

# LASERPROBE

## **INSTRUCTION MANUAL** **including procedures for...**

- **operation**
- **auditing**
- **adjustment**
- **diagnostics**



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### ROM Summary

<u>IC</u>	<u>DESCRIPTION</u>	<u>TYPE</u>	<u>NUMBER</u>	<u>BOARD</u>	<u>PART NO.</u>
Game ROM 0	ROM 2Kx8	2716	IC26	CPU	A-5343-10667
Game ROM 1	ROM 2Kx8	2716	IC14	CPU	A-5343-10666
Flipper ROM 1	ROM 2Kx8	2716	IC20	CPU	A-5343-09553
Flipper ROM 2	ROM 4Kx8	8332	IC17	CPU	A-5341-09554
Sound ROM	ROM 2Kx8	2716	IC12	Sound	A-5343-10665

### Special Considerations When Replacing Circuit Boards

#### CPU BOARD

1. A revision-level 7, D-8342 CPU Board (batteries at lower left) must be used.
2. The CPU Board must be equipped with blue-labeled flipper ROMs and game ROMs.
3. Only jumpers W3, W6, W8, W10, W11, W14, W17, W19, W20, W22, W25, W26 and W29 should be connected.

#### DRIVER BOARD

The D-7997 Driver Board must be equipped with zero-ohm resistors or wire jumpers (W9 through W16) in place of switch-matrix drive series-resistors R204 through R211.

#### SOUND BOARD

The D-8223 Sound Board must be jumpered for ROM operation. The LASER CUE sound-ROM must be used. Jumpers W1, W2, W5, W7, W9, W10 and W15 must be connected (all other jumpers removed).

#### POWER-SUPPLY BOARD

The D-8345 Power-Supply Board (equipped with relay) is required.

#### DISPLAY BOARDS

The C-8363 Master-Display Board and 7-digit slave displays are required.

### Control Locations

THE ON-OFF SWITCH is on the bottom of the cabinet near the right-front leg as you face the game.

THE VOLUME CONTROL is accessible through the coin door on the left cabinet-wall.

DIAGNOSTIC SWITCHES. ADVANCE, AUTO-UP/MANUAL-DOWN, and HIGH-SCORE RESET switches are located on the back of the coin door. Refer to ADJUSTMENT PROCEDURES and DIAGNOSTIC PROCEDURES for operation.

THE MEMORY-PROTECT SWITCH must be open to clear bookkeeping totals and to make game adjustments. This switch is on the inside of the coin-door frame. It automatically opens when the coin door opens.

THE CPU DIAGNOSTIC-SWITCH operates the self-test explained in DIAGNOSTIC PROCEDURES. This switch is on the left edge of the CPU Board.

THE SOUND-BOARD DIAGNOSTIC-SWITCH is on the top edge of the Sound Board. This switch is used to initiate the Sound-Board self-test. Refer to DIAGNOSTIC PROCEDURES.

## Game Operation

GAME-OVER MODE. Turn the game ON. The PLAYER-1 score shows 00, all player scores flash the High-Score-To-Date and the GAME-OVER lamp lights. All playfield-lamps cycle in Attract Mode.

CREDIT POSTING. Insert coins. A sound is produced and the number of credits is displayed. If maximum credits\* are exceeded by coin or High-Score-To-Date, credits are posted correctly. But the coin lockout de-energizes until the remaining credits are below the maximum. No credits may be won (and coins are rejected) while the coin lockout is de-energized.

GAME START. Push the CREDIT button. A start-up tune is played, a ball is served, and the CREDIT display is reduced by one. PLAYER 1 UP flashes until the first scoring-switch is made, and the BALL-IN-PLAY display shows 1. Additional players may enter the game by pushing the CREDIT button before BALL 2 is displayed.

EXTRA BALL. Shoot for flashing ball-targets. Completing a rack (all 15 ball-targets) lights the 8-ball target for an extra ball.

SPECIAL. Making P-O-O-L advances the bonus multiplier and spots a letter in B-A-L-L. Advancing the bonus multiplier to x10 lights SPECIAL. Making B-A-L-L lights the next ball (1-15) and spinner.

BONUS BALL. Completing a rack lights the 8-Ball target for a bonus ball.

BONUS SCORE. The number of balls (1-15) made times the highest bonus multiplier comprises the bonus score.

