Bally

APRIL 1996
16-90003-101
FINAL



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 G11	W1	W2
1MEG, 2MEG, 4 MEG EPROM	In	Out

Dip Switch Chart

Country	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
America	Off	Off	On	On	On	On	On	On
European	Off	Off	On	On	On	Off	On	On
French	Off	Off	On	On	On	On	Off	Off
German	Off	Off	On	On	On	On	On	Off
Spain	Off	Off	On	On	Off	On	On	On

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire Color	Solenoid Part number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	BIG KICK	High Power	J133-2			Q72	J116-1			Vio-Brn	AE-24-900	
02	RIGHT TOKEN TUBE	High Power		J135-2		Q68		J118-2		Vio-Red		04-10424
03	VARI TARGET RESET	High Power	J133-2			Q71	J116-4			Vio-Org	SM1-26-600	
04	LEFT TOKEN TUBE	High Power		J135-2		Q67		J118-5		Vio-Yel		04-10424
05	BANK KICK	High Power	J133-2			Q70	J116-6			Vio-Grn	AE-23-800	
06	TOP POPPER UP	High Power	J133-2			Q66	J116-7			Vio-Blu	AE-24-900	
07	RAMP DIVERTER	High Power	J133-2			Q69	J116-8			Vio-Blk	AE-26-1500	
08	KICKBACK (RAMP)	High Power	J133-2			Q65	J116-9			Vio-Gry	AE-23-800	
09	TROUGH EJECT	Low Power	J133-3			Q44	J113-1			Brn-Blk	AE-26-1500	
10	LEFT SLINGSHOT	Low Power	J133-3			Q48	J113-3			Brn-Red	AE-26-1200	
11	RIGHT SLINGSHOT	Low Power	J133-3			Q43	J113-4			Brn-Org	AE-26-1200	
12	LEFT JET	Low Power	J133-3			Q47	J113-5			Brn-Yel	AE-26-1200	
13	RIGHT JET	Low Power	J133-3			Q42	J113-6			Brn-Grn	AE-26-1200	
14	TOP JET	Low Power	J133-3			Q46	J113-7			Brn-Blu	AE-26-1200	
15	TOP LEFT 3-BANK	Low Power	J133-3			Q41	J113-8			Brn-Vio	AE-26-1200	
16	TOP RIGHT 3-BANK	Low Power	J133-3			Q45	J113-9			Brn-Gry	AE-26-1200	
17	BACK LEFT	Flasher	J133-6			Q28	J111-1			Blk-Brn	#906	
18	JETS & BACK RIGHT (2)	Flasher	J133-6			Q32	J111-2			Blk-Red	#89, #906	
19	RIGHT MIDDLE	Flasher	J133-6			Q27	J111-3			Blk-Org	#906	
20	RIGHT BOTTOM	Flasher	J133-6			Q31	J111-4			Blk-Yel	#906	
21	LEFT MIDDLE	Flasher	J133-6			Q26	J111-5			Blu-Brn	#906	
22	LEFT BOTTOM	Flasher	J133-6			Q30	J111-6			Blu-Red	#906	
23	LIGHT ROPE 1	Flasher		J134-5		Q25		J112-8		Blu-Org		04-10440
24	LIGHT ROPE 2	Flasher		J134-5		Q29		J112-9		Blu-Yel		04-10440
25	TOP POPPER EJECT	Gen. Purpose	J133-1			Q16	J109-1			Blu-Grn	AE-27-1200	
26	TOP LIGHT & MOTOR	Gen. Purpose		J140-2		Q15		J109-2		Blu-Blk		20-10307
27	BOTTOM LEFT 3-BANK	Gen. Purpose	J133-1			Q14	J109-3			Blu-Vio	AE-26-1200	
28	BOTTOM RIGHT 3-BANK	Gen. Purpose	J133-1			Q13	J109-4			Blu-Gry	AE-26-1200	
35	AUTO PLUNGER	High Power	J119-8,9			Q81	J120-3			Yel-Gry	AE-23-800	
36	LOCK UP RELEASE	Low Power	J119-8,9			Q83	J120-1			Org-Gry	AE-26-1200	
37	AUX. LAMP ENABLE	oL.P.D.C.		J138-2				J110-1		Brn-Wht		A-20909
38	AUX. LAMP CLOCK	oL.P.D.C.		J138-2				J110-3		Org-Wht		A-20909
39	AUX. LAMP DATA 1	oL.P.D.C.		J138-2				J110-4		Yel-Wht		A-20909
40	AUX. LAMP DATA 2	oL.P.D.C.		J138-2				J110-5		Grn-Wht		A-20909
	General Illumination											
01	ILLUMINATION STRING 1	G.I.	J105-1	J106-1		Q5	J105-7	J106-7		Wht-Brn	#44	#555
02	**AUX. LAMP 1 POWER	G.I.				Q4		J106-8		Wht-Org		#555
03	ILLUMINATION STRING 3	G.I.	J105-3	J106-3		Q3	J105-9	J106-9		Wht-Yel	#44	#555
04	**AUX. LAMP 2 POWER	G.I.				Q2		J106-10		Wht-Grn		#555
05	**AUX. LAMP 3 POWER	G.I.				Q1		J106-11		Wht-Vio		#555

	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	J119-1 (Red-Grn)	Q90		J120-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J119-1 (Red-Grn)		Q92	J120-11		Org-Grn	FL-20867	WHITE
31		Lwr. Lt. Power	J119-4 (Red-Blu)	Q87		J120-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J119-4 (Red-Blu)		Q89	J120-7		Org-Blu	FL-20867	WHITE
33		Upr. Rt. Power	J119-6 (Red-Vio)	Q84		J120-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J119-6 (Red-Vio)		Q86	J120-4		Org-Vio	FL-11753	YELLOW
35		Upr. Lt. Power	J119-8 (Red-Gry)	Q81		J120-3	Yel-Gry		SEE	ABOVE
36	Upper Left Flipper	Upr. Lt. Hold	J119-8 (Red-Gry)		Q83	J120-1		Org-Gry	SEE	ABOVE

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

**These G.I. strings do not brighten and dim, they are always ON.

oL.P.D.C. = Low Power Device Controls

The manufacturer intends that this game is to be operated for amusement purposes only and not in contravention of any federal, state or local law or regulation of the United States or any foreign country governing gaming devices. All operators of this game are responsible for its operation in accordance with such laws and regulations. The manufacturer's factory settings for this game may require adjustment in order to comply with laws applicable in an operator's specific jurisdiction. It is the operator's responsibility to determine whether adjustments are necessary and, if they are, to make the appropriate adjustments prior to operating the amusement game.

DECLARATION OF CONFORMITY

MIDWAY MANUFACTURING CO., INC.

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

WE, HEREBY DECLARE UNDER SOLE RESPONSIBILITY THAT

THE MODEL: ***"SAFE CRACKER" 90203, 90303, 90403, 90703, 90903, 91003, 91103, 91303, 91403, 91803, 92003, 92103, 92203, 92303 (PINBALL)***

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

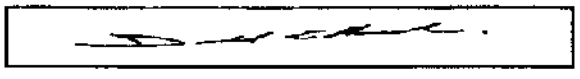
ELECTROMAGNETIC COMPATABILITY DIRECTIVE
(89/336/EEC AND AMENDMENTS 91/C162/08, 92/31/EEC,93/68/EEC

AS IS VERIFIED BY COMPLIANCE WITH THE FOLLOWING STANDARDS:

EN 55014:1993 EN55104:1995 EN61000-4-2: 1995
IEC 801-3: 1984 (EN61000-4-3) EN61000-4-4: 1995 EN61000-4-5: 1995
ENV50141: 1993 (EN61000-4-6) EN61000-4-11: 1994

Date issued: **FEBRUARY 22, 1996**

MANUFACTURE'S SIGNATURE



DON HASSLER

V.P. MANUFACTURING

EPILEPSY WARNING

A very small portion of the population has a condition which may cause them to experience epileptic seizures or have momentary loss of consciousness when viewing certain kinds of flashing lights or patterns that are commonly present in our daily environment. These persons who may never have experienced any such symptoms before may experience seizures while watching some kinds of television pictures or playing certain amusement games or witnessing certain flashing light patterns. We recommend that parents observe their children while they play this game. If you or your child experience any of the following symptoms: dizziness, altered vision, eye or muscle twitching, involuntary movements or disorientation, DISCONTINUE USE IMMEDIATELY and consult your physician.

ATTENTION : RISQUE D'EPILEPSIE

Certaines personnes sont prédisposées aux crises d'épilepsies ou aux pertes de conscience momentanées quand elles regardent certains flashes lumineux ou images que l'on trouve régulièrement dans notre environnement quotidien. Ces personnes, qui n'ont peut-être jamais développé ces symptômes auparavant, peuvent être sujettes à des crises en regardant la télévision, en jouant sur certains jeux d'amusements ou en subissant certains types de flashes lumineux. Nous recommandons donc aux parents de surveiller leurs enfants lorsqu'ils jouent sur ce jeu. Si vous ou vos enfants développez les symptômes suivants : sensation de vertige, trouble de la vision, convulsion, mouvement involontaire ou désorientation, ARRETEZ IMMEDIATEMENT L'UTILISATION et consultez votre médecin.

EPILEPSY WARNING

In sehr seltenen Faellen kann es bei zu Epilepsie neigenden Personen zu Bewusstseinsstoerungen beim Betrachten von bestimmten blinkenden Lichtfolgen oder Mustern, die alltaeglich sind, kommen. Auch bei Personen, die niemals derartige Symptome an sich beobachtet haben, kann es beim Betrachten gewisser Fernsehbilder, beim Spiel an bestimmten Geraeten oder dem Beobachten bestimmter blinkender Lichtfolgen zu Stoerungen kommen. Sollten Sie beim Spielen Symptome wie Schwindelgefuehl, veraendertes Sehvermoegen, Augen- oder Muskelzucken, Bewegungs- order Orientierungsstoerungen feststellen so beenden Sie sofort das Spiel und konsultieren einen Arzt.

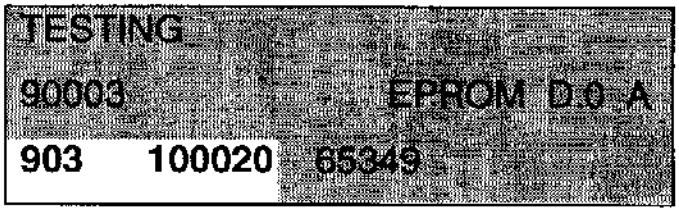
AVVISO IMPORTANTE!

Un'esigua parte della popolazione puo' essere soggetta ad attacchi di epilessia o momentaneo perdite di coscienza quando guarda alcuni particolari tipi di scritte luminose lampeggianti comunemente presenti nell'ambiente in cui viviamo. Queste persone, che tuttavia possono non aver mai sperimentato simili sintomi, possono essere colpite da attacchi epilettici quando guardano certi tipi di immagini televisive oppure giocando con alcuni particolari videogiochi oppure guardando particolari scritte luminose lampeggianti. Si raccomanda quindi di controllare i regazzi mentre giocano con questo flipper. Se si dovessero provare sensazioni come alterazione della vista, vertigini, contrazioni muscolari o degli occhi, movimenti involontari, INTERROMPETE IL GIOCO IMMEDIATAMENTE e consultate il vostro medico.

ATTENTION

This game uses a Security CPU Board that is not downward compatible to the CPU boards used in previous games. The board has an added security chip that can be interchanged between other Safe Cracker 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.



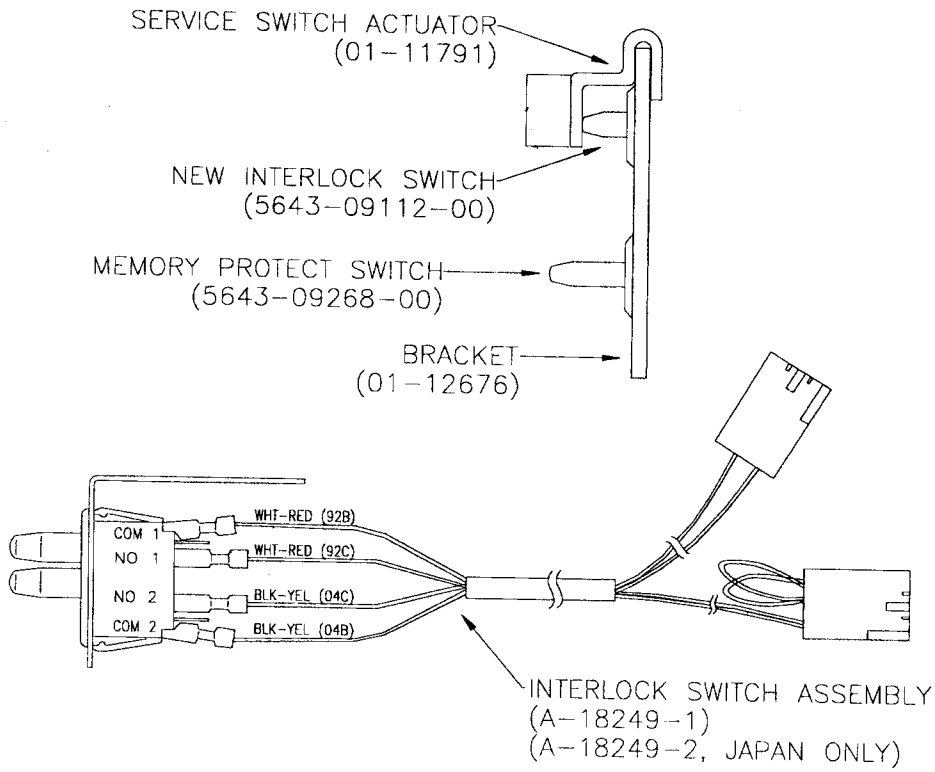
IMPORTANT NOTICE

PLEASE READ

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



SAFE CRACKER™

Information current at time of release.

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

PIC Number_____ Serial Number_____

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

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

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Bally's

SAFE CRACKER

Game Rules

SAFE CRACKER™

GAME RULES

OBJECT: Work against TIME to Break into the BANK. Make your way around the BOARD GAME in the back glass to get to the VAULT. Break into the vault for MAGIC TOKENS!

TIME: This game is timed. Extra time is awarded by making different shots on the playfield.

SUDDEN DEATH: When the TIMER goes to ZERO you are in SUDDEN DEATH. When that ball is lost the game is over.

BREAK-INS: Shoot for the FLASHING DROP TARGETS. When all targets are made the LOCK shot on the ramp will light. LOCK balls to light bank entrances for a BREAK-IN.

IN THE BANK: Check your position on the board game in the backglass. Spin the wheel in the display to move inside the bank. Avoid the chasing guard.

THE WHEEL: Lite the wheel by going thru the right upper mini-flipper lane or by shooting the ramp. Collect the value that the wheel lands on in the center of the timer by shooting for the Main Bank entrance when the yellow lamp is lit.

MULTI-BALL™: Multi-ball can be started after a bank BREAK-IN. Guards, laser beams, and exploding gifts can stop you from getting Multi-ball! Cyber-dogs and Alarms require quick shots back into the bank entrances.

HINT: Replay MAGIC TOKENS for surprising results!

SECTION ONE

GAME OPERATION AND TEST INFORMATION

(System WPC) ROM Summary

IC	TYPE	BOARD	LOCATION	PART NUMBER
Game 1	27c040	CPU	G11	A-5343-90003-1
Security Chip	PIC16C57	CPU	G10	A-5400-90003-1
Music/Speech	27c080	Audio	SU2	A-5343-90003-S2
Music/Speech	27c080	Audio	SU3	A-5343-90003-S3
Music/Speech	27c080	Audio	SU4	A-5343-90003-S4

NOTICE
Order replacement ROM's 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

SAFECRACKER IS A 4 BALL GAME.

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

Temp: 32^{o} F to 100^{o} F
(0^{o} C to 38^{o} C)

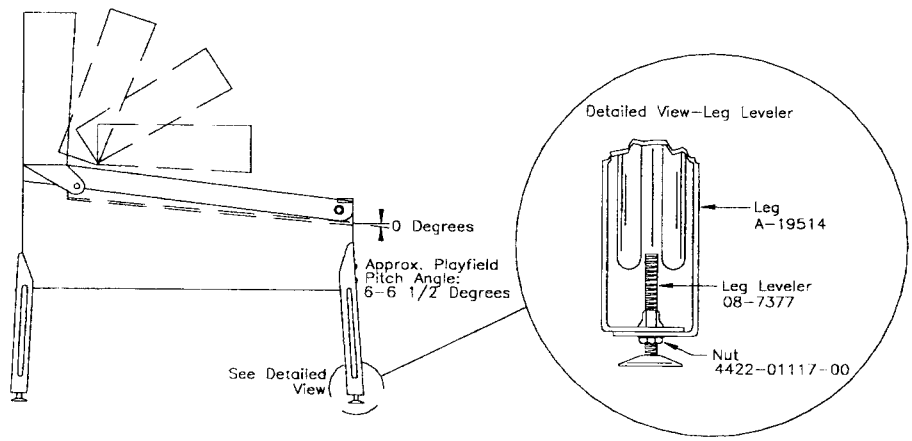
Humidity: Not to exceed 95% relative.

Dimensions: Width: 40" Approx.
Depth: 48" Approx.
Height: 77" Approx.

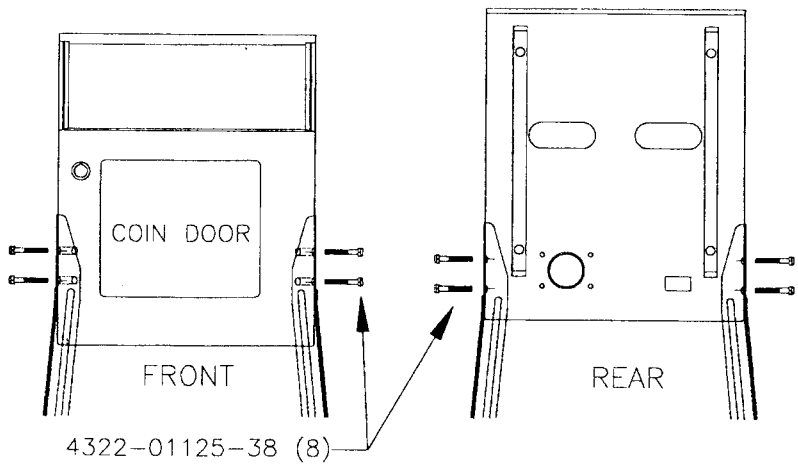
1. Remove all cartons, parts, and miscellaneous items from the shipping container and set them aside.

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 front legs using leg bolts (View 2).



VIEW 1



VIEW 2

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

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

   Note: The insert panel is attached to the speaker panel and is separated from the backbox as a single unit.

   Unlock the backbox and remove the backglass, storing it carefully to avoid damage. Remove the two foam packing blocks between the backglass and insert panel.

   Grasp the upper insert unit and rotate it away from the backbox, toward the playfield glass.

   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.

6. Load the tokens. Lift the insert up at an angle and slowly drop the tokens into the token tube filling the tube only ¾ full. Replace the insert unit, the backglass, and lock the backbox.

CAUTION

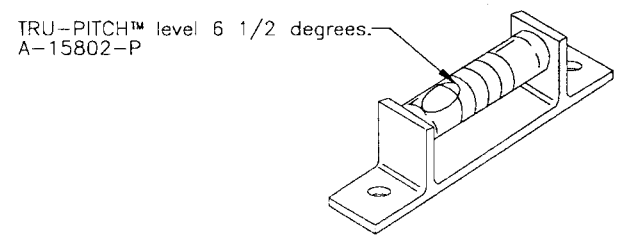
FAILURE TO INSTALL the backbox mounting hardware properly can cause personal injury.
NEVER TRANSPORT a pinball game with the hinged backbox erect. Always lower the backbox forward onto the playfield cabinet on a layer of protective material to prevent marring or damage and possible personal injury.

7. 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.

8. Unlock and open the coin door. Move the front 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.

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.

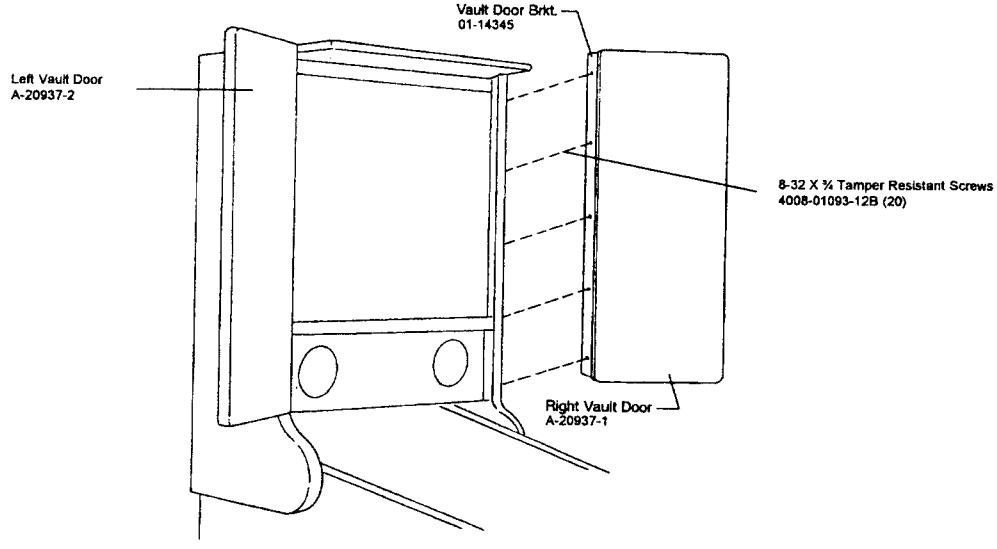
10. The TRU-PITCH™ level is located on the right shooter rail. This allows the playfield pitch angle to be accurately adjusted WITHOUT REMOVING THE GLASS. The first line (closest to the front of the game) on the level is approximately 6 degrees. Every line thereafter is approximately another 1/2 degree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



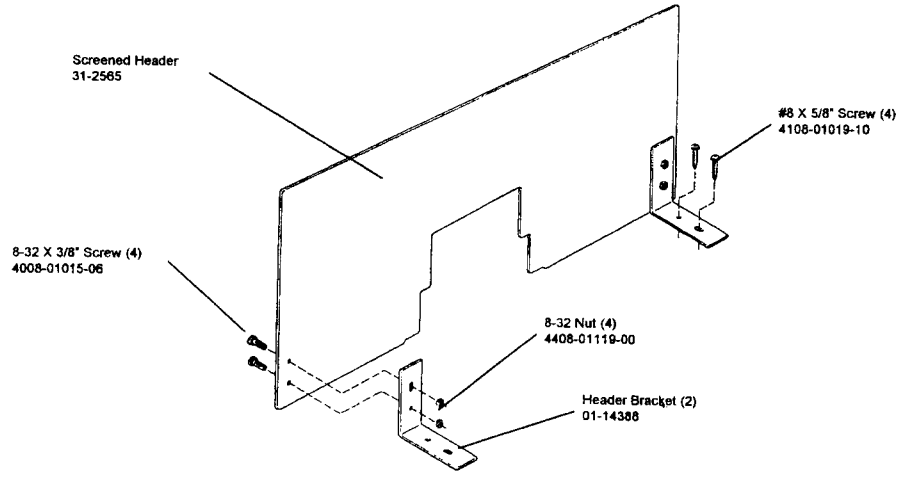
CAUTION

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. Install the left and right vault doors (backbox side panels). Attach one vault door bracket to each door, using the tamper resistant screws found in the same box as the vault doors and brackets. Attach the vault doors to the backbox with the decal side of the door facing the front of the game.



12. Install the backbox header if desired. Hardware and header brackets are located in the unique parts bag.

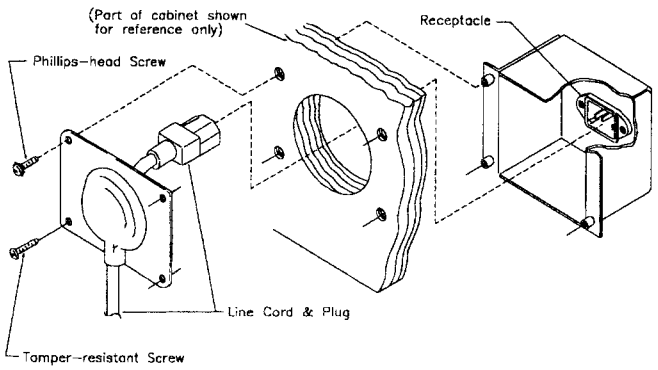


13. Verify that the ***required number*** of balls are installed in the game. This game uses 4 balls.

14. Install playfield mylars if desired.

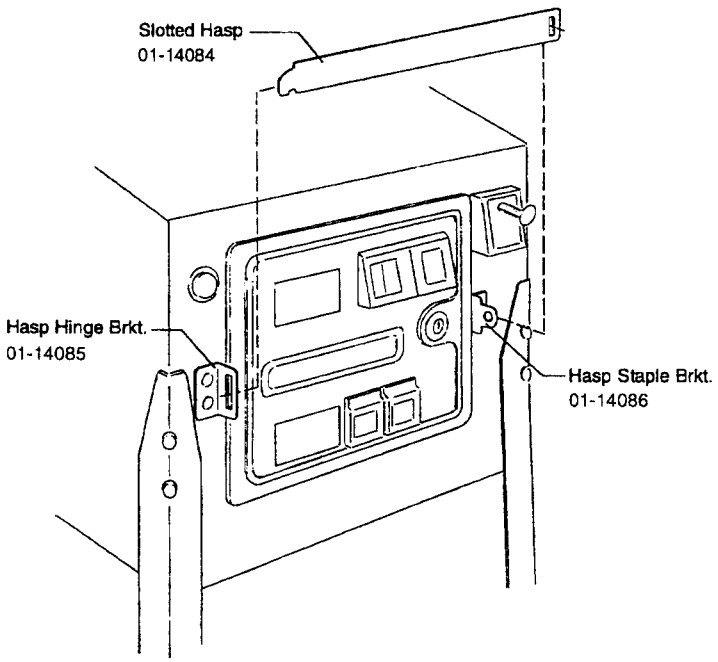
15. Clean and reinstall the playfield cover glass.

16. 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.



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

18. If a padlock is desired, install the security bar as shown below.



19. IMPORTANT: Fill out and return the registration card.

RAISING THE PLAYFIELD

⚠CAUTION

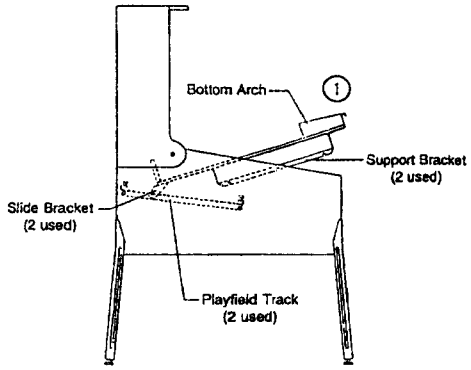
Do not raise the playfield straight up! This game uses a slide assembly to raise and lower the playfield.

Before Raising the Playfield:

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

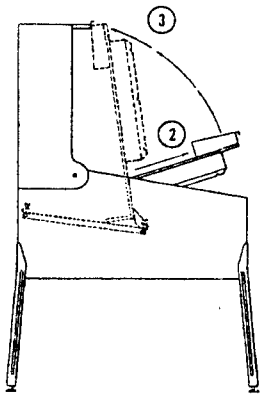
To Raise Playfield:

1. Grasp bottom arch and carefully lift up playfield only high enough to clear support brackets.



2. Pull the playfield out toward you until it stops (rest position).

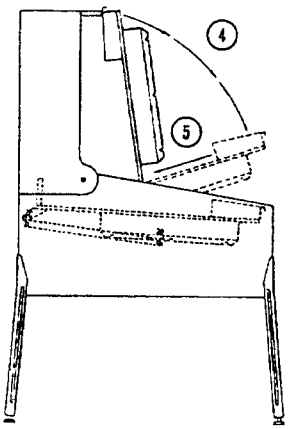
3. Rotate playfield to upright service position (lean on backbox) by pulling toward you and up.



To Lower Playfield:

4. Rotate the playfield to the rest position.

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

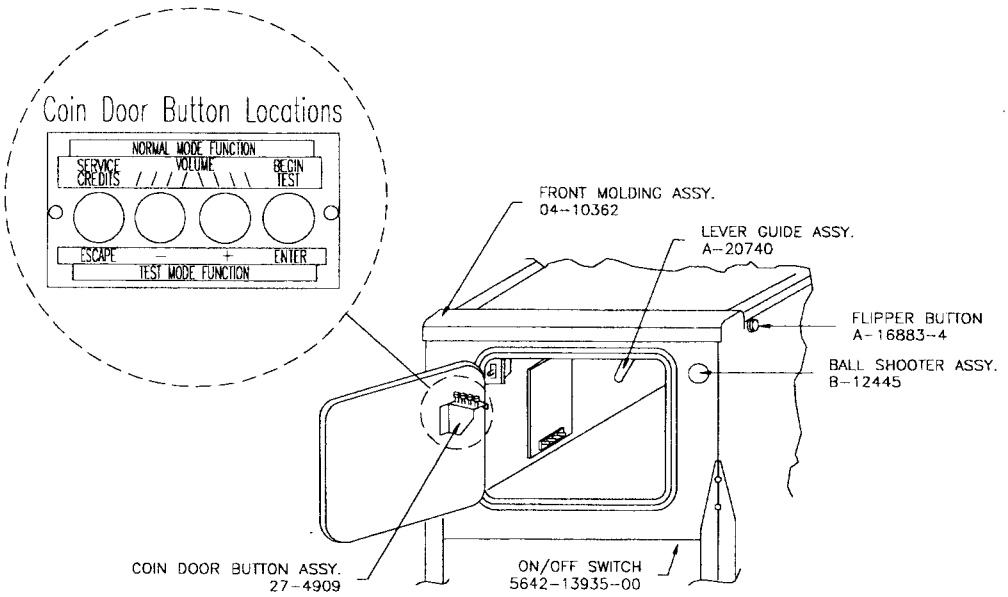
The operator controls all game adjustments, obtains bookkeeping information, and diagnoses problems, using only four push-button switches mounted on the inside of the coin door. The Coin Door Switches have two modes of operation: Normal Function and Test Function.

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: **SAFECRACKER** **Sound Rev. D.0**
90003 Rev. D.23R **Sy. 3.52 2/26/96**

Press the Enter button to enter the WPC Menu System (refer to the section entitled 'Menu System Operation' for more information). Slide the Service Switch Actuator over the top interlock switch located in the bottom left corner of the coin door opening. Perform the entire Test Menu routine to verify 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 Wheel Test
- T.17 Vari Target Test
- T.18 Token Tube Test
- T.19 Light Rope Test
- T.20 3-Bank Drop Target Test
- T.21 Top Trough Test
- T.22 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	Max Extra Ball Count	00	B.1	08	Percent Replays	00
B.1	05	Time Per Credit	00				

B.2 Earning Audits*

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

*These audits are NOT 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	22	Minutes On	00
B.3	02	Total Plays**	00	B.3	23	Balls Played	00
B.3	03	Total Free Play	00	B.3	24	Tilts	00
B.3	04	Free Play Percent	00	B.3	25	Replay 1 Awards	00
B.3	05	Replay Awards	00	B.3	28	Replay 4 Awards	00
B.3	06	Percent Replays	00	B.3	29	1 Player Games	00
B.3	09	Match Awards	00	B.3	30	2 Player Games	00
B.3	10	Percent Match	00	B.3	31	3 Player Games	00
B.3	11	H.S.T.D. Credits	00	B.3	32	4 Player Games	00
B.3	12	Percent H.S.T.D	00	B.3	33	H.S.T.D. Reset Count	00
B.3	17	Left Drains	00	B.3	34	Burn-in Time †	00:00:00
B.3	18	Right Drains	00	B.3	35	1st Replay Level	00
B.3	20	Time Per Credit	00	B.3	36	Left Flipper	00
B.3	21	Play Time	00:00:00	B.3	37	Right Flipper	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	Tokens Vault Tokens given from Vault without Vault Jackpot.	0%	00
B.4	02	Tokens Vault Jackpot Tokens given from Vault via the Vault Jackpot.	0%	00
B.4	03	Tokens Free Gift Tokens given from the free-gift.	0%	00
B.4	04	Locks Lit Number of times Locks were lit.	0%	00
B.4	05	Locked Balls Number of locked balls.	0%	00
B.4	06	Total Multi-ball Games Total number of main Multi-ball games played.	0%	00
B.4	07	Top Left 3-Bank Completed Number of times the top left 3-bank was completed.	0%	00
B.4	08	Top Right 3-Bank Completed Number of times the top right 3-bank was completed.	0%	00
B.4	09	Bottom Left 3-Bank Completed Number of times the bottom left 3-bank was completed.	0%	00
B.4	10	Bottom Right 3-Bank Completed Number of times the bottom right 3-bank was completed.	0%	00
B.4	11	Big Kicks Number of balls kicked from the left kicker.	0%	00
B.4	12	Alarm Targets Complete Number of times the Alarm standup targets were completed.	0%	00
B.4	13	Total Wheel Hits Total number of Wheel hits.	0%	00
B.4	14	Top Left Lane Number of times the top left lane was lit.	0%	00
B.4	15	Top Center Lane Number of times the top center lane was lit.	0%	00
B.4	16	Top Right Lane Number of times the top right lane was lit.	0%	00
B.4	17	Top Lanes Completed Number of times all 3 lanes were lit.	0%	00

B.4 Feature Audits Continued

B.4	18	Ramp Made Number of ramp shots made.	0%	00
B.4	19	Vari Nudge Number of times the Vari Target nudged back.	0%	00
B.4	20	Vari Hole Shot Number of times the ball fell past Vari Target into hole.	0%	00
B.4	21	Vari ATM Card Number of times the Vari Target awarded: A.T.M. Card.	0%	00
B.4	22	Vari Note Number of times the Vari Target awarded: Note to Teller.	0%	00
B.4	23	Vari Explosives Number of times the Vari Target awarded: Explosives.	0%	00
B.4	24	Vari Invisible Number of times the Vari Target awarded: Invisible.	0%	00
B.4	25	Vari Lite Outlane Number of times the Vari Target awarded: Lite Outlanes.	0%	00
B.4	26	Super Jets Number of Super Jets started.	0%	00
B.4	27	Wheel Call Guard Number of times the Wheel awarded: Call Guard.	0%	00
B.4	28	Wheel Lite Lock Number of times the Wheel awarded: Lite Lock(s).	0%	00
B.4	29	Wheel Disable Computer Number of times the Wheel awarded: Disable Computer.	0%	00
B.4	30	Wheel Lite Deposit Window Number of times the Wheel awarded: Lite Deposit Window.	0%	00
B.4	31	Bonus 2X Number of times Bonus X raised to 2X.	0%	00
B.4	32	Bonus 3X Number of times Bonus X raised to 3X.	0%	00
B.4	33	Bonus 4X Number of times Bonus X raised to 4X.	0%	00
B.4	34	Bonus 5X Number of times Bonus X raised to 5X.	0%	00

B.4 Feature Audits Continued

B.4	35	Bonus 5X Plus Number of times Bonus X raised to 5X plus.	0%	00
B.4	36	Multi-Ball No Jackpot Number of Multi-balls played with out any Jackpot won.	0%	00
B.4	37	Total Jackpots Total number of Multi-ball Jackpots won.	0%	00
B.4	38	Jackpot Relit Number of times Jackpot was re-lit.	0%	00
B.4	39	Main Entrance Starts Number of board game starts from "Bank" entrance.	0%	00
B.4	40	Roof Entrance Starts Number of board game starts from "Roof" entrance.	0%	00
B.4	41	Cellar Entrance Starts Number of board game starts from "Cellar" entrance.	0%	00
B.4	42	Board Game Quits Number of times a player choose to quit Board Game.	0%	00
B.4	43	Board Game Wins Number of times a player reached the Vault.	0%	00
B.4	44	Caught by Guard Number of times a player was caught by the Guard.	0%	00
B.4	45	Bribe Started Number of Bribe games started.	0%	00
B.4	46	Bribe Accepted Number of Bribe games accepted by player.	0%	00
B.4	47	Bribe Caught Number of Bribe games where player was caught.	0%	00
B.4	48	Alarm Started Number of times Alarm Mode was started.	0%	00
B.4	49	Alarm Wins Number of times Alarm Mode was successfully completed.	0%	00
B.4	50	Cyber Dog Starts Number of times Cyber Dog was started.	0%	00
B.4	51	Cyber Dog Wins Number of times Cyber Dog was completed.	0%	00

B.5 Histograms

B.5	01	0 - 100 Thousand Score	00%
B.5	02	100 - 300 Thousand Score	00%
B.5	03	300 - 500 Thousand Score	00%
B.5	04	500 - 750 Thousand Score	00%
B.5	05	750 - 1 Million Scores	00%
B.5	06	1 - 1.25 Million Score	00%
B.5	07	1.25 - 1.5 Million Score	00%
B.5	08	1.5 - 1.8 Million Score	00%
B.5	09	1.8 - 2.25 Million Scores	00%
B.5	10	2.25 - 3.0 Million Score	00%
B.5	11	3.0 - 5.0 Million Score	00%
B.5	12	5.0 - 7.0 Million Score	00%
B.5	13	Over 7 Million	00%
B.5	14	Game Time 0.0 - 1.0 Mins	00%
B.5	15	Game Time 1.0 - 1.5 Mins	00%
B.5	16	Game Time 1.5 - 2.0 Mins	00%
B.5	17	Game Time 2.0 - 2.5 Mins	00%
B.5	18	Game Time 2.5 - 3.0 Mins	00%
B.5	19	Game Time 3.0 - 3.5 Mins	00%
B.5	20	Game Time 3.5 - 4.0 Mins	00%
B.5	21	Game Time 4 - 5 Mins	00%
B.5	22	Game Time 5 - 6 Mins	00%
B.5	23	Game Time 6 - 8 Mins	00%
B.5	24	Game Time 8 - 10 Mins	00%
B.5	25	Game Time 10 - 15 Mins	00%
B.5	26	Game Time Over 15 Mins	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	Totals Cleared
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	**Wheel Test**
T.17	**Vari Target Test**
T.18	**Token Tube Test**
T.19	**Light Rope Test**
T.20	**3-Bank Drop Target Test**
T.21	**Top Trough Test**
T.22	**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. **Note: G.I strings 4 and 5 do not dim and brighten, they are always ON.**

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 Wheel Test This test is used to determine if both optos on the Wheel are working and to see if they are wired correctly to the two inputs. By turning the Wheel, the display shows whether the switches are seen and which direction it believes the Wheel is turning.

T.17 Vari Target Test This test is used to exercise the Vari Target and monitor the switches on the assembly. The "ENTER" button is used to reset the Vari Target, and the state of the three switches is shown on the display.

T.18 Token Tube Test This test is used to exercise the Token Tube solenoids and to check the state of the switches in the mechanism. The "UP" and "DOWN" buttons change the mode of the test, and the "ENTER" button is used to release a token. Possible Modes: LEFT TUBE, RIGHT TUBE, ALTERNATE.

The LEFT TUBE mode will fire only the left solenoid.

The RIGHT TUBE mode will fire only the right tube's solenoid.

The SEQUENTIAL mode will alternately fire the left and right solenoids.

During this test, the state of the switches in the mechanism is displayed.

T.19 Light Rope Test This test is used to turn on the Light Rope segments. The "UP" and "DOWN" buttons change which segment(s) will be exercised. Possible combinations are: LIGHT ROPE 1, LIGHT ROPE 2, and BOTH. Pressing the "ENTER" key will start flashing the selected rope segments.

T.20 3-Bank Drop Target Test This test is used to exercise each of the 3-Bank sets and show the state of their switches. The "UP" and "DOWN" switches select the bank to test, and the "ENTER" switch fires the reset coil. The display shows the state of the switches for the selected drop bank.

T.21 Top Trough Test This test is used to show the state of switches in the Underground Trough. Balls placed in the top popper will be popped into the Underground Trough. Any balls arriving at the "bank" will be kicked back out after a slight pause.

The state of the underground switches is shown on the display.

T.22 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 New Date And Time" 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 "Executing..." 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

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

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

Adjustment Number	Adjustment Description	Install 3-Ball U.9 07 (factory)	Install 5 Ball U.9 06

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
A.4 20	Alien Champion 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
A.4 20	Alien Champion 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.

U.9 23 Install French 1*
U.9 24 Install French 2*
U.9 25 Install French 3*
U.9 26 Install French 4*
U.9 27 Install French 5*
U.9 28 Install French 6* Adjustments U.9 23 through U.9 28 are used to modify game pricing and type of play. 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 Not Used

A.1 04 Not Used

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 500,000,000 to 9,500,000,000.

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 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.

Range: - Score is boosted between 200,000,000 and 2,500,000,000 points.
OFF - Replay score is not boosted.
AUTO - Replay score is boosted by ½ of the base replay score.

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.
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 Not Used

A.1 16 Match Award

The award automatically provided when the player wins a match.

Credit - Winning a Match awards a Credit.
Token - Winning a Match awards a Token.

A.1 17 Not Used

A.1 18 Not Used

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, German, French or Spanish.

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 special effects and Attract Mode.
NO - Do Not dim General Illumination.

A.1 26 Tournament Play

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

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

A.1 27 Euro. Scr. Format

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

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

A.1 28 Minimum Volume Override

The volume can be turned Off.

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

A.1 29 General Illumination Power Saver

This allows the general illumination and controlled lamps to be dimmed following a time interval after a game is played. Power Saver Level (A.1 30) determines dimness of the lamps. Using this feature 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 Not Used

A.1 32 Not Used

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 Attract Mode Music
This adjustment is to allow the playing of music in the Attract Mode. Factory default is NO.

YES: Allow music to be played in the Attract Mode.
NO: Do NOT allow music to be played in the Attract Mode.

A.2 02 Flipper Plunger
When this adjustment is set to YES, the right flipper will cause a ball sitting in the shooter lane to be launched onto the playfield. This adjustment is provided for use when the launch button is broken and/or intermittent. The game will automatically detect a broken launch button, but it may take several games to perform the detection. In this case, set this adjustment to YES until the launch button can be repaired. Factory default is NO.

YES: Allow the right flipper to launch a ball sitting in the shooter lane.
NO: Do NOT allow the right flipper to launch a ball sitting in the shooter lane.

A.2 03 Start Bonus X
This adjustment chooses which Bonus X will lite at game start. Factory default is 2.

The choices are: 0, 2, 3, 4, 5, or 5+

A.2 04 Drop Sequence
This adjustment is used to regulate how difficult the Bank is to light. Factory default is 0.

0: Minimum difficulty.
3: Maximum difficulty.

A.2 05 Timer Difficulty
This determines at what speed the Timer will start. Factory default is Extra Slow. Factory default is EXTRA SLOW.

EXTRA SLOW
SLOW
MEDIUM
FAST
EXTRA FAST

A.2 06 End Game Lock Release
When this adjustment is set to YES, the game will release all locked balls from the Top Lockup at the end of each game. Factory default is YES.

YES: Release locked balls at end of game.
NO: Do NOT release locked balls at end of game.

A.2 07 Lock Difficulty
This adjustment determines the 1st Lock sequence difficulty. Factory default is EASY.

EASY
MEDIUM
HARD

A.2 08 First Wheel Position

This adjustment chooses which starting wheel position is lit on first ball. Factory default is LITE DEPOSIT.

CALL GUARD
LITE LOCK
DISABLE COMPUTER
LITE DEPOSIT

A.2 09 1st Collect Lit

This adjustment chooses whether the 1st Collect light is lit on first ball. Factory default is YES.

YES: Start 1st Collect light on first ball.
NO: Do NOT start 1st Collect light on first ball.

A.2 10 Guards Start

This determines the position of the Guard at game start. Factory default is RANDOMIZED.

RANDOMIZED
UPPER LEFT POSITION OPEN
UPPER RIGHT POSITION OPEN
LOWER RIGHT POSITION OPEN
LOWER LEFT POSITION OPEN

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

A.3 16 Maximum Credits
The maximum number of credits the game can accumulate, either through game play awards or coin purchases. The range of this setting is 5 through 99. Reaching the specified setting prevents the award of any credits. 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

This adjustment determines the value of each coin unit on the coin meter. For example, to show the total amount of money collected as "total quarters", set this adjustment to "0.25". To show the total amount of money collected as "total dollars", set this adjustment to "1.00". Setting this adjustment to anything other than OFF establishes the coin unit for the meter install on the Coin Door Interface Board. *Note: All WPC games are cable ready to operate a coin meter mounted to the Coin Door Interface Board. Boards without a meter can use the parts listed below to take advantage of the coin meter feature. The coin meter and spacer may be purchased from you distributor.*

Coin Meter +6V	20-9302-3
Spacer	20-9914

A.3 22 Dollar Bill Slot

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

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

A.3 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)	$1.50	4 cred.

Display View

Note that the line "5) $2.00 6 cred." no longer fits on the display. Whenever there are more than 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.

Bonus for Special Coins

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

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

1)	$0.25	1/2 Cred
2)	$0.50	1 Cred
3)	$0.75	1 1/2 Cred
4)	$1.00	2 Cred

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

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

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

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

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

A.3 28 Left Slot Credit Value
A.3 29 Center Slot Credit Value
A.3 30 Right Slot Credit Value
A.3 31 4th Slot Credit Value

This adjustment specifies the value to be used for awarding credits. It is typically the same value as the corresponding A.2 12 (Left Slot Value) through A.2 15 (4th Slot Value) adjustment.

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

Pricing Table

Country	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¢, 2/$1.00, 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	
	1Fr	2Fr	5Fr	-	1/1Fr, 5/5Fr	SWISS 3	
	1Fr	2Fr	5Fr	-	1/1Fr, 2/2Fr, 6/5Fr	SWISS 4	
	1Fr	1Fr	1Fr	-	1/1Fr	SWISS 5	
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr , 3/50Fr [2]	BELGIUM 1	
	5Fr	20Fr	50Fr	-	1/20Fr, 3/60Fr, 3/50Fr	BELGUIM 2	
Germany	1DM	2DM	5DM	-	1/2DM, 2/3DM, 3/4DM, 4/5DM [1,2]	GER. 4/5DM	
					1/2DM, 2/3DM, 3/4DM, 5/5DM [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 [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 1	
	1Hfl	2.5Hfl	2.5Hfl	-	1/1Hfl, 3/3Hfi, 3/2.5Hfl	NETHERLANDS 2	
Hungary	20 Old	20 New	50F	-	1/40F, 2/60F, 4/100F [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 Token.

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 - 9,500,000,000.

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

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

Range: 00 - 9,500,000,000.

A.4 15 Backup Buy-In H.S.T.D. 1
A.4 16 Backup Buy-In H.S.T.D. 2
A.4 17 Backup Buy-In H.S.T.D. 3
A.4 18 Backup Buy-In H.S.T.D. 4

The first through the fourth Back-up Buy-In High Score values. The game automatically restores these values when the High Score Reset Every value is reached. **Note:** These adjustments are shown when "A.2 01 Buy Extra Ball" is set to ½ Credit or 1 Credit.

Range: 00 to 9,500,000,000

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 a message, "Press ENTER for Test Report". This indicates the game program has detected a possible problem with the game.

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

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 60 balls or approximately 20 games). The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep your game earning, until the service technician can repair the problem. To verify the problem, refer to the Test Menu text describing Switch Testing, and check each reported switch using applicable switch tests. Always check switch operation using a ball, to simulate game conditions. Switch problems may often be resolved by adjusting the wire switch actuators, fixing switch circuitry problems, securing loose connectors, etc. Mechanisms using 'opto switches' (ball poppers, etc.) need to be checked for proper power connections (+12V dc and ground).

Check Fuses F101 and F106 and Opto 12V Supply

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

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

Opto Trough Bad Check Connectors, Wires and 12V Supply.

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

Pinball Missing.

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

xxxxx Sw. is Stuck On.

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

Ground Short Row - N, Wht - xxx.

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

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

G10 Error

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

G11 Checksum Error.

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

Time and Date Not Set.

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

Factory Settings Restored.

