CPU JUMPER TABLE

Game	CPU* Version	ROM Location	Jumpers Installed	Jumpers Removed
Laser Wars	Ver 1	5C	J1b,J3,J4,J6a,J7a,&J8	J1a,J2,J5,J6,&J7b
	Ver 2	5C	J1b,J3,J4,J5a,J6a,J7b,&J8	J1a,J2,J5,J5b,J6b,&J7a
Secret Service	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Torpedo Alley	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Time Machine	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a
Playboy	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J5a,J6a,&J7a

*Version 1 has a 2K RAM which is a 24-pin IC at location 5D.
*Version 2 has an 8K RAM which is a 28-pin IC at location 5D.

Power-up CPU Self Tests

Upon power-up, the CPU board performs a series of self tests of major components. Turn the game on while observing the LEDS on the CPU board. Tests of the PIAs, RAM, and EPROMs are performed automatically and results of the test are indicated by the PIA LED.

With all tests passed, the LEDs illuminate in the following sequence at power turn-on. The PIA and +5V LEDs illuminate immediately. Approximately 1/2-second later the PIA LED goes out and the Blanking LED illuminates; the +5V and Blanking LEDs remain illuminated until the game is turned off. Test failures are indicated with the PIA LED:

PIA LED	SUSPECT COMPONENT
Stays On	One of the 6821 PIAs
Flashes 1 Time	6064 RAM at location D5.
Flashes 2 Times	EPROM at location B5.
Flashes 3 Times	EPROM at location C5.

QUICK REFERENCE FUSE CHART

PPB BOARD

F1 5A Slo-Blo G.I. 6.3VAC
F2 5A Slo-Blo G.I. 6.3VAC
F3 5A Slo-Blo G.I. 6.3VAC
F4 5A Slo-Blo G.I. 6.3VAC
F5 5A Slo-Blo Flipper Power 48VAC
F6 3A Slo-Blo PPB Solenoids/Flash Lamps (34VDC)

POWER SUPPLY BOARD

F1 7A Slo-Blo +5VDC Regulator Input (9VAC)
F2 7A Slo-Blo +5VDC Regulator Input (9VAC)
F3 0.25A Slo-Blo Display Reg. Input (90VAC)
F4 8A Slo-Blo Switched Illumination Buss (18VDC)
F5 4A Slo-Blo Solenoid Buss (34VDC)
F6 5A Slo-Blo Solenoid Buss (34VDC)

DATA EAST

PLAYBOY

35th Anniversary

AUDIT FUNCTIONS

There are 69 audit functions provided for accounting purposes and for evaluation of game difficulty adjustments. Audit functions are split into two groups. There are eleven most-used audits (AU01 through AU11) in a 'quick look' group and 57 less-used audits (E AU13 through E AU69), in an 'expanded' group. The various auditing functions are summarized in the **AUDITING FEATURES TABLE** and, when accessed, are shown on the player score displays. The *Audit Number* is shown in the Player 3 Display, the *Description* in the Player 1 and 2 Displays, and the *Audit Total* in the Player 4 Display. Access and control is provided from switches located on the inside of the coin door.

To access audit functions,open the coin door and make sure that the FORWARD/REVERSE switch is in the FORWARD (up) position. Depress the STEP switch and the game name is shown in the Player 1 and 2 displays, the Player 3 display is blank, and the PROM revision level is shown in the Player 4 display. This indicates access to audit functions.

With the FORWARD/REVERSE push-button switch still in the FORWARD (up) position, depressing the STEP push-button switch advances through the audit functions one at a time. To review lower-numbered functions, set the forward/reverse push-button switch to the REVERSE (down) position and operate the STEP push-button switch.

To access expanded audits, operate the step push-button until AU12, EXPAND AUDITS is displayed. Set the choice to ON as indicated in the Player 4 display by depressing the Game Start push-button and then depress the step push-button. The request is installed and E AU13 is displayed. When you exit audits and adjustments, the AU12 setting is returned to off for the next time that a review of audits are required.

Audit totals may be reset to zero using Game Adjustment Ad17, Audits Reset. Game adjustments (Ad01 to Ad19 and E Ad20 to E Ad59) begin after the last audit function (AU12 or E AU69). Once audits functions have been recorded, and if no adjustments are required, you may return the game to the attract mode. If adjustments are required, continue pressing the STEP button until the game adjustments are reached. See Game Adjustments for details.

