Bally

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16-50032-101
FINAL

The Shadow™

Operations Manual Includes:

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

Midway Manufacturing Company, 3401 North California Avenue, Chicago, Illinois 60618

DIP SWITCH SETTINGS AND JUMPERS

EPROM Jumper Settings for U6	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
Euopean	Off	Off	On	On	On	Off	On	On
French	Off	Off	On	On	On	On	Off	Off
German	Off	Off	On	On	On	On	On	Off
Spain	Off	Off	On	On	Off	On	On	On

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire Color	Solenoid Part number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	BALL LAUNCH	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-23-800	
02	LOCKUP KICKOUT	High Power	J107-2			Q80	J130-2			Vio-Red	A-14189	
03	LEFT DIVERTER LEFT	High Power	J107-2			Q78	J130-4			Vio-Org	AE-25-1000	
04	LEFT DIVERTER RIGHT	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-25-1000	
05	RIGHT DIVERTER RIGHT	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-25-1000	
06	RIGHT DIVERTER LEFT	High Power	J107-2			Q66	J130-7			Vio-Blu	AE-25-1000	
07	KNOCKER	High Power		J107-2		Q68		J130-8		Vio-Blk		AE-23-800
08	WALL TARGET UP	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-23-800	
09	LEFT SLINGSHOT	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	
10	RIGHT SLINGSHOT	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	
11	RIGHT EJECT	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-27-1200	
12	LEFT EJECT	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1500	
13	BALL RELEASE	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1500	
14	BALL POPPER	Low Power	J107-3			Q48	J127-7			Brn-Blu	AE-25-1000	
15	MINI KICKER	Low Power	J107-3			Q46	J127-8			Brn-Vio	AE-25-1000	
16	WALL TARGET DOWN	Low Power	J107-3			Q44	J127-9			Brn-Gry	SM-30-1100-DC	
17	MINI PLAYFIELD FLASHER	Flasher	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#89	#906 (2)
18	LEFT SIDE FLASHER	Flasher	J107-6	J106-5		Q40	J126-2	J125-2		Blk-Red	#89	#906
19	MINI MOTOR RIGHT	Flasher	J116-2			Q38	J126-3			Blk-Org	14-8014	
20	MINI MOTOR LEFT	Flasher	J116-2			Q36	J126-4			Blk-Yel	14-8014	
21	RIGHT SIDE FLASHER	Flasher	J107-6			Q28	J126-5			Blu-Grn	#906, #89	
22	RIGHT RAMP FLASHER	Flasher	J107-6			Q30	J126-6			Blu-Blk	#906, #89	
23	LEFT RAMP FLASHER	Flasher	J107-6			Q34	J126-7			Blu-Vio	#906, #89	
24	MINI DROP BANK	Flasher	J107-1			Q32	*J126-8			Blu-Gry	AE-25-1000	
25	SINGLE DROP UP	Gen. Purpose	J107-1			Q26	*J122-1			Blu-Brn	AE-26-1200	
26	LEFT BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q24	J122-2	J124-2		Blu-Red	#906	#906
27	CENTER BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q22	J122-3	J124-3		Blu-Org	#906	#906
28	RIGHT BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q20	J122-4	J124-5		Blu-Yel	#906	#906
35	MAGNET	High Power	J907-8,9			Q2	J902-3			Yel-Gry	20-9247	
36	SINGLE DROP DOWN	Low Power	J907-8,9			Q7	J902-1			Org-Gry	SM1-26-600	
	General Illumination											
01	BOTTOM PLAYFIELD	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	
02	TOP LEFT PLAYFIELD	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	
03	INSERT BOTTOM	G.I.		J120-3		Q14		J120-9		Wht-Yel		#555
04	INSERT TOP	G.I.		J120-5		Q16		J120-10		Wht-Grn		#555
05	TOP RIGHT PLAYFIELD	G.I.	J121-6			Q12	J121-11			Wht-Vio	#44	

	Flipper Circuits		Voltage Connections Playfield	Drive Transistors Power	Drive Transistors Hold	Drive Connectors Playfield	Drive Wire Colors Power	Drive Wire Colors Hold	Coil Part No.	Coil Color
29		Lwr. Rt. Power	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn	FL-11629	BLUE
31		Lwr. Lt. Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J907-4 (Red-Blu)		Q9	J902-7		Org-Blu	FL-11629	BLUE
33		Upr. Rt. Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio	FL-15411	ORANGE
35		Upr. Lt. Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry			
36	Upper Left Flipper	Upr. Lt. Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	NOT	USED

J1xx=Power Driver Board; J9xx=Fliptronic II Board; 24-6549=#44 bulb; 24-8704=#89 bulb; 24-8768=#555 bulb; 24-8802=#906 bulb

* Tieback Diode J122-5 (loop) from J126-11 (end).

THE SHADOW (50032)
A-18536
Gun Handle Installation
Installation De La Crosse
Pistolengriff am Gehäuse innen lösen
Istruzioni Per L'Installazione Dell'Impugnatura Della Pistola

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

4410-01119-00 (4 used) Nut 10-24 ESN (To install 10-24 ESN nut use 3/8" nut driver: color code, blue)
4700-00060-00 (4 used) Flat Washer .219x.500x.063
4310-01123-24B (4 used) Bolt 10-24 x1-1/2 CB

Démontez la crosse du revolver située à l'intérieur de l'appareil. Avec les vis récupérées après démontage, ainsi que les vis supplémentaires, les écrous et les rondelles se trouvant dans la pochette, installez cette crosse à l'extérieur de l'appareil. (voir dessin ci-dessous). Après la mise en place de la crosse, branchez son connecteur avec son correspondant à l'intérieur de l'appareil.

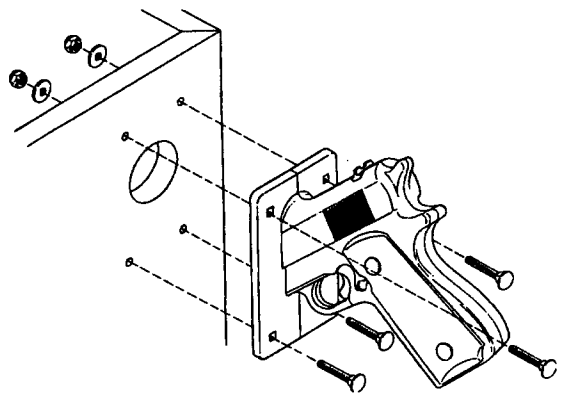
4410-01119-00 (Quantité 4) Ecrou 10-24 ESN (Pour installer l'Ecrou 10-24 ESN utilisez une clé plate de 3/8)
4700-00060-00 (Quantité 4) Rondelle plate .219x.500x.063
4310-01123-24B (Quantité 4) Vis 10-24x1-1/2 CB

Dann mit beiliegenden Schrauben und Muttern an der Außenseite des Gehäuses oben rechts montieren, s. Abbildung. Ist der Pistolengriff angebaut, den Steckkontakt des Griffes und den entsprechenden Gehäusestecker zusammenstecken.

4 Sechskantmuttern, 4410-01119-00 (Sechskantmuttern Mit 3/8" Schlüssel Anziehen)
4 Unterlegscheiben, 4700-00060-00
4 Schrauben, 4310-01123-24B

Rimuovere l'impugnatura della pistola dal fondo del flipper. Usando l'atrezzo in dotazione, le 2 viti, i 2 dadi e le rondelle piane situate nel sacchetto delle parti, installare l'impugnatura della pistola all'esterno del flipper nell'angolo superiore destro. (Vedi figura sottostante.) Una volta installata l'impugnatura della pistola collegare i connettori.

4410-01119-00 (4 utilizzati) dadi 10-24 ESN (Per installare i dadi utilizzare la chiave blu da 3/8")
4700-00060-00 (4 utilizzati) rondelle piane .219x.500x.063
4310-01123-24B (4 utilizzati) viti 10-24x1-1/2 CB



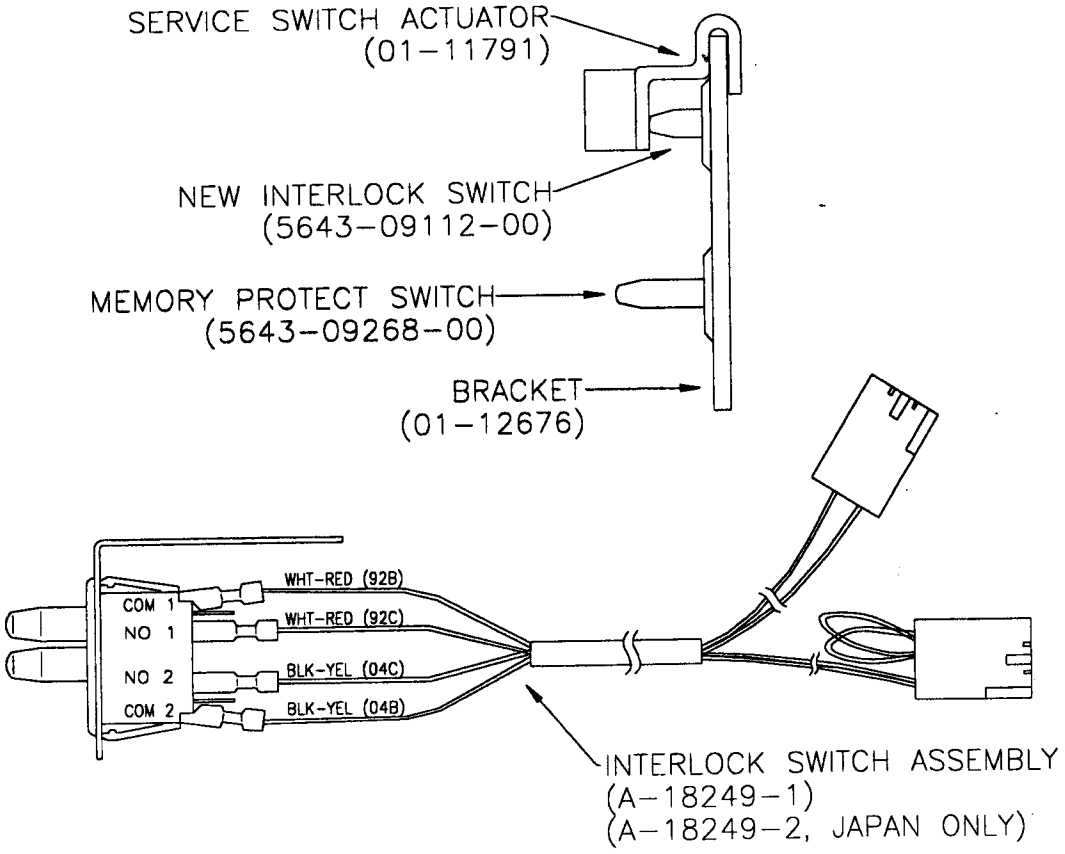
IMPORTANT NOTICE

PLEASE READ

This pinball game is equipped with a SAFETY FEATURE to prevent shocks from the solenoid circuit when the coin door is open. A new interlock switch assembly (part no. A-18249-1), located at the left of the coin door opening, has been added to the game. This assembly is a bracket containing the existing memory protect switch on the bottom and a new interlock switch on the top. When the coin door is open, the 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 open, allowing the serviceman to test and repair the solenoid circuit.

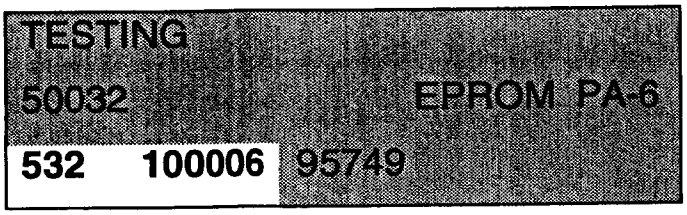
Hold the top interlock switch in, then slide the short end of the Service Switch Actuator over the top of the interlock switch bracket and the long end over the center of the switch plunger to hold it in.



ATTENTION

This game uses a new Security CPU Board that is not downward compatible to the CPU boards used in previous games. The new board has an added security chip that can be interchanged between other Shadow 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 a country specific code. An example of the power-up display is shown below, the electronic ID number is bolded.



THE SHADOW™

TABLE OF CONTENTS

Bally's
THE SHADOW Pinball

Game Rules & Shot Maps

RULES

OBJECT: Defeat Shiwan Khan in the final battle to save the world.

SKILL SHOT: Use left blue button to choose award. Make Left ramp to collect award.

START SCENE: Make left or right eject when Start Scene light is lit.

SHADOW MULTI-BALL™: Hit Sanctum brick wall to light locks, then shoot Sanctum to lock balls.

KHAN MULTI-BALL™: Spell K-H-A-N to light Khan multiball at the left eject. Shoot in left eject to start Khan multiball.

JACKPOTS: When in Shadow or Khan multiball shoot lit jackpot lights. Left and right ball ejects double and triple jackpots.

VENGEANCE: Use blue side buttons to move Phurba divertors to light all 4 Shadow rings to start Vengeance Mode. During Vengeance complete all rings in the given time.

MONGOL ATTACK: Spell M-O-N-G-O-L by hitting targets. Once completed shoot for the outer loops.

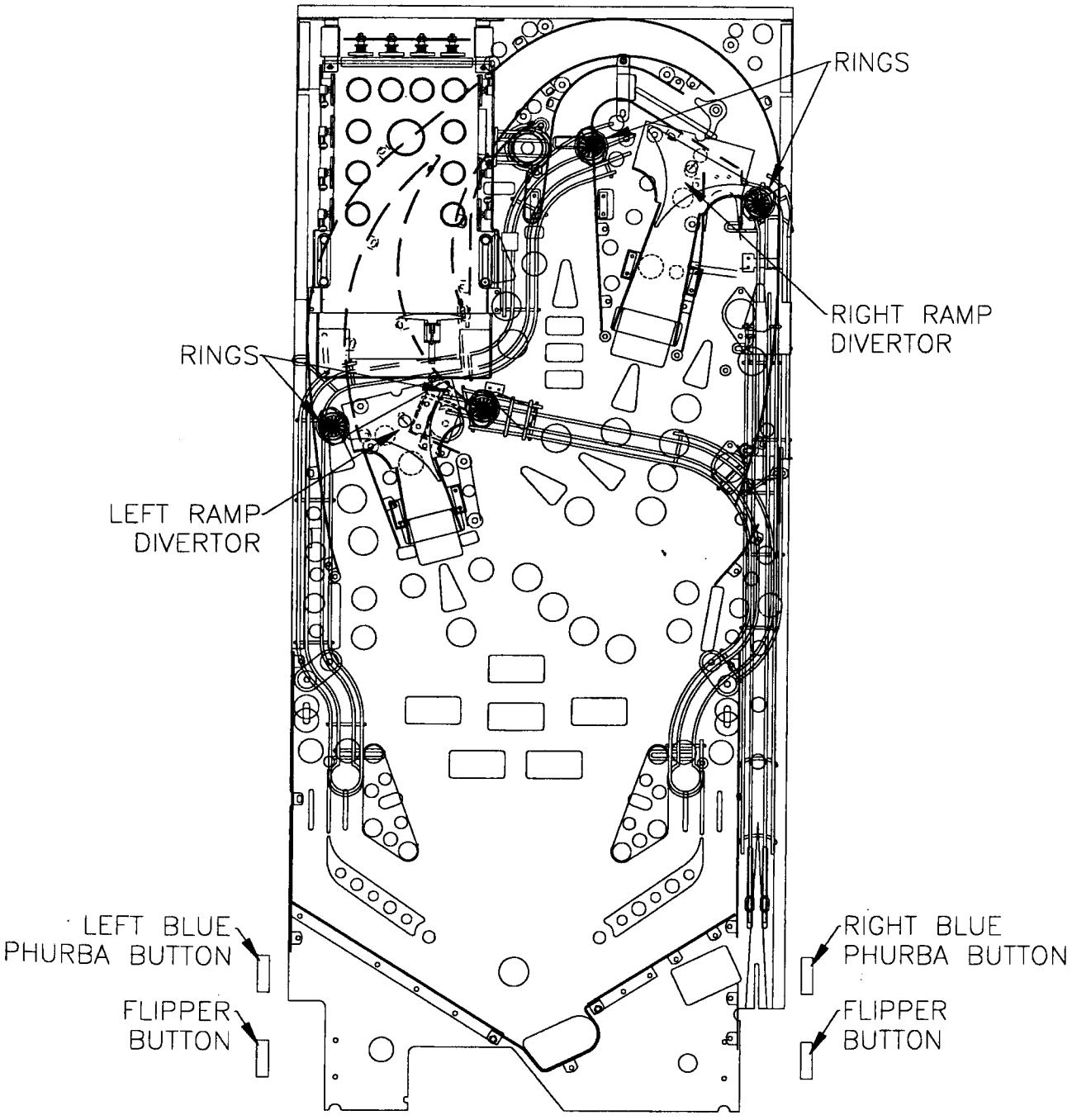
BATTLEFIELD: Hit target to gain access to the battlefield. Use flippers to move kicker head to the right and left. Make displayed number of hits and then break through the back to wall to collect jackpot.

FINAL BATTLE: Complete Shadow multiball, Khan multiball, Battlefield and all the scenes to light THE FINAL BATTLE.

EXTRA BALL: Complete Battlefield or make displayed Shadow loops IN-A-ROW to light Extra Ball. Shoot right eject to collect Extra Ball.

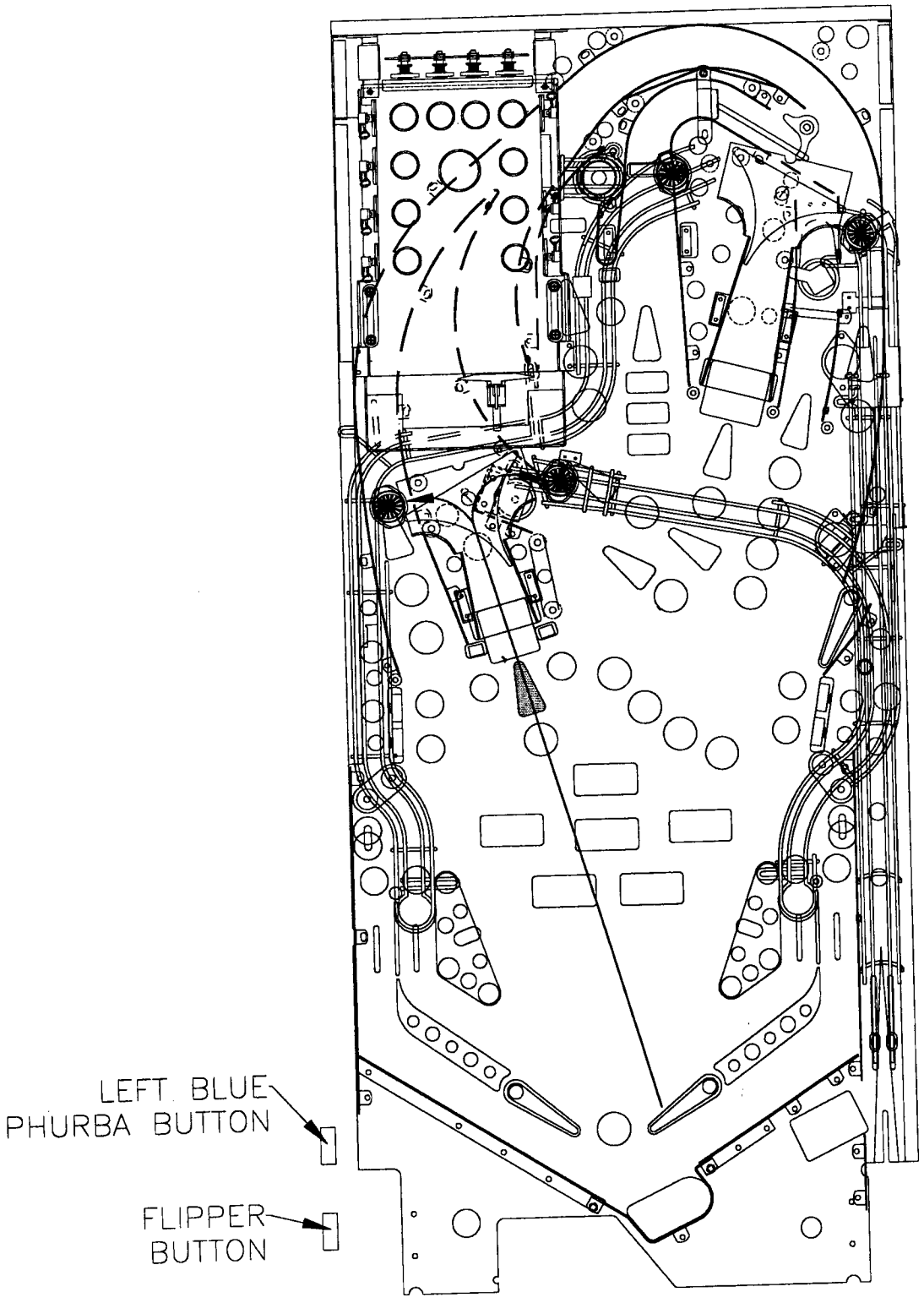
PHURBA RAMP DIVERTORS

Use blue Phurba cabinet buttons (located above flipper buttons) to control the ramp divertors. The left blue button will toggle the left ramp divertor to the right and left. The right blue button will toggle the right ramp divertor to the right and left. Use divertors to light rings and to return the ball to the flipper needed to best play the game.



SKILL SHOT

At ball start use left blue Phurba divertor button to choose award in display. Make left ramp shot to collect awards.

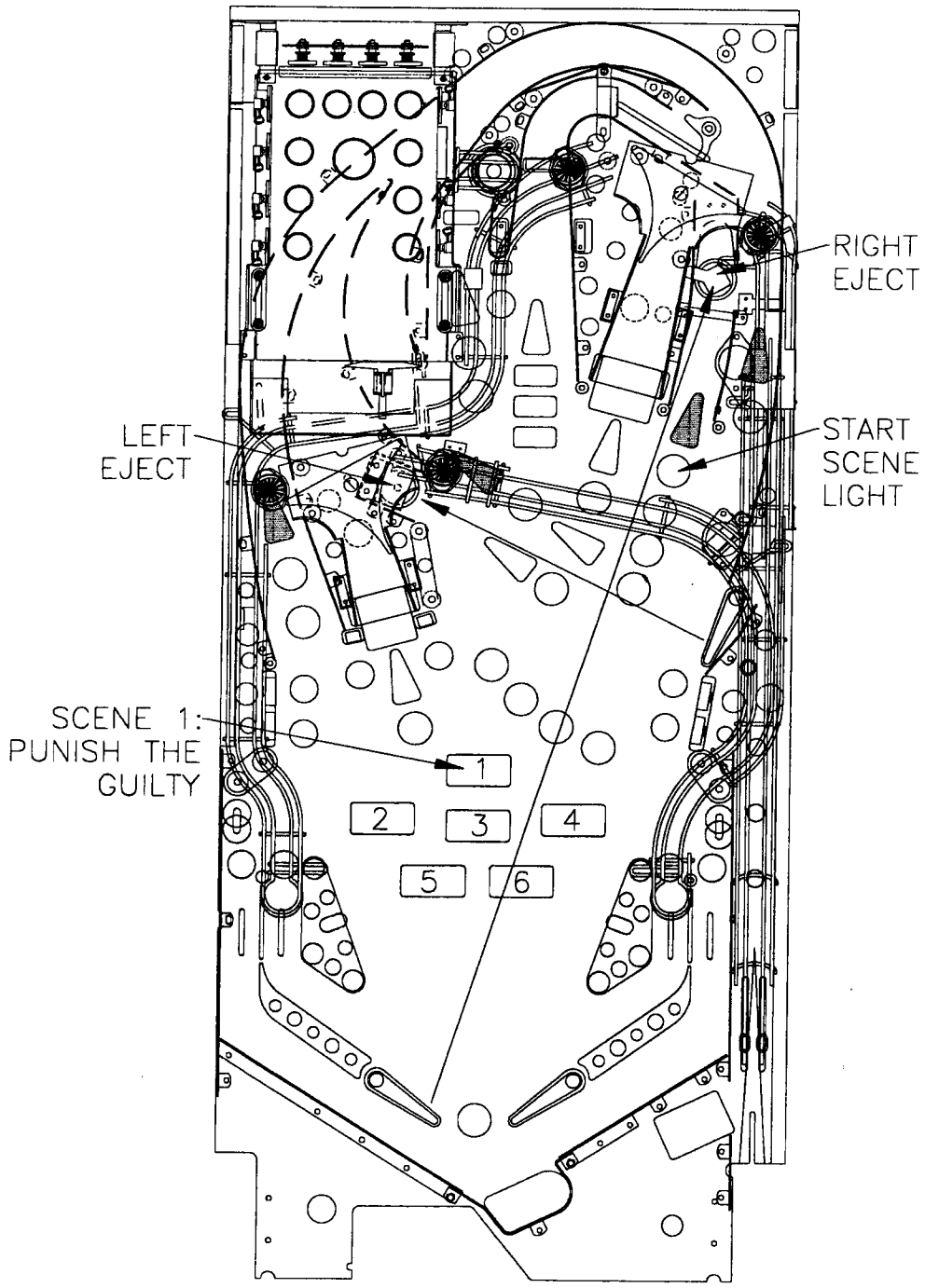


START SCENE

To start a scene, make left or right eject when Start Scene light is lit.

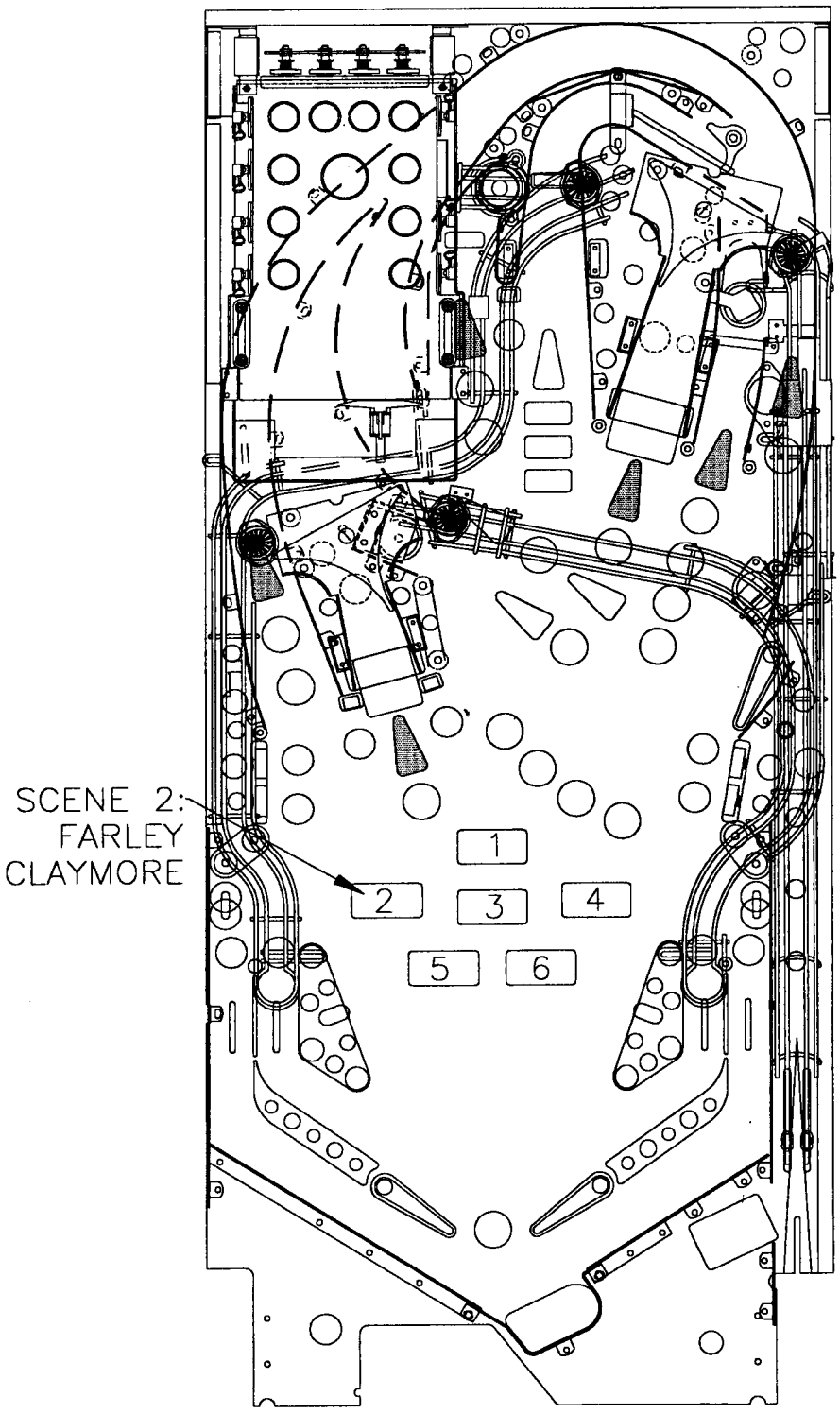
Scene 1: *Punish the Guilty*

Shoot lit arrows (outer and inner loops), then shoot the right eject to rescue Tam.



Scene 2: *Farley Claymore*

Shoot lit arrows and stand-up targets. Each shot reduces the Hit-O-Meter Bar (display). Make enough shots and the Hit-O-Meter Bar disappears. This will complete the scene and make Farley drool and jump out a window.

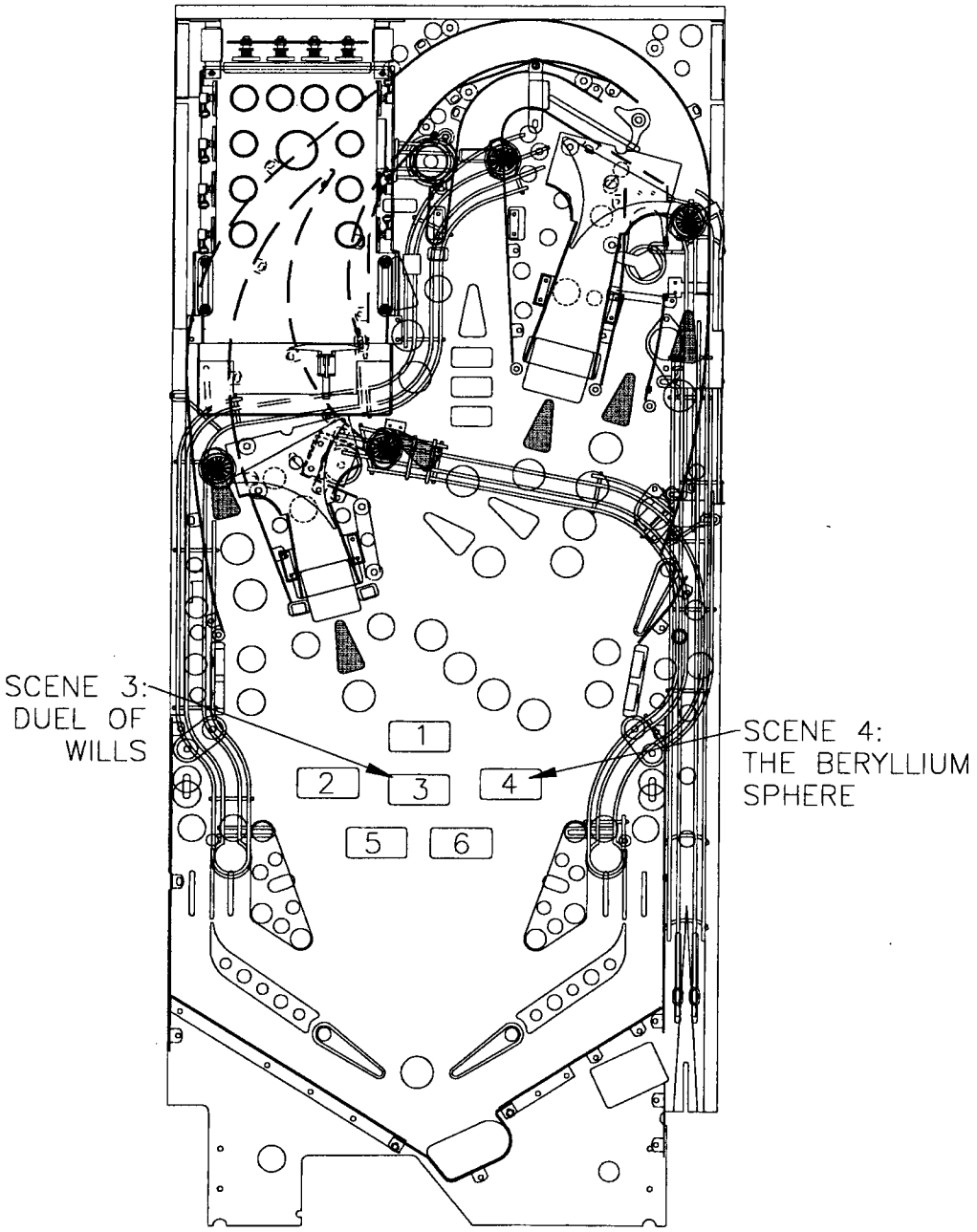


Scene 3: *Duel of Wills*

This is a video mode. Use the left and right flippers to avoid the Phurba knives. Collect square items by running into them for points and extra ball.

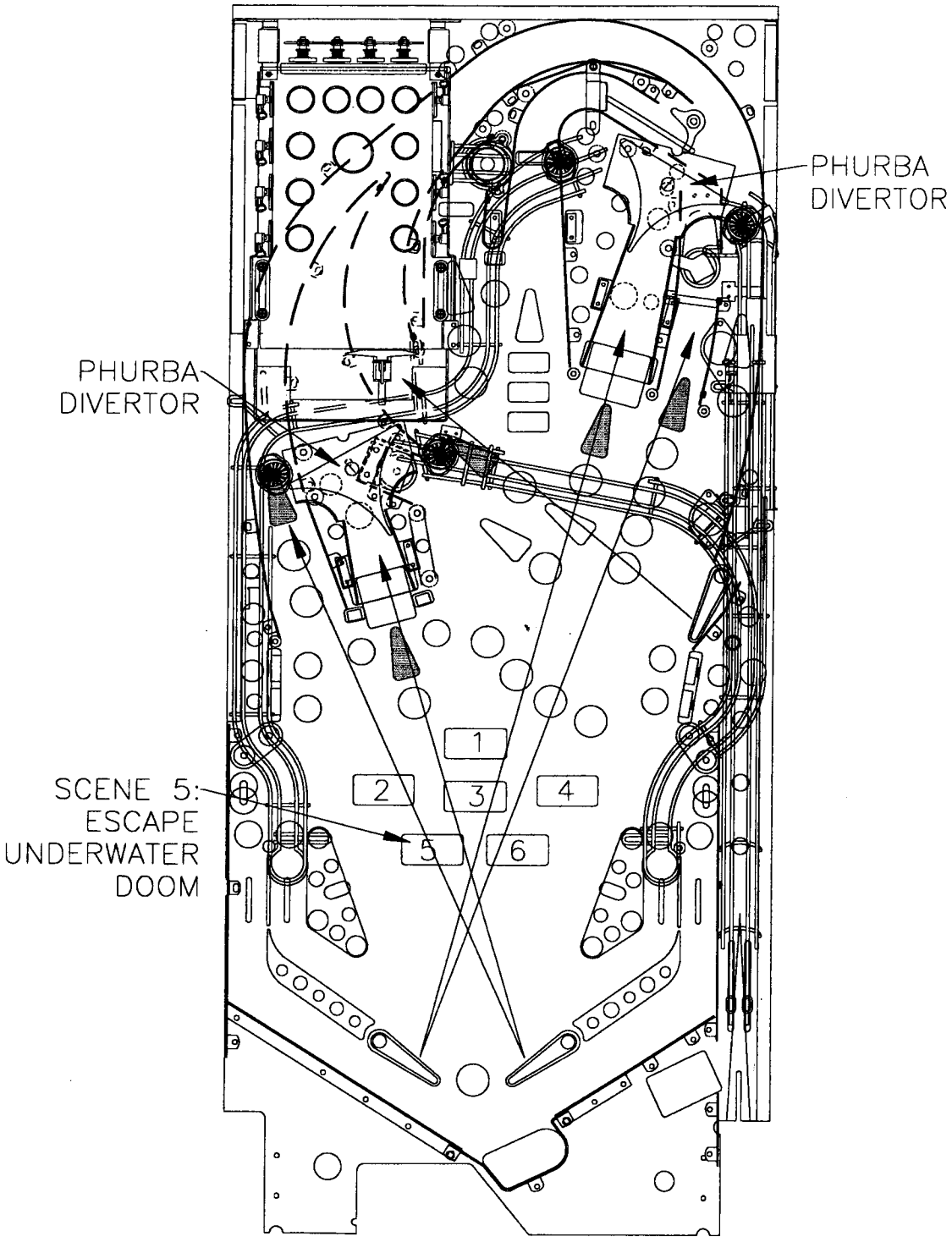
Scene 4: *The Beryllium Sphere*

Shoot all the lit arrows to diffuse the bomb and save the world.



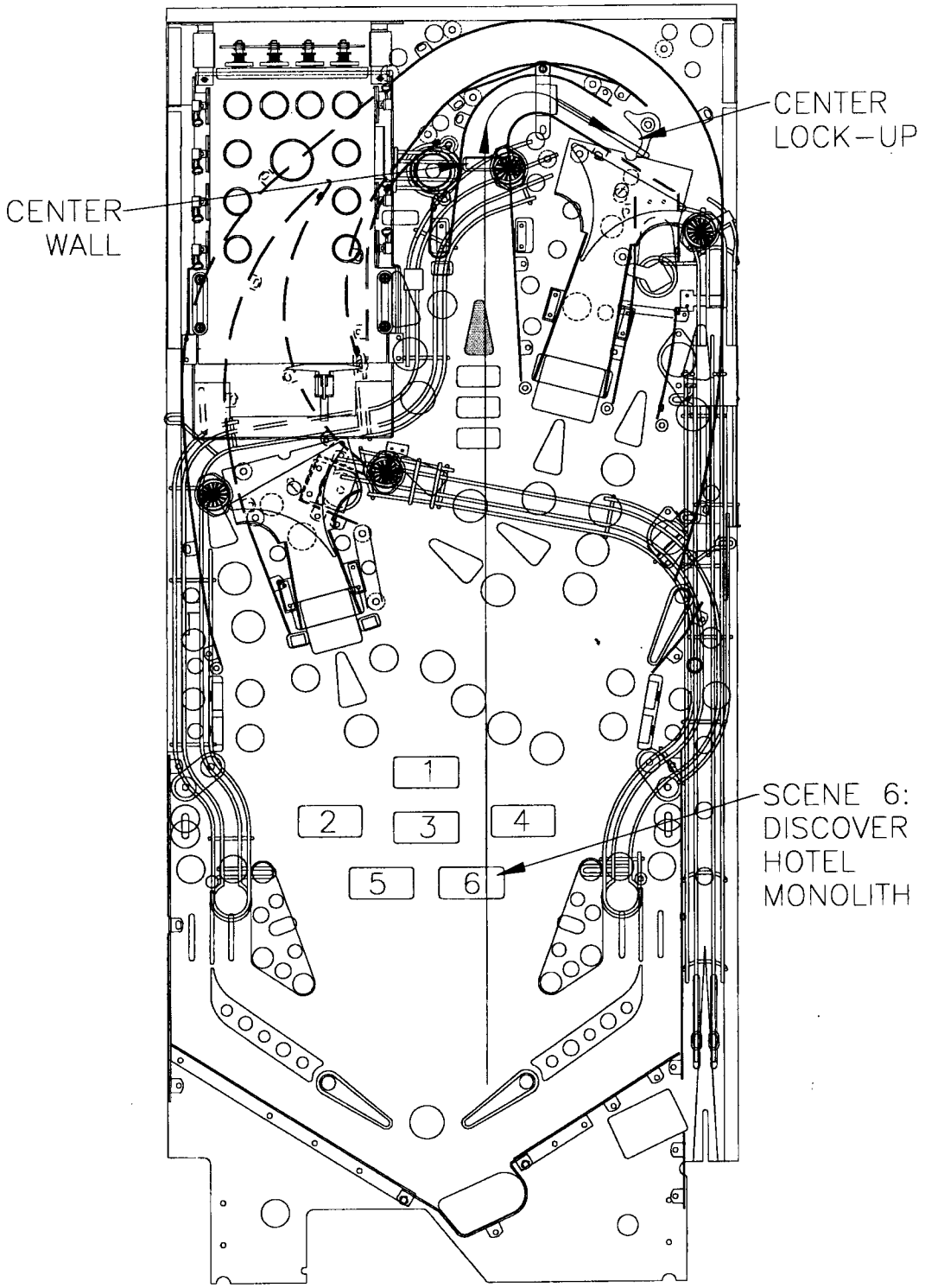
Scene 5: *Escape Underwater Doom*

Shoot lit arrows to save The Shadow. Shots light up in a flowing pattern once each is made. Use Phurba divertors to get the ball back to the needed flipper. The score for each shot is counting down in the display. Make shots early for the most points.



Scene 6: *Discover Hotel Monolith*

This will start a 2-Ball Multi-ball. Make the Center Wall shot (lit arrow) 3 times to reveal the hotel. Then shoot into Center Lock-up to start a Mongol Attack. Make all lit arrows to defeat the Mongols.

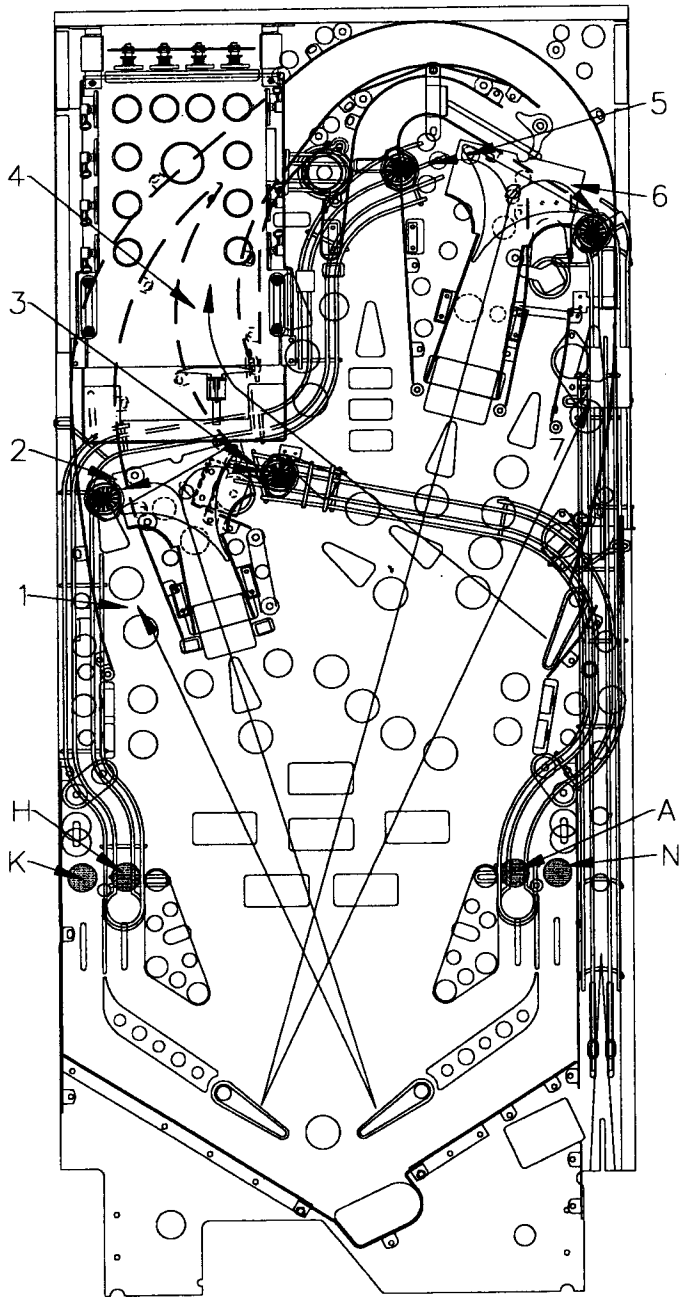


COMBO'S

Making unique consecutive loops and ramp shots, in any order, will collect 3- to 7-Way Combo Bonus.

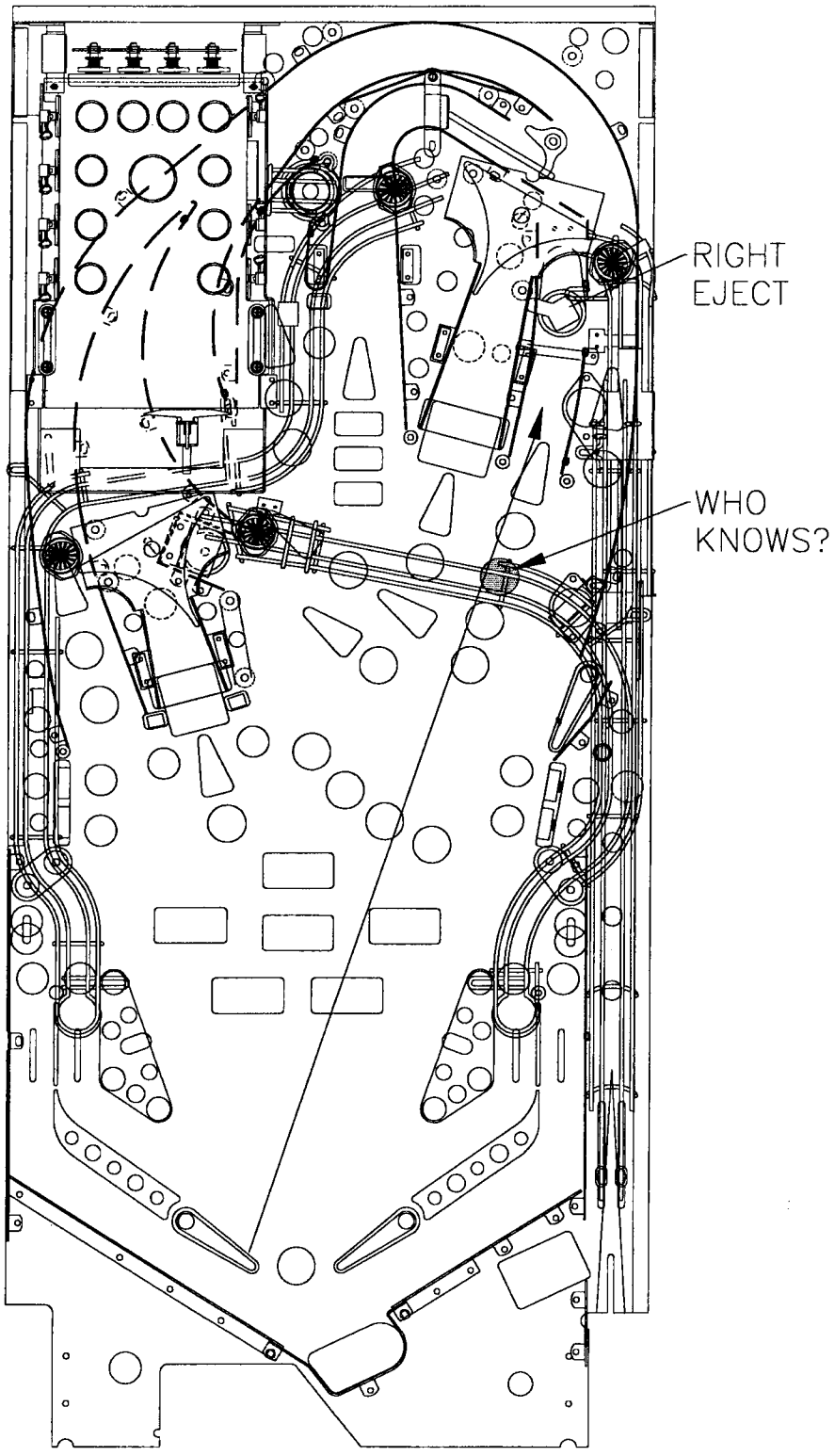
BONUS X

Completing K-H-A-N lanes when Khan Multi-ball is lit, or in Multi-balls, will increase the end of ball bonus multiplier.



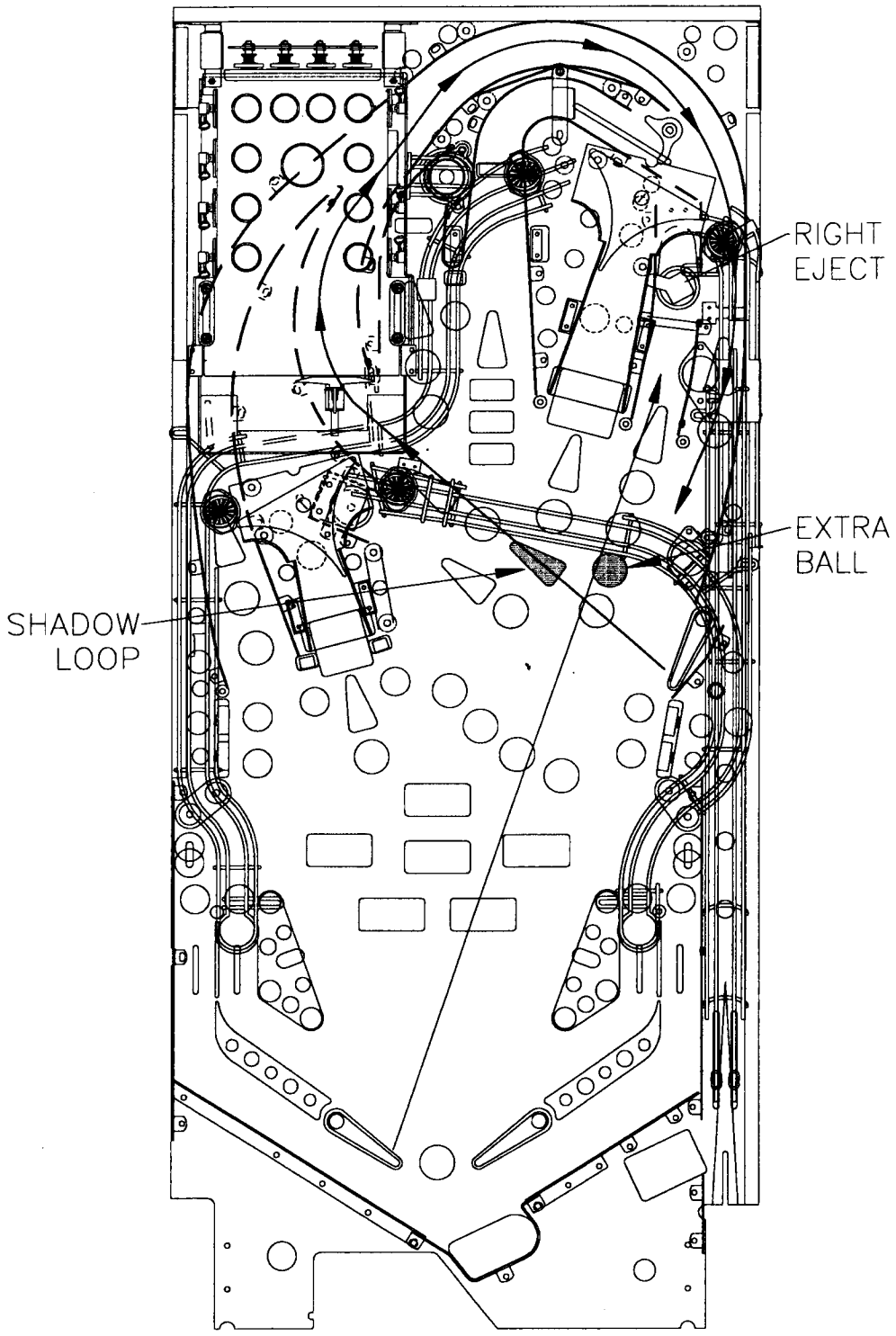
WHO KNOWS?

Starting a Mongol Attack will light Who Knows. Shoot right eject to collect Who Knows Random Award.



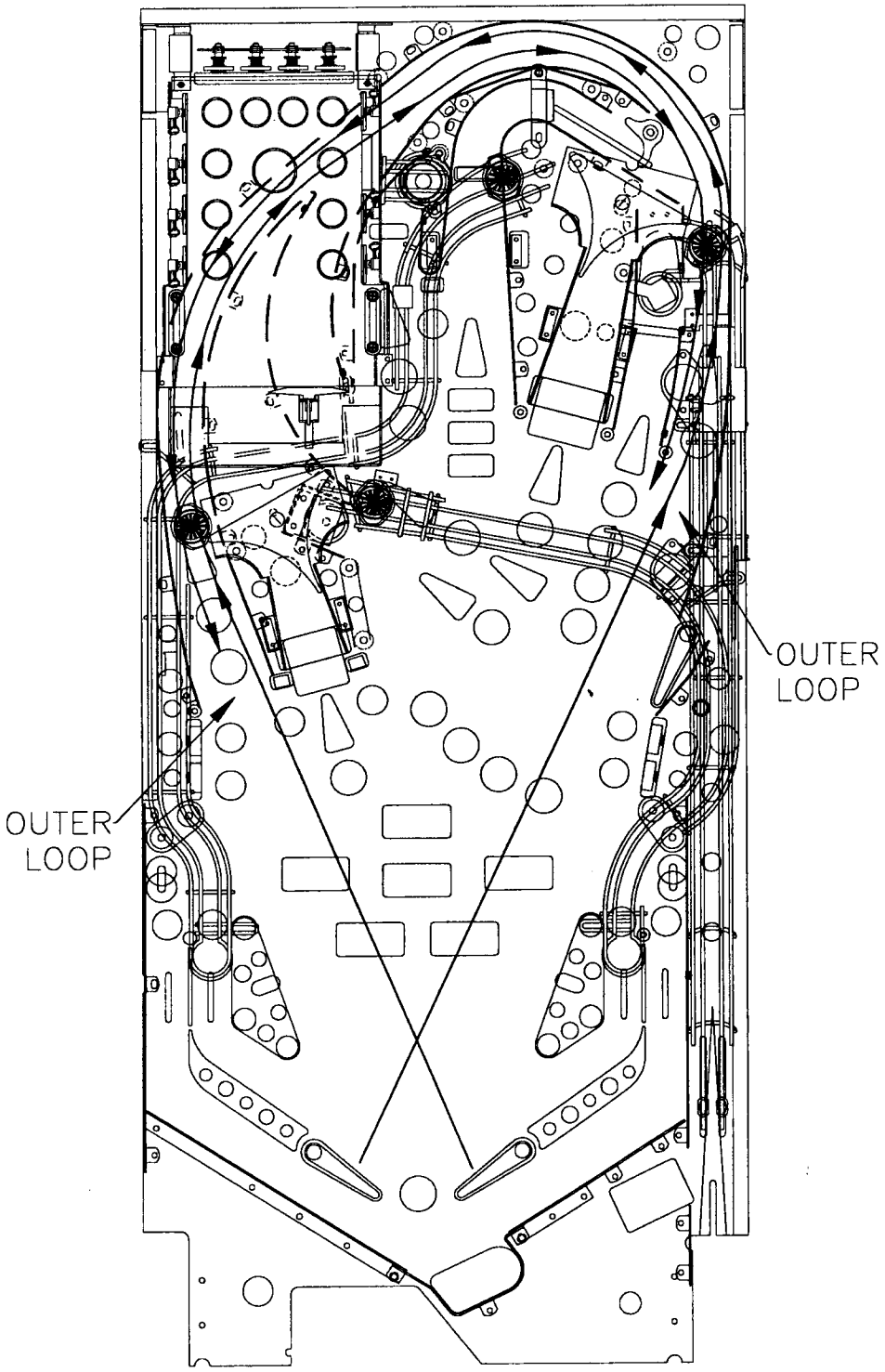
EXTRA BALL

Shoot right eject to collect Extra Ball when lit. Light Extra Ball by completing the Battlefield or by making the displayed number of Shadow loops In-A-Row. Skill Shot and Who Knows can also light Extra ball.



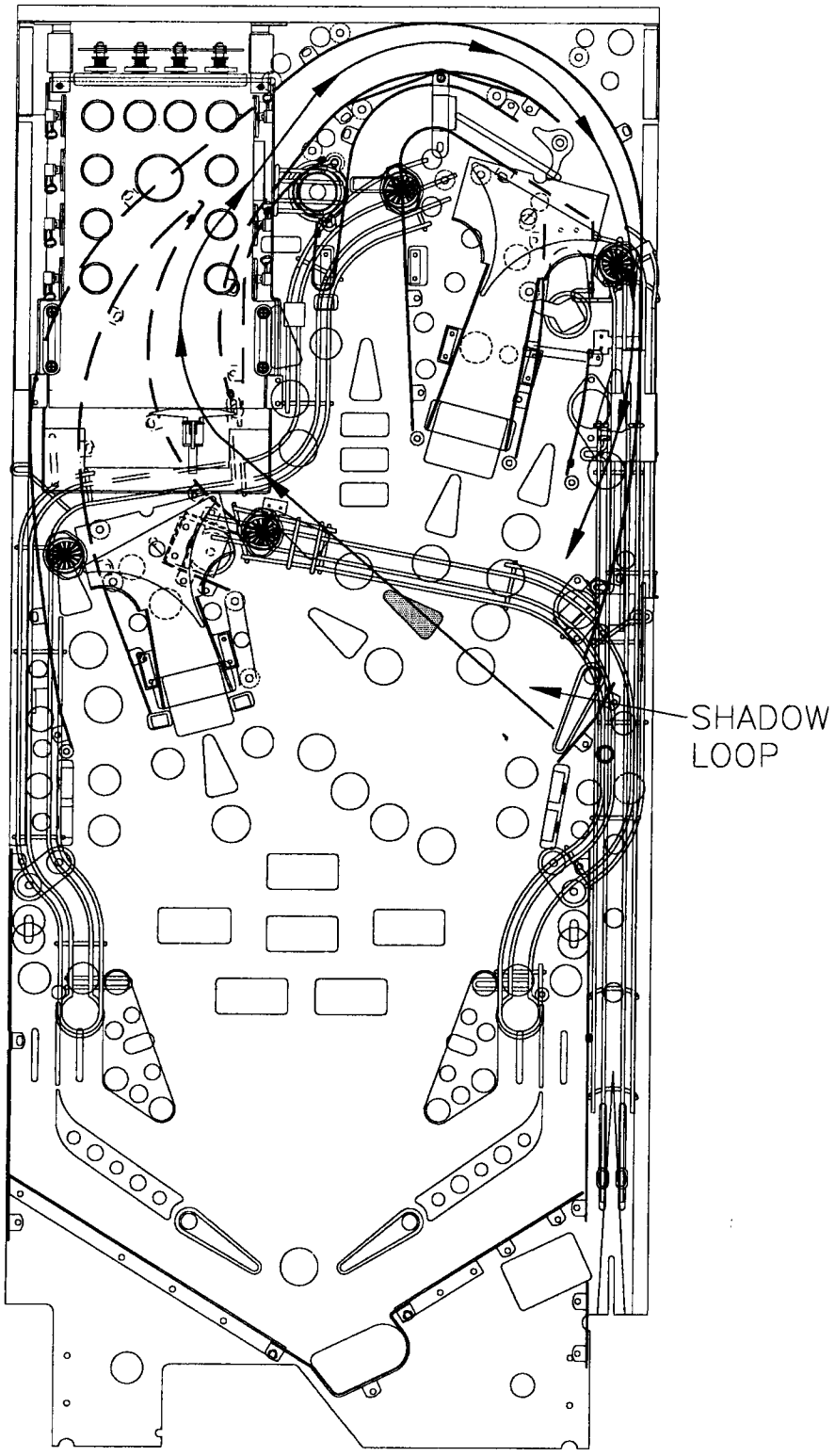
OUTER LOOPS

Each loop shot made gets you closer to a Destination. Make it to all the Destinations to start Super Loops. When in Super Loops, outer loops are worth 20 million until the end of the ball.



