



# **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<br>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

| FUNCTION | DESCRIPTION                                                                | FACTORY SETTING <sup>1</sup> |
|----------|----------------------------------------------------------------------------|------------------------------|
| 13       | BACKUP HIGH-SCORE-TO-DATE<br>(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)                                             | 00                           |
|          | AWARDS EXTRA BALL = 01                                                     |                              |
|          | AWARDS POINTS = 02                                                         |                              |
| 28       | REPLAY : (AWARDS CREDIT = 00)                                              | 00                           |
|          | AWARDS EXTRA BALL = 01                                                     |                              |
| 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                                                             | 11                           |
|          | 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             |                              |
| 33       | GAME-ADJUST #3 FOR EXTRA-BALL TIME (25 SEC.)                               | 10                           |
|          | 00-25 ADDS TO MINIMUM 15 SECONDS WHICH ALLOWS 15 - 40 SEC. EXTRA-BALL TIME |                              |
| 34       | GAME-ADJUST #4 FOR RESETTING BACK DROP-TARGETS                             | 02                           |
|          | 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                                  |                              |
| 35       | GAME-ADJUST #5 MEMORY ON SPECIAL OR EXTRA-BALL LAMPS                       | 01                           |
|          | 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                                   |                              |
| 36       | GAME-ADJUST #6 BACKGROUND SOUND                                            | 01                           |
|          | 01 : YES                                                                   |                              |
|          | 00 : NO                                                                    |                              |



|       |                                                         |    |
|-------|---------------------------------------------------------|----|
| 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

[illegible]

## 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.

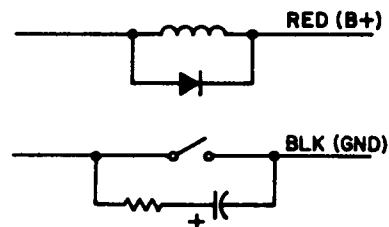
-10-  
Solenoid Table

| SOL.<br>NO. | FUNCTION              | WIRE<br>COLOR | CONNECTIONS<br>DR. BD. OTHER | DRIVER<br>TRANS. | SOLENOID<br>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-<br>30-2600-50VDC |
|             | Left Flipper*         | BLU-GRY       | 2P12-2, 7P1-9                | -                | FL24/600-<br>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<br>ROW    | 1<br>YEL-BRN<br>2J5-8   | 2<br>YEL-RED<br>2J5-9 | 3<br>YEL-ORN<br>2J5-6 | 4<br>YEL-BLK<br>2J5-7 | 5<br>YEL-GRN<br>2J5-3 | 6<br>YEL-BLU<br>2J5-5 | 7<br>YEL-VIO<br>2J5-1 | 8<br>YEL-GRY<br>2J5-2 |
|------------------|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| RED-BRN<br>2J7-1 | GAME-OVER<br>1          | X2<br>9               | 1ST RACK<br>17        | C<br>25               | 1<br>33               | 9<br>41               | 6 BALL<br>10K<br>49   | TRI<br>10K<br>57      |
| RED-BLK<br>2J7-2 | MATCH<br>2              | X3<br>10              | 2ND RACK<br>18        | U<br>26               | 2<br>34               | 10<br>42              | 6 BALL<br>20K<br>50   | TRI<br>20K<br>58      |
| RED-ORN<br>2J7-3 | TILT<br>3               | X4<br>11              | 3RD RACK<br>19        | E<br>27               | 3<br>35               | 11<br>43              | 6 BALL<br>30K<br>51   | TRI<br>30K<br>59      |
| RED-YEL<br>2J7-4 | HIGH-SCORE-TO-DATE<br>4 | X5<br>12              | B<br>20               | P<br>28               | 4<br>36               | 12<br>44              | 6 BALL<br>50K<br>52   | TRI<br>50K<br>60      |
| RED-GRN<br>2J7-5 | BALL-IN-PLAY<br>5       | X7<br>13              | A<br>21               | O<br>29               | 5<br>37               | 13<br>45              | 7 BALL<br>10K<br>53   | 8 BALL<br>20K<br>61   |
| RED-BLU<br>2J7-6 | SHOOT AGAIN<br>B/B<br>6 | X10<br>14             | L<br>22               | O<br>30               | 6<br>38               | 14<br>46              | 7 BALL<br>20K<br>54   | 8 BALL<br>40K<br>62   |
| RED-VIO<br>2J7-9 | LEFT SPECIAL<br>7       | X15<br>15             | L<br>23               | L<br>31               | 7<br>39               | 15<br>47              | 7 BALL<br>30K<br>55   | 8 BALL<br>60K<br>63   |
| RED-GRY<br>2J7-8 | RIGHT SPECIAL<br>8      | X20<br>16             | SPINNER<br>24         | GET EXTRA BALL<br>32  | 8<br>40               | SHOOT AGAIN<br>48     | 7 BALL<br>50K<br>56   | 8 BALL<br>100K<br>64  |

Switch-Matrix Table

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

## Warnings & Notices

### WARNING

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

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### 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.

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