W *Williams*

Tales of the Arabian Nights

C E

(U L) DE   (U L) c DE

OPERATIONS MANUAL INCLUDES

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

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

DIP SWITCH SETTINGS AND JUMPERS

EPROM Jumper Settings for G11	W1	W2
1MEG, 2MEG, 4 MEG EPROM	In	Out

DIP Switch Chart

COUNTRY	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
AMERICA	Off	Off	On	On	On	On	On	On
EUROPEAN	Off	Off	On	On	On	Off	On	On
FRENCH	Off	Off	On	On	On	On	Off	Off
GERMAN	Off	Off	On	On	On	On	On	Off
SPAIN	Off	Off	On	On	Off	On	On	On

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections Playfield	Voltage Connections Backbox	Voltage Connections Cabinet	Drive Xistor	Drive Connections Playfield	Drive Connections Backbox	Drive Connections Cabinet	Drive Wire Color	Solenoid Part Number / Flashlamp Type Playfield	Backbox
01	LEFT CAGE	High Power	J133-2			Q72	J116-1			Vio-Brn	A-20099	
02	RIGHT CAGE	High Power	J133-2			Q68	J116-2			Vio-Red	A-20099	
03	VANISH DROP	High Power	J133-2			Q71	J116-4			Vio-Org	FL-11753	
04	LOCK EJECT	High Power	J133-2			Q67	J116-5			Vio-Yel	AE-27-1200	
05	BAZAAR EJECT	High Power	J133-2			Q70	J116-6			Vio-Grn	AE-25-1000	
06	LOCK MAGNET	High Power	J133-2			Q66	J116-7			Vio-Blu	20-10197	
07	KNOCKER	High Power		J133-2		Q69		J116-8		Vio-Blk		AE-23-800
08	RAMP MAGNET COIL	High Power	J133-1			Q65	J116-9			Vio-Gry	20-10179	
09	TROUGH EJECT	Low Power	J133-3			Q44	J113-1			Brn-Blk	AE-26-1500	
10	LEFT SLINGSHOT	Low Power	J133-3			Q48	J113-3			Brn-Red	AE-27-1200	
11	RIGHT SLINGSHOT	Low Power	J133-3			Q43	J114-4			Brn-Org	AE-27-1200	
12	LEFT JET BUMPER	Low Power	J133-3			Q47	J113-5			Brn-Yel	AE-26-1200	
13	RIGHT JET BUMPER	Low Power	J133-3			Q42	J113-6			Brn-Grn	AE-26-1200	
14	MIDDLE JET BUMPER	Low Power	J133-3			Q46	J113-7			Brn-Blu	AE-26-1200	
15	LEFT KICKER	Low Power	J133-3			Q41	J113-8			Brn-Vio	AE-27-1200	
16	LEFT EJECT FLASHER	Low Power	J133-6	J134-5		Q45	J113-9	J114-5		Brn-Gry	#89 (2)	#906
17	INLANE FLASHERS	Flasher	J133-6			Q28	J111-1			Blk-Brn	#89 (2)	
18	FINAL BATTLE FLASHER	Flasher	J133-6			Q32	J111-2			Blk-Red	#906	
19	LEFT LOOP FLASHER	Flasher	J133-6			Q27	J111-3			Blk-Org	#906	
20	BAZAAR FLASHER	Flasher	J133-6			Q31	J111-4			Blk-Yel	#89	
21	RAMP DIVERTER	Low Power	J133-2			Q26	J111-5			Blu-Grn	AE-30-2000	
22	RUB LAMP FLASHER	Flasher	J133-6			Q30	J111-6			Blu-Blk	#906	
23	MAGIC LAMP FLASHERS	Flasher	J133-6			Q25	J111-7			Blu-Vio	#906	
24	RIGHT LOOP FLASHER	Flasher	J133-6			Q29	J111-8			Blu-Gry	#906	
25	START TALE FLASHERS	Gen. Purpose	J133-6	J134-5		Q16	J109-1	J108-1		Blu-Brn	#906	#906
26	JET FLASHERS	Gen. Purpose	J133-6	J134-5		Q15	J109-2	J108-2		Blu-Red	#906	#906
27	TOP LOOP FLASHER	Gen. Purpose	J133-6	J134-5		Q14	J109-3	J108-3		Blu-Org	#906	#906
28	RAMP FLASHER	Gen. Purpose	J133-6			Q13	J109-4			Blu-Yel	#906	

General Illumination

Sol. No.	Function	Solenoid Type	Voltage Connections Playfield	Voltage Connections Backbox	Voltage Connections Cabinet	Drive Xistor	Drive Connections Playfield	Drive Connections Backbox	Drive Connections Cabinet	Drive Wire Color	Flashlamp Type Playfield	Backbox
01	ILLUMINATION STRING 1	G.I.		J106-1		Q5		J106-7		Wht-Brn	#44	
02	ILLUMINATION STRING 2	G.I.		J106-2		Q4		J106-8		Wht-Org	#44	
03	ILLUMINATION STRING 3	G.I.		J106-3		Q3		J106-9		Wht-Yel	#44	
04	*ILLUMINATION STRING 4	G.I.	J105-5			Q2	J105-10			Wht-Grn		#555
05	*ILLUMINATION STRING 5	G.I.	J105-6		J104-3	Q1	J105-11		J104-1	Wht-Vio		#555

Flipper Circuits		Voltage Connection Playfield	Drive Transistors Power	Drive Transistors Hold	Drive Connections Playfield	Drive Wire Colors Power	Drive Wire Colors Hold	Coil Part No.	Coil Colors
29		Lwr. Rt. Power	J119-1 (Red-Grn)	Q90		J120-13	Yel-Grn		FL-11629	BLUE
30	LOWER RIGHT FLIPPER	Lwr. Rt. Hold	J119-1 (Red-Grn)		Q92	J120-11		Org-Grn		
31		Lwr. Lt. Power	J119-4 (Red-Blu)	Q87		J120-9	Yel-Blu		FL-11629	BLUE
32	LOWER LEFT FLIPPER	Lwr. Lt. Hold	J119-4 (Red-Blu)		Q89	J120-7		Org-Blu		
33	LEFT DIVERTER POWER	Upr. Rt. Power	J119-6 (Red-Vio)	Q84		J120-6	Yel-Vio		FL-11753	YELLOW
34	LEFT DIVERTER HOLD	Upr. Rt. Hold	J119-6 (Red-Vio)		Q86	J120-4		Org-Vio		
35	VANISH MAGNET	Upr. Lt. Power	J119-8 (Red-Gry)	Q81		J120-3	Yel-Gry		20-10197	
36	LOOP POST DIVERTER	Upr. Lt. Hold	J119-8 (Red-Gry)		Q83	J120-1		Org-Gry	AE-27-1200	

J1XX = POWER DRIVER BOARD
24-6549 = #44 BULB; 24-8704 = #89 BULB; 24-8768 = #555 BULB; 24-8802 = #906 BULB
*THESE G.I. STRINGS DO NOT BRIGHTEN AND DIM, THEY ARE ALWAYS ON.

DECLARATION OF CONFORMITY

WILLIAMS ELECTRONICS GAMES INC.

3401 N. CALIFORNIA AVE.
CHICAGO, IL 60618
U.S.A.

WE, HEREBY DECLARE UNDER SOLE RESPONSIBILITY THAT

THE MODEL: *"ARABIAN NIGHTS"* *50247, 50347, 50447, 50747, 50947,*
51047, 51147, 51347, 51447, 51847, 52047, 52147, 52247, 52347 (PINBALL)

TO WHICH THIS DECLARATION RELATES IS IN CONFORMITY WITH THE
FOLLOWING EUROPEAN PRODUCT SAFETY DIRECTIVES:

ELECTROMAGNETIC COMPATABILITY DIRECTIVE
(89/336/EEC AND AMENDMENTS 91/C162/08, 92/31/EEC, 93/68/EEC
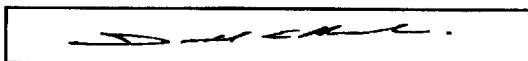
AS IS VERIFIED BY COMPLIANCE WITH THE FOLLOWING STANDARDS:
EN 55014:1993   EN55104:1995   EN61000-4-2: 1995
IEC 801-3: 1984 (EN61000-4-3)   EN61000-4-4: 1995   EN61000-4-5: 1995
ENV50141: 1993 (EN61000-4-6)   EN61000-4-11: 1994

Date issued: FEBRUARY 1, 1996

MANUFACTURE'S SIGNATURE

DON HASSLER
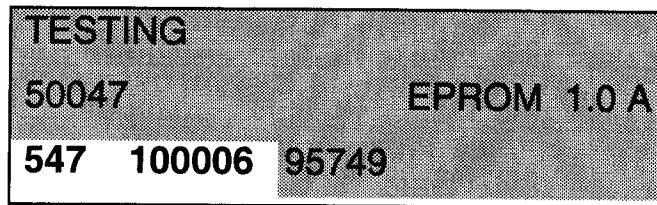
V.P. MANUFACTURING
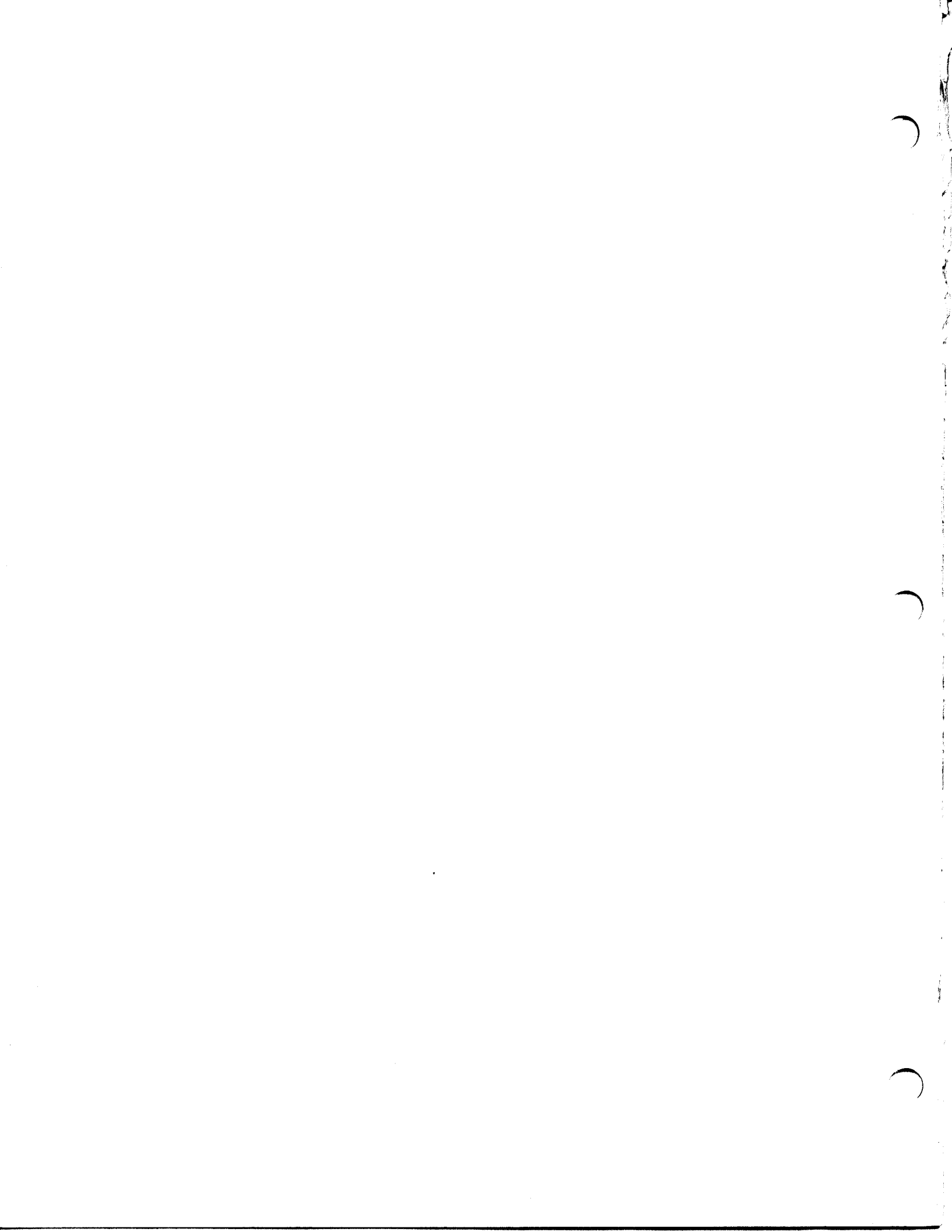
ATTENTION

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

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

```
TESTING

50047                    EPROM 1.0 A

547   100006  95749
```
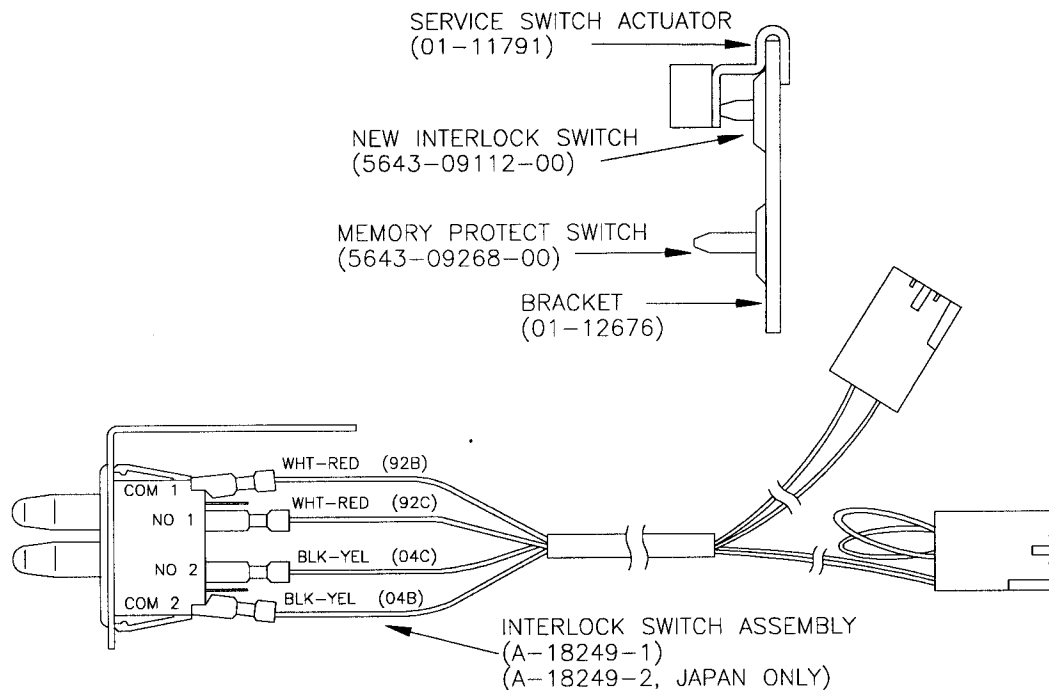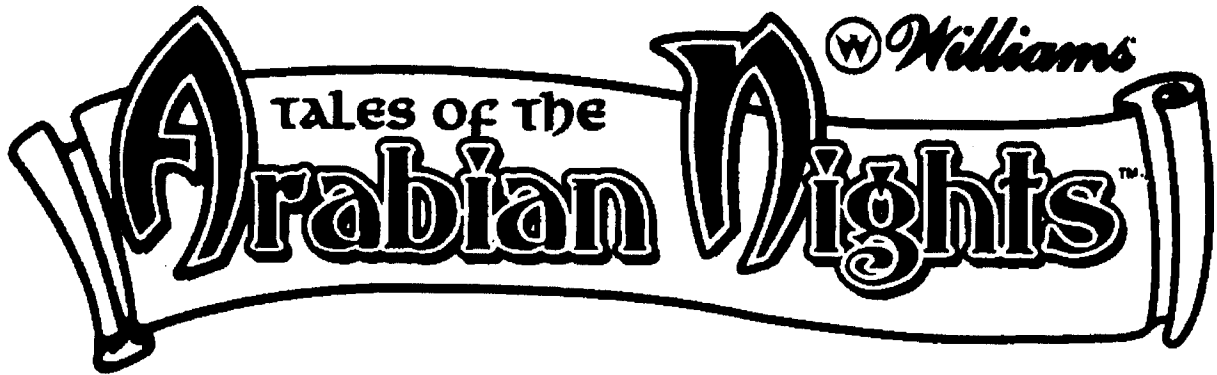
IMPORTANT NOTICE

PLEASE READ

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

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

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

SERVICE SWITCH ACTUATOR
(01-11791)

NEW INTERLOCK SWITCH
(5643-09112-00)

MEMORY PROTECT SWITCH
(5643-09268-00)

BRACKET
(01-12676)

WHT-RED   (92B)
WHT-RED   (92C)
BLK-YEL   (04C)
BLK-YEL   (04B)

COM 1
NO 1
NO 2
COM 2

INTERLOCK SWITCH ASSEMBLY
(A-18249-1)
(A-18249-2, JAPAN ONLY)

TALES OF THE Arabian Nights

(W) Williams™

Information current at time of release.

Fill out and mail in game Registration card. Be sure to include the game serial number. For your records, write the PIC and game serial numbers in manual.

PIC Number _____   Serial Number _____

TABLE OF CONTENTS

Tales of the Arabian Nights

Williams

Story and and Shot Maps

The Original Tales of 1001 Nights.

The collection of approximately 300 tales known in the West as 'The Arabian Nights' has evolved through eleven centuries of Indian, Arabic, and Persian story telling.

Many of the stories take place in the magical cities of Baghdad and Bazrah found in the Middle East. The events were often supposed to happen in the reign of the great Caliph, or ruler of the Faithful, Haroun al Raschid, who lived in Baghdad in 786-808 A.D.

The wonderful stories that include Aladdin and his lamp, Sinbad the Sailor and Ali-Baba with his thieves are told night after night by a young bride named Scheherezad. All the tales bring forth masterful Genies, surreal peoples in great lands full of magic, fortune with the power of imagination.

The Realm of Pinball

For you the player the majestic city of wonders, Baghdad, awaits. Beautiful dancing girls, music, flying carpets, mysterious monsters and caves full of gold lay ahead. The Sultan's only daughter has been imprisoned by an evil Genie, never to return. It is up to you to save the Princess.

At your feet lay a golden lamp in the Bazaar. You pick it up and brush off the dirt. It begins to glow as a lovely Genie appears, "What is your wish?"

You are about to experience the greatest story the world has ever known. The Tales of the Arabian Nights.

Pinball Rules and Game Play

You must escape the pythons first as you journey into Baghdad and collect the "Seven Jewels of the Arabian Nights." The glorious tales and unbelievable events will reveal the locations of these mystical jewels. The magic lamp full of lightning beholds Dimira, your faithful Genie to guide you.

Striking the big blue Genie will begin a new story. You must collect the yellow symbols and ride your magic carpet. All these jewels collected together and placed back into the handle of your mighty Scimitar will unleash the power to engage the "Master of all the Jinn." In this final Genie Battle the red symbol will illuminate. It is here that you can release the Princess from the bottle and escape.

Scorecard

OBJECT- Collect the seven jewels of the Arabian Nights to rescue the Princess.
SKILL SHOT - Fly the ball into play, HIT the basket with the snake in it.
MULTIBALL - Spell GENIE to light LOCKS. Hit the GENIE when lit to start Multiball.
JACKPOT - During Multiball hit the Genie to score Jackpot. Shoot the lit Tiger Loop to re-light Jackpot.
LAMP - Spin the Lamp to: Score Bonus, light Wish and score Lightning Value when lit.
JEWELS - Complete lit Golden Symbols then shoot Magic Carpet to collect Jewels.
BAZAAR - Advance Bazaar letters. Orbs add Bonus X Value when lit.
EXTRA BALL - Shoot the right Passageway to score EXTRA BALL when lit.
GENIE BATTLE - Strike the Genie when all seven Jewels are lit to start Genie Battle.

PLAYFIELD SHOTS

GENIE TARGET

HAREM SECRET ENTRANCE

DAGGER DIVERTER

JETS OF BAGHDAD

FIREBALL MAGNET

HAREM TIGER "LOCK"

PRINCESS IN A BOTTLE

MAGIC CARPET (RAMP)

HAREM "LOCK"

"BASKET OF PYTHONS"

LEFT ORB

BAZAAR

LEFT PATHWAY

RIGHT PATHWAY

RIGHT ORB

CATWALK

ALADDINS MAGIC
"SPINNING LAMP"

"CHARM THE SNAKE"
ENTRANCE

SHOOTING STAR CAGE SAVERS

Williams

JACKPOT

GENIE LETTERS

START TALE

FIREBALL

GOLDEN SYMBOL

ADVANCE X

LOCK

HAREM ADVANCE

TIGER LOOP

GOLDEN SYMBOL

SHOOTING STAR
SAVE ON L

WISHES

MAGIC AMULET

SPECIAL

GOLDEN SYMBOL

MULTIBALL

LOCK

LAMP BONUS COUNTERS

MAGIC CARPET

LOCK

LIGHTNING LAMP

"MAKE A WISH"

GOLDEN SYMBOL

EXTRA BALL

TIGER LOOP

BAZAAR LETTERS

ADVANCE X

SHOOTING STAR
SAVE ON R

ALADDIN LAMP BONUS

COLLECT ALL 7 JEWELS
TO RESCUE THE PRINCESS

SPECIAL

SHOOT AGAIN

GENIE BATTLE

Williams

SKILL SHOT

1) Shoot the ball into play to "Charm The Snake".

2) Hit the Genie for Super Skill Shot Value.
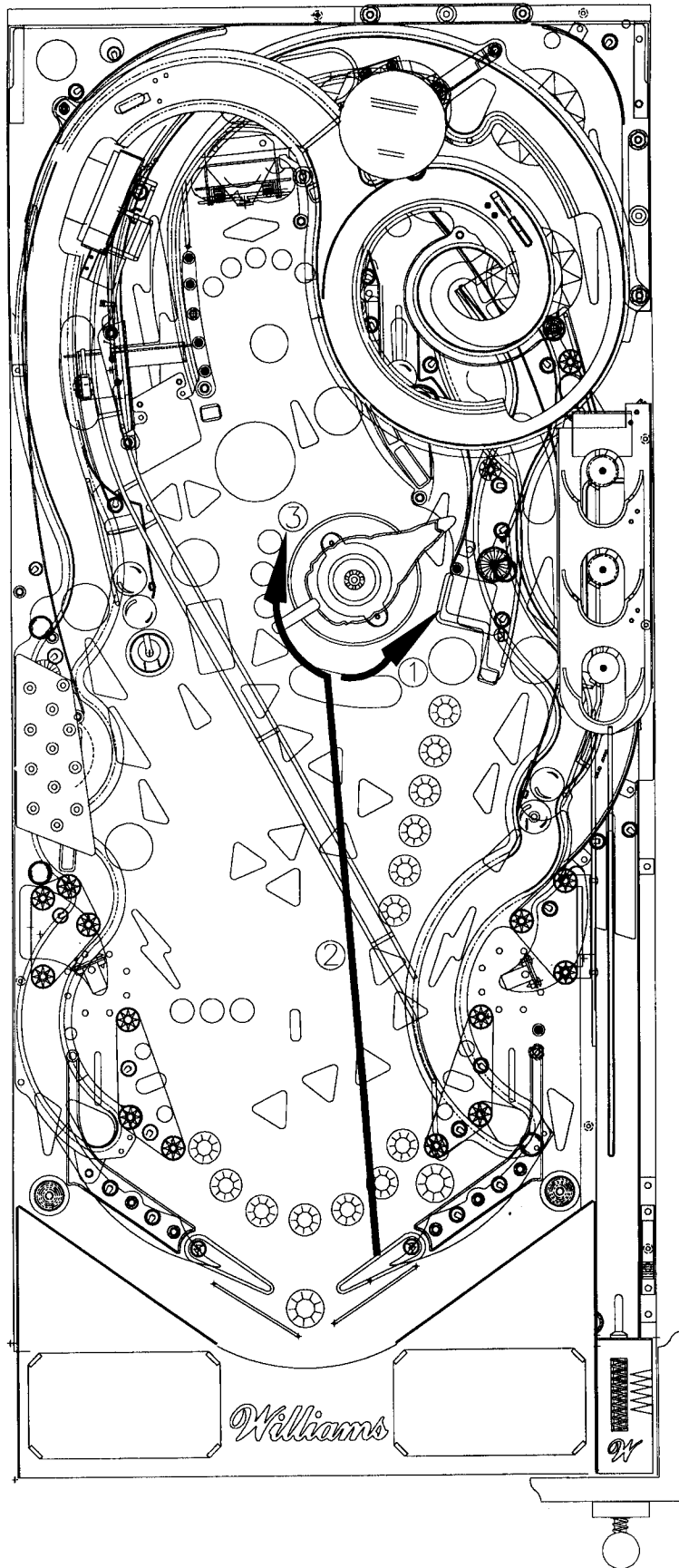
ALADDIN'S WONDERFUL LAMP

1) Shoot the ball to spin the magic lamp.

2) More lamp spins add more bonus.

3) Spin the lamp to light "Lightning Lamp" for added scoring and effects.

4) Collect Lamp Bonus after each ball.
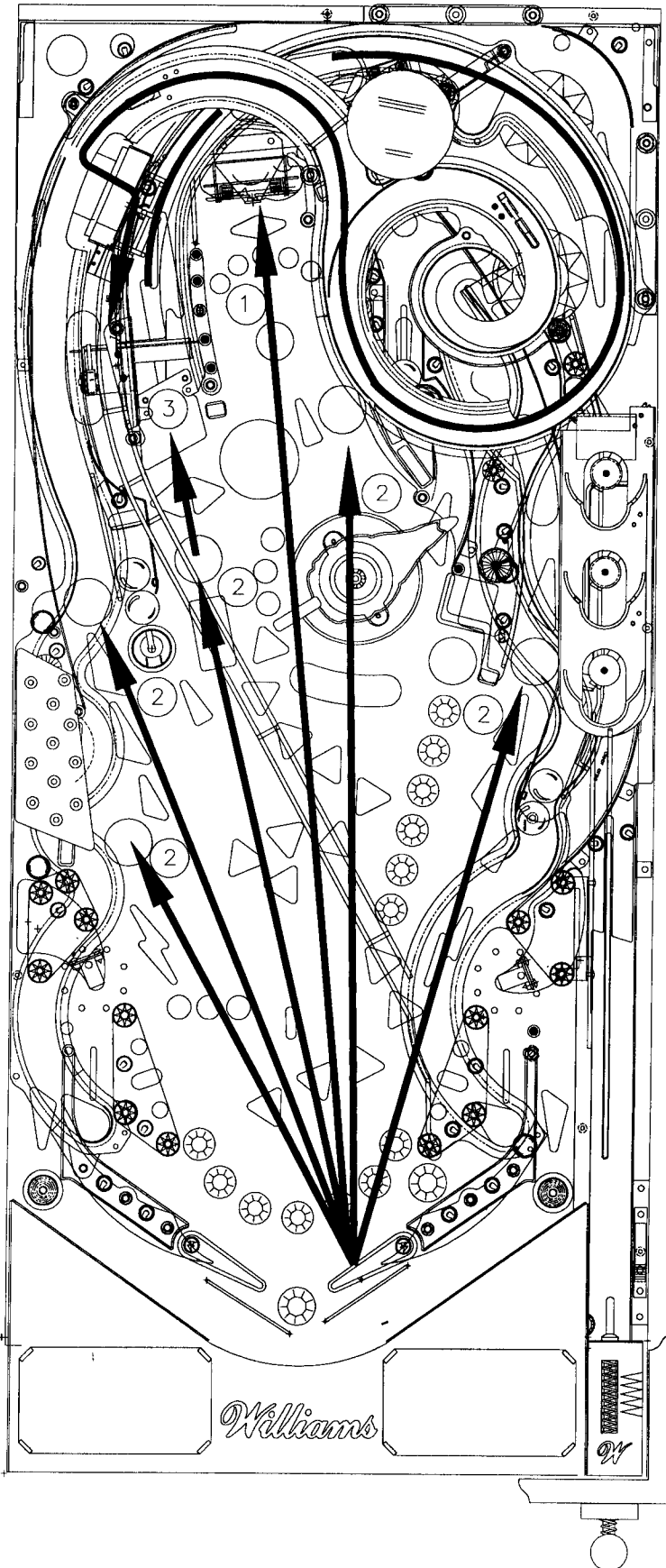
THE SEVEN TALES

Collect the seven jewels from the tales to rescue the princess.

1) Hit the Genie when lit, to start the next tale.

2) Shoot the lit Golden Symbols during the tale.

This will light the Magic Carpet shot.

COLLECT A JEWEL

3) Shoot the Magic Carpet ramp to collect the Jewel.

All Jewels collected will light Genie Battle.
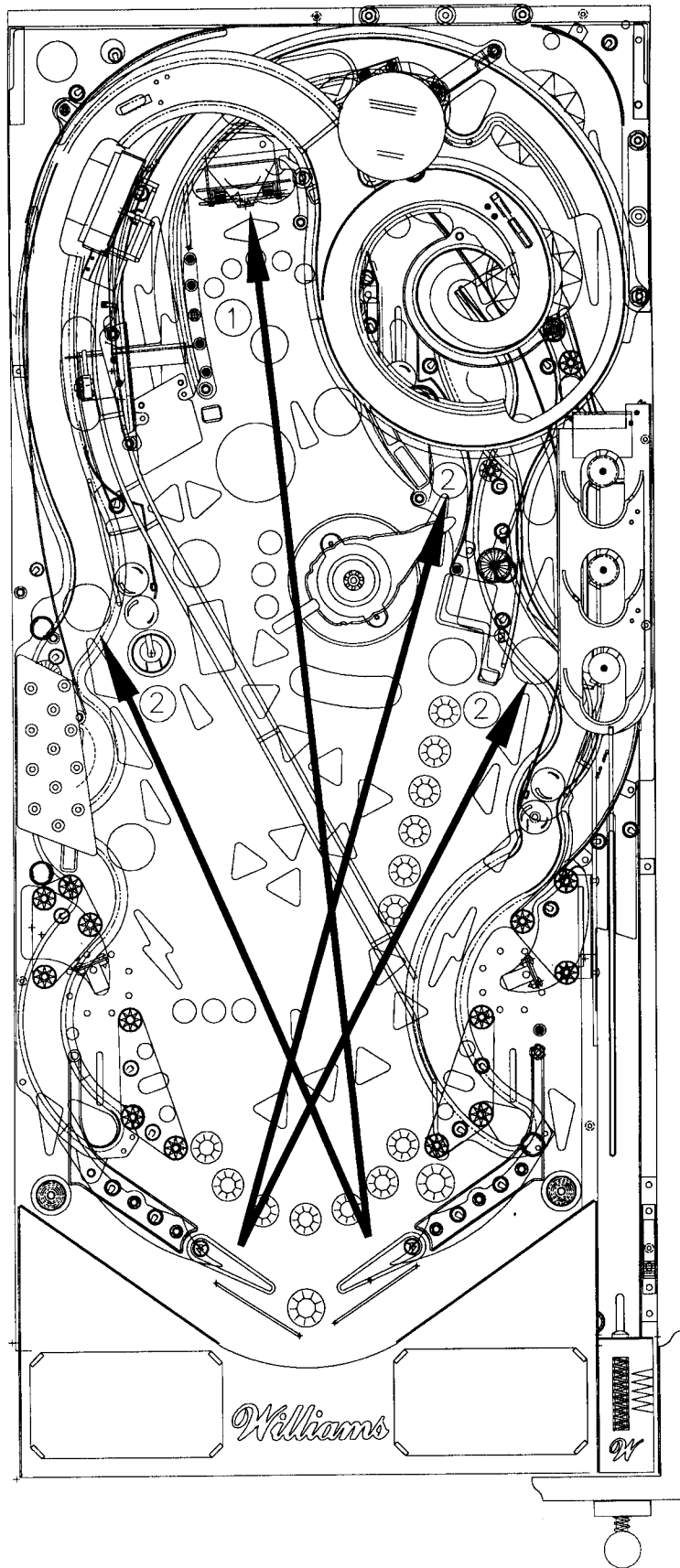
HAREM TIGER LOCK

1) Strike the Genie to light a letter in G-E-N-I-E. All letters lit will light locks.

2) Shoot the Harem or pathways to lock a ball by the Tiger.
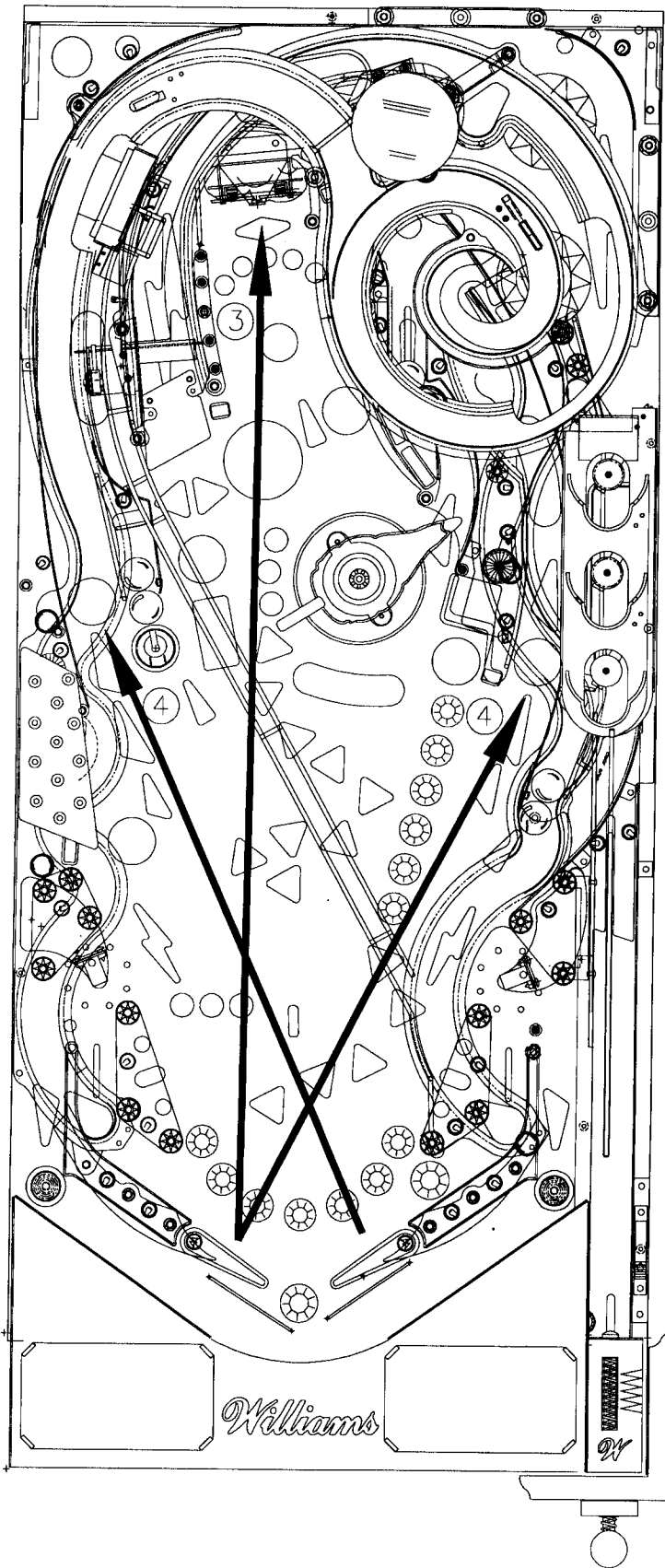
HAREM TIGER LOCK CONTINUED...

3) Then hit the Genie to start Multiball.

4) Hit the Genie to score Jackpot, and shoot the Left and Right Passageways to re-light the Lock.
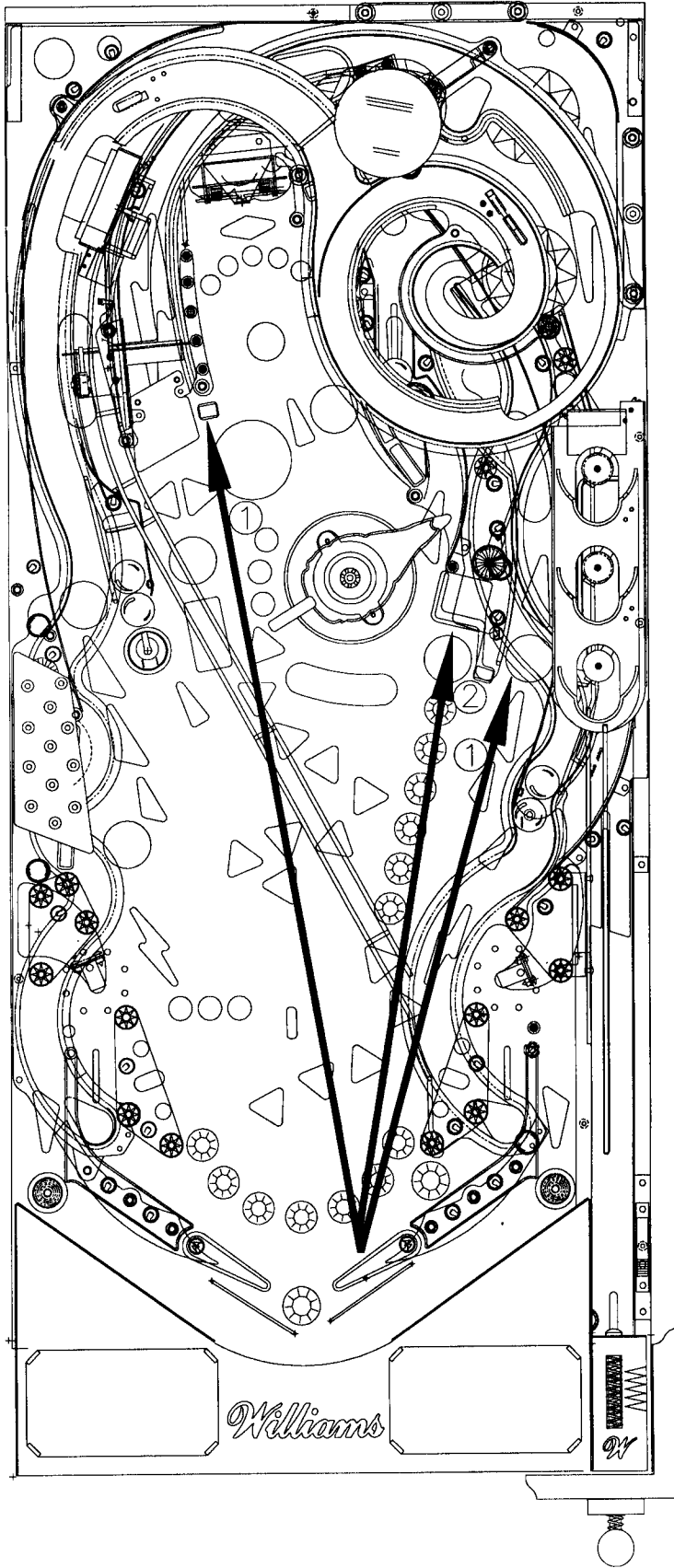
THE BAZAAR

1) Hit the small targets to light the Bazaar letters.

2) When all letters are lit, go in the Bazaar to find a great prize.
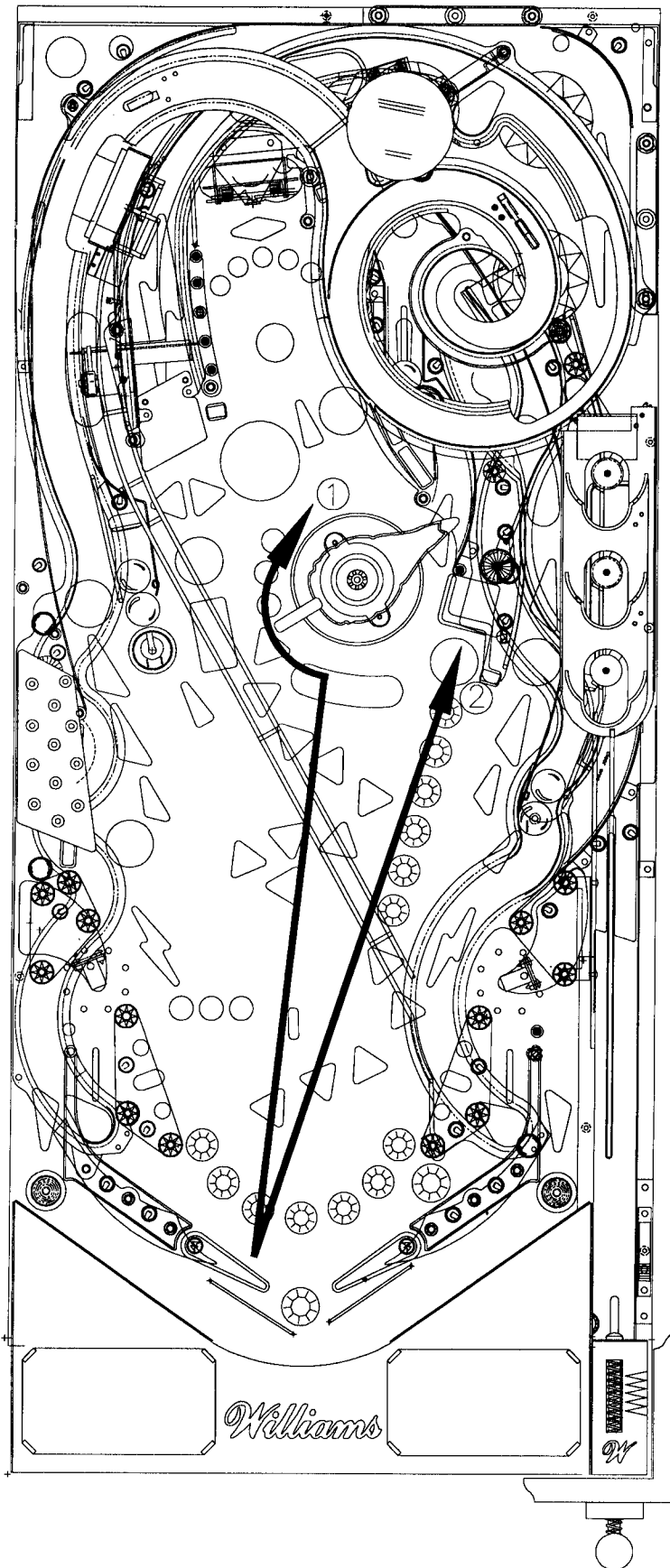
MAKE A WISH

1) Spin the Magic Lamp to light
   the Bonus to the top. This
   will light one Wish.

2) Shoot into the Bazaar when
   "Make a Wish" is lit to choose
   your destiny.
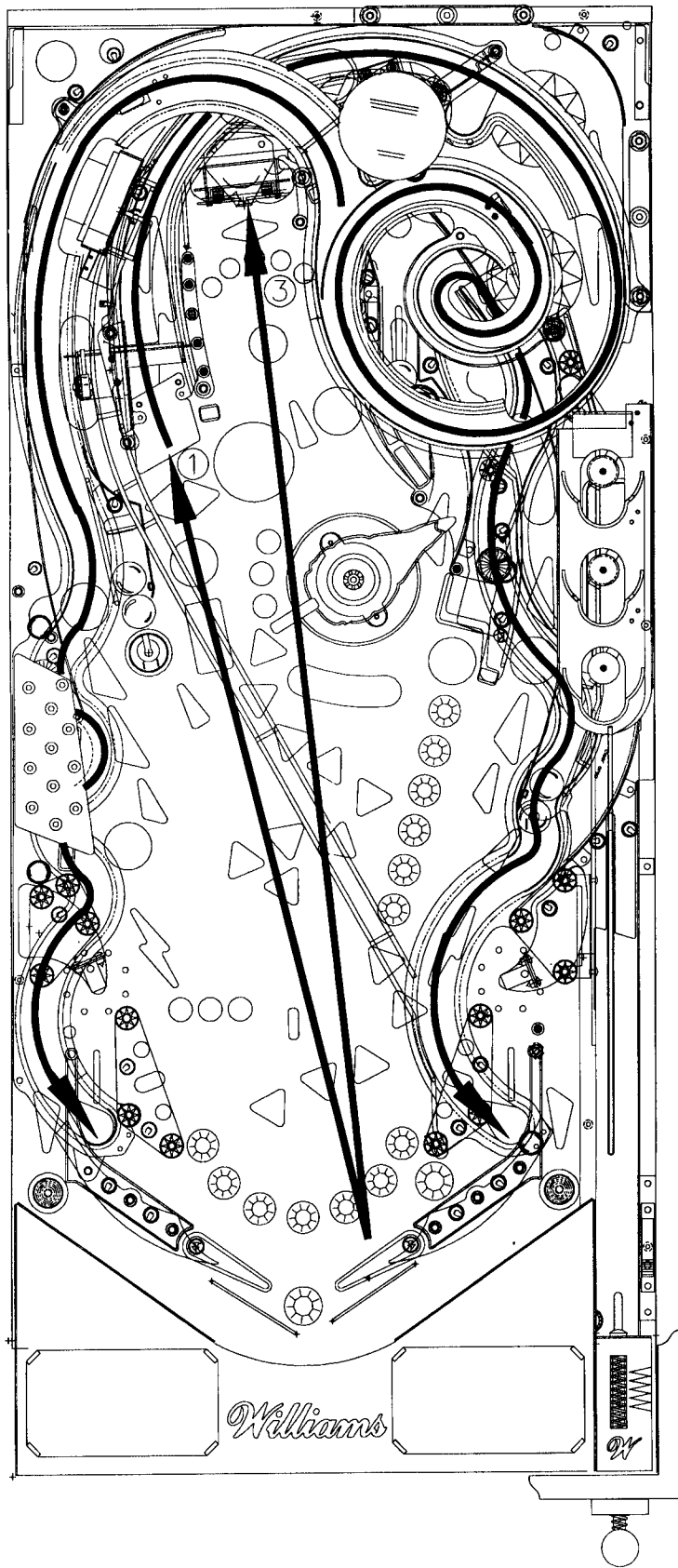
THROW A FIREBALL

1) Shoot the "Magic Carpet" ramp to light the Fireball Diamonds.

2) Make the "Magic Carpet" ramp again to have the Genie conjure and throw a Fireball at you.

3) Strike the Genie to collect the "Fireball Jackpot".
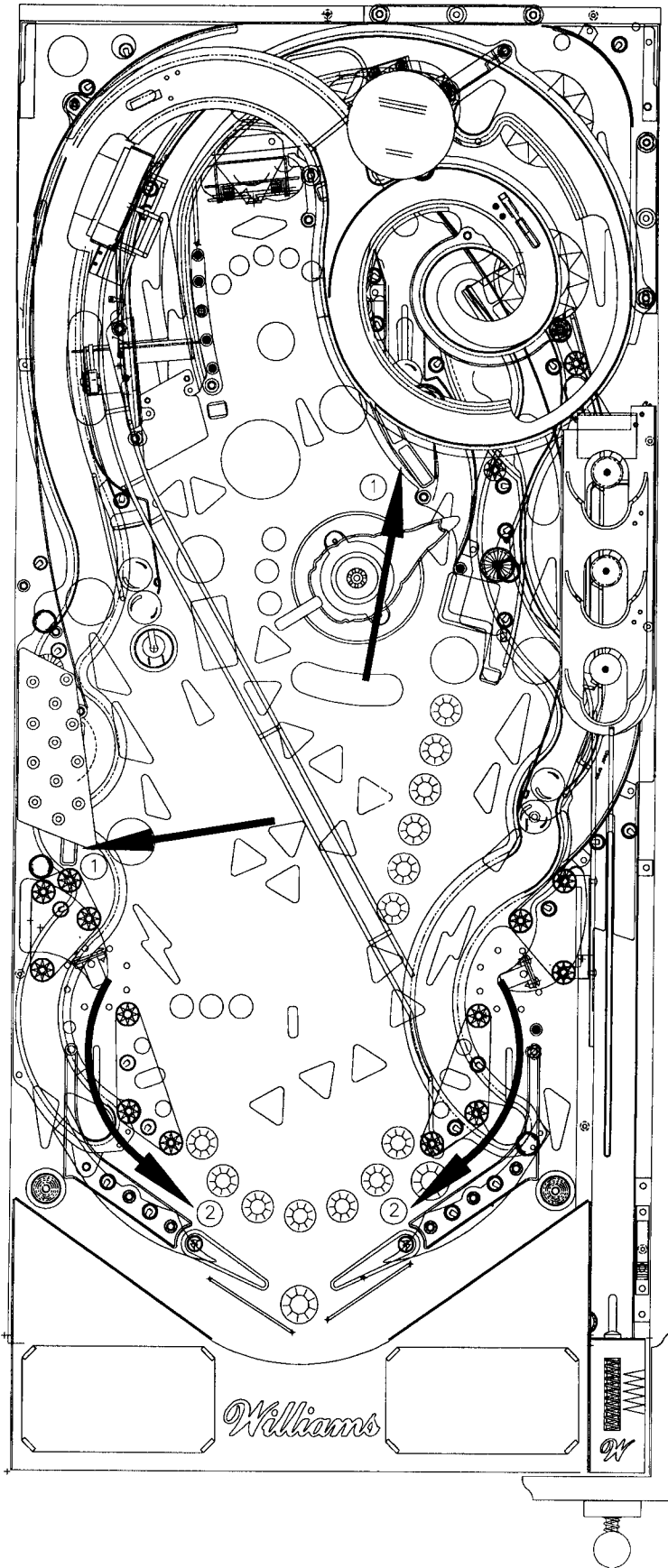
SHOOTING STARS
(Outlane Savers)

1) Hit the large red targets to light the Shooting Stars.

2) Then, for a timed amount, the Shooting Stars will save the ball from exiting the playfield and give it back to you.
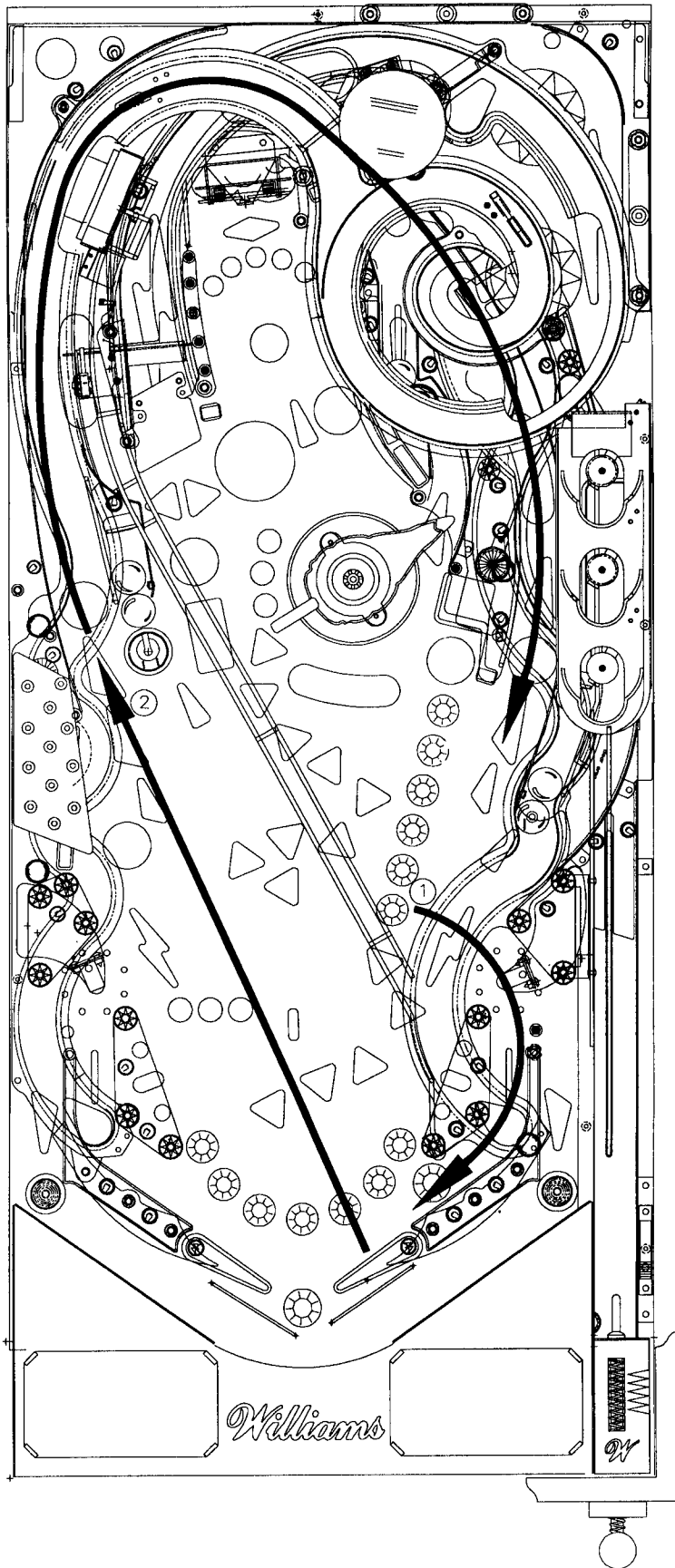
TIGER LOOPS

1) The return lanes will light the opposite passageway for a Tiger Loop.

