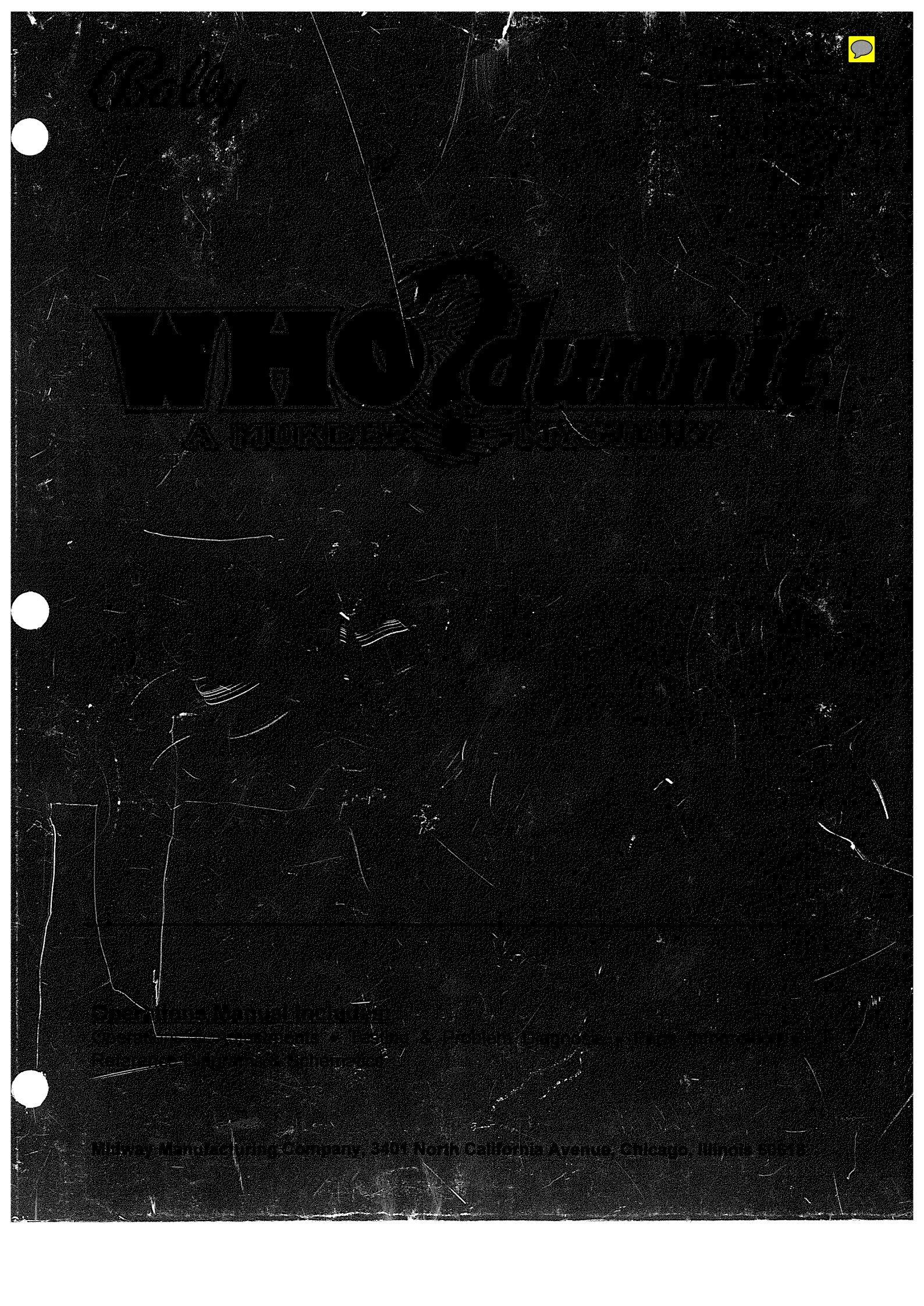
Williams

Arcade Classic



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

DIP SWITCH SETTINGS AND JUMPERS

EPROM Jumper Settings for U6	W1	W2
1MEG, 2MEG, 4 MEG EPROM	In	Out

Dip Switch Chart

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

SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire Color	Solenoid Part number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	Trough	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-26-1500	---
02	Plunger	High Power	J107-2			Q80	J130-2			Vio-Red	AE-23-800	---
03	Left Lock Up	High Power	J107-2			Q78	J130-4			Vio-Org	AE-27-1200	---
04	Right Back Popper	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-24-900	---
05	Ramp Down	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-26-1200	---
06	Not Used	High Power				Q66				Vio-Blu	---	---
07	Knocker	High Power		J107-2		Q68		J130-8		Vio-Blk	---	AE-23-800
08	Right Front Popper	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-23-800	---
09	Left Sling	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	---
10	Right Sling	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	---
11	Left Jet	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-26-1200	---
12	Bottom Jet	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1200	---
13	Right Jet	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1500	---
14	Phone Flasher	Low Power	J107-6			Q48	J127-7			Brn-Blu	#906 (1)	---
15	Not Used	Low Power				Q46				Brn-Vio	---	---
16	Ramp Up	Low Power	J107-3			Q44	J127-9			Brn-Gry	SM1-28-900-DC	---
17	Back Flasher	Flasher	J107-6	J105-5		Q42	J126-1	J125-1		Blk-Brn	#906 (2)	#906 (1)
18	Autofire Flasher	Flasher	J107-6			Q40	J126-2			Blk-Red	#89 (1)	---
19	Lower Left Flasher	Flasher	J107-6	J105-5		Q38	J126-3	J125-3		Blk-Org	#906 (1)	#906 (1)
20	Spinner Flasher	Flasher	J107-6	J105-5		Q36	J126-4	J125-5		Blk-Yel	#906 (1)	#906 (2)
21	Lower Right Flasher	Flasher	J107-6	J105-5		Q28	J126-5	J125-6		Blu-Grn	#906 (1)	#906 (1)
22	Motor 3-Bank	Flasher	J116-2			Q30	J126-6			Blu-Blk	14-8026 12V	---
23	Left Slot B	Flasher	J116-2			Q34	J126-7			Blu-Vio	14-8024 12V	---
24	Left Slot A	Flasher	J116-2			Q32	J126-8			Blu-Gry	14-8024 12V	---
25	Center Slot B	Gen. Purpose	J116-2			Q26	J122-1			Blu-Brn	14-8024 12V	---
26	Center Slot A	Gen. Purpose	J116-2			Q24	J122-2			Blu-Red	14-8024 12V	---
27	Right Slot B	Gen. Purpose	J116-2			Q22	J122-3			Blu-Org	14-8024 12V	---
28	Right Slot A	Gen. Purpose	J116-2			Q20	J122-4			Blu-Yel	14-8024 12V	---
36	Up Down Post	Low Power	J907-8,9			Q5	J902-1			Org-Gry	AE-27-1200	---
	General Illumination											
01	Left Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	---
02	Right Playfield	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	---
03	Back Playfield	G.I.	J121-3			Q14	J121-9			Wht-Yel	#44	---
04	Insert 1	G.I.		J120-5		Q16		J120-10		Wht-Grn	---	#555
05	Insert 2	G.I.		J120-6		Q12		J120-11		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	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn	FL-15411	ORANGE
31		Lwr. Lt. Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J907-4 (Red-Blu)		Q9	J902-7		Org-Blu	FL-15411	ORANGE
33		Upr. Rt. Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio	NOT USED	NOT USED
35		Upr. Lt. Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry			
36	Upper Left Flipper	Upr. Lt. Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	SEE	ABOVE

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

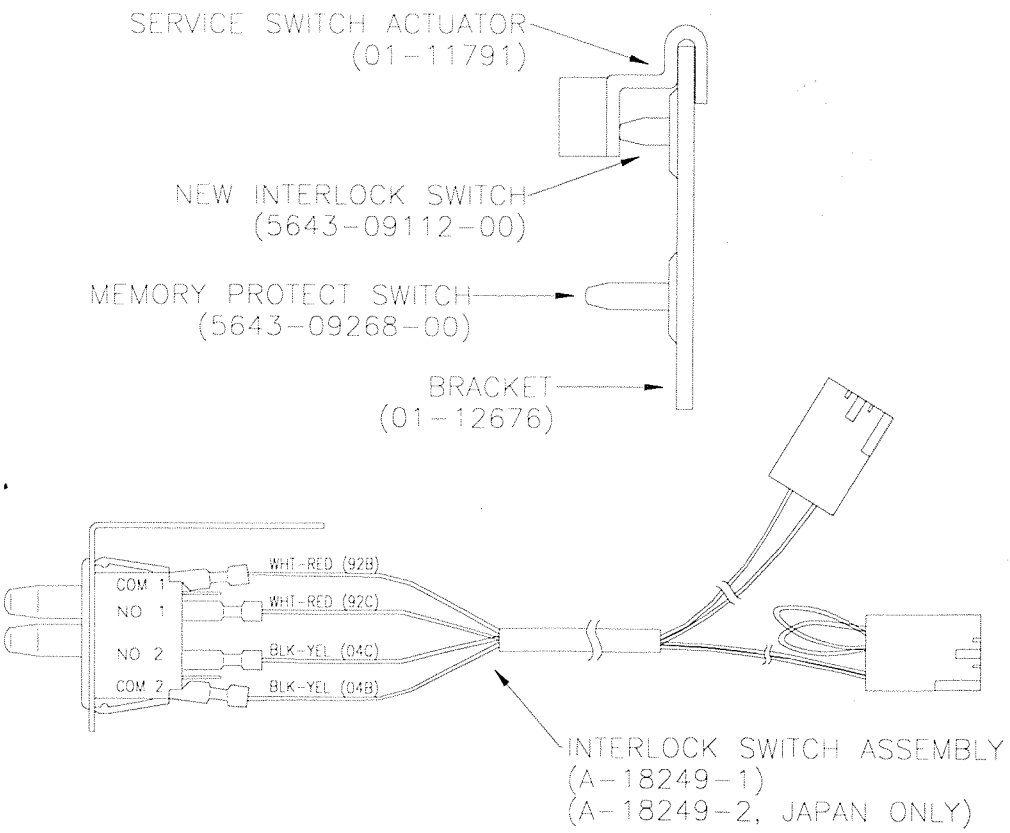
IMPORTANT NOTICE

PLEASE READ

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

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

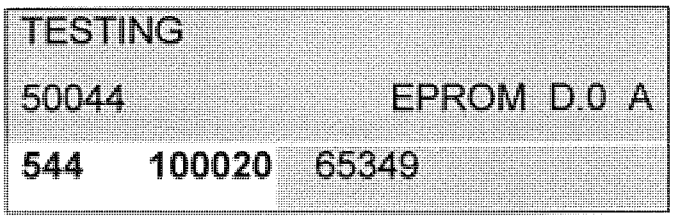
Hold the top interlock switch in, then slide the short end of the Service Switch Actuator over the top of the interlock switch bracket and the long end over the center of the switch plunger to hold it in.



ATTENTION

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



WHO DUNNIT™

A MURDER MYSTERY

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, white the game serial number in the manual.

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.

TABLE OF CONTENTS

Bally's

WHO DUNNIT™

A MURDER MYSTERY

Background Story, Game Rules and Shotmaps

BACKGROUND STORY

CHARACTERS:

TONY'S PALACE - Casino, The place it all happens.

Nick Spade		Private eye.
Tony	38	Owner of the casino and very content.
Trixie	23	Works as a dealer, for Tony.
Bruno	42	Tony's bouncer/ body guard.
Victoria	34	Spider Lady from Europe.
Butler	53	Victoria's Manservant.

TIME LINE:

1900

Walter, a young wealthy playboy, and Mia, wife of the English Ambassador have a fling. They conceive VICTORIA, a secret VICTORIA'S mother keeps. She doesn't tell him before he leaves, never to see him again.

1911

TRIXIE'S mom dies giving birth to her. Tex is forced to be a single parent.

1915

Walter comes to town, meets TONY, and they become partners. They start the W&T PALACE, a struggling casino. TONY then cheats Walter out of his half of the casino and Walter disappears.

1917

Walter returns to Europe to find that VICTORIA'S mother has died and that VICTORIA has grown up in a boarding school. VICTORIA looks amazingly like her mother. Walter can only think of how much he loved Mia when he sees VICTORIA. Walter changes his name to BUTLER. He tells VICTORIA that he used to work for her mom and she hires him as her manservant. BUTLER, trapped by the memory of Mia, does whatever VICTORIA says. VICTORIA treats BUTLER like dirt...as she does most everyone.

1919

Tex forms a partnership with TONY and they create the T&T PALACE. This casino thrives and they become rich. TONY and Tex each get a tattoo on their arm that reads T&T PALACE. TRIXIE is 8 and has a crush on TONY. TONY and Tex are like brothers.

1922 MAY

BUTLER suspects the fate of all his daughter's past husbands and encourages VICTORIA to go after TONY. VICTORIA shows up with BUTLER. VICTORIA and TONY have been lovers off and on for a couple of years. TONY still avoids her grasp. VICTORIA marries Tex, her Third husband. She becomes TRIXIE'S stepmother. TONY doesn't recognize Walter because BUTLER is the shadow of the man Walter was and looks 10 years older.

1923 JANUARY

VICTORIA and TONY conspire to kill Tex. The plan was: VICTORIA gets the money and TONY gets the Casino. Tex overhears VICTORIA'S half of the conspiracy. When she hangs up the phone he roughs her up and threatens that if anything happened to him she would be sorry. BUTLER witnessed Tex roughing her up. Unknowing to VICTORIA or TONY, BUTLER sabotages the brakes of Tex's car. Tex drives off a cliff. Car explodes. Body was never found.

Tex, injured and disfigured, makes it to an underground doctor/plastic surgeon. Tex is reborn as Bruno. Bruno has one agenda, to get VICTORIA for attempting to kill him. No one will get in his way.

TRIXIE, now 11, moves in with TONY. VICTORIA can not be tied down with a child. TONY is the closest family that TRIXIE has. She resents VICTORIA for this and still has a crush on TONY.

TONY and VICTORIA each believe that the other did the brake job on Tex. VICTORIA and BUTLER leave for Europe in search of another husband for VICTORIA.

T&T PALACE becomes TONY'S PALACE.

1930

TRIXIE and TONY are lovers but TONY will not commit. TONY gives her a job at his Casino. He keeps her on a string, never letting her get enough money to be free.

1932

Bruno goes on a fact-finding mission about VICTORIA. He learns all about her and her dead husbands. He learns about her real father. He also learns about her relationship with TONY. He now suspects TONY and VICTORIA of "fixing" his brakes.

TONY, unknowingly, hires Bruno to work for him. Bruno wants to be close because he knows that sooner or later VICTORIA will show up, and he wants to keep an eye on TRIXIE, his daughter. TRIXIE has been his only reason to live on some dark lonely nights. Bruno keeps a locker full of TRIXIE pictures and news clippings.

1934 (Yesterday)

Bruno waits for the day that he can extract his revenge on VICTORIA and TONY.

TONY thinks all is well and is ready to enjoy the good life that he deserves.

