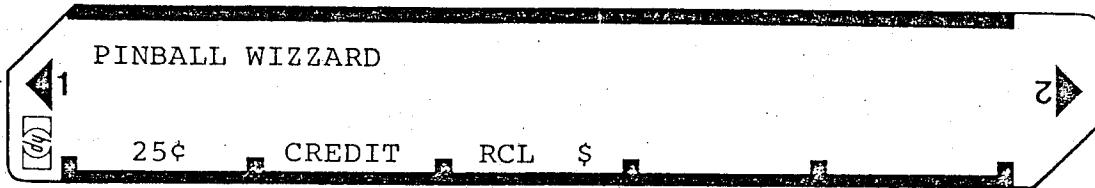
Solution(s) When played out, the second ball will immediately produce a -2, which, if the player should try for, by tilting (inputting a "2"), he would lose the 1000 bonus that starts each ball shot. On the last ball, the player is forced to use the right flipper ("3") because the number -3 shows on the display.

NOTES: After each ball has dropped through the out hole, the Drop-Targets are reset to 5 and the Out-Bonus is set back to 1000, so the player is always assured of at least 1000 points per ball (unless lost through a tilt). Also, the SPECIAL scoring is returned to normal after each ball drops.

***-Indicates a .5 second pause or a printed symbol.

Reference(s) Pamphlets from the following pinball manufacturers:

Williams Electronics, Inc., 3401 N. Calif. Ave. Chicago, Illinois
 Bally Manufacturing Corporation, 2640 Belmont Ave. Chicago, Ill.
 D. Gottlieb & Co., 165 W. Lake St., Northlake, Ill.



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Input program (sides 1 and 2)			
2	Input seed number (s) such that $0 < (s) < 1$ Display will now continually flash "0." until player presses "A" during a pause.	(s)	RTN R/S	0.
3	Obtain credit for 2 additional games: Note: press "A" only when display pauses, otherwise, program will be halted. At this point previous score of last game (if any) will be paused. This number will be "0." directly after initialization.		A	last score
4	Start first game: Displayed will be the number of balls left to play in game.		B	3.
5	Shoot next ball in game: Note: press "," or "0" only when the remaining number of balls is paused on display.			* or 0
*	Score is shown to left of point, the scoring device is indicated to the right of the point. If trailing zeros are shown, the SPECIAL is on and many items score higher (see Prgm. Description I). When "0" is seen, ball has dropped through Out Hole. "-1" indicates left flipper is required, while "-3" indicates right flipper is required. A "-2" means ball is dropping out, but player can attempt a tilt to put ball back in play.			
6	To use left flipper (when "-1" is paused):		1	
7	To use right flipper (when "-3" is paused):		3	
8	Optional--To tilt machine (when "-2" is paused):		2	
9	When current ball is lost through out hole, and Bonus has been collected, next ball is displayed, flashing. To shoot it go to step 5.			
10	When all balls are used up, final score is flashed. If any games remain, go to step 4.			
11	If no games remain, go to step 3.			