INNER SHADOW LOOPS

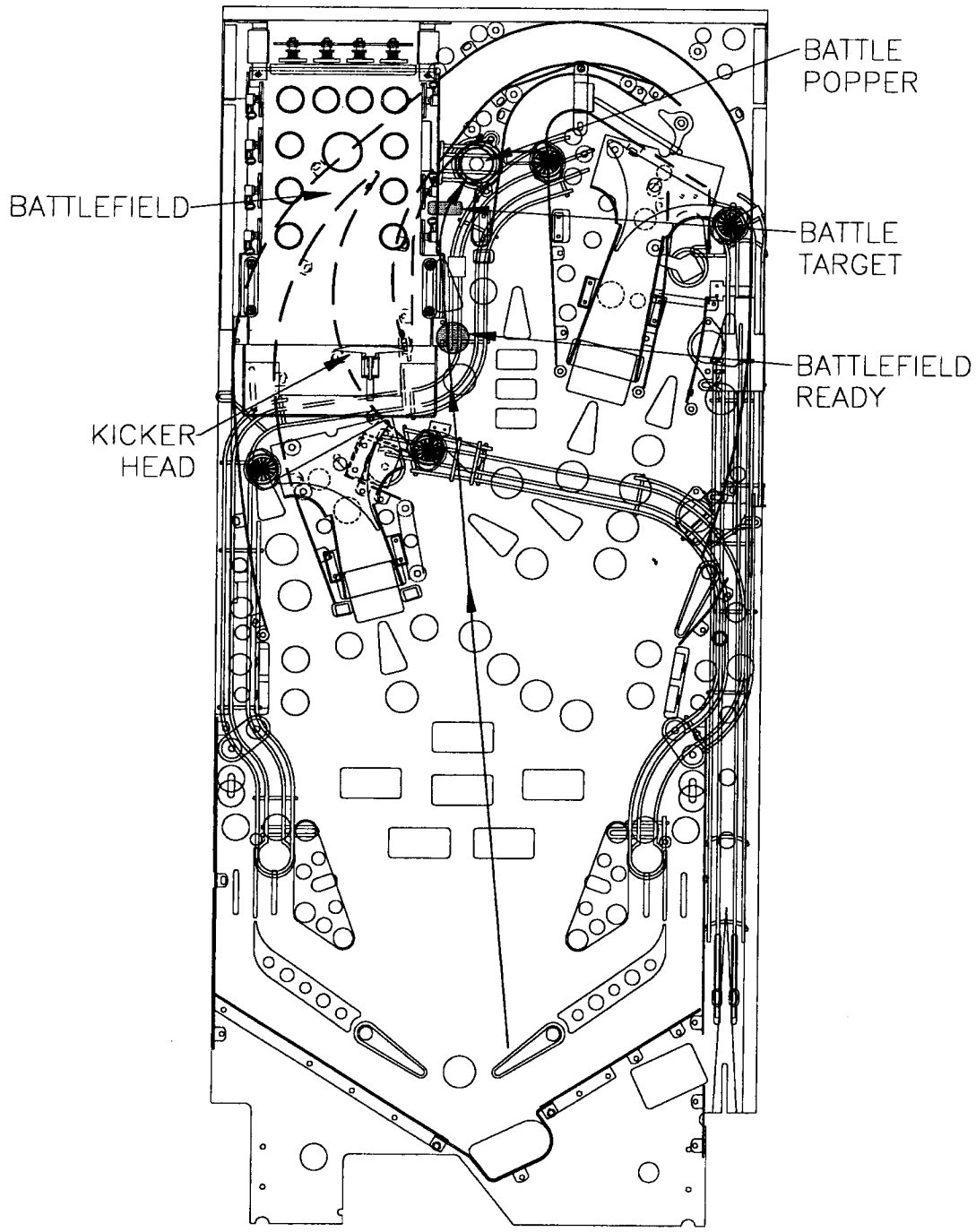
Make inner loops for increasing value. Make the number of loops stated in the display In-A-Row to light Extra Ball or Collect Shadow Bonus.



N

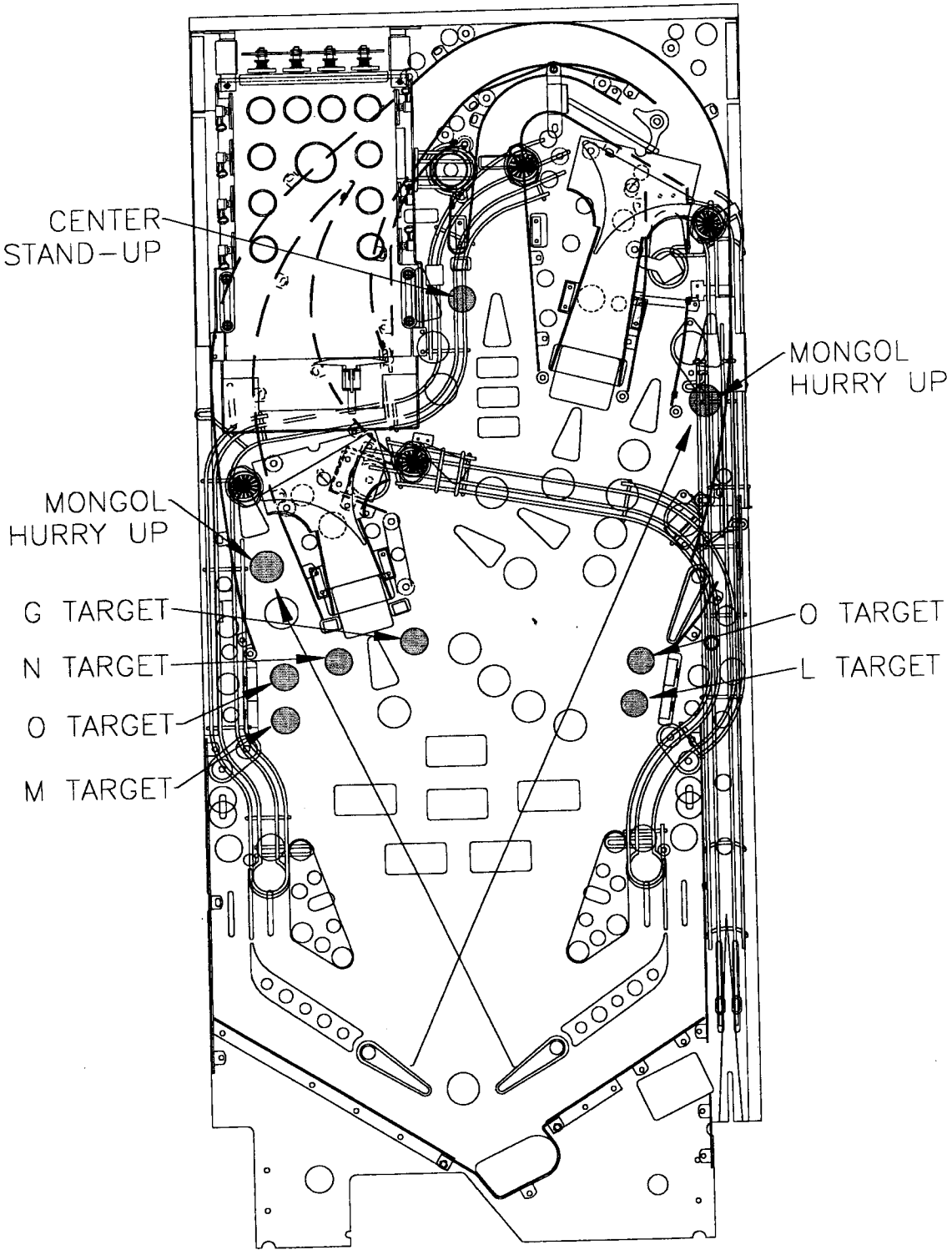
THE BATTLEFIELD

Hit Battle Drop Target to gain access to the Battlefield Mini-playfield. Shoot into the Battle Popper to enter the Battlefield. When on the Battlefield, use the flippers to move the kicker head to the right and left. Kicker head will fire automatically. Hit the amount of targets shown in the display and then break through the back drop targets to collect the Battlefield Jackpot and light Extra Ball. Completing all the lights on the Battlefield will increase the Jackpot value.



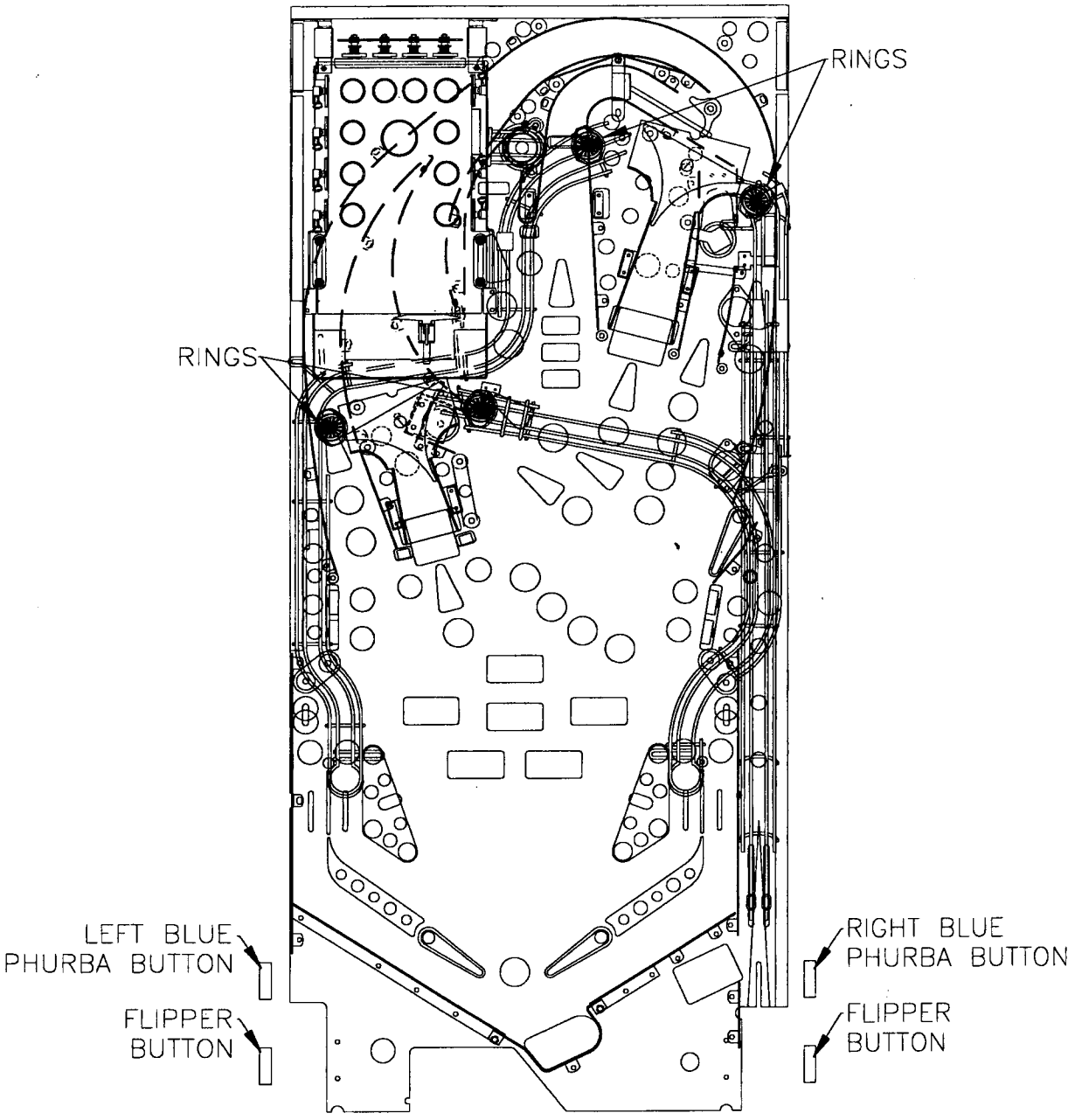
MONGOL ATTACK

Complete M-O-N-G-O-L Targets to start Mongol Attack Hurry Up. Make outer loop to collect Mongol Hurry Up value in display. Center stand-up will spot a letter in M-O-N-G-O-L when lit.



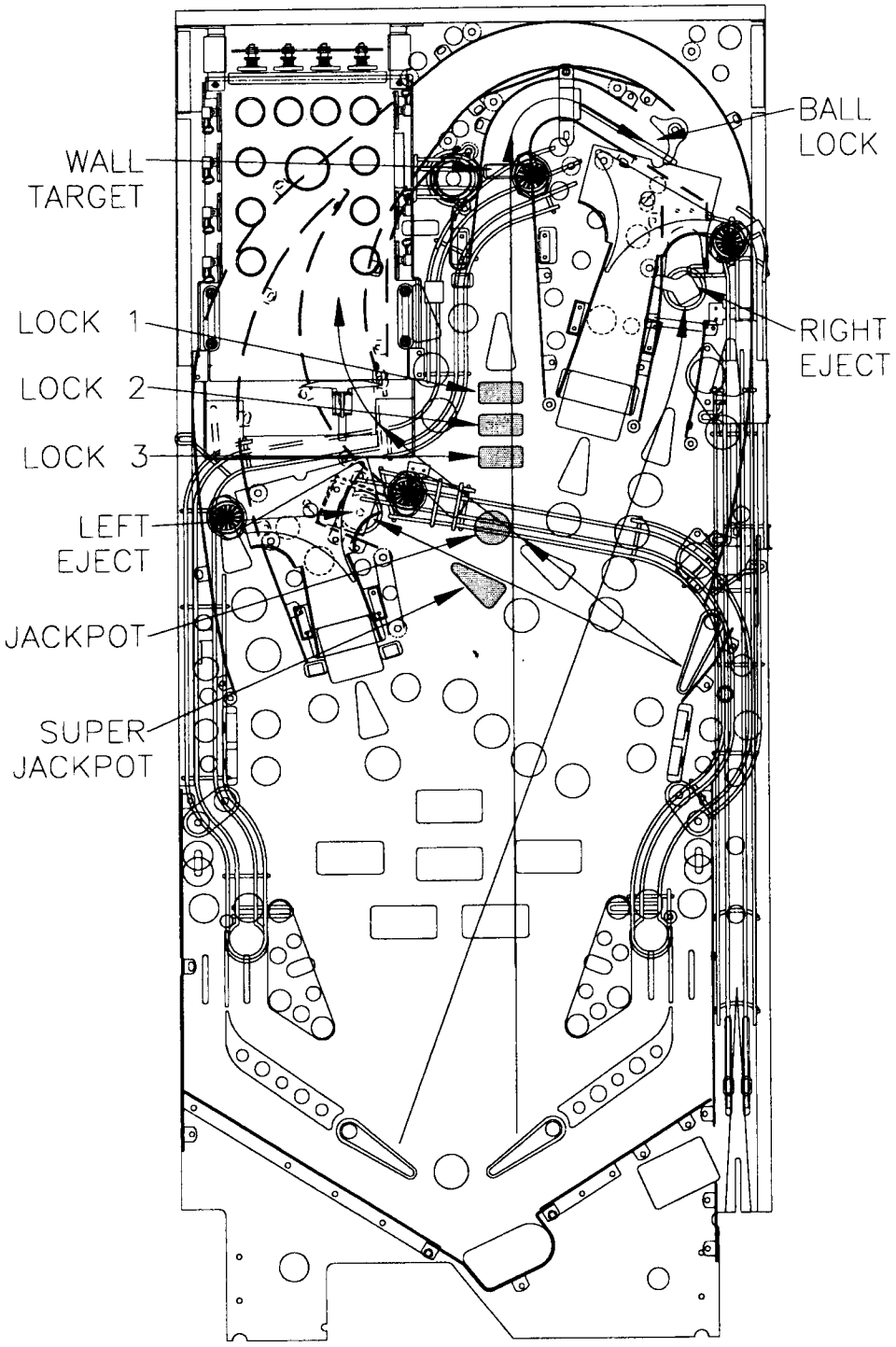
VENGEANCE MODE

Use blue Phurba divertor buttons to direct the ball to all 4 ramp directions. When you make a shot the corresponding Ring will light solid. Collect all 4 Rings to start Vengeance Mode. Make all 4 Ring Shots in the time given for Bonus and re-starting of Vengeance Mode. Each ramp shot made will increase that shots value.



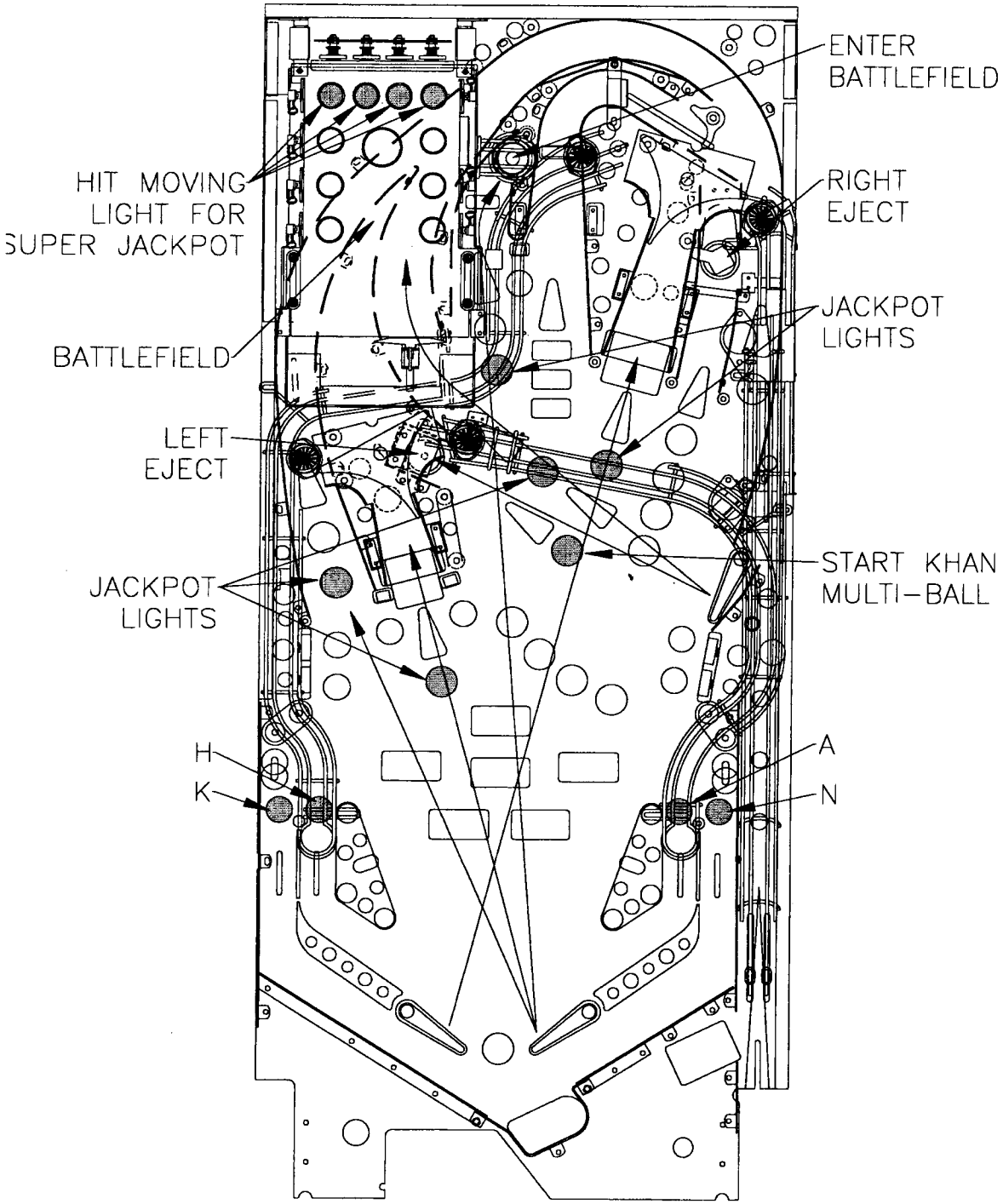
SHADOW MULTI-BALL

Hit center Wall Target (Sanctum) to light Locks. Lock 3 balls to start Shadow Multi-ball. Shoot inner loop for Jackpot. Left and Right ejects double and triple Jackpot value. Make 5 Jackpots while in Multi-ball to light Shadow Super Jackpot at left eject. Make left eject to collect Super Jackpot.



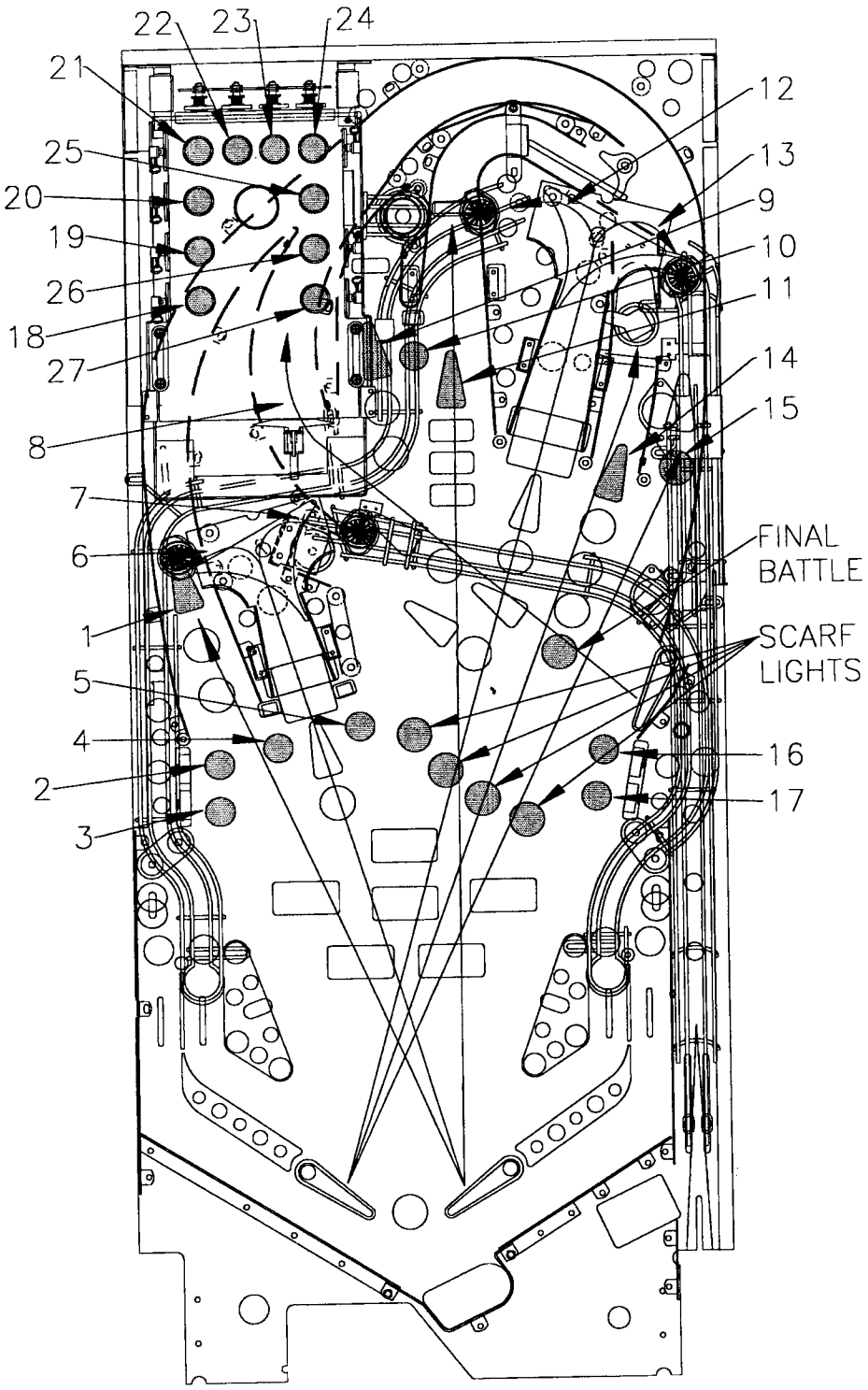
KHAN MULTI-BALL

Complete K-H-A-N Lanes to light Khan Multi-ball at left eject. Shoot in left eject to start Khan 3-Ball Multi-ball (2 balls will kick out of the trough). Make lit jackpot lights to collect Jackpot. Left and right ejects double and triple Jackpot value. Make all 5 Jackpots to light Khan Super Jackpot on the Battlefield. Collect Super Jackpot by entering the Battlefield and hitting the moving light.



FINAL BATTLE

Complete all items on Shadow Scarf to light Final Battle at the right eject. Start Final Battle by making the right eject. Final Battle is a 5-Ball Multi-ball. You must make all 27 shots on the playfield while in Multi-ball to collect 1 BILLION points and defeat Khan.



Notes

Notes

SECTION ONE

GAME OPERATION AND TEST INFORMATION

(System WPC) ROM Summary

IC	TYPE	BOARD	LOCATION	PART NUMBER
Game 1	27c040	CPU	U6	A-5343-50032-1A (Domestic)
Game 1	27c040	CPU	U6	A-5343-50032-1X (Foreign)
Music/Speech	27c040	Audio	SU2	A-5343-50032-S2
Music/Speech	27c040	Audio	SU3	A-5343-50032-S3
Music/Speech	27c040	Audio	SU4	A-5343-50032-S4
Music/Speech	27c040	Audio	SU5	A-5343-50032-S5
Music/Speech	27c040	Audio	SU6	A-5343-50032-S6
Music/Speech	27c040	Audio	SU7	A-5343-50032-S7

NOTICE
Order replacement ROMs from your authorized MIDWAY MANUFACTURING CO. Distributor. Specify: (1) Part Number (if available); (2) ROM Level (number on the label); (3) Game in which ROM is used.

PINBALL GAME ASSEMBLY INSTRUCTIONS

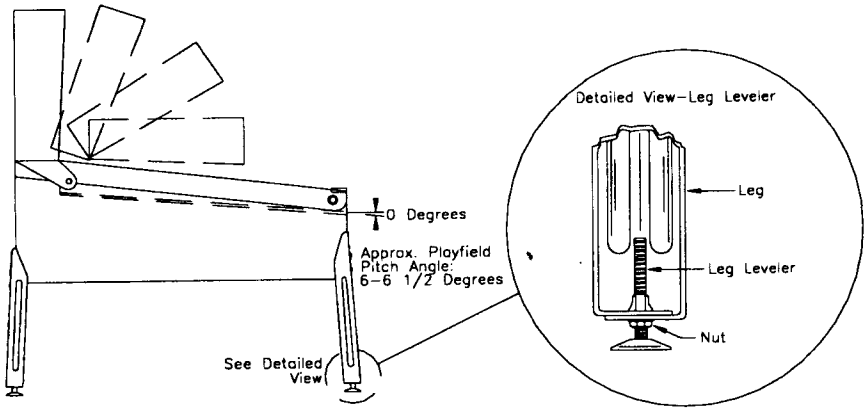
THE SHADOW IS A 5 BALL GAME.

Power:	Domestic 120V @ 60 Hz Foreign 230V @ 50 Hz Japan 100V @ 50 Hz	***Dimensions:***	Width: 29" Approx. Depth: 56" Approx. Height: 76" Approx.
Temp:	32° F to 100° F (0° C to 38° C)		
Humidity:	Not to exceed 95% relative.	***Weight:***	Approx. 325 Lbs. (crated)

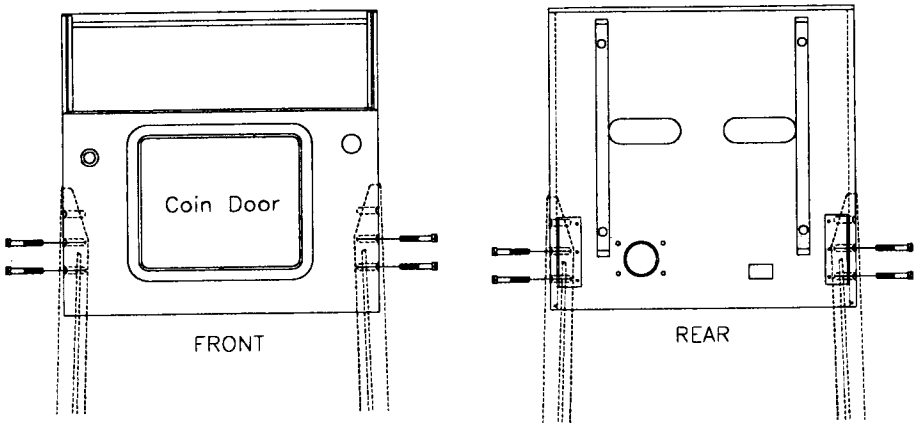
1. Remove all cartons, parts, and miscellaneous items from the shipping container and set them aside.

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

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



VIEW 1



VIEW 2

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

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

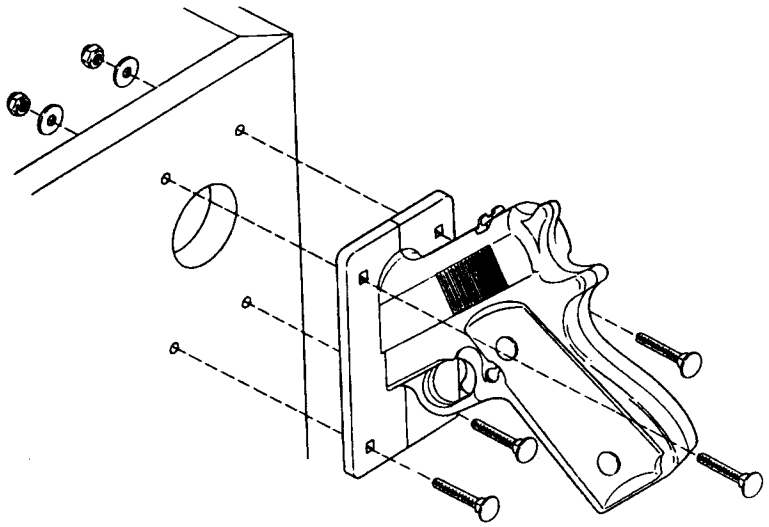
CAUTION

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

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

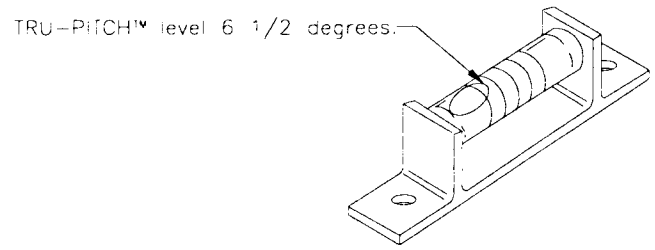
7. Unlock and open the coin door. Move the molding latch lever toward the left side of the game, to release the front molding. Lift the front molding off the playfield cover glass, return the latch lever to the right, and close the coin door. Carefully slide the glass downward, until it clears the grooves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

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



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

10. The TRU-PITCH™ level is located on the right shooter rail. This allows the playfield pitch angle to be accurately 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 for The Shadow is 6 1/2 degrees. The nose of the bubble should be between the first and second line on the level (see diagram below).



CAUTION

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

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

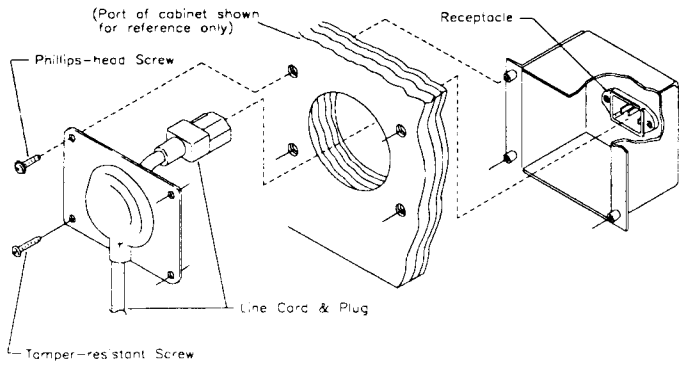
12. Verify that the ***required number*** of balls are installed in the game. **THE SHADOW** uses 5 balls.

13. Install playfield mylars if desired.

    NOTE: **The SHADOW** playfield has a special hardcoat surface and does not require a full protective mylar. However, mylars can be purchased through your local Bally Distributor. Specify part number 03-9315-1 for full playfield mylar.

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

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



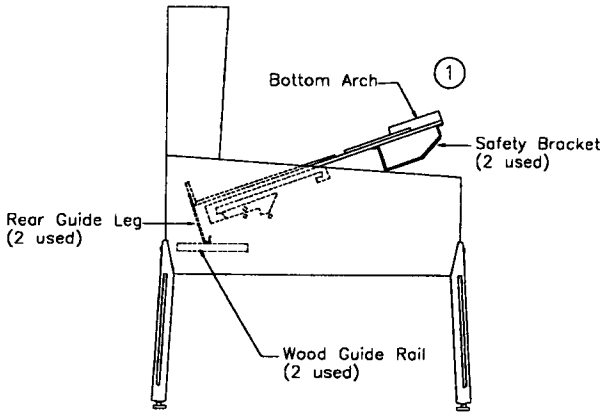
RAISING THE PLAYFIELD

⚠ CAUTION

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

To Raise Playfield:

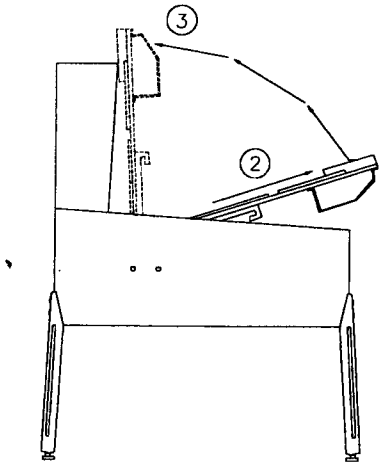
1. Grasp bottom arch and carefully lift up playfield only high enough to clear safety brackets. Rear guide legs should not hit wood guide rails or be used to slide out playfield.



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

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

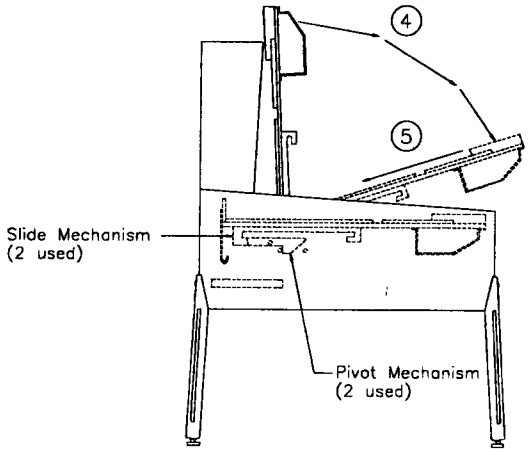
3. Rotate playfield to upright service position (lean on backbox) by pulling toward you and up. Listen for the sound of a click; this insures locking and pivoting sequence.



To Lower Playfield:

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

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



GAME CONTROL LOCATIONS

Cabinet Switches

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

Coin Door Switches

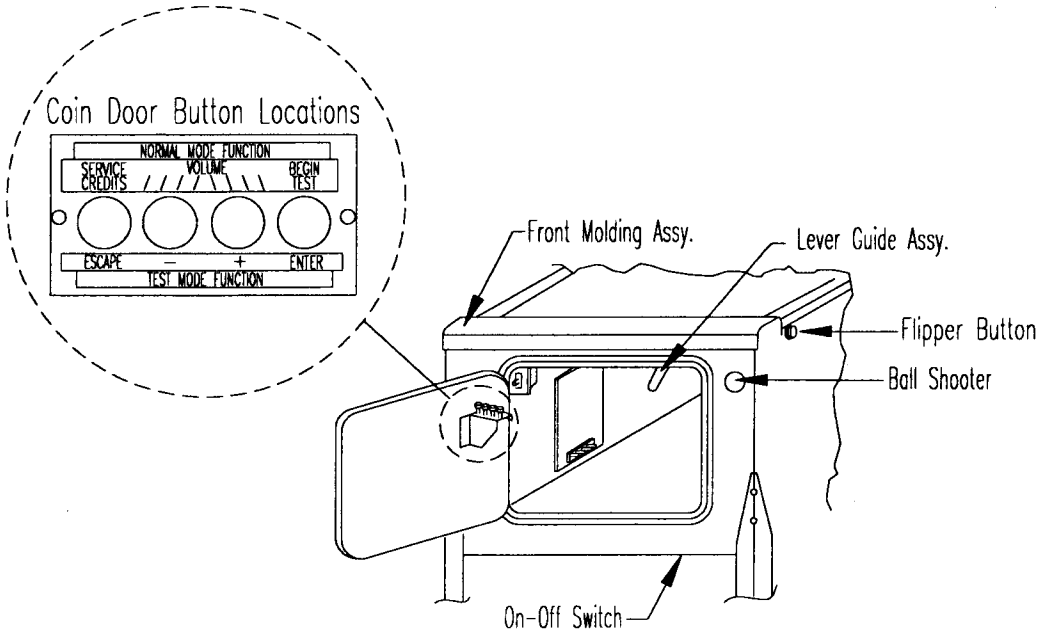
The operator controls all game adjustments, obtains bookkeeping information, and diagnoses problems, using only four push-button switches mounted on the inside of the coin door. The Coin Door Switches have two modes of operation Normal Function and Test Function.

Normal Function

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

Test Function

The Escape button allows you to get out of a menu selection or return to the Attract Mode.
The Up (+) button allows you to cycle forward through the menu selections or adjustment choices.
The Down (-) button allows you to cycle backward through the menu selections or adjustment choices.
The *Enter button allows you to get into a menu selection or lock in an adjustment choice.



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

GAME OPERATION

⚠ CAUTION

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

POWERING UP. With the coin door closed, plug the game in and switch it On. In normal operation, testing will show in the display as the game performs Start-Up Tests. Once the Start-Up Tests have been successfully completed the last score is displayed. After which, the game goes into the Attract Mode.

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

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

Example: **SHADOW** **Sound Rev. P-O**
50032 Rev. PA-O **Sy. 3.24 12/9/93**

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

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

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

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

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

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

GAME OVER MODE. Game Over will show in the display. Afterward, the high scores flash on the display. The game proceeds to the Attract Mode.

*Operator-adjustable feature.

MENU SYSTEM OPERATION

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

Main Menu

- B. Bookkeeping Menu
  - B.1 Main Audits
  - B.2 Earnings Audits
  - B.3 Standard Audits
  - B.4 Feature Audits
  - B.5 Histograms
  - B.6 Time-Stamps
- P. Printouts Menu
  - P.1 Earnings Data
  - P.2 Main Audits
  - P.3 Standard Audits
  - P.4 Feature Audits
  - P.5 Score Histograms
  - P.6 Game Time Histograms
  - P.7 Time-Stamps
  - P.8 All Data
- T. Test Menu
  - T.1 Switch Edges
  - T.2 Switch Levels
  - T.3 Single Switches
  - T.4 Solenoid Test
  - T.5 Flasher Test
  - T.6 General Illumination
  - T.7 Sound & Music Test
  - T.8 Single Lamps
  - T.9 All Lamps
  - T.10 Lamp & Flasher Test
  - T.11 Display Test
  - T.12 Flipper Test
  - T.13 Ordered Lamp Test
  - T.14 Lamp Row-Col Test
  - T.15 Dip Switch Test
  - T.16 Mini-playfield Test
  - T.17 Magnet Test
  - T.18 Empty Balls Test
- U. Utilities Menu
  - U.1 Clear Audits
  - U.2 Clear Coins
  - U.3 Reset H.S.T.D.
  - U.4 Set Time & Date
  - U.5 Custom Message
  - U.6 Set Game I.D.
  - U.7 Factory Adjustments
  - U.8 Factory Resets
  - U.9 Presets
  - U.10 Clear Credits
  - U.11 Auto Burn-In
- A. Adjustments Menu
  - A.1 Standard Adjustments
  - A.2 Feature Adjustments
  - A.3 Pricing Adjustments
  - A.4 H.S.T.D. Adjustments
  - A.5 Printer Adjustments

Press Escape
To move out of a menu selection.

Press Enter
To get into a menu selection.

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

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

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

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

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

B. BOOKKEEPING MENU

B.1 Main Audits
B.2 Earning Audits
B.3 Standard Audits
B.4 Feature Audits
B.5 Histograms

B.6 Time-Stamps

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

B.1 Main Audits

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

B.2 Earning Audits*

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

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

B.3 Standard Audits

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

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

† This Audit is not resettable.

B.4 Feature Audits

B.4	01	Number of games that bought an extra ball from buy in	00
B.4	02	Number of multi player games that bought extra ball from buy in	00
B.4	03	Total Multi-balls (Shadow, Khan, Hotel Monolith, & Final Battle)	00
B.4	04	Number of eject hole Scenes started	00
B.4	05	Number of times the BATTLEFIELD mini-playfield was played	00
B.4	06	Number of times ramp VENGEANCE Mode was started	00
B.4	07	Number of times Khan Multi-ball started	00
B.4	08	Number of Khan Multi-ball Jackpots collected	00
B.4	09	Number of Khan Multi-ball Super Jackpots collected	00
B.4	10	Number of times Shadow Multi-ball was started	00
B.4	11	Number of Shadow Multi-ball Jackpots collected	00
B.4	12	Number of Shadow Multi-ball Super Jackpots collected	00
B.4	13	Number of times all Scenes were completed	00
B.4	14	Number of times Farley Claymore Scene was started	00
B.4	15	Number of times a lit shot was made in Farley Claymore Scene	00
B.4	16	Number of times Farley Claymore Scene was completed	00
B.4	17	Number of times Escape Underwater Doom Scene was started	00
B.4	18	Number of times a lit shot made in Escape Under Water Doom Scene	00
B.4	19	Number of times Escape Under Water Doom Scene was completed	00
B.4	20	Number of times Punish the Guilty Scene was started	00
B.4	21	Number of times a lit shot was made in Punish the Guilty Scene	00
B.4	22	Number of times Punish the Guilty Scene was completed	00
B.4	23	Number of times Beryllium Sphere Mode was started	00
B.4	24	Number of times a lit shot was made in Beryillium Sphere Scene	00
B.4	25	Number of times Beryllium Sphere Scene was completed	00
B.4	26	Number of times Hotel Monolith Scene was started	00
B.4	27	Number of times a lit center "Reveal the Hotel" shot was made	00
B.4	28	Number of times Hotel Monolith Mongol Mode was started	00
B.4	29	Number of times lit shot was made in Hotel Monolith Mongol Mode	00
B.4	30	Number of times Duel of Wills Video Mode was started	00
B.4	31	Number of times Duel of Wills Video Mode was won	00
B.4	32	Number of times a shot was made in Vengeance Mode	00
B.4	33	Number of times Vengeance Mode was completed	00
B.4	34	Number of times Super Vengeance was started	00
B.4	35	Number of times Mongol Hurry Up was started	00
B.4	36	Number of times Mongol Hurry Up was awarded	00
B.4	37	Number of times lamps completed on Battlefield to increase score	00
B.4	38	Number of times Battlefield was completed	00
B.4	39	Number of times Final Battle was started	00
B.4	40	Number of times Final Battle was completed	00
B.4	41	Number of left loops made	00
B.4	42	Number of right loops made	00
B.4	43	Number of inner Shadow loops made	00
B.4	44	Number of 2 way loop combos made	00
B.4	45	Number of 3 way combos made	00
B.4	46	Number of 4 way combos made	00
B.4	47	Number of 5 way combos made	00
B.4	48	Number of 6 way combos made	00
B.4	49	Number of 7 way combos made	00
B.4	50	Extra Balls collected percentage	00
B.4	51	Number of times extra ball was lit by making inner Shadow loops	00
B.4	52	Number of times extra ball was collected from Dual of Wills Mode	00
B.4	53	Number of times extra ball was lit by completing the Battlefield	00

B.4 Feature Audits continued...

B.4	54	Number of times extra ball was lit by Who Knows/Skill Shot Award	00
B.4	56	Number of times any Skill Shot was awarded	00
B.4	57	Number of times a EOB Bonus Multiplier was collected	00
B.4	58	Number of times EOB Bonus Multiplier was maxed out	00
B.4	59	Number of times a Loop Destination was made	00
B.4	60	Number of times Super Loops was started	00
B.4	62	Number of Super Loops shots made	00
B.4	63	Number of ball start balls saved	00
B.4	64	Number of Shadow Multi-ball balls saved	00
B.4	65	Number of Khan Multi-ball balls saved	00
B.4	66	Number of Hotel Monolith Multi-ball balls saved	00
B.4	67	Number of Shadow Multi-ball double jackpots collected	00
B.4	68	Number of Shadow Multi-ball triple jackpots collected	00
B.4	69	Number of Khan Multi-ball double jackpots collected	00
B.4	70	Number of Khan Multi-ball triple jackpots collected	00
B.4	71	Number of times LEFT Phurba button was pressed during a game	00
B.4	72	Number of times RIGHT Phurba button was pressed during a game	00
B.4	73	Number of times the ball was saved when drained down the center after hitting Battle or Wall Drop Target (Adjustment must be ON)	00

B.5 Histograms

B.5	01	1-39 Million Scores	00%	00
B.5	02	40-59 Million Scores	00%	00
B.5	03	60-79 Million Scores	00%	00
B.5	04	80-99 Million Scores	00%	00
B.5	05	100-149 Million Scores	00%	00
B.5	06	150-249 Million Scores	00%	00
B.5	07	250-399 Million Scores	00%	00
B.5	08	400-599 Million Scores	00%	00
B.5	09	600-999 Million Scores	00%	00
B.5	10	1-1.49 Billion Scores	00%	00
B.5	11	1.5-1.9 Billion Scores	00%	00
B.5	12	2-2.9 Billion Scores	00%	00
B.5	13	Over 3 Billion	00%	00
B.5	14	Game Time 0.0-1.0 Mins	00%	00
B.5	15	Game Time 1.0-1.5 Mins	00%	00
B.5	16	Game Time 1.5-2.0 Mins	00%	00
B.5	17	Game Time 2.0-2.5 Mins	00%	00
B.5	18	Game Time 2.5-3.0 Mins	00%	00
B.5	19	Game Time 3.0-3.5 Mins	00%	00
B.5	20	Game Time 3.5-4.0 Mins	00%	00
B.5	21	Game Time 4-5 Mins	00%	00
B.5	22	Game Time 5-6 Mins	00%	00
B.5	23	Game Time 6-8 Mins	00%	00
B.5	24	Game Time 8-10 Mins	00%	00
B.5	25	Game Time 10-15 Mins	00%	00
B.5	26	Game Time Over 15 Mins	00%	00

B.6 Time-Stamps

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

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

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

P. PRINTOUTS MENU

(optional board required)

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

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

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

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

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

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

T. TEST MENU

T.1	**Switch Edges**
T.2	**Switch Levels**
T.3	**Single Switch**
T.4	**Solenoid Test**
T.5	**Flasher Test**
T.6	**General Illumination**
T.7	**Sound & Music Test**
T.8	**Single Lamps**
T.9	**All Lamps**
T.10	**Lamp & Flasher Tests**
T.11	**Display Test**
T.12	**Flipper Test**
T.13	**Ordered Lamps Test**
T.14	**Lamp Row-Col Test**
T.15	**Dip Switch Test**
T.16	**Mini-playfield Test**
T.17	**Magnet Test**
T.18	**Empty Balls Test**

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

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

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

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

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

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

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

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

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

Run - The Run Mode cycles through the solenoids automatically. The display shows the name and number of the solenoid currently being pulsed. Either press the Escape button to return to the Test Menu, or the Enter button to advance to the next mode.

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

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

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

Run - The Run Mode cycles through the flashlamps automatically. The display shows the name and number of the flashlamp circuit currently being pulsed and the corresponding bulb(s) flash. Either press the Escape button to return to the Test Menu, or the Enter button to advance to the next mode.

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

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

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

T.7 Sound and Music Test The Sound and Music Test allows you to check the audio circuits. This test has three modes for testing the sound and music circuits: Run, Repeat, and Stop.

Run - The Run Mode steps through a sequence of sounds and music. Pressing the Up or Down button during this portion of the Sound and Music test advances to a particular sound/tune without having to wait for the program to play all the sounds available in the test. A sound/tune should be heard for each name and number that appears in the display. Any other results indicate the system has detected a problem.

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

Stop - Press the Enter button at any time during the Repeat Mode to stop this test altogether. No sound/tune should be heard. Any other results indicates the system has detected a problem.

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

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

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

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

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

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

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

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

Run - The Run Mode cycles through the flippers automatically. The display shows the name and number of the flipper coil currently being pulsed. Either press the Escape button to return to the Test Menu, or the Enter button to advance to the next mode.

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

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

T.14 Lamp Row-Col Test 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 or DOWN buttons to cycle trough 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 Mini-playfield Test This will test the mini-playfield left & right motor and the left and right limit switches. When first entering this test the mini-playfield will be automatically checked. This will test the mini-playfield to see if it functioning correctly. If it passes this test a message will appear saying so. If it fails then a message will appear showing it failed. The test will then show an error and may not work correctly until the problem is fixed.

The diagnostic test switches act as follows:

ESC - Returns to the previous menu
FWD - motor on right while held down (or limit switch hit)
REV - motor on left while held down (or limit switch hit)
ENTER - switch between ONCE & CONTINUOS MODES

T.17 Magnet Test This will test the magnet's ability to throw the ball. Upon entering or during the test if the Inner sanctum opto switch (#33) does not work a message will be displayed (OPTO 33 IS BAD). This opto switch must be working for the magnet to be able to capture and throw the ball. Toss a pinball into the sanctum shot to test if the magnet is able to capture and throw the ball. If the magnets catch or throw is weak adjust the height of the magnet core to be closer to the playfield (adjustable from bottom of playfield).

The diagnostic test switches act as follows:

ESC - Returns to the previous menu
FWD - Does nothing
REV - Does nothing
ENTER - Does nothing

T.18 Empty Balls Test Select T.18 from the Test Menu and press 'ENTER" to begin the Empty Balls Test.

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

Note: As the trough kicks out balls, they will 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 settings is retained and the new settings is ignored. Press the Escape button to return to the Utility Menu.

U. UTILITIES MENU

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Adj. No.	Adjustment Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03	Hard U.0 04	Extra Hard U.9 05
A.2 27	Mongol Hurry Up	EX. EASY	EASY	MEDIUM	HARD	EX. HARD
A.2 16	Vengeance Timer	40 SEC	35 SEC	30 SEC	25 SEC	20 SEC
A.2 13	Punish the Guilty Timer	40 SEC	35 SEC	30 SEC	25 SEC	20 SEC
A.2 12	Farley Claymore Timer	40 SEC	35 SEC	30 SEC	25 SEC	20 SEC
A.2 14	Beryllium Sphere Timer	40 SEC	35 SEC	30 SEC	25 SEC	20 SEC
A.2 15	Escape Doom Start Value	45 MIL.	40 MIL	30 MIL	25 MIL	20 MIL
A.2 08	Shadow Multi-ball Save	15 SEC	13 SEC	12 SEC	10 SEC	OFF
A.2 09	Khan Multi-ball Save	8 SEC	7 SEC	5 SEC	4 SEC	OFF
A.2 10	Hotel Multi-ball Save	8 SEC	7 SEC	5 SEC	4 SEC	OFF
A.2 11	Center Shot Ball Save	YES	YES	NO	NO	NO
A.2 07	Ball Save Timer	8 SEC	7 SEC	5 SEC	4 SEC	SEC
A.2 17	Multi-lock Hold Timer	15 SEC	12 SEC	10 SEC	8 SEC	5 SEC
A.2 18	Extra Ball Percentage	30%	25%	20%	15%	10%
A.2 19	Mystery EB Lit Memory	YES	YES	YES	YES	NO
A.2 20	Skill Shot EB Lit Memory	YES	YES	YES	YES	NO
A.2 22	Shadow Loop EB Lit Memory	YES	YES	YES	NO	NO
A.2 21	Battlefield EB Lit Memory	YES	YES	YES	NO	NO
A.2 23	Shadow Loop EB Lit Start	2 LOOPS	2 LOOPS	3 LOOPS	4 LOOPS	5 LOOPS
A.2 24	Khan Multi-ball Lit Memory	YES	YES	YES	NO	NO
A.2 25	Khan Multi-ball Lit Timer	25 SEC	20 SEC	15 SEC	10 SEC	7 SEC
A.4 15	Shadow Loop Champ Default	1 LOOP	2 LOOPS	2 LOOPS	3 LOOPS	4 LOOPS

Game Difficulty Setting Table for German/European Games

Adj. No.	Adjustment Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03	Hard U.0 04	Extra Hard U.9 05
A.2 27	Mongol Hurry Up	EX. EASY	EASY	MEDIUM	HARD	EX. HARD
A.2 16	Vengeance Timer	40 SEC	35 SEC	30 SEC	25 SEC	20 SEC
A.2 13	Punish the Guilty Timer	40 SEC	35 SEC	30 SEC	25 SEC	20 SEC
A.2 12	Farley Claymore Timer	40 SEC	35 SEC	30 SEC	25 SEC	20 SEC
A.2 14	Beryllium Sphere Timer	40 SEC	35 SEC	30 SEC	25 SEC	20 SEC
A.2 15	Escape Doom Start Value	45 MIL.	40 MIL	30 MIL	25 MIL	20 MIL
A.2 08	Shadow Multi-ball Save	15 SEC	13 SEC	12 SEC	10 SEC	OFF
A.2 09	Khan Multi-ball Save	8 SEC	7 SEC	5 SEC	4 SEC	OFF
A.2 10	Hotel Multi-ball Save	8 SEC	7 SEC	5 SEC	4 SEC	OFF
A.2 11	Center Shot Ball Save	YES	YES	NO	NO	NO
A.2 07	Ball Save Timer	8 SEC	7 SEC	5 SEC	4 SEC	SEC
A.2 17	Multi-lock Hold Timer	15 SEC	12 SEC	10 SEC	8 SEC	5 SEC
A.2 18	Extra Ball Percentage	30%	25%	20%	15%	10%
A.2 19	Mystery EB Lit Memory	YES	YES	YES	YES	NO
A.2 20	Skill Shot EB Lit Memory	YES	YES	YES	YES	NO
A.2 22	Shadow Loop EB Lit Memory	YES	YES	YES	NO	NO
A.2 21	Battlefield EB Lit Memory	YES	YES	YES	NO	NO
A.2 23	Shadow Loop EB Lit Start	2 LOOPS	2 LOOPS	3 LOOPS	4 LOOPS	5 LOOPS
A.2 24	Khan Multi-ball Lit Memory	YES	YES	YES	NO	NO
A.2 25	Khan Multi-ball Lit Timer	25 SEC	20 SEC	15 SEC	10 SEC	7 SEC
A.4 15	Shadow Loop Champ Default	1 LOOP	2 LOOPS	2 LOOPS	3 LOOPS	4 LOOPS

U.9 06 Install 5 Ball

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

Preset Game Adjustments Table for U.S./Canadian Games

Adjustment Number	Adjustment Description	Install 3-Ball U.9 07 (factory)	Install 5 Ball U.9 06
A.1 01	Balls Per Game	3	5
A.1 07	Replay Start	500,000,000	750,000,000
A.2 27	Mongol Hurry Up	Medium	Hard
A.2 16	Vengeance Timer	10 Seconds	25 Seconds
A.2 15	Escape Doom Start Value	30 Million	25 Million
A.2 08	Shadow Multi-ball Save	12 Seconds	10 Seconds
A.2 09	Khan Multi-ball Save	5 Seconds	4 Seconds
A.2 10	Hotel Multi-ball Save	5 Seconds	4 Seconds
A.2 07	Ball Save Timer	5 Seconds	4 Seconds
A.2 17	Multi Lock Hold Timer	10 Seconds	8 Seconds
A.2 18	Extra Ball Percentage	15%	10%
A.2 22	Shadow Loop EB Lit Memory	Yes	No
A.2 21	Battlefield EB Lit Memory	Yes	No
A.2 23	Shadow Loop EB Lit Start	3 Loops	4 Loops
A.2 24	Khan Muiti-ball Lit Memory	Yes	No
A.2 25	Khan Multi Lit Timer	15 Seconds	10 Seconds
A.4 15	Shadow Loop Champ Default	2 Loops	3 Loops

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:

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

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

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

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

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

U.9 11 Not Used

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

U.9 13 thru U.9 16 Not Used

U.9 17 Install German 1•
U.9 18 Install German 2•
U.9 19 Install German 3•
U.9 20 Install German 4•
U.9 21 Install German 5•
U.9 22 Install German 6• Adjustments U.9 17 through U9 22 are used to modify game pricing and type of game play. The Preset Game Adjustments Table for German/European Games lists the adjustments and settings that comprise the individual groups. **NOTE:** German Replay starts at 50,000,000.

Preset Game Adjustments Table for German/European Games

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

• The German DIP Switch Settings are:

SW4	SW5	SW6	SW7	SW8
On	On	On	On	Off

U.9 23 Install French 1*
U.9 24 Install French 2*
U.9 25 Install French 3*
U.9 26 Install French 4*
U.9 27 Install French 5*
U.9 28 Install French 6* Adjustments U.9 23 through U.9 26 are used to modify game pricing and type of play. The Preset Game Adjustments Table for French Games lists the adjustments and settings that comprise the individual groups.

*** The French DIP Switch Settings are:**

SW4	SW5	SW6	SW7	SW8
On	On	On	Off	Off

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

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

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

A. ADJUSTMENTS MENU

A.1 Standard Adjustments
A.2 Feature Adjustments
A.3 Pricing Adjustments
A.4 H.S.T.D Adjustments
A.5 Printer Adjustments (optional board required)

A.1 Standard Adjustments

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

A.1 02 Tilt Warnings
The number of total actuation's of the plumb bob mechanism that can occur before the game is "tilted".
Range: 1-10

A.1 03 Maximum Extra Balls
The number of extra balls that a player may accumulate.
Range: 1-10

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

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

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

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

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

A.1 07 Replay Start*
The replay start value when Auto % Replay is used. The range of this setting is 100,000,000 to 700,000,000.

A.1 08 Replay Levels*

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

*For Auto % Replay.

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

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

A.1 13 Replay Boost

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

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

A.1 14 Replay Award

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

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

A.1 15 Special Award

The award automatically provided when the player scores a special.

Credit - Scoring a Special awards a Credit.
Ticket - Scoring a Special awards a Ticket.
Ball - Scoring a Special awards an Extra Ball.
Points - Scoring a Special awards 30 Million points.

A.1 16 Match Award

The award automatically provided when the players wins a match.

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

A.1 17 Extra Ball Ticket

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

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

A.1 18 Maximum Ticket/Player

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

A.1 19 Match Feature

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

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

A.1 20 Custom Message

The message displayed during the Attract Mode.

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

A.1 21 Language

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

A.1 22 Clock Style

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

A.1 23 Date Style

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

A.1 24 Show Date and Time

The date and time show in the Attract Mode.

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

A.1 25 Allow Dim Illumination

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

YES - Dim General Illumination for spiral effects and Attract Mode.
NO - Do Not dim General Illumination.

A.1 26 Tournament Play

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

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

A.1 27 Euro. Scr. Format

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

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

A.1 28 Minimum Volume Control

The volume can be turned Off.

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

A.1 29 General Illumination Power Saver

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

Setting: - Off, 2-60 Minutes

A.1 30 Power Saver Level

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

Range: 4-7 (4 = dimmest, 7 = brightest)

A.1 31 Ticket Expansion Board

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

Yes - Ticket Expansion Board is connected.
No - Ticket Expansion Board is NOT installed in the game.

A.1 32 No Bonus Flips

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

A.1 33 Game Restart

When the start button is pressed during or after the 2nd ball, the game in progress will end and a new game will begin. This adjustment has 3 settings to determine how this is handled.

Never: - Do not allow a new game to start until the current game is over.

Slow: - Restart if the start button is pressed continuously for over 1/2 second. This helps to prevent the unintended restart of game in progress.

Instantly: - Restart as soon as the start button is pressed.

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

A.2 Feature Adjustments

A.2 01 BUY EXTRA BALL - BUY IN FEATURE
This determines whether each player may buy 1 extra ball for 1 credit at the end of the game.

Settings: 1 Credit
Off

Factory Default: 1 Credit

A.2 02 MAXIMUM BUY-IN BALLS
If A.2 01 (BUY EXTRA BALL) is set to "1 CREDIT", This determines the number of Extra Balls that may be purchased at the end of the game. The choices are 1-3.

Factory Default: 1

A.2 03 ATTRACT MODE SOUNDS
The operator can select whether or not the attract mode has sound on the flipper and gun buttons to attract players. The choices are:

ON = The attract mode does have sound on buttons
OFF = The attract mode does not have sound on buttons

Factory Default: ON

A.2 04 ATTRACT MODE MUSIC
The operator can select whether or not the attract mode will play music to attract players. The choices are:

ON = The attract mode does have music
OFF = The attract mode does not have music

Factory Default: OFF

A.2 05 TIMED PLUNGER
This is the time allowed for a player to hit the plunger switch (or the launch ball switch) to start a ball. When this time is exceeded, the ball is automatically launched.

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

Factory Default: OFF

A.2 06 FLIPPER PLUNGER

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

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

Factory Default: OFF

A.2 07 BALL SAVE TIMER

After ball start, this is the amount of time that the "SHOOT AGAIN" ball saver lamp is lit. It allows players who drain within this time to be served another ball. This adjustment is for when player is not in a multi-ball. The choices are:

OFF = No ball save is enabled
1-60 seconds = minimum amount of time ball is on playfield

Factory Default: 5 seconds

A.2 08 BALL SAVE TIMER SHADOW MULTI-BALL

After multi-ball start, this is the amount of time that the "SHOOT AGAIN" ball saver lamp is lit. It allows players who drain within this time to be served another ball. This adjustment is for when player is in the 3 ball lockup shadow multi-ball. The choices are:

OFF = No ball save is enabled
1-60 seconds = minimum amount of time ball is on playfield

Factory Default: 12 seconds

A.2 09 BALL SAVE TIMER KHAN MULTI-BALL

After multi-ball start, this is the amount of time that the "SHOOT AGAIN" ball saver lamp is lit. It allows players who drain within this time to be served another ball. This adjustment is for when player is in the left eject lockup Khan multi-ball. The choices are:

OFF = No ball save is enabled
1-60 seconds = minimum amount of time ball is on playfield

Factory Default: 5 seconds

A.2 10 BALL SAVE TIMER 2 BALL HOTEL MONOLITH MULTI-BALL

After multi-ball start, this is the amount of time that the "SHOOT AGAIN" ball saver lamp is lit. It allows players who drain within this time to be served another ball. This adjustment is for when player is in a scene start hotel monolith 2 ball multi-ball. The choices are:

OFF = No ball save is enabled
1-60 seconds = minimum amount of time ball is on playfield

Factory Default: 5 seconds

A.2 11 CENTER SHOT HIT BALL SAVER

The operator selects whether or not during game play a ball will be saved when a ball hits the battlefield drop target OR the inner sanctum wall shot and the ball drains immediately down the center (with about 2 seconds).

YES - allow special ball save
NO - do not allow special ball save

Factory Default: NO

A.2 12 FARLEY CLAYMORE SCENE TIMER

The operator selects the amount of time that the FARLEY CLAYMORE scene is active once started. The setting range is 5-90 seconds.

Factory Default: 30 seconds

A.2 13 PUNISH THE GUILTY SCENE TIMER

The operator selects the amount of time that the PUNISH THE GUILTY scene is active once started. The setting range is 5-90 seconds.