TILT. The ball in play is tilted on the first closure of the ball-roll tilt and the third\* closure of the plumb-bob or playfield tilts. The slam tilt returns the game to the Game-Over Mode.

END OF GAME. Match digits\* appear in the BALL-IN-PLAY display. Credit\* is awarded for a match. Match, High-Score-To-Date, and Game-Over sounds are made as appropriate. One replay is awarded for each score you beat in the displays.

## Power Turn-On And Game Setup

### WARNING

This game must be plugged into a properly-grounded outlet to prevent shock hazard and to assure proper game-operation. DO NOT use a "cheater" plug to defeat the ground pin on line cord, and DO NOT cut off ground pin.

ENTERING GAME-OVER MODE. With the coin door closed, plug the game in and turn it ON. The game should come on in Game-Over Mode.

1. If the game comes on in the Bookkeeping Mode (CREDITS display showing 04, BALL-IN-PLAY display showing 00, and PLAYER-1 display showing the game-identification number) turn the game OFF and ON again.
  - A. If the game now comes on in Game-Over Mode, bookkeeping totals have been reset to zero.

\*Indicates adjustable feature.

B. If the game still comes on in Bookkeeping Mode, open the coin door and turn the game OFF and ON twice. (This is an indication of batteries being removed with the power OFF or of batteries coming loose during shipment. A game without battery power will revert to factory settings.) Any changes from factory settings must be reentered using procedures from this booklet.

2. If the game still comes on in Bookkeeping Mode, troubleshoot the game.

Bookkeeping Mode  
(Functions 01-17)

1. Set the AUTO-UP/MANUAL-DOWN switch to AUTO-UP and press ADVANCE. Test 04 is indicated in the CREDITS display, Function 00 in the MATCH display, and the game-identification number in the PLAYER-1 display.
2. Press ADVANCE to display desired functions on the MATCH display (See the Bookkeeping Table below). Now record the corresponding totals (number of coins and total paid-credits) from the PLAYER-1 display. (To review a total that has been advanced past, use MANUAL-DOWN and press ADVANCE).
3. Use MANUAL-DOWN and press ADVANCE to display Function 50 in the MATCH display.
4. Returning to Game-Over Mode:
  - A. Use AUTO-UP and press ADVANCE.
  - B. OR: To zero bookkeeping totals and return to Game-Over Mode, (1) use AUTO-UP, (2) press the credit button to display 35 in the PLAYER-1 display, and (3) press ADVANCE.

Bookkeeping Table

FUNCTION	PLAYER-1 DISPLAY	PLAYER-2 DISPLAY
00	Game Identification (2520 1)	--
01	Coins, Left chute (closet to coin door hinge)	--
02	Coin, center chute	--
03	Coin, right chute	--
04	Total Paid Credits	--
05	Special Credits	--
06	Replay Score Credits	--
07	Match Credits	--
08	Total Credits	Free Credits
09	Total Extra Balls	--
10	Ball Time in Minutes	--
11	Total Balls Played	--
12	Current High-Score-To-Date	--
13	Backup High-Score-To-Date	High-Score-To-Date Credits Awarded
14	Replay-Level 1 Score	Times exceeded
15	Replay-Level 2 Score	Times exceeded
16	Replay-Level 3 Score	Times exceeded
17	Replay-Level 4 Score	Times exceeded

Game-Adjustment Procedure  
(Functions 13-41)

Coin door must be open to change settings

1. Use AUTO-UP and press ADVANCE. Test 04 is indicated in the CREDITS display, function 00 in the MATCH display, and the game-identification number in the PLAYER-1 display.
2. To raise the function number in the MATCH display, use AUTO-UP and push ADVANCE. To lower the function number, use MANUAL-DOWN and push ADVANCE.
3. With the desired function indicated in the MATCH display, raise the value in the PLAYER-1 display by using AUTO-UP and pressing the credit button. Reduce the value by using MANUAL-DOWN and pressing the credit button. The value left in the PLAYER-1 display is the new setting. Refer to the Game-Adjustment Table and the Pricing Table.
4. ADVANCE to the next function and then repeat step 3 until all adjustments have been made.
5. Press ADVANCE until Function 50 is indicated in the MATCH display. From Function 50 you can return to Game-Over Mode or restore factory settings. Perform step 6 or 7 as desired.
6. To return to Game-Over Mode use AUTO-UP and press ADVANCE.
7. To restore factory settings and zero bookkeeping totals:
  - A. Using AUTO-UP press the CREDIT button until 45 is indicated in the PLAYER-1 display.
  - B. Press ADVANCE. The game returns to Test 04, function 00.
  - C. Use MANUAL-DOWN and press ADVANCE to indicate function 50.
  - D. Use AUTO-UP and press ADVANCE.