2) Shoot the lit Tiger Loop to advance the Loop Value on each passageway.
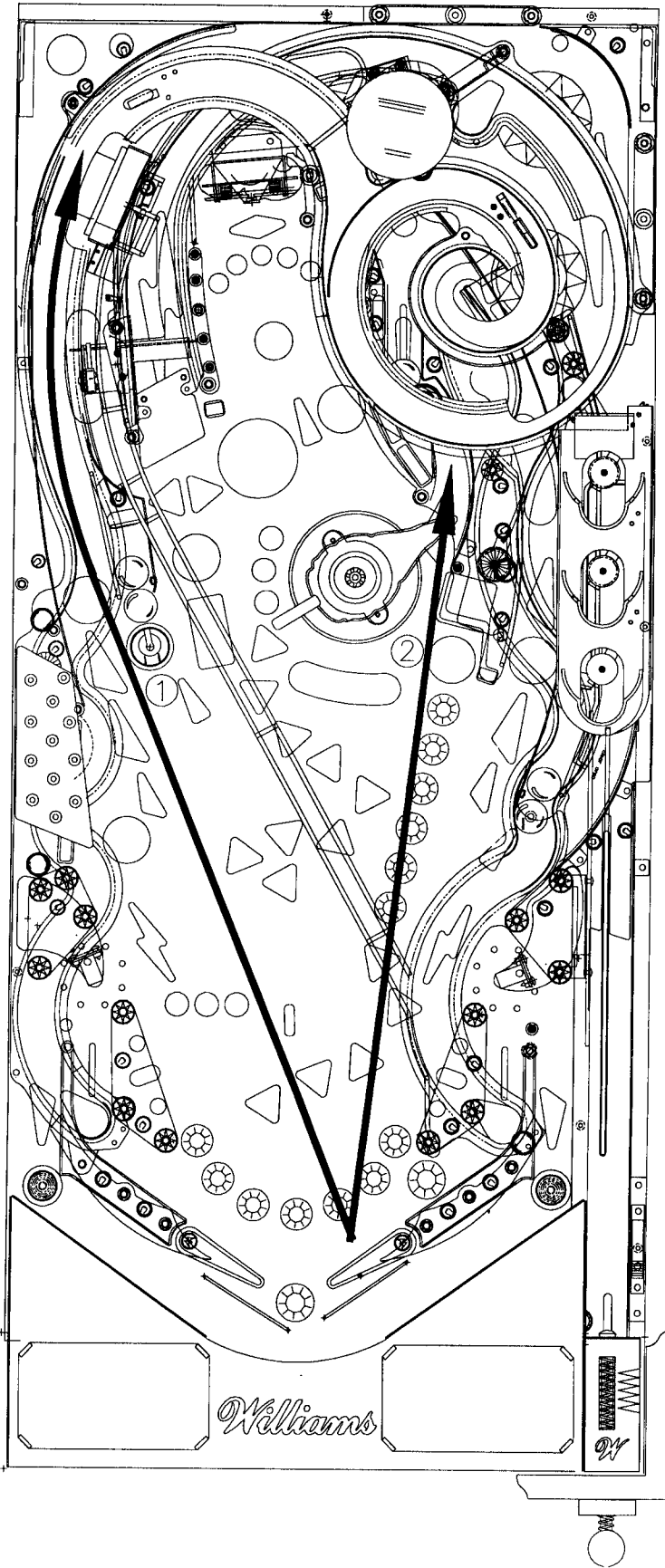
HAREM LETTER MULTIBALL

1) Travel through the Left
   Passageway to light a letter in
   Harem.

2) When all letters are lit shoot
   into the Harem to begin a
   quick Multiball.
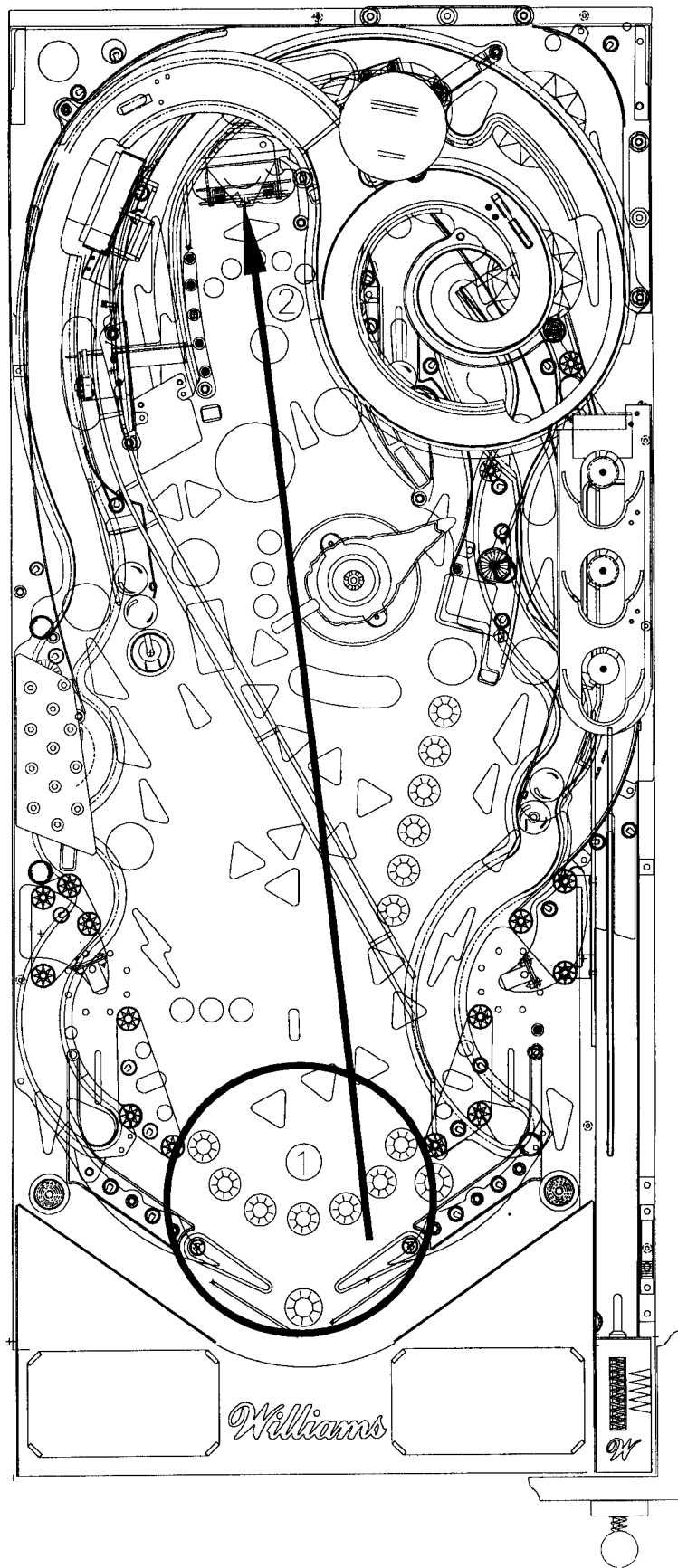
GENIE BATTLE - RESCUE THE PRINCESS

1) When all jewels are collected, the Genie Battle lamp will flash.

2) Strike the Genie to challenge him and begin the battle.

3) Shoot all lit playfield shots to defeat the Genie and his skeleton warriors.

4) Then hit the Genie to banish him in unlimited Multiball and smash the bottle that holds the princess!

SECTION ONE

GAME OPERATION
AND TEST INFORMATION

(System WPC) ROM SUMMARY

IC	TYPE	BOARD	LOCATION	PART NUMBER
Game 1	27c040	CPU	G11	A-5343-50047-1
Security Chip	PIC16C57	CPU	G10	A-5400-50047-1
Music/Speech	M27c801	Audio	SU2	A-5343-50047-S2
Music/Speech	M27c801	Audio·	SU3	A-5343-50047-S3
Music/Speech	M27c801	Audio	SU4	A-5343-50047-S4

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

PINBALL GAME ASSEMBLY INSTRUCTIONS

TALES OF THE ARABIAN NIGHTS™ is a six ball game. There are four ball-in-play balls and two captive balls.

Power: Domestic 120V @ 60Hz   **Dimensions:**   Width: 29" approx.
              Foreign 230V @ 50Hz   Depth: 52" approx.
              Japan 100V @ 50HZ   Height: 75" approx.
Temp: 32°F to 100° F, (0°C to 38°C)
Humidity: Not to exceed 95% relative.   **Weight:**   325 lb. approx. (crated)

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

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

3.   Attach front legs using leg bolts (View 2).
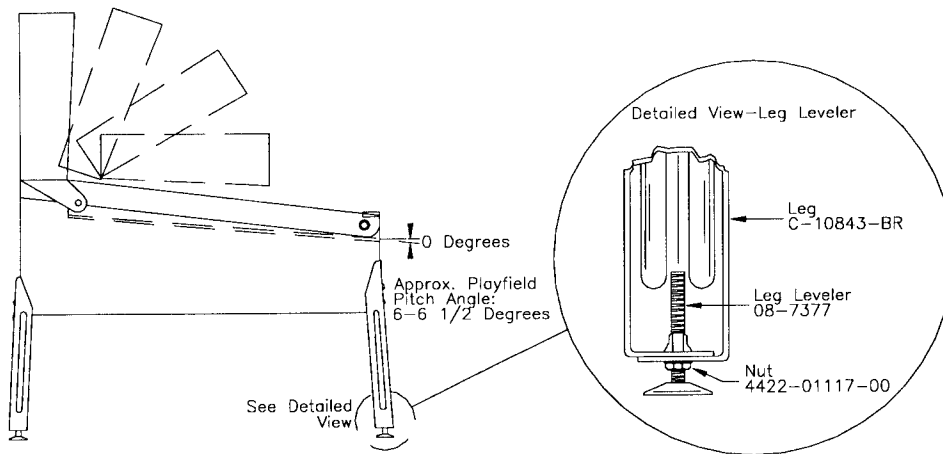
VIEW 1
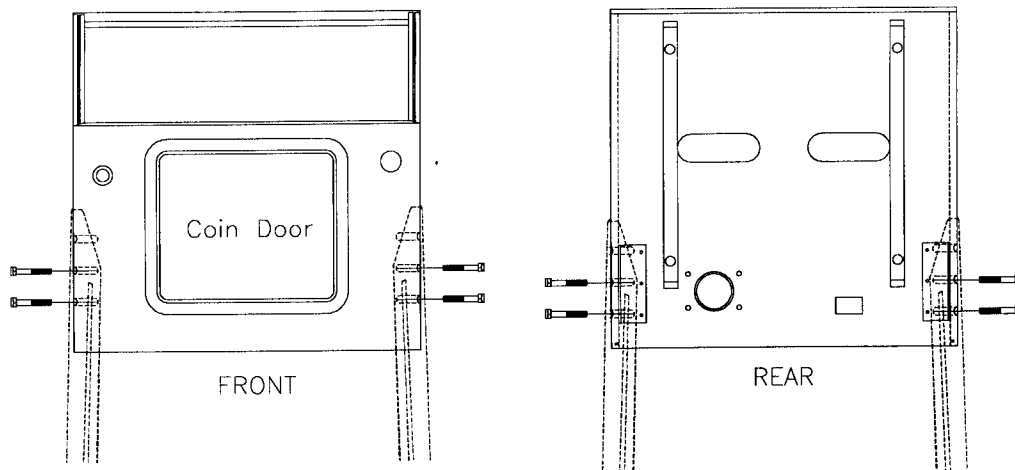
VIEW 2

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

5. Raise the hinged backbox upright and latch it into position.

    Note: The insert panel is no longer latched to the backbox; it is attached to the backglass. The backglass and the insert panel are removed from the backbox housing as a single unit.

    Unlock the backbox, carefully remove the backglass/insert panel, and lay it down on the playfield glass.

    Note: The speaker panel uses a new hinging system; the bottom of the speaker panel remains attached to the backbox unit when released.

    Carefully lift the speaker panel and rotate it away from the backbox, toward the playfield glass. The speaker panel will remain attached to the backbox unit.

    This allows access to the bolt holes for securing the backbox upright. Install the washer-head mounting bolts through the bottom holes of the backbox into the threaded fasteners in the cabinet to secure the backbox. Replace the speaker panel and the backglass/insert panel. Lock the backbox.

⚠ CAUTION

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

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

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

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

9. The TRU-PITCH™ level is located on the right shooter rail. This allows the playfield pitch angle to be properly adjusted WITHOUT REMOVING THE GLASS. The first line (closest to the front of the game) on the level is approximately 6 degrees. Every line thereafter is approximately another 1/2 degree of pitch. The recommended pitch is 6-1/2 degrees. The NOSE of the bubble should be between the first and second line on the level (see diagram below).

TRU–PITCH™ level 6–1/2 degrees.
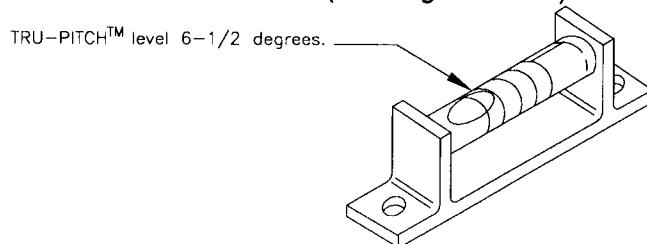
! IMPORTANT !

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

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

11. Be sure the **required number** of balls are installed. The *TALES OF THE ARABIAN NIGHTS™* game uses six balls. There are four ball-in-play balls and two captive balls.

12. Install full playfield mylar, if desired.

     NOTE: The *TALES OF THE ARABIAN NIGHTS™* 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 03-9488-1 for full playfield mylar.

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

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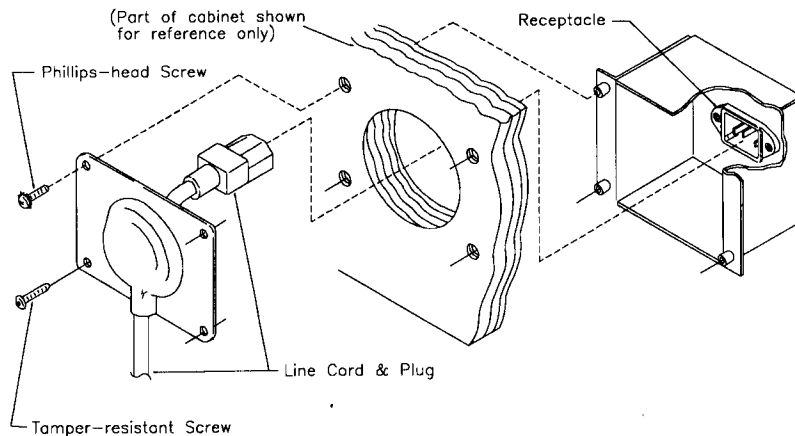
15. IMPORTANT: Fill out and return the registration card.

RAISING THE PLAYFIELD

⚠ CAUTION

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

Before Raising the Playfield:

Make sure there are no balls present in the ball trough or any of the other ball-holding playfield devices (i.e. poppers). Raising the playfield with balls present in these locations may cause them to come loose and damage the playfield. Use the "Empty Balls Test" to remove all of the balls from these locations.

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.

Bottom Arch — ①
Safety Bracket (2 used)
Rear Guide Leg (2 used)
Wood Guide Rail (2 used)
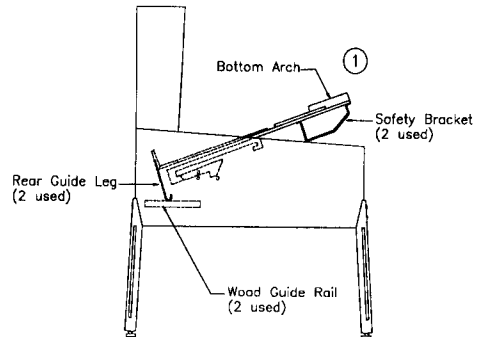
2. Pull the playfield out toward you until it stops (rest position), and raise it approximately 3".

   Be sure playfield is in locked position and does not slide back into 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 ensures locking and pivoting sequence.

③
②
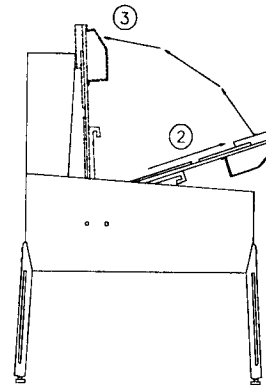
To Lower the Playfield.

4. Rotate the playfield to the rest position. This unlocks the pivoting mechanism.

5. Push the playfield back into cabinet and into the playing position.

④
⑤
Slide Mechanism (2 used)
Pivot Mechanism (2 used)
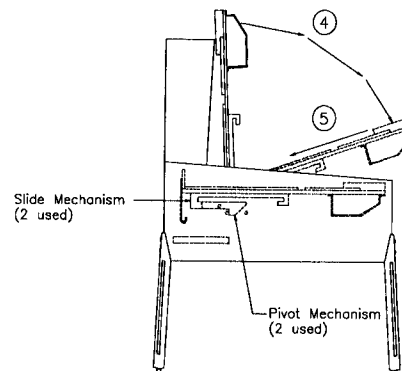
GAME CONTROL LOCATIONS

Cabinet Switches

The On-Off Switch is on the bottom of the cabinet near the right front leg.

The Start Button is a push-button to the left of the coin door on the cabinet exterior. Press the 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 push-button 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.
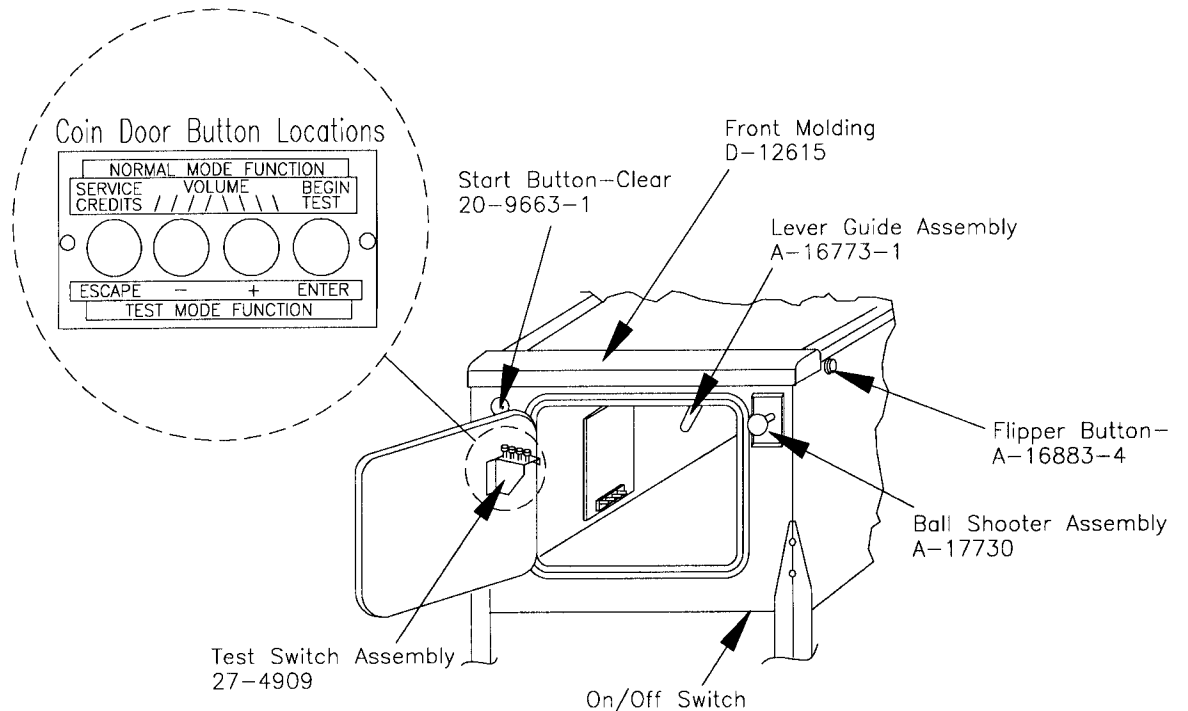
To reset High Score, hold down the Begin Test/Enter switch for five seconds while in the Attract mode.

GAME OPERATION

⚠ CAUTION

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

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

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

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

Example:	***TALES OF THE ARABIAN NIGHTS*™**		**Sound Rev. 1.0A**
	50047 **Rev. 1.0A**	**SY. 0.X0**	**XX-XX-96**

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 display shows a series of messages informing the player of the recent highest *scores, "*custom messages", and the score to obtain a replay *award.

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

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

TILTS. Actuating the cabinet tilt switch inside the cabinet ends the current game and proceeds to the Game Over mode. With the third closure* of the plumb bob tilt switch, the player loses the remaining play of that ball, but can complete the game.

END OF 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. Credits* may be awarded, when the last two digits of any player's score match the random digits. Match, high score, and game over sounds are made.

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

* - Operator-adjustable feature

MENU SYSTEM OPERATION

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

MAIN MENU

B. BOOKKEEPING MENU

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

Press Escape
To move out of a menu selection.

Press Enter
To get into a menu selection.

P. PRINTOUTS MENU

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

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

Press Down
Decreases sequence; Example A.4, A.3, A.2, A.1.

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

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

T. TEST MENU

T.1	Switch Edges Test
T.2	Switch Levels Test
T.3	Single Switches Test
T.4	Solenoid Test
T.5	Flasher Test
T.6	General Illumination Test
T.7	Sound and Music Test
T.8	Single Lamp Test
T.9	All Lamps Test
T.10	Lamp and Flasher Test
T.11	Display Test
T.12	Flipper Coil Test
T.13	Ordered Lamps Test
T.14	Lamp Row-Col.
T.15	DIP Switch Test
T.16	Genie/Vanishing Ball Test
T.17	Empty Balls Test

U. UTILITIES MENU

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

A. ADJUSTMENT MENU

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

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

B. BOOKKEEPING MENU

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

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

B.1 Main Audits

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

B.2 Earning Audits

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

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

B.3 Standard Audits

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

**"Total Plays" only counts 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 re-settable.

B.4 Feature Audits

B.4 01 Buy-in Extra Balls
Number of times the player bought an extra ball.   00   00%

B.4 02 Time Per Credit
Average time per credit of play.   00   00%

B.4 03 1 Buy-in Games
Number of games with 1 Buy-in.   00   00%

B.4 04 2 Buy-in Games
Number of games with 2 Buy-ins.   00   00%

B.4 05 3 Buy-in Games
Number of games with 3 Buy-ins.   00   00%

B.4 06 >=4 Buy-in Games
Number of games with 4 or more Buy-ins.   00   00%

B.4 07 Left Drains
Number of balls drained down the left outlane.   00   00%

B.4 08 Left Cage Saves
Number of times the Shooting Star saved the ball on the left side.   00   00%

B.4 09 Right Drains
Number of balls drained down the right outlane.   00   00%

B.4 10 Right Cage Saves
Number of times the Shooting Star saved the ball on the right side.   00   00%

B.4 11 Ball Saves
Number of times the ball was returned to the player due to Free Ride Time (A2.06).   00   00%

B.4 12 Bonus Multiplier
Number of times the player won a Bonus Multiplier.   00   00%

B.4 13 Tale Starts
Number of times a tale was started from the Genie target.   00   00%

B.4 14 Locks Lit
Number of times the G-E-N-I-E spellout was completed to light Locks.   00   00%

B.4 15 Balls Locked
Number of times a ball was locked.   00   00%

B.4 16 Genie Multiball
Number of times Genie Multiball was started.   00   00%

B.4 17 Genie Jackpots
Number of times Jackpot was won in Genie Multiball.   00   00%

B.4 18 Multiball Rematch Offered
Number of times the player ended multiball without winning a jackpot.   00   00%

B.4 19 Multiball Rematch Made
Number of times the player won a Multiball Rematch.   00   00%

B.4 20 Harem Sneakins
Number of times the ball entered the Harem Sneak-in hole.   00   00%

B.4 21 Harem Multiball Started
Number of times Harem Multiball was started.   00   00%

B.4 22 Genie Awards
Number of times the player completed the G-E-N-I-E spell out for a Genie Award.   00   00%

B.4 23 Bazaar Ready
Number of times the player relight the Bazaar award.   00   00%

B.4 24 Bazaar Awards
Number of times the player won a Bazaar award.   00   00%

B.4 25 Fireball Started
Number of times Fireball was started from the ramp.   00   00%

B.4 26 Fireball Awarded
Number of times Fireball was won by shooting the Genie Target.   00   00%

B.4 27 Tiger Loops
Number of times the player completed a Tiger Loop.   00   00%

B.4 28 Tiger Loop Extra Balls Lit
Number of times Extra Ball was lit from the Tiger Loop.   00   00%

B.4 29 Lightning Lamp Started
Number of times Lightning Lamp was started.   00   00%

B.4 30 Bazaar Awarded 250,000
Number of times the player won 250,000 from the Bazaar award.   00   00%

B.4 31 Bazaar Awarded 500,000
Number of times the player won 500,000 from the Bazaar award.   00   00%

B.4 32 Bazaar Awarded Bonus X .
Number of times the player won a Bonus Multiplier from the Bazaar award.   00   00%

B.4 33 Bazaar Awarded Shooting Star
Number of times the player lit the Shooting Stars from the Bazaar award.   00   00%

B.4 34 Bazaar Awarded Locks Lit
Number of times the player lit the Locks from the Bazaar award.   00   00%

B.4 35 Bazaar Awarded Extra Ball Lit
Number of times the player lit an Extra Ball from the Bazaar award.   00   00%

B.4 36 Bazaar Awarded Extra Ball
Number of times the player won an Extra Ball from the Bazaar award.   00   00%

B.4 37 Bazaar Awarded Make a Wish Lit
Number of times the player lit Make a Wish from the Bazaar award.   00   00%

B.4 38 Bazaar Awarded Special Lit
Number of times the player lit Special from the Bazaar award.   00   00%

B.4 39 Bazaar Awarded Bonus Hold
Number of times the player won a Bonus Multiplier Hold from the Bazaar award.   00   00%

B.4 41 Make a Wish Awarded 3X Lightning Lamp
Number of times player chose 3 times the Lightning Lamp value from Make a Wish. 00   00%

B.4 42 Make a Wish Awarded 3X Fireball
Number of times the player chose 3 times the Fireball value from Make a Wish.   00   00%

B.4 43 Make a Wish Awarded Lightning Lamp
Number of times the player chose to start Lightning Lamp from Make a Wish.   00   00%

B.4 44 Make a Wish Awarded 3 Tiger Loops
Number of times the player chose 3 tiger loops from Make a Wish.   00   00%

B.4 45 Make a Wish Choice Expired
Number of times the Make a Wish screen timed out.   00   00%

B.4 46 Make a Wish Awarded Jewel
Number of times the player chose a jewel from Make a Wish.   00   00%

B.4 47 Skill Shot High Switch
Number of times the ball landed on the top Skill Shot switch.   00   00%

B.4 48 Skill Shot Middle Switch
Number of times the ball landed on the middle Skill Shot switch.   00   00%

B.4 49 Skill Shot Lower Switch
Number of times the ball landed on the bottom Skill Shot switch.   00   00%

B.4 50 Skill Shot Won
Number of times the player won a Skill Shot Award.   00   00%

B.4 51 Skill Shot Lost
Number of times the player missed the Skill Shot Award.   00   00%

B.4 52 All Jewels Collected
Number of times the player collected all 7 Jewels.   00   00%

B.4 53 Final Battle Started
Number of times the player started the Final Genie Battle.   00 00%

B.5   Histograms

B.5	01	0.0 - 0.4 Million Scores	00	00%
B.5	02	0.5 - 0.9 Million Scores	00	00%
B.5	03	1.0 - 1.4 Million Scores	00	00%
B.5	04	1.5 - 1.9 Million Scores	00	00%
B.5	05	2.0 - 2.9 Million Scores	00	00%
B.5	06	3.0 - 3.9 Million Scores	00	00%
B.5	07	4.0 - 4.9 Million Scores	00	00%
B.5	08	5.0 - 5.9 Million Scores	00	00%
B.5	09	6.0 - 7.9 Million Scores	00	00%
B.5	10	8.0 - 9.9 Million Scores	00	00%
B.5	11	10 - 15 Million Scores	00	00%
B.5	12	15 - 20 Million Scores	00	00%
B.5	13	Over 20 Million Score	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

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

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

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

P. PRINTOUTS MENU

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

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

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

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

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

NOTE: During any test, press the Start button to obtain the wire color, driver number, connector number and fuse location.

T. TEST MENU

T.1	Switch Edges Test	T.10 Lamps And Flasher Test
T.2	Switch Levels Test	T.11 Display Test
T.3	Single Switch Test	T.12 Flipper Coil Test
T.4	Solenoid Test	T.13 Ordered Lamps Test
T.5	Flasher Test	T.14 Lamp Row-Col.
T.6	General Illumination Test	T.15 DIP Switch Test
T.7	Sound & Music Test	T.16 Genie/Vanishing Ball Mechanism Test
T.8	Single Lamps Test	T.17 Empty Ball Test
T.9	All Lamps Test	

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

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

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

T.1   Switch Edges Test

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

T.2   Switch Levels Test

This test automatically cycles through all switches that are detected closed. The name and number of each switch that is detected is shown in the display. A filled square indicates the switch's position in the matrix.

T.3   Single Switches Test

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

T.4   Solenoid Test

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

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

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

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

T.5   Flasher Test

This tests the flashlamp part of the solenoid circuit. There are three modes - Repeat, Stop, and Run. During this test the flashlamp circuit named in the display should blink. The system has detected a problem if more then one flashlamp circuit blinks, the lamps stays on, or no lamps blink during the Repeat or Run modes.

Repeat: The Repeat mode pulses a single flashlamp. After entering this test the name and number of the first flashlamp shows in the display and the corresponding bulb(s) blink. The same lamps blink until the Up or Down button is pressed. Either press the Escape button to return to the Test menu, or press the Enter button to advance to the next mode.

Stop: The Stop mode halts the Flasher test. There should not be any flashlamps lit during this mode. Either press the Escape button to return to the Test menu, or press the Enter button to advance to the next mode.

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

T.6   General Illumination Test

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

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

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

T.7 Sound and Music Test

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

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

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

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

T.8 Single Lamp Test

The number assigned to each lamp indicates the lamp's position in the matrix. The number on the left indicates the column. The number on the right indicates the row. Example - Lamp 23 means 2nd column, 3rd row.

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

T.9 All Lamps Test

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

T.10 Lamp and Flasher Test

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

T.11 Display Test

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

T.12 Flipper Coil Test

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

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

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

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

T.13 Ordered Lamps Test

The number assigned to each lamp indicates the lamp's position in the matrix. The number on the left indicates the column. The number on the right indicates the row. Example - Lamp 23 means 2nd column, 3rd row.

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

T.14 Lamp Row-Col.

This test allows individual rows and columns in the lamp matrix to be operated. This is useful for trouble-shooting wiring and driver problems.

Press the Up and Down buttons to cycles through the different rows and columns.

T.15 DIP Switch Test

This test is used to show the positions of the DIP switches on the CPU board (U27).

T.16 Genie/Vanishing Ball Mechanism Test

Select T.16 from the Test Menu and press Enter to begin the Genie/Vanish Test.

This test is designed to test the Genie Target, the Vanishing Ball Mechanism, and the tunnel switches located underneath the playfield. If this mechanism is disabled by adjustment (A2.20), this screen will say VANISH MECH. DISABLED BY A2.20. The test may still be performed, but the game will not attempt to use this mechanism during game play. Set adjustment A2.20 to NO to re-enable the Vanishing Ball Mechanism.

The display will show the state of the following switches:
Genie Target (switch 42)
Vanish Tunnel (switch 12)
Bazaar Eject (switch 25)
An "X" in the box next to the switch name indicates that the switch is closed.

Hit the Genie Target with a ball (or by hand) to begin the test. The Vanishing Ball mechanism will attempt to grab the ball, drop beneath the playfield, and deliver the ball to the bazaar eject. Check to see that all three switches have an "X" in their boxes, showing that they are operational.

If the ball failed to close all three switches, use Switch Test (Test T.1) to check the operation of the failed switches.

Press either flipper button to reset the three boxes and begin the test again.
Press Escape to return to the test menu.

T.17 Empty Balls

This test kicks out all balls loaded in troughs, lockups, poppers, and kick-outs until no balls remain in those locations.

NOTE: *As the trough kicks out balls, they may stack up in the shooter groove, which may require manual clearing in order to allow further balls to be kicked out.*

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

U. Utilities Menu

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

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

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

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

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

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

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

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

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

U.8   Factory Reset

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

U.9   Presets

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

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

U.9 01	**Install Extra Easy**	MUCH LESS difficult than factory setting.
U.9 02	**Install Easy**	Somewhat LESS difficult than factory setting.
U.9 03	**Install Medium**	About the SAME as factory setting.
U.9 04	**Install Hard**	Somewhat MORE difficult than factory setting.
U.9 05	**Install Extra Hard**	MUCH MORE difficult than factory setting.

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

Adj. #	Adj. Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03 (factory)	Hard U.9 04	Extra Hard U.9 05
A.2 07	Shooting Star Difficulty	EASY	EASY	MED.	HARD	HARD
A.2 09	Tiger Loop Difficulty	EASY	EASY	MED.	HARD	HARD
A.2 11	Tiger Loop Extra Ball Level 1	03	04	06	07	08
A.2 13	Bazaar Advance Difficulty	EASY	EASY	MED.	MED.	HARD
A.2 14	Multiball Difficulty	EASY	EASY	MED.	MED.	HARD
A.2 18	Tale Completed Extra Ball	03	03	04	04	05

U.9 06 Install 5 Ball
U.9 07 Install 3 Ball

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

Preset Adjustments Table for U.S. and Canadian Games

Adj. #	Adj. Description	Install 5-ball U.9 06	Install 3-ball U.9 07
A.1 01	Ball Per Game	05	03
A.1 07	Replay Start	10,000,000	8,000,000
A.2 06	Free Ride Time	4 seconds	5 seconds
A.2 07	Shooting Star Difficulty	HARD	MEDIUM
A.2 11	Tiger Loop Extra Ball 1	08	06
A.2 13	Bazaar Advance Difficulty	HARD	MEDIUM
A.2 17	Tale Extra Ball Memory	NO	YES
A.2 18	Tale Completed Extra Ball	05	04

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

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

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

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

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

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

U.9 11 NOT USED

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

U.9 13 to 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 play.

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.

U.10 Clear Credits

Press the Enter button to clear the game Credits.

U.11 Auto Burn-in

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

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

A. ADJUSTMENTS MENU

A.1   Standard Adjustments
A.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 actuation's of the plumb bob that can occur before the game is "tilted".

Range: 1 to 10.

A.1 03 Maximum Extra Balls
The number of Extra Balls that a player may accumulate.

Range: 0 to 10.
NO EXTRA BALL - No Extra Balls may be accumulated.

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.

A.1 08 Replay Levels

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

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

The value to be used for the 1st through 4th Fixed Replay.

Range: 00 to 250,000,000.

A.1 13 Replay Boost

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

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

A.1 14 Replay Award

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

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

A.1 15 Special Award

The award automatically provided when the player scores a special.

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

A.1 16 Match Award

The award automatically provided when the players wins a match.

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

A.1 17 Extra Ball Ticket

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

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

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 random game features and global score values during multi-player games.

YES   -   Equalize random game features and global score values.
NO   -   Do Not equalize random game features and global score values.

A.1 27 Euro. Scr. Format
Use either commas or dots between digits when numbers are displayed.

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

A.1 28 Minimum Volume Override
The volume can be turned Off.

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

A.1 29 General Illumination Power Saver
This allows the general illumination and controlled lamps to be dimmed following a time interval after a game is played. Power Saver Level (A.1 30) determines dimness of the lamps. Using this feature substantially increases the life of the lamps.

Setting: OFF, 2 to 60 minutes.

A.1 30 Power Saver Level
When General Illumination Power Saver (A.1 29) is set to On, this controls the intensity of the G.I. and controlled lamps once the game has been idle for a specified period of time.

Range: 4 to 7. (4 = dimmest, 7 = brightest)

A.1 31 Ticket Expansion Board
When a Ticket Expansion Board is connected, full control of the ticket dispenser is available. This includes a ticket low/error lamp, resume on ticket jam switch and manual ticket dispense switch.

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

A.1 32 No Bonus Flips
The activation of flippers during the end of ball "bonus" sequence. Setting to "YES" may extend the life of the flipper mechanisms.

A.1 33 Game Restart
When the Start button is pressed during or after the 2nd ball, the game in progress will end and a new game will begin. This adjustment has three settings to determine how this is handled.

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

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

A.2 Feature Adjustments

A.2 01 Buy Extra Ball
This determines whether each player may buy 1 Extra Ball for 1 Credit at the end of the game.

Settings: OFF, 1/2 CREDIT, 1 CREDIT
Factory Default: Off

A.2 02 Buy In Count
This determines how many times a player may buy in if **Buy Extra Ball** is not set to **Off.**

Factory Default: 4

A.2 03 Attract Mode Sound
The operator can select whether or not the attract mode has sounds on the flipper buttons to attract players.

Settings: YES, NO
Factory Default: YES

A.2 04 Attract Mode Music
The operator can select whether or not the attract mode will play music to attract players.

Settings: YES, NO
Factory Default: NO

A.2 06 Free Ride Time (Ball Saver)
This determines how long (in seconds) the game will allow the player to get his ball back after a quick drain.

Factory Default: 5 seconds.

A.2 07 Shooting Star Difficulty
This determines how long a 'Shooting Star' ball saver will stay lit when enabled.

Settings: EASY, MEDIUM, HARD
Factory Default: MEDIUM

A.2 08 Shooting Star Memory
This determines if lit Shooting Stars are carried over from ball to ball.

Settings: YES, NO
Factory Default: NO

A.2 09 Tiger Loop Difficulty
This decides how long to keep Tiger Loops lit once they are turned on.

Settings: EASY, MEDIUM, HARD
Factory Default: MEDIUM

A.2 10 Extra Ball Percent

The operator selects the percentage of Extra Balls desired. The game will try to match this percentage by:

1) Increasing or decreasing the number of Tiger Loops necessary to light Extra Ball
2) Increasing or decreasing the chances that Extra Ball will be given from the Bazaar.

The setting range is OFF to 40 percent
Factory Default: 25 Percent.

A.2 11 Tiger Loop Extra Ball Level 1

This sets the number of Tiger Loops necessary to light the first Extra Ball

Setting Range is 3 to 9
Factory Default: 6

A.2 12 Tiger Loop Extra Ball Level 2

This determines if the player can earn a second Extra Ball from Tiger Loops, and at what count. The second count is always 20.

Settings: ON, OFF
Factory Default: ON

A.2 13 Bazaar Advance Difficulty

This determines how hard it is for a player to re-light the Bazaar Random Award.

Settings: EASY, MEDIUM, HARD
Factory Default: MEDIUM

A.2 14 Multiball Difficulty

This determines how hard it is for a player to complete the GENIE spell out to start Multiball.

Settings: EASY, MEDIUM, HARD
Factory Default: MEDIUM

A.2 15 Tiger Extra Ball Memory

The operator selects whether or not the Extra Ball lit from Tiger Loops will remain lit from ball to ball. The choices are:

YES = Extra Ball stays lit until the end of the GAME or when collected.
NO = Extra Ball stays lit until the end of the BALL or when collected
Factory Default: YES

A.2 16 Wish Extra Ball Memory

The operator selects whether or not the Extra Ball lit from Make a Wish will remain lit from ball to ball. The choices are:

YES = Extra Ball stays lit until the end of the GAME or when collected.
NO = Extra Ball stays lit until the end of the BALL or when collected
Factory Default: YES

A.2 17 Tale Extra Ball Memory

The operator selects whether or not the Extra Ball lit from completing Tales will remain lit from ball to ball. The choices are:

YES = Extra Ball stays lit until the end of the GAME or when collected.
NO = Extra Ball stays lit until the end of the BALL or when collected
Factory Default: YES

A.2 18 Tales Completed Light Extra Ball Count

After the player completes this many tales, Extra Ball will light.

Setting Range: 2 to 5
Factory Default: 3

A.2 19 Disable Ramp Diverter

Use this setting to disable the ramp diverter mechanism. If set to YES, the game will not try to open the diverter and will compensate game play accordingly.

Settings: YES, NO
Factory Default: NO

A.2 20 Disable Vanishing Ball Mechanism

Use this setting to disable the vanishing ball mechanism. If set to YES, the game will not try to use the vanishing magnet and will compensate game play accordingly.

Settings: YES, NO
Factory Default: NO

A.2 21 Disable Fireball Ramp Magnet

Use this setting to disable Fireball ramp magnet (located on the left ramp). If set to YES, the game will not try to use the ramp magnet and will compensate game play accordingly.

Settings: YES, NO
Factory Default: NO

A.2 22 Genie Ball Saver Enabled

If the vanishing ball magnet throws the ball down between the flippers, the player will get their ball back.

Settings: YES, NO
Factory Default: NO

A.2 23 Shooting Star Ball Saver Enabled

If a lit Shooting Star device fails to grab the ball and deliver it back to the flippers, the player will get their ball back.

Settings: YES, NO
Factory Default: YES

A.2 24 Volume Interlock

When set to YES, a flipper button must be held to change the game's sound volume. This is designed to prevent accidental volume changes while adding service credits to the game.

Settings: YES, NO
Factory Default: NO

A.2 25 Player Tournament Mode

When this adjustment is set to YES, holding both flipper buttons, (during the Attract mode), for five seconds prompts the player with "TOURNAMENT MODE READY" and gives them ten seconds to start a game in Tournament mode.

Settings: YES, NO
Factory Default: YES

A.2 26 Smoke Carryover

When set to YES, the entire Lamp Bonus is carried over from ball to ball. When set to NO, the units lower then 15 are cleared between balls. Setting this feature to YES will increase the average score of the game and increase the player's chances of earning Lightning Lamp.

Settings: YES, NO
Factory Default: NO

A. 3   Pricing Adjustments

A.3 01 Game Pricing (If set to custom, then 02 to 09 are available.   Custom Pricing Is Not Available For USA And Canadian Games).

The cost of a game is selected here from the Standard Pricing Table or by using the custom pricing editor (A.3 27).

A.3 02 to A.2 09   NOT USED

A.3 10 Coin Door Type (If set to custom, then 11 to 15, 20 and 25 are available. Custom Pricing Is Not Available For USA And Canadian Games).

This adjustment is used to preset adjustments 11 through 15, 20 and 25, based on standard coin doors.

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

These are the values for the coins for these respective coin slots. These values are used for determining collection totals. The corresponding adjustments A.3 28 (Left Slot Credit Value) through A.3 31 (4th Slot Credit Value) typically contain the same values and are used to determine the number of credits awarded for the coin slot. Whenever these values are changed, the new value is copied to the corresponding A.3 28 through A.3 31 adjustment. If a bonus is desired for a particular coin (such as 3 credits for dollar coin) then the corresponding A.3 28 through A.3 31 "Credit Value" adjustment should be modified to award the bonus. See "Bonus for Special Coin" section for more information.

A.3 16 Maximum Credits

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

A.3 17 Free Play

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

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

A.3 18 Hide Coin Audits

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

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

A.3 19 NOT USED

A.3 20 Base Coin Size

This is the smallest unit of coin that may be used when creating a custom pricing mode using the Pricing Editor (A.3 27). For example, in the USA this is typically $0.25. All pricing levels are then specified in 25 cents (or greater) increments.

A.3 21 Coin Meter Units

The adjustment determines the value of each coin unit on the coin meter. For example, to show the total amount of money collected as "total quarters", set the adjustment to "0.25". To show the total 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 the meter installed on the Coin Door Interface board. *Note: All WPC-95 games are cable ready to operate a coin meter mounted to the Coin Door Interface board. Boards without a meter can use the parts listed below to take advantage of the coin meter feature. The coin meter and spacer may be purchased from your distributor.* coin meter +6V p/n 20-9302-3; spacer p/n 20-9914

A.3 22 Dollar Bill Slot

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

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

A.3 23 Minimum Coin Milliseconds

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.3 24 NOT USED

A.3 25 Allow Hundredths

This is used for a custom door specifier. If set to "YES", then the values for A.3 12-15 are specified in units and hundredths (such as dollars and quarters). If set to "NO", then all values are in units (such as Francs and Lire.)

A.3 26 Credit Fraction

This determines the smallest fraction used for credits. It must be even to accommodate the extra ball buy-in option of 1/2 credit, and is typically 1/2 but may need to be a different value for modes requiring more coins per credit.

A.3 27 Pricing Editor (Custom Pricing Is Not Available For U.S.A. And Canadian Games).

This function is now used to enter information for a custom pricing mode. The adjustment A.3 26 (Credit Fraction) may need to be set before entering the custom pricing editor. This specifies the smallest fraction available for partial credits.

Because of availability of an extra ball (buy-in) for 1/2 credit, this value is always even (1/2, 1/4, 1/6 etc.). The typical setting for A.3 26 is 1/2 (such that there are only full credits and half credits) but you may need to used a different value for other pricing modes.

Please note that formerly, the coin values specified by custom coin doors adjustments A.3 12-15 only affected audit totals that showed collection totals. In the 10/94 pricing system, these coin values are added up for each coin received and credits are awarded based on pricing levels being reached. The pricing editor described here allows you to set these levels, however it may be necessary for you to set A.3 10 (Coin Door Type) to "CUSTOM" and then change A.3 11-15, 20 and 25 to reflect the value of the coins being used. This is usually NOT NECESSARY, but must be done BEFORE using the custom pricing editor when it is necessary.

Begin the custom pricing function by pressing the "Enter" button while A.3 27 "Pricing Editor" is showing in the display.

The pricing editor will now show the data for the currently selected pricing mode. If this is the 1st use of the pricing editor then this will show the last built-in pricing that was selected. Otherwise it will be the last custom mode created by this function. (Note that A.3 01 will display "Custom" any time a non-standard pricing has been selected.)

Assuming the last mode installed was 1/$0.50 2/$0.75 3/$1.00 the display appears as follows:

CUSTOM PRICING EDITOR		
1)	$0.25	1/2 cred.
2)	$0.50	1 cred.
3)	$0.75	2 cred.
4)	$1.00	3 cred.

DISPLAY VIEW

The "$0.25" field will be flashing. You may now use the test mode buttons to perform the following functions:

Escape: Undo any changes to the current field and move to the previous field.

"-" (Down):   Make the current field lower.

"+" (Up):   Make the current field higher.

Enter: Save any changes to the current field and move to the next field. Note that there are 2 columns of fields. Price levels are in the left column and credit levels are in the right column. Pressing "Enter" will move from left column to right column before moving to the next line.

Start: Save the current price mode or start over

By using the above functions, you simply enumerate each pricing level and the number of credits that should be awarded at that level. Please note that you must specify each fractional level in sequence.

Example: 1/$0.50   2/$1.00   4/$1.50   6/$2.00

1)	$0.25	1/2 cred.
2)	$0.50	1 cred.
3)	$0.75	1 1/2 cred.
4)	$1.00	2 cred.
5)	$1.25·	2 1/2 cred.
6)	$1.50	4 cred.
7)	$1.75	4 1/2 cred
8)	$2.00	6 cred.

Also note that once the value of the coins repeat that no further specification is necessary.

Example: 1/$0.50   2/$1.00

1) $0.25   1/2 cred.

In the above example, only one line needs to be specified, indicating that 1/2 credit is awarded for each $0.25 received.

Special Features:
There are some special features available by pressing the "-" (Down) button while in the left column. The following words will be displayed instead of a pricing level:

End
Delete
Insert
Clear
Repeat 1
Repeat 2
Repeat 3
Repeat 4
Repeat 5
Repeat 6
Repeat 7
Repeat 8
Repeat 9
Repeat 10
Repeat 11
Repeat 12
Repeat 13
Repeat 14
Repeat 15
Repeat 16
Repeat 17
Repeat 18
Repeat 19
Repeat 20

Pressing "Enter" with the above words selected will activate the following instructions:

End　　　This is the same as pressing the Start button. A menu of choices will be provided (see "Start Button" below).

Delete　　This will delete the current level from the pricing mode.

Insert　　This will insert a new pricing level ABOVE the current level. The current level will be unaffected. There must be room for at least one coin between the current level and the previous level, and at least one fractional credit unit between the current level and the previous level.

Example:　　　Inserting a new pricing level.

CUSTOM PRICING EDITOR		
1)	$0.50	1 cred.
2)	$1.00	2 cred.
3)	$1.50	4 cred.
4)	$2.00	6 cred

DISPLAY VIEW

Use the "Enter " button to move to the $1.50 field. Now press the "-" button once to create the following display:

```
┌─────────────────────────────────────┐
│        CUSTOM PRICING EDITOR         │
│ 1)        $0.50          1 cred.     │
│ 2)        $1.00          2 cred.     │
│ 3)        INSERT         4 cred.     │
│ 4)        $2.00          6 cred      │
└─────────────────────────────────────┘
            DISPLAY VIEW
```

Now press the "Enter" button. The display will now show:

```
┌─────────────────────────────────────┐
│        CUSTOM PRICING EDITOR         │
│ 1)        $0.50          1 cred.     │
│ 2)        $1.00          2 cred.     │
│ 3)        $1.25          2 1/2 cred. │
│ 4)        $1.50          4 cred      │
└─────────────────────────────────────┘
            DISPLAY VIEW
```

Note that the line "5) $2.00 6 cred." No longer fits on the display. Whenever there are more than four pricing levels that the display will scroll up and down as "Enter" and "Escape" are used to move from field to field. If you repeatedly press "Enter" the display will then show:

```
┌─────────────────────────────────────┐
│        CUSTOM PRICING EDITOR         │
│ 2)        $1.00          2 cred.     │
│ 3)        $1.25          2 1/2 cred. │
│ 4)        $1.50          4 cred.     │
│ 5)        $2.00          6 cred      │
└─────────────────────────────────────┘
            DISPLAY VIEW
```

Clear   This will clear out the current entries to allow a new price mode to be entered.

Repeat (1-20)   This will cause all entries above the current line to be repeated the number of times specified. This is only available when there are no pricing levels below the current line.

Example: 1/$0.50   2/$1.00   15/$5.00

Use the "Edit New Pricing Mode" feature described below to clear out the current levels.

Use "+" and "Enter" to specify 1/2 credit for $0.25:

```
┌─────────────────────────────────────┐
│        CUSTOM PRICING EDITOR         │
│ 1)        $0.25          1/2 cred.   │
└─────────────────────────────────────┘
            DISPLAY VIEW
```

Now, use "-" until the display shows "Repeat 20". The display will show the following:

```
┌─────────────────────────────────────┐
│        CUSTOM PRICING EDITOR         │
│ 1)        $0.50          1 cred.     │
│ 2)        REPEAT 20                  │
└─────────────────────────────────────┘
            DISPLAY VIEW
```

Press "Enter" and the display will show the following:

CUSTOM PRICING EDITOR		
1)	$0.25	1/2 cred.
2)	$0.50	1 cred.
3)	$0.75	1 1/2 cred.
4)	$1.00	2 cred

DISPLAY VIEW

Actually, by repeating the 1st line 20 times the pricing mode is currently set up as follows, but only the 1st four lines are displayed.

CUSTOM PRICING EDITOR		
1)	$0.25	1 /2 cred.
2)	$0.50	1 cred.
3)	$0.75	1 1/2 cred.
4)	$1.00	2 cred.
5)	$1.25	2 1/2 cred.
6)	$1.50	3 cred.
7)	$1.75	3 1/2 cred.
8)	$2.00	4 cred.
9)	$2.25	4 1/2 cred.
10)	$2.50	5 cred.
11)	$2.75	5 1/2 cred.
12)	$3.00	6 cred.
13)	$3.25	6 1/2 cred.
14)	$3.50	7 cred.
15)	$3.75	7 1/2 cred.
16)	$4.00	8 cred.
17)	$4.25	8 1/2 cred
18)	$4.50	9 cred.
19)	$4.75	9 1/2 cred.
20)	$5.00	10 cred

DISPLAY VIEW

Now repeatedly press "Enter" to move the right hand column to the 20th level. The display will show (with "10 cred." Blinking):

CUSTOM PRICING EDITOR		
17)	$4.25	8 1/2 cred.
18)	$4.50	9 cred.
19)	$4.75	9 1/2 cred.
20)	$5.00	10 cred

DISPLAY VIEW

Now press "+" repeatedly until the right hand column of line 20 reads "15 cred."

Start Button: Once the pricing mode has be specified, you exit the custom pricing editor by pressing the 'Start" button. This will bring up a menu with some or all of the following choices:
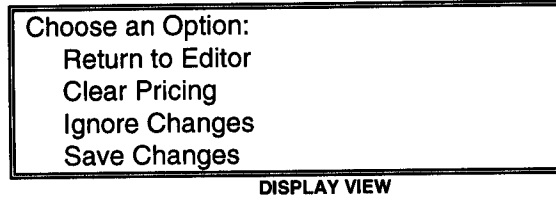
```
Choose an Option:
   Return to Editor
   Clear Pricing
   Ignore Changes
   Save Changes
```
DISPLAY VIEW

Use the "+" and "-" button to select your choice and press the "Enter" button to activate. The selections cause the following actions:

Return To Editor: This option will allow you to continue to edit the pricing information.

Clear Pricing: This option will clear out all pricing levels and bring you back to the pricing editor to create a pricing mode from scratch.

Ignore Changes: This option will discard the work done in the previous pricing editor and leave the previously installed pricing mode in the game.

Save Changes: Press "Enter" to save your custom edited pricing mode and install it as the pricing for the game. Note that this choice will not be displayed if there is not at least one pricing level specified in the pricing editor, or if no changes have been made.

Exit Pricing Editor: This option will appear if no changes have been made. It will exit the Pricing Editor leaving the pricing as is.

Bonus for Special Coins

For most coin modes, the system allows the mixing of any combination of any size coin and awards credits as each appropriate amount is accumulated. With A.3 10 (Coin Door Type) set to "custom", the value of each coin slot may be entered for adjustments A.3 12 (Left slot value) through A.3 15 (4th slot value). Whenever these values are changed, the new values are copied to A.3 28 (Left Slot Credit Value) through A.3 31 (4th Slot Credit Value) respectively. To give a bonus for a particular coin, you need to modify the "Credit Value" adjustment to specify the value to be given for the bonus coin.