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

CPU and Audio Visual Board Error Codes

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

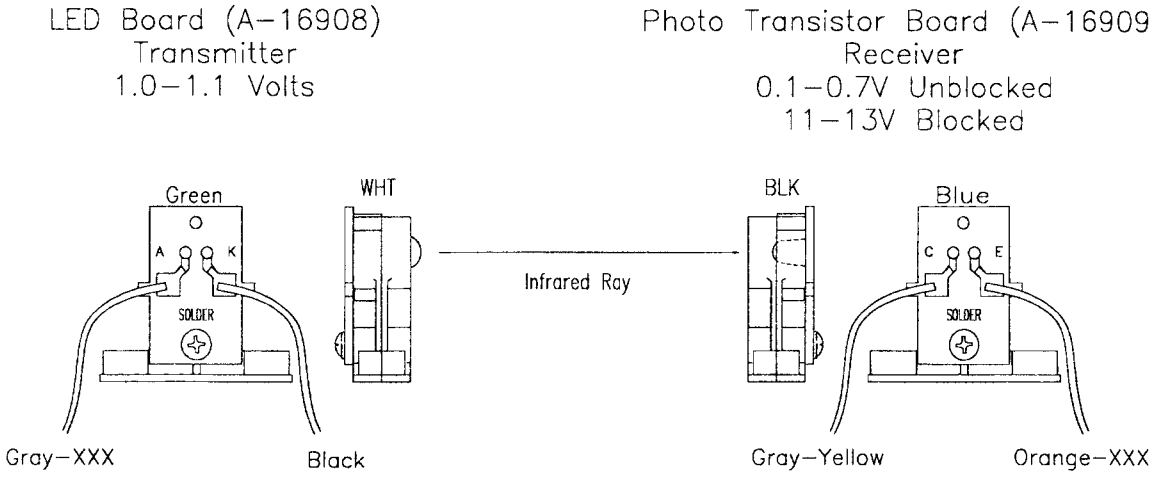
CPU BOARD	Center LED blinks once	= G11 ROM Failure
LED ERROR CODES	Center LED blinks twice	= U8 RAM Failure
	Center LED blinks three times	= G10 Security Chip Failure

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

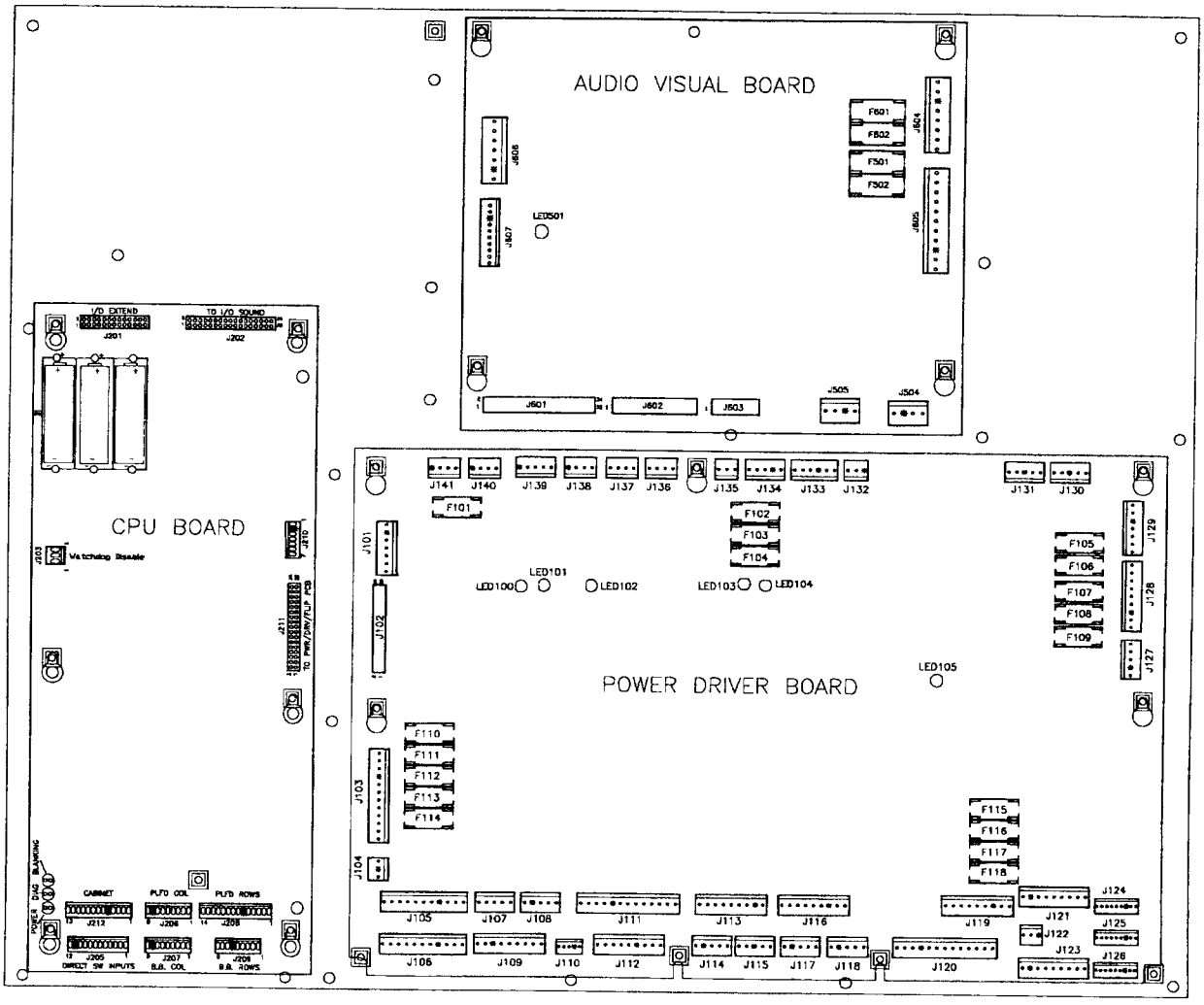
AUDIO VISUAL BOARD	1 Beep	= Audio Visual Board is O.K.
BEEP ERROR CODES	2 Beeps	= S2 Failure
	3 Beeps	= S3 Failure
	4 Beeps	= S4 Failure
	5 Beeps	= S5 Failure
	6 Beeps	= S6 Failure
	7 Beeps	= S7 Failure
	10 Beeps	= Audio Static RAM Failure

Opto Theory

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



LED LIST



CPU BOARD

LED 201	Blanking
LED 202	Power
LED 203	Diagnostics

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

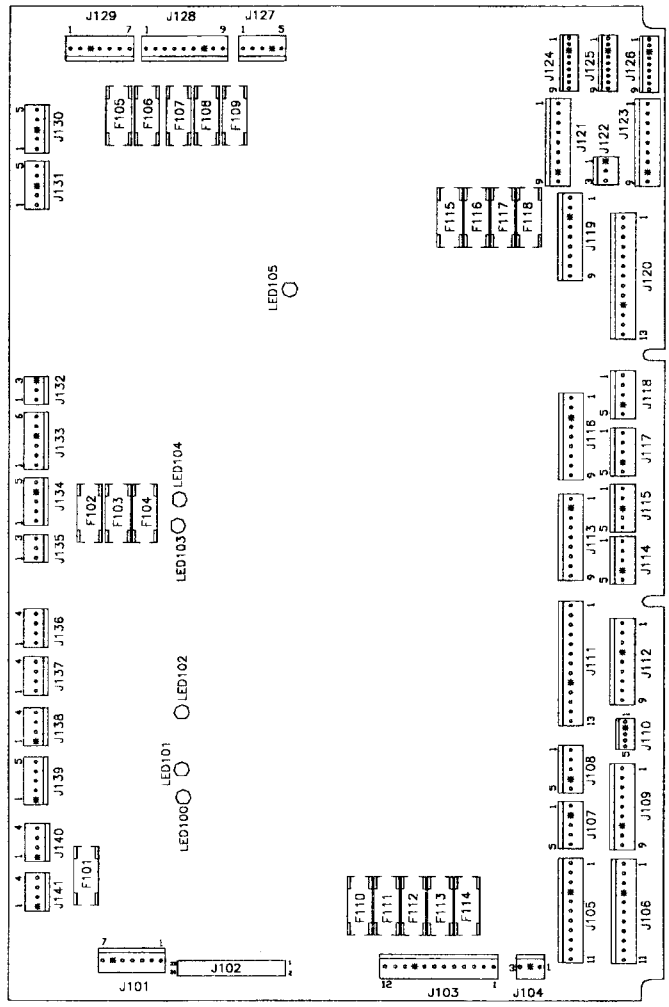
AUDIO VISUAL BOARD

LED 501	+5VDC, Normally Flashing at a slower rate than LED 203.

POWER DRIVER BOARD

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

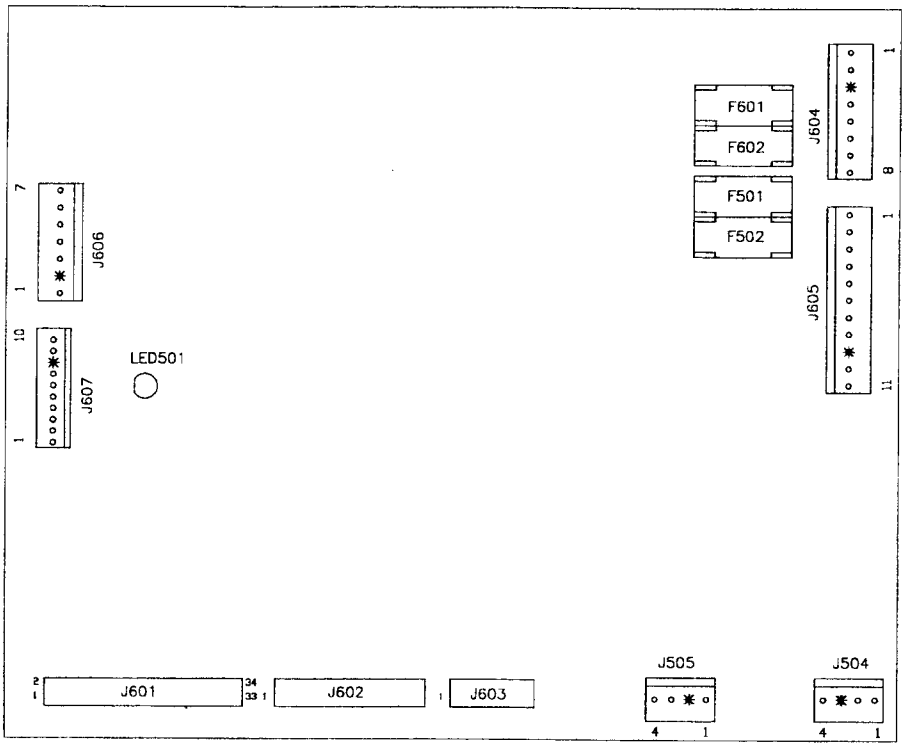
FUSE LIST



POWER DRIVER BOARD

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

FUSE LIST



AUDIO VIDEO BOARD

Loc.	Description	Part Number	Value
F501	-25V	5731-14532-00	T2.5A, 250V
F502	+25V	5731-14532-00	T2.5A, 250V
F601	+62V	5731-14840-00	T0.315A, 250V
F602	-113V & -125V	5731-14840-00	T0.315A, 250V

LINE FILTER

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

MAINTENANCE INFORMATION

LUBRICATION

The two main lubrication points of the Ball 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 misadjusted switch 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.

SAFE CRACKER

Unit Disassembly for Repair

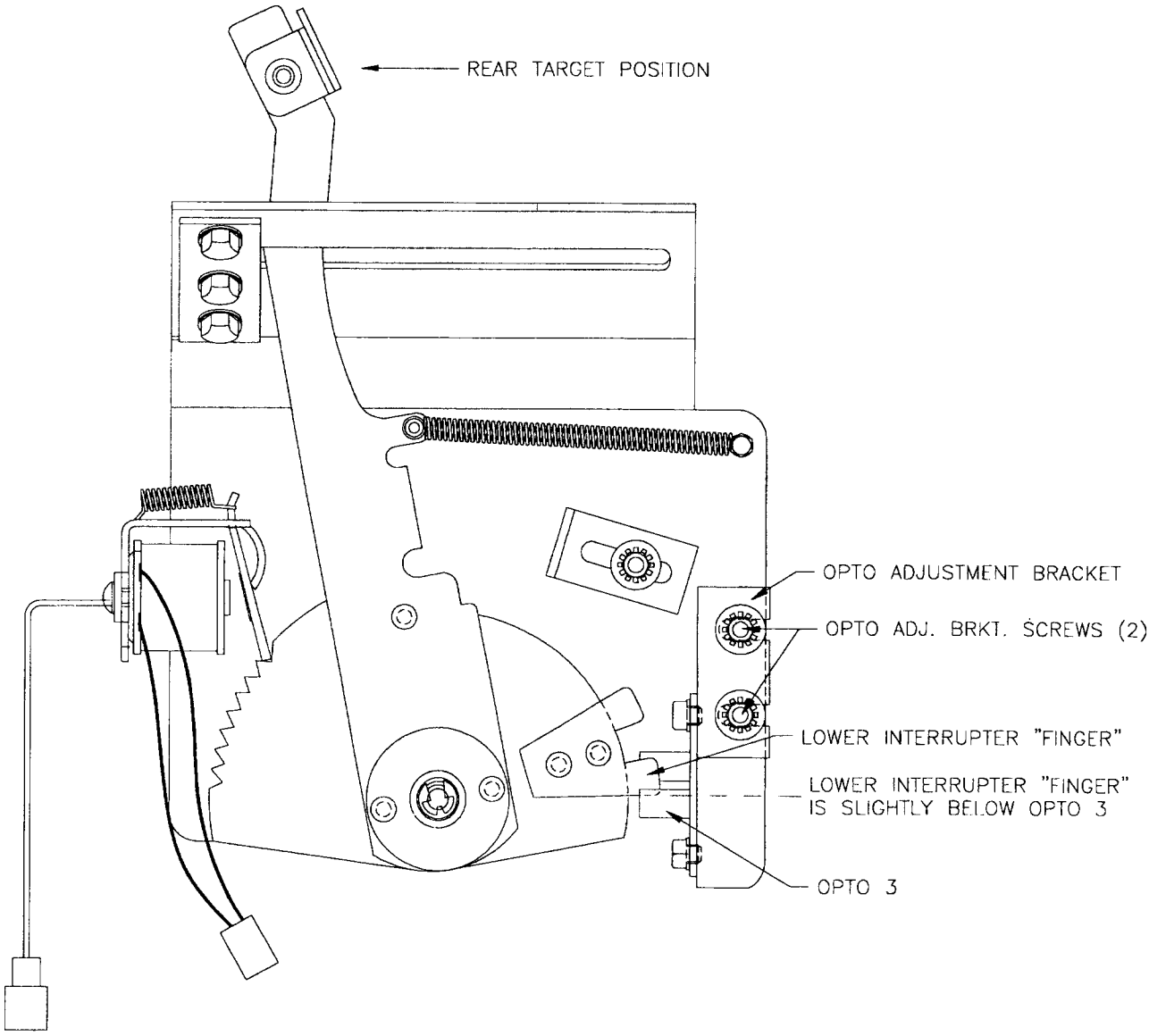
Major Component Service Instructions

Adjust Moving Target Assembly

1) Manually move Target to the rear-most position.

2) Loosen the 2 screws on the Opto Adjustment Bracket. Adjust bracket so that the bottom edge of the Lower Interrupter "Finger" is slightly below the top of Opto 3. ***IMPORTANT: Opto path should not be broken.***

3) Tighten the Opto Adjustment Bracket screws.

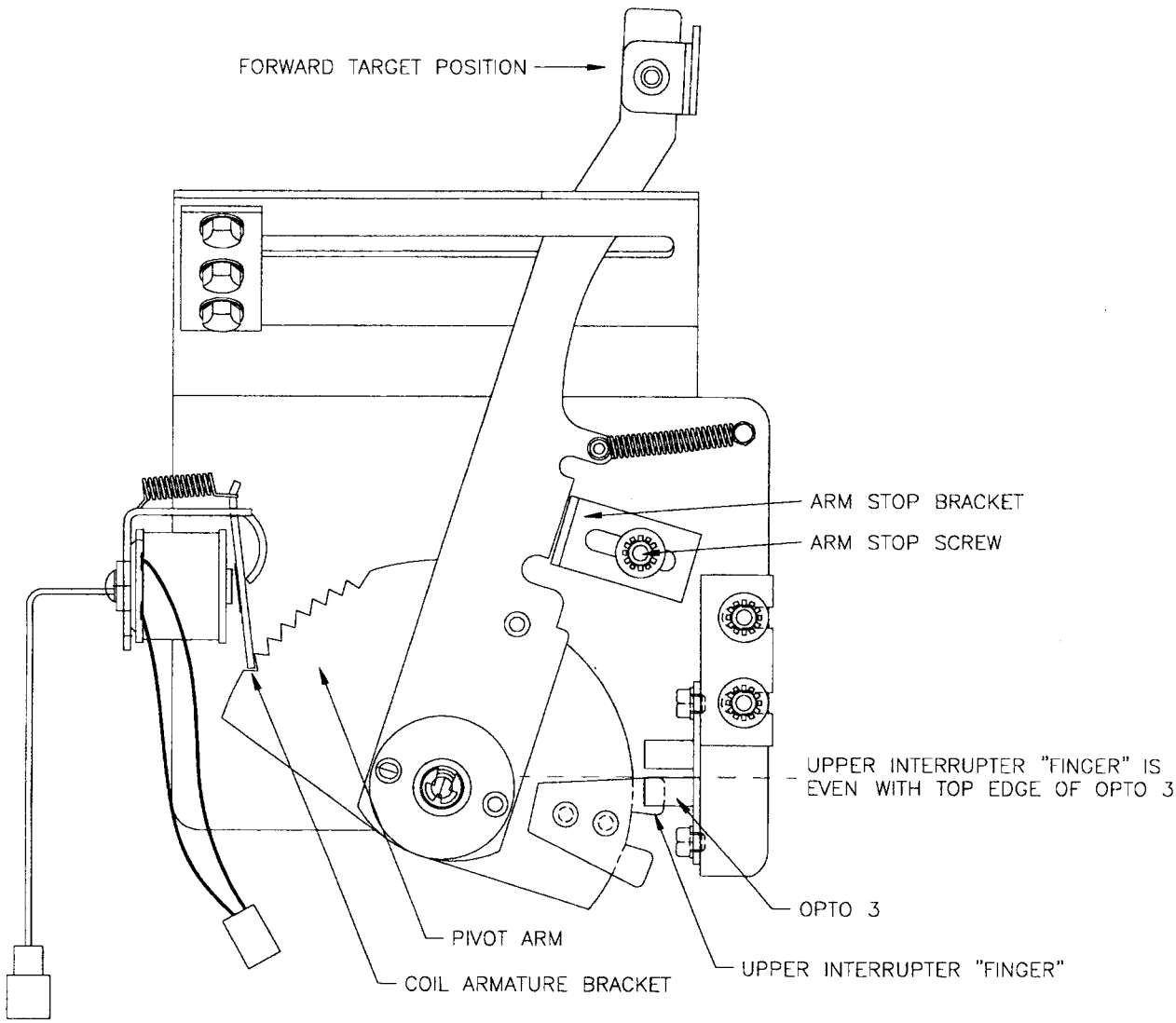


4) Dislodge the Coil Armature Bracket from the Pivot Arm teeth. This will allow the Target to snap to it's forward-most position.

5) Loosen the screw on the Arm Stop Bracket.

6) Adjust bracket so that the top edge of the Upper Interrupter "Finger" is even with the top edge of Opto 3. ***IMPORTANT: Opto path must be completely broken.***

7) Tighten all screws. Target Assembly is now adjusted.



NOTES

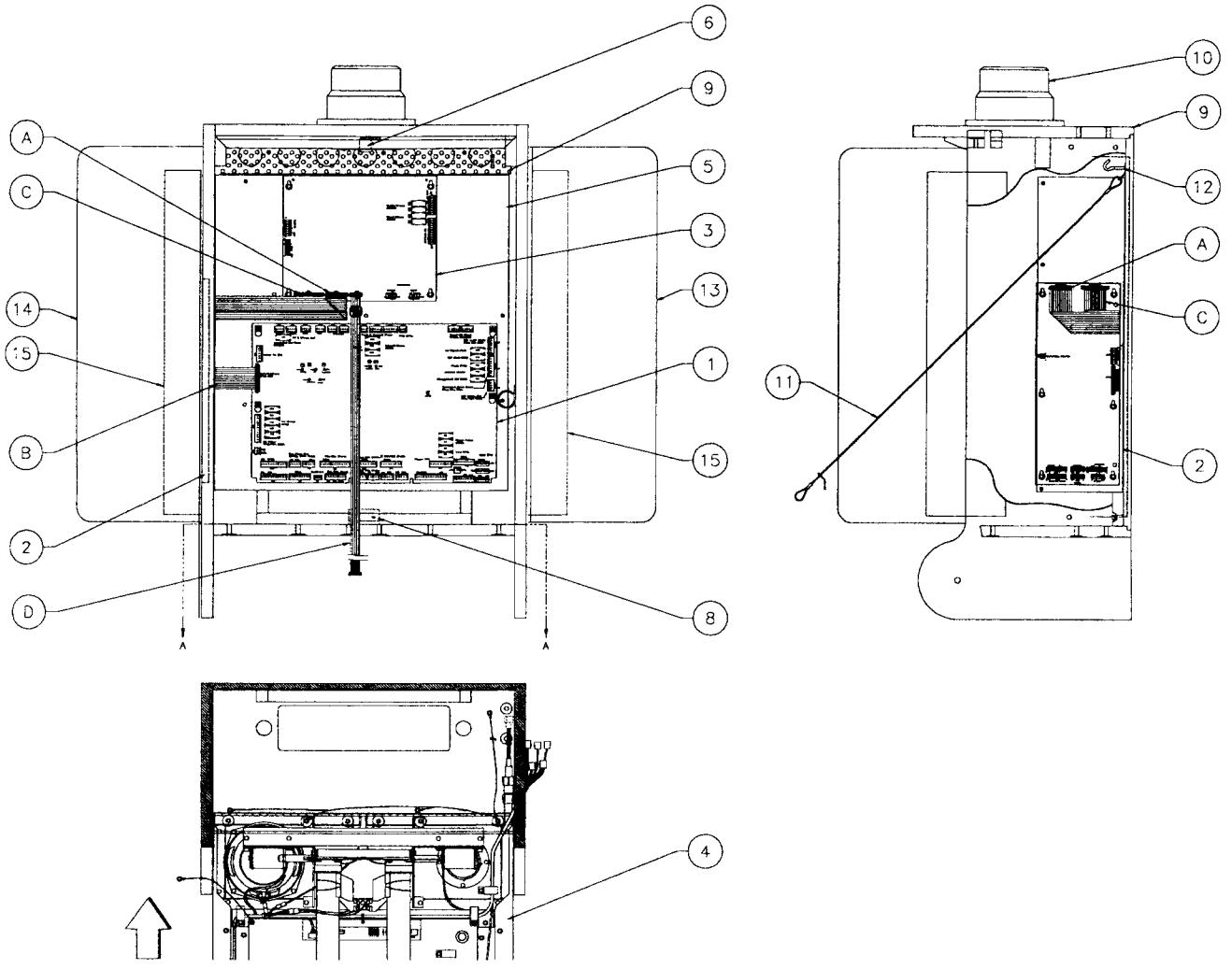
NOTES

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SECTION TWO

GAME PARTS INFORMATION

90003-BB
Backbox Assembly



Item	Part Number	Description
1	A-20028	WPC '95 Power Driver PCB Assy.
2	A-20119-90003	WPC '95 CPU PCB Assembly
3	A-20516-90003	WPC '95 Audio Visual PCB Assy.
4	A-20905	Speaker Display Token Insert Assy.
5	A-21007	WPC '95 Mounting Plate Assy.
6	A-21011	Lock Cam & Plate Assembly
7	01-6645	Vent Screen
8	01-8397	Trunk Latch Bracket
9	04-10402.1	Backbox
10	20-10307	Rotating Light
11	20-10309	Lanyard 32" Long
12	20-10310	J-Screw 10-24

Associated Assemblies:

13	A-20937-1	Vault Door Assembly, R.
14	A-20937-2	Vault Door Assembly, L.
15	01-14345	Vault Door Bracket (2)

Item	Part Number	Description
A	5795-10938-15	Ribbon Cable 26-pin, 15"
B	5795-12653-03	Ribbon Cable 34-pin, 3"
C	5795-12653-12	Ribbon Cable 34-pin, 12"
D	5795-13434-25	Ribbon Cable 14-pin, 25", w/ferrite

Backbox Cables:

H-20477	WPC '95 Logic Power Cable
H-20938	Insert/Interface Cable
H-20941	Rope Lamp Interface Cable
H-20992	Secondary Cable

90003-CAB
Cabinet Assembly

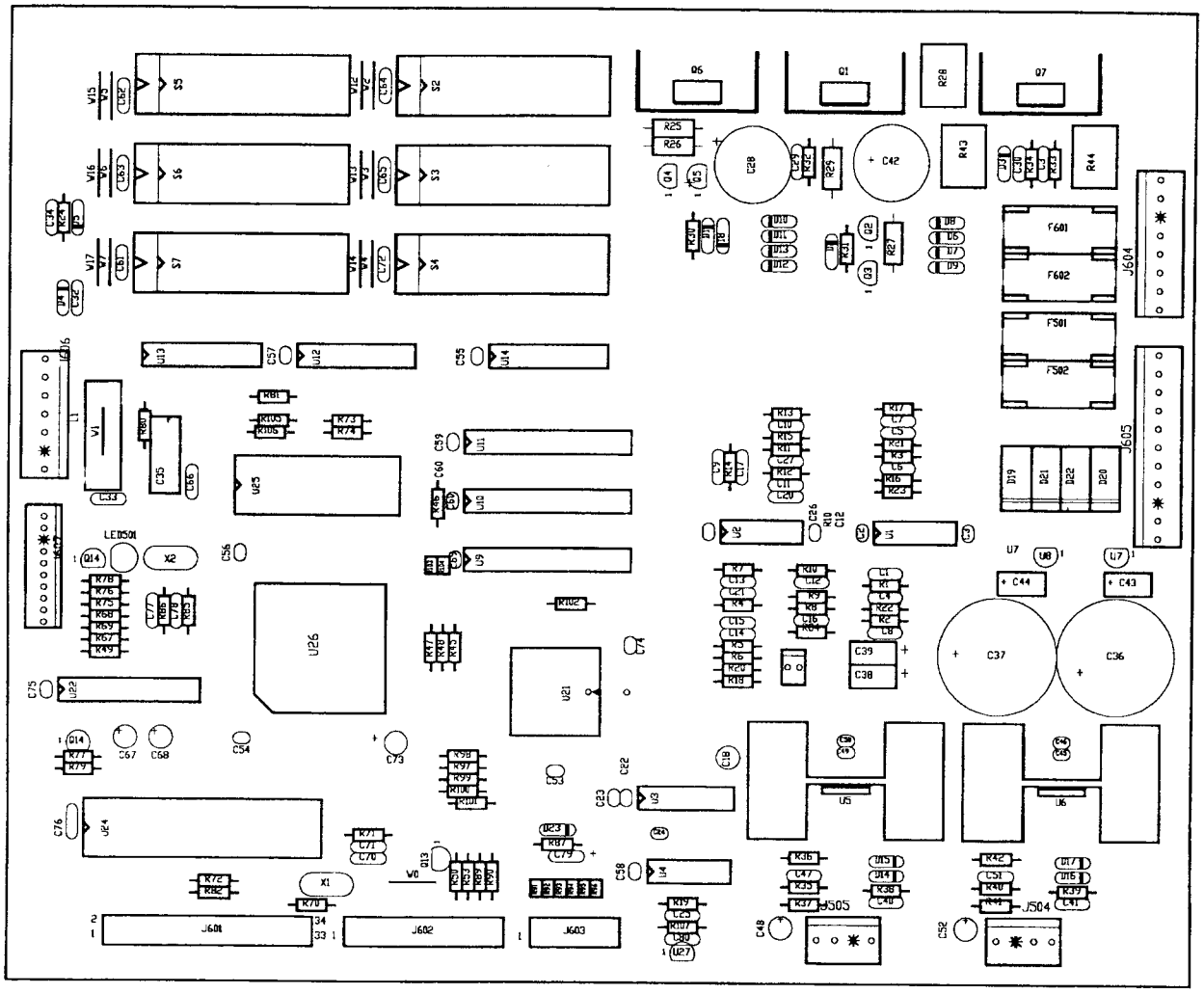
Item	Part Number	Description
1	A-16883-4	Button Assy. w/Spring, Red (2)
2	A-17195-1	Slam Tilt Switch w/Cable
3	A-17316	Flipper Opto Assembly (2)
4	A-17540-1	Univ. Power Interface Assy.
5	A-18249-1	Interlock Switch & Bracket Assy.
6	A-19562.1	Stay Arm Assembly
7	A-20949	Coin Door Interface PCB Assy.
8	B-12445	Ball Shooter Assembly
9	01-8169	Vent Hole Screen
10	01-12352	Clip Bracket
11	01-3535	Rod Mounting Plate
12	01-14085	Hasp Hinge Bracket
13	01-14086	Hasp Staple Bracket
14	03-7135-9	Side Molding 35-7/8" (2)
15	03-8091.1-3	Rear Molding
16	03-8603-2	Vent Screen, 2-1/2" Square
17	04-10346	Tilt Mechanism Assembly
18	11-1323.2	Cabinet, Wood
19	20-9347	Toggle Latch
20	20-9663-16	Push Button w/Switch, Yellow
21	23-6303	White Rubber Ring, 1-1/4"
22	5555-12929-00	Speaker, 4Ω, 6", 25w
23	5610-14515-00	WPC Transformer, Wide Mount

Part Number	Description
01-14016	Cashbox Lock Plate
01-6389-2	Cashbox Nest Bracket
09-85000-1	Coin Door 2-Slot
A-19514	Leg Assembly, Chrome (4)
01-10714	Line Cord Cover
04-10362	Front Molding Assembly
08-8103	Playfield Glass
20-6502-A	Plumb Bob
A-20201	Cable & Jumper Plug Assembly
H-17217.1	Plumb Bob/Mem. Protect Cable
H-17837-2	Voltage Program Jumper Cable
H-20841	Cabinet Sw/Lamp Cable
H-20924.1	Cabinet Cable
H-20925	Slam Tilt Switch Cable
H-20992	Secondary Cable

A-20516-90003
WPC '95 Audio Visual PCB Assembly

Part Number	Designator	Description
4004-01005-06	-	Mach. Screw, 4-40 x 3/8"
4404-01119-00	-	Nut 4-40 ESN
5010-08774-00	R2, R17, R22, R23, R35, R36, R40,R42, R87	Resistor, 22KΩ, ¼w, 5%
5010-08991-00	R20, R46-R48, R50, R72, R76, R77, R80, R107	Resistor, 4.7KΩ, ¼w, 5%
5010-09034-00	R21	Resistor, 10KΩ, ¼w, 5%
5010-09036-00	R19	Resistor, 100Ω, ¼w, 5%
5010-09134-00	R32-R34	Resistor, 150KΩ, ¼w, 5%
5010-09219-00	R1, R3	Resistor, 8.2KΩ, ¼w, 5%
5010-09416-00	R73, R74, R82, R88, R105, R106	Resistor, 470Ω, ¼w, 5%
5010-09807-00	R30, R31, R67-R69, R102	Resistor, 120Ω, ¼w, 5%
5010-10171-00	R24	Resistor, 56Ω, ¼w, 5%
5010-10258-00	R86	Resistor, 1MΩ, ¼w, 5%
5010-10983-00	R53, R75, R79, R84, R85, R89, R90	Resistor, 1.8KΩ, ¼w, 5%
5010-12832-00	R25, R26, R27, R29	Resistor, 47KΩ, ¼w, 5%
5010-13215-00	R78, R97-R101	Resistor, 200KΩ, ¼w, 5%
5010-13372-00	R91-R96, R103, R104	Resistor, 220Ω, 1/8w, 5%
5010-13420-00	R37, R41	Resistor, 680Ω, ¼w, 5%
5010-13517-00	R38, R39	Resistor, 15Ω, ¼w, 5%
5010-13607-00	R4, R5, R7-R15	Resistor, 6.19KΩ,1/8w, 1%
5012-14558-00	R44	Resistor, 1.8KΩ, 5w vertical
5012-14559-00	R43	Resistor, 4.7KΩ, 5w vertical
5012-14560-00	R28	Resistor, 120Ω, 5w vertical
5013-13661-00	R16	Resistor, 9.09KΩ, ¼w, 1%
5013-14456-00	R6, R18	Resistor, 3.32KΩ, ¼w, 1%
5040-14569-00	C35	Cap., 100mf, 25v, Axial
5040-09365-00	C38, C39, C43, C44	Cap.,1m, 63v(+50,-10%)Ax.
5040-12750-00	C48, C52, C73	Cap., 22m, 35v Radial
5040-13098-00	C18, C67, C68	Cap., 4.7µ, 35v (±20%)
5040-13417-00	C36, C37	Cap., 10000µf, 35v Radial
5040-14564-00	C28, C42	Cap., 150µf, 160v, 20%Rad.
5043-08996-00	C2, C3, C19, C22-C24, C26, C32, C34, C45, C46, C49, C50, C53-C66, C69, C72, C74-C76, C79, C80	Cap., 0.1µf, 50v (±20%) Ax.
5043-10267-00	C47, C51	Cap., 150pf, 100v Cer. Ax.
5048-10992-00	C27	Cap., .0047m, 50v, 10% Ax.
5048-11028-00	C77	Cap., 22p, 50v, Axial
5048-11029-00	C25	Cap., 100p, 50v, 5% Axial
5048-11030-00	C7	Cap., 470p, 50v, Axial
5048-11033-00	C1	Cap., .022m, 50v, 10% Ax.
5048-12036-00	C40, C41	Cap., .22m, 50v, Axial
5048-13172-00	C78	Cap., 47pf, 50v, 20% Ax.
5048-13418-00	C4 - C6	Cap., .047m, 50v, 5% Ax.
5048-13609-00	C9, C12, C15	Cap., 3900pf, 50v, 5% Ax.
5048-13610-00	C8, C10, C11, C13, C14	Cap., 1000pf, 50v, 5% Ax.
5048-13611-00	C16, C17, C20, C21	Cap., 680pf, 50v, 5% Ax.
5048-14563-00	C29-C31	Cap., .01µf, 200v, 10% Axial
5070-09045-00	D19-D22	Diode MR501, 3.0A
5070-09054-00	D4, D6-D17, D23	Diode 1N4004, 1.0A
5075-12823-00	D1, D18	Zener, 1N4758A 56v, 1w
5075-12824-00	D3, D5	Zener, 1N4742A 12v, 1w
5075-12826-00	D2	Zener, 1N4759, 62v, 1w
5160-08938-00	Q13-Q15	Transistor, 2N4401 NPN
5164-09056-00	Q2, Q3	Transistor, MPSD02 NPN
5164-12154-00	Q1, Q7	Transistor, MJE15030 NPN
5194-09055-00	Q4, Q5	Transistor, MPSD52 PNP
5194-12155-00	Q6	Transistor, MJE15031 PNP
5250-13302-00	U7	Reg. 78L05T 5v
5250-13303-00	U8	Reg. 79L05T 5v
5311-12538-00	U4	IC 74HC14 Hex. S-T
5317-12211-00	U12-U14	IC Octal Buffer 74ALS541
5340-12278-00	U25	S/Ram 2064 150NS
5370-12687-00	U27	IC MC 340640Reset Chp
5349-14351-00	U9-U11	SRAm 8Kx8-35ms, 28pdlp
5370-12730-00	U1, U2	IC Op Amp TL084
5370-13419-00	U5, U6	IC TDA 2030AV 18w, Audio Amp
5371-13299-00	U3	IC Ad-1851 16bit mono
5520-14561-00	X2	Crystal 20mHz, parallel 20pf
5671-14516-00	LED 501	Led-Display Red T 1-3/4
5700-08985-00	U24	Socket IC 40-pin .6
5700-12047-00	U22	Socket IC 24.3P
5700-12088-00	S2-S7	Socket Dip 32.6P"
5705-12638-00	U5, U6	Heatsink 5298B
5705-14562-00	Q1, Q6, Q7	Heatsink 10-220 wave sol 287
5733-14528-00	F501, F502, F601, F602	Fuse Holder 5x20mm 10A.
5731-14532-00	F501, F502	Fuse 5x20mm T2.5A., 250V
5731-14533-00	F601, F602	Fuse 5x20mm T0.250A., 250V
5791-10850-00	J602	Connector, 26-pin Header Str.
5791-10862-04	J504, J505	Connector, 4-pin Header Str.
5791-10862-07	J606	Connector, 7-pin Header Str.
5791-10862-08	J604	Connector, 8-pin Header Str.
5791-10862-11	J605	Connector, 11-pin Header Str.
5791-12516-00	J601	Connector, 34 hdr 2 x 17 .100
5791-12827-00	J603	Connector, 14 Hen 7x2 Str.
5791-13830-10	J607	Connector, 10-pin Str. Sq.
5010-09534-00	W0, W1-W7, R49	Resistor, 0Ω, 0w
A-5343-90003-S2	S2	E-PROM Assembly
A-5343-90003-S3	S3	E-PROM Assembly
A-5343-90003-S4	S4	E-PROM Assembly

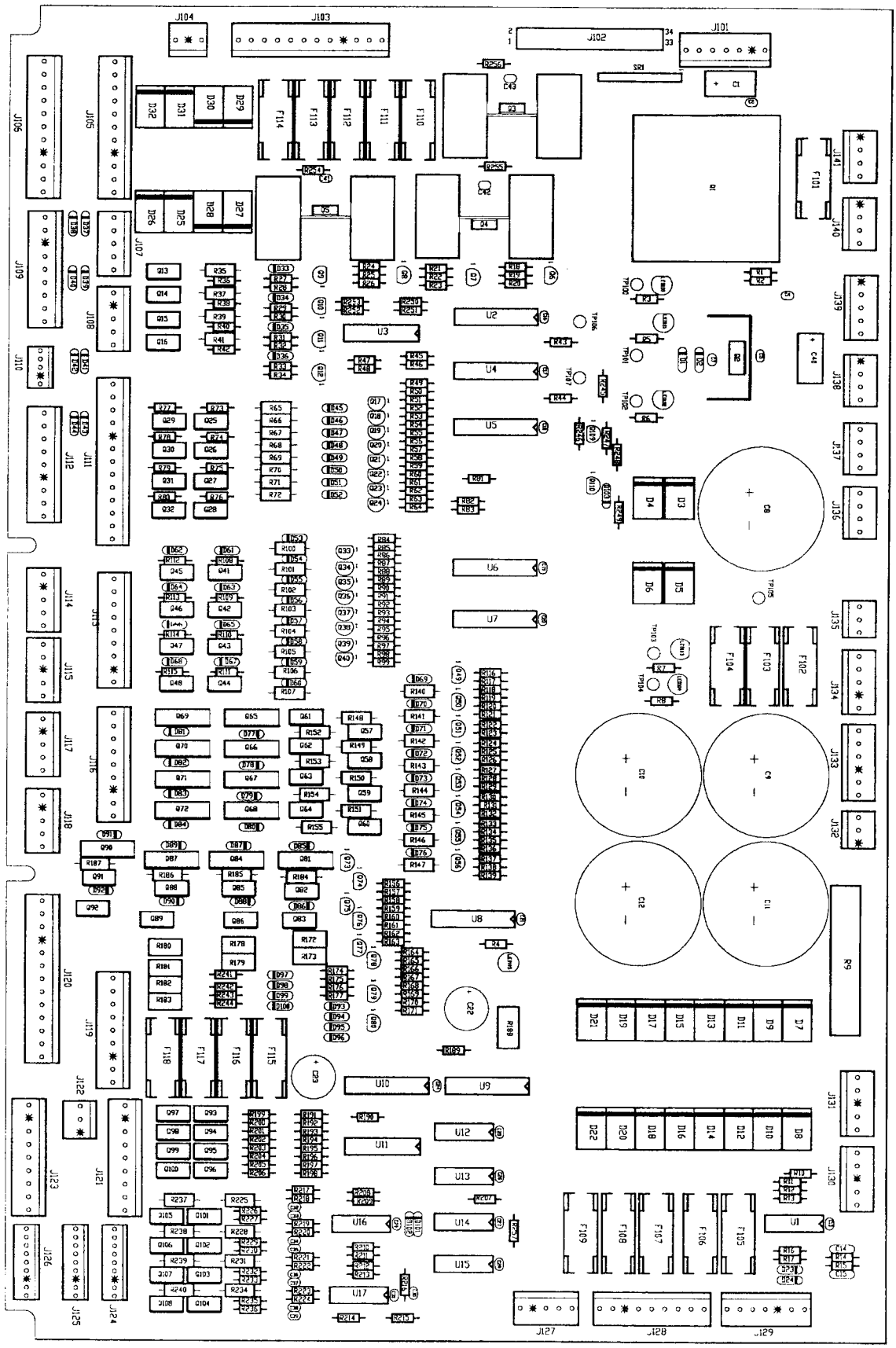
A-20516-90003
WPC '95 Audio Visual PCB Assembly



A-20028
WPC '95 Power Driver PCB Assembly

Part Number	Designator	Description
5040-14569-00	C1, C40	Capacitor, 100µF, 25v, Ax.
5043-08996-00	C2, C4, C5, C7, C13, C16-C21, C24-C39, C41-C43	Capacitor, 0.1m, 50v (±20%) Ax.
5040-13417-00	C8 - C12	
5048-11031-00	C14, C15	Capacitor, 10000µf, 35v Radial
5040-09537-00	C22, C23	Capacitor, .001m, 50v, 10% Ax.
5070-09054-00	D1, D2, D23, D24, D33 - D100, D103	Capacitor, 100µ, 100v (±20%) Radial Diode 1N4004
5070-14526-00	D3-D22, D25-D32	
5070-08919-00	D101, D102	Diode P600G 6A 400 PIV
5731-14531-00	F101	Diode, 1N4148 150mA.
5731-14530-00	F102-F105, F107, F109-F118	Fuse 5 x 20mm TO 63A., 250V Fuse 5 x 20mm T 4A, 250V
5731-14046-00	F106	Fuse S-B, 5A, 5x20mm
5731-14529-00	F108	Fuse 5 x 20mm T 6.3A, 250V
5733-14528-00	F101-F118	Fuse Holder 5 x 20mm10A
5705-14724-00	Q1	Heat Sink TO-3 5.1DEG/W
5701-09652-00	Q1	Thermal Pad TO-3
4406-01128-00	Q1	Nut 6-32 KEPS
4006-01005-06	Q1	Mach. Screw, 6-32 x 3/8"
5705-14562-00	Q2	Heat Sink 10-220 Wave Sol 287
4004-01005-06	Q2-Q5	Mach. Screw, 4-40 x 3/8"
4404-01119-00	Q2-Q5	Nut 4-40 ESN
5705-12638-00	Q3-Q5	Heat Sink 5298B
5791-10862-07	J101, J129	Connector, 7-pin Header Str.
5791-12516-00	J102	Connector, 34 Hdr 2x17
5791-10862-12	J103	Connector, 12-pin Header Str.
5791-10862-03	J104, J122, J132, J135	Connector, 3-pin Header Str.
5791-10862-11	J105, J106	Connector, 11-pin Header Str.
5791-10862-05	J107, J108, J114, J115, J117, J118, J127, J130, J131, J134, J139	Connector, 5-pin Header Str.
5791-10862-09	J109, J112, J113, J116, J119, J121, J123, J128	Connector, 9-pin Header Str.
5791-10862-13	J111, J120	Connector, 13-pin Header Str.
5791-13830-09	J124-J126	Connector, 9-pin Header Str.
5791-10862-06	J133	Connector, 6-pin Header Str.
5791-10862-04	J136-J138, J140, J141	Connector, 4-pin Header Str.
5671-14516-00	LED100-LED105	LED Dspl Red T-1
5250-14527-00	Q1	Regulator Voltage LM317K
5460-12423-00	Q2	I.C. LM7812
5131-12725-00	Q3-Q5	Triac BT138E
5194-09055-00	Q6-Q12, Q17-Q24, Q33-Q40, Q49-Q56, Q109	Transistor, MPSD52 PNP
5162-12635-00	Q13-Q16, Q25-Q32, Q41-Q48, Q57-Q64, Q82, Q83, Q85, Q86, Q88, Q89, Q91, Q92, Q101-Q108	Transistor, TIP102
5191-12179-00	Q65-Q72, Q81, Q84, Q87, Q90	Transistor, TIP36C
5190-09016-00	Q73 - Q80	Transistor, 2N4403 PNP
5192-12428-00	Q93 - Q100	Transistor, TIP107
5160-10269-00	Q110	Transistor, 2N3904
5013-14535-00	R1	Resistor, 750Ω, 1/4w, 1%
5013-14534-00	R2	Resistor, 243Ω, 1/4w, 1%
5010-09999-00	R3, R4, R6-R8, R43, R44, R81-R83, R190	Resistor, 2KΩ, 1/4w, 5%
5010-09224-00	R5, R14 - R17	Resistor, 270Ω, 1/4w, 5%
5012-12632-00	R9	Resistor, 12Ω, 10w, 5%
5010-09324-00	R10	Resistor, 27KΩ, 1/4w, 5%
5010-09358-00	R11, R157, R159, R161, R163, R165, R167, R169, R171, R216-R224	Resistor, 1KΩ, 1/4w, 5%
5010-09036-00	R247	Resistor, 100Ω, 1/4w, 5%
5010-09034-00	R12, R13, R189, R208-R215, R248	Resistor, 10KΩ, 1/4w, 5%
5010-08992-00	R18, R21, R24, R192, R194, R196, R198, R200, R202, R204, R206	Resistor, 560Ω, 1/4w, 5%
5010-08991-00	R19, R22, R25, R28, R30, R32, R34, R50, R52, R54, R56, R58, R60, R62, R64, R84, R86, R88, R90, R92, R94, R96, R98, R116, R119, R122, R125,R128, R131, R134, R137,R246	Resistor, 4.7KΩ, 1/4w, 5%
5010-11079-00	R20, R23, R26, R254-R256	Resistor, 51Ω, 1/4w, 5%
5010-09416-00	R27, R29, R31, R33, R45-R49, R51, R53, R55, R57, R59, R61, R63, R85, R87, R89, R91, R93, R95, R97, R99, R117, R120, R123, R126, R129, R132, R135, R138, R156, R158, R160, R162, R164, R166, R168, R170, R245, R250-R253, R257	Resistor, 470Ω, 1/4w, 5%
5010-08993-00	R35, R37, R39, R41, R65-R72, R100-R107, R140-R147	Resistor, 68Ω, 1/4w, 5%
5010-08997-00	R36, R38, R40, R42, R73-R80, R108, R109, R110-R115, R118, R121, R124, R127, R130, R133, R136, R139	Resistor, 2.7kΩ, 1/4w, 5%
5010-09361-00	R148-R155, R184-R187	Resistor, 220Ω, 1/4w, 5%
5011-12956-00	R172, R173, R178-R183	Resistor, 2.7KΩ,1/4w, 5%
5010-10171-00	R174-R177, R241-R244	Resistor, 56Ω, 1/4w, 5%
5010-14711-00	R188	Resistor, 10KΩ, 1/4w, 5%
5010-09314-00	R191, R193, R195, R197, R199, R201, R203, R205	Resistor, 1.2kΩ, 1/4w, 5%
5010-09086-00	R207	Resistor, 6.8kΩ, 1/4w, 5%
5010-12427-00	R225, R228, R231, R234, R237-R240	Resistor, .22kΩ, 1/4w, 5%
5010-08998-00	R226, R227, R229, R230, R232, R233, R235, R236	Resistor, 2.2kΩ, 1/4w, 5%
5010-13517-00	R249	Resistor, 150Ω, 1/4w, 5%
5019-10143-00	SRI	SIP RES 470 x 9R
5824-09248-00	TP100-TP107	Test Point #1502-1
5370-12272-00	U1, U16, U17	I.C. LM339 Quad Comp
5281-09486-00	U2, U4-U8, U10	I.C. 74LS374 8df/f
5162-12422-00	U3, U11	Trans uln 2803 Oc-drl
5281-10182-00	U9	I.C. 74LS240 I/drvr
5281-09487-00	U12 - U15	I.C. 74LS74 Dual d f/f
5791-13830-05	J110	Connector, 5-pin Header

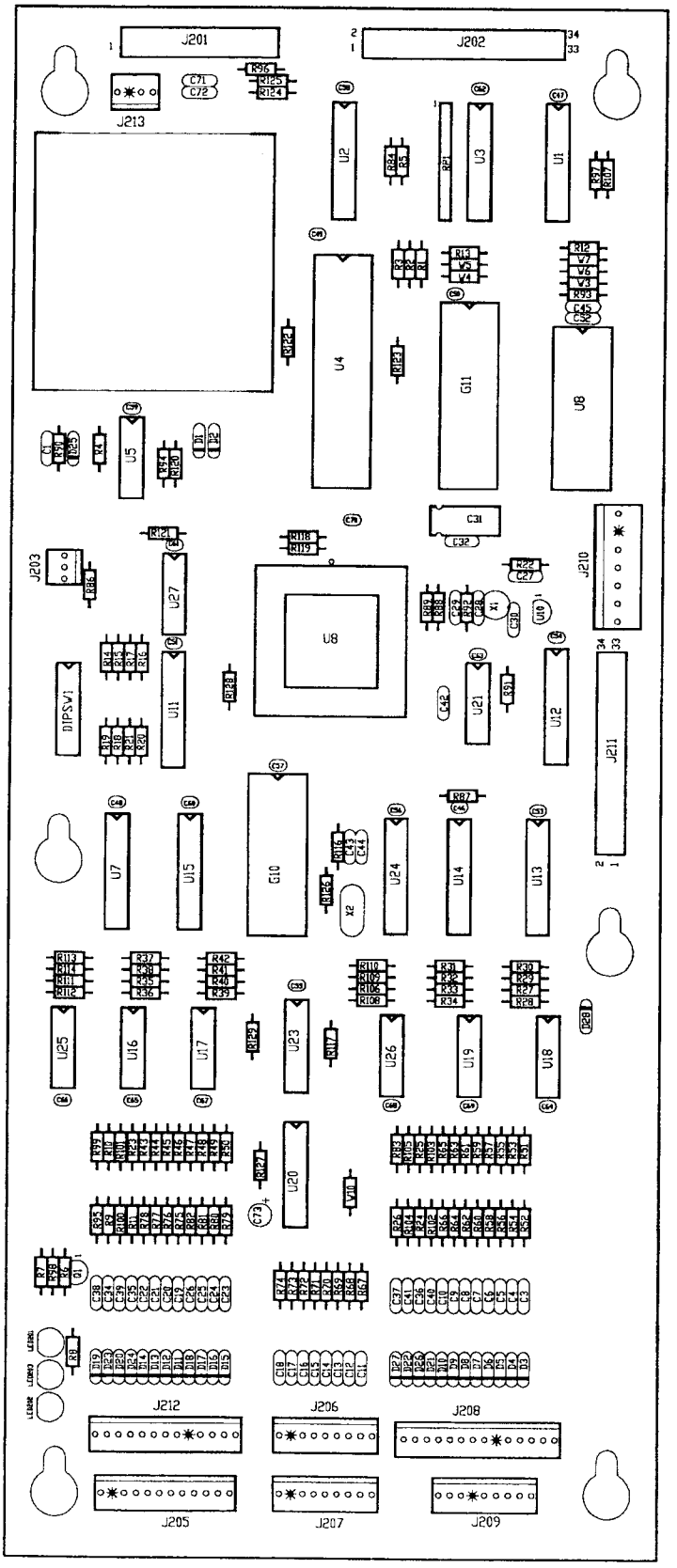
A-20028
WPC '95 Power Driver PCB Assembly