Audit Number (Player 3 Display)	Audit Description (Players 1 & 2 Displays; totals in Player 4 Display)
–	Playboy PROM ID
AU 01	Total Paid Credits
AU 02	Free Percent
AU 03	Ball Time Average
AU 04	Coins Left
AU 05	Coins Right
AU 06	Coins Center
AU 07	Replay Percent
AU 08	High Score Percent
AU 09	Extra Ball Total
AU 10	Extra Ball Percent
AU 11	Cycles Burn In
AU 12	Expand Audits (ON/OFF)
E AU 13	Plays Total
E AU 14	Free Total
E AU 15	Replay Total
E AU 16	Special Total
E AU 17	Special Percent
E AU 18	Match Total
E AU 19	High Score Wins
E AU 20	Play Time (Minutes)
E AU 21	Balls Total
E AU 22	1 Replay Awards
E AU 23	2 Replay Awards
E AU 24	3 Replay Awards
E AU 25	4 Replay Awards
E AU 26	Games 1 Player
E AU 27	Games 2 Player
E AU 28	Games 3 Player
E AU 29	Games 4 Player
E AU 30	Cycles Attract Mode
E AU 31	Cycles Reset High Score
E AU 32	Enter 3 Ball
E AU 33	Unused
E AU 34	Percent Multiball
E AU 35	Lock Ball 1
E AU 36	Lock Ball 2
E AU 37	Percent Lock Ball
E AU 38	Laser Kick Scored
E AU 39	Laser Kick Relit
E AU 40	Left Ramp
E AU 41	Right Ramp
E AU 42	Mansion Lit
E AU 43	Mansion Scored
E AU 44	Pinball Lit
E AU 45	Pinball Scored
E AU 46	Special Scored
E AU 47	Playboy 50K
E AU 48	Playboy 100k
E AU 49	Playboy Outlane
E AU 50	Bonus Hold
E AU 51	Playboy Extra Ball
E AU 52	Playboy Million
E AU 53	2x Bonus
E AU 54	3x Bonus
E AU 55	4x Bonus
E AU 56	5x Bonus
E AU 57	Lane Extra Ball
E AU 58	2x Scores
E AU 59	3x Scores
E AU 60	4x Scores
E AU 61	5x Scores
E AU 62	Jackpot Shots
E AU 63	Jackpot Average
E AU 64	Ramp Average
E AU 65	Drain Left
E AU 66	Drain Center
E AU 67	DrainRight
E AU 68	Buy In Games
E AU 69	Average Game Time

© Copyright Data East Pinball, Inc. 1989

GAME ADJUSTMENTS

GENERAL

There are 59 adjustable functions provided to vary difficulty of play and to periodically reset audits and the high score levels. The various game adjustments are summarized in the **Game Adjustments Table** and, when accessed, are shown on the player score displays. The *Adjustment Number* is shown in the Player 3 Display, the *Description* in the Player 1 and 2 Displays, and the setting in the Player 4 Display. Access and control is provided from switches located on the inside of the coin door.

Game adjustments are accessed from the audit mode. With the audits displaying game identification and the FORWARD/REVERSE switch in the REVERSE (down) position, depress the STEP switch and E Ad59 (Expanded Adjustment 59) is shown in the Player 3 display, FACTORY RESET is shown in the Player 1 & 2 displays,and OFF is shown in the Player 4 display.With the audits displaying AU12(or expanded E AU69)and the FORWARD/REVERSE switch in the FORWARD (up) position, depress the STEP switch and Ad01 is shown in the Player 3 display, REPLAY MANUAL/FIXED is shown in the Player 1 and 2 displays, and the setting is shown in the Player 4 display.

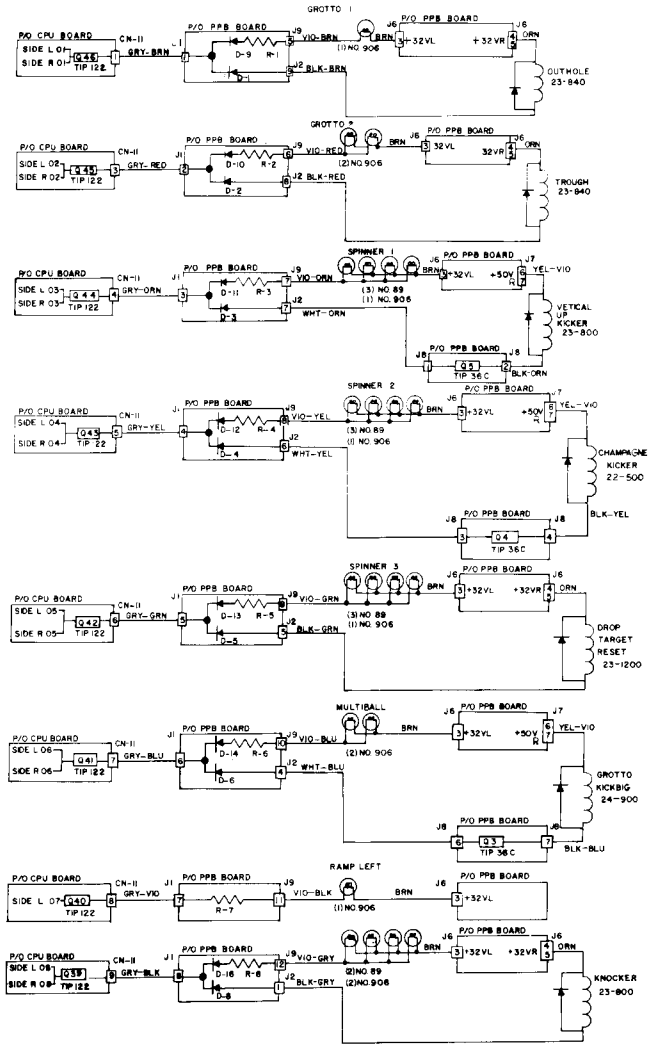
With the FORWARD/REVERSE switch in the FORWARD (up) position, depressing the STEP switch advances through the game adjustments one at a time. With it in the REVERSE (down) position, the STEP switch selects lower-numbered adjustments. To rapidly scroll through adjustments, hold the STEP switch depressed. Adjustment values are changed by operating the GAME START push-button.The FORWARD/REVERSE switch setting determines whether the values are increased or decreased.(With the FORWARD/REVERSE switch up,the value increases ,with it down, the value decreases). When the STEP switch is depressed the Player 1 and 2 displays indicate REQUEST INSTALLED.

