BANZAI RUN™

Williams®
ELECTRONICS GAMES, INC.

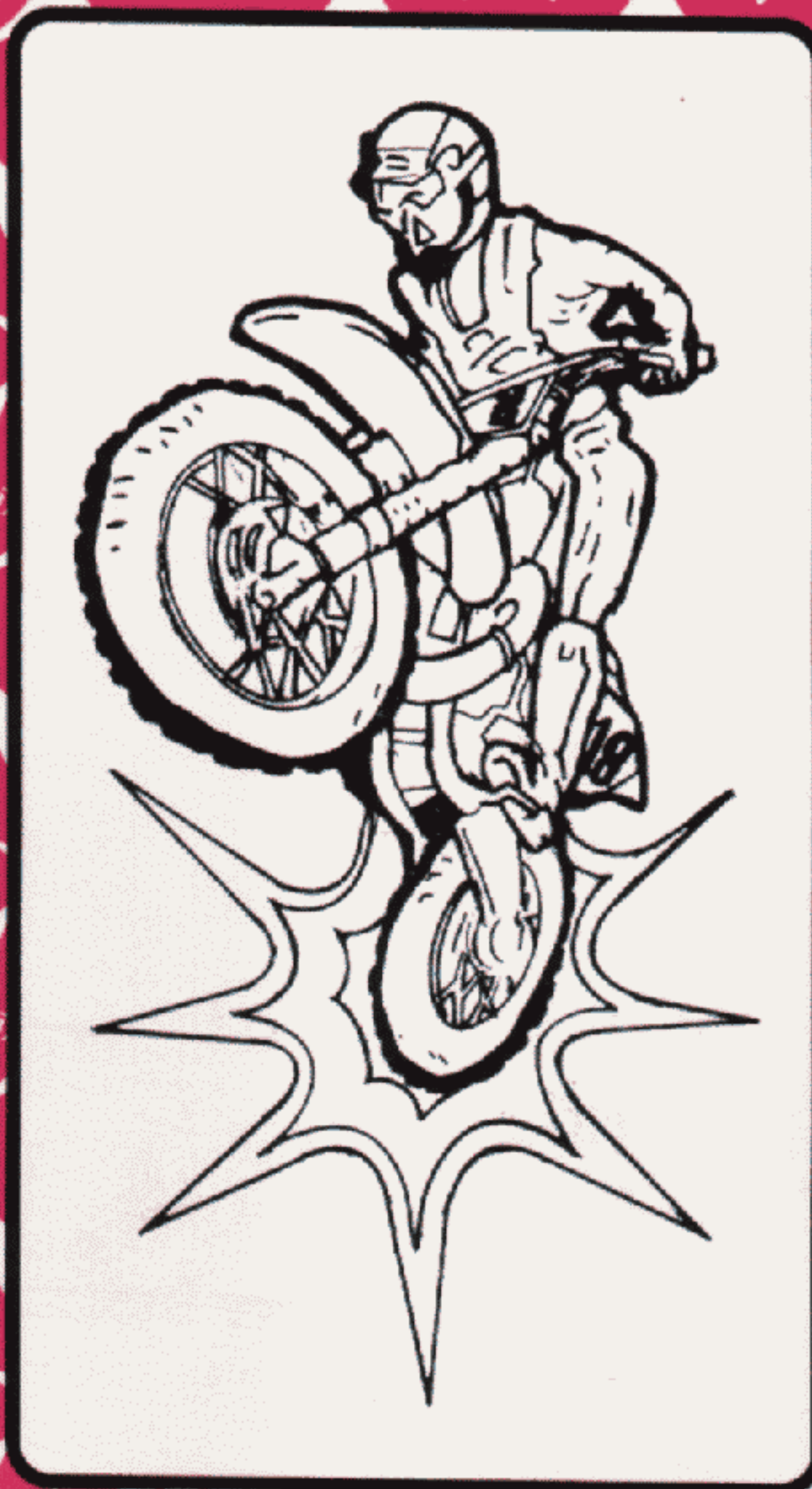## OPERATIONS MANUAL
including
Game Operation,
Test/Diagnostic Procedures,
Parts Information,
Reference Diagrams, &
Schematics

BANZAI RUN ROM and Jumper Table

Game	System 11B CPU Rev.	P/N - U15 Game µP	P/N - U27 G. ROM 1	P/N - U26 G. ROM 2	P/N - U21 S. ROM 1	P/N - U22 S. ROM 2	P/N - U24 Sound µP	Jumpers
BIG GUNS	-	5400-09150-00	A-5343-557-2	A-5343-557-1	A-5343-557-4	A-5343-557-3	5400-09150-00	W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
SPACE STATION	-	↓	A-5343-552-2	A-5343-552-1	A-5343-552-4	A-5343-552-3	↓	W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
CYCLONE	-		A-5343-564-2	A-5343-564-1	A-5343-564-4	A-5343-564-3		W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
BANZAI RUN	-	↓	A-5343-566-2	A-5343-566-1	A-5343-566-4	A-5343-566-3	↓	W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19

BANZAI RUN Solenoid Table

Sol. No.	Function	Solenoid Type	Wire[1] Color	Connections CPU Bd	Connections Playfield/Cabinet	Driver Trnstr	Solenoid Part Number Flashlamp Type m=Marquee; l=lwr p/f; u=upr p/f
01A[3]	Outhole Kicker	Switched	{ Vio-Brn	1P11-1	5J1-9: 5J4-9 (A)	Q33	AE-23-800
01C[3]	Left Spinner Flasher	Switched	{ Blk-Brn	(Gry-Brn)	5J5-9 (C)	Q33	#89 flashlamps 1l
02A[3]	Ball Release (Shtr Lane Feeder)	Switched	{ Vio-Red	1P11-3	5J1-7: 5J4-8 (A)	Q25	AE-23-800
02C[3]	Right Spinner Flasher	Switched	{ Blk-Red	(Gry-Red)	5J5-8 (C)	Q25	#89 flashlamps 1l
03A[3]	Lock Kicker	Switched	{ Vio-Orn	1P11-4	5J1-6: 5J4-7 (A)	Q32	AE-23-800
03C[3]	1/6(M)/Ramp&Arrow (L) Flshs	Switched	{ Blk-Orn	(Gry-Orn)	5J5-7(C)	Q32	#89 flashlamps 1m,2l
04A[3]	Ball Cannon	Switched	{ Vio- Yel	1P11-5	5J1-5: 5J4-6 (A)	Q24	AE-23-800
04C[3]	2/6 (M)/Ramp&Speed-O(L)Flshs	Switched	{ Blk-Yel	(Gry-Yel)	5J5-5 (C)	Q24	#89 flashlamps 1m,2l
05A[3]	Pop-up Flipper Post (upf)	Switched	{ Vio-Grn	1P11-6	5J1-4: 5J4-5 (A)	Q31	AE-23-800
05C[3]	3/6 (M)/Ramp (L)&U p/f (hi) Flshs	Switched	{ Blk-Grn	(Gry-Grn)	5J5-4 (C)	Q31	#89 flashlamps 1m,1l,1u
06A[3]	Freestyle Kicker(upf)	Switched	{ Vio-Blu	1P11-7	5J1-3: 5J4-4 (A)	Q23	AE-23-800
06C[3]	4/6 (M)/Ramp (L)&U p/f (lo) Flshs	Switched	{ Blk-Blu	(Gry-Blu)	5J5-3 (C)	Q23	#89 flashlamps 1m,1l,1u
07A[3]	Knocker	Switched	{ Vio-Blk	1P11-8	5J1-2: 5J4-2 (A)	Q30	AE-23-800
07C[3]	5/6 (M)/Ramp&Tach (L) Flashers	Switched	{ Blk-Vio	(Gry-Vio)	5J5-2 (C)	Q30	#89 flashlamps 1m,2l
08A[3]	Center Eject Hole	Switched	{ Vio-Gry	1P11-9	5J1-1: 5J4-1 (A)	Q22	AE-26-1200
08C[3]	6/6 (M)/Ramp&Captive (L) Flshs	Switched	{ Blk-Gry	(Gry-Blk)	5J5-1 (C)	Q22	#89 flashlamps 1m,2l
09	Upr Flipper Relay	Controlled	Brn-Blk	1P12-1	5J2-9: 5J6-9: 2J4-3	Q17	5580-12299-00[4] (K2)
10	Lower P/f Illum	Controlled	Brn-Red	1P12-2	5J2-8: 5J6-8: 2J4-5	Q9	5580-12145-01[4] (K3)
11	Upper P/f Illum	Controlled	Brn-Orn	1P12-4	5J2-6: 5J6-7: 2J4-6	Q16	5580-12145-01[4] (K4)
12	A/C Select Relay	Controlled	Brn-Yel	1P12-5	5J2-5	Q8	5580-09555-01[5]
13	Lifter Magnet	Controlled	Brn-Grn	1P12-6	5J2-4: 5J6-5	Q15	LW-31-3000
14	Kickback (Low Left Drain)	Controlled	Brn-Blu	1P12-7	5J2-4: 5J6-3	Q7	AE-23-800
15	Lifter Motor	Controlled	Brn-Vio	1P12-8	5J2-2: 5J6-2	Q14	14-7949/5580-12145-01[6]
16	Left Eject Hole	Controlled	Brn-Gry	1P12-9	5J2-1: 5J6-1	Q6	AE-26-1200
17	Left Jet Bumper	Special #1	Blu-Brn	1P19-7	5J3-7: 5J7-7	Q75	AE-23-800
18	Lower Left Kicker ("sling")	Special #2	Blu-Red	1P19-4	5J3-6: 5J7-6	Q71	AE-26-1500
19	Upper Right Jet Bumper	Special #3	Blu-Orn	1P19-3	5J3-3: 5J7-3	Q73	AE-23-800
20	Lower Right Kicker ("sling")	Special #4	Blu-Yel	1P19-6	5J3-4: 5J7-5	Q69	AE-26-1500
21	Lower Right Jet Bumper	Special #5	Blu-Grn	1P19-8	5J3-2: 5J7-2	Q77	AE-23-800
22	Up Lamp Relay	Special #6	Blu-Blk	1P19-9	5J3-1: 5J7-1	Q79	5580-09555-01[4] (K5)
-	Right Flipper	-	Orn-Vio	1P19-1	2J3-1: 2J18-10: 7P1-15	-	
	Lower Right Flipper (UPF & LPF)		[Blu-Vio][2]		[7P1-16: 2J18-6: 2J17-4]		FL11630-50VDC
	Upper Right Flipper (LPF only)		[Blk-Yel][2]		[7P1-13: 2J18-8: 2J17-1]		FL11753-50VDC
-	Left Flipper	-	Orn-Gry	1P19-2	2J3-2: 2J18-9: 7P1-18	-	
	Lower Left Flipper (UPF & LPF)		[Blu-Gry][2]		[7P1-19,2J18-5: 2J17-3]		FL11630-50VDC
	Upper Left Flipper (UPF only)		[Blk-Blu][2]		[7P1-17: 2J18-7: 2J16-1]		FL11630-50VDC

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. 4. Relay is mounted on Backbox Interconnect Bd, p/n D-12112. 5. Relay is mounted on Aux Power Driver Bd, D-12247 in the backbox. 6. Relay is mounted on Relay Bd, C-11902-1.

Contents

Section 1 - Game Operation & Test Information

i

Contents

Section 2 - Game Parts Information (continued)

Section 3 - Reference Diagrams & Schematics

Section 1
Game Operation
&
Test Information

- *BANZAI RUN* (System 11B) ROM Summary
- Game Assembly Instructions
- Game Play
- Game Status Displays
- Game Adjustment Procedure
- Game Pricing
- Test/Diagnostic Procedures

BANZAI RUN (System 11B) ROM Summary

IC	DESCRIPTION	TYPE	IDENTIFIER	BOARD	PART NUMBER
Game ROM 1	32K x 8 ROM	27256	U27	CPU	A-5343-566-2
Game ROM 2	16K x 8 ROM	27128	U26	CPU	A-5343-566-1
Sound ROM 1	32K x 8 ROM	27256	U21	CPU	A-5343-566-4
Sound ROM 2	32K x 8 ROM	27256	U22	CPU	A-5343-566-3
Music/Speech ROM 1	32K x 8 ROM	27256	U4	Audio	A-5343-566-5
Music/Speech ROM 2	32K x 8 ROM	27256	U19	Audio	A-5343-566-6
Music/Speech ROM 2	32K x 8 ROM	27256	U20	Audio	A-5343-566-7

NOTICE
To order a replacement ROM from your authorized WILLIAMS ELECTRONICS GAMES
distributor, specify: (1) part number (if available); (2) ROM label color; (3) ROM level
(number) on the label; (4) which game the ROM is used in.

CONNECTOR IDENTIFICATION

WILLIAMS ELECTRONICS GAMES uses a special technique to identify connectors. Each plug or jack receives a prefix number (which identifies the circuit board), a letter, 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 1 (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.

BANZAI RUN CIRCUIT BOARDS

System 11B Circuit Boards are in the *BANZAI RUN* backbox, behind the upper playfield. They are accessible by (a) unlocking and raising the marquee, and latching its support arm; (b) *pressing the Ball Lifter motor switch briefly to raise the Ball Lifter to clear the lower playfield;* and (c) unlatching the upper playfield and carefully tilting it forward onto the lower playfield.

CPU BOARD. The System 11B CPU Board (p/n D-11883-566) must be equipped with the ROMs specified in the *BANZAI RUN* (System 11B) ROM Summary. For this ROM complement and CPU Board, jumpers W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, and W19 must be connected.

BACKBOX INTERCONNECT BOARD. The Backbox Interconnect Board is D-12112.

AUDIO BOARD. The Audio Board is p/n D-11581-566, as supplied with ROMs and micro-processor.

MASTER DISPLAY BOARD. The Alphanumeric Master Display Board is p/n D-10877. This board is mounted on the interior side of the Score Display & Lamp Board Assembly, D-12146, mounted in the marquee, just behind the marquee glass.

POWER SUPPLY BOARD. The Power Supply Board is p/n D-8345-566.

AUX POWER DRIVER BOARD. The Aux Power Driver Board is D-12247-566.

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 the unit (e.g., connector 1J1).

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

BANZAI RUN **GAME CONTROL LOCATIONS**

The <u>On-Off switch</u> is on the bottom of the cabinet near the right front leg.

The <u>Volume Control</u> is on the left inner wall of the cabinet on the tilt mechanisms board. It is accessible by opening the coin box door.

The <u>Credit switch</u> is a pushbutton to the left of the coin door on the cabinet exterior.

GAME ADJUSTMENT/DIAGNOSTIC SWITCHES.   *BANZAI RUN* allows the operator to program virtually all game adjustments, obtain bookkeeping information, and diagnose problems, using only three switches mounted on the inside of the coin door and 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 Game Status Displays text and the Text/Diagnostic Procedures for details concerning their operation.

> The <u>Memory Protect switch</u> 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.

> The <u>CPU Diagnostic switch</u> (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 <u>Sound Diagnostic switch</u> (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.

The <u>Ball Lifter switch</u> is on the lower left of the upper playfield just to the right of the Ball Lifter Magnet. The Ball Lifter *MUST BE RAISED ENOUGH TO CLEAR THE LOWER PLAYFIELD,* before moving the upper playfield for servicing.

BANZAI RUN GAME ASSEMBLY INSTRUCTIONS

1. Open the shipping container; remove all cartons, parts, and other items, and set them aside. Read the Warnings and Cautions labels and documents on and IN the game.
2. Place the game cabinet on a support and open the coin door; unlatch and remove the Front Molding Assembly to allow removing the lower playfield glass. This allows access for later game adjustments, lubrication, etc.
3. Attach the rear legs (after installing leg levellers), using leg bolts. Leg levellers and leg bolts are both provided among the parts in the cash box. Attach the front legs (after installing leg levellers), using leg bolts. See Figure 1 for details.
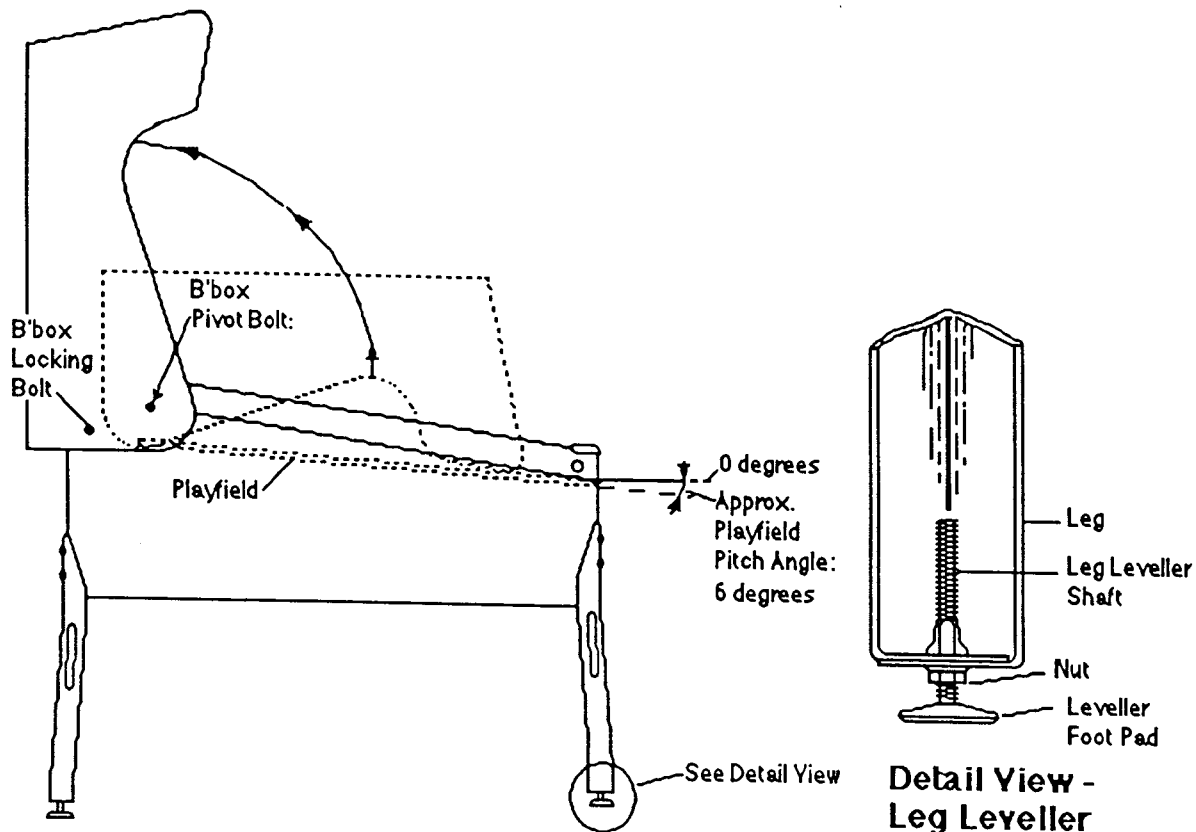
Figure 1. Pinball Assembly, Playfield Pitch Angle, and Leg Leveler Details.

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. Take the two 2" black carriage bolts and, after swinging the hinged backbox upright, stabilize it in position, while placing one carriage bolt up to its head through the locking hole on each side of the lower apron sides of the backbox into the cabinet.

WARNING

NEVER transport a pinball game with the 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. Unlock the marquee and raise it until the hinged marquee support arm (interior right side) is accessible; lock the marquee arm in its straight position. Reach in the backbox and unlatch the upper playfield. Tilt the upper playfield forward and carefully lay it on the lower playfield glass. On each of the two inserted carriage bolts protruding through the inside cabinet wall, place a flatwasher, a lockwasher, and a wingnut. Secure the upright backbox by tightening the wingnut.

7. While accessible, ensure that the pivot bracket of the Freestyle kickbig on the upper playfield is adequately lubricated to provide proper operation. NOTE: Satisfactory operation of the Kickbigs, Kickers, and Eject Holes devices on both the upper and lower playfields is EXTREMELY IMPORTANT for proper game play. An essential means of keeping these devices operating is LUBRICATION.

8. Tilt the upper playfield up, raising it until its playfield glasses can be moved safely. Detach the black plastic glass protector strip from the bottom of the glasses (see Figure 2, left view); place this protector strip inside the game for later use, as necessary. Slide the playfield glasses up until the captured ball area of the playfield is accessible. Install the smaller ball (from among the parts in the cashbox) in the Freestyle area. Remove the foam holding the captured ball in its playfield (upper center) location. Locate the stainless steel Barrier Molding Assembly (in the game legs box); the Barrier Molding Assembly replaces the black plastic glass protector strip (removed earlier). Clean the playfield glasses and slide them downward in the mounting grooves, until they are properly located in the Barrier Molding Assembly (as shown in Figure 2, right view).

Upper Playfield Glass
with Protector Strip

Cross-sectional View of Proper
Upper & Lower Playfield Glasses
Arrangement during Game
Assembly
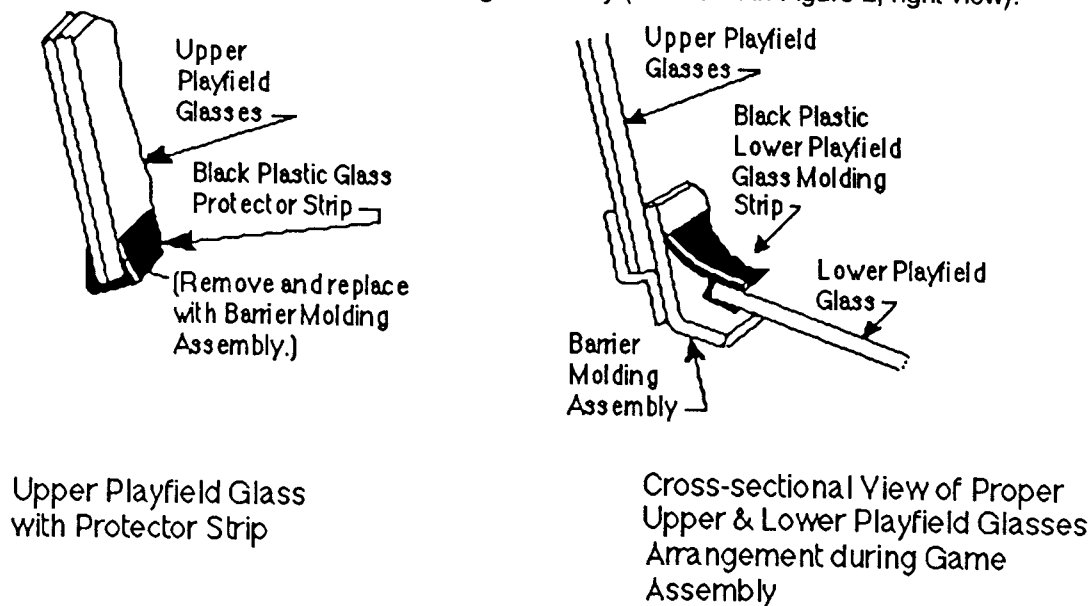
Figure 2. Upper & Lower Playfield Glasses Assembly Details

CAUTION
NEVER raise or lower the backbox with the steel Barrier Molding Assembly attached to the upper playfield glasses.

9. On the lower playfield, remove the foam holding the captured ball in its playfield location. Ensure that the pivot brackets on the Kickbig, Eject Holes, and Kickers are properly lubricated to provide the desired device operation. (Refer to step 7 NOTE.) While the playfield can be moved, lift it and assemble the Plumb Bob Tilt mechanism on the leftside interior panel of the game cabinet. Adjust this tilt for proper operation *after* the lower playfield pitch angle adjustment is completed. (Refer to CAUTION following step 11.)

10. Extend each leg leveler *slightly* below the leg bottom, so that all four foot pads are extended about the same distance. Remove the cabinet from its support and place the game on the floor.

11. Adjust the leg levelers for proper playfield level (side-to-side) _and_ playfield pitch angle (incline) of approximately 6 to 6-1/2 degrees. (It is recommended that these measurements be made ON the playfield, not the cabinet nor the playfield cover glass.) NOTE: 6-1/2 DEGREES IS THE RECOMMENDED MAXIMUM ANGLE. THE LOWER PLAYFIELD'S LEFT BALL GUIDE AT THE EXIT OF THE RAMP MAY REQUIRE ADJUSTMENT TO RETURN THE BALL TO THE MIDDLE OF THE RIGHT FLIPPER PADDLE IF A GREATER ANGLE IS USED. Tighten the nut on each leg leveler shaft to maintain this setting, as shown in Figure 1.

CAUTION
Playfield pitch angle adjustments can affect the operation of the plumb bob tilt, inside the cabinet. The operator should adjust this tilt mechanism for proper operation, after completion of the desired playfield pitch angle setting.

12. Move the game into the desired location; recheck the level and pitch angle of the playfield. To verify that the game's playfield is properly aligned for good play, remove the lower playfield glass and place a ball just left of center of the plastic runway.

NOTE
For good play, the ball should roll from a standing start down the runway exit, along the curved left ball guide to the center of the right flipper paddle. Adjust the curved left ball guide to provide this ball pathway. Also, check that the alignment of the 'Ball Cannon' (Kickbig near the lower left return lane) causes a ball shot to strike the captured ball on the lower playfield; adjust via the nuts atop the Ball Cannon plastic cover.

13. Place the **required number** of balls in the game. (*BANZAI RUN:* 3 balls into outhole of lower playfield. Also, verify that 1 smaller ball was installed in the Freestyle area of the upper playfield (step 7). Verify that one ball is retained in the captured ball runway (upper center) of the upper playfield (step 7) and that one ball is retained in the leftside captured ball runway of lower playfield (step 9), after removal of their sleeve holders.)

14. Clean and re-install the playfield cover glasses. Ensure that the black plastic Lower Playfield Glass Molding Strip is located on the top edge of the lower playfield glass. Slide the Lower Playfield Glass upward in its mounting grooves, until it is firmly against the Barrier Molding Assembly, as shown in Figure 2, right view. Re-install the Front Molding Assembly to complete the game assembly and setup procedure. Prepare the game for your players: Plug it in, turn it on, and check for proper operation.

GAME OPERATION

WARNING
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 coindoor and press the AUTO-UP/MANUAL-DOWN switch to MANUAL-DOWN. Press the ADVANCE button to begin the game test routine. Then, return to AUTO-UP and perform the entire test to verify that the game is operating satisfactorily.

GAME OPERATION (Continued)

NOTE

SYSTEM 11B software for *BANZAI RUN* has a great, new capacity to aid operators and service personnel: If the game software detects a fault at game turn-on, the game displays "PRESS ADVANCE FOR REPORT". These words are accompanied by a sound.

During the Attract Mode, the operator can check for faults *by pressing the CREDIT button,* and observing the resulting message. Normally, the game displays "CREDITS 0" after Credit button actuation. When the game detects a fault, the message will change slightly: A decimal point appears follows the zero (CREDITS 0.). To receive a "TEST REPORT" and enter the test/diagnostic system, press the ADVANCE button.

Pressing the ADVANCE button displays the "TEST REPORT" message. This message is followed by a description of detected faults. Then the game enters the requested test or diagnostic mode. If you press ADVANCE during a report, the game skips the remainder of the report. Instead of continuing the report, the game enters the requested diagnostic or test mode.

ATTRACT MODE*. Playfield and backbox lamps blink. All player score displays exhibit a series of messages informing the player concerning:

A. Recent highest scores*;
B. A "custom message"
       ("BE KING OF THE ... HILL -- -- RACE... BANZAI RUN")*;
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. However, after this maximum credits value is reached, posting of additional credits won (or purchased) by the player does *not* occur.

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. The BALL IN PLAY Lamp lights (to the right of the Player 4 display, which shows 00___1, to identify ball 1 for the flashing Player display). Player display 1 flashes 00, until the first playfield switch is actuated. Additional players may enter the game by pressing the Credit button once for each player, before the end of play on the first ball.

TILT. Actuating the Slam Tilt switch on the coin door inside the cabinet ends the current game; *BANZAI RUN* 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 random 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

BANZAI RUN GAME STATUS DISPLAYS

BANZAI RUN 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: <u>Id</u> (Identification); <u>Au</u> (Audit); <u>Ad</u> (Adjustment). Each of the underscored two-letter abbreviations for these classes appears in the Player 3 score display, while the system microprocessor for the *BANZAI RUN* 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. *BANZAI RUN's* 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	
BANZAI	RUN	Id 00	566	L-x*

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

The game is named in the Player 1 and 2 score displays. The game's identification number shows in the Player 4 score display with the ROM revision level. The Player 3 score display shows the status display mode in abbreviated form, *Id,* with the identifier (**00**) for this particular display.

Pressing ADVANCE once more causes the **Id 01** 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 option 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. Forty-five audit entries are now available. Calculation of the various factors is no longer necessary because 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 can 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 *BANZAI RUN* Audit Table lists the 45 items of the Audit Information portion of the *BANZAI RUN* 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 Player 3 display shows *Au* for all 45 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.)

BANZAI RUN 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	MIN. OF PLAY (Minutes of Play)	
19	BALLS PLAYED	
20	REPLAY1 AWARDS	
21	REPLAY2 AWARDS	
22	REPLAY3 AWARDS	
23	REPLAY4 AWARDS	
24	1 PLAYR. GAMES	
25	2 PLAYR. GAMES	
26	3 PLAYR. GAMES	
27	4 PLAYR. GAMES	
28	BURN IN CYCLES	
29	ALL CHLNGED (# of times All Challenged achieved)	
30	ALL BEATEN (# of times All Beaten achieved)	
31	MULTI BALLS (# of times Multi-Ball play occurred)	
32	KING OF HILL (# of times King -of-the-Hill achieved)	
33	VICTORY LAP (# of 'Victory Laps' awarded)	
34	INSTANT REMATCH (# of times Instant Rematch occurred)	
35	TOTAL LIFTS (# of times Ball Lifter operated)	
36	FINISH LINE (# of times Finish Line achieved)	
37	SKILL SHOTS (# of times successful Skill Shots occurred)	
38	CLIFF JUMPS (# of times Cliff Jump shots occurred)	
39	HIGH SCORE RESET COUNTER	
40	0.0-0.4 M. SCORE (# of games <500K)	
41	0.5-0.9 M. SCORE (# of games ≥500K, <1M)	
42	1.0-1.4 M. SCORE (# of games ≥1M, <1.5M)	
43	1.5-1.9 M. SCORE (# of games ≥1.5M, <2.0M)	
44	2.0-2.4 M. SCORE (# of games ≥2.0M, <2.5M)	
45	2.5-9.9 M. SCORE (# of games ≥2.5M or more)	

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.

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 BANZAI RUN Game Status Displays, as listed in the BANZAI RUN Game Adjustment Table.

BANZAI RUN 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]	1,800,000
03	REPLAY LEVELS (or REPLAY LEVEL 2) [1]	01 (or OFF)
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, 5-20%]	8 (%)
09	BALLS / GAME	03
10	TILT WARNING	03
11	MAXIMUM EX. BALL [00 = NO Ex. Ball; 1-9 Ex. Ball]	04
12	MAXIMUM CREDITS	10
13	HIGHEST SCORES	On
14	BACKUP HI. SCR.1	4,000,000
15	BACKUP HI. SCR. 2	3,800,000
16	BACKUP HI. SCR. 3	3,600,000
17	BACKUP HI. SCR. 4	3,400,000
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 PLAYS) [2]	
23	FREE PLAY	NO
24	U.S.A. 1 COINAGE (4 COINS 3 PLAYS) [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	SW. ALARM KNOCKER [yes=knock for inop switch; no=no knock]	NO
51	A-MODE SOUND [yes=sounds start w/Credit or flipper button push; no=sound only w/coin insertion]	YES
52	A-MODE MUSIC [yes=A-mode music; no= No A-mode music]	YES
53 -58 [5,6]	Special Pricing Adjustments- U.S.A.: 53-55 NOT USED; 56-Install 1 Coin;57-Install 3/$1; 58-Install 2 Coin; see text for 56-58 details.	
59 [5]	INSTALL ADDABALL	NO
60 [5]	INSTALL 5-BALL	NO
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 [7]	CLEAR AUDITS	NO
70	INSTALL FACTORY	NO

NOTES:

1. <u>Automatic Replay</u> 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 <u>Fixed Replay Scores</u>, 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 <u>Factory Setting</u>. 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.