Factory Default: 30 seconds

A.2 14 BERYLLIUM SPHERE SCENE TIMER

The operator selects the amount of time that the FARLEY CLAYMORE scene is active once started. The setting range is 5-90 seconds.

Factory Default: 30 seconds

A.2 15 ESCAPE UNDER WATER DOOM HURRY UP START VALUE

The operator selects the starting score value of the ESCAPE UNDER WATER DOOM scene. The setting range is 20 million to 45 million.

A.2 16 VENGEANCE MODE TIMER

The operator selects the amount of time that the VENGEANCE MODE is active once started. The setting range is 5-90 seconds.

Factory Default: 30 seconds

A.2 17 MULTI-BALL JACKPOT MULTIPLIER TIMER

The operator selects the amount of time that balls remain held in and eject during KHAN or SHADOW multi-ball. The setting range is 1-30 seconds.

Factory Default: 10 seconds

A.2 18 EXTRA BALL PERCENTAGE

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 inner shadow loops needed in-a-row to light extra ball.
2) Increasing or decreasing the number of times the "WHO KNOWS?" mystery award will award an extra ball lit.
3) Increasing or decreasing the number of times the Skill Shot will award an extra ball lit.

The setting range is OFF-35 percent.

Factory Default: 20 seconds

A.2 19 WHO KNOWS MYSTERY AWARD EXTRA BALL LIT MEMORY

The operator selects whether or not an extra ball lit by the WHO KNOWS award will remain lit from ball to ball. The choices are:

YES = extra ball stays lit until the end of GAME or when collected.
NO = extra ball stays lit until the end of the BALL or when collected.

Factory Default: YES

A.2 20 SKILL SHOT AWARD EXTRA BALL LIT MEMORY

The operator selects whether or not an extra ball lit by the SKILL SHOT award will remain lit from ball to ball. The choices are:

YES = extra ball stays lit until the end of GAME or when collected.
NO = extra ball stays lit until the end of the BALL or when collected.

Factory Default: YES

A.2 21 BATTLEFIELD COMPLETE EXTRA BALL LIT MEMORY

The operator selects whether or not an extra ball lit by the completing the battlefield will remain lit from ball to ball. The choices are:

YES = extra ball stays lit until the end of GAME or when collected.
NO = extra ball stays lit until the end of the BALL or when collected.

Factory Default: YES

A.2 22 INNER SHADOW LOOPS EXTRA BALL LIT MEMORY

The operator selects whether or not an extra ball lit by the inner SHADOW LOOP will remain lit from ball to ball. Choices are:

YES = extra ball stays lit until the end of GAME or when collected.
NO = extra ball stays lit until the end of the BALL or when collected.

Factory Default: YES

A.2 23 INNER SHADOW LOOPS IN A ROW EXTRA BALL START

The operator selects the number of loops in a row needed to light an extra ball. If adjustment A.2 18 EXTRA BALL PERCENTAGE is set to 5-35 percent then the game will decide from this starting value if it need to set the loop count higher or lower to maintain the proper extra ball percentage. If adjustment A.2 18 EXTRA BALL PERCENTAGE is set to OFF then this value will be the number of shadow loops needed in a row to lit extra ball and will not change. The setting range is 2-10 shadow loops in a row.

Factory Default: 3

A.2 24 KHAN MULTI-BALL LIT MEMORY

The operator selects whether or not Khan multi-ball will remain lit from ball to ball. The choices are:

YES = Khan multi-ball stays lit until the end of GAME or when collected.
NO = Khan multi-ball stays lit until the end of the BALL or when collected.

Factory Default: YES

A.2 25 KHAN MULTI-BALL LIT START TIMER

The operator selects how long the "Khan multi-ball lit" lamp is lit once started. The setting range is 5-90 seconds)

Factory Default: 15 Seconds

A.2 26 HOLD SANCTUM LOCKS AT GAME OVER

The operator selects whether or not the player can have balls left in the top Sanctum 3 ball lockup at game over. A player must still "earn" their sanctum locks. The choices are:

YES = keep balls locked between games
NO = Release any locked balls at game over

Factory Default: NO

A.2 27 MONGOL HURRY UP DIFFICULTY

The operator selects the amount of time that the Mongol Hurry Up is active once lit. The choices are Extra Easy, Easy, Medium, Hard and Extra Hard. The harder this is set to the shorter the time that the Mongol Hurry Up is active.

Factory Default: MEDIUM

A.2 28 FAMILY MODE

The operator can prevent the speech phrases "Let's get the hell out of here" and "What the Christ was that" from being played. The choices are:

OFF = Use all speech
ON = Remove above speech phrases

Factory Default: OFF

A.2 29 LEFT DIVERTOR

The operator selects whether or not the player can move the left ramp divertor by pressing the left blue button. This adjustment is provided so the operator can lock the divertor in a position if it is broken. The choices are:

ON = Players can control the left ramp divertor
OFF = Players can not control the left ramp divertor

Factory Default: ON

A.2 30 RIGHT DIVERTOR

The operator selects whether or not the player can move the right ramp divertor by pressing the right blue button. This adjustment is provided so the operator can lock the divertor in a position if it is broken. The choices are:

ON = Players can control the right ramp divertor
OFF = Players can not control the right ramp divertor

Factory Default: ON

A.2 31 MINI-PLAYFIELD

The operator selects whether or not the player can control the mini-playfield kicker or not. This adjustment is provided so the operator can lock the mini-playfield in a position to prevent ball hang ups if it is broken. The game will always reset the battle drop target when this is set to OFF to help prevent the ball from entering the mini-playfield. The choices are:

ON = Players can control the mini-playfield
OFF = Players can not control the mini-playfield

Factory Default: ON

A.2 32 AUTOFIRE LOCKS

The operator selects whether or not the ball will autofire onto the playfield when a center shadow multiball lock is made. Note: This also turns off the left ramp skill shot on locked balls. The choices are:

YES = Balls will be autofired when a lock is made
NO = Balls will not be autofied when a lock is made, the player must pull the gun trigger to launch ball.

Factory Default: NO

A.3 Pricing Adjustments

A.3 01 Game Pricing (if set to custom, then 02 to 09 are available)
The cost of a game is selected here, from the Standard Pricing Table or by using the Custom Pricing Editor (A.3 27).

A.3 02 thru A.3 09 Not Used

A.3 10 Coin Door Type (if set to custom, then 11 to 15, 20 and 25 are available)
This adjustment is used to preset adjustments 11 through 15, 20 and 25, based on standard coin doors (U.S.A., German, Etc.).

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

A.3 12 Left Slot Value
A.3 13 Center Slot Value
A.3 14 Right Slot Value
A.3 15 4th Slot Value
The monetary value of the left, center, right, and 4th coin chutes. Formerly, these values only affected the way in which the coins were totaled for auditing displays. In the new 10/94 pricing system, these values are added for each coin inserted and credits are awarded based on the amount of money accumulated. See Pricing Editor (A.3 27) 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. The factory default is 10.

A.3 17 Free Play
The player can operate the game without a coin (free play) or with a coin.

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

A.3 18 Hide Coin Audits
The coin audits may, or may not be displayed.

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

A.3 19 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 cent (or greater) increments.

A.3 21 Coin Meter Units

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

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

A.3 22 Dollar Bill Slot

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

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

A.3 23 Minimum Coin Microseconds

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

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 always 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

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 the 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 use a different value for other pricing modes.

Please note that formerly, the coin values specified by custom coin door 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 on 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 used.)

Assuming that last mode installed was 1/$0.50 2/$0.75 3/$1.00 the display will appear 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): Made the current field higher.

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

Start: Save the current custom price mode or start over.

By using the above functions, 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 the sequence.

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

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

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

Example: 1/$0.50 2/$1.00

1) $0.25 1/2 cred.

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

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

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

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

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

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

Insert This will insert a new pricing level ABOVE the current level. The current level will be unaffected. There must be room for at least 1 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)	$2.00	6 cred.

Display View

Note that the line "5) $2.00 6 cred." no longer fits on the display. Whenever there are more that 4 pricing levels the display will scroll up and down as "Enter" and "Escape" are used to move from field to field. If you repeatedly press "Enter" the display will then show:

Custom Pricing Editor		
2)	$1.00	2 cred.
3)	$1.25	2 1/2 cred.
4)	$1.50	4 cred.
5)	$2.00	6 cred.

Display View

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

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

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

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

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

Custom Pricing Editor		
1)	$0.25	1/2 cred.

Display View

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

Custom Pricing Editor		
1)	$0.50	1 cred.
2)	REPEAT 20	

Display View

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

Custom Pricing Editor		
1)	$0.25	1/2 cred.
2)	$0.50	1 cred.
3)	$0.75	1 1/2 cred.
4)	$1.00	2 cred.

Display View

Actually, by repeating the 1st line 20 times the pricing mode is currently set up as follows, but only the 1st 4 lines are displayed.

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

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

Custom Pricing Editor		
17)	$4.25	8 1/2 cred.
18)	$4.50	9 cred.
19)	$4.75	9 1/2 cred.
20)	$5.00	10 cred.

Display View

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

Start Button: Once the pricing mode has been specified, 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 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.

Pricing Table

Country	Coin Chutes Left	Center	Right	4th Chute	Games/Coins	Display	Pricing Adjustments A3 02 03 04 05 06 07 08 09
USA	25¢	$1.00*	25¢	$1.00	1/50¢, 2/75¢, 3/$1 [2]	50¢, 75¢, $1.00	
	25¢	$1.00*	25¢	$1.00	1/75¢, 2/$1.50, 3/$2.00 [2]	1/.75, 3/2.00	
	25	$1.00	25¢	$1.00	1/3X25¢ [2]	USA1 1/$0.75	
	25	$1.00	25¢	$1.00	1/50¢, 2/$1 [2]	USA 2/$1.00	
	25	$1.00	25¢	$1.00	1/50¢, 3/$1.00 [2]	USA 3/$1.00	
	25	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 3/$1.50, 6/$2.00 [2]	USA 6/$2.00	
	25	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 3/$1.50, 5/$2.00 [1,2]	USA 5/$2.00	
	25	$1.00	25¢	$1.00	1/3X25¢, 2/$1.50, 4/$2.00 [2]	1/.75, 4/$2.00	
	25	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 4/$1.50, 6/$2.00 [2]	6/$2.00 4/$1.50	
	25¢	25¢	25¢	-	1/4x25¢, 6/$5.00 [2]	1/1, 6/5	
	25¢	25¢	25¢	-	1/4x25¢ [2]	1/$1.00	
Canada	25¢	-	$1.00*	-	1/50¢, 2/75¢, 3/$1 [2]	CAN. 50-75-1	
	25	-	$1.00	-	1/50¢, 2/$1 [2]	CAN. 2/$1.00	
	25	-	$1.00	-	1/50¢, 3/$1.00 [2]	CAN. 3/$1.00	
	25	-	$1.00	-	1/2x25¢, 2/4x25¢, 3/$1.00 [2]	3/$1.00 Coin	
	25	-	$1.00	-	1/2x25¢, 2/$1.00, 3/$1.50, 6/$2.00 [2]	CAN. 6/$2.00	
	25	-	$1.00	-	1/2x25¢, 2/$1.00, 3/$1.50, 5/$2.00 [1,2]	CAN. 5/$2.00	
	25	-	$1.00	-	1/2x25¢, 2/$1.00, 4/$1.50, 6/$2.00 [2]	6/$2 4/1.50	
	25	-	$1.00	-	1/3X25¢, 2/$1.50, 4/$2.00 [2]	1/.75, 4/2.00	
	25¢	-	$1.00*	-	1/75¢, 2/$1.50, 3/$2.00 [2]	1/.75, 3/2.00	
	25	-	$1.00	-	1/3X25¢ [2]	CAN. 1/$0.75	
Austria	5sch	10sch	10sch	-	1/2x5sch, 3/2x10sch [2]	AUSTRIA	
	5sch	-	10sch	-	2/5sch, 5/10sch	CUSTOM	02 00 05 00 01 00 01 00
Australia	20¢	$1	$1	$2	1/$1, 3/$2 [2]	AUSTRALIA 1	
	20¢	$1	$1	$2	1/$1, 2/$2	AUSTRALIA 2	
U.K.	£1.00	50P	20P	10P	1/3x10P, 2/50P, 4/£1 [2]	U. KINGDOM	
Switzerland	1Fr	2Fr	5Fr	-	1/1Fr, 3/2Fr, 7/5Fr [2]	SWISS 1	
	1Fr	2Fr	5Fr	-	1/2Fr, 2/3Fr, 3/4Fr, 5/5F	SWISS 2	
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr , 3/50Fr [2]	BELGIUM	
Germany	1DM	2DM	5DM	-	1/2DM, 2/3DM, 3/4DM, 5/5DM [1,2]	GER. 1/2DM	
					1/1DM, 2/2DM, 5/5DM [2]	GER. 1/1DM	
					1/1DM, 2/2DM, 6/5DM [2]	GER. 6/5DM	
Holland	1G	-	1G	-	1/1G [2]	HOLLAND	
Sweden	1Kr	5Kr	10Kr	1Kr	1/10Kr, 2/15Kr, 3/20Kr [1,2]	SWEDEN 1	
	1Kr	5Kr	10Kr	1Kr	1/5Kr [2]	SWEDEN 2	
France	1Fr	5Fr	10Fr	20Fr	1/3x1Fr, 2/5Fr, 5/10Fr , 10/20Fr [2,3]	TARIF 1	
	1Fr	5Fr	10Fr	20Fr	1/2x1Fr, 3/5Fr, 7/10Fr ,14/20Fr [2,3]	TARIF 2	
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr, 7/2x10Fr , 7/20Fr [1,2,3]	TARIF 3	
	1Fr	5Fr	10Fr	20Fr	2/5Fr, 4/10Fr,9/2x10Fr , 9/20Fr [2,3]	TARIF 4	
	1Fr	5Fr	10Fr	20Fr	2/5Fr, 5/10Fr, 11/2x10Fr , 11/20Fr [2,3]	TARIF 5	
	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr , 6/20Fr [2,3]	TARIF 6	
Italy	500L	500L	500L	-	1/500L [2]	ITALY 1	
	500L	500L	500L	-	1/2x500L, 3/4x500L [1,2]	ITALY 2	
	500L	500L	500L	-	1/2x500L, 2/4x500L [2]	ITALY 3	
Spain	100P	-	500P	-	1/100P, 6/500P [2]	SPAIN	
	25P	-	100P	-	1/25P, 5/100P	CUSTOM	01 00 04 00 01 04 01 00
	25P	-	100P	-	1/25P, 4/100P	CUSTOM	01 00 04 00 01 00 01 00
	25P	-	100P	-	1/2x25P, 2/100P	CUSTOM	01 00 04 00 02 00 01 00
	25P	-	100P	-	1/2x25P, 3/100P	CUSTOM	03 00 12 00 04 00 01 06
Japan	100¥	-	100¥	-	1/100¥ [2]	JAPAN	
Chile	Token	-	Token	-	1/1Token [2]	CHILE	
Denmark	1Kr	5Kr	10Kr	20Kr	1/2x1kr, 3/5kr, 7/10kr [2]	DENMARK 1	
	1Kr	5Kr	10Kr	20Kr	1/5kr, 3/10kr, 6/20kr [1,2]	DENMARK 2	
Finland	1Mka	-	5Mka	-	1/2x1Mka, 3/5Mka [2]	FINLAND 1	
	1Mka	-	5Mka	-	1/3x1Mka, 2/5Mka [2]	FINLAND 2	
New Zealand	$1.00	-	$2.00	-	1/$1, 3/$2	NEW ZEALAND 1	
	$2.00	-	$1.00	-	1/$1, 3/$2, ($2-$1 door)	NEW ZEALAND 2	
Norway	5Kr	-	10Kr	-	1/5Kr, 2/10Kr, 5/20Kr [2]	NORWAY	
Argentina	10¢	10¢	10¢	-	1/1 Token [2]	ARGENTINA	
Greece	10D	20D	50D	-	1/2x10D, 1/20D, 3/50D	GREECE	
Antilles	25¢	25¢	1G	-	1/25¢, 4/1G	ANTILLES	
Netherlands	1Hfl	2.5Hfl	2.5Hfl	-	1/1Hfl, 3/2.5Hfl	NETHERLANDS	
Hungary	10F	10F	20F	-	1/1x20F, 1/2x10F, 3/2x20F [2]	HUNGARY	

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

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

A.4 01 Highest Scores

The game maintains a record of the four highest scores achieved to date.

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

A.4 02 H.S.T.D. Award

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

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

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

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

A.4 04 Champion Credits

The operator chooses the number of credits or tickets awarded for a Grand Champion Score. Range: 00 - 10.

A.4 05 H.S.T.D. 1 Credits
A.4 06 H.S.T.D. 2 Credits
A.4 07 H.S.T.D. 3 Credits
A.4 08 H.S.T.D. 4 Credits

The number of credits or tickets to be awarded whenever a player exceeds the 1st, 2nd, 3rd, and 4th highest scores. Range: 00 - 10.

A.4 09 High Score Reset Every

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

A.4 10 Backup Champion

The Back-up Grand Champion Score. Range: 00 - 99,900,000.

A.4 11 Backup H.S.T.D. 1
A.4 12 Backup H.S.T.D. 2
A.4 13 Backup H.S.T.D. 3
A.4 14 Backup H.S.T.D. 4

The first through the fourth Back-up High Score values. The game automatically restores this value when the High Score Reset Every value is reached. Range: 00 - 99,900,000.

A.4 15 Shadow Loop Champ Default

The operator selects the default number of Shadow loops a player must make in a row to be on the SHADOW LOOP CHAMP table. The setting range is 1-6 Shadow loops in a row.

Factory Default: 2

A.4 16 Backup Aux Grand Champion H.S.T.D.

This is the backup BUY-IN grand champion score. Players are placed on this H.S.T.D. table IF they have bought in at least once. The setting range is 0 - 99,900,000.

A.4 17 Backup Aux H.S.T.D. 1
A.4 18 Backup Aux H.S.T.D. 2
A.4 19 Backup Aux H.S.T.D. 3
A.4 20 Backup Aux H.S.T.D. 4

The first through the fourth BUY-IN high score values. The game automatically restores this value when the High Score Reset value is reached. Players are placed on this H.S.T.D. table IF they have bought in at lease once. The setting range is 0 - 99,900,000.

A.5 Printer Adjustments (optional board required)

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

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

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

YES	-	The printer does pause.
NO	-	The printer does not pause.

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

A.5 05 Serial Baud Rate
The baud rate used for Serial or ADP communications (bit rate). Choices: 300, 600, 1200, 2400, 4800, or 9600.

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

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

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 them on-line. Serial printers (or computers) are detected by sending a carriage return (ASCII 0x0D) or XON (ASCII 0x11).

This adjustment has the following settings:

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

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

If the printer is detected during game over or test mode, the printout will take place 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 printout will only take place if the coin door is open.

After an automatic printout has been generated, a second 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 the message, "Press ENTER for Test Report". This indicates the game program has detected a possible problem with the game.

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

ER. MINI PFD. BAD CHK. SWITCHES/MTR

This is saying the mini-playfield is not working correctly. Check the mini-playfield motor (20 - mini motor left, 19 - mini motor right), Bridge driver board, Power Driver board, CPU board, and the two mini-playfield limit switches (38 - mini-playfield right and 37 - mini-playfield left). Also check for blown fuses.

ER. MAGNET OPTO IS NOT WORKING

This is saying that opto switch #33 (inner sanctum) is not working. This switch must be working for the magnet to be able to capture and throw the ball. Check the opto driver board, 12v power supply, CPU board and proper alignment of the opto pair. Also check for blown fuses.

ER. BATTLE KICKER OPTO NOT WORKING

This is saying that opto switch #36 (inner sanctum) is not working. This switch must be working for the magnet to be able to capture and throw the ball. Check the 24 inch opto driver board, 12v power supply, CPU board and proper alignment of the opto pair. Also check for blown fuses.

ER. LOCKUP IS BAD CHK. SWITCH/COIL

This is saying that the 3 ball lockup at the top of the playfield is not working correctly. Check to see that the three lockup switches (lockup right #63, lockup middle #64, lockup left #65) are working properly (check with balls sitting on switches) and that the lockup kickout coil (#02) is working correctly. Also check for blown fuses.

ER. WALL TGT. BAD CHK. SWITCH/COIL

This is saying that the sanctum wall controlled target is not working correctly. Check to see that the wall drop down switch (#51) is functioning correctly (it should trigger closed when the wall is down) and coils #08 (wall target up) & #16 (wall target down) are functioning. Also check for blown fuses.

ER. DROP BANK BAD CHK. SWITCH/COIL

This is saying the mini-playfield 4 bank drop targets are not functioning properly. Check the mini drop bank coil (#24) and the four drop target switches (#85-#88), 12v power supply and the CPU board. Also check for blown fuses.

ER. BAT. DROP BAD CHK. SWITCH/COIL

This is saying that the single drop target at the entrance to the popper (battlefield) is not functioning correctly. Check to see that the battle drop down switch (#55) is functioning correctly (it should trigger closed when the drop target is down) and coils #25 (single drop up) & #36 (single drop down) are functioning. Also check for blown fuses.

ER. MAGNET BAD CHK. SWITCH/COIL

This is saying that the sanctum magnet is unable to capture and/or throw the pinball into the 3 ball lockup. Check to make sure the magnet (coil #35) that the inner sanctum opto switch (#33) are working correctly & the alignment of the opto pair correct. Also check to make sure the height of the magnet core is adjusted properly (the magnets height can be adjusted from the bottom of the playfield). Check to make sure 3 ball lockup switches (lockup right #63, lockup middle #64, lockup left #65) are working properly. Also check for blown fuses on flipper board and power driver board.

ER. POPPER IS BAD CHK. SWITCH/COIL

This is saying that the popper was unable to get the pinball out of the popper. Check to make sure the popper switch (#68) is working properly and is adjusted correctly. This switch can be difficult to adjust. Make sure it is not too sensitive or it make trigger from coils being fired. The weight of the ball falling into the popper should trigger the switch closed. Once the ball is kicked out the switch should open up immediately. Check to make sure the popper coil (#14) is functioning correctly. Also check for blown fuses.

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 Å30 games). The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep the game earning, until the service technician can repair the problem.

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

Check Fuses F115 and F116 and Opto 12V Supply.

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

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

Opto Trough Bad Check Connectors, Wires and 12V Supply

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

Pinball Missing.

This game normally uses 5 balls; however, it will operate with as few as one ball. This message announces that a ball is missing or stuck. When the ball is located, return it to the game via the Outhole. Other possibilities for this problem could be malfunctions of the Ball Trough optos or the Ball Shooter switch.

xxxxx Sw. is Stuck On.

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

Ground Short Row-N, Wht-xxx.

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

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

U6 Checksum Error.

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

Time and Date Not Set.

The real time clock is not set. If this occurs go to U.4 of the Utilities Menu and set the time and date.

Factory Settings Restored.

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

CPU L.E.D.'s

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

CPU Board L.E.D. Error Codes

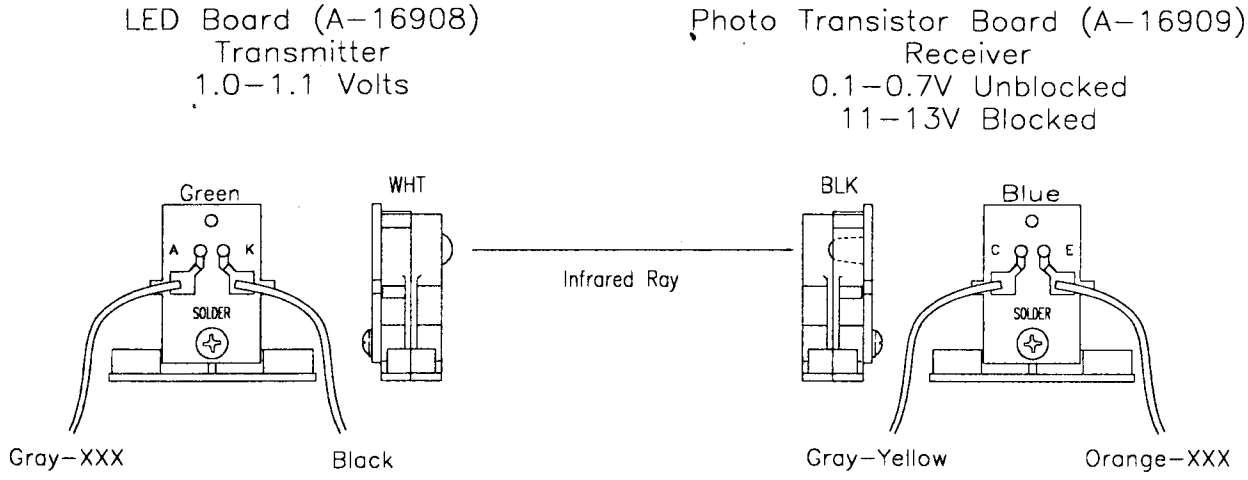
Center L.E.D. blinks one time	-	ROM Error U6
Center L.E.D. blinks two times	-	RAM Error U8
Center L.E.D. blinks three times	-	Custom Chip Failure U9

Sound Board Beep Error Codes
Upon Game Turn-On:

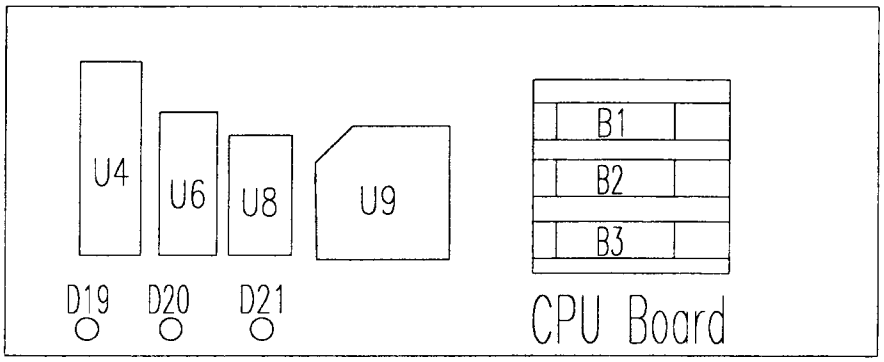
1 Beep	=	Sound Board O.K.
2 Beeps	=	U2 Failure
3 Beeps	=	U3 Failure
4 Beeps	=	U4 Failure
5 Beeps	=	U5 Failure
6 Beeps	=	U6 Failure
7 Beeps	=	U7 Failure
8 Beeps	=	U8 Failure
9 Beeps	=	U9 Failure

OPTO THEORY

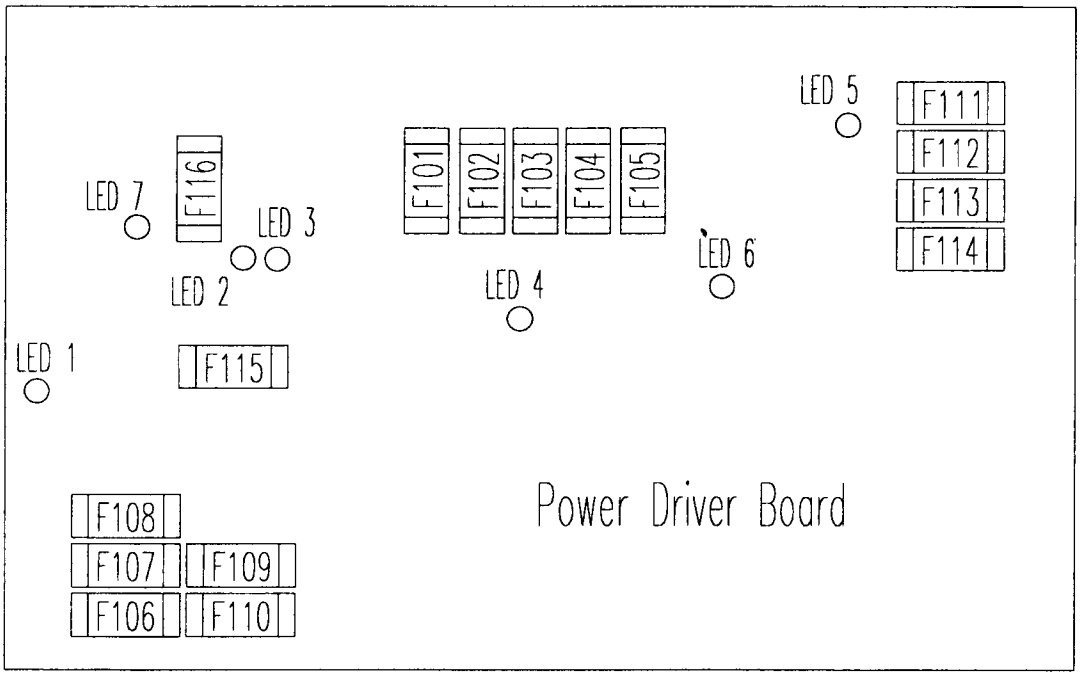
The opto receiver (Photo Transistor) should be approximately 0.1-0.7 volts when the opto beam is unblocked and approximately 11-13 volts when the opto beam is blocked. The opto transmitter (L.E.D.) should always be approximately 1.4 volts. Note, the transmitter (L.E.D.) is larger than the receiver (Photo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



LED List

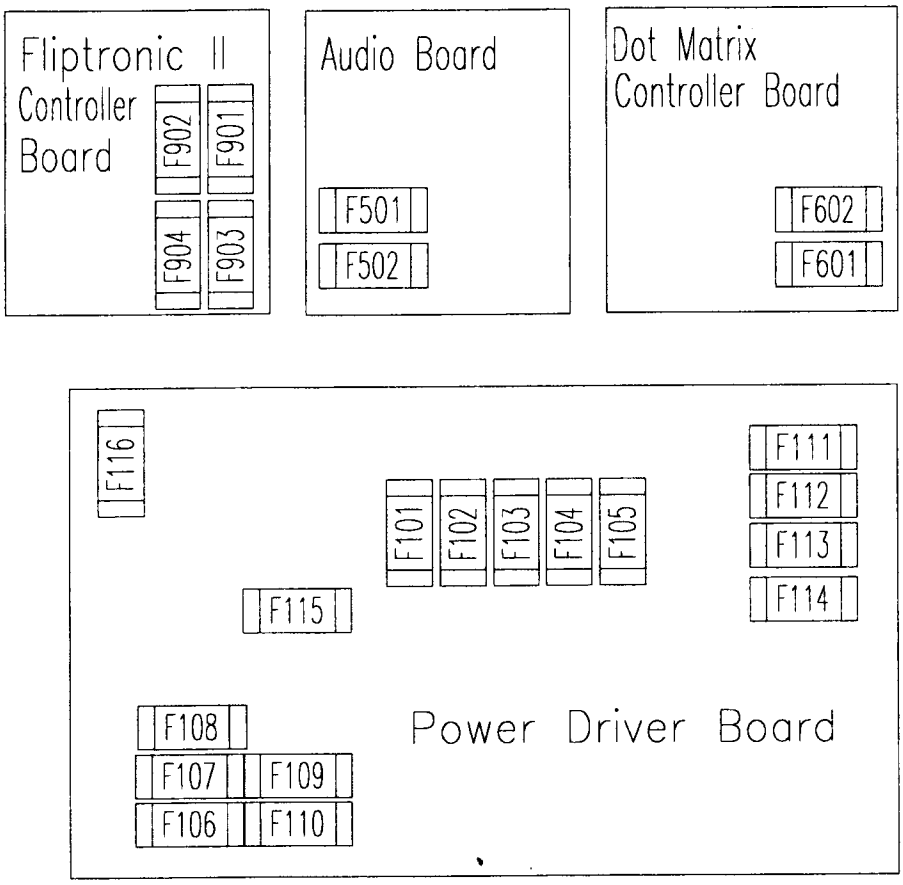


CPU Board
D19, Blanking
D20, Diagnostic
D21, +5vdc
At Game Turn-On = D19 & D21 On, D20 Off
During Normal Operation = D19 Off, D20 flashing, D21 On



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

Fuse List



Audio Board

F501	-25V Circuit	3A, 250V, S.B.
F502	+25V Circuit	3A, 250V, S.B.

Dot Matrix Controller Board

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

Fliptronic II Controller Board

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

Power Driver Board

F101	+50VDC General (Left Flipper)	3A, 250V, S.B.
F102	+50VDC General (Right Flipper)	3A, 250V, S.B.
F103	Solenoid #25-#28	3A, 250V, S.B.
F104	Solenoid #9-#16	3A, 250V, S.B.
F105	Solenoid #1-#8	3A, 250V, S.B.
F106	G.I. #5 Wht-Vio	5A, 250V, S.B.
F107	G.I. #4 Wht-Grn	5A, 250V, S.B.
F108	G.I. #3 Wht-Yel	5A, 250V, S.B.
F109	G.I. #2 Wht-Org	5A, 250V, S.B.
F110	G.I. #1 Wht-Brn	5A, 250V, S.B.
F111	Flasher Secondary	5A, 250V, S.B.
F112	Solenoid Secondary	7A, 250V, S.B.
F113	+5V Logic	5A, 250V, S.B.
F114	+18V Lamp Matrix	8A, 32V, N.B.
F115	+12V Switch Matrix	3/4A, 250V, F.B.
F116	+12V Secondary	3A, 250V, S.B.

Line Filter

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

MAINTENANCE INFORMATION

LUBRICATION

The two main lubrication points of the Ball Eject mechanism* are the pivots for the arm. The mechanisms of other playfield devices are somewhat similar and have the same lubrication requirements. A medium viscosity oil (switch target grease) is satisfactory for these devices. Also, regularly lubricate the slide-mechanism rails and the leg levers.

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

Lubrication to ensure proper operation also applies to the target blades of Drop Targets. MBI Instrument Grease, also known as Drop Target Switch Lubricant, (Bally part number of EI 165), is a recommended lubricant.

SWITCH CONTACTS

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

Flipper Switches
This game uses the new Fliptronic II Electronic Flipper System. The end-of-stroke switches are NORMALLY OPEN and should close when the flipper is energized. All end-of-stroke switches 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 NO REPLACE these switches with the old style tungsten high current type switches, as intermittent operation could occur. Please note that unlike the old style of flipper, an end-of-stroke switch failure will not harm the flipper. The game will notify the operator of a switch being misadjusted in the test report, but will continue to play. The end-of-stroke switches are a means by which the new electronic flippers feel and play with all of the subtleties of the old flippers.

CLEANING

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

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

*May not be used on all games.

The Shadow

Unit Disassembly for Repair

Major Component Service Instructions

Mini-playfield

A. To access mini-playfield.

1. Unscrew thumb screw (Item 1) from the mini-playfield. (See Fig.1) This may be tight the first time it is removed. A straight blade screwdriver may be necessary to remove the thumb screw. Subsequent removals and insertions may be done with just your fingers.

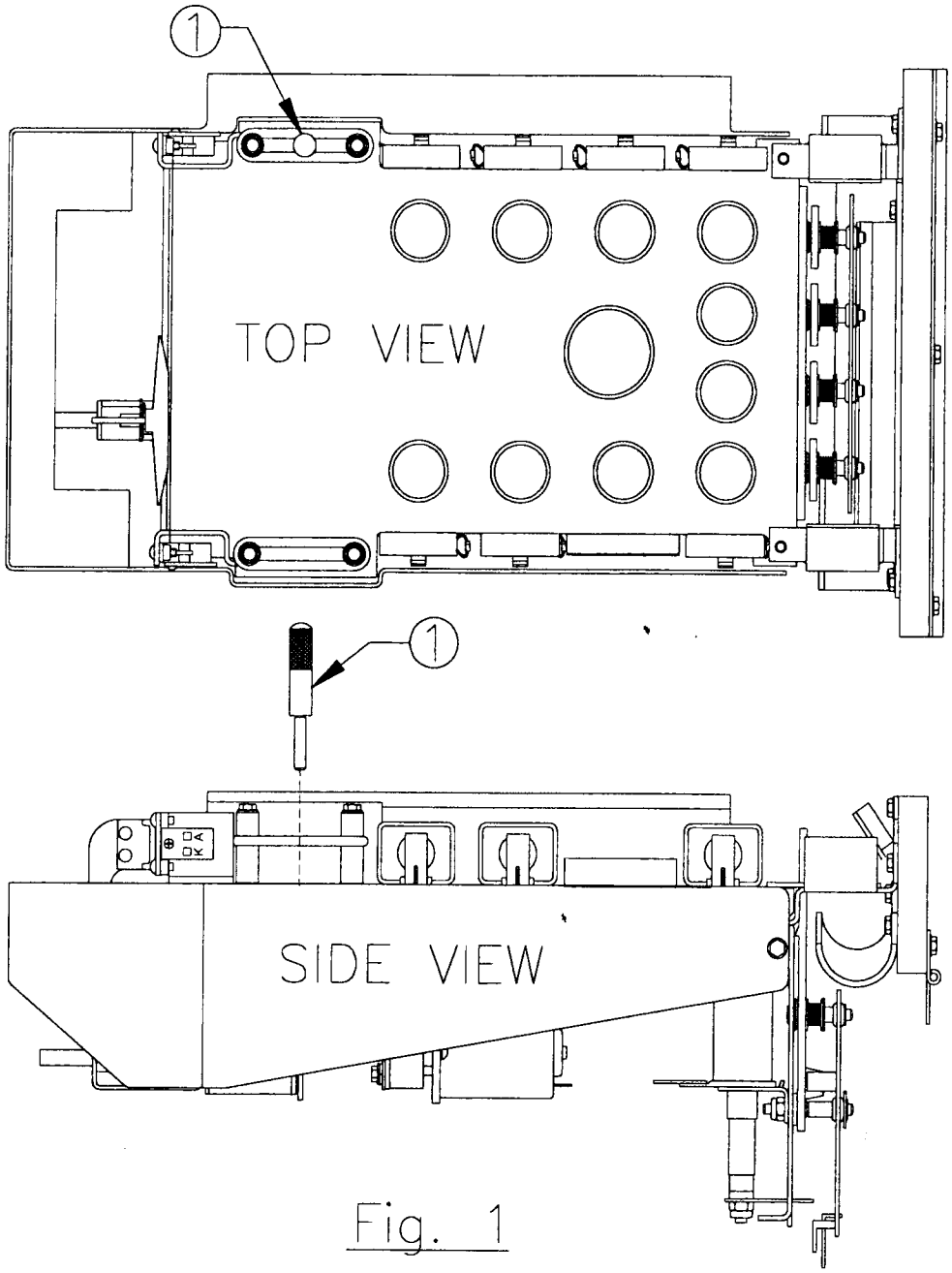


Fig. 1

2. With the main playfield in its service position (i.e. tilted up and moved forward resting on its support brackets), grasp the front edge of the mini-playfield and swing it up and over its hinge point and rest it against the back box. (See Fig. 2)

3. All required service and maintenance required can be performed on the mini play-field while it is in this position.

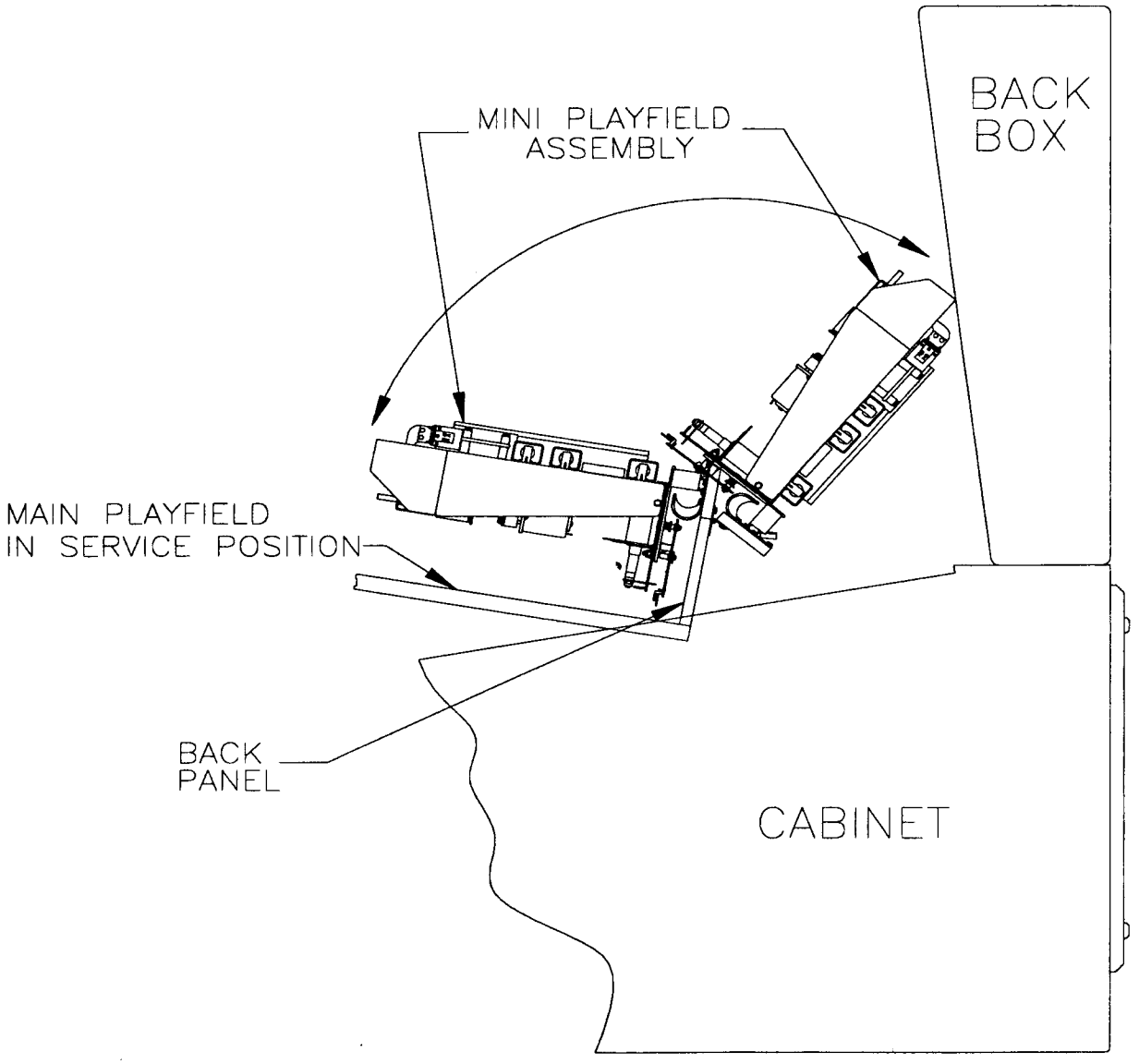


Fig. 2

B. To service mini-playfield unique mechanisms

1. To service kicker assembly

a. Remove four (4) #8 ESNA nuts that secure coil mounting bracket and coil stop brackets.

b. Coil wire guard may then be removed. (See Fig. 3)

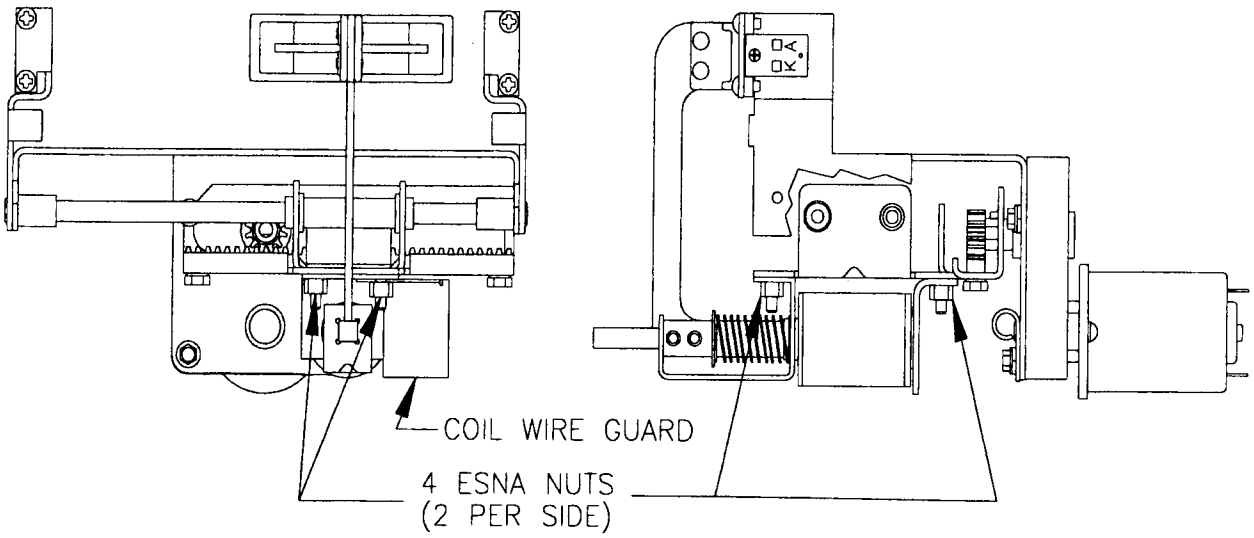


Fig. 3

c. If coil needs to be replaced, de-solder wires from lugs. If coil is okay then let coil hang by wire leads.

d. Entire kicker assembly can be removed from mini-playfield. (See Fig. 4)

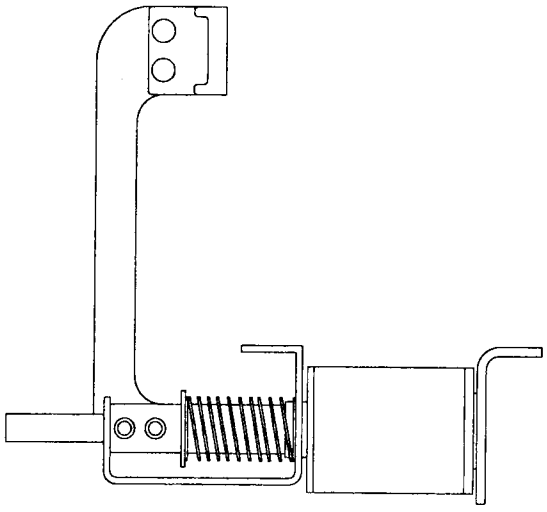


Fig. 4

e. To replace coil spring, remove "E" ring from kicker armature. (See Fig. 5a)

Compress kicker armature until square shaft can be removed from square hole. (See Fig. 5b) With kicker armature removed, replace spring. (See Fig. 5c) Slide kicker armature back through the round hole in coil mounting bracket and compress until square shaft can be re-inserted into square hole. After re-inserting square shaft into square hole, compress just the coil spring far enough back so that the "E" ring can be re-installed.

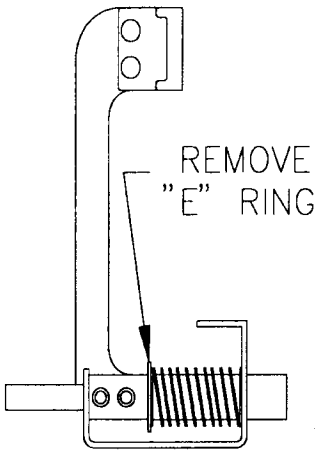


Fig. 5a

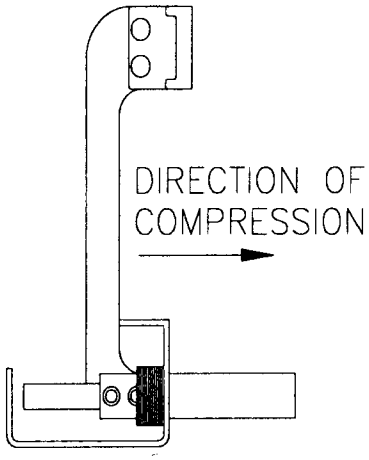


Fig. 5b

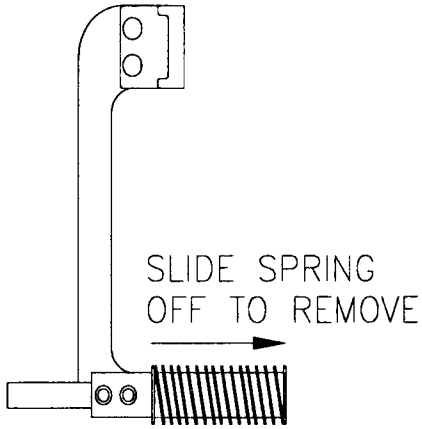


Fig. 5c

f. Reassemble kicker assembly and remount using the four (4) #8 ESNA nuts making sure coil wire guard is re-inserted before nut is secured tight.

2. To service motor

a. De-solder motor wire leads, noting which color wire belongs to which terminal.

b. Remove four (4) motor mounting screws. Motor can now be removed. (See Fig. 6)

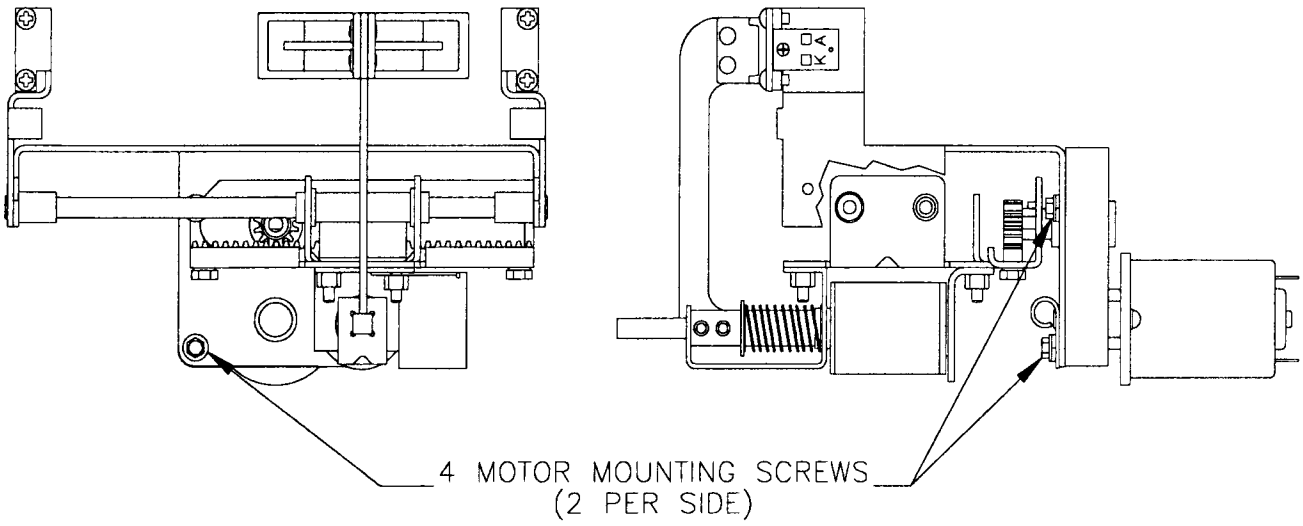


Fig. 6

c. If replacing motor, be sure to remove pinion gear from the motor shaft and install it on the new motor shaft. (See Fig. 7) Apply Loctite to set-screw and use a .050 Hex Allen wrench to re-install. Do not over tighten, screw may strip.

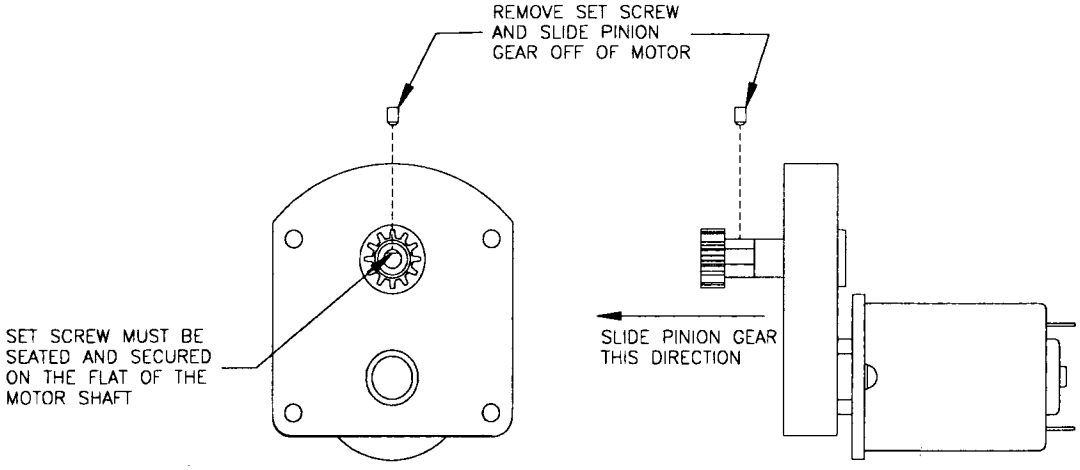


Fig. 7

d. Re-install new motor, making sure that there is proper engagement between the rack and pinion.

e. Solder wire leads back onto terminals.

3. Lubrication points

a. Periodically (every 2 to 3 months depending on usage) wipe clean the square shaft of the kicker assembly with an absorbent rag or towel, carefully removing as much grease, grime and dirt as possible. Re-apply a small amount of Teflon grease, using a cotton swab or similar applicator, to all four sides of the square shaft. Compress the kicker shaft several time to work in the grease. (See Fig. 8)

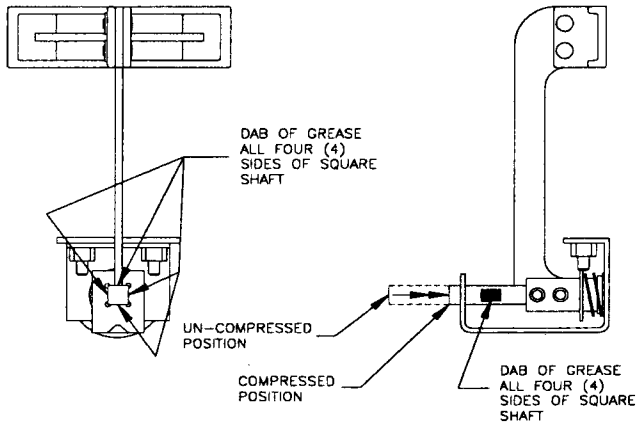


Fig. 8

b. Do Not lubricate the four bronze bushing that are found on the sliding carriage of the kicker assembly. They are oil impregnated and will not need to be lubricated. If lubricated, contamination may occur and subsequently destroy the bushings. (See Fig. 9)

c. Do Not lubricate the rack or the pinion gear. They are made of a plastic material that does not require any lubrication. If the rack or pinion are lubricated they may become contaminated and subsequently be destroyed resulting in the failure of the mechanism. (See Fig. 9)

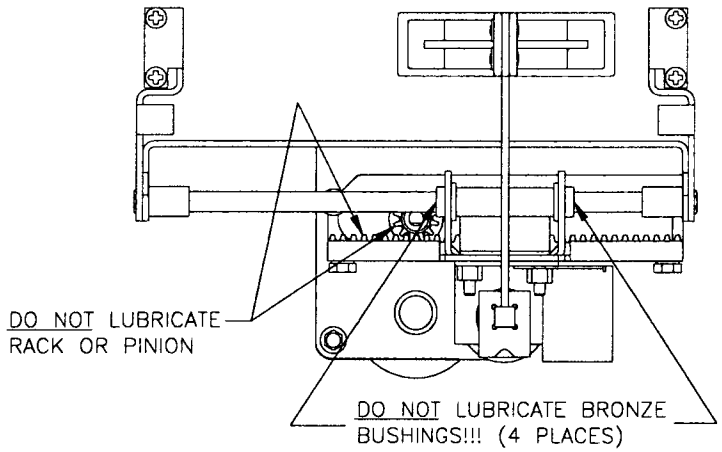


Fig. 9

4. Miscellaneous standard parts and mechanisms

a. All other items on the mini-playfield are standard parts (i.e. lamps, targets, optos, 4-bank drop target). To be serviced as regular standard mechanisms.

Left And Right Divert Mechanisms

1. To service divertor mechanism - Left ramp divertor.

a. Unplug mechanism from main wire harness.

b. Remove tension spring carefully. (See Fig. 10)

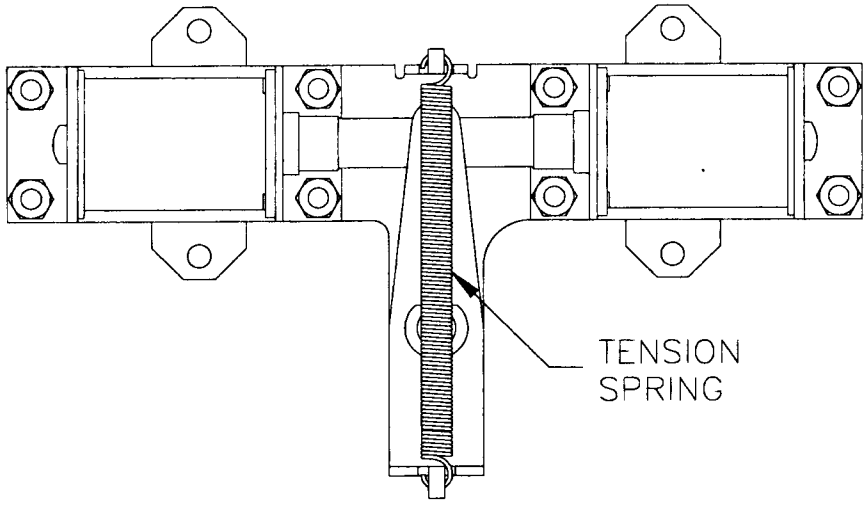


Fig. 10

c. Unscrew set-screws (2 places) using a 3/32 Hex Allen wrench, until divertor shaft can drop through top of playfield. (See Fig. 11)

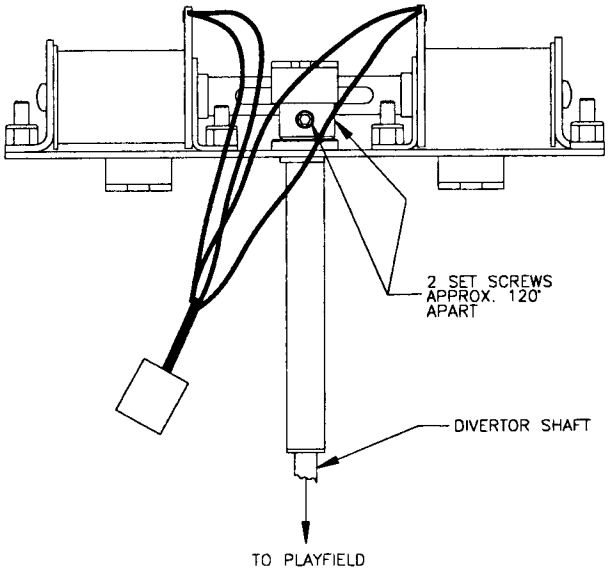


Fig. 11

d. Remove eight (8) #8 ESNA nuts from the top of mechanism. (See Fig. 12)

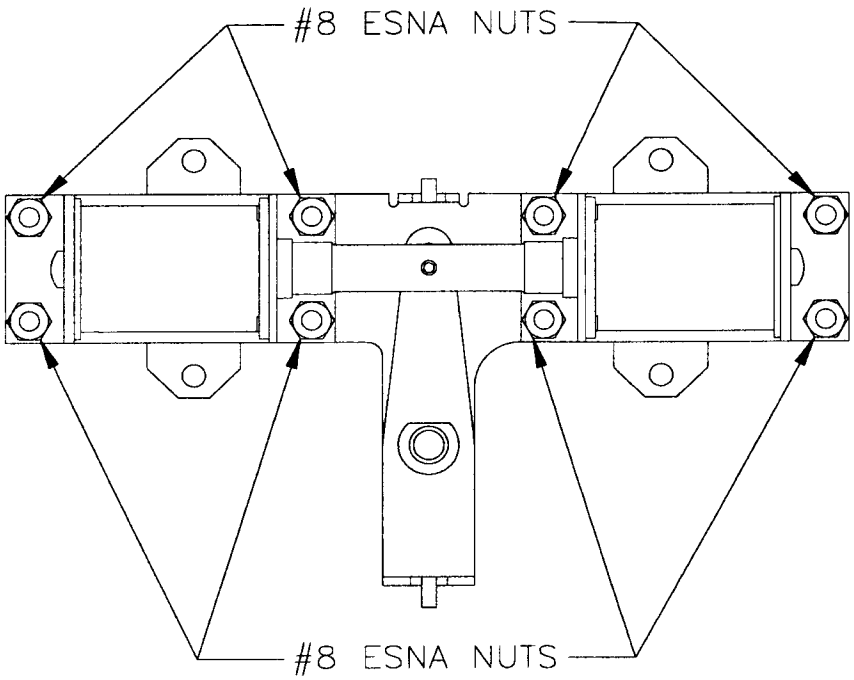


Fig. 12

e. The entire working part of the mechanism can now be removed from the main support bracket. (See Fig. 13)

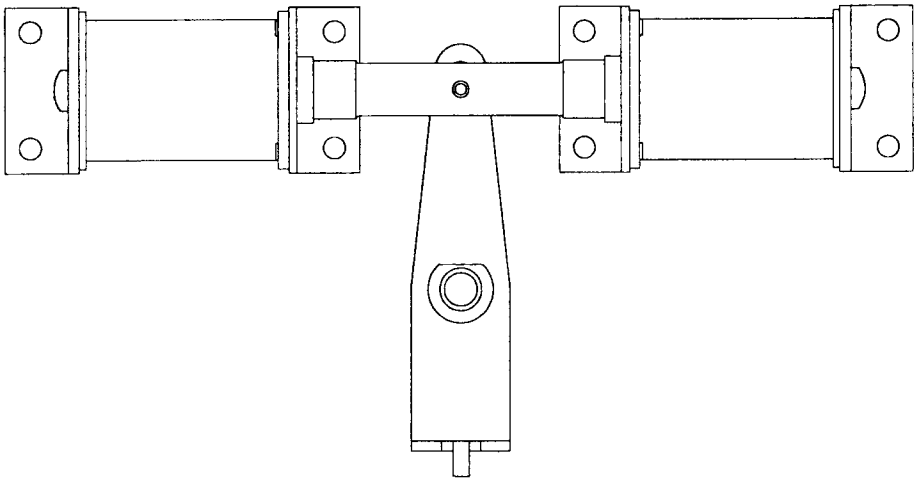


Fig. 13

f. If coils are to be replaced, do so now.

g. If armature and crank are to be replaced, remove the armature/crank assembly from the coils by sliding the coils and coil brackets off of the armature. (See Fig. 14)

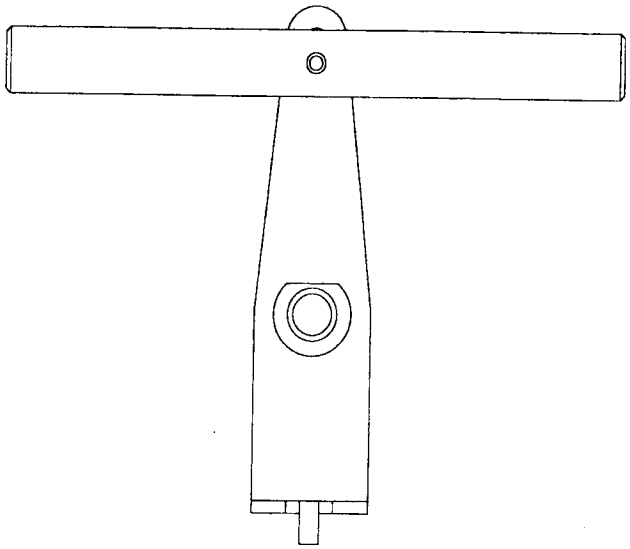


Fig. 14

h. To separate the crank from the armature, carefully drive out the roll pin until the crank can be removed from the slot in the armature. The roll pin does not have to be removed completely from the armature. Leaving the roll pin partially inserted in the armature will make reassembly easier. (See Fig. 15)

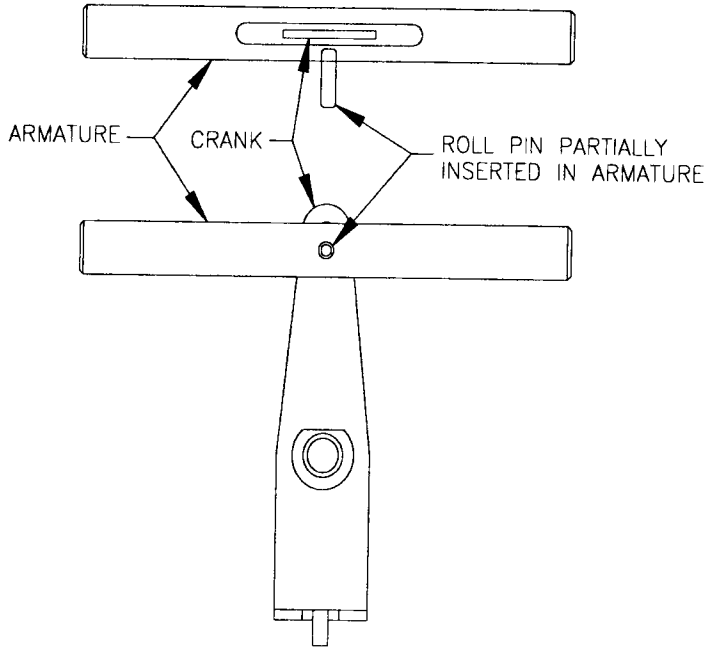


Fig. 15

2. To service divertor mechanism - Right ramp divertor.

a. Follow the same procedures as for the left ramp divertor mechanism.