Program Listing 1

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	FRC	16 44		057	R↓	-31	
002	FI	16-24		058	DSF0	-63 00	of the games.
003	A2Y	-41		059	RTN	24	-----
004	A=0?	16-43	store seed	060	*LBLB	21 12	LBL B: Play
005	+	-55		061	RCL1	36 01	-Any games left?
006	FRC	16 44		062	X=0?	16-43	
007	STGE	35 15	-----	063	GT0a	22 16 11	-No, go to f a
008	5	85		064	1	01	-Else deduct 1 game
009	8	88		065	ST-1	35-45 01	
010	ST0B	35 12	store constants	066	-	-45	
011	1	01		067	PRTX	-14	-Print remaining
012	0	88		068	0	00	games
013	ST0A	35 11		069	ST00	35 00	-clear old score
014	X2	53		070	3	03	
015	ST0C	35 13	-----	071	ST03	35 03	-reset # of balls
016	CLX	-51	clear registers	072	*LBLb	21 16 12	-----
017	ST00	35 00		073	CF0	16 22 06	LBL f b:
018	ST01	35 01	R0 to R2	074	DSF0	-63 00	Clr. SPECIAL flag
019	ST02	35 02	-----	075	5	05	
020	GT0a	22 16 11		076	ST07	35 07	-store drop targets
021	*LBLc	21 16 15		077	EEX	-23	
022	RCL2	36 15	subroutine used to	078	3	03	-initialize out hole
023	9	09	generate random	079	ST06	35 06	bonus.
024	9	09	numbers.	080	*LBLc	21 16 13	-----
025	7	07		081	CF3	16 22 03	
026	X1	-35		082	RCL3	36 03	display remaining
027	FRC	16 44		083	X=0?	16-43	balls and loop
028	STGE	35 15	-----	084	GT0a	22 16 11	until user re-
029	RTN	24		085	PSE	16 51	sponds.
030	*LELA	21 11	LBL A: Add 2 games	086	F3?	16 23 03	
031	2	02	to total.	087	F3?	16 23 03	
032	ST+1	35-55 01		088	GT0c	22 16 13	-----
033	.	-62		089	1	01	deduct 1 ball
034	2	82		090	ST-3	35-45 03	-----
035	5	85		091	DSF1	-63 01	
036	ST-2	35-45 02		092	X#Y	-41	
037	RCL1	36 01		093	*LBLa	21 16 14	-obtain first rnd #
038	PRTX	-14	-print total games	094	GSBe	23 16 15	-----
039	*LBLa	21 16 11	-----	095	1	01	
040	2	02	LBL f a: test for	096	2	02	get number from -3
041	CHS	-22	possible free	097	x	-35	to 8.
042	ST01	35 46	games.	098	INT	16 34	
043	RCL0	36 00		099	3	03	
044	5	85		100	-	-45	
045	EEX	-23		101	X=Y?	16-33	
046	4	04		102	GT0d	22 16 14	if 1st #=0, loop
047	+	-24		103	X>0?	16-44	back to LBL f d
048	INT	16 34		104	GT0E	22 15	-----
049	ST+1	35-55 01	-----	105	PSE	16 51	if # positive, gtoE
050	RCL0	36 00	loop to show old	106	X=0?	16-43	-----
051	PSE	16 51	score.	107	GT00	22 00	else pause to dis-
052	GT0f	22 45	-----	108	F3?	16 23 03	play #. If Ø gtoØ
053	*LBLc	21 13	LBL C: Recall the	109	F3?	16 23 03	-----
054	DSF2	-63 02	total amount of	110	GT00	22 00	if no user responce
055	RCL2	36 02	money spent in play	111	CHS	-22	go to Ø
056	PSE	16 51		112	X#Y?	16-32	

REGISTERS

0 SCORE	1 GAMES	2 \$\$\$	3 BALLS	4	5	6 OUT BONUS	7 DROP TARGETS	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A 10	B 50	C 100	D	E	SEED	I	USED		

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	GT00	22 00		169	PSE	16 51	
114	2	02		170	PSE	16 51	
115	CHS	-22	test if tilt option	171	GT0d	22 16 14	
116	X#Y?	16-32	is up. If not,	172	*LBL1	21 01	
117	GT0d	22 16 14	put ball back in	173	F02	16 23 00	
118	GSBe	23 16 15	play.	174	GT01	22 01	SPECIAL star roll-overs.
119	2	02		175	SF0	16 21 00	
120	x	-35	if player has gone	176	DSP9	-63 09	
121	INT	16 34	for tilt, see if	177	RCLA	36 11	
122	X#0?	16-43	ball is lost or	178	GT00	22 14	
123	GT0b	22 16 12	not. Yes-gto f b	179	*LBL1	21 01	
124	GT0d	22 16 14	No-gto f d	180	DSP1	-63 01	
125	*LBL0	21 15		181	CF0	16 22 00	
126	ST0I	35 46	Store dsp. in I and	182	*LBL2	21 02	top roll-overs
127	GT0I	22 45	jump indirectly.	183	RCLA	36 11	
128	*LBL0	21 00		184	GT09	22 09	
129	8	08	LBL Ø: Out hole	185	*LBL3	21 03	thumper (mushroom)
130	CHS	-22	bonus scoring	186	RCLC	36 13	bumpers.
131	ST0I	35 46		187	RCLA	36 11	
132	RCLG	36 00		188	GT03	22 03	
133	X#0?	16-42		189	*LBL4	21 04	
134	GT00	22 00		190	RCLB	36 12	
135	1	01	if no score yet made	191	x	02	
136	ST+3	35-55 03	give ball back to	192	5	05	
137	DSP0	-63 00	user.	193	*LBL3	21 03	spinner gate
138	GT0c	22 16 13		194	GSBe	23 16 15	
139	*LBL0	21 00	Else, check if	195	x	-35	
140	1	01	double bonus is to	196	1	01	
141	F0?	16 23 00	be scored then	197	+	-55	
142	2	02	give out bonus.	198	INT	16 34	
143	ST+6	35-35 06		199	x	-35	
144	RCLG	36 00		200	GT09	22 09	
145	PSE	16 51		201	*LBL5	21 05	
146	EEX	-23		202	RCLB	36 12	kick out hole.
147	3	03		203	GT09	22 09	
148	ST-6	35-45 06		204	*LBL6	21 06	
149	ST+0	35-55 00		205	EEX	-23	
150	RCLB	36 00		206	3	03	Bonus Advance star
151	PSE	16 51		207	ST+6	35-55 06	roll-overs.
152	RCLG	36 06		208	RCLA	36 11	
153	X#0?	16-42		209	GT09	22 09	
154	GT0I	22 45		210	*LBL7	21 07	
155	R↓	-31		211	RCLA	36 11	
156	PSE	16 51		212	DS2i	16 25 45	
157	GT06	22 16 12		213	GT00	22 14	drop targets
158	*LBL9	21 05		214	5	05	
159	F0?	16 23 00	score points just	215	ST07	35 07	
160	RCLA	36 11	made on device	216	1	01	
161	F0?	16 23 00	checking to see	217	ST+3	35-55 03	
162	x	-35	if SPECIAL was	218	RCLC	36 13	
163	*LBL0	21 14	on.	219	GT09	22 09	
164	ST+0	35-55 00		220	*LBL8	21 08	
165	RCLI	36 46		221	RCLA	36 11	slingshot kickers
166	RCLA	36 11		222	GT0d	22 14	
167	+	-24	-set dsp to show				
168	+	-55	both score & device				