Resetting High-Score-To-Date

1. Using the GAME-ADJUSTMENT PROCEDURE above, set functions 13, 37, 38 and 39 to the desired reset-value.
2. In Game-Over Mode, press HIGH-SCORE RESET until scores come up on the display.

Factory Bookkeeping-Totals  
(Functions 42-49)

The factory bookkeeping-functions are not assigned.

Game-Adjustment Table

<u>FUNCTION</u>	<u>DESCRIPTION</u>	<u>FACTORY SETTING<sup>1</sup></u>
13	BACKUP HIGH-SCORE-TO-DATE (HSTD CREDITS AWARDED-FUNCTION #40)	2,500,000
14	FIRST REPLAY-SCORE (AWARDS 1 CREDIT)	800,000
15	SECOND REPLAY-SCORE (NONE)	00
16	THIRD REPLAY-SCORE (NONE)	00
17	FOURTH REPLAY-SCORE (NONE)	00
18	MAXIMUM CREDITS	30
19	STANDARD AND CUSTOM PRICING-CONTROL (STANDARD)	01/02
20	LEFT COIN-SLOT MULTIPLIER	01/09
21	CENTER COIN-SLOT MULTIPLIER	04/45
22	RIGHT COIN-SLOT MULTIPLIER	01/18
23	COIN UNITS REQUIRED FOR CREDIT	01/05
24	COIN-UNITS BONUS-POINT	00/45
25	MINIMUM COIN-UNITS	00
26	MATCH : (MATCH ON = 00), MATCH OFF = 01)	00
27	SPECIAL : (AWARDS CREDIT = 00) AWARDS EXTRA BALL = 01 AWARDS POINTS = 02	00
28	REPLAY : (AWARDS CREDIT = 00) AWARDS EXTRA BALL = 01	00
29	MAXIMUM PLUMB-TILTS (INCLUDING WARNINGS)	03
30	NUMBER OF BALLS (INCLUDING BONUS BALL)	03
31	GAME-ADJUST #1	04
	01 02 03 04 05 06 07 08	
	01-08 RESETS TO X2-X3-X4-X5-X7-X10-X15-X20 on next ball.	
32	GAME ADJUST #2 00 : DISABLES SPECIAL AWARDS 01 : AWARDS SPECIAL ON X10 ONLY 02 : AWARDS SPECIAL ON X15 ONLY 03 : AWARDS SPECIAL ON X20 ONLY 10 : DISABLES SPECIAL, ENABLES DOUBLE BALL 11 : AWARDS SPECIAL ON X10 - ALSO DOUBLE BALL ON 1ST RACK ONLY 12 : AWARDS SPECIAL ON X15 - ALSO DOUBLE BALL ON 1ST RACK ONLY 13 : AWARDS SPECIAL ON X20 - ALSO DOUBLE BALL ON 1ST RACK ONLY	11
33	GAME-ADJUST #3 FOR EXTRA-BALL TIME (25 SEC.) 00-25 ADDS TO MINIMUM 15 SECONDS WHICH ALLOWS 15 - 40 SEC. EXTRA-BALL TIME	10
34	GAME-ADJUST #4 FOR RESETTING BACK DROP-TARGETS 00 : RESET BACK UP TO #1, #9 BALL-TARGET 01 : RESET BACK UP TO #2, #10 BALL-TARGET 02 : RESET BACK UP TO #3, #11 BALL-TARGET	02
35	GAME-ADJUST #5 MEMORY ON SPECIAL OR EXTRA-BALL LAMPS 00 : NO MEMORY ON EITHER 01 : MEMORY ON EXTRA-BALL LAMP ONLY 10 : MEMORY ON SPECIAL LAMPS ONLY 11 : MEMORY ON BOTH SPECIAL & EXTRA-BALL	01
36	GAME-ADJUST #6 BACKGROUND SOUND 01 : YES 00 : NO	01