3. Lubrication points.

a. Periodically (every 2 to 3 months, depending on usage) apply a small amount of Teflon grease, with a cotton swab or similar applicator, between the armature and crank interface. (See Fig. 16)

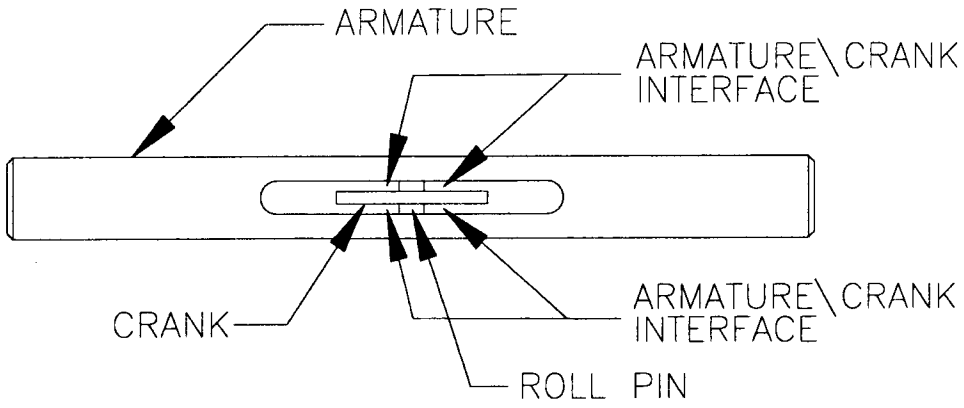
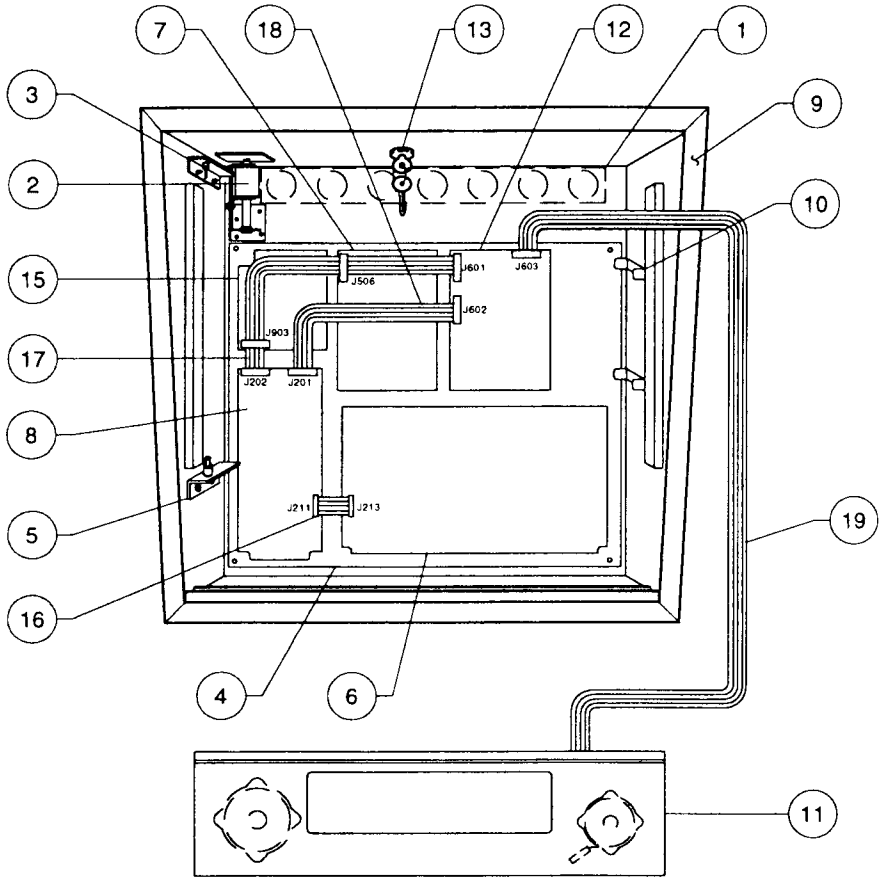


Fig. 16

SECTION TWO

GAME PARTS INFORMATION

50032-BB
Backbox Assembly



♦ **Ribbon Cables**

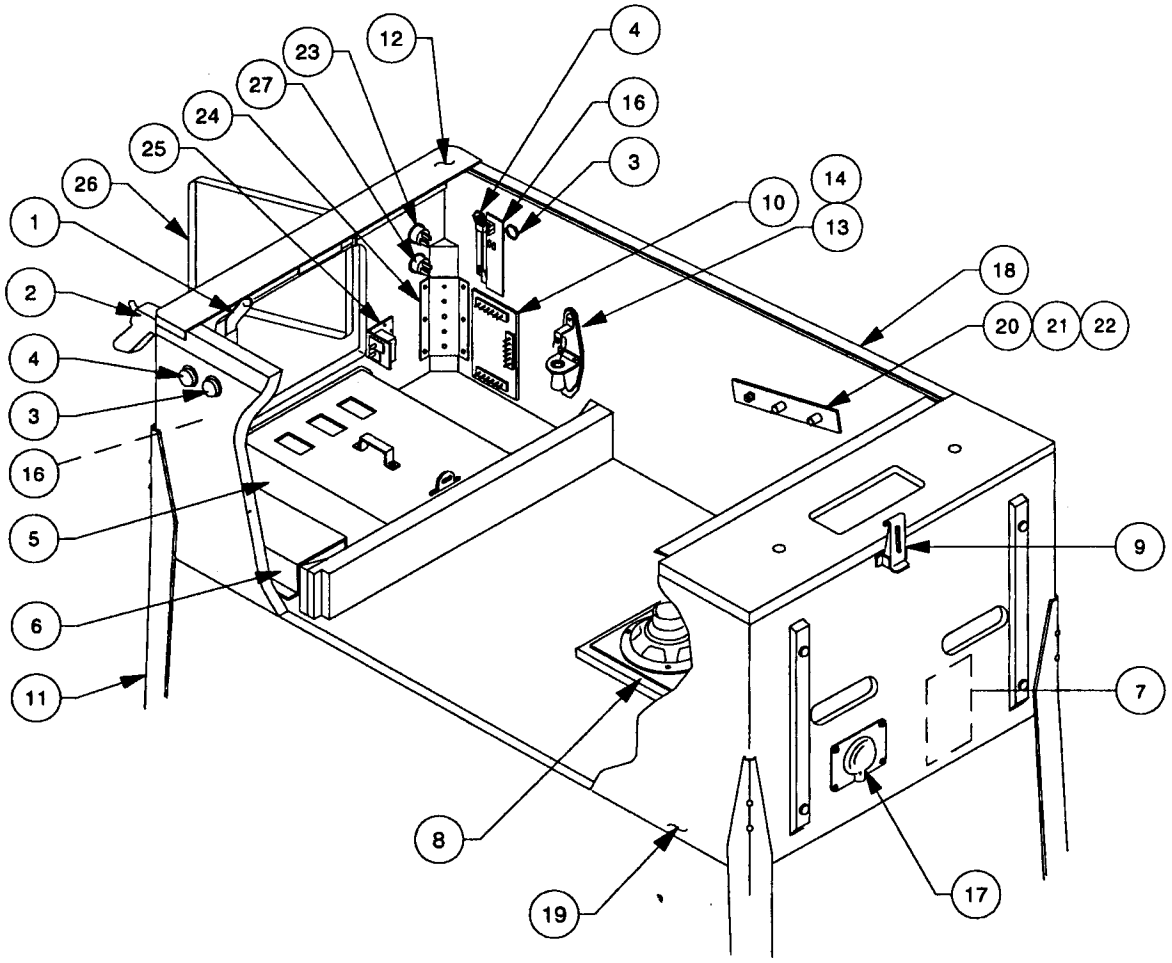
Item	Part Number	Description
16	5795-12653-03	Ribbon Cable, 3"
17	5795-13018-01	Ribbon Cable, 23.5"
18	5795-10938-15	Ribbon Cable, 15"
19	5795-13434-32	Ribbon Cable w/Ferrite 32"

Item	Part Number	Description
1	01-6645	Venting Screen
2	B-10686-1	Knocker Assembly
3	A-12497	Insert Bd.Hinge Assy., Upr.
4	A-14092-6	WPC Mounting Plate Assy.
5	A-12498	Insert Bd. Hinge Assy., Lwr.
6	A-12697-3	Power Driver Assembly
7	A-16917-50032	Sound Board Assembly
8	A-17651-50032	WPC Security CPU Board
9	A-19031	Backbox, Screened
10	01-9047	Insert Stop Bracket
11	A-19032	Speaker/Display Assembly
12	A-14039.1	Dot Matrix Controller Board
13	A-13379	Lock & Plate Assembly
14	50032-IN	Insert Board
15	A-15472-1	Fliptronic II Board

♦ **Miscellaneous Parts**

Part Number	Description
A-8552-50032	Tempered Backglass Assy.
03-8228-2	Glass Channel Top (1)
03-8228-3	Glass Channel Edge (2)
03-8229-1	Glass Lift Channel (1)
08-7456	Backbox Glass:27x18-7/8"
31-1357-50032	Screened Translight

50032-CAB
Cabinet Assembly



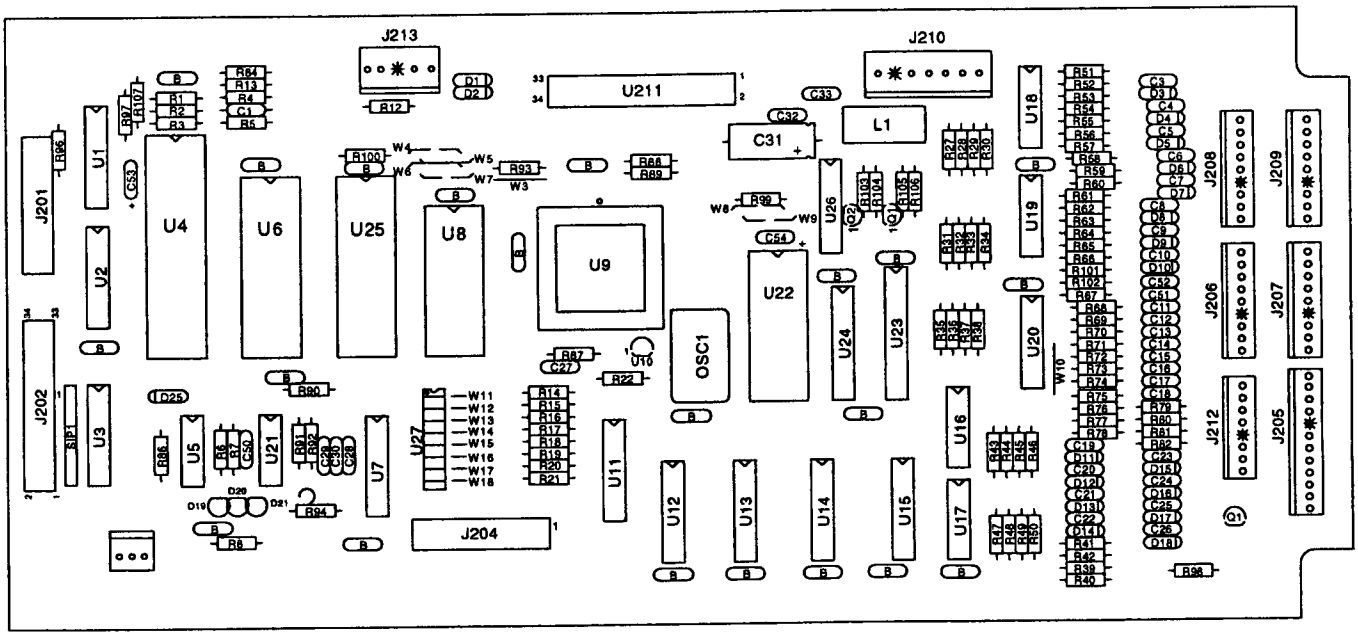
Item	Part Number	Description
1	A-16773-1	Lever Guide Assembly
2	A-18536	Gun Assembly
3	A-16883-1	Flipper Button, Blue (2)
4	A-16883-4	Flipper Button, Red(2)
5	A-17900-1	5-Ball Cashhbox Assembly
6	A-17540	Univ. Power Interface Assy.
7	5610-13953-00	WPC Transformer
8	5555-12929-00	Speaker, 4Ω, 6", 25w
9	20-9347	Toggle Latch
10	A-17051-1	Coin Door Interface Board
11	A-19514	Leg Assembly, Chrome
12	D-12615	Front Molding Assembly
13	20-6502-A	Plum Bob
14	A-15361	Tilt Mechanism Assembly
15	*	Cordset
16	A-17316	Opto Flipper Assembly (2)
17	01-10714	Line Cord Cover
18	A-12359-3	Side Molding Assembly (2)
19	11-1209	Wood Cabinet
20	01-11408	Plate Spacer (2)
21	02-4329-2	Pivot Nut, 11/16" (4)
22	02-4352	Pivot Bushing (2)
23	20-9663-1	Push Button w/Sw., Start
24	01-11400	Leg Plate (4)
25	A-18249-1	Cable & Interlock Switch Assy.
26	09-61000-1	Coin Door-USA
27	20-9663-9	Push Button w/Sw., Extra Ball

♦ Miscellaneous

A-17195	Tilt Switch Assy. w/Cable
A-19562.1	Stay Arm Assembly
01-12352	Clip Bracket
01-9011-L	Backbox Mtg. Bracket, Left
01-9011-R	Backbox Mtg. Bracket, Right
08-7028-T	Playfield Glass
08-7377	Leg Leveler Adjuster, 3"
20-6500	Steel Ball, 1-1/16" (5)

* See Application Chart p.2-35.

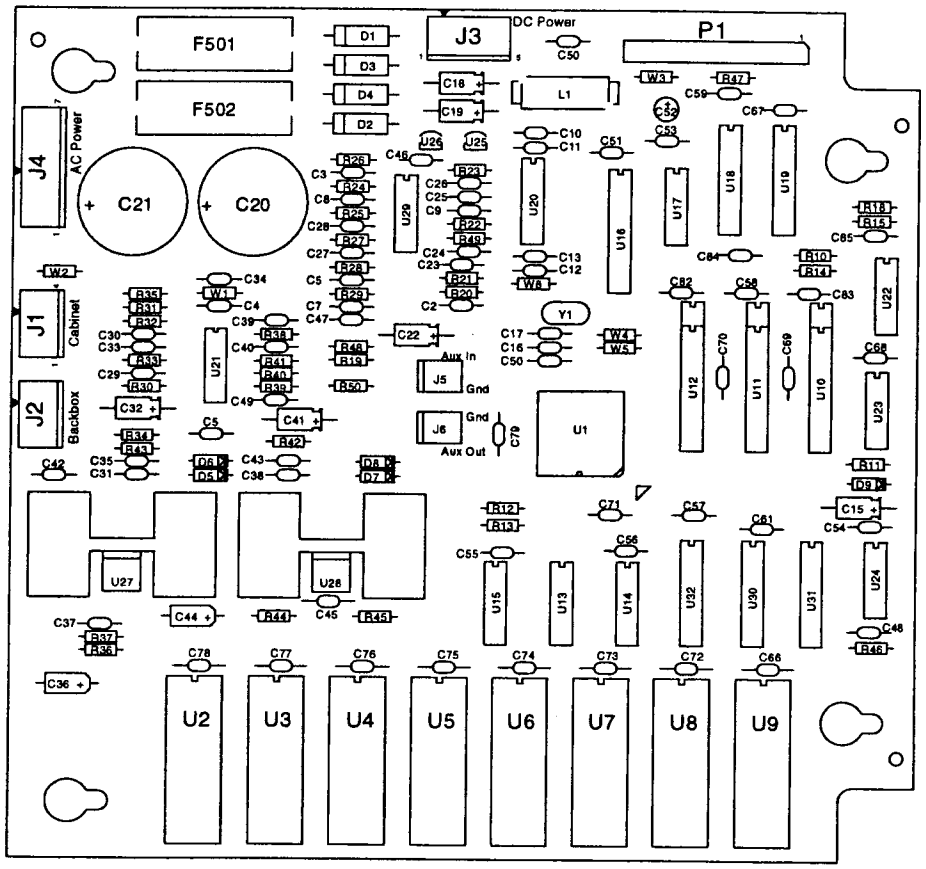
A-17651-50032
WPC CPU Security Board Assembly



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

Part Number	Designator	Description
5281-10182-00	U11-U13, U15	IC, 74LS240 / DRVR
5284-12651-00	U21	IC, 4548
5315-13924-00	U23	IC, 74HC4514 LTCH 1to16 Dec.
5281-09246-00	U26	IC, 74LS139 2 T 4 Decoder
5340-12558-00	U8	S/RAM 8Kx8 Low Power
5370-12558-00	U16-U19	IC, LM339 Quad Comp
5370-12687-00	U10	MC 34064
5521-10931-00	OSC1	8.00MHZ OSC 14PIN DIP
5520-12084-00	X1	Crystal 32.768 KHz
5551-09822-00	L1	Inductor, 4.7µH, 3.0A.
5671-13732-00	D19-D21	Display LED Red
5700-08985-00	U4	Socket IC 40P .6"
5700-12088-00	U6	Socket IC 32P .6"
5700-12424-00	U9	Socket 84 Pin PLCC
5700-10176-00	U22	Socket IC 28 P .6"
5791-10850-00	J201, J204	Connector, 26-pin Header Str
5791-14090-05	J213	Connector, 5-pin Header Str
5791-10862-07	J210	Connector, 7-pin Header Str
5791-13830-08	J212	Connector, 8-pin Header Str
5791-13830-09	J208, J209	Connector, 9-pin Header Str
5791-13830-11	J206, J207	Connector, 11-pin Header Str
5791-12516-00	J202, J211	34 Hen 2x17 Str
5048-11033-00	C50	Cap., .022 µF
5791-13830-12	J205	Cap., 12-pin Header Str
5043-09845-00	C32, C33	Cap., 1KP, 50v (±10%)
5645-09025-00	U27	Switch DIP 8 POS
5162-12422-00	U20	IC, ULN 2803A
A-5400-50032-1	U22	WPC PIC 16C57 Micro-C
A-5343-50032-1	U6	Game ROM Assembly
A-17643	-	Battery Holder PCB Assy.
5400-10320-00	U4	MC68B09E 2Mhz µP
5410-12426-00	U9	WPC ASIC-89
20-9665-1	-	PCB Standoffs
H-18258	-	WPC CPU Security Cable

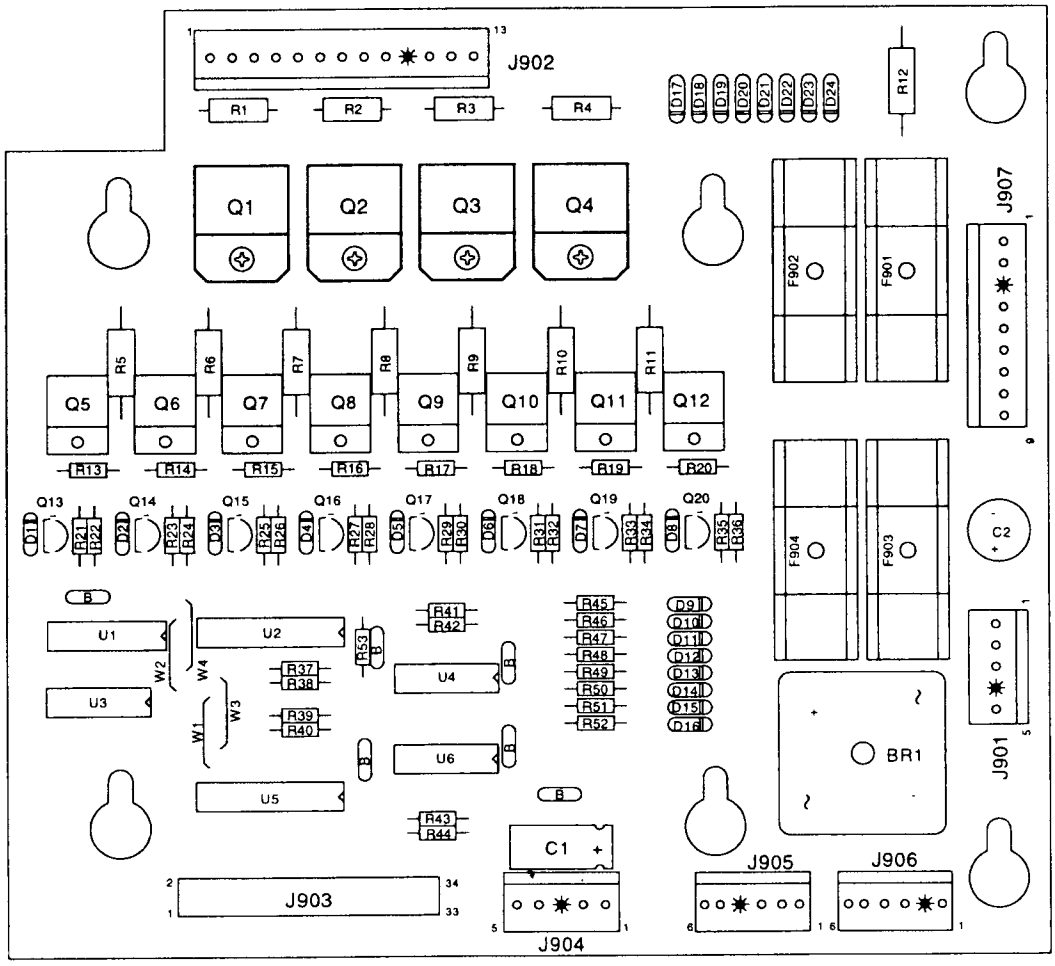
A-16917-50032
Sound Board Assembly



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

Part Number	Designator	Description
5070-09054-00	D5-D9	Diode Signal 1N4004
5250-13302-00	U25	78L05 Pos 5V reg TO-92
5250-13303-00	U26	79L05 Neg 5V Reg TO-92
5283-10551-00	U17	IC74F00 Fast Quad NAND
5311-10946-00	U22	IC74HC74 Dual D Flip Flop
5311-10947-00	U23	IC74HC125 Quad Tri-State Buffer
5311-10948-00	U15	IC74HC138 1 of 8 Decoder
5315-12009-00	U18, U19	IC74HCT374 Octal D Flip Flop
5311-12043-00	U13, U14	IC74HC174 Hex D Flip Flop
5311-12538-00	U24	IC74HC14 Hex Schmitt Inverter
5311-12287-00	U30-U32	IC74HC541 Octal Bus Driver
5340-13304-00	U10-U12	ICSRAM 2Kx8 35ns .300 DIP
5370-12730-00	U21, U29	ICTL084 Quad Op AMP
5370-13419-00	U27, U28	Audio Power Amp TDA2030AV
5371-13299-00	U20	IC DAC AD-1851 16Bit
5520-13301-00	Y1	Crystal 10MHz Parallel resonant
5551-09822-00	L1	Inductor, 4.7µH, 3Amp.
5700-12047-00	U16	IC, Socket 24-Pin .300 DIP
5700-12088-00	U2-U9	IC, Socket 32-Pin .600 DIP
5705-12638-00	U27, U28	Heatsink 5298-B
5733-12060-01	F501, F502	MT3AG PCMounted Fuse Holder
5791-10862-04	J1, J2	Connector, 4-pin Header STR .156
5791-10862-05	J3	Connector, 5-pin Header STR .156
5791-10862-07	J4	Connector, 7-pin Header STR .156
5791-12516-00	P1	Connector, 34 Hen 2x17 STR .100
A-17002	U16	PAL Sub-Assembly
A-5343-50032-S2	U2	ROM Sub-Assembly
A-5343-50032-S3	U3	ROM Sub-Assembly
A-5343-50032-S4	U4	ROM Sub-Assembly
A-5343-50032-S5	U5	ROM Sub-Assembly
A-5343-50032-S6	U6	ROM Sub-Assembly
A-5343-50032-S7	U7	ROM Sub-Assembly
A-5343-50032-S8	U8	ROM Sub-Assembly
A-5343-50032-S9	U9	ROM Sub-Assembly
5731-10356-00	F501, F502	Fuse, 3Amp, 250v, Slow Blow

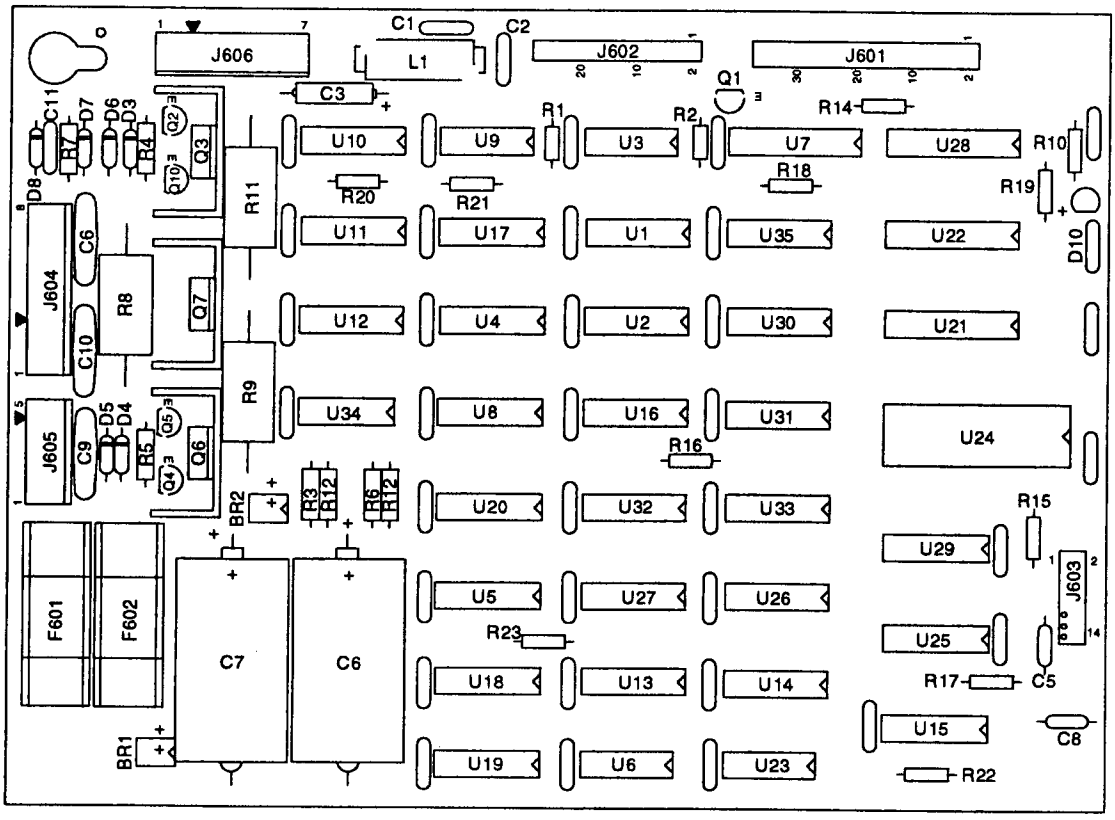
A-15472-1
Fliptronic II Board Assembly



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

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

A-14039.1
Dot Matrix Assembly



Part Number	Designator	Description
5010-08991-00	R1	Res., 4.7KΩ, ¼w, 5%
5010-09036-00	R14-R23	Res., 100Ω, ¼w, 5%
5010-09224-00	R10	Res., 270Ω, ¼w, 5%
5010-12832-00	R3, R6, R12, R13	Res., 4.7KΩ, ½w, 5%
5010-12841-00	R4, R5	Res., 120Ω, ½w, 5%
5012-12830-00	R9	Res., 1.8KΩ, 5w, 5%
5012-12842-00	R11	Res., 120Ω, 5w, 5%
5012-12843-00	R8	Res., 4.7KΩ, 5w, 5%
5010-10171-00	R7	Res., 56Ω, ¼w, 5%
5043-09492-00	C5, C8	Cap., 100P, 50v, (±10%)
5040-08986-00	C3	Cap., 100M, 10v (±20%)
5040-12324-00	C4, C7	Cap., 150M, 160v (±50%)
5043-08980-00	BYPASS	Cap., .01M, 50v (+80,-20%)
5043-09072-00	C6, C9, C10	Cap., .1M, 500v (+80,-20%)
5043-09845-00	C1, C2, C11	Cap., 1KP, 50v (±20%)
5070-09054-00	D7	Diode, 1N4004, 1.0A.
5075-12824-00	D6, D8	Zener, 1N4742A, 12v
5075-12823-00	D4, D5	Zener, 1N4758, 56v
5075-12826-00	D3	Zener, !N4759A, 62v
5100-12833-00	BR1, BR2	Bridge, 400v, 1A
5150-10269-00	Q1	Trans., 2N3904 NPN
5164-09056-00	Q2, Q10	Trans., MPSD02 NPN
5164-12154-00	Q3, Q7	Trans., MJE15030 NPN
5194-09055-00	Q4, Q5	Trans., MPSD52 PNP
5194-12155-00	Q6	Trans., MJE15031 PNP
5281-09738-00	U16, U25-U27	IC, 74LS157
5281-10033-00	U3	IC, 74LS30
5281-10043-00	U31-U33, U35	IC, 74LS175

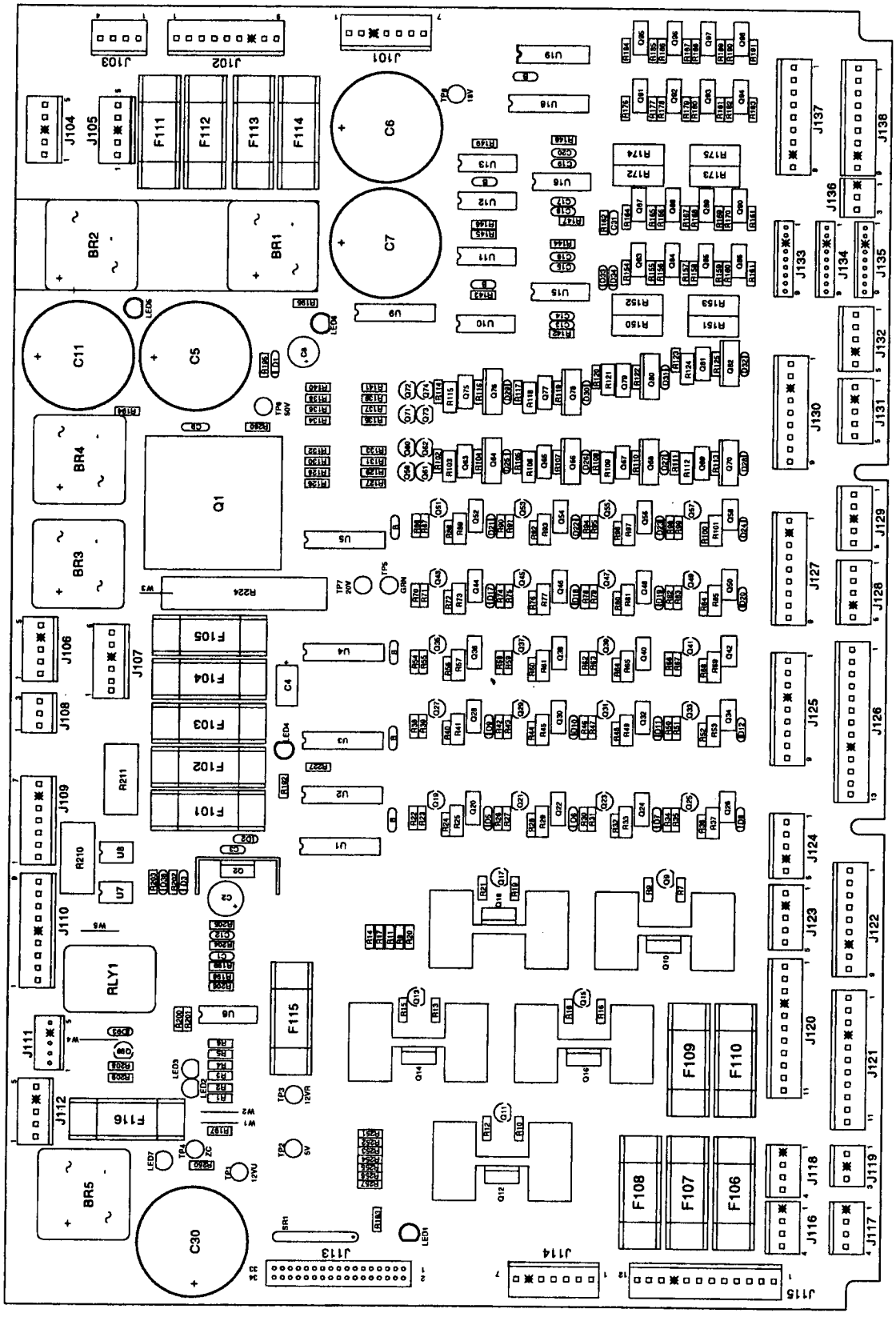
Part Number	Designator	Description
5311-10946-00	U4, U5, U17, U18, U20	IC, 74HC74
5311-10947-00	U9	IC, 74HC125
5311-10951-00	U10, U11	IC, 74HC161
5311-10977-00	U6	IC, 74HC04
5311-12817-00	U29	IC, 74HC165
5311-12819-00	U21	IC, 74HC688
5311-12820-00	U23	IC, 74HC27
5311-12822-00	U13-U15	IC, 74HC193
5315-12009-00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

A-12697-3
WPC Power Driver Assembly

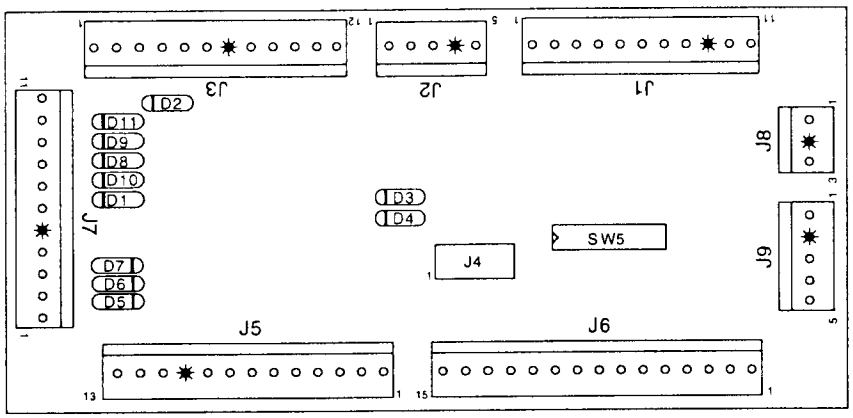
Part Number	Designator	Description
5010-08981-00	R260	Res., 10KΩ, ½w, 5%
5010-08991-00	R9, R12, R15, R18, R21, R23, R27, R31, R35, R39, R43, R47, R51, R55, R59, R63, R67, R71, R75, R79, R83, R87, R91, R95, R99, R126, R128, R130, R132, R134, R136, R138, R140, R227	Res., 4.7KΩ, ¼w, 5%
5010-08992-00	R8, R11, R14, R17, R20, R177, R179, R181, R183, R185, R187, R189, R191	Res., 560Ω, ¼w, 5%
5010-08993-00	R25, R29, R33, R37, R41, R45, R49, R53, R57, R61, R65, R69, R73, R77, R81, R85, R89, R93, R97, R101, R103, R106, R109, R112, R115, R118, R121, R124	Res., 68KΩ, ½w, 5%
5010-08997-00	R24, R28, R32, R36, R40, R44, R48, R52, R56, R60, R64, R68, R72, R76, R80, R84, R88, R92, R96, R100, R102, R105, R108, R111, R114, R117, R120, R123	Res., 2.7KΩ, ¼w, 5%
5010-08998-00	R155, R157, R159, R161, R165, R167, R169, R171	Res., 2.2KΩ, ¼w, 5%
5010-09034-00	R142-R149, R197-R198	Res., 10KΩ, ¼w, 5%
5010-09085-00	R194, R196, R251, R253-R257	Res., 1.5KΩ, ¼w, 5%
5010-09086-00	R252	Res., 6.8KΩ, ¼w, 5%
5010-09224-00	R192, R202-R205	Res., 270Ω, ¼w, 5%
5010-09314-00	R176, R178, R180, R182, R184, R186, R188, R190	Res., 1.2K, ¼w, 5%
5010-09324-00	R206	Res., 27KΩ, ¼w, 5%
5010-09358-00	R154, R156, R158, R160, R162, R164, R166, R168, R170, R193, R199, R250	Res., 1KΩ, ¼w, 5%
5010-09361-00	R104, R107, R110, R113, R116, R119,	Res., 220Ω, ½w, 5%
5010-09416-00	R122, R125 R22, R26, R30, R34, R38, R42, R46, R50, R54, R58, R62, R66, R70, R74, R78, R82, R86, R90, R94, R98, R127, R129, R131, R133, R135, R137, R139, R141	Res., 470Ω, ¼w, 5%
5010-11079-00	R7, R10, R13, R16, R19	Res., 51Ω, ¼w, 5%
5010-12427-00	R150-R153, R172-R175	Res., .22Ω, 1w, 5%
5012-12632-00	R224	Res., .12Ω, 10w, 5%
5019-10143-00	SR1	SIP 470Ω, 9R, 10-pin, 5%
5040-08986-00	C4	Cap., 100M, 10v (±20%)
5040-09421-00	C2	Cap., 100M, 25v (+50, -10%)
5040-09537-00	C8	Cap., 100M, 100v (±20%)

Part Number	Designator	Description
5040-12313-00	C5-C7, C11, C30	Cap., 15KM, 25v (±20%)
5043-08980-00	B-BYPASS	Cap., .01M, 50v (+80, -20%)
5043-08996-00	C13-C20, C31	Cap., .1M, 50v (±20%)
5043-09845-00	C1, C12	Cap., 1KP, 50v (±20%) Axial
5048-10994-00	C3	Cap., .33M, 50v (±20%) Axial
5070-08919-00	D33, D34	Diode 1N4148, 150MA.
5070-09054-00	D1-D3, D5-D12, D17-D32, D38	Diode 1N4004, 1.0A.
5100-09690-00	BR1-BR5	Bridge, 35A., Rect, 200v
5131-12725-00	Q10, Q12, Q14, Q16, Q18	Triac BT138E
5162-12422-00	U19	IC ULN 2803 OC-DRL
5162-12635-00	Q20, Q22, Q24, Q26, Q28, Q30, Q32, Q34, Q36, Q38, Q40, Q42, Q44, Q46, Q48, Q50, Q52, Q54, Q56, Q58, Q63, Q65, Q67, Q69, Q75, Q77, Q79, Q81, Q83-Q90	Transistor, TIP 102
5194-09055-00	Q9, Q11, Q13, Q15, Q17, Q19, Q21, Q23, Q25, Q27, Q29, Q31, Q33, Q35, Q37, Q39, Q41, Q43, Q45, Q47, Q49, Q51, Q53, Q55, Q57, Q59-Q62, Q71-Q74	Transistor, 2N5401 PNP
5191-12179-00	Q64, Q66, Q68, Q70, Q76, Q78, Q80, Q82	Transistor, TIP36C PNP
5192-12428-00	Q91-Q98	Transistor, TIP 107
5250-12634-00	Q1	Reg LM 323 5v
5281-09486-00	U1-U5, U18	IC, 74LS374 8D F/F
5281-09487-00	U10-U13	IC, 74LS74 Dual D F/F
5281-10182-00	U9	IC, 74LS240 L/Drvr.
5370-12272-00	U6, U15, U16	IC, LM339 Quad Comp.
5460-12423-00	Q2	IC, LM7812
5671-13732-00	LED1, LED4-LED7	Display LED Red
5701-09652-00	Q1	Thermal Pad
5705-09199-00	Q2	Heatsink 6030B
5705-12637-00	Q1	Heatsink 5054
5705-12638-00	Q10, Q12, Q14, Q16, Q18	Heatsink 5298B
5733-12060-01	F101-F116	Fuse Holder PC MT3AG
5791-10862-03	J108, J119, J136	Connector, 3-pin Header .156
5791-10862-04	J103, J116-J118	Connector, 4-pin Header .156
5791-10862-05	J104-J106, J112, J123, J124, J128, J129, J131, J132	Connector, 5-pin Header .156
5791-10862-06	J107	Connector, 6-pin Header .156
5791-10862-07	J101, J109, J114	Connector, 7-pin Header .156
5791-10862-09	J102, J122, J125, J127, J130, J137, J138	Connector, 9-pin Header .156
5791-10862-11	J120, J121	Connector, 11-pin Header .156
5791-10862-12	J115	Connector, 12-pin Header .156
5791-10862-13	J126	Connector, 13-pin Header .156
5791-13830-05	J111	Connector, 5-pin Header
5791-13830-09	J133-J135	Connector, 9-pin Header
5791-12516-00	J113	34 Hen 2x17 STR
5824-09248-00	TP1-TP8	Test Point #1502-1
5041-09163-00	C9	Cap., 2.2MF Tant
5730-09071-00	F114	Fuse, 8A, 32v
5731-09432-00	F112	Fuse, S-B, 7A., 250v
5731-09651-00	F106-F111, F113	Fuse, S-B, 5A., 250v
5731-10356-00	F101-F105, F116	Fuse, S-B, 3A., 250v
5730-09797-00	F115	Fuse, S-B, 3/4A., 250v
5705-12698-00		Heatsink #62365

A-12697-3
WPC Power Driver Assembly

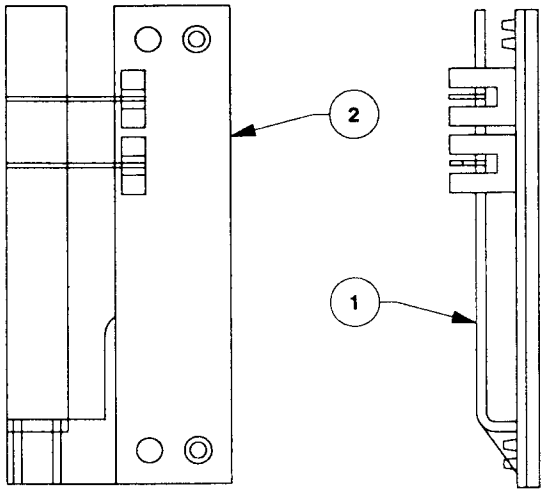


A-17051-1
Coin Door Interface PCB Assembly



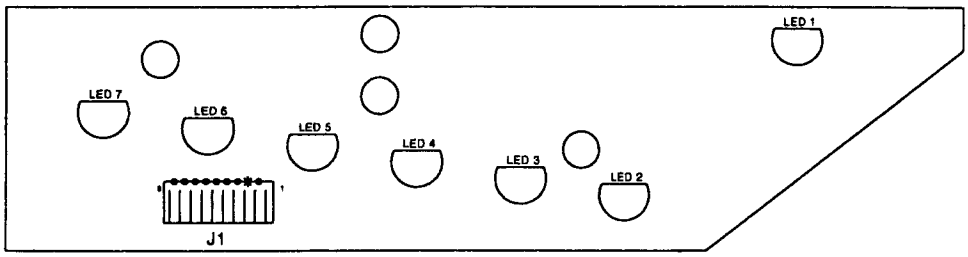
Part Number	Designator	Description
5791-10862-03	J8	Connector, 3-pin Header Str Sq.
5791-10862-05	J2, J9	Connector, 5-pin Header Str Sq.
5791-10862-11	J1, J7	Connector, 11-pin Header Str Sq.
5791-10862-12	J3	Connector, 12-pin Header Str Sq.
5791-10862-13	J5	Connector, 13-pin Header Str Sq.
5791-10862-15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

A-17316
Flipper Opto PCB Assembly



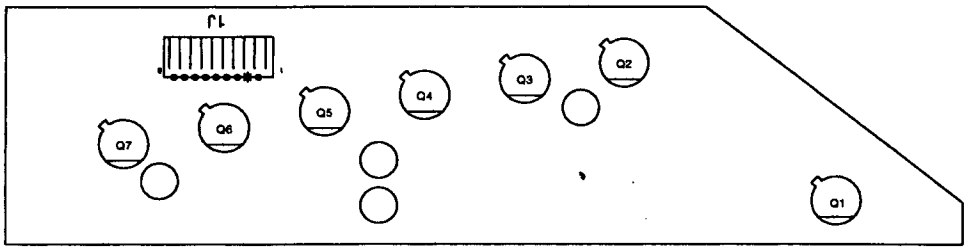
Item	Part Number	Description
1	03-9001	Interrupter Flip-Opto
2	A-16384	Flipper Opto Sw. Assy.
	5010-08930-00	Res., 470Ω, ½w, 5%
	5490-12451-00	Opto Inter Lg. 10mA.
	5791-12462-07	Connector, 7-pin Header

A-18617
Trough 7 IRED PCB Assembly



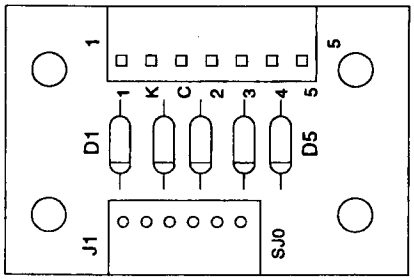
Part Number	Designator	Description
5671-12731-00	LED1 - LED7	Infra Red Diode
5791-12622-09	J1	Connector, 9-pin Header Sq.

A-18618
Trough 7 IR TSTR PCB Assembly



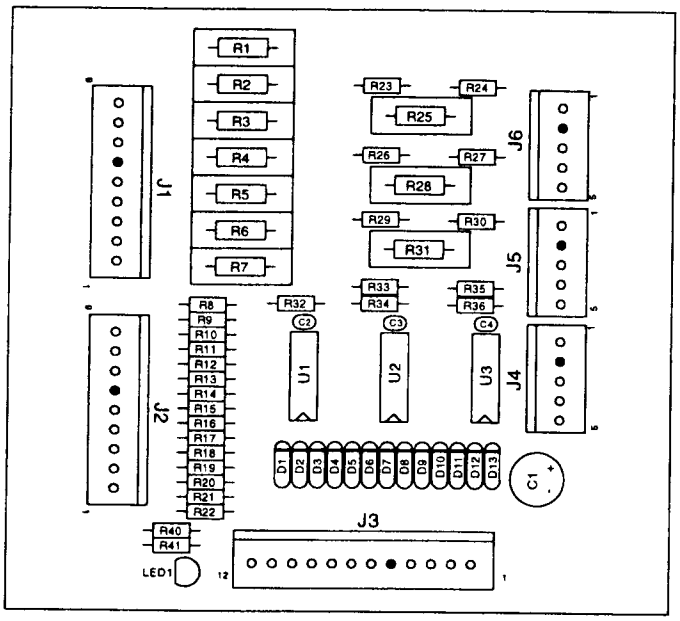
Part Number	Designator	Description
5163-14114-00	Q1 - Q7	Infra Red Photo Transistor
5791-12622-09	J1	Connector, 9-pin Header Sq.

C-13940
5-Switch & Diode PCB Assembly



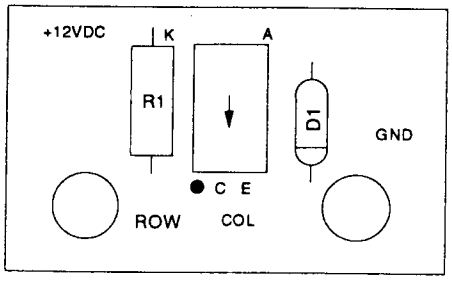
Part Number	Designator	Description
5070-09054-00	D1-D5	Diode 1N4004 1.0A.
5791-10862-07	J2	Connector, 7-pin Header Sq.
5791-12462-06	J1	Connector, 6-pin Header Sq.

A-18159-1
10-Opto Switch PCB & Bracket Assembly



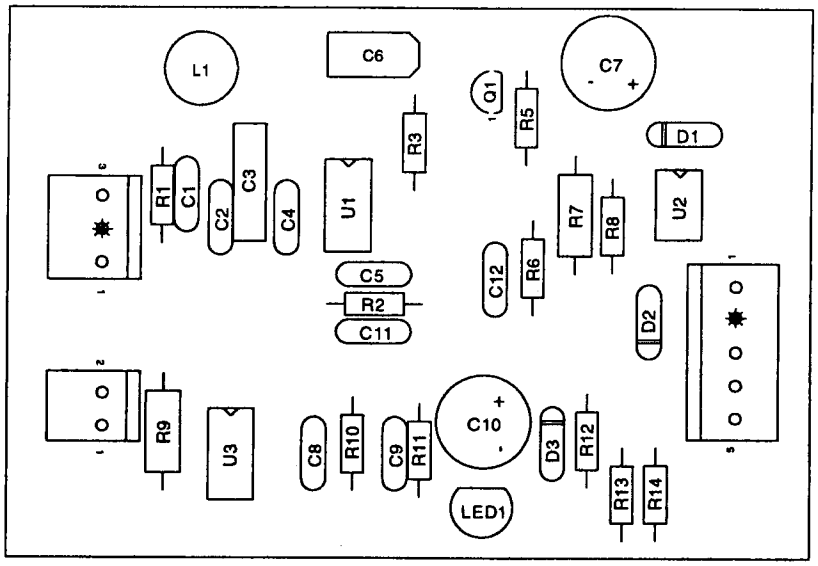
Item	Part Number	Designator	Description
1	A-18159	-	10-Opto PCB Assembly
	5040-10974-00	C1	Cap., 100µFd, 35v
	5043-08980-00	C2-C4	Cap., 0.01µFd, 50v
	5671-13732-00	LED1	Display Red LED1
	5370-12272-00	U1-U3	I.C. LM339, Quad Compar
	5070-09054-00	D1-D13	Diode, 1N4004, 1.0A.
	5010-12928-00	R1-R7, R25, R28, R31	Res., 270Ω, 2w, 5%
	5010-09999-00	R8-R21, R23, R24, R26, R27, R29, R30	Res., 2KΩ, ¼w, 5%
	5010-09314-00	R22	Res., 1.2KΩ, ¼, 5%
	5010-09162-00	R32, R35, R39-R41	Res., 100KΩ, ¼w, 5%
	5010-08774-00	R33, R34, R36	Res., 22KΩ, ¼w, 5%
	5010-09034-00	R37, R38	Res., 10KΩ, ¼w, 5%
	5791-10862-12	J3	Connector, 12-pin Header
	5791-10862-09	J1, J2	Connector, 9-pin Header
	5791-10862-05	J4-J6	Connector, 5-pin Header
2	01-10756	-	Bracket
3	07-6688-18N	-	Rivet, 3/16 X 1/8"

A-14534
Opto Switch PCB Assembly



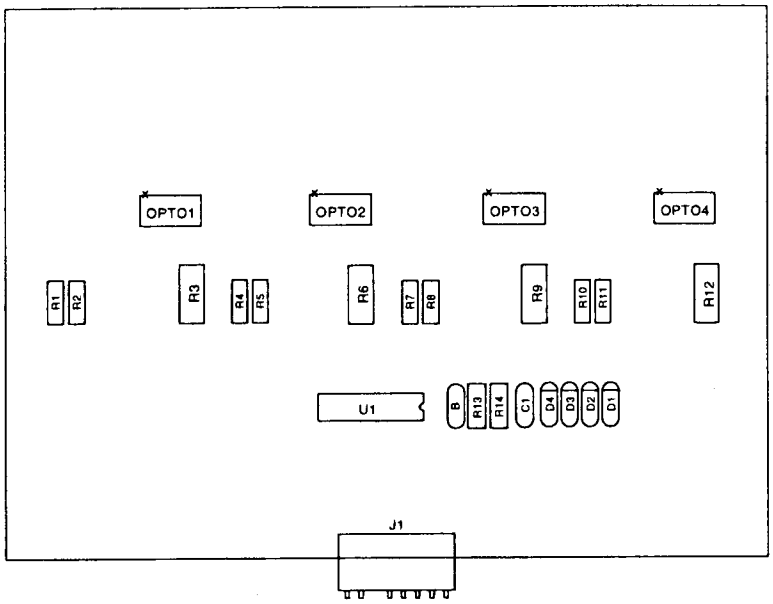
Part Number	Designator	Description
5070-09054-00	D1	Diode 1N4004 1.0A.
5010-08930-00	R1	Resistor, 470Ω, 1/2w, 5%
5490-12451-00	-	Opto Inter lg. 10MA

A-15646-2
Opto Sw-24 PCB Assembly



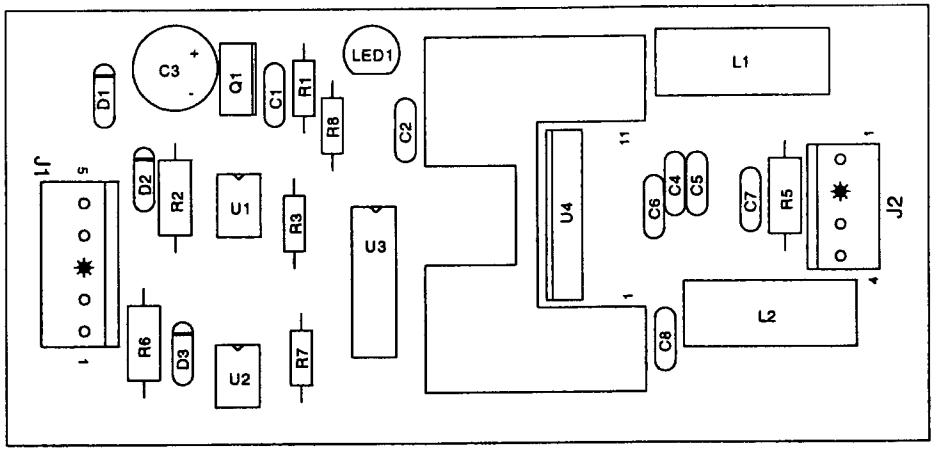
Part Number	Designator	Description
5768-13243-01	-	Opto 24-Sw PCB
5370-10891-00	U1	IC Opto Receiver MC3373
5490-10892-00	U2	IC Opto Isolator
5431-10449-00	U3	IC 555 Timer
5192-13591-00	Q1	Trans MPSZ64 PNP Darlington
5043-10893-00	C3	Capacitor .0015mfd
5043-09065-00	C4, C12	Capacitor 470pf
5043-08996-00	C5, C11	Capacitor 0.1mfd
5041-10588-00	C6	Capacitor 6.8mfd
5043-08980-00	C8	Capacitor .01mfd
5048-12577-00	C2	Capacitor .47mfd
5043-09845-00	C1, C9	Capacitor .001mfd
5070-09054-00	D1, D2, D3	Diode 1N4004 1.0A
5040-10974-00	C7, C10	Capacitor 100mfd 35V +80/-20
5010-08997-00	R1	Resistor 2.7K 1/4w 5%
5010-09162-00	R2, R6	Resistor 100K 1/4w 5%
5010-09768-00	R3	Resistor 180 1/4w 5%
5010-09039-00	R4	Resistor 10 1/4w 5%
5010-09324-00	R5	Resistor 27K 1/4w 5%
5010-08930-00	R7	Resistor 470 1/2w 5%
5010-09034-00	R8	Resistor 10K 1/4w 5%
5010-10022-00	R10	Resistor 7.5K 1/4w 5%
5010-08773-00	R11	Resistor 18K 1/4w 5%
5010-09085-00	R13	Resistor 1.5K 1/4w 5%
5671-13732-00	LED1	Display LED Red 1
5791-12273-03	J1	3H Str. Sq.Lock .156
5791-12273-02	J2	2H Str. Sq.Lock .156
5791-12273-05	J3	5H Str. Sq.Lock .156
5551-10890-00	L1	Inductor 10mH
5010-09534-00	R12	Resistor 0Ω Jumper
5010-09085-00	R9	Resistor 1.5K 1/4w 5%

C-12499
4-Bank Drop Target Opto Assembly



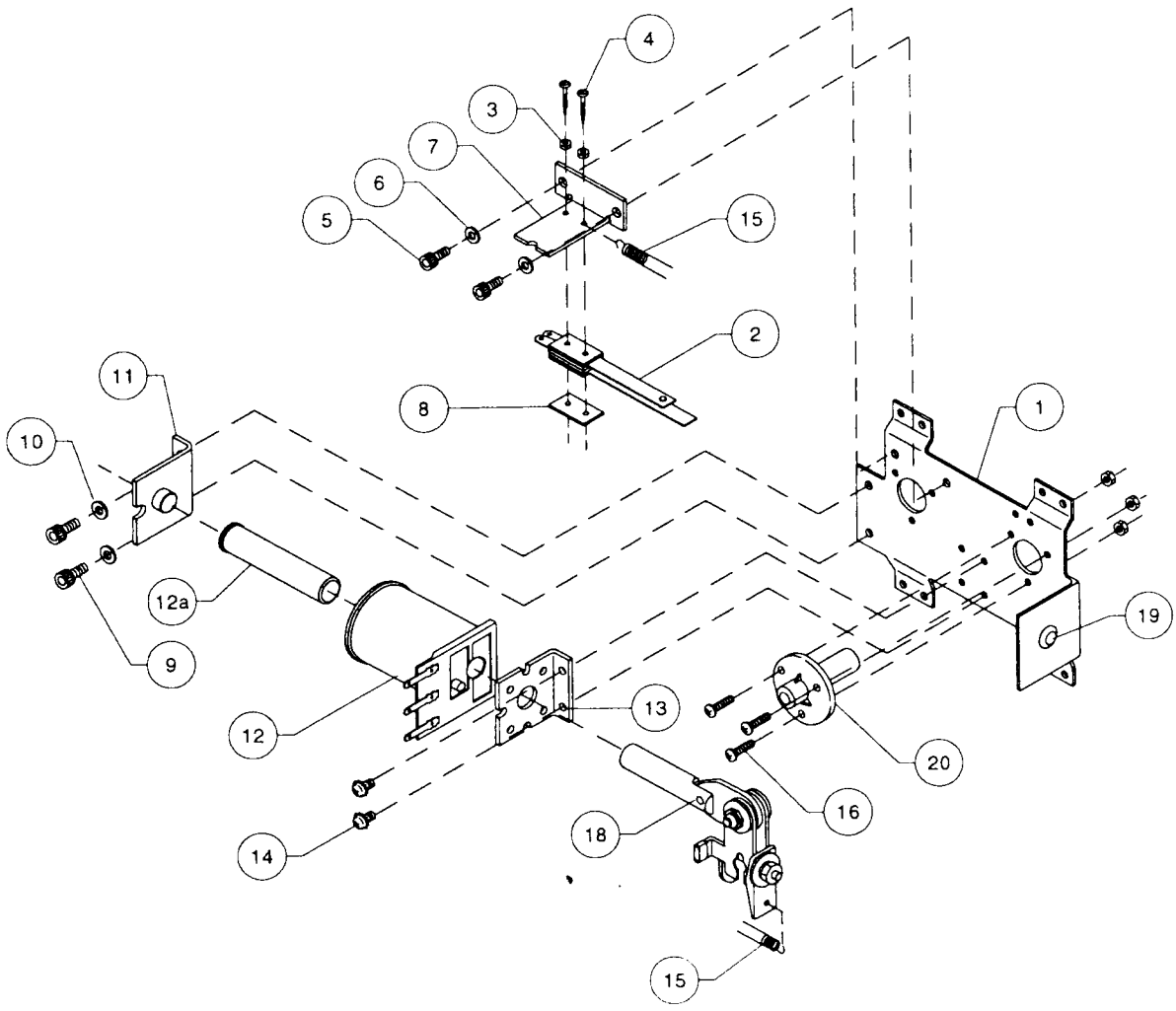
Part Number	Designator	Description
5010-08930-00	R3, R6, R9, R12	Resistor, 470, 1/2w, 5%
5010-09324-00	R2, R5, R8, R11	Resistor, 27K, 1/4w, 5%
5010-08773-00	R1, R4, R7, R10,	Resistor, 18K, 1/4w, 5%
5010-08774-00	R14	Resistor, 22K, 1/4w, 5%
5010-09162-00	R13	Resistor, 100K, 1/4w, 5%
5043-08980-00	C1, B	Capacitor, .01mfd (+80,-20%)
5370-12272-00	U1	IC LM339 Quad Comp.
5490-10159-00	OPTO1-OPTO4	Opto Inter Mdl L/G
5070-09054-00	D1-D4	Diode 1N4004 1.0A.
5791-12622-08	J1	Connector, 8-pin Header .100

