LAMPS

COLUMN / ROW	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-5 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J137-7 Q92	8 Yellow-Gray J137-9 Q91
Red-Brown J134-1 Q90 1	Top Lt. Rollover "D" 11	Upper 3-Bnk Lt. Tgt. 21	"C" 31	Bottom "Drain Savers" 41	Lt. "Bowling" 51	Lower Lt. "Start Job Change" 61	Rt. "Dino" 71	Upper Lt. "Frenzy" 81
Red-Black J134-2 Q89 2	Top Mid. Rollover "I" 12	Upper 3-Bnk Cr. Tgt. 22	"O" 32	3-Bnk D. Tgt. "B" 42	Lt. & Rt. 3-Bnk Upper Tgt. 52	Lower Lt. "Help" 62	Lt. & Rt. Machine Time 72	Upper Lt. "Dino" 82
Red-Orange J134-4 Q88 3	Top Rt. Rollover "G" 13	Upper 3-Bnk Rt. Tgt. 23	"N" 33	3-Bnk D. Tgt. "E" 43	Lower Lt. "Frenzy" 53	Lt. & Rt. 3-Bnk Mid. Tgt. 63	Rt. Combo "2" 73	Lt. Lane "Bronto Crane" 83
Red-Yellow J134-5 Q87 4	Mystery Mode "?" 14	Cr. Lane "Extra Ball" 24	"C" 34	3-Bnk D. Tgt. "D" 44	Lower Lt. "Dino" 54	Lt. & Rt. 3-Bnk Lower Tgt. 64	Rt. Combo "3" 74	Lt. "Search" 84
Red-Green J134-6 Q86 5	Fred's Choice 15	Cr. Lane "Search" 25	"R" 35	4-Bnk D. Tgt "R" 45	Lt. Combo "3" 55	Cr. "Jackpot" 65	Rt. Combo "1" 75	Rt. Lane "Job Change" 85
Red-Blue J134-7 Q85 6	"Eat at Joe's" Diner 16	Cr. Lane "Drive Thru" 26	"E" 36	4-Bnk D. Tgt. "O" 46	Lt. Combo "2" 56	Shoot Again 66	Rt. "Bowling" 76	Lt. & Rt. Lane "Start Multiball" 86
Red-Violet J134-8 Q84 7	Bedrock Water Buffalo 17	Lt. Inner Lane "Super Jackpot" 27	"T" 37	4-Bnk D. Tgt. "C" 47	Lt. Combo "1" 57	Lt. "X" On Lt. Ramp 67	Rt. "Frenzy" 77	Buy-In 87
Red-Gray J134-9 Q83 8	Dino Frenzy 18	Lt. Inner Lane "Pltd 2X" 28	"E" 38	4-Bnk D. Tgt. "K" 48	Lower Lt. "Start Machine" 58	Rt. "X" On Lt. Ramp 68	Rt. "Search" 78	Start Button 88

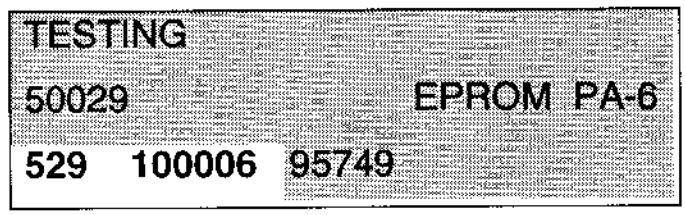
SWITCHES

Dedicated Grounded Switches	COLUMN / ROW	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute D1	**White-Brown** J209-1 U18-11 1	Launch Button 11	Slam 21	Trough #1 31	4-Bnk #1 D.Tgt. 41	Lt. & Rt. 3-Bnk. Bot. Tgt. 51	Lt. Sling 61	Lt. Out Rollover 71	Not Used 81	**Black-Green** J906-1 Lower Right E.O.S. F1
Orange-Red J205-2 Center Coin Chute D2	**White-Red** J209-2 U18-9 2	Ticket Disp. 12	Door Closed 22	Trough #2 32	4-Bnk #2 D. Tgt. 42	Lt. & Rt. 3-Bnk Mid. Tgt. 52	Rt. Sling 62	Lt. Return Rollover 72	Not Used 82	**Blue-Violet** J905-1 Lower Right Opto F2
Orange-Black J205-3 Right Coin Chute D3	**White-Orange** J209-3 U18-5 3	Start Button 13	Extra Ball Button 23	Trough #3 33	4-Bnk #3 D. Tgt. 43	Lt. & Rt. 3-Bnk Up. Tgt. 53	Top Lt. Jet 63	Rt. Return Rollover 73	Not Used 83	**Black-Blue** J906-3 Lower Left E.O.S F3
Orange-Yellow J205-4 4th Coin Chute D4	**White-Yellow** J209-4 U18-7 4	Plumb Tilt 14	Always Closed 24	Trough #4 34	4-Bnk #4 D. Tgt. 44	Low. Lt. Sngl. Tgt. 54	Top Rt. Jet 64	Rt. Out Rollover 74	Not Used 84	**Blue-Gray** J905-2 Lower Left Opto F4
Orange-Green J205-6 Normal Test Service Escape Credit D5	**White-Green** J209-4 U19-11 5	Shooter Lane 15	"Machine" Exit 25	Trough Jam 35	3-Bnk #1 D. Tgt. 45	Rt. Sngl. Tgt. 55	Bottom Jet 65	Up. Rt. Lane Rollover 75	Not Used 85	**Black-Violet** J906-4 Upper Right E.O.S. F5
Orange-Blue J205-7 Normal Test Vol. Dn Down D6	**White-Blue** J209-7 U19-9 6	Upper 3-Bnk Lt. Tgt. "I" 16	Upper Lt. Sngl. Tgt. 26	Ball Popper 36	3-Bnk #2 D. Tgt. 46	Dicta-Bird Tgt. 56	Top Lt. Rollover "D" 66	Up. Rt. Lane Exit Rollover 76	Not Used 86	**Black-Yellow** J905-3 Upper Right Opto F6
Orange-Violet J205-8 Normal Test Vol. Up Up D7	**White-Violet** J209-8 U19-5 7	Upper 3-Bnk Cr. Tgt. "X" 17	Lt. Lane Rollover 27	Rt. Ramp Enter 37	3-Bnk #3 D. Tgt. 47	Not Used 57	Top Cr. Rollover "I" 67	Rt. Ramp Exit 77	Not Used 87	**Black-Gray** J906-5 Upper Left E.O.S. F7
Orange-Gray J205-9 Normal Test Beg. Enter Test D8	**White-Gray** J209-9 U19-7 8	Upper 3 Bnk Rt. Tgt. "I" 18	In. Lt. Lane Rollover 28	Lt. Ramp Enter 38	Cr. Lane Rollover 48	Not Used 58	Top Rt. Rollover "G" 68	Lt. Ramp Exit 78	Not Used 88	**Black-Blue** J905-5 Upper Left Opto F8

ATTENTION

The game uses a new Security CPU Board that is not downward compatible to the CPU boards used in previous games. The new board has an added security chip that can be interchanged between other Flintstones games and software revision levels. The CPU board itself is interchangeable with later model games, but must be equipped with the correct security chip and software for that specific game.

The games' electronic ID number is shown in the display during power-up. The number displayed is the same nine digit number printed on the security chip label. The first three digits are the project number without the country specific code. An example of the power-up display is shown below, the electronic ID number is bolded.



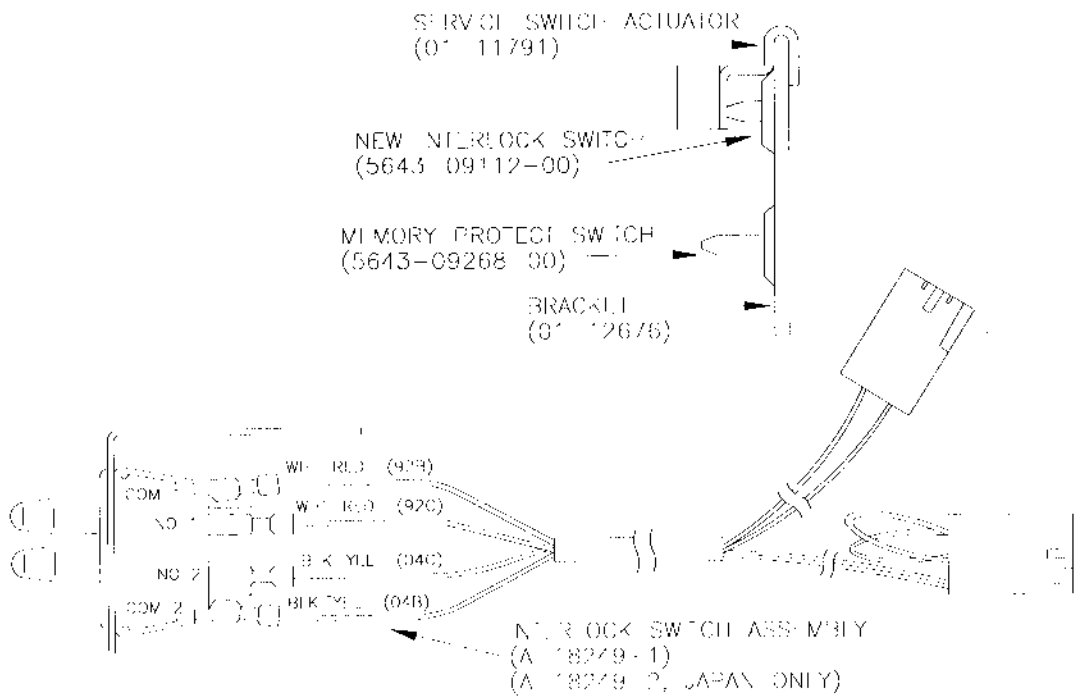
IMPORTANT NOTICE

PLEASE READ

This pinball game is equipped with a SAFETY FEATURE to prevent shocks from the solenoid circuit when the coin door is opened. A new interlock switch assembly (part no. A-18249-1), located at the left of the coin door opening, has been added to the game. This assembly is a bracket containing the existing memory protect switch on the bottom and a new interlock switch on the top. When the coin door is opened, this new interlock switch opens, breaking the connection to the +50V and +20V winding of the transformer secondary.

A special tool called the Service Switch Actuator is provided for the serviceman/technician that repairs the game. This tool is painted yellow and located in a bag stapled inside the cabinet. The service Switch Actuator slips over the interlock switch and holds it closed while the coin door is opened, allowing the serviceman to test and repair the solenoid circuit.

Hold the top interlock switch in, then slide the short end of the Service Switch Actuator over the top of the interlock switch bracket and the long end over the center of the switch plunger to hold it in.



The FLINTSTONES®

TABLE OF CONTENTS

The FLINTSTONES® RULES

EXTRA BALL

Complete center lane count-up to light "Extra Ball"

MULTI-BALL™

1) Complete "Bed" or "Rock" drop target banks to add letters in "Concrete". Complete sequence to light "Start Multi-ball™".

2) Complete three strikes in a row (Turkey), to start "Bowl-O-Rama" Multi-ball™.

3) Complete 1-2-3 combo to start "Dino Frenzy" Multi-ball when lit.

GO BOWLING

Shoot lit ramp and bowling target bank to score strike or spare. Complete 10 frames to qualify for "Bowling Champ" score table.

PLAY MODES

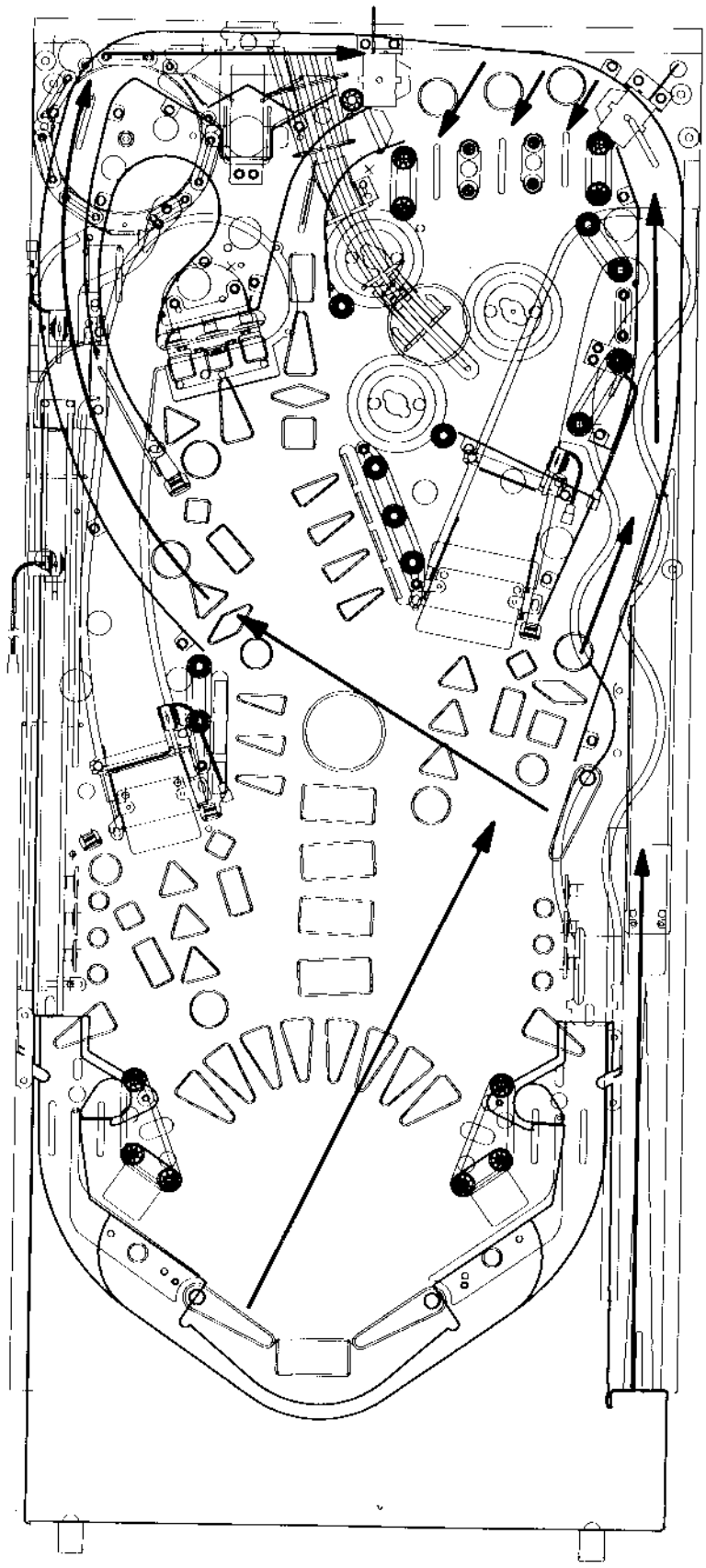
Complete 1-2-3 combo to start lit mode. Complete the following four lit modes to light "Mystery Mode".

1) "Fred's Choice"
2) "Eat At Joe's"
3) "Bedrock Water Buffaloes"
4) "Dino Frenzy"

DRAIN SAVE

Complete either bottom 3-bank to light "Drain Save" for time period.

The FLINTSTONES® SHOT MAPS

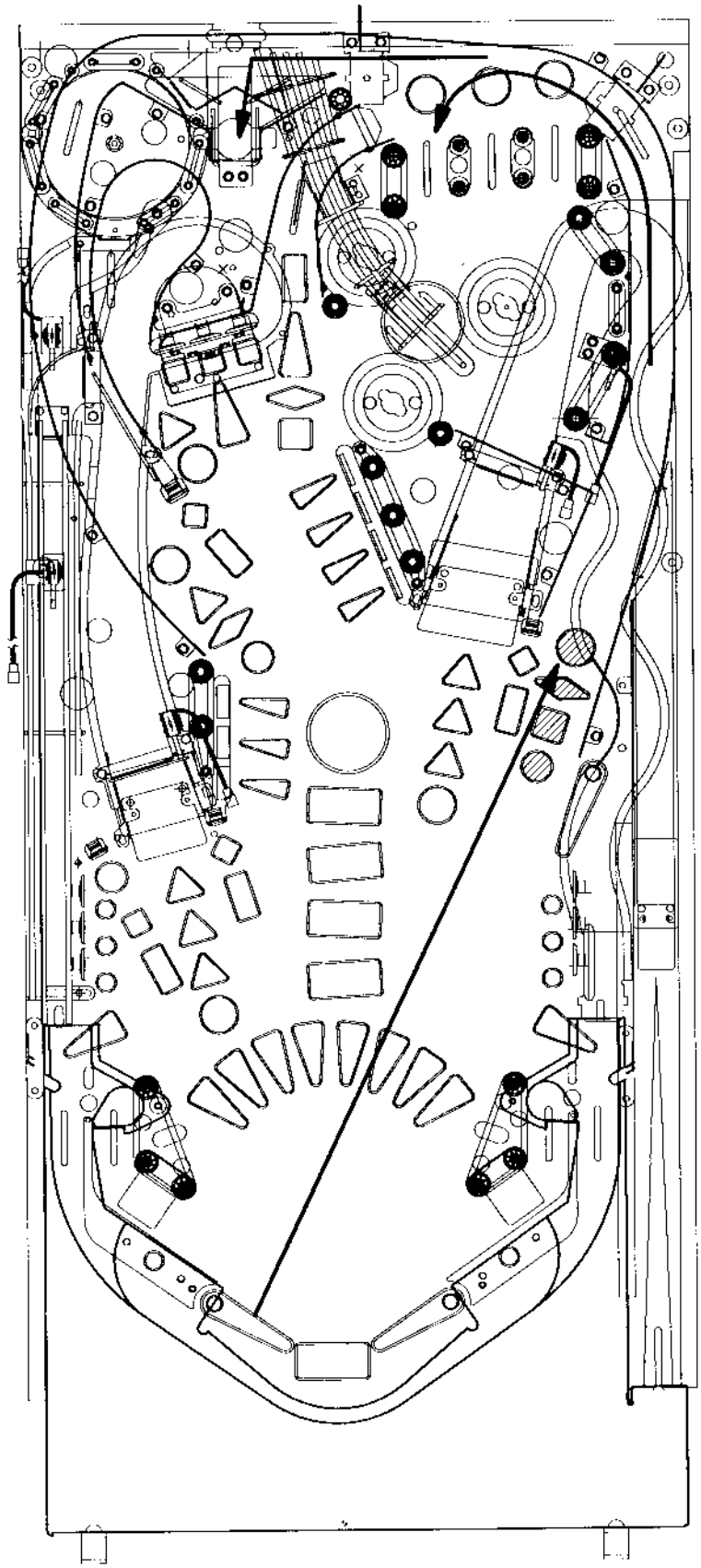


TOP "D-I-G" ROLLOVERS

Complete shooter lane skill shot to flashing rollover advance bonus multiplier and add a letter in "CONCRETE" sequence.

Complete all top rollovers to advance bonus multiplier (Maximum of 10X), score 20 Million (if multiplier is at 10X) and add a letter in "CONCRETE" sequence.

Completion of "CONCRETE" lights "START MULTIBALL" lamps.

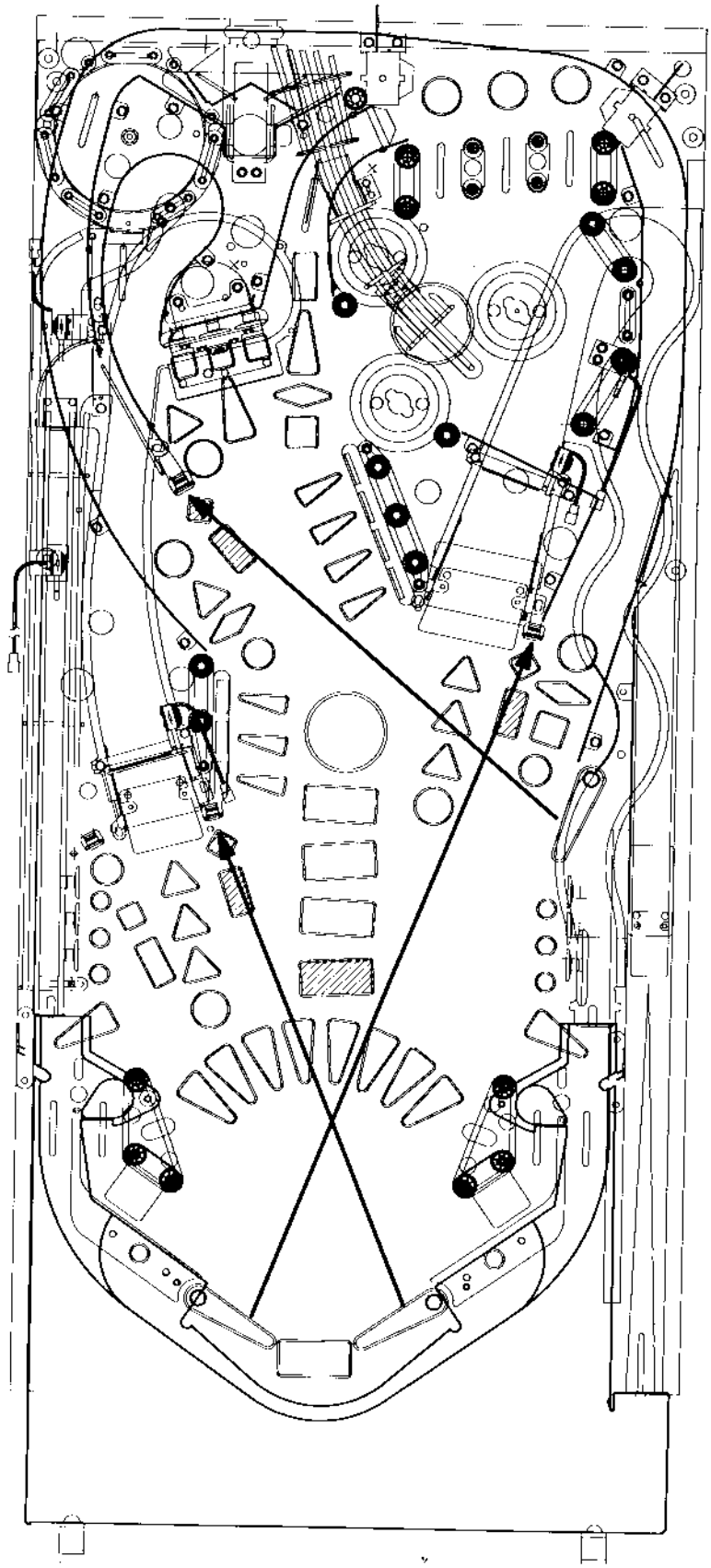


UPPER RIGHT LANE ROLLOVER

Shoot to ball popper when "MACHINE TIME" or "START MULTI-BALL™" is lit.

Shoot to top "D-I-G" rollover lanes when "SEARCH" is lit. Award "SEARCH" points.

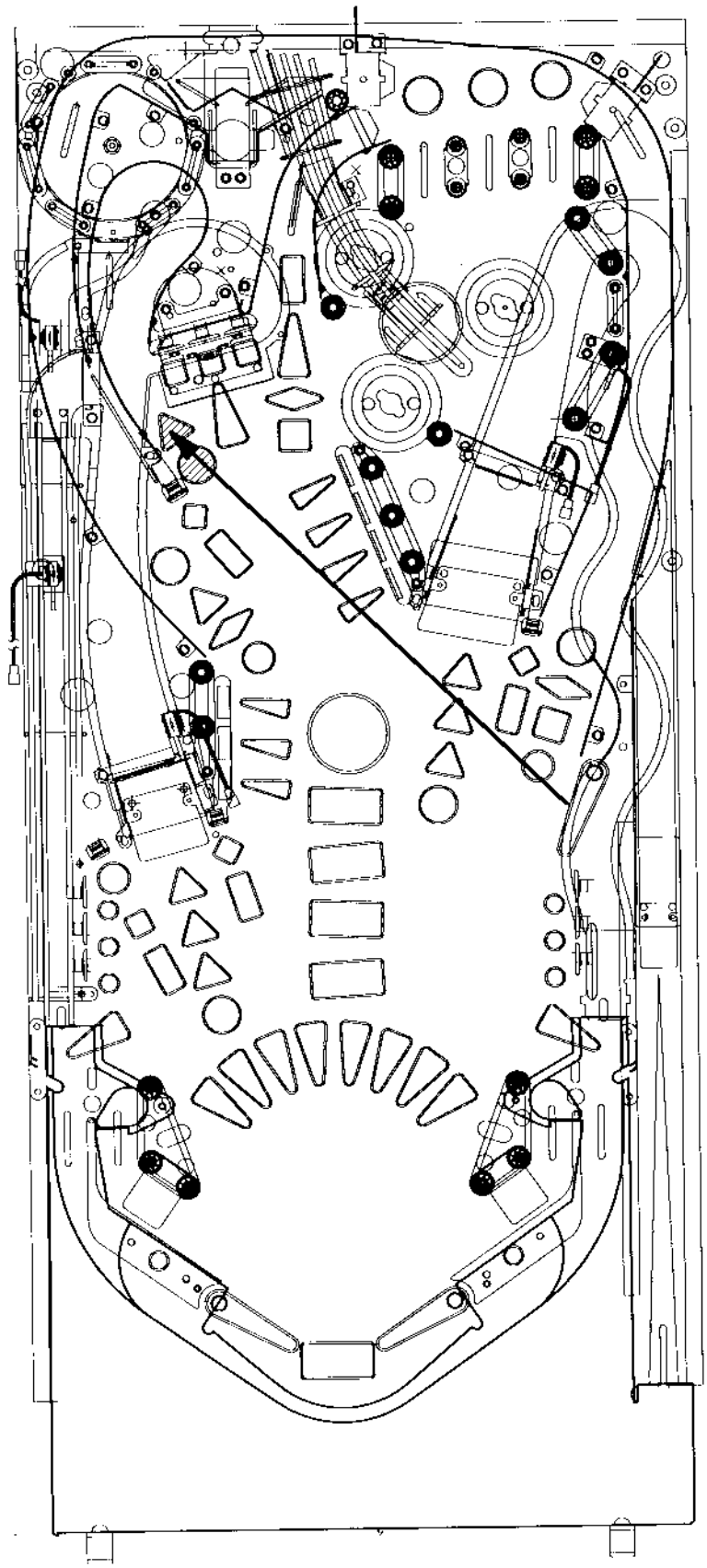
Complete "JOB CHANGE" feature when lit.



DINO TARGETS

Unlit score 100K only. Lit, score 100K plus advance "DINO FRENZY" value 3 Million.

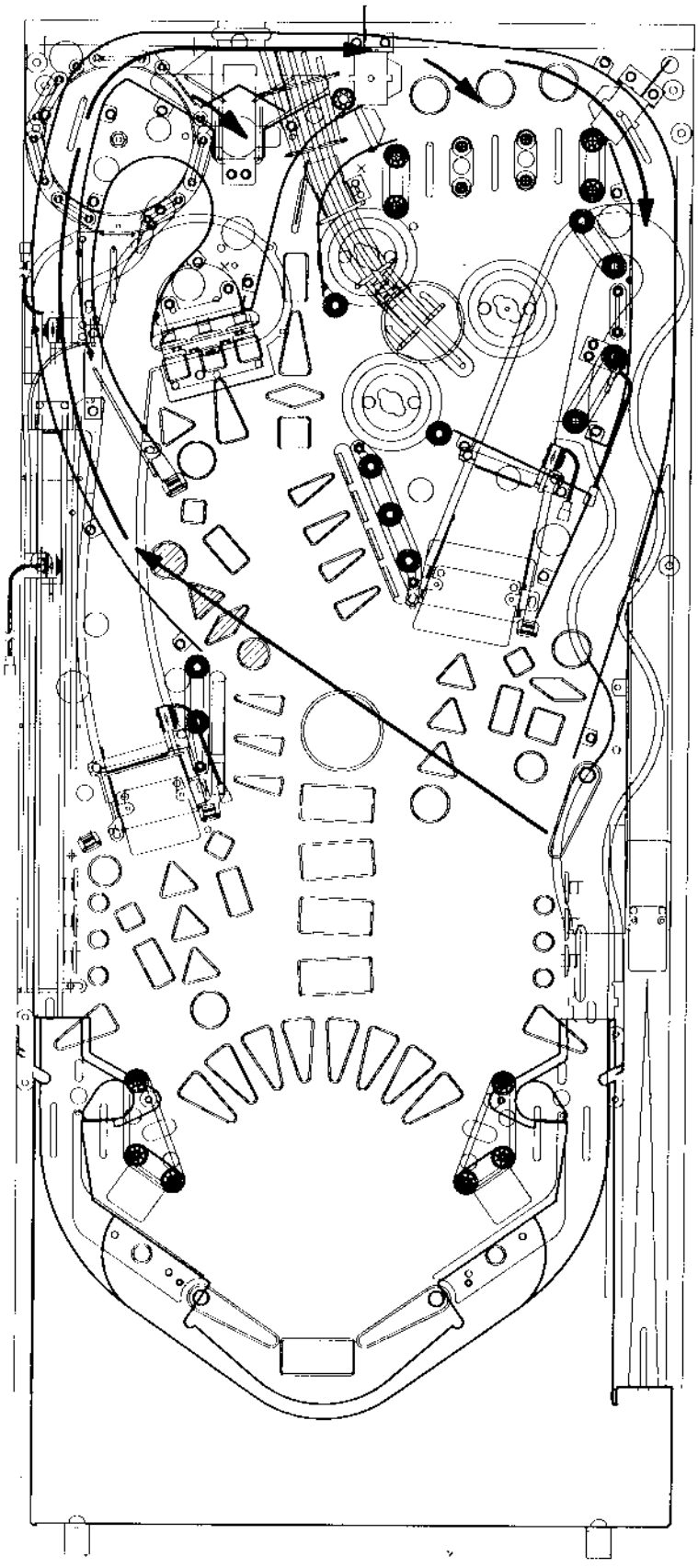
During "DINO FRENZY", unlit score "DINO FRENZY " value. Lit, score "DINO FRENZY" value and advance 3 Million.



LEFT LOOP ROLLOVER

Start 2X playfield scoring when lit. Collect "SUPER JACKPOT" when lit.

Score 2 Million plus 1 Million each time scored.

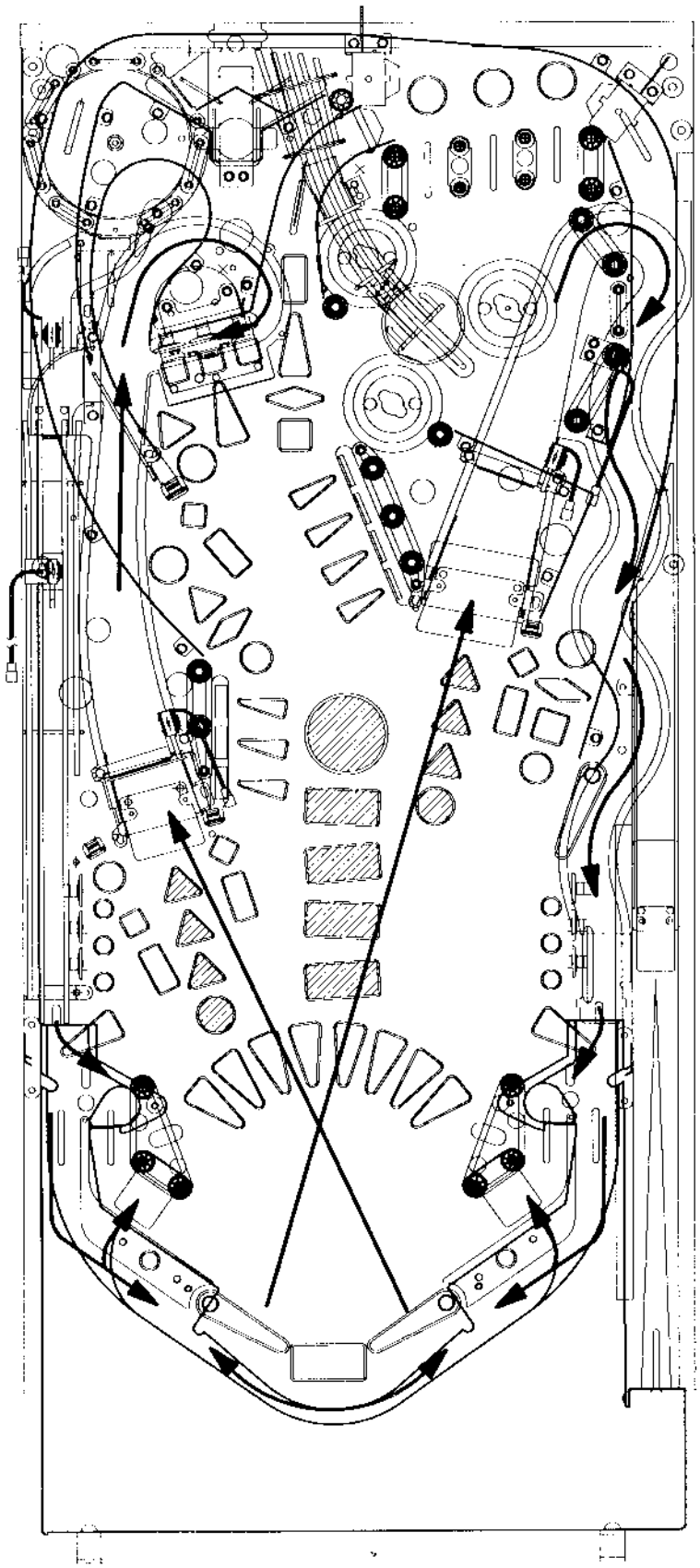


UPPER LEFT LANE ROLLOVER

Shoot to ball popper when "MACHINE TIME", "START MULTI-BALL™" or "BRONTO CRANE" is lit.

Shoot to top "D-I-G" rollover lanes when "SEARCH" is lit.

Shoot complete loop back to upper right flipper to light "BRONTO CRANE".



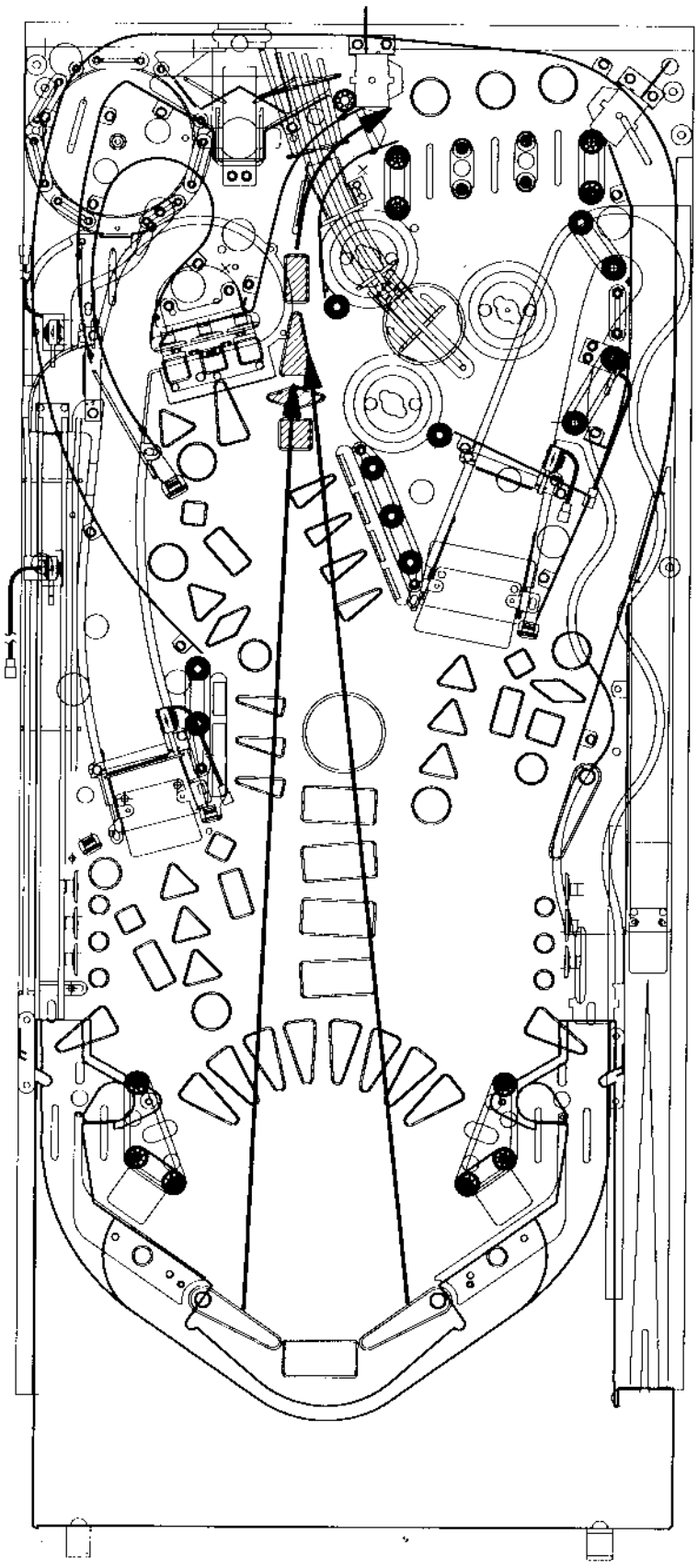
LEFT OR RIGHT RAMP

1-2-3 COMBO
Shoot when flashing to complete sequence and start flashing playfield mode.

GO BOWLING
Shoot when lit to start "BOWLING" feature.

RESCUE
Shoot when flashing to complete "RESCUE" feature.

"1-2-3 COMBO" MYSTERY MODE
Complete 1-2-3 Combo on both ramps during time period to score 100 Million points.



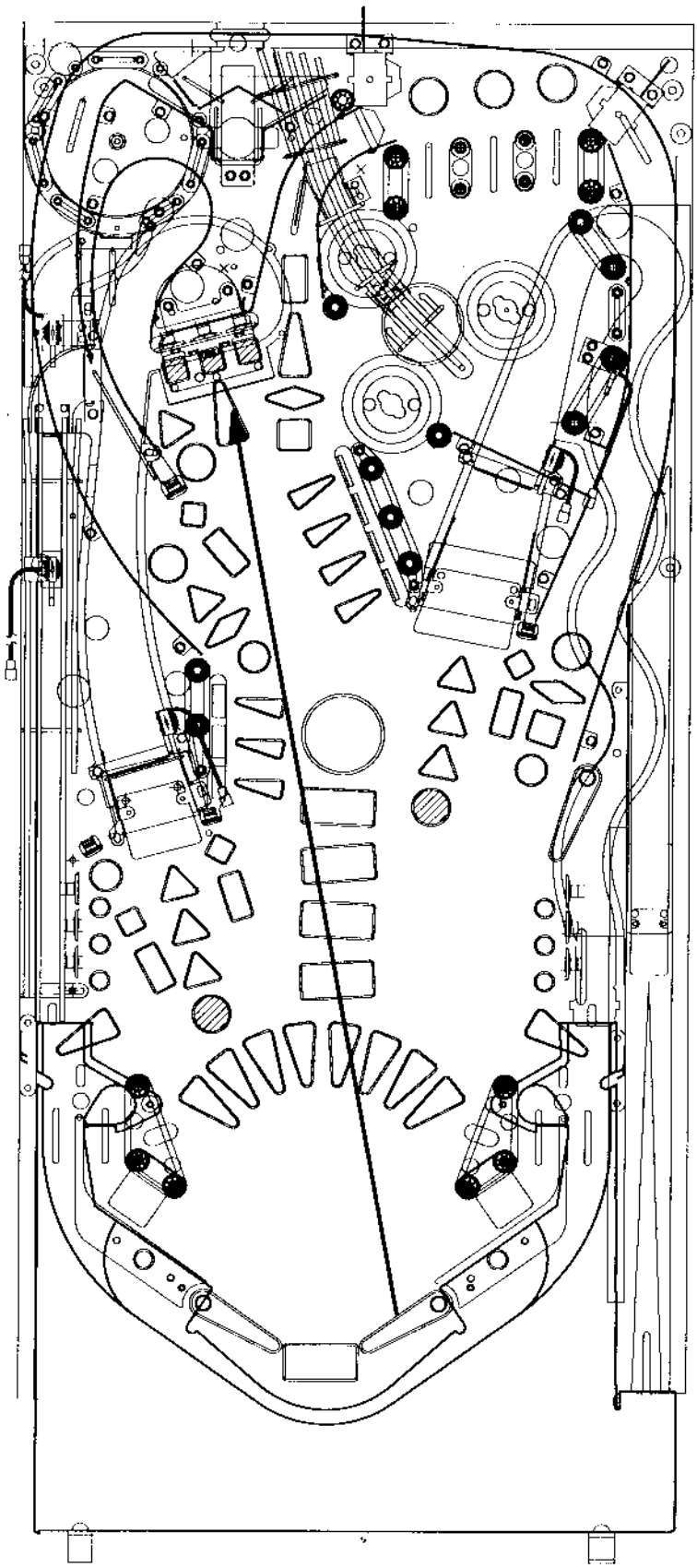
CENTER LANE ROLLOVER

Advance "COUNT-UP" sequence in display to award "EXTRA BALL", "DIG MILLIONS" or 20 Million points.

Award "SEARCH" points when lit.

Collect "JACKPOT" when lit.

Advance "EAT AT JOE'S" feature when lit.



BOWL-O-RAMA TARGET BANK

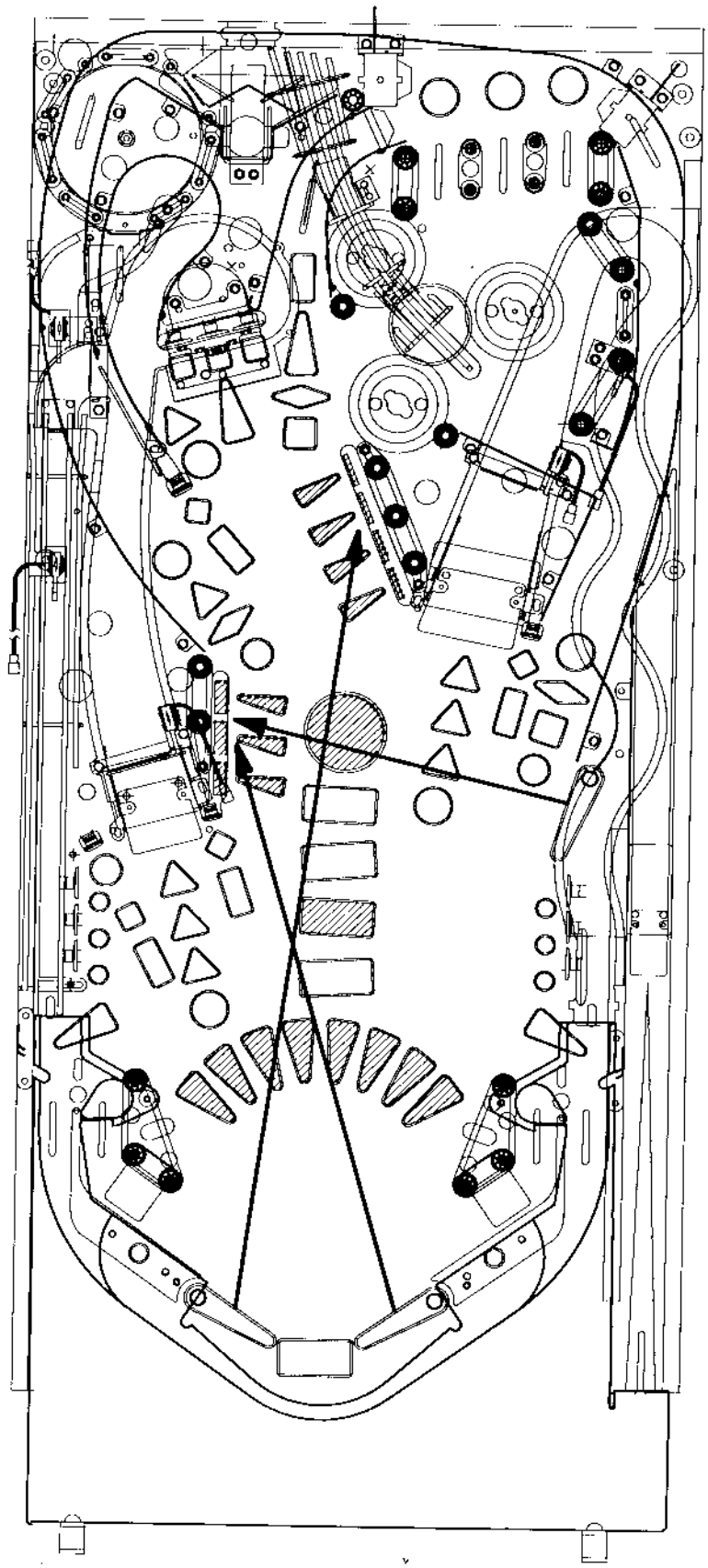
Complete 3-Bank lamps to advance "YABBA-DABBA-DOO" display sequence. Complete "YABBA-DABBA-DOO" for bowling "POWER-UP".

GO BOWLING

Shoot center target (after shooting lit "GO BOWLING" ramp) to score a "STRIKE", either end targets to score a "SPARE" or miss for a gutterball. If ball has been "POWERED-UP" all targets score a "STRIKE".

BOWL-O-RAMA

Shoot three strikes in a row to start "BOWL-O-RAMA" multi-ball™. All hits to bowling bank now score "SUPER STRIKES" or "SUPER SPARES".



"B-E-D" or "R-O-C-K" DROP TARGET BANK

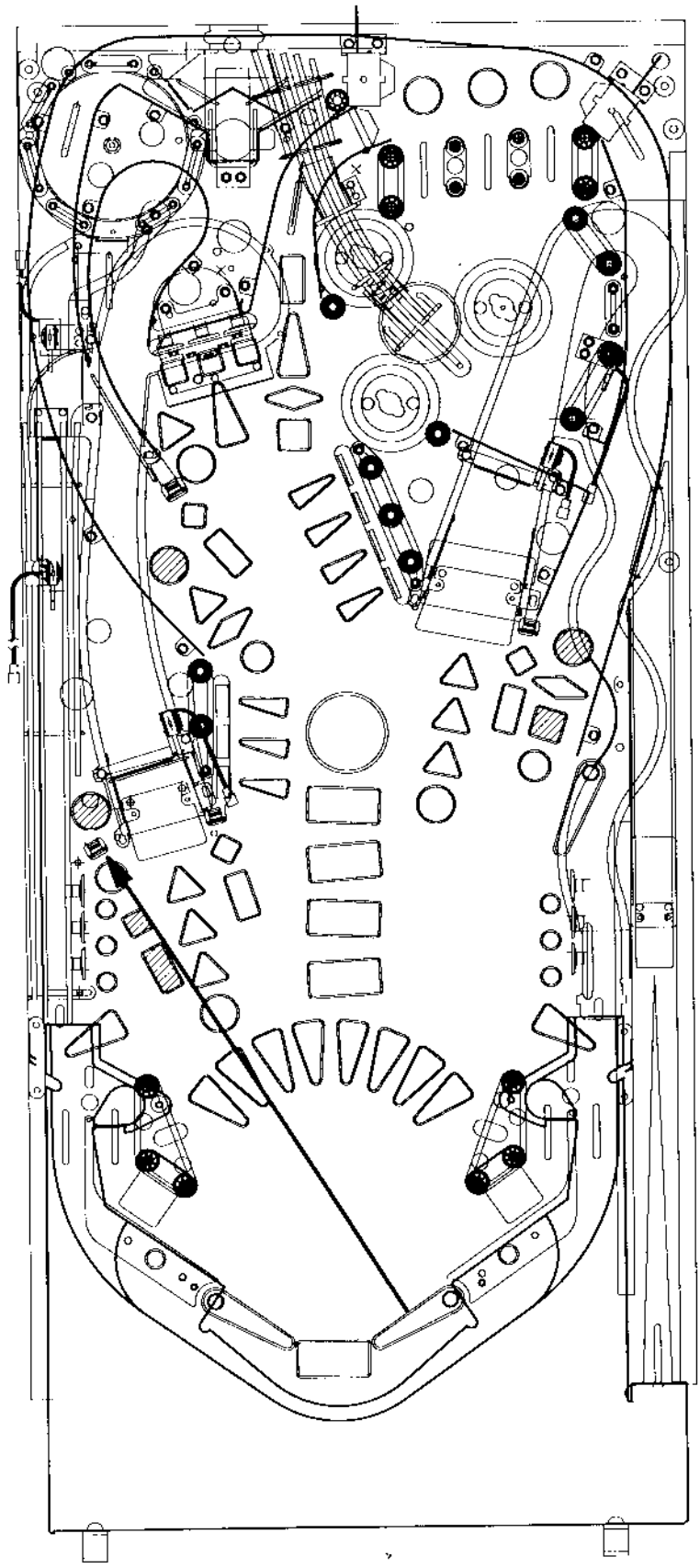
Complete bank to award letter in "CONCRETE". Completion of "CONCRETE" lights "START MULTI -BALL™" lamps.

BEDROCK WATER BUFFALOS

Shoot any flashing target to score 5 Million.

"BEDROCK" MYSTERY MODE

Completion of "BED" and "ROCK" drop target banks awards 100 Million points.

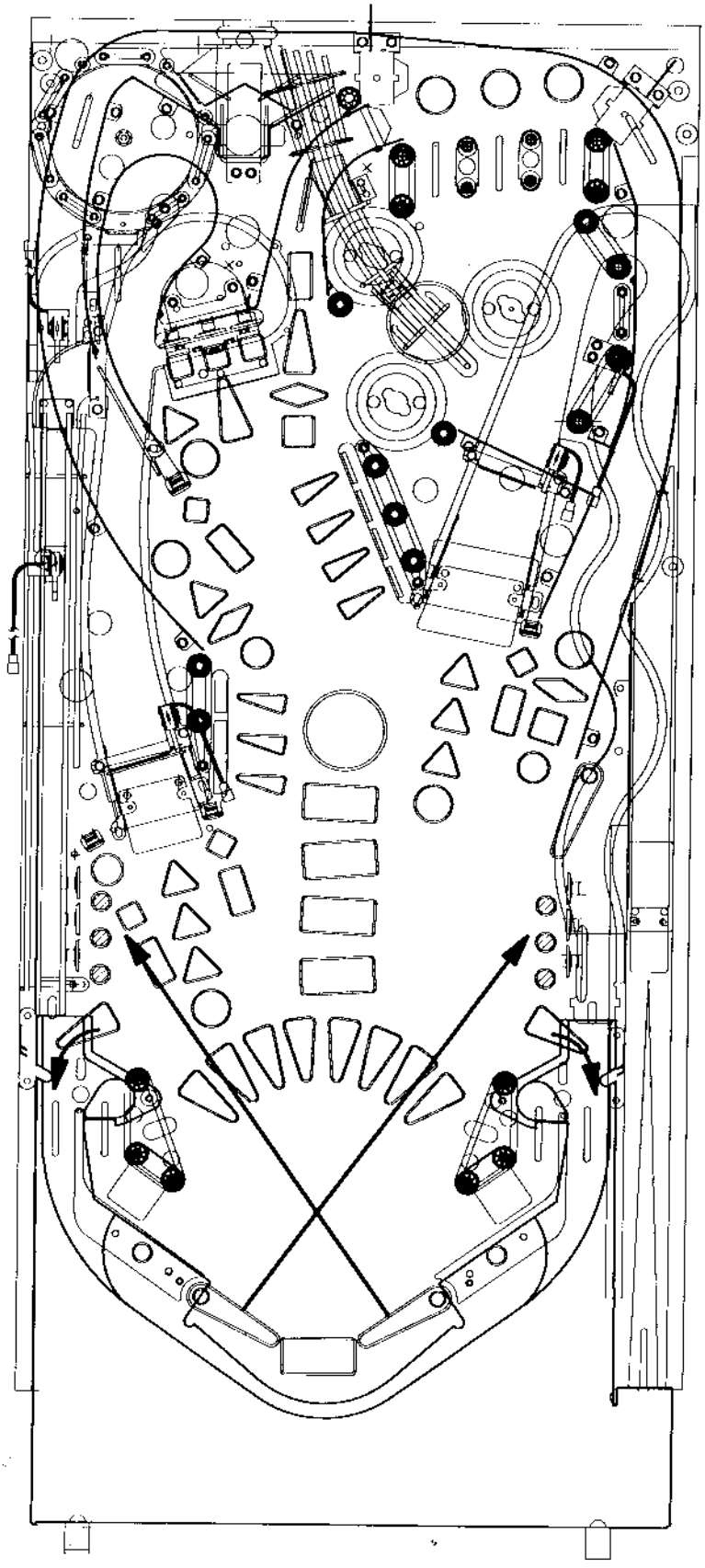


DICTA-BIRD TARGET

MACHINE TIME
Shoot, when lit, to start "ROCK SLICER MACHINE" scoring round.

JOB CHANGE
Shoot, when lit, to light "BARNEY'S JOB CHANGE" feature.

HELP
Shoot, when lit, to start "SEARCH AND RESCUE" sequence.



DRAIN SAVE

Complete either side 3-Bank to light "DRAIN SAVE" rollovers for timed period.

SECTION 1

Game Operation and Test Information

ROM SUMMARY

IC	Type	Location	Board	Part Number
Game ROM 1 (Domestic)	27c040	U6	CPU	A-5343-50029-1A
Game ROM 1 (Foreign)	27c040	U6	CPU	A-5343-50029-1X
Security Chip	PIC16C57	U22	CPU	A-5400-50029-1
Music/Speech ROM	27c040	SU2	Audio	A-5343-50029-S2
Music/Speech ROM	27c040	SU3	Audio	A-5343-50029-S3
Music/Speech ROM	27c040	SU4	Audio	A-5343-50029-S4
Music/Speech ROM	27c040	SU5	Audio	A-5343-50029-S5
Music/Speech ROM	27c040	SU6	Audio	A-5343-50029-S6
Music/Speech ROM	27c040	SU7	Audio	A-5343-50029-S7

NOTICE
Order replacement ROMs from your authorized Williams Electronics Games, Inc. distributor. Specify: (1) part number (if available); (2) ROM level (number) on label; (3) game in which ROM is used.

PINBALL GAME ASSEMBLY INSTRUCTIONS

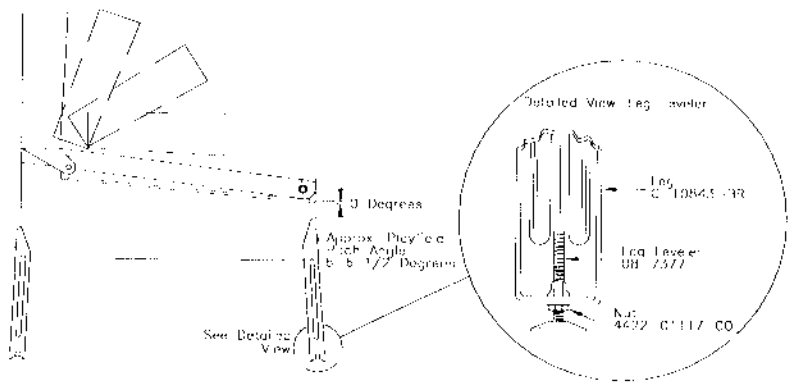
FLINTSTONES IS A FOUR BALL GAME

Power:	Domestic 120V @ 60Hz Foreign 230V @ 50Hz Japan 100V @ 50HZ	***Dimensions:***	Width: 22" approx. Depth: 52" approx. Height: 75" approx.
Temp:	32°F to 100° F, (0°C to 38°C)	***Weight:***	325 lbs approx. (crated)
Humidity:	Not to exceed 95% relative.		

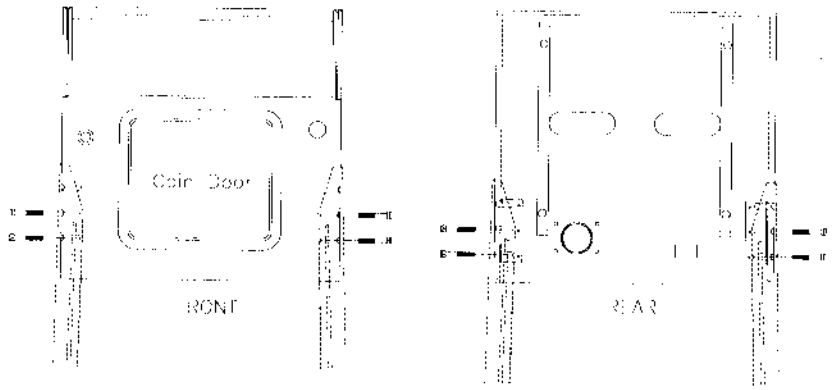
1. Remove all cartons, parts, and other items from the shipping container and set them aside.

2. Leg levelers and leg bolts are among the parts in the cash box. Install leg levelers on the front and rear legs (View 1). Place cabinet on a support and attach rear legs using leg bolts (View 2).

3. Attach front legs using leg bolts (View 2).



VIEW 1



VIEW 2

4. Reach into the cabinet and backbox and ensure that the interconnecting cables are not kinked or pinched. Be careful to avoid damaging wires at any stage of the assembly process.

5. Raise the hinged backbox upright and latch it into position. Unlock the backbox, and remove the backglass. Remove the shipping screws holding the Insert Panel. Unlatch and open the Insert Panel. Carefully lift up the Speaker Panel and lay it down on the playfield glass. (Be careful not to damage the Dot Matrix Display/Driver.) This allows access to the bolt holes used for securing the backbox upright. To secure the backbox, install the washer-head mounting bolts through the bottom holes of the backbox into the threaded fasteners in the cabinet. Close and latch the Insert Panel. Replace the Speaker Panel. Reinstall the backglass, and lock the backbox.

⚠ CAUTION

FAILURE TO INSTALL the backbox mounting hardware properly can cause personal injury. ***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. 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 it on the floor.

7. Unlock and open the coin door. Move the molding latch lever toward the left side of the game. Lift the front molding off the playfield cover glass return the latch lever toward the right, and close the coin door. Carefully slide the glass downward, until it clears the grooves of the left and right side moldings. Lift the glass up and away from the game, storing it carefully to avoid breakage.

8. Place a level or an inclinometer on the playfield surface. Adjust the leg levelers for proper playfield level (side-to-side). ***Note:*** This measurement must be made ON the playfield, not the cabinet nor the playfield cover glass. Tighten the nut on each leg leveler shaft to maintain this setting.

9. Adjust the leg levelers to the proper playfield pitch (back-to-front). The recommended pitch level is 6-1/2 degrees.

! IMPORTANT !

Playfield pitch angle can affect the operation of the plumb bob tilt. The plumb bob weight is among the parts in the cash box; the operator should install the weight and adjust this tilt mechanism for proper operation, after completion of the desired playfield pitch angle setting. The unit is factory installed for a 6-1/2 degree angle. If an adjustment is necessary, loosen the screw at the bottom of the unit. Move the pointer, one grove at a time to the left or the right, depending on the degree desired. Hold the pointer in place and tighten screw.

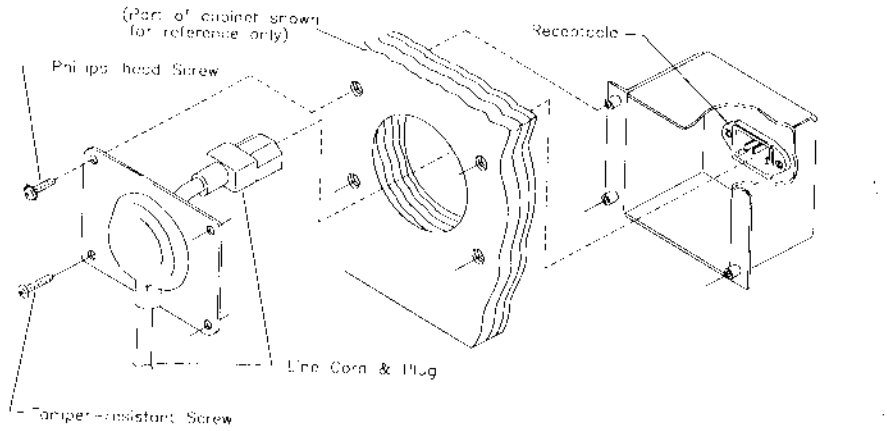
10. Move the game into the desired location; recheck the level and pitch angle of the playfield.