TRIXIE has finally learned that TONY is not to be trusted and she must do what it takes to protect herself.

VICTORIA and BUTLER show up to try and snag TONY once more!

GAME RULES

OBJECTIVE: To catch the killer of the current case. There are four main steps to catching a killer:

STEP 1 - Collect a clue (This lights the phone for interrogating suspects).
STEP 2 - Answer the Phone. Answering the phone will interrogate a suspect.
STEP 3 - Shoot "WHO dunnit", and pick the killer out of the remaining suspects.
STEP 4 - Catch the killer on "THE ROOF" to close the case.

SKILL SHOT Hit flashing "TAXI" light to score value shown on display, or hit lock entry for super skill shot and instant lock.

CLUES Spelling *T-A-X-I* gives a clue:
Bullet,
Broken Mirror,
Dagger,
Fingerprint,
or Matchbook.

Left and right flipper return lanes lite loops for TAXI CHASE. Making loop shots or hitting TAXI targets light letters in TAXI. Collecting a clue, rings (lites) the TELEPHONE. Collect all 5 clues to light EXTRA BALL.

TELEPHONE Make the phone shot to answer the phone and interrogate a suspect. Listen to the suspect carefully because they will discuss the killer, unless they ARE the killer. Interrogating a suspect then lites WHO dunnit.

WHO dunnit Shoot WHO dunnit for an opportunity to pick the correct killer out of the remaining suspects. Use either flipper button to select the possible murderer, then push both buttons to enter. If you select the correct suspect then a chase on "THE ROOF" will begin. If you do not select the correct suspect then the suspect is eliminated and you must start over at STEP 1.

THE ROOF The is an opportunity to catch the killer and close the current case. Shoot for flashing lane to light the phone for ROOF HURRY UP. If the "HURRY UP" times out, you must relight it. completing the two shots starts a 4-ball ROOF Multi-ball, during which all lit shots scores the Hurry-Up value. When Multi-ball ends a new case is started.

CASES There are 5 cases:
Missing Bullet,
Broken Mirror,
Bloody Dagger,
Sticky Fingers,
and The Tattoo.
Each case starts with one of 5 possible victims:
Tony,
Veronica,
Butler,
Bruno,
or Trixie.

The VICTIM will be lit with a steady light and all the suspects will be flashing. As suspects are eliminated their lights will go out. Once you solve "WHO DUNNIT" you must catch the murderer on "THE ROOF" (see THE ROOF).

EQUIPMENT There are 4 pieces of equipment:
Gun,
Magnifying Glass,
Flashlight,
and Map.
Items can be picked up:
in the Sewer,
making Train Combo's,
playing Roulette,
or on the 6th Floor.
The GUN helps you during "Multi-ball" by increasing the value of the jackpot in the jets.
The MAGNIFYING GLASS eliminates suspects if the phone shot is made and no other award is given.
The FLASHLIGHT helps you in the "Sewer" to find the MAP.
The MAP helps you in the "Sewer".

ROULETTE Left (red) and Right (black) mini targets select color for betting on roulette table. Spinner determines size of bet. MAIN FLOOR, TRAIN COMBO, or shooting the roulette table lights ROULETTE. Making ROULETTE shot when lit gives you the option to "bet" (right flipper) or "pass" (left flipper). If your color comes up you win the "bet", if not the "bet" is deducted from your score.

TRAIN COMBOS Making consecutive "ramp shots" scores a TRAIN COMBO.
1st lights ROULETTE
2nd gives EQUIPMENT
3rd lights EXTRA BALL
4th starts LOOP CHAMPION (Try to beat the previous champion for "big points".)

ELEVATOR The center scoop is the ELEVATOR in "Tony's Place".
The left shot is ELEVATOR UP.
The right shot is ELEVATOR DOWN.
The center shot is ELEVATOR EXIT.
There are 11 floors:
Basement,
Main Floor,
2nd thru 8th,
Penthouse,
and The Roof.
Exiting on a floor collects the award for that floor.
Basement = Starts Multi-ball
Main Floor = Lights ROULETTE and SPINS for the SLOT MACHINE
2nd Floor = Spells TAXI to award a CLUE and lights the phone
3rd and 5th Floor = Collect evidence OR Pick WHO dunnit
4th Floor = Spin Slot Machine
6th Floor = EQUIPMENT
7th Floor = ELEVATOR MADNESS
8th Floor = WHO DUNNIT
Penthouse = PENHOUSE PARTY
The Roof = THE ROOF

MULTI-BALL™ During multiball, SPINNER LANE and SEWER SHOT are lit for JACKPOT. All 3 slot reels are spinning. Left, center and right scoop shots (elevator) stop respective reels. Stopping all 3 reels scores JACKPOT.

ELEVATOR MADNESS "Elevator Madness" is a 2-ball Multi-Ball. Either left or right shot reverses direction of elevator, and collects value for that floor. Exiting on a floor, also collects point value for that floor. Avoid moving 3-bank target.

PENTHOUSE PARTY You cannot exit to the PENTHOUSE until you collect the KEY by hitting the right 2-bank. Entering the penthouse starts PENTHOUSE PARTY—all flashing shots scores increasing values (10 Million, 20 Million, 30 Million, Etc.) until timer runs out.

SLOT MACHINE To spin SLOT MACHINE make 1 of 3 SPIN shots when lit:
Telephone,
Roulette Table
or Sewer.
Completing the 3-bank in front of the "Elevator" relights SPIN.

The awards that can be collected are:
3 Bars = 100 Million
3 Fingerprints = Clue
3 Multi-balls = Instant Multi-ball
3 Extra Balls = Extra Ball
3 Jackpots = Instant Jackpot
3 Magnifying Glasses = Equipment
3 Question marks = Elevator Madness
3 Wilds = "THE ROOF"
Wild/Choice = Select your award with left or right flippers.
If you get 2 of the same symbols the third real spins for a "second chance".

SECOND CHANCE Second Chance is a chance to shoot the ball into one of the three holes to stop the third real on the award, and collect that award.

MYSTERY TARGET Hitting the PENTHOUSE KEY targets light the mystery target. The MYSTERY TARGET awards what ever should be awarded at the time: For example, if during Penthouse party, it awards the 3 penthouse party awards.

OUTLANES Gives a FREE SPIN on slot machine when lit. (Use the flippers to change lanes to light the outlanes at the appropriate item.)

JET BUMPERS Nudge slot machine reels. Falling into hole below jets scores value of slot machine.

SKILL SHOT Hit flashing "TAXI" light to score value shown on display, or hit lock entry for super skill shot and instant lock.

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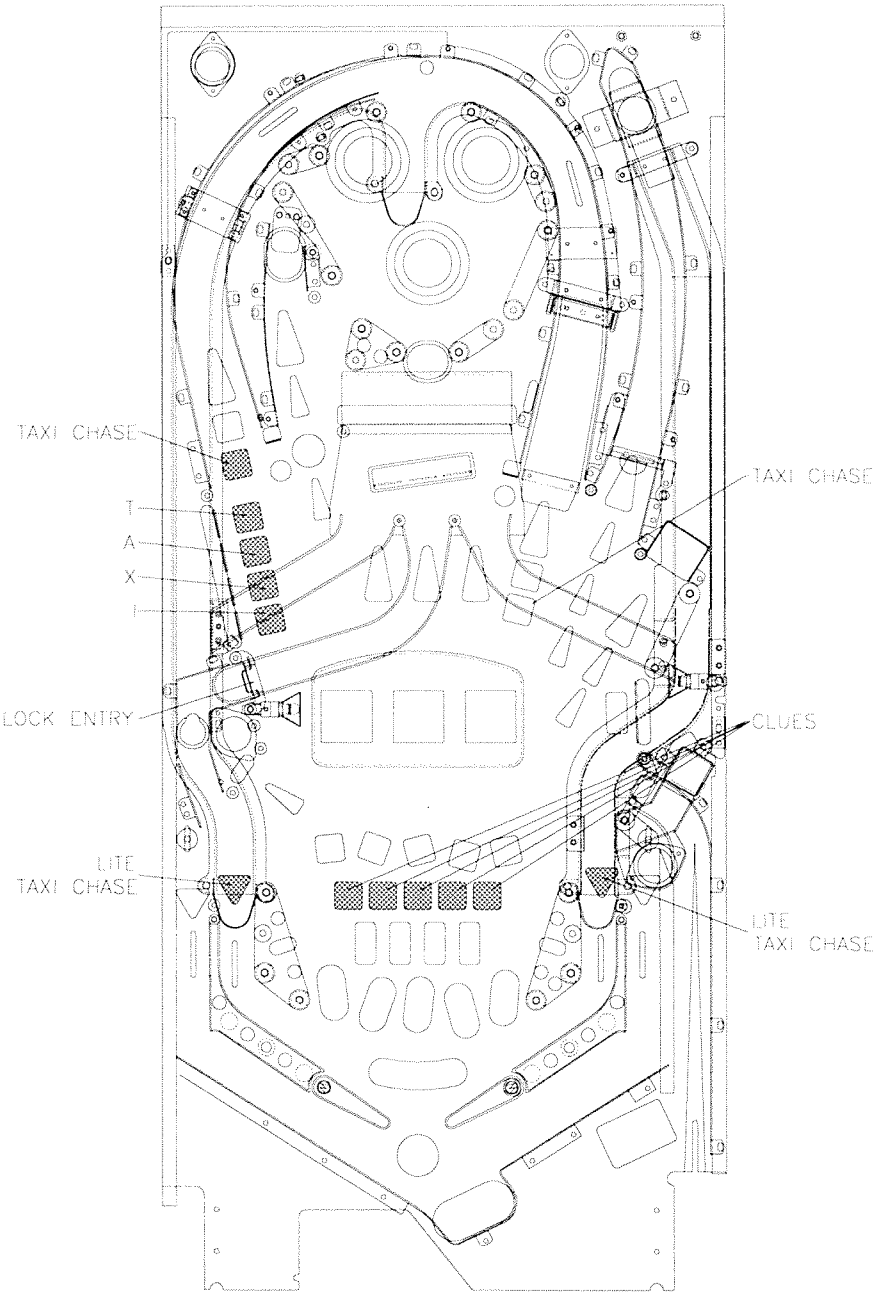

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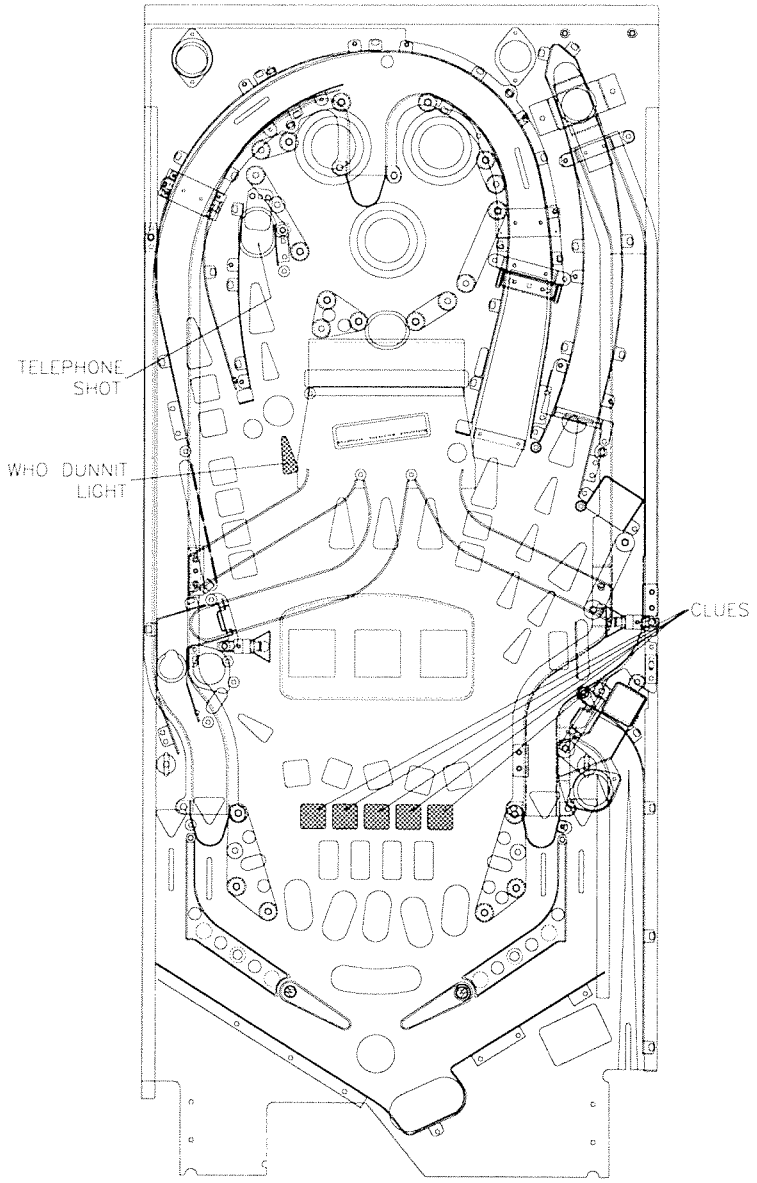

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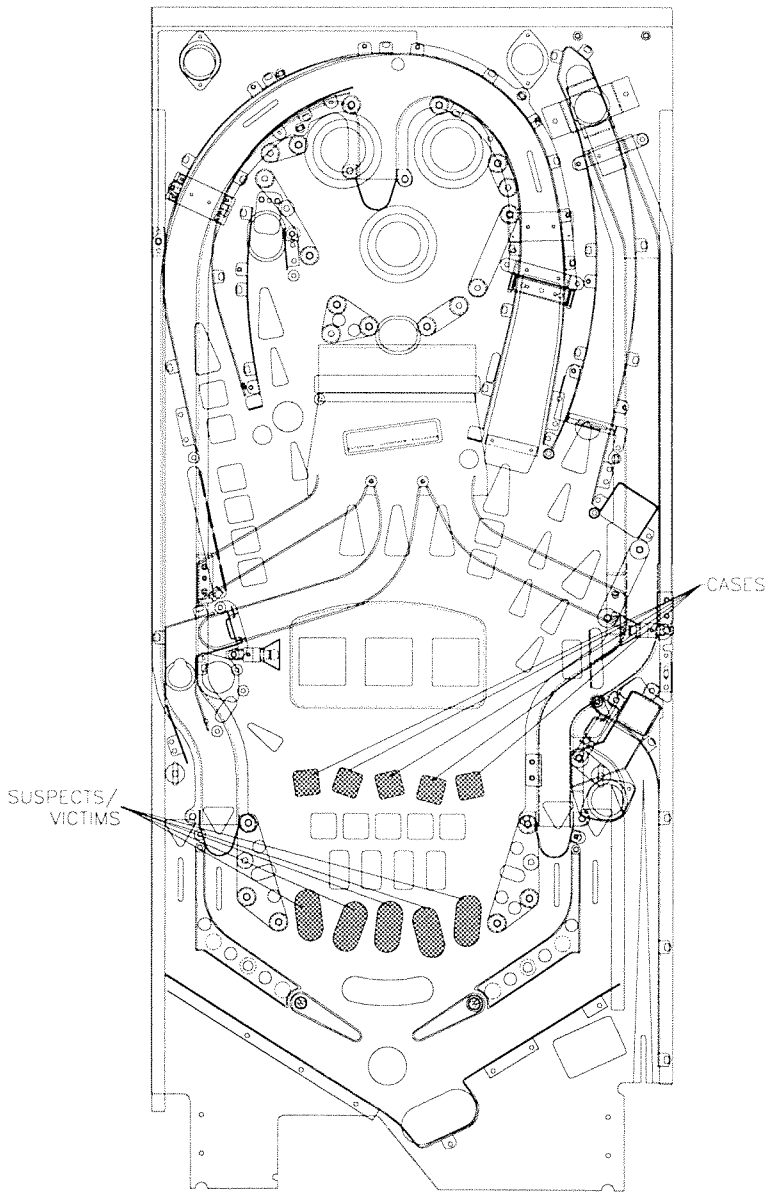