A-16120
D.C. Motor Control PCB Assembly



Part Number	Designator	Description
5768-13402-00	-	PCB DC Motor Control Board
5791-12273-04	J2	4H Str. Sq. Lock .156
5791-12273-05	J1	5H Str. Sq. Lock .156
5671-13732-00	LED1	Display Red LED
5070-09054-00	D1, D2, D3	Diode 1N4004 1.0A
5551-09822-00	L1, L2	Indicator 4.7 mH 3A
5010-09061-00	R2, R6	Resistor 680 1/2w 5%
5010-10255-00	R5	Resistor 10 1/2w 5%
5010-08997-00	R3, R7, R8	Resistor 2.7K 1/2W 5%
5010-09085-00	R1	Resistor 1.5K 1/4w 5%
5040-10974-00	C3	Capacitor 100 mfd 35V Rad
5370-13342-00	U4	IC 3A DMOS Bridge Drive
5490-10892-00	U1, U2	Opto Isolator 4N25)
5250-09157-00	Q1	Regulator 7805 1A 5V
5043-08980-00	C2, C4, C6, C7, C8	Capacitor .01mfd 50V +80/-20
5041-09031-00	C1	Capacitor 1mfd 25V +/-20 Axial
5281-09500-00	U3	IC 74LS32 Quad OR
5043-08996-00	C5	Capacitor .1M 50V +/-20

A-15849-L-2
Flipper Assembly



Item	Part Number	Description
1	B-13104-L	Flipper Base Assembly, Left
2	SW-1A-194	Switch Assembly
3	4701-00002-00	Lockwasher, #6 Split
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6	4701-00003-00	Lockwasher #8 Split
7	01-9375	Switch Mounting Bracket
8	20-6516	Speednut, Tinnerman
9	4010-01066-06	Cap Screw, 10-32 x 3/8"
10	4701-00004-00	Lockwasher #10 Split
11	A-12390	Flipper Stop Assembly
12	FL-11629	Flipper Coil, Blue
a)	03-7066-5	Coil Tubing
13	01-7695	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut, 6-32 Hex

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

Associated Parts:
(Not Shown)

21	23-6519-4	Flipper Rubber Ring, Red
22	20-9250-5	Flipper & Shaft

A-15849-R-4
Flipper Assembly

Item	Part Number	Description
1	A-13104-R	Flipper Bracket Sub-Assy.
2	SW-1A-194	Switch Assembly
3	4701-00002-00	Lockwasher, #6 Split
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6	4701-00003-00	Lockwasher #8 Split
7	01-9375	Switch Mounting Bracket
8	20-6516	Speednut, Tinnerman
9	4010-01066-06	Cap Screw, 10-32 x 3/8"
10	4701-00004-00	Lockwasher #10 Split
11	A-12390	Flipper Stop Assembly
12	FL-15411	Flipper Coil, Orange
a)	03-7066-5	Coil Tubing
13	01-7695	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut, 6-32 Hex
18	A-15848-R	Crank Link Assembly, Right
a)	A-17050-R	Flipper Crank Assembly, Right
b)	A-15847	Flipper Link Assembly
c)	02-4676	Link Spacer Bushing
d)	4010-01086-14	Cap Screw, 10-32 x 7/8"
e)	4700-00023-00	Flatwasher, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lockwasher #10 Split
g)	4410-01132-00	Nut, 10-32 ESN
19	23-6577	Bumper Plug, 5/8"
20	03-7568	Flipper Bushing

Associated Parts:
(Not Shown)

21	23-6519-4	Flipper Rubber Ring, Red
22	20-9250-5	Flipper & Shaft

A-15849-R-2
Flipper Assembly

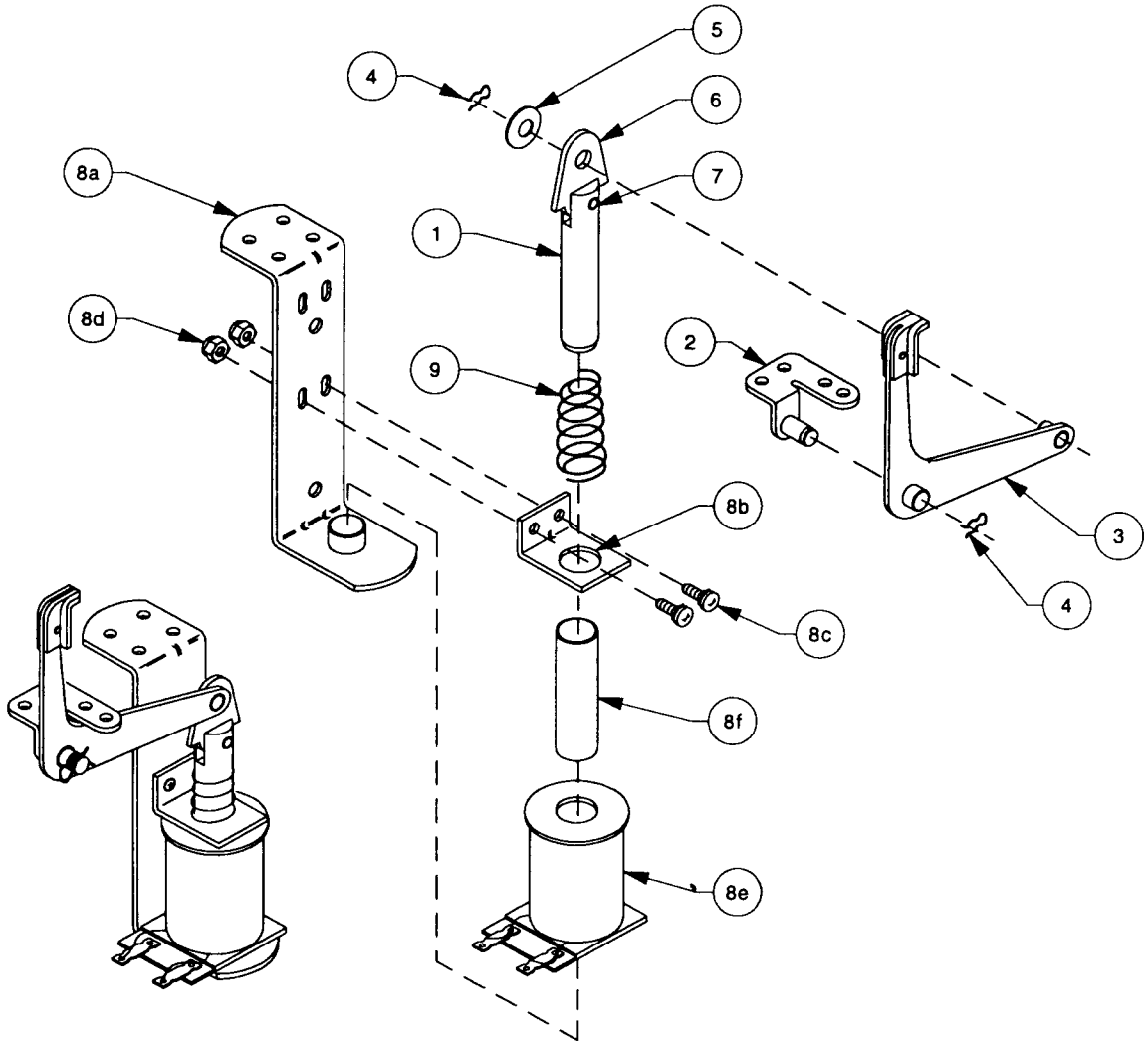
(Parts listed replace same items of **A-15849-R-4**)

Item	Part Number	Description
12	FL-11629	Flipper Coil, Blue

Flipper Notes...

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

A-17811
Kicker Arm (Slingshot) Assembly

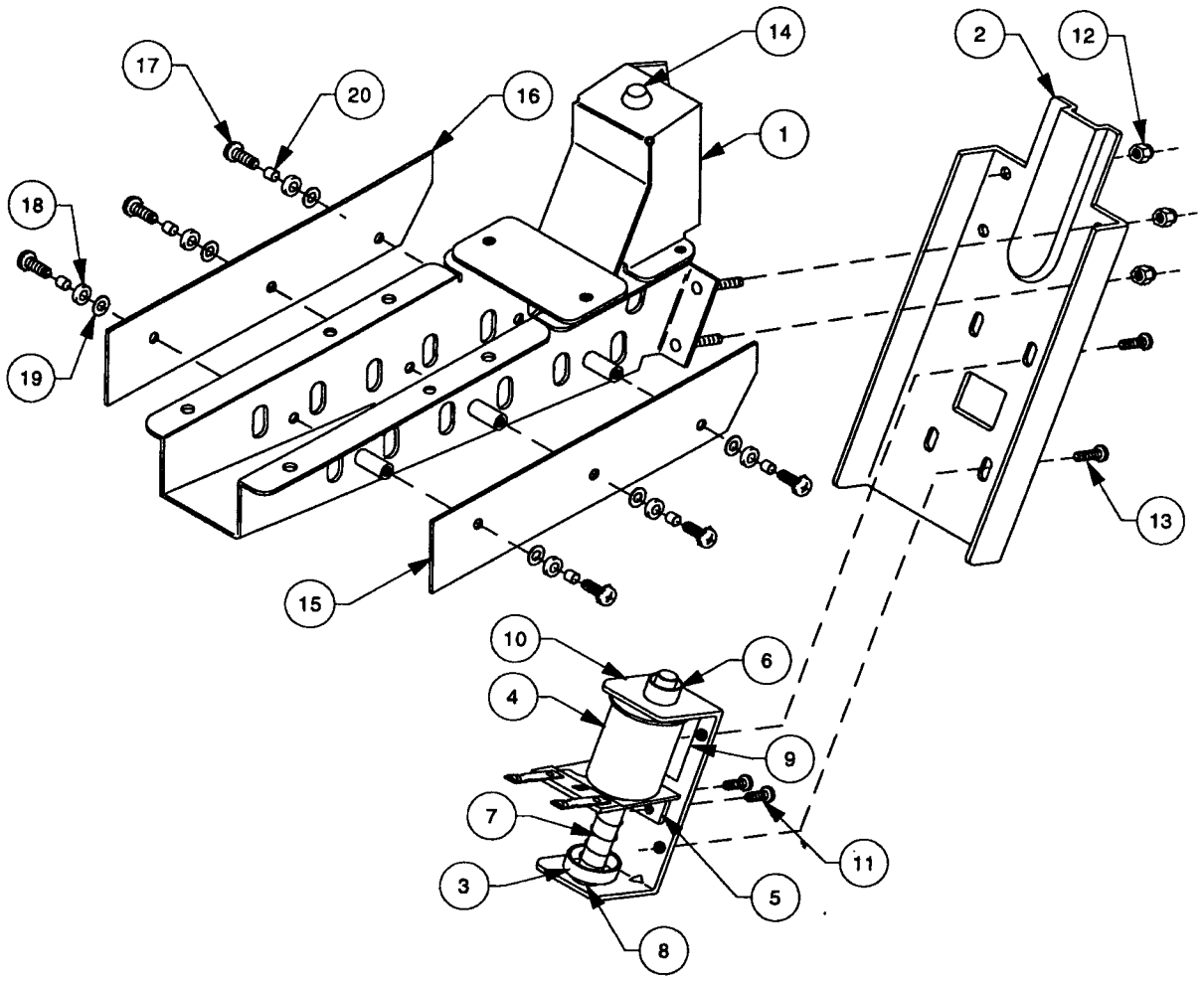


Item	Part Number	Description
1.	02-2364	Coil Plunger
2.	A-17810	Mounting Bracket Assembly
3.	A-12664	Kicker Crank Assembly
4.	12-6227	Hairpin Clip
5.	4700-00030-00	Flatwasher, 17/64 x 1/2 x 15ga.
6.	03-8085	Armature Link
7.	20-8716-5	Roll Pin, 1/8 x 7/16"

Associated Parts for Right & Left Kickers:

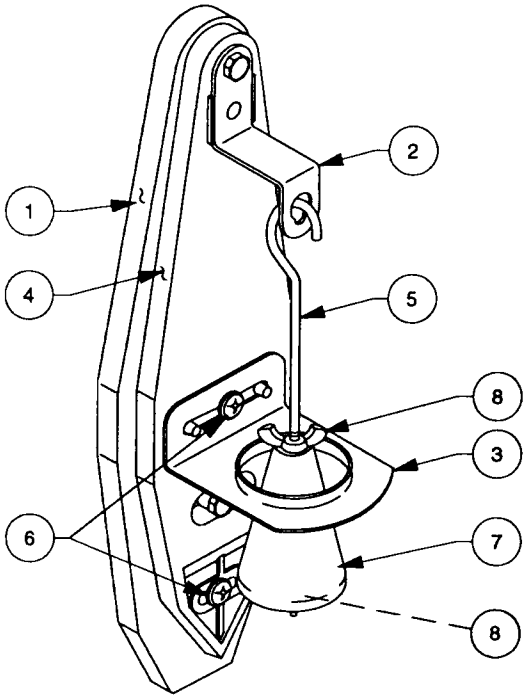
Item	Part Number	Description
8.	**B-9362-R-3**	**Coil & Bracket Assy., Left**
	B-9362-L-2	**Coil & Bracket Assy., Right**
a)	A-17808	Bracket & Stop Assembly
b)	01-8-508-S	Coil Retaining Bracket
c)	4006-01017-06	Mach. Screw, 6-32 x 3/8"
d)	4406-01119-00	Nut, 6-32 ESN
e)	AE-26-1200	Coil Assembly
f)	03-7066	Coil Tubing
9.	10-128	Spring

A-18753
Outhole Ball Trough Assembly



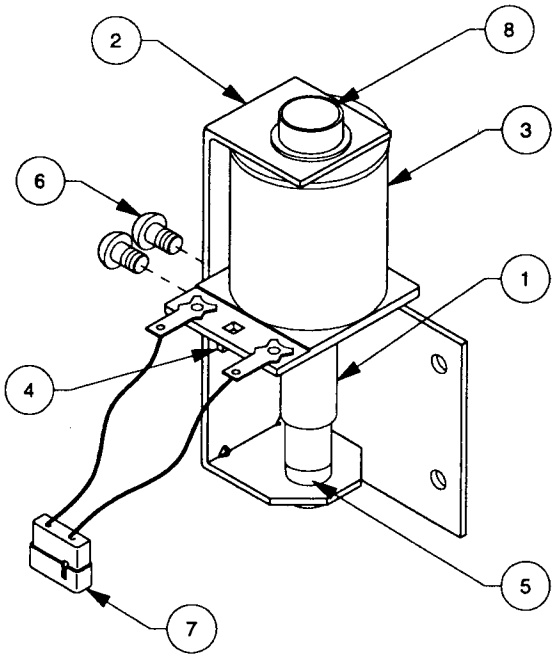
Item	Part Number	Description	Item	Part Number	Description
1	A-16809-2	Ball Trough Welded Assy.	11	4008-01017-05	Mach. Screw, 8-32 x 5/16"
2	01-11587	Ball Trough Front	12	4408-01119-00	Nut 8-32 ESN
3	A-6306-2	Bell Armature Assembly	13	4008-01017-06	Mach. Screw, 8-32 x 3/8"
4	AE-26-1500	Coil Assembly	14	23-6702	Bumper Plug
5	01-8-508-T	Solenoid Assembly	15	A-18617	Trough 7 IRED PCB Assembly
6	03-7067-5	Coil Tubing	16	A-18618	Trough 7 IR TSTR PCB Assy.
7	10-135	Spring	17	4006-01003-10	Mach. Screw, 6-32 x 5/8" SEMS
8	23-6420	Rubber Grommet	18	23-6626	Grommet
9	03-8523	Insulator	19	4700-00004-00	Flatwasher, 9/64 x 7/16 x 21ga.
10	01-11586	Coil Mounting Brkt. (Bell)	20	02-4975	Bushing

A-15361
Tilt Mechanism Assembly



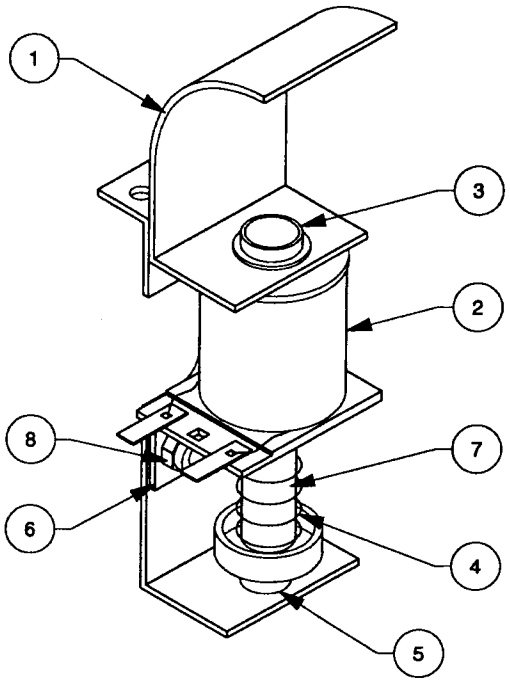
Item	Part Number	Description
1	A-15360	Mount Plate, Tilt Mech.
2	01-3444	Bracket, Tilt Upper
3	01-3445	Bracket, Tilt Lower
4	03-8668	Pendulum, Tilt Mech.
5	12-6231	Wire, Plum Bob
6	4006-01113-06	Mach. Screw, 6-32 x 3/8"
Associated Parts:		
7	20-6502-A	Plumb Bob
8	4406-01120-00	Wing Nut (2)

B-10686-1
Knocker Assembly



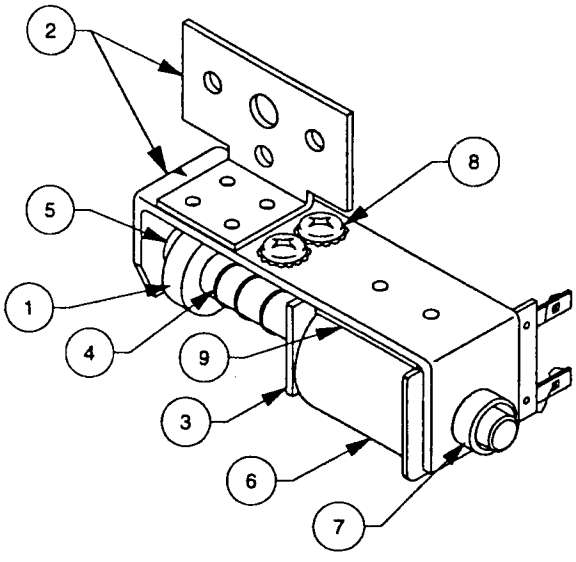
Item	Part Number	Description
1	A-5387	Coil Plunger Assembly
2	01-11273	Mounting Bracket Assy.
3	AE-23-800	Coil Sub-Assembly
4	01-8-508-T	Coil Retaining Bracket
5	23-6420	Rubber Grommet
6	4008-01017-04	Mach. Screw, 8/32 x 1/4"
7	H-11835	Knocker Cable
8	03-7067-5	Coil Tubing

A-18768
Eject Assembly



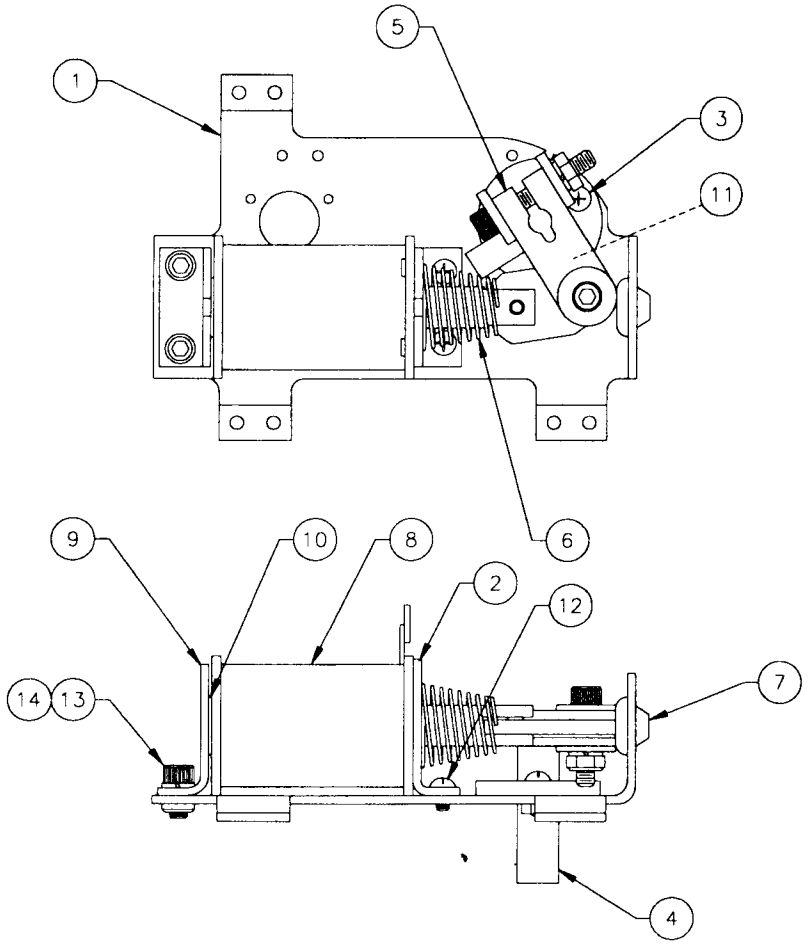
Item	Part Number	Description
1	A-18767	Bracket Assembly
2	AE026-1500	Coil Assembly
3	03-7067	Coil Tubing
4	10-135	Solenoid Spring
5	23-6420	Rubber Grommet
6	01-9784	Coil Bracket
7	A-17767	Bell Armature Assembly
8	4408-01119-00	Nut #8-32 ESN

A-14525
Kicker Bracket Assembly



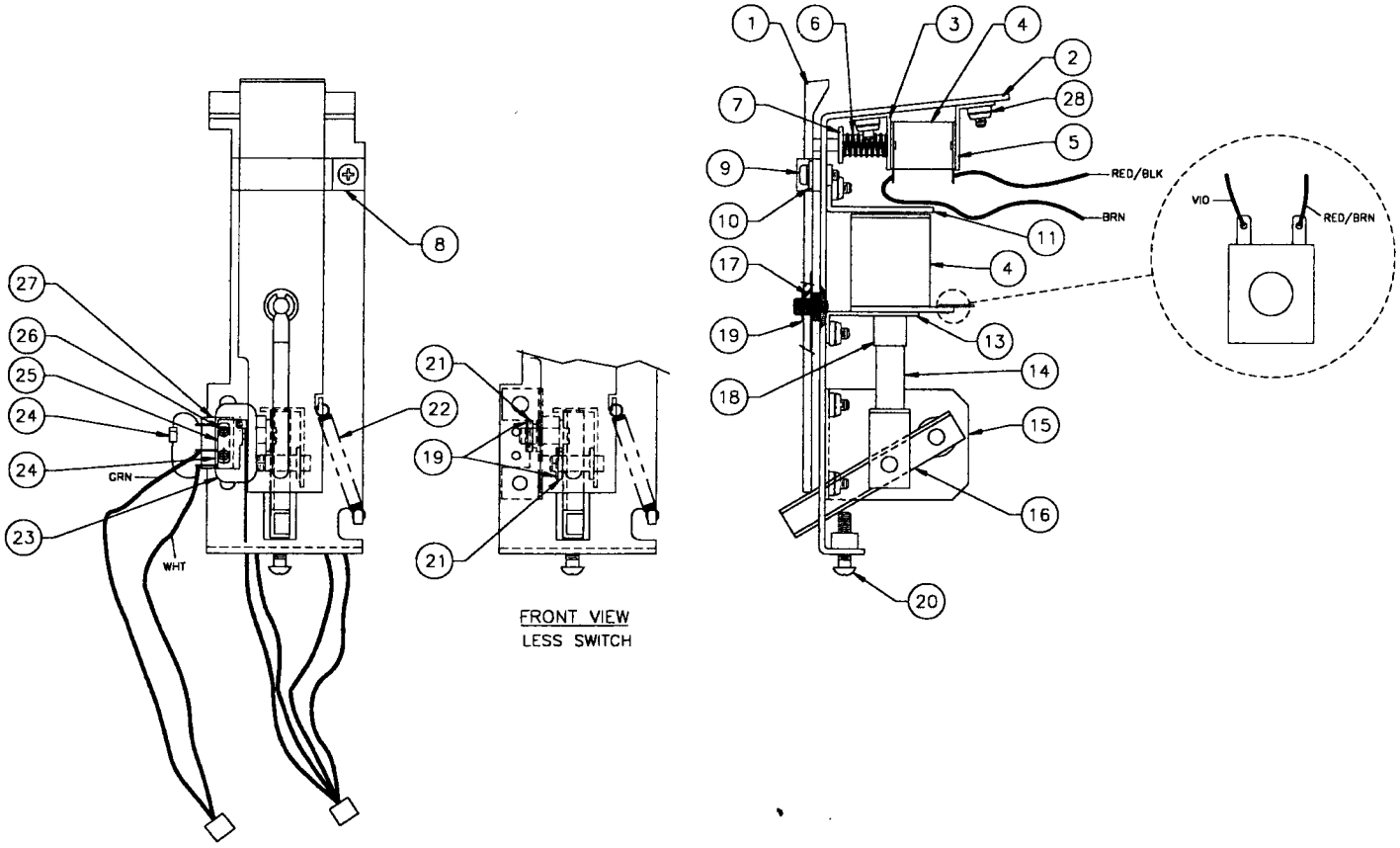
Item	Part Number	Description
1	A-6306-2	Bell Armature Assembly
2	A-14526	Mounting Bracket Assembly
3	01-8-508-T	Solenoid Bracket
4	10-135	Solenoid Spring
5	23-6420	Rubber Grommet
6	AE-23-800	Coil Assembly
7	03-7067-5	Coil Tubing
8	4008-01017-04	Mach. Screw, #8-32 x 1/4"
9	03-8523	Insulator

A-18952
Ball Kicker Assembly



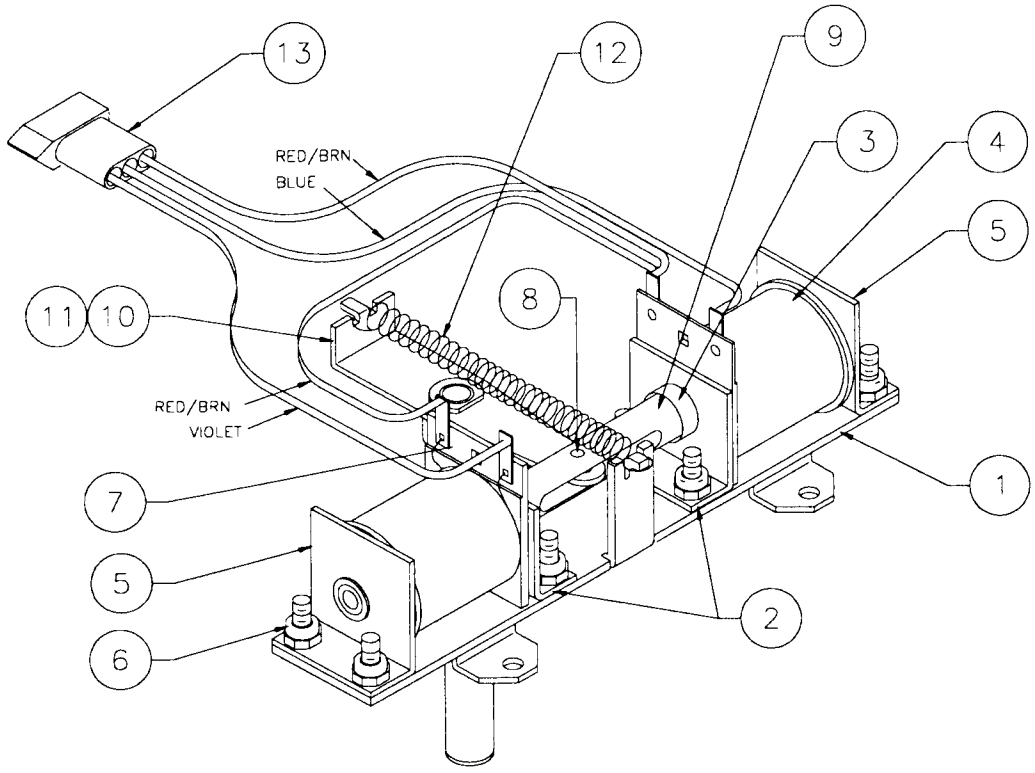
Item	Part Number	Description
1	A-18816	Bracket Sub-Assembly
2	01-7695	Solenoid Bracket
3	4006-01005-06	Mach. Screw, #6-32 x 3/8"
4	03-7568	Flipper Bushing
5	A-15848-L	Crank Link Assembly
6	10-376	Spring
7	23-6577	Rubber Bumper Plug
8	A-14189	Coil Assembly
9	A-12390	Flipper Stop Bracket Assembly
10	03-7066-5	Coil Tubing
11	4406-01117-00	Nut #6-32 Hex.
12	4006-01017-04	Mach. Screw, #6-32 x 1/4"
13	4010-01066-06	Cap Screw, #10-32 x 3/8"
14	4701-00004-00	Lockwasher, #10 Split

A-18622
Extended Target Assembly



Item	Part Number	Description	Item	Part Number	Description
1	03-9210	Target Extended	17	4700-00072-00	Flatwasher, 17/64 x 1/2 x 21ga.
2	A-18776	Main Target Bracket Assy.	18	03-7066-4	Tubing
3	01-13048	Coil Mounting Bracket	19	20-8712-25	"E"-Ring, 1/4" Shaft
4	SM-30-1100-DC	Coil Assembly	20	4010-01025-14	Mach. Screw, #10-32 x 7/8"
5	A-18745	Stop Bracket Assembly	21	4700-00079-00	Flatwasher, 1/4 x 1/2 x 16ga.
6	10-483	Spring Compression	22	10-495	Spring Target Retractor
7	A-19686	Plunger - Extended Target	23	01-13646	Plate Guide Actuator
8	03-9209	Guide Extruded	24	5647-12693-31	Switch
9	4008-01003-08	Mach. Screw, #8-32 x 1/2"	25	01-8240	Nut Plate
10	4700-00089-00	Flatwasher, 11/64x7/16x16ga.	26	4002-01105-10	Mach. Screw, #2-56 x 5/8"
11	A-18746	Stop Bracket Assembly	27	01-8600	Switch Insulator
12	AL-23-800	Coil Assembly	28	4408-01119-00	Nut, #8-32 ESNA
13	01-13050	Coil Mounting Bracket	29	H-19692	Extended Target Cable Assy.
14	A-18752	Bracket & Plunger Assy.	30	H-19739	Switch Cable Assembly
15	A-18778	Bracket-Bushing Assembly	31	5070-09054-00	Diode 1N4004 1.0A
16	A-18777	Bracket Pivot Assembly			

A-18954
Divertor Mechanism Assembly (Left Side)



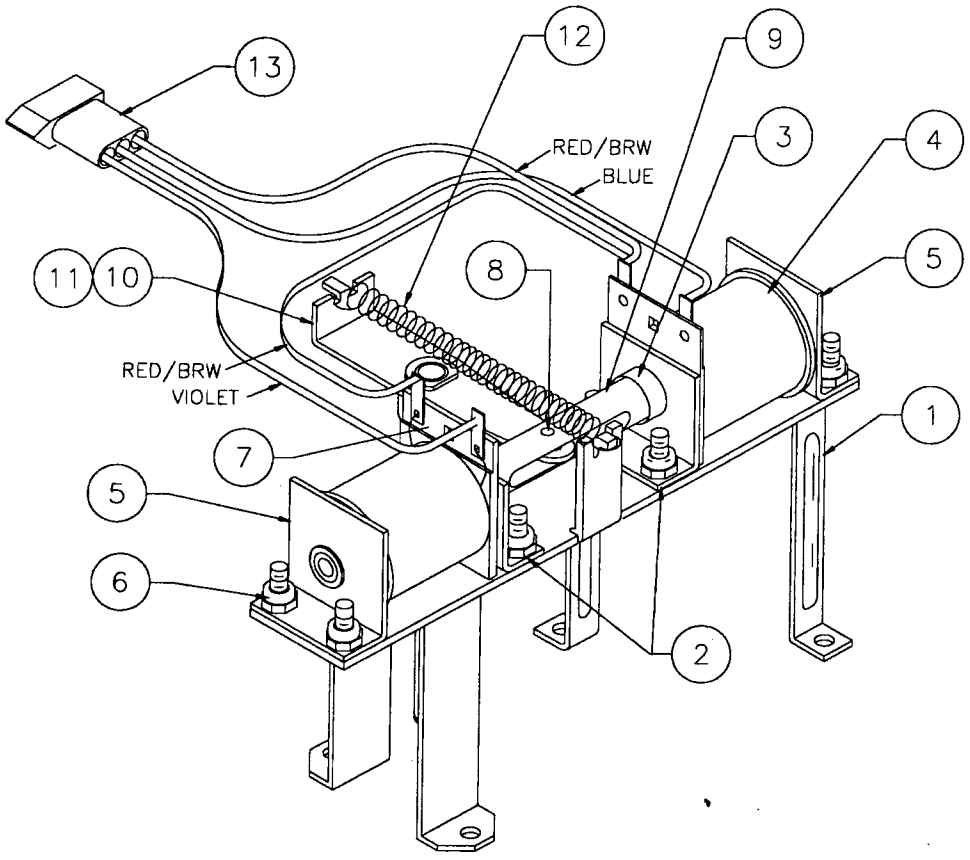
Item	Part Number	Description
1	A-18956-2	Left Bracket, Divertor Mech.
2	01-13116	Bracket - Large Coil
3	03-7066	Coil Tubing, 1-3/4"
4	AE-25-1000	Coil Assembly
5	A-18957	Coil Stop Bracket Assembly, Large
6	4408-01119-00	Nut, 8-32 ESNA
* 7	5070-09054-00	Diode 1N4004, 1.0A.
8	20-8716-5	Roll Pin, 1/8 x 7/16"
9	02-5135	Armature
10	A-18983	Crank Arm Assembly
11	4010-01186-04	Set Screw, 10-32 x 1/4"
12	10-320	Extension Spring
13	H-19704	Divertor Cable

Associated Parts:

A-19638-1	Knife & Diverter Assy.
20-8712-25	"E"-Ring, 1/4' Shaft
4700-00027-00	FW, 1/4 x 1/2 x 21ga.

* Only item location shown.

A-18955
Divertor Mechanism Assembly (Right Side)



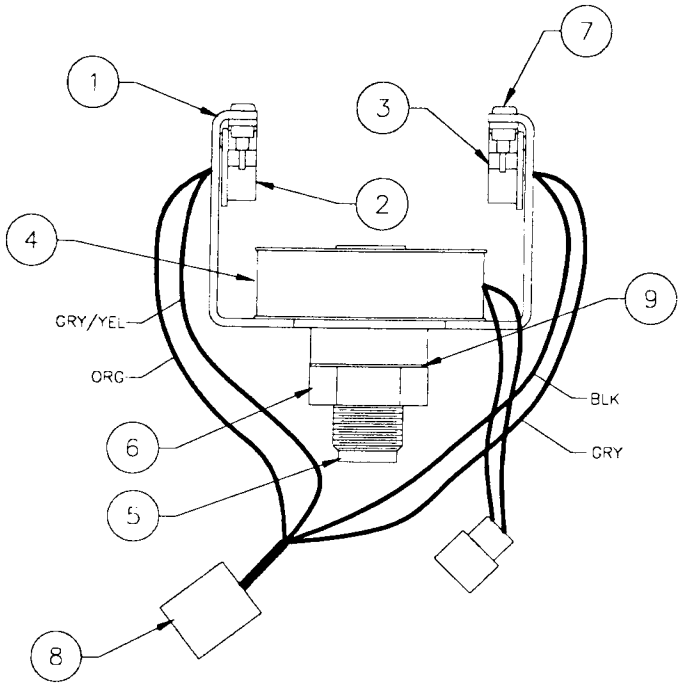
Item	Part Number	Description
1	A-18956-1	Right Bracket, Divertor Mech.
2	01-13116	Bracket - Large Coil
3	03-7066	Coil Tubing, 1-3/4"
4	AE-25-1000	Coil Assembly
5	A-18957	Coil Stop Bracket Assembly, Large
6	4408-01119-00	Nut, 8-32 ESNA
* 7	5070-09054-00	Diode 1N4004, 1.0A.
8	20-8716-5	Roll Pin, 1/8 x 7/16"
9	02-5135	Armature
10	A-18983	Crank Arm Assembly
11	4010-01186-04	Set Screw, 10-32 x 1/4"
12	10-320	Extension Spring
13	H-19704	Divertor Cable

Associated Parts

A-19638-2	Knife & Diverter Assy.
20-8712-25	"E"-Ring, 1/4" Shaft
4700-00027-00	FW, 1/4 x 1/2 x 21ga.

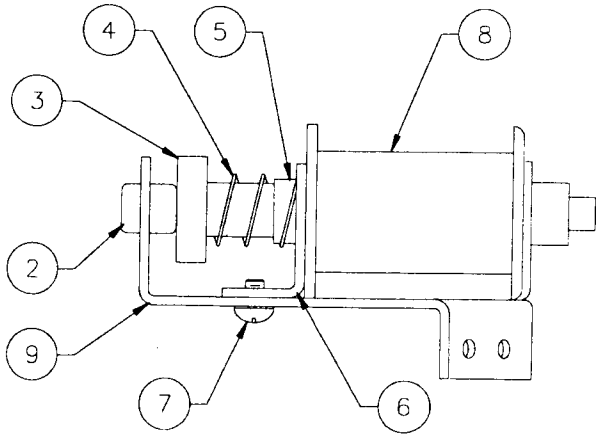
* Only item location shown.

A-18388
Magnet & Opto Assembly



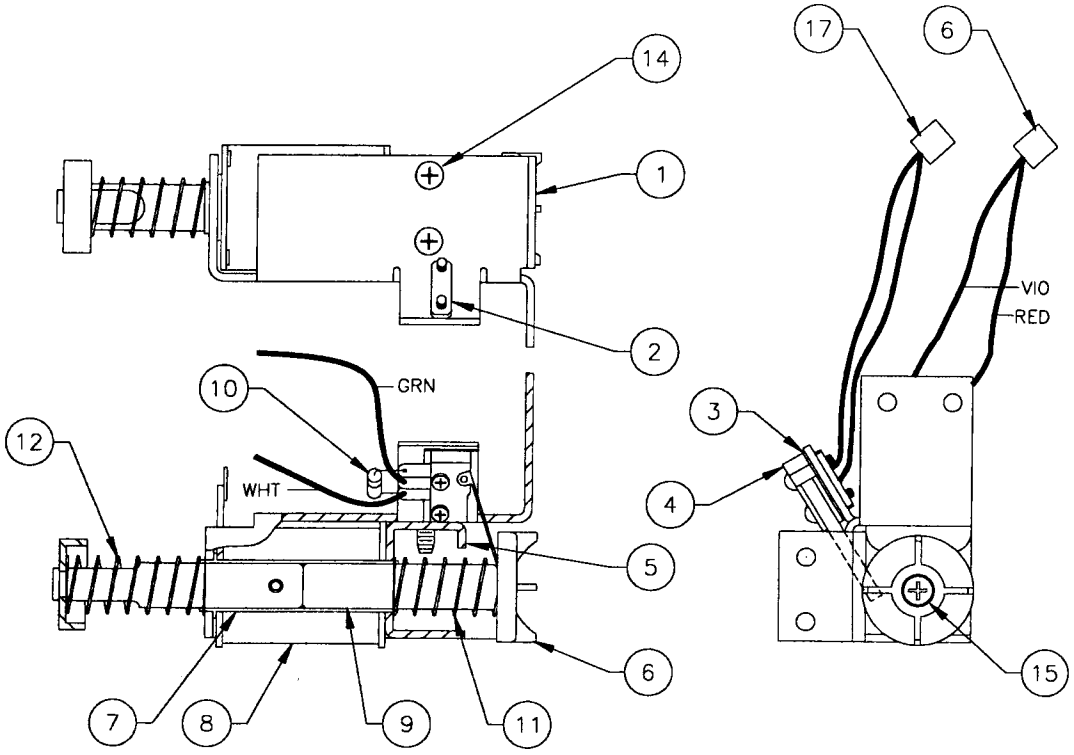
Item	Part Number	Description
1	A-18387	Magnet & Opto Brkt. w/Nut
2	A-16908	Opto LED Assembly-RTV
3	A-16909	Opto Photo Trans. Assy.RTV
4	20-9247	Coil Magnet & Thermal Breaker
5	02-4773	Core - Adj. Magnet
6	4428-01135-00	3/4-16 Hex. Jam Nut
7	4106-01013-06	SMS #6 x 3/8"
8	H-17607-4	Cable Assembly
9	20-9612	Spring Washer

A-15368
Eject Assembly



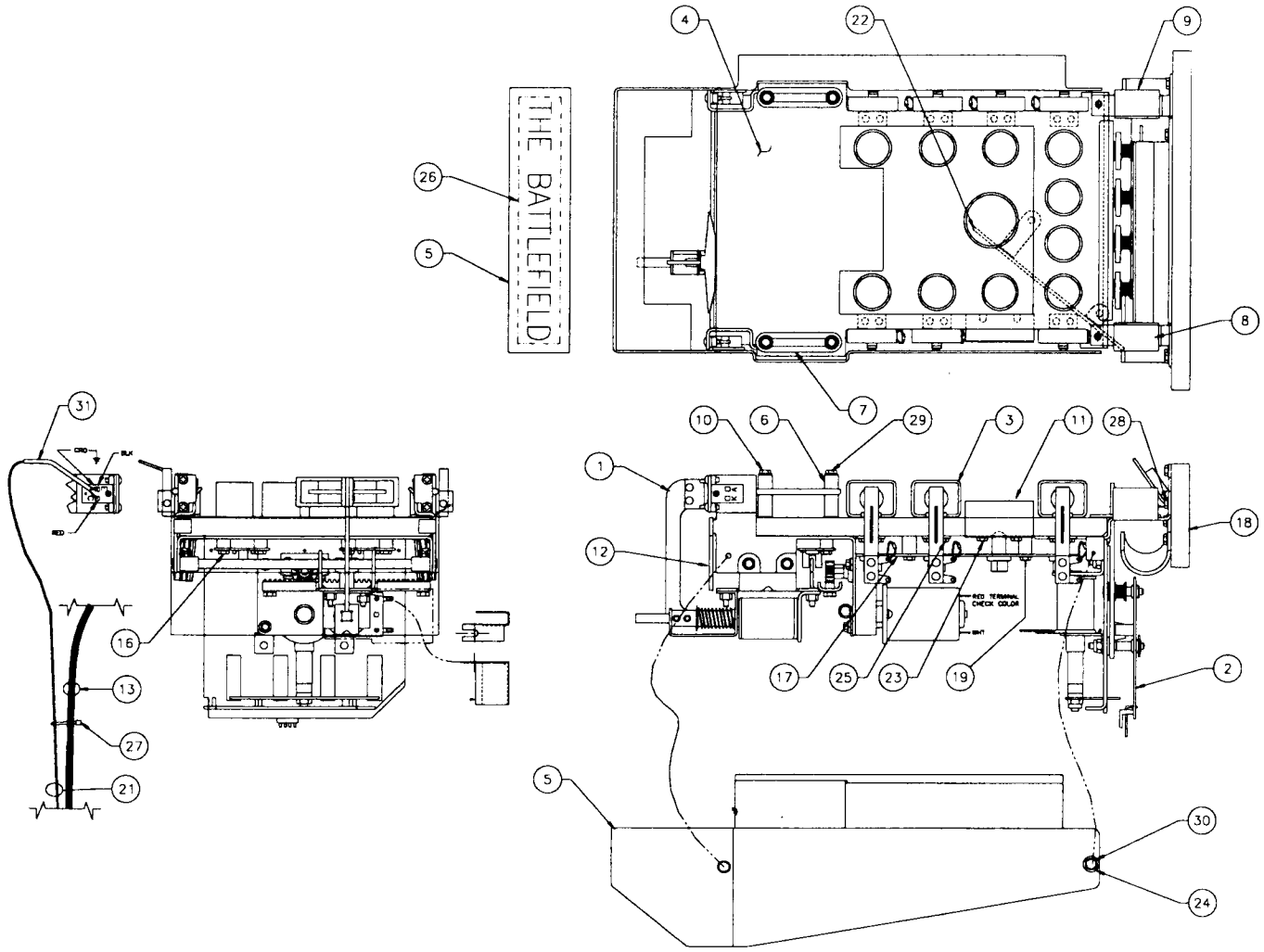
Item	Part Number	Description
1	01-10652	Bracket
2	23-6420	Rubber Grommet
3	A-15371	Plunger Assembly
4	10-135	Spring
5	03-7067-5	Coil Tubing
6	01-8-508-T	Solenoid Bracket
7	4008-01017-04	Mach. Screw, #8-32 x 1/4"
8	AE-27-1200	Coil Assembly

A-18950
Ball Popper Assembly



Item	Part Number	Description
1	01-13110	Ball Popper Bracket
2	01-8240	Nut Plate #2-56
3	01-8600	Insulator
4	5647-12693-24	Mini Micro Switch
5	01-10167	Bracket-Coil Retainer
6	03-8561	Ball Popper Cup
7	03-7067-7	Coil Tubing
8	AE-25-1000	Coil Assembly
9	A-19640	Armature & Extension Assy.
10	5070-09054-00	Diode 1N4004
11	10-148	Spring
12	10-135	Spring
13	4002-01105-07	Mach. Screw, #2-56 x 7/16"
14	4008-01015-06	Mach. Screw, #8-32 x 3/8"
15	4106-01152-06	Sh. Metal Screw, #6 Thd.
16	H-19523	Ball Popper Cable Assembly
17	H-16437	Switch Cable Assembly

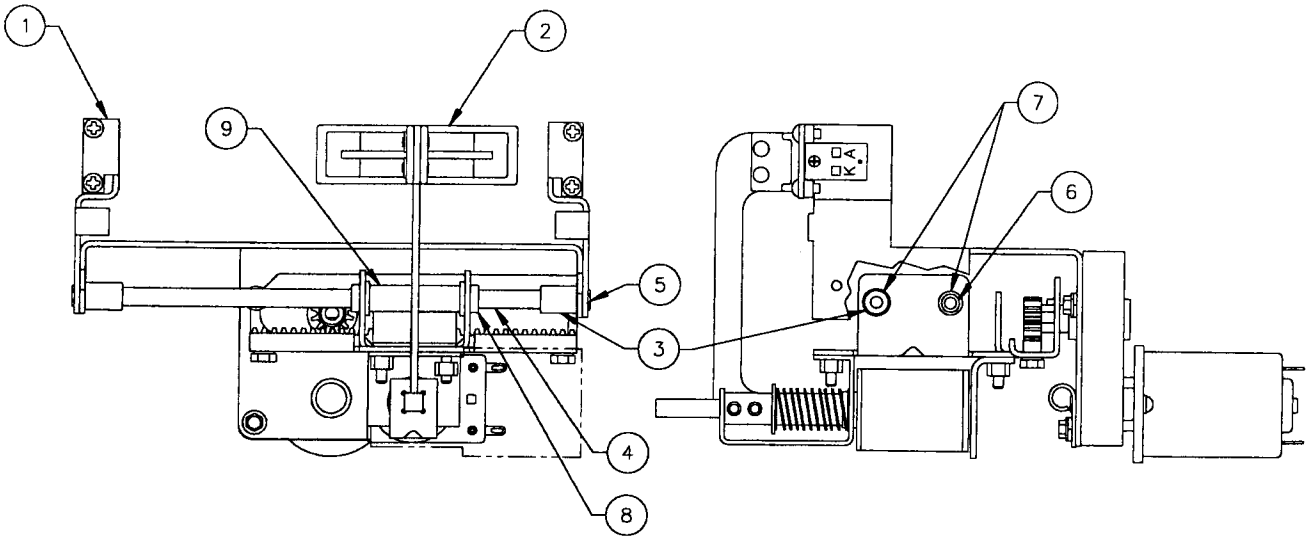
A-18382
Mini-Playfield Assembly



Item	Part Number	Description	Item	Part Number	Description
1	A-17789	Coil Slide Motor Assy.	17	A-19107-1	4-Lamp Assembly
2	A-18783	4-Bank Drop Target Assy.	18	A-19786	Back Board Assembly
3	A-18379-6	Side Target	19	4106-01115-16	Sh. Metal Screw, #6 x 1"
4	36-50032-1	Mini Playfield & Insert Assy.	20	01-13590	Coil Wire Guard
5	03-9229	Mini Playfield Guard	21	H-16293-2	Receiver Cable
6	02-4435	Single Post, Groove #8 x 1-3/16"	22	A-19603-2	Mini Plfd. Low Guard
7	23-6694-6	Rubber Ring, 1" I.D.	23	4808-01175-07Y	E-P #8 x 7/16"
9	A-19113-2	Mounting Bracket Assy., Left	24	4006-01113-06	Mach. Screw, #6-32 x 3/8"
10	4008-01113-28	Mach. Screw, 8-32 x 1-3/4"	25	4808-01175-08	E-P #8 x 1/2"
11	01-13596	Spring Steel Target	26	*31-2028-2	Decal
12	A-19603-1	Plfd. Plastic/Bracket Assy.-Front	27	03-7520-2	Tie Wrap
13	A-19751	Opto/Lamp-Cable Assembly	28	4008-01168-08	Mach. Screw, #8-32 x 1/2"
14	17-1116-3	Jumper Wire, 3" (Yellow)	29	4408-01118-00	Nut 8-32 x 3/8" Long Tee
15	17-1116-5	Jumper Wire, 5" (Yellow)	30	4700-00011-00	FW, 11/64 x 7/16 x 16ga.
16	4006-01113-12	Mach. Screw, #6-32 x 3/4"	31	23-6710-3	Tube-Clear #10 x 2"

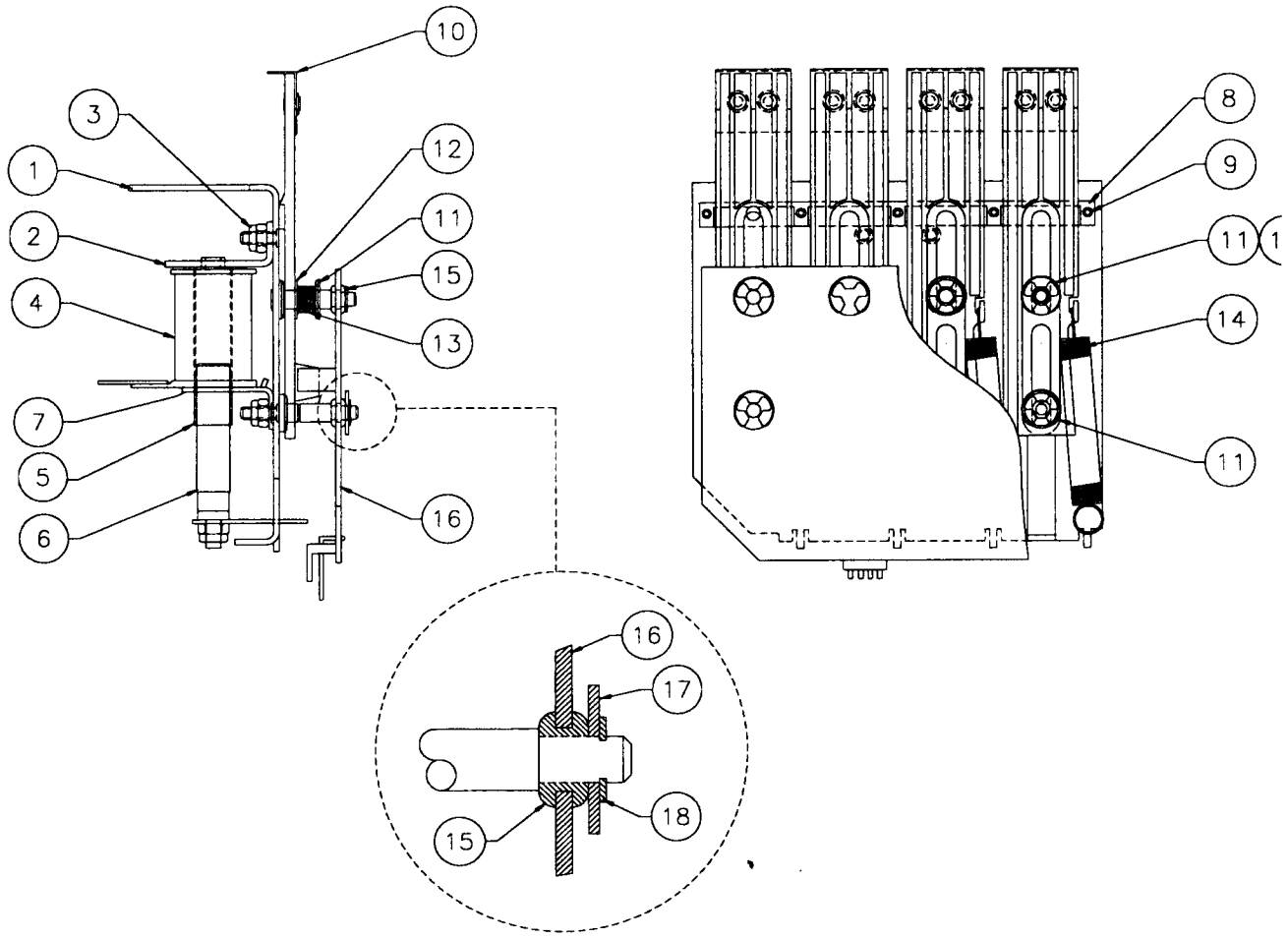
* Not available for individual sale. Order Decal Set 31-2028.

A-17789
Coil Slide Motor Assembly



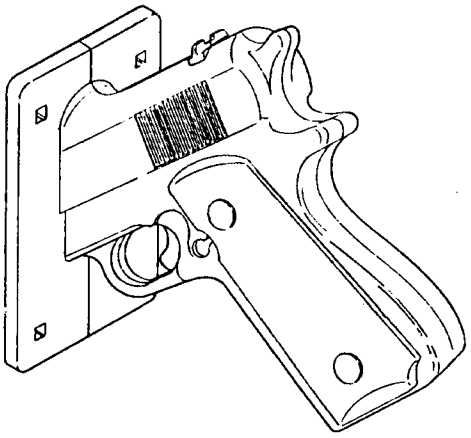
Item	Part Number	Description
1	A-19170	Motor/Opto Assembly
2	A-19070	Coil/Slide Assembly
3	20-10121	Rubber Isolator
4	02-4947	Coil Slide Shaft
5	4008-01113-04	Mach. Screw, 8-32 x 1/4"
6	02-4947	Coil Slide Shaft
7	4701-00003-00	Lockwasher, #8 Split
8	20-9610	Flange Bushing

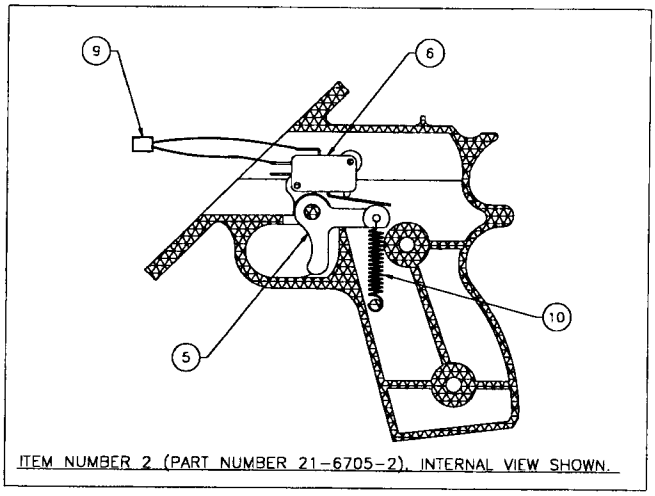
A-18783
4-Bank Drop Target Assembly



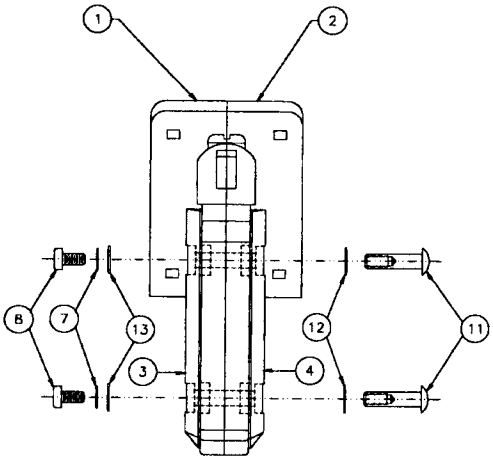
Item	Part Number	Description
1	A-18781	Bracket & Post Assembly
2	A-11397	Stop Bracket Assembly
3	4408-01119-00	Nut #8 ESN Clinch
4	AE-25-1000	Coil Assembly
5	03-7066-4	Coil Tubing, 2.093" Long
6	A-19651	Reset Plate Assembly
7	01-9548	Bracket Coil Mounting
8	03-8334-4	4-Bank Target Stop
9	4004-01005-04	Mach. Screw, #4-40 x .25
10	A-19552	Target Cap Assembly
11	20-8712-25	Retaining Clip
12	4700-00072-00	Flatwasher #12
13	10-392	Compression Spring
14	10-364	Extension Spring
15	23-6626	Rubber Grommet
16	A-19666	4-Drop Target Opto PCB Assy.
17	4700-00016-00	Flatwasher #8
18	20-8712-18	Retaining Clip

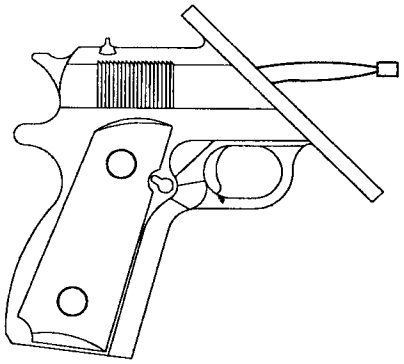
A-18536
Gun Assembly





ITEM NUMBER 2 (PART NUMBER 21-6705-2), INTERNAL VIEW SHOWN.



