

# INDIANA JONES

## OPERATIONS MANUAL

Operations & Adjustments  
Testing & Problem Diagnosis  
Parts Information  
Wiring Diagrams & Schematics

Williams Electronics Games, Inc.  
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## ROM Jumper Chart

	W1	W2
1M / 2M / 4M ROM	In	Out

## Country DIP Switch Chart

	Sw4	Sw5	Sw6	Sw7	Sw8
American	On	On	On	On	On
European	On	On	Off	On	On
French	On	On	On	Off	Off
German	On	On	On	On	Off
Spanish	On	Off	On	On	On

## SOLENOID / FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Transistor	Drive Connections			Drive Wire Color	Solenoid Part Number / Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	Ball Popper	High Power	J107-3			Q82	J130-1			Vio-Brn	AE-26-1200	
02	Ball Launch	High Power	J107-3			Q80	J130-2			Vio-Red	AE-23-800	
03	Totem Drop Up	High Power	J107-3			Q78	J130-4			Vio-Org	AE-26-1200	
04	Ball Release	High Power	J107-3			Q76	J130-5			Vio-Yel	AE-26-1500	
05	Center Drop Bank	High Power	J107-3			Q64	J130-6			Vio-Grn	AE-26-1200	
06	Idol Release	High Power	J107-3			Q66	J130-7			Vio-Blu	AE-26-1500	
07	Knocker	High Power	J107-3			Q68	J130-8			Vio-Blk	AE-23-800	
08	Left Eject	High Power	J107-3			Q70	J130-9			Vio-Gry	AE-26-1200	
09	Left Jet Bumper	Low Power	J107-2			Q58	J127-1			Brn-Blk	AE-26-1200	
10	Right Jet Bumper	Low Power	J107-2			Q56	J127-3			Brn-Red	AE-26-1200	
11	Bumper Bas	Low Power	J107-2			Q54	J127-4			Brn-Org	AE-26-1200	
12	Left Slingshot	Low Power	J107-2			Q52	J127-5			Brn-Yel	AE-27-1200	
13	Right Slingshot	Low Power	J107-2			Q50	J127-6			Brn-Grn	AE-27-1200	
14	Left Control Gate	Low Power	J107-2			Q48	J127-7			Brn-Blu	A-14406	
15	Right Control Gate	Low Power	J107-2			Q46	J127-8			Brn-Vio	A-14406	
16	Totem Drop Down	Low Power	J107-2			Q44	J127-9			Brn-Gry	SM1-26-600	
17	Eternal Life	Flasher	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#906 (1)	#906 (3)
18	Light Jackpot	Flasher	J107-6			Q40	J126-2			Blk-Red	#906 (1)	
19	Super Jackpot	Flasher	J107-6			Q38	J126-3			Blk-Org	#89 (1)	
20	Jackpot	Flasher	J107-6	J106-5		Q36	J126-4	J125-5		Blk-Yel	#89 (1)	#906 (2)
21	Path Of Adventure	Flasher	J107-6	J106-5		Q28	J126-5	J125-6		Blu-Grn	#89 (1)	#906 (4)
22	Mini Motor Left	Low Power	J118-2			Q30	J126-6			Blu-Blk		
23	Mini Motor Right	Low Power	J118-2			Q34	J126-7			Blu-Vio	14-7988	
24	Plane Gun LEDS	Flasher	J118-2	J106-5		Q32	J126-8			Blu-Gry	A-16834	
25	Dogfight Hurry Up	Gen. Purpose	J107-6			Q26	J122-1			Blu-Brn	#89 (1)	
26	Right Ramp	Gen. Purpose	J107-6	J106-5		Q24	J122-2	J124-2		Blu-Red	#89 (3)	#906 (1)
27	Left Ramp	Gen. Purpose	J107-6	J106-5		Q22	J122-3	J124-3		Blu-Org	#89 (1)	#906 (1)
28	Subway Release	Gen. Purpose	J107-1			Q20	J122-4			Blu-Yel	AE-26-1500	
29-36	<i>See Flipper Circuits</i>											
37*	Left Side Flasher	Low Power	J107-6	J106-5		Q16	J4-2	J4-2		Brn-Wht	#89 (2)	#906 (1)
38*	Right Side Flasher	Low Power	J107-6	J106-5		Q15	J4-4	J4-4		Blk-Wht	#89 (2)	#906 (1)
39*	Special Flasher	Low Power	J107-6			Q14	J4-5			Org-Wht	#89 (2)	
40*	Totem Multiball	Low Power	J107-6			Q13	J4-6			Yel-Wht	#89 (1)	
41*	Jackpot Multiplier Fl.	Low Power	J107-6			Q9	J3-2			Grn-Wht	#89 (1)	
42*	Wheel Motor	Low Power	J118-2			Q10	J3-3			Blu-Wht	14-7982	

\*Note: Controlled from the 8-Driver Board, not the Power Driver Board

### General Illumination

01	Top Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	
02	Bottom Playfield	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	
03	Insert Top	G.I.		J120-3		Q14		J120-9		Wht-Yel		#555
04	Insert Bottom	G.I.		J120-4		Q16		J120-10		Wht-Grn		#555
05	Return Lane/Coin	G.I.	J121-6		J119-3	Q12	J121-11		J119-1	Wht-Vio	#44	

### Flipper Circuits

	Function	Solenoid Type	Voltage Connections		Drive Transistors		Drive Connections		Drive Wire Colors		Coil Part Number	Coil Colors
			Playfield	Backbox	Power	Hold	Playfield	Backbox	Power	Hold		
(29)	Lower Right Flipper	Lwr. Rt. Power	J907-7 (Blu-Yel)		Q4		J902-13		Blu-Vio		FL-11629	Blue
(30)		Lwr. Rt. Hold	J907-7 (Blu-Yel)			Q11	J902-11		Org-Grn			
(31)		Lwr. Lt. Power	J907-9 (Gry-Yel)			Q3		J902-9		Blu-Gry		
(32)	Lower Left Flipper	Lwr. Lt. Hold	J907-9 (Gry-Yel)			Q9	J902-7		Org-Blu		FL-11629	Blue
33		Diverter Power	Up Rt. Power	J907-1 (Blu-Yel)		Q2		J902-6		Blk-Yel		FL-11753-1
34	Diverter Hold	Up Rt. Hold	J907-1 (Blu-Yel)			Q7	J902-4		Org-Vio			
35	Top Lockup Power	Up Lt. Power	J907-4 (Gry-Yel)		Q1		J902-3		Blk-Blu		A-15943	Brown
36	Top Lockup Hold	Up Lt. Hold	J907-4 (Gry-Yel)			Q5	J902-1		Org-Gry			

# *INDIANA JONES*

## *The Pinball Adventure....*

Williams Electronics Games, Inc. 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.

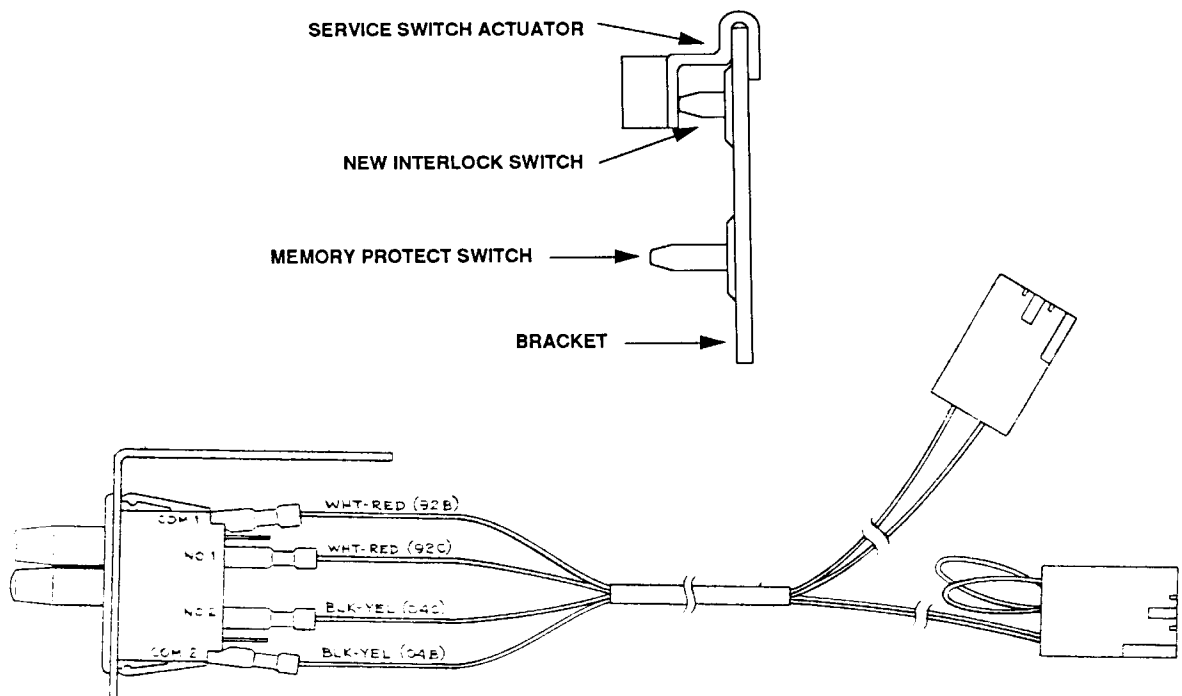
# IMPORTANT NOTICE

## PLEASE READ

Pinball games are now 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 the game. This assembly is a bracket containing the existing memory protect switch on the bottom and a new interlock switch on the top. When the coin door is opened, this new interlock switch opens, breaking the connection to the +50V and +20V winding of the transformer secondary.

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

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





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## INDIANA JONES RULES

### **I-N-D-Y LANES:**

*Advance bonus "X", advance "FRIEND" lamps, then lite Extra Ball at eject.*

### **FRIENDS JACKPOT**

*Lite five friends to increase loop value and lite Jackpot at right ramp.*

### **PATH OF ADVENTURE**

*Complete A-D-V-E-N-T-U-R-E Targets to lite path (right ramp) Make right ramp to complete lit lanes on the TILT-A-MATIC™ playfield. Use left and right flipper buttons to move playfield.*

### **HAND OF FAITH**

*Right and left return lanes lite eject for random award.*

### **MULTIBALL**

*Complete 3-bank drop target to lite lock. Lock three balls in center shot to get in Idol for multiball. Shoot for left ramp to lite jackpot. Make right ramp to collect jackpot. Jackpots can be doubled or tripled at center shot.*

### **START MODE**

*Make eject W/lit to start mode lit on playfield. See display for mode instructions. Complete all modes for 6-ball multiball.*

### **LOST TREASURE**

*Complete the upper right single drop target to expose captive ball. Hit captive ball for instant 2-ball multiball. During this time, hitting captive ball awards lost treasure values.*

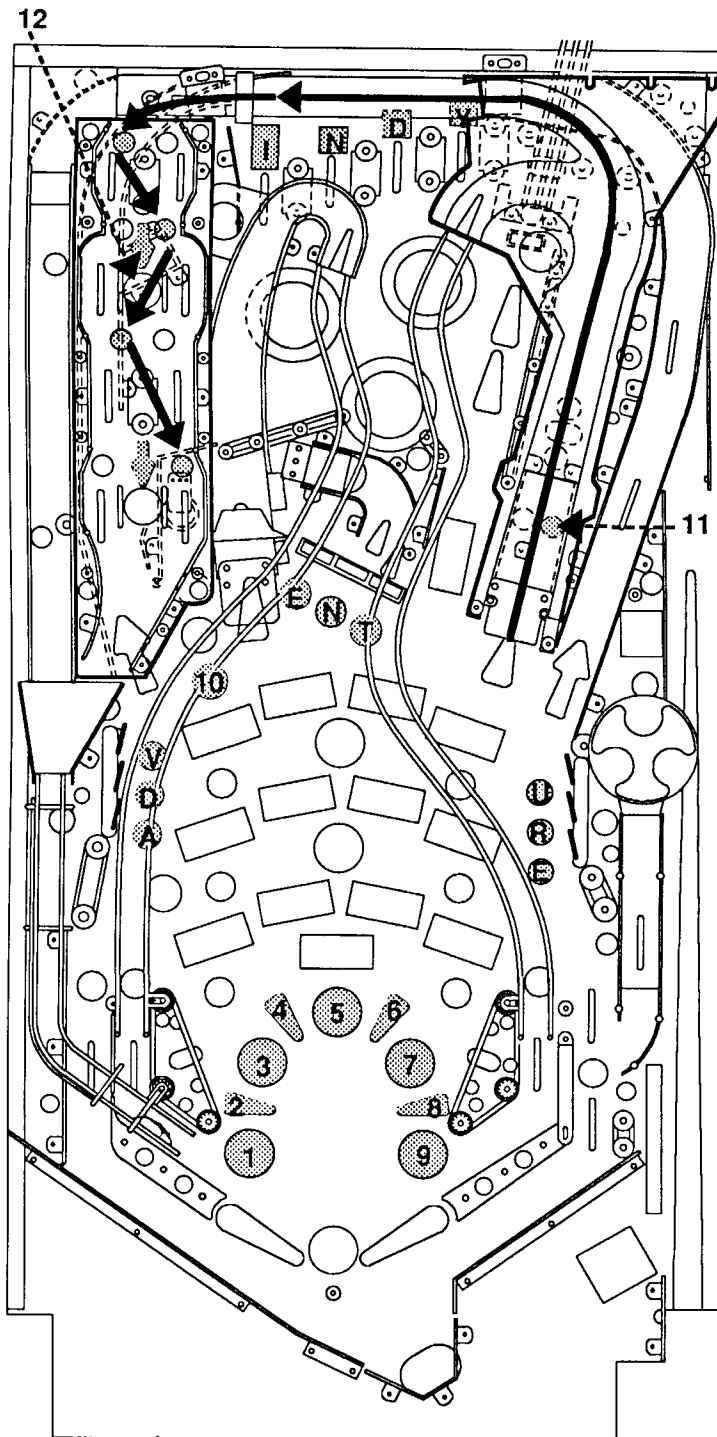
### **HURRY-UP**

*Right & left ramps lite winged lamps (6) in the middle of the playfield. Make center shot for Hurry-up score.*

# *INDIANA JONES*

*The Pinball Adventure....*

*Shot Maps*



**I-N-D-Y Lanes:**

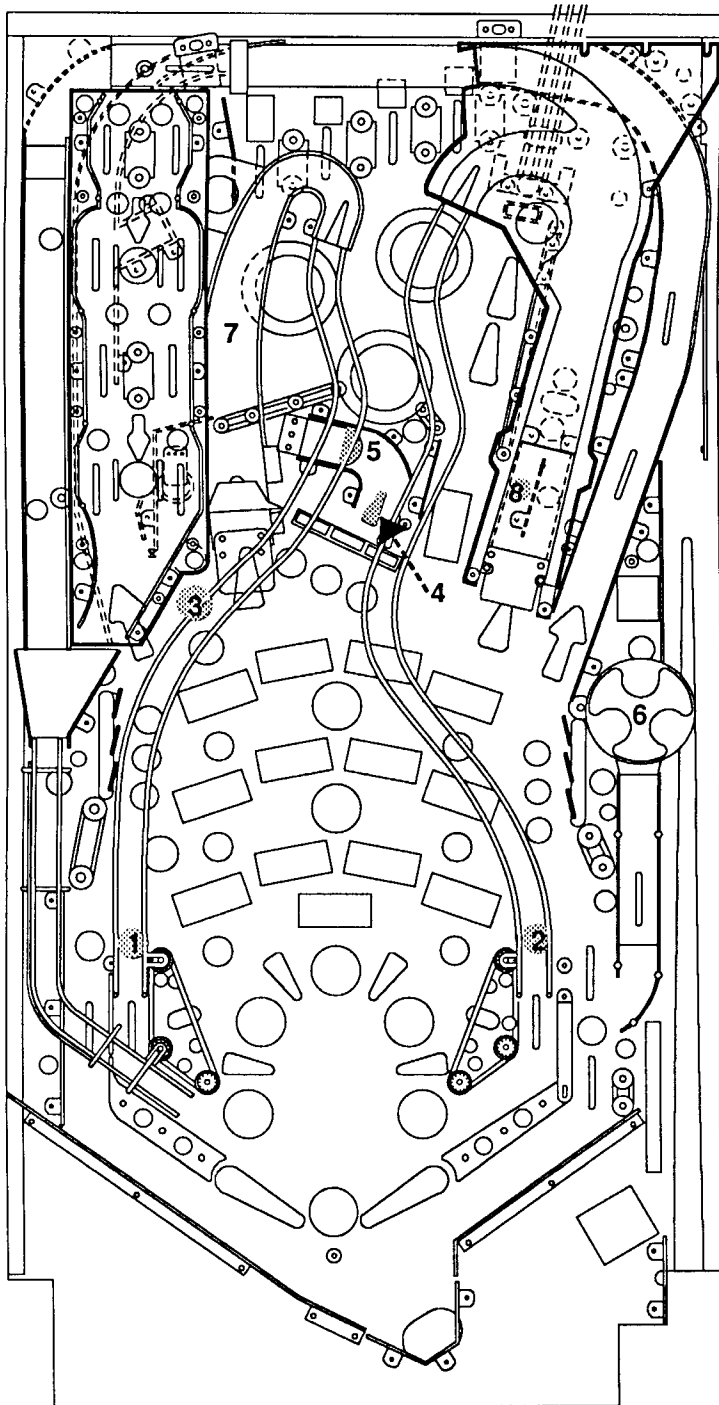
Advance Bonus "X" and awards a Friends Lamps, then lights Extra Ball (10) at Eject.

**Friends Jackpot:**

After lighting all Friends Lamps and making at least 5 lit loop shots, (1-9), Jackpot (11) will be lit at the Right Ramp.

**Path of Adventure:**

Complete A-D-V-E-N-T-U-R-E Targets to light Path Entry at Right Ramp. Shoot the ball up the Right Ramp to holding area (top left). Ball then drops to TILT-A-MATIC™ Playfield. Use the Left and Right Flipper buttons to complete random lit lamp sequence. Complete this once and light Extra Ball. Complete this a second time to light the Pit (12).



**Hand of Fate:**

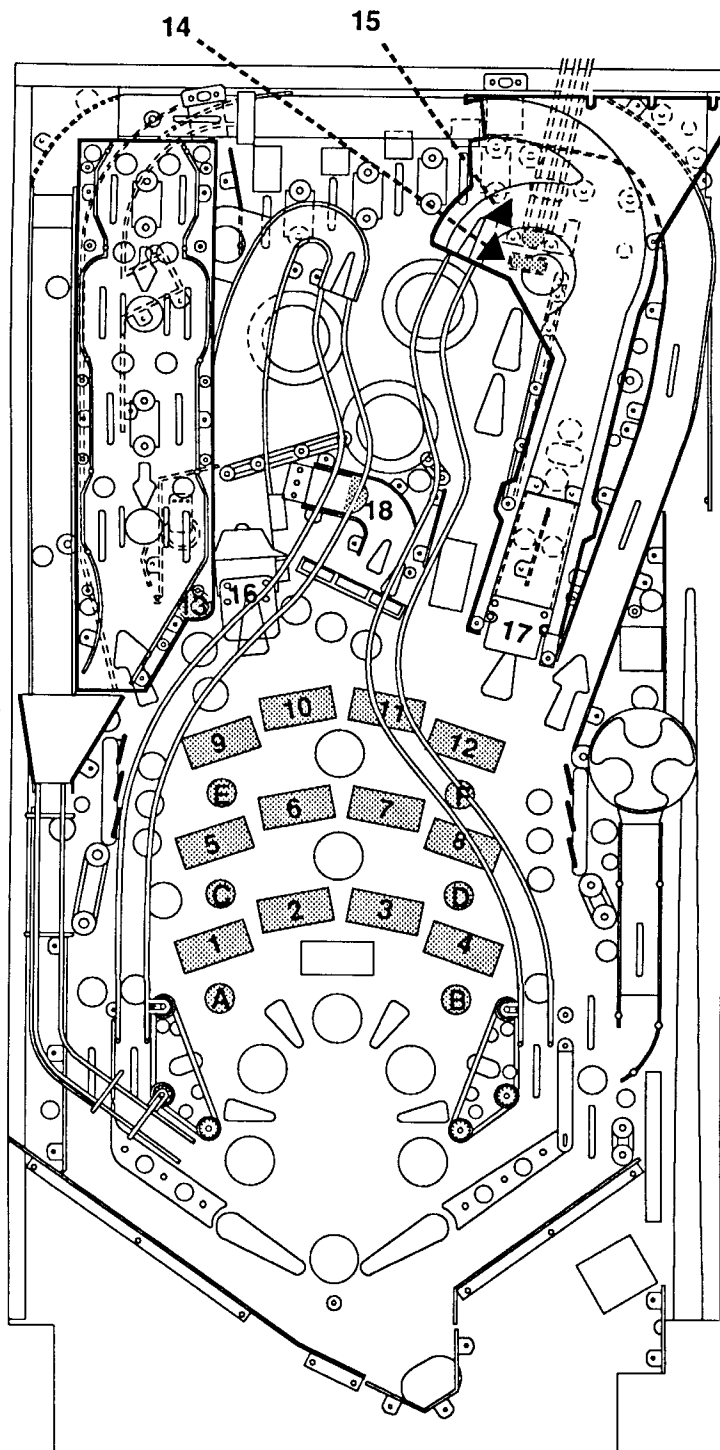
Left (1) and Right (2) Return Lanes light Eject (3) for Random Award (see Display).

**Multiball:**

Complete 3-bank Drop Target to light Lock (4). Lock three balls in the Center Hole (5) to get in the Rotating Idol (6) for Multiball play.

**Jackpot:**

During Multiball, make Left Ramp (7) to light Jackpot then make Right Ramp (8) to collect Jackpot. Make Center Hole (5) to light Jackpot and/or double then triple Jackpot.

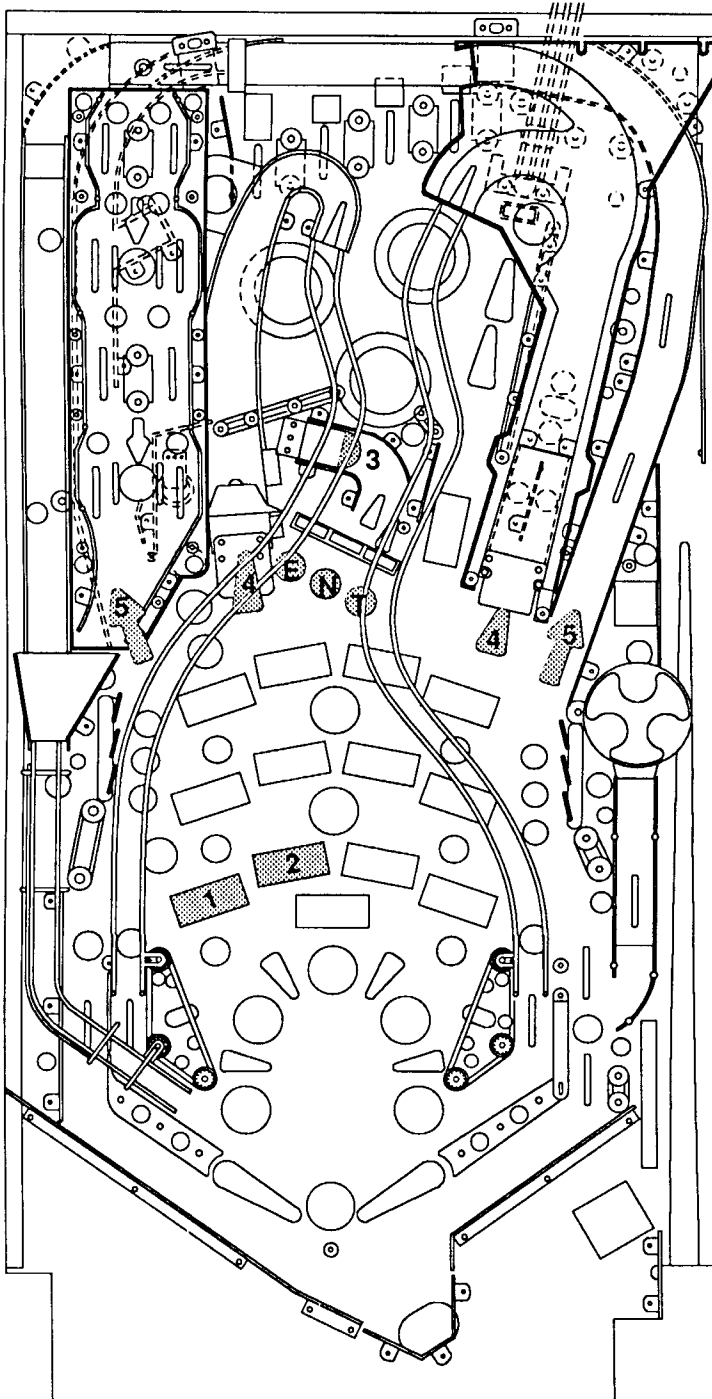


**Start Mode:**  
 Make Left Eject (13) to enter Lit Mode. (1-12).  
 See display for Mode instructions.

**Lost Treasure:**  
 Complete upper right Single Drop Target (14) to expose Captive Ball (15). Hit Captive Ball for Lost Treasure award then, light Special.

**Hurry-Up (Dogfight):**  
 Left and Right Ramps (16 & 17) advance Winged Lights (A-F) in the center of the playfield. When all winged lights are lit, make the Center Hole (18) shot to collect the Hurry-Up score.





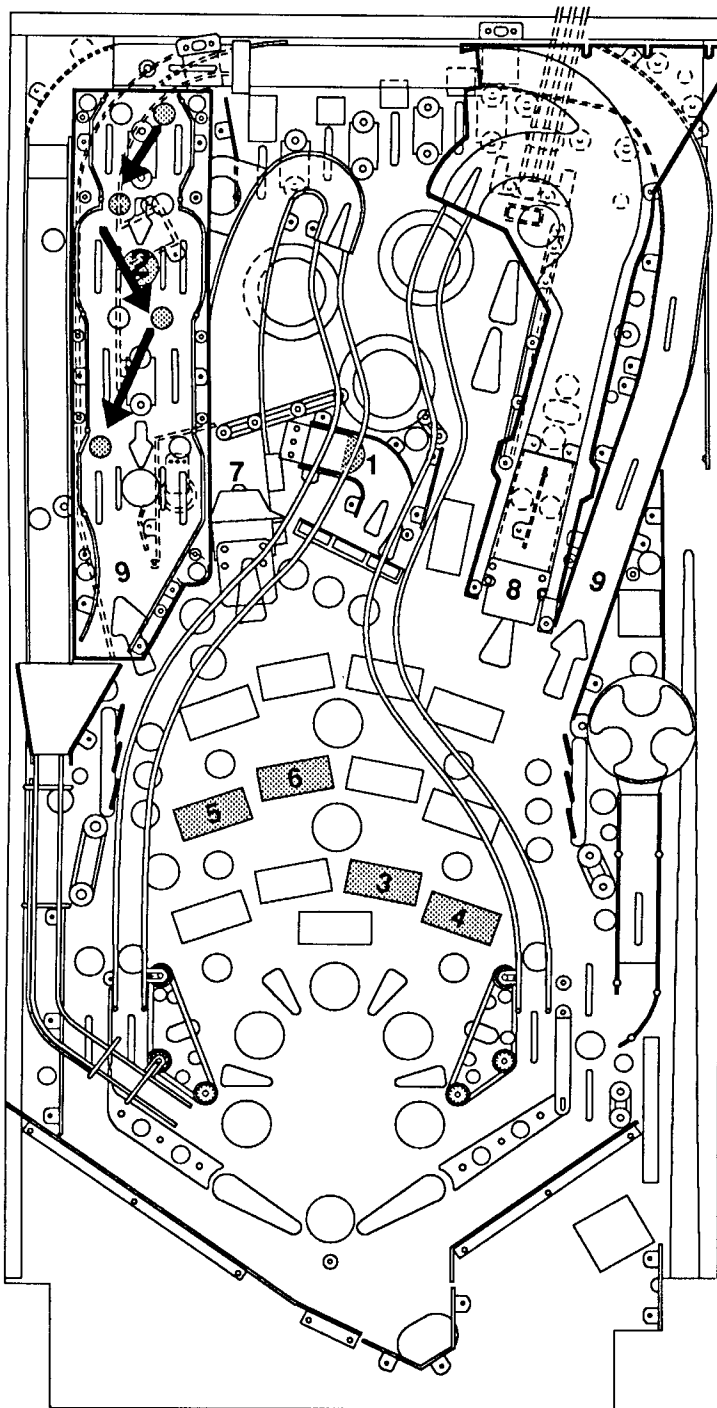
## MODE PLAY

### (1) Get the Idol:

Shoot for the Center Drop Target (E-N-T) four times, then shoot for Center Hole (3) to get the Idol.

### (2) Streets of Cairo:

Marion is in one of the baskets. Shoot loop (5) and ramp (4) shots that are in line with baskets to find Marion. Next, shoot mode start or pistol to shoot the bad guy with the sword.



## MODE PLAY CONT'D

### (3) Well of Souls:

Get automatic 6-ball Multiball and shoot Center Hole (1) to kill snakes for big points.

### (4) Raven Bar (Video Mode):

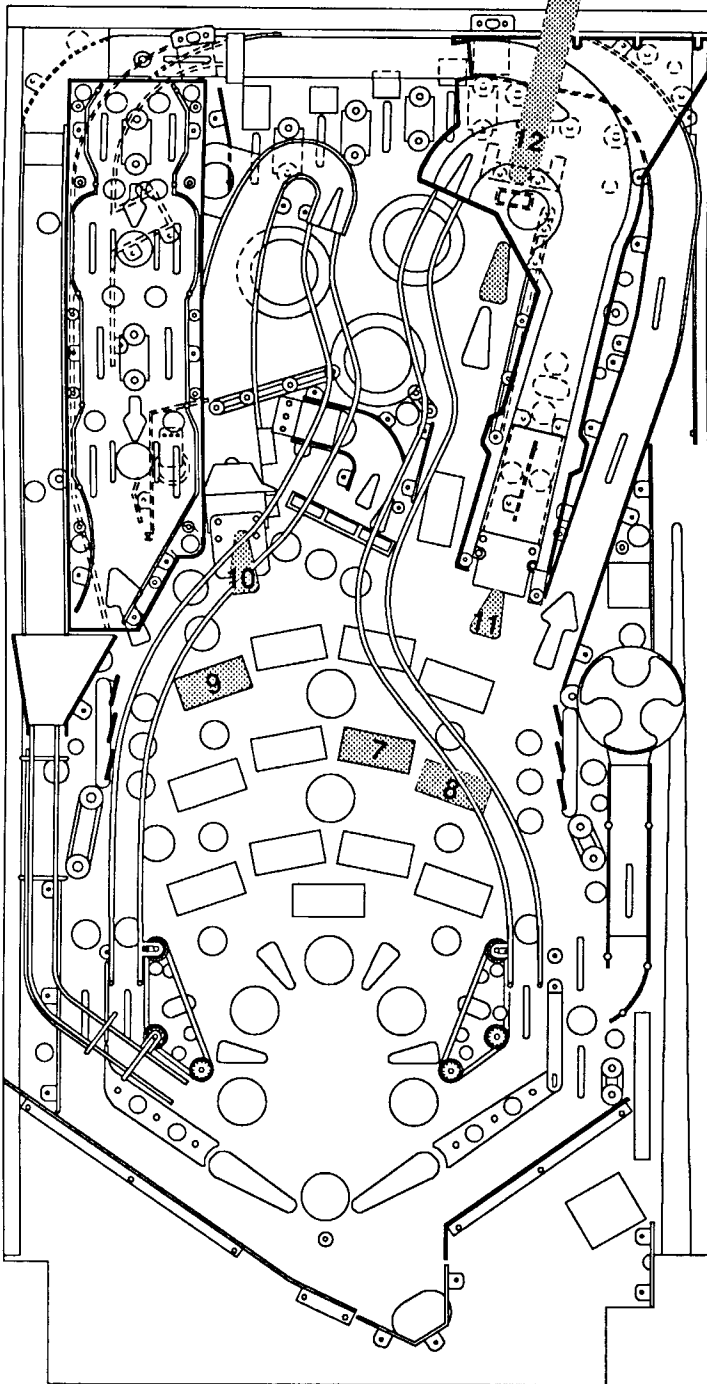
Use the flipper buttons to aim the pistol in the display to shoot the bad guys and to acquire the Head Piece. Gun shoots automatically.

### (5) Monkey Brains:

Shoot for the Left (7) and Right (8) Ramps, and the Loop (9) shots for 8 million points per completed shot.

### (6) Steal the Stones:

Control the movement of the ball, on the mini playfield, by using the Left and Right flipper buttons. The Right flipper button tilts the mini playfield (2) to the Right and the Left flipper button tilts the mini playfield to the left. Move the mini playfield to complete the lit lamp pattern.



## MODE PLAY CONT'D

### (7) Escape in the Mine Cart (Video Mode):

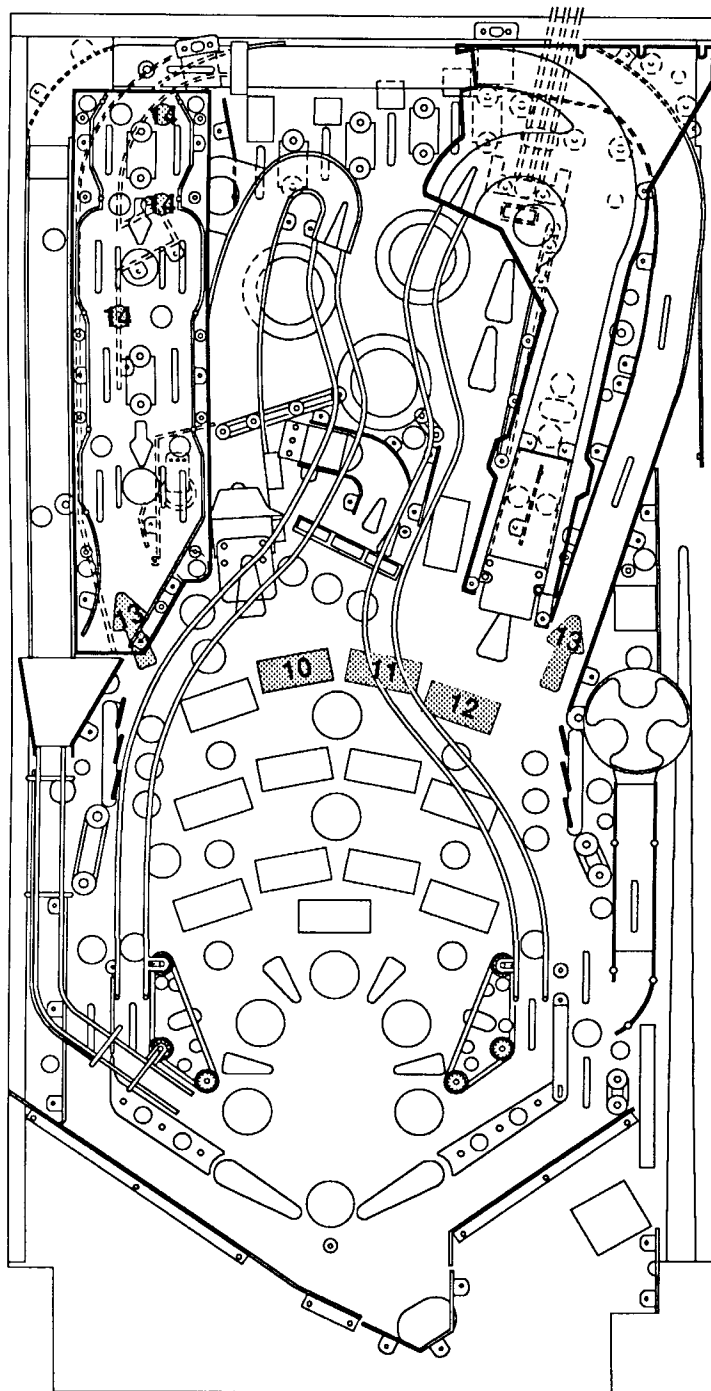
Use the Left and Right flippers to guide the Mine Cart down the non-barricaded paths in the Display.

### (8) Survive the Rope Bridge (Video Mode):

Left (10) and Right (11) ramps move Indy across the bridge (see Display).

### (9) Castle Grunwald:

Shoot for the Captive Ball (12) to rescue Dr. Jones.



## MODE PLAY CONT'D

### (10) Tank Chase:

Shoot for Loop shots (13) to advance Indy on horseback toward the Tank.

### (11) The 3 Challenges:

Complete three lit lamp patterns (14) on the mini playfield. Use the flipper buttons to control the mini playfield movement.

### (12) Choose Wisely (Video Mode):

Comparable to the age old shell game: Carefully watch as the cups move around the display. When movement stops, pick the cup you think is the right one. Select a cup with the flipper buttons and pick it up by pulling the trigger on the gun.

# SECTION 1

## *Game Operation and Test Information*

### ROM SUMMARY

IC	Type	Location	Board	Part Number
Game ROM 1	27c040	U6	CPU	A-5343-50017-1
Music/Speech ROM	27c040	U2	Audio	A-5343-50017-2
Music/Speech ROM	27c040	U3	Audio	A-5343-50017-3
Music/Speech ROM	27c040	U4	Audio	A-5343-50017-4
Music/Speech ROM	27c040	U5	Audio	A-5343-50017-5
Music/Speech ROM	27c040	U6	Audio	A-5343-50017-6
Music/Speech ROM	27c040	U7	Audio	A-5343-50017-7
Music/Speech ROM	27c040	U8	Audio	A-5343-50017-8

# PINBALL GAME ASSEMBLY INSTRUCTIONS

## INDIANA JONES IS A 7 BALL GAME

Contains six active balls and one captive ball.

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

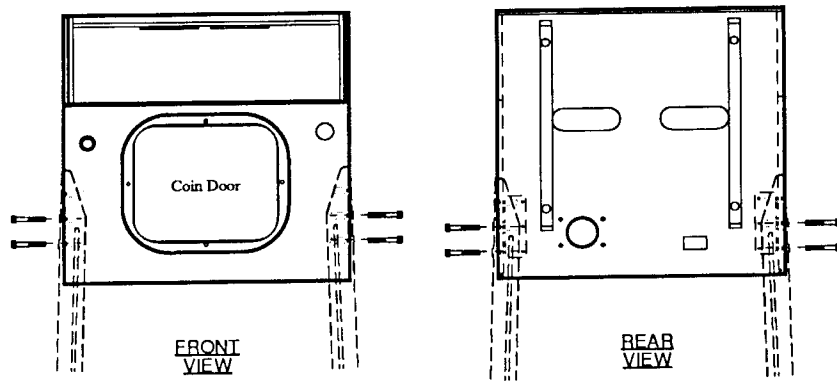
**Temp:** 32°F to 100° F (0°C to 38°C)

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

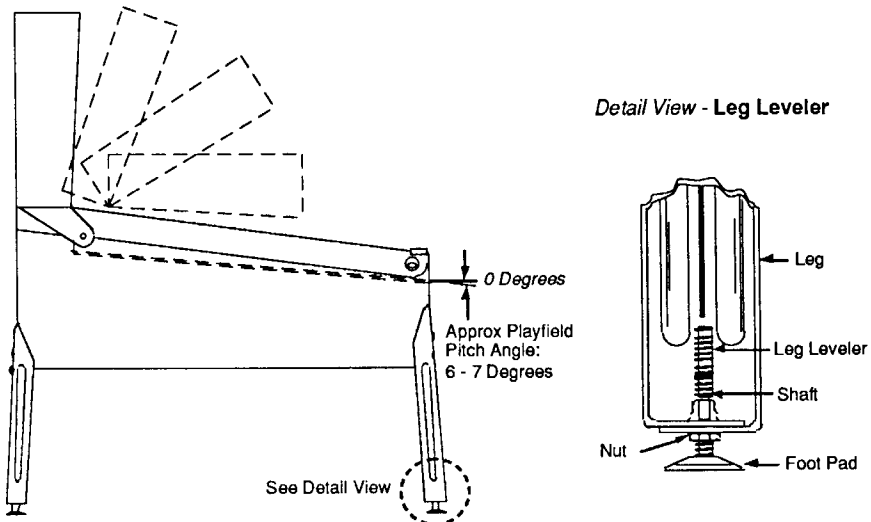
**Dimensions:** Width: 29" approx.  
 Depth: 55" approx.  
 Height: 76" approx.

**Weight:** 322 lbs approx. (crated)

1. Remove all cartons, parts, and other items from the shipping container, and set them aside.
2. Place the cabinet on a support. Remove the leg bolts from the front and rear of the cabinet. Attach rear legs using leg bolts in the center and bottom holes. (See rear view of Leg Bolt Location diagram below.)
3. Leg levelers are among the parts in the cashbox. Install leg levelers (see Pinball Assembly, Playfield Pitch Angle, and Leg Levelers Details diagram below), and attach the front legs using leg bolts in the center and bottom holes. (See front view of Leg Bolt Location diagram below.)



**Leg Bolt Location Diagram**



**Pinball Assembly, Playfield Pitch Angle, and Leg Leveler Details.**

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

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

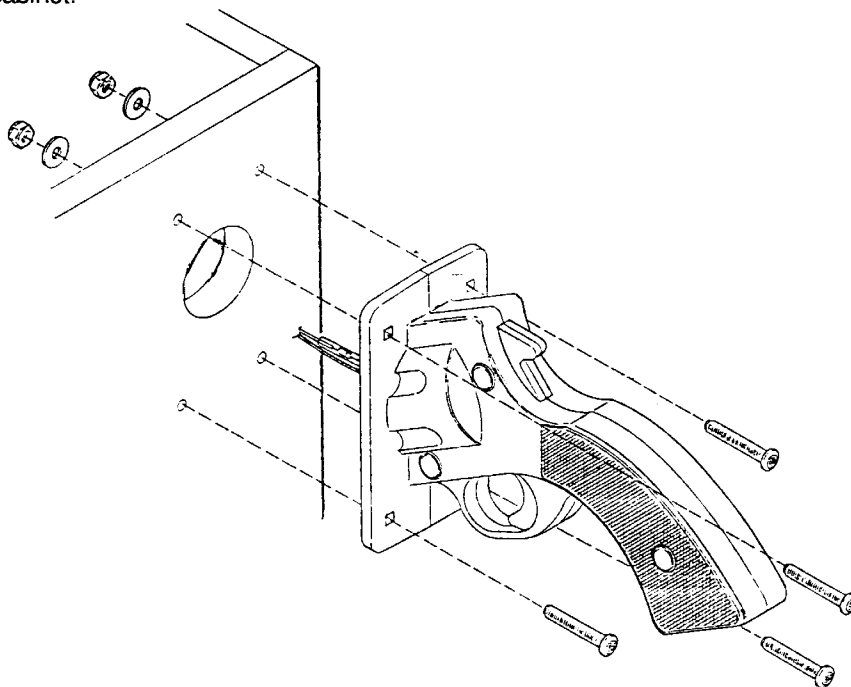
## CAUTION

**FAILURE TO INSTALL** the backbox mounting hardware properly can cause personal injury. **NEVER TRANSPORT** a pinball game with the hinged backbox erect. Always lower the backbox forward onto the playfield cabinet on a layer of protective material to prevent marring or damage and possible personal injury.

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

7. Unlock and open the coin door. Move the molding latch lever toward the left side of the game. Lift the front molding off the playfield cover glass return the latch lever toward the right, and close the coin door. Carefully slide the glass downward, until it clears the grooves of the left and right side moldings. Lift the glass up and away from the game. Raise the playfield. (See page 1-5.)

8. Install the gun handle. Remove the gun handle from the inside bottom of the cabinet. Then, using the hardware included with the gun handle plus two more 10-24 bolts, 10-24 ESN nuts and .219x.500x.063 flat washers located in the parts bag, attach the gun handle to the outside of the cabinet in the upper right corner. (See diagram below.) After the gun handle is in place, plug the connector from the handle into the matching connector from the cabinet.

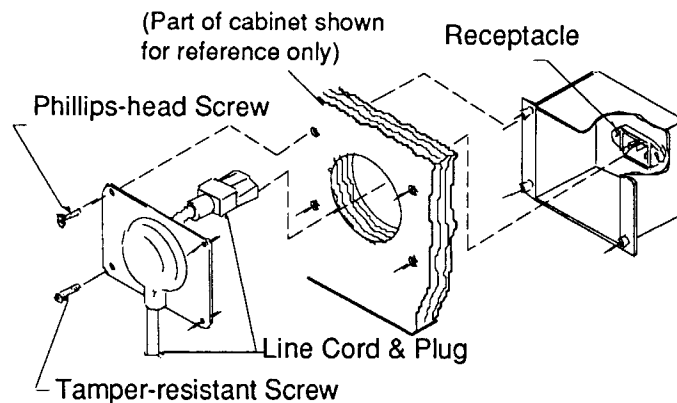


9. Place a level or an inclinometer on the playfield surface. Adjust the leg levelers for proper playfield level (side-to-side). **NOTE:** It is recommended that this measurement be made ON the playfield, not the cabinet nor the playfield cover glass. Tighten the nut on each leg leveler shaft to maintain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

## ! IMPORTANT !

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

10. Move the game into the desired location; recheck the level and pitch angle of the playfield.
11. Be sure the **required number** of ball are installed. *INDIANA JONES* uses seven balls: Six active balls and one captive ball.
12. Pull the foam out from the Captive Ball feature in the upper right corner of the playfield.
13. Install playfield mylars if desired. **NOTE:** The *INDIANA JONES* playfield is coated with a special hardcoat surface and does not require a protective mylar. However, mylars can be purchased through your local Williams Distributor. Specify part number 03-8929-1 for full playfield mylar.
14. Clean and reinstall the playfield cover glass. Prepare the game for player operation.
15. To attach the line cord, remove the envelope stapled to the inside of the cabinet (near the cashbox). Remove the four Phillips-head screws that mount to line cord cover plate to the rear cabinet. Match the prongs on the plug with the holes in the receptacle, and push the line cord securely into place. Make sure the cord is aligned with the indentation on the cover plate (indentation should point toward bottom of the cabinet). Remount line cord cover plate. If desired, four tamper resistant screws have been provided in an envelope marked "Security Screws" (located in the cashbox) to remount cover plate.





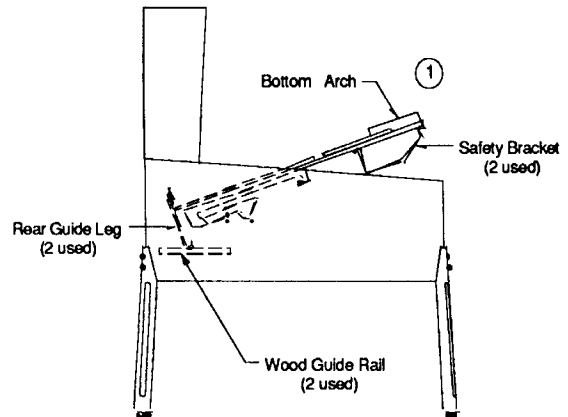
## RAISING THE PLAYFIELD

### CAUTION

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

#### To raise the playfield.

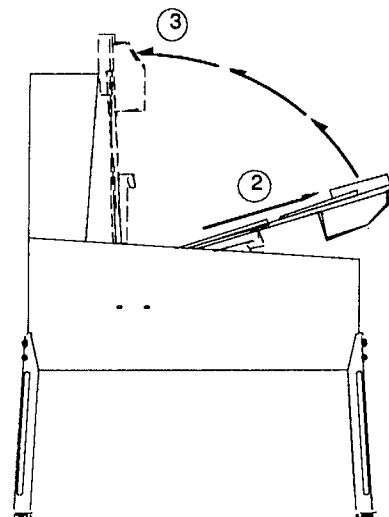
1. Grasp bottom arch and carefully lift up playfield only high enough to clear safety brackets. Rear guide legs should not hit wood guide rails or be used to slide out playfield.



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.**

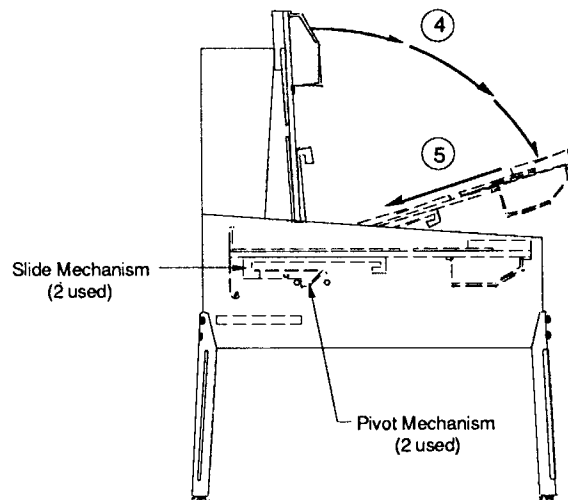
3. Rotate playfield to upright service position (lean on backbox) by pulling toward you and up. Listen for the sound of a click; this insures locking and pivoting sequence.



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

The Start Button is a pushbutton 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 Buttons

The operator controls all game adjustments, obtains bookkeeping information, and diagnoses problems, using only four pushbutton switches mounted on the inside of the coin door. The Coin Door Buttons 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 Buttons from Normal Function to Test Function.

### Test Function

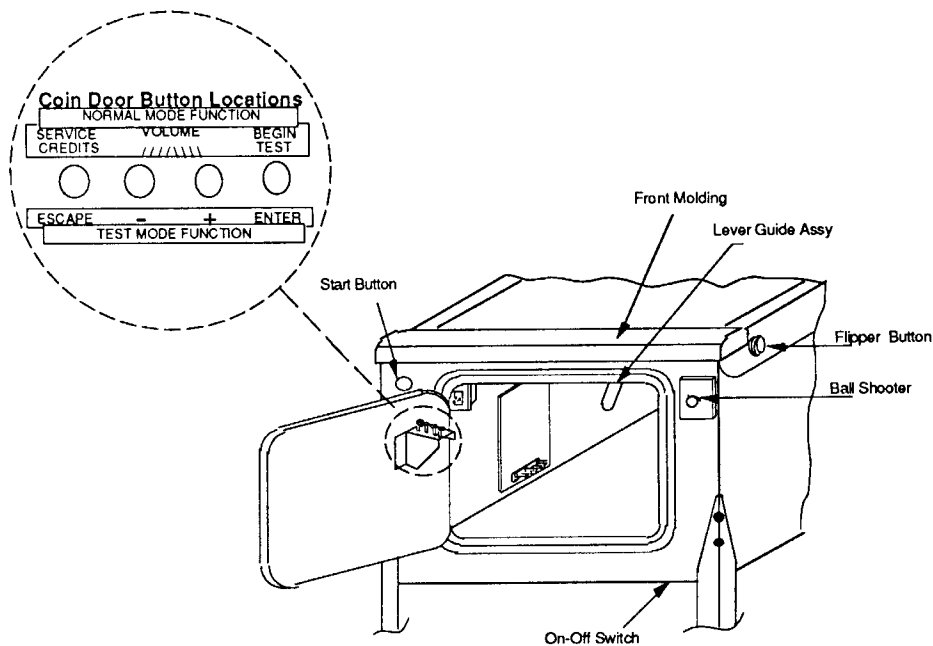
The Escape button allows you to get out of a menu selection or return to the Attract Mode.

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.

**Holding the Enter button for five seconds, during the Attract Mode, resets the High Scores.**



## GAME OPERATION

### CAUTION

After assembly and installation at its site location, this game must be plugged into a properly grounded outlet to prevent shock hazard, and to assure proper game operation. DO NOT use a 'cheater' plug to defeat the ground pin on the line cord. DO NOT cut off the ground pin.

**POWERING UP** With the coin door closed, plug the game in, and switch it On. In normal operation, Testing shows in the displays as the game performs Start-up Tests. Once the Start-up Tests have been successfully completed the last score is displayed. After that, the game goes into the Attract Mode.

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

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

**Example:**

	INDIANA JONES	Sound Rev. L-1
50017	Rev. L-X	SY. 0.X0 X-X-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 that the game is operating satisfactorily.

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

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

**STARTING A GAME.** Press the gun handle trigger 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 then proceeds to the Game Over Mode. With the third closure\* of the plumb bob tilt switch, the player loses the remaining play of that ball, but can complete the game.

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

**GAME OVER MODE.** The Game Over display shows in the display. Then, the high scores flash. The game proceeds to the Attract Mode.

\* - Operator-adjustable feature

## MENU SYSTEM OPERATION

This game operates on a Menu System. The Main Menu allows you to choose from several main categories, which in turn lead to other menus to choose from. To enter the Menu System, open the coin door and press the Begin Test button. The displays show the Game I.D. Mode. Press the Enter button and the Main Menu appears. To cycle through the Main Menu, (or any other menu), selections press either the Up or Down button. Activate any selection by pressing the Enter button when the desired selection appears in the display. Return to the Attract Mode or a previous menu selection, by pressing the Escape button. Press the Start button for HELP at any time.

### MAIN MENU

#### B. Bookkeeping Menu

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

Press Escape

To move out of a menu selection.

Press Enter

To get into a menu selection.

Press Up

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

Press Down

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

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

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

#### P. Printouts Menu

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

#### T. Test Menu

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

#### 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

#### 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

Bookkeeping is the first category available from the Main Menu. Press the Enter button to activate the Bookkeeping Menu. Press the Up or Down button to cycle through the Bookkeeping Menu selections. Press the Enter button to activate a selection. Once you have activated a selection, press the Up or Down button to cycle through the available audits. Audits cannot be set, they can only be cleared by using U1 and U2 from the Utilities Menu. Press the Escape button to return to the Bookkeeping Menu. Press it again to return to the Main Menu.

## B. BOOKKEEPING MENU

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

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

### **B.1 Main Audits**

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

### **B.2 Earning Audits**

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

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

### B.3 Standard Audits

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

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

† This audit is not resettable.

## B.4 Feature Audits

B.4	01	Number of modes started.
B.4	02	Number of times all modes lit.
B.4	03	Number of times Get the Idol mode was started.
B.4	04	Number of Get the Idol mode shots made.
B.4	05	Number of times Get the Idol mode was finished.
B.4	06	Number of times Streets of Cairo mode was started.
B.4	07	Number of Streets of Cairo mode shots made.
B.4	08	Number of times Marion found in Streets of Cairo mode.
B.4	09	Number of gun was used to shoot guy in Streets of Cairo.
B.4	10	Number of times eject was used to shoot guy in Streets of Cairo.
B.4	11	Number of times Well of Souls mode was started.
B.4	12	Number of Wells of Souls mode shots made.
B.4	13	Number of times Raven bar mode was started.
B.4	14	Number of bad guys shot in Raven bar mode.
B.4	15	Number of times Raven bar mode was finished.
B.4	16	Number of times Monkey Brains mode was started.
B.4	17	Number of Monkey Brains mode shots made.
B.4	18	Number of times Steal the Stones mode was started.
B.4	19	Number of times Steal the Stones path of adventure was entered.
B.4	20	Number of Steal the Stones mode shots made.
B.4	21	Number of times Steal the Stones was finished.
B.4	22	Number of times Mine Cart mode was started.
B.4	23	Number of passed tunnels in Mine Cart mode.
B.4	24	Number of times Mine Cart mode was finished.
B.4	25	Number of times Rope Bridge mode was started.
B.4	26	Number of Rope Bridge mode shots made.
B.4	27	Number of times Rope Bridge mode was finished.
B.4	28	Number of times Castle Grunewald mode was started.
B.4	29	Number of Castle Grunewald mode shots made.
B.4	30	Number of times Castle Grunewald mode was finished.
B.4	31	Number of times Tank Chase mode was started.
B.4	32	Number of Tank Chase mode shots made.
B.4	33	Number of times Tank Chase mode was finished.
B.4	34	Number of times 3 Challenges mode was started.
B.4	35	Number of times 3 Challenges path of adventure was entered.
B.4	36	Number of 3 challenges mode shots made.
B.4	37	Number of times 3 Challenges was finished.
B.4	38	Number of times Choose Wisely mode was started.
B.4	39	Number of times Choose Wisely mode was won.
B.4	40	Number of times ball 1 was locks in Idol.
B.4	41	Number of times ball 2 was locks in Idol.
B.4	42	Number of times 3 ball Idol multiball was started.
B.4	43	Number of times Jackpot was lit by left ramp.
B.4	44	Number of times Jackpot was lit by center ramp.
B.4	45	Number of Ark jackpots collected.
B.4	46	Number of Stone jackpots collected.
B.4	47	Number of Grail jackpots collected.
B.4	48	Number of Super jackpots collected.
B.4	49	Number of Double jackpots lit.
B.4	50	Number of Double jackpots collected.
B.4	51	Number of Triple jackpots lit.
B.4	52	Number of Triple jackpots collected.
B.4	53	Number of times 2 ball Totem Multi was lit.
B.4	54	Number of times 2 ball Totem Multi was collected.
B.4	55	Number of times 2 ball Lost Treasures was awarded.

B.4	56	Number of times Path of Adventure was lit.
B.4	57	Number of times Path of Adventure was continued.
B.4	58	Number of times Path of Adventure entered.
B.4	59	Number of times Path of Adventure continued was entered.
B.4	60	Number of times Path of Adventure completed.
B.4	61	Number of times Path of Adventure pit was lit.
B.4	62	Number of times Path of Adventure pit value was increased.
B.4	63	Number of times Path of Adventure pit was awarded.
B.4	64	Number of times Path of Adventure extra ball was lit.
B.4	65	Number of times Path of Adventure extra ball was awarded.
B.4	66	Number of times Hand of Fate was lit
B.4	67	Number of times Hand of Fate was collected.
B.4	68	Number of times Dogfight Hurry-up was lit.
B.4	69	Number of times Dogfight Hurry-up was awarded.
B.4	70	Number of times a lit right loop was made.
B.4	71	Number of times a lit left loop was made.
B.4	72	Number of times a lit right ramp was made.
B.4	73	Number of times a lit left ramp was made.
B.4	74	Number times Narrow Escape was started.
B.4	75	Number of times Narrow Escape was awarded.
B.4	76	Number of times an Idol lock snuck in with drop targets up.
B.4	77	Number of non-multiball Eternal Life ball saves.
B.4	78	Number of 2 ball multiball Eternal Life ball saves.
B.4	79	Number of 3 ball multiball Eternal Life ball saves.
B.4	80	Number of times 2X bonus multiplier was awarded.
B.4	81	Number of times 4X bonus multiplier was awarded.
B.4	82	Number of times 6X bonus multiplier was awarded.
B.4	83	Number of times 8X bonus multiplier /extra ball lit was awarded.
B.4	84	Number of times maximum bonus multiplier was awarded.
B.4	85	Number of times Loop jackpot was lit.
B.4	86	Number of times Loop jackpot was collected.
B.4	87	Number of games that bought an extra ball from buy-in.
B.4	88	Number of multi player games that bought extra ball from buy-in.
B.4	89	Number of balls saved on left outlane after drop targets hit.
B.4	90	Number of balls saved on right outlane after idol lock release.