11. Be sure the ***required number*** of balls are installed. This game uses four balls.

12. Install full playfield mylar, if desired. ***NOTE:*** The playfield is coated with a special hardcoat surface and does not require a protective mylar. However, mylars can be purchased through your local Williams Distributor. Specify part number 03-9251-1 for full playfield mylar.

13. Clean and reinstall the playfield cover glass. Prepare the game for player operation.

14. To attach the line cord, remove the envelope stapled to the inside of the cabinet (near the cash box). Remove the four Phillips-head screws that mount to line cord cover plate to the rear cabinet. Match the prongs on the plug with the holes in the receptacle, and push the line cord securely into place. Make sure the cord is aligned with the indentation on the cover plate (indentation should point toward bottom of the cabinet). Remount line cord cover plate. If desired, four tamper resistant screws have been provided in an envelope marked "Security Screws" (located in the cash box) to remount cover plate.



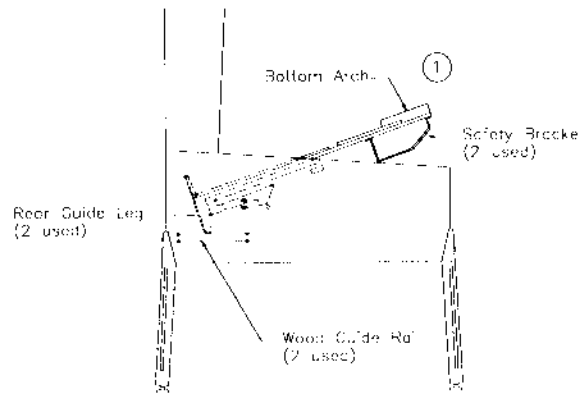
RAISING THE PLAYFIELD

⚠ CAUTION

Do not raise the playfield straight up! This game uses a slide assembly to raise and lower the playfield.

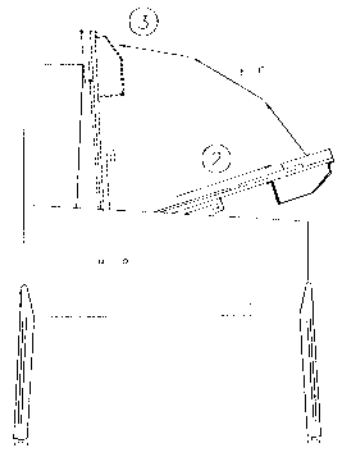
To raise the playfield.

1. Grasp bottom arch and carefully lift up playfield only high enough to clear safety brackets. Rear guide legs should not hit wood guide rails or be used to slide out playfield.



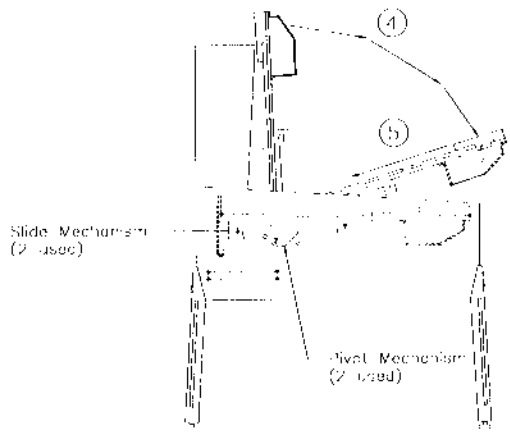
2. Pull the playfield out toward you until it stops (rest position) and raise it approximately 3". **Be sure playfield is in locked position and does not slide back into the cabinet. If it does, repeat Step 2 before proceeding to Step 3.**

3. Rotate playfield to upright service position (lean on backbox) by pulling toward you and up. Listen for the sound of a click; this insures locking and pivoting sequence.



To lower the playfield.

4. Rotate the playfield to the rest position. This unlocks the pivoting mechanism.
5. Push back playfield into cabinet and into playing position.



GAME CONTROL LOCATIONS

Cabinet Switches

The On-Off Switch is on the bottom of the cabinet near the right front leg.
The Start Button is a push-button to the left of the coin door on the cabinet exterior. Press the button to begin a game, or during the diagnostic mode, to ask for HELP.

Coin Door Buttons

The operator controls all game adjustments, obtains bookkeeping information, and diagnoses probl using only four push-button switches mounted on the inside of the coin door. The Coin Door But have two modes of operation Normal Function and Test Function.

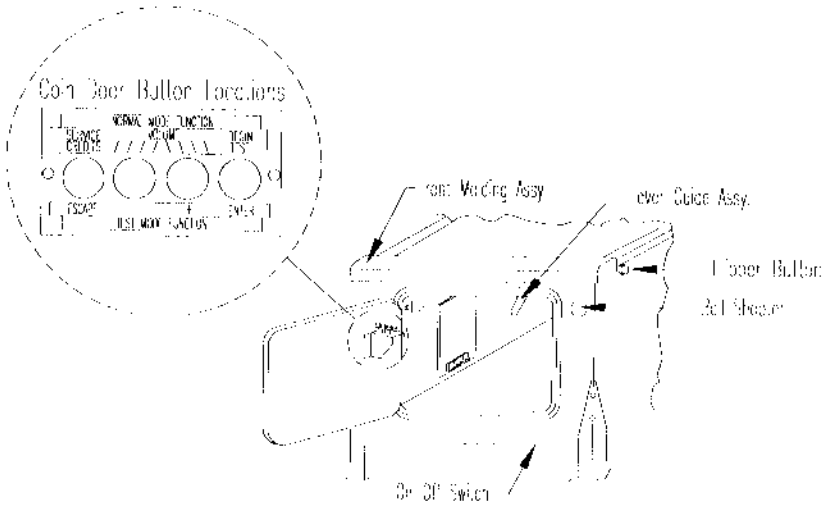
Normal Function

The Service Credits button puts credits on the game that are not included in any of the game aud
The Volume Up (+)button raises the sound level of the game. Press and hold the button unti desired level is reached.
The Volume Down (-) button lowers the sound level of the game. Press and hold the button unti desired level is reached. See Adjustment A.1 28 to shut sound Off completely.
The Begin Test button starts the Menu System Operation and changes the Coin Door Buttons Normal Function to Test Function.

Test Function

The Escape button allows you to get out of a menu selection or return to the Attract Mode.
The Up (+) button allows you to cycle forward through the menu selections or adjustment choices
The Down (-) button allows you to cycle backward through the menu selections or adjustr choices.
The Enter button allows you to get into a menu selection or lock in an adjustment choice.
Holding the Enter button for five seconds, during the Attract Mode, resets the High Scores.

CONTROL SWITCH LOCATIONS



GAME OPERATION

⚠ CAUTION

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. In normal operation, Testing shows in the displays as the game performs Start-up Tests. Once the Start-up Tests have been successfully completed the last score is displayed and the game goes into the Attract Mode.

Note: After the game has been on location for a time, the Start-up Tests may contain messages concerning game problems. The section entitled 'Error Messages' contains more details concerning messages displayed at each game turn-on.

Open the coin door and press the Begin Test switch. The display shows the game name, number, and software revision. The message changes. The display shows the sound software revision, the revision level of the system software, and the date the software was revised.

Example:	**Game Name**		**Sound Rev. L-1**	
	500XX	**Rev. L-X**	**SY. 0.X0**	**X-X-94**

Press the Enter button to enter the WPC Menu System (refer to the section entitled "Menu System Operation" for more information). Slide the Service Switch Actuator over the top interlock switch located in the bottom left corner of the coin door opening. Perform the entire Test Menu routine to verify that the game is operating satisfactorily.

ATTRACT MODE*. After completing the Test Menu routine, press the Escape button three times to enter the Attract Mode. During the Attract Mode, the score display shows a series of messages informing the player concerning, recent highest scores*, "custom messages*", and the score to achieve to obtain a Replay award*.

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

STARTING A GAME. Press the Start button. A startup sound plays, and the credit amount shown in the display decreases by one. The display flashes 00 (until the first playfield switch is actuated), and shows ball 1. If credits are posted, additional players may enter the game by pressing the Start button once for each player, before the end of play on the first ball. Press the Launch Ball button to launch a ball. Press the flipper buttons to operate the flippers.

TILTS. Actuating the cabinet tilt switch inside the cabinet ends the current game and then proceeds to the Game Over Mode. With 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 A 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 display. Credit* may be awarded, when the last two digits of any player's score match the random digits. Match, high score, and game over sounds are made.

GAME OVER MODE. The **Game Over** display shows the high scores and the game proceeds to the Attract Mode.

* - Operator-adjustable feature

MENU SYSTEM OPERATION

The Main Menu allows you to choose from several categories, which in turn lead to other menus to choose from. To access the Main Menu, open the coin door and press the Begin Test button, then press the Enter button. Press the Up or Down buttons to cycle through the Main Menu. Press the Enter button to access a menu. Press the Escape button to return to the Main Menu. Press the Start button for HELP at any time.

MAIN MENU

B. BOOKKEEPING MENU

- B.1 Main Audits
- B.2 Earning Audits
- B.3 Standard Audits
- B.4 Feature Audits
- B.5 Histograms
- B.6 Time-Stamps

P. PRINTOUTS MENU

- P.1 Earnings Data
- P.2 Main Audits
- P.3 Standard Audits
- P.4 Feature Audits
- P.5 Score Histograms
- P.6 Time Histograms
- P.7 Time-Stamps
- P.8 All Data

T. TEST MENU

- T.1 Switch Edges Test
- T.2 Switch Levels Test
- T.3 Single Switches Test
- T.4 Solenoid Test
- T.5 Flasher Test
- T.6 General Illumination Test
- T.7 Sound and Music Test
- T.8 Single Lamp Test
- T.9 All Lamps Test
- T.10 Lamp and Flasher Test
- T.11 Display Test
- T.12 Flipper Coil Test
- T.13 Ordered Lamps Test
- T.14 Machine Test
- T.15 Empty Balls Test

U. UTILITIES MENU

- U.1 Clear Audits
- U.2 Clear Coins
- U.3 Reset H.S.T.D.
- U.4 Set Time and Date
- U.5 Custom Message
- U.6 Set Game I.D.
- U.7 Factory Adjustments
- U.8 Factory Resets
- U.9 Presets
- U.10 Clear Credits
- U.11 Auto Burn-in

A. ADJUSTMENT MENU

- A.1 Standard Adjustments
- A.2 Feature Adjustments
- A.3 Pricing Adjustments
- A.4 H.S.T.D. Adjustments
- A.5 Printer Adjustments

Press Escape
To move out of a menu selection.

Press Enter
To get into a menu selection.

Press Up
Increases sequence;
(ex. A.1, A.2, A.3, A.4).

Press Down
Decreases sequence;
(ex. A.4, A.3, A.2, A.1).

Use Up or Down to cycle through the menu selections.

Use Escape and Enter to move into and out of the selected menu.

Press the Up or Down buttons to cycle through the menu. Press the Enter button to access an audit menu. Press the Escape button to return to the Bookkeeping Menu.

B. BOOKKEEPING MENU

B.1 Main Audits
B.2 Earning Audits
B.3 Standard Audits
B.4 Feature Audits
B.5 Histograms
B.6 Time-Stamps

One Button Audit System. The Bookkeeping Menu is obtainable directly from the Attract Mode. Repeatedly pressing the Enter button, while in the Attract Mode, will cycle through all of the game audits.

B.1 Main Audits

B.1	01	Total Earnings	00
B.1	02	Recent Earnings	00
B.1	03	Free Play Percent	00
B.1	04	Average Ball Time	00
B.1	05	Time Per Credit	00
B.1	06	Total Plays	00
B.1	07	Replay Awards	00
B.1	08	Percent Replays	00
B.1	09	Extra Balls	00
B.1	10	Percent Extra Ball	00

B.2 Earning Audits

B.2	01	Recent Earnings	00
B.2	02	Recent Left Slot	00
B.2	03	Recent Center Slot	00
B.2	04	Recent Right Slot	00
B.2	05	Recent 4th Slot	00
B.2	06	Recent Paid Credits	00
B.2	07	Recent Service Credits	00
B.2	08	Total Earnings*	00
B.2	09	Total Left Slot*	00
B.2	10	Total Center Slot*	00
B.2	11	Total Right Slot*	00
B.2	12	Total 4th Slot*	00
B.2	13	Total Paid Credits*	00
B.2	14	Total Service Credits*	00

* These audits are NOT resettable. They are a record of the earnings of the game since the "CLOCK 1ST SET" Time-stamp.

B.3 Standard Audits

B.3	01	Games Started	00
B.3	02	Total Plays*	00
B.3	03	Total Free Play	00
B.3	04	Free Play Percent	00
B.3	05	Replay Awards	00
B.3	06	Percent Replays	00
B.3	07	Special Awards	00
B.3	08	Percent Special	00
B.3	09	Match Awards	00
B.3	10	Percent Match	00
B.3	11	H.S.T.D. Credits	00
B.3	12	Percent H.S.T.D	00
B.3	13	Extra Ball	00
B.3	14	Percent Extra Ball	00
B.3	15	Tickets Awarded	00
B.3	16	Percent Tickets	00
B.3	17	Left Drains	00
B.3	18	Right Drains	00
B.3	19	Average Ball Time	00
B.3	20	Average Game Time	00
B.3	21	Play Time	00:00:00
B.3	22	Minutes On	00
B.3	23	Balls Played	00
B.3	24	Tilts	00
B.3	25	Replay 1 Awards	00
B.3	26	Replay 2 Awards	00
B.3	27	Replay 3 Awards	00
B.3	28	Replay 4 Awards	00
B.3	29	1 Player Games	00
B.3	30	2 Player Games	00
B.3	31	3 Player Games	00
B.3	32	4 Player Games	00
B.3	33	H.S.T.D. Reset Count	00
B.3	34	Burn-in Time†	00:00:00
B.3	35	1st Replay Level	00
B.3	36	Left Flipper	00
B.3	37	Right Flipper	00

** "Total Plays" only counts on completed games. A game is considered complete when the final ball begins. Audit information from incomplete games is ignored. Operation for test and service do not affect audits.*

† This audit is not resettable.

B.4 Feature Audits

B.4 01 **Multiball™** **00% 00**
This is the total number of multiballs™ played.

B.4 02 **Balls Saved** **00% 00**
This is the total number of ball saves that occured.

B.4 03 **Light Extra Ball** **00% 00**
This is the number times the extra ball feature was lit.

B.4 04 **Time Per Credit** **00% 00**
Computes the average ball time per credit.

B.4 05 **Buy-in** **00% 00**
This is the number of extra balls purchased at the end of a game.

B.4 06 **Drain Saves** **00% 00**
This is the number of times a ball remained in play because of the drain saves feature.

B.4 07 **Bowling High Score Credits** **00% 00**
This is the number of credits that were earned from the Bowling High Score feature.

B.4 08 **Buy-in High Scores** **00% 00**
This is the number of times extra balls were purchased at the end of a game, after being offered from the High Score Feature.

B.4 09 **Bottom Arch Flipper Feed Errors** **00% 00**
Counts the number of times per game the flipper feed fails.

B.5 Histograms

B.5	01	0-1.9 Million Scores	00%	00
B.5	02	2-4.9 Million Scores	00%	00
B.5	03	5-9.9 Million Scores	00%	00
B.5	04	10-19 Million Scores	00%	00
B.5	05	20-29 Million Scores	00%	00
B.5	06	30-39 Million Scores	00%	00
B.5	07	40-49 Million Scores	00%	00
B.5	08	50-69 Million Scores	00%	00
B.5	09	70-99 Million Scores	00%	00
B.5	10	100-149 Million Scores	00%	00
B.5	11	150-199 Million Scores	00%	00
B.5	12	200-299 Million Scores	00%	00
B.5	13	Over 300 Million Scores	00%	00
B.5	14	Game Time 0.0-1.0 Mins	00%	00
B.5	15	Game Time 1.0-1.5 Mins	00%	00
B.5	16	Game Time 1.5-2.0 Mins	00%	00
B.5	17	Game Time 2.0-2.5 Mins	00%	00
B.5	18	Game Time 2.5-3.0 Mins	00%	00
B.5	19	Game Time 3.0-3.5 Mins	00%	00
B.5	20	Game Time 3.5-4.0 Mins	00%	00
B.5	21	Game Time 4-5 Mins	00%	00
B.5	22	Game Time 5-6 Mins	00%	00
B.5	23	Game Time 6-8 Mins	00%	00
B.5	24	Game Time 8-10 Mins	00%	00
B.5	25	Game Time 10-15 Mins	00%	00
B.5	26	Game Time Over 15 Mins	00%	00

B.6 Time-Stamps

Time-Stamps Menu allows you to view dates and times that are important to game software.

B.6	01	Current Time
B.6	02	Clock 1st Set
B.6	03	Clock Last Set
B.6	04	Audits Cleared
B.6	05	Coins Cleared
B.6	06	Factory Setting
B.6	07	Last Game Start
B.6	08	Last Replay
B.6	09	Last H.S.T.D. Reset
B.6	10	Champion Reset
B.6	11	Last Printout
B.6	12	Last Service Credit

Press the Up or Down buttons to cycle through the menu. Press the Enter button to access a menu. Press the Escape button to return to the Printouts Menu.

P. PRINTOUTS MENU

(optional board required)

P.1	**Earnings Data**
P.2	**Main Audits**
P.3	**Standard Audits**
P.4	**Feature Audits**
P.5	**Score Histograms**
P.6	**Time Histograms**
P.7	**Time-Stamps**
P.8	**All Data**

The Printouts Menu is a combination of the other menus. This menu allows you to access and print information in the available menu selections.

If no printer is attached the message "Waiting for Printer" appears in the displays. ***Note:*** Set the print specification from the Adjustment Menu, A.5 Printer Adjustments.

Use the Service Switch Actuator to hold in the top interlock switch located in the bottom left corner of the coin door opening. The actuator must be in place in order to activate the solenoids and flashlamps.

Press the Up or Down buttons to cycle through the menu. Press the Enter button to access a test. Press the Escape button to return to the Test Menu. **NOTE:** During any test, press the Start button to obtain the wire color, driver number, connector number and fuse location.

T. TEST MENU

T.1 Switch Edges Test
T.2 Switch Levels Test
T.3 Single Switch Test
T.4 Solenoid Test
T.5 Flasher Test
T.6 General Illumination Test
T.7 Sound & Music Test
T.8 Single Lamps Test
T.9 All Lamps Test
T.10 Lamp & Flasher Test
T.11 Display Test
T.12 Flipper Coil Test
T.13 Ordered Lamps Test
T.14 Machine Test
T.15 Empty Balls Test

The switch matrix, on the left side of the display, shows the state of all switches. A dot indicates the switch is open, a square indicates the switch is closed. The numbers assigned to each switch indicate where the switch is located in the matrix. The number on the left indicates the column, the number on the right indicates the row. Example - Switch 23 is 2nd column, 3rd row.

A short to ground - on either the row or column wire - appears as a shorted row(s). However, a column wire shorted to ground disappears when all of the indicated row switches are open. A row wire shorted to ground does not disappear.

A shorted diode in the switch matrix can cause other switches to appear closed. These "phantom" switches (though not actually closed), complete a rectangle in the switch matrix. Therefore, if two switches in the same column are closed (example; #22 and #24), and a third switch is pressed in another column but in the same row as one of the first two (example; #32), the "phantom" switch #34 is falsely indicated as closed. The switch with the shorted diode is diagonally opposite the "phantom" switch (in this case #22).

T.1 Switch Edges Test Press each switch one at a time. The name and number of the switch is shown in the display. If a switch other then the one pressed, or no switch at all is indicated, the system has detected a problem with the switch circuit.

T.2 Switch Levels Test This test automatically cycles through all switches that are detected closed. The name and number of each switch that is detected is shown in the display. A filled square indicates the switch's position in the matrix.

T.3 Single Switches Test The Single Switch Test isolates a particular switch by blocking signals from all other switches. Use the Up or Down buttons to select the switch to be tested.

T.4 Solenoid Test

The Solenoid Test has three modes - Repeat, Stop, and Run. Only one solenoid should pulse at a time. The system has detected a problem if more then one solenoid pulses, a solenoid comes on and stays on, or no solenoids pulse during the Repeat or Run modes.

Repeat: The Repeat mode pulses a single solenoid. After entering this test, Solenoid 1 shows in the display and the corresponding solenoid activates. Press the Up or Down button to cycle through the solenoids, one at a time. The same solenoid pulses until the Up or Down button is pressed. Either press the Escape button to return to the Test Menu, or press the Enter button to move to the next mode.

Stop: The Stop mode halts the Solenoid Test. Press Enter during the Repeat mode and the Solenoid Test stops. No solenoids should be activated while the test is stopped. Either press the Escape button to return to the Test Menu, or the Enter button to move to the next mode.

Run: The Run mode cycles through the solenoids automatically. The display shows the name and number of the solenoid currently being pulsed.

T.5 Flasher Test

This tests the flashlamp part of the solenoid circuit exclusively. This, like the Solenoid Test, has three modes - Repeat, Stop, and Run. During this test only one flashlamp circuit should pulse at a time. The system has detected a problem if more then one circuit pulses, a circuit stays on, or no circuits pulse during the Repeat or Run modes.

Repeat: The Repeat mode pulses a single flashlamp. After entering this test the name and number of the first flashlamp circuit shows in the display and the corresponding bulb(s) flash. Press the Up or Down buttons to cycle through all of the flashlamps circuits one at a time. The same circuit pulses until press the Up or Down button is pressed. Either press the Escape button to return to the Test Menu, or press the Enter button to advance to the next mode.

Stop: The Stop mode halts the Flasher Test. No flashlamp circuit should be active during this mode. Either press the Escape button to return to the Test Menu, or press the Enter button to advance to the next mode.

Run: The Run mode cycles through the flashlamps automatically. The display shows the name and number of the flashlamp circuit currently being pulsed as the corresponding bulb(s) flashes.

T.6 General Illumination Test

This test checks all of the General Illumination circuits. There are two modes of operation - Stop and Run.

Stop: Press the Up or Down buttons to cycle through the General Illumination Test manually. All illumination is tested first, followed by an individual circuit test. The circuit name and number shows in the display while the corresponding lamps lights. If any other results occur the system has detected an error.

Run: Press the Enter button any time during Stop mode and the General Illumination Test cycles through automatically. For each circuit shown in the display the corresponding bulbs should light. If any other results occurs the system has detected a problem.

T.7 Sound and Music Test The Sound and Music Test checks the audio circuits. This test has three modes for testing the sound and music circuits - Run, Repeat, and Stop.

Run: The Run mode steps through a sequence of sounds and music. Press the Up or Down buttons during this portion of the Sound and Music test to advance to a particular sound or tune without having to wait for the program to play all the sounds available in the test. A sound or tune should be heard for each name and number that appears in the display. Any other results indicates the system has detected a problem.

Repeat: Press the Enter button at any time during the Run mode to cause the program to stop and repeat a particular sound/tune. The same sound should repeat continuously until the Up or Down button is pressed. Any other results indicates the system has detected a problem.

Stop: Press the Enter button at any time during the Repeat mode to stop this test altogether. Nothing should be heard. Any other results indicates the system has detected a problem.

T.8 Single Lamp Test The number assigned to each lamp indicates the lamp's position in the matrix. The number on the left indicates the column. The number on the right indicates the row. Example - Lamp 23 means 2nd column, 3rd row.

This test checks each lamp circuit individually. Press the Up or Down button to cycle through this test. For each name and number that is shown in the display the corresponding lamp should light. Any other results indicates the system has detected a problem.

T.9 All Lamps Test This test causes all the controlled lamps to flash at the same time. Every controlled lamp should flash. Any other results indicates the system has detected a problem.

T.10 Lamp and Flasher Test This test causes all the flashlamps and the controlled lamps to flash at the same time. The controlled lamps blink, while the flashlamps cycle from highest to lowest. Any other results indicates the system has detected a problem.

T.11 Display Test This test automatically checks every dot in the Dot Matrix Display. A series of patterns appear in sequence. Each pattern turns on and off a section of dots. Every dot on the matrix display should be turned on and off during this test.

T.12 Flipper Coil Test The Flipper Coil Test has three modes - Repeat, Stop, and Run. Only one Flipper should pulse at a time. The system has detected a problem if more then one flipper pulses, a flipper comes on and stays on, or no flippers pulse during the Repeat or Run modes.

Repeat: The Repeat mode pulses a single flipper. After entering this test, flipper coil 01 shows in the display and the corresponding coil activates. Press the Up or Down button to cycle through the flipper coils, one at a time. The same solenoid pulses until the Up or Down button is pressed. Either press the Escape button to return to the Test Menu, or press the Enter button to move to the next mode.

T.12 Flipper Coil Test Continued...

Stop: The Stop mode halts the Flipper Coil Test. Press Enter during the Repeat mode and the test stops. No coils should be activated while the test is stopped. Either press the Escape button to return to the Test Menu, or the Enter button to move to the next mode.

Run: The Run mode cycles through the flippers automatically. The display shows the name and number of the flipper coil currently being pulsed.

T.13 Ordered Lamps Test The number assigned to each lamp indicates the lamp's position in the matrix. The number on the left indicates the column. The number on the right indicates the row. Example - Lamp 23 means 2nd column, 3rd row.

This test checks each lamp circuit individually. Press the Up or Down button to cycle through the lamps. Lamps light in a clock-wise or counter clock-wise direction starting from the bottom of the playfield. Direction depends on which button, Up or Down, is pressed. For each name and number that is shown in the display the corresponding lamp should light. Any other results indicates the system has detected a problem.

T.14 Machine Test This test turns on the Boulder Machine motor in the upper left corner of the playfield. This test is either "running" or "off".

T.15 Empty Balls Test The Empty Balls Test clears all balls from any lock-up device, including the outhole trough. Press the Enter button to begin the test and the Escape button to stop it.

Press the Up or Down buttons to cycle through the menu. Press the Enter button to access a utility. Press the Up or Down buttons to see the setting choices. Press the Enter button to lock in a choice. If a mistake is made, press Escape while "Saving Adjustment Value" is in the display. The original setting is retained and the new setting is ignored. Press the Escape button to return to the Utility Menu.

U. Utilities Menu

U.1 Clear Audits
U.2 Clear Coins
U.3 Reset H.S.T.D.
U.4 Set Time & Date
U.5 Custom Message
U.6 Set Game I.D.
U.7 Factory Adjustments
U.8 Factory Resets
U.9 Presets
U.10 Clear Credits
U.11 Auto Burn-in

U.1 Clear Audits Press the Enter button to clear the Standard Audits (except Burn-in Time), Feature Audits, and Histograms.

U.2 Clear Coins Press the Enter button to clear the Earnings Audits.

U.3 Reset H.S.T.D. Press the Enter button to clear the High Score to Date Table and the Grand Champion.

U.4 Set Time and Date Press the Enter button to activate the time and date. Use the Up or Down button to change the value, then press the Enter button to lock in that value. If a mistake is made press the Escape button while "Saving Adjustment Value" is displayed. The new value is ignored and the original value is retained.

U.5 Custom Message *Set A.1 20 to ON before trying to write a Custom Message.* Press the Enter button to begin entry of the custom message. Use the Up or Down buttons to cycle through letters. Use the Start button to cycle through punctuation marks. Press the Enter button to lock in the desired letter and punctuation. If a mistake is made, use Up and Down to select the "back-arrow" character. The "back-arrow" character is located before the space character and after the number nine. Press Enter while the back-arrow shows to erase the previously entered character. Once the message is complete, press and hold the Enter button until "Message Stored" is displayed.

Press the Escape button to cancel the new message. The message "Press Enter to Reset" appears. If Enter is pressed, the custom message is cleared and no message is displayed. If Escape is pressed, the original message remains intact.

U.6 Set Game I.D. This utility allows for the installation of a message, such as game location, that only appears on printouts. Press the Enter button to activate Set Game I.D.. Use the Up or Down buttons to cycle through letters. Use the Start button to cycle through punctuation marks. Press the Enter button to lock in the desired letter and punctuation.

U.7 Factory Adjustment Press the Enter button to restore the adjustments to factory settings.

U.8 Factory Reset Press the Enter button to restore the adjustments to their factory setting, clear the Audits, H.S.T.D Table, and Custom Message/Game I.D.

U.9 Presets Use the Up or Down buttons to cycle through the available Presets. When the desired Preset is displayed, press the Enter button to lock in that Preset. If a mistake is made, press the Escape button while "Saving Adjustment Value" is displayed. The new value is ignored and the original value is retained.

Game Difficulty Levels The game play difficulty adjustments can be changed to a combination that is MUCH LESS to MUCH MORE difficult than Factory Settings. The Game Difficulty Setting Table lists the adjustments and settings that comprise the individual group.

U.9 01 Install Extra Easy
MUCH LESS difficult than factory setting.

U.9 02 Install Easy
Somewhat LESS difficult than factory setting.

U.9 03 Install Medium
About the SAME as factory setting.

U.9 04 Install Hard
Somewhat MORE difficult than factory setting.

U.9 05 Install Extra Hard
MUCH MORE difficult than factory setting.

Difficulty Setting Table for U.S., Canadian, French, German, and European Games

Adj #	Adj Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03 (factory)	Hard U.9 04	Extra Hard U.9 05
A.2 02	Attract Sounds	Off	Off	Off	Off	Off
A.2 03	Ball Save Timer	10 sec.	9 sec.	7 sec.	5 sec.	5 sec.
A.2 05	Seconds Before Autofire	50 sec.	50 sec.	50 sec.	50 sec.	50 sec.
A.2 08	Concrete Mball™ Percent	20%	20%	10%	8%	8%
A.2 09	Light Ex. Ball Percent	7%	6%	5%	5%	4%
A.2 10	Drain Save Timer	5 sec.	5 sec.	5 sec.	5 sec.	5 sec.
A.2 15	Maximum Buy-ins	9	9	9	9	9
A.2 16	Bedrock Derby Percent	40%	40%	40%	40%	45%

U.9 06 Install 5 Ball

U.9 07 Install 3 Ball Adjustments U.9 06 and U.9 07 can be used to change a game to 3 or 5 ball play, including changing of certain features to the recommended 3-and 5-ball level. The Preset Game Adjustments Table for U.S./Canadian Games lists the adjustments and settings that comprise the individual groups.

Preset Adjustments Table for U.S. and Canadian Games

Adj #	Adj Description	Install 5-ball U.9 06	Install 3-ball U.9 07
A.1 01	Balls Per Game	5	3
A.1 07	Replay Start	400 Million	400 Million

U.9 08 Install Add-A-Ball This option deletes all Free Play awards and replaces them with Extra Ball awards. Individual adjustments are affected, as follows:

Ad	Name	New Setting
A.1 13	Replay Boost	Off
A.1 14	Replay Award	Ex. Ball
A.1 15	Special Award	Ex. Ball
A.1 17	Extra Ball Ticket	No
A.1 19	Match Feature	Off
A.4 04	Champion Credits	00
A.4 05	High Score 1 Credits	00
A.4 06	High Score 2 Credits	00
A.4 07	High Score 3 Credits	00
A.4 08	High Score 4 Credits	00

U.9 09 Install Ticket This option deletes Credit awards and replaces them with Ticket awards. Individual adjustments are affected as follows:

Ad	Name	New Setting
A.1 14	Replay Award	Ticket
A.1 15	Special Award	Ticket
A.1 16	Match Award	Ticket
A.1 17	Ex. Ball Ticket	Yes
A.1 31	Ticket Expan.Brd.	Yes
A.4 02	H.S.T.D. Award Ticket	Yes

U.9 10 Install Novelty This option removes all Free Play and Extra Ball awards. Individual adjustments are affected as follows:

Ad	Name	New Setting
A.1 04	Max. Ex. Ball	Off
A.1 05	Replay System	Fixed
A.1 09	Replay Level 1	Off
A.1 10	Replay Level 2	Off
A.1 11	Replay Level 3	Off
A.1 12	Replay Level 4	Off
A.1 15	Special Award	Points
A.1 19	Match Feature	Off
A.4 01	Highest Score	On
A.4 04	Champion Credits	00
A.4 05	High Score 1 Credits	00
A.4 06	High Score 2 Credits	00
A.4 07	High Score 3 Credits	00
A.4 08	High Score 4 Credits	00

U.9 11 Install Buy-in This option automatically sets game pricing to 1 for 50¢/2 for $1.00, and 1 Coin Buy-in (A.3 19) to YES. **Note that this is not the same feature that allows the player to buy an extra ball at the end of a game. See A.2 04 "Buy Extra Ball".**

U.9 12 Serial Capture This sets up the printer adjustments for a serial transmission to a laptop computer, (9600 baud, 40 column, no page breaks, serial printer). This option requires the installation of the optional printer kit; part number 63110.

U.9 13 Not Used

U.9 14 Not Used

U.9 15 Not Used

U.9 16 Not Used

U.9 17 Install German 1 •
U.9 18 Install German 2 •
U.9 19 Install German 3 •
U.9 20 Install German 4 •
U.9 21 Install German 5 •
U.9 22 Install German 6 •

Adjustments U.9 17 through U.9 22 are used to modify game pricing and type of game play. The Preset Game Adjustments Table for German/European Games lists the adjustments and settings that comprise the individual groups. ***NOTE:*** German replay starts at 500,000,000.

Preset Adjustments Table for German Games

Adj #	Adj Description	German 1 U.9 17	German 2 U.9 18	German 3 U.9 19	German 4 U.9 20	German 5 U.9 21	German 6 U.9 22
A.1 14	Replay Award	Credit	Ticket	Audit	Credit	Ticket	Audit
A.1 15	Special Award	Credit	Ex. Ball	Points	Credit	Ex. Ball	Points
A.1 16	Match Award	Credit	Ticket	Credit	Credit	Ticket	Credit
A.1 19	Match Feature	7%	7%	Off	7%	7%	Off
A.3 01	Game Pricing	6spiele/5DM	6spiele/5DM	6spiele/5DM	7spiele/5DM	7spiele/5DM	7spiele/5DM
A.4 02	H.S.T.D. Award	Credit	Ticket	Credit	Credit	Ticket	Credit
A.4 04	Champion Credits	03	03	00	03	03	00
A.4 05	H.S.T.D. 1 Credits	01	01	00	01	01	00
A.4 06	H.S.T.D. 2 Credits	00	00	00	00	00	00
A.4 07	H.S.T.D. 3 Credits	00	00	00	00	00	00
A.4 08	H.S.T.D. 4 Credits	00	00	00	00	00	00

• German DIP Switch settings are:

Sw4	Sw5	Sw6	Sw7	Sw8
On	On	On	On	Off

U.9 23 Install French 1*
U.9 24 Install French 2*
U.9 25 Install French 3*
U.9 26 Install French 4*
U.9 27 Install French 5*
U.9 28 Install French 6*

Adjustments U.9 23 through U.9 28 are used to modify game pricing and type of play.

*** French DIP Switch settings are:**

Sw4	Sw5	Sw6	Sw7	Sw8
On	On	On	Off	Off

U.10 Clear Credits

Press the Enter button to clear the game Credits.

U.11 Auto Burn-in

Press the Enter button to activate Auto Burn-in. This utility automatically cycles through several tests. This helps in finding intermittent problems. The tests that Auto Burn-in cycles through are: the Display Test, the Sound and Music Test, the All Lamps Test, the Solenoid Test, the Flashers Test, the General Illumination Test, and the Flipper Coil Test. All of the test run are run concurrently. The time spent on the burn-in cycle, and the total time the game has spent in burn-in are displayed.

Press the Up or Down buttons to cycle through the menu. Press the Enter button to access an adjustment. Press the Up or Down buttons to see the setting choices. Press the Enter button to lock in a setting choice. If a mistake is made, press the Escape button while "Saving Adjustment Value" is in the display. The original value is retained and the new value is ignored. Press the Escape button to return to the Adjustment Menu.

A. ADJUSTMENTS MENU

A.1 Standard Adjustments

A.1 01 Balls Per Game
A "game" is defined by specifying the number of balls to be played.
Range: 1 to 10.

A.1 02 Tilt Warnings
The number of total actuations of the plumb bob that can occur before the game is "tilted".
Range: 1 to 10.

A.1 03 Maximum Extra Balls
The number of Extra Balls that a player may accumulate.
Range: 0 to 10.

A.1 04 Maximum Extra Balls/Ball in Play
The number of Extra Balls to be awarded per ball in play.

OFF - No maximum number of Extra Ball per ball in play.
1-10 - 1 through 10 Extra Balls per ball in play.

A.1 05 Replay System
The type of replay system to be used.

Fixed - Replay value is set and does not change during game play.
Auto% - Replay starting value is set but changes every 50 games to comply with the percentage of replays desired.

A.1 06 Replay Percent*
The percentage of replays the players are able to earn when Auto Replay is used.
Range: 5% to 50%.

A.1 07 Replay Start*
Replay start value when Auto% Replay is used.
Range: 15,000,000 to 250,000,000.

*For Auto% Replay.

A.1 08 Replay Levels*

The number of replay levels used by the Auto% Replay mode. The range of this setting is 1 to 4. When two replay levels are chosen, the second replay level is automatically adjusted to twice the starting replay level. When three of four replay levels are chosen, their values are automatically adjusted to three or four times the starting replay level.

A.1 09 Replay Level 1**
A.1 10 Replay Level 2**
A.1 11 Replay Level 3**
A.1 12 Replay Level 4**

The value to be used for the 1st through 4th Fixed Replay.
Range: 00 to 250,000,000.

A.1 13 Replay Boost

The replay score can be temporarily boosted by the selected amount EACH time the player reaches or exceeds the replay score. This temporary boost is canceled when credits equal 0, the player inserts another coin, or when Begin Test is pressed.

ON - Score is boosted between 500,000 and 5,000,000 points.
OFF - Replay score is not boosted.

A.1 14 Replay Award

The form of award automatically provided when the player exceeds any replay level for either Auto% Replay or Fixed Replay.

Credit - Reaching each Replay level awards credit.
Ticket - Reaching each Replay level awards a ticket.
Ball - Reaching each Replay level awards an Extra Ball.
Audit - Reaching each Replay level awards nothing to the player; it does increase the entry value of the Audit Item(s) maintaining a tally of these awards.

A.1 15 Special Award

The award automatically provided when the player scores a special.

Credit - Scoring a Special awards a Credit.
Ticket - Scoring a Special awards a Ticket.
Ball - Scoring a Special awards an Extra Ball.
Points - Scoring a Special awards 1 Million points.

A.1 16 Match Award

The award automatically provided when the players wins a match.

Credit - Winning a Match awards a Credit.
Ticket - Winning a Match awards a Ticket.

A.1 17 Extra Ball Ticket

A Ticket is awarded when the player earns an Extra Ball.

YES - The player is awarded a Ticket in addition to an Extra Ball.
NO - The player is not awarded a Ticket

*For Auto% Replay; ** For Fixed Replay.

A.1 18 Maximum Ticket/Player

The amount of Tickets each player can earn.
Range: 00 to 100.

A.1 19 Match Feature

The desired percentage for the Match Feature occurring at the end of the game.

OFF - Match Feature is not available.
1 - 50% - 1% is 'hard'; 50% is 'extremely easy'. The Match Feature selects a random two-digit number at the end of the game and compares each players score for an identical two digits in the rightmost two positions. A match of these two digit results in an award of a Credit or a Ticket.

A.1 20 Custom Message

The message displayed during the Attract Mode.

YES - A message is displayed
NO - A message is not displayed.

A.1 21 Language

The language the game uses: English, French, or German.

A.1 22 Clock Style

The style of clock the game uses: A.M./P.M. or 24 Hours.

A.1 23 Date Style

The style of date the game uses: Month/Date/Year, or Date/Month/Year.

A.1 24 Show Date and Time

The date and time show in the Attract Mode.

YES - Show the date, time in status report or in the Attract Mode.
NO - Do Not show date, time in status report or in the Attract Mode.

A.1 25 Allow Dim Illumination

The game program dims the General Illumination for special effects and during the Attract Mode.

YES - Dim the General Illumination during the Attract Mode.
NO - Do Not dim the General Illumination.

A.1 26 Tournament Play

Equalize Multiball and Jackpots during multi-player games, (do not carry over to next player).

YES - Keep Multiball and Jackpots equal.
NO - Do Not Keep Multiball and Jackpots equal.

A.1 27 Euro. Scr. Format

Use either commas or dots between digits when numbers are displayed.

YES - Dots instead of commas, (example- 1.000.000).
NO - Commas instead of dots, (example- 1, 000, 000).

A.1 28 Minimum Volume Override

The volume can be turned Off.

YES - Volume can be turned Off.
NO - Volume can be turned Down but not Off.

A.1 29 General Illumination Power Saver

This allows the general illumination and controlled lamps to be dimmed following a time interval after a game is played. Power Saver Level (A.1 30) determines dimness of the lamps. Using this feature substantially increases the life of the lamps.
Setting: OFF, 2 to 60 minutes.

A.1 30 Power Saver Level

When General Illumination Power Saver (A.1 29) is set to On, this controls the intensity of the G.I. and controlled lamps once the game has been idle for a specified period of time.
Range: 4 to 7. (4 = dimmest, 7 = brightest)

A.1 31 Ticket Expansion Board

When a Ticket Expansion Board is connected, full control of the ticket dispenser is available. This includes a ticket low/error lamp, resume on ticket jam switch and manual ticket dispense switch.

YES - Ticket Expansion Board is connected.
NO - Ticket Expansion Board is NOT installed in the game.

A.1 32 No Bonus Flips

The activation of flippers during the end of ball "bonus" sequence. Setting to "YES" may extend the life of the flipper mechanisms.

A.1 33 Game Restart

When the Start button is pressed during or after the 2nd ball, the game in progress will end and a new game will begin. This adjustment has three settings to determine how this is handled.

NEVER - Do not allow a new game start until the current game is over.
SLOW - Restart if the Start button is pressed continuously for over 1/2 second. This helps to prevent the unintended restart of game in progress.
INSTANTLY- Restart as soon as the Start button is pressed.

When the Start button is pressed during game over, or during the 1st ball (to add a player), it is always handled instantly.

A.2 Feature Adjustments

A.2 01 Extra Ball Percent
This determines the total percentage of extra balls desired (for all extra balls awarded from all features except replay score levels).

Settings: 3% to 30%

Factory Default: 18%

A.2 02 Attract Sounds
This determines whether the flipper buttons make a sound, when pressed, during the attract mode.

Settings: ON
OFF

Factory Default: OFF

A.2 03 Ball Save Timer
This sets the number of seconds that the ball saver is activated.

Settings: 0 to 10 seconds

Factory Default 7 seconds

A.2 04 Buy Extra Ball
This determines whether each player may buy one extra ball for one credit at the end of the game.

Settings: 1 Credit
OFF

Factory Default: 1 Credit

A.2 05 Seconds Before Autofire
This sets a time (in seconds) for the ball to be automatically plunged onto the playfield after it has been served.

Settings: 10 to 40 seconds

Factory Default: 50 seconds

A.2 06 Not Used

A.2 07 Bowling Credits
This determines the amount of credits given for every Bowling High Score.

Settings: 0 to 2

Factory Default: 1

A.2 08 Concrete Multiball™ Percent
This determines the percentage of multiballs™ the Concrete Multiball™ feature will deliver.

Settings: 5% to 30%

Factory Default: 10%

A.2 09 Light Extra Ball Percent
This determines the percent of times the Light Extra Balls feature is available.

Settings: 1% to 10%

Factory Default: 5%

A.2 10 Drain Save Timer
This determines the amount of time the Drain Save feature is available.

Settings: 0 to 15 seconds

Factory Default: 5 seconds

A.2 11 to A.2 14 Not Used

A.2 15 Maximum Buy-ins
This determines the maximum amount of Buy-ins a game will offer.

Settings: 1 to 9

Factory Default: 9

A.2 16 Bedrock Derby Percent
This determines the amount of times the Bedrock Derby is available.

Settings: 10% to 80%

Factory Default: 40%

A.2 17 Flipper Plunger
This allows the right flipper button to launch the ball when the launch button is broken.

Settings: ON or OFF

Factory Default: OFF

A. 3 Pricing Adjustments

A.3 01 Game Pricing (if set to custom, then 02 to 09 are available)
The cost of a game is selected from the Standard Pricing Table or by installing Custom pricing.

A.3 02 Left Coin Units
A.3 03 Center Coin Units
A.3 04 Right Coin Units
A.3 05 4th Slot Units
The number of coin units purchased by a coin passing through the left, center, right, or fourth coin chute.

A.3 06 Units/Credits
Defines 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 these coin units exceeds or matches the Unit per Credit value by a multiple (or more, coin units) of the specified Units per Credit value the Credits display shows the proper number of credits. The coin unit counter retains any remaining coin units, until the start of Ball 2; then the coin unit counter is cleared (its contents are zeroed).

A.3 07 Units/Bonus
Additional credits are to be indicated in the credits display, when a certain number of coin units are accumulated.

A.3 08 Bonus Credits
The number of credits that are awarded when the Units/Bonus level is achieved.

A.3 09 Minimum Units
No credits are to be posted (indicated in the credit display), until the credits unit counter reaches a particular value, by setting this value to 02 (or more).

A.3 10 Coin Door Type (if set to custom, then 11 to 15 and 20 are available)
This adjustment is used to pre-set adjustments 11 to 15 based on standard coin doors (U.S.A., German, etc.).

A.3 11 Collection Text
The coin system is used to display the Earning Audits.

A.3 12 Left Slot Value
A.3 13 Center Slot Value
A.3 14 Right Slot Value
A.3 15 4th Slot Value
The monetary value of the left, center, right, or fourth coin chute.

A.3 16 Maximum Credits

The maximum number of credits the game can accumulate, either through game play awards or coin purchases. The range of this setting is 5 through 99. Reaching the specified setting prevents the award of any credits. Factory default is 10.

A.3 17 Free Play

A player can operate the game without a coin (free play) or with a coin.

NO - A coin is necessary for game play.
YES - Game play is free; no coin required.

A.3 18 Hide Coin Audits

The coin audits may, or may not, be displayed.

YES - The coin audits are not displayed.
NO - The coin audits are displayed.
HIDE NAMES - The coin audit value is shown but not the audit name.

A.3 19 1 Coin Buy-in

If game pricing is set to 1 for 50¢/2 for $1.00, the player is allowed to 'buy-in' a subsequent game for 1 coin. The number of games that may be purchased at this cost is determined by the number of players in the previous game; that is, if the previous game had three players, three credits can be purchased at the rate of 1 coin per credit. **Note, this is not the same feature that allows the player to buy an extra ball at the end of a game. See A.2 04 "Buy Extra Ball".**

YES - The player has 10 seconds to buy-in at 1 coin per game.
NO - The buy-in feature is disabled.

A.3 20 Base Coin Size

This number is used for ticket per coin calculations.

A.3 21 Coin Meter Units

It is possible to connect a coin meter to the knocker coil driver which will log all coins through all slots. This adjustment activates the use of the knocker driver for this purpose, and determines the value of each unit on the meter. For example, to show the total amount of money collected as "total quarters", set this adjustment to "0.25". To show the amount of money collected as "total dollars", set this adjustment to "1.00".

Setting this adjustment to anything other than Off establishes the coin unit for a meter attached to the knocker driver, and overrides use of the knocker during awards.

A.3 22 Dollar Bill Slot

The system normally requires 150 microseconds between coin pulses. This is too long a delay for a fast-pulsing dollar bill validator. This adjustment may be used to tell the game that there is a fast-pulsing dollar bill validator connected to one of the coin switches.

NONE	=	No validator connected.
LEFT	=	Validator connected to left slot.
CENTER	=	Validator connected to center slot.
RIGHT	=	Validator connected to right slot
FOURTH	=	Validator connected to fourth.

A.3 23 Minimum Coin Microseconds

This is the minimum width required for coin pulses to be accepted as valid coins. This may be changed to prevent certain kinds of cheating.

Pricing Table

Country	Coin Chutes Left	Center	Right	4th Chute	Games/Coins	Display	Pricing Adjustments A3 02 03 04 05 06 07 08 09
USA	25¢	$1.00*	25¢	$1.00	1/50¢, 2/75¢, 3/$1 [2]	50¢, 75¢, $1.00	
	25¢	$1.00*	25¢	$1.00	1/3X25¢[2]	USA 1/$0.75	
	25¢	$1.00*	25¢	$1.00	1/50¢, 2/$1 [2]	USA 2/$1.00	
	25¢	$1.00	25¢	$1.00	1/50¢, 3/$1.00[2]	USA 3/$1.00	
	25¢	$1.00*	25¢	$1.00	1/2x25¢, 2/4x25¢, 3/$1[2]	3/$1.00 Coin	
	25¢	$1.00*	25¢	$1.00	1/2x25¢, 2/$1.00, 3/$1.50, 6/$2.00[2]	USA 6/$2.00	
	25¢	$1.00*	25¢	$1.00	1/2x25¢, 2/$1.00, 3/$1.50, 5/$2.00[2,1]	USA 5/$2.00	
	25¢	$1.00*	25¢	$1.00	1/3x25¢, 1/$1.50, 4/$2.00[2]	1/.75, 4/$2.00	
	25¢	$1.00*	25¢	$1.00	1/2x25¢, 2/$1.00, 4/$1.50, 6/$2.00[2]	6/$2. 00 4/$1.50	
	25¢	25¢	25¢	-	1/4x25¢, 6/$5.00	1/1, 6/5	
	25¢	25¢	25¢	-	1/4x25¢	1/$1.00	
Canada	25¢	-	$1.00	-	1/50¢, 2/75¢, 3/$1	CANADA 1	
					1/50¢, 2/$1 [2]	CANADA 2	
Austria	5sch	10sch	10sch	-	1/2x5sch, 3/2x10sch [2]	AUSTRIA	
	5sch	-	10sch	-	2/5sch, 5/10sch	CUSTOM	02 00 05 00 01 00 01 00
Australia	20¢	$1	$1	$2	1/$1, 3/$2 [2]	AUSTRALIA 1	
	20¢	$1	$1	$2	1/$1, 2/$2	AUSTRALIA 2	
U.K.	£1.00	50P	20P	10P	1/3x10P, 2/50P, 4/£1 [2]	U. KINGDOM	
Switzerland	1Fr	2Fr	5Fr	-	1/1Fr, 3/2Fr, 7/5Fr [2]	SWISS 1	
	1Fr	2Fr	5Fr	-	1/2Fr, 2/3Fr, 3/4Fr, 5/5F	SWISS 2	
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr , 3/50Fr [2]	BELGIUM	
Germany	1DM	2DM	5DM	-	1/2DM, 2/3DM, 3/4DM, 5/5DM [1,2]	GER. 1/2DM	
Holland	1G	-	1G	-	1/1G [2]	HOLLAND	
Sweden	1Kr	5Kr	10Kr	1Kr	1/10x1Kr, 1/2/5Kr, 1/10Kr, 2/15Kr, 3/20Kr[1,2]	SWEDEN 1	
	1Kr	5Kr	10Kr	1Kr	1/5x1Kr, 1/5kr, 2/10Kr [2]	SWEDEN 2	
France	1Fr	5Fr	10Fr	20Fr	1/3x1Fr, 2/5Fr, 5/10Fr , 10/20Fr[2, 3]	TARIF 1	
	1Fr	5Fr	10Fr	20Fr	1/2x1Fr, 3/5Fr, 7/10Fr , 14/20Fr[2, 3]	TARIF 2	
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr, 7/2x10Fr , 7/20Fr [1,2, 3]	TARIF 3	
	1Fr	5Fr	10Fr	20Fr	2/5Fr, 4/10Fr,9/2x10Fr , 9/20Fr[2,3]	TARIF 4	
	1Fr	5Fr	10Fr	20Fr	2/5Fr, 5/10Fr, 11/2x10Fr , 11/20Fr[2,3]	TARIF 5	
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr , 6/20Fr[2, 3]	TARIF 6	
Italy	500L	500L	500L	-	1/500L [2]	ITALY 1	
	500L	500L	500L	-	1/2x500L, 3/4x500L [1,2]	ITALY 2	
	500L	500L	500L	-	1/500L, 2/1000L	ITALY 3	
Spain	100P	-	500P	-	1/100P, 6/500P [2]	SPAIN	
	25P	-	100P	-	1/25P, 5/100P	CUSTOM	01 00 04 00 01 04 01 00
	25P	-	100P	-	1/25P, 4/100P	CUSTOM	01 00 04 00 01 00 01 00
	25P	-	100P	-	1/2x25P, 2/100P	CUSTOM	01 00 04 00 02 00 01 00
	25P	-	100P	-	1/2x25P, 3/100P	CUSTOM	03 00 12 00 04 00 01 06
Japan	100¥	-	100¥	-	1/100¥ [2]	JAPAN	
Chile	Token	-	Token	-	1/1Token [2]	CHILE	
Denmark	1Kr	5Kr	10Kr	-	1/3x1 Kr, 3/5 Kr, 7/10 Kr [2]	DENMARK	
Finland	1Mka	-	5Mka	-	1/2x1Mka, 3/5Mka [2]	FINLAND 1	
	1Mka	-	5Mka	-	1/3x1Mka, 2/5Mka [2]	FINLAND 2	
New Zealand	$1.00	-	$2.00	-	1/$1, 3/$2	NEW ZEALAND 1	
	$2.00	-	$1.00	-	1/$1, 3/$2, ($2-$1 door)	NEW ZEALAND 2	
Norway	5Kr	-	10Kr	-	1/5Kr, 2/10Kr, 5/20Kr [2]	NORWAY	
Argentina	10¢	10¢	10¢	-	1/1 Token [2]	ARGENTINA	
Greece	10D	20D	50D	-	1/2x10D, 1/20D, 3/50D	GREECE	
Antilles	25¢	25¢	1G	-	1/25¢, 4/1G	ANTILLES	
Netherlands	1Hfl	2.5Hfl	2.5Hfl	-	1/1Hfl, 3/2.5Hfl	NETHERLANDS	
Hungary	10F	10F	20F	-	1/1x20F, 1/2x10F, 3/2x20F [2]	HUNGARY	

Note: 1. Factory Default. 2. Standard Setting - Change by pressing Enter button. 3. Other functions are also affected.
* Only if Bill Acceptor and Center Coin Chute are available.

A.4 H.S.T.D. Adjustments

A.4 01 Highest Scores
The game maintains a record of the four highest scores achieved to date.

OFF - No high scores are recorded, or displayed.
ON - The four highest scores are stored in memory and displayed in Attract Mode.

A.4 02 H.S.T.D. Award
The award given for achieving the High Score To Date, or the Champion H.S.T.D.: Credit or a Ticket.

A.4 03 Champion H.S.T.D.
The "Highest" High Score can be displayed in the Attract Mode. This score is not cleared when "High Score Reset Every" occurs.

ON - The "Highest" High Score is retained in memory and displayed.
OFF - The "Highest" High Score is not retained.

A.4 04 Champion Credits
The number of credits or tickets awarded for a Grand Champion Score.
Range: 00 to 10.

A.4 05 H.S.T.D. 1 Credits
A.4 06 H.S.T.D. 2 Credits
A.4 07 H.S.T.D. 3 Credits
A.4 08 H.S.T.D. 4 Credits
The number of credits or tickets awarded whenever a player exceeds the 1st, 2nd, 3rd, or 4th highest score.
Range: 00 to 10.

A.4 09 High Score Reset Every
The number of games to be played before an automatic reset of the displayed "Highest Score" occurs. The values provided upon reset are those selected by the operator in the Back-up High Scores.
Range: OFF (disabled); 250 to 20,000.

A.4 10 Backup Champion
The Back-up Grand Champion Score.
Range: 00 to 999,000,000.

A.4 11 Backup H.S.T.D. 1
A.4 12 Backup H.S.T.D. 2
A.4 13 Backup H.S.T.D. 3
A.4 14 Backup H.S.T.D. 4
The first through the fourth Back-up High Score values. The game automatically restores this value when the High Score Reset Every value is reached.
Range: 00 - 999,000,000.

A.5 Printer Adjustments (optional board required)

A.5 01 Column Width
The column width to be printed.
Range: 22 to 80.

A.5 02 Lines Per Page
The amount of lines per page.
Range: 20 to 80.

A.5 03 Pause Every Page
Choose whether the printer pauses at the end of a page.

YES - The printer does pause.
NO - The printer doesn't pause.

A.5 04 Printer Type
Select the type of printer: Parallel, Serial, ADP, Mini-Drucker, or NSM.

A.5 05 Serial Baud Rate
Select which baud rate to use for serial or ADP communications (bit rate): 300, 600, 1200, 2400, 4800, or 9600.

A.5 06 Serial D.T.R. (Data Terminal Ready)
When a serial printer is used, this line may be connected to a printer output line signaling that the printer is busy.

NORMAL - Normal D.T.R. signal goes low to indicate the printer is not ready.

INVERTED - Inverted D.T.R. (busy) signal goes high to indicate the printer is not ready.

IGNORE - D.T.R. signal is ignored.

ERROR MESSAGES

The WPC game program has the capability to aid the operator and service personnel. At game turn-on, or after pressing the Begin Test switch, once the game has been operating for an extended period, the display may signal with a message, "Press ENTER for Test Report". This indicates the game program has detected a possible problem with the game.

To obtain details of the problem open the coin door and press the Begin Test switch. Press the Enter button to begin displaying the message(s). The following messages apply to your game.

Check Switch ##.

This message indicates that at least one switch was stuck 'On' at game turn-on or has NOT been actuated during ball play (for 90 balls or apx. 30 games). The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep your game earning, until the service technician can repair the problem.

To verify the problem, refer to the Test Menu text describing Switch Testing, and check each reported switch using applicable switch tests. Always check switch operation using a ball, to simulate game conditions. Switch problems may often be resolved by adjusting the wire switch actuators, fixing switch circuitry problems, securing loose connectors, etc. Mechanisms using 'opto switches' (drop targets, etc.) need to be checked for proper power connections (+12V dc and ground).

Check Fuses F115 and F116 and Opto 12V Supply

This message will be displayed if the game senses that all optical switches are not functioning. This usually occurs when there is no 12V supply to the playfield optics.

The problem is likely to be a blown fuse (F115 or F116), or at connectors J112, J116, J117 or J118 on the power driver board.

Opto Trough Bad Check Connectors, Wires and 12V Supply.

This message will be displayed if all of the optics in the playfield ball trough are not functioning. This is usually caused by a problem with a ball trough connector supplying 12V and ground for the optical circuits.

Pinball Missing.

This game normally uses four balls, however, it will operate with less. This message announces that a ball is missing or stuck. When the ball is located, return it to the game via the Outhole. Other possibilities for this problem could be malfunctions of the Ball Trough switches or the Ball Shooter switch.

xxxxx Sw. is Stuck On.

This message indicates that a switch, which is not usually On, remains in the On position after the game is switched On. The stuck switch is essential for game play (for example, a coin chute switch, the slam tilt switch, the plumb bob tilt switch), and should be cleared to permit proper game operation.

Ground Short Row-N, Wht-xxx.

This message indicates that the switch wires being called out are touching a grounded part on the playfield or coin door. The following should be checked:

1. Slam tilt (or other coin door switch) touching the grounded coin door.
2. A leaf-type, playfield switch touching a grounded part.
3. Players poking metallic objects (wires, coat hangers, etc.) into the game.
4. Switch cable insulation pierced or damaged allowing bare wire contact with a grounded part.
5. All switches in a row closing at the same time. ***Note:*** This is NOT a switch problem; however, for most games it is a very rare possibility.

U6 Checksum Error.

The game ROM checksum is invalid. If this occurs replace the game ROM.

Time and Date Not Set.

The real time clock is not set. Go to U.4 of the Utilities Menu and set the time and date.

Factory Settings Restored.

This message indicates that the CMOS RAM (U8) no longer retains any custom Pricing or Game Adjustment settings and has reverted to factory default settings. Generally, the following CPU checks will isolate the cause of the CMOS RAM memory failure. The voltages at pin 28 and pin 26 of U8 should be +5V (game turned On) and at least +4V (game turned Off). When the voltage drops below +4V, memory reset occurs. Check the batteries and battery holder. Be sure that the batteries are good and that there is no contamination on the battery holder terminals. Turn the game OFF, and use an ohmmeter to check diodes D1 and D2 on the CPU Board. D1 should read 0 ohms when forward-biased and infinite ohms when reverse-biased. D2 should read 15 ohms when forward-biased and infinite ohms when reverse-biased. (Readings taken with an analog meter.)This message can also indicate that there is an open diode on a 50V coil circuit and noise is entering the circuit.