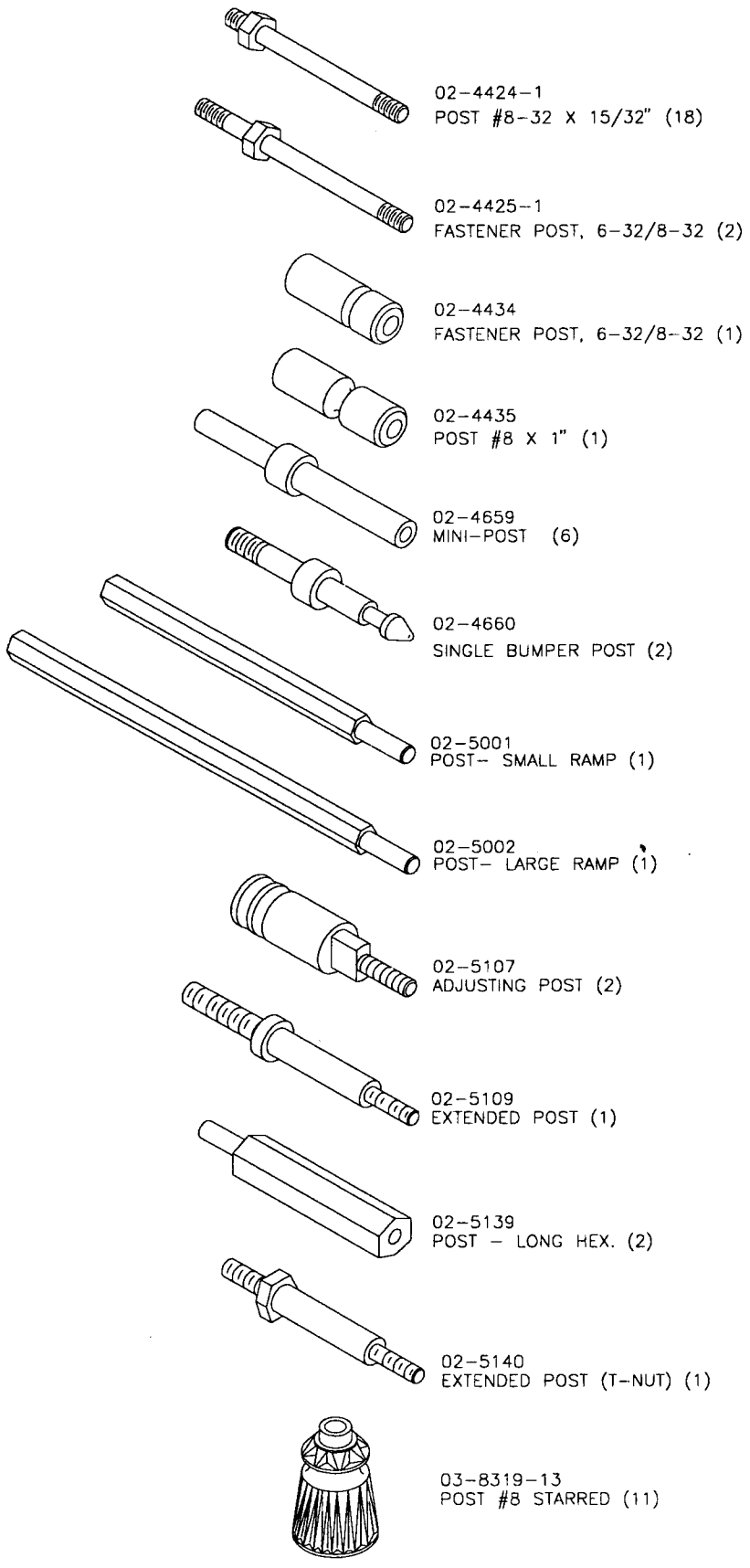


Item	Part Number	Description
1	21-6705-1	Gun Handle, Left
2	21-6705-2	Gun Handle, Right
3	03-9196-1	Gun Grip, Left
4	03-9196-2	Gun Grip, Right
5	01-12942	Trigger
6	5647-12133-16	Switch
7	4702-00013-00	Lockwasher, #10 Int. Tooth
8	4010-01097-06B	Mach. Screw, #10-32 x 3/8"
9	H-19739	Cable Assembly
10	10-320	Extension Spring, Red
11	02-5041-15G	Fastener, Butt Head
12	4702-00014-00B	Lockwasher, 1/4" Int. Tooth
13	4700-00129-00B	Flatwasher, 13/64 x 15/32 x 21ga.

A-14615-1
1-Bank Drop Target Assembly

Item	Part Number	Description
1	03-8750-1	Target Flush, Yellow
2	A-14617	Bracket & Post Assembly
3	4408-01119-00	Nut 8-32 ESN
4	A-11397	Drop Target Stop Bracket
5	AE-26-1200	Coil Assembly
6	01-8413	Bracket Coil Mounting
7	03-7066-4	Coil Tubing
8	A-11388-2	Plunger & Reset Plate Assembly
9	4700-00072-00	Flatwasher, 17/64 x 1/2 x 21ga.
10	10-392	Extension Spring
11	20-8712-25	"E"-Ring, 1/4" Shaft
12	01-10183	Switch Bracket
13	4006-01003-03	Mach. Screw, 6-32 x 3/16"
14	4010-01025-14	Mach. Screw, 10-32 x 7/8"
15	10-433	Extension Spring
16	5070-09054-00	Diode 1N4004, 1.0A
17	5647-12693-31	Mini Micro Switch
18	01-8600	Insulator
19	4002-01105-10	Mach. Screw, 2-56 x 5/8"
20	01-8240	Nut Plate #2-56
21	A-14908	Target Knock Down Assembly
a)	01-8647-L	Actuator
b)	A-15821	Armature Sub-Assembly
c)	A-14913	Frame & Eyelet Assembly
d)	SM1-26-600	Coil Assembly
e)	10-363	Extension Spring
f)	4006-01003-03	Mach. Screw, 6-32 x 3/16"
g)	4700-00089-00	Flatwasher, 11/64 x 7/16 x 16ga.
h)	4701-00003-00	Lockwasher, #8 Split
j)	4008-01005-06	Mach. Screw, 8-32 x 3/8"
22	03-8084	Single Stop Target
23	07-6688-17N	Rivet, 5/32 x 1/8 Nickel
24	03-8630	Guide Actuator

Posts



02-4424-1
POST #8-32 X 15/32" (18)

02-4425-1
FASTENER POST, 6-32/8-32 (2)

02-4434
FASTENER POST, 6-32/8-32 (1)

02-4435
POST #8 X 1" (1)

02-4659
MINI-POST (6)

02-4660
SINGLE BUMPER POST (2)

02-5001
POST- SMALL RAMP (1)

02-5002
POST- LARGE RAMP (1)

02-5107
ADJUSTING POST (2)

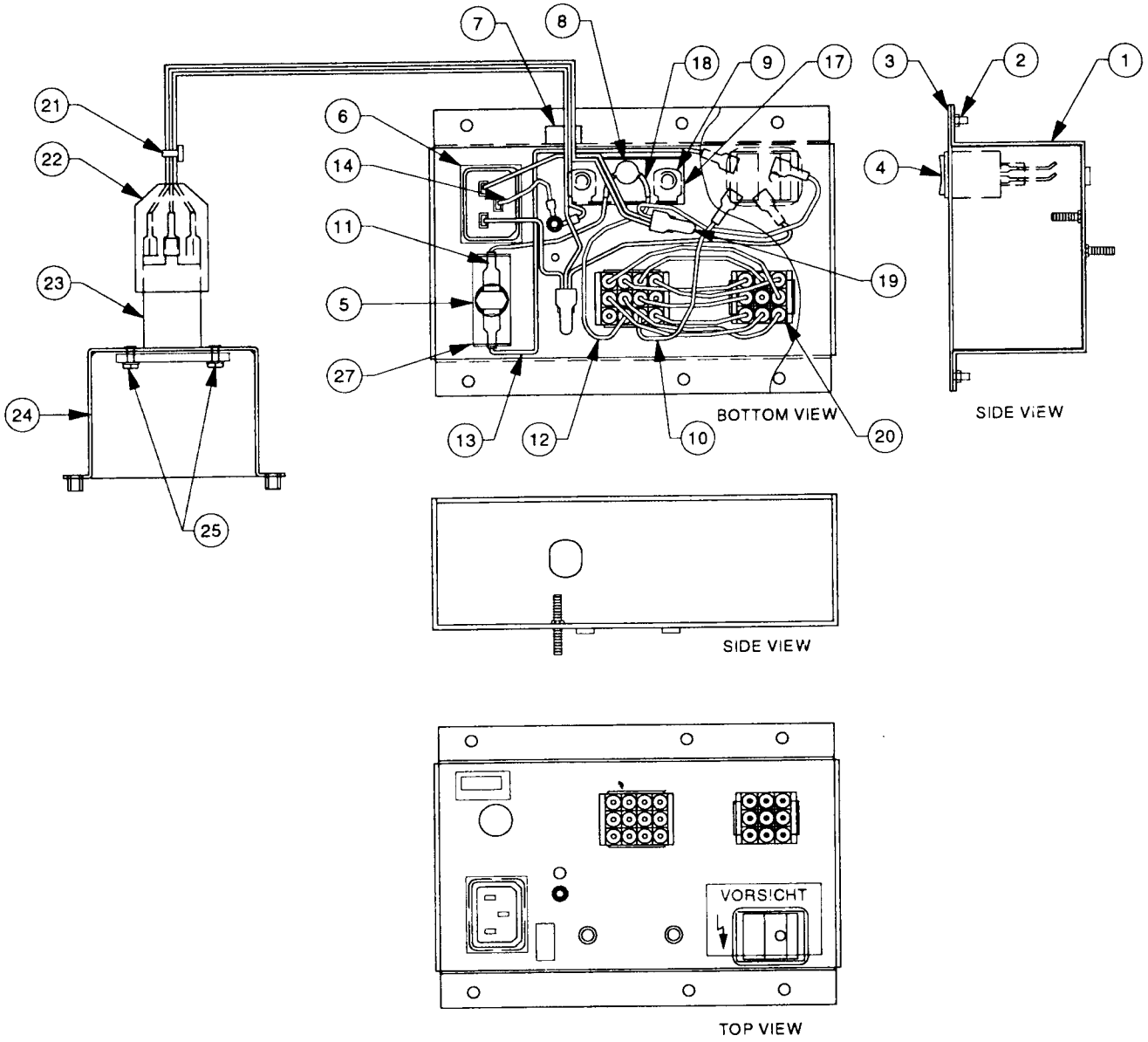
02-5109
EXTENDED POST (1)

02-5139
POST - LONG HEX. (2)

02-5140
EXTENDED POST (T-NUT) (1)

03-8319-13
POST #8 STARRED (11)

A-17540
Universal Power Interface Assembly



Item	Part Number	Description
1	01-12293.1	Power Control Chassis Box
2	4406-01128-00	Nut #6-32 KEPS
3	01-12294	Switch Mounting Plate Assembly
4	5642-13935-00	Power Switch
5	5733-12869-00	Fuse Holder Panel
6	5851-13867-00	Outlet-IEC Conn. 237 Socket
7	03-8712	Strain Relief Bushing
8	5016-12978-00	Thermistor 8A., 2.5R25
9	4006-01003-10	Mach. Screw, #6-32 x 5/8"
10	H-17992	Jumper Cable Neutral Sw/1FC
11	H-17543	Hot Jumper Black Cable
12	H-17546	Jumper Interface Hot Black Cable
13	H-17545	Jumper Switch/Fuse Black Cable

Item	Part Number	Description
14	H-17542	Ground Jumper Grn/Yel Cable
15	5797-13940-01	Jumper Cable
16	01-10623	Insulator, Thermistor
17	01-12299	Insulator, Terminal Strip
18	RM-21-06	#18 Vinyl Fgls
19	5822-13865-00	Terminal Strip 3-CKT 2-Mtg.
20	H-18050	Jumper Cable, Transformer Prog.
21	03-7933	Ty-Wrap Nylon
22	20-9682-1	Boot w/9-32 Dia. Hole
23	5102-13864-00	Line Filter w/IEC Connector
24	01-12292	Line Filter Chassis Box
25	4004-01003-05	Mach. Screw, #4-40 x 5/16"

Universal Power Interface/Cordset Application Chart

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

Cables

Backbox Cables

H-14584	Dot Matrix Display Power Cable
H-15476	Logic Power Cable
H-15736	Secondary Cable
H-19657	Insert Cable

Cabinet Cables

H-16810	50Volt Disconnect Cable
H-17217	Plum Bob/Mech. Protect Cable
H-17837-2	Voltage Program Jumper Cable
H-19130	Dixie-Vend Interconnect Cable
H-19524	Cabinet Cable
H-19601	Power Extension Cable
H-19663.1	Cable Switch/Lamp
H-19691.1	Phurba Cable

Playfield Cables

H-19653	Playfield Switch Cable
H-19654	Playfield Lamp Cable
H-19656	Playfield Opto Cable
H-19736	2-Target Switch Cable

Unique Parts

Part Number	Description
A-13204-50032	Bottom Arch Assembly
A-13769-50032	Playfield & Insert Assembly
A-14615-1	1-Bank Drop Target Assembly
A-16883-1	Flipper Button Assembly, Blue
A-16917-50032	Sound Board PCB Assembly
A-17651	WPC Security CPU PCB Assy.
A-17854	Ramp Assembly, Small
A-17855	Ramp Assembly, Large
A-18512	Ball Guide Assy.-Upper Loop
A-18513	Ball Guide Assy.-Right Drain
A-18514	Ball Guide Assy.-Main Loop Short
A-18515	Ball Guide Assy.-Inner Sanctum
A-18518	Opto Bracket Assembly-Upper Loop
A-18529	Back Panel Assembly
A-18530-6	Standup Target - Oblong, Yellow
A-18536	Gun Assembly
A-18537.1	Bracket Assembly
A-18622	Extended Target Assembly
A-18768	Eject Assembly
A-18950	Ball Popper Assembly
A-18952	Ball Kicker Assembly
A-18954	Divertor Mech. Assembly, Left Side
A-18955	Divertor Mech. Assembly, Right Side
A-19031	Backbox & Decal Assembly
A-19032	Speaker/Display Panel Assembly
A-19052	Ball Guide Assembly, Right Side
A-19060	Rt. Ball Guide Assembly, Right Side
A-19061.1	Lt. Ball Guide Assembly, Right Side
A-19066	Ball Guide Assembly, Pop Left
A-19076	3-Switch Bracket Assembly
A-19107-1	4-Lamp PCB & Spacer Assembly
A-19108-1	16-Lamp Board Assembly
A-19109-1	19-Lamp Board Assembly
A-19603-1	Plfd. Plastic Assy., Front Bracket
A-19603-10	Plfd. Plastic Assy., Right Rail

Part Number	Description
A-19603-11	Plfd. Plastic Assembly
A-19603-2	Plfd. Plastic Assembly, Lower Guard
A-19603-3	Plfd. Plastic Assembly, Mongol Right
A-19603-4	Plfd. Plastic Assembly, Mongol Left
A-19603-5	Plfd. Plastic Sub-Assy., Rear
A-19603-6	Plfd. Plastic Sub-Assy., Left
A-19603-7	Plfd. Plastic Sub-Assy., Right
A-19603-8	Plfd. Plastic Assy., Large Right Rear
A-19603-9	Plfd. Plastic Assy., Small Rear
A-19638-1	Diverter & Knife Assembly, Left
A-19638-2	Diverter & Knife Assembly, Right
A-19642	1-Bank Drop Target Assembly
A-19676-1	Flipper Ball Guide, Right
A-19676-2	Flipper Ball Guide, Left
A-19679	Ball Stop Assembly
A-19693	Micro Switch & Bracket Assembly
A-19737	Switch & Cable Assembly
A-19792	Shaft/Cam Assembly
A-19794	Switch Gate Assembly
01-12915	Ball Guide, Left Drain
01-12916	Ball Guide, Main Loop
01-12918	Ball Guide, Upper Flipper
01-12921	Ball Guide , Left Eject
02-5001	Post, Small Ramp
02-5002	Post, Large Ramp
02-5109	Post-Extended
02-5139	Post- Long Hex.
02-5142	Thumb Screw
03-9252	Spacer
12-7241	Ramp Wire, Mini-Plfd. Feed
31-2002-	Playfield Plastic Set
31-2028-	Decal
36-50032	Playfield Hardcoat
36-50032-1	Mini-Playfield Hardcoat

LAMP MATRIX

Yellow (B+) → Red

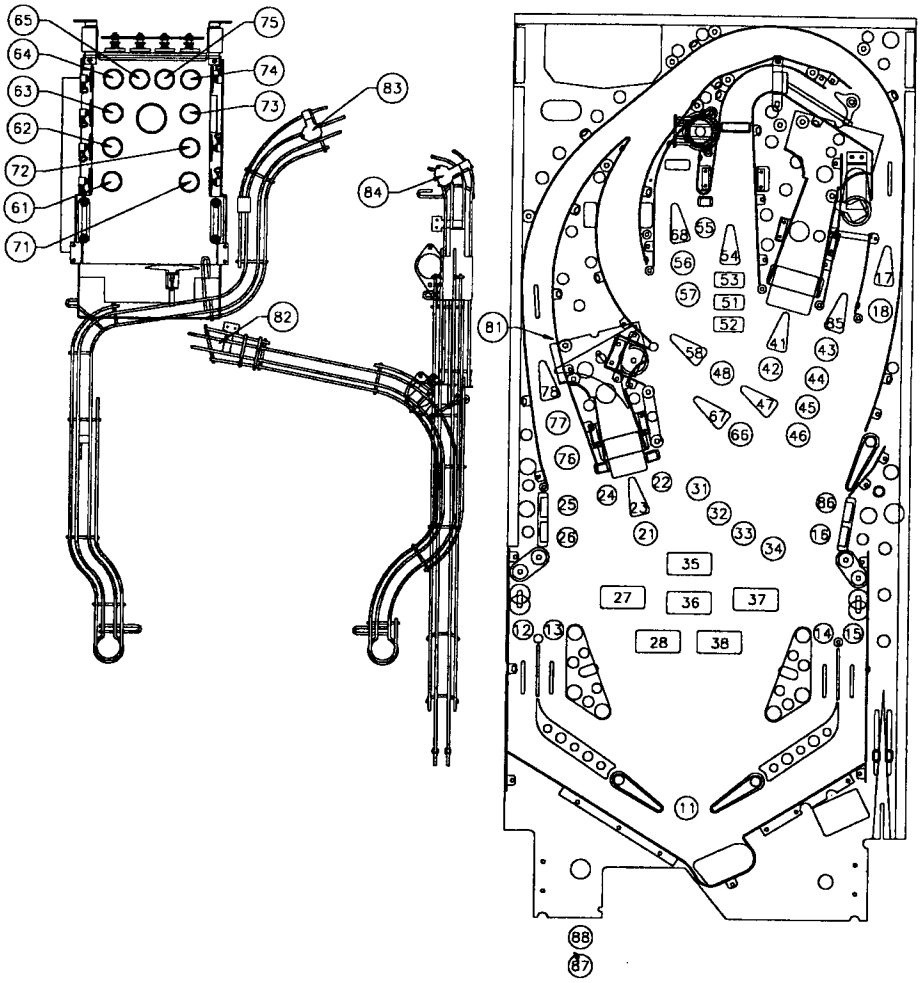
Row \ Column	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-9 Q91
1 Red-Brown J133-1 Q90	SHOOT AGAIN 11	LEFT RAMP JACKPOT 21	SCARF SCENES COMPLETE 31	RIGHT RAMP ARROW 41	LOCK 2 51	MINI LEFT STANDUP 4 61	MINI RIGHT STANDUP 4 71	LEFT RAMP LEFT RING 81
2 Red-Black J133-2 Q89	LEFT OUTLANE 12	MON(G)OL 22	SCARF BATTLE-FIELD 32	RIGHT RAMP JACKPOT 42	LOCK 3 52	MINI LEFT STANDUP 23 2	MINI RIGHT STANDUP 3 72	LEFT RAMP RIGHT RING 82
3 Red-Orange J133-4 Q88	LEFT RETURN LANE 13	LEFT RAMP ARROW 23	SCARF SHADOW MULTIBALL 33	"START SCENE" 43	LOCK 1 53	MINI LEFT STANDUP 12 63	MINI RIGHT STANDUP 2 73	RIGHT RAMP LEFT RING 83
4 Red-Yellow J133-5 Q87	RIGHT RETURN LANE 14	MO(N)GOL 24	SCARF KHAN MULTIBALL 34	WHO KNOWS 44	INNER SANCTUM ARROW 54	MINI LEFT STANDUP 1 64	MINI RIGHT STANDUP 1 74	RIGHT RAMP RIGHT RING 84
5 Red-Green J133-6 Q86	RIGHT OUTLANE 15	M(O)NGOL 25	PUNISH GUILTY 35	EXTRA BALL 45	CENTER STANDUP 55	MINI TOP CENTER LEFT 65	MINI TOP CENTER RIGHT 75	RIGHT EJECT ARROW 85
6 Red-Blue J133-7 Q85	MONGO(L) 16	(M)ONGOL 26	DUAL OF WILLS 36	FINAL BATTLE 46	BATTLE-FIELD READY 56	KHAN MULTIBALL 66	LEFT LOOP JACKPOT 76	MONG(O)L 86
7 Red-Violet J133-8 Q84	RIGHT LOOP ARROW 17	FARLEY CLAYMORE 27	BERYLLIUM SPHERE 37	SHADOW LOOP 47	BATTLE DROP JACKPOT 57	SUPER JACKPOT 67	LEFT MONGOL HURRY 77	BUY-IN BUTTON 87
8 Red-Gray J133-9 Q83	RIGHT MONGOL HURRY 18	UNDER-WATER DOOM 28	HOTEL MONOLITH 38	INNER LOOP JACKPOT 48	INNER LOOP ARROW 58	BATTLE DROP ARROW 68	LEFT LOOP ARROW 78	CREDIT BUTTON 88

J1XX = Power Driver Board

LAMP LOCATIONS

Item No.	Bulb No.	Lamp Assy. No.	Description
11	24-6549	A-17807	Shoot Again
12	24-6549	A-17807	Left Outlane
13	24-6549	A-17835	Left Return Lane
14	24-6549	A-17835	Right Return Lane
15	24-6549	A-17835	Right Outlane
16	24-6549	A-17835	MONGO(L)
17	24-6549	A-17807	Right Loop Arrow
18	24-6549	A-17807	Right Mongol Hurry
21	24-8768	A-19108	Left Ramp Jackpot
22	24-8768	A-19108	MON(G)OL
23	24-8768	A-19108	Left jRamp Arrow
24	24-8768	A-19108	MO(N)GOL
25	24-8768	A-19108	M(O)NGOL
26	24-8768	A-19108	(M)ONGOL
27	24-8768	A-19108	Farley Claymore
28	24-8768	A-19108	Underwater Doom
31	24-8768	A-19108	Scarf Scenes Complete
32	24-8768	A-19108	Scarf Battlefield
33	24-8768	A-19108	Scarf Shadow Multiball
34	24-8768	A-19108	Scarf Khan Multiball
35	24-8768	A-19108	Punish Guilty
36	24-8768	A-19108	Dual of Wills
37	24-8768	A-19108	Beryllium Sphere
38	24-8768	A-19108	Hotel Monolith
41	24-8768	A-19109	Right Ramp Arrow
42	24-8768	A-19109	Right Ramp Jackpot
43	24-8768	A-19109	"Start Scene"
44	24-8768	A-19109	Who Knows
45	24-8768	A-19109	Extra Ball
46	24-8768	A-19109	Final Battle
47	24-8768	A-19109	Shadow Loop
48	24-8768	A-19109	Inner Loop Jackpot

LAMP LOCATIONS (continued)



Item No.	Bulb No.	Lamp Assy. No.	Description
51	24-8768	A-19109	Lock 2
52	24-8768	A-19109	Lock 3
53	24-8768	A-19109	Lock 1
54	24-8768	A-19109	Inner Sanctum Arrow
55	24-8768	A-19109	Center Standup
56	24-8768	A-19109	Battlefield Ready
57	24-8768	A-19109	Battle Drop Jackpot
58	24-8768	A-19109	Inner Loop Arrow
61	24-8768	A-19107	Mini Left Standup 4
62	24-8768	A-19107	Mini Left Standup 3
63	24-8768	A-19107	Mini Left Standup 2
64	24-8768	A-19107	Mini Left Standup 1
65	24-6549	A-17807	Mini Top Center Left
66	24-8768	A-19109	Khan Multiball
67	24-8768	A-19109	Super Jackpot
68	24-8768	A-19109	Battle Drop Arrow

Item No.	Bulb No.	Lamp Assy. No.	Description
71	24-8768	A-19107	Mini Right Standup 4
72	24-8768	A-19107	Mini Right Standup 3
73	24-8768	A-19107	Mini Right Standup 2
74	24-8768	A-19107	Mini Right Standup 1
75	24-6549	A-17807	Mini Top Center Right
76	24-8768	A-17624	Left Loop Jackpot
77	24-8768	A-17624	Left Mongol Hurry
78	24-8768	A-17624	Left Loop Arrow
81	24-8855	A-19545-1	Left Ramp Left Ring
82	24-8855	A-19545-2	Left Ramp Right Ring
83	24-8855	A-19545-1	Right Ramp Left Ring
84	24-8855	A-19545-2	Right Ramp Right Ring
85	24-6549	A-17807	Right Eject Arrow
86	24-6549	A-17835	MONG(O)L
87	20-9663-18	---	Buy In
88	20-9663-2	---	Start Button

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

SWITCH MATRIX

White —— |—o/ o— Green

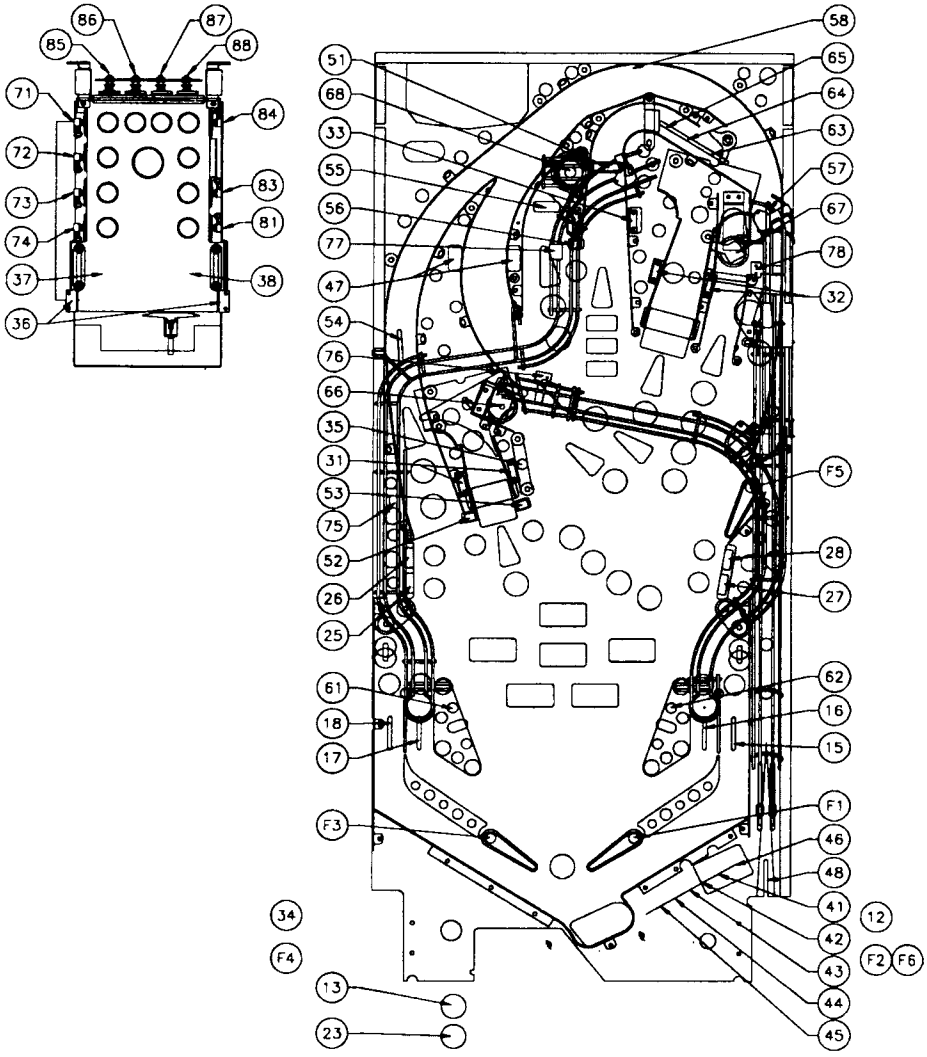
Dedicated Grounded Switches	Row \ Column	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	GUN TRIGGER 11	SLAM TILT 21	LEFT RAMP ENTER 31	TROUGH 1 41	WALL TARGET DOWN 51	LEFT SLINGSHOT 61	MINI LEFT STANDUP 1 71	MINI RIGHT STANDUP 4 81	Black-Green J906-1 Right Flipper EOS F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	RIGHT PHURBA CONTROL 12	COIN DOOR CLOSED 22	RIGHT RAMP ENTER 32	TROUGH 2 42	MO(N)GOL TARGET 52	RIGHT SLINGSHOT 62	MINI LEFT STANDUP 2 72	MINI RIGHT STANDUP 3 82	Black-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	START BUTTON 13	BUY-IN BUTTON 23	INNER SANCTUM 33	TROUGH 3 43	MON(G)OL TARGET 53	LOCKUP RIGHT 63	MINI LEFT STANDUP 3 73	NOT USED 83	Black-Blue J906-3 Left Flipper EOS F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	LEFT PHURBA CONTROL 34	TROUGH 4 44	LEFT LOOP ENTER 54	LOCKUP MIDDLE 64	MINI LEFT STANDUP 4 74	MINI RIGHT STANDUP 1 84	Black-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function: Ser Credits | Test Function: Esc D5	5 White-Green J209-5 U19-11	RIGHT OUTLANE 15	(M)ONGOL TARGET 25	LEFT RUBBER 35	TROUGH 5 45	BATTLE DROP DOWN 55	LOCKUP LEFT 65	LEFT RAMP LEFT MADE 75	MINI DROP LEFT 85	Black-Violet J906-4 Upper Right Flipper EOS F5
Orange-Blue (6) J205-7 Normal Function: Vol Down | Test Function: Down D6	6 White-Blue J209-7 U19-9	RIGHT RETURN LANE 16	M(O)NGOL TARGET 26	MINI KICKER 36	TOP TROUGH 46	CENTER STANDUP 56	LEFT EJECT 66	LEFT RAMP RIGHT MADE 76	MINI DROP MIDDLE LEFT 86	Black-Yellow J905-3 Upper Right Flipper Opto F6
Orange-Violet (7) J205-8 Normal Function: Vol Up | Test Function: Up D7	7 White-Violet J209-8 U19-5	LEFT RETURN LANE 17	MONGO(L) TARGET 27	MINI LIMIT LEFT 37	INNER LOOP ENTER 47	RIGHT LOOP ENTER 57	RIGHT EJECT 67	RIGHT RAMP LEFT MADE 77	MINI DROP MIDDLE RIGHT 87	Black-Gray J906-5 Upper Left Flipper EOS F7
Orange-Gray (8) J205-9 Normal Function: Begin Test | Test Function: Enter D8	8 White-Gray J209-9 U19-7	LEFT OUTLANE 18	MONG(O)L TARGET 28	MINI LIMIT RIGHT 38	SHOOTER 48	MINI EXIT TUBE 58	POPPER 68	RIGHT RAMP RIGHT MADE 78	MINI DROP RIGHT 88	Black-Blue J905-5 Upper Left Flipper Opto F8

J2XX = CPU Board; J9XX = Fliptronic II Board; ☐ = Opto, Typically Closed

SWITCH LOCATIONS

Item No.	Switch Part No.	Description
F1	SW-1A-194	Lower Right Flipper EOS
F2	A-17316	Lower Right Flipper Cabinet
F3	SW-1A-194	Lower Left Flipper EOS
F4	A-17316	Lower Left Flipper Cabinet
F5	SW-1A-194	Upper Right Flipper EOS
F6	A-17316	Upper Right Flipper Cabinet
F7	---	Not Used
F8	---	Not Used
11	5647-12133-16	Gun Trigger
12	SW-1A-195	Right Phurba Control
13	20-9663-2	Start Button
14	A-15361	*Plumb Bob Tilt
15	5647-12693-19	Right Outlane
16	5647-12693-19	Right Return Lane
17	5647-12693-19	Left Lane
18	5647-12693-19	Left Outlane
21	A-17238	*Slam Tilt
22	5643-09288-00	*Coin Door Closed
23	20-9663-18	Buy In Button
24	5643-09112-00	*Always Closed
25	A-18019-6	(M)ONGOL Target
26	A-18019-6	M(O)NGOL Target
27	A-18019-6	MONGO(L) Target
28	A-18019-6	MONG(O)L Target
31	A-16908	Left Ramp Enter (LED)
	A-16909	(Transistor)
32	A-16908	Right Ramp Enter (LED)
	A-16909	(Transistor)
33	A-16908	Inner Sanctum (LED)
	A-16909	(Transistor)
34	SW-1A-195	Left Phurba Control
35	SW-1A-120	Left Rubber
36	A-16908	Mini Kicker (LED)
	A-16909	(Transistor)
37	A-14534	**Mini Limit Left
38	A-14534	**Mini Limit Right
41	A-18617	Trough Ball 1 (LED)
	A-18618	(Transistor)
42	A-18617	Trough Ball 2 (LED)
	A-18618	(Transistor)
43	A-18617	Trough Ball 3 (LED)
	A-18618	(Transistor)

SWITCH LOCATIONS (continued)



Item No.	Switch Part No.	Description
44	A-18617	Trough Ball 4 (LED)
	A-18618	(Transistor)
45	A-18617	Trough Ball 5 (LED)
	A-18618	(Transistor)
46	A-18617	Top Trough (LED)
	A-18618	(Transistor)
47	A-16908	Inner Loop Enter (LED)
	A-16909	(Transistor)
48	5647-12693-32	Shooter
51	5647-12693-31	Wall Target Down
52	A-18530-6	MO(N)GOL Target
53	A-18530-6	MON(G)OL Target
54	5647-12693-19	Left Loop Enter
55	5647-12693-31	Battle Drop Down
56	A-18530-6	Center Standup
57	5647-12693-19	Right Loop Enter
58	5647-12693-13	Mini Exit Tube
61	SW-1A-114	Left Slingshot (kicker)
	SW-1A-120	(score)
62	SW-1A-114	Right Slingshot (kicker)
	SW-1A-120	(score)
63	5647-12073-34	Lockup Right

Item No.	Switch Part No.	Description
64	5647-12073-33	Lockup Middle
65	5647-12693-32	Lockup Left
66	5647-12693-43	Left Eject
67	5647-12133-11	Right Eject
68	5647-12693-24	Popper
71	A-18378-6	Mini Left Standup 1
72	A-18378-6	Mini Left Standup 2
73	A-18378-6	Mini Left Standup 3
74	A-18378-6	Mini Left Standup 4
75	5647-12693-13	Left Ramp Left Made
76	5647-12693-13	Left Ramp Right Made
77	5647-12693-13	Right Ramp Left Made
78	5647-12693-13	Right Ramp Right Made
81	A-18378-6	Mini Right Standup 4
82	A-18378-6	Mini Right Standup 3
83	---	Not Used
84	A-18378-6	Mini Right Standup 1
85	A-19666	Mini Drop Left
86	A-19666	Mini Drop Middle Left
87	A-19666	Mini Drop Middle Right
88	A-19666	Mini Drop Right

*Not Shown; **Located under mini-playfield assembly.

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire Color	Solenoid Part number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	BALL LAUNCH	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-23-800	
02	LOCKUP KICKOUT	High Power	J107-2			Q80	J130-2			Vio-Red	A-14189	
03	LEFT DIVERTER LEFT	High Power	J107-2			Q78	J130-4			Vio-Org	AE-25-1000	
04	LEFT DIVERTER RIGHT	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-25-1000	
05	RIGHT DIVERTER RIGHT	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-25-1000	
06	RIGHT DIVERTER LEFT	High Power	J107-2			Q66	J130-7			Vio-Blu	AE-25-1000	
07	KNOCKER	High Power		J107-2		Q68		J130-8		Vio-Blk		AE-23-800
08	WALL TARGET UP	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-23-800	
09	LEFT SLINGSHOT	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	
10	RIGHT SLINGSHOT	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	
11	RIGHT EJECT	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-27-1200	
12	LEFT EJECT	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1500	
13	BALL RELEASE	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1500	
14	BALL POPPER	Low Power	J107-3			Q48	J127-7			Brn-Blu	AE-25-1000	
15	MINI KICKER	Low Power	J107-3			Q46	J127-8			Brn-Vio	AE-25-1000	
16	WALL TARGET DOWN	Low Power	J107-3			Q44	J127-9			Brn-Gry	SM-30-1100-DC	
17	MINI PLAYFIELD FLASHER	Flasher	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#89	#906 (2)
18	LEFT SIDE FLASHER	Flasher	J107-6	J106-5		Q40	J126-2	J125-2		Blk-Red	#89	#906
19	MINI MOTOR RIGHT	Flasher	J116-2			Q38	J126-3			Blk-Org	14-8014	
20	MINI MOTOR LEFT	Flasher	J116-2			Q36	J126-4			Blk-Yel	14-8014	
21	RIGHT SIDE FLASHER	Flasher	J107-6			Q28	J126-5			Blu-Grn	#906, #89	
22	RIGHT RAMP FLASHER	Flasher	J107-6			Q30	J126-6			Blu-Blk	#906, #89	
23	LEFT RAMP FLASHER	Flasher	J107-6			Q34	J126-7			Blu-Vio	#906, #89	
24	MINI DROP BANK	Flasher	J107-1			Q32	*J126-8			Blu-Gry	AE-25-1000	
25	SINGLE DROP UP	Gen. Purpose	J107-1			Q26	*J122-1			Blu-Brn	AE-26-1200	
26	LEFT BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q24	J122-2	J124-2		Blu-Red	#906	#906
27	CENTER BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q22	J122-3	J124-3		Blu-Org	#906	#906
28	RIGHT BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q20	J122-4	J124-5		Blu-Yel	#906	#906
35	MAGNET	High Power	J907-8,9			Q2	J902-3			Yel-Gry	20-9247	
36	SINGLE DROP DOWN	Low Power	J907-8,9			Q7	J902-1			Org-Gry	SM1-26-600	
	General Illumination											
01	BOTTOM PLAYFIELD	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	
02	TOP LEFT PLAYFIELD	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	
03	INSERT BOTTOM	G.I.		J120-3		Q14		J120-9		Wht-Yel		#555
04	INSERT TOP	G.I.		J120-5		Q16		J120-10		Wht-Grn		#555
05	TOP RIGHT PLAYFIELD	G.I.	J121-6			Q12	J121-11			Wht-Vio	#44	

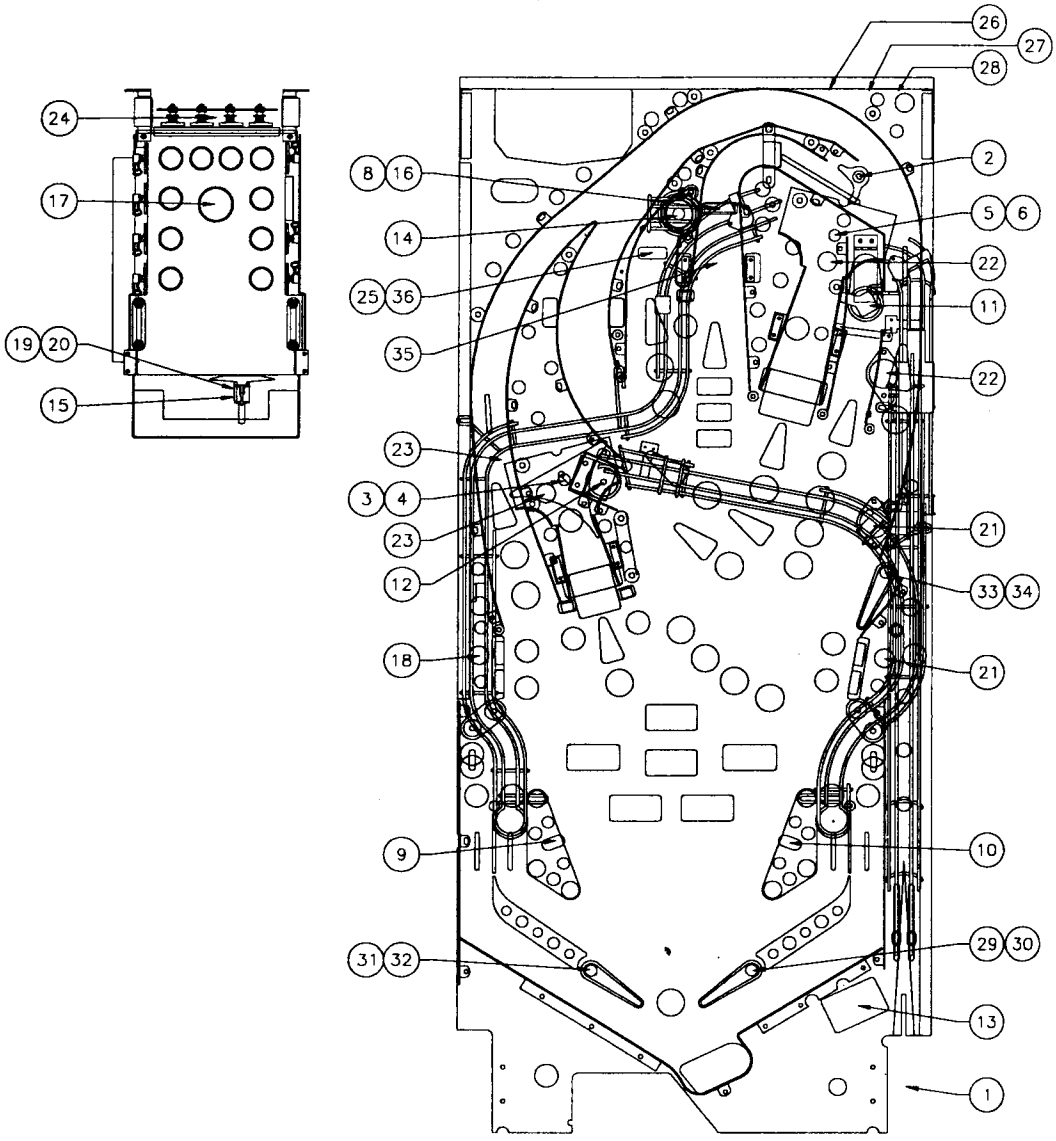
	Flipper Circuits		Voltage Connections	Drive Transistors		Drive Connectors	Drive Wire Colors		Coil Part No.	Coil Color
			Playfield	Power	Hold	Playfield	Power	Hold		
29		Lwr. Rt. Power	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn	FL-11629	BLUE
31		Lwr. Lt. Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J907-4 (Red-Blu)		Q9	J902-7		Org-Blu	FL-11629	BLUE
33		Upr. Rt. Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio	FL-15411	ORANGE
35		Upr. Lt. Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry			
36	Upper Left Flipper	Upr. Lt. Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	NOT	USED

J1xx=Power Driver Board; J9xx=Fliptronic II Board; 24-6549=#44 bulb; 24-8704=#89 bulb; 24-8768=#555 bulb; 24-8802=#906 bulb
* Tieback Diode J122-5 (loop) from J126-11 (end).

SOLENOID/FLASHER LOCATIONS

Item No.	Coil/ Flasher No.	Assy. Number.	Description
01	AE-23-800	A-14525	Ball Launch
02	A-14189	A-18952	Lockup Kickout
03	AE-25-1000	A-18954	Left Diverter Left
04	AE-25-1000	A-18954	Left Diverter Right
05	AE-25-1000	A-18955	Right Diverter Right
06	AE-25-1000	A-18955	Right Diverter Left
07	AE-23-800	B-10686-1	Knocker
08	AL-23-800	A-18622	Wall Target Up
09	AE-26-1200	B-9362-R-3	Left Slingshot
10	AE-26-1200	B-9362-L-2	Right Slingshot
11	AE-27-1200	A-15368	Right Eject
12	AE-26-1500	A-18768	Left Eject
13	AE-26-1500	A-18753	Ball Release
14	AE-25-1000	A-18950	Ball Popper
15	AE-25-1000	A-19070	Mini Kicker
16	SM-30-1100-DC	A-18622	Wall Target Down
17	24-8704	A-17803	Mini Playfield Flasher
18	24-8704	A-17983	Left Side Flasher
19	14-8014	A-19170	Mini Motor Right
20	14-8014	A-19170	Mini Motor Left

SOLENOID/FLASHER LOCATIONS (continued)



Item No.	Coil/ Flasher No.	Assy. Number.	Description
21	24-8704	A-17983	Right Side Flasher
	24-8802	B-12156	
22	24-8704	A-17983	Right Ramp Flasher
	24-8802	B-12156	
23	24-8704	A-17983	Left Ramp Flasher
	24-8802	A-12156	
24	AE-25-1000	A-18783	Mini Drop Bank
25	AE-26-1200	A-19642	Single Drop Up
26	22-8802	B-12156	Left Back Flasher
27	22-8802	B-12156	Center Back Flasher
28	22-8802	B-12156	Right Back Flasher
35	20-9247	A-18388	Magnet
36	SM1-26-600	A-19642	Single Drop Down

General Illumination Circuits

Item No.	Description	Bulb No.	
01	Bottom Playfield	#44	G.I. String 1
02	Top Left Playfield	#44	G.I. String 2
03	Insert Bottom	#555	G.I. String 3
04	Insert Top	#555	G.I. String 4
05	Top Right Playfield	#44	G.I. String 5

Flipper Coils

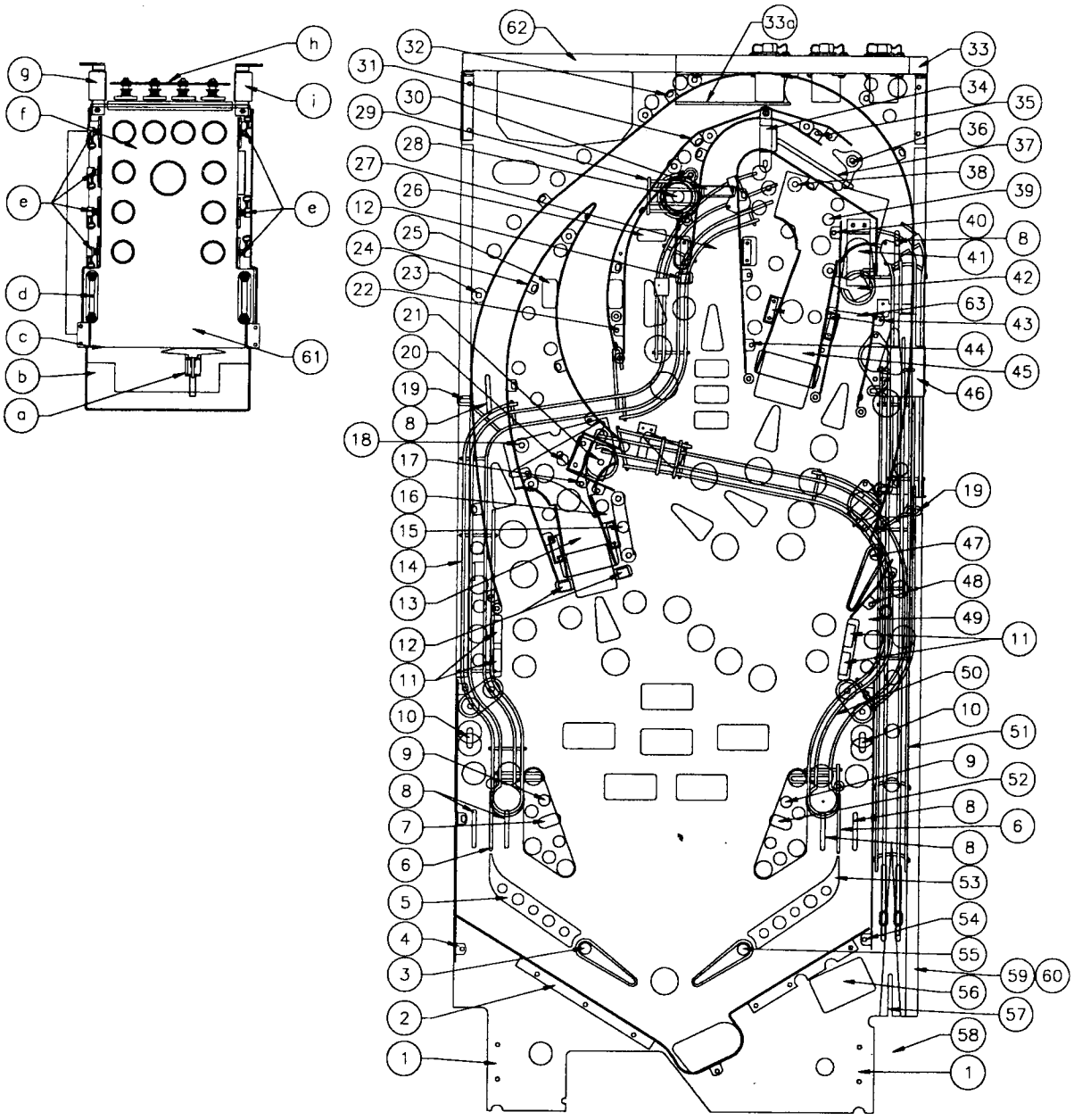
Coil No.	Color	Assy. No.	Description
FL-11629	(blue)	A-15849-R-2	Lower Right Flipper
FL-11629	(blue)	A-15849-L-2	Lower Left Flipper
FL-15411	(org)	A-15849-R-4	Upper Right Flipper

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

UPPER PLAYFIELD PARTS

Item No.	Part Number	Description
1	01-9211	Playfield Hanger Bracket (2)
2	01-13593	Bottom Arch Ball Guide
3	A-15849-L-2	Flipper Assembly Complete
	20-9250-5	Flipper & Shaft, White
4	01-12915	Left Drain Ball Guide
5	A-19676-2	Left Flipper Ball Guide
6	12-6466-10	Ball Guide Wire 2 1/2" (2)
7	A-17811	Sling Shot Kicker Assembly
	B-9362-R-3	Coil & Bracket Assembly
	10-128	Spring
8	A-17813	Rollover Switch Assembly (6)
9	A-17801	Kicker Count Switch Assy.
10	02-5107	Adjusting Post (2)
11	A-18019-6	Skirted Target, Yellow (4)
12	A-18530-6	Oblong Target, Yellow (3)
13	A-17854	Small Ramp Assembly
14	A-19702	Left Drain Wire Ramp Assy.
15	A-17794	Kicker Switch Assembly
16	A-19603-4	Left Mongol Plastic Assembly
17	01-12921	Left Eject Ball Guide
18	02-5001	Small Ramp Post
19	A-17838	#8 Stud Plate
20	A-18954	Left Diverter Mech. Assembly
	A-19638-1	Knife & Diverter Assy., Left
	20-8712-25	E-ring 1/4"
	4700-00027-00	Flat Washer .1/4 x 1/2 21G
21	A-18768	Eject Assembly
	A-19693	Micro Switch & Bracket Assy.
22	A-19066	Left Popper Ball Guide Assy.
23	A-18537	Bracket Assembly
	02-5061	Post 6-32 x 3/8"
24	A-18512	Upper Loop Ball Guide Assy.
25	A-18518	Opto Bracket Assembly
26	A-19642	1-Bank Drop Target Assembly
27	A-18388	Magnet Opto & Nut Assembly
28	A-18950	Ball Popper Assembly
29	12-7241	Mini-Playfield Wire Ramp
30	A-18622	Extended Target Assembly
31	A-18514	Main Loop Short Ball Guide
32	01-12916	Main Loop Long Ball Guide
33	A-18529	Back Panel Assembly
33a	03-9215-2	Bottom Half Tube
34	A-13505-1	Ball Gate Assembly
35	A-19052	Inner Sanctum Ball Guide Left
36	A-18952	Ball Kicker Assembly
	01-13111	Cam
	03-9252	Spacer
	4700-00008-00	Flat Washer 5/32 x 5/8 x 21G
37	A-19076	3 Switch Bracket Assembly
38	02-5002	Large Ramp Post
39	A-18955	Right Diverter Mech. Assy.
	A-19638-2	Knife & Diverter Assy., Right
	20-8712-25	E-ring 1/4"
	4700-00027-00	Flat Washer .1/4 x 1/2 21G
40	A-19061	Ball Guide
41	A-19679	Ball Stop Assembly
42	A-15368	Eject Assembly
	A-17985-R	Eject Switch Assembly
43	A-19060	Ball Guide
44	A-18515	Inner Sanctum Ball Guide Rt.
45	A-17855	Large Ramp Assembly
46	A-19700	Right Drain Wire Ramp Assy.
47	A-15849-R-4	Flipper Assembly Complete
	20-9250-5	Flipper & Shaft, White
48	01-19218	Upper Flipper Ball Guide
49	A-19603-3	Right Mongol Plastic Assy.
50	A-19701	Wire Ramp Assembly
51	A-19730	Shooter Ramp Assembly
52	A-17811	Sling Shot Kicker Assembly
	B-9362-L-2	Coil & Bracket Assembly
	10-128	Spring
53	A-19676-1	Right Flipper Ball Guide
54	A-18513	Right Drain Ball Guide
55	A-15849-R-2	Flipper Assembly Complete
	20-9250-5	Flipper & Shaft, White
56	A-18753	Ball Trough Assembly Comp.
57	A-18973	Shooter Lane Switch Assy.
58	A-14525	Kicker Bracket Assembly
59	A-15802-P	Level & Holder Assembly
60	01-10621	Strike Plate
61	A-18382	Mini-playfield Assy. Comp.
a)	A-17789	Coil Slide Motor Assembly
b)	03-9229	Plastic Guard
c)	A-19603-1	*Front Plastic Guard
d)	02-5142	Thumb Screw
e)	A-18379-6	Rect. Target Assy. Yellow (7)
f)	A-19603-2	†Low Plastic Guard
g)	A-19113-2	Left Mounting Bracket
h)	A-18783	4-Bank Drop Target Assembly
i)	A-19113-1	Right Mounting Bracket
62	A-19786	Mini-playfield Back Board Assy.
	A-19522	*Deflector Assembly
	03-9214	*Mini-playfield Rear Ramp
63	A-19794	Switch Gate Assembly

UPPER PLAYFIELD PARTS



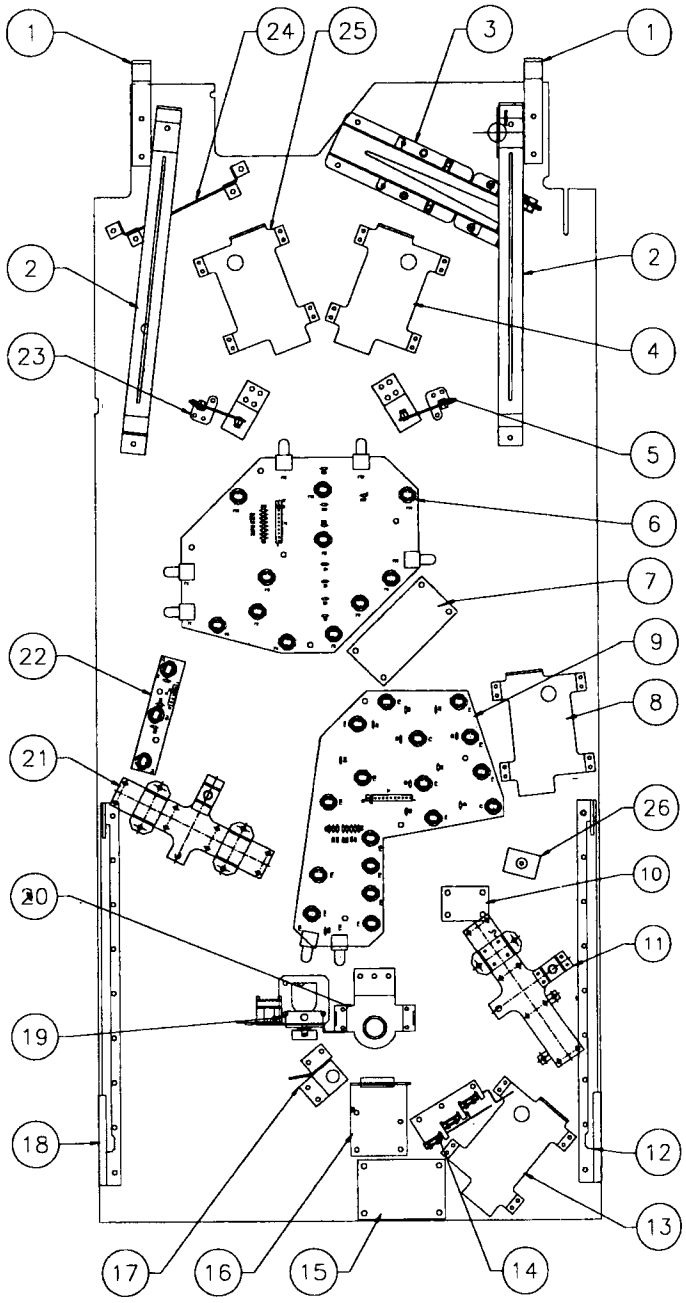
Miscellaneous

A-13204-50032	Bottom Arch Assembly
A-13769-50032	Screened Playfield
A-13769A-50032	Screened Mini-playfield
A-15646-3	Opto SW-24 P.C.B. Assy.
A-16120-1	D.C. Motor Control Assembly
A-18159-1	10 Opto P.C.B. Assembly
A-19603-8	Large Right Rear Plastic Assy.
A-19603-9	Small Rear Plastic Assy.
A-19603-10	Wood Rail Plastic Assy.
C-13940-1	5 Sw & Diode P.C.B. Assy.
03-9315-1	**Full Playfield Mylar
03-9315-2	Mini-playfield Mylar
03-9315-3	Ball Return Mylar
03-9315-4	Ball Return Mylar
03-9315-5	Upper Loop Mylar
03-9315-6	Main Loop Mylar
20-6500	Steel Ball 1 1/6" (5)

†Located Under Mini-playfield
*Not Shown
**The Shadow hardcoat playfield does not require a full mylar. However, mylars can be purchased through your local Bally Distributor.

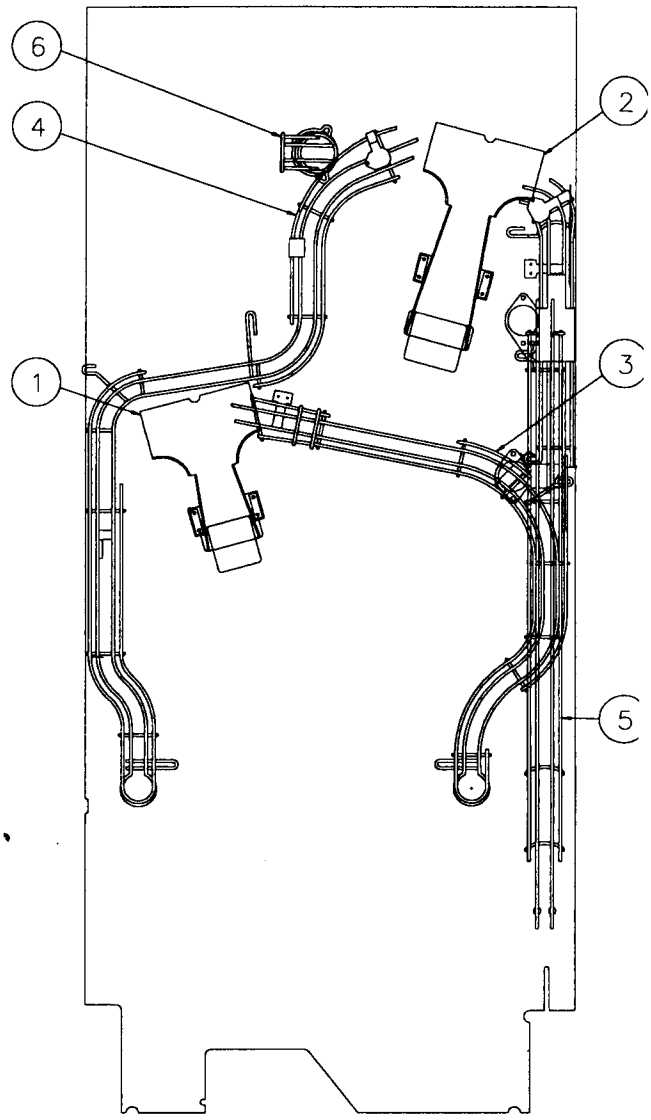
LOWER PLAYFIELD PARTS

Item	Part Number	Description
1	01-9211	Plfd. Hanger Bracket Assy. (2)
2	01-11781	Leg Support (2)
3	A-18753	Outhole Ball Trough Assembly
4	A-15849-R-4	Flipper Assembly, Lwr. Right
5	A-17811	Kicker arm (Slingshot) Assy.
a)	B-9362-L-2	Coil & Bracket Assembly
6	A-19108	16-Lamp Board Assembly
7	A-16120	D.C. Motor Control PCB Assy.
8	A-15849-R-2	Flipper Assembly, Upr. Right
9	A-19109	19-Lamp Board Assembly
10	C-13940-1	5-Sw. & Diode Assy. w/Spacers
11	A-18955	Divertor Mech. Assembly, Right
a)	A-19638-2	Knife & Diverter Assy., Right
12	A-17749.1-2	Plfd. Slide Mechanism, Right
13	A-18952	Ball Kicker Assembly
14	A-19076	3-Switch Bracket Assembly
15	A-15646-2	Opto Sw-24 PCB Assembly
16	A-18622	Extended Target Assembly
17	A-18950	Ball Popper Assembly
18	A-17749.1-1	Plfd. Slide Mechanism, Left
19	A-19642	1-Bank Drop Target Assembly
20	A-18388	Magnet Opto & Nut Assembly
21	A-18954	Divertor Mech. Assembly, Left
a)	A-19638-1	Knife & Diverter Assy., Left
22	A-17624	3-Lamp Board Assembly
23	A-17811	Kicker Arm (Slingshot) Assy.
a)	B-9362-R-3	Coil & Bracket Assembly
24	A-18159-1	Opto Sw-10 PCB Assembly
25	A-15849-L-2	Flipper Assembly, Lwr. Left
26	A-15368	Eject Assembly



RAMPS

Item	Part Number	Description
1	A-17854	Ramp Assembly, Small
a)	A-16909	RTV Opto Photo Trans. Assy.
b)	A-16908	RTV Opto LED Assembly
c)	A-19160-1	Ring Assembly
d)	B-12156	Single Flash Lamp Assembly
2	A-17855	Ramp assembly, Large
a)	A-16909	RTV Opto Photo Trans. Assy.
b)	A-16908	RTV Opto LED Assembly
3	A-19701	Left Ramp Assy. - Right Drain
a)	A-19160-2	Ring Assembly
b)	5647-12693-13	Mini Micro Switch
4	A-19702	Right Ramp Assy. - Left Drain
a)	A-19160-1	Ring Assembly
b)	5647-12693-13	Mini Micro Switch
5	A-19730	Wire Ramp Assembly, Right
a)	A-19700	Right Ramp Assy., -Right Drain
6	12-7241	Mini-Playfield Wire Ramp



Notes

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SECTION THREE

GAME WIRING AND SCHEMATICS

CONNECTOR & COMPONENT IDENTIFICATION

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

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

Prefix number for the WPC circuit boards are as listed below.

