







# **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**

<b>EPROM Jumper Settings for G11</b>	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		age Conne		Drive Xistor		Connecti	ons	Drive Wire	Solenoid Pa Flashlam	
		, ,	Playfiel	d Backbox	Cabinet		Playfield	Backbox	Cabinet	Color	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		
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		<u> </u>	Blk-Brn	#89 (2)	
18	FINAL BATTLE FLASHER	Flasher	J133-6			Q32	J111-2		<u> </u>	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		<u> </u>	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	4.		Q13	J109-4		<u> </u>	Blu-Yel	#906	
	neral Illumination											
	ILLUMINATION STRING 1	G.I.	<u> </u>	J106-1		Q5		J106-7	ļ	Wht-Brn	#44	ļ
	ILLUMINATION STRING 2	G.I.	ļ	J106-2		Q4		J106-8		Wht-Org	#44	
	ILLUMINATION STRING 3	G.I.		J106-3		Q3		J106-9		Wht-Yel	#44	
	*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
			Vo	ltage	Driv	/e	Dr	ive	Drive		Coil	Coil
			Con	nection	Transi	stors	Conne		Col		Part No.	Colors
Fli	pper Circuits				Power	Hold		field	Power	Hold		
29		Lwr. Rt. Power	J119-1	(Red-Grn)	Q90	·	J120		Yel-Grn		FL-11629	BLUE
30	LOWER RIGHT FLIPPER	Lwr. Rt. Hold	J119-1	(Red-Grn)		Q92	J12			Org-Grn		
31		Lwr. Lt. Power	J119-4	(Red-Blu)	Q87		J120-9				FL-11629	BLUE
32	LOWER LEFT FLIPPER	Lwr. Lt. Hold	J119-4	(Red-Blu)		Q89	J120-7			Org-Blu		ž
33	LEFT DIVERTER POWER	Upr. Rt. Power	J119-6	(Red-Vio)	Q84		J12	0-6	Yel-Vio		FL-11753	YELLOW
34	LEFT DIVERTER HOLD	Upr. Rt. Hold	J119-6	(Red-Vio)		Q86	J12	0-4		Org-Vio	L	
35	VANISH MAGNET			(Red-Gry)	Q81		J12	0-3	Yel-Gry	,	20-10197	
36	LOOP POST DIVERTER	Upr. Lt. Hold	J119-8	(Red-Gry)		Q83	J12	0-1		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

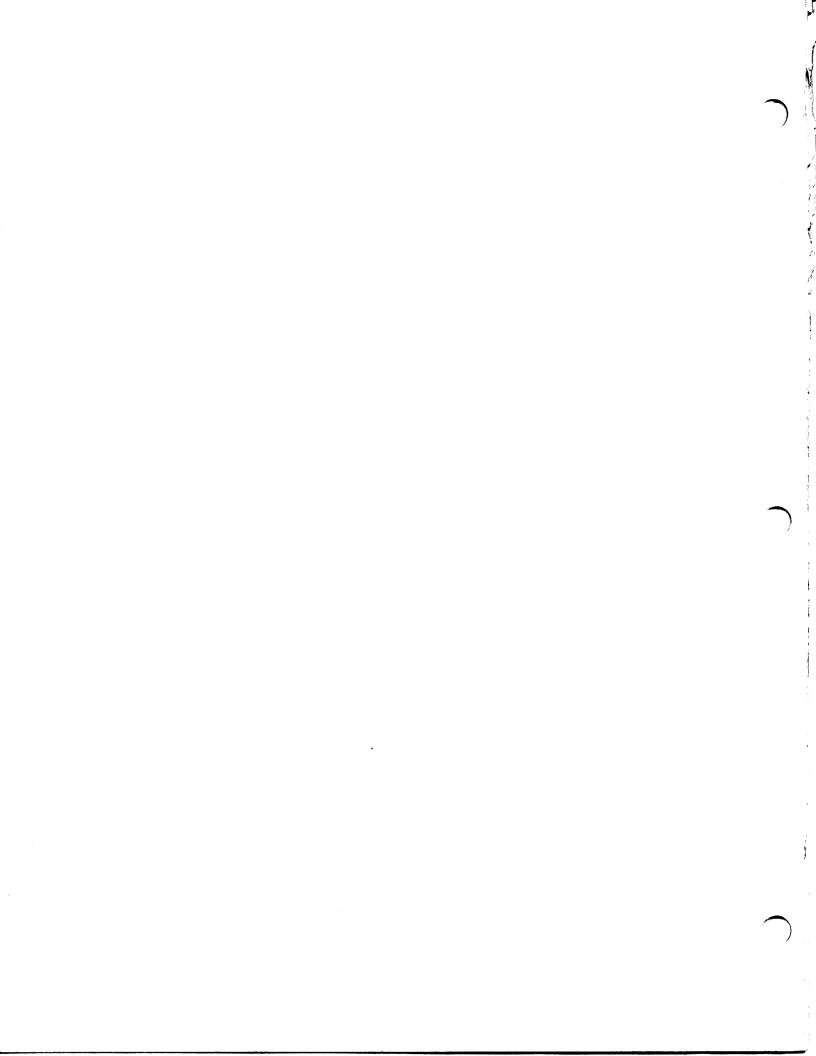
Date issued:

**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.

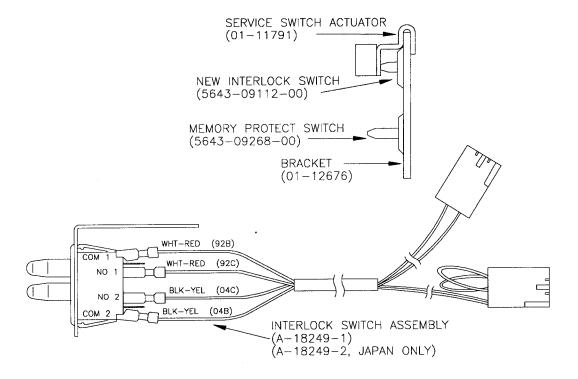
TESTING 50047 EPROM 1.0 A 547 100006 95749

# 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.





Information current at time of release.

Fill out and mail in game Registration card. records, write the PIC and game serial numb	Be sure to include the game serial number. For ers in manual.	you
PIC Number	Serial Number	

Williams Electronics Games, Inc. reserves the rights to make modifications and improvements to its products. The specifications and parts identified in this manual are subject to change without notice.

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# Story 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 Winball

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.

# Minball Rules and Game Mlay

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.

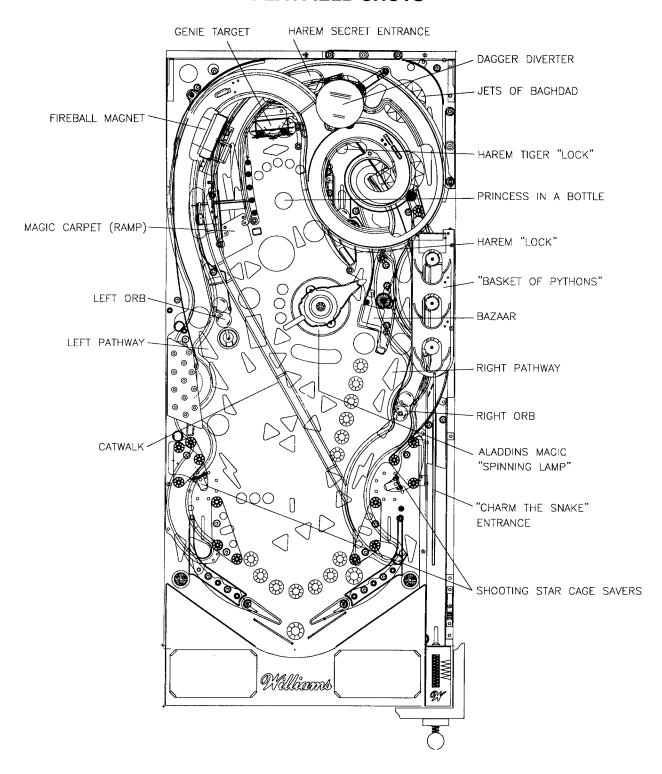
JEWELS - Complete lit Golden Symbols then shoot Magic Carpet to collect Jewels.

BAZAAR - Advance Bazaar letters. Orbs add Bonus X Value when lit.

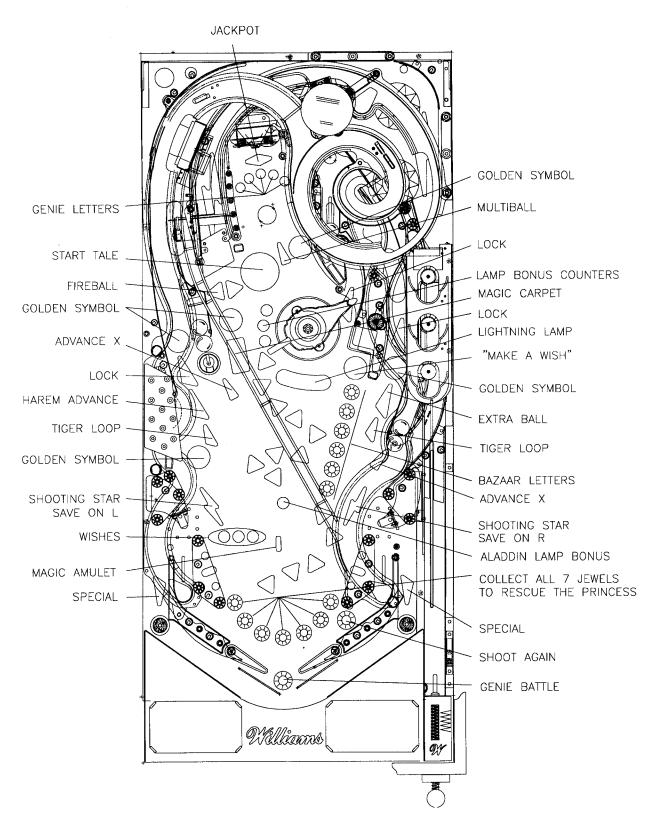
EXTRA BALL - Shoot the right Passageway to score EXTRA BALL when lit.

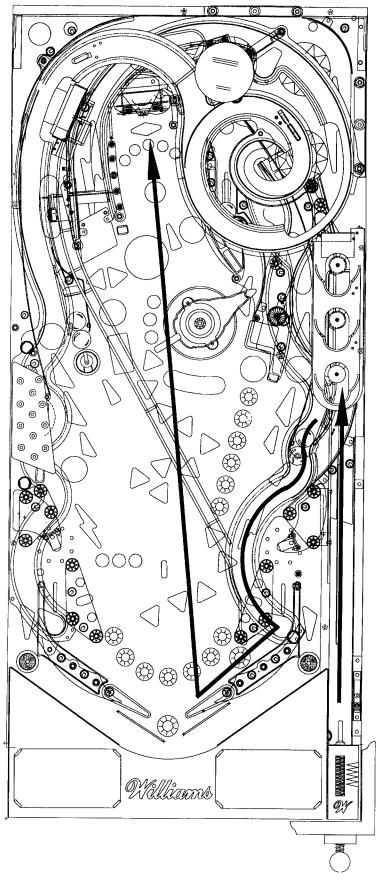
GENIE BATTLE - Strike the Genie when all seven Jewels are lit to start Genie Battle.

# **PLAYFIELD SHOTS**



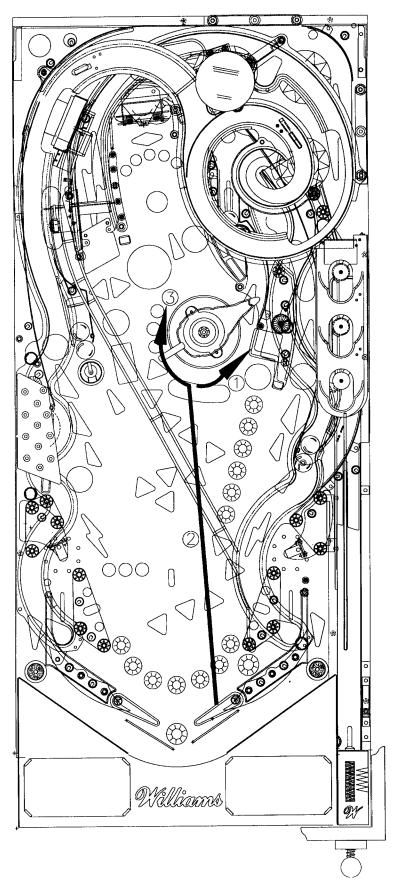
# PLAYFIELD SHOTS CONTINUED...





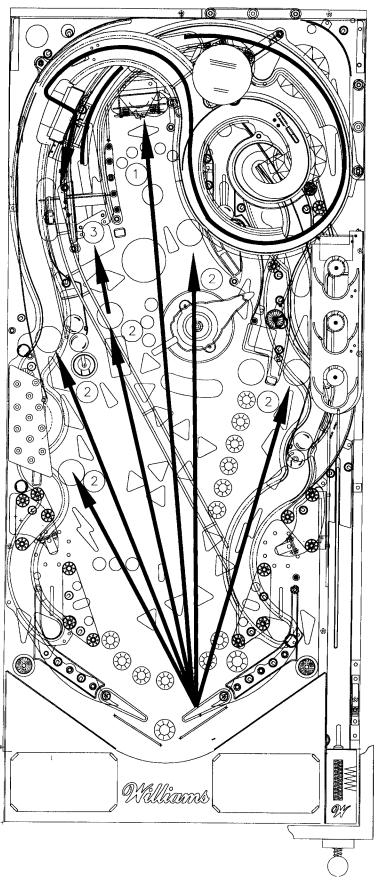
# **SKILL SHOT**

- 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.

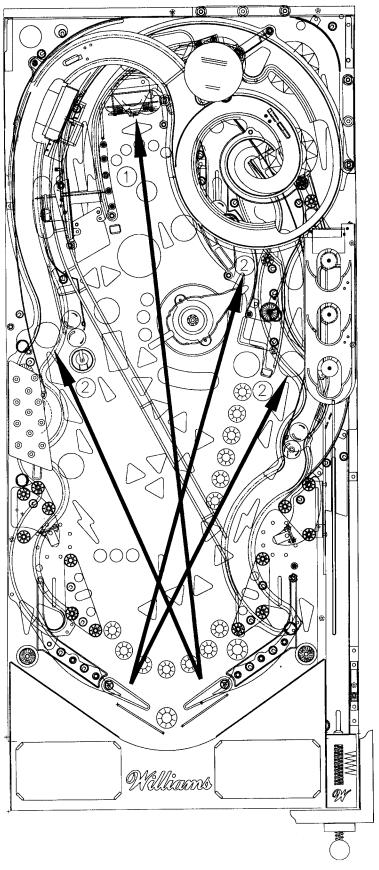
- 1) Hit the Genie when lit, to start the next tale.
- 2) Shoot the lit Golden Symbols during the tale.

This will light the Magic Carpet shot.

# **COLLECT A JEWEL**

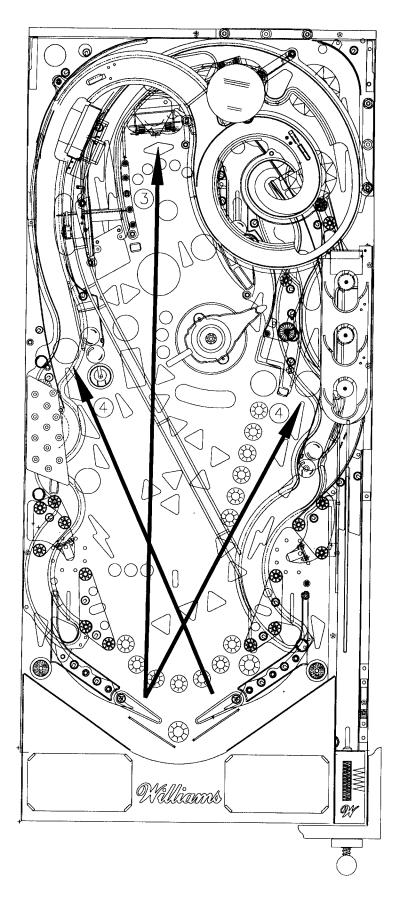
3) Shoot the Magic Carpet ramp to collect the Jewel.

All Jewels collected will light Genie Battle.



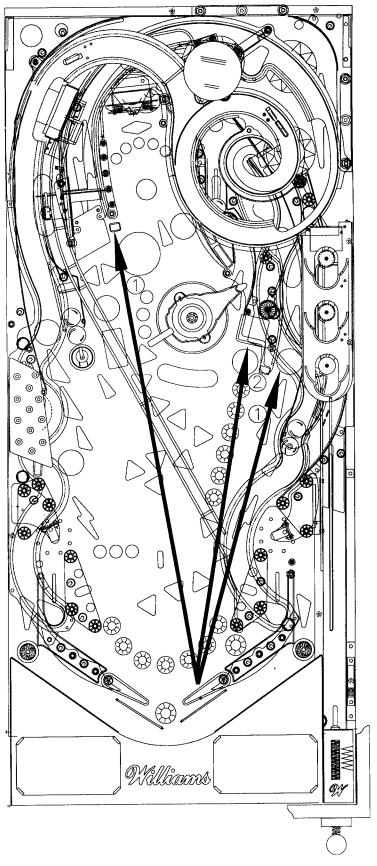
# **HAREM TIGER LOCK**

- 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.



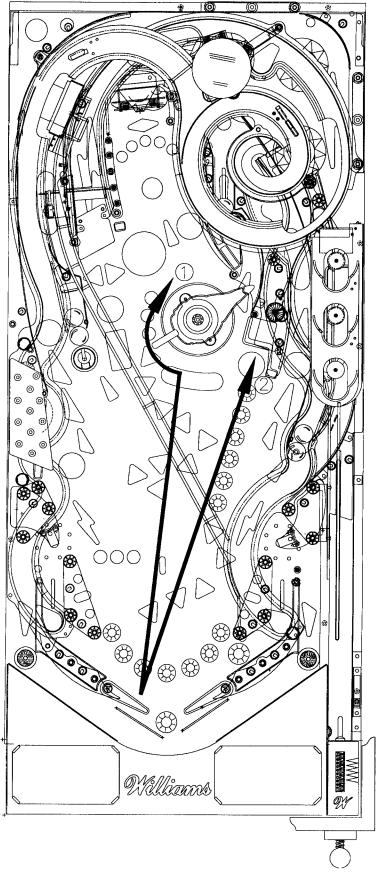
# HAREM TIGER LOCK CONTINUED...

- 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.



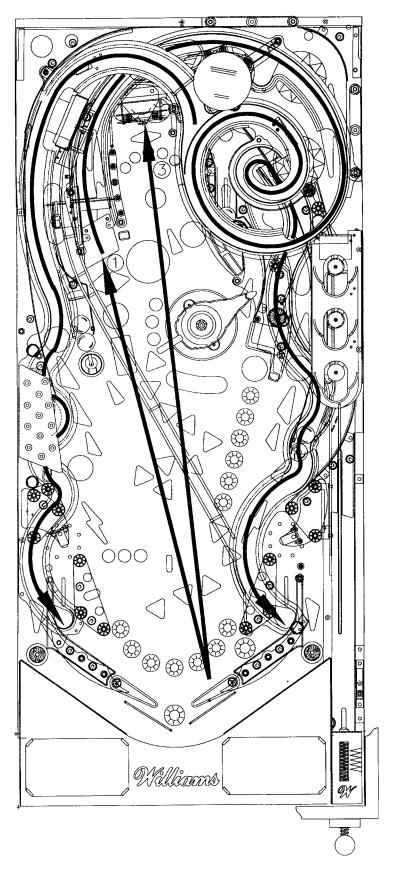
# **THE BAZAAR**

- 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.



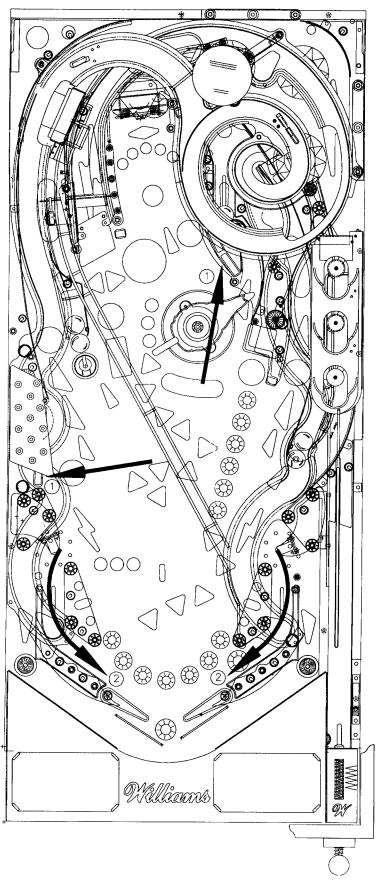
# **MAKE A WISH**

- 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.



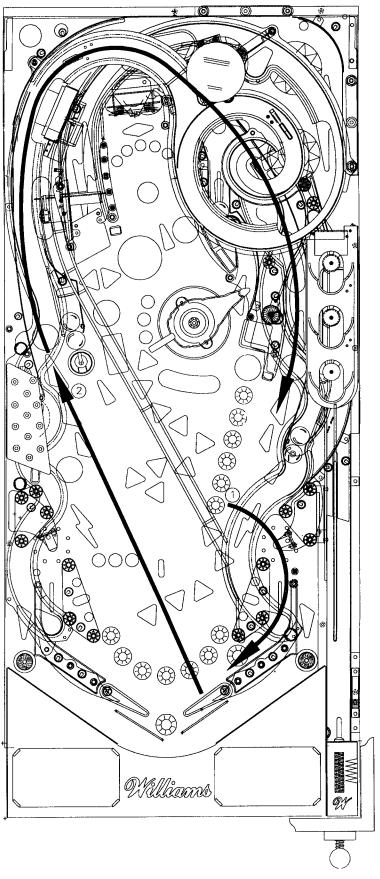
# **THROW A FIREBALL**

- 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".



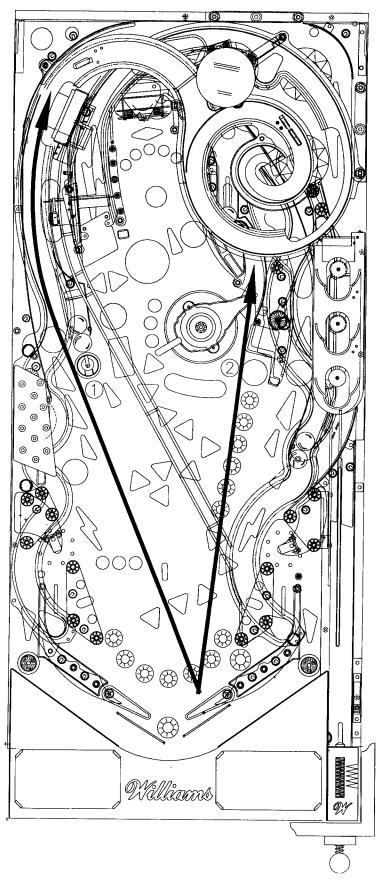
# SHOOTING STARS (Outlane Savers)

- 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.



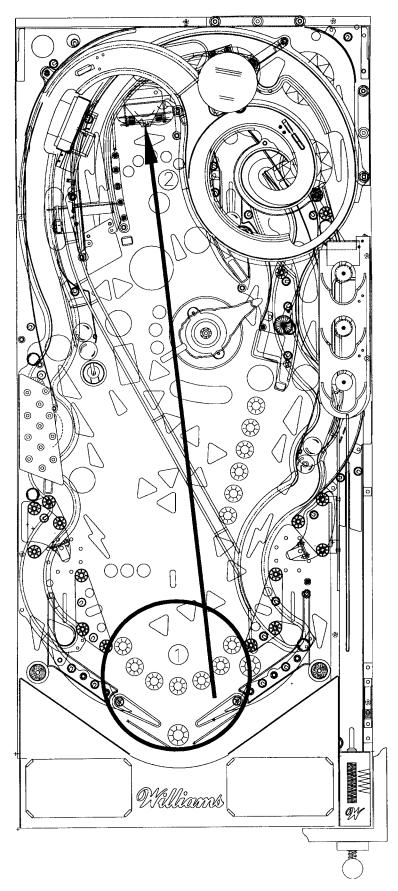
# **TIGER LOOPS**

- 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.
- 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.

Domestic 120V @ 60Hz Power:

Width: 29" approx. Dimensions:

Foreign 230V @ 50Hz

Depth: 52" approx. Height: 75" approx.