## B.5 Histograms

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

## B.6 Time-Stamps

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

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

Press the Enter button to activate the Printouts Menu, once the menu name is shown under the Main Menu. Then, use the Up or Down button to cycle through the Printouts Menu selections. Press the Enter button to activate a selection. Press the Escape button to return to the Printouts Menu. Press in again to return to the Main Menu.

## **P. PRINTOUTS MENU**

(optional board required)

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

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

If no printer is attached the the message "Waiting for Printer" appears in the displays.

**NOTE:** Set the print specification from the Adjustment Menu, A.5 Printer Adjustments.

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

Press the Enter button to activate the Test Menu, once the menu name is shown under the Main Menu. Then, use the Up or Down button to cycle through the Test Menu selections. Press the Enter button to activate a test. Press the Escape button to return to the Test Menu. Press it again to return to the Main Menu. **NOTE:** During any test, press the Start button to obtain the wire color, driver number, connector number and fuse location.

## **T. TEST MENU**

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

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

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

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

- T.1 Switch Edges Test** Press each switch one at a time. The name and number of the switch is shown in the display. If a switch other 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 Test** This test automatically cycles through all switches that are detected closed. The name and number of each switch that is detected is shown in the display. A filled square indicates the switch's position in the matrix.
- T.3 Single Switches Test** The Single Switch Test isolates a particular switch by blocking signals from all other switches. Use the Up or Down buttons to select the switch to be tested.

**T.4 Solenoid Test** The Solenoid Test has three modes, Repeat, Stop, and Run. Only one solenoid should pulse at a time. The system has detected a problem if; more then one solenoid pulses, a solenoid comes On and stays On or, during the Repeat and Run mode, no solenoid pulses.

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

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

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

**T.5 Flasher Test** This tests the flashlamp part of the solenoid circuit exclusively. This, like the Solenoid Test, has three modes: Repeat, Stop, and Run. During this test, only one flashlamp circuit should pulse at a time. The system has detected a problem if more then one circuit pulses, a circuit stays On or, during the Repeat and Run mode, no circuit pulses.

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

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

**Run** The Running 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.

**T.6 General Illumination Test** This test checks all of the General Illumination circuits. There are two modes of operation: Stop and Run.

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

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

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

**Run** The Running 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 or tune without having to wait for the program to play all the sounds available in the test. A sound or tune should be heard for each name and number that appears in the display. Any other results indicates the system has detected a problem.

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

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

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

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

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

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

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

**T.12 Flipper Coil Test** The Flipper Coil Test has three modes, Repeat, Stop, and Run. Only one Flipper should pulse at a time. The system has detected a problem if; more than one flipper pulses, a flipper comes On and stays On or, during the Repeat and Run mode, no flipper pulses.

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

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

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

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

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

**T.14 Idol Lock Test** This will test the rotary idol ball lock device. It will test to see if the motor and position switches are working. When first entering this test the idol lock will be automatically checked. This will test the idol lock to see if it is functioning correctly. If it passes this test a message will appear on the screen saying so. If it fails then a message will appear showing it failed. The test will then show an error and may not work correctly until the problem is fixed.

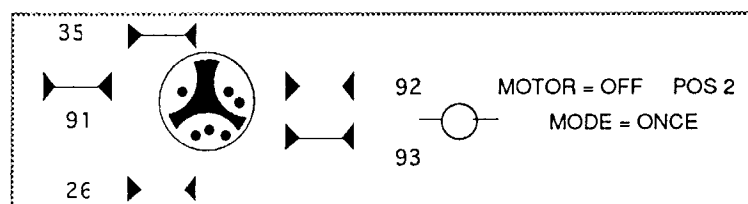
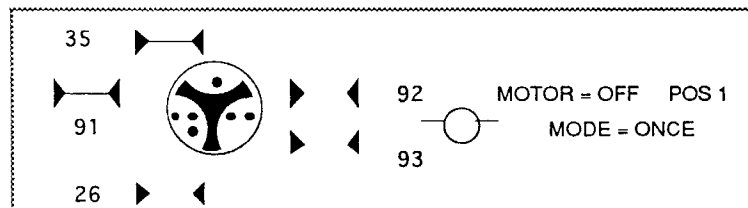
The test switches act as following:

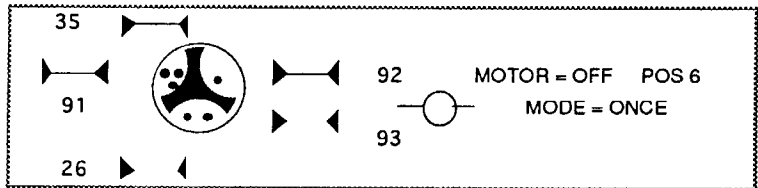
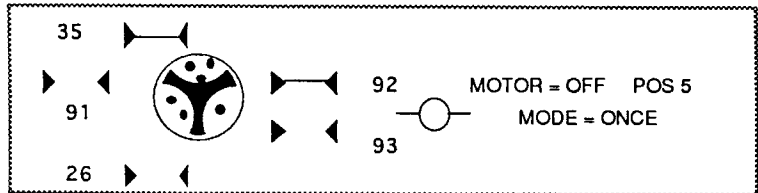
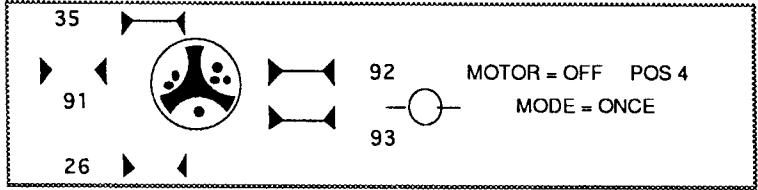
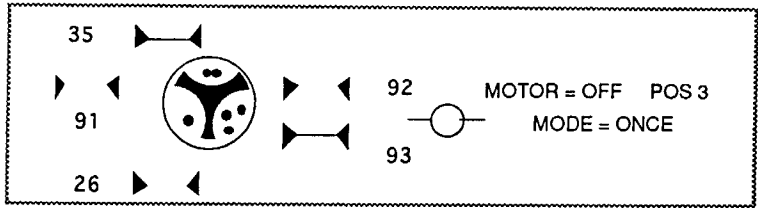
ESCAPE - Returns to the previous menu.

UP - Move to next valid position

DOWN - Move to last valid position

ENTER - Switch between ONCE & CONTINUOUS MODES>





**T.15 Mini Playfield Test** This will test the mini playfield forward and reverse motor and the right and left limit switches. When first entering this test, the mini playfield is automatically checked. This will test the mini playfield to see if it is functioning correctly. If it passes this test, a message will appear saying so. If it fails then a message will appear showing it failed. The test will then show an error and may not work correctly until the problem is fixed.

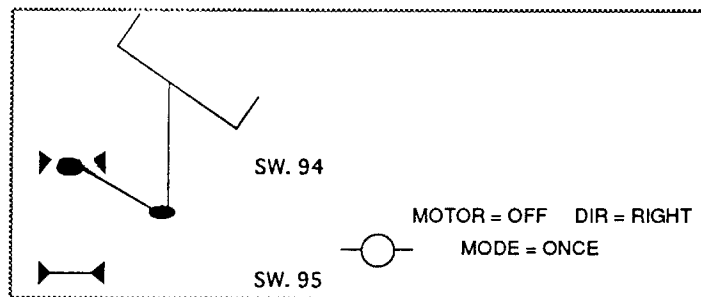
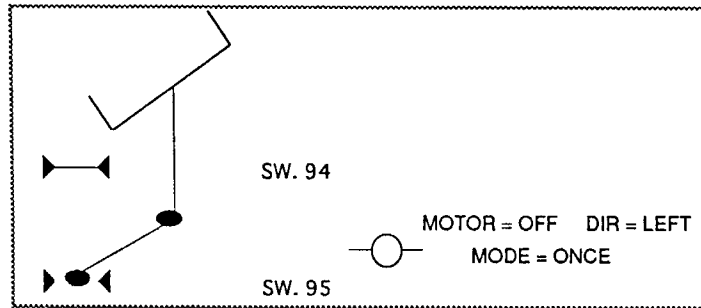
The test switches act as follows:

ESCAPE - Returns to the previous menu

UP - Toggle ON or OFF; motor ON to the right.

DOWN - Toggle ON or OFF; motor ON to the left.

ENTER - Switch between ONCE & CONTINUOUS MODES.





Press the Enter button to activate the Utilities Menu, once the menu name is shown under the Main Menu. Then, use the Up or Down button to cycle through the Utility Menu selections. Press the Enter button to activate a selection. Use the Up or Down button to rotate the settings. Press the Enter button to lock in a setting. If a mistake is made while changing a setting, press the Escape button while "Saving Adjustment Value" is still in the display. The original setting is retained and the new setting is ignored. Press the Escape button to return to the Utilities Menu. Press it again to return to the Main Menu.

## U. Utilities Menu

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**U.9 04 Install Hard**  
Some what MORE difficult than factory setting.

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

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

Adj #	Adj Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03 (factory)	Hard U.9 04	Extra Hard U.9 05
A.2 03	Loop Lit Timer	20 sec	15 sec	10 sec	7 sec	5 sec
A.2 04	Ramp Lit Timer	20 sec	15 sec	8 sec	7 sec	6 sec
A.2 05	Ball Save Timer	10 sec	7 sec	5 sec	4 sec	3 sec
A.2 06	Ball Save 3 Ball Timer	15 sec	12 sec	10 sec	8 sec	7 sec
A.2 07	Ball Save 2 Ball Timer	8 sec	5 sec	3 sec	3 sec	2 sec
A.2 08	Captive Multi Start	1 hit	2 hits	3 hits	4 hits	5 hits
A.2 09	Captive Multiball Start Timer	30 sec	25 sec	20 sec	15 sec	10 sec
A.2 10	Get the Idol Timer	50 sec	40 sec	30 sec	25 sec	20 sec
A.2 11	Streets of Cairo Timer	50 sec	40 sec	30 sec	25 sec	20 sec
A.2 12	Monkey Brains Timer	50 sec	40 sec	30 sec	25 sec	20 sec
A.2 13	Steal the Stones Timer	50 sec	40 sec	30 sec	25 sec	20 sec
A.2 14	Rope Bridge Timer	50 sec	40 sec	30 sec	25 sec	20 sec
A.2 15	Castle Grunewald Timer	50 sec	40 sec	30 sec	25 sec	20 sec
A.2 16	Tank Chase Timer	50 sec	40 sec	30 sec	25 sec	20 sec
A.2 17	3 Challenges Timer	50 sec	40 sec	30 sec	25 sec	20 sec
A.2 18	Raven Bar Level	Level 1	Level 1	Level 1	Level 2	Level 3
A.2 19	Choose Wisely Timer	Level 1	Level 1	Level 1	Level 1	Level 2
A.2 20	Jackpot Multiplier Timer	20 sec	20 sec	15 sec	10 sec	6 sec
A.2 21	Path of Adventure Level	Level 1	Level 1	Level 1	Level 2	Level 3
A.2 22	Adventure Continue Timer	25 sec	20 sec	15 sec	10 sec	8 sec
A.2 23	Path Extra Ball Difficulty	Easy	Easy	Easy	Easy	Hard
A.2 24	Lower Extra Ball Hold	On	On	On	On	Off
A.2 25	Super Jets Start	50 hits	65 hits	75 hits	85 hits	100 hits
A.2 26	Hand of Fate Lit Difficulty	Easy	Easy	Easy	Hard	Hard
A.2 27	Hand of Fate Timer	30 sec	20 sec	10 sec	8 sec	5 sec

**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 Adjustments Table for U.S. and Canadian Games**

Adj #	Adj Description	Install 5-ball U.9 06	Install 3-ball U.9 07
U.9 03	Install Medium	Not Used	Yes
U.9 04	Install Hard	Yes	Not Used

- 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:

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

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

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

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

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

- U.9 11 Install Buy-in** This option automatically sets game pricing to 1 for 50¢/2 for \$1.00 and 1 Coin Buy-in (A.3 19) to YES.

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

**U.9 13 Not Used**

**U.9 14 Not Used**

**U.9 15 Not Used**

**U.9 16 Not Used**

**U.9 17 Install German 1 •**

**U.9 18 Install German 2 •**

**U.9 19 Install German 3 •**

**U.9 20 Install German 4 •**

**U.9 21 Install German 5 •**

**U.9 22 Install German 6 •**

Adjustments U.9 17 through U.9 22 are used to modify game pricing and type of game play. The Preset Game Adjustments Table for German/European Games lists the adjustments and settings that comprise the individual groups.

### Preset Adjustments Table for German Games

Adj #	Adj Description	German 1 U.9 17	German 2 U.9 18	German 3 U.9 19	German 4 U.9 20	German 5 U.9 21	German 6 U.9 22
A.1 14	Replay Award	Credit	Ticket	Audit	Credit	Ticket	Audit
A.1 15	Special Award	Credit	Ex. Ball	Points	Credit	Ex. Ball	Points
A.1 16	Match Award	Credit	Ticket	Credit	Credit	Ticket	Credit
A.1 19	Match Feature	7%	7%	Off	7%	7%	Off
A.3 01	Game Pricing	6spiele/5DM	6spiele/5DM	6spiele/5DM	7spiele/5DM	7spiele/5DM	7spiele/5DM
A.4 02	H.S.T.D. Award	Credit	Ticket	Credit	Credit	Ticket	Credit
A.4 04	Champion Credits	03	03	00	03	03	00
A.4 05	H.S.T.D. 1 Credits	01	01	00	01	01	00
A.4 06	H.S.T.D. 2 Credits	00	00	00	00	00	00
A.4 07	H.S.T.D. 3 Credits	00	00	00	00	00	00
A.4 08	H.S.T.D. 4 Credits	00	00	00	00	00	00
A.4 10	Backup Champion	500,000,000	500,000,000	00	500,000,000	500,000,000	00
A.4 11	Backup H.S.T.D. 1	400,000,000	400,000,000	00	400,000,000	400,000,000	00
A.4 12	Backup H.S.T.D. 2	350,000,000	350,000,000	00	350,000,000	350,000,000	00
A.4 13	Backup H.S.T.D. 3	300,000,000	300,000,000	00	300,000,000	300,000,000	00
A.4 14	Backup H.S.T.D. 4	250,000,000	250,000,000	00	250,000,000	250,000,000	00

• For German CPU Boards only.

German DIP Switch settings are:

Sw4 Sw5 Sw6 Sw7 Sw8  
On On On On Off

**U.9 23 Install French 1\***

**U.9 24 Install French 2\***

**U.9 25 Install French 3\***

**U.9 26 Install French 4\***

**U.9 27 Install French 5\***

**U.9 28 Install French 6\***

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

\* For French CPU Boards only.

French DIP Switch settings are:

Sw4 Sw5 Sw6 Sw7 Sw8  
On On On Off Off

**U.10 Clear Credits** Press the Enter button to clear the game Credits.

**U.11 Auto Burn-in** Press the Enter button to activate Auto Burn-in. This utility automatically cycles through several tests. This helps in finding intermittent problems. The tests that Auto Burn-in cycles through are: the Display Test, the Sound and Music Test, the All Lamps Test, the Solenoid Test, the Flashers Test, the General Illumination Test, and the Flipper Coil Test. All of the test run are run concurrently. The time spent on the burn-in cycle, and the total time the game has spent in burn-in are displayed.

Press the Enter button to activate the Adjustments Menu, once the menu name is shown under the Main Menu. Then, use the Up or Down button to cycle through the Adjustments Menu selections. Press the Enter button to activate a selection. Press the Up or Down button to cycle through the available adjustments. Press the Enter button to activate an adjustment. When an adjustment is activated, the setting value begins to flash. Use the Up or Down button to raise or lower the setting value. Press Enter to lock in the 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. Press the Escape button to return to the Adjustments Menu. Press it again to return to the Main 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 to 10.

#### A.1 02 Tilt Warnings

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

#### A.1 03 Maximum Extra Balls

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

#### A.1 04 Maximum Extra Balls/Ball In Play

The number of Extra Balls to be awarded per ball in play.

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

#### A.1 05 Replay System

The type of replay system to be used.

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

#### A.1 06 Replay Percent\*

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

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

Replay start value when Auto% Replay is used.  
Range: 15,000,000 to 250,000,000.

\*For Auto% Replay.

- A.1 08      **Replay Levels\*****  
The number of replay levels used by the Auto% Replay mode. The range of this setting is 1 through 4. When two replay levels are chosen, the second replay level is automatically adjusted to twice the starting replay level. When three of four replay levels are chosen, their values are automatically adjusted to three or four times the starting replay level.
- A.1 09      **Replay Level 1\*\*****  
**A.1 10      **Replay Level 2\*\*****  
**A.1 11      **Replay Level 3\*\*****  
**A.1 12      **Replay Level 4\*\*****  
The value to be used for the first, second, third, and fourth Fixed Replay.  
Range: 00 to 250,000,000.
- A.1 13      **Replay Boost****  
The replay score can be temporarily boosted by the selected amount EACH time the player reaches or exceeds the replay score. This temporary boost is cancelled when credits equal 0, the player inserts another coin, or when Begin Test is pressed.
- ON      -   Score is boosted between 500,000 and 5,000,000 points.  
OFF     -   Replay score is not boosted.
- A.1 14      **Replay Award****  
The form of award automatically provided when the player exceeds any replay level for either Auto% Replay or Fixed Replay.
- Credit - Reaching each Replay level awards credit.  
Ticket - Reaching each Replay level awards a ticket.  
Ball - Reaching each Replay level awards an Extra Ball.  
Audit - Reaching each Replay level awards nothing to the player; it does increase the entry value of the Audit Item(s) maintaining a tally of these awards.
- A.1 15      **Special Award****  
The award automatically provided when the player scores a special.
- Credit - Scoring a Special awards a Credit.  
Ticket - Scoring a Special awards a Ticket.  
Ball - Scoring a Special awards an Extra Ball.  
Points - Scoring a Special awards 1 Million points.
- A.1 16      **Match Award****  
The award automatically provided when the players wins a match.
- Credit - Winning a Match awards a Credit.  
Ticket - Winning a Match awards a Ticket.
- A.1 17      **Extra Ball Ticket****  
A Ticket is awarded when the player earns an Extra Ball.
- YES - The player is awarded a Ticket in addition to an Extra Ball.  
NO - The player is not awarded a Ticket

\*For Auto% Replay; \*\* For Fixed Replay



- A.1 18 Maximum Ticket/Player**  
The amount of Tickets each player can earn.  
Range: 00 to 100.
- A.1 19 Match Feature**  
The desired percentage for the Match Feature occurring at the end of the game.
- OFF - Match Feature is not available.  
1 - 50%- 1% is 'hard'; 50% is 'extremely easy'. The Match Feature selects a random two-digit number at the end of the game and compares each players score for an identical two digits in the rightmost two positions. A match of these two digit results in an award of a Credit or a Ticket.
- A.1 20 Custom Message**  
The message displayed during the Attract Mode.
- YES - A message is displayed  
NO - A message is not displayed.
- A.1 21 Language**  
The language the game uses: English, French, or German.
- A.1 22 Clock Style**  
The style of clock the game uses: A.M./P.M. or 24 Hours.
- A.1 23 Date Style**  
The style of date the game uses: Month/Date/Year, or Date/Month/Year.
- A.1 24 Show Date and Time**  
The date and time show in the Attract Mode.
- YES - Show the date, time in status report or in the Attract Mode.  
NO - Do Not show date, time in status report or in the Attract Mode.
- A.1 25 Allow Dim Illumination**  
The game program dims the General Illumination for special effects and during the Attract Mode.
- YES - Dim the General Illumination during the Attract Mode.  
NO - Do Not dim the General Illumination.
- A.1 26 Tournament Play**  
Equalize 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 how dimness of lamps Using this feature substantially increases the life of the lamps.  
Setting: OFF, 2 to 60 minutes.
- A.1 30 Power Saver Level**  
When General Illumination Power Saver (A.1 29) is set to On, this controls the intensity of the G.I. and controlled lamps once the game has been idle for a specified period of time.  
Range: 4 to 7. (4=dimmest)
- 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 sequence (while the scores are being compiled). Setting to "YES" may extend the life of the flipper mechanisms.
- A.1 33 Game Restart**  
When the Start button is pressed during or after the 2nd ball, the game in progress will end and a new game will begin. This adjustment has three settings to determine how this is handled.
- NEVER- Do not allow a new game start until the current game is over.
- SLOW - Restart if the Start button is pressed continuously for over 1/2 second.  
This helps to prevent the unintended restart of game in progress.
- INSTANTLY - Restart as soon as the Start button is pressed.
- When the Start button is pressed during game over, or during the 1st ball (to add a player), it is always handled instantly.

## A.2 Feature Adjustments

### A.2 01 Timed Plunger

This is the time allowed for a player to hit the plunger switch (or the "launch ball" switch ) to start a ball. When this time is exceeded, the ball is automatically launched.

Settings:           OFF = Do not automatically launch the ball.  
                      5-120 seconds - Time allowed before the ball is launched automatically.

### A.2 02 Flipper Plunger

If the "launch ball" switch is malfunctioning, set this adjustment to "YES" to use the left flipper to fire the plunger. Normally, the software tries to detect a malfunctioning "launch ball" switch and will automatically use the left flipper to launch a ball. Also, the plumb-bob tilts' first switch hit will also launch a ball.

Setting:            NO = Do not use the left flipper to launch a ball.  
                      YES = Use the left flipper to launch a ball.

### A.2 03 Loop Lit Timer

The time that a loop will remain lit once started.

Settings:           1-120 seconds.

### A.2 04 Ramp Lit Timer

The time that the left and/or right ramp will remain lit once started.

Settings:           1-120 seconds.

### A.2 05 Ball Saver Timer

This is the amount of time, after ball start, that the "ETERNAL LIFE" ball saver lamp is lit. It allows players who drains within this time to be served another ball. This adjustment only applies when a player is not in a multiball.

Settings:           OFF = Ball save is not enabled.  
                      1-60 seconds = Minimum amount of time the ball is on the playfield.

### A.2 06 Ball Saver Timer - 3 Ball Multiball.

This is the amount of time, after multiball start, that the "ETERNAL LIFE" ball saver lamp is lit. It allows players who drain within this time to be served another ball. This adjustment only applies when a player is in an Idol lock 3 ball multiball.

Settings:           OFF = Ball save is not enabled.  
                      1-60 seconds = Minimum amount of time the ball is on the playfield.

### A.2 07 Ball Save Timer - 2 Ball Multiball

This is the amount of time, after multiball start, that the "ETERNAL LIFE" ball saver lamp is lit. It allows a player who drains within this time to be served another ball. This adjustment only applies when a player is in an Idol lock 2 ball multiball.

Settings:           OFF = Ball save is not enabled.  
                      1-60 seconds = Minimum amount of time the ball is on the playfield.

- A.2 08 Captive Multiball Start**  
This determines the number of hits needed on a single drop target to light 2 ball multiball.  
Settings: 1-25 hits.
- A.2 09 Captive Multiball Start Timer**  
This determines the amount of time that captive 2 ball multiball is lit.  
Settings: 5-120 seconds.
- A.2 10 Get the Idol Timer**  
This determines the amount of time that the *Get the Idol* mode is active, once started.  
Settings: 5-120 seconds.
- A.2 11 Streets of Cairo Timer**  
This determines the amount of time that the *Streets of Cairo* mode is active, once started.  
Settings: 5-120 seconds
- A.2 12 Monkey Brains Timer**  
This determines the amount of time that the *Monkey Brains* mode is active, once started.  
Settings: 5-120 seconds.
- A.2 13 Steal the Stones Timer**  
This determines the amount of time that the *Steal the Stones* mode is active, once started.  
Settings: 5-120 seconds.
- A.2 14 Rope Bridge Timer**  
This determines the amount of time that the *Rope Bridge* mode is active, once started.  
Settings: 5-120 seconds.
- A.2 15 Castle Grunewald Timer**  
This determines the amount of time that the *Castle Grunewald* mode is active, once started.  
Settings: 5-120 seconds.
- A.2 16 Tank Chase Timer**  
This determines the amount of time that the *Tank Chase* mode is active, once started.  
Settings: 5-120 seconds.

- A.2 17 The 3 Challenges Timer**  
This determines the amount of time that the *3 Challenges* mode is active, once started.  
Settings: 5-120 seconds.
- A.2 18 Raven Bar Level Started**  
This determines the level of difficulty that the *Raven Bar* video mode starts at. Level 1 is the easiest and level 4 is the hardest.  
Settings: Level 1-Level 4.
- A.2 19 Choose Wisely Level Start**  
This determines the level of difficulty that the *Choose Wisely* video mode starts at. Level 1 is the easiest and level 2 is the hardest.  
Settings: Level 1 and Level 2.
- A.2 20 Jackpot Multiplier Timer**  
This determines the amount of time that the balls remain held in Idol lock during 3 ball multiball.  
Settings: 5-120 seconds.
- A.2 21 Path of Adventure Start Level**  
This determines the starting level of difficulty, (which is the number of lights needed to complete the path), for the *Path of Adventure*.  
Settings: 1-4 (1 is easiest: 4 is hardest).
- A.2 22 Adventure Continue Timer**  
This determines the amount of time that the player has to continue the Path of Adventure feature once they have collected.  
Settings: OFF = No Path of Adventure continue.  
1-120 seconds = Time Path of Adventure continue is lit.
- A.2 23 Path of Adventure Extra Ball/Pit Lit Difficulty**  
This determines the difficulty of collecting an extra ball to the pit on the Path of Adventure, once it is lit.  
Settings: EASY = Path extra ball /pit remains lit for the remainder of the game until it is collected.  
HARD = Path extra ball/pit remains lit for the remainder of the ball until it is collected.
- A.2 24 Lower Playfield Extra Ball Lit Hold**  
This determines whether or not the lower playfield extra ball remains lit from ball to ball.  
Settings: ON = Lower extra ball stays lit until the end of the game or collected.  
OFF = Lower extra ball stays lit until the end of the ball or collected.

- A.2 25 Super Jets Start**  
 This determines the number of jet bumper hits are needed to start the *Super Jet Mode*.  
 Settings: 10-255 hits.
- A.2 26 Hand of Fate Lit Difficulty**  
 This determines the difficulty level of lighting the *Hand of Fate* feature.  
 Settings: EASY = Light Hand of Fate, (return lanes), lit at game start.  
 HARD = Light Hand of Fate, (return lanes), NOT lit at game start. Bonus multiplier lights Hand of Fate Lit.
- A.2 27 Hand of Fate Timer**  
 This determines the amount of time the player has to collect the *Hand of Fate* feature, once it is lit.  
 Settings: STAYS ON = Hand of Fate lights and then does not time down.  
 1-120 seconds = The time Hand of Fate remains lit.
- A.2 28 Hold Idol Locks at Game Over**  
 This determines whether or not the player can have balls left in the Idol lock at game over. A player must still "earn" their Idol locks.  
 Settings: YES = Keep ball locked between games.  
 NO = Unlock any locked balls at game over.
- A.2 29 Attract Mode Sounds**  
 This determines whether or not the attract mode has sound on the flipper and gun buttons to attract players.  
 Settings: ON = The attract mode does have sound on the buttons.  
 OFF = The attract mode does not have sound on the buttons.
- A.2 30 Attract Mode Music**  
 This determines whether or not the attract mode plays music to attract players.  
 Settings: ON = The attract mode does have music.  
 OFF = The attract mode does not have music.
- A.2 31 Buy Extra Ball - Buy-In Feature**  
 This determines whether or not each player may buy 1 extra ball for 1 credit at the end of the game.  
 Settings: 1 CREDIT  
 OFF

**A.2 32**

**Buy-in Ball Saver Timer**

After the player has bought an extra ball (see above adjustment, A.2 31 Buy Extra Ball), this is the amount of time that the "ETERNAL LIFE" ball saver lamp is lit. It allows players who drain within this time to be served another ball. This adjustment only applies for a buy in extra ball.

Settings:           OFF = No ball save is enabled.  
                      1-60 seconds = Minimum amount of time ball is on playfield.

**A.2 33**

**Gun Trigger During Buy-in**

This determines how the gun trigger works during the *Extra Ball Buy-in* feature.

Settings:           EXTRA BALL = This causes an extra ball to be bought, (if the player has enough credits), when the gun trigger is activated.  
                      CANCEL = This cancels the Buy-in feature when the gun trigger is activated during Buy-in.  
                      NOTHING = This does nothing when the gun trigger is activated during Buy-in.

**A.2 34**

**Outlane Ball Save from Idol Lock or Center Drop Targets**

The operator selects whether or not the outlanes will allow ball save when: 1) A ball is released from the idol lock the right outlane will allow a ball save for about 2 seconds; 2) The center drop target bank is hit the left outlane will allow a ball save for about 2 seconds.

Settings:           YES = Allow special outlane ball save.  
                      NO = Do not allow special Outlane ball save.

## **A. 3 Pricing Adjustments**

- A.3 01 Game Pricing (if set to custom, then 02 to 09 are available)**  
The cost of a game is selected from the Standard Pricing Table or by installing Custom pricing.
- A.3 02 Left Coin Units**  
**A.3 03 Center Coin Units**  
**A.3 04 Right Coin Units**  
**A.3 05 4th Slot Units**  
The number of coin units purchased by a coin passing through the left, center, right, or fourth coin chute.
- A.3 06 Units/Credits**  
Defines the number of coin units required to obtain 1 credit. A coin unit counter in the game program totals the number of coin units purchased through all coin chutes prior to each game. If the total number of these coin units exceeds or matches the Unit per Credit value by a multiple (or more, coin units) of the specified Units per Credit value the Credits display shows the proper number of credits. The coin unit counter retains any remaining coin units, until the start of Ball 2; then the coin unit counter is cleared (its contents are zeroed).
- A.3 07 Units/Bonus**  
Additional credits are to be indicated in the credits display, when a certain number of coin units are accumulated.
- A.3 08 Bonus Credits**  
The number of credits that are awarded when the Units/Bonus level is achieved.
- A.3 09 Minimum Units**  
No credits are to be posted (indicated in the credit display), until the credits unit counter reaches a particular value, by setting this value to 02 (or more).
- A.3 10 Coin Door Type (if set to custom, then 11 to 15 and 20 are available)**  
This adjustment is used to pre-set adjustments 11 to 15 based on standard coin doors (U.S.A., German, etc.).
- A.3 11 Collection Text**  
The coin system is used to display the Earning Audits.
- A.3 12 Left Slot Value**  
**A.3 13 Center Slot Value**  
**A.3 14 Right Slot Value**  
**A.3 15 4th Slot Value**  
The monetary value of the left, center, right, or fourth coin chute.
- A.3 16 Maximum Credits**  
The maximum number of credits the game can accumulate, either through game play awards or coin purchases. The range of this setting is 5 through 99. Reaching the specified setting prevents the award of any credits.



**A.3 17**

**Free Play**

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

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

**A.3 18**

**Hide Coin Audits**

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

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

**A.3 19**

**1 Coin Buy-in**

If the game pricing is set to 1 for 50¢/2 for \$1.00 the player can be 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.

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

**A.3 20**

**Base Coin Size**

This number is used for ticket per coin calculations.

**A.3 21**

**Coin Meter Units**

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

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

**A.3 22**

**Dollar Bill Slot**

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

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

**A.3 23**

**Minimum Coin Msec.**

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.



## 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 a Ticket.

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

The "Highest" High Score can be displayed in the Attract Mode. This score is not cleared when "High Score Reset Every" occurs.

ON - The "Highest" High Score is retained in memory and displayed.

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

### A.4 04 Champion Credits

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

### A.4 05 H.S.T.D. 1 Credits

### A.4 06 H.S.T.D. 2 Credits

### A.4 07 H.S.T.D. 3 Credits

### A.4 08 H.S.T.D. 4 Credits

The number of credits or tickets awarded whenever a player exceeds the first, second, third, or fourth highest score.

Range: 00 to 10.

### A.4 09 High Score Reset Every

The number of games to be played before an automatic reset of the displayed 'Highest Score: occurs. The values provided upon reset are those selected by the operator in the Back-up High Scores.

Range: OFF (disabled); 250 to 20,000.

### A.4 10 Backup Champion

The Back-up Grand Champion Score.

Range: 00 to 999,000,000.

### A.4 11 Backup H.S.T.D. 1

### A.4 12 Backup H.S.T.D. 2

### A.4 13 Backup H.S.T.D. 3

### A.4 14 Backup H.S.T.D. 4

The first through the fourth Back-up High Score values. The game automatically restores this value when the High Score Reset Every value is reached.

Range: 00 - 999,000,000.

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

- A.5 01 Column Width**  
The column width to be printed.  
Range: 22 to 80.
- A.5 02 Lines Per Page**  
The amount of lines per page.  
Range: 20 to 80.
- A.5 03 Pause Every Page**  
Choose whether the printer pauses at the end of a page.
- YES - The printer does pause.  
NO - The printer doesn't pause.
- A.5 04 Printer Type**  
Select the type of printer: Parallel, Serial, ADP, Mini-Drucker, or NSM.
- A.5 05 Serial Baud Rate**  
Select which baud rate to use for serial or ADP communications (bit rate): 300, 600, 1200, 2400, 4800, or 9600.
- A.5 06 Serial D.T.R. (Data Terminal Ready)**  
When a serial printer is used, this line may be connected to a printer output line signaling that the printer is busy.
- NORMAL -Normal D.T.R. signal goes low to indicate the printer is not ready.  
INVERTED - Inverted D.T.R. (busy) signal goes high to indicate the printer is not ready.  
IGNORE -D.T.R. signal is ignored.

## ERROR MESSAGES

The WPC game program has the capability to aid the operator and service personnel. At Game Turn-on, or after pressing the Begin Test switch, once the game has been operating for an extended period, the display may signal with a message, "Press ENTER for Test Report". This indicates that 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 your game earning, until the service technician can repair the problem.

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

### **Pinball Missing.**

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

### **xxxxx Sw. Is Stuck On.**

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

### **Ground Short Row-N, Wht-xxx.**

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

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

### **U6 Checksum Error.**

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

### **Time and Date Not Set.**

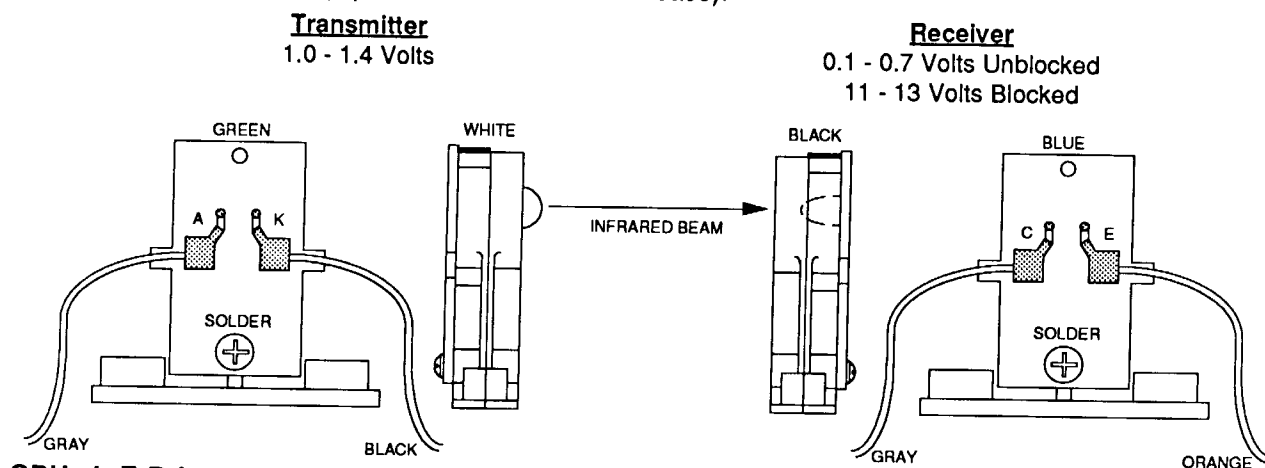
The real time clock is not running. Go to U.4 of the Utilities Menu and set the time and date.

## Factory Settings Restored.

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

## Opto Theory

The opto receiver (detector) 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 (emitter L.E.D.) should always be approximately 1.4 volts. **Note:** The transmitter (L.E.D.) is larger than the receiver (it protrudes further from its case).



## CPU L.E.D.'s

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

### CPU Board L.E.D. Error Codes

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

### Sound Board Beep Error Codes

#### Upon Game Turn-On:

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

**ERR. MINI PFD. BAD**  
**CHK. SWITCHES/MTR.**

This is saying the mini playfield is not working correctly. Check the mini playfield motor, (sol. #22, mini motor left and sol. #23, mini motor right), the Bridge Driver board, Power Driver board, and the two mini playfield limit switches (sw #94, mini playfield right and sw. #95, mini playfield left).

**ERROR IDOL BAD**  
**CHK. SWITCHES/MTR.**

This is saying that the idol rotary lock mechanism is not functioning correctly. Check the idol motor (sol. #42), the Motor EMI board, 8-driver board, power Driver board, the Idol Release coil (sol. #6), the Ball Popper coil (sol. #1), the Top Idol Enter switch (sw. #33), and the 3 idol position switches (sw. #91, Wheel Position 1; sw. #92, Wheel Position 2 and sw. #93, Wheel Position 3).

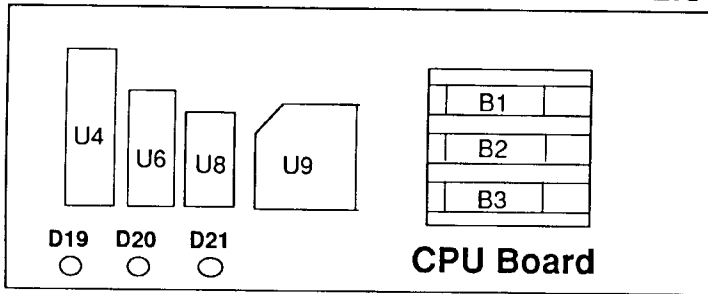
**ERR. DROP BNK BAD**  
**CHK. SWITCH/COIL**

This is saying the center 3-bank Drop Targets are not functioning properly. Check the Center Drop Bank coil (sol. #5) and the three drop target switches.

**ER. SNGL DRP. BAD**  
**CHK. SWITCH/COIL**

This is saying the Single Drop Target is not functioning properly. Check the Single Drop Up coil (sol. #3), the Single Drop Down coil (sol. #6), and the Single Drop switch (sw. #11)

## LED List

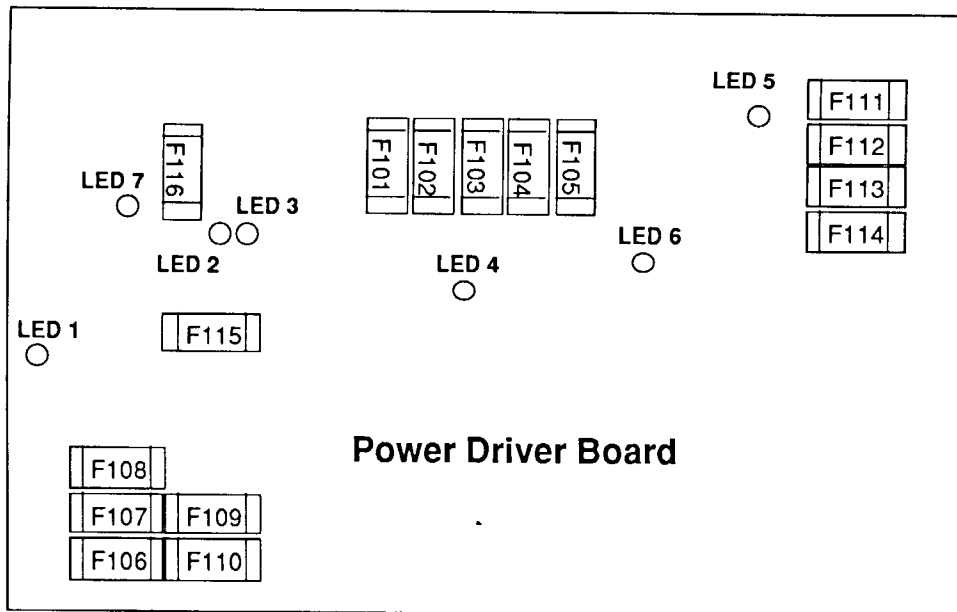


**CPU Board**

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



**Dot Matrix Controller Board**  
 D10, +5V Circuit, Normally On

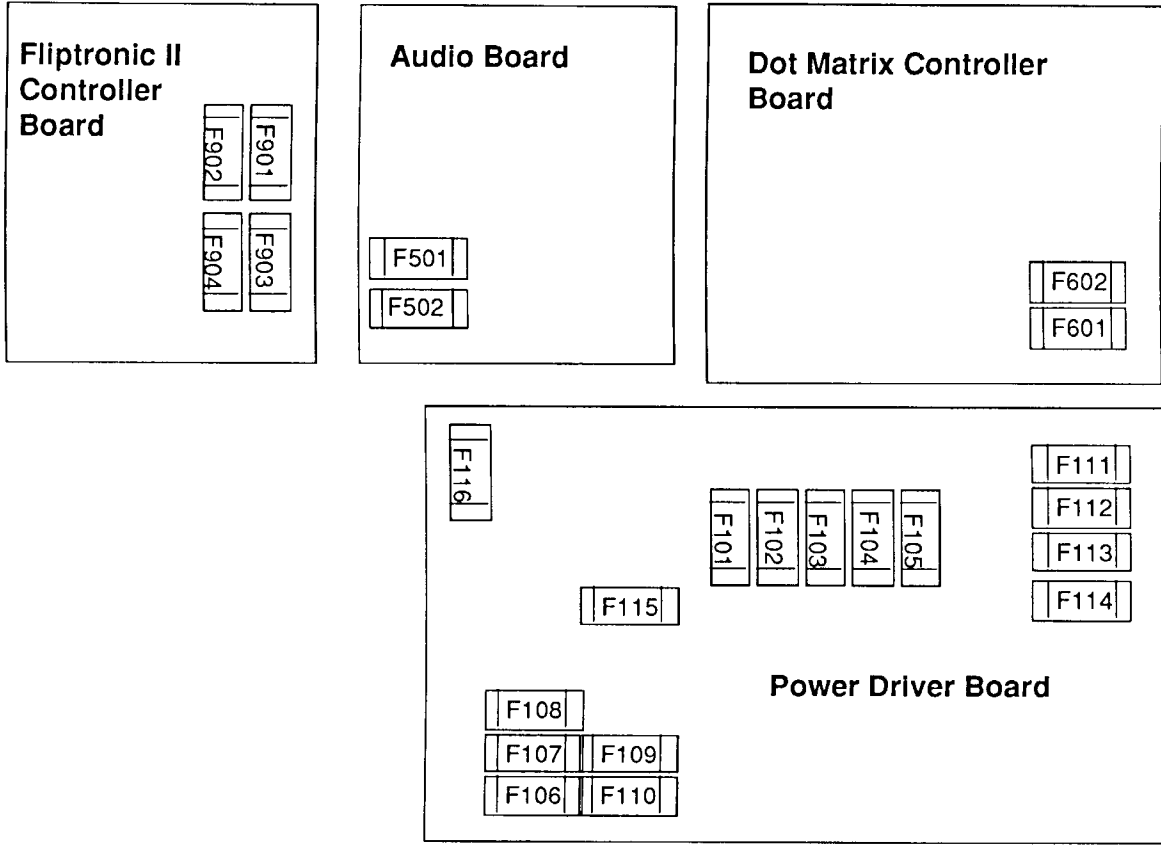


**Power Driver Board**

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



## Fuse List



### Audio Board

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

### Dot Matrix Controller Board

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

### Power Driver Board

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

### Fliptronic II Controller Board

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

### Line Filter

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

## MAINTENANCE INFORMATION

### LUBRICATION

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

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

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

### SWITCH CONTACTS

#### Playfield Switches

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

#### Flipper Switches

This game uses the new Fliptronic II Electronic Flipper System. The End-of-Stroke switches are NORMALLY OPEN. The switch should close when the flipper is energized. All E.O.S. switches 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. **Note:** Unlike the old style of flipper, an E.O.S. switch failure does not harm the flipper. The game notifies the operator of the switch being mis-adjusted in the test report, but continues to play. The E.O.S. switches are a means by which the new electronic flippers feel and play with all of the subtleties of the old flippers.

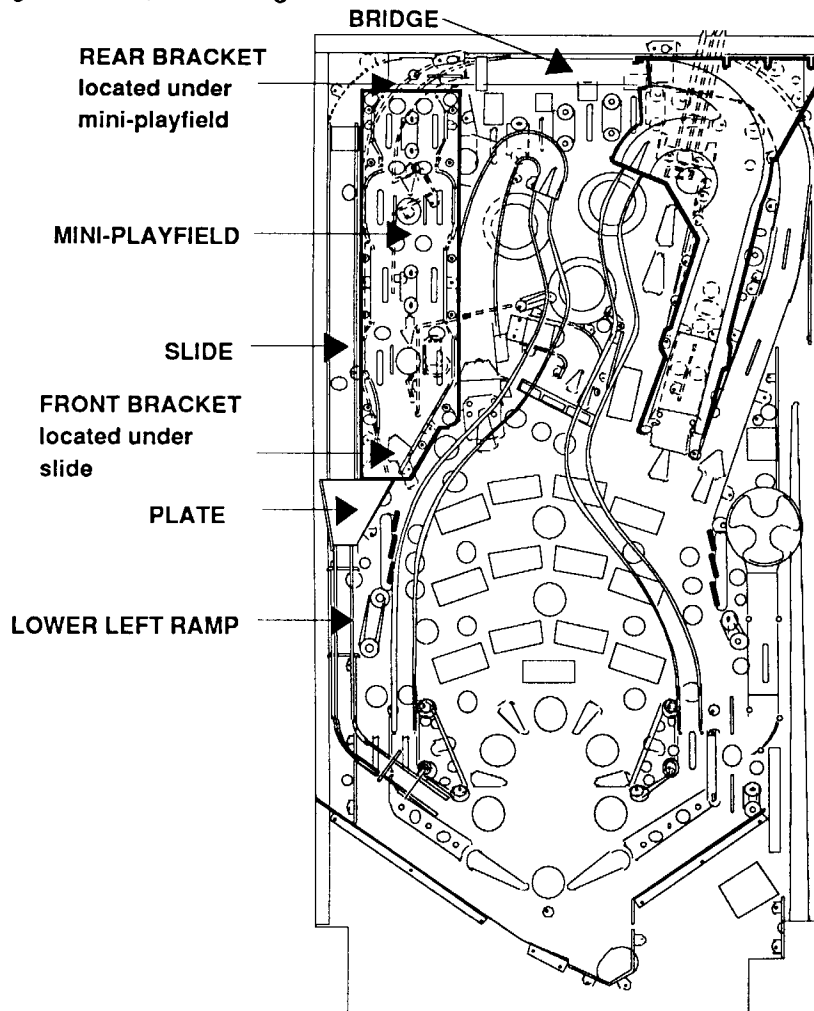
### CLEANING

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

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

## MINI-PLAYFIELD REMOVAL INSTRUCTIONS

1. Turn off power to the game. Open the coin door slide the latch handle toward the left and lift the front molding off the game. Carefully, slide the playfield glass down and off of the game. Lift the playfield and rest it on it's support legs on the front of the cabinet.
2. Disconnect the mini-playfield cables from the underside of the playfield. Be sure to match up the wire colors when reconnecting the cables.
3. Several devices must be removed before the mini-playfield is accessible. Start by removing the bridge above the mini-playfield. There are three screws (#8), two on the top and one on the bottom.
4. Now remove the lower left ramp. There is one nut (#8 ESN) holding the ramp to a plastic piece. Unscrew the nut and slide the ramp out of the plate.
5. Remove the plate and the slide. There are two screws (#8) holding the plate and two screws (#6) holding the slide. Remove the screws and lift these devices off of the game.
6. Loosen the set screw from the motor shaft at the rear of the mini-playfield.
7. Next, remove the two screws (#8) holding the mini-playfield front bracket. **DO NOT LET THE MINI-PLAYFIELD DROP. IF THIS HAPPENS, THE REAR BRACKET CAN BE DAMAGED.** Slide the mini-playfield straight forward, off of the game.



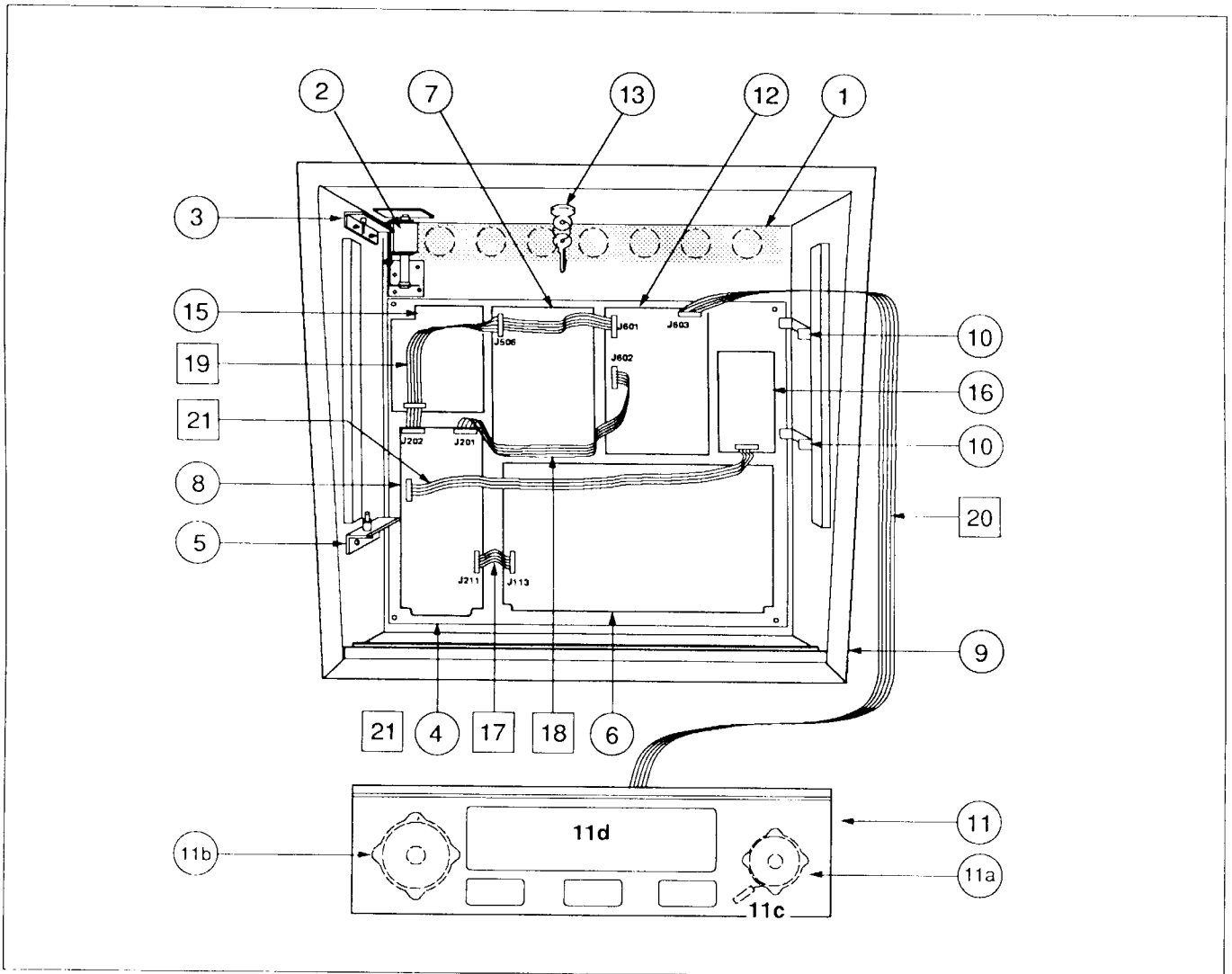
## **IDOL ASSEMBLY REMOVAL INSTRUCTIONS**

1. Open the coin door, slide the latch handle toward the left and lift the front molding off the game. Carefully slide the playfield glass down and off of the game. Install the Service Switch Actuator.
2. Enter the Idol Lock Test. Move the Idol Assembly until the set screw, located on the shaft under the plastic idol, is facing the plastic orange door. Turn off power to the game.
3. Hold the plastic orange door down and loosen the set screw.
4. Lift the idol assembly off of the game.
5. Raise the playfield. Unscrew the three plain hex head sems screws. Unplug the connector to the left of the motor.
6. Pull the idol motor off of the playfield.

