

*Bally*

January 1994  
16-50022-101

**POPEYE**®

SAVES THE EARTH

**Operations Manual Includes**

Operations & Adjustments • Testing & Problem Diagnosis  
Parts Information • Reference Diagrams & Schematics

Midway Manufacturing Company  
3401 North California Avenue  
Chicago, Illinois 60618

# DIP SWITCH SETTINGS

Display	W1	W2
1MEG, 2MEG, 4 MEG EPROM	In	Out

Country	SW4	SW5	SW6	SW7	SW8
America	On	On	On	On	On
European	On	On	Off	On	On
French	On	On	On	Off	Off
German	On	On	On	On	Off
Spain	On	Off	On	On	On

## SOLENOID / FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive zister	Drive Connections			Drive Wire Color	Solenoid Part Number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	Right Popper	High Power	J130-1			Q82	J107-3			Vio-Brn	AE-26-1200	
02	Left Popper	High Power	J130-2			Q80	J107-3			Vio-Red	AE-24-900	
03	Ball Shooter	High Power	J130-4			Q78	J107-3			Vio-Org	AE-23-800	
04	Animal Diverter	High Power	J130-5			Q76	J107-3			Vio-Yel	AE-26-1200	
05	Trough Coil	High Power	J130-6			Q64	J107-3			Vio-Grn	AE-26-1500	
06	Lockup Kicker	High Power	J130-7			Q66	J107-3			Vio-Blu	AE-23-800	
07	Knocker	High Power		J130-8		Q68		J107-3		Vio-Blk		AE-23-800
08	Escalator Popper	High Power	J130-9			Q70	J107-3			Vio-Gry	AE-23-800	
09	Left Jet	Low Power	J127-1			Q58	J107-2			Brn-Blk	AE-26-1200	
10	Right Jet	Low Power	J127-3			Q56	J107-2			Brn-Red	AE-26-1200	
11	Center Jet	Low Power	J127-4			Q54	J107-2			Brn-Org	AE-26-1200	
12	Left Slingshot	Low Power	J127-5			Q52	J107-2			Brn-Yel	AE-26-1200	
13	Right Slingshot	Low Power	J127-6			Q50	J107-2			Brn-Grn	AE-26-1200	
14	Left Gate	Low Power	J127-7			Q48	J107-2			Brn-Blu	A-14406	
15	Right Gate	Low Power	J127-8			Q46	J107-2			Brn-Vio	A-14406	
16	Lockup Release	Low Power	J127-9			Q44	J107-2			Brn-Gry	AE-26-1500	
17	Wheel Motor	Flasher	J128-1			Q42	J107-6			Blk-Brn	14-7990	
18	Upper Playfield Left	Flasher	J128-2			Q40	J107-6			Blk-Red	#906,#89(2)	
19	Right Loop Backbox	Flasher	J126-3	J125-5		Q38	J107-6	J106-5		Blk-Org	#89 (1)	#906 (1)
20	Right Bluto	Flasher	J126-4			Q36	J107-6			Blk-Yel	#906,#89(2)	
21	Left Loop Bkbox	Flasher	J126-5	J126-6		Q28	J107-6	J106-5		Blu-Grn	#89 (1)	#906 (1)
22	Animal Ramp	Flasher	J126-6	J125-7		Q30	J107-6	J106-5		Blu-Blk	#906 (2)	#906 (1)
23	Skill Wheel	Flasher	J126-7	J125-8		Q34	J107-6	J106-5		Blu-Vio	#906 (1)	#906 (1)
24	R Popper BkboxExB	Flasher	J126-8	J125-9		Q32	J107-6	J106-5		Blu-Gry	#906 (1)	#906 (1)
25	Not Used	Gen. Purpose				Q26				Blu-Brn		
26	Ramp Jackpot	Gen. Purpose	J122-2	J124-2		Q24	J107-6	J106-5		Blu-Red	#89 (1)	#906 (1)
27	Lockjaw Arrow	Gen. Purpose	J122-3	J124-3		Q22	J107-6	J106-5		Blu-Org	#89 (2)	#906 (1)
28	Escitr BkboxTurtle	Gen. Purpose	J122-4	J124-4		Q20	J107-6	J106-56		Blu-Yel	#906 (1)	#906 (1)
<b>General Illumination</b>												
01	Left Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	24-6549	
02	Right Playfield	G.I.	J121-2			Q10	J121-8			Wht-Org	24-6549	
03	Backbox General	G.I.		J120-3		Q14		J120-9		Wht-Yel		24-8768
04	Backbox Title	G.I.		J120-5		Q16		J120-10		Wht-Grn		24-8768
05	Upper Playfield	G.I.	J121-6			Q12	J121-11			Wht-Vio	24-6549	
<b>Flipper Circuits</b>												
			Voltage Connections		Drive Transistors	Drive Connections		Drive Wire Colors		Coil Part Number	Coil Colors	
			Playfield		Power	Playfield		Power	Hold			
	Lower Left Flipper	Lwr. Lt. Power	J907-7 (Gry-Yel)		Q3	J902-9		Blu-Gry				
		Lwr. Lt. Hold	J907-7 (Gry-Yel)		Q9	J902-7		Org-Blu		FL-11829	BLUE	
	Lower Right Flipper	Lwr. Rt. Power	J907-9 (Blu-Yel)		Q4	J902-13		Blu-Vio				
		Lwr. Rt. Hold	J907-9 (Blu-Yel)		Q11	J902-11		Org-Grn		FL-11829	BLUE	
	Upper Left Flipper	Up Lt. Power	J907-1 (Gry-Yel)		Q1	J902-3		Blk-Blu				
		Up Lt. Hold	J907-1 (Gry-Yel)		Q5	J902-1		Org-Gry		FL-11722	GREEN	
	Upper Right Flipper	Up Rt. Power	J907-4 (Blu-Yel)		Q2	J902-6		Blk-Yel				
		Up Rt. Hold	J907-4 (Blu-Yel)		Q7	J902-4		Org-Vio		FL-11722	GREEN	

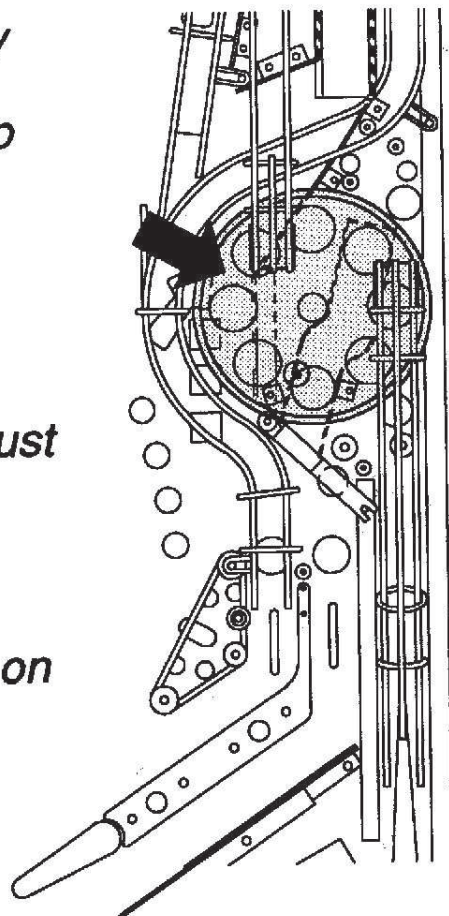
J1XX = Power Driver Board; J9XX - Fliptronic II Board; 24-6549 = #44 Bulb; 24-8704 = #89 Bulb; 24-8768 = #555 Bulb; 24-8902 = #906 Bulb



*Movement of the wheel assembly with cover removed can possibly cause **PHYSICAL INJURY**. Keep fingers and loose clothing away from **ALL** moving parts.*

*As a **safety feature**, during the wheel test both flipper buttons must be pressed before it will move.*

*Warning labels should be visible on wheel assembly when cover is removed.*



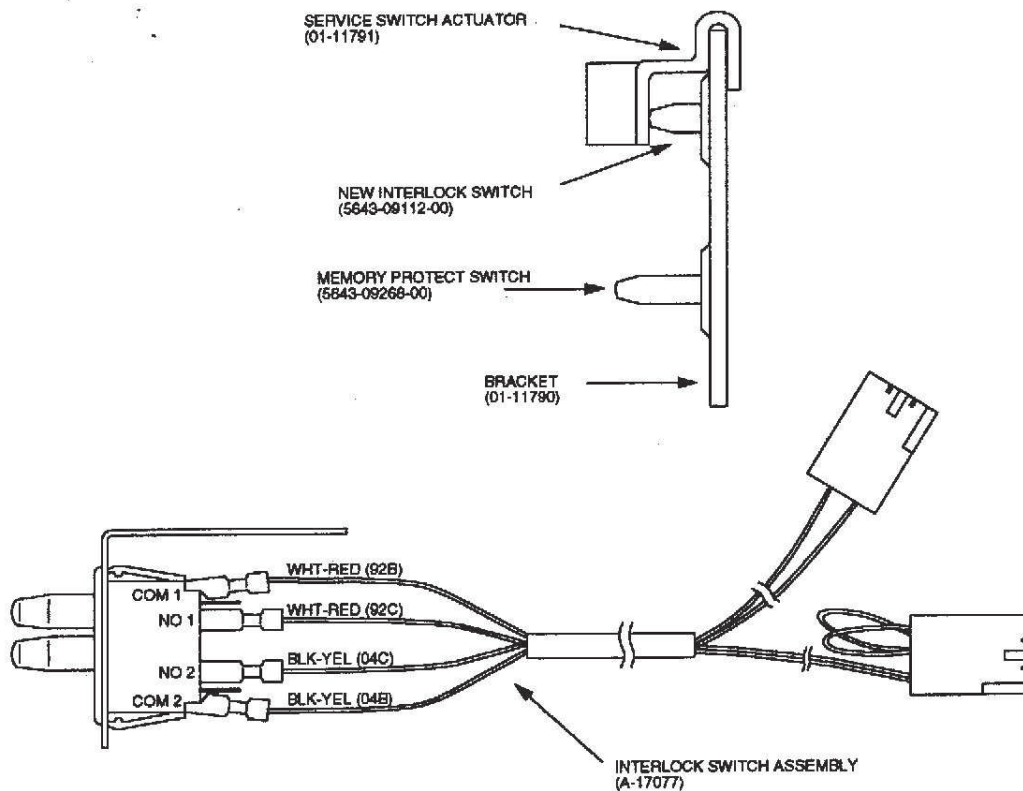
# IMPORTANT NOTICE

## 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-17077), located at the left of the coin door opening, has been added to this 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.



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## **SAVES THE EARTH**

Midway Manufacturing Company reserves the rights to make modifications and improvements to its products.

The specifications and parts identified in this manual are subject to change without notice.

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# **POPEYE**

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**Game Rules and Playfield Shot Maps**

# GAME RULES

## "SKILL SHOT"

'Skill Wheel' is spinning while ball is in shooter lane. Push "Launch Ball" button to shoot ball into desired hole in 'Skill Wheel'. Wheel values are: 10 Million 'X' - Lite Lock - Spinach Can - Oyl - Spot Animal - 2 Million - Spot Item - 100 K. On upper playfield, make '2X' shot when lit & "Wheel" values are doubled.

## "OYL & FIGHT BLUTO"

Completing top 3 rollover lanes "O-Y-L" advances bonus 'X' (2X-3X-4X-5X-6X-7X-8X-9X-10X) & lites right ball popper hole for "FIGHT BLUTO". Enter hole when lit to start lit "FIGHT BLUTO" Mode - "Spillco Oil Co." - "Blutonium Waste" - "Nevergreen Logging Co." - Earth Paving Co.". Try to undo 'Bluto's' damage by hitting targets as quickly as possible. Jet bumpers move "company" lites when not in a "FIGHT BLUTO" mode.

## "SEA HAG" & "COLLECTING ITEMS"

Hitting left "SEA" & right "HAG" targets lites ramp to "COLLECT ITEM": 'Can Opener' - 'Baby Bottle' - 'Ketchup' - 'Flower'. Collecting all four items lites instant 4-ball Multi-ball. During Multi-ball try to get 4 'Items' to 'Popeye', 'Swee'pea', 'Wimpy' & 'Olive Oyl' respectively to collect Item Jackpot.

## "POP" "EYE"

Making "POP" (left 3-bank) or "EYE" (right 3-bank) lites a 'Spinach Can'. Making corresponding shot scores double value.

## LOOP SHOTS "ROUND HOUSE"

Left flipper return lites right "ROUND HOUSE" loop shot. Right flipper return lites left "ROUND HOUSE" loop shot. Consecutive loop shots score 2 - 4 - 6 - 8 - 10 Million points.

## "ANIMAL RAMP"

Entering left ball popper hole shoots ball onto "ANIMAL KICKER RAMP". While ball is rolling down the ramp, push left flipper button to kick ball to desired animal. Once animal is selected try to 'Rescue' animal from 'Bluto' by making either of the "ROUND HOUSE" loop shots. Saving all 5 animals lites a 'Spinach Can' for "HURRY UP" bonus (50 Million rapidly decreasing down to 0). On upper playfield, upper left shot takes ball onto "ANIMAL KICKER RAMP". Making 2-bank on upper level lites shot onto "ANIMAL RAMP" for "SUPER ANIMAL". Making "SUPER ANIMAL" shot flashes one or more animals on "ANIMAL RAMP". Kicking ball into lit animal's mouth scores 10 Million & lites that animal.

### **"RAMP SHOT"**

Making ramp shots increases value & lites different features (see display).

### **"LOCKS & MULTI-BALL"**

Making left "JAB" & right "JAB" targets lites "LOCKJAW". Locking 3 balls in 'Bluto's' mouth starts multi-ball. During multi-ball, ramp shot scores "JACKPOT". Enter 'Bluto's' mouth to re-lite "JACKPOT".

### **"ESCALATOR"**

Making "ESCALATOR" shot takes ball to upper playfield. When shot is lit, you have 3 seconds to select "AWARD" by hitting flipper buttons.

### **"FIND SWEE'PEA"**

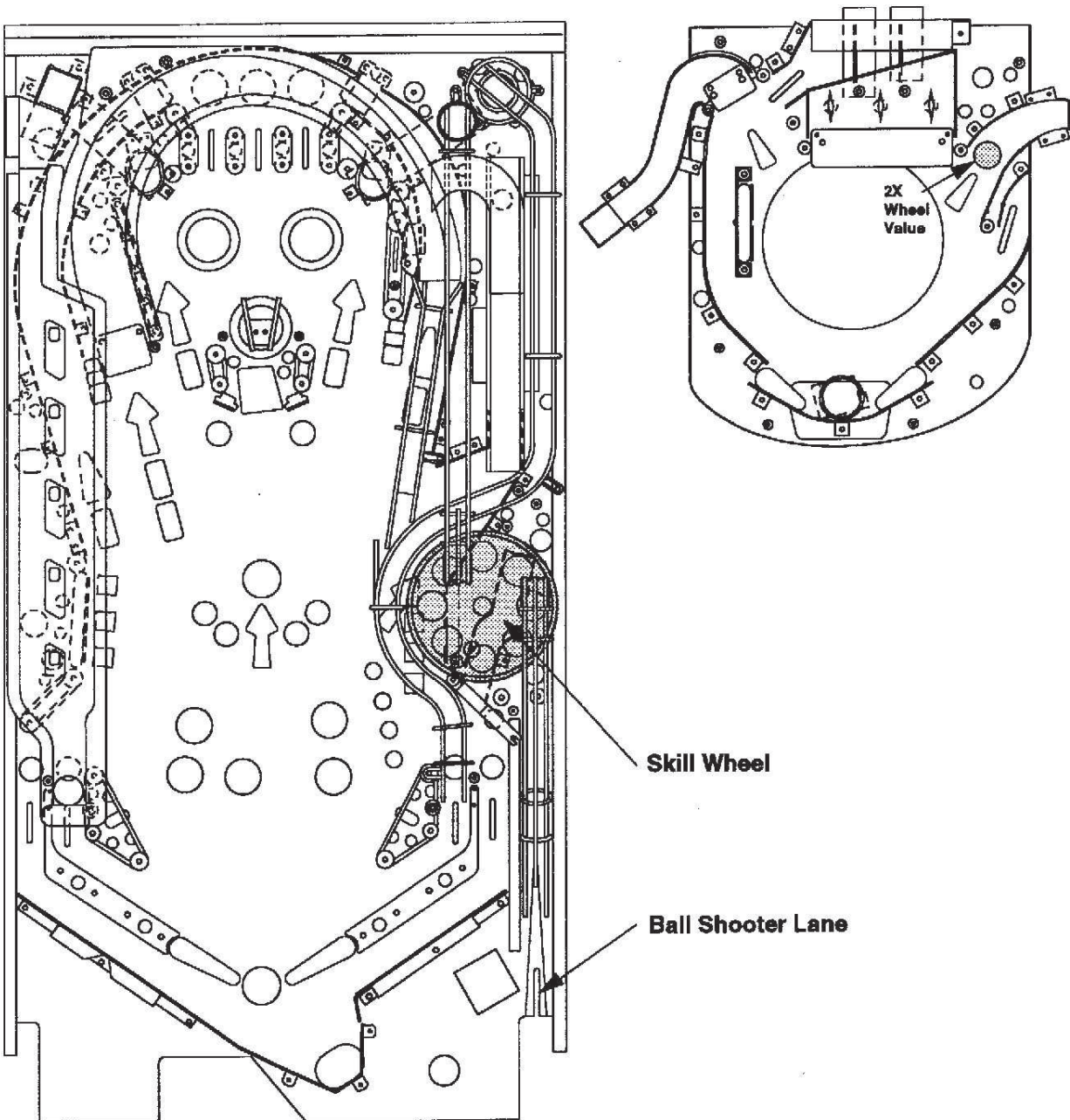
"SWEE'PEA" is lost in a maze of corridors. When on the upper level, look at the map on the Dot Matrix Display to locate "SWEE'PEA". Using the center ramp go through one of the 3 doorways to move closer to finding "SWEE'PEA". If found, collect 30 Million bonus.

### **"RESCUE OLIVE & SUPER JACKPOT"**

If the 5 main features (All 'Fight Bluto' Modes - Collecting all 4 'Items' - Saving all 5 animals - 3-ball Multi-ball - And finding 'Swee'pea') have been completed, start "SAVE OLIVE" 6-ball multi-ball by shooting into center "LOCKJAW" or either ball popper hole. During Multi-ball collect all 5 'Spinach Cans' then shoot one ball into "LOCKJAW" to "RESCUE OLIVE" & collect "SUPER JACKPOT". Value starts at '100 MILLION' and increases from game to game until it is collected.

## "SKILL SHOT"

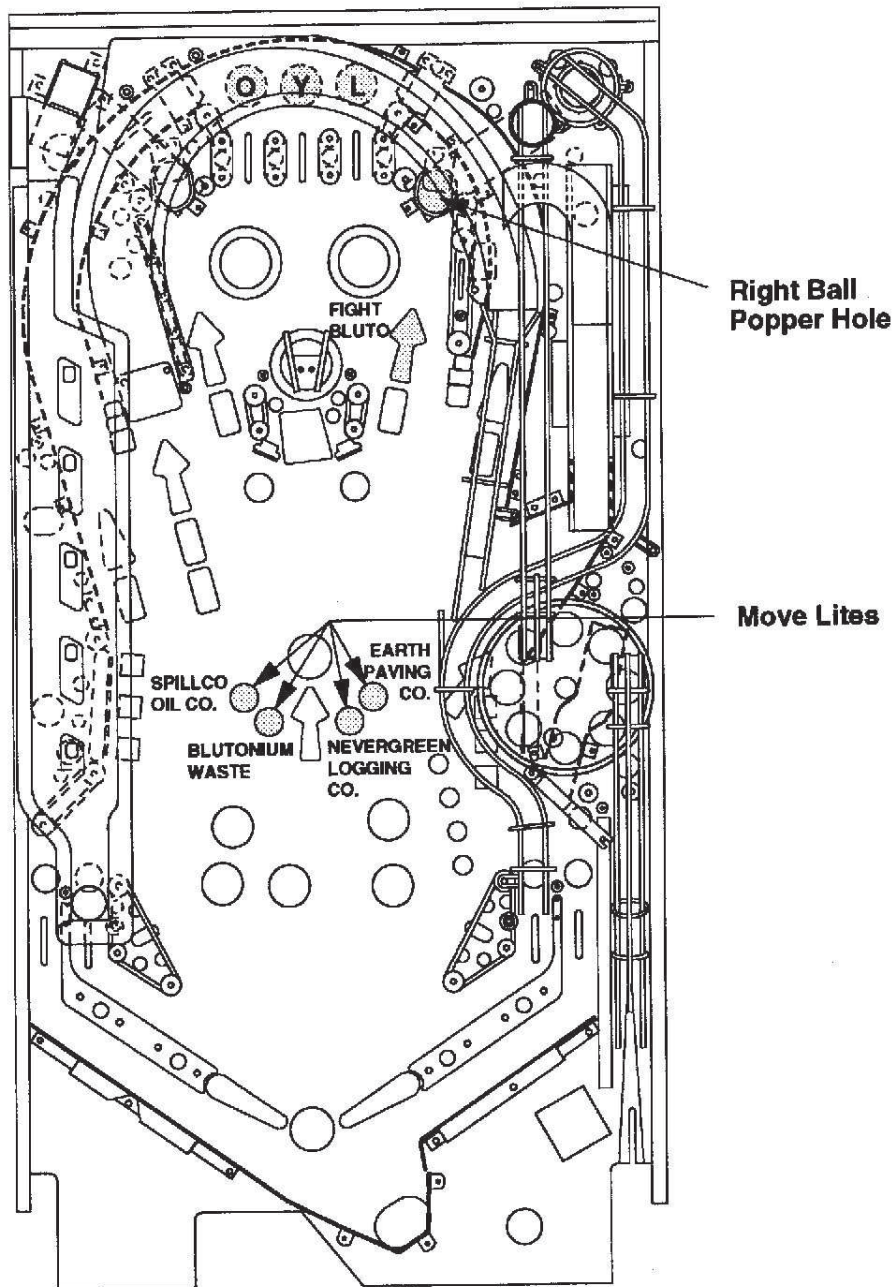
'Skill Wheel' is spinning while ball is in shooter lane. Push "Launch Ball" button to shoot ball into desired hole in 'Skill Wheel'. Wheel values are: 10 Million 'X' - Lite Lock - Spinach Can - Oyl - Spot Animal - 2 Million - Spot Item - 100 K. On upper playfield, make '2X' shot when lit & "Wheel" values are doubled. Push right flipper button to release ball into "Wheel".



### "OYL & FIGHT BLUTO"

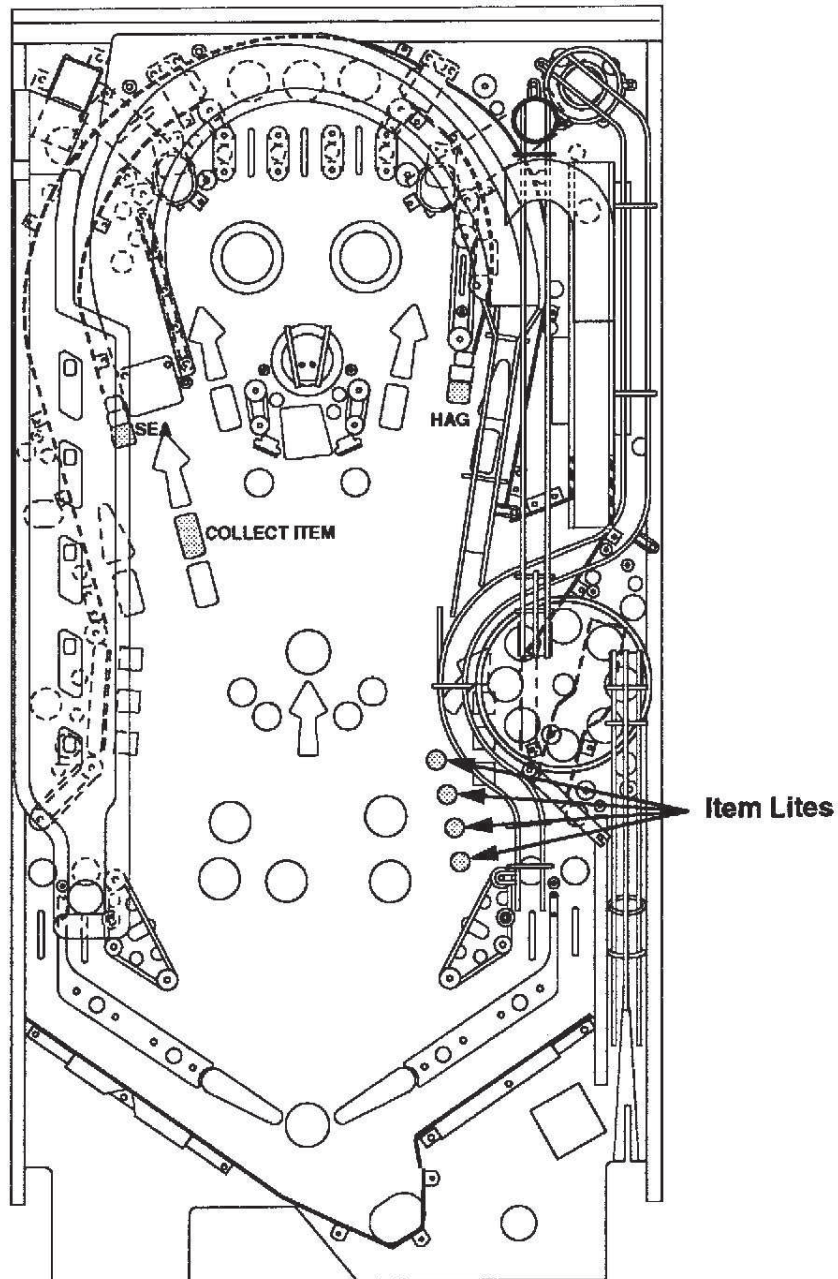
Completing top 3 rollover lanes "O-Y-L" advances bonus 'X' (2X-3X-4X-5X-6X-7X-8X-9X-10X) & lites right ball popper hole for "FIGHT BLUTO". Enter hole when lit to start lit "FIGHT BLUTO" Mode - "Spillco Oil Co." - "Blutonium Waste" - "Nevergreen Logging Co." - Earth Paving Co.". Try to undo 'Bluto's' damage by hitting targets as quickly as possible.

Jet bumpers move "company" lites when not in a "FIGHT BLUTO" mode.



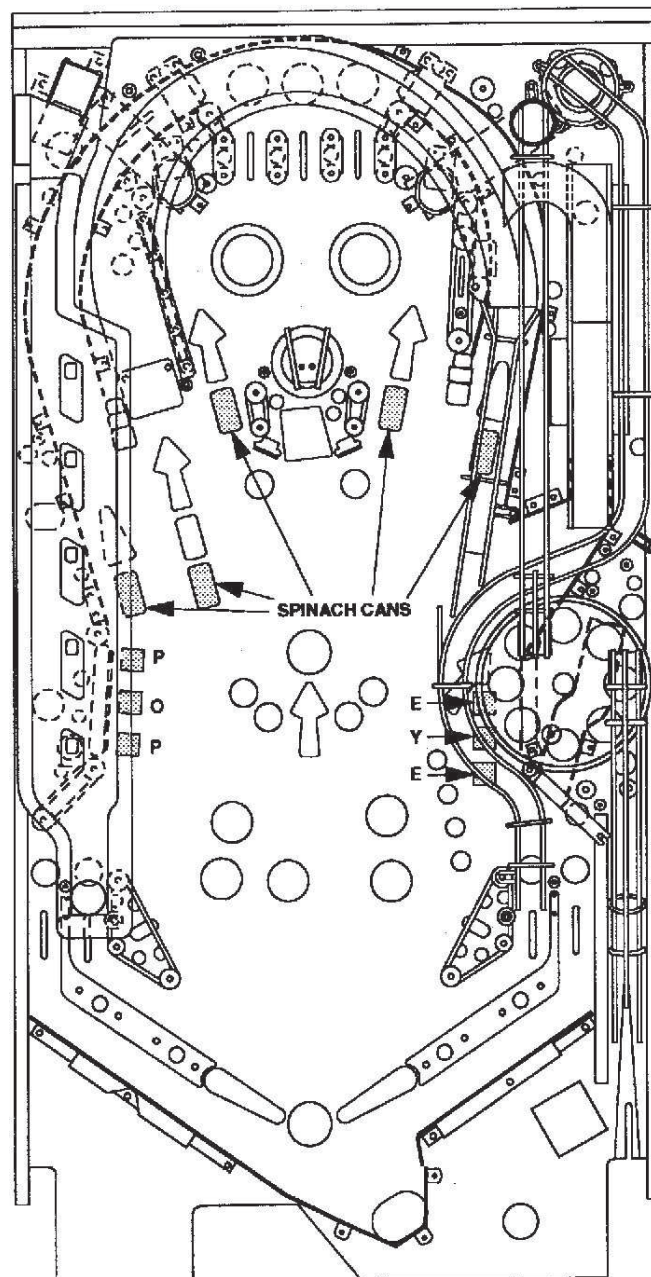
**"SEA HAG" & "COLLECTING ITEMS"**

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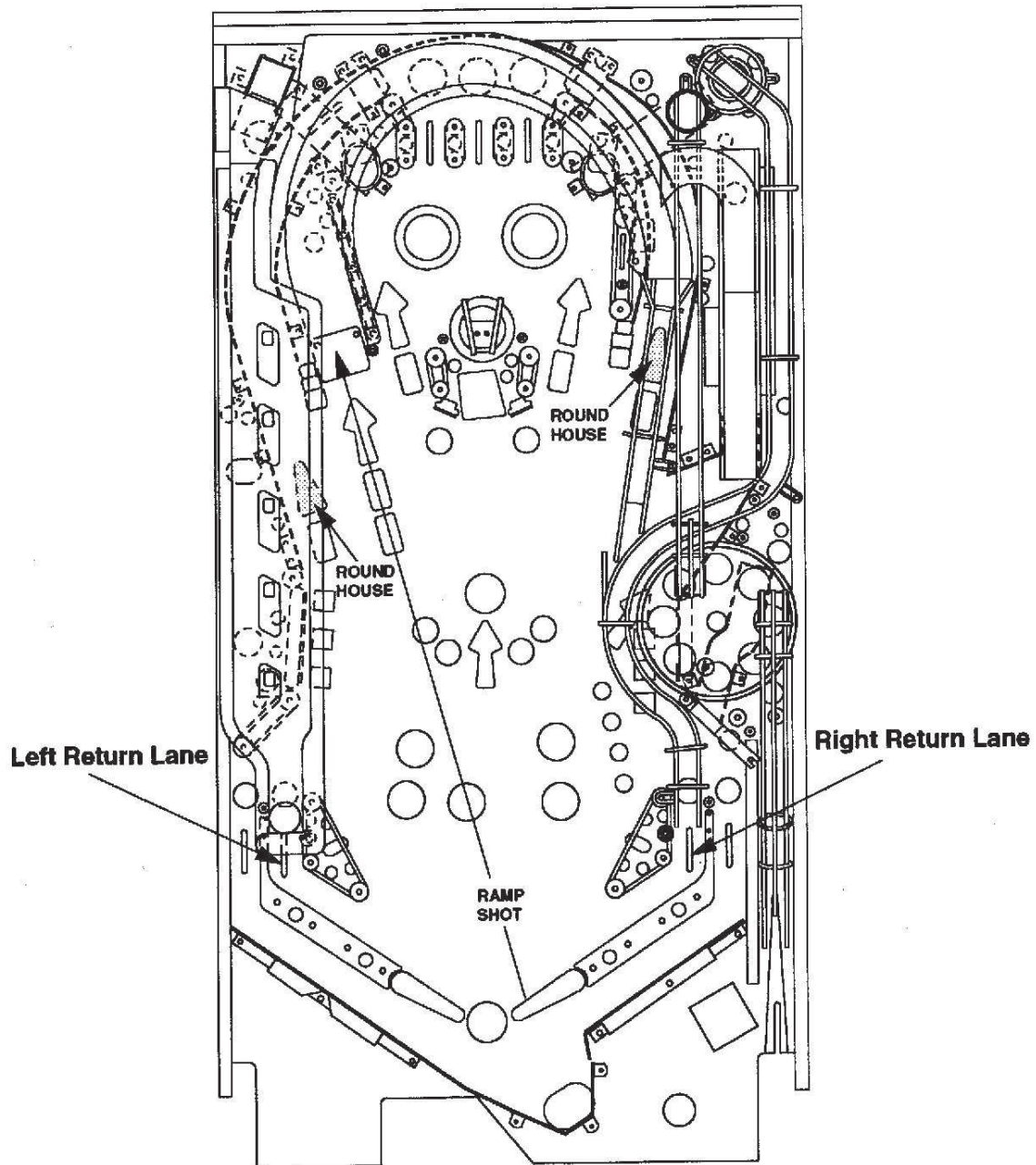


**LOOP SHOTS "ROUND HOUSE"**

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**"RAMP SHOT"**

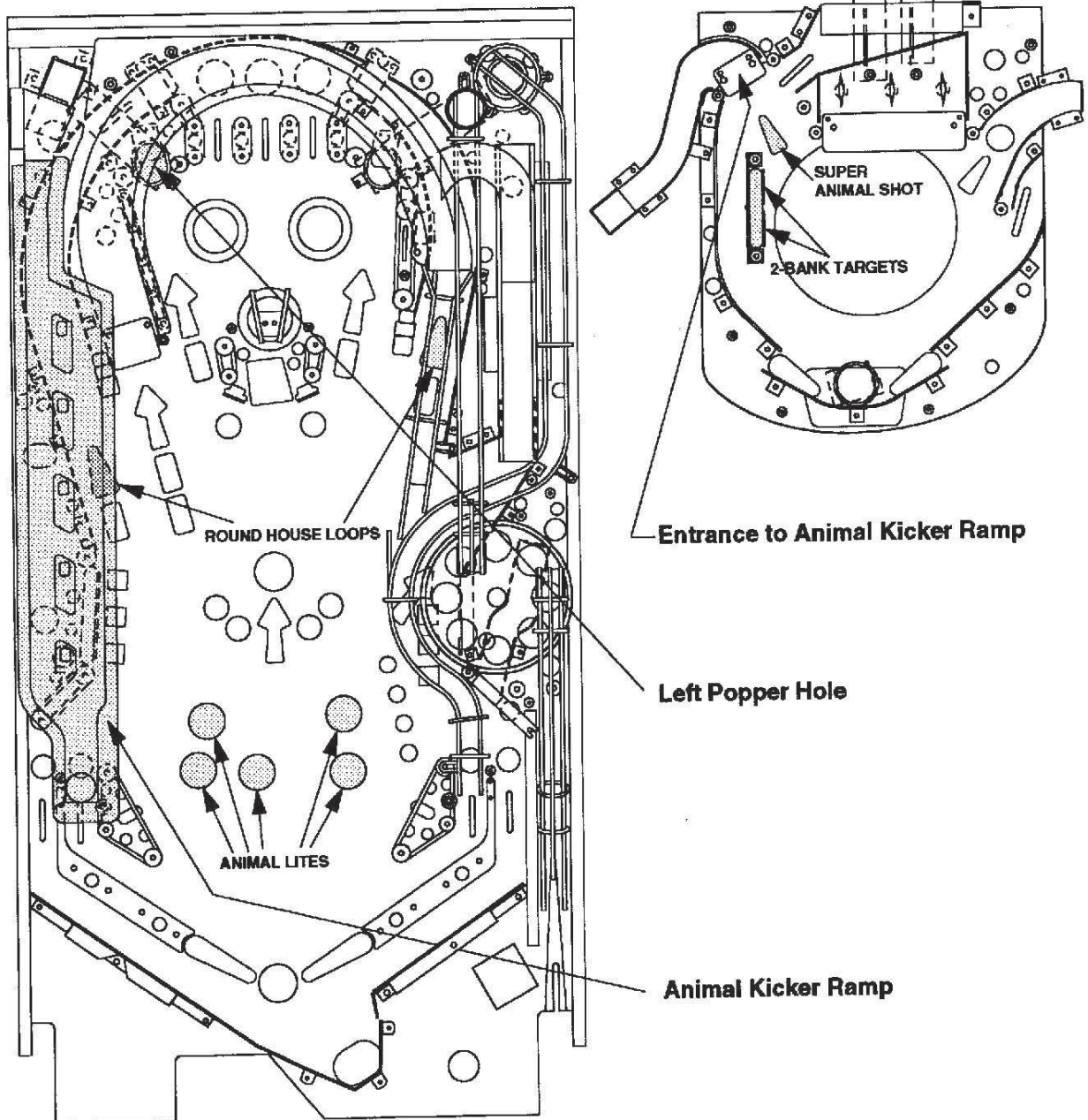
Making ramp shots increases value & lites different features (see display).





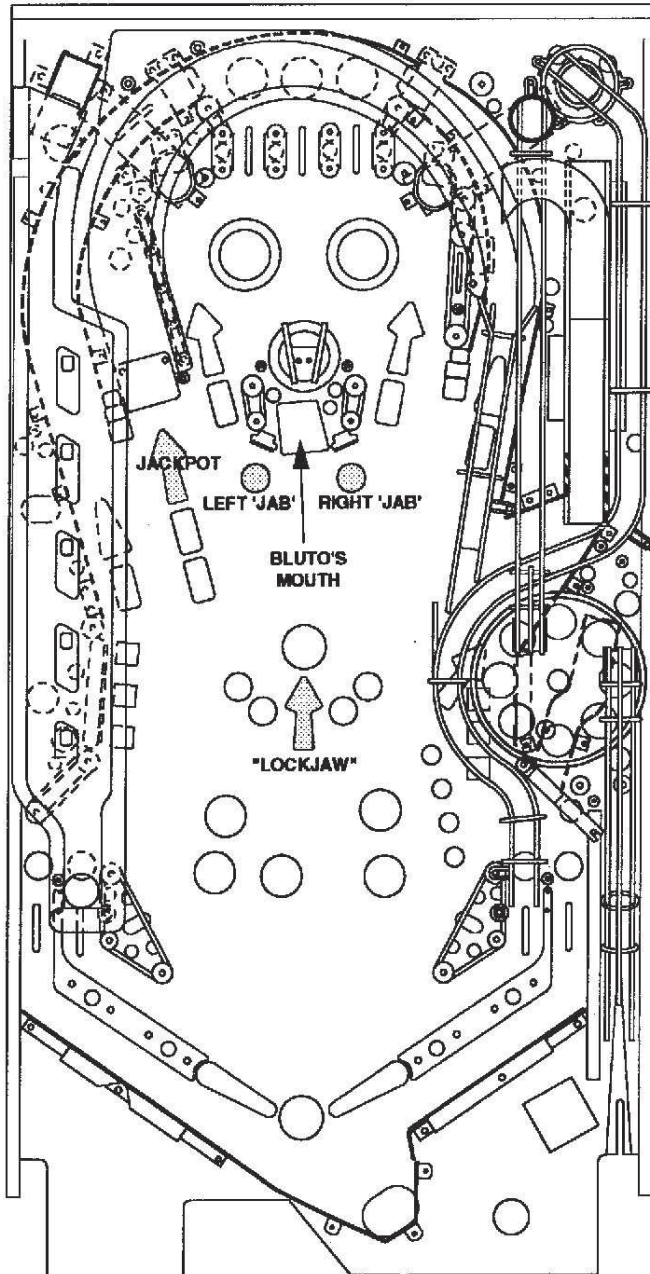
### "ANIMAL RAMP"

Entering left ball popper hole shoots ball onto "Animal Kicker Ramp". While ball is rolling down the ramp, push left flipper button to kick ball to desired animal. Once animal is selected try to 'Rescue' animal from 'Bluto' by making either of the "Round House" loop shots. Saving all 5 animals lites a 'Spinach Can' for "HURRY UP" bonus (50 Million rapidly decreasing down to 0). On upper playfield, upper left shot takes ball onto "ANIMAL KICKER RAMP". Making 2-bank on upper level lites shot onto "ANIMAL RAMP" for "SUPER ANIMAL". Making "SUPER ANIMAL" shot flashes one or more animals on "ANIMAL RAMP". Kicking ball into lit animal's mouth scores 10 Million & lites that animal.



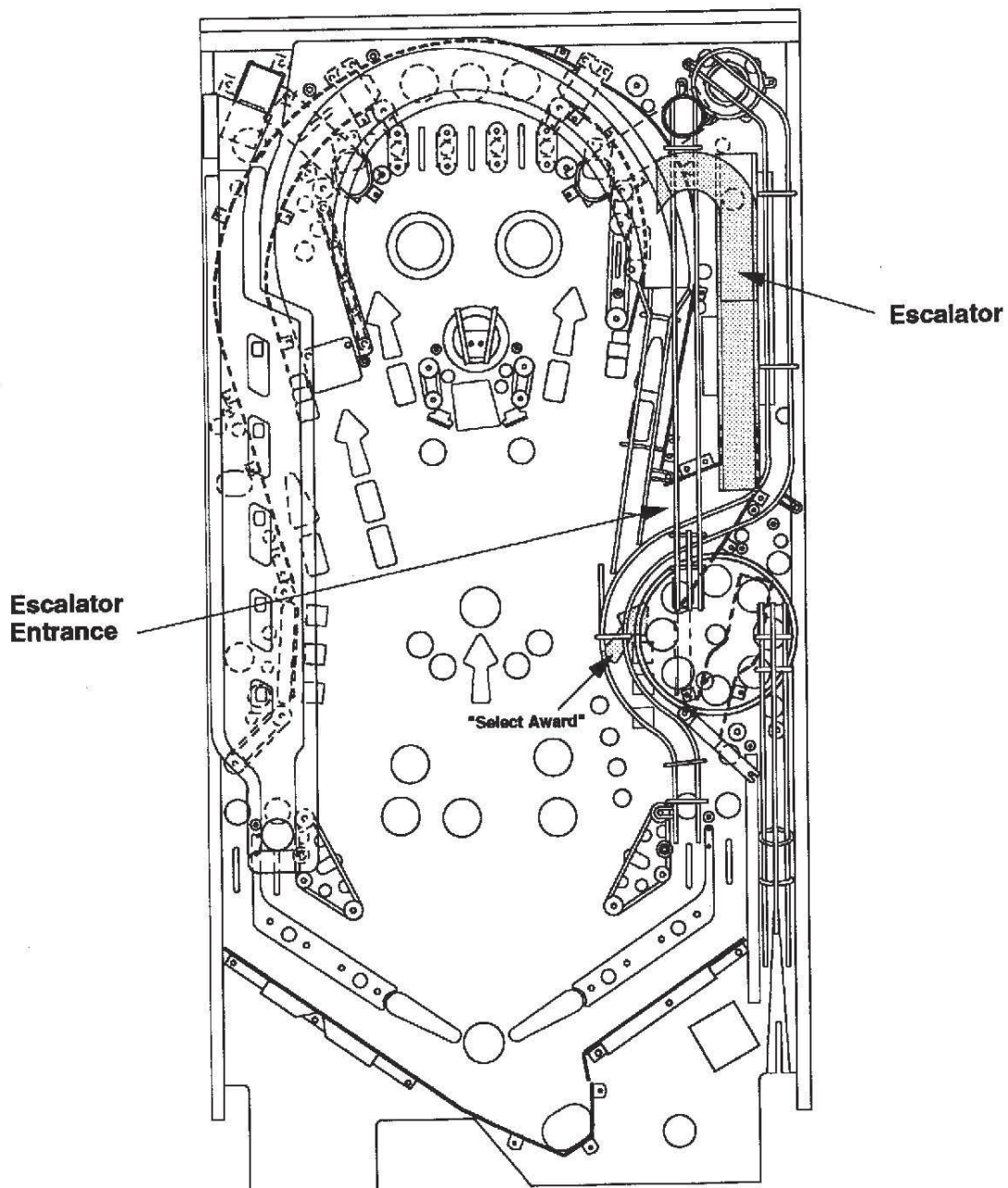
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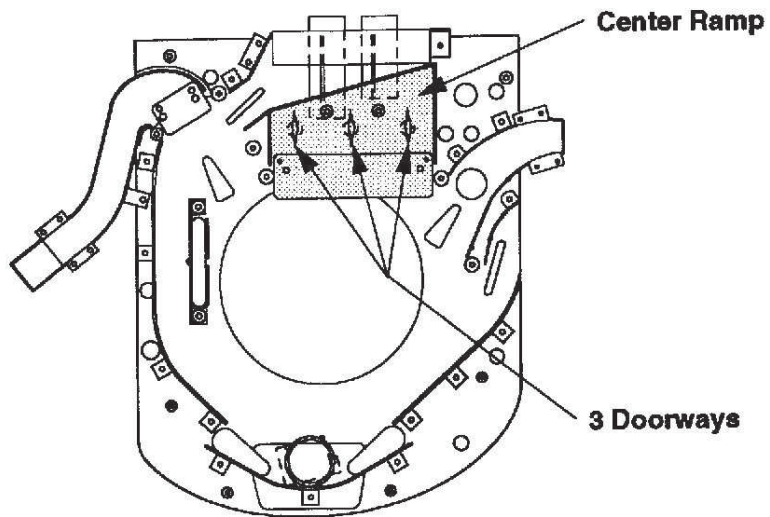
### "ESCALATOR"

Making "ESCALATOR" shot takes ball to upper playfield. When shot is lit, hit flipper buttons to select "AWARD" before ball reaches the top (see display for values).



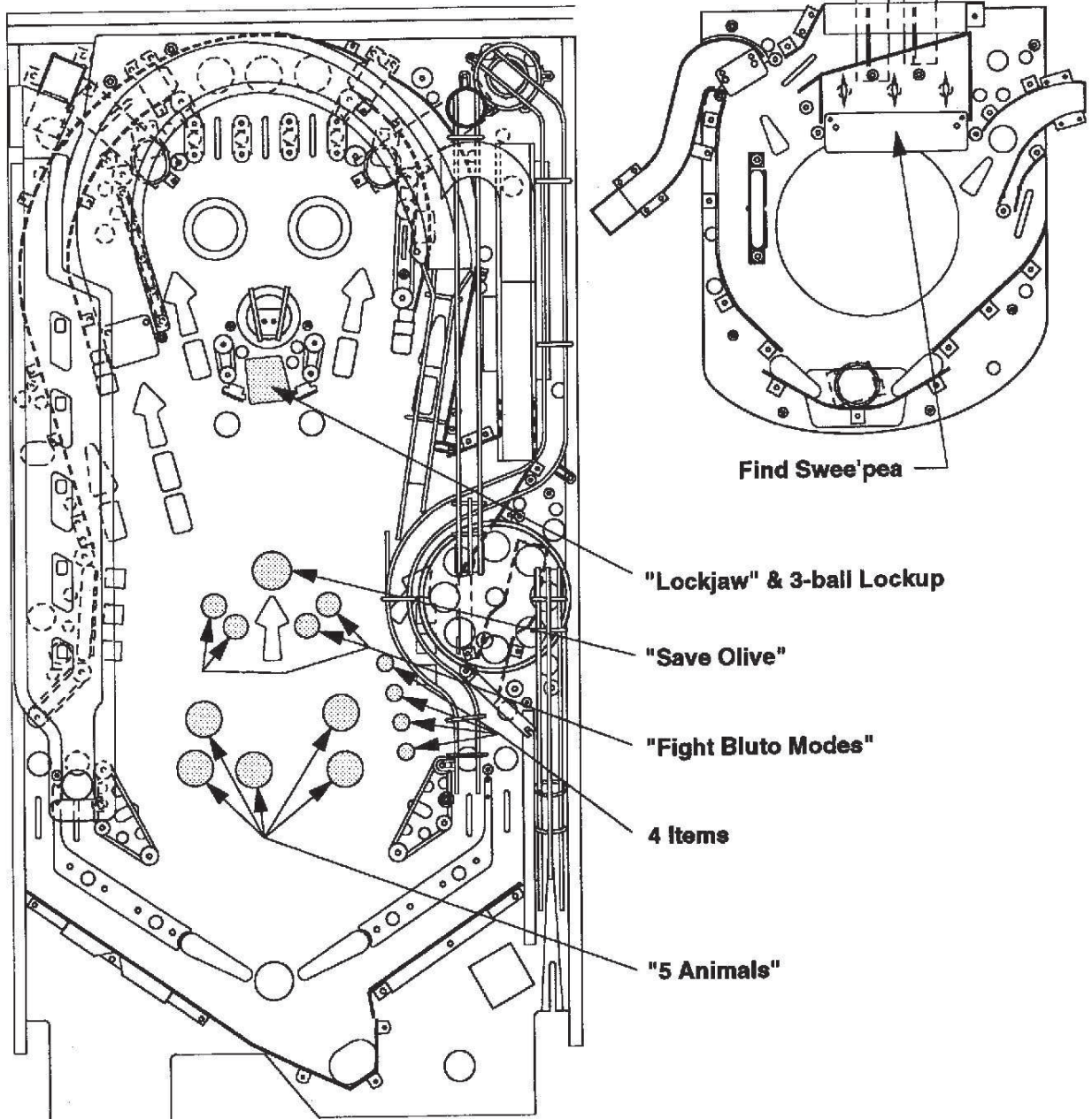
**"FIND SWEE'PEA"**

"SWEE'PEA" is lost in a maze of corridors. When on the upper level, look at the map on the Dot Matrix Display to locate "SWEE'PEA". Using the center ramp go through one of the 3 doorways to move closer to finding "SWEE'PEA". If found, collect 30 Million bonus.



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# Notes...

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# Game Operation and Test Information

## (System WPC) ROM Summary

IC	TYPE	BOARD	LOCATION	PART NUMBER
Game 1	27c040	CPU	U6	†A-5343-50022-1
Music/Speech	27c040	Audio	U2	†A-5343-50022-2
Music/Speech	27c040	Audio	U3	*5341-13934-U3 †A-5343-50022-3
Music/Speech	27c040	Audio	U4	*5341-13934-U4 †A-5343-50022-4
Music/Speech	27c040	Audio	U5	*5341-13812-U5 †A-5343-50022-5
Music/Speech	27c040	Audio	U6	*5341-13812-U6 †A-5343-50022-6
Music/Speech	27c040	Audio	U7	*5341-13812-U7 †A-5343-50022-7

† = EPROM, \* = MASKED ROM

### NOTICE

Order replacement ROMs from your authorized MIDWAY MANUFACTURING CO. distributor. Specify: (1) part number (if available); (2) ROM level (number) on the label; (3) game in which ROM is used.

# PINBALL GAME ASSEMBLY INSTRUCTIONS

## POPEYE IS A 6 BALL GAME.

(Six active balls and three captive balls.)

**Power:** Domestic 120V @ 60 Hz  
Foreign 230V @ 50 Hz  
Japan 100V @ 50 Hz

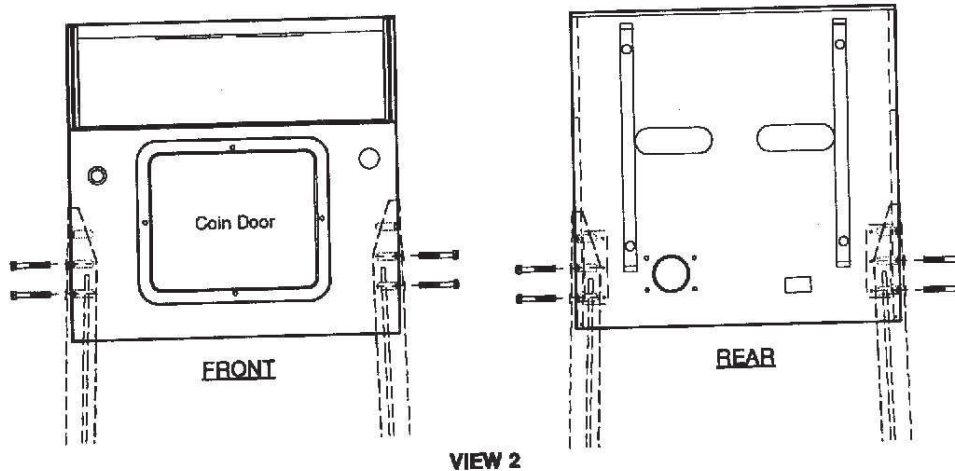
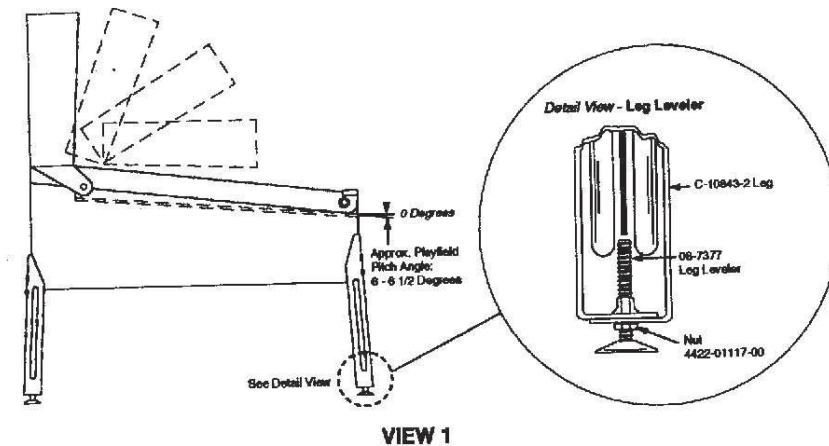
**Temp:** 32° F to 100° F  
(0° C to 38° C)

**Humidity:** Not to exceed 95% relative.

**Dimensions:** Width: 29" Approx.  
Depth: 55" Approx.  
Height: 77" Approx.

**Weight:** Approx. 325 Lbs. (crated)

1. Remove all cartons, parts, and miscellaneous items from the shipping container and set them aside.
2. Leg levelers and leg bolts are provided among the parts in the cash box. Install leg levelers on front and back legs (View 1). Place the cabinet on a support and attach rear legs using leg bolts (View 2).
3. Attach the front legs using leg bolts (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, storing it carefully to avoid damage. Remove the shipping screws holding the Insert Panel. Unlatch and open the Insert Panel. Carefully lift the Speaker Panel and lay it down on the playfield glass. Be careful not to damage the Dot Matrix Display/Driver Board. This allows access to the bolt holes used for securing the backbox upright. Install the washer-head mounting bolts through the bottom holes of the backbox into the threaded fasteners in the cabinet to secure the backbox. Close the Insert Panel and latch into position. 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 protrude approximately 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, to release the front molding. Lift the front molding off the playfield cover glass, return the latch lever to 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: These measurements 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 leg levelers to the desired playfield pitch (front to back). The recommended pitch level is 6 1/2 degrees.

