TRANSPORTER

Operations
and
Parts Information
Manual

TRANSPORTER

Table of Contents

SECTION 1

Game Operation

&

Test Information

TRANSPORTER ROM SUMMARY

IC	DESCRIPTION	TYPE	IDENTIFIER	BOARD	PART NUMBER
Game ROM 1	32K x 8 ROM	27256	U27	CPU	A-5343-2008-2
Game ROM 2	32K x 8 ROM	27256	U26	CPU	A-5343-2008-1
Sound ROM 1	32K x 8 ROM	27256	U21	CPU	A-5343-2008-4
Sound ROM 2	32K x 8 ROM	27256	U22	CPU	A-5343-2008-3
Music/Speech ROM	64K x 8 ROM	27512	U4	AUDIO	A-5343-2008-5
Music/Speech ROM	64K x 8 ROM	27512	U19	AUDIO	A-5343-2008-6
Music/Speech ROM	64K x 8 ROM	27512	U20	AUDIO	A-5343-2008-7

Connector Identification

Since *TRANSPORTER* is using WILLIAMS ELECTRONICS GAMES System 11B, a new connector identification technique must be introduced. Each plug or jack receives a prefix number (which identifies the circuit board), followed by a letter ("J" or "P"), and a number. J-designations refer to the male part of a connector. P-designations refer to the female part of a connector. For example, 1J1 designates jack 1 of board 3 (a CPU Board jack); 3P6 designates plug 6 of board 3 (a Power Supply Board plug). Identifying the specific pin number of a connector involves a hyphen, which separates the pin number from the plug or jack designation. For example, 1J1-3 refers to pin 3 of jack 1 on board 1.

Other game components may also have similar prefixes preceding their designator to clarify their locations or related circuit.

Prefix numbers for the System 11B circuit boards and other major assemblies are listed below. A prefix number may precede a component designator to identify its associated unit (e.g., connector1J1).

1 - CPU	6 - Backbox
2 - Master Interconnect	7 - Cabinet
3 - Backbox Power Supply	8 - Playfield
4 - Alphanumeric Display	9 - Insert Board
5 - Aux Power Driver	10 - Sound Board

Circuitboards

System 11B Circuit Boards for *TRANSPORTER* are in the backbox. They are accessible by unlocking the Backbox lock, removing the Backbox glass, unlatching the Insert Board (with lamps and the Digital Display Boards), and swinging it open.

Lamp circuit boards are mounted on the Playfield and the Insert Board.

CONTROL BOARD

The System 11B CPU Board (p/n D-11883-2008) must be equipped with the ROMs specified in the *TRANSPORTER* ROM Summary. CPU Board jumpers W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, and W19 must be connected.

SOUND BOARD

The Sound Board is p/n D-11581-2008, including ROMs and micro-processor.

DISPLAY BOARD

TRANSPORTER has two Display Boards. The BALLY Lo-Display Board is p/n D-12502, and the BALLY Hi-Display Board is p/n D-12706.

POWER SUPPLY BOARD
The Power Supply Board is p/n D-12246.

AUX POWER DRIVER BOARD
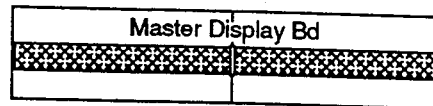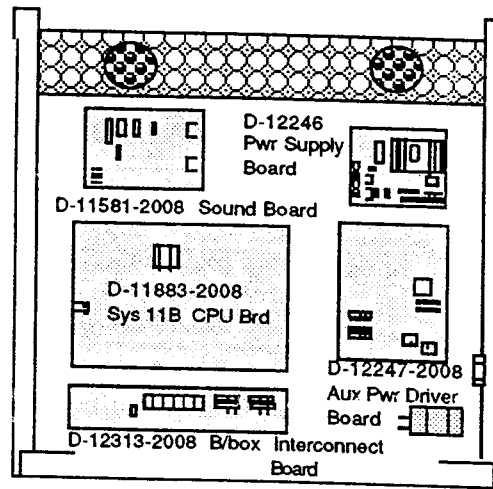The Aux Power Driver Board is D-12247-2008.

MASTER INTERCONNECT BOARD
The Master Interconnect Board is D-12313-2008.
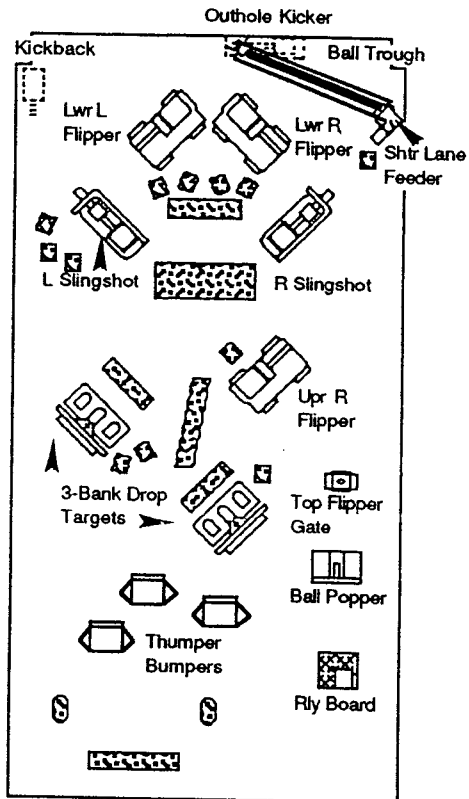
Under side of Lower Playfield,
Viewed in Raised Position

LOCATIONS

- Circuit Boards
- Lamp Boards
- Major Mechanisms

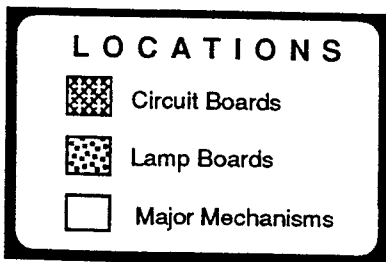Display Panel, Rear View
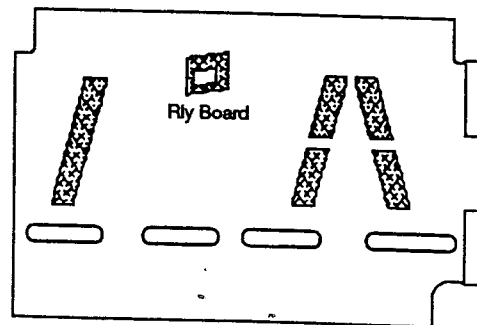
Insert Board, Inner Side View

Figure 1. Locations Diagram - Game Circuit Board and Major Mechanisms.

Control Locations

Figure 2 shows the locations of the following switches, except for the last two (CPU and Sound Diagnostic switches, which are shown in the Circuit Board Locations Diagram).

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

THE VOLUME CONTROL is on the left inner wall of the cabinet on the tilt mechanisms board. It is accessible by opening the coin box door.

THE CREDIT SWITCH is a pushbutton to the left of the coin door on the cabinet exterior.

GAME ADJUSTMENT/DIAGNOSTIC SWITCHES. *TRANSPORTER* allows the operator to control all game adjustments, obtain bookkeeping information, and diagnose problems, using only three switches mounted on the inside of the coin door, along with the Credit button beside the coin door.

ADVANCE, AUTO-UP/MANUAL-DOWN, and HIGH-SCORE RESET are the switches located on the inside of the coin door. Refer to the text discussing Game Status Displays and the Test/Diagnostic Procedures for details concerning button operation.

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

On the previous page, the Circuit Board Locations Diagram shows the locations of the two CPU Board switches (left edge of CPU Board, Backbox View).

THE CPU DIAGNOSTIC SWITCH (SW 2) is the lower switch (of the two switches mounted on the left edge of the CPU Board) near a large, socketed microprocessor chip. This switch initiates the Memory Chip Test explained in the Test/Diagnostic Procedures.

THE SOUND DIAGNOSTIC SWITCH (SW 1) is the upper switch of the two mounted on the left edge of the CPU Board. This switch initiates the Sound Section Test. Refer to the Test/Diagnostic Procedures.
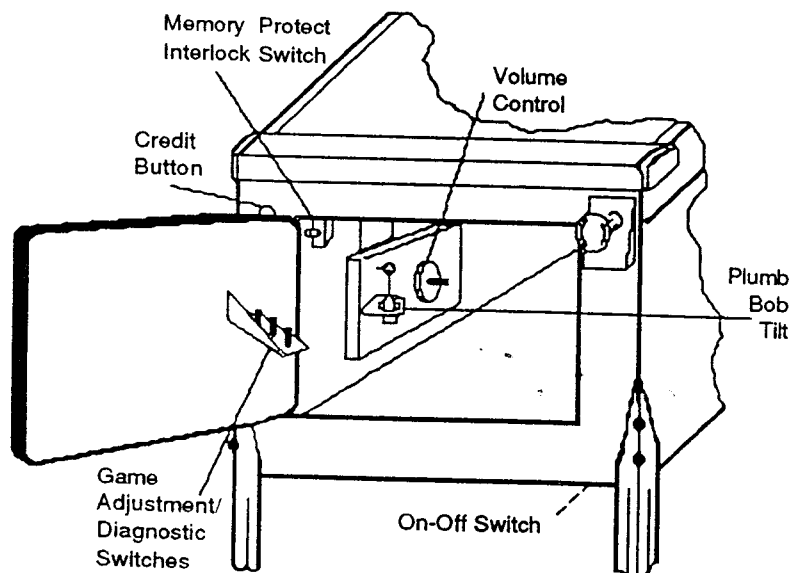
Pinball Game Assembly Instructions

INSTALLATION PROCEDURE

1. Open the shipping container; remove all cartons, parts, and other items, and set them aside.

2. Leg levelers and bolts are provided in the cashbox. Place cabinet on a support and attach rear legs (after installing leg levellers), using leg bolts.

3. Attach the front legs (after installing leg levellers), using leg bolts. See Figure 3 for details.

0 degrees
Approx
Playfield
Pitch
Angle:
7 degrees

See
Detail View

Leg
Leg Leveller
Shaft
Nut
Leveller
Foot Pad

**Detail View -
Leg Leveller**

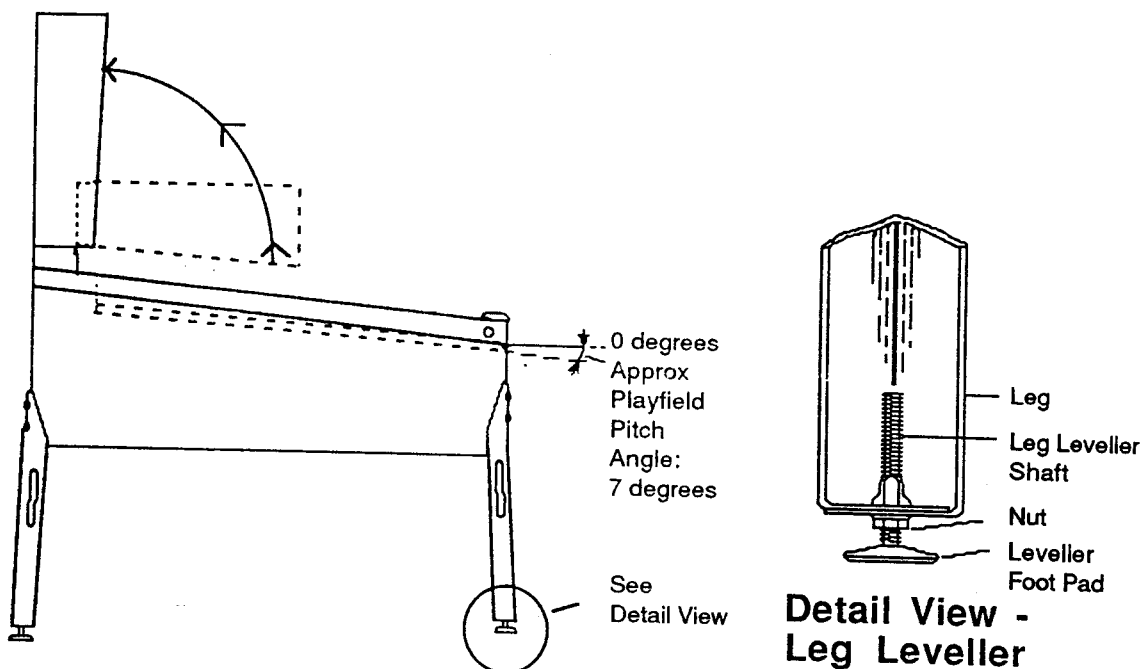Figure 3. Pinball Assembly, Playfield Pitch Angle, and Leg Leveler Details.

4. Reach into the cabinet and backbox and check the mating of the interconnecting cables, matching several wire colors at each connector. Ensure that all connections are properly secure.

CAUTION

Ensure that the interconnecting cables are free to move (not kinked or pinched). Be careful not to damage wires at any stage of the assembly process.

5. Raise the hinged backbox upright and stabilize it into position. Unlock the backbox, and remove the backbox glass, storing it carefully to avoid scratches. Remove the shipping block holding the Insert Board. This allows access to the bolt holes used for securing the backbox upright. Install the mounting bolts, split lockwashers, and flat washers through the bottom holes of the backbox into the threaded fasteners in the cabinet to secure the backbox. Close and latch the Insert Board, and install the backbox glass, and lock the backbox.

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┌─────────────────┐
│  WARNING        │
└─────────────────┘
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NEVER transport a pinball game with hinged backbox erect. Always lower the backbox forward onto the playfield cabinet on a layer of protective material to prevent marring or damage and possible personal injury.

6. Extend each leg leveller slightly below the leg bottom, so that all four foot pads are ex-tended about the same distance. Remove the cabinet from its support and place it on the floor.

7. Adjust the leg levellers for proper playfield level (side-to-side) and playfield pitch angle (incline) of approximately 7 degrees. (Again, it is recommended that these measurements be made ON the playfield, not the cabinet nor the playfield cover glass.) Tighten the nut on each leg leveller shaft to maintain this setting, as shown in Figure 3.

C A U T I O N

Playing pitch angle adjustments can affect the operation of the plumb bob tilt. The plumb bob tilt is inside the cabinet. After completing playfield pitch adjustments, set this mechan- ism for desired operation.

8. Move the game into the desired location: recheck the level and pitch angle of the playfield.

9. Verify that the required number of balls are inside the game.

10. Clean and re-install the playfield cover glass. Prepare the game for player operation.

Game Operation

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┌─────────────────┐
│    WARNING      │
└─────────────────┘
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After assembly and installation at its site location, 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 the line cord. DO NOT cut off the ground pin.

POWERING UP

With the coin door closed, plug the game in, and switch it ON, using the On-Off switch. In normal operation, the player 1 score display initially shows 00. Then, the game goes into the Attract Mode (playfield and backbox lamps flashing, sounds being heard, etc., if the operator does not change the Factory Setting).

Open the coin door and press the AUTO-UP/MANUAL-DOWN switch to MANUAL-DOWN. Press the ADVANCE button to begin the game test routine. Return to AUTO-UP and perform the entire test to verify that the game is operating satisfactorily.

NOTE

The SYSTEM 11B game program has a great capability to aid the operator and service personnel: At game Turn-On (and also at the beginning of the Test/Diagnostic Procedures), the player score displays now signal with a message, "Press ADVANCE for Report", that the game program has detected a possible problem with the game. Usually, this report indicates that at least one switch has NOT been actuated during ball play for 90 balls (≙ 30 games). However, the game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep *TRANSPORTER* earning good profits! More information is available in the Test/ Diagnostic Procedures text describing the Switch Testing.

ATTRACT MODE*

Playfield and backbox lamps blink. The player score displays exhibit a series of messages informing the player concerning:

    A. Recent highest scores*;
    B. A "custom message";
        ("GET ME OUT OF HERE.....BEAM ME UP BALLY")*;
    C. The score to achieve to obtain a
        Replay award*;

These (or similar) displays reappear occasionally, accompanied by sounds and music, until a player initiates game play by inserting a coin or, when credits are available, pressing the Credit button.

CREDIT POSTING

Insert coin(s). A sound is heard for each coin, and the player score displays show the number of credits purchased. So long as the number of maximum allowable credits* are NOT exceeded by coin purchase or high score, credits are posted correctly.

STARTING A GAME

Press the Credit button once. A startup sound plays, and the Credit amount shown in the player score display decreases by one. Player display 1 flashes 00 (until the first playfield switch is actuated), and the Player 4 display shows ball 1, except for 4-player games where the ball # shows in the individual player's display. Additional players may enter the game by pressing the Credit button once for each player, before the end of play on the first ball.

SLAM TILT

Actuating the Slam Tilt switch on the coin door inside the cabinet ends the current game; *TRANSPORTER* then proceeds to the Game Over Mode. With the actuation of the playfield tilt switch, or the third closure* of the plumb bob tilt switch, the player loses the remaining play of that ball, but can complete the game.

END OF GAME

All earned scores and bonuses are awarded. If a player's final score exceeds the specified value, the player receives a designated award for achieving the current highest score. A ran- dom digit set* appears in the Match display. Credit* may be awarded, when the last two digits of any player's score display (1 through 4) match the random digits of the Match display. Match, high score, and game over sounds are made, as appropriate.

GAME OVER MODE

The GAME OVER display shows in the player score displays. Then, the high scores flash on the appropriate player score displays. The game proceeds to the Attract Mode.

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* - operator-adjustable feature

Game Status Displays

INTRODUCTION

TRANSPORTER provides the game owner/operator with a display of information concerning the game's bookkeeping and game play feature adjustments. Basically, three classes of information now become available in this status display mode:
- Id (Identification);
- Au (Audit);
- Ad (Adjustment).

Each of the underscored two-letter abbreviations for these classes appears in the Player 3 score display, while the system microprocessor for the *TRANSPORTER* game is displaying the items within each class.

IDENTIFICATION INFORMATION--Id

With the game turned on, the coin door open, and the AUTO-UP/MANUAL-DOWN switch in the AUTO-UP position, the operator can press the ADVANCE switch once, briefly. Player displays immediately change from the Attract Mode to the Game Status Display Mode. This is evident by the following display, shown in columnar form. The column headings refer to the various backbox displays.

Player 1	Player 2	Player 3	Player 4
TRANSPORTER		2008 LA-x*	ID00

* x - indicates ROM revision level; e.g., 1 is initial issue; 2, 3, etc. for later revisions; A indicates American.

The game is named in the Player 1 and 2 score display. The ROM revision level appears in the Player 3 score display. The Player 4 score display shows the status display mode in abbreviated form, Id. The Player 4 score display also shows the status display mode item (00) for this particular display. Pressing advance (to Id 01) once more shows the Game Revision information.

Player 1	Player 2	Player 3	Player 4
DOMESTIC	LEVEL 1	05-31-89	ID01

The country is named in the Player 1 score display. The Production Level appears in the Player 2 score display. The game's release date appears in the Player 3 score display and the status display mode information is shown in the Player 4 display.

Pressing ADVANCE once more causes the Id 02 display to appear. This display describes which of the "Install" options is currently in effect. For example, if the YES option of the INSTALL FACTORY Adjustment Item (Ad 70) was last selected, FACTORY SETTING appears on the player score displays. Changing the setting of any other game adjustment item, after selecting the YES option for Ad 70 causes the display to change to FACTORY ALTERED. Similarly, if the operator selects the YES op- tion for INSTALL HARD (Ad 65), the display indicates HARD SETTING. Changing a game adjustment item later then causes the display to show HARD ALTERED.

AUDIT INFORMATION - Au

While the AUTO-UP switch remains in the Up position, the operator can press the ADVANCE switch once, briefly, to begin the backbox displays of Audit (sometimes called "bookkeeping") Information. Fifty-one audit entries are now available. Calculation of the various factors is no longer necessary be- cause the System 11B game program now performs all the mathematical factor computations. This information is intended to aid the owner/operator in evaluating how the game is performing in each location, by providing knowledge about which game features are receiving the most play. With this information, the owner/operator can determine whether adjusting the game features to other settings will contribute to increased game earnings.

