



INSTRUCTION BOOKLET

This booklet provides game operation, bookkeeping, game adjustment, and diagnostic procedures for STAR LIGHT. For detailed information refer to Williams Solid State Flipper

Maintenance Manual.

SPECIAL CONSIDERATIONS WHEN REPLACING CIRCUIT BOARDS

CPU Board

1. Revision level 7 CPU Boards (batteries located on lower left corner of board) or later boards must be used. D-8342 or later with the specified ROMs.
2. Must be equipped with blue-labeled Flipper ROMs and correct game ROMs.
3. Jumpers W3, W6, W8, W10, W11, W14, W17, W19, W20, W22, W25, W26, W29 only should be connected.

Driver Board

Either earlier model D 7997 or later model D 8341 boards may be used. When earlier boards are used, eight switch matrix series resistors **R204 thru R211** must be zero-ohm or replaced with wire jumpers. Later D 8341 boards do not use series resistors in the switch matrix. (Note: Refer to the Driver Board Assembly drawing, where R204 thru R211 are shown correctly as jumpers W9 thru W16)

Sound Board

1. Model D 8223 required for sound.
2. Must be jumpered for white-label sound ROM operation and be equipped with Sound ROM 4. (Jumpers W2, W5, W7, W9, W10, W12, and W15 connected; W3, W4, W6, W8, W11, and W13 removed).

Power Supply Board

With transformer mounted in cabinet, D 8345 board (equipped with relay) is required.

Display Boards

Model C 8363 Master Display and 7-digit Slave Displays required.

ROM Summary

IC	DESCRIPTION	TYPE	NUMBER	BOARD	PART NUMBER
Game ROM 1	ROM 4K x 8	2532	IC14	CPU	A-5343-10690
Game ROM 0	ROM 4K x 8	2532	IC20	CPU	A-5343-10689
Flipper ROM 2	ROM 4K x 8	8332	IC17	CPU	A-5341-09554
Sound ROM	ROM 2K x 8	2716	IC12	Sound	A-5343-10466

GAME OPERATION

*Indicates adjustable features

Multi-Ball and Magna-Save are trademarks of Williams Electronics, Inc.

Game Over Mode - Turn game ON; player 1 score shows 00; all player scores alternate the high score to date, Game Over lamps light. All playfield lamps cycle in attract mode.

Credit Posting - Insert coin(s); sound produced, number of credits displayed. If maximum credits* exceeded by coin or high score to date*, credits are posted correctly, coin lockout, de-energizes until remaining credits are below maximum. No credits may be won and coins are rejected while lockout is deenergized.

Game Start - Two balls must be resting on ball ramp, ball locking mechanism or ball shooter switches (maximum of one ball in ball shooter trough) before game will start. Push credit button, startup tune played, ball served, credit display reduced by 1, player 1 score flashes 00 until first scoring switch is made, ball in play shows 1. Pushing credit button before ball 2 displayed allows additional players.

Tilt - The ball in play is tilted on the first closure of the ball-roll or playfield tilts and the third* closure of the plumb-bob tilt. The slam tilt on the coin door 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 and game-over sounds are made as appropriate. One Replay is awarded for each score you beat in the displays.*

Game Play

1. Making **L-I-G-H-T** lights spinner for 1,000 and then for 2,000 when flashing.
 2. **L-I-G-H-T** and **S-T-A-R** light right lane for bonus holdover to next ball.
 3. Roving light (ADV x) advances bonus multiplier to 2x, 3x, 4x, 5x and 10x.
Bonus = Multiplier x (Constellations + stars)
 4. Making 10 stars lights next constellation, each constellation adds 10,000 to constellation value.
 5. **Pisces lit** : right lane lights for extra ball.
 6. **Gemini lit** : alternating special lights on outlanes.
 7. **S-T-A-R** collects current constellation value and lights right eject hole as a lock.
 8. Locking Ball scores 3K for each lit star. During the 2-ball **Multi-Ball™** scores are doubled.
 9. Lighting bonus holdover on last ball awards timed bonus ball with unlimited ball saver. ‡
 10. **Lane Change** Scoring available on upper lanes to light missing stars 1-10.
Extra Button on right hand side of Cabinet operates **Lane Change** function.
 11. If replay function is set, one replay awarded for each score you beat in the displays.
(The four highest scores to date are saved)
- ‡ This is similar to a 'Last Chance' feature on Black Knight '80, except the BK bonus ball length is fixed in the defaults. Typically this is 30sec.
Star Light will award 10 seconds for each constellation lit and 1 second for each star.
A maximum of (6 x 10) + 9 = 69 seconds. If the player lights (and earns) an Extra Ball during extended time, the EB (if enabled) will be awarded after the timed bonus ball ends.

Both **Lane Change** and **Multi-Ball** are Trademarks of Williams Electronics, Inc.

ENTERING GAME-OVER MODE

With the coin door closed, plug the game in and turn it on. The game should come into **Game-Over Mode**.