CPU L.E.D.'s

The CPU has three L.E.D.s located on the upper left side of the board D19, D20, and D21. On game power-up D19 and D21 turn on for a moment then, D19 turns off and D20 starts to blink rapidly. D21 remains on. The system has detected a problem if the following happens:

CPU Board L.E.D. Error Codes

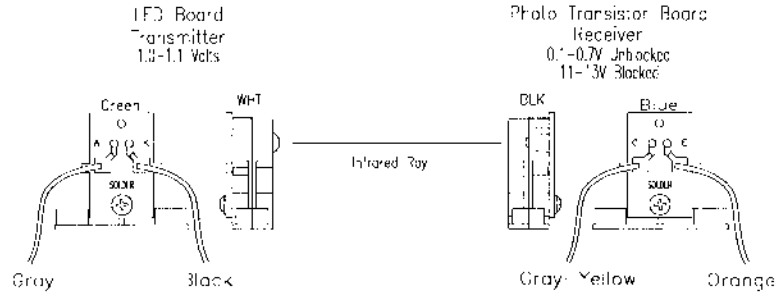
Center L.E.D. blinks one time	-	U6 ROM Failure
Center L.E.D. blinks two times	-	U8 RAM Failure
Center L.E.D. blinks three times	-	U9 Custom Chip Failure

Sound Board Beep Error Codes
Upon Game Turn-On:

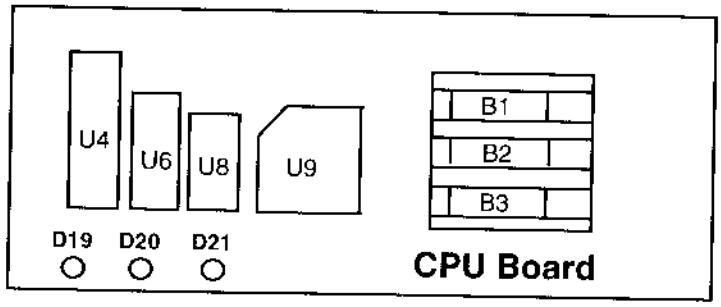
1 Beep	=	Sound Board O.K.
2 Beeps	=	U2 Failure
3 Beeps	=	U3 Failure
4 Beeps	=	U4 Failure
5 Beeps	=	U5 Failure
6 Beeps	=	U6 Failure
7 Beeps	=	U7 Failure
8 Beeps	=	U8 Failure
9 Beeps	=	U9 Failure

Opto Theory

The opto receiver (Photo Transistor) should be approximately 0.1 - 0.7 volts when the opto beam is unblocked and approximately 11 - 13 volts when the opto beam is blocked. The opto transmitter (LED) should always be approximately 1.4 volts. ***Note:*** The transmitter (LED) is larger than the receiver (Photo Transistor); it protrudes further from its case.

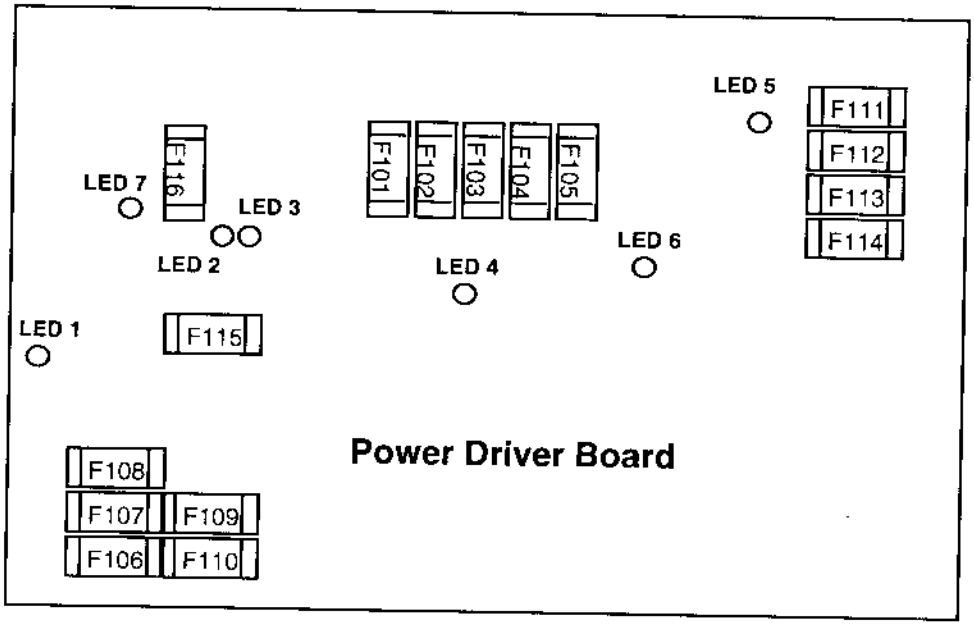


LED List



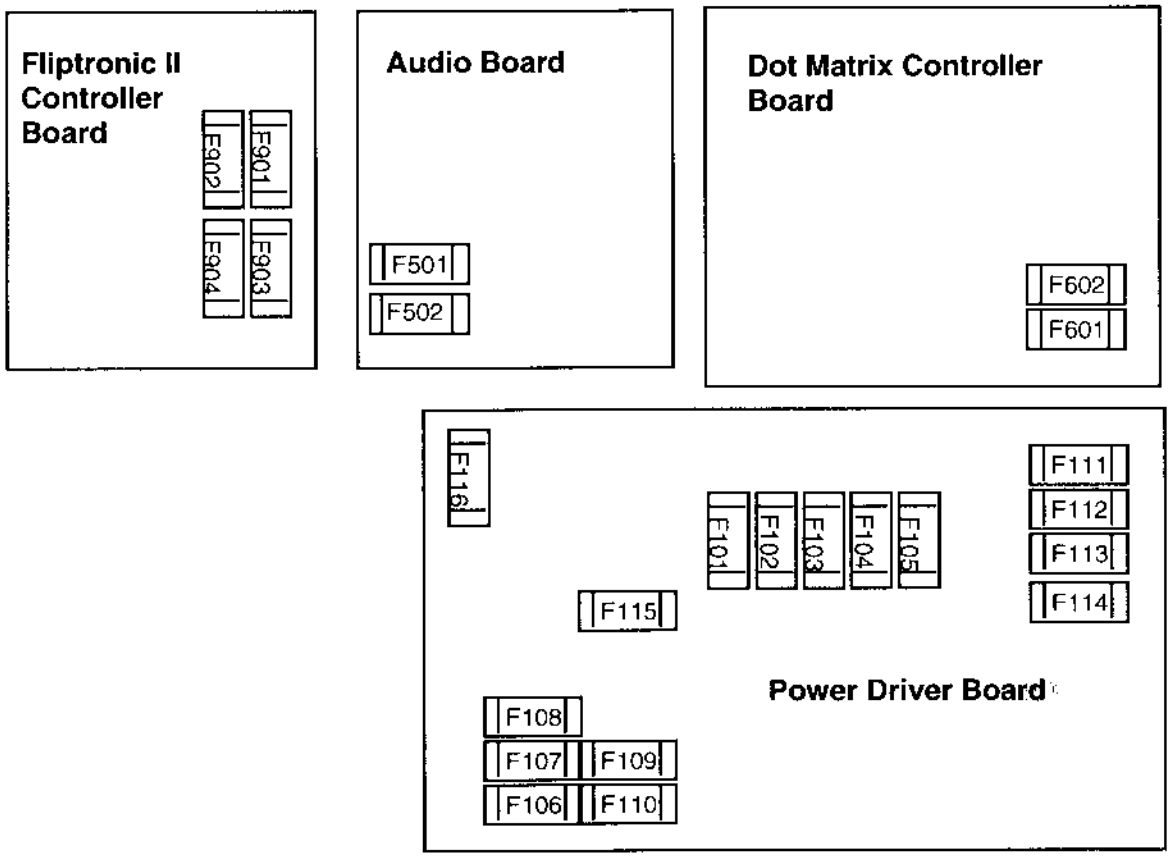
CPU Board
D19 , Blanking
D20, Diagnostic
D21, +5vdc
At game Turn-On = D19 & D21 On, D20 Off
During Normal Operation = D19 Off, D20 Flashing, D21 On

Dot Matrix Controller Board
D10, +5V Circuit, Normallly On



Power Driver Board
LED 1, +12vdc Switch Circuit, Normally On
LED 2, High/Low Line Voltage Sensor, Normally On
LED 3, High/Low Line Voltage Sensor, Normally Off
LED 4, +5vdc, Digital Circuit, Normally On
LED 5, +20vdc, Flashlamp Circuit, Normally On
LED 6, +18vdc, Lamps Circuit, Normally On
LED 7, +12vdc, Power Circuit (motors relays etc.), Normally On

Fuse List



Audio Board

F501	-25V Circuit	3A, S.B.
F502	+25V Circuit	3A, S.B.

Dot Matrix Controller Board

F601	+62V Circuit,	3/8A, F.B.
F602	-113V & -125V Circuits	3/8A, F.B.

Power Driver Board

F101	+50V general (l. flipper)	3A, S.B.
F102	+50V general (r. flipper)	3A, S.B.
F103	Solenoid #25-#28	3A, S.B.
F104	Solenoid #9-#16	3A, S.B.
F105	Solenoid #1-#8	3A, S.B.
F106	G.I. #5 Wht-Vio	5A, S.B.
F107	G.I. #4 Wht-Grn	5A, S.B.
F108	G.I. #3 Wht-Yel	5A, S.B.
F109	G.I. #2 Wht-Org	5A, S.B.
F110	G.I. #1 Wht-Brn	5A, S.B.
F111	Flasher Secondary	5A, S.B.
F112	Solenoid Secondary	7A, S.B.
F113	+5V Logic	5A, S.B.
F114	+18V Lamp Matrix	8A, N.B.
F115	+12V Switch Matrix	3/4A, S.B.
F116	+12V Secondary	3A, S.B.

Fliptronic II Controller Board

F901	Upper Right Flipper	3A, S.B.
F902	Upper Left Flipper	3A, S.B.
F903	Lower Right Flipper	3A, S.B.
F904	Lower Left Flipper	3A, S.B.

Line Filter

Domestic Game	8A, N.B.
Foreign Game	5A, S.B.

MAINTENANCE INFORMATION

LUBRICATION

The two main lubrication points of the Ball Release mechanism are the pivots for the arm. The mechanisms of other playfield devices are somewhat similar to the Ball Release device, and have the same lubrication requirements. A medium viscosity oil (switch target grease) is satisfactory for these devices.

Because of the functional design (arm-actuated via solenoid plunger operation), the pivot points of the Left and Right Kickers ("Slingshots") all require lubrication as a regular servicing procedure.

Lubrication to ensure proper operation also applies to the target blades of the Drop Targets. MBI Instrument Grease, also known as Drop Target Switch Lubricant, with a Williams' part number of E1165, is a recommended lubricant.

SWITCH CONTACTS

Playfield Switches
For proper game operation, switch contacts should be free of dust, dirt, contamination, and corrosion. Blade switch contacts are plated to resist corrosion. Cleaning blade switch contacts requires gentle closing of the contacts on a clean business card or piece of paper, and then pulling the paper about 2 inches, which should restore the clean contact surface. Adjust the switch contacts to a 1/16-inch gap.

Flipper Switches
This game uses the new Fliptronic II Electronic Flipper System. The End-of-Stroke switches are NORMALLY OPEN. The switch should close when the flipper is energized. All E.O.S. switches are gold flashed computer grade leaf switches. Only low computer current is carried through these switches. DO NOT FILE or abrasively clean these switches! DO NOT REPLACE these switches with the old style tungsten high current type switches as intermittent operation could occur. ***Note:*** Unlike the old style of flipper, an E.O.S. switch failure does not harm the flipper. The game notifies the operator of the switch being mis-adjusted in the test report, but continues to play. The E.O.S. switches are a means by which the new electronic flippers feel and play with all of the subtleties of the old flippers.

CLEANING

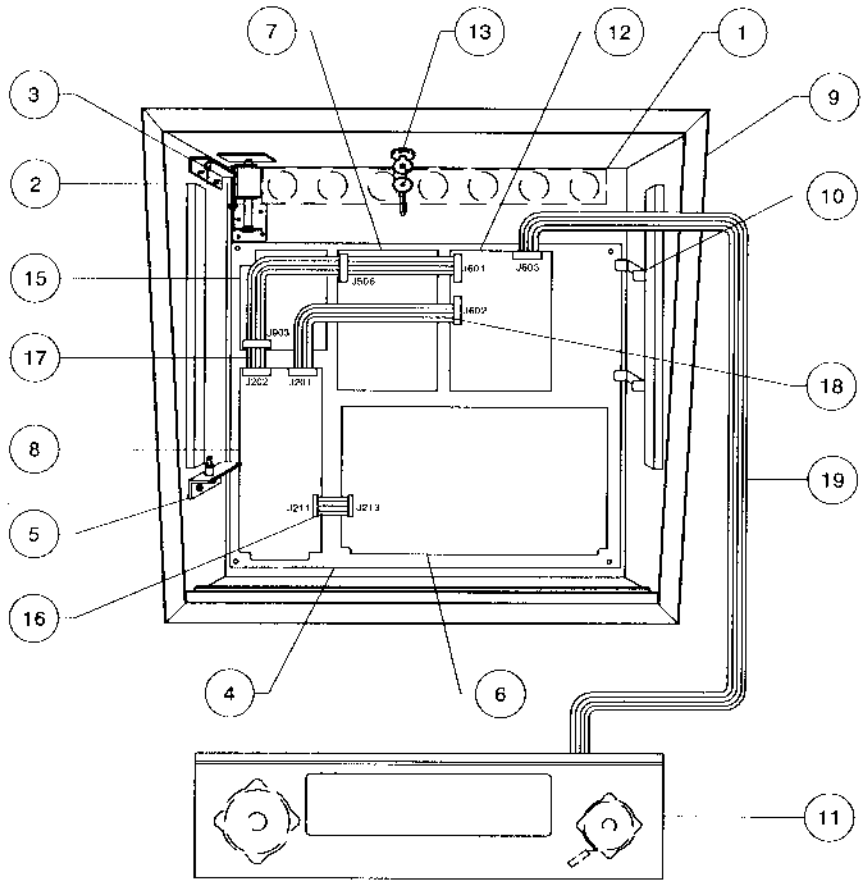
Good game action and extended playfield life are the results of regular playfield cleaning. During each collection stop, the playfield glass should be removed and thoroughly cleaned and the playfield should be wiped off with a clean, lint-free cloth. The game balls should be cleaned and inspected for any chips, nicks, or pits. Replace any damaged balls to prevent playfield damage.

Regular, more extensive, playfield cleaning is recommended. However, avoid excessive use of water and caustic or abrasive cleaners because they tend to damage the playfield surface. Playfield wax (or any carnauba based wax), or polish may be used sparingly, to prevent a buildup on the playfield surface. Do not use cleaners containing petroleum distillates on any playfield plastics because they may dissolve the plastic material or damage the artwork.

SECTION 2

Parts Information

50029-BB Backbox Assembly



Item	Part No.	Description
1.	01-6645	Venting Screen
2.	B-10686-1	Knocker Assembly
3.	A-12497	Insert Bd.Hinge Assy., Upr.
4.	A-14092-5	WPC Mounting Plate Assy.
5.	A-12498	Insert Bd. Hinge Assy., Lwr.
6.	A-12697-3	Power Driver Assembly
7.	A-16917-50029	Sound Board Assembly
8.	A-17651-50029	WPC Security CPU Board
9.	A-18828	Backbox & Decal Assembly
10.	01-9047	Insert Stop Bracket
11.	A-18055	Speaker/Display Assembly
12.	A-14039.1	Dot Matrix Controller Board
13.	A-13379	Lock & Plate Assembly
14.	50029-IN	Insert Board
15.	A-15472-1	Fliptronic II Board

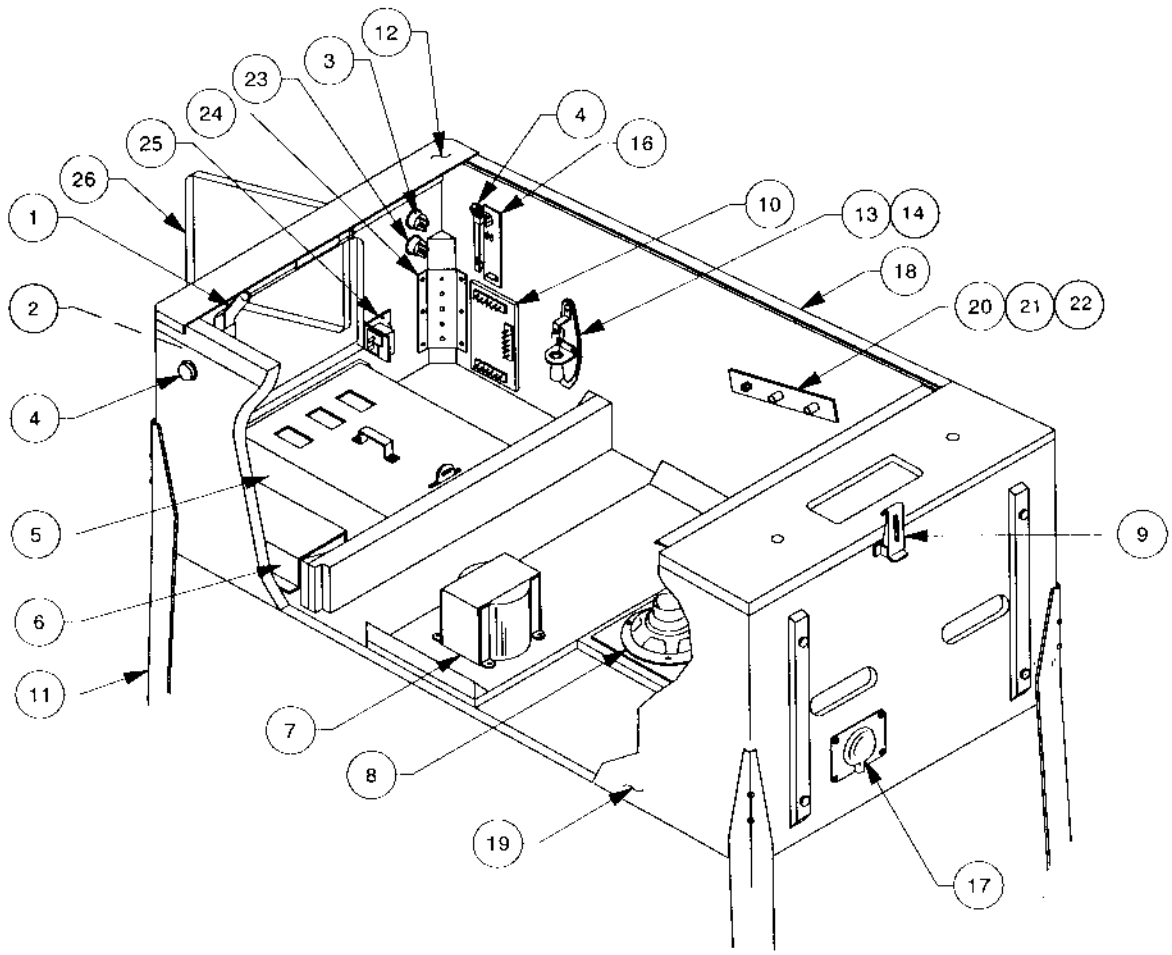
♦ Ribbon Cables

Item	Part No.	Description
16.	5795-12653-03	Ribbon Cable, 3"
17.	5795-13018-01	Ribbon Cable, 23.5"
18.	5795-10938-15	Ribbon Cable, 15"
19.	5795-13434-32	Ribbon Cable w/Ferrite Bead

♦ Miscellaneous Parts

A-8552-50029	Tempered Backglass Assy.
03-8228-2	Glass Channel Top (1)
03-8228-3	Glass Channel Edge (2)
03-8229-1	Glass Lift Channel (1)
08-7456	Backbox Glass:27x18-7/8"
31-1357-50029	Screened Translight

50029-CAB Cabinet Assembly



Item	Part No.	Description
1.	A-16773	Lever Guide Assembly
2.	20-9663-B-7	Push Button w/Sw., Red
3.	20-9663-14	Push Button w/Sw., Yellow
4.	A-16883-4	Flipper Button, Red (2)
5.	A-18531-1	4-Ball Cashbox Assembly
6.	A-17540	Univ. Power Interface Assy.
7.	5610-13953-00	WPC Transformer
8.	5555-12929-00	Speaker, 4Ω, 6", 25w
9.	20-9347	Toggle Latch
10.	A-17051-1	Coin Door Interface Board
11.	C-10843-BR	Leg Assembly, Brass
12.	D-12615	Front Molding Assembly
13.	20-6502-A	Plum Bob
14.	A-15361	Tilt Mechanism Assembly
15.	*	Cordset
16.	A-17316	Opto Flipper Assembly (2)
17.	01-10714	Line Cord Cover
18.	A-12359-3	Side Molding Assembly (2)
19.	11-1157	Wood Cabinet

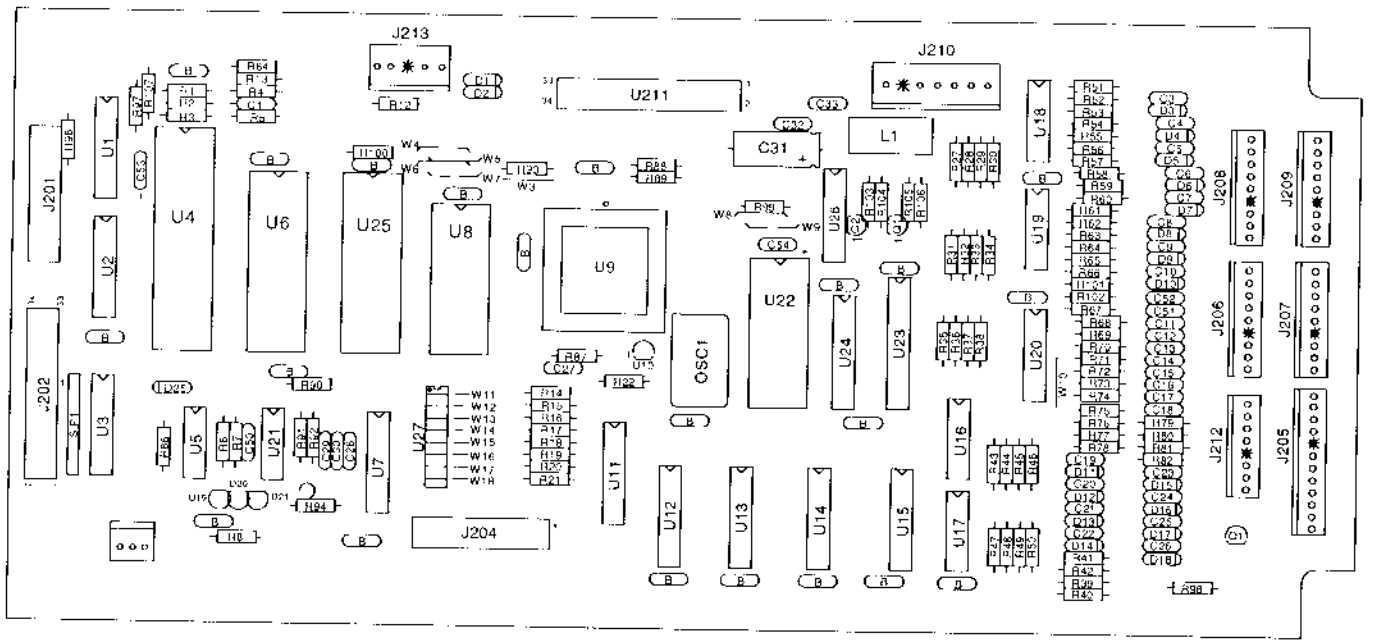
Item	Part No.	Description
20.	01-11408	Plate Spacer (2)
21.	02-4329-1	Pivot Nut, 7/8" (4)
22.	02-4352	Pivot Bushing (2)
23.	20-9663-18	Push Button w/Sw., Orange
24.	01-11400	Leg Plate (4)
25.	A-18249-1	Cable & Interlock Switch Assy.
26.	09-61000-1	Coin Door-USA

♦ Miscellaneous

A-17195	Tilt Switch Assy. w/Cable
01-10797	Playfield Support Bar, 18"
01-12352	Clip Bracket
01-9011-L	Backbox Mtg. Bracket, Left
01-9011-R	Backbox Mtg. Bracket, Right
08-7028-T	Tempered Plfd. Glass: 21"x43"
08-7377	Leg Leveler Adjuster, 3"
20-6500	Steel Ball, 1-1/16" (4)

* See Application Chart p.2-36.

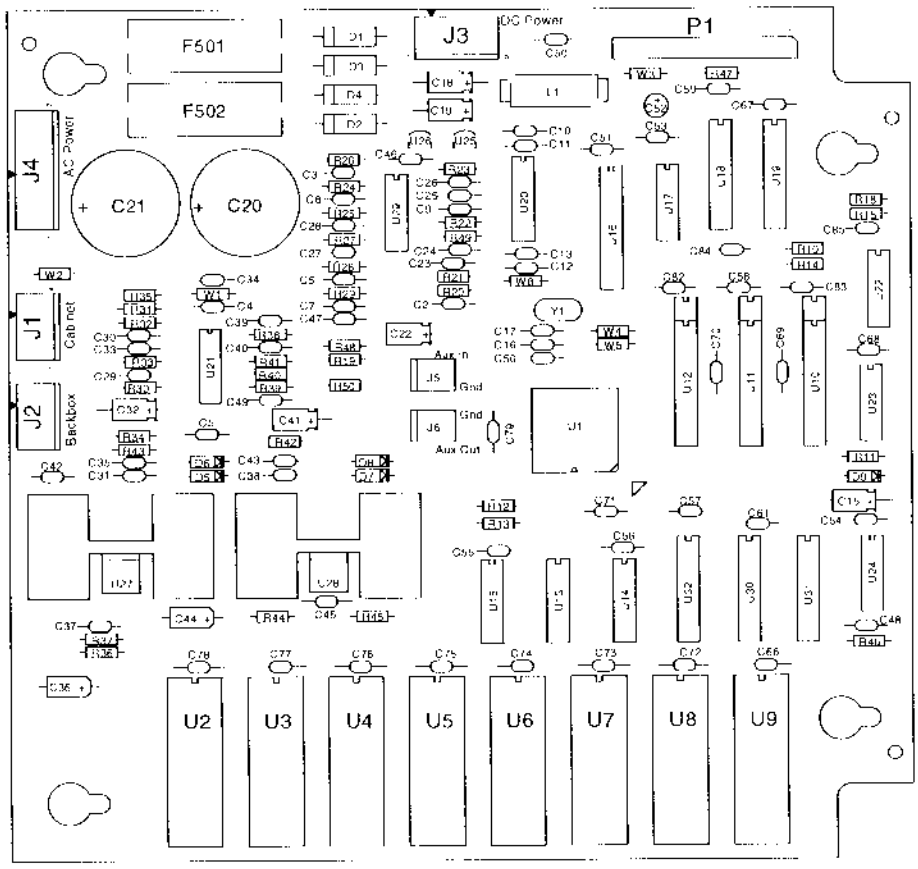
A-17651-50029 WPC CPU Security Board Assembly



Part Number	Designator	Description
5010-09034-00	R14-R22, R27-R42, R86, R94, R90, R98	Res., 10KΩ, ¼w, 5%
5010-09314-00	R52, R54, R56, R58, R60, R62, R64, R66, R75-R82	Res., 1.2KΩ, ¼w, 5%
5010-09358-00	R3, R43-R51, R53, R55, R57, R59, R61, R63, R65, R67-R74, R84, R101, R102, R105, R106	Res., 1KΩ, ¼w, 5%
5010-09416-00	R5-R8, R12, R13, R87-R89, R99, R100	Res., 470Ω, ¼w, 5%
5010-09085-00	R1, R2, R4, R96, R97, R107	Res., 1.5KΩ, ¼w, 5%
5010-09534-00	W3, W4, W7, W9	Res., 0Ω
5010-10989-00	R92	Res., 470KΩ, ¼w, 5%
5010-12104-00	R91	Res., 22MΩ, ¼w, 5%
5010-08991-00	R103, R104	Res., 4.7KΩ, ¼w, 5%
5019-09362-00	SIP1	SIP 4.7K, 9R, 10P, 5%
5040-08986-00	C31	Cap., 100M, 10v (±20%)
5043-08980-00	B	Cap., .01M, 50v (+80, -20%)
5043-09030-00	C27	Cap., .047M, 50v, (±20%)
5043-09065-00	C3,-C26, C51, C52	Cap., 470P, 50v, (±20%)
5043-09491-00	C29, C30	Cap., 22P, 1KV (±10%)
5043-09492-00	C28	Cap., 100P, 50v (±10%)
5041-09163-00	C53, C54	Cap., 2.2µF, 15v (20%) Ax.
5070-08919-00	D2-D18	Diode, 1N4148 150MA
5070-09266-00	D1, D25	Diode, 1N5817, 1.0A.
5160-10269-00	Q1-Q3	Trans., 2N3904 NPN
5700-10389-00	U20	IC Socket 18-pin
5281-09308-00	U3	IC, 74LS245 TRNCV
5281-09486-00	U14, U24	IC, 74LS374 8 D F/F
5281-09851-00	U5	IC, 74LS14 SMT TRG
5281-09867-00	U1, U2, U7	IC, 74LS244 OCT BUF

Part Number	Designator	Description
5281-10182-00	U11-U13, U15	IC, 74LS240 / DRVR
5284-12651-00	U21	IC, 4548
5315-13924-00	U23	IC, 74HC4514 LTCH 1to16 Dec.
5281-09246-00	U26	IC, 74LS139 2 T 4 Decoder
5340-13062-00	U8	IC/RAM 32kX8 Static
5370-12272-00	U16-U19	IC, LM339 Quad Comp
5370-12687-00	U10	MC 34064
5521-10931-00	OSC1	8.00MHZ OSC 14PIN DIP
5520-12084-00	X1	Crystal 32.768 KHz
5551-09822-00	L1	Inductor, 4.7µH, 3.0A.
5671-13732-00	D19-D21	Display LED Red
5700-08985-00	U4	Socket IC 40P .6"
5700-12088-00	U6	Socket IC 32P .6"
5700-12424-00	U9	Socket 84 Pin PLCC
5700-10176-00	U22	Socket IC 28 P .6"
5791-10850-00	J201, J204	Connector, 26-pin Header Str
5791-14090-05	J213	Connector, 5-pin Header Str
5791-10862-07	J210	Connector, 7-pin Header Str
5791-13830-08	J212	Connector, 8-pin Header Str
5791-13830-09	J208, J209	Connector, 9-pin Header Str
5791-13830-11	J206, J207	Connector, 11-pin Header Str
5791-12516-00	J202, J211	34 Hen 2x17 Str
5048-11033-00	C50	Cap., .022 µF
5791-13830-12	J205	Cap., 12-pin Header Str
5043-09845-00	C32, C33	Cap., 1KP, 50v (±10%)
5645-09025-00	U27	Switch DIP 8 POS
5162-12422-00	U20	IC, ULN 2803A
A-5400-50029-1	U22	WPC PIC 16C57 Micro-C
A-5343-50029-1	U6	Game ROM Assembly
A-17643	-	Battery Holder PCB Assy.
5400-10320-00	U4	MC68B09E 2Mhz µP
5410-12426-00	U9	WPC ASIC-89
20-9665-1	-	PCB Standoffs
H-18258	-	WPC CPU Security Cable

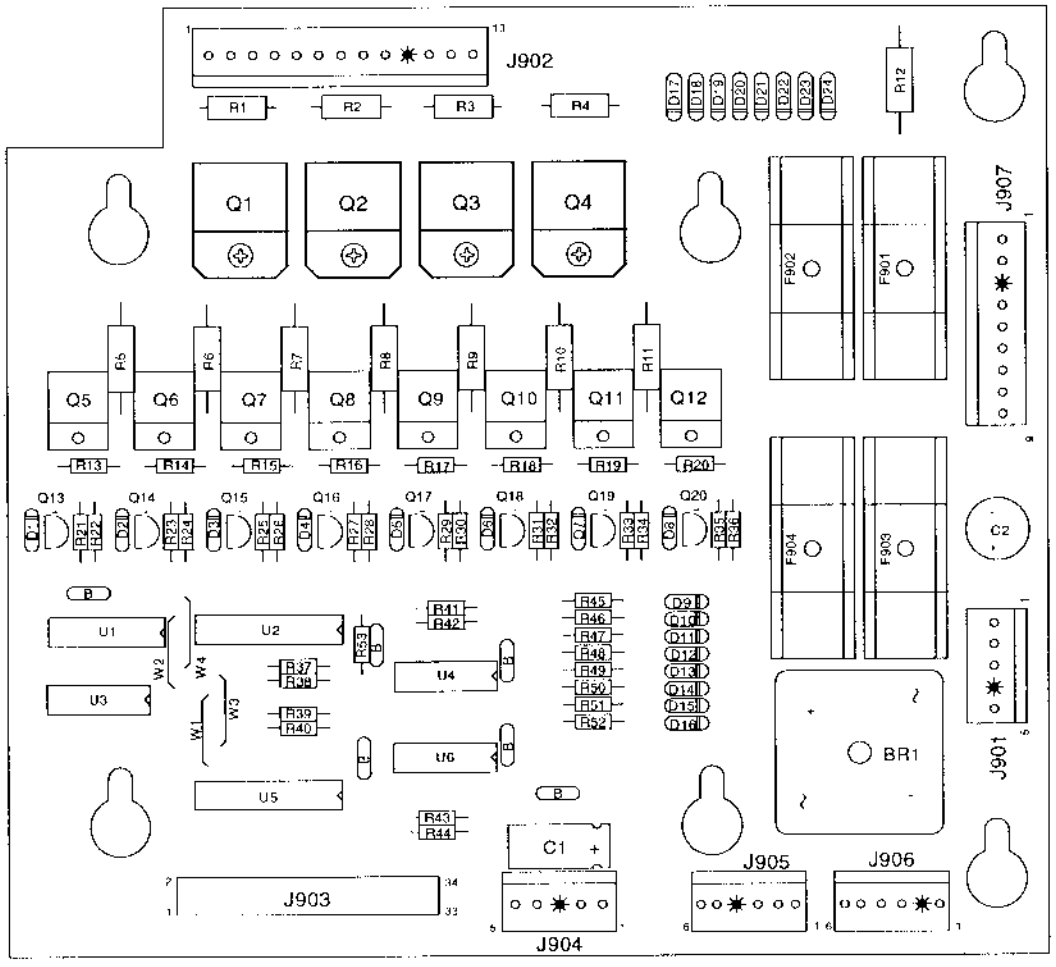
A-16917-50029 Sound Board Assembly



Part Number	Designator	Description
4004-01005-06	U27, U28	MS, 4-40 x 3/8"
4404-01119-00	U27, U28	Nut 4-40
5010-08772-00	R39, R41	Resistor, 15KΩ, ¼w, 5%
5010-08774-00	R30, R34, R37, R42, R45	Resistor, 22KΩ, ¼w, 5%
5010-08991-00	R10, R12-R16	Resistor, 4.7Ω,¼ w, 5%
5010-09034-00	R47	Resistor, 10KΩ, ¼w, 5%
5010-09035-00	R11, R19, R33, R40	Resistor, 47KΩ, ¼w, 5%
5010-09036-00	R46	Resistor, 100Ω, ¼w, 5%
5010-09219-00	R31, R32, R38	Resistor, 8.2KΩ, ¼w, 5%
5010-09358-00	R50	Resistor, 1KΩ,¼ w, 5%
5010-09534-00	W4, W6	Resistor,0Ω (Jumper)
5010-13420-00	R36, R44	Resistor, 680Ω, ¼w, 5%
5010-13607-00	R20-R29, R48, R49	Resistor, 6.2KΩ, 1/8w, 1%
5010-13517-00	R35, R43	Resistor, 15Ω, ¼w, 5%
5040-09365-00	C15, C18, C19, C32, C41	Cap., 1µF, 63v, Alum Ax.
5040-09421-00	C52	Cap., 100µF,25v,Alum Ax.
5040-13417-00	C20, C21	Cap., 10,000µF, 35v, Alum.
5041-09009-00	C36, C44	Cap., 22µF,10v, Tant Alum
5041-13187-00	C22	Cap., 4.7µF, Tant Axial.
5043-08996-00	C4, C5, C10-C13 C31, C35, C38, C43, C46, C4 C50-C79	Cap., .10µF, 50v, Cer Ax.
5043-10267-00	C37, C45	Cap., 150pF,50v, Cer Ax.
5048-11028-00	C16, C17	Cap., 22pF, 50v, Cer Ax.
5048-11029-00	C48	Cap., 100pF,50v, Cer Ax.
5048-11030-00	C49	Cap., 470pF,50v, Cer Ax.
5048-11033-00	C33	Cap., .022µF,50v, CerAx.
5048-12036-00	C34, C4	Cap., .22µF, 50v, Cer Ax.
5048-13418-00	C30, C39, C40	Cap., .047µF,50v, Cer Ax.
5048-13608-00	C8	Cap., 6800pF, 50v, Cer Ax.
5048-13609-00	C7, C24, C26	Cap., 3900pF, 50v, Cer Ax.
5048-13610-00	C2, C3, C9, C27, C29	Cap., 1000pF, 50v, Cer Ax.
5048-13611-00	C6, C23, C25, C28	Cap., 680pF, 50v, Cer Ax.
5070-09045-00	D1-D4	MR-501 Rectifier Diode

Part Number	Designator	Description
5070-09054-00	D5-D9	Diode Signal 1N4004
5250-13302-00	U25	78L05 Pos 5V reg TO-92
5250-13303-00	U26	79L05 Neg 5V Reg TO-92
5283-10551-00	U17	IC74F00 Fast Quad NAND
5311-10946-00	U22	IC74HC74 Dual D Flip Flop
5311-10947-00	U23	IC74HC125 Quad Tri-State Buffer
5311-10948-00	U15	IC74HC138 1 of 8 Decoder
5315-12009-00	U18, U19	IC74HCT374 Octal D Flip Flop
5311-12043-00	U13, U14	IC74HC174 Hex D Flip Flop
5311-12538-00	U24	IC74HC14 Hex Schmitt Inverter
5311-12287-00	U30-U32	IC74HC541 Octal Bus Driver
5340-13304-00	U10-U12	ICSRAM 2Kx8 35ns .300 DIP
5370-12730-00	U21, U29	ICTL084 Quad Op AMP
5370-13419-00	U27, U28	Audio Power Amp TDA2030AV
5371-13299-00	U20	IC DAC AD-1851 16Bit
5520-13301-00	Y1	Crystal 10MHz Parallel resonant
5551-09822-00	L1	Inductor, 4.7µH, 3Amp.
5700-12047-00	U16	IC, Socket 24-Pin .300 DIP
5700-12088-00	U2-U9	IC, Socket 32-Pin .600 DIP
5705-12638-00	U27, U28	Heatsink 5298-B
5733-12060-01	F501, F502	MT3AG PCMounted Fuse Holder
5791-10862-04	J1, J2	Connector, 4-pin Header STR .156
5791-10862-05	J3	Connector, 5-pin Header STR .156
5791-10862-07	J4	Connector, 7-pin Header STR .156
5791-12516-00	P1	Connector, 34 Hen 2x17 STR .100
A-17002	U16	PAL Sub-Assembly
A-5343-50029-S2	U2	ROM Sub-Assembly
A-5343-50029-S3	U3	ROM Sub-Assembly
A 5343-50029-S4	U4	ROM Sub-Assembly
A-5343-50029-S5	U5	ROM Sub-Assembly
A-5343-50029 S6	U6	ROM Sub-Assembly
A-5343-50029-S7	U7	ROM Sub-Assembly
A-5343-50029-S8	U8	ROM Sub Assembly
A-5343-50029-S9	U9	ROM Sub-Assembly
5731-10356-00	F501, F502	Fuse, 3Amp, 250v. Slow Blow

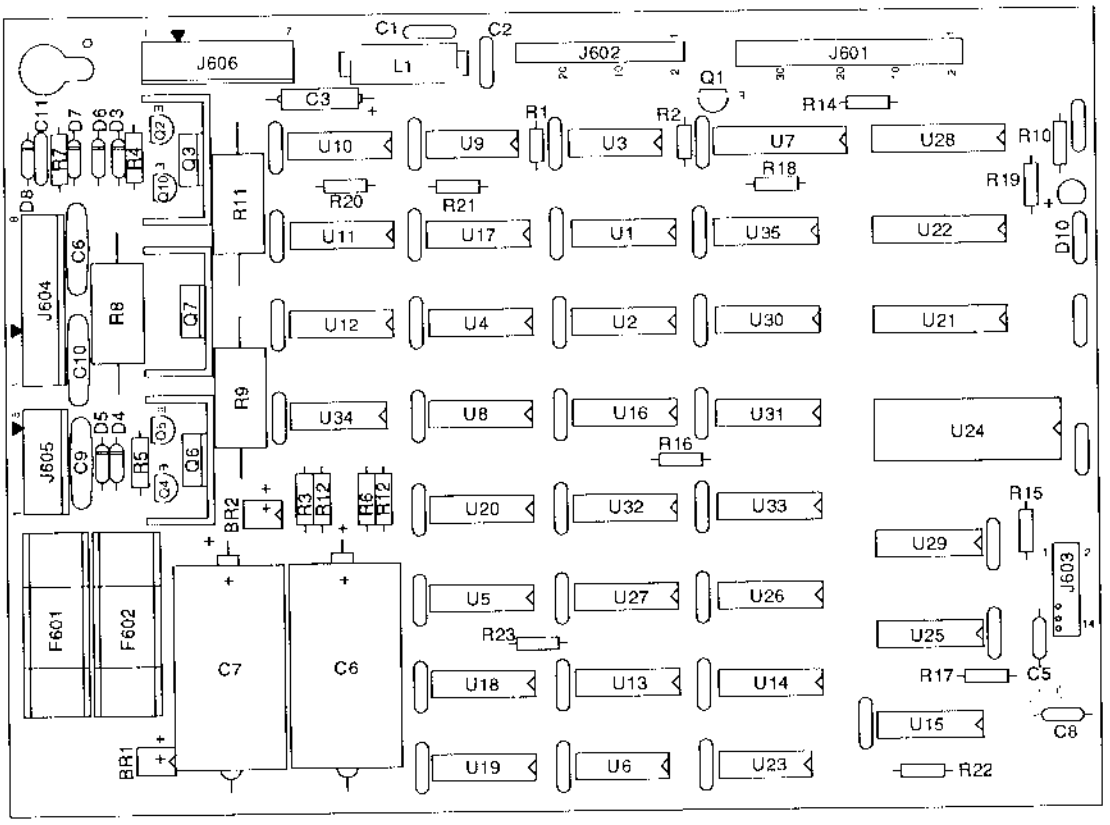
A-15472-1 Fliptronic II Board Assembly



Part Number	Designator	Description
01-10572	Q1-Q4	Heatsink
20-9684	Q5-Q12	Fastener Snap In
4006-10003-08	Q1-Q4	Mach. screw, 6-32
4406-01128-00	Q1-Q4	Nut 6-32 KEPS
5010-09034-00	R37-R44, R53	Res., 10KΩ, ¼w, 5%
5010-09358-00	R22, R24, R26, R28, R30, R32, R34, R36, R45-R52	Res., 1KΩ, ¼w, 5%
5010-09361-00	R1-R4	Res., 220Ω, ½w, 5%
5010-09416-00	R21, R23, R25, R27, R29, R31, R33, R35	Res., 470Ω, ¼w, 5%
5010-09534-00	W3, W4	Res., 0Ω
5010-10171-00	R13, R20	Res., 56Ω, ¼w, 5%
5011-12956-00	R5, R12	Res., 2.7KΩ, 1w, 5%
5040-08986-00	C1	Cap., 100M, 10v
5040-09537-00	C2	Cap., 100µF, 100v
5043-08980-00	B	Cap., .01µF, 50v

Part Number	Designator	Description
5070-09054-00	D1-D24	Diode, 1N4004
5100-09690-00	BR1	Bridge Rectifier
5162-12635-00	Q5-Q12	Trans., TIP102 NPN
5190-09016-00	Q13, Q20	Trans., 2N4403 PNP
5191-12179-00	Q1-Q4	Trans., TIP36C PNP
5315-12009-00	U2	IC, 74HCT374
5315-12031-00	U5	IC, 74HCT244
5315-12812-00	U1	IC, 74HCT138
5315-12951-00	U3	IC, 74HCT00
5370-12272-00	U4, U6	IC, LM339 Quad Comp
5731-10356-00	F901-F904	Fuse S-B, 3A., 250v
5733-12060-01		Fuse Holder (F901-F904)
5791-10862-05	J901, J904	Connector, 5-pin Header
5791-10862-09	J907	Connector, 9-pin Header
5791-10862-13	J902	Connector, 13-pin Header
5791-13830-06	J905, J906	Connector, Str Sq. Pin Hdr.
5791-12516-00	J903	34 Hen 2 x 17 STR

A-14039.1 Dot Matrix Assembly



Part Number	Designator	Description
5010-08991-00	R1	Res., 4.7KΩ, ¼w, 5%
5010-09036-00	R14-R23	Res., 100Ω, ¼w, 5%
5010-09224-00	R10	Res., 270Ω, ¼w, 5%
5010-12832-00	R3, R6, R12, R13	Res., 4.7KΩ, ½w, 5%
5010-12841-00	R4, R5	Res., 120Ω, ½w, 5%
5012-12830-00	R9	Res., 1.8KΩ, 5w, 5%
5012-12842-00	R11	Res., 120Ω, 5w, 5%
5012-12843-00	R8	Res., 4.7KΩ, 5w, 5%
5010-10171-00	R7	Res., 56Ω, ¼w, 5%
5043-09492-00	C5, C8	Cap., 100P, 50v, (±10%)
5040-08986-00	C3	Cap., 100M, 10v (±20%)
5040-12324-00	C4, C7	Cap., 150M, 160v (±50%)
5043-08980-00	BYPASS	Cap., .01M, 50v (+80,-20%)
5043-09072-00	C6, C9, C10	Cap., .1M, 500v (+80,-20%)
5043-09845-00	C1, C2, C11	Cap., 1KP, 50v (±20%)
5070-09054-00	D7	Diode, 1N4004, 1.0A.
5075-12824-00	D6, D8	Zener, 1N4742A, 12v
5075-12823-00	D4, D5	Zener, 1N4758, 56v
5075-12826-00	D3	Zener, IN4759A, 62v
5100-12833-00	BR1, BR2	Bridge, 400v, 1A
5150-10269-00	Q1	Trans., 2N3904 NPN
5164-09056-00	Q2, Q10	Trans., MPSD02 NPN
5164-12154-00	Q3, Q7	Trans., MJE15030 NPN
5194-09055-00	Q4, Q5	Trans., MPSD52 PNP
5194-12155-00	Q6	Trans., MJE15031 PNP
5281-09738-00	U16, U25-U27	IC, 74LS157
5281-10033-00	U3	IC, 74LS30
5281-10043-00	U31-U33, U35	IC, 74LS175

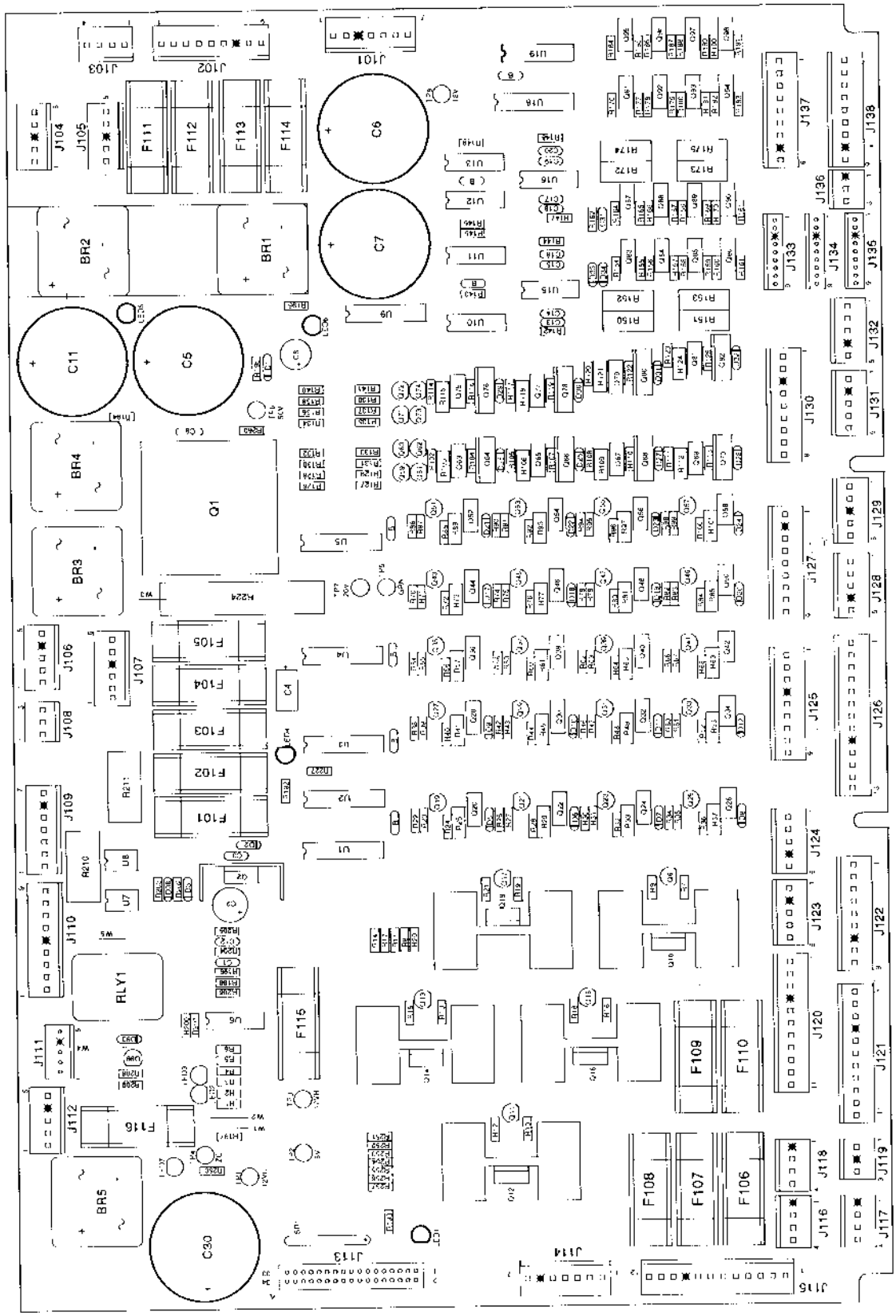
Part Number	Designator	Description
5311-10946-00	U4, U5, U17, U18, U20	IC, 74HC74
5311-10947-00	U9	IC, 74HC125
5311-10951-00	U10, U11	IC, 74HC161
5311-10977-00	U6	IC, 74HC04
5311-12817-00	U29	IC, 74HC165
5311-12819-00	U21	IC, 74HC688
5311-12820-00	U23	IC, 74HC27
5311-12822-00	U13-U15	IC, 74HC193
5315-12009-00	U22	IC, 74HCT374
5315-12812-00	U1, U2, U30, U12	IC, 74HCT138
5281-09308-00	U28	IC, 74HCT245
5315-12815-00	U8, U34	IC, 74HCT08
5315-12816-00	U19	IC, 74HCT32
5315-12821-00	U7	IC 74HCT240
5340-12278-00	U24	S/RAM 2064 150NS
5551-09822-00	L1	Ind. 4.7µH, 3A.
5671-13732-00	D10	Display LED Red
5705-09199-00	Q3, Q6, Q7	Heatsink, 6030B
5731-12328-00	F601, F602	Fuse, 3/8A., SB, 250v
5733-12060-01		Fuse Holder (F601, F602)
5791-10850-00	J602	Connector, 26-pin Header
5791-10862-05	J605	Connector, 5-pin Header
5791-10862-07	J606	Connector, 7-pin Header
5791-10862-08	J604	Connector, 8-pin Header
5791-12516-00	J601	34 Hen 17x2 STR
5791-12827-00	J603	14 Hen 7x2 STR

A-12697-3 WPC Power Driver Assembly

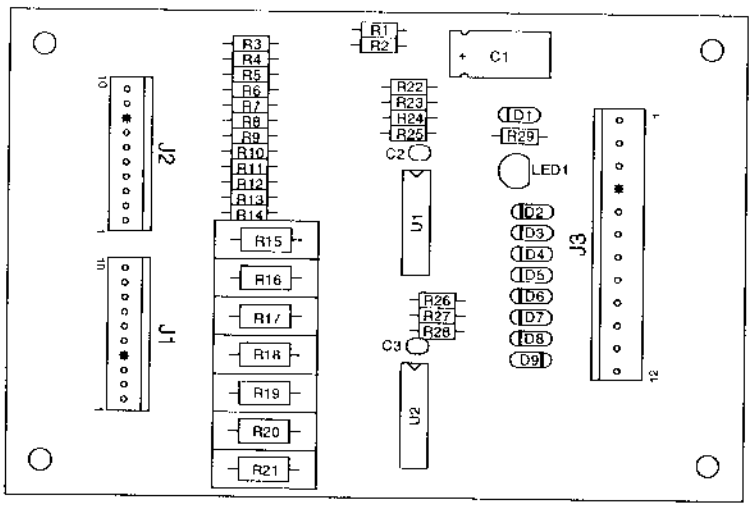
Part No.	Designator	Description
5010-08981-00	R260	Res., 10KΩ, ½w, 5%
5010-08991-00	R9, R12, R15, R18, R21, R23, R27, R31, R35, R39, R43, R47, R51, R55, R59, R63, R67, R71, R75, R79, R83, R87, R91, R95, R99, R126, R128, R130, R132, R134, R136, R138, R140, R227	Res., 4.7KΩ, ¼w, 5%
5010-08992-00	R8, R11, R14, R17, R20, R177, R179, R181, R183, R185, R187, R189, R191	Res., 560Ω, ¼w, 5%
5010-08993-00	R25, R29, R33, R37, R41, R45, R49, R53, R57, R61, R65, R69, R73, R77, R81, R85, R89, R93, R97, R101, R103, R106, R109, R112, R115, R118, R121, R124	Res., 68KΩ, ½w, 5%
5010-08997-00	R24, R28, R32, R36, R40, R44, R48, R52, R56, R60, R64, R68, R72, R76, R80, R84, R88, R92, R96, R100, R102, R105, R108, R111, R114, R117, R120, R123	Res., 2.7KΩ, ¼w, 5%
5010-08998-00	R155, R157, R159, R161, R165, R167, R169, R171	Res., 2.2KΩ, ¼w, 5%
5010-09034-00	R142-R149, R197-R198	Res., 10KΩ, ¼w, 5%
5010-09085-00	R194, R196, R251, R253-R257	Res., 1.5KΩ, ¼w, 5%
5010-09086-00	R252	Res., 6.8KΩ, ¼w, 5%
5010-09224-00	R192, R202-R205	Res., 270Ω, ¼w, 5%
5010-09314-00	R176, R178, R180, R182, R184, R186, R188, R190	Res., 1.2K, ¼w, 5%
5010-09324-00	R206	Res., 27KΩ, ¼w, 5%
5010-09358-00	R154, R156, R158, R160, R162, R164, R166, R168, R170, R193, R199, R250	Res., 1KΩ, ¼w, 5%
5010-09361-00	R104, R107, R110, R113, R116, R119,	Res., 220Ω, ½w, 5%
5010-09416-00	R122, R125 R22, R26, R30, R34, R38, R42, R46, R50, R54, R58, R62, R66, R70, R74, R78, R82, R86, R90, R94, R98, R127, R129, R131, R133, R135, R137, R139, R141	Res., 470Ω, ¼w, 5%
5010-11079-00	R7, R10, R13, R16, R19	Res., 51Ω, ¼w, 5%
5010-12427-00	R150-R153, R172-R175	Res., .22Ω, 1w, 5%
5012-12632-00	R224	Res., .12Ω, 10w, 5%
5019-10143-00	SR1	SIP 470Ω, 9R, 10-pin, 5%
5040-08986-00	C4	Cap., 100M, 10v (±20%)
5040-09421-00	C2	Cap., 100M, 25v (+50, -10%)
5040-09537-00	C8	Cap., 100M, 100v (±20%)

Part No.	Designator	Description
5040-12313-00	C5-C7, C11, C30	Cap., 15KM, 25v (±20%)
5043-08980-00	B-BYPASS	Cap., .01M, 50v (+80, -20%)
5043-08996-00	C13-C20, C31	Cap., .1M, 50v (±20%)
5043-09845-00	C1, C12	Cap., 1KP, 50v (±20%) Axial
5048-10994-00	C3	Cap., .33M, 50v (±20%) Axial
5070-08919-00	D33, D34	Diode 1N4148, 150MA.
5070-09054-00	D1-D3, D5-D12, D17-D32, D38	Diode 1N4004, 1.0A.
5100-09690-00	BR1-BR5	Bridge, 35A., Rect, 200v
5131-12725-00	Q10, Q12, Q14, Q16, Q18	Triac BT138E
5162-12422-00	U19	IC ULN 2803 OC-DRL
5162-12635-00	Q20, Q22, Q24, Q26, Q28, Q30, Q32, Q34, Q36, Q38, Q40, Q42, Q44, Q46, Q48, Q50, Q52, Q54, Q56, Q58, Q63, Q65, Q67, Q69, Q75, Q77, Q79, Q81, Q83-Q90	Transistor, TIP 102
5194-09055-00	Q9, Q11, Q13, Q15, Q17, Q19, Q21, Q23, Q25, Q27, Q29, Q31, Q33, Q35, Q37, Q39, Q41, Q43, Q45, Q47, Q49, Q51, Q53, Q55, Q57, Q59-Q62, Q71-Q74	Transistor, 2N5401 PNP
5191-12179-00	Q64, Q66, Q68, Q70, Q76, Q78, Q80, Q82	Transistor, TIP36C PNP
5192-12428-00	Q91-Q98	Transistor, TIP 107
5250-12634-00	Q1	Reg LM 323 5v
5281-09486-00	U1-U5, U18	IC, 74LS374 8D F/F
5281-09487-00	U10-U13	IC, 74LS74 Dual D F/F
5281-10182-00	U9	IC, 74LS240 L/Drvr.
5370-12272-00	U6, U15, U16	IC, LM339 Quad Comp.
5460-12423-00	Q2	IC, LM7812
5671-13732-00	LED1, LED4-LED7	Display LED Red
5701-09652-00	Q1	Thermal Pad
5705-09199-00	Q2	Heatsink 6030B
5705-12637-00	Q1	Heatsink 5054
5705-12638-00	Q10, Q12, Q14, Q16, Q18	Heatsink 5298B
5733-10450-00	F101-F116	Fuse Holder PC MT3AG
5791-10862-03	J108, J119, J136	Connector, 3-pin Header .156
5791-10862-04	J103, J116-J118	Connector, 4-pin Header .156
5791-10862-05	J104-J106, J112, J123, J124, J128, J129, J131, J132	Connector, 5-pin Header .156
5791-10862-06	J107	Connector, 6-pin Header .156
5791-10862-07	J101, J109, J114	Connector, 7-pin Header .156
5791-10862-09	J102, J122, J125, J127, J130, J137, J138	Connector, 9-pin Header .156
5791-10862-11	J120, J121	Connector, 11-pin Header .156
5791-10862-12	J115	Connector, 12-pin Header .156
5791-10862-13	J126	Connector, 13-pin Header .156
5791-13830-05	J111	Connector, 5-pin Header
5791-13830-09	J133-J135	Connector, 9-pin Header
5791-12516-00	J113	34 Hen 2x17 STR
5824-09248-00	TP1-TP8	Test Point #1502-1
5041-09163-00	C9	Cap., 2.2MF Tant
5730-09071-00	F114	Fuse, 8A, 32v
5731-09432-00	F112	Fuse, S-B, 7A., 250v
5731-09651-00	F106-F111, F113	Fuse, S-B, 5A., 250v
5731-10356-00	F101-F105, F116	Fuse, S-B, 3A., 250v
5730-09797-00	F115	Fuse, S-B, 3/4A., 250v
5705-12698-00		Heatsink #62365

A-12697-3 WPC Power Driver Assembly

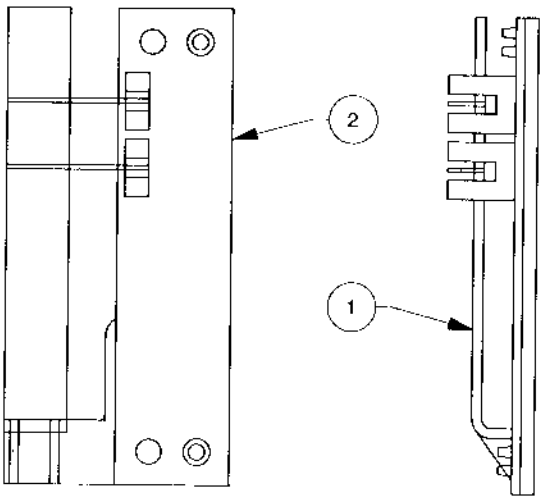


A-15576 7-Switch Opto PCB Assembly



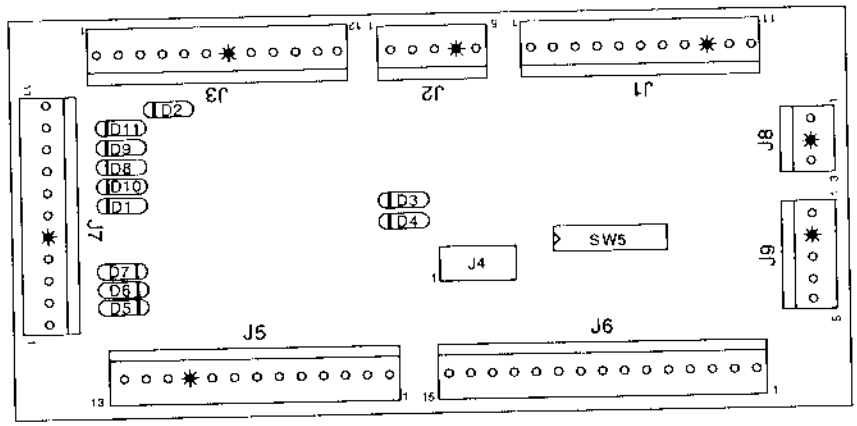
Part Number	Designator	Description	Part Number	Designator	Description
5040-12298-00	C1	Cap., 100µfd, 40v, (±50%)	5010-10631-00	R29	Res., 1.2KΩ, 2w, 5%
5043-08980-00	C2, C3	Cap., .01M, 50v	5010-09162-00	R23, R25, R26	Res., 100KΩ, 2w, 5%
5671-09019-00	LED1	Display LED Red	5010-08774-00	R22, R24	Res., 22KΩ, 2w, 5%
5370-12272-00	U1, U2	IC, LM339 Quad.	5010-09034-00	R28	Res., 10KΩ, 2w, 5%
5070-09054-00	D1 - D9	Diode, 1N4004, 1.0A.	5791-10862-12	J3	Connector, 12-pin Header
5010-12928-00	R15-R21	Res., 270KΩ, 2w, 5%	5791-12462-10	J1, J2	Connector, 10-pin Header
5010-09999-00	R1-R14	Res., 2KΩ, 2w, 5%			

A-17316 Flipper Opto PCB Assembly



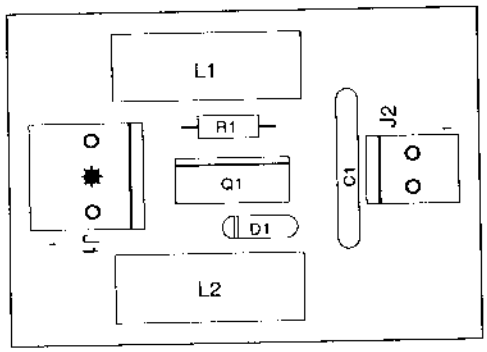
Item	Part Number	Description
1.	03-9001	Interrupter Flip-Opto
2.	A-16384	Flipper Opto Sw. Assy.
	5010-08930-00	Res., 470Ω, ½w, 5%
	5490-12451-00	Opto Inter Lg. 10mA.
	5791-12462-07	Connector, 7-pin Header

A-17051-1 Coin Door Interface PCB Assembly



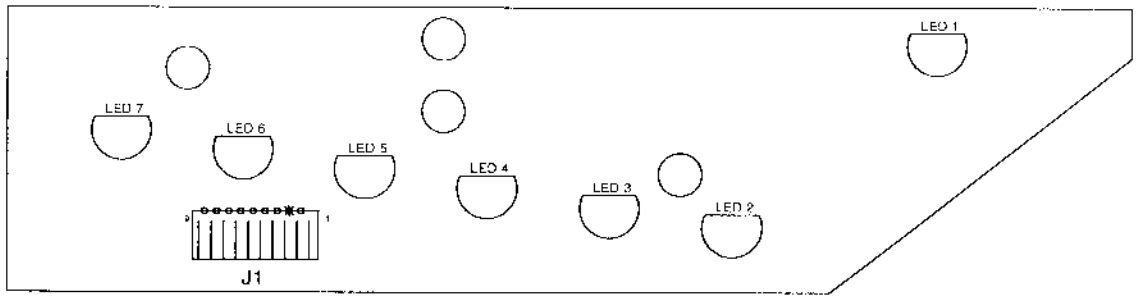
Part Number	Designator	Description
5791-10862-03	J8	Connector, 3-pin Header Str Sq.
5791-10862-05	J2, J9	Connector, 5-pin Header Str Sq.
5791-10862-11	J1, J7	Connector, 11-pin Header Str Sq.
5791-10862-12	J3	Connector, 12-pin Header Str Sq.
5791-10862-13	J5	Connector, 13-pin Header Str Sq.
5791-10862-15	J6	Connector, 15-pin Header Str Sq.
5645-09025-00	SW5	Switch DIP 8 Pos.
5070-09054-00	D1 - D11	Diode, 1N4004, 1.0A.
5791-11000-10	J4	Connector, 10-pin Header Str Sq.