Japan 100V @ 50HZ

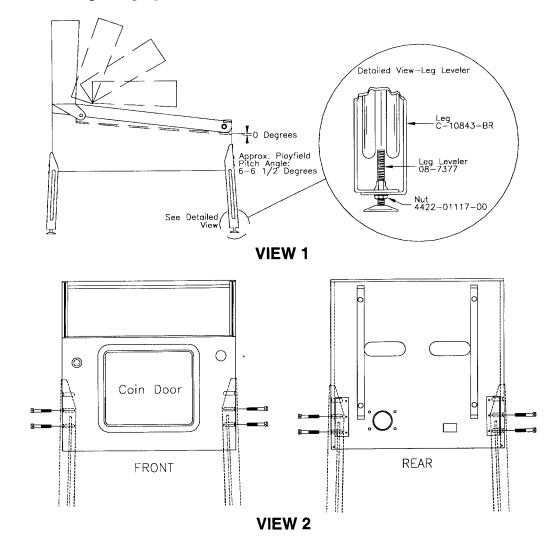
32°F to 100° F, (0°C to 38°C)

Temp: 325 lb. approx. (crated) Not to exceed 95% relative. Weight: Humidity:

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

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

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



- 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.

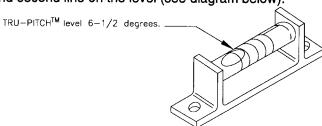
Carefully lift the speaker panel and rotate it away from the backbox, toward the playfield glass. The speaker panel will remain attached to the backbox unit.

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).



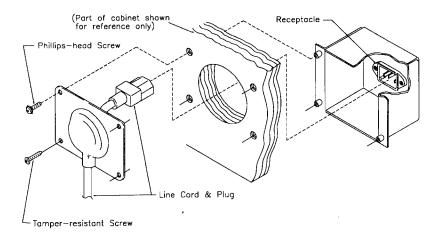
### ! IMPORTANT!

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**

# **A** CAUTION

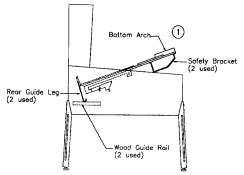
Do not raise the playfield straight up! This game uses a slide assembly to raise and lower the playfield.

# **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.

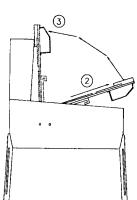
 Grasp bottom arch and carefully lift up playfield only high enough to clear safety brackets. Rear guide legs should not hit wood guide rails, or be used to slide out playfield.



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

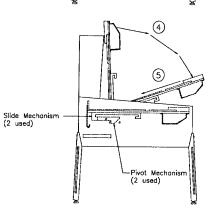
Be sure playfield is in locked position and does not slide back into cabinet. If it does, repeat Step 2 before proceeding to Step 3.

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.



### 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.



# GAME CONTROL LOCATIONS

# **Cabinet Switches**

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

The <u>Start Button</u> 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 <u>Service Credits</u> button puts credits on the game that are not included in any of the game audits. The <u>Volume Up</u> (+) button raises the sound level of the game. Press and hold the button until the desired level is reached.

The <u>Volume Down (-)</u> 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 <u>Begin Test</u> button starts the Menu System operation and changes the coin door buttons from Normal Function to Test Function.

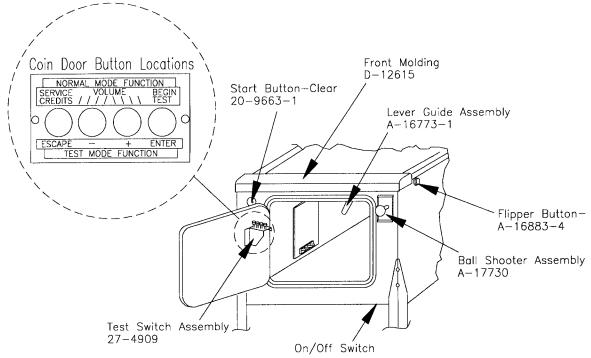
# **Test Function**

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	Press Escape
1	B.2 Earning Audits	To move out of a menu selection.
	B.3 Standard Audits	
	B.4 Feature Audits	Press Enter
	B.5 Histograms	To get into a menu selection.
	B.6 Time-Stamps	<del>-</del> ·
P. PRINTOUTS MENU		Press Up
	P.1 Earnings Data	Increases sequence; Example A.1, A.2, A.3, A.4.
	P.2 Main Audits	
	P.3 Standard Audits	Press Down
	P.4 Feature Audits	Decreases sequence; Example A.4, A.3, A.2, A.1.
	P.5 Score Histograms	
	P.6 Time Histograms	Use Up or Down to cycle through the
	P.7 Time-Stamps	selections in a menu.
	P.8 All Data	
T. TEST MENU	_	Use Escape and Enter to move into and out of the
	T.1 Switch Edges Test	selected menu.
	T.2 Switch Levels Test	name.
	T.3 Single Switches Test	
	T.4 Solenoid Test	<u> </u>
	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	<u> </u>
	T.17 Empty Balls Test	<del>_</del>
U. UTILITIES MENU	<b>7 .</b>	
İ	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	<del></del>
	U.11 Auto Burn-in	<del>_</del>
A. ADJUSTMENT MENU	7	
	A.1 Standard Adjustments	
	A.2 Feature Adjustments	<del>_</del>
	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>B.1</b>	Ma	ain 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	80	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	Ea	rning Audits					
<b>B.2</b>	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>B.2</b>	10	Total Center Slot*	00
B.2	04	Recent Right Slot	00	<b>B.2</b>	11	Total Right Slot*	00
B.2	05	Recent 4th Slot	00	<b>B.2</b>	12	Total 4th Slot*	00
B.2	06	Recent Paid Credits	00	<b>B.2</b>	13	Total Paid Credits*	00
B.2	07	Recent Service Credits	00	<b>B.2</b>	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>B.3</b>	St	landard Audits					
<b>B.3</b>	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>B.3</b>	06	Percent Replays	00	B.3	25	Replay 1 Awards	00
<b>B</b> .3	07	Special Awards	00	B.3	26	Replay 2 Awards	00
B.3	80	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>B.3</b>	12	Percent H.S.T.D.	00	B.3	31	3 Player Games	00
<b>B.3</b>	13	Extra Ball	00	B.3	32	4 Player Games	00
<b>B.3</b>	14	Percent Extra Ball	00	B.3	33	H.S.T.D. Reset Count	00
<b>B</b> .3	15	Tickets Awarded	00	B.3	34	Burn-in Time†	00:00:00
<b>B.3</b>	16	Percent Tickets	00	B.3	35	1st Replay Level	00.00.00
<b>B.3</b>	17	Left Drains	00	B.3	36	Left Flipper	00
<b>B.3</b>	18	Right Drains	00	B.3	37	Right Flipper	00
<b>B.3</b>	19	Average Ball Time	00			3	00

<sup>\*\*\*</sup>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	<b>Ball Saves</b> 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%
	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>B.</b> 5	Hi	istograms		
<b>B.5</b>	01	0.0 - 0.4 Million Scores	00	00%
<b>B.5</b>	02	0.5 - 0.9 Million Scores	00	00%
<b>B.</b> 5	03	1.0 - 1.4 Million Scores	00	00%
<b>B.5</b>	04	1.5 - 1.9 Million Scores	00	00%
<b>B.</b> 5	05	2.0 - 2.9 Million Scores	00	00%
B.5	06	3.0 - 3.9 Million Scores	00	00%
<b>B</b> .5	07	4.0 - 4.9 Million Scores	00	00%
B.5	80	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 B.5	24 25	Game Time 8-10 Mins	00	00%
В.5 В.5	26	Game Time 10-15 Mins	00	00%
D.3	20	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) **Earnings Data** P.1 **Main Audits** P.2 **Standard Audits** P.3 **Feature Audits** P.4 P.5 **Score Histograms** P.6 **Time Histograms Time-Stamps** P.7 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 Toot	T 40	
	Switch Edges Test	1.10	Lamps And Flasher Test
	Switch Levels Test	T.11	Display Test
	Single Switch Test	T.12	Flipper Coil Test
	Solenoid Test	T.13	Ordered Lamps Test
	Flasher Test	T.14	Lamp Row-Col.
	General Illumination Test	T.15	DIP Switch Test
	Sound & Music Test	T.16	Genie/Vanishing Ball Mechanism Test
	Single Lamps Test		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.

### T.12 Flipper Coil Test Continued...

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

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

# T.13 Ordered Lamps Test

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

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

# T.14 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

<b>U.1</b>	Clear Audits	U.7	Factory Adjustments
<b>U.2</b>	Clear Coins	U.8	Factory Reset
U.3	Reset H.S.T.D.	U.9	Preset
<b>U.4</b>	Set Time & Date	U.10	Clear Coins
U.5	<b>Custom Message</b>	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	Instali 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:

<u>Ad</u>		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
<b>A.4</b>	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:

<u>Ad</u>	<u>Name</u>	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:

<u>Ad</u>	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.

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U.9 13 to U.9 16 NOT USED
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- U.9 17 Install German 1
- U.9 18 Install German 2
- U.9 19 Install German 3
- U.9 20 Instail 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.

Settinas:

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.

Settinas:

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

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.

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 <sup>,</sup>	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

nepeal /

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" helpw)

"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 PRICI	IG FDITOR
	0001011111011	10 2511011
1)	\$0.25	1/2 cred.
<u>''</u>	Ψ0.20	

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 1<sup>st</sup> line 20 times the pricing mode is currently set up as follows, but only the 1<sup>st</sup> four lines are displayed.

	The state of the s	
	CUSTOM PRICI	NG 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 20<sup>th</sup> level. The display will show (with "10 cred." Blinking):

1		CUSTOM PRICE	NC EDITOR
ı	CUSTOM PRICING EDITOR		
	17)	\$4.25	8 1/2 cred.
1	18)	\$4.50	9 cred.
١	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

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	CoinChute		4 <sup>th</sup>	uta	Games/Coins	Display	Pricing Adjustments A3 02 03 04 05 06 07 08 09
JSA	Left 25¢	S1.00*	ight Ch	\$1.00		50¢, 75¢, \$1.00	02 03 04 06 07 06 08
J3A		l '	25¢	\$1.00	1/50¢, 2/75¢, 3/\$1	1/.75, 3/2.00	
	25¢	\$1.00*	1	l	1/75¢, 2/\$1.50, 3/\$2.00		
	25¢	\$1.00	25¢	\$1.00	1/3X25¢	USA 1/\$0.75	
	25¢	\$1.00	25¢	\$1.00	1/50¢, 2/\$1 <sup>2</sup>	USA 2/\$1.00	
	25¢	\$1.00	25¢	\$1.00	1/50¢, 3/\$1.00	USA 3/\$1.00	
	25¢	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 3/\$1.50, 6/\$2.00	USA 6/\$2.00	
	25¢	\$1.00	25¢	\$1.00	1,2	USA 5/\$2.00	
	25¢	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 3/\$1.50, 5/\$2.00	1/.75, 4/\$2.00	
		1		\$1.00	1/3x25¢, 2/\$1.50, 4/\$2.00	6/\$2. 00 4/\$1.50	
	25¢	\$1.00	25¢	\$1.00	1/2x25¢, 2/\$1.00, 4/\$1.50, 6/\$2.00		
	25¢	25¢	25¢	1	1/4x25¢, 6/\$5.00	1/1, 6/5	
	25¢	25¢	25¢	٠ .	1/4x25¢	1/\$1.00	1
anada	25¢		\$1.00	-	1/50¢, 2/75¢, 3/\$1	CAN. 50-75-1	
	25¢		\$1.00		2	CAN. 2/\$1.00	i
	25¢	١.	\$1.00	١.	1/50¢, 2/\$1	CAN, 3/\$1.00	
	25¢		\$1.00	1	1/50¢, 3/\$1.00	3/\$1.00 Coin	ł
	l	-	1	l .	1/2x25¢, 2/4x25¢, 3/\$1.00	I '	ľ
	25¢		\$1.00	l -	1/2x25¢, 2/\$1.00, 3/\$1.50, 6/\$2.00	CAN. 6/\$2.00	1
	25¢	-	\$1.00	· .	1/2x25¢, 2/\$1.00, 3/\$1.50, 5/\$2.00	CAN. 5/\$2.00	
	25¢		\$1.00		1/2x25¢, 2/\$1.00, 4/\$1.50, 6/\$2.00	6/\$2, 4/1.50	1
	25¢	-	\$1.00	1 .	1/3x25¢, 2/\$1.50, 4/\$2.00	1/.75, 4/2.00	
	25¢	l .	\$1.00	1 .	2	1/.75, 3/2.00	1
	25¢	١.	\$1.00	١.	1/75¢, 2/\$1.50, 3/\$2.00	CAN. 1/\$0.75	i
oods 3/D-# ^-			\$1.00	1	1/3X25¢ 1/0.50, 2/\$1.00, 3/\$1.00-Coin	CAN.\$ BONUS	1
nada 3/Dollar Coin Justria	25¢ 5sch	10sch	\$1.00 10sch	<del>  :  </del>	7	AUSTRIA	1
, admia			10sch	1 .	1/2x5sch, 3/2x10sch 12/5sch, 5/10sch	CUSTOM	02 00 05 00 01 00 01 00
ustralia	5sch 20¢	\$1	\$1	\$2	1 2 2	AUSTRALIA 1	52 55 55 55 57 55 51 55
	20¢	\$1	\$1	\$2	1/\$1, 3/\$2 1/\$1, 2/\$2	AUSTRALIA 2	
J.K.	£1.00	50P	20P	10P	2	U. KINGDOM	
	1Fr	2Fr	5Fr	<u> </u>	1/3x10P, 2/50P, 4/£1	SWISS 1	
switzerland	1	1		i -	1/1Fr, 3/2Fr, 7/5Fr	swiss 2	
Swiss 2	1Fr 1Fr	2Fr 2Fr	5Fr 5Fr	1 :	1/2Fr, 2/3Fr, 3/4Fr, 5/5F 1/1Fr, 5/5Fr	SWISS 3	
wiss 3	1Fr	2Fr	5Fr	-	1/1Fr, 2/2Fr, 6/5Fr	SWISS 4	
Swiss 4	1Fr	1Fr	1Fr		1/1Fr (all slots = 1Fr)	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	
3ermany	1DM	2DM	5DM		1/2DM, 2/3DM, 3/4DM, 4/5DM	GER. 4/5DM	
					1/2DM, 2/3DM, 3/4DM, 5/5DM	GER. 1/2DM	1
					2	GER. 1/1DM	1
					1/1DM, 2/2DM, 5/5DM	GER. 6/5DM	
falland	1G		1G		1/1DM, 2/2DM, 6/5DM	HOLLAND	
Holland				<u> </u>	1/1G		
Sweden	1Kr	5Kr	10Kr	1Kr	1/10Kr, 2/15Kr, 3/20Kr	SWEDEN 1	
	1Kr	5Kr	10 <b>K</b> r	1Kr	1/5Kr <sup>2</sup>	SWEDEN 2	Ì
rance	1Fr	5Fr	10Fr	20Fr	1/3x1Fr, 2/5Fr, 5/10Fr , 10/20Fr	TARIFF 1	
	1Fr	5Fr	10Fr	20Fr	2,3	TARIFF 2	
	1Fr	5Fr	10Fr	20Fr	1/2x1Fr, 3/5Fr, 7/10Fr ,14/20Fr	TARIFF 3	
		1	l	20Fr	1/5Fr, 3/10Fr, 7/2x10Fr , 7/20Fr	TARIFF 4	1
	1Fr	5Fr	10Fr		2/5Fr, 4/10Fr, 9/2x10Fr , 9/20Fr	1	1
	1Fr	6Fr	10Fr	20Fr	2/5Fr, 5/10Fr, 11/2x10Fr , 11/20Fr	TARIFF 5	1
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr , 6/20Fr	TARIFF 6	
aly	500L	500L	500L	· ·	1/500L	ITALY 1	
	500L	500L	500L	-	1/2x500L, 3/4x500L	ITALY 2	1
	500L	500L	500L		2	ITALY 3	1
		<del></del>		<del>                                      </del>	1/2×500L, 2/4×500L	SPAIN	1
Spain	100P	1	500P	1	1/100P, 6/500P	· ·	04 00 04 00 04 04 04 05
	25P	1 :	100P 100P	1 :	1/25P, 5/100P 1/25P, 4/100P	CUSTOM	01 00 04 00 01 04 01 00 01 00 01 00 04 00 01 00 01 00
	25P 25P	1 :	100P	:	1/2x25P, 2/100P	CUSTOM	01 00 04 00 02 00 01 00
	25P	<u> </u>	100P		1/2x25P, 3/100P	CUSTOM	03 00 12 00 04 00 01 06
apan	100¥	· ·	100¥		1/100¥ ·	JAPAN	
Chile	Token	T -	Token	-	1/1Token	CHILE	
	1Kr	5Kr	10Kr	20Kr	1	DENMARK 1	
enmark	1Kr	5Kr	10Kr	20Kr	1/2x1 Kr, 3/5 Kr, 7/10 Kr	DENMARK 2	1
enmark	<ul> <li>IAI</li> </ul>	ŞIKÎ		1	1/5 Kr, 3/10 Kr, 6/20 Kr		<del></del>
	1		5Mka	-	1/2x1Mka, 3/5Mka	FINLAND 1	1
	1Mka	i			1/3x1Mka, 2/5Mka	FINLAND 2	
	1	-	5Mka			NEW ZEALAND 1	T
enmark Finland w Zealand	1Mka	-	\$2.00		1/\$1, 3/\$2²		1
inland w Zealand	1Mka 1Mka \$1.00 \$2.00	-	\$2.00 \$1.00	٠	1/\$1, 3/\$2 <sup>2</sup> 1/\$1, 3/\$2, (\$2-\$1 door)	NEW ZEALAND 2	
inland	1Mka 1Mka \$1.00	-	\$2.00	:			
inland w Zealand	1Mka 1Mka \$1.00 \$2.00	- - - 10¢	\$2.00 \$1.00	٠	1/\$1, 3/\$2, (\$2-\$1 door) 1/5Kr, 2/10Kr, 5/20Kr	NEW ZEALAND 2	
inland w Zealand lorway rgentina	1Mka 1Mka \$1.00 \$2.00 5Kr	- - 10¢	\$2.00 \$1.00 10Kr		1/\$1, 3/\$2, (\$2-\$1 door) 1/5Kr, 2/10Kr, 5/20Kr 1/1 Token	NEW ZEALAND 2 NORWAY	
w Zealand  orway  gentina	1Mka 1Mka \$1.00 \$2.00 5Kr 10¢	- 10¢	\$2.00 \$1.00 10Kr		1/\$1, 3/\$2, (\$2-\$1 door) 1/5Kr, 2/10Kr, 5/20Kr	NEW ZEALAND 2 NORWAY ARGENTINA	
w Zealand lorway	1Mka 1Mka \$1.00 \$2.00 5Kr	- - 10¢	\$2.00 \$1.00 10Kr 10¢ 50D	-	1/\$1, 3/\$2, (\$2-\$1 door) 1/5Kr, 2/10Kr, 5/20Kr 1/1 Token 1/2x10D, 1/20D, 3/50D	NEW ZEALAND 2 NORWAY ARGENTINA GREECE	

# 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:

Disable automatic printouts OFF Main Audit Table (B.1) MAIN AUDITS Earning Audits (B.2) **EARNINGS** STD. AUDITS Standard Audits (B.3) Feature Audits (B.4) **FEATURES** Histograms (B.5) HISTOGRAMS Time Stamps (B.6) TIMESTAMPS 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 2<sup>nd</sup> 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 BOARDCenter LED blinks once= G11 ROM FailureLED ERROR CODESCenter 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 = \$2 Failure

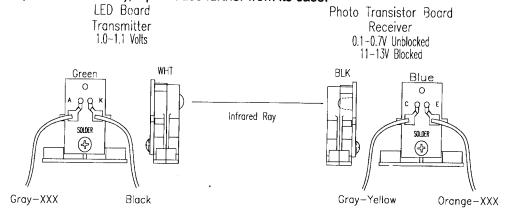
DDES 2 Beeps = S2 Failure 3 Beeps = S3 Failure 4 Beeps = S4 Failure 5 Beeps = S5 Failure 6 Beeps = S6 Failure

7 Beeps = S7 Failure

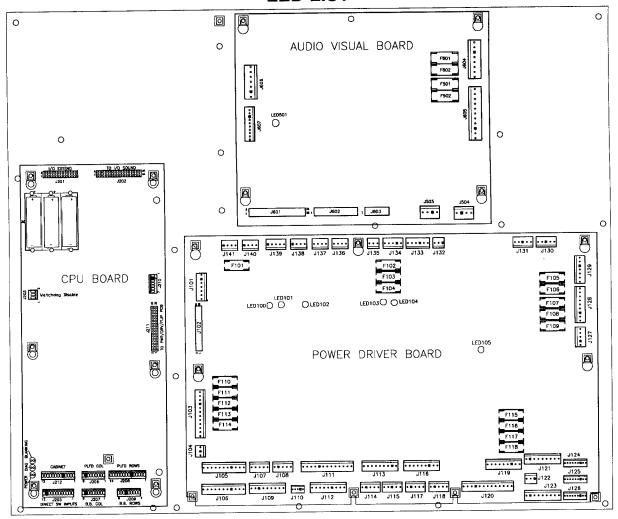
10 Beeps = Audio Static RAM Failure

### **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 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

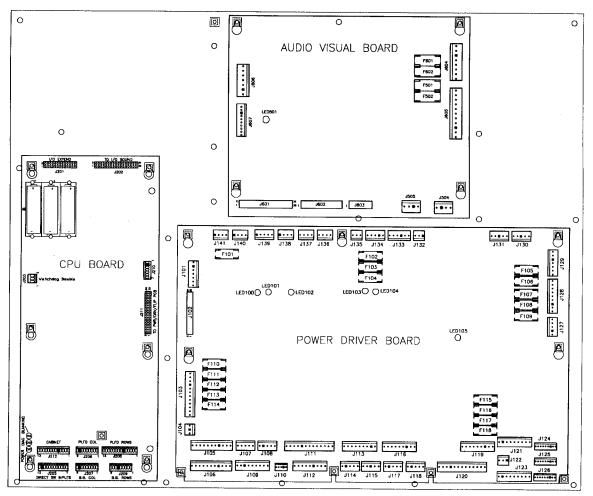
LED 102 +18VDC Lamps, Normally On

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**

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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 El165, 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.

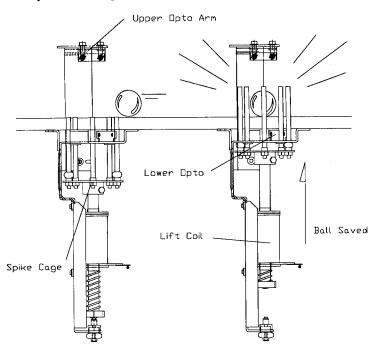
Regular, more extensive, playfield cleaning is recommended. However, avoid excessive use of water and caustic or abrasive cleaners because they tend to damage the playfield surface. Playfield wax (or any carnauba based wax), or polish may be used sparingly, to prevent a buildup on the playfield surface. 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

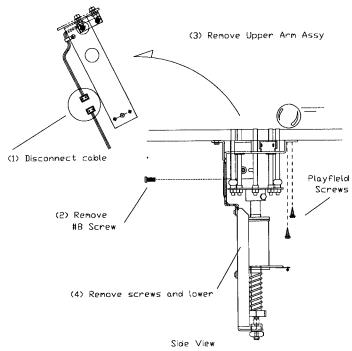
#### "SHOOTING STAR" SPIKE ASSEMBLY

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.



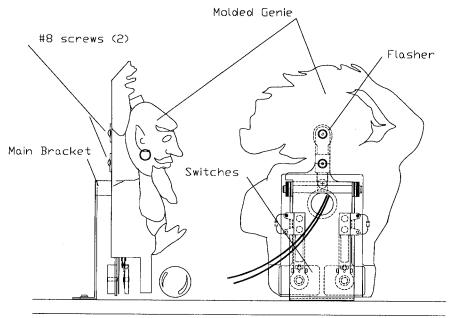
#### REMOVE THE SPIKE ASSEMBLIES

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.