1. If the game comes on in **Bookkeeping Mode** (Credit display showing 04, Ball-In-Play display showing 00, and Player-1 display showing the game-identification number 530, turn the game OFF and ON again.
 - A. If the game now comes into **Game-Over Mode**, bookkeeping totals have been reset to zero.
 - B. If the game still comes into **Bookkeeping Mode**, open the coin door and turn the game off and on twice. (A game without battery power will revert to factory settings.) Any changes from factory settings must be re-entered)
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 (2530 2) in the PLAYER-1 display.
2. Press ADVANCE to display desired function 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.

Table 2. Bookkeeping Table

FUNCTION	PLAYER-1 DISPLAY	PLAYER-2 DISPLAY
00	Game Identification (2530 1)	--
01	Coins, Left Chute (closest to coin door hinge)	--
02	Coins, Center Chute	--
03	Coins, Right Chute	--
04	Total Paid Credits	--
05	Special Credits	--
06	Replay-Score Credits	--
07	Match Credits	--
08	Total Credits	--
09	Total Extra Balls	--
10	Ball time in Minutes	--
11	Total Balls Played	--
12	Current High-Score	--
13	Highest Score	High-Score
14	Replay-Level 1	Times Exceeded
15	Replay-Level 2 or Backup High-Score	2 Times Exceeded
16	Replay-Level 3 or Backup High-Score	3 Times Exceeded
17	Replay-Level 4 or Backup High-Score	4 Times Exceeded

GAME-ADJUSTMENT PROCEDURE (FUNCTIONS 13-41)

Coin door must be open to change settings.

1. Set AUTO-UP/ MANUAL-DOWN switch to AUTO-UP and depress ADVANCE pushbutton. Test 04 is indicated in the Credits display, Function 00 in Match display, and game identification in Player 1 display.
2. To raise Function number in Match display, operate ADVANCE pushbutton with switch set to AUTO-UP. To lower Function number operate ADVANCE with switch set to MANUAL-DOWN.
3. With the desired function indicated in the MATCH display, raise the value in the PLAYER-1 display by using the AUTO-UP and pressing the Credit button. Reduce the value by using MANUAL-DOWN and pressing the Credit button. The value remaining 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 the previous step until all adjustments have been made.
5. Hold 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 either of the following 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 The Four High-Scores

1. Using the GAME-ADJUSTMENT-PROCEDURE above, set functions 13,15,16 and 17 to the desired values.
2. Set function 39 to 01.
3. Set function 40 to 04.
4. Use AUTO-UP and hold down ADVANCE until function 50 is indicated in the MATCH display.
5. Return to ***Game-Over*** mode by pressing ADVANCE.
6. In ***Game-Over*** mode, press HIGH-SCORE RESET. Four scores should come up on the displays.
7. One credit (up to four credits in one game) will be awarded for each high score that's beaten.

Table 2. Game Adjustments

FUNCTION	DESCRIPTION	NOTES	FACTORY SETTING
13	Highest Score to Date [HSTD Credits Awarded - function 40]	2	2,500,000
14	Replay 1 Score [Times exceeded]	1,2,3	2,500,000
15	Replay 2 Score [Times exceeded]	1,2,3	0
16	Replay 3 Score [Times exceeded]	1,2,3	0
17	Replay 4 Score [Times exceeded]	1,2,3	0
18	Maximum Credits (Set to 00 For Free Play)	5	30
19	Standard and Custom Pricing Control (00-08)	1	01/02
20	Left Coin Slot Multiplier	1	01/09
21	Center Coin Slot Multiplier	1	04/45
22	Right Coin Slot Multiplier	1	01/18
23	Coin Units Required for Credit	1	01/05
24	Coin Units Bonus Points	1	00/45
25	Minimum Coin Units	-	00
26	Match (00 = Match ON; 01 = Match OFF)	-	00
27	Special: 00 = Awards Credit; 01 = Awards Extra Ball; 02 = Awards Points	-	00
28	Replay Scores: 00 = Awards Credit; 01 = Awards Extra Ball or Bonus Ball	-	00
29	Maximum Plumb Bob Tilts	-	03
30	Number of Balls (03 or 05)	-	03
31	Adj #1 - Top Rollover Lanes: 00 = Spots 1 star; 01 = Spots 2 stars (in constellation)	-	01
32	Adj #2 - Background Sound: 00 = Background sound OFF; 01 = ON	-	01
33	Adj #3 - 00 = LOCK and holdover lamp not carried to next ball; 01 = LOCK carried; 02 = holdover carried; 03 = LOCK and holdover carried to next ball.	-	00
34	Adj #4 - Time to complete bonus holdover: 00 = 5 secs; 01 = 8 secs; 02 = 10 secs; 03 = On for the remainder of the ball	-	03
35	Adj #5 - 00 = 10,000 lamp in L-I-G-H-T score-string off; 01 = 10,000 lamp in L-I-G-H-T score-string on	-	01
36	Adj #6 - 00 = Extra Ball Easy; 01 = Extra Ball Hard	-	00
37	Adj #7 - 00 = No memory on S-T-A-R and L-I-G-H-T and eject extra-ball lamps 01 = Extra-ball lamp carried; 02 = S-T-A-R and L-I-G-H-T carried; 03 = S-T-A-R and L-I-G-H-T and Extra-ball lamps carried to next ball	-	01
38	Adj #8 - 00 = Lane extra-ball and special lamps not carried to next ball 01 = Extra-ball and special lamps carried to next ball	-	01
39	Adj #9 - 00 = Displays one high score; 01 = Displays four high scores	4	01
40	High Score Credits	-	03
41	Maximum Extra Balls at one time (00 = no extra ball)	-	04
42 - 49	Not used	-	
50	Special function: 15 = Auto-Cycle Mode (burn-in); 35 = Zero Bookkeeping Totals 45 = Restore factory settings and Zero Bookkeeping Totals	-	