For example, in a game with a Left Coin Slot that takes quarters and a center coin slot that takes dollars, if you wish to charge 50 cents for 1 play and $1.00 for 2 plays, you setup the pricing editor to show:

```
         CUSTOM PRICING EDITOR
1)         $0.25          1/2 cred.
2)         $0.50          1 cred.
3)         $0.75          1-1/2 cred.
4)         $1.00          2 cred
```
DISPLAY VIEW

1-38

If you set A.3 10 (Coin Door Type) to "custom" you will see the following coin door specifier adjustments:

A.3 12	Left Slot Value	0.25
A.3 13	Center Slot Value	1.00
A.3 28	Left Slot Credit Value	0.25
A.3 29	Center Slot Credit Value	1.00

To change the pricing to 1 play for $0.50, 2 plays for $1.00 and 3 plays for a dollar coin, you change A.3 29 (Center Slot Credit Value) to 1.50. This will result in the following settings:

A.3 12	Left Slot Value	0.25
A.3 13	Center Slot Value	1.00
A.3 28	Left Slot Credit Value	0.25
A.3 29	Center Slot Credit Value	1.50

This will cause $1.50 worth of credits (3) to be awarded for each coin inserted in the center coin slot (dollar coin). This is due to the $1.50 setting of A.3 29 (Center Slot CREDIT VALUE). Note that the 1.00 setting of A.3 13 tells the game that each coin in the center slot adds $1.00 to the total collection.

A.3 28 Left Slot Credit Value
A.3 29 Center Slot Credit Value
A.3 30 Right Slot Credit Value
A.3 31 4th Slot Credit Value
This adjustment specifies the value to be used for awarding credits. It is typically the same value as the corresponding A.3 12 (Left Slot Value) through A.3 15 (4th Slot Value) adjustment.

The A.3 12 through A.3 15 values are used to determine the auditing value of each coin (for collection totals) while the A.3 28 through A.3 31 value determine the coin value for awarding credits. By making this "Credit Value" adjustment higher than the A.3 12 through A.3 15 "Value" adjustment, a bonus may be given for a specific call (see "Bonus for Special Coin" section for more information).

Pricing Table

Country	Left	Center	Right	4th Chute	Games/Coins	Display	Pricing Adjustments A3 02 03 04 05 06 07 08 09
USA	25¢	$1.00*	25¢	$1.00	1/50¢, 2/75¢, 3/$1 [2]	50¢, 75¢, $1.00	
	25¢	$1.00*	25¢	$1.00	1/75¢, 2/$1.50, 3/$2.00 [2]	1/.75, 3/2.00	
	25¢	$1.00	25¢	$1.00	1/3X25¢ [2]	USA 1/$0.75	
	25¢	$1.00	25¢	$1.00	1/50¢, 2/$1 [2]	USA 2/$1.00	
	25¢	$1.00	25¢	$1.00	1/50¢, 3/$1.00 [2]	USA 3/$1.00	
	25¢	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 3/$1.50, 6/$2.00 [2]	USA 6/$2.00	
	25¢	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 3/$1.50, 5/$2.00 [1,2]	USA 5/$2.00	
	25¢	$1.00	25¢	$1.00	1/3x25¢, 2/$1.50, 4/$2.00 [2]	1/.75, 4/$2.00	
	25¢	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 4/$1.50, 6/$2.00 [2]	6/$2.00 4/$1.50	
	25¢	25¢	25¢	-	1/4x25¢, 6/$5.00 [2]	1/1, 6/5	
	25¢	25¢	25¢	-	1/4x25¢ [2]	1/$1.00	
Canada	25¢	-	$1.00	-	1/50¢, 2/75¢, 3/$1 [2]	CAN. 50-75-1	
	25¢	-	$1.00	-	1/50¢, 2/$1 [2]	CAN. 2/$1.00	
	25¢	-	$1.00	-	1/50¢, 3/$1.00 [2]	CAN. 3/$1.00	
	25¢	-	$1.00	-	1/2x25¢, 2/4x25¢, 3/$1.00	3/$1.00 Coin	
	25¢	-	$1.00	-	1/2x25¢, 2/$1.00, 3/$1.50, 6/$2.00 [2]	CAN. 6/$2.00	
	25¢	-	$1.00	-	1/2x25¢, 2/$1.00, 3/$1.50, 5/$2.00 [1,2]	CAN. 5/$2.00	
	25¢	-	$1.00	-	1/2x25¢, 2/$1.00, 4/$1.50, 6/$2.00 [2]	6/$2, 4/1.50	
	25¢	-	$1.00	-	1/3x25¢, 2/$1.50, 4/$2.00 [2]	1/.75, 4/2.00	
	25¢	-	$1.00	-	1/75¢, 2/$1.50, 3/$2.00 [2]	1/.75, 3/2.00	
	25¢	-	$1.00	-	1/3X25¢ [2]	CAN. 1/$0.75	
Canada 3/Dollar Coin	25¢	-	$1.00	-	1/0.50, 2/$1.00, 3/$1.00-Coin	CAN.$ BONUS	
Austria	5sch	10sch	10sch	-	1/2x5sch, 3/2x10sch [2]	AUSTRIA	
	5sch	-	10sch	-	12/5sch, 5/10sch	CUSTOM	02 00 05 00 01 00 01 00
Australia	20¢	$1	$1	$2	1/$1, 3/$2 [2]	AUSTRALIA 1	
	20¢	$1	$1	$2	1/$1, 2/$2	AUSTRALIA 2	
U.K.	£1.00	50P	20P	10P	1/3x10P, 2/50P, 4/£1 [2]	U. KINGDOM	
Switzerland	1Fr	2Fr	5Fr	-	1/1Fr, 3/2Fr, 7/5Fr [2]	SWISS 1	
	1Fr	2Fr	5Fr	-	1/2Fr, 2/3Fr, 3/4Fr, 5/5F	SWISS 2	
Swiss 2	1Fr	2Fr	5Fr	-	1/1Fr, 5/5Fr	SWISS 3	
Swiss 3	1Fr	2Fr	5Fr	-	1/1Fr, 2/2Fr, 6/5Fr	SWISS 4	
Swiss 4	1Fr	1Fr	1Fr	-	1/1Fr (all slots = 1Fr) [1]	SWISS 5	
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr, 3/50Fr	BELGIUM	
Belgium 2	5Fr	20Fr	50Fr	-	1/20Fr, 3/60Fr, 3/50Fr-Coin	BELG. BONUS	
Germany	1DM	2DM	5DM	-	1/2DM, 2/3DM, 3/4DM, 4/5DM [1,2]	GER. 4/5DM	
					1/2DM, 2/3DM, 3/4DM, 5/5DM [2]	GER. 1/2DM	
					1/1DM, 2/2DM, 5/5DM [2]	GER. 1/1DM	
					1/1DM, 2/2DM, 6/5DM [2]	GER. 6/5DM	
Holland	1G	-	1G	-	1/1G	HOLLAND	
Sweden	1Kr	5Kr	10Kr	1Kr	1/10Kr, 2/15Kr, 3/20Kr [1,2]	SWEDEN 1	
	1Kr	5Kr	10Kr	1Kr	1/5Kr [2]	SWEDEN 2	
France	1Fr	5Fr	10Fr	20Fr	1/3x1Fr, 2/5Fr, 5/10Fr, 10/20Fr [2,3]	TARIFF 1	
	1Fr	5Fr	10Fr	20Fr	1/2x1Fr, 3/5Fr, 7/10Fr, 14/20Fr [2,3]	TARIFF 2	
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr, 7/2x10Fr, 7/20Fr [1,2,3]	TARIFF 3	
	1Fr	5Fr	10Fr	20Fr	2/5Fr, 4/10Fr, 9/2x10Fr, 9/20Fr [2,3]	TARIFF 4	
	1Fr	5Fr	10Fr	20Fr	2/5Fr, 5/10Fr, 11/2x10Fr, 11/20Fr [2,3]	TARIFF 5	
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr, 6/20Fr [2,3]	TARIFF 6	
Italy	500L	500L	500L	-	1/500L [2]	ITALY 1	
	500L	500L	500L	-	1/2x500L, 3/4x500L [1,2]	ITALY 2	
	500L	500L	500L	-	1/2x500L, 2/4x500L [2]	ITALY 3	
Spain	100P	-	500P	-	1/100P, 6/500P [2]	SPAIN	
	25P	-	100P	-	1/25P, 5/100P	CUSTOM	01 00 04 00 01 04 01 00
	25P	-	100P	-	1/25P, 4/100P	CUSTOM	01 00 04 00 01 00 01 00
	25P	-	100P	-	1/2x25P, 2/100P	CUSTOM	01 00 04 00 02 00 01 00
	25P	-	100P	-	1/2x25P, 3/100P	CUSTOM	03 00 12 00 04 00 01 06
Japan	100¥	-	100¥	-	1/100¥ [2]	JAPAN	
Chile	Token	-	Token	-	1/1Token	CHILE	
Denmark	1Kr	5Kr	10Kr	20Kr	1/2x1 Kr, 3/5 Kr, 7/10 Kr [2]	DENMARK 1	
	1Kr	5Kr	10Kr	20Kr	1/5 Kr, 3/10 Kr, 6/20 Kr [1,2]	DENMARK 2	
Finland	1Mka	-	5Mka	-	1/2x1Mka, 3/5Mka [2]	FINLAND 1	
	1Mka	-	5Mka	-	1/3x1Mka, 2/5Mka [2]	FINLAND 2	
New Zealand	$1.00	-	$2.00	-	1/$1, 3/$2 [2]	NEW ZEALAND 1	
	$2.00	-	$1.00	-	1/$1, 3/$2, ($2-$1 door)	NEW ZEALAND 2	
Norway	5Kr	-	10Kr	-	1/5Kr, 2/10Kr, 5/20Kr [2]	NORWAY	
Argentina	10¢	10¢	10¢	-	1/1 Token [2]	ARGENTINA	
Greece	10D	20D	50D	-	1/2x10D, 1/20D, 3/50D	GREECE	
Antilles	25¢	25¢	1G	-	1/25¢, 4/1G	ANTILLES	
Netherlands	1HFl	2.5HFl	2.5HFl	-	1/1Hfl, 3/2.5Hfl	NETHERLANDS	
Netherlands 2	1HFl	2.5HFl	2.5HFl	-	1/1HFl, 3/3HFl, 3/2.5HFl-Coin	NETH. BONUS	
Hungary	20 Old	20 New	50F	-	1/40F, 2/60F, 4/100F	HUNGARY	

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

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

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

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

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

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

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

A.4 04 Champion Credits
The number of credits or tickets awarded for a Grand Champion Score.

Range: 00 to 10.

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

Range: 00 to 10.

A.4 09 High Score Reset Every
The number of games to be played before an automatic reset of the displayed "Highest Score" occurs. The values provided upon reset are those selected by the operator in the Back-up High Scores.

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

A.4 10 Backup Champion
The Back-up Grand Champion Score.

Range: 00 to 999,000,000.

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

Range: 00 - 999,000,000.

A.5   Printer Adjustments (optional board required)

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

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

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

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

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

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

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

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

A.5 07 Auto Printout
With the optional printer board installed, this adjustment allows the initiation of printouts whenever the game detects a printer connected to the game. Parallel printers are detected automatically by plugging them in and putting then on-line. Serial printers (or computers) are detected by sending a carriage return (ASCII 0x0D) or XON (ASCII 0x11).

This adjustment has the following settings:

OFF	Disable automatic printouts
MAIN AUDITS	Main Audit Table (B.1)
EARNINGS	Earning Audits (B.2)
STD. AUDITS	Standard Audits (B.3)
FEATURES	Feature Audits (B.4)
HISTOGRAMS	Histograms (B.5)
TIMESTAMPS	Time Stamps (B.6)
ALL DATA	All of the above data

The table specified above will automatically be printed when a printer (or computer) is detected.

If the printer is detected during game over or test mode, the printout will be taken right away.

If the printer is connected while a game is being played, it will take up to 10 seconds to be detected, after which the printout will occur. The game will resume after the printout is complete.

Automatic printouts will only take place if the coin door is open.

After an automatic printout has been generated, a 2nd automatic printout will not be possible until a new game has started, or test mode begins.

ERROR MESSAGES

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

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

LOCK MAGNET IS BROKEN

The Ball Lock magnet is not grabbing balls correctly. Check the Ball Lock Magnet (Coil #6) as well as the Inner Loop Left switch (#44) and the Inner Loop Right (#45) switches. Also check for blown fuses.

DIVERTER IS BROKEN

The playfield diverter (located in the upper left of the playfield) is not working properly. Check the Left Diverter High Power coil (coil #34) and the Left Diverter Low Power coil (coil #35) for proper operation. Check the Left Loop switch (#43). Also check for blown fuses.

RAMP DIVERTER IS BROKEN

The diverter on the ramp is not functioning properly. Check the Ramp Diverter coil (coil #21) as well as the Ramp Enter switch (#15) for proper adjustment. Also check for blown fuses.

RAMP DIVERTER IS DISABLED

The diverter on the ramp was disabled by the operator. Set adjustment A2.19 to NO to reset the ramp diverter.

VANISH MECH IS BROKEN

The Vanishing Ball Mechanism is not functioning properly. Check the Genie Target switch (switch #42) for proper adjustment. Check the Vanish Tunnel switch (switch #12) and the Bazaar Eject (switch #25). Check the Vanish Drop coil (#3) and the Vanish Magnet coil (#35). Also check for blown fuses. Use Test T.16 (Genie Test) to test the operation of this mechanism.

VANISH MECH IS DISABLED

The Vanishing Ball Mechanism was disabled by the operator. Set adjustment A2.20 to NO to reset the Vanishing Ball Mechanism.

RAMP MAGNET IS BROKEN

The Fireball Magnet (located on the ramp) is not working properly. Check the Ramp Magnet coil (coil #8) for proper operation. Also check the Ramp Made Left switch (#41) and Left Wire Make switch (#28). Also check for blown fuses.

RAMP MAGNET IS DISABLED

The Fireball Magnet (located on the ramp) was disabled by the operator. Set adjustment A2.21 to NO to reset the Vanishing Ball Mechanism.

CHECK SWITCH ##.

This message indicates that at least one switch was stuck 'On' at game turn-on or has NOT been actuated during ball play (for 90 balls or apx. 30 games). The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep your game earning, until the service technician can repair the problem. To verify the problem, refer to the Test Menu text describing Switch Testing, and check each reported switch using applicable switch tests. Always check switch operation using a ball, to simulate game conditions. Switch

problems may often be resolved by adjusting the wire switch actuators, fixing switch circuitry problems, securing loose connectors, etc. Mechanisms using 'opto switches' (drop targets, etc.) need to be checked for proper power connections (+12V dc and ground).

CHECK FUSES F115 AND F116 AND OPTO 12V SUPPLY

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

The problem is likely to be a blown fuse (F109), or at connectors J138, J139, J140 or J141 on the power driver board.

OPTO TROUGH BAD CHECK CONNECTORS, WIRES AND 12V SUPPLY.

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

PINBALL MISSING.

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

XXXX 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.

G10 ERROR

The security chip is incorrect or faulty. If this occurs, replace the security chip.

G11 CHECKSUM ERROR.

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

TIME AND DATE NOT SET.

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

FACTORY SETTINGS RESTORED.

This message indicates that the CMOS RAM (U8) no longer retains any custom Pricing or Game Adjustment settings and has reverted to factory default settings. Generally, the following CPU checks will isolate the cause of the CMOS RAM memory failure. The voltages at pin 28 and pin 26 of U8 should be +5V (game turned On) and at least +4V (game turned Off). When the voltage drops below +4V, memory reset occurs. Check the batteries and battery holder. Be sure that the batteries are

good and that there is no contamination on the battery holder terminals. Turn the game OFF, and use an ohmmeter to check diodes D1 and D2 on the CPU Board. D1 should read 0 ohms when forward-biased and infinite ohms when reverse-biased. D2 should read 15 ohms when forward-biased and infinite ohms when reverse-biased. (Readings taken with an analog meter.)This message can also indicate that there is an open diode on a 50V coil circuit and noise is entering the circuit.

CPU AND AUDIO VISUAL BOARD ERROR CODES

The CPU has three LED's, 201, 202, and 203. At game turn-on, LED 201 and LED 202 are on, LED 203 is off. During normal operation LED 201 is off, LED 202 is on, and LED 203 is flashing. If the system detects and error the following happens:

CPU BOARD	Center LED blinks once	= G11 ROM Failure
LED ERROR CODES	Center LED blinks twice	= U8 RAM Failure
	Center LED blinks three times	= G10 Security Chip Failure

Upon game turn-on you will hear one of the following.

AUDIO VISUAL BOARD	1 Beep	= Audio Visual Board is O.K.
BEEP ERROR CODES	2 Beeps	= S2 Failure
	3 Beeps	= S3 Failure
	4 Beeps	= S4 Failure
	5 Beeps	= S5 Failure
	6 Beeps	= S6 Failure
	7 Beeps	= S7 Failure
	10 Beeps	= Audio Static RAM Failure

OPTO THEORY

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

LED Board
Transmitter
1.0-1.1 Volts

Photo Transistor Board
Receiver
0.1-0.7V Unblocked
11-13V Blocked

Green   WHT   BLK   Blue

Infrared Ray

Gray-XXX   Black   Gray-Yellow   Orange-XXX
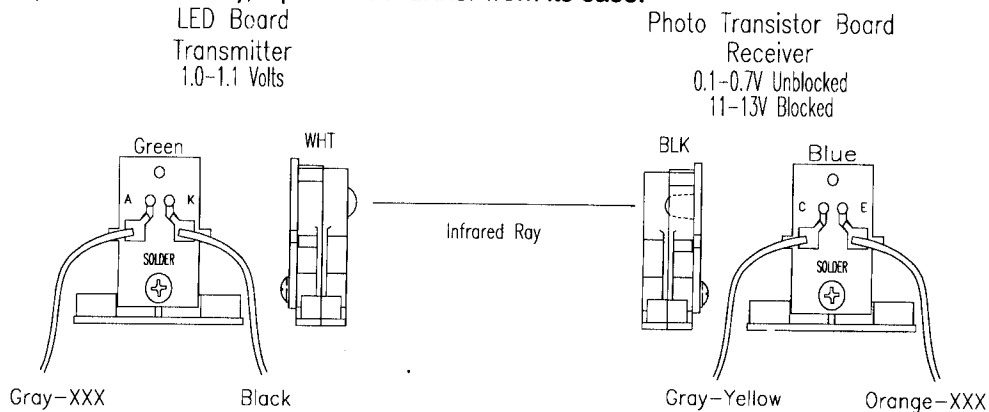
LED LIST
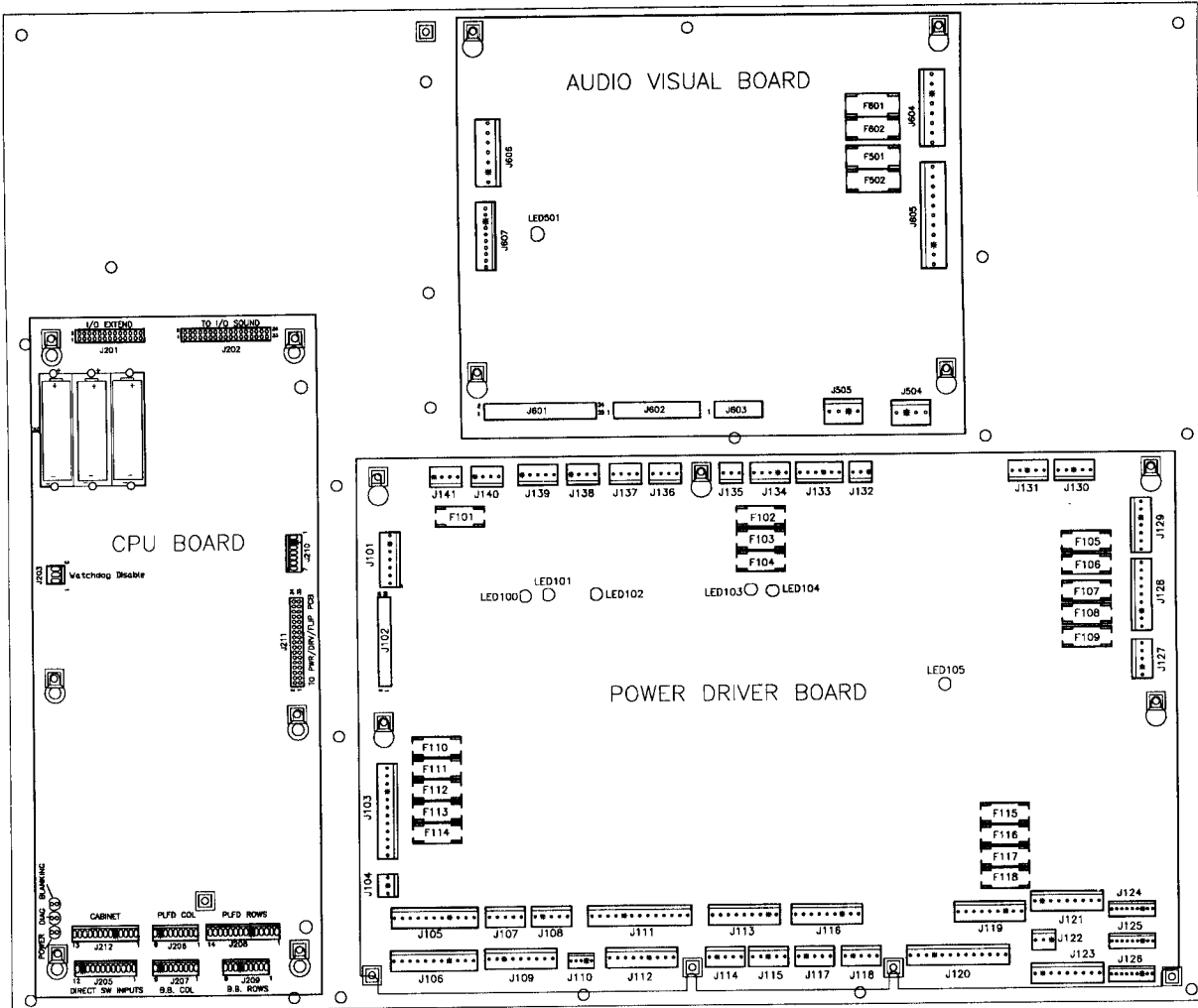
CPU BOARD
LED 201   Blanking
LED 202   Power
LED 203   Diagnostics

At game turn-on, LED 201 and LED 202 are on, LED 203 is off. During normal operation LED 201 is off, LED 202 is on, and LED 203 is flashing.

AUDIO VISUAL BOARD
LED 501   +5VDC, Normally flashing, but at a slower rate than LED 203.

POWER DRIVER BOARD
LED 100   +12VDC Regulated, Normally On
LED 101   +5VDC Digital, Normally On
LED 102   +18VDC Lamps, Normally On
LED 103   +12VDC Unregulated, Normally On
LED 104   +20VDC Flashlamps, Normally On
LED 105   +50VDC Coils, Normally On

FUSE LIST
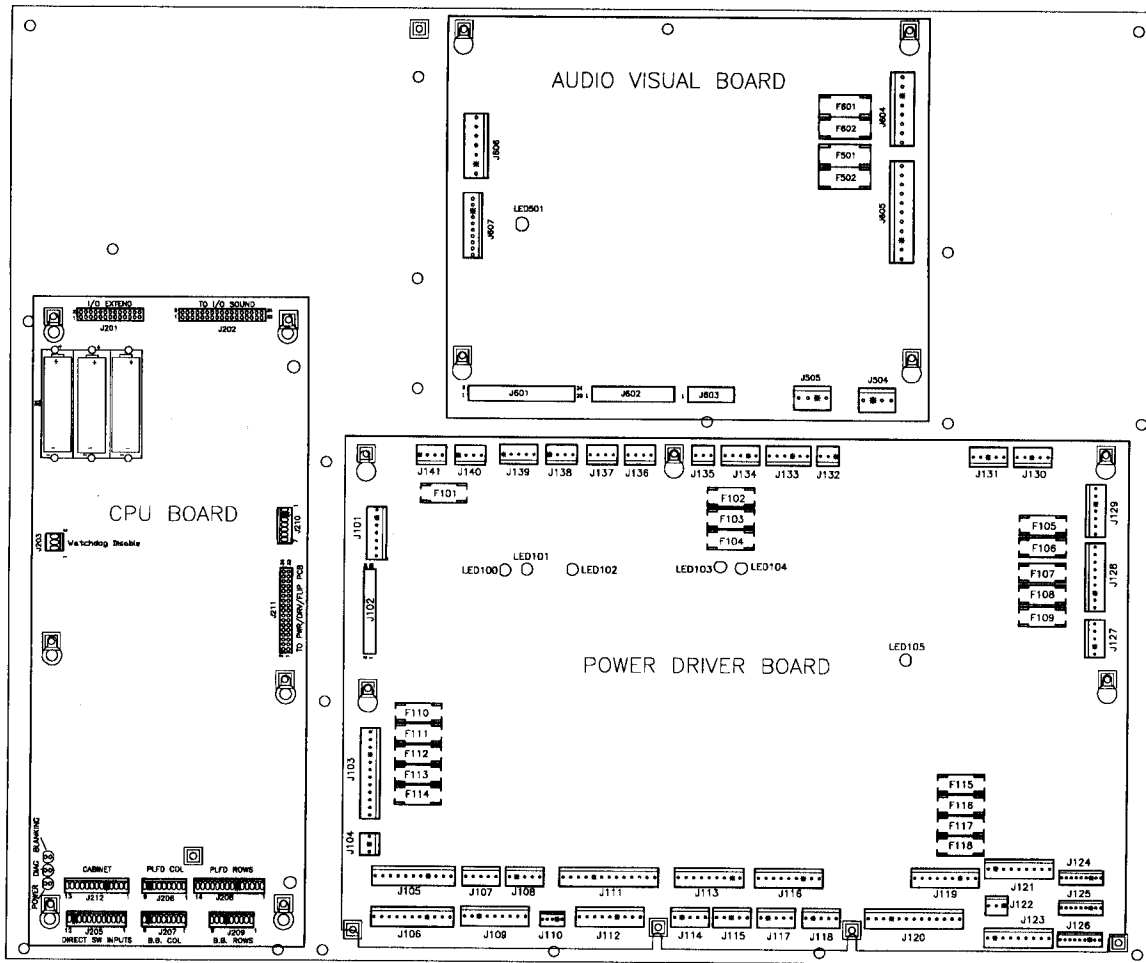
AUDIO VIDEO BOARD

Loc.	Description	Part Number	Value
F501	-25V	5731-14532-00	T2.5A, 250V
F502	+25V	5731-14532-00	T2.5A, 250V
F601	+62V	5731-14533-00	T0.25A, 250V
F602	-113V & -125V	5731-14533-00	T0.25A, 250V

CPU BOARD
There are no fuses on the CPU board.

POWER DRIVER BOARD

Loc.	Description	Part Number	Value	Loc.	Description	Part Number	Value
F101	Regulated 12V	5731-14531-00	T0.63A, 250v	F110	G.I. #5 WHT-VIO	5731-14530-00	T4.0A, 250V
F102	Solenoid. #25 to #28	5731-14530-00	T4.0A, 250V	F111	G.I. #4 WHT-GRN	5731-14530-00	T4.0A, 250V
F103	Solenoid #1-#8	5731-14530-00	T4.0A, 250V	F112	G.I. #3 WHT-YEL	5731-14530-00	T4.0A, 250V
F104	Solenoid #9 to #16	5731-14530-00	T4.0A, 250V	F113	G.I. #2 WHT-ORG	5731-14530-00	T4.0A, 250V
F105	+5V Logic	5731-14530-00	T4.0A, 250V	F114	G.I. #1 WHT-BRN	5731-14530-00	T4.0A, 250V
F106	+18V Lamp Matrix	5731-14046-00	T5.0A, 250V	F115	+50V Flippers	5731-14530-00	T4.0A, 250V
F107	Flasher Secondary	5731-14530-00	T4.0A, 250V	F116	+50V Flippers	5731-14530-00	T4.0A, 250V
F108	Solenoid Secondary	5731-14529-00	T6.3A, 250	F117	+50V Flippers	5731-14530-00	T4.0A, 250V
F109	Unregulated 12V	5731-14530-00	T4.0A, 250V	F118	+50V Flippers	5731-14530-00	T4.0A, 250V

LINE FILTER

Loc.	Part Number	Value
Foreign	5731-14530-00	T4.0A, 250V
Domestic	5731-14046-00	T5.0A, 250V

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 EI165, is a recommended lubricant.

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

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

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

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

TALES OF THE
ARABIAN NIGHTS

UNIT DISASSEMBLY FOR REPAIR

MAJOR COMPONENT SERVICE INSTRUCTIONS

.

"SHOOTING STAR" SPIKE ASSEMBLY

The Spike's can save a ball from exiting play. A ball rolling over the spikes will be detected by an opto pair. When a ball is detected, the coil will drive the Spike finger assembly up and capture the ball in play. The Spikes will automatically lower and give the ball back to the player.

Upper Opto Arm

Lower Opto

Lift Coil

Ball Saved

Spike Cage
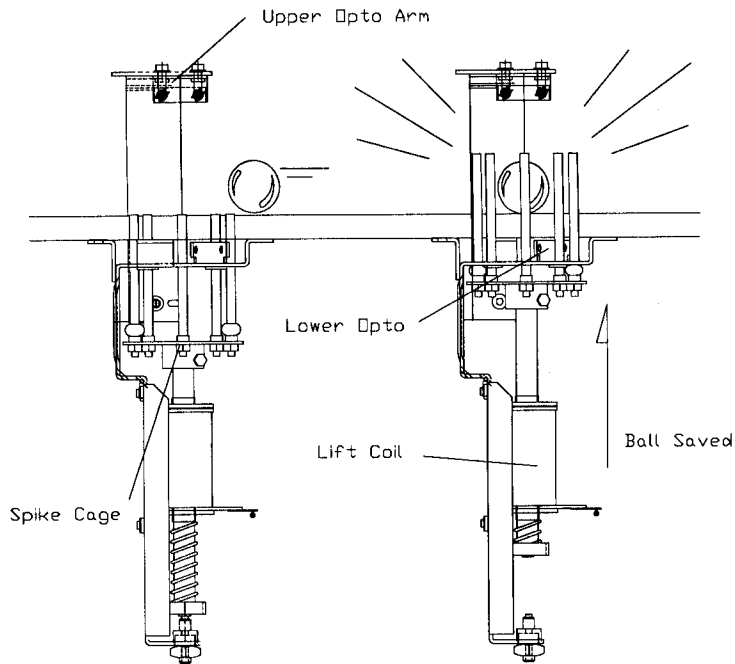
REMOVE THE SPIKE ASSEMBLIES

To remove the Spike Assembly first disconnect the upper opto cable (1) under the playfield, then remove the #8 machine screw (2) that holds the upper arm in place. Then gently lift the arm (3) and remove it from the playfield. Remaining screws (4) that hold the main Spike assembly, can be taken out to lower the Spike Assembly.

(3) Remove Upper Arm Assy

(1) Disconnect cable

(2) Remove #8 Screw

Playfield Screws

(4) Remove screws and lower

Side View
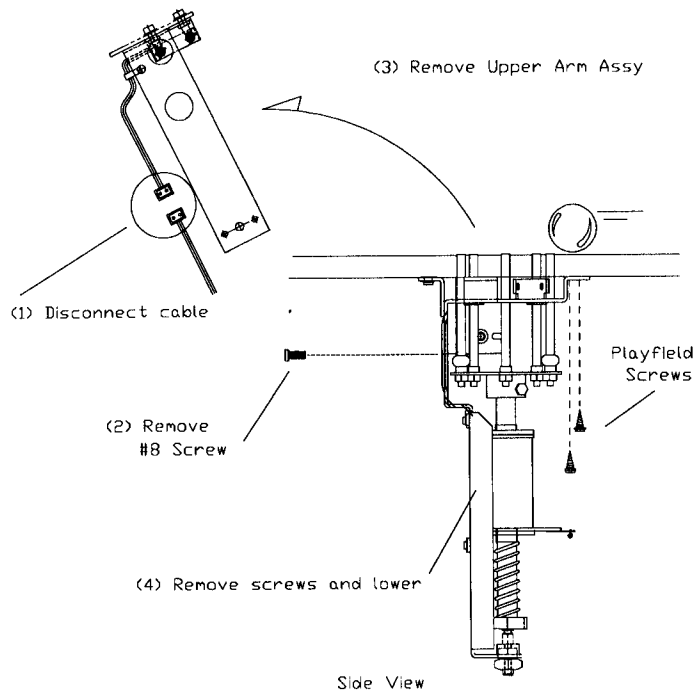
GENIE TARGET ASSEMBLY

The Genie Target consists of a hinged metal bracket which holds switches and a flasher. A molded Genie is attached to this assembly by #8 screws (2). A ball in play will strike the Genie causing the switches to close and score. The whole assembly can be easily dismantled for adjustment or flasher replacement.
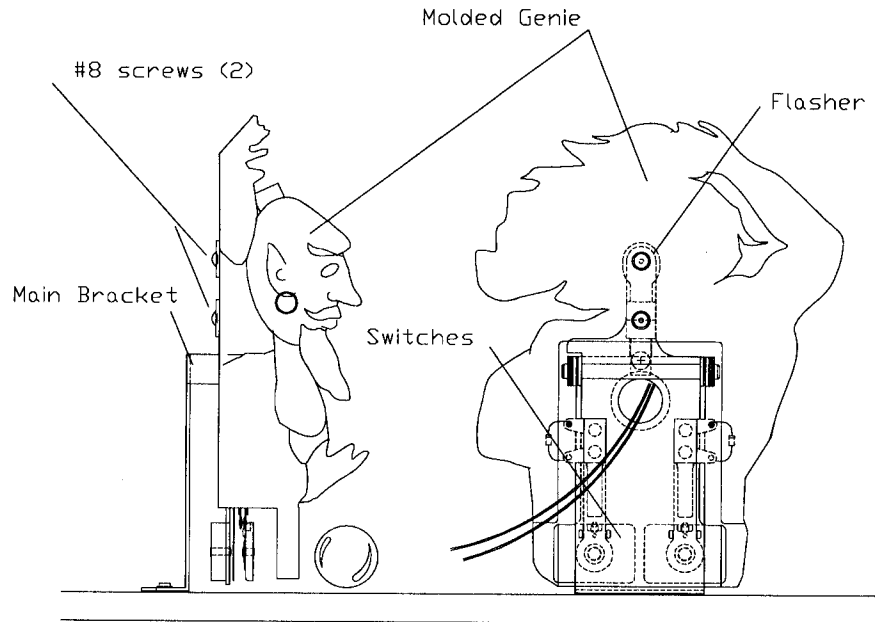
REMOVE THE MOLDED GENIE

To remove the Molded Genie, slide the playfield out of the cabinet and remove the #8 screws (2) on the back of the Genie. Then gently lift up the Genie and remove it from the metal base. The switches and flasher can now be serviced.
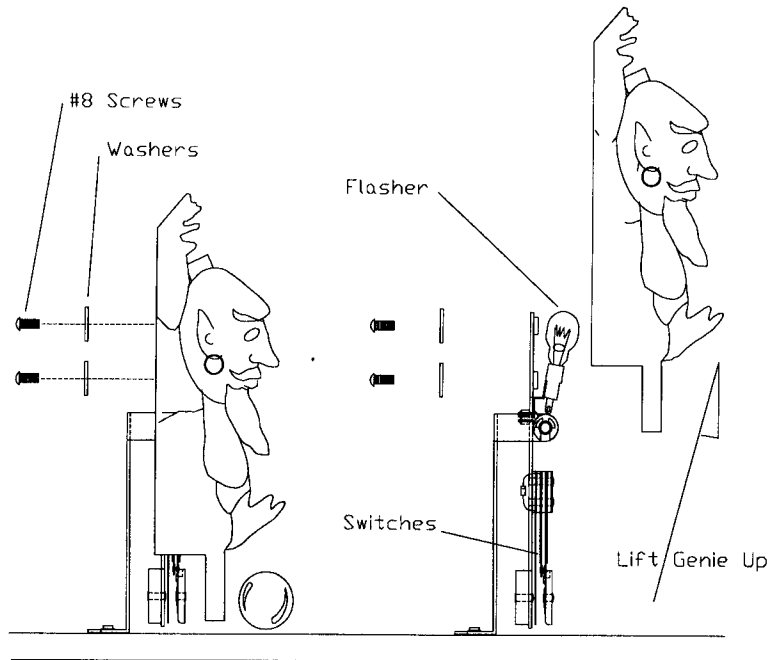
Side View

SPINNING "ALADDINS LAMP" ASSEMBLY

The Spinning Lamp Assembly is mounted from under the playfield. Balls in play can hit the rubber bumpers, making the lamp spin and score points when the lamp switches are closed. The whole unit is easily cleaned and serviceable. The platter should be flush with the playfield for smooth action and height adjustment is achieved by loosening the collar (1) and rotating the main threaded shaft piece (2) up or down. Then re-tighten the collar with needle nose grips.

Molded Lamp

metal support plate

Amber Platter Assy.

Rubber bumpers

G.I. Lamp Assy.

Adjustment Collar (1)
(Must Be Tight.)

Main shaft
(2)

Switch Actuator

Switch Assembly
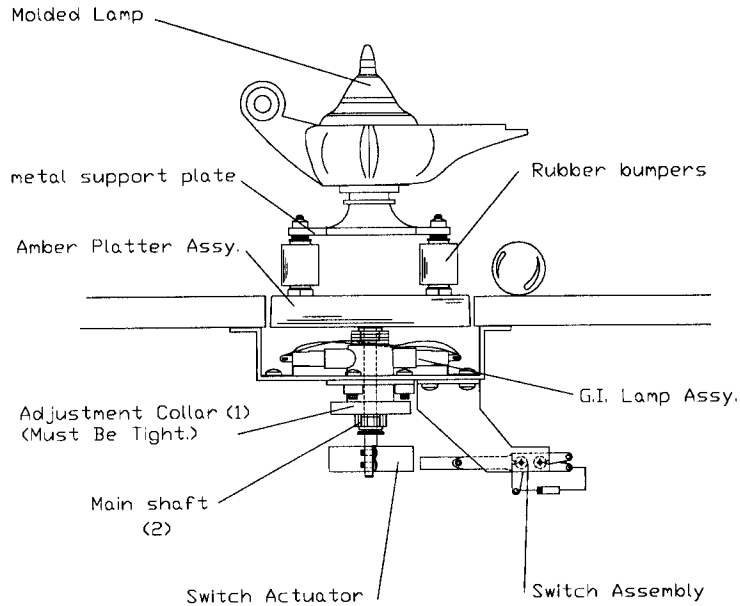
Side View

REMOVE THE SPINNING LAMP ASSEMBLY

1) To remove the Lamp, loosen the nuts (2) that hold the molded lamp and support bracket onto the support posts. Gently lift the lamp and bracket off the platter assembly.

(2) Nuts

Support Bracket

Support posts

1-52
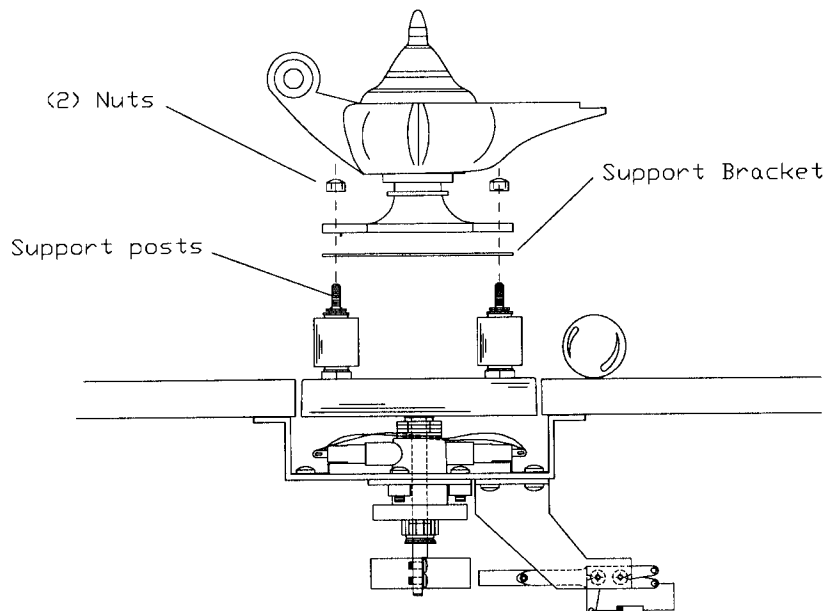
2) Once the upper lamp assembly (4) has been removed, the whole lower mechanism can be quickly released from the playfield by loosening the wood screws that hold the main bracket in place. Once off, the entire assembly can be serviced.

Upper Lamp Assy. (4)

Support Bracket

Support Bracket

Playfield Screws

Playfield Screws

Lower Main Assembly
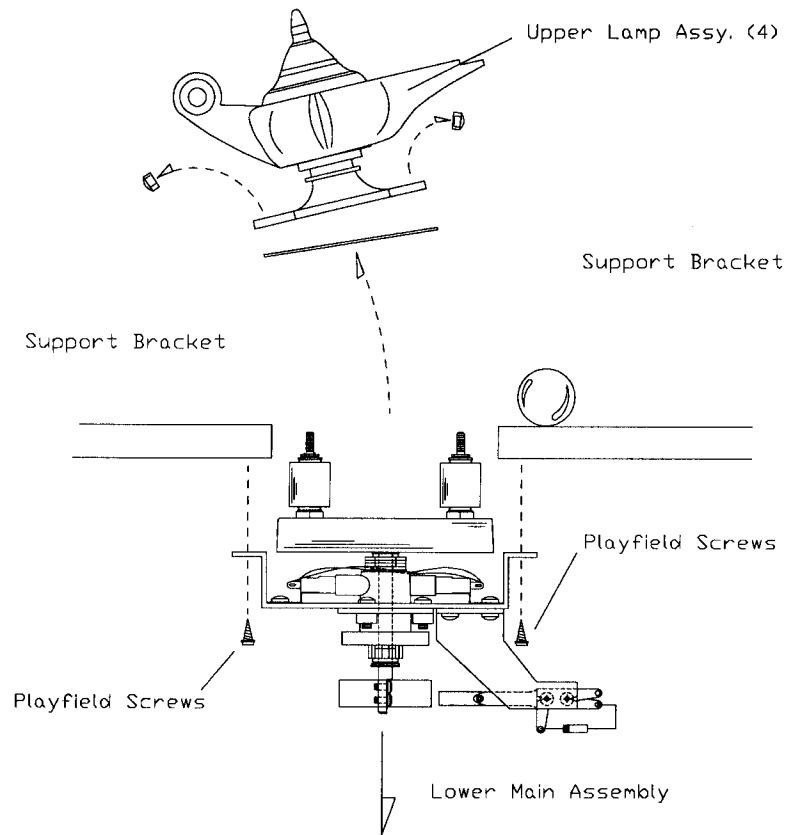
NOTES

NOTES

NOTES

SECTION TWO

PARTS INFORMATION

50047-BB
Backbox Assembly

Ribbon Cables

Item	Part Number	Description
1	01-6645	Venting Screen
2	B-10686-1	Knocker Assembly
3	A-14092-7	WPC '95 Mounting Plate Assy.
4	A-20028	WPC '95 Power Driver PCB
5	A-20516-50047	WPC '95 Audio Visual PCB
6	A-20119-50047	WPC '95 CPU PCB
7	04-10450-50047	Backbox, Wood
8	A-20866	Speaker/Display Assembly
a)	5555-12924-00	Speaker Tweeter, 15w, 4Ω
b)	5555-12856-00	Speaker, 5-1/4", 25w, 4Ω
c)	5045-12914-00	Capacitor, 10µfd., 50v (±20%)
d)	5901-12784-00	Dot Matrix Display/Driver Board
9	A-13379	Lock & Plate Assembly

Ribbon Cables

Item	Part Number	Designator
10	5795-12653-03	Ribbon Cable, 34-pin, 3"
11	5795-12653-12	Ribbon Cable, 34-pin, 12"
12	5795-13434-25	Ribbon Cable, 14-pin w/Ferrite
13	5795-10938-15	Ribbon Cable, 26-pin, 15"

Miscellaneous Parts

	08-7456	Backbox Glass: 27 x 18-7/8"
	20-9718	Wing Screw, 3/8-16 x 2"
	31-1357-50047	Screened Translight

Backbox Cables

	H-20479	Dot Matrix Display Power Cable
	H-20477	Logic Power Cable
	H-20478	Secondary Cable
	H-20858.1	Insert Cable

50047-CAB
Cabinet Assembly
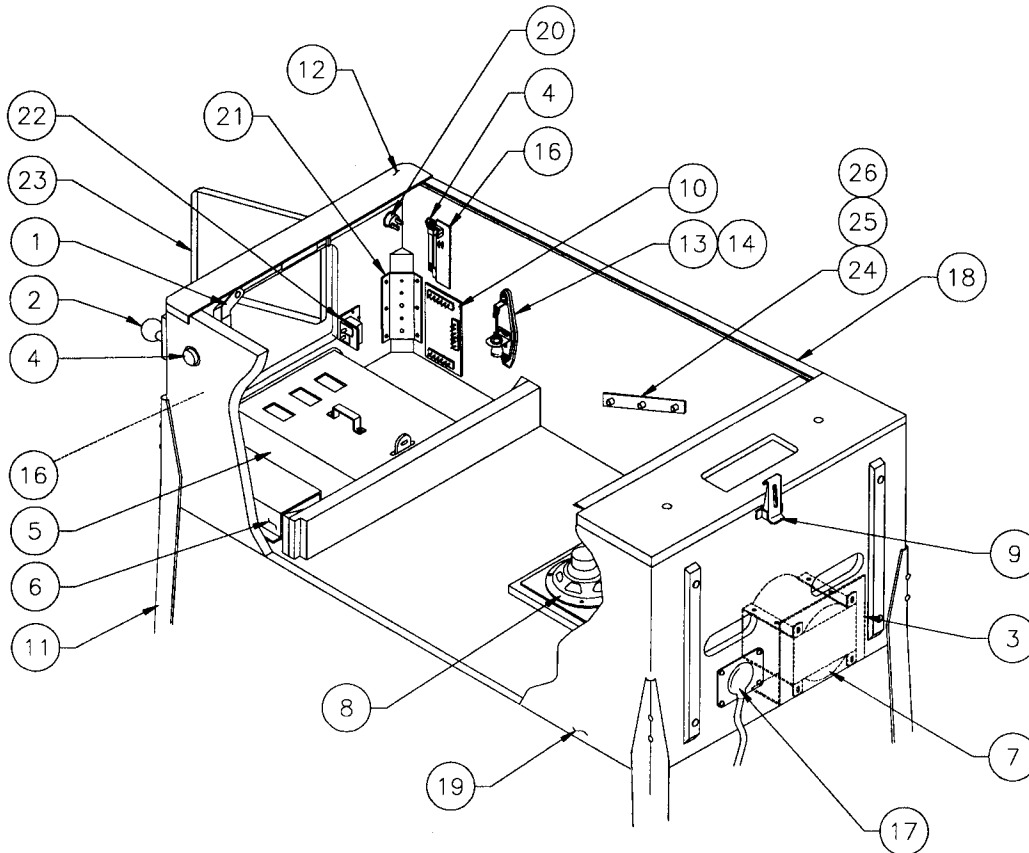
Miscellaneous Parts (Not Shown)

Item	Part Number	Description
1	A-16773-1	Lever Guide Assembly
2	A-17730-3	Ball Shooter w/Silver Knob Assy.
3	01-13936	Drip Plate - Narrow
4	A-16883-4	Flipper Button w/Spring, Red (2)
5	A-20729-5	4-Ball Cashbox Assembly
6	A-17540-1	Univ. Power Interface Assy.
7	5610-14515-00	WPC Transformer
8	5555-12929-00	Speaker, 4Ω, 6", 25w
9	20-9347	Toggle Latch
10	A-20580	Coin Door Interface Board
11	A-19514	Leg Assembly, Chrome (4)
12	D-12615	Front Molding Assembly
13	20-6502-A	Plumb Bob
14	04-10346	Tilt Mechanism Assembly
15	*	Cordset
16	A-17316	Opto Flipper Assembly (2)
17	01-10714	Line Cord Cover
18	A-12359-3	Side Molding Assembly (2)
19	11-1314	Wood Cabinet
20	20-9663-1	Push Button w/Sw., *Start* (Clear)
21	01-11400	Leg Plate (4)
22	A-18249-1	Cable & Interlock Switch Assy.
23	09-61000-1	Coin Door-U.S.A.
24	01-11408	Plate Spacer (2)
25	02-4329-2	Pivot Nut, 11/16" (4)
26	02-4352	Pivot Bushing (2)

Miscellaneous Parts (Not Shown)

Part Number	Description
A-17195	Tilt Switch Assy. w/Cable
A-19562.1	Stay Arm Assembly
01-12352	Clip Bracket
01-9011.1-L	Backbox Mtg. Bracket, Left
01-9011.1-R	Backbox Mtg. Bracket, Right
01-6389-1	Cashbox Lock Bracket
08-7028-T	Playfield Glass
08-7377	Leg Leveler Adjuster, 3"
20-6500	Steel Ball, 1-1/16" (6)

Cabinet Cables

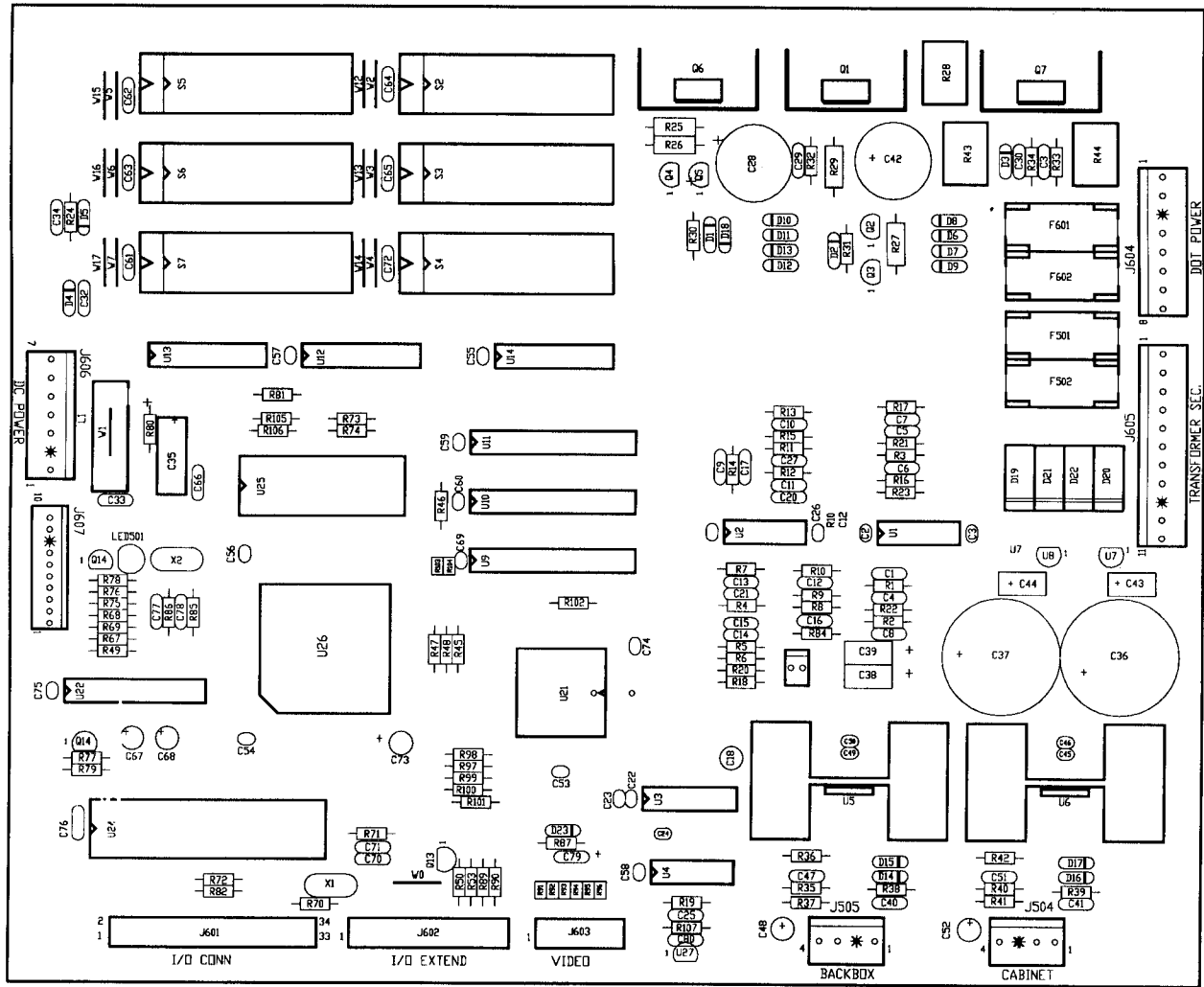| Part Number	Description
A-20201	Cable & Jumper Assy., Coin Door
H-17217.1	Plumb/Bob Mech. Protect Cable
H-17837-2	Voltage Program Jumper Cable
H-20599-1.1	Cabinet Cable
H-19601-1	Power Extension Cable
H-20856	Cabinet Switch/Lamp Cable

* See Application Chart p.2-29.