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

P.C. BOARD LEGEND
J1XX = Power Driver Board
J2XX = CPU Board
J3XX = Dot Matrix Controller Board
J4XX = Fliptronic II Board

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

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

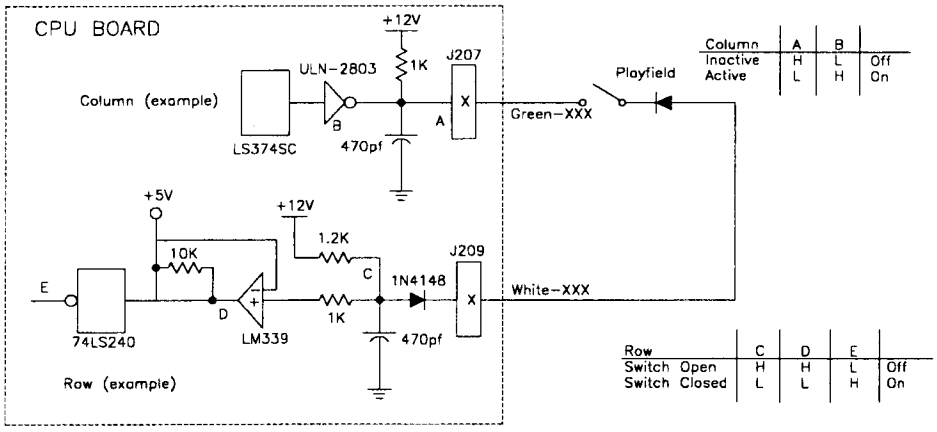
SWITCH MATRIX

White —|—o— Green

Dedicated Grounded Switches	Row \ Column	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	GUN TRIGGER 11	SLAM TILT 21	LEFT RAMP ENTER 31	TROUGH 1 41	WALL TARGET DOWN 51	LEFT SLINGSHOT 61	MINI LEFT STANDUP 1 71	MINI RIGHT STANDUP 4 81	Black-Green J906-1 Right Flipper EOS F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	RIGHT PHURBA CONTROL 12	COIN DOOR CLOSED 22	RIGHT RAMP ENTER 32	TROUGH 2 42	MO(N)GOL TARGET 52	RIGHT SLINGSHOT 62	MINI LEFT STANDUP 2 72	MINI RIGHT STANDUP 3 82	Black-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	START BUTTON 13	BUY-IN BUTTON 23	INNER SANCTUM 33	TROUGH 3 43	MON(G)OL TARGET 53	LOCKUP RIGHT 63	MINI LEFT STANDUP 3 73	NOT USED 83	Black-Blue J906-3 Left Flipper EOS F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	LEFT PHURBA CONTROL 34	TROUGH 4 44	LEFT LOOP ENTER 54	LOCKUP MIDDLE 64	MINI LEFT STANDUP 4 74	MINI RIGHT STANDUP 1 84	Black-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function: Ser Credits | Test Function: Esc D5	5 White-Green J209-5 U19-11	RIGHT OUTLANE 15	M(O)NGOL TARGET 25	LEFT RUBBER 35	TROUGH 5 45	BATTLE DROP DOWN 55	LOCKUP LEFT 65	LEFT RAMP LEFT MADE 75	MINI DROP LEFT 85	Black-Violet J906-4 Upper Right Flipper EOS F5
Orange-Blue (6) J205-7 Normal Function: Vol Down | Test Function: Down D6	6 White-Blue J209-7 U19-9	RIGHT RETURN LANE 16	M(O)NGOL TARGET 26	MINI KICKER 36	TOP TROUGH 46	CENTER STANDUP 56	LEFT EJECT 66	LEFT RAMP RIGHT MADE 76	MINI DROP MIDDLE LEFT 86	Black-Yellow J905-3 Upper Right Flipper Opto F6
Orange-Violet (7) J205-8 Normal Function: Vol Up | Test Function: Up D7	7 White-Violet J209-8 U19-5	LEFT RETURN LANE 17	MONGO(L) TARGET 27	MINI LIMIT LEFT 37	INNER LOOP ENTER 47	RIGHT LOOP ENTER 57	RIGHT EJECT 67	RIGHT RAMP LEFT MADE 77	MINI DROP MIDDLE RIGHT 87	Black-Gray J906-5 Upper Left Flipper EOS F7
Orange-Gray (8) J205-9 Normal Function: Begin Test | Test Function: Enter D8	8 White-Gray J209-9 U19-7	LEFT OUTLANE 18	MONG(O)L TARGET 28	MINI LIMIT RIGHT 38	SHOOTER 48	MINI EXIT TUBE 58	POPPER 68	RIGHT RAMP RIGHT MADE 78	MINI DROP RIGHT 88	Black-Blue J905-5 Upper Left Flipper Opto F8

J2XX = CPU Board; J9XX = Fliptronic II Board; ▨ = Opto, Typically Closed

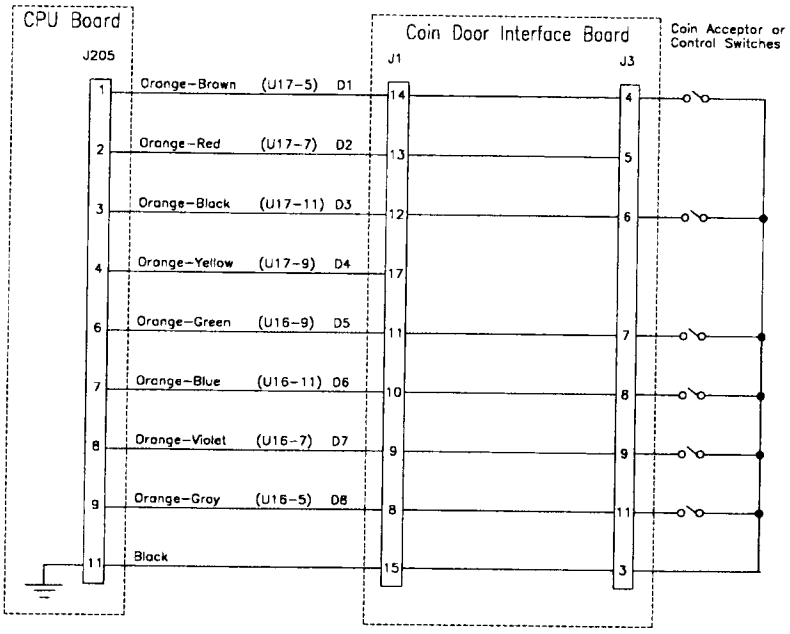
SWITCH MATRIX CIRCUIT



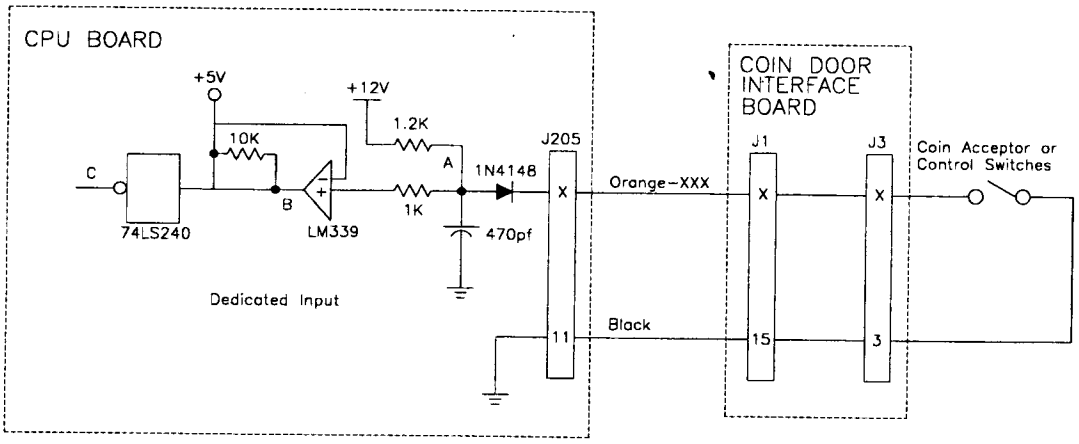
The microprocessor is constantly strobing the column side of the switch. When point "A" on the column circuit toggles low, the column side is active.

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

DEDICATED SWITCHES



DEDICATED SWITCH CIRCUIT



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

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

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

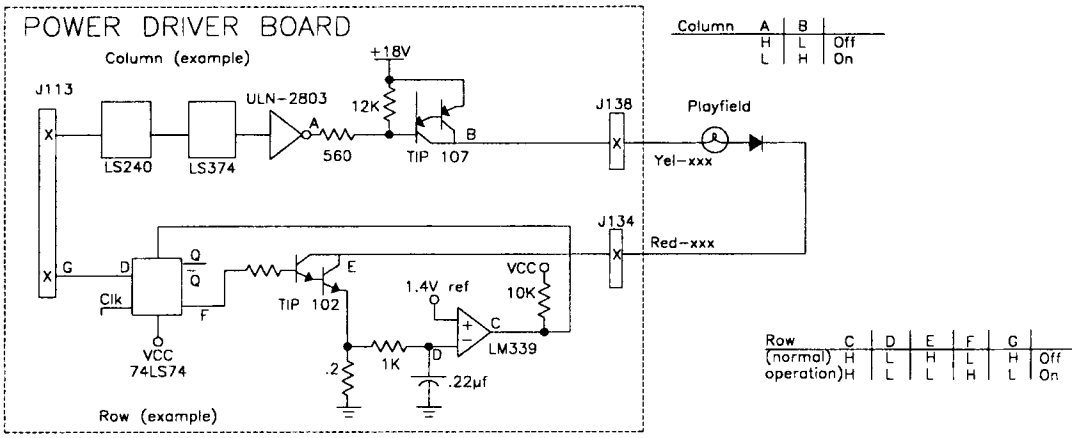
LAMP MATRIX

Yellow (B+) → Red

Row \ Column	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-9 Q91
1 Red-Brown J133-1 Q90	SHOOT AGAIN 11	LEFT RAMP JACKPOT 21	SCARF SCENES COMPLETE 31	RIGHT RAMP ARROW 41	LOCK 2 51	MINI LEFT STANDUP 4 61	MINI RIGHT STANDUP 4 71	LEFT RAMP LEFT RING 81
2 Red-Black J133-2 Q89	LEFT OUTLANE 12	MON(G)OL 22	SCARF BATTLE-FIELD 32	RIGHT RAMP JACKPOT 42	LOCK 3 52	MINI LEFT STANDUP 23 2	MINI RIGHT STANDUP 3 72	LEFT RAMP RIGHT RING 82
3 Red-Orange J133-4 Q88	LEFT RETURN LANE 13	LEFT RAMP ARROW 23	SCARF SHADOW MULTIBALL 33	"START SCENE" 43	LOCK 1 53	MINI LEFT STANDUP 12 63	MINI RIGHT STANDUP 2 73	RIGHT RAMP LEFT RING 83
4 Red-Yellow J133-5 Q87	RIGHT RETURN LANE 14	MO(N)GOL 24	SCARF KHAN MULTIBALL 34	WHO KNOWS 44	INNER SANCTUM ARROW 54	MINI LEFT STANDUP 1 64	MINI RIGHT STANDUP 1 74	RIGHT RAMP RIGHT RING 84
5 Red-Green J133-6 Q86	RIGHT OUTLANE 15	M(O)NGOL 25	PUNISH GUILTY 35	EXTRA BALL 45	CENTER STANDUP 55	MINI TOP CENTER LEFT 65	MINI TOP CENTER RIGHT 75	RIGHT EJECT ARROW 85
6 Red-Blue J133-7 Q85	MONGO(L) 16	(M)ONGOL 26	DUAL OF WILLS 36	FINAL BATTLE 46	BATTLE-FIELD READY 56	KHAN MULTIBALL 66	LEFT LOOP JACKPOT 76	MONG(O)L 86
7 Red-Violet J133-8 Q84	RIGHT LOOP ARROW 17	FARLEY CLAYMORE 27	BERYLLIUM SPHERE 37	SHADOW LOOP 47	BATTLE DROP JACKPOT 57	SUPER JACKPOT 67	LEFT MONGOL HURRY 77	BUY-IN BUTTON 87
8 Red-Gray J133-9 Q83	RIGHT MONGOL HURRY 18	UNDER-WATER DOOM 28	HOTEL MONOLITH 38	INNER LOOP JACKPOT 48	INNER LOOP ARROW 58	BATTLE DROP ARROW 68	LEFT LOOP ARROW 78	CREDIT BUTTON 88

J1XX = Power Driver Board

LAMP MATRIX CIRCUIT



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

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

In overcurrent conditions the lamps is shut Off through the comparator. If the voltage at the negative input of the LM330 rises above 1.4V the output changes to a low, which is fed back to the 74LS74 and shuts the row circuit Off.

SOLENOID/FLASHER TABLE

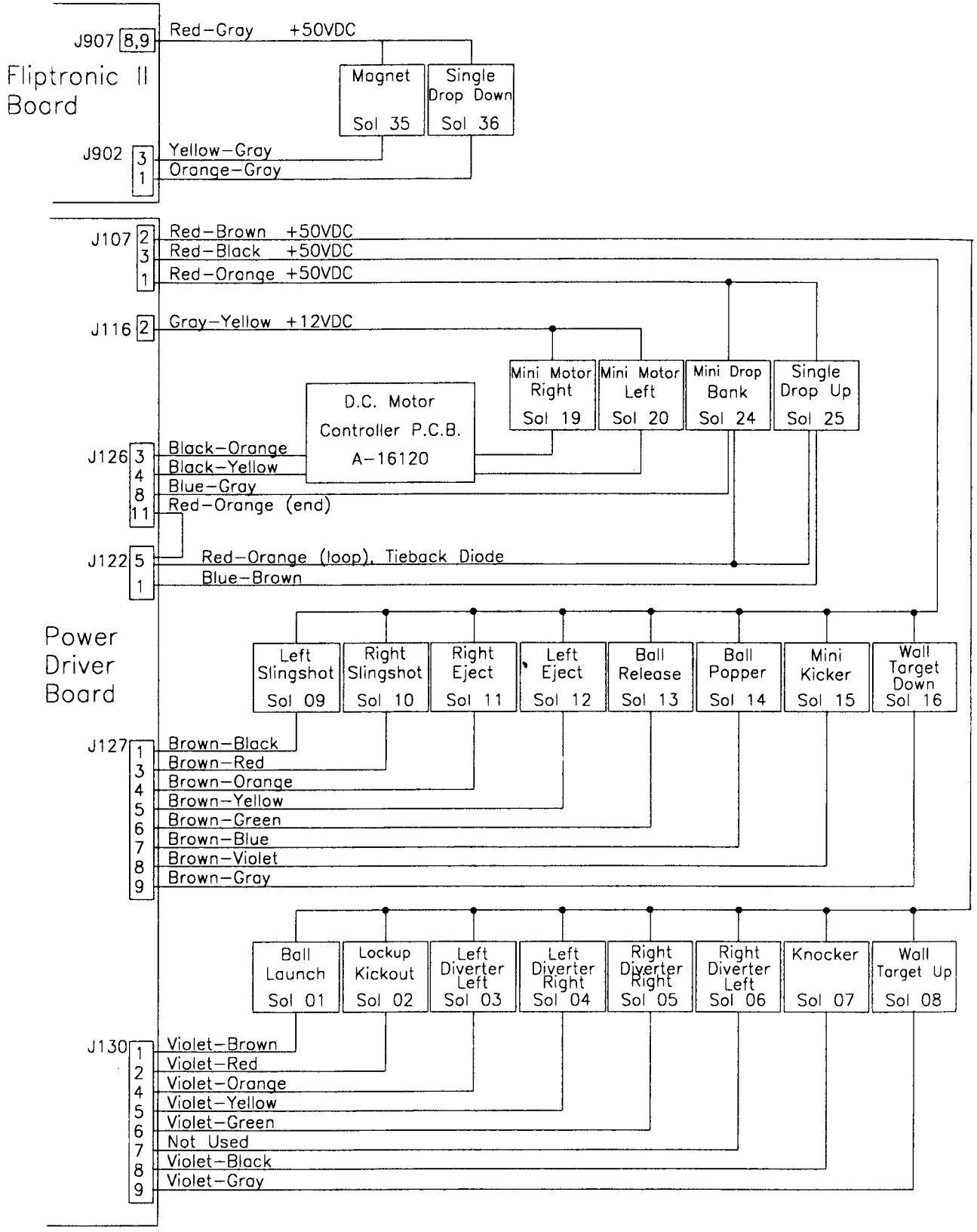
Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire Color	Solenoid Part number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	BALL LAUNCH	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-23-800	
02	LOCKUP KICKOUT	High Power	J107-2			Q80	J130-2			Vio-Red	A-14189	
03	LEFT DIVERTER LEFT	High Power	J107-2			Q78	J130-4			Vio-Org	AE-25-1000	
04	LEFT DIVERTER RIGHT	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-25-1000	
05	RIGHT DIVERTER RIGHT	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-25-1000	
06	RIGHT DIVERTER LEFT	High Power	J107-2			Q66	J130-7			Vio-Blu	AE-25-1000	
07	KNOCKER	High Power		J107-2		Q68		J130-8		Vio-Blk		AE-23-800
08	WALL TARGET UP	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-23-800	
09	LEFT SLINGSHOT	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	
10	RIGHT SLINGSHOT	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	
11	RIGHT EJECT	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-27-1200	
12	LEFT EJECT	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1500	
13	BALL RELEASE	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1500	
14	BALL POPPER	Low Power	J107-3			Q48	J127-7			Brn-Blu	AE-25-1000	
15	MINI KICKER	Low Power	J107-3			Q46	J127-8			Brn-Vio	AE-25-1000	
16	WALL TARGET DOWN	Low Power	J107-3			Q44	J127-9			Brn-Gry	SM-30-1100-DC	
17	MINI PLAYFIELD FLASHER	Flasher	J107-6	J106-5		Q42	J126-1	J125-1		Blk-Brn	#89	#906 (2)
18	LEFT SIDE FLASHER	Flasher	J107-6	J106-5		Q40	J126-2	J125-2		Blk-Red	#89	#906
19	MINI MOTOR RIGHT	Flasher	J116-2			Q38	J126-3			Blk-Org	14-8014	
20	MINI MOTOR LEFT	Flasher	J116-2			Q36	J126-4			Blk-Yel	14-8014	
21	RIGHT SIDE FLASHER	Flasher	J107-6			Q28	J126-5			Blu-Grn	#906, #89	
22	RIGHT RAMP FLASHER	Flasher	J107-6			Q30	J126-6			Blu-Blk	#906, #89	
23	LEFT RAMP FLASHER	Flasher	J107-6			Q34	J126-7			Blu-Vio	#906, #89	
24	MINI DROP BANK	Flasher	J107-1			Q32	*J126-8			Blu-Gry	AE-25-1000	
25	SINGLE DROP UP	Gen. Purpose	J107-1			Q26	*J122-1			Blu-Brn	AE-26-1200	
26	LEFT BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q24	J122-2	J124-2		Blu-Red	#906	#906
27	CENTER BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q22	J122-3	J124-3		Blu-Org	#906	#906
28	RIGHT BACK FLASHER	Gen. Purpose	J107-6	J106-5		Q20	J122-4	J124-5		Blu-Yel	#906	#906
35	MAGNET	High Power	J907-8,9			Q2	J902-3			Yel-Gry	20-9247	
36	SINGLE DROP DOWN	Low Power	J907-8,9			Q7	J902-1			Org-Gry	SM1-26-600	
	General Illumination											
01	BOTTOM PLAYFIELD	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	
02	TOP LEFT PLAYFIELD	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	
03	INSERT BOTTOM	G.I.		J120-3		Q14		J120-9		Wht-Yel		#555
04	INSERT TOP	G.I.		J120-5		Q16		J120-10		Wht-Grn		#555
05	TOP RIGHT PLAYFIELD	G.I.	J121-6			Q12	J121-11			Wht-Vio	#44	

	Flipper Circuits		Voltage Connections	Drive Transistors		Drive Connectors	Drive Wire Colors		Coil Part No.	Coil Color
			Playfield	Power	Hold	Playfield	Power	Hold		
29		Lwr. Rt. Power	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn	FL-11629	BLUE
31		Lwr. Lt. Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J907-4 (Red-Blu)		Q9	J902-7		Org-Blu	FL-11629	BLUE
33		Upr. Rt. Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio	FL-15411	ORANGE
35		Upr. Lt. Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry			
36	Upper Left Flipper	Upr. Lt. Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	NOT	USED

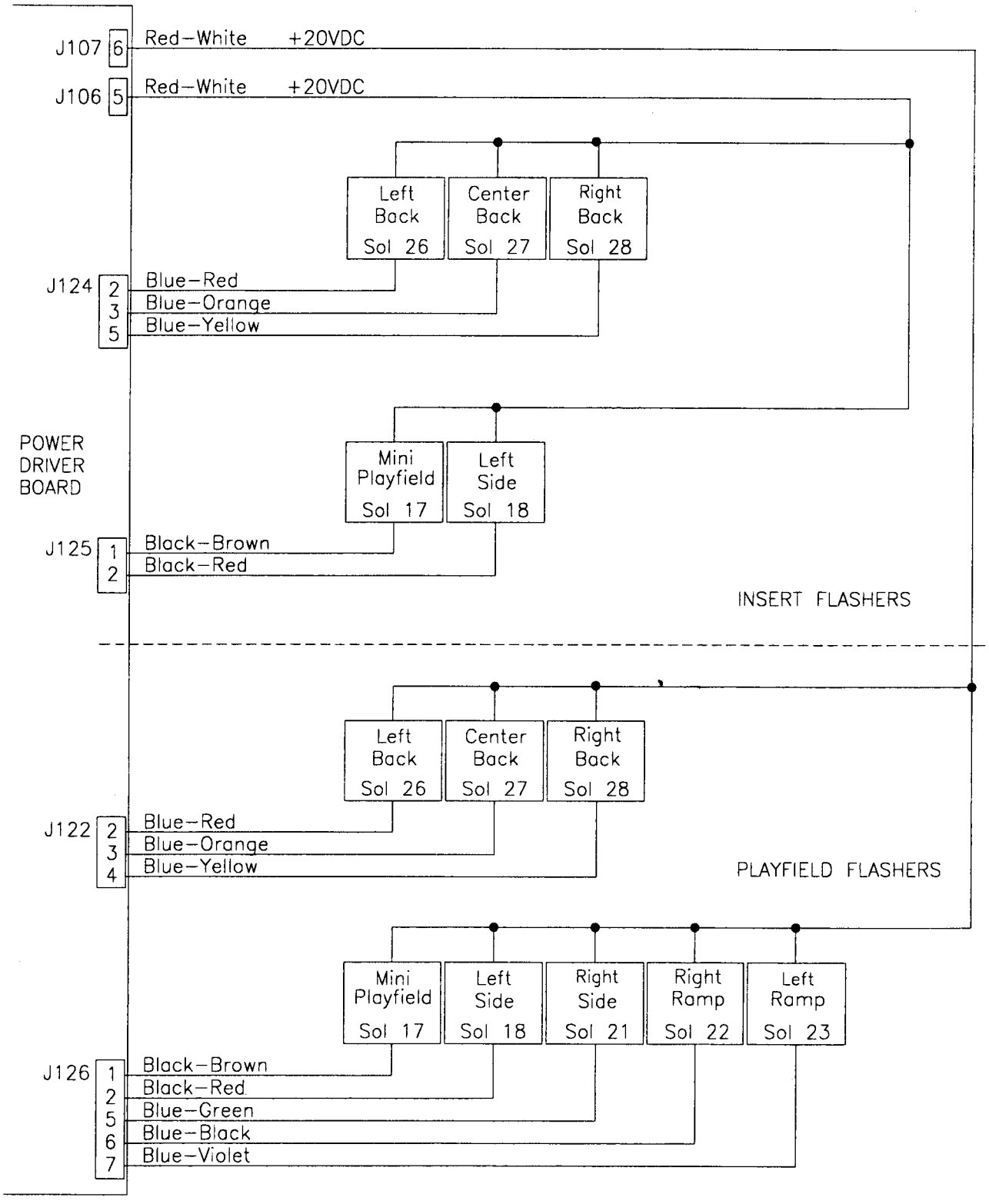
J1xx=Power Driver Board; J9xx=Fliptronic II Board; 24-6549=#44 bulb; 24-8704=#89 bulb; 24-8768=#555 bulb; 24-8802=#906 bulb

* Tieback Diode J122-5 (loop) from J126-11 (end).

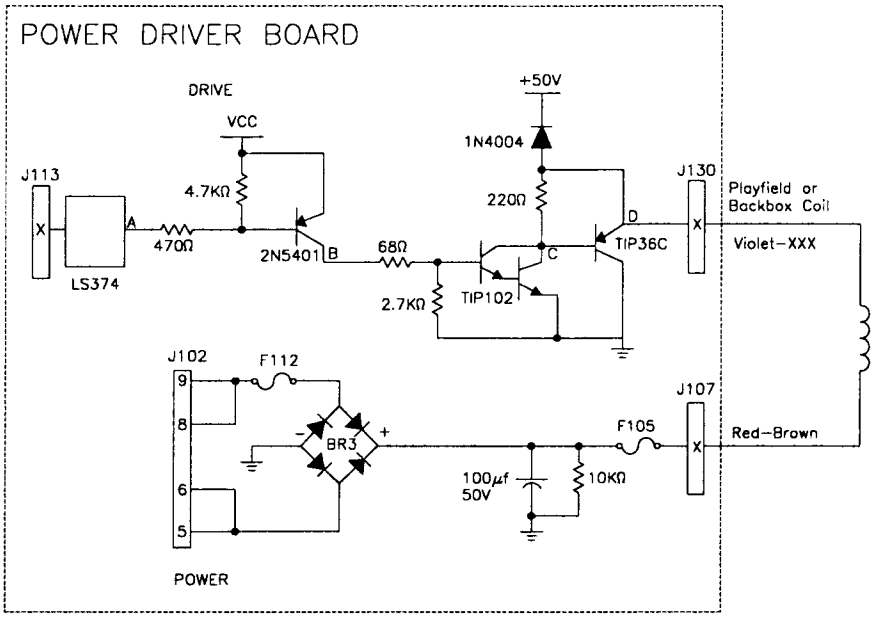
SOLENOID WIRING



FLASHER WIRING

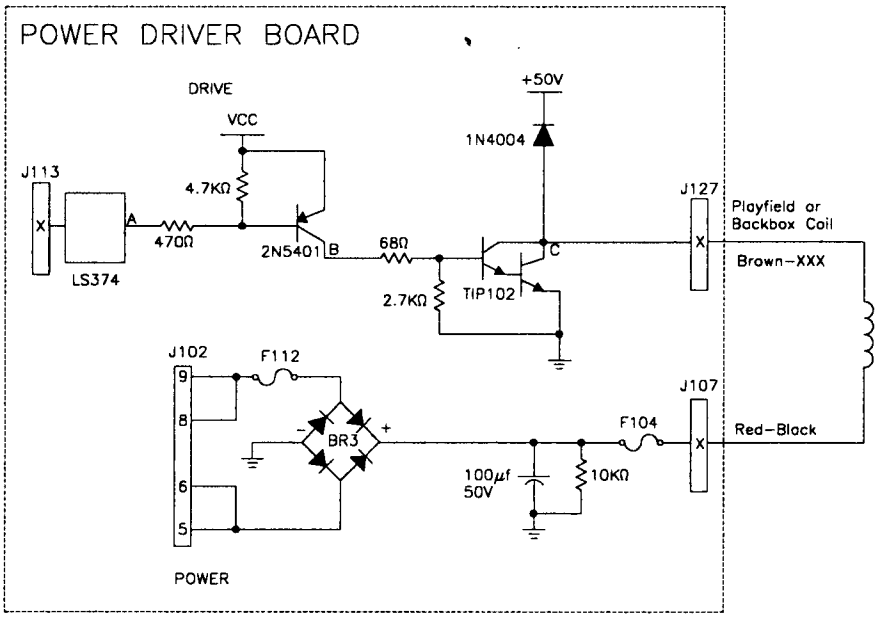


High Power Solenoid Circuit



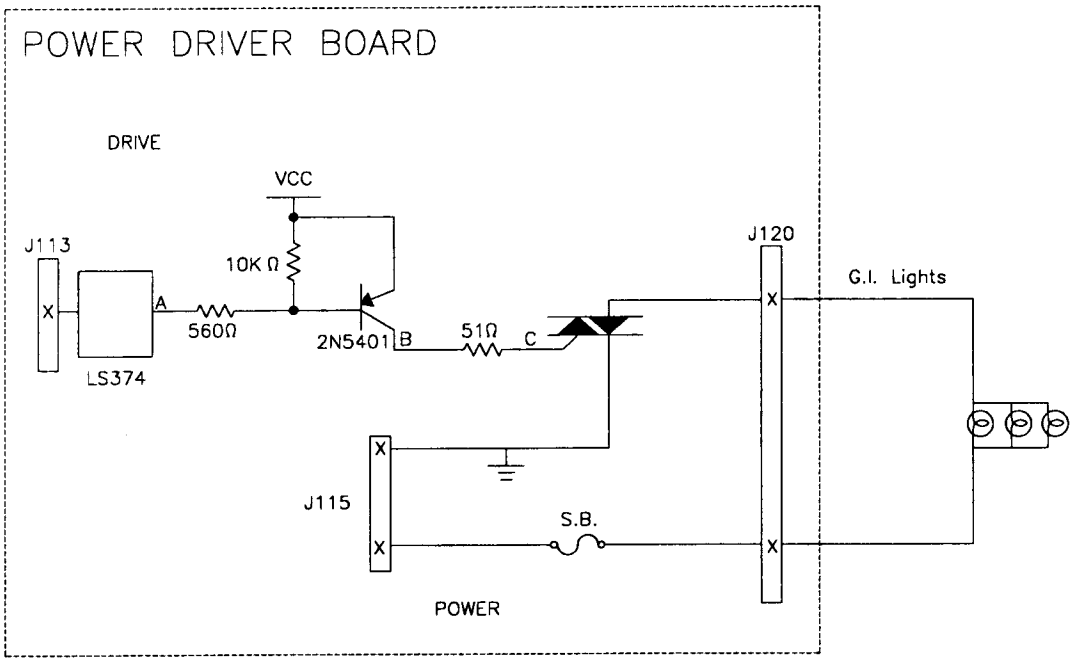
The microprocessor toggles the output of the 74LS374. When point "A" drops low, point "B" the collector of the 2N5401 transistor is high. A high at point "B" causes point "C" the collector of the TIP102 transistor, and point "D" the emitter of the TIP36 transistor to drop low. When point "D" is low the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

Low Power Solenoid Circuit

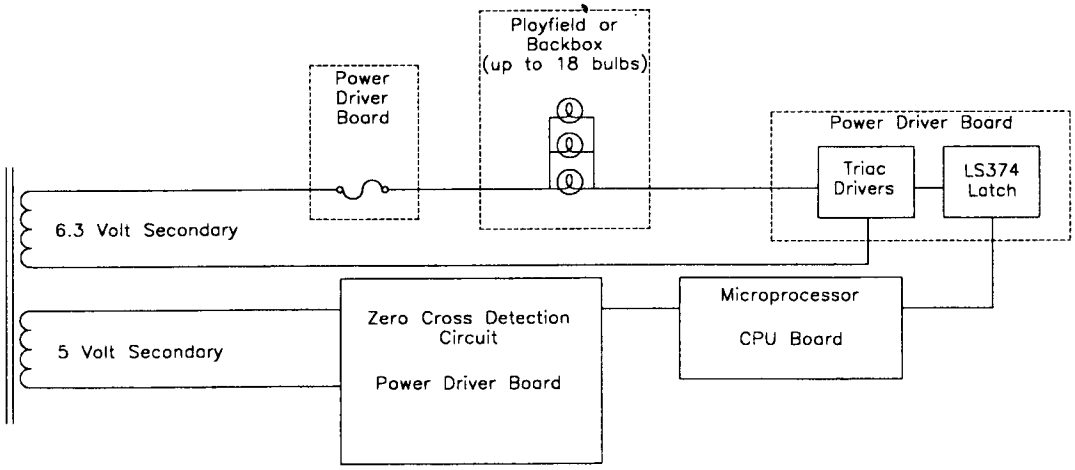


The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor is driven high. A high at point "B" turns On the TIP102 transistor, and causes point "C" to drop low. When point "C" is low the coil is grounded through the transistor and the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

General Illumination Circuit

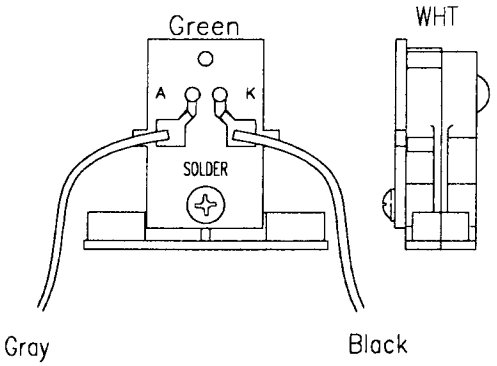


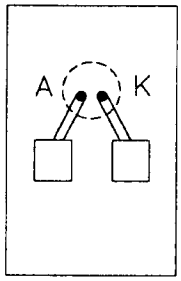
Block Diagram of General Illumination Circuit



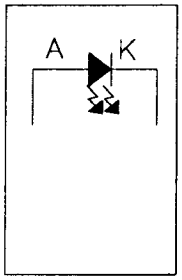
When point "A" toggles low, then points "B" and "C" are high. This turns On the triac and the desired general illumination string lights.

LED P.C.B. Assembly (transmitter)
A-16908

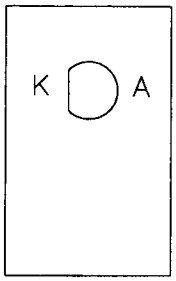




solder side

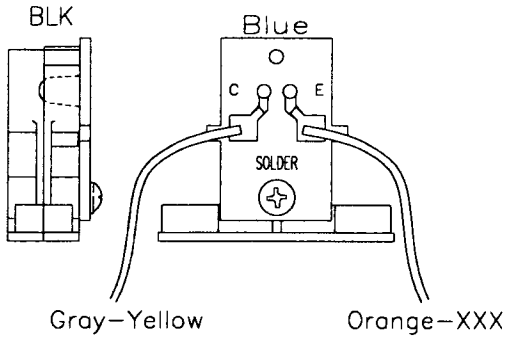


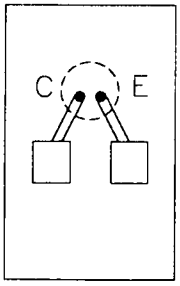
schematic



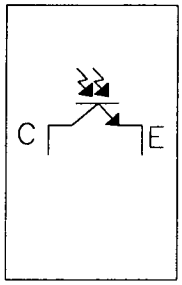
component side

Photo Transistor P.C.B. Assembly (receiver)
A-16909

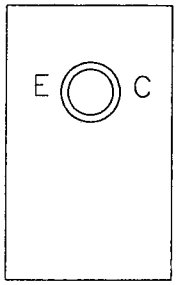




solder side

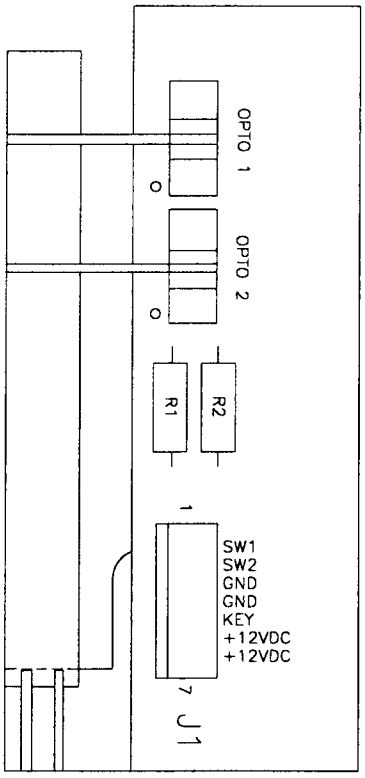


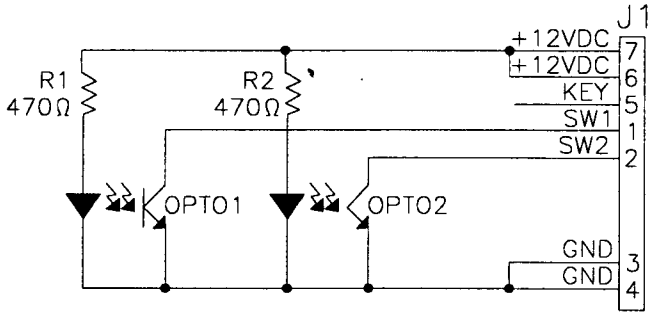
schematic



component side

Flipper Opto P.C.B. Assembly
A-17316

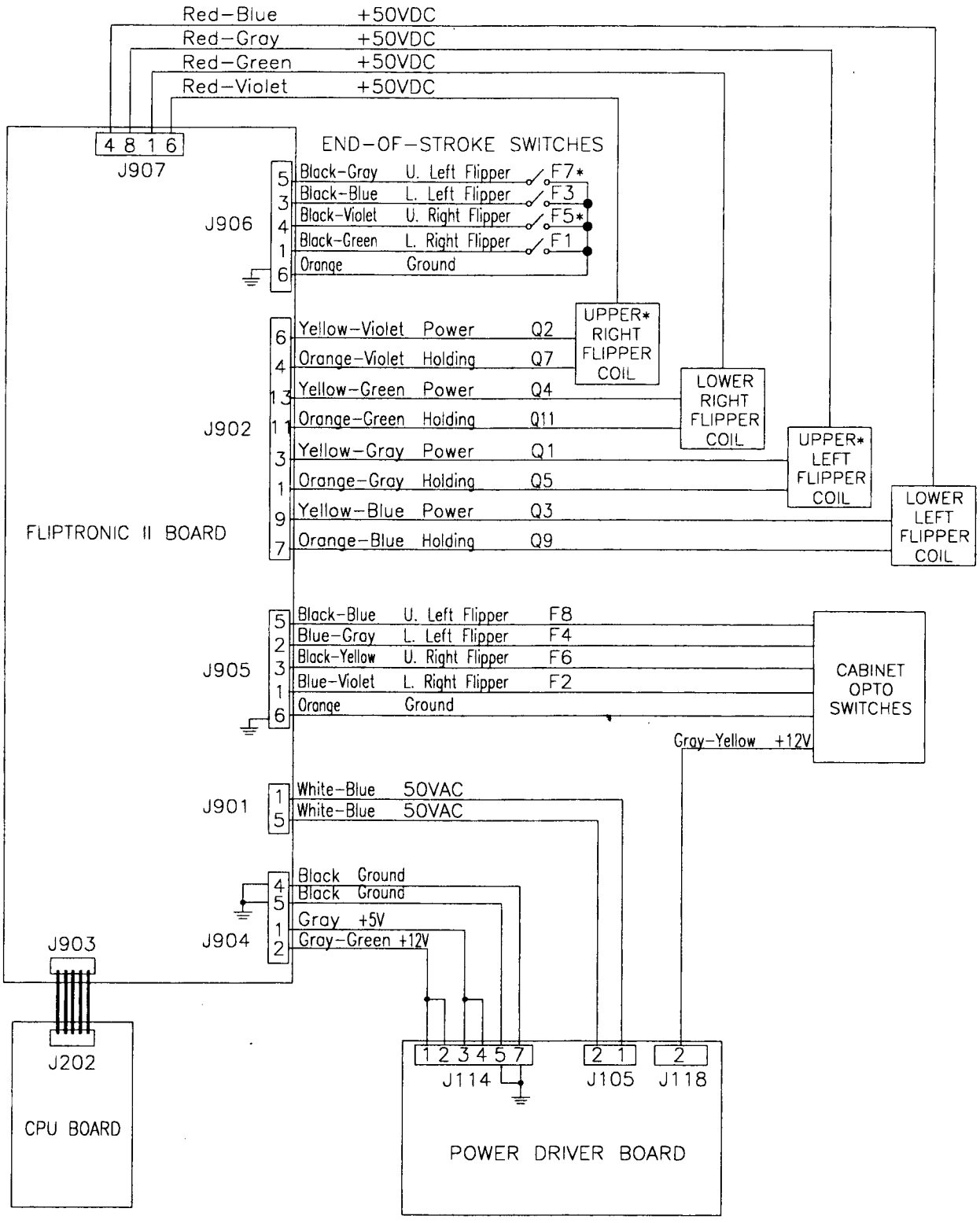




Left Side Flipper Cabinet Opto Switch Board
J1-1 Black-Blue from Fliptronic II Board J905-5
J1-2 Blue-Gray from Fliptronic II Board J905-2
J1-3 Not Used
J1-4 Orange from Fliptronic II Board J905-6
J1-5 Not Used
J1-6 Gray-Yellow to Right Flipper Opto Board J1-6
J1-7 Gray-Yellow from Fliptronic II Board J118-2

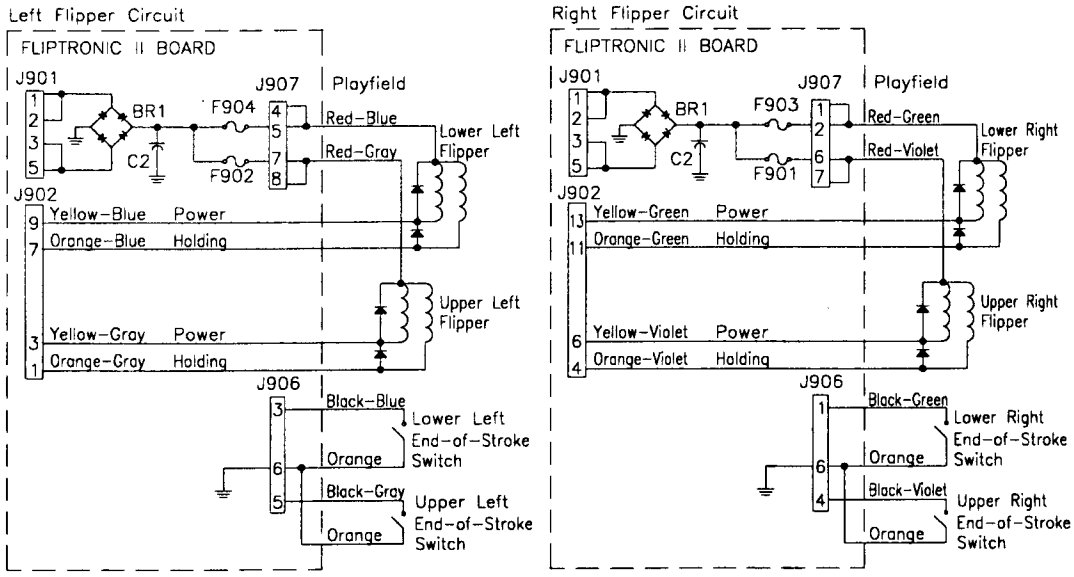
Right Side Flipper Cabinet Opto Switch Board
J2-1 Black-Yellow from Fliptronic II Board J905-3
J2-2 Blue-Violet from Fliptronic II Board J905-1
J2-3 Orange from Fliptronic II Board J905-6
J2-4 Orange from Left Flipper Opto Board J1-4
J2-5 Not Used
J2-6 Gray-Yellow to Left Flipper Opto Board J1-6
J2-7 Not Used

Flipper Circuit Diagram

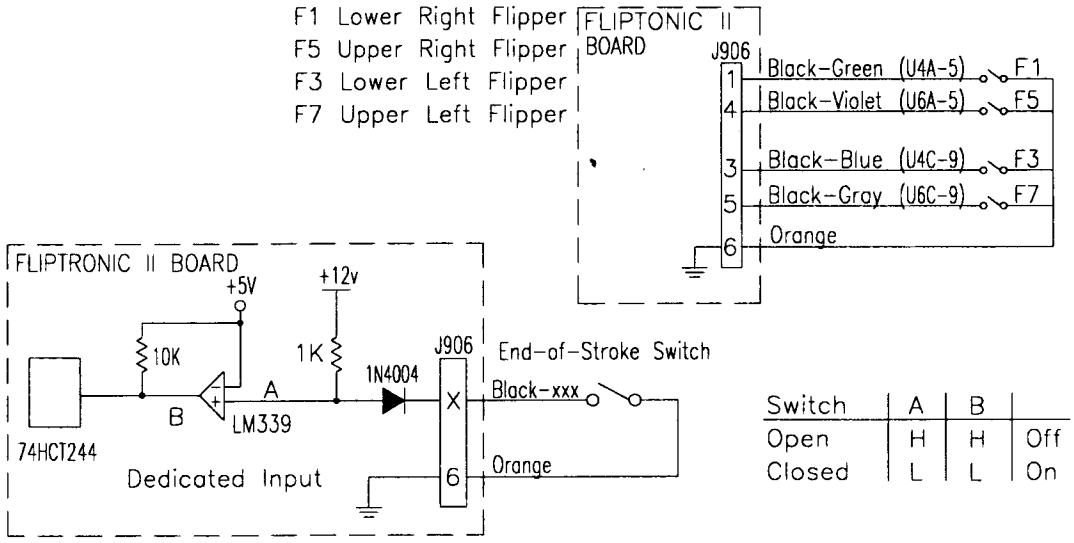


NOTE: Used as circuits other than flipper circuits in this game.

Flipper Coil Circuits



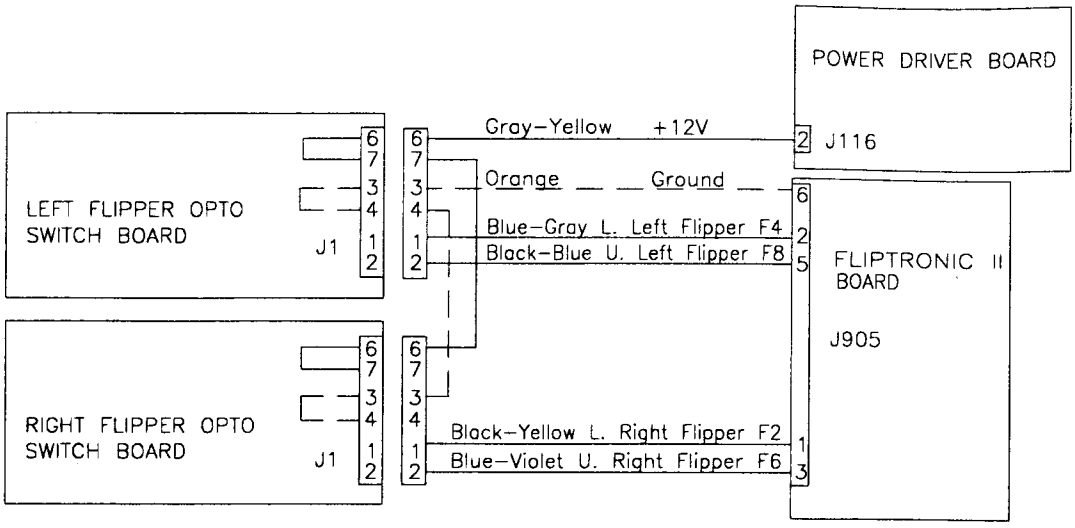
Flipper End-of-Stroke Switches



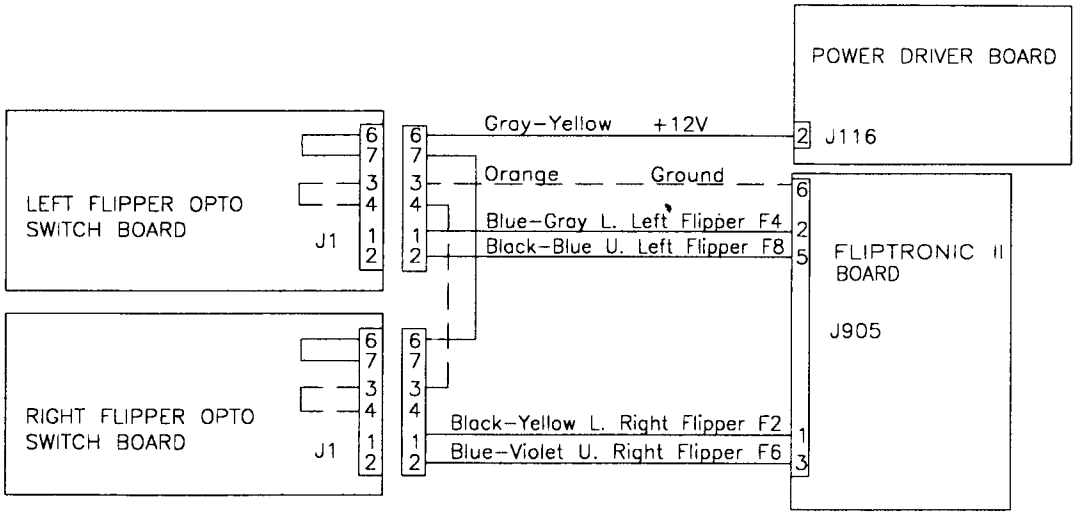
The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

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

Flipper Cabinet Switch Circuit Diagram



Flipper Cabinet Switches

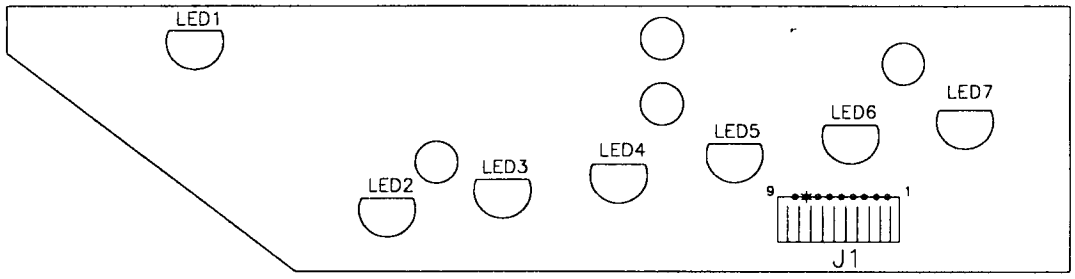


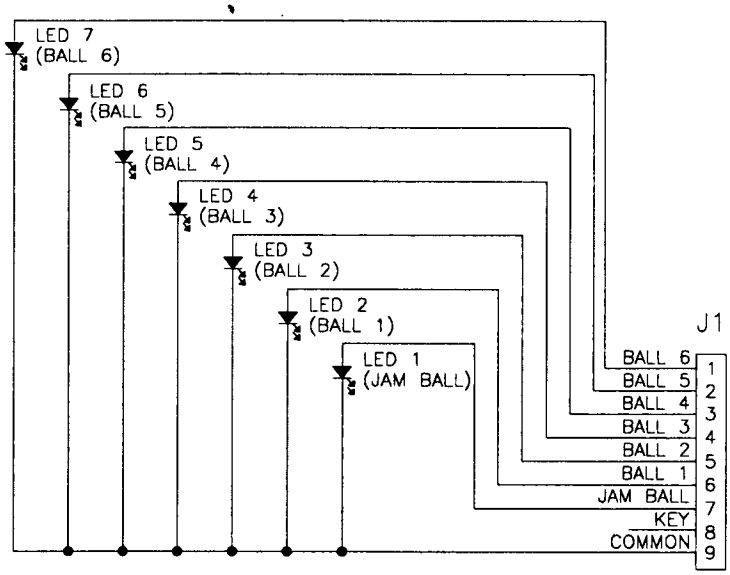
The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

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

TROUGH 7 IRED PCB ASSEMBLY
A-18617

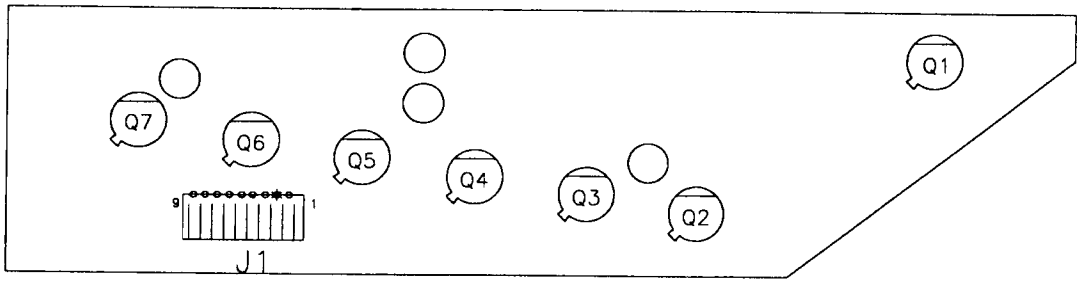
J1-1 Not Used
J1-2 Gray-Green, from Opto SW10 Board J1-3
J1-3 Gray-Black, from Opto SW10 Board J1-4
J1-4 Gray-Orange, from Opto SW10 Board J1-5
J1-5 Gray-Red, from Opto SW10 Board J1-6
J1-6 Gray-Brown, from Opto SW10 Board J1-7
J1-7 Gray-Blue, from Opto SW10 Board J1-2
J1-8 Key
J1-9 Black, from Opto SW10 Board J1-9

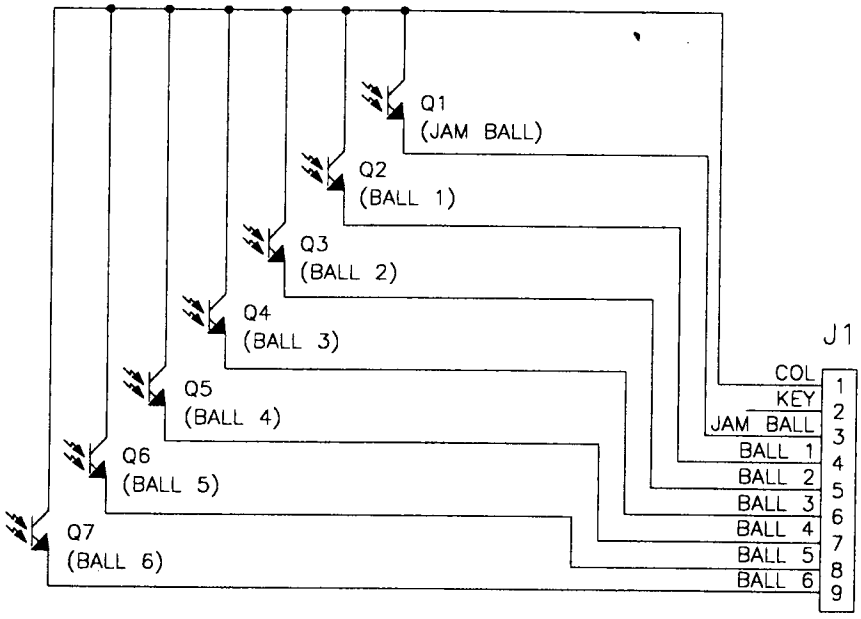




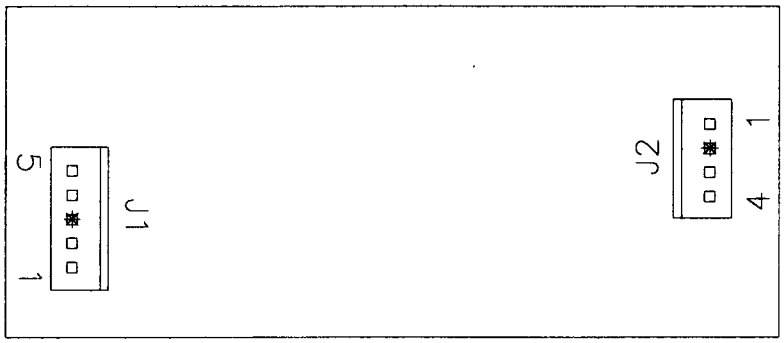
TROUGH 7 IR TSTR PCB ASSEMBLY
A-18618

J1-1 Gray-Yellow, from Opto SW10 Board J2-9
J1-2 Key
J1-3 Orange-Blue, from Opto SW10 Board J2-2
J1-4 Orange-Brown, from Opto SW10 Board J2-8
J1-5 Orange-Red, from Opto SW10 Board J2-7
J1-6 Orange-Black, from Opto SW10 Board J2-5
J1-7 Orange-Yellow, from Opto SW10 Board J2-4
J1-8 Orange-Green, from Opto SW10 Board J2-3
J1-9 Not Used



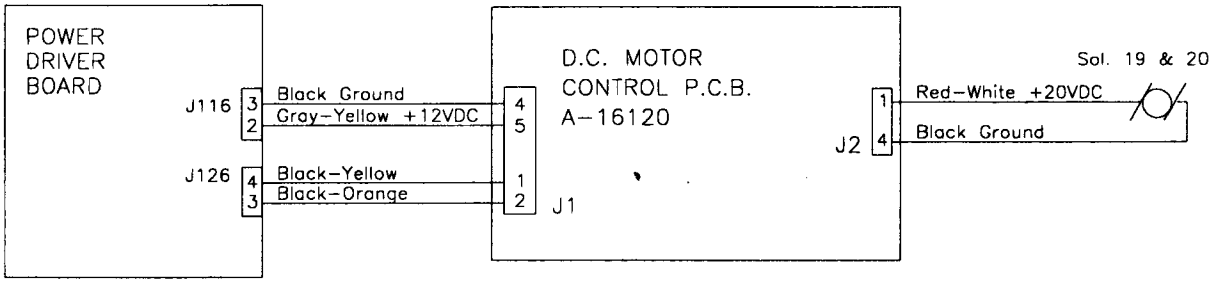


D.C. MOTOR CONTROL P.C.B.
A-16120

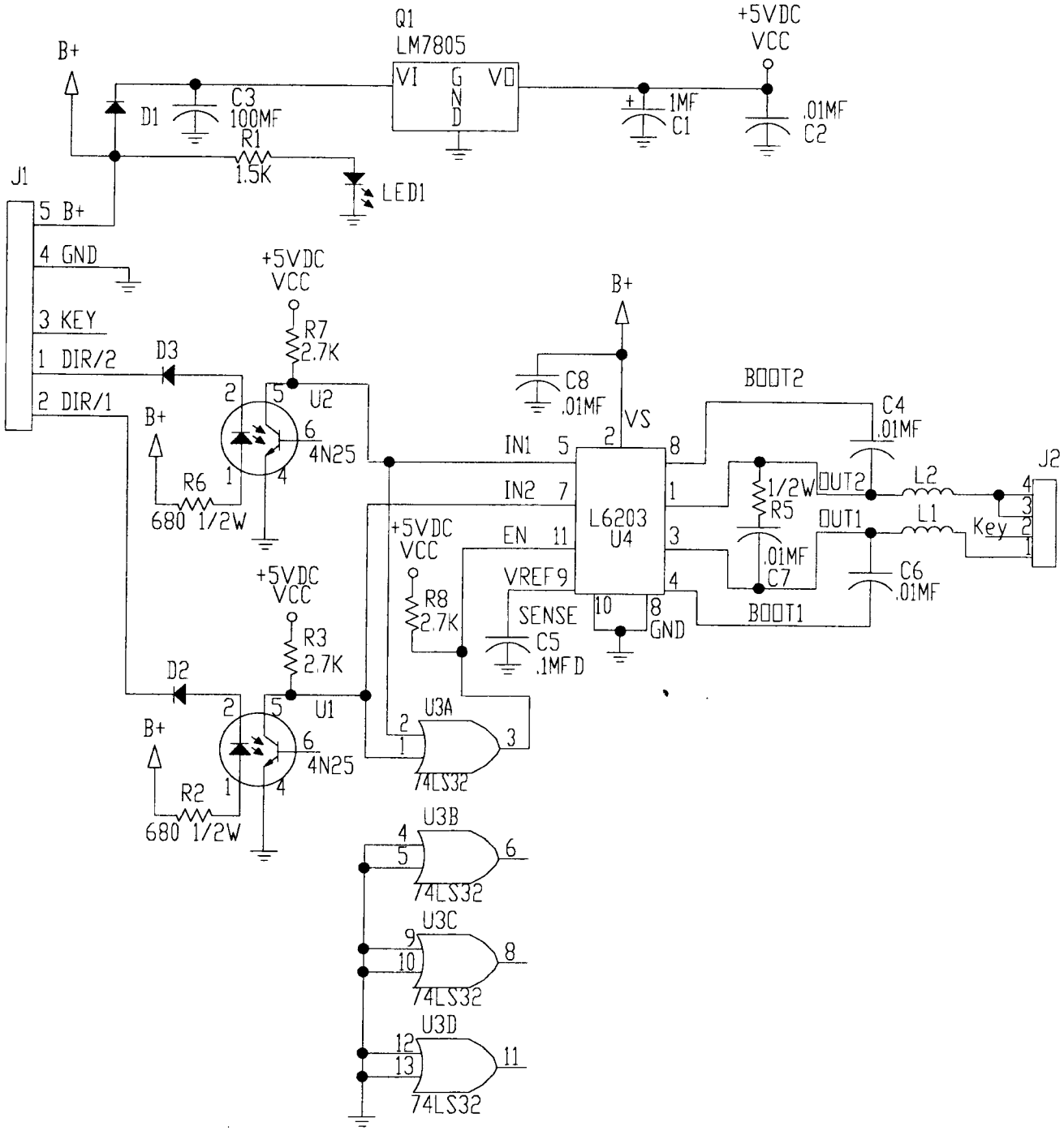


J1-1 Black-Yellow from J126-4
J1-2 Black Orange from J126-3
J1-3 Key
J1-4 Black Ground from J116-3
J1-5 Gray-Yellow +12VDC from J116-2