The operator can press the ADVANCE button <u>once</u> to view each Adjustment Information display item. To proceed more rapidly through this information, the operator only has to press <u>*and hold*</u> the AD-VANCE 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 *BANZAI RUN* **Game Adjustment Table** lists the 70 items of the Adjustment Information portion of the *BANZAI RUN* Game Status Displays. Presentation of the displays is similar to that for the Audit Information (that is, the player 1 and 2 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.

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 BANZAI RUN* **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" message, 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 follows the 'details' text.

GAME ADJUSTMENT PROCEDURE (Continued)

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 <u>Game-Over Mode</u>; or (B) restore factory settings and zero audit (bookkeeping) totals. Perform either of the following, as desired:

    A. To reach <u>Game-Over Mode</u>, use AUTO-UP and press ADVANCE once. *BANZAI RUN* now goes to the <u>Game-Over Mode</u>.

    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 <u>Game-Over Mode</u>, 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. *BANZAI RUN* 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 <u>Game-Over Mode</u>.

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 for the first 1,000 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). (After the first 1,000 games, the comparison occurs after every 500 games. The adjustment value is 100K, for this (and each subsequent) comparison.) 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). *BANZAI RUN* 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 <u>Factory Setting</u> is listed in the Game Adjustment Table, but this will change when the game compares the players' scores with this adjustment's value during its auto adjustment activity. The range of settings is *1,000,000* to *3,000,000* 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).

GAME ADJUSTMENT PROCEDURE (Continued)

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, *BANZAI RUN* 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. *BANZAI RUN* 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. *BANZAI RUN* 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). A variation to this award occurs, when the setting of Ad 06 is Coil. (This permits a ticket or token dispenser to provide the award, when applicable.)
Ball - Scoring each Special, when lit, obtains an extra ball.
Score - Scoring each Special, when lit, obtains a score advance of 250,000 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:

5%-20% - 5% is 'hard'; 20% 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 (or a ticket/token, if a dispenser is attached, and the setting of Ad 06 is Coil).

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

09 Balls / Game

The operator can define a "game" by specifying the number of balls to be played. The range of this setting is *1* through *9*. For example, for 5-ball play, select 5 as the setting , which then automatically installs the preset adjustments noted for 5-ball play (Ad 60).

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 Maximum Extra Ball

The operator can choose (via the Credit button) the maximum number of Extra Balls to be accumulated at any time during game play. The range of this setting is: *00* (which allows NO extra ball play and displays a message, NO EX. BALL) and *01 -09,* the selected number of balls. The Factory Setting is 4.

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.

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.

Auto - The four highest scores are stored in memory for use in a game program subroutine associated with 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.

GAME ADJUSTMENT PROCEDURE (Continued)

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*. A variation to this award occurs, when the setting of Ad 06 is Coil. (This permits a ticket or token dispenser to provide the award, when applicable.)

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 *1,000* 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 16 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 number of coin units purchased exceeds the 1 Credit factor 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.

31 CHALLENGED AT START

The operator can choose (via the Credit button) the number of riders challenged at the game start. The range of this setting is *00* (Conservative; NO riders challenged at game start); and *01* (1 opponent rider challenged) through *04* (Liberal; 4 opponent riders challenged).

32 KICK BACK

The operator can choose (via the Credit button) the Kickback action to suit the game location. The range of this setting is *Easier* (Liberal; the Kickback is ALWAYS ON); *Easy* (Kickback is ON at start of each ball); *Regular* (Kickback is ON at start of game and remains in memory from ball to ball): *Hard* (Kickback is OFF at start of game and remains in memory from ball to ball); *Harder* (Kickback is OFF at start of every ball). The game program automatically sets *REGULAR* for 1 play @ 1 coin (25¢).

33 EXTRA BALL AT (# of Laps)

The operator can choose (via the Credit button) the number of laps needed to light the Lower Captive Ball lamp for an EXTRA BALL. (Each player begins the game with 1 Lap.)

34 FINISH LINE AT (# of Laps)

The operator can choose (via the Credit button) the number of laps needed for the Finish Line feature. This feature is intended to be a challenge for the very skilled player. The range of this setting is *20* (Liberal) through *39* (Conservative).

35 INSTANT REMATCH

The operator can choose (via the Credit button) the time period for achieving an Instant Rematch. The choices are *Easy* (approximately 28 seconds) and *Hard* (approximately 23 seconds).

36 SPECIAL AT RANK 2

The operator can choose (via the Credit button) the number of Races in which the player must achieve Rank 2 to light the SPECIAL lamps at the Outlanes. The range of this setting is *OFF* (No Special lamps light); *Race 1* (Liberal; Special lamps light the 1st time Rank 2 is achieved) through *Race 4* (Conservative; Special lamps light the 4th time Rank 2 is achieved).

37 SPECIAL MEMORY

The operator can choose (via the Credit button) whether the lighting of the Special lamps is stored in memory. The choices are *No* (The Special achievement is NOT stored in memory from ball to ball) and *Yes* (The Special achievement IS stored in memory from ball to ball).

38 FREE STYLE

The operator can choose (via the Credit button) the manner in which the Freestyle lamps light upon completion of the lower targets. The choices are *Easy* (Liberal; both lamps light, when the lower targets are all completed) and *Hard* (Conservative; one lamp lights each time lower targets are completed).

39 STUNT CHALLENGED

The operator can choose (via the Credit button) the number of riders challenged by the Super Cycle Stunt skill shot. The range of this setting is *00* (Conservative; NO riders challenged by Super Cycle Stunt skill shot; ONLY points are awarded); and *01* (1 opponent rider challenged and points are awarded) through *04* (Liberal; 4 opponent riders challenged and points are awarded).

40 CENTER EJECT LOCK

The operator can choose (via the Credit button) how the Center Eject Hole lamp is lighted, AFTER the player achieves Rank #2. The choices are *Earn* (the player must complete the 12 rider targets on the lower playfield) and *Free* (the Center Eject Hole lights when the the player achieves Rank 2.)

41 RAMP   SPOT

The operator can choose (via the Credit button) whether the Ramp spots a Rider arrow and on which race that the spot occurs. The range of this setting is:

Off   -   The Ramp NEVER spots a rider arrow.
1 Race   -   The Ramp spots a rider arrow during the 1st Race (until the 1st Multi-Ball).
2 Races   -   The Ramp spots a rider arrow during the 1st 2 Races (until the 2nd Multi-Ball).
3 Races   -   The Ramp spots a rider arrow during the 1st 3 Races (until the 3rd Multi-Ball).
4 Races   -   The Ramp spots a rider arrow during the 1st 4 Races (until the 4th Multi-Ball).
5 Races   -   The Ramp spots a rider arrow during the 1st 5 Races (until the 5th Multi-Ball).

42 TIME   LOCK   CHANCES

The operator can choose (via the Credit button) when the ball ejects from the Time Lock. The choices are 1 (the ball ejects from Time Lock after the 1st trip to the upper playfield following Time Lock) and 2 (the ball ejects from Time Lock after the 2nd trip to the upper playfield).

43 LIFTER   HOME

The operator can choose (via the Credit button) the 'home' position of the Ball Lifter after its operations are complete. The choices are Lo (the Ball Lifter returns to the lower position after the lift) and Hi (the Ball Lifter returns to the upper position after the lift).

44 RANK-1   EX. BALL

The operator can choose (via the Credit button) whether the Rank #1 Captive Ball lights to award an Extra Ball (in addition to awarding King of the Hill) to the player who completes the A - B - C Targets. Note: This is only available after a Time Lock in Multi-Ball. The choices are Yes (the Extra Ball is awarded) and No (No Extra Ball is awarded).

45 POST   TIME

The operator can choose (via the Credit button) the amount of time for the upper playfield Flipper Post to be extended, during the 1st Race only. The range of this setting is Short (Post stays out approximately 7 seconds, during the 1st Race); Regular (Post stays out approximately 12 seconds, during the 1st Race); Long (Post stays out approximately 16 seconds, during the 1st Race). Note: AFTER the first Race, the post stays out only 7 seconds.

46 2 Coin Prompt

The operator can choose (via the Credit button) to inform the player that a second coin is necessary, after the first coin is inserted. The choices are Yes (when the game is set for 2 coins per credit, a prompt appears requesting the second coin); and No (No prompt appears).

47 Dollar   Bills

The operator can choose (via the Credit button), on games using a Dollar Bill Acceptor, to inform the player whether a dollar bill is allowed to replace four coins or not. The choices are No ("$1.00 will NOT replace 4 coins" in prompt and pricing messages); and Yes ("$1.00 WILL replace 4 coins" in prompt and pricing messages).

48 Show Half Credit

The operator can choose (via the Credit button) to show, on games set for 2 coins per credit, that one coin gives One-half Credit. The choices are Yes (when only one coin is inserted, the game shows 1/2 Credit); and No (the game will not show credit fractions).

GAME ADJUSTMENT PROCEDURE (Continued)

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:

BE KING OF THE ... HILL - - RACE ... BANZAI RUN

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:

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789<>?-/*'
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 SW. ALARM KNOCKER

The operator can choose (via the Credit button) whether the knocker operates, sounding an alarm to signal a switch problem, at the time of game Turn-On and at the beginning of the Test/Diagnostic Procedures. Two choices are available:

Yes - The knocker sounds, signalling a switch problem, at game Turn-On and at the beginning of the Test/Diagnostic Procedures.

No - The knocker does NOT sound. (Player 4 shows NO.)

51 Attract Mode Sounds

The operator can select (via the Credit button) whether sounds occur during the Attract Mode. The choices are:

Yes - Sounds occur after the player touches the Credit or Flipper buttons.

No - No sounds occur until coins are inserted.

52 Attract Mode Sounds

The operator can select (via the Credit button) whether music plays periodically during the Attract Mode. The choices are:

Yes - After a game is played, music occurs during the Attract Mode.

No - No music during the Attract Mode.

SPECIAL PRESET ADJUSTMENTS CAUTION

Adjustments 53 through 55 aren't used in U. S. games. Adjustments 56 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) modify a game for a specific area (special U.S.A. coinage settings, for example, Ad 56 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 Adjustment Items affected accompanies each Special Preset Adjustment 59 through 61. For Adjustments 62 through 66, a table itemizing the differences between each Difficulty Adjustment follows the text concerning Game Adjustments.

SPECIAL PRESET ADJUSTMENTS CAUTION (Continued)

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.

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.

53-55 Not Used

56 Install One Coin

The operator can select the Standard Setting "U.S.A. 3", as shown in the **Pricing Table**, and also select the value of Regular for Adjustment Ad32. The choices are *Yes* (Select USA 3 [1 play/1 -25¢ coin] and Ad32 = Regular) and *No* (Factory Setting USA 2).

57 Install 3/$1

The operator can select Standard Setting "U.S.A. 2", as shown in the **Pricing Table**, rather than one of the other Standard Settings. The choices are *Yes* (Select USA 2 [1 play/2-25¢ coins or 3 plays/4-25¢ coins] or *No* [Another Standard Setting must be selected]). This is the Factory Setting.

58 Install 2 Coins

The operator can select Standard Setting "U.S.A. 1", as shown in the **Pricing Table**, rather than another Standard Setting. The choices are *Yes* (Select USA 1 [1 play/2-25¢ coins or 2 plays/4-25¢ coins] or *No* [Another Standard Setting must be selected]).

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
			21	Hi Scr 4 Credits	00

60 Install 5 Ball

The operator can change the game to 5-Ball play, including the changing of certain Game Adjustment settings to the recommended 5-Ball play difficulty level. Individual Adjustments are affected, as follows:

Ad	Name	New Setting		Ad	Name	New Setting
02	Replay Start	2,500,000		34	Finish Line at	35 Laps
09	Balls / Game	05		38	Freestyle	Hard
32	Kickback	Hard		41	Ramp ISpot	Off
33	Extra Ball at	12 Laps				

61 Install Novelty

The operator can remove all Free Play and Extra Ball awards. Individual Adjustments are affected, 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 (sometines called "liberal"). The Game Adjustment Setting Comparison Table, which follows 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 follows 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 follows 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 follows 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 follows these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Extra Hard' group.

GAME ADJUSTMENT PROCEDURE (Continued)

BANZAI RUN Game Adjustment Setting Comparison Table

Adj #	Adj Description	Extra Easy Ad 62	Easy Ad 63	Medium Ad (Factory) 64	Hard Ad 65	Extra Hard Ad 66
31	Challenged at Start	2	0	0	0	0
32	Kickback	Easy	Easy	Regular	Regular	Hard
35	Instant Rematch	Easy	Easy	Easy	Hard	Hard
38	Freestyle	Easy	Easy	Easy	Hard	Hard
39	Stunt Challenged	4	1	1	1	0
40	Center Eject Lock	Free	Earn	Earn	Earn	Earn
42	Time Lock Chances	2	2	2	1	1
45	Post Time	Long	Long	Regular	Short	Short

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 *BANZAI RUN*, 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 automatically setting the Pricing Functions, shown in columns 25 through 30 in the *Pricing Table*. 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 Ad 24 Display column of the *Pricing Table*, each "Standard" Setting is denoted by a Country identifier, as mentioned above; otherwise, when applicable for a country, the word "Custom" denotes that the operator must perform the Custom Pricing process.

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 the desired values for the Pricing Functions (Items 25 through 30, listed in 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 eqivalent 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, by the factory setting.)

GAME PRICING (Continued)

BANZAI RUN 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¢	1/50¢, 2/$1 [2]	U.S.A. 1	01	04	01	02	00	00
				1/50¢, 3/$1 [1,2]	U.S.A. 2	01	04	01	02	04	00
				1/25¢, 4/$1 [2]	U.S.A. 3	01	04	01	01	00	00
				1/25¢, 3/50¢, 6/$1	CUSTOM	01	04	01	01	02	00
				1/25¢, 5/$1	CUSTOM	01	00	01	01	04	00
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, 3/2 DM, 6/5 DM [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
				Ticket/Token Mode [4]	CUSTOM						
				Keyset Mode [4]	CUSTOM						
France	1 F	5 F	10 F	1/5x1 F, 1/5 F, 3/10 Franc [2]	FRANCE	01	05	10	05	10	00
Antilles (Netherlands)	25¢	-	1G	1/25¢, 4/1 Guilder	CUSTOM	01	01	04	01	00	00
Netherlands	1 HFl	2.5 HFl	2.5 HFl	1/1 HFl, 3/2.5 HFl [2]	NETHERL.	06	15	15	05	00	00
	25¢	-	1G	1/25¢, 5/1 Guilder	CUSTOM	01	00	05	01	00	00
Belgium	20 F	20 F	20 F	3/20 F [2]	BELGIUM	03	12	12	12	04	00
	5 F	-	20 F	1/2x5 F, 2/20 Franc	CUSTOM	01	01	04	02	00	00
	5 F	20 F	20 F	1/2x5 F, 2/20 F, 2/20 F	CUSTOM	01	04	04	02	00	00
	5 F	5 F	20 F	1/2X5 F, 1/2X5 F, 2/20 F	CUSTOM	01	01	04	02	00	00
Spain	25 P	-	100P	1/25 P, 5/100 Peseta [2]	SPAIN	01	00	05	01	00	00
Switzerland	1 F	-	2 F	1/1 F, 3/2 F [2]	SWISS	03	00	06	02	00	00
	1 F	2 F	5 F	1/1 F, 3/2 F, 7/5 Franc	CUSTOM	02	06	14	02	00	00
Japan	-	100¥	-	2/100 ¥ [2]	JAPAN	01	04	01	02	00	00
	100¥	-	100¥	2/100 Yen	CUSTOM	04	00	04	02	00	00
Italy	500 L	500L	500 L	1/500 Lire [2]	ITALY	01	01	01	01	00	00
Australia	$1	-	$2	1/$1, 3/$2 [2]	AUSTRAL.	01	00	02	01	02	00
United Kingdom	10 P	50 P	10 P	1/10 P, 5/50 P [2]	U.K.	01	05	01	01	00	00
	10 P	50 P	20 P	1/10 P, 5/50 P, 2/20 Pence	CUSTOM	01	05	02	01	00	00
Argentina	10¢	10¢	10¢	1/1 Token	CUSTOM	01	01	01	01	00	00
Austria	5 Sch	10 Sch	10 Sch	1/2x5 Sch, 3/2x10 Sch [2]	AUSTRIA	01	02	02	02	04	00
	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
Chile	Token	-	Token	1/1 Token [1,2]	U.S.A. 3	01	04	01	01	00	00
Denmark	1 Kr	5 Kr	10 Kr	1/2x1 Kr, 3/5 Kr, 7/10 Krone	CUSTOM	01	06	14	02	00	00
Finland	1 Mka	-	1 Mka	1/1 Markka [1,2]	U.S.A. 3	01	04	01	01	00	00
New Zealand	20¢	-	20¢	1/2x20¢ [2]	U.S.A. 1	01	04	01	02	00	00
Norway	1 Kr	-	1 Kr	1/2x1 Kr, 3/5x1 Krone	CUSTOM	01	00	01	02	05	00
Sweden	1 Kr	5 Kr	5 Kr	1/3x1 Kr, 2/5 Krona [2]	SWEDEN	02	10	10	05	00	00
	1 Kr	-	1 Kr	1/2x1 Krona [2]	U.S.A. 1	01	04	01	02	00	00

Notes: 1. Factory Default. 2. Standard Setting - Change by pressing Credit button. 3. Default with jumper W7 cut/removed.
4. Other functions are also affected; see the explanations for Adjustment Items 53 through 58.

TEST/DIAGNOSTIC PROCEDURES
AUTOMATIC TEST REPORT

Before and during operation, the *BANZAI RUN* game software monitors many operational aspects of the game and is able to provide a report of any problems detected, as mentioned in the earlier text on Game Operation. When the software does detect a problem, at game turn-on, a display message, "PRESS ADVANCE FOR REPORT", appears. Open the coin door, and press the ADVANCE button to obtain a display describing the detected problem.

For example, display of the message, "Row 1 WHT-BRN Short", indicates that the software has detected a short circuit affecting an entire row in the switch matrix. (Another row with a short circuit problem will cause the display of a similar message, identifying the row, affected wire color, and symptom.)

The message, "PINBALL MISSING", appears after the game detects only two balls available for play. As a remedy, the operator can press the Credit button, which causes the solenoids to actuate three times. Then, if the ball remains missing, the game automatically shifts to 2-ball game play, and the message is stored for later display (by pressing ADVANCE), while game play can continue. After the third ball returns to the ball trough during game play *OR* at Game Over, the software reverts to 3-ball game play, and automatically clears the stored message.

Another message might be "CHECK MAGNET", which indicates that the ball lifter is operating correctly, but the ball is not being lifted out of the left eject hole. When the ball lifter stalls or does not operate properly, the message "CHECK LIFTER" will appear. (This usually is not the result of a bad lifter switch because these are monitored separately. Either of these messages can be cleared only after successful operation of the particular device during game play.

The message, "CHECK SWITCH", followed by a switch's name and matrix number indicates that this switch has NOT been actuated for many games. Clearing of this message can occur during either of the switch diagnostic tests, or during game play, *EXCEPT* for the Lower Lifter and the Upper Lifter switches. When the report displays, "CHECK SWITCH 51 -- LOWER LIFTER" or "CHECK SWITCH 63 -- UPPER LIFTER", it is necessary for the ball lifter diagnostic test (described later in the Diagnostic Test text), or normal game play, to perform 20 consecutive, correct switch closures to clear this message.

NOTICE

During Attract Mode, you may check for faults *by pressing the CREDIT button.* When you press the CREDIT button, the game displays "CREDITS 0." The zero may be followed by a decimal point (CREDITS 0."). The decimal point indicates that the game program has detected a fault. To receive a "TEST REPORT" and enter the diagnostic testing process, open the coin door and press the ADVANCE button.

When a fault is detected at game turn-on, the game displays "PRESS ADVANCE FOR REPORT". These words are accompanied by a sound.

Pressing the ADVANCE button displays the "TEST REPORT" message. This message is followed by a description of detected faults. Then, the program permits selection of the desired diagnostic test or of the entire series of diagnostic tests. Pressing ADVANCE during a report causes the game program to skip the remainder of the report and begin the diagnostic testing.

TEST/DIAGNOSTIC PROCEDURES (Continued)

DIAGNOSTIC TEST PROCEDURES

WILLIAMS ELECTRONICS GAMES also continues to provide 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 all the electonic and electromechanical game devices, so that operator can readily locate a malfunctioning device or simplify verify that all devices are working properly. In the order of testing, tested features include music, displays, sounds, lamps, solenoids, switches, and any special features.

A feature called the Auto Burn-in Mode is also available. This mode enables observation of the game during diagnostic tests, *except Switch Test*. This mode can help locate 'intermittent' problems.

To initiate tests, open the coin door. Then, switch the game on. Inside the coin door, set the AUTO-UP/MANUAL- DOWN switch to MANUAL-DOWN. Now, press the ADVANCE button.

MUSIC TEST.
1. In the Music Test, observe that the player 1 and 2 displays show the message, MUSIC TEST. When this MUSIC TEST message appears, listen for an error code from the music board: One beep indicates that the board is OK. Two beeps: RAM error. Three beeps: U4 error. Four beeps: U19 error. You may repeat the beep test by pressing the DIAGNOSTIC button on the Sound Board.

   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 06 - 'King of the Hill Theme'. Adjust the volume control as desired.

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 words, DISPLAY TEST, and that the player 3 score display shows 01 (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). Note that the Player 4 display shows COL 3 LO and all feature lamps on the lower playfield blink on and off, along with all upper playfield features lamps, except 65 - 72, which share the Column 3 driver with the lower playfield. (Note, however, that the General Illumination lamps remain lighted steadily.)

Press the Credit button and note that the Player 4 display now shows COL 3 HI and that all feature lamps on the upper playfield blink on and off, along with all lower playfield feature lamps, except 17 - 24, which share the Column 3 driver with the upper playfield.

To locate the wiring associated with a particular feature lamp, refer to the **Lamp-Matrix Tables.** CPU Board connections at jacks 1J6 (columns) and 1J7 (rows) are also listed in the tables.

Each *BANZAI RUN* playfield has its own **Lamp-Matrix Table.** In the lower playfield table, a • shows that the lamp is a #44 bulb; all others are #555. All lamps on the upper playfield are #44.

BANZAI RUN Lower Playfield **Lamp-Matrix Table**

COLUMN / ROW	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9
Q80 RED-BRN 1J6-1	Arrow • (Banzai Hill) 1	Lock (Center Eject) 9	SUPER (Super Cycle Stunt) 17	25	Rank 6 (Low, Left Eject) 33	RACE (Low Red Stndup Tgt) 41	Green Machine [2] Challenged 49	SPECIAL • (L Outlane) 57
Q81 RED-BLK 1J6-2	Ramp Arrow (Rank #1) 2	Freestyle (Center Eject) 10	CYCLE (Super Cycle Stunt) 18	26	Rank 5 (Left Eject) 34	RED (Cntr Red Stndup Tgt) 42	Red Hot [2] Challenged 50	LAPS 1 58
Q82 RED-ORN 1J6-3	Race Again• 3	Timelock (Center Eject) 11	STUNT (Super Cycle Stunt) 19	27	Rank 4 (Mid, Left Eject) 35	HOT (Right Red Stndup Tgt) 43	Prior Race Blue 51	LAPS 2 59
Q83 RED-YEL 1J6-5	Ball in Play (Scoreboard) 4	Kickback (Center Eject) 12	Double Lap (Ramp, lwr left) 20	28	Rank 3 (Left Eject) 36	RACE (Low Blue Stndup Tgt) 44	Prior Race Yellow 52	LAPS 3 60
Q84 RED-GRN 1J6-6	Kickback • 5	3000 W/L • (Left Spinner) 13	SPOT (Ramp, lwr right) 21	29	Rank 2 (High, Left [2] Eject) 37	BLUE (Cntr Blue Stndup Tgt) 45	Prior Race Green 53	LAPS 4 61
Q85 RED-BLU 1J6-7	Extra Ball • (Cap. Ball, low) 6	RACE (Top left lane) 14	3000 W/L • (Right Spinner) 22	30	RACE (Left Yel Stndup Tgt) 38	BEARD (High Blue Stndup Tgt) 46	Prior Race Red 54	LAPS 5 62
Q86 RED-VIO 1J6-8	50,000 • (Cap. Ball, cntr) 7	GREEN (Top center lane) 15	Flipper Lane (both) (2) 23	31	YELLOW (Cntr Yel Stndup Tgt) 39	Blue Beard Chall'ngd [2] 47	SPECIAL • (R Outlane) 55	LAPS 10 63
Q87 RED-GRY 1J6-9	25,000 • (Cap. Ball, high) 8	MACHINE (Top right lane) 16	1 LAP Standup Targets (2) 24	32	BELLY • (Rt Yel Stndup Tgt) 40	Yel Belly Chall'ngd [2] 48	56	LAPS 20 64

Symbols: [2] Two Lamps: 1 on Up P/F; 1 on Lo P/F   (2) Two Lamps on Lo P/F   • = #44 Bulb; all other bulbs = #555

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 ARROW, the name of the lamp currently blinking. Press the Credit button to proceed through an ascending series of designator numbers (01 through 72), with the Player 1 and 2 displays showing the individual lamp's name. Press and hold the Credit button to proceed rapidly to the desired lamp.

BANZAI RUN Upper Playfield Lamp-Matrix Table

COLUMN / ROW	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9	9 Q62 YEL-ORN 1J7-3
Q80 1 RED-BRN 1J6-1	1	9	17	Freestyle (lwr blue) 25	33	41	Defeat Green Machine [2] 49	57	Cliff Jump 2X 65
Q81 2 RED-BLK 1J6-2	2	10	18	Freestyle (upr blue) 26	34	42	Defeat Red Hot [2] 50	58	Extra Ball (Captive Ball) 66
Q82 3 RED-ORN 1J6-3	3	11	19	Freestyle (lwr yellow) 27	35	43	51	59	Rank #1 (Captive Ball) 67
Q83 4 RED-YEL 1J6-5	4	12	20	Freestyle (upr yellow) 28	36	44	52	60	A Standup Tgt 68
Q84 5 RED-GRN 1J6-6	5	13	21	Freestyle (lwr green) 29	Lock Arrow [2] 37	45	53	61	B Standup Tgt 69
Q85 6 RED-BLU 1J6-7	6	14	22	Freestyle (upr green) 30	38	46	54	62	C Standup Tgt 70
Q86 7 RED-VIO 1J6-8	7	15	23	Freestyle (lwr red) 31	39	Defeat Blue Beard [2] 47	55	63	Post Out 71
Q87 8 RED-GRY 1J6-9	8	16	24	Freestyle (upr red) 32	40	Defeat Yellow Belly [2] 48	Ball Popper Arrow 56	64	Cliff Jump 72

Symbols: [2] Two Lamps: 1 on Up P/F, 1 on Lo P/F   All lamps = # 44 Bulb

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.

"On" State Logic - Special Solenoid

"On" State Logic - Controlled Solenoid
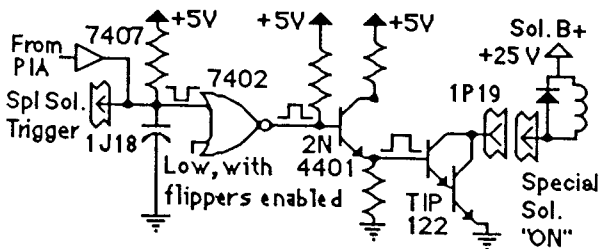
"Off" State - Special Solenoid:
The Special Switch Trigger Input goes low. Meanwhile, the PIA line remains high. The remaining signals reverse their states.
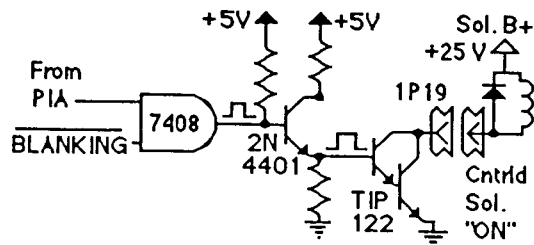
"Off" State - Controlled Solenoid:
The Enable Input (from the PIA) goes low. Meanwhile, the BLANKING signal remains high. The rest of the signals reverse their states.

TEST/DIAGNOSTIC PROCEDURES (Continued)

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 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 Left Spinner Flasher circuit (sol. 01C). Using this "multiplexing" technique, the same driver transistor can control actuation of two separate solenoid circuits.

BANZAI RUN Solenoid Table

| Sol. No.	Function	Solenoid Type	Wire Color [1]	CPU Bd	Playfield/ Cabinet	Driver Trnstr	Solenoid Part Number / Flashlamp Type m=Marquee; l=lwr p/f; u=upr p/f	
01A [3]	Outhole Kicker	Switched	{ Vio-Brn	1P11-1	5J1-9: 5J4-9 (A)	Q33	AE-23-800	
01C [3]	Left Spinner Flasher	Switched	{ Blk-Brn	(Gry-Brn)	5J5-9 (C)	Q33	#89 flashlamps	1l
02A [3]	Ball Release (Shtr Lane Feeder)	Switched	{ Vio-Red	1P11-3	5J1-7: 5J4-8 (A)	Q25	AE-23-800	
02C [3]	Right Spinner Flasher	Switched	{ Blk-Red	(Gry-Red)	5J5-8 (C)	Q25	#89 flashlamps	1l
03A [3]	Lock Kicker	Switched	{ Vio-Orn	1P11-4	5J1-6: 5J4-7 (A)	Q32	AE-23-800	
03C [3]	1/6(M)/Ramp&Arrow (L) Flshs	Switched	{ Blk-Orn	(Gry-Orn)	5J5-7(C)	Q32	#89 flashlamps	1m,2l
04A [3]	Ball Cannon	Switched	{ Vio-Yel	1P11-5	5J1-5: 5J4-6 (A)	Q24	AE-23-800	
04C [3]	2/6 (M)/Ramp&Speed-O(L)Flshs	Switched	{ Blk-Yel	(Gry-Yel)	5J5-5 (C)	Q24	#89 flashlamps	1m,2l
05A [3]	Pop-up Flipper Post (upf)	Switched	{ Vio-Grn	1P11-6	5J1-4: 5J4-5 (A)	Q31	AE-23-800	
05C [3]	3/6 (M)/Ramp (L)&U p/f (hi) Flshs	Switched	{ Blk-Grn	(Gry-Grn)	5J5-4 (C)	Q31	#89 flashlamps	1m,1l,1u
06A [3]	Freestyle Kicker(upf)	Switched	{ Vio-Blu	1P11-7	5J1-3: 5J4-4 (A)	Q23	AE-23-800	
06C [3]	4/6 (M)/Ramp (L)&U p/f (lo) Flshs	Switched	{ Blk-Blu	(Gry-Blu)	5J5-3 (C)	Q23	#89 flashlamps	1m,1l,1u
07A [3]	Knocker	Switched	{ Vio-Blk	1P11-8	5J1-2: 5J4-2 (A)	Q30	AE-23-800	
07C [3]	5/6 (M)/Ramp&Tach (L) Flashers	Switched	{ Blk-Vio	(Gry-Vio)	5J5-2 (C)	Q30	#89 flashlamps	1m,2l
08A [3]	Center Eject Hole	Switched	{ Vio-Gry	1P11-9	5J1-1: 5J4-1 (A)	Q22	AE-26-1200	
08C [3]	6/6 (M)/Ramp&Captive (L) Flshs	Switched	{ Blk-Gry	(Gry-Blk)	5J5-1 (C)	Q22	#89 flashlamps	1m,2l
09	Upr Flipper Relay	Controlled	Brn-Blk	1P12-1	5J2-9: 5J6-9: 2J4-3	Q17	5580-12299-00 [4] (K2)	
10	Lower P/f Illum	Controlled	Brn-Red	1P12-2	5J2-8: 5J6-8: 2J4-5	Q9	5580-12145-01 [4] (K3)	
11	Upper P/f Illum	Controlled	Brn-Orn	1P12-4	5J2-6: 5J6-7: 2J4-6	Q16	5580-12145-01 [4] (K4)	
12	A/C Select Relay	Controlled	Brn-Yel	1P12-5	5J2-5	Q8	5580-09555-01 [5]	
13	Lifter Magnet	Controlled	Brn-Grn	1P12-6	5J2-4: 5J6-5	Q15	LW-31-3000	
14	Kickback (Low Left Drain)	Controlled	Brn-Blu	1P12-7	5J2-4: 5J6-3	Q7	AE-23-800	
15	Lifter Motor	Controlled	Brn-Vio	1P12-8	5J2-2: 5J6-2	Q14	14-7949/5580-12145-01 [6]	
16	Left Eject Hole	Controlled	Brn-Gry	1P12-9	5J2-1: 5J6-1	Q6	AE-26-1200	
17	Left Jet Bumper	Special #1	Blu-Brn	1P19-7	5J3-7: 5J7-7	Q75	AE-23-800	
18	Lower Left Kicker ("sling")	Special #2	Blu-Red	1P19-4	5J3-6: 5J7-6	Q71	AE-26-1500	
19	Upper Right Jet Bumper	Special #3	Blu-Orn	1P19-3	5J3-3: 5J7-3	Q73	AE-23-800	
20	Lower Right Kicker ("sling")	Special #4	Blu-Yel	1P19-6	5J3-4: 5J7-5	Q69	AE-26-1500	
21	Lower Right Jet Bumper	Special #5	Blu-Grn	1P19-8	5J3-2:5J7-2	Q77	AE-23-800	
22	Up Lamp Relay	Special #6	Blu-Blk	1P19-9	5J3-1: 5J7-1	Q79	5580-09555-01 [4] (K5)	
-	Right Flipper	-	Orn-Vio	1P19-1	2J3-1: 2J18-10: 7P1-15	-		
	Lower Right Flipper (UPF & LPF)		[Blu-Vio] [2]	,	[7P1-16: 2J18-6: 2J17-4]		FL11630-50VDC	
	Upper Right Flipper (LPF only)		[Blk-Yel] [2]		[7P1-13: 2J18-8: 2J17-1]		FL11753-50VDC	
-	Left Flipper	-	Orn-Gry	1P19-2	2J3-2: 2J18-9: 7P1-18	-		
	Lower Left Flipper (UPF & LPF)		[Blu-Gry] [2]		[7P1-19,2J18-5:2J17-3]		FL11630-50VDC	
	Upper Left Flipper (UPF only)		[Blk-Blu] [2]		[7P1-17: 2J18-7: 2J16-1]		FL11630-50VDC	

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. 4. Relay is mounted on Backbox Interconnect Bd, p/n D-12112. 5. Relay is mounted on Aux Power Driver Bd, D-12247 in the backbox. 6. Relay is mounted on Relay Bd, C-11902-1.