A-20516-50047
WPC '95 Audio Visual PCB Assembly

Part Number	Designator	Description
4004-01005-06	-	Mach. Screw, 4-40 x 3/8"
4404-01119-00	-	Nut 4-40 ESN
5010-08774-00	R2, R17, R22, R23, R35, R36, R40, R42, R87	Resistor, 22KΩ, ¼w, 5%
5010-08991-00	R20, R46-R48, R50, R72, R76, R77, R80, R107	Resistor, 4.7KΩ, ¼w, 5%
5010-09034-00	R21	Resistor, 10KΩ, ¼w, 5%
5010-09036-00	R19	Resistor, 100Ω, ¼w, 5%
5010-09134-00	R32-R34	Resistor, 150KΩ, ¼w, 5%
5010-09219-00	R1, R3	Resistor, 8.2KΩ, ¼w, 5%
5010-09416-00	R73, R74, R82, R88, R105, R106	Resistor, 470Ω, ¼w, 5%
5010-09807-00	R30, R31, R67-R69, R102	Resistor, 120Ω, ¼w, 5%
5010-10171-00	R24	Resistor, 56Ω, ¼w, 5%
5010-10258-00	R86	Resistor, 1MΩ, ¼w, 5%
5010-10983-00	R53, R75, R79, R84, R85, R89, R90	Resistor, 1.8KΩ, ¼w, 5%
5010-12832-00	R25, R26, R27, R29	Resistor, 47KΩ, ¼w, 5%
5010-13215-00	R78, R97-R101	Resistor, 200KΩ, ¼w, 5%
5010-13372-00	R91-R96, R103, R104	Resistor, 220Ω, 1/8w, 5%
5010-13420-00	R37, R41	Resistor, 680Ω, ¼w, 5%
5010-13517-00	R38, R39	Resistor, 15Ω, ¼w, 5%
5010-13607-00	R4, R5, R7-R15	Resistor, 6.19KΩ, 1/8w, 1%
5012-14558-00	R44	Resistor, 1.8KΩ, 5w vertical
5012-14559-00	R43	Resistor, 4.7KΩ, 5w vertical
5012-14560-00	R28	Resistor, 120Ω, 5w vertical
5013-13661-00	R16	Resistor, 9.09KΩ, ¼w, 1%
5013-14456-00	R6, R18	Resistor, 3.32KΩ, ¼w, 1%
5040-14569-00	C35	Cap., 100mf, 25v, Axial
5040-09365-00	C38, C39, C43, C44	Cap., 1m, 63v(+50,-10%)Ax.
5040-12750-00	C48, C52, C73	Cap., 22m, 35v Radial
5040-13098-00	C18, C67, C68	Cap., 4.7μ, 35v (±20%)
5040-13417-00	C36, C37	Cap., 10000μf, 35v Radial
5040-14564-00	C28, C42	Cap., 150μf, 160v, 20%Rad.
5043-08996-00	C2, C3, C19, C22-C24, C26, C32, C34, C45, C46, C49, C50, C53-C66, C69, C72, C74-C76, C79, C80	Cap., 0.1μf, 50v (±20%) Ax.
5043-10267-00	C47, C51	Cap., 150pf, 100v Cer. Ax.
5048-10992-00	C27	Cap., .0047m, 50v, 10% Ax.
5048-11028-00	C77	Cap., 22p, 50v, Axial
5048-11029-00	C25	Cap., 100p, 50v, 5% Axial
5048-11030-00	C7	Cap., 470p, 50v, Axial
5048-11033-00	C1	Cap., .022m, 50v, 10% Ax.
5048-12036-00	C40, C41	Cap., .22m, 50v, Axial

Part Number	Designator	Description
5048-13172-00	C78	Cap., 47pf, 50v, 20% Ax.
5048-13418-00	C4 - C6	Cap., .047m, 50v, 5% Ax.
5048-13609-00	C9, C12, C15	Cap., 3900pf, 50v, 5% Ax.
5048-13610-00	C8, C10, C11, C13, C14	Cap., 1000pf, 50v, 5% Ax.
5048-13611-00	C16, C17, C20, C21	Cap., 680pf, 50v, 5% Ax.
5048-14563-00	C29-C31	Cap., .01μf, 200v, 10% Axial
5070-09045-00	D19-D22	Diode MR501, 3.0A
5070-09054-00	D4, D6-D17, D23	Diode 1N4004, 1.0A
5075-12823-00	D1, D18	Zener, 1N4758A 56v, 1w
5075-12824-00	D3, D5	Zener, 1N4742A 12v, 1w
5075-12826-00	D2	Zener, 1N4759, 62v, 1w
5160-08938-00	Q13-Q15	Transistor, 2N4401 NPN
5164-09056-00	Q2, Q3	Transistor, MPSD02 NPN
5164-12154-00	Q1, Q7	Transistor, MJE15030 NPN
5194-09055-00	Q4, Q5	Transistor, MPSD52 PNP
5194-12155-00	Q6	Transistor, MJE15031 PNP
5250-13302-00	U7	Reg. 78L05T 5v
5250-13303-00	U8	Reg. 79L05T 5v
5311-12538-00	U4	IC 74HC14 Hex. S-T
5317-12211-00	U12-U14	IC Octal Buffer 74ALS541
5340-12278-00	U25	S/Ram 2064 150NS
5370-12687-00	U27	IC MC 340640Reset Chp
5349-14351-00	U9-U11	SRAm 8Kx8-35ms, 28pdlp
5370-12730-00	U1, U2	IC Op Amp TL084
5370-13419-00	U5, U6	IC TDA 2030AV 18w, Audio Amp
5371-13299-00	U3	IC Ad-1851 16bit mono
5520-14561-00	X2	Crystal 20mHz, parallel 20pf
5671-14516-00	LED 501	Led-Display Red T 1-3/4
5700-08985-00	U24	Socket IC 40-pin .6
5700-12047-00	U22	Socket IC 24.3P
5700-12088-00	S2-S7	Socket Dip 32.6P"
5705-12638-00	U5, U6	Heatsink 5298B
5705-14562-00	Q1, Q6, Q7	Heatsink 10-220 wave sol 287
5733-14528-00	F501, F502, F601, F602	Fuse Holder 5x20mm 10A.
5731-14532-00	F501, F502	Fuse 5x20mm T2.5A., 250V
5731-14533-00	F601, F602	Fuse 5x20mm T0.250A., 250V
5791-10850-00	J602	Connector, 26-pin Header Str.
5791-10862-04	J504, J505	Connector, 4-pin Header Str.
5791-10862-07	J606	Connector, 7-pin Header Str.
5791-10862-08	J604	Connector, 8-pin Header Str.
5791-10862-11	J605	Connector, 11-pin Header Str.
5791-12516-00	J601	Connector, 34 hdr 2 x 17 .100
5791-12827-00	J603	Connector, 14 Hen 7x2 Str.
5791-13830-10	J607	Connector, 10-pin Str. Sq.
5010-09534-00	W0, W1-W7, R49	Resistor, 0Ω, 0w
A-5343-50047-S2	S2	E-PROM Assembly
A-5343-50047-S3	S3	E-PROM Assembly
A-5343-50047-S4	S4	E-PROM Assembly
A-5343-50047-S5	S5	E-PROM Assembly

A-20028
WPC '95 Power Driver PCB Assembly

Part Number	Designator	Description
5040-14569-00	C1, C40	Capacitor, 100µF, 25v, Ax.
5043-08996-00	C2, C4, C5, C7, C13, C16-C21, C24-C39, C41-C43	Capacitor, 0.1m, 50v (±20%) Ax.
5040-13417-00	C8 - C12	Capacitor, 10000µf, 35v Radial
5048-11031-00	C14, C15	Capacitor, .001m, 50v, 10% Ax.
5040-09537-00	C22, C23	Capacitor, 100µ, 100v (±20%) Radial
5070-09054-00	D1, D2, D23, D24, D33 - D100, D103	Diode 1N4004 1.0A.
5070-14526-00	D3-D22, D25-D32	Diode P600G 6A 400 PIV
5070-08919-00	D101, D102	Diode, 1N4148 150mA.
5731-14531-00	F101	Fuse 5 x 20mm TO 63A., 250V
5731-14530-00	F102-F105, F107, F109-F118	Fuse 5 x 20mm T 4A, 250V
5731-14046-00	F106	Fuse S-B, 5A, 5x20mm
5731-14529-00	F108	Fuse 5 x 20mm T 6.3A, 250V
5733-14528-00	F101-F118	Fuse Holder 5 x 20mm10A
5705-14724-00	Q1	Heat Sink TO-3 5.1DEG/W
5701-09652-00	Q1	Thermal Pad TO-3
4406-01128-00	Q1	Nut 6-32 KEPS
4006-01005-06	Q1	Mach. Screw, 6-32 x 3/8"
5705-14562-00	Q2	Heat Sink 10-220 Wave Sol 287
4004-01005-06	Q2-Q5	Mach. Screw, 4-40 x 3/8"
4404-01119-00	Q2-Q5	Nut 4-40 ESN
5705-12638-00	Q3-Q5	Heat Sink 5298B
5791-10862-07	J101, J129	Connector, 7-pin Header Str.
5791-12516-00	J102	Connector, 34 Hdr 2x17
5791-10862-12	J103	Connector, 12-pin Header Str.
5791-10862-03	J104, J122, J132, J135	Connector, 3-pin Header Str.
5791-10862-11	J105, J106	Connector, 11-pin Header Str.
5791-10862-05	J107, J108, J114, J115, J117, J118, J127, J130, J131, J134, J139	Connector, 5-pin Header Str.
5791-10862-09	J109, J112, J113, J116, J119, J121, J123, J128	Connector, 9-pin Header Str.
5791-10862-13	J111, J120	Connector, 13-pin Header Str.
5791-13830-09	J124-J126	Connector, 9-pin Header Str.
5791-10862-06	J133	Connector, 6-pin Header Str.
5791-10862-04	J136-J138, J140, J141	Connector, 4-pin Header Str.
5671-14516-00	LED100-LED105	LED Dspl Red T-1
5250-14527-00	Q1	Regulator Voltage LM317K
5460-12423-00	Q2	I.C. LM7812
5131-12725-00	Q3-Q5	Triac BT138E
5194-09055-00	Q6-Q12, Q17-Q24, Q33-Q40, Q49-Q56, Q109	Transistor, MPSD52 PNP
5162-12635-00	Q13-Q16, Q25-Q32, Q41-Q48, Q57-Q64, Q82, Q83, Q85, Q86, Q88, Q89, Q91, Q92, Q101-Q108	Transistor, TIP102
5191-12179-00	Q65-Q72, Q81, Q84, Q87, Q90	Transistor, TIP36C
5190-09016-00	Q73 - Q80	Transistor, 2N4403 PNP
5192-12428-00	Q93 - Q100	Transistor, TIP107
5160-10269-00	Q110	Transistor, 2N3904
5013-14535-00	R1	Resistor, 750Ω, 1/4w, 1%
5013-14534-00	R2	Resistor, 243Ω, 1/4w, 1%

Part Number	Designator	Description
5010-09999-00	R3, R4, R6-R8, R43, R44, R81-R83, R190	Resistor, 2KΩ, 1/4w, 5%
5010-09224-00	R5, R14 - R17	Resistor, 270Ω, 1/4w, 5%
5012-12632-00	R9	Resistor, 12Ω, 10w, 5%
5010-09324-00	R10	Resistor, 27KΩ, 1/4w, 5%
5010-09358-00	R11, R157, R159, R161, R163, R165, R167, R169, R171, R216-R224	Resistor, 1KΩ, 1/4w, 5%
5010-09036-00	R247	Resistor, 100Ω, 1/4w, 5%
5010-09034-00	R12, R13, R189, R208-R215, R248	Resistor, 10KΩ, 1/4w, 5%
5010-08992-00	R18, R21, R24, R192, R194, R196, R198, R200, R202, R204, R206	Resistor, 560Ω, 1/4w, 5%
5010-08991-00	R19, R22, R25, R28, R30, R32, R34, R50, R52, R54, R56, R58, R60, R62, R64, R84, R86, R88, R90, R92, R94, R96, R98, R116, R119, R122, R125,R128, R131, R134, R137,R246	Resistor, 4.7KΩ, 1/4w, 5%
5010-11079-00	R20, R23, R26, R254-R256	Resistor, 51Ω, 1/4w, 5%
5010-09416-00	R27, R29, R31, R33, R45-R49, R51, R53, R55, R57, R59, R61, R63, R85, R87, R89, R91, R93, R95, R97, R99, R117, R120, R123, R126, R129, R132, R135, R138, R156, R158, R160, R162, R164, R166, R168, R170, R245, R250-R253, R257	Resistor, 470Ω, 1/4w, 5%
5010-08993-00	R35, R37, R39, R41, R65-R72, R100-R107, R140-R147	Resistor, 68Ω, 1/4w, 5%
5010-08997-00	R36, R38, R40, R42, R73-R80, R108, R109, R110-R115, R118, R121, R124, R127, R130, R133, R136, R139	Resistor, 2.7kΩ, 1/4w, 5%
5010-09361-00	R148-R155, R184-R187	Resistor, 220Ω, 1/4w, 5%
5011-12956-00	R172, R173, R178-R183	Resistor, 2.7KΩ,1/4w, 5%
5010-10171-00	R174-R177, R241-R244	Resistor, 56Ω, 1/4w, 5%
5010-14711-00	R188	Resistor, 10KΩ, 1/4w, 5%
5010-09314-00	R191, R193, R195, R197, R199, R201, R203, R205	Resistor, 1.2kΩ, 1/4w, 5%
5010-09086-00	R207	Resistor, 6.8kΩ, 1/4w, 5%
5010-12427-00	R225, R228, R231, R234, R237-R240	Resistor, .22kΩ, 1/4w, 5%
5010-08998-00	R226, R227, R229, R230, R232, R233, R235, R236	Resistor, 2.2kΩ, 1/4w, 5%
5010-13517-00	R249	Resistor, 150Ω, 1/4w, 5%
5019-10143-00	SRI	SIP RES 470 x 9R
5824-09248-00	TP100-TP107	Test Point #1502-1
5370-12272-00	U1, U16, U17	I.C. LM339 Quad Comp
5281-09486-00	U2, U4-U8, U10	I.C. 74LS374 8df/f
5162-12422-00	U3, U11	Trans uln 2803 Oc-drl
5281-10182-00	U9	I.C. 74LS240 l/drvr
5281-09487-00	U12 - U15	I.C. 74LS74 Dual d f/f
5791-13830-05	J110	Connector, 5-pin Header

A-20028
WPC '95 Power Driver PCB Assembly

A-20119-50047
WPC '95 CPU PCB Assembly

Part Number	Designator	Description
A-15814	B1	Battery Holder
5048-11033-00	C1, C42	Cap., .022µ. 50v, 10% Ax.
5048-11030-00	C3-C26, C34-C41	Cap., 470p, 50v Axial
5043-09030-00	C27	Cap., .047m, 50v (±20%) Ax.
5048-13375-00	C28	Cap., 100p, 50v, 10% Axial
5048-11028-00	C29, C30, C43, C44	Cap., 22p, 50v Axial
5040-14569-00	C31	Cap., 100µ, 25v, Axial
5048-11031-00	C32	Cap., .001µ, 50v, Axial
5043-08996-00	C45 - C70	Cap., 0.1µ, 50v (±20%) Ax.
5040-13098-00	C73	Cap., 4.7µF, 35v (±20%)
5645-09025-00	DIPSW1	Switch Dip 8-Position
5070-09266-00	D1, D25, D28	Diode 1N5817 1.0A.
5070-08919-00	D2 - D24, D26, D27	Diode 1N4148 150mA.
5700-10176-00	G10	Socket Dip 28.6
5700-12088-00	G11	Socket Dip 32.6p"
5700-08985-00	U4	IC Socket 40-pin
5700-12424-00	U9	Socket 84-pin
5700-10389-00	U20	IC Socket 18-pin 3"
5791-10850-00	J201	Connector, 26-pin Header
5791-12516-00	J202, J211	Connector, 34-pin Hdr. 2x17
5791-13830-12	J205	Connector, 12-pin Header Str.
5791-13830-09	J206, J207, J209	Connector, 9-pin Header
5791-13830-14	J208	Connector, 14-pin Header
5791-10862-07	J210	Connector, 7-pin Header
5791-13830-13	J212	Connector, 13-pin Header
5671-14516-00	LED201 - LED203	LED Dspl. Red T-1-3/4
5160-10269-00	Q1	Transistor, 2N3904 NPN
5019-09669-00	RP1	SIP 4.7K, 9R, 10 (5%)
5010-09358-00	R1-R4, R9-R11, R23-R26, R43-R84, R93, R95-R97, R99-R114, R117	Resistor, 1kΩ, 1/4W, 5%
5010-08774-00	R129	Resistor, 22KΩ, 1/4w, 5%
5010-09416-00	R5-R8, R12, R13, R87-R89	Resistor, 470Ω, 1/4w, 5%
5010-09034-00	R14-R22, R27-R42, R86, R90, R94, R98	Resistor, 10KΩ, 1/4w, 5%
5010-12104-00	R91	Resistor, 22M, 1/4w, 5%
5010-10989-00	R92	Resistor, 470KΩ, 1/4w, 5%
5010-09187-00	R118 - R123, R128	Resistor, 150Ω, 1/4w, 5%
5010-09040-00	R127	Resistor, 33Ω, 1/4w, 5%
5010-09534-00	W3, W4, W7, R124, R125	Resistor, 0Ω
5010-10258-00	R126	Resistor, 1M, 5% 1/4w
5281-09867-00	U1, U2, U7	I.C. 74HCT244
5281-09851-00	U5	I.C. 74LS14 SMT/TRG
5281-09308-00	U3	IC 74LS245 Trnc
5340-13062-00	U8	IC RAM 32k x 8 Static
5370-12687-00	U10	I.C. MC 34064 Reset Chp.
5281-10182-00	U11-U13, U15	I.C. 74LS240 I/drvr
5311-14068-00	U14, U24	I.C. 74HC574 Octal d-latch
5370-12272-00	U16-U19, U25, U26	I.C. LM339 Quad Comp.
5284-12651-00	U21	I.C. 4584 Hex Schmitt
5311-14554-00	U23	I.C. 74HC237 3 to 8 non inv
5281-09743-00	U27	I.C. 74LS08 Quad.
5520-12084-00	X1	Crystal 32.768KHz
5520-14761-00	X2	Xtal-8M Anti Res Parallel Cut
A-5400-50047-1	G10	PIC16C57 Assembly
5880-09022-00	B1	Battery 1.5v AA Alkaline
5400-10320-00	U4	I.C. MPU68B09E
5410-12426-00	U9	I.C. WPC-89 ASIC
5162-12422-00	U20	Trans uln 2803 Oc-Drl
A-5343-50047-1A	G11	Game ROM Assembly

A-20119-50047
WPC '95 CPU PCB Assembly
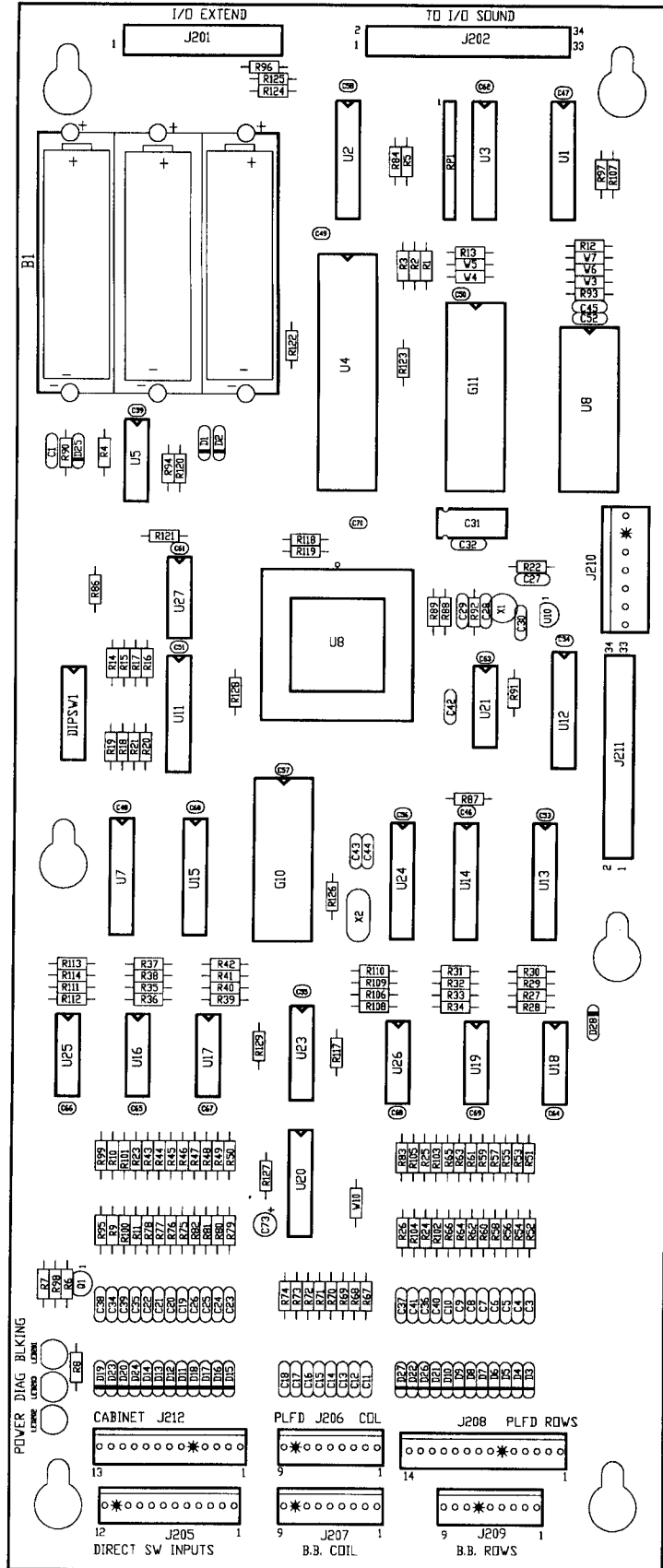
A-20580
Coin Interface PCB Assembly
(This board does not contain optional items such as the coin counter and printer interface.)
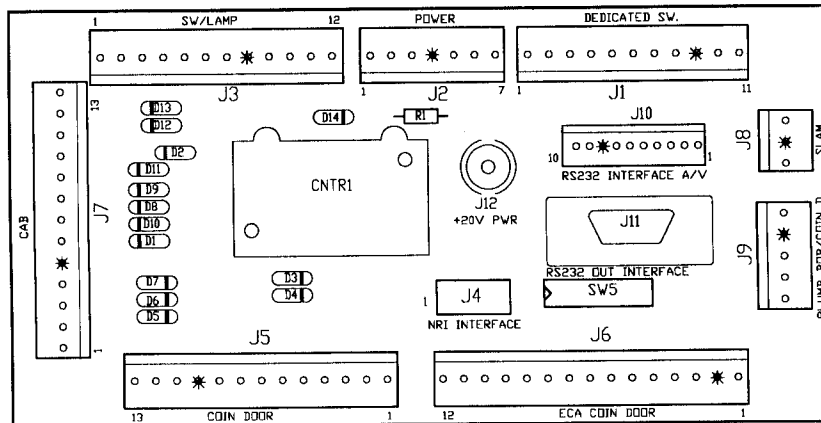
Part Number	Designator	Description
5070-09054-00	D1-D14	Diode 1N4004 1.0A.
5791-10862-11	J1	Connector, 11-pin Header Str. Sq.
5791-10862-07	J2	Connector, 7-pin Header Str. Sq.
5791-10862-12	J3	Connector, 12-pin Header Str. Sq.
5791-11000-10	J4	Connector, 10-pin Header Str. Sq.
5791-10862-13	J5, J7	Connector, 13-pin Header Str. Sq.
5791-10862-15	J6	Connector, 15-pin Header Str. Sq.
5791-10862-03	J8	Connector, 3-pin Header Str. Sq.
5791-10862-05	J9	Connector, 5-pin Header Str. Sq.
5791-12462-10	J10	Connector, 10-pin Header Str. Sq.
5010-13517-00	R1	Resistor, 15Ω, ¼w, 5%
5645-09025-00	SW5	Switch DIP 8 Pos.

A-17316
Flipper Opto PCB Assembly
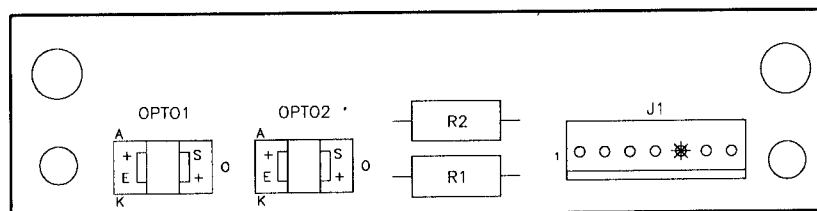
Part Number	Designator	Description
A-20207	-	Flipper Opto Switch PCB
5010-09061-00	R1, R2	Resistor, 680Ω, 1/2w, 5%
5490-14575-00	OPTO1, OPTO2	IC Opto Integ Schmitt 10mA.
5791-13830-07	J1	Connector, 7-pin Header Solid Sq.
03-9001	-	Interrupter Flip-Opto

A-18617-1
Trough IR LED PCB Assembly
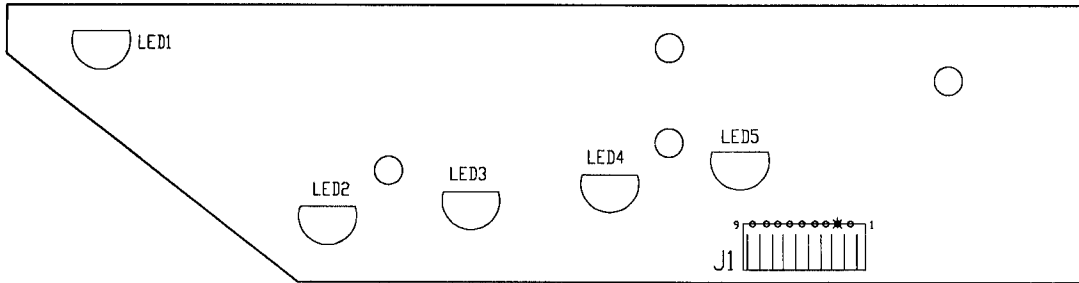
Part Number	Designator	Description
5671-12731-00	LED1 - LED5	Infra Red Diode
5791-12622-09	J1	Connector, 9-pin Header Sq.

A-18618-1
Trough IR Photo Transistor PCB Assembly
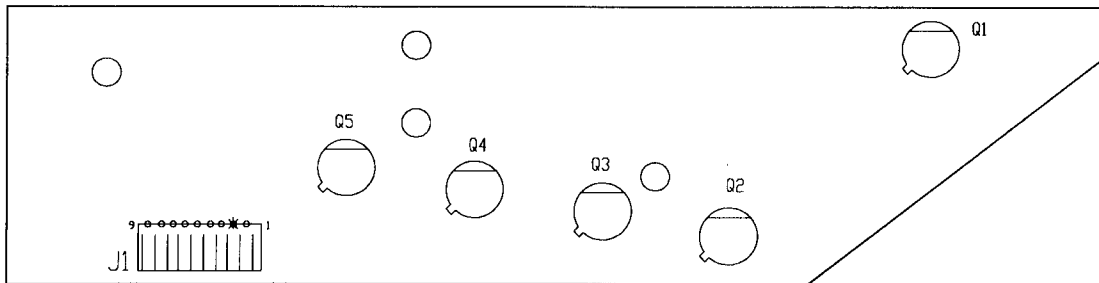
Part Number	Designator	Description
5671-14114-00	Q1 - Q5	Infra Red Photo Transistor
5791-12622-09	J1	Connector, 9-pin Header Sq.

A-15576
7-Switch Opto PCB Assembly
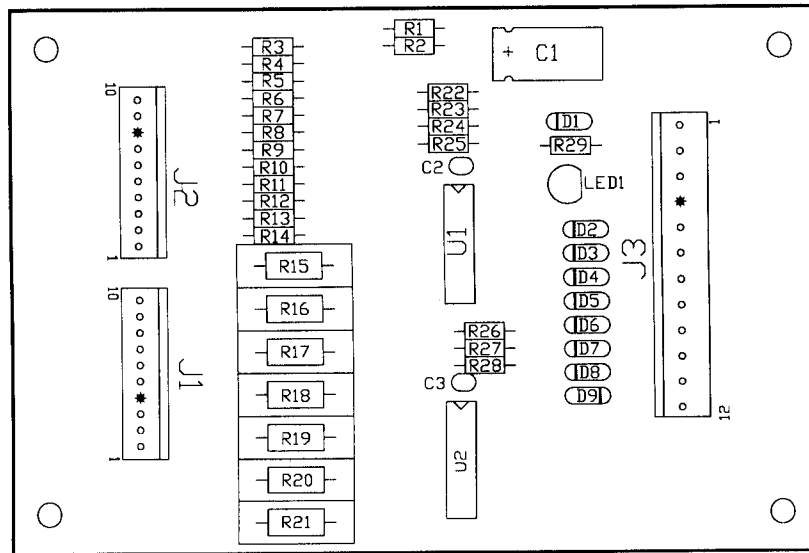
Part Number	Designator	Description
5040-12298-00	C1	Capacitor, 100µFd, 40v (±50%)
5043-08980-00	C2, C3	Capacitor, 0.01µ, 50v
5671-13732-00	LED1	Display LED Red
5370-12272-00	U1, U2	ICLM339 Quad
5070-09054-00	D1 - D9	Diode 1N4004 1.0A.
5010-12928-00	R15 - R21	Resistor, 270Ω, 2w, 5%
5010-09999-00	R1 - R14	Resistor, 2KΩ, 1/4w, 5%
5010-10631-00	R29	Resistor, 1.2KΩ, 1/4w, 5%
5010-09162-00	R23, R25, R26	Resistor, 100KΩ, 1/4w, 5%
5010-08774-00	R22, R24	Resistor, 22KΩ, 1/4w, 5%
5010-09034-00	R28	Resistor, 10KΩ, 1/4w, 5%
5791-10862-12	J3	Connector, 12-pin Header Sq.
5791-13830-10	J1, J2	Connector, 10-pin Header Sq.

B-9361-R-1
Ball Eject Assembly
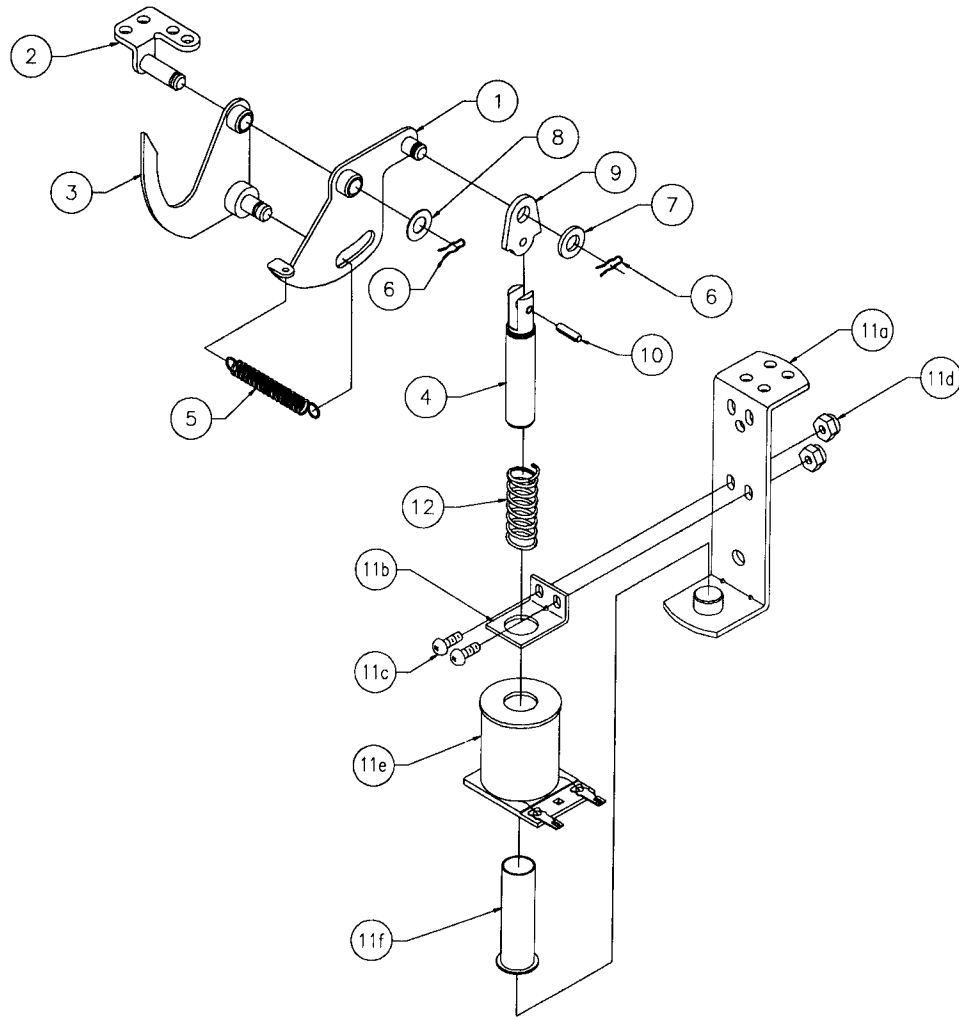
Associated Assemblies:

Item	Part Number	Description		Item	Part Number	Description
1	A-6949-R	Spring Plate		11	**B-9362-L-3**	Coil & Bracket Assembly
2	A-18146	Mounting Bracket Assembly		a)	A-17808	Bracket & Stop Assembly
3	A-7471-R	Eject Cam Assembly		b)	01-8-508-S	Coil Retaining Bracket
4	02-3407-02	Coil Plunger		c)	4006-01017-06	Mach. Screw, 6-32 x 3/8"
5	10-362	Spring Eject		d)	4406-01119-00	Nut, 6-32 ESN
6	12-6227	Hairpin Clip		e)	AE-27-1200	Coil Assembly
7	4700-00030-00	Flat Washer, 17/64 x 1/2 x 15ga.		f)	03-7066	Coil Tubing
8	4700-00103-00	Flat Washer, 17/64 x 1/2 x 28ga.		12	10-128	Spring
9	03-8085	Armature Link		* 13	03-9101-18	Eject Shield, Tr. Violet
10	20-8716-5	Roll Pin, 1/8 x 7/16"				

*Not shown.

A-15849-L-2
Flipper Assembly
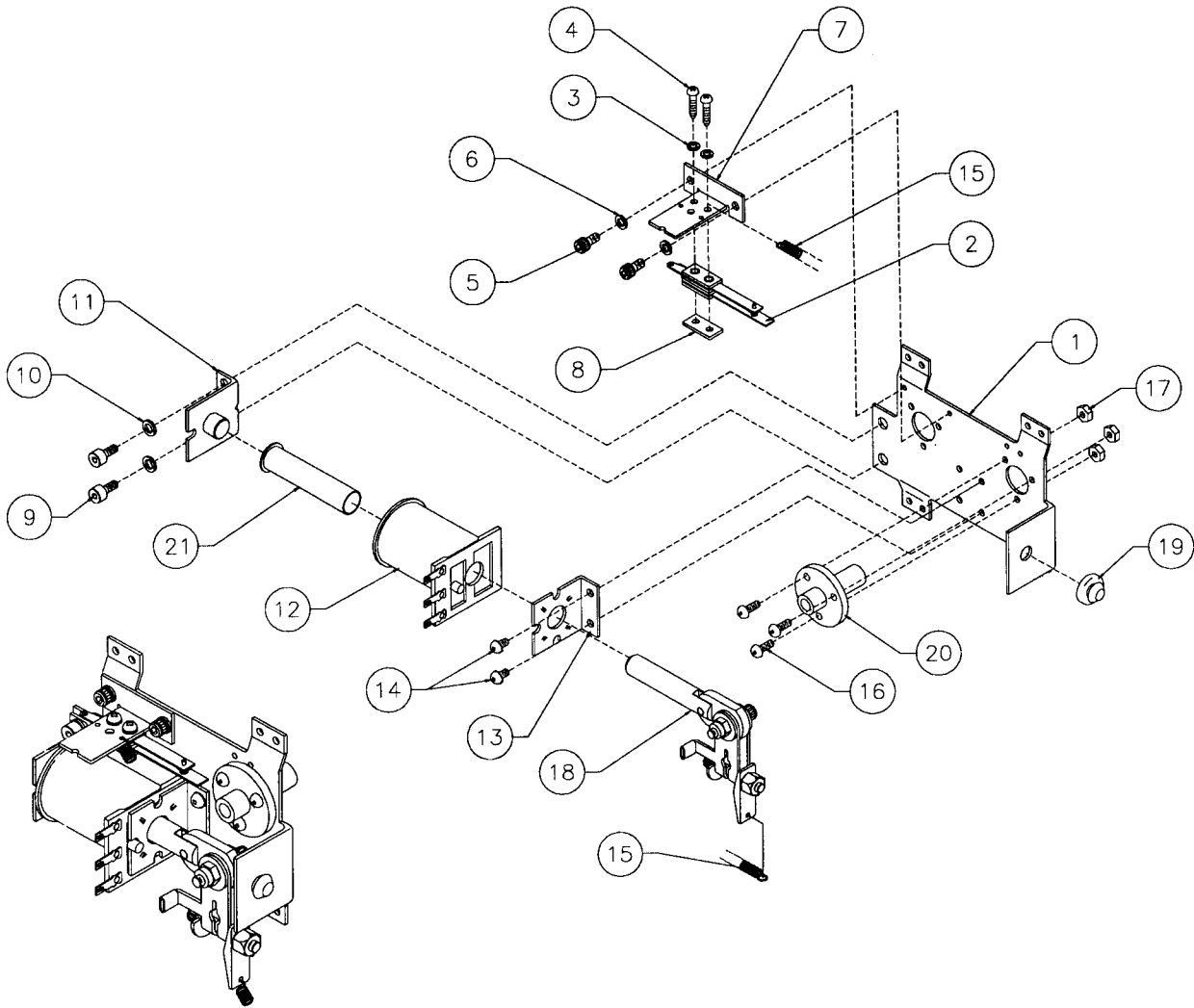
Item	Part Number	Description
1	A-14877-L	Flipper Bracket-Sub Assy.
2	SW-1A-194	Switch Assembly
3	4701-00002-00	Lockwasher #6 Split
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6	4701-00003-00	Lockwasher #8 Split
7	01-9375	Switch Mounting Bracket
8	20-6516	Speednut, Tinnerman
9	4010-01066-06	Cap Screw, 10-32 x 3/8"
10	4701-00004-00	Lockwasher #10 Split
11	A-12390	Flipper Stop Assembly
12	FL-11629	Flipper Coil, Blue
13	01-7695-1	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut 6-32 Hex.

Item	Part Number	Description
18	A-15848-L	Crank Link Assembly, Left
a)	A-17050-L	Flipper Crank Assembly, Left
b)	A-15847	Flipper Link Assembly
c)	02-4676	Link Spacer Bushing
d)	4010-01086-14	Cap Screw, 10-32 x 7/8"
e)	4700-00023-00	Flat Washer, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lockwasher #10 Split
g)	4410-01132-00	Nut 10-32 ESN
19	23-6577	Bumper Plug, 5/8"
20	03-7568	Flipper Bushing
21	03-7066-5	Coil Tubing

Associated Parts:
(Not Shown)

Item	Part Number	Description
21	23-6695	Flipper Rubber Ring, Black
22	20-10110-5	Flipper Bat & Shaft Assembly

A-14876-R-3
Flipper Assembly
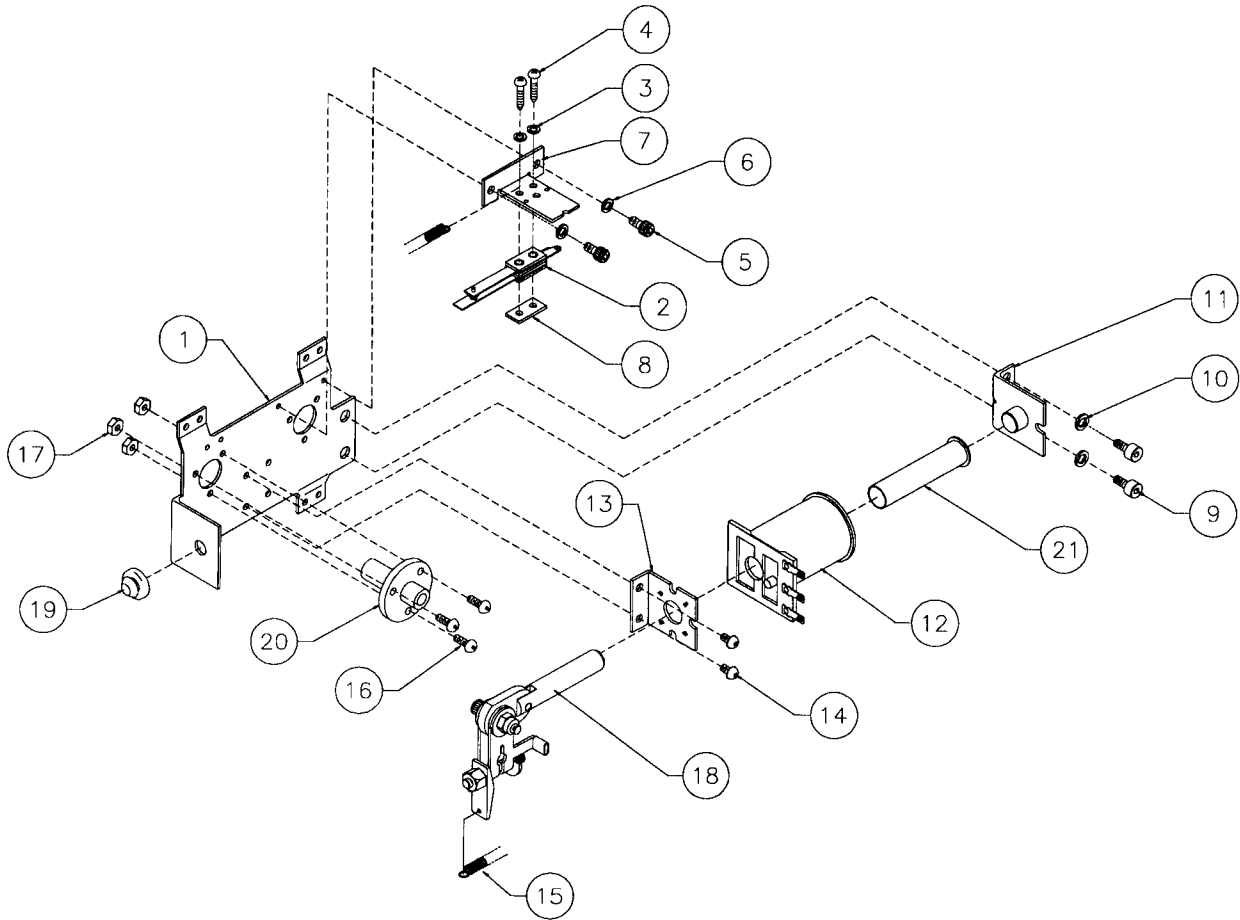
Item	Part Number	Description	Item	Part Number	Description
1	A-14877-R	Flipper Bracket - Sub-Assy.	18	A-15848-R	Crank Link Assembly, Right
2	SW-1A-194	Switch Assembly	a)	A-17050-R	Flipper Crank Assembly, Right
3	4701-00002-00	Lockwasher #6 Split	b)	A-15847	Flipper Link Assembly
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"	c)	02-4676	Link Spacer Bushing
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"	d)	4010-01086-14	Cap Screw, 10-32 x 7/8"
6	4701-00003-00	Lockwasher #8 Split	e)	4700-00023-00	Flat Washer, 5/8 x 13/64 x 16ga.
7	01-9375	Switch Mounting Bracket	f)	4701-00004-00	Lockwasher #10 Split
8	20-6516	Speednut, Tinnerman	g)	4410-01132-00	Nut 10-32 ESN
9	4010-01066-06	Cap Screw, 10-32 x 3/8"	19	23-6577	Bumper Plug, 5/8"
10	4701-00004-00	Lockwasher #10 Split	20	03-7568	Flipper Bushing
11	A-12390	Flipper Stop Assembly	21	03-7066-5	Coil Tubing
12	FL-11629	Flipper Coil, Blue			
13	01-7695-1	Solenoid Bracket			
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"		**Associated Parts:**	
15	10-364	Spring		(Not Shown)	
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"			
17	4406-01117-00	Nut 6-32 Hex.	21	23-6695	Flipper Rubber Ring, Red
			22	20-10110-5	Flipper Bat & Shaft 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 (±.015) inch. When flipper is activated switch must close.

3. Any adjustment of the E.O.S. switch must be made at a minimum distance of 0.25 inch from the switch body.

4. Longer blade of E.O.S. switch must be made straight. Gap adjustment is done by adjusting shorter blade.

5. All moving elements of the assembly must operate freely without any evidence of binding.

6. Apply Loctite™ 245 when reattaching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.

A-17811
Kicker Arm (Slingshot) Assembly

Item	Part Number	Description
1	02-2364	Coil Plunger
2	A-17810	Mounting Bracket Assembly
3	A-12664	Kicker Crank Assembly
4	12-6227	Hairpin Clip
5	4700-00030-00	FW, 17/64 x 1/2 x 15ga.
6	03-8085	Armature Link
7	20-8716-5	Roll Pin, 1/8 x 7/16"
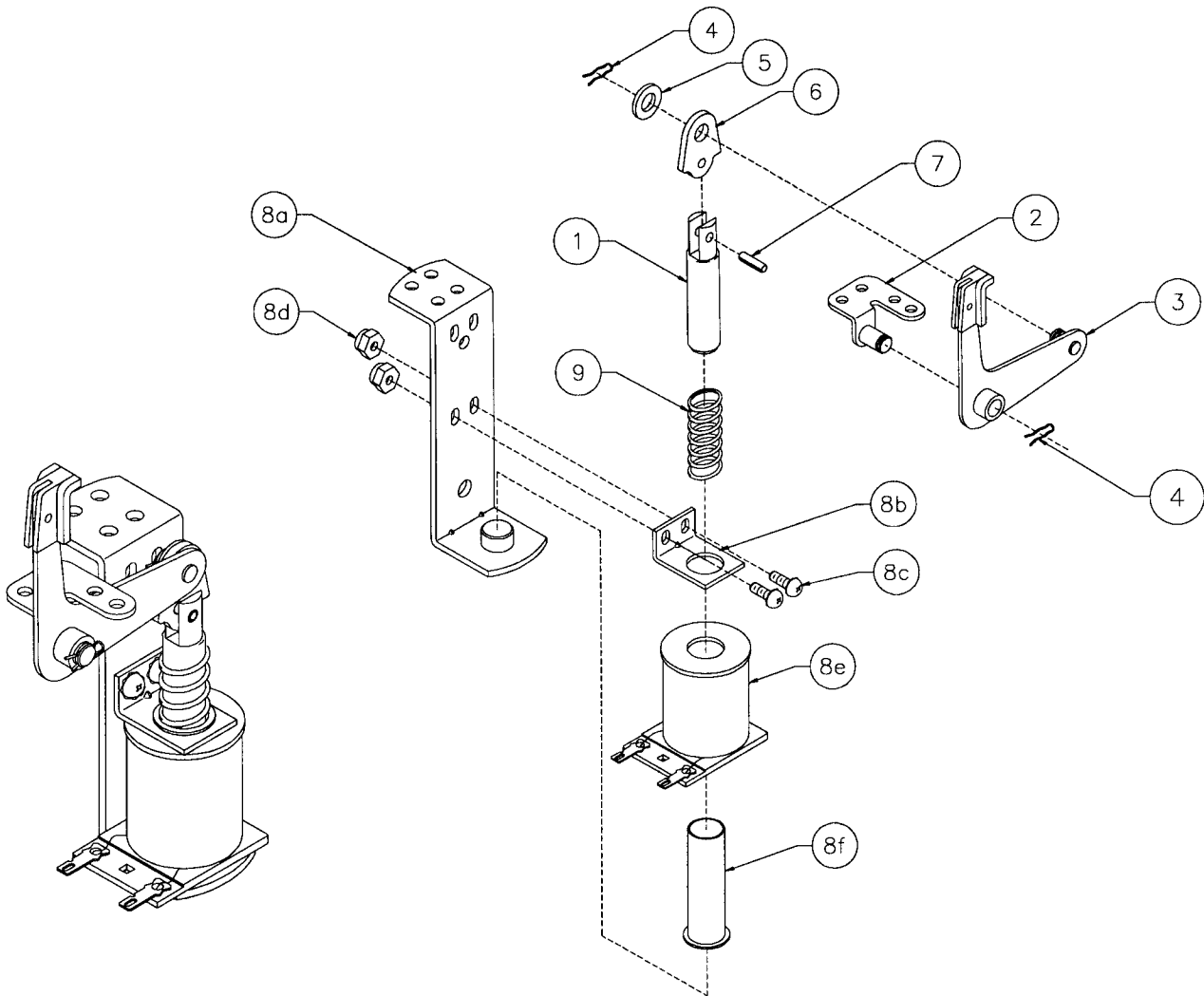
Associated Parts for Right & Left Kickers:

Item	Part Number	Description
8	**B-9362-L-3**	**Coil & Bracket Assembly**
a)	A-17808	Bracket & Stop Assembly
b)	01-8-508-S	Coil Retaining Bracket
c)	4006-01017-06	Mach. Screw, 6-32 x 3/8"
d)	4406-01119-00	Nut, 6-32 ESN
e)	AE-27-1200	Coil Assembly
f)	03-7066	Coil Tubing
9	10-128	Spring

A-19963-1
Ball Trough Assembly Complete
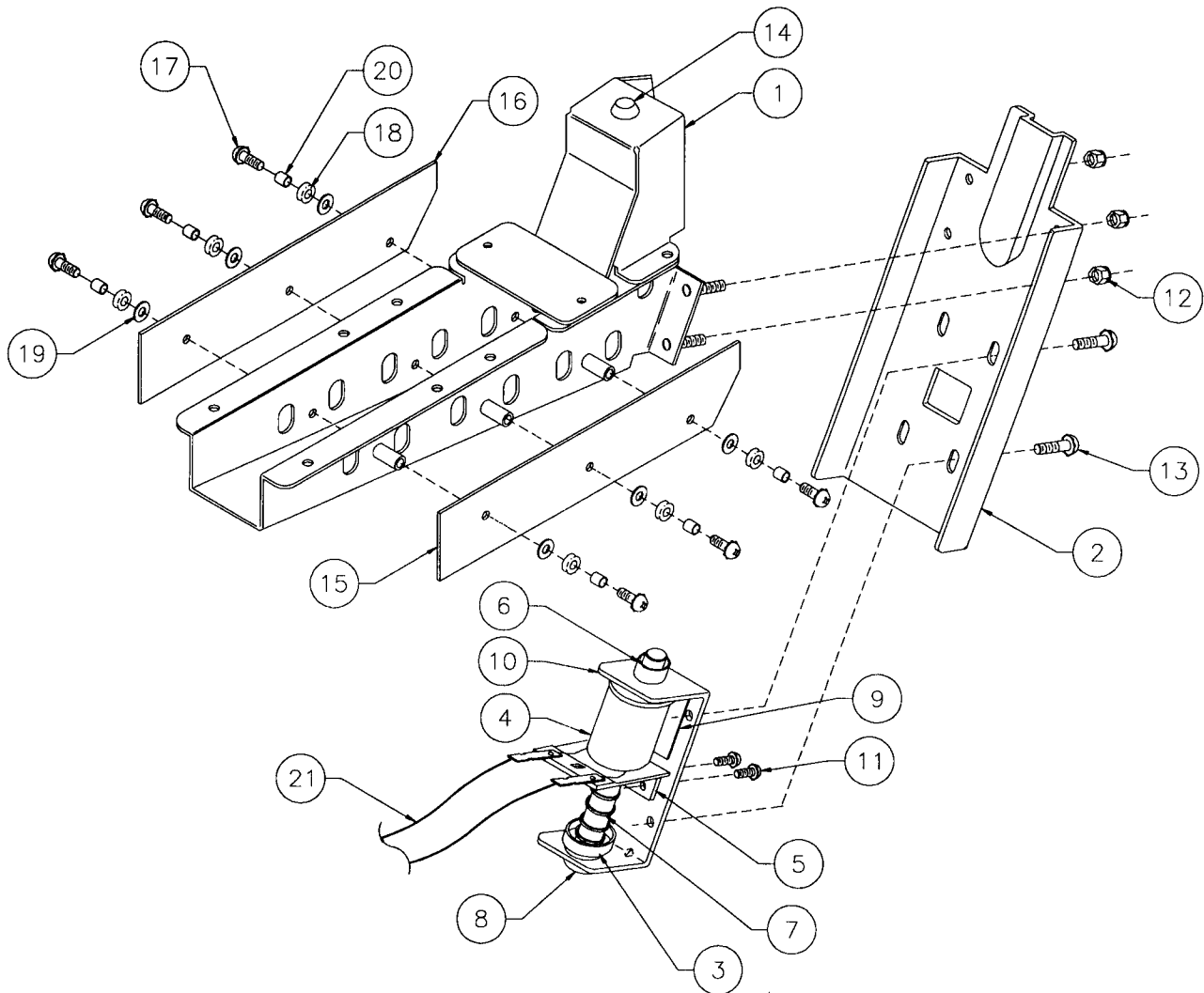
Item	Part Number	Description
1	A-16809-2	Ball Trough Welded Assy.
2	01-11587	Ball Trough Front
3	A-6306-2	Bell Armature Assembly
4	AE-26-1500	Coil Assembly
5	01-8-508-T	Solenoid Assembly
6	03-7067-5	Coil Tubing
7	10-135	Spring
8	23-6420	Rubber Grommet
9	03-8523	Insulator
10	01-1158	Coil Mounting Bracket
11	4008-01017-05	Mach. Screw, 8-32 x 5/16"

Item	Part Number	Description
12	4408-01119-00	Nut 8-32 ESN
13	4008-01017-06	Mach. Screw, 8-32 x 3/8"
14	23-6702	Bumper Plug
15	A-18617-1	Trough IRED LED PCB Assembly
16	A-18618-1	Trough IRED Transistor PCB Assy.
17	4006-01003-10	Mach. Screw, 6-32 x 5/8" SEMS
18	23-6626	Rubber Grommet
19	4700-00004-00	Flat Washer, 9/64 x 7/16 x 21ga.
20	02-4975	Bushing
21	H-19523	Mini Solenoid Cable

B-9414-7
Jet Bumper Assembly
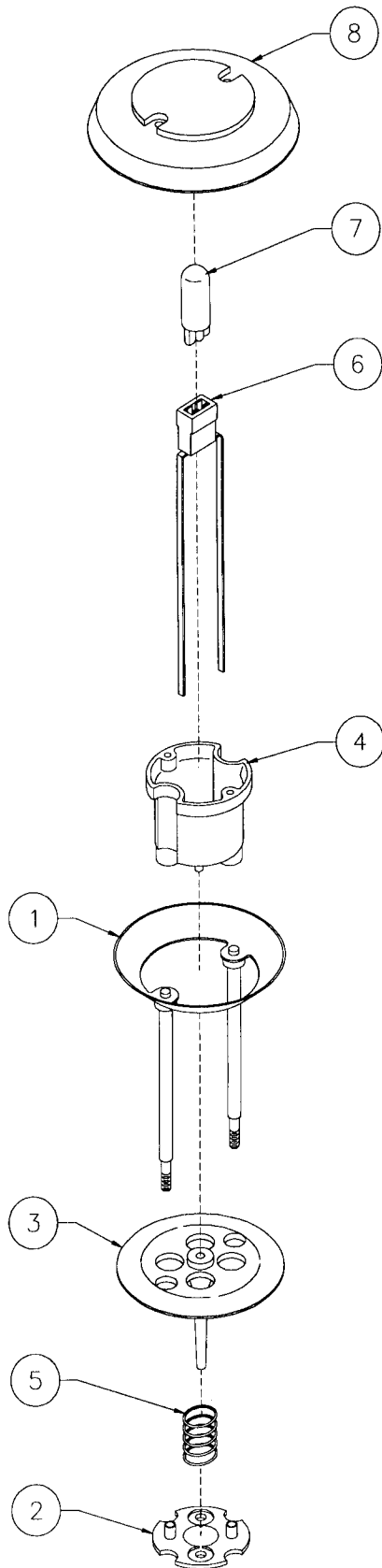
Item	Part Number	Description
1	A-4754	Bumper Ring Assembly
2	03-6009-A5	Bumper Base, White
3	03-6035-3	Bumper Wafer, Purple
4	03-7443-5	Bumper Body, White
5	10-7	Spring
6	24-8776	Socket-Wedge Base
7	24-8768	Bulb #555(6.3v., 0.25A.)