Game-Adjustment Table (cont'd)

37	GAME ADJUST #7	21
	2ND BACKUP HIGH-SCORE-TO-DATE (2,100,000)	
38	GAME-ADJUST #8	17
	3RD BACKUP HIGH-SCORE-TO-DATE (1,700,000)	
39	GAME-ADJUST #9	13
	4TH BACKUP HIGH-SCORE-TO-DATE (1,300,000)	
40	HIGH-SCORE-TO-DATE-CREDITS (HS CREDITS)	04
41	MAXIMUM EXTRA-BALLS AT ANY TIME	07
42-49	NOT USED	
50	SPECIAL FUNCTION	
	15 : AUTO-CYCLE MODE	
	35 : ZERO BOOKKEEPING TOTALS	
	45 : RESTORE FACTORY SETTINGS & ZERO BOOKKEEPING TOTALS	

NOTES

1. The second factory-setting value is with jumper W25 on the CPU Board removed.
2. Functions 13 through 17 and 37 through 39 may be set to any multiple of 100,000 points. Setting function 40 to zero with function 13 set to any score but zero permits the High-Score-To-Date feature to operate but no credits are awarded.
3. Setting functions 14 through 17 (replay scores) to zero disables the replay-score point.

Pricing Table

● indicates standard pricing settings by adjusting ONLY function 19

Coin-Door Mechanism	Games/Price	Function							
		19	20	21	22	23	24	25	
Twin-Quarter	●1/25¢, 4/\$1	1	1	4	1	1	0	0	
	●1/50¢, 3/\$1, 6/\$2	3	1	4	1	2	4	0	
Quarter, Dollar, Quarter	●1/50¢, 2/75¢, 3/4x25¢	5	3	15	3	4	15	0	
	2/25¢, 8/\$1	0	2	8	2	1	0	0	
	1/25¢, 3/50¢, 6/\$1	0	1	4	1	1	2	0	
	1/25¢, 5/\$1	0	1	4	1	1	4	0	
	1/50¢	0	1	4	1	2	0	0	
1DM, 5DM, 2DM	●1/1DM, 3/2DM, 10/5DM	2	9	45	18	5	45	0	
	2/1DM, 5/2DM, 14/5DM	0	13	65	26	5	65	0	
20¢, 50¢	1/20¢, 3/50¢	0	6	0	15	5	0	0	
1F, 10F, 5F	●1/2F, 3/5F only, 8/10F only	4	1	16	6	2	0	0	
25-Cent	●1/25¢, 4/1G	6	1	0	4	1	0	0	
1-Guilder	1/25¢, 5/1G	0	1	0	4	1	4	0	
5-Franc,	●1/5F, 2/10F	7	1	0	2	1	0	0	
10-Franc	●1/10F	8	1	0	2	2	0	0	
1-Franc or	1/1F, 3/2F	0	1	1	1	1	2	0	
Twin 1-Franc	1/1F	0	1	1	1	1	0	0	
Twin 2-Franc	●1/2F	3	1	4	1	1	0	0	
10F, 20F	●1/10F, 2/20F	7	1	0	2	1	0	0	
Twin 100-Yen	2/100Y	0	2	0	2	1	0	0	
100L, 200L	●1/200 Lire	8	1	0	2	2	0	0	
Twin 1-Sucre	1/3S, 2/5S	0	2	0	2	5	0	0	
Any	●Free Play	set function 18 to 0 for free play							

## Diagnostic Procedures

### DISPLAY TEST

1. Use MANUAL-DOWN and press ADVANCE. Displays should indicate all 0's.
2. Use AUTO-UP. Displays should sequence from all 0's thru all 9's. Comma segments should come on when the odd digits are displayed.
3. To stop cycling, use MANUAL-DOWN. Press ADVANCE to step through the tests one number at a time. Use AUTO-UP to resume cycling.

### SOUND TEST

1. (From Display Test) Use AUTO-UP and press ADVANCE. Test 00 should be indicated in the CREDITS display and the MATCH display should sequence from 00 thru 06. A different sound should be produced for each number.
2. To continuously pulse a single sound, use MANUAL-DOWN. Press ADVANCE to sequence through sounds one at a time. Use AUTO-UP to resume sequencing.