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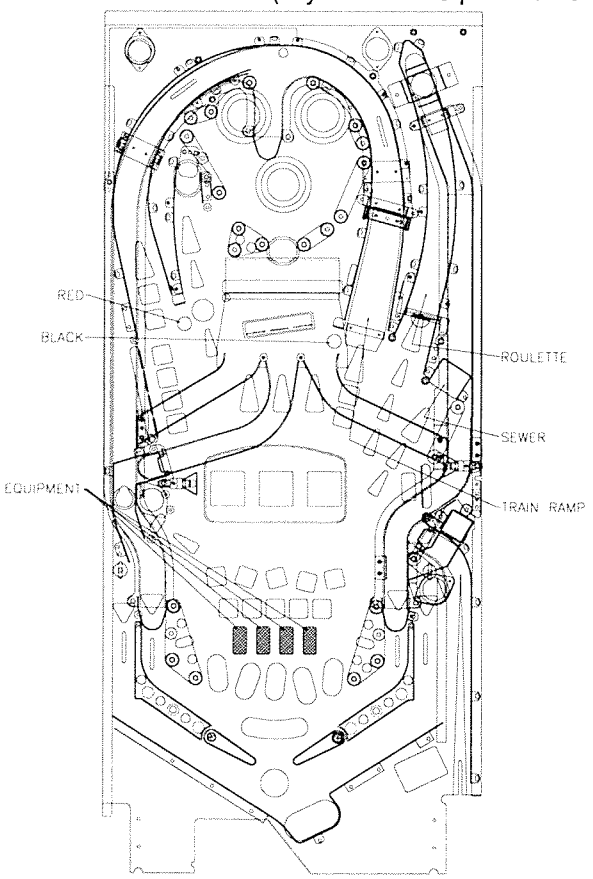

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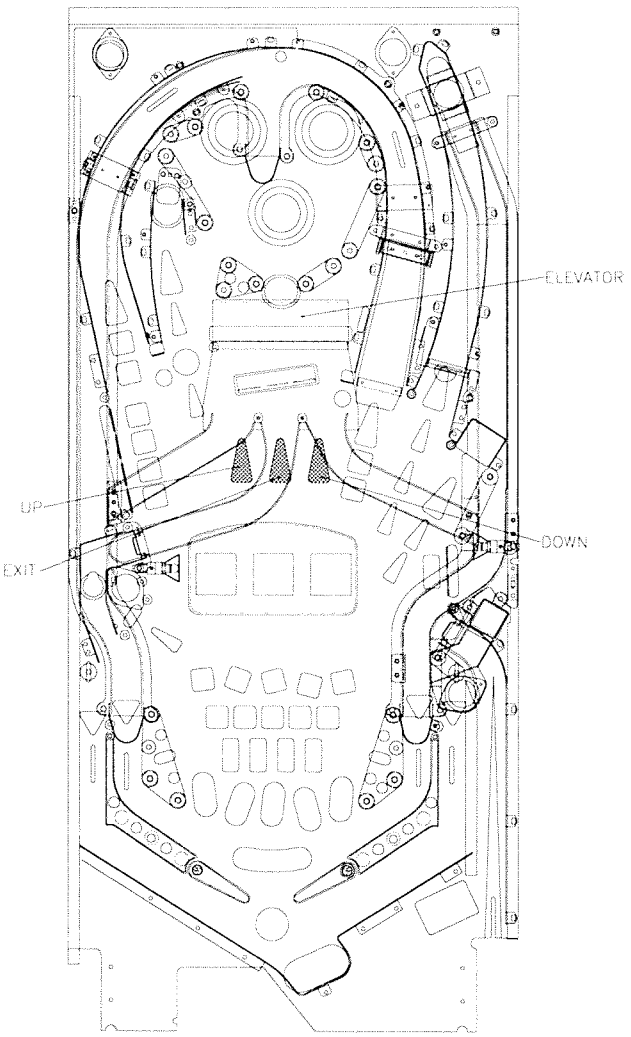

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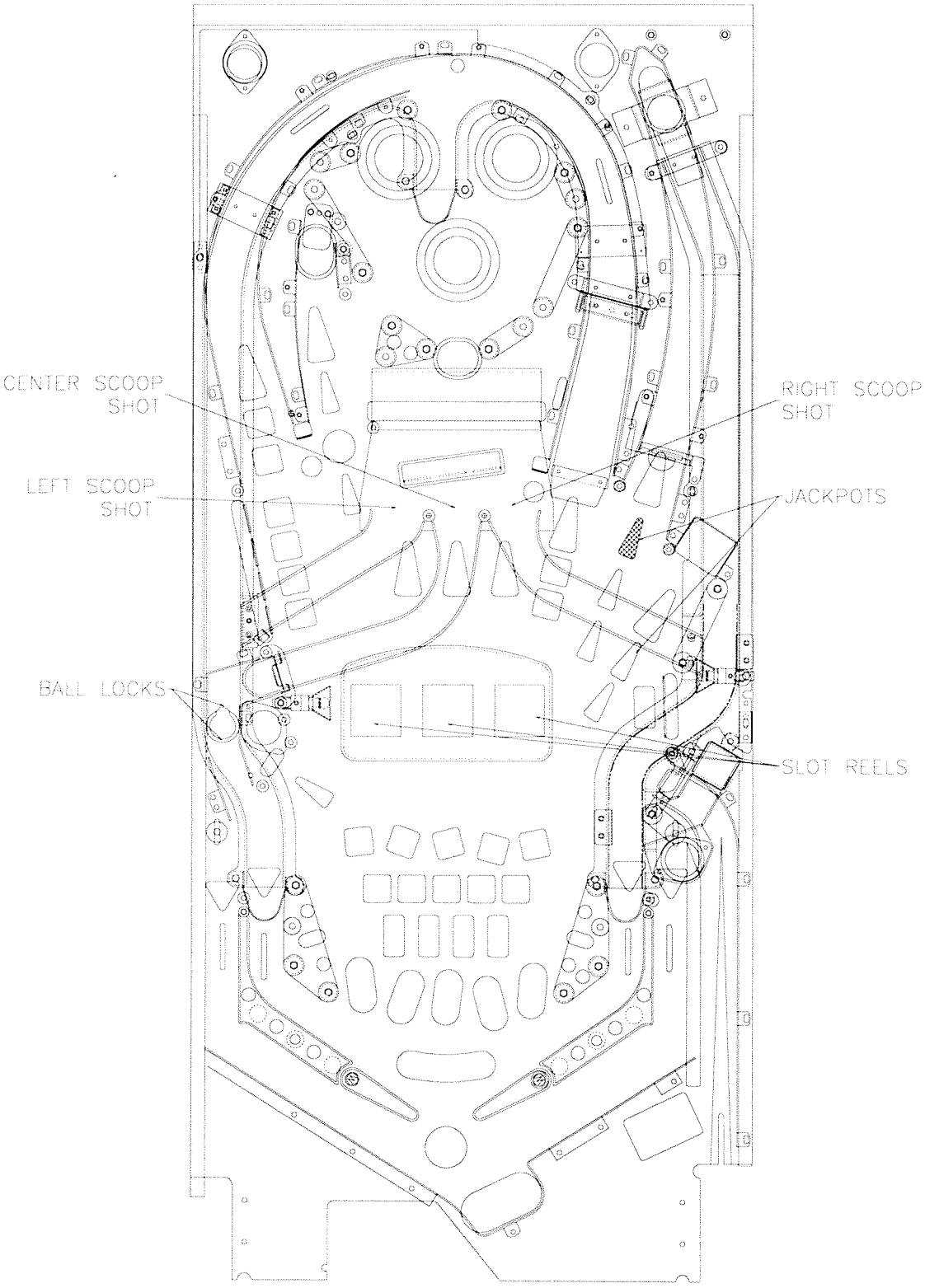

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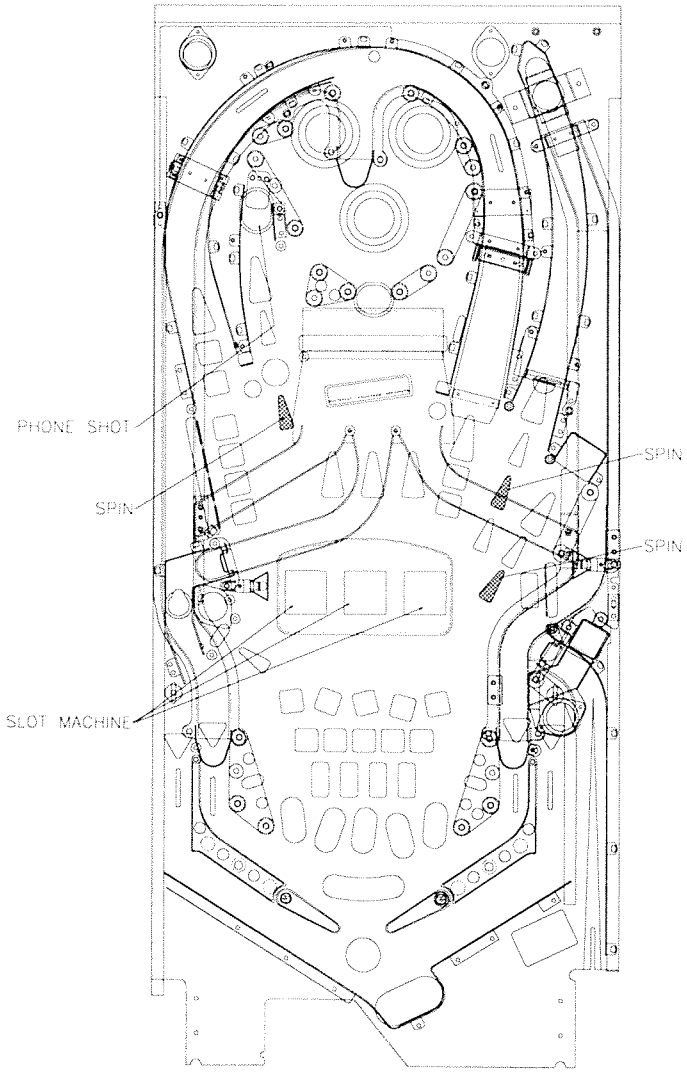
If you get 2 of the same symbols the third real spins for a "second chance".

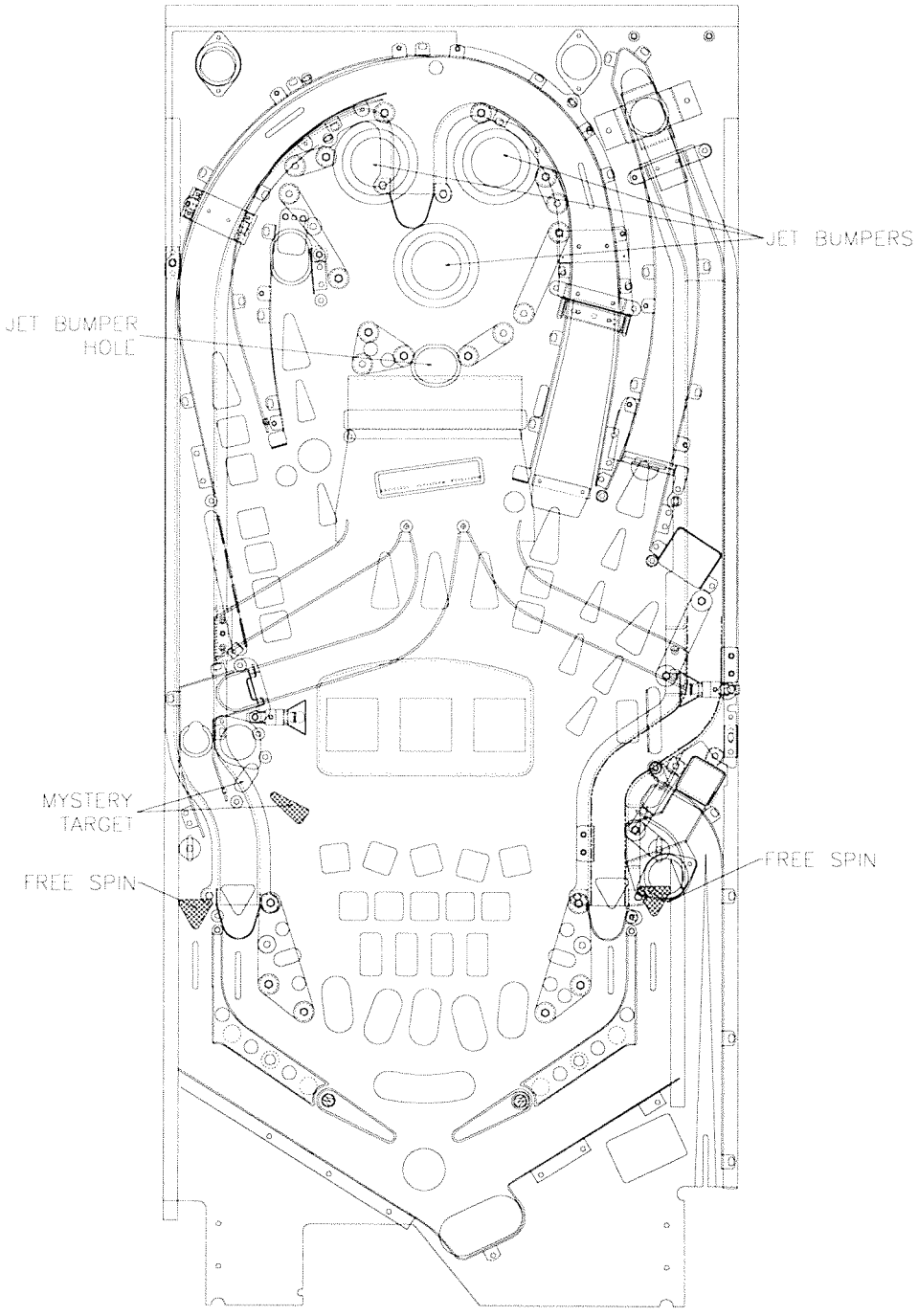
SECOND CHANCE Second Chance is a chance to shoot the ball into one of the three holes to stop the third real on the award, and collect that award.