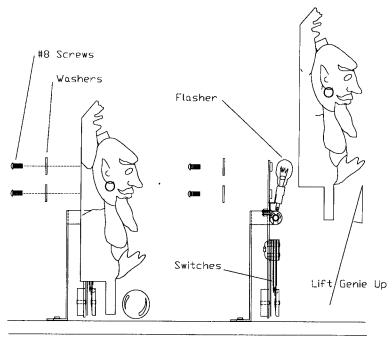
#### **GENIE TARGET ASSEMBLY**

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**

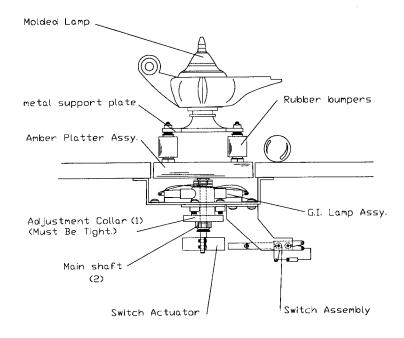
To remove the Molded Genie, slide the playfield out of the cabinet and remove the #8 screws (2) on the back of the Genie. Then gently lift up the Genie and remove it from the metal base. The switches and flasher can now be serviced.



Side View

#### SPINNING "ALADDINS LAMP" ASSEMBLY

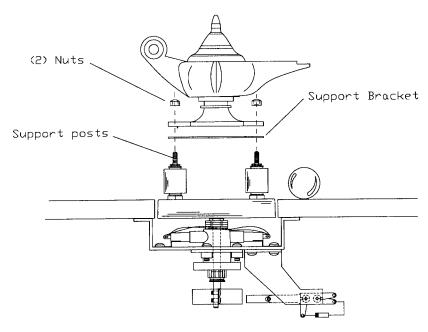
The Spinning Lamp Assembly is mounted from under the playfield. Balls in play can hit the rubber bumpers, making the lamp spin and score points when the lamp switches are closed. The whole unit is easily cleaned and serviceable. The platter should be flush with the playfield for smooth action and height 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.



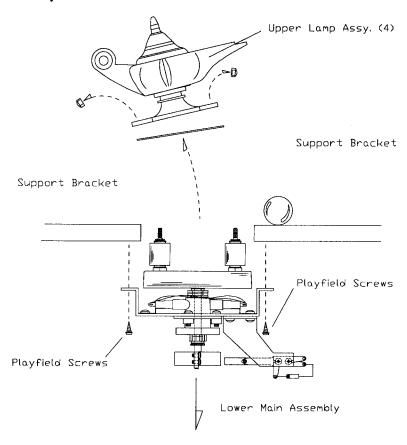
Side View

#### 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) 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.



#### **NOTES**

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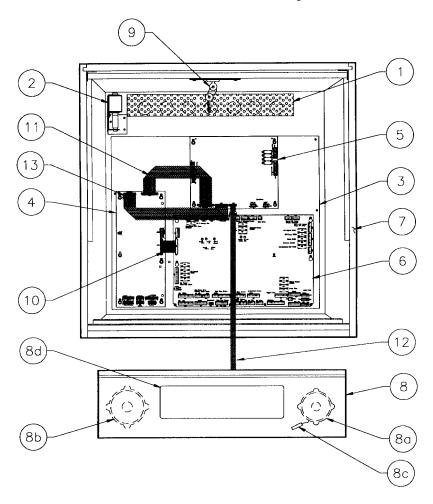
### **NOTES**

## **NOTES**

## **SECTION TWO**

**PARTS INFORMATION** 

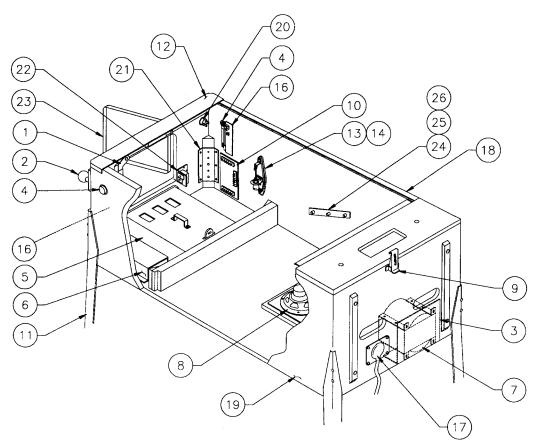
## 50047-BB Backbox Assembly



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ltem	Part Number	Description	Item	Part Number	Designator
1	01-6645	Venting Screen	10	5795-12653-03	Ribbon Cable, 34-pin, 3"
2	B-10686-1	Knocker Assembly	11	5795-12653-12	Ribbon Cable, 34-pin, 12"
3	A-14092-7	WPC '95 Mounting Plate Assy.	12	5795-13434-25	Ribbon Cable, 14-pin w/Ferrite
4	A-20028	WPC '95 Power Driver PCB	13	5795-10938-15	Ribbon Cable, 26-pin, 15"
5	A-20516-50047	WPC '95 Audio Visual PCB			
6	A-20119-50047	WPC '95 CPU PCB			
7	04-10450-50047	Backbox, Wood .	Misce	llaneous Parts	
8	A-20866	Speaker/Display Assembly		08-7456	Backbox Glass: 27 x 18-7/8"
a)	5555-12924-00	Speaker Tweeter, 15w, 4Ω		20-9718	Wing Screw, 3/8-16 x 2"
b)	5555-12856-00	Speaker, 5-1/4", 25w, 4Ω		31-1357-50047	Screened Translight
c)	5045-12914-00	Capacitor, 10µfd., 50v (±20%)			
ď)	5901-12784-00	Dot Matrix Display/Driver Board			
9 ′	A-13379	Lock & Plate Assembly	Backb	ox 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



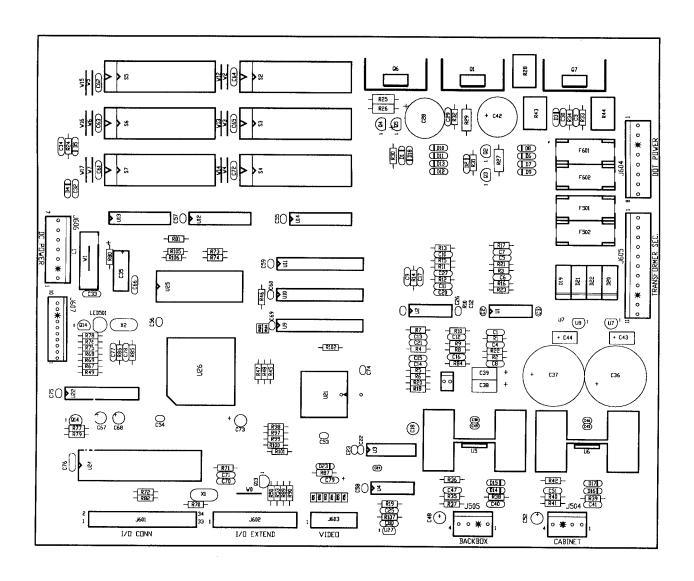
#### Miscellaneous Parts (Not Shown)

ltem	Part Number	Description	Part Number	Description
1	A-16773-1	Lever Guide Assembly	A-17195	Tilt Switch Assy. w/Cable
2	A-17730-3	Ball Shooter w/Silver Knob Assy.	A-19562.1	Stay Arm Assembly
3	01-13936	Drip Plate - Narrow	01-12352	Clip Bracket
4	A-16883-4	Flipper Button w/Spring, Red (2)	01-9011.1-L	Backbox Mtg. Bracket, Left
5	A-20729-5	4-Ball Cashbox Assembly	01-9011.1-R	Backbox Mtg. Bracket, Right
6	A-17540-1	Univ. Power Interface Assy.	01-6389-1	Cashbox Lock Bracket
7	5610-14515-00	WPC Transformer	08-7028-T	Playfield Glass
8	5555-12929-00	Speaker, $4\Omega$ , 6", 25w	08-7377	Leg Leveler Adjuster, 3"
9	20-9347	Toggle Latch	20-6500	Steel Ball, 1-1/16" (6)
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	Cabinet Cables	
15	*	Cordset	Cabillet Cables	
16	A-17316	Opto Flipper Assembly (2)	A-20201	Cable & Jumper Assy., Coin Door
17	01-10714	Line Cord Cover	H-17217.1	Plumb/Bob Mech. Protect Cable
18	A-12359-3	Side Molding Assembly (2)	H-17837-2	Voltage Program Jumper Cable
19	11-1314	Wood Cabinet	H-20599-1.1	Cabinet Cable
20	20-9663-1	Push Button w/Sw., Start (Clear)	H-19601-1	Power Extension Cable
21	01-11400	Leg Plate (4)	H-20856	Cabinet Switch/Lamp Cable
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)	* See Application Cha	rt p.2-29.

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

Part Number	Designator	Description	Part Number	Designator	Description
4004-01005-06		Mach. Screw, 4-40 x 3/8"	5048-13172-00	C78	Cap., 47pf, 50v, 20% Ax.
4404-01119-00	-	Nut 4-40 ESN	5048-13418-00	C4 - C6	Cap., .047m, 50v, 5% Ax.
5010-08774-00	R2, R17, R22, R23,	Resistor, 22KΩ, ¼w, 5%	5048-13609-00	C9, C12, C15	Cap., 3900pf, 50v, 5% Ax.
00,0000	R35, R36, R40,R42,		5048-13610-00	C8, C10, C11, C13, C14	Cap., 1000pf, 50v, 5% Ax.
	R87		5048-13611-00	C16, C17, C20, C21	Cap., 680pf, 50v, 5% Ax.
5010-08991-00	R20, R46-R48, R50,	Resistor, 4.7KΩ, ¼w, 5%	5048-14563-00	C29-C31	Cap., .01µf, 200v, 10% Axial
0010 00001 00	R72, R76, R77, R80,	1100101011 1111111111 7417, 070	5070-09045-00	D19-D22	Diode MR501, 3.0A
	R107		5070-09054-00	D4, D6-D17, D23	Diode 1N4004, 1.0A
5010-09034-00	R21	Resistor, 10KΩ, ¼w, 5%	5075-12823-00	D1, D18	Zener, 1N4758A 56v, 1w
5010-09036-00	R19	Resistor, 100Ω, ¼w, 5%	5075-12824-00	D3, D5	Zener, 1N4742A 12v, 1w
5010-09030-00	R32-R34	Resistor, 150KΩ, ¼w, 5%	5075-12826-00	D2	Zener, 1N4759, 62v, 1w
5010-09134-00	R1, R3	Resistor, 8.2KΩ, ¼w, 5%	5160-08938-00	Q13-Q15	Transistor, 2N4401 NPN
		Resistor, 470Ω, ¼w, 5%	5164-09056-00	Q2, Q3	Transistor, MPSD02 NPN
5010-09416-00	R73, R74, R82, R88,	Mesistor, 47 012, 74W, 5 76	5164-12154-00	Q1, Q7	Transistor, MJE15030 NPN
E010 00007 00	R105, R106	Decister 1000 1/w E9/	5194-09055-00	Q4, Q5	Transistor, MPSD52 PNP
5010-09807-00	R30, R31, R67-R69,	Resistor, 120Ω, ¼w, 5%			Transistor, MFSD32 FNF Transistor, MJE15031 PNP
5040 40474 00	R102	Desister 500 1/w 50/	5194-12155-00	Q6 U7	•
5010-10171-00	R24	Resistor, 56Ω, ¼w, 5%	5250-13302-00	U8	Reg. 78L05T 5v
5010-10258-00	R86	Resistor, 1MΩ, ¼w, 5%	5250-13303-00		Reg. 79L05T 5v
5010-10983-00	R53, R75, R79, R84,	Resistor, 1.8KΩ, ¼w, 5%	5311-12538-00	U4	IC 74HC14 Hex. S-T
	R85, R89, R90	B - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	5317-12211-00	U12-U14	IC Octal Buffer 74ALS541
5010-12832-00	R25, R26, R27, R29	Resistor, 47KΩ, ¼w, 5%	5340-12278-00	U25	S/Ram 2064 150NS
5010-13215-00	R78, R97-R101	Resistor, 200KΩ, ¼w, 5%	5370-12687-00	U27	IC MC 340640Reset Chp
5010-13372-00	R91-R96, R103, R104	Resistor, 220Ω, 1/8w, 5%	5349-14351-00	U9-U11	SRAm 8Kx8-35ms, 28pdlp
5010-13420-00	R37, R41	Resistor, 680Ω, ¼w, 5%	5370-12730-00	U1, U2	IC Op Amp TL084
5010-13517-00	R38, R39	Resistor, 15Ω, ¼w, 5%	5370-13419-00	U5, U6	IC TDA 2030AV 18w, Audio Amp
5010-13607-00	R4, R5, R7-R15	Resistor, 6.19KΩ,1/8w, 1%	5371-13299-00	U3	IC Ad-1851 16bit mono
5012-14558-00	R44	Resistor, 1.8KΩ, 5w vertical	5520-14561-00	X2	Crystal 20mHz, parallel 20pf
5012-14559-00	R43	Resistor, 4.7KΩ, 5w vertical	5671-14516-00	LED 501	Led-Display Red T 1-3/4
5012-14560-00	R28	Resistor, 120Ω, 5w vertical	5700-08985-00	U24	Socket IC 40-pin .6
5013-13661-00	R16	Resistor, 9.09KΩ, ¼w, 1%	5700-12047-00	U22	Socket IC 24.3P
5013-14456-00	R6, R18	Resistor, 3.32KΩ, ¼w, 1%	5700-12088-00	S2-S7	Socket Dip 32.6P"
5040-14569-00	C35	Cap., 100mf, 25v, Axial	5705-12638-00	U5, U6	Heatsink 5298B
5040-09365-00	C38, C39, C43, C44	Cap.,1m, 63v(+50,-10%)Ax.	5705-14562-00	Q1, Q6, Q7	Heatsink 10-220 wave sol 287
5040-12750-00	C48, C52, C73	Cap., 22m, 35v Radial	5733-14528-00	F501, F502, F601, F602	Fuse Holder 5x20mm 10A.
5040-13098-00	C18, C67, C68	Cap., 4.7µ, 35v (±20%)	5731-14532-00	F501, F502	Fuse 5x20mm T2.5A., 250V
5040-13417-00	C36, C37	Cap., 10000µf, 35v Radial	5731-14533-00	F601, F602	Fuse 5x20mm T0.250A., 250V
5040-14564-00	C28, C42	Cap., 150µf, 160v, 20%Rad.	5791-10850-00	J602	Connector, 26-pin Header Str.
5043-08996-00	C2, C3, C19, C22-	Cap., 0.1µf, 50v (±20%) Ax.	5791-10862-04	J504, J505	Connector, 4-pin Header Str.
	C24, C26, C32, C34,		5791-10862-07	J606	Connector, 7-pin Header Str.
	C45, C46, C49, C50,		5791-10862-08	J604	Connector, 8-pin Header Str.
	C53-C66, C69, C72,		5791-10862-11	J605	Connector, 11-pin Header Str.
	C74-C76, C79, C80	0 450 ( 400 0 0 0 40	5791-12516-00	J601	Connector, 34 hdr 2 x 17 .100
5043-10267-00	C47, C51	Cap., 150pf, 100v Cer. Ax.	5791-12827-00	J603	Connector, 14 Hen 7x2 Str.
5048-10992-00	C27	Cap., .0047m, 50v, 10% Ax.	5791-13830-10	J607	Connector, 10-pin Str. Sq.
5048-11028-00	C77	Cap., 22p, 50v, Axial	5010-09534-00	W0, W1-W7, R49	Resistor, 0Ω, 0w
5048-11029-00	C25	Cap., 100p, 50v, 5% Axial	A-5343-50047-S2	S2	E-PROM Assembly
5048-11030-00	C7	Cap., 470p, 50v, Axial	A-5343-50047-S3	S3	E-PROM Assembly
5048-11033-00	C1	Cap., .022m, 50v, 10% Ax.	A-5343-50047-S4	S4	E-PROM Assembly
5048-12036-00	C40, C41	Cap., .22m, 50v, Axial	A-5343-50047-S5	S5	E-PROM Assembly

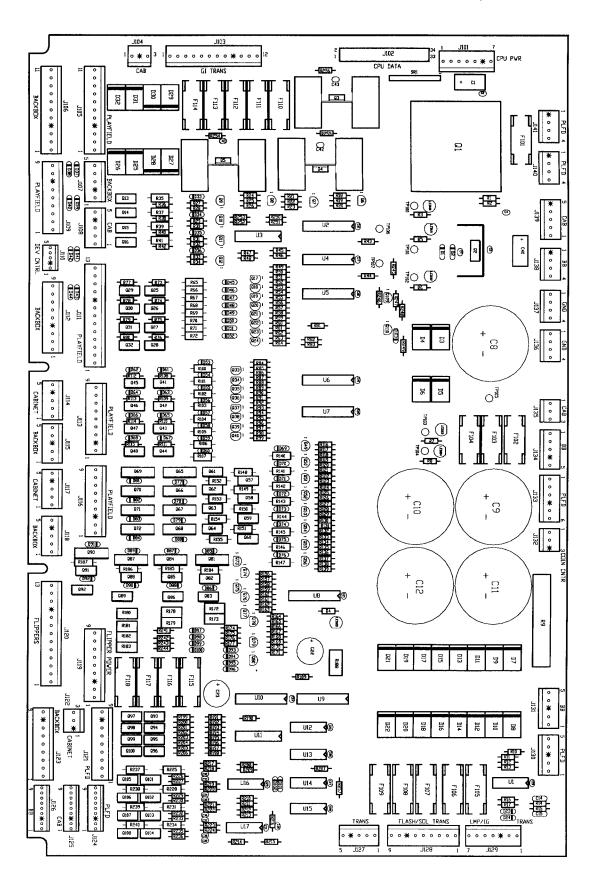
## A-20516-50047 WPC '95 Audio Visual PCB Assembly



## A-20028 WPC '95 Power Driver PCB Assembly

Part Number	Designator	Description	Part Number	Designator	Description
	C1. C40	Capacitor, 100µF, 25v, Ax.	5010-09999-00	R3, R4, R6-R8, R43, R44,	Resistor, 2KΩ, 1/4w, 5%
5040-14569-00 5043-08996-00	C2, C4, C5, C7, C13,	Capacitor, 0.1m, 50v (±20%) Ax.	5010-05555 00	R81-R83, R190	
	C16-C21, C24-C39,		5010-09224-00	R5, R14 - R17	Resistor, $270\Omega$ , $1/4w$ , $5\%$ Resistor, $12\Omega$ , $10w$ , $5\%$
5040 10417 00	C41-C43	Capacitor, 10000µf, 35v Radial	5012-12632-00 5010-09324-00	R9 R10	Resistor, 27KΩ, 1/4w, 5%
5040-13417-00 5048-11031-00	C8 - C12 C14, C15	Capacitor, .001m, 50v, 10% Ax.	5010-09358-00	R11, R157, R159, R161,	Resistor, 1KΩ, 1/4w, 5%
5040-09537-00	C22, C23	Capacitor, 100µ, 100v (±20%) Radial		R163, R165, R167, R169,	
5070-09054-00	D1, D2, D23, D24,	Diode 1N4004 1.0A.	5040 00000 00	R171, R216-R224	Basister 1000 1/4w 59/
F070 44F00 00	D33 - D100, D103	Diode P600G 6A 400 PIV	5010-09036-00 5010-09034-00	R247 R12, R13, R189,	Resistor, 100Ω, 1/4w, 5% Resistor, 10KΩ, 1/4w, 5%
5070-14526-00 5070-08919-00	D3-D22, D25-D32 D101, D102	Diode 7000G 6A 400 FW Diode, 1N4148 150mA.	5010-05054-00	R208-R215, R248	110516101, 10162, 17411, 070
5731-14531-00	F101	Fuse 5 x 20mm TO 63A., 250V	5010-08992-00	R18, R21, R24, R192,	Resistor, 560Ω, 1/4w, 5%
5731-14530-00	F102-F105, F107,	Fuse 5 x 20mm T 4A, 250V		R194, R196, R198, R200,	
5704 44040 00	F109-F118	Fues C. P. EA. Evolume	5010-08991-00	R202, R204, R206 R19, R22, R25, R28, R30,	Resistor, 4.7KΩ, 1/4w, 5%
5731-14046-00 5731-14529-00	F106 F108	Fuse S-B, 5A, 5x20mm Fuse 5 x 20mm T 6.3A, 250V	5010-06991-00	R32, R34, R50, R52, R54,	110313101, 4.71122, 1744, 070
5733-14528-00	F101-F118	Fuse Holder 5 x 20mm10A		R56, R58, R60, R62, R64,	
5705-14724-00	Q1	Heat Sink TO-3 5.1DEG/W		R84, R86, R88, R90, R92,	
5701-09652-00	Q1	Thermal Pad TO-3		R94, R96, R98, R116, R119, R122, R125,R128,	
4406-01128-00 4006-01005-06	Q1 Q1	Nut 6-32 KEPS Mach. Screw, 6-32 x 3/8"		R131, R134, R137,R246	
5705-14562-00	Q2	Heat Sink 10-220 Wave Sol 287	5010-11079-00	R20, R23, R26,	Resistor, $51\Omega$ , $1/4w$ , $5\%$
4004-01005-06	Q2-Q5	Mach. Screw, 4-40 x 3/8"		R254-R256	Decistor 4700 1/4m 59/
4404-01119-00	Q2-Q5	Nut 4-40 ESN	5010-09416-00	R27, R29, R31, R33, R45-R49, R51, R53, R55,	Resistor, 470Ω, 1/4w, 5%
5705-12638-00 5791-10862-07	Q3-Q5 J101, J129	Heat Sink 5298B Connector, 7-pin Header Str.		R57, R59, R61, R63, R85,	
5791-12516-00	J102	Connector, 34 Hdr 2x17		R87, R89, R91, R93, R95,	
5791-10862-12	J103	Connector, 12-pin Header Str.		R97, R99, R117, R120,	
5791-10862-03	J104, J122, J132, J135	Connector, 3-pin Header Str.		R123, R126, R129, R132, R135, R138, R156, R158,	
5791-10862-11	J105, J106	Connector, 11-pin Header Str.		R160, R162, R164, R166,	
5791-10862-05	J107, J108, J114,	Connector, 5-pin Header Str.		R168, R170, R245,	
	J115, J117, J118,		5010-08993-00	R250-R253, R257	Resistor, 68Ω, 1/4w, 5%
	J127, J130, J131, J134, J139		5010-06995-00	R35, R37, R39, R41, R65-R72, R100-R107,	116515101, 0022, 174W, 070
5791-10862-09	J109, J112, J113,	Connector, 9-pin Header Str.		R140-R147	
	J116, J119, J121,		5010-08997-00	R36, R38, R40, R42,	Resistor, 2.7k $\Omega$ , 1/4w, 5%
E701 10000 10	J123, J128	Connector, 13-pin Header Str.		R73-R80, R108, R109, R110-R115, R118, R121,	
5791-10862-13 5791-13830-09	J111, J120 J124-J126	Connector, 9-pin Header Str.		R124, R127, R130, R133,	
5791-10862-06	J133	Connector, 6-pin Header Str.		R136, R139	
5791-10862-04	J136-J138, J140, J141	Connector, 4-pin Header Str.	5010-09361-00	R148-R155, R184-R187	Resistor, 220Ω, 1/4w, 5% Resistor, 2.7KΩ,1/4w, 5%
5671-14516-00 5250-14527-00	LED100-LED105 Q1	LED Dspl Red T-1 Regulator Voltage LM317K	5011-12956-00 5010-10171-00	R172, R173, R178-R183 R174-R177, R241-R244	Resistor, 56Ω, 1/4w, 5%
5460-12423-00	Q2	I.C. LM7812	5010-14711-00	R188	Resistor, 10KΩ, 1/4w, 5%
5131-12725-00	Q3-Q5	Triac BT138E	5010-09314-00	R191, R193, R195, R197,	Resistor, 1.2kΩ, 1/4w, 5%
5194-09055-00	Q6-Q12, Q17-Q24,	Transistor, MPSD52 PNP	5010-09086-00	R199, R201, R203, R205 R207	Resistor, 6.8kΩ, 1/4w, 5%
	Q33-Q40, Q49-Q56, Q109		5010-09080-00	R225, R228, R231, R234,	Resistor, .22kΩ, 1/4w, 5%
5162-12635-00	Q13-Q16, Q25-Q32,	Transistor, TIP102	••••	R237-R240	
	Q41-Q48, Q57-Q64,		5010-08998-00	R226, R227, R229, R230,	Resistor, 2.2kΩ, 1/4w, 5%
	Q82, Q83, Q85, Q86,		5010-13517-00	R232, R233, R235, R236	Resistor, 150Ω, 1/4w, 5%
	Q88, Q89, Q91, Q92, Q101-Q108		5019-10143-00	H249 SRI	SIP RES 470 x 9R
5191-12179-00	Q65-Q72, Q81, Q84,	Transistor, TIP36C	5824-09248-00	TP100-TP107	Test Point #1502-1
	Q87, Q90	•	5370-12272-00	U1, U16, U17	I.C. LM339 Quad Comp
5190-09016-00	Q73 - Q80	Transistor, 2N4403 PNP	5281-09486-00	U2, U4-U8, U10 U3, U11	I.C. 74LS374 8df/f Trans uln 2803 Oc-drl
5192-12428-00 5160-10269-00	Q93 - Q100 Q110	Transistor, TIP107 Transistor, 2N3904	5162-12422-00 5281-10182-00	U9	I.C. 74LS240 I/drvr
5013-14535-00	R1	Resistor, 750Ω, 1/4w, 1%	5281-09487-00	U12 - U15	I.C. 74LS74 Dual d f/f
5013-14534-00	R2	Resistor, 243Ω, 1/4w, 1%	5791-13830-05	J110	Connector, 5-pin Header

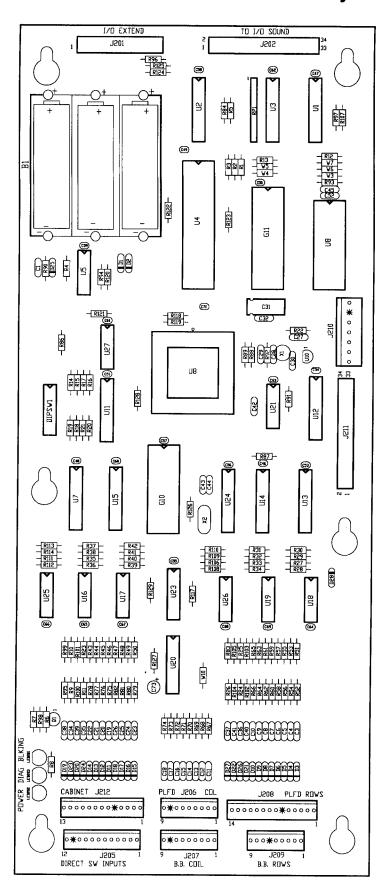
# A-20028 WPC '95 Power Driver PCB Assembly



## A-20119-50047 WPC '95 CPU PCB Assembly

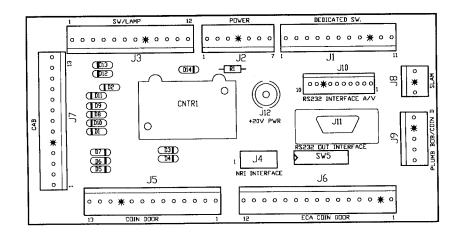
Part Number	Designator	Description
A-15814	B1	Battery Holder
5048-11033-00	C1, C42	Cap., .022µ. 50v, 10% Ax.
5048-11030-00	C3-C26, C34-C41	Cap., 470p, 50v Axial
5043-09030-00	C27	Cap., .047m, 50v (±20%) Ax.
5048-13375-00	C28	Cap., 100p, 50v, 10% Axial
5048-11028-00	C29, C30, C43, C44	Cap., 22p, 50v Axial
5040-14569-00	C31	Cap., 100u, 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,	Resistor, 1kΩ, 1/4W, 5%
	R23-R26, R43-R84,	
	R93, R95-R97, R99-R114,	
	R117	
5010-08774-00	R129	Resistor, 22KΩ, 1/4w, 5%
5010-09416-00	R5-R8, R12, R13,	Resistor, 470Ω, 1/4w, 5%
	R87-R89	
5010-09034-00	R14-R22, R27-R42,	Resistor, 10KΩ, 1/4w, 5%
	R86, R90, R94, R98	
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, $0\Omega$
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 Vdrvr
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



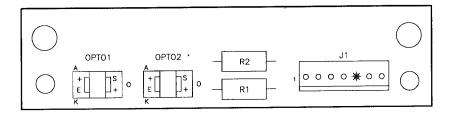
## A-20580 Coin Interface PCB Assembly

(This board does not contain optional items such as the coin counter and printer interface.)