J2-1 Red to Solenoids 19 & 20
J2-2 Key
J2-3 Not Used
J2-4 Black Ground to Solenoids 19 & 20

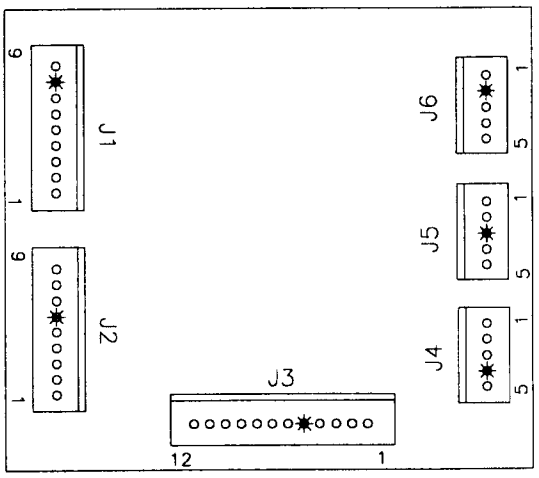


D.C. MOTOR CONTROL P.C.B. SCHEMATIC



OPTO SW10 P.C.B.
A-18159

J1-1 Gray-Violet to A-16908 (LED) Sw #47
J1-2 Gray-Blue to A-18617 (LED) J1-7 Sw #46
J1-3 Gray-Green to A-18617 (LED) J1-2 Sw #45
J1-4 Gray-Black to A-18617 (LED) J1-3 Sw #44
J1-5 Gray-Orange to A-18617 (LED) J1-4 Sw #43
J1-6 Gray-Red to A-18617 (LED) J1-5 Sw #42
J1-7 Gray-Brown to A-18617 (LED) J1-6 Sw #41
J1-8 Key
J1-9 Black Ground to A-18617 J1-9



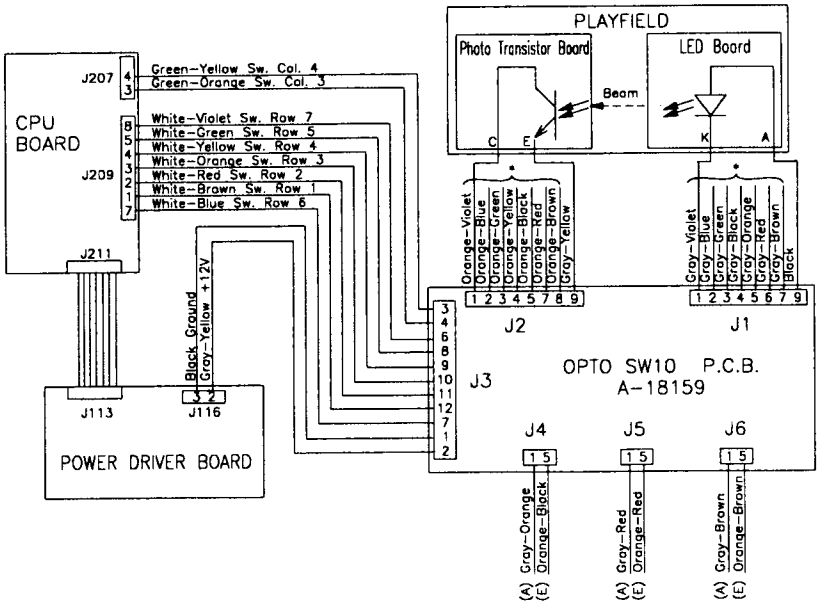
J2-1 Orange-Violet to A-16909 (Photo) Sw #47
J2-2 Orange-Blue to A-18618 (Photo) J1-3 Sw #46
J2-3 Orange-Green to A-18618 (Photo) J1-8 Sw #45
J2-4 Orange-Yellow to A-18618 (Photo) J1-7 Sw #44
J2-5 Orange-Black to A-18618 (Photo) J1-6 Sw #43
J2-6 Key
J2-7 Orange-Red to A-18618 (Photo) J1-5 Sw #42
J2-8 Orange-Brown to A-18618 (Photo) J1-4 Sw #41
J2-9 Gray-Yellow +12VDC to A-18618 (Photo) J1-1

J3-1 Black Ground from J116-3
J3-2 Gray-Yellow +12VDC from J116-2
J3-3 Green-Yellow from J207-4
J3-4 Green-Orange from J207-3
J3-5 Key
J3-6 White-Violet from J209-8
J3-7 White-Blue from J209-7
J3-8 White-Green from J209-5
J3-9 White-Yellow from J209-4
J3-10 White-Orange from J209-3
J3-11 White-Red from J209-2
J3-12 White-Brown from J209-1

J4-1 Gray-Orange to A-16908 (LED) Sw #33
J4-2 Not Used
J4-3 Not Used
J4-4 Key
J4-5 Orange-Black to A-16909 (Photo) Sw #33

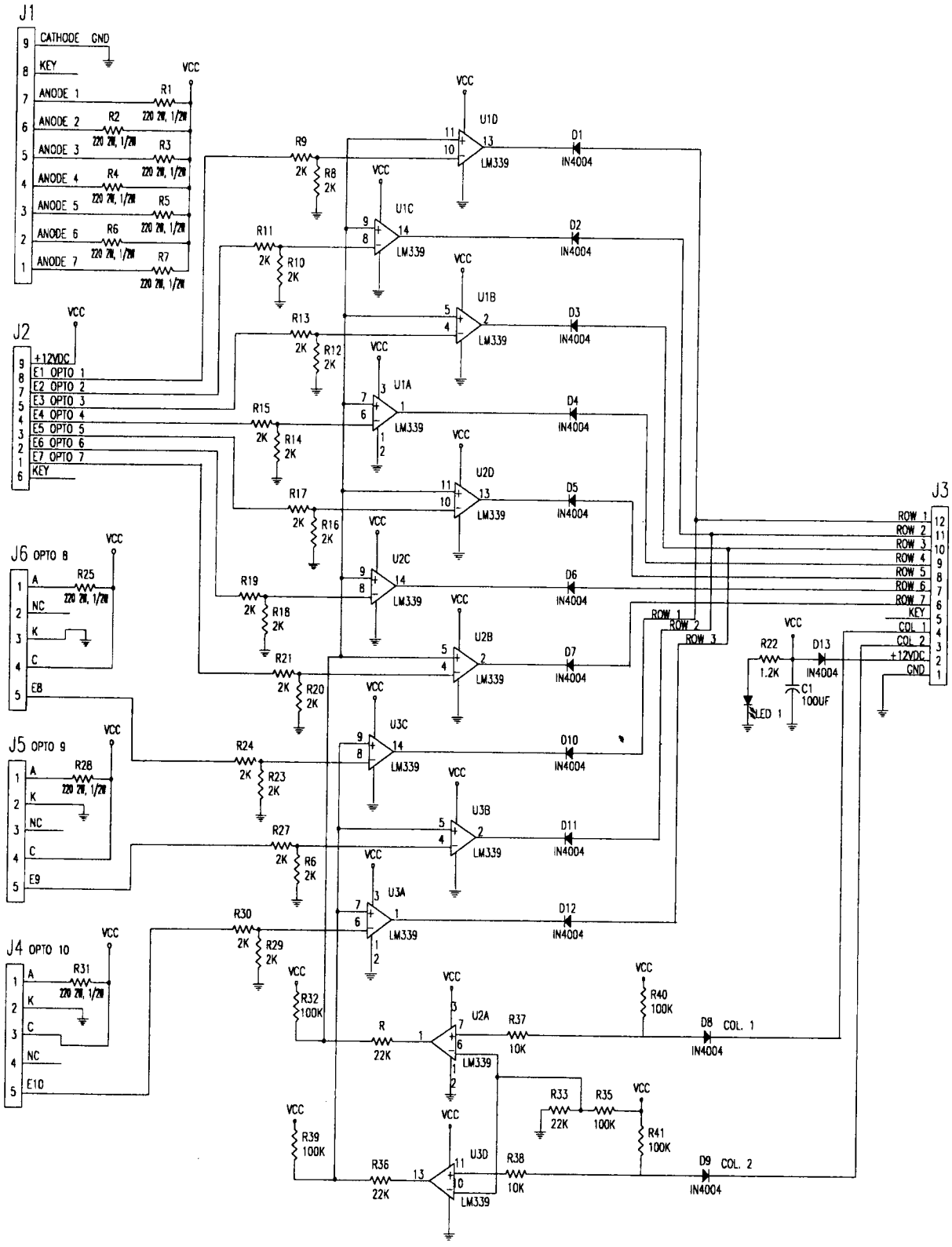
J5-1 Gray-Red to A-16908 (LED) Sw #32
J5-2 Not Used
J5-3 Key
J5-4 Not Used
J5-5 Orange-Red to A-16909 (Photo) Sw #32

J6-1 Gray-Brown to A-16908 (LED) Sw #31
J6-2 Key
J6-3 Not Used
J6-4 Not Used
J6-5 Orange-Brown to A-16909 (Photo) Sw #31

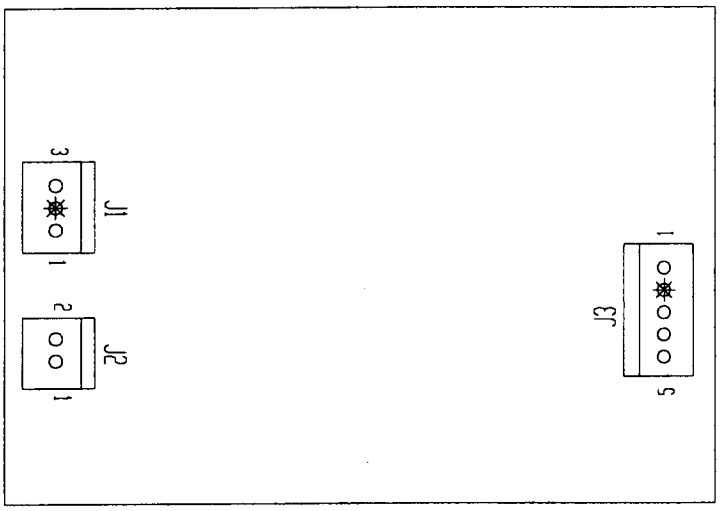


*Repeat 7 times

OPTO SW10 P.C.B. SCHEMATIC



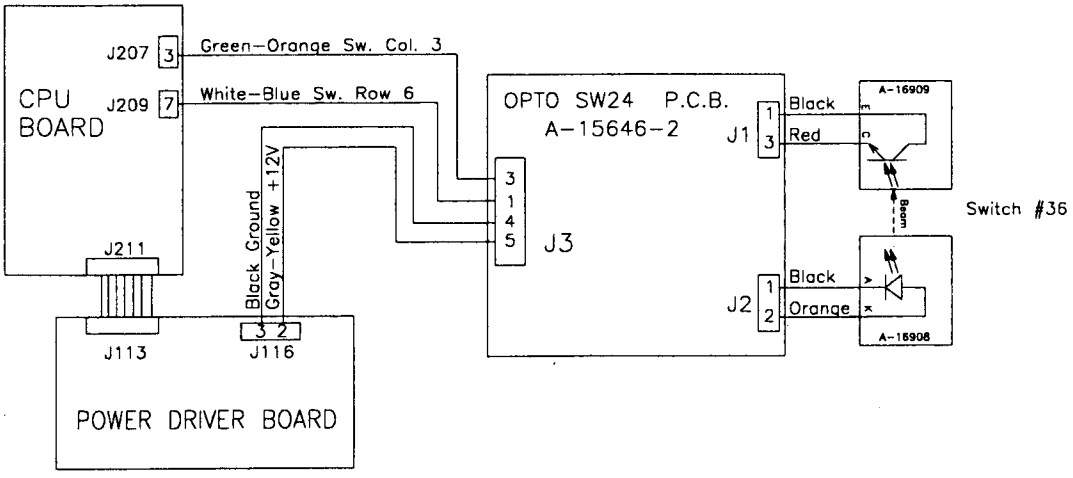
OPTO SW24 P.C.B.
A-15646-2



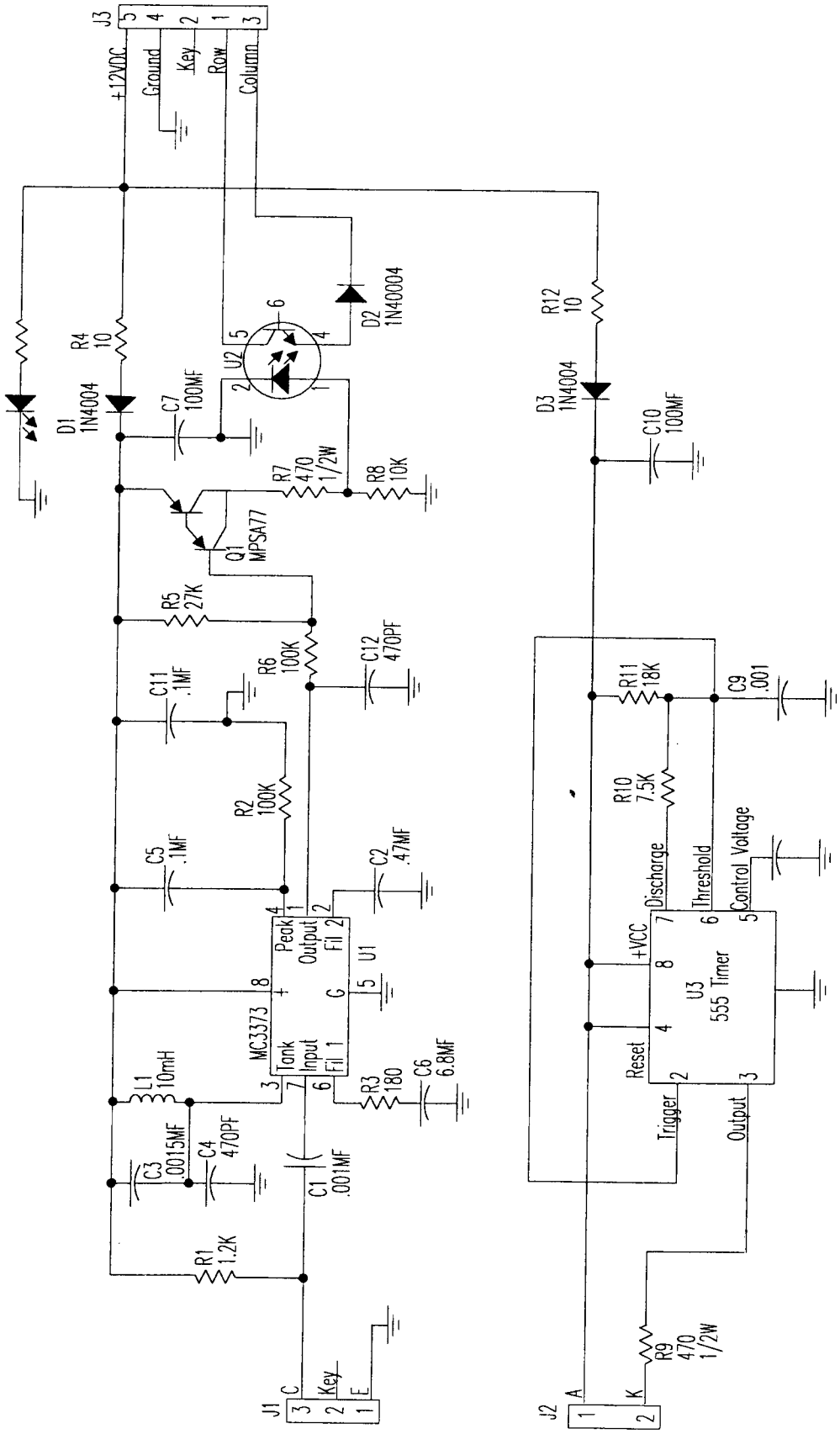
J1-1 Black A-16909 (Photo) Sw. #36
J1-2 Key
J1-3 Red to A-16909 (Photo) Sw. #36

J2-1 Black A-16908 (LED) Sw. #36
J2-2 Orange to A-16908 (LED) Sw. #36

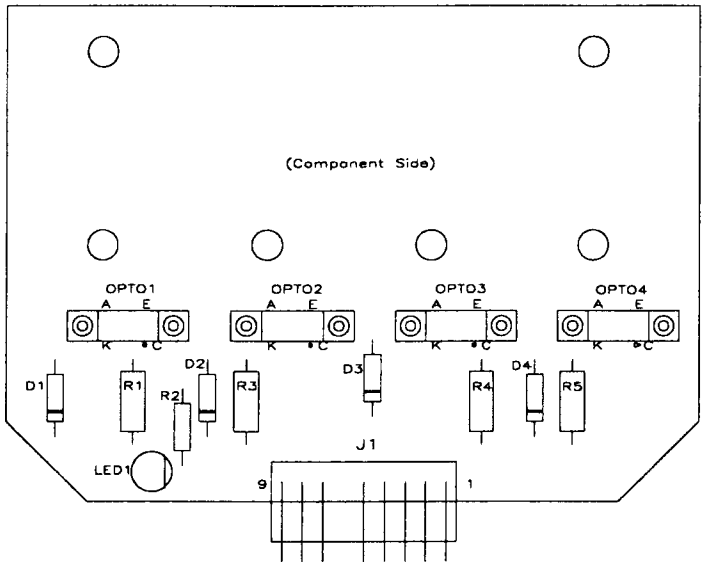
J3-1 White-Blue from J209-7
J3-2 Key
J3-3 Green-Orange from J207-3
J3-4 Black Ground from J116-3
J3-5 Gray-Yellow +12VDC from J116-2



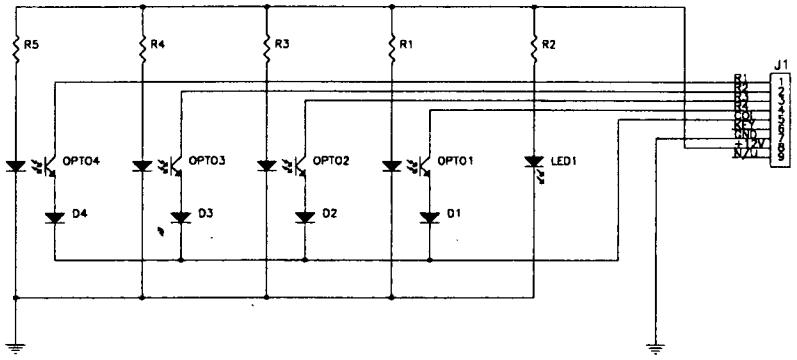
OPTO SW24 P.C.B. SCHEMATIC



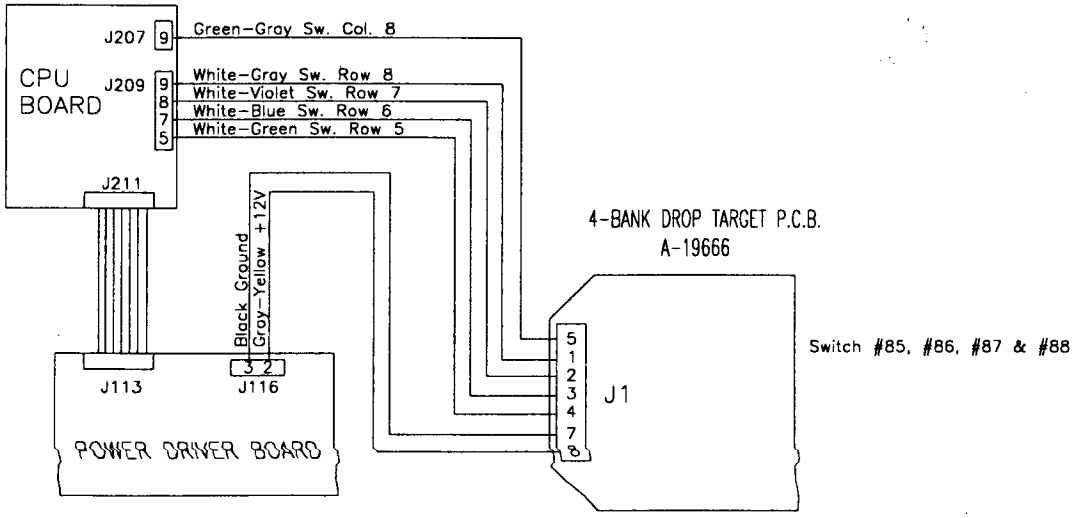
4-BANK DROP TARGET OPTO P.C.B.
A-19666



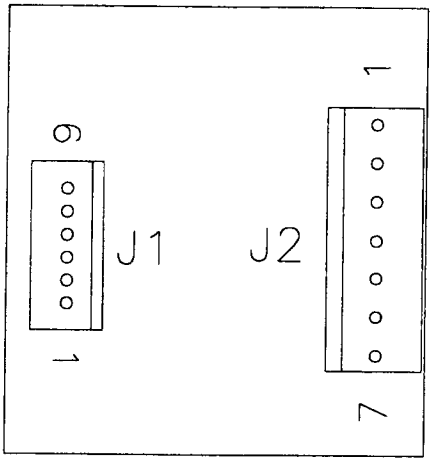
J1-1 White-Gray from J209-9
J1-2 White-Violet from J209-8
J1-3 White-Blue from J209-7
J1-4 White-Green from J209-5
J1-5 Green-Gray from J207-9
J1-6 Key
J1-7 Black Ground from J116-3
J1-8 Gray-Yellow +12VDC from J116-2
J1-9 Not Used



SCHEMATIC

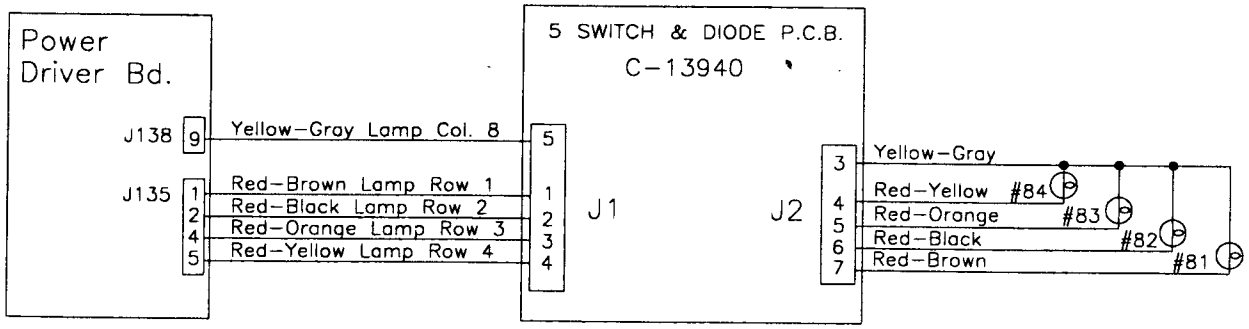


5 SWITCH & DIODE P.C.B.
C-13940

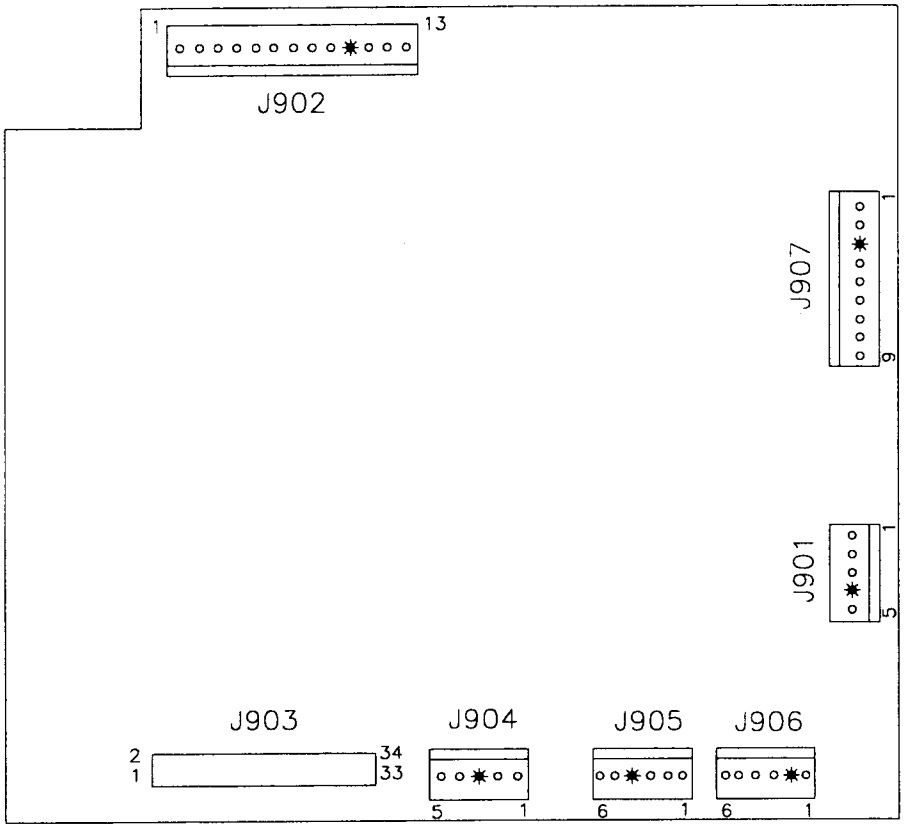


J1-1 Red-Brown from J135-1
J1-2 Red-Black from J135-2
J1-3 Red-Orange from J135-4
J1-4 Red-Yellow from J135-5
J1-5 Yellow-Gray from J138-9
J1-6 Not Used

J2-1 Not Used
J2-2 Key
J2-3 Yellow-Gray lamp column 8 to switch #81, #82, #83 & #84
J2-4 Red-Yellow lamp row 4 to switch #84
J2-5 Red-Orange lamp row 3 to switch #83
J2-6 Red-Black lamp row 2 to switch #82
J2-7 Red-Brown lamp row 1 to switch #81



Fliptronic II Board
A-15472-1



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

J902-1 Orange-Gray, Sol 36 to playfield coil
J902-2 Not Used
J902-3 Yellow-Gray, Sol 35 to playfield magnet
J902-4 Orange-Violet, holding upper right flipper
J902-5 Not Used
J902-6 Yellow-Violet, power upper right flipper
J902-7 Orange-Blue, holding lower left flipper
J902-8 Not Used
J902-9 Yellow-Blue, power lower left flipper
J902-10 Key
J902-11 Orange-Green, holding lower right flipper
J902-12 Not Used
J902-13 Yellow-Green, power lower right flipper

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

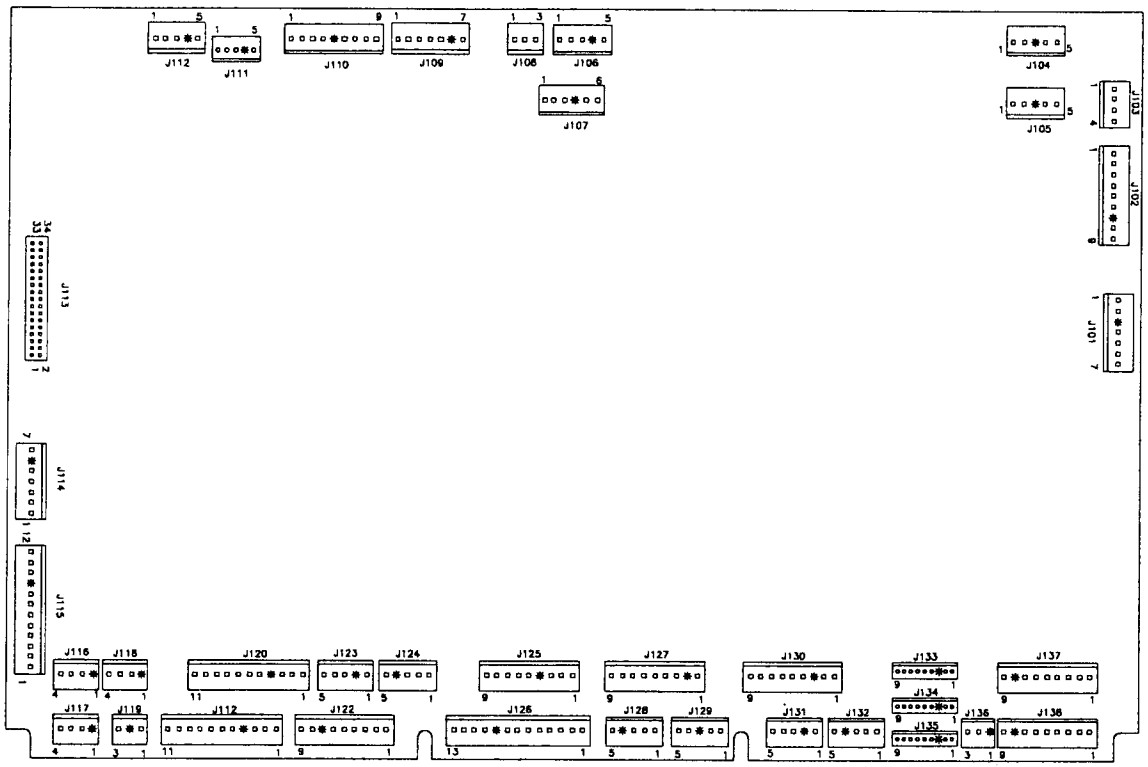
J904-1 Gray, +5V to/from J114-4; J210-4
J904-2 Gray-Green, +12V to/from J114-2; J210-6
J904-3 Key
J904-4 Black, Ground to/from J114-7; J210-1
J904-5 Black, Ground to/from J114-5; J210-3

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

J906-1 Black-Green, to lower right E.O.S. switch
J906-2 Key
J906-3 Black-Blue, to lower left E.O.S. switch
J906-4 Black-Violet, to upper right E.O.S. switch
J906-5 Not Used
J906-6 Orange, Switch Ground

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

Power Driver Board
A-12697-3



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

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

J103 Not Used

J104-1 White-Blue 50VAC to J901-1,2
J104-2 White-Blue 50VAC to J901-3,5
J104-3 Key
J104-4 Not Used
J104-5 Not Used

J105 Not Used

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

J107-1 Red-Orange 50V to playfield coils
J107-2 Red-Brown 50V to playfield coils
J107-3 Red-Black 50V to playfield coils
J107-4 Key
J107-5 Not Used
J107-6 Red-White +20V to playfield flashlamps

J108 Not Used

J109 Not Used

J110 Not Used

J111 Not Used

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

J113 Ribbon Cable data to/from J211

J114-1 Gray-Green +12VDC to J210-7
J114-2 Gray-Green +12VDC to J904-2; J210-6
J114-3 Gray +5VDC to J3-3 Sound Bd; J210-5
J114-4 Gray +5VDC to J3-1 Sound Bd; J904-1; J210-4
J114-5 Black Ground to J3-5 Sound Bd; J904-5; J210-3
J114-6 Key
J114-7 Black Ground to J3-4 Sound Bd; J904-4; J210-1

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

J116-1 Key
J116-2 Gray-Yellow +12VDC to playfield
J116-3 Black Ground
J116-4 Gray +5VDC to playfield

J117-1 Key
J117-2 Gray-Yelow +12VDC to J606-6,7
J117-3 Black Ground to J606-1,3
J117-4 Gray +5VDC to J606-4,5

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

J119-1 White-Violet 6.8VAC G.I. to A-17051-1 J2-3
J119-2 Key
J119-3 Violet Return G.I. to A-17051-1 J2-5

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

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

J122-1 Blue-Brown Sol 25 to playfield coil
J122-2 Blue-Red Sol 26 to playfield flashlamps
J122-3 Blue-Orange Sol 27 to playfield flashlamps
J122-4 Blue-Yellow Sol 28 to playfield flashlamps
J122-5 Red-Orange Tieback Diode to Sol 24 & 25
J122-6 Not Used
J122-7 Key
J122-8 Not Used
J122-9 Not Used

J123 Not Used

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

J125-1 Black-Brown Sol 17 to insert flashlamps
J125-2 Black-Red Sol 18 to insert flashlamps
J125-3 Not Used
J125-4 Key
J125-5 Not Used
J125-6 Not Used
J125-7 Not Used
J125-8 Not Used
J125-9 Not Used

J126-1 Black-Brown Sol 17 to playfield flashlamps
J126-2 Black-Red Sol 18 to playfield flashlamps
J126-3 Black-Orange Sol 19 to playfield motor
J126-4 Black-Yellow Sol 20 to playfield motor
J126-5 Blue-Green Sol 21 to playfield flashlamps
J126-6 Blue-Black Sol 22 to playfield flashlamps
J126-7 Blue-Violet Sol 23 to playfield flashlamps
J126-8 Blue-Gray Sol 24 to playfield coil
J126-9 Key
J126-10 Not Used
J126-11 Red-Orange Tieback Diode from J122-5
J126-12 Not Used
J126-13 Not Used

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

J128 Not Used

J129 Not Used

J130-1 Violet-Brown Sol 1 to playfield coil
J130-2 Violet-Red Sol 2 to playfield coil
J130-3 Key
J130-4 Violet-Orange Sol 3 to playfield coil
J130-5 Violet-Yellow Sol 4 to playfield coil
J130-6 Violet-Green Sol 5 to playfield coil
J130-7 Violet-Blue Sol 6 to playfield coil
J130-8 Violet-Black Sol 7 to playfield coil
J130-9 Violet-Gray Sol 8 to playfield coil

J131 Not Used

J132 Not Used

J133 Not Used

J134-1 Not Used
J134-2 Not Used
J134-3 Key
J134-4 Not Used
J134-5 Not Used
J134-6 Not Used
J134-7 Red-Blue Row 6 to cabinet lamp
J134-8 Red-Violet Row 7 to cabinet lamp
J134-9 Red-Gray Row 8 to cabinet lamp

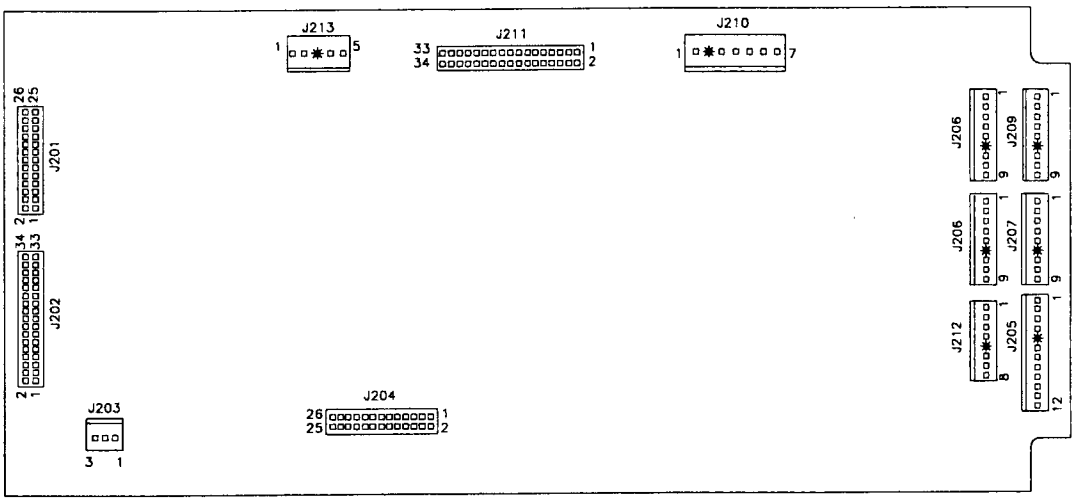
J135-1 Red-Brown Row 1 to playfield lamps
J135-2 Red-Black Row 2 to playfield lamps
J135-3 Key
J135-4 Red-Orange Row 3 to playfield lamps
J135-5 Red-Yellow Row 4 to playfield lamps
J135-6 Red-Green Row 5 to playfield lamps
J135-7 Red-Blue Row 6 to playfield lamps
J135-8 Red-Violet Row 7 to playfield lamps
J135-9 Red-Gray Row 8 to playfield lamps

J136-1 Key
J136-2 Not Used
J136-3 Yellow-Gray Col 8 to insert lamps

J137 Not Used

J138-1 Yellow-Brown Col 1 to playfield lamps
J138-2 Yellow-Red Col 2 to playfield lamps
J138-3 Yellow-Orange Col 3 to playfield lamps
J138-4 Yellow-Black Col 4 to playfield lamps
J138-5 Yellow-Green Col 5 to playfield lamps
J138-6 Yellow-Blue Col 6 to playfield lamps
J138-7 Yellow-Violet Col 7 to playfield lamps
J138-8 Key
J138-9 Yellow-Gray Col 8 to playfield lamps

Security CPU Board
A-17651-50036



J201 Ribbon Cable data to J602

J202 Ribbon Cable data to J903; J506; J601

J203 Not Used

J204 Ribbon Cable data to A-16100 J1

J205-1 Orange-Brown Dir Sw 1, Left Coin to J1-14
J205-2 Orange-Red Dir Sw 2, Center Coin to J1-13
J205-3 Orange-Black Dir Sw 3, Right Coin to J1-12
J205-4 Orange-Yellow Dir Sw 4, 4th Coin to J1-17
J205-5 Key
J205-6 Orange-Green Dir Sw 5, Escape/Service to J1-11
J205-7 Orange-Blue Dir Sw 6, Down/Vol Down to J1-10
J205-8 Orange-Violet Dir Sw 7, Up/Vol Up to J1-9
J205-9 Orange-Gray Dir Sw 8, Enter/Test to J1-8
J205-10 Black ground to J1-15
J205-11 Not Used
J205-12 Orange-White Enable to J1-18

J206 Not Used

J207-1 Green-Brown Sw Col 1 to playfield switches
J207-2 Green-Red Sw Col 2 to playfield switches
J207-3 Green-Orange Sw Col 3 to playfield switches
J207-4 Green-Yellow Sw Col 4 to playfield switches
J207-5 Green-Black Sw Col 5 to playfield switches
J207-6 Green-Blue Sw Col 6 to playfield switches
J207-7 Green-Violet Sw Col 7 to playfield switches
J207-8 Key
J207-9 Green-Gray Sw Col 8 to playfield switches
J207-10 Not Used
J207-11 Not Used

J208 Not Used

J209-1 White-Brown Sw Row 1 to playfield switches
J209-2 White-Red Sw Row 2 to playfield switches
J209-3 White-Orange Sw Row 3 to playfield switches
J209-4 White-Yellow Sw Row 4 to playfield switches
J209-5 White-Green Sw Row 5 to playfield switches
J209-6 Key
J209-7 White-Blue Sw Row 6 to playfield switches
J209-8 White-Violet Sw Row 7 to playfield switches
J209-9 White-Gray Sw Row 8 to playfield switches

J210-1 Black ground from J904-4;J3-4 Sound Bd; J114-7
J210-2 Key
J210-3 Black ground from J904-4; J3-5 Sound Bd; J114-5
J210-4 Gray +5VDC from J901-1; J3-1 Sound Bd; J114-4
J210-5 Gray +5VDC from J3-3 Sound Bd; J114-3
J210-6 Gray-Green +12VDC from J904-2; J114-2
J210-7 Gray-Green +12VDC from J114-1

J211 Ribbon Cable data from J113

J212-1 Green-Brown Sw Col 1 to J1-1
J212-2 Green-Red Sw Col 2 to J1-7
J212-3 Not Used
J212-4 White-Brown Sw Row 1 to J1-6
J212-5 Key
J212-6 White-Red Sw Row 2 to J1-5
J212-7 White-Orange Sw Row 3 to J1-4
J212-8 White-Yellow Sw Row 4 to J1-3

J213-1 Black to battery holder J1-1
J213-2 Black to battery holder J1-2
J213-3 Key
J213-4 Gray to battery holder J1-4
J213-5 Gray to battery holder J1-5

Sound Board
A-16917-50036

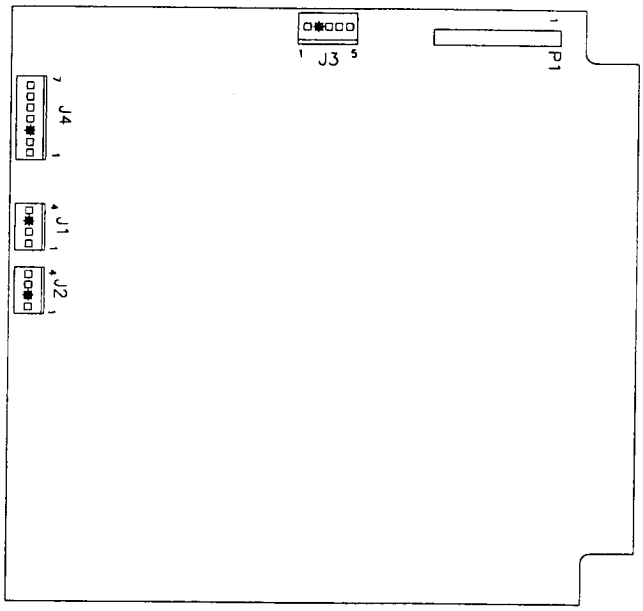
P1 34-pin Ribbon Cable data to/from J601; J903; J202

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

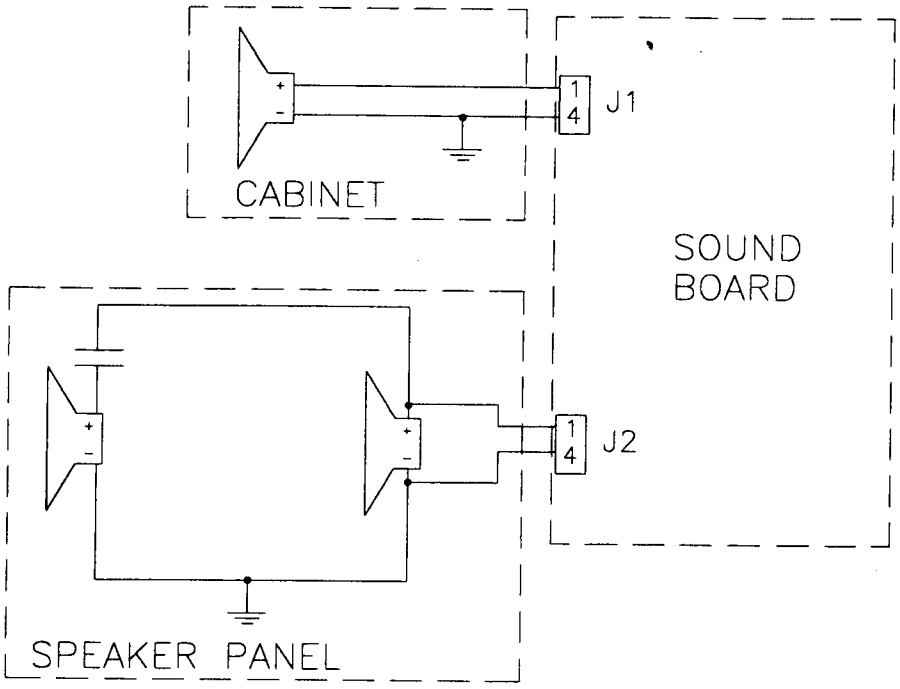
J2-1 Black-Yellow signal to display panal speakers
J2-2 Key
J2-3 Not Used
J2-4 Black ground

J3-1 Gray +5V from J114-4; J904-1; J210-4
J3-2 Key
J3-3 Gray +5V from J114-3; J210-5
J3-4 Black ground from J114-7; J904-4; J210-1
J3-5 Black ground from J114-5; J904-5; J210-3

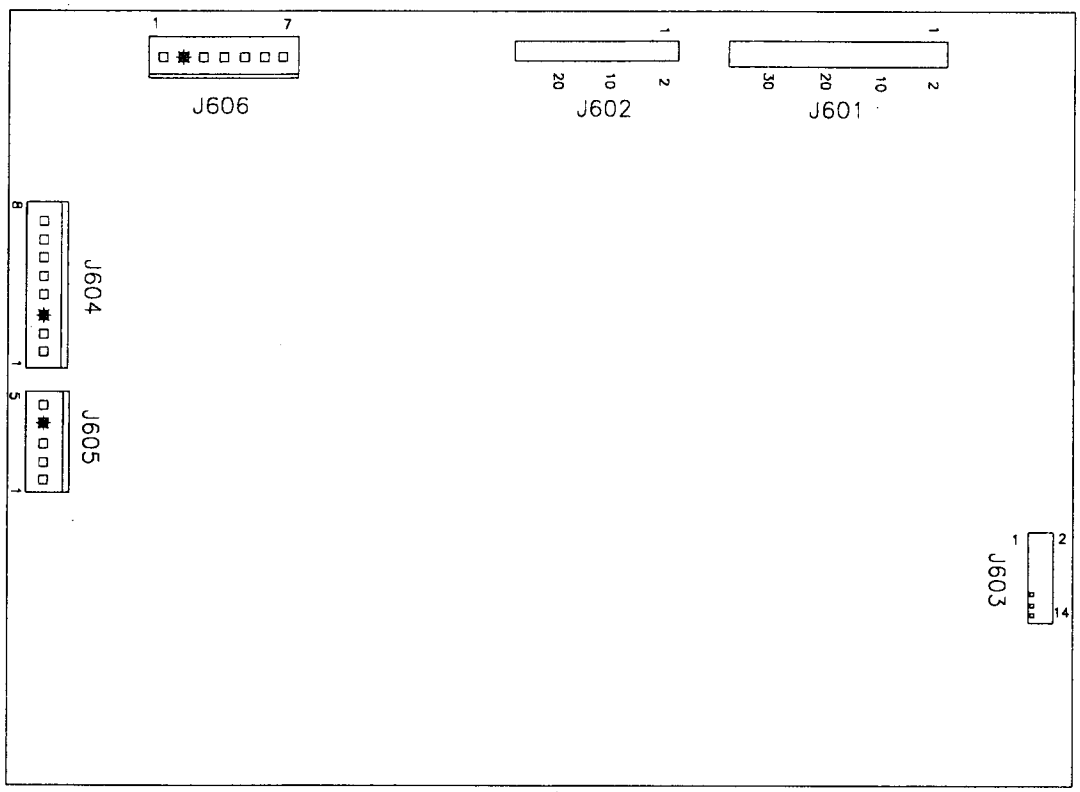
J4-1 Gray-Green 18VAC from xfrmr secondary
J4-2 Gray-Green 18VAC loop from J4-1
J4-3 Key
J4-4 Gray 18VAC from xfrmr secondary
J4-5 Gray 18VAC loop from J4-4
J4-6 Gray-White 18VAC from xfrmr secondary
J4-7 Gray-White loop from J4-6



Speaker Wiring Diagram



Dot Matrix Contoller Board
A-14039.1



J601 Ribbon Cable data to/from J202; J903; Dot Matrix Display/Driver P1

J601 Ribbon Cable data from J201

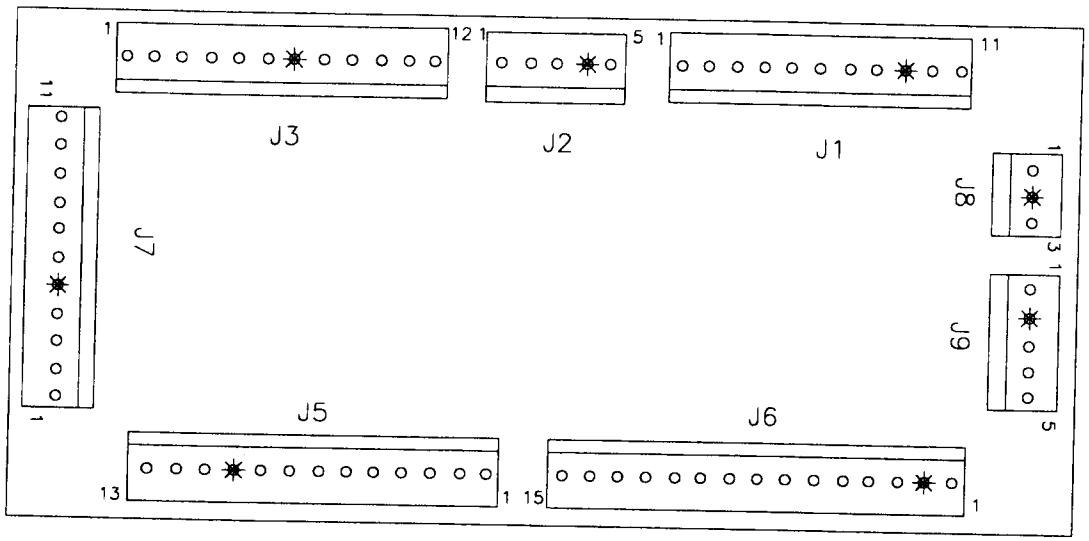
J603 Ribbon Cable data to Dot Matrix Display/Driver

J604-1 Orange -125V to Dot Matrix Display/Driver Pin 1
J604-2 Blue -113V to Dot Matrix Display/Driver Pin 2
J604-3 Key
J604-4 Black ground to Dot Matrix Display/Driver Pin 4
J604-5 Black ground to Dot Matrix Display/Driver Pin 5
J604-6 Gray +5V to Dot Matrix Display/Driver Pin 6
J604-7 Gray-Yellow +12V Dot Matrix Display/Driver Pin 7
J604-8 Brown +62 to Dot Matrix Display/Driver Pin 8

J605-1 White 80VAC from xfrmr secondary
J605-2 White 80VAC from xfrmr secondary
J605-3 Violet 100VAC from xfrmr secondary
J605-4 Key
J605-5 Violet 100VAC from xfrmr secondary

J606-1 Black ground loop from J606-3
J606-2 Key
J606-3 Black ground from J117-3
J606-4 Gray +5V loop from J606-5
J606-5 +5V from J117-4
J606-6 Gray-Yellow +12V loop from J606-7
J606-7 Gray-Yellow +12V from J117-2

Coin Door Interface P.C.B. Assembly
A-17051-1



J1-1 Orange-Gray dedicated row 8 from J205-9
J1-2 Orange-Violet dedicated row 7 from J205-8
J1-3 Orange-Blue dedicated row 6 from J205-7
J1-4 Orange-Green dedicated row 5 from J205-6
J1-5 Orange-Yellow dedicated row 4 from J205-4
J1-6 Orange-Black dedicated row 3 from J205-3
J1-7 Orange-Red dedicated row 2 from J205-2
J1-8 Orange-Brown dedicated row 1 from J205-1
J1-9 Key
J1-10 Black ground from J205-10
J1-11 Orange-White switch enable from J205-12

J2-1 Black ground from J116-3
J2-2 Gray-Yellow +12VAC from J116-2
J2-3 White-Violet G.I. 6.8VAC from J119-1
J2-4 Key
J2-5 Violet G.I. from J119-3

J3-1 Green-Brown switch column 1 from J212-1
J3-2 Green-Red switch column 2 from J212-2
J3-3 White-Brown switch row 1 from J212-4
J3-4 White-Red switch row 2 from J212-6
J3-5 White-Orange switch row 3 from J212-7
J3-6 White-Yellow switch row 4 from J212-8
J3-7 Key
J3-8 Yellow-Gray lamp column 8 from J136-3
J3-9 Red-Blue lamp row 6 from J134-7
J3-10 Red-Violet lamp row 7 from J134-8
J3-11 Red-Gray lamp row 8 from J134-9
J3-12 Not Used

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 dedicated switch row 1 to coin door
J5-5 Orange-Red dedicated switch row 2 to coin door
J5-6 Orange-Black dedicated switch row 3 to coin door
J5-7 Orange-Green dedicated switch row 5 to coin door
J5-8 Orange-Blue dedicated switch row 6 to coin door
J5-9 Orange-Violet dedicated switch row 7 to coin door
J5-10 Key
J5-11 Orange-Gray dedicated 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

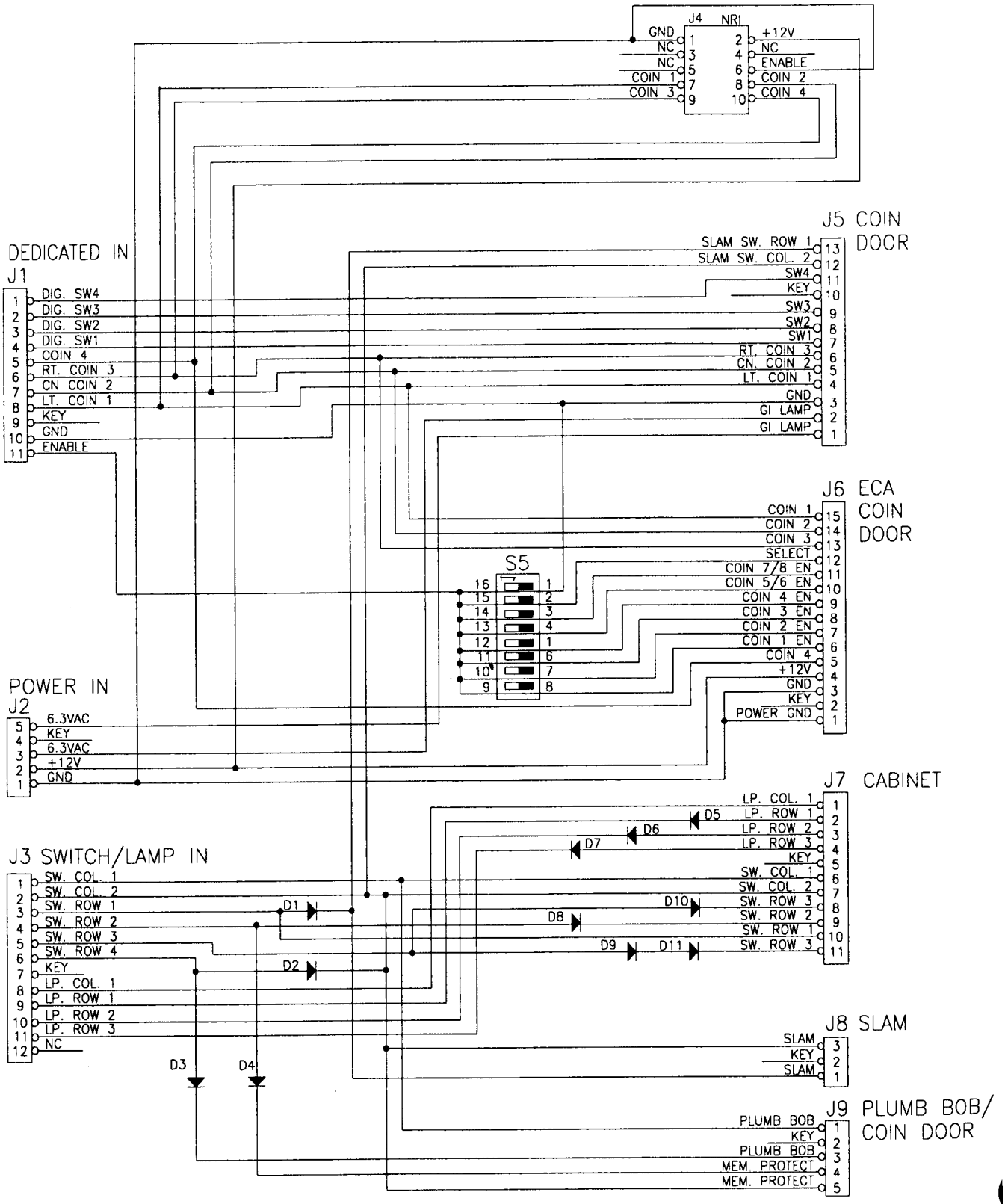
J6 Not Used

J7-1 Yellow-Gray lamp column 8 to cabinet
J7-2 Not Used
J7-3 Red-Violet lamp row 7 to cabinet
J7-4 Red-Gray lamp row 8 to cabinet
J7-5 Key
J7-6 Green-Brown switch column 1 to cabinet
J7-7 Green-Red switch column 2 to cabinet
J7-8 White-Orange switch row 3 to cabinet
J7-9 White-Red switch row 2 to cabinet
J7-10 White-Brown switch row 1 to cabinet
J7-11 White-Orange switch row 3 to cabinet

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

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

Coin Door Interface P.C.B. Schematic



Notes

Notes

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LAMP MATRIX

Yellow (B+) —Q— Red

Row \ Column	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-9 Q91
1 Red-Brown J133-1 Q90	SHOOT AGAIN 11	LEFT RAMP JACKPOT 21	SCARF SCENES COMPLETE 31	RIGHT RAMP ARROW 41	LOCK 2 51	MINI LEFT STANDUP 4 61	MINI RIGHT STANDUP 4 71	LEFT RAMP LEFT RING 81
2 Red-Black J133-2 Q89	LEFT OUTLANE 12	MON(G)OL 22	SCARF BATTLE-FIELD 32	RIGHT RAMP JACKPOT 42	LOCK 3 52	MINI LEFT STANDUP 23 2	MINI RIGHT STANDUP 3 72	LEFT RAMP RIGHT RING 82
3 Red-Orange J133-4 Q88	LEFT RETURN LANE 13	LEFT RAMP ARROW 23	SCARF SHADOW MULTIBALL 33	"START SCENE" 43	LOCK 1 53	MINI LEFT STANDUP 12 63	MINI RIGHT STANDUP 2 73	RIGHT RAMP LEFT RING 83
4 Red-Yellow J133-5 Q87	RIGHT RETURN LANE 14	MO(N)GOL 24	SCARF KHAN MULTIBALL 34	WHO KNOWS 44	INNER SANCTUM ARROW 54	MINI LEFT STANDUP 1 64	MINI RIGHT STANDUP 1 74	RIGHT RAMP RIGHT RING 84
5 Red-Green J133-6 Q86	RIGHT OUTLANE 15	M(O)NGOL 25	PUNISH GUILTY 35	EXTRA BALL 45	CENTER STANDUP 55	MINI TOP CENTER LEFT 65	MINI TOP CENTER RIGHT 75	RIGHT EJECT ARROW 85
6 Red-Blue J133-7 Q85	MONGO(L) 16	(M)ONGOL 26	DUAL OF WILLS 36	FINAL BATTLE 46	BATTLE-FIELD READY 56	KHAN MULTIBALL 66	LEFT LOOP JACKPOT 76	MONG(O)L 86
7 Red-Violet J133-8 Q84	RIGHT LOOP ARROW 17	FARLEY CLAYMORE 27	BERYLLIUM SPHERE 37	SHADOW LOOP 47	BATTLE DROP JACKPOT 57	SUPER JACKPOT 67	LEFT MONGOL HURRY 77	BUY-IN BUTTON 87
8 Red-Gray J133-9 Q83	RIGHT MONGOL HURRY 18	UNDER-WATER DOOM 28	HOTEL MONOLITH 38	INNER LOOP JACKPOT 48	INNER LOOP ARROW 58	BATTLE DROP ARROW 68	LEFT LOOP ARROW 78	CREDIT BUTTON 88

J1XX = Power Driver Board

SWITCH MATRIX

White —|—o— Green

Dedicated Grounded Switches	Row \ Column	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	GUN TRIGGER 11	SLAM TILT 21	LEFT RAMP ENTER 31	TROUGH 1 41	WALL TARGET DOWN 51	LEFT SLINGSHOT 61	MINI LEFT STANDUP 1 71	MINI RIGHT STANDUP 4 81	Black-Green J906-1 Right Flipper EOS F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	RIGHT PHURBA CONTROL 12	COIN DOOR CLOSED 22	RIGHT RAMP ENTER 32	TROUGH 2 42	MO(N)GOL TARGET 52	RIGHT SLINGSHOT 62	MINI LEFT STANDUP 2 72	MINI RIGHT STANDUP 3 82	Black-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	START BUTTON 13	BUY-IN BUTTON 23	INNER SANCTUM 33	TROUGH 3 43	MON(G)OL TARGET 53	LOCKUP RIGHT 63	MINI LEFT STANDUP 3 73	NOT USED 83	Black-Blue J906-3 Left Flipper EOS F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	LEFT PHURBA CONTROL 34	TROUGH 4 44	LEFT LOOP ENTER 54	LOCKUP MIDDLE 64	MINI LEFT STANDUP 4 74	MINI RIGHT STANDUP 1 84	Black-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function: Ser Credits / Test Function: Esc D5	5 White-Green J209-5 U19-11	RIGHT OUTLANE 15	(M)ONGOL TARGET 25	LEFT RUBBER 35	TROUGH 5 45	BATTLE DROP DOWN 55	LOCKUP LEFT 65	LEFT RAMP LEFT MADE 75	MINI DROP LEFT 85	Black-Violet J906-4 Upper Right Flipper EOS F5
Orange-Blue (6) J205-7 Normal Function: Vol Down / Test Function: Down D6	6 White-Blue J209-7 U19-9	RIGHT RETURN LANE 16	M(O)NGOL TARGET 26	MINI KICKER 36	TOP TROUGH 46	CENTER STANDUP 56	LEFT EJECT 66	LEFT RAMP RIGHT MADE 76	MINI DROP MIDDLE LEFT 86	Black-Yellow J905-3 Upper Right Flipper Opto F6
Orange-Violet (7) J205-8 Normal Function: Vol Up / Test Function: Up D7	7 White-Violet J209-8 U19-5	LEFT RETURN LANE 17	MONGO(L) TARGET 27	MINI LIMIT LEFT 37	INNER LOOP ENTER 47	RIGHT LOOP ENTER 57	RIGHT EJECT 67	RIGHT RAMP LEFT MADE 77	MINI DROP MIDDLE RIGHT 87	Black-Gray J906-5 Upper Left Flipper EOS F7
Orange-Gray (8) J205-9 Normal Function: Begin Test / Test Function: Enter D8	8 White-Gray J209-9 U19-7	LEFT OUTLANE 18	MONG(O)L TARGET 28	MINI LIMIT RIGHT 38	SHOOTER 48	MINI EXIT TUBE 58	POPPER 68	RIGHT RAMP RIGHT MADE 78	MINI DROP RIGHT 88	Black-Blue J905-5 Upper Left Flipper Opto F8

J2XX = CPU Board; J9XX = Fliptronic II Board; ▨ = Opto, Typically Closed

WARNINGS & NOTICES

WARNING

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

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