#### CAUTION

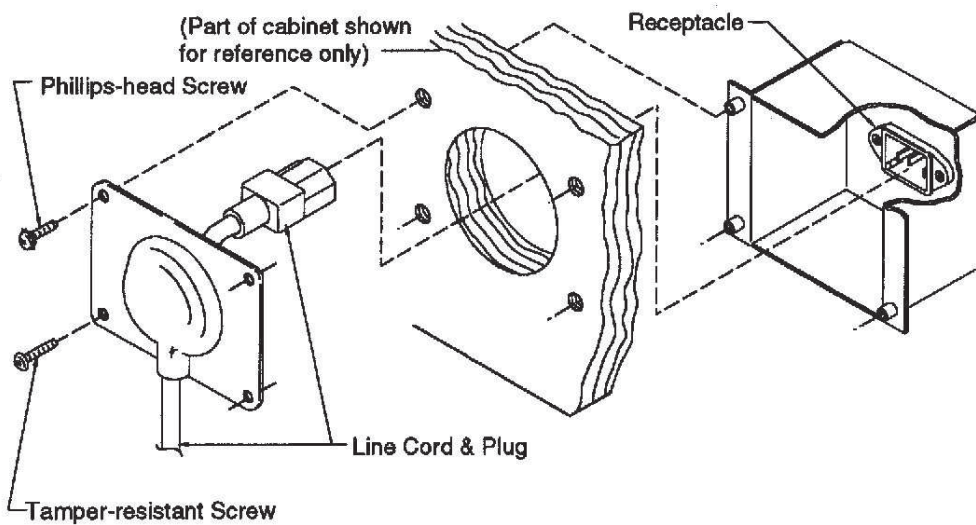
*Playfield pitch angle adjustments can affect the operation of the plumb bob tilt, inside the cabinet. The plumb bob weight is among the parts in the cash box; the operator should install the weight and adjust this tilt mechanism for proper operation, after completion of the desired playfield pitch angle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

10. Move the game into the desired location; recheck the level and pitch angle of the playfield.
11. Verify that the **required number** of balls are installed in the game. **POPEYE** uses 6 balls.
12. Install playfield mylars if desired.

**NOTE:** The **POPEYE** playfield has a special hardcoat surface and does not require a full protective mylar. However, mylars can be purchased through your local Bally Distributor. Specify part number 03-9025-2 for full playfield mylar.

13. Clean and reinstall the playfield cover glass, reversing the procedure of step 7.

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



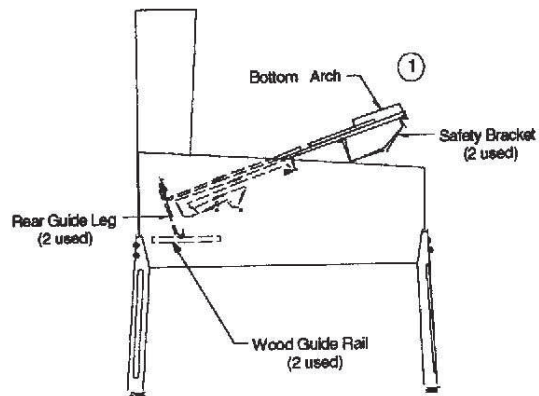
## RAISING THE PLAYFIELD

### CAUTION

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

#### To raise the playfield.

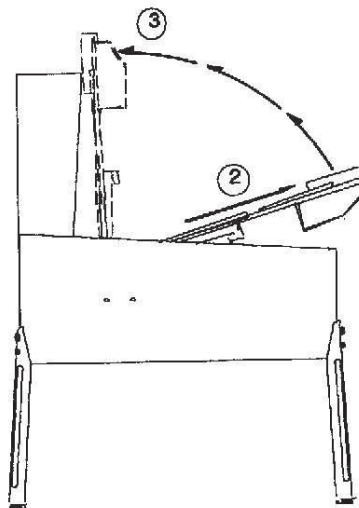
1. Grasp bottom arch and carefully lift up playfield only high enough to clear safety brackets. Rear guide legs should not hit wood guide rails or be used to slide out playfield.



2. Pull the playfield out toward you until it stops (rest position) and raise it approximately 3".

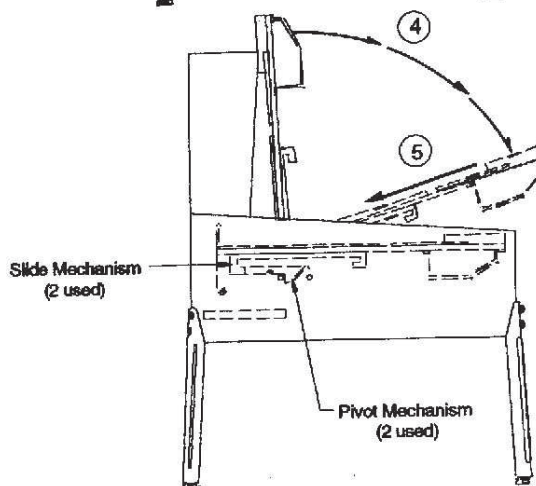
**Be sure playfield is in locked position and does not slide back into the cabinet. If it does, repeat Step 2 before proceeding to Step 3.**

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 located on the bottom of the cabinet near the right front leg.

The Start Button is the push-button to the left of the coin door on the cabinet exterior. Press the Start button to begin a game, or during the diagnostic mode, to ask for HELP.

## Coin Door Switches

The operator controls all game adjustments, obtains bookkeeping information, and diagnoses problems, using only four push-button switches mounted on the inside of the coin door. The Coin Door Switches 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 audits.

The Volume Up (+) button raises the sound level of the game. Press and hold the button until the desired level is reached.

The Volume Down (-) button lowers the sound level of the game. Press and hold the button until the 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 Switches from Normal Function to Test Function.

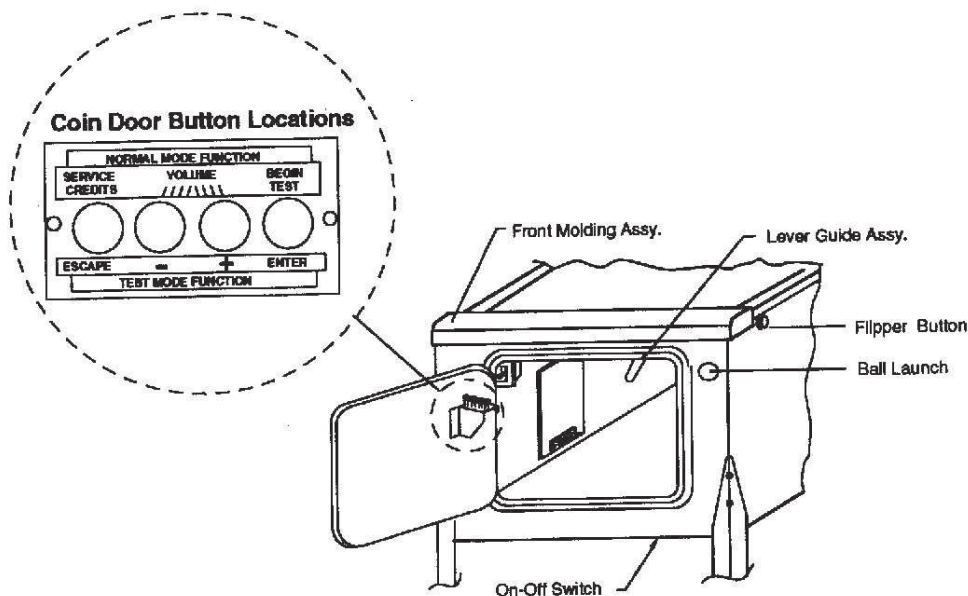
### Test Function

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 adjustment choices.

The \*Enter button allows you to get into a menu selection or lock in an adjustment choice.



*\*To reset High Score, hold down the Begin Test/Enter switch for 5 seconds while in the Attract Mode.*

# GAME OPERATION

## CAUTION

After assembly and installation at the 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 will show in the display as the game performs Start-Up Tests. Once the Start-Up Tests have been successfully completed the last score is displayed. After which, the game goes into the Attract Mode.

**Note:** After the game has been on location for a period of time, the Start-Up Tests may contain messages concerning game problems. See 'Error Messages' for more detailed information regarding messages.

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, revision level of the system software and date the game software was revised.

<b>Example:</b>	<b>POPEYE</b>	<b>Sound Rev. L-1</b>	
	50022	Rev. P-O Sy. 2.63	5/27/93

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 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 display shows a series of messages informing the player of the 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 once. 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.

**TILTS.** Actuating the cabinet tilt switch inside the cabinet ends the current game and 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 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, as appropriate.

**GAME OVER MODE.** Game Over will show in the display. Afterward, the high scores flash on the display. 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 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 Earnings Audits
B.3 Standard Audits
B.4 Feature Audits
B.5 Histograms
B.6 Time-Stamped

#### Press Escape

To move out of a menu selection.

#### Press Enter

To get into a menu selection.

#### 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 Game Time Histograms
P.7 Time-Stamped
P.8 All Data

#### Press Up

Increases sequence; Example A.1, A.2, A.3, A.4.

#### Press Down

Decreases Sequence; Example A.4, A.3, A.2, A.1.

Use Up and Down to cycle through the selections in a menu.

#### T. Test Menu

T.1 Switch Edges
T.2 Switch Levels
T.3 Single Switches
T.4 Solenoid Test
T.5 Flasher Test
T.6 General Illumination
T.7 Sound & Music Test
T.8 Single Lamps
T.9 All Lamps
T.10 Lamp & Flasher Test
T.11 Display Test
T.12 Flipper Test
T.13 Ordered Lamp Test
T.14 Wheel Test
T.15 Lockup Test
T.16 Empty All Balls

Use Escape and Enter to move into and out of the selected 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 Bum-In

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

\* "Total Plays" only counts completed games. A game is considered complete when the final ball begins. Audit information from incomplete games is ignored, therefore test and servicing operations do not affect the Audits.

† This Audit is not resettable.

### B.4 Feature Audits

B.4	01	Wheel 100K	00	B.4	20	Panda Awarded	00
B.4	02	Wheel 2 Million	00	B.4	21	Leopard Awarded	00
B.4	03	Wheel Spot Item	00	B.4	22	Eagle Awarded	00
B.4	04	Wheel Spot Animal	00	B.4	23	Dolphin Awarded	00
B.4	05	Wheel Spot O-Y-L	00	B.4	24	Animals Finished	00
B.4	06	Wheel Lite Lock	00	B.4	25	3 Ball Multi-balls	00
B.4	07	Wheel 10 Million	00	B.4	26	3 Ball Jackpots	00
B.4	08	Wheel Spot Spinach Can	00	B.4	27	Triple Jackpots	00
B.4	09	Mode Starts	00	B.4	28	Item Multi-balls	00
B.4	10	Oil Mode Start	00	B.4	29	Item Jackpot	00
B.4	11	Oil Mode Won	00	B.4	30	Escalator Entry	00
B.4	12	Waste Mode Start	00	B.4	31	Select Award	00
B.4	13	Waste Mode Won	00	B.4	32	Escalator Extra Ball Lit	00
B.4	14	Tree Mode Start	00	B.4	33	Ramp Extra Ball Lit	00
B.4	15	Tree Mode Won	00	B.4	34	Extra Ball Awarded	00
B.4	16	Brick Mode Start	00	B.4	35	Buy-In Extra Balls	00
B.4	17	Brick Mode Won	00	B.4	36	Swee'pea Found	00
B.4	18	Modes Completed	00	B.4	37	Time Per Credit	00
B.4	19	Rhino Awarded	00	B.4			



## B.5 Histograms

B.5	01	0-10 Million Scores	00%	00
B.5	02	10-20 Million Scores	00%	00
B.5	03	20-40 Million Scores	00%	00
B.5	04	40-50 Million Scores	00%	00
B.5	05	50-70 Million Scores	00%	00
B.5	06	70-100 Million Scores	00%	00
B.5	07	100-150 Million Scores	00%	00
B.5	08	150-200 Million Scores	00%	00
B.5	09	200-300 Million Scores	00%	00
B.5	10	300-500 Million Scores	00%	00
B.5	11	500-900 Million Scores	00%	00
B.5	12	900-1 Billion Scores	00%	00
B.5	13	Over 1 Billion	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

The 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)

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

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 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
T.2	Switch Levels
T.3	Single Switch
T.4	Solenoid Test
T.5	Flasher Test
T.6	General Illumination
T.7	Sound & Music Test
T.8	Single Lamps
T.9	All Lamps
T.10	Lamp & Flasher Tests
T.11	Display Test
T.12	Flipper Test
T.13	Ordered Lamps Test
T.14	Wheel Test
T.15	Lockup Test
T.16	Empty All Balls

The switch matrix, on the left side of the display, shows the state of all switches. A dot indicates the switch is open, and 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, and 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 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** Press each switch one at a time. The name and number of the switch is shown in the display. If a switch other than the one pressed, or no switch at all is indicated, the system has detected a problem with the switch circuit.

**T.2 Switch Levels** 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** 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 advance 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 advance 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. Either press the Escape button to return to the Test Menu, or the Enter button to advance to the next mode.

**T.5 Flasher Test**      This tests the flashlamp part of the solenoid circuit exclusively. This, like the Solenoid Test has three test 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 than 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 will show in the display and the corresponding bulb(s) flash. Press the Up or Down button to cycle through all of the flashlamp circuits one at a time. The same circuit 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 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 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 and the corresponding bulb(s) flash. Either press the Escape button to return to the Test Menu, or the Enter button to advance to the next mode.

**T.6 General Illumination**      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 will show in the display while the corresponding lamps light. 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 displays 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 allows you to check 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. Pressing the Up or Down button during this portion of the Sound and Music test advances to a particular sound/tune without having to wait for the program to play all the sounds available in the test. A sound/tune should be heard for each name and number that appears in the display. Any other results indicate 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. No sound/tune 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 indicate 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 indicate 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 lights 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 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 than 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, coil 01 shows in the display and the corresponding flipper activates. Press the Up or Down button to cycle through the flipper coils, one at a time. The same flipper coil 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 advance to the next mode.
- Stop - The Stop Mode halts the Flipper Coil Test. Press Enter during the Repeat mode and the Flipper Coil Test stops. No flipper coil should be activated while the test is stopped. Either press the Escape button to return to the Test Menu, or the Enter button to advance 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. Either press the Escape button to return to the Test Menu, or the Enter button to advance to the next mode.

**T.13 Ordered 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 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 Wheel Test** The Wheel Test is used to determine if the skill wheel device is functioning properly. To run the test, press and hold both flipper buttons. After doing so, the game will begin to fire balls from the trough into the wheel. The status of each of the three wheel opto's, and the wheel exit opto are displayed.

**T.15 Lockup Test** The Lockup Test has 2 options:

1) Single Ball

Choose Single Ball option. The status of all lockup switches is displayed. Putting a ball into the lockup will cause the lockup to eject the ball while displaying the status of the lockup switches.

2) Multiple Balls

Choose Multiple Ball option. The status of the switches is displayed. Insert 3 balls into the lockup. Ball count should go up as each ball is inserted. When all 3 balls are in, the lockup will empty itself.

**T.16 Empty All Balls** Removes all balls from the game. All devices begin kicking out any balls present. Collect balls at outhole.

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 settings is retained and the new settings 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 writing a Custom Message. Press the Enter button to begin entry of the custom message. Use the Up or Down button 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 you make a mistake, 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 your 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 you press Enter, 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 the operator to install 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 button 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 groups.

**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.



**Game Difficulty Setting Table for U.S./Canadian/French Games**

Adj. No.	Adjustment Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03	Hard U.0 04	Extra Hard U.9 05
A2.01	Extra Ball Percent	35%	30%	25%	15%	10%
A2.02	Ramp Extra Ball 1	8	8	8	12	13
A2.03	Ramp Extra Ball 2	ON	ON	ON	ON	OFF
A2.04	Ramp Extra Ball Memory	YES	YES	YES	YES	NO
A2.05	Escalator Extra Ball Memory	YES	YES	YES	NO	NO
A2.06	Special Memory	YES	YES	YES	YES	NO
A2.07	Mode Difficulty	EXTRA EASY	EASY	MEDIUM	HARD	EXTRA HARD
A2.08	Hurry Up Start	40 MIL	40 MIL	40 MIL	30 MIL	20 MIL
A2.09	Escalator Award Time	06	05	04	03	03
A2.11	Ball Saver	ON	ON	OFF	OFF	OFF
A2.12	Loop Record	01	01	02	04	06

**Game Difficulty Setting Table for German/European Games**

Adj. No.	Adjustment Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03	Hard U.0 04	Extra Hard U.9 05
A2.01	Extra Ball Percent	35%	30%	25%	15%	10%
A2.02	Ramp Extra Ball 1	8	8	8	12	13
A2.03	Ramp Extra Ball 2	ON	ON	ON	ON	OFF
A2.04	Ramp Extra Ball Memory	YES	YES	YES	YES	
A2.05	Escalator Extra Ball Memory	YES	YES	YES		
A2.06	Special Memory	YES	YES	YES	YES	
A2.07	Mode Difficulty	EXTRA EASY	EASY	MEDIUM	HARD	EXTRA HARD
A2.08	Hurry Up Start	40 MIL	40 MIL	40 MIL	30 MIL	20 MIL
A2.09	Escalator Award Time	06	05	04	03	03
A2.11	Ball Saver	ON	ON	OFF	OFF	OFF
A2.12	Loop Record	01	01	02	04	06

**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 the 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 Game Adjustments Table for U.S./Canadian Games**

Adjustment Number	Adjustment Description	Install 5-Ball U.9 06	Install 3 Ball U.9 07
A1.01	Balls per Game	5	3
A2.01	Extra Ball Percent	20%	25%
A2.02	Ramp Extra Ball 1	10	8
A2.03	Ramp Extra Ball 2	ON	ON
A2.07	Mode Difficulty	HARD	MEDIUM
A2.12	Loop Record	03	02

**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:

<u>Adjustment</u>	<u>Name</u>	<u>New Setting</u>
A.1 13	Replay Boost	Off
A.1 14	Replay Award	Extra Ball
A.1 15	Special Award	Extra 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 08	High Score 3 Credits	00
A.4 07	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:

<u>Adjustment</u>	<u>Name</u>	<u>New Setting</u>
A.1 14	Replay Award	Ticket
A.1 15	Special Award	Ticket
A.1 16	Match Award	Ticket
A.1 17	Extra Ball Ticket	Yes
A.1 31	Ticket Expansion Board	Yes
A.4 02	H.S.T.D. Award	Ticket

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

<u>Adjustment</u>	<u>Name</u>	<u>New Setting</u>
A.1 04	Max. Extra 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 the game. See A.2 01 "Buy Extra Ball".

**U.9 12 Serial Capture** This sets up the printer adjustments for 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 U9 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 50,000,000.

### Preset Game Adjustments Table for German/European 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.114	Replay Award	Credit	Ticket	Audit	Credit	Ticket	Audit
A.115	Special Award	Credit	Extra Ball	Points	Credit	Extra Ball	Points
A.115	Match Award	Credit	Ticket	Credit	Credit	Ticket	Credit
A.119	Match Feature	7%	7%	Off	7%	7%	Off
A.301	Game Pricing	6 spiele/5 DM	6 spiele/5 DM	6 spiele/5 DM	7 spiele/5 DM	7 spiele/5 DM	7 spiele/5 DM
A.402	H.S.T.D. Award	Credit	Ticket	Credit	Credit	Ticket	Credit
A.404	Champion Credits	03	03	00	03	03	00
A.405	High Score 1 Credits	01	01	00	01	01	00
A.406	High Score 2 Credits	00	00	00	00	00	00
A.407	High Score 3 Credits	00	00	00	00	00	00
A.408	High Score 4 Credits	00	00	00	00	00	00

\* The 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 26 are used to modify game pricing and type of play. The Preset Game Adjustments Table for French Games lists the adjustments and settings that comprise the individual groups.

### Preset Game Adjustments Table for French Games

Adj. #	Adjustment Description	French 1 U.9 23	French 2 U.9 24	French 3 U.9 25	French 4 U.9 26	French 5 U.9 27	French 6 U.9 28
A.201	Extra Ball Percent	20%	15%	25%	25%	20%	20%

\* The 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 will help in find intermittent problems. The tests that Auto Burn-in cycle through are: the Display Test, Sound and Music Test, All Lamps Test, Solenoid Test, Flashers Test, General Illumination Test, and the Flipper Coil Test. All of the tests are run concurrently. The time spent on the current 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 choice. If a mistake is made, press Escape while "Saving Adjustment Value" is in the display. The original settings 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.2 Feature Adjustments
- A.3 Pricing Adjustments
- A.4 H.S.T.D Adjustments
- A.5 Printer Adjustments (optional board required)

### A.1 Standard Adjustments

#### A.1 01 Balls Per Game

A "game" is defined by specifying the number of balls to be played.  
Range: 1-10

#### A.1 02 Tilt Warnings

The number of total actuation's of the plumb bob mechanism that can occur before the game is "tilted".  
Range: 1-10

#### A.1 03 Maximum Extra Balls

The number of extra balls that a player may accumulate.  
Range: 1-10

#### 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 Balls 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 and 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: 5-50%

#### A.1 07 Replay Start\*

The replay start value when Auto % Replay is used. The range of this setting is 100,000,000 to 700,000,000.

**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 value. When three or four replay levels are chosen, their values are automatically adjusted to three or four times the starting replay level.

\*For Auto % Replay.

**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 values used for the 1st through 4th levels of Fixed Replay. Range: 00 - 25,000,000.

**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 Begin Test is pressed.

- ON - Score is boosted between 1,000,000 and 75,000,000 points.
- OFF - Replay score is not boosted.

**A.1 14 Replay Award**

For 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 30 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.

**A.1 18 Maximum Ticket/Player**

The amount of Tickets each player can earn.  
Range 00 - 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 matching of these two digits 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 date and time in status report, or Attract Mode.  
NO - Do Not show date and time in status report or 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 General Illumination for spiral effects and Attract Mode.  
NO - Do Not dim General Illumination.

**A.1 26 Tournament Play**

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

YES - Keep Multi-ball and Jackpots equal.  
NO - Do Not Keep Multi-ball 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 Control**

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 will substantially increase the life of the lamps.

Setting: - Off, 2-60 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: 4-7 (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 this 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 3 settings to determine how this is handled.

- Never: - Do not allow a new game to 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**

The percent of games that award an extra ball.

Default: 25%                      Maximum Value: 40%

### **A.2 02 Ramp Extra Ball 1**

The number of ramp shots needed to light the first extra ball.

Default: 8                      Minimum Value: 4                      Maximum Value: 15

### **A.2 03 Ramp Extra Ball 2**

Completing 50 ramp shots lights the second extra ball.

Settings: ON/OFF              Default: ON

### **A.2 04 Ramp Extra Ball Memory**

An extra ball awarded from the ramp remains lit for the following ball.

Settings: YES/NO              Default: YES

### **A.2 05 Escalator Extra Ball Memory**

An extra ball awarded from the escalator remains lit for the following ball.

Settings: YES/NO              Default: YES

### **A.2 06 Special Memory**

Special lamp remains lit for the following ball.

Settings: YES/NO              Default: YES

### **A.2 07 Mode Difficulty**

Adjusts the difficulty of completing the four "Fight Bluto" Modes.

Settings: EXTRA EASY / EASY / MEDIUM / HARD / EXTRA HARD              Default: MEDIUM

### **A.2 08 Hurry Up Start**

The starting value a player can collect during the Hurry Up "Stampede Mode" feature. The award starts at this value and counts down to 10 Million.

Default: 40,000,000

### **A.2 09 Escalator Award Time**

The amount of time a player is given to choose an award from the escalator award list.

Default: 4 seconds              Minimum Value: 2 seconds              Maximum Value: 7 seconds

### **A.2 10 Buy Extra Ball**

This determines whether each player may buy 1 extra ball for 1 credit at the end of the game.

Settings: 1 CREDIT, OFF              Default: 1 CREDIT  
Popeye 1-27

**A.2 11 Ball Saver**

This determines whether or not a game has a minimum ball time of 8 seconds.

Factory Setting: OFF

**A.2 12 Attract Sounds**

Set to ON to enable attract mode sound and music.

Settings: ON/OFF      Default: OFF

**A.2 13 Flipper Sounds**

Set to OFF to disable flipper sounds during attract mode.

Settings: ON/OFF      Default: ON

## **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, right, center, and fourth coin chutes.

### **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 are available)**

This adjustment is used to preset adjustments 11 through 15, based on standard coin doors (U.S.A., German, Etc.).

### **A.3 11 Collection Text**

The coin system 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, and 4th coin chutes.

### **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. The factory default is 10.

### A.3 17 Free Play

The 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, 3 Credits can be purchased at the rate of 1 coin per credit. Note that this is not the same feature that allows the player to buy an extra ball at the end of the game. See A.2 01 "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

The number of 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. The options are:

- 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 slot.

### 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			4th Chute	Games/Coins	Display	Pricing Adjustments A3														
	Left	Center	Right				02	03	04	05	06	07	08	09							
USA	25¢	\$1.00 <sup>1</sup>	25¢	\$1.00	1/50¢, 2/75¢, 3/\$1 <sup>2</sup>	50¢, 75¢, \$1.00															
	25	\$1.00	25¢	\$1.00	1/3X25¢ <sup>2</sup>	USA1 1/\$0.75															
	25	\$1.00	25¢	\$1.00	1/50¢, 2/\$1 <sup>2</sup>	USA 2/\$1.00															
	25	\$1.00	25¢	\$1.00	1/50¢, 3/\$1.00 <sup>2</sup>	USA 3/\$1.00															
	25	\$1.00	25¢	\$1.00	1/2x25¢, 2/4x25¢, 3/\$1.00 <sup>2</sup>	3/\$1.00 Coin															
	25	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 3/\$1.50, 6/\$2.00 <sup>2</sup>	USA 6/\$2.00															
	25	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 3/\$1.50, 5/\$2.00 <sup>2</sup>	USA 5/\$2.00															
	25	\$1.00	25¢	\$1.00	1/3X25¢, 2/\$1.50, 4/\$2.00 <sup>2</sup>	1/.75, 4/\$2.00															
	25	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 4/\$1.50, 6/\$2.00 <sup>1,2</sup>	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 1/50¢, 2/\$1 <sup>2</sup>	CANADA 1 CANADA 2															
Austria	5sch 5sch	10sch -	10sch 10sch	- -	1/2x5sch, 3/2x10sch <sup>2</sup> 2/5sch, 5/10sch	AUSTRIA CUSTOM															
Australia	20¢ 20¢	\$1 \$1	\$1 \$1	\$2 \$2	1/\$1, 3/\$2 <sup>2</sup> 1/\$1, 2/\$2	AUSTRALIA 1 AUSTRALIA 2															
U.K.	£1.00	50P	20P	10P	1/3x10P, 2/50P, 4/£1 <sup>2</sup>	U. KINGDOM															
Switzerland	1Fr 1Fr	2Fr 2Fr	5Fr 5Fr	- -	1/1Fr, 3/2Fr, 7/5Fr <sup>2</sup> 1/2Fr, 2/3Fr, 3/4Fr, 5/5Fr	SWISS 1 SWISS 2															
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr, 3/50Fr <sup>2</sup>	BELGIUM															
Germany	1DM	2DM	5DM	-	1/2DM, 2/3DM, 3/4DM, 5/5DM <sup>2</sup> 1/1DM, 2/2DM, 5/5DM <sup>2</sup> 1/1DM, 2/2DM, 6/5DM <sup>1,2</sup>	GER. 1/2DM GER. 1/1DM GER. 6/5DM															
Holland	1G	-	1G	-	1/1G <sup>2</sup>	HOLLAND															
Sweden	1Kr 5Kr	5Kr 5kr	10Kr 5Kr	- -	1/5x1Kr, 1/5kr, 2/10Kr <sup>1,2</sup> 1/5Kr <sup>2</sup>	SWEDEN 1 SWEDEN 2															
France	1Fr 1Fr 1Fr 1Fr 1Fr 1Fr	5Fr 5Fr 5Fr 5Fr 5Fr 5Fr	10Fr 10Fr 10Fr 10Fr 10Fr 10Fr	20Fr 20Fr 20Fr 20Fr 20Fr 20Fr	1/3x1Fr, 2/5Fr, 5/10Fr, 10/20Fr <sup>2,3</sup> 1/2x1Fr, 3/5Fr, 7/10Fr, 14/20Fr <sup>2,3</sup> 1/5Fr, 3/10Fr, 7/2x10Fr, 7/20Fr <sup>1,2,3</sup> 2/5Fr, 4/10Fr, 9/2x10Fr, 9/20Fr <sup>2,3</sup> 2/5Fr, 5/10Fr, 11/2x10Fr, 11/20Fr <sup>2,3</sup> 1/5Fr, 3/10Fr, 6/20Fr <sup>2,3</sup>	TARIF 1 TARIF 2 TARIF 3 TARIF 4 TARIF 5 TARIF 6															
Italy	500L 500L 500L	500L 500L 500L	500L 500L 500L	- - -	1/500L <sup>2</sup> 1/2x500L, 3/4x500L <sup>1,2</sup> 1/500L, 2/1000L	ITALY 1 ITALY 2 ITALY 3															
Spain	100P 25P 25P 25P 25P	- - - - -	500P 100P 100P 100P 100P	- - - - -	1/100P, 6/500P <sup>2</sup> 1/25P, 5/100P 1/25P, 4/100P 1/2x25P, 2/100P 1/2x25P, 3/100P	SPAIN CUSTOM CUSTOM CUSTOM CUSTOM															
Japan	100¥	-	100¥	-	1/100¥ <sup>2</sup>	JAPAN															
Chile	Token	-	Token	-	1/1Token <sup>2</sup>	CHILE															
Denmark	1Kr	5Kr	10Kr	-	1/3x1 Kr, 3/5 Kr, 7/10 Kr <sup>2</sup>	DENMARK															
Finland	1Mka 1Mka	- -	5Mka 5Mka	- -	1/2x1 Mka, 3/5Mka <sup>2</sup> 1/3x1 Mka, 2/5Mka <sup>2</sup>	FINLAND 1 FINLAND 2															
New Zealand	\$1.00 \$2.00	- -	\$2.00 \$1.00	- -	1/\$1, 3/\$2 1/\$1, 3/\$2, (\$2-\$1 door)	NEW ZEALAND 1 NEW ZEALAND 2															
Norway	5Kr	-	10Kr	-	1/5Kr, 2/10Kr, 5/20Kr <sup>2</sup>	NORWAY															
Argentina	10¢	10¢	10¢	-	1/1 Token <sup>2</sup>	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 <sup>2</sup>	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 the 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 Ticket.

### **A.4 03 Champion H.S.T.D.**

The "Highest" High Score is 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 is displayed.
- OFF - The "Highest" High Score is not retained.

### **A.4 04 Champion Credits**

The operator chooses the number of credits or tickets awarded for a Grand Champion Score. Range: 00 - 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 to be awarded whenever a player exceeds the 1st, 2nd, 3rd, and 4th highest scores. Range: 00 - 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 - 99,900,000.

### **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 - 99,900,000.

**A.5 Printer Adjustments** (optional board required)

**A.5 01 Column Width**

The column width to be printed. Range: 22 - 80.

**A.5 02 Lines Per Page**

The amount of lines per page. Range: 20 - 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 does not pause.

**A.5 04 Printer Type**

Select the type of printer . Choices: Parallel, Serial, ADP., Mini-Drucker, or NSM.

**A.5 05 Serial Baud Rate**

The baud rate used for Serial or ADP communications (bit rate). Choices: 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 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 the 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 ≈30 games). The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep the 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).

### Pinball Missing.

This game normally uses six balls; however, it will operate with as few as one ball. 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 optos 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 hanger, 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 instance is NOT a switch problem; however, for most games this 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 running. If this occurs go to U.4 of the Utilities Menu and set the time and date.



### Factory Settings Restored.

This message indicates that the CMOS RAM 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 voltage 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 +4 V, 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. Note: Readings taken from Analog Meter. This message can also indicate that there is an open diode on a 50V coil, 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	-	ROM Error U6
Center L.E.D. blinks two times	-	RAM Error U8
Center L.E.D. blinks three times	-	Custom Chip Failure U9

#### Sound Board Beep Error Codes

##### Upon Game Turn-On:

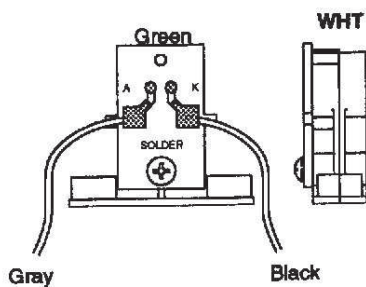
1 Beep	=	Sound Board O.K.
2 Beeps	=	U2 Failure
3 Beeps	=	U3 Failure
4 Beeps	=	U4 Failure
5 Beeps	=	U5 Failure
6 Beeps	=	U6 Failure
7 Beeps	=	U7 Failure
8 Beeps	=	U8 Failure
9 Beeps	=	U9 Failure

### 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 (L.E.D.) should always be approximately 1.4 volts. Note, the transmitter (L.E.D.) is larger than the receiver (Photo Transistor); it protrudes further from its case.

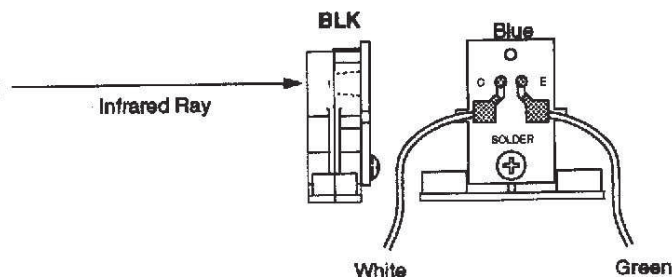
#### LED Board Transmitter

1.0-1.4 Volts

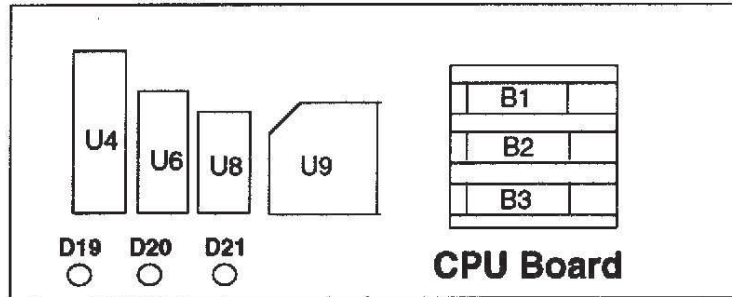


#### Photo Transistor Board Receiver

0.1-0.7V Unblocked  
11-13V Blocked



## LED List



### CPU Board

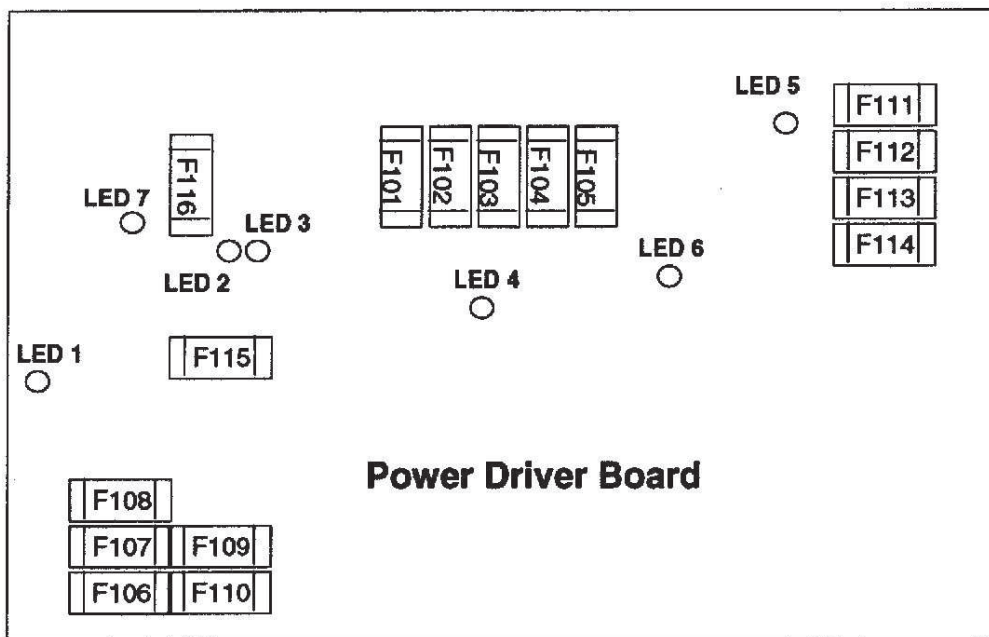
D19, Blanking

D20, Diagnostic

D21, +5vdc

At Game Turn-On = D19 & D21 On, D20 Off

During Normal Operation = D19 Off, D20 flashing, D21 On



### 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

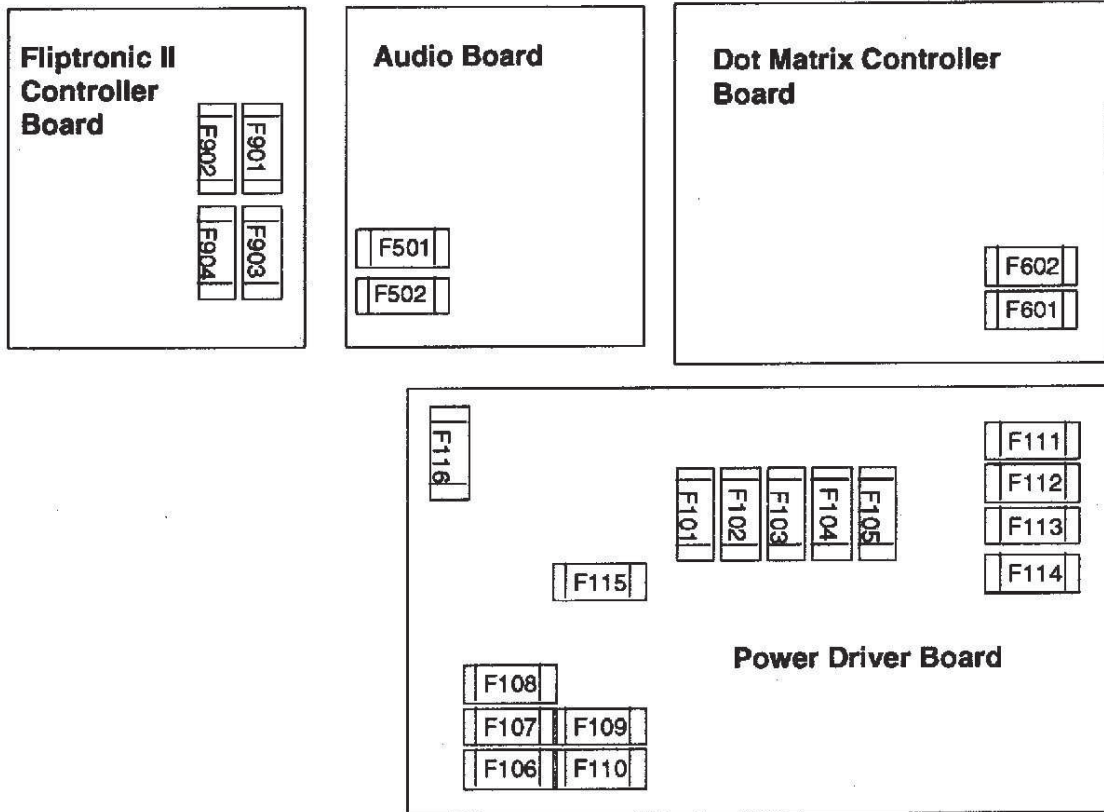
LED 4, +5vdc, Digital Circuit, Normally On

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, 250V, S.B.  
 F502 +25V Circuit 3A, 250V, S.B.

### Dot Matrix Controller Board

F601 +62V Circuit 3/8A, 250V, F.B.  
 F602 -113V and -125V Circuits 3/8A, 250V, F.B.

### Power Driver Board

F101 Left Flipper 3A, 250V, S.B. (Not Used)  
 F102 Right Flipper 3A, 250V, S.B. (Not Used)  
 F103 Solenoid #25-#28 3A, 250V, S.B.  
 F104 Solenoid #9-#16 3A, 250V, S.B.  
 F105 Solenoid #1-#8 3A, 250V, S.B.  
 F106 G.I. #5 Wht-Vio 5A, 250V, S.B.  
 F107 G.I. #4 Wht-Gm 5A, 250V, S.B.  
 F108 G.I. #3 Wht-Yel 5A, 250V, S.B.  
 F109 G.I. #2 Wht-Org 5A, 250V, S.B.  
 F110 G.I. #1 Wht-Brn 5A, 250V, S.B.  
 F111 Flasher Secondary 5A, 250V, S.B.  
 F112 Solenoid Secondary 7A, 250V, S.B.  
 F113 +5V Logic 5A, 250V, S.B.  
 F114 +18V Lamp Matrix 8A, 32V, N.B.  
 F115 +12V Switch Matrix 3/4A, 250V, F.B.  
 F116 +12V Secondary 3A, 250V, S.B.

### Fliptronic II Controller Board

F901 Upper Right Flipper 3A, 250V, S.B.  
 F902 Upper Left Flipper 3A, 250V, S.B.  
 F903 Lower Right Flipper 3A, 250V, S.B.  
 F904 Lower Left Flipper 3A, 250V, S.B.

### Line Filter

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

## MAINTENANCE INFORMATION

### LUBRICATION

The two main lubrication points of the Ball Shooter Lane Feeder mechanism are the pivots for the arm. The mechanism of other playfield devices are somewhat similar 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 Drop Targets. MBI Instrument Grease, also known as Drop Target Switch Lubricant, (Bally part number of EI 165), 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 and should close when the flipper is energized. All end-of-stroke switches and flipper button cabinet 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. Please note that unlike the old style of flipper, an end-of-stroke switch failure will not harm the flipper. The game will notify the operator of a switch being misadjusted in the test report, but will continue to play. The end-of-stroke switches are a means by which the new electronic flippers feel and play with all of the subtleties of the old flippers.

### CLEANING

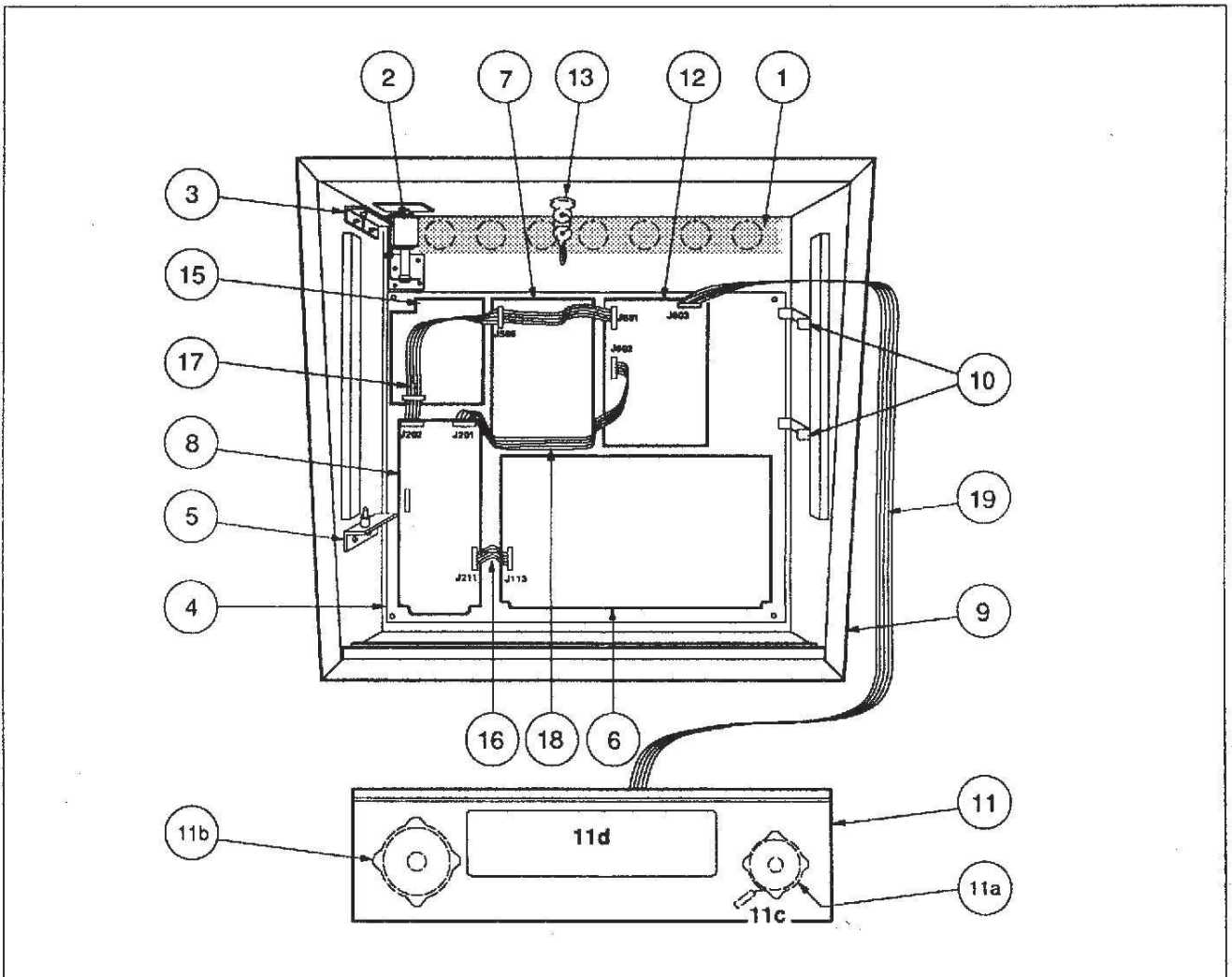
Good game action and extended playfield life are the results of regular playfield cleaning. During each collection stop, the playfield glass should be removed and thoroughly cleaned and the playfield should be wiped off with a clean, lint-free cloth. The game balls should be cleaned and inspected for 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 TWO

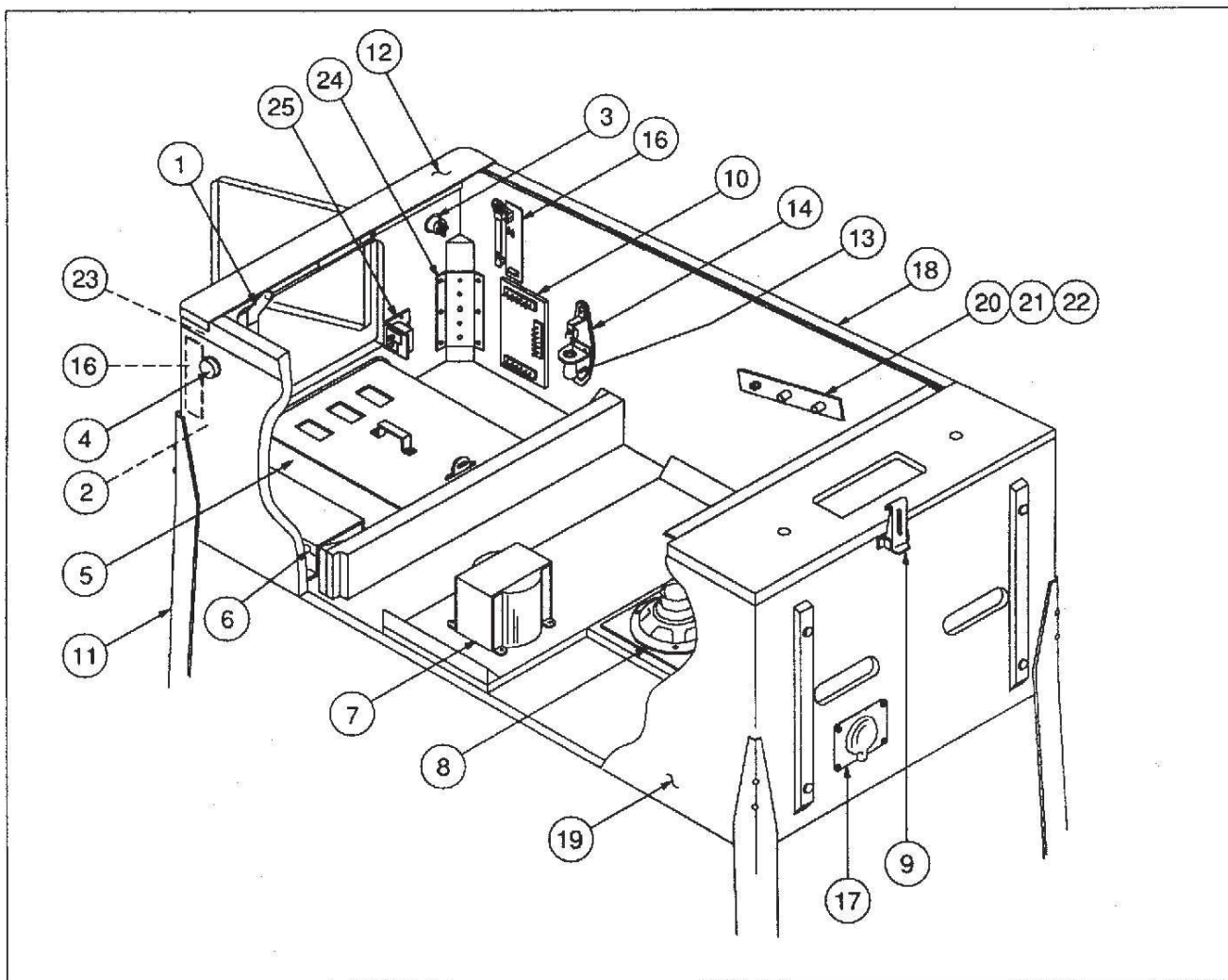
## Game Parts Information

## Backbox Assembly



Item	Part Number	Description	Item	Part Number	Description
1.	01-6645	Venting Screen	15.	A-15472-1	Fliptronic II Board
2.	B-10686-1	Knocker & Bracket Assy.	<b>■ Ribbon Cables:</b>		
3.	A-12497	Upper Insert Bd Hinge Assy.	16.	5795-12653-03	Ribbon Cable, 3"
4.	A-14092-5	Mounting Plate Assembly	17.	5795-13018-01	Ribbon Cable, 23.5"
5.	A-12498	Lower Insert Bd Hinge Assy.	18.	5795-10938-14	Ribbon Cable, 14"
6.	A-12697-3	Power Driver Assembly	19.	5795-12838-30	Ribbon Cable, 30"
7.	A-16917-50022	WPC Sound Board	<b>■ Miscellaneous Parts:</b>		
8.	A-12742-50022	WPC CPU Board	A-8552-50022	Tempered Backglass Assy.	
9.	A-16123-50022	Backbox Assembly	08-7456	Backbox Glass: 27" x 18-7/8"	
10.	01-9047	Insert Stop Bracket	31-1357-50022	Screened Translight	
11.	A-17583	Speaker / Display Assy.	03-8228-2	Glass Channel Top (1)	
a)	5555-12924-00	Speaker, 4Ω, 15w	03-8228-3	Glass Channel Edge (2)	
b)	5555-12856-00	Speaker, 5-1/4", 4Ω, 25w	03-8229-1	Glass Lift Channel (1)	
c)	5045-12914-00	Cap., 10μfd., 50v, (±20%)			
d)	5901-12784-00	Dot Matrix Display/Driver Bd.			
12.	A-14039	Dot Matrix Contoller Board			
13.	A-13379	Lock & Plate Assembly			
a)	20-9637	Lock & Cam Kit			
14.	50022-IN	Insert Board			

## Cabinet Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16773	Lever Guide Assembly	18.	A-12359-3	Side Molding Assy. (2 Used)
2.	20-9663-9	Extra Ball Button, Yellow	19.	11-1131	Wood Cabinet
3.	20-9663-1	Start Button, Yellow	20.	01-11408	Spacer (2 Used)
4.	A-16883-4	Flipper Button - Red (2 Used)	21.	02-4329-1	Pivot Nut, 7/8" (4 Used)
5.	A-17445-1	6-Ball Cashbox Assembly	22.	02-4352	Pivot Bushing (2 Used)
6.	*	Line Filter Assembly	23.	20-9663-B-4	Launch Ball, Red
7.	5610-13491-00	WPC Transformer, 115/230v	24.	01-11400	Leg Plate (4 Used)
8.	5555-12929-00	Speaker, 4Ω, 6", 25w	25.	A-17175-1	Cable & Interlock Switch Assy.
9.	20-9347	Toggle Latch			
10.	A-17051-1	Coin Door Interface Bd.			
11.	C-10843-2	Metal Leg Assembly			
12.	A-16055	Front Molding Assembly			
13.	20-6502-A	Plum Bob			
14.	A-15361	Tilt Mechanism Assembly			
15.	*	Cordset			
16.	A-17316	Opto Flipper Assembly (2 Used)			
	A-16384	Opto Flipper			
17.	01-10714	Line Cord Cover			

\* See Application Chart (p.2-4).