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 *BANZAI RUN* 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 *BANZAI RUN*, switch numbers can range from 01 through 64. Refer to the *BANZAI RUN* **Switch-Matrix Tables** (one table for each playfield) for switch numbers and wiring information. CPU Board connections at jacks 1J8 (columns) and 1J10 (rows) are also listed in the table.

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.

BANZAI RUN Lower Playfield **Switch-Matrix Table**

COLUMN / ROW	1 Q45 GRN-BRN 1J8-1	2 Q49 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	Plumb Bob Tilt 1	Outhole 9	Center Eject Hole 17	Left Flipper Lane Change 25	Ramp Entrance 33	RACE Lwr Red Stndup Target 41	49	57
2 WHT-RED 1J10-8	Playfield Tilt 2	Ball Trough #1 (right) 10	Center Red Standup Target 18	Ramp Upper Exit 26	Rt Flipper Lane Change 34	RED Mdl Red Stndup Target 42	50	58
3 WHT-ORN 1J10-7	Credit Button 3	Ball Trough #2 (mid) 11	Ball Shooter Lane 19	Left Jet Bumper 27	Ramp Lower Exit 35	HOT Upr Red Stndup Target 43	51	59
4 WHT-YEL 1J10-6	Right Coin Chute 4	Ball Trough #3 (left) 12	Right Outlane 20	Upr Rt Jet Bumper 28	Ball Cannon 36	RACE Lwr Blue Stndup Target 44	52	60
5 WHT-GRN 1J10-5	Center Coin Chute 5	Left Eject Hole 13	Left Spinner 21	Lwr Rt Jet Bumper 29	Target Captive Ball 37	BLUE Mdl Blue Stndup Target 45	53	61
6 WHT-BLU 1J10-3	Left Coin Chute 6	Top Lane Left 14	Right Spinner 22	Left Kicker 30	RACE Lwr Yel Stndup Target 38	BEARD Upr Blue Stndup Target 46	54	62
7 WHT-VIO 1J10-2	Slam Tilt 7	Top Lane Cntr 15	Left Flipper Lane 23	Right Kicker 31	YELLOW Mdl Yel Stndup Target 39	1 LAP L Standup Tgt 47	55	63
8 WHT-GRY 1J10-1	High-Score Reset 8	Top Lane Right 16	Right Flipper Lane 24	Left Outlane 32	BELLY Upr Yel Stndup Target 40	1 LAP R Standup Tgt 48	56	64

BANZAI RUN *Upper Playfield* Switch-Matrix Table

COLUMN \ ROW	1 Q45 GRN-BRN 1J8-1	2 Q49 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	1	9	17	25	33	41	Freestyle (lower Blue) 49	Freestyle (lower Green) 57
2 WHT-RED 1J10-8	2	10	18	26	34	Freestyle (upper Blue) 42	Flipper Post 50	Freestyle (upper Green) 58
3 WHT-ORN 1J10-7	3	11	19	27	35	Freestyle (lower Yellow) 43	Lower Lifter 51	Mouse Hole Drain 59
4 WHT-YEL 1J10-6	4	12	20	28	36	Freestyle (upper Yellow) 44	Defeat Red Cliff Jump 52	A Stndup Tgt 60
5 WHT-GRN 1J10-5	5	13	21	29	37	45	Defeat Yellow Roll-Under 53	B Stndup Tgt 61
6 WHT-BLU 1J10-3	6	14	22	30	38	46	Defeat Blue Roll-Under 54	C Stndup Tgt 62
7 WHT-VIO 1J10-2	7	15	23	31	39	Freestyle (lower Red) 47	Target Captive Ball 55	Upper Lifter 63
8 WHT-GRY 1J10-1	8	16	24	32	40	Freestyle (upper Red) 48	Defeat Green Standup Tgt 56	Left Lock Ball Popper 64

SWITCH TESTS (Continued).

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 *BANZAI RUN* 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, 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.

TEST/DIAGNOSTIC PROCEDURES (Continued)

BALL LIFTER TEST.

From the Switch Edges Test, press ADVANCE. Observe that the Player 1 and 2 displays show the message, LIFTER TEST, and that the Player 3 displays shows 08 (Ball Lifter Test identifier). Next, the Player 1 and 2 displays change to the message, LIFTER OFF.

The test checks the operation of the ball lifter mechanism and the associated actuation of the upper and lower ball lifter switches. During the test, the displays provide information concerning the test status (Off or On), the operation of the switches, detected errors, and the number of switch operations without an error.

Pressing the Credit button starts the Ball Lifter test, as indicated by the Player 1 and 2 displays showing the message, LIFTER ON. (Subsequent operations of the Credit button stop or start the ball lifter test, and cause the message to alternate between LIFTER OFF and LIFTER ON.)

Information about the ball lifter test operation is shown in the Player 2, 3, and 4 displays; for example:

Player 1 and 2:	[LIFTER]	[ON X4]
Player 3 and 4	[08 UL]	[1,000]

The number in the rightmost (7th character) position of the Player 2 display identifies the portion of the test being performed, as designated in the following chart. The Player 2 display 7th digit can also be <u>blank</u>, which indicates that the ball lifter has not yet completed a correct switch sequence.

7th Digit of Plyr 2	Last Switch Made	Switch Expected Next
1	Lower switch going down	Lower switch going up
2	Lower switch going up	Upper switch going up
3	Upper switch going up	Upper switch going down
4	Upper switch going down	Lower switch going down

Whenever the "Switch Expected Next" is *not* actuated, the program detects this as an error and causes a "buzzer" sound. The program then displays the physical state of the lifter at the time of the error in the sixth position of the Player 2 display (shown as "X" in the example display). The "X" is a number (defined in the following chart) that represents the physical state of the lifter when the wrong switch closed.

6th Digit of Plyr 2	Expected Switch	Detected Switch
1	Lower switch	Upper switch
2	Upper switch	Lower switch
3	Upper switch	Lower switch
4	Lower switch	Upper switch

Switch errors may be reported because the "Expected Switch" is intermittent. They may also be reported because the "Detected Switch" is actuating erroneously.

To the right of the test number (08) in the Player 3 display, the letters "U" (upper) and "L" (lower) will appear. Each letter should appear *momentarily*, when the lifter actuates the associated switch. If either the "U" or "L" remains on constantly, then the associated switch is stuck closed and must be repaired to operate properly. As each switch actuates, a unique sound should be heard.

The Player 4 display shows the number of successive switches closed without error. Along with the buzzer, this Player 4 counter is reset when an error occurs.

BALL LIFTER TEST (Continued)

CLEARING LIFTER SWITCH REPORTS. As a result of game operation, the malfunction of either the lower or upper switch associated with the ball lifter will cause 'Test Report' statements, such as the following:

CHECK SWITCH 51 -- Lower Lifter
CHECK SWITCH 63 -- Upper Lifter

Manually operating the switch won't clear the report. To clear either of these reports, the Ball Lifter Test must correctly close the reported switch 20 times (the Player 4 display reads 20, or more). An alternate method of clearing the report is 20 correct closures in game play.

ENDING THE DIAGNOSTIC TESTS.
To end the Diagnostic Tests, reach the Lifter Test (08 in the Player 3 display), use AUTO-UP and press ADVANCE. The backbox displays should show the *BANZAI RUN* game's Identification Information. Use MANUAL-DOWN, and press ADVANCE to reach Adjustment Item 70 (INSTALL FACTORY). Use AUTO-UP and press ADVANCE to obtain 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. *BANZAI RUN* 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.

In addition to the displayed message, when a test fails, the center LED (marked DIAGNOSTICS) mounted on the CPU Board can be observed to determine the probable cause of the problem. The 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.

SYSTEM-11B MEMORY CHIP TEST (Continued)

CPU LED Indicator Codes Table

Diagnostic LED		
Blinks/Flashes	**Display Message**	**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. **Sound/Speech 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: <u>No sound</u> = Sound/ Speech Board is not operating, or a failure is affecting the sound circuitry (broken cable; dead amplifier; etc.); <u>1 sound</u> = system OK; <u>2 sounds</u> = RAM problem; <u>3 sounds</u> = U4 problem; <u>4 sounds</u> = U19 problem; <u>5 sounds</u> = U20 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 (Continuously Variable Slope Delta) Modulator, which provides the voices for *BANZAI RUN,* 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 <u>one</u> "ring" is heard, this indicates a malfunction of the U23 RAM Chip. If either <u>two</u> or <u>four</u> "rings" is heard, this indicates a problem associated with the U21 ROM Chip. If either <u>three</u> or <u>five</u> "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).

SYSTEM-11B SOUND CIRCUITRY TESTS (Continued)

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 Control, 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 .

FUSE LISTING.
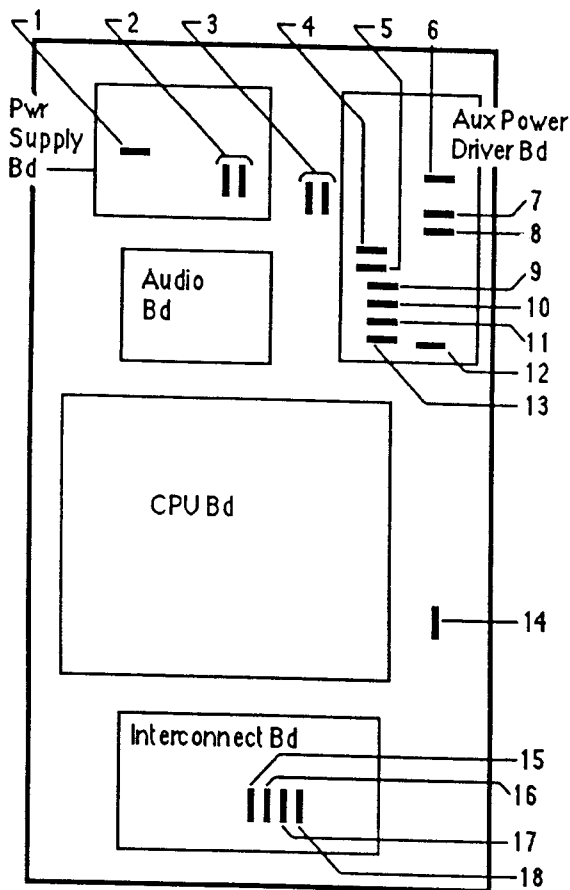
Fuse Placement Chart - Backbox Interior

BANZAI RUN

Fuse Listing - *BANZAI RUN*

1 - 1/4A.	±100 Vdc	Power Supply
2 - 7A.	+5 Vdc; ±12 Vdc	Power Supply
3 - 1/10A.	±100 Vdc	Player Score Display
4 - 2-1/2A.	25 Vdc Coil (F2A - Brn)	
5 - 5A.	25 Vdc Flashlamps (F2C - Orn)	
6 - W6 (0Ω)	A/C Select Relay (F2)	
7 - 2-1/2A.	25 Vdc Coil (F3 - Red)	
8 - 2-1/2A.	25 Vdc Coil (F1 - Red)	
9 - 2A.	50 Vdc Coil (F4 - Yel-Vio)	
10 - 2A.	50 Vdc R Flipper (F5 - Blu-Yel)	
11 - 2A.	50 Vdc L Flipper (F6 - Gry-Yel)	
12 - 4A.	50 Vac Input to 50Vdc Pwr Ckt	
13 - 7A.	25 Vac Input to 25Vdc Pwr Ckt and the Ball Lifter Motor	
14 - 8A.	13.5 Vac Input to +18 Vdc Lamp Circuit	
15 - 5A.	5.9 Vac Input (F1: Lwr R Playfield/ Gnl Illumination)	
16 - 5A.	5.9 Vac Input (F2: Marquee/Gnl Illumination)	
17 - 5A.	5.9 Vac Input (F3: Lwr Playfield/ Gnl Illumination)	
18 - 5A.	5.9 Vac Input (F4: Upr Playfield/ Gnl Illumination)	

NOTE: All listed fuses are 250V, Slow-blow, EXCEPT #14, which is a 32V, Slow-blow.

One 8A., 125V, Slow-blow fuse is installed in the Cabinet Line Filter Assembly, except for those foreign games that require a 4A., 250V, Slow-blow fuse.

Figure 3. Fuse Locations & Listing, *BANZAI RUN*

MAINTENANCE INFORMATION

Figure 4 shows the two main lubrication points of the Ball Shooter Lane Feeder. The shaded arrows show the directions in which the Ball Shooter Lane Feeder and other parts of its related assemblies can be adjusted for proper operation. The Freestyle Kickbig on the upper playfield, as well as the Ball Cannon Kickbig, the Lower Left and Right Kickers, and the Eject Hole Assembly (same for both the Left and the Center Eject Holes) all utilize similar mechanisms. To provide your players with the best game action, it is recommended that these devices be checked for operation regularly and lubricated whenever a sluggish action is noted.
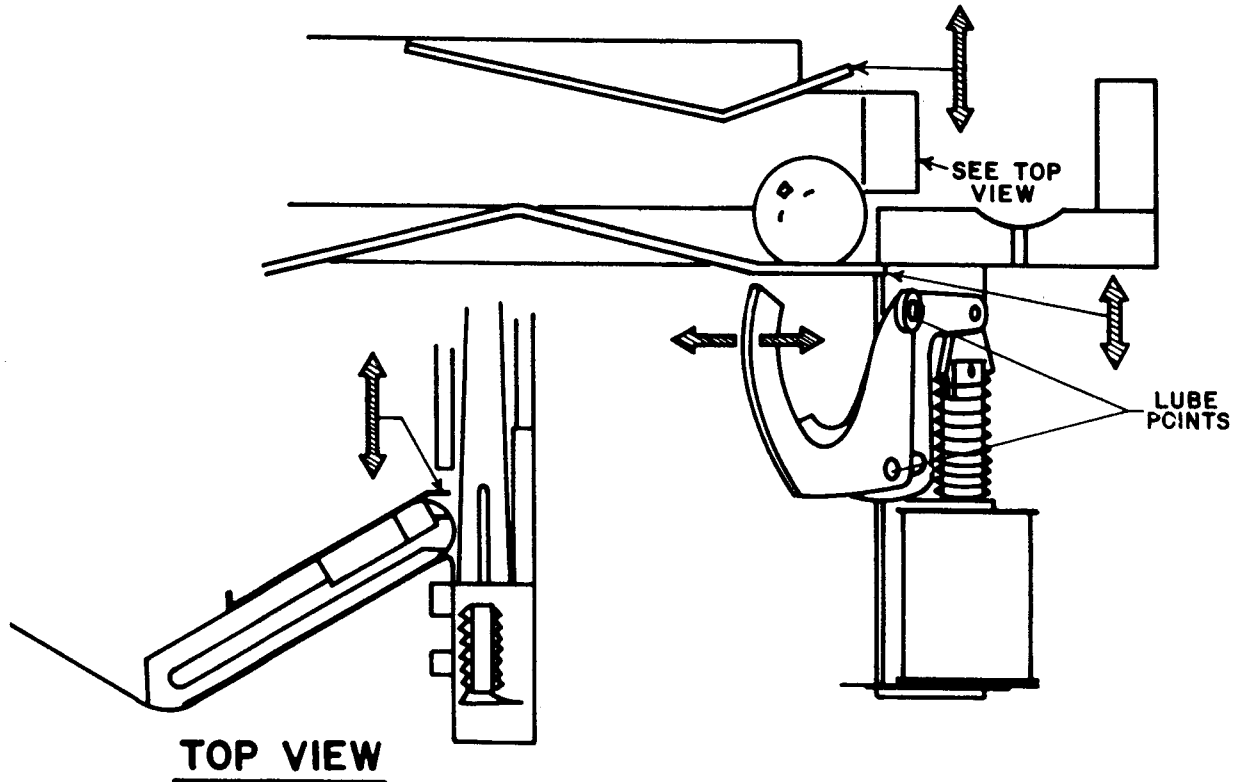
Figure 4. Adjustments and Lubrication Points, Ball Shooter Lane Feeder.

Lubrication to ensure proper operation also applies to other devices on *BANZAI RUN*, such as the shaft of the Ball Popper and the Pop-up Flipper Post on the upper playfield. Regular maintenance is essential to a game's continuing contribution to the operator's earnings.

Lower Playfield
(in raised position)

Outhole Kicker

Kickback

L Flip'r

R Flip'r

L Kicker

Ball Cannon Kickbig

Ball Shooter Lane Feeder

R Kicker

8-L

11-L

13-L

4-L

Up R Flip'r

Jet Bumpers

Eject Hole (Cntr)

Eject Hole (Left)

6-L

Backbox (with Upper Playfield removed)

Marquee Score Display & Lamps Bd
Marquee Flashers Bd

D-8345-566 Pwr Sup Bd

D-12247 Aux Pwr Drvr Bd

D-11581 Audio Bd

D-11883 Sys 11B CPU Bd

D-12112 Intrcn Bd

Upper Playfield
(viewed as tilted forward onto Lower Playfield)

L Flip'r

R Flip'r

Lifter Reversing Screw Assy

Up L Flip'r

Pop-up Post

Relay Bd

Kickbig (Freestyle)

Ball Lifter Motor

SYMBOLS:

PC Boards

Major Game Devices
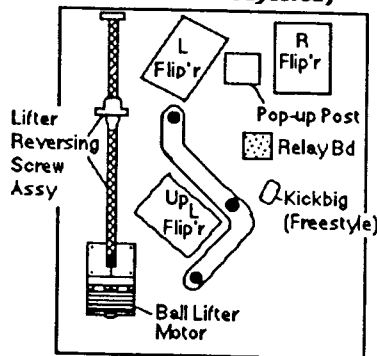
BANZAI RUN Major Components & Locations

Lower Playfield Items

Part No.	Description
B-11873	Kickback (L Outlane)
B-8039-2	Outhole Kicker
C-11626-L-3	Left Flipper (lower)
C-11626-R-3	Right Flipper (lower)
C-9638	Shooter Lane Feeder
B-9463	Left Kicker ('slingshot')
B-9463	Right Kicker ('slingshot')
B-11395-1	Ball Cannon Kickbig
C-12040	'8-L' Lamp PC Board
D-12042	'11-L' Lamp PC Board
D-12041	'13-L' Lamp PC Board
C-12139	'4-L' Lamp PC Board
C-11626-R-8	Upper Right Flipper
B-9414	Jet Bumper (3)
B-9361-R	Eject Hole (Center)
B-9361-R	Eject Hole (Left)
C-12043	'6-L' Lamp PC Board

Backbox & Upper Playfield Items

Part No.	Description
D-12146	Marq. Score Display & Lamps PC Bd
D-12144	Marquee Flashers PC Board
D-8345-566	Power Supply Board
D-12247	Aux Power Driver Board
D-11581	Audio Board
D-11883-566	System 11B CPU Board
D-12112	Backbox Interconnect Board
C-11626-L-3	Left Flipper (lower)
C-11626-R-3	Right Flipper (lower)
C-11661-1	Pop-up Post
C-11902-1	Relay PC Board
C-12169	Lifter Reversing Screw Assembly
C-11626-L-3	Left Flipper (upper)
B-11395-1	Freestyle Kickbig
B-12154	Ball Lifter Motor Assembly

Section 2

Game Parts Information

- ## *Parts Lists and Diagrams*
  Marquee Displays Information
    Alphanumeric Master Display Board
    Marquee Score Display & Lamps PC Board
  Power Supply Board (D-8345-566)
  CPU Board (D-11883-566)
  Audio Board (D-11581-566)
  Motor Relay Circuit Board
  Aux Power Driver Board
  Flipper Assemblies
  Jet Bumpers
  Standup Targets
  Outhole Kicker Assembly
  Kicker Arm & Kickbig Arm Assemblies
  Eject Hole Assembly
  Ramp Assembly
  Ball Popper
  Pop-up Post
  Ball Lifter Devices
  Cliff Jump Chute
  Lamps, Lamp Circuitry, and Lamp Matrixes
  Switches, Switch Circuitry, and Switch Matrixes
  Solenoids/Flashers
  Playfield Parts
  Miscellaneous *BANZAI RUN* Parts
  Rubber Parts
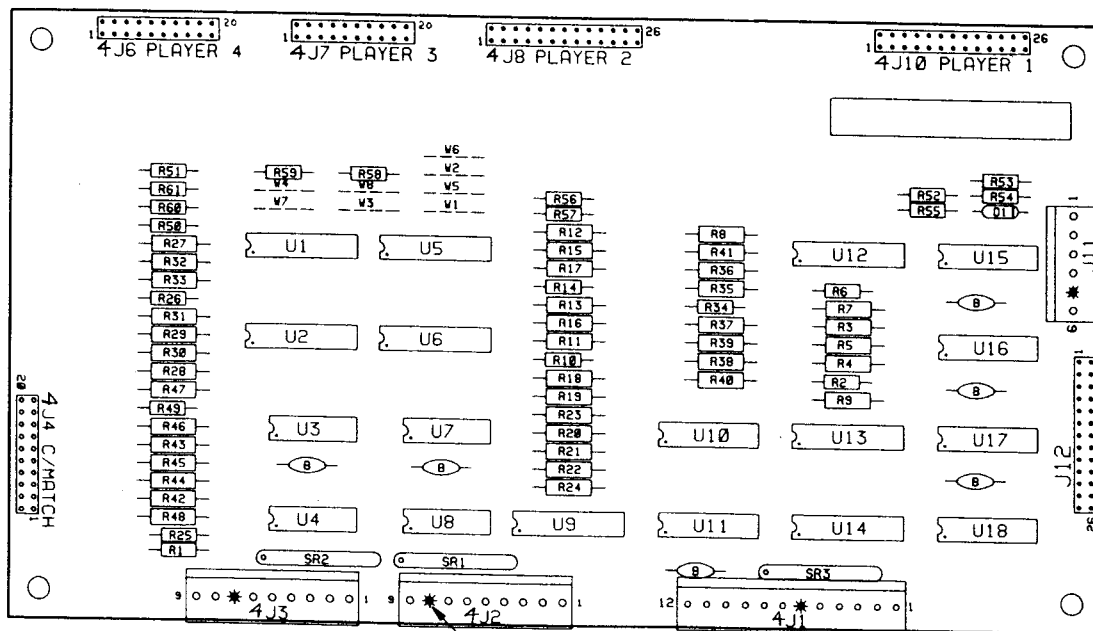
Alphanumeric Master Display Board
p/n D-10877

Part No.	Ckt Designation	Description
5760-10875-00		Bare P. C. Board
5791-10850-00	J8, J10, J12	Connector, 26 pin (Hdr)
5791-09437-00	J4, J6, J7	Connector, 20 pin (Hdr)
5791-10862-12	J1	Connector, 12 pin (Hdr)
5791-10862-09	J2, J3	Connector, 9 pin (Hdr)
5791-10862-06	J11	Connector, 6 pin (Hdr)
5010-10258-00	R25, R26, R50 - R61	Resistor, 1 M, 1/4 w, 5%
5010-08773-00	R1, R2, R6, R10, R14, R34, R35	Resistor, 22 K, 1/4 w, 5%
5010-08772-00	R49	Resistor, 15 K, 1/4 w, 5%
5010-08981-00	R18 - R24, R27 - R33, R36, R37, R39, R40, R42 - R48	Resistor, 10 K, 1/4 w, 5%
5010-09534-00	W1 - W8	Resistor, 0 Ω
5010-10927-00	R3 - R5, R7 - R9, R38 R11 - R13, R15 - R17	Resistor, 8.2 K, 1/2 w, 5%
5019-10387-00	SR1 - SR3	SIP, 18 K, 9R, 10P, 5%
5043-08980-00	B	Capacitor, 0.01 µfd, 50V
5075-09135-00	D1	Zener, 1N4740A, 10V, 1 w
5310-09153-00	U10, U11, U15 - U18	IC, Hex Buffer, 4050
5310-09882-00	U3, U4, U7, U8	IC, Quad NOR, 4001B
5680-08969-00	U9, U12 - U14	IC, Cathode Seg. Driver, UDN7180A
5680-08968-00	U1, U2, U5, U6	IC, Anode/Digit Driver, UDN6118A or 6184
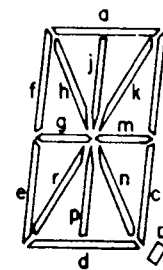
Alphanumeric
Character
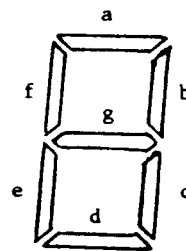
Display Characters
Segment Designations

Marquee Score Display & Lamps PC Board
p/n D-12146

Part No.	Description	Part No.	Description
D-10877*	Master Display PC Board	24-8767	Socket, Twist Lamp (#555)
D-12145	Mounted Displays Subassembly	24-8768	Bulb, #555 (6.3v, 0.25A)
20-9566	PC Bd Support	03-8069-2	Double Light Shield

* - See separate parts list.
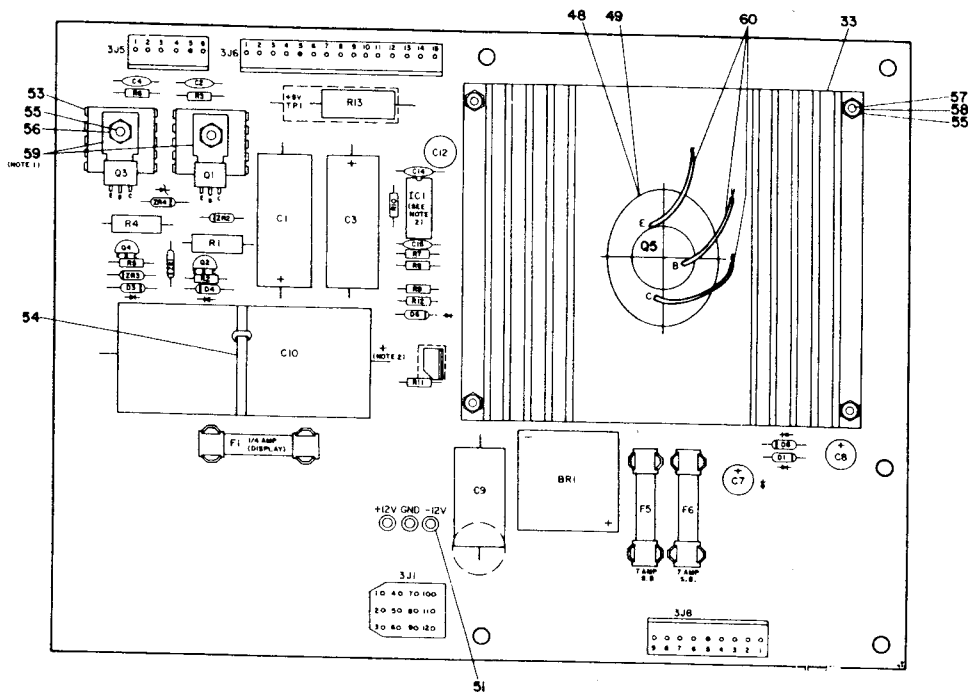
NOTES: 1. Heat sink compound must be applied between transistor and heat sink.
2. Observe index mark on integrated circuit, polarity of capacitors and diodes, and position of transistors.
3. The view of Q5 and its related heat sink and hardware is from the bottom of the heatsink, to clarify installation.