LABELS

LABELS					FLAGS		SET STATUS		
A	B	C	D	E	0	SPECIAL	FLAGS	TRIG	DISP
25c	CREDIT	RCL \$	USED	USED	1	ON OFF			
used	b used	c ball disp.	d used	e rnd. # gen.	0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
0 out hole	SPECIAL	2 roll overs	3 mushrooms	4 spin. gate	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
5 kick outs	6 bonus adv.	7 drop targ.	8 sling shot	9 used	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
					3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	n <input type="checkbox"/>	

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SCORING ITEMS AT A GLANCE

DEVICE #1: (Two circles at top of board, labeled "SPECIAL")
 Roll-Over Stars; switches SPECIAL scoring on and off and scores 10 points for each one hit.

DEVICE #2: (Two slots at top, marked with arrows)
 Top Roll-Overs; scores 10 points or 100 points when SPECIAL is lit.

DEVICE #3: (Two large circles about 1/3 down from top of board, Mushroom or Thumper-Bumpers; scores 100 points each time they are hit, or 1000 points when SPECIAL is lit. Ball can bounce between them for up to 10 times at one instance.

DEVICE #4: (Slot along left side of machine)
 Spinner Gate; scores 50 points for each spin, or 500 points when SPECIAL is lit. Gat can spin as much as 25 times when struck.

DEVICE #5: (Two circles, one by Spinner Gate, the other by drop targets, device #7)
 Kick Out Holes; scores 50 or 500 when SPECIAL is lit.

DEVICE #6: (Two circles near bottom marked "Advance Bonus")
 Bonus Advance Roll-Overs; scores 10 or 100 if SPECIAL is lit. Also adds 1000 more points to Out-Hole Bonus.

DEVICE #7: (Area to the right of board)
 Drop-Targets; scores 10 points for the first 4 hit. Scores 100 or 1000 (if SPECIAL is lit) on fifth hit. This fifth shot resets flags and adds an additional ball to game.

DEVICE #8: (Areas above the words "Flippers")
 Sling Shot Bumpers; scores 10 points when struck.

DEVICE #-1: Left Flipper is called for.