MYSTERY TARGET Hitting the PENTHOUSE KEY targets light the mystery target. The MYSTERY TARGET awards what ever should be awarded at the time: For example, if during Penthouse party, it awards the 3 penthouse party awards.

OUTLANES Gives a FREE SPIN on slot machine when lit. (Use the flippers to change lanes to light the outlanes at the appropriate item.)

JET BUMPERS Nudge slot machine reels. Falling into hole below jets scores value of slot machine.



NOTES

NOTES

SECTION ONE

GAME OPERATION AND TEST INFORMATION

(System WPC) ROM Summary

IC	TYPE	BOARD	LOCATION	PART NUMBER
Game 1	27c040	CPU	U6	A-5343-50044-1R (For All Countries Except France, Belgium & Switzerland)
Game 1	27c040	CPU	U6	A-5343-50044-1F (France)
Game 1	27c040	CPU	U6	A-5343-50044-1B (Belgium and Switzerland)
Security Chip	PIC16C57	CPU	U22	A-5400-50044-1
Music/Speech	27c040	Audio	SU2	A-5343-50044-S2
Music/Speech	27c040	Audio	SU3	A-5343-50044-S3
Music/Speech	27c040	Audio	SU4	A-5343-50044-S4
Music/Speech	27c040	Audio	SU5	A-5343-50044-S5
Music/Speech	27c040	Audio	SU6	A-5343-50044-S6
Music/Speech	27c040	Audio	SU7	A-5343-50044-S7

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

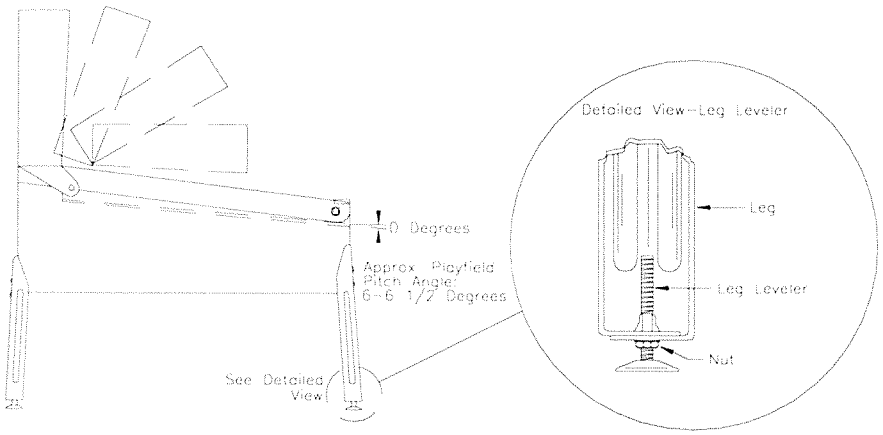
WHO DUNNIT IS A 4 BALL GAME.

Power:	Domestic 120V @ 60 Hz Foreign 230V @ 50 Hz Japan 100V @ 50 Hz	***Dimensions***:	Width: 29" Approx. Depth: 55" Approx. Height: 78" Approx.
Temp:	32^{O} F to 100^{O} F (0^{O} C to 38^{O} C)		
Humidity:	Not to exceed 95% relative.	***Weight***:	Approx. 325 Lbs. (crated)

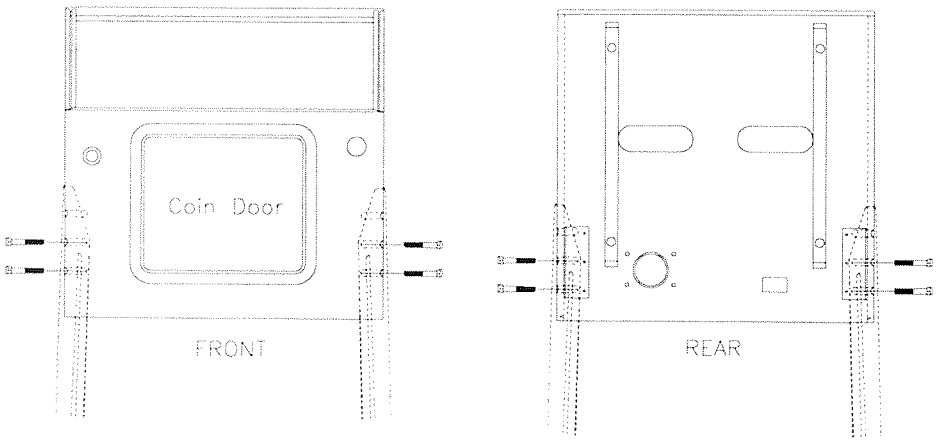
1. Remove all cartons, parts, and miscellaneous items from the shipping container and set them aside.

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

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



VIEW 1



VIEW 2

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

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

CAUTION

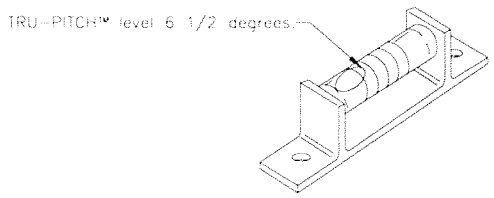
FAILURE TO INSTALL the backbox mounting hardware properly can cause personal injury.
NEVER TRANSPORT a pinball game with the hinged backbox erect. Always lower the backbox forward onto the playfield cabinet on a layer of protective material to prevent marring or damage and possible personal injury.

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

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

8. 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.

9. 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.

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

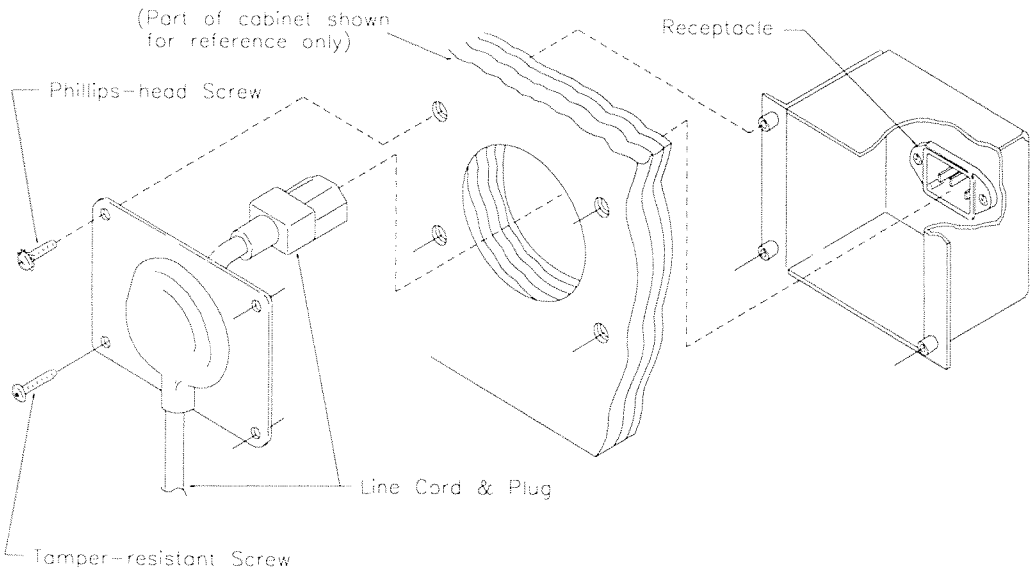
11. Verify that the ***required number*** of balls are installed in the game. This game uses 4 balls.

12 Install playfield mylars if desired.

NOTE: This playfield has a special hardcoat surface and does not require a full protective mylar. However, mylars can be purchased through your local Bally Distributor. Specify part number 03-9459-2 for full playfield mylar.

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

14. 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.



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

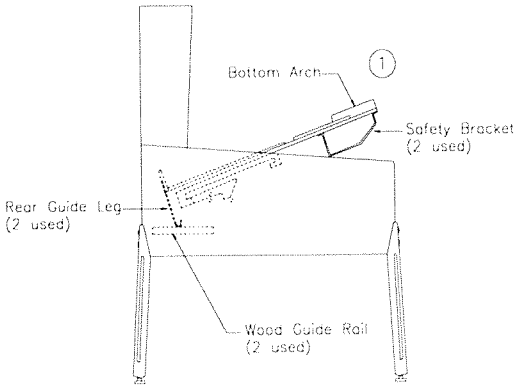
RAISING THE PLAYFIELD

⚠ CAUTION

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

To Raise Playfield:

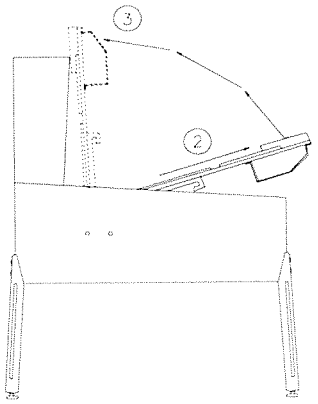
1. Grasp bottom arch and carefully lift up playfield only high enough to clear safety brackets. Rear guide legs should not hit wood guide rails or be used to slide out playfield.



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

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

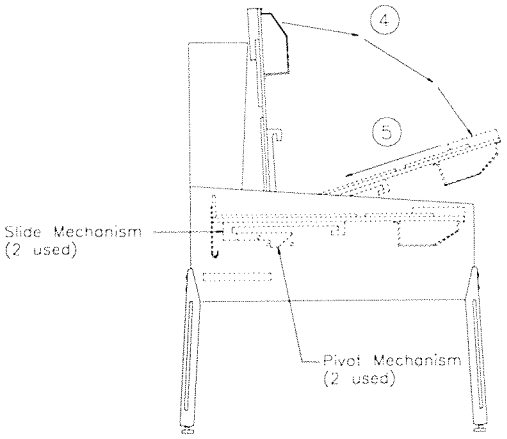
3. Rotate playfield to upright service position (lean on backbox) by pulling toward you and up. Listen for the sound of a click; this insures locking and pivoting sequence.



To Lower Playfield:

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

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



GAME CONTROL LOCATIONS

Cabinet Switches

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

Coin Door Switches

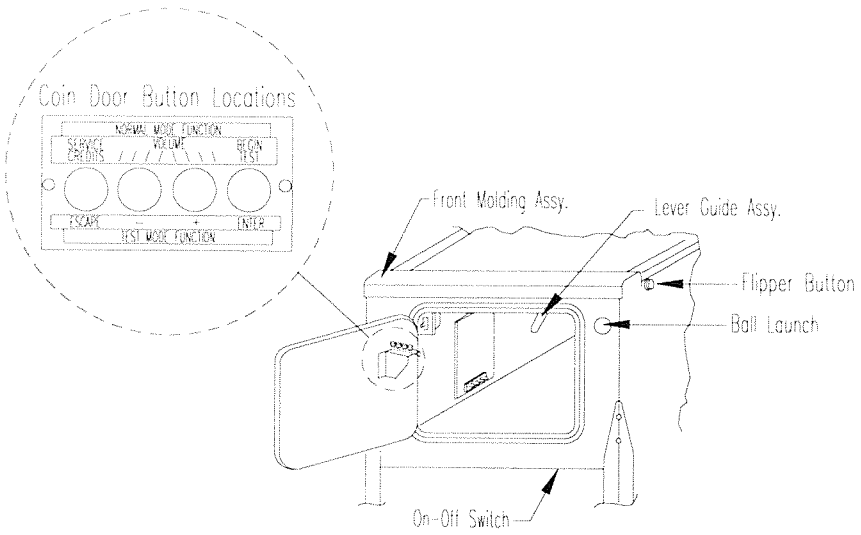
The operator controls all game adjustments, obtains bookkeeping information, and diagnoses problems, using only four push-button switches mounted on the inside of the coin door. The Coin Door Switches have two modes of operation Normal Function and Test Function.

Normal Function

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

Test Function

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



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

GAME OPERATION

⚠ CAUTION

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

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

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

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

Example: WHO DUNNIT 50044 Rev. D.55A — Sound Rev. P-0 Sy. 3.46 7/31/95

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 3-Bank Test
  - T.17 Ramp Test
  - T.18 Reel Test
  - T.19 Empty Balls Test
- U. Utilities Menu
  - U.1 Clear Audits
  - U.2 Clear Coins
  - U.3 Reset H.S.T.D.
  - U.4 Set Time & Date
  - U.5 Custom Message
  - U.6 Set Game I.D.
  - U.7 Factory Adjustments
  - U.8 Factory Resets
  - U.9 Presets
  - U.10 Clear Credits
  - U.11 Auto Burn-In
- A. Adjustments Menu
  - A.1 Standard Adjustments
  - A.2 Feature Adjustments
  - A.3 Pricing Adjustments
  - A.4 H.S.T.D. Adjustments
  - A.5 Printer Adjustments

Press Escape
To move out of a menu selection.

Press Enter
To get into a menu selection.