Notes:

1. The second factory setting value is with Jumper W25 on the CPU board removed.
2. Functions 13 through 17 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 function to operate but no credits are awarded.
3. Setting functions 14 through 17 (replay levels) to zero disables the replay-score point.
4. Function 39 also determines whether functions 14 through 17 represent replay levels or high scores only. Function 39, setting 00 = replay levels; setting 01 = high scores.
5. **Free Play Mode** Set function 18 (Maximum Credits) to 00 for free play.

Table 3. Standard and Custom Price Settings

COIN DOOR MECHANISM	CREDITS	FUNCTION						
		19	20	21	22	23	24	25
Twin-Quarter Quarter, Dollar, Quarter	•1/25¢, 4/\$1 •1/50¢, 3/\$1, 6/\$2 •1/50¢, 2/75¢, 3/4 x 25¢ 2/25¢, 8/\$1 1/25¢, 3/50¢, 6/\$1 1/25¢, 5/\$1 1/50¢	01	01	04	01	01	00	00
		03	01	04	01	02	04	00
		05	03	15	03	04	15	00
		00	02	08	02	01	00	00
		00	01	04	01	01	02	00
		00	01	04	01	01	04	00
		00	01	04	01	02	00	00
1DM, 5DM, 2DM	•1/1DM, 3/2DM, 10/5DM 2/1DM, 5/2DM, 14/5DM	02	09	45	18	05	45	00
		00	13	65	26	05	65	00
20-Cent, 50-Cent	1/20¢, 3/50¢	00	06	00	15	05	00	00
1 Franc, 10 Franc, 5 Franc	•1/2F, 3/5F only, 8/10F only	04	01	16	06	02	00	00
25 Cent, 1 Guilder	•1/25¢, 4/1G 1/25¢, 5/1G	06	01	00	04	01	00	00
		00	01	00	04	01	04	00
Twin 100 Yen	2/100Y	00	02	00	02	01	00	00
1 Franc or Twin 1 Franc	1/1F, 3/2F 1/1F	00	01	01	01	01	02	00
		00	01	01	01	01	00	00
5 Franc, 10 Franc	•1/5F, 2/10F •1/10F	07	01	00	02	01	00	00
		08	01	00	02	02	00	00
Twin 2 Franc	•1/2F, 3/4F	03	01	04	01	02	04	00
10, 20 Franc	•1/10F, 2/20F	07	01	00	02	01	00	00
Twin 1 Sucre	1/3S, 2/5S	00	02	00	02	05	00	00
Any	Free Play	set function 18 to 00 for free play						

- Indicates standard price setting by adjusting **only** Function 19.

For other price settings, set Function 19 to 00 and set Functions 20 through 25 to the values indicated in the chart

The Games : Price Ratio is equivalent to the ratio $X : VC$ where:

X = Coin-Slot Multiplier (the number at function 20, 21 or 22)

V = Coin Value

C = Coin Units Required for Credit (the number at function 23)

For example, at factory settings with quarter chutes the variables produce $1 : 25 \times 1$ or one game for 25¢.