The operator can press the ADVANCE button once to view each Audit Information display item. To proceed more rapidly through this information, the operator only has to press and hold the ADVANCE button. If a desired item is passed, the operator can use the MANUAL-DOWN switch position with the ADVANCE button to back up to the desired item.

The *TRANSPORTER* Audit Table lists the 51 items of the Audit Information portion of the *TRANSPORTER* Game Status Displays. Presentation of this Audit Information again utilizes the player score displays; however, the Player 1 and 2 displays are combined as a descriptive phrase. The light type below the table's column headings names the respective backbox displays where the information appears. Because the Player 4 display contains information which depends on game play, only a few example entries are shown in the table. The Credits display shows Au for all 49 audit items, so its entry is omitted from the tabular listing. Detection of erroneous data affecting any of the counters used in these audit items causes the message, ERROR, to be displayed in the Player 3 display, during display of any audit item associated with that particular counter. (The program does not analyze the cause of the error; it merely alerts the operator of the error's existence by the message.)

ADJUSTMENT INFORMATION - Ad

At end of the Audit Information presentation, with the AUTO-UP switch in the Up position, the operator can press the ADVANCE button to proceed to the Adjustment Information portion of the TRANSPORTER Game Status Displays, as listed in the TRANSPORTER Game Adjustment Table.

The operator can press the ADVANCE button once to view each Adjustment Information display item. To proceed more rapidly through this information, the operator only has to press and hold the ADVANCE button. If a desired item is passed, the operator can use the MANUAL-DOWN switch position with the ADVANCE button to back up to the desired item.

The TRANSPORTER Game Adjustment Table lists the 70 items of the Adjustment Information portion of the TRANSPORTER Game Status Displays. Presentation of the displays is similar to that for the Audit Information (that is, the player 1 and 2

TRANSPORTER Audit Table

Audit Item (Player 3)	Descriptive Phrases (Player 1 and 2 Displays)	Audit Factor [1] Value (Player 4)
AU 01	LEFT COINS [chute next to coin door hinge]	432
02	CENTER COINS	0
03	RIGHT COINS	398
04	PAID CREDITS	830
05	TOTAL PLAYS	
06	TOTAL FREE (Total Free Plays)	
07	PERCENT FREE (% Free Plays)	
08	REPLAY AWARDS	
09	PERCENT REPLAY (% Replay Awards)	
10	SPECIAL AWARDS	
11	PERCENT SPECIAL (% Special Awards)	
12	MATCH AWARDS	
13	HSTD (High Score to Date) CREDITS	
14	PERCENT HSTD (% HSTD Credits)	
15	EXTRA BALLS	
16	PERCENT EX. BALL (% Extra Balls)	
17	AV. BALL TIME (Average Time in Seconds)	
18	MINUTES OF PLAY (Minutes of Play)	
19	BALLS PLAYED	
20	REPLAY1 AWARDS	
21	REPLAY2 AWARDS	
22	REPLAY3 AWARDS	
23	REPLAY4 AWARDS	
24	1 PLAYER GAMES	
25	2 PLAYER GAMES	
26	3 PLAYER GAMES	
27	4 PLAYR. GAMES	
28	BURN IN CYCLES	
29	MULTI-BALL MADE (# of Multi-Ball™ plays)	
30	JACKPOT MADE (# of times Jackpot was awarded)	
31	KICKBACK MADE	
32	BONUS 5X (# of times 5X was made)	
33	XPORTER 1 MIL. LIT (# of times Spinner Ramp reached 1 Mil.)	
34	XPORTER 1 MIL. MADE (# of times 1 Mil. was awarded)	
35	EXCELLERATOR (# of times Excltr activated via return lanes)	
36	EXCELLERATOR 250K MADE (# of times 250K was awarded)	
37	EXTRA BALL LIT (# of times Ex. Ball was lit by S.O.S Lanes)	
38	RESCUE BONUS MADE (# of times Rescue Bonus was awarded)	
39	H.S.RESET COUNTER	
40	0.0-0.4 MIL. SCORE (# of games <500K)	
41	0.5-0.9 MIL. SCORE (# of games ≥500K, <1M)	
42	1.0-1.4 MIL. SCORE (# of games ≥1M, <1.5M)	
43	1.5-1.9 MIL. SCORE (# of games ≥1.5M, <2.0M)	
44	2.0-2.9 MIL. SCORE (# of games ≥2.0M, <2.9M)	
45	3.0-3.9 MIL. SCORE (# of games ≥3.0M, <3.9M)	
46	4.0-4.9 MIL. SCORE (# of games ≥4.0M, <4.9M)	
47	5.0-5.9 MIL. SCORE (# of games ≥5.0M, <5.9M)	
48	6.0-7.9 MIL SCORE (# of games ≥6.0M, <7.9M)	
49	8.0-9.9 MIL SCORE (# of games ≥8.0M, <9.9M)	
50	10-99 MIL. SCORE (# of games ≥10.0M, <99 M)	
51	AV. MIN. GAME TIME (Avg Game Time in minutes)	
52	LEFT DRAINS (# of drains through the left outlane)	
53	RIGHT DRAINS (# of drains through the right outlane)	
54	3 PLAYS/ $1 (# of times player inserted one dollar)	
55	NOT USED	

NOTE:
1. The numbers shown in this column for Items 1 through 4 are examples. Entries for all items depend on the amount of play; thus, they will vary from location to location.

TRANSPORTER Game Adjustment Table

Adjustment Item (Player 3)	Descriptive Phrases (Player 1 and 2 Displays)		Factory Setting (Player 4)
Ad 01	AUTO REPLAY [1] or		10 (%)
	FIXED REPLAY [1]		SCORES [1]
02	REPLAY START (or REPLAY LEVEL 1) [1]		2,500,000
03	REPLAY LEVELS (or REPLAY LEVEL 2) [1]		02
04	(REPLAY LEVEL 3) [1]		(see text)
05	(REPLAY LEVEL 4) [1]		(see text)
06	REPLAY AWARD		Credit
07	SPECIAL AWARD		Credit
08	MATCH FEATURE	[Off, 1-50%]	10 (%)
09	NOT USED		-
10	TILT WARNING		03
11	EX. BALL / B. I. P.		02
12	MAXIMUM CREDITS		10
13	HIGHEST SCORES		On
14	BACKUP HI. SCR.1		7,000,000
15	BACKUP HI. SCR. 2		6,500,000
16	BACKUP HI. SCR. 3		6,000,000
17	BACKUP HI. SCR. 4		5,500,000
18	HI. SCR.1 CREDITS		01
19	HI. SCR.2 CREDITS		01
20	HI. SCR.3 CREDITS		01
21	HI. SCR.4 CREDITS		01
22	H. S. RESET EVERY		3,000
23	FREE PLAY		NO
24	U.S.A. 1 COINAGE (1 COIN 1 PLAY) [2,3,6]		
25	LEFT UNITS		01
26	CENTER UNITS		04
27	RIGHT UNITS		01
28	UNITS/ CREDIT		01
29	UNITS/ BONUS		00
30	MINIMUM UNITS		00
31 - 48	Game-specific Adjustments (detailed in text and the Game Adjustment Setting Comparison Table)		
49 [4]	CUSTOM MESSAGE		ON
50	DISPLAY AU (01 - 04)		YES
51 - 52	Game-specific Adjustments (detailed in text and the Game Adjustment Setting Comparison Table)		
53 -58 [5,6]	Special Adjustments- See text for 53-58 details.		
59 [5]	INSTALL ADDABALL		NO
60 [5]	NOT USED		-
61 [5]	INSTALL NOVELTY		NO
62 [5]	INSTALL EX. EASY		NO
63 [5]	INSTALL EASY		NO
64 [5]	INSTALL MEDIUM		NO
65 [5]	INSTALL HARD		NO
66 [5]	INSTALL EX. HARD		NO
67	AUTO BURN-IN		NO
68	CLEAR COINS		NO
69	CLEAR AUDITS		NO
70 [7]	INSTALL FACTORY		NO

NOTES:

1. Automatic Replay percentage value range is adjustable from 5 to 50%, via the Credit button. Item 02 permits changing the factory setting value for Replay Start Level (valid for next 500 games played). Item 03 permits setting up to four replay levels, with values as detailed in text describing Item 03. For Fixed Replay Scores set Auto Replay value to 1 less than 5(%) via the Credit button. Go to Items 02, 03, 04, and 05; install their replay level scores. Turn off any replay level by setting 00 as its value.

2. Phrase in parentheses is Factory Setting. Phrase appears in player 2 and 4 displays. Press Credit button to change setting of the game pricing of Item 24.

3. To change country OR coinage setting, press Credit button to obtain 16 Standard settings, followed by a Custom Setting. The Custom Setting activates Items 25 through 30. When a Standard Setting is used, Items 25 through 30 are set automatically, and cannot be changed.

4. To install Custom Message, press flipper button for alphabet and special characters. Press Credit button for next message letter or character.

5. Special Preset Adjustment, whose effects are noted in the Game Adjustment text.

6. Refer to Pricing Table and text describing these items.

7. Approximates Ad 64, yet includes all factors listed in Factory Setting column, not just Ad 31 through 47 provided by Ad 64.

displays combine as a descriptive phrase; the light type below the column headings names the respective backbox displays where the information appears, etc.). The Player 3 display shows Ad for all 70 adjustment items, so its entry is omitted from the tabular listing.

The TRANSPORTER Game Adjustment Setting Comparison Table shows the five game 'difficulty' Adjustment Items (ranging from Ad 62 - Extra Easy through Ad 66 - Extra Hard). Installing any one of these 'difficulty' Adjustments causes the values shown for each of the included game play Adjustment Items to be installed as a group, changing the level of play from one difficulty level to another. The owner/operator can use the information provided by the Audit Table items to determine whether the 'difficulty level' for this game in this location needs to change to obtain a higher level of earnings from the game or to provide a greater challenge to the location's players.

Once the 'difficulty level' is changed, a careful review of the Audit Items will reveal whether the change has achieved this higher-earnings goal. Sometimes, one (or more) of the Adjustment Items needs further change to keep the number of plays high, while still keeping the earnings level high.

TRANSPORTER
Game Adjustment Setting Comparison Table

Adj #	Adj Description	Extra Easy Ad 62	Easy Ad 63	US & French Factory Settings	German & European Fctry Stngs	Extra Hard Ad 66
				Medium Ad (Factory) 64	Hard Ad 65	
31	SPINNER ON VALUE	5K	4K	3K	1K	1K
32	LEFT KICKBACK	YES	YES	YES	YES	NO
33	XPORTER MEMORY	YES	YES	YES	NO	NO
34	SPECIAL MEMORY	YES	YES	YES	NO	NO
35	RESCUE MEMORY	YES	YES	YES	YES	NO
36	XPORTER BONUS TIME	YES	YES	YES	NO	NO
37	TOP LANE MEMORY	YES	YES	YES	NO	NO
38	EXTRA BALL MEMORY	YES	YES	YES	YES	YES
39	JACKPOT ADV VALUE	9K	6K	5K	4K	3K
40	EASY LOCK (via Ret Lns)	YES	YES	YES	NO	NO
41	TOP LANE CHANGE	YES	YES	YES	YES	NO
42	CONSOL EXTRA BALL	YES	YES	YES	YES	YES
43	EXTRA BALL PERCENT	33	33	33	33	33
44	EXTRA BALL ON	4X	4X	5X	1 AFTER	2 AFTER
45	XCEL MEMORY	YES	YES	YES	NO	NO
46	NOT USED					
47	CONSOLATION TIME	40	40	40	40	40
48	ATTRACT SOUNDS	NONE	NONE	NONE	NONE	NONE

Game Adjustment Procedure

Adjustment Items 01 through 70

The coin door must be open to access the Game Adjustment/Diagnostic switches. All readings and setting changes require operation of these coin door switches. Some setting changes utilize the Credit button; some also use the flipper button(s). Additional text describing the game adjustment items follows this procedure; the value of the Factory Setting for each Game Adjustment item is in the preceding TRANSPORTER Game Adjustment Table.

1. Use AUTO-UP and press ADVANCE. The Id 00 display initially appears. Press ADVANCE until the Player 3 display indicates Ad 01. If the factory setting has not changed, the Player 1 and 2 Score displays indicate AUTO REPLAY, and the Player 4 display shows 10%, indicating a 10% replay percentage. (The game program adjusts itself automatically, as discussed in the following text concerning the 'details' about Adjustment Item 01.)

2. To reach a higher item number (in the Player 3 display), use AUTO-UP and press ADVANCE. To return to a previous item number, use MANUAL-DOWN and press ADVANCE.

3. With the desired Game Adjustment Item number showing in the Player 3 display, increase the setting value (or select another option) shown in the Player 4 display by using AUTO-UP and pressing the Credit button. Repeat this step for each item, until all changes to the factory settings for the Game Adjustment Items have been made. The preceding Game Adjustment Table consolidates the Factory Settings into one grouping.

   (The same procedure can be used for Audit Items. To zero Au 01 - 04 (concerning the coin chutes and the total coins), the operator can proceed to item 68, Clear Coins, and press the Credit button to obtain the YES option. The operator then presses the ADVANCE button and notes the "DONE" display, which verifies that the entry values for items 01 through 04 of the Audit Items are now reset to zero.)

   For example, the operator may desire to change the degree of game play difficulty from the Factory Setting (equivalent to the Install Medium [Ad 64] difficulty, along with a number of other automatically installed settings, as shown in the right column of the Game Adjustment Table) to another difficulty more suitable for the players at a particular game site. Four other 'automatic' play difficulty settings (Ad 62 - Ad 66) are available, each of which, if selected, installs all the adjustments listed for that difficulty in the Game Adjustment Setting Comparison Table, which precedes the 'details' text.

4. To proceed rapidly through the entire adjustments series, press and hold ADVANCE, until Ad 70 shows in the Player 3 display. From item 70, you can: (A) return to the Game-Over Mode; or (B) restore factory settings and zero audit (bookkeeping) totals. Perform either of the following, as desired:

A. To reach Game-Over Mode, use AUTO-UP and press ADVANCE once. TRANSPORTER now goes to the Game-Over Mode.

B. To restore the Factory Settings for Game Adjustment Items (as listed in the Game Adjustments Table), zero all audit (bookkeeping) totals, and return to Game-Over Mode, use AUTO-UP or MANUAL-DOWN to display Ad 70 in the Player 3 display. Press the Credit button to display the YES option in the Player 4 display. Using AUTO-UP, press ADVANCE once. TRANSPORTER now zeroes ALL Audit Item totals and changes ALL Game Adjustment Items back to those originally selected as Factory Settings. It then shows the operator a message ("FACTORY SETTING") that this has occurred. (A problem in the Memory Protection circuit or closing the coin door will cause the message "ADJUST FAILURE" to appear.) Press ADVANCE once more to return to the Game-Over Mode.

Details of Adjustment Items 01 through 70

▲ 01 Auto Replay (or Fixed Replay)

Of the two options, AUTO REPLAY is the percentage of replays automatically awarded per game. The game program aids a pinball's initial installation by causing a comparison of the value of the Replay Level to the value of all players' scores every 50 games. At each comparison, the program increases (or decreases) the Replay Level by an amount necessary to achieve the replay percentage specified either via the factory setting or later operator selection. Use the Credit button to change the percentage within the range of 5 to 25 (%), with the value increasing using AUTO-UP (or decreasing using MANUAL-DOWN). The next Credit button change below 5%, selects the FIXED REPLAY option.

For AUTO REPLAY, Ad 02 provides the Starting Replay Level (Player 1 and 2 displays show REPLAY START). Ad 03 provides the number of replay levels (01, 02, 03, or 04). TRANSPORTER then proceeds to Ad 06 automatically.

For FIXED REPLAY, Ad 02 is the first replay level (REPLAY LEVEL 1). Ad 03, 04, and 05 are the other replay levels.

▲ 02 Starting Replay Level (or Replay Level 1)

For AUTO REPLAY (refer to Ad 01), the initial Factory Setting is listed in the Game Adjustment Table. The range of settings is 800,000 through 9,800,000 (by increments of 100,000 with AUTO-UP or decrements of 100,000 with MANUAL- DOWN).

For FIXED REPLAY, the operator can enter the value to be used for the first fixed replay score level via the Credit button. The range of settings is: OFF; 100,000 through 9,900,000 (by increments of 100,000 with AUTO-UP, or decrements of 100,000 with MANUAL-DOWN).

▲ 03 Replay Levels (or Replay Level 2)

For AUTO REPLAY (refer to Ad 01), this is the number of replay levels in a game. The option range is one, two, three, or four replay level(s). When the operator chooses two replay levels, TRANSPORTER automatically adjusts the second replay level to be twice the value selected for Ad 02, the starting replay level. Choosing three or four replay levels automatically adjusts their replay levels to three times or four times the Ad 02 value.

For FIXED REPLAY, the technique of value entry and the range of settings are identical to those of Ad 02.

▲ 04 (Replay Level 3)

For AUTO REPLAY, this Adjustment Item is not applicable. TRANSPORTER automatically bypasses this adjustment.

For FIXED REPLAY, the technique of value entry and the range of settings are identical to those of Ad 02.

▲ 05 (Replay Level 4)

For AUTO REPLAY, this Adjustment Item is not applicable. TRANSPORTER automatically bypasses this adjustment.

For FIXED REPLAY, the technique of value entry and the range of settings are identical to those of Ad 02.

▲ 06 Replay Award

For either AUTO REPLAY or FIXED REPLAY (Ad 01), the operator can select the form of the award automatically provided when the player exceeds any Replay Level (Automatic or Fixed). The choices are:

Credit - Reaching each replay level obtains a credit (free game).
Ball - Reaching each replay level obtains an extra ball.
Audit - Reaching each replay level obtains nothing to the player; it does increase the entry value of the Audit Item(s) maintaining a tally of these awards (Au 08, and Au 20 through 23, as applicable).

▲ 07 Special Award

The operator can select the form of the award automatically provided when the player scores a Special. The choices are:

Credit - Scoring each Special, when lit, obtains a credit (free game).
Ball - Scoring each Special, when lit, obtains an extra ball.
Score - Scoring each Special, when lit, obtains a score advance of 100,000 points to the player.

▲ 08 Match Award

The operator can select (via the Credit button) the desired percentage for the Match action occurring at the completion of each game. The choices are:

1%-50% - 1% is 'hard'; 50% is 'extremely easy'. During Match action, the game selects a random two-digit number at end of game and compares each player's score for an identical two digits in the rightmost two positions. A matching of the two digits results in the award of a credit.

Off - The MATCH display does not operate at completion of the game; no award is given.

▲ 09 Not Used

▲ 10 Tilt Warning

The operator can specify the number of total actuations of the plumb bob and playfield tilt mechanisms that can occur before the game is "tilted". The range of this setting is 1 through 5.

▲ 11 Extra Ball/Ball In Play

The operator can choose (via the Credit button) the number of Extra Balls to be awarded to a player. The range of this setting is:

00 - NO extra ball play; displays a message, NO EX. BALL.

1 -9 E. B./Ball - 1 through 9 Extra Balls per ball (i.e., all balls including Extra Balls) are awarded.

1-9 E. B./B.I. P. - 1 through 9 Extra Balls per Ball In Play (B. I. P.) (i.e., all balls NOT including Extra Balls) are awarded.

1-9 E. B./Game - 1 through 9 Extra Balls per game.

▲ 12 Maximum Credits

The operator can specify the maximum number of credits the game can accumulate, either through game play awards or coin purchases. The range of settings is 5 through 10. Reaching the specified setting prevents the award of additional credits by game play. Coin purchases do continue to accumulate and are displayed.