A-15542 Motor EMI PCB Assembly



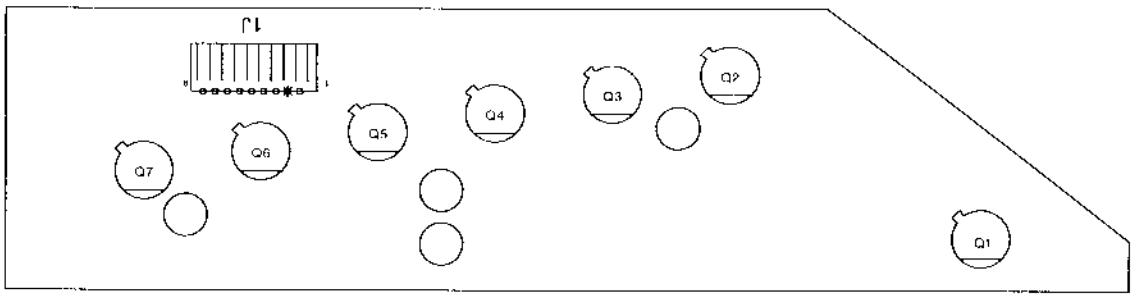
Part Number	Designator	Description
5551-09822-00	L1, L2	Inductor, 4.7MH3AMP
5791-12273-03	J1	Connector, 3-pin Header Str Sq.
5791-12273-02	J2	Connector, 2-pin Header Str Sq.
5070-09054-00	D1	Diode, 1N4004 1.0A.

A-18617 Trough 7 IRED PCB Assembly



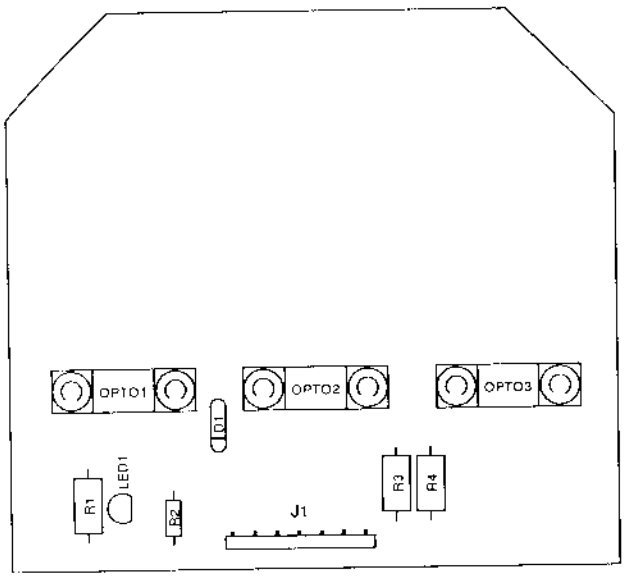
Part No.	Designator	Description
5671-12731-00	LED1 - LED7	Infra Red Diode
5791-12622-09	J1	Connector, 9-pin Header Sq.

A-18618 Trough 7 IR TSTR PCB Assembly



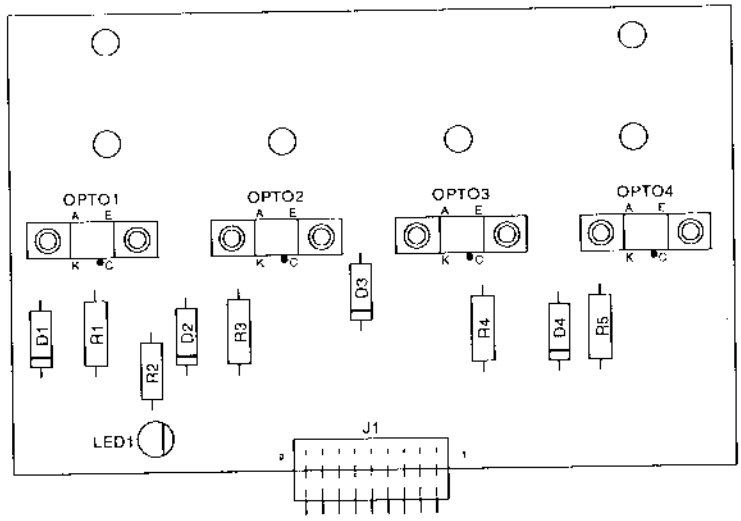
Part No.	Designator	Description
5163-14114-00	Q1 - Q7	Infra Red Photo Transistor
5791-12622-09	J1	Connector, 9-pin Header Sq.

A-13609 3-Bank Drop Target Opto PCB Assembly



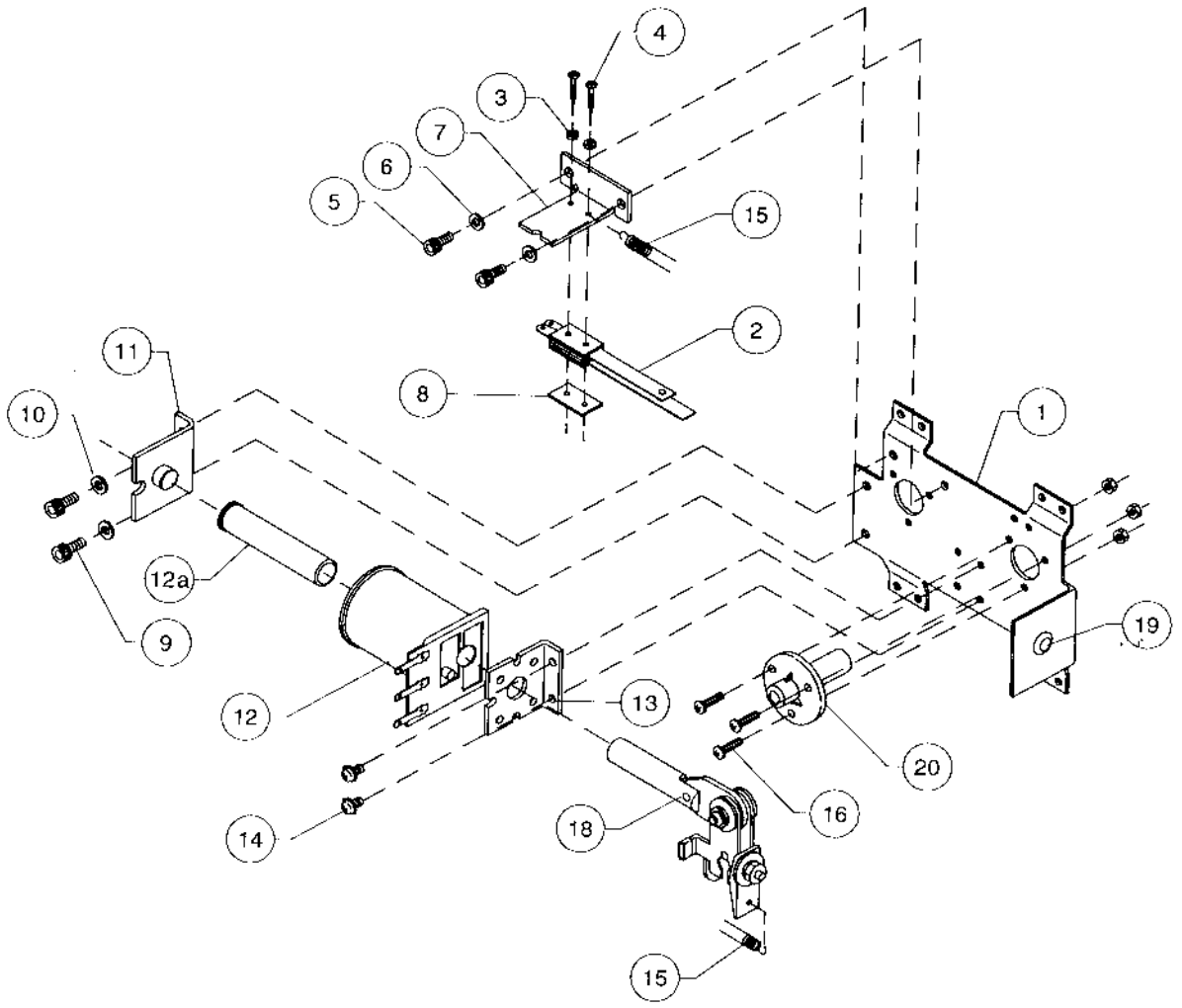
Part No.	Designator	Description
5490-13341-00	OPTO1- OPTO3	Opto Inter w/Tab 10MA.
5011-13292-00	R1, R3, R4	Resistor, 330Ω, 2w, 5%
5010-09314-00	R2	Resistor, 1.2KΩ, ¼w, 5%
5070-09054-00	D1	Diode, 1N4004, 1.0A.
5671-13732-00	LED1	Disp. LED Red
5791-10869-07	J1	Connector, 7-pin Header
20-9864	OPTO1 -OPTO3	Eyelet, 1/8" x 7/32" Lg.

A-19103 4-Bank Drop Target Opto PCB Assembly



Part No.	Designator	Description
5490-13341-00	OPTO1- OPTO4	Opto Inter w/Tab 10MA.
5010-08930-00	R1, R3-R5	Resistor, 470Ω, 2w, 5%
5010-09356-00	R2	Resistor, 820Ω, ¼w, 5%
5070-09054-00	D1-D4	Diode, 1N4004, 1.0A.
5671-13732-00	LED1	Disp. LED Red
5791-10869-09	J1	Connector, 9-pin Header
20-9864	OPTO1 -OPTO4	Eyelet, 1/8" x 7/32" Lg.

A-15849-L-2 Flipper Assembly



Item	Part No.	Description
1.	B-13104-L	Flipper Base Assembly, Left
2.	SW-1A-194	Switch Assembly
3.	4701-00002-00	Lockwasher, #6 Split
4.	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5.	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6.	4701-00003-00	Lockwasher #8 Split
7.	01-9375	Switch Mounting Bracket
8.	20-6516	Speednut, Tinnerman
9.	4010-01066-06	Cap Screw, 10-32 x 3/8"
10.	4701-00004-00	Lockwasher #10 Split
11.	A-12390	Flipper Stop Assembly
12.	FL-11629	Flipper Coil, Blue
a)	03-7066-5	Coil Tubing
13.	01-7695	Solenoid Bracket
14.	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15.	10-364	Spring
16.	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17.	4406-01117-00	Nut, 6-32 Hex

Item	Part No.	Description
18.	A-15848-L	Crank Link Assembly, Left
a)	A-17050-L	Flipper Crank Assembly, Left
b)	A-15847	Flipper Link Assembly
c)	02-4676	Link Spacer Bushing
d)	4010-01086-14	Cap Screw, 10-32 x 7/8"
e)	4700-00023-00	Flatwasher, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lockwasher #10 Split
g)	4410-01132-00	Nut, 10-32 ESN
19.	23-6577	Bumper Plug, 5/8"
20.	03-7568	Flipper Bushing

Associated Parts:
(Not Shown)

21.	23-6695	Flipper Rubber Ring, Red
22.	20-9250-29	Flipper & Shaft

A-15849-R-2 Flipper Assembly

Item	Part No.	Description
1.	B-13104-R	Flipper Base Assembly, Right
2.	SW-1A-194	Switch Assembly
3.	4701-00002-00	Lockwasher, #6 Split
4.	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5.	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6.	4701-00003-00	Lockwasher #8 Split
7.	01-9375	Switch Mounting Bracket
8.	20-6516	Speednut, Tinnerman
9.	4010-01066-06	Cap Screw, 10-32 x 3/8"
10.	4701-00004-00	Lockwasher #10 Split
11.	A-12390	Flipper Stop Assembly
12.	FL-11629	Flipper Coil, Blue
a)	03-7066-5	Coil Tubing
13.	01-7695	Solenoid Bracket
14.	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15.	10-364	Spring
16.	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17.	4406-01117-00	Nut, 6-32 Hex
18.	A-15848-R	Crank Link Assembly, Right
a)	A-17050-R	Flipper Crank Assembly, Right
b)	A-15847	Flipper Link Assembly
c)	02-4676	Link Spacer Bushing
d)	4010-01086-14	Cap Screw, 10-32 x 7/8"
e)	4700-00023-00	Flatwasher, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lockwasher #10 Split
g)	4410-01132-00	Nut, 10-32 ESN
19.	23-6577	Bumper Plug, 5/8"
20.	03-7568	Flipper Bushing

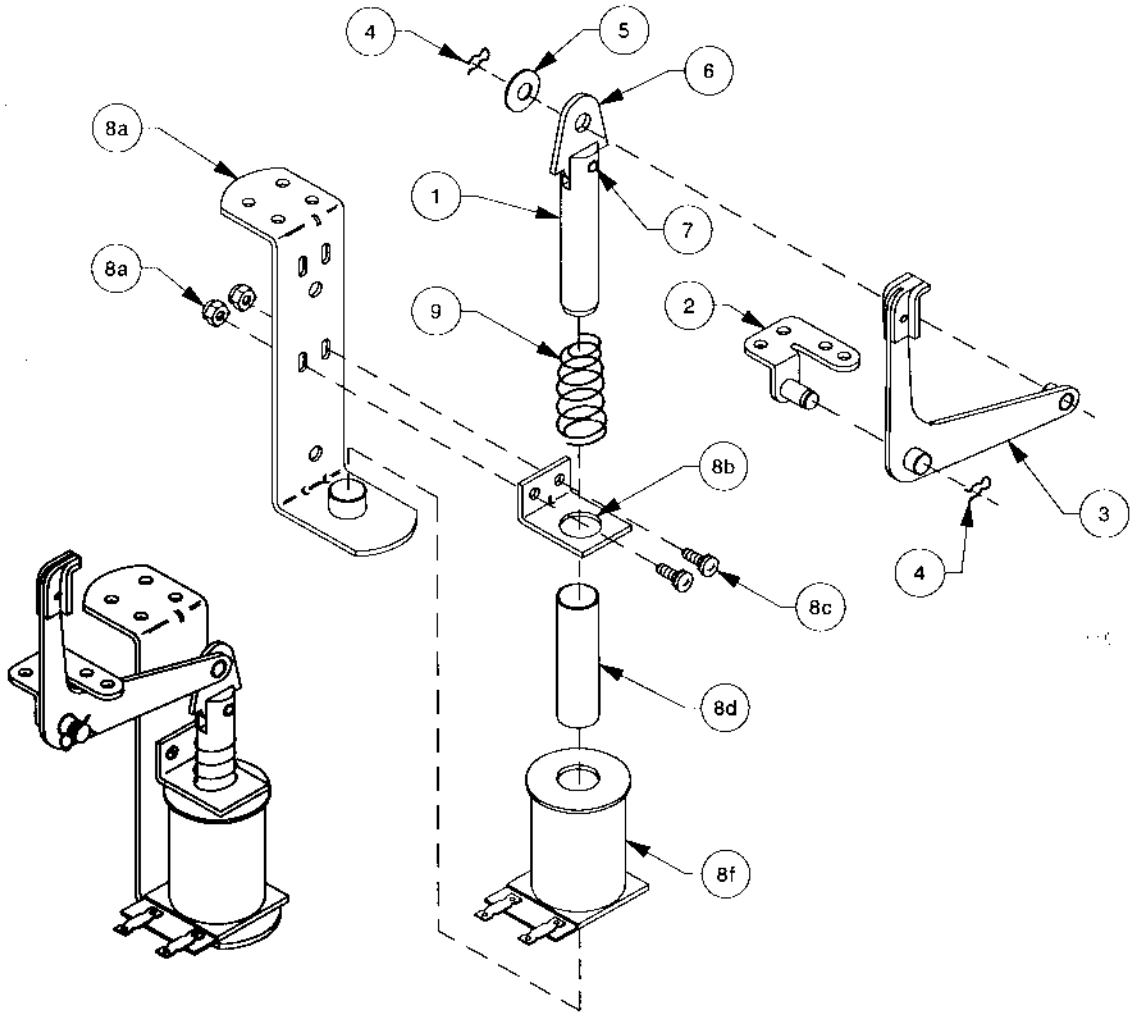
Associated Parts:

21.	23-6695	Flipper Rubber Ring, Red
22.	20-9250-29	Flipper & Shaft

Flipper Notes...

1. Each Flipper Assembly is mounted beneath the playfield, in conjuction with the Plastic Flipper & Shaft, and Flipper Rubber on the upper side of the playfield.
2. With the flipper, in the non-activated position, the E.O.S. Switch contacts must have a gap of .062 (±.015) inch. When flipper is activated switch must close.
3. Any adjustment of the E.O.S. switch must be made at a minimum distance of 0.25 inch from the switch body.
4. Longer blade of E.O.S. switch must be made straight. Gap adjustment is done by adjusting shorter blade.
5. All moving elements of the assembly must operate freely without any evidence of binding.
6. Apply Loctite™ 245 when reataching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.

A-17811 Kicker Arm (Slingshot) Assembly

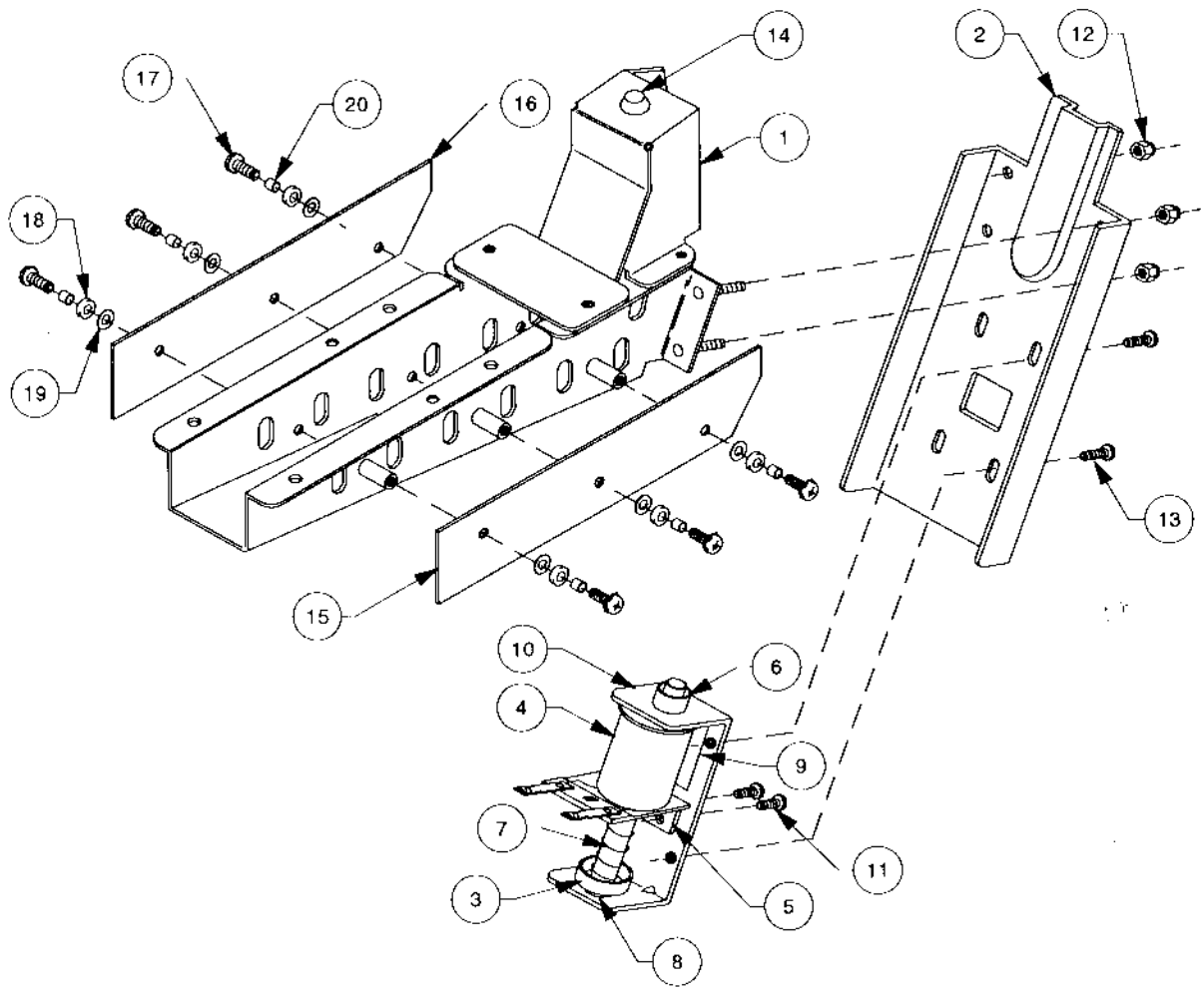


Associated Parts for Right & Left Kickers:

Item	Part No.	Description
1.	02-2364	Coil Plunger
2.	A-17810	Mounting Bracket Assembly
3.	A-12664	Kicker Crank Assembly
4.	12-6227	Hairpin Clip
5.	4700-00030-00	Flatwasher, 17/64 x 1/2 x 15ga.
6.	03-8085	Armature Link
7.	20-8716-5	Roll Pin, 1/8 x 7/16"

Item	Part No.	Description
8.	**B-9362-R-3**	**Coil & Bracket Assy., Right**
	B-9362-L-2	**Coil & Bracket Assy., Left**
a)	A-17808	Bracket & Stop Assembly
b)	01-8-508-S	Coil Retaining Bracket
c)	4006-01017-06	Mach. Screw, 6-32 x 3/8"
d)	4406-01119-00	Nut, 6-32 ESN
e)	AE-26-1200	Coil Assembly
f)	03-7066	Coil Tubing
9.	10-128	Spring

A-18753 Outhole Ball Trough Assembly

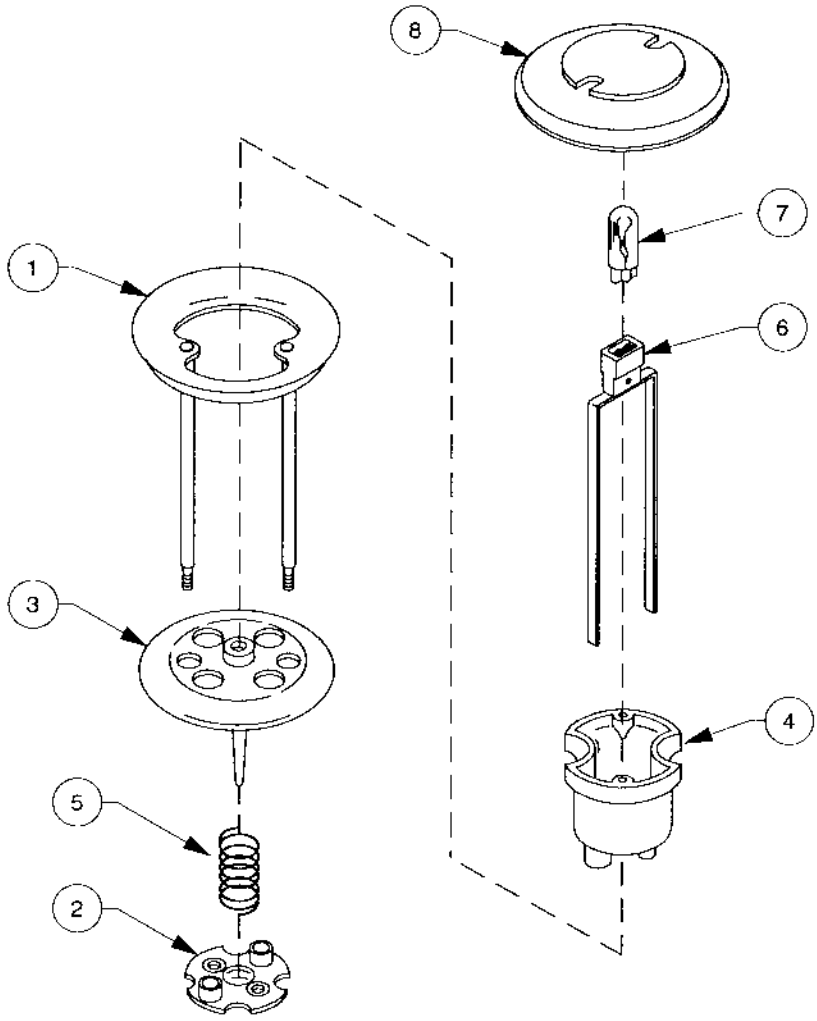


Item	Part No.	Description	Item	Part No.	Description
1.	A-16809-2	Ball Trough Welded Assy.	11.	4008-01017-05	Mach. Screw, 8-32 x 5/16"
2.	01-11587	Ball Trough Front	12.	4408-01119-00	Nut 8-32 ESN
3.	A-6306-2	Bell Armature Assembly	13.	4008-01017-06	Mach. Screw, 8-32 x 3/8"
4.	AE-26-1500	Coil Assembly	14.	23-6702	Bumper Plug
5.	01-8-508-T	Solenoid Assembly	15.	A-18617	Trough 7 IRED PCB Assembly
6.	03-7067-5	Coil Tubing	16.	A-18618	Trough 7 IR TSTR PCB Assy.
7.	10-135	Spring	17.	4006-01003-10	Mach. Screw, 6-32 x 5/8" SEMS
8.	23-6420	Rubber Grommet	18.	23-6626	Grommet
9.	03-8523	Insulator	19.	4700-00004-00	Flatwasher, 9/64 x 7/16 x 21ga.
10.	01-11586	Coil Mounting Brkt. (Bell)	20.	02-4975	Bushing

Associated Assemblies:
(Not Shown)

A-15576	7-Switch Opto Board
H-18757	7 Opto Trough Cable, Input
H-18758	7 Opto Trough Cable, Output

B-9414-2 Jet Bumper Assembly

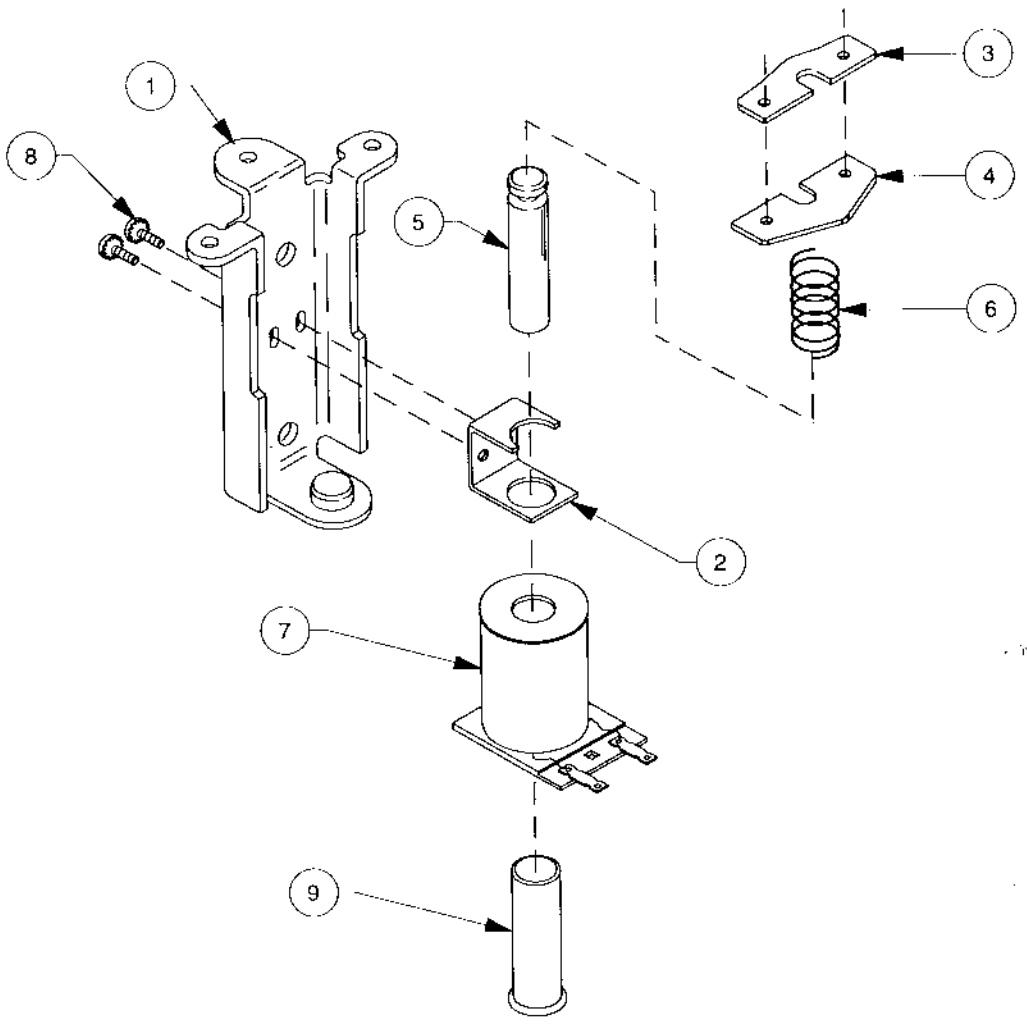


Item	Part No.	Description
1.	A-4754	Bumper Ring Assembly
2.	03-6009-A5	Bumper Base, White
3.	03-6035-6	Bumper Wafer, Yellow
4.	03-7443-5	Bumper Body, White
5.	10-7	Spring
6.	24-8776	Socket-Wedge Base
7.	24-8768	Bulb #555 (6.3v., 0.25A.)

Associated Parts:

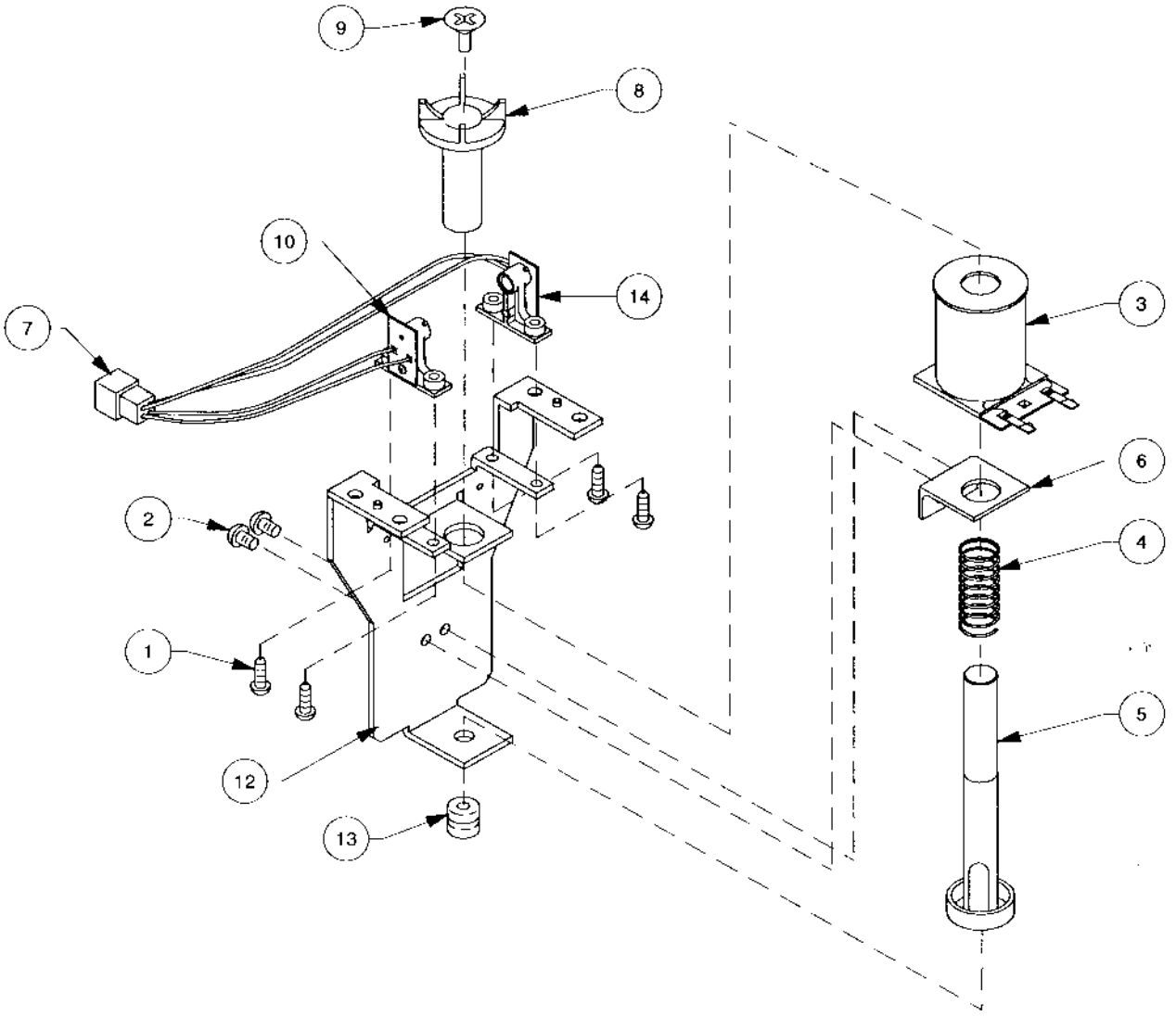
8.	03-9007-16	Jet Bumper Cap, Starburst Yellow (3)

A-9415-2 Jet Bumper Coil Assembly



Item	Part No.	Description
1.	B-7417	Bracket & 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-26-1200	Coil Assembly
8.	4006-01017-04	Mach. Screw, 6-32 x 1/4"
9.	03-7066	Coil Tubing

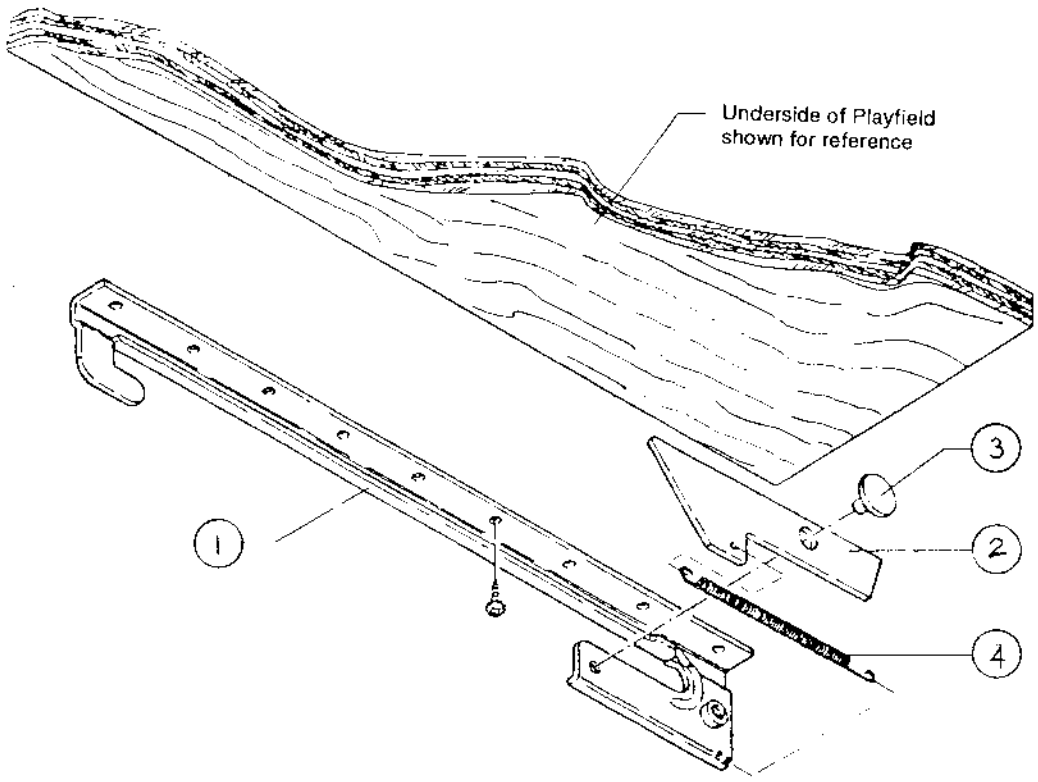
A-15769-1 Ball Popper & Opto Assembly



Item	Part No.	Description	Item	Part No.	Description
1.	4106-01019-06	Sh. Metal Screw, #6x3/8"	8.	03-8561	Photo Transistor Assembly
2.	4008-01017-04	Mach. Screw, 8-32 x 1/4"	9.	4106-01152-06	Coil Tubing
3.	AE-23-800	Coil Assembly	10.	A-16909	Bracket, Ball Popper
4.	10-135	Spring	11.	03-7067-5	Rubber Grommet
5.	02-4668	Armature Assembly	12.	A-15914	LED Assembly
6.	01-9794	Mounting Bracket	13.	23-6420	Ball Popper Cup
7.	H-17609-4	Opto Switch Cable	14.	A-16908	Sh. Metal Screw, #6-32 x 3/8"

Playfield Slide Mechanism Assembly

(Left Assembly Shown)



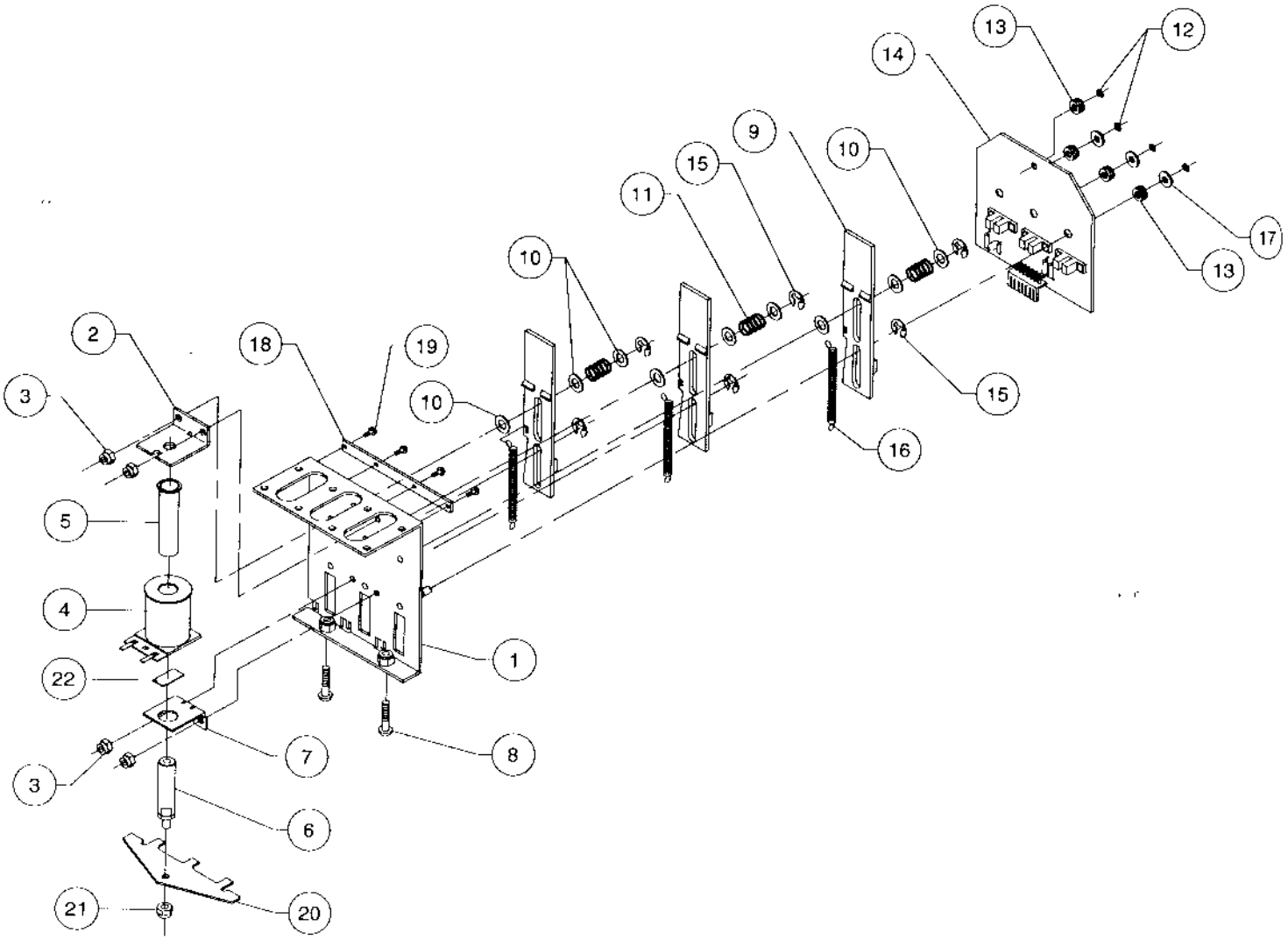
A-17749.1-1
Playfield Slide Mechanism (Left)

Item	Part No.	Description
1.	01-12304-1	Slide
2.	01-10664.1	Pivot Mech.
3.	02-4615	Shoulder Rivet
Associated Part:		
4.	10-439	Spring

A-17749.1-2
Playfield Slide Mechanism (Right)

Item	Part No.	Description
1.	01-12304-2	Slide
2.	01-10664.1	Pivot Mech.
3.	02-4615	Shoulder Rivet
Associated Part:		
4.	10-439	Spring

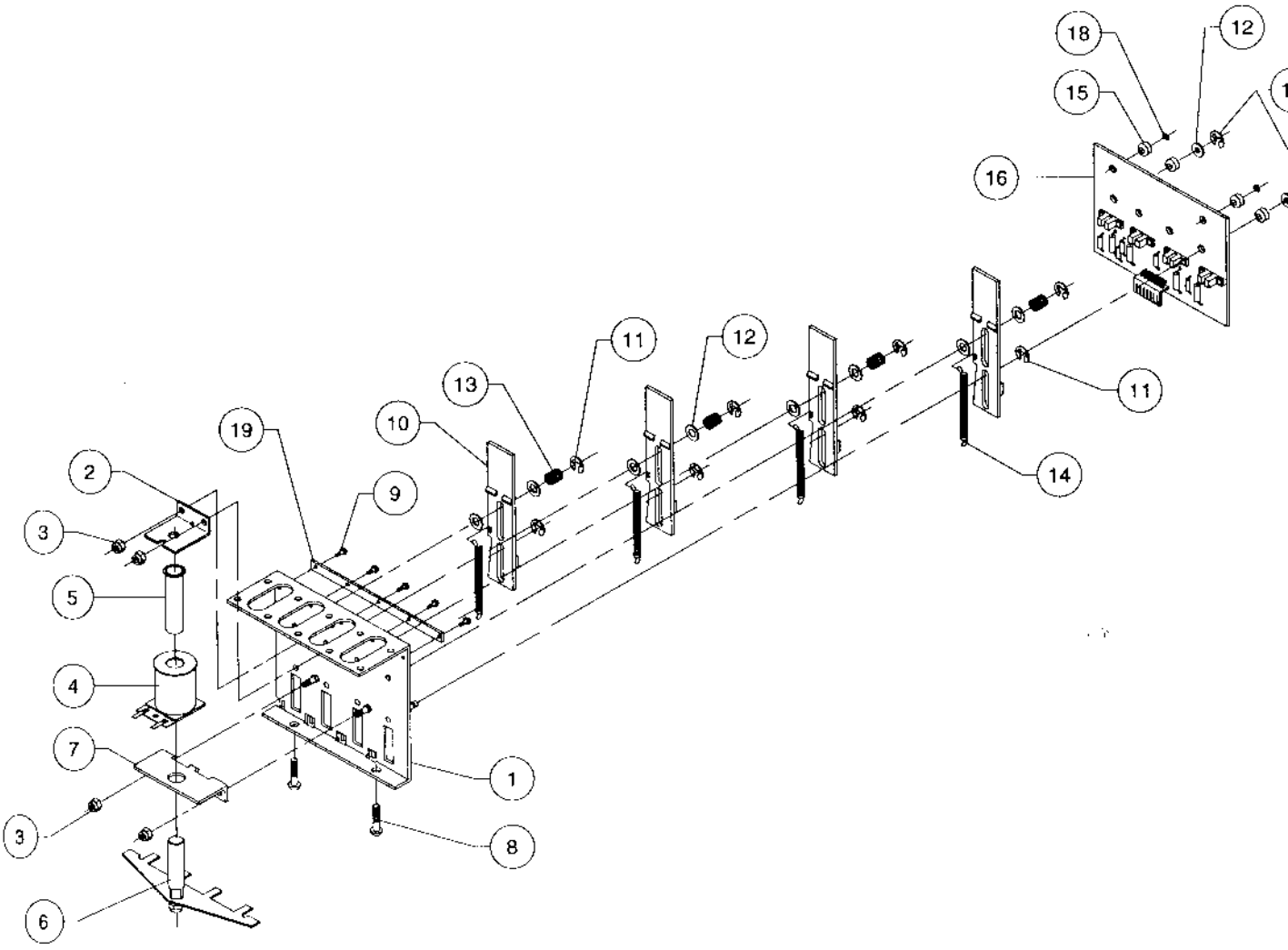
A-16032-1 3-Bank Drop Target Assembly



Item	Part No.	Description
1.	A-17045	3-Bank Bracket & Stud Assy.
2.	A-11397	Stop Bracket Assembly
3.	4408-01119-00	Nut #8 ESN
4.	AE-26-1200	Coil Assembly
5.	03-7066-4	Coil Tubing, 2.093" Lg.
6.	02-3972-1	Plunger
7.	01-8413-1	Bracket Coil Mounting Assy.
8.	4010-01025-14	Mach. Screw, #10-32 x 7/8"
9.	03-8749-1	Plain Target, Black
10.	4700-00072-00	Flatwasher, 17/64x1/2x21ga.
11.	10-392	Spring, Extension

Item	Part No.	Description
12.	20-8712-18	"E"-Ring, 3/16" Shaft
13.	23-6626	Rubber Grommet
14.	A-13609	3-Bank Opto Assembly
15.	20-8712-25	"E"-Ring, 1/4" Shaft
16.	10-364	Spring, Retractor
17.	4700-00016-00	Flatwasher, 3/16x7/16x17ga.
18.	03-8334-3	Target Stop, 3-15/16"
19.	4004-01005-04	Mach. Screw, 4-40 x 1/4"
20.	01-11769	Reset Plate
21.	4410-01132-00	Nut #10 ESNA
22.	23-6622	Foam Tape, Double Sided

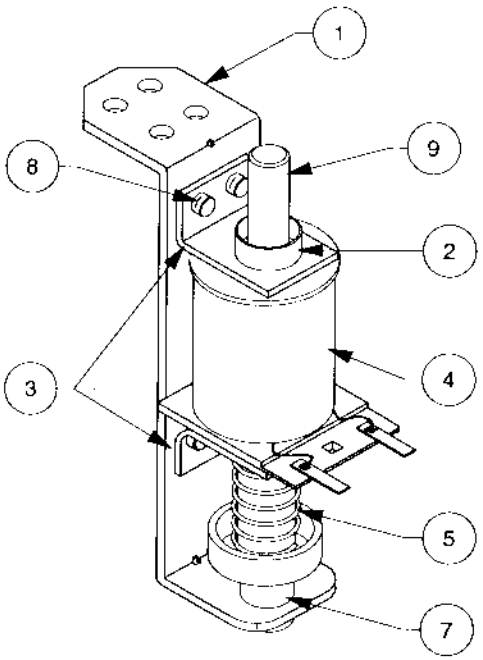
A-18188 4-Bank Drop Target Assembly



Item	Part No.	Description
1.	A-18186	Bracket & Stop Post Assy.
2.	A-11397	Stop Bracket Assembly
3.	4408-01119-00	Nut #8 ESN
4.	AE-24-900	Coil Assembly
5.	03-7066-4	Coil Tubing, 2.093" Lg.
6.	A-13453	Reset Plate Assembly
7.	01-9548	Bracket Coil Mounting Assy.
8.	4008-01016-04	Mach. Screw, #8-32 x 5/8"
9.	4004-01005-04	Mach. Screw, #4-40 x 1/2"
10.	03-8749-1	Target, Plain

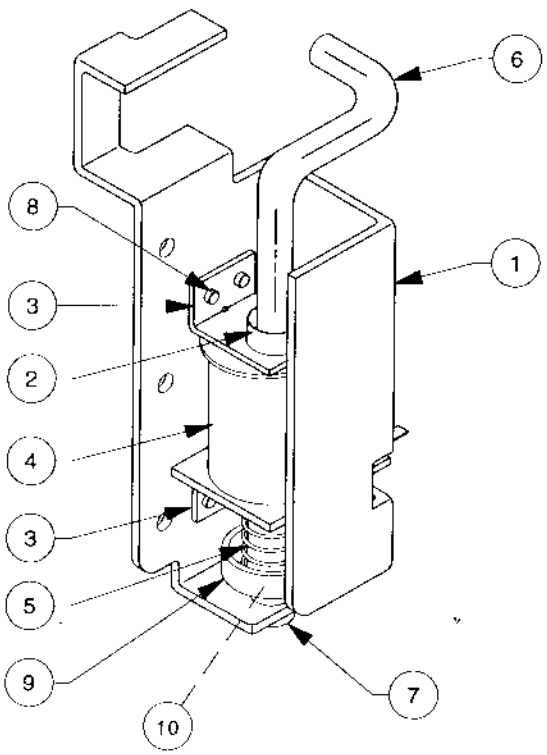
Item	Part No.	Description
11.	20-8712-25	Retaining Clip, 1/4" Shaft
12.	4700-00072-00	Flatwasher #12
13.	10-392	Spring, Compression
14.	10-364	Spring, Extension
15.	23-6626	Rubber Grommet
16.	A-19103	4-Drop Target Opto PCB
17.	4700-00016-00	Flatwasher #8
18.	20-8712-18	Retaining Clip, 3/16" Shaft
19.	03-8334-4	4-Bank Target Stop

A-17932 Diverter Assembly



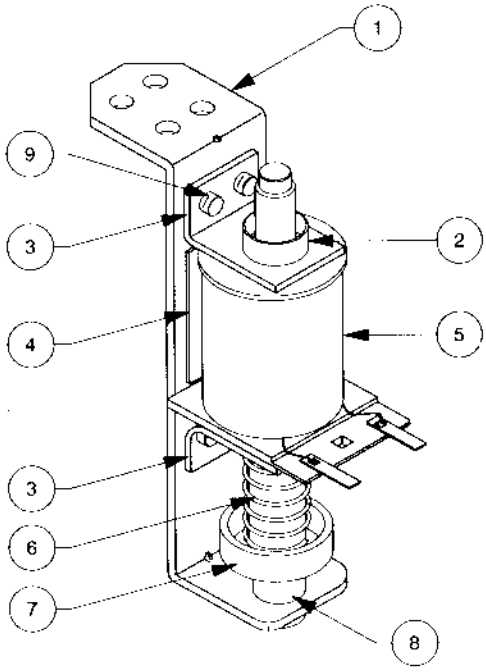
Item	Part No.	Description
1.	01-12441	Diverter Post Bracket
2.	03-7067-5	Coil Tubing
3.	01-8-508-T	Coil Retainer Bracket
4.	AE-27-1200	Coil Sub-Assembly
5.	10-135	Spring
6.	A-17986	Bell Armature Assembly
7.	23-6420	Rubber Grommet
8.	4008-01017-04	Mach. Screw, #8-32 x 1/4"

A-18369 Diverter Assembly



Item	Part No.	Description
1.	01-12803	Back Diverter
2.	03-7067-5	Coil Tubing
3.	01-8-508-T	Coil Retainer Bracket
4.	AE-27-1200	Coil Sub-Assembly
5.	10-135	Spring
6.	A-18368	Bell Armature Assembly
7.	23-6420	Rubber Grommet
8.	4008-01017-04	Mach. Screw, #8-32 x 1/4"
9.	02-2963	Bell Armature Stop
10.	4008-01075-08	Cap Screw, #8-32 (Nylock)

A-18078 Diverter Assembly

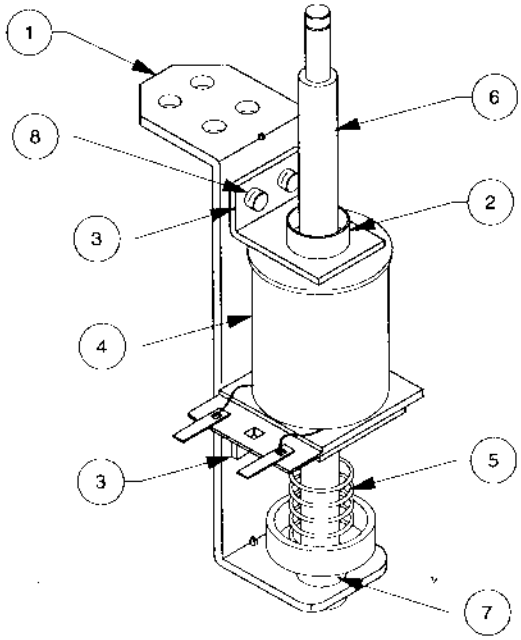


Item	Part No.	Description
1.	01-12441	Diverter Post Bracket
2.	03-7067-5	Coil Tubing
3.	01-8-508-T	Coil Retainer Bracket
4.	03-8523	Insulator
5.	AE-28-1500	Coil Sub-Assembly
6.	10-135	Spring
7.	A-6306-2	Bell Armature Assembly
8.	23-6420	Rubber Grommet
9.	4008-01017-04	Mach. Screw, #8-32 x 1/4"

Associated Parts:
Not Shown

10.	A-18079	Dicta-Bird Perch Mtg. Brkt. Assy.

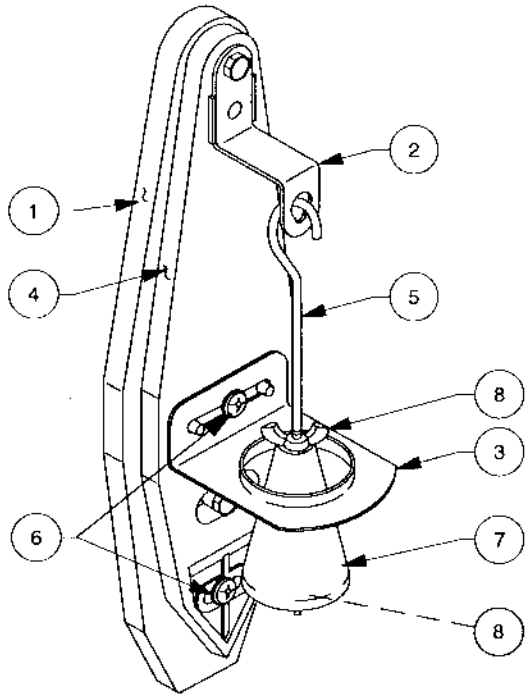
A-19097-1 Diverter Assembly (Right)
A-19097-2 Diverter Assembly (Left)