# SECTION 2

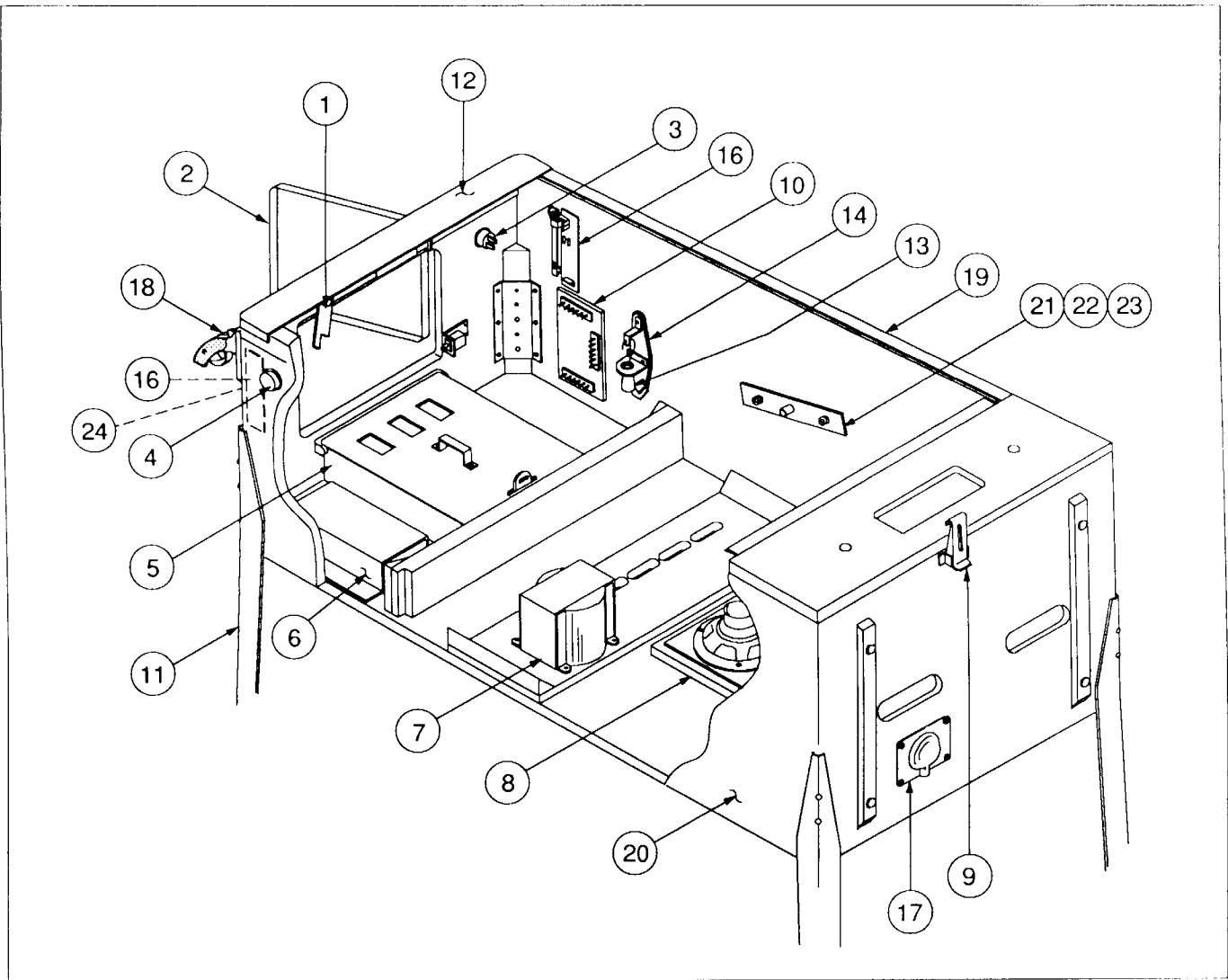
## *Parts Information*

# Backbox Assembly



Item	Part Number	Description	Item	Part Number	Description
1.	01-6645	Venting Screen	16.	A-16100	8-Driver PCB Assembly
2.	B-10686-1	Knocker & Bracket Assy.	<b>■ Ribbon Cables:</b>		
3.	A-12497	Upper Insert Bd Hinge Assy.	17.	5795-12653-03	Ribbon Cable, 3"
4.	A-14092-5	Mounting Plate Assembly	18.	5795-13018-01	Ribbon Cable, 9.5"
5.	A-12498	Lower Insert Bd Hinge Assy.	19.	5795-10938-14	Ribbon Cable, 14"
6.	A-12697-3	Power Driver Assembly	20.	5795-12838-30	Ribbon Cable, 30"
7.	A-16917-50017	WPC Sound Board	21.	5795-10938-32	Ribbon Cable, 32"
8.	A-12742-50017	WPC CPU Board	<b>■ Miscellaneous Parts:</b>		
9.	A-16123-50017	Backbox Assembly	A-8552-50017	Tempered Backglass Assy.	
10.	01-9047	Insert Stop Bracket	08-7456	Backbox Glass: 27" x 18-7/8"	
11.	A-16576	Speaker / Display Assy.	31-1357-50017	Screened Translight	
a)	5555-12924-00	Speaker, 4Ω, 15w	03-8228-2	Glass Channel Top (1)	
b)	5555-12856-00	Speaker, 5-1/4", 4Ω, 25w	03-8228-3	Glass Channel Edge (2)	
c)	5045-12914-00	Cap., 10μfd., 50v, (±20%)	03-8229-1	Glass Lift Channel (1)	
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.	50017-IN	Insert Board			
15.	A-15472-1	Fliptronic II Board			

# Cabinet Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-9174-4	Lever Guide Assembly
2.	09-23002-USA	Coin Door - 2 Slot
3.	20-9663-11	Start Button, Clear
4.	A-16883-4	Flipper Button - Red (2 Used)
5.	A-16828-1	Cashbox Assembly
6.	*	Line Filter Assembly
7.	5610-13491-00	WPC Transformer, 115/230v
8.	5555-12929-00	Speaker, 4Ω, 6", 25w
9.	20-9347	Toggle Latch
10.	A-14689	WPC Coin Door Interface Bd.
11.	C-10843-BR	Metal Leg Assembly
12.	A-16055	Front Molding Assembly
13.	20-6502-A	Plum Bob
14.	A-15361	Tilt Switch Assembly
15.	*	Cordset
16.	A-16384-1	Opto Flipper Assembly (2 Used)
17.	01-10714	Line Cord Cover

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
18.	A-16113	Gun Handle Assembly
19.	A-12359-3	Side Molding Assembly
20.	11-1102	Wood Cabinet
21.	01-11408	Spacer (2 Used)
22.	02-4329-01	Pivot Nut, 7/8" (4 Used)
23.	02-4352	Pivot Bushing (2 Used)
24.	A-17205	Switch & Cable Assembly
a)	20-9663-12	Extra Ball Push Button

## ■ Miscellaneous Parts:

08-7028-1	Tempered Playfield Glass, Wide Body: 23.75" x 43"
20-6500	Steel Ball, 1-1/16" (6)
01-10797	Playfield Support Bar, 18" Long
01-5148	Clip Bracket
08-7377	Leg Adjuster, 3"

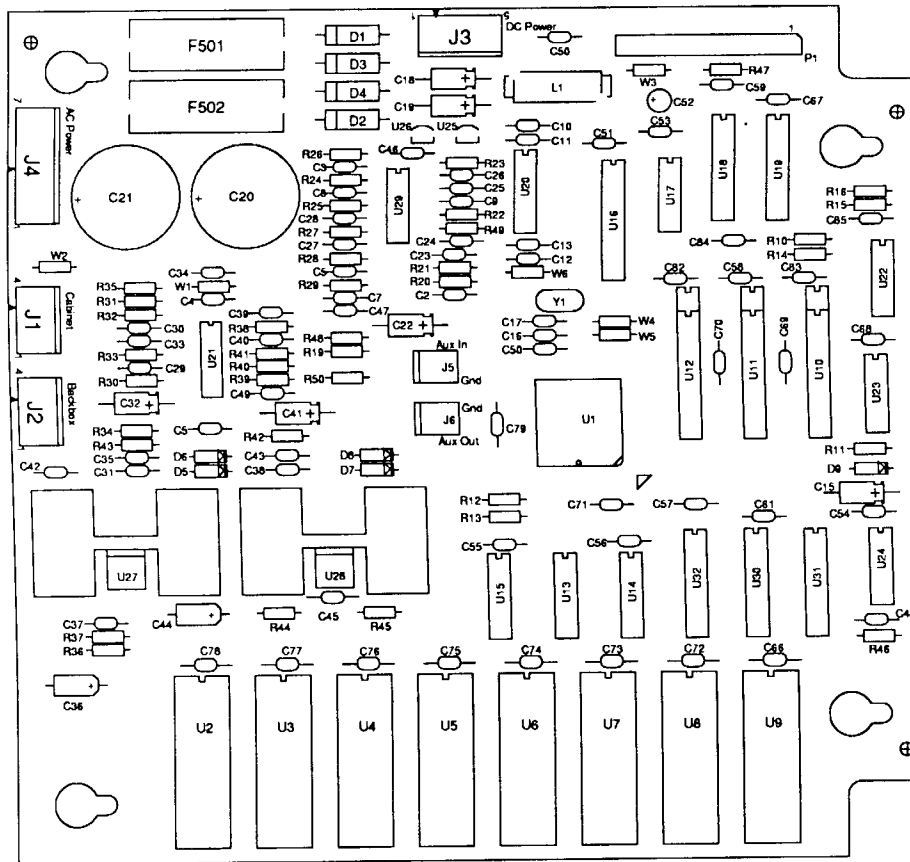
\* See Application Chart (p.2-4).

## 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	H-15756
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	✓										✓	✓

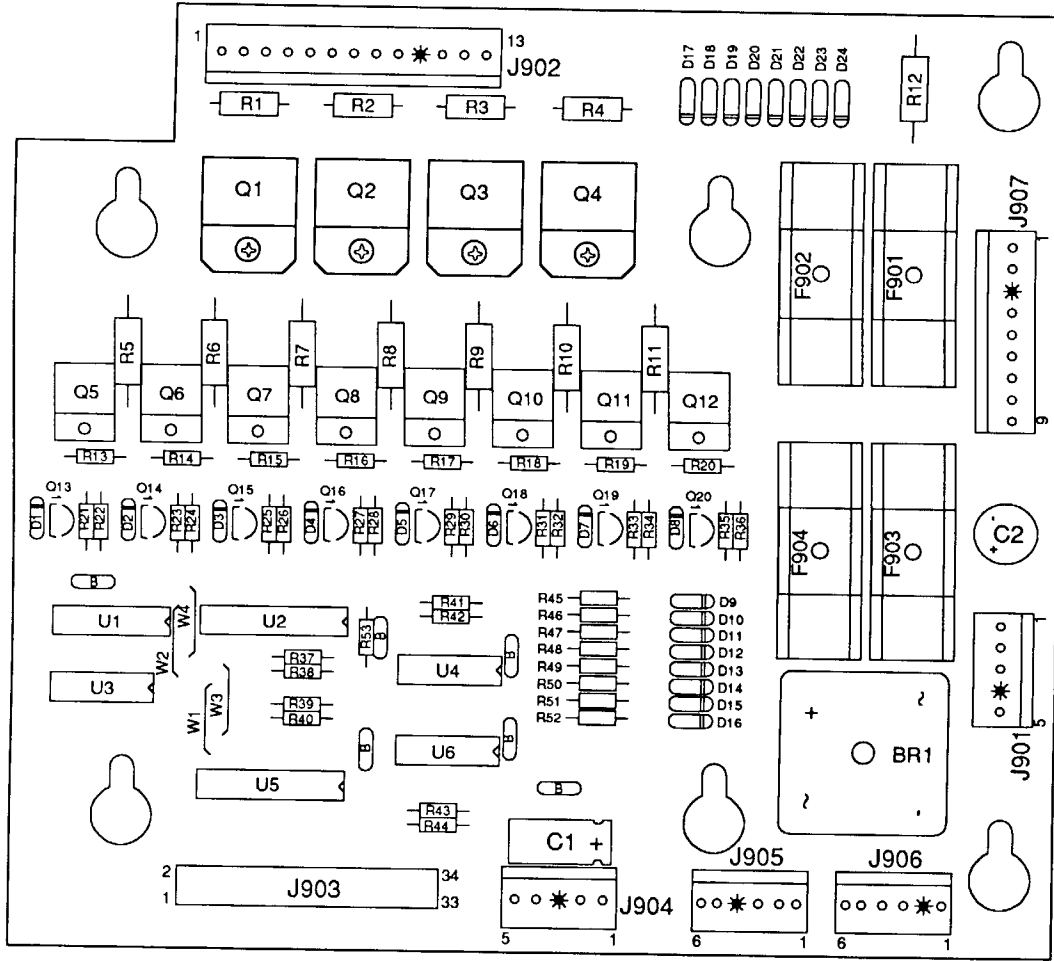


# A-16917-50017 Sound Board Assembly



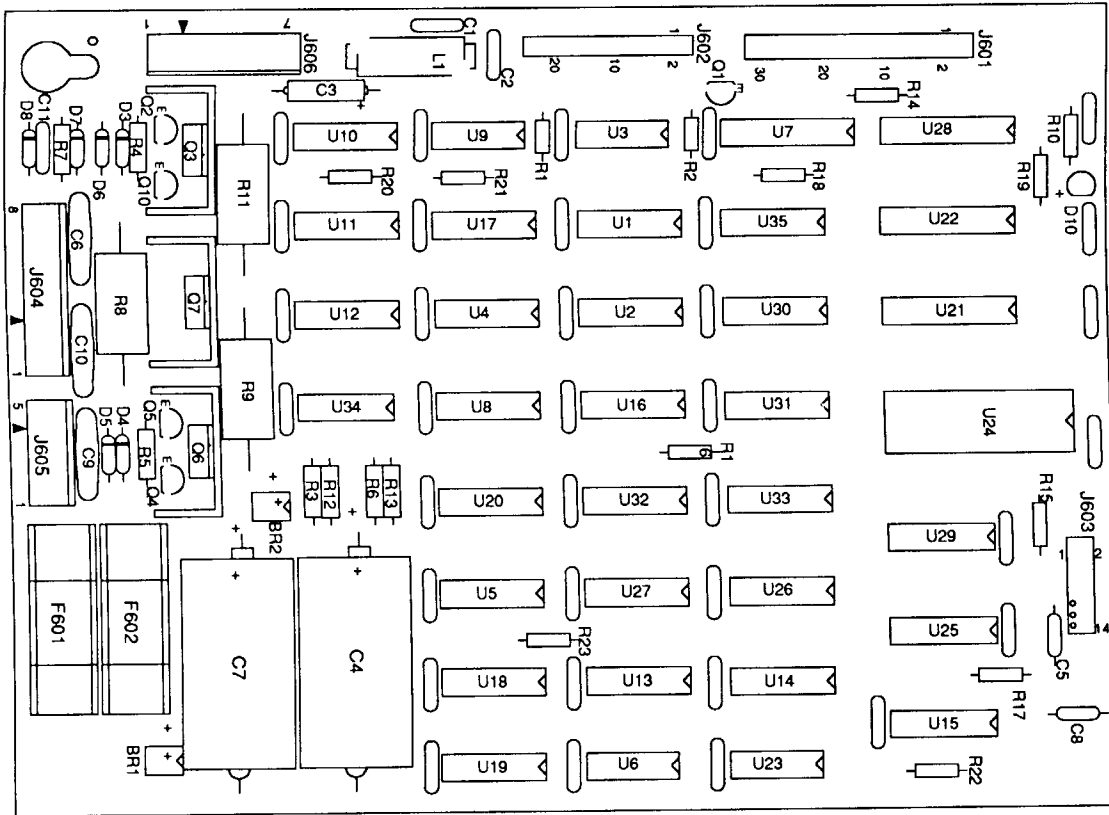
Part No.	Designator	Description	Part No.	Designator	Description
4004-01005-06	U27, U28	Mach. Screw, 4-40 x 3/8"	5070-09054-00	D5 - D9	1N4004 Signal Diode
4404-01119-00	U27, U28	Nut, 4-40	5250-13302-00	U25	78L05 Pos 5 Volt Reg TO-92
5010-08772-00	R39, R41	Resistor, 15K $\Omega$ , 1/4W, 5%	5250-13303-00	U26	79L05 Neg 5 Volt Reg TO-92
5010-08774-00	R30, R34, R37, R42, R45	Resistor, 22K $\Omega$ , 1/4W, 5%	5283-10551-00	U17	IC74F00 Fast Quad NAND Gate
5010-08991-00	R10, R12 -R16	Resistor, 4.7K $\Omega$ , 1/4W, 5%	5311-10946-00	U22	IC74HC74 Dual D Flip Flop
5010-09034-00	R47	Resistor, 10K $\Omega$ , 1/4W, 5%	5311-10947-00	U23	IC74HC125 quad Tri-State Buffer
5010-09035-00	R11, R19, R33, R40	Resistor, 47K $\Omega$ , 1/4W, 5%	5311-10948-00	U15	IC74HC138 1 of 8 Decoder
5010-09036-00	R46	Resistor, 100 $\Omega$ , 1/4W, 5%	5311-10954-00	U18, U19	IC74HCT374 Octal D Flip Flop
5010-09219-00	R31, R32, R38	Resistor, 8.2K $\Omega$ , 1/4W, 5%	5311-12043-00	U13, U14	IC74HC174 Hex D Flip Flop
5010-09358-00	R50	Resistor, 1K $\Omega$ , 1/4W, 5%	5311-12538-00	U24	IC74HC14 Hex Schmitt Inverter
5010-09534-00	W4, W6	Resistor, 0 $\Omega$ (Jumper)	5311-12287-00	U30 - U32	IC74HC541 Octal Bus Driver
5010-13420-00	R36, R44	Resistor, 680 $\Omega$ , 1/4w, 5%	5340-13304-00	U10 - U12	ICSRAM 2Kx8 35ns .300DIP
5010-13607-00	R20-R29, R48, R49	Resistor, 8.2K $\Omega$ , 1/4w, 5%	5370-12730-00	U21, U29	ICTL084 Quad op Amp
5010-13517-00	R35, R43	Resistor, 15 $\Omega$ , 1/4w, 5%	5370-13419-00	U27, U28	Audio Power Amp TDA2030AV
5040-09365-00	C15, C18, C19, C32, C41	Capacitor, 1 $\mu$ F, 63V, Alum Axial	5371-13299-00	U20	ICDAC AD-1851 16 bit
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.	5551-09822-00	L1	Inductor, 4.7 $\mu$ H, 3Amp
5041-09009-00	C36, C44	Capacitor, 22 $\mu$ F, 10V, Tant Axial	5700-12047-00	U16	IC socket 24 pin 0.300 DIP
5041-13187-00	C22	Capacitor, 4.7 $\mu$ F Tant Axial	5700-12088-00	U2 - U9	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	5705-12638-00	U27, U28	Heatsink 5298-B
5043-10267-00	C37, C45	Capacitor, 150pF, Cer Axial	5733-12060-01		Fuse Holder MT3AG(F501, F502)
5048-11028-00	C16, C17	Capacitor, 22pF, Cer Axial	5791-10862-04	J1, J2	Connector, 4-pin Header
5048-11029-00	C48	Capacitor, 100pF, Cer Axial	5791-10862-05	J3	Connector, 5-pin Header
5048-11030-00	C49	Capacitor, 470pF, Cer Axial	5791-10862-07	J4	Connector, 7-pin Header
5048-11033-00	C33	Capacitor, 0.022 $\mu$ F, 5%, Cer Axial	5791-12516-00	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-5343-50017-2	U2	EPROM Sub-Assembly
5048-13608-00	C8	Capacitor, 6800 pF, 50V, Cer Axial	A-5343-50017-3	U3	EPROM Sub-Assembly
5048-13609-00	C7, C24, C26	Capacitor, 3900 pF, 50V, Cer Axial	A-5343-50017-4	U4	EPROM Sub-Assembly
5048-13610-00	C2, C3, C9, C27, C29	Capacitor, 1000 pF, 50V, Cer Axial	A-5343-50017-5	U5	EPROM Sub-Assembly
5048-13611-00	C6, C23, C25, C28	Capacitor, 680 pF, 50V, Cer Axial	A-5343-50017-6	U6	EPROM Sub-Assembly
5070-09045-00	D1 - D4	MR-501 Rectifier Diode	A-5343-50017-7	U7	EPROM Sub-Assembly
			A-5343-50017-8	U8	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	5190-09016-005	Q13 - Q20	Transistor 2N4403 PNP
4406-01128-00	Q1-Q4	Nut 6-32 KEPS	191-12179-00	Q1-Q4	Transistor TIP36C PNP
5010-09034-00	R37 - R44, R53	Resistor, 10KΩ, 1/4w, 5%	5315-12009-00	U2	IC 74HCT374
5010-09358-00	R22, R24, R26, R28, R30, R32, R34, R36, R45 - R52	Resistor, 1KΩ, 1/4w, 5%	5315-12031-00	U5	IC 74HCT244
5010-09361-00	R1 - R4	Resistor, 220Ω, 1/2w, 5%	5315-12812-00	U1	IC 74HCT138
5010-09416-00	R21, R23, R25, R27, R29, R31, R33, R35	Resistor, 470Ω, 1/4w, 5%	5315-12951-00	U3	IC 74HCT00
5010-09534-00	W3, W4	Resistor, 0Ω	5370-12272-00	U4, U6	IC LM339 QUAD COMP
5010-10171-00	R13 - R20	Resistor, 56Ω, 1/4w, 5%	5791-10862-09	J907	Connector, 9-pin Header Sq. Pin
5011-12956-00	R5 - R12	Resistor, 2.7KΩ, 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
5043-08980-00	B	Capacitor, .01μF, 50v	5791-12461-06	J905, J906	Connector, Str Sq. Pin Header .100
			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)

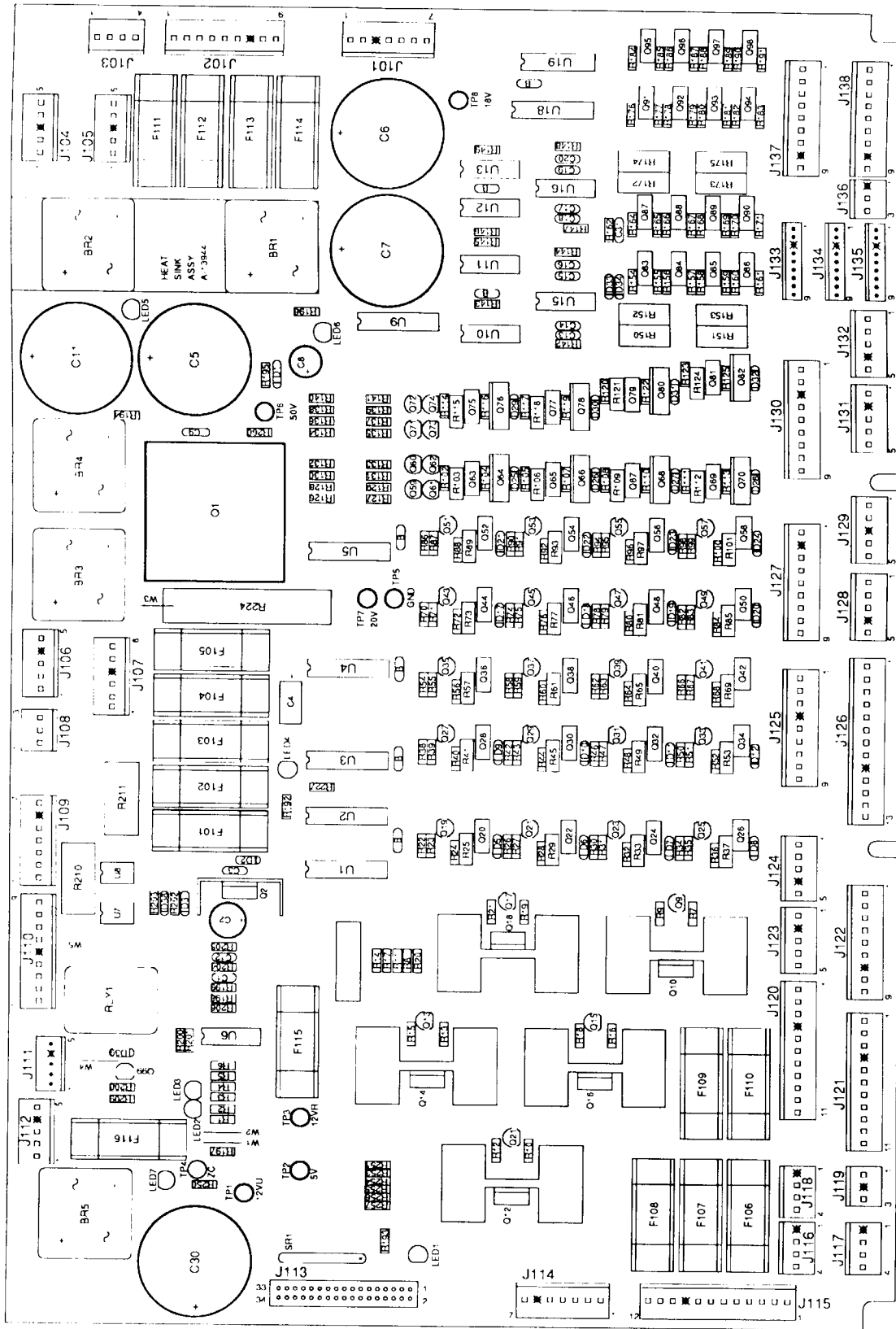
# A-14039 Dot Matrix Controller Assembly

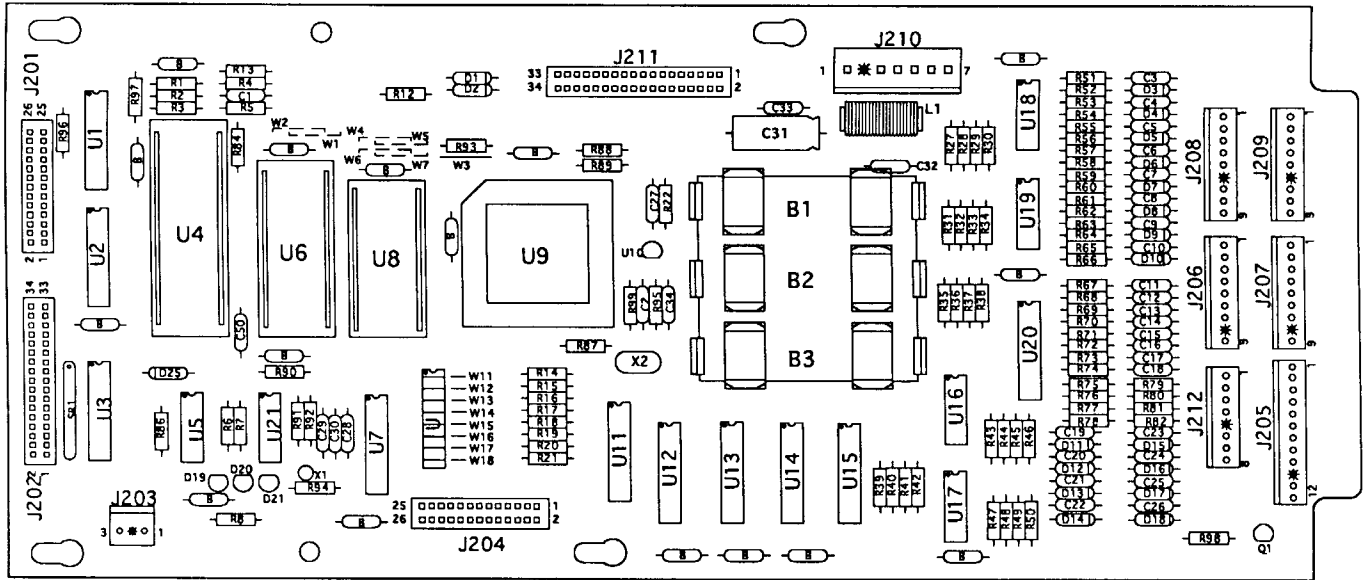


<u>Part Number</u>	<u>Ckt Designator</u>	<u>Description</u>	<u>Part Number</u>	<u>Ckt Designator</u>	<u>Description</u>
5010-08991-00	R1	Resistor, 4.7K $\Omega$ , 1/4w, 5%	5311-10947-00	U9	IC, 74HC125
5010-09224-00	R10	Resistor, 270 $\Omega$ , 1/4w, 5%	5311-10951-00	U10, U11	IC, 74HC161
5010-12832-00	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/RAM 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

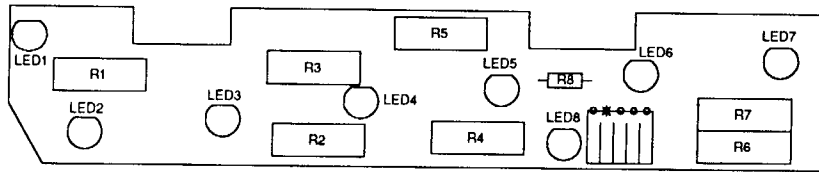
Item	Part Number	Ckt Designator	Description	Item	Part Number	Ckt Designator	Description
1	Not Used			32	5043-08996-00	C13-C20, C31	Capacitor, .1µfd, 50v (±20%)
2	4006-01005-06	Q1, Q2	Mach. Screw, 6-32 x 3/8	33	5043-09845-00	C1, C12	Capacitor, 1,000µfd, 50v (±20%)
3	4406-01128-00	Q1, Q2	Nut, 6-32 KEPS	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 SNUJT	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	R9, R12, R15, R18, R21, R23, R27, R31, R35, R39, R43, R47, R51, R55, R59, R63, R67, R71, R75, R79, R83, R87, R91, R95, R99, R126, R128, R130, R132, R134, R136, R138, R140, R227	Resistor, 4.7KΩ, 14w, 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	5162-12422-00	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, Q65, 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-R149, 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	R176, R178, R180, R182, R184, R186, R188, R190	Resistor, 1.2KΩ, 1/4w, 5%	47	5281-10182-00	U9	IC, 74LS240, L/Drvr
17	5010-09324-00	R206	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, R162, R193, R199, R200, R250	Resistor, 1KΩ, 1/4w, 5%	49	5460-12423-00	Q2	IC, LM7812
19	5010-09361-00	R104, R107, R110, R113, R116, R119, R122, R125	Resistor, 220Ω, 1/4w, 5%	50	Not Used		
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	Resistor, 470Ω, 1/4w, 5%	51	5671-13732-00	LED1 - LED7	Display LED Red
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		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	5791-12461-05	J111	Connector, 5-pin Header STR Sq.
				70	5791-12461-09	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	5041-09163-00	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





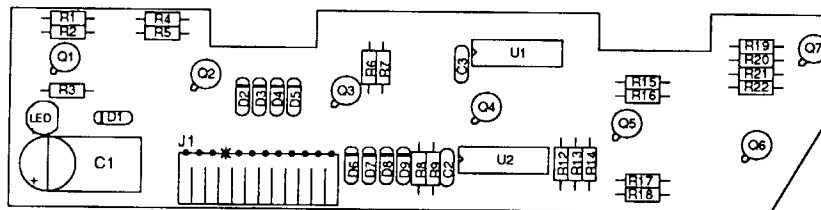
Part Number	Designator	Description	Part Number	Designator	Description
5010-09034-00	R14-R22, R27-R42, R86, R90, R94, R98	Resistor, 10KΩ, 1/4w, 5%	5281-09851-00	U5	IC, 74LS14, SMT/TRG
5010-09085-00	R1, R2, R4, R96, R97	Resistor, 1.5KΩ, 1/4w, 5%	5281-09867-00	U1, U2, U7	IC, Octal Buffer, 74LS244
5010-09314-00	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%)	5671-09019-00	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%)	5791-12461-08	J212	Connector, 8-pin Header Str Sq.
5070-08919-00	D2 - D18	Diode, 1N4148, 150MA	5791-12461-09	J206 - J209	Connector, 9-pin Header Sq. pin
5070-09266-00	D1, D25	Diode, 1N5817, 1.0A.	5791-12461-12	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-5343-50017-1	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 LED 7 Ball Trough Assembly



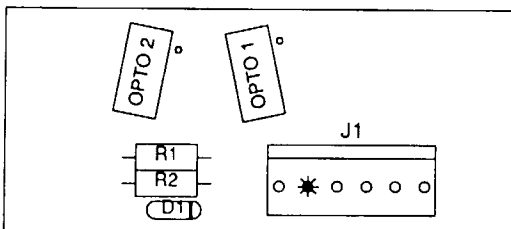
Part Number	Designator	Description
5791-12548-05	J1	Connector, 5-pin Header
5671-12731-00	LED1 - LED7	Diode-Infra Red
5010-12928-00	R1 -R7	Resistor, 270Ω, 2W, 5%
5671-09019-00	LED8	Display LED Red
5010-10631-00	R8	Resistor, 1.2KΩ, 1/4W, 5%

## A-16926 OPTO 7 Ball Trough Assembly



Part Number	Designator	Description	Part Number	Designator	Description
5163-12732-00	Q1 - Q7	Photo Transistor	5010-08774-00	R9, R17	Resistor, 22KΩ, 1/4W, 5%
5791-12548-12	J1	Connector, 12-pin Header	5010-09034-00	R12	Resistor, 10KΩ, 1/4W, 5%
5010-09999-00	R1, R2, R4-R7, R10, R11, R15, R16, R19-R22	Resistor, 2KΩ, 1/4W, 5%	5070-09054-00	D1 - D9	Diode 1N4004, 1.0A
5010-10631-00	R3	Resistor, 1.2KΩ, 1/4W, 5%	5370-12272-00	U1, U2	ICLM339 Quad
5010-09162-00	R18, R8, R13	Resistor, 100KΩ, 1/4W, 5%	5671-09019-00	LED1	Display LED Red
			5043-08980-00	C2, C3	Capacitor, 0.01μF, 50V
			5040-12298-00	C1	Capacitor, 100μFd, 40V (±50%)

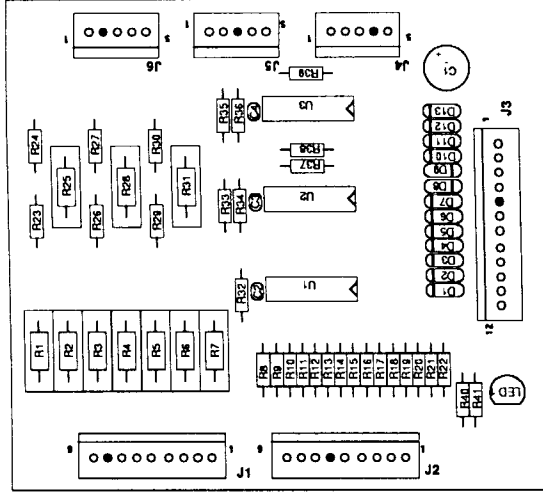
## A-16657 Motor Opto Switch Board



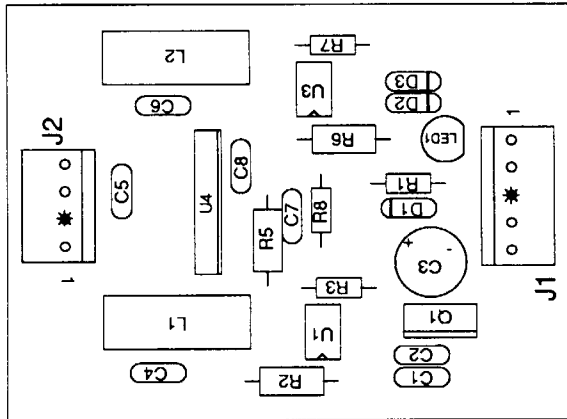
Part Number	Designator	Description
5791-10862-06	J1	Connector, 6-pin Header Str. Sq.
5010-08930-00	R1, R2	Resistor, 470Ω, 1/2w, 5%
5070-09054-00	D1	Diode 1N4004 1.0A.
5490-12451-00	OPTO1, OPTO2	Opto Inter Long 10mA

# Printed Circuit Boards

## A-15430 10-Switch Opto Assembly



## A-15946 Bridge Driver Assembly

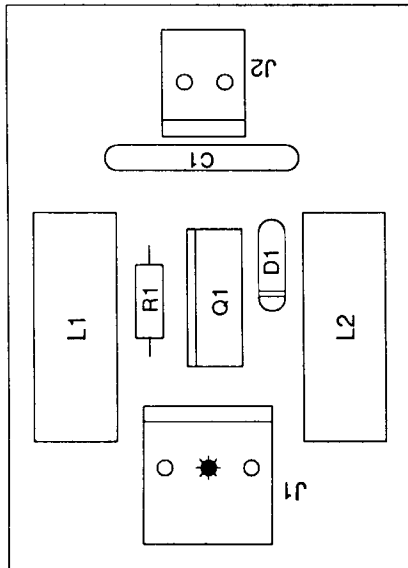


Part Number	Designator	Description
5040-10974-00	C1	Capacitor, 100µfd, 35v (+80, -20%)
5043-08980-00	C2 - C4	Capacitor, 0.01µfd, 50v (+1, -20%)
5671-09019-00	LED1	Display LED 1 Red
5370-12272-00	U1 - U3	IC LM339 Quad
5070-09054-00	D1 - D13	Diode 1N4004 1.0A.
5010-12928-00	R1 - R7, R25, R28, R31	Resistor, 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

Part Number	Designator	Description
5791-12273-04	J2	Connector, 4-pin Header Str Sq.
5791-12273-05	J1	Connector, 5-pin Header Str Sq.
5671-09019-00	LED1	Display LED Red
5070-09054-00	D1-D3	Diode 1N4004, 1.0A.
5551-09822-00	L1, L2	Ind. 4.7µΩ, 3.0A.
5010-09061-00	R2, R6	Resistor, 680Ω, 1/2w, 5%
5010-10255-00	R5	Resistor, 10Ω, 1/2w, 5%
5010-09085-00	R1	Resistor, 1.5KΩ, 1/4w, 5%
5010-08997-00	R3, R7, R8	Resistor, 2.7KΩ, 1/4w, 5%
5040-10974-00	C3	Capacitor, 100µfd, 35v RAD
5370-13342-00	U4	I.C. 3A DMOS Bridge Driver
5490-10892-00	U1, U3	Opto Isolator 4N25
5250-09157-00	Q1	Reg 7805 1.A, 5V
5043-08980-00	C2, C4, C6-C8	Capacitor, 0.01µfd, 50v (+80, -20%)
5043-08996-00	C5	Capacitor, 0.1µfd, 50v (±20%)
5041-09031-00	C1	Capacitor, 1µfd, 25v (±20%) Axial

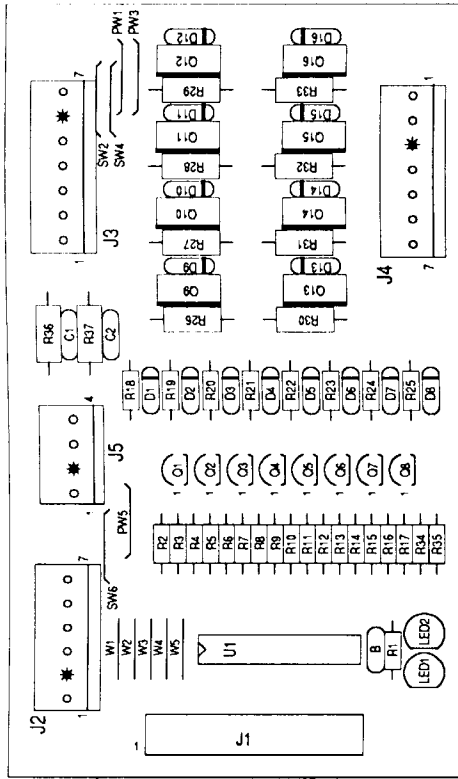


## A-15340 Motor EMI Board



Part Number	Designator	Description
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.
5010-08998-00	R1	Resistor, 2.2K $\Omega$ , 1/4w, 5%
5070-09054-00	D1	Diode 1N4004, 1.0A.
5162-12635-00	Q1	Transistor TIP 102

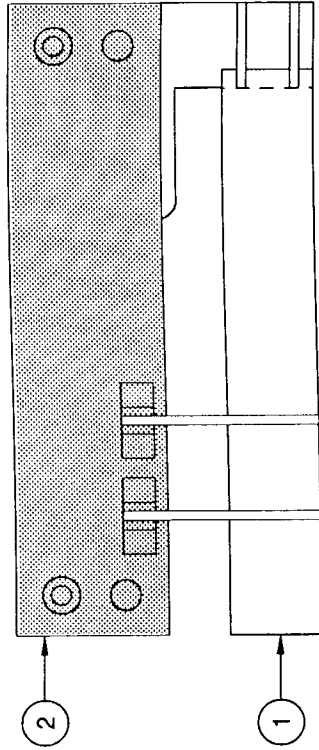
## A-16100 8-Driver PCB Assembly



Part Number	Designator	Description
5317-13400-00	U1	IC74ALS576 O/F-F
5190-09016-00	Q1 - Q8	Trans. 2N4403 PNP
5162-12635-00	Q9 - Q16	Trans. TIP 102NPN
5070-09054-00	D1 - D16	Diode, 1N4004, 1.0A.
5010-08991-00	R1, R2, R4, R6, R8, R10, R12, R14, R16, R3, R5, R7, R9, R11, R13, R15, R17	Resistor, 4.7K $\Omega$ , 1/4w, 5%
5010-09416-00	R3, R5, R7, R9, R11, R13, R15, R17	Resistor, 470 $\Omega$ , 1/4w, 5%
5043-08980-00	B	Capacitor, .01 $\mu$ F, 50v(+80, -20%)
5010-10171-00	R18 - R25	Resistor, 56 $\Omega$ , 1/4w, 5%
5011-12956-00	R26 - R33	Resistor, 2.7K $\Omega$ , 1/4w, 5%
5010-09314-00	R35	Resistor, 1.2K $\Omega$ , 1/4w, 5%
5010-09224-00	R34	Resistor, 270 $\Omega$ , 1/4w, 5%
5671-09019-00	LED1, LED2	Disp. Red LED
5010-08930-00	R37	Resistor, 470 $\Omega$ , 1/2w, 5%
5043-09065-00	C2	Capacitor, 470PF, 50v( $\pm$ 20%)
5010-09534-00	W4, SW2, SW4, SW6	Resistor, 0 $\Omega$ (Jumper)
5791-10850-00	J1	Connector, 26-pin Header Str
5791-10862-06	J2	Sq.100
5791-10862-07	J3, J4	Connector, 6-pin Header Str Sq.100
5791-10862-04	J5	Connector, 7-pin Header Str Sq.100
		Connector, 4-pin Header Str Sq.100

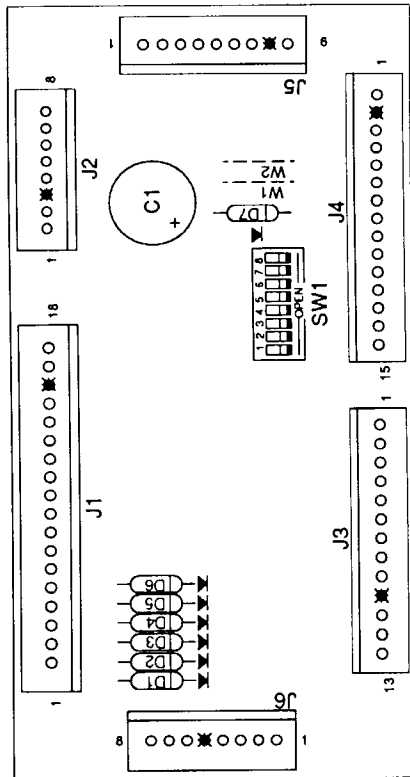
# Printed Circuit Boards

**A-16384-1  
Flipper Opto Assembly**



Item	Part Number	Description
1.	03-8795	Interrupter Flip/Opto
2.	A-16384	Flipper Opto Switch Assy.
	5010-08930-00	Resistor, 470Ω, 1/2W, 5%
	5490-12451-00	Opto Inter Lg. 10mA.
	5791-12462-07	Connector, 7-pin Header

**A-14689  
WPC Coin Door Interface Board**

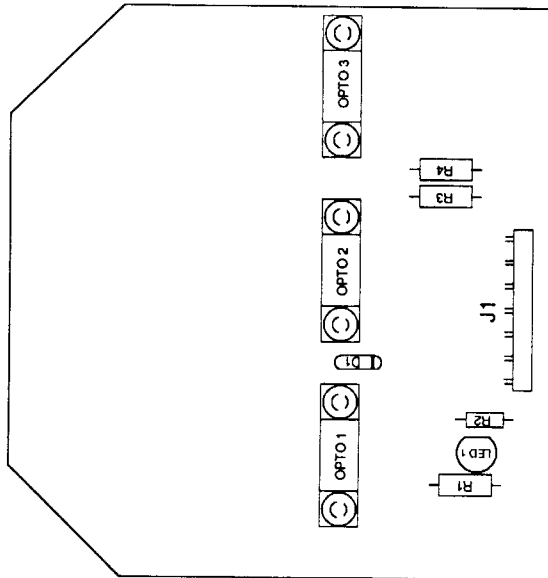


Part Number	Designator	Description
5070-09054-00	D1-D7	Diode, 1N4004, 1.0A.
5791-10862-18	J1	Connector, 18-pin Header Str Sq.
5791-10862-08	J2, J6	Connector, 8-pin Header Str Sq.
5791-10862-13	J3	Connector, 13-pin Header Str Sq.
* 5791-10862-15	J4	Connector, 15-pin Header Str Sq.
* 5791-10862-09	J5	Connector, 9-pin Header Str Sq.
* 5645-09025-00	SW1	Switch DIP 8-Position

**Notes:**

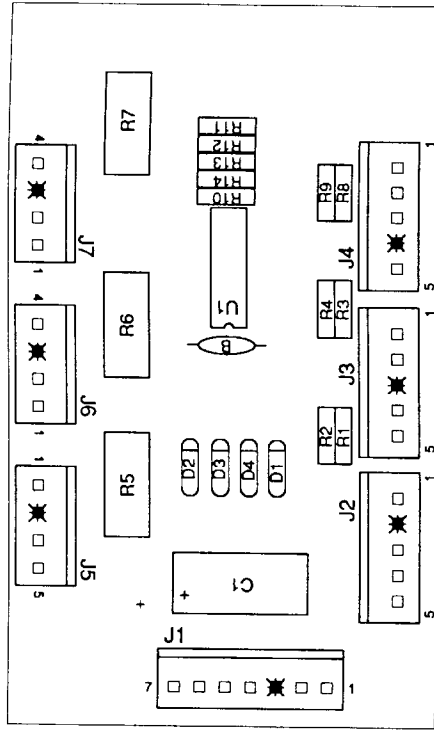
1. For Belgium, France, Finland, Sweden and England use A-14689-1 Coin Door Interface Board.
2. \* = Used on Electronic Coin Door only.

### A-13609 3-Bank Drop Target Opto Board



Part Number	Designator	Designator
5490-13341-00	OPTO 1 - OPTO 3	Opto Inter w/Tab 10MA.
5010-08930-00	R1, R3, R4	Resistor, 470Ω, 1/2w, 5%
5010-09314-00	R2	Resistor, 1.2KΩ, 1/4w, 5%
5070-09054-00	D1	Diode 1N4004 1.0A.
5671-09019-00	LED 1	Disp. LED Red
5791-10869-07	J1	Connector, 7-pin Header R/A Sq.
20-9864	OPTO 1 - OPTO 3	Eyelet, 1/8 x 7/32" Lg.

### A-13901-2 Opto Ramp Switch Board



Part Number	Designator	Designator	Description
5010-08774-00	R10, R13	R10, R13	Resistor, 22ΩK, 1/4w, 5%
5010-09034-00	R14	R14	Resistor, 10KΩ, 1/4w, 5%
5010-09162-00	R11, R12	R11, R12	Resistor, 100KΩ, 1/4w, 5%
5010-09999-00	R1 - R4, R8, R9	R1 - R4, R8, R9	Resistor, 2KΩ, 1/4w, 5%
5010-12733-00	R5 - R7	R5 - R7	Resistor, 220Ω, 1w, 5%
5040-12298-00	C1	C1	Capacitor, 100µfd., 40v (+50, -10%)
5043-08980-00	B	B	Capacitor, .01µfd., 50v (+80, -20%)
5070-09054-00	D1 - D4	D1 - D4	Diode, 1N4004
5370-12272-00	U1	U1	IC, LM339 Quad.
5791-12273-05	J2, J3, J4	J2, J3, J4	Connector, 5-pin Header Sq.
5791-12273-07	J1	J1	Connector, 7-pin Header Sq.

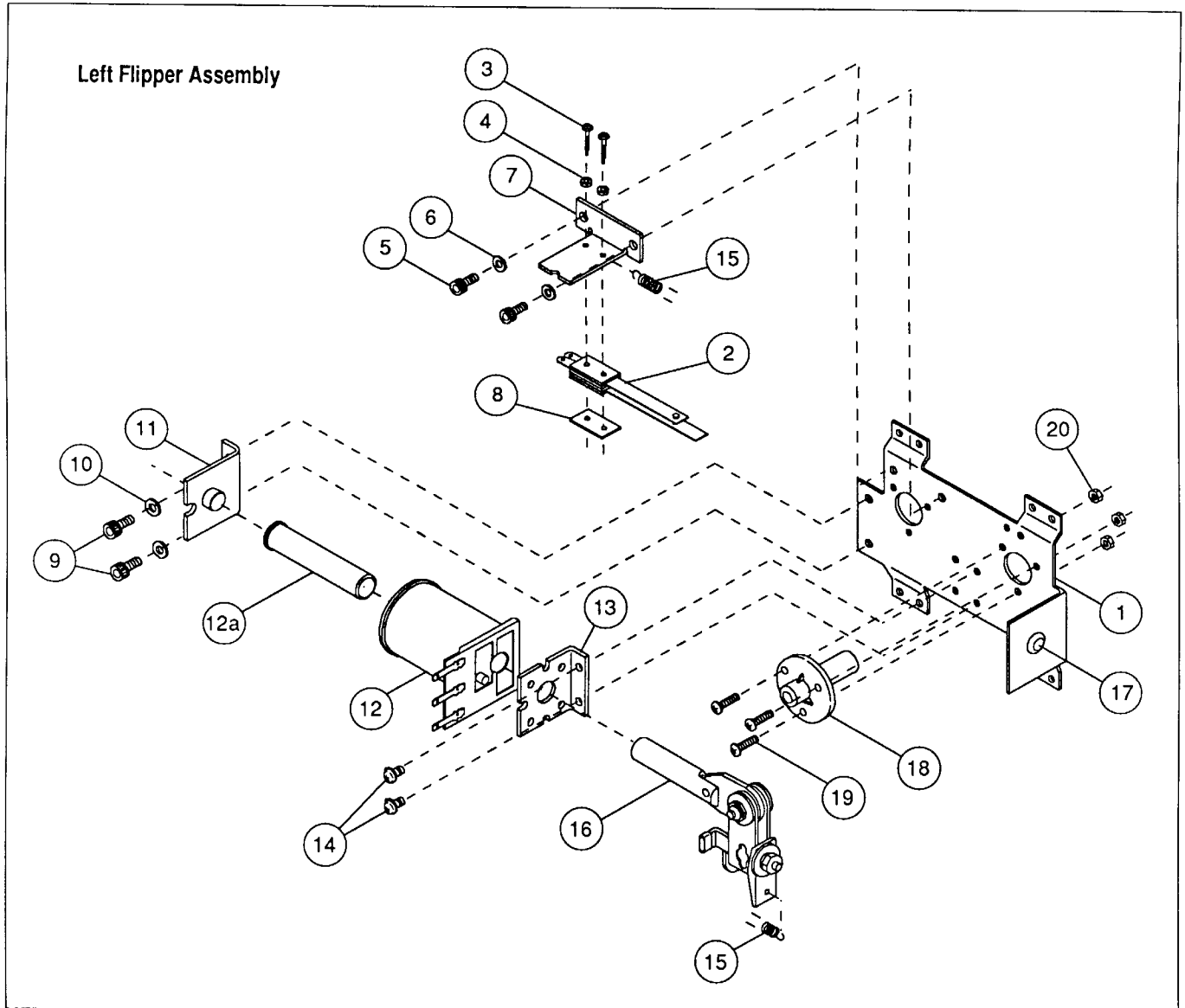
## A-15205-L-2 & A-15205-R-2      Fliptronic II Flipper Assembly

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	B-13104-R	Flipper Base Assy., Right
	<b>B-13104-L</b>	<b>Flipper Base Assy., Left</b>
2.	SW-1A-194	Switch Assembly
3.	4701-00002-00	Lockwasher, #6 Split
4.	4105-01019-10	Sh. Metal Screw, #5 x 5/8 P-RH-A
5.	4008-01079-05	Mach. Screw, 8-32 x 5/16 H-SOC
6.	4701-00003-00	Lockwasher, #8 Split
7.	01-9375	Switch Mounting Bracket
8.	20-6516	Speednut, Tinnerman
9.	4010-01066-06	Cap Screw, 10-32 x 3/8, SH
10.	4701-00004-00	Lockwasher, #10 Split
11.	A-12390	Flipper Stop Assembly
12.	FL-11629	Flipper Coil (Blue)
a)	03-7066-5	Coil Tubing
13.	01-7695	Solenoid Bracket
14.	4006-01017-04	Mach. Screw, 6-32 x 1/4 P-RH-S
15.	10-364	Spring
16.	B-13882-R	Crank Link Assembly, Right
	<b>B-13882-L</b>	<b>Crank Link Assembly, Left</b>
a)	B-13884-R	Flipper Crank Assembly, Right
	<b>B-13884-L</b>	<b>Flipper Crank Assembly, Left</b>
b)	A-10656	Flipper Link Assembly
c)	02-4179	Link Spacer Bushing
d)	4010-01086-14	Cap Screw, 10-32 x 7/8 SH
e)	4700-00023-00	Flatwasher, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lockwasher #10 Split
g)	4410-01132-00	Nut, 10-32 ESN
17.	23-6577	Bumper Plug, 5/8"
18.	03-7568	Flipper Bushing
19.	4006-01005-06	Mach. Screw, 6-32 x 3/8 P-PH
20.	4406-01117-00	Nut, 6-32 Hex

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

21.	23-6695	Flipper Rubber Ring, 1-1/2" dia. (Black)
22.	20-9250-5	Flipper & Shaft (White)

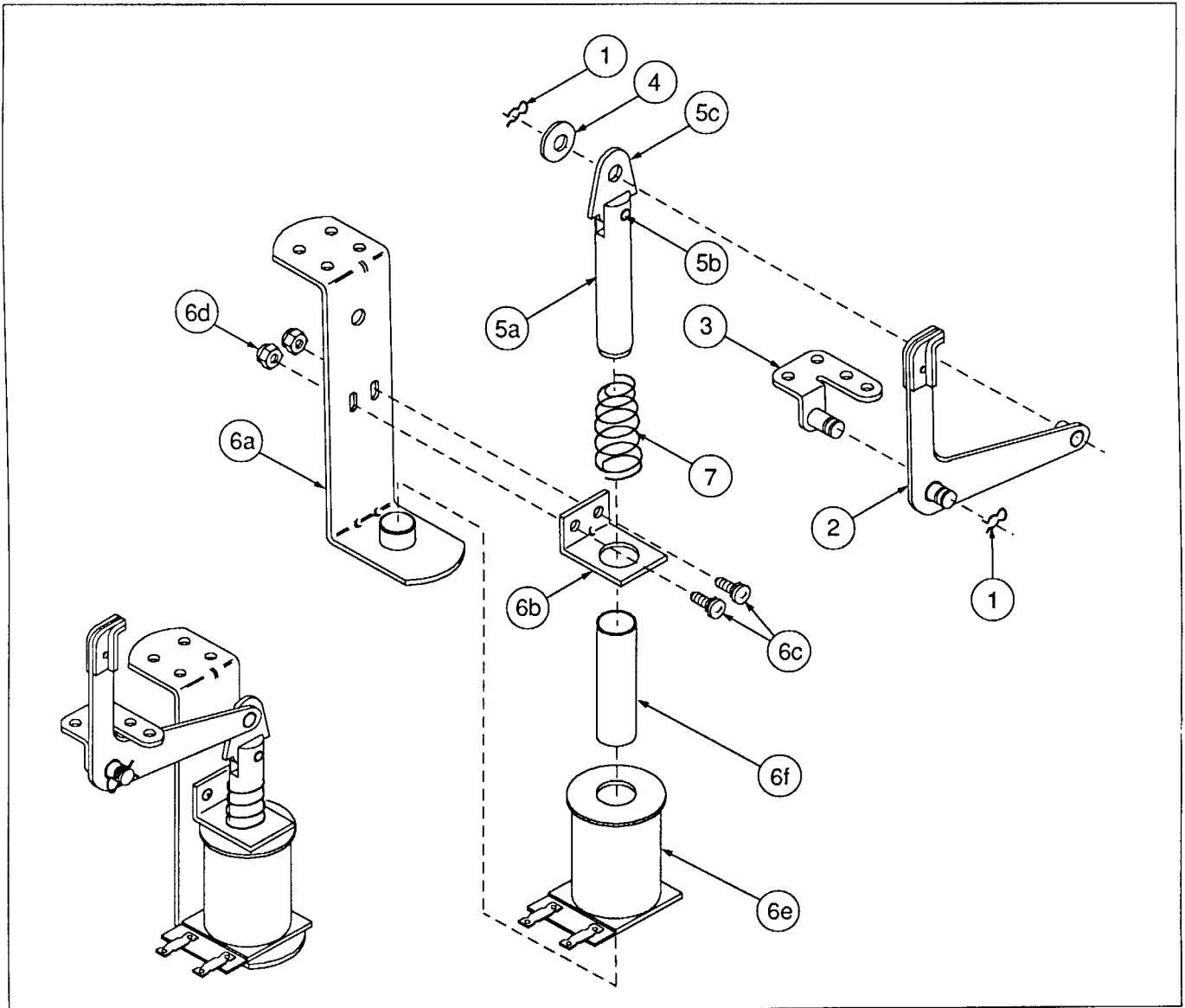
## A-15205-L-2 & A-15205-R-2 Fliptronic II Flipper Assembly



### ■ 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.

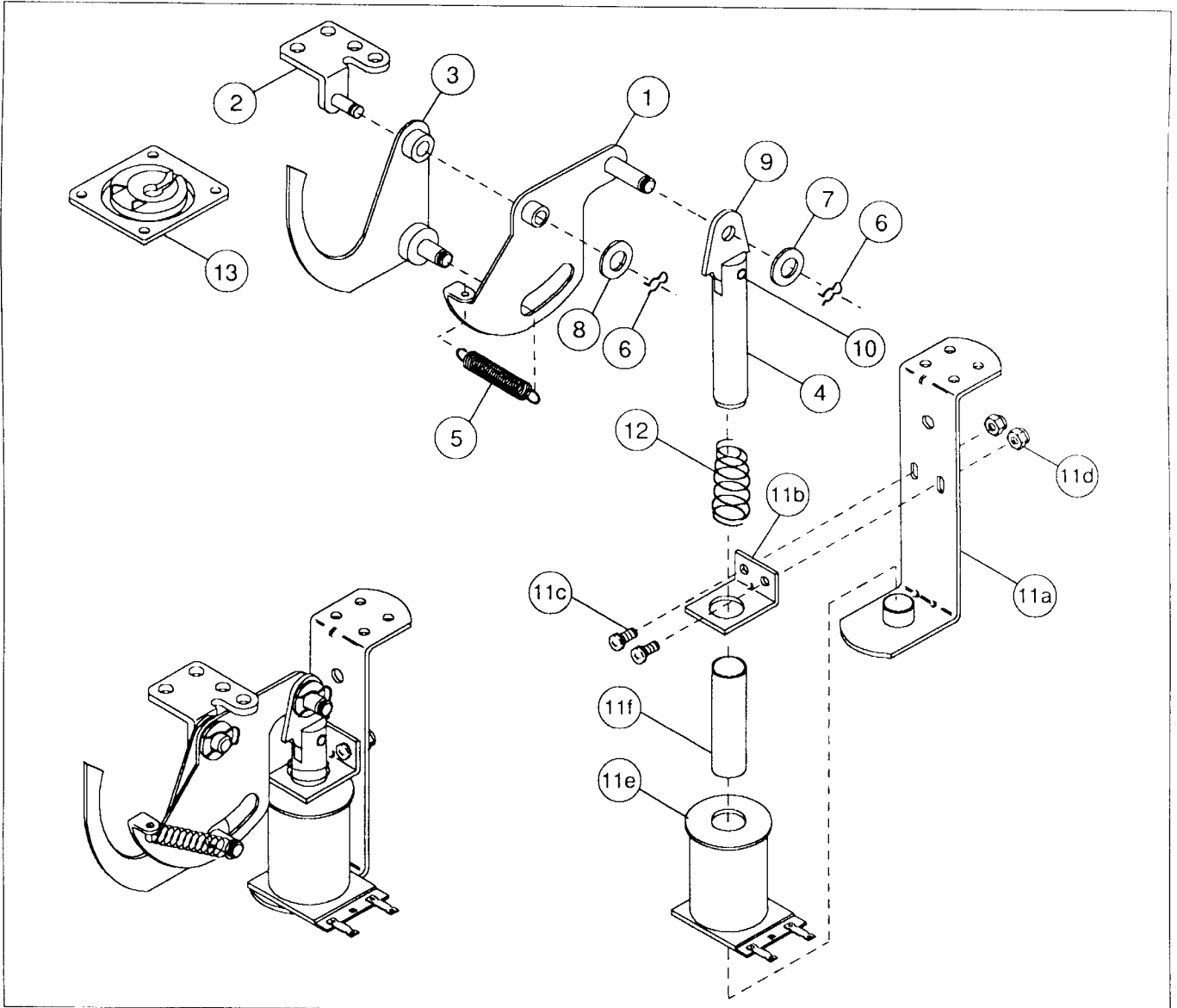
## B-12665 Kicker Arm (Slingshot) Assembly



### 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.	12-6227	Hairpin Clip	6.	<b>A-14369-R</b>	<b>Coil &amp; Bracket Assy., Right</b>
2.	A-12664	Kicker Crank Assembly		<b>A-14369-L</b>	<b>Coil &amp; Bracket Assy., Left</b>
3.	A-5653	Mounting Bracket Assembly	a)	B-7572-1	Bracket & Stop Assembly
4.	4700-00030-00	Flatwasher, 17/64 x 1/2 x 15ga.	b)	01-8-508-S	Coil Retaining Bracket
5.	A-5103	Coil Plunger Assembly	c)	4006-01017-06	Mach. Screw, 6-32 x 3/8
a)	02-2364	Coil Plunger	d)	4406-01119-00	Nut, 6-32 ESN
b)	03-8085	Armature Link	e)	AE-27-1200	Coil Assembly
c)	20-8716-5	Roll Pin, 1/8 x 7/16"	f)	03-7066	Coil Tubing
			7.	10-128	Spring