▲ 13 Highest Scores

The operator can specify (via the Credit button) whether the game is to maintain a record of the four highest scores achieved to date. The choices are:

Off - NO high scores are recorded.

On - The four highest scores are stored in memory for use by Game Adjustment 22.

▲ 14 Backup High Score 1

The operator can set the Backup High Score value in the Player 1 Score display, using the Credit button. The game automatically restores this value, when the operator presses, and holds, the HIGH SCORE RESET switch, or when an automatic High Score Reset event (Ad 22) occurs.

▲ 15 Backup High Score 2

This adjustment is similar to Ad 14, except that this applies to the Player 2 Score display. The adjustment technique is identical to Ad 14. It is also restored as described for Ad 14.

▲ 16 Backup High Score 3

This adjustment is similar to Ad 14, except that this applies to the Player 3 Score display. The adjustment technique is identical to Ad 14. It is also restored as described for Ad 14.

▲ 17 Backup High Score 4

This adjustment is similar to Ad 14, except that this applies to the Player 4 Score display. The adjustment technique is identical to Ad 14. It is also restored as described for Ad 14.

▲ 18 Credits for Highest Score 1

The operator can select the number of credits to be awarded, by using the Credit button, whenever a player exceeds the previous Highest Score. The range of this setting is 00 through 10.

▲ 19 Credits for Highest Score 2

This adjustment is similar to Ad 18, except that this applies to the player's exceeding the second highest score. The Credit button adjustment technique is the same as for Ad 18. The range of this setting is 00 through 03.

▲ 20 Credits for Highest Score 3

This adjustment is similar to Ad 18, except that this applies to the player's exceeding the third highest score. The Credit button adjustment technique is the same as for Ad 18. The range of this setting is 00 through 03.

▲ 21 Credits for Highest Score 4

This adjustment is similar to Ad 18, except that this applies to the player's exceeding the fourth highest score. The Credit button adjustment technique is the same as for Ad 18. The range of this setting is 00 through 03.

▲ 22 Automatic High Score Reset

The operator can specify (via Credit button) that the game will provide an automatic reset of the displayed "Highest Scores", and the number of games to be played before the reset occurs. (Audit item 39 displays the games remaining before the reset.) The values provided upon reset are those selected by the operator in Ad 14 through 17, the Backup High Scores. The range of this setting is Off (to disable this adjustment), and 250 to 24,750 games (in increments of 250).

▲ 23 Free Play

The operator can select (via the Credit button) whether a player can operate the game without a coin (free play) or with a coin. The choices are:

No   -   A coin is necessary for game play.
Yes   -   Game play is free; no coin is required.

▲ 24 Coinage Selections

The operator can specify (via the Credit button) any of the 23 Standard Settings for game pricing, each of which exhibits a message identifying the country and the number of coins required and the number of games that the coin requirement purchases. Choosing a Standard Setting permits the game to omit items Ad 25 through 30, which are adjustments allowing for a special custom coinage setting.

Following the last Standard Setting is a Custom Coinage Setting, which allows the operator to utilize Ad 25 through 30 in establishing a special coinage setting. A message, CUSTOM COINAGE, indicates that the operator can enter the appropriate values into the Ad 25 through 30 adjustment items.

The values for Ad 25 through 30 of each Standard Setting, as well as other possible values for the Custom Coinage Setting are shown in the Pricing Table.

▲ 25 Left Chute Coin Units

The operator can specify (via the Credit button) the number of coin units purchased by a coin passing through the left coin chute.

▲ 26 Center Chute Coin Units

The operator can specify (via the Credit button) the number of coin units purchased by a coin passing through the center coin chute.

▲ 27 Right Chute Coin Units

The operator can specify (via the Credit button) the number of coin units purchased by a coin passing through the right coin chute.

▲ 28 Units Required for Credit

The operator can define (via the Credit button) the number of coin units required to obtain 1 Credit. A coin unit counter in the game program totals the number of coin units purchased through all coin chutes prior to each game. If the total of these coin units matches, or exceeds, the Units per Credit value by a multiple (or more, coin units) of the specified Units per Credit value, the Credits display shows the proper number of Credits. The coin unit counter retains any remaining coin units, until the start of a game; then, the coin unit counter is cleared (its contents are zeroed).

▲ 29 Units Required for Bonus

The operator can specify (via the Credit button) that 1 additional Credit is to be indicated in the Credits display, when a certain number of coin units are accumulated.

▲ 30 Minimum Units Required for any Credits Posted

The operator can specify that NO Credits are to be posted (indicated in the Credits display), until the credit units counter reaches a particular value, by setting this value to 02 (or more). A setting of 01 allows the Credits display to show fractional coin units.

The System 11B game program defines the following 18 Adjustment Items as "game-specific"; that is, they are unique for each game. The Game Designer/Engineer/Programmer team members work together to use these as controlling factors for game play. By varying the setting of these Adjustment Items, it is possible to "fine-tune" a game to suit a particular location, enabling the owner/operator to reap maximum earnings, while still providing the players with sufficient challenge to keep them playing.

▲31 Spinner On Value

The operator can choose (via the Credit button) the value of the Spinner award. The range of this setting is 1,000 to 9,000; the Factory Setting range is 3,000 (Conservative) to 5,000 (Liberal). Note that the setting of this Adjustment can affect the Replay Level value, if too Liberal a setting is selected, allowing high scores.

▲32 Left Kickback

The operator can choose whether to enable the left Outlane Kickback at the beginning of game play. The choices are:

Yes - (Liberal) Kickback is turned ON at ball start. The Factory Setting is Yes.

No - (Conservative) Kickback is OFF at ball start.

▲33 Transporter Memory

The operator can choose (via the Credit button) whether the Transporter Bonus Lights are stored in memory for "next ball" play (continues from ball to ball). The choices are:

Yes - (Liberal) When lighted , the Transporter lamps are turned ON at ball start (stored in memory) for each ball during the game. The Factory Setting is Yes.

No - (Conservative) Lamps are turned Off at ball start.

▲34 Special Memory

The operator can choose (via the Credit button)whether the lighted Special lamp is stored in memory for 'next ball' play (continues from ball to ball) or is reset for each ball. The choices are:

Yes - (Liberal) When lighted , the Special lamp is turned ON at ball start (stored in memory) for each ball during the game. The Factory Setting is yes.

No - (Conservative) Lamp is turned Off at ball start.

▲35 Rescue Memory

The operator can choose (via the Credit button)whether the lighted RESCUE lamps are stored in memory for 'next ball' play (continues from ball to ball) or is reset for each ball. The choices are:

Yes - (Liberal) When lighted , the RESCUE lamps are turned ON at ball start (stored in memory) for each ball during the game. The Factory Setting is Yes.

No - (Conservative) Lamps are turned Off at ball start.

▲36 Transporter Bonus Time

The operator can choose (via the Credit button) whether the countdown time between the Transporter lamps (located on backbox) is 15 seconds or 10 seconds after Transporter Bonus is activated. The choices are:

Yes - (Liberal) When Transporter activated, countdown time between lamps = 15 sec. The Factory Setting is yes.

No - (Conservative) Countdown time between lamps = 10 sec.

▲37 Top Lane Memory

The operator can choose (via the Credit button) whether the lighted Top Lane lamp is stored in memory for 'next ball' play (continues from ball to ball) or is reset for each ball. The choices are:

Yes - (Liberal) When lighted , the Top Lane lamp is turned ON at ball start (stored in memory) for each ball during the game. The Factory Setting is Yes.

No - (Conservative) Lamp is turned Off at ball start.

▲38 Extra Ball Memory

The operator can choose (via the Credit button) whether the lighted Extra Ball lamp is stored in memory for 'next ball' play (continues from ball to ball) or is reset for each ball. The choices are:

Yes - (Liberal) When lighted , the Extra Ball lamp is turned ON at ball start (stored in memory) for each ball during the game. The Factory Setting is Yes.

No - (Conservative) Lamp is turned Off at ball start.

▲39 Jackpot Advance Value

The operator can choose (via the Credit button) the value of the Jackpot award. The range of this setting is 1,000 to 99,000; the Factory Setting range is 5,000 (Conservative) to 10,000 (Liberal). Note that the setting of this Adjustment can affect the Replay Level value, if too Liberal a setting is selected, allowing high scores.

▲40 Easy Lock via Return Lanes

The operator can choose (via the Credit button) whether going through the return lanes will spot the letters R, E, and S of RESCUE. The choices are:

Yes - (Liberal) Completion of return lanes will spot R, E, and S.The Factory setting is yes.

No - (Conservative) Completion of return lanes will not spot R, E, and S.

▲41 Top Lane Change

The operator can choose (via the Credit button) whether the player has control over the Top Lane lights for lane changes. The choices are:

Yes - (Liberal) The player has lane change control. The factory setting is yes.

No - (Conservative) The player does not have lane change control.

▲42 Consolidation Extra Ball

The operator can choose (via the Credit button) whether a less-skilled player can obtain an Extra Ball by completing the Top Center Lane and obtain 30 seconds of Left Outlane Kickback operation for a better score. The choices are:

Yes - With a ball time less than the setting of Ad 47, the player receives an opportunity to obtain an Extra Ball.

No - The player does not receive this opportunity.

▲43 Extra Ball Percent

The operator can choose (via the Credit button) the percentage value for all Extra Balls per game. The range of this automatic adjustment setting is Enabled 1% (Hard) through 99% (Extremely easy); it can also be turned off (disabled), via a setting of Off. When the automatic adjustment is turned on (enabled), the game program adjusts the setting at the end of a game, after each 50 games, unless the current value is within 2% of the setting; then, no auto adjustment occurs. The Factory Setting is 33%, for all levels of difficulty.

▲44 Extra Ball ON (4X, 5X, 1 AFTER, 2 AFTER)

The operator can choose (via the Credit button) whether the Extra Ball lamp lights when 4X, 5X, one after 5X, or two after 5X is lighted. The range of this setting is Easy (Liberal, Extra Ball lamp lights when the 4X Multiplier level is achieved); Medium (Extra Ball lamp lights when the 5X Multiplier level is achieved); Hard (Extra Ball lamp lights when one after the 5x Multiplier level is achieved); E Hard (Extra Ball lamp lights when two after the 5X Multiplier level is achieved).

▲45 X-cellerator Memory

The operator can choose (via the Credit button) whether the X-cellerator Lamps are stored in memory for "next ball" play. The choices are:

Yes - (Liberal) When lighted , the X-cellerator lamps are turned ON at ball start (stored in memory) for each ball during the game. The Factory Setting is Yes.

No - (Conservative) Lamp is turned Off at ball start.

▲46 Not Used

▲47 Average Ball Time

The operator can choose (via the Credit button) the minimum game time below which a form of 'Consolation' becomes effective. This compensates for less skilled players to encourage them to continue playing the game. (Less skilled players are those who did not get a Special, an Extra Ball, or other type of 'specialty' shot.) Factory Setting is 40 seconds.

▲48 Attract Mode Sounds

The operator can select (via the Credit button) the amount of sounds occurring during the Attract Mode. The choices are:

ALOT - Sounds occur for approximately 8 minutes during the Attract Mode sequence.

LESS - Sounds occur for approximately 2 mintues during only the Attract Mode.

NONE - No sounds occur during the Attract Mode. The Factory Setting is NONE.

▲49 Custom Message

The operator can choose (via the Credit button) whether to display a message during the Attract Mode. (When display of a message is selected, the operator can either utilize the message provided or change the message.) Three choices are available:

1 - Display a message during the Attract Mode. The Player 4 display shows this choice as ON. The 3-line message provided is:

GET ME...OUT OF HERE...BEAM ME UP BALLY

2 - Do NOT display a message during the Attract Mode. (Player 4 shows OFF.)

3 - The Player 4 display shows this choice as CHANGE. The operator can enter a special ("custom") message, as follows:

A. Press ADVANCE once. The operator can now enter as many as three 14-character lines for display during the Attract Mode.

B. Use the flipper button(s) to select each message character (alphabet, numbers, and special symbols are available). In case of error, enter a "back arrow" (just before "space") to correct, followed by correct character. For a period after any letter, use letters with periods (following the special symbols). The entire character set is the following:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 < > ? - / * '
A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z. _

C. Move to the next character via the Credit button. No entirely blank lines will be displayed.

▲50 Display AU 01 - 04

The operator can choose (via the Credit button) how to display the coinage audit information, Au 01 - 04. No information is lost; it remains stored in the CPU memory. The information is now available for readout via the player score displays. Three choices are available:

Yes   -   Both the audit text (slot identification) and the value is displayed.
Value   -   Only the value is displayed.
No   -   NO display occurs.

▲51 Not Used

▲52 Not Used

▲53-55   Not Used in USA Games (Refer to Game Adjustments for German Games)

▲56 Install 3 Balls/2 Coins

The operator can use this Adjustment Item to modify the current game pricing selection to enable game play to begin when the specified number of coins are deposited. In this instance, the player now receives a 3 ball game when 2 coins of proper denomination (USA: 50 cents) passes through the coin chute.

▲57 Install 3 Balls/1 Coin

The operator can use this Adjustment Item to modify the current game pricing selection to enable game play to begin when the specified number of coins are deposited. In this instance, the player now receives a 3 ball game when 1 coin of proper denomination (USA: 25 cents) passes through the coin chute.

SPECIAL PRESET ADJUSTMENTS CAUTION

Adjustments 53 through 66 are Special Preset Adjustments to enable the operator to perform the setting of multiple adjustments at once. They permit the operator to: (1) either modify a game for a specific area (for example, USA coinage settings, Ad 56 through 58, or special German coinage settings, Ad 53 through 58) (2) change a group of adjustments to conform with laws of certain localities (Ad 59 through 61); and (3) to change the degree of difficulty of game play (Ad 62 through 66). A list of the preceding individual Adjustments affected accompanies each of these Special Preset Adjustments. Whenever the operator chooses to use any Special Preset Adjustment, the operator can later access any or all of the individual Adjustments affected by that Special Adjustment for subsequent changes.

SPECIAL PRESET ADJUSTMENTS CAUTION (Continued)

A similar technique is recommended in the event of error or uncertainty concerning any Special Preset Adjustment, after the operator selects it: The operator can restore the factory setting of each individual Adjustment, then select the desired Special Preset Adjustment, and then return to any of the preceding individual adjustments to determine whether use of the Special Adjustment has had the desired effect.

The Backbox displays for each Special Preset Adjustment indicate whether the operator has selected it, by identifying the Adjustment in the Player 1 and 2 displays by name and the selection choice of NO, meaning Not Selected (this is the Factory Setting), or YES, meaning Selected, in the Player 4 display. Operator installation of the 'selected' Preset Adjustment occurs by using the Credit button to choose YES and then pressing the ADVANCE switch. The displays then show the name of the Adjustment again, with DONE to show that the installation is now in effect.

Note that, when an operator installs any of the Special Preset Adjustments, Adjustment Items using the automatic adjust feature of the game program reset to the auto adjust value listed for that Adjustment Item.

NOTE

Games in which the CPU has ROMs installed for German (Deutsch) language and play adjustments automatically have certain Adjustment Items preset. The following table shows these Preset Adjustment Items for each of the special German Coinage Adjustments.

PRESET GAME ADJUSTMENTS TABLE FOR DOMESTIC GAMES

AD	ADJ DESCRIPTION	AD 53 NOT USED	AD 54 NOT USED	AD 55 NOT USED	AD 56 3 Balls for 50 cents	AD 57 3 Balls for 25 cents	AD 58 5 Balls for 50 cents
02	Replay Start				2,500,000	2,500,000	3,500,000
09	Balls/Game				03	03	05
14	Backup High Score 1				7,000,000	7,000,000	8,000,000
15	Backup High Score 2				6,500,000	6,500,000	7,500,000
16	Backup High Score 3				6,000,000	6,000,000	7,000,000
17	Backup High Score 4				5,500,000	5,500,000	6,500,000
24	Coinage				USA 4	USA 1	USA 4
64	Install Medium				YES	YES	NO
65	Install Hard				NO	NO	YES

PRESET GAME ADJUSTMENTS TABLE FOR GERMAN/EUROPEAN GAMES

AD	ADJ DESCRIPTION	GERMAN 1 AD 53	GERMAN 2 AD 54	GERMAN 3 AD 55	GERMAN 4 AD 56	GERMAN 5 AD 57	GERMAN 6 AD 58
01	Auto Replay	ON	ON	ON	ON	ON	ON
02	Replay Start	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
03	Replay Level 2	02	02	02	02	02	02
06	Replay Award	CREDIT	COIL	AUDIT	CREDIT	COIL	AUDIT
07	Special Award	CREDIT	BALL	SCORE	CREDIT	BALL	SCORE
08	Match Feature	10%	10%	OFF	10%	10%	OFF
12	Max. Credits	30	30	30	30	30	30
14	Backup High Score 1	7,000,000	7,000,000	7,000,000	7,000,000	7,000,000	7,000,000
15	Backup High Score 2	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000
16	Backup High Score 3	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000
17	Backup High Score 4	5,500,000	5,500,000	5,500,000	5,500,000	5,500,000	5,500,000
18	High Score 1 Credits	03	03	03	03	03	03
19	High Score 2 Credits	00	00	00	00	00	00
20	High Score 3 Credits	00	00	00	00	00	00
21	High Score 4 Credits	00	00	00	00	00	00
22	High Score Reset	1000 SPIELE	1000 SPIELE	1000 SPIELE	1000 SPIELE	1000 SPIELE	1000 SPIELE
24	Coinage Setting	7 SPIELE/5 DM	7 SPIELE/5 DM	7 SPIELE/5 DM	6 SPIELE/5 DM	6 SPIELE/5 DM	6 SPIELE/5 DM

▲53 through 58 FOR GERMAN/USA GAMES ONLY:
Install German 1, 2, 3, 4, 5 or 6

The operator can use these Adjustment Items to modify the game pricing selection of Standard Setting named "German 2 or German 1" in the Pricing Table to permit the style of play for the particular price shown in the JOKERZ Preset Game Adjustments Table for German Games.

▲58 Install 5 Balls/2 Coins

The operator can use this Adjustment Item to modify the current game pricing selection to enable game play to begin when the specified number of coins are deposited. In this instance, the player now receives a 5 ball game when 2 coins of proper denomination (USA: 50 cents) passes through the coin chute.

▲59 Install Add-A-Ball

The operator can utilize this option to delete all Free Play awards and replace them with Extra Ball awards. Individual Adjustments are affected, as follows:

Ad	Name	New Setting	Ad	Name	New Setting
06	Replay Award	Ball	18	Hi Scr 1 Credits	00
07	Special Award	Ball	19	Hi Scr 2 Credits	00
08	Match Feature	Off	20	Hi Scr 3 Credits	00
11	Ex. Ball	4/BIP	21	Hi Scr 4 Credits	00

▲60 NOT USED

▲61 Install Novelty

The operator can remove all Free Play and Extra Ball awards. Individual Adjustments are affec- ted, as follows:

Ad	Name	New Setting	Ad	Name	New Setting	
01	Fixed Replay	SCORES	07	Special Award	Score	
02	Replay Level 1	Off	08	Match Feature	Off	
03	Replay Level 2	Off	11	No Extra Ball	00	
04	Replay Level 3	Off	18	Hi Scr 1 Credits		00
05	Replay Level 4	Off	19	Hi Scr 2 Credits		00
06	Replay Award	Audit	20	Hi Scr 3 Credits		00
			21	Hi Scr 4 Credits		00

▲62 Install Extra Easy

The operator can change the game play difficulty adjustments to a combination that is extremely easy (sometimes called "liberal"). The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Extra Easy' group.

▲63 Install Easy

The operator can change the game play difficulty adjustments to a combination that is slightly easier than the Factory Settings. The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Easy' group.

▲64 Install Medium

The operator can change the game play difficulty adjustments to a combination that matches the Factory Settings. The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Medium' group.

▲65 Install Hard

The operator can change the game play difficulty adjustments to a combination that is more difficult than the Factory Settings. The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Hard' group.