Associated Parts:

8	03-8254-18	Jet Bumper Cap (3)

A-9415-2
Jet Bumper Coil Assembly
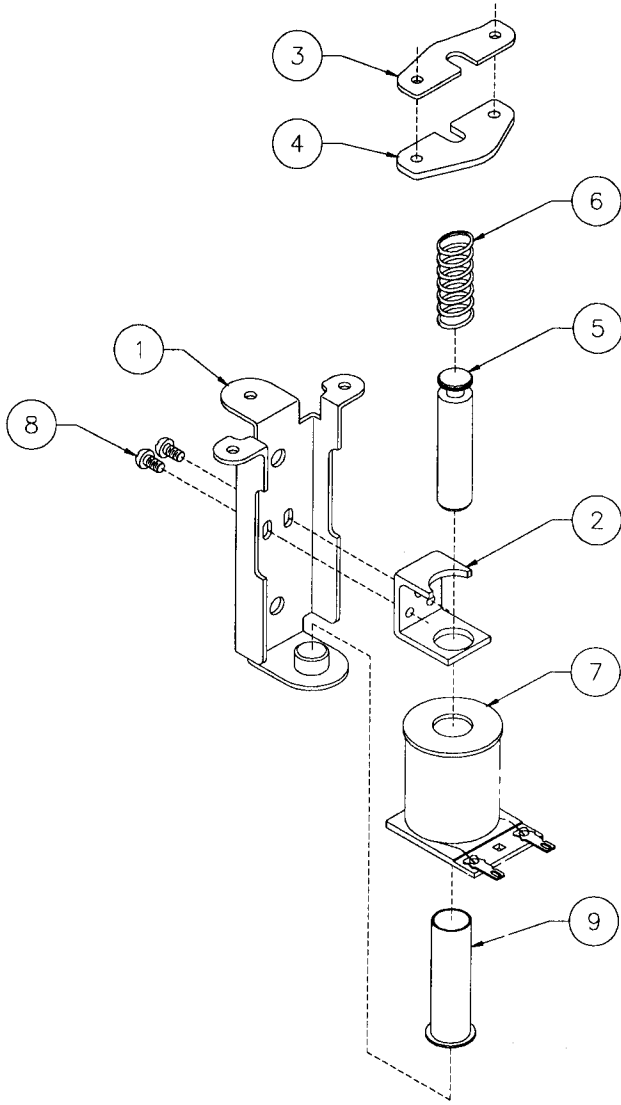
Item	Part Number	Description
1	B-7417	Bracket & Stop Assembly
2	01-1747	Coil Retaining Bracket
3	01-5492	Armature Link, Steel
4	01-5493	Armature Link, Bakeline
5	02-3406-1	Coil Plunger
6	10-326	Armature Spring
7	AE-26-1200	Coil Assembly
8	4006-01017-04	Mach. Screw, 6-32 x 1/4"
9	03-7066	Coil Tubing

Associated Parts:
(Not Shown)

Item	Part Number	Description
10	B-12030-2	Leaf Switch Assembly
a)	A-16443	Switch & Diode Assembly
b)	01-1168	Switch Mounting Bracket
c)	01-3670	Switch Plate
d)	03-7395	Switch Actuator
e)	4005-01003-12	Mach. Screw, 5-40 x 3/4"
f)	4405-01117-00	Nut 5-40 Hex.

04-10346
Tilt Mechanism Assembly
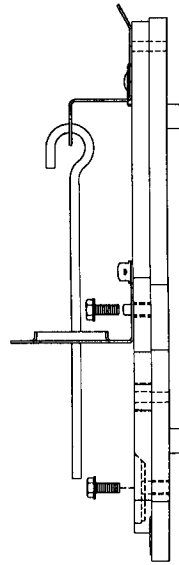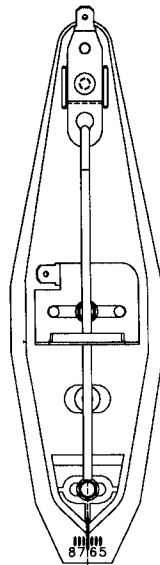
Associated Assemblies:

20-6502-A
Plumb Bob

20-10289
Fastener
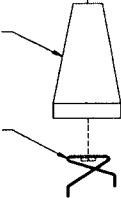
B-10686-1
Knocker Assembly
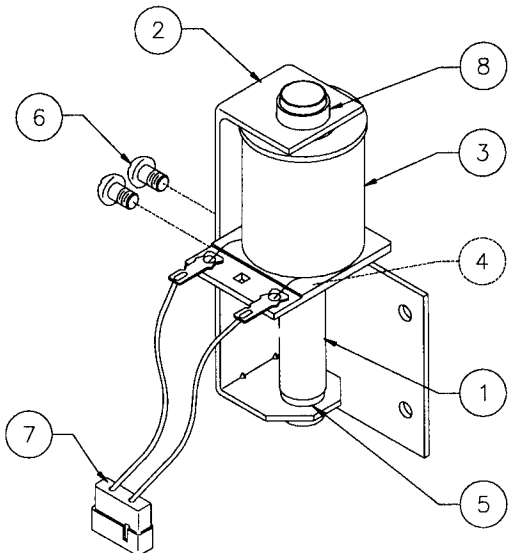
Item	Part Number	Description
1	A-5387	Coil Plunger Assembly
2	01-11273	Mounting Bracket Assembly
3	AE-23-800	Coil Sub-Assembly
4	01-8-508-T	Coil Retaining Bracket
5	23-6420	Rubber Grommet
6	40008-01017-04	Mach. Screw, 8-32 x ¼"
7	H-11835	Knocker Cable
8	03-7067-5	Coil Tubing

A-16434-2
Kicker Assembly
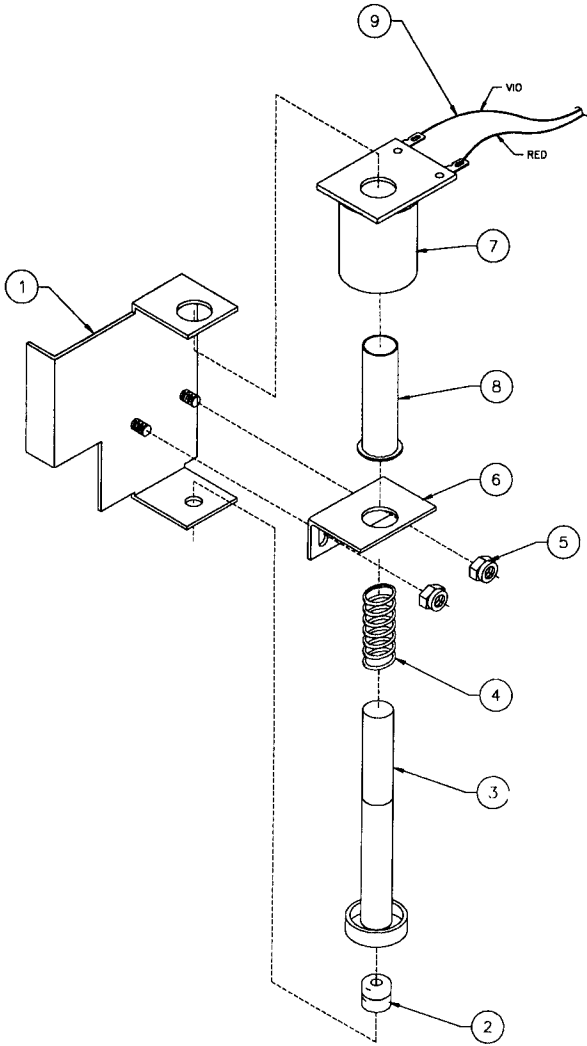
Item	Part Number	Description
1	A-16435	Kicker Bracket
2	23-6420	Rubber Grommet
3	A-17747	Bell Armature Assembly
4	10-135	Coil Plunger Spring
5	4408-01119-00	Nut 8-32 ESN
6	01-9423	Coil Bracket
7	AE-25-1000	Coil Sub-Assembly
8	03-7067	Coil Tubing
9	H-19523-1	Mini Solenoid Cable

A-20839
Magnet Diverter Unit Assembly
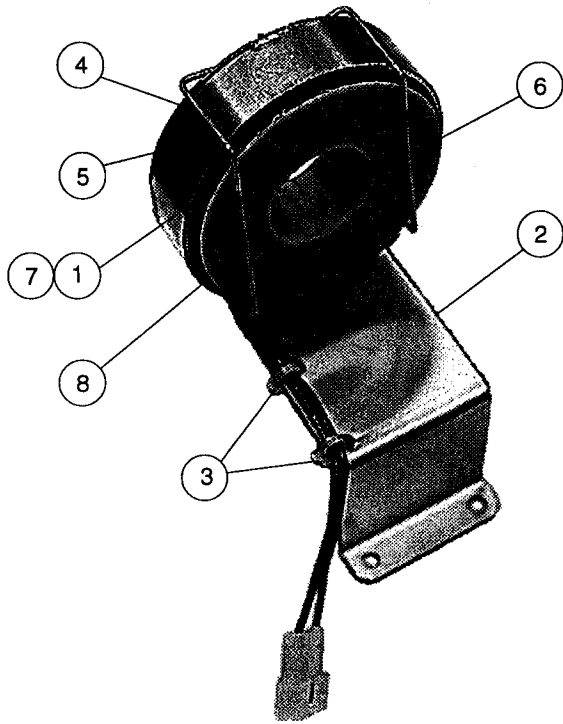
Item	Part Number	Description
1	04-10365	Diverter Magnet Bracket
2	01-14262	Bracket
3	03-9454	Cable Tie
4	31-2546-2	Decal
5	4008-01003-05	Mach. Screw, #8-32 x 5/16"
6	12-7331	Magnet Wire
7	31-2546-3	Decal
8	20-10179	Magnet & Thermal Breaker Coil

A-20636
Spinning Lamp Unit Assembly
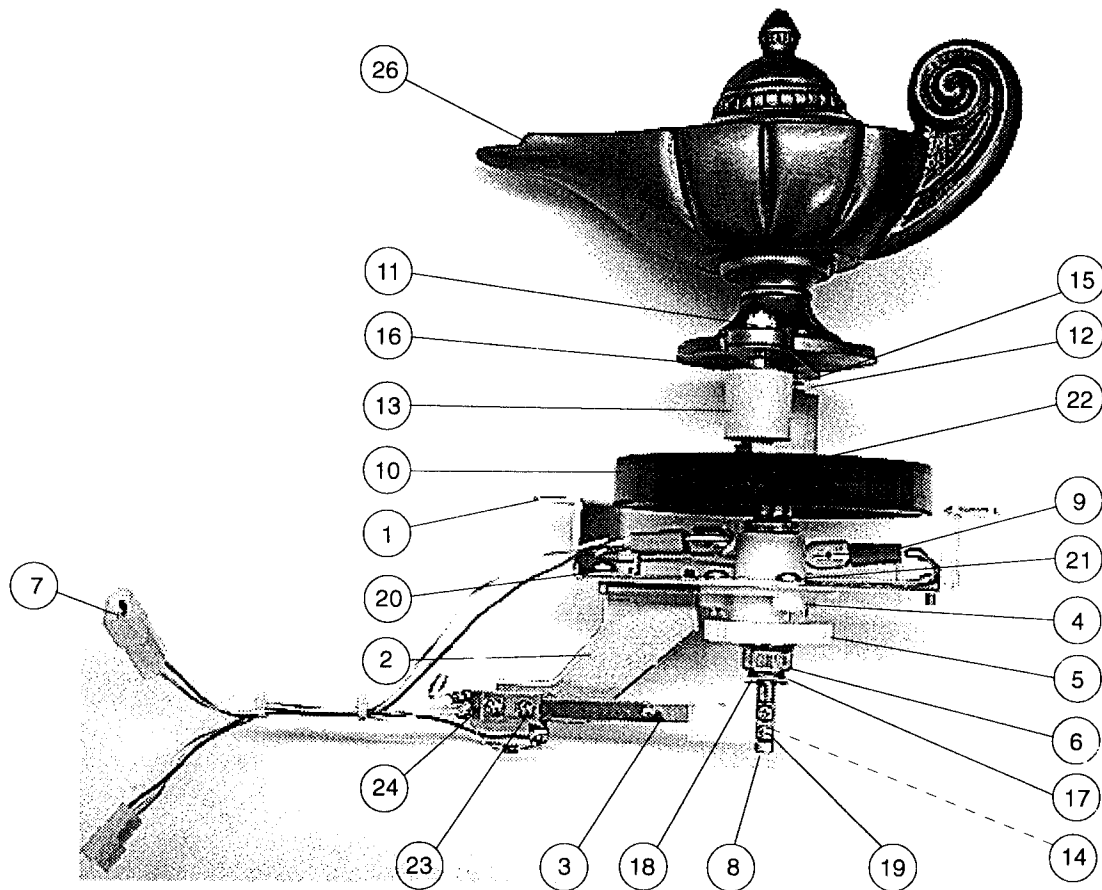
Item	Part Number	Description	Item	Part Number	Description
1	01-14156	Spinning Lamp Assembly	15	20-8712-18	"E" Retaining Ring
2	01-14157	Spin Lamp Act. Switch	16	4700-00021-00	FW, 13/64 X 7/6 X 22ga.
3	SW-1A-206	Spinning Lamp Switch Assy.	17	4700-00072-00	FW, 17/64 x 35/64 x 22ga.
4	03-8347	Gland	18	20-8712-25	"E" Reatining Ring
5	03-8363-1	Locking Nut	19	4004-01003-04	Mach. Screw, #4-40 x 1/4"
6	04-10412	Adj. Screw Assembly	20	4008-01003-05	Mach. Screw, #8-32 x 5/16"
7	H-20863	Cable	21	4108-01013-08	Sh. Metal Screw, #8 x 1/2"
8	04-10308	Shaft/Bracket Assembly	22	4410-01132-01	Nut #10-32 ESN
9	A-17826	Socket & Bulb Assembly	23	4005-01003-12	Mach. Screw, #5-40 x 3/4"
10	03-9466	Spinning Lamp Disk	24	01-3670-1	Switch Plate
11	02-5233	Post - Spinning Lamp			
12	03-7301	Rotate Bumper Insulator	**Associated Assembly:**		
13	23-6770	Bumper	25	31-2526	Lamp
14	03-9465	Actuator - Spin Lamp Switch			

A-20638
Genie Double Target Assembly

FRONT VIEW

REAR VIEW
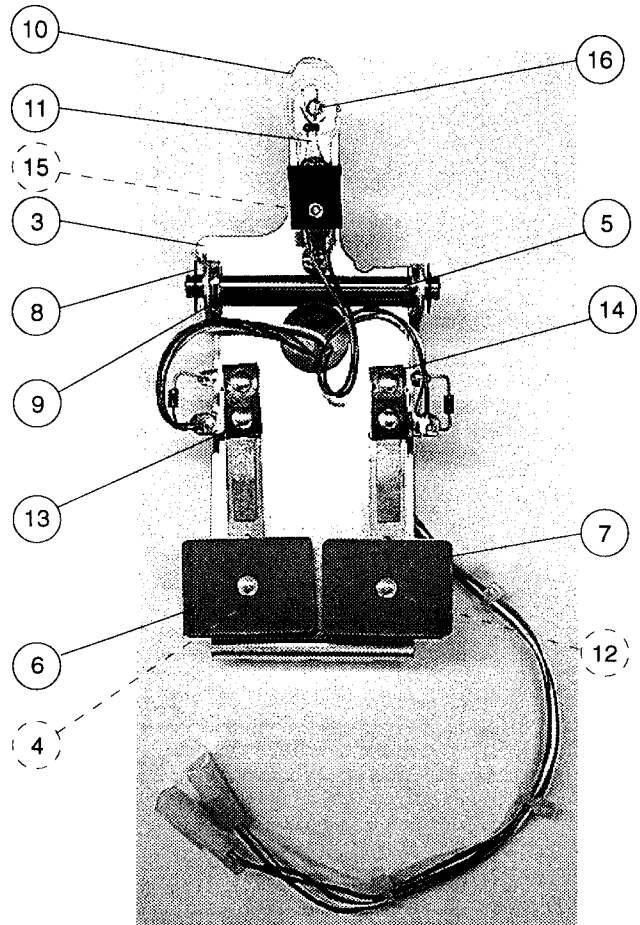
Item	Part Number	Description	Item	Part Number	Description
1	31-2527	Genie	10	A-17802	Socket & Bulb Assembly
* 2	01-14260	Target Mounting Bracket	11	4008-01003-06	Mach. Screw, #8-32 x 3/8"
3	04-10310	Genie Double Target Bracket	12	07-6688-23N	Rivet, 1/8 x 3/8"
4	01-14261	Weight Genie Plate	13	07-6688-27	Rivet, 1/8 x 9/16"
5	02-5255	Genie Target Shaft	14	01-3670	Switch Plate Curved
6	SW-1A-207	Genie Target Assembly, Left	15	4408-01119-01	Nut #8-32 ESN
7	SW-1A-208	Genie Target Assembly, Right	16	4700-00023-00	FW, 13/64 x 5/8 x 16ga.
8	20-8712-25	"E" Retaining Ring	17	A-20862	Cable
9	4700-00072-00	FW, 17/64 x 1/2 x 21ga.			

* Not Shown.

A-20644
Vanishing Magnet Assembly
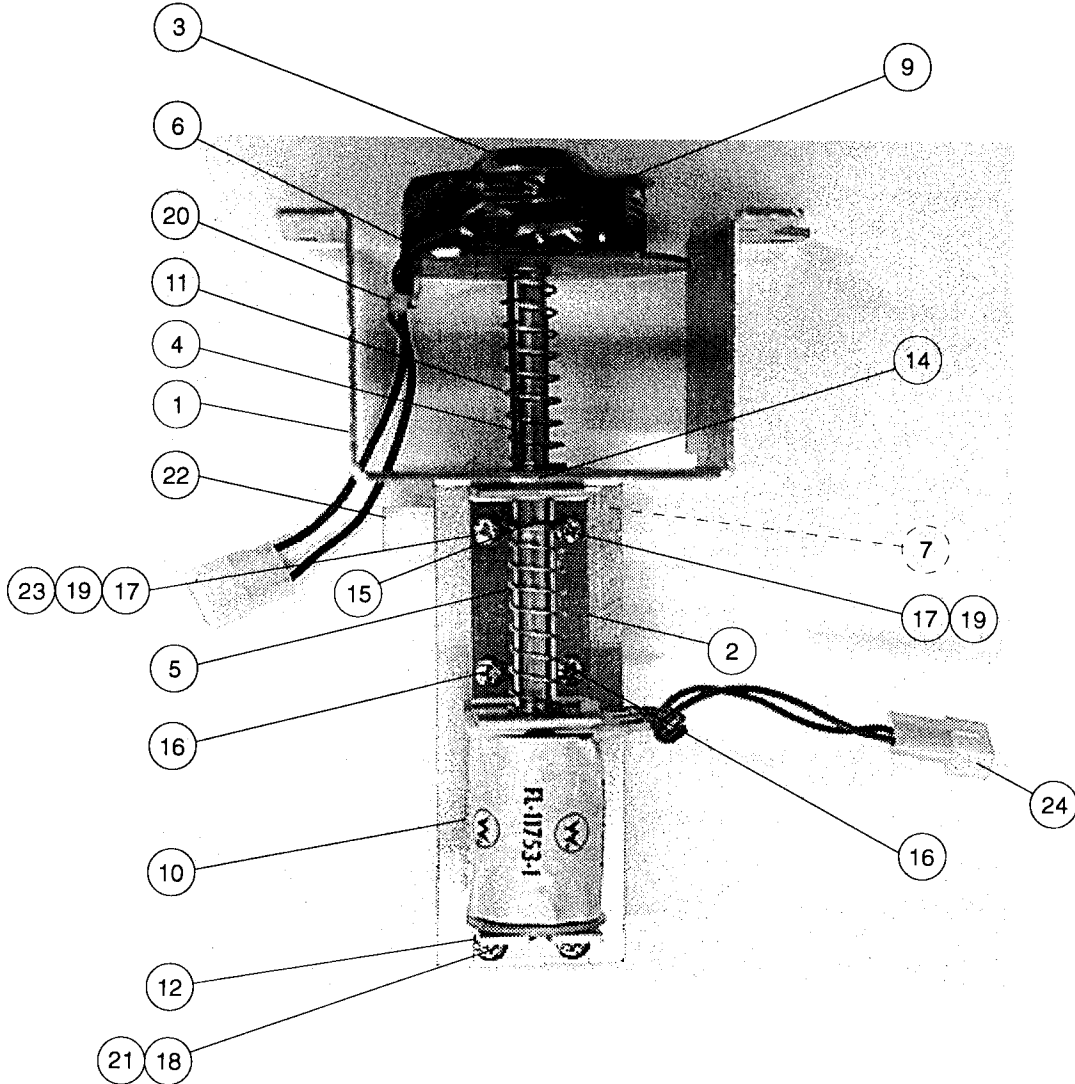
Item	Part Number	Description	Item	Part Number	Description
1	04-10307	Bracket	13	03-7066-5	Coil Tubing
2	02-5231	Plunger	14	20-8790-2	Nyliner
3	04-10373	Pole Piece	15	20-8712-43	"E" Retaining Ring
4	02-5234	Shaft	16	4008-01003-04	Mach. Screw, #8-32 x 1/4"
5	01-14166	Shaft Bracket	17	4008-01003-10	Mach. Screw, #8-32 x 5/8"
6	01-14179	Plate	18	4010-01008-06	Mach. Screw, #10-32 x 3/8"
7	01-14182	Post Bracket	19	4408-01119-01	Nut #8-32 ESN
*8	02-5251	Guide Post	20	03-9454	Tie Wrap Nylon 4"
9	20-10197	Coil Magnet	21	4701-00004-00	Lockwasher #10 Split
10	FL-11753/50V	Coil, Yellow	22	03-7655-12	Clamp 3/4"
11	10-406	Spring, Compression	23	4700-00011-00	FW, 11/64 x 7/16 x 16ga.
12	A-10821	Stop Bracket Assembly	24	H-19523-1	Mini Solenoid Cable

* Not Shown.

A-20693
Solenoid Bracket Assembly
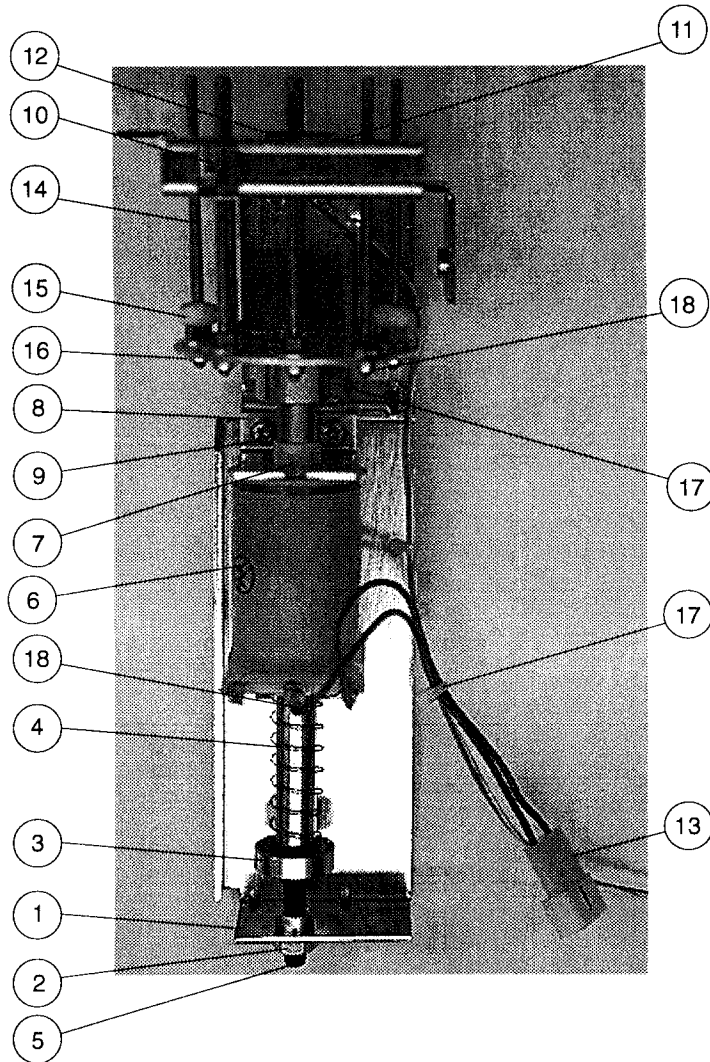
Item	Part Number	Description
1	04-10336	Solenoid Bracket
2	4420-01117-00	Hex Nut 1/4-20
3	04-10019	Armature Extension
4	10-128	Spring
5	4020-01196-16	Set Screw, 1/4-20 x 1.0 Nylon Tip
6	A-20099	Coil Assembly
7	03-7067-6	Coil Tubing
8	01-7695-1	Solenoid Bracket
9	4008-01017-06	Mach. Screw, #8-32 x 3/8"
10	20-8790	Nylined Bearing
11	4106-01013-06	Sh. Metal SCrew, #6-32 x 3/8"
12	A-16909	Photo Transistor Assembly
13	H-20899.1	Cable
14	02-5248	Post - Spike
15	23-6535	Bumper Post
16	04-10333.2	Washer Assembly
17	02-5161	Screw Pin-Scoop
18	4406-01119-00	Nut #6-32 ESN
19	03-9454	Tie Wrap Nylon 4"

A-20692
Skill Shot Bracket Assembly
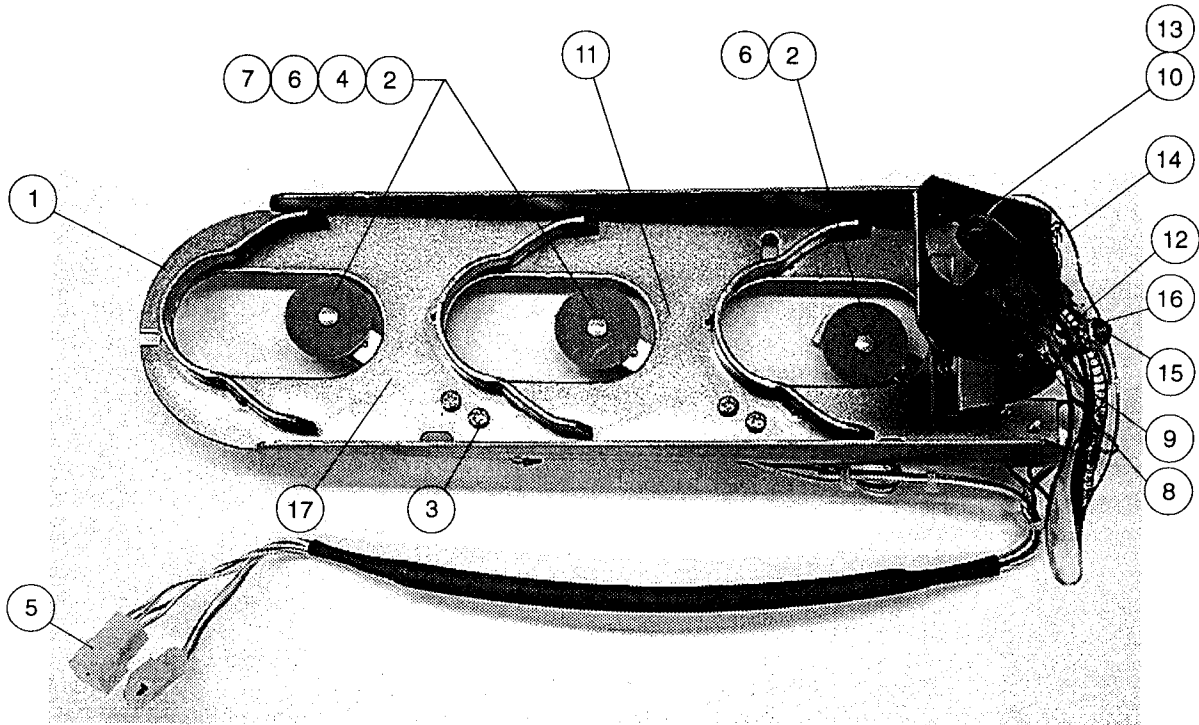
Item	Part Number	Description	Qty.
1	04-10335	Skill Shot Bracket	1
2	SW-1A-202-15	Standup Target Assembly	3
3	4005-01003-12	Mach. Screw, 5-40 x 3/4"	6
4	01-12823	Nut Plate	2
5	H-20898	Cable Assembly	1
6	01-3670	Plate Switch Curved	3
7	01-8657	Switch Limit	3
8	23-6626	Grommet	1
9	4406-01128-00	Nut 6-32 KEPS	1
10	A-17826	Socket & Bulb Assembly	1
*11	31-2546-5	Decal	1
12	23-6710-1	Tubing	2
13	03-8063-2	Light Bulb Sleeve	1
14	31-2545-4	Plastic	1
15	03-6047-2	Spacer	1
16	4406-01119-00	Nut ESN	1
*17	31-2546-4	Decal	1

* Not Shown.

A-17540-1
Universal Power Interface Assembly
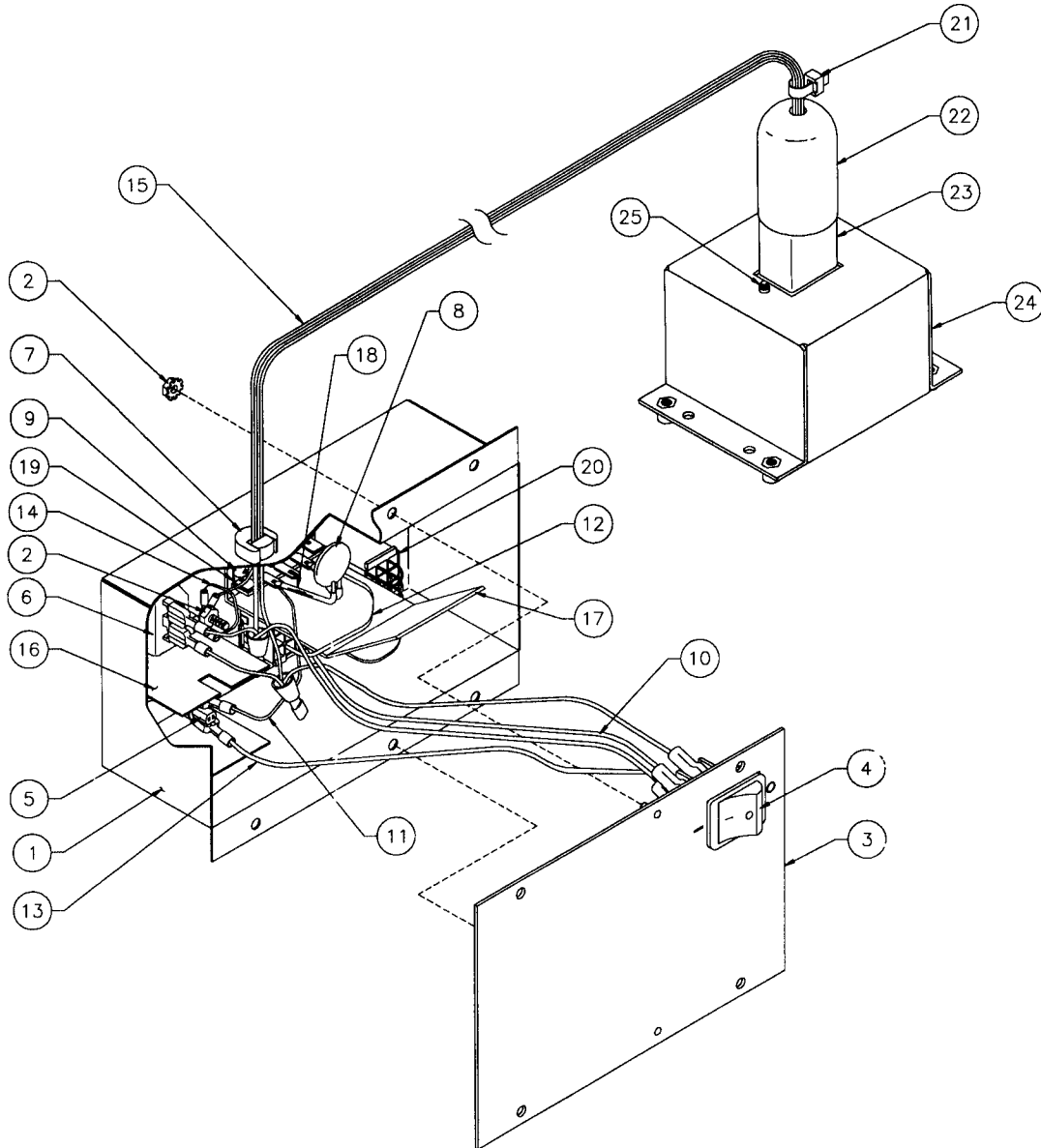
Item	Part Number	Description	Item	Part Number	Description
1	04-10292	Power Control Chassis Box	14	H-17542	Ground Jumper Grn/Yel Cable
2	4406-01128-00	Nut #6-32 KEPS (3)	15	5797-13940-01	Jumper Cable
3	01-12294	Switch Mounting Plate Assembly	16	01-10623	Insulator, Thermistor
4	5642-13935-00	Power Switch	17	01-12299	Insulator, Terminal Strip
5	5733-14734-00	Fuse Holder Panel (5 x 20mm)	18	RM-21-06	#18 Vinyl Fgls
6	5851-13867-00	Outlet-IEC Conn. 237 Socket	19	5822-13865-00	Terminal Strip 3-CKT 2-Mtg.
7	03-8712	Strain Relief Bushing	20	H-18050	Jumper Cable, Transformer Prog.
8	5016-12978-00	Thermistor 8A., 2.5R25	21	03-7933	Ty-Wrap Nylon
9	4006-01003-10	Mach. Screw, #6-32 x 5/8"	22	20-9682-1	Boot w/9-32 Dia. Hole
10	H-17992	Jumper Cable Neutral Sw/1FC	23	5102-13864-00	Line Filter w/IEC Connector
11	H-17543	Hot Jumper Black Cable	24	04-10293	Line Filter Chassis Box
12	H-17546	Jumper Interface Hot Black Cable	25	4004-01003-05	Mach. Screw, #4-40 x 5/16" (2)
13	H-17545	Jumper Switch/Fuse Black Cable			

Universal Power Interface/Cordset Application Chart

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

Playfield Slide Mechanism

(Left Assembly Shown)

Underside of Playfield shown for reference
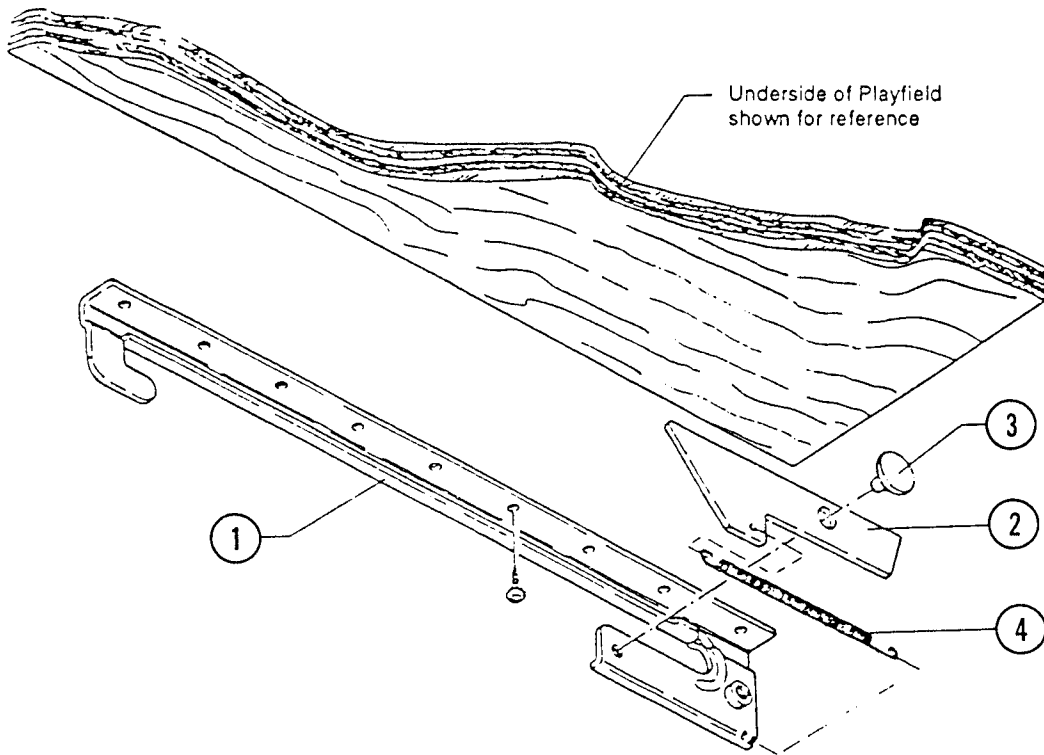
A-17749.1-1
Playfield Slide Mechanism
(Left Assembly)

Item	Part Number	Description
1	01-12304-1	Slide, Left
2	01-10664.1	Lever Retainer
3	02-4615	Shoulder Rivet

Associated Part:

4	10-439	Spring

A-17749.1-2
Playfield Slide Mechanism
(Right Assembly)

Item	Part Number	Description
1	01-12304-1	Slide, Right
2	01-10664.1	Lever Retainer
3	02-4615	Shoulder Rivet

Associated Part:

4	10-439	Spring

A-17730-3
Ball Shooter Rod Assembly
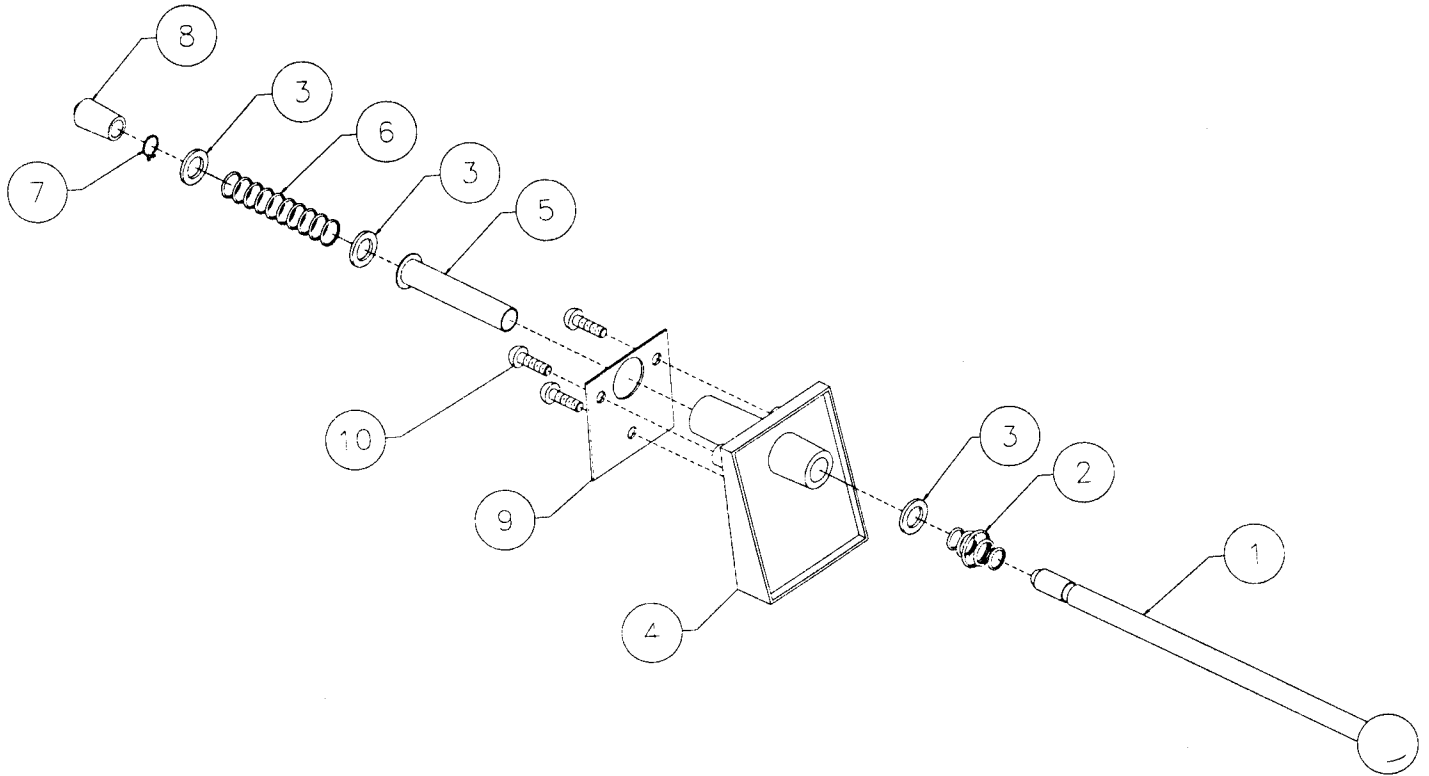
Item	Part Number	Description
1	20-9927-1	Ball Shooter Knob w/Shaft, Silver
2	10-149	Shooter Rod Spring
3	4700-00051-00	FW, 25/64 x 5/8 x 16ga.
4	21-6645-1	Shooter Housing
5	03-7357	Shooter Sleeve
6	10-148-3	Power Spring, Blue
7	20-8714-37	External Retainer Ring
8	23-6327	Ball Shooter Tip

Associated Assemblies:

9	01-3535	Rod Mounting Bracket
10	4010-01006-10	Mach. Screw, 10-32 x 5/8"

Upper Playfield Parts

Item No.	Part No.	Description
1	A-17730-3	Ball Shooter w/ Silver Knob
	23-6327	Ball Shooter Rubber Tip
	20-9927-1	Silver Knob with Shaft
2	A-20842	Shooter Lane Switch & Bracket
	01-14004	Shooter Switch Bracket
3	20-9691	Level
	03-8633	Mount
4	A-14876-R-3	Flipper Coil Assembly
	20-10110-5	Flipper Shaft & White Bat
5	A-20903	Rollover Button Assembly
	A-16443	Switch & Diode Assembly
	03-9103.1	Rollover Button
	A-17806	Socket & Bulb
6	A-20878-1	Flipper Guide-Right
	03-9216-18	Violet Flipper Return
	03-9255-3	Spacer #8 x .541
7	A-20694	Guide Assembly
8	B-9362-L-3	Coil & Bracket Assembly
9	A-20877-1	Scimitar Plastic
10	A-20627	Skill Ramp
	01-14268	End Ramp Guard
	01-14267.1	Skill Ramp Guard
11	A-20693	Spike Assembly
	A-16909	Photo Transistor PCB Assembly
	02-5248	Spike Post
	04-10333.1	Spike Plate Sub-assembly
12	A-20695-1	Bracket & Opto Assembly
13	04-10337	Welded Sword Assembly
14	A-18530-6	Yellow Standup Target
15	A-18017-6	Yellow Standup Mini Target
16	A-20691	Loop Sub-Assembly
	5647-12693-13	Switch
	5070-09054-00	1N4004 Diode
17	A-16434-2	Kicker Assembly
18	A-20636	Spinning Lamp Assembly
	A-17826	Socket & Bulb
	01-14157	Actuator Bracket
19	A-20692	Skill Shot Assembly
	SW-1A-202-15	Stationary Target Assembly
	A-17826	Socket & Bulb
	03-8063-2	Green Bulb Sleeve
20	A-20499-9	Red Standup Target
21	B-9362-L-3	Coil & Bracket Assembly
22	A-20846-9	Red Standup Target
23	A-20626	Swirl Ramp
	01-14266	Ramp Flap
	A-20847	Ball Gate
	03-8365-13	Post #8 -Clear
	A-20811	Ramp Guard
	A-20914	Plunger & Ball Guide Assembly
24	A-18530-6	Yellow Standup Target
25	A-20643	Ball Guide Diverter Assembly
	02-5235	Diverter Shaft
	01-14163	Diverter Ball Guide
	01-14162	Diverter Flap
26	B-9414-7	Jet Bumper Assembly
	B-12030-2	Switch Assembly
	A-9415-2	Coil Assembly
27	A-17932-2	Disappearing Post Assembly
28	A-20798	Back Panel
	03-8171-26	Green Twist Lock Mini Dome
	03-8171-16	Yellow Twist Lock Mini Dome
29	A-20839	Magnet Diverter Unit
	20-10179	Coil Magnet & Brake-large hole
	12-7331	Magnet Wire
	01-14262	Diverter Magnet Mounting Bracket

Item No.	Part No.	Description
30	A-20638	Genie Double Target
31	A-20642	Loop Post Diverter
	A-16636	Diverter Plunger Assembly
32	A-20644	Vanishing Magnet
	04-10373	Magnet Pole Piece
	20-10197	Coil Magnet & Brake-small hole
33	A-18017-6	Yellow Standup Mini Target
34	A-18530-6	Yellow Standup Target
35	A-20810	Magnet Wire Ramp
36	B-9362-L-3	Coil & Bracket Assembly
37	A-20628	Magnet Ramp
	A-20879	Bed of Nails
	01-14268	End Ramp Guard
	03-9255-3	Spacer #8 x .541
38	A-20846-9	Red Standup Target
39	A-20499-9	Red Standup Target
40	A-20695	Bracket & Opto Assembly
41	A-20693	Spike Assembly
	A-16909	Photo Transistor PCB Assembly
	02-5248	Spike Assembly
	04-10333.1	Spike Plate Sub-assembly
42	B-9362-L-3	Coil & Bracket Assembly
43	A-20878-2	Flipper Guide-Left
	03-9216-18	Violet Flipper Return
	03-9255-3	Spacer #8 x .541
44	A-20903	Rollover Button Assembly
	A-16443	Switch & Diode Assembly
	03-9103.1	Rollover Button
	A-17806	Socket & Bulb
45	A-15849-L-2	Flipper Coil Assembly
	20-10110-5	Flipper Shaft w/ White Bat
46	A-13204-50047	Screened Bottom Arch
47	12-7210	Rebound Wires
48	12-7315	Wire Ball Guide #7
49	12-7316	Wire Ball Guide #8
50	12-7317	Wire Ball Guide #9
51	12-7318	Wire Ball Guide #10
52	12-7319	Wire Ball Guide #11
53	12-7326	Wire Ball Guide #12
54	12-7340	Wire Ball Guide
55	01-14148	Ball Guide #1
56	01-14221	Ball Guide #14
57	01-14222	Ball Guide #15
58	01-14223	Ball Guide #16
59	04-10297	Ball Guide #2
60	04-10300	Ball Guide #5
61	04-10301	Ball Guide #6

Not Shown:

03-9488-1	*Full Playfield Mylar
03-9488-2	Jet Bumper Area Mylar
03-9488-3	Drop Area Mylar (2)
03-9488-4	Drop Area Mylar (2)
12-7210	Rebound Wires
20-6500	**Steel Balls (6)
31-1357-50047	Backglass Translight
36-50047	Screened Hardcoat Playfield

*The *Tales of the Arabian Nights* hardcoat playfield does not require a full mylar. However, mylars can be purchased through your local Williams Distributor.

**There are four ball-in-play balls and two captive balls.

2-32

Upper Playfield Parts Locations
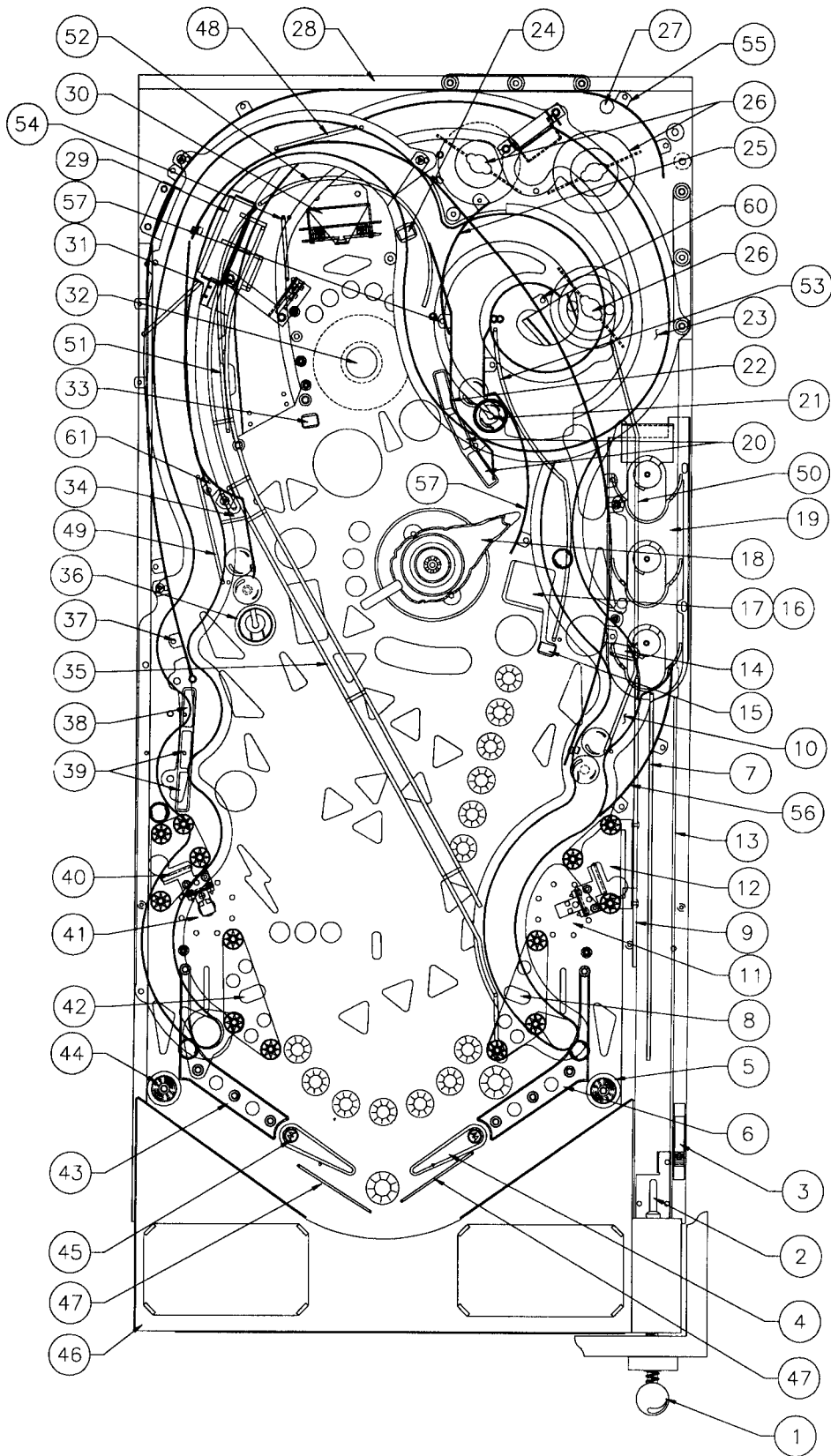
Lower Playfield Parts

Item	Part Number	Description
1	A-19963-1	Ball Trough Assembly
2	B-9362-L-3	Coil & Bracket Assembly (2)
	*A-17811	Kicker (Slingshot) Assy. (2)
3	A-20742	3-Lamp Board Assembly
4	A-20695-1	Bracket & Opto Board Assy.
5	A-20749	3-Lamp Board Assembly
6	A-20743	5-Lamp Board Assembly
7	A-16434-2	Kicker Assembly
8	A-20691	Loop Sub-Assembly
9	A-20636	Spinning Lamp Assembly
10	B-9362-L-3	Coil & Bracket Assembly (2)
	*B-9361-R-1	Ball Eject Assembly (2)
11	A-17749.1-2	Plfd. Slide Mechanism Assy., R.
12	A-9415-2	Jet Bumper Coil Assembly (3)
13	A-17932-1	Disappearing Post Assembly
14	A-18157	Magnet Bracket Assembly
15	A-20812	Bottom Trough Assembly
16	A-20642	Diverter Assembly
17	A-17749.1-1	Plfd. Slide Mechanism Assy., L.
18	A-20744	7-Lamp PCB Assembly
19	A-20644	Vanishing Magnet Assembly
20	A-20747	8-Lamp PCB Assembly
21	A-20746	5-Lamp PCB Assembly
22	A-14876-R-3	Flipper Assembly, Right
23	A-20745	8-Lamp PCB Assembly
24	A-15576	7-Switch Opto PCB Assy.
25	A-20693	Spike Assembly
26	A-20748	3-Lamp Board
27	A-20750	7-Lamp PCB Assembly
28	A-15849-L-2	Flipper Assembly, Left
29	01-11781	Support Bracket (2)
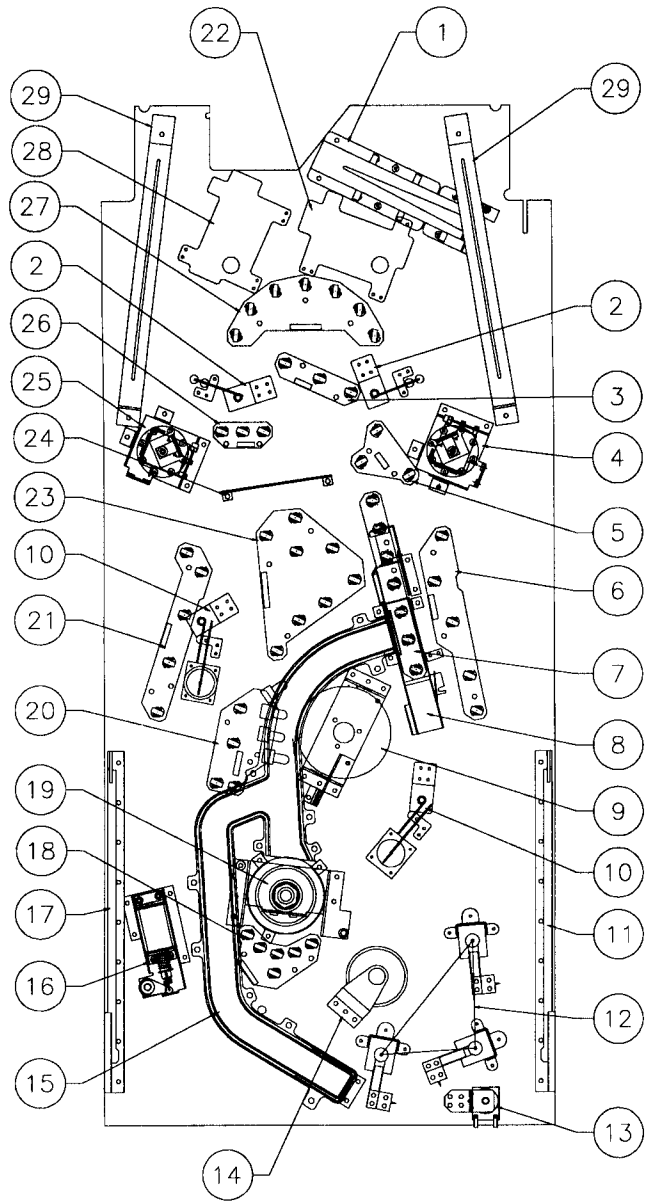
NOTE:
* Item located on **top of playfield.**

Underside of playfield, viewed in raised position.