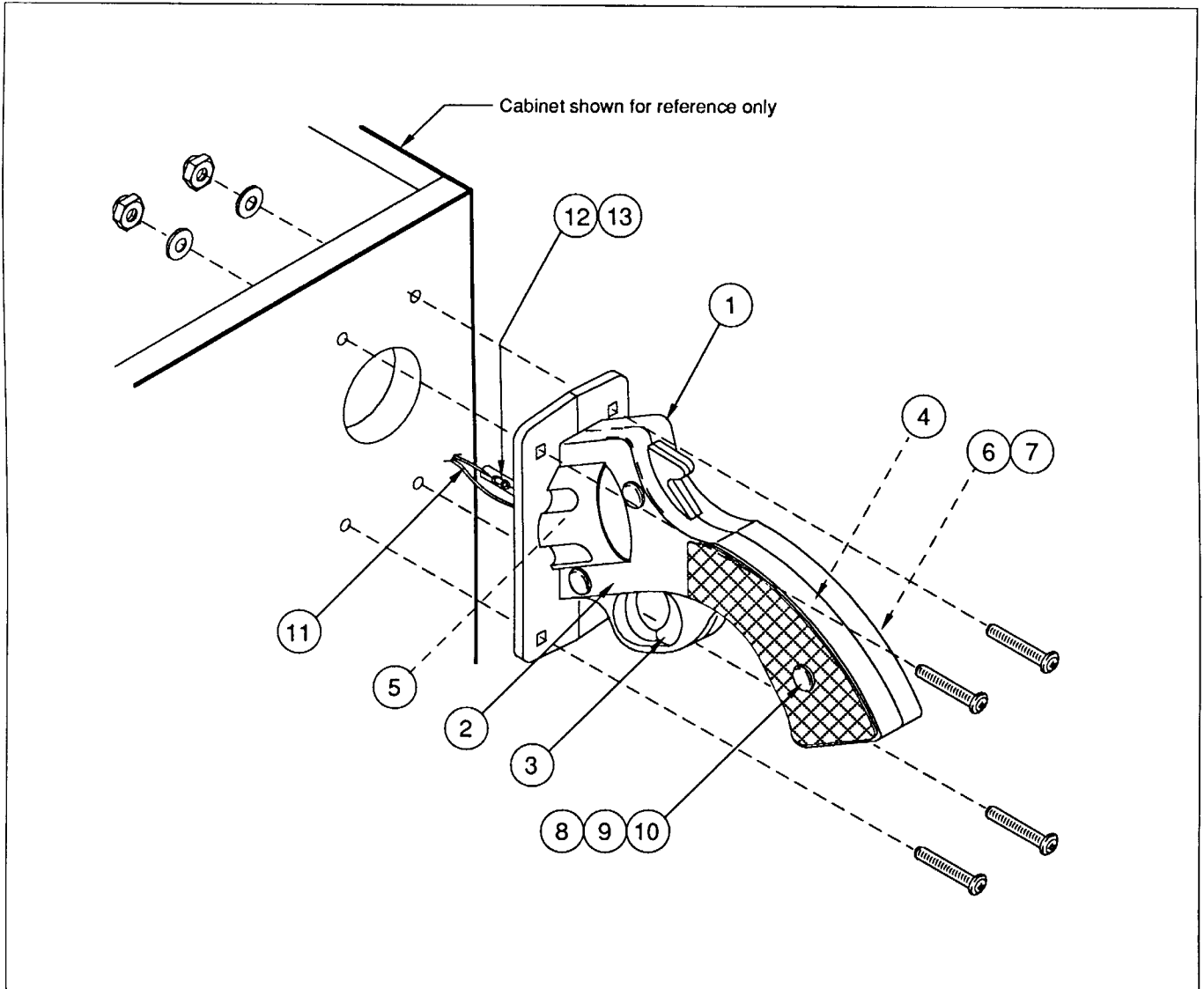
## A-17073      Ball Eject Assembly - Special



■ Associated Parts:

<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-6949-R	Spring Plate Assembly	11	<b>B-9362-L-2</b>	Coil & Bracket Assembly
2.	A-8268	Mounting Bracket Assembly	a)	B-7572-1	Bracket & Stop Assembly
3.	A-7471-R	Eject Cam Assembly	b)	01-8-508-S	Coil Retaining Bracket
4.	02-2364	Plunger Coil	c)	4006-01017-06	Mach. Screw, 6-32 x 3/8
5.	10-320	Spring - Eject	d)	4406-01119-00	Nut, 6-32 ESN
6.	12-6227	Hair Pin Clip (2)	e)	AE-26-1200	Coil Assembly
7.	4700-00030-00	Flatwasher, 17/64 x 1/2 x 15ga.	f)	03-7066	Coil Tubing
8.	4700-00103-00	Flatwasher, 17/64 x 1/2 x 28ga.	12.	10-128	Spring
9.	03-8085	Armature Link	13.	03-7351-1-9	Eject Shield
10.	20-8716-5	Roll Pin, 1/8 x 7/16"			

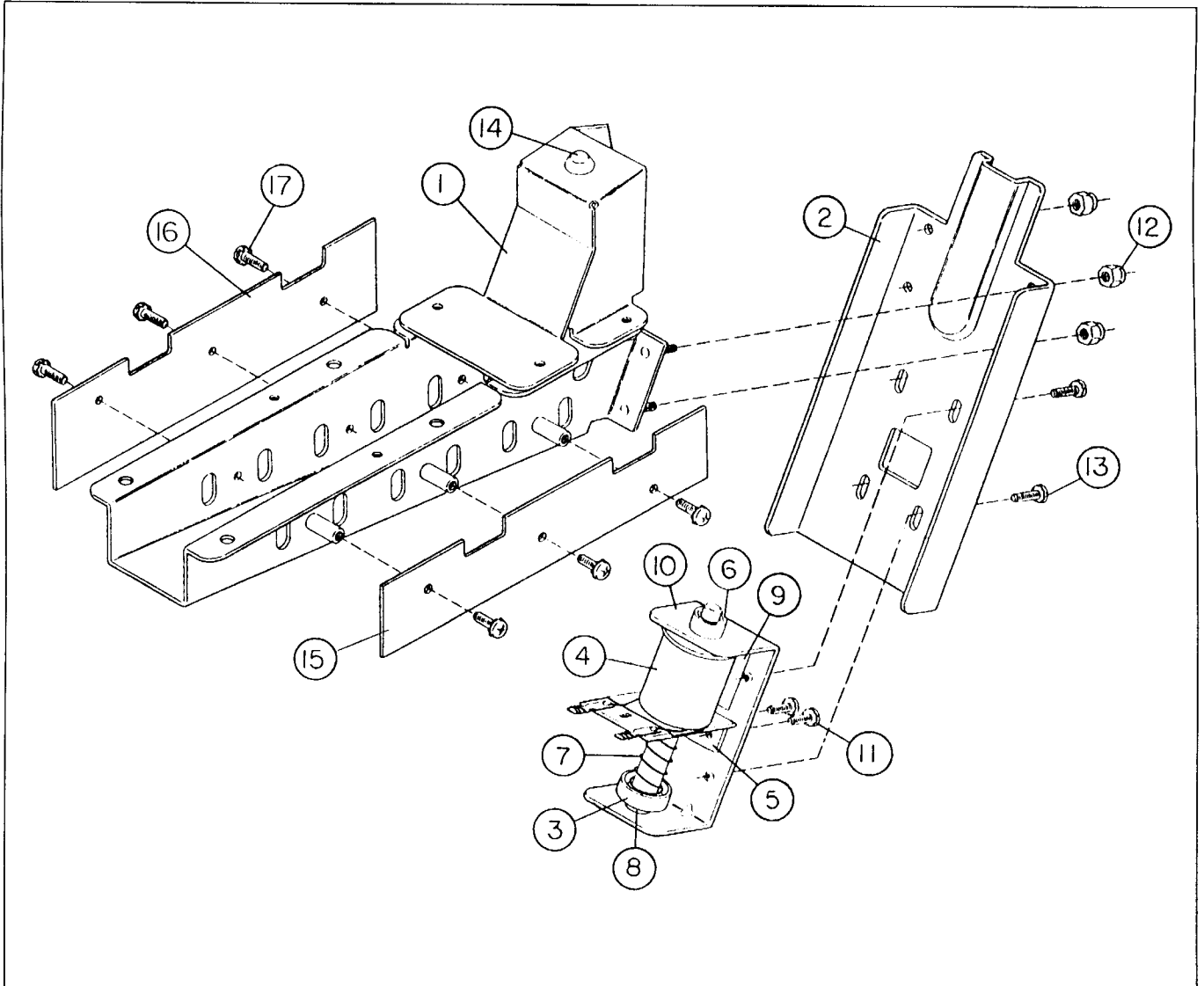
## A-16113 Gun Handle Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	21-6692-1	Gun Handle, Right
2.	21-6692-2	Gun Handle, Left
3.	01-11066	Trigger
4.	10-320	Extension Spring (Red)
5.	5647-12133-12	Miniature Switch
6.	02-4547	Fastner
7.	4702-00014-00B	Lockwasher #1/4, Int. Tooth (Black)
8.	4700-00129-00B	Flatwasher, 13/64 x 15/32 x 22ga.
9.	4702-00013-00B	Lockwasher #10, Int. Tooth (Black)
10.	4010-01097-06B	Mach. Screw, #10-32 x 3/8 TR-BH
11.	H-16871	Cable Assembly
12.	RM-21-03	Tubing #10
13.	5070-09054-00	Diode 1N4004

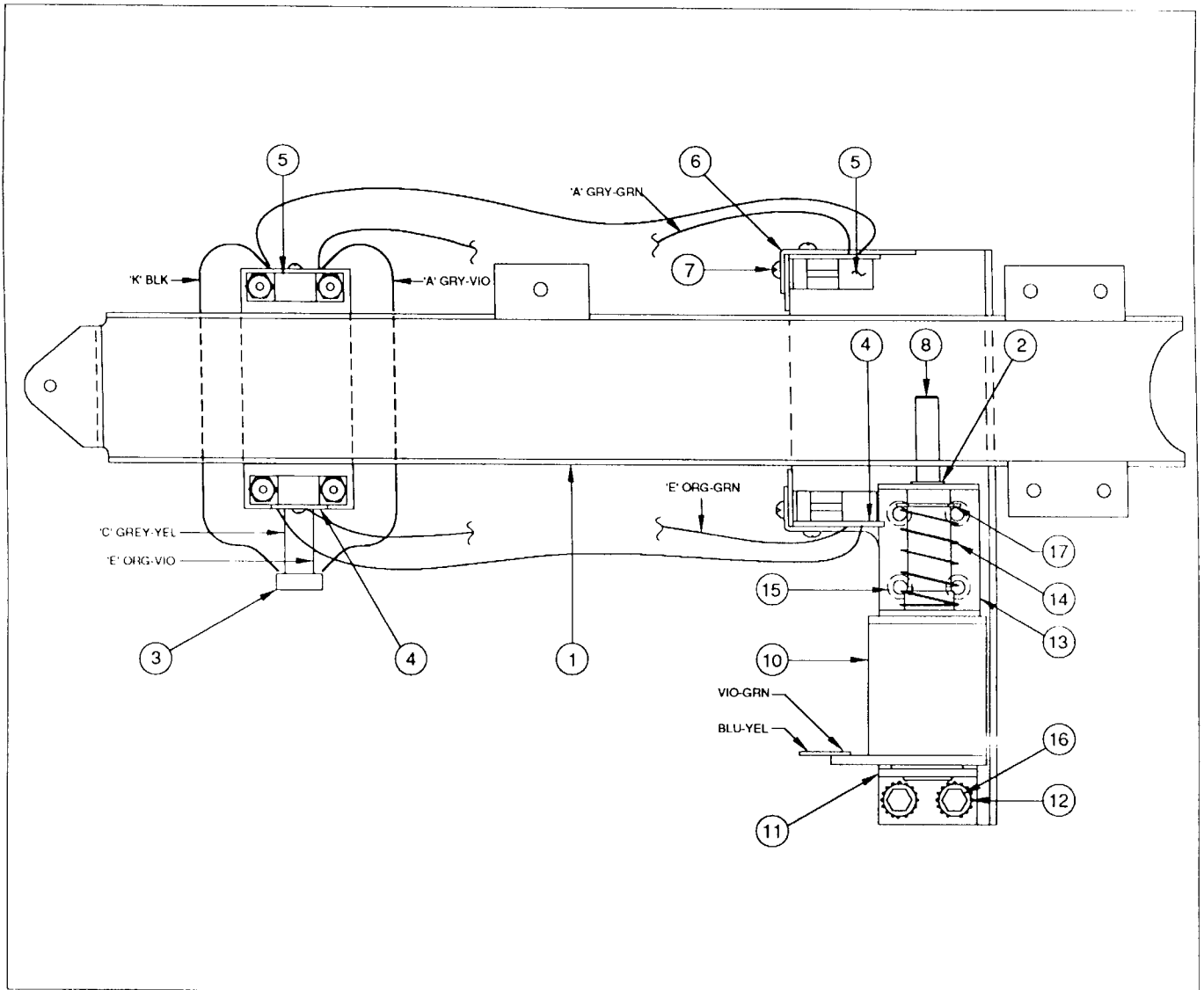


## A-16765      Ball Trough Assembly - Complete



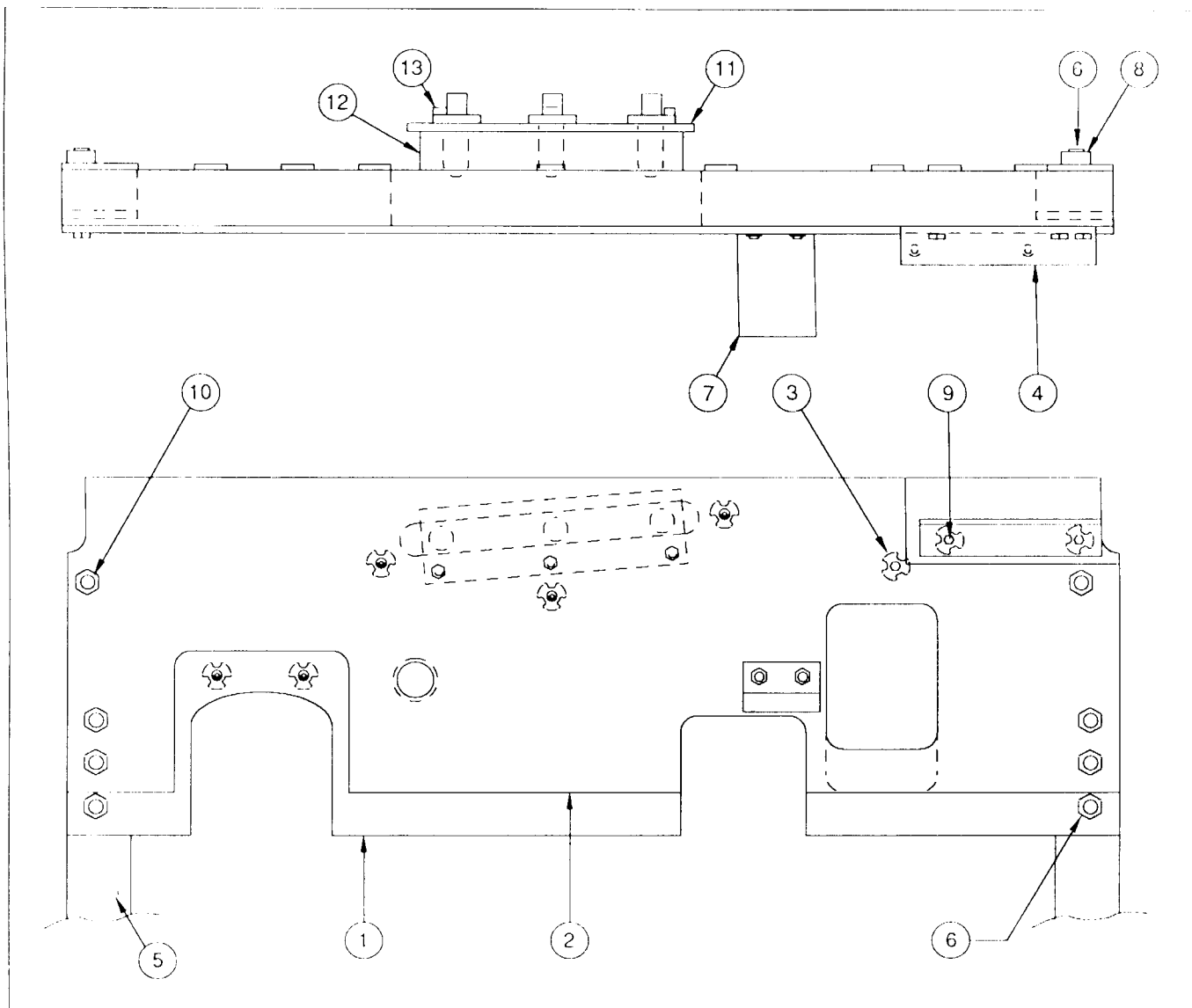
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16809	Ball Trough Welded Assy.	10.	01-11586	Coil Mtg. Bracket (Bell)
2.	01-11587	Ball Trough Front	11.	4008-01017-05	Mach. Screw, 8-32x5/16 P-RH SEMS
3.	A-6306-2	Bell Armature Assembly	12.	4408-01119-00	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-16927	LED 7 Ball Trough Assembly
7.	10-135	Solenoid Spring	16.	A-16926	OPTO 7 Ball Trough Assembly
8.	23-6420	Rubber Grommet	17.	4006-01017-06	Mach. Screw, 6-32x3/8 P-RH SEMS
9.	03-8523	Insulator			

## A-16317 Ball Trough Assembly



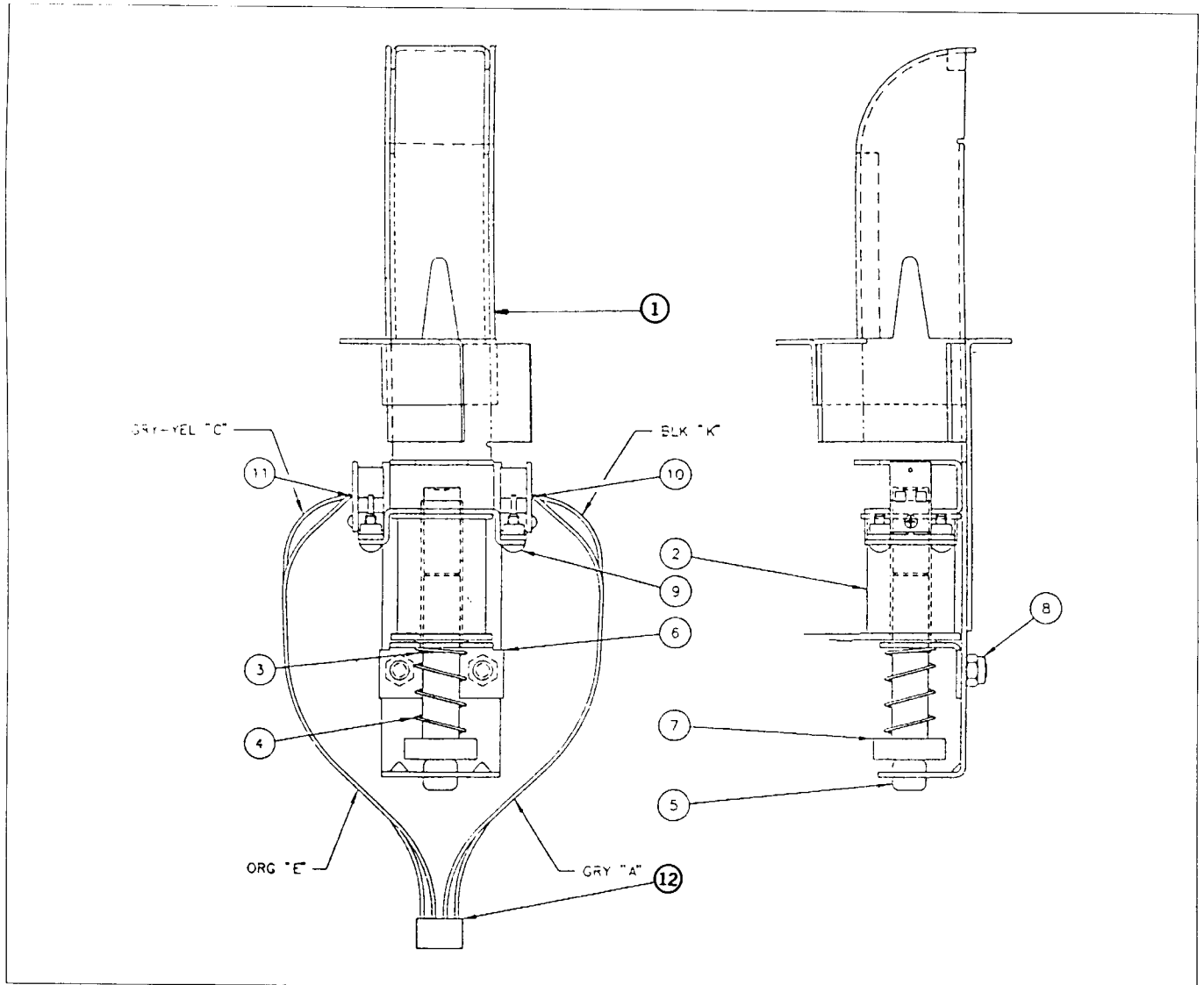
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	01-11178	Bracket - Ball Trough	10.	AE-26-1500	Coil Assembly
2.	20-8790	Nylined Bearing	11.	A-16575	Stop Bracket Assembly
3.	H-16873	Cable Assembly	12.	4010-01006-08	Mach. Screw, #10-32 x 1/2 P-PH-S
4.	A-16909	Photo Transistor Assembly	13.	01-11393	Bracket - Plunger Guide
5.	A-16908	LED Assembly	14.	10-135	Spring
6.	01-11062	Shield Insulator	15.	4006-01003-04	Mach. Screw, #6-32 x 1/4 P-PH-S
7.	4106-01013-06	Sh. Metal Screw, #6 x 3/8 P-PH	16.	4410-01132-01	Nut #10-32 ESN
8.	02-4791	Plunger-Trough Coil	17.	20-8712-43	"E"-Ring, 7/16 " Shaft
9.	03-7066-3	Coil Tubing, 1-7/8" Long			

## A-16578 Back Panel Assembly



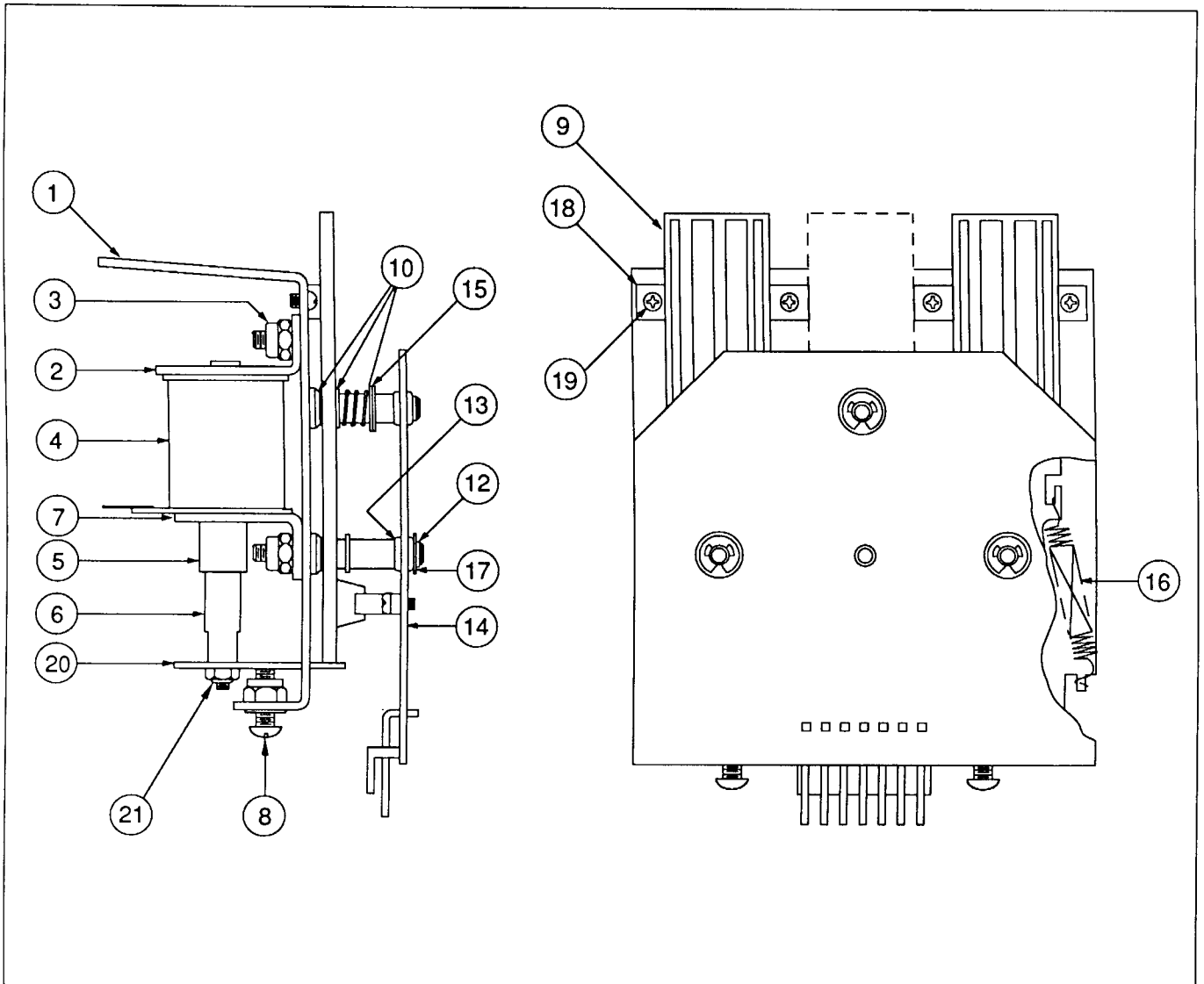
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	11-831-50017	Back Panel, Wood
2.	31-1773A-1	Playfield Plastic
3.	01-11668	Ball Deflect Bracket
4.	01-11391	Rt. Ramp Mounting Bracket
5.	01-10726	Leg, Rear Guide
6.	4506-01106-16B	SSS, 6-32 x 1" Long
7.	4408-01118-00	Tee Nut, 8-32
8.	4406-01128-00	Nut #6-32 KEPS
9.	4008-01168-16	Mach. Screw, #8-32 x 1" PL-HH-S
10.	4106-01114-08	Sh. Metal Screw, #6 x 1/2 PL-HWH
11.	A-16930	Circuit Board Assembly
12.	03-8022-1	Spacer, .541"
13.	4106-01115016	Sh. Metal Screw, #6 x 1" PL-HWH

# A-16231 Rotor Lock Ball Popper Unit Assembly



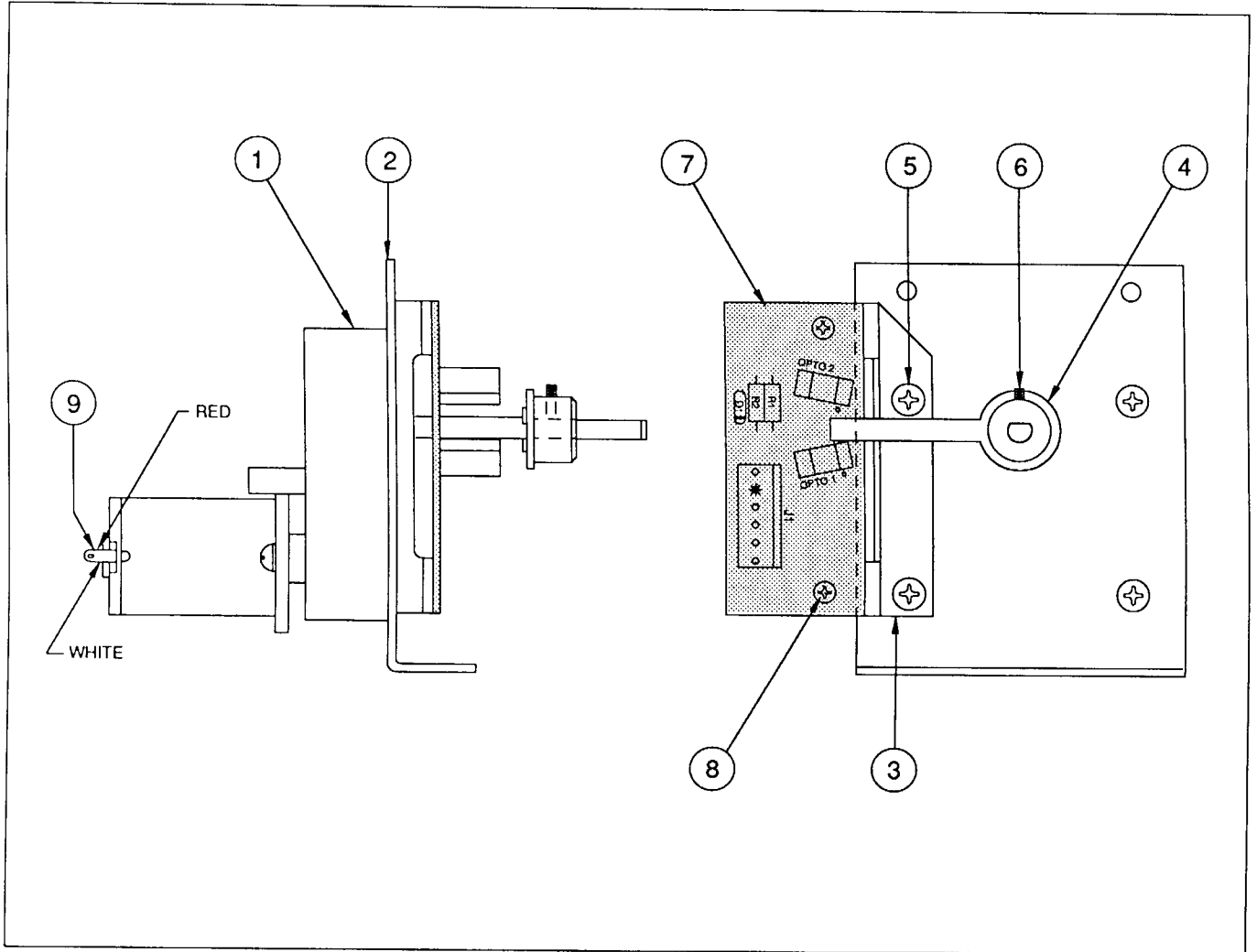
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16230	Ball Popper Sub-Assembly
2.	AE-26-1200	Coil Assembly
3.	03-7067	Tubing Coil
4.	10-135	Solenoid Spring
5.	23-6420	Rubber Grommet
6.	A-16858	Mounting Bracket
7.	A-13270	Bell Armature Assembly
8.	4408-01119-00	Nut, 8-32 ESN
9.	4106-01013-06	Sh. Metal Screw, #6x3/8 P-PH Type 25
10.	A-16808	LED Assembly, RTV
11.	A-16809	Photo Trans. Assembly, RTV
12.	H-16229	Cable Assembly

## A-16032-2 3-Bank Drop Target Assembly



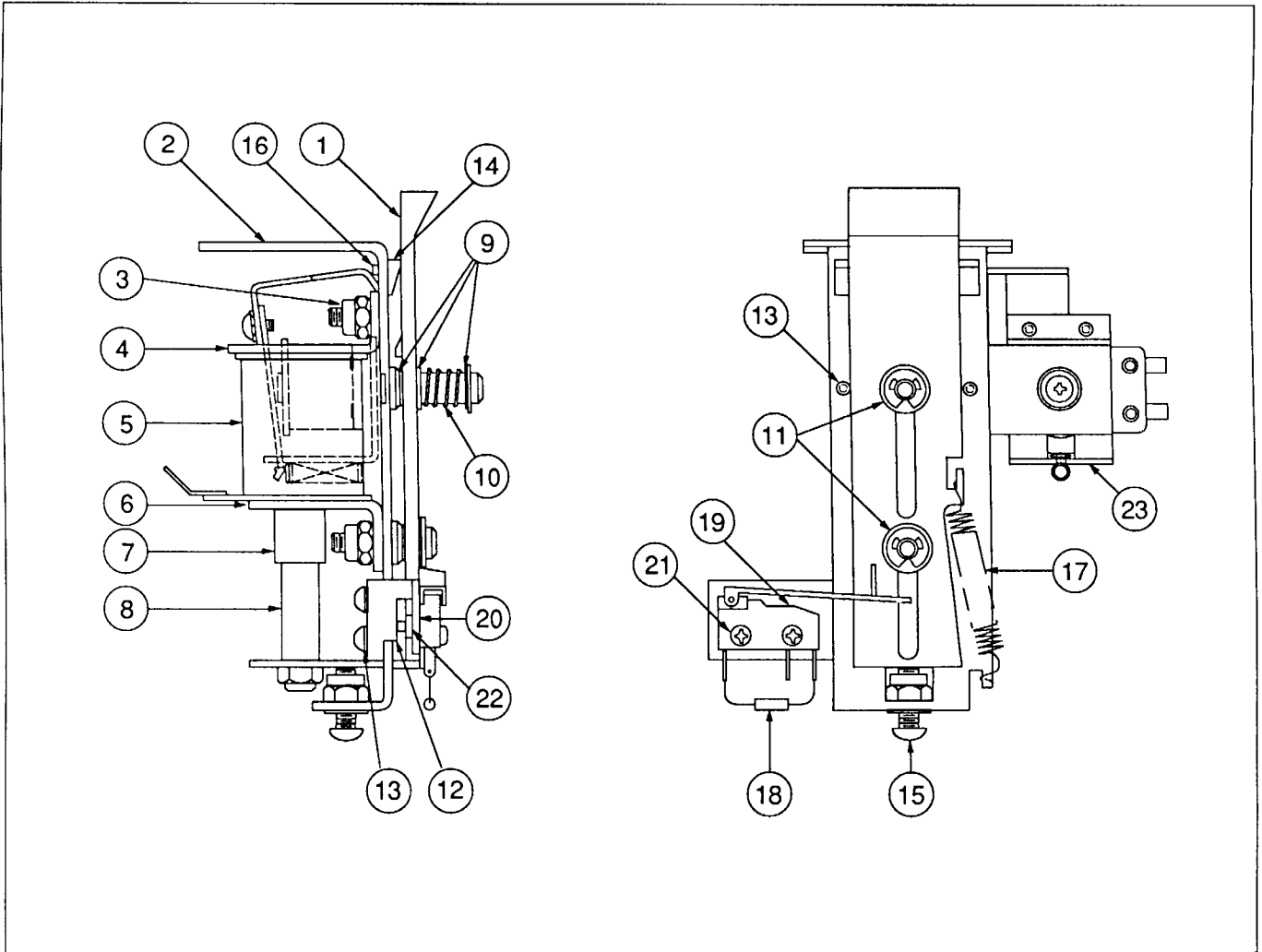
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-17045	3-Bank Brkt. & Stud Assembly	12.	20-8712-18	Retaining Clip
2.	A-11397	Stop Bracket Assembly	13.	23-6626	Rubber Grommet
3.	4408-01119-00	Nut 8-32 ESNA	14.	A-13609	3-Bank Opto Board
4.	AE-26-1200	Coil Assembly	15.	20-8712-25	Retaining Clip
5.	03-7066-4	Coil Tubing	16.	10-364	Extension Spring
6.	01-3972-1	Plunger	17.	4700-00016-00	Flatwasher, 3/16 x 7/16 x 21ga.
7.	01-8413-1	Coil Mounting Bracket	18.	03-8334-3	Stop Target, 3-15/16"
8.	4010-01025-14	Mach. Screw, 10-32 x 7/8"	19.	4004-01005-04	Mach. Screw, 4-40 x 1/4"
9.	03-8750	Target	20.	01-11769	Reset Plate
10.	4700-00072-00	Flatwasher, 17/64 x 1/2 x 21ga.	21.	4410-01132-00	Nut #10 ESNA
11.	10-392	Compression Spring	22.	23-6622	Foam Taple, Double-Sided

# A-16738 Motor Pivot/Drive Unit Assembly



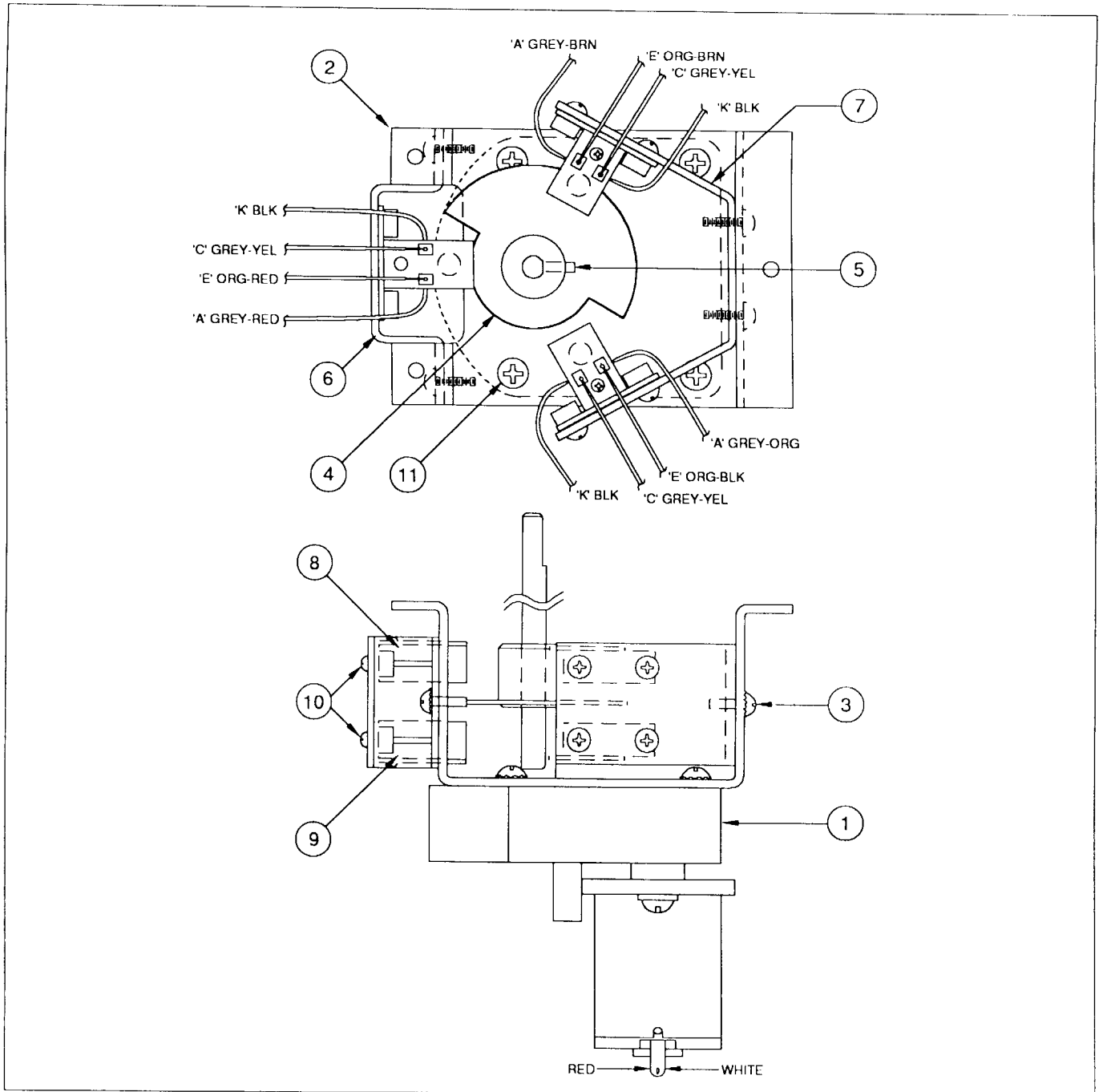
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	14-7988	Motor, 12VDC
2.	01-11535	Mounting Bracket
3.	01-11536	Motor Opto Bracket
4.	A-16733	Interrupter Bush Assembly
5.	4008-01003-12	Mach. Screw, #8-32 x 3/4 P-PH-S
6.	4008-01083-04	Sh. Metal Screw, #8-32 x 1/4" Long
7.	A-16657	Circuit Board Assembly
8.	4006-01003-04	Mach. Screw, #6-32 x 1/4 P-PH-S
9.	H-16893	Cable Assembly

# A-14615 1-Bank Drop Target Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	03-8033	Target - Flush	14.	03-8034	Single Stop Target
2.	A-14617	Bracket & Post Assy.	15.	4010-01025-14	Mach. Screw, 10-32 x 7/8"
3.	4408-0119-00	Nut 8-32 ESNA	16.	07-6688-17N	Rivet, 5/32 x 7/32
4.	A-11397	Stop Bracket Assembly	17.	10-433	Spring Extension
5.	AE-26-1200	Coil Assembly	18.	5070-09054-00	Diode 1N4001
6.	01-8413	Coil Mounting Bracket	19.	5647-12693-31	Switch
7.	03-7066-4	Tubing	20.	01-8600	Switch Insulator
8.	A-11388-2	Plate & Reset Assy.	21.	4002-01105-08	Mach. Screw, 2-56 x 1/2
9.	4700-00072-00	Flatwasher, 17/64 x 1/2"	22.	01-8240	Nut Plate
10.	10-392	Spring	23.	A-14908	Target Knock Down Assembly
11.	20-8712-25	"E"-Ring	a)	01-8647-L	Actuator
12.	01-10183	Switch Bracket	b)	A-14913	Frame & Eyelet Assembly
13.	4006-01003-03	Mach. Screw, 6-32 x 3/16"	c)	SM1-26-600	Coil Assembly

## A-16228 Rotor Lock Motor Unit

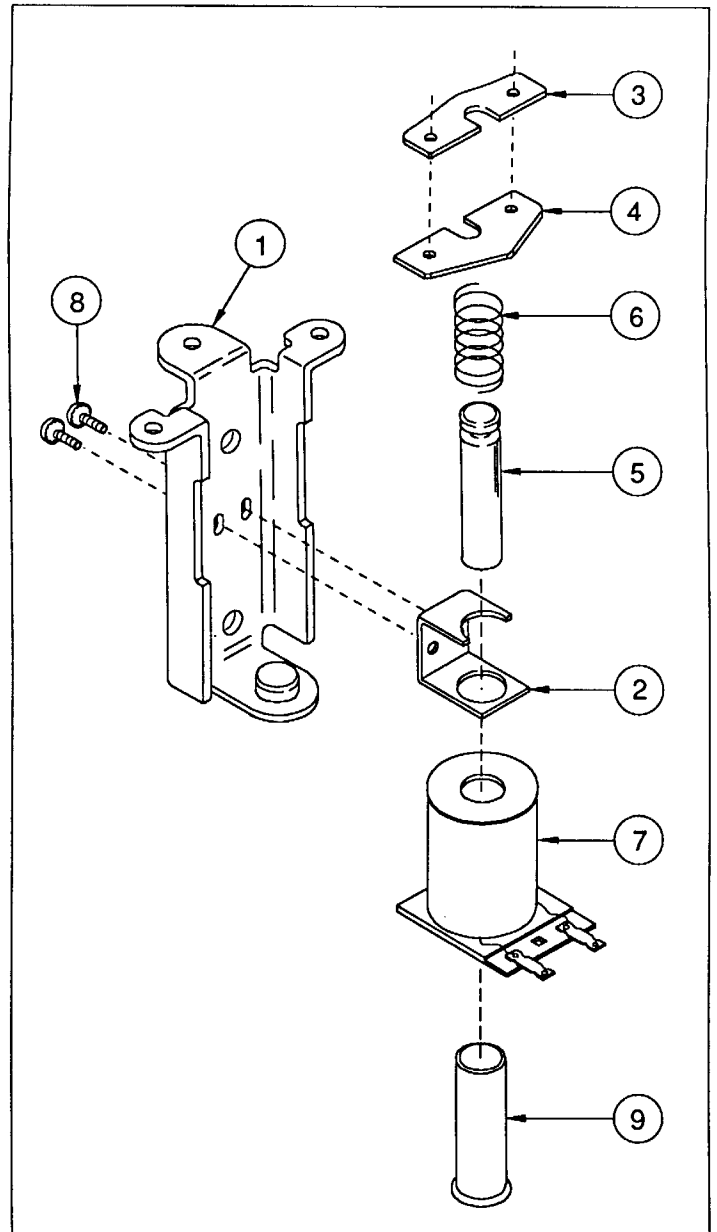
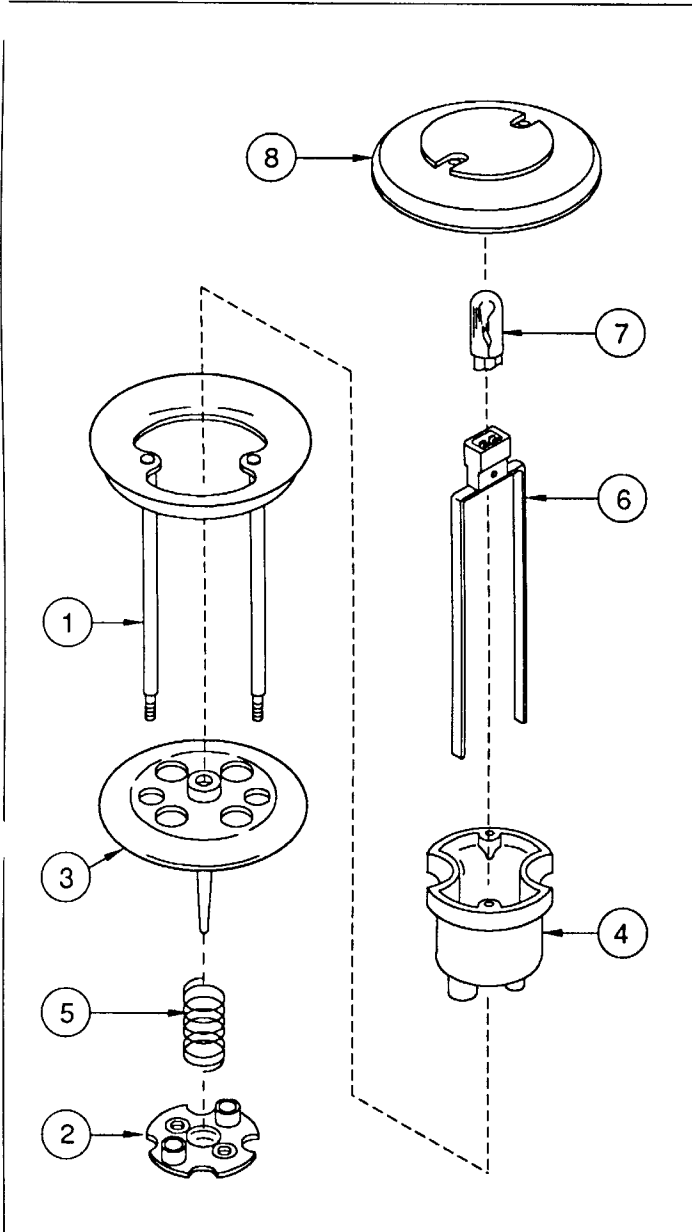


Item	Part Number	Description	Item	Part Number	Description
1.	14-7982	Motor	7.	01-11175	Bracket - Double Opto
2.	01-11176	Opto Mounting Bracket	8.	A-16909	Photo Transistor Assembly
3.	4006-01003-06	Mach. Screw, #6-32 x 3/8 P-PH-S	9.	A-16908	LED Assembly
4.	A-16225	Opto Interrupt Plate Assembly	10.	4106-01013-06	Sh. Metal Screw, #6 x 3/8 P-PH
5.	4008-01083-04	Set Screw, #8-32 x 1/4" Long	11.	4008-01003-12	Mach. Scw, #8-32 x 3/4 P-PH-S
6.	01-11174	Bracket - Single Opto	12.	H-16872	Cable Assembly



## B-9414-3 Jet Bumper Assembly

## A-9415-2 Jet Bumper Coil Assembly

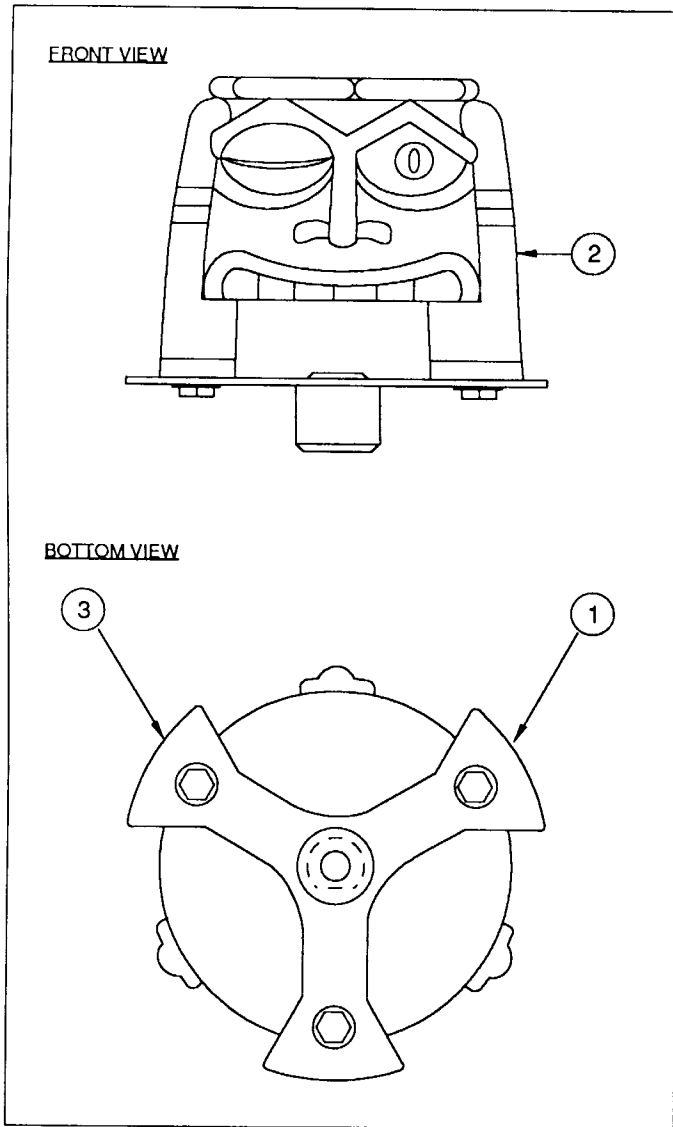


<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-4754	Bumper Ring Assembly
2.	03-6009-A5	Bumper Base, White
3.	03-6035-4	Bumper Wafer, Red
4.	03-7443-5	Bumper Body, White
5.	10-7	Spring
6.	24-8776	Socket - Wedge Base
7.	24-8768	Bulb #555 (6.3V., 0.25A.)

### Associated Parts:

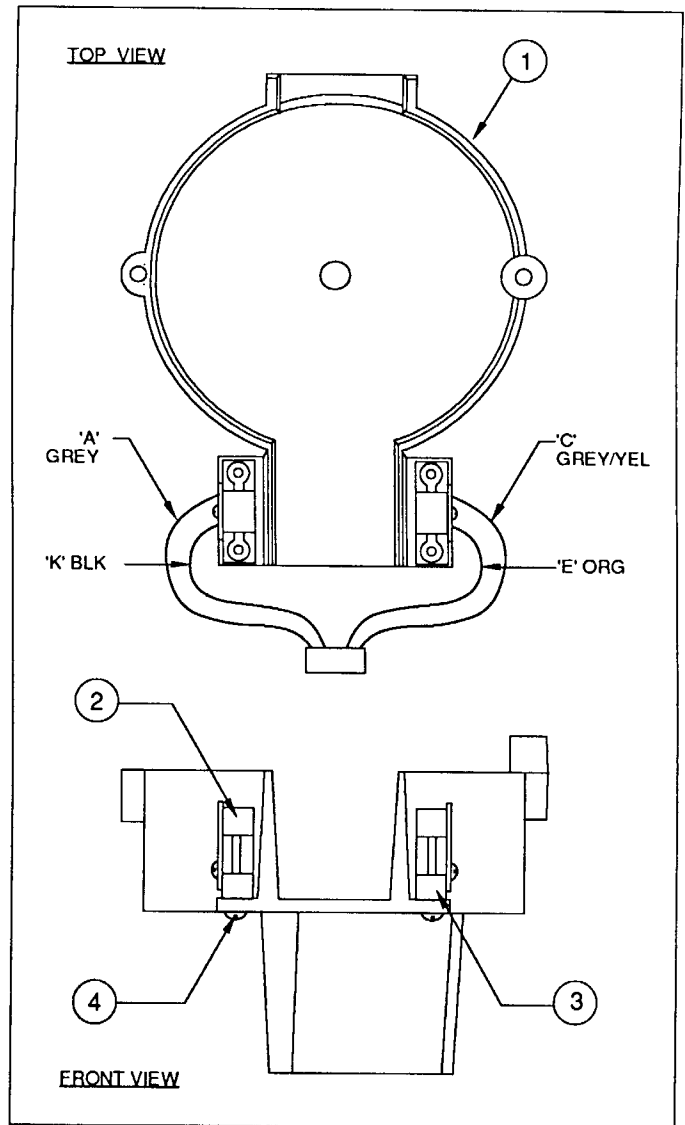
8.	03-8254-9	Jet Bumper Cap (Tr. Red)
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<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	B-7417	Bracket & Stop Assembly
2.	01-1747	Coil Retaining Bracket
3.	01-5492	Armature Link, Steel
4.	01-5493	Armature Link, Bakelite
5.	02-3406-1	Coil Plunger
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



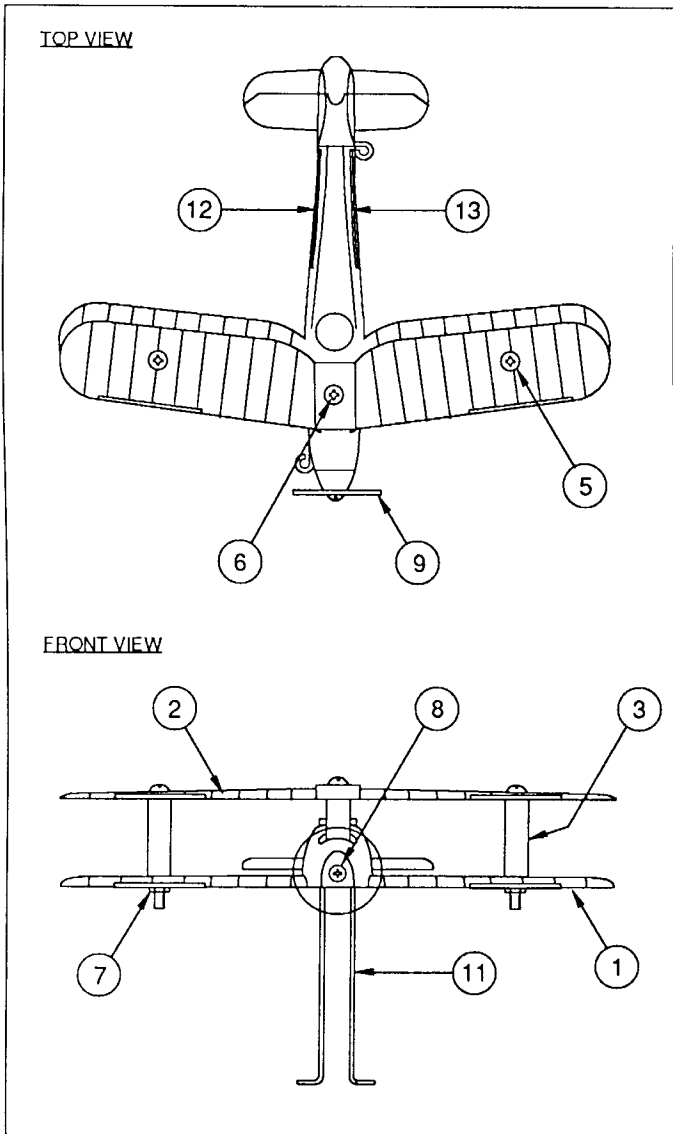
**A-16708  
Idol Assembly**

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16224	Ball Plate Assembly
2.	03-8907	Idol
3.	4608-01081-07	Hi-Fast #8 x 7/16 PL-HWH



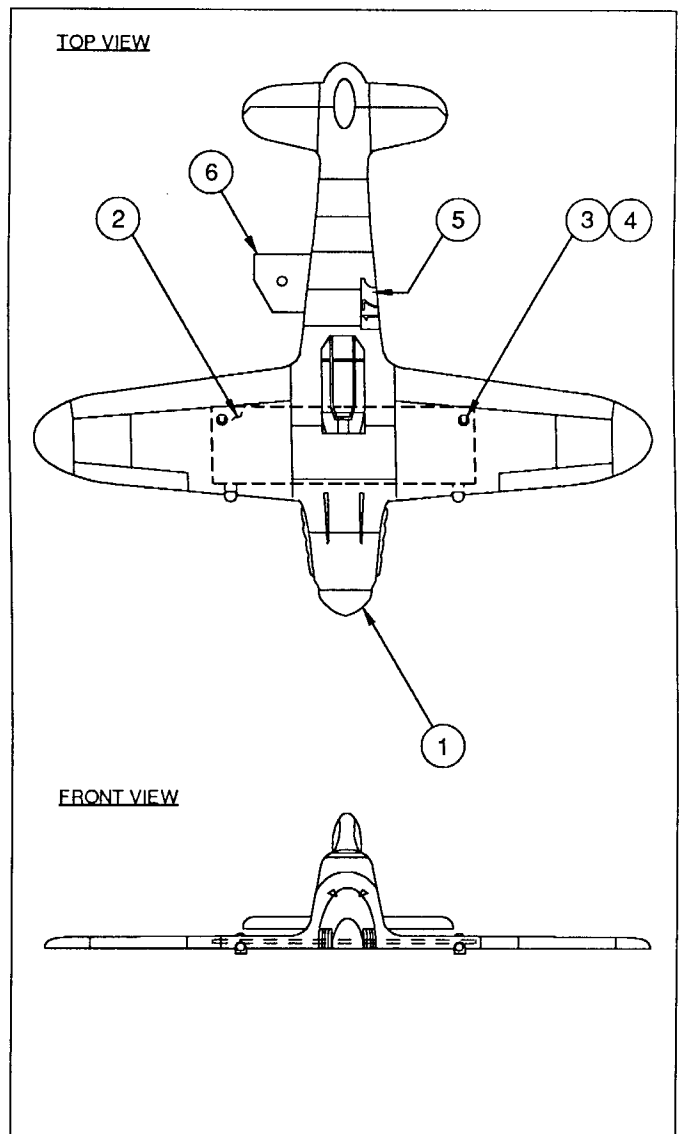
**A-16227  
Rotor Lock/Opto Assembly**

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	03-8843	Rotor Lock
2.	A-16098	LED Assembly, RTV
3.	A-16909	Photo Transistor Assy., RTV
4.	4106-01013-06	Sh. Metal Screw, #6 x 3/8"
5.	H-16335	Cable Assembly



**A-16709  
Biplane Assembly**

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	03-8903	Fuselage, Biplane
2.	03-8904	Wing, Biplane
3.	03-6047-15	Spacer, 1" Long
4.	03-6047	Spacer, 9/16" Long
5.	4006-01005-24	Mach. Screw, #6-32 x 1-1/2"
6.	4006-01005-16	Mach. Screw, #6-32 x 1"
7.	4406-01119-00	Nut, #6-32 Hex. ESN
8.	4006-01005-06	Mach. Screw, #6-32 x 3/8"
* 9.	31-1773-22	Playfield Plastic
10.	4700-00004-00	Flatwasher, 9/64 x 3/8 x 21ga.
11.	12-7128	WireForm, Biplane
* 12.	31-1786-7	Decal, Plane
* 13.	31-1786-8	Decal, Plane



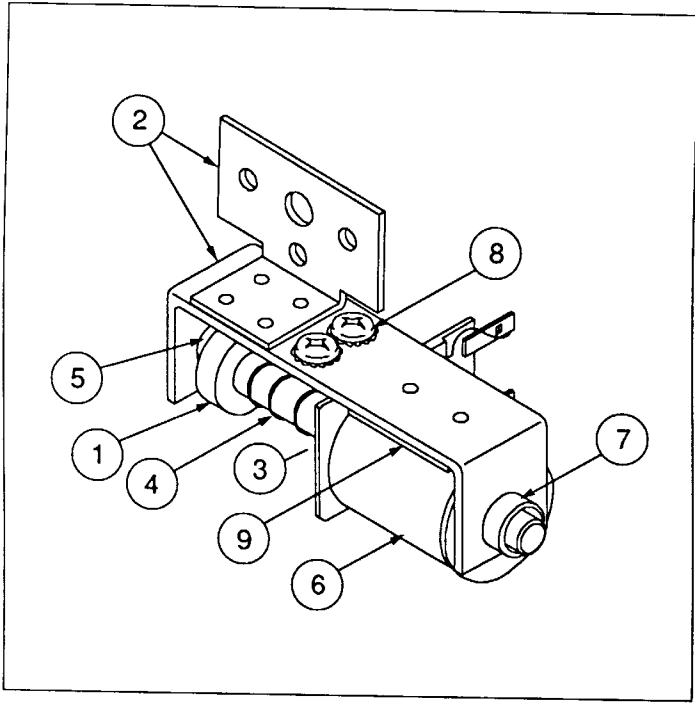
**A-16707  
Fighter Plane Assembly**

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	03-8902	Fighter Plane
2.	A-16834-1	2 LED Flasher Assembly
3.	07-6688-20N	Rivet, 1/8 x 1/4"
4.	4700-00003-00	Flatwasher, 1/8x 9/32 x 21ga.
* 5.	31-1786-9	Decal, Plane

■ **Associated Part:**

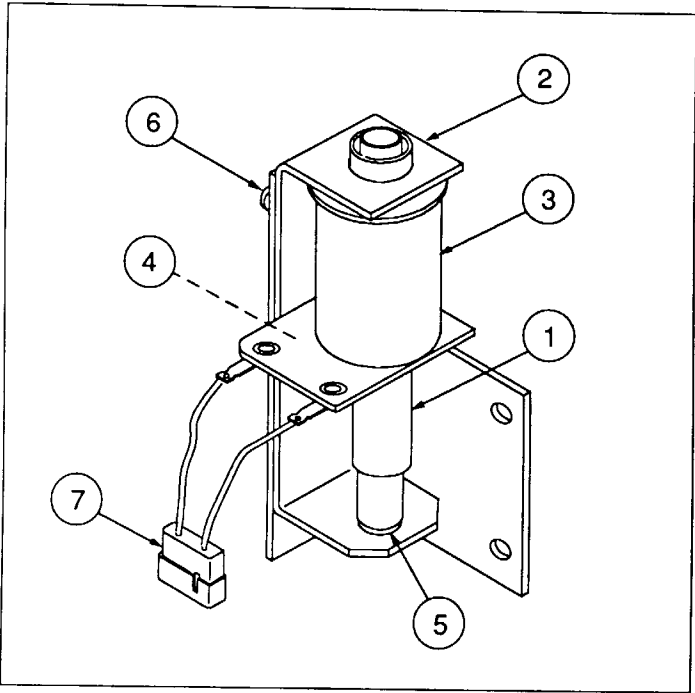
6.	01-11665	Mtg. Bracket - Fighter Plane
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\* Not available for individual sale. Order Decal Set 31-1786.