Power Supply
p/n D-8345-566

Item	Part No.	Ckt Designator	Description	Item	Part No.	Ckt Designator	Description
1	5765-09466-01		Bare P. C. Board	26	5164-12154-00	Q1	Transistor, MJE15030, NPN
2	5013-09426-00	R7	Resistor, 2.15K, 1%, 1/4w, C. F.	27	5164-09056-00	Q4	Transistor, MPSD02, NPN
3	5013-09427-00	R8	Resistor, 4.99K, 1%, 1/4w, C. F.	28	5194-12155-00	Q3	Transistor, MJE15031, PNP
4	5010-09428-00	R11	Resistor, 1.5K, 2%, 1/4w, C. F.	29	5194-09055-00	Q2	Transistor, MPSD52, PNP
5	5010-09085-00	R10	Resistor, 1.5K, 5%,1/4w, C. F.	30	5791-10862-15	3J6	Connector, 15 pin (Hdr)
6	5010-09541-00	R9	Resistor, 2.7K, 2%,1/4w, C. F.	31	5791-10862-06	3J5	Connector, 6 pin (Hdr)
7	5010-09508-00	R12	Resistor, 270Ω, 2%, 1/4w, C. F.	32	5791-09068-00	3J1	Connector, 12 pin (Hdr)
8	5012-09429-00	R13	Resistor, 0.12Ω, 5%,5w	33	5321-09178-00		Fuseholder
9	5010-09536-00	R1, R4	Resistor, 39K, 5%,1w	34	5731-08761-00	F1	Fuse, 1/4A, 250v, S-B
10	5010-09061-00	R2, R5	Resistor, 680Ω, 2w	35	B-8416	Q5 Regr	Transistor/Heat sink subassy
11	5010-09069-00	R3, R6	Resistor, 330K, 5%,1/2w, C. F.	a)	5162-09425-00	Q5	Transistor, 2N6057, NPN
12	5040-09419-00	C10	Capacitor, 18,000 mfd, electr, 20v, axial	b)	5700-09445-00		Socket
13	5040-09420-00	C9	Capacitor, 1000 mfd, electr, 25v, axial or radial	c)	5701-09652-00		Mica Insulator
				d)	5705-09431-00		Heatsink
14	5040-09423-00	C12	Capacitor, 330 mfd, electr, 10v,radial	e)	4006-01003-12		Mach. Screw 5-32 x 3/4
				f)	HW-30118-4		Wire, 18AWG, YEL, 4-3/8"
15	5043-09065-00	C15	Capacitor, 470 pfd	g)	HW-30118-5		Wire, 18AWG, GRN, 4-3/8"
16	5040-09053-00	C1, C3	Capacitor, 100 mfd, electr, 150v	h)	HW-30118-9		Wire, 18AWG, WHT, 4-3/8"
17	5043-09072-00	C2, C4	Capacitor, 0.1 mfd, 500v, disc	36	5824-09428-00	TP2 - TP4	Terminal, #1502-1 (Test Post)
18	5043-09446-00	C14	Capacitor, 0.1 mfd, 50v, disc	37	5100-09418-00	BR1	Bridge Rectifier, 35A, 100V
19	5040-09421-00	C7	Capacitor, 100 mfd, 25v, radial	38	5705-09042-00		Heat Sink
20	5040-09422-00	C8	Capacitor, 47 mfd, 50v, radial	39	03-7947		Tie Wrap
21	5070-06258-00	D1, D5, D6	Diode, 1N4001	40	4005-01016-07		Mach. Screw, 5-40 x 7/16, RH
22	5070-09054-00	D3, D4	Diode, 1N4004	41	4700-00004-00		Flat washer, 3/8 od x .146 id x 21 ga
23	5075-09059-00	ZR1, ZR3	Zener, 1N5990, 3.9v, 5%	42	4701-00023-00		Lockwasher, #5, split
24	5075-09060-00	ZR2, ZR4	Zener, 1N4764, 100v, 5%	43	4405-01117-00		Hex Nut, 5-40
25	5460-09424-00	IC1	IC, Volt. Reg., MC1723C	44	20-9229		Heatsink Thermal Compound
				45	5731-09342-00	F6, F5	Fuse, 7A, 250V, S-B

System 11B CPU Board
p/n D-11883-566

Item	Part No.	Ckt Designator	Description
1	5764-12206-00		Bare P. C. Board
2	5370-09691-00	U3	IC, CVSD Mod., 55536
3	5370-09321-00	U4, U5	IC, Dual Op Amp, 1458
4	5281-09308-00	U16	IC, Octal Bus Xcvr, 74LS245
5	5430-08972-00	U9, U10, U38, U41, U42, U51, U54	IC, PIA, MC6820/6821
6	5340-10139-00	U25	IC, 2K x 8 CMOS Static RAM
7	5280-09010-00	U44	IC, 4-16 Decoder, 74154
8	5281-09246-00	U7, U8, U12	IC, 2-4 Decoder, 74LS139
9	5075-09406-00	ZR3 - ZR8	Diode, Zener, 6.2v, 0.5w
10	5164-10998-00	Q42 - Q49	Transistor, NPN, 2N5550, TO-92
11	5281-09487-00	U6	IC, Dual D Flip-flop,74LS74
12	5431-09449-00	U43	IC, Timer, MC1455
13	5310-09236-00	U29	IC, 14-b Counter, 4020
14	5281-09743-00	U32	IC, Quad 2-Input AND, 74LS08
15	5281-09247-00	U14	IC, Quad 2-Input NOR, 74LS02
16	5281-09235-00	U35	IC, Triple 3-Input NAND, 74LS10
17	5280-09013-00	U36	IC, Hex Inverter, 7404
18	5281-09499-00	U31, U34	IC, Quad 2-Input NAND, 74LS00
19	5281-10014-00	U33	IC, Dual 4-Input NAND, 74LS20
20	5281-09486-00	U28	IC, Octal D Flip-flop, 74LS374
21	5371-09152-00	U2	IC, D/A Converter, MC1408
22	5281-09745-00	U37	IC, 3-8 Decoder, 74LS138
23	5340-09878-00	U23	IC, 2K x 8 Static RAM, 2016
24	5164-10998-00	Q42 - Q49	Transistor, NPN, 2N5550, TO-92
25	5281-09867-00	U11, U13, U40	IC, Octal Buffer, 74LS244
26	5280-08973-00	U17-U20, U52, U53	IC, Quad 2-Input AND, 7408
27	5280-09013-00	U55, U56	IC, Hex Inverter, 7406
28	5310-09155-00	U30, U39	IC, Quad 2-Input NAND, MC14011
29	5280-08948-00	U45, U50	IC, Quad 2-Input NOR, 7402
30	5280-09309-00	U49	IC, Hex Buffer, 7407
31	5671-09019-00	LED1-LED3	LED, Red, Display
32	5521-10506-00	CR1	Oscillator, 4 MHz
33	5162-08976-00	Q51, Q53, Q55, Q57, Q59, Q61, Q63, Q65	Transistor, NPN Darl. 2N6427, TO-92
34	5191-08978-00	Q52, Q54, Q56, Q58, Q60, Q62, Q64, Q66	Transistor, PNP, TIP42, TO-220
35	5162-09410-00	Q6-Q9, Q14-Q17, Q22-Q25, Q30-Q33, Q69, Q71, Q73, Q75, Q77, Q79, Q80-Q87	Transistor, NPN, TIP122, TO-220
36	5160-08938-00	Q2-Q5, Q10-Q13, Q18-Q21, Q26-Q29, Q34-Q38, Q41, Q67, Q68, Q70, Q72, Q74, Q76, Q78	Transistor, NPN, 2N4401, TO-92
37	5160-10269-00	Q1, Q40	Transistor, NPN, 2N3904, TO-92
38	5190-09016-00	Q39, Q50	Transistor, PNP, 2N4403, TO-92
39	5130-09014-00	S1-S8	SCR, 30v, 0.8A, 2N5060
40	5070-06258-00	D3-D19	Diode, 1N4001
41	5070-08919-00	D2	Diode, 1N4148, 150mA
42	5070-09266-00	D1	Diode, 1N5817, 1.0A
43	5075-09018-00	ZR1	Diode, Zener, 1N5996A, 6.8v, 0.5w
44	5075-09059-00	ZR2	Diode, Zener, 1N5990, 3.9v, 0.5w
45	5010-08992-00	R94, R97, R100, R103, R106, R109	Resistor, 560Ω, 5%, 1/4w, C. F.
46	5010-09039-00	R56	Resistor, 10Ω, 5%, 1/4w, C. F.
47	5010-09534-00	W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, W19	Resistor, 0Ω, 5%, 1/4w, C. F.
48	5010-08991-00	R31, R32, R35, R52, R55, R68, R92, R146	Resistor, 4.7KΩ, 5%, 1/4w, C. F.
49	5010-09358-00	R54, R57, R58, R64, R66, R138-R145	Resistor, 1.0KΩ, 5%, 1/4w, C. F.
50	5010-09113-00	R79	Resistor, 33KΩ, 5%, 1/4w, C. F.
51	5010-08983-00	R7, R8, R10, R70, R80	Resistor, 3.3KΩ, 5%, 1/4w, C. F.
52	5010-09034-00	R11-R14, R25, R26, R53, R60, R65, R90	Resistor, 10KΩ, 5%, 1/4w, C. F.
53	5010-09086-00	R81	Resistor, 6.8KΩ, 5%, 1/4w, C. F.
54	5010-09363-00	R3	Resistor, 5.6KΩ, 5%, 1/4w, C. F.
55	5010-08997-00	R23, R24, R91, R93, R96, R99, R102, R105, R108, R112, R115, R118, R121, R124, R127, R130, R133	Resistor, 2.7KΩ, 5%, 1/4w, C. F.
56[2]	5012-09037-00	R113, R116, R119, R122, R125, R128, R131, R134	Resistor, 0.4Ω, 5%, 3w, Wire-Wnd.
57	5010-08993-00	R36-R51, R95, R98, R101, R104, R107, R110	Resistor, 68Ω, 5%, 1/2w, C. F.
58[2]	5012-10860-00	R82-R89	Resistor, 27Ω, 5%, 2w, C. F.
59	Not Used		
60	Not Used		
61	5010-10987-00	R19	Resistor, 56KΩ, 5%, 1/4w, C. F.
62	5010-10003-00	R62, R63	Resistor, 390Ω, 5%, 1/4w, C. F.
63	5010-10171-00	R67	Resistor, 56Ω, 5%, 1/4w, C. F.
64	5010-10170-00	R69	Resistor, 47Ω, 5%, 1/4w, C. F.
65	5010-09160-00	R59, R61, W12, W13	Resistor, 220Ω, 5%, 1/4w, C. F.
66	5010-09416-00	R33, R34, R71-R78, R135-R137	Resistor, 470Ω, 5%, 1/4w, C. F.
67	5010-09179-00	R9	Resistor, 3.3MΩ, 5%, 1/4w, C. F.
68	Not Used		
69	5010-10361-00	R111, R114, R117, R120, R123, R126, R129, R132	Resistor, 1.2KΩ, 5%, 1/2w, C. F.
70	Not Used		
71	Not Used		
72	5010-09120-00	R17	Resistor, 270KΩ, 5%, 1/4w, C. F.
73	5010-09333-00	R15, R16, R18	Resistor, 180KΩ, 5%, 1/4w, C. F.
74	5010-09324-00	R29, R30	Resistor, 27KΩ, 5%, 1/4w, C. F.
75	5010-09269-00	R20, R21	Resistor, 12KΩ, 5%, 1/4w, C. F.
76	5010-09356-00	R27, R28	Resistor, 820Ω, 5%, 1/4w, C. F.
77	5019-09783-00	SR18	SIP, 9R, 10-pin, 6.8KΩ, .125w/R, 5%
78	5019-09362-00	SR3, SR15, SR17, SR19, SR20	SIP, 9R, 10-pin, 4.7KΩ, .125w/R, 5%
79	5019-09808-00	SR4, SR6, SR11	SIP, 9R, 10-pin, 560Ω, .125w/R, 5%
80	5019-09785-00	SR16	SIP, 9R, 10-pin, 2.2KΩ, .125w/R, 5%
81	5019-10472-00	SR14	SIP, 9R, 10-pin, 3.3KΩ, .125w/R, 5%
82	5019-09669-00	SR8	SIP, 9R, 10-pin, 1.0KΩ, .125w/R, 5%
83	5019-09780-00	SR9, SR10	SIP, 4R, 8-pin, 1KΩ, 5%
84	5019-09786-00	SR1, SR2	SIP, 5R, 6-pin, 4.7KΩ, .125w/R, 5%
85	5019-09792-00	SR5, SR7	SIP, 9R, 10-pin, 2.7KΩ, .125w/R, 5%
86	5060-10396-00	SRC1 - SRC5, SRC7 - SRC9	SIP, 8R, 8C,10-pin, 4.7KΩ & 470pfd
87	5010-08774-00	R22	Resistor, 22KΩ, 5%, 1/4w, C. F.
88	5043-08980-00	C14, C17-C21, C31, C32, C49-C56, C59, + 54 Bypass, marked B	Capacitor, 0.01 µfd, 50v(+80,-20%), Axial
89	5043-09845-00	C22, C23, C25, C27, C28	Capacitor, 1K pfd, 50v(±20%), Axial
90	5043-08996-00	C9, C70-75, C77, C78	Capacitor, 0.1 µfd, 50v(±20%), Axial
91	5040-09343-00	C8, C15	Capacitor, 10 µfd, Electr., 20v(±20%), Axial
92	5043-09844-00	C7	Capacitor, 47 pfd, 50v(±20%), Axial
93	5040-10974-00	C24, C26, C29	Capacitor, 100 µfd, Electr., 25v(+50,-10%), Axial
94	Not Used		
95	5045-09796-00	C60-C67	Capacitor, 0.1 µfd, Polycarbonate Rad., 100v(±10%)
96	5043-09065-00	C33-C40, C68, C69, C76, C10, C12	Capacitor, 470 pfd, 50v(±20%), Axial
97	5040-09545-00	C30	Capacitor, 22 µfd, Electr., 10v(+50,-10%), Axial
98	5041-09031-00	C58	Capacitor, 1 µfd, Tant., 25v(±20%), Axial
99	5043-09030-00	C16, C57	Capacitor, 0.047 µfd, 50v(±20%), Axial
100	Not Used		
101	5043-09492-00	C11	Capacitor, 100 pfd, ceramic,100v(±20%)
102	Not Used		
103	5048-10992-00	C13	Capacitor, 4700 pfd, ceramic,50v(±10%)
104	5551-09822-00	L1-L3	Inductor, 4.7 µH, 3A
105	5641-09312-00	SW1, SW2	Switch, Pushbutton, DPDT, 100v, 5A
106	5880-09022-00	B1-B3	Battery, Alkaline, 1.5v, AA
107	20-9491	W18, W19	Bus Wire, Jumper
108	5881-09021-00		Battery Holder, #171
109	5700-10176-00		IC Socket, 28 pin
a)	A-5343-566-1	U26	IC, Game ROM 2, 27128
b)	A-5343-566-2	U27	IC, Game ROM 1, 27256
c)	A-5343-566-4	U21	IC, Sound ROM 1, 27256
d)	A-5343-566-3	U22	IC, Sound ROM 2, 27256
110	5700-08985-00		IC Socket, 40 pin
a)	5400-09150-00	U15	IC, µProcessor, 6802
b)	5400-09150-00	U24	IC, µProcessor, 6802
111	5824-09248-00	TP1, TP2	Test Point
112 - 115	Not Used		
116	Not Used		
117	5580-08994-01	K1	Relay, 4-pole, 40Ω, 6v
118	5791-10862-09	1J1, 1J2, 1J4-1J8, 1J10-1J12, 1J17-1J19	Connector, 9 pin (Hdr)
119	5791-10862-04	1J13, 1J14,1J16	Connector, 4 pin (Hdr)
120	5791-10862-12	1J3	Connector, 12 pin (Hdr)
121	Not Used		
122	5791-10850-00	1J22	Connector, 26 pin Ribbon (Hdr)
123	5791-09437-00	1J21	Connector, 20 pin Ribbon (Hdr)

NOTES:
1. For Schematic, refer to drawing #16-9019.
2. Items 56 and 58 (resistors) must be mounted 1/8" above PCB surface.
3. Standard Jumper: W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, W19.
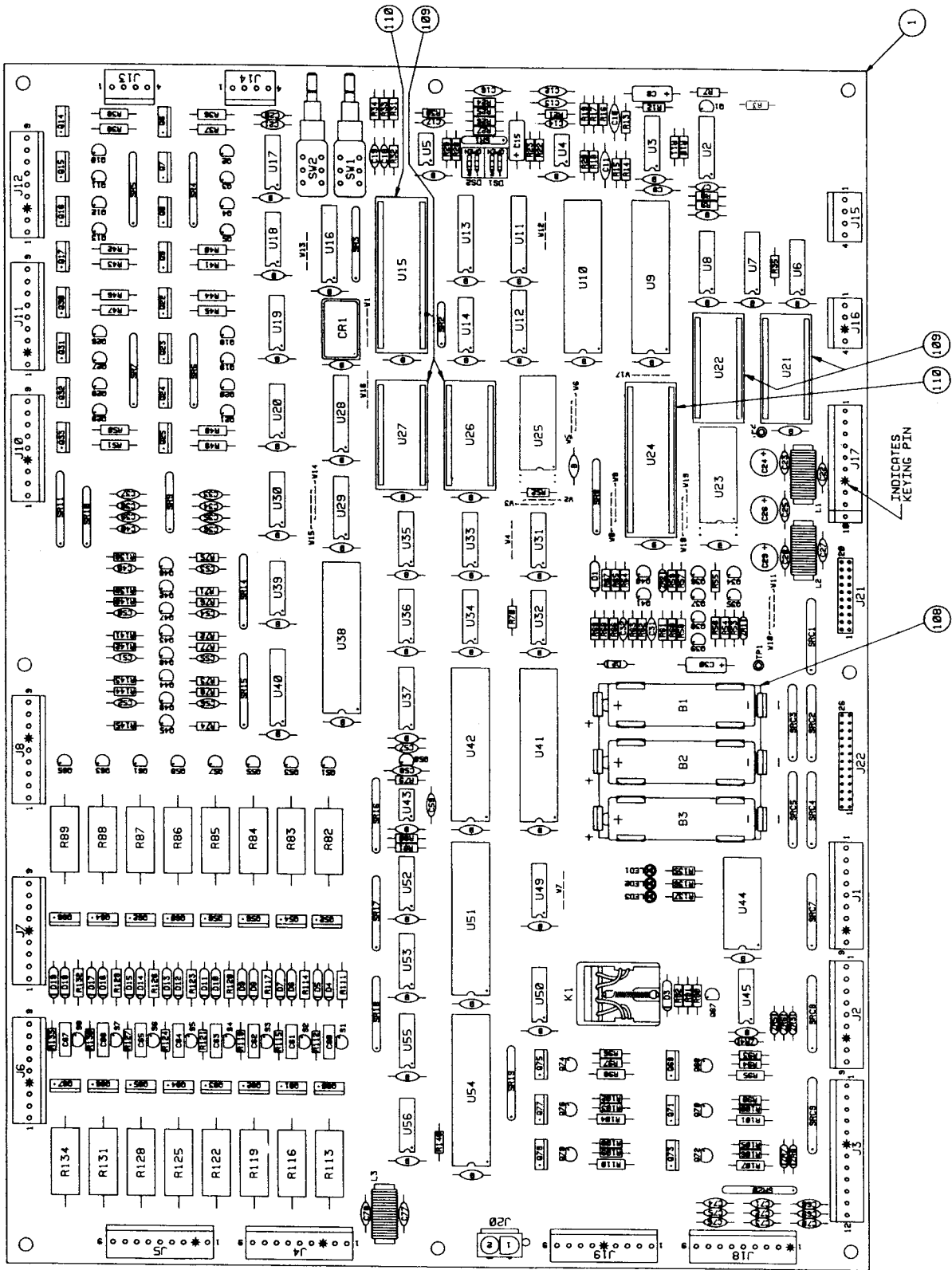
System 11B CPU Board (D-11883) Parts Information
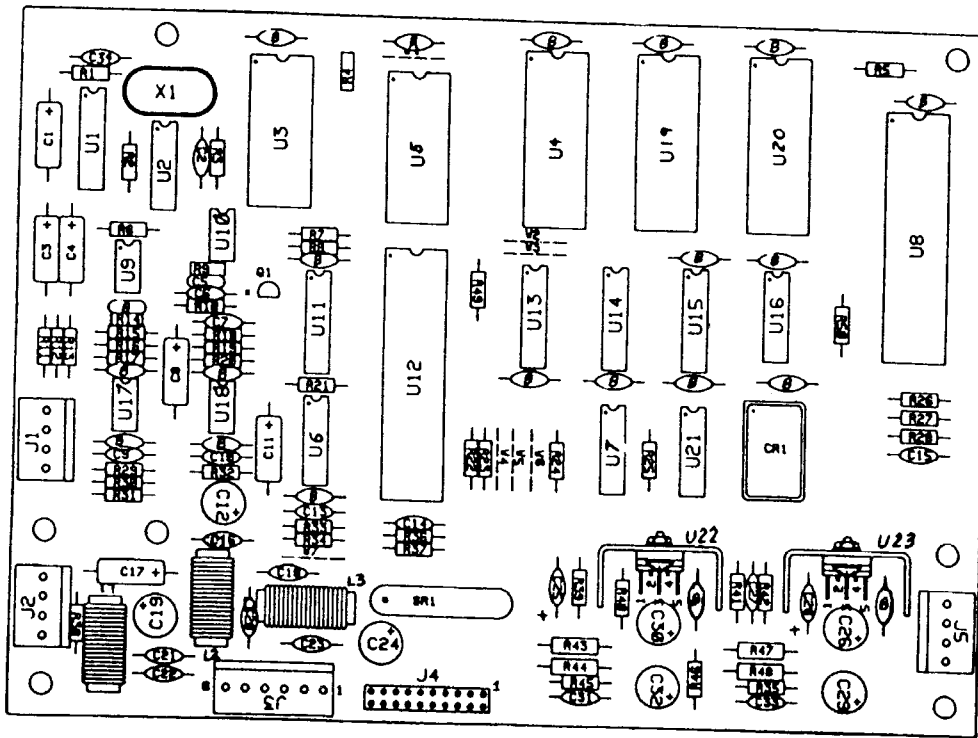
Audio Board Assembly
p/n D-11581-566

Part No.	Ckt Designator	Description
5766-12130-00		Bare P. C. Board
5731-11087-00	U1	IC, D/A Conv, YM3012
a) 5700-09006-00		Socket, IC, 16-pin (U1)
5730-11086-00	U3	IC, Sound Processor, YM2151
a) 5700-09004-00		Socket, IC, 24-pin (U3)
5400-10320-00	U8	IC, µProcessor, MC68B09E
a) 5700-08985-00		Socket, IC, 40-pin (U8)
A-5343-566-5	U4	IC, Audio ROM 1
A-5343-566-6	U19	IC, Audio ROM 2
A-5343-566-7	U20	IC, Audio ROM 3
a) 5700-10176-00		Socket, IC, 28-pin (U4, U19, U20)
5371-09152-00	U11	IC, D/A Convtr, MC1408
5430-10322-00	U12	IC, PIA, MC68B21
5340-09878-00	U5	IC, RAM, 2016
5281-09487-00	U16	IC, Dual D Flipflop, 74LS74
5281-10043-00	U13	IC, 74LS175
5281-09235-00	U21	IC,Triple NAND, 74LS10
5370-09321-00	U9, U10, U17	IC, Op Amp, MC1458
5281-09215-00	U2	IC, Hex Inv, 74LS04
5281-09246-00	U14	IC, 2-4 Dec, 74LS139
5281-09745-00	U15	IC, Dual Mux, 74LS138
5370-09156-00	U22, U23	IC, Audio Amp, TDA2002
a) 5705-09199-00		Heatsink, #6030B
b) 20-9229		Thermal Compound
c) 4006-01003-06		6-32 x 3/8 P-PH-S
d) 4406-01117-00		6-32 Hexnut
e) 4703-00007-00		#6 Ext. Lockwasher
5370-09691-00	U6	IC, CVSD, 55536
5160-10269-00	Q1	Transistor, 2N3904, NPN
5060-10396-00	SR1	SIP 4.7K & 470pfd, 8R8C
5010-09181-00	R44, R48	Resistor, 1.0Ω, 1/2w, 5%
5010-09161-00	R35, R45	Resistor, 2.2Ω, 1/4w, 5%
5010-09361-00	R43, R46, R47	Resistor, 220Ω, 1/2w, 5%
5010-09358-00	R41, R42	Resistor, 1K, 1/4w, 5%
5010-08998-00	R2, R3, R12	Resistor, 2.2K, 1/4w, 5%
5010-08983-00	R7 - R9	Resistor, 3.3K, 1/4w, 5%

Part No.	Ckt Designator	Description
5010-08991-00	R1, R4, R5, R11, R25 - R28, R33, R36, R37, R49, R50	Resistor, 4.7K, 1/4w, 5%
5010-09034-00	R14 - R17	Resistor, 10K, 1/4w, 5%
5010-09324-00	R6, R38	Resistor, 27K, 1/4w, 5%
5010-09162-00	R39	Resistor, 100K, 1/4w, 5%
5010-10258-00	R40	Resistor, 1M, 1/4w, 5%
5010-09179-00	R10	Resistor, 3.3M, 1/4w, 5%
5010-09534-00	W9	Resistor, 0Ω, 1/4w, 5%
5040-09343-00	C1, C3, C4, C8	Capacitor, 10µfd, 20v, ±20%
5040-10974-00	C12, C19, C24	Capacitor, 100µfd, 35v
5040-09776-00	C26, C30	Capacitor, 470µfd, 16v; +50, -10%
5040-12006-00	C29, C32	Capacitor, 1000µfd, 16v, 20%
5041-09243-00	C25, C28	Capacitor, 10µfd, 10v,±10%
5043-08980-00	C5, B (17)*	Capacitor, 0.01µfd, 50v,+80, -20%
5043-08996-00	C31, C33	Capacitor, 0.1µfd, 50v, ±20%
5043-09065-00	C13 - C15	Capacitor, 470 pfd, 50v, ±20%
5043-09492-00	C2, C34	Capacitor, 100 pfd, 50v, ±10%
5043-09844-00	C6	Capacitor, 47 pfd, 50v, ±20%
5043-09845-00	C16, C18, C20 - C23, C27	Capacitor, 1000 pfd, 50v, ±20%
5520-09020-00	X1	Crystal, 3.58 MHz
5521-10931-00	CR1	Oscillator, 8 MHz
5551-09822-00	L1 - L3	Inductor, 4.7 µH, 3A
5791-09437-00	J4	Connector, 20 pin, (Hdr), Rib. Cbl
5791-10862-04	J1, J2, J5	Connector, 4 pin (Hdr)
5791-10862-06	J3	Connector, 6 pin (Hdr)

Notes: * 17 capacitors (shown on diagram with "B" symbol) provide +5VDC filtering for ICs.
All capacitors are ceramic, 50v, axial, unless otherwise noted.
All resistors are 5%, 1/4w, Carbon Film, unless otherwise noted.
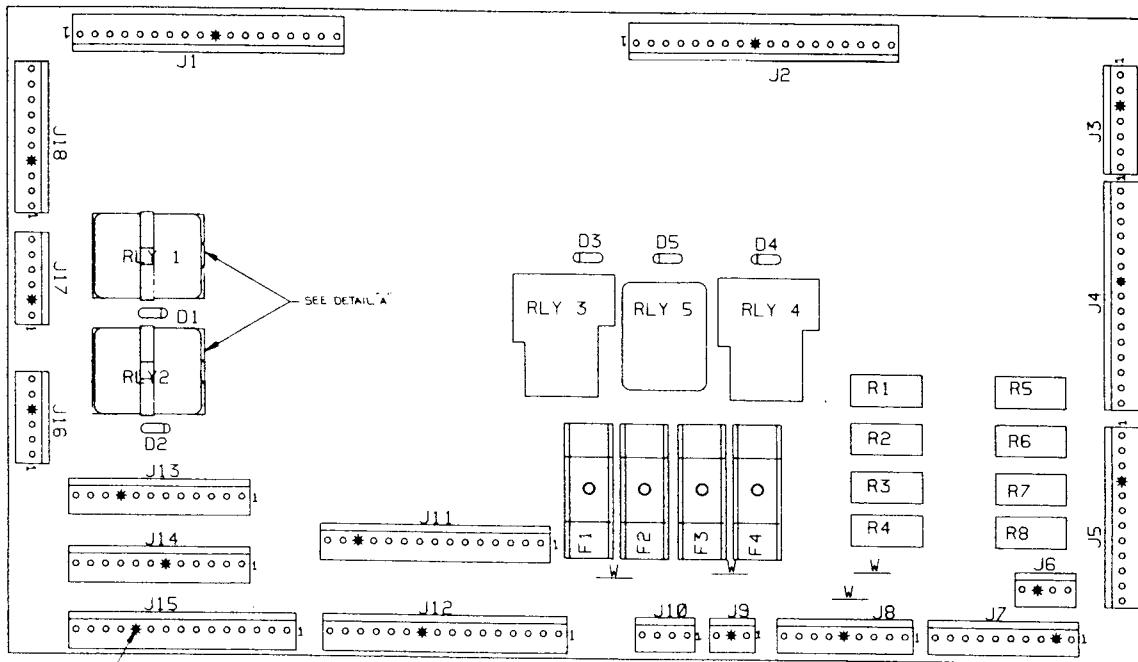
BANZAI RUN Interconnect
PC Board Assembly
p/n D-12112

Part No.	Description		Part No.	Description
5768-12292-00	PC Board		5733-12060-01	Fuseholder (for F1 - F4)
5791-12273-03	Header, 3-pin	(J9)	5731-09651-00	Fuse, 5A, S-B, 250v (F1 - F4)
5791-10862-04	Header, 4-pin	(J6, J10)	5580-09555-01	Relay, DPDT 13A (RLY 5)
5791-10862-06	Header, 6-pin	(J16, J17)	5580-12145-00	Relay, 24V dc (RLY3, RLY4)
5791-10862-07	Header, 7-pin	(J3)	5070-09054-00	Diode, 1N4004, 1A (D1 - D5)
5791-10862-09	Header, 8-pin	(J8)	5012-12163-00	Resistor, 11Ω, 10% (R1, R2)
5791-10862-10	Header, 10-pin	(J7, J18)	5012-10023-00	Resistor, 8Ω, 10% (R3 - R8)
5791-10862-12	Header, 12-pin	(J5, J13, J14)	5580-12299-00	Relay Assy, (RLY1, RLY2)
5791-10862-15	Header, 15-pin	(J4, J11, J15)		including:
5791-10862-16	Header, 16-pin	(J12)	5580-12299-0A	Relay, 24V dc (RLY1, RLY2)
5791-10862-18	Header, 18-pin	(J1, J2)	5580-12299-0B	Socket, Relay Mounting
			5580-12299-0C	Clip, Relay Holddown
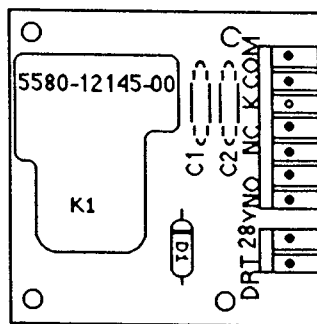
Ball Lifter Motor
Relay Board Assembly
p/n C-11902-1

Part No.	Description	
5768-12221-00	PC Board	
5070-09054-00	Diode, 1N4004, 1.0A	
5580-12145-00	Relay, 24vdc, 30A	
5791-12273-02	Header, 2-pin sq post	(J1)
5791-12273-07	Header, 7-pin sq post	(J2)

Marquee Flashers
PC Board Assembly
p/n D-12144

Part No.	Description
5768-12296-00	PC Board
24-8803	Twist Lamp (#906) Socket
24-8802	Flashlamp, #906 (13v, 0.69A)
5791-10871-09	Header, 9-pin sq post (J1)

Top 6 Lamps ('6-L')
PC Board Assembly
p/n G-12043

Part No.	Description
5768-12269-00	PC Board
24-8767	Socket, Twist Lamp (#555)
24-8768	Bulb, #555 (6.3v, 0.25A)
5070-09054-00	Diode, 1N4004
5791-10871-09	Header, 10-pin sq post (J1)
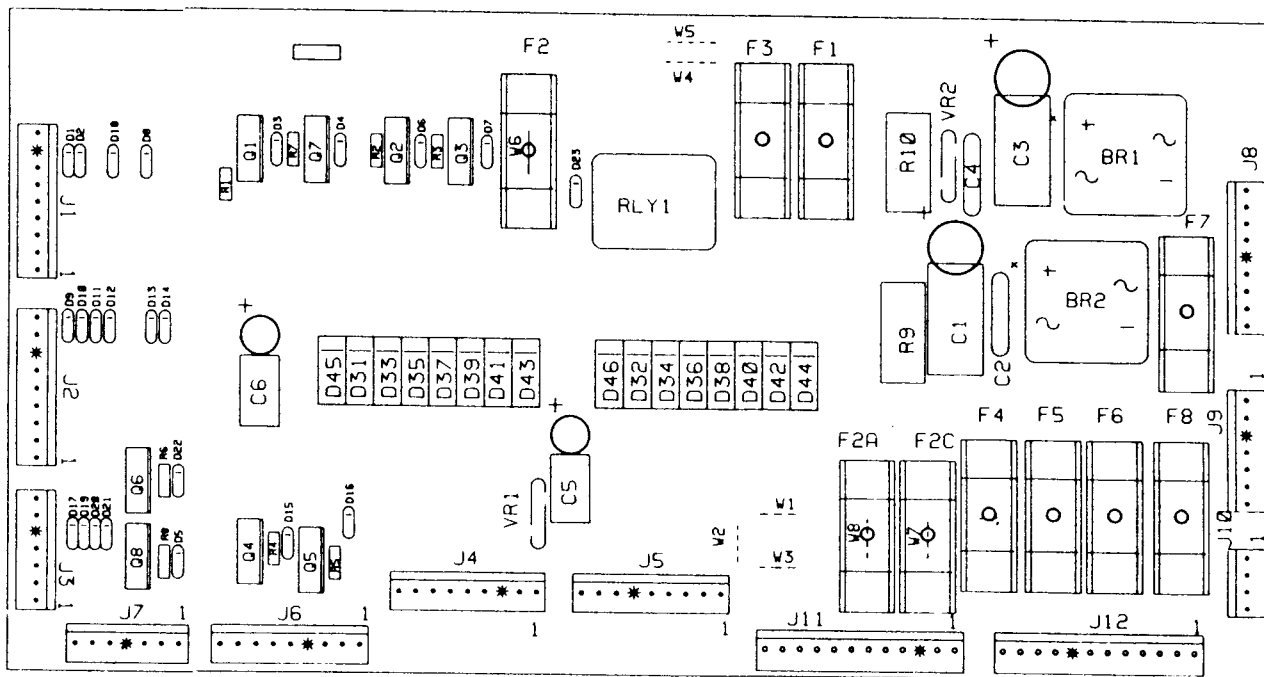
Aux Power Driver Unit Board
p/n D-12247-566