Rubber Rings

Item No.	Part No.	Description	Quantity
A	23-6556	Black Bumper Sleeve	6
B	23-6694-1	Black Rubber Grommet	11
C	23-6694-5	Black Rubber Ring ¾"	1
D	23-6694-9	Black Rubber Ring 2"	4
E	23-6694-10	Black Rubber Ring 2½"	2
F	23-6695	Black Flipper Ring 1½"	2

Yellow (B+) ———▶|— Red

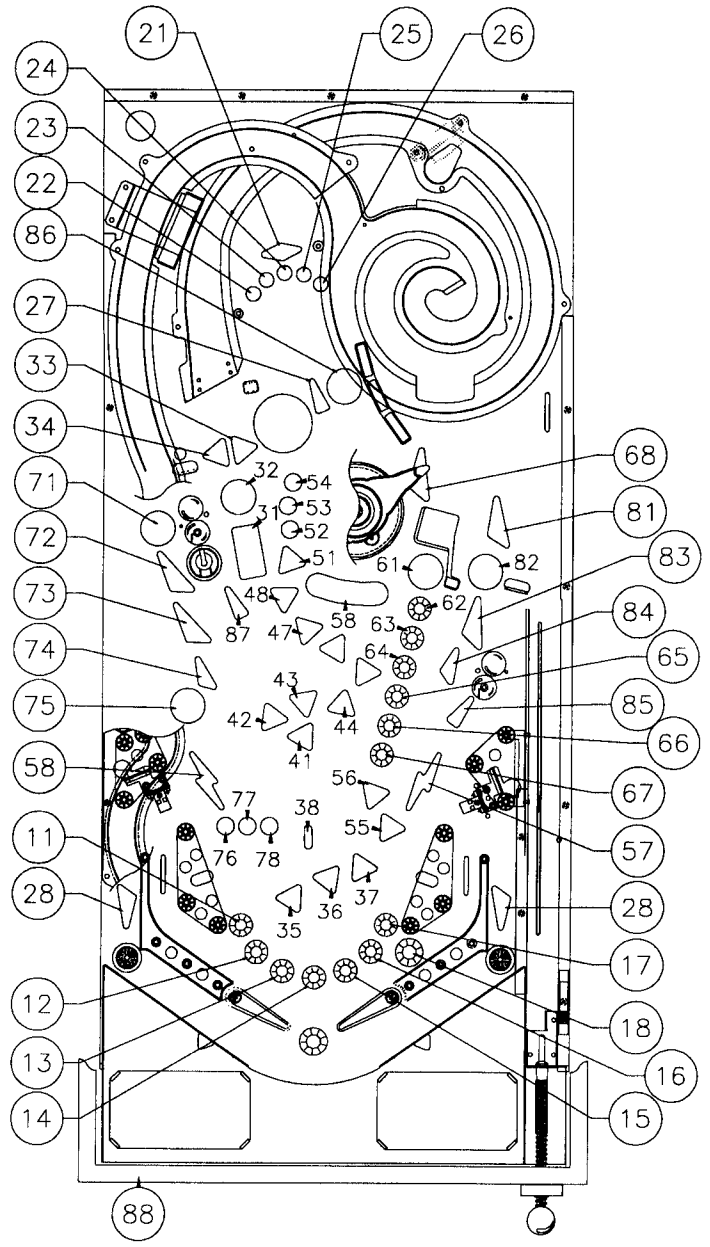| Column \ Row	1 Yellow-Brown J121-1 Q96	2 Yellow-Red J121-2 Q100	3 Yellow-Orange J121-3 Q95	4 Yellow-Black J121-4 Q99	5 Yellow-Green J121-5 Q94	6 Yellow-Blue J121-6 Q98	7 Yellow-Violet J121-7 Q93	8 Yellow-Gray J121-9 Q97
1 Red-Brown J125-1 Q104	JEWEL 1 (LEFT) 11	JACKPOT 21	MAGIC CARPET 31	SMOKE 6 41	SMOKE 14 (TOP) 51	MAKE A WISH 61	ACTION 2 71	EXTRA BALL 81
2 Red-Black J125-2 Q108	JEWEL 2 12	(G)ENIE 22	ACTION 3 32	SMOKE 7 42	LAMP-15 52	(B)AZAAR 62	LEFT LOCK 72	ACTION 5 82
3 Red-Orange J125-4 Q103	JEWEL 3 13	G(E)NIE 23	RAMP ARROW RIGHT 33	SMOKE 8 43	LAMP-30 53	B(A)ZAAR 63	HAREM ADVANCE 73	RIGHT LOCK 83
4 Red-Yellow J125-5 Q107	JEWEL 4 14	GE(N)IE 24	RAMP ARROW LEFT 34	SMOKE 9 44	LAMP-60 54	BA(Z)AAR 64	LEFT TIGER LOOP 74	RIGHT TIGER LOOP 84
5 Red-Green J125-6 Q102	JEWEL 5 15	GEN(I)E 25	SMOKE 1 (BOTTOM) 35	SMOKE 10 45	SMOKE 4 55	BAZ(A)AR 65	ACTION 1 75	CAPTIVE BALL RIGHT 85
6 Red-Blue J125-7 Q106	JEWEL 6 16	GENI(E) 26	SMOKE 2 36	SMOKE 11 46	SMOKE 5 56	BAZA(A)R 66	WISH 1 76	ACTION 4 86
7 Red-Violet J125-8 Q101	JEWEL 7 (RIGHT) 17	MULTIBALL 27	SMOKE 3 37	SMOKE 12 47	SHOOT STAR RIGHT 57	BAZAA(R) 67	WISH 2 77	CAPTIVE BALL LEFT 87
8 Red-Gray J125-9 Q105	SHOOT AGAIN 18	OUTLANE SPECIAL 28	AMULET 38	SMOKE 13 48	SHOOT STAR LEFT 58	CENTER LOCK 68	WISH 3 78	START BUTTON 88

J1XX = Power Driver Board

Lamp Locations

Item No.	Bulb No.	Lamp Assy No.	Description
11	24-8768	A-20750	Jewel 1 (left)
12	24-8768	A-20750	Jewel 2
13	24-8768	A-20750	Jewel 3
14	24-8768	A-20750	Jewel 4
15	24-8768	A-20750	Jewel 5
16	24-8768	A-20750	Jewel 6
17	24-8768	A-20750	Jewel 7 (right)
18	24-6549	A-17835	Shoot Again
21	24-8768	A-20741	Jackpot
22	24-8768	A-20741	(G)enie
23	24-8768	A-20741	G(E)nie
24	24-8768	A-20741	Ge(N)ie
25	24-8768	A-20741	Gen(I)e
26	24-8768	A-20741	Geni(E)
27	24-6549	A-17807	Multiball
28	24-6549	A-17835	Outlane Special (2)
31	24-8768	A-20747	Magic Carpet
32	24-8768	A-20747	Action 3
33	24-8768	A-20747	Ramp Arrow Right
34	24-8768	A-20747	Ramp Arrow Left
35	24-8768	A-20742	Smoke 1 (bottom)
36	24-8768	A-20742	Smoke 2
37	24-8768	A-20742	Smoke 3
38	24-6549	A-17807	Amulet
41	24-8768	A-20745	Smoke 6
42	24-8768	A-20745	Smoke 7
43	24-8768	A-20745	Smoke 8
44	24-8768	A-20745	Smoke 9
45	24-8768	A-20745	Smoke 10
46	24-8768	A-20745	Smoke 11
47	24-8768	A-20745	Smoke 12
48	24-8768	A-20745	Smoke 13
51	24-8768	A-20747	Smoke 14 (top)
52	24-8768	A-20747	Lamp 15
53	24-8768	A-20747	Lamp 30
54	24-8768	A-20747	Lamp 60
55	24-8768	A-20749	Smoke 4
56	24-8768	A-20749	Smoke 5
57	24-8768	A-20749	Shoot Star Right
58	24-6549	A-17807	Shoot Star Left
61	24-8768	A-20744	Make A Wish
62	24-8768	A-20744	(B)azaar
63	24-8768	A-20744	B(A)zaar
64	24-8768	A-20744	Ba(Z)aar
65	24-8768	A-20744	Baz(A)ar
66	24-8768	A-20744	Baza(A)r
67	24-8768	A-20744	Bazaa(R)
68	24-6549	A-17835	Center Lock
71	24-8768	A-20746	Action 2
72	24-8768	A-20746	Left Lock
73	24-8768	A-20746	Harem Advance
74	24-8768	A-20746	Left Tiger Loop
75	24-8768	A-20746	Action 1
76	24-8768	A-20748	Wish 1
77	24-8768	A-20748	Wish 2
78	24-8768	A-20748	Wish 3
81	24-8768	A-20743	Extra Ball
82	24-8768	A-20743	Action 5
83	24-8768	A-20743	Right Lock
84	24-8768	A-20743	Right Tiger Loop
85	24-8768	A-20743	Captive Ball Right
86	24-6549	A-17835	Action 4
87	24-6549	A-17835	Captive Ball Left
88	----------	20-9663-1	Start Button

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

2-37

SWITCH MATRIX

White —|—o—o— Green

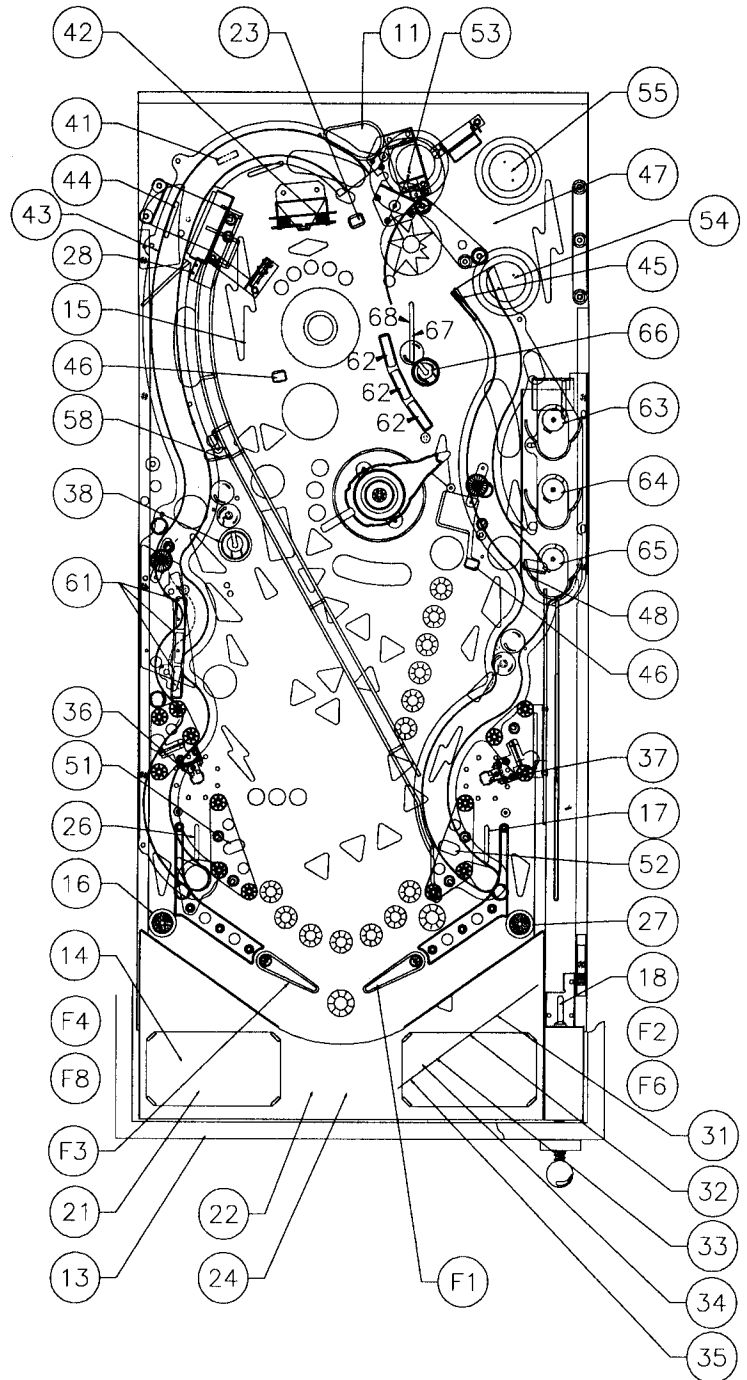| Dedicated Grounded Switches	Column / Row	1 Green-Brown J206-1 U20-18	2 Green-Red J206-2 U20-17	3 Green-Orange J206-3 U20-16	4 Green-Yellow J206-4 U20-15	5 Green-Black J206-5 U20-14	6 Green-Blue J206-6 U20-13	7 Green-Violet J206-7 U20-12	8 Green-Gray J206-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute U17-5 D1	1 White-Brown J208-1 U18-11	HAREM PASSAGE 11	SLAM TILT 21	TROUGH EJECT 31	RAMP MADE LEFT 41	LEFT SLING 51	LEFT STANDUPS 61	NOT USED 71	NOT USED 81	Black-Green J208-13 Lower Right Flipper E.O.S. F1
Orange-Red J205-2 Center Coin Chute U17-7 D2	2 White-Red J208-2 U18-9	VANISH TUNNEL 12	COIN DOOR CLOSED 22	TROUGH BALL 1 32	GENIE TARGET 42	RIGHT SLING 52	RIGHT STANDUPS 62	NOT USED 72	NOT USED 82	Blue-Violet J212-12 Lower Right Flipper Opto F2
Orange-Black J205-3 Right Coin Chute U17-11 D3	3 White-Orange J208-3 U18-5	START BUTTON 13	GENIE STANDUP TARGET 23	TROUGH BALL 2 33	LEFT LOOP 43	LEFT JET 53	TOP SKILL 63	NOT USED 73	NOT USED 83	Black-Blue J208-12 Lower Left Flipper E.O.S. F3
Orange-Yellow J205-4 4th Coin Chute U17-9 D4	4 White-Yellow J208-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH BALL 3 34	INNER LOOP LEFT 44	RIGHT JET 54	MIDDLE SKILL 64	NOT USED 74	NOT USED 84	Blue-Gray J212-11 Lower Left Flipper Opto F4
Orange-Green J205-6 U16-9 Normal Function Srv Crdts / Test Function Escape D5	5 White-Green J208-5 U19-11	RAMP ENTER 15	BAZAAR EJECT 25	TROUGH BALL 4 35	INNER LOOP RIGHT 45	MIDDLE JET 55	BOTTOM SKILL 65	NOT USED 75	NOT USED 85	Black-Violet J208-11 Upper Right Flipper E.O.S. F5
Orange-Blue J205-7 U16-11 Normal Function Volume Dn / Test Function Down D6	6 White-Blue U208-7 U19-9	LEFT OUTLANE 16	LEFT INLANE 26	LEFT CAGE OPTO 36	MINI STANDUPS 46	LAMP SPIN CCW 56	LOCK 1 (BOTTOM) 66	NOT USED 76	NOT USED 86	Black-Yellow J212-10 Upper Right Flipper Opto F6
Orange-Violet J205-8 U16-7 Normal Function Volume Up / Test Function Up D7	7 White-Violet J208-8 U19-5	RIGHT INLANE 17	RIGHT OUTLANE 27	RIGHT CAGE OPTO 37	RAMP MADE RIGHT 47	LAMP SPIN CW 57	LOCK 2 (MIDDLE) 67	NOT USED 77	NOT USED 87	Black--Gray J208-10 Upper Left Flipper E.O.S. F7
Orange-Gray J205-9 U16-5 Normal Function Begin Test / Test Function Enter D8	8 White-Gray J208-9 U19-7	BALL SHOOTER 18	LEFT WIRE MAKE 28	LEFT EJECT 38	RIGHT CAPTIVE BALL 48	LEFT CAPTIVE BALL 58	LOCK 3 (TOP) 68	NOT USED 78	NOT USED 88	Black-Blue J212-9 Upper Left Flipper Opto F8

J2XX = CPU BOARD   ▨ = OPTO, TYPICALLY CLOSED

Switch Locations

Item No.	Switch No.	Description
F1	SW-1A-194	Lower Right Flipper E.O.S.
F2	A-17316	Lower Right Flipper Cabinet.
F3	SW-1A-194	Lower Left Flipper E.O.S.
F4	A-17316	Lower Left Flipper Cabinet
F5	Not Used	Upper Right Flipper E.O.S.
F6	Not Used	Upper Right Flipper Cabinet
F7	Not Used	Upper Left Flipper E.O.S.
F8	Not Used	Upper Left Flipper Cabinet
11	A-12238	Harem Passage
12	A-12238	Vanish Tunnel
13	20-9663-1	Start Button
14	04-10346	Plumb Bob Tilt*
15	5647-12693-36	Ramp Enter
16	A-16443	Left Outlane
17	A-17813	Right Inlane
18	A-20842	Ball Shooter
21	A-17238	Slam Tilt*
22	5643-09268-00	Coin Door Closed*
23	A-18530-6	Genie Standup
24	5643-09112-00	Always Closed*
25	5647-12693-13	Bazaar Eject
26	A-17813-1	Left Inlane
27	A-16443	Right Outlane
28	5647-12693-21	Left Wire Make
31	A-18617-1 (LED) A-18618-1 (photo transistor)	Trough Eject
32	A-18617-1 (LED) A-18618-1 (photo transistor)	Trough Ball 1
33	A-18617-1 (LED) A-18618-1 (photo transistor)	Trough Ball 2
34	A-18617-1 (LED) A-18618-1 (photo transistor)	Trough Ball 3
35	A-18617-1 (LED) A-18618-1 (photo transistor)	Trough Ball 4
36	A-16908 (LED) A-16909 (photo transistor)	Left Cage Opto
37	A-16908 (LED) A-16909 (photo transistor)	Right Cage Opto
38	A-17985-R	Left Eject
41	A-12238	Ramp Made Left
42	SW-1A-207 (left) SW-1A-208 (right)	Genie Target
43	A-17813	Left Loop
44	A-17813	Inner Loop Left
45	A-17813	Inner Loop Right
46	A-18017-6	Mini Standups (3)
47	A-12238	Ramp Made Right
48	A-18530-6	Right Captive Ball
51	A-17800 (Kick) A-17793 (Score)**	Left Slingshot
52	A-17800 (Kick) A-17793 (Score)**	Right Slingshot
53	A-16443	Left Jet Bumper
54	A-16443	Right Jet Bumper
55	A-16443	Middle Jet Bumper
56	SW-1A-206	Lamp Spin CCW
57	SW-1A-206	Lamp Spin CW
58	A-18530-6	Left Captive Ball
61	A-20846-9 (top) A-20499-9 (middle) A-20499-9 (bottom)	Left Standups
62	A-20846-9 (top) A-20499-9 (middle) A-20499-9 (bottom)	Right Standups
63	SW-1A-202-15	Top Skill
64	SW-1A-202-15	Middle Skill
65	SW-1A-202-15	Bottom Skill
66	A-17985-R	Lock 1 (bottom)
67	A-14820	Lock 2 (middle)
68	A-14820	Lock 3 (top)
71 to 88	Not Used	

*NOT SHOWN.   **SCORE SWITCHES HAVE DIODES ATTACHED.

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections Playfield	Backbox	Cabinet	Drive Xistor	Voltage Connections Playfield	Backbox	Cabinet	Drive Wire Color	Solenoid Part Number / Flashlamp Type Playfield	Backbox
01	LEFT CAGE	High Power	J133-2			Q72	J116-1			Vio-Brn	A-20099	
02	RIGHT CAGE	High Power	J133-2			Q68	J116-2			Vio-Red	A-20099	
03	VANISH DROP	High Power	J133-2			Q71	J116-4			Vio-Org	FL-11753	
04	LOCK EJECT	High Power	J133-2			Q67	J116-5			Vio-Yel	AE-27-1200	
05	BAZAAR EJECT	High Power	J133-2			Q70	J116-6			Vio-Grn	AE-25-1000	
06	LOCK MAGNET	High Power	J133-2			Q66	J116-7			Vio-Blu	20-10197	
07	KNOCKER	High Power		J133-2		Q69		J116-8		Vio-Blk		AE-23-800
08	RAMP MAGNET COIL	High Power	J133-1			Q65	J116-9			Vio-Gry	20-10179	
09	TROUGH EJECT	Low Power	J133-3			Q44	J113-1			Brn-Blk	AE-26-1500	
10	LEFT SLINGSHOT	Low Power	J133-3			Q48	J113-3			Brn-Red	AE-27-1200	
11	RIGHT SLINGSHOT	Low Power	J133-3			Q43	J113-4			Brn-Org	AE-27-1200	
12	LEFT JET BUMPER	Low Power	J133-3			Q47	J113-5			Brn-Yel	AE-26-1200	
13	RIGHT JET BUMPER	Low Power	J133-3			Q42	J113-6			Brn-Grn	AE-26-1200	
14	MIDDLE JET BUMPER	Low Power	J133-3			Q46	J113-7			Brn-Blu	AE-26-1200	
15	LEFT KICKER	Low Power	J133-3			Q41	J113-8			Brn-Vio	AE-27-1200	
16	LEFT EJECT FLASHER	Low Power	J133-6	J134-5		Q45	J113-9	J114-5		Brn-Gry	#89 (2)	#906
17	INLANE FLASHERS	Flasher	J133-6			Q28	J111-1			Blk-Brn	#89 (2)	
18	FINAL BATTLE FLASHER	Flasher	J133-6			Q32	J111-2			Blk-Red	#906	
19	LEFT LOOP FLASHER	Flasher	J133-6			Q27	J111-3			Blk-Org	#906	
20	BAZAAR FLASHER	Flasher	J133-6			Q31	J111-4			Blk-Yel	#89	
21	RAMP DIVERTER	Low Power	J133-2			Q26	J111-5			Blu-Grn	AE-30-2000	
22	RUB LAMP FLASHER	Flasher	J133-6			Q30	J111-6			Blu-Blk	#906	
23	MAGIC LAMP FLASHERS	Flasher	J133-6			Q25	J111-7			Blu-Vio	#906	
24	RIGHT LOOP FLASHER	Flasher	J133-6			Q29	J111-8			Blu-Gry	#906	
25	START TALE FLASHERS	Gen. Purpose	J133-6	J134-5		Q16	J109-1	J108-1		Blu-Brn	#906	#906
26	JET FLASHERS	Gen. Purpose	J133-6	J134-5		Q15	J109-2	J108-2		Blu-Red	#906	#906
27	TOP LOOP FLASHER	Gen. Purpose	J133-6	J134-5		Q14	J109-3	J108-3		Blu-Org	#906	#906
28	RAMP FLASHER	Gen. Purpose	J133-6			Q13	J109-4			Blu-Yel	#906	

General Illumination

Sol. No.	Function	Solenoid Type	Voltage Connections Playfield	Backbox	Cabinet	Drive Xistor	Voltage Connections Playfield	Backbox	Cabinet	Drive Wire Color	Flashlamp Type Playfield	Backbox
01	ILLUMINATION STRING 1	G.I.		J106-1		Q5		J106-7		Wht-Brn	#44	
02	ILLUMINATION STRING 2	G.I.		J106-2		Q4		J106-8		Wht-Org	#44	
03	ILLUMINATION STRING 3	G.I.		J106-3		Q3		J106-9		Wht-Yel	#44	
04	*ILLUMINATION STRING 4	G.I.	J105-5			Q2	J105-10			Wht-Grn		#555
05	*ILLUMINATION STRING 5	G.I.	J105-6		J104-3	Q1	J105-11		J104-1	Wht-Vio		#555

Flipper Circuits

	Function		Voltage Connection Playfield	Drive Transistors Power	Hold	Drive Connections Playfield	Drive Wire Colors Power	Hold	Coil Part No.	Coil Colors
29		Lwr. Rt. Power	J119-1 (Red-Grn)	Q90		J120-13	Yel-Grn		FL-11629	BLUE
30	LOWER RIGHT FLIPPER	Lwr. Rt. Hold	J119-1 (Red-Grn)		Q92	J120-11		Org-Grn		
31		Lwr. Lt. Power	J119-4 (Red-Blu)	Q87		J120-9	Yel-Blu		FL-11629	BLUE
32	LOWER LEFT FLIPPER	Lwr. Lt. Hold	J119-4 (Red-Blu)		Q89	J120-7		Org-Blu		
33	LEFT DIVERTER POWER	Upr. Rt. Power	J119-6 (Red-Vio)	Q84		J120-6	Yel-Vio		FL-11753	YELLOW
34	LEFT DIVERTER HOLD	Upr. Rt. Hold	J119-6 (Red-Vio)		Q86	J120-4		Org-Vio		
35	VANISH MAGNET	Upr. Lt. Power	J119-8 (Red-Gry)	Q81		J120-3	Yel-Gry		20-10197	
36	LOOP POST DIVERTER	Upr. Lt. Hold	J119-8 (Red-Gry)		Q83	J120-1		Org-Gry	AE-27-1200	

J1XX = POWER DRIVER BOARD
24-6549 = #44 BULB; 24-8704 = #89 BULB; 24-8768 = #555 BULB; 24-8802 = #906 BULB
*THESE G.I. STRINGS DO NOT BRIGHTEN AND DIM, THEY ARE ALWAYS ON.

2-40

Solenoid/Flashlamp Locations

Item No.	Coil/Flasher Number	Assembly Number	Description
01	A-20099	A-20693	Left Cage
02	A-20099	A-20693	Right Cage
03	FL-11753	A-20644	Vanish Drop
04	AE-27-1200	B-9362-L-3	Lock Eject
05	AE-25-1000	A-16434-2	Bazaar Eject
06	20-10197	----------	Lock Magnet
07	AE-23-800	B-10686-1	*Knocker
08	20-10179	A-20839	Ramp Magnet Coil
09	AE-26-1500	A-19963-1	Trough Eject
10	AE-27-1200	B-9362-L-3	Left Slingshot
11	AE-27-1200	B-9362-L-3	Right Slingshot
12	AE-26-1200	A-9415-2	Left Jet Bumper
13	AE-26-1200	A-9415-2	Right Jet Bumper
14	AE-26-1200	A-9415-2	Bottom Jet Bumper
15	AE-27-1200	B-9362-L-3	Left Kicker
16	24-8704	A-17983 (2)	Left Eject Flasher
	24-8802	----------	*Insert Flasher
17	24-8704	A-17983 (2)	Inlane Flasher
18	24-8802	A-17802	Final Battle Flasher
19	24-8802	A-17802	Left Loop Flasher
20	24-8704	A-17983	Bazaar Flasher
21	AE-30-2000	A-20626	Ramp Diverter
22	24-8802	A-17802	Rub Lamp Flasher
23	24-8802	A-17802	Magic Lamp Flasher
24	24-8802	A-17802	Right Loop Flasher
25	24-8802	A-17802	Start Tale Flasher
	24-8802	----------	*Insert Flasher
26	24-8802	A-17802	Jet Flasher
	24-8802	----------	*Insert Flasher
27	24-8802	A-17802	Top Loop Flasher
	24-8802	----------	*Insert Flasher
28	24-8802	A-17802	Ramp Flasher

Flippers

Item No.	Coil/Flasher Number	Assembly Number	Description
29-30	FL-11629	A-14876-R-3	Lower Right Flipper
31-32	FL-11629	A-15849-L-2	Lower Left Flipper
33	FL-11753	A-20642	Left Diverter Power
34			Left Diverter Hold
35	20-10197	A-20644	Vanish Magnet
36	AE-27-1200	A-17932-1	Loop Post Diverter

General Illumination

Item No.	Bulb Number	Description
01	24-6549	*Illumination String 1
02	24-6549	*Illumination String 2
03	24-6549	*Illumination String 3
04	24-8768	*Illumination String 4
05	24-8768	*Illumination String 5

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

*NOT SHOWN
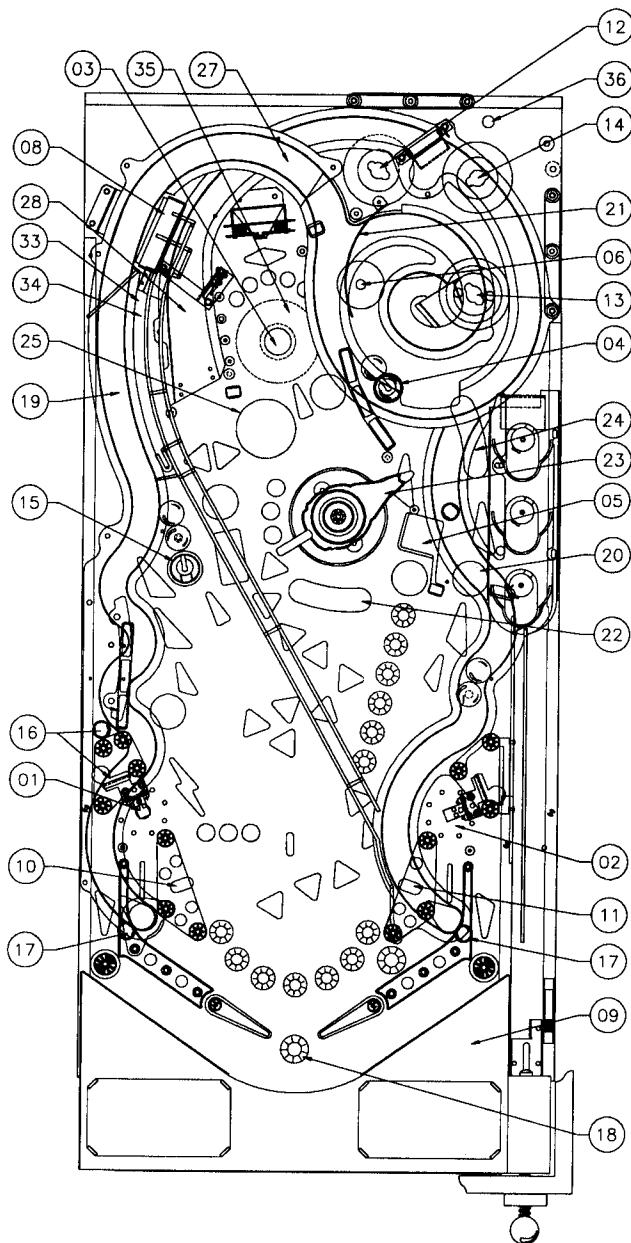
Ramps

Item	Part Number	Description
1	A-20628	Magnet Ramp Assembly
a)	A-20879	Bed of Nails Assembly
b)	01-14268	End Ramp Guard
c)	A-12238	Switch & Diode Assy.
*2	A-20626	Swirl Ramp Assembly
3	A-20627	Skill Ramp Assembly
	01-14268	End Ramp Guard
4	A-20810	Magnet Wire Ramp Assy.

* See page 2-43 for ramp assembly details.
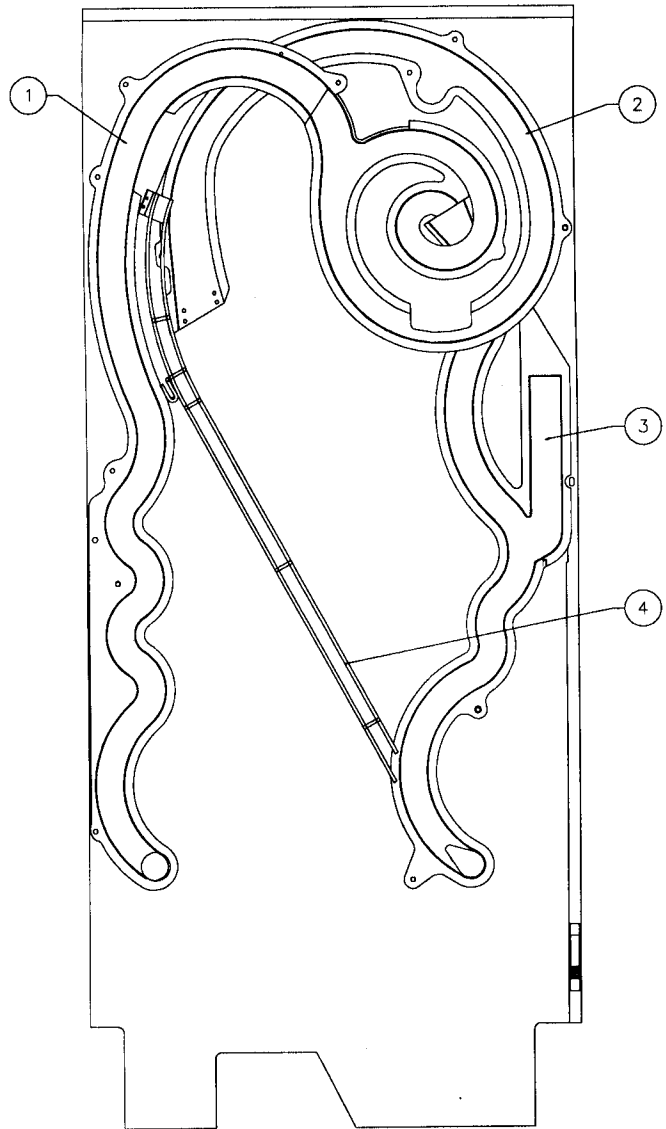
A-20626
Swirl Ramp Assembly
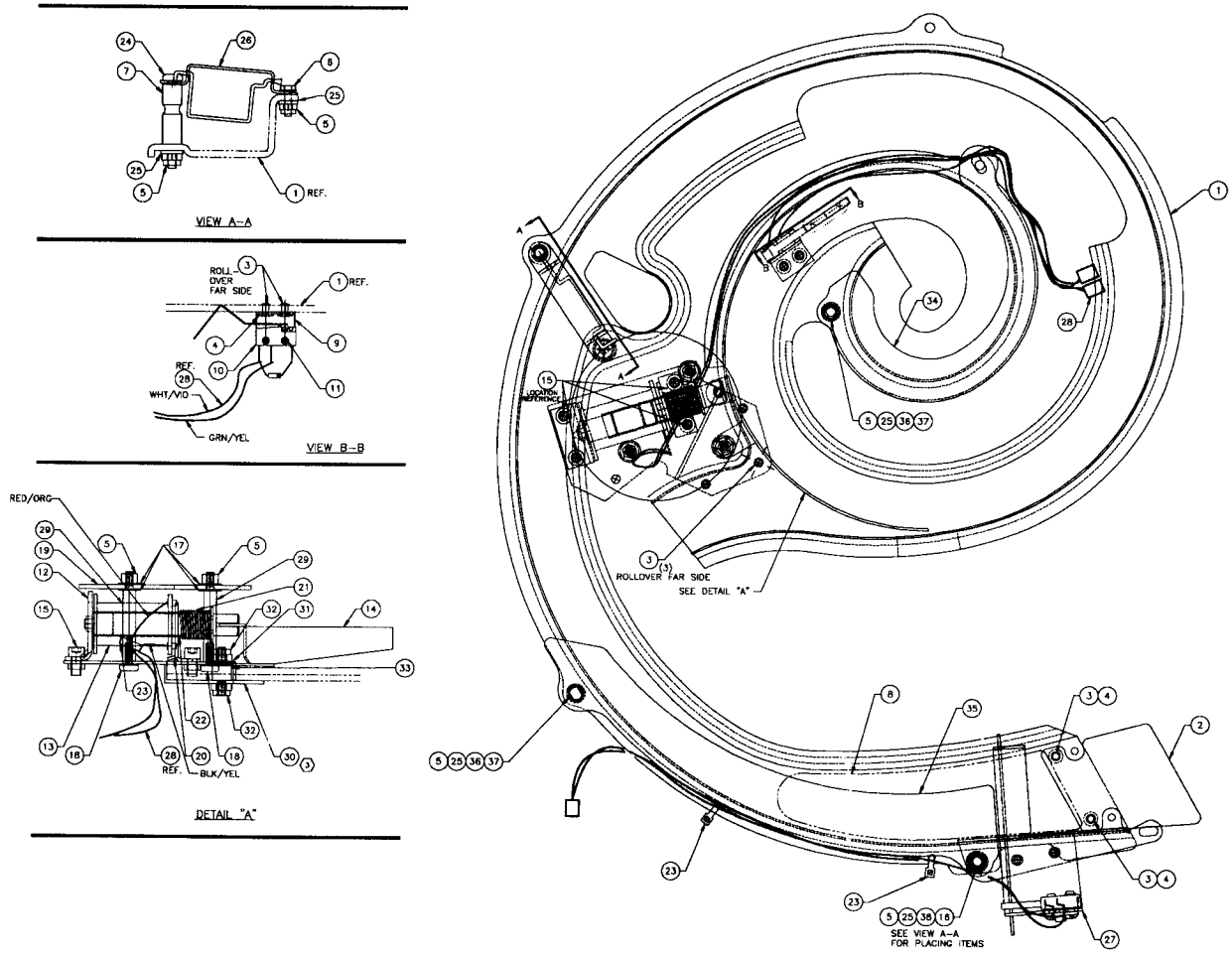
Item	Part Number	Description	Item	Part Number	Description
1	03-9462	Ramp - Swirl	20	01-8413	Coil Mounting Bracket
2	01-14266	Flap	21	10-303	Spring Master
3	07-6688-20N	Rivet, 1/8 x ¼" Nickel	22	03-7066	Coil Tubing
4	4700-00003-00	Fw, 1/8 x 9/32 x 21ga.	23	03-9454	Tie Wrap
5	4406-01119-00	Nut 6-32 ESN	24	4006-01005-26	Mach. Screw, 6-32 x 1-5/8"
6	4006-01113-06	Mach. Screw, 6-32 x 3/8"	25	4700-00007-00	Flat Washer, 5/32 x 7/16 x 16ga.
7	03-8365-13	Post #8 Clear	26	A-20847	Gate Assembly
8	31-2547-1	Decal - Under Side	27	A-20811	Guard Assembly
9	01-8774	Switch Mounting Bracket	28	H-20897	Cable
10	A-12238	Switch & Diode	29	02-4250-23	M-F Sapcer 6-32 x 1-7/16 x ¼" Hex.
11	4002-01105-06	Screw, #2-56 x 3/8" w/SEMS	30	04-10490	Diverter Ramp Plate
12	A-11397	Drop Target Stop Bracket	31	4700-00009-00	Flat Washer, 11/64 x 7/16 x 21ga.
13	AE-30-2000	Coil Assembly	32	4408-01119-01	Nut 8-32 ESNA/NTM
14	A-20914	Plunger & Ball Guide Assy.	33	02-5262	Diverter Ramp Post
15	4010-01066-06	Cap Screw, 10-32 x 3/8"	34	31-2562-1	Playfield Plastics
16	4006-01113-18	Mach. Screw, #6-32 x 1-1/8"	35	31-2562-2	Playfield Plastics
17	4700-00005-00	Flat Washer, 9/64 x 7/16 x 21ga.	36	03-9255-1	Spacer #8.250 Long
18	4006-01003-06	Mach. Screw, 6-32 x 3/8"	37	4006-01113-12	Mach. Screw, #6-32 x ¾"
19	31-2545-21A	Playfield Plastic	38	03-9255-3	Spacer #8.541 Long

Notes

NOTES

NOTES

NOTES

NOTES

SECTION THREE

GAME WIRING
AND SCHEMATICS

CONNECTOR & COMPONENT IDENTIFICATION

Each plug or jack receives a number that identifies the circuit board and the position on that board that it connects to. J-designations refer to a male connector. P-designations refer to a female connector. For example, J101 designates jack 1 of board 1 (a Power Driver board jack); P206 designates plug 6 of board 2 (a CPU board plug). Identifying the specific pin number of a connector involves a hyphen, which separates the pin number from the plug or jack designation. For example, J101-3 refers to pin 3 of jack 1 on board 1.

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

Prefix numbers for WPC circuit boards are listed below.
J1XX - Power Driver board jacks; F1XX - Power Driver board fuses
J2XX - CPU Board (There are no fuses on the CPU board.)
J5XX and J6XX - Audio Video board (AV board) jacks; F5XX and F6XX - Audio Video board fuses

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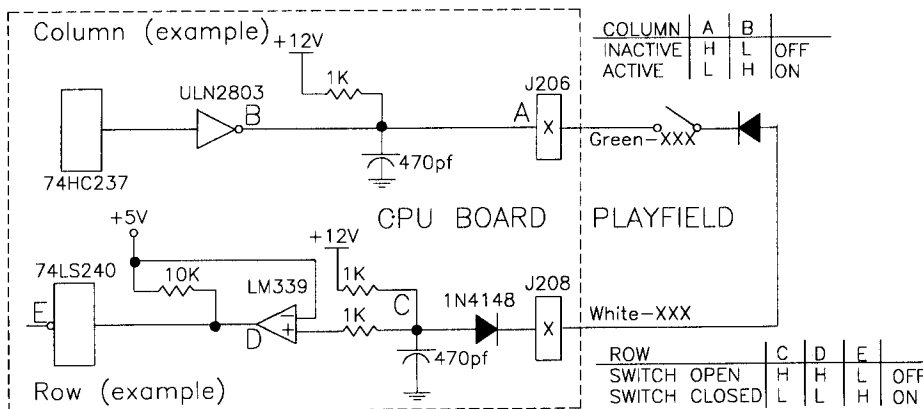
SWITCH MATRIX

White ——▸—o∕ o—— Green

Dedicated Grounded Switches	Column / Row	1 Green-Brown J206-1 U20-18	2 Green-Red J206-2 U20-17	3 Green-Orange J206-3 U20-16	4 Green-Yellow J206-4 U20-15	5 Green-Black J206-5 U20-14	6 Green-Blue J206-6 U20-13	7 Green-Violet J206-7 U20-12	8 Green-Gray J206-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute U17-5 D1	1 White-Brown J208-1 U18-11	HAREM PASSAGE 11	SLAM TILT 21	TROUGH EJECT 31	RAMP MADE LEFT 41	LEFT SLING 51	LEFT STANDUPS 61	NOT USED 71	NOT USED 81	Black-Green J208-13 Lower Right Flipper E.O.S. F1
Orange-Red J205-2 Center Coin Chute U17-7 D2	2 White-Red J208-2 U18-9	VANISH TUNNEL 12	COIN DOOR CLOSED 22	TROUGH BALL 1 32	GENIE TARGET 42	RIGHT SLING 52	RIGHT STANDUPS 62	NOT USED 72	NOT USED 82	Blue-Violet J212-12 Lower Right Flipper Opto F2
Orange-Black J205-3 Right Coin Chute U17-11 D3	3 White-Orange J208-3 U18-5	START BUTTON 13	GENIE STANDUP TARGET 23	TROUGH BALL 2 33	LEFT LOOP 43	LEFT JET 53	TOP SKILL 63	NOT USED 73	NOT USED 83	Black-Blue J208-12 Lower Left Flipper E.O.S. F3
Orange-Yellow J205-4 4th Coin Chute U17-9 D4	4 White-Yellow J208-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH BALL 3 34	INNER LOOP LEFT 44	RIGHT JET 54	MIDDLE SKILL 64	NOT USED 74	NOT USED 84	Blue-Gray J212-11 Lower Left Flipper Opto F4
Orange-Green J205-6 U16-9 Normal/Test Function Function Srv Crdts/Escape D5	5 White-Green J208-5 U19-11	RAMP ENTER 15	BAZAAR EJECT 25	TROUGH BALL 4 35	INNER LOOP RIGHT 45	MIDDLE JET 55	BOTTOM SKILL 65	NOT USED 75	NOT USED 85	Black-Violet J208-11 Upper Right Flipper E.O.S. F5
Orange-Blue J205-7 U16-11 Normal/Test Function Function Volume Dn/Down D6	6 White-Blue U208-7 U19-9	LEFT OUTLANE 16	LEFT INLANE 26	LEFT CAGE OPTO 36	MINI STANDUPS 46	LAMP SPIN CCW 56	LOCK 1 (BOTTOM) 66	NOT USED 76	NOT USED 86	Black-Yellow J212-10 Upper Right Flipper Opto F6
Orange-Violet J205-8 U16-7 Normal/Test Function Function Volume Up/Up D7	7 White-Violet J208-8 U19-5	RIGHT INLANE 17	RIGHT OUTLANE 27	RIGHT CAGE OPTO 37	RAMP MADE RIGHT 47	LAMP SPIN CW 57	LOCK 2 (MIDDLE) 67	NOT USED 77	NOT USED 87	Black-Gray J208-10 Upper Left Flipper E.O.S. F7
Orange-Gray J205-9 U16-5 Normal/Test Function Function Begin Test/Enter D8	8 White-Gray J208-9 U19-7	BALL SHOOTER 18	LEFT WIRE MAKE 28	LEFT EJECT 38	RIGHT CAPTIVE BALL 48	LEFT CAPTIVE BALL 58	LOCK 3 (TOP) 68	NOT USED 78	NOT USED 88	Black-Blue J212-9 Upper Left Flipper Opto F8

J2XX = CPU BOARD   ▓▓ = OPTO, TYPICALLY CLOSED

SWITCH MATRIX CIRCUIT

COLUMN	A	B	
INACTIVE	H	L	OFF
ACTIVE	L	H	ON

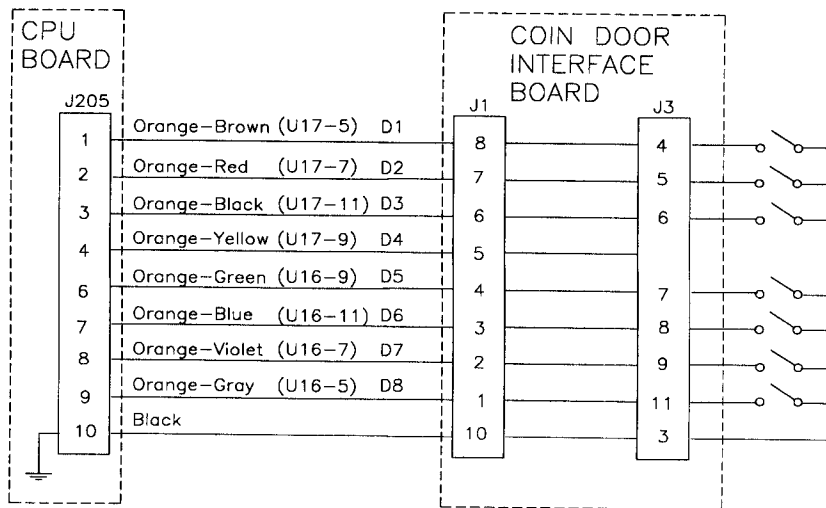| ROW	C	D	E	
SWITCH OPEN	H	H	L	OFF
SWITCH CLOSED	L	L	H	ON

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

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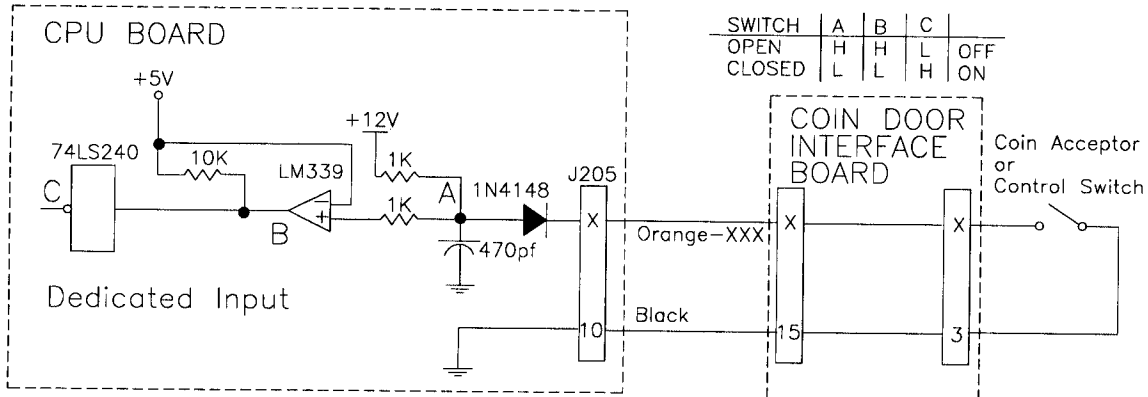
DEDICATED SWITCHES

CPU BOARD — J205

Pin	Wire	
1	Orange–Brown (U17–5)	D1
2	Orange–Red (U17–7)	D2
3	Orange–Black (U17–11)	D3
4	Orange–Yellow (U17–9)	D4
6	Orange–Green (U16–9)	D5
7	Orange–Blue (U16–11)	D6
8	Orange–Violet (U16–7)	D7
9	Orange–Gray (U16–5)	D8
10	Black	

COIN DOOR INTERFACE BOARD — J1, J3

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

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

DEDICATED SWITCH CIRCUIT

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

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

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

LAMP MATRIX

Yellow (B+) ⟶ Red

Column \ Row	1 Yellow-Brown J121-1 Q96	2 Yellow-Red J121-2 Q100	3 Yellow-Orange J121-3 Q95	4 Yellow-Black J121-4 Q99	5 Yellow-Green J121-5 Q94	6 Yellow-Blue J121-6 Q98	7 Yellow-Violet J121-7 Q93	8 Yellow-Gray J121-9 Q97
1 Red-Brown J125-1 Q104	JEWEL 1 (LEFT) 11	JACKPOT 21	MAGIC CARPET 31	SMOKE 6 41	SMOKE 14 (TOP) 51	MAKE A WISH 61	ACTION 2 71	EXTRA BALL 81
2 Red-Black J125-2 Q108	JEWEL 2 12	(G)ENIE 22	ACTION 3 32	SMOKE 7 42	LAMP-15 52	(B)AZAAR 62	LEFT LOCK 72	ACTION 5 82
3 Red-Orange J125-4 Q103	JEWEL 3 13	G(E)NIE 23	RAMP ARROW RIGHT 33	SMOKE 8 43	LAMP-30 53	B(A)ZAAR 63	HAREM ADVANCE 73	RIGHT LOCK 83
4 Red-Yellow J125-5 Q107	JEWEL 4 14	GE(N)IE 24	RAMP ARROW LEFT 34	SMOKE 9 44	LAMP-60 54	BA(Z)AAR 64	LEFT TIGER LOOP 74	RIGHT TIGER LOOP 84
5 Red-Green J125-6 Q102	JEWEL 5 15	GEN(I)E 25	SMOKE 1 (BOTTOM) 35	SMOKE 10 45	SMOKE 4 55	BAZ(A)AR 65	ACTION 1 75	CAPTIVE BALL RIGHT 85
6 Red-Blue J125-7 Q106	JEWEL 6 16	GENI(E) 26	SMOKE 2 36	SMOKE 11 46	SMOKE 5 56	BAZA(A)R 66	WISH 1 76	ACTION 4 86
7 Red-Violet J125-8 Q101	JEWEL 7 (RIGHT) 17	MULTIBALL 27	SMOKE 3 37	SMOKE 12 47	SHOOT STAR RIGHT 57	BAZAA(R) 67	WISH 2 77	CAPTIVE BALL LEFT 87
8 Red-Gray J125-9 Q105	SHOOT AGAIN 18	OUTLANE SPECIAL 28	AMULET 38	SMOKE 13 48	SHOOT STAR LEFT 58	CENTER LOCK 68	WISH 3 78	START BUTTON 88

J1XX = Power Driver Board

LAMP MATRIX CIRCUIT

COLUMN	A	B	
	H	L	OFF
	L	H	ON

ROW	C	D	E	F	G	
NORMAL	H	L	H	L	H	OFF
OPERATION	H	L	L	H	L	ON
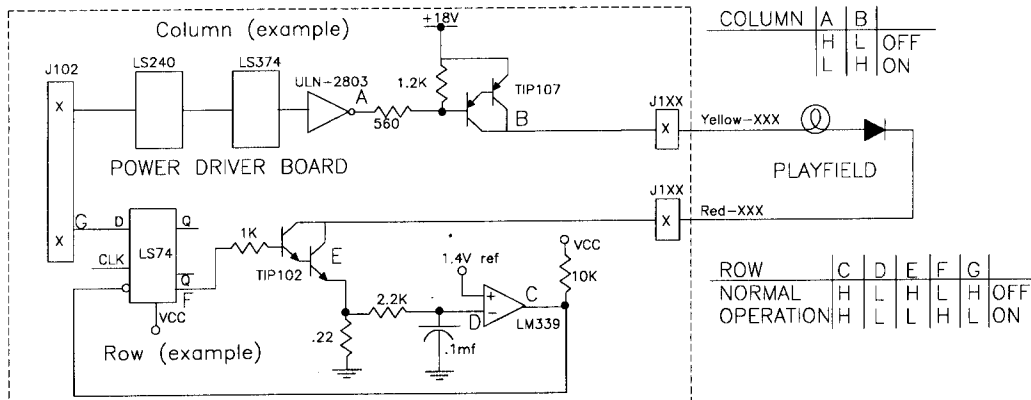
The microprocessor sends a signal to the column circuit causing the output of the UNL-2803 to toggle. When point "A" drops low, the TIP107 transistor conducts and point "B" changes to a high state. At the same time, the microprocessor drives the input of the 74LS74 low, causing a high at output "F". A high state at the base of the TIP102 causes the transistor to conducts, bringing the row circuit to ground and turning the lamp on. The microprocessor 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 circuit off.