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

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

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

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

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

B. BOOKKEEPING MENU

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

B.6 Time-Stamps

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

B.1 Main Audits

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

B.2 Earning Audits*

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

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

B.3 Standard Audits

B.3	01	Games Started	00	B.3	20	Time Per Credit	00
B.3	02	Total Plays**	00	B.3	21	Play Time	00:00:00
B.3	03	Total Free Play	00	B.3	22	Minutes On	00
B.3	04	Free Play Percent	00	B.3	23	Balls Played	00
B.3	05	Replay Awards	00	B.3	24	Tilts	00
B.3	06	Percent Replays	00	B.3	25	Replay 1 Awards	00
B.3	07	Not Used	00	B.3	26	Replay 2 Awards	00
B.3	08	Not Used	00	B.3	27	Replay 3 Awards	00
B.3	09	Match Awards	00	B.3	28	Replay 4 Awards	00
B.3	10	Percent Match	00	B.3	29	1 Player Games	00
B.3	11	H.S.T.D. Credits	00	B.3	30	2 Player Games	00
B.3	12	Percent H.S.T.D	00	B.3	31	3 Player Games	00
B.3	13	Extra Balls	00	B.3	32	4 Player Games	00
B.3	14	Percent Extra Ball	00	B.3	33	H.S.T.D. Reset Count	00
B.3	15	Tickets Awarded	00	B.3	34	Burn-in Time †	00:00:00
B.3	16	Percent Tickets	00	B.3	35	1st Replay Level	00
B.3	17	Left Drains	00	B.3	36	Left Flipper	00
B.3	18	Right Drains	00	B.3	37	Right Flipper	00
B.3	19	Average Ball Time	00				

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

B.4 Feature Audits

B.4 01	Novice Modes	The # of games the player selected NOVICE to REGULAR.
B.4 02	Total Multi-Balls	The TOTAL # of MULTI-BALLS the player started.
B.4 03	Extra Balls	The TOTAL # of EXTRA BALLS the player was awarded.
B.4 04	Roof Multi-Balls	The TOTAL # of ROOF MULTI-BALLS the player started.
B.4 05	Time Per Credit	The TOTAL time allowed per credit to play a game.
B.4 06	Buy-In Extra Balls	The TOTAL # of times a player bought an extra ball at the end of the game.
B.4 07	1 Buy-In Games	The TOTAL # of times a player bought 1 or more extra balls at the end of the game.
B.4 08	2 Buy-In Games	The TOTAL # of times a player bought 2 or more extra balls at the end of the game.
B.4 09	3 Buy-In Games	The TOTAL # of times a player bought 3 or more extra balls at the end of the game.
B.4 10	>=4 Buy-In Games	The TOTAL # of times a player bought 4 or more extra balls at the end of the game.
B.4 11	Ball Saves	The TOTAL # of balls saved by the AUTOFIRE feature.
B.4 12	Super Skill	The TOTAL # of times a player made the super skill shot.
B.4 13	Skill Shot Made	The TOTAL # of times a player made the regular skill shot.
B.4 14	Clue Awarded	The TOTAL # of clues awarded to players.
B.4 15	All Clues	The TOTAL # of times a player collected all clues for a case.
B.4 16	New Phone Lit	The TOTAL # of times the player lit the phone.
B.4 17	Phone Answered	The TOTAL # of times the player answered the phone.
B.4 18	Who Dunnits	The TOTAL # of times the player was able to choose WHO DUNNIT.
B.4 19	Who Dunnit Roof	The # of times the player started THE ROOF from WHO DUNNIT.
B.4 20	Total Roofs	The TOTAL # of times the player started THE ROOF.
B.4 21	Roof Multi-Balls	The TOTAL # of times the player started THE ROOF MULTI-BALLS.
B.4 22	Total Slot Spins	The TOTAL # of times the player SPUN the Slot Machine.
B.4 23	Nudge Slots Awards	The TOTAL # of slot awards from the jets.
B.4 24	Free Spins	The # of free spins from drains and the 4th floor.
B.4 25	Slot Multi-Ball	The # of times the Slot Machine awarded MULTI-BALL.
B.4 26	Slot Extra Ball	The # of times the Slot Machine awarded EXTRA BALL.
B.4 27	Slot Bar	The # of times the Slot Machine awarded BAR.
B.4 28	Slot Madness	The # of times the Slot Machine awarded ELEVATOR MADNESS.
B.4 29	Slot Jackpot	The # of times the Slot Machine awarded a JACKPOT.
B.4 30	Slot Equipment	The # of times the Slot Machine awarded EQUIPMENT.
B.4 31	Slot Clue	The # of times the Slot Machine awarded a CLUE.
B.4 32	Slot Roof	The # of times the Slot Machine awarded THE ROOF.
B.4 33	Slot Choice	The # of times the Slot Machine awarded a CHOICE.
B.4 34	Slot Second Chance	The # of times the Slot Machine awarded SECOND CHANCE.
B.4 35	Slot Nothing	The # of times the Slot Machine awarded NOTHING.
B.4 36	Second Chance Complete	The # of times the player completed a Second Chance opportunity.
B.4 37	Exit Basement	The # of times the player exited the Elevator on to the BASEMENT.
B.4 38	Exit Main	The # of times the player exited the Elevator on to the MAIN FLOOR.
B.4 39	Exit 2nd	The # of times the player exited the Elevator on to the 2ND FLOOR.
B.4 40	Exit 3rd	The # of times the player exited the Elevator on to the 3RD FLOOR.
B.4 41	Exit 4th	The # of times the player exited the Elevator on to the 4TH FLOOR.
B.4 42	Exit 5th	The # of times the player exited the Elevator on to the 5TH FLOOR.
B.4 43	Exit 6th	The # of times the player exited the Elevator on to the 6TH FLOOR.

B.4 Feature Audits Continued

B.4 44	Exit 7th	The # of times the player exited the Elevator on to the 7TH FLOOR.
B.4 45	Exit 8th	The # of times the player exited the Elevator on to the 8TH FLOOR.
B.4 46	Exit Penthouse	The # of times the player exited the Elevator on to the PENTHOUSE.
B.4 47	Exit Roof	The # of times the player exited the Elevator on to THE ROOF.
B.4 48	Equipment Awards	The TOTAL # of times the player was awarded EQUIPMENT.
B.4 49	Total Multi-Balls	The TOTAL # of times the player was awarded MULTI-BALL.
B.4 50	Total Jackpots	The TOTAL # of jackpots the player was awarded.
B.4 51	Roulette Lit	The TOTAL # of times the player lit Roulette.
B.4 52	Roulette Ask	The TOTAL # of times the player was prompted to play Roulette.
B.4 53	Roulette Spins	The TOTAL # of times the player choose to play Roulette.
B.4 54	Roulette Wins	The TOTAL # of times the player won on Roulette.
B.4 55	Train Combo Lit	The TOTAL # of times the player lit TRAIN COMBOS.
B.4 56	Train Combo L1	The TOTAL # of times the player completed level 1 of Train Combos.
B.4 57	Train Combo L2	The TOTAL # of times the player completed level 2 of Train Combos.
B.4 58	Train Combo L3	The TOTAL # of times the player completed level 3 of Train Combos.
B.4 59	Train Combo L4	The TOTAL # of times the player completed level 4 of Train Combos.
B.4 60	New Loop Champ	The TOTAL # of times the player made enough loops to be loop champ.
B.4 61	Special Modes	The TOTAL # of times the player started a special mode.

B.5 Histograms

B.5	01	0-39 Million Scores	00%
B.5	02	40-59 Million Scores	00%
B.5	03	60-79 Million Scores	00%
B.5	04	80-99 Million Scores	00%
B.5	05	100-149 Million Scores	00%
B.5	06	150-249 Million Scores	00%
B.5	07	250-399 Million Scores	00%
B.5	08	400-599 Million Scores	00%
B.5	09	600-999 Million Scores	00%
B.5	10	1-1.49 Billion Scores	00%
B.5	11	1.5-1.9 Billion Scores	00%
B.5	12	2-2.9 Billion Scores	00%
B.5	13	Over 3 Billion	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	**3-Bank Test**
T.17	**Ramp Test**
T.18	**Reel Test**
T.19	**Empty Balls Test**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

T.14 Lamp Row-Col Test This test allows individual rows and columns in the lamp matrix to be operated. This is useful for trouble-shooting wiring and driver problems.

Press the UP or DOWN buttons to cycle trough the different rows and columns.

T.15 Dip Switch Test This test is used to show the positions of the dip switches on the CPU board (U27).

T.16 3-Bank Test This TEST allows the operator to test the motorized 3-bank. The state of the switches are displayed at the bottom.

The +(plus) and -(minus) buttons change the state of the test.
CYCLE - Cycle the bank from UP to DOWN.
BANK UP - Move the bank to the UP position.
BANK DOWN - Move the bank to the DOWN position.

The ENTER button toggles the test.
STOPPED - The three bank is stationary.
RUNNING - The three bank can move.

The ESCAPE button exits the test.

T.17 Ramp Test This TEST allows the operator to test the UP/DOWN ramp. The state of the switch is displayed at the bottom.

The +(plus) and -(minus) buttons change the state of the test.
RAMP UP - Move the ramp to the UP position.
RAMP DOWN - Move the ramp to the DOWN position.

The ENTER button toggles the test.
RUNNING - The ramp will move if necessary.
REPEAT - The appropriate coil will continue to fire regardless of position
STOPPED - The ramp is stationary.

The ESCAPE button exits the test.

T.18 Reel Test This TEST allows the operator to test the slot machine. The state of the current switch is displayed at the bottom. The lamp of the current reel should be on.

The +(plus) and -(minus) buttons change the state of the test.
LEFT REEL - SETS the left reel as current and starts it moving.
CENTER REEL - SETS the center reel as current and starts it moving.
RIGHT REEL - SETS the right reel as current and starts it moving.
STOP TEST - Stops all reels.

ENTER button exits the test if the current state is Stop Test.

ESCAPE button exits the test.

T.19 Empty Balls Test This test kicks out all balls loaded in troughs, lockups, poppers, and kickouts until no balls remain in those locations.

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

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

U. UTILITIES MENU

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Adj. No.	Adjustment Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03	Hard U.0 04	Extra Hard U.9 05
A.2 04	Ball Save Time	6 seconds	6 seconds	6 seconds	3 seconds	3 seconds
A.2 13	Extra Ball Percent	45%	40%	35%	30%	25%
A.2 14	Multi-ball Percent	45%	40%	35%	30%	25%
A.2 15	Extra Ball Memory	ON	ON	ON	ON	OFF
A.2 16	Roof Champ Hard	OFF	OFF	OFF	ON	ON

Game Difficulty Setting Table for German/European Games

Adj. No.	Adjustment Description	Extra Easy U.9 01	Easy U.9 02	Medium U.9 03	Hard U.0 04	Extra Hard U.9 05
A.2 04	Ball Save Time	6 seconds	6 seconds	6 seconds	3 seconds	3 seconds
A.2 13	Extra Ball Percent	45%	40%	35%	30%	25%
A.2 14	Multi-ball Percent	45%	40%	35%	30%	25%
A.2 15	Extra Ball Memory	ON	ON	ON	ON	OFF
A.2 16	Roof Champ Hard	OFF	OFF	ON	ON	ON

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
A.2 04	Ball Save Time	6 seconds	3 seconds
A.2 13	Extra Ball Percent	35%	25%
A.2 14	Multi-ball Percent	35%	25%
A.2 15	Extra Ball Memory	ON	OFF
A.2 16	Roof Champ Hard	OFF	ON
A.1 07	Replay Start	1.5 BILLION	2.5 BILLION

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

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

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

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

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

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

U.9 11 Not Used

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

U.9 13 thru U.9 16 Not Used

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

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 Maximum Extra Balls

The number of extra balls that a player may accumulate.
Range: 1-10

A.1 04 Maximum Extra Balls/Ball in Play

The number of extra balls to be awarded per ball in play.

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

A.1 05 Replay System

The type of replay system to be used.

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

A.1 06 Replay Percent*

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

A.1 07 Replay Start*

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

A.1 08 Replay Levels*

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

*For Auto % Replay.

A.1 13 Replay Boost

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

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

A.1 14 Replay Award

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

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

A.1 16 Match Award

The award automatically provided when the players wins a match.

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

A.1 17 Extra Ball Ticket

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

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

A.1 18 Maximum Ticket/Player

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

A.1 19 Match Feature

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

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

A.1 20 Custom Message

The message displayed during the Attract Mode.

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

A.1 21 Language

The language the game uses: English, 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 spiral effects and Attract Mode.
NO - Do Not dim General Illumination.

A.1 26 Tournament Play

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

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

A.1 27 Euro. Scr. Format

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

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

A.1 28 Minimum Volume 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 Ticket Expansion Board

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

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

A.1 32 No Bonus Flips

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

A.1 33 Game Restart

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

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

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

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

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

A.2 Feature Adjustments

A.2 01 Buy Extra Ball - Buy-In Feature
This determines whether each player may buy 1 extra ball for 1 credit at the end of the game.
Settings: 1 Credit
Off

Factory Default: 1 Credit

A.2 02 Buy-In Count
If A.2 01 (BUY EXTRA BALL) is set to "1 CREDIT", this determines the number of Extra Balls that may be purchased at the end of the game. The choices are 1-3 or Unlimited.

Factory Default: 3 Buy-Ins

A.2 03 Ball Saves
Maximum number of ball saves a player is allowed.

Setting: 1-5 Balls

Factory Default: 1 Ball

A.2 04 Ball Save Time
Sets the amount of time a player has Ball Save active at the start of each ball.

Setting: 3-15 seconds
OFF

Factory Default: 6 Seconds

A.2 05 Timed Plunger
The ball launch plunger automatically shoots for the player after specified amount of time.

Setting: ON = After 30 - 90 Seconds, the plunger will kick automatically.

OFF = The plunger will NOT kick automatically.

Factory Default: OFF

A.2 06 Flipper Plunger
Pressing The flipper button will fire the launch plunger. (Turn this adjustment on ONLY if the Launch button does not function properly.) The choices are:

NO = Pressing the right flipper does not launch the ball.
YES = Pressing the right flipper will launch the ball.

Factory Default: NO

A.2 07 Novice Mode

This allows the operator to prompt the player for SKILL LEVEL at the start of each game. The choices are:

ON = Allow player prompt for Skill Level.
OFF = No player prompt for Skill Level.

Factory Default: ON

A.2 08 Special Mode

This allows the operator to turn Special Modes on or off. The choices are:

ON = Allow Special Modes.
OFF = No Special Modes.

Factory Default: ON

A.2 09 Player Tournament

The operator chooses if holding both flipper buttons for approximately 5 seconds will allow the player to play a game in tournament mode. The choices are:

YES - If the player holds both flippers for approximately 5 seconds, they will be allowed to play a game with tournament mode settings.

NO - Tournament mode is NOT available from the flippers. (Tournament mode is still available using the adjustment.)

Factory Default: YES

A.2 10 Staged Ball

This allows the operator to turn the Staged Ball feature on or off. The choices are:

ON = Allow Staged Ball feature.
OFF = No Staged Ball feature.

Factory Default: ON

A.2 11 Attract Mode Sounds

This allows the operator to select whether or not the game will play music and speech during the attract mode to attract players. The choices are:

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

Factory Default: OFF

A.2 12 Clock Bong Sounds

This allows the operator to turn the Game Over clock bongs ON, SPARSE or OFF. The choices are:

ON = The Game Over clock will bong.
SPARSE = The Game Over clock will only bong 1/3 of the time.
OFF = The Game Over clock will not bong.

Factory Default: SPARSE

A.2 13 Extra Ball Percent

This allows the operator to effect the number of EXTRA BALLS the game gives out, if any. **NOTE:** This adjustment may change if the difficulty settings are changed. The setting range is 25% to 45%.

Factory Default: 35%

A.2 14 Multi-ball Percent

This allows the operator to effect the number of MULTI-BALLS the game gives out. **NOTE:** This adjustment may change if the difficulty settings are changed. The setting range is 25% to 45%.

Factory Default: 35%

A.2 15 Extra Ball Memory

This allows the operator to select whether or not the Extra Ball light s carried over from ball to ball, or reset at ball start. **NOTE:** This adjustment may change if the difficulty settings are changed.

ON = The Extra Ball light is carried over from ball to ball.
OFF = The Extra Ball light is reset at ball start.

Factory Default: ON

A.2 16 Roof Champ Hard

This allows the operator to make the ROOF CHAMPION feature harder to achieve. **NOTE:** This adjustment may change if the difficulty settings are changed.

ON = The player must make 1 BILLION or more during "THE ROOF" to be the champion.
OFF = The player must only reach ROOF MULTI-BALL to be the champion.

Factory Default: OFF

A.2 17 Disable Slots

This allows the operator to disable the SLOT MACHINE. ***WARNING*** - This will cause an error message to appear.

ON = The SLOT MACHINE is disabled.
OFF = The SLOT MACHINE is not disabled.

Factory Default: OFF

A.2 18 Disable Ramp

This allows the operator to disable the UP/DOWN RAMP. ***WARNING*** - This will cause an error message to appear.