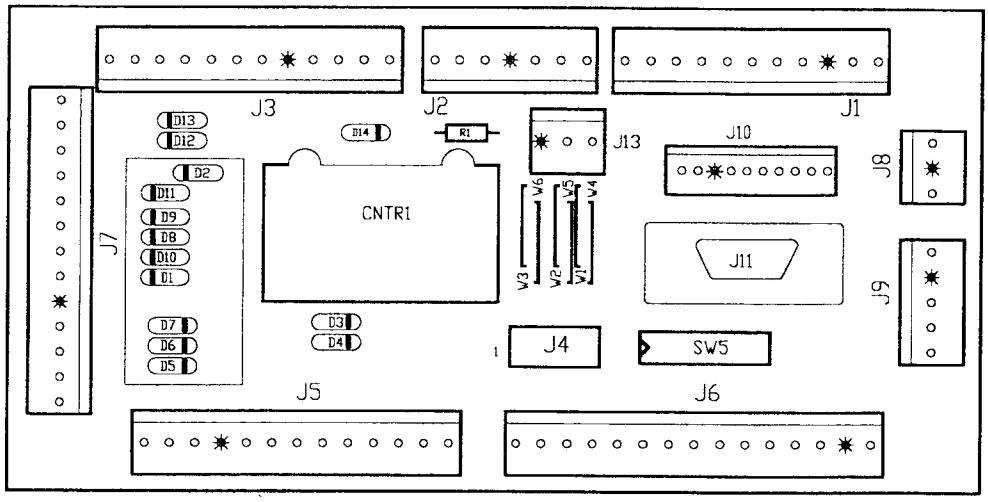
A-20119-90003
WPC '95 CPU PCB Assembly

Part Number	Designator	Description
A-15814	B1	Battery Holder
5048-11033-00	C1, C42	Cap., .022µ. 50v, 10% Ax.
5048-11030-00	C3-C26, C34-C41	Cap., 470p, 50v Axial
5043-09030-00	C27	Cap., .047m, 50v (±20%) Ax.
5048-13375-00	C28	Cap., 100p, 50v, 10% Axial
5048-11028-00	C29, C30, C43, C44	Cap., 22p, 50v Axial
5040-14569-00	C31	Cap., 100µ, 25v, Axial
5048-11031-00	C32	Cap., .001µ, 50v, Axial
5043-08996-00	C45 - C70	Cap., 0.1µ, 50v (±20%) Ax.
5040-13098-00	C73	Cap., 4.7µF, 35v (±20%)
5645-09025-00	DIPSW1	Switch Dip 8-Position
5070-09266-00	D1, D25, D28	Diode 1N5817 1.0A.
5070-08919-00	D2 - D24, D26, D27	Diode 1N4148 150mA.
5700-10176-00	G10	Socket Dip 28.6
5700-12088-00	G11	Socket Dip 32.6p"
5700-08985-00	U4	IC Socket 40-pin
5700-12424-00	U9	Socket 84-pin
5700-10389-00	U20	IC Socket 18-pin 3"
5791-10850-00	J201	Connector, 26-pin Header
5791-12516-00	J202, J211	Connector, 34-pin Hdr. 2x17
5791-13830-12	J205	Connector, 12-pin Header Str.
5791-13830-09	J206, J207, J209	Connector, 9-pin Header
5791-13830-14	J208	Connector, 14-pin Header
5791-10862-07	J210	Connector, 7-pin Header
5791-13830-13	J212	Connector, 13-pin Header
5671-14516-00	LED201 - LED203	LED Dspl. Red T-1-3/4
5160-10269-00	Q1	Transistor, 2N3904 NPN
5019-09669-00	RP1	SIP 4.7K, 9R, 10 (5%)
5010-09358-00	R1-R4, R9-R11, R23-R26, R43-R84, R93, R95-R97, R99-R114, R117	Resistor, 1kΩ, 1/4W, 5%
5010-08774-00	R129	Resistor, 22KΩ, 1/4w, 5%
5010-09416-00	R5-R8, R12, R13, R87-R89	Resistor, 470Ω, 1/4w, 5%
5010-09034-00	R14-R22, R27-R42, R86, R90, R94, R98	Resistor, 10KΩ, 1/4w, 5%
5010-12104-00	R91	Resistor, 22M, 1/4w, 5%
5010-10989-00	R92	Resistor, 470KΩ, 1/4w, 5%
5010-09187-00	R118 - R123, R128	Resistor, 150Ω, 1/4w, 5%
5010-09040-00	R127	Resistor, 33Ω, 1/4w, 5%
5010-09534-00	W3, W4, W7, R124, R125	Resistor, 0Ω
5010-10258-00	R126	Resistor, 1M, 5% 1/4w
5281-09867-00	U1, U2, U7	I.C. 74HCT244
5281-09851-00	U5	I.C. 74LS14 SMT/TRG
5281-09308-00	U3	IC 74LS245 Trnc
5340-13062-00	U8	IC RAM 32k x 8 Static
5370-12687-00	U10	I.C. MC 34064 Reset Chp.
5281-10182-00	U11-U13, U15	I.C. 74LS240 I/drvr
5311-14068-00	U14, U24	I.C. 74HC574 Octal d-latch
5370-12272-00	U16-U19, U25, U26	I.C. LM339 Quad Comp.
5284-12651-00	U21	I.C. 4584 Hex Schmitt
5311-14554-00	U23	I.C. 74HC237 3 to 8 non inv
5281-09743-00	U27	I.C. 74LS08 Quad.
5520-12084-00	X1	Crystal 32.768KHz
5520-14761-00	X2	Xtal-8M Anti Res Parallel Cut
A-5400-90003-1	G10	PIC16C57 Assembly
5880-09022-00	B1	Battery 1.5v AA Alkaline
5400-10320-00	U4	I.C. MPU68B09E
5410-12426-00	U9	I.C. WPC-89 ASIC
5162-12422-00	U20	Trans uln 2803 Oc-Drl
A-5343-90003-1A	G11	Game ROM Assembly

A-20119-90003
WPC '95 CPU PCB Assembly

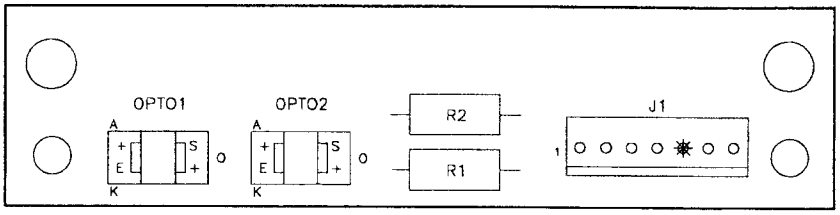


A-20949
Coin Door Interface PCB Assembly



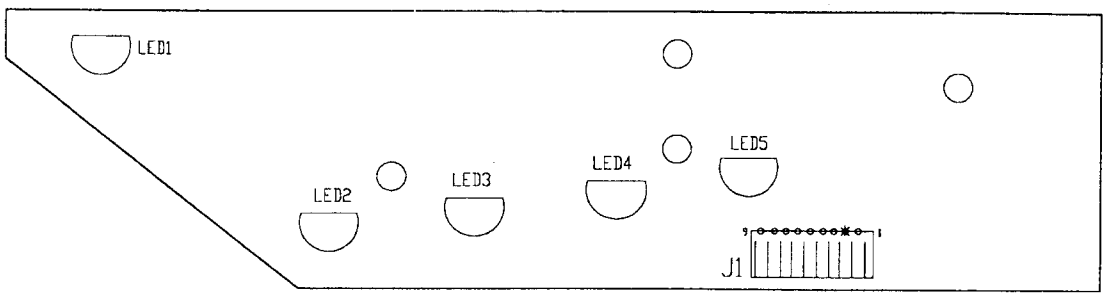
Part Number	Designator	Description
5070-09054-00	D1-D14	Diode 1N4004 1.0A.
5791-10862-11	J1	Connector, 11-pin Header Str. Sq.
5791-10862-07	J2	Connector, 7-pin Header Str. Sq.
5791-10862-12	J3	Connector, 12-pin Header Str. Sq.
5791-11000-10	J4	Connector, 10-pin Header Str. Sq.
5791-10862-13	J5, J7	Connector, 13-pin Header Str. Sq.
5791-10862-15	J6	Connector, 15-pin Header Str. Sq.
5791-10862-03	J8, J13	Connector, 3-pin Header Str. Sq.
5791-10862-05	J9	Connector, 5-pin Header Str. Sq.
5010-13517-00	R1	Resistor, 15Ω, ¼w, 5%
5010-09534-00	W2-W4	Resistor, 0Ω, 0w
5645-09025-00	SW5	Switch DIP 8 Pos.

A-17316
Flipper Opto PCB Assembly



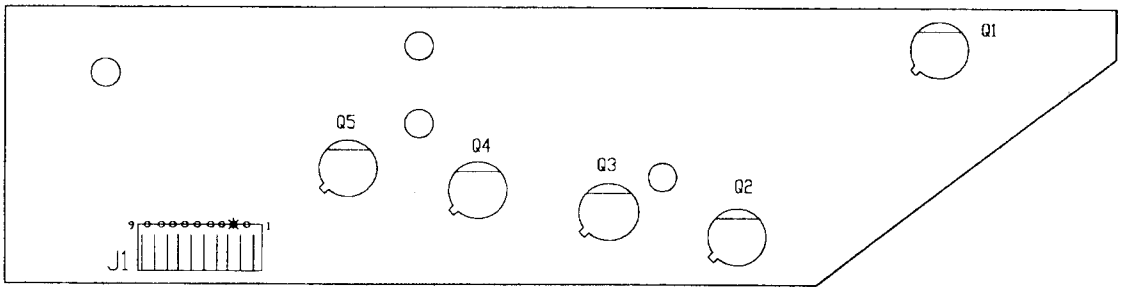
Part Number	Designator	Description
A-20207.1	-	Flipper Opto Switch PCB
5010-09061-00	R1, R2	Resistor, 680Ω, 1/2w, 5%
5490-14575-00	OPTO1, OPTO2	IC Opto Integ Schmitt 10mA.
5791-13830-07	J1	Connector, 7-pin Header Solid Sq.
03-9001.1	-	Interrupter Flip-Opto

A-18617-1
Trough IR LED PCB Assembly



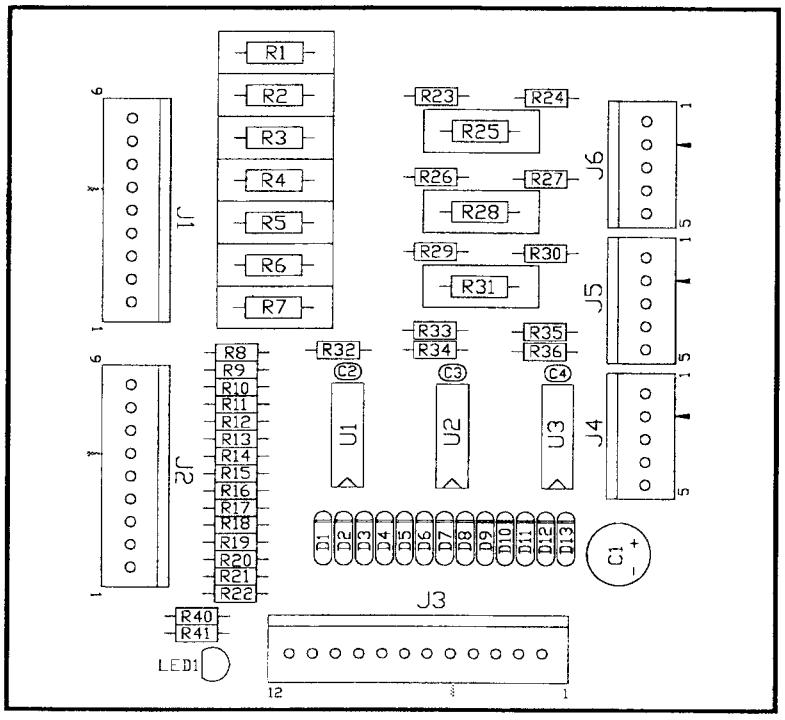
Part Number	Designator	Description
5671-12731-00	LED1 - LED5	Infra Red Diode
5791-12622-09	J1	Connector, 9-pin Header Sq.

A-18618-1
Trough IR Photo Transistor PCB Assembly



Part Number	Designator	Description
5671-14114-00	Q1 - Q5	Infra Red Photo Transistor
5791-12622-09	J1	Connector, 9-pin Header Sq.

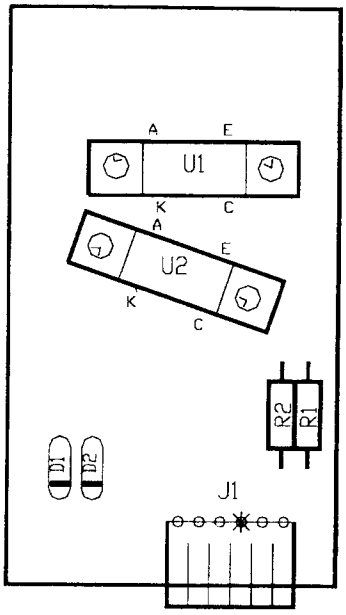
A-20246
10-Opto PCB Assembly w/Brackets



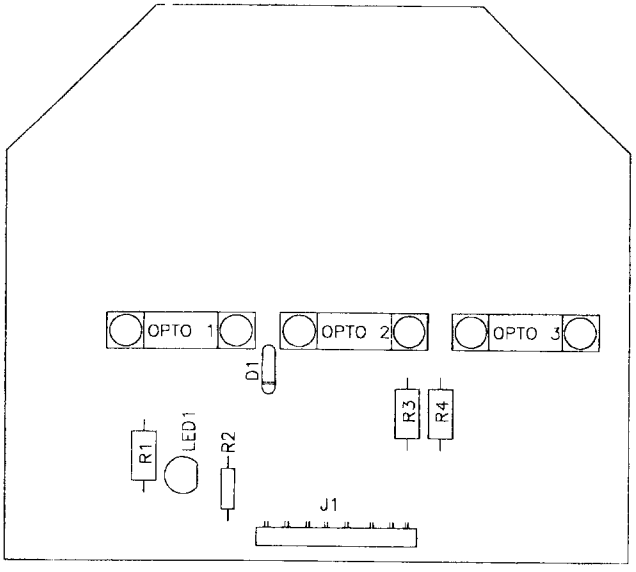
Part Number	Designator	Description
A-18159	-	10-Opto PCB Assembly
5040-10974-00	C1	Cap., 100µFd, 35v
5043-08980-00	C2-C4	Cap., 0.01µFd, 50v
5671-13732-00	LED1	Display Red LED1
5370-12272-00	U1-U3	I.C. LM339, Quad Compar
5070-09054-00	D1-D13	Diode, 1N4004, 1.0A.
5010-12928-00	R1-R7, R25, R28, R31	Res., 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
01-10756	-	PCB Mounting Bracket
07-6688-18N	-	Rivet, 3/16 x 1/8" Nickel

A-20906
3-Opto Vari Target PCB Assembly

Part Number	Designator	Description
5070-09054-00	D1, D2	Diode 1N4004, 1.0A.
5791-12622-06	J1	Connector, 6-pin Header
5010-09083-00	R1, R2	Resistor, 470, 1/2w, 10%
5490-13341-00	U1, U2	IC Opto Inter w/Tab 10ma.
20-9864	@U1X2, @U2X2	Eyelet, 1/8 x 7/32"

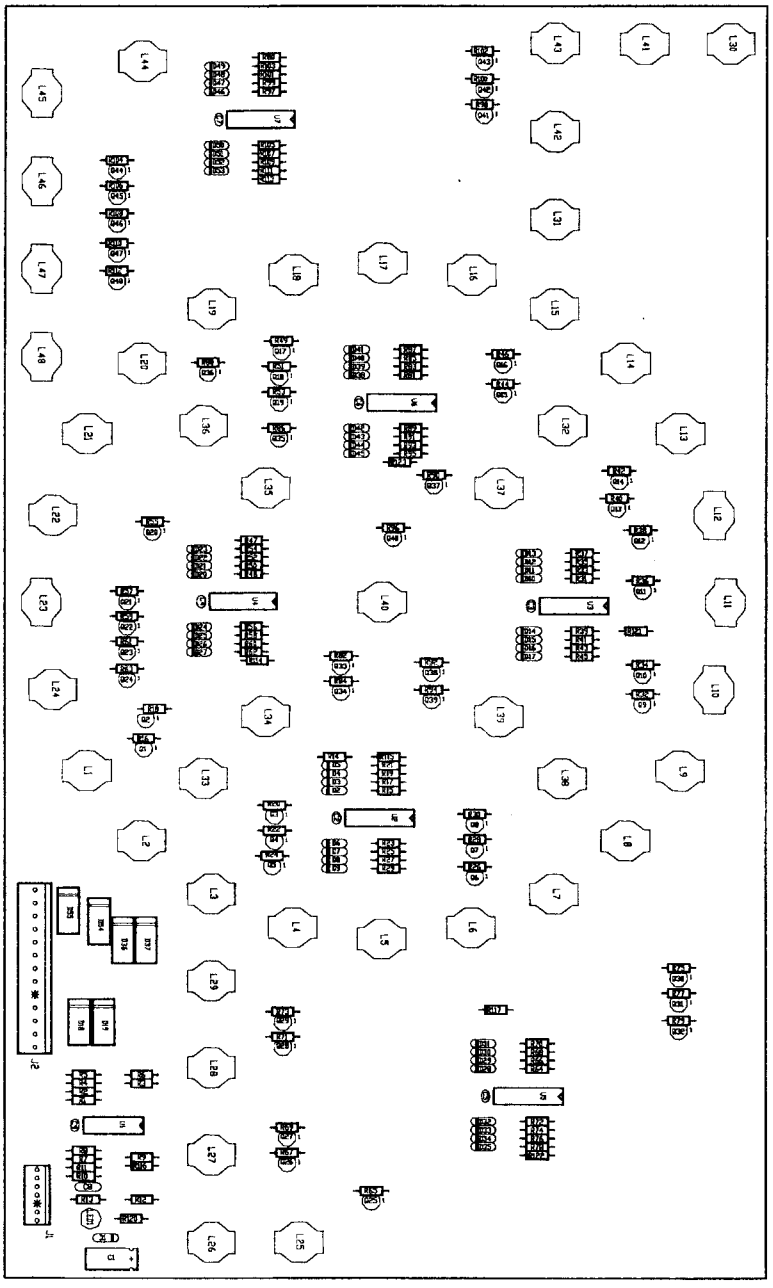


A-13609
3-Bank Drop Target Assembly



Part Number	Designator	Description
5490-13341-00	OPTO1 - OPTO3	Opto Inter w/Tab 10mA.
5011-13292-00	R1, R3, R4	Resistor, 330, 2w, 5%
5010-09314-00	R2	Resistor, 1.2K, 1/4w, 5%
5070-09054-00	D1	Diode 1N4004, 1.0A.
5671-13732-00	LED1	Disp. LED Red
5791-10869-07	J1	Connector, 7-pin Header
20-9864	OPTO1 -OPTO3	Eyelet, 1/8 x 7/32"

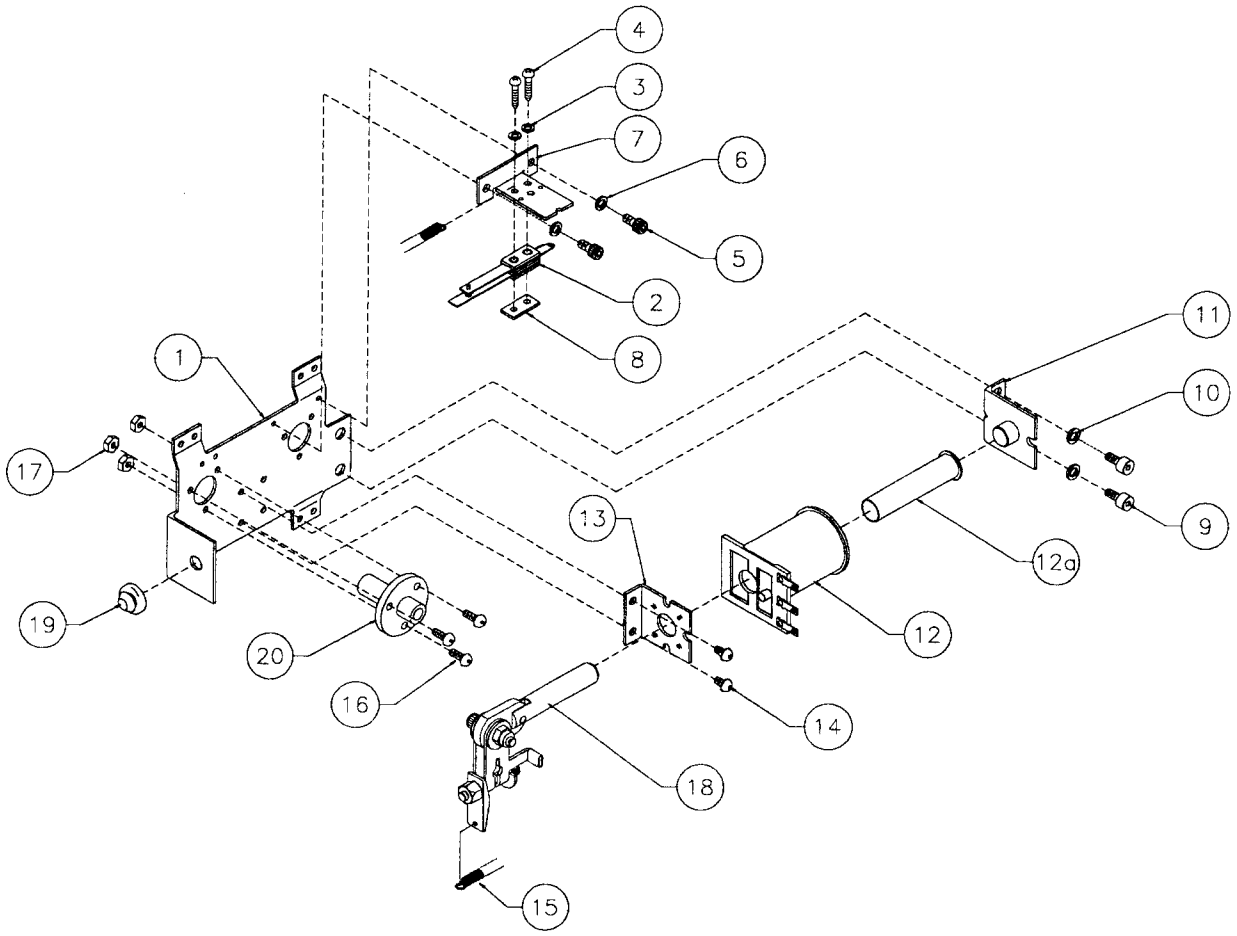
A-20909
48 Lamp & Driver PCB Assembly



Part Number	Designator	Description
5040-09343-00	C1	Cap., 10m, 20v (±20%) Ax.
5043-08996-00	C2-C7, C9	Cap., 0.1m, 50v (±20%) Ax.
5048-10994-00	C8	Cap., .33mFD, 50v (±20%) Ax.
5070-09054-00	D1	Diode 1N4004, 1.0A.
5070-08919-00	D2-D17, D20-D29, D30-D35,D38-D53	Diode 1N4148 150mA.
5070-09045-00	D18, D19, D36, D37, D54, D55	Diode MR501 3.0A.
24-8767	L1-L48	Lamp Skirt PCB Twist
5791-13830-07	J1	Connector, 7-pin Header
5791-10862-13	J8	Connector, 13-pin Header
5671-14516-00	LED1	LED Display Red T-1 ¾
24-8768	L1-L48	Bulb #555 6.3v, 0.25A.
5162-13514-00	Q1-Q48	Trans. 2N6426 NPN DAR
5010-09358-00	R1, R2, R4, R5, R7, R8, R10, R11	Resistor, 1KΩ, 1/4w, 5%
5010-09416-00	R120	Resistor, 470Ω, 1/4ω, 5%
5370-12272-00	U1	IC LM339 Quad Comp
5310-14760-00	U2-U7	IC 4094 Parallel Out Shift Reg

Part Number	Designator	Description
5010-09034-00	R3, R6, R9, R12-R14, R16, R18, R20, R22, R24, R26, R28, R30, R32, R34, R36, R38, R40, R42, R44, R46, R47, R49, R51,R53, R55, R57, R59, R61, R63, R65, R67, R69, R71, R73, R75, R77, R79, R80, R82, R84, R86,R88, R90, R92, R94, R96, R98, R100, R102, R104, R106, R108, R110, R112-R117, R121-R123	Resistor, 10kΩ, 1/4w, 5%
5070-09999-00	R15, R17, R19, R21, R23, R25, R27, R29, R31, R33, R35, R37, R39, R41, R43, R45, R48,R50, R52, R54, R56, R58, R60, R62, R64, R66, R68, R70, R72, R74, R76, R78, R81, R83, R85, R87, R89, R91, R93, R95, R97, R99, R101, R103, R105, R107, R109, R111	Resistor, 2KΩ, 1/4w, 5%

A-14876-R-3
Flipper Assembly



Item	Part Number	Description
1	A-14877-R	Flipper Base Assembly, Right
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-20867	Flipper Coil, White
13	01-7695-1	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut 6-32 Hex.

Item	Part Number	Description
18	A-15848-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	Flat Washer, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lockwasher #10 Split
g)	4410-01132-00	Nut 10-32 ESN
19	23-6577	Bumper Plug, 5/8"
20	03-7568	Flipper Bushing

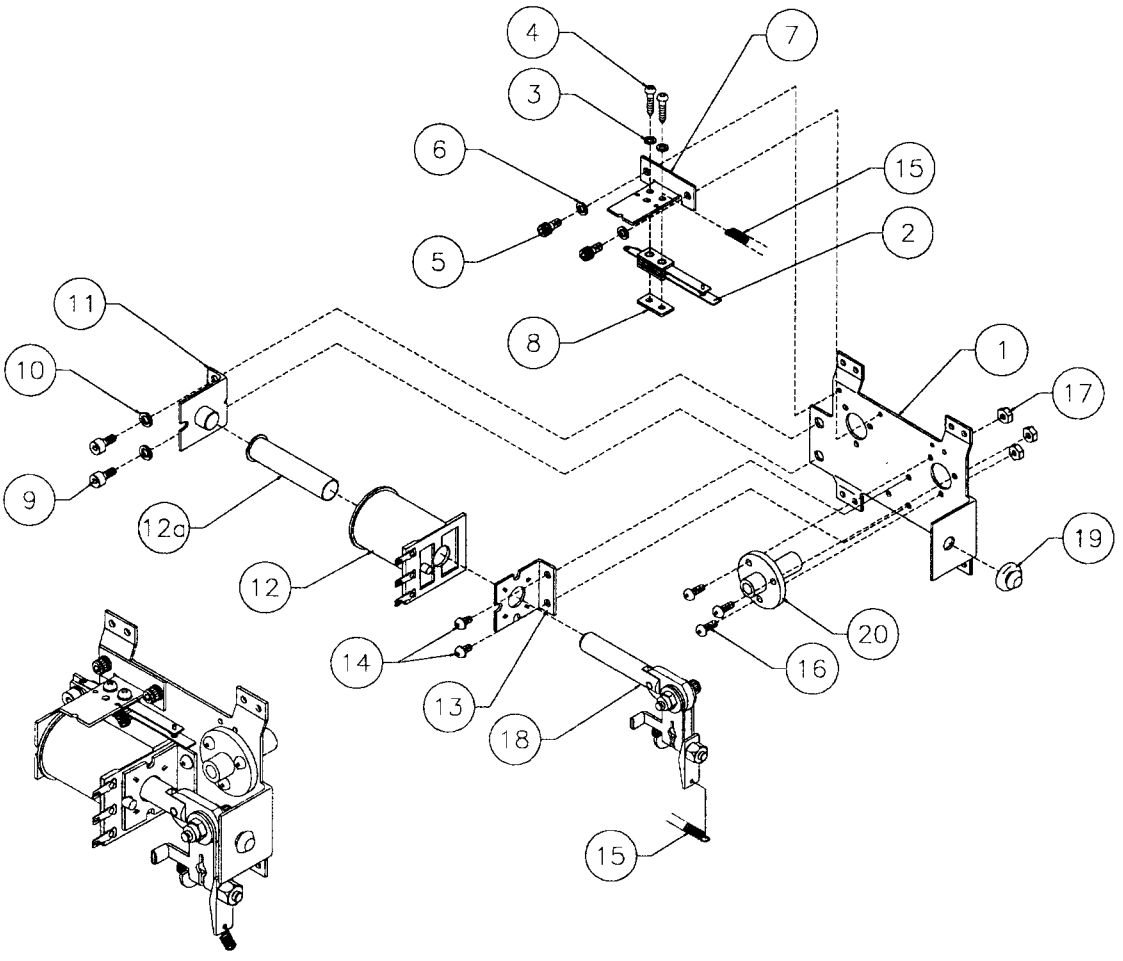
Associated Parts:
(Not Shown)

21	23-6773	Flipper Ring, Red
22	20-10290	Flipper w/Shaft, Yellow

Flipper Notes...

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

A-15849-L-7
Flipper Assembly



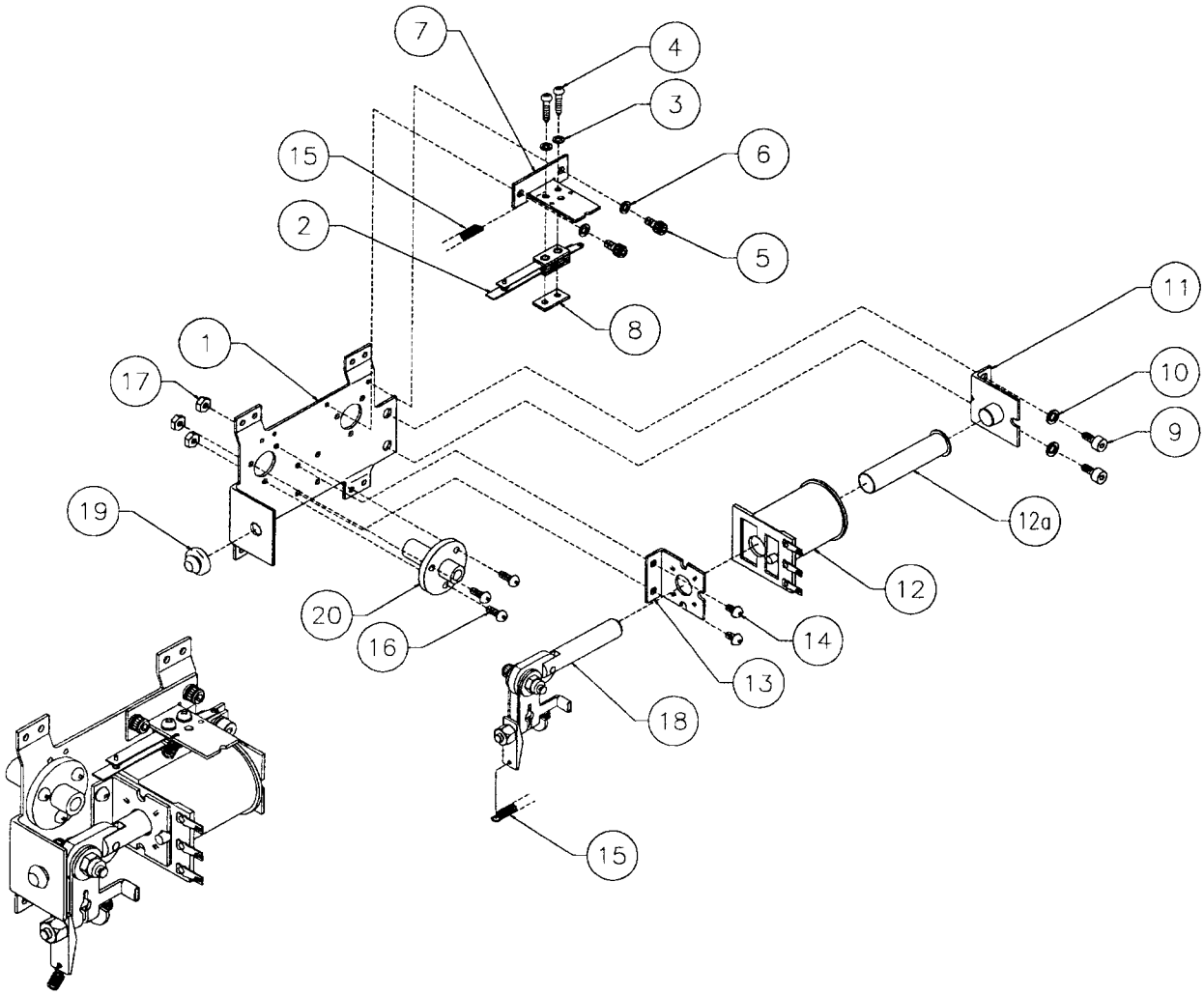
Item	Part Number	Description
1	B-13104-L	Flipper Base Assembly, Left
2	SW-1A-194	Switch Assembly
3	4701-00002-00	Lockwasher #6 Split
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6	4701-00003-00	Lockwasher #8 Split
7	01-9375	Switch Mounting Bracket
8	20-6516	Speednut, 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-20867	Flipper Coil, White
13	01-7695-1	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut 6-32 Hex.

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

Associated Parts:
(Not Shown)

21	23-6773	Flipper Ring, Red
22	20-10290-6	Flipper w/Shaft, Yellow

A-15849-R-1
Flipper Assembly



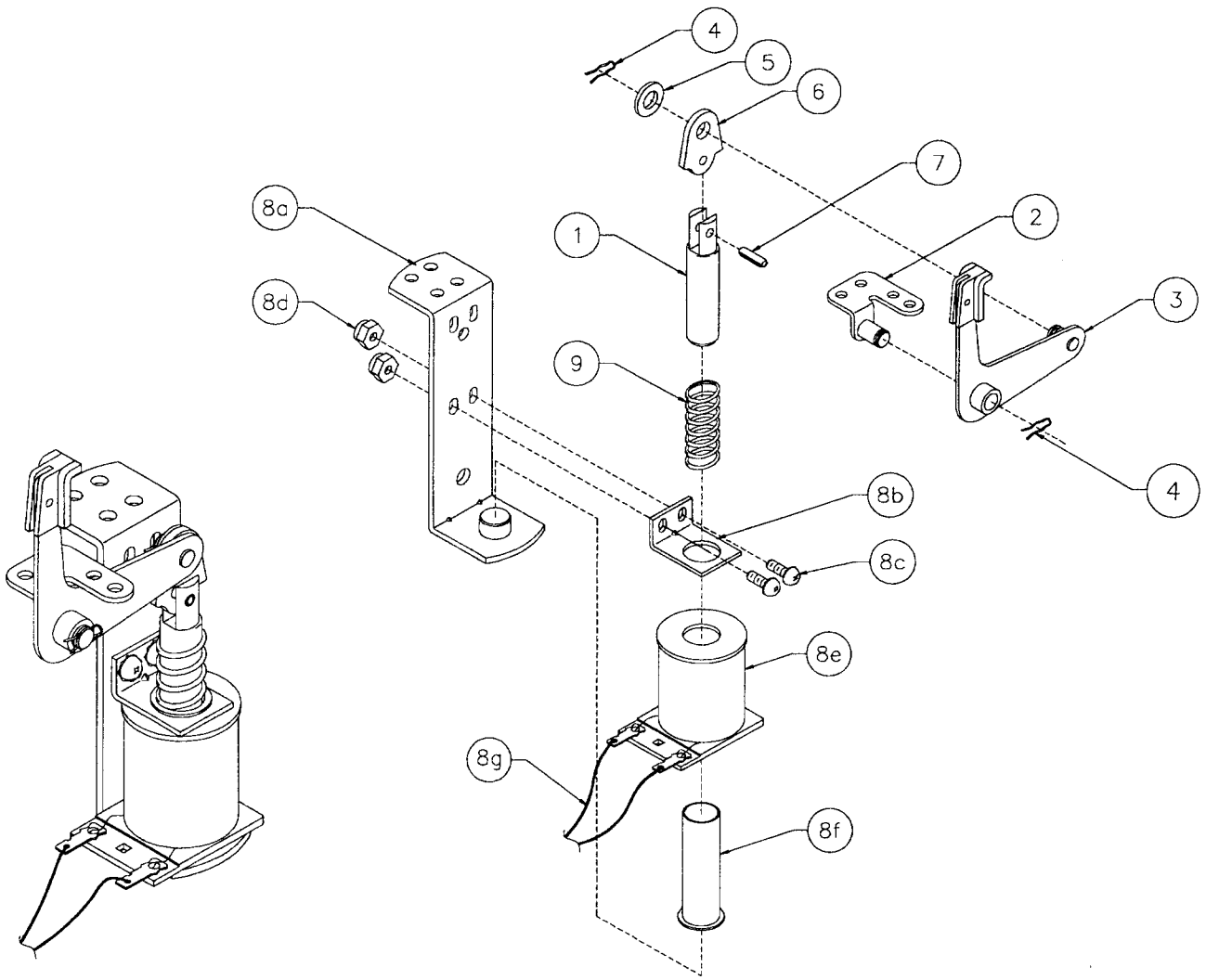
Item	Part Number	Description
1	B-13104-R	Flipper Base Assembly, Right
2	SW-1A-194	Switch Assembly
3	4701-00002-00	Lockwasher #6 Split
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6	4701-00003-00	Lockwasher #8 Split
7	01-9375-1	Switch Mounting Bracket
8	20-6516	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-11753	Flipper Coil, Yellow
13	01-7695-1	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut 6-32 Hex.

Item	Part Number	Description
18	A-15848-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	Flat Washer, 5/8 x 13/64 x 16ga.
f)	4701-00004-00	Lockwasher #10 Split
g)	4410-01132-00	Nut 10-32 ESN
19	23-6577	Bumper Plug, 5/8"
20	03-7568	Flipper Bushing

Associated Parts:
(Not Shown)

21	23-6553-4	Small Flipper Ring, Red
22	20-9264	Small Flipper w/Shaft, Yellow

A-17811
Kicker Arm (Slingshot) Assembly

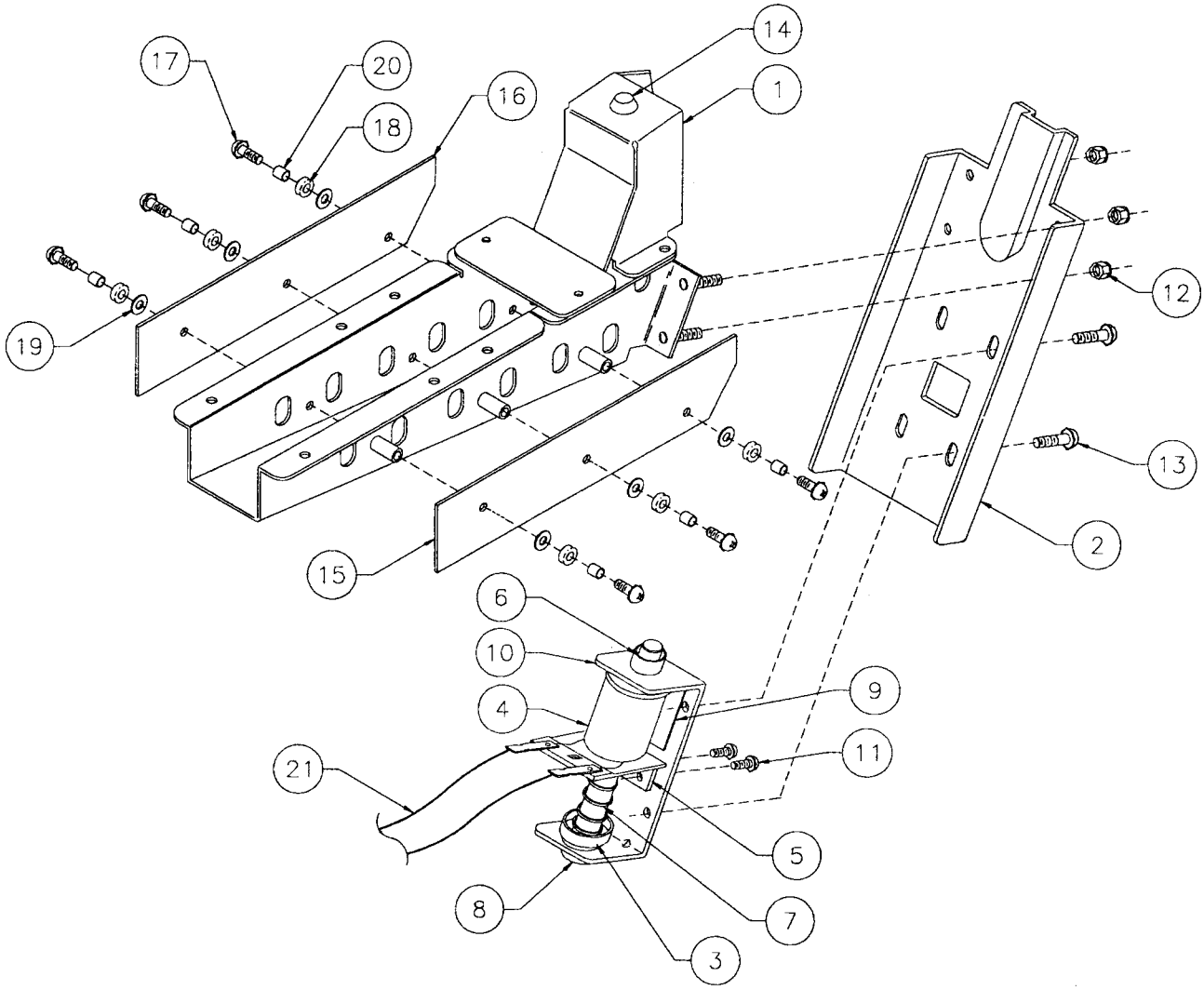


Item	Part Number	Description
1	02-2364	Coil Plunger
2	A-17810	Mounting Bracket Assembly
3	A-12664	Kicker Crank Assembly
4	12-6227	Hairpin Clip
5	4700-00030-00	FW, 17/64 x 1/2 x 15ga.
6	03-8085	Armature Link
7	20-8716-5	Roll Pin, 1/8 x 7/16"

Associated Parts for Right & Left Kickers:

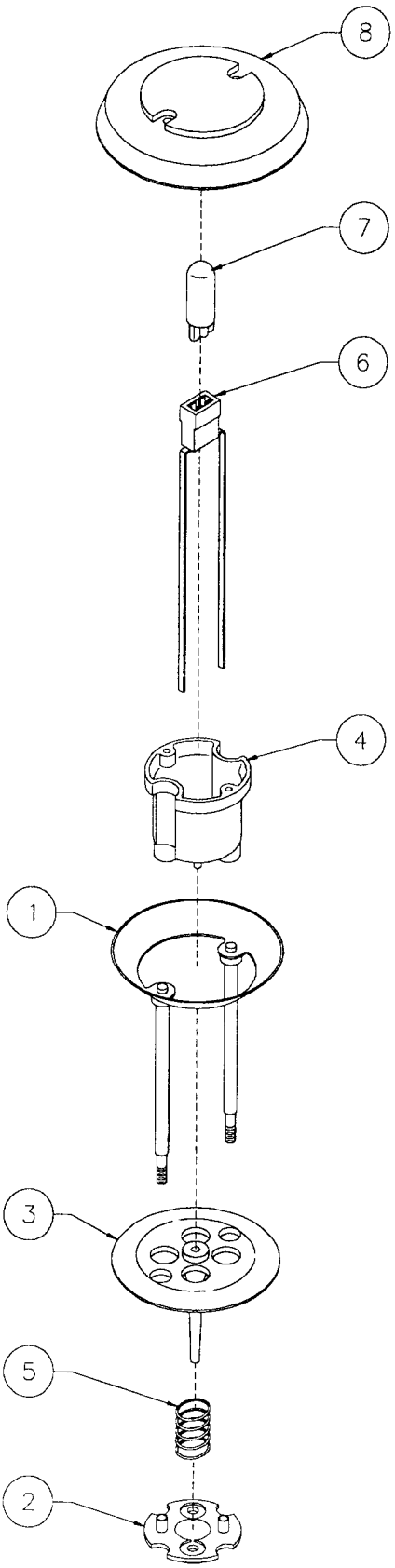
Item	Part Number	Description
8	**B-9362-L-2**	**Coil & Bracket Assembly, L.**
	B-9362-R-3	**Coil & Bracket Assembly, R.**
a)	A-17808	Bracket & Stop Assembly
b)	01-8-508-S	Coil Retaining Bracket
c)	4006-01017-06	Mach. Screw, 6-32 x 3/8"
d)	4406-01119-00	Nut, 6-32 ESN
e)	AE-26-1200	Coil Assembly
f)	03-7066	Coil Tubing
g)	H-19523-1	Mini Solenoid Cable
9	10-128	Spring

A-19963-3
Ball Trough Assembly Complete



Item	Part Number	Description	Item	Part Number	Description
1	04-10433	Ball Trough Welded Assy.	12	4408-01119-00	Nut 8-32 ESN
2	01-11587	Ball Trough Front	13	4008-01017-06	Mach. Screw, 8-32 x 3/8"
3	A-6306-2	Bell Armature Assembly	14	23-6702	Bumper Plug
4	AE-26-1500	Coil Assembly	15	A-18617-1	Trough IRED LED PCB Assembly
5	01-8-508-T	Solenoid Assembly	16	A-18618-1	Trough IRED Transistor PCB Assy.
6	03-7067-5	Coil Tubing	17	4006-01003-10	Mach. Screw, 6-32 x 5/8" SEMS
7	10-135	Spring	18	23-6626	Rubber Grommet
8	23-6420	Rubber Grommet	19	4700-00004-00	Flat Washer, 9/64 x 7/16 x 21ga.
9	03-8523	Insulator	20	02-4975	Bushing
10	01-1158	Coil Mounting Bracket	21	H-19523	Mini Solenoid Cable
11	4008-01017-05	Mach. Screw, 8-32 x 5/16"			

B-9414-3
Jet Bumper Assembly

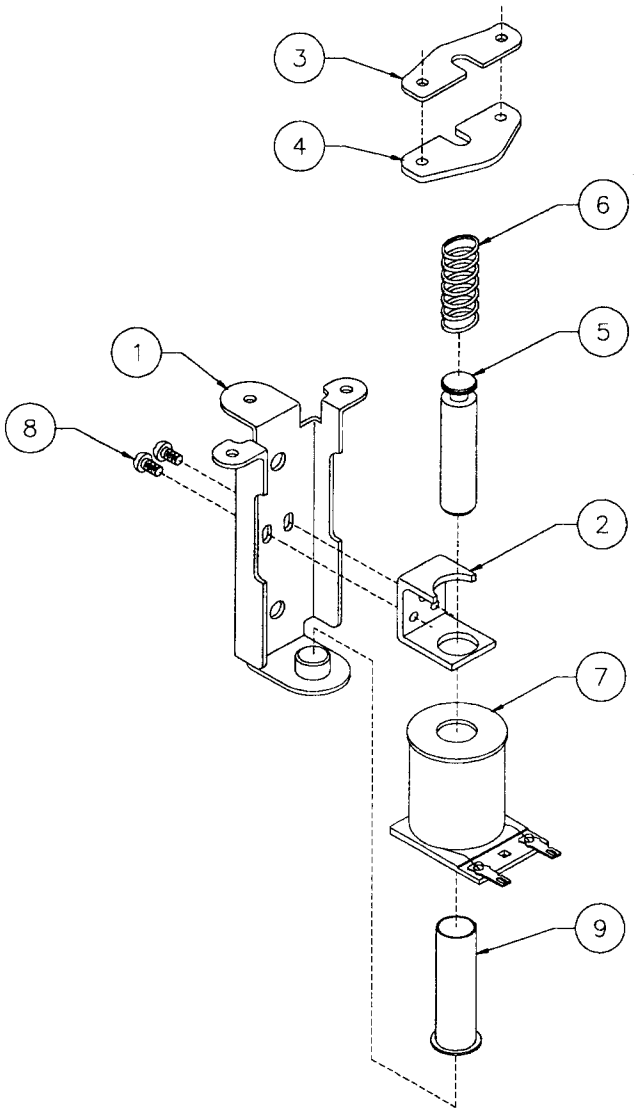


Item	Part Number	Description
1	A-4754	Bumper Ring Assembly
2	03-6009-A5	Bumper Base, White
3	03-6035-4	Bumper Wafer, Red
4	03-7443-5	Bumper Body, White
5	10-7	Spring
6	24-8776	Socket-Wedge Base
7	24-8768	Bulb #555(6.3v., 0.25A.)