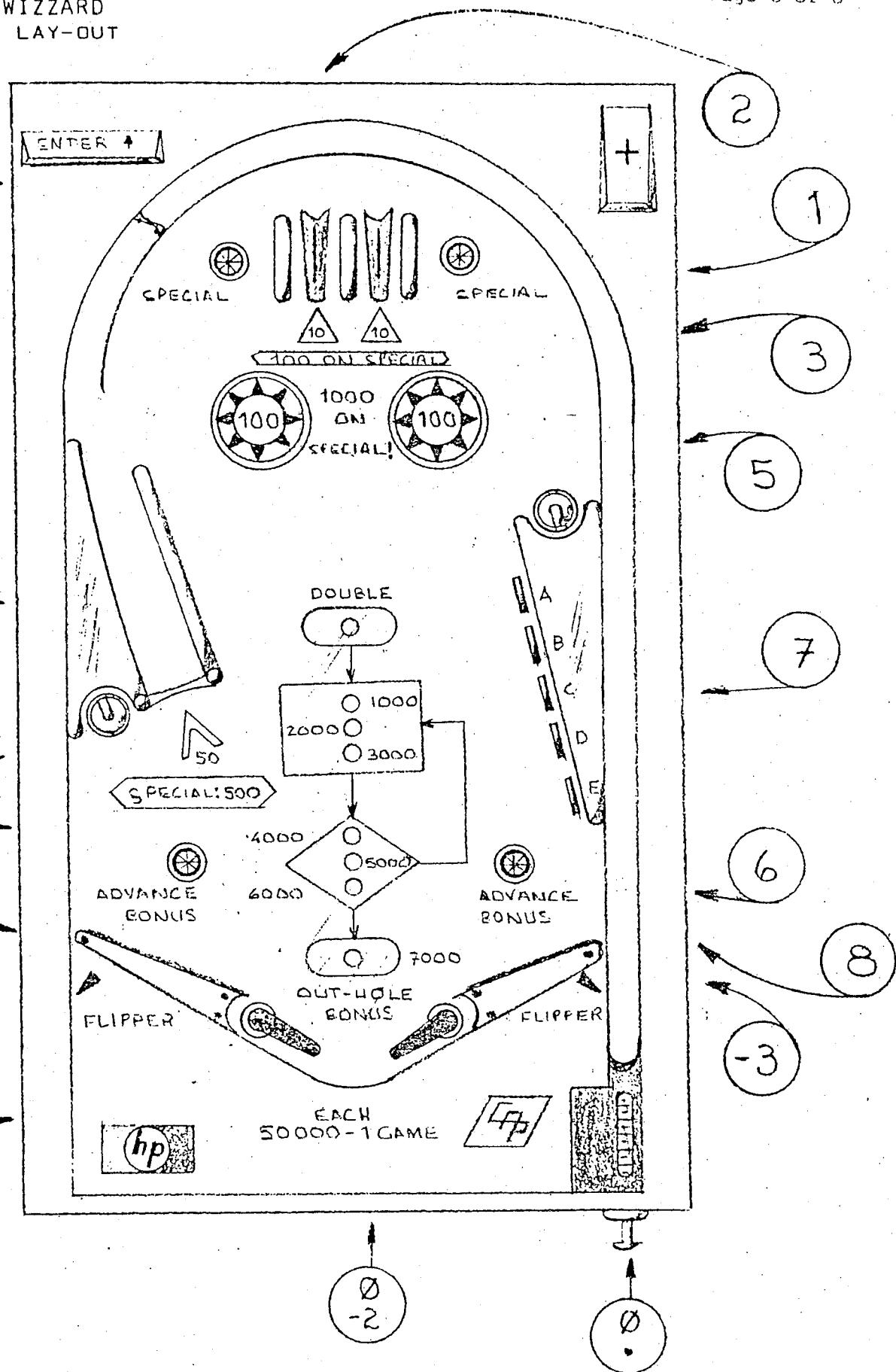
DEVICE #-3: Right Flipper is called for.

ZERO (0): Ball falls through Out Hole and collects Bonus points.

-2 : Ball falls through Out Hole and collects Bonus points, but gives player the option of tilting to put ball in play once more.

": Ball launcher.

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SPECIAL NOTE CONCERNING EITHER PROGRAM:

Steps have been added so that on the first ball, should the "ball" drop directly to a flipper or come a -2 (the tilt option) and no score was made, the ball will be returned to the player to shoot again, as it does on many regular pinball machines. Note that if the player chooses to attempt a tilt and fails, the ball will not return. Also, any accumulated score prior to a ball dropping through the out hole will prevent the ball from returning.

*** ADJUSTMENTS FOR LIBERAL SCORING ***

In the previously listed program, the scoring set up is referred to as "conservative"; that is, it is more difficult to score any free balls or free games. To make the game easier, the following changes can be made to adjust your "pinball" machine for easier scoring:

STEP NUMBER:	CHANGE FROM:	TO:	
# 070	3	5	(increase # of balls)
# 075	5	3	(decrease drop targets)
# 119	2	3	(less chance to tilt)
# 182	DELETE THIS STEP COMPLETELY		
# 183 (was # 184)	GTO 9	GTO D	
GTO STEP # 202 and key in:		LBL 2	(this now becomes step #203)
# 208	RCL A	RCL C	
# 213	GTO D	GTO 9	
# 214	5	3	

By making the following changes listed above, the following now occurs:

1. Five (5) balls are provided for each game
2. The number of drop targets needed for a free ball is reduced to 3.
3. First two drop targets down either score 10, or 100 if SPECIAL is lit.
4. Third drop target down either scores 100 or 1000 if SPECIAL is lit.
5. Both devices 2 and 6 (top roll-overs and Bonus advance roll-overs) advance Out Hole Bonus by 1000.
6. Both top roll-overs and Bonus advance roll-overs score 100, or 1000 if SPECIAL is lit.
7. Instead of a 50/50 chance of tilting the machine, the player has a 2 out of 3 chance of putting the ball back in play.

EXCEPT FOR THE CHANGES LISTED ABOVE, ALL OTHER DEVICES WORK THE SAME, AND NO FURTHER PROGRAM CHANGES SHOULD BE MADE.