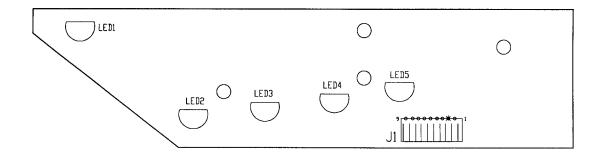
Part Number	Designator	Description
5070-09054-00	D1-D14	Diode 1N4004 1.0A.
5791-10862-11	J1	Connector, 11-pin Header Str. Sq.
5791-10862-07	J2	Connector, 7-pin Header Str. Sq.
5791-10862-12	J3	Connector, 12-pin Header Str. Sq.
5791-11000-10	J4	Connector, 10-pin Header Str. Sq.
5791-10862-13	J5, J7	Connector, 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, 15 $\Omega$ , ¼w, 5%
5645-09025-00	SW5	Switch DIP 8 Pos.

## A-17316 Flipper Opto PCB Assembly



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

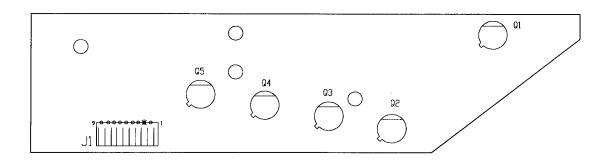
A-18617-1
Trough IR LED PCB Assembly



Part Number Designator Description

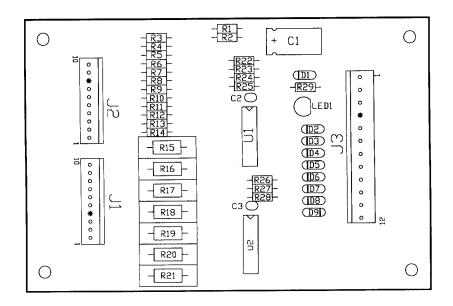
5671-12731-00 LED1 - LED5 Infra Red Diode
5791-12622-09 J1 Connector, 9-pin Header Sq.

A-18618-1
Trough IR Photo Transistor PCB Assembly



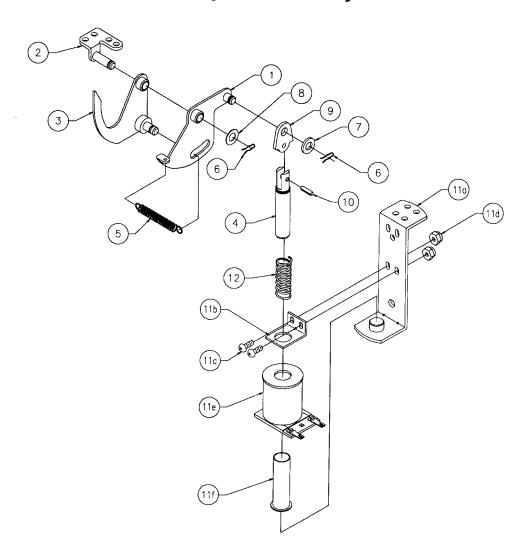
Part NumberDesignatorDescription5671-14114-00Q1 - Q5Infra Red Photo Transistor5791-12622-09J1Connector, 9-pin Header Sq.

## 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, $270\Omega$ , $2w$ , $5\%$
5010-09999-00	R1 - R14	Resistor, $2K\Omega$ , $1/4w$ , $5\%$
5010-10631-00	R29	Resistor, 1.2K $\Omega$ , 1/4w, 5%
5010-09162-00	R23, R25, R26	Resistor, 100K $\Omega$ , 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

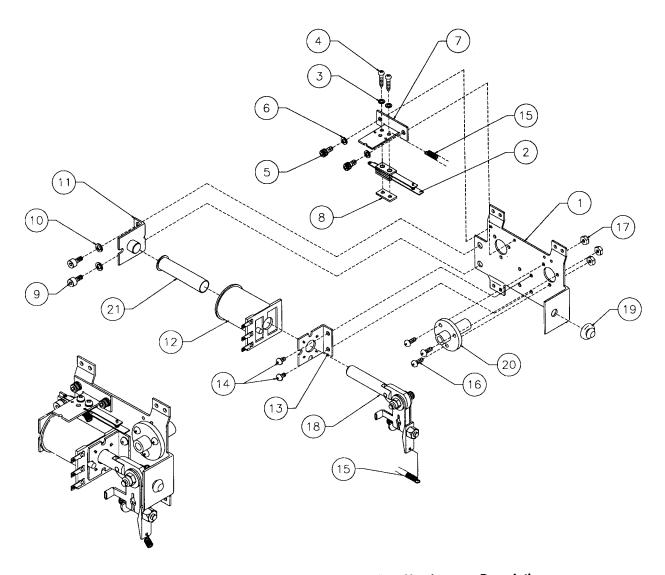


#### **Associated Assemblies:**

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	ď)	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"			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,

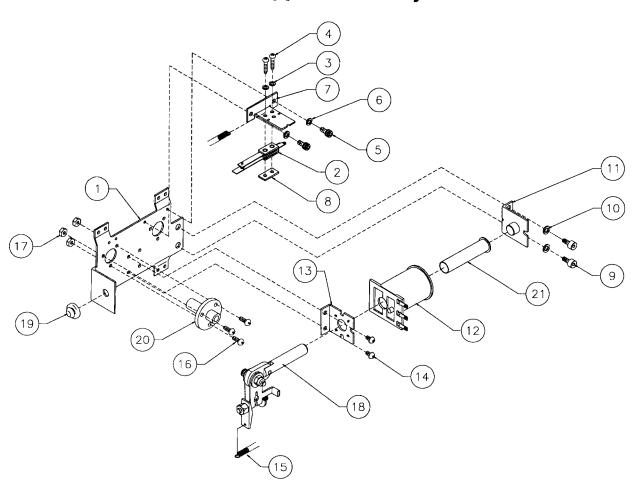
<sup>\*</sup>Not shown.

## A-15849-L-2 Flipper Assembly



Item	Part Number	Description	Item	Part Number	Description
1	A-14877-L	Flipper Bracket-Sub Assy.	18	A-15848-L	Crank Link Assembly, Left
2	SW-1A-194	Switch Assembly	a)	A-17050-L	Flipper Crank Assembly, Left
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	<b>e</b> )	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	A i	ated Parts:	
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"	(Not Sh		
15	10-364	Spring	(NOL SI	IOWITI	
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"	21	23-6695	Flipper Rubber Ring, Black
17	4406-01117-00	Nut 6-32 Hex.	22	20-10110-5	Flipper Bat & Shaft Assembly

## A-14876-R-3 Flipper Assembly



Item	Part Number	Description	Item	Part Number	Description
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	A-14877-R SW-1A-194 4701-00002-00 4105-01019-10 4008-01079-05 4701-00003-00 01-9375 20-6516 4010-01066-06 4701-00004-00 A-12390 FL-11629 01-7695-1 4006-01017-04 10-364 4006-01005-06	Flipper Bracket - Sub-Assy. Switch Assembly Lockwasher #6 Split Sh. Metal Screw, #5 x 5/8" Mach. Screw, 8-32 x 5/16" Lockwasher #8 Split Switch Mounting Bracket Speednut, Tinnerman Cap Screw, 10-32 x 3/8" Lockwasher #10 Split Flipper Stop Assembly Flipper Coil, Blue Solenoid Bracket Mach. Screw, 6-32 x 1/4" Spring Mach. Screw, 6-32 x 3/8"		A-15848-R A-17050-R A-15847 02-4676 4010-01086-14 4700-00023-00 4701-00004-00 4410-01132-00 23-6577 03-7568 03-7066-5	Crank Link Assembly, Right Flipper Crank Assembly, Right Flipper Link Assembly Link Spacer Bushing Cap Screw, 10-32 x 7/8" Flat Washer, 5/8 x 13/64 x 16ga. Lockwasher #10 Split Nut 10-32 ESN Bumper Plug, 5/8" Flipper Bushing Coil Tubing
17	4406-01117-00	Nut 6-32 Hex.	21 22	23-6695 20-10110-5	Flipper Rubber Ring, Red Flipper Bat & Shaft Assembly

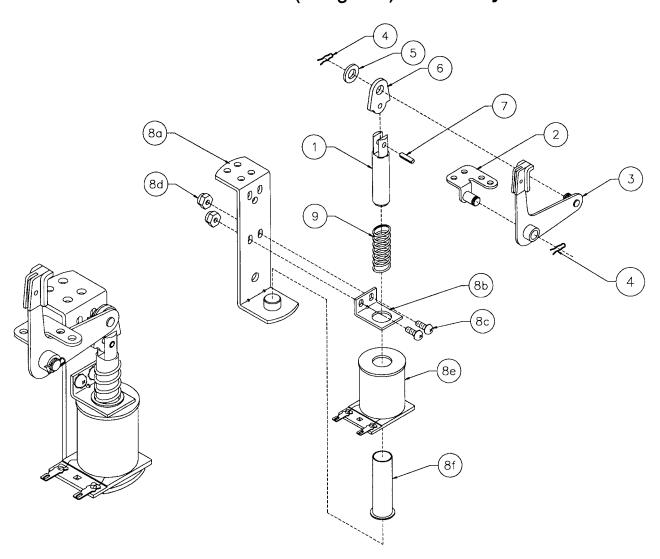
- IIPPER NOTES...

  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. 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. Any adjustment of the E.O.S. switch must be made at a minimum distance of 0.25 inch from the switch body. Longer blade of E.O.S. switch must be made straight. Gap adjustment is done by adjusting shorter blade.

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

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

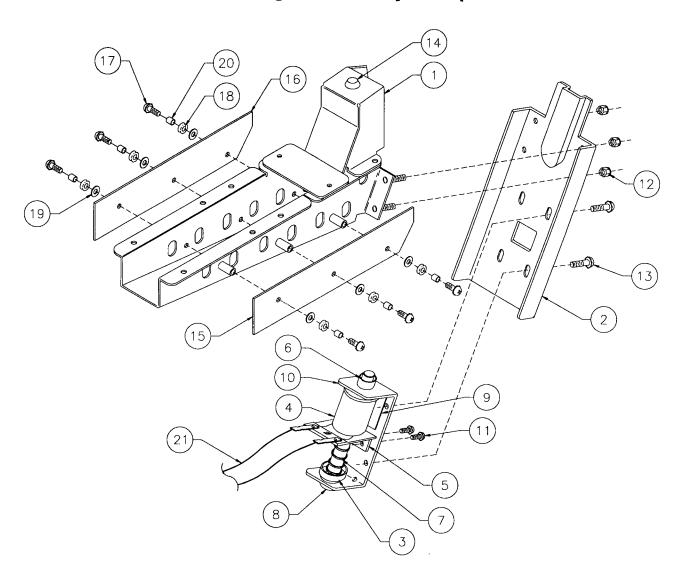
A-17811 Kicker Arm (Slingshot) Assembly



#### Associated Parts for Right & Left Kickers:

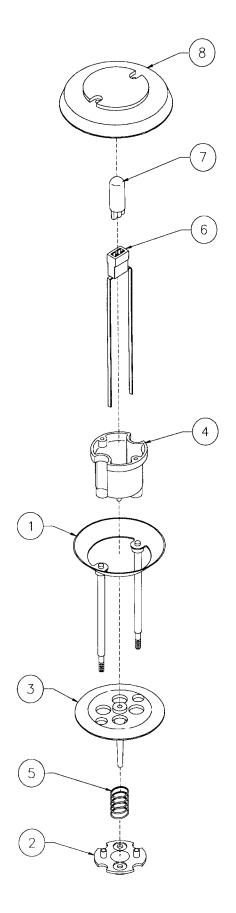
Item	Part Number	Description	Item	Part Number	Description
1 2 3 4 5 6 7	02-2364 A-17810 A-12664 12-6227 4700-00030-00 03-8085 20-8716-5	Coil Plunger Mounting Bracket Assembly Kicker Crank Assembly Hairpin Clip FW, 17/64 x 1/2 x 15ga. Armature Link Roll Pin, 1/8 x 7/16"	8 a) b) c) d) e) f)	B-9362-L-3 A-17808 01-8-508-S 4006-01017-06 4406-01119-00 AE-27-1200 03-7066	Coll & Bracket Assembly Bracket & Stop Assembly Coil Retaining Bracket Mach. Screw, 6-32 x 3/8" Nut, 6-32 ESN Coil Assembly Coil Tubing
			9	10-128	Spring

A-19963-1
Ball Trough Assembly Complete



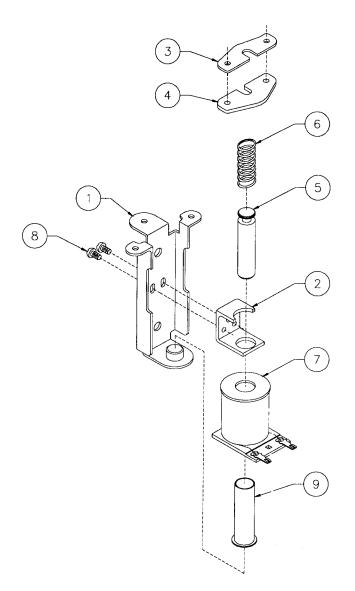
Item	Part Number	Description	Item	Part Number	Description
1	A-16809-2	Ball Trough Welded Assy.	12	4408-01119-00	Nut 8-32 ESN
2	01-11587	Ball Trough Front	13	4008-01017-06	Mach. Screw, 8-32 x 3/8"
3	A-6306-2	Bell Armature Assembly	14	23-6702	Bumper Plug
4	AE-26-1500	Coil Assembly	15	A-18617-1	Trough IRED LED PCB Assembly
5	01-8-508-T	Solenoid Assembly	16	A-18618-1	Trough IRED Transistor PCB Assy.
6	03-7067-5	Coil Tubing	17	4006-01003-10	Mach. Screw, 6-32 x 5/8" SEMS
7	10-135	Spring	18	23-6626	Rubber Grommet
8	23-6420	Rubber Grommet	19	4700-00004-00	Flat Washer, 9/64 x 7/16 x 21ga.
9	03-8523	Insulator	20	02-4975	Bushing
10	01-1158	Coil Mounting Bracket	21	H-19523	Mini Solenoid Cable
11	4008-01017-05	Mach. Screw, 8-32 x 5/16"			

## B-9414-7 Jet Bumper Assembly



Item	Part Number	Description
1 2 3 4 5 6 7	A-4754 03-6009-A5 03-6035-3 03-7443-5 10-7 24-8776 24-8768	Bumper Ring Assembly Bumper Base, White Bumper Wafer, Purple Bumper Body, White Spring Socket-Wedge Base Bulb #555(6.3v., 0.25A.)
Asso	ciated Parts:	
8	03-8254-18	Jet Bumper Cap (3)

## A-9415-2 Jet Bumper Coil Assembly



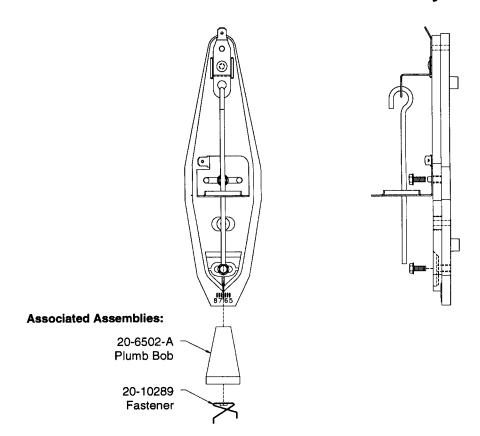
item	Part Number	Description
	D = 4.4=	
1	B-7417	Bracket & Stop Assembly
2	01-1747	Coil Retaining Bracket
3	01-5492	Armature Link, Steel
4	01-5493	Armature Link, Bakeline
5	02-3406-1	Coil Plunger
6	10-326	Armature Spring
7	AE-26-1200	Coil Assembly
8	4006-01017-04	Mach. Screw, 6-32 x 1/4"
9	03-7066	Coil Tubing

#### Associated Parts:

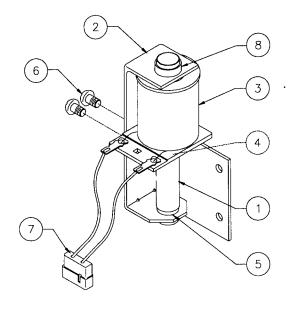
(Not Shown)

10 a) b)	B-12030-2 A-16443 01-1168	Leaf Switch Assembly Switch & Diode Assembly 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

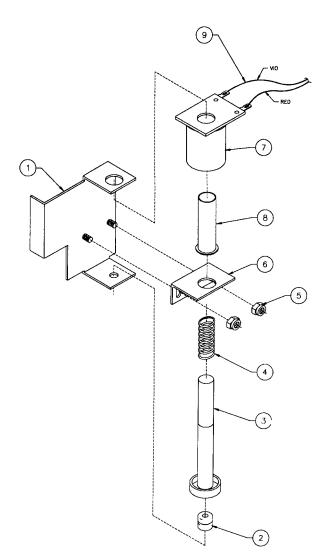


## B-10686-1 Knocker Assembly



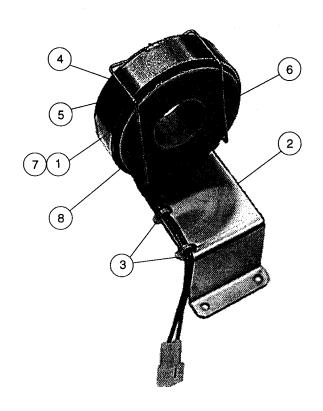
Item	Part Number	Description
1	A-5387	Coil Plunger Assembly
2	01-11273	Mounting Bracket Assembly
3	AE-23-800	Coil Sub-Assembly
4	01-8-508-T	Coil Retaining Bracket
5	23-6420	Rubber Grommet
6	40008-01017-04	Mach. Screw, 8-32 x 1/4"
7	H-11835	Knocker Cable
8	03-7067-5	Coil Tubing

## A-16434-2 Kicker Assembly



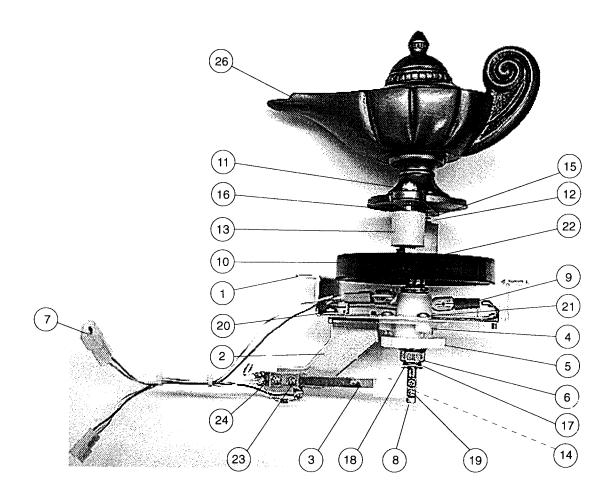
Item	Part Number	Description
1	A-16435	Kicker Bracket
2	23-6420	Rubber Grommet
3	A-17747	Bell Armature Assembly
4	10-135	Coil Plunger Spring
5	4408-01119-00	Nut 8-32 ESN
6	01-9423	Coil Bracket
7	AE-25-1000	Coil Sub-Assembly
8	03-7067	Coil Tubing
9	H-19523-1	Mini Solenoid Cable

## A-20839 Magnet Diverter Unit Assembly



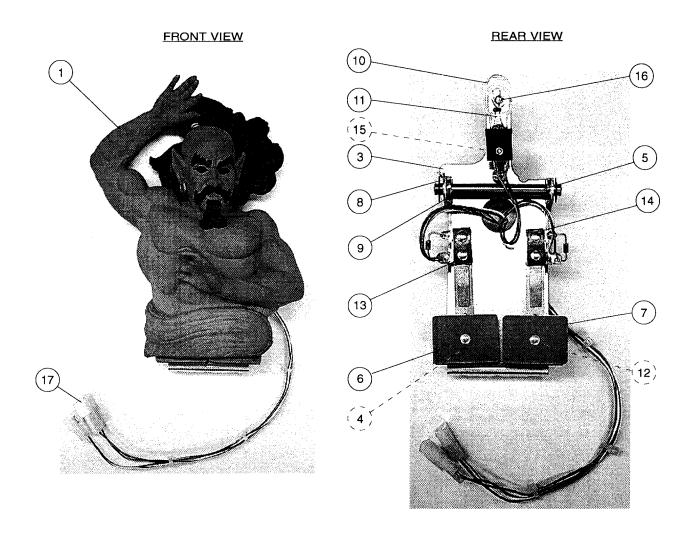
item	Part Number	Description
1	04-10365	Diverter Magnet Bracket
2	01-14262	Bracket
3	03-9454	Cable Tie
4	31-2546-2	Decal
5	4008-01003-05	Mach. Screw, #8-32 x 5/16"
6	12-7331	Magnet Wire
7	31-2546-3	Decal
8	20-10179	Magnet & Thermal Breaker Coil

## 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			
14	03-9465	Actuator - Spin Lamp Switch	25	31-2526	Lamp

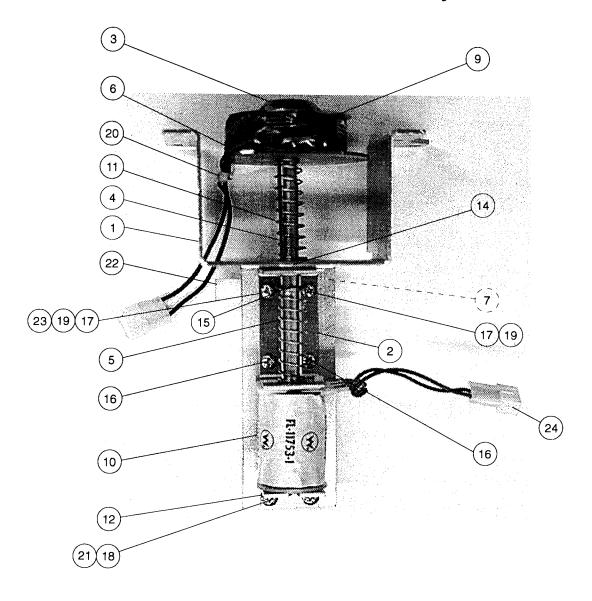
## A-20638 Genie Double Target Assembly



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.			