Part No.	Ckt Designator	Description	Part No.	Ckt Designator	Description
5760-12184-00		Bare P. C. Board	5191-12179-00	Q1 - Q8	Transistor, TIP36C
5040-09537-00	C1, C3	Capacitor, 100 µfd., 100v, Radial	5580-09555-01	K1	Relay, DPDT, 13A
5040-12181-00	C5, C6	Capacitor, 10 µfd., 100v, Radial	5733-12060-01		Fuseholder
5043-08996-00	C2, C4	Capacitor, 0.1 µfd., 500v	5731-08665-00	F5, F6	Fuse, 2, S-B, 250v
5010-09160-00	R1 - R8	Resistor, 220Ω, 1/4w C.F., 5%	5731-09128-00	F1, F2A, F3, F4	Fuse, 2-1/2A, S-B, 250v
5012-12238-00	R9	Resistor, 8.2K, 5w, 5%	5731-09651-00	F2C	Fuse, 5A, S-B, 250v
5010-09534-00	W1, W3, W4, W6	Resistor, 0Ω, 1/4w	5731-06314-00	F7	Fuse, 4A, S-B, 250v
5017-12180-00	VR1	Varistor, 100v	5731-09432-00	F8	Fuse, 7A, S-B, 250v
5017-09064-00	VR2	Varistor, 47v	5791-10862-09	J1, J2, J4 - J6, J8	Connector, 9-pin Hdr, Sq Pin
5100-09690-00	BR1, BR2	Bridge Rectifier, 35A, 200v	5791-10862-07	J3, J7, J9	Connector, 7-pin Hdr, Sq Pin
5070-08785-00	D1 - D23	Diode, 1N4003	5791-10862-12	J11, J12	Connector, 12-pin Hdr, Sq Pin
5070-09045-00	D31 - D46	Diode, MR501	5791-10862-04	J10	Connector, 4-pin Hdr, Sq Pin

Center Eject Lamp ('4-L') PC Board Assembly
p/n C-12139

Part No.	Description
5768-12295-00	PC Board
24-8767	Socket, Twist Lamp (#555)
24-8768	Bulb, #555 (6.3v, 0.25A)
5070-09054-00	Diode, 1N4004
5791-10871-06	Header, 6-pin sq post (J1)

6-Bank ('13-L') Lamp PC Board Assembly
p/n D-12041

Part No.	Description
5768-12267-00	PC Board
24-8767	Socket, Twist Lamp (#555)
24-8768	Bulb, #555 (6.3v, 0.25A)
5070-09054-00	Diode, 1N4004
5791-10871-10	Header, 10-pin sq post (J1)

Bonus Lamps ('11-L') PC Board Assembly
p/n D-12042

Part No.	Description
5768-12268-00	PC Board
24-8767	Socket, Twist Lamp (#555)
24-8768	Bulb, #555 (6.3v, 0.25A)
5070-09054-00	Diode, 1N4004
5791-10871-12	Header, 12-pin sq post (J1)
5010-09534-00	Resistor, 0Ω (W1)

Bottom 8 Lamp ('8-L') PC Board Assembly
p/n C-12040

Part No.	Description
5768-12266-00	PC Board
24-8767	Socket, Twist Lamp (#555)
24-8768	Bulb, #555 (6.3v, 0.25A)
5070-09054-00	Diode, 1N4004
5791-10871-12	Header, 12-pin sq post (J1)
5010-09534-00	Resistor, 0Ω (W1)

Flipper Assembly
p/n C-11626-R-3

Item	Part No.	Description
1	HW-30018-6	Wire, 18 AWG, Blue
2	03-7520-2	Ty-Wrap, Nylon
3	20-6516	Speednut, Tinnerman
4	5045-12098-00	Capacitor, 2.2 µFd, 250V, 20%
5	RM-21-06	Sleeve, Vinyl (Cap. leads)
6	4010-01066-06	Cap Screw, 10-32 x 3/8, SH
7	4701-00004-00	Lockwasher, #10 split
8	A-12111	Flipper Stop Assembly
9	FL-11630/50V*	Flipper Coil (* - Refer to Note 3)
10	4006-01017-04	Mach. Screw, 6-32 x 1/4, P-RH-S
11	01-7695	Solenoid Bracket
12	10-404	Coil Plunger Spring
13	B-10655-R	Crank Link Assembly
a)	02-4179	Link Spacer Bushing
b)	4010-01086-14	Cap Screw, 10-32 x 7/8, SH
c)	4700-00023-00	Washer, 5/8 o.d. x 13/64 i. d. x 16 ga.
d)	4701-00004-00	Lockwasher, #10 split
e)	4410-01132-00	Nut, 10-32 ESNA
f)	A-10656**	Flipper Link Assembly
1.)	02-4219	Coil Plunger
2.)	20-9370-1	Spring Pin, 5/32 dia. x 7/16
3.)	03-8050-1	Flipper Link
g)	B-10657-R	Flipper Crank Assembly, Right
1.)	01-8073-R	Flipper Crank, Right
2.)	17-1037	Crank Washer
3.)	4010-01066-18	Cap Screw, 10-32 x 1-1/8, HCS
4.)	4410-01127-00	Nut, 10-32 Hex Hd.
5.)	4700-00107-00	Washer, 5/8 o.d. x 13/64 i. d. x 12 ga.
6.)	4701-00004-00	Lockwasher, #10 split
7.)	RM-23-06	Tubing, H. S. 1/4 DWP
14	23-6577	Bumper Plug
15	03-7568	Flipper Bushing
16	4006-01005-06	Mach. Screw, 6-32 x 3/8, P-PH
17	4406-01117-00	Nut, 6-32 Hex
18	C-11627-R	Flipper Base Assembly, R.
19	06-14G	Insulating Blade
20	Not Used	
21	Not Used	
22	Not Used	
23	4105-01019-10	Sh. Metal Screw, #5 x 5/8, P-PH-A
24	4701-00002-00	Lockwasher, #6 split
25	23-6622	Tape, Double-sided
26	03-7811	End of Stroke (EOS) Switch

** - also see separate diagram
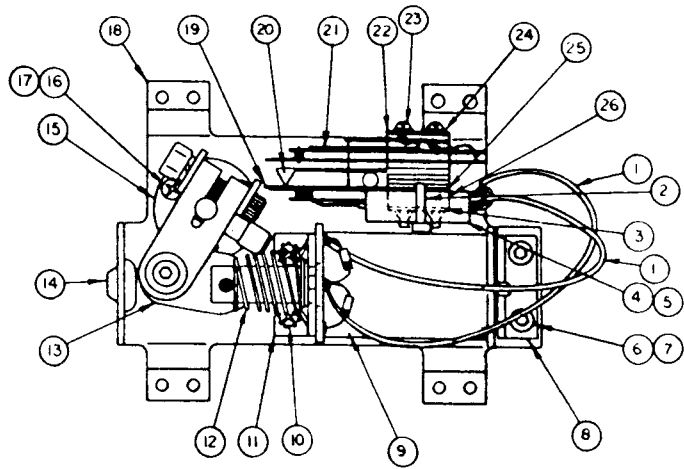
Flipper Assembly Notes

1 Each Flipper Assembly on the Lower Playfield (and the two Lower Flipper Assemblies on the Upper Playfield) is mounted beneath the playfield, in conjunction with the plastic Flipper Paddle and Shaft (20-9250-6) and flipper Rubber (23-6519-4) on the upper side of the playfield. The Upper Flipper Assembly on the Upper Playfield uses a plastic Flipper Paddle and Shaft (20-9264-6) and flipper Rubber (23-6553-4).

2 The tip of the EOS Switch must travel 0.0150 (+ .010, - .000) inch, before the contacts fully open, with the flipper in the actuated position. The EOS Switch contacts must have a gap of 0.062 (± .015) inch. Adjustment of the EOS Switch must be made at a minimum distance of 0.25 inch from the switch body.

3 Flipper Assembly C-11626-R-8 (upper flipper on Lower Playfield) uses a Flipper Coil, FL-11753/50V.

4 All moving elements of the assembly must operate freely, with no evidence of binding.

5 The large end of the Coil Plunger Spring (item 12) must fit within the four lugs of the Solenoid Bracket.

6 For coil replacement, remove the Solenoid Bracket (item 11) to prevent screw damage.

7 Use Loctite™ 242 when reattaching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.

8 When replacing the Bumper Plug (item 14) to restore proper flipper operation, readjust the flipper paddle and shaft position.

9 Solid color blue wire connects to the banded end of each diode, mounted on the connector end of the Flipper Coil (item 9). Trace color wire connects to the unbanded end of the diode.

Flipper Assembly ➡
p/n C-11626-L-3
(Parts listed replace same Items of C-11626-R-3)

Item	Part No.	Description
13	B-10655-L	Crank Link Assembly
g)	B-10657-L	Flipper Crank Assembly, Left
1.)	01-8073-L	Flipper Crank, Left
18	C-11627-L	Flipper Base Assy, L.
20	Not Used	
21	Not Used	
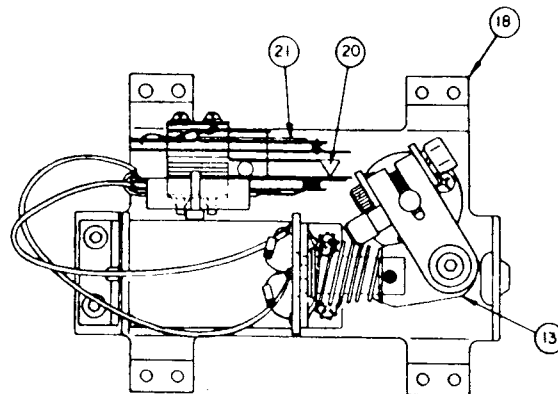
Flipper Link Assembly, p/n A-10656
(Items listed refer to items listed for C-11626-R-3)

Item	Part No.	Description
13 f) 1.)	02-4219	Coil Plunger
13 f) 2.)	20-9370-1	Spring Pin, 5/32 dia. x 7/16
13 f) 3.)	03-8050-1	Flipper Link
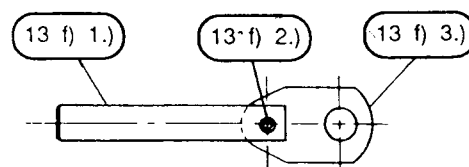
Jet Bumper Assembly
p/n B-9414 (Above the playfield)

Item	Part No.	Description
1	A-4754	Bumper Ring Assembly
2	03-6009-A5	Bumper Base, White
3	03-6035-5	Bumper Wafer, Blue
4	03-7443-5	Bumper Body, White
5	10-7	Spring
6	A-11199	Socket & Bulb Assembly
a)	24-8776	Lamp Socket
b)	24-8768	Bulb, #555
Not Shown	03-7444-9	Cap, Jet Bumper
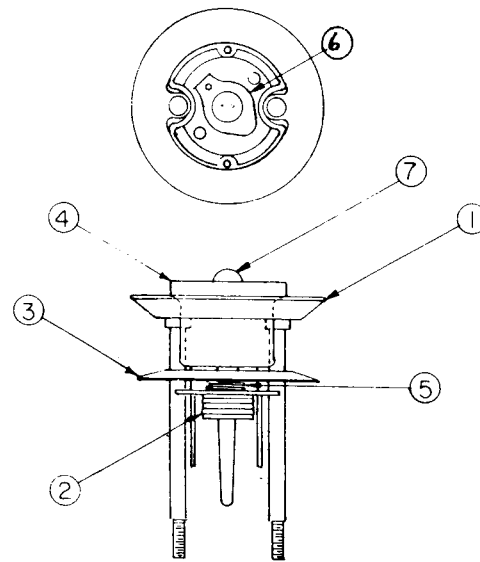
Jet Bumper Coil Assembly
p/n B-9415-1 (Beneath the playfield)

Item	Part No.	Description
1	B-7417	Bracket and Stop Assembly
2	01-1747	Coil Retaining Bracket
3	01-5492	Armature Link, Steel
4	01-5493	Armature Link, Bakelite
5	02-3406-1	Coil Plunger
6	10-326	Armature Spring
7	AE-23-800	Coil
8	03-7066	Coil Tubing

Jet Bumper Associated Parts

B-8928		Jet Bumper Switch Assy (3 used)
	A-7459-7	Switch Assembly
	SW-11A-35	Switch
	01-1168	Mounting Bracket
	01-3670	Switch Plate, Curved
	03-7395	Switch Actuator
	4005-01051-18	Mach. Screw, 5-40 x 1-1/8
	4405--1117-00	Nut, 5-40 Hex
	5070-06258-00	Diode, 1N4001
	5010-09036-00	Resistor, 100Ω, 1/4w, C. F.
	5040-09370-00	Capacitor, 22µfd, 16v±20%
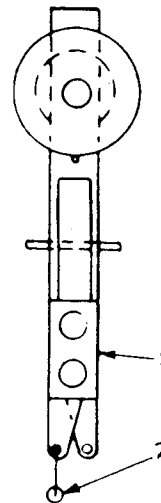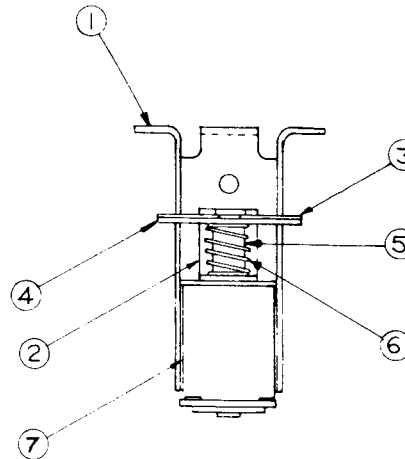
Standup Target Assemblies

Item	Part No.	Description
1	B-11696-1	Standup Target (Blue)
1	B-11696-2	Standup Target (Green)
1	B-11696-4	Standup Target (Red)
1	B-11696-5	Standup Target (White)
1	B-11696-6	Standup Target (Yellow)
2	5070-06258-00	1N4001 Diode

Outhole Kicker Assembly
p/n B-8039-2

Part No.	Description	Part No.	Description
A-6378	Mounting Plate Assembly	A-8038	Coil Stop Assembly
AE-23-800	Coil Assembly	4006-01003-03	Mach. Screw, 6-32 x 3/16
03-7066	Coil Tubing	A-6889	Kicker Lever Assembly
A-8335	Coil Plunger Assembly	20-8712-25	E-Ring Clip, 1/4"
02-2364	Plunger	03-7176-1	Striker Ring
20-8716-5	Roll Pin	10-101-4	Spring, Reset
01-4251	Ball Return Link		

	01-8652
	BRACKET
5070-06258-00	
DIODE	A-8645

5647-09957-00
Microswitch

A-5844-45

5647-12073-08
MICROSWITCH

A-5844-44

A-8643
MOUNTING PLATE

RM-21-03
TUBING

5647-9957-00
Microswitch

5070-06258-00
DIODE
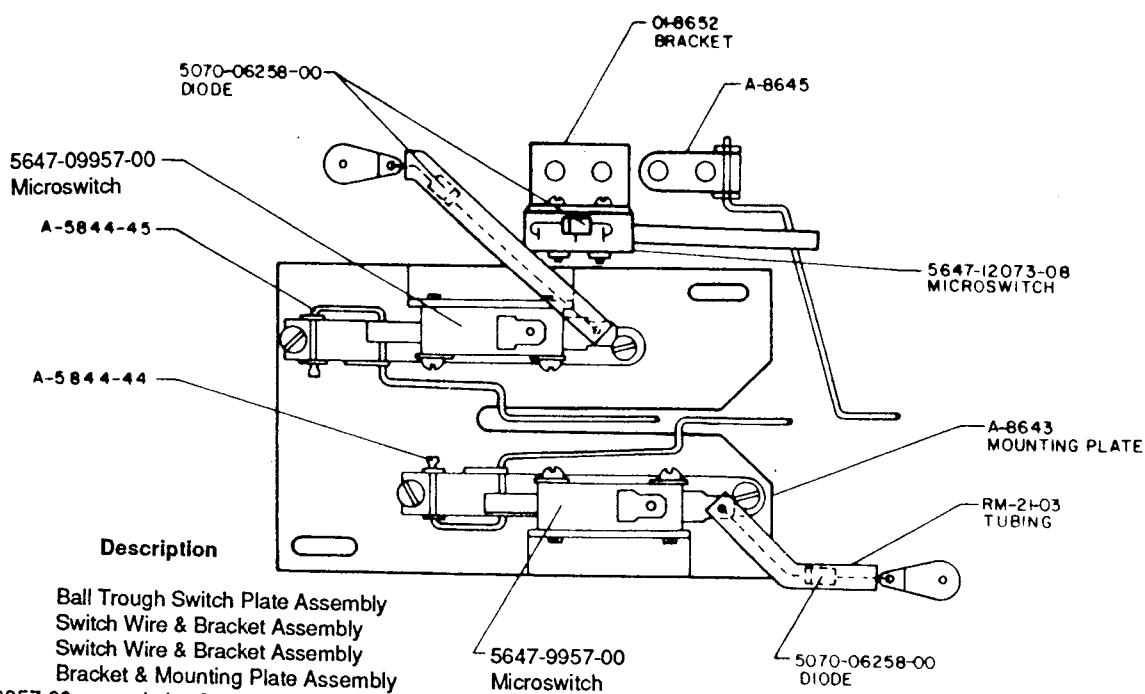
Part No.	Description
B-8644	Ball Trough Switch Plate Assembly
A-5844-44	Switch Wire & Bracket Assembly
A-5844-45	Switch Wire & Bracket Assembly
A-8643	Bracket & Mounting Plate Assembly
5647-09957-00	µswitch; Cntr & L Ball Trough
4004-01060-08	Mach. Screw, 4-40 x 1/2
4005-01005-02	Mach. Screw, 5-40 x 1/8
5070-06258-00	Diode, 1N4001
5825-09372-00	Solder Lug
RM-21-03	Insulating Tubing, #10 x 1.75"
A-11680	Ball Trough Switch, Right
5647-12073-08	Submin. Switch
5070-06258-00	Diode, 1N4001
A-8645	Switch Wire & Bracket Assembly

Ball Trough Switches
(viewed from underside of playfield to show parts locations)

Ball Shooter Lane Feeder
C-9638 & Associated Parts
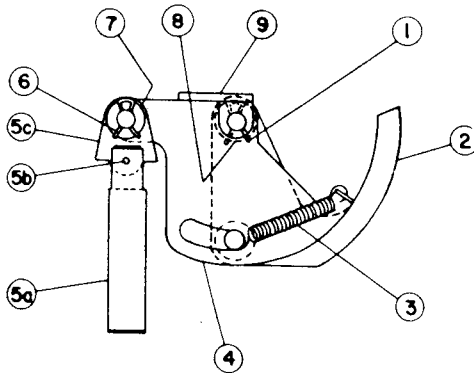
Item	Part No.	Description
1	12-6227	Clip
2	A-8427	Eject Cam Assembly
3	10-362	Ejector Spring
4	A-6949-L	Spring Plate Assembly
5	A-8050-1	Coil Plunger Assembly
a)	02-3407-2	Coil Plunger
b)	20-8716-5	Roll Pin
c)	03-8085	Plastic Actuator Link
6	12-6227	Clip
7	4700-00030-00	Flatwasher
8	4700-00103-00	Flatwasher
9	A-8268	Mounting Bracket

Associated Parts

B-9362-R-1		Coil & Bracket Assembly
B-7572-1		Bracket & Stop Assembly
01-8-508-S		Coil Retaining Bracket
4006-01017-06		Mach. Screw, 6-32 x 3/8
4406-01119-00		Nut, 6-32 ESN
AE-23-800		Coil Assembly
03-7066		Coil Tubing
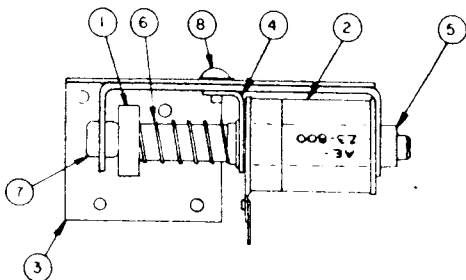
Outlane Kickback Assembly
p/n B-11873

Item	Part No.	Description
1	A-6306-2	Armature Assembly
2	AE-23-800	Coil Assembly
3	B-7409-2	Mounting Bracket
4	01-8-508-T	Coil Retaining Bracket
5	03-7067-5	Coil Tubing
6	10-135	Plunger Spring
7	23-6420	Rubber Grommet
8	4008-01017-05	Mach. Screw, 8-32 x 5/16

Kicker Arm ("Slingshot") Assembly
p/n B-9463 (Left & Right Kickers)

Part No.	Description
12-6227	Clip, Hair Pin
A-7986	Kicker Arm Assembly
A-5103	Plunger Assembly
02-2364	Coil Plunger
20-8716-5	Roll Pin
03-8085	Armature Link
4700-00073-00	Washer, 1/2 o.d. x 9/32 i.d. x 15 ga.
A-5653	Mounting Bracket Assy

Associated Parts

B-11203-R-1	Coil & Bracket Assembly
B-7572-1	Bracket & Stop Assembly
01-8-508-S	Coil Retaining Bracket
4006-01017-06	Mach. Screw, 6-32 x 3/8
4406-01119-00	Nut, 6-32 ESN
AE-26-1500	Coil Assembly
03-7066	Coil Tubing
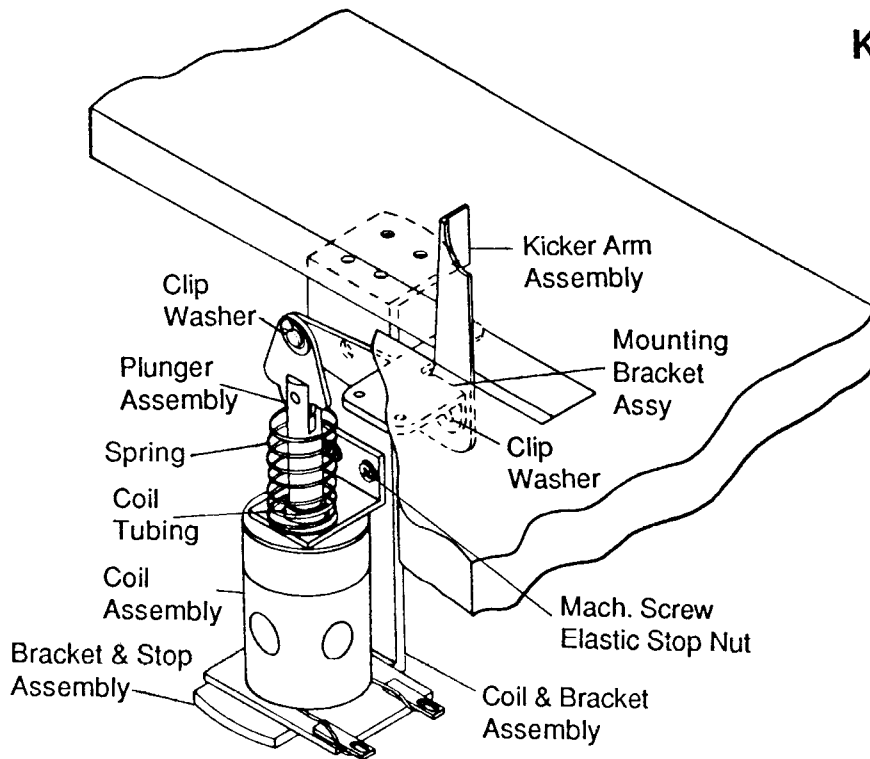
Freestyle (upper pl'field)
Ball Cannon (lower pl'field)
Kickbig Arm Assembly
p/n B-11395-1

Part No.	Description
12-6227	Clip, Hair Pin
A-5652-1	Kickbig Arm Assembly
A-5103	Plunger Assembly
02-2364	Coil Plunger
20-8716-5	Roll Pin
03-8085	Armature Link
4700-00030-00	Washer, 1/2 o.d. x 17/64 i.d. x 15 ga.
B-11052	Mounting Bracket Assy

Associated Parts

B-9362-R-1	Coil & Bracket Assembly
B-7572-1	Bracket & Stop Assembly
01-8-508-S	Coil Retaining Bracket
4006-01017-06	Mach. Screw, 6-32 x 3/8
4406-01119-00	Nut, 6-32 ESN
AE-23-800	Coil Assembly
03-7066	Coil Tubing

Eject Hole Assembly
(Left & Center units, Lower Playfield)
B-9361-R & Associated Parts

Item	Part No.	Description
1	12-6227	Clip
2	A-7471-R	Eject Cam Assembly
3	10-362	Plunger Spring
4	A-6949-R	Spring Plate Assembly
5	A-8050	Coil Plunger Assembly
a)	02-3407-2	Plunger
b)	20-8716-5	Roll Pin
c)	03-8085	Plastic Link
6	12-6227	Clip
7	4700-00030-00	Flatwasher
8	4700-00103-00	Flatwasher
9	A-6950-R	Mounting Bracket
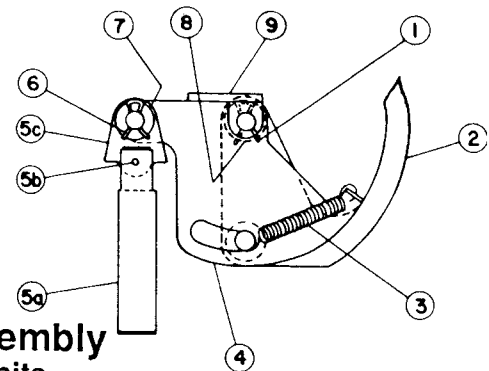
Associated Parts for Left Eject Hole

B-9362-L-2	Coil & Bracket Assembly
AE-26-1200	Coil Assembly
B-7572-1	Bracket & Stop Assembly
01-8-508-S	Coil Retaining Bracket
4006-01017-06	Mach. Screw, 6-32 x 3/8
4406-01119-00	Nut, 6-32 ESN
03-7066	Coil Tubing
03-7351-1-9	Ball Cup, Tran Red

Associated Parts for Center Eject Hole

B-11203-L-1	Coil & Bracket Assembly
AE-26-1500	Coil Assembly
B-7572-1	Bracket & Stop Assembly
01-8-508-S	Coil Retaining Bracket
4006-01017-06	Mach. Screw, 6-32 x 3/8
4406-01119-00	Nut, 6-32 ESN
03-7066	Coil Tubing
03-7351-1-9	Ball Cup, Tran Red

Ramp Assembly
(Lower Playfield LAPS Ramp)
p/n R-12150

Part No.	Description
A-12216	Ball Gate Assembly
01-8888	Gate Bracket
12-6796	Gate Wire
A-12239	Switch & Diode Assy (Entr)
5647-12073-11	µSwitch
5070-06258-00	Diode, 1N4001

Part No.	Description
A-12238	Switch & Diode Assy (Exit, upr/lwr)
5647-12073-13	µSwitch
5070-06258-00	Diode, 1N4001
H-12151-1	Leftside Cable
H-12151-2	Rightside Cable

Ball Popper & Switch Assembly, UPF
including p/n C-12227, and associated parts

Item	Part No.	Description
1	A-11336	Armature Assembly
2	AE-23-800	Coil Assembly
3	01-8-508-T	Solenoid Bracket
4	01-8918	Mounting Bracket
5	10-135	Spring
6	03-7067	Tubing, Coil
7	03-8053	Cap, Ball Popper
8	20-9314-7	Dowel Pin, 3/32 dia x 1/2
9	23-6420	Grommet, Rubber
10	4008-01017-05	Mach. Screw, 8-32 x 5/16

Associated Parts

	Part No.	Description
	A-12229	Switch Assembly
a)	A-12241	Switch & Diode Assembly
b)	01-3670-1	Switch Plate
c)	01-624-2	Switch Plate
d)	4004-01003-12	Mach. Screw, 4-40 x 3/4
e)	4404-01119-00	Nut, 4-40 ESNA
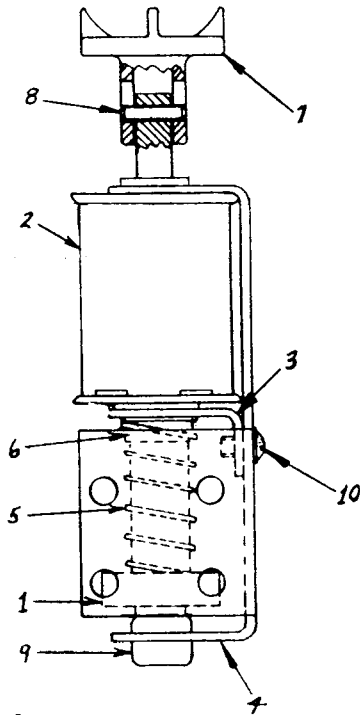
Pop-up Post Assembly
p/n C-11661-1

Item	Part No.	Description
1	B-11662	Plunger Assembly
2	B-11660	Main Frame Subassy
3	03-8090	Flat Cam
4	01-8639	Coil Support Bracket
5	A-10821	Flipper Stop Brkt Assy
6	23-6623	Bumper, Rubber
7	10-399	Spring, Compression
8	10-401	Spring, Extension
9	10-392	Spring, Compression
10	01-8600	Insulator
11	AE-23-800	Coil Assembly
12	5647-12073-06	µSwitch w/roller
13	4006-01027-06	Mach. Screw, 6-32 x 3/8
14	4700-00021-00	Flatwasher, .437x.203x.032
15	4701-00024-00	Lockwasher, #2
16	4002-01005-06	Mach. Screw, 2-56 x 3/8
17	4700-00103-00	Flatwasher, #12
18	20-8712-25	E-Ring Retainer Clip
19	20-8790-7	Bearing, Ny-lined
20	4010-01008-06	Mach. Screw, #10-32 x 1/2
21	4700-00004-00	Lockwasher, #10 split
22	5070-06258-00	Diode, 1N4001, 1.0A
23	03-7066	Tubing, Coil
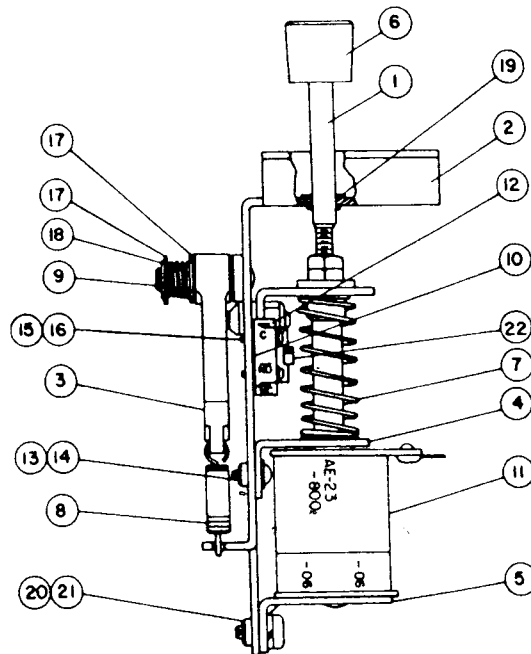
Ball Lifter
Motor Assembly
p/n B-12154

Item	Part No.	Description
1	01-8823	Motor Bracket
2	14-7949	Lifter Motor
3	20-8716-2	Roll Pin, 3/32 x 5/8
4	4008-01003-08	Mach. Screw, 8-32 x 1/2
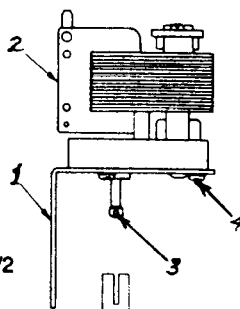
Ball Lifter
Reversing Screw
Assembly
p/n C-12169