Associated Parts:

8	03-8254-9	Jet Bumper Cap, Red (1)
	03-8254-13	Jet Bumper Cap, Clear (1)
	03-8254-16	Jet Bumper Cap, Yellow (1)

A-9415-2
Jet Bumper Coil Assembly

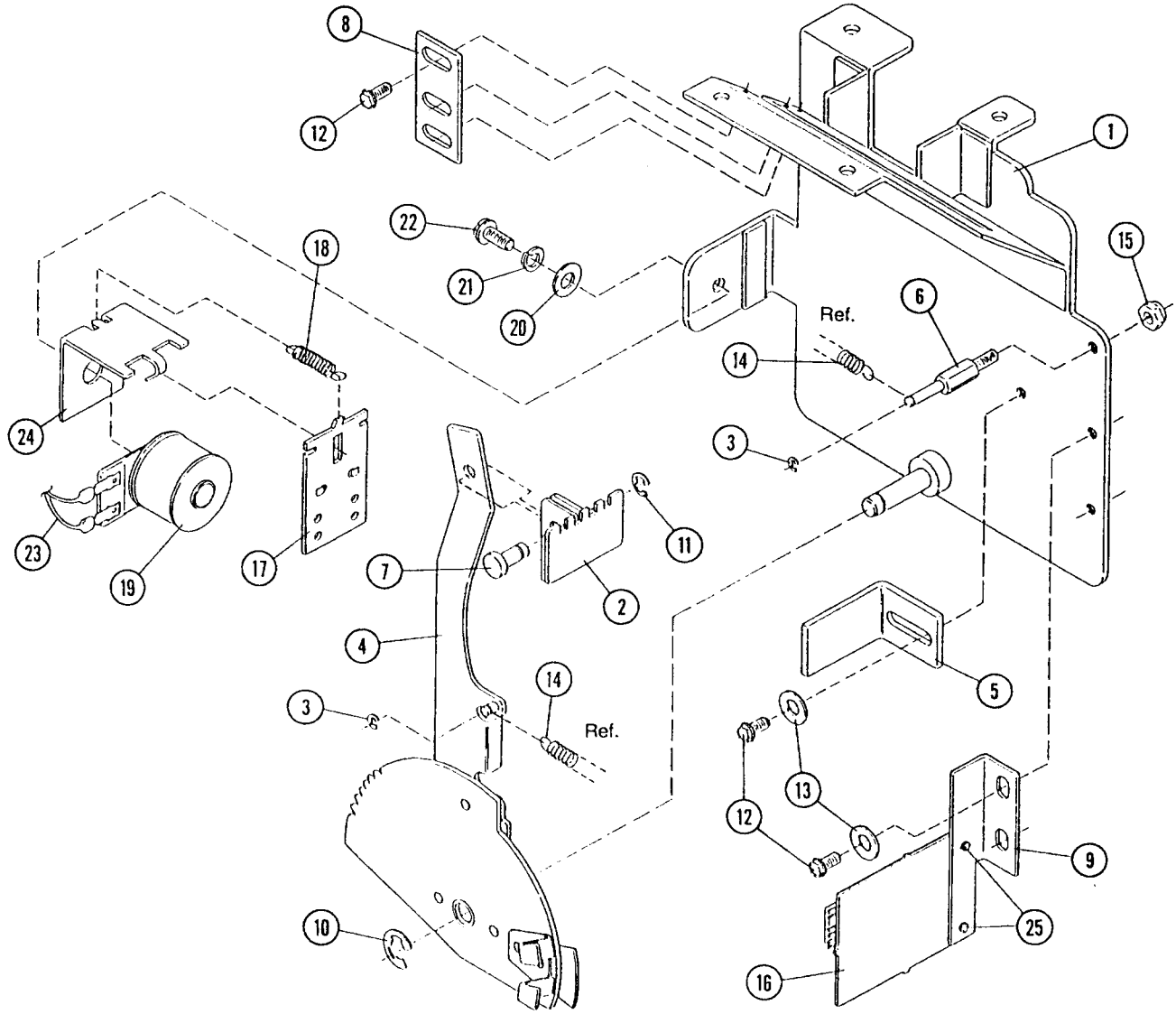


Item	Part Number	Description
1	B-7417	Bracket & Stop Assembly
2	01-1747	Coil Retaining Bracket
3	01-5492	Armature Link, Steel
4	01-5493	Armature Link, Bakeline
5	02-3406-1	Coil Plunger
6	10-326	Armature Spring
7	AE-26-1200	Coil Assembly
8	4006-01017-04	Mach. Screw, 6-32 x 1/4"
9	03-7066	Coil Tubing

Associated Parts:
(Not Shown)

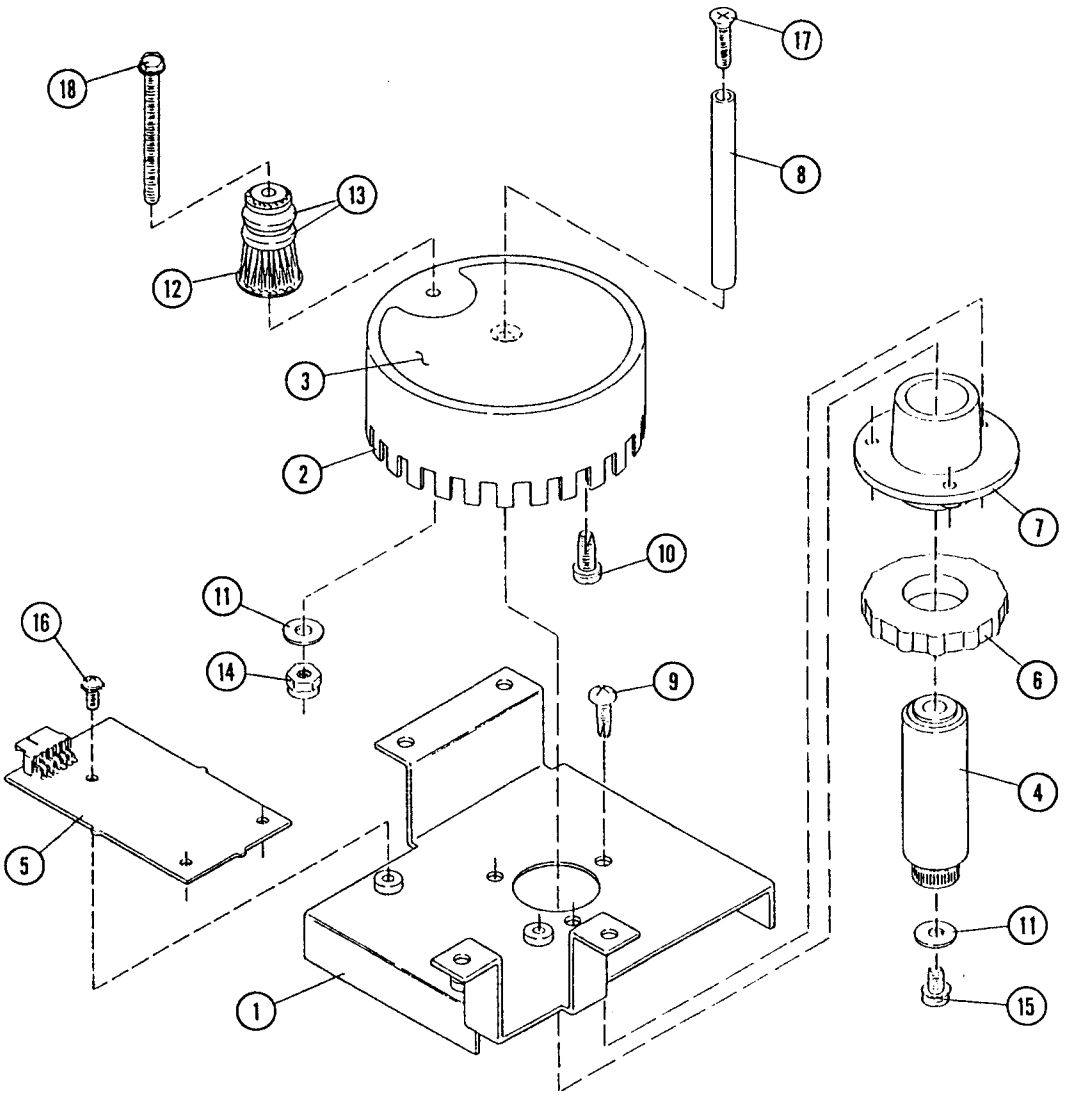
10	B-12030-2	Leaf Switch Assembly
a)	A-16443	Switch & Diode Assembly
b)	01-1168	Switch Mounting Bracket
c)	01-3670	Switch Plate
d)	03-7395	Switch Actuator
e)	4005-01003-12	Mach. Screw, 5-40 x 3/4"
f)	4405-01117-00	Nut 5-40 Hex.

A-20851
Vari-Target Assembly



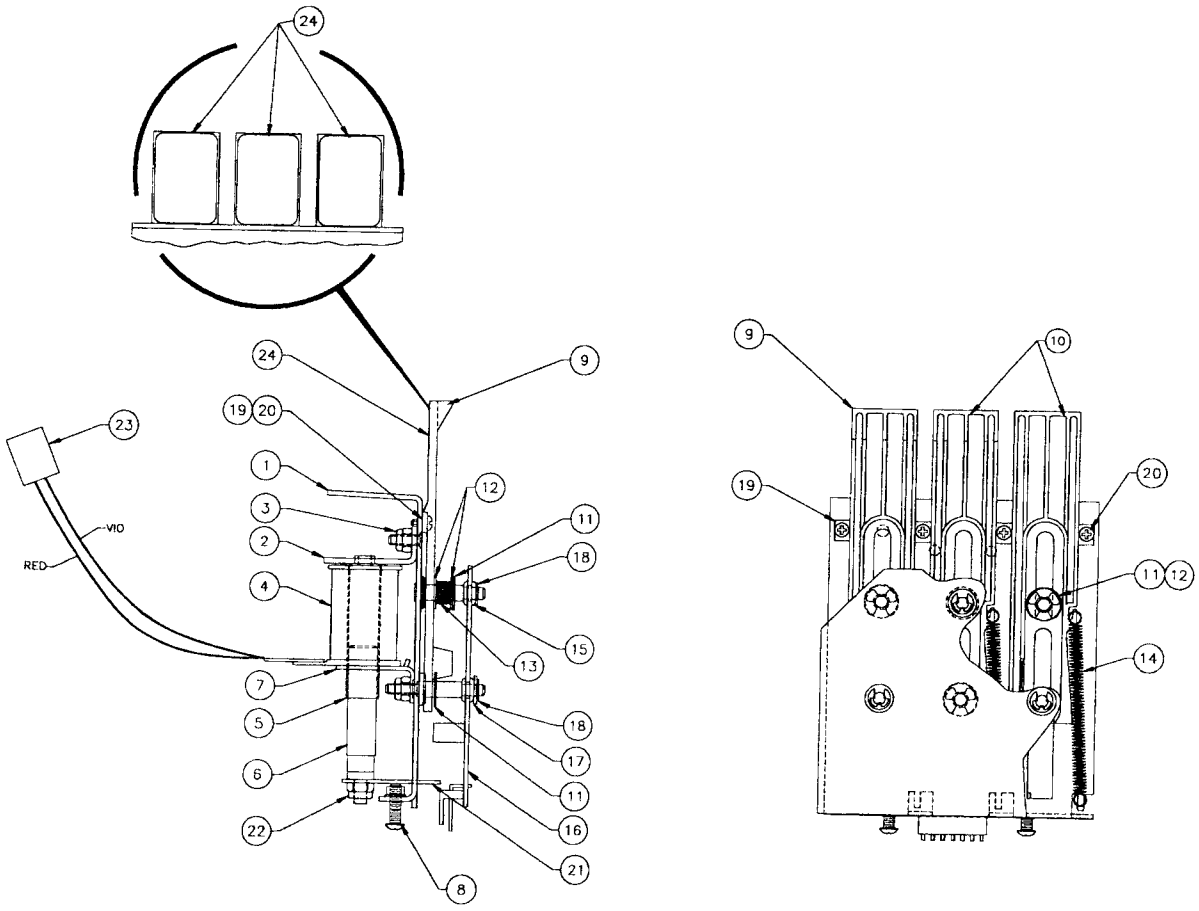
Item	Part Number	Description	Item	Part Number	Description
1	04-10385.1	Mounting Frame Assembly	14	10-433	Extension Spring
2	04-10387.1	Strike Plate Assembly	15	4408-01119-00	Nut #8-32 ESN
3	20-8712-12	"E" Ring, 1/8 Shaft (2)	16	A-20906	Opto Board Assembly
4	04-10388	Pivot Arm Assembly	17	A-15821	Armature Sub-Assembly
5	01-14340	Stop Bracket	18	10-363	Extension Spring
6	02-5266	Spring Pin	19	SM1-26-600	Coil Assembly
7	02-5260	Strike Plate Pivot Stud	20	4700-00089-00	FW .172 x .437 x 16 ga.
8	01-14332	Stop Plate	21	4701-00003-00	LW #8 Split
9	01-14335.1	Opto Board Bracket	22	4008-01005-06BR	MS 8-32 x 3/8 P-PH, Brass
10	20-8712-25	"E" Ring, 1/4 Shaft	23	H-19523	Cable Assembly
11	20-8712-18	"E" Ring, 3/16 Shaft	24	04-10451	Mounting Frame & Eyelet Assembly
12	4008-01168-06	MS 8-32 x 3/8 PL--HH-S (6)			
13	4700-00021-00	FW .203 x .437 x .0329 (4)	25	4008-01168-04	MS 8-32 x 1/4 PL-HH-S (2)

A-20911
Spin Target Assembly



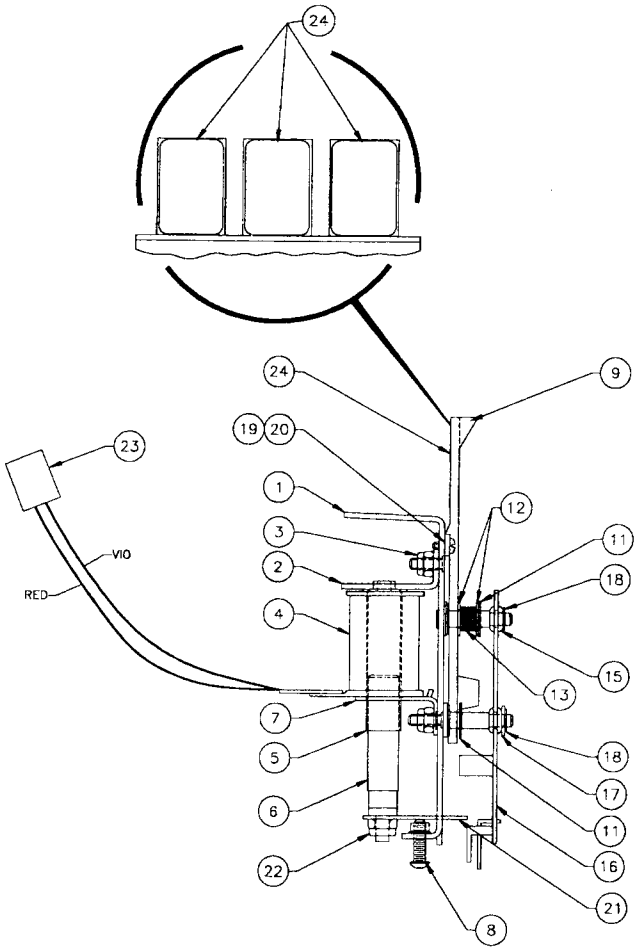
Item	Part Number	Description	Item	Part Number	Description
1	04-10410	Spin Bracket	10	4110-01013-08	SMS #10-32 x 1/2 P-PH T25 (3)
2	03-9126	Spinning Disc	11	4700-00016-00	FW .187 x .437 x .053 (3)
3	31-2556	Decal	12	03-8247-13	Post #8 Double Star, Clear
4	04-10412	Adjust Screw Assembly	13	23-6300	Rubber Ring 5/8", White (2)
5	A-20952	Spin Disc Cpto PCB Ass'y	14	4408-01119-00	Nut #8-32 ESN
6	03-8363-1	Locking Nut	15	4008-01003-04	MS 8-32 x 1/4 P-PH-S
7	03-8347	Gland	16	4006-01003-04	MS 6-32 x 1/4 P-PH-S (3)
8	02-4418	Shaft	17	4008-01041-10	MS 8-32 x 5/8 P-FH
9	4108-01013-08	SMS #8-32 x 1/2 P-PH T25 (3)	18	4008-01113-28	MS 8-32 x 1-3/4 PL-HWH

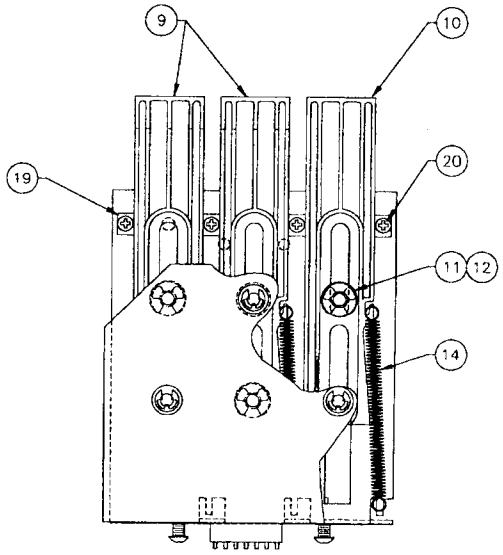
A-20895
3-Bank Target Assembly (1 Ramp)



Item	Part Number	Description
1	04-10403	Bracket & Post Assembly
2	A-11397	Drop Target Stop Bracket
3	4408-01119-00	Nut #8 ESN
4	AE-26-1200	Coil Sub-Assembly
5	03-7066-4	Coil Tubing, 2.093" Long
6	02-3972-1	Plunger
7	01-8413	Bracket Coil Mounting
8	4010-01025-14	Mach. Screw, 10-32 x 7/8"
9	20-8712-18	"E"-Ring, 3/16" Shaft
10	03-8749	Plain Target, Black (2)
11	20-8712-25	"E"-Ring, ¼" Shaft
12	4700-00072-00	FW, 17/64 x ½ x 21ga.
13	10-364	Spring, Retractor
14	10-392	Spring, Extension
15	23-6626	Rubber Grommet
16	A-13609	3-Bank Target Opto Board
17	4700-00016-00	FW, 3/16 x 7/16 x 17ga.
18	03-8334-3	Traget Stop, 3-15/16"
19	4004-01005-04	Mach. Screw, 4-40 x ¼"
20	20-10318	Drop Target Prism Foil, Silver
21	01-11769	3-Bank Reset Plate
22	4410-01132-00	Nut #10 ESN
23	H-19523	Cable

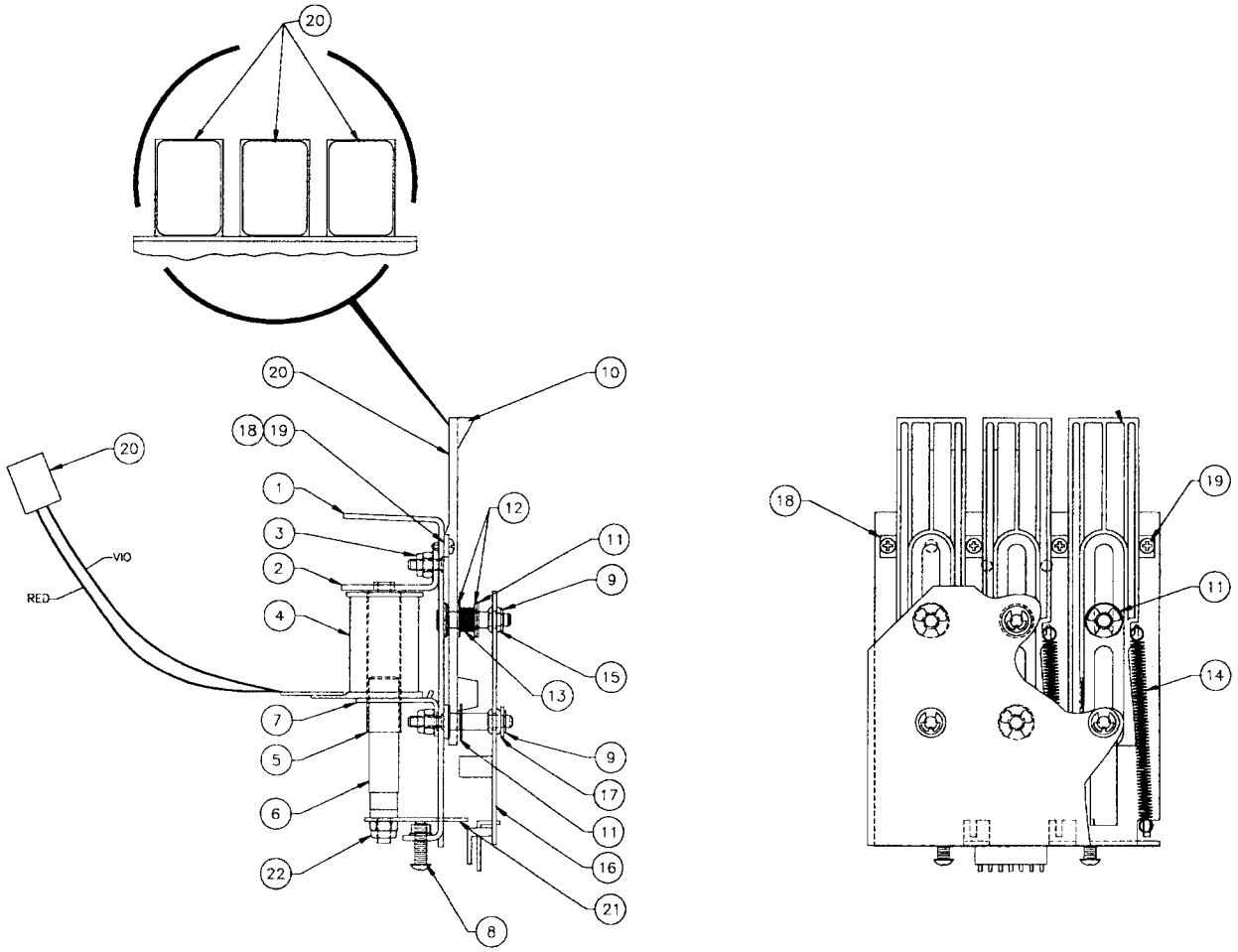
A-20896
3-Bank Target Assembly (2 Ramp)





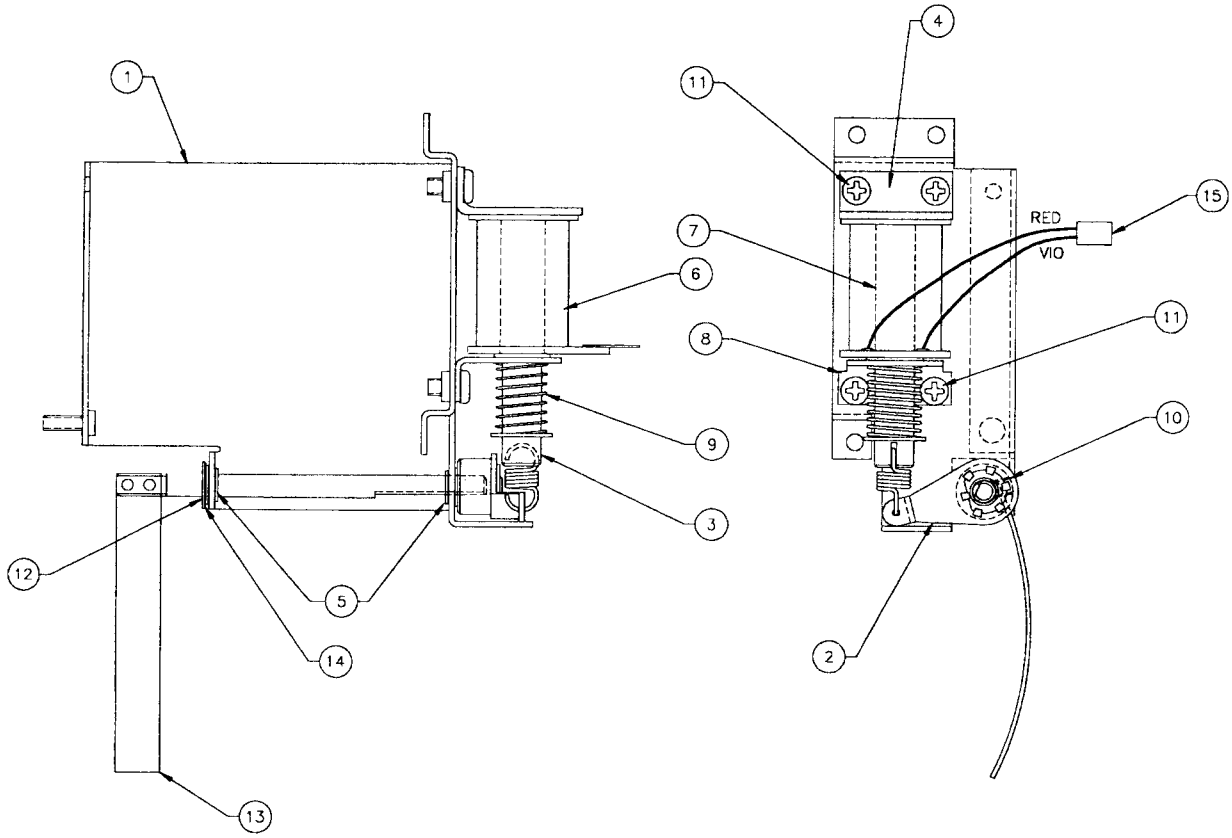
Item	Part Number	Description
1	04-10403	Bracket & Post Assembly
2	A-11397	Drop Target Stop Bracket
3	4408-01119-00	Nut #8 ESN
4	AE-26-1200	Coil Sub-Assembly
5	03-7066-4	Coil Tubing, 2.093" Long
6	02-3972-1	Plunger
7	01-8413	Bracket Coil Mounting
8	4010-01025-14	Mach. Screw, 10-32 x 7/8"
9	20-8712-18	"E"-Ring, 3/16" Shaft
10	03-8749	Plain Target, Black (1)
11	20-8712-25	"E"-Ring, ¼" Shaft
12	4700-00072-00	FW, 17/64 x ½ x 21ga.
13	10-364	Spring, Retractor
14	10-392	Spring, Extension
15	23-6626	Rubber Grommet
16	A-13609	3-Bank Target Opto Board
17	4700-00016-00	FW, 3/16 x 7/16 x 17ga.
18	03-8334-3	Traget Stop, 3-15/16"
19	4004-01005-04	Mach. Screw, 4-40 x ¼"
20	20-10318	Drop Target Prism Foil, Silver
21	01-11769	3-Bank Reset Plate
22	4410-01132-00	Nut #10 ESN
23	H-19523	Cable
24	03-10318	Drop Target Prism Foil, Silver

A-20892
3-Bank Drop Target Assembly



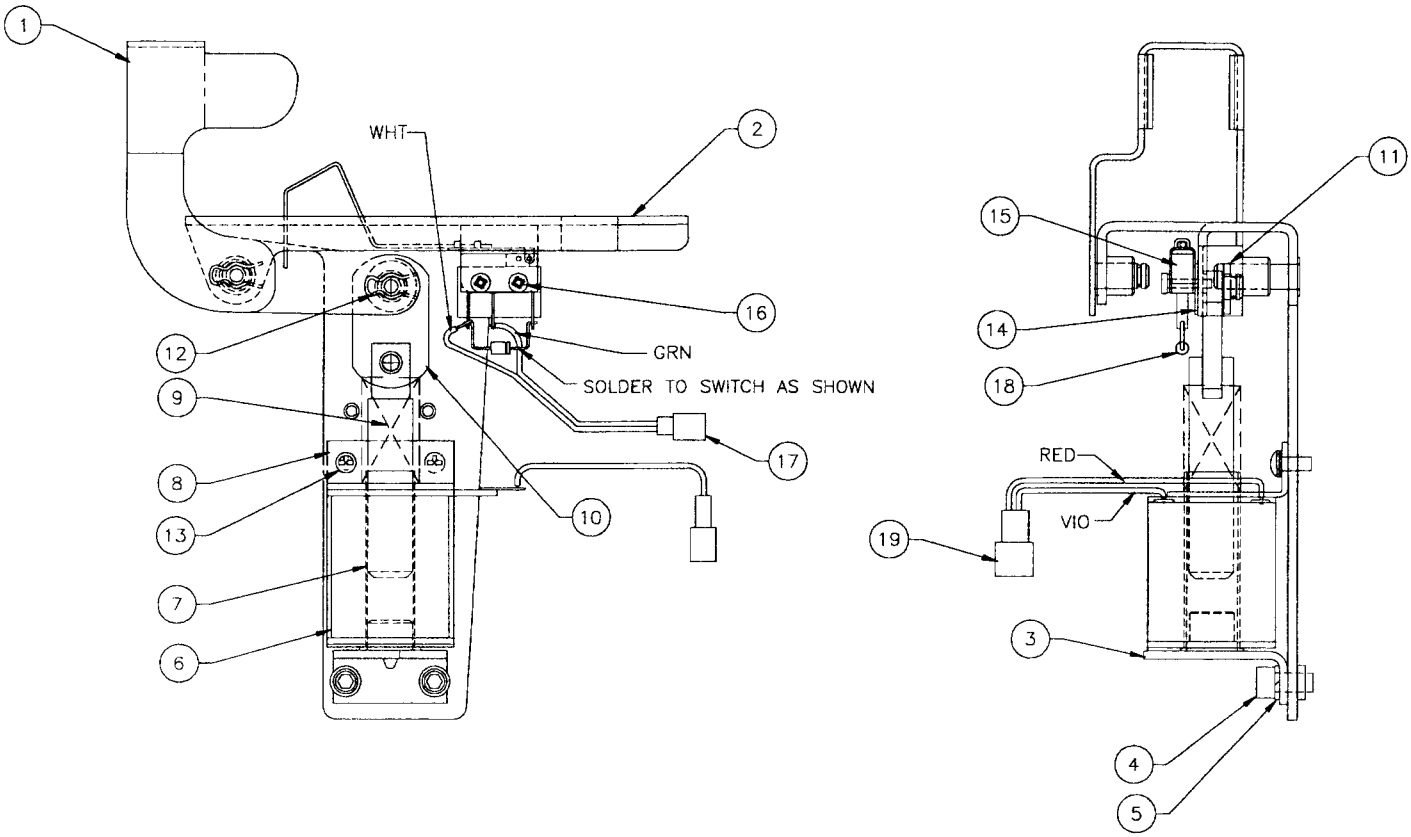
Item	Part Number	Description
1	04-10403	Bracket & Post Assembly
2	A-11397	Drop Target Stop Bracket
3	4408-01119-00	Nut #8 ESN
4	AE-26-1200	Coil Sub-Assembly
5	03-7066-4	Coil Tubing, 2.093" Long
6	02-3972-1	Plunger
7	01-8413	Bracket Coil Mounting
8	4010-01025-14	Mach. Screw, 10-32 x 7/8"
9	20-8712-18	"E"-Ring, 3/16" Shaft
10	03-8749	Plain Target, Black (3)
11	20-8712-25	"E"-Ring, ¼" Shaft
12	4700-00072-00	FW, 17/64 x ½ x 21ga.
13	10-364	Spring, Retractor
14	10-392	Spring, Extension
15	23-6626	Rubber Grommet
16	A-13609	3-Bank Target Opto Board
17	4700-00016-00	FW, 3/16 x 7/16 x 17ga.
18	03-8334-3	Traget Stop, 3-15/16"
19	4004-01005-04	Mach. Screw, 4-40 x ¼"
20	20-10318	Drop Target Prism Foil, Silver
21	01-11769	3-Bank Reset Plate
22	4410-01132-00	Nut #10 ESN
23	H-19523	Cable

A-20882
Diverter Assembly



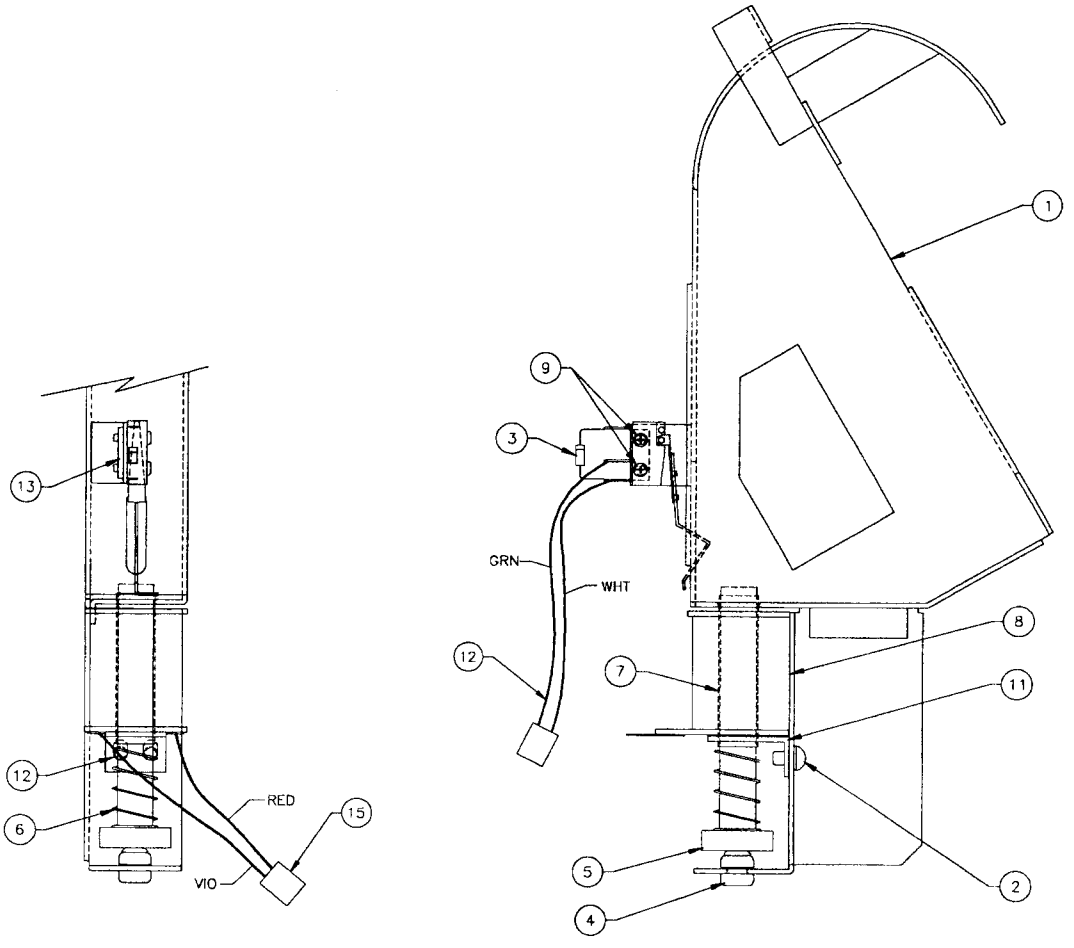
Item	Part Number	Description
1	04-10398.1	Diverter Bracket Assembly
2	01-10408	Drive Arm Assembly
3	A-13278	Plunger Assembly
4	A-10821	Flipper Stop Bracket Assembly
5	20-8790	Bearing
6	AE-26-1500	Coil Assembly
7	03-7066	Coil Tubing
8	01-8413	Coil Mounting Bracket
9	10-437	Spring, Kicker Heavy
10	4010-01169-04	Set Screw, 10-32 x ¼"
11	4010-01008-06	Mach. Screw, 10-32 x ¼"
12	20-8712-25	"E"-Ring, ¼" Shaft
13	04-10399.1	Diverter Blade Assembly
14	4700-00103-00	FW, 17/64 x ½ x 28ga.
15	H-19523	Cable

A-21022
Shooter Lane Kicker Assembly



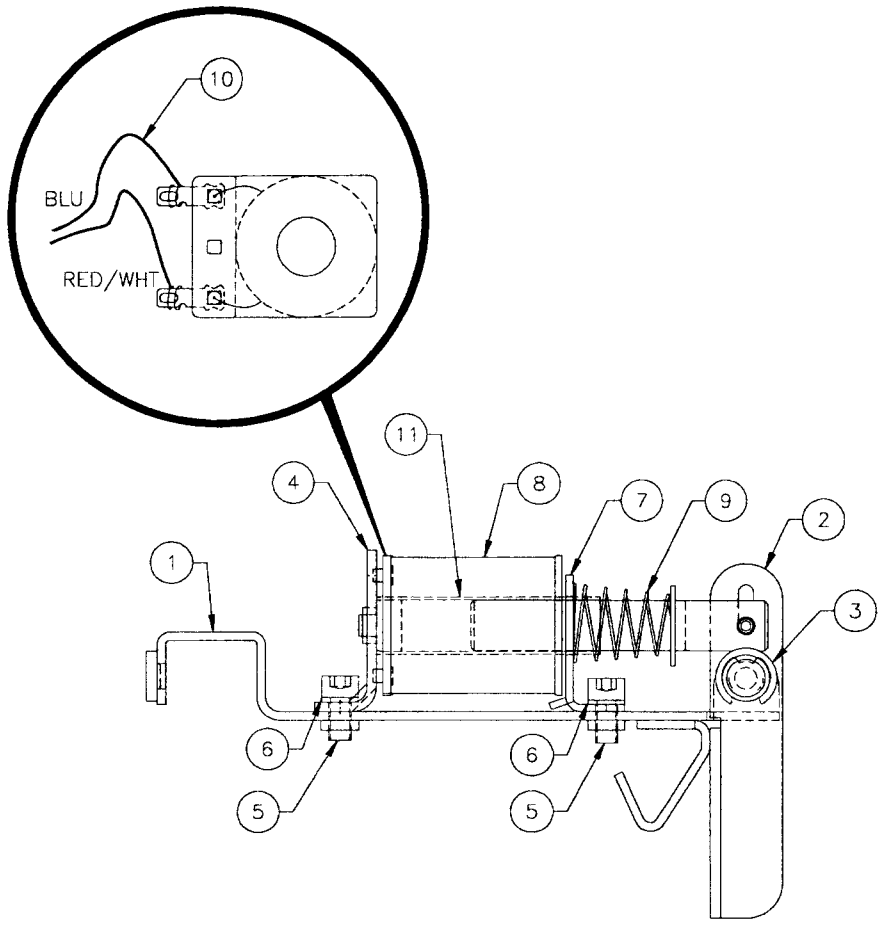
Item	Part Number	Description
1	04-10210.4	Kicker Crank
2	04-10211.5	Coil Mounting Bracket
3	04-10461	Flipper Stop Bracket Assembly
4	4010-01066-06	Cap Screw, #10 x 3/8"
5	4701-00004-00	Lock Washer #10 Split
6	AE-23-800	Coil Assembly
7	03-7066	Coil Tubing
8	01-8413	Coil Mounting Bracket
9	10-128	Spring
10	A-15847	Flipper Link Assembly
11	4700-00104-00	Flat Washer, 23/64 x ½ x 16ga.
12	12-6227	Hair Pin Clip
13	4006-01003-05	Mach. Screw, 6-32 x 5/16"
14	01-8600	Insulator
15	5647-12693-65	Mini-Micro Switch
16	4002-01105-08	Mach. Screw, 2-56 x ½"
17	H-16437	Cable
18	5070-09054-00	Diode
19	H-19523	Cable

A-20923
Center Loop Kick-Back Assembly



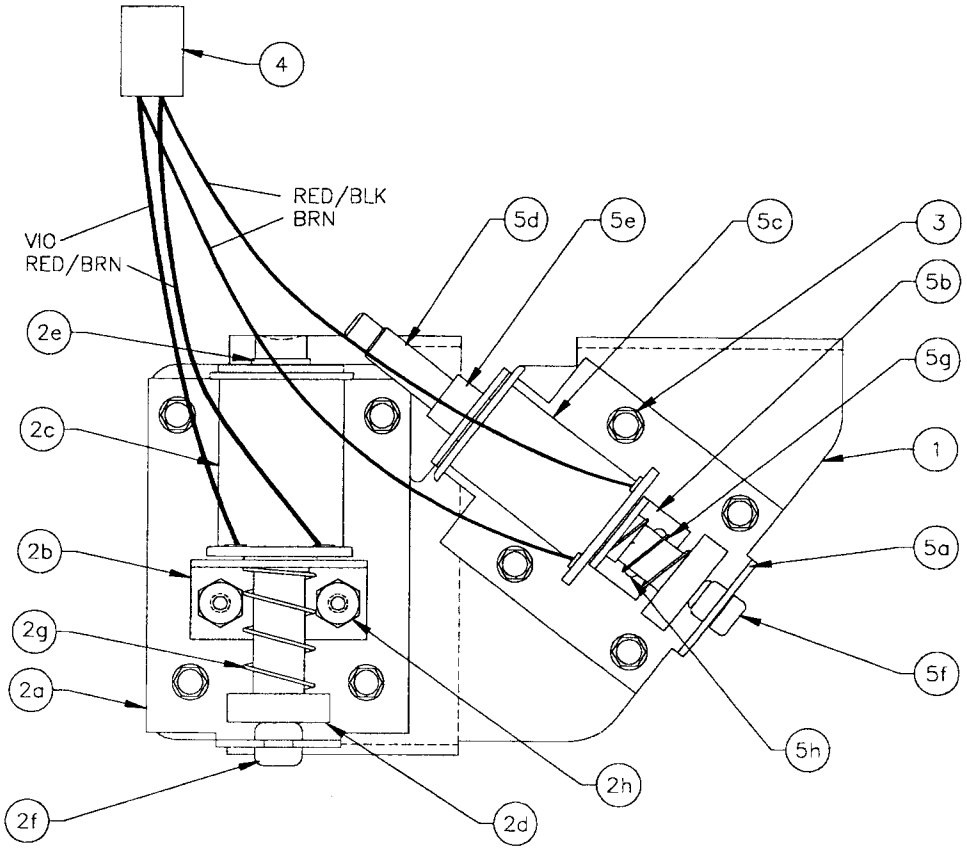
Item	Part Number	Description
1	04-10378	Center Loop Kick-Back
2	4008-01017-04	Mach. Screw, #8-32 x ¼"
3	5070-09054-00	Diode 1n4004
4	23-6420	Rubber Grommet
5	A-17767	Bell Armature Assembly
6	10-135	Spring
7	03-7067	Coil Tubing
8	AE-23-800	Coil Assembly
9	4002-01105-07	Mach. Screw, #2-56 x 7/16"
10	5647-12693-26	Sub-Mini Switch
11	01-8-508-T	Solenoid Bracket
12	H-16437	Cable
13	01-8240	Nut Plate #2-56
14	H-19523-1	Cable

A-20935
Multi-Ball Assembly



Item	Part Number	Description
1	04-10427	Coil Mounting Bracket
2	A-20936	Plunger Assembly
3	20-8712-25	"E"-Ring, ¼" Shaft
4	A-11397	Drop Target Stop Bracket
5	4010-01066-06	Cap Screw, #10-32 x 3/8"
6	4701-00004-00	Lock Washer #10 Split
7	01-8413	Coil Mounting Bracket
8	AE-26-1200	Coil Assembly
9	10-515	Spring
10	H-18216-11	Cable
11	03-7066	Coil Tubing

A-20907
Popper Mounting Bracket Assembly

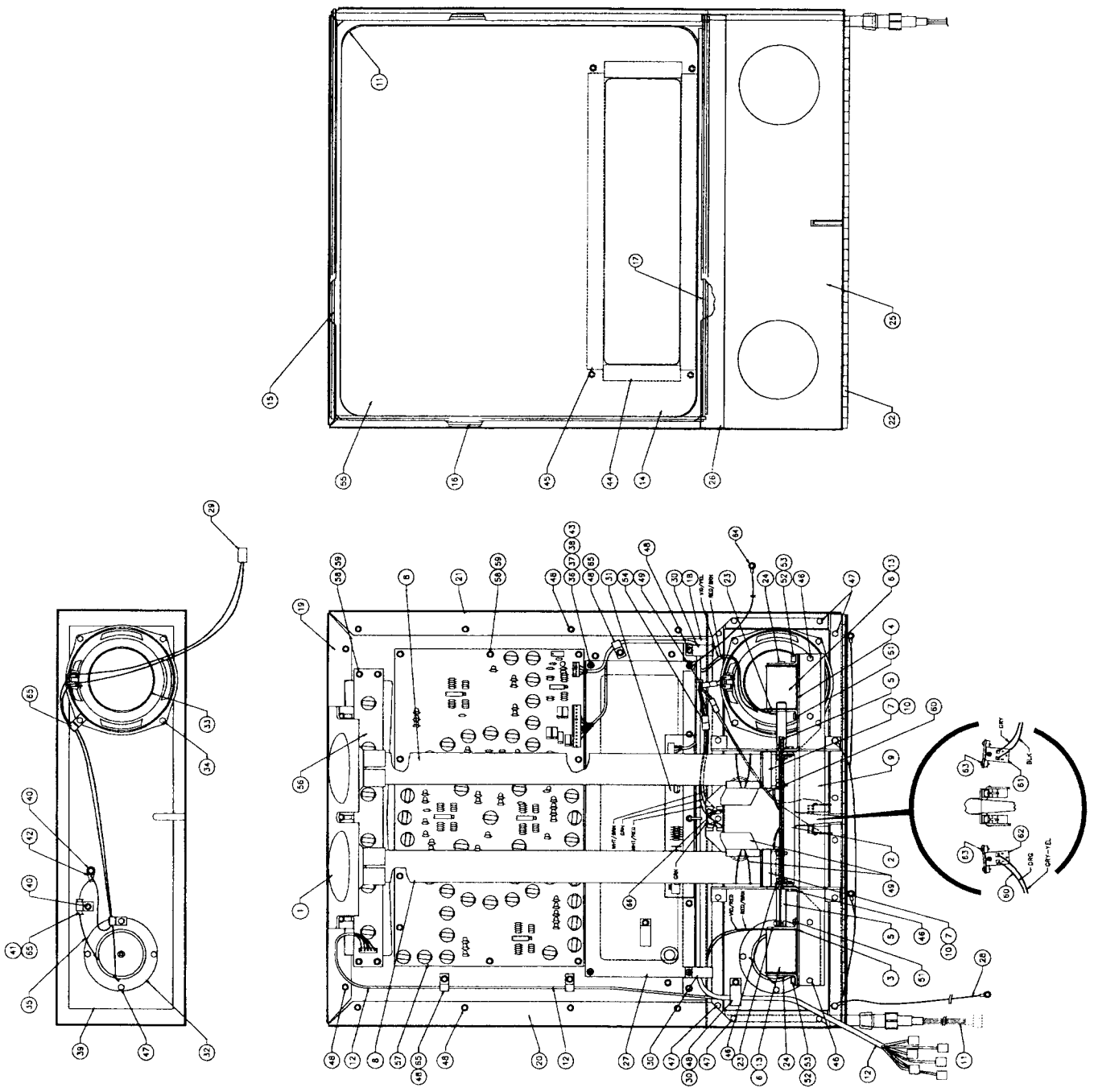


Item	Part Number	Description	Item	Part Number	Description
1	01-14323	Popper Mounting Bracket	5	A-20920	Shooter Sub-Assembly
2	A-20919	Popper Sub-Assembly	a)	01-14325	Shooter Bracket
a)	01-14324	Shooter Bracket	b)	01-14338	Shooter Coil Bracket
b)	01-14337	Shooter Coil Bracket	c)	AE-27-1200	Coil Assembly
c)	AE-24-900	Coil Assembly	d)	04-10432	Bell Armature Assembly
d)	A-17767	Bell Armature Assembly	e)	03-7067	Coil Tubing
e)	03-7067	Coil Tubing	f)	23-6420	Rubber Grommet
f)	23-6420	Rubber Grommet	g)	10-135	Spring Plunger
g)	10-135	Plunger Spring	h)	4008-01003-04	Mach. Screw, 8-32 x ¼"
h)	4408-01119-00	Nut 8-32 ESNA			
3	4008-01113-04	Mach. Screw, 8-32 x ¼"			
4	H-19692	Cable			

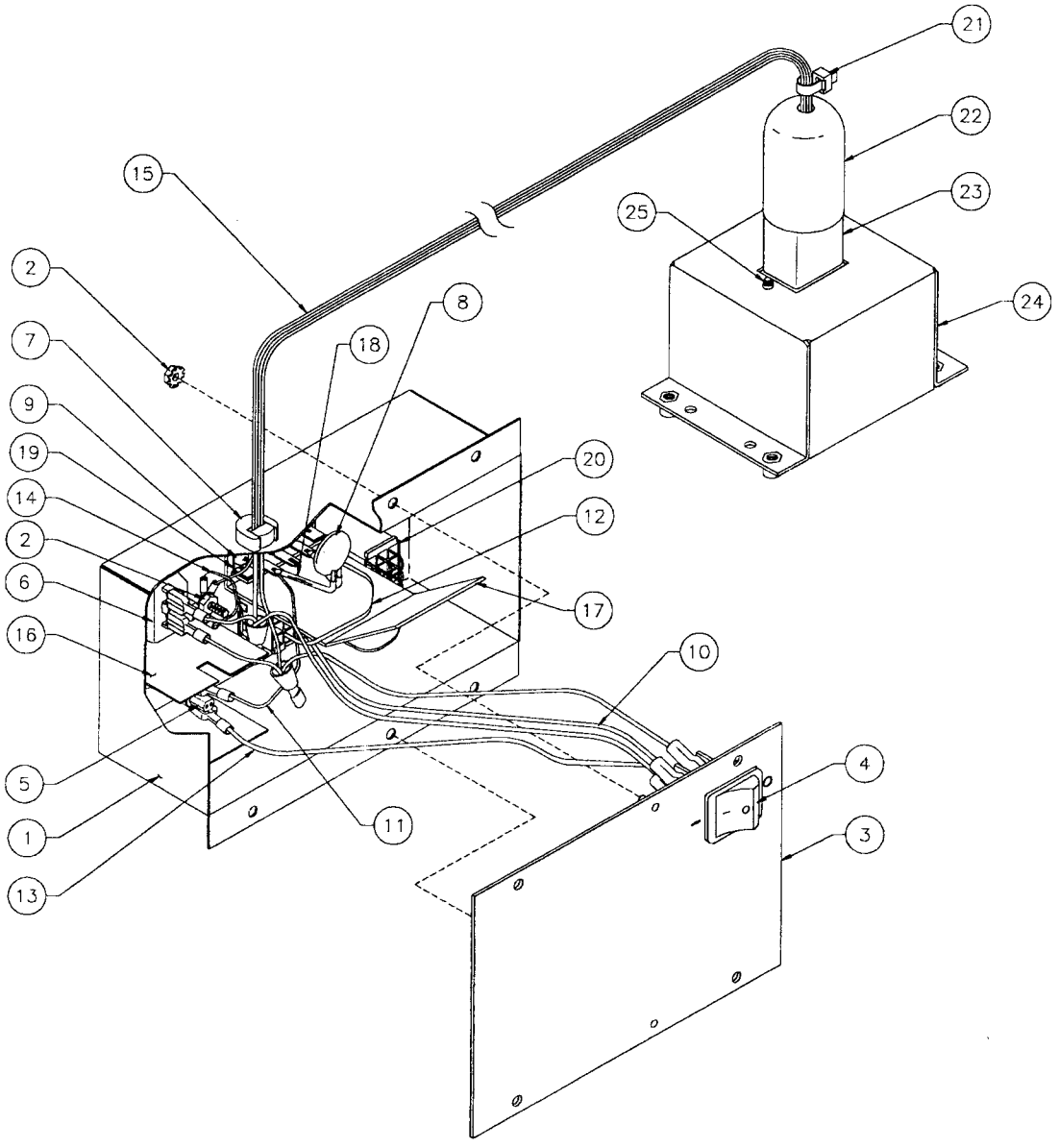
A-20905
Speaker Display Token Insert Assembly

Item	Part Number	Description	Item	Part Number	Description
1	03-9500	Loading Funnel	34	4008-01168-10	Mach. Screw, 8-32 x 5/8"
2	04-10405.1	Token Chute	35	RM-21-06	#18 Vinyl Sleeve
3	04-10406.1-1	Dispenser Bracket, Right	36	03-6047-13	Spacer, 5/8" Long
4	04-10406.1-2	Dispenser Bracket, Left	37	4406-01128-00	Nut 6-32 KEPS
5	A-21038	Shuttle & Plunger Assembly	38	4700-00005-00	FW, 9/64 x 7/16 x 21ga.
6	04-10424	Coin Dispenser Coil Assy.	39	04-10397	Speaker Panel Sub-Assy.
7	03-9503.1	Tube Base	40	4106-01115-06Y	Sh. Metal Screw, #6 x 3/8"
8	03-9501.1	Token Tube	41	5045-12914-00	Capacitor, 10µ, 50v (±20%)
9	01-14331.1	Reinforcement Bracket	42	5825-09372-00	#6 Solder Lug, Bent
10	20-10291-15	Hose Clamp	43	4506-01106-24B	SSS, 6-32 x 1-1/2"
11	04-10440	Ropelight Assembly	44	23-6534-16	Rubber Edge Prot., 3-5/8"
12	H-20926	Insert Cable	45	23-6534-15	Rubber Edge Prot. 14"
13	03-7066-5	Coil Tubing	46	4008-01168-06	Mach. Screw, 8-32 x 3/8"
14	11-1324	Insert Panel	47	4008-01168-08	Mach. Screw, 8-32 x ½"
15	04-10430-1	Mirror Assembly	48	4808-01175-08	E-P #8 x ½" Ind.
16	04-10430-2	Mirror Assembly	49	20-10301	Level Switch Assembly
17	04-10430-3	Mirror Assembly	50	03-9454	Cable Tie 4" Long
18	01-14322	Insert Frame, Lower	51	4008-01003-06	Mach. Screw, 8-32 x 3/8"
19	01-14321	Insert Frame, Upper	52	4010-01066-06	Cap Screw, 10-32 x 3/8"
20	01-14320-1	Insert Frame, Right	53	4701-00004-00	Lockwasher #10 Split
21	01-14320-2	Insert Frame, Left	54	H-20993	Token Switch Cable
22	20-10294	Speaker Hinge Panel	55	31-2561	Insert Overlay
23	01-7695-1	Solenoid Bracket	56	A-20889	6-Lamp PCB Assembly
24	A-12390	Flipper Stop Bracket	57	A-20909	48-Lamp PCB Assembly
25	31-2553	Screened Spkr. Panel Cover	58	4808-01175-16	E-P #8 x 1" Ind.
26	03-8265-3	Speaker Bracket Panel	59	03-9255-2	Spacer, #8 x .343"
27	01-13636	Display Shield	60	H-17609-5	Opto Cable, Square
28	H-20946.2	Insert Ground Cable	61	A-16908	RTV Opto LED Assembly
29	H-20940	Speaker Panel Cable	62	A-16909	RTV Opto Photo Trans. Assy.
30	03-7655-12	Cable Clamp, ¾"	63	4106-01013-06	Sh. Metal Screw, #6 x 3/8"
31	5901-12784-00	Dot Matrix Display Comp.	64	B-13826-3	Ground Lug Assy., 12"
32	5555-12924-00	Speaker 4Ω, Tweeter 15w	65	03-7655-4	Cable Clamp, ¼"
33	5555-12856-00	Speaker 5-1/4, 4Ω, 25w	66	5070-09054-00	Diode 1N4004 1.0A.