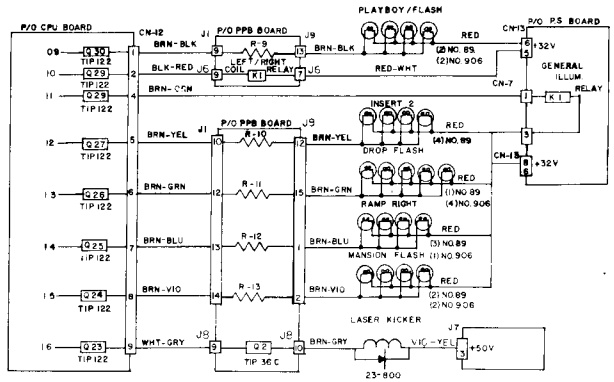
CUSTOM PRICING TABLE

Coin Mechs				Adjustment Numbers						
Left	Right	Center	Plays/Coins	14	19	38	39	40	41	42
25¢	25¢	$1.00	1/25¢ 3/50¢	Custom	ON	01	01	04	01	02
			1/25¢ 5/$1.00	Custom	ON	01	01	04	01	04
			1/25¢/ 6/$1.00	Custom	ON	05	05	20	04	20
5SCH	10SCH	10SCH	1/10 SCH	Custom	ON	01	02	02	02	00
			1/10 SCH 4/30SCH	Custom	ON	04	08	08	06	00
20¢	$1.00	--	1/20¢	Custom	ON	01	05	00	01	00
			1/60¢ 2/$1.00	Custom	ON	01	05	00	03	05
10P	10P	50P	1/10P 6/50P	Custom	ON	01	01	05	01	05
			1/20P 3/50P	Custom	ON	01	01	05	02	05

INSTALL ADJUSTMENT TABLE

Install Adjustment	Ad 06 Extra Easy	Ad 07 Easy	Ad 08 Factory	Ad 09 Hard	Ad 10 Extra Hard
E Ad 47 General Scores	EASY	FACTORY	FACTORY	HARD	HARD
E Ad 48 General Timer	EASY	EASY	FACTORY	FACTORY	HARD
E Ad 49 General Memory	EASY	EASY	FACTORY	HARD	HARD
E Ad 50 Playboy Targets	EASY	FACTORY	FACTORY	FACTORY	HARD
E Ad 51 Extra Ball 5x	ON	ON	ON	OFF	OFF
E Ad 52 Playboy Percent	EASY	FACTORY	FACTORY	HARD	HARD
E Ad 53 Laser Kick	EASY	EASY	FACTORY	HARD	HARD
E Ad 55 Mansion Memory	PLAYER	BALL	BALL	BALL	NONE
E Ad 56 Pinball Memory	PLAYER	PLAYER	BALL	BALL	NONE





COIL TESTS

Sixteen regular (pulsed under microprocessor control) and six switch-triggered coil drivers are provided to switch ground to coils. Coil number 10 is used in conjunction with drives 1 through 8 to switch +34 volts between coils or flash lamps; these sets are termed "left" and "right". Coil number 10 is located on the PPB board which provides isolation diodes and current limiting and heater resistors. This effectively provides 23 regular coils.