ON = The UP/DOWN RAMP is disabled.
OFF = The UP/DOWN RAMP is not disabled.

Factory Default: OFF

A.2 19 Disable 3-Bank

This allows the operator to disable the MOTORIZED 3-BANK. ***WARNING*** - This will cause an error message to appear.

ON = The MOTORIZED 3-BANK is disabled.
OFF = The MOTORIZED 3-BANK is not disabled.

Factory Default: OFF

A.3 Pricing Adjustments

A.3 01 Game Pricing (if set to custom, then 02 to 09 are available). Custom pricing is not available for U.S.A. and Canadian games.

The cost of a game is selected here, from the Standard Pricing Table or by using the Custom Pricing Editor (A.3 27).

A.3 02 thru A.3 09 Not Used

A.3 10 Coin Door Type (if set to custom, then 11 to 15, 20 and 25 are available)

This adjustment is used to preset adjustments 11 through 15, 20 and 25, based on standard coin doors (U.S.A., German, Etc.).

A.3 11 Collection Text

The coin system used to display the Earning Audits.

A.3 12 Left Slot Value
A.3 13 Center Slot Value
A.3 14 Right Slot Value
A.3 15 4th Slot Value

The monetary value of the left, center, right, and 4th coin chutes. Formerly, these values only affected the way in which the coins were totaled for auditing displays. In the new 10/94 pricing system, these values are added for each coin inserted and credits are awarded based on the amount of money accumulated. See Pricing Editor (A.3 27) for more information.

A.3 16 Maximum Credits

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

A.3 17 Free Play

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

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

A.3 18 Hide Coin Audits

The coin audits may, or may not be displayed.

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

A.3 19 Not Used

A.3 20 Base Coin Size

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

A.3 21 Coin Meter Units

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

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

A.3 22 Dollar Bill Slot

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

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

A.3 23 Minimum Coin Microseconds

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

A.3 25 Allow Hundredths

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

A.3 26 Credit Fraction

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

A.3 27 Pricing Editor

Custom pricing is not available for U.S.A. and Canadian games.

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

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

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

Begin the custom pricing function by pressing the "Enter" button while A.3 27 "PRICING EDITOR" is showing on the display.

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

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

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

Display View

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

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

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

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

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

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

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

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

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

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

Example: 1/$0.50 2/$1.00

1) $0.25 1/2 cred.

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

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

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

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

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

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

Insert This will insert a new pricing level ABOVE the current level. The current level will be unaffected. There must be room for at least 1 coin between the current level and the previous level, and at least one fractional credit unit between the current level and the previous level.

Example: Inserting a new pricing level.

Custom Pricing Editor		
1)	$0.50	1 cred.
2)	$1.00	2 cred.
3)	$1.50	4 cred.
4)	$2.00	6 cred.

Display View

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

Custom Pricing Editor		
1)	$0.50	1 cred.
2)	$1.00	2 cred.
3)	INSERT	4 cred.
4)	$2.00	6 cred.

Display View

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

Custom Pricing Editor		
1)	$0.50	1 cred.
2)	$1.00	2 cred.
3)	$1.25	2 1/2 cred.
4)	$2.00	6 cred.

Display View

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

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

Display View

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

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

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

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

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

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

Display View

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

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

Display View

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

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

Display View

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

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

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

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

Display View

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

Start Button: Once the pricing mode has been specified, exit the custom pricing editor by pressing the "Start" button. This will bring up a menu with (some or all of) the following choices:

Choose an Option:
- Return to Editor
- Clear Pricing
- Ignore Changes
- Save Changes

Display View

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

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

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

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

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

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

Pricing Table

Country	Coin Chutes Left	Center	Right	4th Chute	Games/Coins	Display	Pricing Adjustments A3 02 03 04 05 06 07 08 09
USA	25¢	$1.00*	25¢	$1.00	1/50¢, 2/75¢, 3/$1 [2]	50¢, 75¢, $1.00	
	25¢	$1.00*	25¢	$1.00	1/75¢, 2/$1.50, 3/$2.00 [2]	1/.75, 3/2.00	
	25	$1.00	25¢	$1.00	1/3X25¢ [2]	USA1 1/$0.75	
	25	$1.00	25¢	$1.00	1/50¢, 2/$1 [2]	USA 2/$1.00	
	25	$1.00	25¢	$1.00	1/50¢, 3/$1.00 [2]	USA 3/$1.00	
	25	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 3/$1.50, 6/$2.00 [2]	USA 6/$2.00	
	25	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 3/$1.50, 5/$2.00 [1,2]	USA 5/$2.00	
	25	$1.00	25¢	$1.00	1/3X25¢, 2/$1.50, 4/$2.00 [2]	1/.75, 4/$2.00	
	25	$1.00	25¢	$1.00	1/2x25¢, 2/$1.00, 4/$1.50, 6/$2.00 [2]	6/$2.00 4/$1.50	
	25¢	25¢	25¢	-	1/4x25¢, 6/$5.00 [2]	1/1, 6/5	
	25¢	25¢	25¢	-	1/4x25¢ [2]	1/$1.00	
Canada	25¢	-	$1.00*	-	1/50¢, 2/75¢, 3/$1 [2]	CAN. 50-75-1	
	25	-	$1.00	-	1/50¢, 2/$1 [2]	CAN. 2/$1.00	
	25	-	$1.00	-	1/50¢, 3/$1.00 [2]	CAN. 3/$1.00	
	25	-	$1.00	-	1/2x25¢, 2/4x25¢, 3/$1.00 [2]	3/$1.00 Coin	
	25	-	$1.00	-	1/2x25¢, 2/$1.00, 3/$1.50, 6/$2.00 [2]	CAN. 6/$2.00	
	25	-	$1.00	-	1/2x25¢, 2/$1.00, 3/$1.50, 5/$2.00 [1,2]	CAN. 5/$2.00	
	25	-	$1.00	-	1/2x25¢, 2/$1.00, 4/$1.50, 6/$2.00 [2]	6/$2 4/1.50	
	25	-	$1.00	-	1/3X25¢, 2/$1.50, 4/$2.00 [2]	1/.75, 4/2.00	
	25¢	-	$1.00*	-	1/75¢, 2/$1.50, 3/$2.00 [2]	1/.75, 3/2.00	
	25	-	$1.00	-	1/3X25¢ [2]	CAN. 1/$0.75	
Austria	5sch	10sch	10sch	-	1/2x5sch, 3/2x10sch [2]	AUSTRIA	
	5sch	-	10sch	-	2/5sch, 5/10sch	CUSTOM	02 00 05 00 01 00 01 00
Australia	20¢	$1	$1	$2	1/$1, 3/$2 [2]	AUSTRALIA 1	
	20¢	$1	$1	$2	1/$1, 2/$2	AUSTRALIA 2	
U.K.	£1.00	50P	20P	10P	1/3x10P, 2/50P, 4/£1 [2]	U. KINGDOM	
Switzerland	1Fr	2Fr	5Fr	-	1/1Fr, 3/2Fr, 7/5Fr [2]	SWISS 1	
	1Fr	2Fr	5Fr	-	1/2Fr, 2/3Fr, 3/4Fr, 5/5F	SWISS 2	
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr , 3/50Fr [2]	BELGIUM	
Germany	1DM	2DM	5DM	-	1/2DM, 2/3DM, 3/4DM, 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	$1.00	-	$2.00	-	1/$1, 3/$2 [2]	NEW ZEALAND 1	
Zealand	$2.00	-	$1.00	-	1/$1, 3/$2, ($2-$1 door)	NEW ZEALAND 2	
Norway	5Kr	-	10Kr	-	1/5Kr, 2/10Kr, 5/20Kr [2]	NORWAY	
Argentina	10¢	10¢	10¢	-	1/1 Token [2]	ARGENTINA	
Greece	10D	20D	50D	-	1/2x10D, 1/20D, 3/50D	GREECE	
Antilles	25¢	25¢	1G	-	1/25¢, 4/1G	ANTILLES	
Netherlands	1Hfl	2.5Hfl	2.5Hfl	-	1/1Hfl, 3/2.5Hfl	NETHERLANDS	
Hungary	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 Ticket.

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

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

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

A.4 04 Champion Credits

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

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

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

A.4 09 High Score Reset Every

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

A.4 10 Backup Champion

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

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

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

A.5 Printer Adjustments (optional board required)

A.5 01 Column Width

The column width to be printed. Range: 22 - 80.

A.5 02 Lines Per Page

The amount of lines per page. Range: 20 - 80.

A.5 03 Pause Every Page

Choose whether the printer pauses at the end of a page.

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

A.5 04 Printer Type

Select the type of printer . Choices: Parallel, Serial, ADP., Mini-Drucker, or NSM.

A.5 05 Serial Baud Rate

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

A.5 06 Serial D.T.R. (Data Terminal Ready)

When a Serial Printer is used, this line may be connected to a printer output line signaling that the printer is busy.

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

A.5 07 Auto Printout

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

This adjustment has the following settings:

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

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

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

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

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

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

ERROR MESSAGES

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

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

SLOTS DISABLED, ADJUSTMENT IS SET TO ON

Adjustment A.2 17 is set to on. Please reset the adjustment after the problem is fixed.

RAMP DISABLED, ADJUSTMENT IS SET TO ON

Adjustment A.2 18 is set to on. Please reset the adjustment after the problem is fixed.

3 BANK DISABLED, ADJUSTMENT IS SET TO ON

Adjustment A.219 is set to on. Please reset the adjustment after the problem is fixed.

MOTORIZED 3-BANK ERROR

The motorized 3-bank is having trouble finding one or both of the position switches. One of the switches are broken or needing attention.

SLOT MACHINE IS STUCK

One or more of the reels have recently tried to spin and was unable to. The opto of the reel needs some attention.

UP / DOWN RAMP ERROR

The Up / down ramp recently had trouble moving into position. The ramp switch needs attention.

Check Switch ##.

This message indicates that at least one switch was stuck 'On' at game turn-on or has NOT been actuated during ball play (for 90 balls or Å30 games). The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep the game earning, until the service technician can repair the problem.

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

Check Fuses F115 and F116 and Opto 12V Supply.

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

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

Opto Trough Bad Check Connectors, Wires and 12V Supply

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

Pinball Missing.

This game normally uses 4 balls; however, it will operate with as few as one ball. This message announces that a ball is missing or stuck. When the ball is located, return it to the game via the Outhole. Other possibilities for this problem could be malfunctions of the Ball Trough optos or the Ball Shooter switch.

xxxxx Sw. is Stuck On.

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

Ground Short Row-N, Wht-xxx.

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

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

U6 Checksum Error.

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

Time and Date Not Set.

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

Factory Settings Restored.

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

CPU L.E.D.'s

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

CPU Board L.E.D. Error Codes

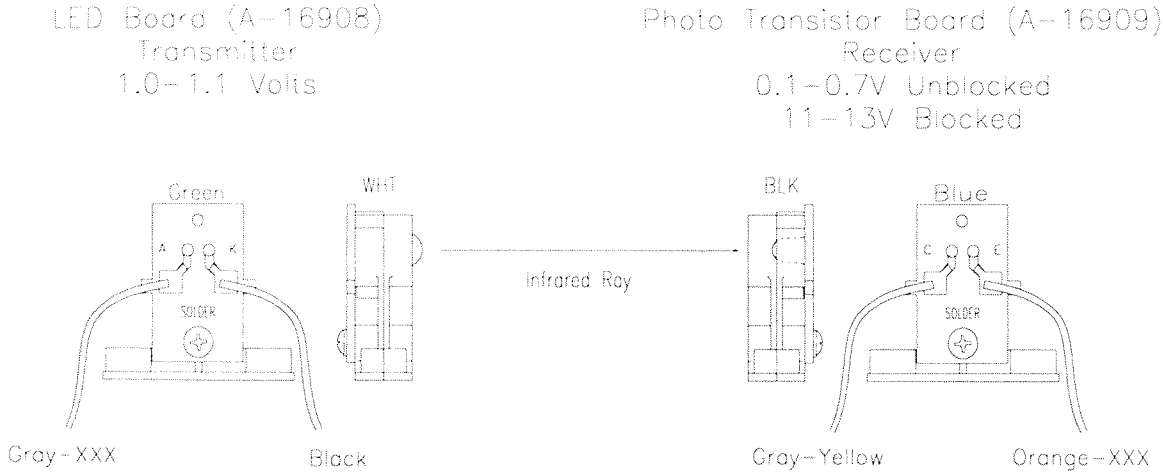
Center L.E.D. blinks one time	-	ROM Error U6
Center L.E.D. blinks two times	-	RAM Error U8
Center L.E.D. blinks three times	-	Custom Chip Failure U9

Sound Board Beep Error Codes
Upon Game Turn-On:

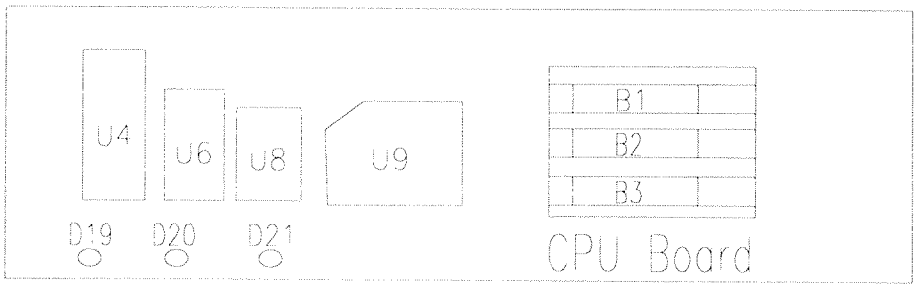
1 Beep	=	Sound Board O.K.
2 Beeps	=	U2 Failure
3 Beeps	=	U3 Failure
4 Beeps	=	U4 Failure
5 Beeps	=	U5 Failure
6 Beeps	=	U6 Failure
7 Beeps	=	U7 Failure
8 Beeps	=	U8 Failure
9 Beeps	=	U9 Failure