### LAMP TEST

1. Refer to the Lamp-Matrix Table for lamp numbers and wiring. Driver-Board connections at jacks 2J5 (columns) and 2J7 (rows) are also shown there.
2. (From Sound Test) Use AUTO-UP and press ADVANCE. Test 01 should be indicated in the CREDITS display and all feature-lamps should flash.

### SOLENOID TEST

1. Refer to the Solenoid Table for solenoid numbers and wiring. Driver-Board connections at plugs 2P9, 2P11 and 2P12 are also shown there.
2. (From Lamp Test) Use AUTO-UP and press ADVANCE. Test 02 should be indicated in the CREDITS display. The MATCH display sequences from 01 through 25. Corresponding solenoids 01 through 24 are pulsed. The flipper relay is de-energized with subtest 25.
3. To continuously pulse a single solenoid use MANUAL-DOWN. Press ADVANCE to sequence through the solenoids one at a time. Use AUTO-UP to resume sequencing.

### SWITCH TEST

1. Refer to the Switch-Matrix Table for switch numbers and wiring. Driver-Board connections at jacks 2J2 (columns) and 2J3 (rows) are also shown there.
2. (From Solenoid Test) Use AUTO-UP and press ADVANCE. Test 03 should be indicated in the CREDITS display with the switch numbers sequencing in the BALL-IN-PLAY display. As a switch number is displayed a sound is produced. As a switch is opened, its number is removed from the sequence. When all switches are open, the BALL-IN-PLAY display is blank and the sounds stop.



3. HOLD DOWN EACH SWITCH so its number is shown at least twice. A sound is produced and a switch number is momentarily indicated in the BALL-IN-PLAY display. If two switches in a row are indicated with only one switch closed, check for a short between the column wires. For multiple indications check the column wire for a short to ground. If two switches in a column are indicated with only one switch closed, check for a short between row wires.
4. To determine whether the problem is in the playfield or the Driver Board, remove connectors 2P2 and 2P3 from the upper right corner of the Driver Board and use a jumper wire to simulate operation of the switch.

#### Auto-Cycle Mode

1. The Auto-Cycle Mode permits you to check intermittent problems in the playfield, backbox, cabinet and driver board.
2. Set function 50 of Test 04 (Bookkeeping Mode) to 15.
3. Press ADVANCE to start the Auto-Cycle Mode. This mode repeatedly sequences through the Display Test, Sound Test (00), Lamp Test (01), and Solenoid test (02).
4. This sequence is repeated until the game is turned off and on.

#### CPU-Board Self-Test

Press the DIAGNOSTIC button on the left side of the CPU Board. The following indications are provided.

- 0-test passed (game returns to Game-Over Mode)
- 1-IC13 RAM faulty
- 2-IC16 RAM faulty
- 3-IC17 ROM 2 faulty
- 4-IC17 ROM 2 faulty
- 5-IC20 ROM 1 faulty
- 6-IC14 Game ROM 1 faulty
- 7-IC26 Game ROM 0 faulty
- 8-IC19 CMOS RAM, memory-protect circuit faulty or CPU-Board lockup
- 9-Coin-door closed, memory-protect circuit faulty, or IC19 CMOS RAM faulty.

Note that "0" remaining after power turn-on indicates CPU-Board lockup.

#### Sound-Board Self-Test

1. PRESS THE DIAGNOSTIC BUTTON at the top of the Sound Board. Several electronic sounds should be produced. This sequence of sounds is repeated until the game is turned OFF and back ON.
2. NO SOUND IN DIAGNOSTIC TEST (but sounds are present in the Self-Test): Check the sound-select inputs (connector 10J3 and adjacent circuitry) or replace the Sound Board and rerun the Diagnostic Test (see SOUND TEST above).
3. NEW SOUND-BOARD, SAME SYMPTOM: Check the cables to the CPU Board. If they're good, replace the CPU Board and rerun the Diagnostic Test.
4. NO SOUND: Check +12V, -12V and +5V-supply voltages on the Sound Board. If voltages are low (or AC ripple seems too high), replace C27 and C26.