A-19097-1 Shown

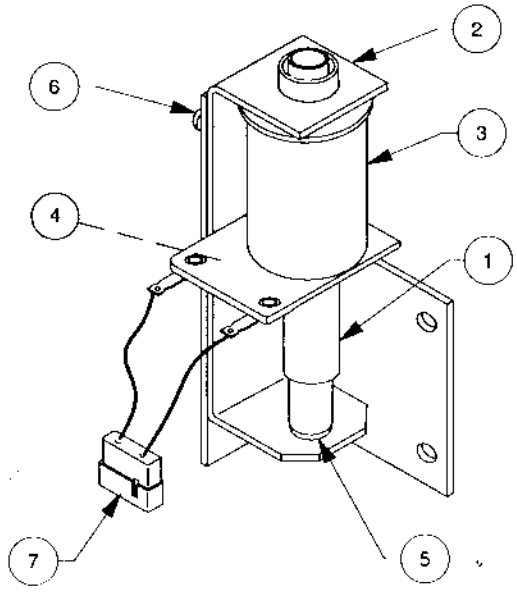
Item	Part No.	Description
1.	01-12441	Diverter Post Bracket
2.	03-7067-5	Coil Tubing
3.	01-8-508-T	Coil Retainer Bracket
4.	AE-27-1200	Coil Sub-Assembly
5.	10-135	Spring
6.	A-19096	Bell Armature Assembly
7.	23-6420	Rubber Grommet
8.	4008-01017-04	Mach. Screw, #8-32 x 1/4"

A-15361 Tilt Mechanism Assembly



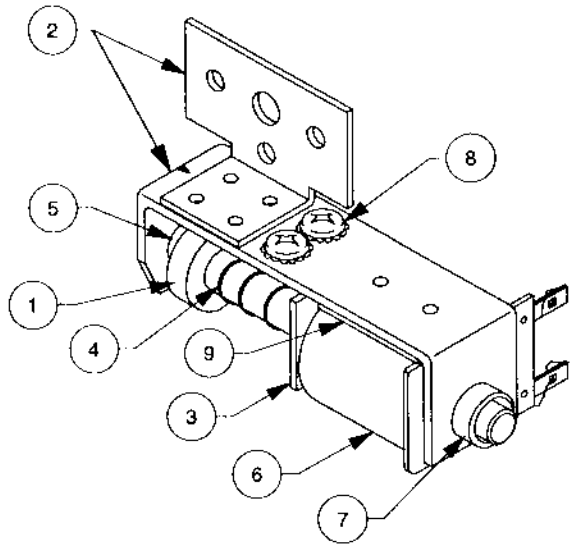
Item	Part No.	Description
1.	A-15360	Mount Plate, Tilt Mech.
2.	01-3444	Bracket, Tilt Upper
3.	01-3445	Bracket, Tilt Lower
4.	03-8668	Pendulum, Tilt Mech.
5.	12-6231	Wire, Plum Bob
6.	4006-01113-06	Mach. Screw, 6-32 x 3/8"
Associated Parts:		
7.	20-6502-A	Plumb Bob
8.	4406-01120-00	Wing Nut (2)

B-10686-1 Knocker Assembly



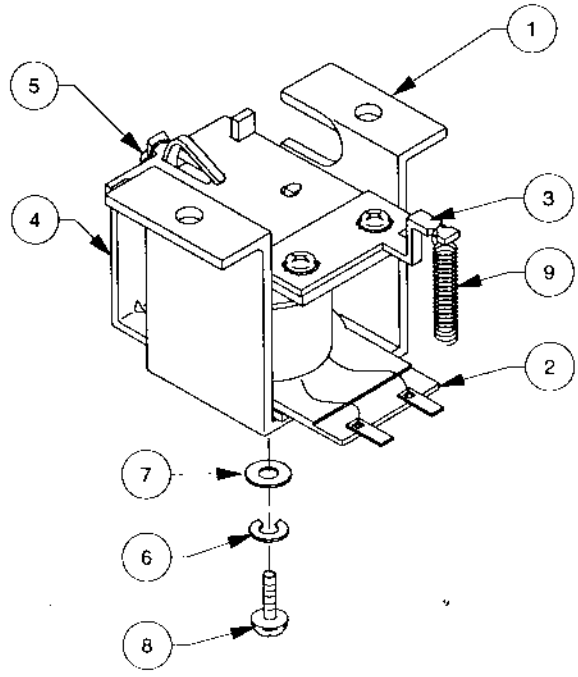
Item	Part No.	Description
1.	A-5387	Coil Plunger Assembly
2.	01-11273	Mounting Bracket Assy.
3.	AE-23-800	Coil Sub-Assembly
4.	01-8-508-T	Coil Retaining Bracket
5.	23-6420	Rubber Grommet
6.	4008-01017-04	Mach. Screw, 8/32 x 1/4"
7.	H-11835	Knocker Cable
8.	03-7067-5	Coil Tubing

A-14525 Kicker Bracket Assembly



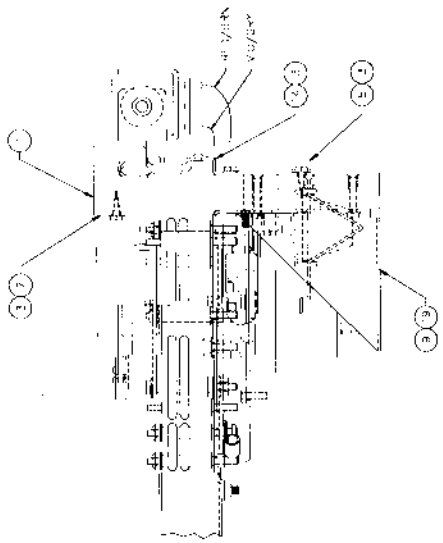
Item	Part No.	Description
1.	A-6306-2	Bell Armature Assembly
2.	A-14526	Mounting Bracket Assy.
3.	01-8-508-T	Solenoid Bracket
4.	10-135	Solenoid Spring
5.	23-6420	Rubber Grommet
6.	AE-23-800	Coil Assembly
7.	03-7067-5	Coil Tubing
8.	4008-01017-04	Mach. Screw, #8-32 x 1/4"
9.	03-8523	Insulator

A-17796 Ball Gate Actuator Assembly

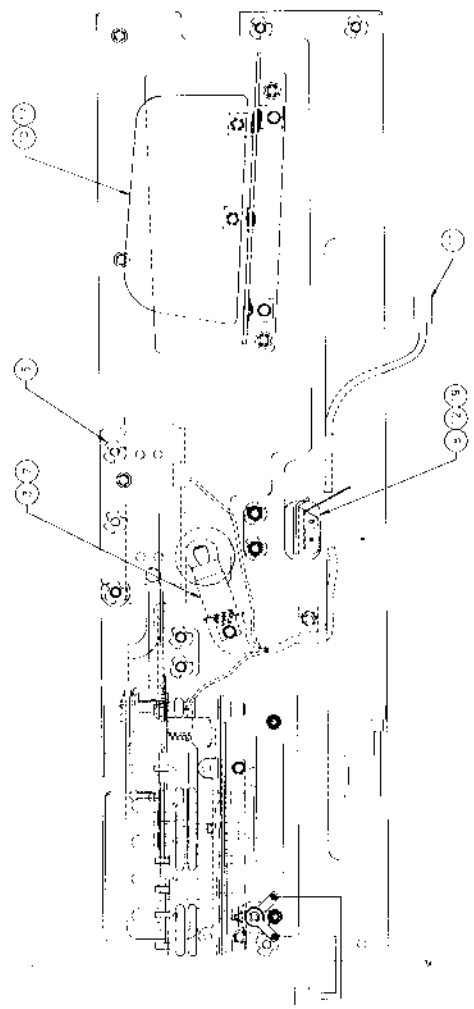


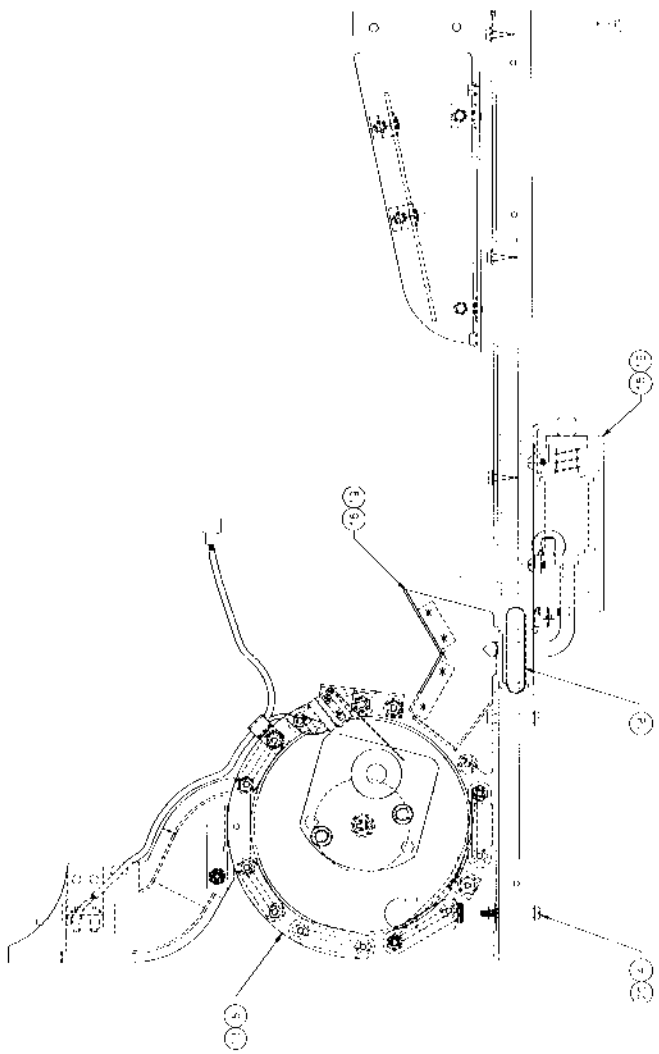
Item	Part No.	Description
1.	01-12348	Ball Gate Coil Bracket
2.	A-14406	Coil Assembly
3.	A-11146	Armature Assembly
4.	A-6892	Frame & Eyelet Assembly
5.	10-120	Spring
6.	4701-00003-00	Lockwasher, #8 Split
7.	4700-00089-00	Flatwasher, 11/64 x 7/16 x 16ga.
8.	4008-01021-07	Mach. Screw, 8-32 x 7/16"
9.	10-194	Extension Spring

A-18823 Back Panel Assembly

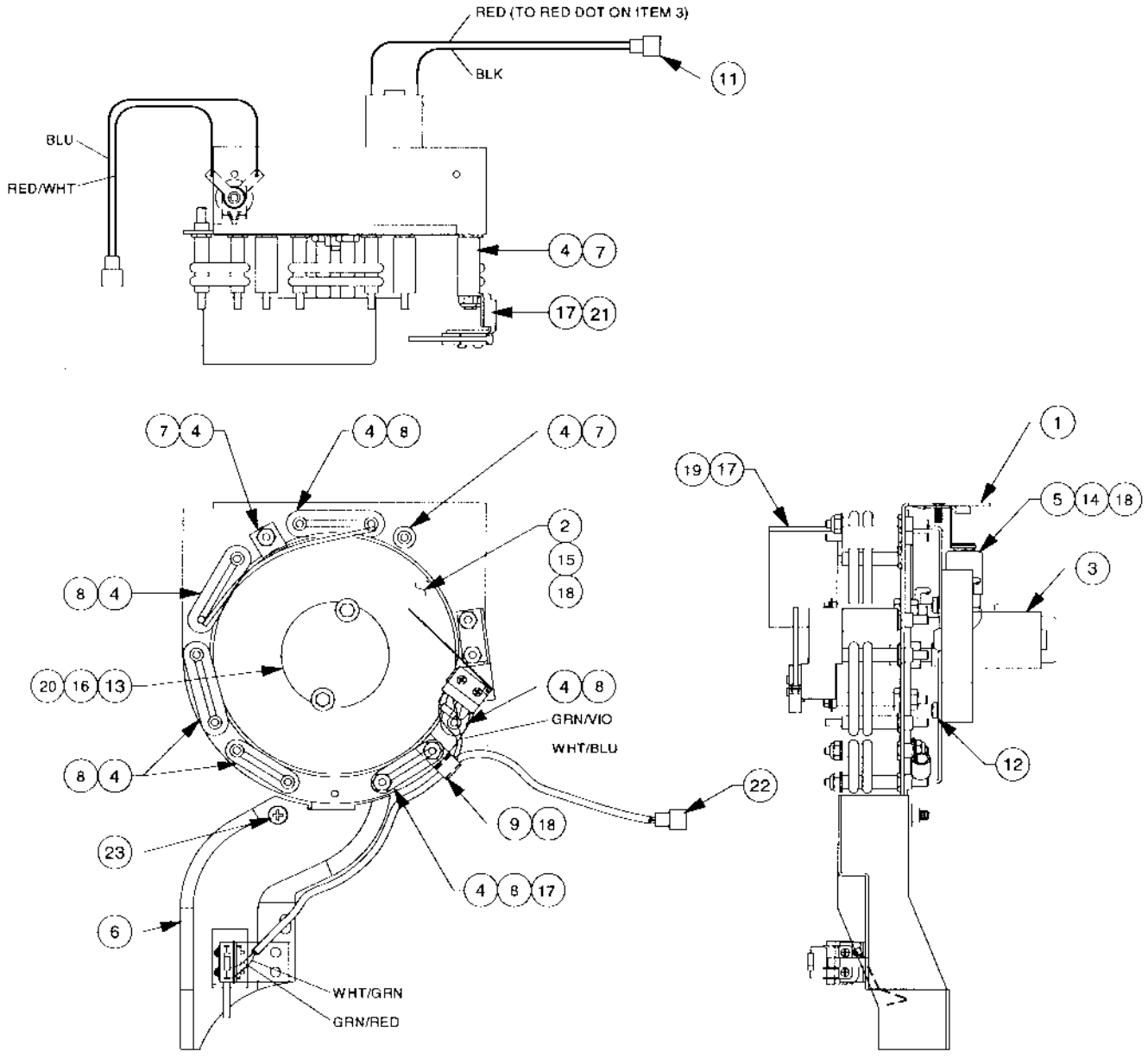


Item	Part No.	Description
1.	11-831-50029	Back Panel
2.	31-1977-1	Plastic
3.	4808-01175-08	E-P #8 x1/2" IND PL-HWH
4.	4008-01168-16	Mach. Screw, 8-32 x 1"
5.	03-7655-4	Wire Harness Clip
6.	4408-01168-14	T-Nut #8-32
7.	A-17803	Socket/ Bulb Assembly
8.	4008-01168-14	Mach. Screw, #8-32 x 7/8"
9.	01-12569	Bracket-Gusset
10.	A-18942-4	Playfield Plastic Assembly
11.	H-18798	Back Panel Cable
12.	A-18128	Ballgate Mtg. Bracket Assy.
13.	A-17978	Bracket Assembly (See p.2-29)
14.	A-18985	PCB & Bracket Assembly
15.	A-18369	Diverter Assembly (See p.2-24)
16.	01-12669	Bracket
17.	4106-0115-12	Sh. Metal Screw, #6 x 3/4"
18.	03-9131	Back Panel Div. Guide
19.	4008-01113-12	Mach. Screw, #8-32 x 3/4"
20.	4700-00021-00	Flatwasher, 13/64 x 7/16 x 21ga.





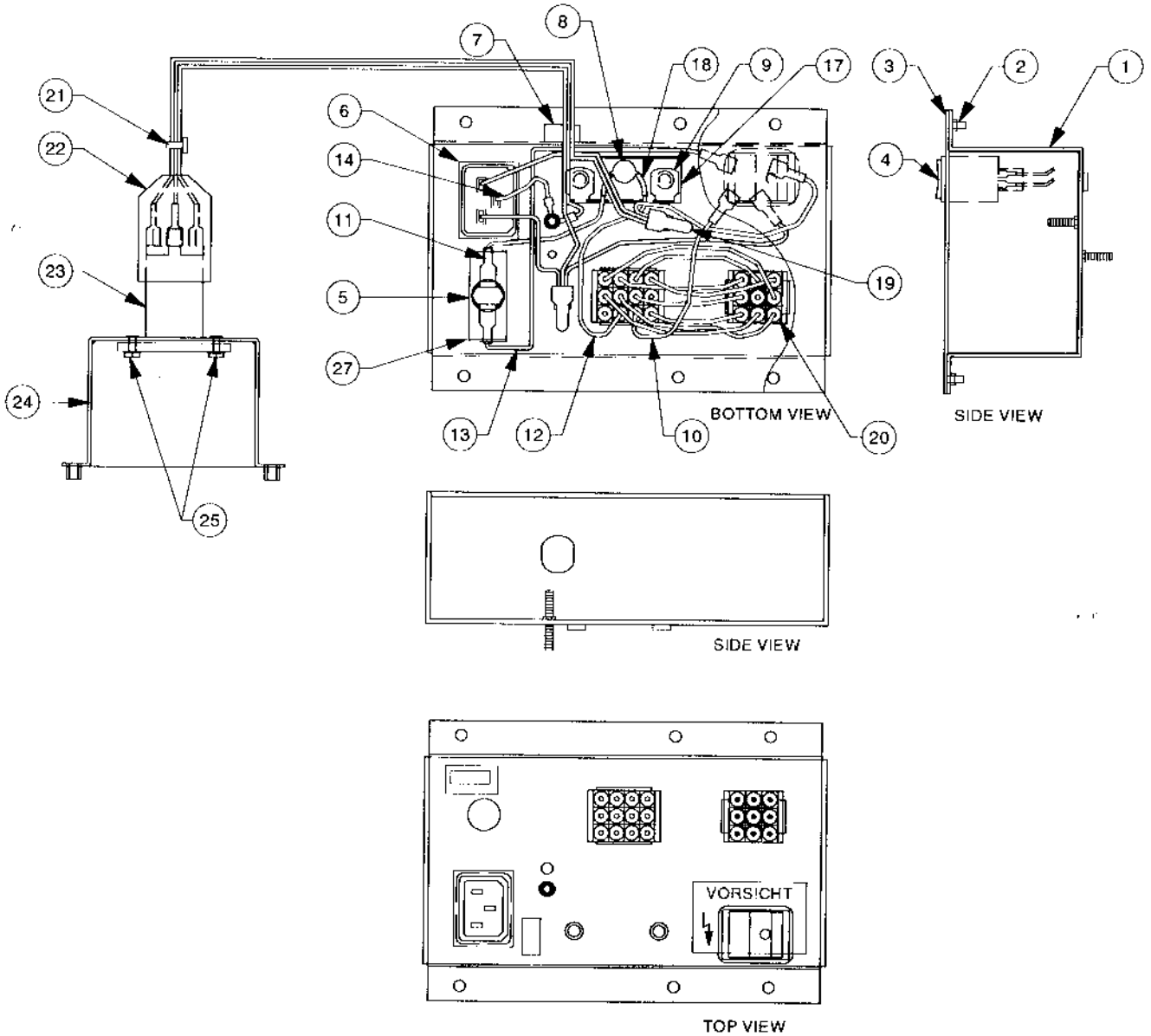
A-17978 Bracket Assembly



Item	Part No.	Description
1.	A-17977.1	Bracket Assembly
2.	A-18135	Wheel Assembly
3.	14-7999	Motor
4.	02-4493	Post
5.	A-11541	Socket & Bulb
6.	A-18566	Ramp Assembly
7.	23-6556	Bumper Sleeve, Black
8.	23-6694-5	Ring, Black
9.	03-7655-4	Clamp Cable, 1/4"
10.	H-18219-3	Flasher Cable Assembly
11.	H-18600-6	Motor Cable Assembly
12.	4008-01168-10	Mach. Screw, #8-32 x 5/8"

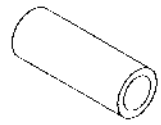
Item	Part No.	Description
13.	4006-01168-06	Mach. Screw, #6-32 x 3/8"
14.	4700-00011-00	Flatwasher, 11/64x 7/16 x 16ga.
15.	4700-00009-00	Flatwasher, 11/64 x 7/16 x 20ga.
16.	4700-00005-00	Flatwasher, 9/64 x 7/16 x 20ga.
17.	4406-01119-00	Nut #6-32 ESN
18.	4408-01119-01	Nut #8-32 ESN
19.	A-18942-6	Playfield Plastic Assembly
20.	31-1977-24	Playfield Plastic
21.	A-19098	Ball Popper Exit Sw. Assembly
22.	H-19142	Exit Switch Cable Assembly
23.	4008-01041-06	Mach. Screw, 8-32 x 3/8"

A-17540 Universal Power Interface Assembly

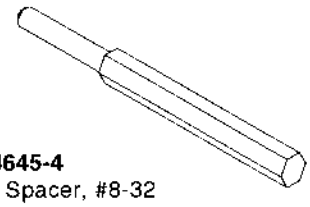


Item	Part No.	Description	Item	Part No.	Description
1.	01-12293.1	Power Control Chassis Box	14.	H-17542	Ground Jumper Grn/Yel Cable
2.	4406-01128-00	Nut #6-32 KEPS	15.	5797-13940-01	Jumper Cable
3.	01-12294	Switch Mounting Plate Assembly	16.	01-10623	Insulator, Thermistor
4.	5642-13935-00	Power Switch	17.	01-12299	Insulator, Terminal Strip
5.	5733-12869-00	Fuse Holder Panel	18.	RM-21-06	#18 Vinyl Fgls
6.	5851-13867-00	Outlet-IEC Conn. 237 Socket	19.	5822-13865-00	Terminal Strip 3-CKT 2-Mtg.
7.	03-8712	Strain Relief Bushing	20.	H-18050	Jumper Cable, Transformer Prog.
8.	5016-12978-00	Thermistor 8A., 2.5R25	21.	03-7933	Ty-Wrap Nylon
9.	4006-01003-10	Mach. Screw, #6-32 x 5/8"	22.	20-9682-1	Boot w/9-32 Dia. Hole
10.	H-17992	Jumper Cable Neutral Sw/1FC	23.	5102-13864-00	Line Filter w/IEC Connector
11.	H-17543	Hot Jumper Black Cable	24.	01-12292	Line Filter Chassis Box
12.	H-17546	Jumper Interface Hot Black Cable	25.	4004-01003-05	Mach. Screw, #4-40 x 5/16"
13.	H-17545	Jumper Switch/Fuse Black Cable			

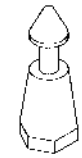
Posts



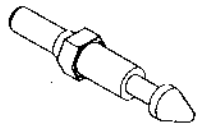
02-4020
Support Post, 1/2"



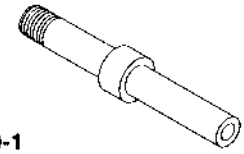
02-4645-4
M-F Spacer, #8-32



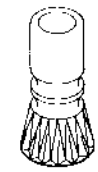
03-8044-13
Bumper Post, Double Starred



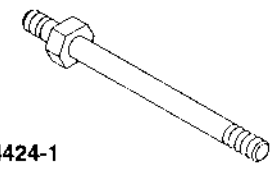
02-4177
Ball Guide Post



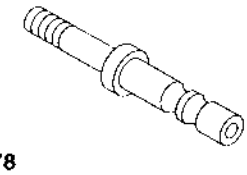
02-4659-1
Post-Mini #10



03-8130-13
Post, Double Bumper Hex.

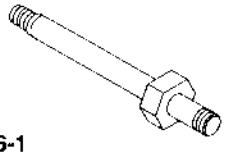


02-4424-1
Post Fastner #6-32

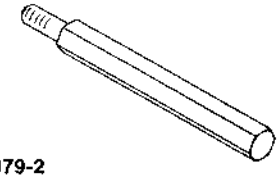


02-4678
Double Bumper Post

03-8247-12
Post #8 Double Starred

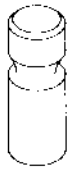


02-4426-1
Post # 6-32

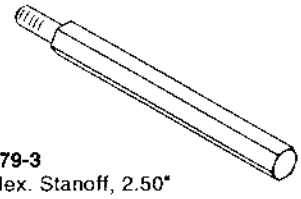


02-5079-2
1/4" Hex. Stanoff, 2.12"

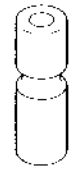
03-8319-12
Bumper Post Starred



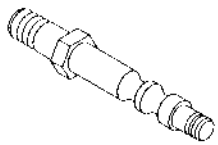
02-4434
Post # 8-32



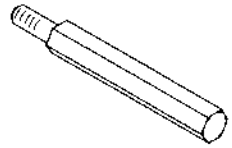
02-5079-3
1/4" Hex. Stanoff, 2.50"



03-8365-12
Post, 3/8 x 1-3/16", Tr. Orange



02-4493
Post, Double Bumper Hex.



02-5079-4
1/4" Hex. Standoff, 1.62"

Unique Assemblies

	Part Number	Description
UNIQUE BACKBOX ASSEMBLIES	A-14039.1	Dot Matrix Controller Assembly
	A-16917-50029	Sound Board Assembly
	A-17651-50029	WPC Security CPU Assembly
	A-18055	Speaker/Display Panel Assembly
UNIQUE CABINET ASSEMBLIES	A-18531-1	4-Ball Cashbox Assembly
	11-1157	Cabinet, Wood
	20-9663-B-7	Push Button w/Switch, Red (Rock Me)
	20-9663-18	Push Button w/Switch, Orange (Extra Ball)
	H-18797	Playfield Solenoid Cable
UNIQUE PLAYFIELD ASSEMBLIES	A-13769-50029	Playfield & Insert Assembly
	A-17818	Gate Shield Assembly
	A-17860	Ball Guide Assembly
	A-17862	Ball Guide Assembly #2
	A-17863	Ball Guide
	A-17879	Ball Guide
	A-17880	Ball Guide
	A-17912	Ramp Assembly
	A-17932	Disappearing Post Assembly
	A-17935	Diverter Assembly
	A-18078	Diverter Assembly
	A-18079	Dicta-Bird Perch Mounting Bracket Assembly
	A-18129	Ball Gate Assembly
	A-18130	Ball Gate Assembly
	A-18131	Ramp Assembly
	A-18154	Ramp Assembly
	A-18234	Complete Hanger Bracket Assembly
	A-18531-1	4-Cashbox Assembly
	A-18553-1	3-Lamp Board & Spacer Assembly
	A-18554-1	3-Lamp Board & Spacer Assembly
	A-18555-1	5-Lamp Board & Spacer Assembly
	A-18556-1	4-Lamp Board & Spacer Assembly
	A-18557-1	6-Lamp Board & Spacer Assembly

Unique Assemblies (Continued)

	Part Number	Description
UNIQUE PLAYFIELD ASSEMBLIES	A-18558-1	6-Lamp Board & Spacer Assembly
	A-18559-1	8-Lamp Board & Spacer Assembly
	A-18560-1	10-Lamp Board & Spacer Assembly
	A-18561-1	13-Lamp Board & Spacer Assembly
	A-18566	Ramp & Switch Assembly
	A-18605-5	Stationary Target Assembly, White
	A-18606-5	Stationary Target Assembly, White
	A-18606-7	Stationary Target Assembly, Black
	A-18607-6	Stationary Target Assembly, Yellow
	A-18809-1	Switch Gate & Bracket Assembly, Right
	A-18809-2	Switch Gate & Bracket Assembly, Left
	A-18812	4-Bank Drop Target & Decal Assembly
	A-18823	Back Panel Assembly
	A-18825	3-Bank Drop Target & Decal Assembly
	A-18829	Ball Guide & Wire Gate Assembly
	A-18942-1, -2, -3	Playfield Plastics
	A-18959	Guard Bracket Assembly
	A-18971	Scoop & Decal Assembly
	A-18972	Popper Guide & Decal Assembly
	A-18990-1	Flipper Ball Guide Assembly, Right
	A-18990-2	Flipper Ball Guide Assembly, Left
	A-19045	Ball Guide Assembly
	A-19062	Downtown Bedrock Assembly
	A-19063	Residential Bedrock Assembly
	A-19077	Ball Guide & Wood Rail Assembly
	01-12580	Ball Guide - Arch
	01-12822	Flipper Bracket
	01-12941	Shooter Lane Guard
	01-12974-1	Diverter Guide, Left
	01-12974-2	Diverter Guide, Right
	01-12983	Handle
	01-13054	Downtown Bedrock Bracket
	01-13055	Residential Bedrock Bracket
	01-12089	Drive-In Bracket

Unique Assemblies (Continued)

UNIQUE PLAYFIELD ASSEMBLIES

Part Number	Description
01-13098	Ball Guide
02-5019	Standoff Arch, 10-32
03-9071	Ball Guide
03-9195	Expanding Nut
03-9205	Downtown Bedrock
03-9206	Residential Bedrock
11-1156-A	Wood Rail, Left Hand
11-1156-B	Wood Rail, Right Hand Short
11-1156-C	Wood Rail, Right Hand Short
20-9250-29	Flipper w/Shaft, Gray
31-1982-2	Decal, Right Ramp
31-1983-1	Decal, Target
31-1983-2	Decal, Scoop
31-1983-3	Decal, Bowling Pin
31-1983-4	Decal, Popper Guide
31-1983-5	Decal, Tongue
31-1983-6	Decal, Score Board

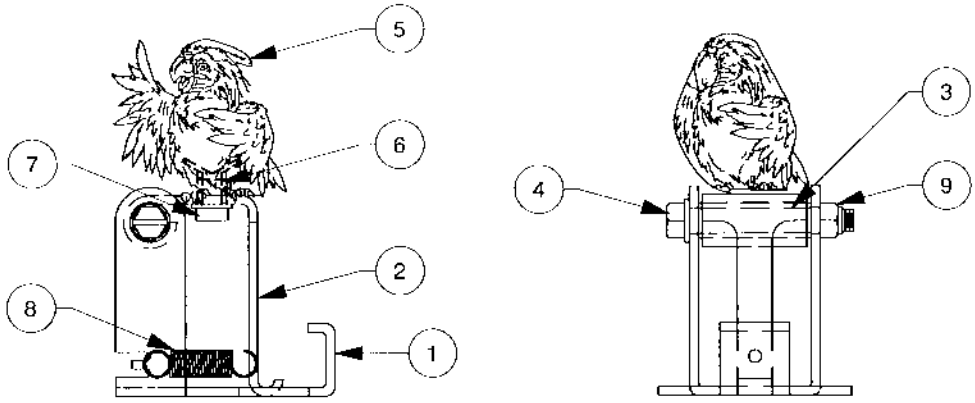
Cables

	Part Number	Description
BACKBOX CABLES	H-14584	Dot Matrix Display Cable
	H-15476	Logic Power Cable
	H-15736	Secondary Cable
	H-18799	Insert Cable
PLAYFIELD CABLES	H-18757-1	7-Opto Trough Input Cable
	H-18796.1	Playfield Lamp Cable
CABINET CABLES	H-17005-2	Cabinet Cable
	H-17019	Dixie-Mars Interconnect Cable
	H-17217	Plumb Bob Mech. Assembly
	H-17837-2	Voltage Program Jumper
	H-18800.1	Cabinet Switch Lamp Cable

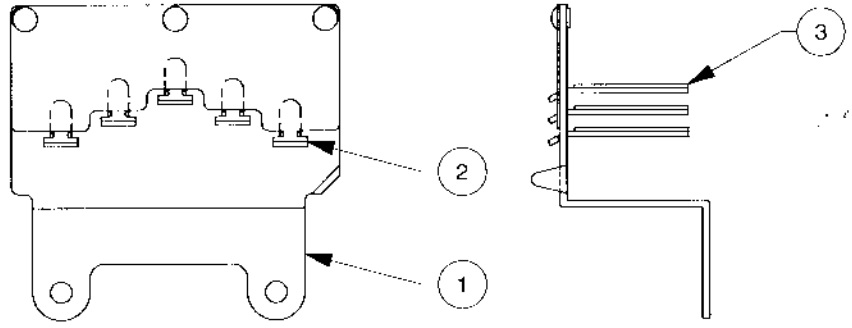
Universal Power Interface/Cordset Application Chart

COUNTRY	UNIVERSAL PWR. INTERFACE ASSEMBLY	VOLTAGE PROGRAMMING JUMP CABLE				5AMP FUSE/ LABEL		8AMP FUSE/ LABEL		LABEL HIGH/ VOLTAGE CAUTION	POWER ADAPTER CORD	CORDSET								
	A-17540	H-17837-1	H-17837-2	H-17837-3	H-17837-4	5731-09651-00 FUSE	16-9668 LABEL	5730-09252-00 FUSE	16-9670 LABEL	16-9669	5850-14052-00	5850-13271-00	5850-13272-00	5850-13273-00	5850-13274-00	5850-13275-00	5850-13276-00	5850-13277-00	5850-13278-00	A-17175-2
UNITED STATES	X		X					X	X		X	X								
CANADA	X	X						X	X			X								
TAIWAN	X		X					X	X			X								
MEXICO	X		X					X	X			X								
CENTRAL AMERICA	X		X					X	X			X								
SOUTH KOREA	X		X					X	X			X								
PUERTO RICO	X		X					X	X			X								
AUSTRIA	X			X		X	X			X			X							
BELGIUM	X			X		X	X			X			X							
FINLAND	X			X		X	X			X			X							
FRANCE	X			X		X	X			X			X							
GREECE	X			X		X	X			X			X							
HOLLAND	X			X		X	X			X			X							
HUNGARY	X			X		X	X			X			X							
NETHERLANDS	X			X		X	X			X			X							
NETH. ANTILLES	X			X		X	X			X			X							
NORWAY	X			X		X	X			X			X							
POLAND	X			X		X	X			X			X							
PORTUGAL	X			X		X	X			X			X							
SPAIN	X			X		X	X			X			X							
SWEDEN	X			X		X	X			X			X							
TURKEY	X			X		X	X			X			X							
WEST GERMANY	X			X		X	X			X			X							
UNITED KINGDOM	X			X		X	X			X				X						
IRELAND	X			X		X	X			X				X						
HONG KONG	X			X		X	X			X				X						
DENMARK	X			X		X	X			X					X					
ITALY	X			X		X	X			X						X				
CHILE	X			X		X	X			X						X				
PEOPLE'S REP. OF CHINA	X			X		X	X			X						X				
SWITZERLAND	X			X		X	X			X							X			
AUSTRALIA	X			X		X	X			X								X		
NEW ZEALAND	X			X		X	X			X								X		
ARGENTINA	X			X		X	X			X								X		
JAPAN	X				X			X	X										X	X

Dicta Bird Mounting Bracket Assembly



Complete Hanger Bracket Assembly



A-18079 Dicta-Bird Mounting Bracket Assembly

Item	Part No.	Description
1.	01-12561.1	Mounting Bracket
2.	01-12563.1	Hinge
3.	02-5073	Pivot
4.	4008-01059-20	Mach. Screw, #8-32 x 1-1/4"
5.	03-9194	Dicta-Bird
6.	03-9195	Expanding Nut
7.	4106-01115-16	Sh. Metal Screw, #6 x 1"
8.	10-120	Spring
9.	4408-01119-00	Nut 8-32 ESN

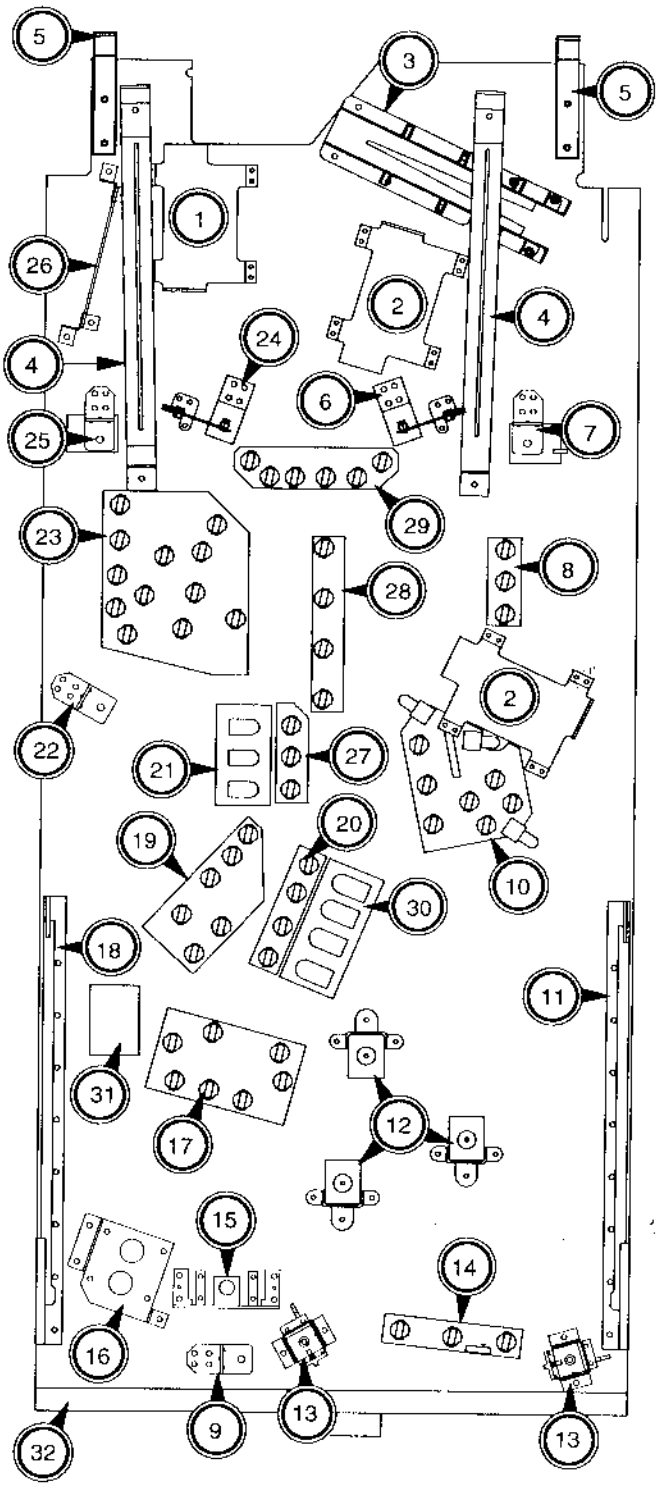
A-18234 Complete Hanger Bracket Assembly

Item	Part No.	Description
1.	A-17819	Bracket Retainer Assembly
2.	01-12369	Bowling Pin Target
*3.	31-1983-3	Decal

* Not available for individual sale. Order decal set 31-1983.

Lower Playfield Parts

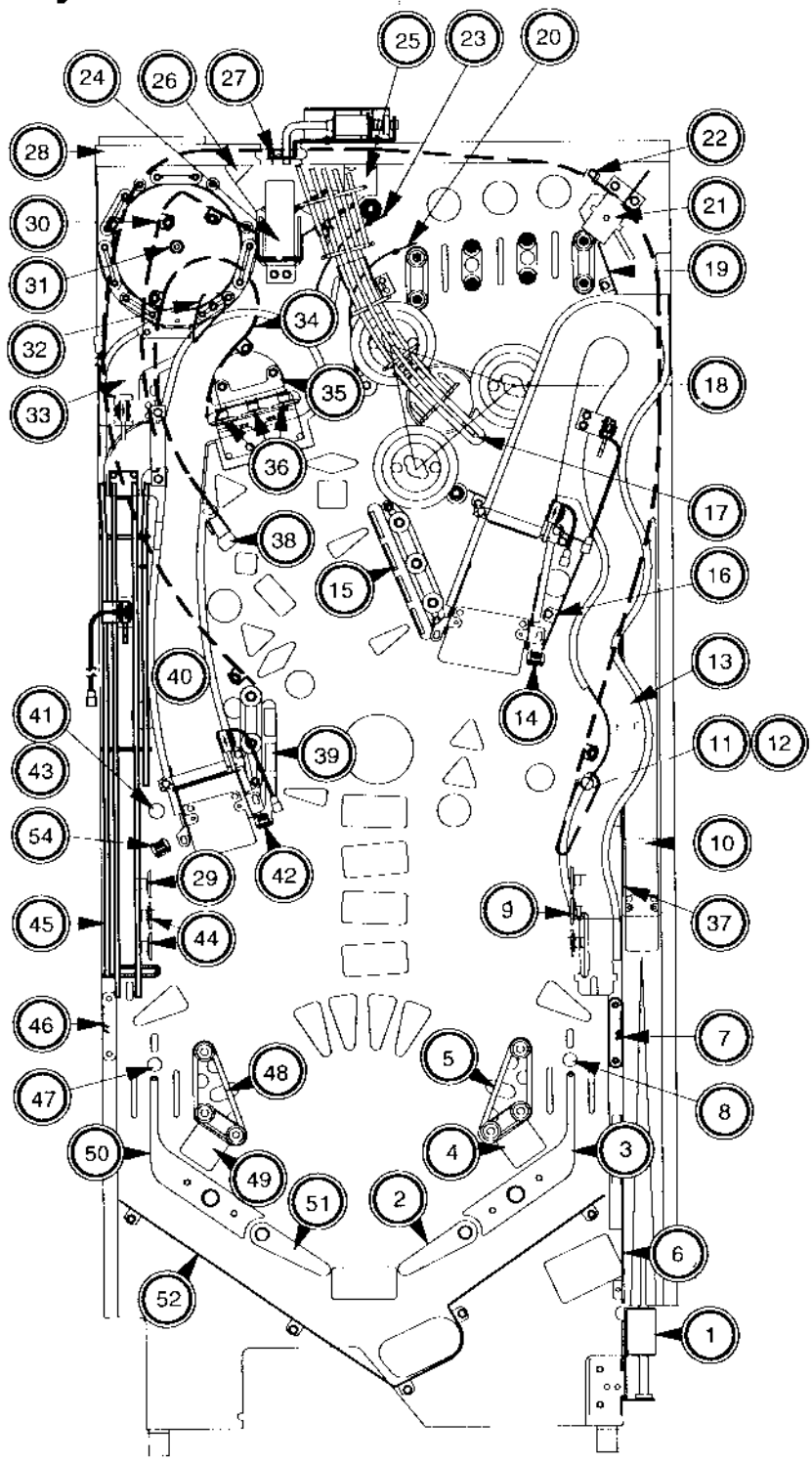
Item	Part No.	Description
1.	A-15849-L-2	Flipper Assembly
2.	A-15849-R-2	Flipper Assembly (2)
3.	A-18753	Outhole Ball Trough Assembly
4.	01-11781	Leg Support (2)
5.	01-9211	Plfd. Hanger Bracket Assy. (2)
6.	A-17811	Kicker Arm (Slingshot) Assy.
	B-9362-L-2	Coil & Bracket Assembly
7.	A-19097-1	Diverter Assembly, Right
8.	A-18553	3-Lamp PCB
9.	A-17932	Disappearing Post Assembly
10.	A-18560	10-Lamp PCB
11.	A-17749.1-2	Plfd. Slide Mechanism, Right
12.	A-9415-2	Jet Bumper Coil Assembly (3)
	B-9414-2	Jet Bumper Assembly (3)
13.	A-17796	Ball Gate Actuator (2)
14.	A-17624	3-Lamp PCB
15.	A-15769-1	Ball Popper Assembly
16.	A-17978	Motor & Bracket Assembly
17.	A-18559	8-Lamp PCB
18.	A-17749.1-1	Plfd. Slide Mechanism, Left
19.	A-18557	6-Lamp PCB
20.	A-18556	4-Lamp PCB
21.	A-16032-3	3-Bank Drop Target Assy.
22.	A-18078	Diverter Assembly
23.	A-18561	13-Lamp PCB
24.	A-17811	Kicker Arm (Slingshot) Assy.
	B-9362-R-3	Coil & Bracket Assembly
25.	A-19097-2	Diverter Assembly, Left
26.	A-15576	7-Switch Opto PCB
27.	A-18554	3-Lamp PCB
28.	A-18555	5-Lamp PCB
29.	A-18558	6-Lamp PCB
30.	A-18188	4-Bank Drop Target Assembly
31.	A-15542	Motor EMI PCB Assembly
32.	A-18823	Back Panel Assembly



Underside of playfield, viewed in raised position

Upper Playfield Parts

Item	Part Number	Description
1	A-14525	Shooter Lane
2	A-15849-R-2	Right Flipper Assembly
	FL-11629	Flipper Coil
	20-9250-6	Shaft & Paddle
3	A-18990-1	Right Flipper Ball Guide Assembly
	01-12403.1-1	Right Flipper Ball Guide
4	A-18971	Scoop
5	A-17811	Slingshot Assembly
	A-17810	Bracket
	B-9362-R-3	Coil & Bracket Assembly
6	01-12941	Shooter Lane Guard
7	01-12974.1-2	Diverter Guide
8	A-19097-1	Diverter Assembly, Right
9	A-18605-5	Standup Targets, White Round
10	A-17912	Ramp
	01-12454	Ramp Flap
11	A-15849-R-2	Right Flipper Assembly
	FL-11629	Flipper Coil
	20-9250-6	Shaft & Paddle
12	01-12822	Flipper Bracket
13	A-18130	Ramp
	01-12397	Ramp Flap
14	A-17778-5	Standup Target, White Oblong
15	A-18812	4-Bank Drop Target Assembly
16	A-18829	Ball Guide
17	A-18239	Ramp
18	A-9415-2	Jet Bumper Coil Assembly
	B-9414-2	Jet Bumper Assembly
19	A-17879	Ball Guide
20	A-17862	Ball Guide
21	A-18129	Ball Gate
	A-17796	Ball Gate Actuator
22	A-17860	Ball Guide
23	A-17863	Ball Guide
24	A-15769-1	Ball Popper & Opto Assembly
25	A-18128	Ball Gate
	A-17796	Ball Gate Actuator
26	01-12669	Diverter Bracket
27	A-17932	Top Diverter Post Assembly
28	A-18823	Back Panel Assembly
	A-18369	Top Diverter Assembly
	A-18985	PCB & Bracket
29	A-18606-5	Standup Target, White Round
30	A-19045	Ball Guide
31	A-17978	Motor & Bracket Assembly
	14-7999	Motor
	A-18135	Spinning Wheel
32	03-9071	Ball Guide
33	A-18566	Ramp & Switch Assembly
34	A-17880	Ball Guide
35	A-18234	Complete Hanger Assembly
36	A-18606-7	Standup Targets, Black Round
37	A-17860	Ball Guide
38	A-17778-5	Standup Target, White Oblong
39	A-18825	3-Bank Drop Target Assembly
40	A-18131	Ramp
	01-12398	Ramp Flap
41	A-18078	Dictabird Diverter
42	A-17778-5	Standup Targets, White Oblong
43	A-18079	Dictabird Perch Mounting Bracket
44	A-18605-5	Standup Targets, White Round
45	A-18154	Ramp
46	01-12974.1-1	Diverter Guide
47	A-19097-2	Diverter Assembly, Left
48	A-17811	Slingshot
	A-17810	Slingshot Bracket
	B-9362-L-2	Coil & Bracket Assembly
49	A-18971	Scoop
50	A-18990-2	Left Flipper Ball Guide Assembly
	01-12403.1-2	Left Flipper Ball Guide
51	A-15849-L-2	Left Flipper Assembly
	FL-11629	Flipper Coil Assembly
	20-9250-6	Shaft & Paddle
52	01-12580	Bottom Arch Fence
53	A-18829	Ball Guide
54	A-18607-6	Standup Target, Yellow Oblong



Not Shown:

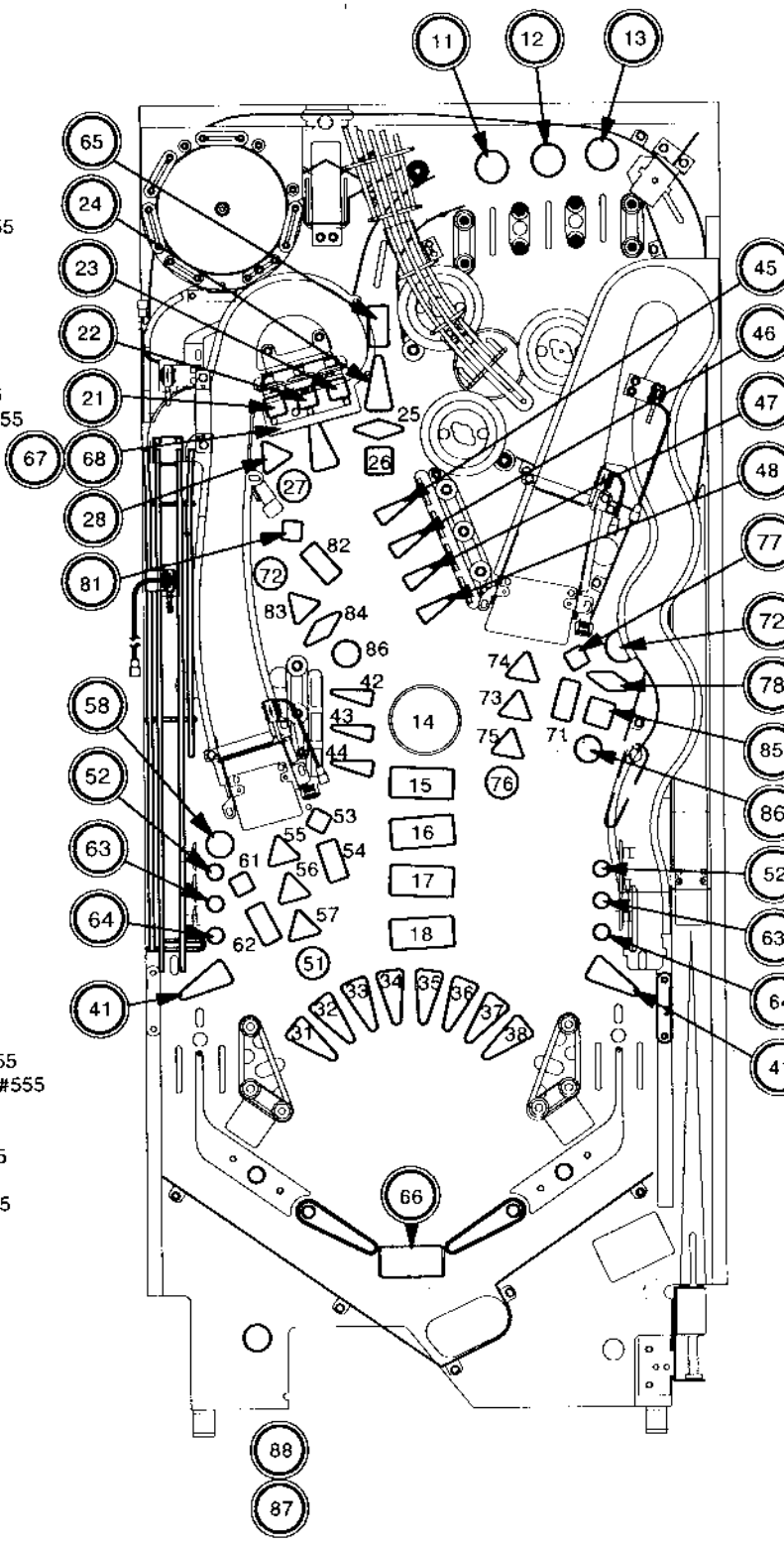
A-13769-50029	Playfield & Insert Assembly
01-12983	Bottom Arch Handle
A-19062	Downtown Bedrock Assembly
03-9205	Downtown Bedrock
01-13054	Downtown Bedrock Bracket
A-19063	Residential Bedrock Assembly
03-9206	Residential Bedrock
01-13055	Residential Bedrock Bracket
03-9068	Screened Bottom Arch
03-9251-1	Full Playfield Mylar
20-6500	Steel Ball

Lamp Circuit

COLUMN / ROW	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-5 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J137-7 Q92	8 Yellow-Gray J137-9 Q91
Red-Brown J134-1 Q90 1	Top Lt. Rollover "D" 11	Upper 3-Bnk Lt. Tgt. 21	"C" 31	Bottom "Drain Savers" 41	Lt. "Bowling" 51	Lower Lt. "Start Job Change" 61	Rt. "Dino" 71	Upper Lt. "Frenzy" 81
Red-Black J134-2 Q89 2	Top Mid. Rollover "I" 12	Upper 3-Bnk Cr. Tgt. 22	"O" 32	3-Bnk D. Tgt. "B" 42	Lt. & Rt. 3-Bnk Upper Tgt. 52	Lower Lt. "Help" 62	Lt. & Rt. Machine Time 72	Upper Lt. "Dino" 82
Red-Orange J134-4 Q88 3	Top Rt. Rollover "G" 13	Upper 3-Bnk Rt. Tgt. 23	"N" 33	3-Bnk D. Tgt. "E" 43	Lower Lt. "Frenzy" 53	Lt. & Rt. 3-Bnk Mid. Tgt. 63	Rt. Combo "2" 73	Lt. Lane "Bronto Crane" 83
Red-Yellow J134-5 Q87 4	Mystery Mode "?" 14	Cr. Lane "Extra Ball" 24	"C" 34	3-Bnk D. Tgt. "D" 44	Lower Lt. "Dino" 54	Lt. & Rt. 3-Bnk Lower Tgt. 64	Rt. Combo "3" 74	Lt. "Search" 84
Red-Green J134-6 Q86 5	Fred's Choice 15	Cr. Lane "Search" 25	"R" 35	4-Bnk D. Tgt "R" 45	Lt. Combo "3" 55	Cr. "Jackpot" 65	Rt. Combo "1" 75	Rt. Lane "Job Change" 85
Red-Blue J134-7 Q85 6	"Eat at Joe's" Diner 16	Cr. Lane "Drive Thru" 26	"E" 36	4-Bnk D. Tgt. "O" 46	Lt. Combo "2" 56	Shoot Again 66	Rt. "Bowling" 76	Lt. & Rt. Lane "Start Multiball" 86
Red-Violet J134-8 Q84 7	Bedrock Water Buffalo 17	Lt. Inner Lane "Super Jackpot" 27	"T" 37	4-Bnk D. Tgt. "C" 47	Lt. Combo "1" 57	Lt. "X" On Lt. Ramp 67	Rt. "Frenzy" 77	Buy-In 87
Red-Gray J134-9 Q83 8	Dino Frenzy 18	Lt. Inner Lane "Plfd 2X" 28	"E" 38	4-Bnk D. Tgt. "K" 48	Lower Lt. "Start Machine" 58	Rt. "X" On Lt. Ramp 68	Rt. "Search" 78	Start Button 88

Lamp Locations

Item	Bulb Number	Lamp Assy Number	Description
11	24-8768	A-17624	Top Lt. Rollover "D" #555
12	24-8768	A-17624	Top Mid. Rollover "I" #555
13	24-8768	A-17624	Top Rt. Rollover "G" #555
14	24-8768	A-18555	Mystery Mode "?" #555
15	24-8768	A-18555	Fred's Choice #555
16	24-8768	A-18555	"Eat At Joe's" Diner #555
17	24-8768	A-18555	Bedrock Water Buffalo #555
18	24-8768	A-18555	Dino Frenzy #555
21	24-8768	A-18559	Up. 3-Bnk Lt. Tgt. #555
22	24-8768	A-18559	Up. 3-Bnk Cen. Tgt. #555
23	24-8768	A-18559	Up. 3-Bnk Rt. Tgt. #555
24	24-8768	A-18559	Cen. Ln. "Ex. Ball" #555
25	24-8768	A-18559	Cen. Lane "Search" #555
26	24-8768	A-18559	Cen. Ln. "Drive Thru" #555
27	24-8768	A-18559	Lt. In. Ln. "Spr Jackpot" #555
28	24-8768	A-18559	Lt. In. Ln. "Plfd 2X" #555
31	24-6549	A-17836	"C" #44
32	24-8768	A-18558	"O" #555
33	24-8768	A-18558	"N" #555
34	24-8768	A-18558	"C" #555
35	24-8768	A-18558	"R" #555
36	24-8768	A-18558	"E" #555
37	24-8768	A-18558	"T" #555
38	24-6549	A-17836	"E" #44
41	24-8768	A-18561	Lt. Bot. "Drain Save" #555
	24-6549	A-17836	Rt. Bot. "Drain Save" #44
42	24-8768	A-18554	3-Bnk Drop Tgt. "B" #555
43	24-8768	A-18554	3-Bnk Drop Tgt. "E" #555
44	24-8768	A-18554	3-Bnk Drop Tgt. "D" #555
45	24-8768	A-18556	4-Bnk Drop Tgt. "R" #555
46	24-8768	A-18556	4-Bnk Drop Tgt. "O" #555
47	24-8768	A-18556	4-Bnk Drop Tgt. "C" #555
48	24-8768	A-18556	4-Bnk Drop Tgt. "K" #555
51	24-8768	A-18561	Left Bowling #555
52	24-8768	A-18561	Left 3-Bnk Up. Tgt. #555
	24-8768	A-18553	Right 3-Bnk Up. Tgt. #555
53	24-8768	A-18561	Lower Lt. Frenzy #555
54	24-8768	A-18561	Lower Lt. Dino #555
55	24-8768	A-18561	Lt. Combo "3" #555
56	24-8768	A-18561	Lt. Combo "2" #555
57	24-8768	A-18561	Lt. Combo "1" #555
58	24-8768	A-18561	Low. Lt. Start Machine #555
61	24-8768	A-18561	Low. Lt Start Job Change #555
62	24-8768	A-18561	Lower Left Help #555
63	24-8768	A-18561	Left 3-Bnk Mid. Tgt. #555
	24-8768	A-18553	Right 3-Bnk Mid. Tgt. #555
64	24-8768	A-18561	Left 3-Bnk Low. Tgt. #555
	24-8768	A-18553	Right 3-Bnk Low. Tgt. #555
65	24-6549	A-17835	Center "Jackpot" #44
66	24-6549	A-17836	Rock Again #44
67	24-8829	A-18499	Lt. "X" on Lt. Ramp #86
68	24-8829	A-18499	Rt. "X" on Lt. Ramp #86
71	24-8768	A-18560	Right "Dino" #555
72	24-8768	A-18557	Left Machine Time #555
	24-8768	A-18560	Right Machine Time #555
73	24-8768	A-18560	Right Combo "2" #555
74	24-8768	A-18560	Right Combo "3" #555
75	24-8768	A-18560	Right Combo "1" #555
76	24-8768	A-18560	Right "Bowling" #555
77	24-8768	A-18560	Right "Frenzy" #555
78	24-8768	A-18560	Right "Search" #555
81	24-8768	A-18557	Up. Lt. "Frenzy" #555
82	24-8768	A-18557	Up. Lt. "Dino" #555
83	24-8768	A-18557	Lt. Ln. "Bronto Crane" #555
84	24-8768	A-18557	Left "Search" #555
85	24-8768	A-18557	Rt. Ln. Job Change #555
86	24-8768	A-18557	Left Start Multiball #555
	24-8768	A-18560	Right Start Multiball #555
87	-----	20-9663-18	Buy-in
88	-----	20-9663-14	Start Button