▲66 Install Extra Hard

The operator can change the game play difficulty adjustments to a combination that is much more difficult than the Factory Settings. The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Extra Hard' group.

▲67 Auto Burn-in

The operator can choose the YES option for this Special Preset Adjustment to perform certain automatic testing of the game, as used in the factory. It does not affect the game operation, but merely provides for a cyclic testing of most of the game's mechanisms.

▲68 Clear Coins

The operator can request the clearing of the coinage audits (Au 01 through 04) by selecting (via the Credit button) the YES option, as shown in the player 4 display. This adjustment zeroes the counters tallying the number of coins through each slot, the Paid Credits counter, and the Credits display.

After the YES option is displayed, the operator must press the ADVANCE button. The game then displays DONE to show that the coinage audits have been reset to zero.

▲69 Clear Audits

The operator can request the clearing of the non-coinage audits (Au 05 through 55) by selecting (via the Credit button) the YES option, as shown in the player 4 display. This Adjustment zeroes the counters tallying the remaining Audit factors. Please note that this does NOT affect the Automatic Replay Percentaging data nor the automatic High Score Reset counter.

After the YES option is displayed, the operator must press the ADVANCE button. The game then displays DONE to show that the non-coinage audits have been reset to zero.

▲70 Install Factory

The operator can request the game (via the Credit button) to provide the normal Factory Settings, essentially restoring the game to its 'factory condition'. The operator must select the 'YES' option for this adjustment. This Adjustment clears all Audits, resets all Game Adjustments to the respective Factory Settings, and provides a restart of the Auto Replay (Ad 01). After selecting the YES option, the operator must press the ADVANCE button. The game then displays FACTORY SETTING.

Closing of the coin door before appearance of the FACTORY SETTING message or a problem in the Memory Protect circuit will cause the game to display ADJUST FAILURE.

A loss of battery power or improper treatment of the Game Adjustments will cause the game to attempt to restore Factory Settings. The game announces the results of this reset process with the appropriate message, FACTORY SETTING or ADJUST FAILURE.

Resetting the High Scores

The challenge of exceeding the High Score (either the factory setting or a higher score by another player) is the goal of many pinball game players. To keep a pinball game challenging requires a method of resetting the High Score value for those occasions when a skilled player registers a truly excellent score. Other players note this score and may decide not to play simply because their skill is not adequate to exceed an extremely high score.

For TRANSPORTER, in fact, three methods of resetting the High Score values are available. The simplest method involves allowing Game Adjustment Item Ad 22 to reset the High Score values automatically after the specified number of plays designated by the operator. The second method requires pressing the High Score Reset switch on the inside of the coin door in the Attract Mode. This action simply erases the previous high score values and replaces them with the Backup High Score values. The third method establishes new values replacing the factory setting values or previous operator setting values; it requires performing the following steps:

1. Using AUTO-UP or MANUAL-DOWN, reach item Ad 14 (and items Ad 15, 16, and 17, if desired). The High Score value of the factory setting (or previous operator-adjusted setting) appears in the Player 1 display. If this value is satisfactory, go to step 4 below.

2. If you wish to increase the High Score value from that displayed in the Player 1 display, use AUTO-UP, and press the Credit button, until the desired value shows in the Player 1 display.

3. If you wish to decrease the High Score value, use MANUAL-DOWN, and press the Credit button, until the desired value shows in the Player 1 display.

4. Using AUTO-UP, press and hold down ADVANCE, until the Player 3 display shows Ad 70 Press ADVANCE once, to return to Game-Over Mode.

5. Press the High Score Reset switch (on coin door), and listen for the sound signifying that the score reset action is complete. Observe player score displays (Player 1, Player 2, etc.) to verify that the new High Score values are displayed.

Game Pricing

___PRICING MADE EASY

Game Adjustment Item Ad 24 allows the operator an easy method of setting the pricing functions. Pressing the Credit button allows the operator a choice of one of the 16 "Standard" Settings, with associated automatic pricing (Player 1 and 2 displays show the Country identifier, with a number for a country having more than one "Standard" Setting; player 3 and 4 displays show the games per coin(s) information). In the Pricing Table, each "Standard" Setting is denoted by a Country Identifier. Automatic Pricing causes each of the other pricing items (columns 25 through 30) to change to the value shown in the table for that selected "Standard" Setting. In the table where the word "CUSTOM" appears, the owner/operator must enter the values shown (columns 25 through 30) to obtain the games per coin factor shown in the Games/Coin column of the table. To make these setting adjustments, the owner/operator must press the Credit button until the words "CUSTOM COINAGE" appear in the player score displays.

TRANSPORTER Pricing Table

Country	Coin Chute			Games/Coin	Ad 24 Display	Pricing Functions					
	Left	Center	Right			25	26	27	28	29	30
USA and Canada	25¢	-	25¢	1/25¢, 4/$1 [2]	U.S.A. 1	01	04	01	01	00	00
				1/50¢, 2/75¢, 3/$1 [1,2]	U.S.A. 2	03	12	03	04	00	00
				1/50¢, 2/$1 [2]	U.S.A. 3	01	04	01	02	00	01
				1/50¢, 3/$1	U.S.A. 4	01	00	01	02	04	01
				1/50¢ ; Add'l game: 25¢	CUSTOM	98	00	98	99	00	00
Austria	5 Sch	10 Sch	10 Sch	1/2x5 Sch, 3/2x10 Sch [2]	AUSTRIA	01	02	02	02	04	01
	5 Sch	-	10 Sch	2/5 Sch, 5/10 Schilling	CUSTOM	02	00	05	01	00	00
	1 Sch	5 Sch	10 Sch	2/5x1 Sch, 2/5 Sch, 5/10 Sch	CUSTOM	02	10	25	05	00	00
Australia	20¢	-	$1	1/3x20¢, 2/$1 [2]	AUSTRAL.	02	00	10	05	00	00
United Kingdom	10 P	50 P	1£	1/3x10 P, 2/50 P, 5/1£ [2]	U.K.	02	10	20	05	20	00
Switzerland	1 F	2 F	5 F	1/1 F, 3/2 F, 7/5 Franc [2]	SWISS	01	03	07	01	00	00
	1 F	-	2 F	1/1 F, 3/2 F	CUSTOM	03	00	06	02	00	00
Belgium	20F	-	50 F	1/20 F, 3/50 Franc [2]	BELGIUM	06	00	15	05	00	00

TRANSPORTER Pricing Table (Continued)

Country	Coin Chute			Games/Coin	Ad 24 Display	Pricing Functions					
	Left	Center	Right			25	26	27	28	29	30
West Germany	1 DM	2 DM	5 DM	1/1 DM, 2/2 DM, 7/5 DMark [2,3]	GERMAN1	06	12	30	05	30	00
				1/1 DM, 2/2 DM, 6/5 DM [1,2]	GERMAN2	06	12	30	05	00	00
				1/1 DM, 3/2 DM, 9/5 DM	CUSTOM	09	18	45	05	00	00
				1/2x1 DM, 1/2 DM, 3/5 DM	CUSTOM	03	06	15	05	00	00
				2/1 DM, 5/2 DM, 14/5 DM	CUSTOM	13	26	65	05	65	00
Netherlands	1 HFl	2.5 HFl	2.5 HFl	1/1 HFl, 3/2.5 Holland Florin [2]	NETHERL.	06	15	15	05	00	00
	25¢	-	1 G	1/25¢, 5/1 Guilder	CUSTOM	01	00	05	01	00	00
	1 G	-	1 G	1/1 Guilder [2]	HOLLAND	01	00	01	01	00	00
Sweden	5 Kr	5 Kr	5 Kr	1/5 Krona [2]	SWEDEN	01	01	01	01	00	00
	1 Kr	-	1 Kr	1/2x1 Krona	CUSTOM	01	04	01	02	00	01
France	1 F	5 F	10 F	1/2x1F, 3/5F, 7/10 Franc [1,2]	FRANCE	03	15	30	05	30	00
	1 F	5 F	10 F	1/3x1 F, 2/5 F, 5/10 Franc	CUSTOM	02	10	20	05	20	00
	5 F	10 F	10 F	1/5 F, 3/10 F, 7/2x10 Franc	CUSTOM	03	15	30	10	60	15
	5 F	10 F	10 F	2/5 F, 4/10 F, 9/2x10 Franc	CUSTOM	02	10	20	05	40	10
	5 F	10 F	10 F	2/5 F, 5/10 F, 11/2x10 Franc	CUSTOM	01	05	10	02	20	05
Italy	200 L	-	500 L	1/2X200 L, 3/2X500 L Lire [2]	ITALY	06	00	15	10	00	00
Spain	25 P	-	100P	1/25 P, 5/100 Peseta [2]	SPAIN	05	00	20	04	00	00
	25 P	-	100P	1/25 P, 4/100 Peseta	CUSTOM	01	00	04	01	00	00
	25 P	-	100P	1/2x25 P, 2/100 Peseta	CUSTOM	01	00	04	02	00	00
	25 P	-	100P	1/2x25 P, 3/100 Peseta	CUSTOM	03	00	12	04	00	06
Japan	100 ¥	-	100 ¥	1/100 Yen [2]	JAPAN	01	00	01	01	00	00
Antilles, Netherl.	25¢	-	1 G	1/25¢, 4/1 Guilder [2]	ANTILLES	01	01	04	01	00	00
Chile	Token	-	Token	1/1 Token [2]	CHILE	01	04	01	01	00	00
Denmark	1 Kr	5 Kr	10 Kr	1/2x1 Kr, 3/5 Kr, 7/10 Krone [2]	DENMARK	03	15	30	05	30	00
Finland	1 Mka	-	5 Mka	1/2x1 Mka, 3/5 Markka [2]	FINLAND	03	00	15	05	00	00
New Zealand	20¢	-	20¢	1/3x20¢ [2]	N. Z.	01	00	01	03	00	01
Norway	1 Kr	-	1 Kr	1/2x1 Kr, 3/5x1 Krone [2]	NORWAY	01	00	01	02	05	00
Argentina	10¢	10¢	10¢	1/1 Token [2]	ARG.	01	01	01	01	00	00
Greece	10D	20D	50D	1/2x10D, 1/20D, 3/50Drachma [2]	GREECE	03	06	15	05	00	00

Notes: 1. Factory Default.   2. Standard Setting - Change by pressing Credit button.   3. Other functions are also affected; see the explanations for Adjustment Items 53 through 58.

___CUSTOM PRICING

Adjustment Item 24 must be set to the Custom Coinage Setting (player 1 and 2 displaying CUSTOM COINAGE) to enable the operator to enter desired custom pricing selections for Items 25 through 30, based on the Pricing Table. Item 25 is the left coin chute multiplier. Item 26 is the center coin chute multiplier. Item 27 is the right coin chute multiplier. Item 28 is the number of coin units equal to one Credit. (A Credit is usually equal to one game.)

The calculation of the ratio of Games : Price uses the ratio equation of $X : VC$, where:

X = Coin Chute Multiplier (Item 25, 26, or 27 in Pricing Table);
V = Value of coin;
C = Coin units equivalent to one Credit (Item 28).

For example, for 25¢ chutes at the factory setting, substituting values in the Games : Price ratio calculation gives 1 : 25 x 1, or one game for 25¢.

___UNITS REQUIRED FOR BONUS CREDIT

Item 29 is the number of coin units that must pass through the coin chute(s) before an additional Credit (game) is posted (displayed). At the factory setting, the number in this item is 00. (This 00 means that NO bonus credit (free game) is awarded, although purchase of more than one game at a time occurs.)

___MINIMUM COIN UNITS

Item 30 determines the number of coin units that must pass through the coin chute(s) before play may begin. The Factory Setting for this item is 00. (This 00 means that the Minimum Coin Units feature (Item 30) is disabled; a 01 setting also means that this feature is still disabled, yet the Credits message display should display fractional coin units.)

Test/Diagnostic Procedures

TRANSPORTER provides a series of diagnostic tests to aid the operator in determining game condition (that is, whether the game's features and highlights are operating satisfactorily). These tests activate virtually all the electronic and electromechanical devices comprising the game, so that the operator can readily locate a malfunctioning device or simply verify that all devices are working properly. In order, these tests deal with the music, the displays, the game sounds, the lamps, the solenoids, and the switches.

In addition to the diagnostic testing, a feature called the Auto Burn-in Mode is available. Activating this mode enables the operator to observe the game while all of the diagnostic tests, except the switch test, occur. This can be very helpful in locating 'intermittent' problems.

Activating either the entire test series or one of the individual tests requires use of the Game Adjustment/ Diagnostic switches. Open the coin door for access to these switches. To proceed to the Diagnostic Tests, the operator must simply switch the game On, set the AUTO-UP/MANUAL- DOWN switch to MANUAL-DOWN, and press the ADVANCE button.

C A U T I O N

The System-11B game program greatly aids the operator and service personnel: At the beginning of the Test/Diagnostic Procedures (and also at game Turn-On), the player score displays now signal, with a message ("Press ADVANCE for Report") that at least one switch has NOT been actuated during ball play for a lengthy period of time (90 balls, or ≥30 games). Moreover, the Problem Reporting activity at the beginning of the Test/ Diagnostic Procedures, the display of problem switches now includes ALL switches exhibiting problems. Refer to the text on Switch Tests for additional information. To proceed with the Test/Diagnostic Procedures, use AUTO-UP, and press ADVANCE.

MUSIC TEST

1. In the Music Test, observe that the player 1 and 2 displays show the message, MUSIC TEST. Switching to AUTO-UP, observe that the message now reads MUSIC OFF, and that the player 3 score display shows 00 00. Press the Credit button to select the desired music selection: 01 - 'Main Theme' through 07 - 'Hi. Score Theme' (the selections repeat). Adjust the volume control for proper sound level for the game location.

2. Use the AUTO-UP position.

DISPLAY TEST

1. To initiate the Display Test, press ADVANCE. Observe that player 1 and 2 displays briefly show the message, DISPLAY TEST, and that the player 3 score display shows 01 (the Display Test identifier).

2. Use AUTO-UP. Observe that all displays begin a display cycle of all 0s through all 9s, one digit at a time. Verify that the proper comma segments light during display of the odd-numbered digits. Next, a special "all segments" character 'walks' from left to right across each player score display.

3. To halt the display cycle, use MANUAL-DOWN. Then, press ADVANCE to step through the sequential digit display, digit by digit, and the subsequent "all segments" characters display test. Use AUTO-UP to resume cycling, and to proceed to the next test.

SOUND TEST

1. (From Display Test) To initiate the Sound Test, press ADVANCE. Observe that the player 1 and 2 displays show the message, SOUND TEST, and that the player 3 display shows 02 (the Sound Test identifier). The player 3 display shows a series of test steps from 00 through 07. Verify that a different sound is heard each time the number in the display changes.

2. To repeatedly pulse a single sound, use MANUAL-DOWN. Verify that one particular sound repeats. Press ADVANCE to step to the next sound, which repeats until ADVANCE is pressed again. Use AUTO-UP to resume cycling the sounds, and to proceed to the next test.

LAMP TESTS

1. **All Lamps**

   (From Sound Test) To initiate the first Lamps Test, press ADVANCE. Observe that the Player 1 and 2 displays show the message, ALL LAMPS, and that the Player 3 display shows 03 (All LampsTest identifier) and that all feature lamps (playfield and backbox) blink on and off. (Note, however, that the General Illumination lamps remain lighted steadily.) To locate the wiring associated with a particular feature lamp, refer to the Lamp-Matrix Table. CPU Board connections at jacks 1J6 (columns) and 1J7 (rows) are also listed in the table.

2. Single Lamps

From the All Lamps test, using AUTO-UP, press ADVANCE to initiate the Single Lamps Test. The Player 1 and 2 displays initially show the message, SINGLE LAMPS, and the Player 3 display shows 04. Then, the Player 3 display shows 04 01, and the Player 1 and 2 displays change to show "BONUS 1K", the name of the lamp currently blinking. Press the Credit button to proceed through an ascending series of designator numbers (01 through 64), with the Player 1 and 2 displays showing the individual lamp's name. (To proceed through a descending series of lamp identifiers, use MANUAL-DOWN.) Press and hold the Credit button to proceed rapidly to the desired lamp.

TRANSPORTER Lamp Matrix

COLUMN \ ROW	1 Q66 DISP BD BACKGL YEL-BRN 1J7-1	2 Q64 DISP BOARD(KEY) YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-5	6 Q56 BACKGLASS (KEY) YEL-BLU 1J7-6	7 Q54 BACKGLASS YEL-VIO 1J7-7	8 Q52 BACKGLASS YEL-GRY 1J7-8
1 Q80 RED-BRN 1J6-1	Shoot Again 1	Bonus 2X 9	Multi-Ball 17	Top Lanes, Left 25	Left Return Lane 33	Black Hole 10K 41	Black Hole 90K 49	Insert Board 500K 57
2 Q81 RED-BLK 1J6-2	Left Lock Status 2	Bonus 3X 10	18	Top Lanes, Middle 26	Right Return Lane 34	Black Hole 20K 42	Black Hole 100K 50	Insert Board 1 Million 58
3 Q82 RED-ORN 1J6-3	Right Lock Status 3	Bonus 4X 11	L Drop Target "R" 19	Top Lanes, Right 27	Right Spinner 35	Black Hole 30K 43	Black Hole 200K 51	Insert Board 1.5 Million 59
4 Q83 RED-YEL 1J6-5	Center 50K 4	Bonus 5X 12	L Drop Target "E" 20	"X" Target 28	Top Flipper 36	Black Hole 40K 44	Black Hole 300K 52	Insert Board 2 Million 60
5 Q84 RED-GRN 1J6-6	Center 100K 5	Playfield 2X ** 13	L Drop Target "S" 21	EXTRA BALL 29	Super Bonus, Bottom 37	Black Hole 50K 45	Black Hole 400K 53	Insert Board 2.5 Million 61
6 Q85 RED-BLU 1J6-7	Center 150K 6	Playfield 3X ** 14	Mid. Drop Trgt "C" 22	Left Kicker Lane 30	Super Bonus, Middle 38	Black Hole 60K 46	Black Hole 500K 54	Insert Board 3 Million 62
7 Q86 RED-VIO 1J6-8	Center 200K 7	LOCK 1 Now 15	Mid. Drop Trgt "U" 23	Left SPECIAL 31	Super Bonus, Top 39	Black Hole 70K 47	Black Hole 1 Million ** 55	Insert Board 3.5 Million 63
8 Q87 RED-GRY 1J6-9	Center 250K 8	LOCK 2 Now 16	Mid Drop Trgt "E" 24	Right SPECIAL 32	Excellerator Arrow ** 40	Black Hole 80K 48	56	Insert Board 4 Million 64

NOTE: ** = 2 Lamps

SOLENOID TEST

1. (From Lamp Test) Using AUTO-UP, press ADVANCE. Observe that the Player 1 and 2 displays show the message, COIL TEST, the Player 3 display shows 05 (Solenoid Test identifier). Next, the Player 3 display shows a series of test steps from 01 through 22, while the Player 1 and 2 displays show the solenoid/circuit name. During each of these steps, pulsing of the respective solenoid/circuit occurs. The test cycles repeatedly, unless halted via the MANUAL-DOWN switch. Refer to the Solenoid Table for solenoid numbers and wiring information. CPU Board connections at 1P11, 1P12, and 1P19 are also listed in the table.

To continuously pulse a single solenoid/circuit, use MANUAL-DOWN. Press ADVANCE to sequence through the switched, controlled, and special solenoids. Use AUTO-UP to resume test cycling, and to proceed to the next test.