<sup>\*</sup> Not Shown.

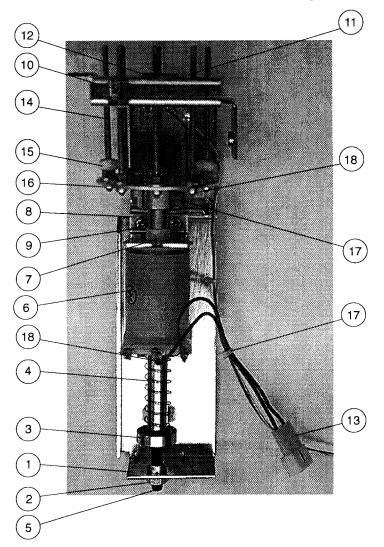
A-20644 Vanishing Magnet Assembly



ltem	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	"É" 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

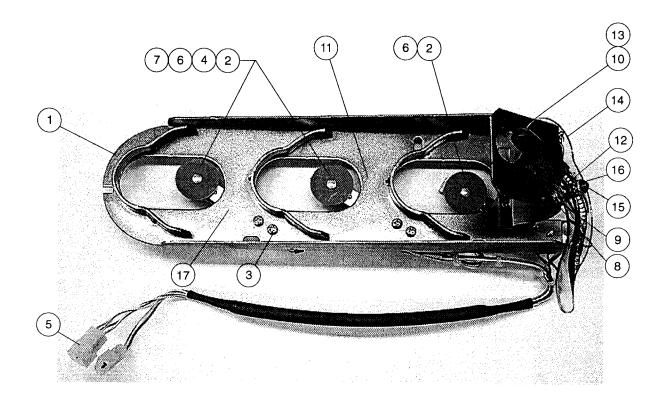
<sup>\*</sup> Not Shown.

## 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"

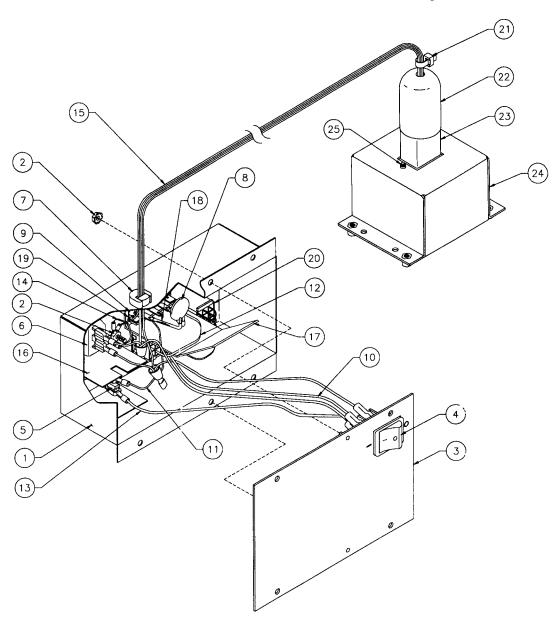
# A-20692 Skill Shot Bracket Assembly



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
<b>*17</b>	31-2546-4	Decal	1

<sup>\*</sup> Not Shown.

A-17540-1 **Universal Power Interface Assembly** 



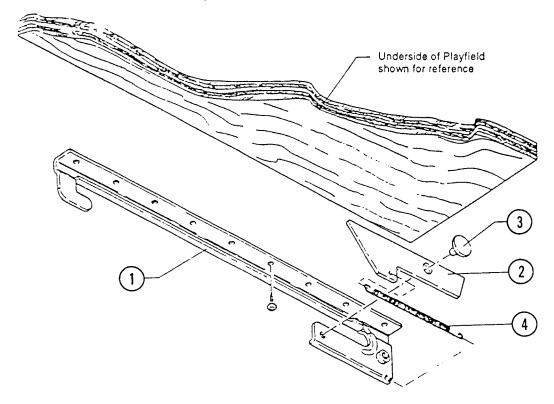
Item	Part Number	Description	ltem	Part Number	Description
1	04-10292	Power Control Chassis Box	14	H-17542	Ground Jumper Grn/Yel Cable
2	4406-01128-00	Nut #6-32 KEPS (3)	15	5797-13940-01	Jumper Cable
3	01-12294	Switch Mounting Plate Assembly	16	01-10623	Insulator, Thermistor
4	5642-13935-00	Power Switch	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	PR	OL OGR MP	AMN.	IING BLE	FU	BEL	/  Fl -  L/	\BE(	VOLTAGE CAUTION	POWER ADAPTER CORD				C	JR I	)SE	T		
	A-17540-1	H-17837-1	H-17837-2	H-17837-3	H-17837-4	5731-09651-00	16-9668	5730-09252-00	16-9670 18-9670	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		Х					X			Х	Х				-				
CANADA	×	Х						X	X			Х		T			T			
TAIWAN	×		Х					X	X			Х			T	Ī		<u> </u>		
MEXICO	×		Х					X	X			X				ļ	<u> </u>			
CENTRAL AMERICA	×		X			<b> </b>		X	X			X								_
SOUTH KOREA	×		Х					X	X			Х							<u> </u>	
PUERTO RICO	X		X					X	X			X								
AUSTRIA	X			X		Х	Х			X			Х	<del>                                     </del>	<b>†</b>			-		
BELGIUM	X			Х		X	X	Ì		Х			X							
FINLAND	X			Χ		X	X		<u> </u>	X			X					<u> </u>		
FRANCE	×			X		X	X			X			X							
GREECE	X			X		Х	Х		1	X			X					<u> </u>		
HOLLAND	X			X		Х	X			Х			X	<u> </u>	ļ					
HUNGARY	×			X		Х	X	T		X			X						-	-
NETHERLANDS	X			Х		Х	Х			X			X							
NETH. ANTILLES	×			Х		Х	X			Х			X							
NORWAY	×			Х		X	Х			Х			X							
POLAND	×			Х		Х	Х			Х			X							
PORTUGAL	X		Ì	Х		Х	X			Х			X							
SPAIN	×			Х		Х	Х			Х			X							
SWEDEN	×			Χ		Χ	Χ			X			Х							
TURKEY	×			X		X	X			Х			X							
WEST GERMANY	X			Х		Χ	Х			Χ			Х							
UNITED KINGDOM	×			Х		Х	Χ			Х				Х						
IRELAND	X			X		Χ	Х			X				Х						
HONG KONG	X	Ī		X		Х	X			Х	-			Х						
DENMARK	X			X		Х	Х			Х					X				7	
ITALY	X			X.		Х	X			Х						X				
CHILE	X	$\exists$	-	x		X	X			Х						X		7	7	
PEOPLE'S REP. OF CHINA	X	7	$\dashv$	X		Х	X			X			1		$\neg$	Х				$\neg$
SWITZERLAND	Х	7	$\top$	Х		X	X			Х		+	_		7		X		$\dashv$	_
AUSTRALIA	X			X		X	Х			Х					+			x		$\dashv$
NEW ZEALAND	X	1	+	x		X	Х			X				7	_			X	+	$\dashv$
ARGENTINA	X	$\top$	1	X		X	X			Х		+	$\dashv$	+	_	_		X	+	
JAPAN	X	$\top$	+	+	X		$\dashv$	Х	Х			$\dashv$	_	$\dashv$	$\dashv$	$\dashv$	-+	+	$\times$	Χ

## Playfield Slide Mechanism

(Left Assembly Shown)

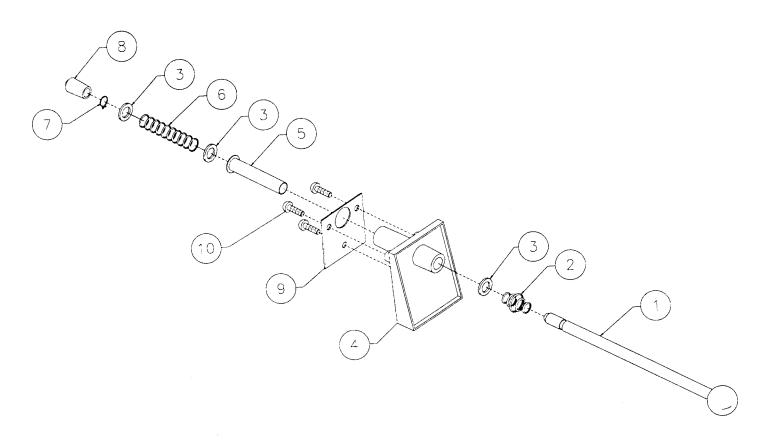


A-17749.1-1
Playfield Slide Mechanism
(Left Assembly)

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

Item	Part Number	Description	Item	Part Number	Description
1 2 3	01-12304-1 01-10664.1 02-4615	Slide, Left Lever Retainer Shoulder Rivet	1 2 3	01-12304-1 01-10664.1 02-4615	Slide, Right Lever Retainer Shoulder Rivet
Associ	ated Part:		Associ	ated Part:	
4	10-439	Spring	4	10-439	Spring

# A-17730-3 Ball Shooter Rod Assembly



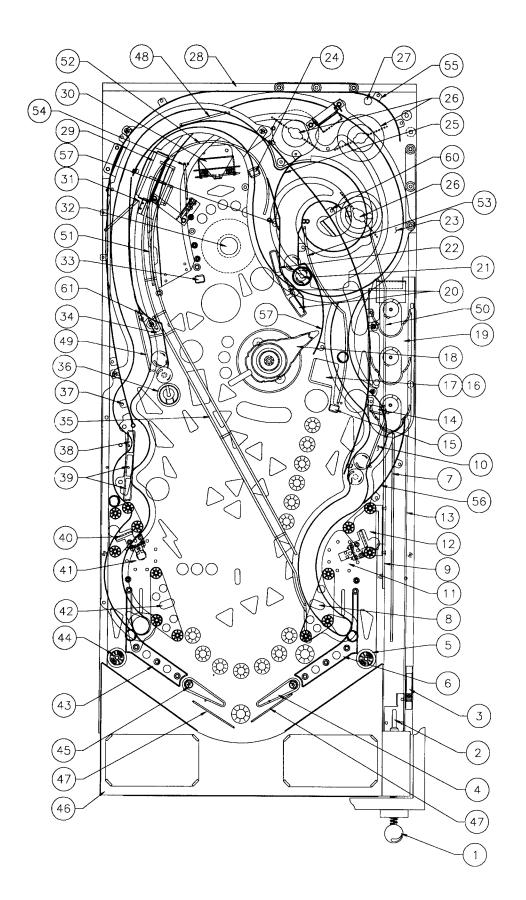
Item	Part Number	Description
1	20-9927-1	Ball Shooter Knob w/Shaft, Silver
2	10-149	Shooter Rod Spring
3	4700-00051-00	FW, 25/64 x 5/8 x 16ga.
4	21-6645-1	Shooter Housing
5	03-7357	Shooter Sleeve
6	10-148-3	Power Spring, Blue
7	20-8714-37	External Retainer Ring
8	23-6327	Ball Shooter Tip
Associ	ated 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	Item No.	Part No.	Description
1	A-17730-3	Ball Shooter w/ Silver Knob	30	A-20638	Genie Double Target
•	23-6327	Ball Shooter Rubber Tip	31	A-20642	Loop Post Diverter
	20-9927-1	Silver Knob with Shaft		A-16636	Diverter Plunger Assembly
2	A-20842	Shooter Lane Switch & Bracket	32	A-20644	Vanishing Magnet
2	01-14004	Shooter Switch Bracket		04-10373	Magnet Pole Piece
•	20-9691	Level		20-10197	Coil Magnet & Brake-small hole
3		Mount	33	A-18017-6	Yellow Standup Mini Target
4	03-8633 A 14976 B 3	Flipper Coil Assembly	34	A-18530-6	Yellow Standup Target
4	A-14876-R-3 20-10110-5	Flipper Shaft & White Bat	35	A-20810	Magnet Wire Ramp
E	A-20903	Rollover Button Assembly	36	B-9362-L-3	Coil & Bracket Assembly
5	A-20903 A-16443	Switch & Diode Assembly	37	A-20628	Magnet Ramp
		Rollover Button	٠.	A-20879	Bed of Nails
	03-9103.1	Socket & Bulb		01-14268	End Ramp Guard
	A-17806 A-20878-1	Flipper Guide-Right		03-9255-3	Spacer #8 x .541
6		Violet Flipper Return	38	A-20846-9	Red Standup Target
	03-9216-18	Spacer #8 x .541	39	A-20499-9	Red Standup Target
7	03-9255-3 A-20694	Guide Assembly	40	A-20695	Bracket & Opto Assembly
7		Coil & Bracket Assembly	41	A-20693	Spike Assembly
8	B-9362-L-3 A-20877-1	Scimitar Plastic	71	A-16909	Photo Transistor PCB Assembly
9	· · · · · · · · · · · · · · · · · · ·	Skill Ramp		02-5248	Spike Assembly
10	A-20627	End Ramp Guard		04-10333.1	Spike Plate Sub-assembly
	01-14268 01-14267.1	Skill Ramp Guard	42	B-9362-L-3	Coil & Bracket Assembly
44	A-20693	Spike Assembly	43	A-20878-2	Flipper Guide-Left
11	A-20093 A-16909	Photo Transistor PCB Assembly	,0	03-9216-18	Violet Flipper Return
		Spike Post		03-9255-3	Spacer #8 x .541
	02-5248 04-10333.1	Spike Plate Sub-assembly	44	A-20903	Rollover Button Assembly
10	A-20695-1	Bracket & Opto Assembly	77	A-16443	Switch & Diode Assembly
12 13	04-10337	Welded Sword Assembly		03-9103.1	Rollover Button
14	A-18530-6	Yellow Standup Target		A-17806	Socket & Bulb
15	A-18017-6	Yellow Standup Mini Target	45	A-15849-L-2	Flipper Coil Assembly
16	A-20691	Loop Sub-Assembly		20-10110-5	Flipper Shaft w/ White Bat
10	5647-12693-13	Switch	46	A-13204-50047	Screened Bottom Arch
	5070-09054-00	1N4004 Diode	47	12-7210	Rebound Wires
17	A-16434-2	Kicker Assembly	48	12-7315	Wire Ball Guide #7
18	A-20636	Spinning Lamp Assembly	49	12-7316	Wire Ball Guide #8
	A-17826	Socket & Bulb	50	12-7317	Wire Ball Guide #9
	01-14157	Actuator Bracket	51	12-7318	Wire Ball Guide #10
19	A-20692	Skill Shot Assembly	52	12-7319	Wire Ball Guide #11
	SW-1A-202-15	Stationary Target Assembly	53	12-7326	Wire Ball Guide #12
	A-17826	Socket & Bulb	54	12-7340	Wire Ball Guide
	03-8063-2	Green Bulb Sleeve	55	01-14148	Ball Guide #1
20	A-20499-9	Red Standup Target	56	01-14221	Ball Guide #14
21	B-9362-L-3	Coil & Bracket Assembly	57	01-14222	Ball Guide #15
22	A-20846-9	Red Standup Target	58	01-14223	Ball Guide #16
23	A-20626	Swirl Ramp	59	04-10297	Ball Guide #2
	01-14266	Ramp Flap	60	04-10300	Ball Guide #5
	A-20847	Ball Gate	61	04-10301	Ball Guide #6
	03-8365-13	Post #8 -Clear			
	A-20811	Ramp Guard			
	A-20914	Plunger & Ball Guide Assembly	Not 9	Shown:	
24	A-18530-6	Yellow Standup Target		9488-1	*Full Playfield Mylar
25	A-20643	Ball Guide Diverter Assembly		9488-2	Jet Bumper Area Mylar
	02-5235	Diverter Shaft .			Drop Area Mylar (2)
	01-14163	Diverter Ball Guide		9488-3	• • • • • • • • • • • • • • • • • • • •
	01-14162	Diverter Flap		9488-4	Drop Area Mylar (2)
26	B-9414-7	Jet Bumper Assembly	12-1	7210	Rebound Wires
	B-12030-2	Switch Assembly	20-0	6500	**Steel Balls (6)
	A-9415-2	Coil Assembly	31-	1357-50047	Backglass Translight
27	A-17932-2	Disappearing Post Assembly		50047	Screened Hardcoat Playfield
28	A-20798	Back Panel	50-		
	03-8171-26	Green Twist Lock Mini Dome	***	Talas af the A !	ion Nighta hardaget playfiold door
	03-8171-16	Yellow Twist Lock Mini Dome			pian Nights hardcoat playfield does
29	A-20839	Magnet Diverter Unit	not	require a full m	ylar. However, mylars can be
	20-10179	Coil Magnet & Brake-large hole	purch	nased through you	ır local Williams Distributor.
	12-7331	Magnet Wire			
	01-14262	Diverter Magnet Mounting Bracket	**The	ere are four ball-in	-play balls and two captive balls.

### **Upper Playfield Parts Locations**

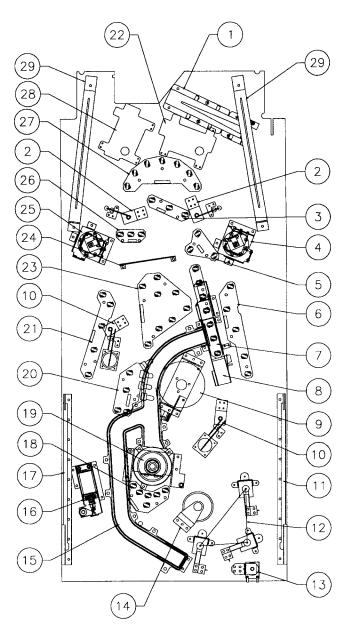


### **Lower Playfield Parts**

ltem	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)



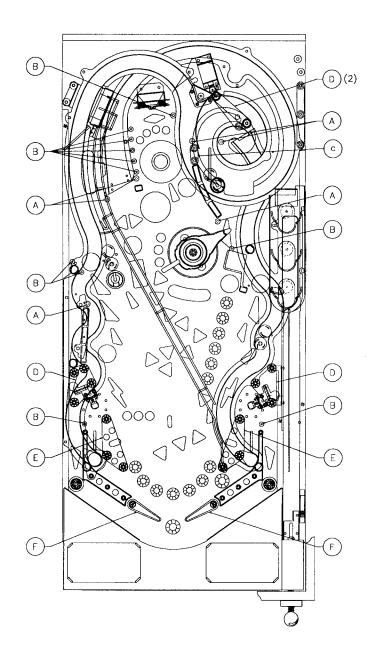
<sup>\*</sup> Item located on top of playfield.



Underside of playfield, viewed in raised position.

# **Rubber Rings**

Item No.	Part No.	Description	Quantity
Α	23-6556	Black Bumper Sleeve	6
В	23-6694-1	Black Rubber Grommet	11
С	23-6694-5	Black Rubber Ring 3/4"	1
D	23-6694-9	Black Rubber Ring 2"	4
Ε	23-6694-10	Black Rubber Ring 21/2"	2
F	23-6695	Black Flipper Ring 11/2"	2



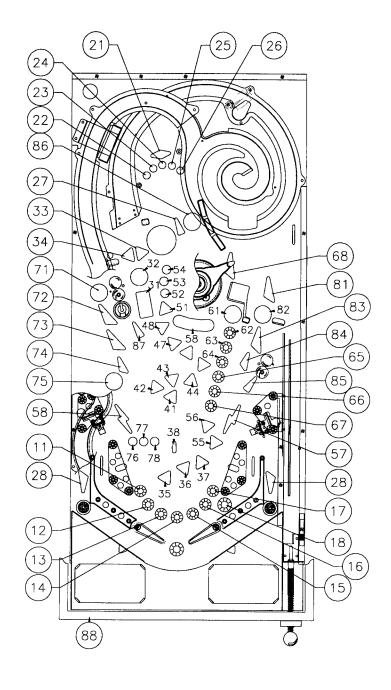
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L	٩M	10	RЛ	ΔΤ	R	IX	
	~ I V		IVI			_	

Red Yellow (B+) 8 Çolumn 3 5 Yellow-Yellow-Yellow-Yellow Yellow-Green Yellow-Brown Yellow-Yellow-Violet J121-1 Red Orange Black J121-5 Blue Gray J121-7 J121-9 Q96 J121-2 J121-3 J121-4 Q94 J121-6 Q100 Q95 Q99 Q98 Q93 Q97 Row **ACTION EXTRA** MAGIC SMOKE SMOKE MAKE A WISH JEWEL JACKPOT Red-14 (TOP) CARPET BALL Brown (LEFT) J125-1 Q104 **ACTION** SMOKE LAMP-15 (B)AZAAR LEFT **JEWEL** (G)ENIE ACTION Red-LOCK 5 Black J125-2 Q108 3 SMOKE LAMP-30 B(A)ZAAR **HAREM** RIGHT RAMP **JEWEL** G(E)NIE Red-ARROW **ADVANCE** LOCK Orange 3 RIGHT J125-4 Q103 43 83 23 4 LEFT TIGER LAMP-60 RIGHT **JEWEL** GE(N)IE RAMP SMOKE BA(Z)AAR Red-LOOP TIGER **ARROW** Yellow LOOP J125-5 Q107 LEFT SMOKE SMOKE BAZ(A)AR **ACTION** CAPTIVE BALL JEWEL GEN(I)E SMOKE Red-RIGHT 10 Green 5 (BOTTOM) J125-6 Q102 ACTION SMOKE SMOKE BAZA(A)R WISH JEWEL SMOKE Red-GENI(E) 5 Blue J125-7 Q106 **CAPTIVE BALL** SMOKE SHOOT WISH Red-JEWEL MULTIBALL **SMOKE** BAZAA(R) Violet STAR LEFT (RIGHT) RIGHT J125-8 Q101 CENTER LOCK START BUTTON OUTLANE **AMULET** SMOKE SHOOT WISH SHOOT Red-SPECIAL STAR **AGAIN** 13 Gray LEFT J125-9 Q105 28 38 68 88

J1XX = Power Driver Board

## **Lamp Locations**

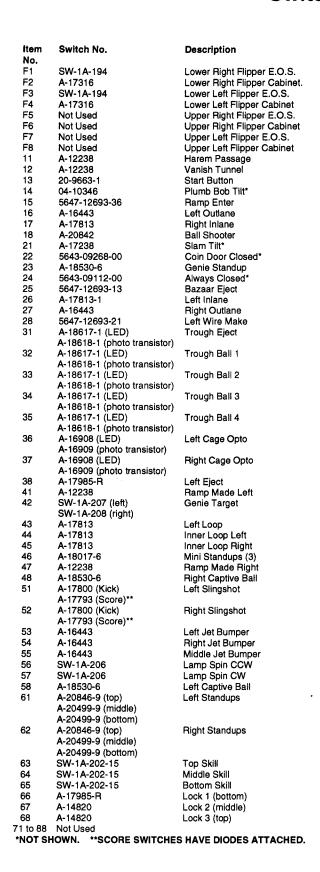
Item	Bulb	Lamp Assy	Description
No.	No.	No.	
11	24-8768	A-20750	Jewel 1 (left)
12	24-8768	A-20750	Jewel 2
13	24-8768	A-20750	Jewel 3
14	24-8768	A-20750	Jewel 4
15	24-8768	A-20750	Jewel 5
16	24-8768	A-20750	Jewel 6
17	24-8768	A-20750	Jewel 7 (right)
18	24-6549	A-17835	Shoot Again
21 22	24-8768	A-20741	Jackpot (C)
23	24-8768 24-8768	A-20741	(G)enie
24	24-8768	A-20741 A-20741	G(E)nie Ge(N)ie
25	24-8768	A-20741 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 55	24-8768	A-20747	Lamp 60
56	24-8768 24-8768	A-20749 A-20749	Smoke 4 Smoke 5
57	24-8768	A-20749 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(Ŕ)
68	24-6549	A-17835	Center Lock
71	24-8768	A 20746	
72	24-8768	A-20746 A-20746	Action 2
73	24-8768	A-20746 A-20746	Left Lock Harem Advance
74	24-8768	A-20746	Left Tiger Loop
75	24-8768	A-20746	Action 1
76	24-8768	A-20748	Wish 1
70 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
	l9 = #44 Bulk		
		_ :	