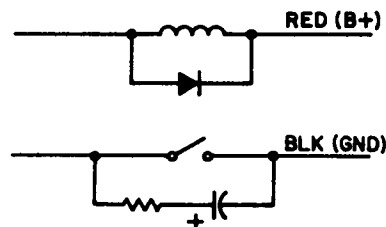
-10-  
Solenoid Table

SOL. NO.	FUNCTION	WIRE COLOR	CONNECTIONS DR. BD. OTHER	DRIVER TRANS.	SOLENOID PART-NO.
01	Outhole	GRY-BRN	2P11-4, 8P3-1	Q15	SA-23-850-DC
02	Drop Target 1	GRY-RED	2P11-5, 8P3-2	Q17	SA-5-24-750-DC
03	Drop Target 2	GRY-ORN	2P11-7, 8P3-3	Q19	SA-5-24-750-DC
04	Drop Target 3	GRY-YEL	2P11-8, 8P3-4	Q21	SA-5-24-750-DC
05	Drop Target 4	GRY-GRN	2P11-9, 8P3-5	Q23	SA-5-24-750-DC
06	Drop Target 5	GRY-BLU	2P11-3, 8P3-6	Q25	SA-5-24-750-DC
07	Drop Target Bank	GRY-VIO	2P11-2, 8P3-7	Q27	SA-6-24-750-DC
08	Not Used	GRY-BLK	2P11-1, 8P3-8	Q29	-
09	Not Used	BRN-BLK	2P9-9, 8P3-9	Q31	-
10	Not Used	BRN-RED	2P9-7, 8P3-10	Q33	-
11	General Illumination	BRN-ORN	2P9-1, 3P7-1	Q35	5580-09555
12	Not Used	BRN-YEL	2P9-2, 8P3-12	Q37	-
13	Not Used	BRN-GRN	2P9-3, 8P3-13	Q39	-
14	Bell	BRN-BLU	2P9-4, 8P3-14	Q41	SM-29-1000-DC
15	Credit Knocker	BRN-VIO	2P9-5, 7P1-17	Q43	SA-2-23-850-DC
16	Coin Lockout Coil	BRN-GRY	2P9-6, 7P1-18, 7P2-4	Q45	904218-696
*17	Left Kicker	BLU-BRN	2P12-7, 8P3-17	Q2	SG1-23-850-DC
*18	Lower Jet Bumper	BLU-RED	2P12-4, 8P3-18	Q4	SG1-23-850-DC
*19	Right Jet Bumper	BLU-ORN	2P12-4, 8P3-19	Q6	SG1-23-850-DC
*20	Upper Left Jet Bumper	BLU-YEL	2P12-6, 8P3-20	Q8	SG1-23-850-DC
*21	Not Used	BLU-GRN	2P12-8, 8P3-12	Q10	-
*22	Not Used	BLU-BLK	2P12-9, 8P3-22	Q12	-
	Right Flipper*	BLU-VIO	2P12-1, 7P1-7	-	FL24/600-30-2600-50VDC
	Left Flipper*	BLU-GRY	2P12-2, 7P1-9	-	FL24/600-30-2600-50VDC

**\*NOTES**

- Special-switch connections for solenoids 17 through 21 are as follows:  
 17--ORN-BRN--2P13-5, 8P3-24  
 18--ORN-RED--2P13-3, 8P3-25  
 19--ORN-BLK--2P13-2, 8P3-26  
 20--ORN-YEL--2P13-4, 8P3-27  
 21--ORN-GRY--2P13-8, 8P3-28
- FLIPPER COILS.** This game requires 50-volt flipper coils. For proper operation, the replacement part shown MUST be used.
- Flipper-button connections:  
 Right--ORN-VIO--2P12-1, 7P1-7  
 Left--ORN-GRY--2P12-2, 7P1-9

- Solenoid 16 has a Coinco part-number.
- Typical wiring for solenoids and special switches follows.