DIAGNOSTIC PROCEDURES

Display Digits Test

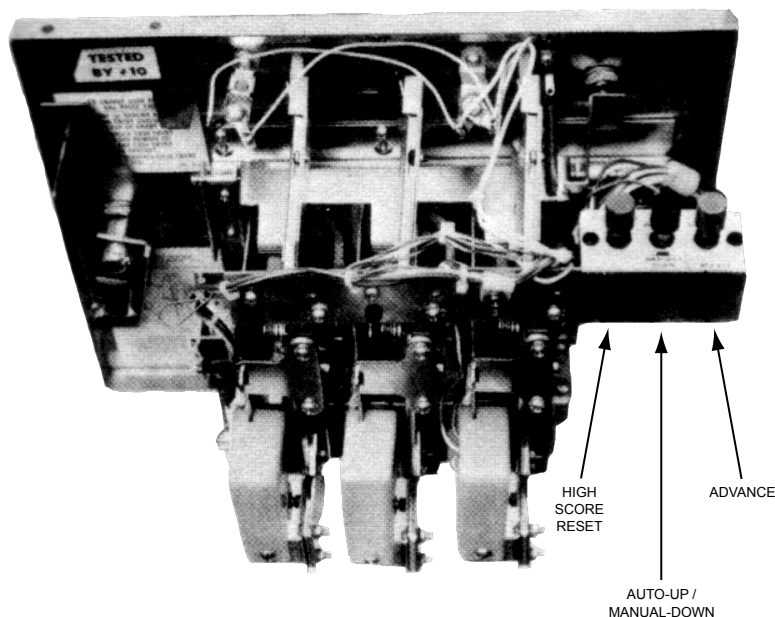
1. Set AUTO-UP / MANUAL-DOWN switch to MANUAL-DOWN and depress ADVANCE. Displays should indicate all 0's.
2. Set the switch to AUTO-UP. Displays should sequence from all 0's thou all 9's. Comma segments should come on when odd digits are displayed.
3. To stop cycling, set switch to MANUAL-DOWN. Operate ADVANCE pushbutton to step tests one number at a time. Set switch to AUTO-UP to resume cycling.

Sound Test

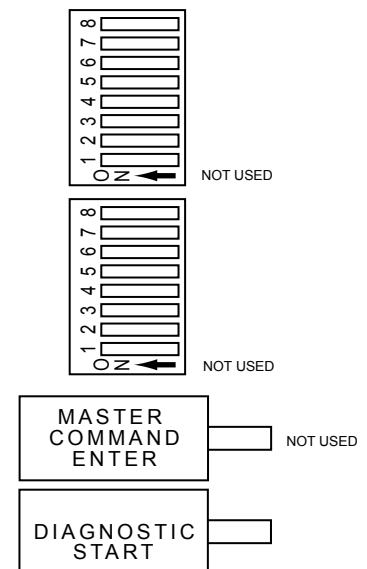
1. From Display Digits Test depress ADVANCE with the switch set to AUTO-UP. Test 00 should be indicated in the number of Credits display and the Match display should sequence from 00 thou 06. Different sounds should be produced for 00, 01, 02, 03, 04, 05 and 06.
2. To continuously pulse a single sound, set the toggle switch to MANUAL-DOWN. Operate ADVANCE pushbutton to sequence through sounds one at a time. Set toggle switch to AUTO-UP to resume sequencing.

Lamp Test

1. From Sound Test depress ADVANCE with the switch set to AUTO-UP. Test 01 should be indicated in the Credits display and all multiplexed lamps should flash. Refer to the **Lamp-Matrix Table** for lamo numbers and wiring. Driver-Board connections at plugs 2J5 (columns) and 2J7 (rows) are also shown there.