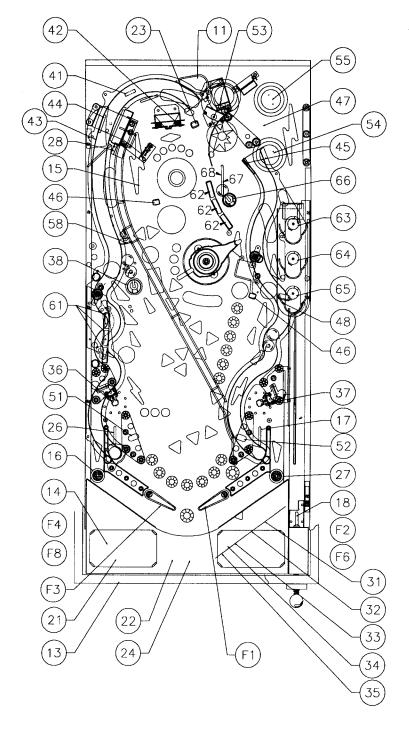


SWITCH I						Wh		-0 0-	Green	
Dedicated Grounded Switches	Column	1 Green- Brown J206-1 U20-18	2 Green- Red J206-2 U20-17	3 Green- Orange J206-3 U20-16	4 Green- Yellow J206-4 U20-15	5 Green- Black J206-5 U20-14	6 Green- Blue J206-6 U20-13	7 Green- Violet J206-7 U20-12	8 Green- Gray J206-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute U17-5	1 White- Brown J208-1 U18-11	I HAREM PASSAGE	SLAM TILT	TROUGH EJECT	RAMP MADE LEFT	LEFT SLING	LEFT STANDUPS	NOT USED	NOT USED	Black-Green J208-13 Lower Right Flipper E.O.S.
D1		11	21	31	41	51	61	71	81	F1 Blue-Violet
Orange-Red J205-2 Center Coin Chute U17-7	2 White- Red J208-2 U18-9	VANISH TUNNEL	COIN DOOR CLOSED	TROUGH BALL 1	GENIE TARGET	RIGHT SLING	RIGHT STANDUPS	NOT USED	NOT USED	J212-12 Lower Right Flipper Opto
D2		12	22	32	42	52	62	72	82	F2
Orange-Black J205-3 Right Coin Chute U17-11	3 White- Orange J208-3 U18-5	START BUTTON	GENIE STANDUP TARGET	TROUGH BALL 2	LEFT LOOP	LEFT JET	TOP SKILL	NOT USED	NOT USED	Black-Blue J208-12 Lower Left Flipper E.O.S.
D3		13	23	33	43	53	63	73	83	F3
Orange-Yellow J205-4 4th Coin Chute U17-9	4 White- Yellow J208-4 U18-7	PLUMB BOB TILT	ALWAYS CLOSED	TROUGH BALL 3	INNER LOOP LEFT	RIGHT JET	MIDDLE SKILL	NOT USED	NOT USED	Blue-Gray J212-11 Lower Left Flipper Opto
D4		14	24	34	44	54	64	74	84	Fi Black-Violet
Orange-Green J205-6 U16-9 Iormal Test Function Function Fire Crdts Escape	5 White- Green J208-5 U19-11	RAMP ENTER	BAZAAR EJECT	TROUGH BALL 4	INNER LOOP RIGHT	MIDDLE JET	BOTTOM SKILL	NOT USED	NOT USED	J208-11 Upper Right Flipper E.O.S.
D5		15	25	35	45	55	65	75	85	F5 Black-Yellow
Orange-Blue J205-7 U16-11 Iormal Test Function Colume Dn Down	6 White- Blue U208-7 U19-9	LEFT OUTLANE	LEFT INLANE	LEFT CAGE OPTO	MINI STANDUPS	LAMP SPIN CCW	LOCK 1 (BOTTOM)	NOT USED	NOT USED	J212-10 Upper Right Flipper Opto
D6		16	26	36	46	56	66	76	86	BlackGray
Orange-Violet J205-8 U16-7 Iornal Test Function Volume Up	7 White- Violet J208-8 U19-5	RIGHT INLANE	RIGHT OUTLANE	RIGHT CAGE OPTO	RAMP MADE RIGHT	LAMP SPIN CW	LOCK 2 (MIDDLE)	NOT USED	NOT USED	J208-10 Upper Left Flipper E.O.S.
D7		17	27	37	47	57	67	77	87	F
Orange-Gray J205-9 U16-5 Jormal Test Function Enter	8 White- Gray J208-9 U19-7	BALL SHOOTER	LEFT WIRE MAKE	LEFT EJECT	RIGHT CAPTIVE BALL	LEFT CAPTIVE BALL	LOCK 3 (TOP)	NOT USED	NOT USED	Black-Blue J212-9 Upper Left Flipper Opto
D8	I	- 18	28	38	48	58	68	78	88	F!

2-38

### **Switch Locations**





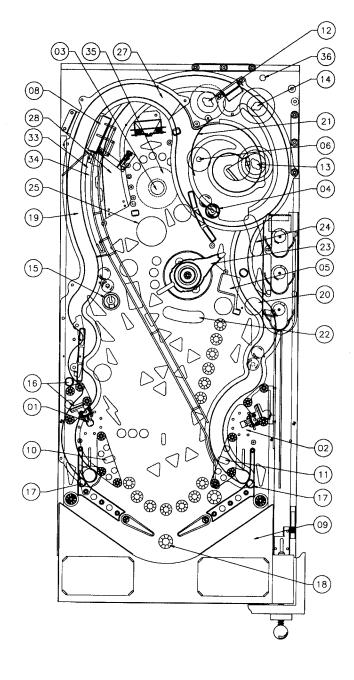
#### **SOLENOID/FLASHER TABLE**

Sol. No.	Function	Solenoid	Voltage Connections			Drive				Drive	Solenoid Part Number	
NO.		Туре	Diovijals	i Backbox	Cahinat	Xistor		Backbox	Cabinet	Wire Color	Flashlam	ip Type Backbox
01	LEFT CAGE	High Power	J133-2	Dackbox	Cabinet	Q72	J116-1	Dackbox	Cabinet	Vio-Brn	Playfield A-20099	DUCKDOX
02	RIGHT CAGE	High Power	J133-2			Q68	J116-2			Vio-Bill	A-20099	<del></del>
03	VANISH DROP	High Power	J133-2			Q71	J116-4			Vio-Neu Vio-Ora	FL-11753	
		High Power	J133-2		····	Q67	J116-4			Vio-Vig	AE-27-1200	
04 05	LOCK EJECT	High Power	J133-2			Q70	J116-6			Vio-Tei	AE-27-1200	
	BAZAAR EJECT	High Power	J133-2			Q66	J116-6			Vio-Blu	20-10197	
06	LOCK MAGNET	High Power	J133-2	1400.0			J116-7	11100			20-10197	AF 00 000
07	KNOCKER	High Power	J133-1	J133-2		Q69	1440.0	J116-8		Vio-Blk	00.40470	AE-23-800
80	RAMP MAGNET COIL	High Power				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				AE-27-1200	
11	RIGHT SLINGSHOT	Low Power	J133-3			Q43	J113-4				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		
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	<u> </u>	Brn-Gry	#89 (2)	#906
17	INLANE FLASHERS	Flasher	J133-6			Q28	J111-1			Bik-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	
	neral Illumination	C.1	1	1406.4		OF		1100.7		IM/hA Dan	Г 444	
	ILLUMINATION STRING 1 ILLUMINATION STRING 2	G.I.	$\vdash$	J106-1 J106-2		Q5 Q4	<b>—</b>	J106-7 J106-8		Wht-Brn Wht-Org	#44 #44	
	ILLUMINATION STRING 3	G.I.	1	J106-2		Q3		J106-8		Wht-Yel	#44	
		G.I.	J105-5	3100-3		Q2	J105-10	3100-9	<del></del>		#44	4555
	*ILLUMINATION STRING 4 *ILLUMINATION STRING 5	G.I.	J105-6		J104-3	Q1	J105-10		J104-1	Wht-Grn Wht-Vio		#555 #555
05	ILLUMINATION STAINS	G.I.	MARKET STATE OF THE STATE OF TH							Name and Address of the Owner, where the Owner, which is the Owner, which is the Owner, where the Owner, which is the Owner,		
				tage	Driv	-		ive	Drive		Coil	Coil
Flipper Circuits			ection	Transis Power	Hold		ctions	Col	ors Hold	Part No.	Colors	
29	pper Circuits	Lwr. Rt. Power			Q90	noiu		field 0-13	Power Yel-Grn	HOIU	I EL 11000	BLUE
1	LOWER RICHT ELIRRER	Lwr. Rt. Hold		Red-Grn)	Q90	Q92				Org-Grn	FL-11629	BLUE
30	LOWER RIGHT FLIPPER			Red-Grn)	007	Q92	J120-11				EL 11000	DILLE
31	LOWED LEET CLIDOCO			Red-Blu)	Q87	000	J120-9		J120-9 Yel-Blu J120-7		FL-11629	BLUE
32	LOWER LEFT FLIPPER	Lwr. Lt. Hold		Red-Blu)	004	Q89			Val Via	Org-Blu	FL 11750	VELLOW
33	LEFT DIVERTER POWER	Upr. Rt. Power		Red-Vio)	Q84	000	J12		Yel-Vio	0 10	FL-11753	YELLOW
34	LEFT DIVERTER HOLD	Upr. Rt. Hold	<del></del>	Red-Vio)	004	Q86	, J12			Org-Vio	00.40407	
35	VANISH MAGNET	Upr. Lt. Power		Red-Gry)	Q81	000	J12		Yel-Gry	0 0	20-10197	
36	LOOP POST DIVERTER	Upr. Lt. Hold	J119-8 (i	Hea-Gry)		Q83	J120-1			Org-Gry	AE-27-1200	L

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/Flashlamp Locations

Item	Coil/Flasher	Assembly	Description
No.	Number	Number	
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
80	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
Flipper	'S		
Item	Coil/Flashe	Assembly	Description
No.	r Number	Number	
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
Genera	l Illumination		
Item	Bulb Number	Desci	ription
No.		2030.	-F ±11
01	24-6549	*(  umi	nation String 1
02	24-6549		nation String 2
03	24-6549		nation String 3
04	24-8768		•
05	24-8768		nation String 4 nation String 5
00	LT-0/00	mum	ກລແບກ ວັນການ ວ .



24-6549 = #44 BULB 24-8704 = #89 BULB

24-8768 = #555 BULB

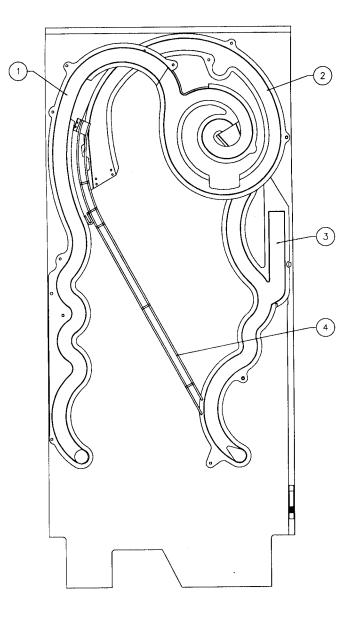
24-8802 = #906 BULB

\*NOT SHOWN

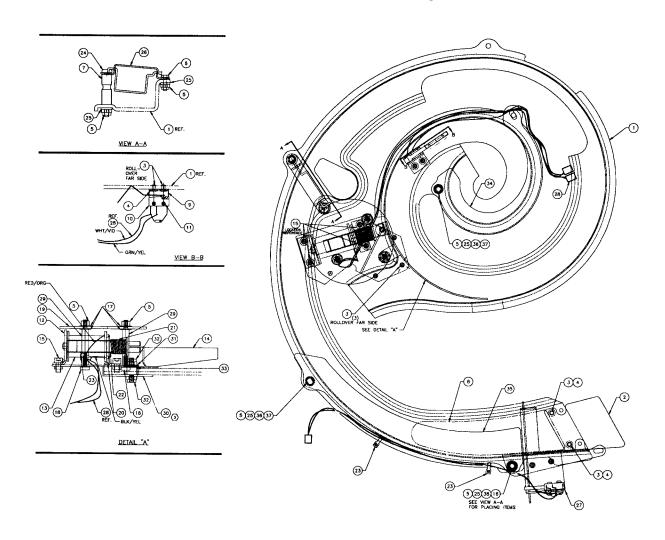
# Ramps

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

<sup>\*</sup> See page 2-43 for ramp assembly details.



## A-20626 Swirl Ramp Assembly



ltem	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 <b>-</b> 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 1/4" 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**

# 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

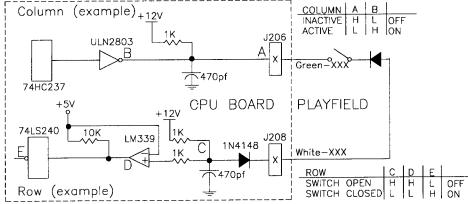
J2XX - CPU Board (There are no fuses on the CPU board.)

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 I	VIA I DI.	^				Wh	iile		Green	
Dedicated Grounded Switches	Column	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	1 White- Brown J208-1 U18-11	I HAREM PASSAGE	SLAM TILT	TROUGH EJECT	RAMP MADE LEFT	LEFT SLING	LEFT STANDUPS	NOT USED	NOT USED	Black-Green J208-13 Lower Right Flipper E.O.S.
D1	010-11	11	21	31	41	51	61	71	81	F1
Orange-Red J205-2 Center Coln Chute U17-7	2 White- Red J208-2 U18-9	VANISH TUNNEL	COIN DOOR CLOSED	TROUGH BALL 1	GENIE TARGET	RIGHT SLING	RIGHT STANDUPS	NOT USED	NOT USED	Blue-Violet J212-12 Lower Flight Flipper Opto
D2 Orange-Black	3	. 12	22	32	42	52	62	72	82	F; Black-Blue
J205-3 Right Coin Chute U17-11	White- Orange J208-3 U18-5	START BUTTON	GENIE STANDUP TARGET	TROUGH BALL 2	LEFT LOOP	LEFT JET	TOP SKILL	NOT USED	NOT USED	J208-12 Lower Left Flipper E.O.S.
D3	010-5	13	23	83	43	53	63	73	83	F
Orange-Yellow J205-4 4th Coin Chute U17-9	4 White- Yellow J208-4 U18-7	PLUMB BOB TILT	ALWAYS CLOSED	TROUGH BALL 3	INNER LOOP LEFT	RIGHT JET	MIDDLE SKILL	NOT USED	NOT USED 84	Blue-Gray J212-11 Lower Left Flipper Opto
D4 Orange-Green	5	14	24	34	44	54	64	74	84	Black-Violet
J205-6 U16-9 Iormal Test Function Function Fry Crdts Escape	White- Green J208-5	RAMP ENTER	BAZAAR EJECT	TROUGH BALL 4	INNER LOOP RIGHT	MIDDLE JET	BOTTOM SKILL	NOT USED	NOT USED	J208-11 Upper Right Flipper E.O.S
D5	U19-11	15	25	35	45	55	65	75	85	F
Orange-Blue J205-7 U16-11 lormal Test unction Function /olume Dn Down	6 White- Blue U208-7 U19-9	LEFT OUTLANE	LEFT INLANE	LEFT CAGE OPTO	MINI STANDUPS	LAMP SPIN CCW	LOCK 1 (BOTTOM)	NOT USED	NOT USED	Black-Yellow J212-10 Upper Right Ripper Opto
D6	019-9	16	26	36	46	56	66	76	86	F
Orange-Violet J205-8 U16-7 Normal Test Function Function /olume Up Up	7 White- Violet J208-8	RIGHT INLANE	RIGHT OUTLANE	RIGHT CAGE OPTO	RAMP MADE RIGHT	LAMP SPIN CW	LOCK 2 (MIDDLE)	NOT USED	NOT USED	BlackGray J208-10 Upper Left Flipper E.O.S
D7	U19-5	17	27	37	47	57	67	77	87	F
Orange-Gray J205-9 U16-5 Normal Test Function Begin Test	8 White- Gray J208-9 U19-7	BALL SHOOTER	LEFT WIRE MAKE	LEFT EJECT	RIGHT CAPTIVE BALL	LEFT CAPTIVE BALL	LOCK 3 (TOP)	NOT USED	NOT USED	Black-Blue J212-9 Upper Left Plipper Opto
D8	018-7	18	28	38	48	58	68	78	88	F

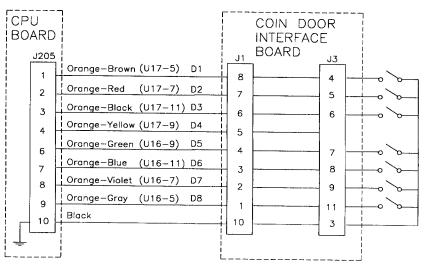




The microprocessor is constantly strobing the column side of the switch. When point "A" on the column circuit toggles low, the column side is active.

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

#### **DEDICATED SWITCHES**



#### Coin Acceptor Switches

D1 - Left Coin Chute

D2 - Center Coin Chute

D3 - Right Coin Chute

D4 - Fourth Coin Chute

#### Control Switches

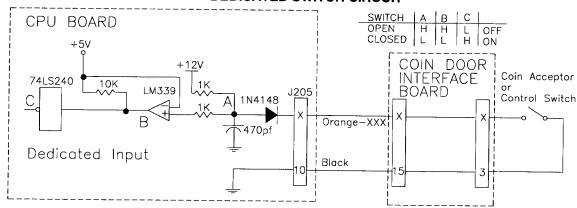
D5 - Normal Function, Service Credits; Test Function, Escape

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**



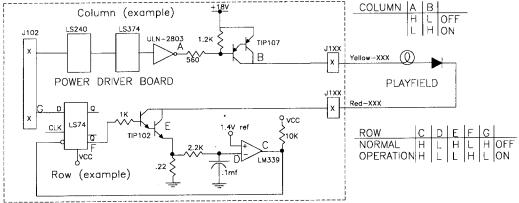
The dedicated switches operate similar in the matrix, except that instead of a column circuit there is a direct tie to ground. Therefore, the column side is constantly active (low).

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				Yel	low (B+) —	Q + F	Red
Column	1 Yellow- Brown J121-1 Q96	2 Yellow- Red J121-2 Q100	3 Yellow- Orange J121-3 Q95	4 Yeliow- 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)	JACKPOT	MAGIC CARPET 31	SMOKE 6	SMOKE 14 (TOP) 51	MAKE A WISH	ACTION 2	EXTRA BALL 81
2 Red- Black J125-2 Q108	JEWEL 2	(G)ENIE	ACTION 3	SMOKE 7	LAMP-15	(B)AZAAR	LEFT LOCK	ACTION 5
3 Red- Orange J125-4 Q103	JEWEL 3	G(E)NIE	RAMP ARROW RIGHT	SMOKE 8	LAMP-30 53	B(A)ZAAR	HAREM ADVANCE	RIGHT LOCK 83
4 Red- Yellow J125-5 Q107	JEWEL 4	GE(N)IE	RAMP ARROW LEFT 34	SMOKE 9	LAMP-60 54	BA(Z)AAR	LEFT TIGER LOOP	RIGHT TIGER LOOP 84
5 Red- Green J125-6 Q102	JEWEL 5	GEN(I)E	SMOKE 1 (BOTTOM) 35	SMOKE 10	SMOKE 4	BAZ(A)AR	ACTION 1	CAPTIVE BALL RIGHT 85
6 Red- Blue J125-7 Q106	JEWEL 6	GENI(E)	SMOKE 2	SMOKE 11	SMOKE 5	BAZA(A)R	WISH 1	ACTION 4
7 Red- Violet J125-8 Q101	JEWEL 7 (RIGHT)	MULTIBALL 27	SMOKE 3	SMOKE 12	SHOOT STAR RIGHT	BAZAA(R)	WISH 2	CAPTIVE BALL LEFT 87
8 Red- Gray J125-9 Q105	SHOOT AGAIN	OUTLANE SPECIAL 28	AMULET	SMOKE 13 48	SHOOT STAR LEFT 58	CENTER LOCK	WISH 3	START BUTTON 88

J1XX = Power Driver Board

#### **LAMP MATRIX CIRCUIT**



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.