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections Playfield	Backbox	Cabinet	Drive Xistor	Drive Connections Playfield	Backbox	Cabinet	Drive Wire Color	Solenoid Part Number / Flashlamp Type Playfield	Backbox
01	LEFT CAGE	High Power	J133-2			Q72	J116-1			Vio-Brn	A-20099	
02	RIGHT CAGE	High Power	J133-2			Q68	J116-2			Vio-Red	A-20099	
03	VANISH DROP	High Power	J133-2			Q71	J116-4			Vio-Org	FL-11753	
04	LOCK EJECT	High Power	J133-2			Q67	J116-5			Vio-Yel	AE-27-1200	
05	BAZAAR EJECT	High Power	J133-2			Q70	J116-6			Vio-Grn	AE-25-1000	
06	LOCK MAGNET	High Power	J133-2			Q66	J116-7			Vio-Blu	20-10197	
07	KNOCKER	High Power		J133-2		Q69		J116-8		Vio-Blk		AE-23-800
08	RAMP MAGNET COIL	High Power	J133-1			Q65	J116-9			Vio-Gry	20-10179	
09	TROUGH EJECT	Low Power	J133-3			Q44	J113-1			Brn-Blk	AE-26-1500	
10	LEFT SLINGSHOT	Low Power	J133-3			Q48	J113-3			Brn-Red	AE-27-1200	
11	RIGHT SLINGSHOT	Low Power	J133-3			Q43	J113-4			Brn-Org	AE-27-1200	
12	LEFT JET BUMPER	Low Power	J133-3			Q47	J113-5			Brn-Yel	AE-26-1200	
13	RIGHT JET BUMPER	Low Power	J133-3			Q42	J113-6			Brn-Grn	AE-26-1200	
14	MIDDLE JET BUMPER	Low Power	J133-3			Q46	J113-7			Brn-Blu	AE-26-1200	
15	LEFT KICKER	Low Power	J133-3			Q41	J113-8			Brn-Vio	AE-27-1200	
16	LEFT EJECT FLASHER	Low Power	J133-6	J134-5		Q45	J113-9	J114-5		Brn-Gry	#89 (2)	#906
17	INLANE FLASHERS	Flasher	J133-6			Q28	J111-1			Blk-Brn	#89 (2)	
18	FINAL BATTLE FLASHER	Flasher	J133-6			Q32	J111-2			Blk-Red	#906	
19	LEFT LOOP FLASHER	Flasher	J133-6			Q27	J111-3			Blk-Org	#906	
20	BAZAAR FLASHER	Flasher	J133-6			Q31	J111-4			Blk-Yel	#89	
21	RAMP DIVERTER	Low Power	J133-2			Q26	J111-5			Blu-Grn	AE-30-2000	
22	RUB LAMP FLASHER	Flasher	J133-6			Q30	J111-6			Blu-Blk	#906	
23	MAGIC LAMP FLASHERS	Flasher	J133-6			Q25	J111-7			Blu-Vio	#906	
24	RIGHT LOOP FLASHER	Flasher	J133-6			Q29	J111-8			Blu-Gry	#906	
25	START TALE FLASHERS	Gen. Purpose	J133-6	J134-5		Q16	J109-1	J108-1		Blu-Brn	#906	#906
26	JET FLASHERS	Gen. Purpose	J133-6	J134-5		Q15	J109-2	J108-2		Blu-Red	#906	#906
27	TOP LOOP FLASHER	Gen. Purpose	J133-6	J134-5		Q14	J109-3	J108-3		Blu-Org	#906	#906
28	RAMP FLASHER	Gen. Purpose	J133-6			Q13	J109-4			Blu-Yel	#906	

General Illumination

Sol. No.	Function	Solenoid Type	Voltage Connections Playfield	Backbox	Cabinet	Drive Xistor	Drive Connections Playfield	Backbox	Cabinet	Drive Wire Color	Flashlamp Playfield	Backbox
01	ILLUMINATION STRING 1	G.I.		J106-1		Q5		J106-7		Wht-Brn	#44	
02	ILLUMINATION STRING 2	G.I.		J106-2		Q4		J106-8		Wht-Org	#44	
03	ILLUMINATION STRING 3	G.I.		J106-3		Q3		J106-9		Wht-Yel	#44	
04	*ILLUMINATION STRING 4	G.I.	J105-5			Q2	J105-10			Wht-Grn		#555
05	*ILLUMINATION STRING 5	G.I.	J105-6		J104-3	Q1	J105-11		J104-1	Wht-Vio		#555

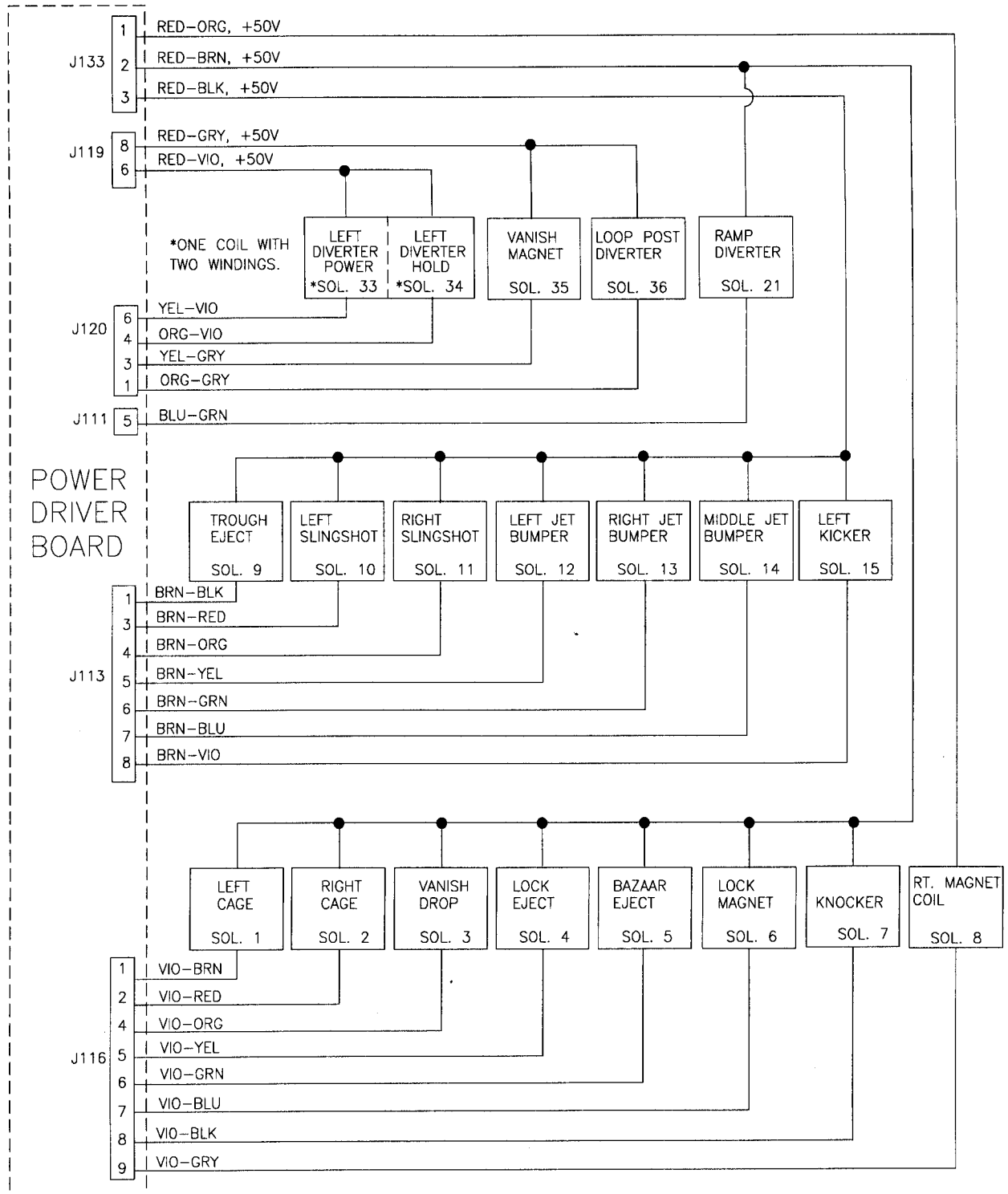| Flipper Circuits			Voltage Connection Playfield	Drive Transistors Power	Hold	Drive Connections Playfield	Drive Wire Colors Power	Hold	Coil Part No.	Coil Colors
29		Lwr. Rt. Power	J119-1 (Red-Grn)	Q90		J120-13	Yel-Grn		FL-11629	BLUE
30	LOWER RIGHT FLIPPER	Lwr. Rt. Hold	J119-1 (Red-Grn)		Q92	J120-11		Org-Grn		
31		Lwr. Lt. Power	J119-4 (Red-Blu)	Q87		J120-9	Yel-Blu		FL-11629	BLUE
32	LOWER LEFT FLIPPER	Lwr. Lt. Hold	J119-4 (Red-Blu)		Q89	J120-7		Org-Blu		
33	LEFT DIVERTER POWER	Upr. Rt. Power	J119-6 (Red-Vio)	Q84		J120-6	Yel-Vio		FL-11753	YELLOW
34	LEFT DIVERTER HOLD	Upr. Rt. Hold	J119-6 (Red-Vio)		Q86	J120-4		Org-Vio		
35	VANISH MAGNET	Upr. Lt. Power	J119-8 (Red-Gry)	Q81		J120-3	Yel-Gry		20-10197	
36	LOOP POST DIVERTER	Upr. Lt. Hold	J119-8 (Red-Gry)		Q83	J120-1		Org-Gry	AE-27-1200	

J1XX = POWER DRIVER BOARD
24-6549 = #44 BULB; 24-8704 = #89 BULB; 24-8768 = #555 BULB; 24-8802 = #906 BULB
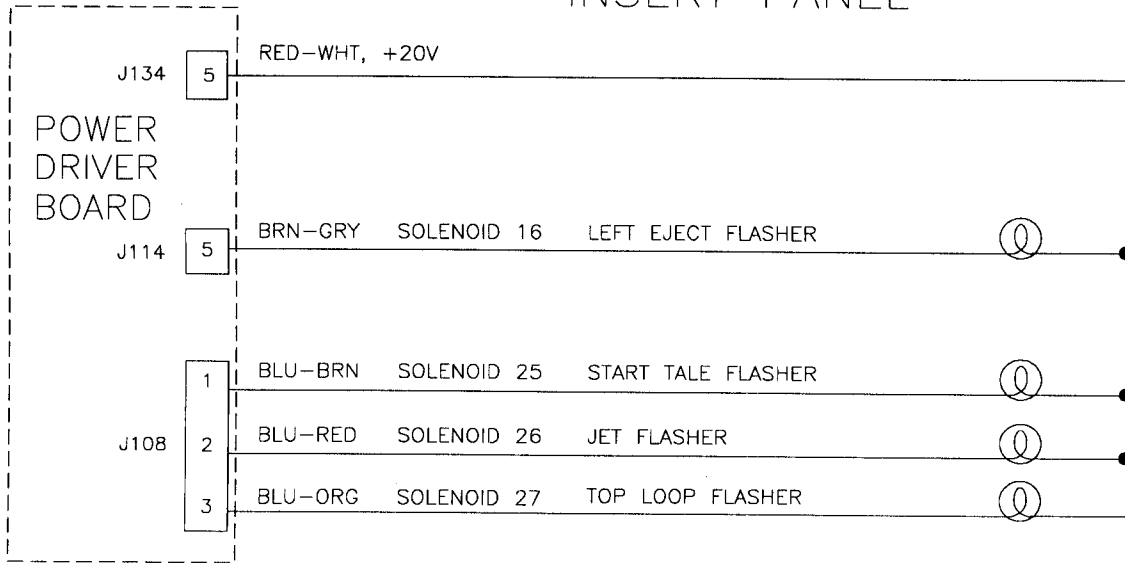*THESE G.I. STRINGS DO NOT BRIGHTEN AND DIM, THEY ARE ALWAYS ON.
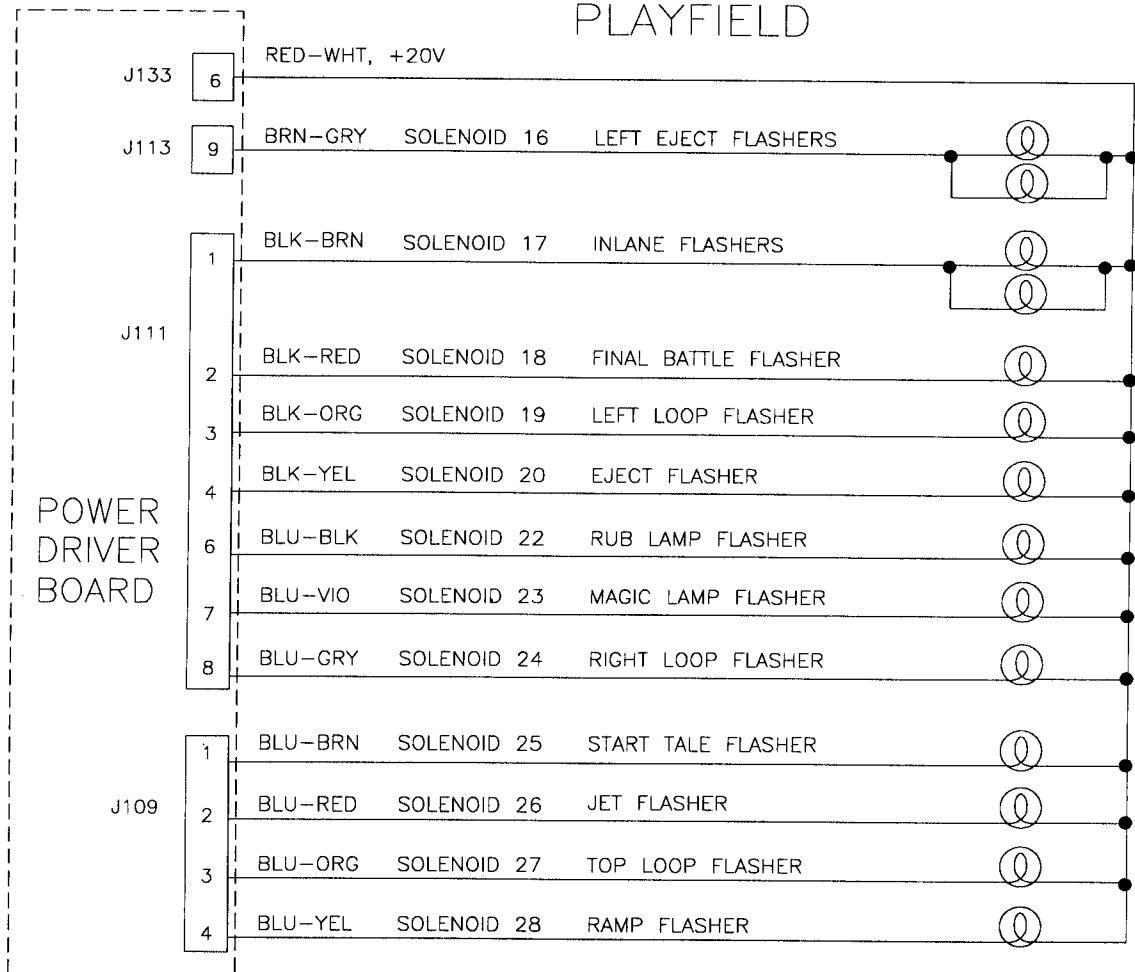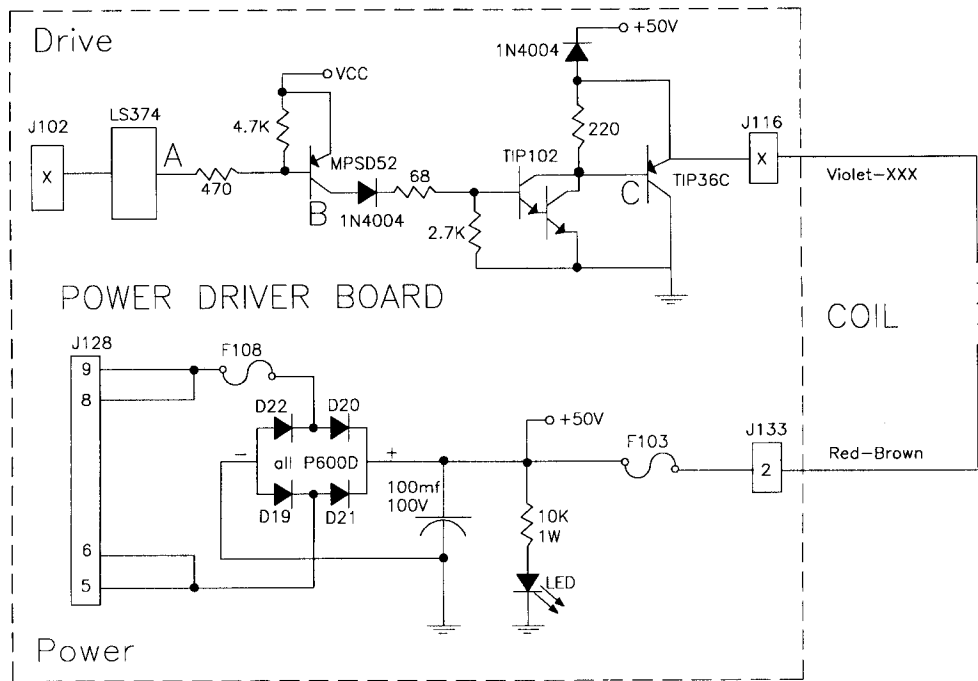
SOLENOID WIRING

COILS

*ONE COIL WITH TWO WINDINGS.

Connector	Pin	Wire
J133	1	RED–ORG, +50V
	2	RED–BRN, +50V
	3	RED–BLK, +50V
J119	8	RED–GRY, +50V
	6	RED–VIO, +50V

LEFT DIVERTER POWER *SOL. 33	LEFT DIVERTER HOLD *SOL. 34	VANISH MAGNET SOL. 35

LOOP POST DIVERTER SOL. 36	RAMP DIVERTER SOL. 21

Connector	Pin	Wire
J120	6	YEL–VIO
	4	ORG–VIO
	3	YEL–GRY
	1	ORG–GRY
J111	5	BLU–GRN

POWER DRIVER BOARD

TROUGH EJECT SOL. 9	LEFT SLINGSHOT SOL. 10	RIGHT SLINGSHOT SOL. 11	LEFT JET BUMPER SOL. 12	RIGHT JET BUMPER SOL. 13	MIDDLE JET BUMPER SOL. 14	LEFT KICKER SOL. 15

Connector	Pin	Wire
J113	1	BRN–BLK
	3	BRN–RED
	4	BRN–ORG
	5	BRN–YEL
	6	BRN–GRN
	7	BRN–BLU
	8	BRN–VIO

LEFT CAGE SOL. 1	RIGHT CAGE SOL. 2	VANISH DROP SOL. 3	LOCK EJECT SOL. 4	BAZAAR EJECT SOL. 5	LOCK MAGNET SOL. 6	KNOCKER SOL. 7	RT. MAGNET COIL SOL. 8

Connector	Pin	Wire
J116	1	VIO–BRN
	2	VIO–RED
	4	VIO–ORG
	5	VIO–YEL
	6	VIO–GRN
	7	VIO–BLU
	8	VIO–BLK
	9	VIO–GRY

FLASHLAMPS

INSERT PANEL

J134	5	RED–WHT, +20V		
J114	5	BRN–GRY	SOLENOID 16	LEFT EJECT FLASHER
J108	1	BLU–BRN	SOLENOID 25	START TALE FLASHER
	2	BLU–RED	SOLENOID 26	JET FLASHER
	3	BLU–ORG	SOLENOID 27	TOP LOOP FLASHER

POWER DRIVER BOARD

PLAYFIELD

J133	6	RED–WHT, +20V		
J113	9	BRN–GRY	SOLENOID 16	LEFT EJECT FLASHERS
J111	1	BLK–BRN	SOLENOID 17	INLANE FLASHERS
	2	BLK–RED	SOLENOID 18	FINAL BATTLE FLASHER
	3	BLK–ORG	SOLENOID 19	LEFT LOOP FLASHER
	4	BLK–YEL	SOLENOID 20	EJECT FLASHER
	6	BLU–BLK	SOLENOID 22	RUB LAMP FLASHER
	7	BLU–VIO	SOLENOID 23	MAGIC LAMP FLASHER
	8	BLU–GRY	SOLENOID 24	RIGHT LOOP FLASHER
J109	1	BLU–BRN	SOLENOID 25	START TALE FLASHER
	2	BLU–RED	SOLENOID 26	JET FLASHER
	3	BLU–ORG	SOLENOID 27	TOP LOOP FLASHER
	4	BLU–YEL	SOLENOID 28	RAMP FLASHER

POWER DRIVER BOARD

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

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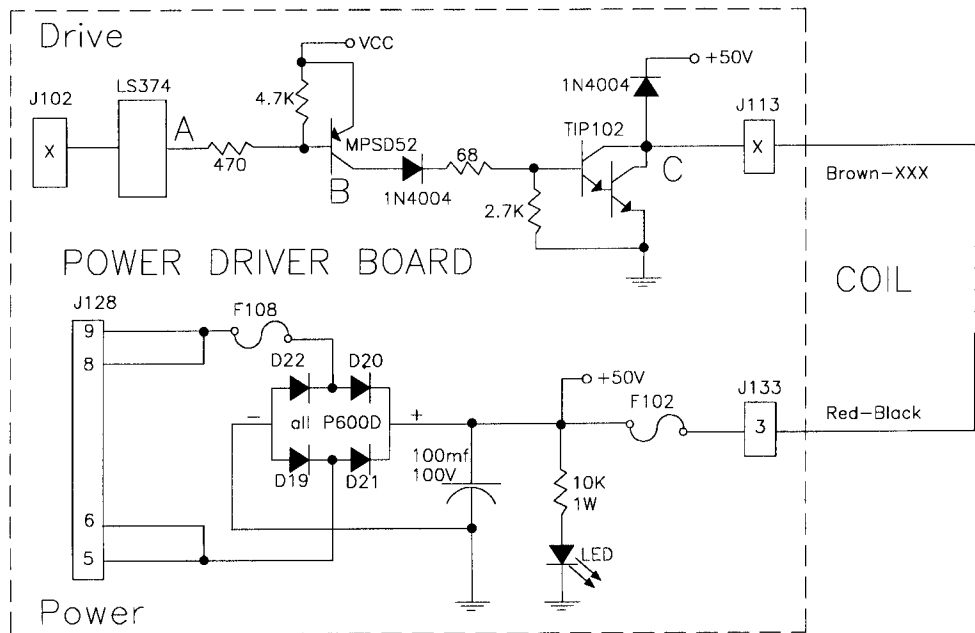
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B", the collector of the 2N5401 transistor, is high. A high at point "B" turns on the TIP102 transistor and causes point "C" to drop low. When point "C" is low the coil is grounded through the transistor and turns on.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

3-8

SPECIAL (GENERAL PURPOSE) SOLENOID CIRCUIT
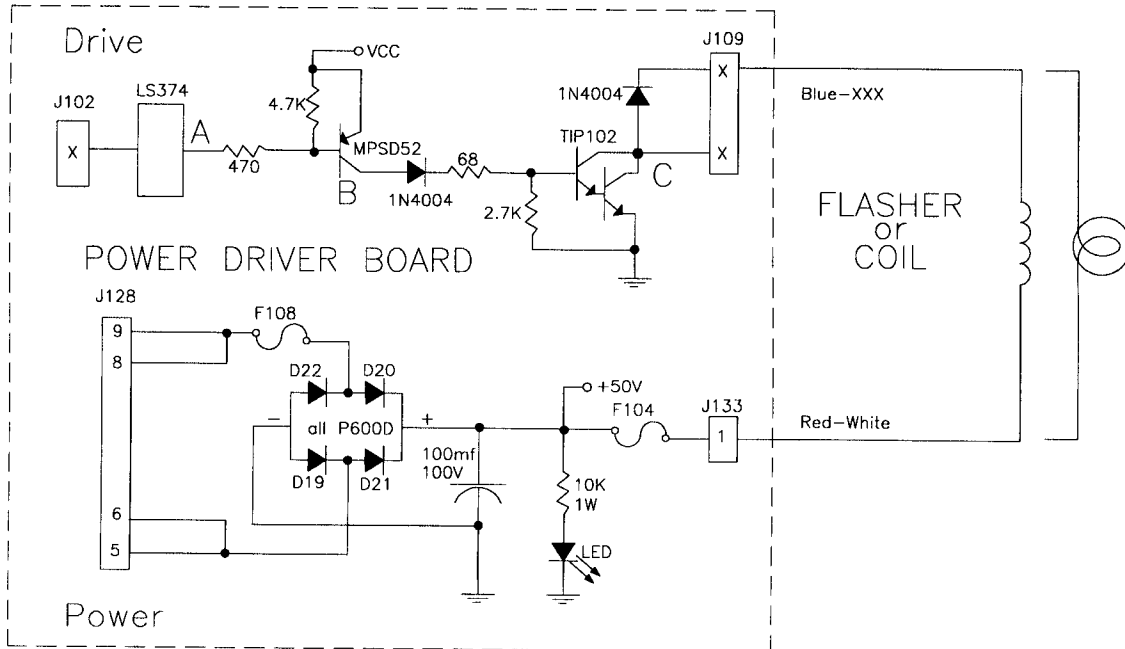
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor , is high. A high at point "B" causes a low at point "C". When point "C" is low, the coil/flashlamp is grounded through the transistor and turns on. When point "A" toggles high the coil/flashlamp turns off.
* Tieback diode is not used for flashlamp circuit.

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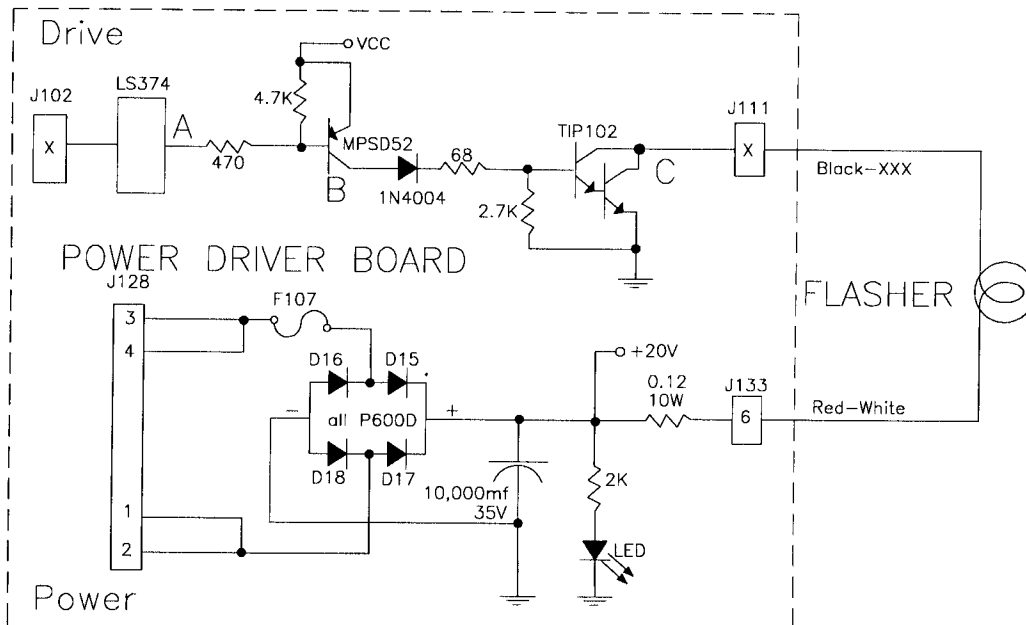
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor, is high. Once point "B" is high, point "C" the collector of the TIP102 transistor is low. When point "C" is low, the flashlamp is grounded through the transistor and turns on.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

GENERAL ILLUMINATION CIRCUIT
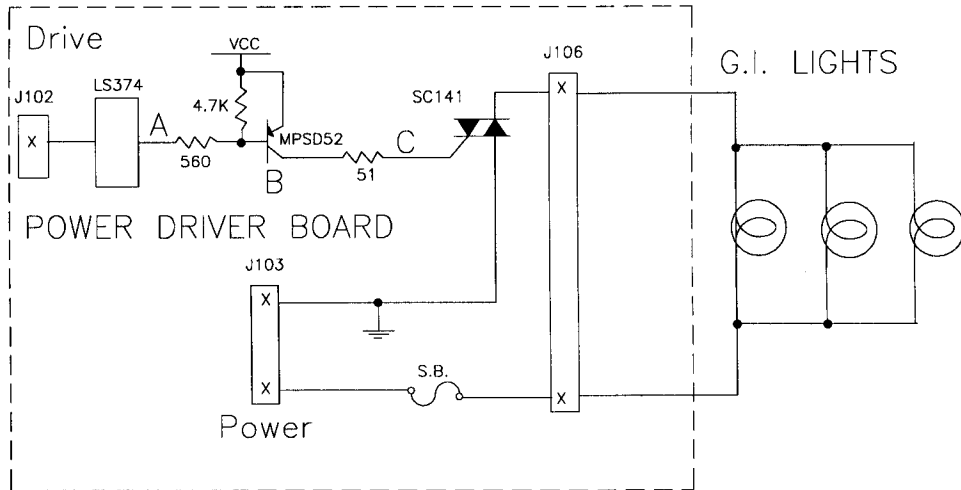
Figure #1
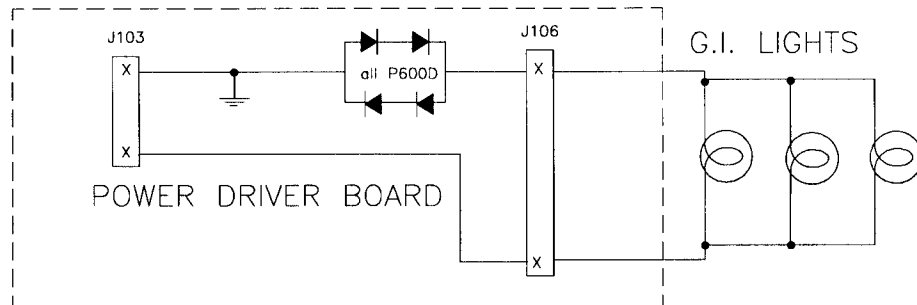
Figure #2

There are five general illumination strings; three like figure #1 and two like figure #2. When point "A" toggles low, points, "B" and "C" are high. This turns on the triac and the desired general illumination string of lights.

BLOCK DIAGRAM OF GENERAL ILLUMINATION CIRCUIT
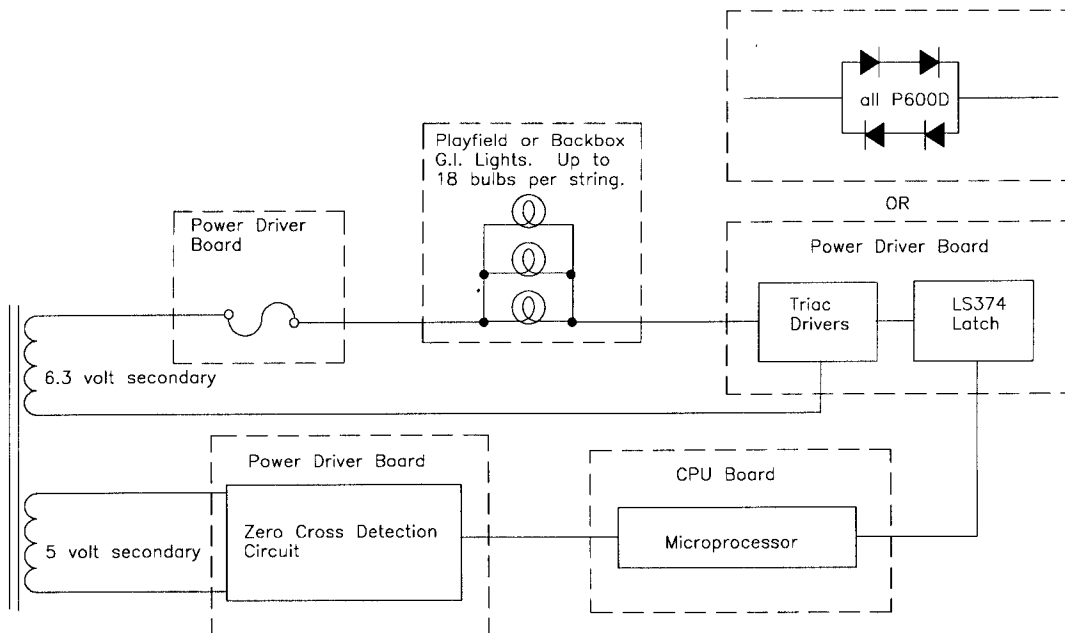
FLIPPER CIRCUIT DIAGRAM

RED–GRAY +50V

RED–VIOLET +50V

RED–BLUE +50V

RED–GREEN +50V

```
8  6  4  1
```
J119

POWER
DRIVER
BOARD

J120

LOWER RIGHT FLIPPER COIL

| 12 | YELLOW–GREEN | POWER | Q90 |
| 11 | ORANGE–GREEN | HOLD | Q92 |

LOWER LEFT FLIPPER COIL

| 9 | YELLOW–BLUE | POWER | Q87 |
| 7 | ORANGE–BLUE | HOLD | Q89 |

UPPER RIGHT FLIPPER COIL

| 6 | YELLOW–VIOLET | POWER | Q84 |
| 4 | ORANGE–VIOLET | HOLD | Q86 |

UPPER LEFT FLIPPER COIL

| 3 | YELLOW–GRAY | POWER | Q81 |
| 1 | ORANGE–GRAY | HOLD | Q83 |

J139

J102

| 2 | GRAY–YELLOW +12V |

J211

CPU
BOARD

J212

CABINET OPTO SWITCHES

13	ORANGE	GROUND		
12	BLUE–VIOLET	L. RIGHT FLIPPER	F2	U25A–1
11	BLUE–GRAY	L. LEFT FLIPPER	F4	U25B–2
10	BLACK–YELLOW	U. RIGHT FLIPPER	F6	U25C–14
9	BLACK–BLUE	U. LEFT FLIPPER	F8	U25D–13

FLIPPER
OPTO
BOARDS

J208

END–OF–STROKE SWITCHES

14	ORANGE	GROUND		
13	BLACK–GREEN	L. RIGHT FLIPPER	F1	U26A–1
12	BLACK–BLUE	L. LEFT FLIPPER	F3	U26B–2
11	BLACK–VIOLET	U. RIGHT FLIPPER	F5	U26C–14
10	BLACK–GRAY	U. LEFT FLIPPER	F7	U26D–13

The upper right flipper coil power and hold circuits are used for the Left Diverter. The upper left flipper coil power circuit is used for the Vanish Magnet. The upper left flipper hold circuit is used for the Loop Post Diverter.

3-11

FLIPPER COIL CIRCUITS

LEFT FLIPPER CIRCUIT
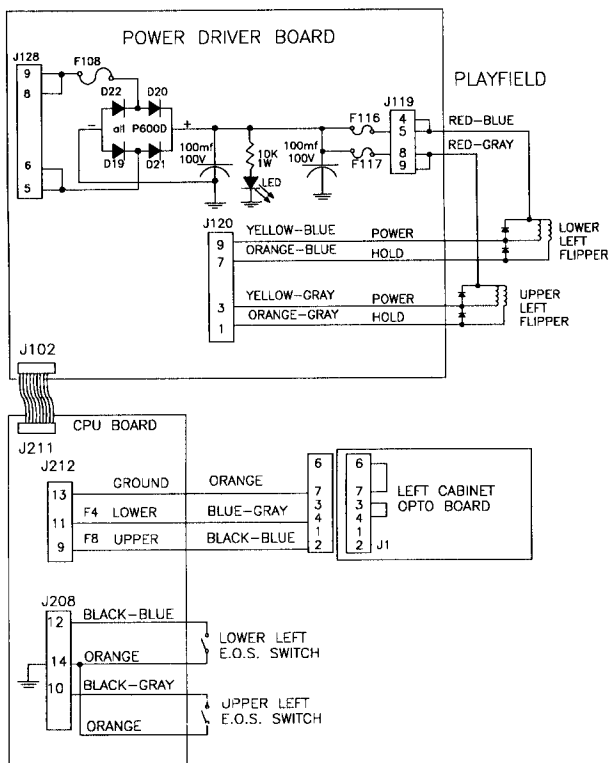
RIGHT FLIPPER CIRCUIT
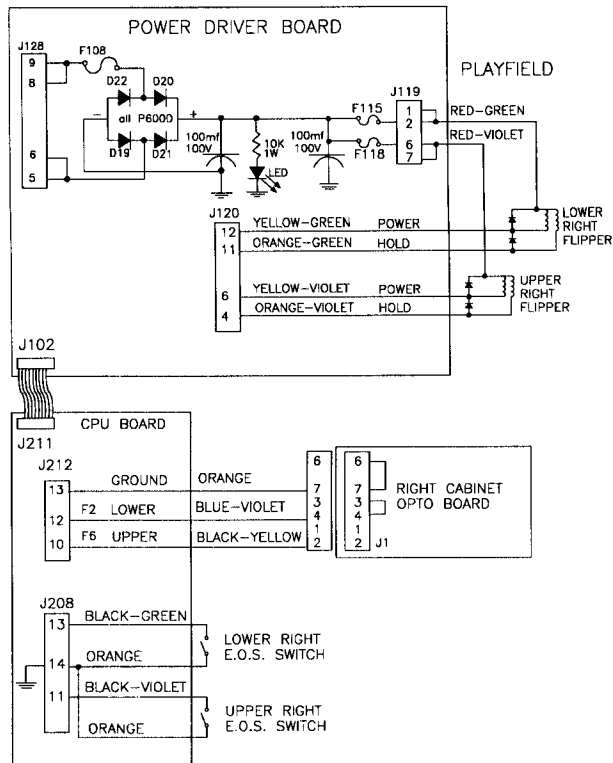
FLIPPER END-OF-STROKE SWITCH CIRCUIT

SWITCH	A	B	
OPEN	H	H	OFF
CLOSED	L	L	ON
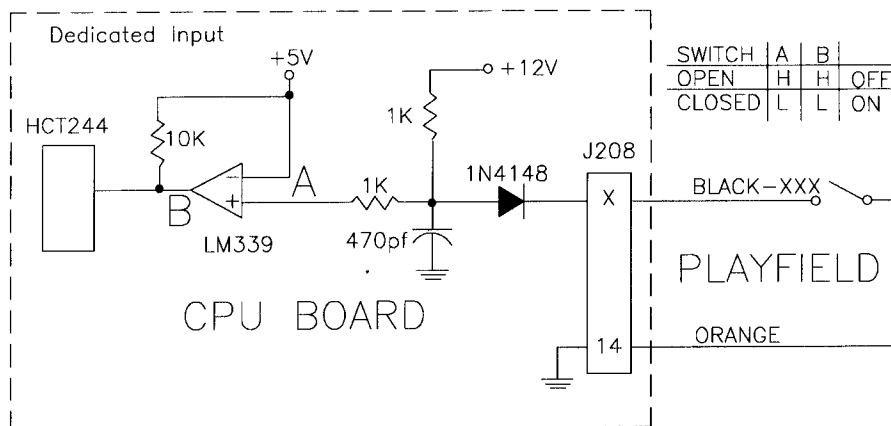
The flipper E.O.S. circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

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

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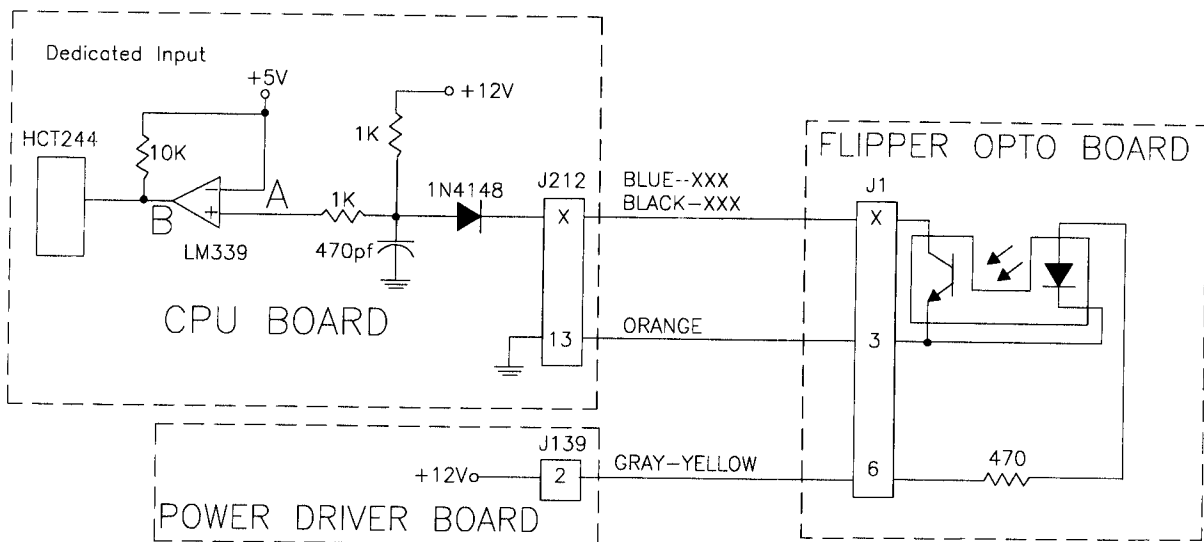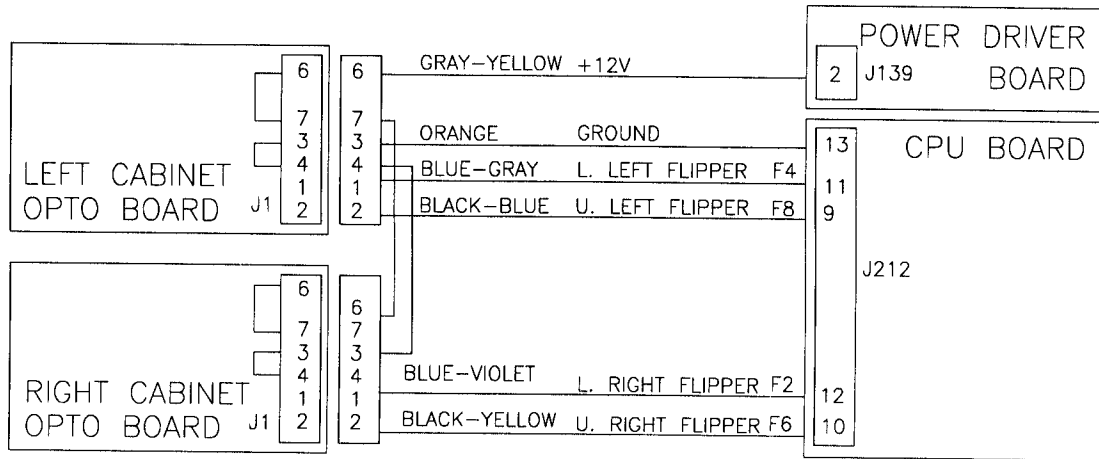
The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch circuit.