A-20905
Speaker Display Token Insert Assembly



A-17540-1
Universal Power Interface Assembly

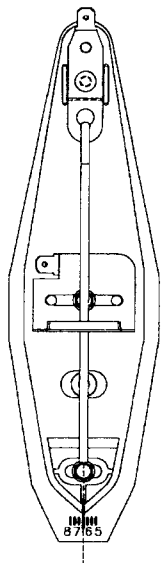


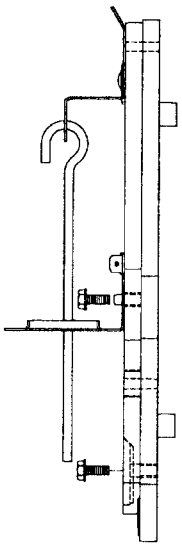
Item	Part Number	Description	Item	Part Number	Description
1	04-10292	Power Control Chassis Box	14	H-17542	Ground Jumper Grn/Yel Cable
2	4406-01128-00	Nut #6-32 KEPS (3)	15	5797-13940-01	Jumper Cable
3	01-12294	Switch Mounting Plate Assembly	16	01-10623	Insulator, Thermistor
4	5642-13935-00	Power Switch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

Universal Power Interface/Cordset Application Chart

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

04-10346
Tilt Mechanism Assembly



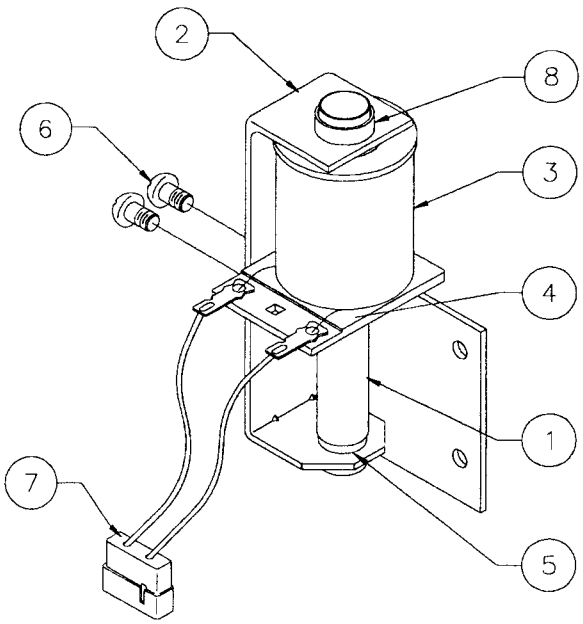


Associated Assemblies:

20-6502-A
Plumb Bob

20-10289
Fastener

B-10686-1
Knocker Assembly



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

A-16713
V-Pad Kicker Assembly

Item	Part Number	Description
1	A-11396	Mounting Bracket Assy.
2	A-16714	V-Pad Crank Assembly
3	02-2364	Coil Plunger
4	12-6227	Hair Pin Clip
5	4700-00030-00	FW, 17/64 x ½ x 15ga.
6	03-8085	Armature Link
7	20-8716-5	Roll Pin, 1/8 x 7/16"
Associated Assemblies:		
8	A-21034	Coil Bracket Assembly
a)	A-17808	Bracket & Stop Assy.
b)	01-8-508-S	Coil Retainer Bracket
c)	AE-24-900	Coil Assembly
d)	4006-01017-06	MS, 6-32 x 3/8"
e)	4406-01119-00	Nut 6-32 ESN
f)	03-7066	Coil Tubing
g)	H-19523	Cable

B-12445
Ball Shooter Assembly

Item	Part Number	Description
1	03-7357	Ball Shooter Sleeve
2	10-148	Spring, Black
3	10-149	Rod Spring
4	20-8714-37	Ext. Retaining Ring, 3/8"
5	20-9253-7	Shooter Rod Assembly
6	21-6645-1	Ball Shooter Housing
7	23-6327	Tip
8	4700-00051-00	FW, 25/64 x 5/8 x 16ga.
Associated Assemblies:		
9	01-3535	Rod Mounting Plate
10	4010-01006-10	MS, 10-32 x 5/8"

Upper Playfield Parts

Item No.	Part Number	Description
2	01-12624	Lower Arch Mounting Bracket (2)
3	A-20246	** 10 Opto P.C.B. w/Brackets
4	A-15849-L-7	Flipper Assembly Complete
	20-10290-6	Flipper w/Shaft, Yellow
5	A-20981-2	Flipper Ball Guide Assy, Left
6	A-17811	Slingshot Kicker Assembly
	B-9362-L-2	Coil & Bracket Assembly
	10-128	Spring
7	A-17801	Kicker Count Switch
8	02-4796-26	Standoff 8/32 x 1 5/8"
9	A-20958	Left Ramp Assembly
10	A-16713	V Pad Kicker Assembly
	A-20989	Single Opto Assembly
	A-21034	Coil & Bracket Assembly
	10-128	Spring
11	A-20965	Ball Guide & Opto Assembly
12	A-20896	3 Bank Drop Target Assembly
13	A-20911	Spin Disk Assembly
14	A-20923	Center Loop Assembly
15	04-10445.1	Ball Guide
17	A-20851	Vari-Target Assembly
18	04-10434	Ball Guide
19	04-10441.1	Ball Guide
20	A-20922	Under Playfield Trough Assy.
21	A-20988	* Left Sign Assembly
22	A-20912	Trough Assembly
23	03-9504	Ball Popper Tube
24	A-20882	Diverter Assembly
25	12-7330.2	Wire Popper Ramp
26	01-14308	Ball Guide
27	04-10407	Ball Guide
28	A-20116	Flap Gate Assembly
29	03-8379-9	Lite Hood
30	4700-00070-00	Flat Washer (12)
31	A-20935	Multi-Ball Assembly
32	A-20116-1	Flap Gate Assembly
33	A-20982	* Bracket & Light Assembly
34	01-14313	Ball Guide
35	A-20907	Popper Mtg. Bracket Assembly
	A-21005	Switch & Bracket Assembly
36	A-17838-1	* Stud Plate
	02-4796-42	* Standoff 8/32 x 2 5/8"
37	01-14306	Ball Guide
38	A-9415-2	Jet Bumper Coil Assembly
	A-12030-3	Jet Bumper Leaf Switch Assy.
	A-12753-2	Lug & Diode Assembly
	B-9414-3	Jet Bumper Wafer Assy., Red
	03-8254-16	Jet Bumper Car, Yellow
	23-6710-1	Clear Tubing 1"
39	A-20895	3 Bank Drop Target Assembly
40	A-20892	3 Bank Drop Target Assembly
41	A-20944	Right Ramp Assembly

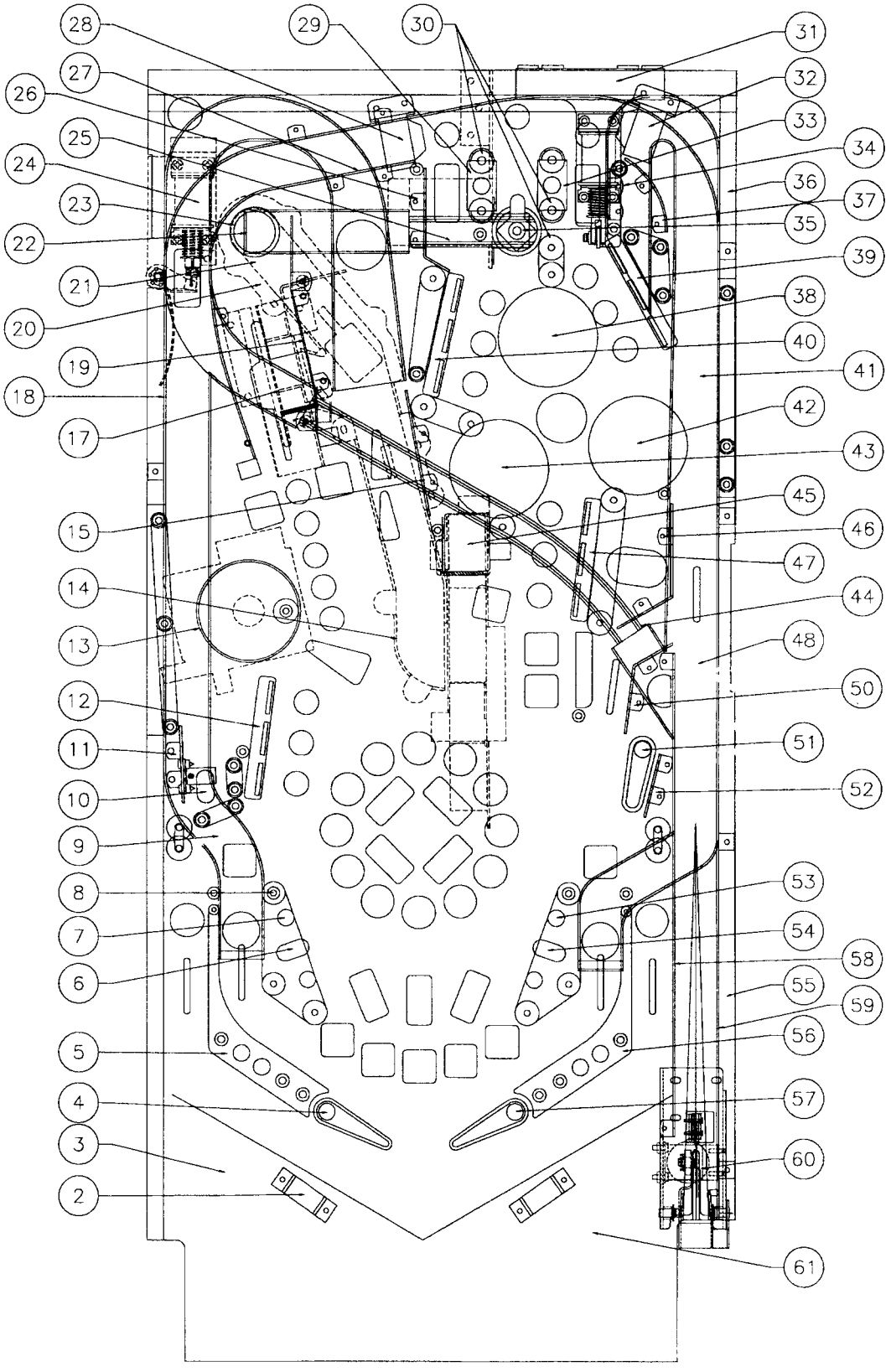
Item No.	Part Number	Description
42	A-9415-2	Jet Bumper Coil Assembly
	A-12030-3	Jet Bumper Leaf Switch Assy.
	A-12753-2	Lug & Diode Assembly
	B-9414-3	Jet Bumper Wafer Assy., Red
	03-8254-9	Jet Bumper Car, Red
	23-6710-1	Clear Tubing 1"
43	A-9415-2	Jet Bumper Coil Assembly
	A-12030-3	Jet Bumper Leaf Switch Assy.
	A-12753-2	Lug & Diode Assembly
	B-9414-3	Jet Bumper Wafer Assy., Red
	03-8254-13	Jet Bumper Cap, Clear
	23-6710-1	Clear Tubing 1"
44	12-7344.2	Center Wire Ramp
45	A-20961	* Bank Light Assembly
46	01-14307	Ball Guide
47	A-20892	3 Bank Drop Target Assembly
48	A-14196	* Shooter Gate Assembly
50	04-10417	Ball Guide
51	A-15849-R-1	Flipper Assembly Complete
	20-9264-6	Small Flipper w/Shaft, Yellow
52	04-10418	Ball Guide
53	A-17801	Kicker Count Switch
54	A-17811	Slingshot Kicker Assembly
	B-9362-R-3	Coil & Bracket Assembly
	10-128	Spring
55	A-15802-P	* Level & Holder Assembly
56	A-20981-1	Flipper Ball Guide Assy, Right
57	A-14876-R-6	Flipper Assembly Complete
	20-10290-6	Flipper w/Shaft, Yellow
58	04-10415.1	Ball Guide
59	04-10423	Ball Guide
60	A-21022	Shooter Lane Auto Kicker Assy.
61	A-19963-3	Outhole Opto Ball Trough Assy.

NOT SHOWN:

A-13204-90003	Bottom Arch Assembly
A-17812-4	Cable Mtg. Brkt. Assy. 1"
A-21040	Playfield Plastic Assembly
20-6500	1-1/16 Steel Ball (4)
36-90003	† Screened Playfield

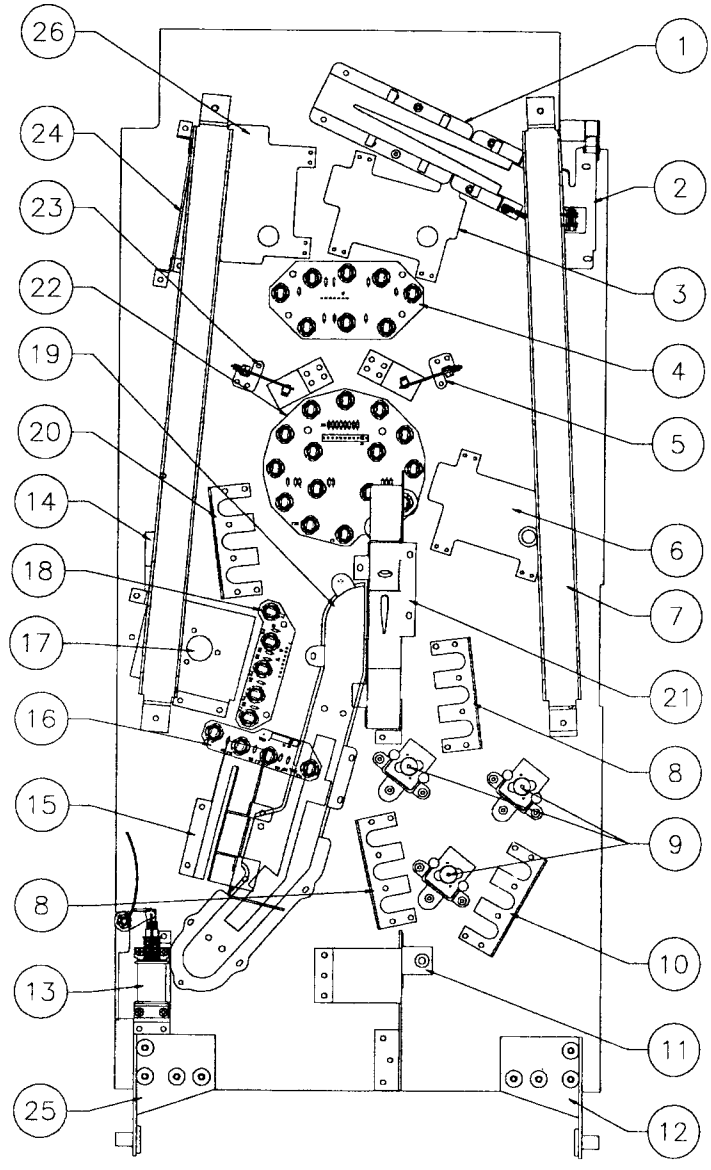
* Not Shown
** Located Under Playfield

Upper Playfield Parts Locations



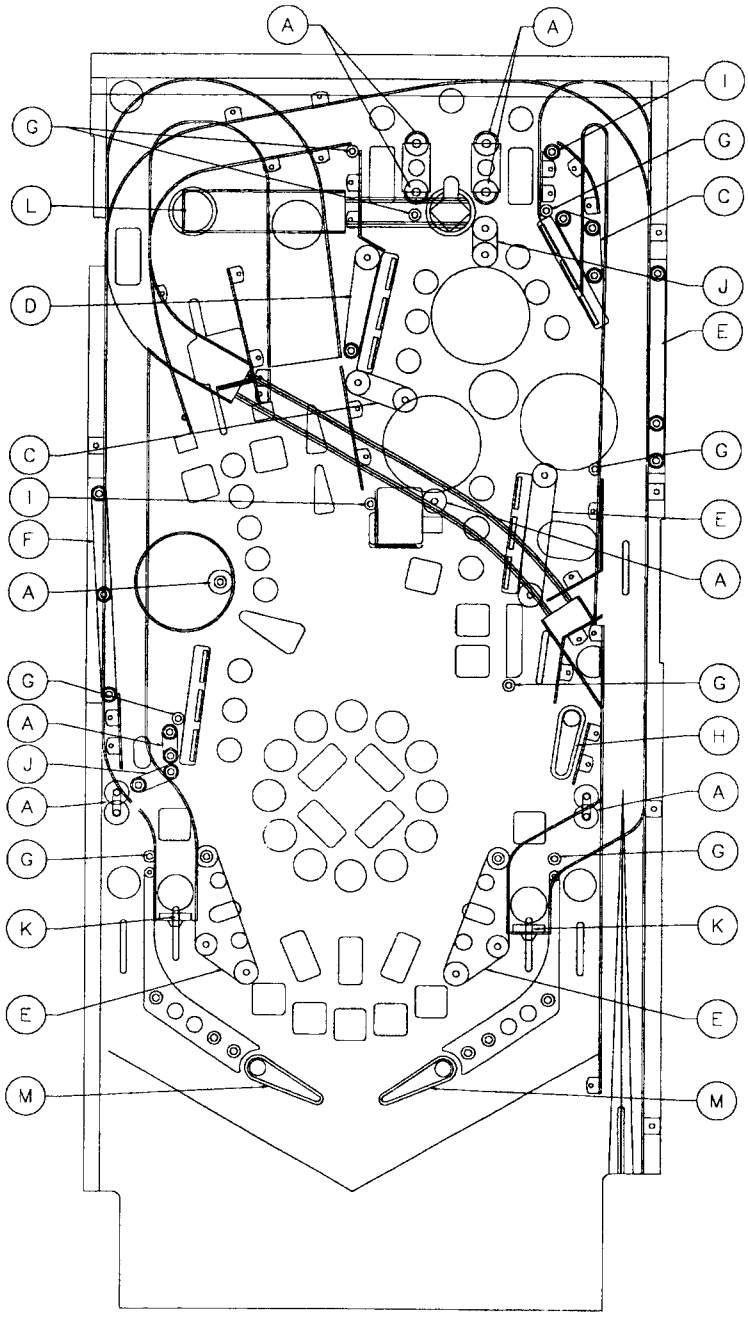
Lower Playfield Parts

Item	Part Number	Description
1	A-19963-3	Outhole Ball Trough Assembly
2	A-21022	Shooter Lane Auto Kicker Assy.
3	A-14876-R-6	Flipper Assembly
4	A-20886	8-Lamp PCB Assembly
5	B-9362-R-3	Coil & Bracket Assembly
6	a-15849-R-1	Flipper Assembly
7	01-14381	Support Bracket (2)
8	A-20892	3-Bank Drop Target Assy. (2)
9	A-9415-2	Jet Bumper Coil Assembly (3)
10	A-20895	3-Bank Target Assembly
11	A-20907	Popper Mtg. Bracket Assembly
12	04-10452.1-1	Slide Bracket, Right
13	A-20882	Diverter Assembly
14	A-21034	Coil & Bracket Assembly
15	A-20851	Vari-Target Assembly
16	A-20888	4-Lamp PCB Assembly
17	A-20911	Spin Disc Assembly
18	A-20890	5-Lamp PCB Assembly
19	A-20922	Under Playfield Trough Assy.
20	A-20896	3-Bank Drop Target Assembly
21	A-20923	Center Loop Assembly
22	A-20887	16-Lamp PCB Assembly
23	B-9362-L-2	Coil & Bracket Assembly
24	A-2-246	10-Opto PCB Assembly
25	04-10452.1-2	Slide Bracket, Left
26	A-15849-L-7	Flipper Assembly



Underside of Playfield, Viewed in Raised Position.

Rubber Rings



Item No.	Part Number	Description.	Qty	Item No.	Part Number	Description.	Qty
A	23-6300	Rubber Ring 5/16"	14	H	23-6553-4	Small Flipper Ring, Red	1
C	23-6302	Rubber Ring 1"	4	I	23-6556	Black Rubber Sleeve	2
D	23-6303	Rubber Ring 1 ¼"	2	J	23-6599	Rubber Ring 7/16"	3
E	23-6305	Rubber Ring 2"	6	K	23-6686	Round Pad, Blue	2
F	23-6307	Rubber Ring 3"	2	L	23-6702	Bumper Plug, Blue	1
G	23-6535	Rubber Grommet	8	M	23-6773	Flipper Ring, Red	2

SWITCH MATRIX

White ——▶|—o o—— Green

Dedicated Grounded Switches	Row \ Column	1 Green-Brown J206-1 U20-18	2 Green-Red J206-2 U20-17	3 Green-Orange J206-3 U20-16	4 Green-Yellow J206-4 U20-15	5 Green-Black J206-5 U20-14	6 Green-Blue J206-6 U20-13	7 Green-Violet J206-7 U20-12	8 Green-Gray J206-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 U17-5 Left Coin Chute D1	1 White-Brown J208-1 U18-11	TP TROUGH (ROOF) 11	SLAM TILT 21	TROUGH EJECT 31	KICKBACK 41	(A)LARM STANDUP 51	TOP LEFT 3-BANK TOP 61	BOTTOM LEFT 3-BANK TOP 71	LEFT TOKEN LEVEL 81	Black-Green J208-13 Lower Right Flipper EOS F1
Orange-Red J205-2 U17-7 Center Coin Chute D2	2 White-Red J208-2 U18-9	TP TROUGH (VARI) 12	COIN DOOR CLOSED 22	TROUGH BALL 1 32	LEFT BIG KICK 42	A(L)ARM STANDUP 52	TOP LEFT 3-BANK MIDDLE 62	BOTTOM LEFT 3-BANK MIDDLE 72	RIGHT TOKEN LEVEL 82	Blue-Violet J212-12 Lower Right Flipper Opto F2
Orange-Black J205-3 U17-11 Right Coin Chute D3	3 White-Orange J208-3 U18-5	START BUTTON 13	NOT USED 23	TROUGH BALL 2 33	TOKEN CHUTE JAM 43	AL(A)RM STANDUP 53	TOP LEFT 3-BANK BOTTOM 63	BOTTOM LEFT 3-BANK BOTTOM 73	RAMP ENTRANCE 83	Black-Blue J208-12 Lower Left Flipper EOS F3
Orange-Yellow J205-4 U17-9 4th Coin Chute D4	4 White-Yellow J208-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH BALL 3 34	LEFT JET 44	ALA(R)M STANDUP 54	TOP RIGHT 3-BANK BOTTOM 64	BOTTOM RIGHT 3-BANK BOTTOM 74	RAMP MADE 84	Blue-Gray J212-11 Lower Left Flipper Opto F4
Orange-Green J205-6 U16-9 Normal Function | Test Function Ser Credits | Esc D5	5 White-Green J208-5 U19-11	RIGHT ORBIT 15	UPPER RIGHT FLIP ROLLOVER 25	TROUGH BALL 4 35	RIGHT JET 45	ALAR(M) STANDUP 55	TOP RIGHT 3-BANK MIDDLE 65	BOTTOM RIGHT 3-BANK MIDDLE 75	WHEEL CHANNEL A 85	Black-Violet J208-11 Upper Right Flipper EOS F5
Orange-Blue J205-7 U16-11 Normal Function | Test Function Vol Down | Down D6	6 White-Blue J208-7 U19-9	LEFT OUTLANE 16	LEFT RETURN 26	LOCKUP 1 FRONT 36	TOP JET 46	VARI TARGET C 56	TOP RIGHT 3-BANK TOP 66	BOTTOM RIGHT 3-BANK TOP 76	WHEEL CHANNEL B 86	Black-Yellow J212-10 Upper Right Flipper Opto F6
Orange-Violet J205-8 U16-7 Normal Function | Test Function Vol Up | Up D7	7 White-Violet J208-8 U19-5	RIGHT OUTLANE 17	RIGHT RETURN 27	LOCKUP 2 REAR 37	LEFT SLINGSHOT 47	VARI TARGET B 57	TOP LEFT LANE 67	BANK KICKOUT 77	NOT USED 87	Black-Gray J208-10 Upper Left Flipper EOS F7
Orange-Gray J205-9 U16-5 Normal Function | Test Function Begin Test | Enter D8	8 White-Gray J208-9 U19-7	BALL SHOOTER 18	LEFT ORBIT 28	NOT USED 38	RIGHT SLINGSHOT 48	VARI TARGET A 58	TOP POPPER 68	TOP RIGHT LANE 78	NOT USED 88	Black-Blue J212-9 Upper Left Flipper Opto F8

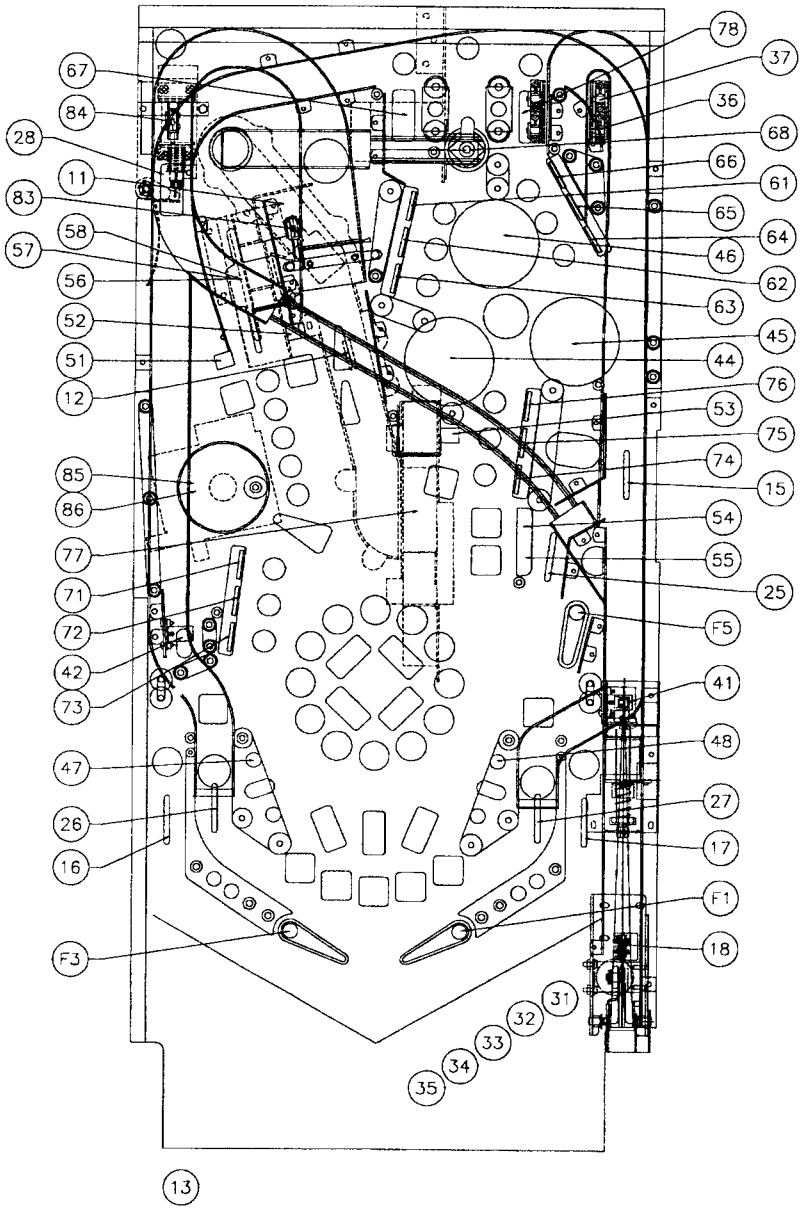
J2XX = CPU Board; ▒ = Opto, Typically Closed

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	5647-12693-26	Tp Trough (Roof)
12	5647-12693-26	Tp Trough (Vari)
13	20-9663-16	Start Button
14	04-10346	*Plumb Bob Tilt
15	5647-12693-19	Right Orbit
16	5647-12693-19	Left Outlane
17	5647-12693-19	Right Outlane
18	5647-12693-65	Ball Shooter
21	A-17195-1	*Slam Tilt
22	5643-09288-00	*Coin Door Closed
23	---	Not Used
24	5643-09112-00	*Always Closed
25	5647-12693-19	Upper Right Flip Rollover
26	5647-12693-19	Left Return
27	5647-12693-19	Right Return
28	20-10293	Left Orbit

Item No.	Switch Part No.	Description
31	A-18617-1	Trough Eject (LED)
	A-18618-1	(Trans.)
32	A-18617-1	Trough Ball 1 (LED)
	A-18618-1	(Trans.)
33	A-18617-1	Trough Ball 2 (LED)
	A-18618-1	(Trans.)
34	A-18617-1	Trough Ball 3 (LED)
	A-18618-1	(Trans.)
35	A-18617-1	Trough Ball 4 (LED)
	A-18618-1	(Trans.)
36	A-16908	Lockup 1 Front (LED)
	A-16909	(Trans.)
37	A-16908	Lockup 2 Rear (LED)
	A-16909	(Trans.)
38	---	Not Used
41	A-16908	Kick Back (LED)
	A-16909	(Trans.)
42	A-16908	Left Big Kick (LED)
	A-16909	(Trans.)
43	A-16908	*Token Chute Jam (LED)
	A-16909	(Trans.)
44	SW-11A-37-1	Left Jet
45	SW-11A-37-1	Right Jet
46	SW-11A-37-1	Top Jet

*Not Shown
† Located Under Playfield



Item No.	Switch Part No.	Description
47	SW-1A-114	Left Slingshot (kicker)
	SW-1A-120	(score)
48	SW-1A-114	Right Slingshot (kicker)
	SW-1A-120	(score)
51	A-18530-6	(A)LARM Standup
52	A-18530-6	A(L)ARM Standup
53	A-20976-6	AL(A)RM Standup
54	A-17799-6	ALA(R)M Standup
55	A-17799-6	ALAR(M) Standup
56	A-20906	Vari Target C
57	A-20906	Vari Target B
58	A-20906	Vari Target A
61	A-13609	Top Left 3-Bank Top
62	A-13609	Top Left 3-Bank Middle
63	A-13609	Top Left 3-Bank Bottom
64	A-13609	Top Right 3-Bank Bottom
65	A-13609	Top Right 3-Bank Middle
66	A-13609	Top Right 3-Bank Top

*Not Shown

Item No.	Switch Part No.	Description
67	20-10293	Top Left Lane
68	5647-12693-15	Top Popper
71	A-13609	Bottom Left 3-Bank Top
72	A-13609	Bottom Left 3-Bank Middle
73	A-13609	Bottom Left 3-Bank Bottom
74	A-13609	Bottom Right 3-Bank Bottom
75	A-13609	Bottom Right 3-Bank Middle
76	A-13609	Bottom Right 3-Bank Top
77	5647-12693-26	Bank Kickout
78	20-10293	Top Right Lane
81	20-10301	*Left Token Level
82	20-10301	*Right Token Level
83	5647-12693-21	Ramp Entrance
84	5647-12693-11	Ramp Made
85	A-20952	Wheel Channel A
86	A-20952	Wheel Channel B

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	BIG KICK	High Power	J133-2			Q72	J116-1			Vio-Brn	AE-24-900	
02	RIGHT TOKEN TUBE	High Power		J135-2		Q68		J118-2		Vio-Red		04-10424
03	VARI TARGET RESET	High Power	J133-2			Q71	J116-4			Vio-Org	SM1-26-600	
04	LEFT TOKEN TUBE	High Power		J135-2		Q67		J118-5		Vio-Yel		04-10424
05	BANK KICK	High Power	J133-2			Q70	J116-6			Vio-Grn	AE-23-800	
06	TOP POPPER UP	High Power	J133-2			Q66	J116-7			Vio-Blu	AE-24-900	
07	RAMP DIVERTER	High Power	J133-2			Q69	J116-8			Vio-Blk	AE-26-1500	
08	KICKBACK (RAMP)	High Power	J133-2			Q65	J116-9			Vio-Gry	AE-23-800	
09	TROUGH EJECT	Low Power	J133-3			Q44	J113-1			Brn-Blk	AE-26-1500	
10	LEFT SLINGSHOT	Low Power	J133-3			Q48	J113-3			Brn-Red	AE-26-1200	
11	RIGHT SLINGSHOT	Low Power	J133-3			Q43	J113-4			Brn-Org	AE-26-1200	
12	LEFT JET	Low Power	J133-3			Q47	J113-5			Brn-Yel	AE-26-1200	
13	RIGHT JET	Low Power	J133-3			Q42	J113-6			Brn-Grn	AE-26-1200	
14	TOP JET	Low Power	J133-3			Q46	J113-7			Brn-Blu	AE-26-1200	
15	TOP LEFT 3-BANK	Low Power	J133-3			Q41	J113-8			Brn-Vio	AE-26-1200	
16	TOP RIGHT 3-BANK	Low Power	J133-3			Q45	J113-9			Brn-Gry	AE-26-1200	
17	BACK LEFT	Flasher	J133-6			Q28	J111-1			Blk-Brn	#906	
18	JETS & BACK RIGHT (2)	Flasher	J133-6			Q32	J111-2			Blk-Red	#89, #906	
19	RIGHT MIDDLE	Flasher	J133-6			Q27	J111-3			Blk-Org	#906	
20	RIGHT BOTTOM	Flasher	J133-6			Q31	J111-4			Blk-Yel	#906	
21	LEFT MIDDLE	Flasher	J133-6			Q26	J111-5			Blu-Brn	#906	
22	LEFT BOTTOM	Flasher	J133-6			Q30	J111-6			Blu-Red	#906	
23	LIGHT ROPE 1	Flasher		J134-5		Q25		J112-8		Blu-Org		04-10440
24	LIGHT ROPE 2	Flasher		J134-5		Q29		J112-9		Blu-Yel		04-10440
25	TOP POPPER EJECT	Gen. Purpose	J133-1			Q16	J109-1			Blu-Grn	AE-27-1200	
26	TOP LIGHT & MOTOR	Gen. Purpose		J140-2		Q15		J109-2		Blu-Blk		20-10307
27	BOTTOM LEFT 3-BANK	Gen. Purpose	J133-1			Q14	J109-3			Blu-Vio	AE-26-1200	
28	BOTTOM RIGHT 3-BANK	Gen. Purpose	J133-1			Q13	J109-4			Blu-Gry	AE-26-1200	
35	AUTO PLUNGER	High Power	J119-8,9			Q81	J120-3			Yel-Gry	AE-23-800	
36	LOCK UP RELEASE	Low Power	J119-8,9			Q83	J120-1			Org-Gry	AE-26-1200	
37	AUX. LAMP ENABLE	¤L.P.D.C.		J138-2				J110-1		Brn-Wht		A-20909
38	AUX. LAMP CLOCK	¤L.P.D.C.		J138-2				J110-3		Org-Wht		A-20909
39	AUX. LAMP DATA 1	¤L.P.D.C.		J138-2				J110-4		Yel-Wht		A-20909
40	AUX. LAMP DATA 2	¤L.P.D.C.		J138-2				J110-5		Grn-Wht		A-20909
	General Illumination											
01	ILLUMINATION STRING 1	G.I.	J105-1	J106-1		Q5	J105-7	J106-7		Wht-Brn	#44	#555
02	**AUX. LAMP 1 POWER	G.I.				Q4		J106-8		Wht-Org		#555
03	ILLUMINATION STRING 3	G.I.	J105-3	J106-3		Q3	J105-9	J106-9		Wht-Yel	#44	#555
04	**AUX. LAMP 2 POWER	G.I.				Q2		J106-10		Wht-Grn		#555
05	**AUX. LAMP 3 POWER	G.I.				Q1		J106-11		Wht-Vio		#555

	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	J119-1 (Red-Grn)	Q90		J120-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J119-1 (Red-Grn)		Q92	J120-11		Org-Grn	FL-20867	WHITE
31		Lwr. Lt. Power	J119-4 (Red-Blu)	Q87		J120-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J119-4 (Red-Blu)		Q89	J120-7		Org-Blu	FL-20867	WHITE
33		Upr. Rt. Power	J119-6 (Red-Vio)	Q84		J120-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J119-6 (Red-Vio)		Q86	J120-4		Org-Vio	FL-11753	YELLOW
35		Upr. Lt. Power	J119-8 (Red-Gry)	Q81		J120-3	Yel-Gry		SEE	ABOVE
36	Upper Left Flipper	Upr. Lt. Hold	J119-8 (Red-Gry)		Q83	J120-1		Org-Gry	SEE	ABOVE

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

**These G.I. strings do not brighten and dim, they are always ON.

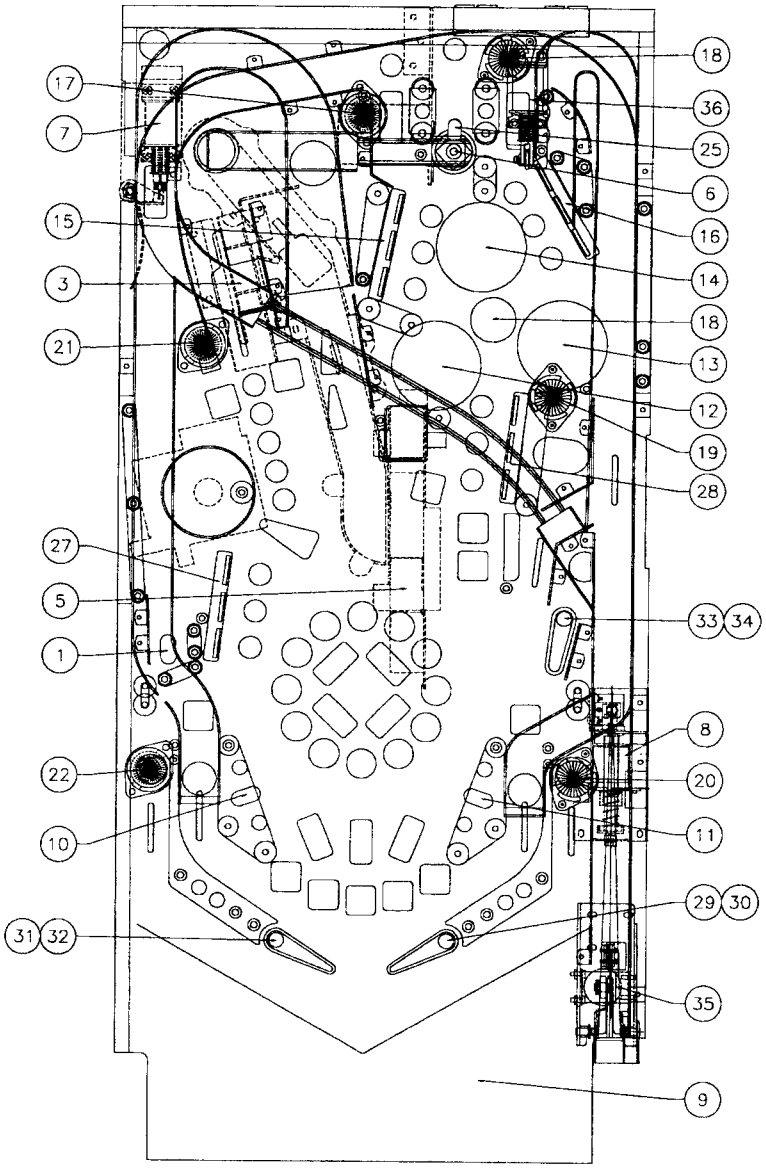
¤L.P.D.C. = Low Power Device Controls

SOLENOID/FLASHER LOCATIONS

Item No.	Coil/ Flasher No.	Assy. Number	Description
01	AE-24-900	A-21034	BIG KICK
02	04-10424	A-20925	* RIGHT TOKEN TUBE
03	SM1-26-600	A-20916	VARI TARGET RESET
04	04-10424	A-20925	* LEFT TOKEN TUBE
05	AE-23-800	A-20923	BANK KICK
06	AE-24-900	A-20919	TOP POPPER UP
07	AE-26-1500	A-20882	RAMP DIVERTER
08	AE-23-800	A-20959	KICKBACK (RAMP)
09	AE-26-1500	A-19963-3	TROUGH EJECT
10	AE-26-1200	B-9362-L-2	LEFT SLINGSHOT
11	AE-26-1200	B-9362-R-3	RIGHT SLINGSHOT
12	AE-26-1200	A-9415-2	LEFT JET
13	AE-26-1200	A-9415-2	RIGHT JET
14	AE-26-1200	A-9415-2	TOP JET
15	AE-26-1200	A-20892	TOP LEFT 3-BANK
16	AE-26-1200	A-20895	TOP RIGHT 3-BANK

*Located in Backbox

Solenoid/Flasher Locations



Item No.	Coil/ Flasher No.	Assy. Number.	Description
17	24-8802	A-20958	BACK LEFT
18	24-8802	A-20944	JETS & BACK RIGHT (2)
	24-8704	A-17984	
19	24-8802	A-20944	RIGHT MIDDLE
20	24-8802	A-20944	RIGHT BOTTOM
21	24-8802	A-20958	LEFT MIDDLE
22	24-8802	A-20958	LEFT BOTTOM
23	04-10440	90003-BB	* LIGHT ROPE 1
24	04-10440	90003-BB	* LIGHT ROPE 2
25	AE-27-1200	A-20920	TOP POPPER EJECT
26	20-10307	90003-BB	* TOP LIGHT & MOTOR
27	AE-26-1200	A-20896	BOTTOM LEFT 3-BANK
28	AE-26-1200	A-20892	BOTTOM RIGHT 3-BANK
35	AE-23-800	A-21022	AUTO PLUNGER
36	AE-26-1200	A-20935	LOCK UP RELEASE
37	---	A-20909	* AUX. LAMP ENABLE
38	---	A-20909	* AUX. LAMP CLOCK
39	---	A-20909	* AUX. LAMP DATA 1
40	---	A-20909	* AUX. LAMP DATA 2

General Illumination Circuits

Item No.	Description	Bulb No.	
01	ILLUMINATION STRING 1	#44, #555	G.I. STRING 1
02	AUX. LAMP 1 POWER	#555	G.I. STRING 2
03	ILLUMINATION STRING 3	#44, #555	G.I. STRING 3
04	AUX. LAMP 2 POWER	#555	G.I. STRING 4
05	AUX. LAMP 3 POWER	#555	G.I. STRING 5

Flipper Coils

Item No.	Coil No.	Color	Assy. No.	Description
29 & 30	FL-20867	WHITE	A-14876-R-6	LOWER R FLIPPER
31 & 32	FL-20867	WHITE	A-15849-L-7	LOWER L FLIPPER
33 & 34	FL-11753	YELLOW	A-15849-R-1	UPPER R. FLIPPER

* Located in Backbox

LAMP MATRIX

Yellow (B+) → Red

Row \ Column	1 Yellow-Brown J121-1 Q96	2 Yellow-Red J121-2 Q100	3 Yellow-Orange J121-3 Q95	4 Yellow-Black J121-4 Q99	5 Yellow-Green J121-5 Q94	6 Yellow-Blue J121-6 Q98	7 Yellow-Violet J121-7 Q93	8 Yellow-Gray J121-9 Q97
1 Red-Brown J125-1 Q104	LITE DEPOSIT 11	CENTER TIMER "15" 21	ARMOR CAR CELLAR 31	BONUS 5X + OUTLANE 41	WHEEL ARROW 51	TOP RIGHT 3-BANK TOP 61	BOTTOM R. 3-BANK TOP 71	TOP JET (YELLOW) 81
2 Red-Black J125-2 Q108	CENTER TIMER "10" 12	CENTER TIMER "20" 22	ARMOR CAR ROOF 32	BONUS 5X 42	LITE OUTLANES 52	TOP RIGHT 3-BANK MIDDLE 62	BOTTOM R. 3-BANK MIDDLE 72	LEFT JET (CLEAR) 82
3 Red-Orange J125-4 Q103	DISABLE COMPUTER 13	CENTER TIMER "25" 23	ARMOR CAR MAIN 33	BONUS 4X 43	INVISIBLE CODE 53	TOP RIGHT 3-BANK BOTTOM 63	BOTTOM R. 3-BANK BOTTOM 73	RIGHT JET (RED) 83
4 Red-Yellow J125-5 Q107	CENTER TIMER "5" 14	CENTER TIMER "30" 24	BONUS 2X 34	BONUS 3X 44	EXPLOSIVES 54	TOP LEFT 3-BANK TOP 64	BOTTOM L. 3-BANK TOP 74	BANK LEFT 84
5 Red-Green J125-6 Q102	CENTER TIMER "0" 15	CENTER TIMER "35" 25	(A)LARM STANDUP 35	RAMP LOCK 45	NOTE TO TELLER 55	TOP LEFT 3-BANK MIDDLE 65	BOTTOM R. 3-BANK MIDDLE 75	BANK RIGHT 85
6 Red-Blue J125-7 Q106	LITE LOCK 16	CALL GUARD 26	ATM CARD 36	AL(A)RM STANDUP 46	TOP LEFT LANE 56	TOP LEFT 3-BANK BOTTOM 66	BOTTOM R. 3-BANK BOTTOM 76	VARI BREAK IN 86
7 Red-Violet J125-8 Q101	CENTER TIMER "55" 17	CENTER TIMER "45" 27	A(L)ARM STANDUP 37	ALA(R)M STANDUP 47	TOP MIDDLE LANE 57	RIGHT "EXTRA TIME" 67	LEFT RETURN 77	ROOF BREAK IN 87
8 Red-Gray J125-9 Q105	CENTER TIMER "50" 18	CENTER TIMER "40" 28	RAMP JACKPOT 38	ALAR(M) STANDUP 48	TOP RIGHT LANE 58	RIGHT RETURN 68	LEFT "EXTRA TIME" 78	START BUTTON 88