OPTO THEORY

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

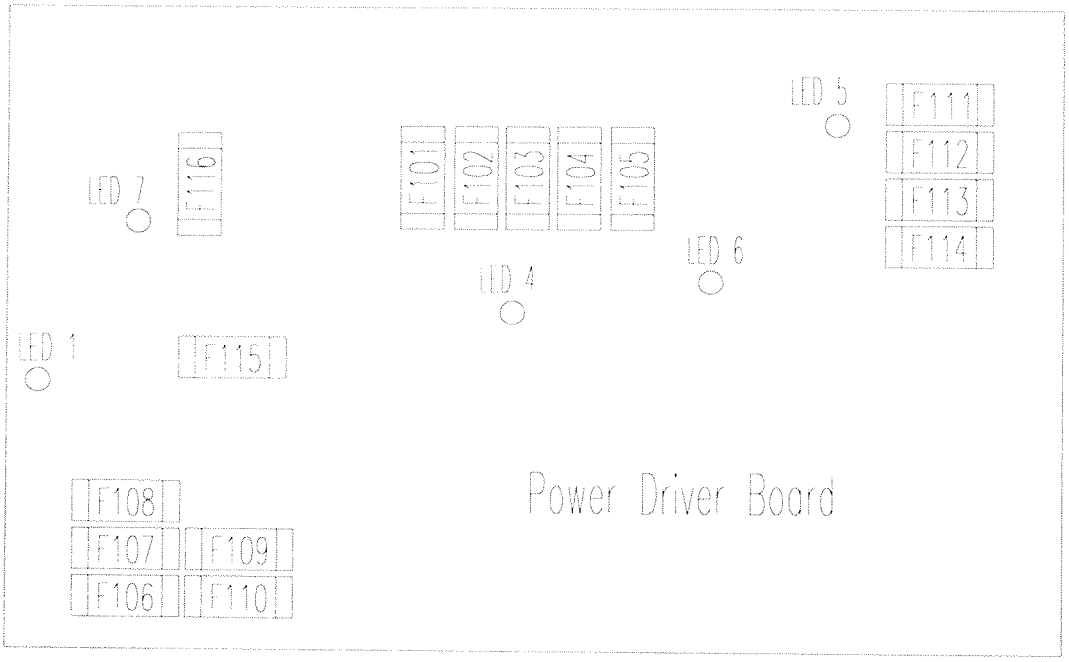


LED List



CPU Board

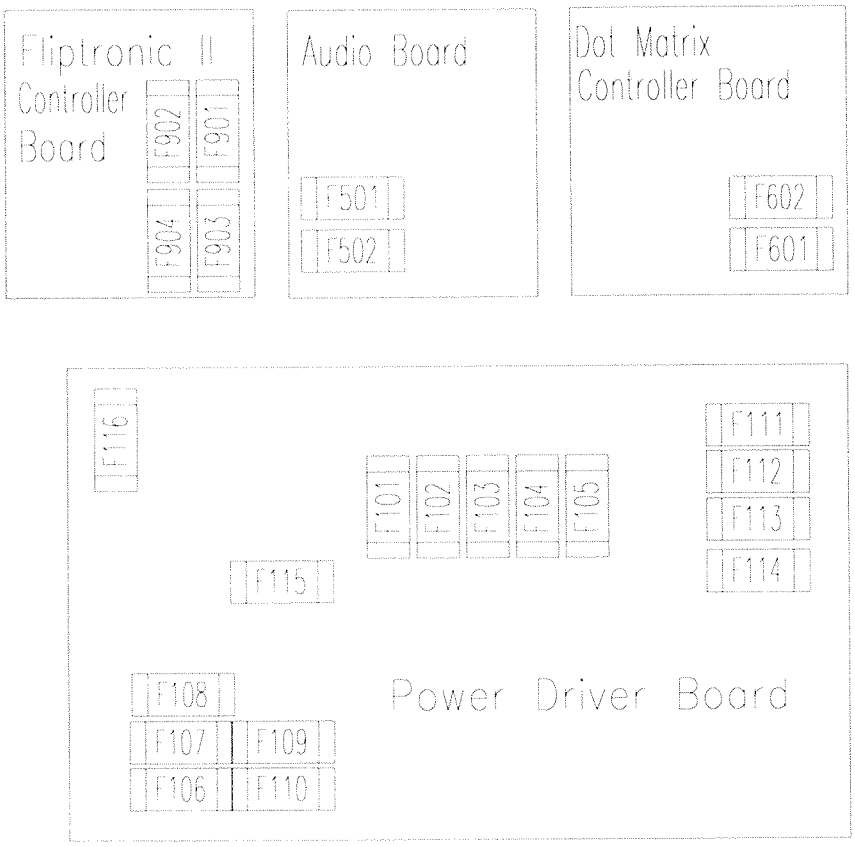
D19, Blanking
D20, Diagnostic
D21, +5vdc
At Game Turn-On = D19 & D21 On, D20 Off
During Normal Operation = D19 Off, D20 flashing, D21 On



Power Driver Board

LED 1, +12vdc, Switch Circuit, Normally On
LED 2, Not Used
LED 3, Not Used
LED 4, +5vdc, Digital Circuit, Normally On
LED 5, +20vdc, Flashlamp Circuit, Normally On
LED 6, +18vdc, Lamps Circuit, Normally On
LED 7, +12vdc, Power Circuit (Motors, Relays, Etc.), Normally On

Fuse List



Audio Board

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

Dot Matrix Controller Board

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

Fliptronic II Controller Board

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

Power Driver Board

F101 +50VDC General (Not Used)	3A, 250V, S.B.
F102 +50VDC General (Not Used)	3A, 250V, S.B.
F103 Solenoid #25-#28	3A, 250V, S.B.
F104 Solenoid #1-#8	3A, 250V, S.B.
F105 Solenoid #9-#16	3A, 250V, S.B.
F106 G.I. #5 Wht-Vio	5A, 250V, S.B.
F107 G.I. #4 Wht-Grn	5A, 250V, S.B.
F108 G.I. #3 Wht-Yel	5A, 250V, S.B.
F109 G.I. #2 Wht-Org	5A, 250V, S.B.
F110 G.I. #1 Wht-Brn	5A, 250V, S.B.
F111 Flasher Secondary	5A, 250V, S.B.
F112 Solenoid Secondary	7A, 250V, S.B.
F113 +5V Logic	5A, 250V, S.B.
F114 +18V Lamp Matrix	8A, 32V, N.B.
F115 +12V Switch Matrix	3/4A, 250V, F.B.
F116 +12V Secondary	3A, 250V, S.B.

Line Filter

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

*May be used for circuits other than flipper circuits.

MAINTENANCE INFORMATION

LUBRICATION

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

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

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

SWITCH CONTACTS

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

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

CLEANING

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

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

*May not be used on all games.

WHO DUNNIT

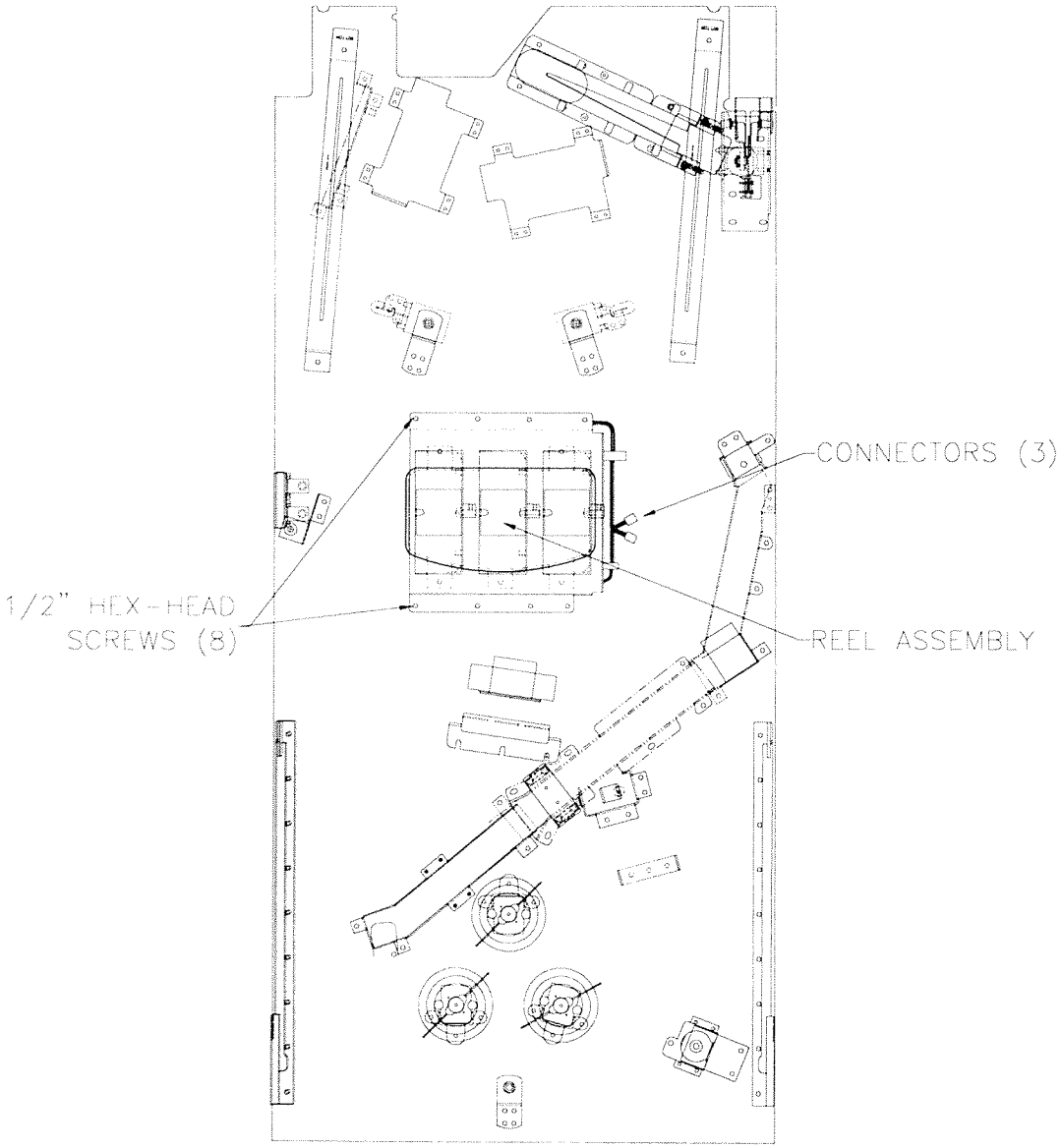
A MURDER MYSTERY

Unit Disassembly for Repair

Major Component Service Instructions

REEL ASSEMBLY

1. Lift the playfield to its raised position (leaning against the backbox).
2. Disconnect the three cable from the reel assembly.
3. Remove eight ½" hex-head screws holding the base to the playfield.
4. Remove assembly and repair as needed.
5. Reassemble in reverse order.