Coin Door Diagnostic Switches



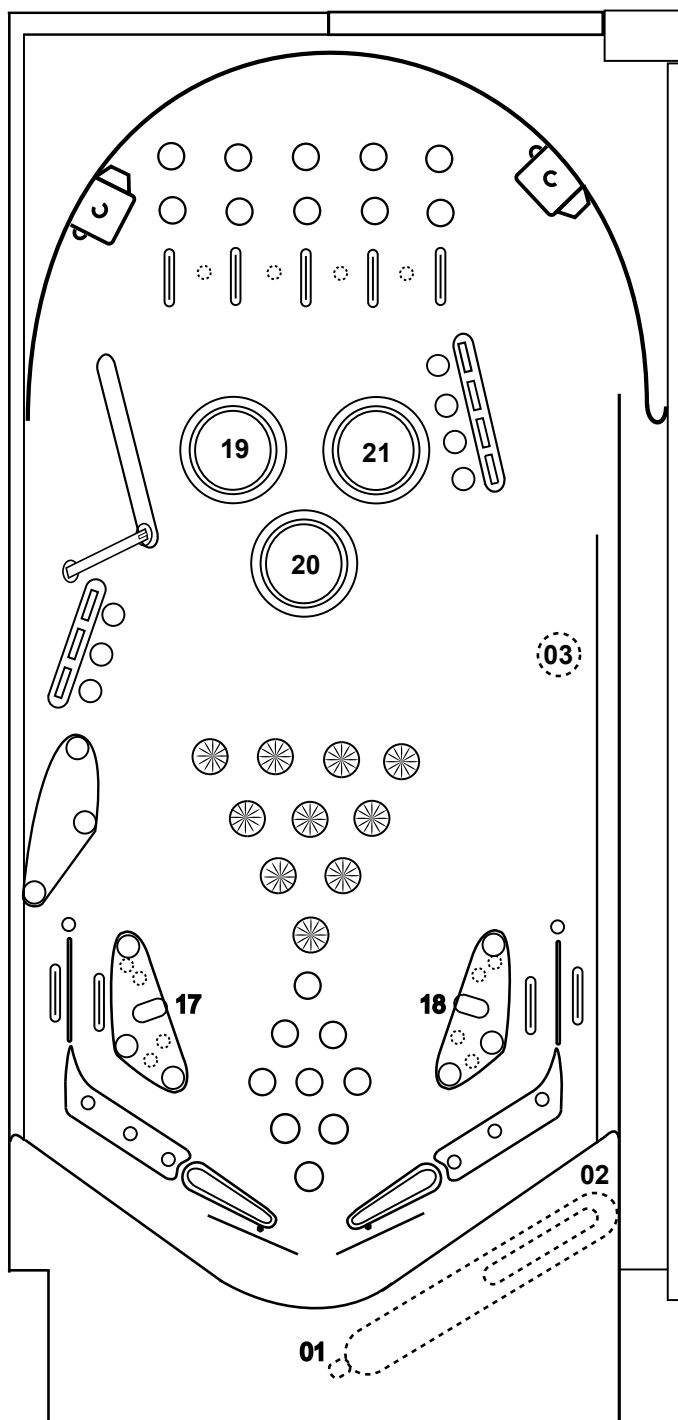
Diagnostic Start Switch

ROW \ COLUMN	1	2	3	4	5	6	7	8
	YEL-BRN 2J5-8	YEL-RED 2J5-9	YEL-ORN 2J5-6	YEL-BLK 2J5-7	YEL-GRN 2J5-3	YEL-BLU 2J5-5	YEL-VIO 2J5-1	YEL-GRY 2J5-2
1 RED - BRN 2J7-1	GAME OVER 1	2x LAMP 9	L 17	SPINNER 25	STAR 8 33	TOP LANE 6 41	10,000 49	LEO 57
2 RED - BLK 2J7-2	MATCH 2	3x LAMP 10	I 18	STAR 1 26	STAR 9 34	TOP LANE 7 42	30,000 50	ARIES 58
3 RED - ORN 2J7-3	TILT 3	5x LAMP 11	G 19	STAR 2 27	STAR 10 35	TOP LANE 8 43	50,000 51	LIBRA 59
4 RED - YEL 2J7-4	HIGH SCORE TO DATE 4	10x LAMP 12	H 20	STAR 3 28	TOP LANE 1 36	TOP LANE 9 44	100,000 & LIGHTS EJECT 52	PISCES 60
5 RED - GRN 2J7-5	SHOOT AGAIN (BACKBOX INSERT) 5	S 13	T 21	STAR 4 29	TOP LANE 2 37	TOP LANE 10 45	EXTRA BALL RIGHT LANE 53	VIRGO 61
6 RED - BLU 2J7-6	BALL IN PLAY 6	T 14	ADV 'X' LEFT TARGET 22	STAR 5 30	TOP LANE 3 38	LEFT SPECIAL 46	EXTRA BALL (EJECT) 54	GEMINI 62
7 RED - VIO 2J7-9	ALL SCORES DBL 7	A 15	ADV 'X' RIGHT LANE 23	STAR 6 31	TOP LANE 4 39	RIGHT SPECIAL 47	LOCK (EJECT) 55	STAR 63
8 RED - GRY 2J7-8	BONUS H/OVER 8	R 16	ADV 'X' RIGHT TARGET 24	STAR 7 32	TOP LANE 5 40	LITES BONUS H/OVER ARR. 48	SHOOT AGAIN (PLAYFIELD) 56	LIGHT 64

Figure 1. Lamp Matrix

Solenoid Test

1. Refer to **Solenoid Table** for solenoid numbers and wiring. Driver-Board connections at plugs 2P9, 2P11 and 2P12 are shown there.
2. From Lamp Test depress ADVANCE with the switch set to AUTO-UP. Test 02 should be indicated in the Credits display. Display sequences from 01 thru 25. Corresponding solenoids 01 thru 24 are pulsed. Flipper relay is de-energized with subtest 25.
3. To continuously pulse a single solenoid set switch to MANUAL-DOWN. Operate ADVANCE pushbutton to sequence through the solenoids one at a time. Set toggle switch to AUTO-UP to resume sequencing.



SOL. NO.

DESCRIPTION

01	Ball Release (Outhole)
02	Ramp Eject
03	Eject Hole
04	Flash Lamps
05	Not Used
06	Not Used
07	Not Used
08	Not Used
09	Not Used
10	Not Used
11	General Illumination Relay *
12	Not Used
13	Not Used
14	Not Used
15	Knocker
16	Coin Lockout
17	Left Kicker
18	Right Kicker
19	Jet Bumper (Left)
20	Jet Bumper (Lower)
21	Jet Bumper (Right)
22	Not Used

* Special relay located on Power Supply Board
(games with transformer in cabinet)