## A-14525 Kicker Bracket Assembly

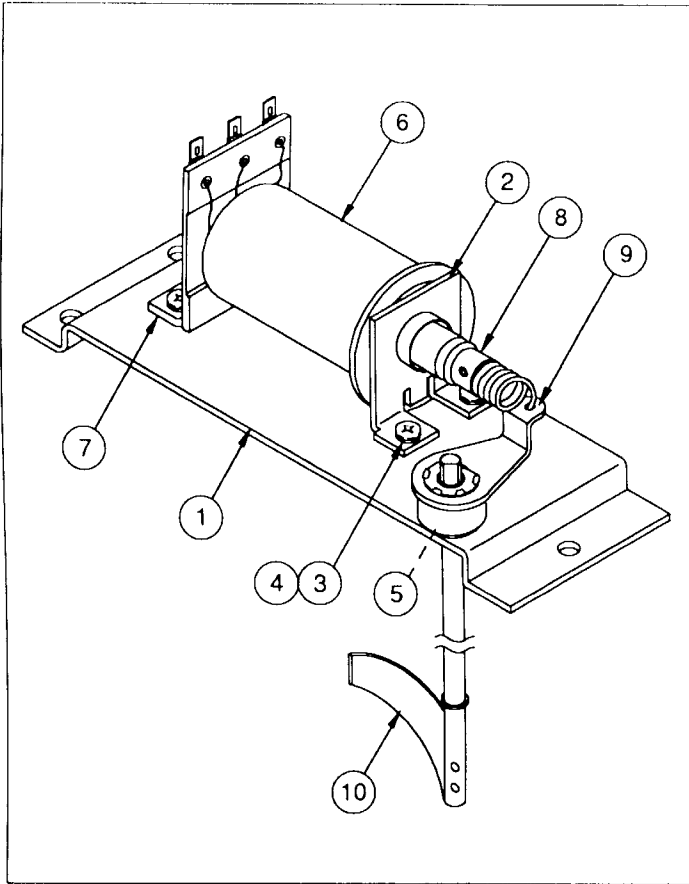
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-6306-2	Bell Armature Assembly
2.	A-14526	Mounting Bracket Assembly
3.	01-8-508-T	Solenoid Bracket
4.	10-135	Solenoid Spring
5.	23-6420	Rubber Grommet
6.	AE-23-800	Coil Assembly
7.	03-7067-5	Coil Tubing
8.	4008-01017-04	Mach. Screw, #8-32 x 5/16 P-RH
9.	03-8523	Insulator



## B-10686-1 Knocker Assembly

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
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"
7.	H-11835	Knocker Cable
8.	03-7067-5	Coil Tubing

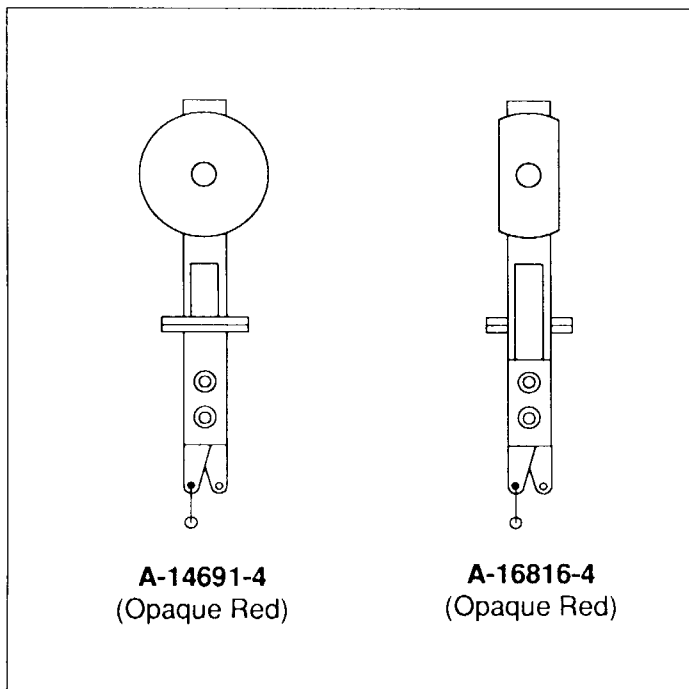
## A-16301 Diverter Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	01-11202	Bracket- Diverter
2.	01-8413-1	Coil Mounting Bracket
3.	4701-00004-00	Lockwasher, #10 Split
4.	4010-01008-06	Mach. Screw, 10-32 x 3/8" P-PH
5.	20-8790	Nylined Bearing
6.	FL-11753-1	Coil Assembly
7.	A-10821	Flipper Stop Assembly

### ■ Associated Parts:

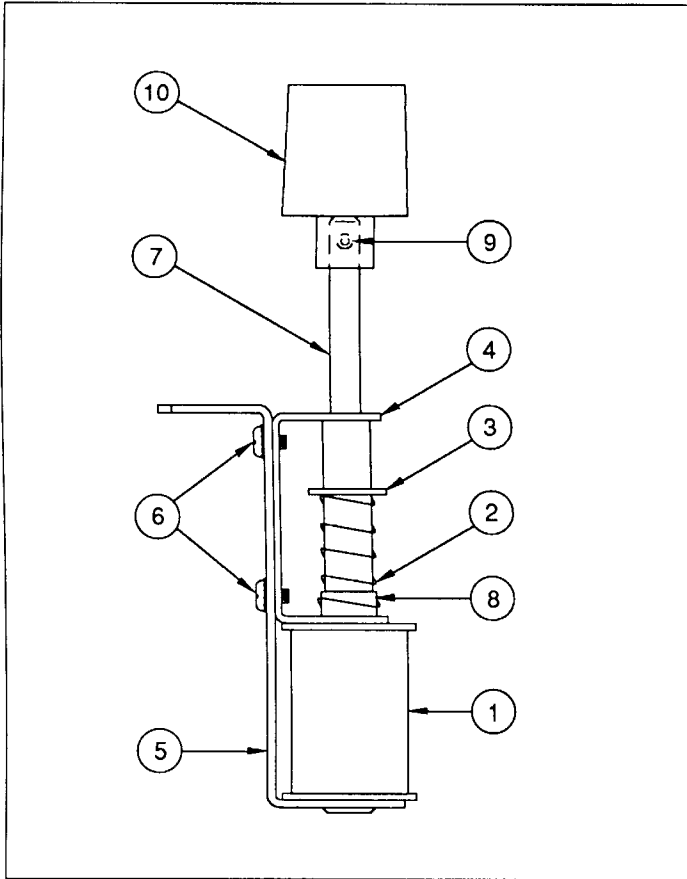
8.	A-16636	Diverter Plunger
9.	A-14185	Drive Arm Assembly
10.	A-16302	Shaft Ball Guide Assembly



## Standup Target Assemblies

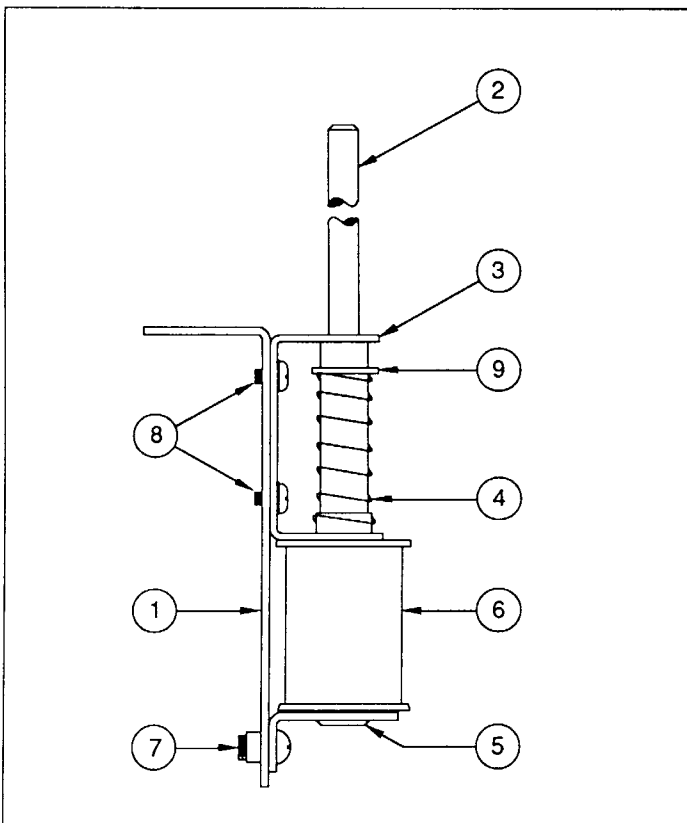
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16816-4	Oblong Standup Target
2.	A-14691-4	Stationary Target Assy. (7 Used)

## A-16226 Rotor Lock Door Unit Assembly

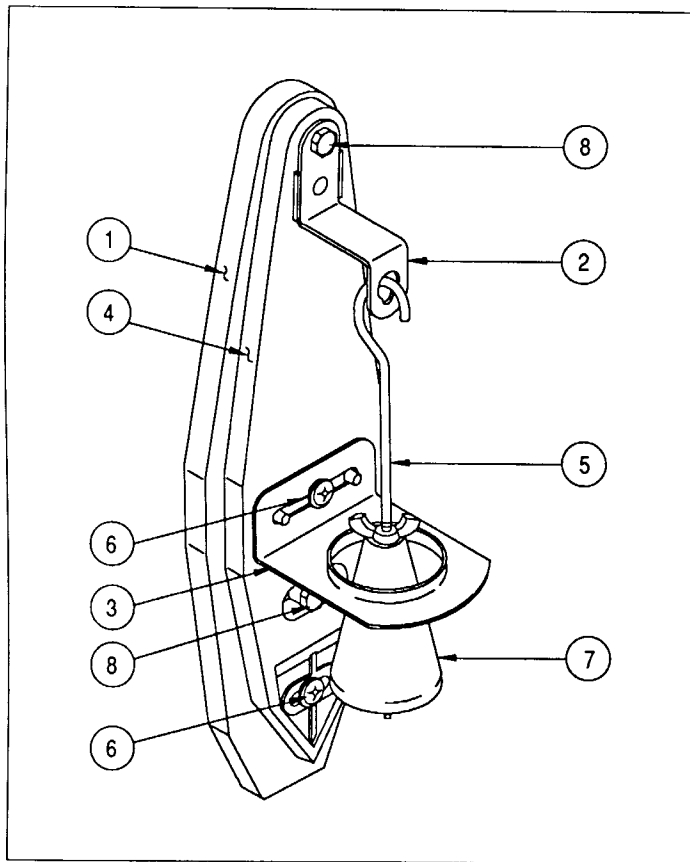


<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	AE-26-1500	Coil Assembly
2.	10-135	Spring
3.	20-8712-43	"E" Ring, 7/16 Shaft
4.	01-10008	Coil Stop Bracket
5.	B-7572-1	Bracket & Stop Assembly
6.	4006-01003-04	Mach. Screw, #6-32 x 1/4 P-PH-S
7.	02-4738	Plunger
8.	03-7066-3	Coil Tubing, 1-7/8" Long
9.	20-8716-1	Roll Pin, 3/32 x 1/2"
10.	03-8844	Rotor Lock Door

## A-16656 Up/Down Post Unit Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	01-11471	Mtg. Bracket - Up/Down Post
2.	A-16655	Plunger & Rod Assembly
3.	01-11470	Plunger Guide Bracket
4.	10-128	Spring
5.	A-10821	Flipper Stop Bracket Assy.
6.	A-15943	Coil Assembly
7.	4010-01008-06	Mach. Screw, #10-32 x 3/8 P-PH
8.	4008-01003-04	Mach. Screw, #8-32 x 1/4 P-PH-S
9.	20-8712-43	"E"-Ring, 7/16" Shaft

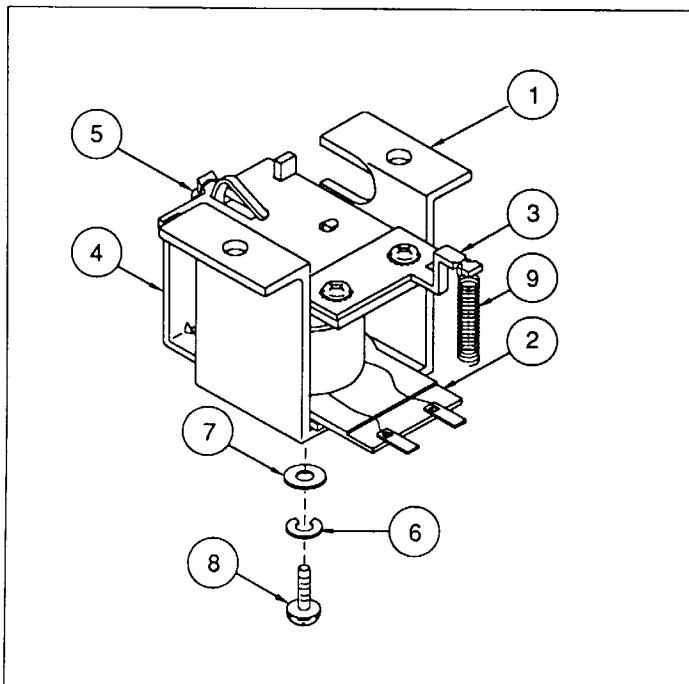


## A-15361 Tilt Mechanism Assembly

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
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-14422 Actuator Assembly

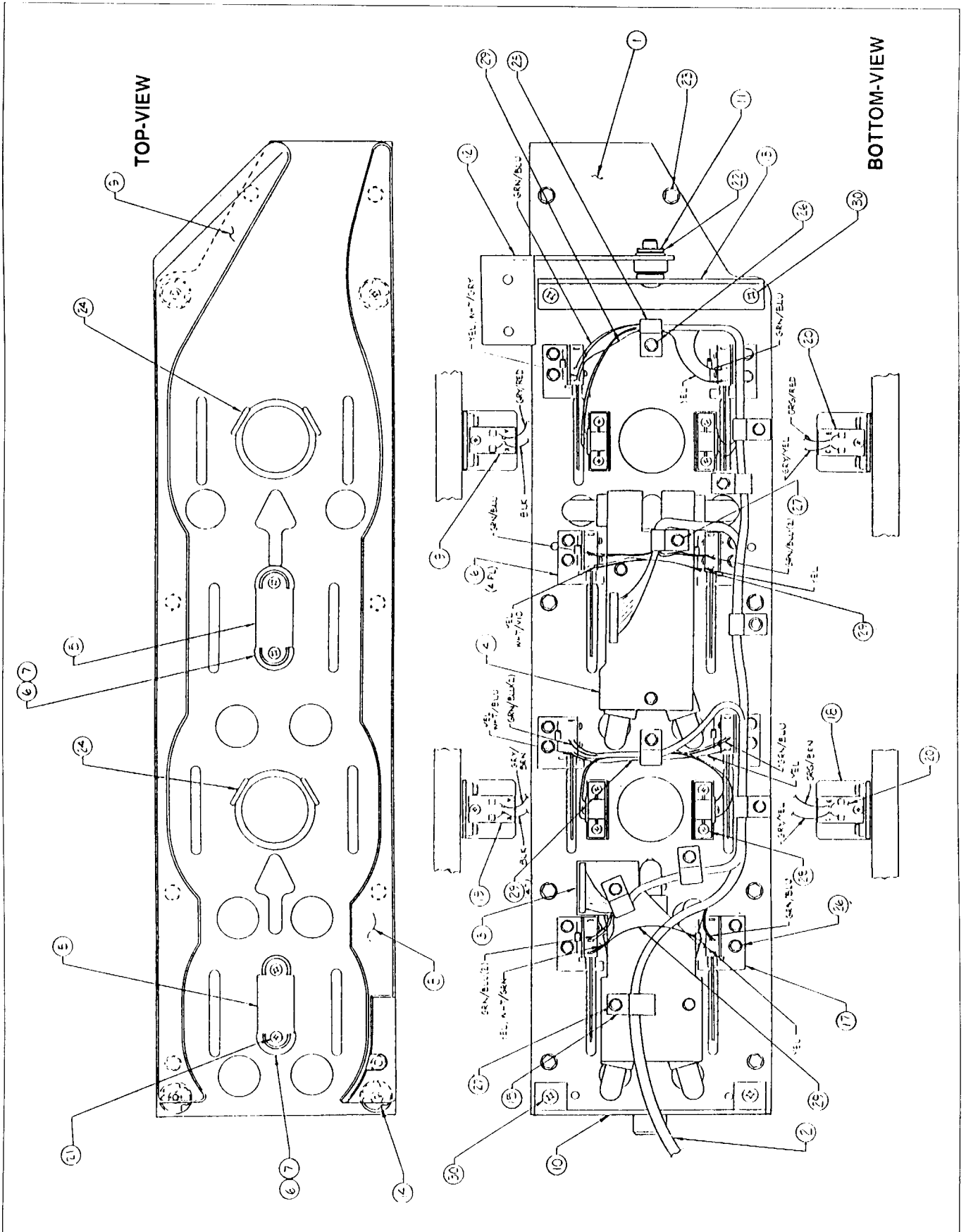
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	01-8111	Ball Gate Coil Bracket
2.	A-14406	Coil Assembly
3.	A-11146	Armature Assembly
4.	A-6892	Frame & Eyelet Assembly
5.	10-120	Spring
6.	4701-00003-00	Lockwasher #8 Split
7.	4700-00089-00	Flatwasher, 11/64 x 7/16 x 16ga.
8.	4008-01021-07	Mach. Screw, 8-32 x 7/16"
9.	10-194	Extension Spring

## A-17168    Mini-Playfield Assembly

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	36-50017-2	Mini-Playfield Hard Coat
2.	H-16868	Cable, Mini-Playfield
3.	A-16746	6-Lamp & G.I. PCB
4.	A-16747	6-Lamp & G.I. PCB
5.	03-8318-9	Light Hood Dbl Side Stripple (Red)
6.	03-8319-16	Star Post (Trans. Yellow)
7.	23-6300	Rubber Ring, 5/16"
8.	03-8938	Ball Guide - Left
9.	03-8937	Ball Guide - Right
10.	A-16734	Drive Bracket Assembly
11.	20-8712-25	"E" Ring, 1/4" Shaft
12.	A-16736	Front Pivot Mounting Assembly
13.	A-16735	Pivot Bracket/Shaft Assembly
14.	4408-01118-00	T-Nut, 8-32
15.	03-7655	Cable Clamp, 1/2"
16.	A-12688	Rollover Switch Assembly
17.	A-12688-1	Rollover Switch Assembly
18.	01-11654	Opto Guard Bracket
19.	A-16908	LED Assembly-RTV
20.	A-16909	Photo Transistor Assembly-RTV
21.	4108-01001-26	Sh. Metal Screw, 8 x 1-5/8" P-PW
22.	4700-00072-00	Flatwasher, 17/64 x 1/2 x 21ga.
23.	4108-01170-16	PLS No. 8x 1" HWH, Trilobular
24.	12-6466-2	Wire Ball Guide, 1/2"
25.	03-7655-4	Cable Clamp, 1/4"
26.	4106-01114-08	Sh. Metal Screw, #6x1/2" PLHWH-A
27.	4106-01115-16	Sh. Metal Screw, #6 x 1" PLHWH-A
28.	4104-01001-10	Sh. Metal Screw, #4 x 5/8" PPH
29.	17-1116-4	Wire, 22AWG (Yellow)
30.	4008-01017-10	Mach. Screw, 8-32 x 5/8 PRH-S

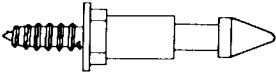

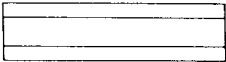
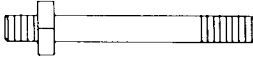
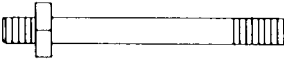
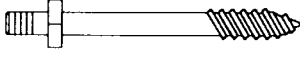



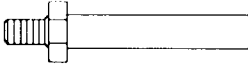
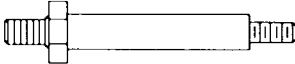
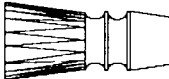
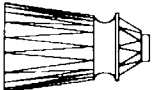


# A-17168 Mini-Playfield Assembly



## Notes

## Metal & Plastic Posts

	02-3905	Bumper Post #8 WS	(2)
	02-4176-52	M-F Spacer 8-32 x 3.25"	(1)
	02-4252-20	Spacer 6-32 x 1-1/4"	(2)
	02-4252-32	Spacer 6-32 x 2"	(1)
	02-4252-56	Spacer 6-32 x 3-1/2"	(1)
	02-4424-1	Post 8-32/ #8-32 2-1/32"	(9)
	02-4425-1	Post 8-32/ #8-32 2-3/8"	(3)
	02-4426-1	Post #6-32 /8 1-29/32"	(10)
	02-4434	Post, #8 x 1"	(16)
	02-4659-1	Mini Post	(7)
	02-4679	Bumper Post #10	(1)
	02-4842	Bumper Post #10	(2)
	02-4843	Bumper Post	(2)
	03-8130-13	Double Star Post, Crystal Clear	(2)
	03-8319-16	Star Post #8	(27)

## Cable List

<u>Part Number</u>	<u>Description</u>
H-11835	Knocker Cable
H-13870	Black Jumper Cable
H-14584	Dot Matrix Display
H-14790	A.C. Cable
H-14792-1	A.C. Jumper Cable
H-14792-2	A.C. Jumper Cable
H-15476	Logic Power cable
H-15478	Tilt Switch Cable
H-15736	Secondary Cable
H-16229	Playfield Opto Cable
H-16288	General Switch
H-16335	Plfd. Opto Cable
H-16437	Mini-Switch Cable
H-16505	Extended Driver Assembly
H-16727	Plfd. Switch Cable
H-16728	Plfd. Lamp Cable
H-16729	Plfd. Solenoid Cable
H-16730	Cabinet Cable
H-16731-1	Plfd. Opto Cable
H-16868	Mini-Playfield Cable
H-16869	Mini Playfield Cable
H-16870	Flash Lamp Cable
H-16871	Gun Cable
H-16872	Wheel Lock-Up Cable
H-16873	Subway Cable
H-16884	Speaker Panel Cable
H-16893	Mini-Playfield Cable
H-16894	Ramp Cable
H-16954	Back Panel G. I. Cable

## Unique Parts List

<u>Part Number</u>	<u>Description</u>	<u>Part Number</u>	<u>Description</u>
A-12742-50017	WPC CPU Assembly	A-16912-1, -5	Playfield Plastic Assembly
A-13204-50017	Bottom Arch Assembly	A-16917-50017	Sound Board Assembly
A-13609	3-Bank Opto Board	A-16918	Ball Gate Assembly
A-13769-50017	Playfield & Insert	A-16921-1	3-Bank Target w/Decal
A-13769-50017	Playfield & Insert	A-16931	Ball Guide Assembly
A-14092-5	WPC Mounting Plate Assembly	A-17040	Opto Switch PCB - w/Spacers
A-15473-1	IEC Power Input Box Assembly	A-17073	Ball Eject Assembly
A-16032-2	3-Bank Drop Target Assembly	A-17153	1-Bank Drop Target w/Decal
A-16113	Gun Handle Assembly	A-17153	P/B Switch & Cable Assembly
A-16123-500017	Backbox Assembly	A-8552-50017	Back Glass Assembly
A-16226	Rotor Lock Door Unit Assembly		
A-16231	Rotor Lock Ball Popper Assembly	01-11307	Ball Guide
A-16301	Diverter Assembly	01-11308	Ball Guide
A-16302	Diverter Ball Guide Assembly	01-11310	Ball Guide
A-16317	Ball Trough Assembly	01-11384	Ball Guide
A-16319	Ramp Assembly - Right	01-11385	Ball Guide Arch
A-16384-1	Opto Flipper Assembly	01-11386	Ball Guide Arch
A-16418	Captive Ball Assembly	01-11387	Ball Guide Arch
A-16487	Ball Guide Assembly	01-11519	Ball Guide
A-16488	Ball Guide Assembly	01-11520	Ball Guide
A-16489	Ball Guide Assembly	01-11533	Guard - Right Ramp
A-16491	Ball Guide Assembly	01-11534	Guard - Left Ramp
A-16492	Ball Guide Assembly	01-11541	Straight Metal Ramp
A-16493	Ball Guide Assembly	01-11542	Chute - Metal
A-16494	Ball Guide Assembly	01-11653	Bracket - Fence
A-16576	Speaker/Display Assembly	01-11665	Mtg. Bracket, Fight Plate
A-16578	Back Panel Assembly	01-11757	Ball Guide
A-16596-1	Special Ball Gate Assy.-Left	01-11768	Ball Guide
A-16596-2	Special Ball Gate Assy.-Right	01-11781	Support Bracket
A-16636	Diverter Plunger Assembly		
A-16641	Ball Guide Unit	02-4842	Bumper Post
A-16654	Opto Plate Assembly	02-4843	Bumper Post
A-16656	Up/Down Post Unit Assembly		
A-16706	Metal Ramp Assembly	03-8906	Ruins, Left
A-16707	Plane Assembly		
A-16708	Idol Assembly	11-1102	Cabinet
A-16709	Biplane Assembly	11-1109-A	Rail, 1/2 x 1-1/8 x 41
A-16710	Right Ruin Assembly	11-1109-B	Rail, 1/2 x 1-1/8 x 41
A-16716	39-Lamp Combo PCB Assy.	11-1109-C	Rail, 1/2 x 1-1/8 x 5
A-16716-2	38-Lamp Combo PCB Assy.	11-50017-IN	Wood Insert Panel
A-16737	Mini-Playfield Assembly		
A-16738	Motor Pivot/Drive Unit	12-7069	Wire Ramp - Left
A-16739-1	U-4 Lamp & Spacer Assembly	12-7070	Wire Ramp - Right
A-16747	6-PCB Lamp & G.I.	12-7080	Wire Ramp Bottom
A-16765	Outhole Ball Trough Assembly	12-7107	Wire Ball Guide
A-16783-01	50017 Envelope Assembly - USA	12-7108	Wire Ball Guide
A-16816-4	Oblong Standup Target Assy., Red		
A-16823-1	U-3 Lamp PCB Assembly	31-1002-50017	Screened Playfield
A-16824	Jackpot Light Assembly	31-1002A-50017	Screened Playfield
A-16828-1	Cashbox Assembly	31-1008-50017	Bottom Arch Screened
A-16834-1	2 LED & Cable Assembly	31-1357-50017	Backglass
A-16861	Single Flash Lamp Assembly	31-1420-50017	Speaker Panel Cover, Screened
A-16863	Metal Bridge Ramp Assembly	31-1769	Speaker Grill
A-16883-4	Button Assembly, w/Spring (Red)	31-1773-	Playfield Plastic Set
A-16892	Unique Parts Assembly		
A-16911-1	Flipper Ball Guide Assembly	5795-10938-32	Ribbon Cable, 32"
A-16911-2	Flipper Ball Guide Assembly	5795-13018-01	Ribbon Cable, 9.5"

# UPPER PLAYFIELD PARTS LIST

<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1	A-14525	Shooter	40	A-15205-L-2	Flipper Assembly
2	A-16765	Ball Trough	40a)	20-9250-5	Flipper Paddle & Shaft
3	A-15205-R-2	Flipper Assembly	41	A-9415-2	Jet Bumper Assembly
3a)	20-9250-5	Flipper Paddle & Shaft	42	A-17073	Ball Eject Assembly
4	A-16911-1	Flipper Ball Guide	42a)	A-9381-L	Micro Switch Eject Assembly
5	A-16918	Ball Gate Assembly	43	A-16710	Right Ruins
6	A-14369-R	Right Slingshot	44	A-13204-50017	Bottom Arch Assembly
6a)	B-12665	Nylon Kicker			
7	12-6466-6	Wire Guide			
8	A-16641	Ball Guide			
9	12-7070	Wire Ramp-Right			
10	A-16418	Standup Target			
11	A-16228	Rotor Lock Unit			
11a)	14-7982	Motor			
11b)	A-16225	Opto Interrupter Plate			
11c)	A-16226	Rotor Lock Door Unit			
11d)	A-16227	Rotor Lock Opto Assembly			
11e)	A-16708	Idol Assembly			
12	A-16231	Ball Popper			
13	01-11533	Right Ramp Guard			
14	01-11534	Left Ramp Guard			
15	A-16707	Plane			
16	A-14615	Single Drop Target			
17	A-16654	Opto Plate Assembly			
18	A-16302	Diverter Ball Guide			
19	A-16301	Diverter Assembly			
19a)	A-16636	Diverter Plunger			
19b)	A-14185	Drive Arm Assembly			
20	A-16319	Right Ramp Assembly			
21	A-16418	Captive Ball Wireform			
22	A-16596-2	Ball Gate Assembly			
22a)	A-14422	Coil & Bracket Assembly			
23	A-16863	Metal Bridge Ramp			
24	A-16596-1	Ball Gate Assembly			
24a)	A-14422	Coil & Bracket Assembly			
25	A-16738	Motor Drive Unit			
25a)	A-16657	Motor Opto Switch Assembly			
26	A-16656	Up/Down Post Assembly			
27	A-16706	Metal Ramp			
28	A-17168	Mini Playfield Assembly			
28a)	12-6466-5	Wire Guide 1-1/4			
28b)	12-6466-2	Wire Guide 1/2			
28c)	A-16735	Pivot Bracket/Shaft Assembly			
29	A-16709	Bi-Plane Assembly			
30	A-16824	Jackpot Light Assembly			
31	A-16816-4	Oblong Standup Target			
32	01-11541	Straight Metal Ramp			
33	01-11542	Metal Chute			
34	A-16032-2	3-bank Drop Target			
35	12-7080	Wire Ramp-Bottom			
36	12-7069	Wire Ramp-Left			
37	12-6466-1	Wire Guide			
38	A-14369-L	Left Slingshot			
39	A-16911-2	Flipper Ball Guide			

<b>Parts Under Bottom Arch</b>	
<u>Part Number</u>	<u>Description</u>
31-1008-50017	Screened Bottom Arch
12-7090	Wire Fence
20-9041	Tinnerman Speednut
20-9601	#8-32 Nut Retainer

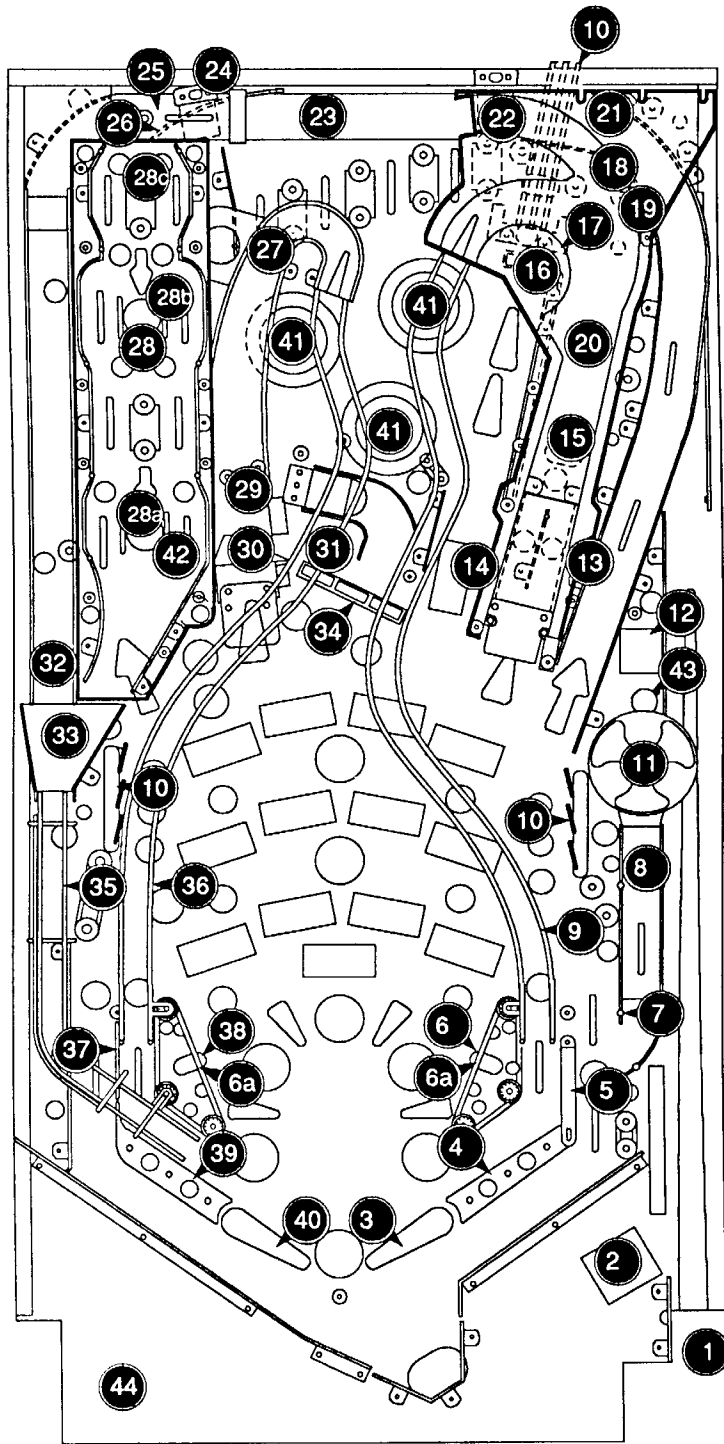
  

<b>Not Shown</b>	
<u>Part Number</u>	<u>Description</u>
A-16765	Ball Trough Assembly Complete
03-8929-1	*Full Playfield Mylar
16-50017-1	Instruction Card
20-6500	Steel Ball

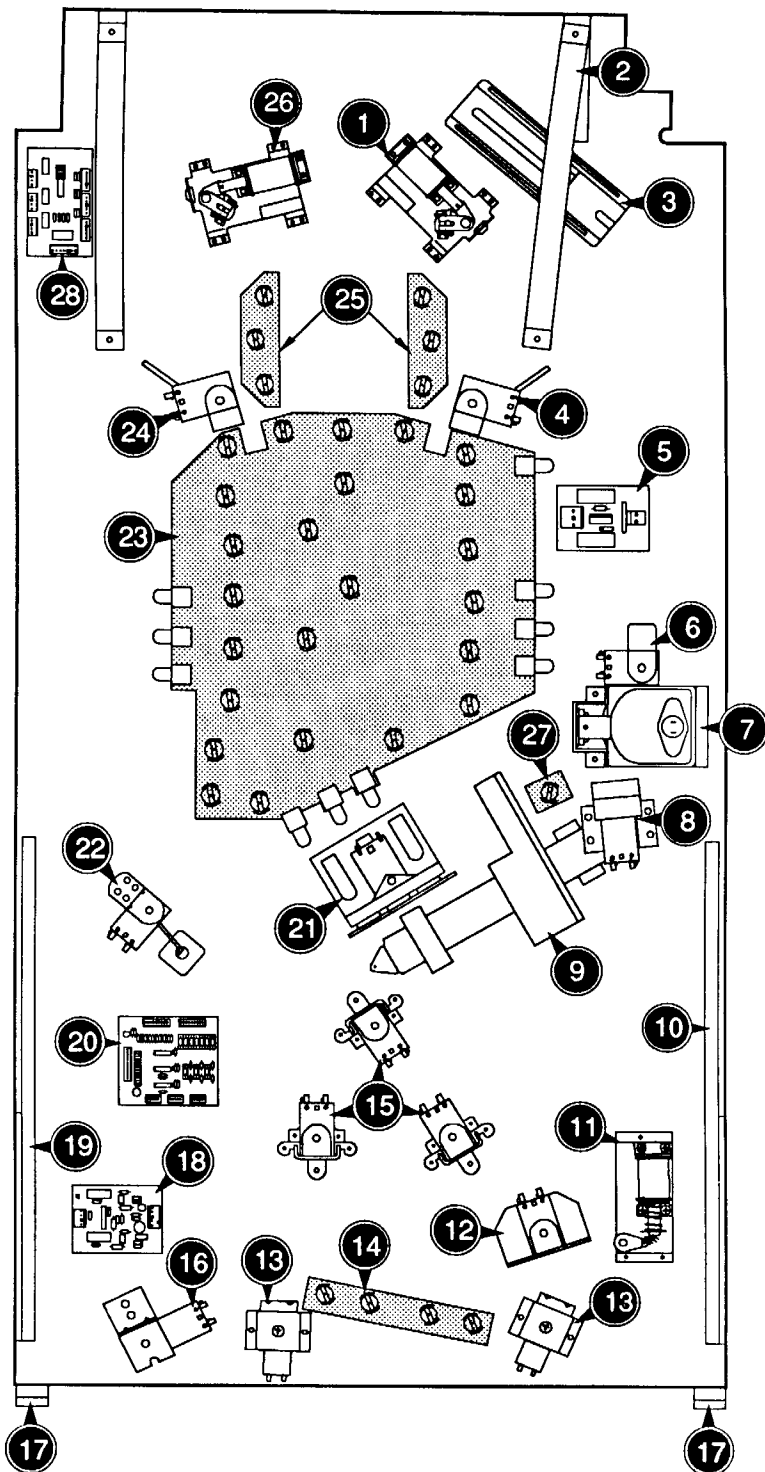
**\*The INDIANA JONES hardcoat playfield does not require a full mylar. However Mylars can be purchased through your local Williams Distributor.**

# UPPER PLAYFIELD PARTS LOCATIONS



# LOWER PLAYFIELD PARTS

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-15205-R-2	Lower Right Flipper Assembly
2.	01-11781	Support Bracket (2 Used)
3.	A-16765	Outhole Ball Trough Assembly
4.	B-12665	Kicker Arm (Slingshot) Assy., Right
a)	A-14369-R	Coil & Bracket Assembly
b)	10-128	Spring
c)	B-8284-1	Kicker Switch Assembly
5.	A-15340	Motor EMI Board
6.	A-16226	Rotor Lock Door Unit Assy.
7.	A-16228	Rotor Lock Unit assembly
8.	A-16231	Rotor Ball Popper Assembly
9.	A-16317	Ball Trough Assembly
10.	A-16637-2	Plfd. Slide Mechanism, Right
11.	A-16301	Diverter Assembly
12.	A-14615	1-Bank Drop Target Assembly
13.	A-14522	Actuator Assembly (2 Used)
14.	A-16739	4-Lamp PC Board
15.	A-9415-2	Jet Bumper Coil Assembly
16.	B-12030-2	Switch & Diode Assembly (3 Used)
17.	01-10726	Rear Guide Leg (2 Used)
18.	A-15946	Bridge Driver PC Board
19.	A-16637-1	Plfd. Slide Mechanism, Left
20.	A-15430	10-Switch Opto Assembly
21.	A-16929-1	3-Bank Drop Target Assembly
22.	A-17073	Ball Eject Assembly
23.	A-16716-2	38-Lamp Combo Assembly
24.	B-12665	Kicker Arm (Slingshot) Assy., Left
a)	A-14369-L	Coil & Bracket Assembly
b)	10-128	Spring
c)	B-8284-1	Kicker Switch Assembly
25.	A-16823	3-Lamp Board (2 Used)
26.	A-15205-L-2	Lower Left Playfield Assembly
27.	B-12224	Single Lamp Board
28.	A-13901-2	Opto Ramp Switch Board

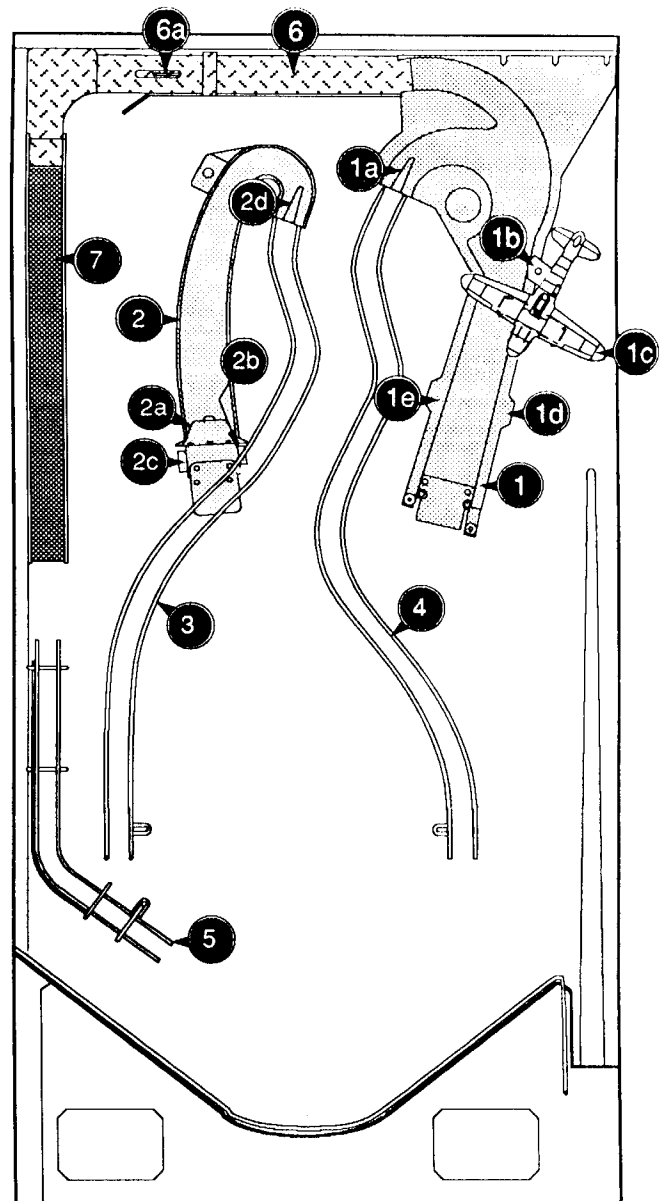


*Underside of Playfield, Viewed In Raised Position*

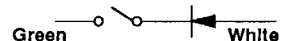


## RAMPS LOCATIONS

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	<b>A-16319</b>	<b>Rt. Plastic Ramp Assembly</b>
a)	5647-12693-21	Sub-miniature Switch
b)	01-11665	Mounting Bracket-Fighter Plane
c)	A-16707	Fighter Plane
d)	A-16909	Photo Transistor Assy.,-RTV
e)	A-16908	LED Assembly, RTV
2.	<b>A-16706</b>	<b>Metal Ramp Assembly</b>
a)	A-16824	Jackpot Light Assembly
b)	A-16909	Photo Transistor Assy., RTV
c)	A-16908	LED Assembly, RTV
d)	5647-12693-21	Sub-miniature Switch
3.	12-7069	Wire Ramp - Left
4.	12-7070	Wire Ramp - Right
5.	12-7080	Wire Ramp - Bottom
6.	A-16863	Bridge Ramp Assembly
7.	01-11541	Straight Metal Ramp



# SWITCHES

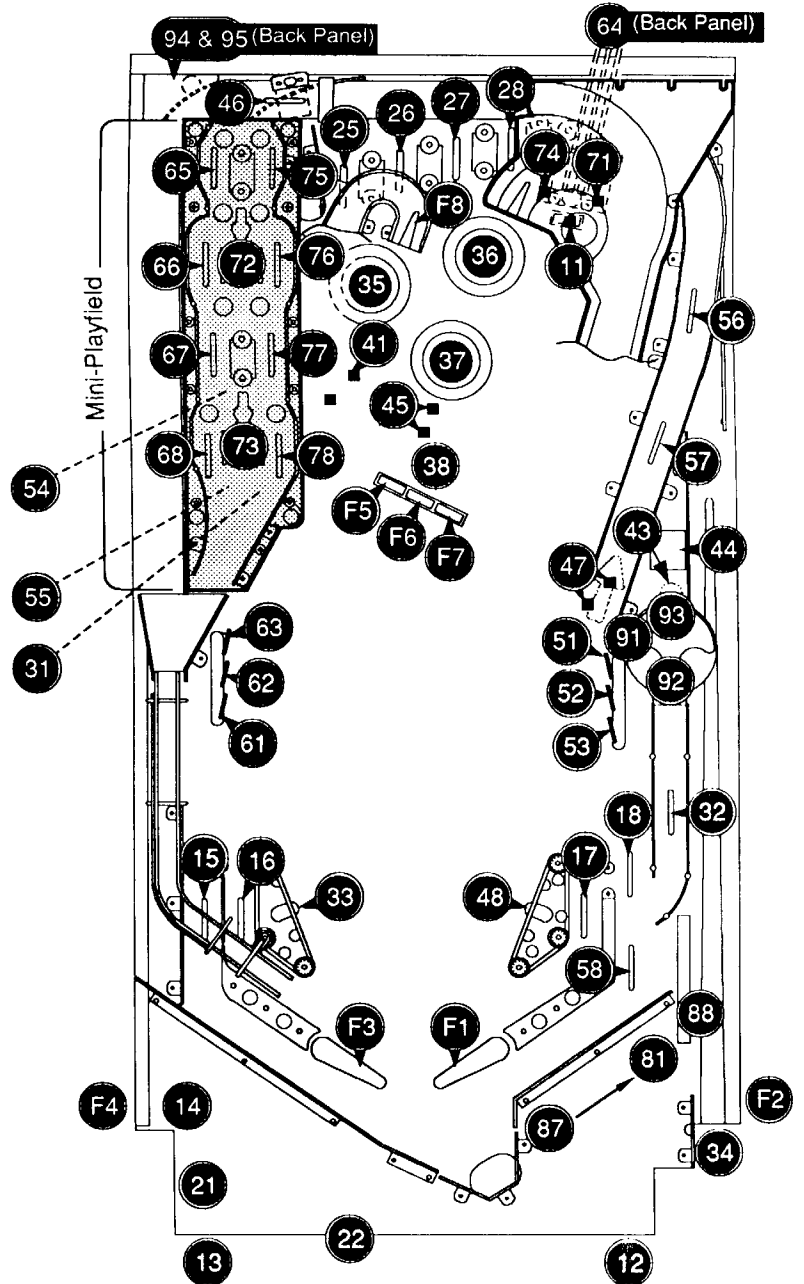


Dedicated Grounded Switches	Column	1	2	3	4	5	6	7	8	9	Flipper Grounded Switches
	Row	Green-Brown J207-1 U20-18	Green-Red J207-2 U20-17	Green-Orange J207-3 U20-16	Green-Yellow J207-4 U20-15	Green-Black J207-5 U20-14	Green-Blue J207-6 U20-13	Green-Violet J207-7 U20-12	Green-Gray J207-9 U20-11	Violet-White Q11 J5-4	
Orange-Brown J205-1 Left Coin Chute D1	White-Brown J209-1 U18-11	Single Drop Top 11	Slam Tilt 21	Left Eject 31	Left Ramp Enter 41	Adventure Tgt. 51	Adventure Tgt. 61	Captive Ball Frt. 71	Trough 6 81	Wheel Position 1 91	Black-Green J906-1 Lower Right E.O.S. F1
Orange-Red J205-2 Center Coin Chute D2	White-Red J209-2 U18-9	Buy-in Button 12	Coin Door Closed 22	Exit Idol 32	Right Ramp Enter 42	Adventure Tgt. 52	Adventure Tgt. 62	Mini Top Hole 72	Trough 5 82	Wheel Position 2 92	Blue-Violet J905-1 Lower Right Opto F2
Orange-Black J205-3 Right Coin Chute D3	White-Orange J209-3 U18-5	Start Button 13	Ticket Opto 23	Left Slingshot 33	Top Idol Enter 43	Adventure Tgt. 53	Adventure Tgt. 63	Mini Bottom Hole 73	Trough 4 83	Wheel Position 3 93	Black-Blue J906-3 Lower Left E.O.S. F3
Orange-Yellow J205-4 4th Coin Chute D4	White-Yellow J209-4 U18-7	Plumb Bob Tilt 14	Always Closed 24	Gun Trigger 34	Right Popper 44	Left Loop Top 54	Captive Ball Back 64	Right Ramp Made 74	Trough 3 84	Mini Playfield Left Limit 94	Blue-Gray J905-2 Lower Left Opto F4
Orange-Green J205-6 Normal Function Service Credits   Test Function Escape D5	White-Green J209-5 U19-11	Left Outlane 15	Indy Lane 25	Left Jet 35	Center Enter 45	Left Loop Bottom 55	Mini Top Left 65	Mini Top Right 75	Trough 2 85	Mini Playfield Right Limit 95	Black-Violet J906-4 *Center Drop Bank Left F5
Orange-Blue J205-7 Normal Function Volume Down   Test Function Down D6	White-Blue J209-7 U19-9	Left Return Lane 16	Indy Lane 26	Right Jet 36	Top Post 46	Right Loop Top 56	Mini Middle Top Left 66	Mini Middle Top Right 76	Trough 1 86		Black-Yellow J905-3 *Center Drop Bank Middle F6
Orange-Violet J205-8 Normal Function Volume Up   Test Function Up D7	White-Violet J209-8 U19-5	Right Return Lane 17	Indy Lane 27	Bottom Jet 37	Subway Lockup 47	Right Loop Bottom 57	Mini Middle Bottom Left 67	Mini Middle Bottom Right 77	Top Trough 87		Black-Gray J906-5 *Center Drop Bank Right F7
Orange-Gray J205-9 Normal Function Begin Test   Test Function Enter D8	White-Gray J209-9 U19-7	Right Outlane Top 18	Indy Lane 28	Center Standup 38	Right Slingshot 48	Right Outlane Bottom 58	Mini Bottom Left 68	Mini Bottom Right 78	Shooter 88		Black-Blue J905-5 *Left Ramp Made F8

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

# SWITCH LOCATIONS

Item	Switch No.	Where Used
F1	SW-1A-194	Lwr Rt. Flipper EOS
F2	A-16384-1	Lwr Rt. Flipper Cab.
F3	SW-1A-194	Lwr Lt. Flipper EOS
F4	A-16384-1	Lwr Lt. Flipper Cab.
F5	A-13609	Center Drop Bank Left
F6	A-13609	Center Drop Bank Mid.
F7	A-13609	Center Drop Bank Right
F8	5647-12693-21	Left Ramp Made
11	5647-12693-31	Single Drop Target
12	20-9663-12	Buy-in Button
13	20-9663-11	Start Button
14	A-6502-A	Plumb Bob Tilt
15	A-12688	Left Outlane
16	A-12688	Left Return Lane
17	A-12688	Right Return Lane
18	A-12688-1	Right Outlane Top
21	SW-1A-117	Slam Tilt
22	5643-09288-00	Coin Door Closed
23		Not Used
24	5643-09288-00	†Always Closed
25	A-12688	(I)ndy Lane
26	A-12688	I(n)y Lane
27	A-12688	In(d)y Lane
28	A-12688	Ind(y) Lane
31	5647-12133-11	Left Eject
32	5647-12693-25	Exit Idol
33	SW-1A-114 (kick)	Left Slingshot
	SW-1A-120 (score*)	
34	5647-12133-12	Gun Trigger
35	SW-11A-37	Left Jet Bumper
35	SW-11A-37	Right Jet Bumper
37	SW-11A-37	Bottom Jet Bumper
38	A-16816-4	Center Standup Target
41	A-16908 (LED)	Left Ramp Enter
	A-16909 (trans.)	
42	A-14231 (LED)	Right Ramp Enter
	A-14232 (trans.)	
43	A-14231 (LED)	Top Idol Enter
	A-14232 (trans.)	
44	A-14231 (LED)	Right Popper
	A-14232 (trans.)	
45	A-14231 (LED)	Center Enter
	A-14232 (trans.)	
46	5647-12693-56	TopPost
47	A-14231 (LED)	Subway Lockup
	A-14232 (trans.)	
48	SW-1A-114 (kick)	Right Slingshot
	SW-1A-120 (score*)	
51	A-14691-4	Advent(u)re Target
52	A-14691-4	Adventu(r)e Target
53	A-14691-4	Adventur(e) Target
54	A-12688	Left Loop Top
55	A-12688	Left Loop Bottom
56	A-12688	Right Loop Top
57	A-12688	Right Loop Bottom
58	A-12688	Right Outlane Bottom
61	A-14691-4	(A)dventure Target
62	A-14691-4	A(d)venture Target
63	A-14691-4	Ad(v)enture Target
64	A-16418	Captive Ball Back
65	A-12688	Mini Top Left
66	A-12688	Mini Mid. Top Left
67	A-12688	Mini Mid. Bottom Left
68	A-12688	Mini Bottom Left
71	A-14231 (LED)	Captive Ball Front
	A-14232 (trans.)	
72	A-16908 (LED)	Mini Top Hole
	A-16909 (trans.)	
73	A-16908 (LED)	Mini Bottom Hole
	A-16909 (trans.)	
74	5647-12693-21	Right Ramp Made
75	A-12688-1	Mini Top Right
76	A-12688-1	Mini Mid. Top Right
77	A-12688-1	Mini Mid. Bot. Right
78	A-12688-1	Mini Bottom Right
81	A-16927 (LED)	Trough 6
	A-16926 (trans.)	
82	A-16927 (LED)	Trough 5
	A-16926 (trans.)	
83	A-16927 (LED)	Trough 4
	A-16926 (trans.)	
84	A-16927 (LED)	Trough 3
	A-16926 (trans.)	