Automatic Test

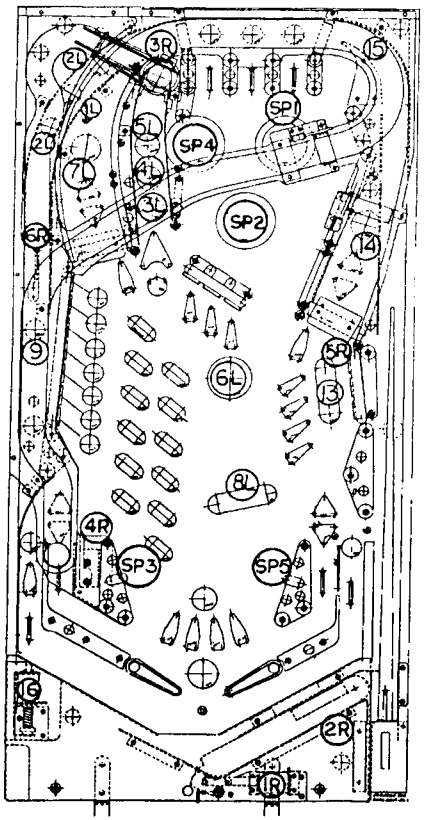
From the Discrete Lamps test, depress the STEP push-button switch. Player 1 and 2 displays indicate COIL TEST. The test pulses each regular solenoid or flash lamp sequentially with the coil/flash lamp name indicated in the Player 1 and 2 displays and the drive number in the Player 4 display.

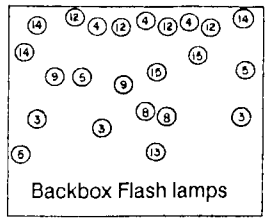
Select Coil

From the Coil Test, depress the STEP push-button switch. Player 1 and 2 displays indicate SELECT COIL and then the name of drive 1L, the drive number is indicated in the Player 4 display. Operate the Game Start push-button switch to select the coil or flash lamp to be tested. With the desired drive number indicated in the Player 4 display, depress the STEP push-button switch to cause it to be pulsed repeatedly.

RETURN TO GAME OVER

From the Select Coil test, depress the STEP push-button switch one time if a selected coil is pulsing or two times none is pulsing. The game returns to the game-over mode.





SWITCH TRIGGERED SOLENOIDS

Coil Number	Coil Description	Control Line (CPU to Coil)	Power Line (PS to Coil)	Trigger Line (Coil Bd To CPU)	Drive Transistor (TIP 122)	Coil Type
SP1	Center Pop Bumper	BLU-ORN CPU CN19-3	RED PS CN3-6	ORN-BLK CPU CN 18-2	Q8	23-800
SP2	Right Pop Bumper	BLU-RED CPU CN19-4	RED PS CN3-6	ORN-RED CPU CN 18-3	Q9	23-800
SP3	Left Slingshot	BLU-YEL CPU CN19-5	RED PS CN3-6	ORN-YEL CPU CN 18-4	Q10	23-800
SP4	Left Pop Bumper	BLU-BRN CPU CN19-7	RED PS CN3-6	ORN-BRN CPU CN 18-5	Q11	23-800
SP5	Right Slingshot	BLU-GRN CPU CN19-8	RED PS CN3-6	ORN-GRN CPU CN 18-6	Q12	23-800
SP6	NOT USED	– CPU CN19-9	– PS CN3-6	– CPU CN 18-9	Q13	–

FLIPPER SOLENOIDS

Coil Description	Flipper GND (CPU to Cab)	Flipper GND (Cab To Coil)	Power Lines (PPB & PS to Coil)		Coil Type
Left Flipper	ORN-GRY CPU CN19-2	BLU-GRY 1M/F-24	GRY-YEL PPB J7-5	GRY-GRN PS CN1-10	22-900
Right Flipper	ORN-VIO CPU CN19-1	BLU-VIO 1M/F-21	BLK-WHT PPB J7-1,2 50VDC	GRY-GRN PS CN1-10 8VAC	22-900

PLAYBOY COIL PART NUMBER CHART

QUANTITY USED	COIL TYPE	DATA EAST PINBALL PART NUMBER
8	23-800	090-5001-00
1	24-900	090-5002-00
2	23-840	090-5005-00
1	12-1200	090-5006-00
1	22-500	090-5017-00
2	22-900	090-5020-21