Item	Part No.	Description
1	B-12204	Retractile Cord Assembly
2	02-4332	Reversing Screw Shaft
3	02-4343	Reversing Screw Follower
4	03-8159	Carrier Body
5	03-8160	Carrier Cap
6	20-9567	Bronze Bushing
7	4106-01001-07	Sh Metal Screw, #6 x 7/16
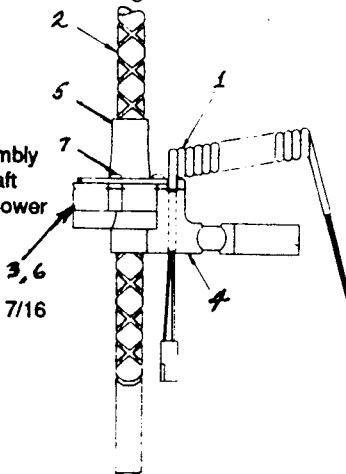
Ball Lifter Carrier Tube
p/n A-12251

Part No.	Description
A-12158	Coil & Connector Assembly
02-4340	Magnet Core
03-8167	Carrier Tube
31-1458-1	Decal
4008-01003-08	Mach. Screw, 8-32 x 1/2
4700-00016-00	Flatwasher

Chute Assembly,
Cliff Jump
p/n D-12162

Replaceable Parts

Part No.	Description
5647-12073-16	µSwitch
5070-06258-00	Diode, 1N4001
4002-01005-06	Mach. Screw, 2-56 x 3/8
4701-00024-00	Lockwasher, #2 split

Lower Playfield Lamps
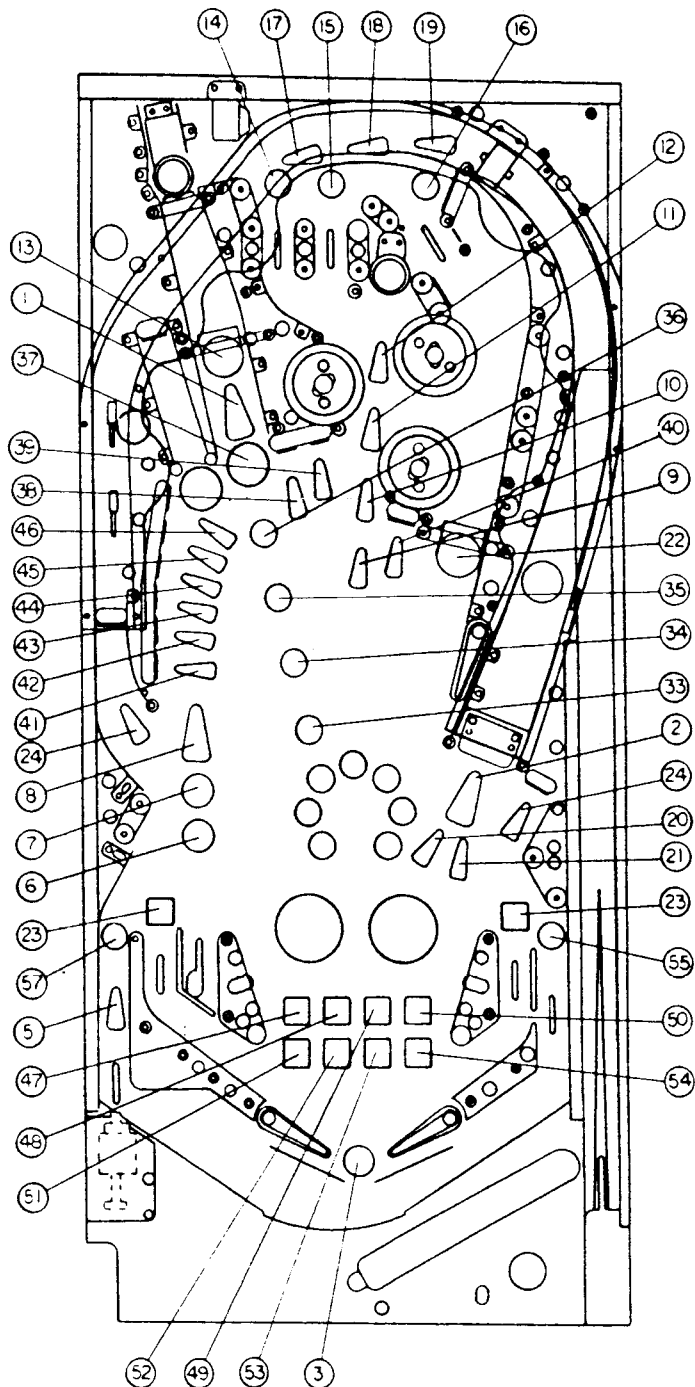
Lamp	Location/Description
1	BANZAI HILL Arrow
2	RANK 1 (Ramp Arrow)
3	RACE AGAIN
4	BALL IN PLAY (marquee)
5	KICKBACK
6	EXTRA BALL (Cap. Ball Value)
7	50,000 (Cap. Ball Value)
8	25,000 (Cap. Ball Value)
9	LOCK (Cntr Eject Hole)
10	FREESTYLE (Cntr Eject Hole)
11	TIME LOCK (Cntr Eject Hole)
12	KICKBACK (Cntr Eject Hole)
13	3,000 WHEN LIT (L Spinner)
14	RACE (Top left lane)
15	GREEN (Top center lane)
16	MACHINE (Top right lane)
17	SUPER (Left Eject Hole)
18	CYCLE (Left Eject Hole)
19	STUNT (Left Eject Hole)
20	DOUBLE LAP (Ramp)
21	SPOT (Ramp)
22	3,000 WHEN LIT (R Spinner)
23	L & R Flipper Lanes
24	1 LAP (L & R Standup Targets)
25 - 32*	* = Add'l Upper Playfield Lamps
33	RANK 6
34	RANK 5
35	RANK 4
36	RANK 3
37*	RANK 2
38	RACE (Left Yel Standup Target)
39	YELLOW (Mdl Yel Standup Target)
40	BELLY (Right Yel Standup Target)
41	RACE (Lwr Red Standup Target)
42	RED (Mdl Red Standup Target)
43	HOT (Upr Red Standup Target)
44	RACE (Lwr Blue Standup Target)
45	BLUE (Mdl Blue Standup Target)
46	BEARD (Upr Blue Standup Target)
47*	BLUE BEARD Challenged
48*	YELLOW BELLY Challenged
49*	GREEN MACHINE Challenged
50*	RED HOT Challenged
51	PRIOR RACE Blue
52	PRIOR RACE Yellow
53	PRIOR RACE Green
54	PRIOR RACE Red
55	SPECIAL (R Outlane)
56*	Not used on Lower Playfield.
57	SPECIAL (L Outlane)
58	1 LAPS
59	2 LAPS
60	3 LAPS

Lamp	Location/Description
61	4 LAPS
62	5 LAPS
63	10 LAPS
64	20 LAPS

Typical Lamp Circuit

BANZAI RUN Lower Playfield Lamp-Matrix Table

COLUMN / ROW	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9
Q80 RED-BRN 1 1J6-1	Arrow (Banzai Hill) • 1	Lock (Center Eject) 9	SUPER (Super Cycle Stunt) 17	25	Rank 6 (Low, Left Eject) 33	RACE (Low Red Stndup Tgt) 41	Green Machine Challenged [2] 49	SPECIAL (L Outlane) • 57
Q81 RED-BLK 2 1J6-2	Ramp Arrow (Rank #1) 2	Freestyle (Center Eject) 10	CYCLE (Super Cycle Stunt) 18	26	Rank 5 (Left Eject) 34	RED (Cntr Red Stndup Tgt) 42	Red Hot Challenged [2] 50	LAPS 1 58
Q82 RED-ORN 3 1J6-3	Race Again • 3	Timelock (Center Eject) 11	STUNT (Super Cycle Stunt) 19	27	Rank 4 (Mid, Left Eject) 35	HOT (Right Red Stndup Tgt) 43	Prior Race Blue 51	LAPS 2 59
Q83 RED-YEL 4 1J6-5	Ball In Play (Scoreboard) 4	Kickback (Center Eject) 12	Double Lap (Ramp, lwr left) 20	28	Rank 3 (Left Eject) 36	RACE (Low Blue Stndup Tgt) 44	Prior Race Yellow 52	LAPS 3 60
Q84 RED-GRN 5 1J6-6	Kickback • 5	3000 W/L (Left Spinner) • 13	SPOT (Ramp, lwr right) 21	29	Rank 2 (High, Left Eject) [2] 37	BLUE (Cntr Blue Stndup Tgt) 45	Prior Race Green 53	LAPS 4 61
Q85 RED-BLU 6 1J6-7	Extra Ball (Cap. Ball, low) • 6	RACE (Top left lane) 14	3000 W/L (Right Spinner) • 22	30	RACE (Left Yel Stndup Tgt) 38	BEARD (High Blue Stndup Tgt) 46	Prior Race Red 54	LAPS 5 62
Q86 RED-VIO 7 1J6-8	50,000 (Cap. Ball, cntr) • 7	GREEN (Top center lane) 15	Flipper Lane (both) (2) 23	31	YELLOW (Cntr Yel Stndup Tgt) 39	Blue Beard Chall'ngd [2] 47	SPECIAL (R Outlane) • 55	LAPS 10 63
Q87 RED-GRY 8 1J6-9	25,000 (Cap. Ball, high) • 8	MACHINE (Top right lane) 16	1 LAP Standup Targets (2) 24	32	BELLY (Rt Yel Stndup Tgt) 40	Yel Belly Chall'ngd [2] 48	56	LAPS 20 64

Symbols: [2] Two Lamps: 1 on Up P/F; 1 on Lo P/F   (2) Two Lamps on Lo P/F   • = #44 Bulb; all other bulbs = #555

Upper Playfield Lamps

Lamp   Location/Description

1 - 24   Not Used in Upper Playfield;
       see Lower Playfield listing.
25   FREESTYLE (lwr blue)
26   FREESTYLE (upr blue)
27   FREESTYLE (lwr yellow)
28   FREESTYLE (upr yellow)
29   FREESTYLE (lwr green)
30   FREESTYLE (upr green)
31   FREESTYLE (lwr red)
32   FREESTYLE (upr red)
33 - 36   Not Used in Upper Playfield.
37   LOCK Arrow
38 - 46   Not Used in Upper Playfield.
47   Defeat BLUE BEARD
48   Defeat YELLOW BELLY
49   Defeat GREEN MACHINE
50   Defeat RED HOT
51 - 55   Not Used in Upper Playfield.
56   Ball Popper Arrow
57 - 64   Not Used in Upper Playfield.
65   JUMP 2X (Cliff Jump)
66   EXTRA BALL (Cap. Ball)
67   RANK #1 (Cap. Ball)
68   A (Standup Target)
69   B (Standup Target)
70   C (Standup Target)
71   POST OUT
72   JUMP (Cliff Jump)

BANZAI RUN Upper Playfield Lamp-Matrix Table

COLUMN → / ROW ↓	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9	9 Q62 YEL-ORN 1J7-3
Q80 RED-BRN 1 1J6-1	1	9	17	Freestyle (lwr blue) 25	33	41	Defeat Green Machine [2] 49	57	Cliff Jump 2X 65
Q81 RED-BLK 2 1J6-2	2	10	18	Freestyle (upr blue) 26	34	42	Defeat Red Hot [2] 50	58	Extra Ball (Captive Ball) 66
Q82 RED-ORN 3 1J6-3	3	11	19	Freestyle (lwr yellow) 27	35	43	51	59	Rank #1 (Captive Ball) 67
Q83 RED-YEL 4 1J6-5	4	12	20	Freestyle (upr yellow) 28	36	44	52	60	A Standup Tgt 68
Q84 RED-GRN 5 1J6-6	5	13	21	Freestyle (lwr green) 29	Lock Arrow [2] 37	45	53	61	B Standup Tgt 69
Q85 RED-BLU 6 1J6-7	6	14	22	Freestyle (upr green) 30	38	46	54	62	C Standup Tgt 70
Q86 RED-VIO 7 1J6-8	7	15	23	Freestyle (lwr red) 31	39	Defeat Blue Beard [2] 47	55	63	Post Out 71
Q87 RED-GRY 8 1J6-9	8	16	24	Freestyle (upr red) 32	40	Defeat Yellow Belly [2] 48	Ball Popper Arrow 56	64	Cliff Jump 72

Symbols: [2] Two Lamps: 1 on Up P/F, 1 on Lo P/F   All lamps = # 44 Bulb

Lower Playfield Switches

Item	Part No.	Description
1	A-8476	Plumb Bob Tilt
2	B-8306-1	Playfield Tilt
3	SW-1A-126	Credit Button
4	27-1092	R Coin Chute (USA)
5	Not Used (USA)	Center Coin Chute
6	27-1092	L Coin Chute (USA)
7	27-1066	Slam Tilt
8	27-1008*	High Score Reset
9	17-1067	Outhole
10	5647-12073-08	Ball Trough #1 (right)
11	5647-09957-00	Ball Trough #2 (mid)
12	5647-09957-00	Ball Trough #3 (left)
13	17-1012	Left Eject Hole
14	5647-12073-10	Green Lane 1
15	5647-12073-10	Green Lane 2
16	5647-12073-10	Green Lane 3
17	17-1012	Center Eject Hole
18	B-11696-4	RED (mdl red stnd up tgt)
19	5647-12073-04	Ball Shooter Lane
20	5647-12073-10	Right Outlane
21	5647-12133-08	Left Spinner
22	5647-12133-08	Right Spinner
23	5647-12073-10	Left Flipper Lane
24	5647-12073-10	Right Flipper Lane
25	5647-12073-14	Left Flipper Lane Change
26	5647-12073-13	Ramp Upper Exit
27	SW-11A-35	Jet Bumper (left)
28	SW-11A-35	Jet Bumper (upr rt)
29	SW-11A-35	Jet Bumper (lwr rt)
30		Left Kicker**
31		Right Kicker**
32	5647-12073-10	Left Outlane
33	5647-12073-11	Ramp Entrance
34	5647-12073-14	Right Flipper Lane Change
35	5647-12073-13	Ramp lower Exit
36	5647-12133-01	Ball Cannon
37	B-11696-5	Captive Ball (wht stnd up tgt)
38	B-11696-6	RACE (I yel stnd up tgt)
39	B-11696-6	YELLOW (mdl yel stnd up tgt)
40	B-11696-6	BELLY (r yel stnd up tgt)
41	B-11696-4	RACE (lwr red st up tgt)
42	Not Used	
43	B-11696-4	HOT (upr red stnd up tgt)
44	B-11696-1	RACE (lwr blu st up tgt)
45	B-11696-1	BLUE (mdl blu st up tgt)
46	B-11696-1	BEARD (upr blu st up tgt)
47	B-11696-5	1 LAP (I stnd up tgt)
48	B-11696-5	1 LAP (r stnd up tgt)
49 - 64		Not Used on Lower Playfield; see Upper Playfield Switches listing.
-	SW-1010A-14	Flipper Button (on L & R Cabinet sides, with #25 & #34 Lane Change)
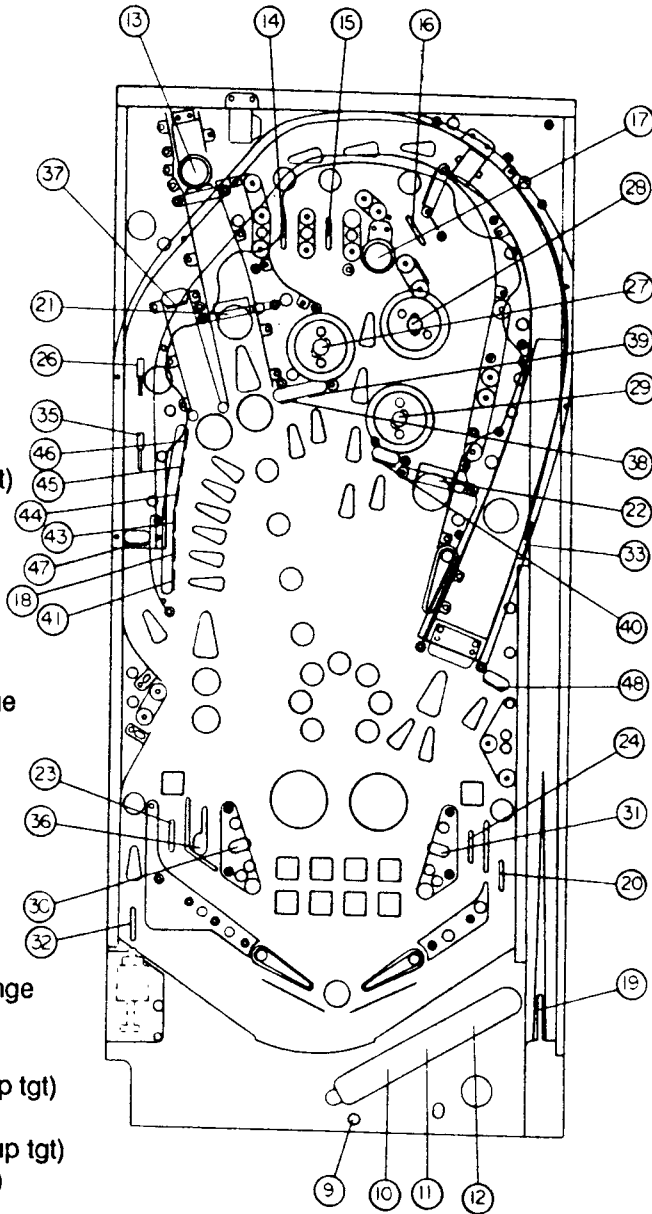
Notes: * Part Number is for entire Diagnostic Switch Assembly, including H S Reset Switch.
** [Paired Kicker Actuating Sw: A-4834-H; B-8734-1 (w/ diode)]

1P8
- 9 — Grn/Gry — Column 8
- 8 — Grn/Vio — Column 7
- 7 — Grn/Blu — Column 6
- 5 — Grn/Blk — Column 5
- 4 — Grn/Yel — Column 4
- 3 — Grn/Orn — Column 3
- 2 — Grn/Red — Column 2
- 1 — Grn/Brn — Column 1

1P10
- 9 — Wht/Brn — Row 1
- 8 — Wht/Red — Row 2
- 7 — Wht/Orn — Row 3
- 6 — Wht/Yel — Row 4
- 5 — Wht/Grn — Row 5
- 3 — Wht/Blu — Row 6
- 2 — Wht/Vio — Row 7
- 1 — Wht/Gry — Row 8

Typical Switch Circuit

BANZAI RUN *Lower Playfield* **Switch-Matrix Table**

COLUMN / ROW	1 Q45 GRN-BRN 1J8-1	2 Q49 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	Plumb Bob Tilt 1	Outhole 9	Center Eject Hole 17	Left Flipper Lane Change 25	Ramp Entrance 33	RACE Lwr Red Stndup Target 41	49	57
2 WHT-RED 1J10-8	Playfield Tilt 2	Ball Trough #1 (right) 10	Center Red Standup Target 18	Ramp Upper Exit 26	Rt Flipper Lane Change 34	RED Mdl Red Stndup Target 42	50	58
3 WHT-ORN 1J10-7	Credit Button 3	Ball Trough #2 (mid) 11	Ball Shooter Lane 19	Left Jet Bumper 27	Ramp Lower Exit 35	HOT Upr Red Stndup Target 43	51	59
4 WHT-YEL 1J10-6	Right Coin Chute 4	Ball Trough #3 (left) 12	Right Outlane 20	Upr Rt Jet Bumper 28	Ball Cannon 36	RACE Lwr Blue Stndup Target 44	52	60
5 WHT-GRN 1J10-5	Center Coin Chute 5	Left Eject Hole 13	Left Spinner 21	Lwr Rt Jet Bumper 29	Target Captive Ball 37	BLUE Mdl Blue Stndup Target 45	53	61
6 WHT-BLU 1J10-3	Left Coin Chute 6	Top Lane Left 14	Right Spinner 22	Left Kicker 30	RACE Lwr Yel Stndup Target 38	BEARD Upr Blue Stndup Target 46	54	62
7 WHT-VIO 1J10-2	Slam Tilt 7	Top Lane Cntr 15	Left Flipper Lane 23	Right Kicker 31	YELLOW Mdl Yel Stndup Target 39	1 LAP L Standup Tgt 47	55	63
8 WHT-GRY 1J10-1	High-Score Reset 8	Top Lane Right 16	Right Flipper Lane 24	Left Outlane 32	BELLY Upr Yel Stndup Target 40	1 LAP R Standup Tgt 48	56	64

Upper Playfield Switches

| Item | Part No. | Description |

1 - 41 Not Used on Upper Playfield;
see Lower Playfield listing.
42 B-11696-1 FREESTYLE (upr blue)
43 B-11696-6 FREESTYLE (lwr yel)
44 B-11696-6 FREESTYLE (upr yel)
45 Not Used on Upper Playfield.
46 Not Used on Upper Playfield.
47 B-11696-4 FREESTYLE (lwr red)
48 B-11696-4 FREESTYLE (upr red)
49 B-11696-1 FREESTYLE (lwr blue)
50 5647-12073-06 Flipper Post
51 5647-12133-10 Lower Ball Lifter
52 5647-12073-16 Defeat RED (tunnel entr)
53 5647-12133-09 Defeat YELLOW
54 5647-12133-09 Defeat BLUE
55 B-11696-5 Captive Ball (wh st up tgt)
56 B-11696-2 Defeat GREEN
57 B-11696-2 FREESTYLE (lwr grn)
58 B-11696-2 FREESTYLE (upr grn)
59 5647-12073-16 Mouse Hole Drain
60 B-11696-5 A (white stand up tgt)
61 B-11696-5 B (white stand up tgt)
62 B-11696-5 C (white stand up tgt)
63 5647-12133-10 Upper Ball Lifter
64 SW-1A-175 Ball Popper

BANZAI RUN Upper Playfield Switch-Matrix Table

COLUMN / ROW	1 Q45 GRN-BRN 1J8-1	2 Q49 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	1	9	17	25	33	41	Freestyle (lower Blue) 49	Freestyle (lower Green) 57
2 WHT-RED 1J10-8	2	10	18	26	34	Freestyle (upper Blue) 42	Flipper Post 50	Freestyle (upper Green) 58
3 WHT-ORN 1J10-7	3	11	19	27	35	Freestyle (lower Yellow) 43	Lower Lifter 51	Mouse Hole Drain 59
4 WHT-YEL 1J10-6	4	12	20	28	36	Freestyle (upper Yellow) 44	Defeat Red Cliff Jump 52	A Stndup Tgt 60
5 WHT-GRN 1J10-5	5	13	21	29	37	45	Defeat Yellow Roll-Under 53	B Stndup Tgt 61
6 WHT-BLU 1J10-3	6	14	22	30	38	46	Defeat Blue Roll-Under 54	C Stndup Tgt 62
7 WHT-VIO 1J10-2	7	15	23	31	39	Freestyle (lower Red) 47	Target Captive Ball 55	Upper Lifter 63
8 WHT-GRY 1J10-1	8	16	24	32	40	Freestyle (upper Red) 48	Defeat Green Standup Tgt 56	Left Lock Ball Popper 64

Solenoids/Flashers

Item	Part No.	Description
01A	AE-23-800	Outhole Kicker
01C	#89 Flashlamp	Left Spinner (lpf) Flasher
02A	AE-23-800	Ball Shooter Lane Feeder
02C	#89 Flashlamp	Right Spinner (lpf) Flasher
03A	AE-23-800	Lock Kicker (upf ball popper)
03C	#89 Flashlamps	1/6(m)/Ramp & Arrow (l) Flashers
04A	AE-23-800	Ball Cannon Kickbig
04C	#89 Flashlamps	2/6(m)/Ramp & Spdomtr (l) Flashers
05A	AE-23-800	Flipper Post (upf)
05C	#89 Flashlamps	3/6(m)/Ramp(l)/UPF hi (u) Flashers
06A	AE-23-800	Freestyle (upf) Kickbig
06C	#89 Flashlamps	4/6(m)/Ramp(l)/UPF lo (u) Flashers
07A	AE-23-800-02	Knocker (Ticket Dispenser)
07C	#89 Flashlamps	5/6(m)/Ramp & Tach (l) Flashers
08A	AE-26-1500	Center Eject Hole (lpf)
08C	#89 Flashlamps	6/6(m)/Ramp & Cap. Ball (l) Flashers
09	5580-12299-00	Upper Flipper Relay (K2)*
10	5580-12145-01	LPF General Illumin Relay (K3)*
11	5580-12145-01	UPF Gen. Illumin. Relay (K4)*
12	5580-09555-01	Solenoid A/C Select Relay**
13	LW-31-3000	Ball Lifter Magnet
14	AE-23-800	Left Drain Lane Kickback
15	5580-12145-01	Ball Lifter Motor/Relay***
16	AE-26-1200	Left Eject Hole
17	AE-23-800	Left Jet Bumper
18	AE-26-1500	Lower Left Kicker ("Sling")
19	AE-23-800	Upper Right Jet Bumper
20	AE-26-1500	Lower Right Kicker ("Sling")
21	AE-23-800	Bottom Jet Bumper
22	5580-09555-01	Up Lamp Relay (K5)*
-	FL 11630-50VDC	Lwr L and R Flipper (lpf, upf)
-	FL 11630-50VDC	Upper L Flipper (upf)
-	FL 11753-50VDC	Upper R Flipper (lpf)

* - On Backbox Interconnect Bd, D-12112
** - In backbox on Aux Power Driver Bd, D-12247
*** - On Relay Board, C-11902-1; Motor p/n 14-7949
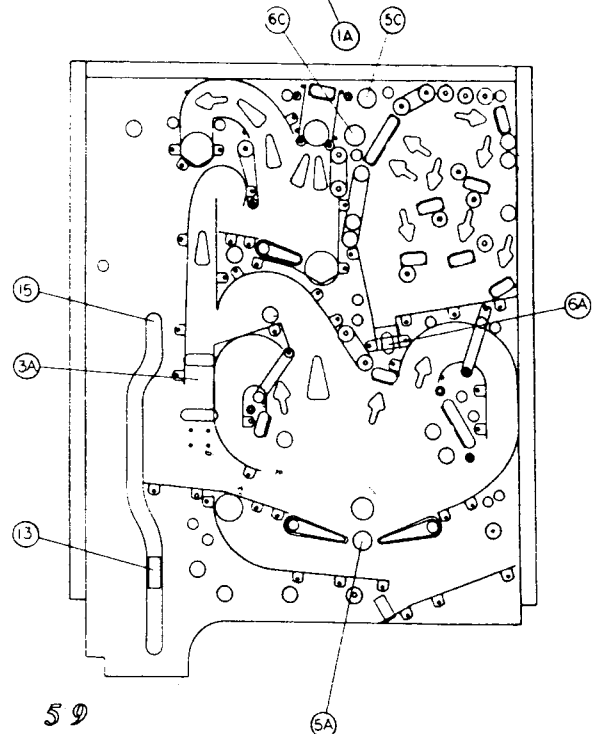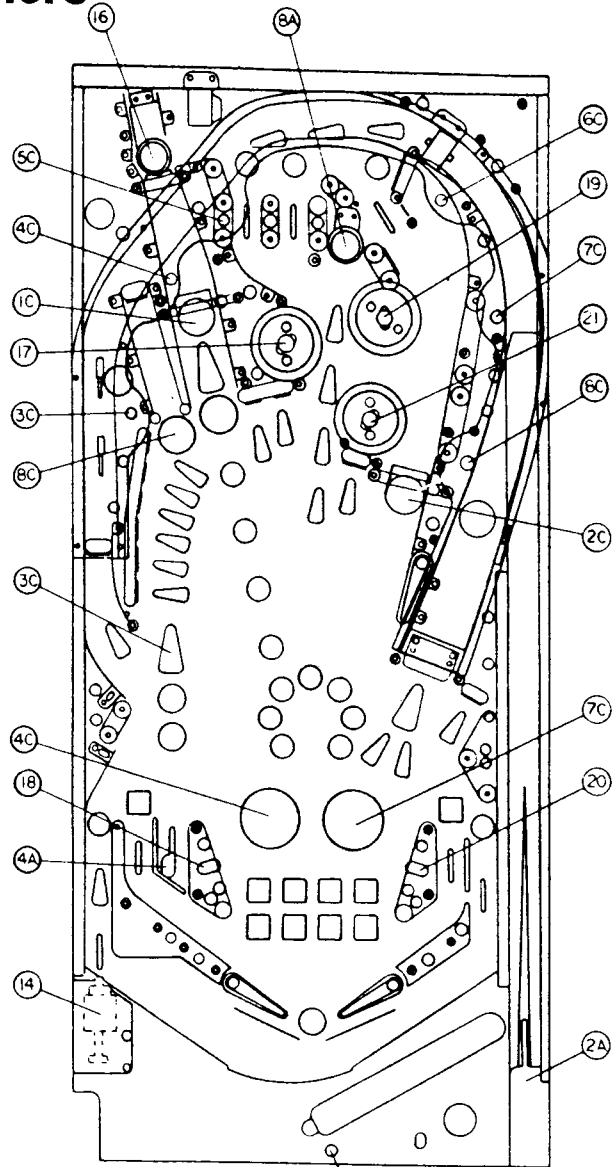
Upper Playfield Parts

Item	Part No.	Description
1	C-12051	Ball Guide
2	B-12059	Ball Guide
3	C-11626-R-3	Lwr R Flipper Assembly
a)	20-9250-6	Flipper Arm on Shaft
4	B-12057	Ball Guide
5	C-11661-1	Flipper Pop-up Post
6	C-11626-L-3	Lwr L Flipper Assembly
a)	20-9250-6	Flipper Arm on Shaft
7	B-12064	Ball Guide
8	B-12053	Ball Guide
9	C-12169	Lifter Reversing Screw Assy
a)	A-12174	Lifter Magnet Carrier
	LW-31-3000	Magnet Coil
b)	03-8159	Lifter Transport Arm
	B-12204	Retractile Cord Assembly
c)	03-8160	Lifter Transport Cap
10	01-8923	Lifter Shaft Bracket (front)
11	B-12251	Lifter Shaft Bracket (back)
12	B-11696-5	White Standup Target
13	A-12228	Ball Guide
14	A-12171	Ball Gate
a)	12-6733	Gate Wire
b)	12-6785	Wire Switch Hook
15	C-12227	Lock Kicker (Ball Popper)
16	A-12241	Popper Switch
17	B-12065	Ball Guide
18	B-12154	Ball Lifter Motor Unit
19	B-12153	Ball Guide
20	B-12062	Ball Guide
21	C-11626-L-3	Upr L Flipper Assembly
a)	20-9264-6	Sm Flipper Arm on Shaft
22	A-12186	Ball Guide
23	B-12061	Ball Guide
24	B-12058	Ball Guide
25	D-12162	Chute Assembly
26	A-12052	Ball Guide
27	B-11696-1	Blue Standup Target
28	B-11696-6	Yellow Standup Target
29	B-11696-4	Red Standup Target
30	B-11696-2	Green Standup Target
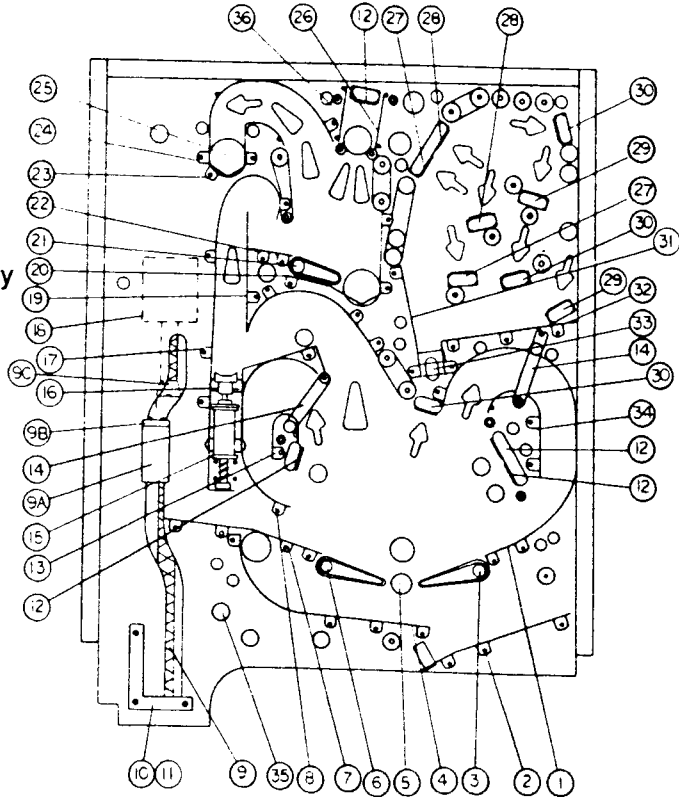
Item	Part No.	Description
31	A-12054	Ball Guide
32	B-12063	Ball Guide
33	B-11395-1	Freestyle Kickbig
34	B-12060	Ball Guide
35	A-12213	Ball Lifter Motor Switch Assy
36	A-12159	Ball Guide