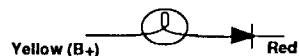


Item	Switch No.	Where Used
85	A-16927 (LED)	Trough 2
	A-16926 (trans.)	
86	A-16927 (LED)	Trough 1
	A-16926 (trans.)	
87	A-16927 (LED)	Trough Top
	A-16926 (trans.)	
88	A-12688	Shooter
91	A-14231 (LED)	Wheel Position 1
	A-14232 (trans.)	
92	A-14231 (LED)	Wheel Position 2
	A-14232 (trans.)	
93	A-14231 (LED)	Wheel Position 3
	A-14232 (trans.)	
94	A-16657	Mini Plfd Right Limit
95	A-16657	Mini Plfd Left Limit

† Not Shown

\* The Score slingshot switches have diodes across them.

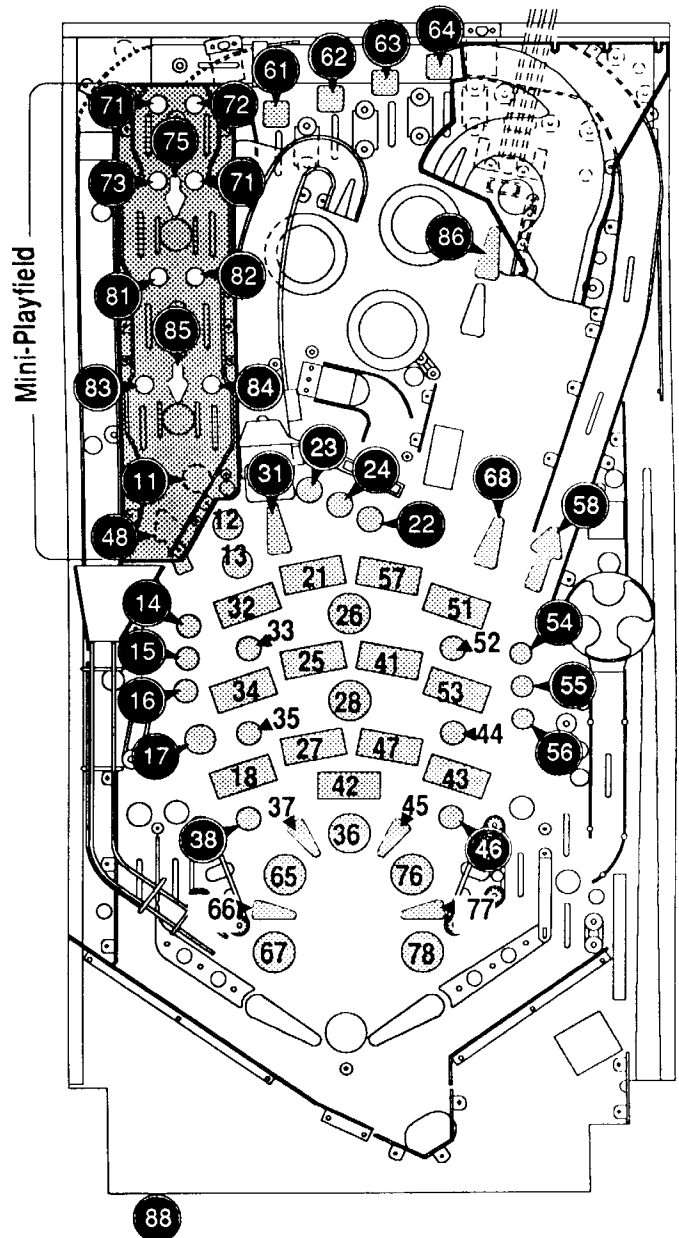
# LAMPS



Column \ Row	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J137-7 Q92	8 Yellow-Gray J137-9 Q91
1 Red-Brown J133-1 Q90	Mode Start 11	Tank Chase 21	Left Ramp Arrow 31	Mine Cart 41	Choose Wisely 51	(I)ndy 61	Mini Top Left 71	Mini Middle Bottom Left 81
2 Red-Black J133-2 Q89	Hand of Fate 12	Adven(t)ure Light 22	Castle Grunewald 32	Ark Jackpot 42	Right Plane Top 52	(n)dy 62	Mini Top Right 72	Mini Middle Bottom Right 82
3 Red-Orange J133-4 Q88	Eject Extra Ball 13	Adv(e)ture Light 23	Left Plane Top 33	Raven Bar 43	Rope Bridge 53	In(d)y 63	Mini Middle Top Left 73	Mini Bottom Left 83
4 Red-Yellow J133-5 Q87	Ad(v)enture Light 14	Adve(n)ture Light 24	Monkey Brains 34	Right Plane Middle 44	Advent(u)re Light 54	Ind(y) 64	Mini Middle Top Right 74	Mini Bottom Right 84
5 Red-Green J133-6 Q86	A(d)venture Light 15	Steal The Stones 25	Left Plane Middle 35	Bonus 6X 45	Adventu(r)e Light 55	Willie 65	Mini Top Arrow 75	Mini Bottom Arrow 85
6 Red-Blue J133-7 Q85	(A)dventure Light 16	Grail Jackpot 26	Sallah 36	Right Plane Bottom 46	Adventur(e) Light 56	Bouns 2X 66	Marion 76	Totem Top Arrow 86
7 Red-Violet J133-8 Q84	Shoot Again 17	Streets Of Cairo 27	Bonus 4X 37	Well Of Souls 47	The 3 Challenges 57	Shorty 67	Bonus 8X 77	Center Lock 87
8 Red-Gray J133-9 Q83	Get The Idol 18	Stones Jackpot 28	Left Plane Bottom 38	Left Loop 48	Right Loop 58	Right Ramp Arrow 68	Dr. Jones 78	Start Button 88

# LAMPS LOCATIONS

Item	Bulb No.	Lamp Assy No.	Description
11	24-8768	A-16716-2	Mode Start #555
12	24-8768	A-16716-2	Hand of Fate #555
13	24-8768	A-16716-2	Eject Extra Ball #555
14	24-8768	A-16716-2	Ad(v)enture Light #555
15	24-8768	A-16716-2	A(d)venture Light #555
16	24-8768	A-16716-2	(A)dventure Light #555
17	24-8768	A-16716-2	Shoot Again #555
18	24-8768	A-16716-2	Get the Idol #555
21	24-8768	A-16716-2	Tank Chase #555
22	24-8758	A-16716-2	Adven(t)ure Light #555
23	24-8768	A-16716-2	Adv(e)nture Light #555
24	24-8768	A-16716-2	Adve(n)ture Light #555
25	24-8768	A-16716-2	Steal the Stones #555
26	24-8768	A-16716-2	Grail Jackpot #555
27	24-8768	A-16716-2	Street of Cairo #555
28	24-8768	A-16716-2	Stones Jackpot #555
31	24-8768	A-16716-2	Left Ramp Arrow #555
32	24-8768	A-16716-2	Castle Grunewald #555
33	24-8768	A-16716-2	Left Plane Top #555
34	24-8768	A-16716-2	Monkey Brains #555
35	24-8768	A-16716-2	Left Plane Middle #555
36	24-8768	A-16716-2	Sallah #555
37	24-8768	A-16716-2	Bonus 4X #555
38	24-8768	A-16716-2	Left Plane Bottom #555
41	24-8768	A-16716-2	Mine Cart #555
42	24-8768	A-16716-2	Ark Jackpot #555
43	24-8768	A-16716-2	Raven Bar #555
44	24-8768	A-16716-2	Right Plane Middle #555
45	24-8768	A-16716-2	Bonus 6X #555
46	24-8768	A-16716-2	Right Plane Bottom #555
47	24-8768	A-16716-2	Well of Souls #555
48	24-6549	A-11754	Left Loop #44
51	24-8768	A-16716-2	Choose Wisely #555
52	24-8768	A-16716-2	Right Plane Top #555
53	24-8768	A-16716-2	Rope Bridge #555
54	24-8768	A-16716-2	Advent(u)re Light #555
55	24-8768	A-16716-2	Adventu(r)e Light #555
56	24-8768	A-16716-2	Adventur(e) Light #555
57	24-8768	A-16716-2	The 3 Challenges #555
58	24-8768	B-15648	Right Loop #555
61	24-8768	A-16739	(I)-N-D-Y #555
62	24-8768	A-16739	I-(N)-D-Y #555
63	24-8768	A-16739	I-N-(D)-Y #555
64	24-8768	A-16739	I-N-D-(Y) #555
65	24-8768	A-16823	Willie #555
66	24-8768	A-16823	Bonus 2X #555
67	24-8768	A-16823	Shorty #555
68	24-6549	A-11754	Right Ramp Arrow #44
71	24-8768	A-16746	Mini Top Left #555
72	24-8768	A-16746	Mini Top Right #555
73	24-8768	A-16746	Mini Mid. Top Left #555
74	24-8768	A-16746	Mini Mid. Top Right #555
75	24-8768	A-16746	Mini Top Arrow #555
76	24-8768	A-16823	Marion #555
77	24-8768	A-16823	Bonus 8X #555
78	24-8768	A-16823	Dr. Jones #555



Item	Bulb No.	Lamp Assy No.	Description
81	24-8768	A-16747	Mini Mid. Bot. Left #555
82	24-8768	A-16747	Mini Mid. Bot. Right #555
83	24-8768	A-16747	Mini Bottom Left #555
84	24-8768	A-16747	Mini Bottom Right #555
85	24-8768	A-16747	Mini Bottom Arrow #555
86	24-6549	A-11754	Totem Top Arrow #44
87	24-6549	A-11754	Center Lock #44
88	-----	20-9663-11	Start Button

# 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	Ball Popper	High Power	J107-3			Q82	J130-1			Vio-Brn	AE-26-1200	
02	Ball Launch	High Power	J107-3			Q80	J130-2			Vio-Red	AE-23-800	
03	Totem Drop Up	High Power	J107-3			Q78	J130-4			Vio-Org	AE-26-1200	
04	Ball Release	High Power	J107-3			Q76	J130-5			Vio-Yel	AE-26-1500	
05	Center Drop Bank	High Power	J107-3			Q64	J130-6			Vio-Grn	AE-26-1200	
06	Idol Release	High Power	J107-3			Q66	J130-7			Vio-Blu	AE-26-1500	
07	Knocker	High Power	J107-3			Q68	J130-8			Vio-Blk	AE-23-800	
08	Left Eject	High Power	J107-3			Q70	J130-9			Vio-Gry	AE-26-1200	
09	Left Jet Bumper	Low Power	J107-2			Q58	J127-1			Brn-Blk	AE-26-1200	
10	Right Jet Bumper	Low Power	J107-2			Q56	J127-3			Brn-Red	AE-26-1200	
11	Bumpour Bas	Low Power	J107-2			Q54	J127-4			Brn-Org	AE-26-1200	
12	Left Slingshot	Low Power	J107-2			Q52	J127-5			Brn-Yel	AE-27-1200	
13	Right Slingshot	Low Power	J107-2			Q50	J127-6			Brn-Grn	AE-27-1200	
14	Left Control Gate	Low Power	J107-2			Q48	J127-7			Brn-Blu	A-14406	
15	Right Control Gate	Low Power	J107-2			Q46	J127-8			Brn-Vio	A-14406	
16	Totem Drop Down	Low Power	J107-2			Q44	J127-9			Brn-Gry	SM1-26-600	
17	Eternal Life	Flasher	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#906 (1)	#906 (3)
18	Light Jackpot	Flasher	J107-6			Q40	J126-2			Blk-Red	#906 (1)	
19	Super Jackpot	Flasher	J107-6			Q38	J126-3			Blk-Org	#89 (1)	
20	Jackpot	Flasher	J107-6	J106-5		Q36	J126-4	J125-5		Blk-Yel	#89 (1)	#906 (2)
21	Path Of Adventure	Flasher	J107-6	J106-5		Q28	J126-5	J125-6		Blu-Grn	#89 (1)	#906 (4)
22	Mini Motor Left	Low Power	J118-2			Q30	J126-6			Blu-Blk	14-7988	
23	Mini Motor Right	Low Power	J118-2			Q34	J126-7			Blu-Vio	14-7988	
24	Plane Gun LEDS	Flasher	J118-2	J106-5		Q32	J126-8	J125-9		Blu-Gry	A-16834	
25	Dogfight Hurry Up	Gen. Purpose	J107-6			Q26	J122-1			Blu-Brn	#89 (1)	
26	Right Ramp	Gen. Purpose	J107-6	J106-5		Q24	J122-2	J124-2		Blu-Red	#89 (3)	#906 (1)
27	Left Ramp	Gen. Purpose	J107-6	J106-5		Q22	J122-3	J124-3		Blu-Org	#89 (1)	#906 (1)
28	Subway Release	Gen. Purpose	J107-1			Q20	J122-4			Blu-Yel	AE-26-1500	
29-36	<i>See Flipper Circuits</i>											
37*	Left Side Flasher	Low Power	J107-6	J106-5		Q16	J4-2	J4-2		Brn-Wht	#89 (2)	#906 (1)
38*	Right Side Flasher	Low Power	J107-6	J106-5		Q15	J4-4	J4-4		Blk-Wht	#89 (2)	#906 (1)
39*	Special Flasher	Low Power	J107-6			Q14	J4-5			Org-Wht	#89 (2)	
40*	Totem Mutilball	Low Power	J107-6			Q13	J4-6			Yel-Wht	#89 (1)	
41*	Jackpot Multiplier Fl.	Low Power	J107-6			Q9	J3-2			Grn-Wht	#89 (1)	
42*	Wheel Motor	Low Power	J118-2			Q10	J3-3			Blu-Wht	14-7982	

\*Note: Controlled from the 8-Driver Board, not the Power Driver Board

## General Illumination

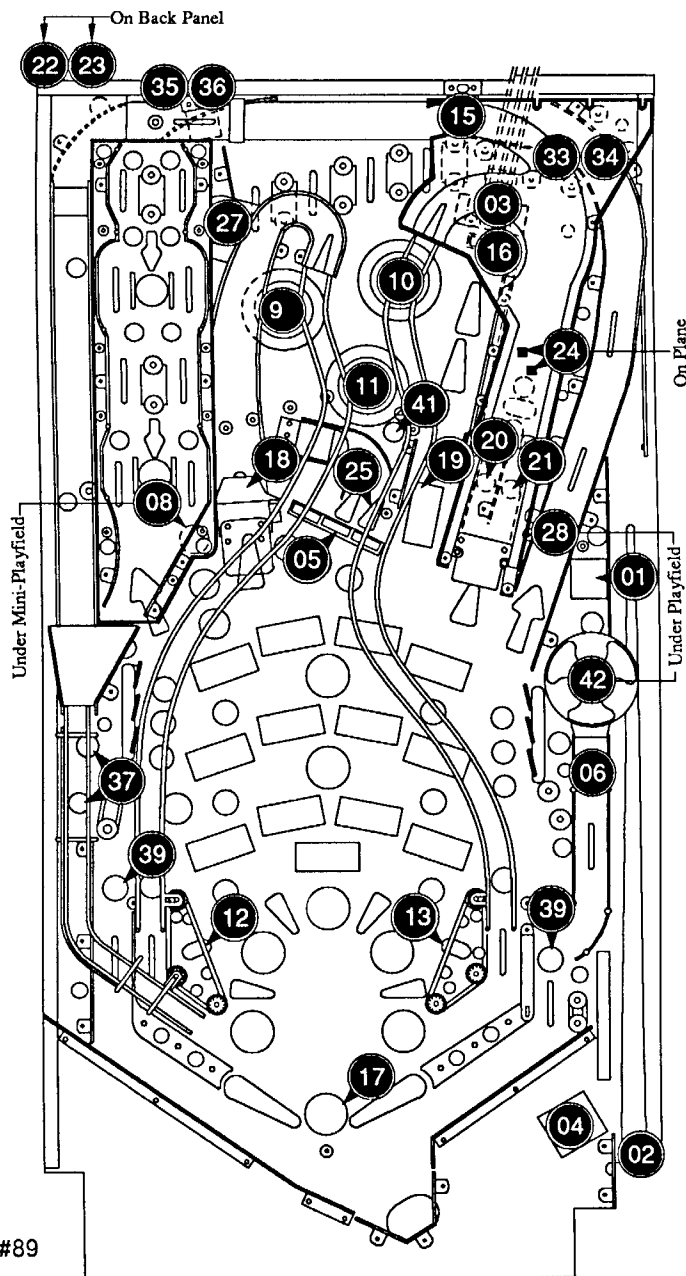
01	Top Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	
02	Bottom Playfield	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	
03	Insert Top	G.I.		J120-3		Q14		J120-9		Wht-Yel		#555
04	Insert Bottom	G.I.		J120-4		Q16		J120-10		Wht-Grn		#555
05	Return Lane/Coin	G.I.	J121-6		J119-3	Q12	J121-11		J119-1	Wht-Vio	#44	

## Flipper Circuits

	Function	Solenoid Type	Voltage Connections		Drive Transistors		Drive Connections		Drive Wire Colors		Coil Part Number	Coil Colors
			Playfield	Backbox	Power	Hold	Playfield	Backbox	Power	Hold		
(29)	Lower Right Flipper	Lwr. Rt. Power	J907-7 (Blu-Yel)		Q4		J902-13		Blu-Vio		FL-11629	Blue
(30)		Lwr. Rt. Hold	J907-7 (Blu-Yel)			Q11	J902-11			Org-Grn		
(31)	Lower Left Flipper	Lwr. Lt. Power	J907-9 (Gry-Yel)		Q3		J902-9		Blu-Gry		FL-11629	Blue
(32)		Lwr. Lt. Hold	J907-9 (Gry-Yel)			Q9	J902-7			Org-Blu		
33	Diverter Power	Up Rt. Power	J907-1 (Blu-Yel)		Q2		J902-6		Blk-Yel		FL-11753-1	Brown
34	Diverter Hold	Up Rt. Hold	J907-1 (Blu-Yel)			Q7	J902-4			Org-Vio		
35	Top Lockup Power	Up Lt. Power	J907-4 (Gry-Yel)		Q1		J902-3		Blk-Blu		A-15943	Brown
36	Top Lockup Hold	Up Lt. Hold	J907-4 (Gry-Yel)			Q5	J902-1			Org-Gry		

# SOLENOID/FLASHER LOCATION

Item No.	Coll/Flasher No.	Assy No.	Description
01	AE-26-1200	A-16231	Ball Popper
02	AE-23-800	A-14525	Ball Launch
03	AE-26-1200	A-14615	Totem Drop Up
04	AE-26-1500	A-16765	Ball Release
05	AE-26-1200	A-16032-2	Center Drop Bank
06	AE-26-1500	A-16226	Idol Release
07	AE-23-800	B-10686-1	Knocker
08	AE-26-1200	A-17073	Left Eject
09	AE-26-1200	A-9415-2	Left Jet Bumper
10	AE-26-1200	A-9415-2	Right Jet Bumper
11	AE-26-1200	A-9415-2	Bumpeur Bas
12	AE-27-1200	A-14369-L	Left Slingshot
13	AE-27-1200	A-14369-R	Right Slingshot
14	A-14406	A-14422	Left Control Gate
15	A-14406	A-14422	Right Control Gate
16	SM1-26-600	A-14615	Totem Drop Down
17	24-8802	A-12336-1	Eternal Life #906
	24-8802	----	Backbox #906
18	24-8802	A-16824	Light Jackpot #906
19	24-8704	A-9302	Super Jackpot #89
20	24-8704	A-8798	Jackpot #89
	24-8802	----	Backbox #906
21	24-8704	A-8798	Path Of Adventure #89
	24-8802	----	Backbox #906
22	14-7988	A-16738	Mini Motor Left
23	14-7988	A-16738	Mini Motor Right
24	----	A-16834	Plane Gun LEDs
	24-8802	----	Backbox #906
25	24-8704	A-9359	Dogfight Hurry Up #89
26	24-8704	A-8798/A-16861	Right Ramp #89
	24-8802	----	Backbox #906
27	24-8704	A-16861	Left Ramp #89
	24-8802	----	Backbox #906
28	AE-26-1500	A-16317	Subway Release
<i>29 to 36 see Flipper Circuits</i>			
37	24-8704	A-8798	Left Side Flasher #89
	24-8802	----	Backbox #906
38	24-8704	A-8798	Right Side Flasher #89
	24-8802	----	Backbox #906
39	24-8704	A-9302	Special Flashers #89
40	24-8704	A-9302	Totem Flasher #89
41	24-8704	A-8798	Jackpot Multiplier Flshr #89
42	14-7982	A-16228	Wheel Motor



## General Illumination

01	24-6549	----	*Top Playfield #44
02	24-6549	----	*Bottom Playfield #44
03	24-8768	----	*Insert Top #555
04	24-8768	----	*Insert Bottom #555
05	24-6549	----	*Return Lane/Coin #44

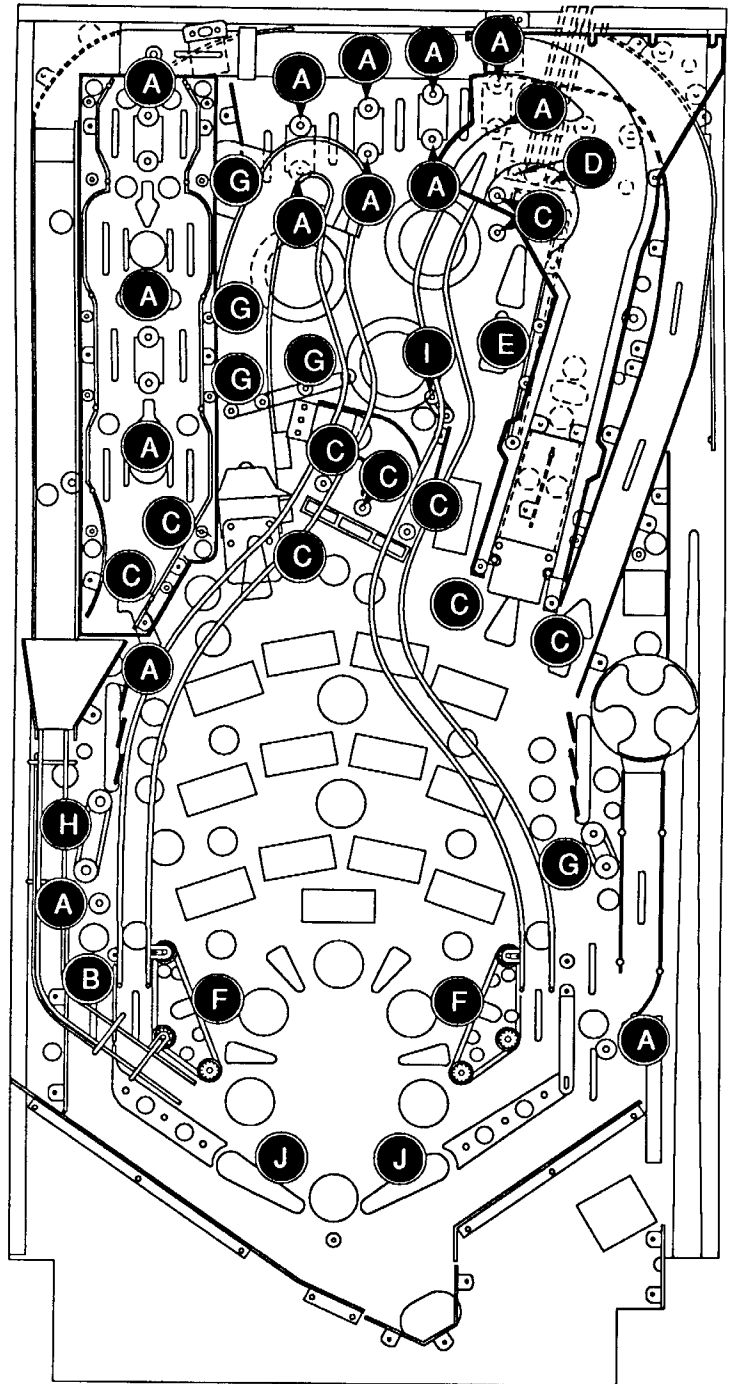
## Flippers

29-30	FL-11629	A-15205-R-2	*Lower Right Flipper
31-32	FL-11629	A-15205-L-2	*Lower Left Flipper
33	FL-11753-1	A-16301	Diverter Power
34	FL-11753-1	A-16301	Diverter Hold
35	A-15943	A-16656	Top Lockup Power
36	A-15943	A-16656	Top Lockup Hold

\* Not Shown

# RUBBER PARTS LOCATIONS

Item	Part No.	Qty	Description
A	23-6300	16	5/16" Rubber Rings
B	23-6535	1	Bumper
C	23-6556	10	Black Sleeve Bumpers
D	23-6552	2	Yellow Sleeve Bumpers
E	23-6308	1	3-1/2" Rubber Ring
F	23-6306	2	2-1/2" Rubber Rings
G	23-6301	5	3/4" Rubber Rings
H	23-6303	1	1-1/4" Rubber Ring
I	23-6599	2	7/16" Rubber Rings
J	23-6695	2	Black Flipper Rings





# SECTION 3

## *Schematics, Wiring Diagrams, and Circuit Theory*

### 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 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 Audio 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

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

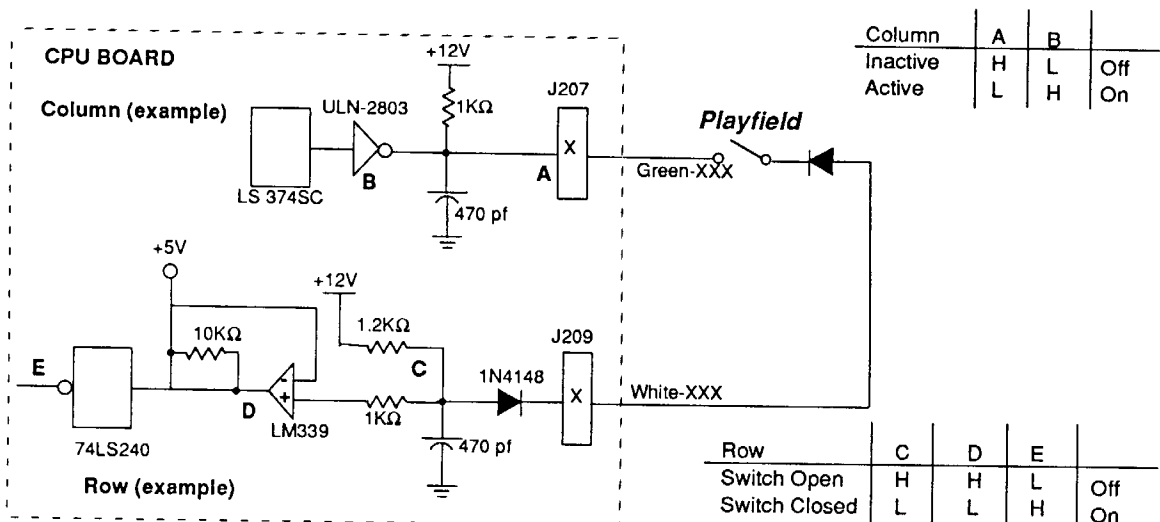
Schematics for standard WPC backbox boards are found in the WPC Schematics Manual. Playfield, cabinet and all other backbox board schematics are found in this section.

# SWITCHES

Dedicated Grounded Switches	Column Row	1	2	3	4	5	6	7	8	9	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 J207-9 U20-11	Violet-White Q11 J5-4	
Orange-Brown J205-1 Left Coin Chute D1	White-Brown J209-1 U18-11	11	21	31	41	51	61	71	81	91	Black-Green J906-1 Lower Right E.O.S. F1
Orange-Red J205-2 Center Coin Chute D2	White-Red J209-2 U18-9	12	22	32	42	52	62	72	82	92	Blue-Violet J905-1 Lower Right Opto F2
Orange-Black J205-3 Right Coin Chute D3	White-Orange J209-3 U18-5	13	23	33	43	53	63	73	83	93	Black-Blue J906-3 Lower Left E.O.S. F3
Orange-Yellow J205-4 4th Coin Chute D4	White-Yellow J209-4 U18-7	14	24	34	44	54	64	74	84	94	Blue-Gray J905-2 Lower Left Opto F4
Orange-Green J205-6 Normal Function Service Credits D5	White-Green J209-5 U19-11	15	25	35	45	55	65	75	85	95	Black-Violet J906-4 *Center Drop Bank Left F5
Orange-Blue J205-7 Normal Function Volume Down D6	White-Blue J209-7 U19-9	16	26	36	46	56	66	76	86		Black-Yellow J905-3 *Center Drop Bank Middle F6
Orange-Violet J205-8 Normal Function Volume Up D7	White-Violet J209-8 U19-5	17	27	37	47	57	67	77	87		Black-Gray J906-5 *Center Drop Bank Right F7
Orange-Gray J205-9 Normal Function Begin Test D8	White-Gray J209-9 U19-7	18	28	38	48	58	68	78	88		Black-Blue J905-5 *Left Ramp Made F8

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

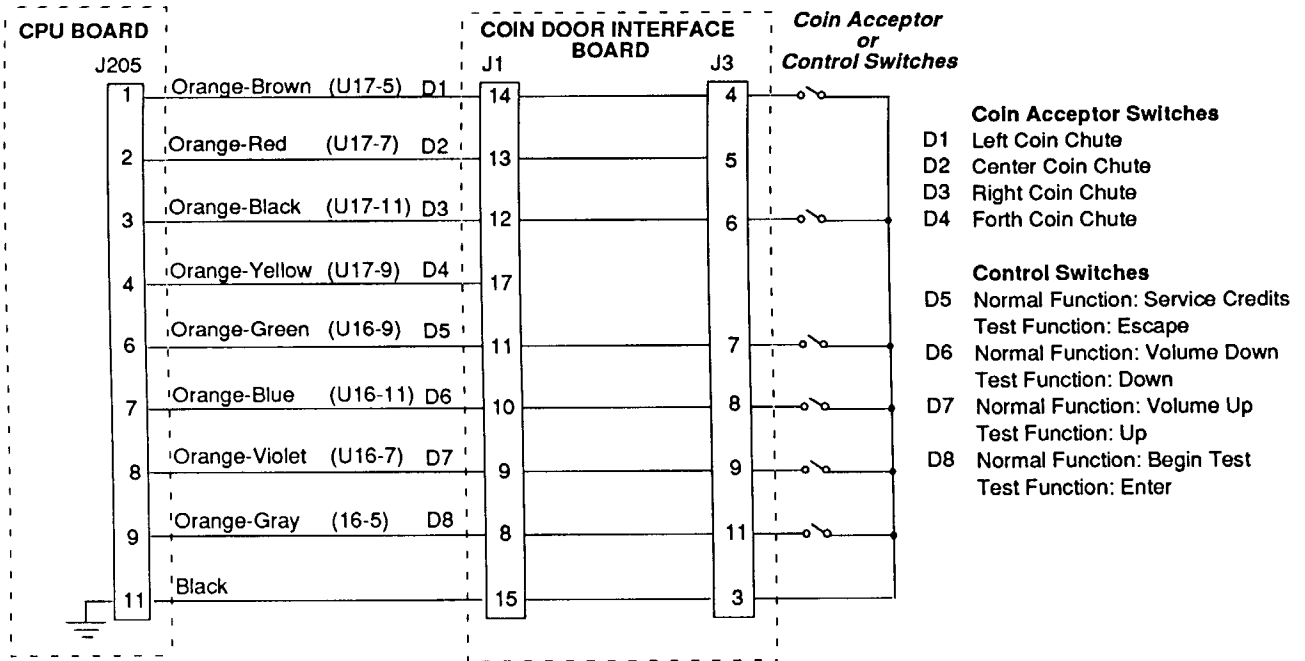
## Switch Matrix Circuit



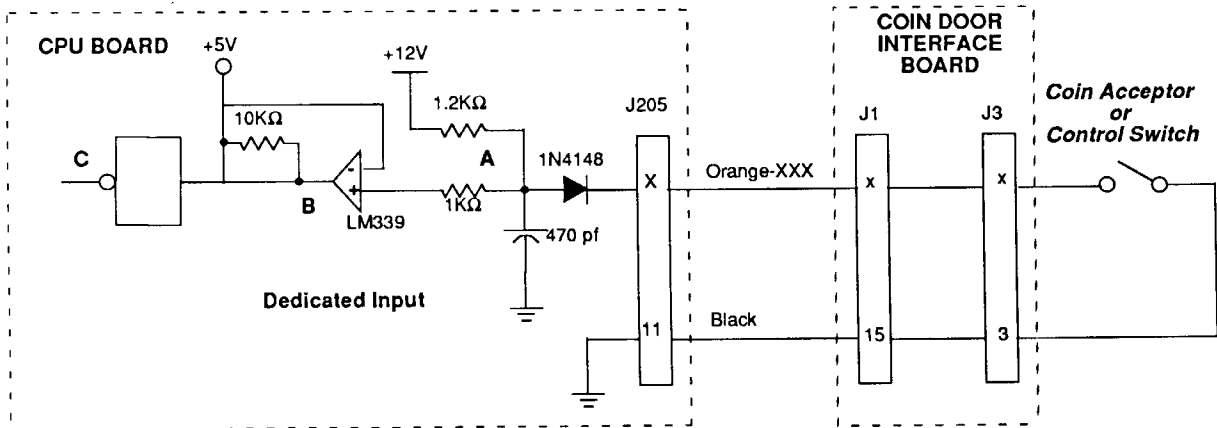
The microprocessor is constantly strobing the column side of the switch. When point "A" on the column circuit toggles low the column side is active.

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

### Dedicated Switches



### Dedicated Switch Circuit

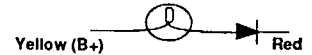


Switch	A	B	C	
Open	H	H	L	Off
Closed	L	L	H	On

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

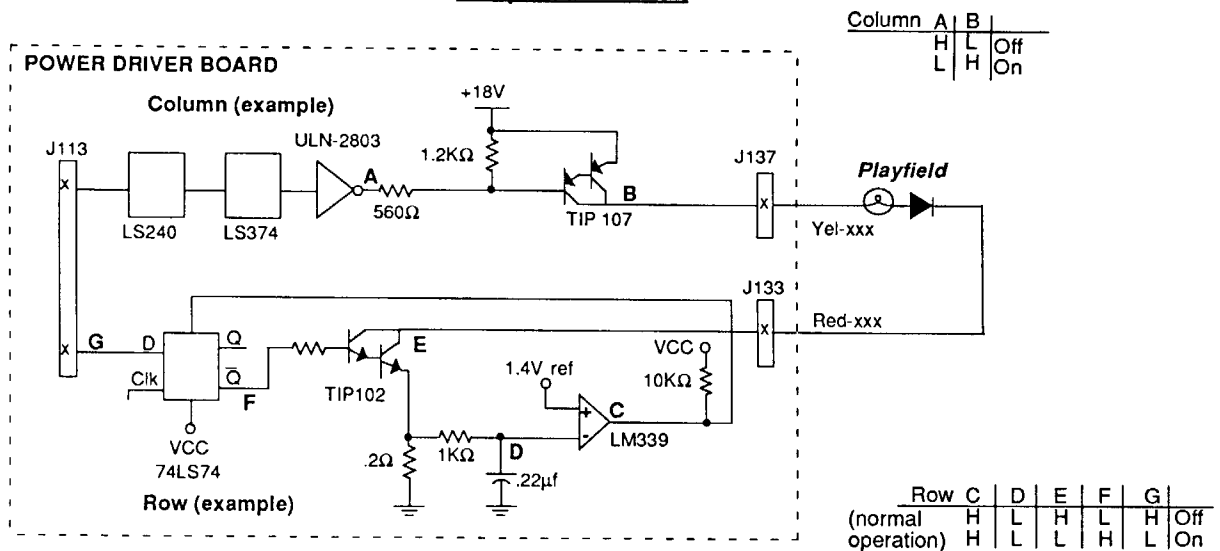
When a switch closes the row side (dedicated input) of the circuit activates. The "+" input to the LM339 drops below +5V therefore its output is low. Since the row circuit (dedicated input) is tied directly to ground through the switch, the switch is considered closed by the microprocessor. When the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

# LAMPS



Column Row	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J137-7 Q92	8 Yellow-Gray J137-9 Q91
1 Red-Brown J133-1 Q90	Mode Start 11	Tank Chase 21	Left Ramp Arrow 31	Mine Cart 41	Choose Wisely 51	(I)ndy 61	Mini Top Left 71	Mini Middle Bottom Left 81
2 Red-Black J133-2 Q89	Hand of Fate 12	Adven(t)ure Light 22	Castle Grunewald 32	Ark Jackpot 42	Right Plane Top 52	(I)ndy 62	Mini Top Right 72	Mini Middle Bottom Right 82
3 Red-Orange J133-4 Q88	Eject Extra Ball 13	Adv(e)ture Light 23	Left Plane Top 33	Raven Bar 43	Rope Bridge 53	In(d)y 63	Mini Middle Top Left 73	Mini Bottom Left 83
4 Red-Yellow J133-5 Q87	Ad(v)enture Light 14	Adve(n)ture Light 24	Monkey Brains 34	Right Plane Middle 44	Advent(u)re Light 54	Ind(y) 64	Mini Middle Top Right 74	Mini Bottom Right 84
5 Red-Green J133-6 Q86	A(d)venture Light 15	Steal The Stones 25	Left Plane Middle 35	Bonus 6X 45	Adventu(r)e Light 55	Willie 65	Mini Top Arrow 75	Mini Bottom Arrow 85
6 Red-Blue J133-7 Q85	(A)dventure Light 16	Grail Jackpot 26	Sallah 36	Right Plane Bottom 46	Adventur(e) Light 56	Bouns 2X 66	Marion 76	Totem Top Arrow 86
7 Red-Violet J133-8 Q84	Shoot Again 17	Streets Of Cairo 27	Bonus 4X 37	Well Of Souls 47	The 3 Challenges 57	Shorty 67	Bonus 8X 77	Center Lock 87
8 Red-Gray J133-9 Q83	Get The Idol 18	Stones Jackpot 28	Left Plane Bottom 38	Left Loop 48	Right Loop 58	Right Ramp Arrow 68	Dr. Jones 78	Start Button 88

## Lamp Matrix Circuit



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

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

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

# SOLENOID / FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire Color	Solenoid Part Number	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Flashlamp Type	Playfield
01	Ball Popper	High Power	J107-3			Q82	J130-1			Vio-Brn	AE-26-1200	
02	Ball Launch	High Power	J107-3			Q80	J130-2			Vio-Red	AE-23-800	
03	Totem Drop Up	High Power	J107-3			Q78	J130-4			Vio-Org	AE-26-1200	
04	Ball Release	High Power	J107-3			Q76	J130-5			Vio-Yel	AE-26-1500	
05	Center Drop Bank	High Power	J107-3			Q64	J130-6			Vio-Grn	AE-26-1200	
06	Idol Release	High Power	J107-3			Q66	J130-7			Vio-Blu	AE-26-1500	
07	Knocker	High Power	J107-3			Q68	J130-8			Vio-Blk	AE-23-800	
08	Left Eject	High Power	J107-3			Q70	J130-9			Vio-Gry	AE-26-1200	
09	Left Jet Bumper	Low Power	J107-2			Q58	J127-1			Brn-Blk	AE-26-1200	
10	Right Jet Bumper	Low Power	J107-2			Q56	J127-3			Brn-Red	AE-26-1200	
11	Bumpeur Bas	Low Power	J107-2			Q54	J127-4			Brn-Org	AE-26-1200	
12	Left Slingshot	Low Power	J107-2			Q52	J127-5			Brn-Yel	AE-27-1200	
13	Right Slingshot	Low Power	J107-2			Q50	J127-6			Brn-Grn	AE-27-1200	
14	Left Control Gate	Low Power	J107-2			Q48	J127-7			Brn-Blu	A-14406	
15	Right Control Gate	Low Power	J107-2			Q46	J127-8			Brn-Vio	A-14406	
16	Totem Drop Down	Low Power	J107-2			Q44	J127-9			Brn-Gry	SM1-26-600	
17	Eternal Life	Flasher	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#906 (1)	#906 (3)
18	Light Jackpot	Flasher	J107-6			Q40	J126-2			Blk-Red	#906 (1)	
19	Super Jackpot	Flasher	J107-6			Q38	J126-3			Blk-Org	#89 (1)	
20	Jackpot	Flasher	J107-6	J106-5		Q36	J126-4	J125-5		Blk-Yel	#89 (1)	#906 (2)
21	Path Of Adventure	Flasher	J107-6	J106-5		Q28	J126-5	J125-6		Blu-Grn	#89 (1)	#906 (4)
22	Mini Motor Left	Low Power	J118-2			Q30	J126-6			Blu-Blk		
23	Mini Motor Right	Low Power	J118-2			Q34	J126-7			Blu-Vio	14-7988	
24	Plane Gun LEDS	Flasher	J118-2	J106-5		Q32	J126-8			Blu-Gry	A-16834	
25	Dogfight Hurry Up	Gen. Purpose	J107-6			Q26	J122-1			Blu-Brn	#89 (1)	
26	Right Ramp	Gen. Purpose	J107-6	J106-5		Q24	J122-2	J124-2		Blu-Red	#89 (3)	#906 (1)
27	Left Ramp	Gen. Purpose	J107-6	J106-5		Q22	J122-3	J124-3		Blu-Org	#89 (1)	#906 (1)
28	Subway Release	Gen. Purpose	J107-1			Q20	J122-4			Blu-Yel	AE-26-1500	
29-36	<i>See Flipper Circuits</i>											
37*	Left Side Flasher	Low Power	J107-6	J106-5		Q16	J4-2	J4-2		Brn-Wht	#89 (2)	#906 (1)
38*	Right Side Flasher	Low Power	J107-6	J106-5		Q15	J4-4	J4-4		Blk-Wht	#89 (2)	#906 (1)
39*	Special Flasher	Low Power	J107-6			Q14	J4-5			Org-Wht	#89 (2)	
40*	Totem Multiball	Low Power	J107-6			Q13	J4-6			Yel-Wht	#89 (1)	
41*	Jackpot Multiplier Fl.	Low Power	J107-6			Q9	J3-2			Grn-Wht	#89 (1)	
42*	Wheel Motor	Low Power	J118-2			Q10	J3-3			Blu-Wht	14-7982	

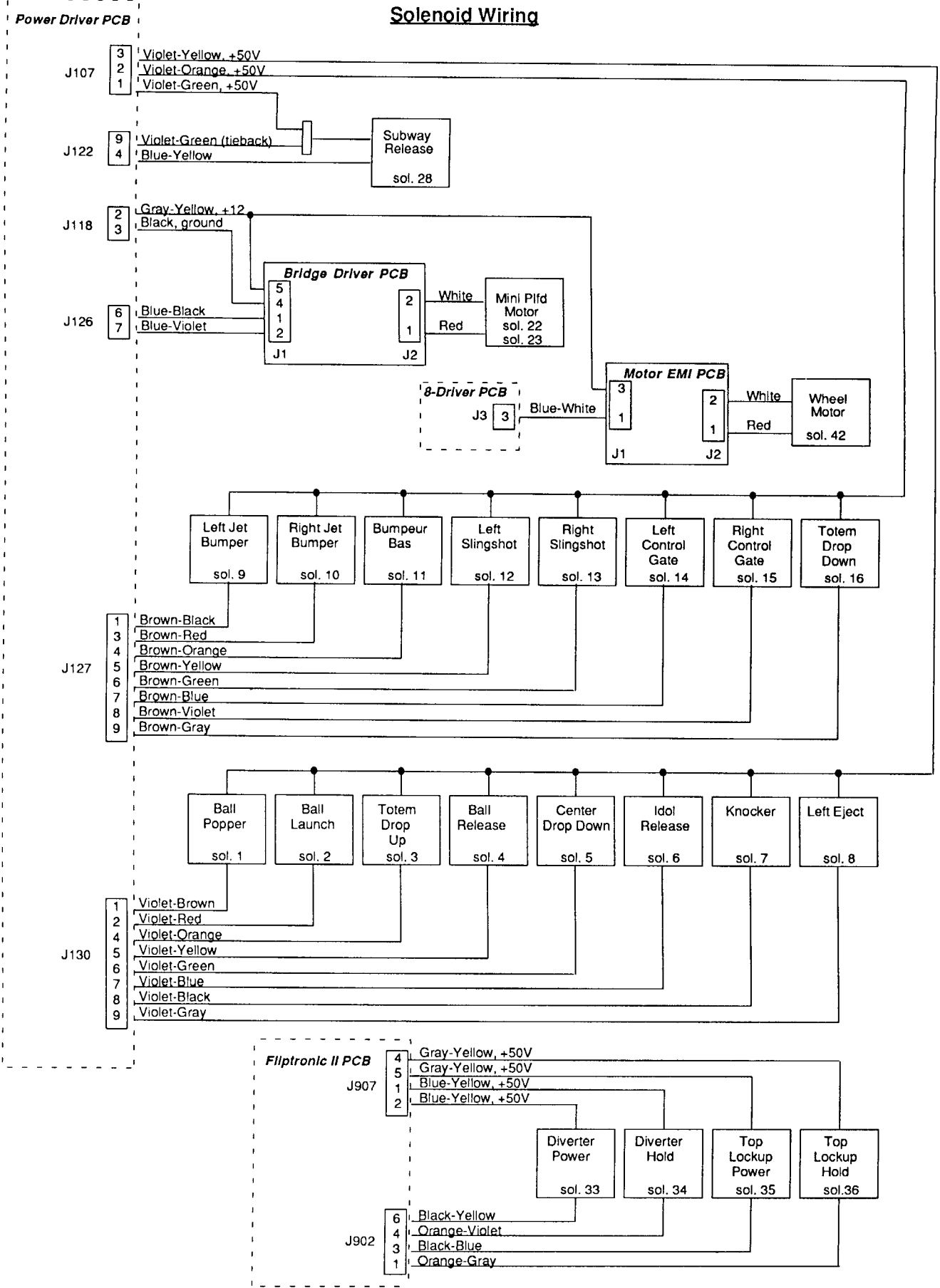
\*Note: Controlled from the 8-Driver Board, not the Power Driver Board

## General Illumination

01	Top Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	
02	Bottom Playfield	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	
03	Insert Top	G.I.		J120-3		Q14		J120-9		Wht-Yel		#555
04	Insert Bottom	G.I.		J120-4		Q16		J120-10		Wht-Grn		#555
05	Return Lane/Coin	G.I.	J121-6		J119-3	Q12	J121-11		J119-1	Wht-Vio	#44	

Flipper Circuits		Voltage Connections	Drive Transistors		Drive Connections	Drive Wire Colors		Coll Part Number	Coll Colors
			Playfield	Power		Hold	Playfield		
(29)	Lower Right Flipper	Lwr. Rt. Power	J907-7 (Blu-Yel)	Q4		J902-13	Blu-Vio	FL-11629	Blue
(30)		Lwr. Rt. Hold	J907-7 (Blu-Yel)		Q11	J902-11	Org-Grn		
(31)		Lwr. Lt. Power	J907-9 (Gry-Yel)	Q3		J902-9	Blu-Gry	FL-11629	Blue
(32)	Lower Left Flipper	Lwr. Lt. Hold	J907-9 (Gry-Yel)		Q9	J902-7	Org-Blu		
33	Diverter Power	Up Rt. Power	J907-1 (Blu-Yel)	Q2		J902-6	Blk-Yel	FL-11753-1	Yellow
34	Diverter Hold	Up Rt. Hold	J907-1 (Blu-Yel)		Q7	J902-4	Org-Vio		
35	Top Lockup Power	Up Lt. Power	J907-4 (Gry-Yel)	Q1		J902-3	Blk-Blu	A-15943	Brown
36	Top Lockup Hold	Up Lt. Hold	J907-4 (Gry-Yel)		Q5	J902-1	Org-Gry		

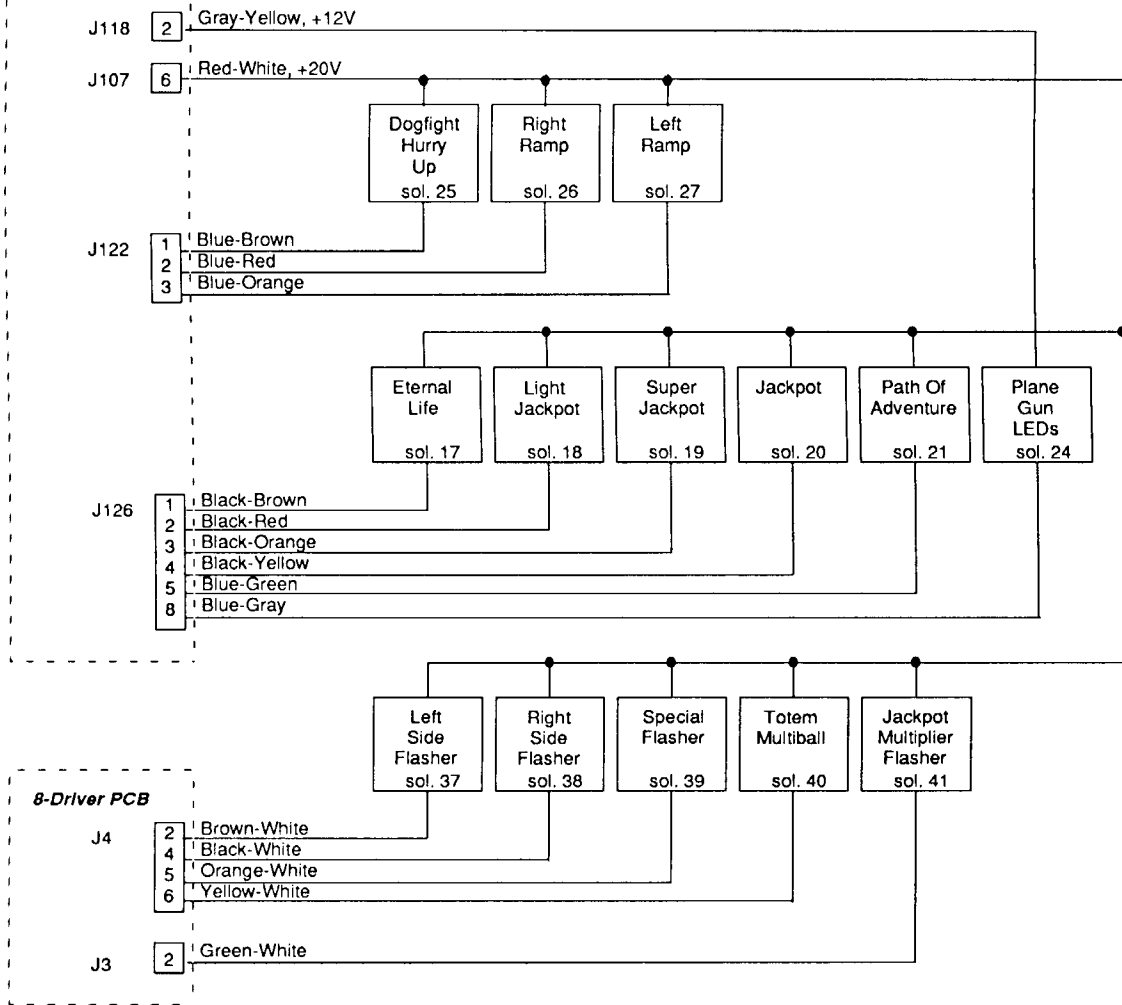
# Solenoid Wiring



# Flashlamp Wiring

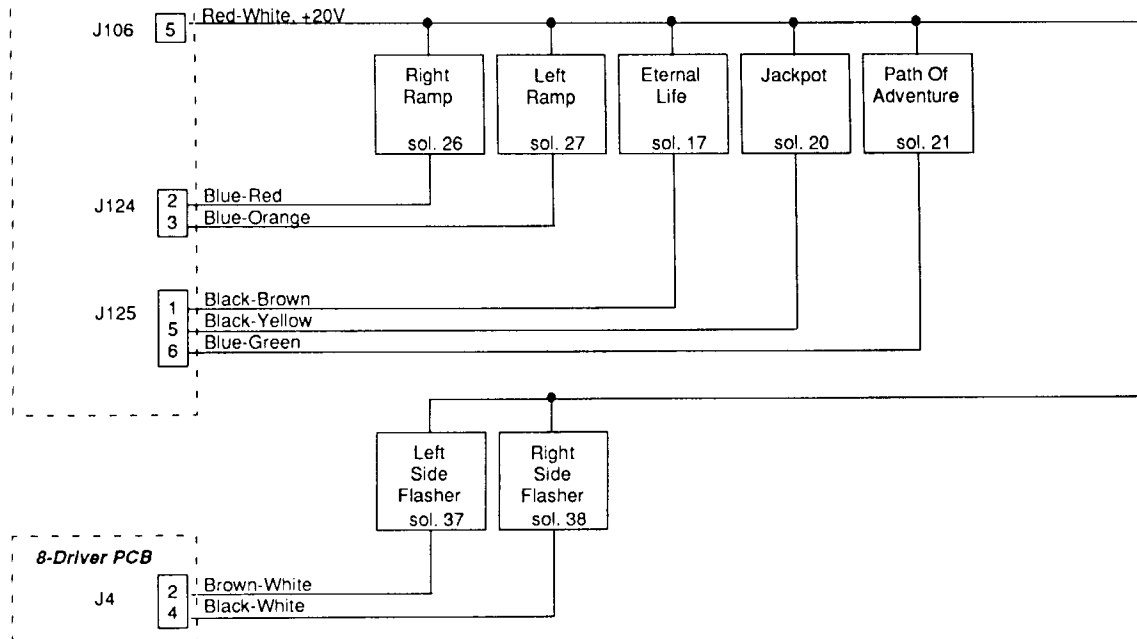
PLAYFIELD FLASHLAMPS

Power Driver PCB



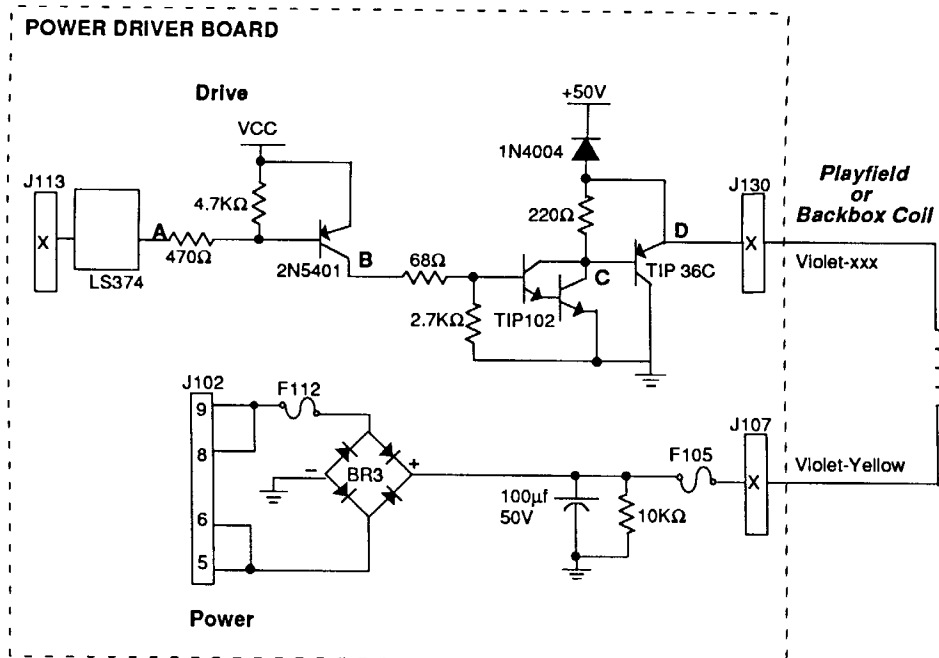
BACKBOX FLASHLAMPS

Power Driver PCB



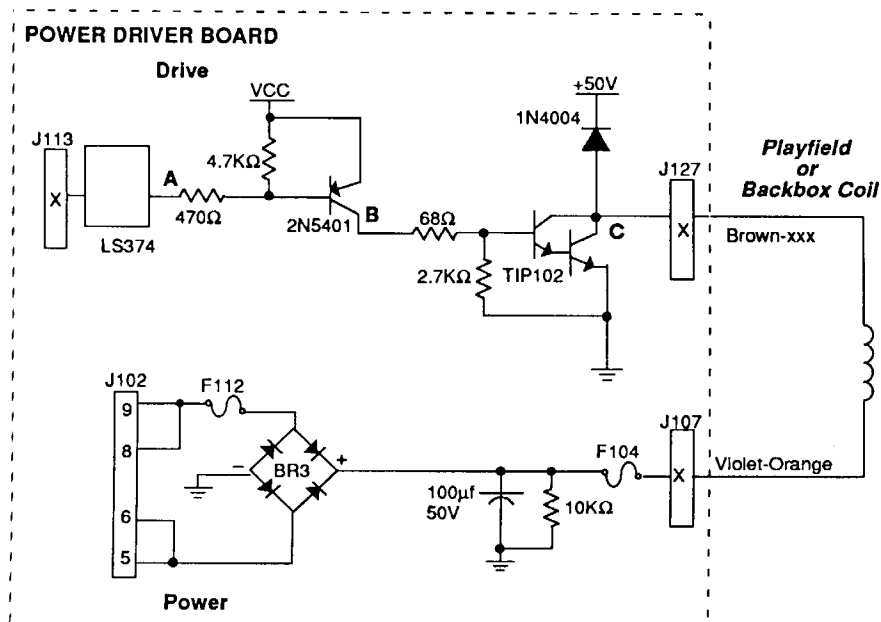
INDIANA JONES 3-7

## 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.

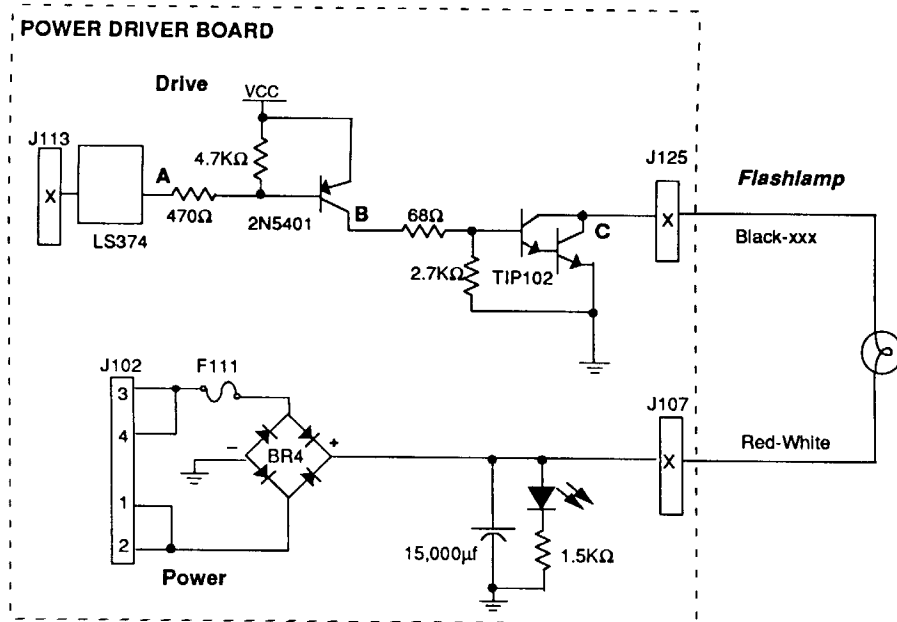
## Low Power Solenoid Circuit



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.