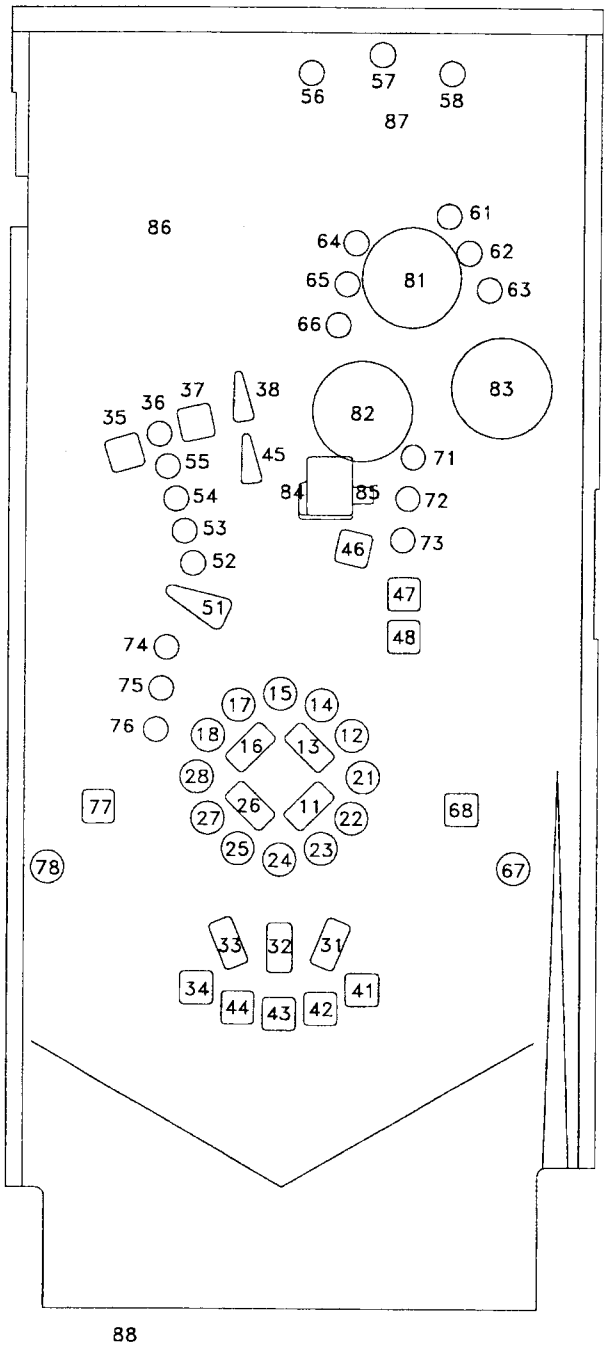
J1XX = Power Driver Board

LAMP LOCATIONS

Item No.	Bulb No.	Lamp Assy. No.	Description
11	24-8768	A-20887	Lite Deposit
12	24-8768	A-20887	Center Timer "10"
13	24-8768	A-20887	Disable Computer
14	24-8768	A-20887	Center Timer "5"
15	24-8768	A-20887	Center Timer "0"
16	24-8768	A-20887	Lite Lock
17	24-8768	A-20887	Center Timer "55"
18	24-8768	A-20887	Center Timer "50"
21	24-8768	A-20887	Center Timer "15"
22	24-8768	A-20887	Center Timer "20"
23	24-8768	A-20887	Center Timer "25"
24	24-8768	A-20887	Center Timer "30"
25	24-8768	A-20887	Center Timer "35"
26	24-8768	A-20887	Call Guard
27	24-8768	A-20887	Center Timer "45"
28	24-8768	A-20887	Center Timer "40"
31	24-8768	A-20886	Armor Car-Cellar
32	24-8768	A-20886	Armor Car-Roof
33	24-8768	A-20886	Armor Car-Main
34	24-8768	A-20886	Bonus 2X
35	24-8768	A-20888	(A)LARM Standup
36	24-8768	A-20888	ATM Card
37	24-8768	A-20888	A(L)ARM Standup
38	24-8768	A-20888	Ramp Jackpot

Item No.	Bulb No.	Lamp Assy. No.	Description
41	24-8768	A-20886	Bonus 5X + Outlane
42	24-8768	A-20886	Bonus 5X
43	24-8768	A-20886	Bonus 4X
44	24-8768	A-20886	Bonus 3X
45	24-6549	A-17807	Ramp Lock
46	24-6549	A-17835	AL(A)RM Standup
47	24-6549	A-17835	ALA(R)M Standup
48	24-6549	A-17835	ALAR(M) Standup
51	24-8768	A-20888	Wheel Arrow
52	24-8768	A-20888	Lite Outlanes
53	24-8768	A-20888	Invisible Code
54	24-8768	A-20888	Explosives
55	24-8768	A-20888	Note to Teller
56	24-6549	A-17835	Top Left Lane
57	24-6549	A-17807	Top Middle Lane
58	24-6549	A-17835	Top Right Lane
61	24-6549	A-17835	Top Right 3-Bank Top
62	24-6549	A-17807	Top Right 3-Bank Middle
63	24-6549	A-17835	Top Right 3-Bank Bottom
64	24-6549	A-17835	Top Left 3-Bank Top
65	24-6549	A-17807	Top Left 3-Bank Middle
66	24-6549	A-17835	Top Left 3-Bank Bottom
67	24-6549	A-17835	Right "Extra Time"
68	24-6549	A-17835	Right Return

Lamp Locations

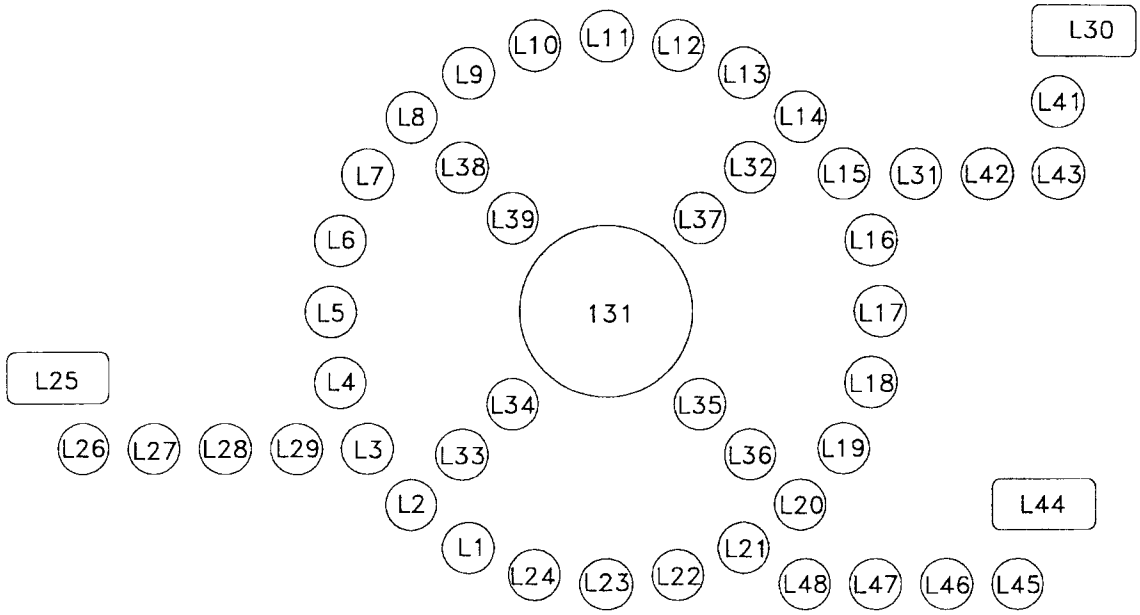


Item No.	Bulb No.	Lamp Assy. No.	Description
71	24-6549	A-17835	Bottom Right 3-Bank Top
72	24-6549	A-17807	Bottom Right 3-Bank Middle
73	24-6549	A-17835	Bottom Right 3-Bank Bottom
74	24-6549	A-17835	Bottom Left 3-Bank Top
75	24-6549	A-17807	Bottom Left 3-Bank Middle
76	24-6549	A-17835	Bottom Left 3-Bank Bottom
77	24-6549	A-17835	Left Return
78	24-6549	A-17835	Left "Extra Time"
81	24-8768	B-9414-3	Top Jet (Yellow)
82	24-8768	B-9414-3	Left Jet (Clear)

Item No.	Bulb No.	Lamp Assy. No.	Description
83	24-8768	B-9414-3	Right Jet (Red)
84	24-6549	04-10083	Bank Left
85	24-6549	04-10083	Bank Right
86	24-6549	A-16041	Vari Break In
87	24-6549	A-16041	Roof Break In
88	---	20-9663-16	Start Button

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

Lamp Locations



Backbox Lamps

Item No.	Bulb No.	Lamp Assy. No.	Description
L1	24-8768	A-20909	Backbox Lamp
L2	24-8768	A-20909	Backbox Lamp
L3	24-8768	A-20909	Backbox Lamp
L4	24-8768	A-20909	Backbox Lamp
L5	24-8768	A-20909	Backbox Lamp
L6	24-8768	A-20909	Backbox Lamp
L7	24-8768	A-20909	Backbox Lamp
L8	24-8768	A-20909	Backbox Lamp
L9	24-8768	A-20909	Backbox Lamp
L10	24-8768	A-20909	Backbox Lamp
L11	24-8768	A-20909	Backbox Lamp
L12	24-8768	A-20909	Backbox Lamp
L13	24-8768	A-20909	Backbox Lamp
L14	24-8768	A-20909	Backbox Lamp
L15	24-8768	A-20909	Backbox Lamp
L16	24-8768	A-20909	Backbox Lamp
L17	24-8768	A-20909	Backbox Lamp
L18	24-8768	A-20909	Backbox Lamp
L19	24-8768	A-20909	Backbox Lamp
L20	24-8768	A-20909	Backbox Lamp
L21	24-8768	A-20909	Backbox Lamp
L22	24-8768	A-20909	Backbox Lamp
L23	24-8768	A-20909	Backbox Lamp

Item No.	Bulb No.	Lamp Assy. No.	Description
L24	24-8768	A-20909	Backbox Lamp
L25	24-8768	A-20909	Backbox Lamp
L26	24-8768	A-20909	Backbox Lamp
L27	24-8768	A-20909	Backbox Lamp
L28	24-8768	A-20909	Backbox Lamp
L29	24-8768	A-20909	Backbox Lamp
L30	24-8768	A-20909	Backbox Lamp
L31	24-8768	A-20909	Backbox Lamp
L32	24-8768	A-20909	Backbox Lamp
L33	24-8768	A-20909	Backbox Lamp
L34	24-8768	A-20909	Backbox Lamp
L35	24-8768	A-20909	Backbox Lamp
L36	24-8768	A-20909	Backbox Lamp
L37	24-8768	A-20909	Backbox Lamp
L38	24-8768	A-20909	Backbox Lamp
L39	24-8768	A-20909	Backbox Lamp
L40	24-8768	A-20909	Backbox Lamp
L41	24-8768	A-20909	Backbox Lamp
L42	24-8768	A-20909	Backbox Lamp
L43	24-8768	A-20909	Backbox Lamp
L44	24-8768	A-20909	Backbox Lamp
L45	24-8768	A-20909	Backbox Lamp
L46	24-8768	A-20909	Backbox Lamp
L47	24-8768	A-20909	Backbox Lamp
L48	24-8768	A-20909	Backbox Lamp

24-8768 = #555 Bulb
Associated parts for lamps L1 thru L48:

03-8063-4	Lite Sleeve, Red (4)
03-8063-5	Lite Sleeve, White (40)
03-8063-6	Lite Sleeve, Yellow (4)

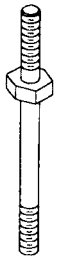
Posts



02-4020
Support Post, 1/2"
Quantity: 2

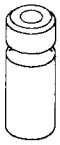


02-4424-1
Post #6-32/#8-32
Quantity: 10

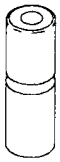


02-4425-1
Post #8-32/#8-32 x 5/8"
Quantity: 3

02-4425-2
Post #8-32/#8-32 x 9/32"
Quantity: 1



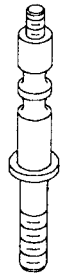
02-4434
Post #8 x 1"
Quantity: 3



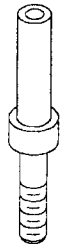
02-4435
Post Spacer, #8 x 1-3/16"
Quantity: 3



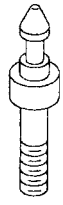
02-4493
Double Bumper Post, Hex. Base
Quantity: 1



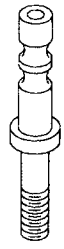
02-4658
Double Bumper Post #10
Quantity: 9



02-4659-1
Post #10 (3/8" Deep MS)
Quantity: 1



02-4660
Single Bumper Post #10
Quantity: 8



02-4678
Double Bumper Post #10
Quantity: 3

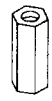


02-4679
Bumper Post #10
Quantity: 1

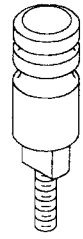


02-4796-26
M-F Spacer 8-32 x 1-5/8"
Quantity: 1

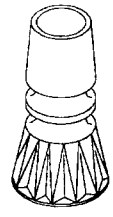
02-4796-42
M-F Spacer 8-32 x 2-5/8"
Quantity: 1



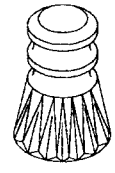
02-4252-10
Spacer F-F 6-32 x 5/8"
Quantity: 1



02-5107
Adjusting Post
Quantity: 2



03-8130-13
Double Star Post, Clear
Quantity: 1



03-8247-13
Bumper Post Double Starred
Quantity: 1



03-8319-13
Post #8 Starred, Clear
Quantity: 6

Notes

NOTES

NOTES

SECTION THREE

GAME WIRING AND SCHEMATICS

CONNECTOR & COMPONENT IDENTIFICATION

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

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

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

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

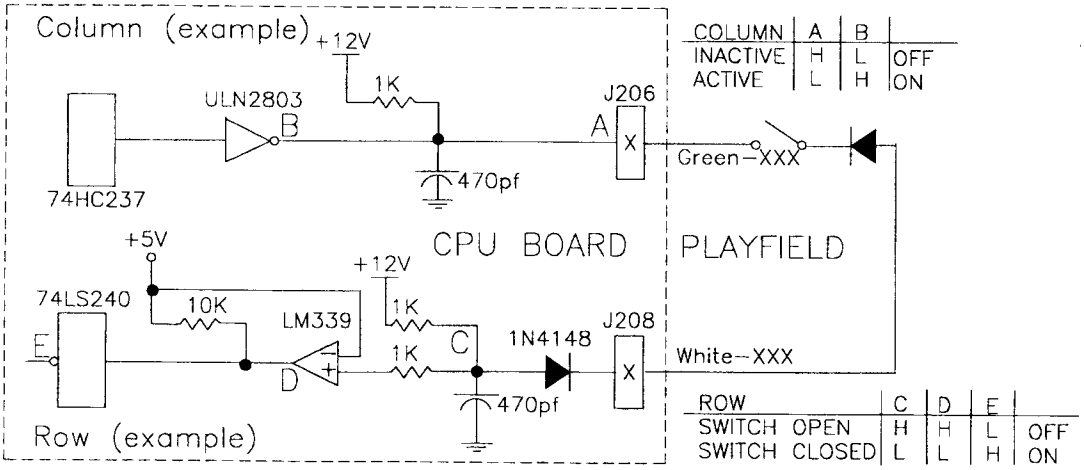
SWITCH MATRIX

White ——▶|—o/ o—— Green

Dedicated Grounded Switches	Column / Row	1 Green-Brown J206-1 U20-18	2 Green-Red J206-2 U20-17	3 Green-Orange J206-3 U20-16	4 Green-Yellow J206-4 U20-15	5 Green-Black J206-5 U20-14	6 Green-Blue J206-6 U20-13	7 Green-Violet J206-7 U20-12	8 Green-Gray J206-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 U17-5 Left Coin Chute D1	1 White-Brown J208-1 U18-11	TP TROUGH (ROOF) 11	SLAM TILT 21	TROUGH EJECT 31	KICKBACK 41	STANDUP 1 51	TOP LEFT 3-BANK (TOP) 61	BOTTOM LEFT 3-BANK (TOP) 71	TOKEN LEVEL 1 81	Black-Green J208-13 Lower Right Flipper EOS F1
Orange-Red J205-2 U17-7 Center Coin Chute D2	2 White-Red J208-2 U18-9	TP TROUGH (VARI) 12	COIN DOOR CLOSED 22	TROUGH BALL 1 32	LEFT BIT KICK 42	STANDUP 2 52	TOP LEFT 3-BANK (MIDDLE) 62	BOTTOM LEFT 3-BANK (MIDDLE) 72	TOKEN LEVEL 2 82	Blue-Violet J212-12 Lower Right Flipper Opto F2
Orange-Black J205-3 U17-11 Right Coin Chute D3	3 White-Orange J208-3 U18-5	START BUTTON 13	NOT USED 23	TROUGH BALL 2 33	COIN CHUTE 43	STANDUP 3 53	TOP LEFT 3-BANK (BOTTOM) 63	BOTTOM LEFT 3-BANK (BOTTOM) 73	RAMP ENTRANCE 83	Black-Blue J208-12 Lower Left Flipper EOS F3
Orange-Yellow J205-4 U17-9 4th Coin Chute D4	4 White-Yellow J208-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH BALL 3 34	LEFT JET 44	STANDUP 4 54	TOP RIGHT 3-BANK (BOTTOM) 64	BOTTOM RIGHT 3-BANK (BOTTOM) 74	RAMP MADE 84	Blue-Gray J212-11 Lower Left Flipper Opto F4
Orange-Green J205-6 U16-9 Normal Function: Ser Credits | Test Function: Esc D5	5 White-Green J208-5 U19-11	RIGHT ORBIT 15	UPPER RIGHT FLIP ROLLOVER 25	TROUGH BALL 4 35	RIGHT JET 45	STANDUP 5 55	TOP RIGHT 3-BANK (MIDDLE) 65	BOTTOM RIGHT 3-BANK (MIDDLE) 75	WHEEL CHANNEL A 85	Black-Violet J208-11 Upper Right Flipper EOS F5
Orange-Blue J205-7 U16-11 Normal Function: Vol Down | Test Function: Down D6	6 White-Blue J208-7 U19-9	LEFT OUTLANE 16	LEFT RETURN 26	LOCKUP 1 36	TOP JET 46	VARI TARGET A 56	TOP RIGHT 3-BANK (TOP) 66	BOTTOM RIGHT 3-BANK (TOP) 76	WHEEL CHANNEL B 86	(NOT USED) Black-Yellow J212-10 Upper Right Flipper Opto F6
Orange-Violet J205-8 U16-7 Normal Function: Vol Up | Test Function: Up D7	7 White-Violet J208-8 U19-5	RIGHT OUTLANE 17	RIGHT RETURN 27	LOCKUP 2 37	LEFT SLINGSHOT 47	VARI TARGET B 57	LEFT LANE 67	SCOOP KICK 77	NOT USED 87	Black-Gray J208-10 Upper Left Flipper EOS F7
Orange-Gray J205-9 U16-5 Normal Function: Begin Test | Test Function: Enter D8	8 White-Gray J208-9 U19-7	BALL SHOOTER 18	LEFT ORBIT 28	NOT USED 38	RIGHT SLINGSHOT 48	VARI TARGET C 58	TOP POPPER 68	RIGHT LANE 78	NOT USED 88	(NOT USED) Black-Blue J212-9 Upper Left Flipper Opto F8

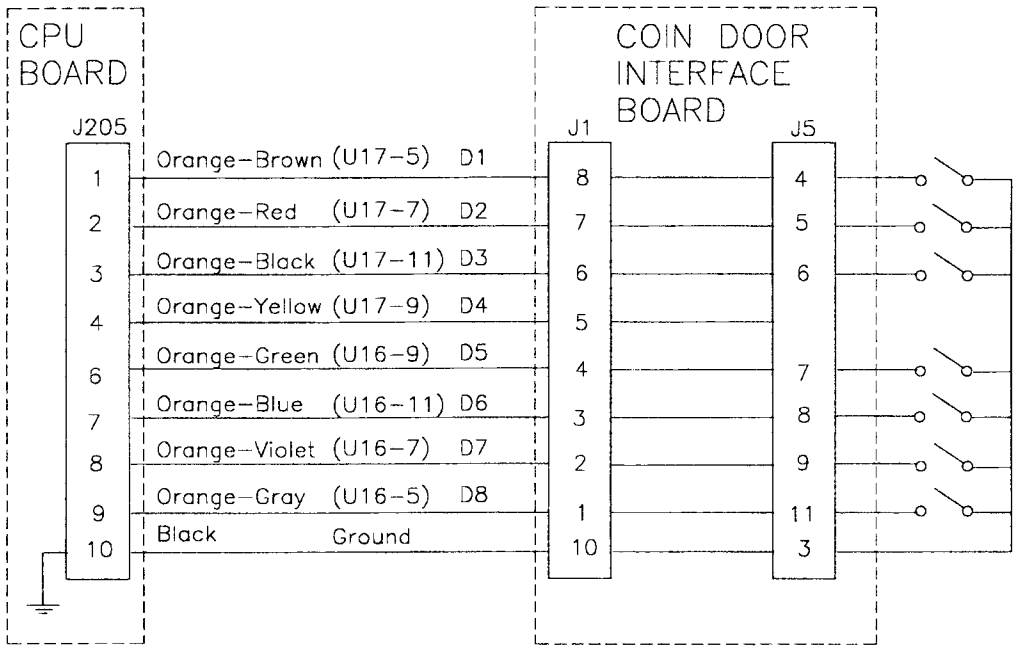
J2XX = CPU Board; ▭ = Opto, Typically Closed

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

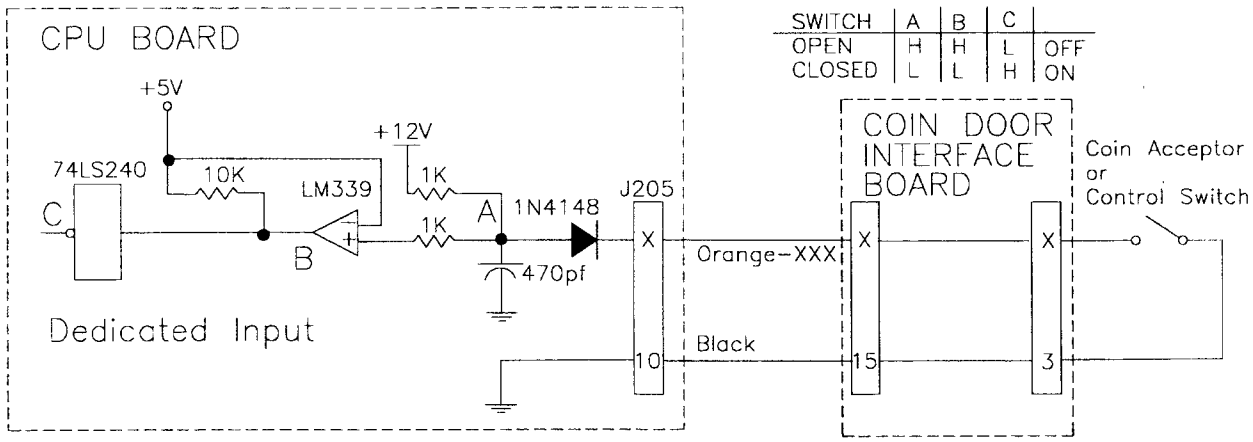
DEDICATED SWITCHES



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

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

DEDICATED SWITCH CIRCUIT



The dedicated switches operate similar in the matrix, except that instead of a column circuit there is a direct tie to ground. Therefore, the column side is constantly active (low). When a switch closes, the row side (dedicated input) of the circuit activates. The "+" input to the LM339 drops below +5V, therefore the output is low. Since the row circuit (dedicated input) is tied directly to ground through the switch, the switch is considered closed by the microprocessor. When the switch opens, the "+" input to the LM339 is above +5V, it output is high and the row is inactive

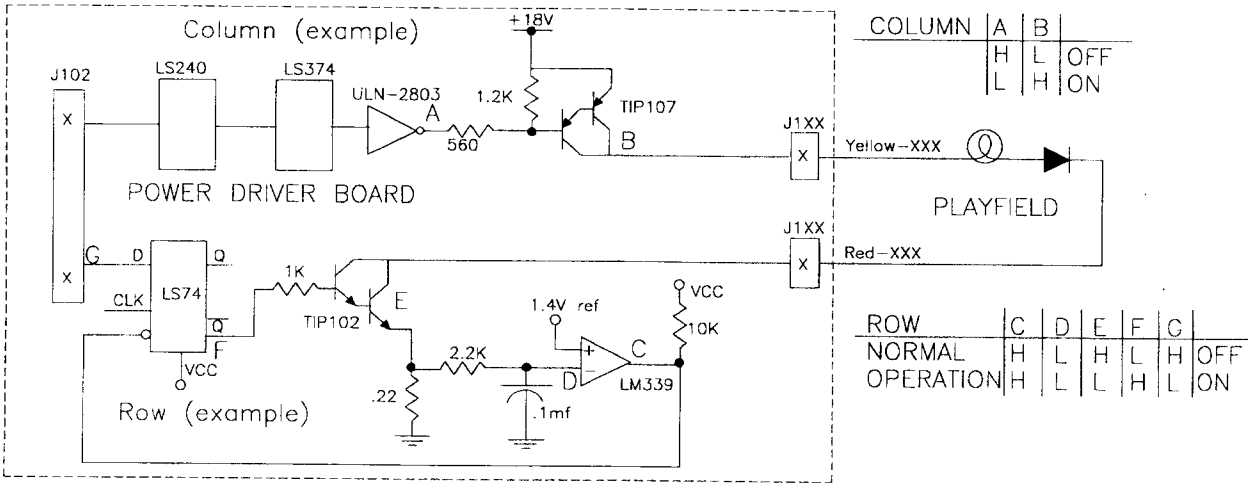
LAMP MATRIX

Yellow (B+) → Red

Column / Row	1 Yellow-Brown J121-1 Q96	2 Yellow-Red J121-2 Q100	3 Yellow-Orange J121-3 Q95	4 Yellow-Black J121-4 Q99	5 Yellow-Green J121-5 Q94	6 Yellow-Blue J121-6 Q98	7 Yellow-Violet J121-7 Q93	8 Yellow-Gray J121-9 Q97
1 Red-Brown J125-1 Q104	LITE DEPOSIT 11	CENTER TIMER "15" 21	ARMOR CAR CELLAR 31	BONUS 5X + OUTLANE 41	WHEEL ARROW 51	TOP RIGHT 3-BANK TOP 61	BOTTOM R. 3-BANK TOP 71	TOP JET (YELLOW) 81
2 Red-Black J125-2 Q108	CENTER TIMER "10" 12	CENTER TIMER "20" 22	ARMOR CAR ROOF 32	BONUS 5X 42	LITE OUTLANES 52	TOP RIGHT 3-BANK MIDDLE 62	BOTTOM R. 3-BANK MIDDLE 72	LEFT JET (CLEAR) 82
3 Red-Orange J125-4 Q103	DISABLE COMPUTER 13	CENTER TIMER "25" 23	ARMOR CAR MAIN 33	BONUS 4X 43	INVISIBLE CODE 53	TOP RIGHT 3-BANK BOTTOM 63	BOTTOM R. 3-BANK BOTTOM 73	RIGHT JET (RED) 83
4 Red-Yellow J125-5 Q107	CENTER TIMER "5" 14	CENTER TIMER "30" 24	BONUS 2X 34	BONUS 3X 44	EXPLOSIVES 54	TOP LEFT 3-BANK TOP 64	BOTTOM L. 3-BANK TOP 74	BANK LEFT 84
5 Red-Green J125-6 Q102	CENTER TIMER "0" 15	CENTER TIMER "35" 25	(A)LARM STANDUP 35	RAMP LOCK 45	NOTE TO TELLER 55	TOP LEFT 3-BANK MIDDLE 65	BOTTOM R. 3-BANK MIDDLE 75	BANK RIGHT 85
6 Red-Blue J125-7 Q106	LITE LOCK 16	CALL GUARD 26	ATM CARD 36	AL(A)RM STANDUP 46	TOP LEFT LANE 56	TOP LEFT 3-BANK BOTTOM 66	BOTTOM R. 3-BANK BOTTOM 76	VARI BREAK IN 86
7 Red-Violet J125-8 Q101	CENTER TIMER "55" 17	CENTER TIMER "45" 27	A(L)ARM STANDUP 37	ALA(R)M STANDUP 47	TOP MIDDLE LANE 57	RIGHT "EXTRA TIME" 67	LEFT RETURN 77	ROOF BREAK IN 87
8 Red-Gray J125-9 Q105	CENTER TIMER "50" 18	CENTER TIMER "40" 28	RAMP JACKPOT 38	ALAR(M) STANDUP 48	TOP RIGHT LANE 58	RIGHT RETURN 68	LEFT "EXTRA TIME" 78	START BUTTON 88

J1XX = Power Driver Board

LAMP MATRIX CIRCUIT



The microprocessor sends a signal to the column circuit causing the output of the UNL-2803 to toggle. When point "A" drops low, the TIP107 transistor conducts and point "B" changes to a high state. At the same time, the microprocessor drives the input of the 74LS74 low, causing a high at output "F". A high state at the base of the TIP102 causes the transistor to conducts, bringing the row circuit to ground and turning the lamp on. The microprocessor changes the input of the 74LS74 to a high state to turn the lamp off. In over-current conditions, the lamp is shut off through the comparator. If the voltage at the negative input of the LM339 rises above 1.4V, the output changes to a low, which is fed back to the 74LS74 and shuts the circuit off.

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire Color	Solenoid Part number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	BIG KICK	High Power	J133-2			Q72	J116-1			Vio-Brn	AE-24-900	
02	RIGHT TOKEN TUBE	High Power		J135-2		Q68		J118-2		Vio-Red		04-10424
03	VARI TARGET RESET	High Power	J133-2			Q71	J116-4			Vio-Org	SM1-26-600	
04	LEFT TOKEN TUBE	High Power		J135-2		Q67		J118-5		Vio-Yel		04-10424
05	BANK KICK	High Power	J133-2			Q70	J116-6			Vio-Grn	AE-23-800	
06	TOP POPPER UP	High Power	J133-2			Q66	J116-7			Vio-Blu	AE-24-900	
07	RAMP DIVERTER	High Power	J133-2			Q69	J116-8			Vio-Blk	AE-26-1500	
08	KICKBACK (RAMP)	High Power	J133-2			Q65	J116-9			Vio-Gry	AE-23-800	
09	TROUGH EJECT	Low Power	J133-3			Q44	J113-1			Brn-Blk	AE-26-1500	
10	LEFT SLINGSHOT	Low Power	J133-3			Q48	J113-3			Brn-Red	AE-26-1200	
11	RIGHT SLINGSHOT	Low Power	J133-3			Q43	J113-4			Brn-Org	AE-26-1200	
12	LEFT JET	Low Power	J133-3			Q47	J113-5			Brn-Yel	AE-26-1200	
13	RIGHT JET	Low Power	J133-3			Q42	J113-6			Brn-Grn	AE-26-1200	
14	TOP JET	Low Power	J133-3			Q46	J113-7			Brn-Blu	AE-26-1200	
15	TOP LEFT 3-BANK	Low Power	J133-3			Q41	J113-8			Brn-Vio	AE-26-1200	
16	TOP RIGHT 3-BANK	Low Power	J133-3			Q45	J113-9			Brn-Gry	AE-26-1200	
17	BACK LEFT	Flasher	J133-6			Q28	J111-1			Blk-Brn	#906	
18	JETS & BACK RIGHT (2)	Flasher	J133-6			Q32	J111-2			Blk-Red	#89, #906	
19	RIGHT MIDDLE	Flasher	J133-6			Q27	J111-3			Blk-Org	#906	
20	RIGHT BOTTOM	Flasher	J133-6			Q31	J111-4			Blk-Yel	#906	
21	LEFT MIDDLE	Flasher	J133-6			Q26	J111-5			Blu-Brn	#906	
22	LEFT BOTTOM	Flasher	J133-6			Q30	J111-6			Blu-Red	#906	
23	LIGHT ROPE 1	Flasher		J134-5		Q25		J112-8		Blu-Org		04-10440
24	LIGHT ROPE 2	Flasher		J134-5		Q29		J112-9		Blu-Yel		04-10440
25	TOP POPPER EJECT	Gen. Purpose	J133-1			Q16	J109-1			Blu-Grn	AE-27-1200	
26	TOP LIGHT & MOTOR	Gen. Purpose		J140-2		Q15		J109-2		Blu-Blk		20-10307
27	BOTTOM LEFT 3-BANK	Gen. Purpose	J133-1			Q14	J109-3			Blu-Vio	AE-26-1200	
28	BOTTOM RIGHT 3-BANK	Gen. Purpose	J133-1			Q13	J109-4			Blu-Gry	AE-26-1200	
35	AUTO PLUNGER	High Power	J119-8,9			Q81	J120-3			Yel-Gry	AE-23-800	
36	LOCK UP RELEASE	Low Power	J119-8,9			Q83	J120-1			Org-Gry	AE-26-1200	
37	AUX. LAMP ENABLE	¤L.P.D.C.		J138-2				J110-1		Brn-Wht		A-20909
38	AUX. LAMP CLOCK	¤L.P.D.C.		J138-2				J110-3		Org-Wht		A-20909
39	AUX. LAMP DATA 1	¤L.P.D.C.		J138-2				J110-4		Yel-Wht		A-20909
40	AUX. LAMP DATA 2	¤L.P.D.C.		J138-2				J110-5		Grn-Wht		A-20909
	General Illumination											
01	ILLUMINATION STRING 1	G.I.	J105-1	J106-1		Q5	J105-7	J106-7		Wht-Brn	#44	#555
02	**AUX. LAMP 1 POWER	G.I.				Q4		J106-8		Wht-Org		#555
03	ILLUMINATION STRING 3	G.I.	J105-3	J106-3		Q3	J105-9	J106-9		Wht-Yel	#44	#555
04	**AUX. LAMP 2 POWER	G.I.				Q2		J106-10		Wht-Grn		#555
05	**AUX. LAMP 3 POWER	G.I.				Q1		J106-11		Wht-Vio		#555

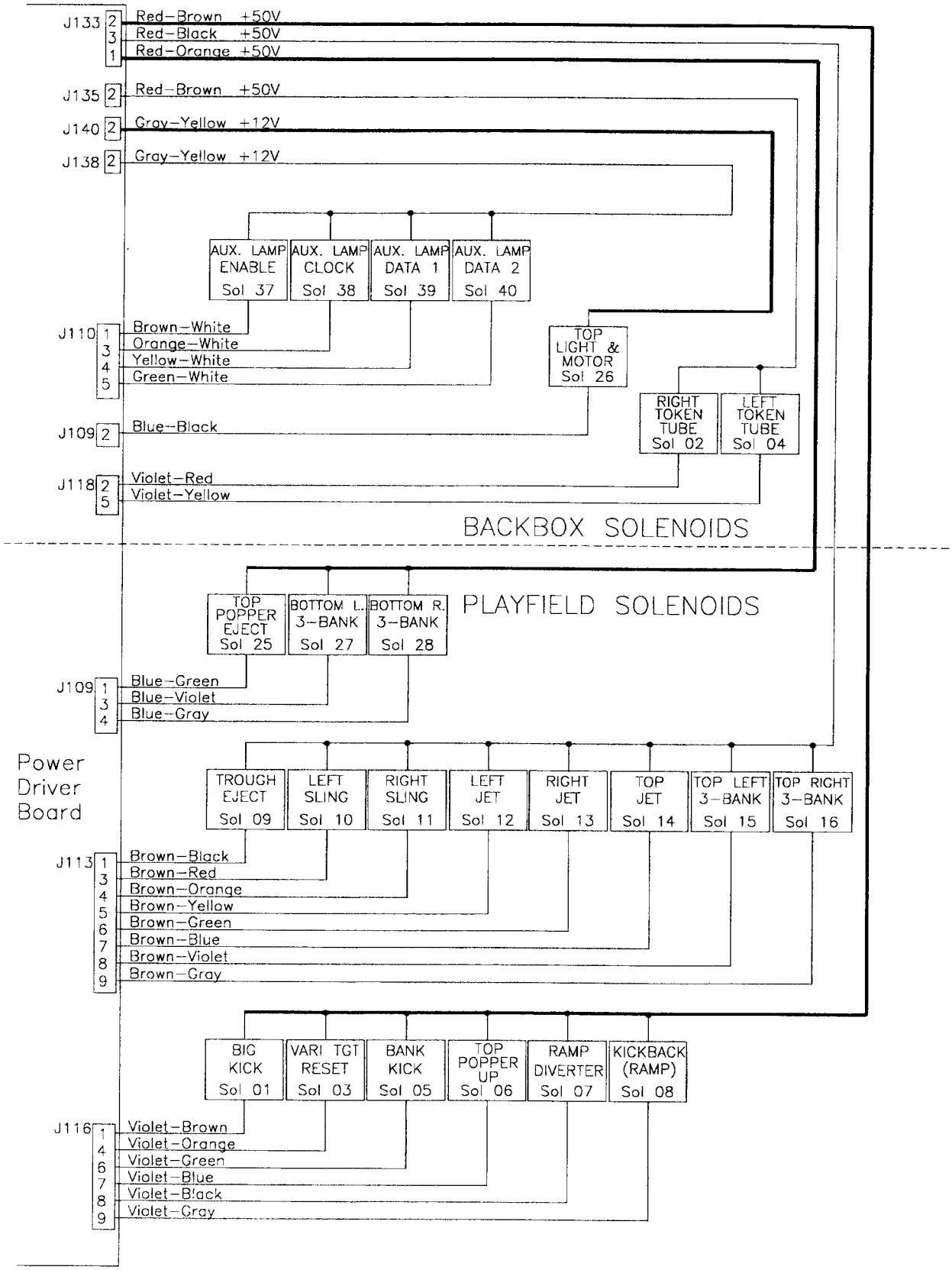
	Flipper Circuits		Voltage Connections	Drive Transistors		Drive Connectors	Drive Wire Colors		Coil Part No.	Coil Color
			Playfield	Power	Hold	Playfield	Power	Hold		
29		Lwr. Rt. Power	J119-1 (Red-Grn)	Q90		J120-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J119-1 (Red-Grn)		Q92	J120-11		Org-Grn	FL-20867	WHITE
31		Lwr. Lt. Power	J119-4 (Red-Blu)	Q87		J120-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J119-4 (Red-Blu)		Q89	J120-7		Org-Blu	FL-20867	WHITE
33		Upr. Rt. Power	J119-6 (Red-Vio)	Q84		J120-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J119-6 (Red-Vio)		Q86	J120-4		Org-Vio	FL-11753	YELLOW
35		Upr. Lt. Power	J119-8 (Red-Gry)	Q81		J120-3	Yel-Gry		SEE	ABOVE
36	Upper Left Flipper	Upr. Lt. Hold	J119-8 (Red-Gry)		Q83	J120-1		Org-Gry	SEE	ABOVE

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

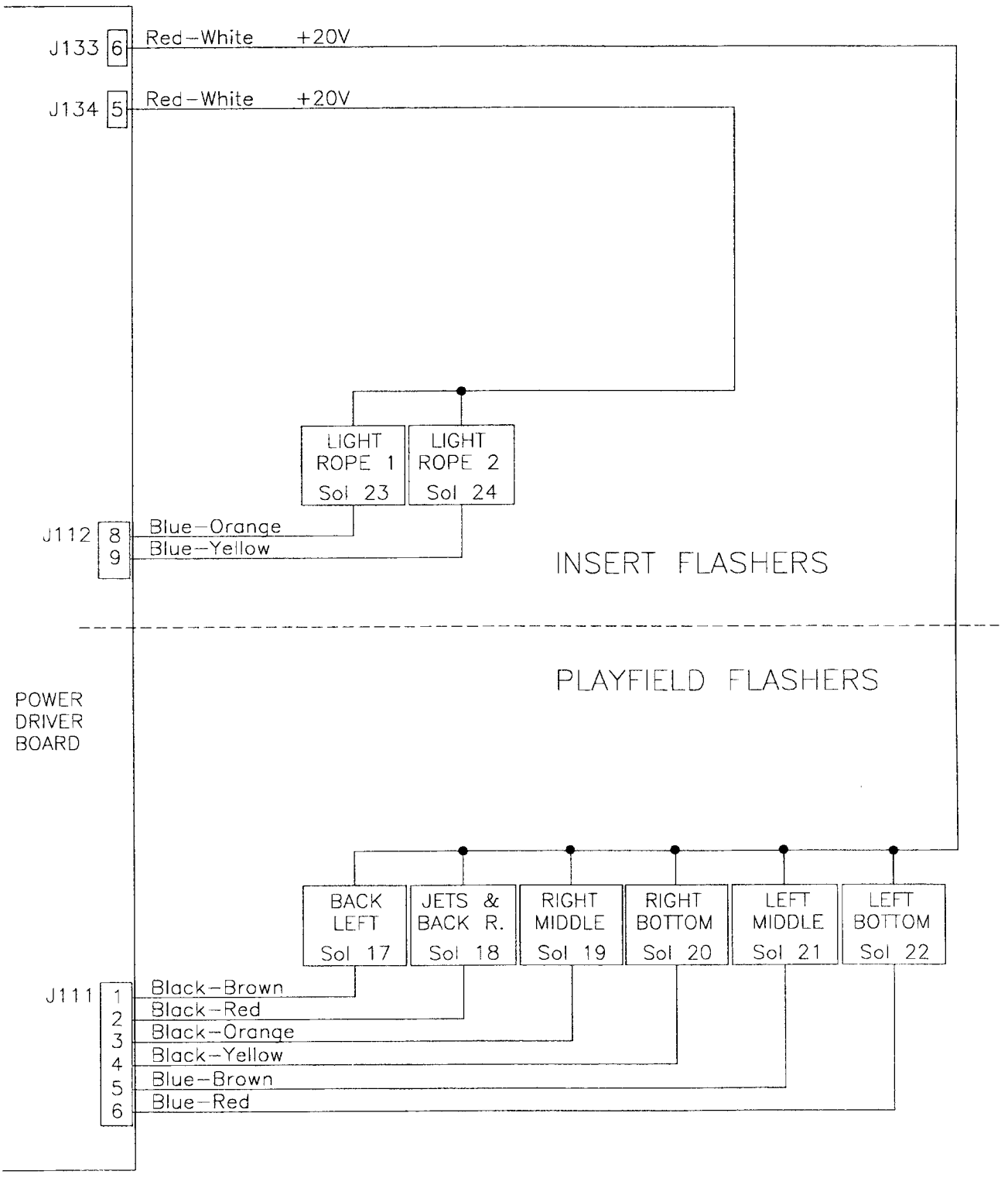
**These G.I. strings do not brighten and dim, they are always ON.

¤L.P.D.C. = Low Power Device Controls

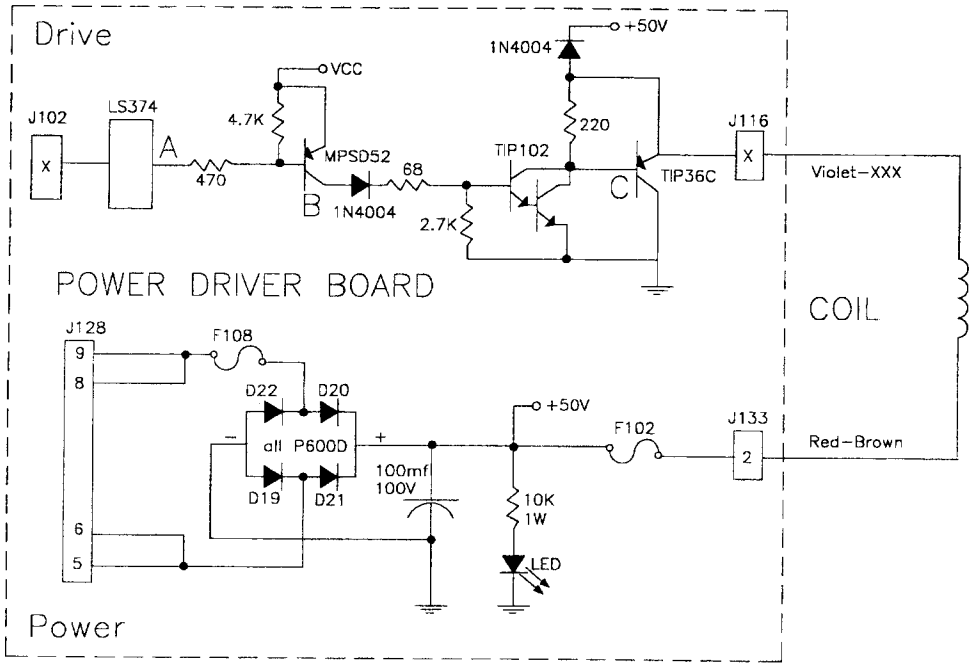
SOLENOID WIRING



FLASHER WIRING

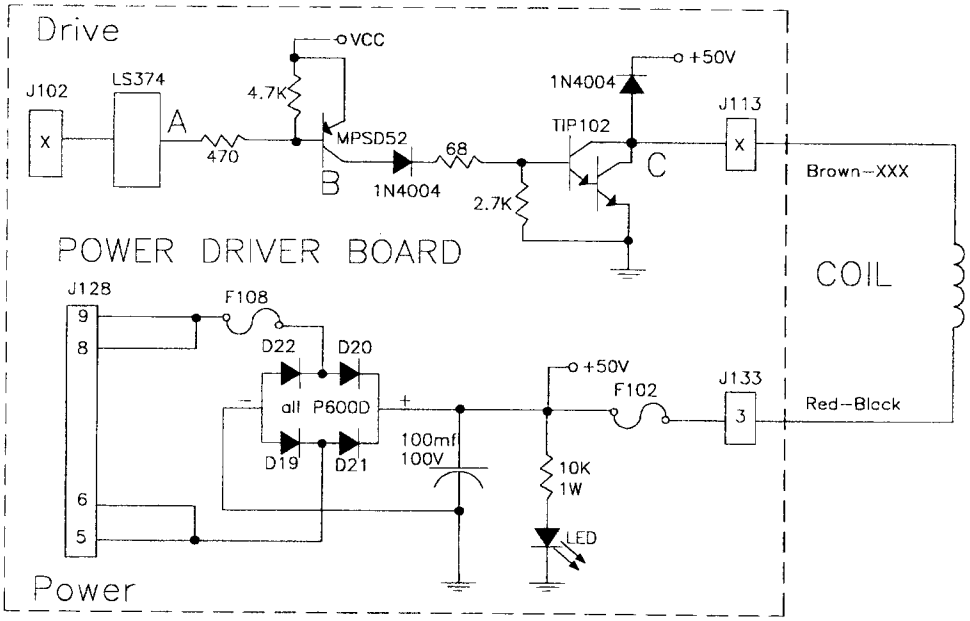


HIGH POWER SOLENOID CIRCUIT



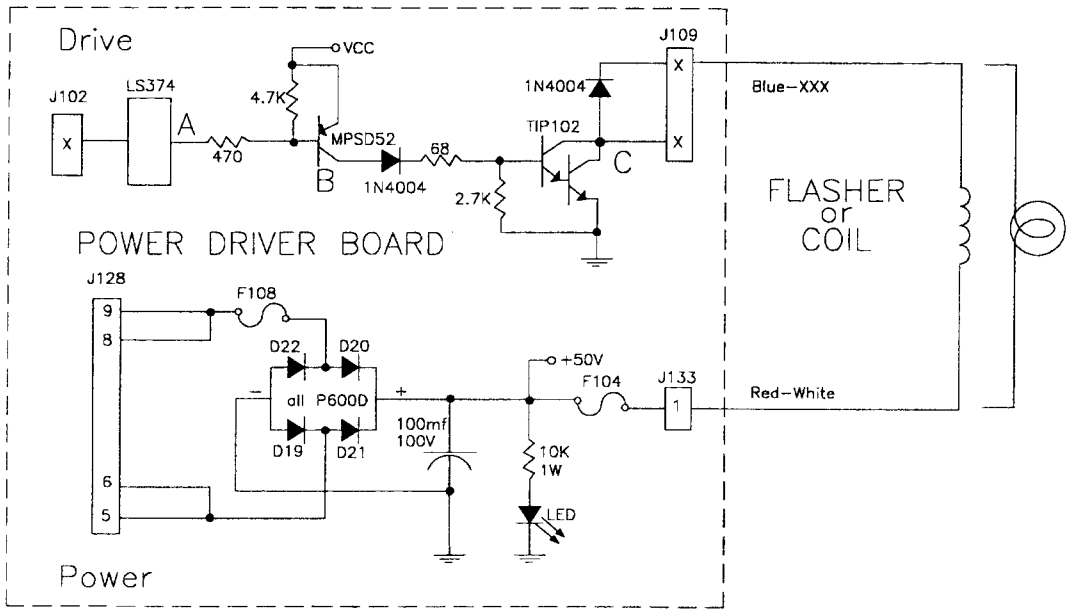
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B", the collector of the 2N5401 transistor, is high. A high at point "B" causes point "C", the collector of the TIP102 transistor and point "D", the emitter of the TIP36C transistor, to drop low. When point "D" is low,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

LOW POWER SOLENOID CIRCUIT



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

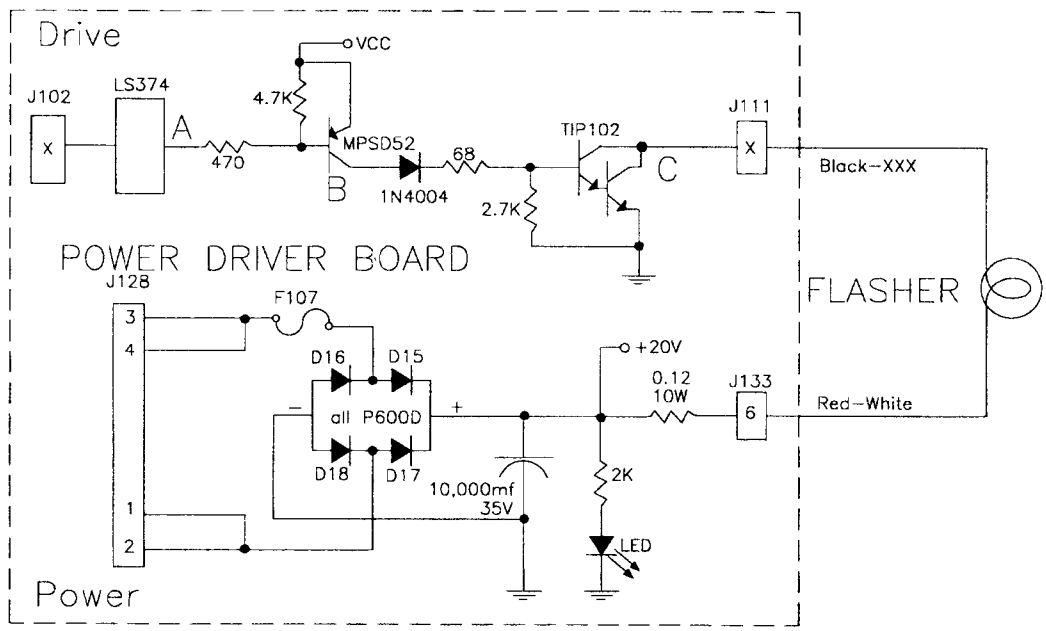
SPECIAL (GENERAL PURPOSE) SOLENOID CIRCUIT



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

* Tieback diode is not used for flashlamp circuit.