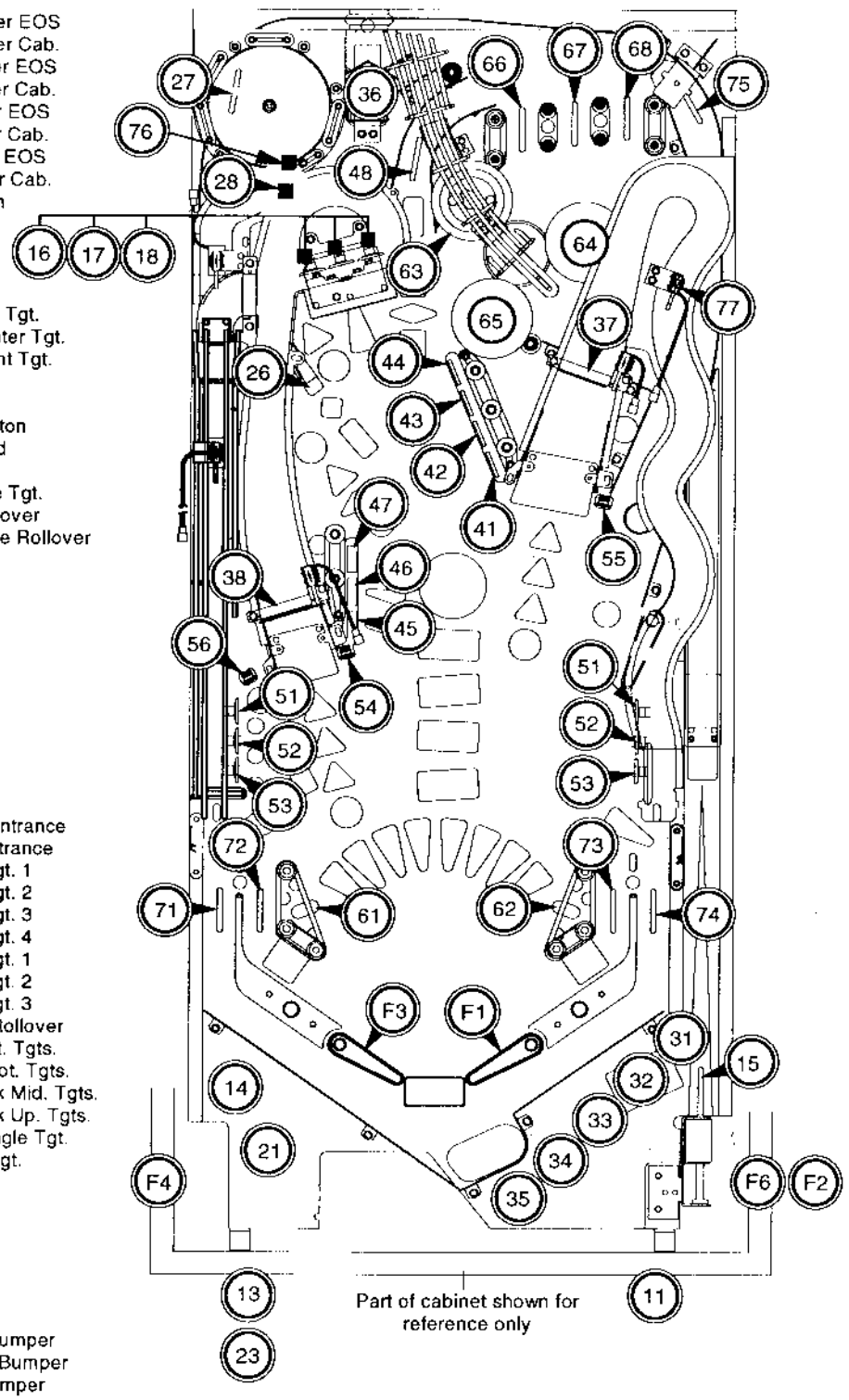


Switch Circuit

Dedicated Grounded Switches	COLUMN / ROW	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute D1	White-Brown J209-1 U18-11 1	Launch Button 11	Slam 21	Trough #1 31	4-Bnk #1 D.Tgt. 41	Lt. & Rt. 3-Bnk. Bot. Tgt 51	Lt. Sling 61	Lt. Out Rollover 71	Not Used 81	Black-Green J906-1 Lower Right E.O.S. F1
Orange-Red J205-2 Center Coin Chute D2	White-Red J209-2 U18-9 2	Ticket Disp. 12	Door Closed 22	Trough #2 32	4-Bnk #2 D. Tgt. 42	Lt. & Rt. 3-Bnk Mid. Tgt 52	Rt. Sling 62	Lt. Return Rollover 72	Not Used 82	Blue-Violet J905-1 Lower Right Opto F2
Orange-Black J205-3 Right Coin Chute D3	White-Orange J209-3 U18-5 3	Start Button 13	Extra Ball Button 23	Trough #3 33	4-Bnk #3 D. Tgt. 43	Lt. & Rt. 3-Bnk Up. Tgt 53	Top Lt. Jet 63	Rt. Return Rollover 73	Not Used 83	Black-Blue J906-3 Lower Left E.O.S F3
Orange-Yellow J205-4 4th Coin Chute D4	White-Yellow J209-4 U18-7 4	Plumb Tilt 14	Always Closed 24	Trough #4 34	4-Bnk #4 D. Tgt. 44	Low. Lt. Sngl. Tgt. 54	Top Rt. Jet 64	Rt. Out Rollover 74	Not Used 84	Blue-Gray J905-2 Lower Left Opto F4
Orange-Green J205-6 Normal Test Service Escape Credit D5	White-Green J209-4 U19-11 5	Shooter Lane 15	"Machine" Exit 25	Trough Jam 35	3-Bnk #1 D. Tgt. 45	Rt. Sngl. Tgt. 55	Bottom Jet 65	Up. Rt. Lane Rollover 75	Not Used 85	Black-Violet J906-4 Upper Right E.O.S. F5
Orange-Blue J205-7 Normal Test Vol. On Down D6	White-Blue J209-7 U19-9 6	Upper 3-Bnk Lt. Tgt. "I" 16	Upper Lt. Sngl. Tgt. 26	Ball Popper 36	3-Bnk #2 D. Tgt. 46	Dicta-Bird Tgt. 56	Top Lt. Rollover "D" 66	Up. Rt. Lane Exit Rollover 76	Not Used 86	Black-Yellow J905-3 Upper Right Opto F6
Orange-Violet J205-8 Normal Test Vol. Up Up D7	White-Violet J209-8 U19-5 7	Upper 3-Bnk Cr. Tgt. "X" 17	Lt. Lane Rollover 27	Rt. Ramp Enter 37	3-Bnk #3 D. Tgt. 47	Not Used 57	Top Cr. Rollover "I" 67	Rt. Ramp Exit 77	Not Used 87	Black-Gray J906-5 Upper Left E.O.S. F7
Orange-Gray J205-9 Normal Test Beg. Test Enter D8	White-Gray J209-9 U19-7 8	Upper 3-Bnk Rt. Tgt. "I" 18	In. Lt. Lane Rollover 28	Lt. Ramp Enter 38	Cr. Lane Rollover 48	Not Used 58	Top Rt. Rollover "G" 68	Lt. Ramp Exit 78	Not Used 88	Black-Blue J905-5 Upper Left Opto F8

Switch Locations

Item	Switch Number	Where Used
F1	SW-1A-194	Low Rt. Flipper EOS
F2	A-17316	Low Rt. Flipper Cab.
F3	SW-1A-194	Low Lt. Flipper EOS
F4	A-17316	Low Lt. Flipper Cab.
F5	SW-1A-194	Up Rt. Flipper EOS
F6	A-17316	Up Rt. Flipper Cab.
F7	Not Used	Up Lt. Flipper EOS
F8	Not Used	Up LT. Flipper Cab.
11	20-9663-B-7	Launch Button
12	Not Used	Ticket Disp.
13	20-9663-14	Start Button
14	A-15361	Plumb/Tilt
15	5647-12693-32	Shooter Lane
16	A-18606-7	Up 3-Bnk Left Tgt.
18	A-18606-7	Up 3-Bnk Center Tgt.
18	A-18606-7	Up 3-Bnk Right Tgt.
21	A-17238	Slam
22	5643-09268-00	Door Closed
23	20-9663-18	Extra Ball Button
24	5643-09112-00	Always Closed
25	5647-12693-21	Machine Exit
26	A-17778-5	Up Left Single Tgt.
27	5647-12693-19	Left Lane Rollover
28	5647-12693-19	Inner Left Lane Rollover
31	A-18617 (LED) A-18618 (Trans)	Trough #1
32	A-18617 (LED) A-18618 (Trans)	Trough #2
33	A-18617 (LED) A-18618 (Trans)	Trough #3
34	A-18617 (LED) A-18618 (Trans)	Trough #4
35	A-18617 (LED) A-18618 (Trans)	Trough Jam
36	A-16908 (LED) A-16909 (Trans)	Ball Popper
37	5647-12693-36	Right Ramp Entrance
38	5647-12693-36	Left Ramp Entrance
41	A-19103	4-Bnk Drop Tgt. 1
42	A-19103	4-Bnk Drop Tgt. 2
43	A-19103	4-Bnk Drop Tgt. 3
44	A-19103	4-Bnk Drop Tgt. 4
45	A-13609	3-Bnk Drop Tgt. 1
46	A-13609	3-Bnk Drop Tgt. 2
47	A-13609	3-Bnk Drop Tgt. 3
48	5647-12693-19	Center Lane Rollover
51	A-18606-5 A-18605-5	Left 3-Bnk Bot. Tgts. Right 3-Bnk Bot. Tgts.
52	A-18605-5	Lt. & Rt. 3-Bnk Mid. Tgts.
53	A-18605-5	Lt. & Rt. 3-Bnk Up. Tgts.
54	A-17778-5	Lower Left Single Tgt.
55	A-17778-5	Right Single Tgt.
56	A-18607-6	Dictabird
57		Not Used
58		Not Used
61	SW-1A-114 (kick) SW-1A-120 (score)	Left Sling
62	SW-1A-114 (kick) SW-1A-120 (score)	Right Sling
63	SW-11A-37	Top Left Jet Bumper
64	SW-11A-37	Top Right Jet Bumper
65	SW-11A-37	Bottom Jet Bumper
66	5647-12693-19	Top Left Rollover "D"
67	5647-12693-19	Top Center Rollover "I"
68	5647-12693-19	Top Right Rollover "G"
71	5647-12693-19	Left Out Rollover
72	5647-12693-19	Left Return Rollover
73	5647-12693-19	Right Return Rollover
74	5647-12693-19	Right Out Rollover
75	5647-12693-19	Up. Rt. Lane Rollover



Item	Switch Number	Where Used
76	5647-12693-08	Up. Rt. Ln. Exit Rollover
77	5647-12693-21	Right Ramp Exit
78	5647-12693-17	Left Ramp Exit
81 to 88		Not Used

Solenoid/Flashlamp Circuit

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire	Solenoid Part Number / Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	Ball Trough	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-26-1500	
02	Ball Shooter	High Power	J107-2			Q80	J130-2			Vio-Red	AE-23-800	
03	Top Diverter Post	High Power	J107-2			Q78	J130-4			Vio-Org	AE-27-1200	
04	Top Popper	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-23-800	
05	3-Bank Drop Reset	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-26-1200	
06	4-Bank Drop Reset	High Power	J107-2			Q66	J130-7			Vio-Blu	AE-24-900	
07	Knocker	High Power		J107-2		Q68		J130-8		Vio-Blk		AE-23-800
08	Top Diverter	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-27-1200	
09	Right Sling	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	
10	Left Sling	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	
11	Left Jet Bumper	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-26-1200	
12	Middle Jet Bumper	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1200	
13	Right Jet Bumper	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1200	
14	Dictabird	Low Power	J107-3			Q48	J127-7			Brn-Blu	AE-28-1500	
15	Lower Lt. Diverter	Low Power	J107-3			Q46	J127-8			Brn-Vio	AE-27-1200	
16	Lower Rt. Diverter	Low Power	J107-3			Q44	J127-9			Brn-Gry	AE-27-1200	
17	Under Lt. Rmp Fls.	Low Power	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#89 (1)	#906 (2)
18	Under Rt. Rmp Fls.	Flasher	J107-6	J106-5		Q40	J126-2	J125-2		Blk-Red	#89 (1)	#906 (2)
19	Flintstones Fls.	Flasher	J107-6	J106-5		Q38	J126-3	J125-3		Blk-Org	#906 (1)	#906 (2)
20	Popper Rmp Fls.	Flasher	J107-6	J106-5		Q36	J126-4	J125-5		Blk-Yel	#89 (2)	#906 (2)
21	Dino Slide Fls.	Flasher	J107-6	J106-5		Q28	J126-5	J125-6		Blu-Grn	#89 (1)	#906 (2)
22	Bowl-O-Rama Fls.	Flasher	J107-6			Q30	J126-6			Blu-Blk	#89(1)#906(1)	
23	Boulder Machine	Motor	J118-2			Q34	J126-7			Blu-Vio	14-7999	
24	Boulder Machine Fls	Flasher	J107-6			Q32	J126-8			Blu-Gry	#89 (1)	
25	Dig Millions Fls.	Gen. Purpose	J107-6			Q26	J122-1			Blu-Brn	#89 (1)	
26	Flint Fls.	Gen. Purpose		J106-5		Q24		J124-2		Blu-Red		#906 (3)
27	Stones Fls.	Gen. Purpose		J106-5		Q22		J124-3		Blu-Org		#906 (3)
28	Fred's Choice Fls.	Gen. Purpose	J107-6			Q20	J122-4			Blu-Yel	#906 (2)	
29-36	See Flipper Circuits											
37*	Not Used	Low Power				Q16				Brn-Wht		
38*	Not Used	Low Power				Q15				Blk-Wht		
39*	Not Used	Low Power				Q14				Org-Wht		
40*	Not Used	Low Power				Q13				Yel-Wht		
41*	Not Used	Low Power				Q9				Grn-Wht		
42*	Not Used	Low Power				Q10				Blu-Wht		
43*	Not Used	Low Power				Q11				Vio-Wht		
44*	Not Used	Low Power				Q12				Gry-Wht		
	General Illumination											
01	Machine Lighting	G.I.		J120-1		Q18		J120-7		Wht-Brn		#555
02	Flintstones Logo	G.I.	J121-2	J120-2		Q10	J121-8	J120-8		Wht-Org	#44	#555
03	Up Pfld & Insrt Pan.	G.I.	J121-3	J120-3		Q14	J121-9	J120-9		Wht-Yel	#44	#555
04	Mid Pfld & Insrt Pan.	G.I.	J121-5	J120-5		Q16	J121-10	J120-10		Wht-Grn	#44	#555
05	Low Pfld & Insrt Pan.	G.I.	J121-6		J119-3	Q12	J121-11		J119-1	Wht-Vio	#44	

	Flipper Circuits		Voltage Connection	Drive Transistor Power	Drive Transistor Hold	Drive Connection Playfield	Drive Wire Power	Drive Wire Hold	Coil Part Number	Coil Colors
29	Lower Right Flipper	Power	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn		FL-11629	BLUE
30		Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn		
31	Lower Left Flipper	Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu		FL-11629	BLUE
32		Hold	J907-4 (Red-Blu		Q9	J902-7		Org-Blu		
33	Upper Right Flipper	Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio		FL-11629	BLUE
34		Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio		
35	Top Rt. Up/Dn Gate	Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry		A-14406	
36	Top Lt. Up/Dn Gate	Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	A-14406	

Solenoid/Flasher Locations

Item	Coil/Flasher Number	Assembly Number	Description
01	AE-26-1500	A-18753	Ball Trough
02	AE-23-800	A-14525	Ball Shooter
03	AE-27-1200	A-17932	Top Diverter Post
04	AE-23-800	A-15769-1	Top Popper
05	AE-26-1200	A-18825	3-Bnk Drop Reset
06	AE-24-900	A-18812	4-Bnk Drop Reset
07	AE-23-800	B-10686-1	Knocker
08	AE-27-1200	A-18369	Top Diverter
09	AE-26-1200	B-9362-R-3	Right Sling
10	AE-26-1200	B-9362-L-2	Left Sling
11	AE-26-1200	A-9415-2	Left Jet Bumper
12	AE-26-1200	A-9415-2	Middle Jet Bumper
13	AE-26-1200	A-9415-2	Right Jet Bumper
14	AE-28-1500	A-18078	Dictabird
15	AE-27-1200	A-19097-2	Lower Left Diverter
16	AE-27-1200	A-19097-1	Lower Right Diverter
17	24-8704	A-17983	Under Lt. Ramp Fls. #89
	24-8802	-----	Insert Flasher #906
18	24-8704	A-17983	Under Rt. Ramp Fls. #89
	24-8802	-----	Insert Flasher #906
19	24-8802	A-17802	Flintstones Fls. #906
	24-8802	-----	Insert Flasher #906
20	24-8704	A-17983	Popper Wire Rmp Fls. #89
	24-8802	-----	Insert Flasher #906
21	24-8704	A-17803	Dino Slide Fls. #89
	24-8802	-----	Insert Flasher #906
22	24-8704/24-8802	A-17803/A-17802	Bowl-O-Rama Fls. #89/#906
23	14-7999	A-17978	Boulder Motor
24	24-8704	A-17983	Boulder Machine Fls. #89
25	24-8704	A-17803	Dig Millions Fls. #89
26	24-8802	-----	Flint Fls. #906
27	24-8802	-----	Stones Fls. #906
28	24-8802	-----	Fred's Choice Fls. #906

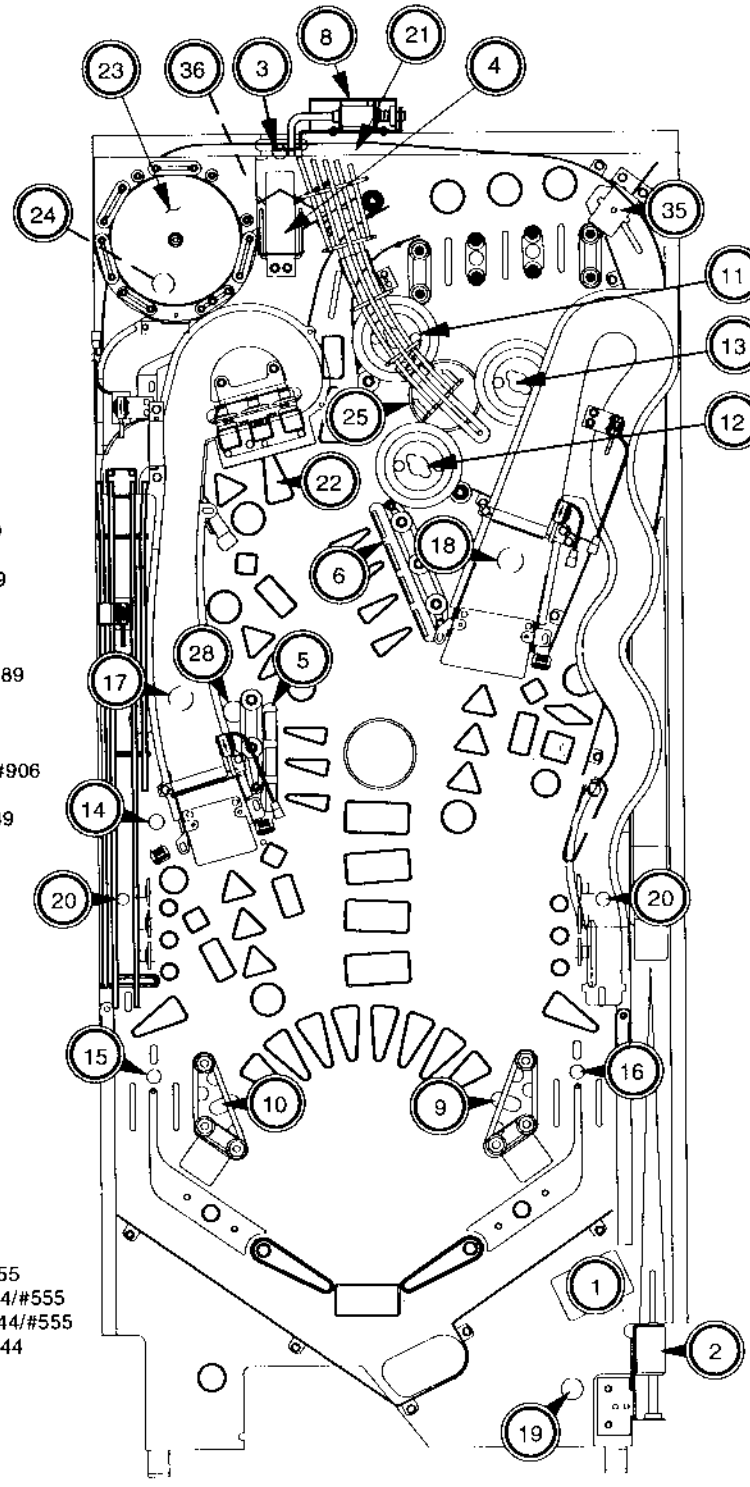
FLIPPER CIRCUITS

29-30	FL-11629	A-15849-R-2	Lower Right Flipper
31-32	FL-11629	A-15849-L-2	Lower Left Flipper
33-34	FL-11629	A-15849-R-2	Upper Right Flipper
35	A-14406	A-17796	Top Rt. Up/Dn Gate
36	A-14406	A-17796	Top Lt. Up/Dn Gate

37-44 Not Used

GENERAL ILLUMINATION

01	24-8768	-----	Machine Lighting#555
02	24-6549/24-8768	-----	Flintstones Logo#44/#555
03	24-6549/24-8768	-----	Up. Plfd. & Insrt Pan.#44/#555
04	24-6549/24-8768	-----	Mid. Plfd. & Insrt Pan.#44/#555
05	24-6549	-----	Low. Plfd. & Insrt Pan.#44

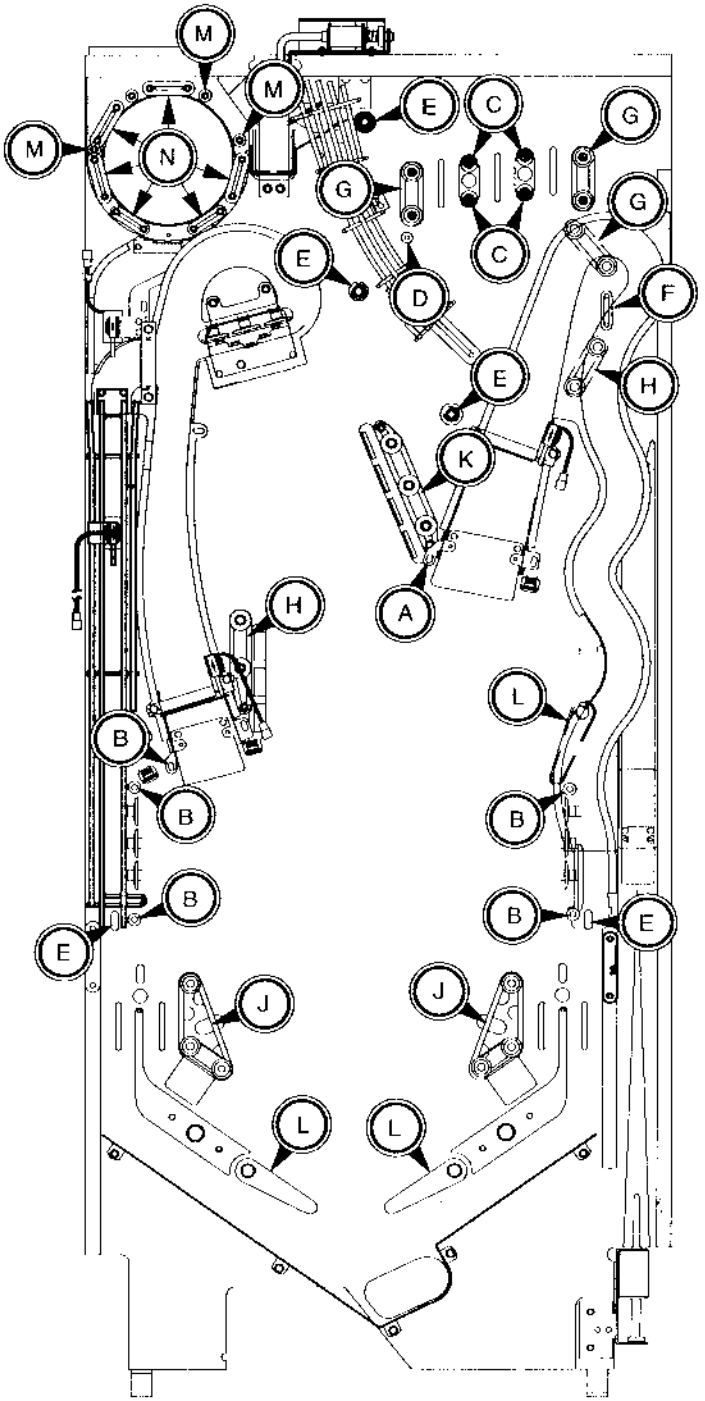


Rubber Rings

Item	Part Number	Description	Quantity
A	23-6552	Yellow Rubber Bumper Sleeve	1
B	23-6556	Black Rubber Bumper Sleeve	5
C	23-6641	Black Rubber Bumpers	4
D	23-6694-1	Black Rubber Ring 3/32"	1
E	23-6694-3	Black Rubber Ring 5/16"	7
F	23-6694-5	Black Rubber Ring 3/4"	2
G	23-6694-6	Black Rubber Ring 1"	4
H	23-6694-8	Black Rubber Ring 1-1/2"	4
J	23-6694-9	Black Rubber Ring 2"	2
K	23-6694-10	Black Rubber Ring 2-1/2"	2
L	23-6695	Black Flipper Rubber Ring	3

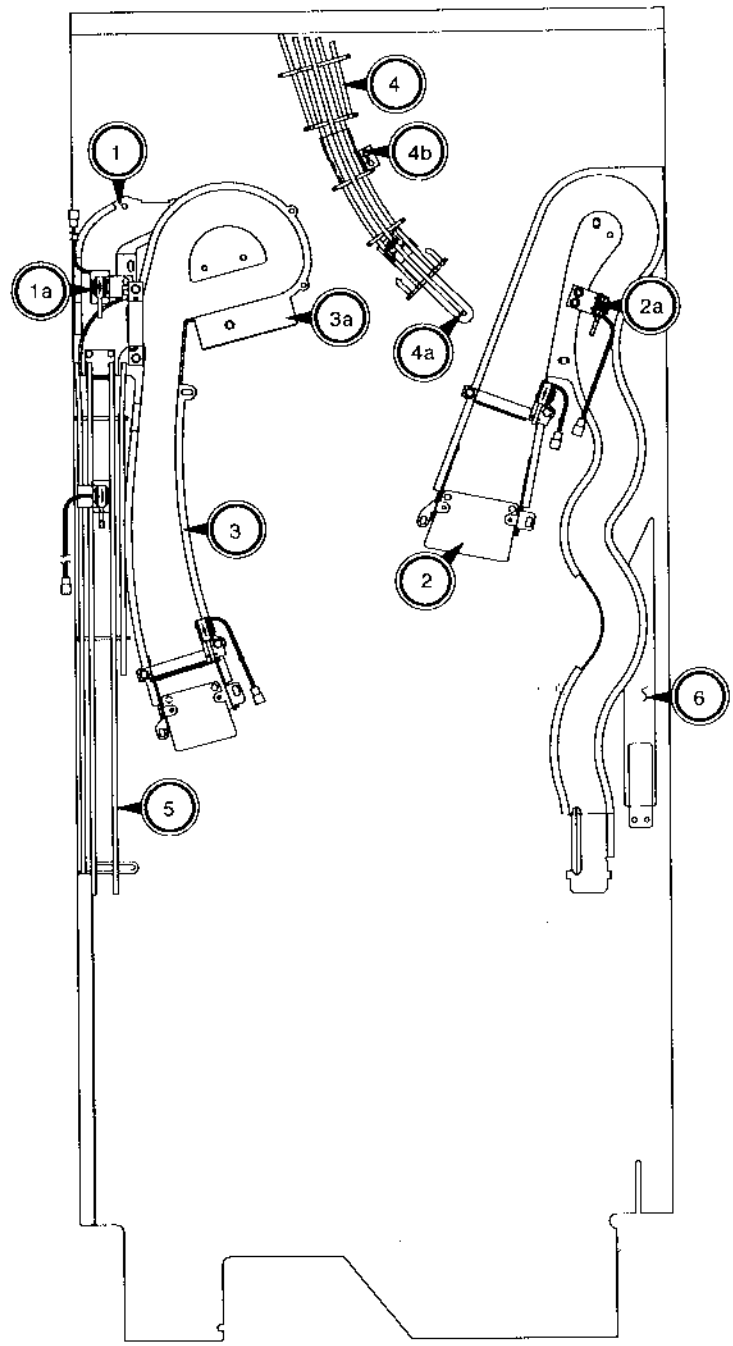
Motor and Bracket Assembly

Item	Part Number	Description	Quantity
M	23-6556	Black Rubber Bumper Sleeve	3
N	23-6694-5	Black Rubber Ring 3/4"	12



Ramps

Item	Part No.	Description
1.	A-18566	Ramp & Switch Assembly
a)	A-18380-1	Switch Assembly
2.	A-18130	Ramp Assembly
a)	A-18380-2	Switch Assembly
3.	A-18131	Ramp Assembly
a)	A-18389	PCB & Bracket Assembly
4.	A-18239	Ramp Assembly
a)	01-12670	Plate, .005 Tongue
b)	01-13032	Lock-Bronto Crane
5.	A-18154	Ramp Assembly
6.	A-17912	Ramp Assembly



Notes

SECTION 3

Schematics, Wiring Diagrams, and Circuit Theory

CONNECTOR & COMPONENT IDENTIFICATION

Each plug or jack - except the Audio board and the Dot Matrix Display/Driver board - receives a number that identifies the circuit board and the position on that board that it connects to. J-designations refer to the male part of a connector. P-designations refer to the female part of a connector. For example, J101 designates jack 1 of board 1 (a Power Driver board jack); P206 designates plug 6 of board 2 (a CPU 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, J101-3 refers to pin 3 of jack 1 on board 1.

Prefix numbers for WPC circuit boards are listed below.
1 - Power Driver board
2 - CPU board
6 - Dot Matrix Controller board
9 - Fliptronic II Controller board
Audio board and Dot Matrix Display/Driver board do not have identification numbers.

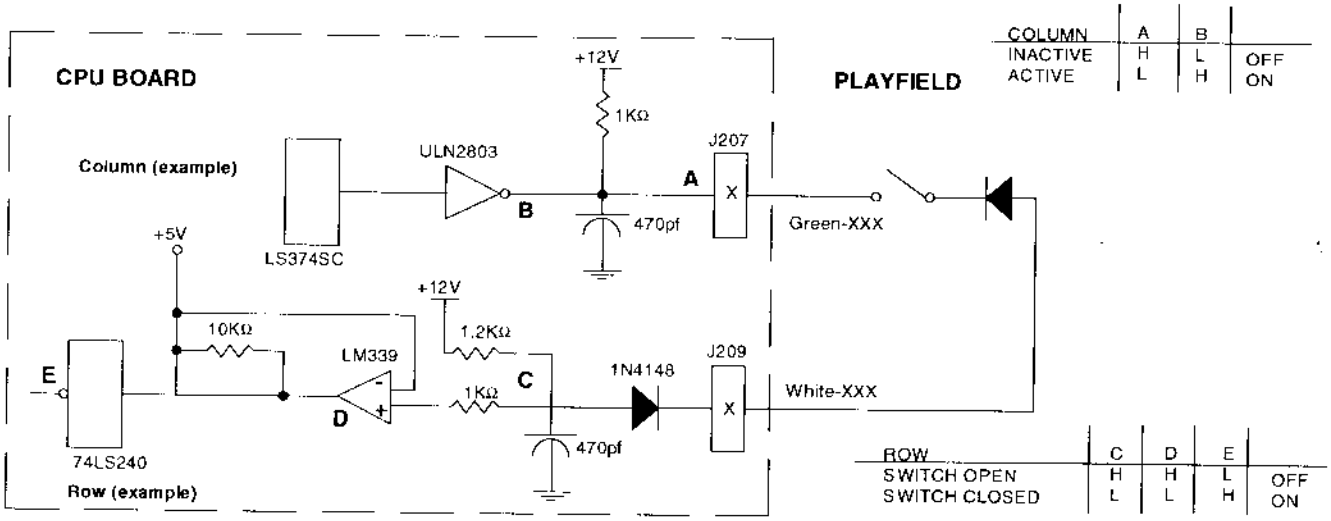
Other game components may also have similar numbers to clarify their locations or related circuits. For example, F501 refers to a fuse located on the Audio board.

Schematics for standard WPC backbox boards are found in the WPC Schematics Manual. Playfield, cabinet, and all other backbox board schematics are found in this section.

SWITCH CIRCUIT

Dedicated Grounded Switches	COLUMN / ROW	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute D1	White-Brown J209-1 U18-11 1	Launch Button 11	Slam 21	Trough #1 31	4-Bnk #1 D.Tgt. 41	Lt. & Rt. 3-Bnk. Bot. Tgt. 51	Lt. Sling 61	Lt. Out Rollover 71	Not Used 81	Black-Green J906-1 Lower Right E.O.S. F1
Orange-Red J205-2 Center Coin Chute D2	White-Red J209-2 U18-9 2	Ticket Disp. 12	Door Closed 22	Trough #2 32	4-Bnk #2 D. Tgt. 42	Lt. & Rt. 3-Bnk Mid. Tgt 52	Rt. Sling 62	Lt. Return Rollover 72	Not Used 82	Blue-Violet J905-1 Lower Right Opto F2
Orange-Black J205-3 Right Coin Chute D3	White-Orange J209-3 U18-5 3	Start Button 13	Extra Ball Button 23	Trough #3 33	4-Bnk #3 D. Tgt. 43	Lt. & Rt. 3-Bnk Up. Tgt 53	Top Lt. Jet 63	Rt. Return Rollover 73	Not Used 83	Black-Blue J906-3 Lower Left E.O.S F3
Orange-Yellow J205-4 4th Coin Chute D4	White-Yellow J209-4 U18-7 4	Plumb Tilt 14	Always Closed 24	Trough #4 34	4-Bnk #4 D. Tgt. 44	Low. Lt. Sngl. Tgt. 54	Top Rt. Jet 64	Rt. Out Rollover 74	Not Used 84	Blue-Gray J905-2 Lower Left Opto F4
Orange-Green J205-6 Normal Service Credit Test Escape D5	White-Green J209-4 U19-11 5	Shooter Lane 15	"Machine" Exit 25	Trough Jam 35	3-Bnk #1 D. Tgt. 45	Rt. Sngl. Tgt. 55	Bottom Jet 65	Up. Rt. Lane Rollover 75	Not Used 85	Black-Violet J906-4 Upper Right E.O.S. F5
Orange-Blue J205-7 Normal Vol. Dn Test Down D6	White-Blue J209-7 U19-9 6	Upper 3-Bnk Lt. Tgt. "I" 16	Upper Lt. Sngl. Tgt. 26	Ball Popper 36	3-Bnk #2 D. Tgt. 46	Dicta-Bird Tgt. 56	Top Lt. Rollover "D" 66	Up. Rt. Lane Exit Rollover 76	Not Used 86	Black-Yellow J905-3 Upper Right Opto F6
Orange-Violet J205-8 Normal Vol. Up Test Up D7	White-Violet J209-8 U19-5 7	Upper 3-Bnk Cr. Tgt. "X" 17	Lt. Lane Rollover 27	Rt. Ramp Enter 37	3-Bnk #3 D. Tgt. 47	Not Used 57	Top Cr. Rollover "I" 67	Rt. Ramp Exit 77	Not Used 87	Black-Gray J906-5 Upper Left E.O.S. F7
Orange-Gray J205-9 Normal Beg. Test Test Enter D8	White-Gray J209-9 U19-7 8	Upper 3-Bnk Rt. Tgt. "I" 18	In. Lt. Lane Rollover 28	Lt. Ramp Enter 38	Cr. Lane Rollover 48	Not Used 58	Top Rt. Rollover "G" 68	Lt. Ramp Exit 78	Not Used 88	Black-Blue J905-5 Upper Left Opto F8

SWITCH MATRIX CIRCUIT



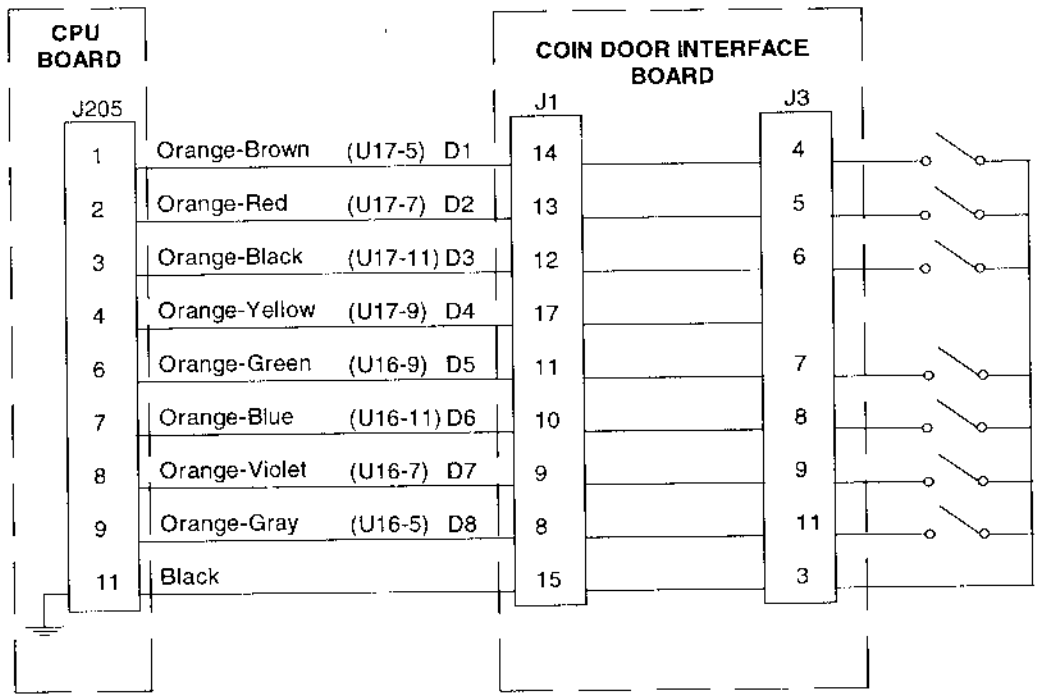
COLUMN	A	B	
INACTIVE	H	L	OFF
ACTIVE	L	H	ON

ROW	C	D	E	
SWITCH OPEN	H	H	L	OFF
SWITCH CLOSED	L	L	H	ON

The microprocessor is constantly strobing the column side of the switch. When point "A" on the column circuit toggles low, the column side is active.

When a switch closes the row side of the circuit activates. The "+" input to the LM339 drops below +5V, therefore, its output is low. Corresponding row and column switches must be low at the same time for the switch to be considered closed by the microprocessor. When the switch opens, the "+" input to the LM339 is above +5V, its output is high and the row is inactive.

DEDICATED SWITCHES

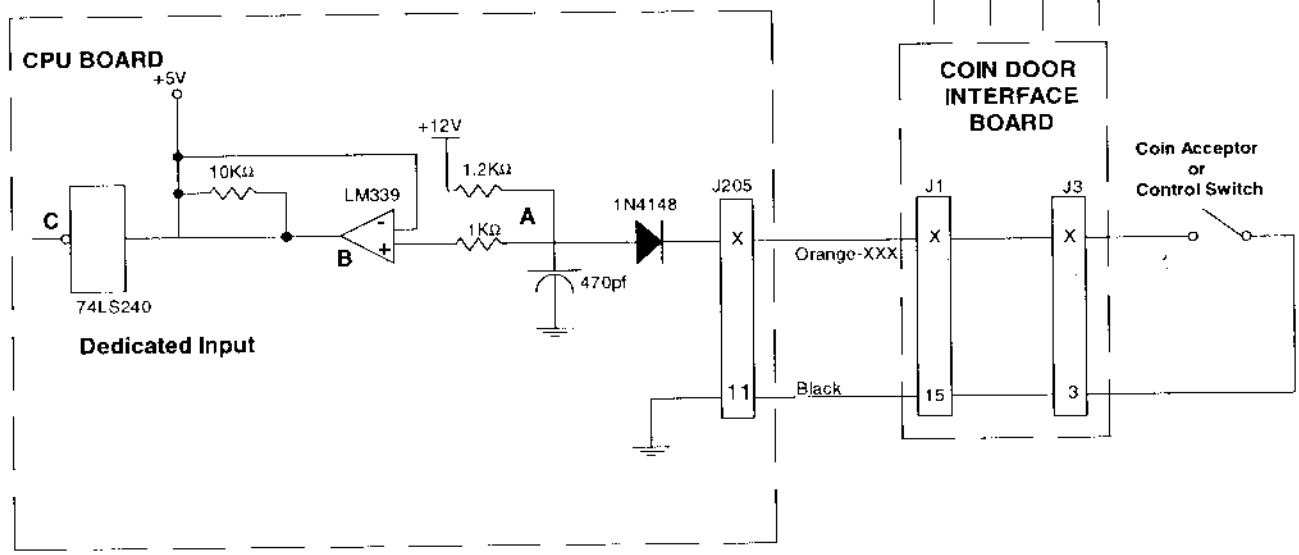


Coin Acceptor Switches
D1 - Left Coin Chute
D2 - Center Coin Chute
D3 - Right Coin Chute
D4 - Forth Coin Chute

Control Switches
D5 - Normal Function, Service Credits; Test Function, Escape
D6 - Normal Function, Volume Down; Test Function, Down
D7 - Normal Function, Volume Up; Test Function, Up
D8 - Normal Function, Begin Test; Test Function, Enter

DEDICATED SWITCH CIRCUIT

SWITCH	A	B	C	
OPEN	H	H	L	OFF
CLOSED	L	L	H	ON



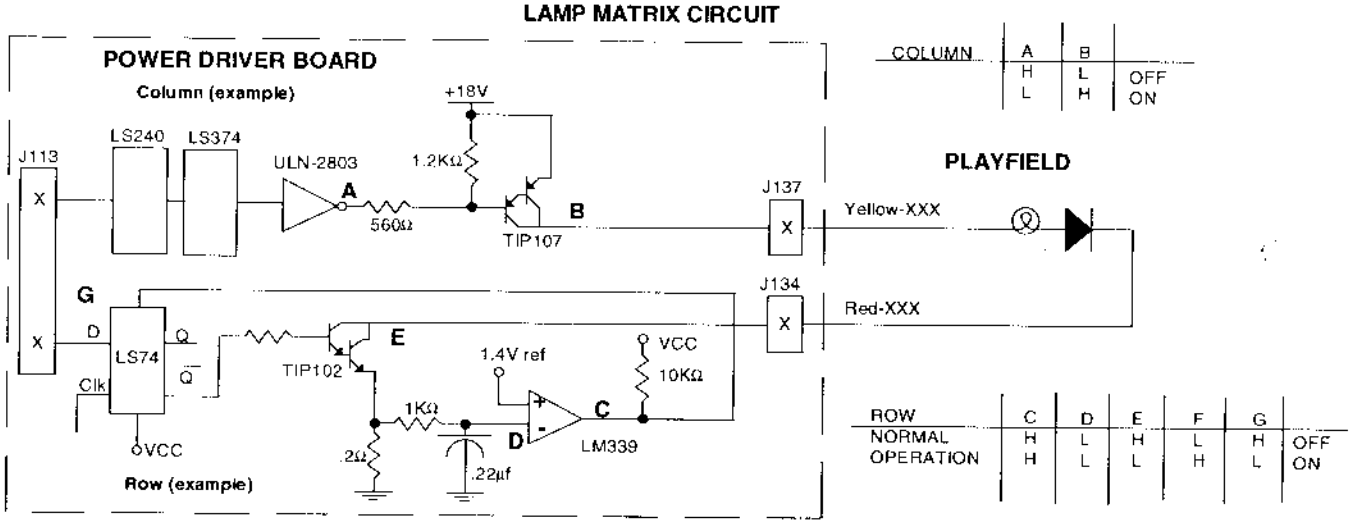
The dedicated switches operate similar to switches in the matrix, except that instead of a column circuit there is a direct tie to ground. Therefore, the column side is constantly active (low).

When a switch closes, the row side (dedicated input) of the circuit activates. The "+" input to the LM339 drops below +5V, therefore the output is low. Since the row circuit (dedicated input) is tied directly to ground through the switch, the switch is considered closed by the microprocessor. When the switch opens, the "+" input to the LM339 is above +5V, its output is high and the row is inactive.

LAMP CIRCUIT

COLUMN / ROW	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-5 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J137-7 Q92	8 Yellow-Gray J137-9 Q91
Red-Brown J134-1 Q90 1	Top Lt. Rollover "D" 11	Upper 3-Bnk Lt. Tgt. 21	"C" 31	Bottom "Drain Savers" 41	Lt. "Bowling" 51	Lower Lt. "Start Job Change" 61	Rt. "Dino" 71	Upper Lt. "Frenzy" 81
Red-Black J134-2 Q89 2	Top Mid. Rollover "I" 12	Upper 3-Bnk Cr. Tgt. 22	"O" 32	3-Bnk D. Tgt. "B" 42	Lt. & Rt. 3-Bnk Upper Tgt. 52	Lower Lt. "Help" 62	Lt. & Rt. Machine Time 72	Upper Lt. "Dino" 82
Red-Orange J134-4 Q88 3	Top Rt. Rollover "G" 13	Upper 3-Bnk Rt. Tgt. 23	"N" 33	3-Bnk D. Tgt. "E" 43	Lower Lt. "Frenzy" 53	Lt. & Rt. 3-Bnk Mid. Tgt. 63	Rt. Combo "2" 73	Lt. Lane "Bronto Crane" 83
Red-Yellow J134-5 Q87 4	Mystery Mode "?" 14	Cr. Lane "Extra Ball" 24	"C" 34	3-Bnk D. Tgt. "D" 44	Lower Lt. "Dino" 54	Lt. & Rt. 3-Bnk Lower Tgt. 64	Rt. Combo "3" 74	Lt. "Search" 84
Red-Green J134-6 Q86 5	Fred's Choice 15	Cr. Lane "Search" 25	"R" 35	4-Bnk D. Tgt "R" 45	Lt. Combo "3" 55	Cr. "Jackpot" 65	Rt. Combo "1" 75	Rt. Lane "Job Change" 85
Red-Blue J134-7 Q85 6	"Eat at Joe's" Diner 16	Cr. Lane "Drive Thru" 26	"E" 36	4-Bnk D. Tgt. "O" 46	Lt. Combo "2" 56	Shoot Again 66	Rt. "Bowling" 76	Lt. & Rt. Lane "Start Multiball" 86
Red-Violet J134-8 Q84 7	Bedrock Water Buffalo 17	Lt. Inner Lane "Super Jackpot" 27	"T" 37	4-Bnk D. Tgt. "C" 47	Lt. Combo "1" 57	Lt. "X" On Lt. Ramp 67	Rt. "Frenzy" 77	Buy-In 87
Red-Gray J134-9 Q83 8	Dino Frenzy 18	Lt. Inner Lane "Pfld 2X" 28	"E" 38	4-Bnk D. Tgt. "K" 48	Lower Lt. "Start Machine" 58	Rt. "X" On Lt. Ramp 68	Rt. "Search" 78	Start Button 88

LAMP MATRIX CIRCUIT



The processor sends a signal to the column circuit causing the output of the UNL-2803 to toggle. When point "A" drops low, the TIP107 transistor conducts and point "B" changes to a high state. At the same time, the processor drives the input of the 74LS74 low, causing a high at output "F". A high state at the base of TIP102 causes the transistor to conduct, bringing the row circuit to ground and turning the lamp on.

The processor changes the input of the 74LS74 to a high state to turn the lamp off.

In overcurrent conditions, the lamp is shut off through the comparator. If the voltage at the negative input of the LM339 rises above 1.4V, the output changes to a low, which is fed back to the 74LS74 and shuts the row circuit off.

SOLENOID/FLASHLAMP CIRCUIT

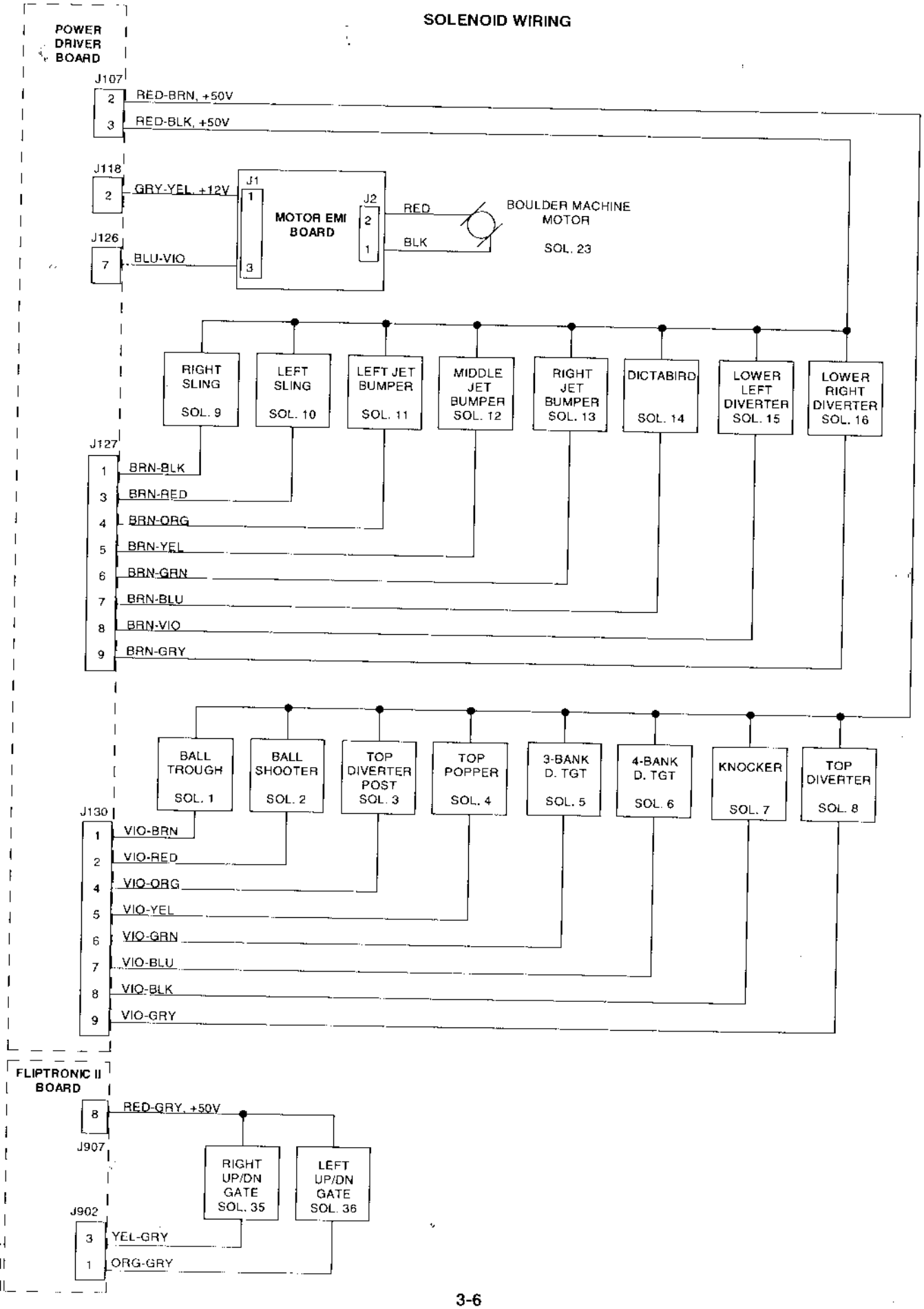
Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire	Solenoid Part Num / Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Back
01	Ball Trough	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-26-1500	
02	Ball Shooter	High Power	J107-2			Q80	J130-2			Vio-Red	AE-23-800	
03	Top Diverter Post	High Power	J107-2			Q78	J130-4			Vio-Org	AE-27-1200	
04	Top Popper	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-23-800	
05	3-Bank Drop Reset	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-26-1200	
06	4-Bank Drop Reset	High Power	J107-2			Q66	J130-7			Vio-Blu	AE-24-900	
07	Knocker	High Power		J107-2		Q68		J130-8		Vio-Blk		AE-2
08	Top Diverter	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-27-1200	
09	Right Sling	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	
10	Left Sling	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	
11	Left Jet Bumper	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-26-1200	
12	Middle Jet Bumper	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1200	
13	Right Jet Bumper	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1200	
14	Dictabird	Low Power	J107-3			Q48	J127-7			Brn-Blu	AE-28-1500	
15	Lower Lt. Diverter	Low Power	J107-3			Q46	J127-8			Brn-Vio	AE-27-1200	
16	Lower Rt. Diverter	Low Power	J107-3			Q44	J127-9			Brn-Gry	AE-27-1200	
17	Under Lt. Rmp Fls.	Low Power	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#89 (1)	#906
18	Under Rt. Rmp Fls.	Flasher	J107-6	J106-5		Q40	J126-2	J125-2		Blk-Red	#89 (1)	#906
19	Flintstones Fls.	Flasher	J107-6	J106-5		Q38	J126-3	J125-3		Blk-Org	#906 (1)	#906
20	Popper Rmp Fls.	Flasher	J107-6	J106-5		Q36	J126-4	J125-5		Blk-Yel	#89 (2)	#906
21	Dino Slide Fls.	Flasher	J107-6	J106-5		Q28	J126-5	J125-6		Blu-Grn	#89 (1)	#906
22	Bowl-O-Rama Fls.	Flasher	J107-6			Q30	J126-6			Blu-Blk	#89(1)#906(1)	
23	Boulder Machine	Motor	J118-2			Q34	J126-7			Blu-Vio	14-7999	
24	Boulder Machine Fls	Flasher	J107-6			Q32	J126-8			Blu-Gry	#89 (1)	
25	Dig Millions Fls.	Gen. Purpose	J107-6			Q26	J122-1			Blu-Brn	#89 (1)	
26	Flint Fls.	Gen. Purpose		J106-5		Q24		J124-2		Blu-Red		#906
27	Stones Fls.	Gen. Purpose		J106-5		Q22		J124-3		Blu-Org		#906
28	Fred's Choice Fls.	Gen. Purpose	J107-6			Q20	J122-4			Blu-Yel	#906 (2)	
29-36	See Flipper Circuits											
37*	Not Used	Low Power				Q16				Brn-Wht		
38*	Not Used	Low Power				Q15				Blk-Wht		
39*	Not Used	Low Power				Q14				Org-Wht		
40*	Not Used	Low Power				Q13				Yel-Wht		
41*	Not Used	Low Power				Q9				Grn-Wht		
42*	Not Used	Low Power				Q10				Blu-Wht		
43*	Not Used	Low Power				Q11				Vio-Wht		
44*	Not Used	Low Power				Q12				Gry-Wht		
	General Illumination											
01	Machine Lighting	G.I.		J120-1		Q18		J120-7		Wht-Brn		#555
02	Flintstones Logo	G.I.	J121-2	J120-2		Q10	J121-8	J120-8		Wht-Org	#44	#555
03	Up Plfd & Insrt Pan	G.I.	J121-3	J120-3		Q14	J121-9	J120-9		Wht-Yel	#44	#555
04	Mid Plfd & Insrt Pan	G.I.	J121-5	J120-5		Q16	J121-10	J120-10		Wht-Grn	#44	#555
05	Low Plfd & Insrt Pan	G.I.	J121-6		J119-3	Q12	J121-11		J119-1	Wht-Vio	#44	

	Flipper Circuits		Voltage Connection	Drive Transistor Power	Drive Transistor Hold	Drive Connection Playfield	Drive Wire Power	Drive Wire Hold	Coil Part Number	Coi Col
29		Power	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn		FL-11629	B
30	Lower Right Flipper	Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn		
31		Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu		FL-11629	B
32	Lower Left Flipper	Hold	J907-4 (Red-Blu		Q9	J902-7		Org-Blu		
33		Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio		FL-11629	B
34	Upper Right Flipper	Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio		
35	Top Rt. Up/Dn Gate	Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry		A-14406	
36	Top Lt. Up/Dn Gate	Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	A-14406	

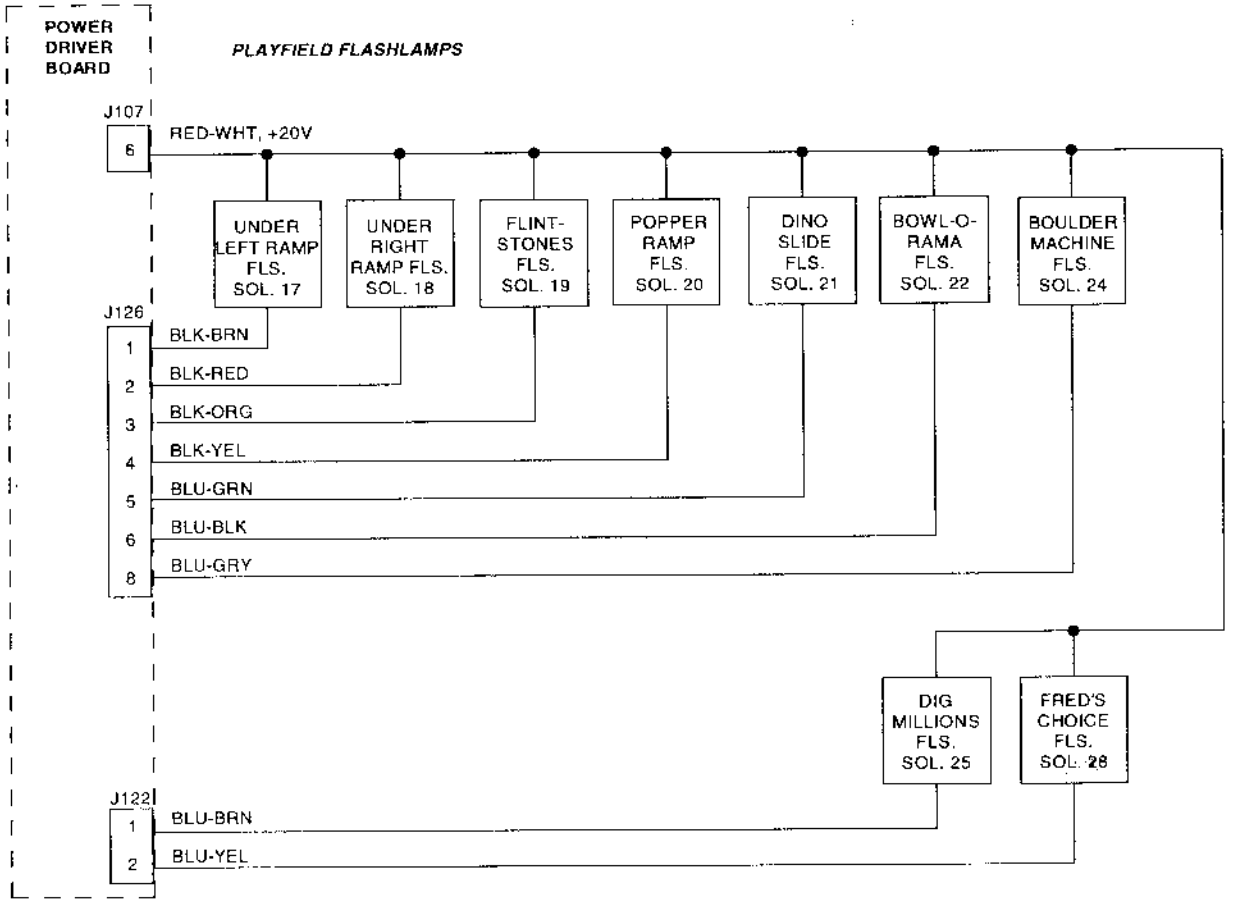
J1XX-X = POWER DRIVER BOARD, JX-X =8-DRIVER BOARD, J9XX-X =FLIPTRONIC II BOARD

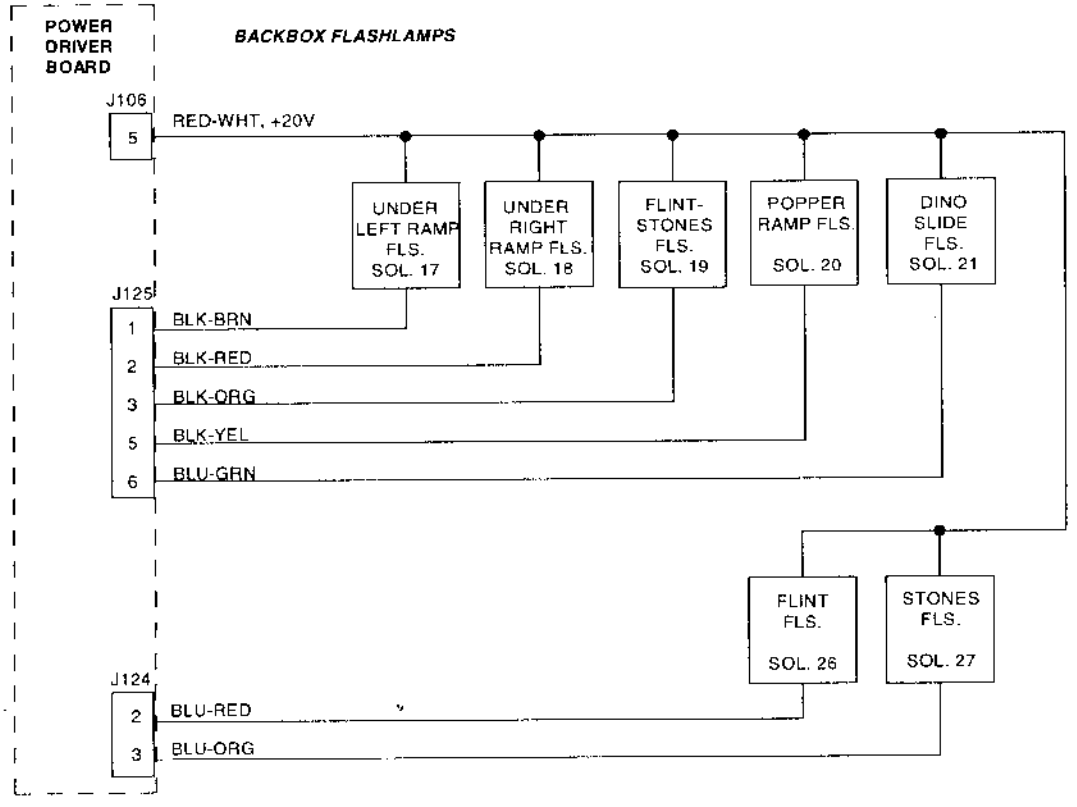
PLEASE NOTE: IN THIS GAME, THE UPPER RIGHT FLIPPER CIRCUIT IS USED TO DRIVE THE LEFT & RIGHT UP/DOWN GATES.