Game Adjustment Table

Adjustment Number (Player 3)	Description (Players 1 & 2)	Factory Setting (Player 4)
AD 01	Replay/Manual	10%
AD 02	Start Replay/Level 1 Replay	2,300,000
AD 03	Levels Replay/Level 2 Replay	01
AD 04	Level 3 Replay	-
AD 05	Level 4 Replay	-
AD 06	Extra Easy Rules	OFF
AD 07	Easy Rules	OFF
AD 08	Factory Rules	ON
AD 09	Hard Rules	OFF
AD 10	Extra Hard Rules	OFF
AD 11	Novelty Rules	OFF
AD 12	5 Ball Rules	OFF
AD 13	Addaball Rules	OFF
AD 14	Standard/Custom Pricing	USA 1
AD 15	Time Setting	ON
AD 16	Coin Reset	OFF
AD 17	Audits Reset	OFF
AD 18	Restore Hiscr	OFF
AD 19	Expand Adjustments	OFF
E Ad 20	Awards Replay	CREDITS
E Ad 21	Awards Special	CREDITS
E Ad 22	Match Feature	ON
E Ad 23	Balls/Game	03
E Ad 24	Warning Tilt	01
E Ad 25	Maximum Extra Balls	03
E Ad 26	Credits Limit	30
E Ad 27	Scores Highest	ON
E Ad 28	Credits High Score 1	03
E Ad 29	Credits High Score 2	00
E Ad 30	Credits High Score 3	00
E Ad 31	Credits High Score 4	00
E Ad 32	High Score 1 Backup	5,000,000
E Ad 33	High Score 2 Backup	4,000,000
E Ad 34	High Score 3 Backup	3,000,000
E Ad 35	High Score 4 Backup	2,500,000
E Ad 36	High Score Reset Every	700
E Ad 37	Free Play	OFF
E Ad 38	Left Coin Pulses	-
E Ad 39	Right Coin Pulses	-
E Ad 40	Center Coin Pulses	-
E Ad 41	Pulses For Credit	-
E Ad 42	Pulses For Bonus Credit	-
E Ad 43	Message Custom	ON
E Ad 44	Text	ENGLISH
E Ad 45	Attract Mode Music	ON
E Ad 46	Lights	FACTORY
E Ad 47	General Scores	FACTORY
E Ad 48	General Timer	FACTORY
E Ad 49	General Memory	FACTORY
E Ad 50	Playboy Targets	HARD
E Ad 51	Extra Ball 6x	ON
E Ad 52	Playboy Percent	FACTORY
E Ad 53	Laser Kick	FACTORY
E Ad 54	Knocker Alarm	ON
E Ad 55	Mansion Memory	BALL
E Ad 56	Pinball Memory	BALL
E Ad 57	Auto Special	ON
E Ad 58	Risque Sound	ON
E Ad 59	Factory Restore	OFF

GAME DIAGNOSTICS

The Data East Pinball system provides tests for sounds, digital displays, lamps, switches, and solenoids. Each feature may be tested manually or automatically using the STEP and FORWARD/REVERSE push-button switches inside the coin door and the Game Start push-button switch on the front of the cabinet. The automatic tests may be used for a quick verification of automatic test functions and the manual tests, for troubleshooting.

ENTERING DIAGNOSTICS

With the game in the game-over mode, open the coin door and make sure that the FORWARD/REVERSE push-button switch is set to REVERSE (down) and depress the STEP push-button switch. The Player displays will show the tollfree Customer Service number 1-800-KICKERS, that is 1-800-542-5377 (outside Illinois) and the toll number (312) 345-7700 (inside Illinois). this indicates entry into game diagnostics.

SOUND TESTS

The Data East Pinball sound system produces true digital stereo sound on left and right speakers and mono on a center speaker. During Sound tests, the Player 1 and 2 displays show the sound board circuit under test and the corresponding sounds are produced. Refer to the Sound Test Chart for the sound circuits displayed and the sounds produced.

The sine wave functions allow verification that all channels are functioning properly and that the speaker connections are correct. Speaker Phase Testing procedures follow for checking speaker connections.

SOUND TEST CHART

Auto/Manual Tests (Player 1 & 2)	**Sounds Produced**
LEFT SINE	60 CYCLE TONE (Left Speaker Only)
CENTER SINE	60 CYCLE TONE (All speakers)
RIGHT SINE	60 CYCLE TONE (Right Speaker Only)
VOICE ROM1 (Loc F6)	"THAT'S BEAUTIFUL", "00H!", HORN BLAST "MMM..!" CHIMPANZEE SOUNDS
VOICE ROM2 (Loc F4)	BIRD CALL, "OOH!", "CAIO BABY" HORN BLAST.
MUSIC TEST (Sound ROM Loc F7)	MUSIC

Automatic Test

With Customer Service telephone numbers displayed, depress the STEP push-button switch. Player 1 and 2 displays indicate SOUNDS AUTO and the system sequences through the test producing the sounds indicated in the Sound Test Chart.

Manual Test

Operate the STEP push-button switch during the Automatic tests until SOUNDS MANUAL is indicated in the Player 1 and 2 displays. Depressing the Game Start push-button switch allows you to advance through each sound function.