### ■ Miscellaneous Parts:

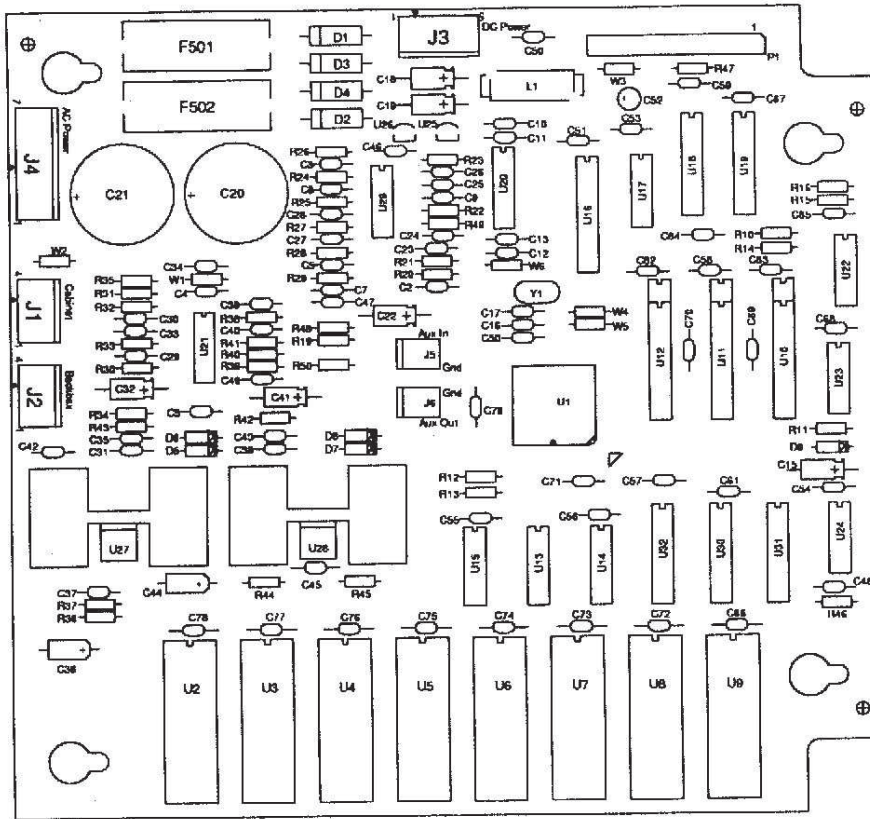
08-7028-1	Tempered Playfield Glass, Wide Body: 23.75" x 43"
01-10797	Playfield Support Bar, 18" Long
01-11791	Service Switch Actuator
01-12352	Clip Bracket
08-7377	Leg Leveler Adjuster, 3"
20-6500	Steel Ball, 1-1/16" (6)
A-17195	Tilt Switch Assy. w/Cable

## Line Filter/Cordset Application Chart

COUNTRY	LINE FILTER ASSY.			CORDSET								
	A-16970-120V	A-16970-230V		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	✓			✓								
CANADA	✓			✓								
TAIWAN	✓			✓								
MEXICO	✓			✓								
CENTRAL AMERICA	✓			✓								
SOUTH KOREA	✓			✓								
PUERTO RICO	✓			✓								
AUSTRIA		✓			✓							
BELGIUM		✓			✓							
FINLAND		✓			✓							
FRANCE		✓			✓							
GREECE		✓			✓							
HOLLAND		✓			✓							
HUNGARY		✓			✓							
NETHERLANDS		✓			✓							
NETH. ANTILLES		✓			✓							
NORWAY		✓			✓							
POLAND		✓			✓							
PORTUGAL		✓			✓							
SPAIN		✓			✓							
SWEDEN		✓			✓							
TURKEY		✓			✓							
WEST GERMANY		✓			✓							
UNITED KINGDOM		✓				✓						
IRELAND		✓				✓						
HONG KONG		✓				✓						
DENMARK		✓					✓					
ITALY		✓						✓				
CHILE		✓						✓				
PEOPLE'S REP. OF CHINA		✓						✓				
SWITZERLAND		✓							✓			
AUSTRALIA		✓								✓		
NEW ZEALAND		✓								✓		
ARGENTINA		✓								✓		
JAPAN	✓										✓	✓

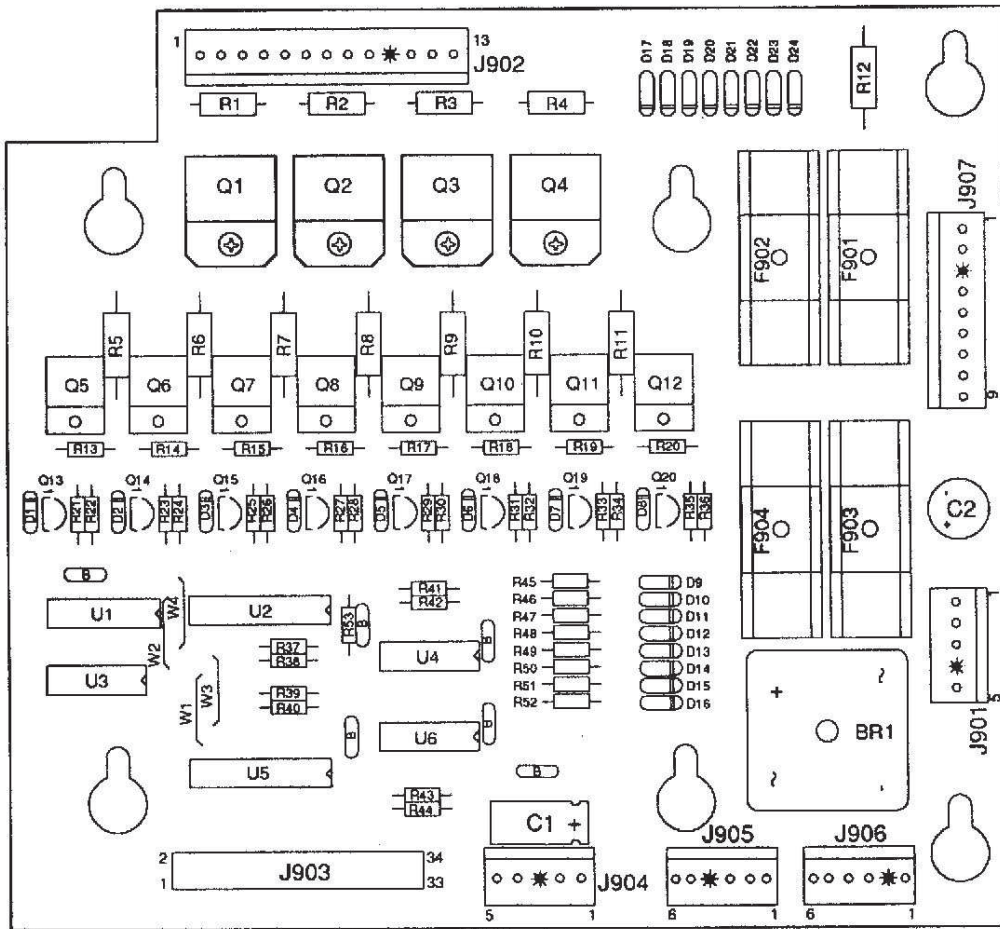


# A-16917-50022 Sound Board Assembly



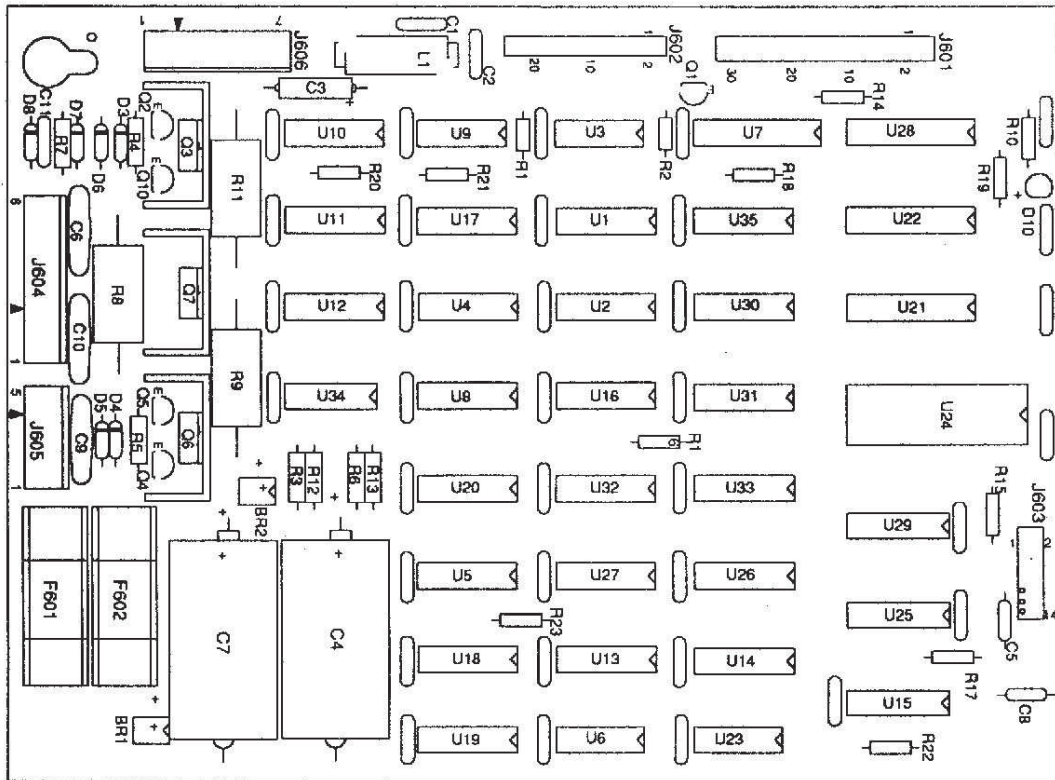
Part No.	Designator	Description	Part No.	Designator	Description
4004-01005-06	U27, U28	Mach. Screw, 4-40 x 3/8"	5250-13302-00	U25	78L05 Pos 5 Volt Reg TO-92
4404-01119-00	U27, U28	Nut, 4-40	5250-13303-00	U26	79L05 Neg 5 Volt Reg TO-92
5010-08772-00	R39, R41	Resistor, 15K $\Omega$ , 1/4W, 5%	5283-10551-00	U17	IC74F00 Fast Quad NAND Gate
5010-08774-00	R30, R34, R37, R42, R45	Resistor, 22K $\Omega$ , 1/4W, 5%	5311-10946-00	U22	IC74HC74 Dual D Flip Flop
5010-08991-00	R10, R12 -R16	Resistor, 4.7K $\Omega$ , 1/4W, 5%	5311-10947-00	U23	IC74HC125 quad Tri-State Buffer
5010-09034-00	R47	Resistor, 10K $\Omega$ , 1/4W, 5%	5311-10948-00	U15	IC74HC138 1 of 8 Decoder
5010-09035-00	R11, R19, R33, R40	Resistor, 47K $\Omega$ , 1/4W, 5%	5315-12009-00	U18, U19	IC74HCT374 Octal D Flip Flop
5010-09036-00	R46	Resistor, 100 $\Omega$ , 1/4W, 5%	5311-12043-00	U13, U14	IC74HC174 Hex D Flip Flop
5010-09219-00	R31, R32, R38	Resistor, 8.2K $\Omega$ , 1/4W, 5%	5311-12538-00	U24	IC74HC14 Hex Schmitt Inverter
5010-09358-00	R50	Resistor, 1K $\Omega$ , 1/4W, 5%	5311-12287-00	U30 - U32	IC74HC541 Octal Bus Driver
5010-09534-00	W4, W6	Resistor, 0 $\Omega$ (Jumper)	5340-13304-00	U10 - U12	ICSRAM 2Kx8 35ns .300DIP
5010-13420-00	R36, R44	Resistor, 680 $\Omega$ , 1/4w, 5%	5370-12730-00	U21, U29	ICTL084 Quad op Amp
5010-13607-00	R20-R29, R48, R49	Resistor, 6.2K $\Omega$ , 1/4w, 5%	5370-13419-00	U27, U28	Audio Power Amp TDA2030AV
5010-13517-00	R35, R43	Resistor, 15 $\Omega$ , 1/4w, 5%	5371-13299-00	U20	ICDAC AD-1851 16 bit
5040-09365-00	C15, C18, C19, C32, C41	Capacitor, 1 $\mu$ F, 63V, Alum Axial	5400-13298-00	U1	Processor ADSP-2105-KP40
5040-09421-00	C52	Capacitor, 100 $\mu$ F, 25V, Alum Radial	5520-13301-00	Y1	Crystal 10MHz Parallel Resonant
5040-13417-00	C20, C21	Capacitor, 10,000 $\mu$ F, 35V, Alum Rad.	5700-12047-00	U16	Inductor, 4.7 $\mu$ H, 3Amp
5041-09009-00	C36, C44	Capacitor, 22 $\mu$ F, 10V, Tant Axial	5700-12088-00	U2 - U9	IC socket 24 pin 0.300 DIP
5041-13187-00	C22	Capacitor, 4.7 $\mu$ F Tant Axial	5705-12638-00	U27, U28	IC socket 32 pin 0.600 DIP
5043-08996-00	C4, C5, C10-C13, C31, C35, C38, C43, C46, C47, C50 -C79	Capacitor, 0.10 $\mu$ F, Cer Axial	5733-12060-01	-	Heatsink 5298-B
5043-10267-00	C37, C45	Capacitor, 150pF, Cer Axial	5791-10862-04	J1, J2	Fuse Holder MT3AG(F501, F502)
5048-11028-00	C16, C17	Capacitor, 22pF, Cer Axial	5791-10862-05	J3	Connector, 4-pin Header
5048-11029-00	C48	Capacitor, 100pF, Cer Axial	5791-10862-07	J4	Connector, 5-pin Header
5048-11030-00	C49	Capacitor, 470pF, Cer Axial	5791-12516-00	J4	Connector, 7-pin Header
5048-11033-00	C33	Capacitor, 0.022 $\mu$ F, 5%, Cer Axial	P1	P1	Connector, 34 Hen 2 x 17 Str .100
5048-12036-00	C34, C42	Capacitor, 0.22 $\mu$ F, Cer Axial	A-17002	U16	PAL Sub-Assembly
5048-13418-00	C30, C39, C40	Capacitor, .047 $\mu$ F; 5%, Cer Axial	A-5343-50022-2	U2	EPROM Sub-Assembly
5048-13608-00	C8	Capacitor, 6800 pF, 50V, Cer Axial	A-5343-50022-3	U3	EPROM Sub-Assembly
5048-13609-00	C7, C24, C26	Capacitor, 3900 pF, 50V, Cer Axial	A-5343-50022-4	U4	EPROM Sub-Assembly
5048-13610-00	C2, C3, C9, C27, C29	Capacitor, 1000 pF, 50V, Cer Axial	A-5343-50022-5	U5	EPROM Sub-Assembly
5048-13611-00	C6, C23, C25, C28	Capacitor, 680 pF, 50V, Cer Axial	A-5343-50022-6	U6	EPROM Sub-Assembly
5070-09045-00	D1 - D4	MR-501 Rectifier Diode	A-5343-50022-7	U7	EPROM Sub-Assembly
5070-09054-00	D5 - D9	1N4004 Signal Diode	Not Used	U8	EPROM Sub-Assembly
			Not Used	U9	EPROM Sub-Assembly
			5731-10356-00	F501, F502	Fuse, 3Amp, 250V, Slow Blow

# A-15472-1 Fliptronic II Board



Part Number	Designator	Description	Part Number	Designator	Description
01-10572	Q1-Q4	Heatsink	5070-09054-00	D1 - D24	Diode 1N4004
20-9684	Q5-Q12	Fastener Snap	5162-12635-00	Q5-Q12	Transistor TIP102 NPN
4006-01003-08	Q1-Q4	Mach. Screw, 6-32	5190-09016-00	Q13 - Q20	Transistor 2N4403 PNP
4406-01128-00	Q1-Q4	Nut 6-32 KEPS	5191-12179-00	Q1-Q4	Transistor TIP36C PNP
5010-09034-00	R37 - R44, R53	Resistor, 10K $\Omega$ , 1/4w, 5%	5315-12009-00	U2	IC 74HCT374
5010-09358-00	R22, R24, R26, R28, R30, R32, R34, R36, R45 - R52	Resistor, 1K $\Omega$ , 1/4w, 5%	5315-12031-00	U5	IC 74HCT244
5010-09361-00	R1 - R4	Resistor, 220 $\Omega$ , 1/2w, 5%	5315-12812-00	U1	IC 74HCT138
5010-09416-00	R21, R23, R25, R27, R29, R31, R33, R35	Resistor, 470 $\Omega$ , 1/4w, 5%	5315-12951-00	U3	IC 74HCT00
5010-09534-00	W3, W4	Resistor, 0 $\Omega$	5370-12272-00	U4, U6	IC LM339 QUAD COMP
5010-10171-00	R13 - R20	Resistor, 56 $\Omega$ , 1/4w, 5%	5791-10862-09	J907	Connector, 9-pin Header Sq. Pin
5011-12956-00	R5 - R12	Resistor, 2.7K $\Omega$ , 1w, 5%	5791-10862-05	J901, J904	Connector, 5-pin Header Sq. Pin
5040-08986-00	C1	Capacitor, 100M, 10v	5791-10862-13	J902	Connector, 13-pin Header Sq. Pin
5040-09537-00	C2	Capacitor, 100 $\mu$ F, 100v	5791-13830-06	J905, J906	Connector, Str Sq. Pin Header .100
5043-08980-00	B	Capacitor, .01 $\mu$ F, 50v	5791-12516-00	J903	34 HEN 2x17 STR
			5100-09690-00	BR1	Bridge Rectifier
			5731-10356-00	F901 - F904	Fuse S-B, 3A., 250v
			5733-12060-01		Fuse Holder (F901-F904)

# A-14039 Dot Matrix Controller Assembly

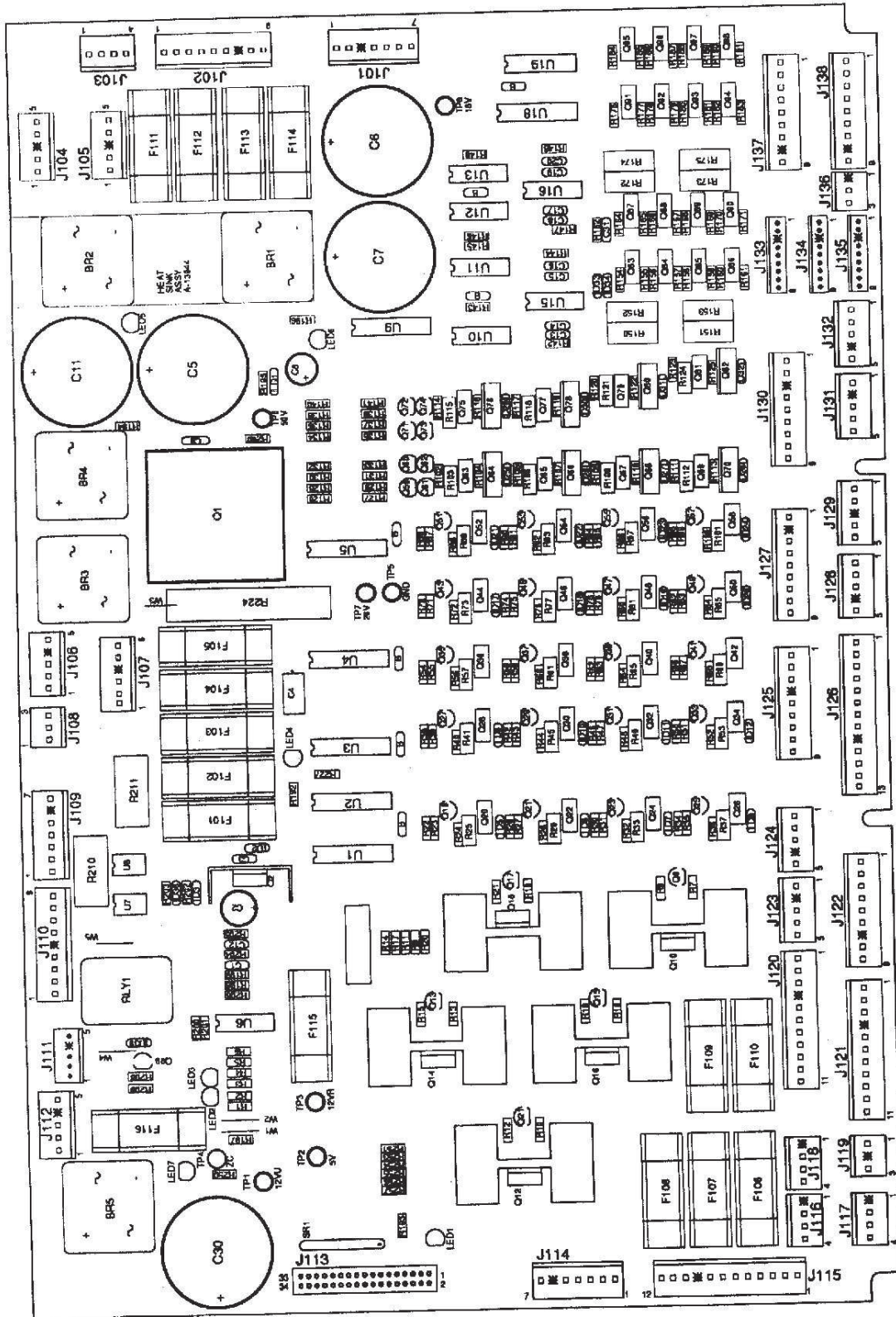


Part Number	Ckt Designator	Description	Part Number	Ckt Designator	Description
5010-08991-00	R1	Resistor, 4.7K $\Omega$ , 1/4w, 5%	5311-10947-00	U9	IC, 74HC125
5010-09224-00	R10	Resistor, 270 $\Omega$ , 1/4w, 5%	5311-10951-00	U10, U11	IC, 74HC161
5010-12832-00	R3, R6, R12, R13	Resistor, 47K $\Omega$ , 1/2w, 5%	5311-10977-00	U6	IC, 74HC04
5010-12841-00	R4, R5	Resistor, 120 $\Omega$ , 1/2w, 5%	5311-12817-00	U29	IC, 74HC165
5012-12830-00	R9	Resistor, 1.8K $\Omega$ , 5w, 5%	5311-12819-00	U21	IC, 74HC688
5012-12842-00	R11	Resistor, 120 $\Omega$ , 5w, 5%	5311-12820-00	U23	IC, 74HC27
5012-12843-00	R8	Resistor, 4.7K, 5w, 5%	5311-12822-00	U13 - U15	IC, 74HC193
5010-10171-00	R7	Resistor, 56 $\Omega$ , 1/4w, 5%	5315-12009-00	U22	IC, 74HCT374
5040-08986-00	C3	Capacitor, 100 $\mu$ fd., 10v, ( $\pm$ 20%)	5315-12812-00	U1, U2, U30	IC, 74HCT138
5040-12324-00	C4, C7	Capacitor, 150 $\mu$ fd., 160v, ( $\pm$ 50%)	5281-09308-00	U28	IC, 74HCT245
5043-08980-00	BYPASS	Capacitor, .01 $\mu$ fd., 50v, (+80, -20%)	5315-12815-00	U8, U34	IC, 74HCT08
5043-09072-00	C6, C9, C10	Capacitor, .1 $\mu$ fd., 500v, (+80, -20%)	5315-12816-00	U19	IC, 74HCT32
5043-09845-00	C1, C2, C11	Capacitor, 1KP, 50v, ( $\pm$ 20%)	5315-12821-00	U7	IC, 74HCT240
5043-09492-00	C5, C8	Capacitor, 100P, 50v, ( $\pm$ 10%)	5340-12278-00	U24	S/DRAM 2064 150NS
5070-09054-00	D7	Diode, 1N4004, 1.0A.	5551-09822-00	L1	IND 4.7 $\mu$ H, 3.0A.
5075-12824-00	D6, D8	Zener, 1N4742A, 12v	5671-13732-00	D10	Display LED Red
5075-12823-00	D4, D5	Zener, 1N4758A, 56v	5705-09199-00	Q3, Q6, Q7	Heatsink 6030B
5075-12826-00	D3	Zener, 1N4759A, 62v	5731-12328-00	F601, F602	Fuse, 3/8A, .SB, 250v
5100-12833-00	BR1, BR2	Bridge, 400v, 1A.	5733-12060-00		Fuse Holder (F601, F602)
5160-10269-00	Q1	Transistor, 2N3904 NPN	5791-10850-00	J602	Connector, 26-pin STR Sq.
5164-09056-00	Q2, Q10	Transistor, MPSD02, NPN	5791-10862-05	J605	Connector, 5-pin Header Sq.
5164-12154-00	Q3, Q7	Transistor, MJE15030 NPN	5791-10862-07	J606	Connector, 7-pin Header Sq.
5194-09055-00	Q4, Q5	Transistor, MPSD52 PNP	5791-10862-08	J604	Connector, 8-pin Header Sq.
5194-12155-00	Q6	Transistor, MJE15031 PNP	5791-12516-00	J601	34 Hen 17x2 STR
5281-09738-00	U16, U25 - U27	IC, 74LS157	5791-12827-00	J603	14 Hen 7x2 STR
5281-10033-00	U3	IC, 74LS30	5010-09036-00	R14-R23	Resistor, 100 $\Omega$ , 1/4w, 5%
5281-10043-00	U31 - U33, U35	IC, 74LS175	4006-01003-06	Q3, Q6, Q7	Mach. Screw, 6-32 x 3/8
5311-10946-00	U4, U5, U17, U18, U20	IC, 74HC74	4406-01128-00	Q3, Q6, Q7	Nut, 6-32 KEPS

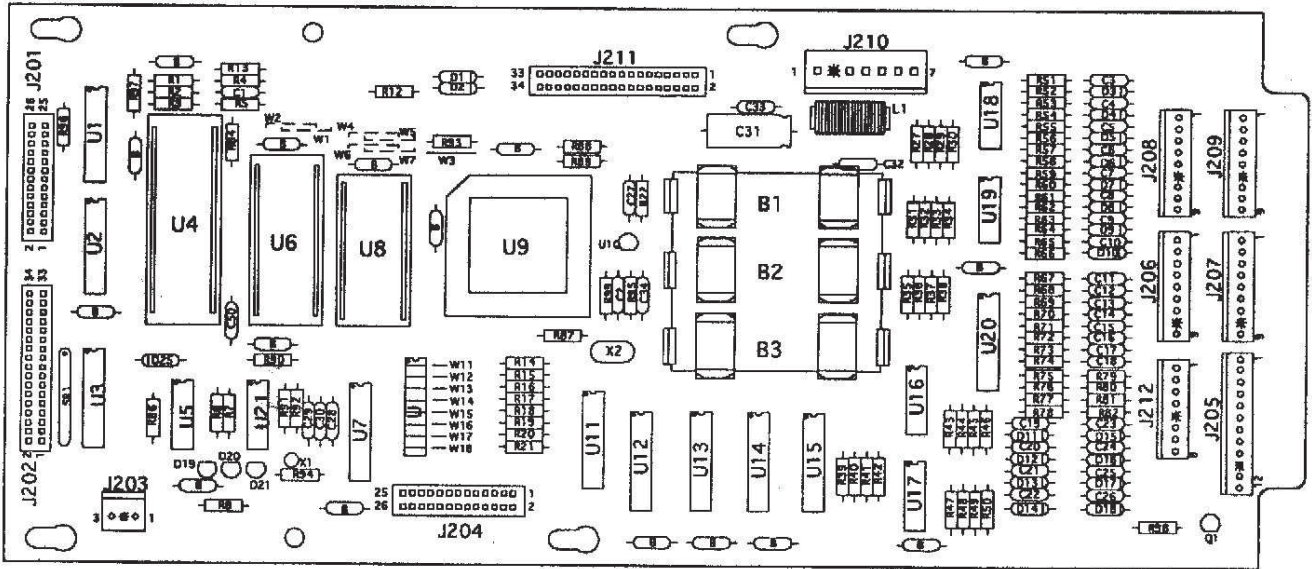
# A-12697-3 WPC Power Driver Assembly

Item	Part Number	Ckt Designator	Description	Item	Part Number	Ckt Designator	Description
1	Not Used			32	5043-08996-00	C13-C20, C31	Capacitor, .1µfd, 50v (±20%)
2	4006-01005-06	Q1, Q2	Mach. Screw, 6-32 x 3/8	33	5043-08845-00	C1, C12	Capacitor, 1.000µfd, 50v (±20%)
3	4408-01128-00	Q1, Q2	Nut, 6-32 KEPS	34	5048-10994-00	C3	Capacitor, .33µfd, 50v (±20%) Ax.
4	4004-01005-06	Q10, Q12, Q14, Q16, Q18	Mach. Screw, 4-40 x 3/8	35	5070-08919-00	D33, D34	Diode, 1N4148, 150MA.
5	4404-01119-00	Q10, Q12, Q14, Q16, Q18	Nut, 4-40 SNUT	36	5070-09054-00	D1-D3, D5-D12, D17-D32, D38	Diode, 1N4004, 1.0A.
6	5010-08981-00	R260	Resistor, 10KΩ, 1/2w, 5%	37	5100-09690-00	BR1-BR5	Bridge Rectifier, 35A., 200v
7	5010-08991-00	R8, R12, R15, R18, R21, R23, R27, R31, R36, 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	Resistor, 4.7KΩ, 1/4w, 5%	38	5131-12725-00	Q10, Q12, Q14, Q16, Q18	Triac, BT138E
8	5010-08992-00	R8, R11, R14, R17, R20, R177, R179, R181, R183, R185, R187, R189, R191	Resistor, 560Ω, 1/4w, 5%	39	5182-12422-00	U19	IC, ULN 2803
9	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	Resistor, 68Ω, 1/4w, 5%	40	5162-12635-00	Q20, Q22, Q24, Q26, Q28, Q30, Q32, Q34, Q36, Q38, Q40, Q42, Q44, Q46, Q48, Q50, Q52, Q54, Q56, Q58, Q63, Q66, Q67, Q69, Q75, Q77, Q79, Q81, Q83 - Q90	Transistor, TIP 102
10	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, R195	Resistor, 2.7KΩ, 1/4w, 5%	41	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
11	5010-08998-00	R155, R157, R159, R161, R165, R167, R169, R171	Resistor, 2.2KΩ, 1/4w, 5%	42	5191-12179-00	Q64, Q66, Q68, Q70, Q76, Q78, Q80, Q82	Transistor, TIP36C PNP
12	5010-09034-00	R3, R4, R6, R142-R148, R197, R198	Resistor, 10KΩ, 1/4w, 5%	43	5192-12428-00	Q91-Q98	Transistor, TIP 107
13	5010-09085-00	R194, R196, R251, R253-R257	Resistor, 1.5KΩ, 1/4w, 5%	44	5250-12634-00	Q1	Reg LM 323 5v
14	5010-09086-00	R252	Resistor, 6.8KΩ, 1/4w, 5%	45	5281-09486-00	U1-U5, U18	IC, 74LS374 8 Dual D Flipflop
15	5010-09224-00	R1, R2, R192, R201, R205, R208	Resistor, 270Ω, 1/4w, 5%	46	5281-09487-00	U10-U13	IC, 74LS74 Dual D flipflop
16	5010-09314-00	R178, R178, R180, R182, R184, R186, R188, R190	Resistor, 1.2KΩ, 1/4w, 5%	47	5281-10182-00	U9	IC, 74LS240, L/Drrv
17	5010-09324-00	R208	Resistor, 27KΩ, 1/4w, 5%	48	5370-12272-00	U6, U15, U16	IC, LM339 Quad. Comp
18	5010-09358-00	R154, R156, R158, R160, R164, R166, R168, R170, R182, R183, R199, R200, R250	Resistor, 1KΩ, 1/4w, 5%	49	5460-12423-00	Q2	IC, LM 7812
19	5010-09361-00	R104, R107, R110, R113, R116, R119, R122, R125	Resistor, 220Ω, 1/4w, 5%	50	Not Used		Display LED Red
20	5010-09416-00	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, W1, W2	Resistor, 470Ω, 1/4w, 5%	51	5671-13732-00	LED1 - LED7	
21	5010-09534-00	W1, W2	Resistor, 0Ω	52	Not Used		
22	5010-11079-00	R7, R10, R13, R16, R19	Resistor, 51Ω, 1/4w, 5%	53	5701-09652-00	Q1	Thermal Pad TO-3
23	5010-12427-00	R150-R153, R172-R175	Resistor, .22Ω, 1w, 5%	54	5705-09199-00	Q2	Heatsink, #6030B
24	5012-12632-00	R224	Resistor, .12Ω, 10w, 5%	55	Not Used		
25	Not Used			56	5705-12637-00	Q1	Heatsink 5054
26	5019-10143-00	SR1	SIP, 9R, 10 pin, 470Ω, 5%	57	5705-12638-00	Q10, Q12, Q14, Q16, Q18	Heatsink 5298B
27	5040-08986-00	C4	Capacitor, 100µfd, 10v (±20%)	58	5733-12060-01	Not Used	Fuse Holder, F101-F116
28	5040-09421-00	C2	Capacitor, 100µfd, 25v (+50, -10%)	59	Not Used		
29	5040-09537-00	C8	Capacitor, 100µfd, 100v (±20%)	60	5791-10862-03	J108, J119, J136	Connector, 3-pin Header STR Sq.
30	5040-12313-00	C5, C6, C7, C11, C30	Capacitor, 15.000µfd, 25v (±20%)	61	5791-10862-04	J103, J116-J118	Connector, 4-pin Header STR Sq.
31	5043-08980-00	B-BYPASS	Capacitor, .01µfd, 50v (+80, -20%)	62	5791-10862-05	J112, J104-J106, J123, J124, J128, J129, J131, J132	Connector, 5-pin Header STR Sq.
				63	5791-10862-06	J107	Connector, 6-pin Header STR Sq.
				64	5791-10862-07	J101, J109, J114	Connector, 7-pin Header STR Sq.
				65	5791-10862-09	J102, J122, J125, J127, J130, J137, J138	Connector, 9-pin Header STR Sq.
				66	5791-10862-11	J120, J121	Connector, 11-pin Header STR Sq.
				67	5791-10862-12	J115	Connector, 12-pin Header STR Sq.
				68	5791-10862-13	J126	Connector, 13-pin Header STR Sq.
				69	5791-13830-05	J111	Connector, 5-pin Header STR Sq.
				70	5791-13830-09	J133-J135	Connector, 9-pin Header STR Sq.
				71	5791-12516-00	J113	34 HEN 2x17 STR
				72	5824-09248-00	TP1-TP8	Test Point #1502-1
				73	5041-09183-00	C9	Capacitor, 2.2µfd TANT
				74-100	Not Used		
				101	Not Used		
				102	5730-09071-00	F114	Fuse, 8A, 32v
				103	Not Used		
				104	5731-09432-00	F112	Fuse, S-B, 7A., 250v
				105	5731-09651-00	F106 - F111, F113	Fuse, S-B, 5A., 250v
				106	Not Used		
				107	5731-10356-00	F101 - F105, F116	Fuse, S-B, 3A., 250v
				108	5730-09797-00	F115	Fuse, S-B, 3/4A., 250v
				109	5705-12698-00		Heatsink #62365
				110	4010-01006-00		Mach. Screw, 10-32 x 5/8

# A-12697-1 WPC Power Driver Assembly

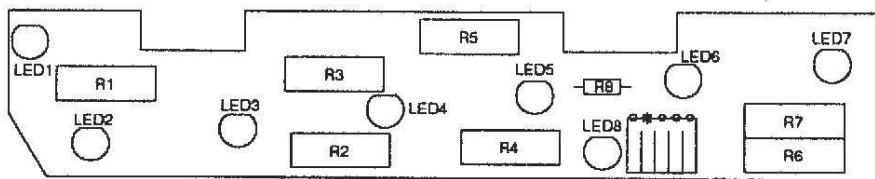


# A-12742-50022 WPC CPU Board Assembly



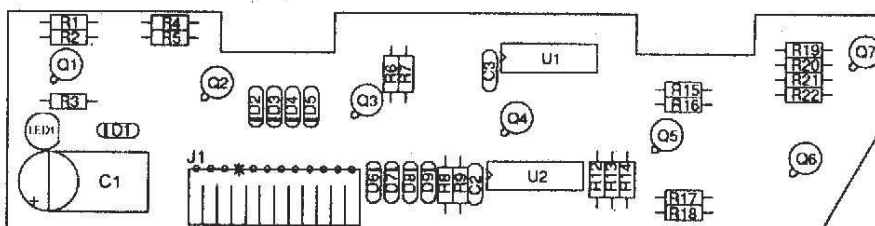
Part Number	Designator	Description	Part Number	Designator	Description
5010-09034-00	R14-R22, R27-R42, R86, R90, R94, R98	Resistor, 10KΩ, 1/4w, 5%	5281-09851-00	U5	IC, 74LS14, SMT/TRG
5010-09085-00	R1, R2, R4, R96, R97	Resistor, 1.5KΩ, 1/4w, 5%	5281-09867-00	U1, U2, U7	IC, Octal Buffer, 74LS244
5010-09314-00	R52, R54, R56, R58, R60, R62, R64, R66, R75-R82	Resistor, 1.2KΩ, 1/4w, 5%	5281-10182-00	U11, U12, U13, U15	IC, 74LS240 Driver
5010-09358-00	R3, R43-R51, R53, R55, R57, R59, R61, R63, R65, R67-R74, R84	Resistor, 1KΩ, 1/4w, 5%	5284-12651-00	U21	IC, 4584
5010-09416-00	R5-R8, R12, R13, R87-R89	Resistor, 470Ω, 1/4w, 5%	5340-13062-00	U8	IC/RAM 32K x 8
5010-09534-00	W1, W3, W4, W7	Resistor, 0Ω	5370-12272-00	U16 - U19	IC, LM339, Quad. Comp
5010-10258-00	R95, R99	Resistor, .01μfdΩ, 1/4w, 5%	5370-12687-00	U10	MC, 34064 Reset Chip
5010-10989-00	R92	Resistor, 470KΩ, 1/4w, 5%	5520-10438-00	X2	Crystal, 8.0MHz
5010-12104-00	R91	Resistor, 22μfd, 1/4w, 5%	5520-12084-00	X1	Crystal 32.768 KHz
5019-09362-00	SIP 1	SIP, 9R, 10-pin, 4.7KΩ, 5%	5551-09822-00	L1	ILN, 4.7 UH 3A
5040-08986-00	C31	Capacitor, 100μfd, 10v (±20%)	5671-13732-00	D19 - D21	DSPL LED RED
5043-08980-00	B	Capacitor, .01μfd, 50v, (+80, -20%)	5700-08985-00	U4	Socket, IC 40P, .6"
5043-09030-00	C27	Capacitor, 0.047μfd, 50v (±20%)	5700-12088-00	U6	Socket, IC 32P, .6"
5043-09065-00	C3 - C26	Capacitor, 470pfd, 50v (±20%)	5700-12424-00	U9	Socket, 84 Pin PLCC
5043-09491-00	C2, C29, C30, C34	Capacitor, 22pfd, 1KV, (±10%)	5791-10850-00	J201, J204	Connector, 26-pin Header Str Sq.
5043-09492-00	C28	Capacitor, 100pfd, 50v, (±10%)	5791-10862-07	J210	Connector, 7-pin Header Str Sq.
5043-09845-00	C32, C33	Capacitor, 1KP, 50v, (±20%)	5791-13830-08	J212	Connector, 8-pin Header Str Sq.
5070-08919-00	D2 - D18	Diode, 1N4148, 150MA	5791-13830-09	J206 - J209	Connector, 9-pin Header Sq. pin
5070-09266-00	D1, D25	Diode, 1N5817, 1.0A.	5791-13830-12	J205	Connector, 12-pin Header Sq. pin
5160-10269-00	Q1	Transistor, 2N3904, NPN	5791-12516-00	J202, J211	34 Hen 2x17 STR
5162-12422-00	U20	IC, ULN, 2803A	A-15814	B1 - B3	Battery Holder "AA"
5281-09308-00	U3	IC, 74LS245, Octal Bus Trncv	5048-11033-00	C50	Capacitor, 0.022μf, 10v
5281-09486-00	U14	IC, 74LS374, 8D F/F	A-5343-50022-1	U6	Game PROM Assembly
			5410-12426-00	U9	WPC-89 ASIC
			5400-10320-00	U4	IC MPU 68B09E
			5880-09022-00	B1 - B3	Battery, Alkaline, 1.5v ("AA")
			5645-09025-00	W11 - W18	Switch Dip 8 Pos

## A-16927 7 Ball Trough LED PCB Assembly



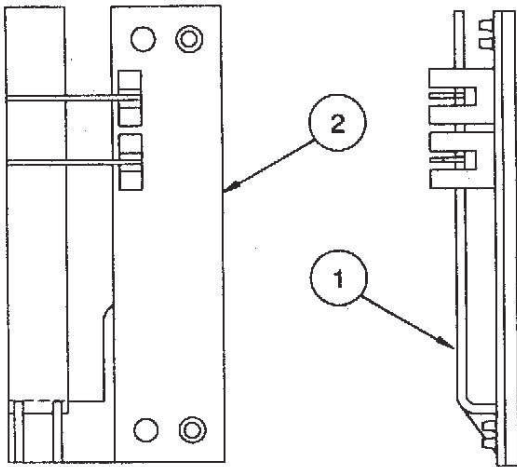
<u>Part Number</u>	<u>Designator</u>	<u>Description</u>
5791-13830-05	J1	Connector, 5-pin Header
5671-12731-00	LED1 - LED7	Diode-Infra Red
5010-12928-00	R1 -R7	Resistor, 270Ω, 2W, 5%
5671-13732-00	LED8	Display LED Red
5010-09314-00	R8	Resistor, 1.2KΩ, 1/4W, 5%

## A-16926 7 Ball Trough Photo Transistor Assy.



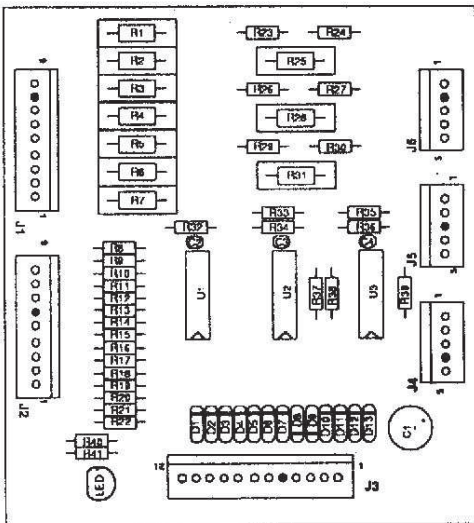
<u>Part Number</u>	<u>Designator</u>	<u>Description</u>
5163-12732-00	Q1 - Q7	Photo Transistor
5791-13830-12	J1	Connector, 12-pin Header
5010-09999-00	R1, R2, R4-R7, R10, R11, R15, R16, R19-R22	Resistor, 2KΩ, 1/4W, 5%
5010-10631-00	R3	Resistor, 1.2KΩ, 1/4W, 5%
5010-09162-00	R18, R8, R13	Resistor, 100KΩ, 1/4W, 5%
5010-08774-00	R9, R17	Resistor, 22KΩ, 1/4W, 5%
5010-09034-00	R12	Resistor, 10KΩ, 1/4W, 5%
5070-09054-00	D1 - D9	Diode 1N4004, 1.0A
5370-12272-00	U1, U2	ICLM339 Quad
5671-13732-00	LED1	Display LED Red
5043-08980-00	C2, C3	Capacitor, 0.01μF, 50V
5040-12298-00	C1	Capacitor, 100μFd, 40V (±50%)

## A-17316 Flipper Opto PCB Assembly



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

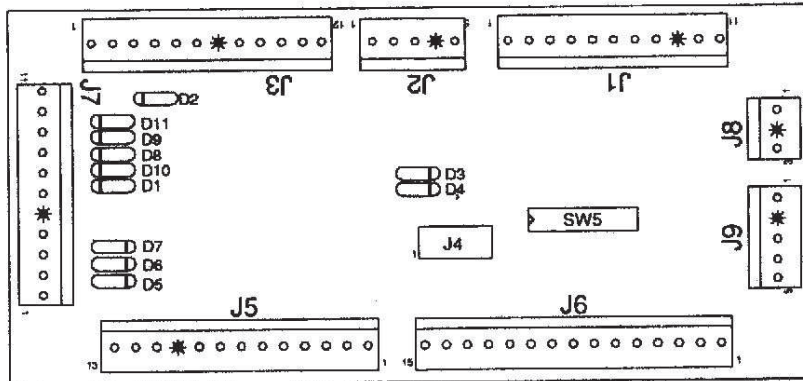
## A-15430 10-Switch Opto Assembly



Part Number	Designator	Description
5040-10974-00	C1	Capacitor, 100μfd, 35v (+80, -20%)
5043-08980-00	C2 - C4	Capacitor, 0.01μfd, 50v (+1, -20%)
5671-09019-00	LED1	Display LED 1 Red
5370-12272-00	U1 - U3	IC LM339 Quad
5070-09054-00	D1 - D13	Diode 1N4004 1.0A.
5010-12928-00	R1 - R7, R25, R28, R31	Resistor, 270Ω, 2w, 5%
5010-09999-00	R8 - R21, R23, R24, R26, R27, R29, R30	Resistor, 2KΩ, 1/4w, 5%
5010-09314-00	R22	Resistor, 1.2KΩ, 1/4w, 5%
5010-09162-00	R32, R35, R39, R40, R41	Resistor, 100KΩ, 1/4w, 5%
5010-08774-00	R33, R34, R36	Resistor, 22KΩ, 1/4w, 5%
5010-09034-00	R37, R38	Resistor, 10KΩ, 1/4w, 5%
5791-10862-12	J3	Connector, 12-pin Header STR Sq. Pin
5791-10862-09	J1, J2	Connector, 9-pin Header STR Sq. Pin
5791-10862-05	J4 - J6	Connector, 5-pin Header STR Sq. Pin

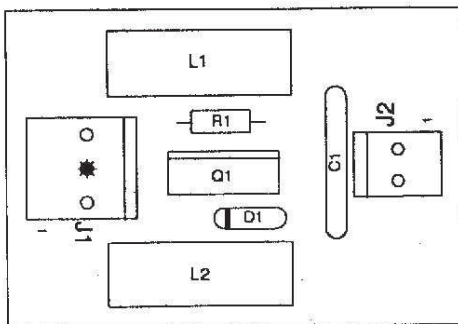


## A-17051-1 Coin Door Interface PCB Assembly



<u>Part Number</u>	<u>Designator</u>	<u>Description</u>
5791-10862-03	J8	Connector, 3-pin Header Str Sq. pin .156
5791-10862-05	J2, J9	Connector, 5-pin Header Str Sq. pin .156
5791-10862-11	J1, J7	Connector, 11-pin Header Str Sq. pin .156
5791-10862-12	J3	Connector, 12-pin Header Str Sq. pin .156
5791-10862-13	J5	Connector, 13-pin Header Str Sq. pin .156
5791-10862-15	J6	Connector, 15-pin Header Str Sq. pin .156
5645-09025-00	SW5	Sw DIP 8 Pos
5070-09054-00	D1 - D11	Diode, 1N4004, 1.0A.
5791-11000-10	J4	Connector, 10-pin Header Str Sq. pin .156

## A-15542 Motor EMI PCB Assembly



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

## A-15849-R-2 & A-15849-L-2 Flipper Assembly

<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	B-13104-R <b>B-13104-L</b>	Flipper Base Assy., Right <b>Flipper Base Assy., Left</b>	16.	A-15848-R <b>A-15848-L</b>	Crank Link Assembly, Right <b>Crank Link Assembly, Left</b>
2.	SW-1A-194	Switch Assembly	a)	A-17050-R <b>A-17050-L</b>	Flipper Crank Assembly, Right <b>Flipper Crank Assembly, Left</b>
3.	4701-00002-00	Lockwasher, #6 Split	b)	A-15847	Flipper Link Assembly
4.	4105-01019-10	Sh. Metal Screw, #5 x 5/8 P-RH-A	c)	02-4676	Link Spacer Bushing
5.	4008-01079-05	Mach. Screw, 8-32 x 5/16 H-SOC	d)	4010-01086-14	Cap Screw, 10-32 x 7/8 SH
6.	4701-00003-00	Lockwasher, #8 Split	e)	4700-00023-00	Flatwasher, 5/8 x 13/64 x 16ga.
7.	01-9375	Switch Mounting Bracket	f)	4701-00004-00	Lockwasher #10 Split
8.	20-6516	Speednut, Tinnerman	g)	4410-01132-00	Nut, 10-32 ESN
9.	4010-01066-06	Cap Screw, 10-32 x 3/8, SH	17.	23-6577	Bumper Plug, 5/8"
10.	4701-00004-00	Lockwasher, #10 Split	18.	03-7568	Flipper Bushing
11.	A-12390	Flipper Stop Assembly	19.	4006-01005-06	Mach. Screw, 6-32 x 3/8 P-PH
12.	FL-11629	Flipper Coil (Blue)	20.	4406-01117-00	Nut, 6-32 Hex
a)	03-7066-5	Coil Tubing	■ <b>Associated Parts for Left &amp; Right Flippers:</b>		
13.	01-7695	Solenoid Bracket	21.	23-6519-4	Flipper Rubber Ring, Red (2 used)
14.	4006-01017-04	Mach. Screw, 6-32 x 1/4 P-RH-S	22.	20-9734-5	Flipper & Shaft-White (2 used)
15.	10-364	Spring			

### Flipper Assemblies on Mini-Playfield:

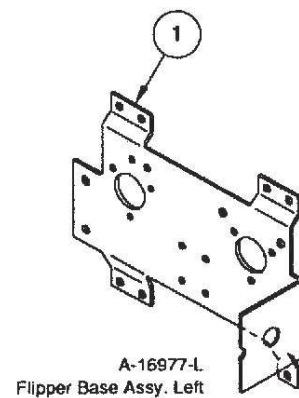
#### **A-16976-L-1 Flipper Assembly**

(The parts listed replace same items of A-15849-L-2)

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16977-L	Flipper Base Assy., Left
12.	FL-11722	Flipper Coil (Green)

■ **Associated Parts for Left & Right Flippers:**

21.	23-6553-4	Small Flipper Rubber Ring, Red (2 used)
22.	20-9732-5	Flipper & Shaft-White (2 used)



#### **A-16976-R Flipper Assembly**

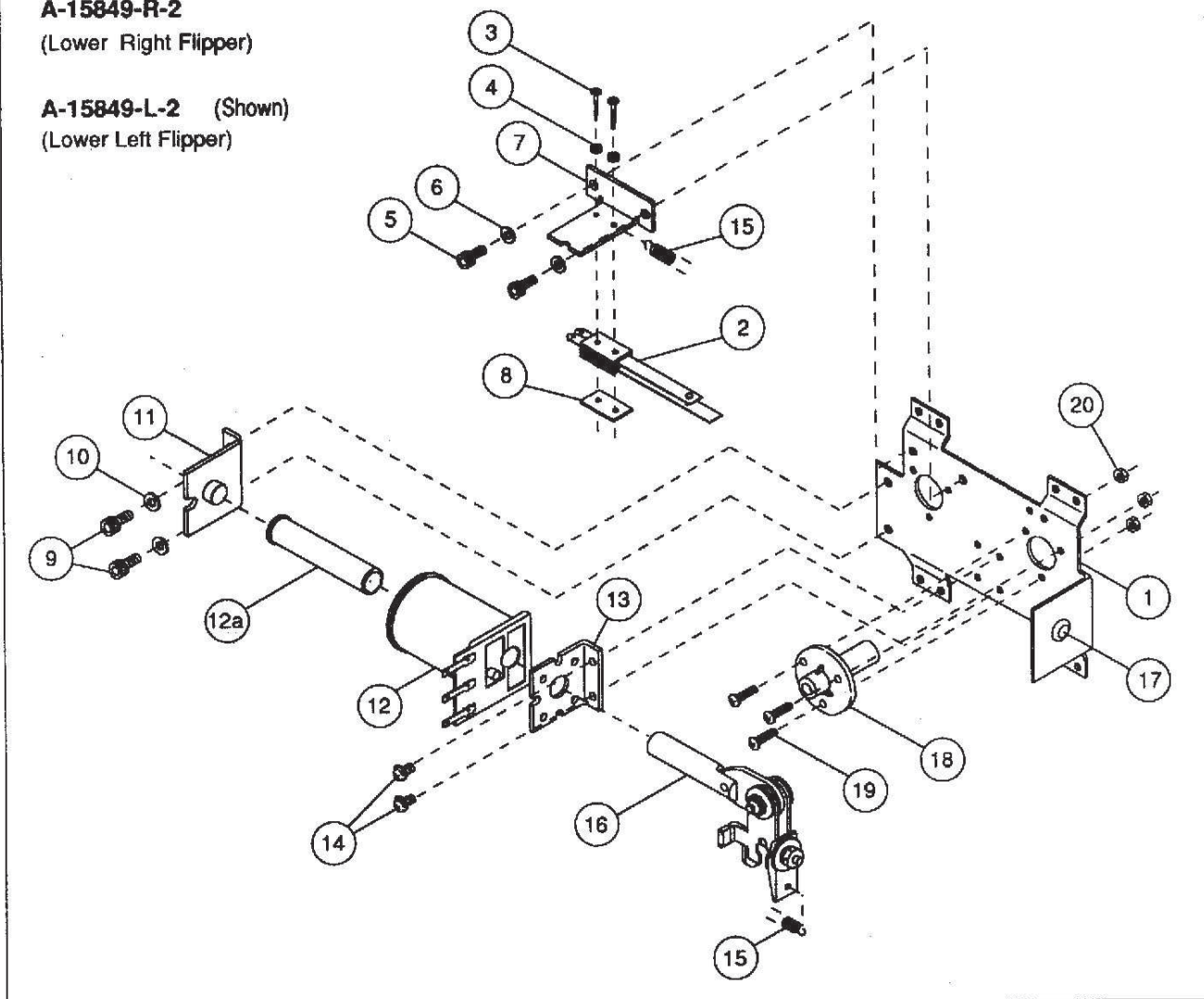
(The parts listed replace same items of A-15849-R-2)

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16977-R	Flipper Base Assy., Right
12.	FL-11722	Flipper Coil (Green)

## Flipper Assembly

**A-15849-R-2**  
(Lower Right Flipper)

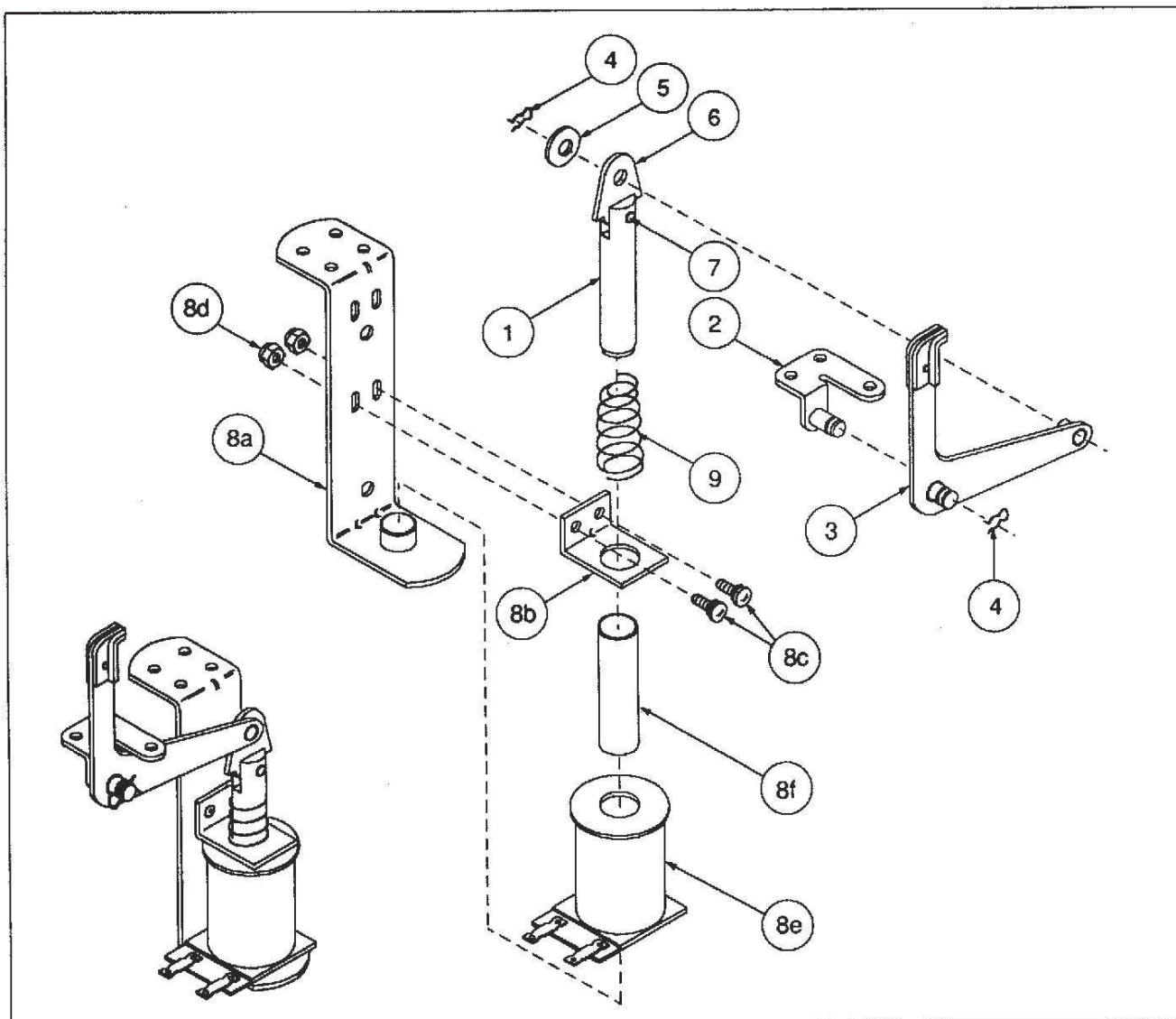
**A-15849-L-2** (Shown)  
(Lower Left Flipper)



■ **Flipper Notes:**

1. Each Flipper Assembly is mounted beneath the playfield, in conjunction 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 ( $\pm 0.015$ ) 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 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 reattaching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.