Figure 2. Playfield Solenoid Locations and Solenoid Chart

Table 4. Solenoid Connections

SOL. NO.	FUNCTION	WIRE COLOR	CONNECTIONS	DRIVER TRANS. *	SOLENOID PART NO.
01	Ball Release (Outhole)	GRY-BRN	2P11-4, 8P3-1	Q15 (Q7)	SA-23-850-DC
02	Ramp Eject	GRY-RED	2P11-5, 8P3-2	Q17 (Q8)	SG1-23-850-DC
03	Eject Hole	GRY-ORN	2P11-7, 8P3-3	Q19 (Q9)	SG1-23-850-DC
04	Flash Lamps	GRY-YEL	2P11-8, 8P3-4	Q21 (Q10)	—
05	Not Used	GRY-GRN	2P11-9, 8P3-5	Q23 (Q11)	—
06	Not Used	GRY-BLU	2P11-3, 8P3-6	Q25 (Q14)	—
07	Not Used	GRY-VIO	2P11-2, 8P3-7	Q27 (Q15)	—
08	Not Used	GRY-BLK	2P11-1, 8P3-8	Q29 (Q16)	—
09	Not Used	BRN-BLK	2P9-9, 10P3-9	Q31 (Q13)	—
10	Not Used	BRN-RED	2P9-7, 10P3-10	Q33 (Q12)	—
11	Special Relay (G.I.)	BRN-ORN	2P9-1, 3P7-1	Q35 (Q17)	5580-09555
12	Not Used	BRN-YEL	2P9-2, 10P3-12	Q37 (Q18)	—
13	Not Used	BRN-GRN	2P9-3, 10P3-13	Q39 (Q19)	—
14	Not Used	BRN-BLU	2P9-4, 7P1-16	Q41 (Q20)	—
15	Knocker	BRN-VIO	2P9-5, 7P1-17	Q43 (Q21)	SA-2-23-850DC
16	Coin Lockout	BRN-GRY	2P9-6, 7P1-18, 7P2-4	Q45 (Q22)	SM-35-4000-DC†
*17	Left Kicker	BLU-BRN	2P12-7, 8P3-17	Q2 (Q1)	SG1-23-850-DC
*18	Right Kicker	BLU-RED	2P12-4, 8P3-18	Q4 (Q5)	SG1-23-850-DC
*19	Jet Bumper (Left)	BLU-ORN	2P12-3, 8P3-19	Q6 (Q4)	SG1-23-850-DC
*20	Jet Bumper (Lower)	BLU-YEL	2P12-6, 8P3-20	Q8 (Q6)	SG1-23-850-DC
*21	Jet Bumper (Right)	BLU-GRN	2P12-8, 8P3-21	Q10 (Q2)	SG1-23-850-DC
*22	Not Used	BLU-BLK	2P12-9, 8P3-22	Q12 (Q3)	—
*	Right Flipper	BLU-VIO	2P12-1, 7P1-7	— —	FL-24-600/ 30-2600-50VDC
*	Left Flipper	BLU-GRY	2P12-2, 7P1-9	— —	FL-24-600/ 30-2600-50VDC
FLIPPER COILS This game requires 50v flipper coils. For proper operation, the replacement part shown must be used.					

*NOTES:

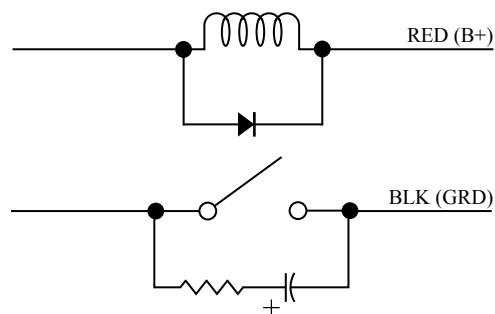
First transistor reference Qn for earlier D7997 Driver Board;
2nd shown (Qn) for D8341 Driver Board.

† Solenoid 16 originally had a Coinco part number: 904218-696

Special switch connections for solenoids 17 through 21 are as follows:

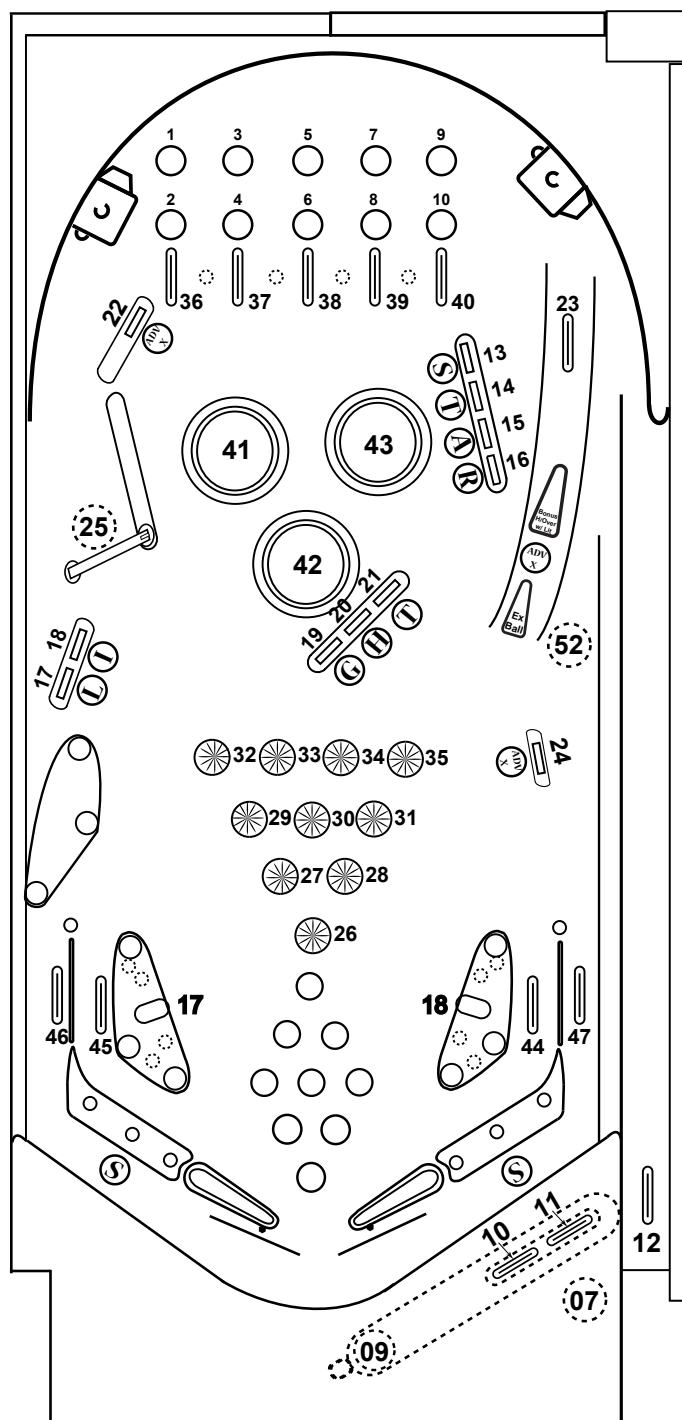
17 — ORN-BRN — 2P13-5, 8P3-24
 18 — ORN-RED — 2P13-3, 8P3-25
 19 — ORN-BLK — 2P13-2, 8P3-26
 20 — ORN-YEL — 2P13-4, 8P3-27
 21 — ORN-GRY — 2P13-8, 8P3-28

Typical wiring for solenoids and special switches:



Switch Test

1. From Solenoid Test depress ADVANCE with the switch set to AUTO-UP. Test 03 should be indicated in the Credits display, and any stuck switches in the Master display. As stuck switch(es) are displayed a sound is produced. The display continuously cycles through the stuck switches and as they are opened, the number is removed from the sequence. When all switches are open, the Match display is blank and the sounds stop.
2. If all switches in a row are displayed, first verify that all are open and then check for a short to ground on the row wire.
3. Operate switches, a sound is produced and switch number is momentarily indicated in the ball in play display. If two switches in a row are indicated with one switch closed, check for a short between the column wires; for multiple indication check column wire for short to ground. If two switches in a column are indicated with one switch closed, check for short between row wires.
4. If proper indications are obtained in Test 03 but matrix problem is suspected in game play, disconnect lamp connectors 2P5 and 2P7. Recheck in game play. Perform CPU Self-Test if problem remains. If problem is cleared, check for short between lamp matrix and jet bumper mounting brackets.
5. Shorted diodes can cause "rectangle" switch matrix problems as follows: The lower left 3-bank upper target is down (switch 27), and lower right 3-bank center target is down (switch 30). A ball enters the lockup trough making switch 43, a shorted diode at switch 27 would cause switch 46 Playfield Tilt to be (incorrectly) indicated. Note that the "rectangle" is always completed with an incorrect switch diagonally opposite from the switch with the shorted diode. See Fig. 5 - Switch Matrix Table.



SWITCH NO.	FUNCTION (SCORE)
01	Plumb Bob Tilt †
02	Ball Roll Tilt †
03	Credit Button †
04	Left Coin Switch °
05	Centre Coin Switch °
06	Right Coin Switch °
07	Slam Tilt
08	High Score Reset °
09	Outhole
10	Ramp 1
11	Ramp 2
12	Shooter Lane Switch
13	"S"
14	"T"
15	"A"
16	"R"
17	"L"
18	"I"
19	"G"
20	"H"
21	"T"
22	Adv 'X' Top L Target
23	Adv 'X' Right Lane
24	Adv 'X' Right Target
25	Spinner
26	Star 1
27	Star 2
28	Star 3
29	Star 4
30	Star 5
31	Star 6
32	Star 7
33	Star 8
34	Star 9
35	Star 10
36	Top Lanes 1-2
37	Top Lanes 3-4
38	Top Lanes 5-6
39	Top Lanes 7-8
40	Top Lanes 9-10
41	Left Jet Bumper
42	Lower Jet Bumper
43	Right Jet Bumper
44	Right Flipper Return Lane
45	Left Flipper Return Lane
46	Left Special
47	Right Special
48	Lower L Switch
49	Upper L Switch
50	Left Kicker
51	Right Kicker
52	Eject
53	Playfield Tilt
54	Lane Change
55-64	Not used