LAMP MATRIX CHART

Column (*) / Row (*)	1 YEL-BRN (41) Q71	2 YEL-RED (42) Q70	3 YEL-ORN (43) Q69	4 YEL-BLK (40) Q68	5 YEL-GRN (45) Q67	6 YEL-BLU (46) Q66	7 YEL-VIO (47) Q65	8 YEL-GRY (48) Q64
1 RED-BRN (21) Q72	Playboy 1	Miss July 50k 9	Photo Shoot 1 17	Up L&R Release 25	Up Rt. Man.Pty 33	Pinball 41	pInball 49	Mansion 57
2 RED-BLK (20) Q73	pLayboy 2	Miss Aug.100k 10	Photo Shoot 2 18	Lock Ball#1 26	Bonus Hold 34	Rt.Score PBValue 42	Lt.Score PBValue 50	mAnsion 58
3 RED-ORN (23) Q74	plAyboy 3	Miss Sept. 11	Photo Shoot 3 19	Lock Ball Arr. 27	Play Again 35	Right Peacock 43	Left Peacock 51	maNsion 59
4 RED-YEL (24) Q75	playBoy 4	Miss Oct. 12	Photo Shoot 4 20	Left Grn Arr.Tar. 28	2X 36	DropTar. 100K 44	Lwr.Lft. BunnyHop 52	manSion 60
5 RED-GRN (25) Q76	playBoy 5	Miss Nov. 13	Photo Shoot 5 21	Ctr.Grn Arr.Tar. 29	3X 37	DropTar. 75K 45	piNball 53	mansIon 61
6 RED-BLU (26) Q77	playbOy 6	Miss Dec. 14	Photo Special 22	Rt.Green Arr.Tar. 30	4X 38	DropTar. 50K 46	pInBall 54	mansIOn 62
7 RED-VIO (27) Q78	playboY 7	Top Left BunnyHop 15	Spinner X-Ball 23	Mult.All Scores 31	5X 39	DropTar. 25K 47	pInbAll 55	mansioN 63
8 RED-GRY (28)) Q79	Lt."H" Lane 8	Ctr."M" Lane 16	Rt."H" Lane 24	Lock Ball#2 32	Up.Left Man.Pty 40	Up.Rt. BunnyHop 48	pInbaLl 56	pInbaIL 64

(*) 2 DIGIT NUMBER IN PARENTHESES INDICATES RESISTOR/WIRE COLOR CODE NUMBER DISPLAYED DURING DIAGNOSTICS.

LAMP TESTS

Controlled lamps are configured in an 8 x 8 matrix of columns (lamp drives) and rows (lamp returns) with up to 64 lamps possible. The lamp tests include four parts, all lamps, lamp return (row), lamp drive (column), and discrete (individual) lamps. Row and column wire colors are indicated in the discrete lamp test using corresponding resistor color code numbers.

All Lamps

From the Bad Switch test, operate the STEP push-button switch. Player 1 and 2 displays indicate ALL LAMPS and all controlled lamps will light.

Lamp Returns

From the ALL LAMPS test, depress the STEP push-button switch. Player 1 and 2 displays indicate LAMP ROWS and the Player 4 display indicates 01 for row 1. All controlled lamps in row 1 should be lit. Operating the Game Start push-button switch cycles through each of the rows separately.

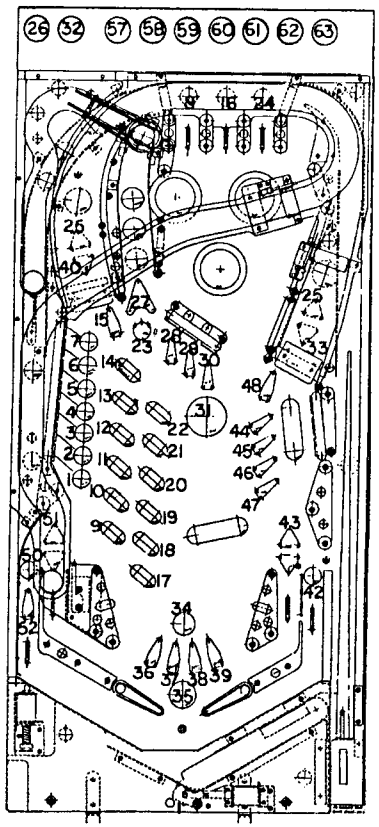
Lamp Drives

From the LAMP ROWS test, depress the STEP push-button switch. Player 1 and 2 displays indicate LAMP COLUMNS and the Player 4 display indicates 01 for column 1. All controlled lamps in column 1 should be lit. Operating the Game Start push-button switch,cycles through each of the columns separately.

Discrete Lamp

From the LAMP COLUMNS test, depress the STEP push-button switch. Player 1 and 2 displays indicate LAMP TEST and then the name assigned to lamp 01; the Player 1 and 2 displays indicate the lamp name, the Player 3 display indicates the row and column wire colors, and the Player 4 display indicates 01. Lamp 01 should light. With the FORWARD/REVERSE push-button switch in the FORWARD (up) position, operating the Game Start push-button switch selects higher-numbered lamps; with it in the REVERSE (down) position, Game Start selects lower-numbered lamps.