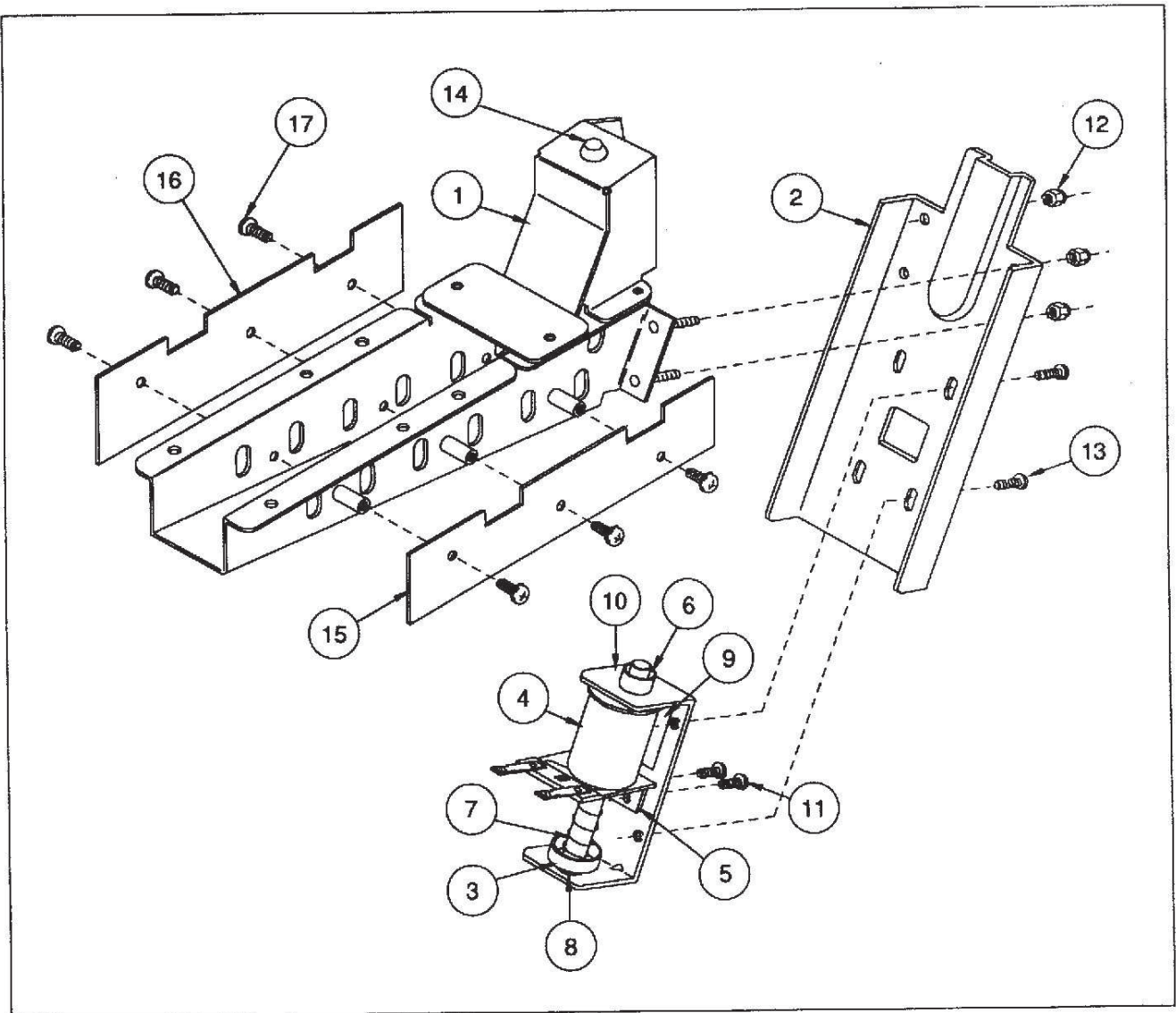
## A-17811 Kicker Arm (Slingshot) Assembly



■ Associated Parts for Right & Left Kickers:

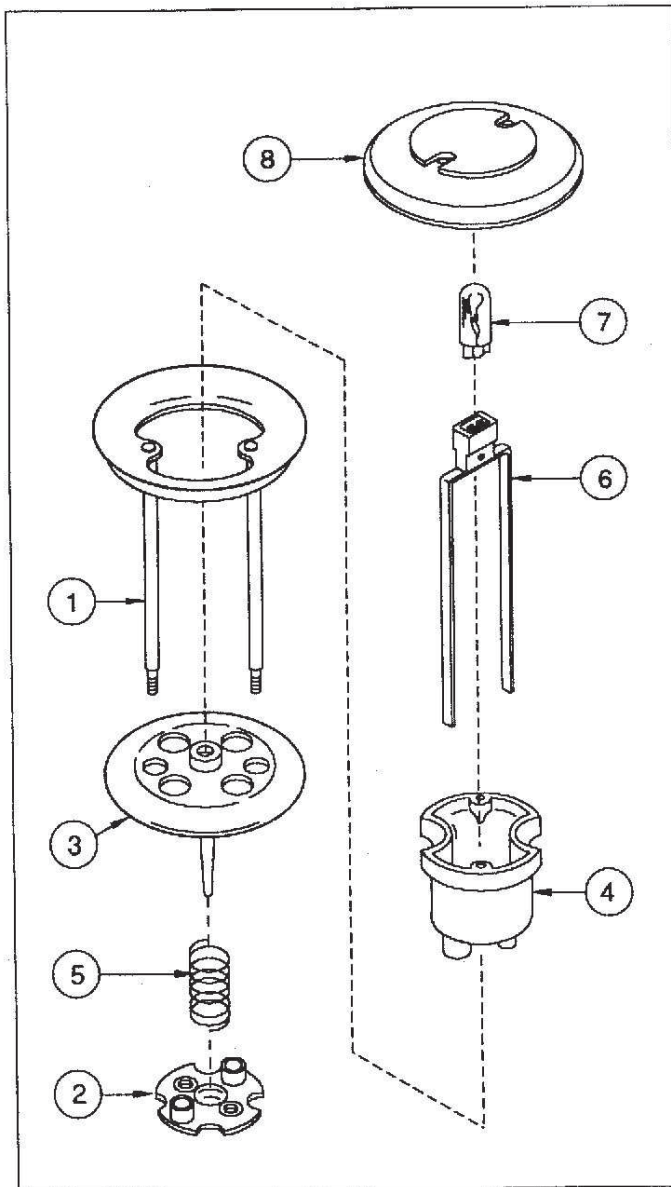
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	02-2364	Coil Plunger	8.	A-17809	Coil & Bracket Assy., Right
2.	A-17810	Mounting Bracket Assembly		A-17809-1	Coil & Bracket Assy., Left
3.	A-12664	Kicker Crank Assembly	a)	A-17808	Bracket & Stop Assembly
4.	12-6227	Hairpin Clip	b)	01-8-508-S	Coil Retaining Bracket
5.	4700-00030-00	Flatwasher, 17/64 x 1/2 x 15ga	c)	4006-01017-06	Mach. Screw, 6-32 x 3/8
6.	03-8085	Armature Link	d)	4406-01119-00	Nut, 6-32 ESN
7.	20-8716-5	Roll Pin, 1/8 x 7/16"	e)	AE-26-1200	Coil Assembly
			f)	03-7066	Coil Tubing
			9.	10-128	Spring

## A-16765 Outhole Ball Trough Assembly

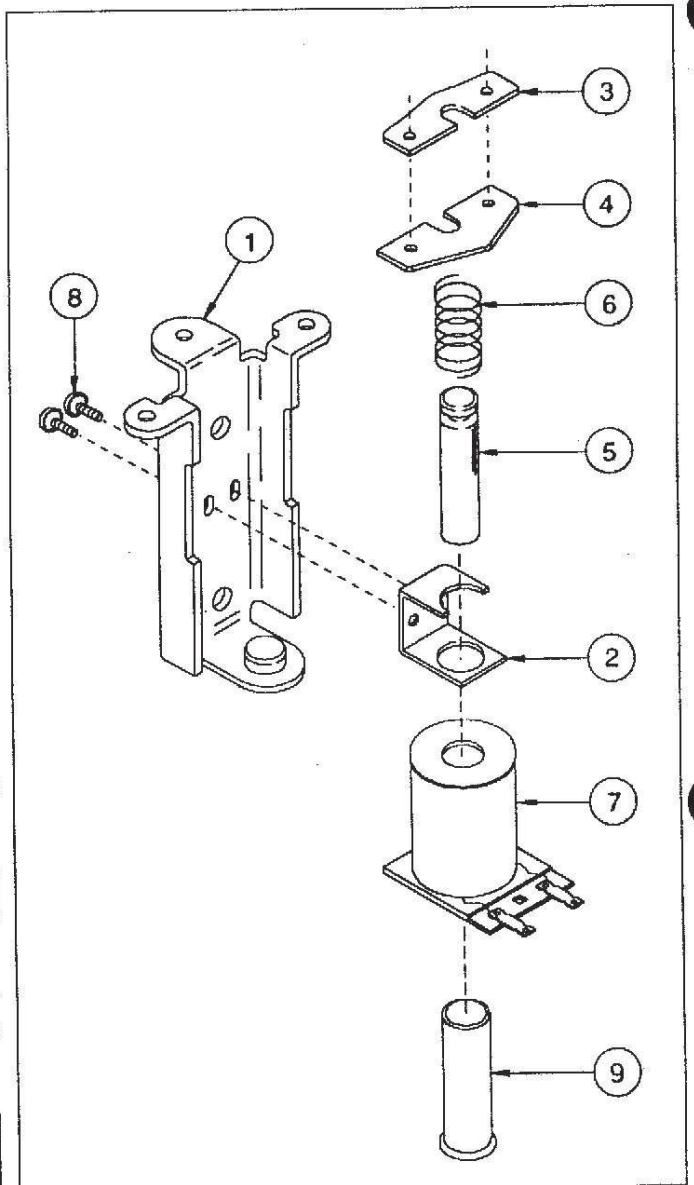


<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16809	Ball Trough Welded Assy.	10.	01-11586	Coil Mtg. Bracket (Bell)
2.	01-11587	Ball Trough Front	11.	4008-01017-05	Mach. Screw, 8-32x5/16 P-RH SEMS
3.	A-6306-2	Bell Armature Assembly	12.	4408-01119-00	Nut 8-32 ESN
4.	AE-26-1500	Coil Assembly	13.	4008-01017-06	Mach. Screw, 8-32x3/8 P-RH SEMS
5.	01-8-508-T	Solenoid Bracket	14.	23-6702	Bumper Plug
6.	03-7067-5	Coil Tubing	15.	A-16529	7 IR LED PCB Assembly
7.	10-135	Insulator	16.	A-16530	7 IR LED PCB Assembly
8.	23-6420	Rubber Grommet	17.	4006-01017-06	Mach. screw, 6-32x3/8 P-RH SEMS
9.	03-8523	Insulator			

## B-9414-3 Jet Bumper Assembly



## A-9415-2 Jet Bumper Coil Assembly



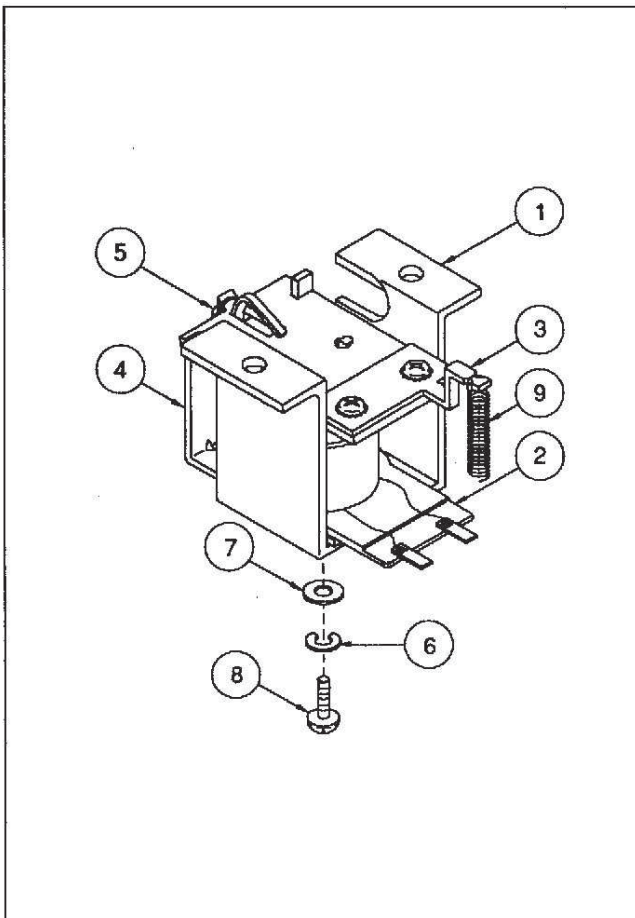
Item	Part Number	Description
1.	A-4754	Bumper Ring Assembly
2.	03-6009-A5	Bumper Base, White
3.	03-6035-4	Bumper Wafer, Red
4.	03-7443-5	Bumper Body, White
5.	10-7	Spring
6.	24-8776	Socket - Wedge Base
7.	24-8768	Bulb #555 (6.3V., 0.25A.)

■ **Associated Parts:**

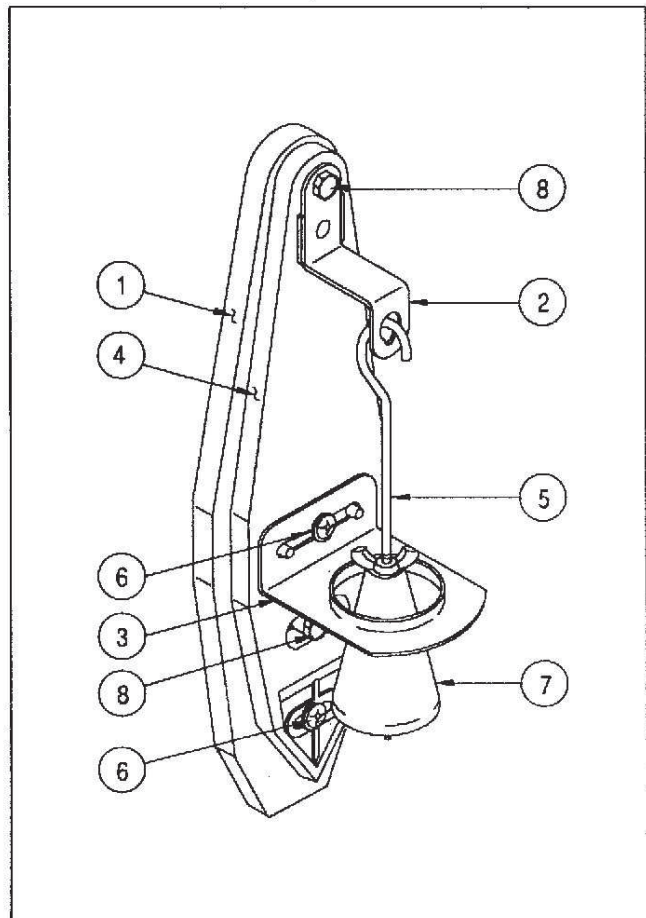
8.	03-8254-10	Jet Bumper Cap (Tr. Blue) 3 Used
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Item	Part Number	Description
1.	B-7417	Bracket & Stop Assembly
2.	01-1747	Coil Retaining Bracket
3.	01-5492	Armature Link, Steel
4.	01-5493	Armature Link, Bakelite
5.	02-3406-1	Coil Plunger
6.	10-326	Armature Spring
7.	AE-26-1200	Coil Assembly
8.	4006-01017-04	Mach. Screw, 6-32 x 1/4"
9.	03-7066	Coil Tubing

**A-17796  
Ball Gate Actuator Assembly**



**A-15361  
Tilt Mechanism Assembly**



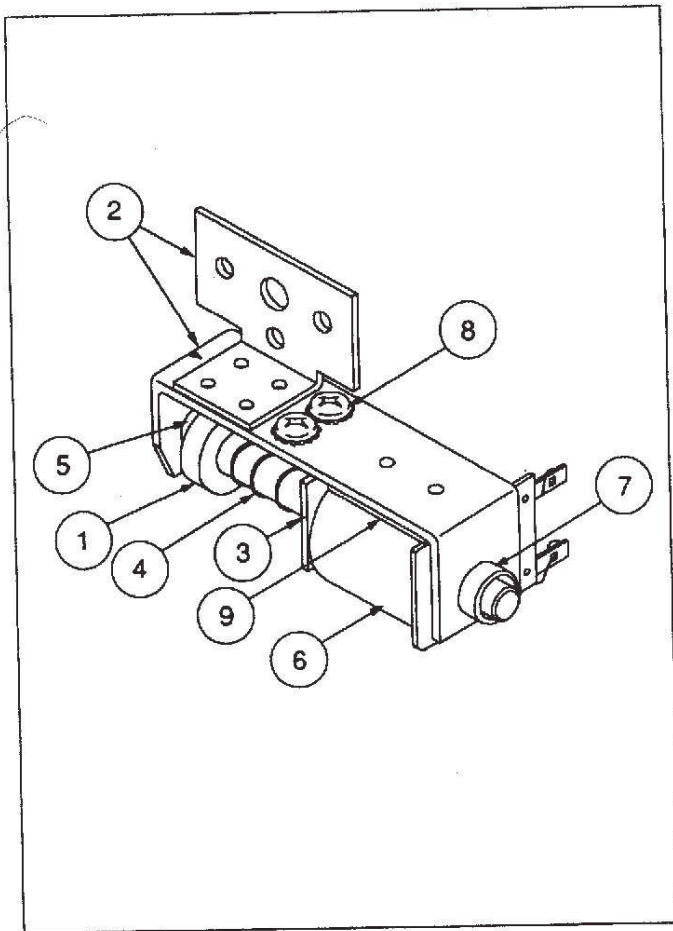
Item	Part Number	Description
1.	01-12348	Ball Gate Coil Bracket
2.	A-14406	Coil Assembly
3.	A-11146	Armature Assembly
4.	A-6892	Frame & Eyelet Assembly
5.	10-120	Spring
6.	4701-00003-00	Lockwasher #8 Split
7.	4700-00089-00	Flatwasher, 11/64 x 7/16 x 16ga.
8.	4008-01021-07	Mach. Screw, 8-32 x 7/16"
9.	10-194	Extension Spring

Item	Part Number	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	MS, 6-32 x 3/8 PL-HEX-WHD

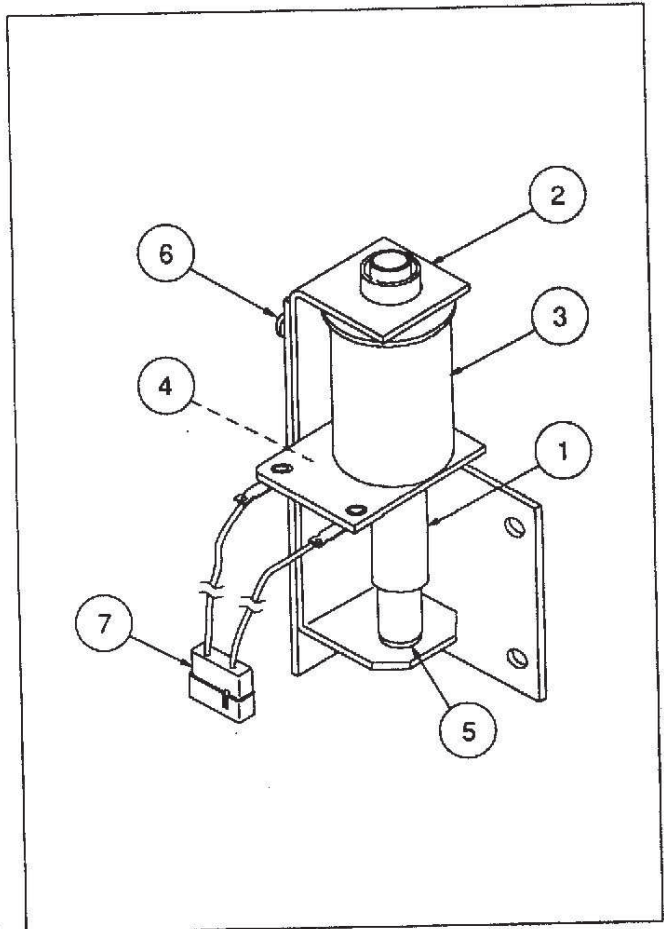
■ **Associated Parts**

7.	20-6502-A	Plum Bob
8.	4406-01120-00	Wing Nut (2)

**A-14525  
Kicker Bracket Assembly**



**B-10686-1  
Knocker Assembly**

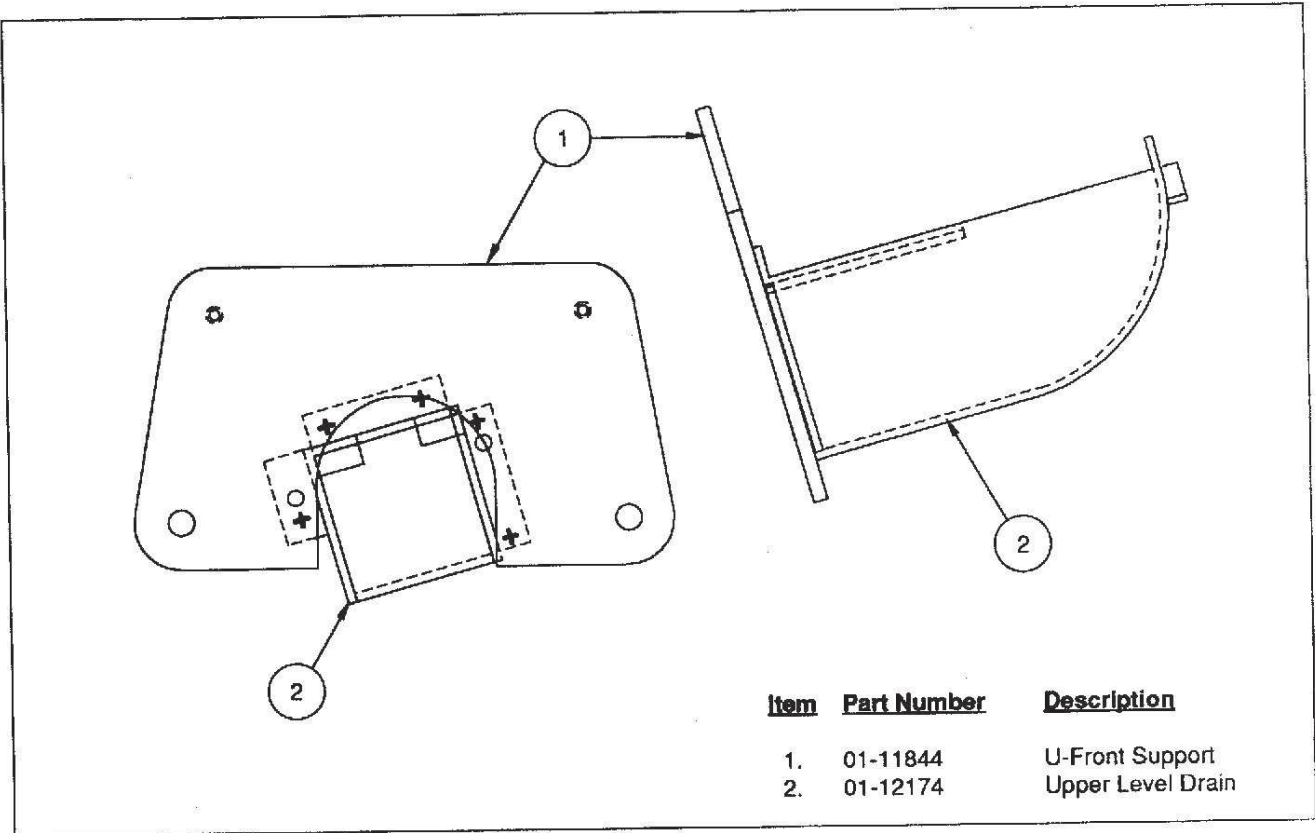


Item	Part Number	Description
1.	A-6306-2	Bell Armature Assembly
2.	A-14526	Mtg. Bracket Assembly
3.	01-8-508-T	Solenoid Bracket
4.	10-135	Solenoid Spring
5.	23-6420	Rubber Grommet
6.	AE-23-800	Coil Assembly
7.	03-7067-5	Coil Tubing
8.	4008-01017-04	Mach. Screw, #8-32 x 1/4"P-RH
9.	03-8523	Insulator

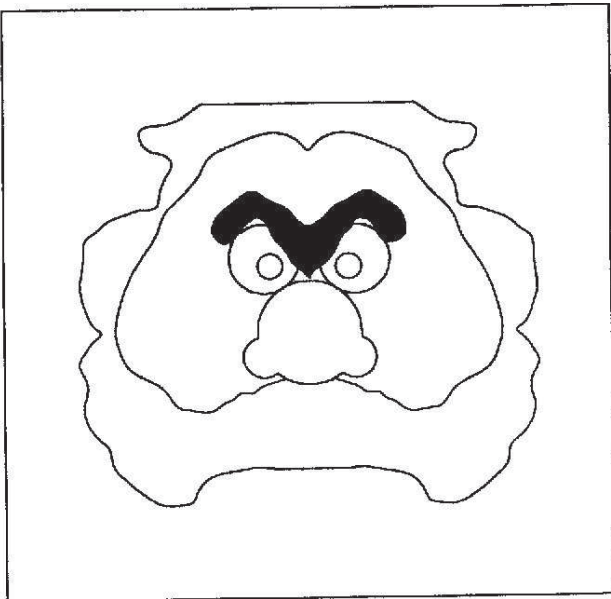
Item	Part Number	Description
1.	A-5387	Coil Plunger Assembly
2.	01-11273	Mtg. Bracket Assembly
3.	AE-23-800	Coil Sub-Assembly
4.	01-8-508-T	Coil Retaining Bracket
5.	23-6420	Rubber Grommet
6.	4008-01017-04	Mach. Screw, 8/32 x 1/4"P-RH
7.	H-11835	Knocker Cable
8.	03-7067-5	Coil Tubing



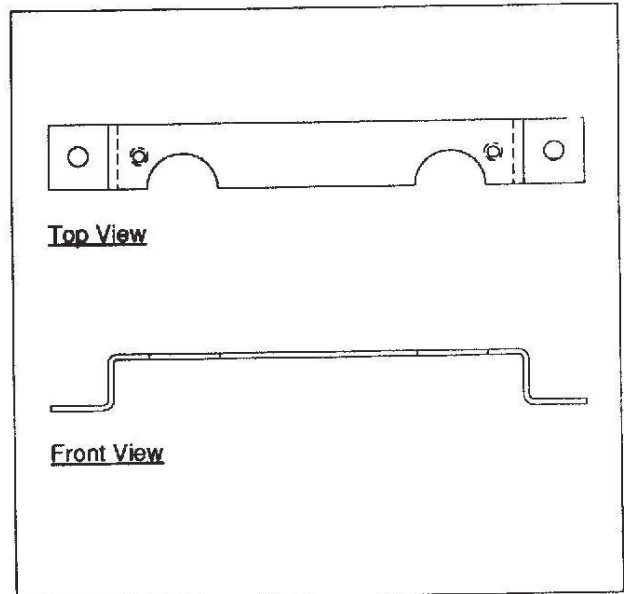
**A-17567  
Upper Level Drain Assembly**



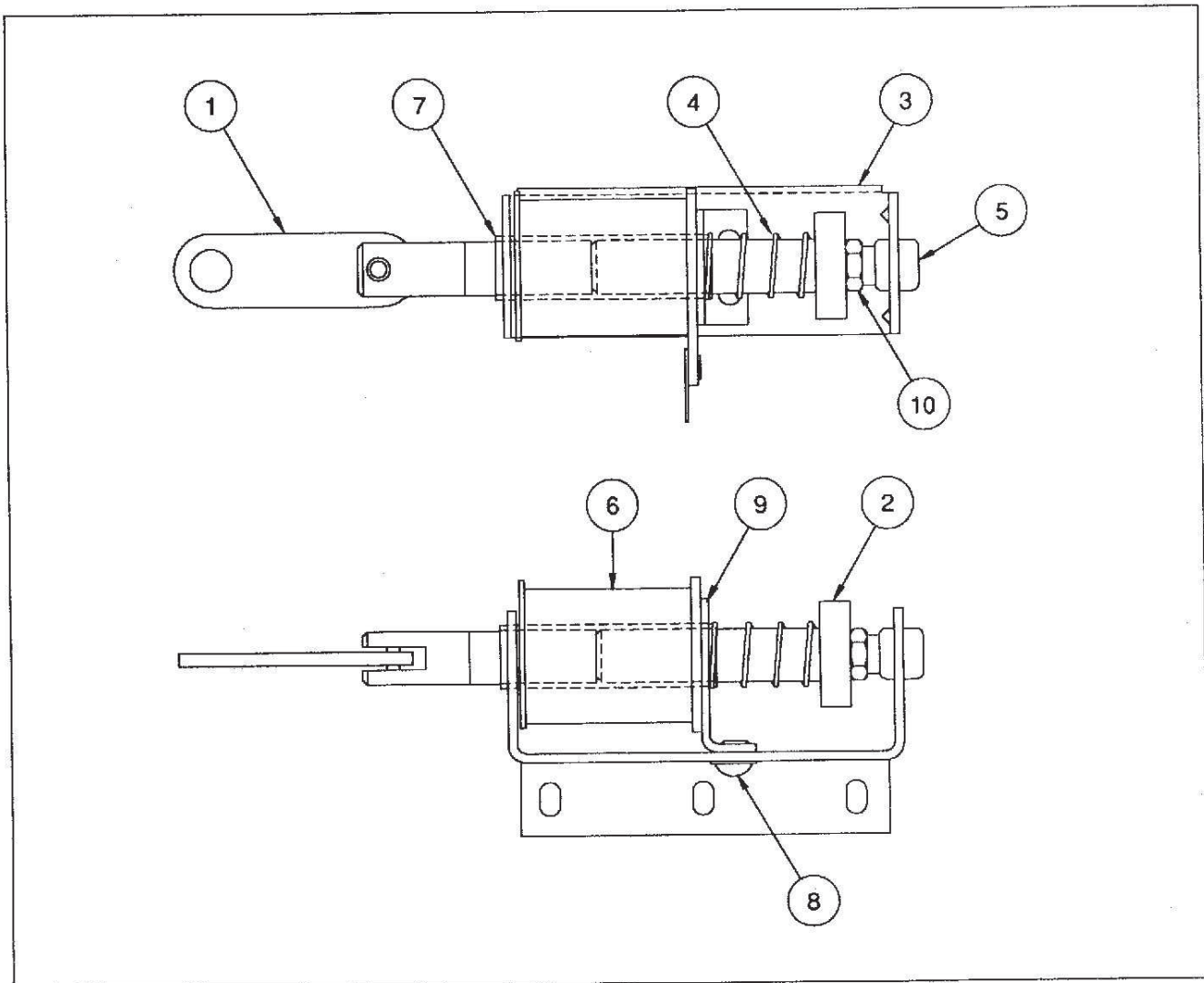
**03-9088  
Bluto**



**01-12359  
Head Support Bracket**

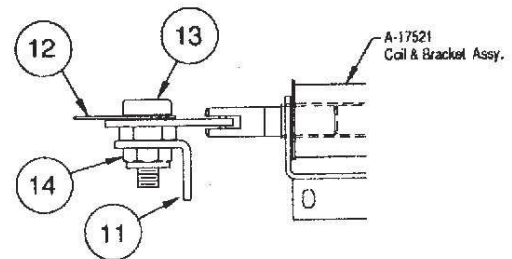


## A-17251 Coil & Bracket Assembly



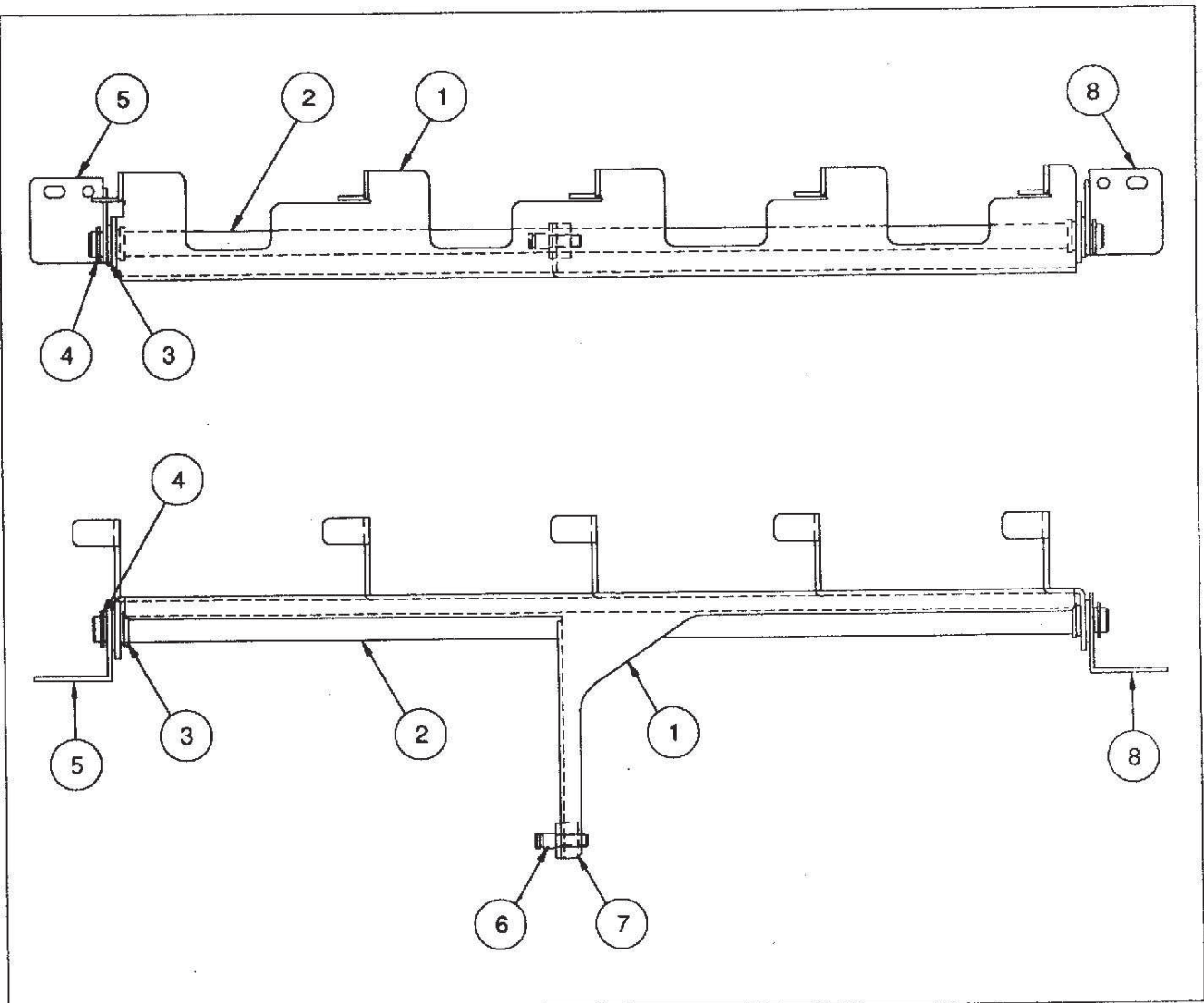
### ■ Associated Parts:

Item	Part Number	Description	Item	Part Number	Description
1.	A-17252	Plunger Assembly	11.	A-17560	5 Position Kicker Assy. (see p. 2-23)
2.	02-2963	Armature Bell	12.	12-6227	Hair Pin Clip
3.	01-11969	Coil Mounting Bracket	13.	02-4724	Entry Ramp Rollover
4.	10-135	Solenoid Spring	14.	4700-00026-00	Flatwasher: 1/4 x 29/64 x 21ga.
5.	23-6420	Rubber Grommet			
6.	AE-26-1200	Coil Assembly			
7.	03-7067-5	Coil Tubing			
8.	4008-01017-04	Mach. Screw, #8-32 x 1/4 P-RH			
9.	01-8-508-T	Solenoid Bracket			
10.	4420-01119-00	Nut 1/4-20 ESN/NE			



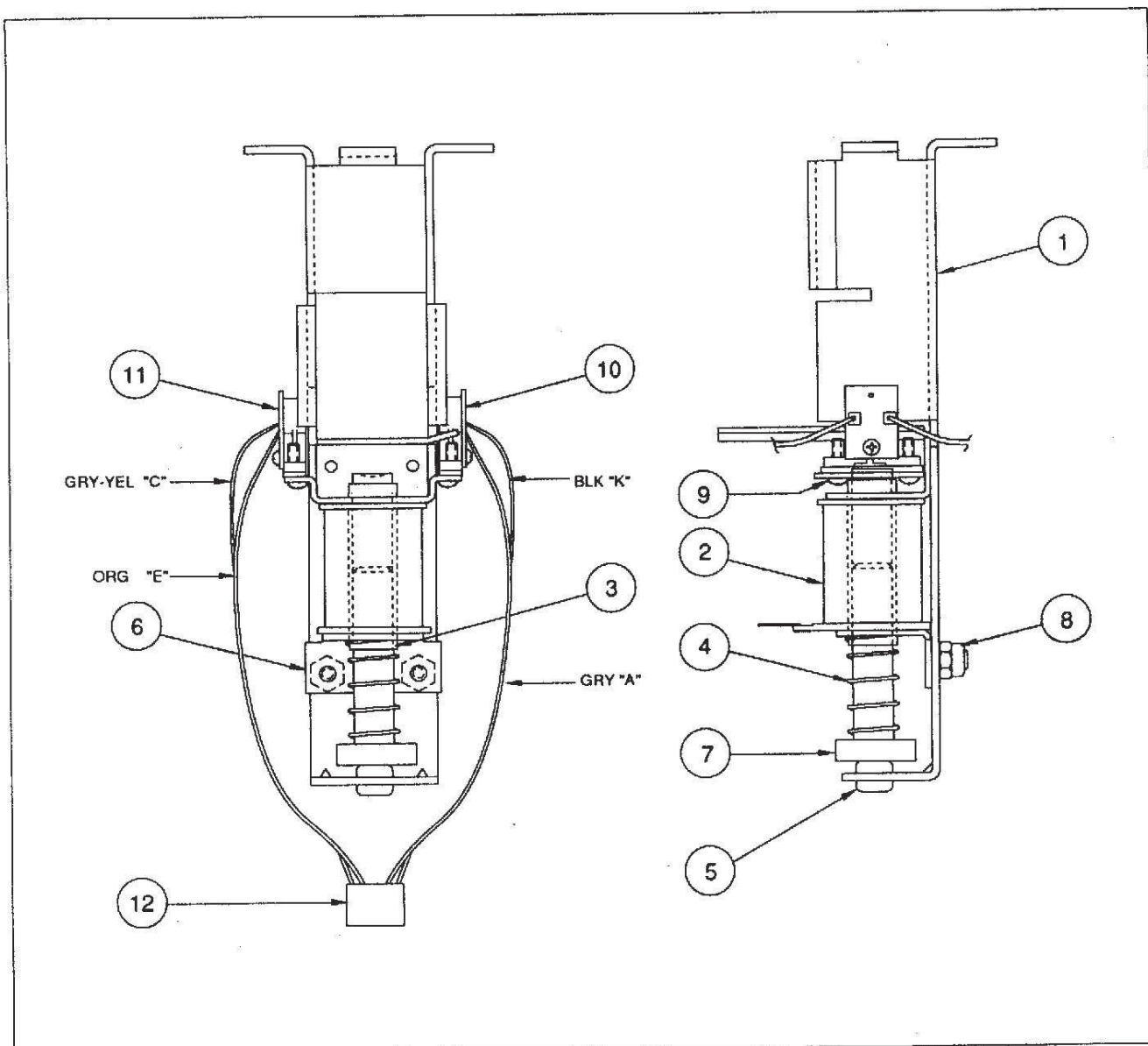
*Coil & Bracket Assy. And Associated Parts*

## A-17560 5-Position Kicker Assembly



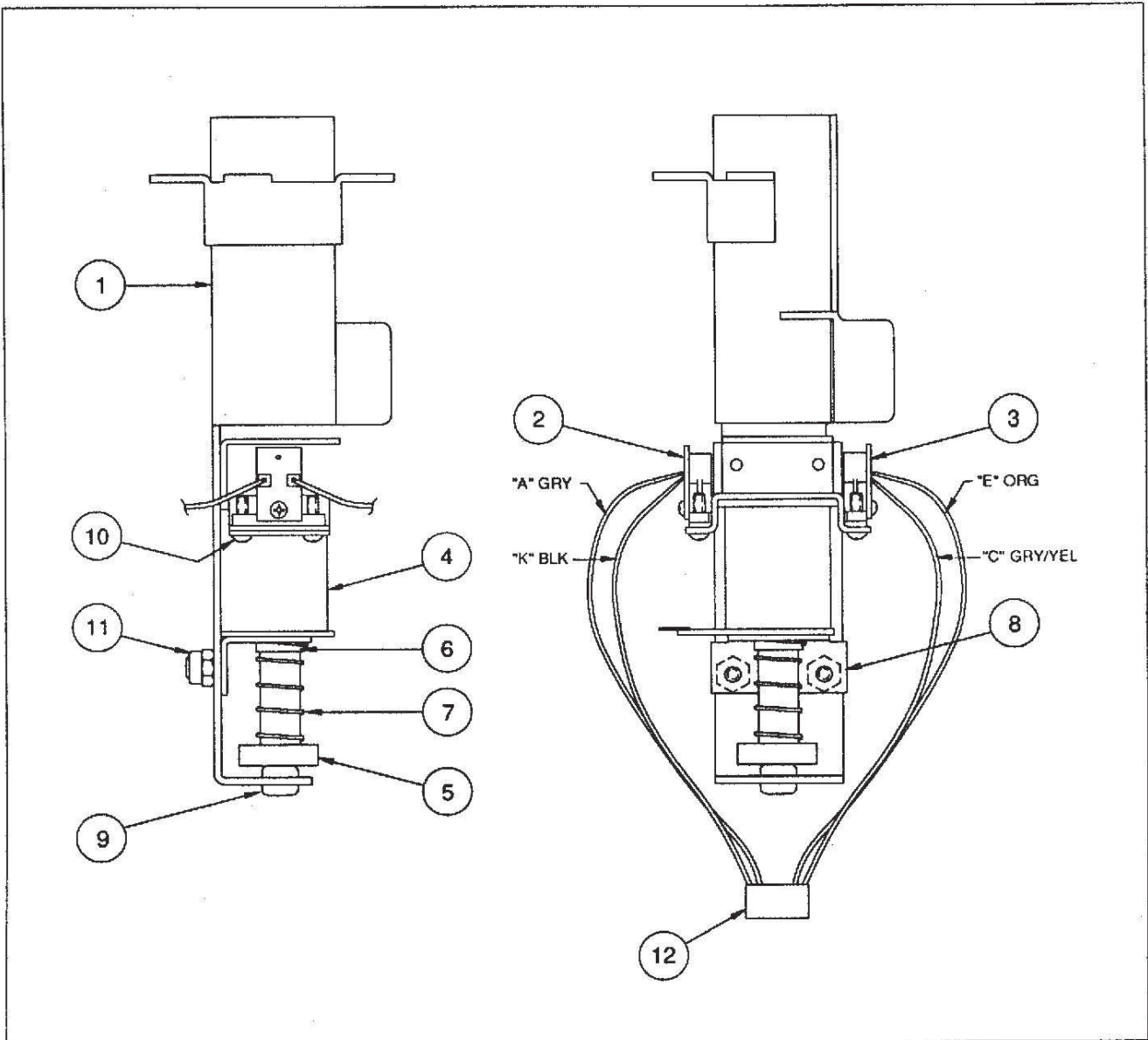
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	01-11822	Kicker Bracket
2.	02-4864	Kicker Rod
3.	20-8790-6	Nylined Bearing
4.	20-8712-37	"E" Ring: 3/8" Shaft
5.	01-11823-L	Mounting Bracket - Left
6.	02-4862	Pin - 5 Kicker
7.	4410-01132-01	Nut 10-32 ESNA
8.	01-11823-R	Mounting Bracket - Right

## A-17258 Ball Popper Assembly



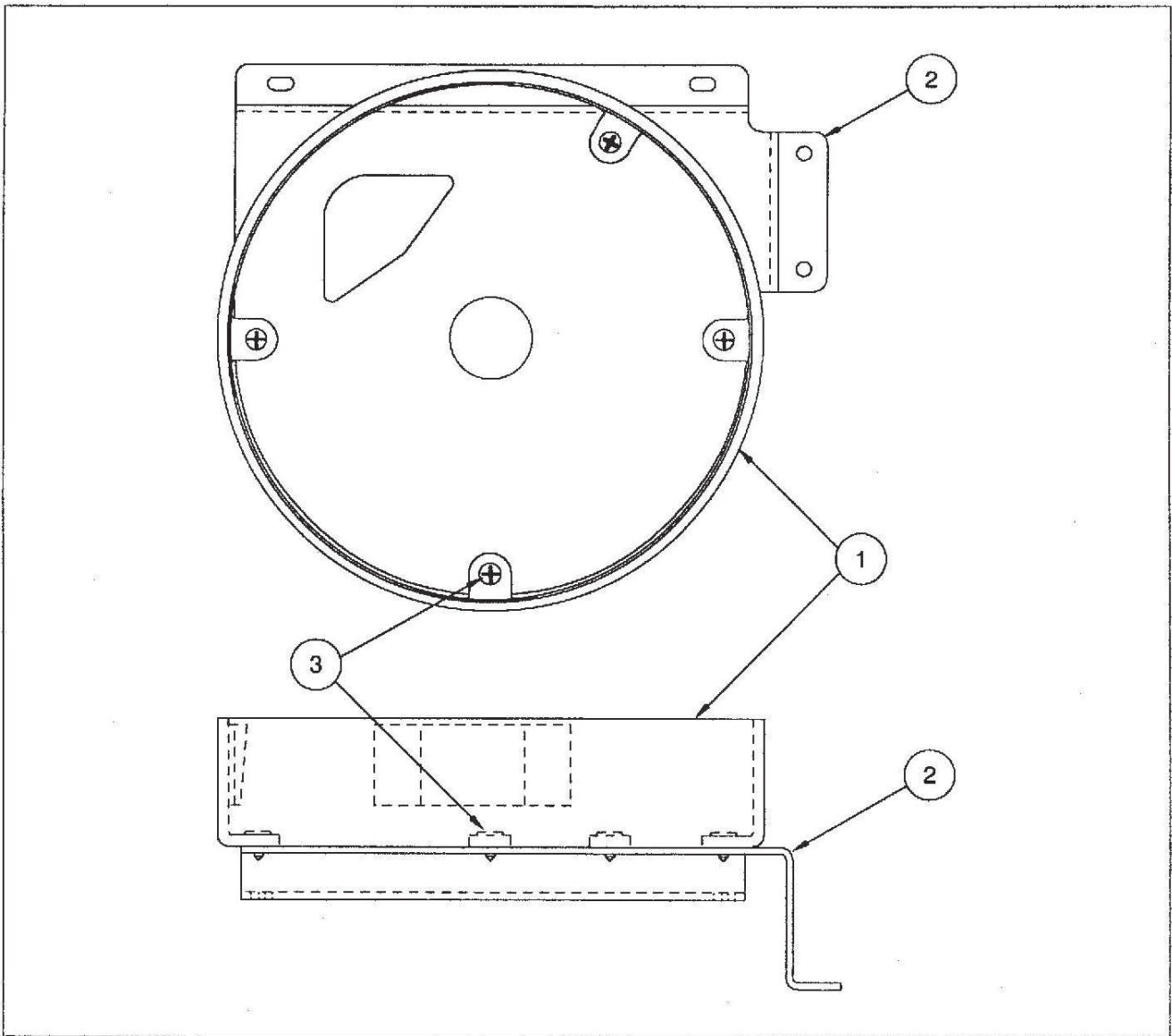
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-17913	Ball Popper Sub-Assembly
2.	AE-24-900	Coil Assembly
3.	03-7067	Coil Tubing Assembly
4.	10-135	Solenoid Spring
5.	23-6420	Rubber Grommet
6.	A-16858	Mounting Bracket
7.	A-17767	Bell Armature Assembly
8.	4408-01119-00	Nut 8-32 ESN
9.	4106-01013-06	Sh. Metal Screw, #6 x 3/8 P-PH Type 25
10.	A-16908	Opto LED Assembly, RTV
11.	A-16909	Opto Photo Transistor Assy., RTV
12.	H-17609-5	Opto Cable - Square