Lower Playfield Parts
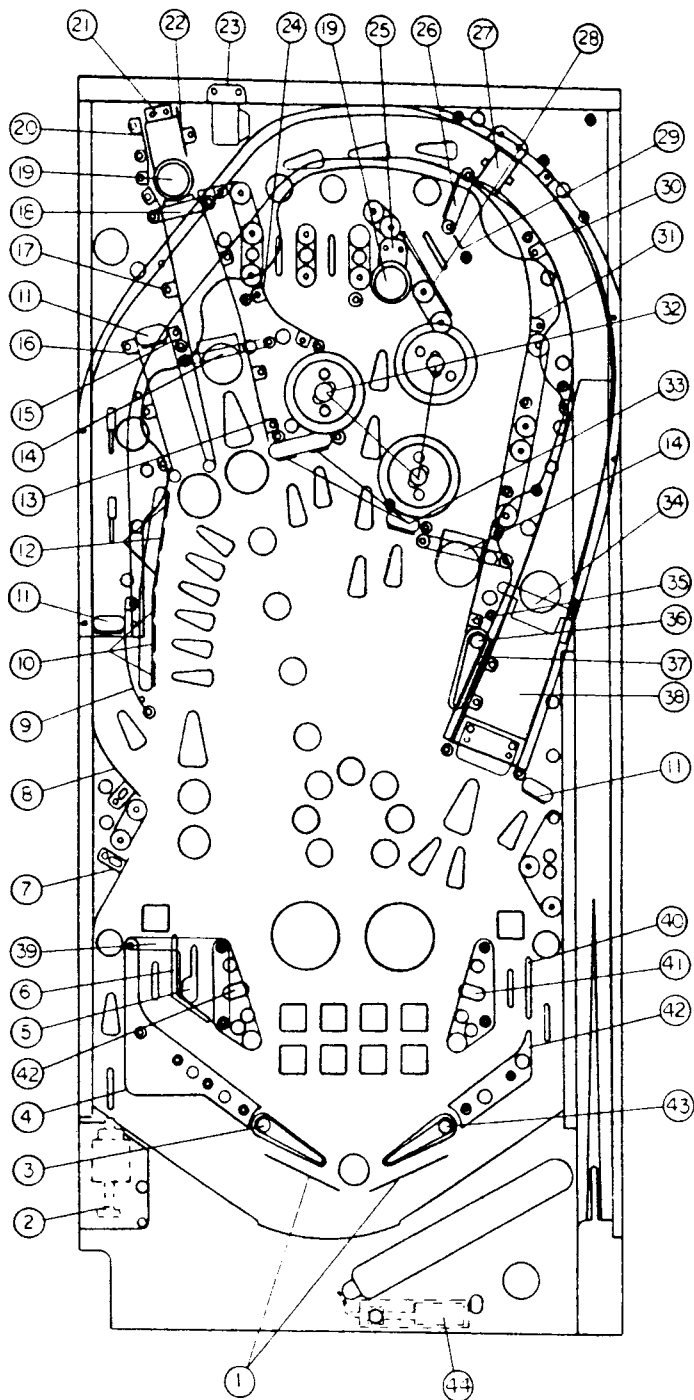
Item	Part No.	Description
1	12-6468	Anti-Rebound Wireform
2	B-11873	Kickback
3	C-11626-L-3	Lwr L Flipper Assembly
a)	20-9250-6	Flipper Arm on Shaft
4	B-12103	L Flipper Return Frame
5	B-11395-1	Ball Cannon (Kickbig)
6	12-6784	Wireform
7	B-12069	Ball Guide
8	B-12073	Ball Guide
9	B-12072	Ball Guide
10	B-11696-4	Red Standup Target
11	B-11696-5	White Standup Target
12	B-11696-1	Blue Standup Target
13	B-12070	Ball Guide
14	B-12164	Spinner Target Gate
15	B-12075	Ball Guide
16	A-12080	Ball Guide
17	C-12076	Ball Guide
18	A-12254	Ball Gate
a)	12-6731-1	Gate Wire
19	B-9361-R	Eject Hole
a)	03-7351-1-9	Tr Red Ball Seat
20	A-12182	Ball Guide
21	A-12121	Padded Ball Deflector
22	D-12067	Ball Guide
23	A-8244-L	Ball Gate Assembly
24	A-12074	Ball Guide
25	01-6933	Eject Hole Ball Stop
26	A-12120	Ball Gate
a)	12-6565	Gate Wire
27	A-8244-R	Ball Gate
28	A-12077	Ball Guide
29	12-6466-2	Wireform
30	C-12068	Ball Guide
31	B-12071	Ball Guide
32	B-9414	Jet Bumper Assembly
a)	B-9415-1	Coil & Bracket Assembly
b)	B-8928	Switch Assy
33	B-11696-6	Yellow Standup Target
34	A-12216	Ball Gate
a)	12-6796	Gate Wire
35	A-12078	Ball Guide
36	C-11626-R-8	Upr R Flipper Assembly
a)	20-9250-6	Flipper Arm on Shaft
37	A-12217	Ball Guide
38	R-12150	Ramp Assembly
39	B-12215	Ball Cannon Guide
40	12-6466-9	Wireform
41	B-9463	Kicker (Slingshot) Assy
42	A-12102	R Flipper Return Frame

Item	Part No.	Description
43	C-11626-R-3	Lwr R Flipper Assembly
a)	20-9250-6	Flipper Arm on Shaft
44	B-8039-2	Outhole Kicker Assy

Miscellaneous *BANZAI RUN* Parts

Part No.	Description	Part No.	Description
03-7960-566A	Lower Playfield Mylar	03-7960-566B	Upper Playfield Mylar
31-1006-566	Plastics Set, *BANZAI RUN*	31-1456-566	Marquee Glass
31-1008-566	Bottom Arch (screened)	5795-09453-00	Ribbon Cable, 20-conductor, 12"
31-1009-566	Shooter Gauge (screened)	5795-09941-00	Ribbon Cable, 20-conductor, 18"
31-1457	Ramp Decals	5795-10868-14	Ribbon Cable, 26-conductor, 14"
31-1458	Miscellaneous Coinage Decals	5795-10868-36	Ribbon Cable, 26-conductor, 36"
03-8127	Black Plastic Glass Molding	5795-10937-06	Ribbon Cable, 20-conductor, 6"
B-12223	Steel Barrier Molding	A-8552-566	Upper Playfield Glasses Assy
		31-1357-566	Backglass, *BANZAI RUN*
		03-8166	Plastic Inner Backglass Shield
		A-12213	Ball Lifter P'button Switch Assy
		B-12251	Lifter Shaft Bearing Bracket
		01-8923	Bearing Bracket Front Plate

Rubber Parts

Part No.	Description	Qty UPF	Qty LPF	Part No.	Description	Qty UPF	Qty LPF
23-6300	5/16" Ring	34	6	23-6313-1	Grommet	-	1
23-6301	3/4" Ring	2	2	23-6327	Ball Shooter Tip	-	1
23-6302	1" Ring	-	2	23-6519-4	Red Flipper Ring	2	3
23-6303	1-1/4" Ring	4	1	23-6535	Bumper	-	1
23-6304	1-1/2" Ring	1	-	23-6552	Sleeving	-	1
23-6305	2" Ring	2	3	23-6553-4	Red Flipper Ring	1	-
23-6307	3" Ring	-	1	23-6556	Sleeving, Black	5	12

Section 3

Reference Diagrams
&
Schematics

- **Diagrams and Schematics:**

    Cabinet Wiring
    Aux Power Driver Board
    Audio Board
    A/N Display Unit Board
    Power Supply Board
    BAckbox Interconnect Board
    CPU Board
    Controlled, Special, & Switched Solenoids
    Power Wiring
    Diagnostic Flowchart
    Interboards Signals
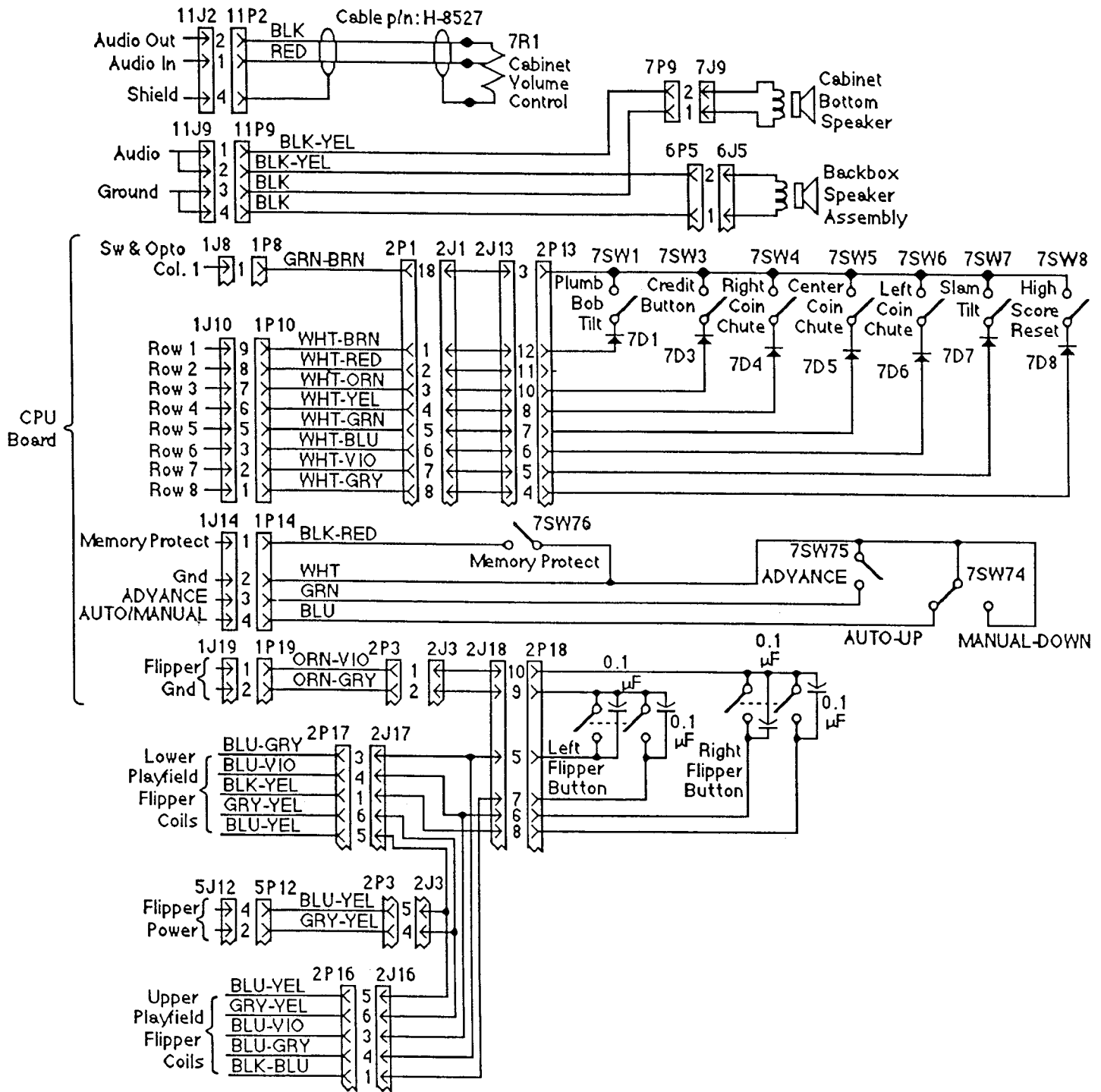
BANZAI RUN Cabinet Wiring

Aux Power Driver Board Schematic

Audio Board (D-11581) Schematic

BANZAI RUN 66
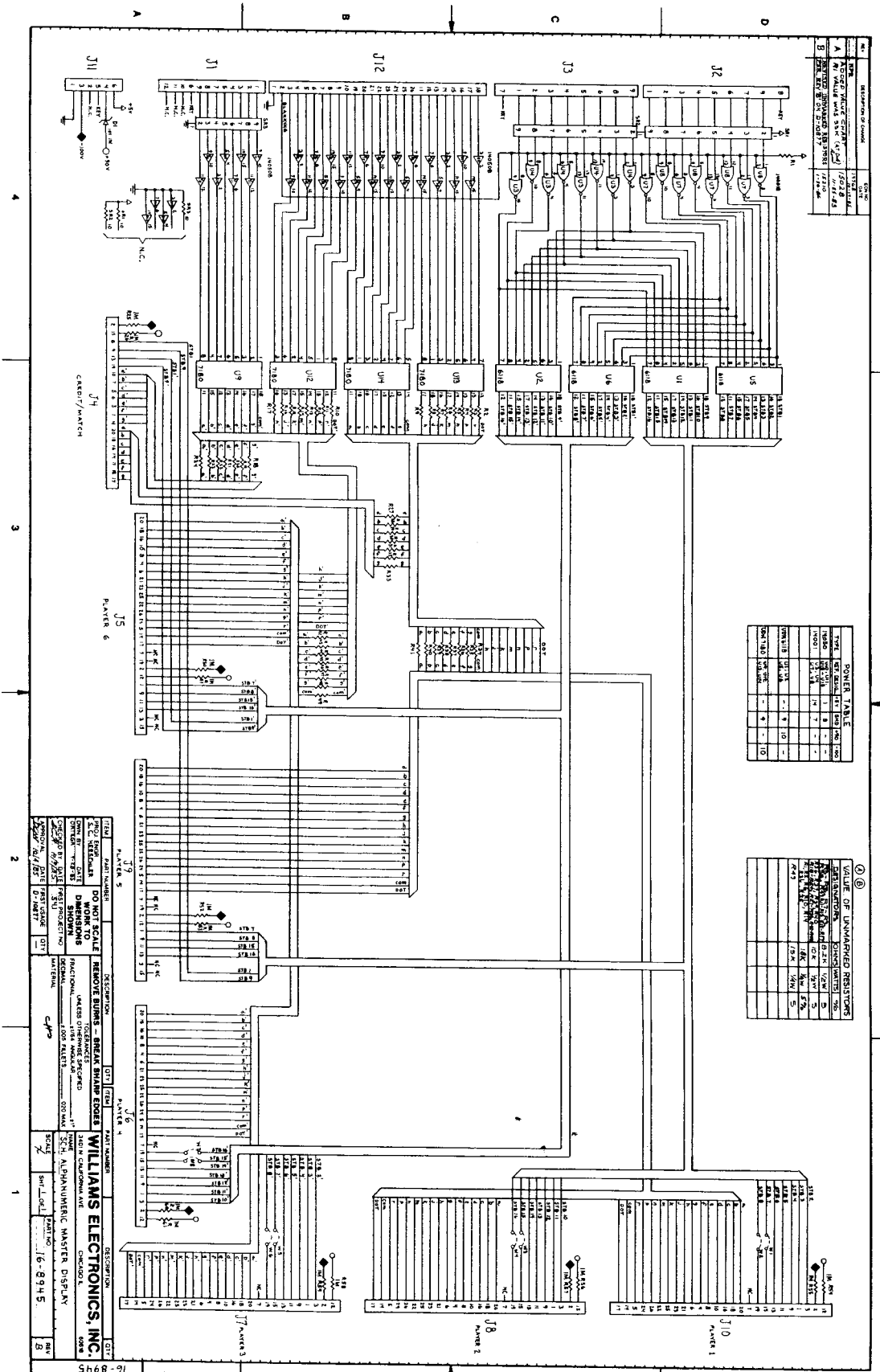
Alphanumeric Master Display Board (D-10877) Schematic

BANZAI RUN 67
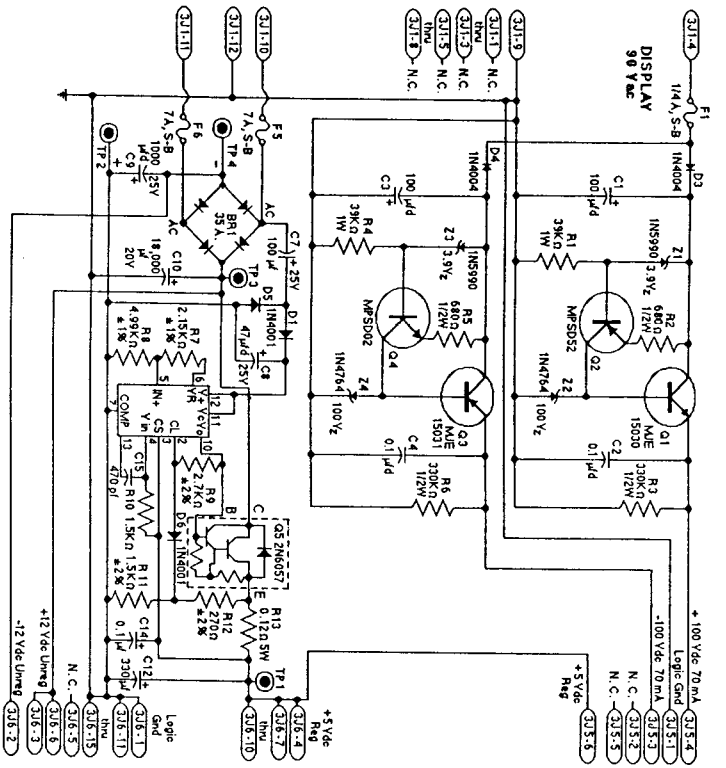
D-8345-566 Power Supply Schematic
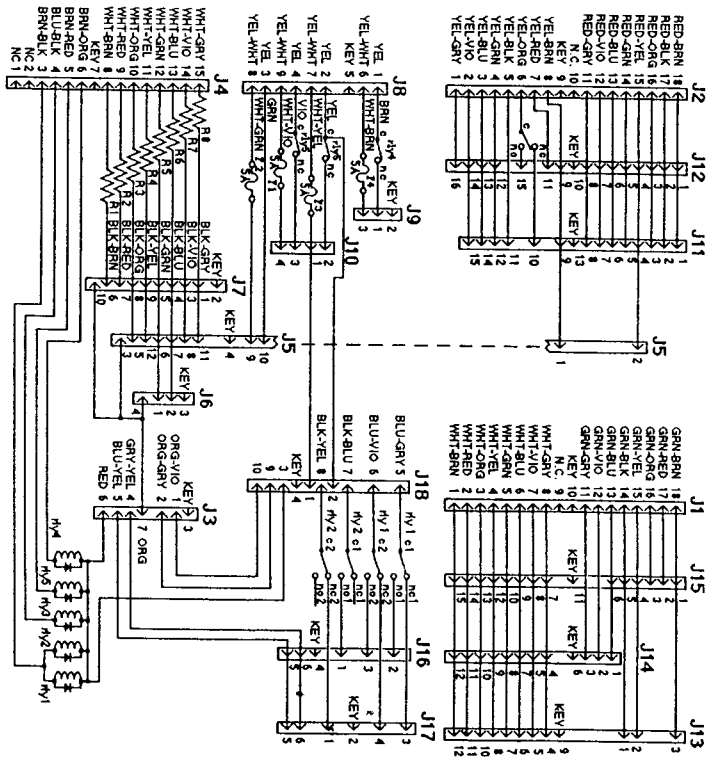
Backbox Interconnect Board (D-12112) Schematic

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

BANZAI RUN 69

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

BANZAI RUN 70

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

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

BANZAI RUN 72

CONTROLLED SOLENOIDS (25V)

5J11 -9, -10 RED

5J2-9 Brn-Blk 2J4-3

Sol. 9 UPPER FLIPPER RELAY (Q17)

5J2-8 Brn-Red 2J4-5

Sol. 10 LOWER PFIELD GEN'L ILLUM RELAY (Q9)

5J2-6 Brn-Orn 2J4-6

Sol. 11 UPPER PFIELD GEN'L ILLUM RELAY (Q16)

5J2-5 Brn-Yel 1P12-5

Sol. 12 A/C SELECT RELAY AUX PWR DRVR BD (Q8)

BRN A Side 5J11-5
ORN C Side 5J11-1, -2
YEL- A Side 5J12-11, -12
VIO C Side NOT USED

Switched 25V Circuits
Switched 50V Circuits

5J2-2 Brn-Vio 5J6-2

Sol. 15 BALL LIFTER MOTOR RELAY (Q14)

5J2-1 Brn-Gry 5J6-1

Sol. 16 LEFT EJECT HOLE (Q6)

SPECIAL SOLENOIDS (25V)

5J11-12 RED-WHT

5J3-7 Blu-Brn 5J6-7

Sol. 17 LEFT JET BUMPER (Q75)

5J3-3 Blu-Orn 5J7-3

Sol. 19 UPPER RIGHT JET BUMPER (Q73)

5J3-2 Blu-Grn 5J7-2

Sol. 21 LOWER RIGHT JET BUMPER (Q77)

5J3-1 Blu-Blk 5J7-1

Sol. 22 UP LAMP RELAY (Q79)

SPECIAL SOLENOIDS (50V)

5J12-7 VIO-YEL

5J2-4 Brn-Grn 5J6-5

Sol. 13 BALL LIFTER MAGNET (COIL) (Q15)

5J2-3 Brn-Blu 5J6-3

Sol. 14 KICKBACK (Q7)

5J3-6 Blu-Red 5J7-6

Sol. 18 LEFT KICKER ("sling") (Q71)

5J3-4 Blu-Yel 5J7-5

Sol. 20 RIGHT KICKER ("sling") (Q69)

SWITCHED SOLENOIDS

5J11-5 A Side   Aux Pwr Driver Board   5J11-1, -2 C Side
A/C Select Relay 25V Circuits

5J1-9 (Q33)   5J1-1, -2 C Side

B R N   O R N

Sol. 01A Outhole Kicker   Vio-Brn   D45 D46   Blk-Brn   Sol. 01C 1 of 6 (U)/ Arrow
Sol. 02A Ball Shooter Lane Feeder   Vio-Red   D31 D32   Blk-Red   Sol. 02C Right Spinner Flasher
    Gry-Brn   Sol. 01C Left Spinner Flasher   5J1-8 (Q25)
    Gry-Red   Sol. 02C   5J1-4 (Q31)

Sol. 05A Flipper Post Upr PF   Vio-Grn   D37 D38   Blk-Grn   Sol. 05C 3 of 6 (U)/ Upr PF Hi Flashers   5J1-4 (Q31)

Sol. 08A Center Eject Hole   Vio-Gry   D43 D44   Blk-Gry   Sol. 08C 6 of 6 (U)/ Cap. (L) Flashers   5J1-1 (Q22)

Sol. 03A Lock Kicker   Vio-Orn   D33 D34   Blk-Orn   Sol. 03C 1 of 6 (U)/ Arrow   5J1-6 (Q32)

Sol. 04A Ball Cannon   Vio-Yel   D35 D36   Blk-Yel   Sol. 04C 2 of 6 (U)/ Speed -O(L) Flashers   5J1-4 (Q24)

Sol. 06A Freestyle Kicker   Vio-Blu   D39 D40   Blk-Blu   Sol. 06C 4 of 6 (U)/ Upr PF Lo Flashers   5J1-3 (Q23)

Sol. 07A Knocker   Vio-Blk   D41 D42   Blk-Vio   Sol. 07C 5 of 6 (U)/ Tech (L) Flashers   5J1-2 (Q30)
    Gry-Vio   Sol. 07C

Aux Pwr Driver Bd A/C Select Relay 50V Circuits
A Side 5J12-11, -12 YEL-VIO

Controlled, Special, and Switched Solenoids

BANZAI RUN 73

Power Wiring Diagram

BANZAI RUN 74

Diagnostic Test Flowchart

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

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

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

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

NO

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

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

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

Game Over

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

Game is in Attract Mode, ready to play.

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

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

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.

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 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.

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

BANZAI RUN 76

SYSTEM 11B CPU INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
1J1-1	BLU-GRY	ST-8: Display Digit Strobe / 4J3-1	1J2-1	VIO-GRY	ST-16: Display Digit Strobe / 4J4-1
1J1-2	BRN-VIO	ST-7: Display Digit Strobe / 4J3-2	1J2-2	VIO-BLK	ST-15: Display Digit Strobe / 4J4-2
1J1-3	BRN-BLU	ST-6: Display Digit Strobe / 4J3-3	1J2-3	VIO-BLU	ST-14: Display Digit Strobe / 4J4-3
1J1-4	BRN-GRN	ST-5: Display Digit Strobe / 4J3-4	1J2-4	VIO-GRN	ST-13: Display Digit Strobe / 4J4-4
1J1-5	BRN-YEL	ST-4: Display Digit Strobe / 4J3-5	1J2-5	VIO-YEL	ST-12: Display Digit Strobe / 4J4-5
1J1-6	BRN-RED	ST-3: Display Digit Strobe / 4J3-6	1J2-6	VIO-ORG	ST-11: Display Digit Strobe / 4J4-6
1J1-7	BRN-ORG	ST-2: Display Digit Strobe / 4J3-7	1J2-7	VIO-RED	ST-10: Display Digit Strobe / 4J4-7
1J1-8	—	Key Pin	1J2-8	VIO-BRN	ST-9: Display Digit Strobe / 4J4-8
1J1-9	BRN-BLK	ST-1: Display Digit Strobe / 4J3-9	1J2-9	—	Key Pin
1J3-1	BLU-BRN	D1 / Display BCD / 4J5-1	1J4-1	VIO	No Connection
1J3-2	BLU-RED	C1 / Display BCD / 4J5-2	1J4-2	VIO	No Connection
1J3-3	BLU-ORG	B1 / Display BCD / 4J5-2	1J4-3	—	Key Pin
1J3-4	BLU-YEL	A1 / Display BCD / 4J5-4	1J4-4	—	No Connection
1J3-5	BLU-GRN	D2 / Display BCD / 4J5-5	1J4-5	—	No Connection
1J3-6	—	No Connection	1J4-6	—	No Connection
1J3-7	BLU-BLK	C2 / Display BCD / 4J5-7	1J4-7	—	No Connection
1J3-8	BLU-VIO	B2 / Display BCD / 4J5-8	1J4-8	VIO	Lamp +18V dc Power
1J3-9	BLU-GRY	A2 / Display BCD / 4J5-9	1J4-9	VIO	Lamp +18V dc Power
1J3-10	—	No Connection			
1J3-11	—	No Connection			
1J3-12	—	No Connection			
1J5-1	—	Key Pin	1J6-1	RED-BRN	Lamp Row 2 (Q81)
1J5-2	BLK	Ground (Lamp Ckt)	1J6-2	RED-BLK	Lamp Row 1 (Q80)
1J5-3	BLK	Ground (Lamp Ckt)	1J6-3	RED-ORG	Lamp Row 3 (Q82)
1J5-4	BLK	Ground (Lamp Ckt)	1J6-4	—	Key Pin
1J5-5	—	No Connection	1J6-5	RED-YEL	Lamp Row 4 (Q83)
1J5-6	—	No Connection	1J6-6	RED-GRN	Lamp Row 5 (Q84)
1J5-7	—	No Connection	1J6-7	RED-BLU	Lamp Row 6 (Q85)
1J5-8	—	No Connection	1J6-8	RED-VIO	Lamp Row 7 (Q86)
1J5-9	—	No Connection	1J6-9	RED-GRY	Lamp Row 8 (Q87)
1J7-1	YEL-BRN	Lamp Col 1 (D65/66)	1J8-1	GRN-BRN	Switch Col 1 (Q33) / 5J1-9
1J7-2	YEL-RED	Lamp Col 2 (D63/64)	1J8-2	GRN-RED	Switch Col 2 (Q25) / 5J1-7
1J7-3	YEL-ORG	Lamp Col 3 (D61/62)	1J8-3	—	Key Pin
1J7-4	—	Key Pin	1J8-4	GRN-ORG	Switch Col 3 (Q32) / 5J1-6
1J7-5	YEL-GRN	Lamp Col 4 (D59/60)	1J8-5	GRN-YEL	Switch Col 4 (Q24) / 5J1-5
1J7-6	YEL-YEL	Lamp Col 5 (D57/58)	1J8-6	GRN-BLU	Switch Col 5 (Q31) / 5J1-4
1J7-7	YEL-BLU	Lamp Col 6 (D55/56)	1J8-7	GRN-VIO	Switch Col 6 (Q23) / 5J1-3
1J7-8	YEL-VIO	Lamp Col 7 (D53/54)	1J8-8	GRN-GRY	Switch Col 7 (Q30) / 5J1-2
1J7-9	YEL-GRY	Lamp Col 8 (D51/52)	1J8-9	GRN-GRY	Switch Col 8 (Q22) / 5J1-1
			1J9		Not Applicable

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
1J10-1	WHT-GRY	Switch Row 8	1J11-1	GRN-BRN	Solenoid 1 (Q33) / 5J1-9
1J10-2	WHT-VIO	Switch Row 7	1J11-2	—	Key Pin
1J10-3	WHT-BLU	Switch Row 6	1J11-3	GRY-RED	Solenoid 2 (Q25) / 5J1-7
1J10-4	—	Key Pin	1J11-4	GRY-ORG	Solenoid 3 (Q32) / 5J1-6
1J10-5	WHT-GRN	Switch Row 5	1J11-5	GRY-YEL	Solenoid 4 (Q24) / 5J1-5
1J10-6	WHT-YEL	Switch Row 4	1J11-6	GRY-GRN	Solenoid 5 (Q31) / 5J1-4
1J10-7	WHT-ORG	Switch Row 3	1J11-7	GRY-BLU	Solenoid 6 (Q23) / 5J1-3
1J10-8	WHT-RED	Switch Row 2	1J11-8	GRY-VIO	Solenoid 7 (Q30) / 5J1-2
1J10-9	WHT-BRN	Switch Row 1	1J11-9	GRY-BLK	Solenoid 8 (Q22) / 5J1-1
			1J12-1	BLK	Solenoid 9 (Q17) / 5J2-9
			1J12-2	BLK	Solenoid 10 (Q9) / 5J2-8
			1J12-3	—	Key Pin
			1J12-4	BLK	Solenoid 11 (Q16) / 5J2-5
			1J12-5	BLK	Solenoid 12 (Q8) / 5J2-5
			1J12-6	BLK	Solenoid 13 (Q15) / Mys. Whl Mtr Cntl
			1J12-7	BLK	Solenoid 14 (Q7) / Mys. Whl Mtr Cntl
			1J12-8	BRN-BLK	Solenoid 15 (Q14) / 5J2-2
			1J12-9	BRN-GRY	Solenoid 16 (Q6) / 5J2-1
1J14-1	BLK-RED	Memory Protect / 7J1-4	1J13-1	BLK	Ground / 3J6-11
1J14-2	BLK	Ground / 7J1-3	1J13-2	BLK	No Connection / 3J6-12
1J14-3	GRN	ADVANCE Switch / 7J1-1	1J13-3	BLK	— / 3J6-13
1J14-4	BLU	AUTO/MANUAL Switch / 7J1-2	1J13-4	BLK	Power: +12V dc / 3J6-7
			1J13-5	GRY	Power: +12V dc Unreg / 3J6-8
			1J13-6	GRY	Power: +5V dc / 3J6-8