SOLENOID WIRING

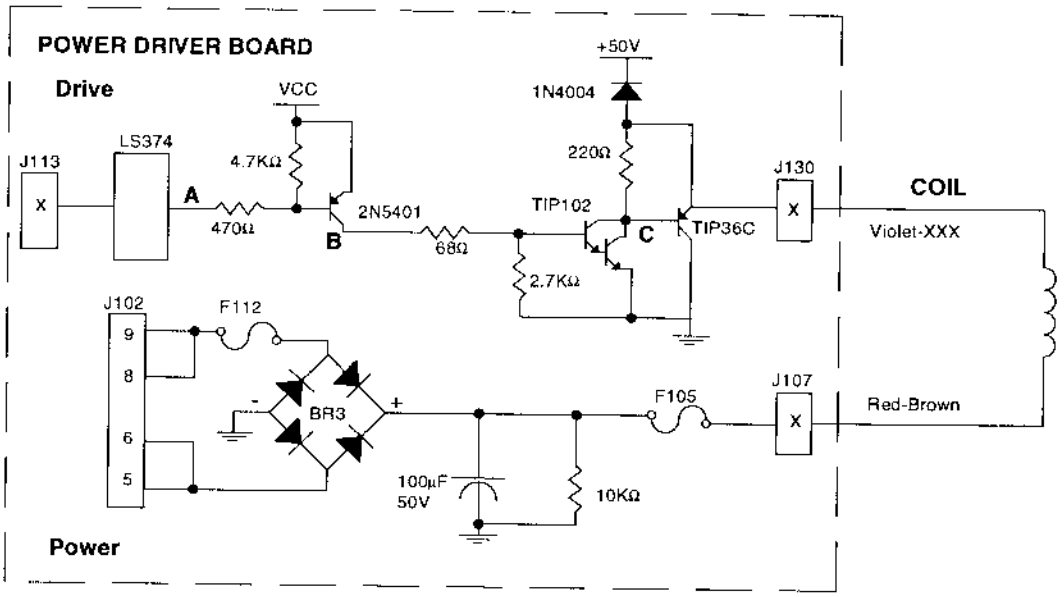


FLASHLAMP WIRING



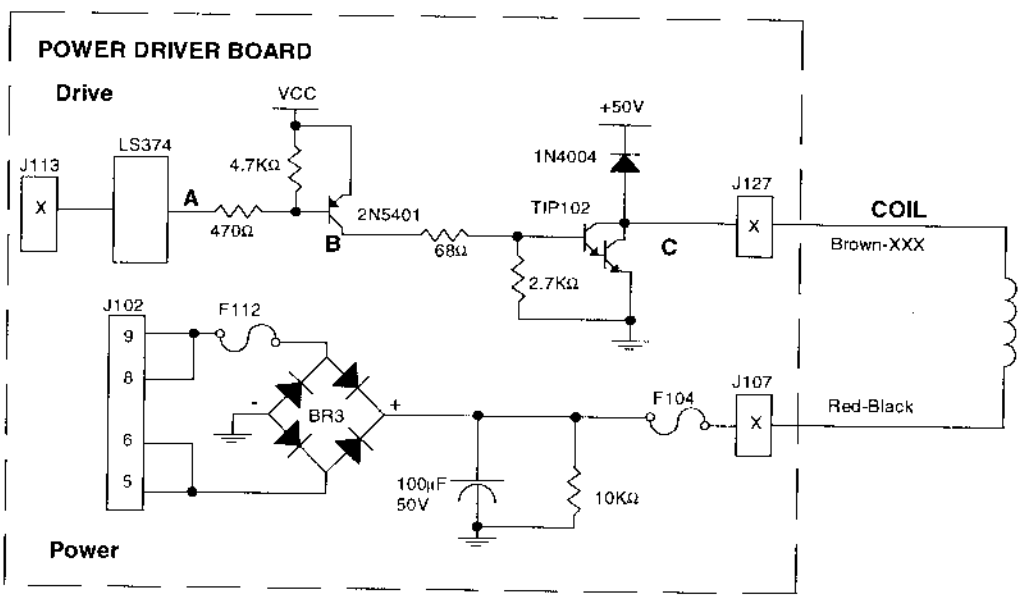


HIGH POWER SOLENOID CIRCUIT



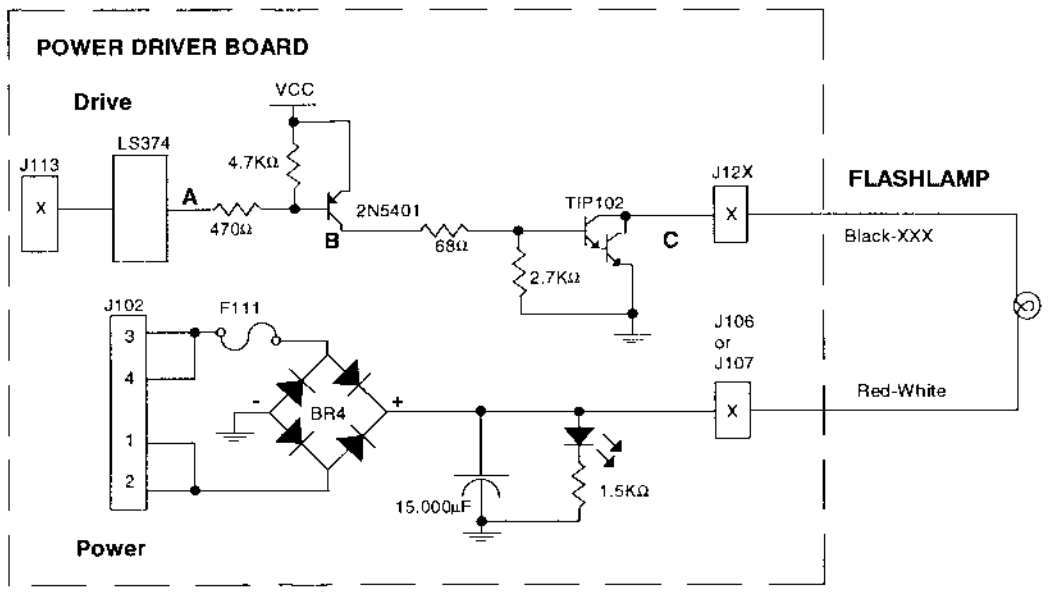
The processor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor, is high. A high at point "B" causes point "C", the collector of the TIP102 transistor, and point "D", the emitter of the TIP36C transistor, to drop low. When point "D" is low, the coil is grounded through the transistor and turns on. The coil shuts off when point "A" toggles high.

LOW POWER SOLENOID CIRCUIT



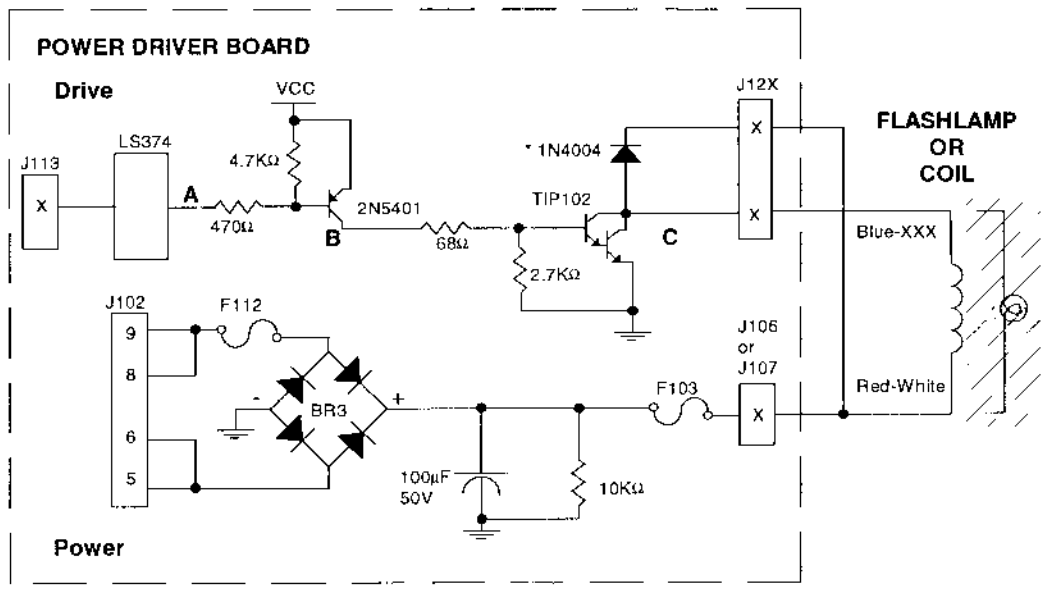
The processor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor, is high. A high at point "B" turns on the TIP102 transistor and causes point "C" to drop low. When point "C" is low the coil is grounded through the transistor and turns on. The coil shuts off when point "A" toggles high.

FLASHLAMP CIRCUIT



The processor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor, is high. Once point "B" is high, point "C" the collector of the TIP102 transistor is low. When point "C" is low, the flashlamp is grounded through the transistor and turns on. When point "A" toggles high, the circuit shuts off.

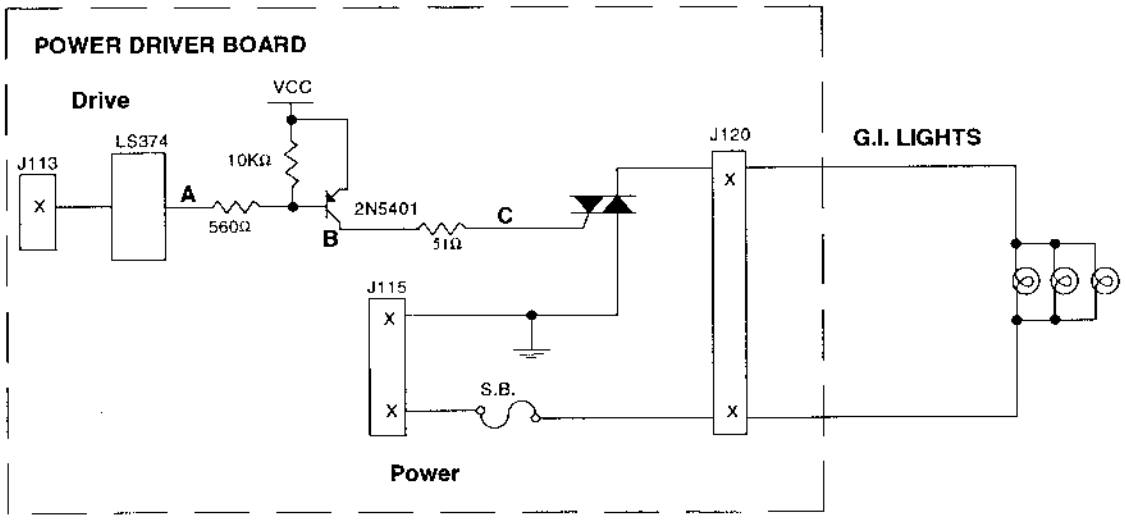
SPECIAL (GENERAL PURPOSE) SOLENOID CIRCUIT



The processor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor, is high. A high at point "B" causes a low at point "C". When point "C" is low the coil/flashlamp is grounded through the transistor and turns on. When point "A" toggles high the coil/flashlamp turns off.

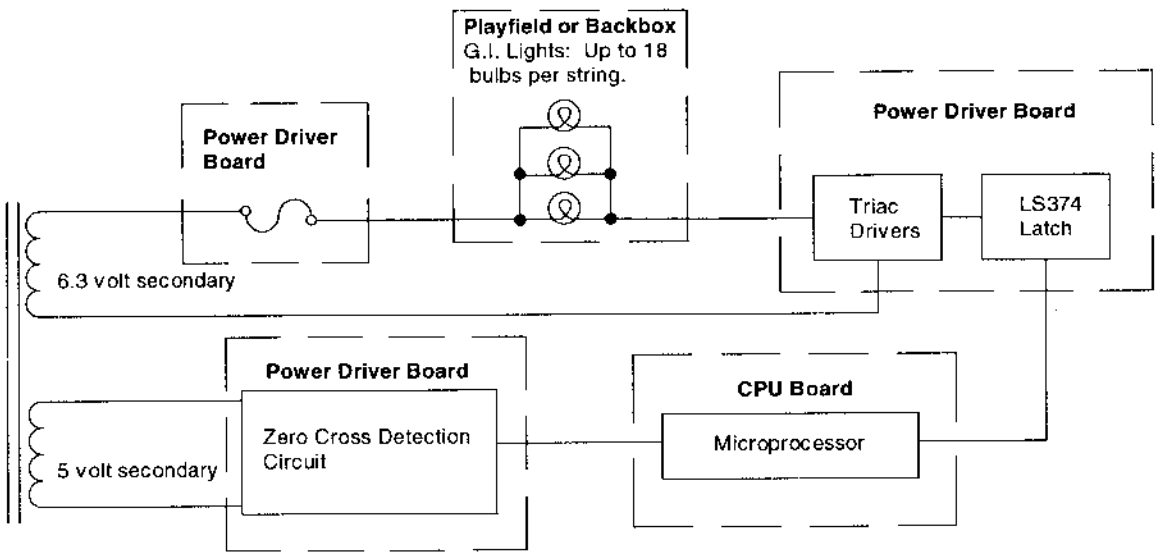
* Tieback diode is not used for flashlamp circuit.

GENERAL ILLUMINATION CIRCUIT

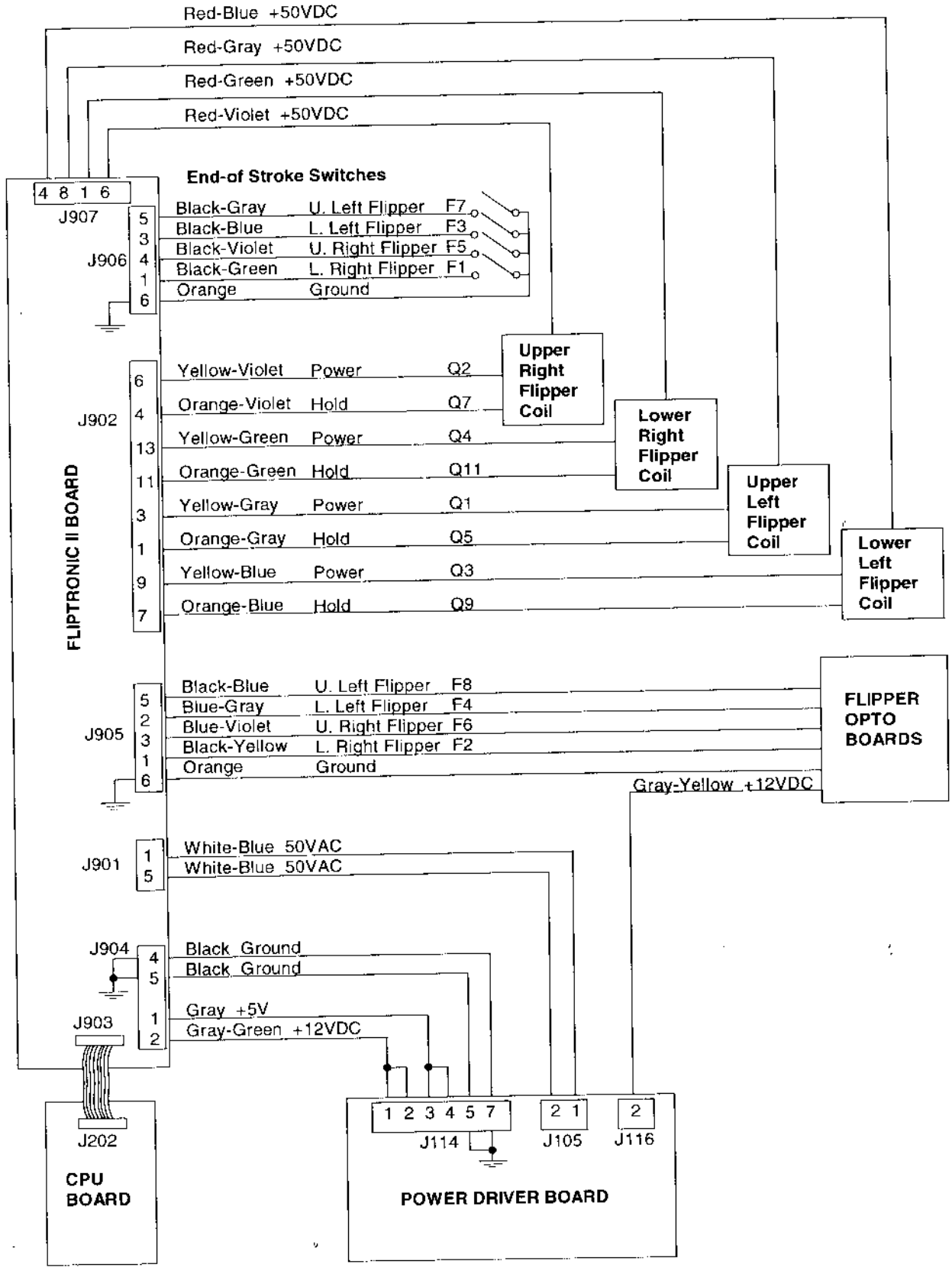


When point "A" toggles low, points "B" and "C" are high. This turns on the triac and the desired general illumination string lights.

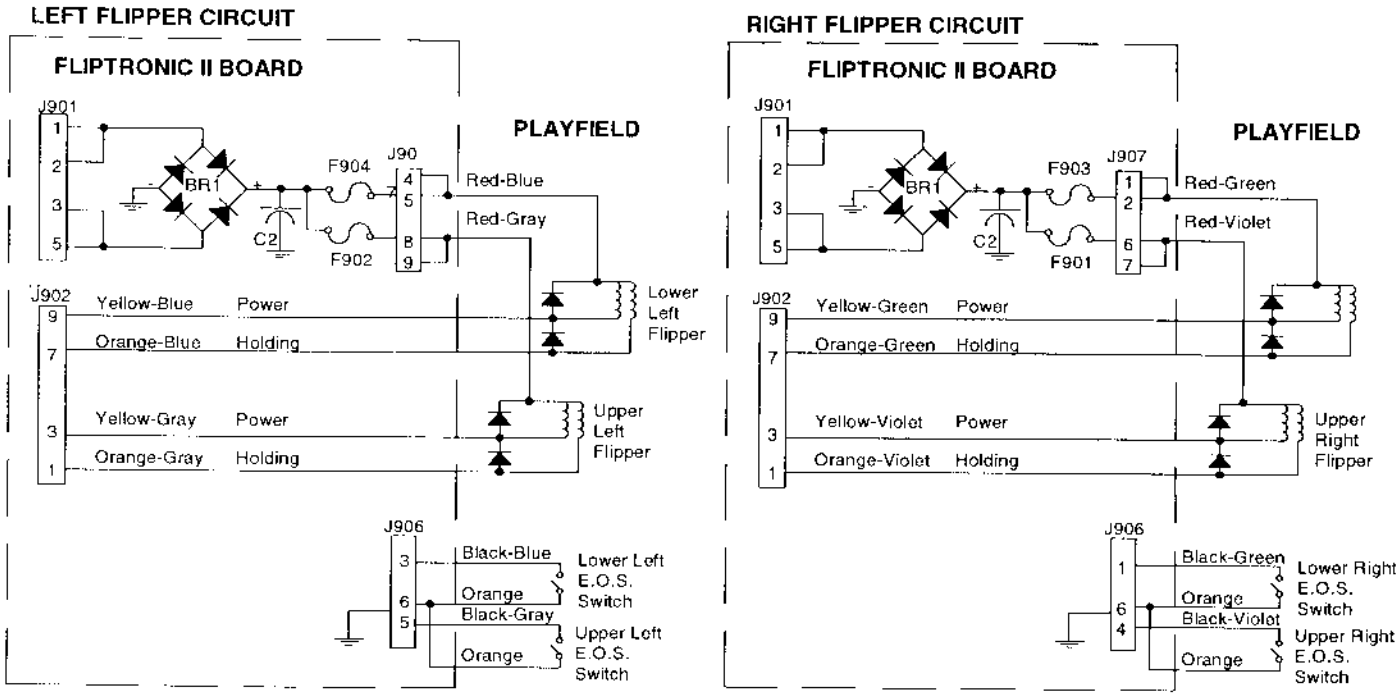
BLOCK DIAGRAM OF GENERAL ILLUMINATION CIRCUIT



FLIPPER CIRCUITS

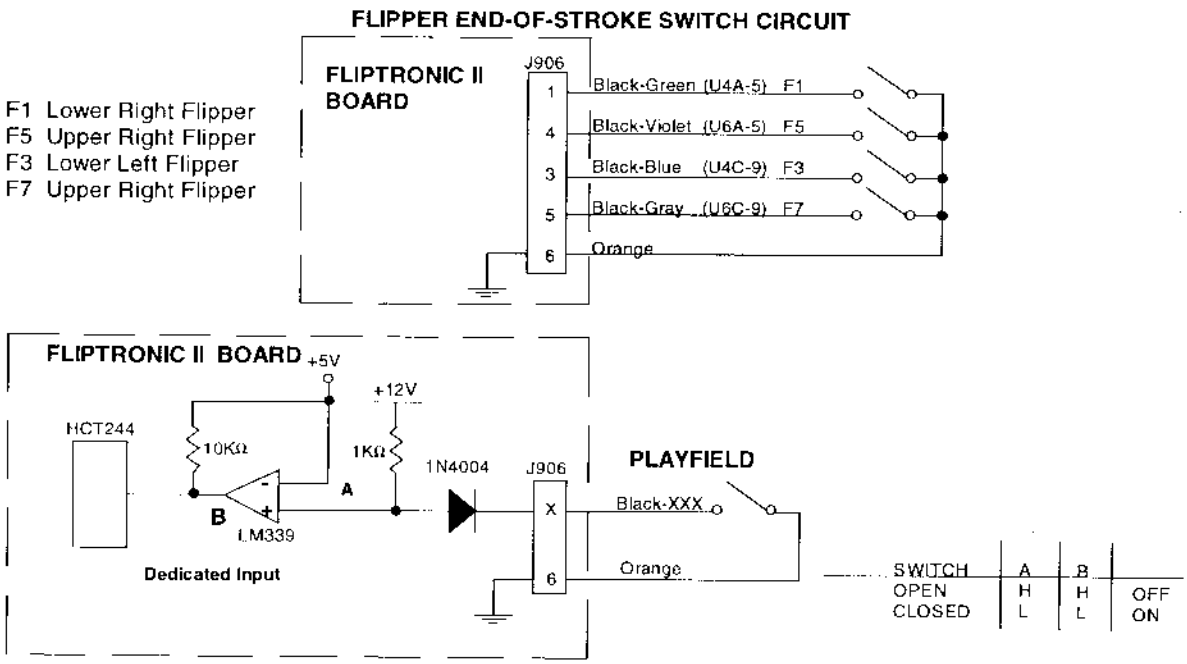


FLIPPER COIL CIRCUIT



FLIPPER END-OF-STROKE SWITCH CIRCUIT

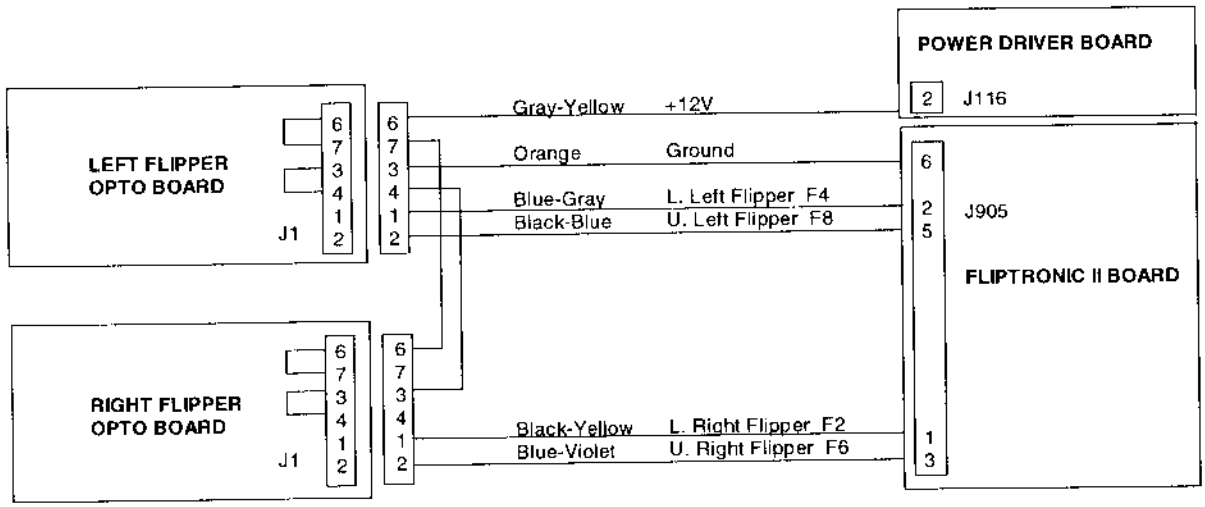
F1 Lower Right Flipper
F5 Upper Right Flipper
F3 Lower Left Flipper
F7 Upper Right Flipper

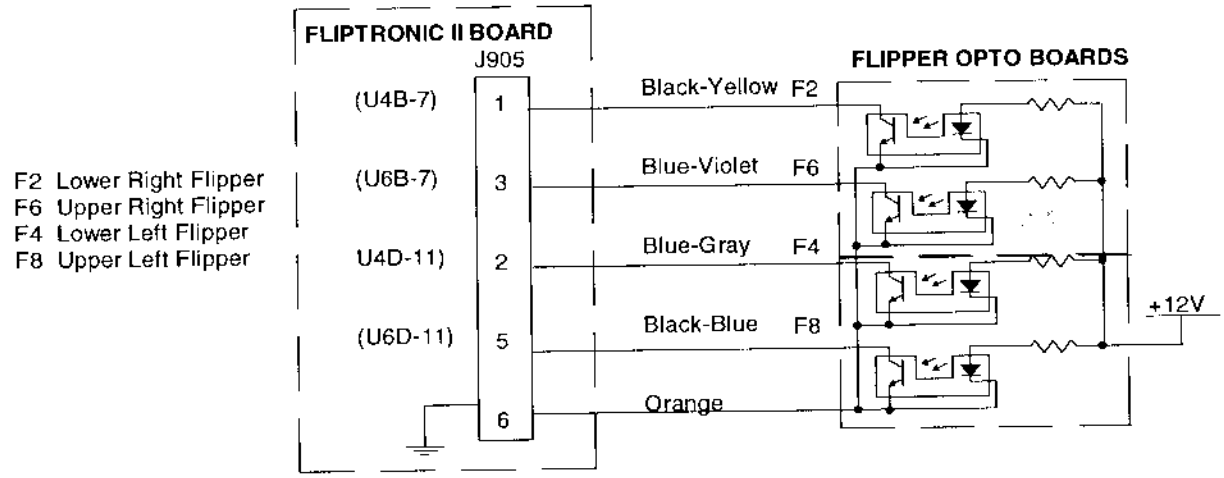


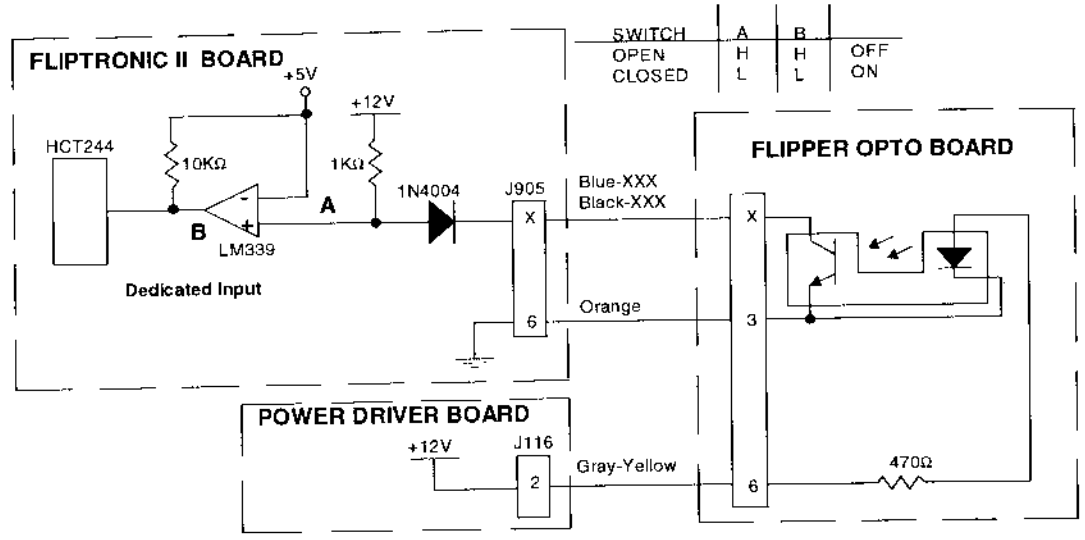
The flipper E.O.S. circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

When a switch closes, the row side, (dedicated input), of the circuit actives. The "+" input of the LM339 drops below +5V therefore its output is low. Since the row (dedicated input), circuit is tied directly to ground through the switch, the switch is considered closed by the microprocessor. When the switch opens, the "+" input to the LM339 is above +5V, its output is high and the row (dedicated input) is inactive.

FLIPPER CABINET SWITCH CIRCUIT



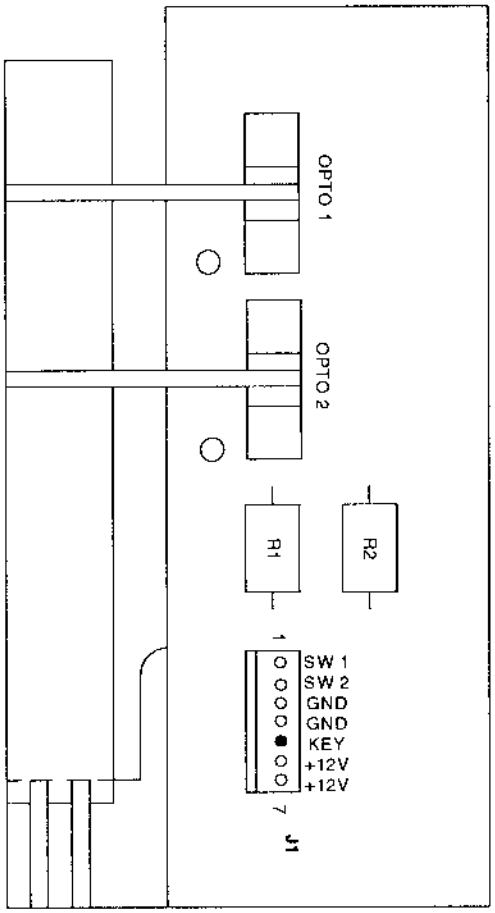


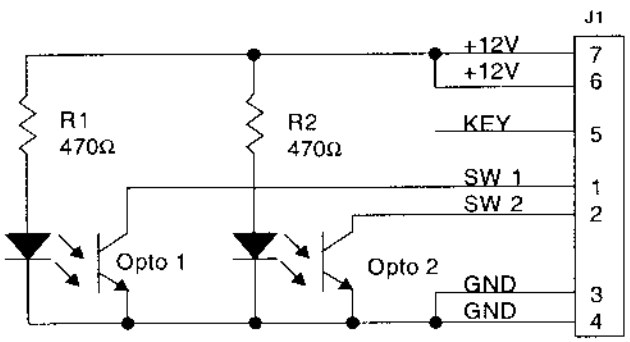


The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch circuit.

When a switch closes, the row side, (dedicated input), of the circuit actives. The "+" input to the LM339 drops below +5V, therefore, its output is low. Since the row , (dedicated input), circuit is tied directly to ground through the switch, the switch is consisered closed by the microprocessor. When the switch opens, the "+" input to the LM339 is above +5V, its output is high and the row, (dedicated input), is inactive.

A-17316
Flipper Opto Board Assembly





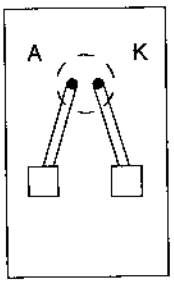
Left Flipper Opto Board Assembly

J1 - 1 Blue-Gray from Fliptronic II Board J905-2
J1 - 2 Black-Blue from Fliptronic II Board J905-5
J1 - 3 N/C
J1 - 4 Orange from Fliptronic II Board J905-6
J1 - 5 N/C
J1 - 6 Gray-Yellow from Fliptronic II Board J904-2
J1 - 7 Gray-Yellow from Fliptronic II Board J904-2

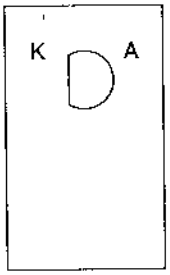
Right Flipper Opto Board Assembly

J1 - 1 Black-Yellow from Fliptronic II Board J905-1
J1 - 2 Blue-Violet from Fliptronic II Board J905-3
J1 - 3 Orange from Fliptronic II Board J905-6
J1 - 4 Orange from Left Flipper Opto Board Assy. J1-4
J1 - 5 N/C
J1 - 6 Gray-Yellow from Left Flipper Opto Board Assy. J1-6
J1 - 7 N/C

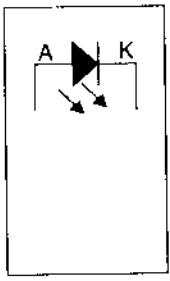
A-16908
LED Board Assembly
(green board)



solder side

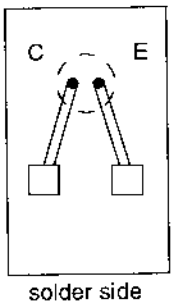


component side

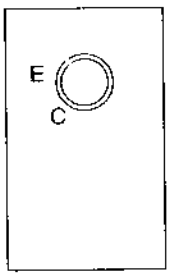


schematic

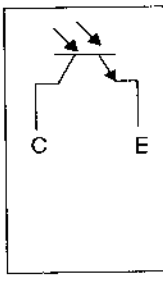
A-16909
Photo Transistor
Board Assembly
(blue board)



solder side

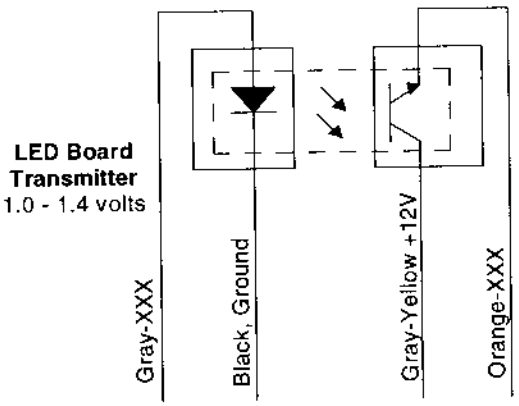


component side

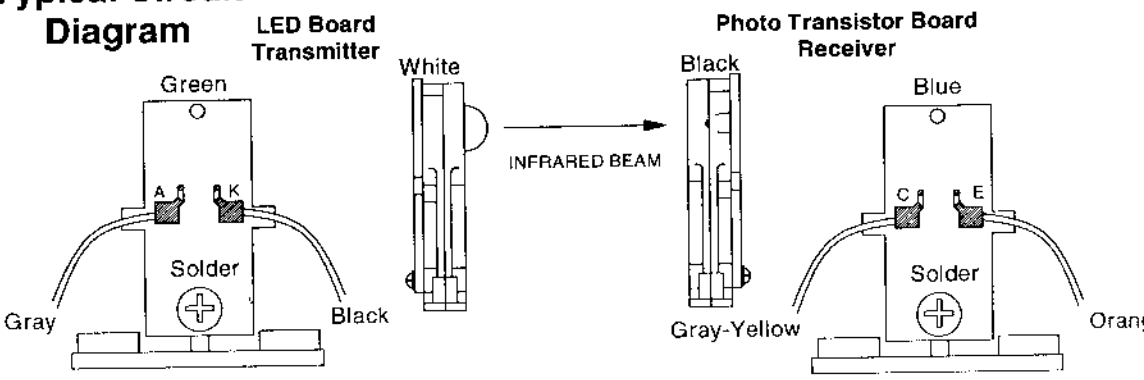


schematic

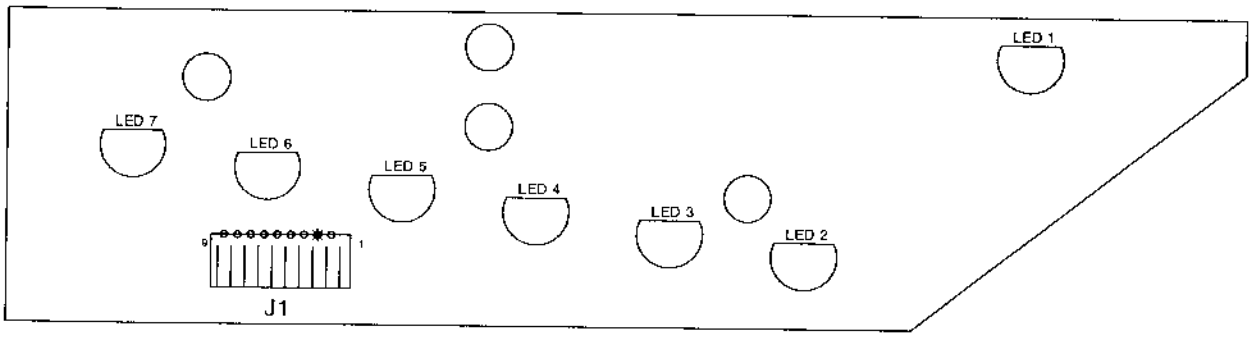
Typical Circuit Schematic

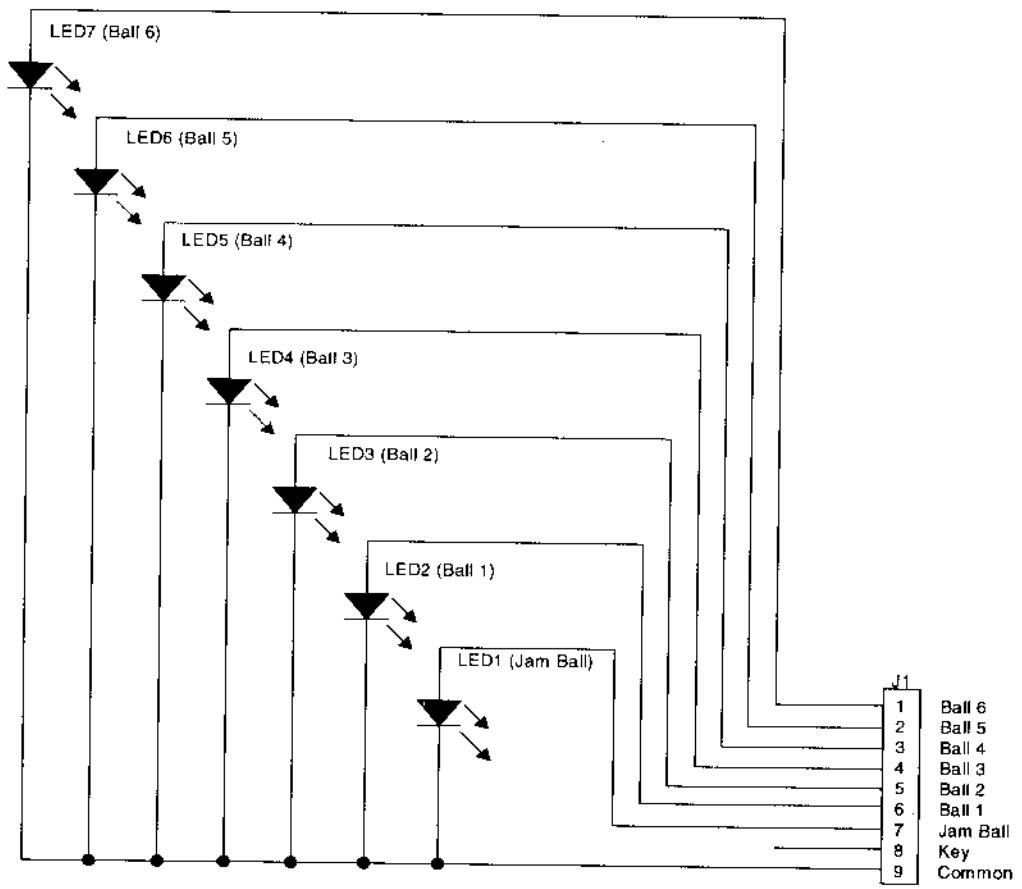


Typical Circuit Diagram



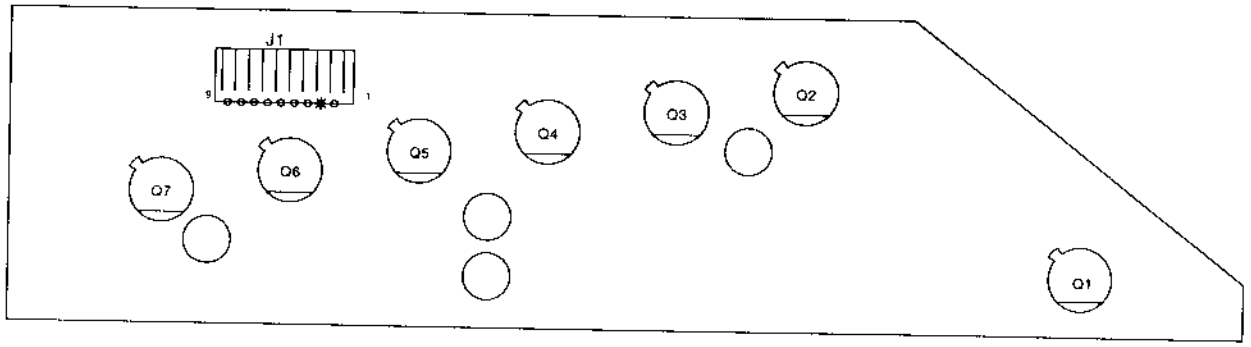
A-18617
Trough 7 IR LED Board Assembly
(green board)

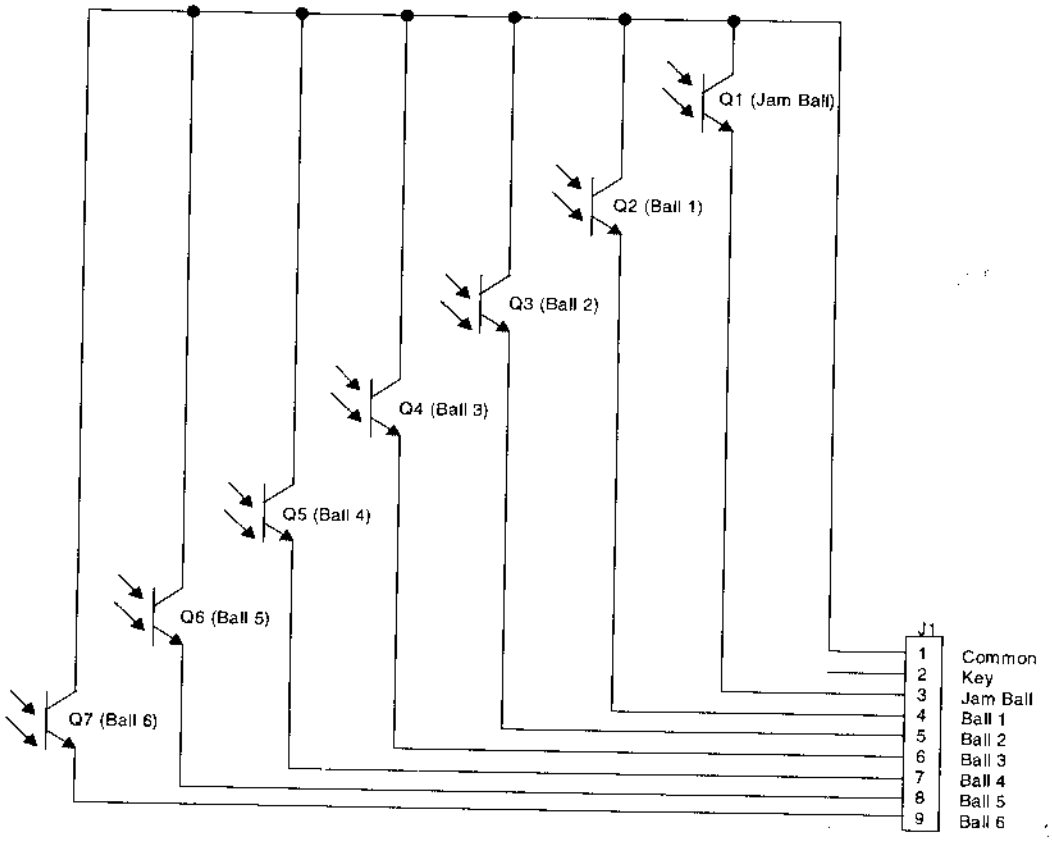




J1-1 Gray-Violet, LED7, to 7-Opto Switch Board J1-1
J1-2 N/C
J1-3 Gray-Green, LED5, to 7-Opto Switch Board J1-3
J1-4 Gray-Black, LED4, to 7-Opto Switch Board J1-5
J1-5 Gray-Orange, LED3, to 7-Opto Switch Board J1-6
J1-6 Gray-Red, LED2, to 7-Opto Switch Board J1-7
J1-7 Gray-Brown, LED1 to 7-Opto Switch Board J1-8
J1-8 Key
J1-9 Black, ground, to 7-Opto Switch Board J1-10

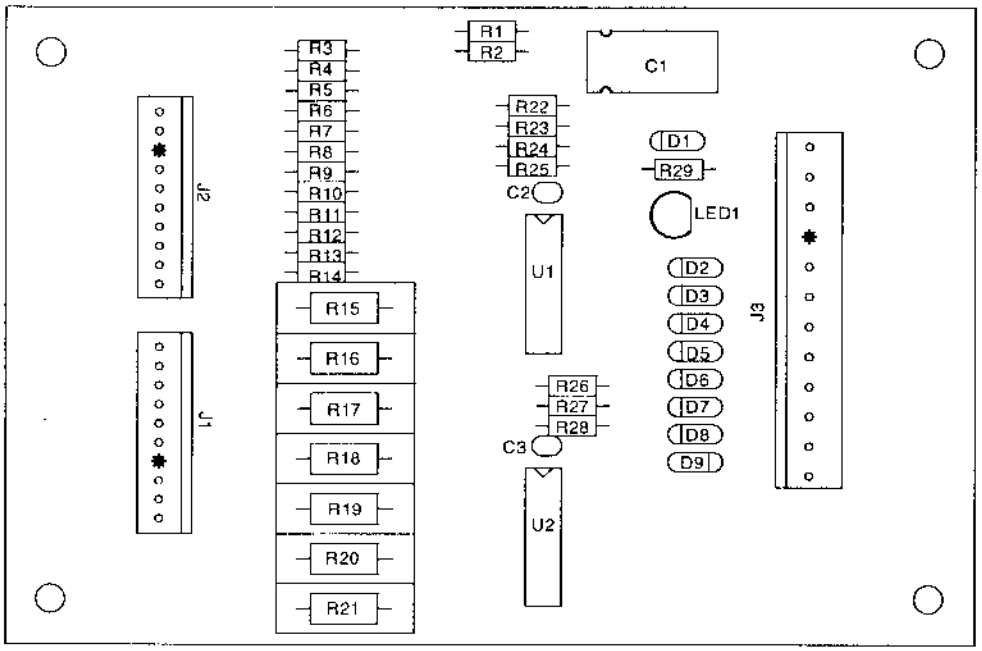
A-18618
Trough 7 IR Photo Transistor Board Assembly
(blue board)





J1-1 Gray-Yellow, +12V, to 7-Opto Switch Board J2-10
J1-2 Key
J1-3 Orange-Brown, Photo Transistor 1, to 7-Opto Switch Board J2-7
J1-4 Orange-Red, Photo Transistor 2, to 7-Opto Switch Board J2-6
J1-5 Orange-Black, Photo Transistor 3, to 7-Opto Switch Board J2-5
J1-6 Orange-Yellow, Photo Transistor 4, to 7-Opto Switch Board J2-4
J1-7 Orange-Green, Photo Transistor 5, to 7-Opto Switch Board J2-3
J1-8 N/C
J1-9 Orange-Violet, Photo Transistor 7, to 7-Opto Switch Board J2-1

A-15595
7-Opto Switch Board Assembly

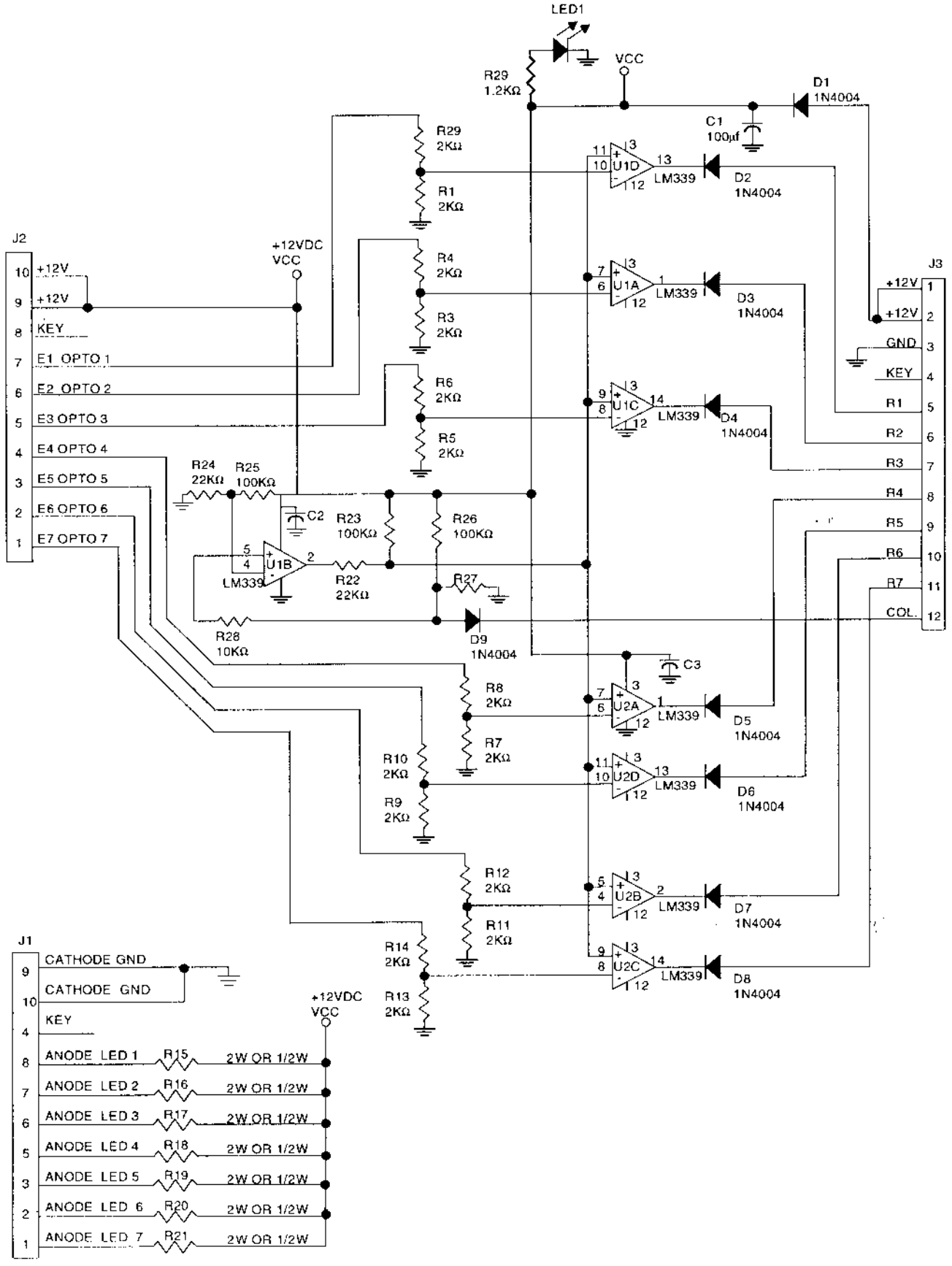


J1-1 Gray-Violet, LED7, to Trough 7 IR LED Board J1-1
J1-2 Gray-Blue, to Ball Popper LED Board
J1-3 Gray-Green, LED5, to Trough 7 IR LED Board J1-3
J1-4 Key
J1-5 Gray-Black, LED4, to Trough 7 IR LED Board J1-4
J1-6 Gray-Orange, LED3, to Trough 7 IR LED Board J1-5
J1-7 Gray-Red, LED2, to Trough 7 IR LED Board J1-6
J1-8 Gray-Brown, LED1, to Trough 7 IR LED Board J1-7
J1-9 N/C
J1-10 Black, ground, to Trough 7 IR LED Board J1-9

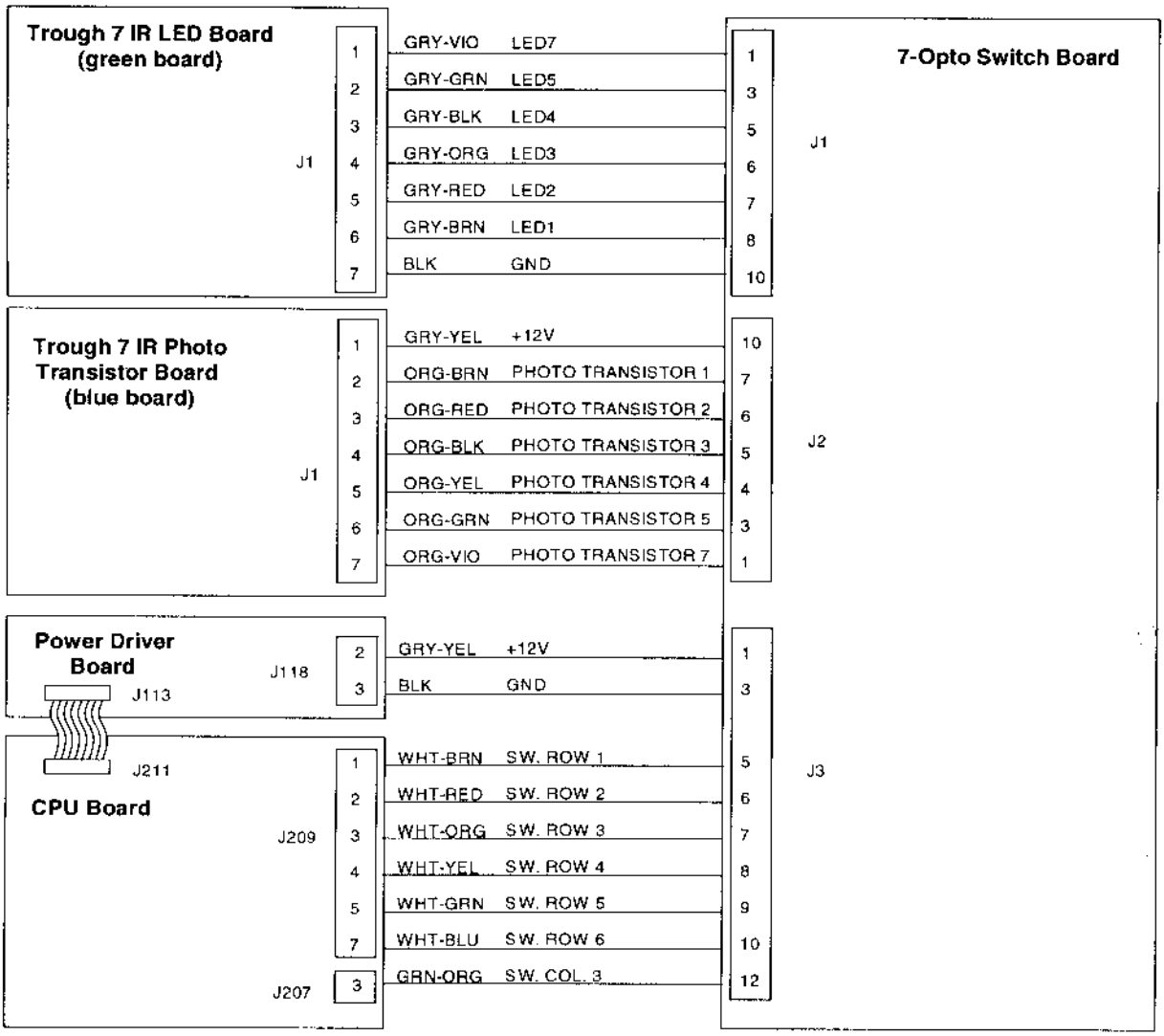
J2-1 Orange-Violet, Photo Transistor 7, to Trough 7 IR Photo Transistor Board J1-9
J2-2 Orange-Blue, to Ball Popper Photo Transistor Board
J2-3 Orange-Green, Photo Transistor 5, to Trough 7 IR Photo Transistor Board J1-7
J2-4 Orange-Yellow, Photo Transistor 4, to Trough 7 IR Photo Transistor Board J1-6
J2-5 Orange-Black, Photo Transistor 3, to Trough 7 IR Photo Transistor Board J1-5
J2-6 Orange-Red, Photo Transistor 2, to Trough 7 IR Photo Transistor Board J1-4
J2-7 Orange-Brown, Photo Transistor 1, to Trough 7 IR Photo Transistor Board J1-3
J2-8 Key
J2-9 N/C
J2-10 Gray-Yellow, +12V, to Trough 7 IR Photo Transistor Board J1-1

J3-1 Gray-Yellow, +12V from Power Driver Board J118-2
J3-2 N/C
J3-3 Black, ground, from Power Driver Board J118-3
J3-4 Key
J3-5 White-Brown, Switch Row 1, from CPU Board J209-1
J3-6 White-Red, Switch Row 2, from CPU Board J209-2
J3-7 White-Orange, Switch Row 3, from CPU Board J209-3
J3-8 White-Yellow, Switch Row 4, from CPU Board J209-4
J3-9 White-Green, Switch Row 5, from CPU Board J209-5
J3-10 White-Blue, Switch Row 6, from CPU Board J209-7
J3-11 N/C
J3-12 Green-Orange, Switch Column 3, from CPU Board J207-3

A-15595
7-Opto Switch Board Schematic

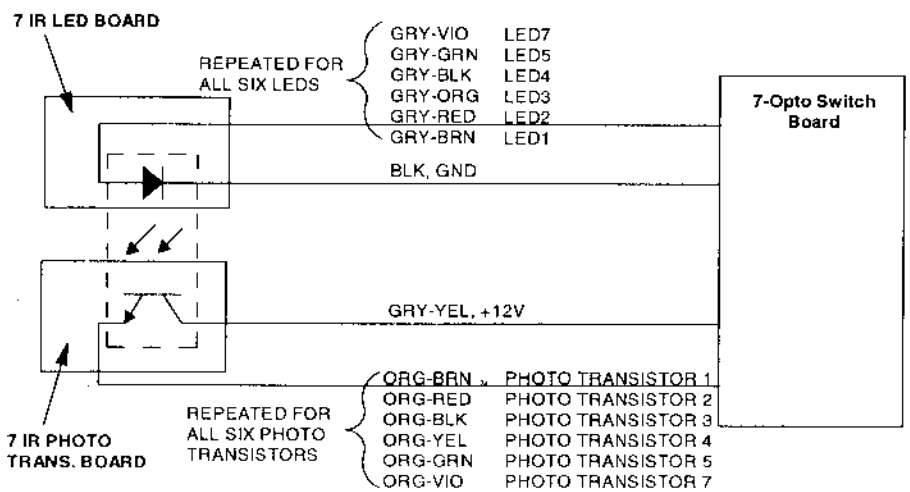


Outhole Trough Circuit Block Diagram



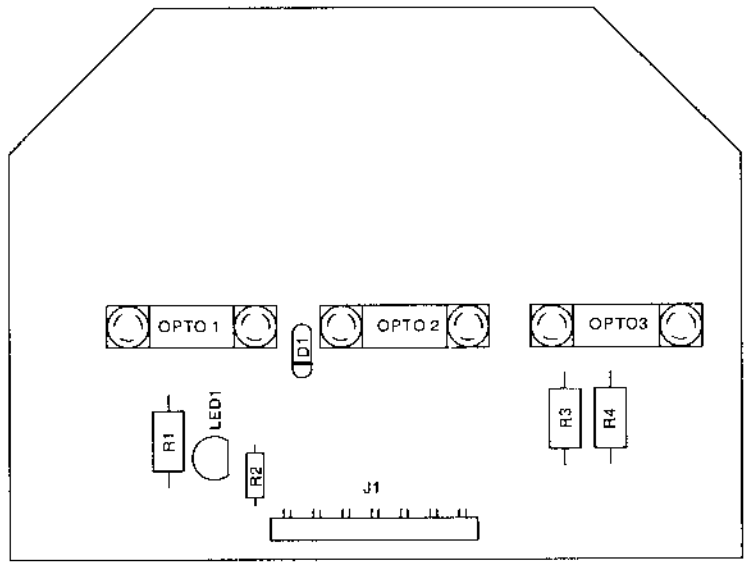
NOTE: GRAY-BLUE AND ORANGE-BLUE WIRES FROM THE 7-OPTO SWITCH BOARD GO TO THE BALL POPPER AND ARE NOT PART OF THE OUTHOLE TROUGH CIRCUIT.