## A-17180 Popper Assembly - Left



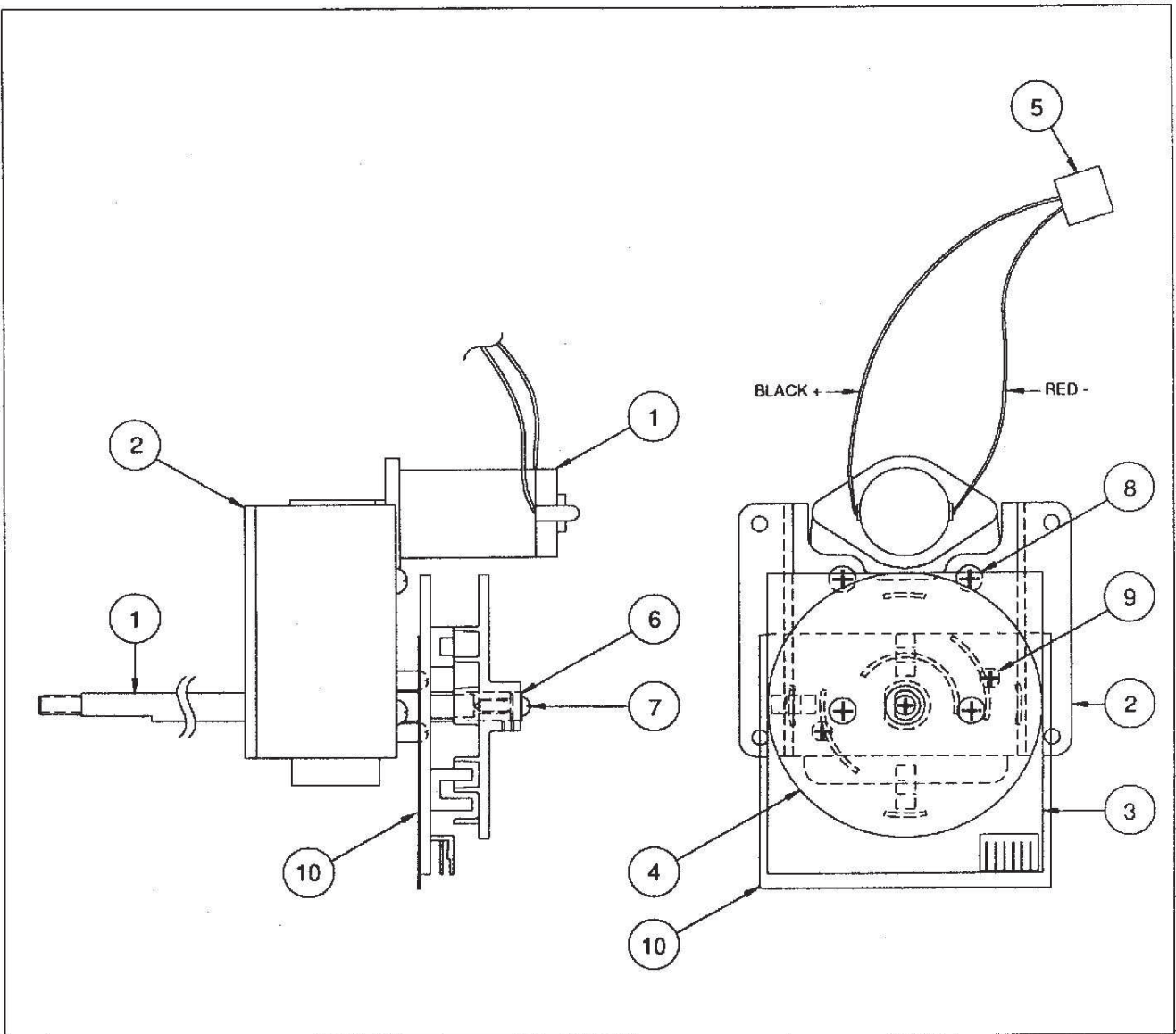
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-17181	Popper Sub-Assembly, Left
2.	A-16908	Opto LED Assembly, RTV
3.	A-16909	Opto Photo Transistor Assy., RTV
4.	AE-24-900	Coil Assembly
5.	A-17767	Bell Armature Assembly
6.	03-7067	Coil Tubing
7.	10-135	Solenoid Spring
8.	A-16858	Mounting Bracket
9.	23-6420	Rubber Grommet
10.	4106-01004-06	Sh. Metal Screw, #6 x 3/8 P-PH-ST
11.	4408-01119-01	Nut 8-32 ESN
12.	H-17609-5	Opto Cable-Square

## A-17895 Wheel Ring Assembly



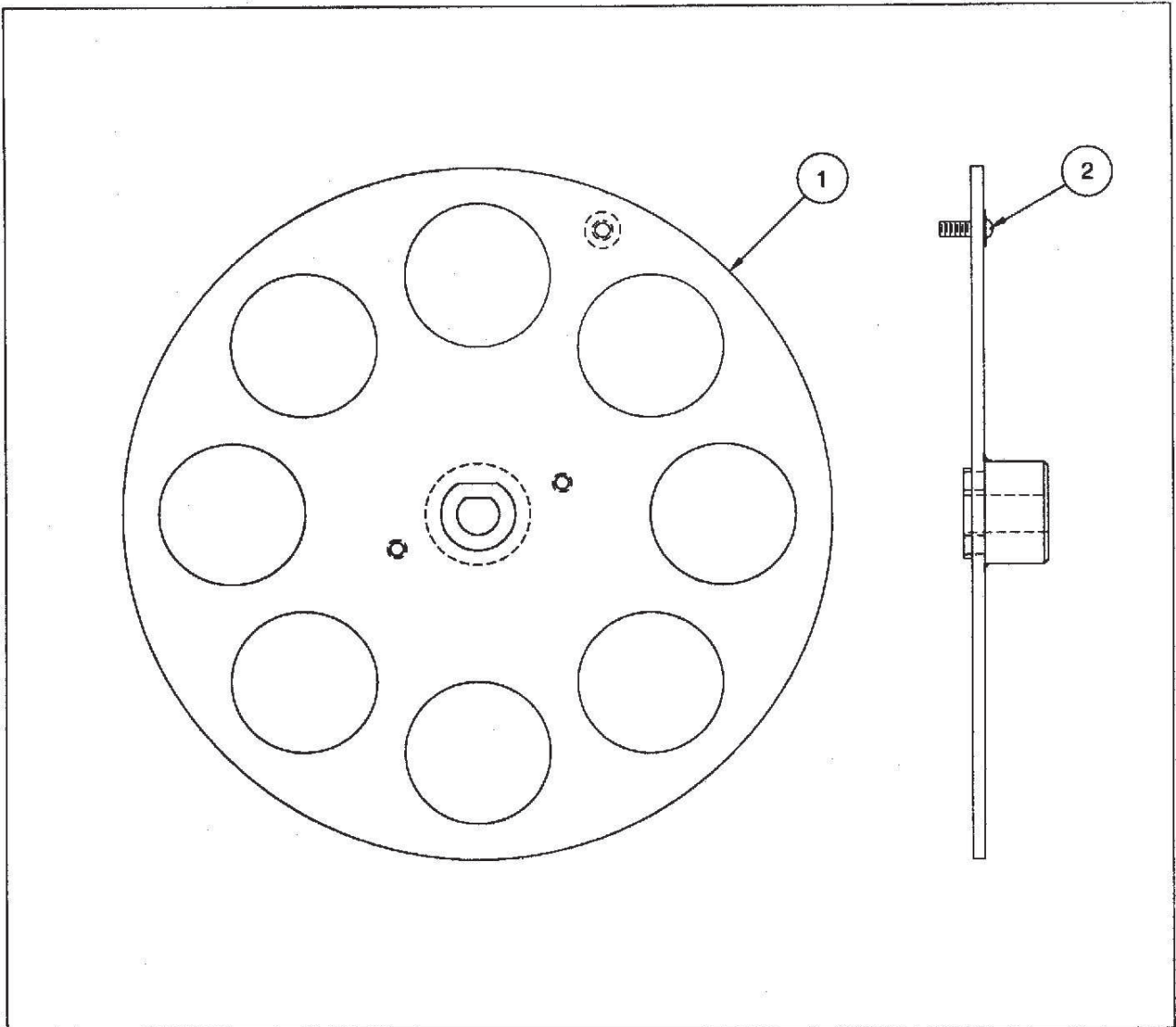
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	03-9093	Wheel Ring
2.	01-12438	Bracket w/out hole
3.	4006-01027-06	Mach. Screw, 6-32 x 3/8 P-RWH

## A-17623 Wheel Motor Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	14-7990	Motor, 12VDC
2.	A-17146	Mtg. Motor Bracket Sub-Assy.
3.	A-17069	3-Bit Encoder PCB Assy.
4.	03-8950	Opto Interrupter
5.	H-17594	Motor Cable
6.	4700-00009-00	Flatwasher, 11/64 x 7/16 x 20ga.
7.	4006-01003-06	Mach. Screw, 6-32 x 3/8" P-PHS
8.	4008-01003-05	Mach. Screw, 8-322 x 5/16" P-PHS
9.	4006-01027-04	Mach. Screw, 6-32 x 1/4" P-RWH
10.	01-12457	Insulator

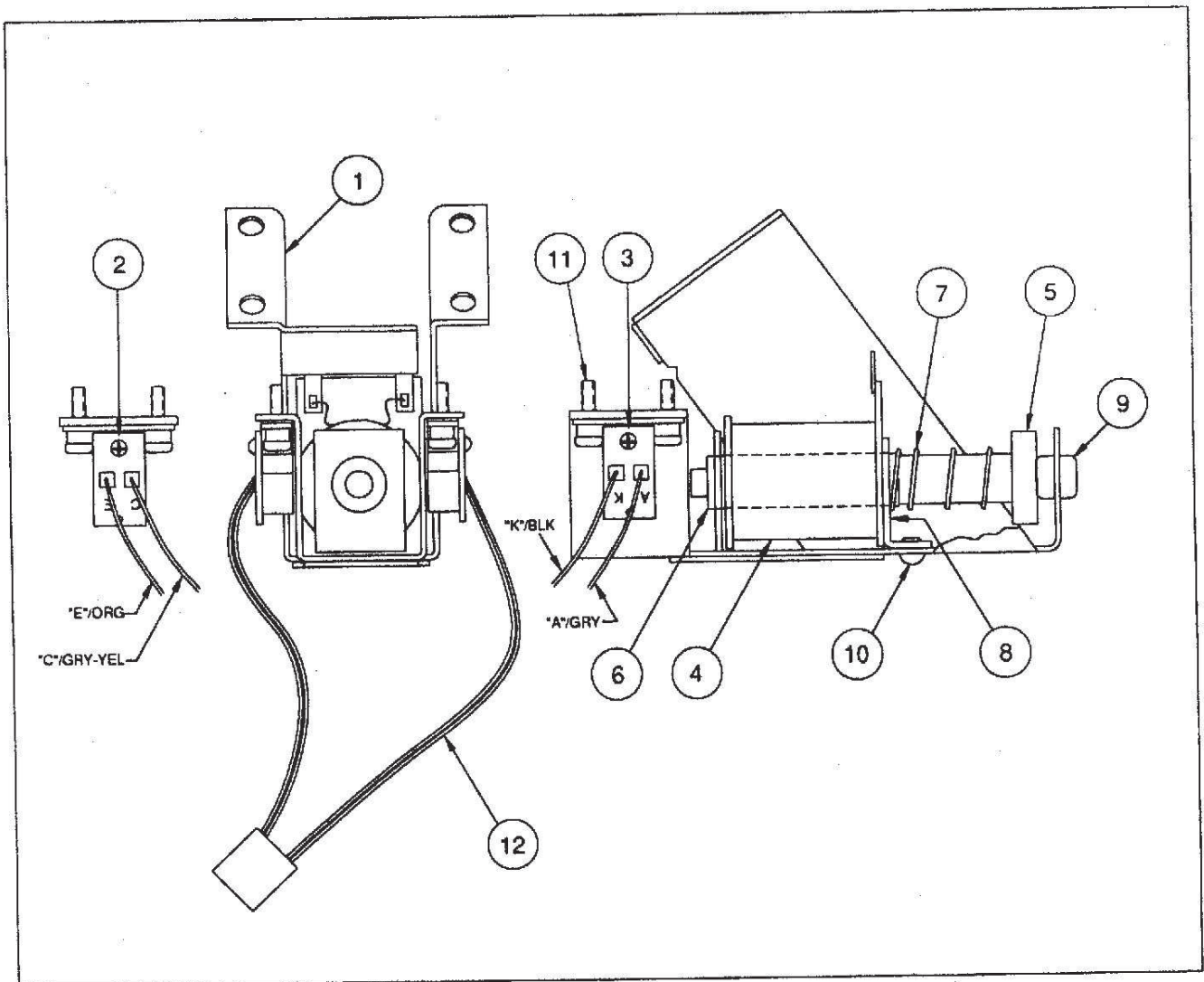
# A-17859 Rotating Plate Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-17145	Plate Rotating Assembly
2.	4006-01027-06	Mach. Screw, 6-32 x 3/8 P-RWH



## A-17774 Kicker Coil Bracket Assembly

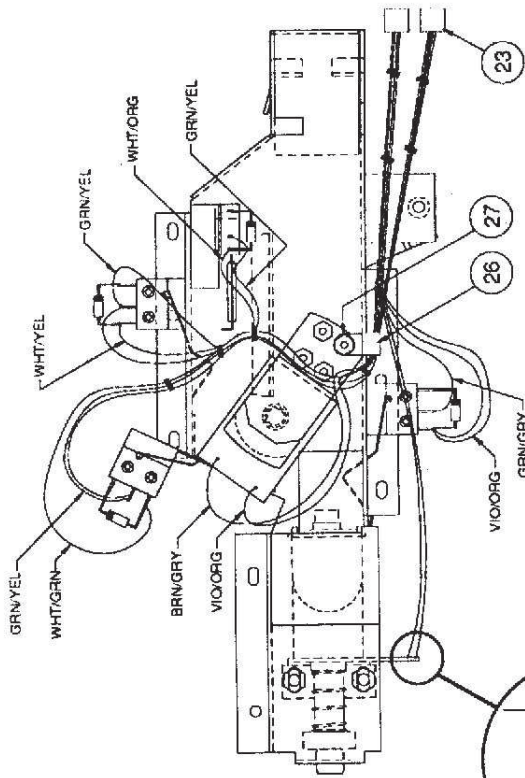


Item	Part Number	Description
1.	01-12306	kicker Coil Bracket Assembly
2.	A-16909	Photo Transistor Assy., RTV
3.	A-16908	LED Assembly, RTV
4.	AE-23-800	Coil Assembly
5.	A-17767	Bell Armature Assembly
6.	03-7067	Coil Tubing
7.	10-135	Solenoid Spring
8.	01-9794	Mounting Bracket
9.	23-6420	Grommet
10.	4008-01017-04	Mach. Screw, #8-32 x 1/4 P-RH-S
11.	4004-01003-06	Mach. Screw, #4-40 x 3/8 P-PH-S
12.	H-17609-8	Cable Assembly

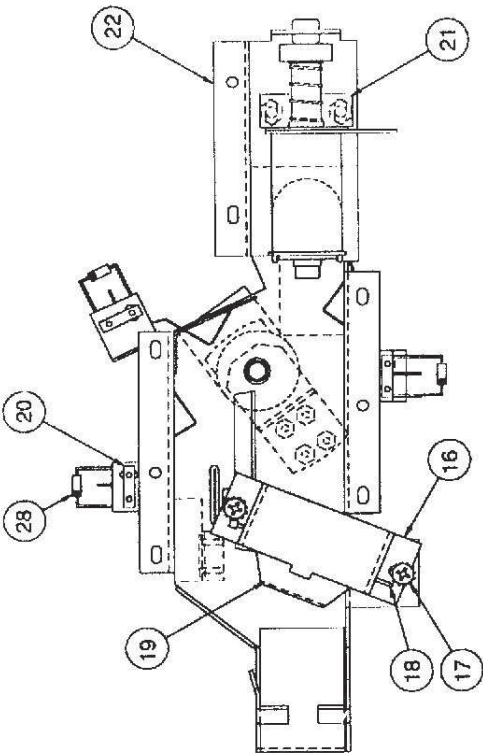
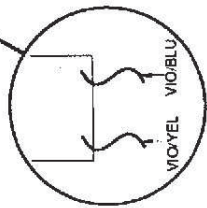
## A-17505 Center Ball Lock Assembly

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	10-135	Solenoid Spring
2.	AE-23-800	Coil Assembly
3.	03-7067	Coil Tubing
4.	A-17767	Bell Armature Assembly
5.	23-6420	Rubber Grommet
6.	4408-01119-01	Nut 8-32 ESN
7.	01-12128	Coil Stop Bracket
8.	02-5005	Post-Disappearing
9.	03-7066-3	Coil Tubing, 1-7/8" Lg.
10.	AE-26-1500	Coil Assembly
11.	B-7572-1	Bracket & Stop Assembly
12.	4006-01003-04	Mach. Screw, #6-32 x 1/4" P-PH-S
13.	4404-01119-00	Nut 4-40 ESN
14.	5647-12693-25	Switch, Sub-Miniature
15.	4002-01105-07	Mach. Screw, 2-56 x 7/16" P-PH-S
16.	01-12423	Gate Bracket
17.	4008-01003-04	Mach. Screw, 8-32 x 1/4 P-PH-S
18.	12-7152	Wire - Gate
19.	01-9936	Gate - Shooter
20.	01-8240	Nut Plate
21.	A-16858	Mounting Bracket
22.	A-18000	Weldment, Center Ball Lock
23.	H-17584	Lock Cable Assembly
24.	01-10024	Insulator
25.	20-8712-43	"E"-Ring, 7/16" Shaft
26.	03-7655-4	Cable Clamp, 1/4"
27.	4700-00005-00	Flatwasher, 9/64 x 7/16 x 21ga.
28.	5070-09054-00	Diode IN4004
29.	20-8790-2	Nylined Bearing

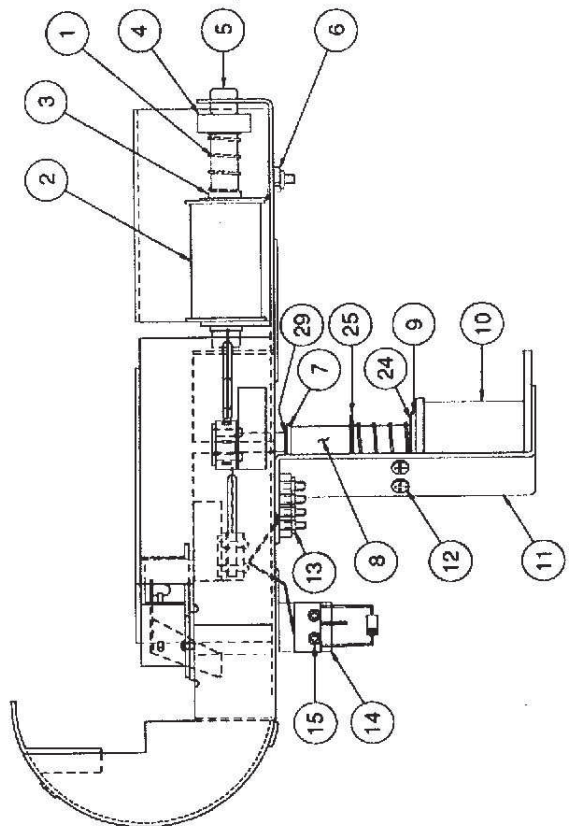
# A-17505 Center Ball Lock Assembly



BOTTOM VIEW



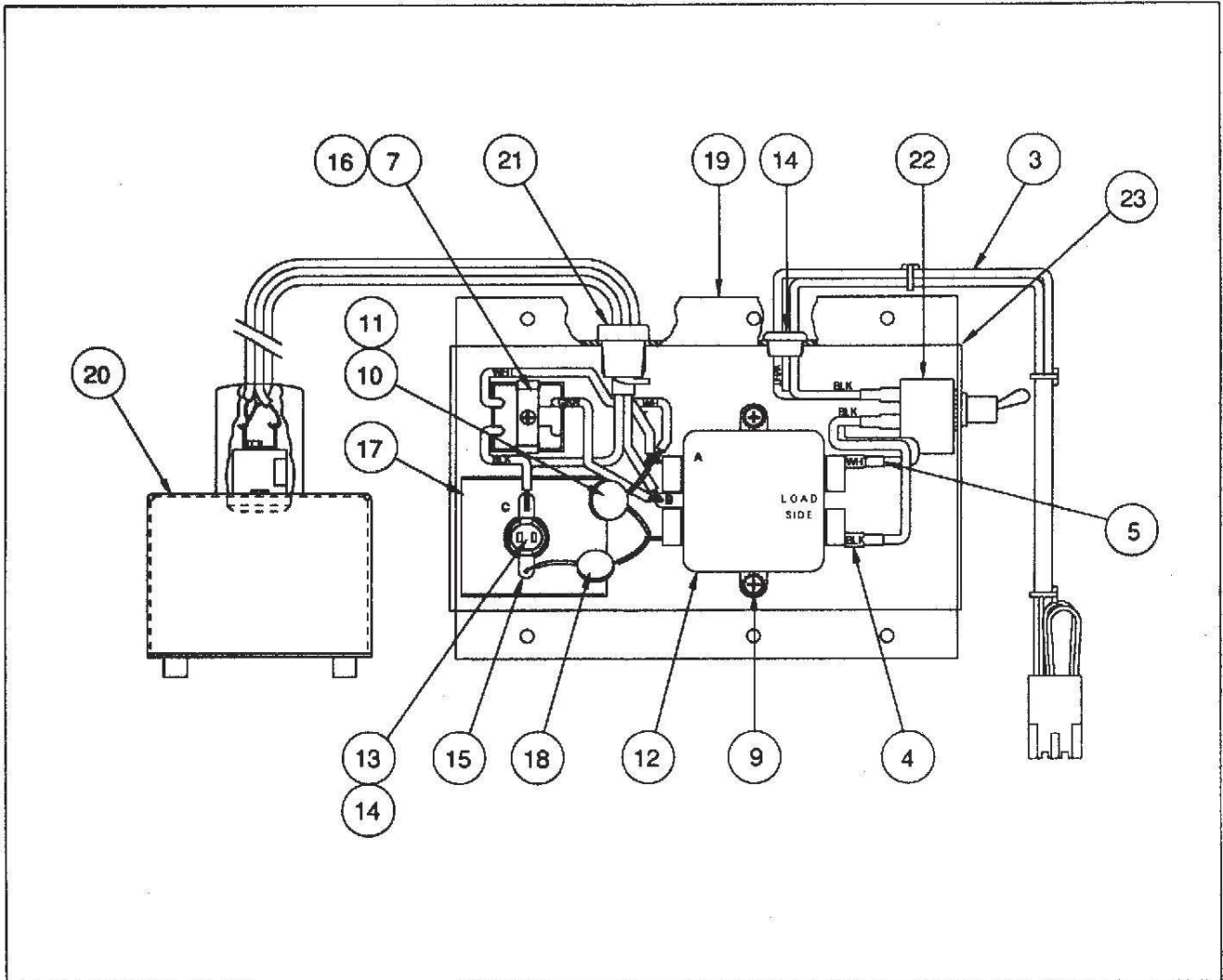
TOP VIEW



SIDE VIEW

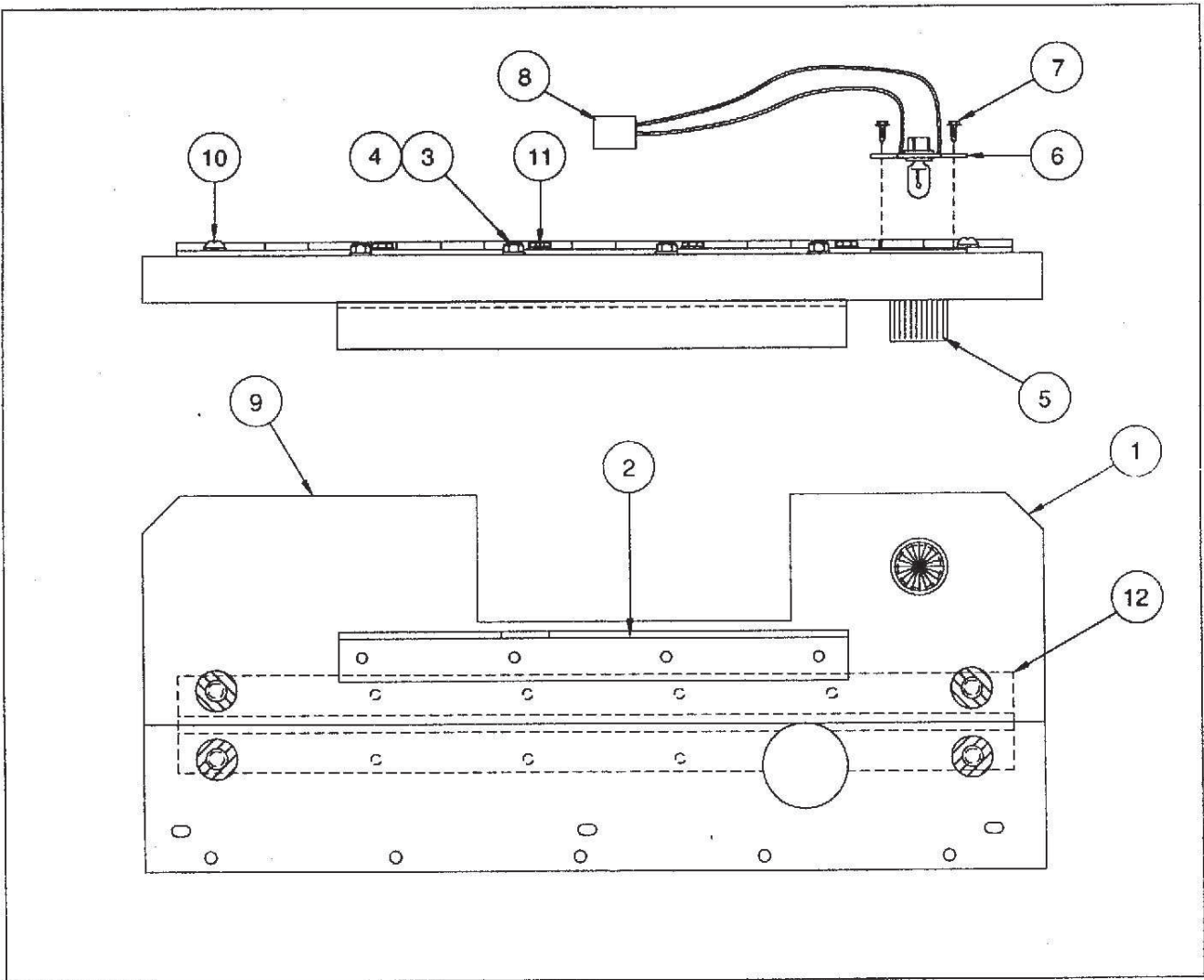
**A-16970-120V  
A-16970-230V**

**Line Filter Assembly**



Item	Part Number	Description	Item	Part Number	Description
1.	H-13870	Black Jumper Cable	13.	5730-09252-00	Fuse 8A 250V
2.	H-13871	Orange Jumper Cable	14.	5731-09651-00	Fuse SB 5A 250V
3.	H-14790	A.C. Cable	15.	5733-12869-00	Fuse Holder Panel Mount
4.	H-14792-1	A.C. Cable, Black	16.	5851-09184-00	SER Outlet Snap-In
5.	H-14792-2	A.C. Cable, White	17.	01-10623	Insulator, Thermistor
6.	RM-21-06	#18 Vinyl Fgls	18.	5016-12978-00	Thermistor 8A 2.5R25
7.	03-8928	Tube Plug 1" Sq.	19.	A-14810-1	Chassis Assembly
8.	03-8591	Bushing-Strain Relief	20.	A-15473-1	IEC Power Input Assembly
9.	4008-01017-08	Mach. Screw, 8-32 x 1/2" P-R	21.	03-8712	Bushing-Strain Relief
10.	5017-09044-00	Varistor Metox 10A	22.	5640-13250-00	Toggle Switch, DPST
11.	5017-09063-00	Varistor 275V 15J	23.	A-16969	Switch Mounting Plate Assy.
12.	5102-10310-00	Line Filter 5VK	24.	4406-01128-00	Nut #6-32 KEPS

## A-17401 Back Panel Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	11-1148-1	Back Panel - Bottom
2.	01-11922	Upper Playfield Support Bracket
3.	4700-00021-00	Flatwasher, 13/64 x 7/16 x 21ga.
4.	4410-01132-01	Nut, 10-32 ESNA/NTM
5.	03-8149-10	Mini-Dome, Tr. Blue
6.	C-13337	Flash/Lamp Assembly
7.	4608-01081-08	Self Tapping Screw, #8 x 1/2"
8.	H-17635	Single Flasher Cable
9.	11-1148-2	Back Panel - Top
10.	4008-01157-08	Mach. Screw, 8-32 x 1/2"
11.	4608-01081-07	H-F #8 x 7/16" PL-HWH
12.	20-9933	Hinge - Back Panel

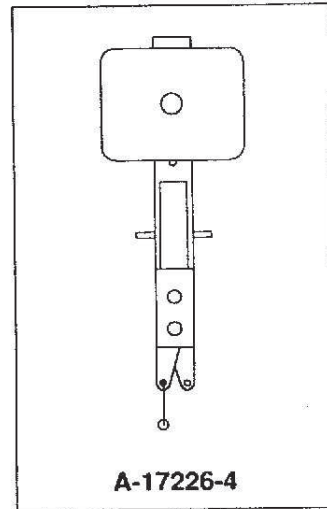
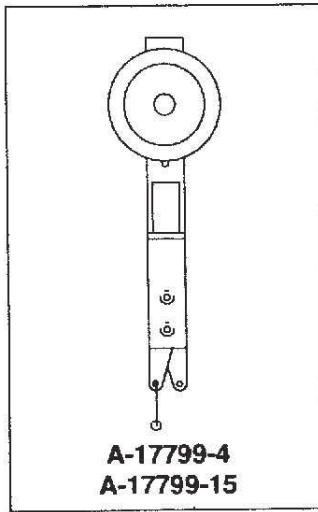
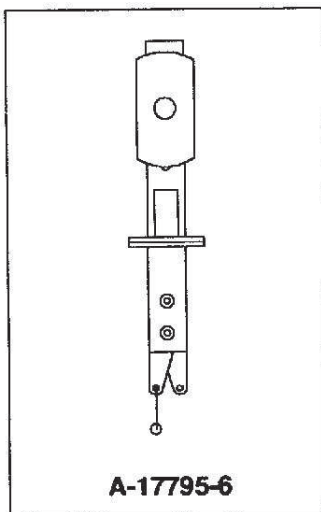
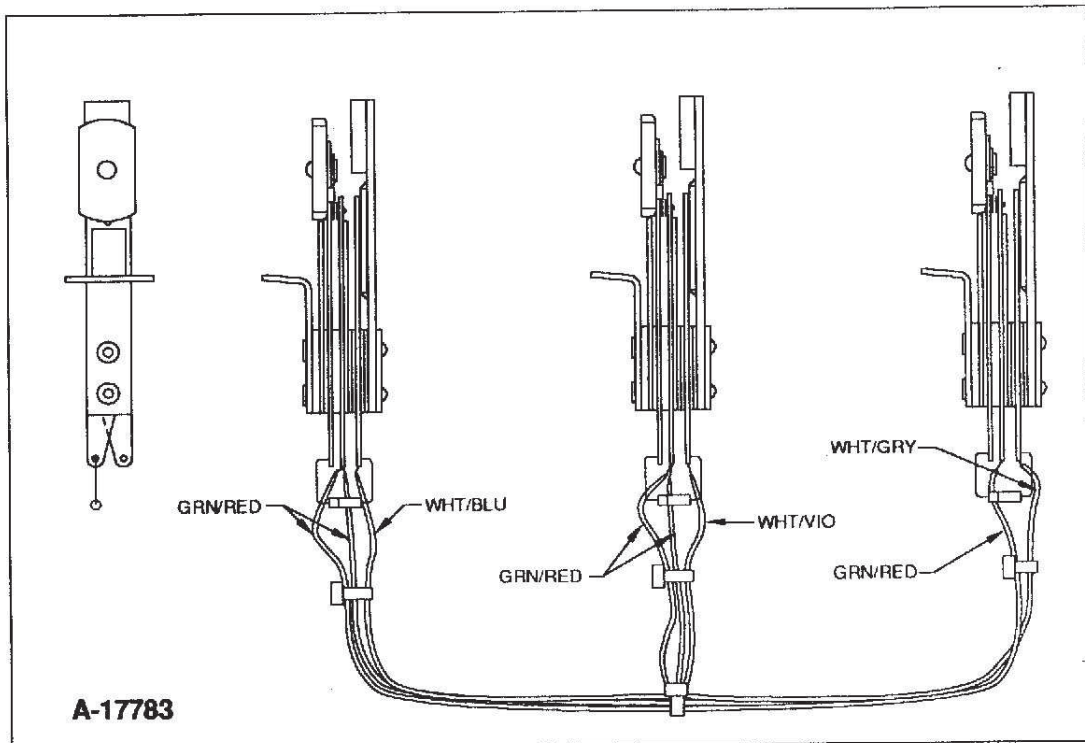
## Target Assemblies

### ■ Target Assemblies used on Playfield:

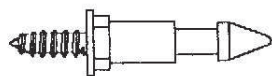
- A-17783 Target & Cable Assembly (1 Used)
- A-17795-6 Oblong Target Assembly, Yellow (2 Used)
- A-17799-4 Stationary Target Assembly, Red (2 Used)
- A-17799-15 Stationary Target Assembly, Orange (3 Used)

### ■ Target Assembly used on Mini-Playfield:

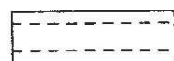
- A-17226-4 Stationary Target Assembly, Op. Red (2 Used)



## Posts



02-3905  
Bumper Post #8 WS



02-4020  
Support Post



02-4176-30  
M-F Spacer 8-32 X 1-7/8"  
02-4176-54  
M-F Spacer 8-32 X 3.19"



02-4252-30  
Spacer 6-32 x 1-7/8"



02-4424-1  
Post 6-32/8-32 2-1/32"



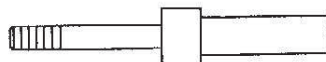
02-4425-1  
Post 8-32/ #8-32 2-3/8"



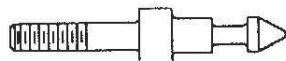
02-4426-1  
Post #6-32 /8 1-29/32"



02-4436-25  
F-F Spacer, 8-32 x 1-9/16"



02-4659-1  
Mini Post, 6-32 x 3/8"



02-4660  
Single Bumper Post



02-4677  
Mini Post



02-4765-6  
Mounting Post, 3.13"  
02-4765-7  
Mounting Post, 3.44"  
02-4765-8  
Mounting Post, 4.31"



02-4842  
Bumper Post



02-4903  
Mounting Post



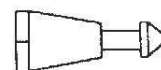
02-4950  
Bumper Post



02-4968-1  
M-F spacer 8-32 x 2.94"  
02-4968-2  
M-F spacer 8-32 x 2.81"



02-4974-1  
Hex Standoff, 5/16 x 3/4"



03-8044-9  
Mini Plastic Post - Trans. Amber



03-8130-13  
Double Bumper Post, Starred  
Crystal Clear



03-8319-9  
Star Post #8



03-8365-10  
Post 3/8 x 1-3/16", Tr. Blue



03-8370-10  
Post, Tr. Blue

## POPEYE Unique Part List

### Unique Backbox Parts:

<u>Part Number</u>	<u>Description</u>
A-12742-50022	WPC CPU Assembly
A-16123-50022	Backbox Assembly
A-16917-50022	Sound Board Assembly
A-17583	Speaker/Display Panel Assy.
A-8552-50022	Backglass Assembly

### Unique Playfield Parts:

A-13204-50022	Bottom Arch Assembly
A-13769-50022	Playfield & Insert Assembly
A-16976-L-1	Flipper Assembly
A-16976-R	Flipper Assembly
A-17129	Back Rail Assembly
A-17145	Rotating Plate Assembly
A-17177	Ramp Assembly
A-17180	Left Popper Assembly
A-17226-4	Stationary Tgt. Assy., Op. Red
A-17251	Coil & Bracket Assembly
A-17258	Ball Popper Assembly
A-17339	Gate Assembly
A-17401	Back Panel Assembly
A-17402	Wheel Drop Guide Assy.
A-17403	Upper Right Exit Assembly
A-17404	Main Ramp Assembly
A-17405	Wire Ramp Chute Assembly
A-17406	Wheel Feeder Ramp Assembly
A-17505	Center Ball Lock Assembly
A-17536	Opto Bracket Assembly
A-17560	5-Pos Kicker Assembly
A-17567	Upper Level Drain Assembly
A-17577-1	Flipper Guide & Plastic Assembly
A-17577-2	Flipper Guide & Plastic Assembly
A-17600-1	5-Lamp Board & Spacer Assembly
A-17602-1	18-Lamp Board & Spacer Assembly
A-17603-1	3-Lamp Board & Spacer Assembly
A-17623	Wheel Motor Assembly
A-17624-1	3-Lamp Board & Spacer Assembly
A-17626-1	Playfield Plastic Assembly
A-17626-2	Playfield Plastic Assembly
A-17626-3	Playfield Plastic Assembly
A-17626-5	Playfield Plastic Assembly
A-17626-7	Playfield Plastic Assembly
A-17639	Decal Ring Cover Assembly
A-17774	Kicker Coil Assembly
A-17777	Guide Ramp Final Assembly
A-17783	Target & Cable Assembly
A-17794	Kicker Sw. Sub-Assembly
A-17795-6	Oblong Target Assy., Yellow
A-17796	Ball Gate Actuator Coil Assembly
A-17797-1	Ball Gate Special Assy., Left

### Unique Playfield Parts (Continued):

<u>Part Number</u>	<u>Description</u>
A-17797-2	Ball Gate Special Assy., Right
A-17799-4	Stationary Target Assembly, Red
A-17801	Kicker Count Switch Assembly
A-17802	Socket #906 Bulb Assembly
A-17803	Socket #89 Bulb Assembly
A-17809	Coil & Bracket Assembly
A-17809-1	Coil & Bracket Assembly
A-17811	Kicker (Slingshot) Assembly
A-17812-1	Cable Mtg. Bracket Assy., 1/4"
A-17812-2	Cable Mtg. Bracket Assy., 1/2"
A-17812-3	Cable Mtg. Bracket Assy., 3/4"
A-17812-4	Cable Mtg. Bracket Assy., 1"
A-17813	Rollover Switch Assembly
A-17813-1	Rollover Switch Assembly
A-17825	Light Socket & Cable Assembly
A-17895	Wheel Ring Assembly
01-11805	Playfield Rail - Left
01-11806	Playfield Rail - Right
01-11814	Ball Guide
01-11817	Ball Guide
01-11818	Ball Guide
01-11973	Ramp - Right Ball Popper
01-12133	Bracket - Left Drop Ramp
01-12166	Ramp - Ball Deflector
01-12214	Plate-Post Adjustment #8
01-12286	Ball Guide - Arch
01-12329	Ball Guide
01-12330	Ball Guide
01-12359	Head Support Bracket
01-12387	Ball Guide
01-12406	Cover Bracket
01-12417	Ball Guide
01-12448	Ball Guide - Arch
01-12460	Left Ball Popper Cover
02-4176-30	M-F Spacer 8-32 x 1-7/8"
02-4176-54	M-F Spacer 8-32 x 3-3/16"
02-4765-6	Mounting Post, 3.13"
02-4765-7	Mounting Post, 3.44"
02-4765-8	Mounting Post, 4.31"
02-4903	Mounting Post
02-4968-1	M-F Spacer 8-32 x 2.94"
02-4968-2	M-F Spacer 8-32 x 2.81"
03-9088	Bluto
11-1134	Rail Wood, .50 x 1.12 x 9.63"
12-7132	Ramp - Right
12-7133	Ramp - Center
12-7183	Ball Guide
31-1878-11	Playfield Plastic
31-1878-13	Playfield Plastic
31-1878-14	Playfield Plastic



## POPEYE Unique Part List (Continued)

### Unique Playfield Parts (Continued):

<u>Part Number</u>	<u>Description</u>
31-1878-15	Playfield Plastic
31-1878-19	Playfield Plastic
31-1878-20	Playfield Plastic
31-1878-22	Playfield Plastic
31-1878-25	Playfield Plastic
31-1878-3	Playfield Plastic
31-1878-30	Playfield Plastic
31-1878-4	Playfield Plastic
36-50022	Playfield Hardcoat

### Unique Cabinet Parts:

<u>Part Number</u>	<u>Description</u>
01-12352	Clip Bracket
11-1131	Pinball Cabinet - Wood

### Unique Mini-Playfield Parts:

A-13769A-50022	Mini-Playfield & Insert Assembly
A-17276	Upper Exit Ball Guide
A-17341	Upper Left Exit Assembly
A-17462	Upper Level Ramp Assembly
A-17604	Ramp Exit Flap Assembly
A-17626-4	Playfield Plastic Assembly
A-17626-8	Playfield Plastic Assembly
A-17647	Light Cover Assembly
A-17648	Left Cover Assy., Upper Playfield
A-17649	Right Cover Assy., Upper Playfield
A-17769	Upper Ramp Deflector Assembly
A-17817	Light & Bracket Assembly
A-17838	Stud Plate Assembly, #8
A-17881	Opto Bracket & Cable Assembly
01-11815	Ball Guide
01-11816	Ball Guide
01-12171	Ball Guide
01-12173	Ball Guide
01-12305	Ball Guide
01-12389	Head Support Bracket
03-8947	Up-Level Window
20-9842-3	Slit Sleeving - Black 10" Lg.
31-1878-10	Playfield Plastic
36-50022-1	Mini-Playfield Hardcoat

## **POPEYE Cable List**

### **Backbox Cables:**

<u>Part Number</u>	<u>Description</u>
H-14584	Dot Mtx. Display Power Cable
H-15476	Logic Power Cable
H-15736	Secondary Cable
H-17591-1	Insert Cable

### **Cabinet Cables:**

<u>Part Number</u>	<u>Description</u>
H-16599	Coin Door Cable - DBV
H-17005-2	Cabinet Cable
H-17019	Dixie-Mars Interconnect
H-17217	Plum Bob/Mech. Protect Cable
H-17592	Cab. Lamp/Sw. Cable

### **Playfield Cables:**

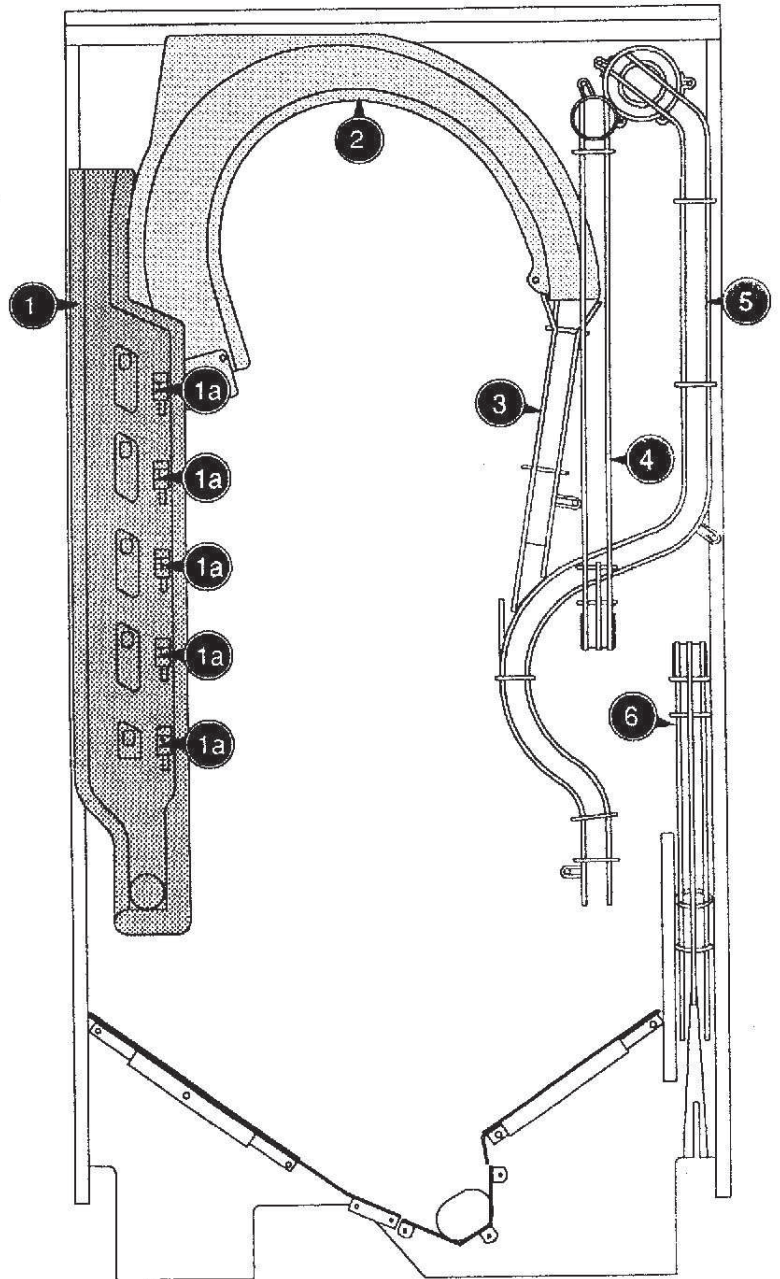
<u>Part Number</u>	<u>Description</u>
H-17588-1	Playfield Lamp Cable
H-17589-2	Playfield Solenoid Cable
H-17590-1	Playfield Switch Cable
H-17593-1	Playfield Opto Cable
H-17635	Single Flasher Cable

### **Mini-Playfield Cable:**

<u>Part Number</u>	<u>Description</u>
H-17585-3	Mini-Playfield Cable

# RAMP LOCATIONS

Item	Part Number	Description
1.	A-17404	Main Ramp Assembly
a)	A-17906	U-Switch Subminiature Assy.
2.	A-17177	Ramp Assembly
3.	12-7184	Wire Ramp - Center
4.	A-17406	Wheel Feeder Wire Ramp Assy.
5.	12-7132	Ramp, Right
6.	A-17405	Wire Ramp Chute Assembly

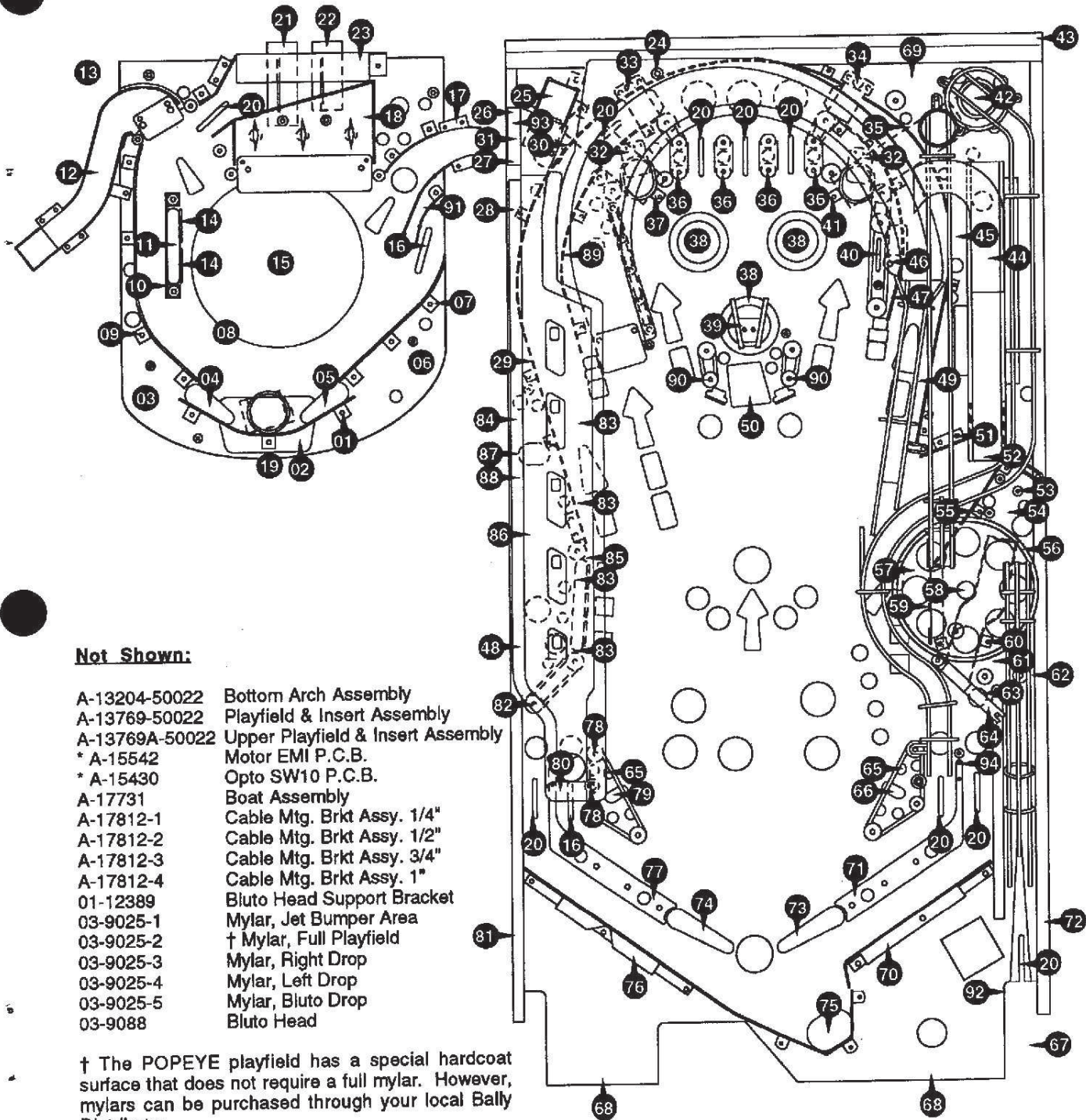


## UPPER PLAYFIELD PARTS LIST

Item	Part Number	Description			
1	01-12173	Ball Guide	49	A-17626-3	Playfield Plastic Assembly
2	A-17567	Upper Level Drain Assembly	50	* A-17505	Center Ball Lock Assembly
3	A-17648	Left Cover Assembly	51	01-12329	Ball Guide
4	A-16976-L-1	Flipper Assembly Complete	52	* A-17774	Kicker Coil Assembly
	20-9732-5	Small Flipper & Shaft	53	02-4765-7	Mounting Post 3.44"
5	A-16976-R	Flipper Assembly Complete	54	A-17626-1	Playfield Plastic Assembly
	20-9732-5	Small Flipper & Shaft	55	01-12330	Ball Guide
6	A-17649	Right Cover Assembly	56	A-17895	Wheel Ring Assembly
7	01-11815	Ball Guide	57	A-17145	Rotating Plate Assembly
8	* A-17838	Stud Plate Assembly (5)	58	A-17639	Decal Ring Cover Assembly
9	01-11816	Ball Guide		* A-17623	Wheel Motor Assembly
10	01-12171	Ball Guide	59	A-17783	Target & Cable Assembly
11	A-17647	Light Cover Assembly	60	A-17402	Wheel Drop Guide Assembly
12	A-17736	Exit Ramp Assembly	61	A-17626-5	Playfield Plastic Assembly
13	A-17626-4	Playfield Plastic Assembly	62	02-4765-7	Mounting Post 3.44"
14	A-17226-4	Stationary Target, Red	63	* 01-12214	Post Adjustment Plate
15	03-8947	Upper Playfield Window	64	A-17339	Gate Assembly
16	A-17813-1	Rollover Switch Assembly	65	A-17801	Kicker Count Switch Assembly
17	A-17403	Upper Right Exit Assembly	66	A-17811	Slingshot Kicker Assembly
18	A-17462	Upper Level Ramp Assembly		A-17809-1	Coil & Bracket Assembly
19	A-17817	Light & Bracket Assembly	67	A-14525	Kicker Assembly
20	A-17813	Rollover Switch Assembly	68	01-9211	Playfield Hanger Bracket
21	A-17738	Opto Bracket Assembly	69	A-17626-8	Playfield Plastic Assembly
22	A-17737	Opto Bracket Assembly	70	01-12286	Ball Guide
23	A-17769	Upper Ramp Deflector Assy.	71	A-17577-2	Flipper Guide & Plastic Assy.
24	02-4765-6	Mounting Post 3.13"	72	01-11806	Right Playfield Rail
25	A-17180	Ball Popper Assembly	73	A-15849-R-2	Flipper Assembly Complete
	01-12460	Cover, Left Ball Popper		20-9734-5	Flipper & Shaft Assembly
26	02-4176-30	Standoff 1 7/8"	74	A-15849-L-2	Flipper Assembly Complete
	02-4176-54	Standoff 3 3/16"		20-9734-5	Flipper & Shaft Assembly
27	02-4176-54	Standoff 3 3/16"	75	A-16765	Outhole Ball Trough Assy.
28	02-4968-1	Standoff 2.94"	76	01-12448	Ball Guide
29	01-11818	Ball Guide	77	A-17577-1	Flipper Guide & Plastic Assy.
30	02-4176-30	Standoff 1 7/8"	78	02-4436-25	Standoff 1 9/16"
	02-4765-8	Mounting Post 4.31"	79	A-17811	Slingshot Kicker Assembly
31	01-12133	Bracket, Left Drop Ramp		A-17809	Coil & Bracket Assembly
32	01-11160	Ball Deflector Bracket	80	01-12166	Ramp Ball Deflector
33	A-17797-2	Special Ball Gate Assembly	81	01-11805	Left Playfield Rail
	A-17796	Ball Gate Actuator Assembly	82	* 01-9510	Post Adjustment Plate
34	A-17797-1	Special Ball Gate Assembly	83	A-17906	Switch Assembly
	A-17796	Ball Gate Actuator Assembly	84	02-4968-1	Standoff 2.94"
35	01-12387	Ball Guide	85	12-7183	Ball Guide Wire
36	03-8318-16	Light Hood, Yellow	86	A-17626-2	Playfield Plastic Assembly
37	01-11921	Ramp, Left Ball Popper	87	A-17251	Coil & Bracket Assembly
38	A-9415-2	Jet Bumper Coil Assembly		* 02-4724	Entry Ramp Rollover
	B-9414-3	Jet Bumper Assembly		* 12-6227	Hair Pin Clip
	B-12030-2	Jet Bumper Switch Assembly	88	A-17560	5 Position Kicker Assembly
	03-8254-10	Jet Bumper Cap, Blue	89	01-11814	Ball Guide
39	A-17626-7	Playfield Plastic Assembly	90	02-4903	Mounting Post
40	12-6466-5	Ball Guide Wire 1 1/4"	91	01-12305	Ball Guide
41	01-11973	Ramp, Right Ball Popper	92	02-12417	Ball Guide
42	A-17258	Ball Popper Assembly	93	01-12461	Cover Bracket
43	A-17129	Back Rail Assembly	94	02-4020	Support Post (8)
	A-17401	Back Panel Assembly			
44	A-17777	Guide Ramp Assembly			
45	A-17536	Opto Bracket Assembly			
46	02-4765-6	Mounting Post 3.13"			
47	01-11817	Ball Guide			
48	02-4968-1	Standoff 2.94"			

\* Located Under Playfield.