When a switch closes, the row side (dedicated input) of the circuit 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 OPTO BOARD ASSEMBLY
A-17316
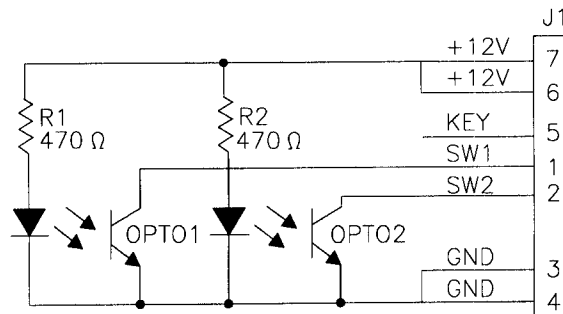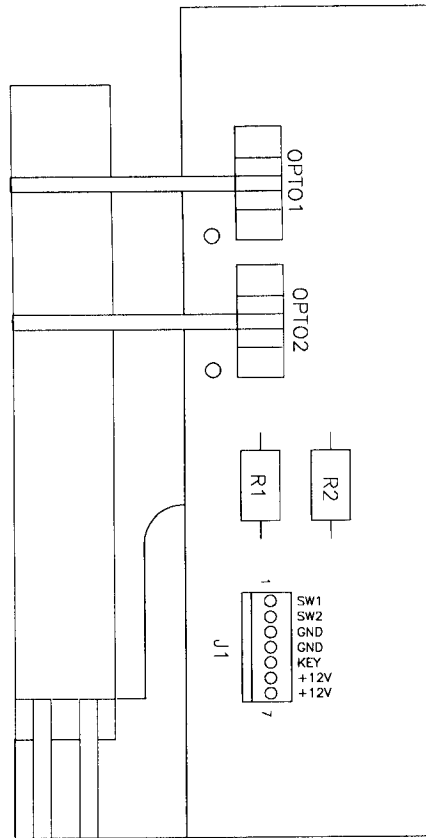
Left Flipper Opto Board Assembly
J1-1 Black-Blue from CPU board J212-9
J1-2 Blue-Gray from CPU board J212-11
J1-3 N/C
J1-4 Orange from CPU board J212-13
J1-5 N/C
J1-6 Gray-Yellow from Power Driver Board J139-2
J1-7 Gray-Yellow from Power Driver Board J139-2

Right Flipper Opto Board Assembly
J1-1 Black-Yellow from CPU board J212-10
J1-2 Blue-Violet from CPU board J212-12
J1-3 Orange from CPU board J212-13
J1-4 Orange from Left Flipper Opto Board Assy J1-4
J1-5 N/C
J1-6 Gray-Yellow from Left Flipper Opto Board Assy J1-6
J1-7 N/C

LED BOARD ASSEMBLY
A-16908
(TRANSMITTER-GREEN BOARD)

A   K

solder side

K   A

component side

A   K
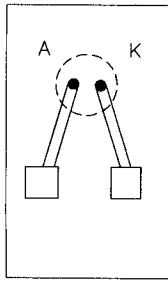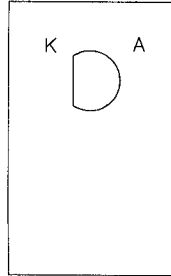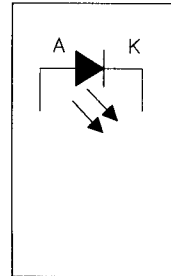
schematic

PHOTO TRANSISTOR BOARD ASSEMBLY
A-16909
(RECEIVER-BLUE BOARD)

C   E

solder side

E
C
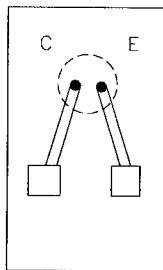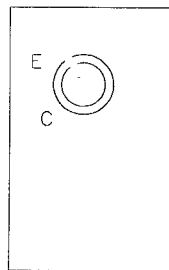
component side

C   E
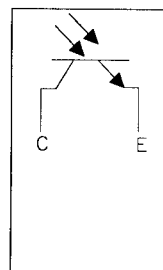
schematic

TYPICAL CIRCUIT DIAGRAM

LED BOARD
Transmitter
1.0—1.4 volts

BEAM
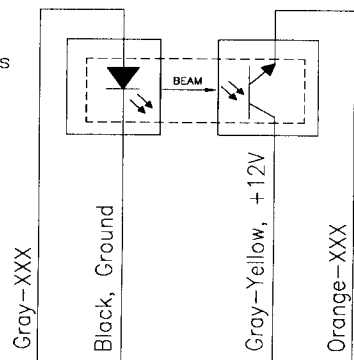
PHOTO TRANSISTOR BOARD
Receiver

0.1—0.7 volts unblocked
11—13 volts blocked

Gray—XXX

Black, Ground

Gray—Yellow, +12V

Orange—XXX

LED BOARD
Transmitter

White

Green

A   K

Solder

Gray

Black

Infrared Beam

PHOTO TRANSISTOR BOARD
Receiver

Black

Blue

C   E

Solder

Gray—Yellow

Orange

3-15
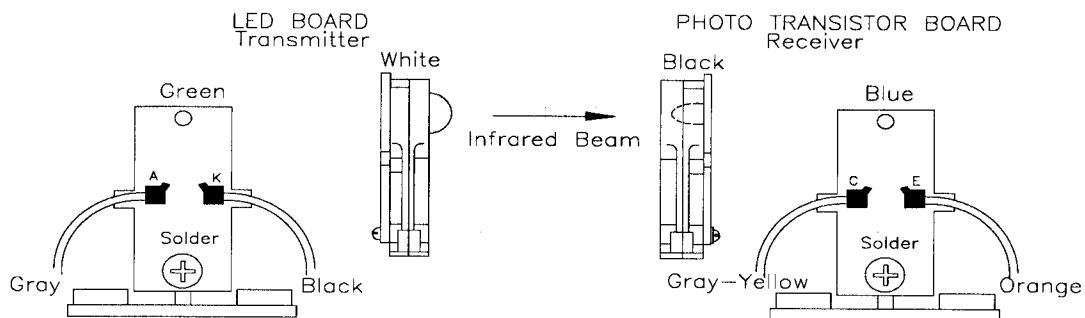
Trough IR LED Board Assembly
(transmitter-green board)
A-18617-1
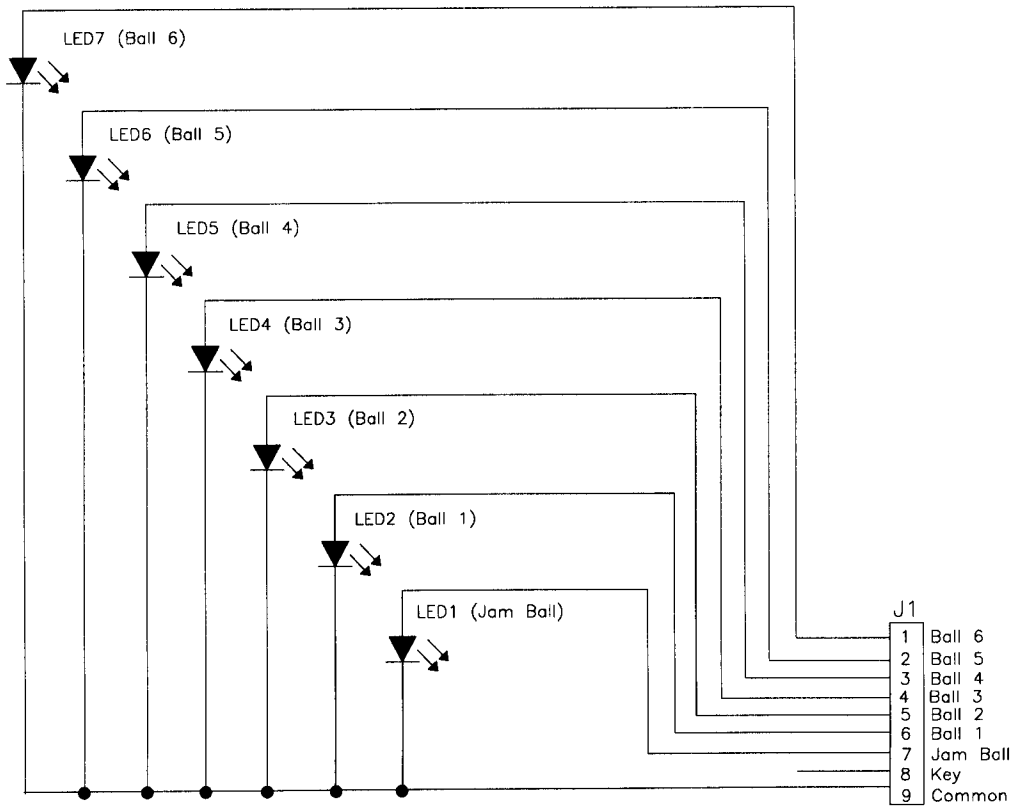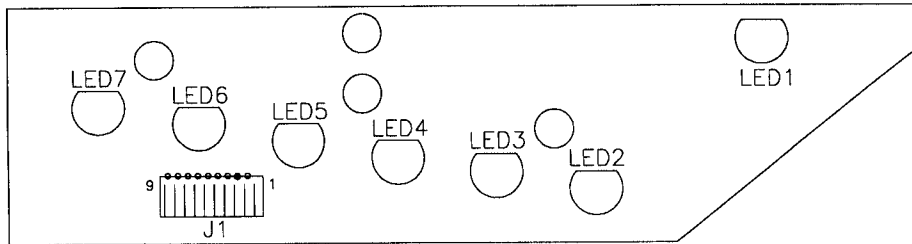
J1-1 N/C
J1-2 N/C
J1-3 GRY-GRN, LED 5, to 7-Opto Switch Board J1-3
J1-4 GRY-BLK, LED 4, to 7-Opto Switch Board J1-5
J1-5 GRY-ORG, LED 3, to 7-Opto Switch Board J1-6
J1-6 GRY-RED, LED 2, to 7-Opto Switch Board J1-7
J1-7 GRY-BRN, LED 1, to 7-Opto Switch Board J1-8
J1-8 Key
J1-9 BLK, ground, to 7-Opto Switch Board J1-9

Trough IR Photo Transistor Board Assembly
(receiver-blue board)
A-18618-1
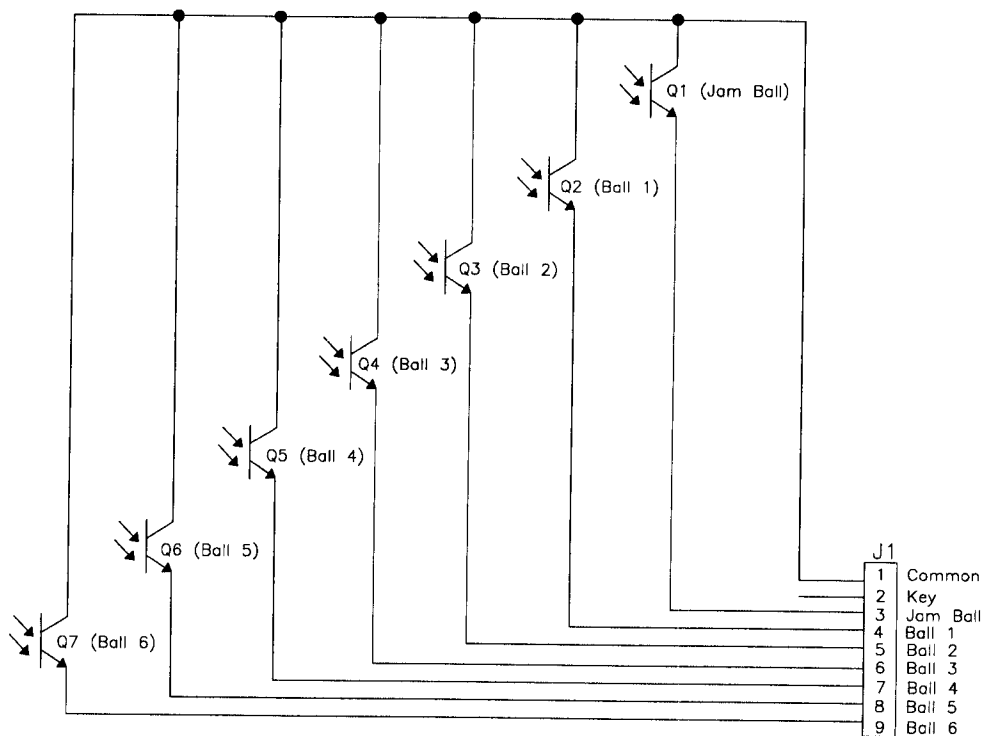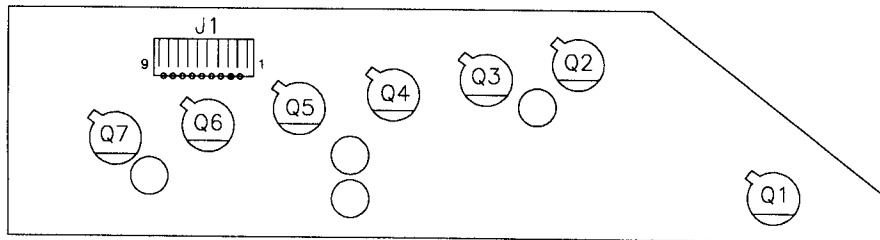
J1-1 GRY-YEL, +12V, to 7-Opto Switch Board J2-9
J1-2 Key
J1-3 ORG-BRN, Photo Transistor 1, to 7-Opto Switch Board J2-7
J1-4 ORG-RED, Photo Transistor 2, to 7-Opto Switch Board J2-6
J1-5 ORG-BLK, Photo Transistor 3, to 7-Opto Switch Board J2-5
J1-6 ORG-YEL, Photo Transistor 4, to 7-Opto Switch Board J2-4
J1-7 ORG-GRN, Photo Transistor 5, to 7-Opto Switch Board J2-3
J1-8 N/C
J1-9 N/C

7-Opto Switch Board Assembly
A-15576
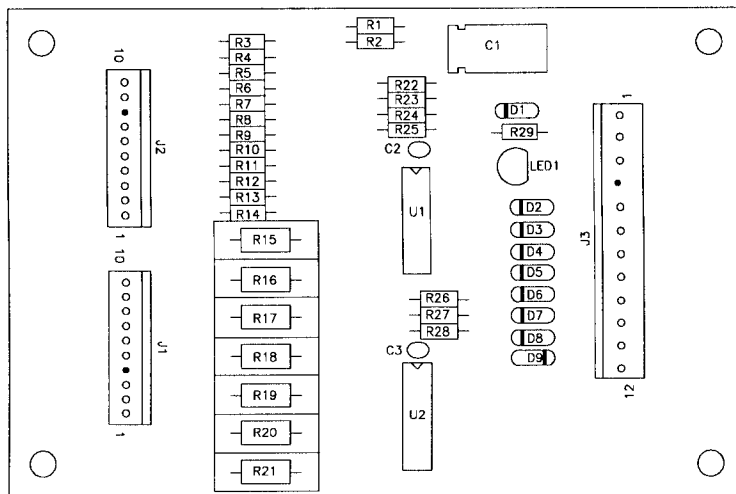
J1-1	GRY-VIO, to switch 37 Right Cage LED board
J1-2	GRY-BLU, to switch 36 Left Cage LED board
J1-3	GRY-GRN, to Trough LED board J1-3
J1-4	KEY
J1-5	GRY-BLK, to Trough LED board J1-4
J1-6	GRY-ORG, to Trough LED board J1-5
J1-7	GRY-RED, to Trough LED board J1-6
J1-8	GRY-BRN, to, Trough LED board J1-7
J1-9	BLK, ground to Trough LED board J1-9
J1-10	N/C

J2-1	ORG-VIO, to switch 37 Right Cage Photo Transistor board
J2-2	ORG-BLU, to switch 36 Left Cage Photo Transistor board
J2-3	ORG-GRN, to Trough Photo Transistor board J1-7
J2-4	ORG-YEL, to Trough Photo Transistor board J1-6
J2-5	ORG-BLK, to Trough Photo Transistor board J1-5
J2-6	ORN-RED, to Trough Photo Transistor board J1-4
J2-7	ORG-BRN, to Trough Photo Transistor board J1-3
J2-8	KEY
J2-9	GRY-YEL, +12V to Trough Photo Transistor board J1-1
J2-10	N/C

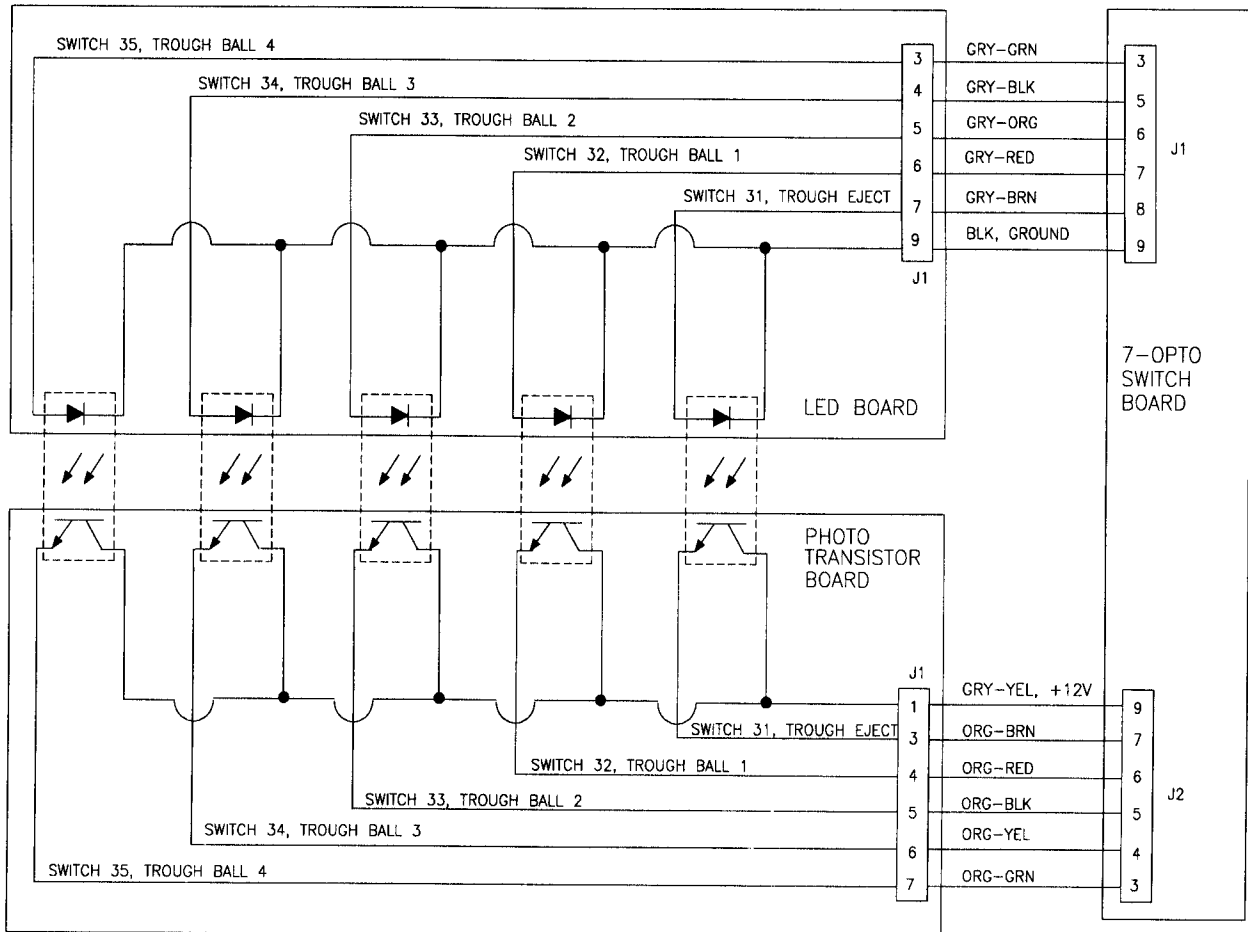| J3-1	N/C
J3-2	GRY-YEL, +12V, from Power Driver board J139-2
J3-3	BLK, ground from Power Driver board J139-3
J3-4	KEY
J3-5	WHT-BRN, switch row 1 from CPU board J208-1
J3-6	WHT-RED, switch row 2 from CPU board J208-2
J3-7	WHT-ORG, switch row 3 from CPU board J208-3
J3-8	WHT-YEL, switch row 4 from CPU board J208-4
J3-9	WHT-GRN, switch row 5 from CPU board J208-5
J3-10	WHT-BLU switch row 6 from CPU board J208-7
J3-11	WHT-VIO switch row 7 from CPU board J208-8
J3-12	GRN-ORG, switch row 3 from CPU board J206-3

7-Opto Switch Board Schematic
A-15576
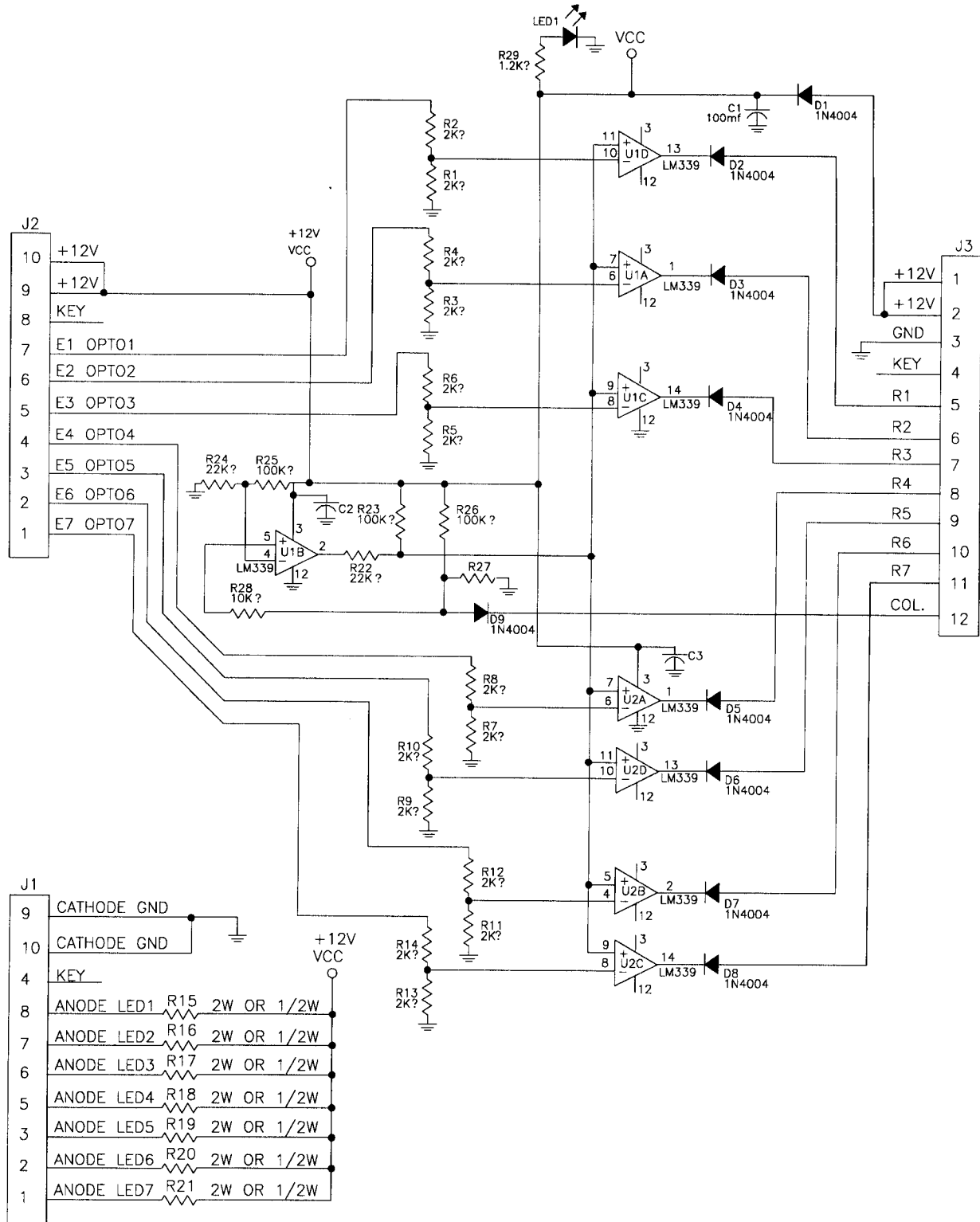
Playfield Opto Switches Wiring Diagram

LED
TROUGH BOARD
(GREEN BOARD)

J1

See detail drawing
on next page.

Pin		7-OPTO SWITCH BOARD
9	BLK, GROUND	9
7	GRY-BRN, SWITCH 31	8
6	GRY-RED, SWITCH 32	7
5	GRY-ORG, SWITCH 33	6
4	GRY-BLK, SWITCH 34	5
3	GRY-GRN, SWITCH 35	3
	GRY-BLU, SWITCH 36	2
	GRY-VIO, SWITCH 37	1

J1

SWITCH 36
LEFT CAGE

SWITCH 37
RIGHT CAGE

ORG-VIO, SWITCH 37   1
ORG-BLU, SWITCH 36   2

PHOTO TRANSISTOR
TROUGH BOARD
(BLUE BOARD)

J1

See detail drawing
on next page.

Pin		J2
7	ORG-GRN, SWITCH 35	3
6	ORG-YEL, SWITCH 34	4
5	ORG-BLK, SWITCH 33	5
4	ORG-RED, SWITCH 32	6
3	ORG-BRN, SWITCH 31	7
1	GRY-YEL, +12v	9

POWER DRIVER BOARD
J102   J139

Pin		
2	GRY-YEL, +12V	2
3	BLK, GND	3

J211

CPU BOARD   J208

Pin		J3
1	WHT-BRN, SW. ROW 1	5
2	WHT-RED, SW. ROW 2	6
3	WHT-ORG, SW. ROW 3	7
4	WHT-YEL, SW. ROW 4	8
5	WHT-GRN, SW. ROW 5	9
7	WHT-BLU, SW. ROW 4	10
8	WHT-VIO, SW. ROW 5	11
J206 3	GRN-ORG, SW. COL. 3	12

Trough Opto Switches Wiring Diagram

SWITCH 35, TROUGH BALL 4		
SWITCH 34, TROUGH BALL 3		
SWITCH 33, TROUGH BALL 2		
SWITCH 32, TROUGH BALL 1		
SWITCH 31, TROUGH EJECT		

J1		J1
3	GRY-GRN	3
4	GRY-BLK	5
5	GRY-ORG	6
6	GRY-RED	7
7	GRY-BRN	8
9	BLK, GROUND	9

LED BOARD

7-OPTO SWITCH BOARD

PHOTO TRANSISTOR BOARD

J1		J2
1	GRY-YEL, +12V	9
3	ORG-BRN	7
4	ORG-RED	6
5	ORG-BLK	5
6	ORG-YEL	4
7	ORG-GRN	3

SWITCH 31, TROUGH EJECT
SWITCH 32, TROUGH BALL 1
SWITCH 33, TROUGH BALL 2
SWITCH 34, TROUGH BALL 3
SWITCH 35, TROUGH BALL 4

THE BALL ROLLS BETWEEN THE LED BOARD AND THE PHOTO TRANSISTOR BOARD, BREAKING THE BEAM. WHEN THE BEAM IS BROKEN THE SWITCH IS MADE.

Coin Door Interface Board
A-20580
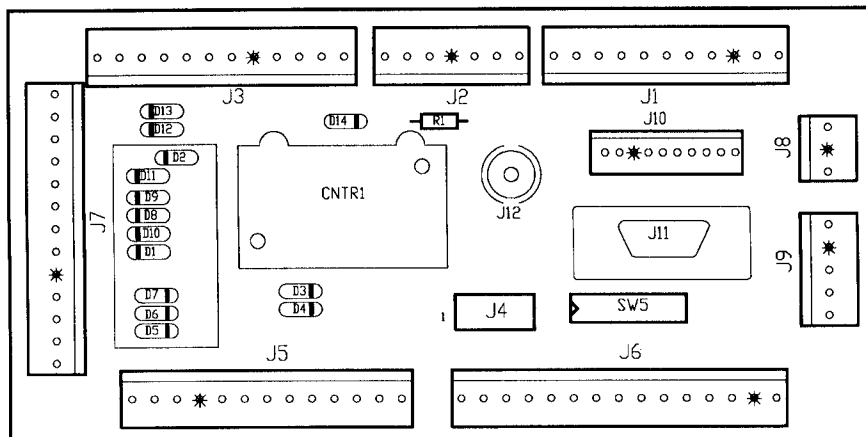
J1-1 Orange-Gray, ded. switch row 8 form CPU J205-9
J1-2 Orange-Violet, ded. switch row 7 from CPU J205-8
J1-3 Orange-Blue, ded. switch row 6 from CPU J205-7
J1-4 Orange-Green, ded. switch row 5 from CPU J205-6
J1-5 Orange-Yellow, ded. switch row 4 from CPU J205-4
J1-6 Orange-Black, ded. switch row 3 from CPU J205-3
J1-7 Orange-Red, ded. switch row 2 from CPU J205-2
J1-8 Orange-Brown, ded. switch row 1 from CPU J205-1
J1-9 Key
J1-10 Black, ground from CPU J205-10
J1-11 Orange-White, switch enable from CPU J205-12

J2-1 Black, ground from Power Driver Board J141-3
J2-2 Gray-Yellow, +12vac for Power Driver Board J141-2
J2-3 White-Violet, G.I. 6.8vac from Power Driver J104-1
J2-4 Key
J2-5 Violet, G.I. from Power Driver Board J104-3
J2-6 N/C
J2-7 Black-White, signal for coin meter from Power Driver
    board J139-5

J3-1 Green-Brown, switch column 1 from CPU J212-1
J3-2 Green-Red, switch column 2 from CPU J212-2
J3-3 White-Brown, switch row 1 from CPU J212-4
J3-4 White-Red, switch row 2 from CPU J212-6
J3-5 White-Orange, switch row 3 from CPU J212-7
J3-6 White-Yellow, switch row 4 from CPU J212-8
J3-7 Key
J3-8 Yellow-Gray, lamp col. 8 from Power Driver J122-3
J3-9 Red-Blue, lamp row 6 from Power Driver J125-7
J3-10 Red-Violet, lamp row 7 from Power Driver J125-8
J3-11 Red-Gray, lamp row 8 from Power Driver J125-9

J4- Not Used

J5-1 Violet, G.I. return to coin door
J5-2 White-Violet, G.I. 6.8vac to coin door
J5-3 Black, ground to coin door
J5-4 Orange-Brown, ded. switch row 1 to coin door
J5-5 Orange-Red, ded. switch row 2 to coin door
J5-6 Orange-Black, ded. switch row 3 to coin door
J5-7 Orange-Green, ded. switch row 5 to coin door
J5-8 Orange-Blue, ded. switch row 6 to coin door
J5-9 Orange-Violet, ded. switch row 7 to coin door
J5-10 Key
J5-11 Orange-Gray, ded. switch row 8 to coin door
J5-12 Green-Red, switch column 2 to coin door Slam Tilt
J5-13 White-Brown, switch row 1 to coin door Slam Tilt

J6- Not Used

J7-1 Yellow-Gray, lamp column 8 to cabinet
J7-2 N/C
J7-3 N/C
J7-4 Red-Gray, lamp row 8 to cabinet
J7-5 Key
J7-6 Green-Brown, switch column 1 to cabinet
J7-7 N/C
J7-8 N/C
J7-9 N/C
J7-10 N/C
J7-11 White-Orange, switch row 3 to cabinet
J7-12 N/C
J7-13 N/C

J8-1 White, switch row to cabinet Slam Tilt
J8-2 Key
J8-3 Green, switch column to cabinet Slam Tilt

J9-1 White-Yellow, switch row 4 to Plumb Bob Tilt
J9-2 Key
J9-3 Green-Brown, switch column 1 to Plumb Bob Tilt
J9-4 White-Red, switch row 2 to Interlock Switch
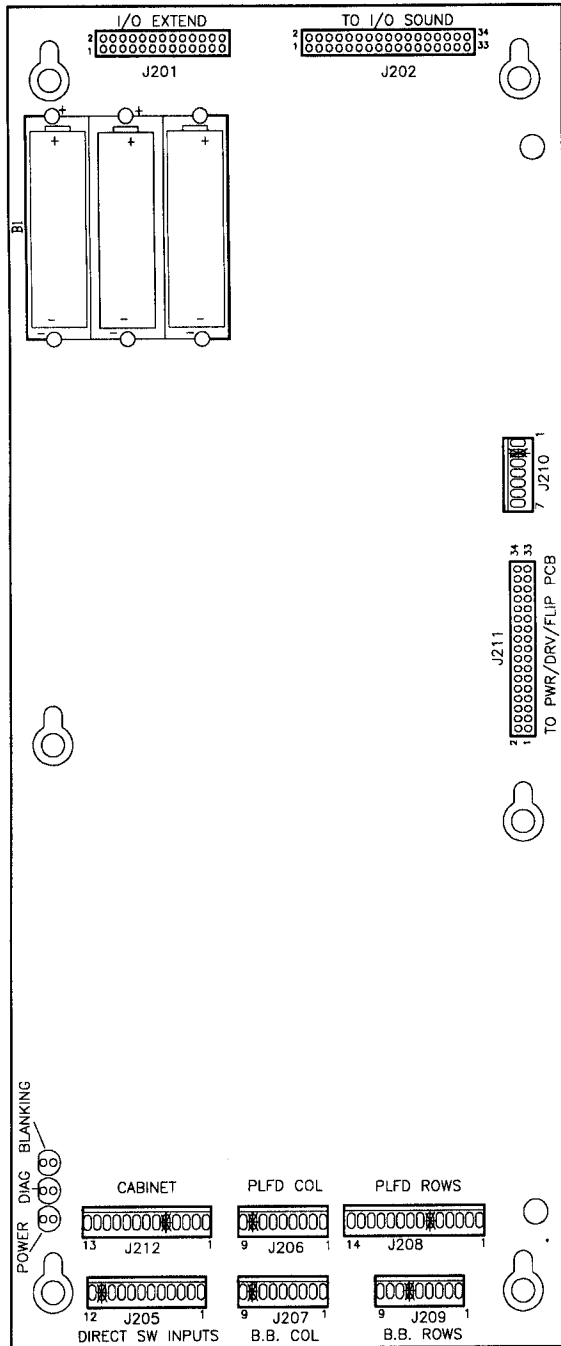J9-5 Green-Red, switch column 2 to Interlock Switch

J10, Ribbon cable to cash flow coin mechanism.

Coin Door Interface Board Schematic
A-20580

J4 / NRI INTERFACE
GND, NC, NC, COIN 1, COIN 3
+12V, ENABLE, COIN 2, COIN 4
1 2 3 4 5 6 7 8 9 10

J1 / DEDICATED SW.
1 DIG. SW4
2 DIG. SW3
3 DIG. SW2
4 DIG. SW1
5 COIN 4
6 COIN 3 (RIGHT)
7 COIN 2 (CENTER)
8 COIN 1 (LEFT)
9 KEY
10 GND
11 ENABLE

J5 / COIN DOOR
13 SLAM SW ROW 1
12 SLAM SW COL 2
11 SW4
10 KEY
9 SW3
8 SW2
7 SW1
6 RT COIN 3
5 CN COIN 2
4 LT COIN 1
3 GND
2 GI LAMP
1 GI LAMP

J6 / ECA COIN DOOR
15 COIN 1
14 COIN 2
13 COIN 3
12 SELECT
11 COIN 7/8 EN
10 COIN 5/6 EN
9 COIN 4 EN
8 COIN 3 EN
7 COIN 2 EN
6 COIN 1 EN
5 COIN 4
4 +12 V
3 KEY
2 PWR GND
1

SW5
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8

J10 / RS232 INTERFACE from A/V
1 GND
2 TXD
3 RXD
4 CTS
5 RTS
6 DTR
7 DSR
8 KEY
9 RI
10 DCD

J11 / RS232 OUT INTERFACE
1 DCD
6 DSR
2 RXD
7 RTS
3 TXD
8 CTS
4 DTR
9 RI
5 GND

J2 / POWER
7 COIN COUNTER
6 +20 V
5 6.3V AC
4 KEY
3 6.3V AC
2 +12 V
1 GND

J12 / +20V POWER
+20V
GND

L1 COIN COUNTER
D14
R1

J3 / SW/LAMP
1 SW COL 1
2 SW COL 2
3 SW ROW 1
4 SW ROW 2
5 SW ROW 3
6 SW ROW 4
7 SW ROW 5
8 KEY
9 LP COL 1
10 LP ROW 1
11 LP ROW 2
12 LP ROW 3

J7 / CAB
1 LP COL 1
2 LP ROW 1
3 LP ROW 2
4 LP ROW 3
5 KEY
6 SW COL 1
7 SW COL 2
8 SW ROW 3
9 SW ROW 2
10 SW ROW 1
11 SW ROW 4
12 SW ROW 5A
13 SW ROW 5B

D5 D6 D7 D8 D9 D10 D11 D12 D13 D1 D2 D3 D4

J8 / SLAM
3 SLAM
2 KEY
1 SLAM

J9 / PLUMB BOB/COIN DOOR
1 PLUMB BOB
2 KEY
3 PLUMB BOB
4 MEM PROTECT
5 MEM PROTECT

Security CPU Board Assembly
A-20119-50047

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

J206-1   Green-Brown, switch column 1, to playfield switches
J206-2   Green-Red, switch column 2, to playfield switches
J206-3   Green-Orange, switch column 3, to playfield switches
J206-4   Green-Yellow, switch column 4, to playfield switches
J206-5   Green-Black, switch column 5, to playfield switches
J206-6   Green-Blue, switch column 6, to playfield switches
J206-7   N/C
J206-8   Key
J206-9   N/C

J207- Not Used

J208-1   White-Brown, switch row 1, to playfield switches
J208-2   White-Red, switch row 2, to playfield switches
J208-3   White-Orange, switch row 3, to playfield switches
J208-4   White-Yellow, switch row 4, to playfield switches
J208-5   White-Green, switch row 5, to playfield switches
J208-6   Key
J208-7   White-Blue, switch row 6, to playfield switches
J208-8   White-Violet, switch row 7, to playfield switches
J208-9   White-Gray, switch row 8, to playfield switches
J208-10 N/C
J208-11 N/C
J208-12 Black-Blue, F3, to lower left E.O.S. switch
J208-13 Black-Green, F1, to lower right E.O.S. switch
J208-14 Orange, ground to E.O.S. switches

J209- Not Used

J210-1   Black, ground, from Power Driver Board J101-5,7
J210-2   Key
J210-3   Black, ground, from Power Driver Board J101-5, 7
J210-4   Gray, +5V, from Power Driver Board J101-3, 4
J210-5   Gray, +5V, from Power Driver Board J101-3, 4
J210-6   Gray-Green, +12V, from Power Driver Board J101-1, 2
J210-7   Gray-Green, +12V, from Power Driver Board J101-1, 2

J211,   34-pin ribbon cable, data to/from J102

J212-1   Green-Brown, switch col. 1, to coin door board J3-1
J212-2   Green-Red, switch col. 2, to coin door board J3-2
J212-3   N/C
J212-4   White-Brown, switch row 1, to coin door board J3-3
J212-5   Key
J212-6   White-Red, switch row 2, to coin door board J3-4
J212-7   White-Orange, switch row 3, to coin door board J3-5
J212-8   White-Yellow, switch row 4, to coin door board J3-6
J212-9   Black-Blue, F8, to left flipper opto board J1-1
J212-10 Black-Yellow, F6, to right flipper opto board J1-1
J212-11 Blue-Gray, F4, to left flipper opto board J1-2
J212-12 Blue-Violet, F2, to right flipper opto board J1-2
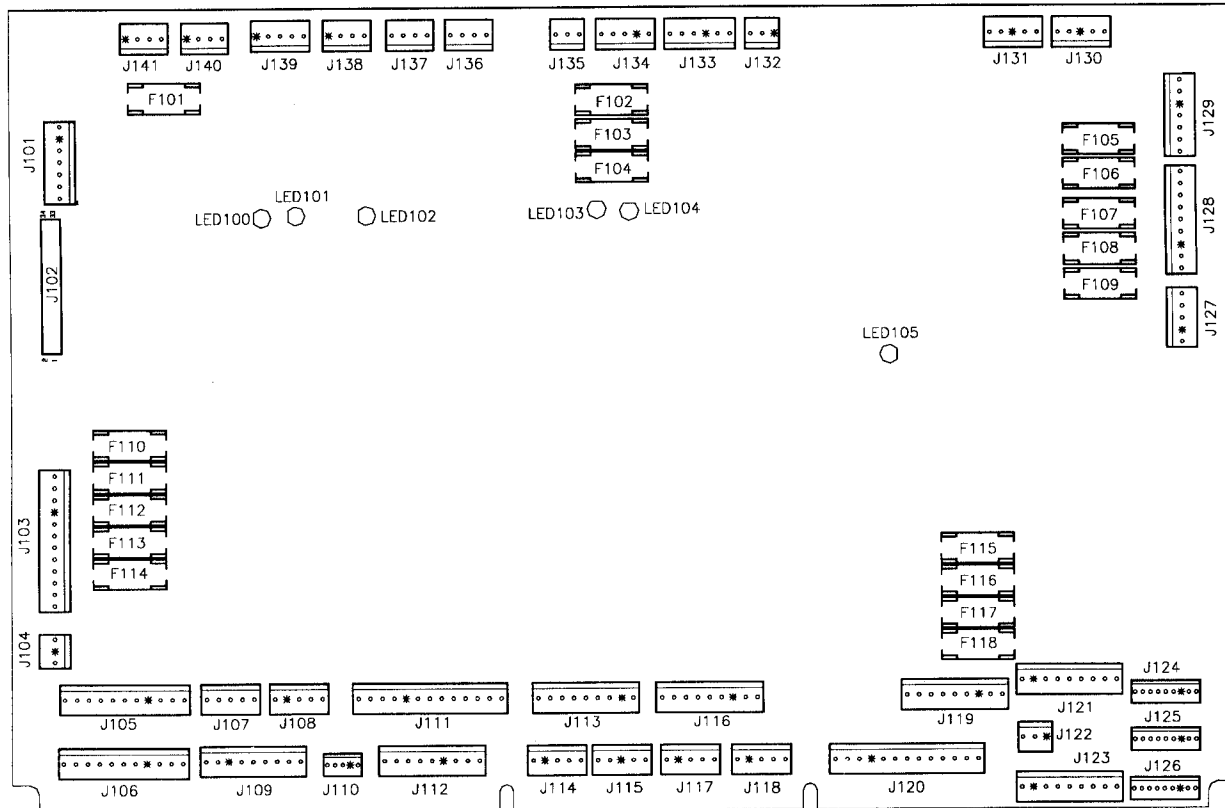J212-13 Orange, Ground to left flipper opto board J1-4

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

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

J203- Not Used

J204- Not Used

Audio Visual Board Assembly
A-20516-50047
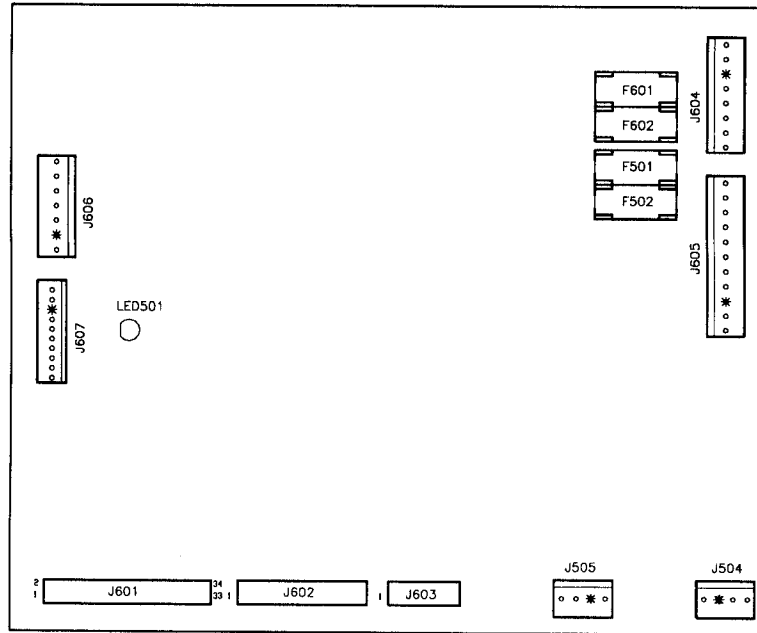
J601   34-pin ribbon cable, data to CPU J202

J602   26-pin ribbon cable, data to CPU J201

J603   14-pin ribbon cable, data to/from dot matrix display driver

J604-1   Orange, -125V to display driver pin1
J604-2   Blue, -113V to display driver pin 2
J604-3   Key
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, +12 to display driver pin 7
J604-8   Brown, +62 to display driver pin 8

J605-1   White, 80VAC from transformer secondary
J605-2   White, 80VAC from transformer secondary
J605-3   Violet, 100VAC from transformer secondary
J605-4   Violet, 100VAC from transformer secondary
J605-5   Gray-White, 18VAC from transformer secondary
J605-6   Gray-White, loop from J605-5
J605-7   Gray, 18VAC from transformer secondary
J605-8   Gray, loop from J605-7
J605-9   Key
J605-10 Gray-Green, 18VAC from transformer secondary
J605-11 Gray-Green, 18VAC loop from J605-10

J606-1   Black, ground from power driver board J101-7
J606-2   Key
J606-3   Black, ground from power driver board J101-5
J606-4   Gray, +5V from power driver board J101-4
J606-5   Gray, +5V from power driver board J101-3
J606-6   Gray-Green, +12V from power driver board J101-2
J606-7   Gray-Green, +12V from power driver board J101-1

J607   Not Used

J504-1   Black-Yellow, signal to speaker
J504-2   Key
J504-3   N/C
J504-4   Black, signal to speaker

J505-1   Black-Yellow, signal to speaker
J505-2   N/C
J505-3   Key
J505-4   Black, signal to speaker

Power Driver Board Assembly
A-20028

J101-1   Gray-Green, +12V to J210-6, 7; J606-1
J101-2   Gray-Green, +12V to J210-6, 7; J606-2
J101-3   Gray, +5V to J210-4, 5; J3-1,3; J606-3
J101-4   Gray, +5V to J210-4, 5; J3-1,3; J606-4
J101-5   Black, ground to J210-1, 3; J606-5
J101-6   Key
J101-7   Black, ground to J210-1,3; J606-7

J102,   34-pin ribbon cable, data to/from CPU J211

J103-1   Yellow-White, 6.8Vac from xformer secondary
J103-2   White-Brown, 6.8Vac from xformer secondary
J103-3   White-Brown, 6.8Vac from xformer secondary
J103-4   White-Orange, 6.8Vac from xformer secondary
J103-5   White-Yellow, 6.8Vac from xformer secondary
J103-6   White-Yellow, 6.8Vac from xformer secondary
J103-7   Orange, 6.8Vac from xformer secondary
J103-8   Orange, 6.8Vac from xformer secondary
J103-9   Key
J103-10 Green, 6.8Vac from xformer secondary
J103-11 Brown, 6.8Vac from xformer secondary
J103-12 Brown, 6.8Vac from xformer secondary

J104-1   Violet, return, G.I. to Coin Door Board J2-3
J104-2   Key
J104-3   White-Violet, 6.8Vac, G.I. to Coin Door BrdJ2-5

J105-1   N/C
J105-2   N/C
J105-3   N/C
J105-4   Key
J105-5   Green, return, G.I. to insert panel
J105-6   Violet, return, G.I. to insert panel
J105-7   N/C
J105-8   N/C
J105-9   N/C
J105-10 White-Green, 6.8Vac, G.I. to insert panel
J105-11 White-Violet, 6.8Vac, G.I. to inset panel

J106-1   Brown, return, G.I. to playfield
J106-2   Orange, return, G.I. to playfield
J106-3   Yellow, return, G.I. to playfield
J106-4   Key
J106-5   N/C
J106-6   N/C
J106-7   White-Brown, 6.8Vac, G.I. to playfield
J106-8   White-Orange, 6.8Vac, G.I. to playfield
J106-9   White-Yellow, 6.8Vac, G.I. to playfield
J106-10 N/C
J106-11 N/C

J107-Not Used

Power Driver Board Continued...

J108-1 Blue-Brown, solenoid 25 drive to insert panel flasher
J108-2 Blue-Red, solenoid 26 drive to insert panel flasher
J108-3 Blue-Orange, solenoid 27 drive to insert panel flasher
J108-4 Key
J108-5 N/C

J109-1 Blue-Brown, solenoid 25 drive to playfield flasher
J109-2 Blue-Red, solenoid 26 drive to playfield flasher
J109-3 Blue-Orange, solenoid 27 drive to playfield flasher
J109-4 Blue-Yellow, solenoid 28 drive to playfield flasher
J109-5 N/C
J109-6 N/C
J109-7 Key
J109-8 N/C
J109-9 N/C

J110- Not Used

J111-1 Black-Brown, solenoid 17 drive to playfield flasher
J111-2 Black-Red, solenoid 18 drive to playfield flasher
J111-3 Black-Orange, solenoid 19 drive to playfield flasher
J111-4 Black-Yellow, solenoid 20 drive to playfield flasher
J111-5 Blue-Green, solenoid 21 drive to playfield coil
J111-6 Blue-Black, solenoid 22 drive to playfield flasher
J111-7 Blue-Violet, solenoid 23 drive to playfield flasher
J111-8 Blue-Gray, solenoid 24 drive to playfield flasher
J111-9 Key
J111-10 N/C
J111-11 N/C
J111-12 Red-Orange, tieback diode for solenoid 21
J111-13 N/C

J112-Not Used

J113-1 Brown-Black, solenoid 9 drive to playfield coil
J113-2 Key
J113-3 Brown-Red, solenoid 10 drive to playfield coil
J113-4 Brown-Orange, solenoid 11 drive to playfield coil
J113-5 Brown-Yellow, solenoid 12 drive to playfield coil
J113-6 Brown-Green, solenoid 13 drive to playfield coil
J113-7 Brown-Blue, solenoid 14 drive to playfield coil
J113-8 Brown-Violet, solenoid 15 drive to playfield coil
J113-9 Brown-Gray, solenoid 16 drive to playfield flasher

J114-1 N/C
J114-2 N/C
J114-3 N/C
J114-4 Key
J114-5 Brown-Gray, solenoid 16 drive to insert panel flasher

J115- Not Used

J116-1 Violet-Brown, solenoid 1 drive to playfield coil
J116-2 Violet-Red, solenoid 2 drive to playfield coil
J116-3 Key
J116-4 Violet-Orange, solenoid 3 drive to playfield coil
J116-5 Violet-Yellow, solenoid 4 drive to playfield coil
J116-6 Violet-Green, solenoid 5 drive to playfield coil
J116-7 Violet-Blue, solenoid 6 drive to playfield coil
J116-8 Violet-Black, solenoid 7 drive to backbox coil
J116-9 Violet-Gray, solenoid 8 drive to playfield coil

J117- Not Used

J118- Not Used

J119-1 Red-Green, +50V to lower right flipper coil
J119-2 Red-Green, loop from J119-1
J119-3 Key
J119-4 Red-Blue, loop from J119-5
J119-5 Red-Blue, +50V to lower left flipper coil
J119-6 Red-Violet, +50V to solenoids 33 and 34
J119-7 Red-Violet, loop from J119-6
J119-8 Red-Gray, +50V to solenoids 35 and 36
J119-9 Red-Gray, Loop from J119-8

J120-1 Orange-Gray, solenoid 36 drive to coil
J120-2 N/C
J120-3 Yellow-Gray, solenoid 35 drive to coil
J120-4 Orange-Violet, solenoid 34 drive to coil
J120-5 N/C
J120-6 Yellow-Violet, solenoid 33 drive to coil
J120-7 Orange-Blue, holding, lower left flipper coil
J120-8 N/C
J120-9 Yellow-Blue, power, lower left flipper coil
J120-10 Key
J120-11 Orange-Green, holding, lower right flipper coil
J120-12 N/C
J120-13 Yellow-Green, power, lower right flipper coil

J121-Not Used

J122-1 Key
J122-2 N/C
J122-3 Yellow-Gray, lamp column 8 to cabinet

J123-1 Yellow-Brown, lamp column 1 to playfield
J123-2 Yellow-Red, lamp column 2 to playfield
J123-3 Yellow-Orange, lamp column 3 to playfield
J123-4 Yellow-Black, lamp column 4 to playfield
J123-5 Yellow-Green, lamp column 5 to playfield
J123-6 Yellow-Blue, lamp column 6 to playfield
J123-7 Yellow-Violet, lamp column 7 to playfield
J123-8 Key
J123-9 Yellow-Gray, lamp column 8 to playfield

J124-Not Used

J125-1   Red-Brown, lamp row 1 to playfield
J125-2   Red-Black, lamp row 2 to playfield
J125-3   Key
J125-4   Red-Orange, lamp row 3 to playfield
J125-5   Red-Yellow, lamp row 4 to playfield
J125-6   Red-Green, lamp row 5 to playfield
J125-7   Red-Blue, lamp row 6 to playfield
J125-8   Red-Violet, lamp row 7 to playfield
J125-9   Red-Gray, lamp row 8 to playfield

J126-1   N/C
J126-2   N/C
J126-3   Key
J126-4   N/C
J126-5   N/C
J126-6   N/C
J126-7   Red-Blue, lamp row 6 to cabinet
J126-8   Red-Violet, lamp row 7 to cabinet
J126-9   Red-Gray, lamp row 8 to cabinet

J127-1   White-Green, 9.8Vac from xformer secondary
J127-2   White-Green, 9.8Vac loop from J112-1
J127-3   White-Green, 9.8Vac from xformer secondary
J127-4   Keys
J127-5   White-Green, 9.8VAC loop from J112-3

J128-1   White-Red, 16Vac loop from J102-2
J128-2   White-Red, 16Vac from xformer secondary
J128-3   White-Red, 16Vac loop from J102-4
J128-4   White-Red, 16Vac from xformer secondary
J128-5   Black-Yellow, 16Vac loop from J102-6
J128-6   Black-Yellow, 16Vac from xformer secondary
J128-7   Key
J128-8   Black-Yellow, 16Vac loop from J102-9
J128-9   Black-Yellow, 16Vac from xformer secondary

J129-1   Red, 9Vac from xformer secondary
J129-2   Red, 9Vac from transformer secondary
J129-3   Key
J129-4   Blue-White, 13Vac from xformer secondary
J129-5   Blue-White, 13Vac loop from J101-4
J129-6   Blue-White, 13Vac from xformer secondary
J129-7   Blue-White, 13Vac loop from J101-6

J130-Not Used

J131-Not Used

J132-Not Used

J133-1   Red-Orange, +50V to coils
J133-2   Red-Brown, +50V to coils
J133-3   Red-Black, +50V to coils
J133-4   Key
J133-5   N/C
J133-6   Red-White, +20V to playfield flasher

J134-1   N/C
J134-2   N/C
J134-3   N/C
J135-4   Key
J134-5   Red-White, +20V to insert panel flasher

J135- Not Used

J136- Not Used

J137- Not Used

J138- Not Used

J139-1   Key
J139-2   Gray-Yellow, +12V to playfield boards
J139-3   Black, ground to playfield boards
J139-4   N/C
J139-5   Black-White, signal for coin meter to Coin Door
           Interface board J2-7.

J140-Not Used

J141-1   Key
J141-2   Gray-Yellow, +12V to Coin Door Board J2-2
J141-3   Black, ground to Coin Door Board J2-1
J141-4   N/C

LAMP MATRIX

Yellow (B+) ———→ Red

Column / Row	1 Yellow-Brown J121-1 Q96	2 Yellow-Red J121-2 Q100	3 Yellow-Orange J121-3 Q95	4 Yellow-Black J121-4 Q99	5 Yellow-Green J121-5 Q94	6 Yellow-Blue J121-6 Q98	7 Yellow-Violet J121-7 Q93	8 Yellow-Gray J121-9 Q97
1 Red-Brown J125-1 Q104	JEWEL 1 (LEFT) 11	JACKPOT 21	MAGIC CARPET 31	SMOKE 6 41	SMOKE 14 (TOP) 51	MAKE A WISH 61	ACTION 2 71	EXTRA BALL 81
2 Red-Black J125-2 Q108	JEWEL 2 12	(G)ENIE 22	ACTION 3 32	SMOKE 7 42	LAMP-15 52	(B)AZAAR 62	LEFT LOCK 72	ACTION 5 82
3 Red-Orange J125-4 Q103	JEWEL 3 13	G(E)NIE 23	RAMP ARROW RIGHT 33	SMOKE 8 43	LAMP-30 53	B(A)ZAAR 63	HAREM ADVANCE 73	RIGHT LOCK 83
4 Red-Yellow J125-5 Q107	JEWEL 4 14	GE(N)IE 24	RAMP ARROW LEFT 34	SMOKE 9 44	LAMP-60 54	BA(Z)AAR 64	LEFT TIGER LOOP 74	RIGHT TIGER LOOP 84
5 Red-Green J125-6 Q102	JEWEL 5 15	GEN(I)E 25	SMOKE 1 (BOTTOM) 35	SMOKE 10 45	SMOKE 4 55	BAZ(A)AR 65	ACTION 1 75	CAPTIVE BALL RIGHT 85
6 Red-Blue J125-7 Q106	JEWEL 6 16	GENI(E) 26	SMOKE 2 36	SMOKE 11 46	SMOKE 5 56	BAZA(A)R 66	WISH 1 76	ACTION 4 86
7 Red-Violet J125-8 Q101	JEWEL 7 (RIGHT) 17	MULTIBALL 27	SMOKE 3 37	SMOKE 12 47	SHOOT STAR RIGHT 57	BAZAA(R) 67	WISH 2 77	CAPTIVE BALL LEFT 87
8 Red-Gray J125-9 Q105	SHOOT AGAIN 18	OUTLANE SPECIAL 28	AMULET 38	SMOKE 13 48	SHOOT STAR LEFT 58	CENTER LOCK 68	WISH 3 78	START BUTTON 88

J1XX = Power Driver Board

SWITCH MATRIX

White ———→ Green

Dedicated Grounded Switches	Column / Row	1 Green-Brown J206-1 U20-18	2 Green-Red J206-2 U20-17	3 Green-Orange J206-3 U20-16	4 Green-Yellow J206-4 U20-15	5 Green-Black J206-5 U20-14	6 Green-Blue J206-6 U20-13	7 Green-Violet J206-7 U20-12	8 Green-Gray J206-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute U17-5 D1	1 White-Brown J208-1 U18-11	HAREM PASSAGE 11	SLAM TILT 21	TROUGH EJECT 31	RAMP MADE LEFT 41	LEFT SLING 51	LEFT STANDUPS 61	NOT USED 71	NOT USED 81	Black-Green J208-13 Lower Right Flipper E.O.S. F1
Orange-Red J205-2 Center Coin Chute U17-7 D2	2 White-Red J208-2 U18-9	VANISH TUNNEL 12	COIN DOOR CLOSED 22	TROUGH BALL 1 32	GENIE TARGET 42	RIGHT SLING 52	RIGHT STANDUPS 62	NOT USED 72	NOT USED 82	Blue-Violet J212-12 Lower Right Flipper Opto F2
Orange-Black J205-3 Right Coin Chute U17-11 D3	3 White-Orange J208-3 U18-5	START BUTTON 13	GENIE STANDUP TARGET 23	TROUGH BALL 2 33	LEFT LOOP 43	LEFT JET 53	TOP SKILL 63	NOT USED 73	NOT USED 83	Black-Blue J208-12 Lower Left Flipper E.O.S. F3
Orange-Yellow J205-4 4th Coin Chute U17-9 D4	4 White-Yellow J208-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH BALL 3 34	INNER LOOP LEFT 44	RIGHT JET 54	MIDDLE SKILL 64	NOT USED 74	NOT USED 84	Blue-Gray J212-11 Lower Left Flipper Opto F4
Orange-Green J205-6 U16-9 Normal Function Srv Crdts / Test Function Escape D5	5 White-Green J208-5 U19-11	RAMP ENTER 15	BAZAAR EJECT 25	TROUGH BALL 4 35	INNER LOOP RIGHT 45	MIDDLE JET 55	BOTTOM SKILL 65	NOT USED 75	NOT USED 85	Black-Violet J208-11 Upper Right Flipper E.O.S. F5
Orange-Blue J205-7 U16-11 Normal Function Volume Dn / Test Function Down D6	6 White-Blue U208-7 U19-9	LEFT OUTLANE 16	LEFT INLANE 26	LEFT CAGE OPTO 36	MINI STANDUPS 46	LAMP SPIN CCW 56	LOCK 1 (BOTTOM) 66	NOT USED 76	NOT USED 86	Black-Yellow J212-10 Upper Right Flipper Opto F6
Orange-Violet J205-8 U16-7 Normal Function Volume Up / Test Function Up D7	7 White-Violet J208-8 U19-5	RIGHT INLANE 17	RIGHT OUTLANE 27	RIGHT CAGE OPTO 37	RAMP MADE RIGHT 47	LAMP SPIN CW 57	LOCK 2 (MIDDLE) 67	NOT USED 77	NOT USED 87	Black-Gray J208-10 Upper Left Flipper E.O.S. F7
Orange-Gray J205-9 U16-5 Normal Function Begin Test / Test Function Enter D8	8 White-Gray J208-9 U19-7	BALL SHOOTER 18	LEFT WIRE MAKE 28	LEFT EJECT 38	RIGHT CAPTIVE BALL 48	LEFT CAPTIVE BALL 58	LOCK 3 (TOP) 68	NOT USED 78	NOT USED 88	Black-Blue J212-9 Upper Left Flipper Opto F8

J2XX = CPU B   = OPTO, TYPICALLY CLOSED

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