TRANSPORTER Solenoid Table

Sol. No.	Function	Solenoid Type	Wire Color	CPU Board	Playfield/ Cabinet	Driver Trnstr	Solenoid Part No. Flashlamp Type (I = Insert Bd ; p = Playfield)
01A[3]	Outhole Kicker	Switched	Vio-Brn }	1P11-1 (Gry-Brn)	5J1-9: 5J4-9 (A)	Q33	AE-23-800
01C[3]	Playfield 2X Flasher	Switched	Blk-Brn }		5J5-9 (C)	Q33	#906 flashlamp 1p
02A[3]	Ball Eject (Shtr Lane Feeder)	Switched	Vio-Red }	1P11-3 (Gry-Red)	5J1-7: 5J4-8 (A)	Q25	AE-23-800
02C[3]	Bridge Flasher	Switched	Blk-Red }		5J5-8 (C)	Q25	#906 flashlamp 1p
03A[3]	Left Drop Target Bank	Switched	Vio-Orn }	1P11-4 (Gry-Orn)	5J1-6: 5J4-7 (A)	Q32	AE-23-800
03C[3]	Top Left Flashers	Switched	Blk-Orn }		5J5-7 (C)	Q32	#906 flashlamp 2p
04A[3]	Right Drop Target Bank	Switched	Vio-Yel }	1P11-5 (Gry-Yel)	5J1-5: 5J4-6 (A)	Q24	AE-23-800
04C[3]	Jet Flashers	Switched	Blk-Yel }		5J5-6 (C)	Q24	#906 flashlamp 2p
05A[3]	Left (Orion) Lockup	Switched	Vio-Grn }	1P11-6 (Gry-Grn)	5J1-4: 5J4-5 (A)	Q31	AE-23-800
05C[3]	Ball Lock Flashers	Switched	Blk-Grn }		5J4-5 (C)	Q31	#906/#89 flashlamps 1p,1i
06A[3]	Ball Popper	Switched	Vio-Blu }	1P11-7 (Gry-Blu)	5J1-3: 5J4-4 (A)	Q23	AE-26-1200
06C[3]	Single Standup Flasher	Switched	Blk-Blu }		5J5-4 (C)	Q23	#906 flashlamp 1p
07A[3]	Knocker	Switched	Vio-Blk }	1P11-8 (Gry-Vio)	5J1-2: 5J4-3 (A)	Q30	AE-23-800
07C[3]	Ball Popper Flashers	Switched	Blk-Vio }		5J5-3 (C)	Q30	#906/#89 flashlamps 1p,1i
08A[3]	Right (Orion) Lockup	Switched	Vio-Gry }	1P11-9 (Gry-Blk)	5J1-1: 5J4-2 (A)	Q22	AE-23-800
08C[3]	Playfield 3X Flasher	Switched	Blk-Gry }		5J5-2 (C)	Q22	#906 flashlamp 1p
09	Playfield G.I.	Controlled	Brn-Blk	1P12-1	5J2-9: 5J6-9:2J4-3	Q17	5580-09555-01[4a]
10	Top Flipper Gate	Controlled	Brn-Red	1P12-2	5J2-8: 5J6-8:2J4-5	Q9	SM2-35-4000-DC
11	Turn 1 Flasher	Controlled	Brn-Orn	1P12-4	5J2-6: 5J6-7:2J4-6	Q16	#906/#89 flashlamps 1p,1i
12	A/C Select Relay	Controlled	Brn-Yel	1P12-5	5J2-5	Q8	5580-09555-01[5]
13	Not Used	Controlled	Brn-Grn	1P12-6	5J2-4: 5J6-5	Q15	-
14	Left Outlane Kicker	Controlled	Brn-Blu	1P12-7	5J2-4: 5J6-3	Q7	AE-23-800
15	Turn 2 Flasher	Controlled	Brn-Vio	1P12-8	5J5-2: 5J6-2	Q14	#906/#89 flashlamps 1p,1i
16	Turn 3 Flasher	Controlled	Brn-Gry	1P12-9	5J2-1: 5J6-1	Q6	#906/#89 flashlamps 1p,1i
17	Left Thumper Bumper	Special #1	Blu-Brn	1P10-7	5J3-7: 5J7-7	Q75	AE-23-800
18	Left Slingshot Kicker	Special #2	Blu-Red	1P19-4	5J3-6: 5J7-6	Q71	AE-26-1500
19	Right Thumper Bumper	Special #3	Blu-Orn	1P19-3	5J3-3: 5J7-3	Q73	AE-23-800
20	Right Slingshot Kicker	Special #4	Blu-Yel	1P19-6	5J3-4: 5J7-5	Q69	AE-26-1500
21	Bottom Thumper Bumper	Special #5	Blu-Grn	1P19-8	5J3-2: 5J7-2	Q77	AE-23-800
22	Backbox G.I.	Special #6	Blu-Blk	1P19-9	5J3-1: 5J7-1	Q79	5530-09555-01[4b]
	Right Flipper		Orn-Vio	1P19-1	2J3-1: 2J18-10: 7P1-15	--	
	Lower Right Flipper		(Blu-Vio)[2]		(7P1-16:2J18-6:2J17-4)		FL-11630/50VDC
	Upper Right Flipper		(Blk-Yel)[2]		(7P1-13:2J18-8:2J17-1)		FL-11630/50VDC
	Left Flipper		Orn-Gry[2]	1P19-2	2J3-2: 2J18-9: 7P1-18		
	Lower Left Flipper		(Blu-Gry)[2]		(7P1-19:2J18-5:2J17-3)		FL-11630/50VDC

Notes: [1] Wire colors, except flipper Orn-Vio and Orn-Gry , are ground connections (to coil terminal with unbanded end of diode). Flipper Orn-Vio and Orn-Gry wires connect from CPU Board to flipper switch. [2] Flipper connections shown in braces are from flipper switch to flipper coil. [3] "A" circuits are pulsed, when Sol. 12 is de-energized; "C" circuits are pulsed, with Sol. 12 energized. Wire colors in brackets are those from respective "A" and "C" terminals corresponding to the J1-terminal connection listed for the Aux Power Driver Bd, which controls the device pulsing by Sol. 12. [4a] Relay is mounted on the playfield, p/n C-11998-1. [4b] Relay is mounted on the Insert Bd, p/n C-11998-1. [5] Relay is mounted on Aux Power Driver Board, p/n D-12247 in the backbox.

"On" State Logic - Special Solenoid
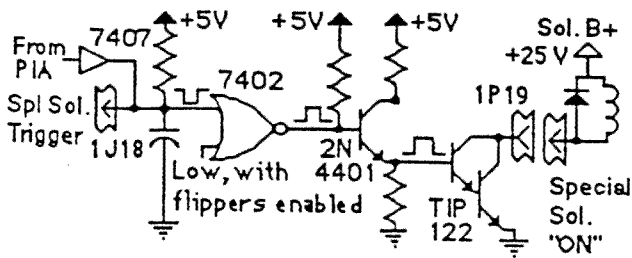
"On" State Logic - Controlled Solenoid
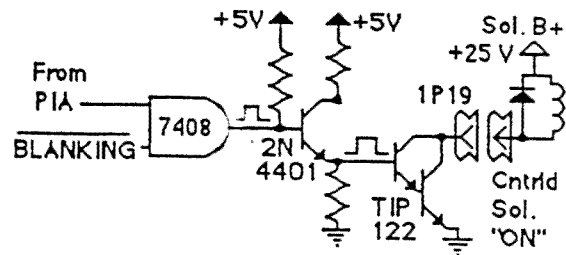
"Off" State - Special Solenoid:
The Special Switch Trigger Input goes low. Meanwhile, the PIA line remains high. The remaining signals reverse their states.

"Off" State - Controlled Solenoid:
The Enable Input (from the PIA) goes low. Meanthe BLANKING signal remains high. The rest of the signals reverse their states.

NOTE

As directed by the game program, the Solenoid A/C Select Relay (solenoid 12) switches the solenoid B+ power between two power busses to permit actuating two groups of solenoids at the proper times. In its de-energized state, the Relay connects the 'circuit A power' to 16 "controlled" and "switched" solenoids (identified in the table with no suffix letter or the letter A, after the solenoid number). Individual solenoid operation then depends on the game program enabling the ground path for solenoid actuation via the driver transistor associated with each solenoid circuit. For example, the game program can actuate the Outhole Kicker solenoid (sol. 01A), via the driver transistor Q33, when the ball drains into the outhole, operating the outhole switch.

When the game program determines that the Solenoid A/C Select Relay (sol. 12) must be energized, the relay connects 'circuit C power' to eight group C solenoids (01C through 08C). Now, driver transistor Q33 can actuate the Captive Ball Flasher circuit (sol. 01C). Using this "multiplexing" technique, the same driver transistor can control actuation of two separate solenoid circuits.
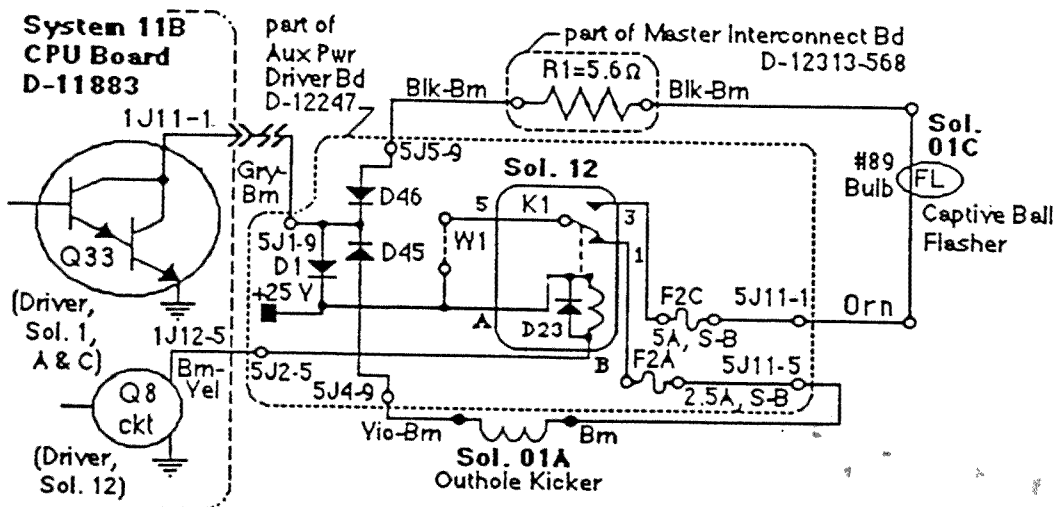
Figure 4. Typical Solenoid A/C Select Relay Circuit, showing the function of Solenoid 12, the Solenoid A/C Select Relay.

SWITCH TESTS

1. Switch Levels

(From Solenoid Test) To initiate the Switch Levels Test, press ADVANCE. Observe that the Player 1 and 2 displays show the message, SWITCH LEVELS, and the Player 3 display shows 06 (Switch Levels Test identifier). Normally, the right portion of the Player 3 display remains blank, indicating that no switch is actuated.

If, however, a switch is actuated (possibly stuck closed), the Player 3 display shows that switch's number, while the Player 1 and 2 displays indicate the switch's name. A sound also accompanies the displays. (This is another facet of the TRANSPORTER System-11B's switch testing capability.) If more than one switch is closed, a series of displays show each actuated switch's name and number.

(In addition, either of these problems could result in the reporting of a switch problem (or problems) at game Turn-On or at the beginning of Diagnostic Tests.)

As soon as the operator opens a closed switch, its name and number are eliminated from the Switch Levels display series. For TRANSPORTER, switch numbers can range from 01 through 64. Refer to the Switch-Matrix Table for switch numbers and wiring information. CPU Board connections at jacks 1J8 (columns) and 1J10 (rows) are also listed in the table.

TRANSPORTER Switch Matrix

COLUMN / ROW	1 Q45 GRN/BRN 1J8-1	2 Q49 GRN/RED 1J8-2	3 Q44 GRN/ORN 1J8-3	4 Q48 GRN/BLK 1J8-4	5 Q43 GRN/GRN 1J8-5	6 Q47 BACKGLASS (KEY) GRN/BLU 1J8-7	7 Q42 INS BCKGL (KEY) GRN/VIO 1J8-8	8 Q46 INS BCKGL GRN/GRY 1J8-9
1 WHT/BRN 1J10-9	Plumb Tilt 1	Playfield Tilt 9	Top of Ramp 17	Top Lane Left "S" 25	Left (Orion) Lockup 33	41	49	Right Flipper 57
2 WHT/BLK 1J10-8	2	Outhole 10	18	Top Lane Middle "O" 26	Right (Orion) Lockup 34	42	50	Left Flipper 58
3 WHT/ORN 1J10-7	Credit Button 3	Trough 1, Right 11	Left Drop Target Bank "R" 19	Top Lane Right "S" 27	Spinner 35	43	51	Left Outlane 59
4 WHT/YEL 1J10-6	Right Coin Sw 4	Trough 2, Middle 12	Left Drop Target Bank "E" 20	28	36	44	52	Left Jet 60
5 WHT/GRN 1J10-5	Center Coin Sw 5	Trough 3, Left 13	Left Drop Target Bank "S" 21	29	Left Return 37	45	53	Right Jet 61
6 WHT/BLU 1J10-3	Left Coin Sw 6	Shooter Lane 14	Middle Drop Target Bank "C" 22	Jet 10 Point 30	38	46	54	Bottom Jet 62
7 WHT/VIO 1J10-2	Slam Tilt 7	Ball Popper 15	Middle Drop Target Bank "U" 23	Transport 31	Right Return 39	47	55	Left Slingshot 63
8 WHT/GRY 1J10-1	High Score Reset 8	X-cellerator Standup Target 16	Middle Drop Target Bank "E" 24	32	Right Outlane 40	48	56	Right Slingshot 64

✔ **Row Problems.** If a display of two (or more) switch numbers of a row occurs, although only one switch is closed, check for a short circuit between the column wires.

✔ **Multiple Switch Number Indications.** Check the associated column wire for a short circuit to ground.

✔ **Column Problems.** If display of two (or more) switch numbers in a column occurs (while only one switch is actuated), check for a short circuit between the row wires.

Use AUTO-UP to proceed to the next test.

2. **Switch Edges**

From the Switch Levels Test, press ADVANCE. Observe that the Player 1 and 2 displays show the message, SWITCH EDGES; the Player 3 display shows 07 (Switch Edges Test identifier). The right portion of the Player 3 display is blank, indicating that no switch is actuated.

This test permits the operator to test whether actuating a switch provides the proper signal to the System-11B switch testing program. When actuating a switch, the operator should see the switch's name and number (in the Player 1, 2, and 3 displays, respectively). If no indication appears at the time the switch is actuated, the operator then knows that there is a malfunction associated with that switch.

Using this technique, the operator can test each switch appearing in the TRANSPORTER switch problem reporting displays (either at game Turn-On or at the beginning of the Diagnostic Tests) to determine whether the switch can be actuated. If the switch's name and number are displayed while the operator checks its operation, the operator then knows that the reported problem with that switch is NOT currently caused by a switch malfunction. The operator can then seek other causes for the reported problem, being almost certain now that the switch did not fail. This test is also useful when the operator is adjusting the sensitivity of a particular switch's actuation mechanism.

Among the possibilities is the fact that the players have not actuated that switch because of some other problem; the operator should try to analyze what could cause the switch to be missed during game play, and remedy that problem cause. With these new tests, switch problems are, therefore, more easily isolated.

3. **Playfield or CPU Board?** To determine whether a switch problem is in the playfield or the CPU Board, remove connectors 1P8 and 1P10 from the CPU Board. Begin the Switch Test. Use a jumper wire to simulate switch actuation. For example, placing a jumper between 1J10-9 and 1J8-2 should (based on the Switch-Matrix Table) should produce an indication of switch 09 being actuated.

C-SIDE TEST

From the Wheel Test, press ADVANCE. Observe that the Player 1 and 2 displays show the message, C-SIDE TEST, and that the Player 3 displays shows 09 (C-Side Test identifier). This test confirms that the Solenoid A/C Select Relay (Sol. 12) is actually in the 'C' position (ready to power flashlamp circuits).

The Player 1 and 2 displays then change to show the 'side' of the circuit being tested, alternating the A/C Relay between "SELECTED A-SIDE" and "SELECTED C-SIDE", while the Player 4 display shows the state of the C-Side Switch. When the switch is closed, the Player 4 display shows "C-SIDE".

The message "Err" appears whenever the C-Side Switch is not operating properly. Causes of improper operation can be blown fuses (F8 or F2C) or a faulty relay on the Aux Power Driver Board; failure of the 12 or 24 volt power circuits; a switch matrix failure; or faulty connections between the circuit boards in the game's backbox (CPU Board, Aux Power Driver Board, Backbox Interconnect Board). To halt the A/C Relay's operation, press MANUAL-DOWN and press ADVANCE to activate the A/C Relay manually.

ENDING THE DIAGNOSTIC TESTS

To end the Diagnostic Tests, reach the C-Side Test (09 in the Player 3 display), use AUTO-UP and press ADVANCE. The backbox displays should show the TRANSPORTER game's Identification Information. Use MANUAL-DOWN, and press ADVANCE to reach Adjustment Item 70 (INSTALL FACTORY). Use AUTO-UP, and press ADVANCE to go to the Attract Mode.

AUTO BURN-IN MODE

The Auto Burn-in Mode permits the operator to check intermittent (or nonrecurring) problems associated with most portions of the game's circuitry. Repeatedly cycling through a group of tests can sometimes bring a problem, which occurs only randomly or occasionally, to exhibit itself more frequently, thereby aiding in the isolation of the problem. To activate the Auto Burn-in Mode:

1. While in the Game Adjustments, reach Ad 67 and change the Factory Setting of NO to YES, via the Credit button. Set the AUTO-UP/MANUAL-DOWN switch to AUTO-UP.

2. Press ADVANCE to start the Auto Burn-in Mode. This mode repeatedly sequences through the Music Test, the Display Test, the Sound Test, the All Lamps portion of the Lamp Test, and the Solenoid Test.

3. To halt the Auto Burn-in Mode, switch the game Off and then On. TRANSPORTER now starts in the Attract Mode. (If a switch problem is now reported by the displays, perform the Switch Tests again to determine the nature of the problem; then, perform necessary repairs.)

SYSTEM-11B MEMORY CHIP TEST

A new feature is now included in the Memory Chip Test for System 11B. During power-up, the CPU performs a self-testing routine. When all tests are satisfactory, the game proceeds to the Attract Mode, allowing players to use the game. Whenever a portion of the testing does not produce satisfactory results, the game displays a message, before proceeding to the next portion of the testing. ONLY after all tests are satisfactory does the game allow play to begin.

In addition to the displayed message, when a test fails, LED2 ('DIAGNOSTIC') mounted on the CPU Board can be observed to determine the probable cause of the problem. This LED blinks, or flashes, a certain number of times to identify the probable cause, as described in the CPU LED Indicator Codes Table. The operator can also start the self-testing routine by pressing the CPU Diagnostic Switch (SW 2) on the edge of the CPU Board.

CPU LED Indicator Codes Table

Diagnostic LED		
Blinks/ Flashes	CPU Problem	Explanation
1	U25 RAM FAILURE	U25 RAM could not be used properly (NO other tests are performed; the game is locked here, until the game is turned off).
2	MEM. PROT. FAILURE	This message means that (A) the Coin Door may be shut; (B) the Memory Protect Switch may be stuck in the ON position; (C) the memory protect logic is protecting the memory; or (D) a U25 RAM failure is occurring. (See Note 1)
3	U51 PIA FAILURE	U51 has a malfunction. (See Note 2)
4	U38 PIA FAILURE	U38 has a malfunction. (See Note 2)
5	U41 PIA FAILURE	U41 has a malfunction. (See Note 2)
6	U42 PIA FAILURE	U42 has a malfunction. (See Note 2)
7	U54 PIA FAILURE	U54 has a malfunction. (See Note 2)
8	U10 PIA FAILURE	U10 has a malfunction. (See Note 2)
9	IRQ FAILURE	IRQ has a malfunction. It may be missing or too fast or too slow.
10	U27 ROM FAILURE	U27's internal checksums do not match. It may be a ROM failure, or its associated connections and connecting devices are causing it to appear to have a problem. (The following U26 test is skipped.)
11	U26 ROM FAILURE	U26's internal checksums do not match.