## UPPER PLAYFIELD PARTS LIST Continued



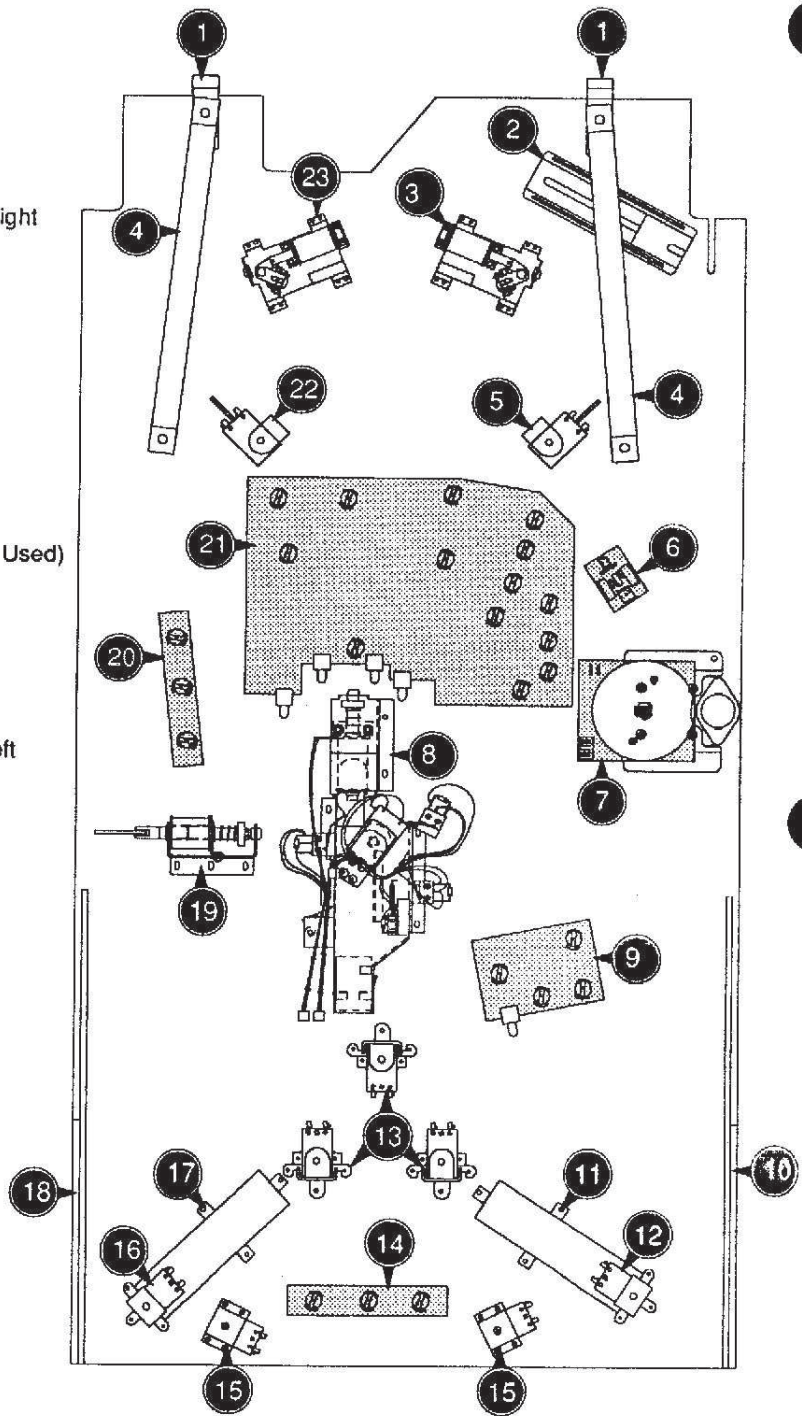
### Not Shown:

- A-13204-50022 Bottom Arch Assembly
- A-13769-50022 Playfield & Insert Assembly
- A-13769A-50022 Upper Playfield & Insert Assembly
- \* A-15542 Motor EMI P.C.B.
- \* A-15430 Opto SW10 P.C.B.
- A-17731 Boat Assembly
- A-17812-1 Cable Mtg. Brkt Assy. 1/4"
- A-17812-2 Cable Mtg. Brkt Assy. 1/2"
- A-17812-3 Cable Mtg. Brkt Assy. 3/4"
- A-17812-4 Cable Mtg. Brkt Assy. 1"
- 01-12389 Bluto Head Support Bracket
- 03-9025-1 Mylar, Jet Bumper Area
- 03-9025-2 † Mylar, Full Playfield
- 03-9025-3 Mylar, Right Drop
- 03-9025-4 Mylar, Left Drop
- 03-9025-5 Mylar, Bluto Drop
- 03-9088 Bluto Head

† The POPEYE playfield has a special hardcoat surface that does not require a full mylar. However, mylars can be purchased through your local Bally Distributor.

# LOWER PLAYFIELD PARTS LOCATIONS

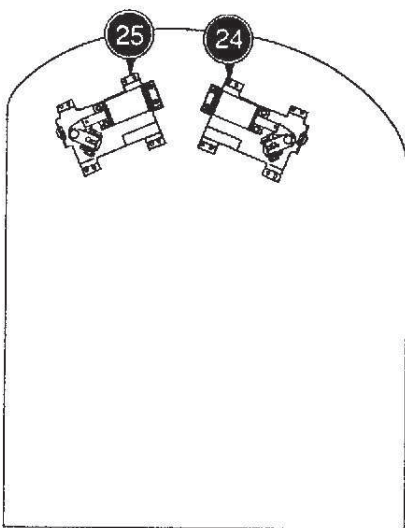
Item	Part Number	Description
1.	01-9211	Plfd. Hanger Bracket (2 Used)
2.	A-16765	Outhole Ball Trough Assembly
3.	A-15849-R-2	Flipper Assembly, Lwr. Right
4.	01-11781	Leg Support (2 Used)
5.	A-17811	Kicker Arm (Slingshot) Assy., Right
	A-17809	Coil & Bracket Assembly
	10-128	Spring
6.	A-15542	Motor EMI Assembly
7.	A-17623	Wheel Motor Assembly
8.	A-17505	Center Ball Lock Assembly
9.	A-17600	5-Lamp PC Board Assy.
10.	A-17749-2	Plfd. Slide Mechanism, Right
11.	01-11973	Right Ramp-Ball Popper
12.	A-17258	Ball Popper Assembly
13.	A-9415-2	Jet Bumper Coil Assembly
14.	A-17624	3-Lamp PC Board Assy.
15.	A-17796	Ball Gate Actuator Assembly (2 Used)
16.	A-17180	Popper Assembly - Left
17.	01-11921	Left Ramp-Ball Popper
18.	A-17749-1	Plfd. Slide Mechanism, Left
19.	A-17251	Coil & Bracket Assembly
20.	A-17603	3-Lamp PC Board Assy.
21.	A-17602	18-Lamp PC Board Assy.
22.	A-17811	Kicker Arm (Slingshot) Assy., Left
	A-17809-1	Coil & Bracket Assembly
	10-128	Spring
23.	A-15849-L-2	Flipper Assembly, Lwr. Left



*Underside of Playfield, Viewed in Raised Position*

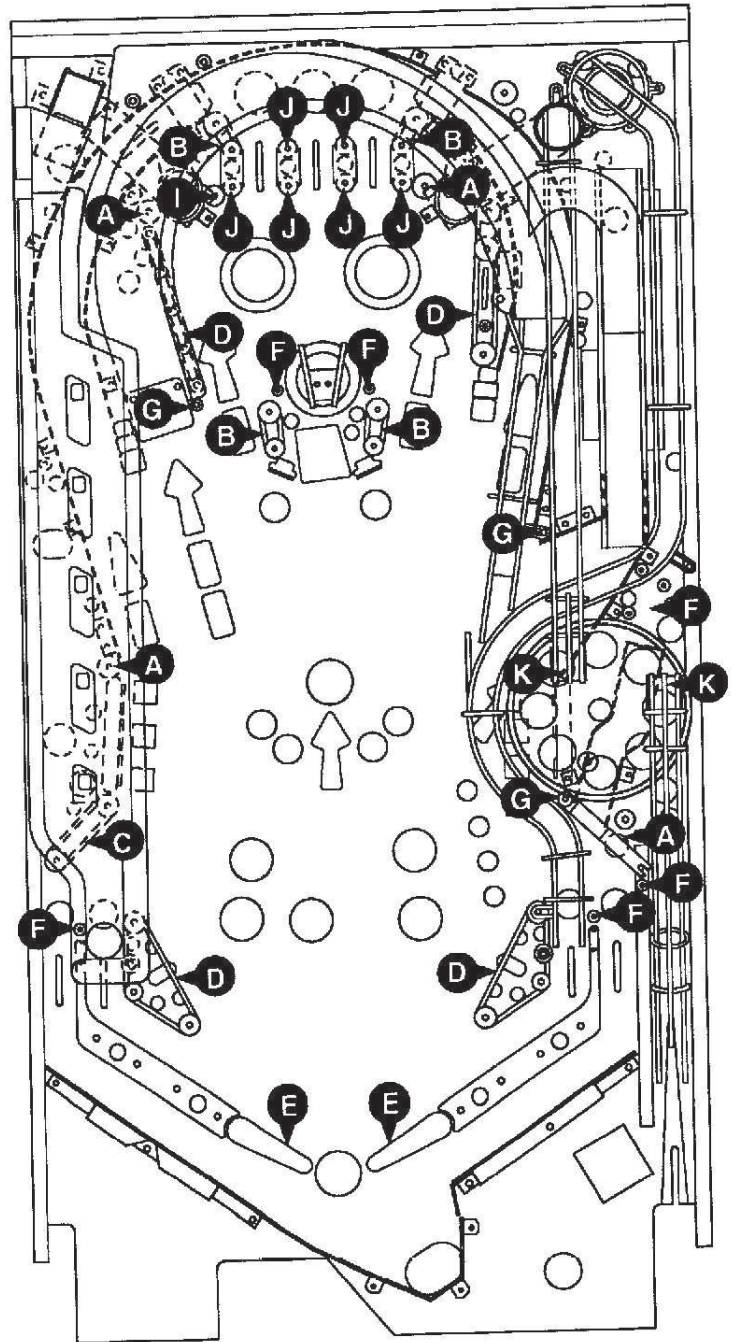
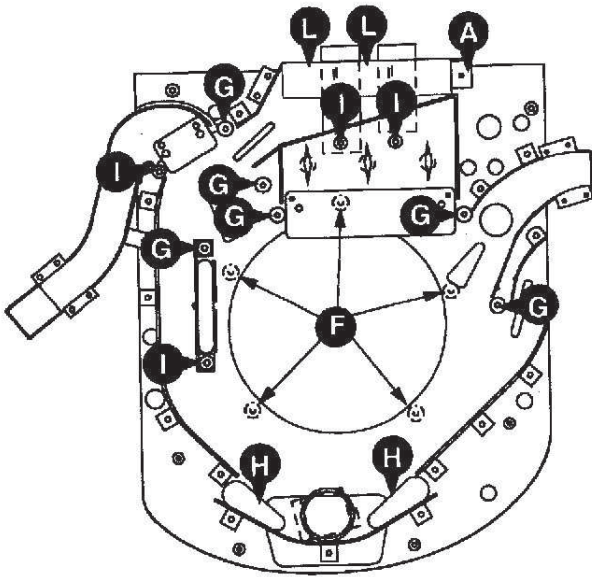
### Lower Playfield Parts on Mini-Playfield:

24.	A-16976-R	Flipper Assembly, Right
25.	A-16976-L-1	Flipper Assembly, Left



*Underside of Mini-Playfield*

## RUBBER PARTS



<u>ITEM</u>	<u>PART#</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
A.	23-6300	5/16" Ring	5
B.	23-6301	3/4" Ring	4
C.	23-6303	1 1/4" Ring	1
D.	23-6306	2 1/2" Ring	4
E.	23-6519-4	Flipper Ring-Red	2
F.	23-6535	Grommet	13
G.	23-6552	Yellow Sleeve	9
H.	23-6553-4	Small Flipper Ring	2
I.	23-6556	Black Sleeve	5
J.	23-6641-1	15/64" Ring	6
K.	23-6686	Bumper Pad	2
L.	23-6702	Bumper Plug	2

# LAMP MATRIX

Yellow (B+)  Red

Column \ Row	1 Yellow-Brown J138-1 Q96	2 Yellow-Red J138-2 Q97	3 Yellow-Orange J138-3 Q96	4 Yellow-Black J138-4 Q96	5 Yellow-Green J138-5 Q94	6 Yellow-Blue J138-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-8 Q91
1 Red-Brown J134-1 Q90	Left Lane 11	Island Rhino 21	Lockjaw 31	Spillco Oil Co. 41	Left Loop Arrow 51	"Sea" Standup 61	Backbox Tail 71	Upper Extra Ball 81
2 Red-Black J134-2 Q89	Center Lane 12	Island Leopard 22	Never Green Co. 32	Blutonium Waste 42	Left Loop Can 52	Animal Dolphin 62	Backbox Star 72	Wimpy 2X Wheel 82
3 Red-Orange J134-4 Q88	Right Lane 13	Island Eagle 23	Earth Paving Co. 33	Left Outlane 43	Popeye "P1" 53	Left Popper Arrow 63	Animal Rhino 73	Two Bank Upper 83
4 Red-Yellow J134-5 Q87	Fight Bluto 14	Island Dolphin 24	Escalator Enter 34	Left Flipper Lane 44	Popeye "O" 54	Instant Multi-ball 64	Backbox Right 74	Two Bank Lower 84
5 Red-Green J134-6 Q86	Right Popper Can 15	Item Can Opener 25	Popeye "E1" 35	Right Flipper Lane 45	Popeye "P2" 55	Left Cheek 65	Animal Eagle 75	Animal Jackpot 85
6 Red-Blue J134-7 Q85	Right Loop Arrow 16	Item Bottle 26	Popeye "Y" 36	Special 46	Left Ramp Arrow 56	Right Cheek 66	Upper Ramp Left 76	Buy-In 86
7 Red-Violet J134-8 Q84	Right Loop Can 17	Item Katsup 27	Popeye "E2" 37	Shoot Again 47	Collect Item 57	Animal Panda 67	Upper Ramp Center 77	Launch Button 87
8 Red-Gray J134-9 Q83	"Hag" Standup 18	Island Panda 28	Item Flower 38	Rescue Olive 48	Left Ramp Can 58	Animal Leopard 68	Upper Ramp Right 78	Start Button 88

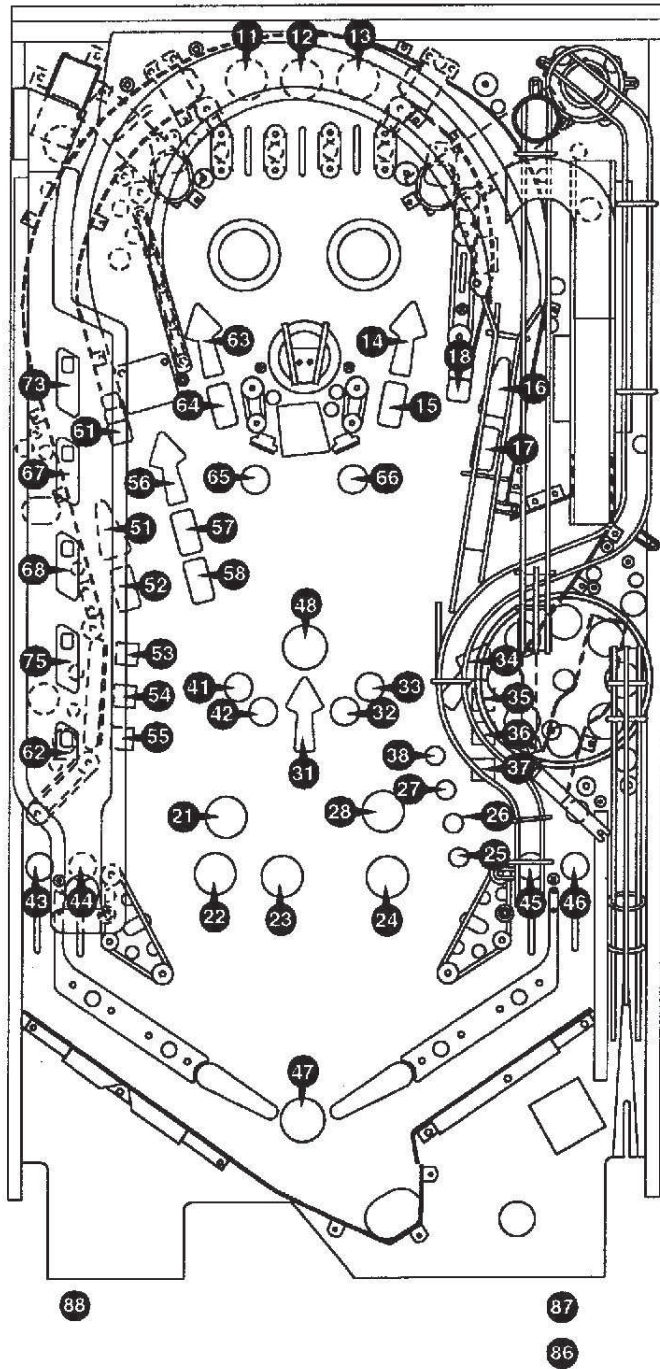
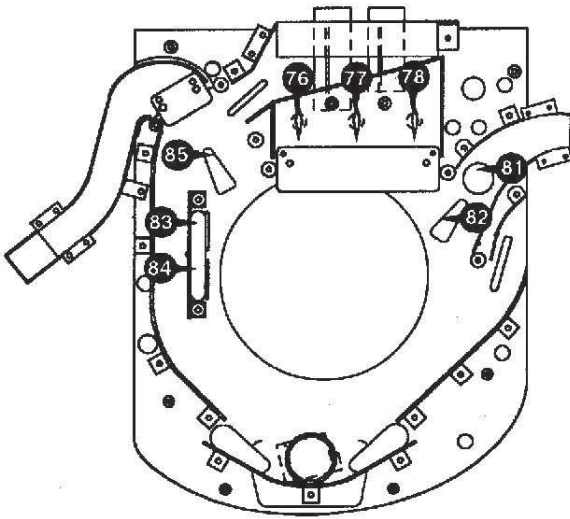
J1XX = Power Driver Board

## LAMP LOCATIONS

Item No.	Bulb No.	Lamp Assy. No.	Description	Item No.	Bulb No.	Lamp Assy. No.	Description
11	24-8768	A-17624	Left Lane	31	24-8768	A-17602	Lockjaw
12	24-8768	A-17624	Center Lane	32	24-8768	A-17602	Never Green Co.
13	24-8768	A-17624	Right Lane	33	24-8768	A-17602	Earth Paving Co.
14	24-8768	A-17600	Fight Bluto	34	24-8768	A-17602	Escalator Enter
15	24-8768	A-17600	Right Popper Can	35	24-8768	A-17602	Popeye "E1"
16	24-8768	A-17600	Right Loop Arrow	36	24-8768	A-17602	Popeye "Y"
17	24-8768	A-17600	Right Loop Can	37	24-8768	A-17602	Popeye "E2"
18	24-8768	A-17600	"Hag" Standup	38	24-8768	A-17602	Item Flower
21	24-8768	A-17602	Island Rhino	41	24-8768	A-17602	Spillco Oil Co.
22	24-8768	A-17602	Island Leopard	42	24-8768	A-17602	Blutonium Waste
23	24-8768	A-17602	Island Eagle	43	24-6549	A-17835	Left Outlane
24	24-8768	A-17602	Island Dolphin	44	24-6549	A-17835	Left Flipper Lane
25	24-8768	A-17602	Item Can Opener	45	24-6549	A-17835	Right Flipper Lane
26	24-8768	A-17602	Item Bottle	46	24-6549	A-17807	Special
27	24-8768	A-17602	Item Katsup	47	24-6549	A-17807	Shoot Again
28	24-8768	A-17602	Island Panda	48	24-6549	A-17807	Rescue Olive



## LAMP LOCATIONS Continued



<u>Item No.</u>	<u>Bulb No.</u>	<u>Lamp Assy. No.</u>	<u>Description</u>
51	24-6549	A-17807	Left Loop Arrow
52	24-6549	A-17835	Left Loop Can
53	24-8768	A-17603	Popeye "P1"
54	24-8768	A-17603	Popeye "O"
55	24-8768	A-17603	Popeye "P2"
56	24-6549	A-17835	Left Ramp Arrow
57	24-6549	A-17835	Collect Item
58	24-6549	A-17835	Left Ramp Can
61	24-6549	A-17835	"Sea" Standup
62	24-8768	A-12887	Animal Dolphin
63	24-6549	A-17835	Instant Multi-ball
64	24-6549	A-17835	Left Popper Can
65	24-6549	A-17807	Left Cheek
66	24-6549	A-17807	Right cheek
67	24-8768	A-12887	Animal Panda
68	24-8768	A-12887	Animal Leopard
71	24-8768	---	* Backbox Tail
72	24-8768	---	* Backbox Star
73	24-8768	A-12887	Animal Rhino
74	24-8768	---	* Backbox Right
75	24-8768	A-12887	Animal Eagle
76	24-6549	A-11905	† Upper Ramp Left
77	24-6549	A-11905	† Upper Ramp Center
78	24-6549	A-11905	† Upper Ramp Right
81	24-6549	A-17836	Upper Extra Ball
82	24-6549	A-17835	Wimpy 2X Wheel
83	24-8768	A-17853	Two Bank Upper
84	24-8768	A-17853	Two Bank Lower
85	24-6549	A-17835	Animal Jackpot
86	20-9663-9	---	Buy-In
87	20-9663-B-4	---	Launch Button
88	20-9663-1	---	Start Button

24-8768 = #555 Bulb  
24-6549 = #44 Bulb

\* Not Shown  
† Associated Parts: A-12753-2 Lug & Diode

# SWITCH MATRIX

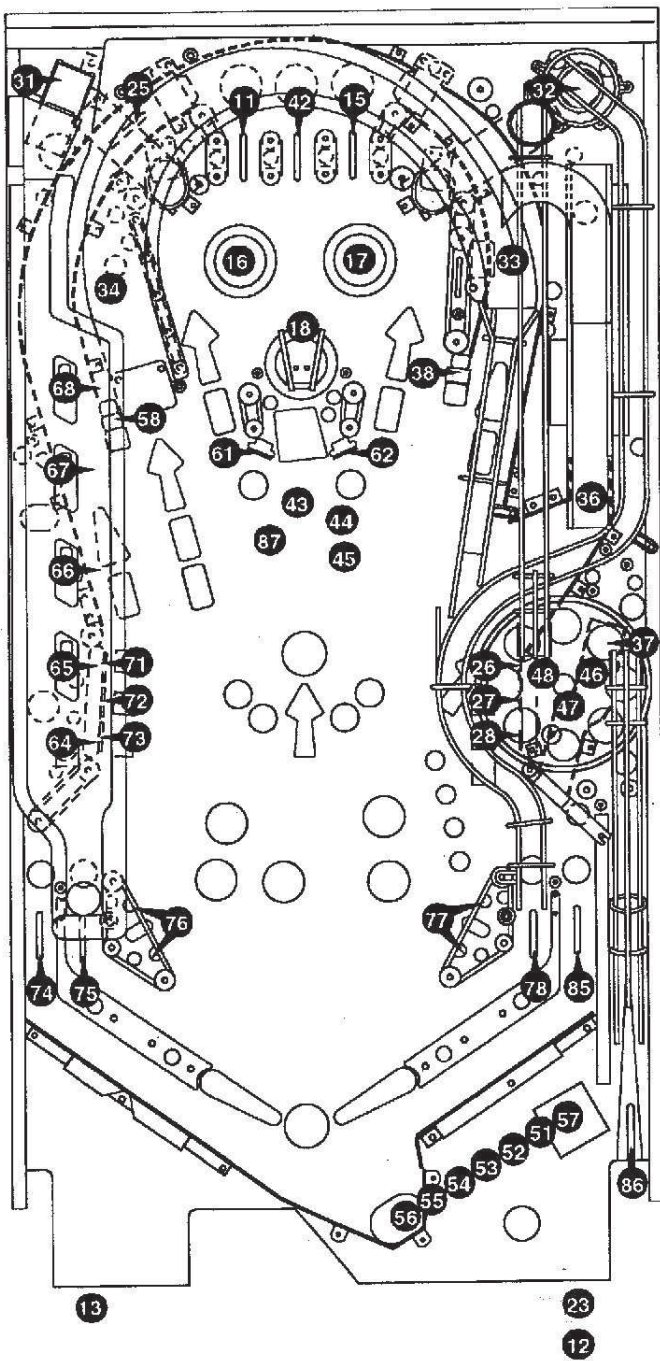
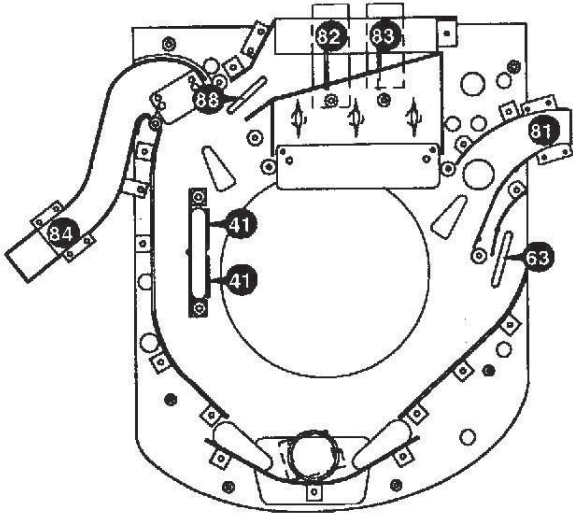
Dedicated Grounded Switches	Column Row	White → ← Green								Flipper Grounded Switches
		1 Green-Brown J207-1 U20-19	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-8 U20-11	
Orange-Brown J206-1 Left Coin Chute D1	1 White-Brown J209-1 U19-11	Left Lane	Slam Tilt	Left Popper	Two Bank	Right Trough	Left Cheek	Popeye "P1"	Upper Exit To Wheel	Black-Green J806-1 Right Flipper End of Stroke F1
Orange-Red J205-2 Center Coin Chute D2	2 White-Red J209-2 U19-9	Buy-In	Coin Door Closed	Right Popper	Center Lane	Trough 2nd	Right Cheek	Popeye "C"	Upper Ramp Left	Blue-Violet J805-1 Right Flipper Opto F2
Orange-Black J205-3 Right Coin Chute D3	3 White-Orange J209-3 U19-5	Start Button	Ball Launch	Right Loop Opto	Lockup Upper	Trough 3rd	Escalator Exit	Popeye "P2"	Upper Ramp Right	Black-Blue J806-3 Left Flipper End of Stroke F3
Orange-Yellow J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	Plumb Bob Tilt	Always Closed	Ramp Entrance	Lockup Center	Trough 4th	Animal Dolphin	Left Outlane	Animal Jackpot	Blue-Gray J805-2 Left Flipper Opto F4
Orange-Green J205-6 Normal Function Service Credits   Escape D5	5 White-Green J209-5 U19-11	Right Lane	Left Loop	Ramp Completion	Lockup Lower	Trough 5th	Animal Eagle	Left Flipper Lane	Right Outlane	Black-Violet J806-4 Upper Right Flipper End of Stroke F5
Orange-Blue J205-7 Normal Function Volume Down   Down D6	6 White-Blue J209-7 U19-9	Left Jet	Popeye "E1"	Escalator Popper	Wheel Opto 1	Left Trough	Animal Tiger	Left Slingshot	Shooter Lane	Black-Yellow J805-3 Upper Right Flipper Opto F6
Orange-Violet J205-8 Normal Function Volume Up   Up D7	7 White-Violet J209-8 U19-5	Right Jet	Popeye "Y"	Wheel Exit	Wheel Opto 2	Trough Jet	Animal Panda	Right Slingshot	Lock-up Kicker	Black-Gray J806-5 Upper Left Flipper End of Stroke F7
Orange-Gray J205-9 Normal Function Begin Test/Enter D8	8 White-Gray J209-9 U19-7	Center Jet	Popeye "E2"	'Hag' Standup	Wheel Opto 3	'Sea' Standup	Animal Rhino	Right Flipper Lane	Upper Shot Exit	Black-Blue J806-5 Upper Left Flipper Opto F8

J20X = CPU Board, J80X = Fliptron II Board   = Opto, Typically Closed

## SWITCH LOCATIONS

Item	Switch Part #	Where Used	Item	Switch Part #	Where Used
F1	SW-1A-194	*Lower Right Flipper EOS	32	A-16908 (LED)	Right Popper
F2	A-17316	*Lower Right Flipper Cabinet		A-16909 (Trans.)	
F3	SW-1A-194	*Lower Left Flipper EOS	33	A-16908 (LED)	Right Loop Opto
F4	A-17316	*Lower Left Flipper Cabinet		A-16909 (Trans.)	
F5	SW-1A-194	*Upper Right Flipper EOS	34	A-16908 (LED)	Ramp Entrance
F6	A-17316	*Upper Right Flipper Cabinet		A-16909 (Trans.)	
F7	SW-1A-194	*Upper Left Flipper EOS	35	A-16908 (LED)	Ramp Completion
F8	A-17316	*Upper Left Flipper Cabinet		A-16909 (Trans.)	
11	5647-12693-19	Left Lane	36	A-16908 (LED)	Escalator Popper
12	20-9663-9	Buy-In		A-16909 (Trans.)	
13	20-9663-1	Start Button	37	A-16908 (LED)	Wheel Exit
14	A-15361	*Plumb Bob Tilt		A-16909 (Trans.)	
15	5647-12693-19	Right Lane	38	A-17795-6	'Hag' Stand-up
16	SW-11A-37	Left Jet	41	A-17226-4	Two Bank (2)
17	SW-11A-37	Right Jet	42	5647-12693-19	Center Lane
18	SW-11A-37	Center Jet	43	5647-12693-25	† Lockup Upper
21	A-17238	*Slam Tilt	44	5647-12693-25	† Lockup Lower
22	5643-09288-00	*Coin Door Closed	45	5647-12693-25	† Lockup Lower
23	20-9663-B-4	Ball Launch	46	A-17069	† Wheel Opto 1
24	5643-09112-00	*Always Closed	47	A-17069	† Wheel Opto 2
25	5647-12693-19	Left Loop	48	A-17069	† Wheel Opto 3
26	A-17778-15	Popeye "E1"	51	A-16927 (LED)	Right Trough
27	A-17778-15	Popeye "Y"		A-16926 (Trans.)	
28	A-17778-15	Popeye "E2"	52	A-16927 (LED)	Trough 2nd
31	A-16908 (LED)	Left Popper		A-16926 (Trans.)	
	A-16909 (Trans.)		53	A-16927 (LED)	Trough 3rd
				A-16926 (Trans.)	

## SWITCH LOCATIONS Continued



<u>Item</u>	<u>Switch Part #</u>	<u>Where Used</u>
54	A-16927 (LED) A-16926 (Trans.)	Trough 4th
55	A-16927 (LED) A-16926 (Trans.)	Trough 5th
56	A-16927 (LED) A-16926 (Trans.)	Left Trough
57	A-16927 (LED) A-16926 (Trans.)	Trough Jam
58	A-17795-6	'Sea' Stand-up
61	A-17799-4	Left Cheek
62	A-17799-4	Right Cheek
63	5647-12693-19	Escalator Exit
64	5647-12693-21	Animal Dolphin
65	5647-12693-21	Animal Eagle
66	5647-12693-21	Animal Tiger
67	5647-12693-21	Animal Panda
68	5647-12693-21	Animal Rhino
71	A-17799-15	Popeye "P1"
72	A-17799-15	Popeye "O"
73	A-17799-15	Popeye "P2"
74	5647-12693-19	Left Outlane
75	5647-12693-19	Left Flipper Lane
76	SW-1A-114 SW-1A-120	Left Slingshot (kicker) (score)
77	SW-1A-114 SW-1A-120	Right Slingshot (kicker) (score)
78	5647-12693-19	Right Flipper Lane
81	A-16908 (LED) A-16909 (Trans.)	Upper Exit to Wheel
82	A-16908 (LED) A-16909 (Trans.)	Upper Ramp Left
83	A-16908 (LED) A-16909 (Trans.)	Upper Ramp Right
84	5647-12693-25	Animal Jackpot
85	5647-12693-19	Right Outlane
86	5647-12693-19	Shooter Lane
87	5647-12693-25	† Lockup Kicker
88	5647-12693-19	Upper Shot Exit

\* Not Shown  
† Located Under Playfield

# SOLENOID / FLASHER TABLE

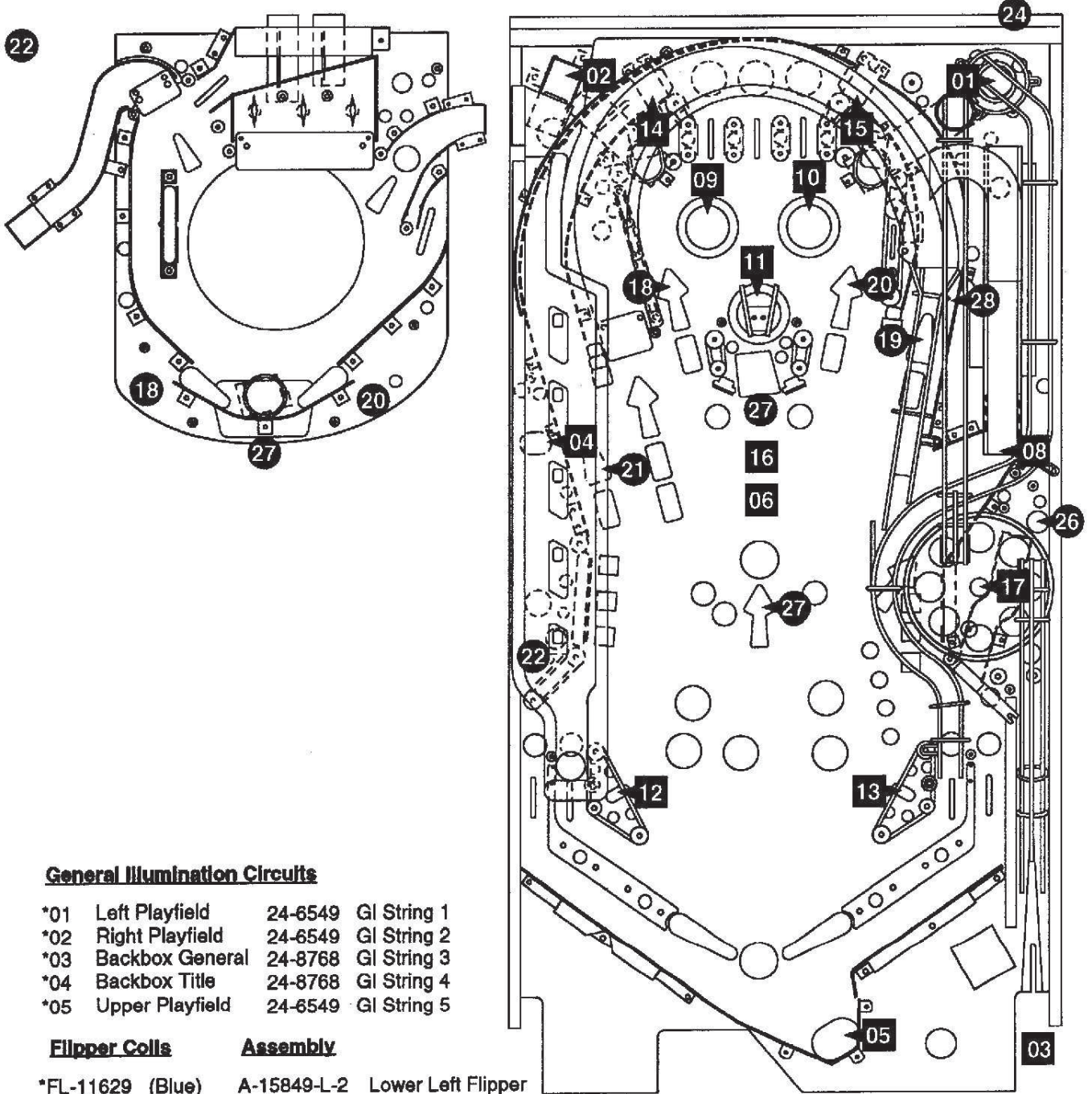
Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Transistor	Drive Connections			Drive Wire Color	Solenoid Part Number	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Flashlamp Type	Backbox
01	Right Popper	High Power	J130-1			Q82	J107-3			Vio-Brn	AE-26-1200	
02	Left Popper	High Power	J130-2			Q80	J107-3			Vio-Red	AE-24-900	
03	Ball Shooter	High Power	J130-4			Q78	J107-3			Vio-Org	AE-23-800	
04	Animal Diverter	High Power	J130-5			Q76	J107-3			Vio-Yel	AE-26-1200	
05	Trough Coil	High Power	J130-6			Q64	J107-3			Vio-Grn	AE-26-1500	
06	Lockup Kicker	High Power	J130-7			Q66	J107-3			Vio-Blu	AE-23-800	
07	Knocker	High Power		J130-8		Q66		J107-3		Vio-Blk		AE-23-800
08	Escalator Popper	High Power	J130-9			Q70	J107-3			Vio-Gry	AE-23-800	
09	Left Jet	Low Power	J127-1			Q58	J107-2			Brn-Blk	AE-26-1200	
10	Right Jet	Low Power	J127-3			Q56	J107-2			Brn-Red	AE-26-1200	
11	Center Jet	Low Power	J127-4			Q54	J107-2			Brn-Org	AE-26-1200	
12	Left Slingshot	Low Power	J127-5			Q52	J107-2			Brn-Yel	AE-26-1200	
13	Right Slingshot	Low Power	J127-6			Q50	J107-2			Brn-Grn	AE-26-1200	
14	Left Gate	Low Power	J127-7			Q48	J107-2			Brn-Blu	A-14406	
15	Right Gate	Low Power	J127-8			Q46	J107-2			Brn-Vio	A-14406	
16	Lockup Release	Low Power	J127-9			Q44	J107-2			Brn-Gry	AE-26-1500	
17	Wheel Motor	Flasher	J126-1			Q42	J107-6			Blk-Brn	14-7990	
18	Upper Playfield Left	Flasher	J126-2			Q40	J107-6			Blk-Red	#906, #89(2)	
19	Right Loop Backbox	Flasher	J126-3	J125-5		Q38	J107-6	J106-5		Blk-Org	#89 (1)	#906 (1)
20	Fight Bluto	Flasher	J126-4			Q36	J107-6			Blk-Yel	#906, #89(2)	
21	Left Loop Bkx.	Flasher	J126-5	J125-6		Q28	J107-6	J106-5		Blu-Grn	#89 (1)	#906 (1)
22	Animal Ramp	Flasher	J126-6	J125-7		Q30	J107-6	J106-5		Blu-Blk	#906 (2)	#906 (1)
23	Skill Wheel	Flasher	J126-7	J125-8		Q34	J107-6	J106-5		Blu-Vio	#906 (1)	#906 (1)
24	R Popper BkxExB	Flasher	J126-8	J125-9		Q32	J107-6	J106-5		Blu-Gry	#906 (1)	#906 (1)
25	Not Used	Gen. Purpose				Q26				Blu-Brn		
26	Ramp Jackpot	Gen. Purpose	J122-2	J124-2		Q24	J107-6	J106-5		Blu-Red	#89 (1)	#906 (1)
27	Lockjaw Arrow	Gen. Purpose	J122-3	J124-3		Q22	J107-6	J106-5		Blu-Org	#89 (2)	#906 (1)
28	Esctr BkxTurtle	Gen. Purpose	J122-4	J124-4		Q20	J107-6	J106-56		Blu-Yel	#906 (1)	#906 (1)
<b>General Illumination</b>												
01	Left Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	24-6549	
02	Right Playfield	G.I.	J121-2			Q10	J121-8			Wht-Orn	24-6549	
03	Backbox General	G.I.		J120-3		Q14		J120-9		Wht-Yel		24-8768
04	Backbox Title	G.I.		J120-5		Q16		J120-10		Wht-Grn		24-8768
05	Upper Playfield	G.I.	J121-6			Q12	J121-11			Wht-Vio	24-6549	
<b>Filpper Circuits</b>												
Circuit	Voltage Connections			Drive Transistors		Drive Connections		Drive Wire Colors		Coil Part Number	Coil Colors	
	Lwr. Lt. Power	Lwr. Lt. Hold	Lwr. Rt. Power	Power	Hold	Playfield	Power	Hold				
Lower Left Flipper	J907-7 (Gry-Yel)	J907-7 (Gry-Yel)	J907-9 (Blu-Yel)	Q3	Q9	J902-9	Blu-Gry		FL-11629	BLUE		
	J907-9 (Blu-Yel)	J907-9 (Blu-Yel)	J907-11 (Blu-Yel)	Q4	Q11	J902-13	Blu-Vio	Org-Blu				
Lower Right Flipper	J907-1 (Gry-Yel)	J907-1 (Gry-Yel)	J907-1 (Gry-Yel)	Q1	Q5	J902-3	Blk-Blu	Org-Grn	FL-11629	BLUE		
	J907-1 (Gry-Yel)	J907-1 (Gry-Yel)	J907-4 (Blu-Yel)	Q2	Q7	J902-1	Blk-Yel	Org-Gry				
Upper Left Flipper	J907-4 (Blu-Yel)	J907-4 (Blu-Yel)	J907-4 (Blu-Yel)	Q7		J902-4	Org-Vio		FL-11722	GREEN		

J1XX = Power Driver Board; J9XX = Filptronic II Board; 24-6549 = #44 Bulb; 24-8704 = #89 Bulb; 24-8768 = #555 Bulb; 24-8802 = #906 Bulb

## SOLENOID/FLASHER LOCATIONS

Item	Coil/Flasher Number	Assembly Number	Description	Item	Coil/Flasher Number	Assembly Number	Description
01	AE-26-1200	A-17258	Right Popper	16	AE-26-1500	A-17505	† Lockup Release
02	AE-24-900	A-17180	Left Popper	17	14-7990	A-17623	Wheel Motor
03	AE-23-800	A-14525	Ball Shooter	18	24-8802	A-12336-1	Upper Playfield Left (2)
04	AE-26-1200	A-17251	Animal Diverter		24-8704	A-17803	
05	AE-26-1500	A-16765	Trough Coil	19	24-8704	A-17803	Right Loop Backbox (2)
06	AE-23-800	A-17505	† Lockup Kicker	20	24-8802	A-12336-1	Fight Bluto (2)
07	----	B-16086-1	* Knocker		24-8704	A-17803	
08	AE-23-800	A-17774	Escalator Popper	21	24-8704	A-17803	Left Loop Bkx. (2)
09	AE-26-1200	A-9415-2	Left Jet	22	24-8802	A-12336-1	Animal Ramp (3)
10	AE-26-1200	A-9415-2	Right Jet		24-8802	A-17626-4	
11	AE-26-1200	A-9415-2	Center Jet	23	24-8802	A-12336-1	Skill Wheel (2)
12	AE-26-1200	A-17809	Left Slingshot	24	24-8802	C-13337	R. Popper Bkx. Ex.B. (2)
13	AE-26-1200	A-17809-1	Right Slingshot	25	---	---	Not Used
14	A-14406	A-17796	Left Gate	26	24-8704	A-17803	Ramp Jackpot (2)
15	A-14406	A-17796	Right Gate	27	24-8704	A-17803	Lockjaw Arrow (3)
				28	24-8802	A-12336-1	Escalator Bkx. Turtle (2)

## SOLENOID/FLASHER LOCATIONS Continued



### General Illumination Circuits

*01	Left Playfield	24-6549	GI String 1
*02	Right Playfield	24-6549	GI String 2
*03	Backbox General	24-8768	GI String 3
*04	Backbox Title	24-8768	GI String 4
*05	Upper Playfield	24-6549	GI String 5

### Flipper Coils      Assembly

*FL-11629	(Blue)	A-15849-L-2	Lower Left Flipper
*FL-11629	(Blue)	A-15849-R-2	Lower Right Flipper
*FL-11722	(Green)	A-16976-L-1	Upper Left Flipper
*FL-11722	(Green)	A-16976-R	Upper Right Flipper

\*Not Shown  
†Located Under Playfield

■ Square indicates coil, P.C.B. or Magnet  
● Circle indicates flasher

24-6549 = #44 Bulb  
24-8704 = #89 Bulb  
24-8768 = #555 Bulb  
24-8802 = #906 Bulb

## Notes

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## Game Wiring and Schematics

### CONNECTOR & COMPONENT IDENTIFICATION

Each plug or jack-except the Audio Board and Dot Matrix Display/Driver Board-receives a number that identifies the circuit board and 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.

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 Sound Board.

Prefix numbers for the WPC circuit boards are listed below.

- 1-Power Driver Board
- 2-CPU Board
- 6-Dot Matrix Controller
- 9-Fliptronic II Controller Board

The Audio Board and Dot Matrix Display/Driver Board do not have an identification number.

**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.**

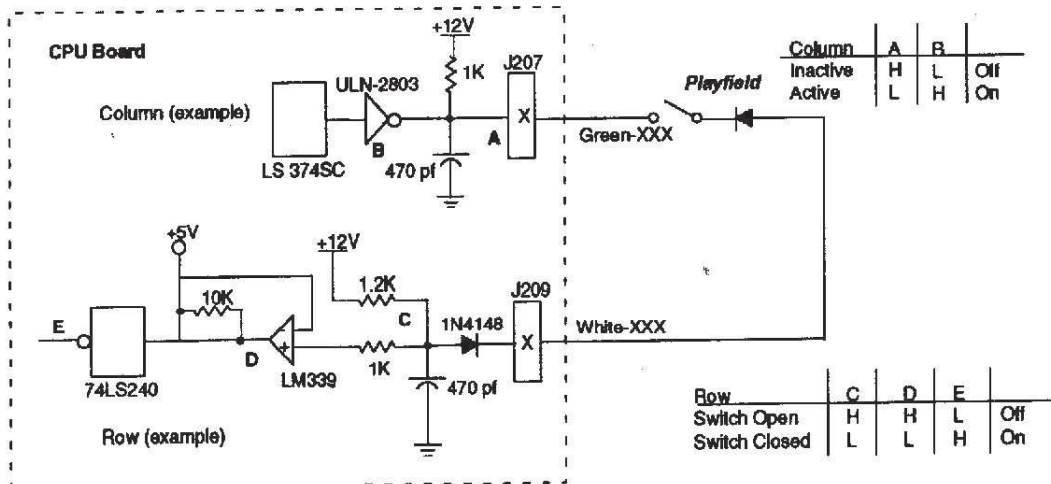
# SWITCH MATRIX

Dedicated Grounded Switches	Column Row	1	2	3	4	5	6	7	8	Flipper Grounded Switches
		Green-Brown J207-1 U20-18	Green-Red J207-2 U20-17	Green-Orange J207-3 U20-16	Green-Yellow J207-4 U20-15	Green-Black J207-5 U20-14	Green-Blue J207-6 U20-13	Green-Violet J207-7 U20-12	Green-Gray J207-8 U20-11	
Orange-Brown (1) J206-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	Left Lane 11	Slam Tilt 21	Left Popper 31	Two Bank 41	Right Trough 51	Left Cheek 61	Popeye "P1" 71	Upper Exit To Wheel 81	Black-Green J906-1 Right Flipper End of Stroke F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	Buy-In 12	Coin Door Closed 22	Right Popper 32	Center Lane 42	Trough 2nd 52	Right Cheek 62	Popeye "O" 72	Upper Ramp Left 82	Blue-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	Start Button 13	Ball Launch 23	Right Loop Opto 33	Lockup Upper 43	Trough 3rd 53	Escalator Exit 63	Popeye "P2" 73	Upper Ramp Right 83	Black-Blue J906-3 Left Flipper End of Stroke F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	Plumb Bob Tilt 14	Always Closed 24	Ramp Entrance 34	Lockup Center 44	Trough 4th 54	Animal Dolphin 64	Left Outlane 74	Animal Jackpot 84	Blue-Gray J906-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function Service Credits Escape D6	5 White-Green J209-5 U19-11	Right Lane 15	Left Loop 25	Ramp Completion 35	Lockup Lower 45	Trough 5th 55	Animal Eagle 65	Left Flipper Lane 75	Right Outlane 85	Black-Violet J906-4 Upper Right Flipper End of Stroke F5
Orange-Blue (6) J205-7 Normal Function Volume Down D6	6 White-Blue J209-7 U19-9	Left Jet 16	Popeye "E1" 26	Escalator Popper 36	Wheel Opto 1 46	Left Trough 56	Animal Tiger 66	Left Slingshot 76	Shooter Lane 86	Black-Yellow J905-3 Upper Right Flipper Opto F6
Orange-Violet (7) J205-8 Normal Function Volume Up D7	7 White-Violet J209-8 U19-5	Right Jet 17	Popeye "Y" 27	Wheel Exit 37	Wheel Opto 2 47	Trough Jam 57	Animal Panda 67	Right Slingshot 77	Lock-up Kicker 87	Black-Gray J906-5 Upper Left Flipper End of Stroke F7
Orange-Gray (8) J205-9 Normal Function Begin Test Enter D8	8 White-Gray J209-9 U19-7	Center Jet 18	Popeye "E2" 28	"Hag" Standup 38	Wheel Opto 3 48	"Sea" Standup 58	Animal Rhino 68	Right Flipper Lane 78	Upper Shot Exit 88	Black-Blue J906-6 Upper Left Flipper Opto F8

J2XX = CPU Board, J9XX = Fliptronic II Board

□ = Opto, Typically Closed

## SWITCH MATRIX CIRCUIT

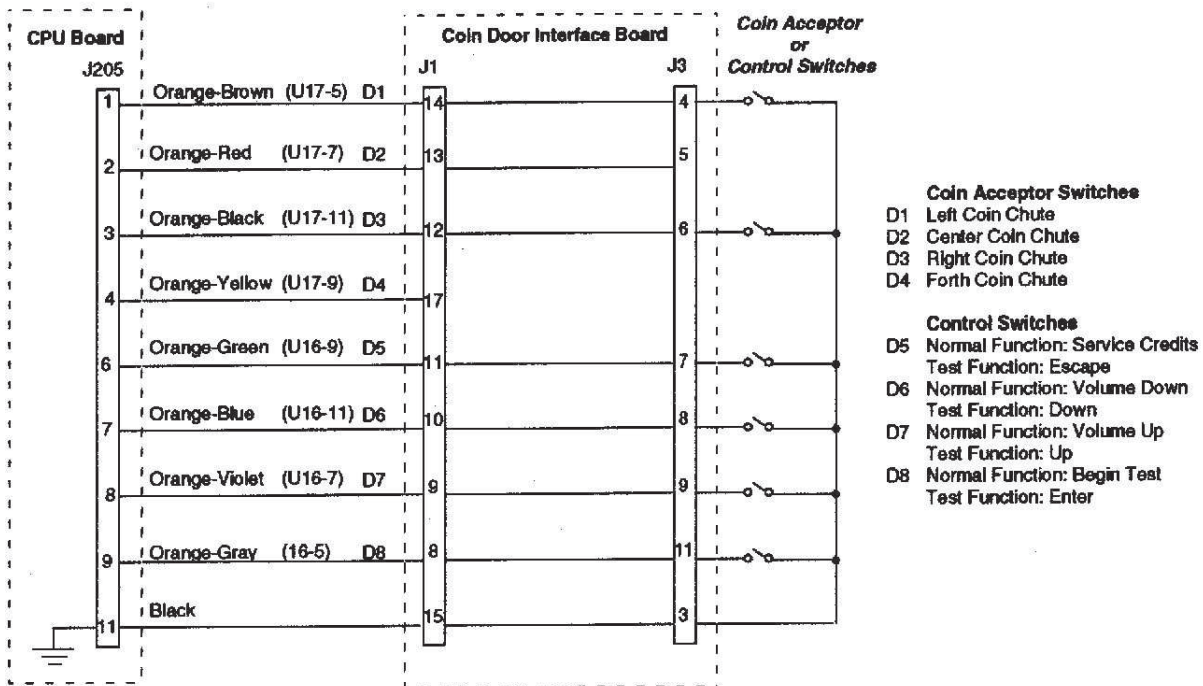


The microprocessor is constantly strobing the column side of the switch. When point "A" on the column circuit toggles low the column side is active.

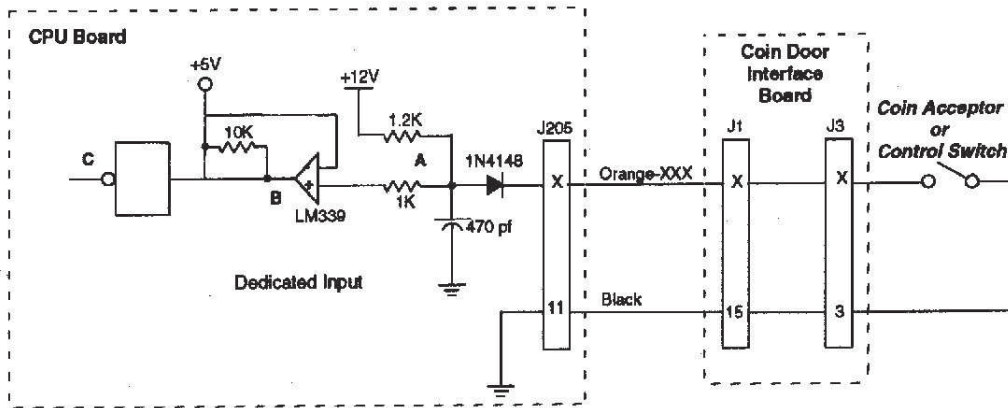
When a switch closes, the row side of the circuit activates. The "+" input to the LM339 drops below +5V causing its output to go low. Corresponding row and column switches must be low at the same time, for the switch to be considered closed by the microprocessor. When the switch opens, the "+" input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



### DEDICATED SWITCHES



### 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 causing its output to go 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.