Lamp-Matrix Table

COLUMN ROW	1 YEL-BRN 2J5-8	2 YEL-RED 2J5-9	3 YEL-ORN 2J5-6	4 YEL-BLK 2J5-7	5 YEL-GRN 2J5-3	6 YEL-BLU 2J5-5	7 YEL-VIO 2J5-1	8 YEL-GRY 2J5-2
RED- BRN 2J7-1	GAME- OVER 1	X2 9	1ST RACK 17	C 25	1 33	9 41	6 BALL 10K 49	TRI 10K 57
RED- BLK 2J7-2	MATCH 2	X3 10	2ND RACK 18	U 26	2 34	10 42	6 BALL 20K 50	TRI 20K 58
RED- ORN 2J7-3	TILT 3	X4 11	3RD RACK 19	E 27	3 35	11 43	6 BALL 30K 51	TRI 30K 59
RED- YEL 2J7-4	HIGH- SCORE-TO -DATE 4	X5 12	B 20	P 28	4 36	12 44	6 BALL 50K 52	TRI 50K 60
RED- GRN 2J7-5	BALL- IN- PLAY 5	X7 13	A 21	O 29	5 37	13 45	7 BALL 10K 53	8 BALL 20K 61
RED- BLU 2J7-6	SHOOT AGAIN B/B 6	X10 14	L 22	O 30	6 38	14 46	7 BALL 20K 54	8 BALL 40K 62
RED- VIO 2J7-9	LEFT SPECIAL 7	X15 15	L 23	L 31	7 39	15 47	7 BALL 30K 55	8 BALL 60K 63
RED- GRY 2J7-8	RIGHT SPECIAL 8	X20 16	SPINNER 24	GET EXTRA BALL 32	8 40	SHOOT AGAIN 48	7 BALL 50K 56	8 BALL 100K 64

Switch-Matrix Table

COLUMN ROW	1 GRN-BRN 2J2-9	2 GRN-RED 2J2-8	3 GRN-ORN 2J2-7	4 GRN-YEL 2J2-6	5 GRN-BLK 2J2-5	6 GRN-BLU 2J2-3	7 GRN-VIO 2J2-2	8 GRN-GRY 2J2-1
WHT- BRN 2J3-9	PLUMB- BOB TILT 1	OUTHOLE 9	UPPER- LEFT JET 17	C 25	1 33	LEFT KICKER 41	NOT USED 49	NOT USED 57
WHT- RED 2J3-8	BALL- ROLL TILT 2	FLIPPER RETURN 10	UPPER- RIGHT JET 18	U 26	2 34	LOWER- RIGHT 1OPT 42	NOT USED 50	NOT USED 58
WHT- ORN 2J3-7	CREDIT BUTTON 3	LEFT SPECIAL 11	LOWER JET 19	E 27	3 35	LANE CHANGE 43	NOT USED 51	NOT USED 59
WHT- YEL 2J3-6	LEFT COIN 4	RIGHT SPECIAL 12	B 20	P 28	4 36	NOT USED 44	NOT USED 52	NOT USED 60
WHT- GRN 2J3-5	CENTER COIN 5	NOT USED 13	A 21	O 29	5 37	NOT USED 45	NOT USED 53	NOT USED 61
WHT- BLU 2J3-4	RIGHT COIN 6	NOT USED 14	L 22	O 30	6 38	NOT USED 46	NOT USED 54	NOT USED 62
WHT- VIO 2J3-3	SLAM TILT 7	RIGHT 50-PT 15	L 23	L 31	7 39	NOT USED 47	NOT USED 55	NOT USED 63
WHT- GRY 2J3-1	HIGH- SCORE RESET 8	UPPER- RIGHT 50-PT 16	SPINNER 24	PLAY- FIELD TILT 32	8 40	NOT USED 48	NOT USED 56	NOT USED 64

Warnings & Notices

WARNING

FOR SAFETY AND RELIABILITY, WILLIAMS does not recommend or authorize any substitute parts or modifications of WILLIAMS equipment.

USE OF NON-WILLIAMS PARTS and modifications of game circuitry may adversely affect game play, or may cause injuries.

SUBSTITUTE PARTS OR EQUIPMENT MODIFICATIONS may void FCC type-acceptance.

SINCE THIS GAME IS PROTECTED by Federal copyright, trademark and patent laws, unauthorized game-conversions may be illegal under Federal law.

THIS "CONVERSION" PRINCIPLE ALSO APPLIES to unauthorized facsimiles of WILLIAMS equipment, logos, designs, publications, assemblies and games (or game features not deemed to be in the public domain), whether manufactured with WILLIAMS components or not.

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 certified 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 correct the interference.

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 FCC regulations.

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

NOTICE

"Laser Cue" and "Lane Change" are trademarks of Williams Electronics, Inc.