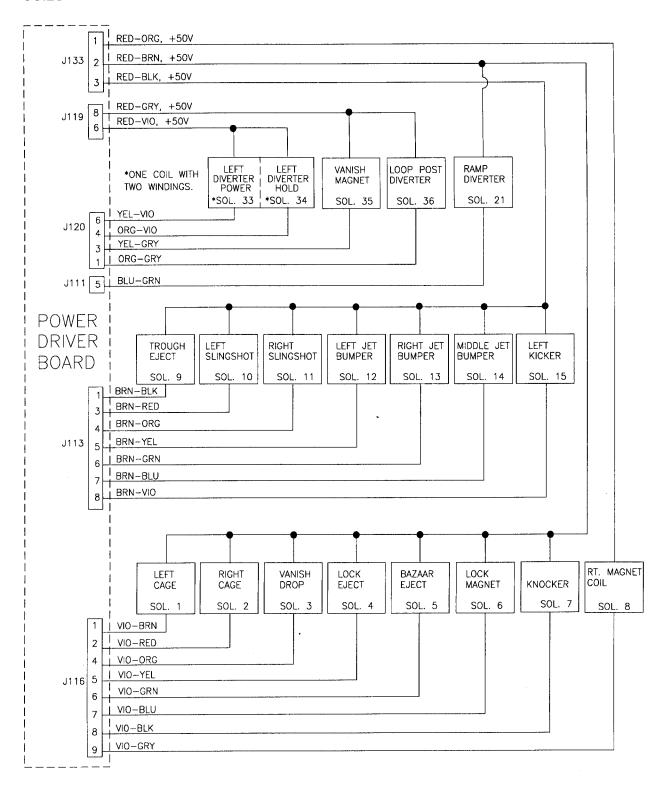
### **SOLENOID/FLASHER TABLE**

No.	Sol. Function		Solenoid	Volta	ge Conne	ctions	Drive	Orive Drive Connection			Drive	Solenoid Pa	Solenoid Part Number	
OT   LEFT CAGE	No.		Туре									Flashlam	lashlamp Type	
Oxford   O		1557 0405			Backbox	Cabinet			Backbo	c Cabinet			Backbox	
Ox   VANISH OPROP										<u> </u>				
O.O.K. E.JECT														
SAZAAR EJECT										<u> </u>		FL-11753		
DECEMBRICATION   DECE										<u> </u>		AE-27-1200		
OF   KNOCKER												AE-25-1000		
RAMP MAGNET COIL				J133-2				J116-7				20-10197		
Description					J133-2				J116-8			L	AE-23-800	
The color of the												20-10179		
11   RIGHT SLINGSHOT   Low Power   J133-3   Q43   J113-4   Brn-Org   AE-27-12   LEFT JET BUMPER   Low Power   J133-3   Q47   J113-5   Brn-Yel   AE-26-12   AE-26-12	_											AE-26-1500		
12   LEFT JET BUMPER	_							J113-3		<u> </u>	Brn-Red	AE-27-1200		
13   RIGHT JET BUMPER											Brn-Org	AE-27-1200		
MIDDLE JET BUMPER							Q47	J113-5			Brn-Yel	AE-26-1200		
15   LEFT KICKER								J113-6			Brn-Grn	AE-26-1200		
The content of the							Q46	J113-7			Brn-Blu	AE-26-1200		
17   INLANE FLASHERS							Q41	J113-8			Brn-Vio	AE-27-1200		
18 FINAL BATTLE FLASHER					J134-5		Q45	J113-9	J114-5		Brn-Gry	#89 (2)	#906	
19   LEFT LOOP FLASHER	_		Flasher	J133-6			Q28	J111-1			Blk-Brn	#89 (2)		
19   LEFT LOOP FLASHER	_			J133-6			Q32	J111-2			Blk-Red	#906		
RAMP DIVERTER							Q27	J111-3				#906		
RUB LAMP FLASHER			Flasher	J133-6			Q31	J111-4			Blk-Yel	#89		
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     26   JET FLASHERS   Gen. Purpose   J133-6   J134-5   Q15   J109-2   J108-2   Blu-Red   #906     27   TOP LOOP FLASHER   Gen. Purpose   J133-6   J134-5   Q14   J109-3   J108-3   Blu-Org   #906     28   RAMP FLASHER   Gen. Purpose   J133-6   J134-5   Q14   J109-3   J108-3   Blu-Org   #906     28   RAMP FLASHER   Gen. Purpose   J133-6   Q13   J109-4   Blu-Yel   #906     3   ILLUMINATION STRING 1   G.I.   J106-1   Q5   J106-7   Wht-Brn   #44     402   ILLUMINATION STRING 2   G.I.   J106-2   Q4   J106-8   Wht-Org   #44     403   ILLUMINATION STRING 3   G.I.   J106-3   Q3   J106-9   Wht-Yel   #44     404   ILLUMINATION STRING 4   G.I.   J105-5   Q2   J105-10   Wht-Grn     405   ILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      50   ILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      50   ILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      50   ILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      60   VILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      60   VILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      70   VILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      70   VILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      70   VILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      70   VILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      70   VILLUMINATION STRING 5   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      70   VILLUMINATION STRING 6   G.I.   J105-6   J104-3   Q1   J105-11   J104-1   Wht-Vio      70   V		RAMP DIVERTER	Low Power	J133-2			Q26	J111-5			Blu-Grn	AE-30-2000		
23   MAGIC LAMP FLASHERS	_		Flasher				Q30	J111-6			Blu-Blk	#906		
25   START TALE FLASHERS   Gen. Purpose   J133-6   J134-5   Q16   J109-1   J108-1   Blu-Brn   #906	_			J133-6			Q25	J111-7				#906		
25   START TALE FLASHERS   Gen. Purpose   J133-6   J134-5   Q16   J109-1   J108-1   Blu-Brn   #906   26   JET FLASHERS   Gen. Purpose   J133-6   J134-5   Q15   J109-2   J108-2   Blu-Red   #906   27   TOP LOOP FLASHER   Gen. Purpose   J133-6   J134-5   Q14   J109-3   J108-3   Blu-Org   #906   28   RAMP FLASHER   Gen. Purpose   J133-6   Q13   J109-4   Blu-Yel   #906   Wht-Yel   #406   Wht-Org   #406   Wht-Org   #44   Wht-Org   Wht-Brn   #44   Wht-Org   Wht-Brn   Wht-Org			Flasher	J133-6			Q29	J111-8			Blu-Gry	#906		
27   TOP LOOP FLASHER   Gen. Purpose   J133-6   J134-5   Q14   J109-3   J108-3   Blu-Org   #906	_		Gen. Purpose	J133-6	J134-5		Q16	J109-1	J108-1	1		#906	#906	
TOP LOOP FLASHER   Gen. Purpose   J133-6   J134-5   Q14   J109-3   J108-3   Biu-Org   #906				J133-6	J134-5		Q15	J109-2	J108-2		Blu-Red	#906	#906	
RAMP FLASHER   Gen. Purpose   J133-6   Q13   J109-4   Biu-Yei   #906			Gen. Purpose	J133-6	J134-5		Q14	J109-3	J108-3			#906	#906	
O1   ILLUMINATION STRING 1   G.I.   J106-1   Q5   J106-7   Wht-Brn   #44	28	RAMP FLASHER	Gen. Purpose	J133-6			Q13	J109-4				#906		
O4   FILLUMINATION STRING 4   G.I.   J105-5   Q2   J105-10   Wht-Grn	01 IL 02 IL	LUMINATION STRING 1 LUMINATION STRING 2	G.I.		J106-2		Q4		J106-8		Wht-Org	#44		
Voltage Connection Flipper Circuits	03 11	LUMINATION STRING 3		1405.5	J106-3				J106-9			#44		
Voltage Connection Playfield													#555	
Connection Playfield Power Hold Playfield Power Hold Playfield Power Hold Playfield Power Hold Power Hold Playfield Power Hold Pow	05 [1	LLUMINATION STRING 5	G.I.							J104-1	Wht-Vio		#555	
Playfield   Power   Hold   Playfield   Power   Hold   Playfield   Power   Hold							-						Coil	
Lwr. Rt. Power J119-1 (Red-Grn) Q90 J120-13 Yel-Grn FL-11629   Lwr. Rt. Hold J119-1 (Red-Grn) Q92 J120-11 Org-Grn   FL-11629   Lwr. Lt. Power J119-4 (Red-Blu) Q87 J120-9 Yel-Blu FL-11629   Lwr. Lt. Hold J119-4 (Red-Blu) Q87 J120-7 Org-Blu   S1 LEFT DIVERTER POWER   Upr. Rt. Power J119-6 (Red-Vio) Q84 J120-6 Yel-Vio FL-11753   FL-11629   FL-11753	Elippor Circuito											Part No.	Colors	
30   LOWER RIGHT FLIPPER   Lwr. Rt. Hold   J119-1 (Red-Grn)   Q92   J120-11   Org-Grn     S11			Lun Di Dani				Hold				Hold			
231		OWED DIGUT ELIDDED										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         Yei-Vio         FL-11753		LOWER RIGHT FLIPPER					Q92				Org-Grn			
33 LEFT DIVERTER POWER Upr. Rt. Power U119-6 (Red-Vio) Q84 J120-6 Yel-Vio FL-11753													FL-11629	BLUE
01200   Tel-11/30							Q89				Org-Blu			
LIKE LIE DIVERTER HOLD Libr Dt Hold 11110 6 (Dod Vio)							i					FL-11753	YELLOW	
0120-4   Old-410	_	LEFT DIVERTER HOLD					Q86	J120-4			Org-Vio			
			Upr. Lt. Power	J119-8 (F	Red-Gry)		I	J120-3		Yel-Gry		20-10197		
36 LOOP POST DIVERTER Upr. Lt. Hold U119-8 (Red-Gry) Q83 J120-1 Org-Gry AE-27-120 J1XX = POWER DRIVER BOARD				J119-8 (F	Red-Gry)		Q83	J120	0-1		Org-Gry	AE-27-1200		

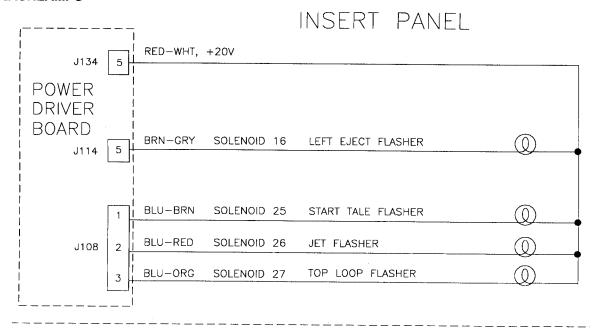
J1XX = POWER DRIVER BOARD 24-6549 = #44 BULB; 24-8704 = #89 BULB; 24-8768 = #555 BULB; 24-8802 = #906 BULB \*THESE G.I. STRINGS DO NOT BRIGHTEN AND DIM, THEY ARE ALWAYS ON.

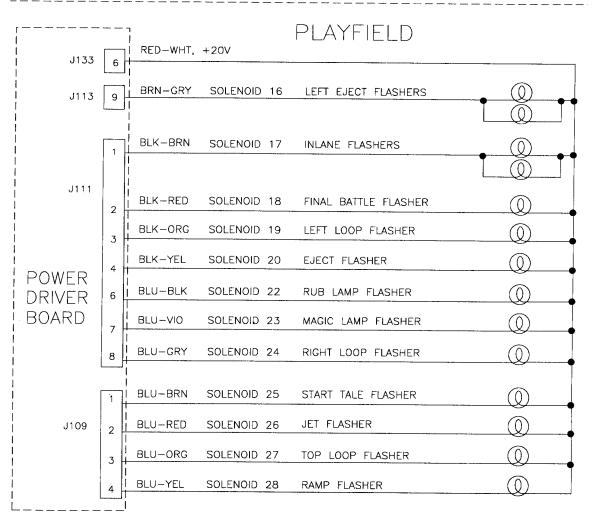
#### **SOLENOID WIRING**

#### **COILS**

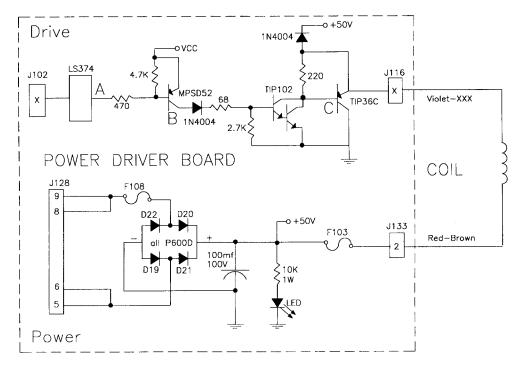


#### **FLASHLAMPS**



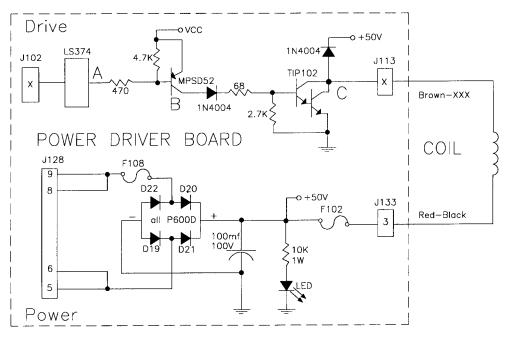


#### HIGH POWER SOLENOID CIRCUIT



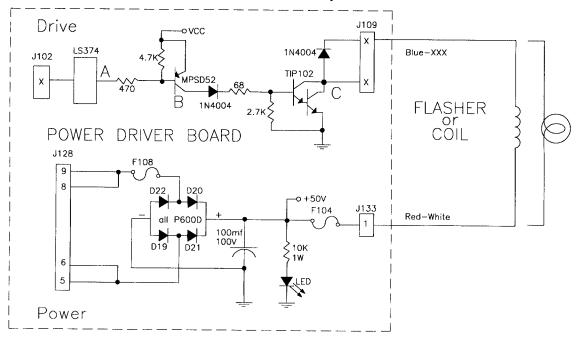
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B", the collector of the 2N5401 transistor, is high. A high at point "B" causes point "C", the collector of the TIP102 transistor and point "D", the emitter of the TIP36C transistor, to drop low. When point "D" is low,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

#### LOW POWER SOLENOID CIRCUIT



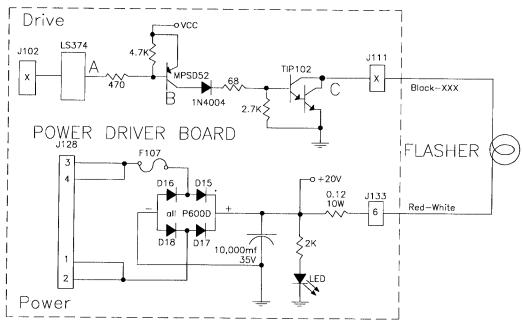
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B", the collector of the 2N5401 transistor, is high. A high at point "B" turns on the TIP102 transistor and causes point "C" to drop low. When point "C" is low the coil is grounded through the transistor and turns on.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

### SPECIAL (GENERAL PURPOSE) SOLENOID CIRCUIT



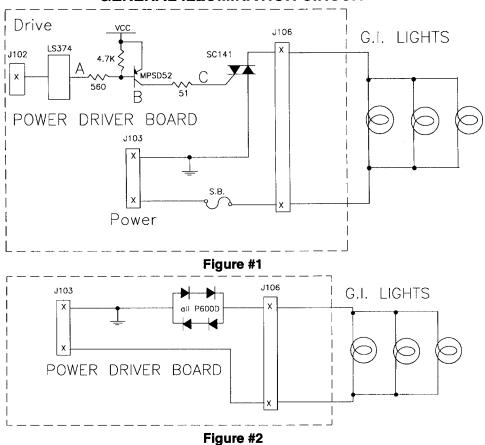
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor , is high. A high at point "B" causes a low at point "C". When point "C" is low, the coil/flashlamp is grounded through the transistor and turns on. When point "A" toggles high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

#### **FLASHLAMP CIRCUIT**



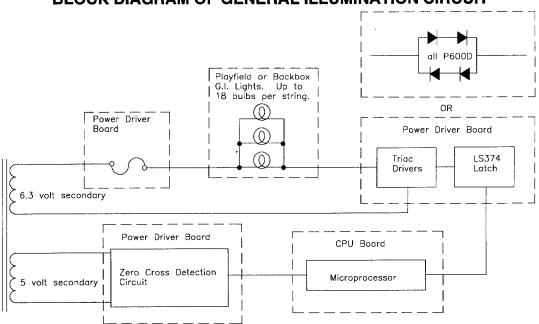
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor, is high. Once point "B" is high, point "C" the collector of the TIP102 transistor is low. When point "C" is low, the flashlamp is grounded through the transistor and turns on.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

#### **GENERAL ILLUMINATION CIRCUIT**

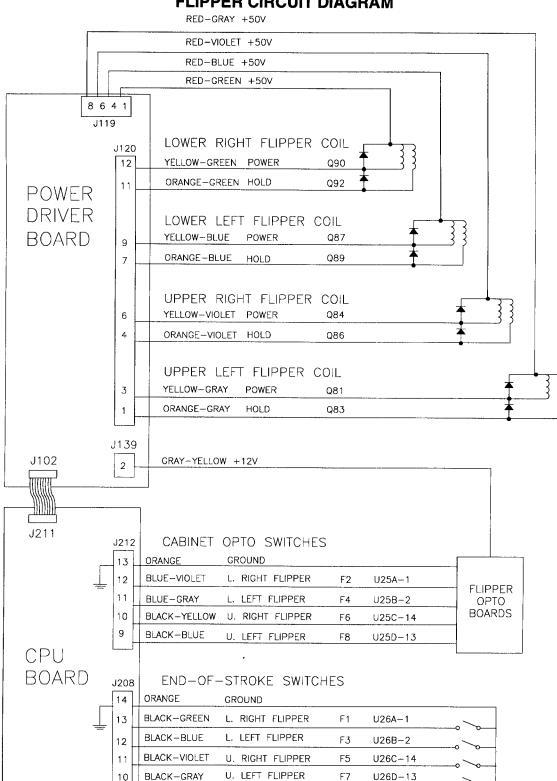


There are five general illumination strings; three like figure #1 and two like figure #2. When point "A" toggles low, points, "B" and "C" are high. This turns on the triac and the desired general illumination string of lights.

#### **BLOCK DIAGRAM OF GENERAL ILLUMINATION CIRCUIT**



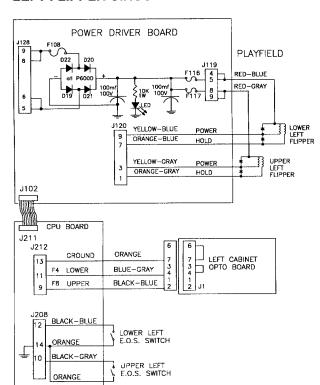
#### FLIPPER CIRCUIT DIAGRAM



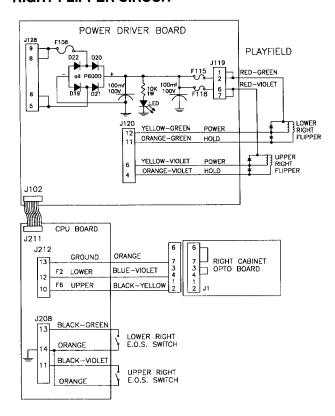
The upper right flipper coil power and hold circuits are used for the Left Diverter. The upper left flipper coil power circuit is used for the Vanish Magnet. The upper left flipper hold circuit is used for the Loop Post Diverter.

#### **FLIPPER COIL CIRCUITS**

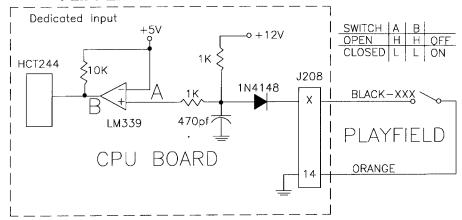
#### **LEFT FLIPPER CIRCUIT**



#### RIGHT FLIPPER CIRCUIT



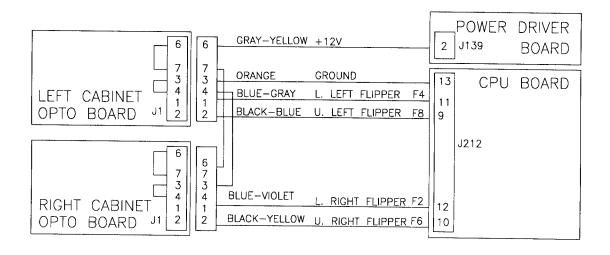
#### FLIPPER END-OF-STROKE SWITCH CIRCUIT

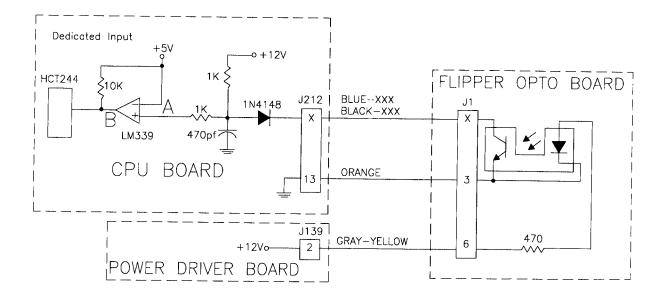


The flipper E.O.S. circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

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**

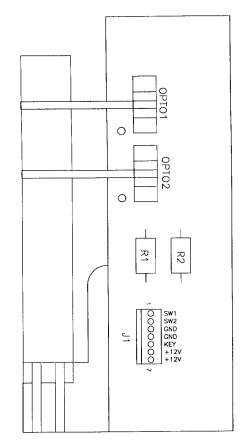


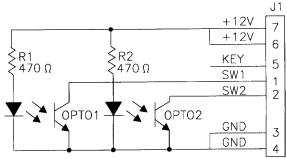


The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch circuit.

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**

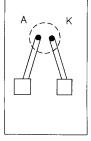
- J1-1 Black-Blue from CPU board J212-9 J1-2 Blue-Gray from CPU board J212-11
- J1-3 N/C
- J1-4 Orange from CPU board J212-13
- J1-5 N/C
- J1-6 Gray-Yellow from Power Driver Board J139-2
- J1-7 Gray-Yellow from Power Driver Board J139-2

#### **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

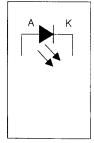
### LED BOARD ASSEMBLY A-16908

(TRANSMITTER-GREEN BOARD)







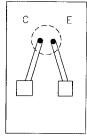


solder side

component side

schematic

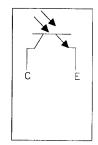
# PHOTO TRANSISTOR BOARD ASSEMBLY A-16909 (RECEIVER-BLUE BOARD)







component side



schematic

#### TYPICAL CIRCUIT DIAGRAM

LED BOARD Transmitter 1.0-1.4 volts

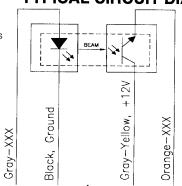
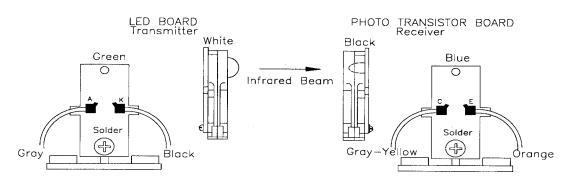
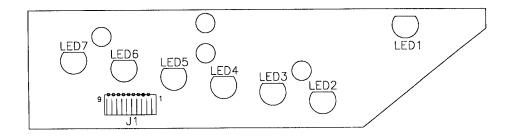
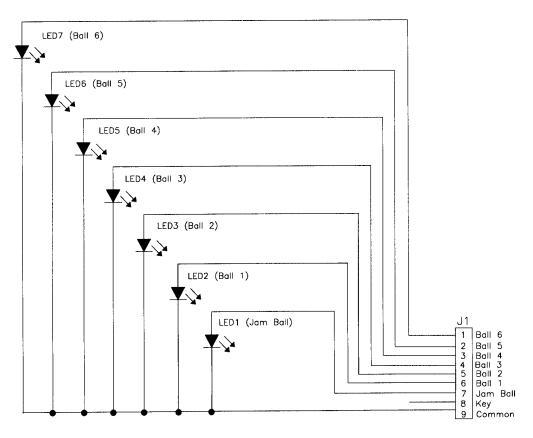


PHOTO TRANSISTOR BOARD Receiver 0.1-0.7 volts unblocked 11-13 volts blocked



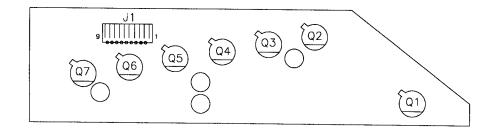
# Trough IR LED Board Assembly (transmitter-green board) A-18617-1

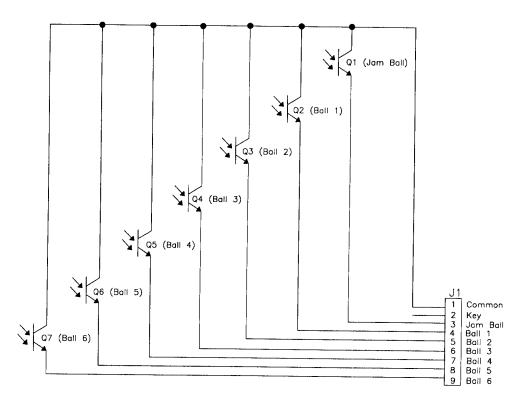




- J1-1 N/C
- J1-2 N/C
- J1-3 GRY-GRN, LED 5, to 7-Opto Switch Board J1-3
- J1-4 GRY-BLK, LED 4, to 7-Opto Switch Board J1-5
- J1-5 GRY-ORG, LED 3, to 7-Opto Switch Board J1-6
- J1-6 GRY-RED, LED 2, to 7-Opto Switch Board J1-7
- J1-7 GRY-BRN, LED 1, to 7-Opto Switch Board J1-8
- J1-8 Key
- J1-9 BLK, ground, to 7-Opto Switch Board J1-9

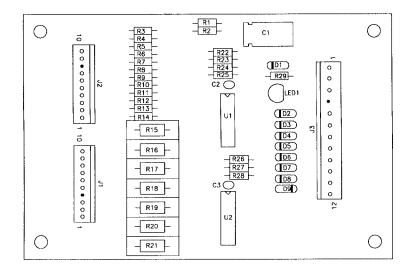
# Trough IR Photo Transistor Board Assembly (receiver-blue board) A-18618-1





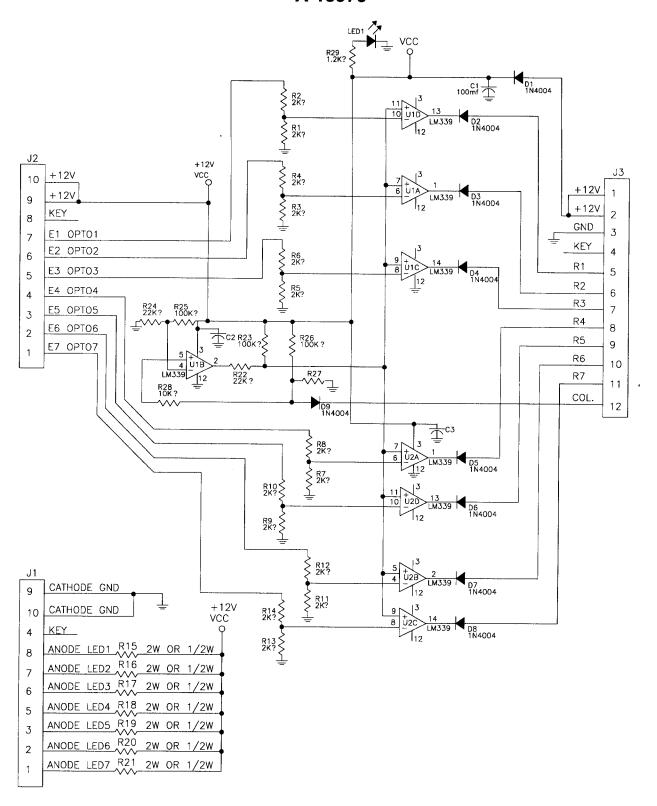
- J1-1 GRY-YEL, +12V, to 7-Opto Switch Board J2-9
- J1-2 Key
- J1-3 ORG-BRN, Photo Transistor 1, to 7-Opto Switch Board J2-7
- J1-4 ORG-RED, Photo Transistor 2, to 7-Opto Switch Board J2-6
- J1-5 ORG-BLK, Photo Transistor 3, to 7-Opto Switch Board J2-5
- J1-6 ORG-YEL, Photo Transistor 4, to 7-Opto Switch 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