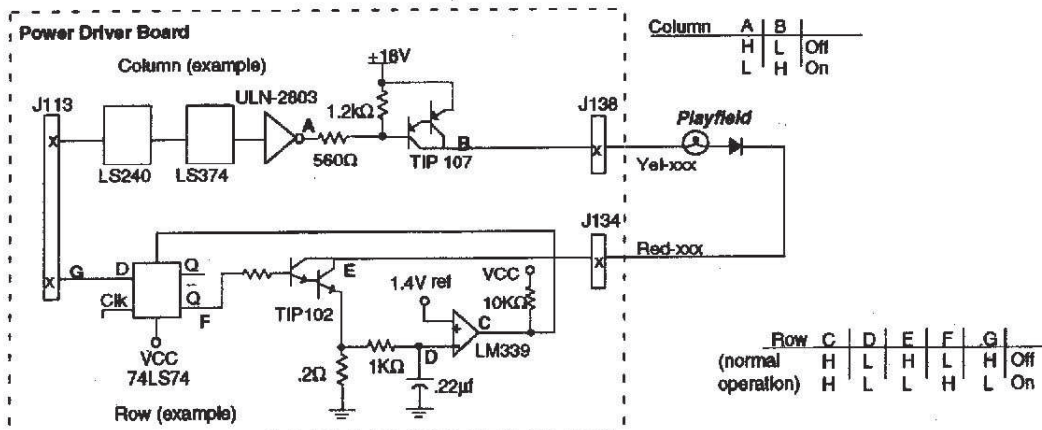
# LAMP MATRIX

Yellow (B+) Red

Column \ Row	1 Yellow-Brown J137-1 Q88	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-9 Q91
1 Red-Brown J133-1 Q90	Left Lane 11	Island Rhino 21	Lockjaw 31	Spillco Oil Co. 41	Left Loop Arrow 51	"Sea" Standup 61	Backbox Tall 71	Upper Extra Ball 81
2 Red-Black J133-2 Q89	Center Lane 12	Island Leopard 22	Never Green Co. 32	Blutonium Waste 42	Left Loop Can 52	Animal Dolphin 62	Backbox Star 72	Wimpy 2X Wheel 82
3 Red-Orange J133-4 Q88	Right Lane 13	Island Eagle 23	Earth Paving Co. 33	Left Outlane 43	Popeye "P1" 53	Left Popper Arrow 63	Animal Rhino 73	Two Bank Upper 83
4 Red-Yellow J133-5 Q87	Fight Bluto 14	Island Dolphin 24	Escalator Enter 34	Left Flipper Lane 44	Popeye "O" 54	Instant Multi-ball 64	Backbox Right 74	Two Bank Lower 84
5 Red-Green J133-6 Q86	Right Popper Can 15	Item Can Opener 25	Popeye "E1" 35	Right Flipper Lane 45	Popeye "P2" 55	Left Cheek 65	Animal Eagle 75	Animal Jackpot 85
6 Red-Blue J133-7 Q85	Right Loop Arrow 16	Item Bottle 26	Popeye "Y" 36	Special 46	Left Ramp Arrow 56	Right Cheek 66	Upper Ramp Left 76	Buy-In 86
7 Red-Violet J133-8 Q84	Right Loop Can 17	Item Katsup 27	Popeye "E2" 37	Shoot Again 47	Collect Item 57	Animal Panda 67	Upper Ramp Center 77	Launch Button 87
8 Red-Gray J133-9 Q83	"Hag" Standup 18	Island Panda 28	Item Flower 38	Rescue Olive 48	Left Ramp Can 58	Animal Leopard 68	Upper Ramp Right 78	Start Button 88

J1XX = Power Driver Board

## LAMP MATRIX CIRCUIT



The processor sends a signal to the column circuit, causing the output of the ULN-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.

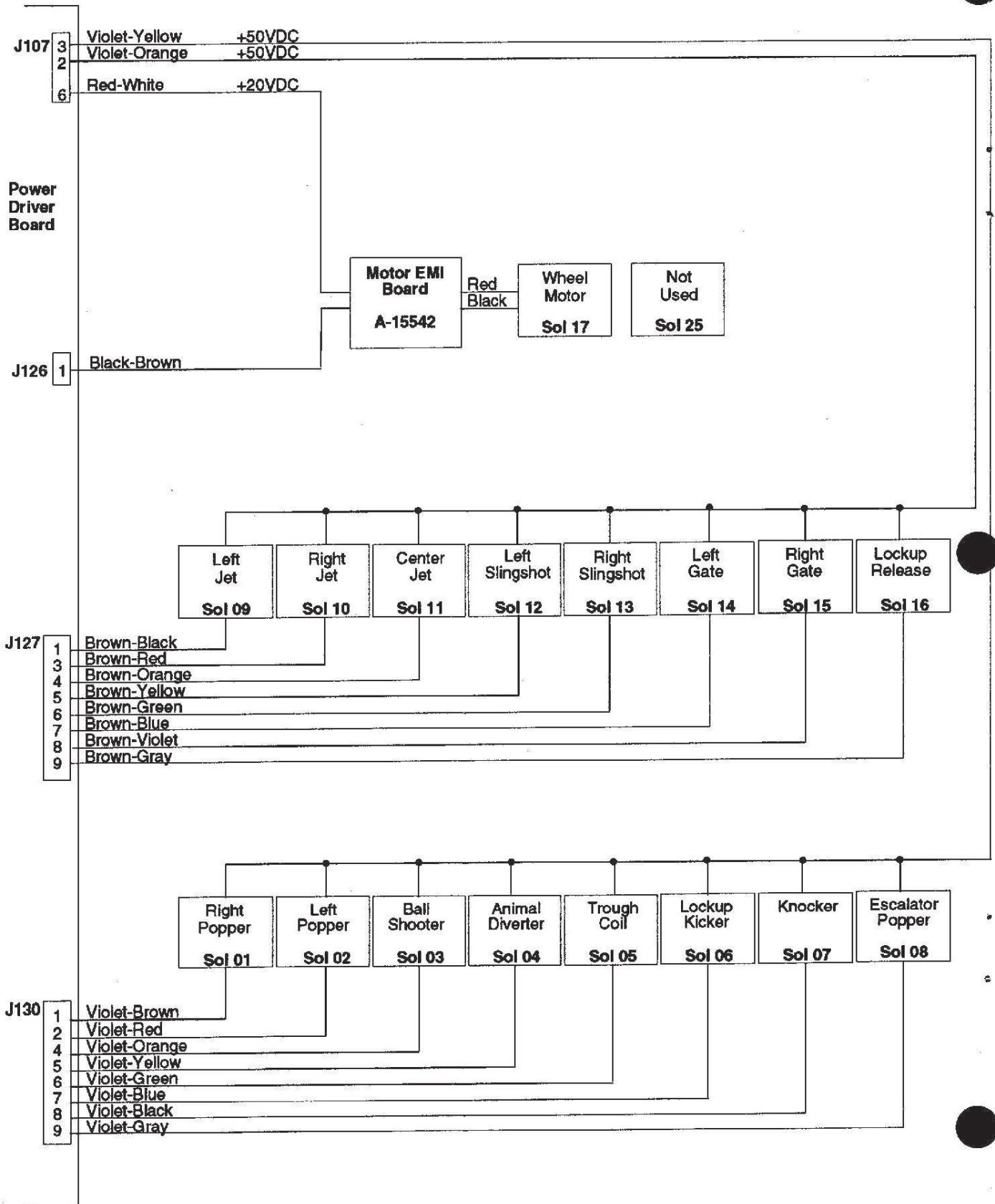
In overcurrent conditions the lamp is shut Off through the comparator. If the voltage at the negative input of the LM339 rises above 1.4V the output changes to a low, which is fed back to the 74LS74 and shuts the row circuit Off.

# SOLENOID / FLASHER TABLE

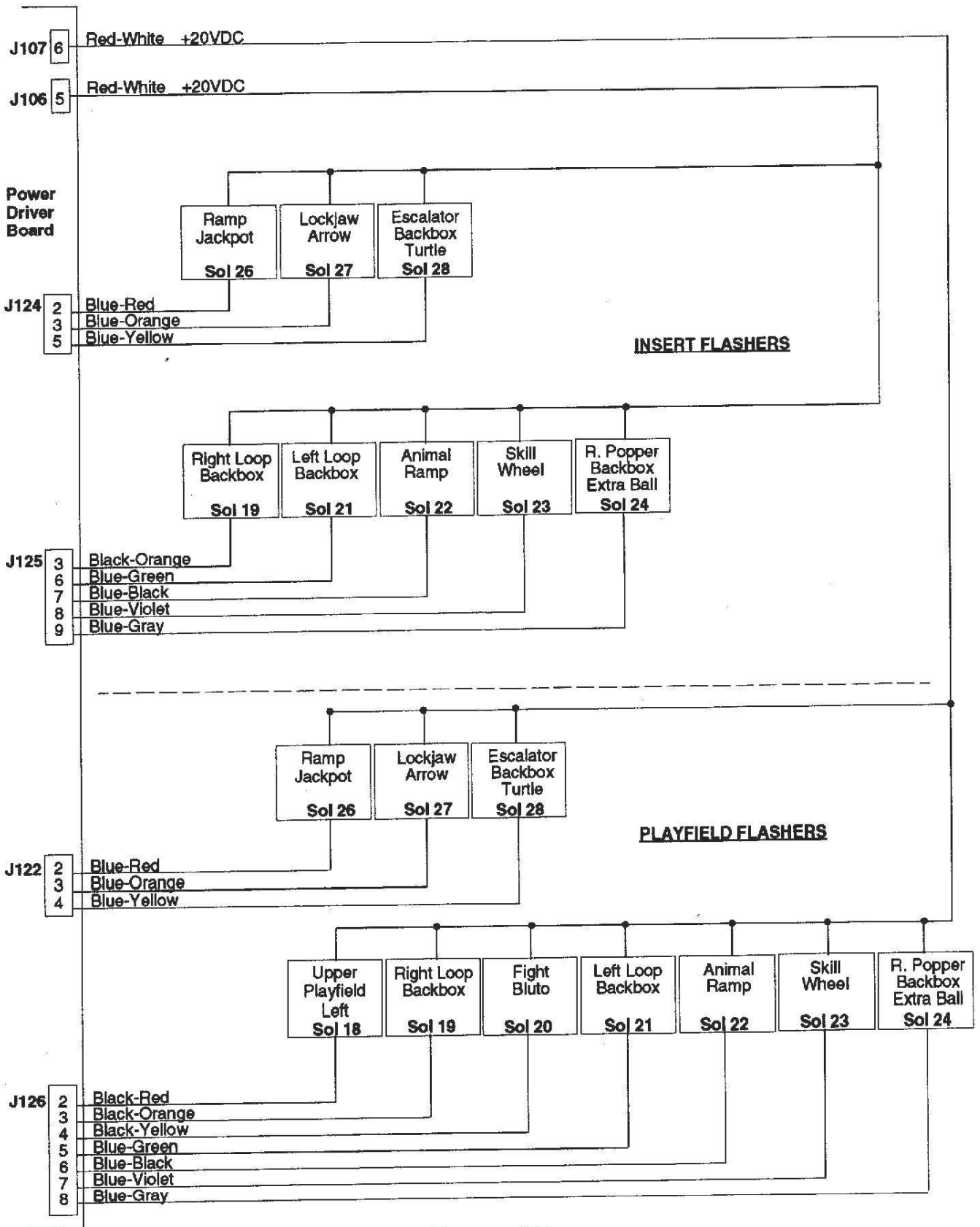
Sol. No.	Function	Solenoid Type	Voltage Connections			Drive xister	Drive Connections			Drive Wire Color	Solenoid Part Number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	Right Popper	High Power	J130-1			Q82	J107-3			Vio-Brn	AE-26-1200	
02	Left Popper	High Power	J130-2			Q80	J107-3			Vio-Red	AE-24-900	
03	Ball Shooter	High Power	J130-4			Q78	J107-3			Vio-Org	AE-23-800	
04	Animal Diverter	High Power	J130-5			Q76	J107-3			Vio-Yel	AE-26-1200	
05	Trough Coil	High Power	J130-6			Q64	J107-3			Vio-Grn	AE-26-1500	
06	Lockup Kicker	High Power	J130-7			Q66	J107-3			Vio-Blu	AE-23-800	
07	Knocker	High Power		J130-8		Q68		J107-3		Vio-Blk		AE-23-800
08	Escalator Popper	High Power	J130-9			Q70	J107-3			Vio-Gry	AE-23-800	
09	Left Jet	Low Power	J127-1			Q58	J107-2			Brn-Blk	AE-26-1200	
10	Right Jet	Low Power	J127-3			Q56	J107-2			Brn-Red	AE-26-1200	
11	Center Jet	Low Power	J127-4			Q54	J107-2			Brn-Org	AE-26-1200	
12	Left Slingshot	Low Power	J127-5			Q52	J107-2			Brn-Yel	AE-26-1200	
13	Right Slingshot	Low Power	J127-6			Q50	J107-2			Brn-Grn	AE-26-1200	
14	Left Gate	Low Power	J127-7			Q48	J107-2			Brn-Blu	A-14406	
15	Right Gate	Low Power	J127-8			Q46	J107-2			Brn-Vio	A-14406	
16	Lockup Release	Low Power	J127-9			Q44	J107-2			Brn-Gry	AE-26-1500	
17	Wheel Motor	Flasher	J126-1			Q42	J107-6			Blk-Brn	14-7990	
18	Upper Playfield Left	Flasher	J126-2			Q40	J107-6			Blk-Red	#906,#89(2)	
19	Right Loop Backbox	Flasher	J126-3	J125-5		Q38	J107-6	J106-5		Blk-Org	#89 (1)	#906 (1)
20	Right Bluto	Flasher	J126-4			Q36	J107-6			Blk-Yel	#906,#89(2)	
21	Left Loop Bkx.	Flasher	J126-5	J125-6		Q28	J107-6	J106-5		Blu-Grn	#89 (1)	#906 (1)
22	Animal Ramp	Flasher	J126-6	J125-7		Q30	J107-6	J106-5		Blu-Bk	#906 (2)	#906 (1)
23	Skill Wheel	Flasher	J126-7	J125-8		Q34	J107-6	J106-5		Blu-Vio	#906 (1)	#906 (1)
24	R Popper BkxExB	Flasher	J126-8	J125-9		Q32	J107-6	J106-5		Blu-Gry	#906 (1)	#906 (1)
25	Not Used	Gen. Purpose				Q26				Blu-Brn		
26	Ramp Jackpot	Gen. Purpose	J122-2	J124-2		Q24	J107-6	J106-5		Blu-Red	#89 (1)	#906 (1)
27	Lockjaw Arrow	Gen. Purpose	J122-3	J124-3		Q22	J107-6	J106-5		Blu-Org	#89 (2)	#906 (1)
28	Escitr BkxTurtle	Gen. Purpose	J122-4	J124-4		Q20	J107-6	J106-56		Blu-Yel	#906 (1)	#906 (1)
<b>General Illumination</b>												
01	Left Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	24-6549	
02	Right Playfield	G.I.	J121-2			Q10	J121-8			Wht-Org	24-6549	
03	Backbox General	G.I.		J120-3		Q14		J120-9		Wht-Yel		24-8768
04	Backbox Title	G.I.		J120-5		Q16		J120-10		Wht-Grn		24-8768
05	Upper Playfield	G.I.	J121-6			Q12	J121-11			Wht-Vio	24-6549	
<b>Flipper Circuits</b>												
		Voltage Connections			Drive Transistors		Drive Connections		Drive Wire Colors		Coil Part Number	Coil Colors
		Playfield			Power	Hold	Playfield		Power	Hold		
	Lower Left Flipper	Lwr. Lt. Power	J907-7 (Gry-Yel)		Q3		J902-9		Blu-Gry		FL-11629	BLUE
		Lwr. Lt. Hold	J907-7 (Gry-Yel)		Q9		J902-7		Org-Blu			
	Lower Right Flipper	Lwr. Rt. Power	J907-9 (Blu-Yel)		Q4		J902-13		Blu-Vio		FL-11629	BLUE
		Lwr. Rt. Hold	J907-9 (Blu-Yel)		Q11		J902-11		Org-Grn			
	Upper Left Flipper	Up Lt. Power	J907-1 (Gry-Yel)		Q1		J902-3		Blk-Blu		FL-11722	GREEN
		Up Lt. Hold	J907-1 (Gry-Yel)		Q5		J902-1		Org-Gry			
	Upper Right Flipper	Up Rt. Power	J907-4 (Blu-Yel)		Q2		J902-6		Blk-Yel		FL-11722	GREEN
		Up Rt. Hold	J907-4 (Blu-Yel)		Q7		J902-4		Org-Vio			

J1XX = Power Driver Board; J9XX - Fliptronic II Board; 24-6549 = #44 Bulb; 24-8704 = #89 Bulb; 24-8768 = #555 Bulb; 24-8802 = #906 Bulb

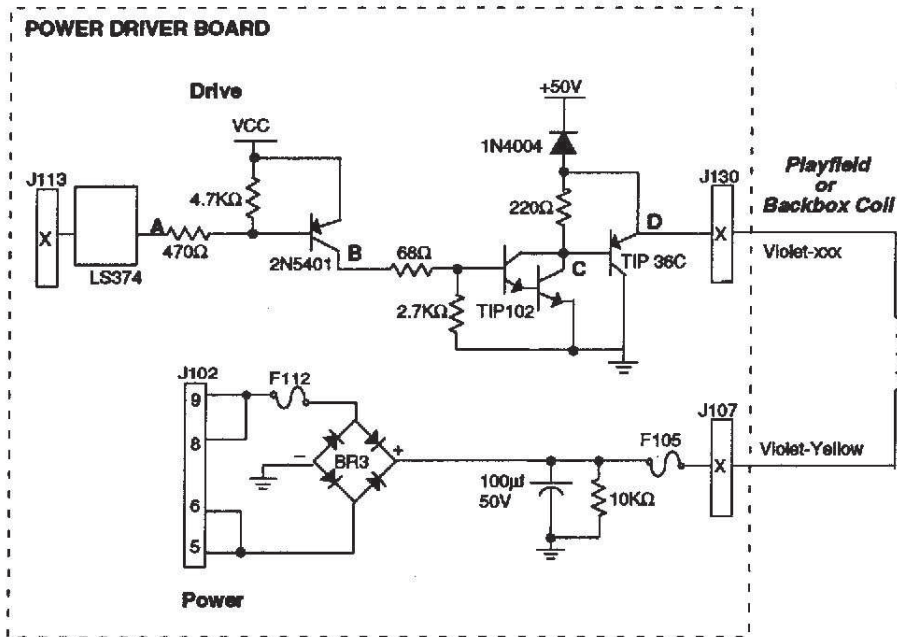
# SOLENOID WIRING



# FLASHER WIRING

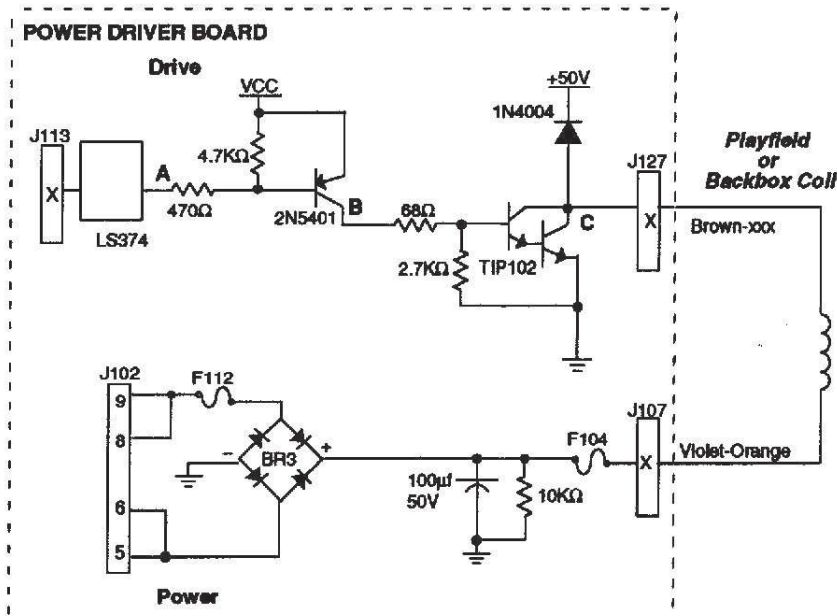


### High Power Solenoid Circuit



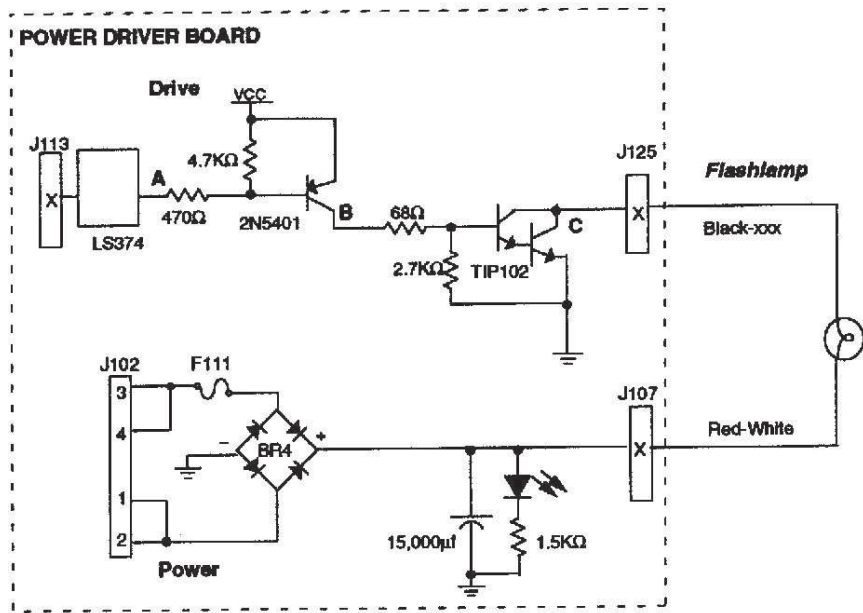
The microprocessor toggles the output of the 74LS374. When point "A" drops low, point "B" the collector of the 2N5401 transistor is high. A high at point "B" causes point "C" the collector of the TIP102 transistor, and point "D" the emitter of the TIP36 transistor to drop low. When point "D" is low the coil is grounded through the transistor and the coil turns On. The coil shuts Off when point "A" toggles high.

### Low Power Solenoid Circuit



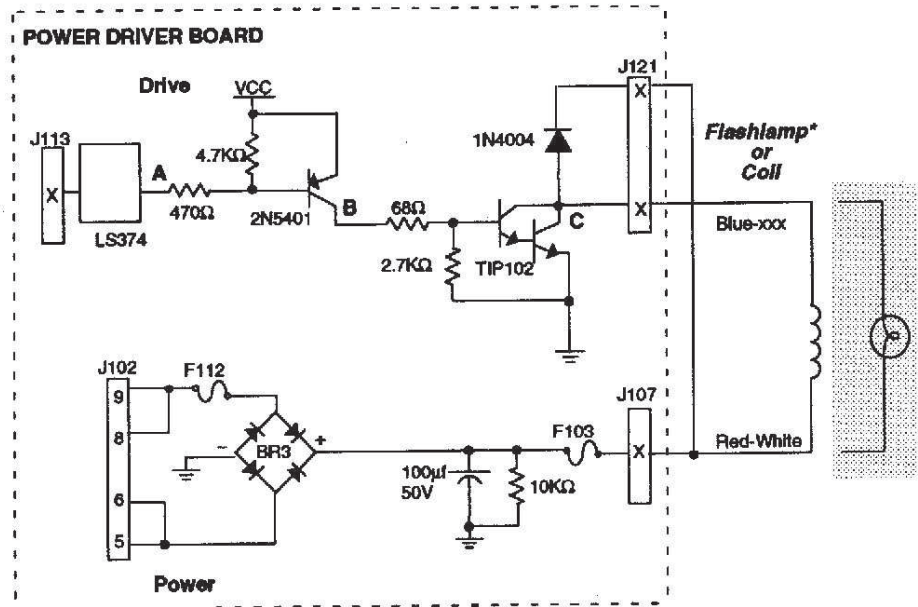
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor is driven high. A high at point "B" turns On the TIP102 transistor and causes point "C" to drop low. When point "C" is low the coil is grounded through the transistor and the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

## Flashlamp Circuit



The microprocessor 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 the flashlamp turns On. When point "A" toggles high the circuit shuts Off.

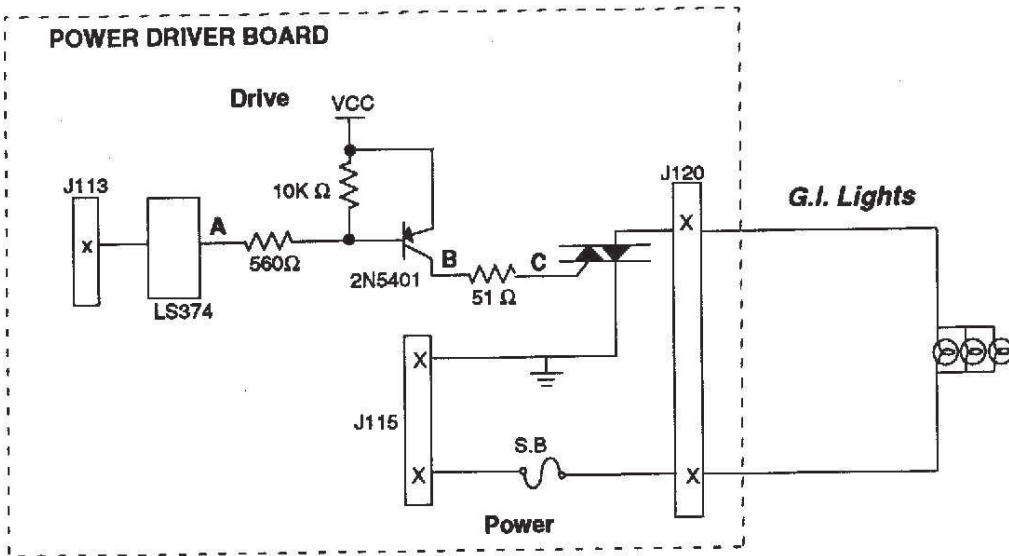
## Special (General Purpose) Solenoid Circuit



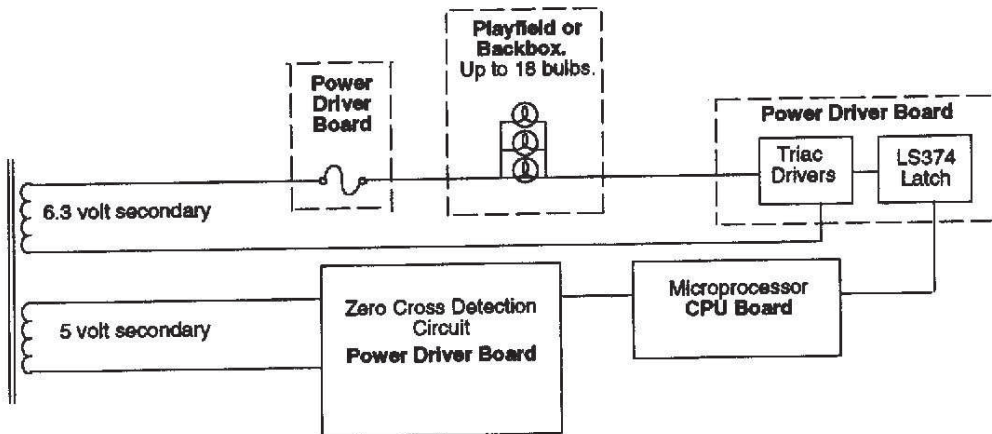
The microprocessor toggles the output of the 74LS374. When point "A" drops low, point "B" is high. A high at point "B" causes a low at point "C". When point "C" is low the coil/flashlamp is grounded through the transistor and the coil/flashlamp turns On. When point "A" toggles high the coil/flashlamp turns Off.

\* Tieback Diode is not used for flashlamp circuit.

**General Illumination Circuit**



**Block Diagram of General Illumination Circuit**

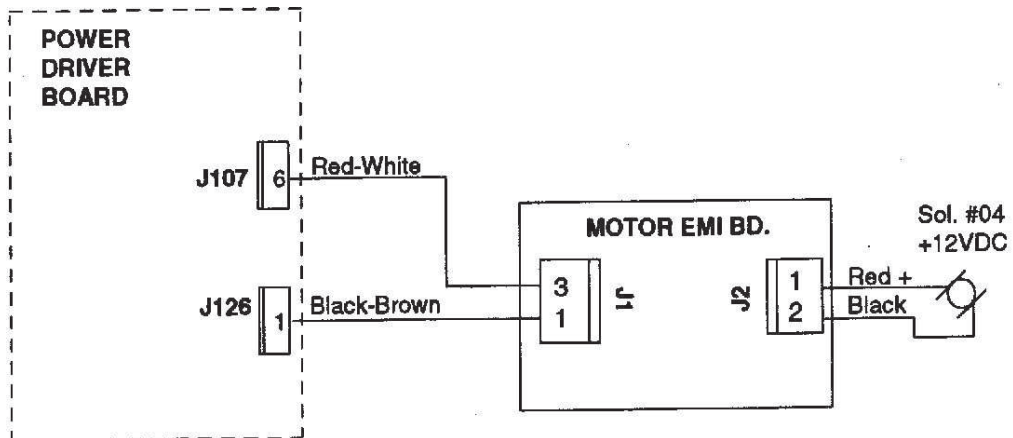
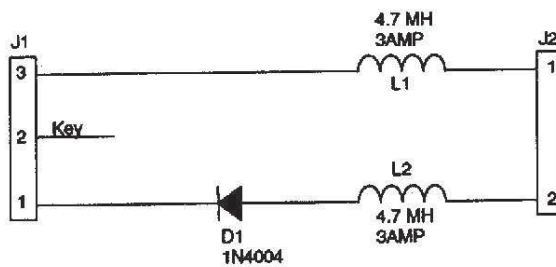
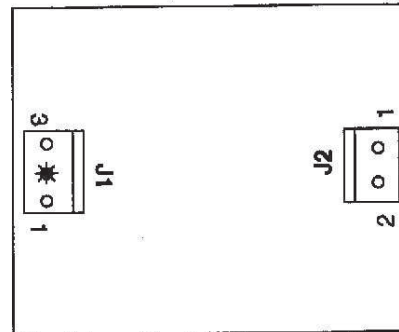


When point "A" toggles low, then points "B" and "C" are high. This turns On the triac and the desired General Illumination string lights.



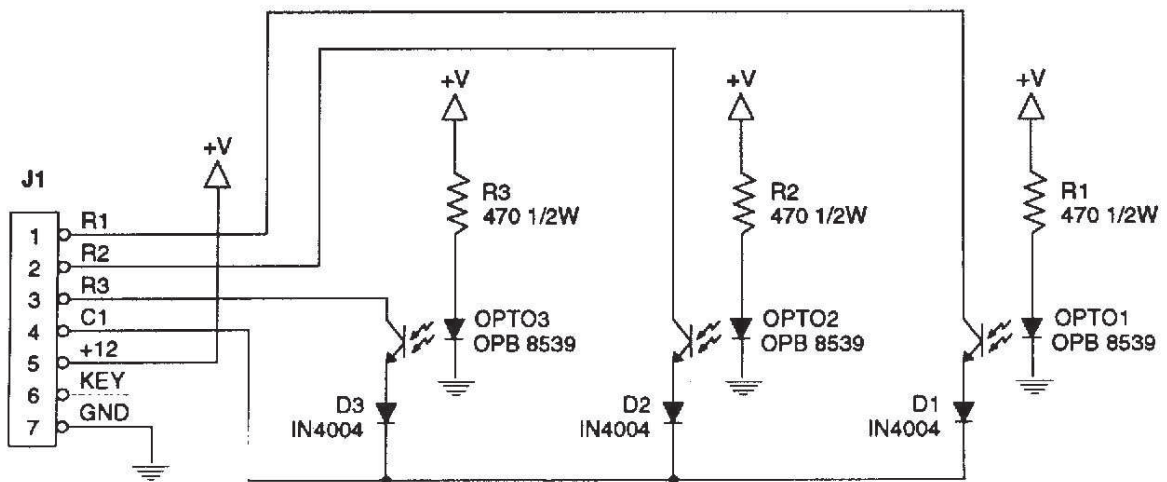
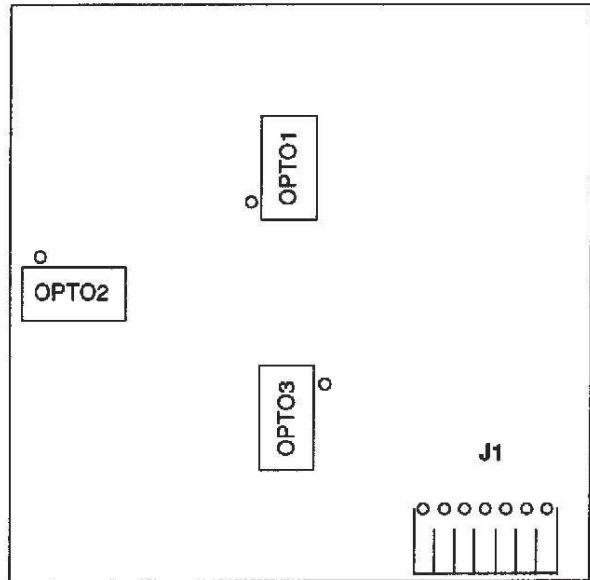
## Motor EMI Assembly A-15542

- J1 - 1 Black-Brown, from J126-1
- J1 - 2 Key
- J1 - 3 Red-White, +20VDC from J107-6
  
- J2 - 1 Red to Motor, Sol #17
- J2 - 2 Black, Ground to Motor, Sol #17

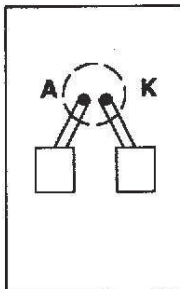
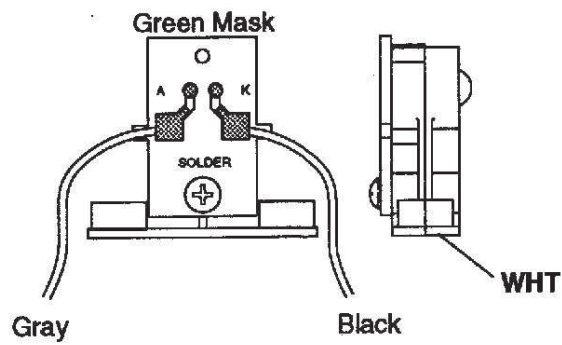


### 3-bit Opto Encoder P.C.B. A-17069

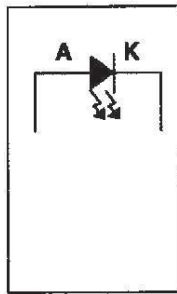
- J1-1 White-Blue, from J209-7
- J1-2 White-Violet, from J209-8
- J1-3 White Gray, from J209-9
- J1-4 Green-Yellow, from J207-4
- J1-5 Gray-Yellow, +12VDC from J118-2
- J1-6 Key
- J1-7 Black, Ground from J118-3



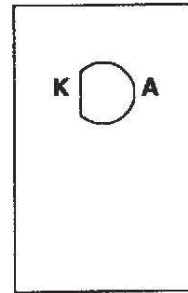
## LED PCB Assembly (transmitter) A-16908



solder side

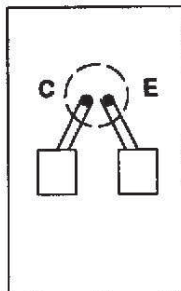
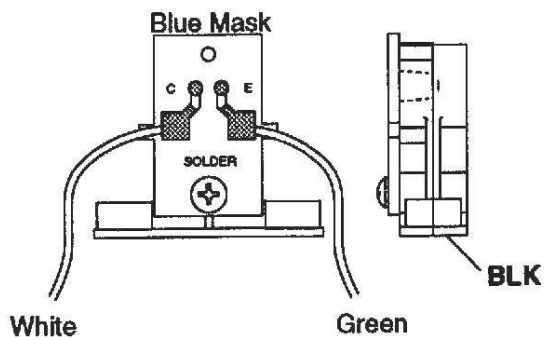


schematic

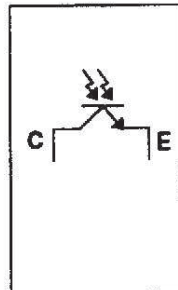


component side

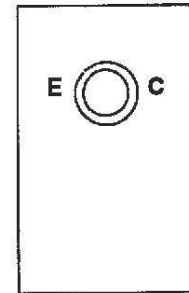
## Photo Transistor PCB Assembly (receiver) A-16909



solder side

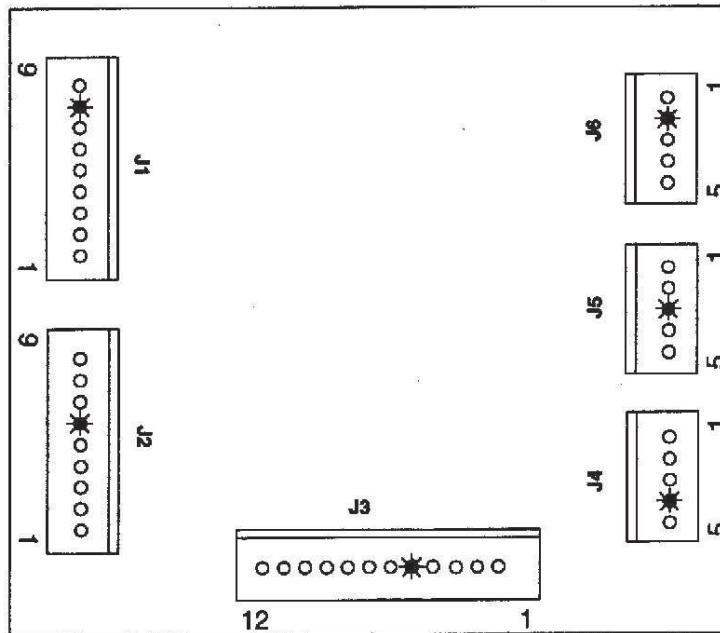


schematic



component side

## Opto Sw10 PCB Assembly A-15430



J1-1 Gray-Violet, to opto transmitter Sw #37  
 J1-2 Gray-Blue, to opto transmitter Sw #36  
 J1-3 Gray-Green, to opto transmitter Sw #35  
 J1-4 Gray-Black, to opto transmitter Sw #34  
 J1-5 Gray-Orange, to opto transmitter Sw #33  
 J1-6 Gray-Red, to opto transmitter Sw #32  
 J1-7 Gray-Brown, to opto transmitter Sw #31 ●  
 J1-8 Key  
 J1-9 Black, Ground

J2-1 Orange-Violet, to opto receiver Sw #37  
 J2-2 Orange-Blue, to opto receiver Sw #36  
 J2-3 Orange-Green, to opto receiver Sw #35  
 J2-4 Orange-Yellow, to opto receiver Sw #34  
 J2-5 Orange-Black, to opto receiver Sw #33  
 J2-6 Key  
 J2-7 Orange-Red, to opto receiver Sw #32  
 J2-8 Orange-Brown, to opto receiver Sw #31 ●  
 J2-9 Gray-Yellow, +12VDC

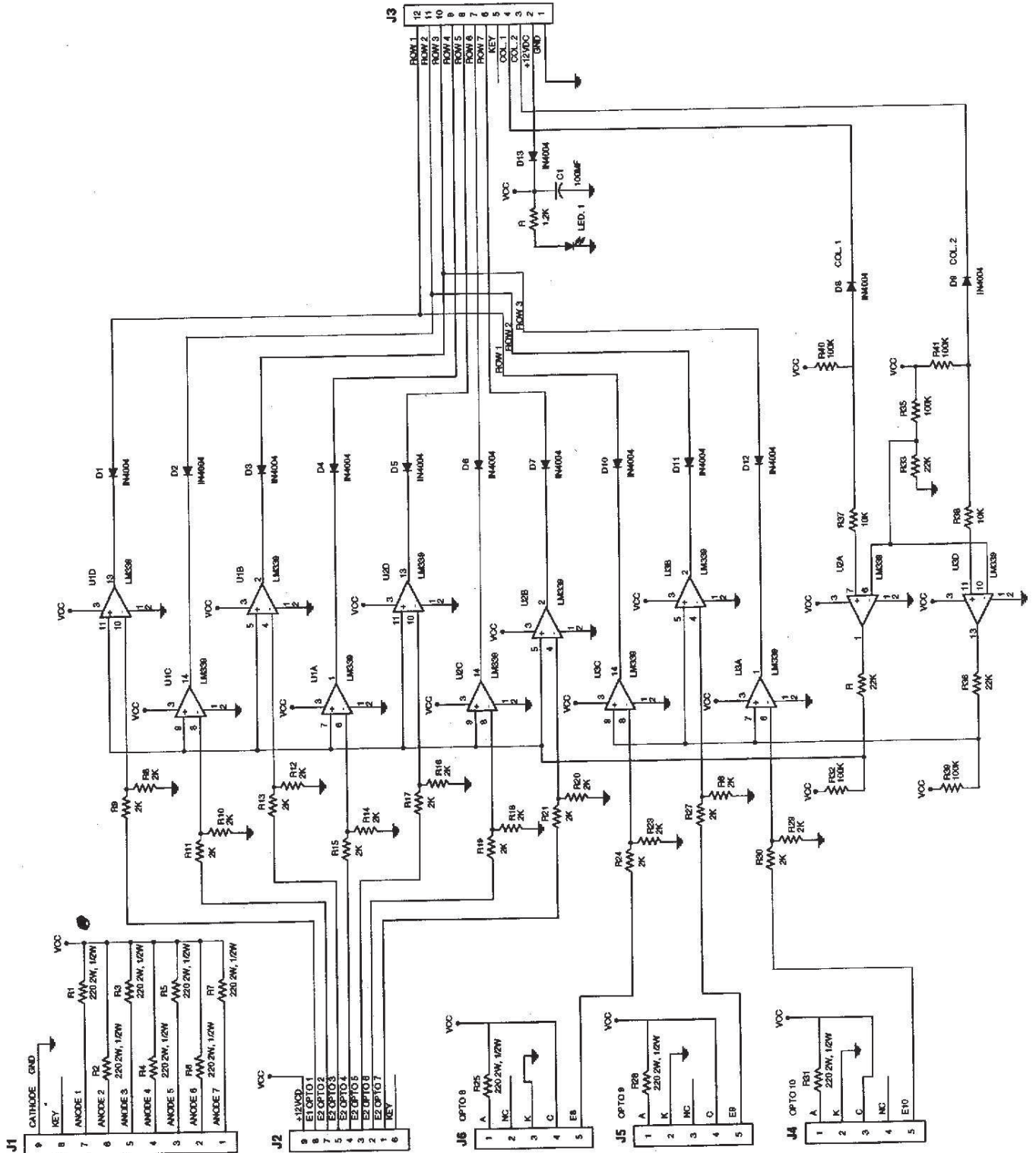
J3-1 Black, Ground from J118-3  
 J3-2 Gray-Yellow, +12VDC from J118-2  
 J3-3 Green-Gray, from J207-9, to playfield switches  
 J3-4 Green-Orange, from J207-3, to playfield switches  
 J3-5 Key  
 J3-6 White-Violet, from J209-8, to playfield switches  
 J3-7 White-Blue, from J209-7, to playfield switches  
 J3-8 White-Green, from J209-5, to playfield switches  
 J3-9 White-Yellow, from J209-4, to playfield switches  
 J3-10 White-Orange, from J209-3, to playfield switches  
 J3-11 White-Red, from J209-2, to playfield switches  
 J3-12 White-Brown, from J209-1, to playfield switches

J4-1 Gray, to opto transmitter Sw #83  
 J4-2 Not Used  
 J4-3 Not Used  
 J4-4 Key  
 J4-5 Orange, to opto receiver Sw #83

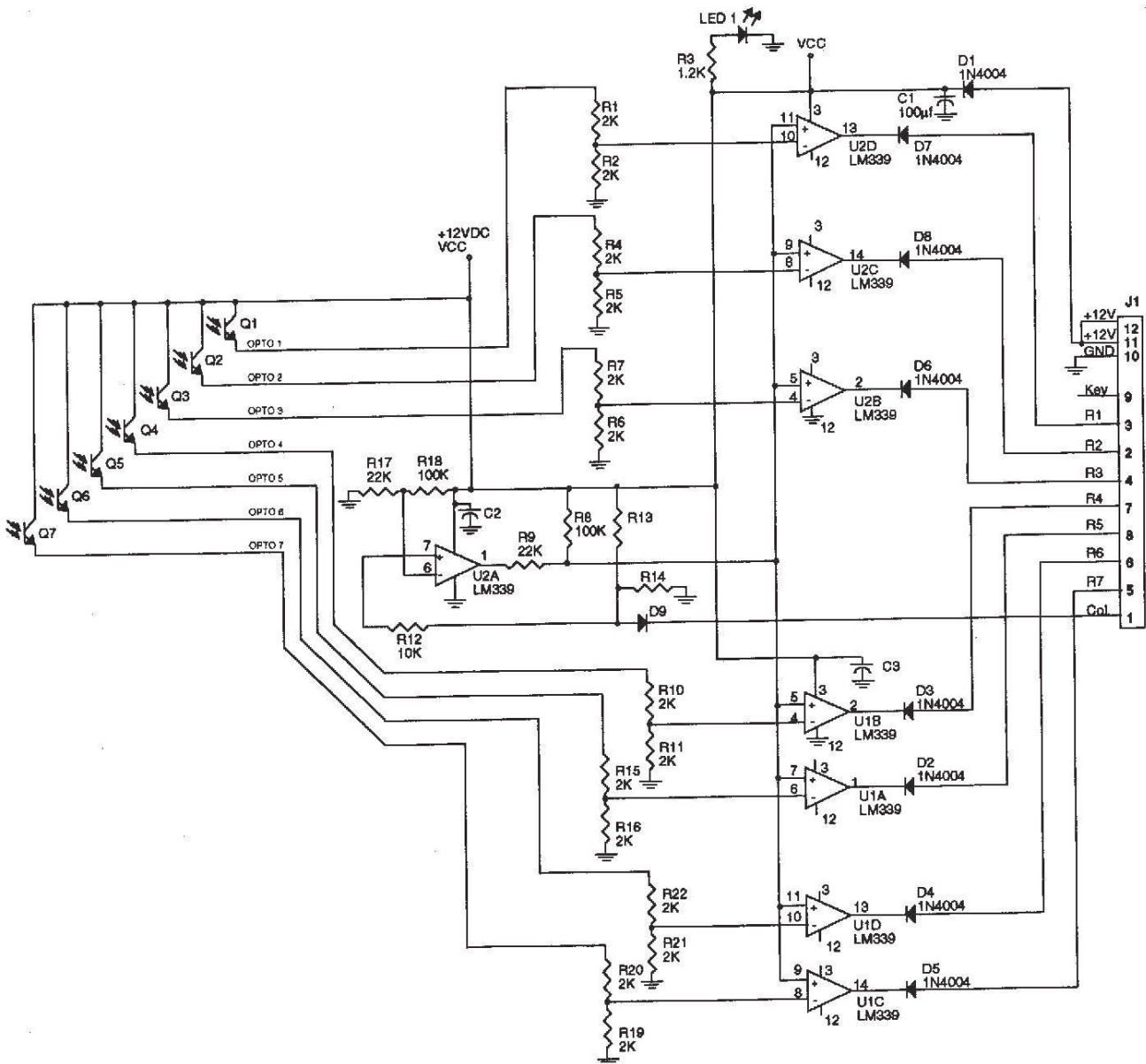
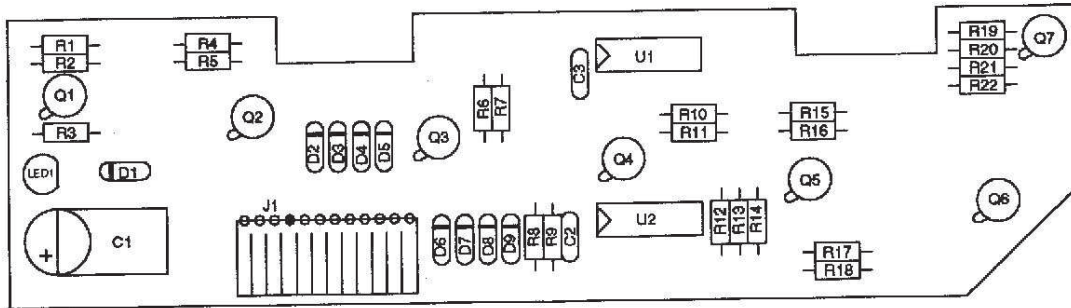
J5-1 Gray-White, to opto transmitter Sw #82  
 J5-2 Not Used  
 J5-3 Key  
 J5-4 Not Used  
 J5-5 Orange-White, to opto receiver Sw #82

J6-1 Gray-Black, to opto transmitter Sw #81  
 J6-2 Key  
 J6-3 Black, Ground  
 J6-4 Gray-Yellow, +12VDC  
 J6-5 Orange-Gray, to opto receiver Sw #81

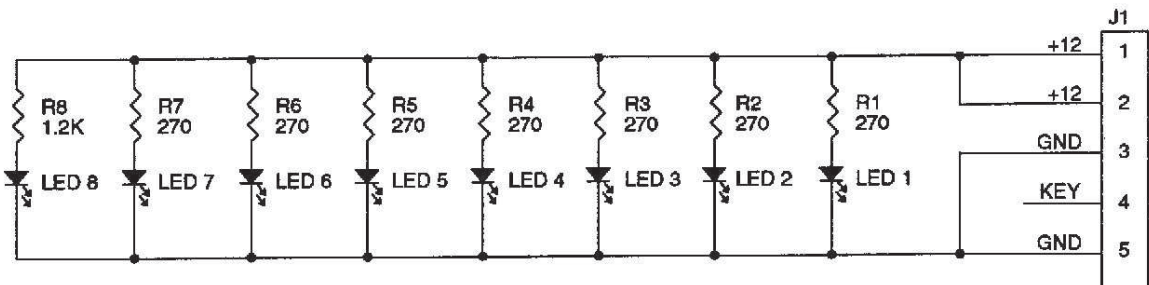
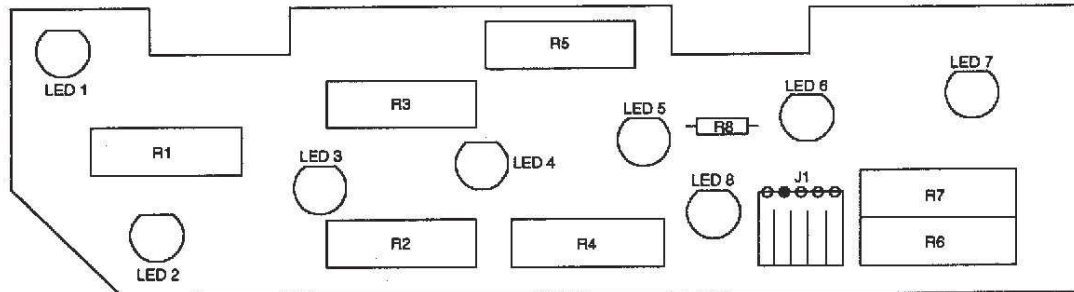
# Opto Sw10 PCB Schematic



## 7 Ball Trough Photo Transistor PCB Assembly A-16926



## 7 Ball Trough LED PCB Assembly A-16927



### 7 Ball Trough LED PCB Assembly

#### Connector Wiring

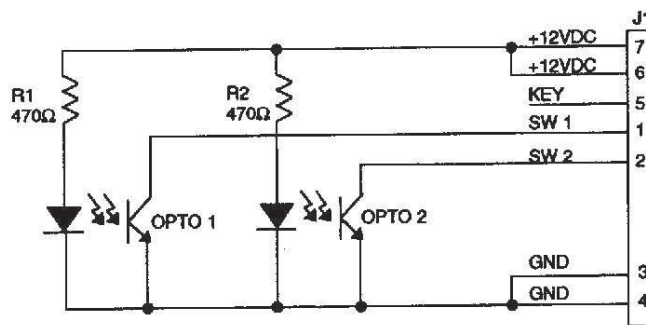
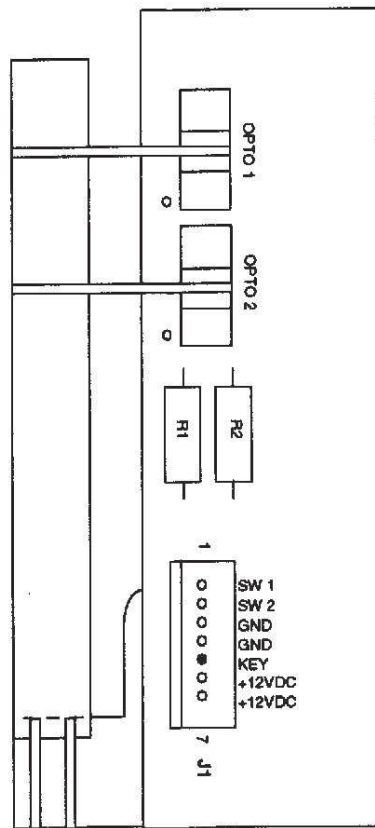
- J1-1 Gray-Yellow, +12V from Power Driver Board J118-2
- J1-2 N/C
- J1-3 N/C
- J1-4 Key
- J1-5 Black, ground from Power Driver Board J118-3