Notes: 1. This test assumes that the Coin Door is OPEN; It is initiated ONLY by pressing the CPU Diagnostic Switch (SW2).

2. Alternatively, its associated connections or connecting devices are causing the IC to appear to have problems.

SYSTEM-11B SOUND CIRCUITRY TESTS

Tests of the System-11B Sound circuitry, including the Audio Board, are possible only after successful completion of the System-11B Memory Chip Test.

1. Audio Board Test. A brief check of the Audio Board (D-11581) circuitry occurs at game Turn-on; the game reports the test results by brief sounds, as follows: No sound = Audio Board is not operating, or a failure is affecting the sound circuitry (broken cable; dead amplifier; etc.); 1 sound = system OK; 2 sounds = RAM problem; 3 sounds = U4 problem; 4 sounds = U19 problem.

2. General System-11B Sound Test. Press the Sound Diagnostic Switch (SW 1) on left edge of the CPU Board. Listen for the two test sounds, showing that both the CVSD (Continu- ously Variable Slope Delta) Modulator, which provides the voices for TRANSPORTER, and the DAC (Digital-to-Analog Converter) sound circuits are functioning properly.

If no sound is heard, refer to the text entitled "NO SOUND ...". If one "ring" is heard, this indicates a malfunction of the U23 RAM Chip. If either two or four "rings" is heard, this indicates a problem associated with the U21 ROM Chip. If either three or five "rings" is heard, this indicates a problem with the U22 ROM Chip.

NO SOUND DURING THIS TEST (but sound can be heard during the Diagnostic Tests).

Check the sound-select inputs (pins 2 through 9 of U9) to see if they pulse during Sound Test 01. Also, check the -12 V supply voltage on the CPU Board. If this voltage is low (or AC ripple seems too high), perform the following checks:

1. The gray and gray-green transformer secondary wires for 19.4 VAC.
2. The CPU Board filter capacitor C26 for -12 VDC.
3. The filter capacitor C26 for excessive AC ripple (over 0.75VAC).

If the previous checks did not isolate the problem, turn the Volume Control for maximum output. Momentarily touch a powered-up AC soldering pencil on the center tap of the Volume Control.

CAUTION

DO NOT use a soldering iron over 40 watts. Note also that cordless soldering irons will NOT work for this test.

Hearing a low hum or a 'click' indicates that the power amplifier (U1, TDA2002), the Volume Con- trol, and the speaker are operating satisfactorily, as is the sound circuit cabling. Not hearing a sound requires repeating the test with the Volume Control turned part way down, to determine whether the Volume Control is faulty. Also, check the cable connectors for proper mating, and that no broken wires affect this circuit .

Test/Diagnostic Procedure

Fuse Locations Diagram & Listing
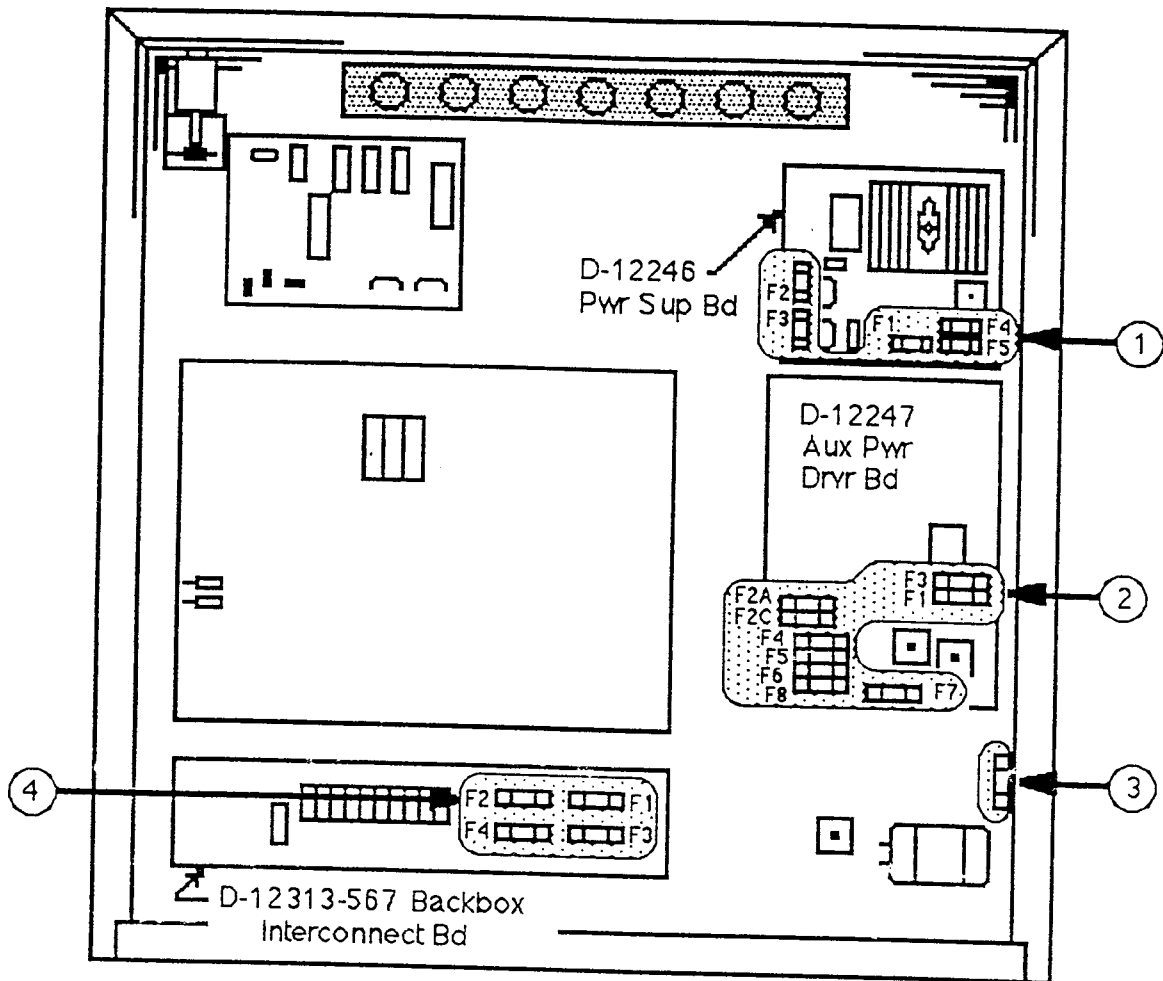
Fuse Listing

ITEM	PART NUMBER	DESCRIPTION	CIRCUIT/LOCATION
1	5731-12328-00	Fuse, 3/8A., S-B, 250V	F1; D-12246 Power Supply Board
1	5731-12327-00	Fuse, 1/8A., S-B, 250V	F2, F3; D-12246 Power Supply Board
1	5731-09432-00	Fuse, 7A S-B, 250v	F4, F5; D-12246 Power Supply Board
2	5731-09128-00	Fuse, 2-1/2A., S-B, 250v	F1, F2A, F3, F4; D-12247 Aux Pwr Driver Board
2	5731-09651-00	Fuse, 5A., S-B, 250v	F2C; D-12247 Aux Pwr Driver Board
2	5731-08665-00	Fuse, 2A., S-B, 250v	F5, F6; D-12247 Aux Pwr Driver Board
2	5731-06314-00	Fuse, 4A., S-B, 250v	F7; D-12247 Aux Pwr Driver Board
2	5731-09432-00	Fuse, 7A., S-B, 250v	F8; D-12247 Aux Pwr Driver Board
3	5730-09071-00	Fuse, 8A., S-B, 32v	+18 Vdc Lamp Ckt/ Lwr Rt B/box fuseholder (1)
4	5731-09651-00	Fuse, 5A., S-B, 250v	F1 - F4: Gen. Illum./B'box Interconnect Board
-	5730-09252-00	Fuse, 8A,Slow-Blow(S-B),125v	Input ("high voltage") Power Line/Cabinet Box*

* One 4A., S-B, 250v fuse (5731-06314-00) is provided for an overseas (220v) game installation.

Maintenance Information

- Figure 3 shows the two main lubrication points of the Ball Eject (Shooter Lane Feeder). The shaded arrows show the directions in which the Ball Eject and other parts of its related assemblies can be adjusted for proper operation. Note that the mechanisms of the Top Right Eject Hole Arm Assembly and the Right Lock (Eject Hole) are quite similar to the Ball Eject Assembly; they have the same lubrication requirements and adjustment capabilities as the Ball Eject.
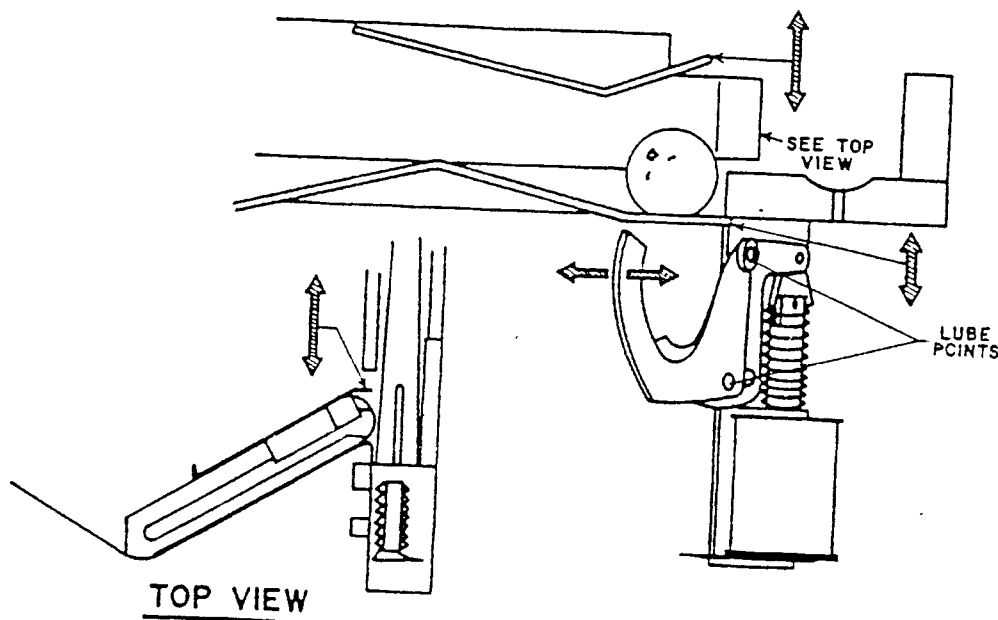
Figure 3. Adjustments and Lubrication Points, Shooter Lane Feeder.

- Because of the functional design (arm-actuated via solenoid plunger operation), the pivot points of the Left and Right Kickers ("Slingshots") and the Spinout Kickbig all require lubrication as a regular servicing procedure. Mechanical adjustments are simple and somewhat similar to the Shooter Lane Feeder. These mechanisms should also be checked for proper fit (snugly tight) where they attach to the playfield.

- Lubrication to ensure proper operation also applies to the target blades of the two 3-Bank Drop Targets. Lubrication reduces friction and wear. BALLY recommends the following lubricants...

  -Medium viscosity oil   -MBI Instrument Grease
  -SUNEX #257, WAY OIL   -Non-Gumming Lubricant
  -Viscosity: 300-350

● Playfield life expectancy and play can be extended by periodic cleaning. Inspect and hand polish the balls in a clean cloth. Replace chipped balls. Otherwise these balls will ruin playfield finish in a short time. Don't use quantities of water, caustic or abrasive cleaners or cleaning pads on the playfield. Don't allow a wax or polish build-up. Waxes yellow with age and spoil the playfield.

● Switch contacts should be free of dust, dirt , and corrosion. Plating helps switch contacts, (except flipper button switch assemblies) resist corrosion. Filing or burnishing contacts breaks the finish and encourages corrosion. Effective contact cleaning requires gentler treatment. Gently close the contacts on a clean business card or piece of paper. Wipe the contacts until they're clean. If necessary, regap the contacts to 1/16 inch. With flipper button swithc contacts, severely pitted contacts may cause game malfunctions. Remove the tarnish from the switch contacts with a contact file. Then smooth your work with a burnishing tool.

SECTION 2

Game Parts
Information

Playfield Parts

Major Assemblies ◯

ITEM	DESCRIPTION	PART NUMBER
1	Post	02-3905
2	Lower Left Flipper Assy	C-11626-L-3
a)	Ball Flipper (Yellow)	20-9592-6
3	Bottom Arch Assembly	D-12861
4	Bottom Arch Kicker Assy	B-11873-1
5	3-Bank Drop Target	C-11223-1
6	Ball Gate Assembly	A-12915
7	Standup Target, Tr Orn	B-12912-12
8	Jet Bumper Assembly	C-12872
9	Ball Gate Assembly	A-8244-L
10	Ball Gate Assembly	A-12910
11	Left Lockup (Kicker)	B-12671-1
12	Right Lockup (Kicker)	B-12671
13	Deflector Assembly	B-12878
14	Spin Target Assembly	B-12164
15	Lt & Rt Slingshot Assy	C-12873
16	Lower Rt Flipper Assy	C-11626-R-3
a)	Bally Flipper (Yellow)	20-9592-6
17	Ball Shooter Lane Feeder	C-9638
a)	Coil & Bracket Assembly	B-9362-L-1
18	Outhole Kicker Assembly	B-8039-2
19	Ball Popper Assembly	D-11335-2
20	Ball Trough Assy.:	
	Lwr Guide	C-8235
	Upr Guide	B-8623
21	Space Ship Assembly	D-12896
22	Ball Gate Actuator	B-12942
23	Upper Right Flipper	C-11626-R-3
a)	Lg Bally Flipper (Yellow)	20-9609-6

Rubber Parts

ITEM	DESCRIPTION	PART NUMBER
A	Flipper Rubbers (Red)	23-6519-4
B	2" Rubber Ring	23-6305
C	1-1/2" Rubber Ring	23-6304
D	2-1/2" Rubber Ring	23-6306
E	3/4" Rubber Ring	23-6301
F	5/16" Rubber Ring	23-6300
G	Bumper Sleeve (Black)	23-6556
H	Ball Shooter Tip	23-6327
J	Rubber Bumper	23-6535
K	Rubber Bumper	23-6632

Ball Guides, Ramps, and Wireforms

ITEM	DESCRIPTION	PART NUMBER
a	Wireform Anti-Rebound	12-6468
b	Flipper Ball Guides.:	
	Left	B-12875
	Right	B-12874
c	Ball Guide Assembly	B-12865
d	Wireform, 2-1/2"	12-6466-10
e	Ball Guide Assembly	D-12868
f	Ball Guide Assembly	B-12869
g	Ball Guide Assembly	C-12866
h	Ball Guide Assembly	B-12862
i	Wireform, 3"	12-6466-12
j	Wireform, 1-1/2"	12-6466-6
k	Ball Guide Assembly	B-12870
m	Wireform, 2"	12-6466-8
n	Right Ramp Assembly	D-12772
p	Left Ramp Assembly	D-12781
q	Crossover Ramp Assy	D-12766

Posts ☐

ITEM	DESCRIPTION	PART NUMBER
1	Playfield Post	02-3408
2	Bumper Post #8 WS	02-3905
3	Bumper Post-Rubber	02-4008
4	Support Post	02-4014
5	Support Post	02-4020
6	Rubber Bumper Post	02-4036
7	Bumper Post	02-4195
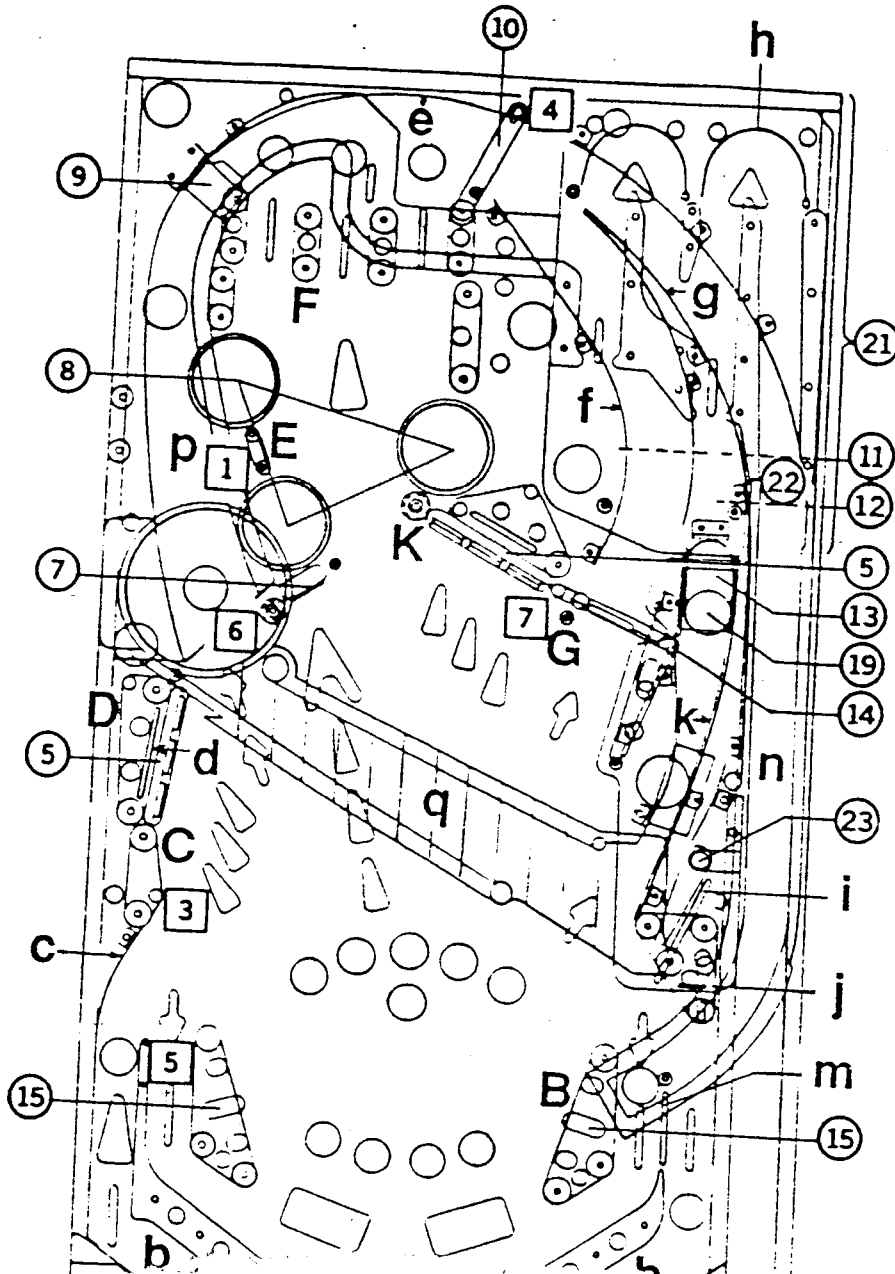
Rubber Ring	23-6304	
4" Rubber Ring	23-6306	
5/16" Rubber Ring	23-6301	
Bumper Sleeve (Black)	23-6300	
Ball Shooter Tip	23-6556	
Rubber Bumper	23-6327	
Rubber Bumper	23-6535	
	23-6632	

H
J
K

Switches

ITEM	DESCRIPTION	PART NUMBER
1	Plumb Bob Tilt	
2	Not Used	
3	Credit Button	SW-1A-126
4	Right Coin Sw	27-1092
5	Center Coin Sw	Not Used (USA)
6	Left Coin Sw	27-1092
7	Slam Tilt	27-1066
8	High Score Reset	27-1008*
9	Playfield Tilt	B-8306-1
10	Outhole	5647-12133-12
11	Trough 1, Right	5647-12073-08
12	Trough 2, Middle	5647-09957-00
13	Trough 3, Left	5647-09957-00
14	Shooter Lane	5647-12073-04
15	Ball Popper	A-11657
16	Single Standup Target	SW-1A-184-12
17	Top of Ramp	p/o D-12781
18	Not Used	
19	Left Drop Target Bank "R"	p/o C-12559
20	Left Drop Target Bank"E"	p/o C-12559
21	Left Drop Target Bank"S"	p/o C-12559
22	Mid Drop Target Bank"C"	p/o C-12559
23	Mid Drop Target Bank "U"	p/o C-12559
24	Mid Drop Target Bank "E"	p/o C-12559
25	Top Lane Left	5647-12073-19
26	Top Lane Middle	5647-12073-19
27	Top Lane Right	5647-12073-19
28-29	Not Used	
30	Jet 10 Point	SW-1A-120
31	Transport	p/o D-12766
32	Not Used	

ITEM	DESCRIPTION	PART NUMBER
33	Left Lockup	5647-12073-19
34	Right Lockup	5647-12073-19
35	Spinner	5647-12133-08
36	Not Used	
37	Left Return	5647-12073-19
38	Not Used	
39	Right Return	5647-12073-19
40	Right Outlane	5647-12073-19
41-56	Not Used	
57	Right Flipper Lane Change**	
58	Left Flipper Lane Change **	
59	Left Outlane	5647-12073-19
60	Left Bumper	p/o C-12872
61	Right Bumper	p/o C-12872
62	Bottom Bumper	p/o C-12872
63	Left Slingshot***	
64	Right Slingshot***	

Notes:

*P/N for entire Diagnostic Switch Assembly, including High Score Reset Switch.