† Switch located in Cabinet
° Switch located in Coin Door

Figure 3. Playfield Switch Locations and Switch Chart

ROW	COLUMN	1	2	3	4	5	6	7	8
		GRN-BRN 2J2-9	GRN-RED 2J2-8	GRN-ORN 2J2-7	GRN-YEL 2J2-6	GRN-BLK 2J2-5	GRN-BLU 2J2-3	GRN-VIO 2J2-2	GRN-GRY 2J2-1
1	WHT - BRN 2J3-9	PLUMB BOB TILT	1 OUTHOLE	9 "L"	17 SPINNER	25 STAR	33 JET BUMPER	41 UPPER L SWITCH	57 NOT USED
2	WHT - RED 2J3-8	BALL ROLL TILT	2 RAMP 1	10 "I"	26 STAR 1	34 STAR 9	42 LOWER JET BUMPER	50 LEFT KICKER	58 NOT USED
3	WHT - ORN 2J3-7	CREDIT BUTTON	3 RAMP 2	11 "G"	27 STAR 2	35 STAR 10	43 RIGHT JET BUMPER	51 RIGHT KICKER	59 NOT USED
4	WHT - YEL 2J3-6	LEFT COIN SWITCH	4 SHOOTER LANE SW	12 "H"	28 STAR 3	36 TOP LANES 1-2	44 RIGHT FLIPPER RETURN	52 EJECT	60 NOT USED
5	WHT - GRN 2J3-5	CENTRE COIN SWITCH	5 "S"	13 "T"	29 STAR 4	37 TOP LANES 3-4	45 LEFT FLIPPER RETURN	53 PLAYFIELD TILT	61 NOT USED
6	WHT - BLU 2J3-4	RIGHT COIN SWITCH	6 "T"	14 ADV 'X' TOP L TARGET	30 STAR 5	38 TOP LANES 5-6	46 LEFT SPECIAL	54 LANE CHANGE	62 NOT USED
7	WHT - VIO 2J3-3	SLAM TILT	7 "A"	15 ADV 'X' RIGHT LANE	31 STAR 6	39 TOP LANES 7-8	47 RIGHT SPECIAL	55 NOT USED	63 NOT USED
8	WHT - GRY 2J3-1	HIGH SCORE RESET	8 "R"	16 ADV 'X' RIGHT TARGET	32 STAR 7	40 TOP LANES 9-10	48 LOWER L SWITCH	56 NOT USED	64 NOT USED

Figure 5. Switch Matrix

INITIATING AUTO-CYCLE MODE

1. Set AUTO-UP/ MANUAL-DOWN switch to AUTO-UP and depress ADVANCE pushbutton. Test 04 is indicated in the credits display, Function 00 in Match display.
2. Set switch to MANUAL-DOWN and depress ADVANCE to indicate Function 50 in the Match Display.
3. Set switch to AUTO-UP and operate Credit button to indicate 15 in Player 1 Display.
4. Depress ADVANCE pushbutton to start Auto-Cycle mode. Each cycle of this mode sequences thru the Display Digits Test, Sound Test (00), Lamp Test (01), and Solenoid Test (02).
5. To terminate the test and return to game over, turn the game OFF and back ON.

CPU BOARD SELF-TEST

Depress the DIAGNOSTIC pushbutton on the left side of the CPU Board. The following indications are provided for a few seconds and then the game attempts to go to game over:

- 0 - Test Passed
- 1 - IC13 RAM Faulty
- 2 - IC16 RAM Faulty
- 3 - IC17 ROM 2 Faulty
- 4 - IC17 ROM 2 Faulty
- 5 - IC20 ROM I Faulty
- 6 - IC14 Game ROM 1 Faulty
- 7 - IC26 Game ROM 0 Faulty
- 8 - IC19 CMOS RAM or Memory Protect Circuit Faulty
- 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

Depress DIAGNOSTIC pushbutton on top of the Sound Board. Several electronic sounds should be produced. This sequence is repeated until the game is turned OFF and back ON. Once this test is completed correctly, to test that the CPU Board is triggering sounds, see DIAGNOSTIC PROCEDURES on Page 7 Sound Test.

Rubber Rings

Complete Star Light (#530) Rubber Ring Kit:

PART	DESCRIPTION	QTY	LOCATION
A. 23-6559	white rubber ring 5/16"	18	Single Posts
B. 23-6306	white rubber ring 2 1/2"	3	Slingshots and Center Targets*
C. 2A-4003	mini-post" 23/64" (3/8" OD)	3	Top Metal post and Both Outlanes
D. 23-6307	white rubber ring 3"	2	Left Side
E. 23-6304	white rubber ring 1 1/2"	1	Right Lower Side
F. 23-6519-4	red flipper ring std. 1 1/2"	2	Red preferred - to match flyer
G. 23-6556	black post sleeve	5	One half sleeve for stubby post near spinner
Total Items		34	(matches the rubber rings on playfield)

Notes: All rings are given as I.D. = Inner Diameter

All Rubber except Flippers (Red) and black post sleeves, should be white.