Lamp Number	Description
01*	"P"layboy
02*	p"L"ayboy
03*	pl"A"yboy
04*	pla"Y"boy
05*	play"B"oy
06*	playb"O"y
07*	playbo"Y"
08*	Left "H" Lane
09	Miss July 50K
10	Miss August 100k
11	Miss September Ltes Outlane 50k
12	Miss October 50k Bonus Hold Over
13	Miss November Extra Ball
14	Miss December 1,000,000
15	Top Left Bunny Hop
16	Center "M" Lane
17	Photo Shoot 1
18	Photo Shoot 2
19	Photo Shoot 3
20	Photo Shoot 4
21	Photo Shoot 5
22	Photo Shoot Special
23	Spinner Extra Ball
24	Right "H" Lane
25	Upper Left and Right Release Ball
26	Lock Ball #1
27	Lock Ball (Big arrow)
28	Left Green Arrow Target
29	Center Green Arrow Target
30	Right Green Arrow Target
31	Multiply All Scores
32	Lock Ball #2
33	Upper Right Mansion Party
34	Bonus Holdover
35	Play Again
36	2x
37	3x
38	4x
39	5x
40	Upper Left Mansion Party
41	"P"inball
42	Rt Score Playboy Value
43	Right Peacock
44	Drop Target 100k
45	Drop Target 75k
46	Drop Target 50k
47	Drop Target 25k
48	Upper Right Bunny Hop
49	p"I"nball
50	Lt.Score Playboy Value
51	Left Peacock
52	Lwr Lft.Bunny Hop
53	pl"N"ball
54	pin"B"all
55	pinb"A"ll
56	pinba"L"l
57	"M"ansion
58	m"A"nsion
59	ma"N"sion
60	man"S"ion
61	mans"I"on
62	mansi"O"n
63	mansio"N"
64	pinball"L"



*Indicates Insert Lamp

DIGITAL DISPLAY TEST

Digital displays are driven by digit and segment driver circuits. Digit drivers sequentially select individual character positions (Player 1 and 2 displays) and digit positions (Player 3 and 4 displays). Segment drivers (16 for Player 1 and 2 characters; 7 for Player 3 and 4 digits) select the individual segments of each position.

Automatic Test

To enter Display tests, operate the STEP push-button switch from the Sound Manual test. Player 1 and 2 displays indicate DISPLAY AUTO. The displays will sequence from all ZEROS to all nines in the four displays. Next all segments are lit for each digit position in sequence.

Manual Test

Operate the TEST push-button switch from the automatic test; Player 1 and 2 displays indicate DISPLAY MANUAL and then display ZEROS in all positions. Operate the Game Start push-button switch to cycle through each portion of the test.

Switches

Switches are configured in an 8 x 8 matrix of columns (switch drives) and rows (switch returns) with up to 64 switches possible. The switch tests include three parts; switch test, active switches, and bad switches. Row and column wire colors are indicated in each test using corresponding resistor color code numbers.

0 = Black
1 = Brown
2 = Red
3 = Orange
4 = Yellow
5 = Green
6 = Blue
7 = Violet
8 = Grey
9 = White

Switch Test

From the Display Manual test, operate STEP push-button switch. Player 1 and 2 displays indicate SWITCH TEST. Close each switch and observe the displays. The Player 1 and 2 displays will indicate the switch name, the Player 3 display indicates the row and column wire colors, and the Player 4 display indicates the switch number. When a switch is released, the name and number disappear until another switch is closed or the test is exited.

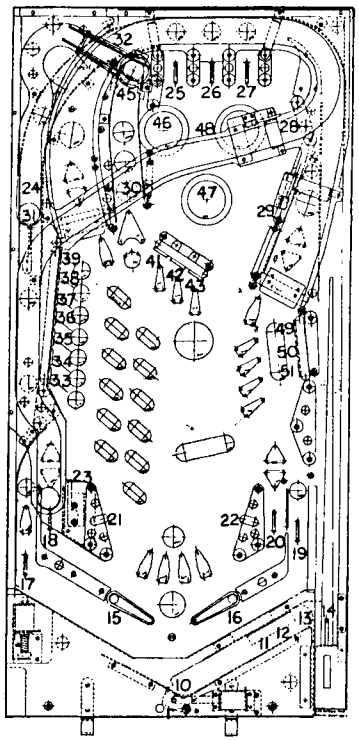
Active Switches

Operate the STEP push-button switch from the Switch Test. Player 1 and 2 Displays indicate ACTIVE SWITCHES. If any switches are stuck closed (or made from the presence of a ball), the Player 1 and 2 displays sequence through switch names, the Player 3 display indicates the row and column wire colors, and the switch numbers are indicated in the Player 4 display. This cycle continues until all switches are cleared or until the STEP push-button switch is depressed.

Bad Switches

Operate the STEP push-button switch from the Switch Test. Player 1 and 2 Displays indicate BAD SWITCHES. During game play, the system keeps track of the last game in which each switch was made. Should a switch not be made for 100 games, it is considered to be bad. If there are any, the Player 1 and 2 displays sequence through switch names, the Player 3 display indicates the row and column wire colors, and the switch numbers are indicated in the Player 4 display. This cycle continues until the STEP push-button switch is depressed.