FLASHLAMP CIRCUIT



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

GENERAL ILLUMINATION CIRCUIT

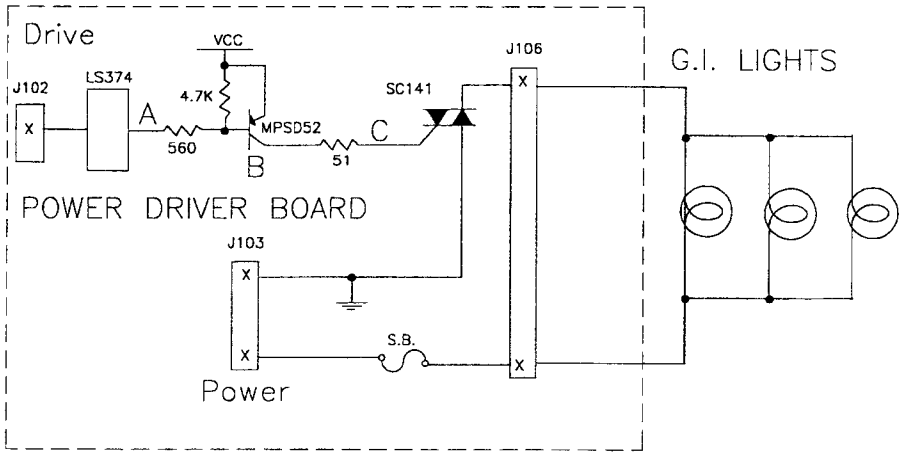


Figure #1

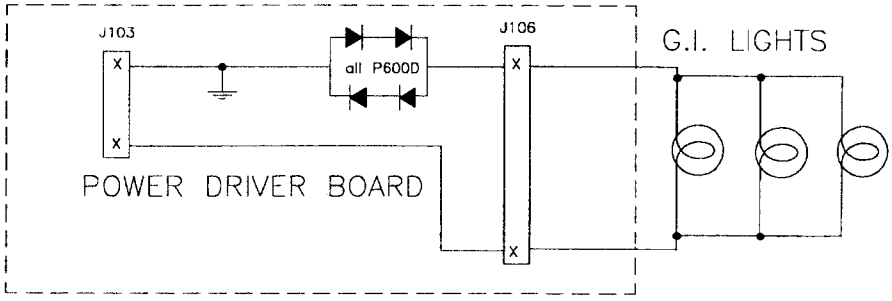
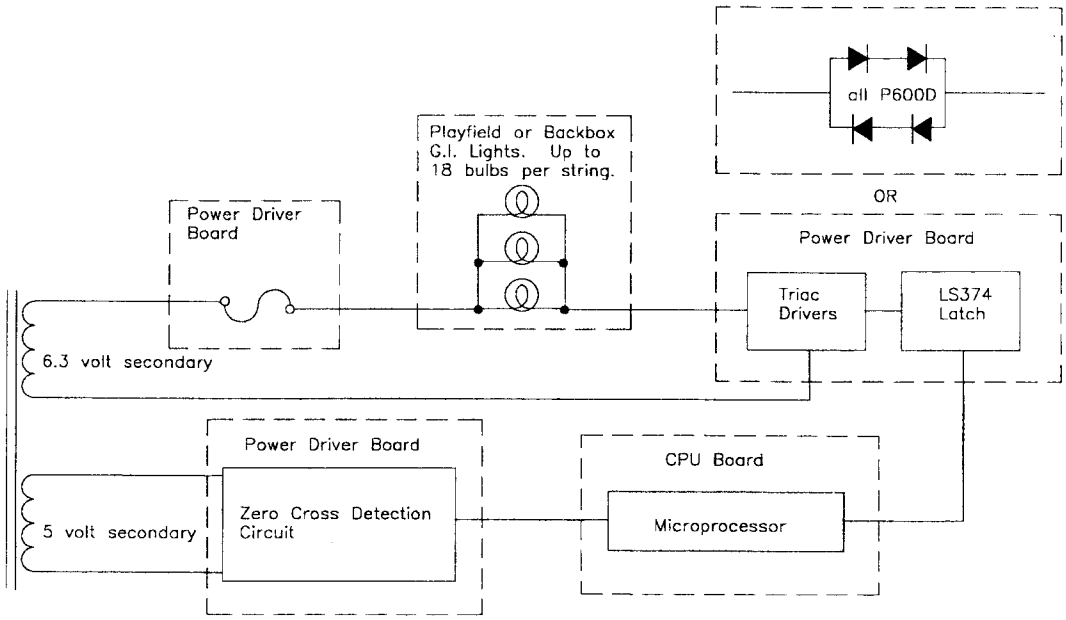


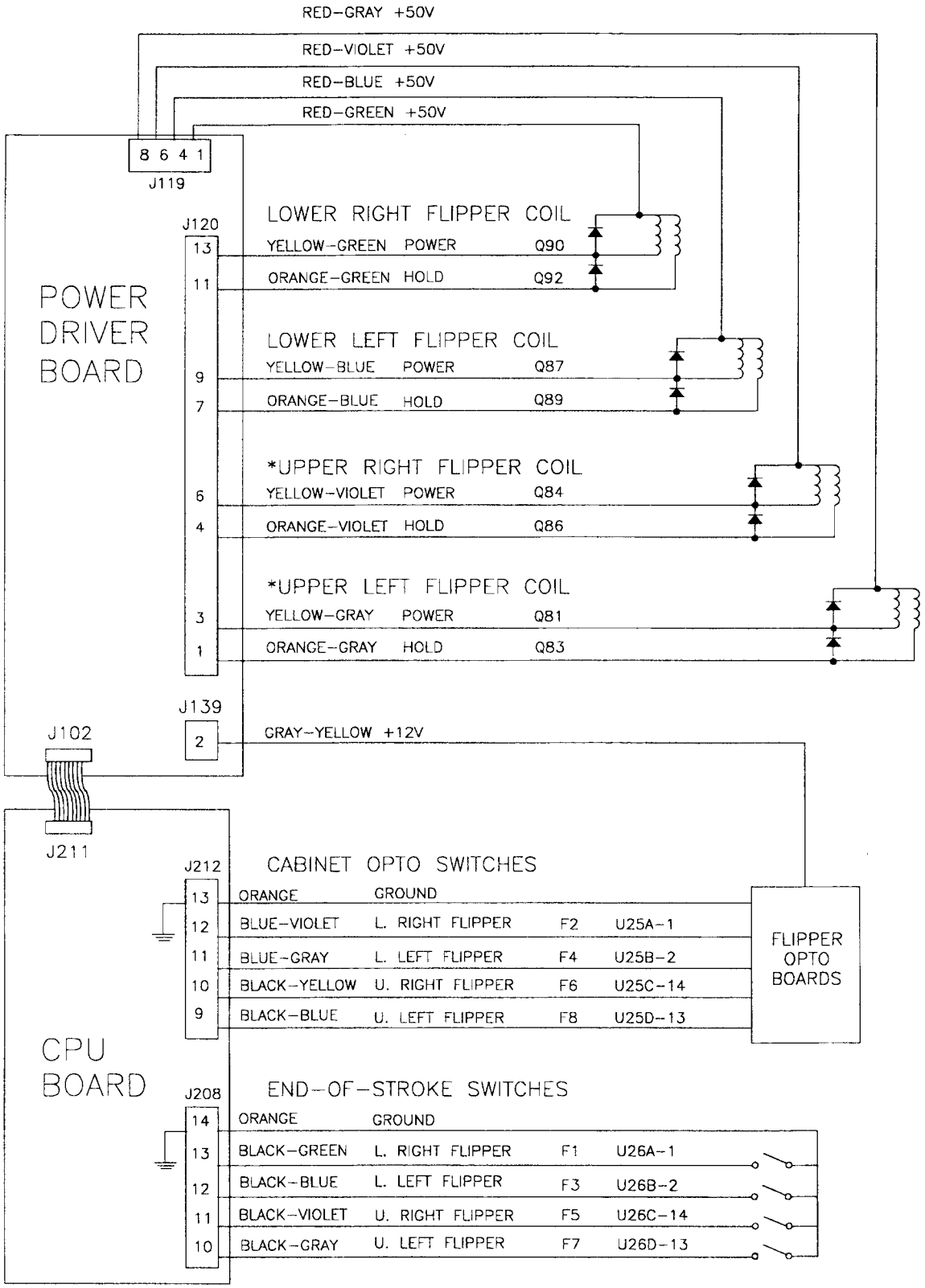
Figure #2

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

BLOCK DIAGRAM OF GENERAL ILLUMINATION CIRCUIT

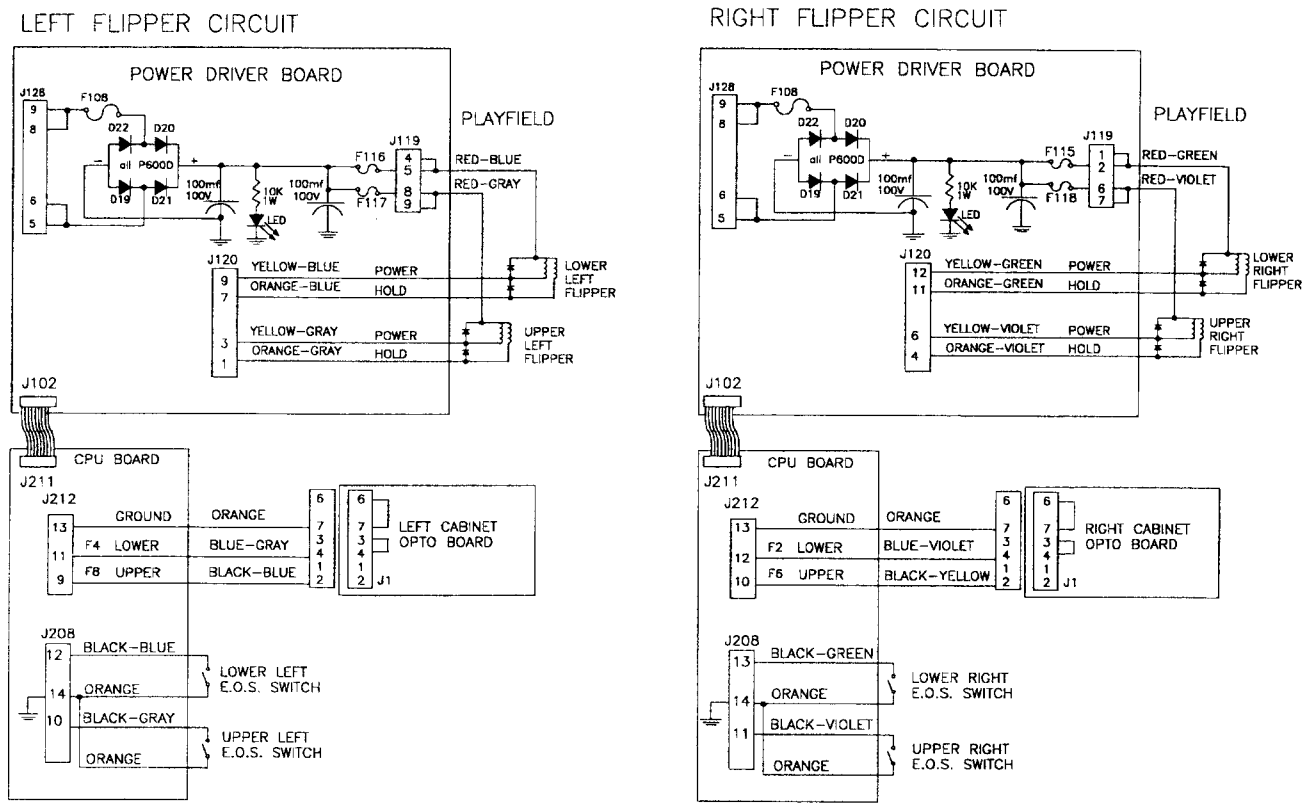


FLIPPER CIRCUIT DIAGRAM

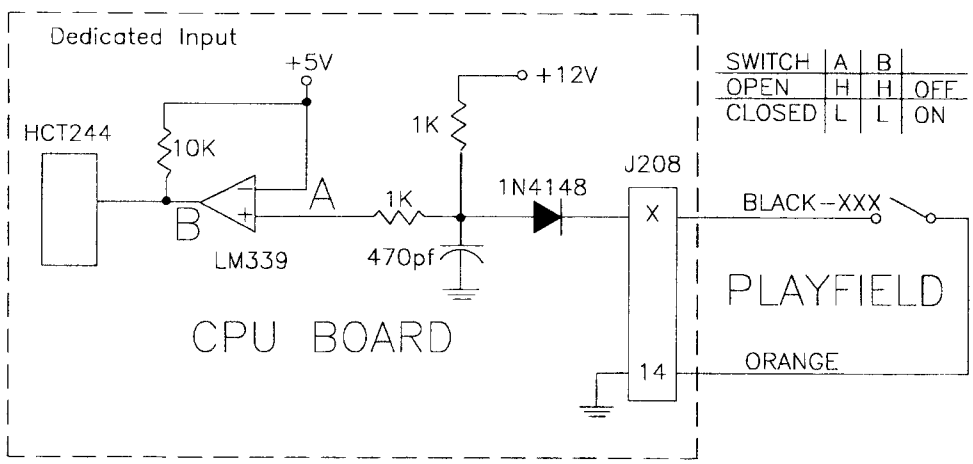


NOTE: May be used as circuits other than flipper circuits.

FLIPPER COIL CIRCUITS

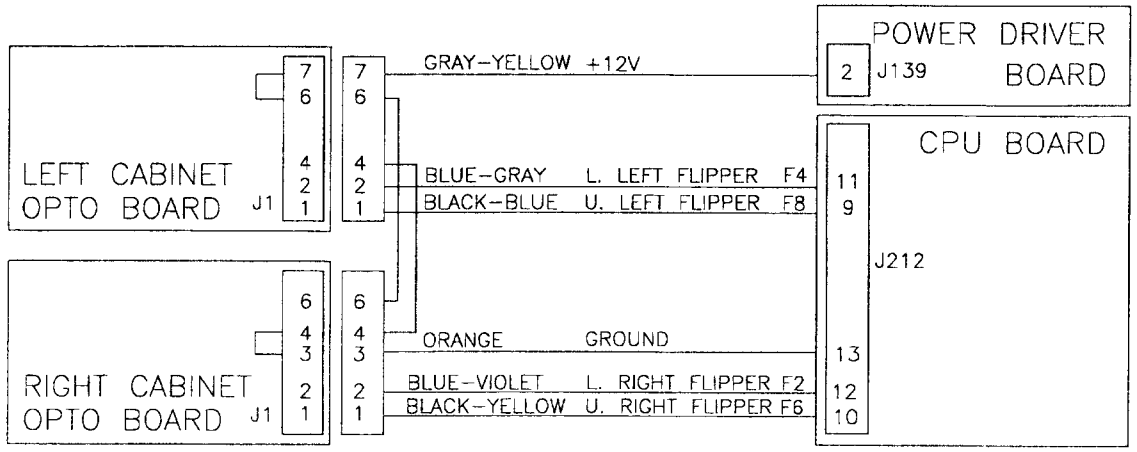


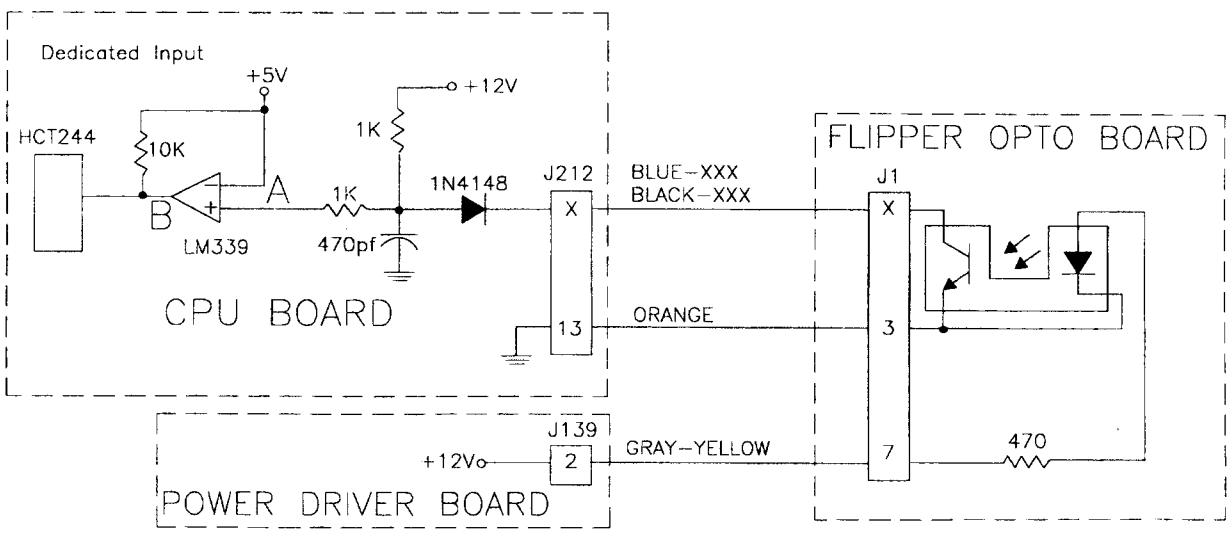
FLIPPER END-OF-STROKE SWITCH CIRCUIT



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

FLIPPER CABINET SWITCH CIRCUITS

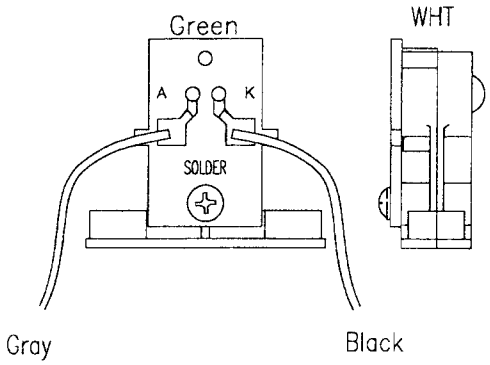


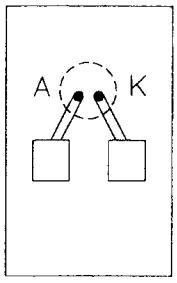


The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch circuit.

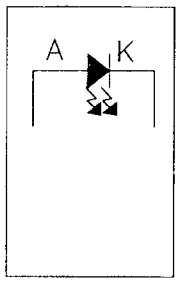
When a switch closes, the row side (dedicated input) of the circuit activates. The "+" input to the LM339 drops below +5V, therefore, its output is low. Since the row, (dedicated input) circuit is tied directly to ground through the switch, the switch is considered closed by the microprocessor. When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

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

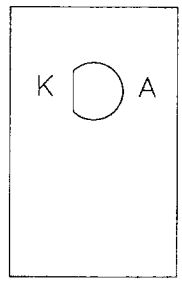




solder side

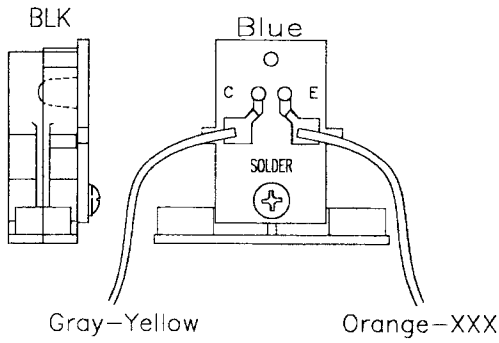


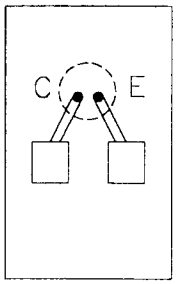
schematic



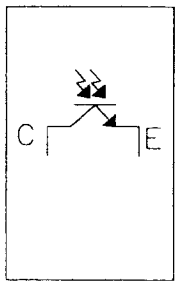
component side

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

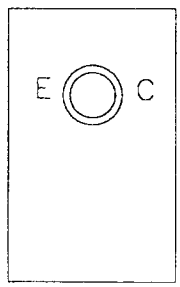




solder side

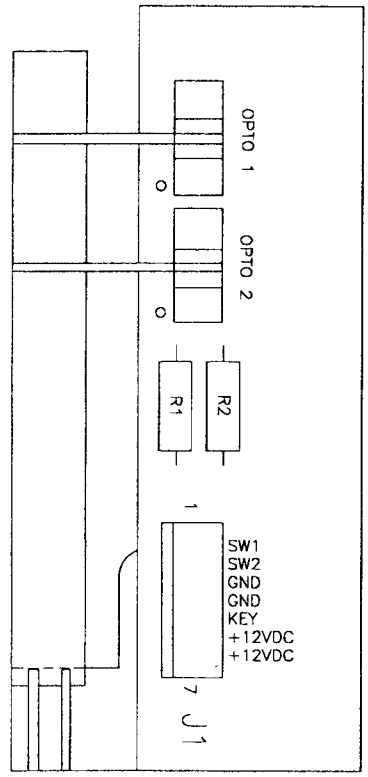


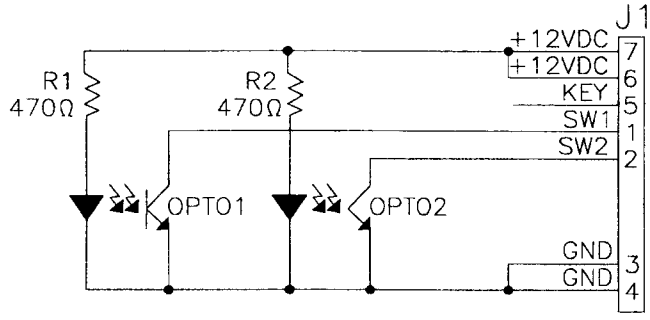
schematic



component side

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





Left Side Flipper Cabinet Opto Switch Board

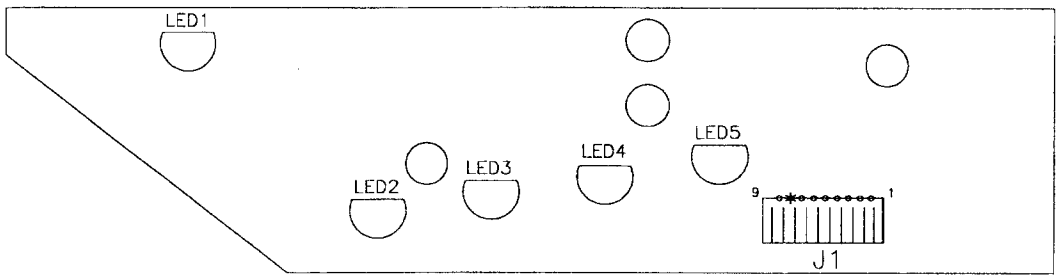
J1-1 Not Used
J1-2 Blue-Gray from CPU Bd. J212-11
J1-3 Orange from Coin Door Interface Bd. J13-1
J1-4 Orange to/from Right Flipper Opto Bd. J1-3
J1-5 Key
J1-6 Gray-Yellow to/from Right Flipper Opto Bd. J1-6
J1-7 Gray-Yellow from Power Driver Bd. J139-2

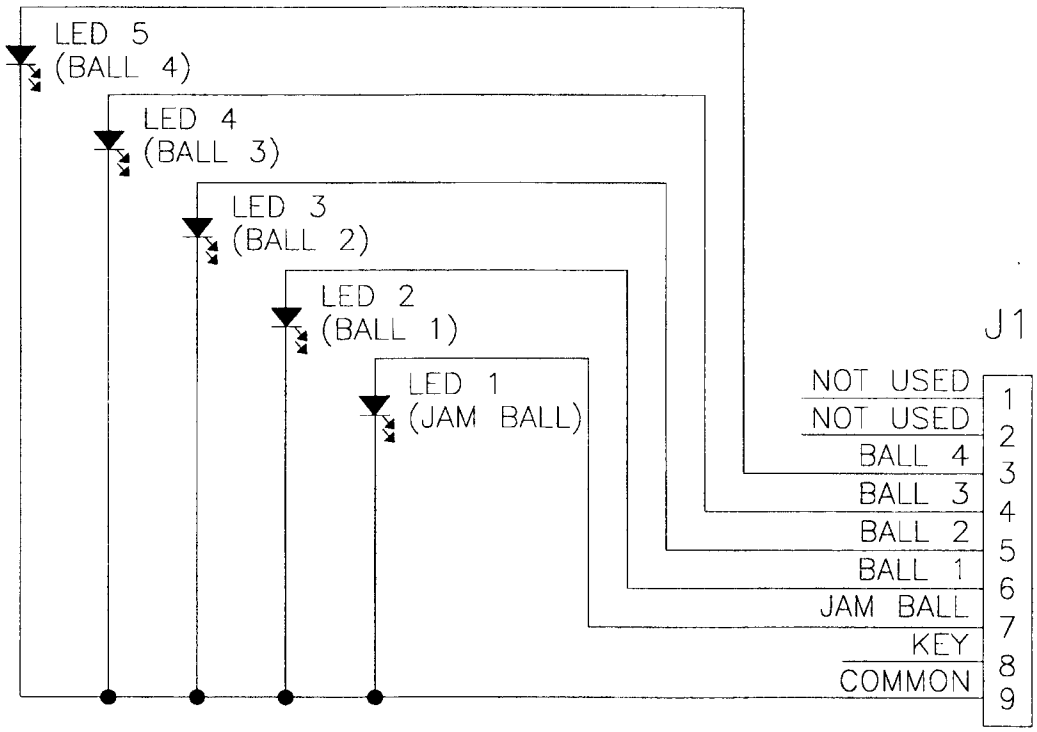
Right Side Flipper Cabinet Opto Switch Board

J1-1 Black-Yellow from CPU Bd. J212-10
J1-2 Blue-Violet from CPU Bd. J212-12
J1-3 Orange to/from Left Flipper Opto Bd. J1-4
J1-4 Orange from CPU Bd. J212-13
J1-5 Key
J1-6 Gray-Yellow to/from Left Flipper Opto J1-6
J1-7 Not Used

TROUGH IRED LED P.C.B. ASSEMBLY
A-18617-1

J1-1 Not Used
J1-2 Not Used
J1-3 Gray-Green, from SW-10 Opto P.C.B. J1-3
J1-4 Gray-Black, from SW-10 Opto P.C.B. J1-4
J1-5 Gray-Orange, from SW-10 Opto P.C.B. J1-5
J1-6 Gray-Red, from SW-10 Opto P.C.B. J1-6
J1-7 Gray-Brown, from SW-10 Opto P.C.B. J1-7
J1-8 Key
J1-9 Black, from SW-7 Opto P.C.B. J1-9

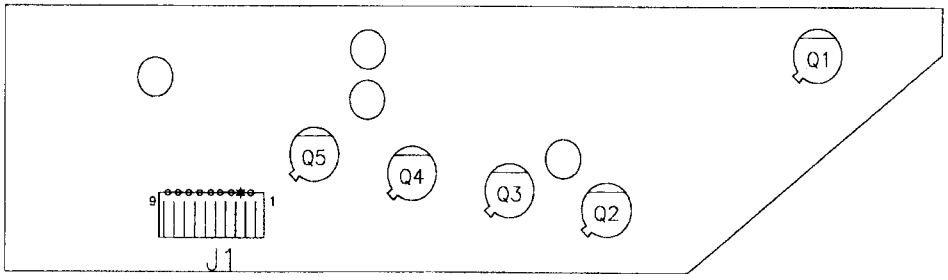


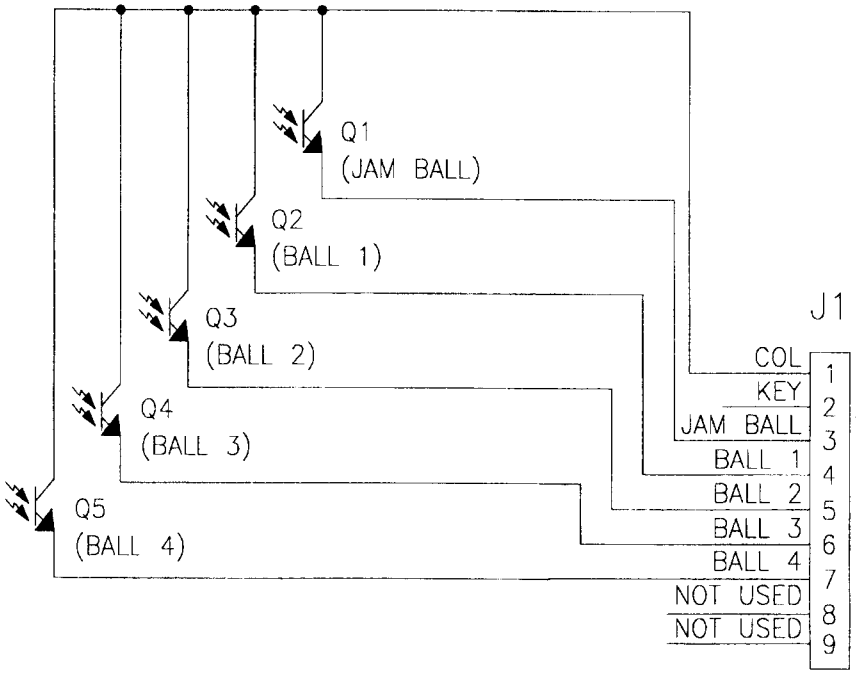


Trough 7 IRED Circuit

TROUGH IRED TRANSISTOR P.C.B. ASSEMBLY
A-18618-1

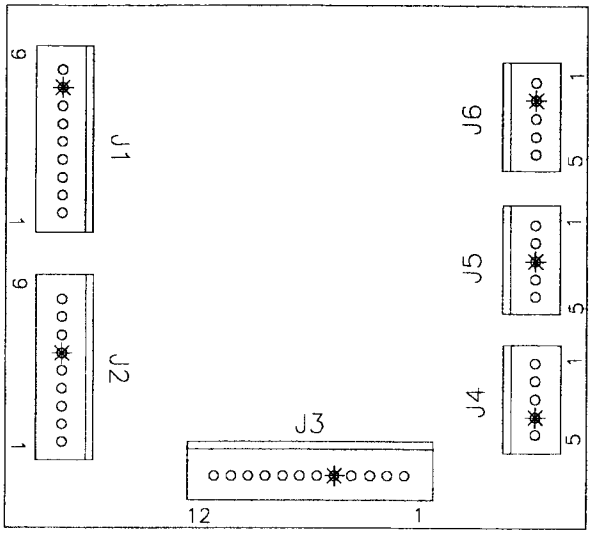
J1-1 Gray-Yellow, from SW-10 Opto P.C.B. J2-9
J1-2 Key
J1-3 Orange-Brown, from SW-10 Opto P.C.B. J2-8
J1-4 Orange-Red, from SW-10 Opto P.C.B. J2-7
J1-5 Orange-Black, from SW-10 Opto P.C.B. J2-5
J1-6 Orange-Yellow, from SW-10 Opto P.C.B. J2-4
J1-7 Orange-Green, from SW-10 Opto P.C.B. J2-3
J1-8 Not Used
J1-9 Not Used





Trough 7 IR TSTR Circuit

10 OPTO P.C.B.
A-18159



J1-1 Gray-Violet to A-16908 (LED) Sw #37
J1-2 Gray-Blue to A-16908 (LED) Sw #36
J1-3 Gray-Green to A-18617-1 (LED) J1-3 Sw #35
J1-4 Gray-Black to A-18617-1 (LED) J1-4 Sw #34
J1-5 Gray-Orange to A-18617-1 (LED) J1-5 Sw #33
J1-6 Gray-Red to A-18617-1 (LED) J1-6 Sw #32
J1-7 Gray-Brown to A-18617-1 (LED) J1-7 Sw #31
J1-8 Key
J1-9 Black Ground to A-18617-1 J1-9

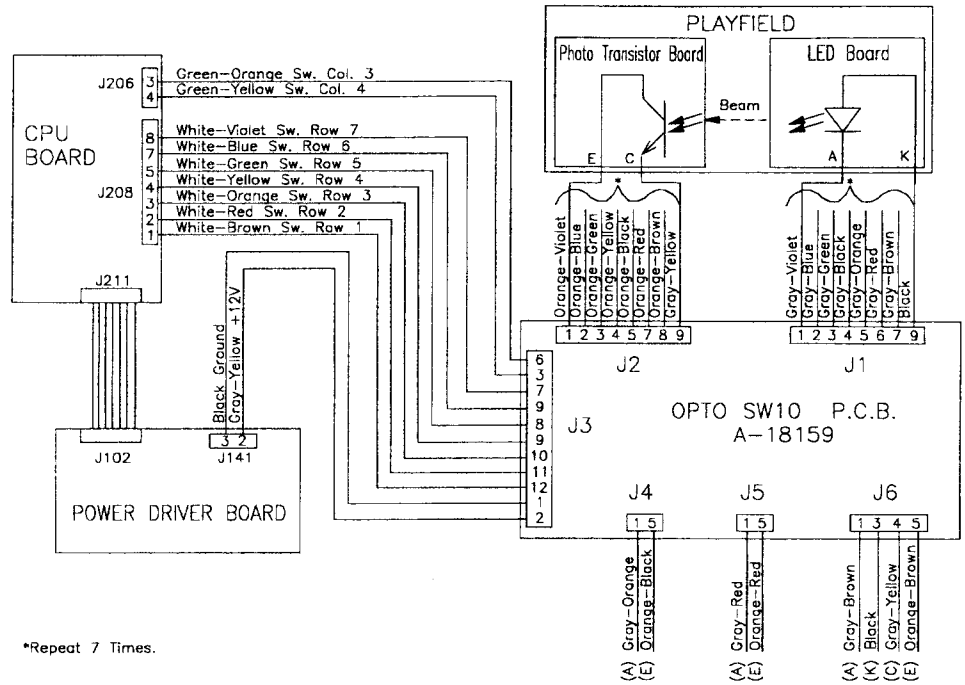
J2-1 Orange-Violet to A-16909 (Trans.) Sw #37
J2-2 Orange-Blue to A-16909 (Trans.) Sw #36
J2-3 Orange-Green to A-18618-1 (Photo) J1-7 Sw #35
J2-4 Orange-Yellow to A-18618-1 (Photo) J1-6 Sw #34
J2-5 Orange-Black to A-18618-1 (Photo) J1-5 Sw #33
J2-6 Key
J2-7 Orange-Red to A-18618-1 (Photo) J1-4 Sw #32
J2-8 Orange-Brown to A-18618-1 (Photo) J1-3 Sw #31
J2-9 Gray-Yellow +12VDC to A-18618-1 (Photo) J1-1

J4-1 Gray-Orange to A-16908 (LED) Sw #43
J4-2 Not Used
J4-3 Not Used
J4-4 Key
J4-5 Orange-Black to A-16909 (Trans.) Sw #43

J5-1 Gray-Red to A-16908 (LED) Sw #42
J5-2 Not Used
J5-3 Key
J5-4 Not Used
J5-5 Orange-Red to A-16909 (Trans.) Sw #42

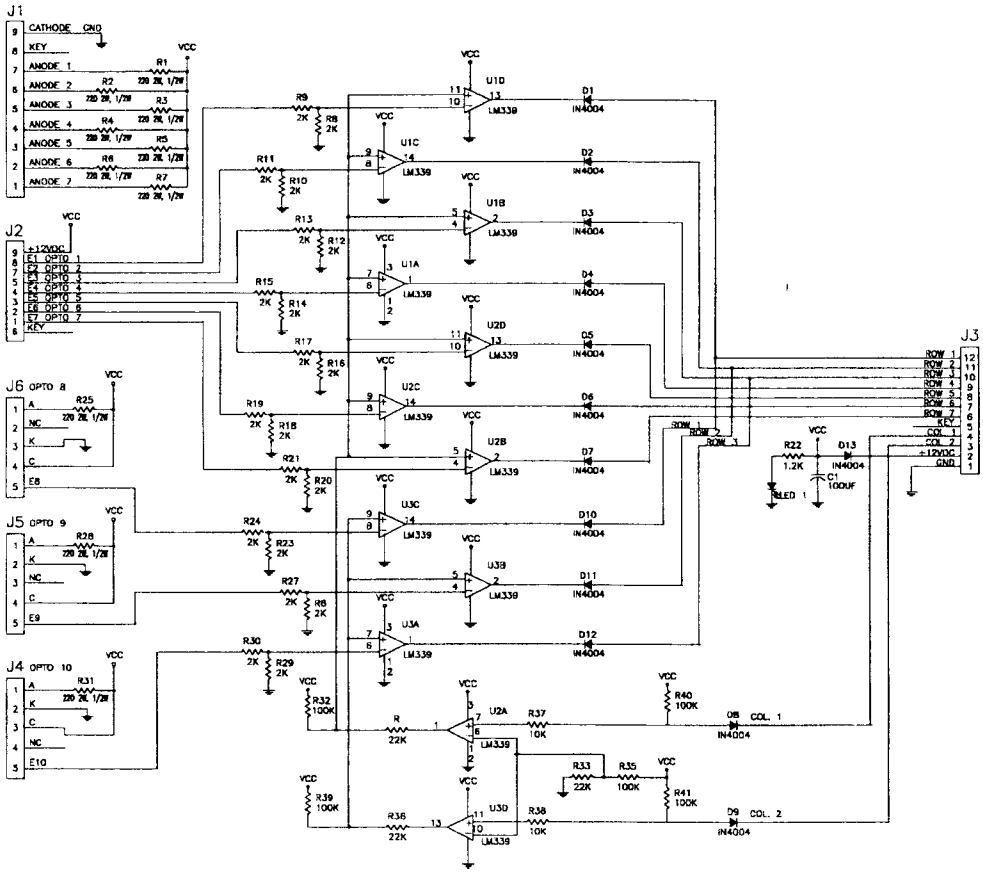
J6-1 Gray-Brown to A-16908 (LED) Sw #41
J6-2 Key
J6-3 Black Ground
J6-4 Gray-Yellow +12VDC
J6-5 Orange-Brown to A-16909 (Trans.) Sw #41

10 OPTO P.C.B.



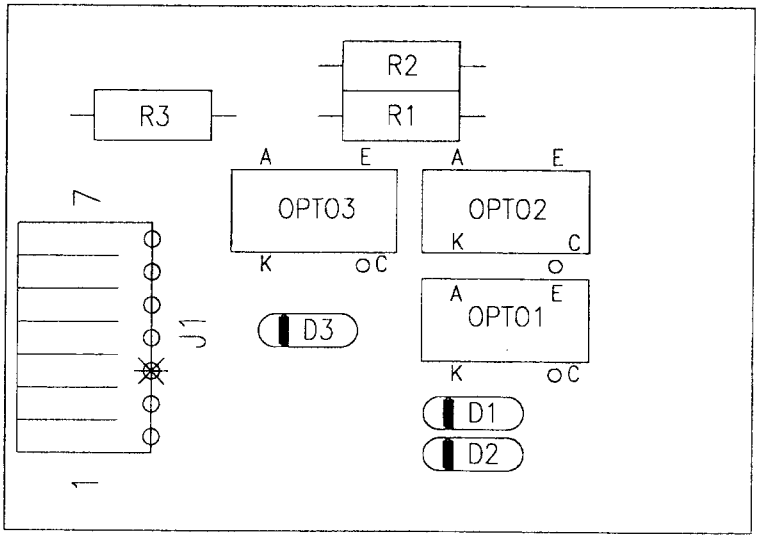
*Repeat 7 Times.

Circuit Diagram

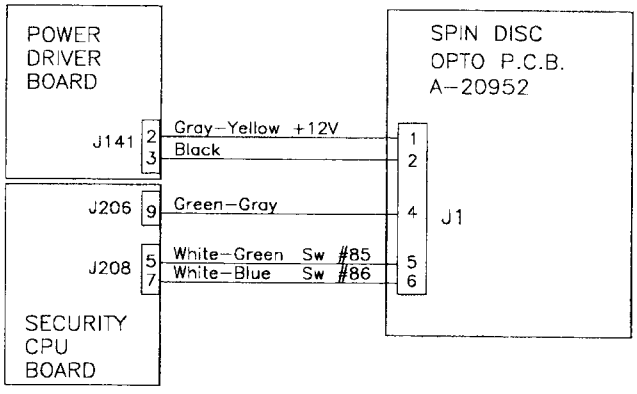


Schematic

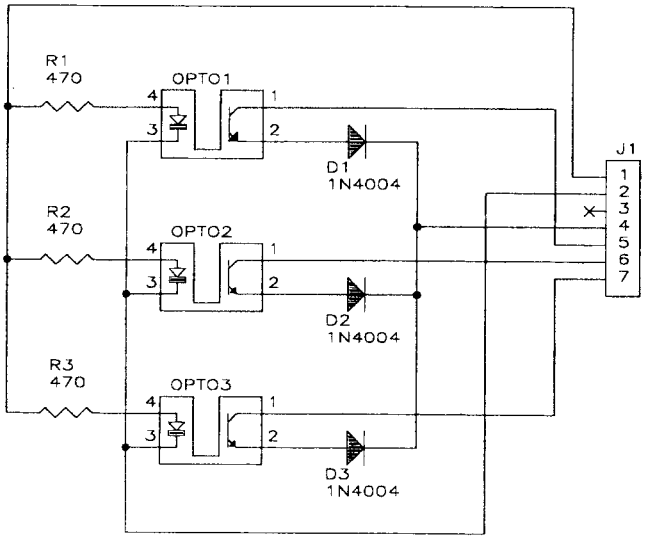
3 OPTO VARI TARGET P.C.B. ASSEMBLY
A-20906



J1-1 Gray-Yellow +12VDC from J141-2
J1-2 Black, Ground from J141-3
J1-3 Key
J1-4 Green-Blue from J206-6
J1-5 White-Blue from J208-7
J1-6 White-Violet from J208-8
J1-7 White-Gray from J208-9

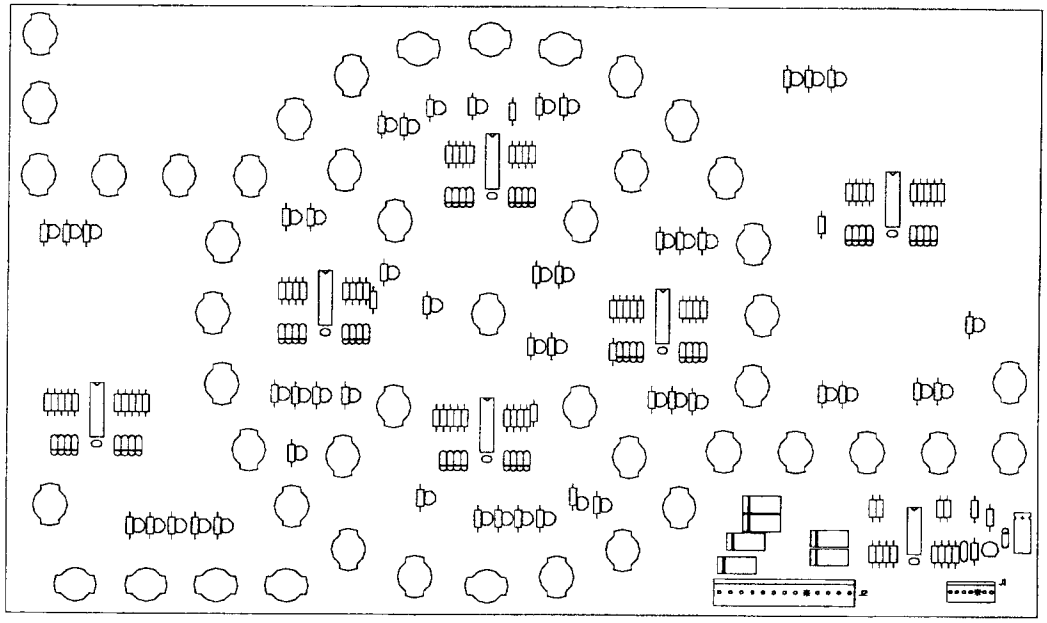


Circuit



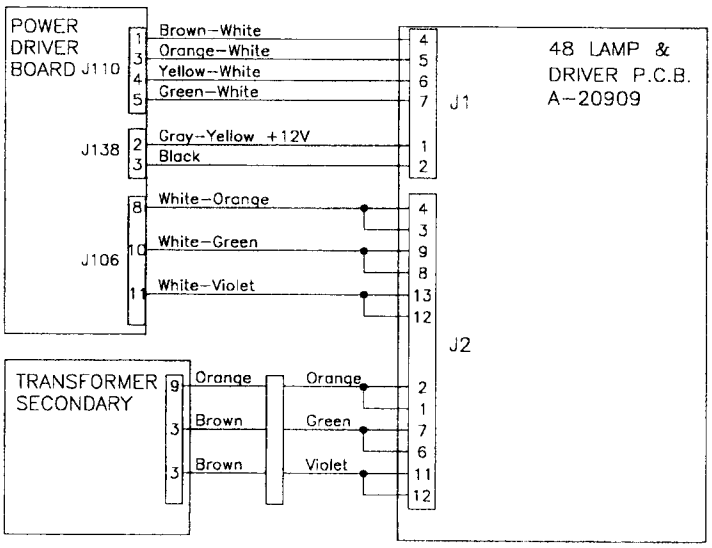
Schematic

48 LAMP & DRIVER P.C.B.
A-20909



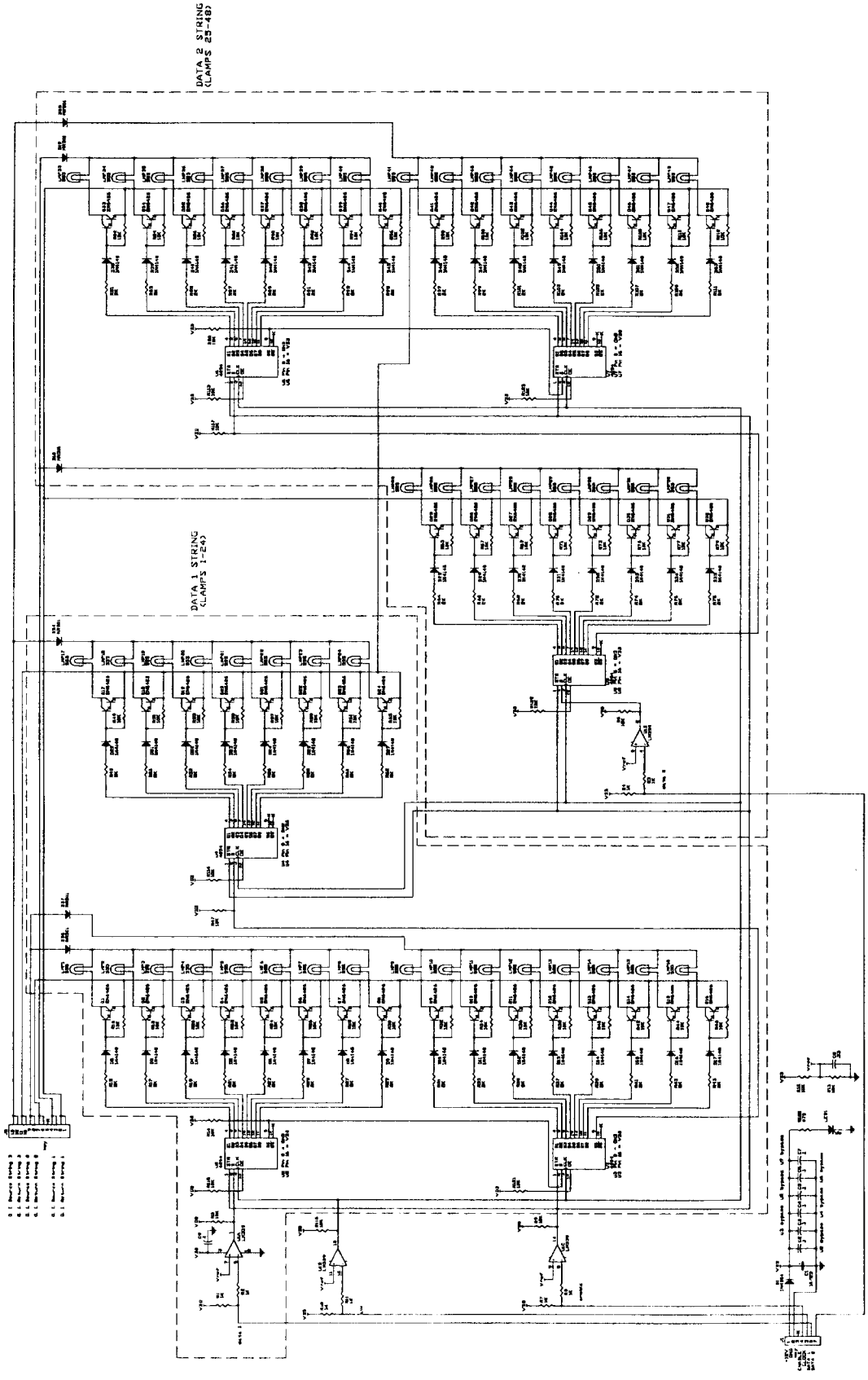
J1-1 Gray-Yellow +12VDC from J138-2
J1-2 Black, Ground from J138-3
J1-3 Key
J1-4 Brown-White from J110-1
J1-5 Orange-White from J110-3
J1-6 Yellow-White from J110-4
J1-7 Green-White from J110-5