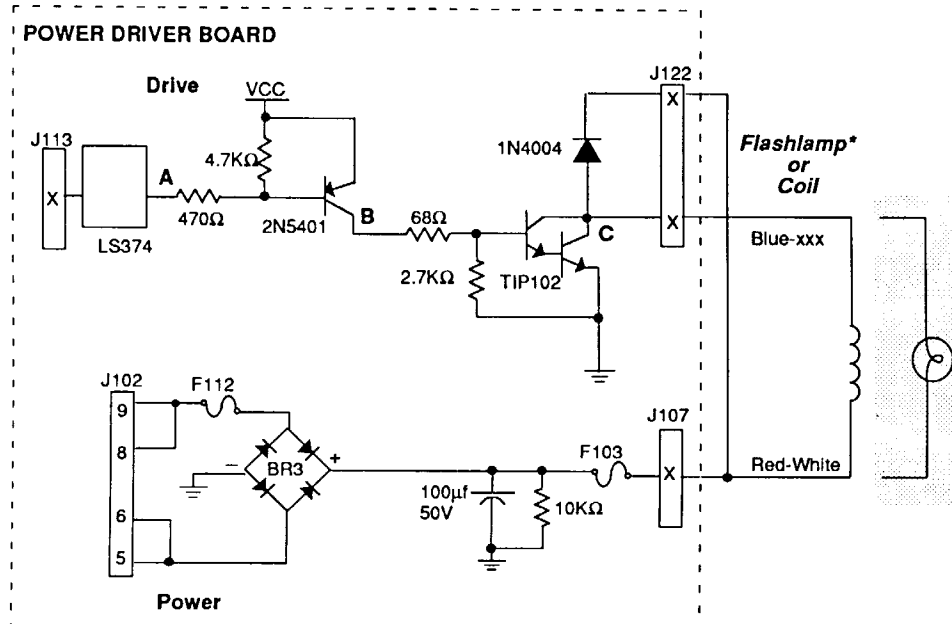


## Flashlamp Circuit



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.

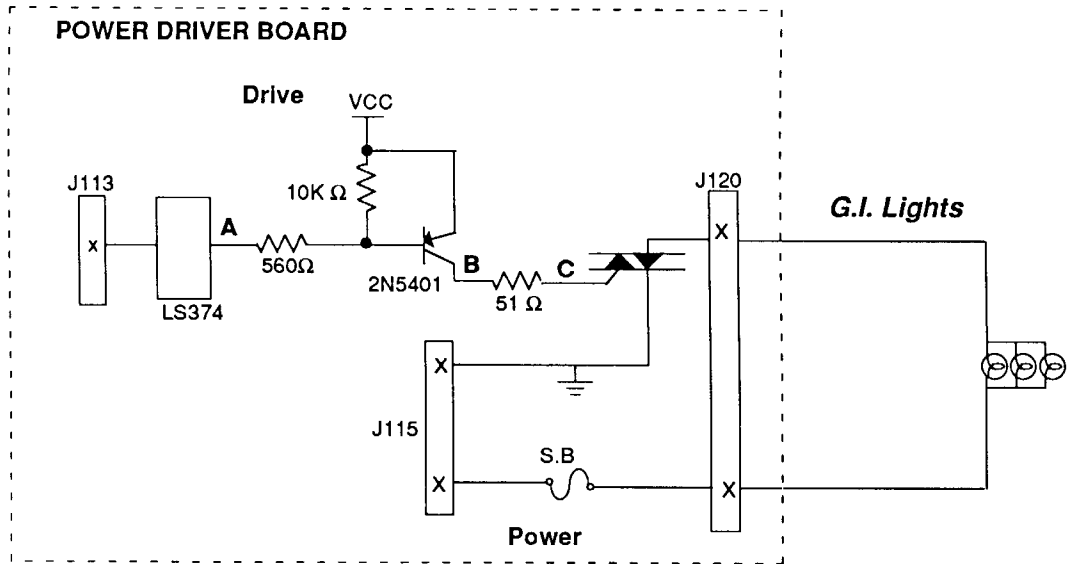
## Special (General Purpose) Solenoid Circuit



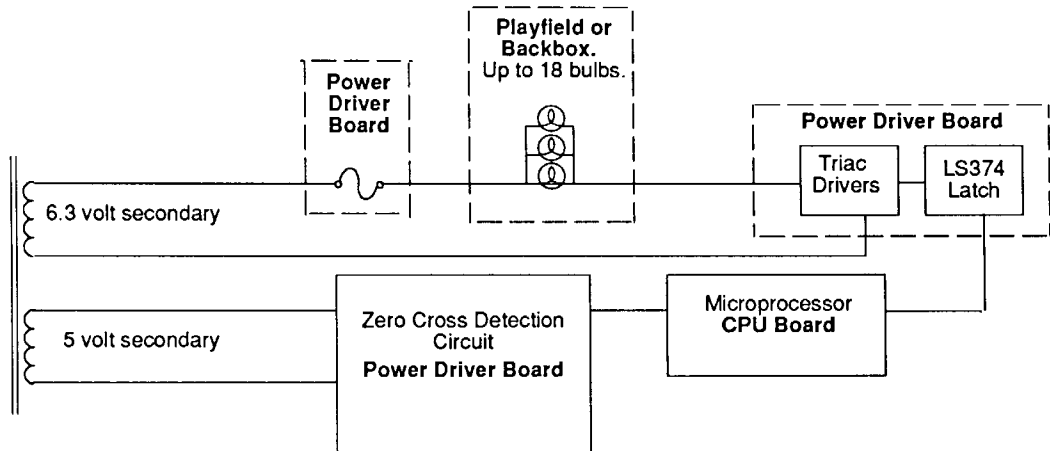
The microprocessor toggles the output of the 74LS374. When point "A" drops low, point "B" is high. A high at point "B" causes a low at point "C". When point "C" is low the coil/flashlamp is grounded through the transistor and the coil/flashlamp turns On. When point "A" toggles high the coil/flashlamp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

\* Tieback Diode is not used for flashlamp circuit.

## General Illumination Circuit

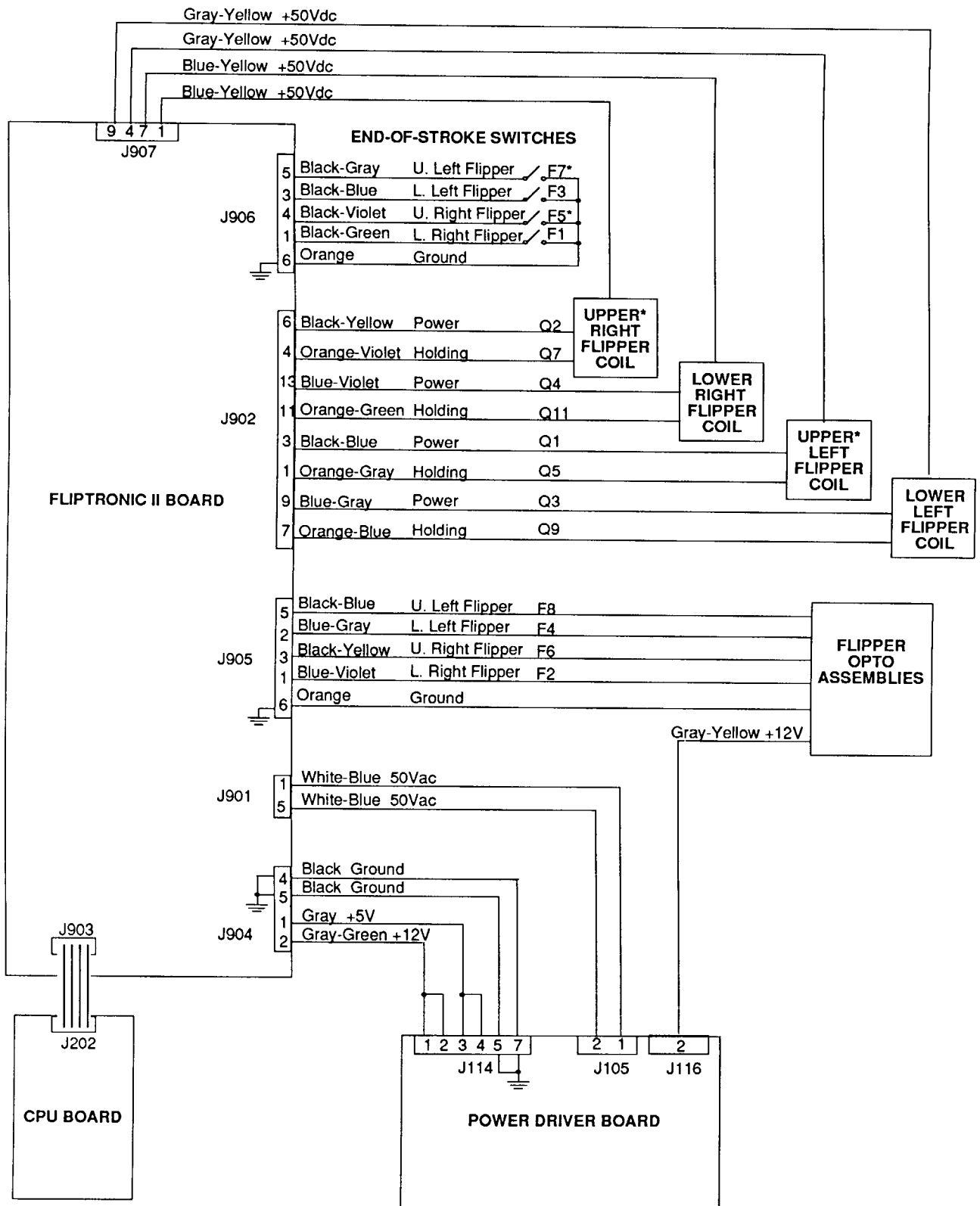


## Block Diagram of General Illumination Circuit



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

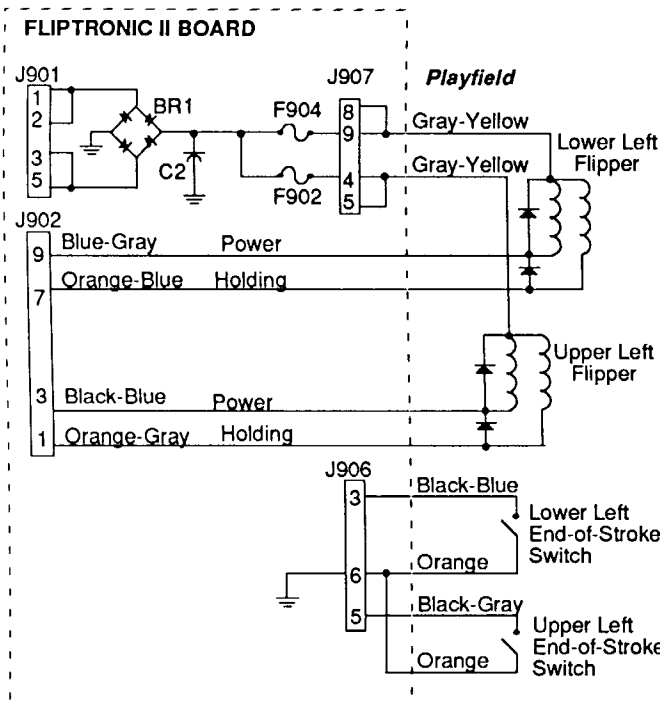
## Flipper Circuit Diagram



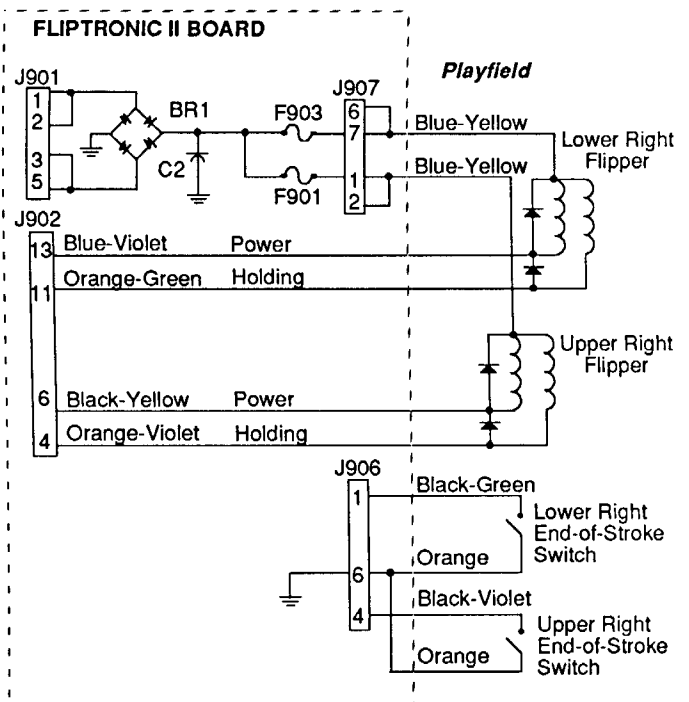
*\*Note: Used as circuits other than flipper circuits in this game.*

## Flipper Coil Circuits

### Left Flipper Circuit

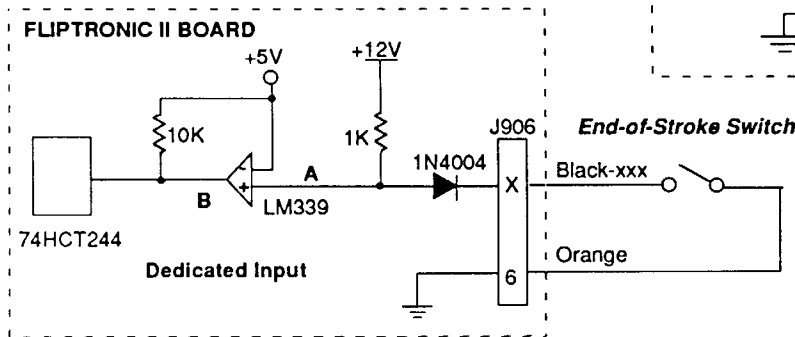
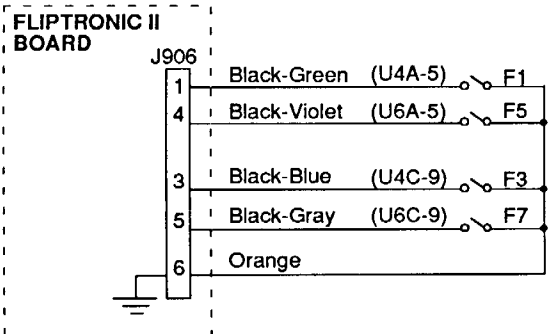


### Right Flipper Circuit



## Flipper End-of-Stroke Switches

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

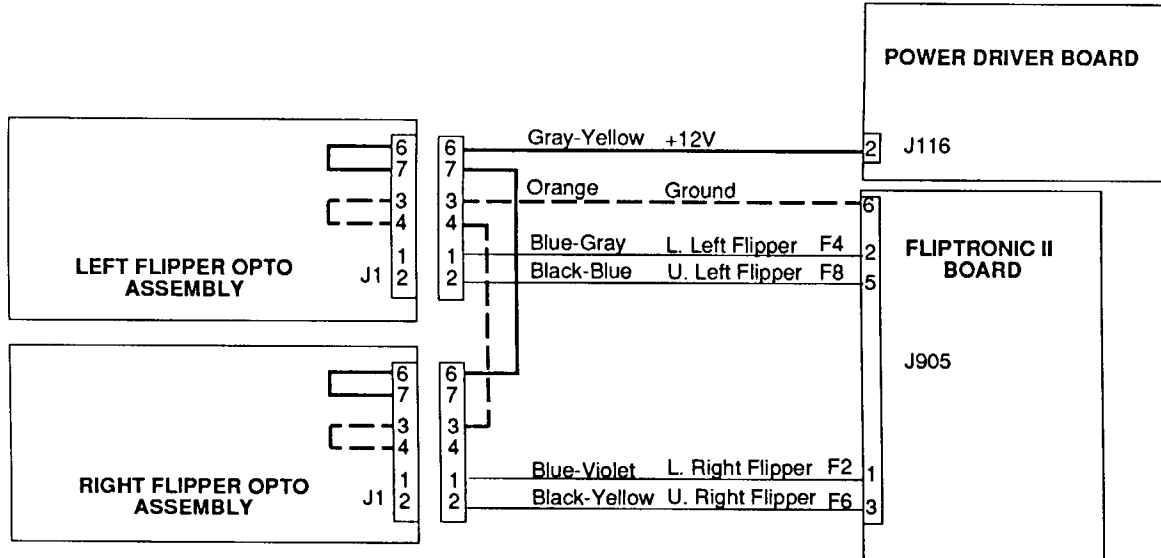


Switch	A	B	
Open	H	H	Off
Closed	L	L	On

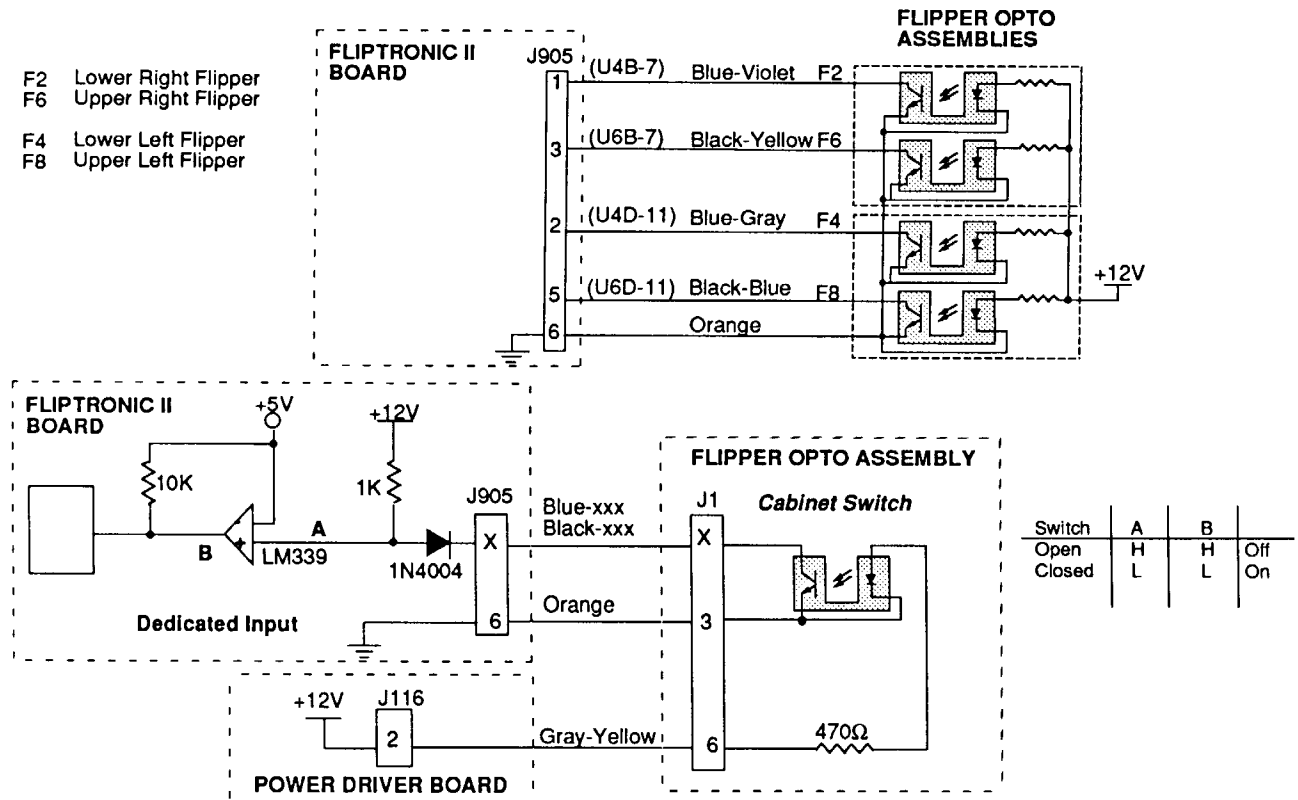
The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

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



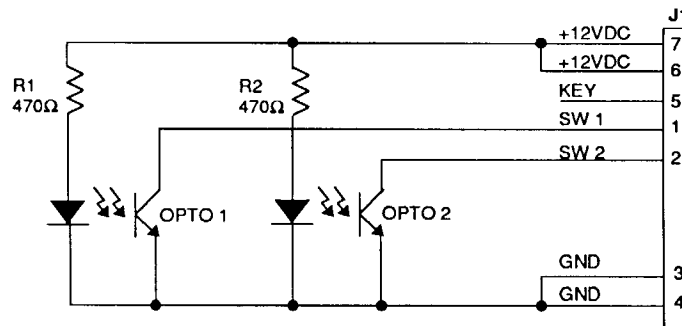
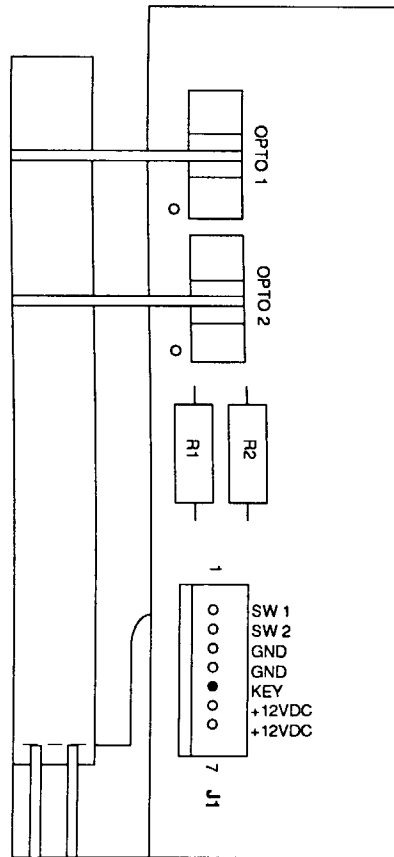
## Flipper Cabinet Switches



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.

# A-16384-1 Flipper Opto PCB Assembly



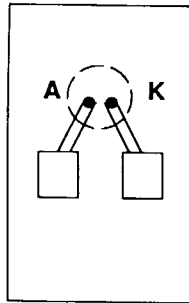
### Left Side Flipper Cabinet Opto Switch Board

- J1-1 Blue-Gray from Fliptronic II Board J905-2
- J1-2 N/C
- 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

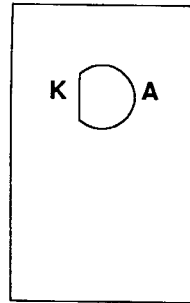
### Right Side Flipper Cabinet Opto Switch Board

- J1-1 Blue-Violet from Fliptronic II Board J905-1
- J1-2 N/C
- 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

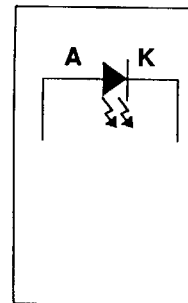
**A-14231  
LED PCB Assembly\*  
(green mask)**



solder side

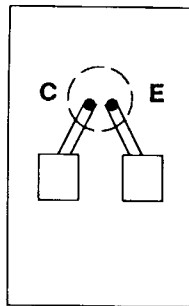


component side

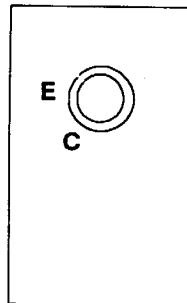


schematic

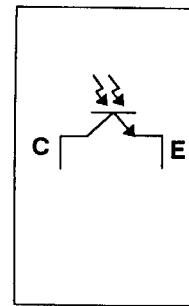
**A-14232  
Photo Transistor PCB Assembly\*\*  
(blue mask)**



solder side



component side



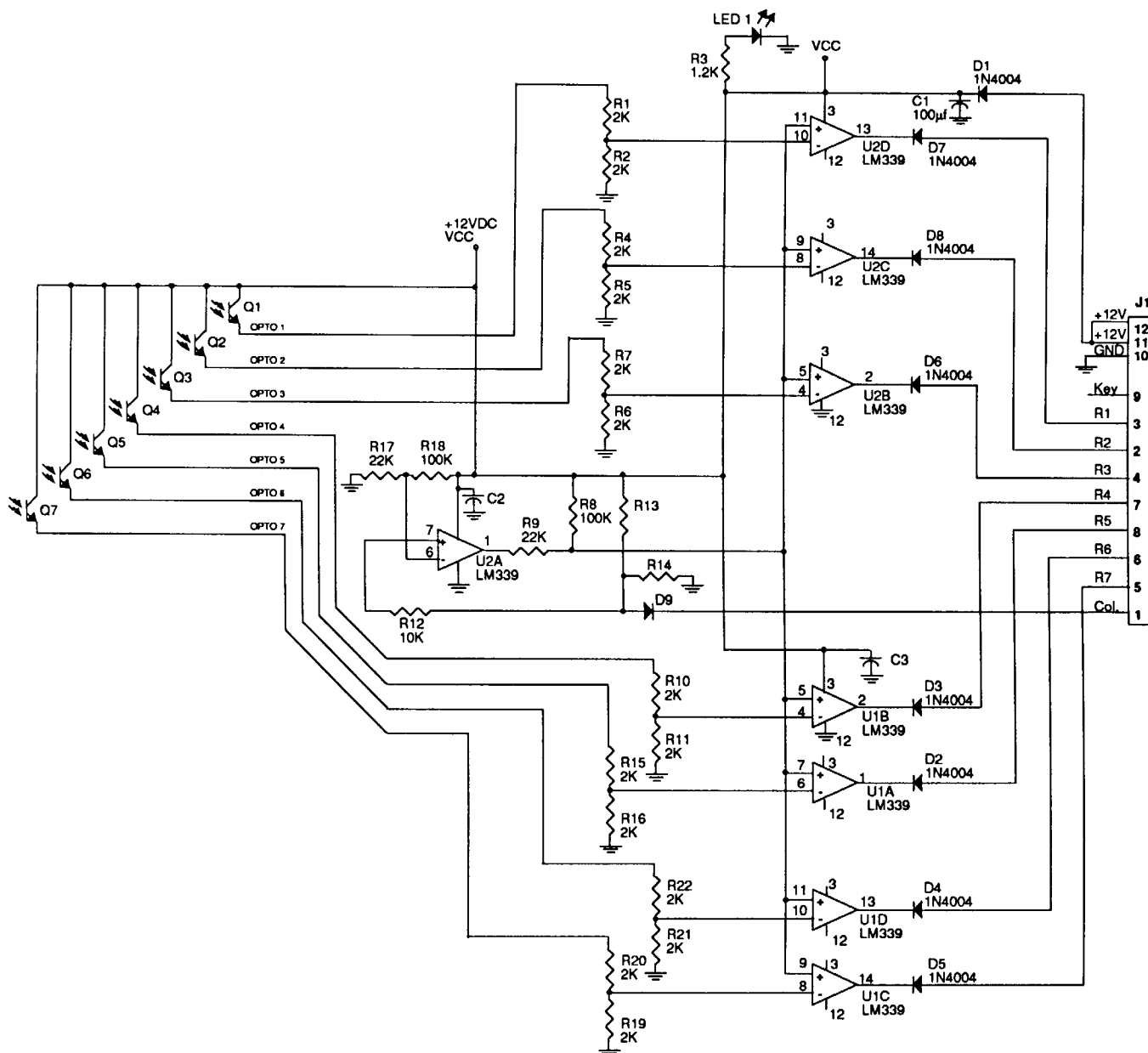
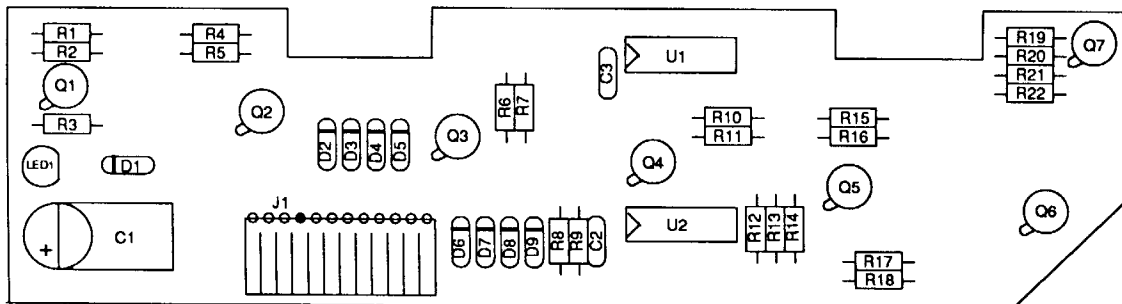
schematic

**Note:** \*Switches #41, #72 and #73 use part number A-16908 for LED PCB Assembly.

\*\* Switches #41, #72 and #73 use part number A-16909 for Photo Trans PCB Assembly.

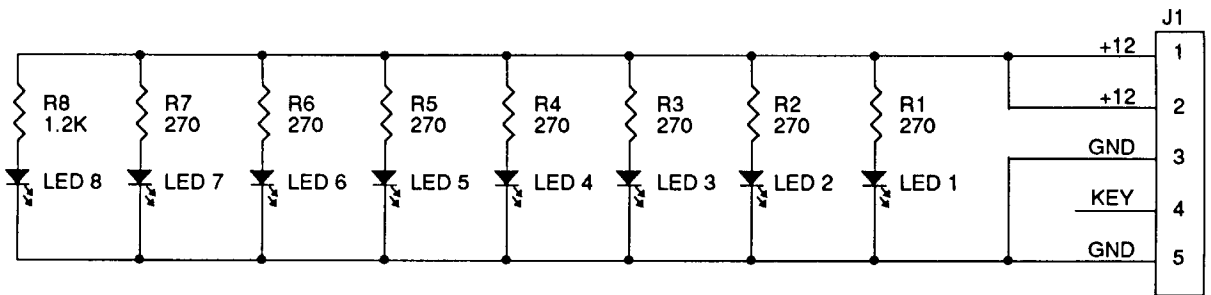
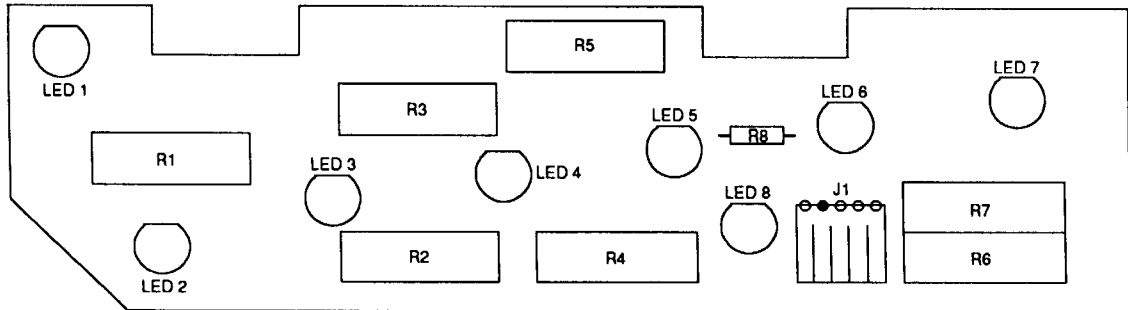
# A-16926

## 7 Ball Trough Photo Transistor PCB Assembly





**A-16927**  
**7 Ball Trough LED PCB Assembly**



**7 Ball Trough LED PCB Assembly**

**Connector Wiring**

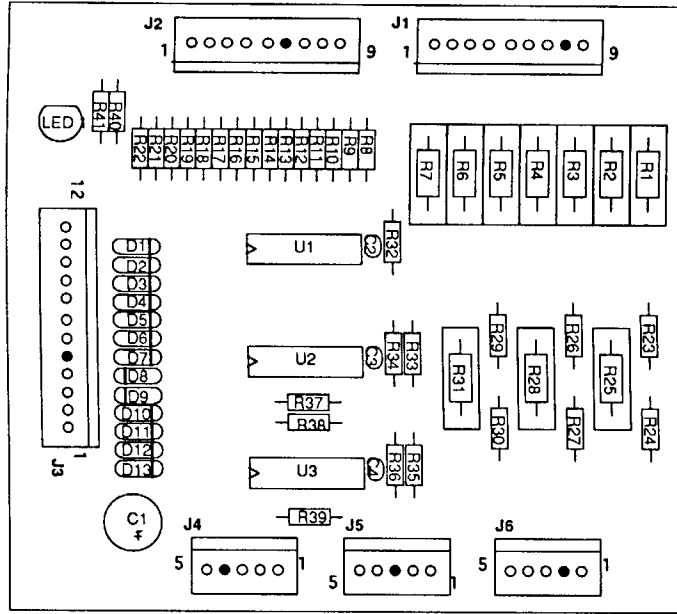
- J1-1 Gray-Yellow, +12V from Power Driver Board J118-2
- J1-2 N/C
- J1-3 N/C
- J1-4 Key
- J1-5 Black, ground from Power Driver Board J118-3

**7 Ball Trough Photo Transistor PCB Assembly**

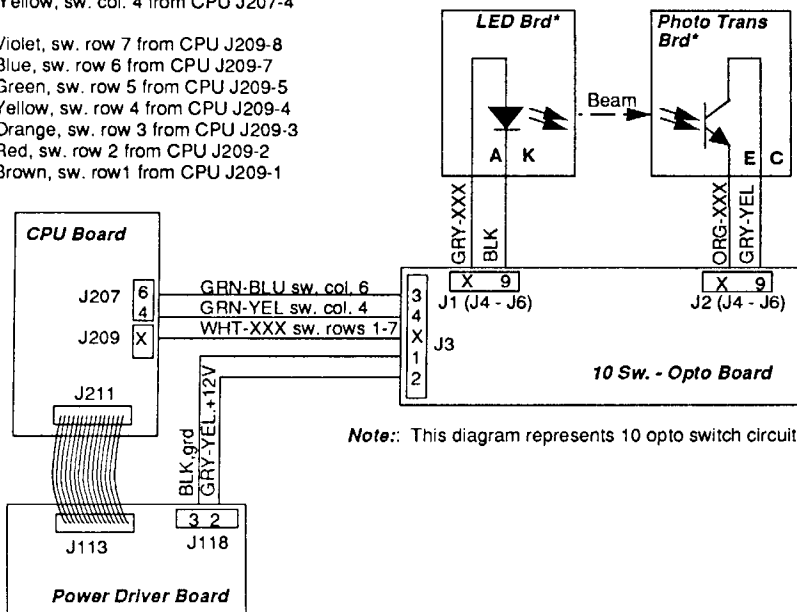
**Connector Wiring**

- 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

# A-15430 10 Sw.-Opto PCB Assembly



- |  |   |
|--|---|
| <p>J1-1 Gray-Violet, to sw. 47 (Subway Lockup) LED brd anode<br/>         J1-2 Gray-Blue, not used<br/>         J1-3 Gray-Green, to sw. 45 (Center Enter) LED brd anode<br/>         J1-4 Gray-Black, to sw. 44 (Right Popper) LED brd anode<br/>         J1-5 Gray-Orange, to sw. 43 (Top Idol Enter) LED brd anode<br/>         J1-6 Gray-Red, to sw. 42 (Right Ramp Enter) LED brd anode<br/>         J1-7 Gray-Brown, to sw. 41 (Left Ramp Enter) LED brd anode<br/>         J1-8 Key<br/>         J1-9 Black, grd to LED brd cathode</p> <p>J2-1 Orange-Violet, to sw. 47 (Subway Lockup) Photo Trans. brd emitter<br/>         J2-2 Orange-Blue, not used<br/>         J2-3 Orange-Green, to sw. 45 (Center Enter) Photo Trans. brd emitter<br/>         J2-4 Orange-Yellow, to sw. 44 (Right Popper) Photo Trans. brd emitter<br/>         J2-5 Orange-Black, to sw. 43 (Top Idol Enter) Photo Trans. brd emitter<br/>         J2-6 Key<br/>         J2-7 Orange-Red, to sw. 42 (Right Ramp Enter) Photo Trans. brd emitter<br/>         J2-8 Orange-Brown, to sw. 41 (Left Ramp Enter) Photo Trans. brd emitter<br/>         J2-9 Gray-Yellow, +12V to Photo Trans. brd collector</p> <p>J3-1 Black, grd from Power Driver Brd J118-3<br/>         J3-2 Gray-Yellow, +12V from Power Driver Brd J118-2<br/>         J3-3 Green-Blue, sw. col. 6 from CPU J207-6<br/>         J3-4 Green-Yellow, sw. col. 4 from CPU J207-4<br/>         J3-5 Key<br/>         J3-6 White-Violet, sw. row 7 from CPU J209-8<br/>         J3-7 White-Blue, sw. row 6 from CPU J209-7<br/>         J3-8 White-Green, sw. row 5 from CPU J209-5<br/>         J3-9 White-Yellow, sw. row 4 from CPU J209-4<br/>         J3-10 White-Orange, sw. row 3 from CPU J209-3<br/>         J3-11 White-Red, sw. row 2 from CPU J209-2<br/>         J3-12 White-Brown, sw. row 1 from CPU J209-1</p> | <p>J4-1 Gray-Brown, to sw. 71 (Captive Ball Front) LED brd anode<br/>         J4-2 NC<br/>         J4-3 NC<br/>         J4-4 Key<br/>         J4-5 Orange-Brown, to sw. 71 (Captive Ball Front) Photo Trans. brd emitter</p> <p>J5-1 Gray-Red, to sw. 72 (Mini Top Hole) LED brd anode<br/>         J5-2 NC<br/>         J5-3 Key<br/>         J5-4 NC<br/>         J5-5 Orange-Red, to sw. 72 (Mini Top Hole) Photo Trans. brd emitter</p> <p>J6-1 Gray-Orange, to sw. 73 (Mini Bottom Hole) LED brd anode<br/>         J6-2 Key<br/>         J6-3 NC<br/>         J6-4 NC<br/>         J6-5 Orange-Black, to sw. 73 (Mini Bottom Hole) Photo Trans. brd emitter</p> |
|--|---|

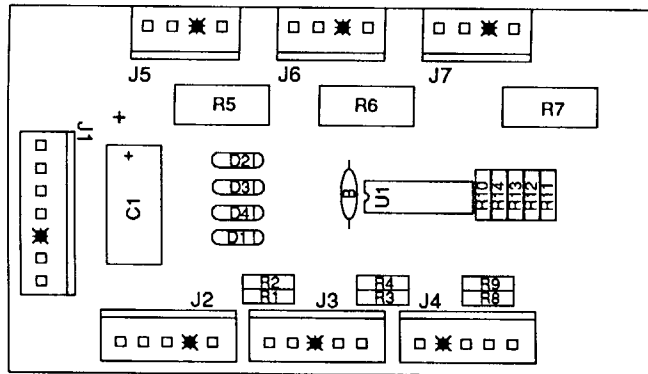


**Note:** LED Brds. are green.  
 Photo Trans. Brds. are blue.

**Note:** This diagram represents 10 opto switch circuits.



## A-13901-2 3-sw. Opto PCB Assembly (for idol)

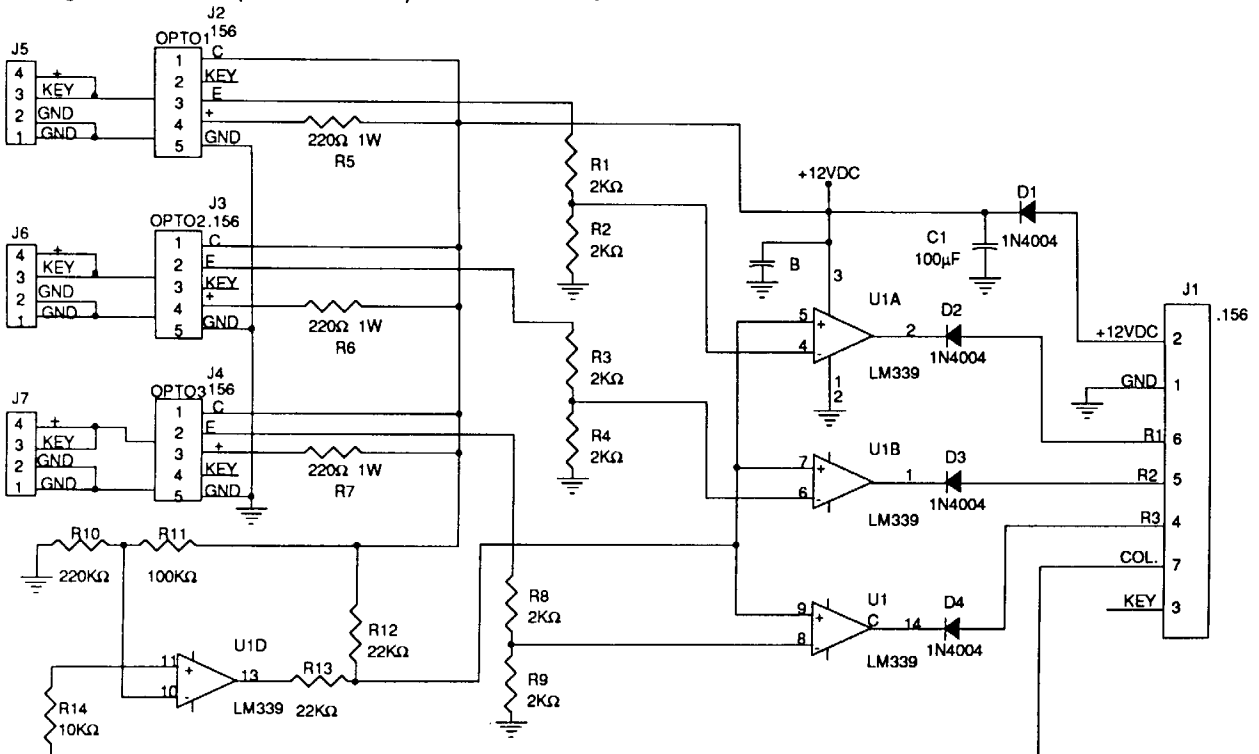


- |  |   |
|--|---|
| J1-1 Black, ground, from Power Driver board J118-3         | J4-1 Gray-Yellow, +12V, to sw. 93 (Wheel Position 3) Photo. Trans. brd. collector |
| J1-2 Gray-Yellow, +12V, from Power Driver board J118-2     | J4-2 Orange-Black, to sw. 93 (Wheel Position 3) Photo. Trans. brd. emitter        |
| J1-3 N/C   | J4-3 Gray-Orange, to sw. 93 (Wheel Position 3) LED board anode                    |
| J1-4 White-Orange, switch row 3, from CPU board J209-3     | J4-4 Key  |
| J1-5 White-Red, switch row 2, from CPU board J209-2        | J4-5 Black, ground, to sw. 93 (Wheel Position 3) LED board cathode                |
| J1-6 White-Brown, switch row 1, from CPU board J209-1      | <b>J5 through J7 are Not Used</b>   |
| J1-7 Violet-White, switch column 9, from 8-Driver PCB J5-4 |   |

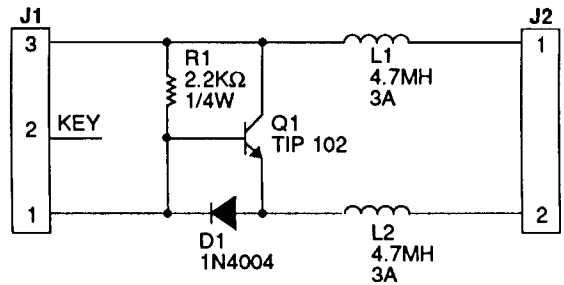
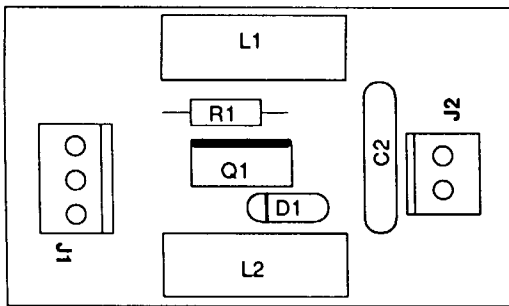
- J2-1 Gray-Yellow, +12V, to sw. 91 (Wheel Position 1) Photo Trans. brd. collector  
 J2-2 Key  
 J2-3 Orange-Brown, to sw. 91 (Wheel Position 1) Photo Trans. brd. emitter  
 J2-4 Gray-Brown, to sw. 91 (Wheel Position 1) LED board anode  
 J2-5 Black, ground, to sw. 91 (Wheel Position 1) LED board cathode

**Note:** LED Brds. are green.  
 Photo Trans. Brds. are blue.

- J3-1 Gray-Yellow, +12V, to sw. 92 (Wheel Position 2) Photo Trans. brd. collector  
 J3-2 Orange-Red, to sw. 92 (Wheel Position 2) Photo Trans. brd. emitter  
 J3-3 Key  
 J3-4 Gray-Red, to sw. 92 (Wheel Position 2) LED board anode  
 J3-5 Black, ground, to sw. 92 (Wheel Position 2) LED board cathode

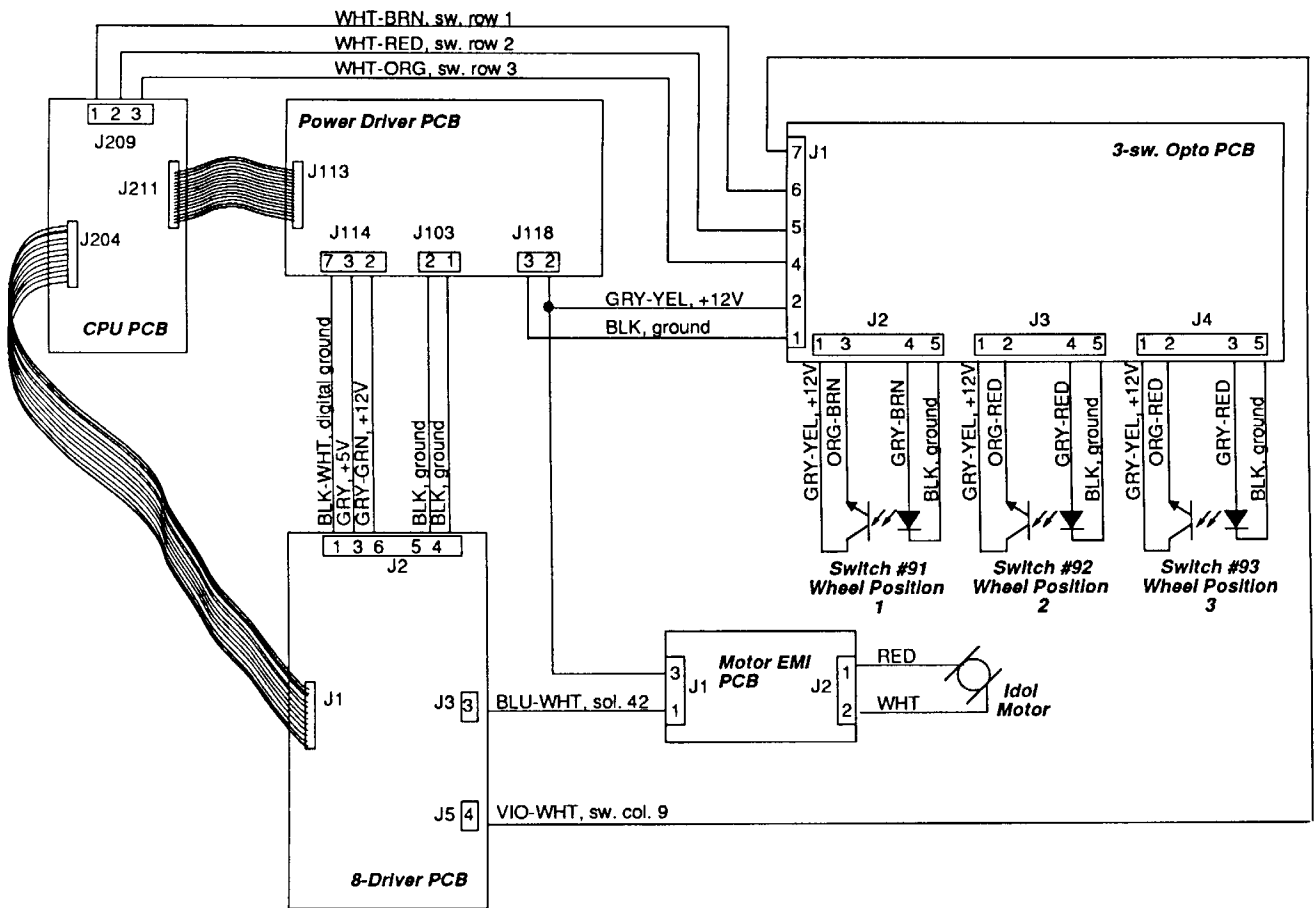


# A-15340 Motor EMI PCB Assembly (for idol)

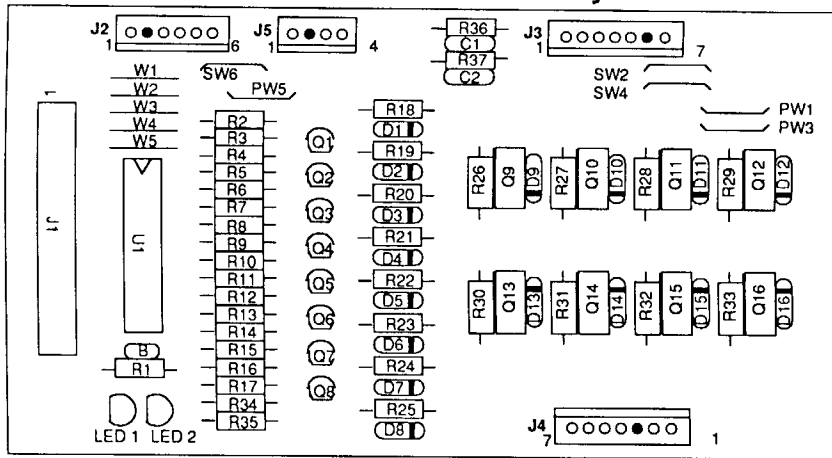


**J1-1** Blue-White, solenoid 42 drive (Wheel Motor), from 8-Driver Board J3-3  
**J1-2** Key  
**J1-3** Gray-Yellow, +12V, from Power Driver Board J118-2

**J2-1** Red, To motor  
**J2-2** White, To motor



## A-16100 8-Driver PCB Assembly



J1-1 Ribbon cable, data, from CPU Board J204

J2-1 Black-White, digital ground, from Power Driver Board J114-7

J2-2 Key

J2-3 Gray, +5V, from Power Driver Board J114-3

J2-4 Black, ground, from Power Driver Board J103-1

J2-5 Black, ground, from Power Driver Board J103-2

J2-6 Gray-Green, +12V, from Power Driver Board J114-2

J3-1 N/C

J3-2 Green-White, sol. 41 drive (Jackpot Multiplier FI), to plfd flasher

J3-3 Blue-White, sol. 42 drive (Wheel Motor), to Motor EMI Board J1-1

J3-4 N/C

J3-5 N/C

J3-6 Key

J3-7 N/C

J4-1 N/C

J4-2 Brown-White, sol. 37 drive (Left Side FI), to bb and plfd flasher

J4-3 N/C

J4-4 Black-White, sol. 38 drive (Right Side FI), to bb and plfd flasher

J4-5 Orange-White, sol. 39 drive (Special FI), to plfd flasher

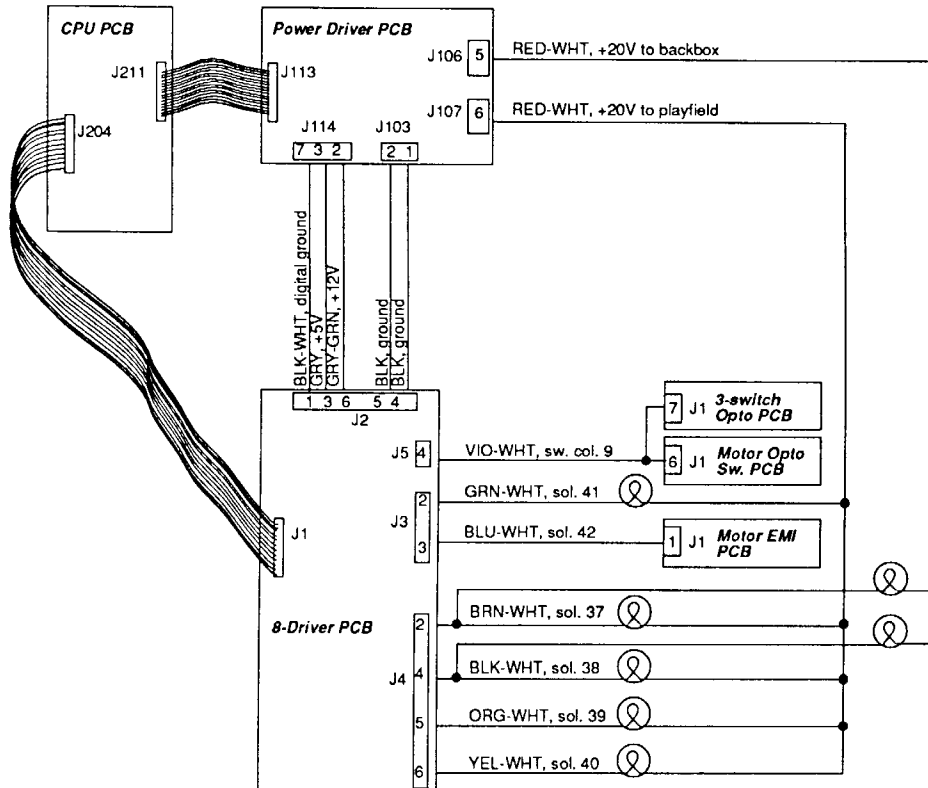
J4-6 Yellow-White, sol. 40 drive (Totem Multiball FI), to plfd flasher

J5-1 N/C

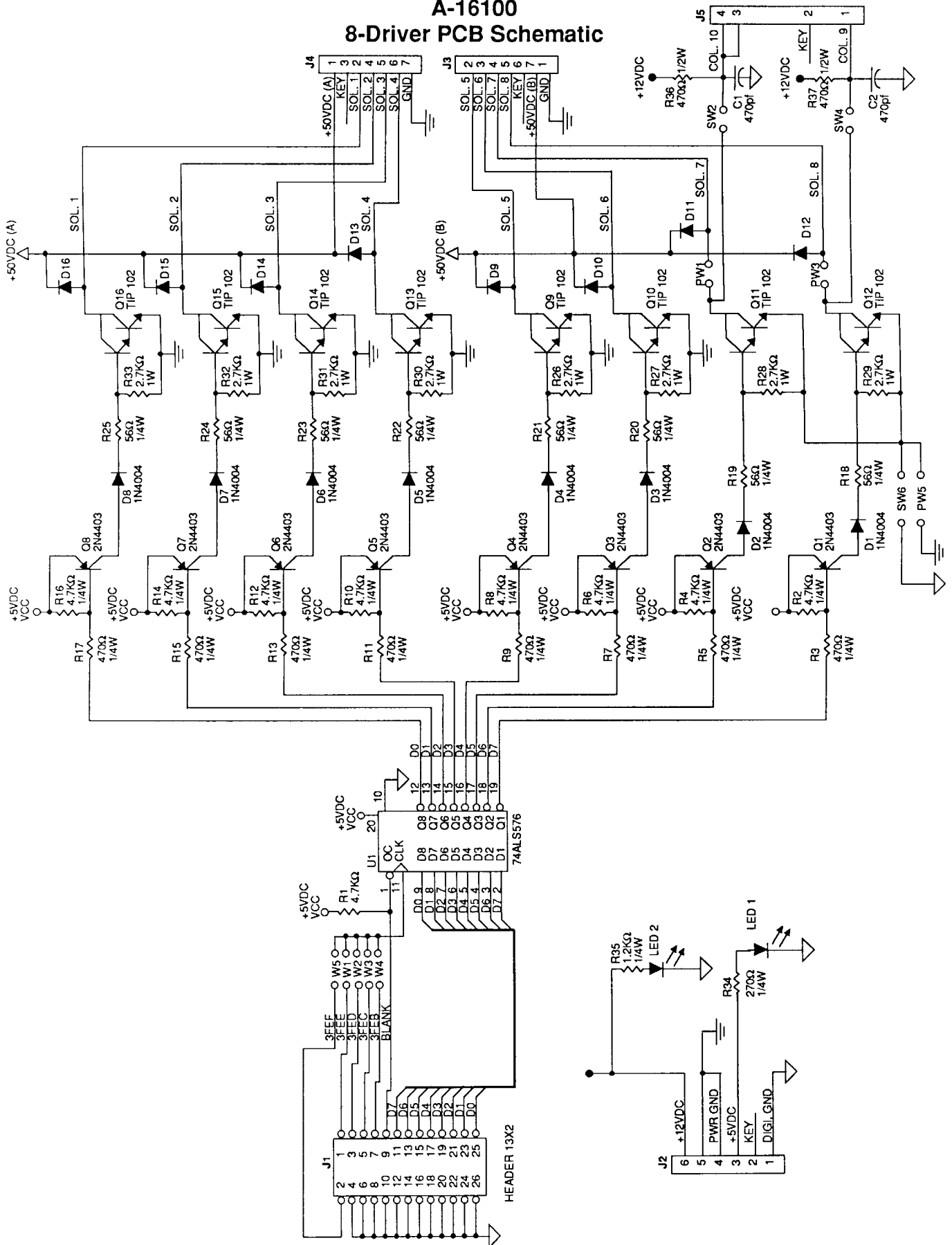
J5-2 Key

J5-3 N/C

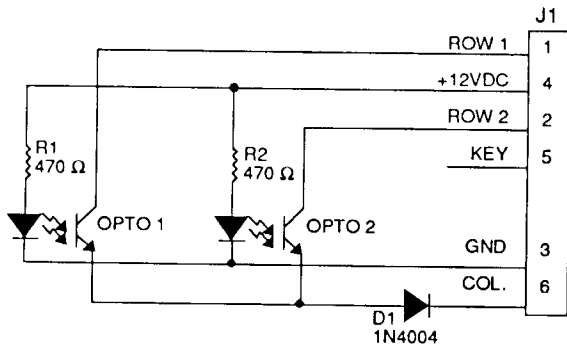
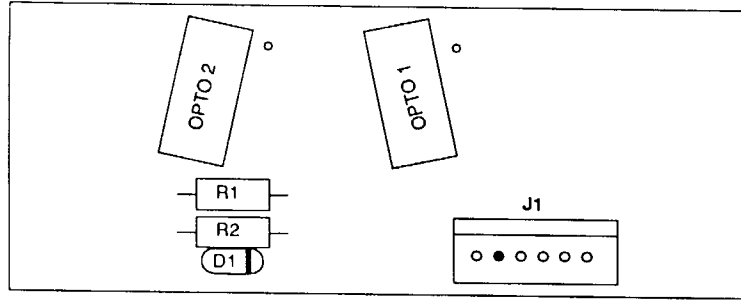
J5-4 Violet-White, switch column 9, to Motor Opto Switch Board J1-6 and 3-sw. Opto Board J1-7