### 7 Ball Trough Photo Transistor PCB Assembly

#### Connector Wiring

- J1-1 Green-Gray, sw. col. 8 from CPU Board J207-9
- J1-2 White-Red, sw. row 2 from CPU Board J209-2
- J1-3 White-Brown, sw. row 1 from CPU Board J209-1
- J1-4 White-Orange, sw. row 3 from CPU Board J209-3
- J1-5 White-Violet, sw. row 7 from CPU Board J209-8
- J1-6 White-Blue, sw. row 6 from CPU Board J209-7
- J1-7 White-Yellow, sw. row 4 from CPU Board J209-4
- J1-8 White-Green, sw. row 5 from CPU Board J209-5
- J1-9 Key
- J1-10 Black, ground from Power Driver Board J118-3
- J1-11 Gray-Yellow, +12v from Power Driver Board J118-2
- J1-12 Gray-Yellow, +12V from Power Driver Board J1-11

## Flipper Opto PCB Assembly A-17316

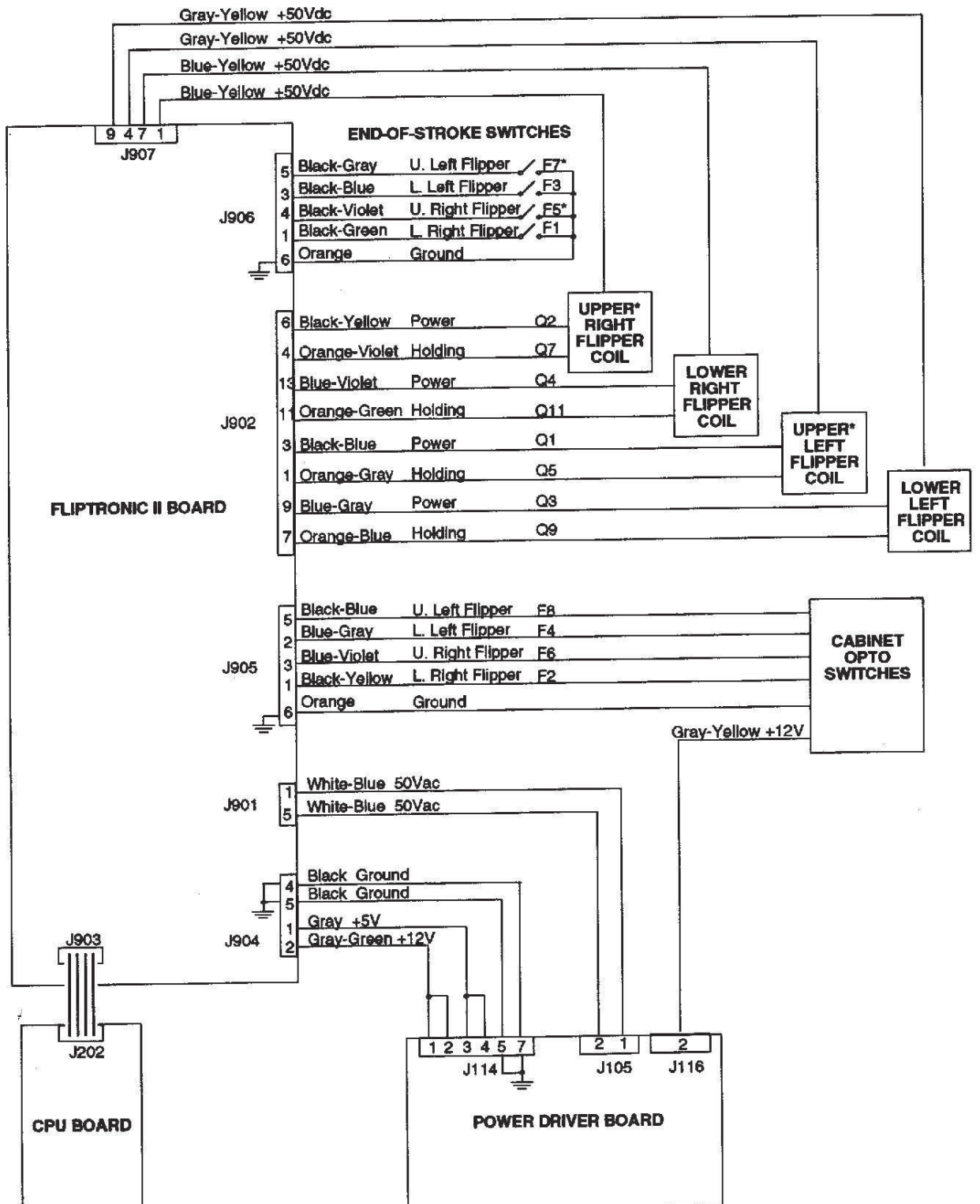


**Left Side Flipper Cabinet Opto Switch Board**  
**J1-1** Blue-Gray from Fliptronic II Board J905-2  
**J1-2** Black-Blue from Fliptronic II Board J905-5  
**J1-3** N/C  
**J1-4** Orange from Fliptronic II Board J905-6  
**J1-5** N/C  
**J1-6** Gray-Yellow from Fliptronic II Board J904-2  
**J1-7** Gray-Yellow from Fliptronic II Board J904-2

**Right Side Flipper Cabinet Opto Switch Board**  
**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 Assembly J1-4  
**J1-5** N/C  
**J1-6** Gray-Yellow from Left Flipper Opto Assembly J1-6  
**J1-7** N/C



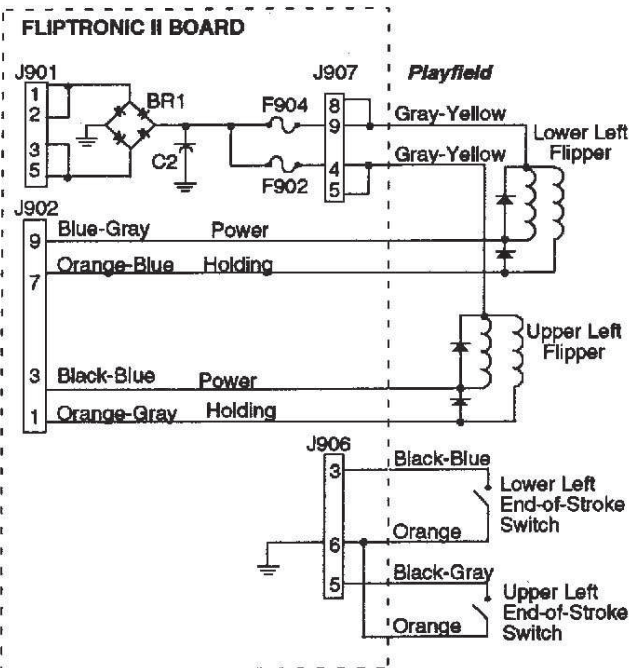
## Flipper Circuit Diagram



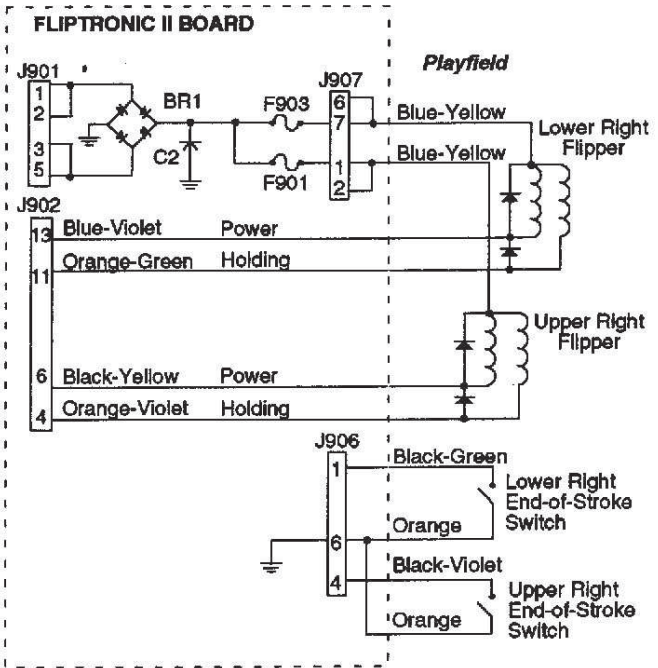
*\*Note: Used as circuits other than flipper circuits in this game.*

## Flipper Coil Circuits

**Left Flipper Circuit**

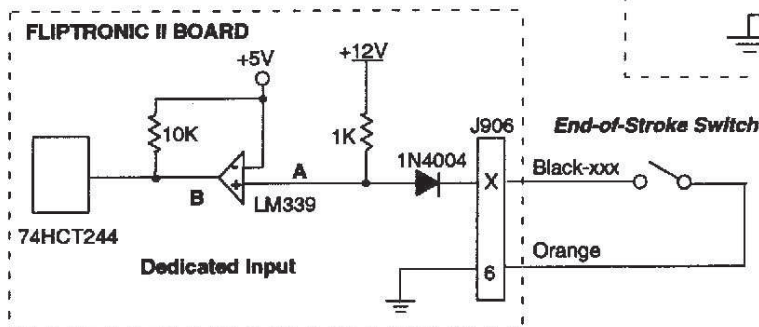
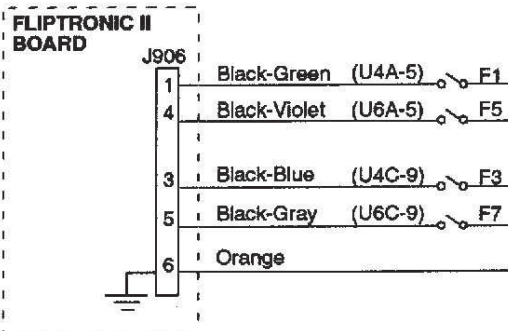


**Right Flipper Circuit**



## Flipper End-of-Stroke Switches

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

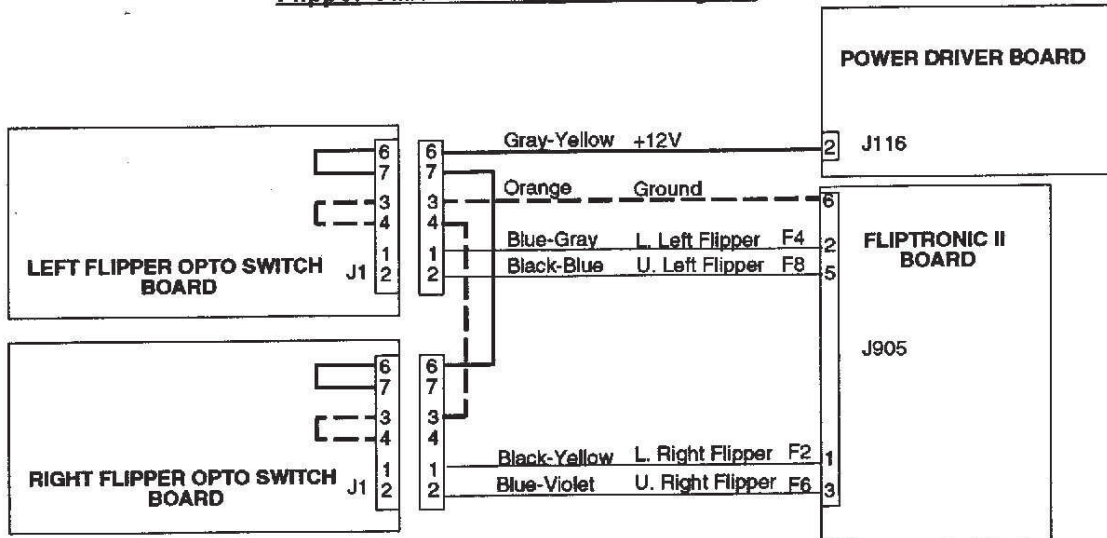


Switch	A	B	
Open	H	H	Off
Closed	L	L	On

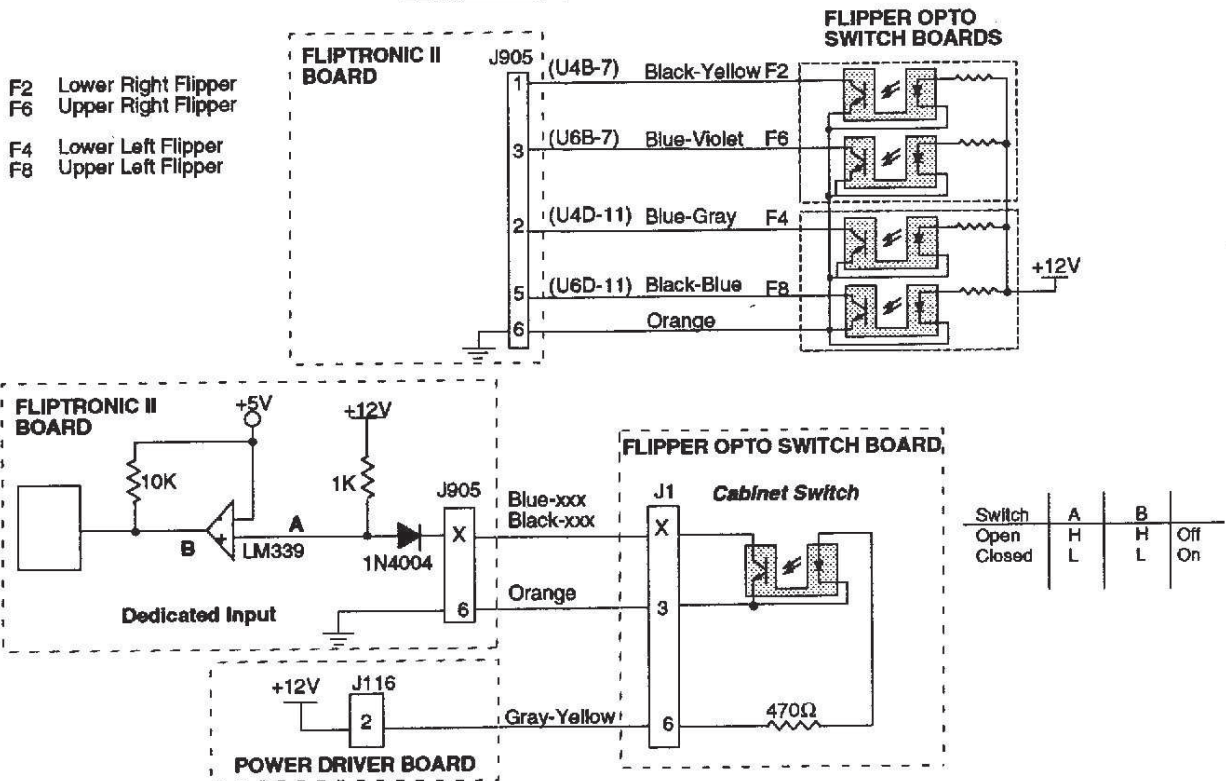
The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

When a switch closes the row side (dedicated input) of the circuit activates. 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 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 Diagram



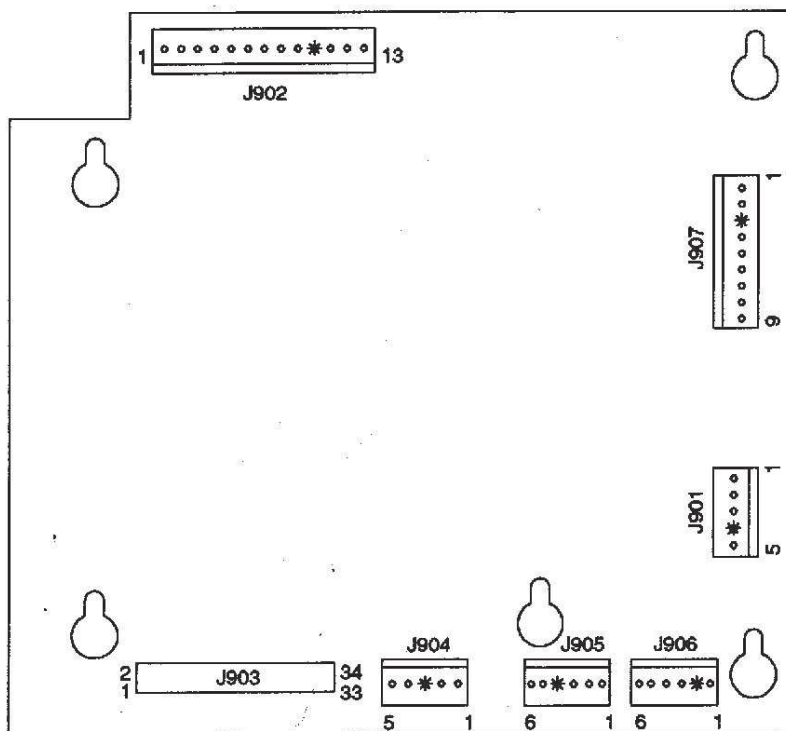
### Flipper Cabinet Switches



The flipper switch 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 activates. 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 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.

## Fliptronic II Board A-15472-1



J901-1 White-Blue, 50VAC loop from J104-1  
 J901-2 White-Blue, loop from J901-1  
 J901-3 White-Blue, 50VAC loop, from J104-2  
 J901-4 Key  
 J901-5 White-Blue, loop from J901-3

J902-1 Orange-Gray, holding to upper left flipper  
 J902-2 Not Used  
 J902-3 Black-Blue, power to upper left flipper  
 J902-4 Orange-Violet, holding to upper right flipper  
 J902-5 Not Used  
 J902-6 Black-Yellow, power to upper right flipper  
 J902-7 Orange-Blue, holding to lower left flipper  
 J902-8 Not Used  
 J902-9 Blue-Gray, power to lower left flipper  
 J902-10 Key  
 J902-11 Orange-Green, holding to lower right flipper  
 J902-12 Not Used  
 J902-13 Blue-Violet, power to lower right flipper

J903 Ribbon Cable, data to/from J202; J506; J601

J904-1 Gray, +5V from J114-4  
 J904-2 Gray-Green, +12V from J114-2  
 J904-3 Key  
 J904-4 Black, Ground from J114-7  
 J904-5 Black, Ground from J114-5

J905-1 Black-Yellow, to right flipper opto  
 J905-2 Blue-Gray, to left flipper opto  
 J905-3 Blue-Violet, to right flipper opto  
 J905-4 Key  
 J905-5 Black-Blue, to left flipper opto  
 J905-6 Orange, Switch Ground

J906-1 Black-Green, to lower right end-of-stroke switch  
 J906-2 Key  
 J906-3 Black-Blue, to lower left end-of-stroke switch  
 J906-4 Black-Violet, to upper right end-of-stroke switch  
 J906-5 Black-Gray, to upper left-end-of-stroke switch  
 J906-6 Orange, Switch Ground

J907-1 Blue-Yellow, +50V to lower right flipper  
 J907-2 Blue-Yellow, loop from J907-1  
 J907-3 Key  
 J907-4 Gray-Yellow, +50V to lower left flipper  
 J907-5 Gray-Yellow, loop from J907-4  
 J907-6 Blue-Yellow, +50V to upper right flipper  
 J907-7 Blue-Yellow, loop from J907-6  
 J907-8 Gray-Yellow, loop from J907-9  
 J907-9 Gray-Yellow, +50V to upper left flipper

### P.C. Board Legend

J1-J9	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J1-J4	Sound Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptronic II Board

## Power Driver Board A-12697-3

J101-1 Red, 9VAC from transformer secondary  
 J101-2 Red, 9VAC from transformer secondary  
 J101-3 Key  
 J101-4 Blue-White, 13VAC from transformer secondary  
 J101-5 Blue-White, loop from J101-4  
 J101-6 Blue-White, 13VAC from transformer secondary  
 J101-7 Blue-White, loop from J101-6

J102-1 White-Red, loop from J102-2  
 J102-2 White-Red, 16VAC from transformer secondary  
 J102-3 White-Red, loop from J102-4  
 J102-4 White-Red, 16VAC from transformer secondary  
 J102-5 Black-Yellow, loop from J102-6  
 J102-6 Black-Yellow, 16VAC from transformer secondary  
 J102-7 Key  
 J102-8 Black-Yellow, loop from J102-9  
 J102-9 Black-Yellow, 16VAC from transformer secondary

J103 Not Used

J104 Not Used

J105-1 White-Blue, 50VAC to J901-1  
 J105-2 White-Blue, 50VAC to J901-3  
 J105-3 Key  
 J105-4 Not Used  
 J105-5 Not Used

J106-1 Not Used  
 J106-2 Not Used  
 J106-3 Not Used  
 J106-4 Key  
 J106-5 Red-White, +20V to insert flashlamps

J107-1 Violet-Green, 50V to playfield coils  
 J107-2 Violet-Orange, 50V to playfield coils  
 J107-3 Violet-Yellow, 50V to playfield coils  
 J107-4 Key  
 J107-5 Not Used  
 J107-6 Red-White, +20V to playfield flashlamps

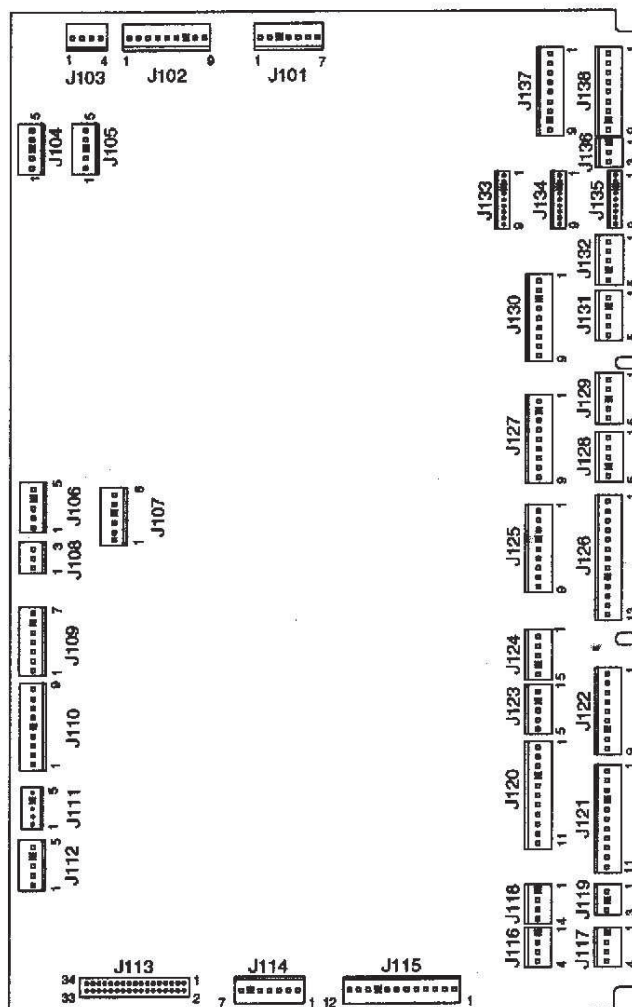
J108 Not Used

J109 Not Used

J110 Not Used

J111 Not Used

J112-1 White-Green, 9.8VAC from transformer secondary  
 J112-2 White-Green, loop from J112-1  
 J112-3 White-Green, 9.8VAC from transformer secondary  
 J112-4 Key  
 J112-5 White-Green, loop from J112-3



J113 Ribbon Cable, Data to/from J211

J114-1 Gray-Green, +12VDC to J210-7  
 J114-2 Not Used  
 J114-3 Gray, +5VDC to J210-5; J502-3  
 J114-4 Not Used  
 J114-5 Not Used  
 J114-6 Key  
 J114-7 Black, Ground to J210-1; J502-4; J904-4

### P.C. Board Legend

J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J1-J4	Sound Board
J6xx	Dot Matrix Controller Board
J9xx	Flitronic II Board

## Power Driver Board Continued...

J115-1 Yellow-White, 6.8VAC from transformer secondary  
 J115-2 White-Brown, 6.8VAC from transformer secondary  
 J115-3 White-Brown, loop from J115-2  
 J115-4 White-Orange, 6.8VAC from transformer secondary  
 J115-5 White-Yellow, loop from J115-6  
 J115-6 White-Yellow, 6.8VAC from transformer secondary  
 J115-7 Orange, 6.8VAC from transformer secondary  
 J115-8 Orange, 6.8VAC loop from J115-7  
 J115-9 Key  
 J115-10 Green, 6.8VAC from transformer secondary  
 J115-11 Brown, 6.8VAC from transformer secondary  
 J115-12 Brown, 6.8VAC loop from J115-11

J116-1 Key  
 J116-2 Gray-Yellow, +12VDC to coin door; J2-4  
 J116-3 Black, Ground to coin door; J2-5  
 J116-4 Not Used

J117-1 Key  
 J117-2 Gray-Yellow, +12VDC to J606-7  
 J117-3 Black, Ground to J606-3  
 J117-4 Gray, +5VDC to J606-5

J118-1 Key  
 J118-2 Gray-Yellow, +12VDC to playfield  
 J118-3 Black, Ground  
 J118-4 Not Used

J119-1 White-Violet, 6.8VAC G.I. to coin door; J2-2  
 J119-2 Key  
 J119-3 Violet, Return G.I. to coin door; J2-1

J120-1 Brown, Return G.I. to playfield  
 J120-2 Orange, Return G.I. to playfield  
 J120-3 Not Used  
 J120-4 Key  
 J120-5 Not Used  
 J120-6 Violet, Return G.I. to playfield  
 J120-7 White-Brown, 6.8VAC to playfield  
 J120-8 White-Violet, 6.8VAC to playfield  
 J120-9 Not Used  
 J120-10 Not Used  
 J120-11 White-Violet, 6.8VAC to playfield

J121-1 Not Used  
 J121-2 Not Used  
 J121-3 Yellow, Return G.I. to insert  
 J121-4 Key  
 J121-5 Green, Return G.I. to insert  
 J121-6 Not Used  
 J121-7 Not Used  
 J121-8 Not Used  
 J121-9 White-Yellow, 6.8VAC to insert  
 J121-10 White-Green, 6.8VAC to insert  
 J121-11 Not Used

J122-1 Not Used  
 J122-2 Blue-Red, Sol 26 to playfield flashlamps  
 J122-3 Blue-Orange, Sol 27 to playfield flashlamps  
 J122-4 Blue-Yellow, Sol 28 to playfield flashlamps  
 J122-5 Not Used  
 J122-6 Not Used  
 J122-7 Key  
 J122-8 Not Used  
 J122-9 Not Used

J123 Not Used

J124-1 Not Used  
 J124-2 Blue-Red, Sol 26 to insert flashlamps  
 J124-3 Blue-Orange, Sol 27 to insert flashlamps  
 J124-4 Key  
 J124-5 Blue-Yellow, Sol 28 to insert flashlamps

J125-1 Not Used  
 J125-2 Not Used  
 J125-3 Black-Orange, Sol 19 to insert flashlamps  
 J125-4 Key  
 J125-5 Not Used  
 J125-6 Blue-Green, Sol 21 to insert flashlamps  
 J125-7 Blue-Black, Sol 22 to insert flashlamps  
 J125-8 Blue-Violet, Sol 23 to insert flashlamps  
 J125-9 Blue-Gray, Sol 24 to insert flashlamps

J126-1 Black-Brown, Sol 17 to playfield motor  
 J126-2 Black-Red, Sol 18 to playfield flashlamps  
 J126-3 Black-Orange, Sol 19 to playfield flashlamps  
 J126-4 Black-Yellow, Sol 20 to playfield flashlamps  
 J126-5 Blue-Green, Sol 21 to playfield flashlamps  
 J126-6 Blue-Black, Sol 22 to playfield flashlamps  
 J126-7 Blue-Violet, Sol 23 to playfield flashlamps  
 J126-8 Blue-Gray, Sol 24 to playfield flashlamps  
 J126-9 Key  
 J126-10 Not Used  
 J126-11 Not Used  
 J126-12 Not Used  
 J126-13 Not Used

J127-1 Brown-Black, Sol 9 to playfield coil  
 J127-2 Key  
 J127-3 Brown-Red, Sol 10 to playfield coil  
 J127-4 Brown-Orange, Sol 11 to playfield coil  
 J127-5 Brown-Yellow, Sol 12 to playfield coil  
 J127-6 Brown-Green, Sol 13 to playfield coil  
 J127-7 Brown-Blue, Sol 14 to playfield coil  
 J127-8 Brown-Violet, Sol 15 to playfield coil  
 J127-9 Brown-Gray, Sol 16 to playfield coil

### P.C. Board Legend

J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J1-J4	Sound Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptronic II Board

## Power Driver Board Continued...

J128 Not Used

J129 Not Used

J130-1 Violet-Brown, Sol 1 to playfield coil

J130-2 Violet-Red, Sol 2 to playfield coil

J130-3 Key

J130-4 Violet-Orange, Sol 3 to playfield coil

J130-5 Violet-Yellow, Sol 4 to playfield coil

J130-6 Violet-Green, Sol 5 to playfield coil

J130-7 Violet-Blue, Sol 6 to playfield coil

J130-8 Violet-Black, Sol 7 to playfield coil

J130-9 Violet-Gray, Sol 8 to playfield coil

J131 Not Used

J132 Not Used

J133-1 Red-Brown, Row 1 to insert lamps

J133-2 Red-Black, Row 2 to insert lamps

J133-3 Not Used

J133-4 Not Used

J133-5 Not Used

J133-6 Red-Yellow, Row 4 to insert lamps

J133-7 Not Used

J133-8 Not Used

J133-9 Not Used

J134-1 Red-Brown, Row 1 to playfield lamps

J134-2 Red-Black, Row 2 to playfield lamps

J134-3 Key

J134-4 Red-Orange, Row 3 to playfield lamps

J134-5 Red-Yellow, Row 4 to playfield lamps

J134-6 Red-Green, Row 5 to playfield lamps

J134-7 Red-Blue, Row 6 to playfield lamps

J134-8 Red-Violet, Row 7 to playfield lamps

J134-9 Red-Gray, Row 8 to playfield lamps

J135-1 Not Used

J135-2 Not Used

J135-3 Key

J135-4 Not Used

J135-5 Not Used

J135-6 Not Used

J135-7 Red-Blue, Row 6 to cabinet lamp

J135-8 Red-Violet, Row 7 to cabinet lamp

J135-9 Red-Gray, Row 8 to cabinet lamp

J136-1 Key

J136-2 Yellow-Violet, Col 7 to insert lamps

J136-3 Not Used

J137-1 Not Used

J137-2 Not Used

J137-3 Not Used

J137-4 Not Used

J137-5 Not Used

J137-6 Not Used

J137-7 Not Used

J137-8 Key

J137-9 Yellow-Gray, Col 8 to cabinet lamps

J138-1 Yellow-Brown, Col 1 to playfield lamps

J138-2 Yellow-Red, Col 2 to playfield lamps

J138-3 Yellow-Orange, Col 3 to playfield lamps

J138-4 Yellow-Black, Col 4 to playfield lamps

J138-5 Yellow-Green, Col 5 to playfield lamps

J138-6 Yellow-Blue, Col 6 to playfield lamps

J138-7 Yellow-Violet, Col 7 to playfield lamps

J138-8 Key

J138-9 Yellow-Gray, Col 8 to playfield lamps

### P.C. Board Legend

J1-J9	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J1-J4	Sound Board
J6xx	Dot Matrix Controller Board
J9xx	Fluoronic II Board

## CPU Board A-12742-50022

J201 Ribbon Cable, Data to J602

J202 Ribbon Cable, Data to J903; J506; J601

J203 Not Used

J204 Ribbon Cable, Data to J1, A-16100

J205-1 Orange-Brown, Dir Sw 1, Left Coin to J1-14

J205-2 Orange-Red, Dir Sw 2, Center Coin to J1-13

J205-3 Orange-Black, Dir Sw 3, Right Coin to J1-12

J205-4 Orange-Yellow, Dir Sw 4, 4th Coin J1-17

J205-5 Key

J205-6 Orange-Green, Dir Sw 5, Escape/Service to J1-11

J205-7 Orange-Blue, Dir Sw 6, Down/Volume Down to J1-10

J205-8 Orange-Violet, Dir Sw 7, Up/Volume Up to J1-9

J205-9 Orange-Gray, Dir Sw 8, Enter/Test to J1-8

J205-10 Black, Ground to J1-15

J205-11 Not Used

J205-12 Orange-White, Enable to J1-18

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 Key

J207-9 Green-Gray, Sw Col 8 to Playfield Switches

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 Key

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 J114-7

J210-2 Key

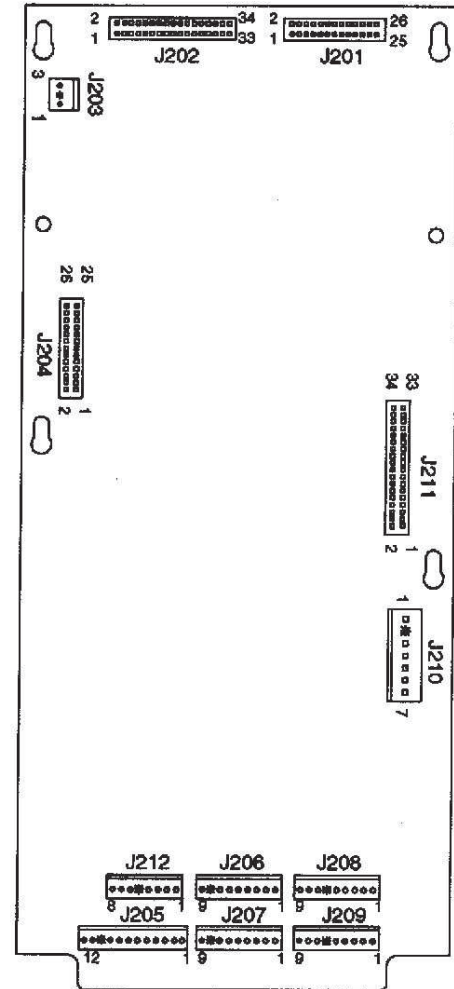
J210-3 Black, Ground from J114-5

J210-4 Gray, +5VDC from J114-4

J210-5 Gray, +5VDC from J114-3

J210-6 Gray-Green, +12VDC from J114-2

J210-7 Gray-Green, +12VDC from J114-1



J211 Ribbon Cable, Data from J113

J212-1 Green-Brown, Sw Col 1 to J1-1

J212-2 Green-Red, Sw Col 2 to J1-7

J212-3 Not Used

J212-4 White-Brown, Sw Row 1 to J1-6

J212-5 Key

J212-6 White-Red, Sw Row 2 to J1-5

J212-7 White-Orange, Sw Row 3 to J1-4

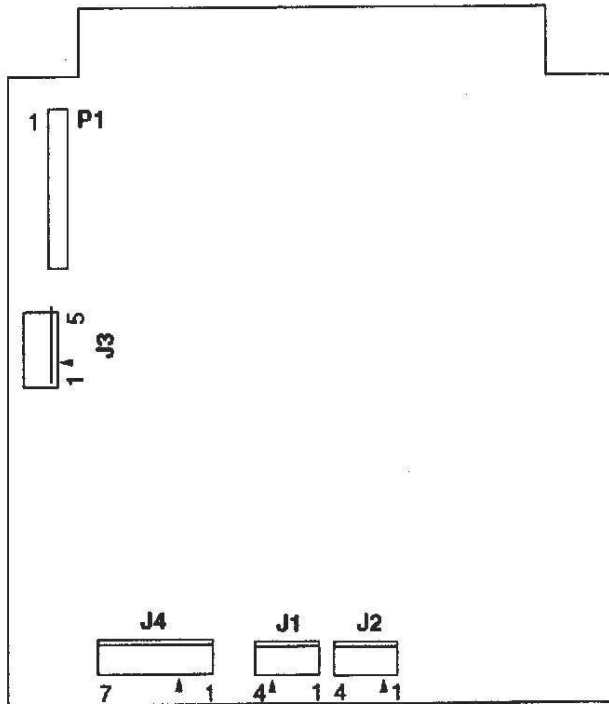
J212-8 White-Yellow, Sw Row 4 to J1-3

### P.C. Board Legend

J1-J9	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J1-J4	Sound Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptonic II Board



## Audio Board A-16917-50022



P1 34-pin Ribbon Cable, Data to/from J601; J903; J202

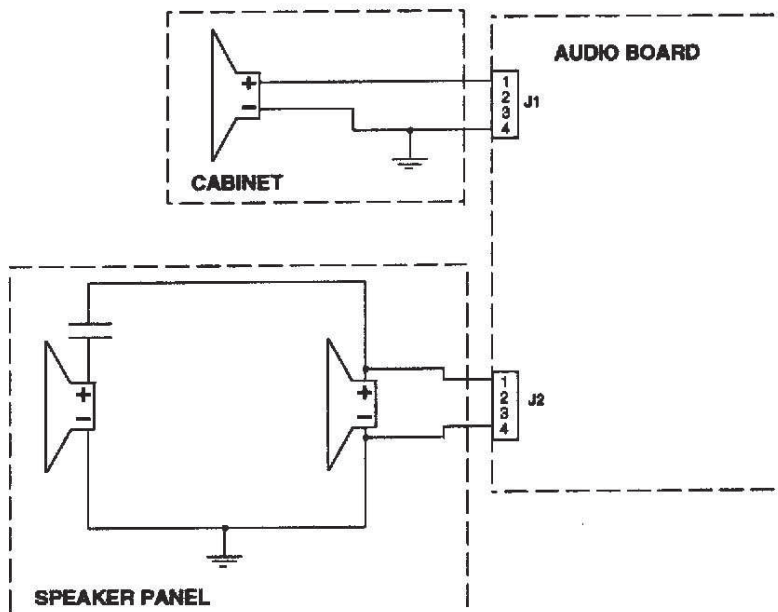
J1-1 Black-Yellow, signal to speaker  
 J1-2 Not Used  
 J1-3 Key  
 J1-4 Black-Yellow, signal to speaker

J2-1 Black-Yellow, signal to speaker  
 J2-2 Key  
 J2-3 Not Used  
 J2-4 Black-Yellow, signal to speaker

J3-1 Gray, +5V from J114-3,4  
 J3-2 Key  
 J3-3 Gray, +5V from J114-3,4  
 J3-4 Black, Ground from J114-5,7  
 J3-5 Black, Ground from J114-5,7

J4-1 Gray-Green, 18VAC from transformer secondary  
 J4-2 Gray-Green, 18VAC loop from J4-1  
 J4-3 Key  
 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

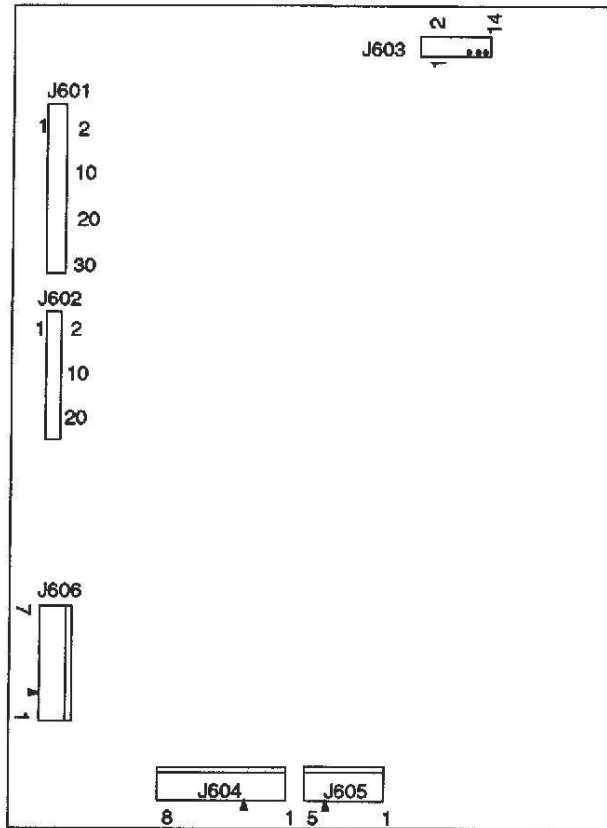
### SPEAKER WIRING DIAGRAM



#### P.C. Board Legend

J1-J9	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J1-J4	Sound Board
J6xx	Dot Matrix Controller Board
J9xx	Flitronic II Board

## Dot Matrix Controller Board A-14039



J601 Ribbon Cable, Data to/from J202; J903; J506

J602 Ribbon Cable, Data from J201

J603 Ribbon Cable, Data to Dot Matrix Display Driver

J604-1 Orange, -125V to Dot Matrix Display Driver Pin 1

J604-2 Blue, -113V to Dot Matrix Display Driver Pin 2

J604-3 Key

J604-4 Black, Ground to Dot Matrix Display Driver Pin 4

J604-5 Black, Ground to Dot Matrix Display Driver Pin 5

J604-6 Gray, +5V to Dot Matrix Display Driver Pin 6

J604-7 Gray-Yellow, +12V to Dot Matrix Display Driver Pin 7

J604-8 Brown, +62 to Dot Matrix 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 Key

J605-5 Violet, 100VAC from transformer secondary

J606-1 Black, Ground loop from J606-3

J606-2 Key

J606-3 Black, Ground from J117-3

J606-4 Gray, +5V loop from J606-5

J606-5 Gray, +5V from J117-4

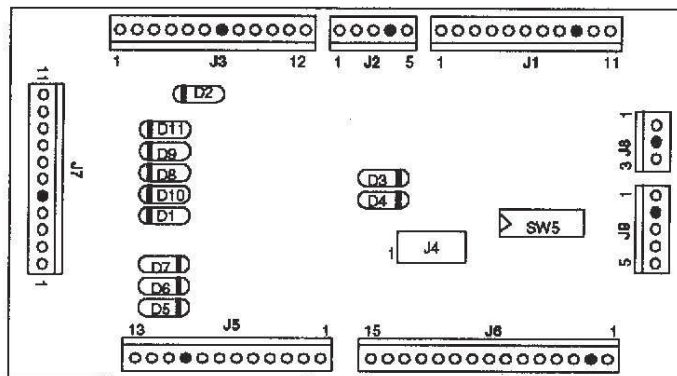
J606-6 Gray-Yellow, +12V loop from J606-7

J606-7 Gray-Yellow, +12V from J117-2

### P.C. Board Legend

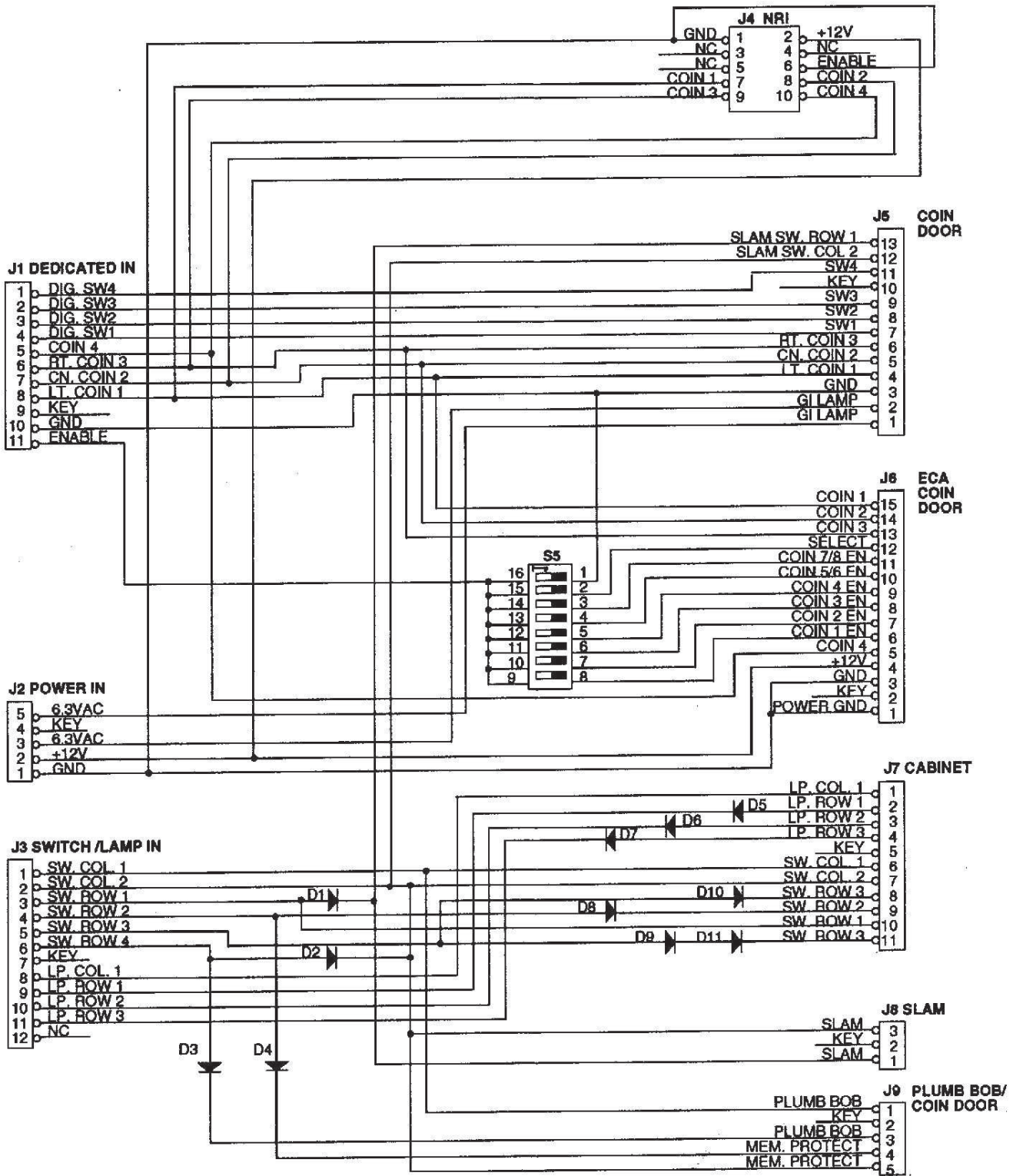
J1-J9	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J1-J4	Sound Board
J6xx	Dot Matrix Controller Board
J9xx	Filtron II Board

## Coin Door Interface PCB Assembly A-17051-1



- |   |  |
|---|--|
| J1-1 Orange-Gray, dedicated row 8 from CPU J205-9           | J5-1 Violet, G.I. return to coin door                |
| J1-2 Orange-Violet, dedicated row 7 from CPU J205-8         | J5-2 White-Violet, G.I. 6.8vac to coin door          |
| J1-3 Orange-Blue, dedicated row 6 from CPU J205-7           | J5-3 Black, ground to coin door                      |
| J1-4 Orange-Green, dedicated row 5 from CPU J205-6          | J5-4 Orange-Brown, dedicated sw. row 1 to coin door  |
| J1-5 Orange-Yellow, dedicated row 4 from CPU J205-4         | J5-5 Orange-Red, dedicated sw. row 2 to coin door    |
| J1-6 Orange-Black, dedicated row 3 from CPU J205-3          | J5-6 Orange-Black, dedicated sw. row 3 to coin door  |
| J1-7 Orange-Red, dedicated row 2 from CPU J205-2            | J5-7 Orange-Green, dedicated sw. row 5 to coin door  |
| J1-8 Orange-Brown, dedicated row 1 from CPU J205-1          | J5-8 Orange-Blue, dedicated sw. row 6 to coin door   |
| J1-9 Key  | J5-9 Orange-Violet, dedicated sw. row 7 to coin door |
| J1-10 Black, ground from CPU J205-10                        | J5-10 Key  |
| J1-11 Orange-White, sw. enable from J205-12                 | J5-11 Orange-Gray, dedicated sw. row 8 to coin door  |
| J2-1 Black, ground from Power Driver Brd J116-3             | J5-12 Green-Red, sw col. 2 to coin door Slam tilt    |
| J2-2 Gray-Yellow, +12vac from Power Driver Brd J116-2       | J5-13 White-Brown, sw. row 1 to coin door Slam tilt  |
| J2-3 White-Violet, G.I. 6.8vac from Power Driver Brd J119-1 | J6- Not Used   |
| J2-4 Key  | J7-1 Yellow-Gray, lamp col. 8 to cabinet             |
| J2-5 Violet, G.I. from Power Driver Brd J119-3              | J7-2 Not Used  |
| J3-1 Green-Brown, sw. col. 1 from CPU J207-1                | J7-3 Red-Violet, lamp row 7 to cabinet               |
| J3-2 Green-Red, sw. col. 2 from CPU J207-2                  | J7-4 Red-Gray, lamp row 8 to cabinet                 |
| J3-3 White-Brown, sw. row 1 from J209-1                     | J7-5 Key   |
| J3-4 White-Red, sw. row 2 from CPU J209-2                   | J7-6 Green-Brown, sw. col. 1 to cabinet              |
| J3-5 White-Orange, sw. row 3 from CPU J290-3                | J7-7 Not Used  |
| J3-6 White-Yellow, sw. row 4 from CPU J209-4                | J7-8 White-Orange, sw. row 3 to cabinet              |
| J3-7 Key  | J7-9 White-Red, sw. row 2 to cabinet                 |
| J3-8 Yellow-Gray, lamp col. 8 from Power Driver Brd J137-9  | J7-10 White-Brown, sw. row 1 to cabinet              |
| J3-9 Red-Blue, lamp row 6 from Power Driver Brd J133-7      | J7-11 Not Used                                       |
| J3-10 Red-Violet, lamp row 7 from Power Driver Brd J133-8   | J8-1 White, sw. row to cabinet Slam tilt             |
| J3-11 Red-Gray, lamp row 8 from Power Driver Brd J133-9     | J8-2 Key   |
| J3-12 Not Used  | J8-3 Green, sw. col to cabinet Slam tilt             |
| J4- Not Used  | J9-1 White-Yellow, sw. row 4 to Plumb Bob tilt       |
|   | J9-2 Key   |
|   | 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       |

# Coin Door Interface PCB Schematic A-17051



NOTE: ALL DIODES IN4004

# LAMP MATRIX

Yellow (B+) Red

Column Row	1 Yellow-Brown J138-1 Q86	2 Yellow-Red J138-2 Q97	3 Yellow-Orange J138-3 Q96	4 Yellow-Black J138-4 Q95	5 Yellow-Green J138-5 Q94	6 Yellow-Blue J138-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-9 Q91
1 Red-Brown J134-1 Q90	Left Lane 11	Island Rhino 21	Lockjaw 31	Spillo Oil Co. 41	Left Loop Arrow 51	"Sea" Standup 61	Backbox Tail 71	Upper Extra Ball 81
2 Red-Black J134-2 Q89	Center Lane 12	Island Leopard 22	Never Green Co. 32	Blutonium Waste 42	Left Loop Can 52	Animal Dolphin 62	Backbox Star 72	Wimpy 2X Wheel 82
3 Red-Orange J134-4 Q88	Right Lane 13	Island Eagle 23	Earth Paving Co. 33	Left Outlane 43	Popeye "P1" 53	Left Popper Arrow 63	Animal Rhino 73	Two Bank Upper 83
4 Red-Yellow J134-5 Q87	Fight Bluto 14	Island Dolphin 24	Escalator Enter 34	Left Flipper Lane 44	Popeye "O" 54	Instant Multi-ball 64	Backbox Right 74	Two Bank Lower 84
5 Red-Green J134-6 Q86	Right Popper Can 15	Item Can Opener 25	Popeye "E1" 35	Right Flipper Lane 45	Popeye "P2" 55	Left Cheek 65	Animal Eagle 75	Animal Jackpot 85
6 Red-Blue J134-7 Q85	Right Loop Arrow 16	Item Bottle 26	Popeye "Y" 36	Special 46	Left Ramp Arrow 56	Right Cheek 66	Upper Ramp Left 76	Buy-In 86
7 Red-Violet J134-8 Q84	Right Loop Can 17	Item Katsup 27	Popeye "E2" 37	Shoot Again 47	Collect Item 57	Animal Panda 67	Upper Ramp Center 77	Launch Button 87
8 Red-Gray J134-9 Q83	"Hag" Standup 18	Island Panda 28	Item Flower 38	Rescue Olive 48	Left Ramp Can 58	Animal Leopard 68	Upper Ramp Right 78	Start Button 88

J1XX = Power Driver Board

# SWITCH MATRIX

White Green

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 (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	Left Lane 11	Slam Tilt 21	Left Popper 31	Two Bank 41	Right Trough 51	Left Cheek 61	Popeye "P1" 71	Upper Exit To Wheel 81	Black-Green J906-1 Right Flipper End of Stroke F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	Buy-In 12	Coin Door Closed 22	Right Popper 32	Center Lane 42	Trough 2nd 52	Right Cheek 62	Popeye "O" 72	Upper Ramp Left 82	Blue-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	Start Button 13	Ball Launch 23	Right Loop Opto 33	Lockup Upper 43	Trough 3rd 53	Escalator Exit 63	Popeye "P2" 73	Upper Ramp Right 83	Black-Blue J906-3 Left Flipper End of Stroke F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	Plumb Bob Tilt 14	Always Closed 24	Ramp Entrance 34	Lockup Center 44	Trough 4th 54	Animal Dolphin 64	Left Outlane 74	Animal Jackpot 84	Blue-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function Service Credits Escaped D5	5 White-Green J209-5 U19-11	Right Lane 15	Left Loop 25	Ramp Completion 35	Lockup Lower 45	Trough 5th 55	Animal Eagle 65	Left Flipper Lane 75	Right Outlane 85	Black-Violet J906-4 Upper Right Flipper End of Stroke F5
Orange-Blue (6) J205-7 Normal Function Volume Down D6	6 White-Blue J209-7 U19-9	Left Jet 16	Popeye "E1" 26	Escalator Popper 36	Wheel Opto 1 46	Left Trough 56	Animal Tiger 66	Left Slingshot 76	Shooter Lane 86	Black-Yellow J905-3 Upper Right Flipper Opto F6
Orange-Violet (7) J205-8 Normal Function Volume Up D7	7 White-Violet J209-8 U19-5	Right Jet 17	Popeye "Y" 27	Wheel Exit 37	Wheel Opto 2 47	Trough Jam 57	Animal Panda 67	Right Slingshot 77	Lock-up Kicker 87	Black-Gray J906-5 Upper Left Flipper End of Stroke F7
Orange-Gray (8) J205-9 Normal Function Begin Test Enter D8	8 White-Gray J209-9 U19-7	Center Jet 18	Popeye "E2" 28	"Hag" Standup 38	Wheel Opto 3 48	"Sea" Standup 58	Animal Rhino 68	Right Flipper Lane 78	Upper Shot Exit 88	Black-Blue J905-5 Upper Left Flipper Opto F8

J2XX = CPU Board, J9XX = Fliptronic II Board

= Opto, Typically Closed

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