Number	Description	Part No.
01*	Plumb Tilt	500-5023-00
02	Not Used	--
03	Credit Button	500-5097-00
04*	Right Coin	180-5024-00
05*	Center Coin	180-5024-00
06*	Left Coin	180-5024-00
07*	Slam Tilt	180-5022-00
08	Not Used	--
09	Not Used	--



Number	Description	Part No
10	Out Hole	180-5011-00
11	Trough #1	180-5009-00
12	Trough #2	180-5009-00
13	Trough #3	180-5010-00
14	Shooter Lane	500-5142-00
15	Left Flip. Instant Info.	180-5026-00
	Left EOS	180-5018-00
16	Right Flip. Instant Info.	180-5026-00
	Right EOS	180-5018-00
17	Left Outlane	500-5143-00
18	Left Return Lane	180-5003-00
19	Right Outlane	515-5138-00
20	Right Return Lane	180-5003-00
21	Left Slingshot Trigger Sw.	180-5054-00
	Left Slingshot Point Sw.	180-5055-00
22	Right Slingshot Trigger Sw.	180-5054-00
	Right Slingshot Point Sw.	180-5055-00
23	Champagne Kicker	180-5040-00
24	Grotto 1	180-5028-00
25	Left Top Lane	515-5138-00
26	Center Top Lane	515-5138-00
27	Right Top Lane	515-5138-00
28	Ramp Center	180-5010-00
29	Ramp Right	180-5010-00
30	Left Spinner	180-5004-00
31	Grotto 2	180-5040-00
32	Ramp Left	180-5034-00
33	P -Target	515-5124-18
34	L -Target	515-5124-08
35	A -Target	515-5124-18
36	1st Y -Target	515-5124-18
37	B -Target	515-5124-18
38	O -Target	515-5124-18
39	2nd Y -Target	515-5124-18
40	Not Used	--
41	Center 3 Bank Left	515-5124-18
42	Center 3 Bank Middle	515-5124-18
43	Center 3 Bank Right	515-5124-18
44	Not Used	--
45	VUK	180-5041-00
46	Left Pop Bumper	180-5036-00
47	Center Pop Bumper	180-5036-00
48	Right Pop Bumper	180-5036-00
49	Drop 1 (Top)	180-5025-01
50	Drop 2 (Center)	180-5025-01
51	Drop 3 (Bottom)	180-5025-01
52	Not Used Thru 64	

*INDICATES CABINET SWITCHES.

SWITCH MATRIX CHART

Column (*) / Row (*)	1 GRN-BRN (51) Q55	2 GRN-RED (52) Q54	3 GRN-ORN (53) Q53	4 GRN-YEL (54) Q52	5 GRN-BLK (50) Q51	6 GRN-BLU (56) Q50	7 GRN-VIO (57) Q49	8 GRN-GRY (58) Q48
1 WHT-BRN (91)	Plumb Tilt 1	Not Used 9	Left Outlane 17	Left Top Lane 25	P Target 33	Ctr 3 Bank-Lft 41	Drop 1 Top 49	Not Used 57
2 WHT-RED (92)	Not Used 2	Outhole 10	Left Return 18	Cntr.Top Lane 26	L Target 34	Cntr 3 Bank-Mid 42	Drop 2 Center 50	Not Used 58
3 WHT-ORN (93)	Credit Button 3	Trough #1 11	Right Outlane 19	RightTop Lane 27	A Target 35	Cntr 3 Bank-Rt. 43	Drop 3 Bottom 51	Not Used 59
4 WHT-YEL (94)	Right Coin 4	Trough #2 12	Right Return 20	Ramp Center 28	1st Y Target 36	Not Used 44	Not Used 52	Not Used 60
5 WHT-GRN (95)	Center Coin 5	Trough #3 13	Left Slingsht 21	Ramp Right 29	B Target 37	VUK 45	Not Used 53	Not Used 61
6 WHT-BLU (96)	Left Coin 6	Shooter Lane 14	Right Slingsht 22	Left Spinner 30	O Target 38	Left Pop 46	Not Used 54	Not Used 62
7 WHT-VIO (97)	Slam Tilt 7	Left EOS 15	Champ. Kicker 23	Grotto 2 31	2nd Y Target 39	Center Pop 47	Not Used 55	Not Used 63
8 WHT-GRY (98)	Not Used 8	Right EOS 16	Grotto 1 24	Ramp Left 32	Not Used 40	Right Pop 48	Not Used 56	Not Used 64

(*) 2 DIGIT NUMBER IN PARENTHESES INDICATES RESISTOR/WIRE COLOR CODE NUMBER DISPLAYED DURING DIAGNOSTICS.