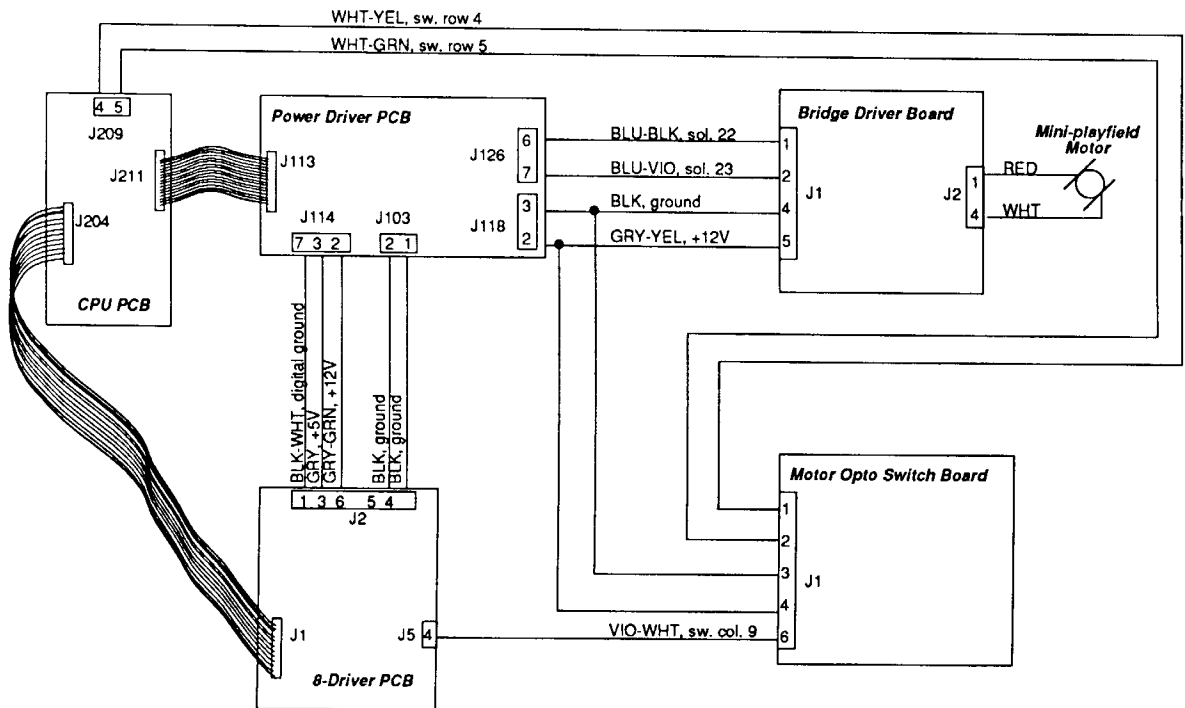
# A-16100 8-Driver PCB Schematic



# A-16657 Motor Opto Switch PCB Assembly (for mini playfield)

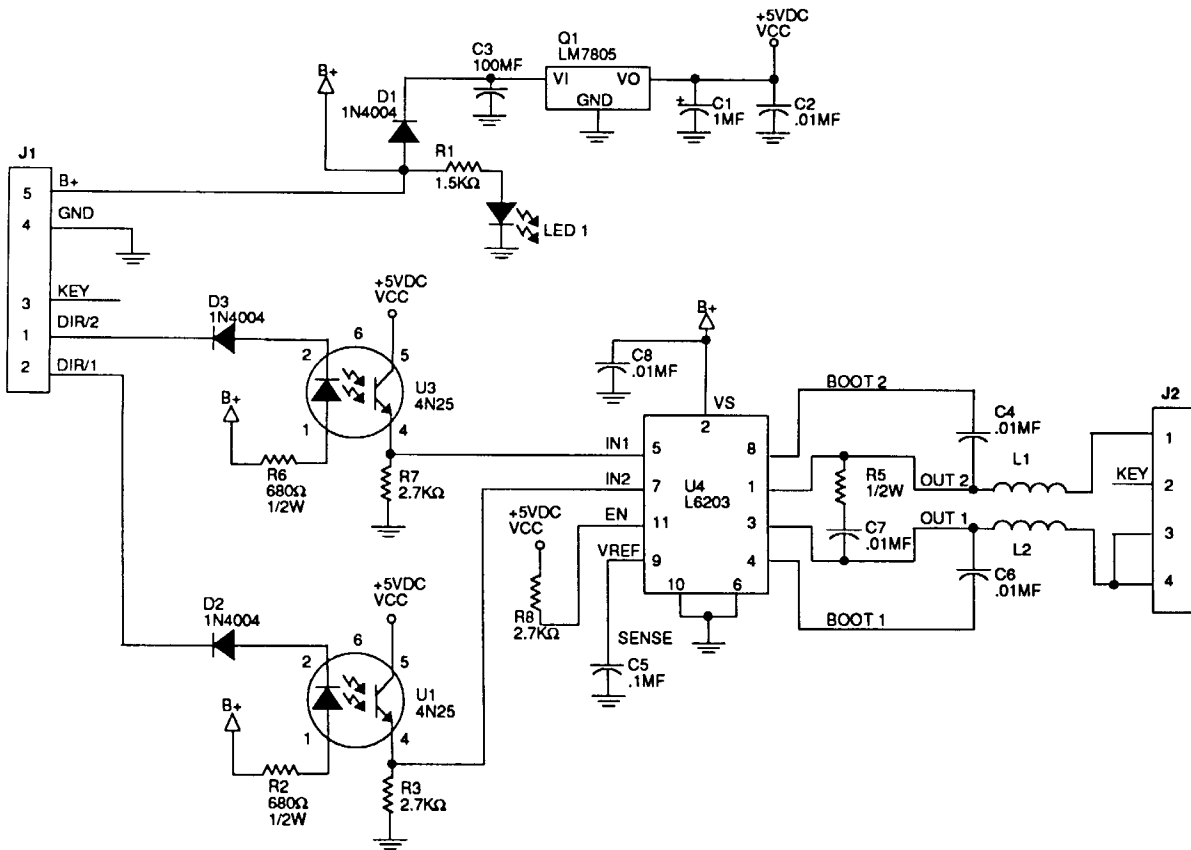
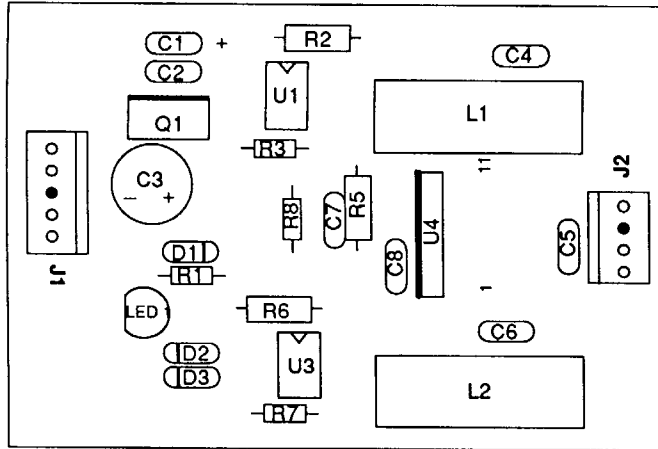


- J1-1 White-Yellow, switch row 4, from CPU Board J209-4
- J1-2 White-Green, switch row 5, from CPU Board J209-5
- J1-3 Black, ground, from Power Driver Board J118-3
- J1-4 Gray-Yellow, +12V, from Power Driver Board J118-2
- J1-5 Key
- J1-6 Violet-White, switch column 9, from 8-Driver Board J5-4



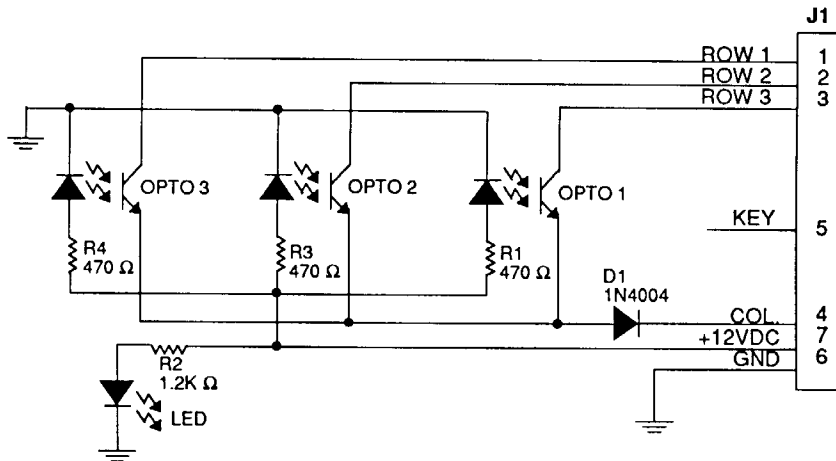
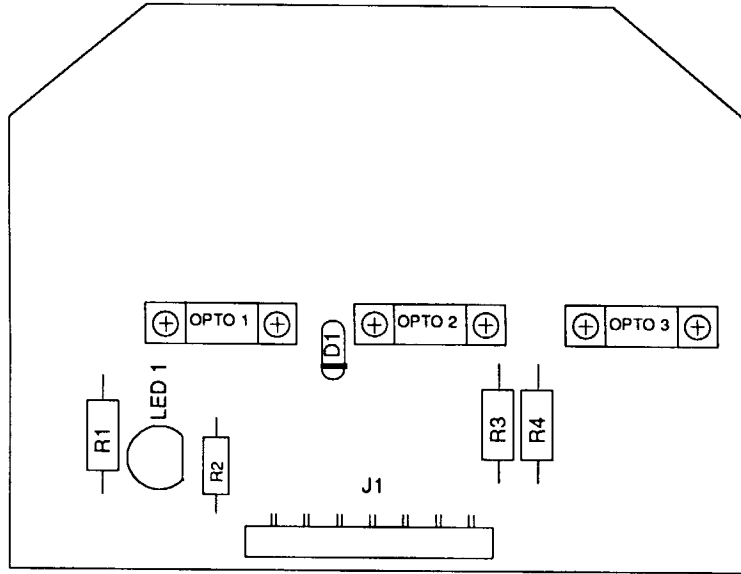


## A-15946 Bridge Driver PCB Assembly (for mini playfield)



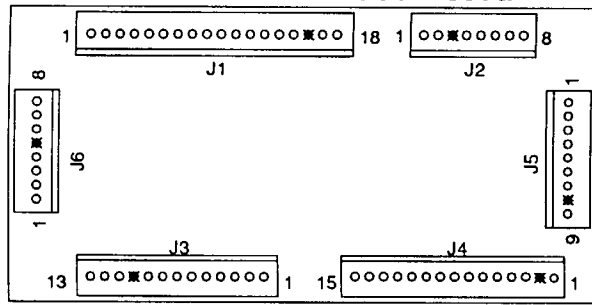
- J1-1** Blue-Black, solenoid 22 drive (Mini Motor Left), from Power Driver Board J126-6
- J1-2** Blue-Violet, solenoid 23 drive (Mini Motor Right), from Power Driver Board J126-7
- J1-3** Key
- J1-4** Black, ground, from Power Driver Board J118-3
- J1-5** Gray-Yellow, +12V, from Power Driver Board J118-2
  
- J2-1** Red, To motor
- J2-2** Key
- J2-3** N/C
- J2-4** White, To motor

**A-13609**  
**3-bank Opto Drop Target PCB Assembly**



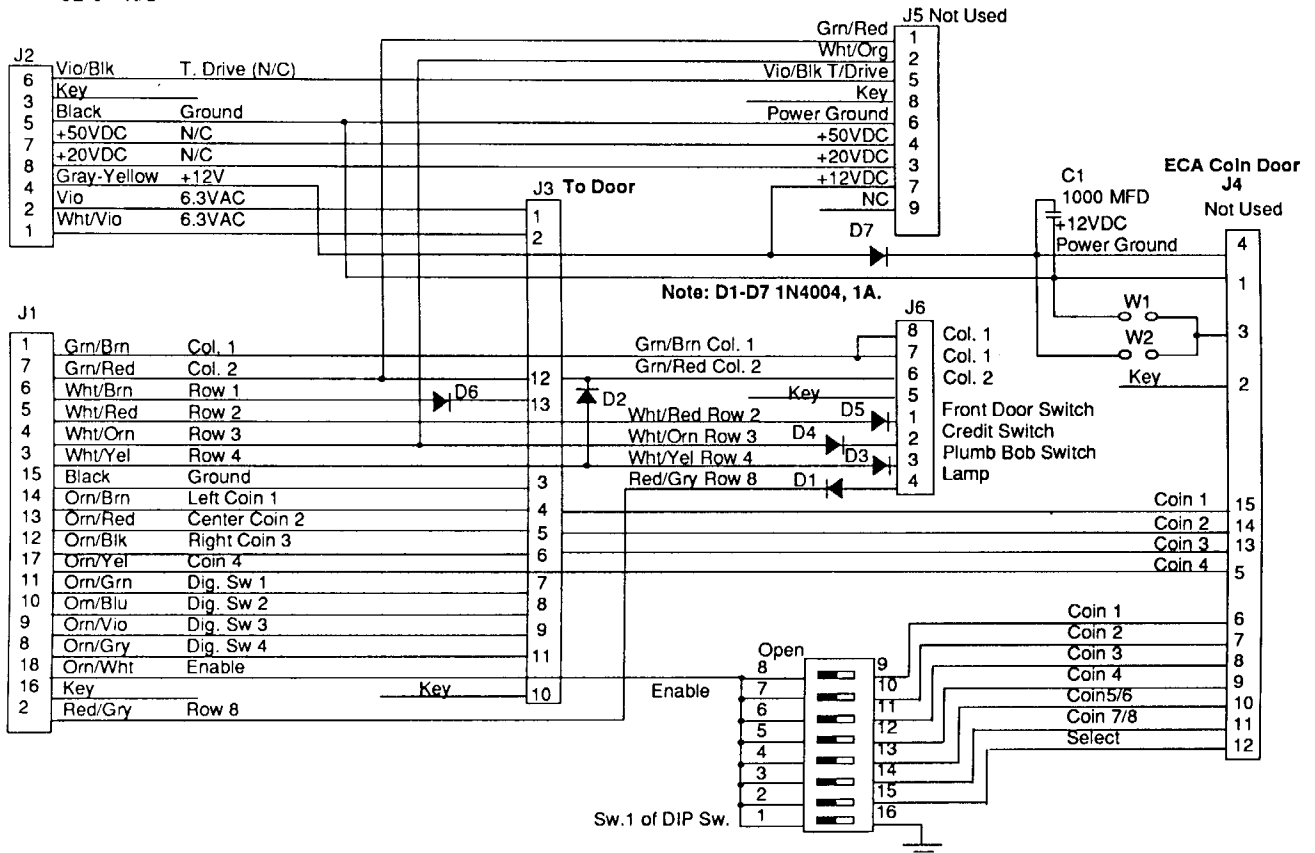
- J1-1 Black-Gray, switch F7 (Center Drop Bank Right), from Fliptronic II Board J906-5
- J1-2 Black-Yellow, switch F6 (Center Drop Bank Middle), from Fliptronic II Board J905-3
- J1-3 Black-Violet, switch F5 (Center Drop Bank Left), from Fliptronic II Board J906-4
- J1-4 Orange, column (switch ground), from Fliptronic II Board J905-6
- J1-5 Key
- J1-6 Black, Ground from Power Driver Board J118-3
- J1-7 Gray-Yellow, +12V from Power Driver Board J118-2

# A-14689 Coin Door Interface Board

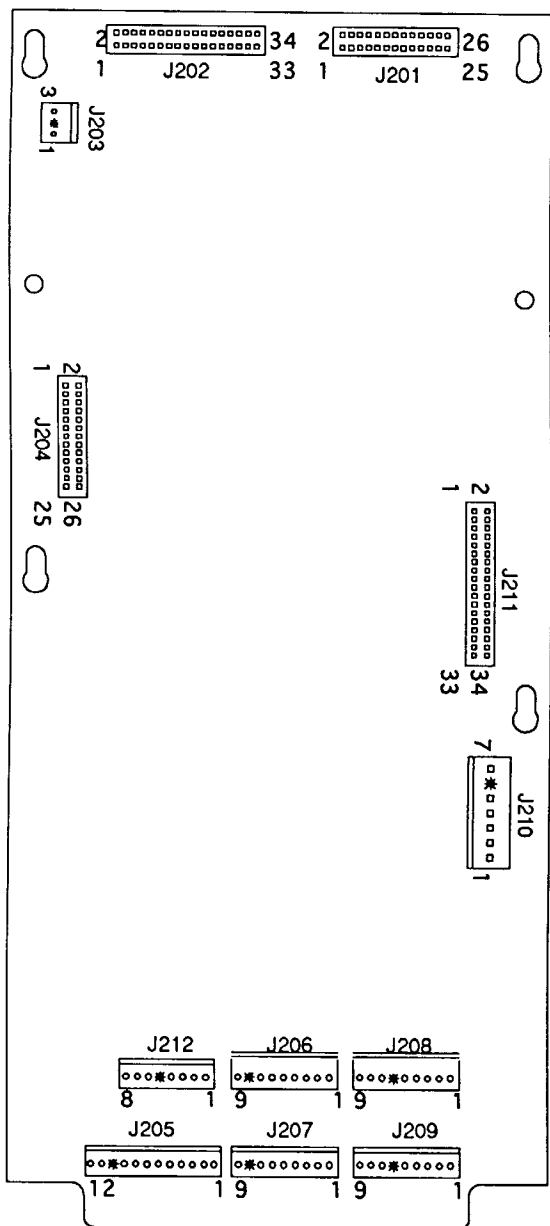


- J1-1 Green-Brown, sw. col. 1, from CPU J212-1
- J1-2 Red-Gray, lamp row 8, from Power Driver Brd J134-9
- J1-3 White-Yellow, sw. row 4, from CPU J212-8
- J1-4 White-Orange, sw. row 3, from CPU J212-7
- J1-5 White-Red, sw. row 2, from CPU J212-6
- J1-6 White-Brown, sw. row 1, from CPU J212-4
- J1-7 Green-Red, sw. col. 2, from CPU J212-2
- J1-8 Orange-Gray, dedicated sw. row 8, from CPU J205-9
- J1-9 Orange-Violet, dedicated sw. row 7, from CPU J205-8
- J1-10 Orange-Blue, dedicated sw. row 6, from CPU J205-7
- J1-11 Orange-Green, dedicated sw. row 5, from CPU J205-6
- J1-12 Orange-Black, dedicated sw. row 3, from CPU J205-3
- J1-13 Orange-Red, dedicated sw. row 2, from CPU J205-2
- J1-14 Orange-Brown, dedicated sw. row 1, from CPU J205-1
- J1-15 Black, ground, from CPU J205-10
- J1-16 N/C
- J1-17 Orange-Yellow, dedicated sw. row 4, from CPU J205-4
- J1-18 Orange-White, sw. enable, from CPU J205-12
  
- J2-1 Violet, G.I. return, from Power Driver Board J119-3
- J2-2 White-Violet, G.I. 6.8VAC, from Power Driver Board J119-1
- J2-3 N/C
- J2-4 Gray-Yellow, +12V, from Power Driver Board J116-2
- J2-5 Black, ground, from Power Driver Board J116-3
- J2-6 N/C
- J2-7 N/C
- J2-8 N/C

- J3-1 Violet, G.I. return, to coin door
- J3-2 White-Violet, G.I. 6.8VAC, to coin door
- J3-3 Black, ground, to Door
- J3-4 Orange-Brown, dedicated sw. row 1, to coin door
- J3-5 N/C
- J3-6 Orange-Black, dedicated sw. row 3, to coin door
- J3-7 Orange-Green, dedicated sw. row 4, to coin door
- J3-8 Orange-Blue, dedicated sw. row 6, to coin door
- J3-9 Orange-Violet, dedicated sw. row 7, to coin door
- J3-10 N/C
- J3-11 Orange-Gray, dedicated sw. row 8, to coin door
- J3-12 Green-Brown, sw. col 2, to coin door
- J3-13 White-Brown, sw. row 1, to coin door
  
- J4 - Not Used
- J5 - Not Used
  
- J6-1 White-Red, sw. row 2, to cabinet
- J6-2 White-Orange, sw. row 3, to cabinet
- J6-3 White-Yellow, sw. row 3, to cabinet
- J6-4 Red-Gray, lamp row 8, to cabinet
- J6-5 N/C
- J6-6 Green-Brown, sw. col 2, to cabinet
- J6-7 Green-Brown, sw. col 1, to cabinet
- J6-8 Green-Brown, sw. col 1, to cabinet



# A-12742-50017 CPU Board



- J206-1 N/C
- J206-2 N/C
- J206-3 N/C
- J206-4 N/C
- J206-5 N/C
- J206-6 N/C
- J206-7 N/C
- J206-8 N/C
- J206-9 N/C

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

- J208-1 N/C
- J208-2 N/C
- J208-3 N/C
- J208-4 N/C
- J208-5 N/C
- J208-6 N/C
- J208-7 N/C
- J208-8 N/C
- J208-9 N/C

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

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

**J201, 26-pin Ribbon Cable, data, To/from J602**

**J202, 34-pin Ribbon Cable, data, To/from J903; P1; J601**

**J203-Not Used**

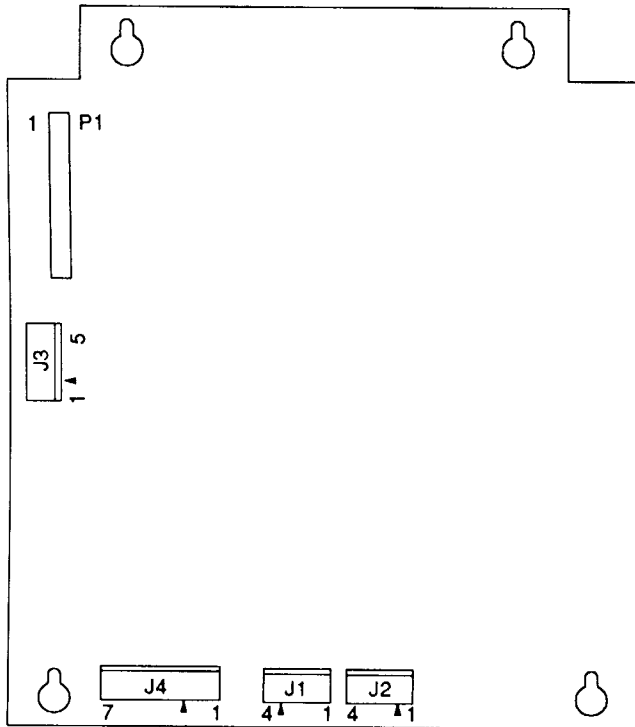
**J204, 26-pin Ribbon Cable, data To/from 8-Driver Board J1**

- J205 - 1 Orange-Brown, ded. sw. row 1, to Coin Door Brd J1-14
- J205 - 2 Orange-Red, ded. sw. row 2, to Coin Door Brd J1-13
- J205 - 3 Orange-Black, ded. sw. row 3, to Coin Door Brd J1-12
- J205 - 4 Orange-Yellow, ded. sw. row 4, to Coin Door J1-17
- J205 - 5 N/C
- J205 - 6 Orange-Green, ded. sw. row 5, to Coin Door Brd J1-11
- J205 - 7 Orange-Blue, ded. sw. row 6, to Coin Door Brd J1-10
- J205 - 8 Orange-Violet, ded. sw. row 7, to Coin Door Brd J1-9
- J205 - 9 Orange-Gray, ded. sw. row 8, to Coin Door Brd J1-8
- J205 - 10 Black, ground, to Coin Door Brd J1-15
- J205 - 11 N/C
- J205 - 12 Orange-White, sw. enable, to Coin Door Brd J1-18

**J211, 34-pin Ribbon Cable, data, To/from J113**

- J212-1 Green-Brown, sw. col. 1, to Coin Door Brd J1-1
- J212-2 Green-Red, sw. col. 2, to Coin Door J1-7
- J212-3 Green-Orange, sw. col. 3, to Gun Handle assembly
- J212-4 White-Brown, sw. row 1, to Coin Door Brd J1-6
- J212-5 N/C
- J212-6 White-Red, sw. row 2, to Coin Door Brd J1-5
- J212-7 White-Orange, sw. row 3, Coin Door Brd J1-4
- J212-8 White-Yellow, sw. row 4, to Coin Door Brd J1-3

## A-16917-50017 Audio Board



**P1, 34-pin Ribbon Cable, data, To/from J601; J903; J202**

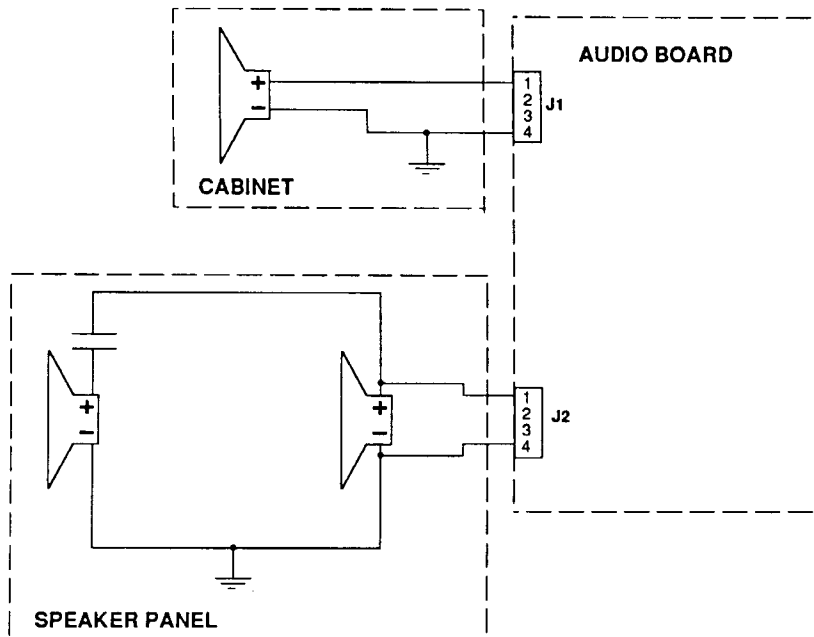
**J1-1** Black-Yellow, signal to speaker  
**J1-2** N/C  
**J1-3** N/C  
**J1-4** Black-Yellow, signal to speaker

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

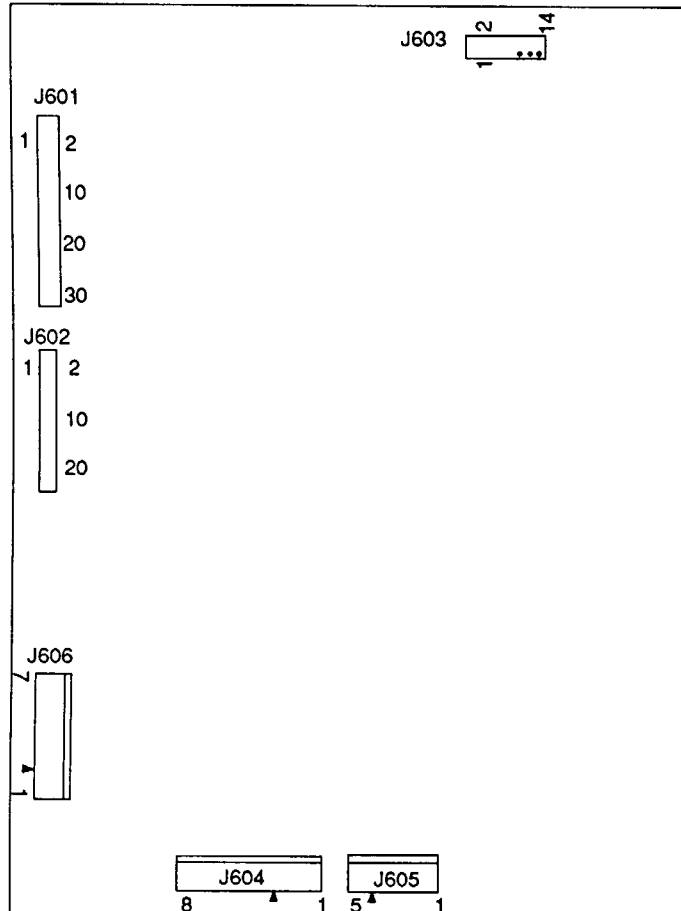
**J3-1** Gray, +5V, from Power Driver Board J114-3,4  
**J3-2** N/C  
**J3-3** Gray, +5V, from Power Driver Board J114-3,4  
**J3-4** Black, ground, from Power Driver Board J114-5,7  
**J3-5** Black, ground, from Power Driver Board J114-5,7

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

### SPEAKER WIRING DIAGRAM



## A-14039 Dot Matrix Controller Board



**J601, 34-pin Ribbon Cable** data, To/from J202; J903; P1

**J602, 26-pin Ribbon Cable** data, To/from J201

**J603, 14-pin Ribbon Cable** data, To/from Dot Matrix Display/Driver

**J604-1** Orange, -125V, to Display/Driver pin 1

**J604-2** Blue, -113V, to Display/Driver pin 2

**J604-3** N/C

**J604-4** Black, ground, to Display/Driver pin 4

**J604-5** Black, ground, to Display/Driver pin 5

**J604-6** Gray, +5V, to Display/Driver pin 6

**J604-7** Gray-Yellow, +12V, to Display/Driver pin 7

**J604-8** Brown, +62V, to Display/Driver pin 8

**J605-1** White, 80VAC, from xformer secondary

**J605-2** White, 80VAC, from xformer secondary

**J605-3** Violet, 100VAC, from xformer secondary

**J605-4** N/C

**J605-5** Violet 100VAC, from xformer secondary.

**J606-1** Black, ground, loop from J606-3

**J606-2** N/C

**J606-3** Black, ground, from Power Driver Brd J117-3

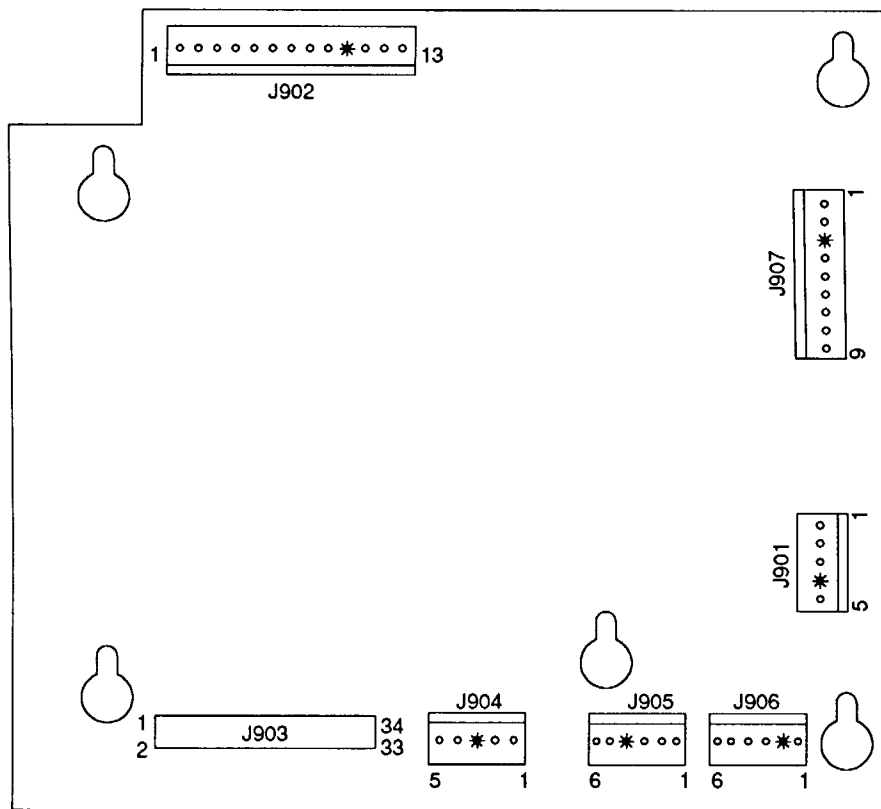
**J606-4** Gray, +5V, loop from J606-5

**J606-5** Gray, +5V, from Power Driver Brd J117-4

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

**J606-7** Gray-Yellow, +12V, from Power Driver Brd J117-2

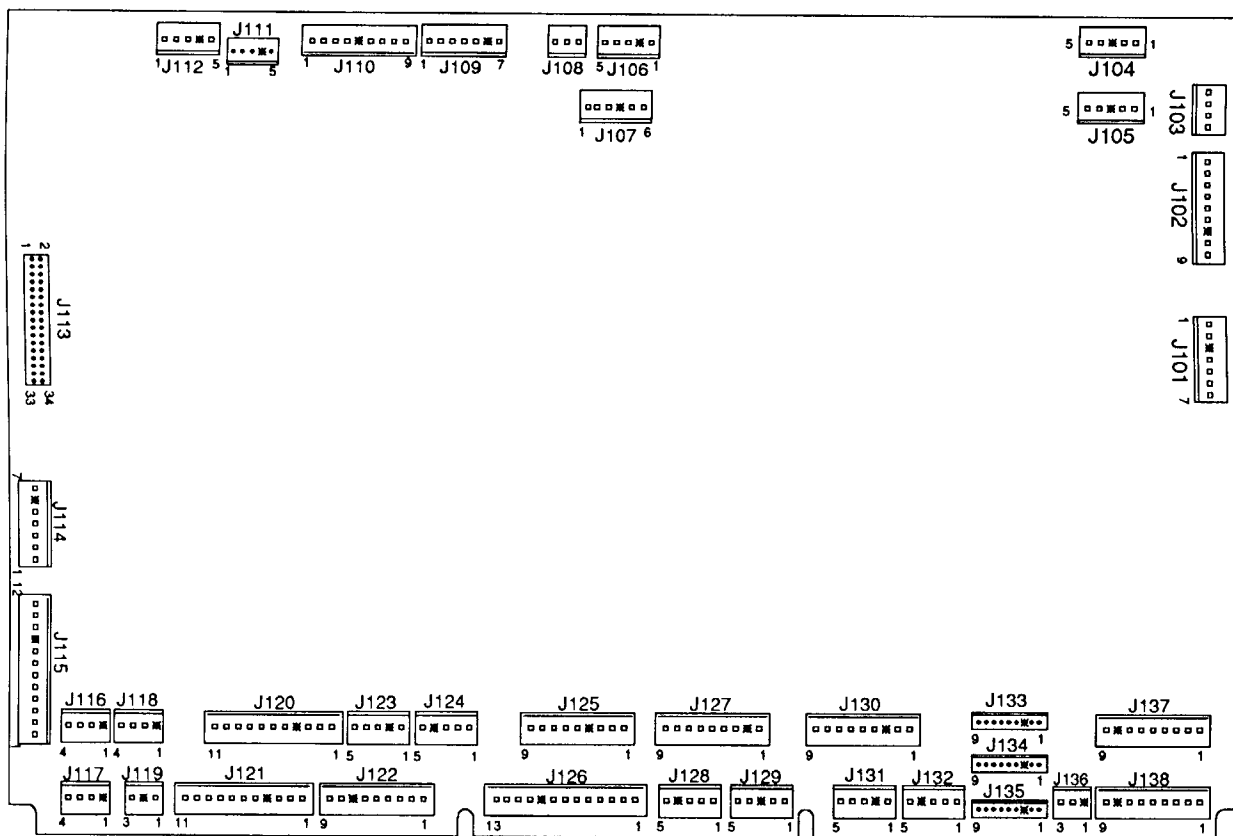
## A-15472-1 Fliptronic II Board



- |                            |  |        |  |
|----------------------------|--|--------|--|
| J901-1                     | White-Blue, 50VAC, from Power Driver Board J104-2  | J905-1 | Blue-Violet, F2, to right opto switch board J1-1             |
| J901-2                     | White-Blue, 50VAC, loop from J901-1                | J905-2 | Blue-Gray, F4, to left opto switch board J1-1                |
| J901-3                     | White-Blue, 50VAC, from Power Driver Board J104-1  | J905-3 | Black-Yellow, F6 (Cntr Dr Bnk Mid.), to 3-bnk Opto Brd. J1-2 |
| J901-4                     | N/C  | J905-4 | N/C  |
| J901-5                     | White-Blue, 50VAC, loop from J901-3                | J905-5 | Black-Blue, F8 (Left Ramp Made), to playfield switch         |
| J902-1                     | Orange-Gray, sol. 36 (Top Lockup Hold)             | J905-6 | Orange, ground, to left opto switch board J1-3               |
| J902-2                     | Black-Blue, sol. 35 (Top Lockup Power)             | J906-1 | Black-Green, F1, to lower right EOS switch                   |
| J902-3                     | N/C  | J906-2 | N/C  |
| J902-4                     | Orange-Violet, sol. 34 (Diverter Hold)             | J906-3 | Black-Blue, F3, to lower left EOS switch                     |
| J902-5                     | N/C  | J906-4 | Black-Violet, F5 (Cntr Dr Bnk Lt), to 3-bnk Opto Brd. J1-3   |
| J902-6                     | Black-Yellow, sol. 33 (Diverter Power)             | J906-5 | Black-Gray, F7 (Cntr Dr Bnk Rt), to 3-bnk Opto Brd. J1-1     |
| J902-7                     | Orange-Blue, holding, lower left flipper coil      | J906-6 | Orange, ground, to EOS switches                              |
| J902-8                     | N/C  | J907-1 | Blue-Yellow, +50V, to upper right flipper coil               |
| J902-9                     | Blue-Gray, power, lower left flipper coil          | J907-2 | Blue-Yellow, +50, loop from J907-1                           |
| J902-10                    | N/C  | J907-3 | N/C  |
| J902-11                    | Orange-Green, holding, lower right flipper coil    | J907-4 | Gray-Yellow, +50V, to upper left flipper coil                |
| J902-12                    | N/C  | J907-5 | Gray-Yellow, +50V, loop from J907-4                          |
| J902-13                    | Blue-Violet, power, lower right flipper coil       | J907-6 | Blue-Yellow, +50V, to lower right flipper coil               |
| J903, 34-pin Ribbon Cable, | data, To/from J202; J601; P1                       | J907-7 | Blue-Yellow, +50V, loop from J907-6                          |
| J904-1                     | Gray, +5V, from Power Driver Board J114-3,4        | J907-8 | Gray-Yellow, +50V, to lower left flipper coil                |
| J904-2                     | Gray-Green, +12V, from Power Driver Board J114-1,2 | J907-9 | Gray-Yellow, +50V, loop from J907-8                          |
| J904-3                     | N/C  |        |  |
| J904-4                     | Black, ground, from Power Driver Board J114-5,7    |        |  |
| J904-5                     | Black, ground, from Power Driver Board J114-5,7    |        |  |

**NOTE:** In this game, the upper right and left flipper coil circuits are used to drive solenoids 33, 34, 35 and 36. The upper right and left flipper switch circuits are used as playfield switches.

## A-12697-3 Power Driver Board



- |   |   |
|---|---|
| J101-1 Red, 9VAC, from xformer secondary                | J105-1 N/C                                    |
| J101-2 Red, 9VAC, from xformer secondary                | J105-2 N/C                                    |
| J101-3 N/C  | J105-3 N/C                                    |
| J101-4 Blue-White, 13VAC, from xformer secondary        | J105-4 N/C                                    |
| J101-5 Blue-White, 13VAC, loop from J101-4              | J105-5 N/C                                    |
| J101-6 Blue-White, 13VAC, from xformer secondary        | J106-1 N/C                                    |
| J101-7 Blue-White, 13VAC, loop from J101-6              | J106-2 N/C                                    |
|   | J106-3 N/C                                    |
| J102-1 White-Red, 16VAC, loop from J102-2               | J106-4 N/C                                    |
| J102-2 White-Red, 16VAC, from xformer secondary         | J106-5 Red-White, +20V, to backbox flashlamps |
| J102-3 White-Red, 16VAC, loop from J102-4               |   |
| J102-4 White-Red, 16VAC, from xformer secondary         | J107-1 Violet-Green, +50V, to coils           |
| J102-5 Black-Yellow, 16VAC, loop from J102-6            | J107-2 Violet-Orange, +50V, to coils          |
| J102-6 Black-Yellow, 16VAC, from xformer secondary      | J107-3 Violet-Yellow, +50V, to coils          |
| J102-7 N/C  | J107-4 N/C                                    |
| J102-8 Black-Yellow, 16VAC, loop from J102-9            | J107-5 N/C                                    |
| J102-9 Black-Yellow, 16VAC, from xformer secondary      | J107-6 Red-White, +20V, to playfield          |
|   |   |
| J103-1 Black, ground, to 8-Driver Brd J2-4              | J108-1 N/C                                    |
| J103-2 Black, ground, to 8-Driver Brd J2-5              | J108-2 N/C                                    |
| J103-3 N/C  | J108-3 N/C                                    |
| J103-4 N/C  |   |
|   | J109-1 N/C                                    |
| J104-1 White-Blue, 50VAC, to Fliptronic II Board J901-3 | J109-2 N/C                                    |
| J104-2 White-Blue, 60VAC, to Fliptronic II Board J901-1 | J109-3 N/C                                    |
| J104-3 N/C  | J109-4 N/C                                    |
| J104-4 N/C  | J109-5 N/C                                    |
| J104-5 N/C  | J109-6 N/C                                    |
|   | J109-7 N/C                                    |



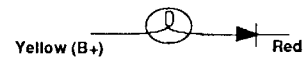
## Power Driver Board Continued...

J110-1	N/C	J118-1	N/C
J110-2	N/C	J118-2	Gray-Yellow, +12V, to Playfield Boards and airplane flashers
J110-3	N/C	J118-3	Black, ground, to Playfield Boards and airplane flashers
J110-4	N/C	J118-4	N/C
J110-5	N/C		
J110-6	N/C	J120-1	N/C
J110-7	N/C	J120-2	N/C
J110-8	N/C	J120-3	Yellow, return, G.I. to backbox
J110-9	N/C	J120-4	N/C
		J120-5	Green, return, G.I. to backbox
J111-1	N/C	J120-6	N/C
J111-2	N/C	J120-7	N/C
J111-3	N/C	J120-8	N/C
J111-4	N/C	J120-9	White-Yellow, 6.8VAC, G.I. to backbox
J111-5	N/C	J120-10	White-Green, 6.8VAC, G.I. to backbox
		J120-11	N/C
J112-1	White-Green, 9.8VAC, from xformer secondary		
J112-2	White-Green, 9.8VAC, loop from J112-1	J121-1	Brown, return, G.I. to playfield
J112-3	White-Green, 9.8VAC, from xformer secondary	J121-2	Orange, return, G.I. to playfield
J112-4	N/C	J121-3	N/C
J112-5	White-Green, 9.8VAC, loop from J112-3	J121-4	N/C
		J121-5	N/C
J113, 34-pin Ribbon Cable, data, To/from CPU J211		J121-6	Violet, return, G.I. to playfield
		J121-7	White-Brown, 6.8VAC, G.I. to playfield
J114-1	Gray-Green, +12V, to J210-6,7; J904-2	J121-8	White-Orange, 6.8VAC, G.I. to playfield
J114-2	Gray-Green, +12V, to 8-Driver Brd. J2-6	J121-9	N/C
J114-3	Gray, +5V, to 8-Driver Brd. J2-3	J121-10	N/C
J114-4	Gray, +5V, to J210-4,5; J3-1,3; J904-1	J121-11	White-Violet, 6.8VAC, G.I. to playfield
J114-5	Black-White, ground, to J210-1,3; J3-4,5; J904-4,5		
J114-6	N/C	J122-1	Blue-Brown, sol. 25 drive, to playfield flashlamp
J114-7	Black-White, ground, to 8-Driver Brd. J2-1	J122-2	Blue-Red, sol. 26 drive, to playfield flashlamp
		J122-3	Blue-Orange, sol. 27 drive, to playfield flashlamp
J115-1	Yellow-White, 6.8VAC, from xformer secondary	J122-4	Blue-Yellow, sol. 28 drive, to playfield coil
J115-2	White-Brown, 6.8VAC, from xformer secondary	J122-5	N/C
J115-3	White-Brown, 6.8VAC, from xformer secondary	J122-6	N/C
J115-4	White-Orange, 6.8VAC, from xformer secondary	J122-7	N/C
J115-5	White-Yellow, 6.8VAC, from xformer secondary	J122-8	N/C
J115-6	White-Yellow, 6.8VAC, from xformer secondary	J122-9	Violet-Green, sol. tieback diode, to playfield coil
J115-7	Orange, 6.8VAC, from xformer secondary		
J115-8	Orange, 6.8VAC, from xformer secondary	J123-1	N/C
J115-9	N/C	J123-2	N/C
J115-10	Green, 6.8VAC, from xformer secondary	J123-3	N/C
J115-11	Brown, 6.8VAC, from xformer secondary	J123-4	N/C
J115-12	Brown, 6.8VAC, from xformer secondary	J123-5	N/C
J116-1	N/C	J124-1	N/C
J116-2	Gray-Yellow, +12V, to Coin Door J2-4	J124-2	Blue-Red, sol. 26 drive, to backbox flashlamp
J116-3	Black, ground, to Coin Door J2-5	J124-3	Blue-Orange, sol. 27 drive, to backbox flashlamp
J116-4	N/C	J124-4	N/C
		J124-5	N/C
J117-1	N/C		
J117-2	Gray-Yellow, +12V, to Dot Matrix Controller J606-7	J125-1	Black-Brown, sol. 17 drive, to backbox flashlamp
J117-3	Black, ground, to Dot Matrix Controller J606-3	J125-2	N/C
J117-4	Gray, +5V, to Dot Matrix Controller J606-5	J125-3	N/C
		J125-4	N/C
J119-1	White-Violet, 6.8VAC, G.I. to Coin Door Brd J2-2	J125-5	Black-Yellow, sol. 20 drive, to backbox flashlamp
J119-2	N/C	J125-6	Blue- Green, sol. 21 drive, to backbox flashlamp
J119-3	Violet, return, G.I. to Coin Door Brd J2-1	J125-7	N/C
		J125-8	N/C
		J125-9	N/C

## Power Driver Board Continued...

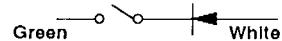
J126-1	Black-Brown, sol 17 drive, to playfield flashlamps	J133-1	Red-Brown, lamp row 1, to playfield lamps
J126-2	Black-Red, sol. 18 drive, to playfield flashlamps	J133-2	Red-Black, lamp row 2, to playfield lamps
J126-3	Black-Orange, sol. 19 drive, to playfield flashlamps	J133-3	N/C
J126-4	Black-Yellow, sol. 20 drive, to playfield flashlamps	J133-4	Red-Orange, lamp row 3, to playfield lamps
J126-5	Blue-Green, sol. 21 drive, to playfield flashlamps	J133-5	Red-Yellow, lamp row 4, to playfield lamps
J126-6	Blue-Black, sol. 22 drive, to Bridge Driver assy J1-1	J133-6	Red-Green, lamp row 5, to playfield lamps
J126-7	Blue-Violet, sol. 23 drive, to Bridge Driver assy J1-2	J133-7	Red-Blue, lamp row 6, to playfield lamps
J126-8	Blue-Gray, sol. 24 drive, to playfield flashlamps	J133-8	Red-Violet, lamp row 7, to playfield lamps
J126-9	N/C	J133-9	Red-Gray, lamp row 8, to playfield lamps
J126-10	N/C		
J126-11	N/C	J134-1	N/C
J126-12	N/C	J134-2	N/C
J126-13	N/C	J134-3	N/C
		J134-4	N/C
J127-1	Brown-Black, sol. 9 drive, to playfield coil	J134-5	N/C
J127-2	N/C	J134-6	N/C
J127-3	Brown-Red, sol. 10 drive, to playfield coil	J134-7	N/C
J127-4	Brown-Orange, sol. 11 drive, to playfield coil	J134-8	N/C
J127-5	Brown-Yellow, sol. 12 drive, to playfield coil	J134-9	Red-Gray, lamp row 8, to coin door
J127-6	Brown-Green, sol. 13 drive, to playfield coil		
J127-7	Brown-Blue, sol. 14 drive, to playfield coil	J135-1	N/C
J127-8	Brown-Violet, sol. 15 drive, to playfield coil	J135-2	Red-Black, lamp row 2, to speaker panel J1-1
J127-9	Brown-Gray, sol.16 drive, to playfield coil	J135-3	N/C
		J135-4	N/C
J128-1	N/C	J135-5	N/C
J128-2	N/C	J135-6	N/C
J128-3	N/C	J135-7	Red-Blue, lamp row 6, to speaker panel, J1-6
J128-4	N/C	J135-8	N/C
J128-5	N/C	J135-9	Red-Gray, lamp row 8, to speaker panel, J1-5
J129-1	N/C	J136-1	N/C
J129-2	N/C	J136-2	N/C
J129-3	N/C	J136-3	Yellow-Gray, lamp column 8, to coin door
J129-4	N/C		
J129-5	N/C	J137-1	Yellow-Brown, lamp column 1, to playfield lamps
		J137-2	Yellow-Red, lamp column 2, to playfield lamps
J130-1	Violet-Brown, sol. 1 drive, to playfield coil	J137-3	Yellow-Orange, lamp column 3, to playfield lamps
J130-2	Violet-Red, sol. 2 drive, to playfield coil	J137-4	Yellow-Black, lamp column 4, to playfield lamps
J130-3	N/C	J137-5	Yellow-Green, lamp column 5, to playfield lamps
J130-4	Violet-Orange, sol. 3 drive, to playfield coil	J137-6	Yellow-Blue, lamp column 6, to playfield lamps
J130-5	Violet-Yellow, sol.4 drive, to playfield coil	J137-7	Yellow-Violet, lamp column 7, to playfield lamps
J130-6	Violet-Green, sol. 5 drive, to playfield coil	J137-8	N/C
J130-7	Violet-Blue, sol. 6 drive, to playfield coil	J137-9	Yellow-Gray, lamp column 8, to playfield lamps
J130-8	Violet-Black, sol.7 drive, to playfield coil		
J130-9	Violet-Gray, sol. 8 drive, to playfield coil	J138-1	Yellow-Red, lamp column 2, to speaker panel J1-3
		J138-2	N/C
J131-1	N/C	J138-3	N/C
J131-2	N/C	J138-4	Yellow-Black, lamp column 4, to speaker panel J1-5
J131-3	N/C	J138-5	N/C
J131-4	N/C	J138-6	N/C
J131-5	N/C	J138-7	N/C
		J138-8	N/C
J132-1	N/C	J138-9	N/C
J132-2	N/C		
J132-3	N/C		
J132-4	N/C		
J132-5	N/C		

# LAMPS



Column Row	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J137-7 Q92	8 Yellow-Gray J137-9 Q91
Red-Brown J133-1 Q90	Mode Start 11	Tank Chase 21	Left Ramp Arrow 31	Mine Cart 41	Choose Wisely 51	(l)ndy 61	Mini Top Left 71	Mini Middle Bottom Left 81
Red-Black J133-2 Q89	Hand of Fate 12	Adven(t)ure Light 22	Castle Grunewald 32	Ark Jackpot 42	Right Plane Top 52	(l(n)dy 62	Mini Top Right 72	Mini Middle Bottom Right 82
Red-Orange J133-4 Q88	Eject Extra Ball 13	Adv(e)ture Light 23	Left Plane Top 33	Raven Bar 43	Rope Bridge 53	In(d)y 63	Mini Middle Top Left 73	Mini Bottom Left 83
Red-Yellow J133-5 Q87	Ad(y)venture Light 14	Adve(n)ture Light 24	Monkey Brains 34	Right Plane Middle 44	Advent(u)re Light 54	Ind(y) 64	Mini Middle Top Right 74	Mini Bottom Right 84
Red-Green J133-6 Q86	A(d)venture Light 15	Steal The Stones 25	Left Plane Middle 35	Bonus 6X 45	Adventu(r)e Light 55	Willie 65	Mini Top Arrow 75	Mini Bottom Arrow 85
Red-Blue J133-7 Q85	(A)dventure Light 16	Grail Jackpot 26	Saliah 36	Right Plane Bottom 46	Adventur(e) Light 56	Bouns 2X 66	Marion 76	Totem Top Arrow 86
Red-Violet J133-8 Q84	Shoot Again 17	Streets Of Cairo 27	Bonus 4X 37	Well Of Souis 47	The 3 Challenges 57	Shorty 67	Bonus 8X 77	Center Lock 87
Red-Gray J133-9 Q83	Get The Idol 18	Stones Jackpot 28	Left Plane Bottom 38	Left Loop 48	Right Loop 58	Right Ramp Arrow 68	Dr. Jones 78	Start Button 88

# SWITCHES



Dedicated Grounded Switches	Column Row	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	9 Violet-White Q11 J5-4	Flipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute D1	White-Brown J209-1 U18-11	Single Drop Top 11	Slam Tilt 21	Left Eject 31	Left Ramp Enter 41	Adventu(r)e Tgt. 51	(A)dventure Tgt. 61	Captive Ball Frt. 71	Trough 6 81	Wheel Position 1 91	Black-Green J906-1 Lower Right E.O.S. F1
Orange-Red J205-2 Center Coin Chute D2	White-Red J209-2 U18-9	Buy-in Button 12	Coin Door Closed 22	Exit Idol 32	Right Ramp Enter 42	Adventu(r)e Tgt. 52	(A)dventure Tgt. 62	Mini Top Hole 72	Trough 5 82	Wheel Position 2 92	Blue-Violet J905-1 Lower Right Opto F2
Orange-Black J205-3 Right Coin Chute D3	White-Orange J209-3 U18-5	Start Button 13	Ticket Opto 23	Left Slingshot 33	Top Idol Enter 43	Adventur(e) Tgt. 53	(A)dventure Tgt. 63	Mini Bottom Hole 73	Trough 4 83	Wheel Position 3 93	Black-Blue J906-3 Lower Left E.O.S. F3
Orange-Yellow J205-4 4th Coin Chute D4	White-Yellow J209-4 U18-7	Plumb Bob Tilt 14	Always Closed 24	Gun Trigger 34	Right Popper 44	Left Loop Top 54	Captive Ball Back 64	Right Ramp Made 74	Trough 3 84	Mini Playfield Left Limit 94	Blue-Gray J905-2 Lower Left Opto F4
Orange-Green J205-6 Normal Function Service Credits D5	White-Green J209-5 U19-11	Left Outlane 15	(l)ndy Lane 25	Left Jet 35	Center Enter 45	Left Loop Bottom 55	Mini Top Left 65	Mini Top Right 75	Trough 2 85	Mini Playfield Right Limit 95	Black-Violet J906-4 *Center Drop Bank Left F5
Orange-Blue J205-7 Normal Function Volume Down D6	White-Blue J209-7 U19-9	Left Return Lane 16	(n)dy Lane 26	Right Jet 36	Top Post 46	Right Loop Top 56	Mini Middle Top Left 66	Mini Middle Top Right 76	Trough 1 86		Black-Yellow J905-3 *Center Drop Bank Middle F6
Orange-Violet J205-8 Normal Function Volume Up D7	White-Violet J209-8 U19-5	Right Return Lane 17	In(d)y Lane 27	Bottom Jet 37	Subway Lockup 47	Right Loop Bottom 57	Mini Middle Bottom Left 67	Mini Middle Bottom Right 77	Top Trough 87		Black-Gray J906-5 *Center Drop Bank Right F7
Orange-Gray J205-9 Normal Function Begin Test D8	White-Gray J209-9 U19-7	Right Outlane Top 18	Ind(y) Lane 28	Center Standup 38	Right Slingshot 48	Right Outlane Bottom 58	Mini Bottom Left 68	Mini Bottom Right 78	Shooter 88		Black-Blue J905-5 *Left Ramp Made F8

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

## WARNINGS & NOTICES

### WARNING

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

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#### RF Interference Notice

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

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

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

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with hinged backbox DOWN!**

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