**Optotransistor on Backbox Interconnect Board.

***Paired Kicker Actuating Sw: B-12459; B-12715

Lamps

TRANSPORTER Lamp Matrix

COLUMN / ROW	1 Q66 DISP BD BACKGL YEL BRN 1J7-1	2 Q64 DISP BOARD(KEY) YEL-RED 1J7-2	3 Q62 YEL ORN 1J7-3	4 Q60 YEL BLK 1J7-4	5 Q58 YEL-GRN YEL-5	6 Q56 BACKGLASS (KEY) YEL BLU 1J7-6	7 Q54 BACKGLASS YEL VIO 1J7-7	8 Q52 BACKGLASS YEL GRY 1J7-9
1 Q80 RED BRN 1J6-1	Shoot Again 1	Bonus 2X 9	Mult-Ball 17	Top Lanes, Left 25	Left Return Lane 33	Black Hole 10K 41	Black Hole 90K 49	Insert Board 500K 57
2 Q81 RED BLK 1J6-2	Left Lock Status 2	Bonus 3X 10	18	Top Lanes, Middle 26	Right Return Lane 34	Black Hole 20K 42	Black Hole 100K 50	Insert Board 1 Million 58
3 Q82 RED ORN 1J6-3	Right Lock Status 3	Bonus 4X 11	L Drop Target "R" 19	Top Lanes, Right 27	Right Spinner 35	Black Hole 30K 43	Black Hole 200K 51	Insert Board 1.5 Million 59
4 Q83 RED YEL 1J6-5	Center 50K 4	Bonus 5X 12	L Drop Target "E" 20	"X" Target 28	Top Flipper 36	Black Hole 40K 44	Black Hole 300K 52	Insert Board 2 Million 60
5 Q84 RED GRN 1J6-6	Center 100K 5	Playfield 2X ** 13	L Drop Target "S" 21	EXTRA BALL 29	Super Bonus, Bottom 37	Black Hole 50K 45	Black Hole 400K 53	Insert Board 2.5 Million 61
6 Q85 RED BLU 1J6-7	Center 150K 6	Playfield 3X ** 14	Mid. Drop Trgt "C" 22	Left Kicker Lane 30	Super Bonus, Middle 38	Black Hole 60K 46	Black Hole 500K 54	Insert Board 3 Million 62
7 Q86 RED VIO 1J6-8	Center 200K 7	LOCK 1 Now 15	Mid. Drop Trgt "U" 23	Left SPECIAL 31	Super Bonus, Top 39	Black Hole 70K 47	Black Hole 1 Million ** 55	Insert Board 3.5 Million 63
8 Q87 RED GRY 1J6-9	Center 250K 8	LOCK 2 Now 16	Mid Drop Trgt "E" 24	Right SPECIAL 32	Excellerator Arrow ** 40	Black Hole 80K 48	56	Insert Board 4 Million 64

NOTE: ** = 2 Lamps

Solenoids

ITEM	DESCRIPTION	PART NUMBER
01A	Outhole Kicker	AE-23-800
01C	Playfield "2X" Flasher	#906 flashlamp
02A	Ball Shooter Lane Feeder	AE-23-800
02C	Bridge Flasher	#906 flashlamp
03A	Left Drop Target Bank	AE-23-800
03C	Top Left Flashers	#906 flashlamp
04A	Right Drop Target Bank	AE-23-800
04C	Jet Flashers	#906 flashlamp
05A	Left (Orion) Lock Up	AE-23-800
05C	Ball Lock Flashers	#906/#89 flashlamps
06A	Ball Popper	AE-23-1200
06C	Single Standup Flasher	#906 flashlamp
07A	Knocker	AE-23-800
07C	Ball Popper Flashers	#906/#89 flashlamps
08A	Right (Orion) Lock Up	AE-23-800
08C	Playfield "3X" Flasher	#906 flashlamp
09	Playfield G.I.	5580-09555-01
10	Top Flipper Gate	SM2-35-4001-DC
11	Turn 1 Flasher	#906/#89 flashlamps
12	A/C Select Relay	5580-09555-01
13	Not Used	
14	Left Outlane Kicker	AE-23-800
15	Turn 2 Flasher	#906/#89 flashlamps
16	Turn 3 Flasher	#906/#89 flashlamps
17	Left Thumper Bumper	AE-23-800
18	Left Slingshot Kicker	AE-26-1500
19	Right Thumper Bumper	AE-23-800
20	Right Slingshot Kicker	AE-26-1500
21	Bottom Thumper Bumper	AE-23-800
22	Backbox G.I.	5580-09555-01
-	Flipper .: Lwr Lf, Lwr Rt & Upr Rt	FL-11630/50VDC

Solenoids Location Diagram
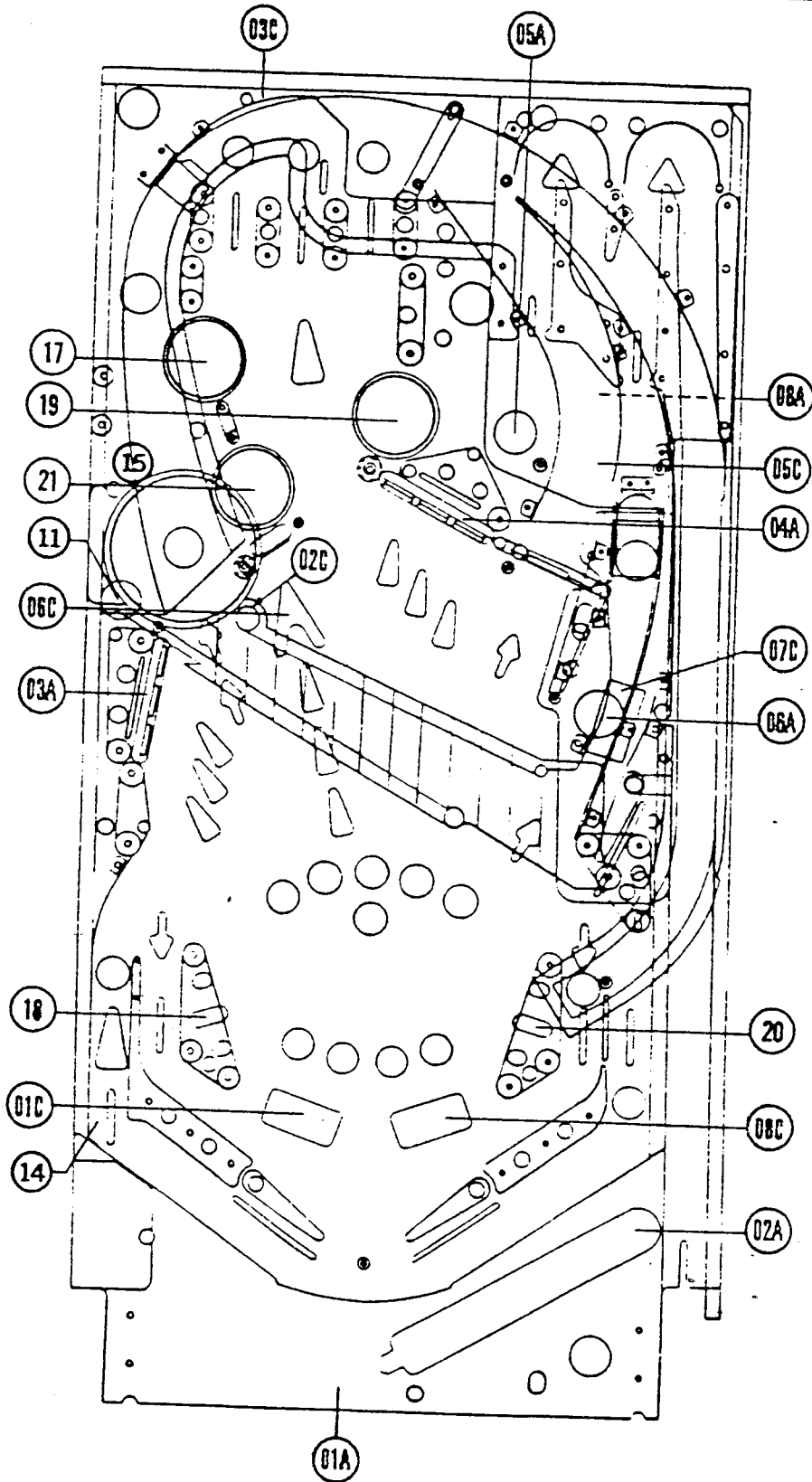
Solenoid

SECTION 5

Reference Diagrams

&

Schematics

11J2 11P2 BLK Cable p/n: H-8527 7R1
Audio Out — 2 RED Cabinet Volume Control
Audio In — 1
Shield — 4

7P9 7J9 Cabinet Bottom Speaker

11J9 11P9 BLK-YEL Cable p/n: H-12299
Audio — 1 BLK-YEL
— 2 BLK
Ground — 3 BLK
— 4

6P5 6J5 Backbox Speaker Assembly

CPU Board

1J8 1P8 GRN-BRN
Sw & Col 1 — 1 GRN-GRY
Opto Col 9 — 9

2P1 2J1 2J18 2P18

7SW3 7P1 7J1 7SW4 7SW5 7SW6 7SW7
7SW2 Plumb Bob Tilt 7D2 Right Coin Chute 7D4 Left Coin Chute High Score Reset 7SW8
Credit 7D3 Center Coin Chute Slam Tilt 7D8
7D5 7D6 7D7

1J10 1P10 WHT-BRN
Row 1 — 9 WHT-RED 1 12
Row 2 — 8 WHT-ORN 2 11
Row 3 — 7 WHT-YEL 3 10
Row 4 — 6 WHT-GRN 4 9
Row 5 — 5 WHT-BLU 5 8
Row 6 — 3 WHT-VIO 6 7
Row 7 — 2 WHT-GRY 7 6
Row 8 — 1 8 5

8
9
10
11
12

1J14 1P14 BLK-RED 7SW76
Memory Protect — 1 Memory Protect
Gnd — 2 WHT
ADVANCE — 3 GRN
AUTO/MANUAL — 4 BLU

13
14
15

7SW75 7SW74
AUTO-UP MANUAL-DOWN
ADVANCE

1J19 1P19 ORN-VIO 2P5 2J5 2J10 2P10
Flipper — 1 ORN-GRY 5 7
Gnd — 2 4 8
Left Flipper Button 0.1 µF Right Flipper Button 0.1 µF

2P8 2J8
Playfield Flipper Coils
BLU-GRY 14
BLU-VIO 15
GRY-YEL 8
BLU-YEL 9

2
1

5J12 5P12 2P5 2J5
Flipper Power 4 BLU-YEL 2
2 GRY-YEL 3

2P6 2J6
5.9Vac from Xfmr YEL 2
YEL-WHT 7
F2 5A S-B

10
9

7P1 7J1
1
2
General Illumination: Coin Door

TRANSPORTER Cabinet Wiring
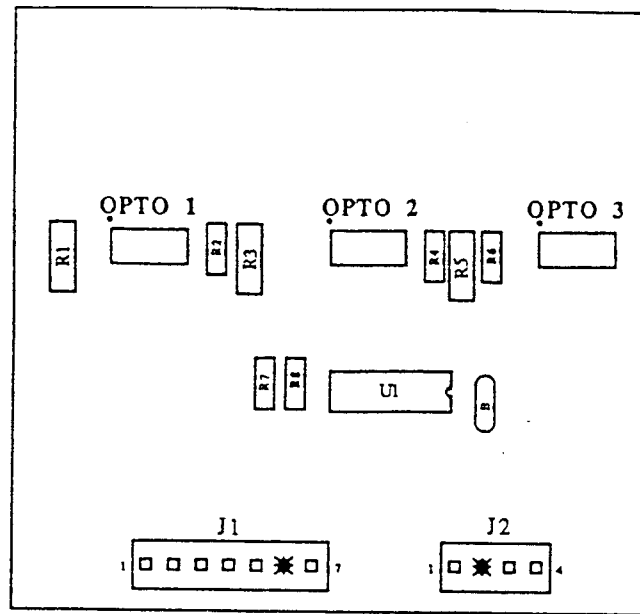
3-BANK DROP TARGET BOARD
p/n C-12559
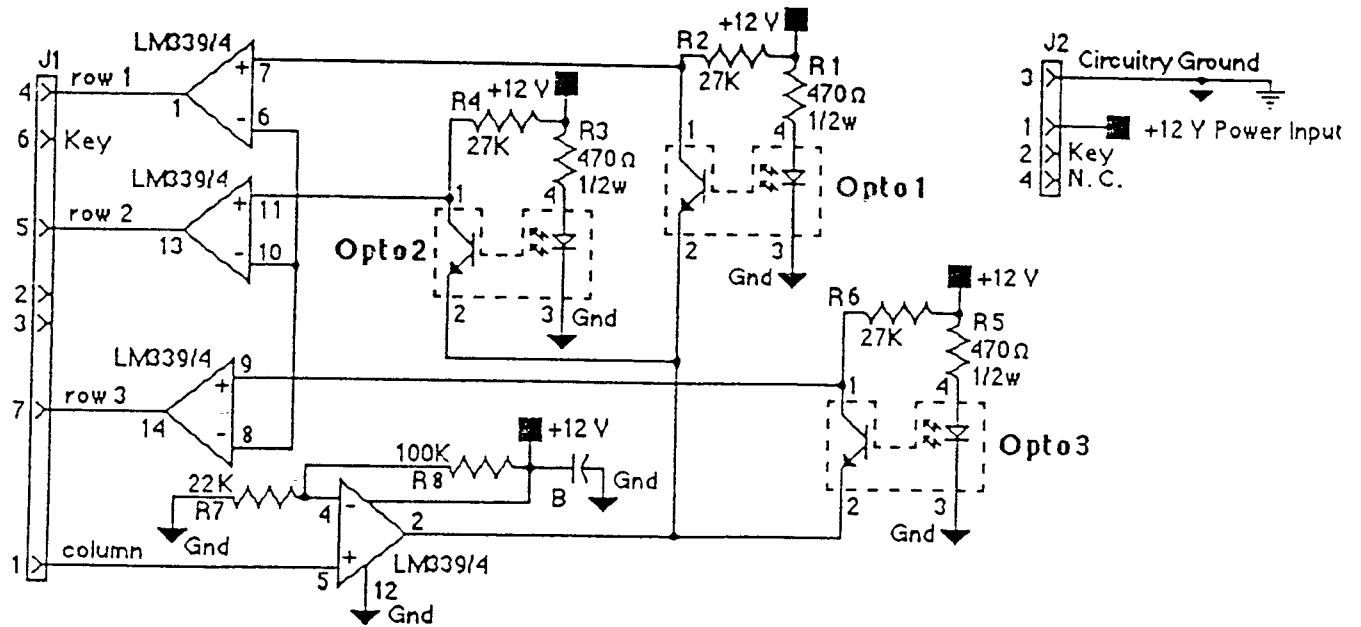
3-BANK DROP TARGET BOARD & SCHEMATIC
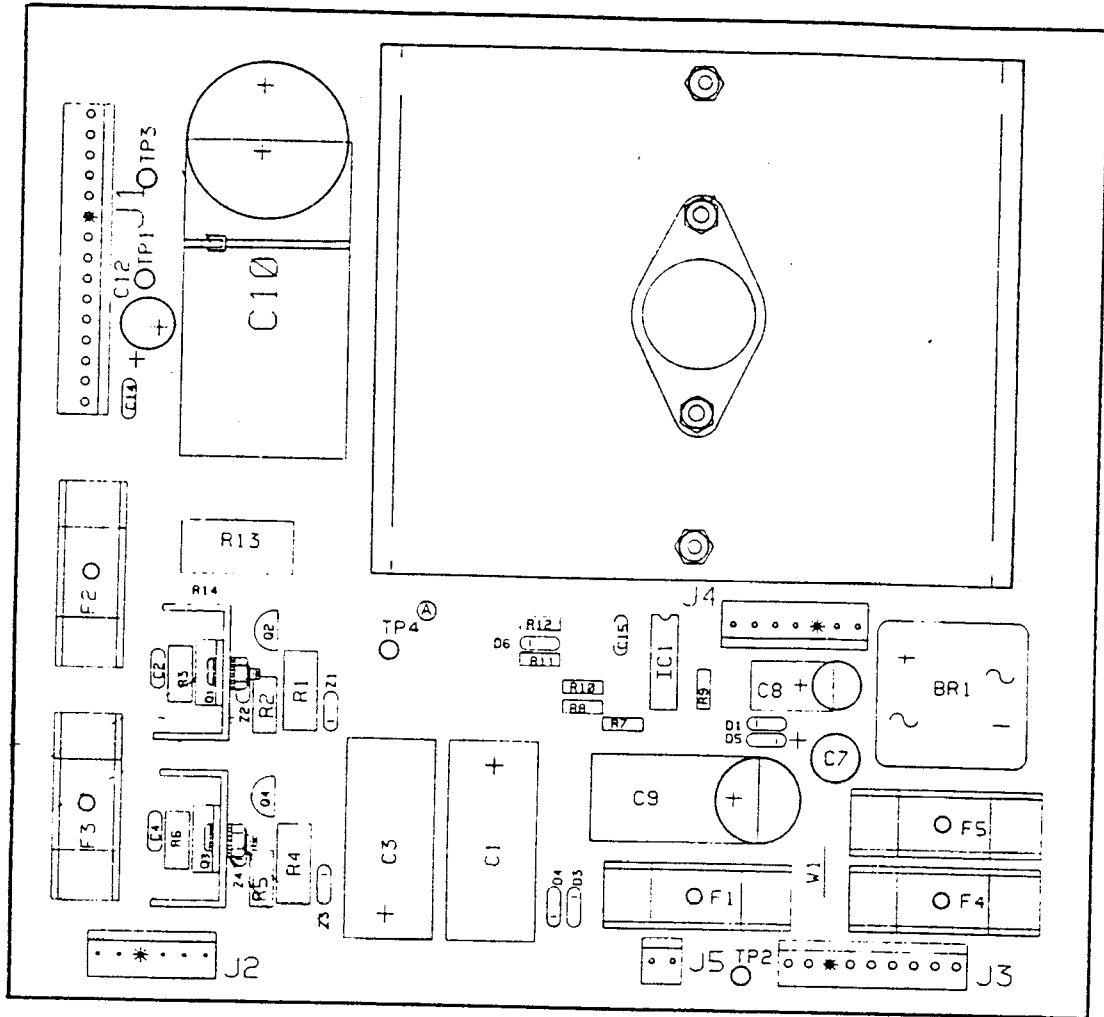
POWER SUPPLY BOARD
p/n D-12246