Connector	Wire Color	Signal Designation/Description
1J16-1	RED	Volume Control Input / 11J1-1
1J16-2	BLK	Volume Control Output / 11J1-2
1J16-3	—	Key Pin No Connection
1J16-4	White	Signal Ground - CPU / 11J1-4
1J18-1	—	No Connection
1J18-2	ORG-BLK	Spl Solnd Sw 3
1J18-3	ORG-RED	Spl Solnd Sw 2
1J18-4	—	Key Pin No Connection
1J18-5	ORG-YEL	Spl Solnd Sw 4
1J18-6	ORG-GRN	Spl Solnd Sw 1
1J18-7	WHT	No Connection
1J18-8	Key Pin	No Connection
1J18-9	ORG-BLU	Spl Solnd Sw Ground
1J19-1	ORG-VIO	Spl Solnd 4 (Q68) / 5J3-4
1J19-2	ORG-GRY	Flipper Ground
1J19-3	BLU-ORN	Spl Solnd 3 (Q71) / 5J3-3
1J19-4	BLU-GRN	Flipper Ground
1J19-5	Key Pin	No Connection
1J19-6	BLU-YEL	Spl Solnd 2 (Q71) / 5J3-3
1J19-7	BLU-BRN	Flipper Ground
1J19-8	BLU-GRN	Spl Solnd 5 (Q77) / 5J3-2
1J19-9	BLU-BLK	Spl Solnd 6 (Q79) / 5J3-1
1J21		Ribbon Cable to Audio Board 11J4
1J22		Ribbon Cable to Master Display Board 4J1

POWER SUPPLY INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
3J1-1	—	No Connection	3J6-1	RED	Signal Input (from CPU) / 11J16-1
3J1-2	—	No Connection	3J6-2	BLK	Sound Input (from CPU) / 11J16-2
3J1-3	—	No Connection	3J6-3	—	No Connection
3J1-4	WHT	Transformer: 88.5V ac	3J6-4	WHT	Ground / 11J16-4
3J1-5	—	No Connection	3J6-5	Key Pin	No Connection
3J1-8	—	No Connection	3J6-6	WHT-GRY	CPU Pwr: +12V dc Unreg / 1J17-9
3J1-9	WHT	Transformer: 88.5V ac	3J6-7	GRY	CPU Pwr: +5V dc Reg / 1J17-4
3J1-10	VIO-RED	Transformer: 19.4V ac, 10, C.T.	3J6-8	—	No Connection
3J1-11	GRY	Transformer: 19.4V ac, 10, C.T.	3J6-9	GRY-YEL	CPU Pwr: +5V dc Reg / 1J17-8
3J1-12	GRY-WHT	Transformer: 19.4V ac, C.T. com	3J6-10	BLK	Ground / 1J17-5
3J5-1	BLK	Ground (Display ckt) / 4J2-5	3J6-11	BLK	Ground / 1J17-1
3J5-2	—	No Connection	3J6-12	BLK	Ground / 1J17-2
3J5-3	ORG	Display Power: -100V dc / 4J2-1	3J6-13	BLK	Ground / 1J17-3
3J5-4	BRN	Display Power: +100V dc / 4J2-3	3J6-14	—	No Connection
3J5-5	GRY	Display Power: +5V dc / 4J2-6	3J6-15	—	No Connection
3J8-1	BRN	Gen'l Illumination Power: 6V ac			
3J8-2	YEL	Transformer: 6V ac			
3J8-3	GRN	Transformer: 6V ac			
3J8-4	VIO	Transformer: 6V ac			
3J8-5	—	No Connection			
3J8-6	WHT-BRN	Gen'l Illumination Power: 6V ac			
3J8-7	YEL-WHT	Transformer: 6V ac			
3J8-8	WHT-GRN	Transformer: 6V ac			
3J8-9	WHT-VIO	Transformer: 6V ac			
3J9-1	YEL	Transformer: 6V ac			
3J9-2	YEL	Transformer: 6V ac			
3J9-3	YEL-WHT	Transformer: 6V ac			
3J9-4	WHT-GRY	Power: +12 Vdc Unreg / 3J6-6			

AUDIO BOARD INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description
11J1-1	RED	Signal Level (to Vol Cmt)
11J1-2	BLK	Signal Level (from Vol Cmt)
11J1-3	—	No Connection
11J1-4	WHT	Ground
11J4		Ribbon Cable from CPU 1J21
11J2-1	GRY	Power: +5 Vdc / 3J6-7
11J2-2	BLK	Ground / 3J6-11
11J2-3	BLK-WHT	Power: -12 Vdc Unreg / 3J6-2
11J2-4	WHT	Power: +12 Vdc Unreg / 3J6-6
11J5-1	BLK-YEL	Logic Ground
11J5-2	BLK	BLK-YEL / Speaker
11J5-3	BLK	BLK-YEL / Speaker
11J5-4	BLK	BLK / Speaker

MASTER DISPLAY INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
4J2-1	BLU-BRN	D1 / Display BCD / 1J3-1	4J1-1	BLU-BRN	ST-16: Digit Display Strobe / 1J1-1
4J2-2	BLU-RED	C1 / Display BCD / 1J3-2	4J1-2	VIO-BLK	ST-15: Display Digit Strobe / 1J1-2
4J2-3	BLU-ORG	B1 / Display BCD / 1J3-3	4J1-3	BLU-ORG	ST-14: Display Digit Strobe / 1J1-3
4J2-4	BLU-YEL	A1 / Display BCD / 1J3-4	4J1-4	A1	ST-13: Display Digit Strobe / 1J1-4
4J2-5	BLU-GRN	D2 / Display BCD / 1J3-5	4J1-5	BLU-GRN	ST-12: Display Digit Strobe / 1J1-5
4J2-6	—	No Connection	4J1-6	—	No Connection
4J2-7	BLU-BLK	C2 / Display BCD / 1J3-7	4J1-7	BLU-BLK	ST-3: Display Digit Strobe / 1J1-7
4J2-8	BLU-VIO	B2 / Display BCD / 1J3-8	4J1-8	BLU-VIO	ST-2: Display Digit Strobe / 1J1-8
4J2-9	BRN-BLK	A2 / Display BCD / 1J3-9	4J1-9	BRN-BLK	ST-1: Display Digit Strobe / 1J1-9
4J3-1	BLU-GRY	ST-8: Digit Display Strobe / 1J2-1	4J11-1	—	Ground / 3J5-1
4J3-2	VIO-BLK	ST-7: Display Digit Strobe / 1J2-2	4J11-2	—	No Connection
4J3-3	BLU-ORG	ST-6: Display Digit Strobe / 1J2-3	4J11-3	ORG	Display Power: -100V dc / 3J5-3
4J3-4	VIO-GRN	ST-5: Display Digit Strobe / 1J2-4	4J11-4	BRN	Display Power: +100V dc / 3J5-4
4J3-5	VIO-YEL	ST-4: Display Digit Strobe / 1J2-5	4J11-5	GRY	Display Power: +5V dc / 3J5-6
4J3-6	VIO-ORG	ST-3: Display Digit Strobe / 1J2-6	4J11-6	Key Pin	No Connection
4J3-7	VIO-RED	ST-2: Display Digit Strobe / 1J2-7			
4J3-8	VIO-BRN	ST-8: Display Digit Strobe / 1J2-8			
4J3-9	GRY	ST-8: Display Digit Strobe / 1J2-9			
4J12		Ribbon Cable from CPU 1J22			

Diagram — board layout

Master Display Board D-10877

Power Supply D-8345-566

Audio Board D-11581-566

System 11B CPU Board D-11883-566

Backbox Interconnect Board D-12112

Aux Power Driver Bd D-11813-566

Connector references: 1J1–1J22, 2J1–2J18, 3J5, 3J6, 4J1, 4J2, 4J3, 4J11, 4J12, 5J1–5J12, RLY1 RLY2 RLY3 RLY4 RLY5, R1 R2 R3 R4 R5, F1–F4

Interboards Signals - Sheet 1

BACKBOX INTERCONNECT BOARD INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
2J1-1	WHT-BRN	Switch Row 1	2J2-1	YEL-GRY	Lamp Col 8 (Q51/52)
2J1-2	WHT-RED	Switch Row 2	2J2-2	YEL-VIO	Lamp Col 7 (Q53/54)
2J1-3	WHT-ORG	Switch Row 3	2J2-3	YEL-BLU	Lamp Col 6 (Q55/56)
2J1-4	WHT-GRN	Switch Row 4	2J2-4	YEL-BLK	Lamp Col 5 (Q57/58)
2J1-5	WHT-YEL	Switch Row 5	2J2-5	YEL-ORG	Lamp Col 4 (Q59/60)
2J1-6	WHT-BLU	Switch Row 6	2J2-6	YEL-RED	Lamp Col 3 (Q61/62)
2J1-7	WHT-VIO	Switch Row 7	2J2-7	YEL-BRN	Lamp Col 2 (Q63/64)
2J1-8	WHT-GRY	Switch Row 8	2J2-8	Key Pin	No Connection
2J1-9	Key Pin	No Connection	2J2-9	YEL-BRN	Lamp Col 1 (Q65/66)
2J1-10	GRN-BRN	Switch Col 8 (Q46)	2J2-10	WHT-BRN	No Connection
2J1-11	GRN-RED	Switch Col 7 (Q47)	2J2-11	WHT-RED	Lamp Row 8 (Q87)
2J1-12	GRN-ORG	Switch Col 6 (Q48)	2J2-12	WHT-ORG	Lamp Row 7 (Q86)
2J1-13	GRN-YEL	Switch Col 5 (Q43)	2J2-13	WHT-GRN	Lamp Row 6 (Q85)
2J1-14	GRN-BLU	Switch Col 4 (Q44)	2J2-14	WHT-BLU	Lamp Row 5 (Q84)
2J1-15	GRN-VIO	Switch Col 3 (Q49)	2J2-15	WHT-VIO	Lamp Row 4 (Q83)
2J1-16	GRN-GRY	Switch Col 4 (Q48)	2J2-16	RED-ORG	Lamp Row 3 (Q82)
2J1-17	GRN-ORG	Switch Col 2 (Q4A)	2J2-17	RED-BRN	Lamp Row 2 (Q81)
2J1-18	GRN-BRN	Switch Col 1 (Q45)	2J2-18	RED-BLK	Lamp Row 1 (Q80)
2J3-1	ORG-VIO	Flipper Ground	2J4-1		No Connection
2J3-2	ORG-GRY	Flipper Ground	2J4-2		No Connection
2J3-3	GRY-YEL	Flipper Power/SJ12-2	2J4-3	BLU-BLK	Spl Solnd 9
2J3-4	BLU-YEL	Flipper Power/SJ12-4	2J4-4	BRN-RED	Solenoid 10
2J3-5	RED	+25 Vdc / SJ11-8	2J4-5	BRN-ORG	Solenoid 11
2J3-6	RED	+25 Vdc / SJ11-8	2J4-6		No Connection
2J3-7	ORG	+25 Vdc (C solnd)/ SJ11-1	2J4-7		No Connection
2J5-1	YEL-BRN	Lamp Col 1 (Q65/66)	2J6-1	BLK-GRN	Solenoid 05C Out
2J5-2	RED-YEL	Lamp Row 4 (Q83)	2J6-2	BLK-BLU	Solenoid 06C Out
2J5-3	ORG	+25 Vdc (C solnd)/ SJ11-1	2J6-3	Key Pin	No Connection
2J5-4	Key Pin	No Connection	2J6-4		+25 Vdc (C solnd)/ SJ11-1
2J5-5	BLK-ORG	Solenoid 05C Out	2J6-5	YEL-GRN	Illum pwr. 6V ac
2J5-6	BLK-GRN	Solenoid 06C Out	2J6-6	YEL/Gen.	Illum pwr. 6V ac
2J5-7	BLK-BLU	Solenoid 07C Out	2J6-7	YEL/Gen.	Illum pwr. 6V ac
2J5-8	BLK-VIO	Solenoid 07C Out	2J6-8	YEL/Gen.	Illum pwr. 6V ac
2J5-9	BLK-VIO	Solenoid 06C Out	2J6-9	YEL-WHT/Gen.	Illum pwr. 6V ac
2J5-10	GRN-GRN/Gen.	Illum pwr. 6V ac	2J6-10	YEL-WHT/Gen.	Illum pwr. 6V ac
2J5-11	BLK-GRY	Solenoid 04C Out	2J6-11	YEL-WHT/Gen.	Illum pwr. 6V ac
2J5-12	BLK-YEL	Solenoid 04C Out	2J6-12	YEL-WHT/Gen.	Illum pwr. 6V ac
2J7-1	BLK-GRY	Solenoid 08C Out	2J8-1	YEL-GRN	Illum. pwr. 6V ac
2J7-2		No Connection	2J8-2	Key Pin	No Connection
2J7-3	BLK-VIO	Solenoid 07C Out	2J8-3	YEL/Gen.	Illum pwr. 6V ac
2J7-4	BLK-BLU	Solenoid 07C Out	2J8-4	YEL/Gen.	Illum pwr. 6V ac
2J7-5	BLK-GRN	Solenoid 05C Out	2J8-5	Key Pin	No Connection
2J7-6	BLK-BRN	Solenoid 01C Out	2J8-6	YEL-WHT/Gen.	Illum pwr. 6V ac
2J7-7	BLK-RED	Solenoid 02C Out	2J8-7	YEL-WHT/Gen.	Illum pwr. 6V ac
2J7-8	BLK-ORG	Solenoid 03C Out	2J8-8	YEL-WHT/Gen.	Illum pwr. 6V ac
2J7-9	BLK-VIO	Solenoid 07C Out	2J8-9	YEL-WHT/Gen.	Illum pwr. 6V ac
2J7-10		+25 Vdc (C solnd)/ SJ11-1	2J10-1	BLK-GRN	Solenoid 05C Out
2J9-1	BRN/Gen.	Illum pwr. 6V ac	2J10-2		No Connection
2J9-2	Key Pin	No Connection	2J10-3		No Connection
2J9-3	WHT-BRN/Gen.	Illum pwr. 6V ac	2J10-4	VIO/Gen.	Illum pwr. 6V ac

BACKBOX INTERCONNECT BOARD INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
2J15-1	GRN-BRN	Switch Col 1 (Q45)	2J16-1	GRN-BRN	Switch Col 1 (Q45)
2J15-2	GRN-RED	Switch Col 2 (Q49)	2J16-2	GRN-RED	Switch Col 2 (Q49)
2J15-3	GRN-ORG	Switch Col 3 (Q44)	2J16-3	GRN-ORG	Switch Col 3 (Q44)
2J15-4	GRN-YEL	Switch Col 4 (Q48)	2J16-4	GRN-YEL	Switch Col 4 (Q48)
2J15-5	Key Pin	No Connection	2J16-5	GRN-BLU	Switch Col 5 (Q43)
2J15-6	WHT-GRY	Switch Row 8	2J16-6	GRN-GRY	Switch Col 6 (Q47)
2J15-9	WHT-VIO	Switch Row 7	2J17-1	WHT-BLU	Switch Row 6
2J15-10	WHT-BLU	Switch Row 6	2J17-2	WHT-YEL	Switch Row 5
2J15-11	WHT-YEL	Switch Row 5	2J17-3	Key Pin	No Connection
2J15-12	WHT-ORG	Switch Row 3	2J17-4	WHT-ORG	Switch Row 3
2J15-13	WHT-RED	Switch Row 2	2J17-5	WHT-RED	Switch Row 2
2J15-14	WHT-BRN	Switch Row 1	2J17-6	WHT-BRN	Switch Row 1
2J18-1	WHT-YEL/Gen.	Illum pwr. 6V ac			
2J18-2	YEL/Gen.	Illum pwr. 6V ac			
2J18-3	BLK-YEL	Upr R Flipper Switch, UPF			
2J18-4	RED	Key Pin	No Connection		
2J18-5	BLU-GRY	Lwr L Flipper Switch, LPF			
2J18-6	BLU-VIO	Lwr R Flipper Switch, LPF			
2J18-7	ORG-GRY	Flipper Ground			

AUX POWER DRIVER INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
5J1-1	GRY-BLK	CPU: Solenoid 8 (Q22) / 1J11-9	5J2-1	BRN-GRY	CPU: Solenoid 16 (Q6) / 1J12-9
5J1-2	WHT-VIO	CPU: Solenoid 7 (Q20) / 1J11-8	5J2-2	BRN-VIO	CPU: Solenoid 15 (Q14) / 1J12-8
5J1-3	GRY-BLU	CPU: Solenoid 6 (Q23) / 1J11-7	5J2-3	Key Pin	No Connection
5J1-4	BLU-YEL	CPU: Solenoid 5 (Q21) / 1J11-6	5J2-4	VIO-GRN	Solenoid 06A
5J1-5	GRY-YEL	CPU: Solenoid 4 (Q24) / 1J11-5	5J2-5	VIO-YEL	Solenoid 05A
5J1-6	GRY-RED	CPU: Solenoid 3 (Q25) / 1J11-4	5J2-6	VIO-ORG	Solenoid 04A
5J1-7	GRY-BRN	CPU: Solenoid 2 (Q25) / 1J11-3	5J2-7	VIO-RED	Solenoid 03A
5J1-8	Key Pin	No Connection	5J2-8	VIO-BRN	Solenoid 02A
5J1-9	GRY-BRN	CPU: Solenoid 1 (Q35) / 1J11-1	5J2-9	VIO-BRN	Solenoid 01A
5J3-1	BLU-BLK	CPU: Spl Solnd 6	5J4-1	VIO-GRY	Solenoid 08A
5J3-2	BLU-GRN	CPU: Spl Solnd 5 (Q77) / 1J19-8	5J4-2	VIO-BLK	Solenoid 07A
5J3-3	BLU-ORG	CPU: Spl Solnd 3 (Q73) / 1J19-6	5J4-3	Key Pin	No Connection
5J3-4	BLU-RED	CPU: Spl Solnd 4 (Q69) / 1J19-6	5J4-4	VIO-GRN	Solenoid 06A
5J3-5	Key Pin	No Connection	5J4-5	VIO-YEL	Solenoid 05A
5J3-6	BLU-YEL	CPU: Spl Solnd 2 (Q71) / 1J19-4	5J4-6	VIO-ORG	Solenoid 04A
5J3-7	BLU-BRN	CPU: Spl Solnd 1 (Q75) / 1J19-7	5J4-7	VIO-RED	Solenoid 03A
5J5-1	WHT-GRY	Solenoid 08C	5J4-8	VIO-BRN	Solenoid 02A
5J5-2	WHT-VIO	Solenoid 07C	5J4-9	VIO-BRN	Solenoid 01A
5J5-3	WHT-BLU	Solenoid 06C	5J6-1	BRN-GRY	CPU: Solenoid 12 (Q15) / 1J12-5
5J5-4	WHT-GRN	Solenoid 05C	5J6-2	BRN-VIO	CPU: Solenoid 11 (Q16) / 1J12-4
5J5-5	WHT-YEL	Solenoid 04C	5J6-3	Key Pin	No Connection
5J5-6	WHT-ORG	Solenoid 03C	5J6-4	BRN-RED	No Connection
5J5-7	WHT-RED	Solenoid 02C	5J6-5		No Connection
5J5-8	Key Pin	No Connection	5J6-6		Solenoid 13
5J5-9	WHT-BRN	Solenoid 01C	5J6-7	BRN-ORG	Solenoid 14
5J7-1	BLU-BLK	Spl Solnd 6	5J6-8	BRN-RED	Solenoid 15
5J7-2	BLU-GRN	Spl Solnd 5	5J6-9	BRN-BLK	Solenoid 9
5J7-3	BLU-ORG	Spl Solnd 4	5J8-1	WHT-RED	Transformer: 26V ac / 7J2-6
5J7-4	BLU-YEL	Key Pin	No Connection	5J8-2	WHT-RED	Transformer: 26V ac / 7J2-6
5J7-5	BLU-VIO	Spl Solnd 3	5J8-3	WHT-RED	Transformer: 26V ac / 7J2-7
5J7-6	BLU-RED	Spl Solnd 2	5J8-4	WHT-RED	Transformer: 26V ac / 7J2-7
5J7-7	BLU-BRN	Spl Solnd 1	5J8-5	Key Pin	No Connection
5J9-1		No Connection	5J8-6	BRN-ORG	No Connection
5J9-2		No Connection	5J8-7	BLK-YEL	Transformer: 48V ac / 7J2-11
5J9-3	Key Pin	No Connection	5J8-8	BLK-YEL	Transformer: 48V ac / 7J2-11
5J9-4		No Connection	5J8-9	BLK-YEL	Transformer: 48V ac / 7J2-12
5J9-5	WHT-BLU	25 Vac: Ferris Wheel Motor	5J10-1	Key Pin	No Connection
5J9-6		No Connection	5J10-2	BLK	Solnd Gnd / 1J13-2
5J9-7	WHT-BLU	25 Vac: Ferris Wheel Motor	5J10-3	BLK	Solnd Gnd / 1J13-3
5J12-1	GRY-YEL	No Connection	5J10-4	BLK	Solnd Gnd / 1J13-4
5J12-2		+50 Vdc / Flippers	5J11-1	ORG	+25 Vdc (C solnd) / Sol 01C thru
5J12-3	BLU-YEL	No Connection	5J11-2	ORG	+25 Vdc (C solnd) / Sol 08C
5J12-4		+50 Vdc / Flippers	5J11-3	Key Pin	No Connection
5J12-5		No Connection	5J11-4		No Connection
5J12-6		No Connection	5J11-5	BRN	+25 Vdc / 7PA-3
5J12-7	VIO-YEL	+50 Vdc / Sol. 18 & 20	5J11-6		No Connection
5J12-8	Key Pin	No Connection	5J11-7		No Connection
5J12-9		No Connection	5J11-8	RED	+25 Vdc / Sol 9,10,11, &
5J12-10		No Connection	5J11-9	RED	+25 Vdc / Sol 15,16
5J12-11	VIO-VIO	+50 Vdc (A solnd)/ Sol. 03A, 04A, &	5J11-10	RED	No Connection
5J12-12	YEL-VIO	+50 Vdc (A solnd)/ Sol. 07A	5J11-11	RED	+25 Vdc / Sol. 17, 19, 21
			5J11-12	RED-WHT	+50 Vdc / No Connection

Interboards Signals -

Sheet 2

BANZAI RUN Upper and Lower Playfields Lamp-Matrix Table

COLUMN / ROW	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9	9 Q62 YEL-ORN 1J7-3
Q80 RED-BRN 1J6-1	1 upf Not Used / 1 lpf Arrow Banzai Hill	9 upf Not Used / 9 lpf Lock (hwr) Center Eject	17 upf Not Used / 17 lpf "SUPER" (Super Cycle Stunt)	25 upf Freestyle (lower Blue) / 25 lpf Not Used	33 upf Not Used / 33 lpf Left Eject Rank 6 (low)	41 upf Not Used / 41 lpf "RACE" Low Red Strup Tgt	49 upf Defeat Green Machine / 49 lpf [2] Gr. Machine Challenged	57 upf Not Used / 57 lpf SPECIAL (L Outlane)	65 upf Cliff Jump 2X Lower Mouse Hole / 65 lpf Not Used
Q81 RED-BLK 1J6-2	2 upf Not Used / 2 lpf Ramp Arrow (Rank #1)	10 upf Not Used / 10 lpf Freestyle Center Eject	18 upf Not Used / 18 lpf "CYCLE" (Super Cycle Stunt)	26 upf Freestyle (upper Blue) / 26 lpf Not Used	34 upf Not Used / 34 lpf Left Eject Rank 5	42 upf Not Used / 42 lpf "RED" Cen Red Strup Tgt	50 upf Defeat RED HOT / 50 lpf [2] RED HOT Challenged	58 upf Not Used / 58 lpf LAPS 1	66 upf Extra Ball Cap. Ball (high) / 66 lpf Not Used
Q82 RED-ORN 1J6-3	3 upf Not Used / 3 lpf Ride Again	11 upf Not Used / 11 lpf Timelock Center Eject	19 upf Not Used / 19 lpf "CYCLE" (Super Cycle Stunt)	27 upf Freestyle (lower Yellow) / 27 lpf Not Used	35 upf Not Used / 35 lpf Left Eject Rank 4	43 upf Not Used / 43 lpf "HOT" Hi Red Strup Tgt	51 upf Not Used / 51 lpf PRIOR RACE Blue	59 upf Not Used / 59 lpf LAPS 2	67 upf Rank #1 Cap. Ball / 67 lpf Not Used
Q83 RED-YEL 1J6-5	4 upf Not Used / 4 lpf Ball in Play (Scoreboard)	12 upf Not Used / 12 lpf Kickback Center Eject	20 upf Not Used / 20 lpf Ramp Double Lap (low left)	28 upf Freestyle (upper Yellow) / 28 lpf Not Used	36 upf Not Used / 36 lpf Left Eject Rank 3	44 upf Not Used / 44 lpf "RACE" Low Blu Strup Tgt	52 upf Not Used / 52 lpf PRIOR RACE Yellow	60 upf Not Used / 60 lpf LAPS 3	68 upf A Standup Target / 68 lpf Not Used
Q84 RED-GRN 1J6-6	5 upf Not Used / 5 lpf Kickback	13 upf Not Used / 13 lpf Left Spinner 3000 W/L	21 upf Not Used / 21 lpf Ramp "SPOT" (low right)	29 upf Freestyle (lower Green) / 29 lpf Not Used	37 upf Lock Arrow [2] / 37 lpf Left Eject Rank 2 (high)	45 upf Not Used / 45 lpf "BLUE" Cen Blu Strup Tgt	53 upf Not Used / 53 lpf PRIOR RACE Green	61 upf Not Used / 61 lpf LAPS 4	69 upf B Standup Target / 69 lpf Not Used
Q85 RED-BLU 1J6-7	6 upf Not Used / 6 lpf Extra Ball Cap. Ball (low)	14 upf Not Used / 14 lpf "RACE" (Top left lane)	23 upf Not Used / 22 lpf R Spinner 3000 W/L	30 upf Freestyle (upper Green) / 30 lpf Not Used	38 upf Not Used / 38 lpf "RACE" L Yel Stndup Tgt	46 upf Not Used / 46 lpf "BEARD" Hi Blu Strup Tgt	54 upf Not Used / 54 lpf PRIOR RACE Red	62 upf Not Used / 62 lpf LAPS 5	70 upf C Standup Target / 70 lpf Not Used
Q86 RED-VIO 1J6-8	7 upf Not Used / 7 lpf 50,000 Cap. Ball (cntr)	15 upf Not Used / 15 lpf "GREEN" (Top cntr lane)	23 upf Not Used / 23 lpf Flipper Lane [2] (both)	31 upf Freestyle (lower Red) / 31 lpf Not Used	39 upf Not Used / 39 lpf "YELLOW" C Yel Stndup Tgt	47 upf Defeat BLUE BEARD / 47 lpf [2] BLUE BEARD Challenged	55 upf Not Used / 55 lpf SPECIAL (R Outlane)	63 upf Not Used / 63 lpf LAPS 10	71 upf Post Out / 71 lpf Not Used
Q87 RED-GRY 1J6-9	8 upf Not Used / 8 lpf 25,000 Cap. Ball (high)	16 upf Not Used / 16 lpf "MACHINE" (Top right lane)	24 upf Not Used / 24 lpf 1 LAP Stndup Tgt [2] (both)	32 upf Freestyle (upper Red) / 32 lpf Not Used	40 upf Not Used / 40 lpf "BELLY" R Yel Stndup Tgt	48 upf Defeat YELLOW BELLY / 48 lpf [2] YELLOW BELLY Challenged	56 upf Arrow (Kicker) / 56 lpf Not Used	64 upf Not Used / 64 lpf LAPS 20	72 upf Cliff Jump / 72 lpf Not Used

BANZAI RUN Upper and Lower Playfields Switch-Matrix Table

COLUMN / ROW	1 Q45 GRN-BRN 1J8-1	2 Q49 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
WHT-BRN 1J10-9	1 upf Not Used / 1 lpf Plumb Bob Tilt	9 upf Not Used / 9 lpf Outhole	17 upf Not Used / 17 lpf Center Eject Hole	25 upf Not Used / 25 lpf Left Flipper EOS	33 upf Not Used / 33 lpf Ramp #1 (right)	41 upf Not Used / 41 lpf "RACE" Low Red Strup Tgt	49 upf Freestyle (lower Blue) / 49 lpf Not Used	57 upf Freestyle (lower Green) / 57 lpf Not Used
WHT-RED 1J10-8	2 upf Not Used / 2 lpf Playfield Tilt	10 upf Not Used / 10 lpf Ball Trough #1 (right)	18 upf Not Used / 18 lpf "RED" Cen Red Strup Tgt	26 upf Not Used / 26 lpf Ramp #2 (up-left)	34 upf Not Used / 34 lpf Right Flipper EOS	42 upf Freestyle (upper Blue) / 42 lpf Not Used	50 upf Flipper Post / 50 lpf Not Used	58 upf Freestyle (upper Green) / 58 lpf Not Used
WHT-ORN 1J10-7	3 upf Not Used / 3 lpf Credit Button	11 upf Not Used / 11 lpf Ball Trough #2 (mid)	19 upf Not Used / 19 lpf Ball Shooter Lane	27 upf Not Used / 27 lpf Left Jet Bumper	35 upf Not Used / 35 lpf Ramp #3 (low left)	43 upf Freestyle (lower Yellow) / 43 lpf "HOT" Hi Red Strup Tgt	51 upf Lower Lifter / 51 lpf Not Used	59 upf Mouse Hole Drain / 59 lpf Not Used
WHT-YEL 1J10-6	4 upf Not Used / 4 lpf Right Coin Chute	12 upf Not Used / 12 lpf Ball Trough #3 (left)	20 upf Not Used / 20 lpf Right Outlane	28 upf Not Used / 28 lpf Upper Right Jet Bumper	36 upf Not Used / 36 lpf Ball Cannon	44 upf Freestyle (upper Yellow) / 44 lpf "RACE" Low Blu Stndup Tgt	52 upf Mouse Hole Cliff Jump / 52 lpf Not Used	60 upf A Stndup Tgt / 60 lpf Not Used
WHT-GRN 1J10-5	5 upf Not Used / 5 lpf Center Coin Chute	13 upf Not Used / 13 lpf Left Eject Hole	21 upf Not Used / 21 lpf Left Spinner	29 upf Not Used / 29 lpf Lower Right Jet Bumper	37 upf Not Used / 37 lpf Target Cap. Ball	45 upf Not Used / 45 lpf "BLUE" Cen Blu Stndup Tgt	53 upf Yellow Roll-Under / 53 lpf Not Used	61 upf B Stndup Tgt / 61 lpf Not Used
WHT-BLU 1J10-3	6 upf Not Used / 6 lpf Left Coin Chute	14 upf Not Used / 14 lpf Top Lane Left	22 upf Not Used / 22 lpf Right Spinner	30 upf Not Used / 30 lpf Left Kicker	38 upf Not Used / 38 lpf "RACE" L Yel Stndup Tgt	46 upf Not Used / 46 lpf "BEARD" Hi Blu Stndup Tgt	54 upf Blue Roll-Under / 54 lpf Not Used	62 upf C Stndup Tgt / 62 lpf Not Used
WHT-VIO 1J10-2	7 upf Not Used / 7 lpf Slam Tilt	15 upf Not Used / 15 lpf Top Lane Cntr	23 upf Not Used / 23 lpf Left Flipper Lane	31 upf Not Used / 31 lpf Right Kicker	39 upf Not Used / 39 lpf "YELLOW" C Yel Stndup Tgt	47 upf Freestyle (lower Red) / 47 lpf Left 1 LAP Stndup Tgt	55 upf Target Cap. Ball / 55 lpf Not Used	63 upf Upper Lifter / 63 lpf Not Used
WHT-GRY 1J10-1	8 upf Not Used / 8 lpf High-Score Reset	16 upf Not Used / 16 lpf Top Lane Right	24 upf Not Used / 24 lpf Right Flipper Lane	32 lpf Left Outlane	40 upf Not Used / 40 lpf "BELLY" R Yel Stndup Tgt	48 upf Freestyle (upper Red) / 48 lpf Right 1 LAP Stndup Tgt	56 upf Green Stndup Tgt / 56 lpf Not Used	64 upf Left Lock Kicker / 64 lpf Not Used

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