J2-1 Orange loop end from J2-2
J2-2 Orange from Transformer Secondary
J2-3 White-Orange loop end from J2-4
J2-4 White-Orange from J106-8
J2-5 Key
J2-6 Green loop end from J2-7
J2-7 Green from Transformer Secondary
J2-8 White-Green loop end from J2-9
J2-9 White-Green from J106-10
J2-10 Violet loop end from J2-11
J2-11 Violet from Transformer Secondary
J2-12 White-Violet loop end from J2-13
J2-13 White-Violet from J106-11

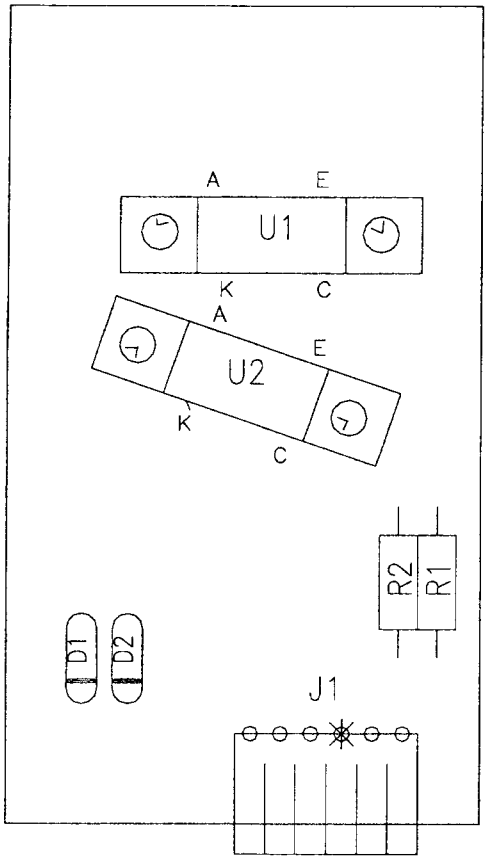


Circuit

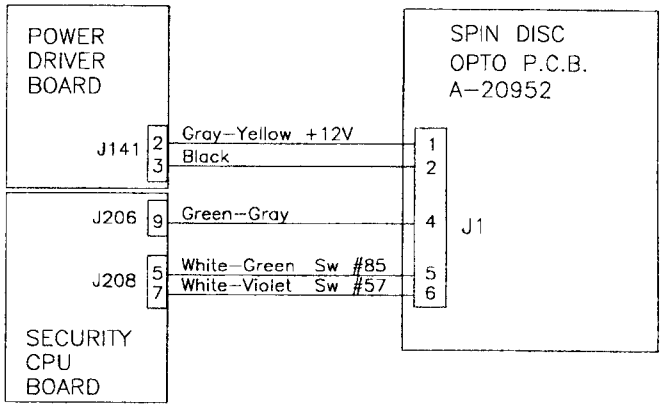
48 LAMP & DRIVER P.C.B. SCHEMATIC
A-20909



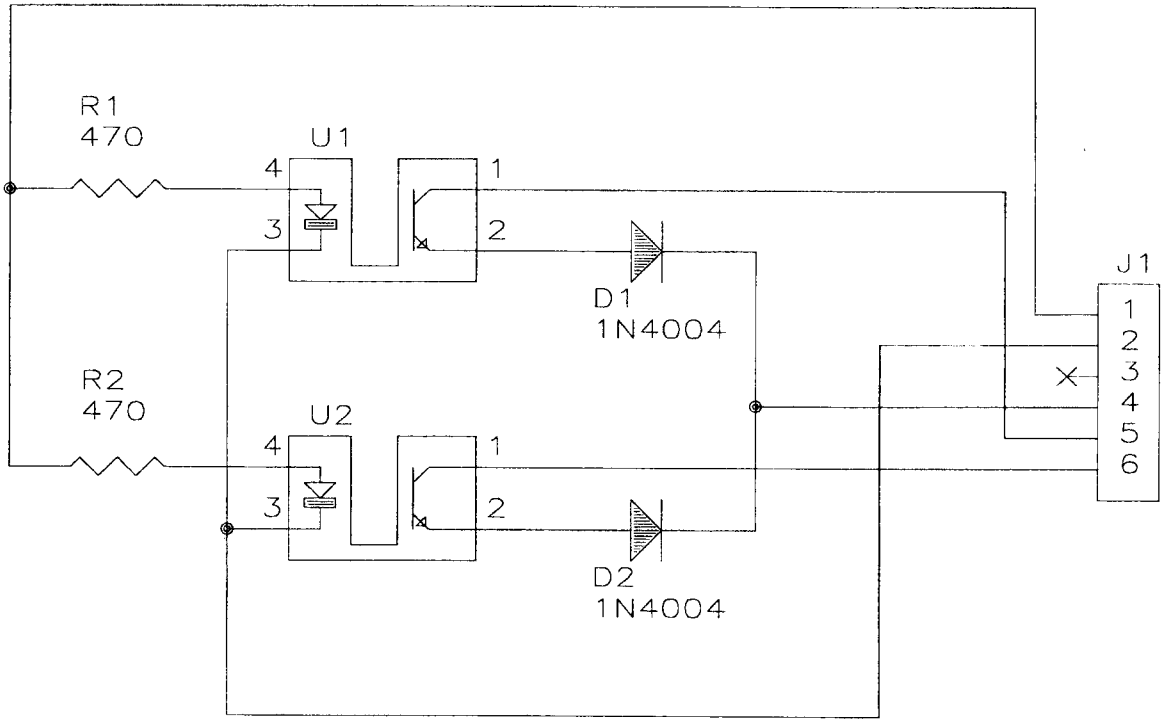
SPIN DISC OPTO P.C.B.
A-20952



J1-1 Gray-Yellow +12VDC from J141-2
J1-2 Black, Ground from J141-3
J1-3 Key
J1-4 Green-Gray from J206-9
J1-5 White-Green from J208-5
J1-6 White-Blue from J208-7

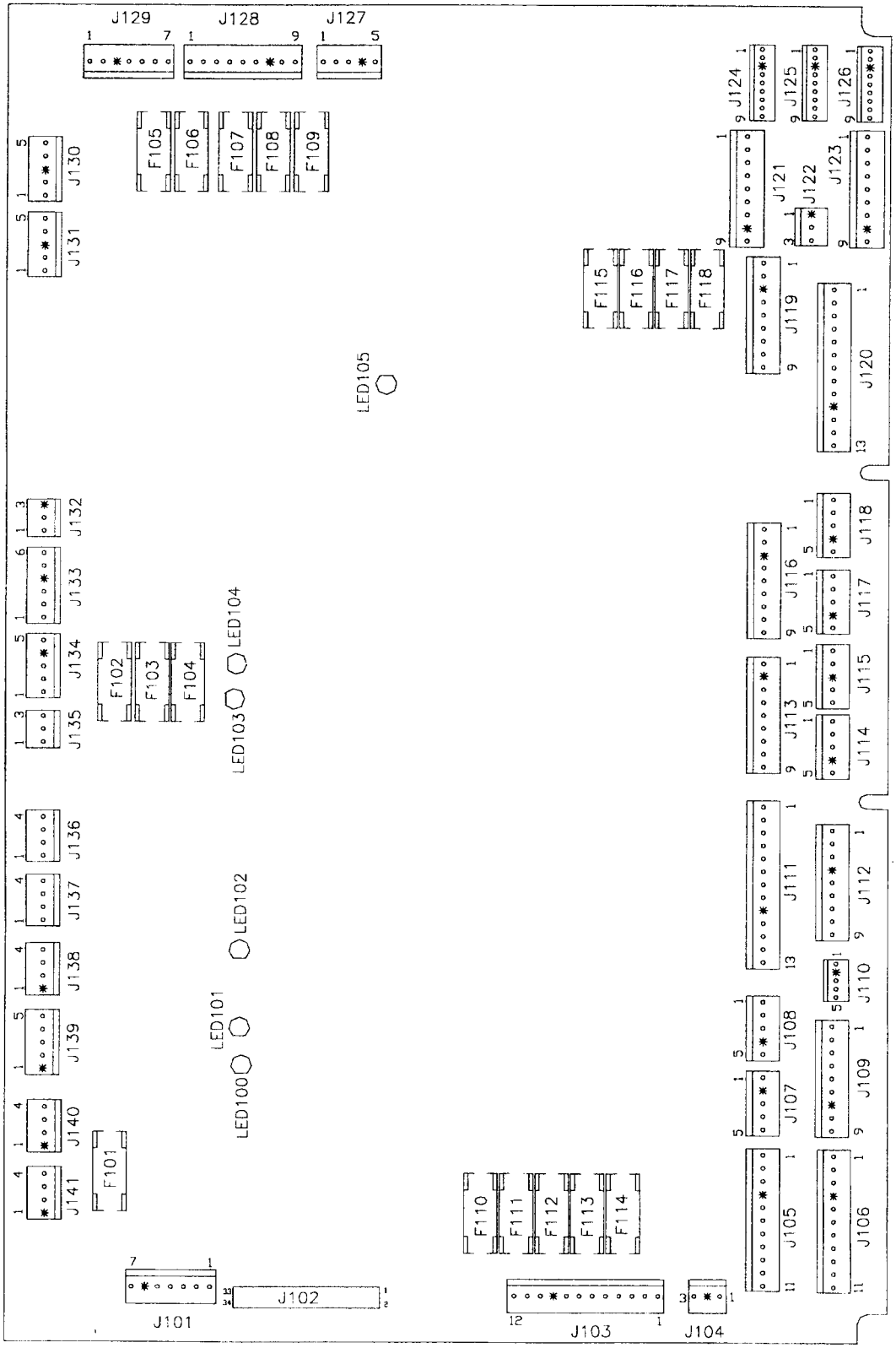


Circuit



Schematic

POWER DRIVER BOARD ASSEMBLY
A-20028



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

J102 34-Pin Ribbon Cable, Data to/from CPU J211

J103-1 Yellow-White, 6.8VAC from Xformer Secondary
J103-2 White-Brown, 6.8VAC from Xformer Secondary
J103-3 White-Brown, 6.8VAC from Xformer Secondary
J103-4 White-Orange, 6.8VAC from Xformer Secondary
J103-5 White-Yellow, 6.8VAC from Xformer Secondary
J103-6 White-Yellow, 6.8VAC from Xformer Secondary
J103-7 Orange, 6.8VAC from Xformer Secondary
J103-8 Not Used
J103-9 Key
J103-10 Green, 6.8VAC from Xformer Secondary
J103-11 Not Used
J103-12 Not Used

J104 Not Used

J105-1 Brown, Return, G.I. to Coin Door Board J2-5
J105-2 Not Used
J105-3 Yellow, Return, G.I. to Playfield
J105-4 Key
J105-5 Not Used
J105-6 Not Used
J105-7 White-Brown, 6.8VAC, G.I. to Coin Door Bd. J2-3
J105-8 Not Used
J105-9 White-Yellow, 6.8VAC, G.I. to Playfield
J105-10 Not Used
J105-11 Not Used

J106-1 Brown, Return G.I. to Insert Panel
J106-2 Not Used
J106-3 Yellow, Return G.I. to Insert Panel
J106-4 Key
J106-5 Not Used
J106-6 Not Used
J106-7 White-Brown, 6.8VAC, G.I. to Insert Panel
J106-8 White-Orange, 6.8VAC, G.I. to Insert Panel
J106-9 White-Yellow, 6.8VAC, G.I. to Insert Panel
J106-10 White-Green, 6.8VAC, G.I. to Insert Panel
J106-11 White-Violet, 6.8VAC, G.I. to Insert Panel

J107 Not Used

J108 Not Used

J109-1 Blue-Green, Solenoid 25 to Playfield Coil
J109-2 Blue-Black, Solenoid 26 to Backbox Motor
J109-3 Blue-Violet, Solenoid 27 to Playfield Coil
J109-4 Blue-Gray, Solenoid 28 to Playfield Coil
J109-5 Red-Orange Tieback Diode to Sol. 25, 27, 28
J109-6 Not Used
J109-7 Key
J109-8 Red-Orange Tieback Diode to Sol. 25, 27, 28
J109-9 Red-Orange Tieback Diode to Sol. 25, 27, 28

J110-1 Brown-White to Solenoid 37 to Insert
J110-2 Key
J110-3 Orange-White to Solenoid 38 to Insert
J110-4 Yellow-White to Solenoid 39 to Insert
J110-5 Green-White to Solenoid 40 to Insert

J111-1 Black-Brown, Solenoid 17 to Playfield Flasher
J111-2 Black-Red, Solenoid 18 to Playfield Flasher
J111-3 Black-Orange, Solenoid 19 to Playfield Flasher
J111-4 Black-Yellow, Solenoid 20 to Playfield Flasher
J111-5 Blue-Brown, Solenoid 21 to Playfield Flasher
J111-6 Blue-Red, Solenoid 22 to Playfield Flasher
J111-7 Not Used
J111-8 Not Used
J111-9 Key
J111-10 Not Used
J111-11 Not Used
J111-12 Not Used
J111-13 Not Used

J112-1 Not Used
J112-2 Not Used
J112-3 Not Used
J112-4 Key
J112-5 Not Used
J112-6 Not Used
J112-7 Not Used
J112-8 Blue-Orange, Solenoid 23 to Insert Flasher
J112-9 Blue-Yellow, Solenoid 24 to Insert Flasher

J113-1 Brown-Black, Solenoid 9 Drive to Playfield Coil
J113-2 Key
J113-3 Brown-Red, Solenoid 10 to Playfield Coil
J113-4 Brown-Orange, Solenoid 11 to Playfield Coil
J113-5 Brown-Yellow, Solenoid 12 to Playfield Coil
J113-6 Brown-Green, Solenoid 13 to Playfield Coil
J113-7 Brown-Blue, Solenoid 14 to Playfield Coil
J113-8 Brown-Violet, Solenoid 15 to Playfield Coil
J113-9 Brown-Gray, Solenoid 16 to Playfield Coil

J114 Not Used

J115 Not Used

J116-1 Violet-Brown, Solenoid 1 to Playfield Coil
J116-2 Not Used
J116-3 Key
J116-4 Violet-Orange, Solenoid 3 to Playfield Coil
J116-5 Not Used
J116-6 Violet-Green, Solenoid 5 to Playfield Coil
J116-7 Violet-Blue, Solenoid 6 to Playfield Coil
J116-8 Violet-Black, Solenoid 7 to Playfield Coil
J116-9 Violet-Gray, Solenoid 8 to Playfield Coil

J117 Not Used

J118-1 Not Used
J118-2 Violet-Red Solenoid 2 to Backbox Coil
J118-3 Not Used
J118-4 Key
J118-5 Violet-Yellow Solenoid 4 to Backbox Coil

J119-1 Red-Green, +50V to Lower Right Flipper Coil
J119-2 Red-Green, Loop End from J119-1
J119-3 Key
J119-4 Red-Blue, +50V to Lower Left Flipper
J119-5 Red-Blue, Loop End from J119-4
J119-6 Red-Violet, +50V to Upper Right Flipper Coil
J119-7 Red-Violet, Loop End from J119-6
J119-8 Red-Gray, +50V to Playfield Coil 35 & 36
J119-9 Red-Gray, Loop End from J119-8

J120-1 Orange-Gray, Holding, Playfield Coil 36
J120-2 Not Used
J120-3 Yellow-Gray, Power, Playfield Coil 35
J120-4 Orange-Violet, Holding, Upr Right Flipper Coil
J120-5 Not Used
J120-6 Yellow-Violet, Power, Upr Right Flipper Coil
J120-7 Orange-Blue, Holding, Lower Left Flipper Coil
J120-8 Not Used
J120-9 Yellow-Blue, Power, Lower Left Flipper Coil
J120-10 Key
J120-11 Orange-Green, Holding, Lwr Right Flipper Coil
J120-12 Not Used
J120-13 Yellow-Green, Power, Lower Right Flipper Coil

J121-1 Yellow-Brown, Lamp Col. 1 to Playfield
J121-2 Yellow-Red, Lamp Col. 2 to Playfield
J121-3 Yellow-Orange, Lamp Col. 3 to Playfield
J121-4 Yellow-Black, Lamp Col. 4 to Playfield
J121-5 Yellow-Green, Lamp Col. 5 to Playfield
J121-6 Yellow-Blue, Lamp Col. 6 to Playfield
J121-7 Yellow-Violet, Lamp Col. 7 to Playfield
J121-8 Key
J121-9 Yellow-Gray, Lamp Col. 8 to Playfield

J122-1 Key
J122-2 Not Used
J122-3 Yellow-Gray, Lamp Col 8 to Coin Door Bd. J3-9

J123 Not Used

J124 Not Used

J125-1 Red-Brown, Lamp Row 1 to Playfield
J125-2 Red-Black, Lamp Row 2 to Playfield
J125-3 Key
J125-4 Red-Orange, Lamp Row 3 to Playfield
J125-5 Red-Yellow, Lamp Row 4 to Playfield
J125-6 Red-Green, Lamp Row 5 to Playfield
J125-7 Red-Blue, Lamp Row 6 to Playfield
J125-8 Red-Violet, Lamp Row 7 to Playfield
J125-9 Red-Gray, Lamp Row 8 to Playfield

J126-1 Not Used
J126-2 Not Used
J126-3 Key
J126-4 Not Used
J126-5 Not Used
J126-6 Not Used
J126-7 Red-Blue, Lamp Row 6 to Coin Door Bd. J3-10
J126-8 Red-Violet, Lamp Row 7 to Coin Door Bd. J3-11
J126-9 Red-Gray, Lamp Row 8 to Coin Door Bd. J3-12

J127-1 White-Green, 9.8VAC from Xformer Secondary
J127-2 White-Green, 9.8VAC Loop End from J127-1
J127-3 White-Green, 9.8VAC from Xformer Secondary
J127-4 Key
J127-5 White-Green, 9.8VAC Loop End from J127-3

J128-1 White-Red, 16VAC Loop End from J128-2
J128-2 White-Red, 16VAC from Xformer Secondary
J128-3 White-Red, 16VAC Loop End from J128-4
J128-4 White-Red, 16VAC from Xformer Secondary
J128-5 Black-Yellow, 16VAC Loop End from J128-6
J128-6 Black-Yellow, 16VAC from Xformer Secondary
J128-7 Key
J128-8 Black-Yellow, 16VAC Loop End from J128-9
J128-9 Black-Yellow, 16VAC from Xformer Secondary

J129-1 Red, 9VAC from Xformer Secondary
J129-2 Red, 9VAC from Xformer Secondary
J129-3 Key
J129-4 Blue-White, 13VAC from Xformer Secondary
J129-5 Blue-White, 13VAC Loop End from J129-4
J129-6 Blue-White, 13VAC from Xformer Secondary
J129-7 Blue-White, 13VAC Loop End from J129-6

J130 Not Used

J131 Not Used

J132 Not Used

J133-1 Red-Orange, +50V to Playfield Coils
J133-2 Red-Brown, +50V to Playfield Coils
J133-3 Red-Black, +50V to Playfield Coils
J133-4 Key
J133-5 Not Used
J133-6 Red-White, +20V to Playfield Flashlamps

J134-1 Not Used
J134-2 Not Used
J134-3 Not Used
J134-4 Key
J134-5 Red-White, +20VDC to Insert Flashlamps

J135-1 Not Used
J135-2 Red-Brown +50V to Backbox Coils
J135-3 Not Used

J136 Not Used

J137 Not Used

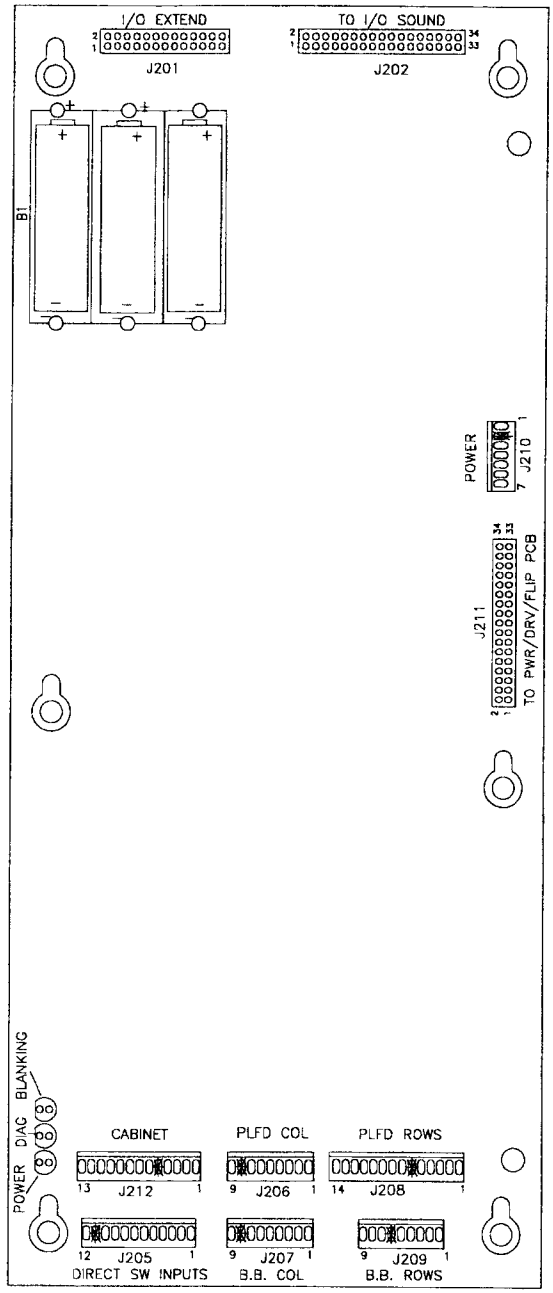
J138-1 Key
J138-2 Gray-Yellow, +12V to Backbox Coils
J138-3 Black, Ground to Backbox Coils
J138-4 Not Used

J139-1 Key
J139-2 Gray-Yellow +12V to Coin Door Bd. J2-2
J139-3 Black Ground to Coin Door Bd. J2-1
J139-4 Not Used
J139-5 Black-White to Coin Door Bd. J2-7

J140-1 Key
J140-2 Gray-Yellow, +12V to Backbox Motor
J140-3 Not Used
J140-4 Not Used

J141-1 Key
J141-2 Gray-Yellow, +12V to Playfield Switches
J141-3 Black, Ground to playfield Switches
J141-4 Not Used

SECURITY CPU BOARD ASSEMBLY
A-20119-90003



J201 26-Pin Ribbon Cable, Data to/from J602

J202 34-Pin Ribbon Cable, Data to/from J601

J203 Not Used

J204 Not Used

J205-1 Orange-Brown, Ded. Sw. Row 1, to Coin Door Bd. J1-8
J205-2 Orange-Red, Ded. Sw. Row 2, to Coin Door Bd. J1-7
J205-3 Orange-Black, Ded. Sw. Row 3, to Coin Door Bd. J1-6
J205-4 Orange-Yellow, Ded. Sw. Row 4, to Coin Door Bd. J1-5
J205-5 Not Used
J205-6 Orange-Green, Ded. Sw. Row 5, to Coin Door Bd. J1-4
J205-7 Orange-Blue, Ded. Sw. Row 6, to Coin Door Bd. J1-3
J205-8 Orange-Violet, Ded. Sw. Row 7, to Coin Door Bd. J1-2
J205-9 Orange-Gray, Ded. Sw. Row 8, to Coin Door Bd. J1-1
J205-10 Black, Ground, to Coin Door Bd. J1-10
J205-11 Key
J205-12 Orange-White, Sw. Enable, to Coin Door Bd. J1-11

J206-1 Green-Brown, Sw. Col. 1, to Playfield Sw.
J206-2 Green-Red, Sw. Col. 2, to Playfield Sw.
J206-3 Green-Orange, Sw. Col. 3, to Playfield Sw.
J206-4 Green-Yellow, Sw. Col. 4, to Playfield Sw.
J206-5 Green-Black, Sw. Col. 5, to Playfield Sw.
J206-6 Green-Blue, Sw. Col. 6, to Playfield Sw.
J206-7 Green-Violet, Sw. Col. 7, to Playfield Sw.
J206-8 Key
J206-9 Green-Gray, Sw. Col. 8, to Playfield Sw.

J207-1 Not Used
J207-2 Not Used
J207-3 Not Used
J207-4 Not Used
J207-5 Not Used
J207-6 Not Used
J207-7 Not Used
J207-8 Key
J207-9 Green-Gray, Sw. Col. 8, to Backbox Sw.

J208-1 White-Brown, Sw. Row 1, to Playfield Sw.
J208-2 White-Red, Sw. Row 2, to Playfield Sw.
J208-3 White-Orange, Sw. Row 3, to Playfield Sw.
J208-4 White-Yellow, Sw. Row 4, to Playfield Sw.
J208-5 White-Green, Sw. Row 5, to Playfield Sw.
J208-6 Key
J208-7 White-Blue, Sw. Row 6, to Playfield Sw.
J208-8 White-Violet, Sw. Row 7, to Playfield Sw.
J208-9 White-Gray, Sw. Row 8, to Playfield Sw.
J208-10 Not Used
J208-11 Black-Violet, F5, to Upr Right E.O.S. Sw.
J208-12 Black-Blue, F3, to Lwr Left E.O.S. Sw.
J208-13 Black-Green, F1, to Lwr Right E.O.S. Sw.
J208-14 Orange, Ground to E.O.S. Sw.

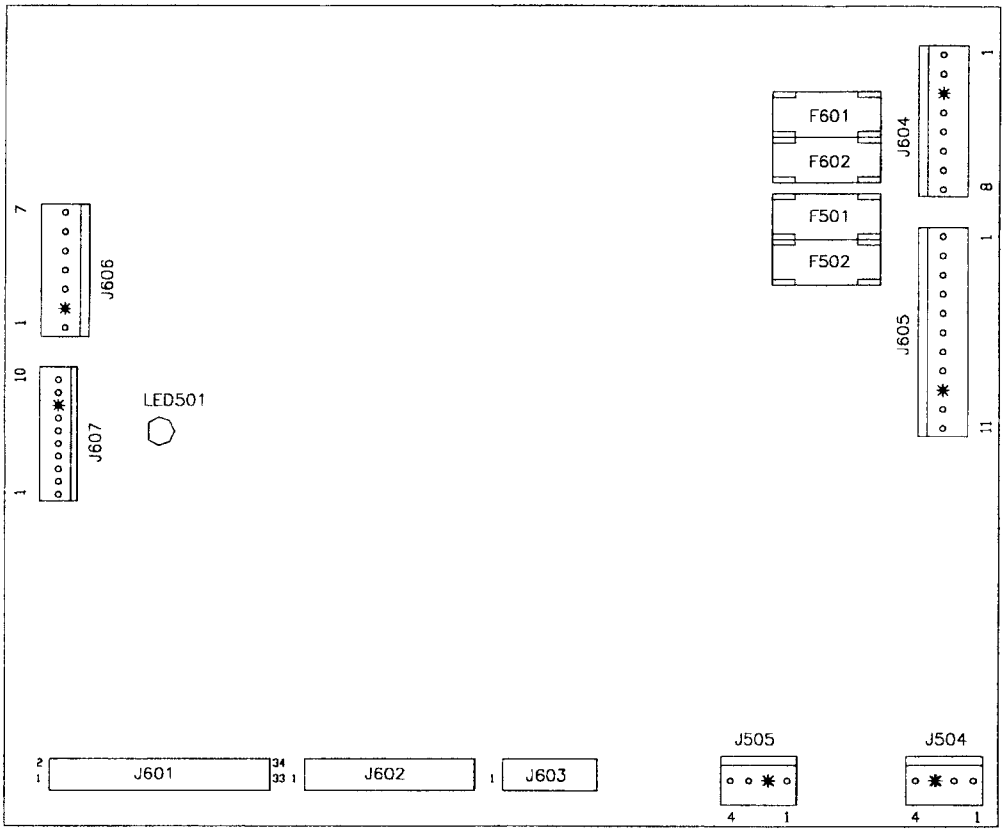
J209-1 White-Brown, Sw. Row 1, to Backbox Sw.
J209-2 White-Red, Sw. Row 2, to Backbox Sw.
J209-3 Not Used
J209-4 Not Used
J209-5 Not Used
J209-6 Key
J209-7 Not Used
J209-8 Not Used
J209-9 Not Used

J210-1 Black, Ground, to/from J101-7, J606-1
J210-2 Key
J210-3 Black, Ground, to/from J101-5, J606-3
J210-4 Gray, +5V, to/from J101-4, J606-4
J210-5 Gray, +5V, to/from J101-3, J606-5
J210-6 Gray-Green, +12V, to/from J101-2, J606-6
J210-7 Gray-Green, +12V, to/from J101-1, J606-7

J211 34-Pin Ribbon Cable, Data to/from J102

J212-1 Green-Brown, Sw. Col. 1, to Coin Door Board J3-1
J212-2 Green-Red, Sw. Col. 2, to Coin Door Board J3-2
J212-3 Not Used
J212-4 White-Brown, Sw. Row 1, to Coin Door Board J3-3
J212-5 Key
J212-6 White-Red, Sw. Row 2, to Coin Door Board J3-4
J212-7 White-Orange, Sw. Row 3, to Coin Door Board J3-5
J212-8 White-Yellow, Sw. Row 4, to Coin Door Board J3-6
J212-9 Black-Blue, F8, Coin Door Board J13-2
J212-10 Black-Yellow, F6, to Right Flipper Opto Board J1-1
J212-11 Blue-Gray, F4, to Left Flipper Opto Board J1-2
J212-12 Blue-Violet, F2, to Right Flipper Opto Board J1-2
J212-13 Orange, Ground to Right Flipper Opto Board J1-4

AUDIO VISUAL BOARD ASSEMBLY
A-20516-90003



J601 34-Pin Ribbon Cable, Data to CPU J202

J602 26-Pin Ribbon Cable, Data to CPU J201

J603 14-Pin Ribbon Cable, Data to/from Dot Matrix Display Driver

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

J605-1 White, 80VAC from Transformer Secondary
J605-2 White, 80VAC from Transformer Secondary
J605-3 Violet, 100VAC from Transformer Secondary
J605-4 Violet, 100VAC from Transformer Secondary
J605-5 Gray-White, 18VAC from Transformer Secondary
J605-6 Gray-White, Loop End from J605-5
J605-7 Gray, 18VAC from Transformer Secondary
J605-8 Gray, Loop End from J605-7
J605-9 Key
J605-10 Gray-Green, 18VAC from Transformer Secondary
J605-11 Gray-Green, 18VAC Loop End from J605-10

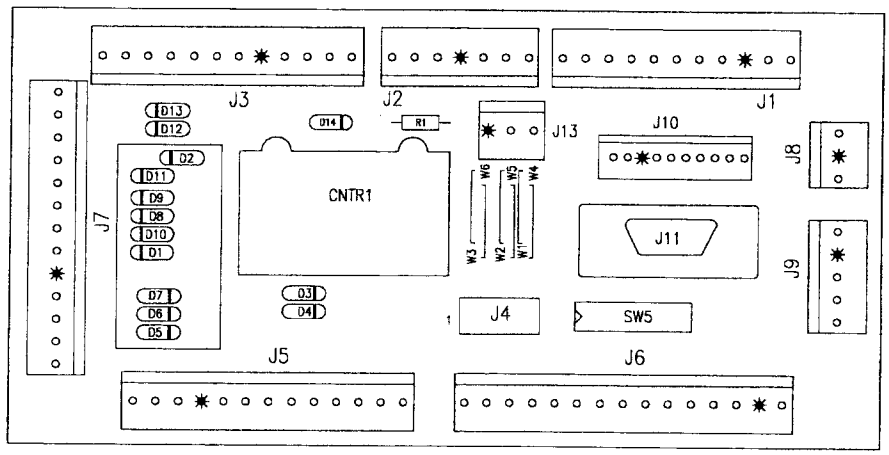
J606-1 Black, Ground to/from J101-7, J210-1
J606-2 Key
J606-3 Black, Ground to/from J101-5, J210-3
J606-4 Gray, +5V to/from J101-4, J210-4
J606-5 Gray, +5V to/from J101-3, J210-5
J606-6 Gray-Green, +12V to/from J101-2, J210-6
J606-7 Gray-Green, +12V to/from J101-1, J210-7

J607 Not Used

J504-1 Black-Yellow, Signal to Cabinet Speaker
J504-2 Key
J504-3 Not Used
J504-4 Black, Signal to Cabinet Speaker

J505-1 Black-Yellow, Signal to Backbox Speaker
J505-2 Key
J505-3 Not Used
J505-4 Black, Signal to Backbox Speaker

COIN DOOR INTERFACE BOARD
A-20949



J1-1 Orange-Gray, Ded. Sw. Row 8 Form CPU J205-9
J1-2 Orange-Violet, Ded. Sw. Row 7 from CPU J205-8
J1-3 Orange-Blue, Ded. Sw. Row 6 from CPU J205-7
J1-4 Orange-Green, Ded. Sw. Row 5 from CPU J205-6
J1-5 Orange-Yellow, Ded. Sw. Row 4 from CPU J205-4
J1-6 Orange-Black, Ded. Sw. Row 3 from CPU J205-3
J1-7 Orange-Red, Ded. Sw. Row 2 from CPU J205-2
J1-8 Orange-Brown, Ded. Sw. Row 1 from CPU J205-1
J1-9 Key
J1-10 Black, Ground from CPU J205-10
J1-11 Orange-White, Sw. Enable from CPU J205-12

J2-1 Black, Ground from Power Driver Board J139-3
J2-2 Gray-Yellow, +12VAC from Power Driver Bd. J139-2
J2-3 White-Brown, GI 6.8VAC from Power Driver J105-7
J2-4 Key
J2-5 Brown, G.I. from Power Driver Bd. J105-1
J2-6 Not Used
J2-7 Black-White from J139-5

J3-1 Green-Brown, Sw. Col.. 1 from CPU J212-1
J3-2 Green-Red, Sw. Col. 2 from CPU J212-2
J3-3 White-Brown, Sw. Row 1 from CPU J212-4
J3-4 White-Red, Sw. Row 2 from CPU J212-6
J3-5 White-Orange, Sw. Row 3 from CPU J212-7
J3-6 White-Yellow, Sw. Row 4 from CPU J212-8
J3-7 Not Used
J3-8 Key
J3-9 Yellow-Gray, Lamp Col. 8 from Power Driver J122-3
J3-10 Red-Blue, Lamp Row 6 from Power Driver J126-7
J3-11 Red-Violet, Lamp Row 7 from Power Driver J126-8
J3-12 Red-Gray, Lamp Row 8 from Power Driver J126-9

J4 Not Used

J5-1 Violet, G.I. Return to Coin Door
J5-2 White-Violet, G.I. 6.8VAC to Coin Door
J5-3 Black, Ground to Coin Door
J5-4 Not Used
J5-5 Orange-Red, Ded. Sw. Row 2 to Coin Door
J5-6 Not Used
J5-7 Orange-Green, Ded. Sw. Row 5 to Coin Door
J5-8 Orange-Blue, Ded. Sw. Row 6 to Coin Door
J5-9 Orange-Violet, Ded. Sw. Row 7 to Coin Door
J5-10 Key
J5-11 Orange-Gray, Ded. Sw. Row 8 to Coin Door
J5-12 Green-Red, Sw. Col. 2 to Coin Door Slam Tilt
J5-13 White-Brown, Sw. Row 1 to Coin Door Slam Tilt

J6 Not Used

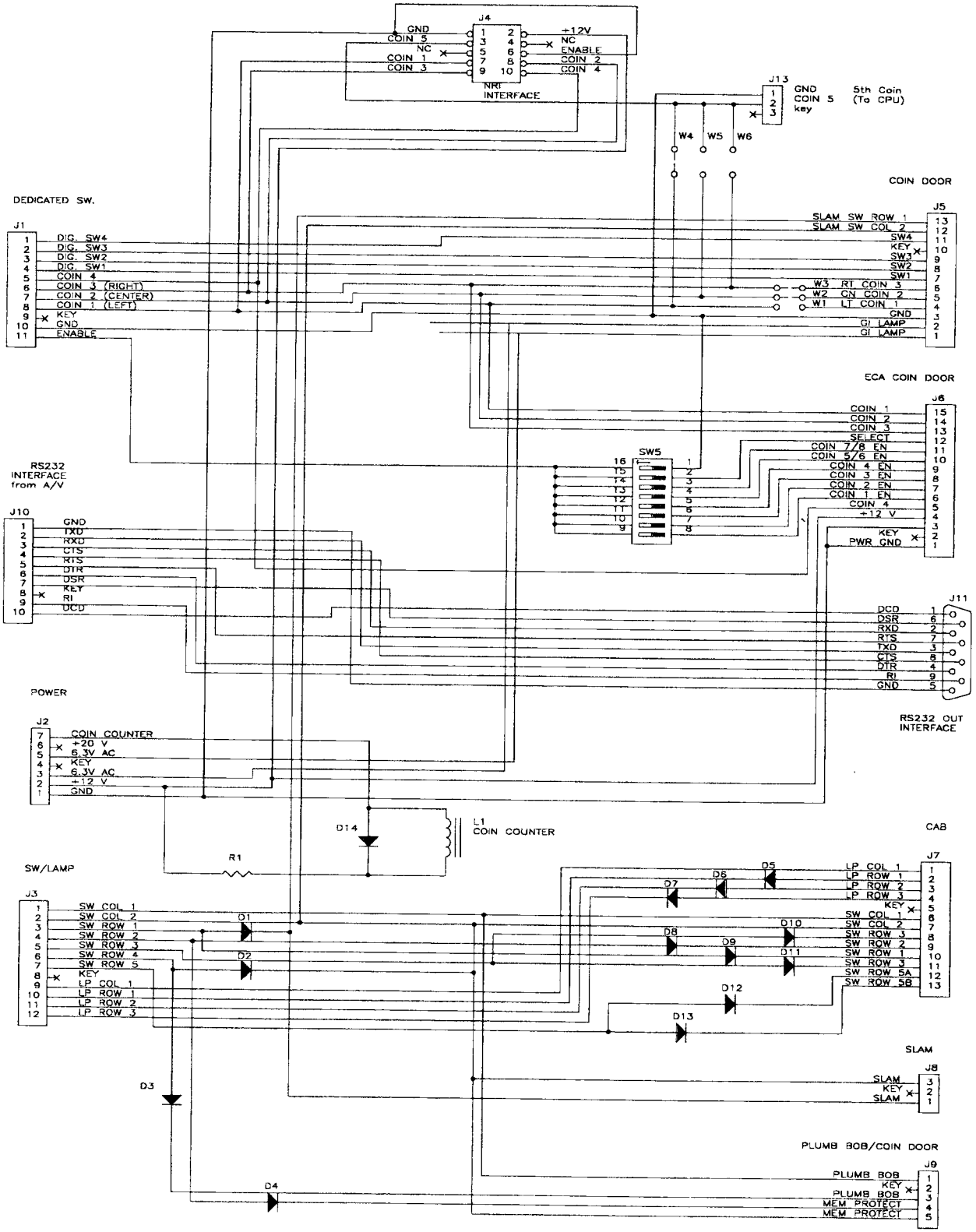
J7-1 Yellow-Gray, Lamp Col. 8 to Cabinet
J7-2 Red-Blue, Lamp Row 6 to Cabinet
J7-3 Not Used
J7-4 Red-Gray, Lamp Row 8 to Cabinet
J7-5 Key
J7-6 Green-Brown, Sw. Col. 1 to Cabinet
J7-7 Not Used
J7-8 Not Used
J7-9 Not Used
J7-10 White-Brown, Sw. Row 1 to Cabinet
J7-11 White-Orange, Sw. Row 3 to Cabinet
J7-12 Not Used
J7-13 Not Used

J8-1 White, Sw. Row to Cabinet Slam Tilt
J8-2 Key
J8-3 Green, Sw. Col. to Cabinet Slam Tilt

J9-1 White-Yellow, Sw. Row 4 to Plumb Bob Tilt
J9-2 Key
J9-3 Green-Brown, Sw. Col. 1 to Plumb Bob Tilt
J9-4 White-Red, Sw. Row 2 to Interlock Sw.
J9-5 Green-Red, Sw. Col. 2 to Interlock Sw.

J13-1 Orange to Left Flipper Opto Bd. J1-3
J13-2 Black-Blue from J212-9
J13-3 Key

COIN DOOR INTERFACE BOARD SCHEMATIC
A-20949



LAMP MATRIX

Yellow (B+) → Red

Row \ Column	1 Yellow-Brown J121-1 Q96	2 Yellow-Red J121-2 Q100	3 Yellow-Orange J121-3 Q95	4 Yellow-Black J121-4 Q99	5 Yellow-Green J121-5 Q94	6 Yellow-Blue J121-6 Q98	7 Yellow-Violet J121-7 Q93	8 Yellow-Gray J121-9 Q97
1 Red-Brown J125-1 Q104	LITE DEPOSIT 11	CENTER TIMER "15" 21	ARMOR CAR CELLAR 31	BONUS 5X + OUTLANE 41	WHEEL ARROW 51	TOP RIGHT 3-BANK TOP 61	BOTTOM R. 3-BANK TOP 71	TOP JET (YELLOW) 81
2 Red-Black J125-2 Q108	CENTER TIMER "10" 12	CENTER TIMER "20" 22	ARMOR CAR ROOF 32	BONUS 5X 42	LITE OUTLANES 52	TOP RIGHT 3-BANK MIDDLE 62	BOTTOM R. 3-BANK MIDDLE 72	LEFT JET (CLEAR) 82
3 Red-Orange J125-4 Q103	DISABLE COMPUTER 13	CENTER TIMER "25" 23	ARMOR CAR MAIN 33	BONUS 4X 43	INVISIBLE CODE 53	TOP RIGHT 3-BANK BOTTOM 63	BOTTOM R. 3-BANK BOTTOM 73	RIGHT JET (RED) 83
4 Red-Yellow J125-5 Q107	CENTER TIMER "5" 14	CENTER TIMER "30" 24	BONUS 2X 34	BONUS 3X 44	EXPLOSIVES 54	TOP LEFT 3-BANK TOP 64	BOTTOM L. 3-BANK TOP 74	BANK LEFT 84
5 Red-Green J125-6 Q102	CENTER TIMER "0" 15	CENTER TIMER "35" 25	(A)LARM STANDUP 35	RAMP LOCK 45	NOTE TO TELLER 55	TOP LEFT 3-BANK MIDDLE 65	BOTTOM R. 3-BANK MIDDLE 75	BANK RIGHT 85
6 Red-Blue J125-7 Q106	LITE LOCK 16	CALL GUARD 26	ATM CARD 36	AL(A)RM STANDUP 46	TOP LEFT LANE 56	TOP LEFT 3-BANK BOTTOM 66	BOTTOM R. 3-BANK BOTTOM 76	VARI BREAK IN 86
7 Red-Violet J125-8 Q101	CENTER TIMER "55" 17	CENTER TIMER "45" 27	A(L)ARM STANDUP 37	ALA(R)M STANDUP 47	TOP MIDDLE LANE 57	RIGHT "EXTRA TIME" 67	LEFT RETURN 77	ROOF BREAK IN 87
8 Red-Gray J125-9 Q105	CENTER TIMER "50" 18	CENTER TIMER "40" 28	RAMP JACKPOT 38	ALAR(M) STANDUP 48	TOP RIGHT LANE 58	RIGHT RETURN 68	LEFT "EXTRA TIME" 78	START BUTTON 88

J1XX = Power Driver Board

SWITCH MATRIX

White → Green

Dedicated Grounded Switches	Row \ Column	1 Green-Brown J206-1 U20-18	2 Green-Red J206-2 U20-17	3 Green-Orange J206-3 U20-16	4 Green-Yellow J206-4 U20-15	5 Green-Black J206-5 U20-14	6 Green-Blue J206-6 U20-13	7 Green-Violet J206-7 U20-12	8 Green-Gray J206-9 U20-11	Flipper Grounded Switches
Orange-Brown J205-1 U17-5 Left Coin Chute D1	1 White-Brown J208-1 U18-11	TP TROUGH (ROOF) 11	SLAM TILT 21	TROUGH EJECT 31	KICKBACK 41	(A)LARM STANDUP 51	TOP LEFT 3-BANK TOP 61	BOTTOM LEFT 3-BANK TOP 71	LEFT TOKEN LEVEL 81	Black-Green J208-13 Lower Right Flipper EOS F1
Orange-Red J205-2 U17-7 Center Coin Chute D2	2 White-Red J208-2 U18-9	TP TROUGH (VARI) 12	COIN DOOR CLOSED 22	TROUGH BALL 1 32	LEFT BIG KICK 42	A(L)ARM STANDUP 52	TOP LEFT 3-BANK MIDDLE 62	BOTTOM LEFT 3-BANK MIDDLE 72	RIGHT TOKEN LEVEL 82	Blue-Violet J212-12 Lower Right Flipper Opto F2
Orange-Black J205-3 U17-11 Right Coin Chute D3	3 White-Orange J208-3 U18-5	START BUTTON 13	NOT USED 23	TROUGH BALL 2 33	TOKEN CHUTE JAM 43	AL(A)RM STANDUP 53	TOP LEFT 3-BANK BOTTOM 63	BOTTOM LEFT 3-BANK BOTTOM 73	RAMP ENTRANCE 83	Black-Blue J208-12 Lower Left Flipper EOS F3
Orange-Yellow J205-4 U17-9 4th Coin Chute D4	4 White-Yellow J208-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH BALL 3 34	LEFT JET 44	ALA(R)M STANDUP 54	TOP RIGHT 3-BANK BOTTOM 64	BOTTOM RIGHT 3-BANK BOTTOM 74	RAMP MADE 84	Blue-Gray J212-11 Lower Left Flipper Opto F4
Orange-Green J205-6 U16-9 Normal Function / Test Function Ser Credits / Esc D5	5 White-Green J208-5 U19-11	RIGHT ORBIT 15	UPPER RIGHT FLIP ROLLOVER 25	TROUGH BALL 4 35	RIGHT JET 45	ALAR(M) STANDUP 55	TOP RIGHT 3-BANK MIDDLE 65	BOTTOM RIGHT 3-BANK MIDDLE 75	WHEEL CHANNEL A 85	Black-Violet J208-11 Upper Right Flipper EOS F5
Orange-Blue J205-7 U16-11 Normal Function / Test Function Vol Down / Down D6	6 White-Blue J208-7 U19-9	LEFT OUTLANE 16	LEFT RETURN 26	LOCKUP 1 FRONT 36	TOP JET 46	VARI TARGET C 56	TOP RIGHT 3-BANK TOP 66	BOTTOM RIGHT 3-BANK TOP 76	WHEEL CHANNEL B 86	Black-Yellow J212-10 Upper Right Flipper Opto F6
Orange-Violet J205-8 U16-7 Normal Function / Test Function Vol Up / Up D7	7 White-Violet J208-8 U19-5	RIGHT OUTLANE 17	RIGHT RETURN 27	LOCKUP 2 REAR 37	LEFT SLINGSHOT 47	VARI TARGET B 57	TOP LEFT LANE 67	BANK KICKOUT 77	NOT USED 87	Black-Gray J208-10 Upper Left Flipper EOS F7
Orange-Gray J205-9 U16-5 Normal Function / Test Function Begin Test / Enter D8	8 White-Gray J208-9 U19-7	BALL SHOOTER 18	LEFT ORBIT 28	NOT USED 38	RIGHT SLINGSHOT 48	VARI TARGET A 58	TOP POPPER 68	TOP RIGHT LANE 78	NOT USED 88	Black-Blue J212-9 Upper Left Flipper Opto F8

J2XX = CPU Board; ☐ = Opto, Typically Closed

WARNINGS & NOTICES

WARNING

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