DISPLAY INPUT 88.5V ac

LOGIC POWER INPUT 9.7V ac

3J3-9   F1 3/8A., S-B   D3 1N4004
C1 150 µFd
ZR1 1N5990 Vz: 3.9
R2 1.2KΩ 1/2w
Q1 MJE 15030
R3 330KΩ 1/2w
C2 0.1 µFd
Q2 MPSD52
R1 39KΩ 1w
ZR2 1N4764 Vz: 100

F2 1/8A., S-B   3J2-3
3J2-5
F3 1/8A., S-B   3J2-1
N.C. 3J2-2
Key 3J2-4
3J2-6

W1
3J3-8
3J5-1
3J5-2
(3J5 Not Installed)

D4 1N4004
C3 150 µFd
ZR3 1N5990 Vz: 3.9
R5 1.2KΩ 1/2w
Q3 MJE 15031
R6 330KΩ 1/2w
C4 0.1 µFd
Q4 MPSD02
R4 39KΩ 1w
ZR4 1N4764 Vz: 100

3J3-7 Key

(3J4 Not Installed)
3 4 6 7 2 1

+5V dc Reg

3J3-6
3J3-5
F4 7A., S-B
AC
C7 100µFd + 25V
D1 1N4004
D5 1N4004
C8 47µFd 25V
TP3

Q5 2N6057
R11 0.12Ω 5w
TP1   3J1-6 thru 3J1-9

3J3-4 TP4
BR1 35 A.
−

R7 2.15KΩ ±1%
V+ VcVo VR
R9 2.7KΩ ±2%
C
B
E
R12 270Ω ±2%

3J1-9 Key

3J3-3
3J3-2
F5 7A., S-B
AC
C10 18,000 µFd 20V
R8 4.99KΩ ±1%
5 IN+
CL
CS
V in
IC 1
COMP
3 2
D6 1N4001

330 µFd Logic Gnd

3J3-1
C9 1,000 µFd 25V
12 11 10
13
C15 470 pFd
R10 1.5KΩ
R11 1.5KΩ ±2%
C14 0.1 µFd
C12

3J1-1 thru 3J1-5

TP2
3J1-11 thru 3J1-13

3J1-14
3J1-15

POWER SUPPLY BOARD SCHEMATIC

SYSTEM 11B CPU BOARD
p/n D-11883

System 11B CPU Schematic (16-9019, Sheet 1 of 4)

System 11B CPU Schematic (16-9019, Sheet 2 of 4)

System 11B CPU Schematic (16-9019, Sheet 3 of 4)

System 11B CPU Schematic (16-9019, Sheet 4 of 4)

LEFT DISPLAY BOARD

NOTES:
1) CUT KEYING PINS AS INDICATED.
2) ALIGN TOP EDGE OF GLASS DISPLAY WITH TOP EDGE OF DISPLAY 74284670.
3) FOR SCHEMATIC SEE DRAWING 16-6256.

BALLY L-DISPLAY
BILL OF MATERIALS

ITEM	PART NUMBER	DESCRIPTION	QTY
1	5043-08990-00	CAP .01MF 50V AX -R (BYPASS CAP)	6
2	5043-08996-00	CAP .01MF 50V AX -R	2
3	5040-08043-00	CAP .1MF 25V AX. CR	1
4	5070-09135-00	CAP 10MF 25V AX. ELECT.	2
5	5870-12308-00	ZENER 1N4746 10V	1
6	5791-10869-09	DISPLAY 16 CHARACTER A/N	1
7	5791-10869-00	9 PIN HEADER W/A. 156	2
8	5791-10851-00	24 PIN HEADER W/A 100	1
9	5791-10869-08	8 PIN HEADER W/A. 156	1
10	5010-08773-00	RES. 18K ohm 1/4W / RES. 100K ohm 1/4W	25 / 32
11	5010-08981-00	RES. 10K ohm 1/2W	9
12	5010-10927-00	RES. 8.2K ohm 1/2W	7
13	5010-10256-00	RES. 1M ohm 1/4W	1
14	5310-08975-00	4049	3
15	5310-08882-00	4001	4
16	5600-08908-00	UDN-7180	4
17	5600-08908-00	UDN-6118	2
18	5708-12409-00	BALLY HI-DISPLAY PCB	1
19	03-8088-1	SUPPORT DISPLAY	5

WILLIAMS ELECTRONICS, INC.
3401 N. CALIFORNIA AVE
CHICAGO, IL

NAME BALLY L-DISPLAY ASSY
PART NO D-12706
D-12706

RIGHT DISPLAY BOARD

WILLIAMS ELECTRONICS, INC.
CHICAGO IL

NOTES:

1) 100K ohm RESISTORS
   SEE CHART ALSO

2) 1M ohm RESISTORS
   SEE CHART ALSO

3) 8.2K ohm RESISTORS
   SEE CHART ALSO

4) 1K ohm RESISTOR
   SEE CHART ALSO

5) THE CHART SPECIFIES RESISTORS, IC's, AND
   CONNECTORS THAT ARE OPTION SPECIFIC

6) THE TWO LAST DIGITS OF THE PART NUMBER
   SPECIFIES THE SUB-ASSEMBLY OPTION

   -01 MAIN DISPLAY ONLY, ALPHA NUMERIC
   -02 MAIN DISPLAY,NUMERIC, ONE EXTENTED
       7-SEGMENT NUMERIC
   -03 MAIN DISPLAY,NUMERIC, TWO EXTENTED
       7-SEGMENT NUMERIC

7) CUT KEYING PINS AS INDICATED

8) ALLOW TOP EDGE OF GLASS DISPLAY AT TOP EDGE OF DISPLAY SUPPORT

9) FOR SCHEMATIC, SEE DRAWING D-12502

BALLY LEFT DISPLAY BD SCHEMATIC

BALLY RIGHT DISPLAY BD SCHEMATIC

Aux Power Driver Board Schematic

Audio Board (D-11581) Schematic

Backbox Interconnect Board (D-12313-568) Schematic

BACKBOX INTERCONNECT BOARD
p/n D-12313-568
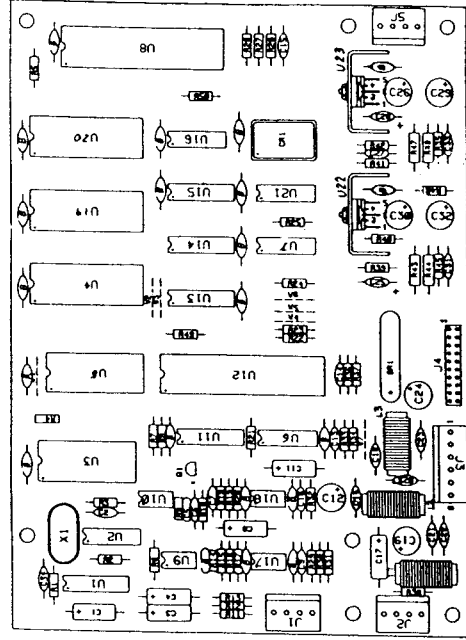
AUDIO BOARD ASSEMBLY
p/n D-11581-20C6

AUX POWER DRIVER UNIT BOARD
p/n D-12247

Power Wiring Diagram

SWITCHED SOLENOIDS
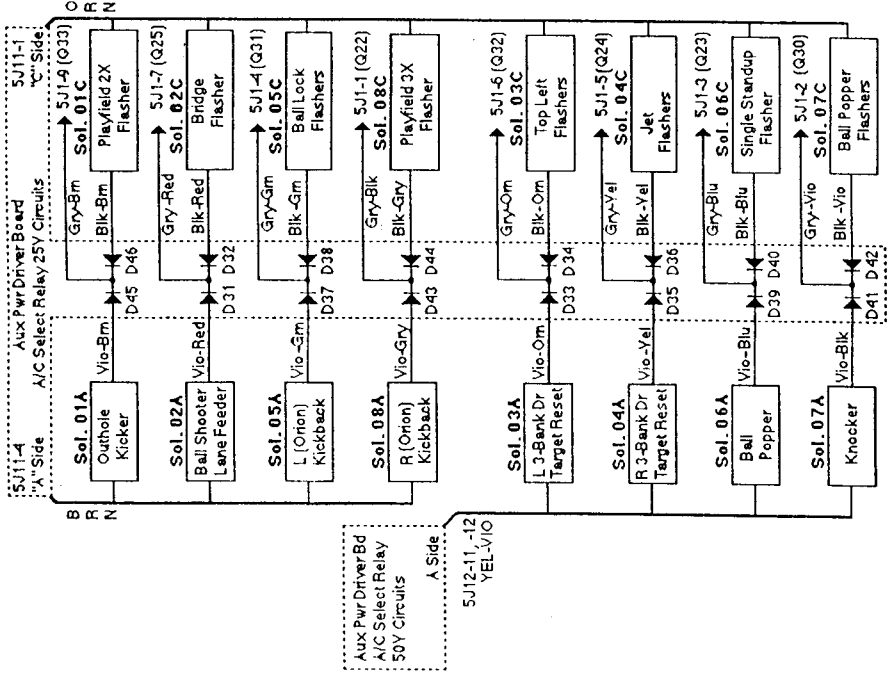
CONTROLLED, SPECIAL, & SWITCHED SOLENOIDS

CONTROLLED SOLENOIDS (25V)

SPECIAL SOLENOIDS (25V)

SPECIAL SOLENOIDS (50V)
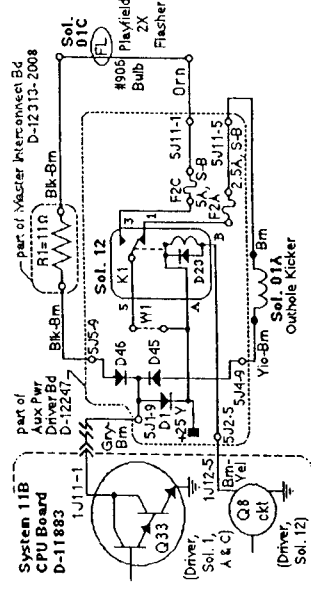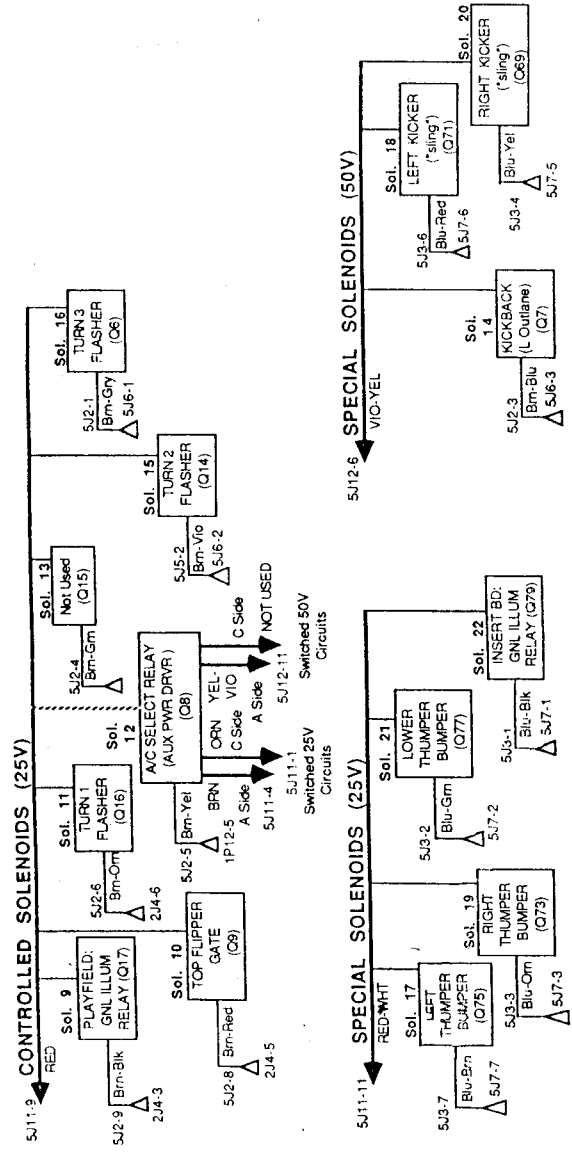
Typical A/C Select (Switched Solenoid) Circuit

START

PRESS, and latch, AUTO-UP/ MANUAL-DOWN (red) switch in the MANUAL-DOWN position

PRESS ADVANCE (black) switch once, briefly

OBSERVE "Music Test" (in Player 1+2 Score Displays)

After a few seconds

OBSERVE "Music Off" display [with "00 00" in Player 3]

PRESS, and unlatch, AUTO-UP/ MANUAL-DOWN (red) switch to reach the AUTO-UP position

Want to check any portion of the "Music Test"? — YES

NO

PRESS ADVANCE (black) switch once, briefly

OBSERVE "Display Test" (in Player 1+2 Score Displays) [01 in Player 3 Display]

After a few seconds

OBSERVE automatic display cycle of all digits in each display, individual digits, "walking" digits, etc.

Want to check any portion of the "Display Test"? — YES

NO

PRESS ADVANCE (black) switch once, briefly
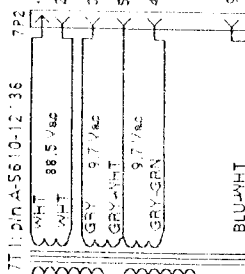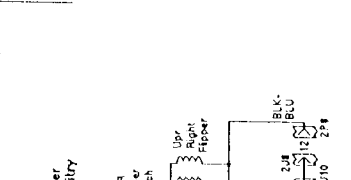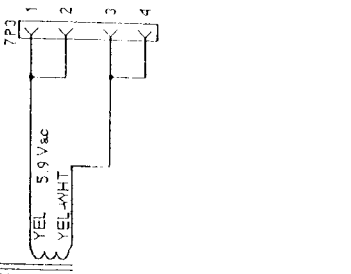
OBSERVE "Sound Test" (in Player 1+2 Score Displays) [02 in Player 3 Display]

After a few seconds

OBSERVE automatic cycle of sounds [02 00 - 02 0x · in Player 3 Display]

Want to check any portion of the "Sound Test"? — YES

NO

PRESS ADVANCE (black) switch once, briefly

OBSERVE "All Lamps" (in Player 1+2 Score Displays) [03 in Player 3 Display]

After a few seconds

OBSERVE flashing display of all controlled lamps on playfield and backbox. (NO manual selection of individual lamps is available in this test.)

PRESS ADVANCE (black) switch once, briefly

1 Continued on side 2

WILLIAMS Electronics Games

Diagnostic Test Flowchart

REPEAT steps A and B of Music Test as necessary, until desired checks of Music Test are complete. In each repeat, OBSERVE name of next music theme (in Player 1+2 Score Displays) and its identifier [02 > 0x in Player 3 Display]

Music Test B
OBSERVE name of first music theme (in Player 1+2 Score Displays) and its identifying number [00 01 in Player 3 Display]

Music Test A

PRESS Credit button once, briefly

Display Test A
PRESS, and latch, AUTO-UP/MANUAL-DOWN (red) switch in the MANUAL-DOWN position

Display Test B
PRESS ADVANCE (black) switch once, briefly, to reach the first portion of the "Display Test"

Display Test C
OBSERVE that each display shows the same digit, segment, etc.

REPEAT steps B and C of Display Test, until desired checks of display digits, segments, etc., are complete.

PRESS, and unlatch, AUTO-UP/MANUAL-DOWN (red) switch to reach the AUTO-UP position

Sound Test A
PRESS, and latch, AUTO-UP/MANUAL-DOWN (red) switch in the MANUAL-DOWN position

Sound Test B
OBSERVE that only one sound is identified [02 00 > 02 0x in the Player 3 display]. Listen for that single sound to repeat.

Sound Test C
PRESS ADVANCE (black) switch once, briefly, to reach the next sound of the "Sound Test"

REPEAT steps B and C of Display Test, until desired checks of sounds are complete.

PRESS, and unlatch, AUTO-UP/MANUAL-DOWN (red) switch to reach the AUTO-UP position

WILLIAMS Electronics Games **Diagnostic Test Flowchart** Side 2

(1)

OBSERVE "Single Lamps" (in Player 1+2 Score Displays) [04 in Player 3 Display]

After a few seconds

OBSERVE the name of the first controlled lamp in the Player 1+2 displays and 04 01 in the Player 3 display

Want to check any particular lamp in the "Single Lamps" test? — YES →

REPEAT steps A and B of Single Lamps Test as necessary, until desired checks of Single Lamps Test are complete.

Single Lamps Test B
OBSERVE name of next lamp (in Player 1+2 Score Displays) and its identifying number [04 0x in Player 3 Display] and its location (blinking).

Single Lamps Test A
PRESS Credit button once, briefly, to reach next lamp in series detailed in Lamp Matrix Table

NO ↓

PRESS ADVANCE (black) switch once, briefly

OBSERVE "Coil Test" (in Player 1+2 Score Displays) [05 in Player 3 Display]

After a few seconds

OBSERVE automatic cycle of all solenoids and flashers on playfield and backbox (circuit name in Player 1+2 displays and 05 01-22 in Player 3 display

Want to check any particular solenoid in the "Coil Test"? — YES →

Solenoid Test A
PRESS, and latch, AUTO-UP/MANUAL-DOWN (red) switch in the MANUAL-DOWN position to select repeated operation of a particular solenoid/flasher, during the test cycle. Observe its operation.

Solenoid Test B
PRESS ADVANCE (black) switch once, briefly, to advance to the next ckt of the "Coil Test" to be checked. Observe its operation.

REPEAT step B of Solenoid Test, until desired checks of solenoid/flasher circuits are complete.

PRESS, and unlatch, AUTO-UP/MANUAL-DOWN (red) switch to reach the AUTO-UP position

NO ↓

PRESS ADVANCE (black) switch once, briefly

OBSERVE "Switch Levels" (in Player 1+2 Score Displays) [06 in Player 3 Display]

After a few seconds

OBSERVE name and number (06 xx) of each switch that is presently actuated, if any

PRESS ADVANCE (black) switch once, briefly

OBSERVE "Switch Edges" (in Player 1+2 Score Displays) [07 in Player 3 Display]

Want to check any particular switch? — YES →

OPERATE any switch listed in the Switch Matrix Table to check whether its operation is detected by the CPU for use in the game program. OBSERVE the switch's name and number in the Player Score displays, verifying proper switch operation. Select and operate switches, until desired checks of switch circuits are complete.

NO ↓

PRESS ADVANCE (black) switch once, briefly, to proceed to special game tests, if any; otherwise, exit Test/Diagnostic program.

PRESS ADVANCE (black) switch once, briefly, to advance to the Id 01 display, which tells about changes from Factory Settings. Press ADVANCE switch again to advance to Audit Items (Au 01 > 44) and then to Adjustment Items (Ad 01 > 70).

OBSERVE Game name and number in Player 1+2 Score Displays and Id 00 in Player 3 Display, showing the exit from the Test/Diagnostic portion of the game program

OBSERVE desired data in Audit Items (to determine game operations and earnings). CHANGE desired Adjustment Items (to enhance the game play and earnings). Refer to game manual for details.

Go to Audits and Adjustments or Go to Game Over? — Audits/Adjustments →

Proceed to Ad 70, press ADVANCE again, briefly, to reach Attract Mode, ready to play.

Game Over ↓

TOGGLE game On-Off switch to Off, then to ON.

Game is in Attract Mode, ready to play.