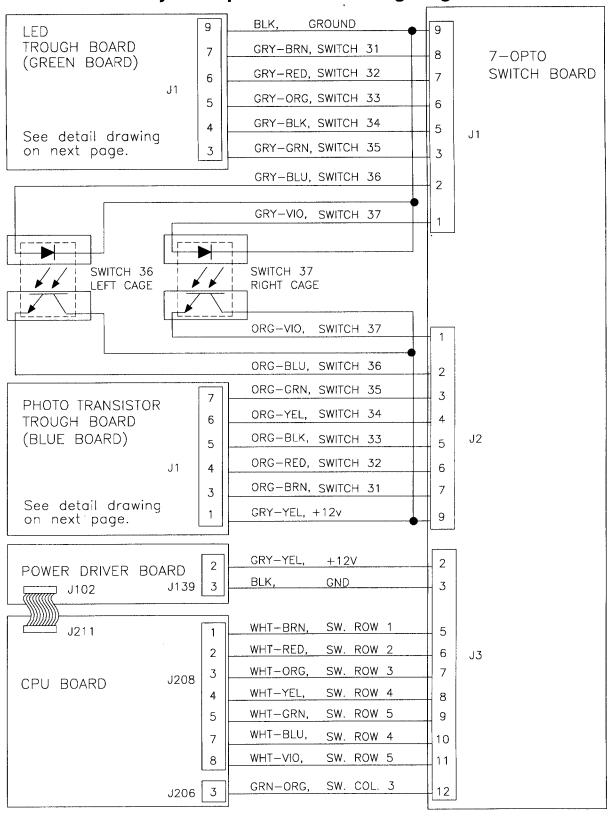


- J1-1 GRY-VIO, to switch 37 Right Cage LED board
- J1-2 GRY-BLU, to switch 36 Left Cage LED board
- J1-3 GRY-GRN, to Trough LED board J1-3
- J1-4 KEY
- J1-5 GRY-BLK, to Trough LED board J1-4
- J1-6 GRY-ORG, to Trough LED board J1-5
- J1-7 GRY-RED, to Trough LED board J1-6
- J1-8 GRY-BRN, to, Trough 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
- of the office, officer for o north of o board observe

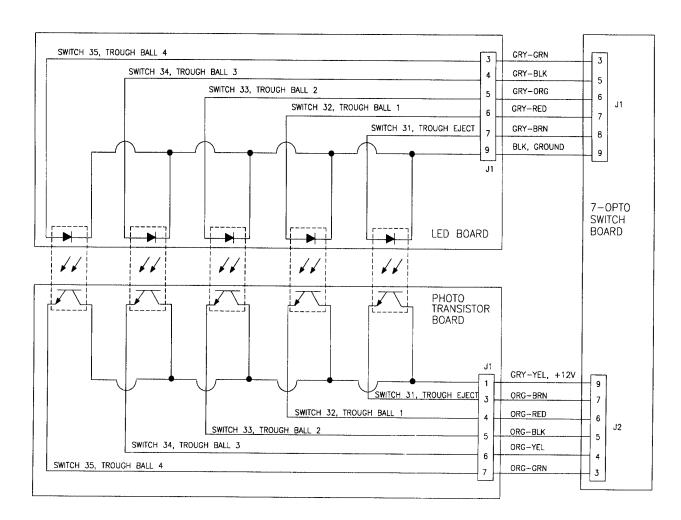
## 7-Opto Switch Board Schematic A-15576



### **Playfield Opto Switches Wiring Diagram**

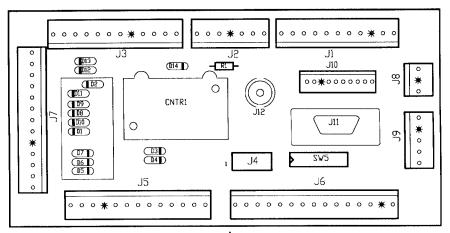


### **Trough Opto Switches Wiring Diagram**



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

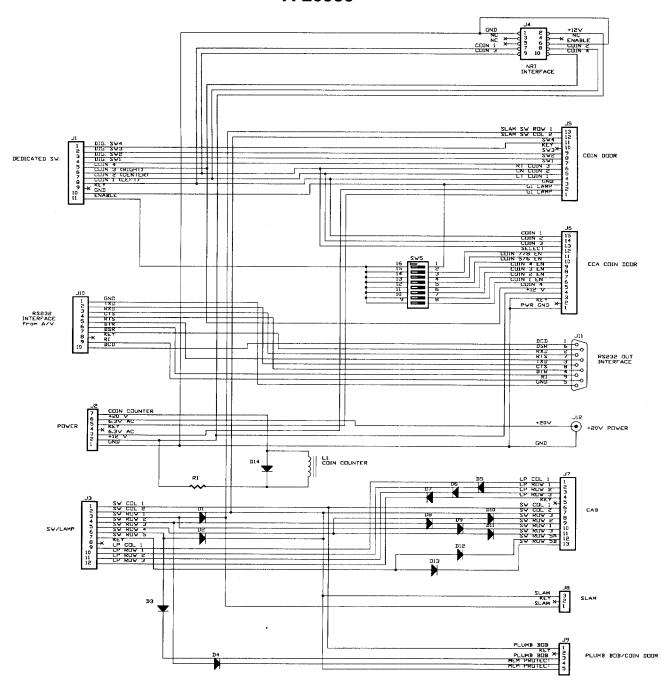
#### Coin Door Interface Board A-20580



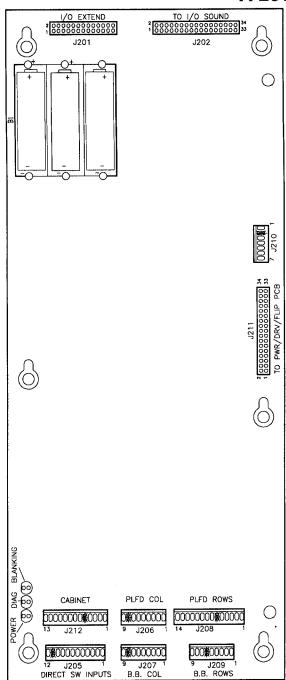
- J1-1 Orange-Gray, ded. switch row 8 form CPU J205-9
- J1-2 Orange-Violet, ded. switch row 7 from CPU J205-8
- J1-3 Orange-Blue, ded. switch row 6 from CPU J205-7
- J1-4 Orange-Green, ded. switch row 5 from CPU J205-6
- J1-5 Orange-Yellow, ded. switch row 4 from CPU J205-4
- J1-6 Orange-Black, ded. 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 Kev
- 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 Kev
- 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 Kev
- J8-3 Green, switch column to cabinet Slam Tilt
- J9-1 White-Yellow, switch row 4 to Plumb Bob Tilt
- 9-2 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



### Security CPU Board Assembly A-20119-50047



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

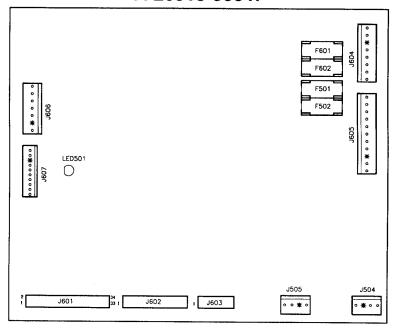
J202, 34-pin ribbon cable, data to/from J601

J203- Not Used

J204- Not Used

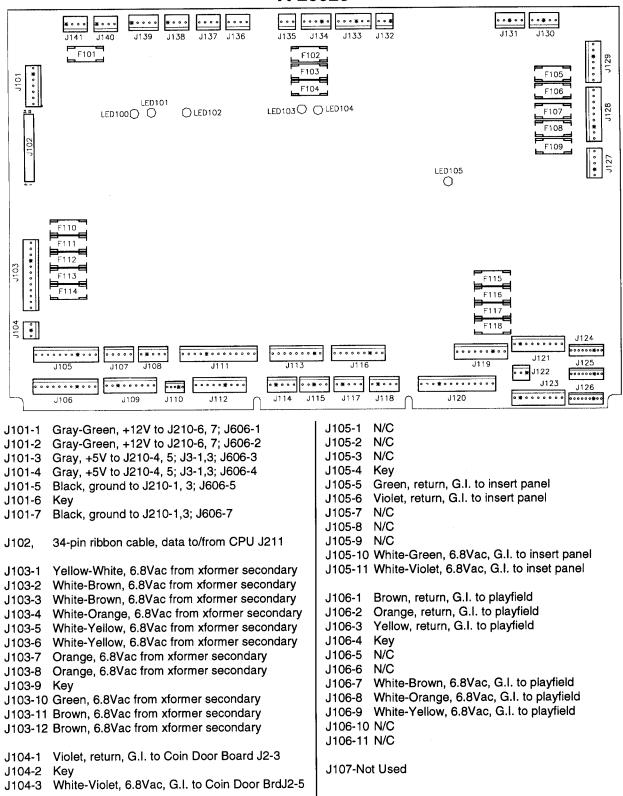
```
J205-1
        Orange-Brown, ded. sw. row 1, to Coin Door Brd J1-8
        Orange-Red, ded. sw. row 2, to Coin Door Brd J1-7
        Orange-Black, ded. sw. row 3, to Coin Door Brd J1-6
J205-4
        Orange-Yellow, ded. sw. row 4, to Coin Door Brd J1-5
J205-5
        N/C
J205-6
        Orange-Green, ded. sw. row 5, to Coin Door Brd J1-4
        Orange-Blue, ded. sw. row 6, to Coin Door Brd J1-3
J205-7
        Orange-Violet, ded. sw. row 7, to Coin Door Brd J1-2
J205-8
        Orange-Gray, ded. sw. row 8, to Coin Door Brd J1-1
J205-9
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
        Green-Brown, switch column 1, to playfield switches
        Green-Red, switch column 2, to playfield switches
        Green-Orange, switch column 3, to playfield switches
J206-3
        Green-Yellow, switch column 4, to playfield switches
J206-4
        Green-Black, switch column 5, to playfield switches
J206-5
        Green-Blue, switch column 6, to playfield switches
J206-6
J206-7
        N/C
J206-8
        Key
J206-9 N/C
J207- Not Used
        White-Brown, switch row 1, to playfield switches
        White-Red, switch row 2, to playfield switches
.1208-2
J208-3
        White-Orange, switch row 3, to playfield switches
        White-Yellow, switch row 4, to playfield switches
J208-4
        White-Green, switch row 5, to playfield switches
J208-5
J208-6
         Kev
        White-Blue, switch row 6, to playfield switches
.1208-7
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
        Black, ground, from Power Driver Board J101-5. 7
J210-3
        Gray, +5V, from Power Driver Board J101-3, 4
J210-4
J210-5 Gray, +5V, from Power Driver Board J101-3, 4
        Gray-Green, +12V, from Power Driver Board J101-1, 2
J210-6
        Gray-Green, +12V, from Power Driver Board J101-1, 2
J210-7
J211.
         34-pin ribbon cable, data to/from J102
        Green-Brown, switch col. 1, to coin door board J3-1
J212-1
        Green-Red, switch col. 2, to coin door board J3-2
J212-2
J212-3
        White-Brown, switch row 1, to coin door board J3-3
J212-4
        Key
J212-5
        White-Red, switch row 2, to coin door board J3-4
J212-6
        White-Orange, switch row 3, to coin door board J3-5
.1212-7
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
```

# Audio Visual Board Assembly A-20516-50047



J601	34-pin ribbon cable, data to CPU J202	J504-1	Black-Yellow, signal to speaker
J602	26-pin ribbon cable, data to CPU J201	J504-2 J504-3	Key N/C
0002	20-pii ribboli cable, data to CFO 3201	J504-3	N/C Black, signal to speaker
J603	14-pin ribbon cable, data to/from dot matrix display driver	3304-4	black, signal to speaker
	The second secon	J505-1	Black-Yellow, signal to speaker
J604-1	Orange, -125V to display driver pin1	J505-2	N/C
J604-2	Blue, -113V to display driver pin 2	J505-3	Key
J604-3		J505-4	Black, signal to speaker
J604-4	Black, ground to display driver pin 4		and it, organical
	Black, ground to display driver pin 5		
J604-6	Gray, +5V to display driver pin 6	l	
J604-7	Gray-Yellow, +12 to display driver pin 7	ľ	
J604-8	Brown, +62 to display driver pin 8		
J605-1	White, 80VAC from transformer secondary	İ	
J605-1	White, 80VAC from transformer secondary		
	Violet, 100VAC from transformer secondary		
J605-4	Violet, 100VAC from transformer secondary	l	
J605-5	Gray-White, 18VAC from transformer secondary	ŀ	
	Gray-White, loop from J605-5	l	
J605-7	Gray, 18VAC from transformer secondary		
J605-8	Gray, loop from J605-7		
J605-9			
	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	i	
J606-2	· <b>,</b>	ŀ	
J606-3	Black, ground from power driver board J101-5		
J606-4			
J606-5			
	Gray-Green, +12V from power driver board J101-2		
J606-7	Gray-Green, +12V from power driver board J101-1		
J607	Not Used		
2001			

### Power Driver Board Assembly A-20028



Power	Driver Board Continued	1 H15-N	lot Used
		1 3113-1	voi Osea
3106-1	Blue-Brown, solenoid 25 drive to insert panel	1	
	flasher	J116-1	Violet-Brown, solenoid 1 drive to playfield coil
J108-2	Blue-Red, solenoid 26 drive to insert panel	J116-2	Violet-Red, solenoid 2 drive to playfield coil
	flasher	J116-3	
1400.0		I	,
3108-3	Blue-Orange, solenoid 27 drive to insert panel	J116-4	
	flasher	J116-5	Violet-Yellow, solenoid 4 drive to playfield coil
J108-4	Key	J116-6	
J108-5	•	J116-7	
01000	1470	E .	
	<b>5</b> 1 <b>5 1 1 1 1 1 1 1 1 1 1</b>	J116-8	Violet-Black, solenoid 7 drive to backbox coil
J109-1	Blue-Brown, solenoid 25 drive to playfield	J116-9	Violet-Gray, solenoid 8 drive to playfield coil
	flasher		
J109-2	Blue-Red, solenoid 26 drive to playfield flasher	J117- N	lot Used
J109-3		• • • • • • • • • • • • • • • • • • •	
0103-0		1,,,,,,,	
	flasher	J118- N	lot Used
J109-4	Blue-Yellow, solenoid 28 drive to playfield		
	flasher	J119-1	Red-Green, +50V to lower right flipper coil
J109-5	N/C	J119-2	
J109-6			•
		J119-3	
J109-7	•	J119-4	Red-Blue, loop from J119-5
J109-8	N/C	J119-5	Red-Blue, +50V to lower left flipper coil
J109-9	N/C	J119-6	
		J119-7	
J110- N	at I land	1	
3110-14	or Osea	J119-8	
		J119-9	Red-Gray, Loop from J119-8
J111-1	Black-Brown, solenoid 17 drive to playfield		
	flasher	J120-1	Orange-Gray, solenoid 36 drive to coil
J111-2	Black-Red, solenoid 18 drive to playfield flasher	J120-2	y,
	Black-Orange, solenoid 19 drive to playfield	l .	
3111-3	- · · · · · · · · · · · · · · · · · · ·	J120-3	Yellow-Gray, solenoid 35 drive to coil
	flasher	J120-4	Orange-Violet, solenoid 34 drive to coil
J111-4	Black-Yellow, solenoid 20 drive to playfield	J120-5	N/C
	flasher	J120-6	Yellow-Violet, solenoid 33 drive to coil
.1111-5	Blue-Green, solenoid 21 drive to playfield coil	J120-7	
11116	Blue-Black, solenoid 22 drive to playfield		
3111-0		J120-8	
	flasher	J120-9	Yellow-Blue, power, lower left flipper coil
J111-7	Blue-Violet, solenoid 23 drive to playfield	J120-10	) Key
	flasher	J120-11	Orange-Green, holding, lower right flipper coil
J111-8	Blue-Gray, solenoid 24 drive to playfield flasher	J120-12	
J111-9			
		3120-13	Yellow-Green, power, lower right flipper coil
J111-10			
J111-11		J121-No	ot Used
J111-12	Red-Orange, tieback diode for solenoid 21		
J111-13		J122-1	Key
	· · · -	J122-2	N/C
1110 Na	at Llood		
J112-No	or Osed	J122-3	Yellow-Gray, lamp column 8 to cabinet
J113-1	Brown-Black, solenoid 9 drive to playfield coil	J123-1	Yellow-Brown, lamp column 1 to playfield
J113-2	Key	J123-2	Yellow-Red, lamp column 2 to playfield
J113-3	Brown-Red, solenoid 10 drive to playfield coil		
		J123-3	Yellow-Orange, lamp column 3 to playfield
J113-4	Brown-Orange, solenoid 11 drive to playfield	J123-4	Yellow-Black, lamp column 4 to playfield
	coil	J123-5	Yellow-Green, lamp column 5 to playfield
J113-5	Brown-Yellow, solenoid 12 drive to playfield coil	J123-6	Yellow-Blue, lamp column 6 to playfield
J113-6	Brown-Green, solenoid 13 drive to playfield coil	J123-7	Yellow-Violet, lamp column 7 to playfield
	Brown-Blue, solenoid 14 drive to playfield coil		
J113-7		J123-8	Key
J113-8	Brown-Violet, solenoid 15 drive to playfield coil	J123-9	Yellow-Gray, lamp column 8 to playfield
J113-9	Brown-Gray, solenoid 16 drive to playfield		
	flasher	J124-No	t Used
		3,27110	
11111	N/C		
J114-1	N/C		
	N/C		
J114-3	N/C		
.1114-4	Kov		

J114-4 Key
J114-5 Brown-Gray, solenoid 16 drive to insert panel flasher

Power L	Driver Board Continued							
J125-1 J125-2	Red-Brown, lamp row 1 to playfield Red-Black, lamp row 2 to playfield							
J125-3	Key							
J125-4	Red-Orange, lamp row 3 to playfield Red-Yellow, lamp row 4 to playfield							
J125-5 J125-6	Red-freilow, lamp row 4 to playfield  Red-Green, lamp row 5 to playfield							
J125-0 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 J126-2	N/C N/C							
J126-2	Key							
J126-4	N/C							
J126-5	N/C							
J126-6	N/C							
J126-7								
J126-8 J126-9	Red-Violet, lamp row 7 to cabinet Red-Gray, lamp row 8 to cabinet							
3120-9	ned-dray, famp fow o to cabinet							
J127-1	White-Green, 9.8Vac from xformer secondary							
J127-2	White-Green, 9.8Vac loop from J112-1							
J127-3 J127-4	White-Green, 9.8Vac from xformer secondary Keys							
J127-5	White-Green, 9.8VAC loop from J112-3							
J128-1 J128-2	White-Red, 16Vac loop from J102-2 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 Black-Yellow, 16Vac loop from J102-9							
J128-8 J128-9	Black-Yellow, 16Vac from xformer secondary							
J129-1 J129-2	Red, 9Vac from xformer secondary Red, 9Vac from transformer secondary							
J129-2	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 N/C							
J133-5 J133-6								
J134-1 J134-2	N/C N/C							
J134-3								
J135-4	Key							
1124-5	Red-White ±20V to insert panel flasher							

J134-5 Red-White, +20V to insert panel flasher

J135- 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 N	/ATRIX					Yellow (B+	(_Q)	Red
Column	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)	JACKPOT	MAGIC CARPET	SMOKE 6	SMOKE 14 (TOP) 51	MAKE A WISH	ACTION 2	EXTRA BALL
2 Red- Black J125-2 Q108	JEWEL 2	(G)ENIE	ACTION 3	SMOKE 7	LAMP-15	(B)AZAAR	LEFT LOCK	ACTION 5
3 Red- Orange J125-4 Q103	JEWEL 3	G(E)NIE	RAMP ARROW RIGHT	SMOKE 8	LAMP-30	B(A)ZAAR	HAREM ADVANCE	RIGHT LOCK
4 Red- Yellow J125-5 Q107	JEWEL 4	GE(N)IE	RAMP ARROW LEFT 34	SMOKE 9	LAMP-60 54	BA(Z)AAR	LEFT TIGER LOOP	RIGHT TIGER LOOP
5 Red- Green J125-6 Q102	JEWEL 5	GEN(I)E	SMOKE 1 (BOTTOM)	SMOKE 10	SMOKE 4	BAZ(A)AR	ACTION 1	CAPTIVE BALL RIGHT
6 Red- Blue J125-7 Q106	JEWEL 6	GENI(E)	SMOKE 2	SMOKE 11	SMOKE 5	BAZA(A)R	WISH 1	ACTION 4
7 Red- Violet J125-8 Q101	JEWEL 7 (RIGHT)	MULTIBALL 27	SMOKE 3	SMOKE 12	SHOOT STAR RIGHT	BAZAA(R)	WISH 2	CAPTIVE BALL LEFT
8 Red- Gray J125-9 Q105	SHOOT AGAIN	OUTLANE SPECIAL	AMULET	SMOKE 13	SHOOT STAR LEFT	CENTER LOCK	WISH 3	START BUTTON

J1XX = Power Driver Board

SWITCH !	MATRI	X				White	-	°—Green		
Dedicated Grounded Switches	Column	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	Filipper Grounded Switches
Orange-Brown J205-1 Left Coin Chute U17-5	1 White- Brown J208-1 U18-11	HAREM PASSAGE	SLAM TILT	TROUGH EJECT	RAMP MADE LEFT	LEFT SLING	LEFT STANDUPS	NOT USED	NOT USED	Black-Green J208-13 Lower Right Flipper E.O.S.
Orange-Red J205-2 Center Coin Chute U17-7	2 White- Red J208-2 U18-9	VANISH TUNNEL	COIN DOOR CLOSED	TROUGH BALL 1	GENIE TARGET	51 RIGHT SLING 52	RIGHT STANDUPS	NOT USED	NOT USED	F1 Blue-Violet J212-12 Lower Right Flipper Opto
Orange-Black J205-3 Right Coin Chute U17-11	3 White- Orange J208-3 U18-5	START BUTTON	GENIE STANDUP TARGET	TROUGH BALL 2	LEFT LOOP	LEFT JET	TOP SKILL	NOT USED	NOT USED	Black-Blue J208-12 Lower Left Flipper E.O.S.
Orange-Yellow J205-4 4th Coin Chute U17-9	4 White- Yellow J208-4 U18-7	PLUMB BOB TILT	ALWAYS CLOSED	TROUGH BALL 3	· INNER LOOP LEFT	RIGHT JET	MIDDLE SKILL	NOT USED	NOT USED	Blue-Gray J212-11 Lower Left Flipper Opto
Orange-Green J205-6 U16-9 lormal Test unction Function lov Crdts Escape	5 White- Green J208-5 U19-11	RAMP ENTER	BAZAAR EJECT	TROUGH BALL 4	INNER LOOP RIGHT	MIDDLE JET	BOTTOM SKILL	NOT USED	NOT USED	Black-Violet J208-11 Upper Right Flipper E.O.S.
Orange-Blue J205-7 U16-11 lormal Test unction Function folume Dn Down D6	6 White- Blue U208-7 U19-9	15 LEFT OUTLANE	25 LEFT INLANE	LEFT CAGE OPTO	MINI STANDUPS	55 LAMP SPIN CCW	LOCK 1 (BOTTOM)	75 NOT USED	NOT USED	Black-Yellow J212-10 Upper Right Flipper Opto
Orange-Violet J205-8 U16-7 Iormal Test Function Function Colume Up Up	7 White- Violet J208-8 U19-5	RIGHT INLANE	RIGHT OUTLANE	RIGHT CAGE OPTO	RAMP MADE RIGHT	LAMP SPIN CW	LOCK 2 (MIDDLE)	NOT USED	NOT USED	BlackGray J208-10 Upper Left Flipper E.O.S.
Orange-Gray J205-9 U16-5 lormal Test unction Function legin Test Enter	8 White- Gray J208-9 U19-7	BALL SHOOTER	LEFT WIRE MAKE	LEFT EJECT	RIGHT CAPTIVE BALL	LEFT CAPTIVE BALL	LOCK 3 (TOP)	NOT USED	NOT USED	Black-Blue J212-9 Upper Left Flipper Opto
D8		. 18	28	38	48	58	68	78	88	FB

#### **WARNINGS & NOTICES**

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