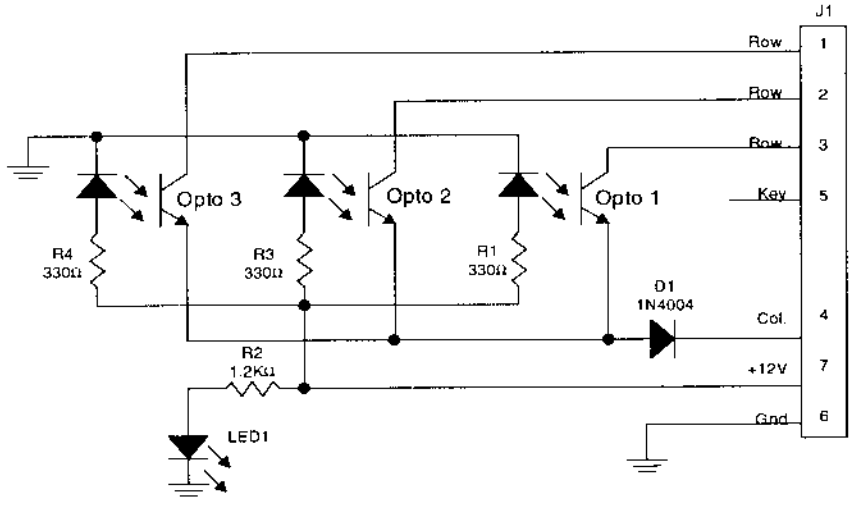
Outhole Trough Circuit Detail



IN THE OUTHOLE TROUGH CIRCUIT, THE BALL ROLLS BETWEEN THE TWO BOARDS AND BREAKS THE BEAM, CAUSING THE SWITCH TO READ AS MADE.

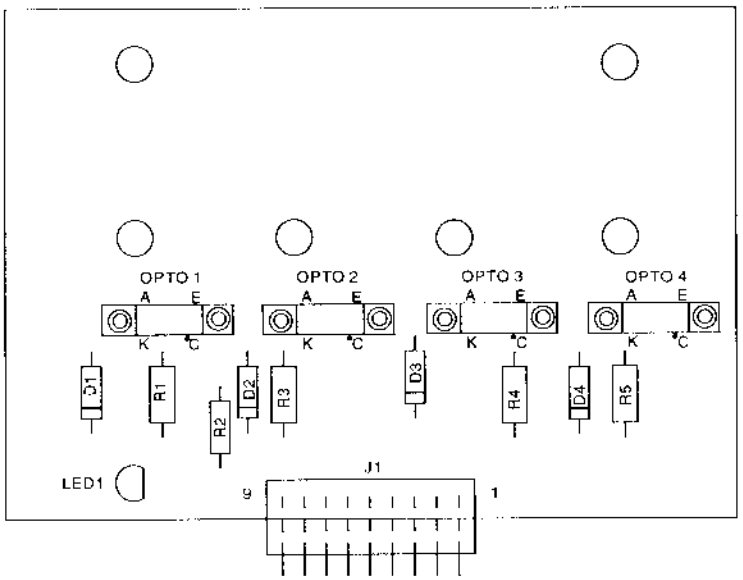
A-13609
3-Bank Drop Target Board Assembly

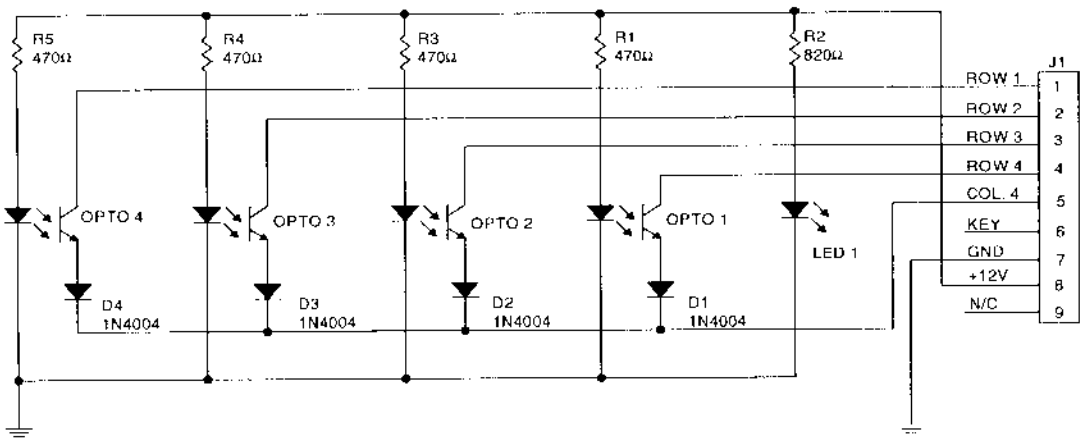




J1-1 White-Violet, Switch Row 7, from CPU Board J209-8
J1-2 White-Blue, Switch Row 6, from CPU Board J209-7
J1-3 White-Green, Switch Row 5, from CPU Board J209-5
J1-4 Green-Yellow, Switch Column 4, from CPU Board J207-4
J1-5 Key
J1-6 Black, Ground, from Power Driver Board J118-3
J1-7 Gray-Yellow, +12V, from Power Driver Board J118-2

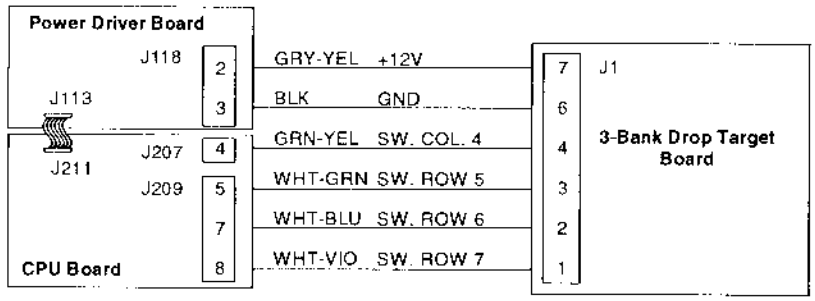
A-19103
4-Bank Drop Target Board Assembly



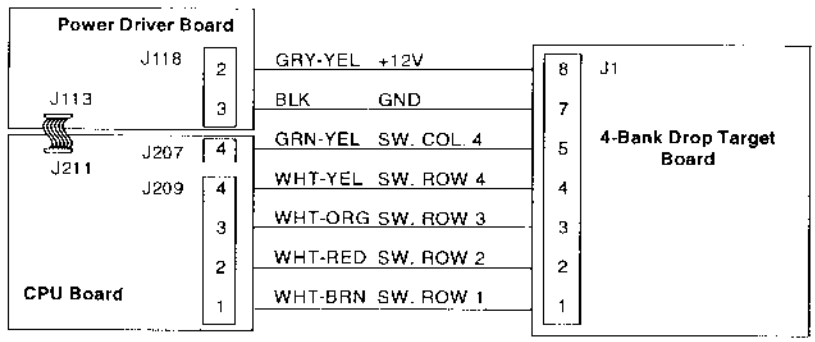


J1-1 White-Brown, Switch Row 1, from CPU Board J209-1
J1-2 White-Red, Switch Row 2, from CPU Board J209-2
J1-3 White-Orange, Switch Row 3, from CPU Board J209-3
J1-4 White-Yellow, Switch Row 4, from CPU Board J209-4
J1-5 Green-Yellow, Switch Column 4, from CPU Board J207-4
J1-6 Key
J1-7 Black, ground, from Power Driver Board J118-3
J1-8 Gray-Yellow, +12V, from Power Driver Board J118-2
J1-9 N/C

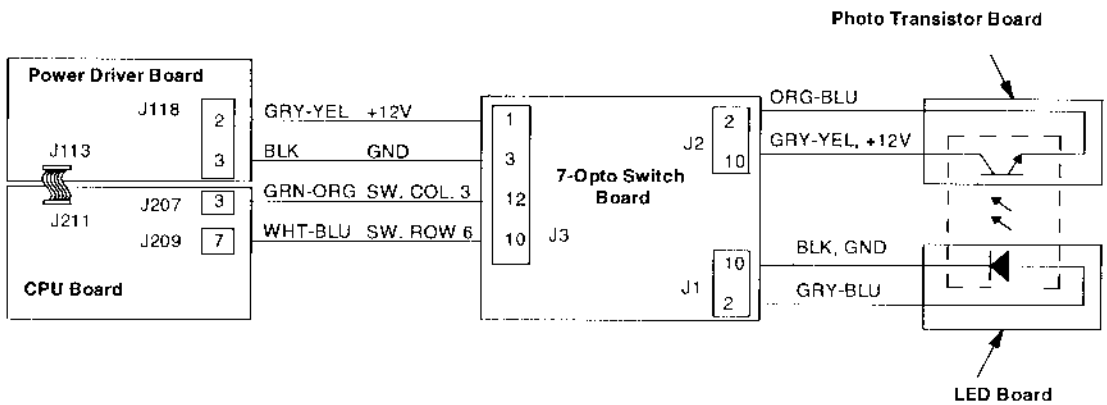
3-Bank Drop Target Circuit Block Diagram



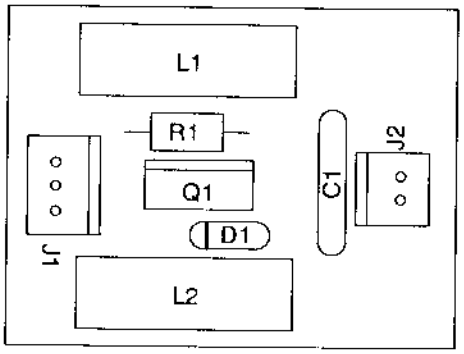
4-Bank Drop Target Circuit Block Diagram

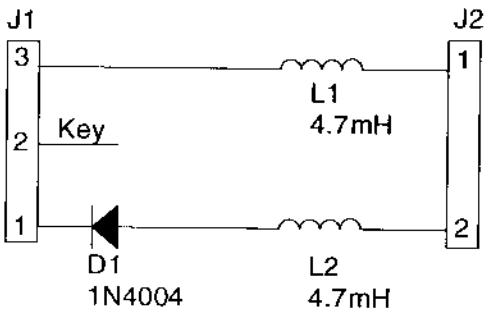


Ball Popper Circuit Block Diagram



A-15542
Motor EMI Board Assembly

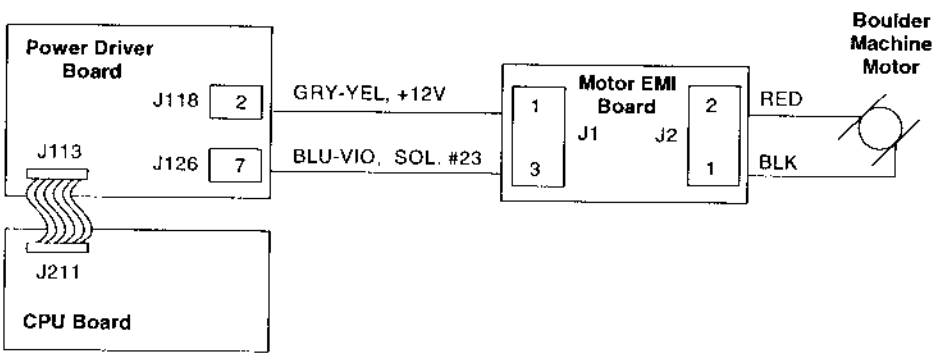




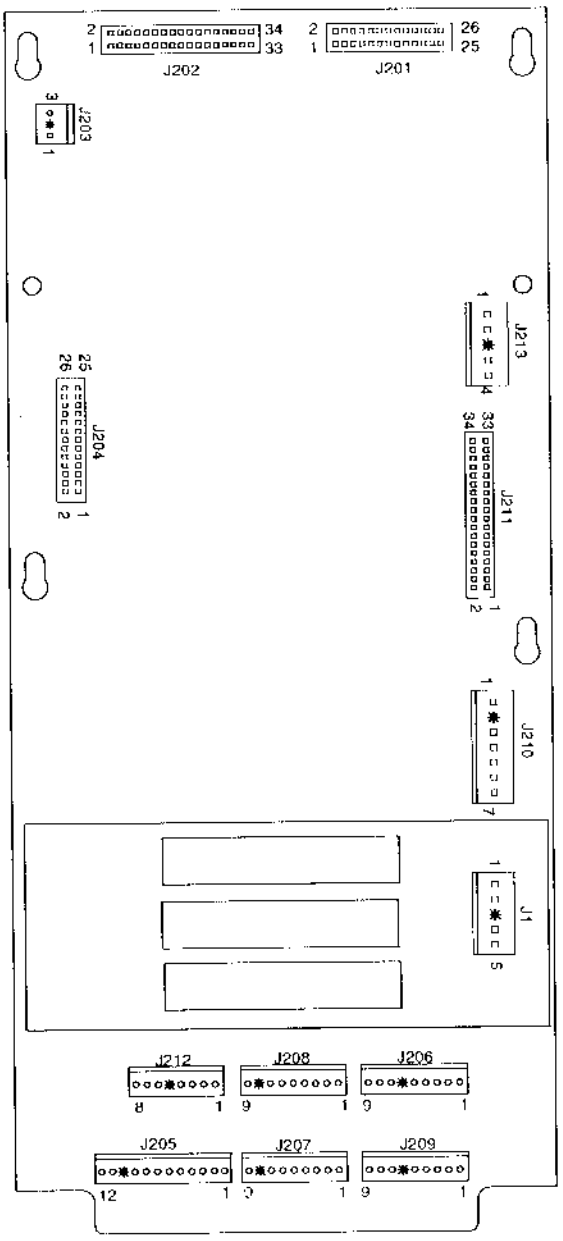
J1-1 Gray-Yellow, +12V from Power Driver Board J118-2
J1-2 Key
J1-3 Blue-Violet, Solenoid Drive #23, from Power Driver Board J126-7

J2-1 White, to Motor
J2-2 Red, to Motor

Boulder Machine Circuit Diagram



A-17651-50029
Security CPU Board Assembly



J201, 26-pin ribbon cable, data to/from J602

J202, 34-pin ribbon cable, data to/from J903; P1; J601

J203- Not Used

J204- Not Used

J205-1 Orange-Brown, ded. sw. row 1, to Coin Door Brd J1-8
J205-2 Orange-Red, ded. sw. row 2, to Coin Door Brd J1-7
J205-3 Orange-Black, ded. sw. row 3, to Coin Door Brd J1-6
J205-4 Orange-Yellow, ded. sw. row 4, to Coin Door Brd J1-5
J205-5 N/C
J205-6 Orange-Green, ded. sw. row 5, to Coin Door Brd J1-4
J205-7 Orange-Blue, ded. sw. row 6, to Coin Door Brd J1-3
J205-8 Orange-Violet, ded. sw. row 7, to Coin Door Brd J1-2
J205-9 Orange-Gray, ded. sw. row 8, to Coin Door Brd J1-1
J205-10 Black, ground, to Coin Door Brd J1-10
J205-11 N/C
J205-12 Orange-White, sw. enable, to Coin Door Brd J1-11

J206- Not Used

J207-1 Green-Brown, sw. col. 1, to playfield switches
J207-2 Green-Red, sw. col. 2, to playfield switches
J207-3 Green-Orange, sw. col. 3, to playfield switches
J207-4 Green-Yellow, sw. col. 4, to playfield switches
J207-5 Green-Black, sw. col. 5, to playfield switches
J207-6 Green-Blue, sw. col. 6, to playfield switches
J207-7 Green-Violet, sw. col. 7, to playfield switches
J207-8 N/C
J207-9 N/C

J208- Not Used

J209-1 White-Brown, sw. row 1, to playfield switches
J209-2 White-Red, sw. row 2, to playfield switches
J209-3 White-Orange, sw. row 3, to playfield switches
J209-4 White-Yellow, sw. row 4, to playfield switches
J209-5 White-Green, sw. row 5, to playfield switches
J209-6 N/C
J209-7 White-Blue, sw. row 6, to playfield switches
J209-8 White-Violet, sw. row 7, to playfield switches
J209-9 White-Gray, sw. row 8, to playfield switches

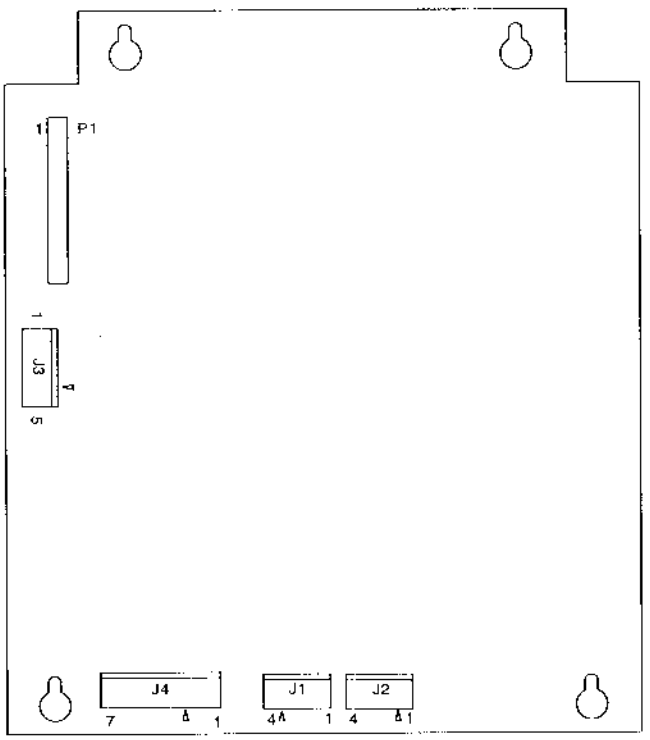
J210-1 Black, ground, from Power Driver Brd J114-5,7
J210-2 N/C
J210-3 Black, ground, from Power Driver Brd J114-5,7
J210-4 Gray, +5V, from Power Driver Brd J114-3,4
J210-5 Gray, +5V, from Power Driver Brd J114-3,4
J210-6 Gray-Green, +12V, from Power Driver Brd J114-1,2
J210-7 Gray-Green, +12V, from Power Driver Brd J114-1,2

J211, 34-pin ribbon cable, data to/from J113

J212-1 Green-Brown, sw. col. 1, to Coin Door Brd J3-1
J212-2 Green-Red, sw. col. 2, to Coin Door Brd J3-2
J212-3 N/C
J212-4 White-Brown, sw. row 1, to Coin Door Brd J3-3
J212-5 N/C
J212-6 White-Red, sw. row 2, to Coin Door Brd J3-4
J212-7 White-Orange, sw. row 3, to Coin Door Brd J3-5
J212-8 White-Yellow, sw. row 4, to Coin Door Brd J3-6

J213-1 Black to battery holder P.C.B. J1-1
J213-2 Black to battery holder P.C.B. J1-2
J213-3 N/C
J213-4 Gray to battery holder P.C.B. J1-4
J213-5 Gray to battery holder P.C.B. J1-5

A-16917-50029
Audio Board Assembly



P1, 34-pin ribbon cable, data to/from J601; J903, J202

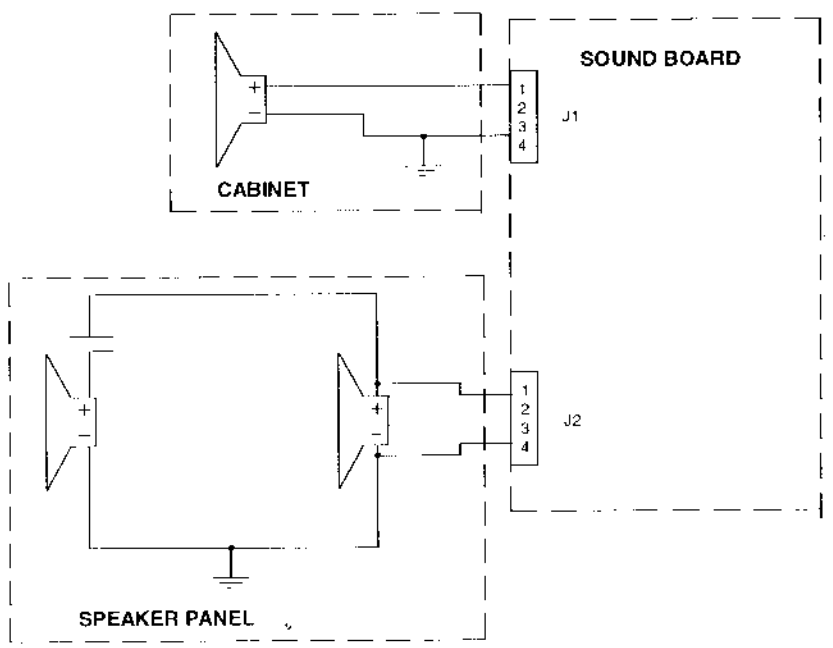
J1-1 Black-Yellow, signal to speaker
J1-2 N/C
J1-3 N/C
J1-4 Black, signal to speaker

J2-1 Black-Yellow, signal to speaker
J2-2 N/C
J2-3 N/C
J2-4 Black, signal to speaker

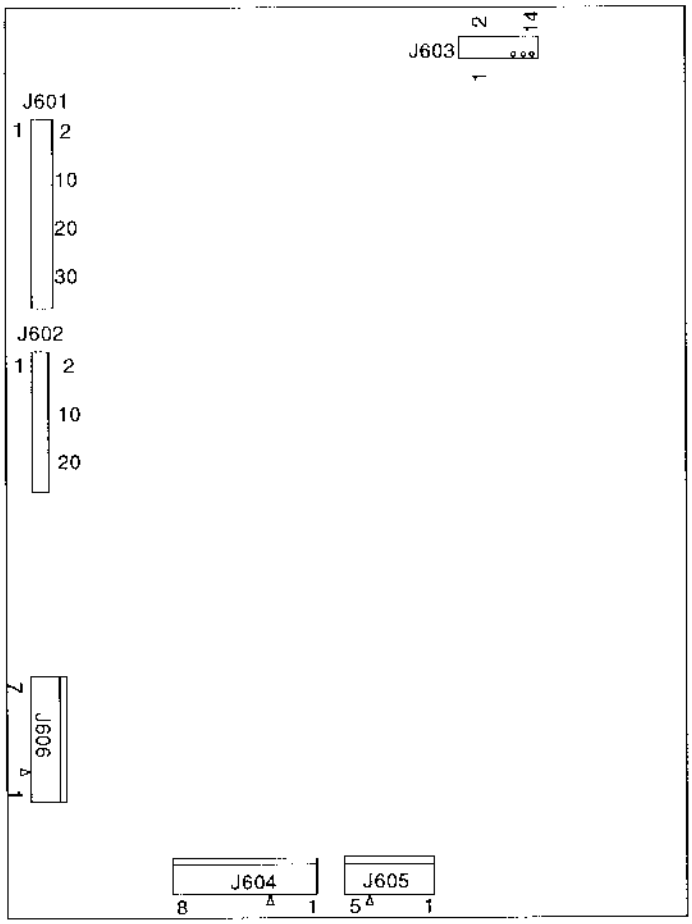
J3-1 Gray, +5V from Power Driver Brd J114-3,4
J3-2 N/C
J3-3 Gray, +5V from Power Driver Brd J114-3,4
J3-4 Black, ground from Power Driver Brd J114-5,7
J3-5 Black, ground from Power Driver Brd J114-5,7

J4-1 Gray-Green, 18Vac from transformer secondary
J4-2 Gray-Green, 18Vac loop from J4-1
J4-3 N/C
J4-4 Gray, 18Vac from transformer secondary
J4-5 Gray, 18Vac loop from J4-4
J4-6 Gray-White, 18Vac from transformer secondary
J4-7 Gray-White, 18Vac loop from J4-6

SPEAKER WIRING DIAGRAM



A-14039.1
Dot Matrix Controller Board Assembly



J601, 34-pin ribbon cable, data to/from J202; J903; P1

J602, 26-pin ribbon cable, data to/from J201

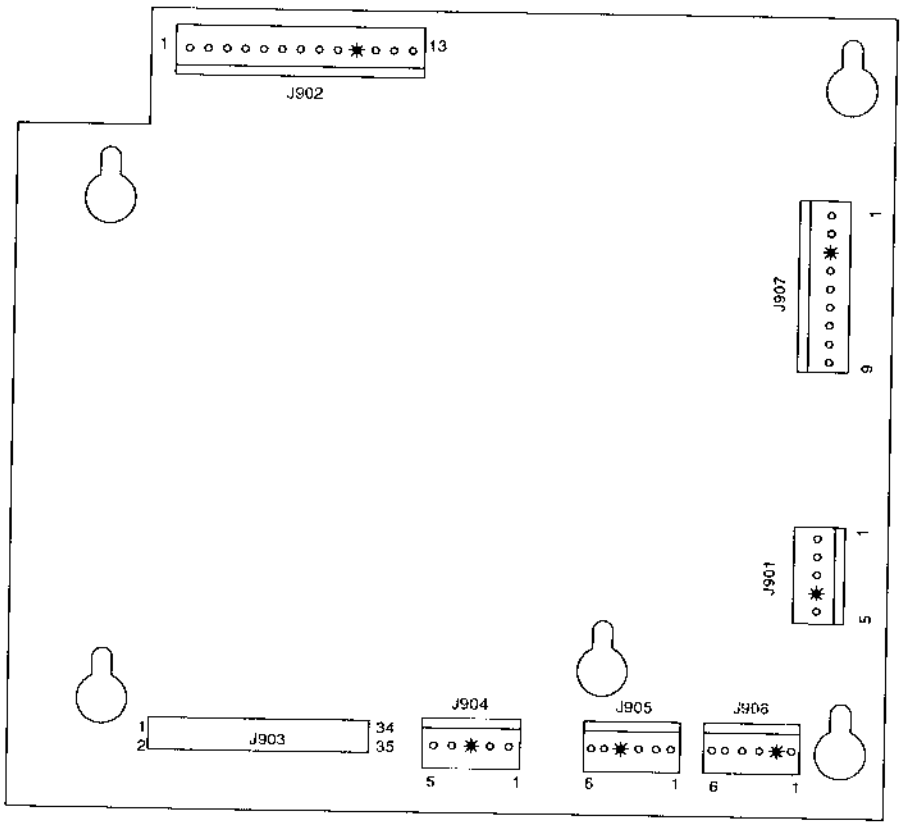
J603, 14-pin ribbon cable, data to/from Dot Matrix Display/Driver

J604-1 Orange, -125V to Display Driver pin 1
J604-2 Blue, -113V to Display/Driver pin 2
J604-3 N/C
J604-4 Black, ground to Display/Driver pin 4
J604-5 Black, ground to Display/Driver pin 5
J604-6 Gray, +5V to Display/Driver pin 6
J604-7 Gray-Yellow, to Display/Driver pin 7
J604-8 Brown, +62V to Display/Driver Pin 8

J605-1 White, 80Vac from transformer secondary
J605-2 White, 80Vac from transformer secondary
J605-3 Violet, 100Vac from transformer secondary
J605-4 N/C
J605-5 Violet, 100Vac from transformer secondary

J606-1 Black, ground loop from J606-3
J606-2 N/C
J606-3 Black, ground from Power Driver Brd J117-3
J606-4 Gray, +5V loop from J606-5
J606-5 Gray, +5V from Power Driver Brd J117-4
J606-6 Gray-Yellow, +12V loop from J606-7
J606-7 Gray-Yellow, +12V from Power Driver Brd J117-2

A-15472-1
Fliptronic II Board Assembly



J901-1 White-Blue, 50Vac from Power Driver Brd J104-2
J901-2 White-Blue, 50Vac loop grom J901-1
J901-3 White-Blue, 50Vac from Power Driver Brd J104-1
J901-4 N/C
J901-5 White-Blue, 50Vac loop from J901-3

J902-1 Orange-Gray, sol. 36, Up/Down Gate Left
J902-2 N/C
J902-3 Yellow-Gray, sol. 35, Up/Down Gate Right
J902-4 Orange-Violet, holding, upper right flipper coil
J902-5 N/C
J902-6 Yellow-Violet, power, upper right flipper coil
J902-7 Orange-Blue, holding, lower left flipper coil
J902-8 N/C
J902-9 Yellow-Blue, power, lower left flipper coil
J902-10 N/C
J902-11 Orange-Green, holding, lower right flipper coil
J902-12 N/C
J902-13 Yellow-Green, power, lower right flipper coil

J903, 34-pin ribbon cable, data to/from J202; J601; P1

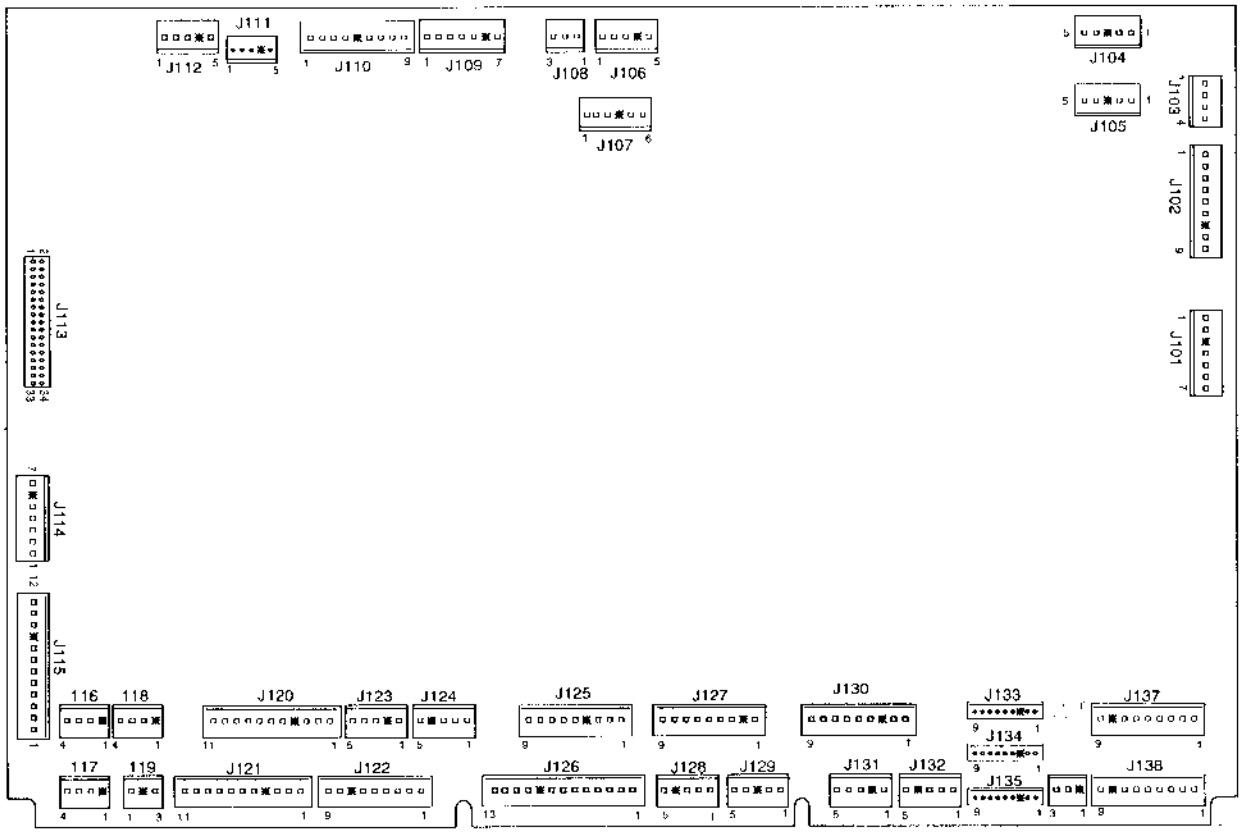
J904-1 Gray, +5V from Power Driver Board J114-3,4
J904-2 Gray-Green, +12V from Power Driver Brd J114-1,2
J904-3 N/C
J904-4 Black, ground from Power Driver Brd J114-5,7
J904-5 Black, ground from Power Driver Brd J114-5,7

J905-1 Blue-Violet, F2 to right flipper opto switch brd J1-1
J905-2 Blue-Gray, F4 to left flipper opto switch brd J1-1
J905-3 Black-Yellow, F6 to right flipper opto switch brd J1-2
J905-4 N/C
J905-5 Black-Blue, F8 to left flipper opto switch brd J1-2
J905-6 Orange, ground to left flipper opto switch brd J1-3

J906-1 Black-Green, F1 to lower right end-of-stroke switch
J906-2 N/C
J906-3 Black-Blue, F3 to lower left end-of-stroke switch
J906-4 Black-Violet, F5 to upper right end-of-stroke switch (not used)
J906-5 Black-Gray, F7 to upper left end-of-stroke switch
J906-6 Orange, ground to end-of-stroke switches

J907-1 Red-Green, +50V to lower right flipper coil
J907-2 Red-Green, +50V loop from J907-1
J907-3 B/C
J907-4 Red-Blue, +50V to lower left flipper coil
J907-5 Red-Blue, +50V loop from J907-4
J907-6 Red-Violet, +50V to upper right flipper coil
J907-7 Red-Violet, +50V loop from J907-6
J907-8 Red-Gray, +50V to upper left flipper coil
J907-9 Red-Gray +50V loop from J907-8

A-12697-3
Power Driver Board Assembly



J101-1 Red, 9Vac from transformer secondary
J101-2 Red, 9Vac from transformer secondary
J101-3 N/C
J101-4 Blue-White, 13Vac from transformer secondary
J101-5 Blue-White, 13Vac loop from J101-4
J101-6 Blue-White, 13Vac from transformser secondary
J101-7 Blue-White, 13 Vac loop from J101-6

J102-1 White-Red, 16Vac loop from J102-2
J102-2 White-Red, 16Vac from transformer secondary
J102-3 White-Red, 16Vac loop from J102-4
J102-4 White-Red, 16Vac from transformer secondary
J102-5 Black-Yellow, 16Vac loop from J102-6
J102-6 Black-Yellow, 16Vac from transformer secondary
J102-7 N/C
J102-8 Black-Yellow, 16Vac loop from J102-9
J102-9 Black-Yellow, 16Vac from transformer secondary

J103- Not Used

J104-1 White-Blue, 50Vac to Fliptronic II Brd J901-3
J104-2 White-Blue, 50Vac to Fliptronic II Brd J901-1
J104-3 N/C
J104-4 N/C
J104-5 N/C

J105- Not Used

J106-1 N/C
J106-2 N/C
J106-3 N/C
J106-4 N/C
J106-5 Red-White, +20V to backbox flashlamps

J107-1 N/C
J107-2 Red-Brown, +50V to coils
J107-3 Red-Black, +50V to coils
J107-4 N/C
J107-5 N/C
J107-6 Red-White, +20V to playfield flashlamps

J108- Not Used

J109- Not Used

J110- Not Used

J111- Not Used

Power Driver Board Continued...

J112-1 White-Green. 9.8Vac from transformer secondary
J112-2 White-Green, 9.8Vac loop from J112-1
J112-3 White-Green 9.8Vac from transformer secondary
J112-4 N/C
J112-5 White-Green, 9.8Vac loop from J112-3

J113, 34-pin ribbon cable, data to/from CPU J211

J114-1 Gray-Green, +12V to J210-6,7; J904-2
J114-2 Gray-Green, +12V
J114-3 Gray, +5V
J114-4 Gray, +5V to J210-4,5; J3-1,3; J904-1
J114-5 Black, ground to J210-1,3; J3-4,5; J904-4,5
J114-6 N/C
J114-7 Black, ground

J115-1 Yellow-White, 6.8Vac from transformer secondary
J115-2 White-Brown, 6.8Vac from transformer secondary
J115-3 White-Brown, 6.8Vac from transformer secondary
J115-4 White-Orange, 6.8Vac from transformer secondary
J115-5 White-Yellow, 6.8Vac from transformer secondary
J115-6 White-Yellow, 6.8Vac from transformer secondary
J115-7 Orange, 6.8Vac from transformer secondary
J115-8 Orange, 6.8Vac from transformer secondary
J115-9 N/C
J115-10 Green, 6.8Vac from transformer secondary
J115-11 Brown, 6.8Vac from transformer secondary
J115-12 Brown, 6.8Vac from transformer secondary

J116-1N/C
J116-2 Gray-Yellow, +12V to Coin Door J2-4
J116-3 Black, ground to Coin Door J2-5
J116-4 N/C

J117-1 N/C
J117-2 Gray-Yellow, +12V to Dot Matrix Controller J606-7
J117-3 Black, ground to Dot Matrix Controller J606-3
J117-4 Gray, +5V to Dot Matrix Controller J606-5

J118-1 N/C
J118-2 Gray-Yellow, +12V to EMI Brd, 3-bnk & 4-bnk drop tgt brds
J118-3 Black, gound to EMI Brd, 3-bnk & 4-bnk drop tgt brds
J118-4 N/C

J119-1 White-Violet, 6.8Vac, G.I., to Coin Door Board J2-2
J119-2 N/C
J119-3 Violet, return, G.I., to Coin Door Board J2-1

J120-1 N/C
J120-2 Orange, return, G.I. to backbox
J120-3 Yellow, return, G.I. to backbox
J120-4 N/C
J120-5 Green, return, G.I. to backbox
J120-6 Violet, return, G.I. to backbox
J120-7 N/C
J120-8 White-Orange, 6.8Vac, G.I. to backbox
J120-9 White-Yellow, 6.8Vac, G.I. to backbox
J120-10 White-Green, 6.8Vac, G.I. to backbox
J120-11 White-Violet, 6.8Vac, G.I. to backbox

J121-1 Brown, return, G.I. to playfield
J121-2 Orange, return, G.I. to playfield
J121-3 Yellow, return, G.I. to playfield
J121-4 N/C
J121-5 Green, return, G.I. to playfield
J121-6 N/C
J121-7 White-Brown, 6.8Vac, G.I. to playfield
J121-8 White-Orange, 6.8Vac, G.I. to playfield
J121-9 White-Yellow, 6.8Vac, G.I. to playfield
J121-10 White-Green, 6.8Vac, G.I. to playfield
J121-11 N/C

J122-1 Blue-Brown, sol. 25 drive to playfield flashlamp
J122-2 N/C
J122-3 N/C
J122-4 Blue-Yellow, sol. 28 drive to playfield flashlamp

J123- Not Used

J124-1 N/C
J124-2 Blue-Red, sol. 25 drive to backbox playfield
J124-3 Blue-Orange, sol. 27 drive to backbox playfield
J124-5 N/C

J125-1 Black-Brown, sol. 17 drive to backbox flashlamps
J125-2 Black-Red, sol. 18 drive to backbox flashlamps
J125-3 Black-Orange, sol. 19 drive to backbox flashlamps
J125-4 N/C
J125-5 Black-Yellow, sol. 20 drive to backbox flashlamps
J125-6 Blue-Green, sol. 21 drive to backbox flashlamps
J125-7 N/C
J125-8 N/C
J125-9 N/C

Power Driver Board Continued...

J126-1 Black-Brown, sol. 17 drive to playfield flashlamps
J126-2 Black-Red, sol. 18 drive to playfield flashlamps
J126-3 Black-Orange, sol. 19 drive to playfield flashlamps
J126-4 Black-Yellow, sol. 20 drive to playfield flashlamps
J126-5 Blue-Green, sol. 21 drive to playfield flashlamps
J126-6 Blue-Black, sol. 22 drive to playfield flashlamps
J126-7 Blue-Violet, sol. 23 drive to playfield flashlamps
J126-8 Blue-Gray, sol. 24 drive to playfield flashlamps

J127-1 Brown-Black, sol. 9 drive to playfield coil
J127-2 N/C
J127-3 Brown-Red, sol. 10 drive to playfield coil
J127-4 Brown-Orange, sol. 11 drive to playfield coil
J127-5 Brown-Yellow, sol. 12 drive to playfield coil
J127-6 Brown-Green, sol. 13 drive to playfield coil
J127-7 Brown-Blue, sol. 14 drive to playfield coil
J127-8 Brown-Violet, sol. 15 drive to playfield coil
J127-9 Brown-Gray, sol. 16 drive to playfield coil

J128- Not Used

J129- Not Used

J130-1 Violet-Brown, sol. 1 drive to playfield coil
J130-2 Violet-Red, sol. 2 drive to playfield coil
J130-3 N/C
J130-4 Violet-Orange, sol. 3 drive to playfield coil
J130-5 Violet-Yellow, sol. 4 drive to playfield coil
J130-6 Violet-Green, sol. 5 drive to playfield coil
J130-7 Violet-Blue, sol. 6 drive to playfield coil
J130-8 Violet-Black, sol. 7 drive to playfield coil
J130-9 Violet-Gray, sol. 8 drive to playfield coil

J131- Not Used

J132- Not Used

J133-1 Red-Brown, lamp row 1 to playfield lamps
J133-2 Red-Black, lamp row 2 to playfield lamps
J133-3 N/C
J133-4 Red-Orange, lamp row 3 to playfield lamps
J133-5 Red-Yellow, lamp row 4 to playfield lamps
J133-6 Red-Green, lamp row 5 to playfield lamps
J133-7 Red-Blue, lamp row 6 to playfield lamps
J133-8 Red-Violet, lamp row 7 to playfield lamps
J133-9 Red-Gray, lamp row 8 to playfield lamps

J134- Not Used

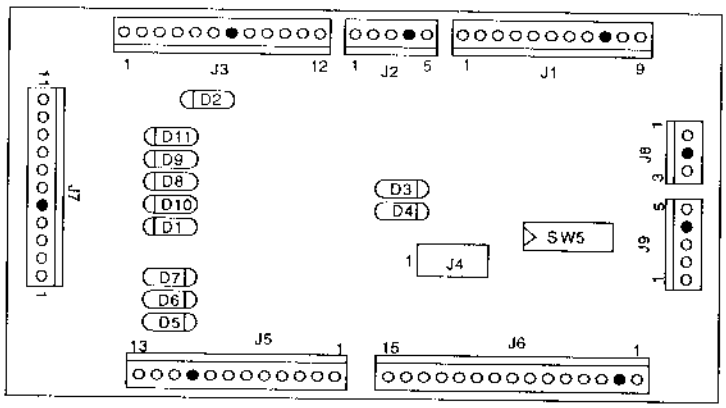
J135-1 N/C
J135-2 N/C
J135-3 N/C
J135-4 N/C
J135-5 N/C
J135-6 N/C
J135-7 Red-Blue, lamp row 6 to cabinet
J135-8 Red-Violet, lamp row 7 to cabinet
J135-9 Red-Gray, lamp row 8 to cabinet

J136-1 N/C
J136-2 N/C
J136-3 Yellow-Gray, lamp column 8 to cabinet

J137- Not Used

J138-1 Yellow-Brown, lamp column 1 to playfield lamps
J138-2 Yellow-Red, lamp column 2 to playfield lamps
J138-3 Yellow-Orange, lamp column 3 to playfield lamps
J138-4 Yellow-Black, lamp column 4 to playfield lamps
J138-5 Yellow-Green, lamp column 5 to playfield lamps
J138-6 Yellow-Blue, lamp column 6 to playfield lamps
J138-7 Yellow-Violet, lamp column 7 to playfield lamps
J138-8 N/C
J138-9 Yellow-Gray, lamp column 8 to playfield lamps

A-17051-1
Coin Door Interface Board Assembly



J1-1 Orange-Gray, dedicated row 8 from CPU J205-9
J1-2 Orange-Violet, dedicated row 7 from CPU J205-8
J1-3 Orange-Blue, dedicated row 6 from CPU J205-7
J1-4 Orange-Green, dedicated row 5 from CPU J205-6
J1-5 Orange-Yellow, dedicated row 4 from CPU J205-4
J1-6 Orange-Black , dedicated row 3 from CPU J205-3
J1-7 Orange-Red, dedicated row 2 from CPU J205-2
J1-8 Orange-Brown, dedicated row 1 from CPU J205-1
J1-9 N/C
J1-10 Black, ground from CPU J205-10
J1-1 Orange-White, sw. enable from CPU J205-12

J2-1 Black, ground from Power Driver Brd J116-3
J2-2 Gray-Yellow. +12Vac from Power Driver Brd J116-2
J2-3 Violet, G.I. from Power Driver Brd J119-3
J2-4 N/C
J2-5 White-Violet, G.I. 6.8Vac from Power Driver Brd J119-1

J3-1 Green-Brown, sw. col. 1 from CPU J212-1
J3-2 Green-Red, sw. col. 2 from CPU J212-2
J3-3 White-Brown, sw. row 1 from CPU J212-4
J3-4 White-Red, sw. row 2 from CPU J212-6
J3-5 White-Orange, sw. row 3 from CPU J212-7
J3-6 White-Yellow, sw. row 4 from CPU J212-8
J3-7 N/C
J3-8 Yellow-Gray, lamp col. 8 from Power Driver Brd J136-3
J3-9 Red-Blue, lamp row 6 from Power Driver Brd J133-7
J3-10 Red-Violet, lamp row 7 from Power Driver Brd J133-8
J3-11 Red-Gray, lamp row 8 from Power Driver Brd J133-8
J3-12 N/C

J4- Not Used

J5-1 Violet, G.I. return to coin door
J5-2 White-Violet, G.I. 6.8Vac to coin door
J5-3 Black, ground to coin door
J5-4 N/C
J5-5 Orange-Red, dedicated sw. row 2 to coin door
J5-6 N/C
J5-7 Orange-Green, dedicated sw. row 5 to coin door
J5-8 Orange-Blue, dedicated sw. row 7 to coin door
J5-9 Orange-Violet, dedicated sw. row 7 to coin door
J5-10 N/C
J5-11 Orange-Gray, dedicated sw. row 8 to coin door
J5-12 Green-Red, sw. col. 2 to coin door Slam Tilt
J5-13 White-Brown, sw. row 1 to coin door Slam Tilt

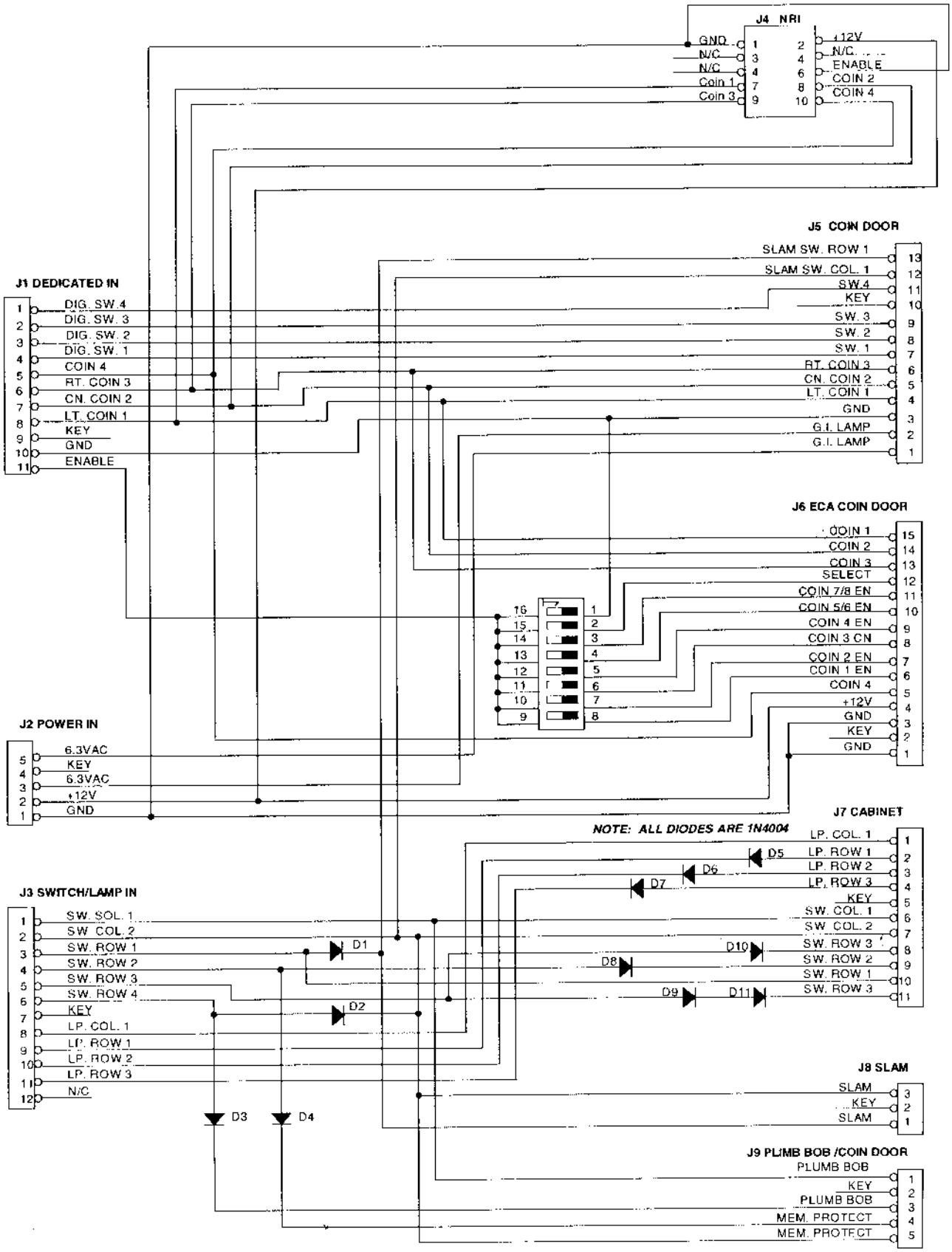
J6- Not Used

J7-1 Yellow-Gray, lamp col. 8 to cabinet
J7-2 N/C
J7-3 Red-Violet, lamp row 7 to cabinet
J7-4 Red-Gray, lamp row 8 to cabinet
J7-5 N/C
J7-6 Green-Brown, sw. col. 1 to cabinet
J7-7 Green-Red, sw. col. 2 to cabinet
J7-8 White-Orange, sw. row 3 to cabinet
J7-9 N/C
J7-10 White-Brown, sw. row 1 to cabinet
J7-11 White-Orange, sw. row 3 to cabinet

J8-1 White, sw. row to cabinet Slam Tilt
J8-2 N/C
J8-3 Green, sw. col. to cabinet Slam Tilt

J9-1 White-Yellow, sw. row 4 to Plumb Bob Tilt
J9-2 N/C
J9-3 Green-Brown, sw. col 1 to Plumb Bob Tilt
J9-4 White-Red, sw. row 2 to interlock switch
J9-5 Green-Red, sw. col. 2 to interlock switch

A-17051-1
Coin Door Interface Board Schematic



JUMPER AND DIP SWITCH SETTING CHARTS

EPROM JUMPER SETTING FOR U6

	W1	W2
1M/2M/4M EPROM	IN	OUT

COUNTRY DIP SWITCH SETTINGS

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
AMERICAN	OFF	OFF	ON	ON	ON	ON	ON	ON
EUROPEAN	OFF	OFF	ON	ON	ON	OFF	ON	ON
FRENCH	OFF	OFF	ON	ON	ON	ON	OFF	OFF
GERMAN	OFF	OFF	ON	ON	ON	ON	ON	OFF
SPANISH	OFF	OFF	ON	ON	OFF	ON	ON	ON

SOLENOID/FLASHLAMPS

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xistor	Drive Connections			Drive Wire	Solenoid Part Number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	Ball Trough	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-26-1500	
02	Ball Shooter	High Power	J107-2			Q80	J130-2			Vio-Red	AE-23-800	
03	Top Diverter Post	High Power	J107-2			Q78	J130-4			Vio-Org	AE-27-1200	
04	Top Popper	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-23-800	
05	3-Bank Drop Reset	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-26-1200	
06	4-Bank Drop Reset	High Power	J107-2			Q66	J130-7			Vio-Blu	AE-24-900	
07	Knocker	High Power		J107-2		Q68		J130-8		Vio-Blk		AE-23-800
08	Top Diverter	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-27-1200	
09	Right Sling	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	
10	Left Sling	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	
11	Left Jet Bumper	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-26-1200	
12	Middle Jet Bumper	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1200	
13	Right Jet Bumper	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1200	
14	Dictabird	Low Power	J107-3			Q48	J127-7			Brn-Blu	AE-26-1500	
15	Lower Lt. Diverter	Low Power	J107-3			Q46	J127-8			Brn-Vio	AE-27-1200	
16	Lower Rt. Diverter	Low Power	J107-3			Q44	J127-9			Brn-Gry	AE-27-1200	
17	Under Lt. Rmp Fls.	Low Power	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#89 (1)	#906 (2)
18	Under Rt. Rmp Fls.	Flasher	J107-6	J106-5		Q40	J126-2	J125-2		Blk-Red	#89 (1)	#906 (2)
19	Flintstones Fls.	Flasher	J107-6	J106-5		Q38	J126-3	J125-3		Blk-Org	#906 (1)	#906 (2)
20	Popper Rmp Fls.	Flasher	J107-6	J106-5		Q36	J126-4	J125-5		Blk-Yel	#89 (2)	#906 (2)
21	Ding Slide Fls.	Flasher	J107-6	J106-5		Q28	J126-5	J125-6		Blu-Grn	#89 (1)	#906 (2)
22	Bowl-O-Rama Fls.	Flasher	J107-6			Q30	J126-6			Blu-Blk	#89(1)#906(1)	
23	Boulder Machine	Motor	J118-2			Q34	J126-7			Blu-Vio	14-7999	
24	Boulder Machine Fls.	Flasher	J107-6			Q32	J126-8			Blu-Gry	#89 (1)	
25	Dig Millions Fls.	Gen. Purpose	J107-6			Q26	J122-1			Blu-Brn	#89 (1)	
26	Flint Fls.	Gen. Purpose		J106-5		Q24		J124-2		Blu-Red		#906 (3)
27	Stones Fls.	Gen. Purpose		J106-5		Q22		J124-3		Blu-Org		#906 (3)
28	Fred's Choice Fls.	Gen. Purpose	J107-6			Q20	J122-4			Blu-Yel	#906 (2)	
29-36	See Flipper Circuits											
37*	Not Used	Low Power				Q16				Brn-Wht		
38*	Not Used	Low Power				Q15				Blk-Wht		
39*	Not Used	Low Power				Q14				Org-Wht		
40*	Not Used	Low Power				Q13				Yel-Wht		
41*	Not Used	Low Power				Q9				Grn-Wht		
42*	Not Used	Low Power				Q10				Blu-Wht		
43*	Not Used	Low Power				Q11				Vio-Wht		
44*	Not Used	Low Power				Q12				Gry-Wht		
	General Illumination											
01	Machine Lighting	G.I.		J120-1		Q18		J120-7		Wht-Brn		#555
02	Flintstones Logo	G.I.	J121-2	J120-2		Q10	J121-8	J120-8		Wht-Org	#44	#555
03	Up Plfd & Insrt Pan.	G.I.	J121-3	J120-3		Q14	J121-9	J120-9		Wht-Yel	#44	#555
04	Mid Plfd & Insrt Pan.	G.I.	J121-5	J120-5		Q16	J121-10	J120-10		Wht-Grn	#44	#555
05	Low Plfd & Insrt Pan.	G.I.	J121-6		J119-3	Q12	J121-11		J119-1	Wht-Vio	#44	

	Flipper Circuits		Voltage Connection	Drive Transistor Power	Drive Transistor Hold	Drive Connection Playfield	Drive Wire Power	Drive Wire Hold	Coil Part Number	Coil Colors
29	Lower Right Flipper	Power	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn		FL-11629	BLUE
30		Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn		
31	Lower Left Flipper	Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu		FL-11629	BLUE
32		Hold	J907-4 (Red-Blu)		Q9	J902-7		Org-Blu		
33	Upper Right Flipper	Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio		FL-11629	BLUE
34		Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio		
35	Top Rt. Up/Dn Gate	Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry		A-14406	
36	Top Lt. Up/Dn Gate	Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	A-14406	

J1XX-X = POWER DRIVER BOARD, JX-X =8-DRIVER BOARD, J9XX-X =FLIPTRONIC II BOARD

PLEASE NOTE: IN THIS GAME, THE UPPER RIGHT FLIPPER CIRCUIT IS USED TO DRIVE THE LEFT & RIGHT UP/DOWN GATES.

WARNINGS & NOTICES

WARNING

FOR SAFETY AND RELIABILITY, substitute parts and equipment modifications are not recommended. Use of Non-WILLIAMS parts or modifications of game circuitry, may adversely affect game play, or may cause injuries.

SUBSTITUTE PART OR EQUIPMENT MODIFICATIONS may void FCC Type Acceptance.

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

NOTICE

WARNING

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generated, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RF Interference Notice

CABLE HARNESS PLACEMENTS and ground strap routing on this game have been designed to keep RF radiation and conduction within levels accepted by the FCC Rules.

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

FCC STICKER. Check the back of your game to verify that an FCC-certification sticker was attached to your game at the factory. All games that leave the WILLIAMS plant have been tested and found to comply with FCC Rules. Because the sticker is proof of this fact, legal repercussions to the owner and distributor may result, if the sticker is missing. If you receive a game, manufactured after December 1982, that has no FCC sticker, call WILLIAMS for advice or write us a note on your Game Registration Card. Be sure that the card bears your game's serial number.

For Service...
Call your authorized Williams Distributor

Williams Electronics Games, Inc.
3401 N. California Avenue
Chicago, IL 60618

CAUTION: Transport this game ONLY with the hinged backbox DOWN!