Underside of Playfield, Viewed in Raised Position

NOTES

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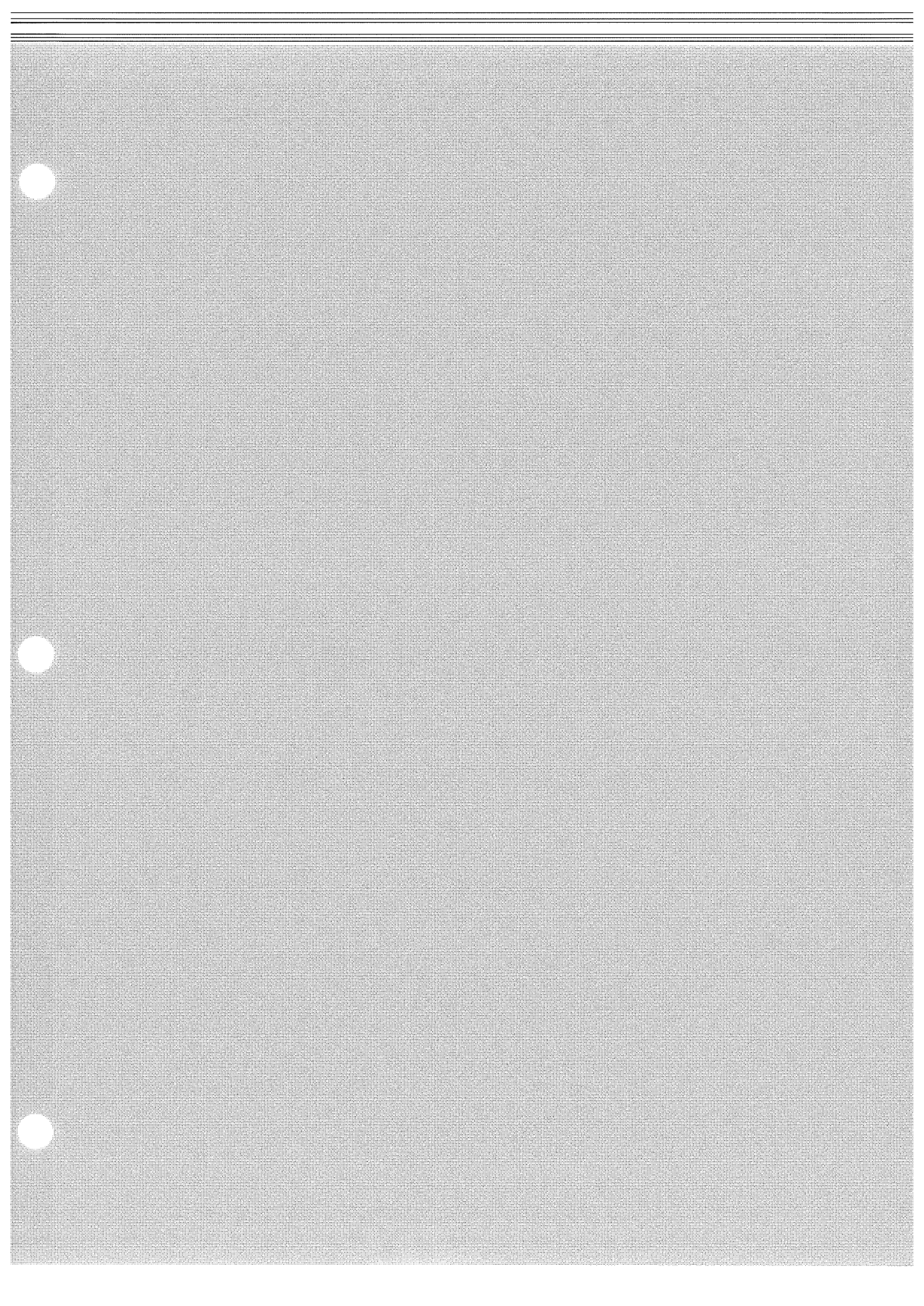
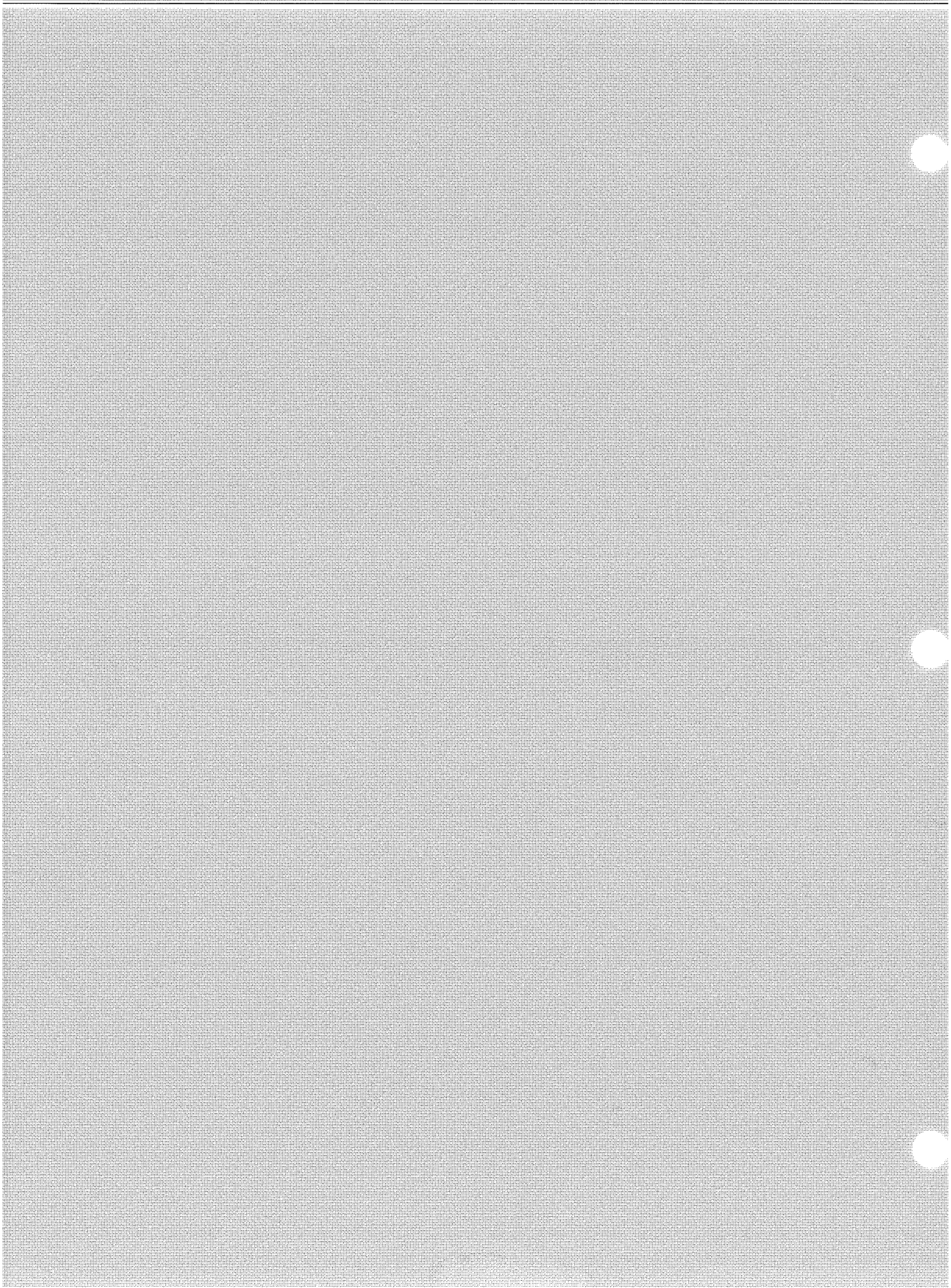
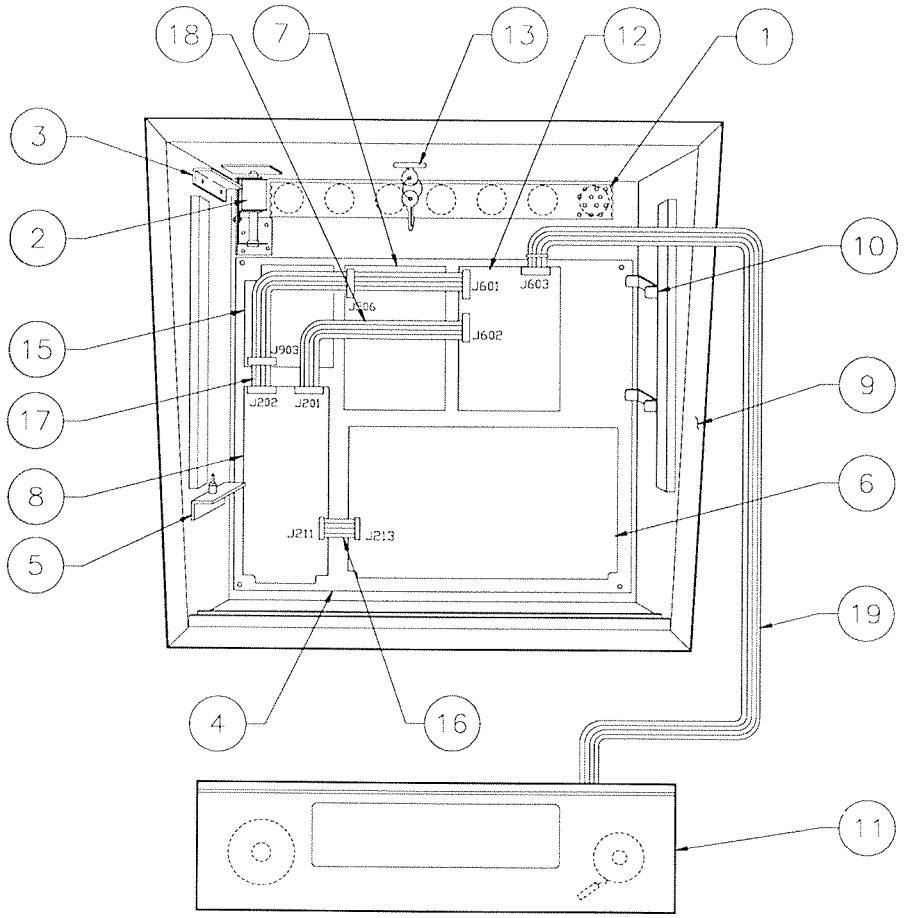




SECTION TWO

GAME PARTS INFORMATION

50044-BB-1
Backbox Assembly



Item	Part Number	Description
1	01-6645	Venting Screen
2	B-10686-1	Knocker Assembly
3	A-12497	Insert Bd. Hinge Assy., Upper
4	A-14092-6	WPC Mounting Plate Assy.
5	A-12498	Insert Bd. Hinge Assy., Lower
6	A-12697-4	Power Driver Assembly
7	A-16917-50044	Sound Board Assembly
8	A-17651-50044	WPC Security CPU Board
9	04-10259	Backbox, Wood
10	01-9047	Insert Stop Bracket
11	A-20442	Speaker/Display Assembly
a)	5555-12924-00	Speaker Tweeter, 15w, 4Ω
b)	5555-12856-00	Speaker, 5-1/4", 25w, 4Ω
c)	5045-12914-00	Capacitor, 10µfd., 50v(±20%)
d)	5901-12784-00	Dot Matrix Display/Driver Board
12	A-14039.1	Dot Matrix Controller Board
13	A-13379	Lock & Plate Assembly
14	50044-IN	Insert Board
15	A-15472-1	Fliptronic II Board

Backbox Cables:

Item	Part Number	Description
16	5795-12653-03	Ribbon Cable 34-pin, 3"
17	5795-13018-01	Ribbon Cable34-pin, 23.5"
18	5795-10938-15	Ribbon Cable 26-pin, 15"
19	5795-13434-32	Ribbon Cable w/Ferrite 32"

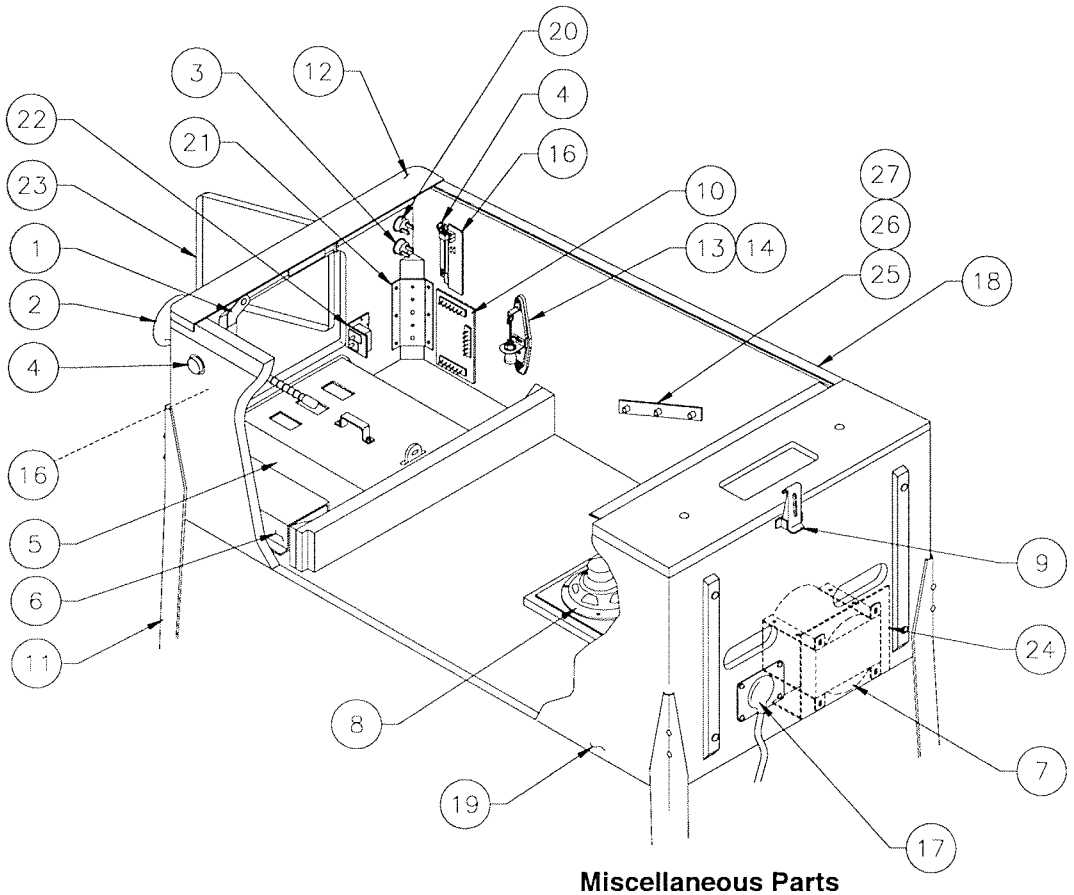
Miscellaneous Parts:

	A-8552-50044	Tempered Backglass Assy.
	03-8228-2	Glass Channel Top (1)
	03-8228-3	Glass Channel Edge (2)
	03-8229-1	Glass Lift Channel (1)
	08-7456	Backbox Glass: 27 x 18-7/8"
	20-9718	Wing Screw, 3/8-16 x 2"
	31-1357-50044	Screened Translight

Ribbon Cables:

	H-14584	Dot Matrix Display Power Cable
	H-15476	Logic Power Cable
	H-15736-1	Secondary Cable
	H-20470	Insert Cable

50044-CAB-1
Cabinet Assembly



Item	Part Number	Description
1	A-16773-1	Lever Guide Assembly
2	B-12445-7	Ball Shooter Assembly
3	20-9663-18	Push Button w/Sw., *Extra Ball* (Org)
4	A-16883-4	Flipper Button, Red (2)
5	A-18531-1	4-Ball Cashbox Assembly
6	A-17540-1	Univ. Power Interface Assy.
7	5610-14515-00	WPC Transformer
8	5555-12929-00	Speaker, 4Ω, 6", 25w
9	20-9347	Toggle Latch
10	A-17051-1	Coin Door Interface Board
11	A-19514	Leg Assembly, Chrome (4)
12	D-12615	Front Molding Assembly
13	20-6502-A	Plum Bob
14	A-15361	Tilt Mechanism Assembly
15	*	Cordset
16	A-17316	Opto Flipper Assembly (2)
17	01-10714	Line Cord Cover
18	A-12359-3	Side Molding Assembly (2)
19	11-1303	Wood Cabinet
20	20-9663-1	Push Button w/Sw., *Start* (Clear)
21	01-11400	Leg Plate (4)
22	A-18249-1	Cable & Interlock Switch Assy.
23	09-61000-1	Coin Door-USA
24	01-13936	Drip Plate
25	01-11408	Plate Spacer (2)
26	02-4329-1	Pivot Nut, 7/8" (4)
27	02-4352	Pivot Bushing (2)

Miscellaneous Parts

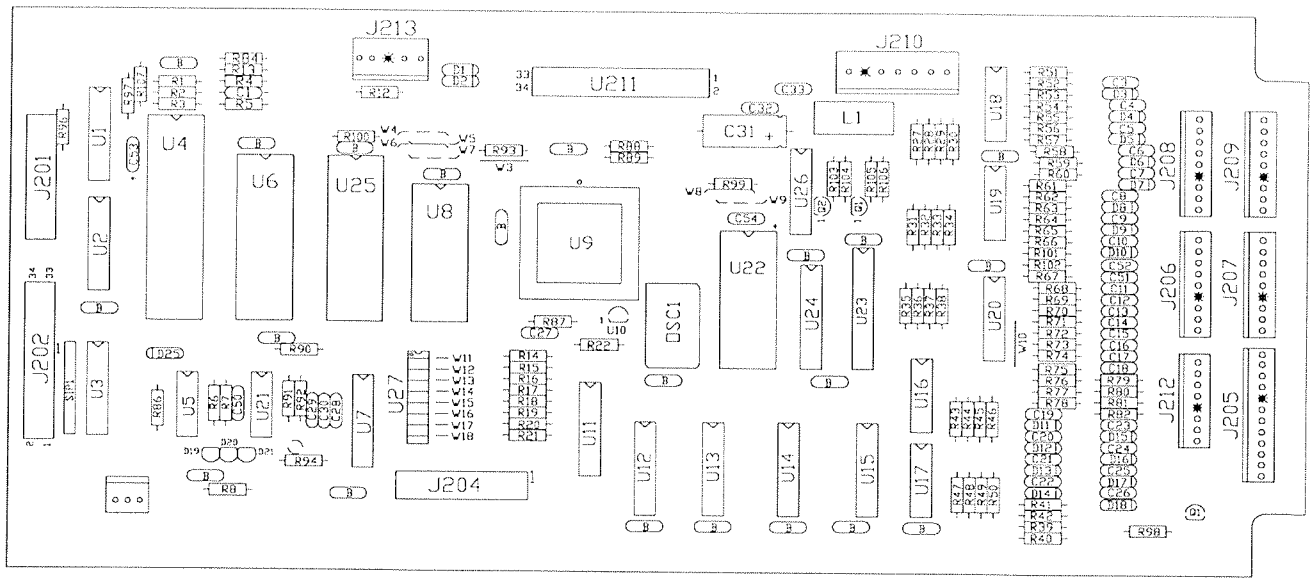
Part Number	Description
A-17195	Tilt Switch Assy. w/Cable
A-19562.1	Stay Arm Assembly
01-12352	Clip Bracket
01-9011.1-L	Backbox Mtg. Bracket, Left
01-9011.1-R	Backbox Mtg. Bracket, Right
01-6389-1	Cashbox Lock Bracket
08-7028-T	Playfield Glass
08-7377	Leg Leveler Adjuster, 3"
20-6500	Steel Ball, 1-1/16" (4)
01-3535	Rod Mounting Plate

Cabinet Cables

A-20201	Cable & Jumper Assy., Coin Door
H-17217	Plumb/Bob Mech. Protect Cable
H-17837-2	Voltage Program Jumper Cable
H-19524	Cabinet Cable
H-19601-1	Power Extension Cable
H-20593	Cabinet Switch/Lamp Cable

* See Application Chart p.2-36.

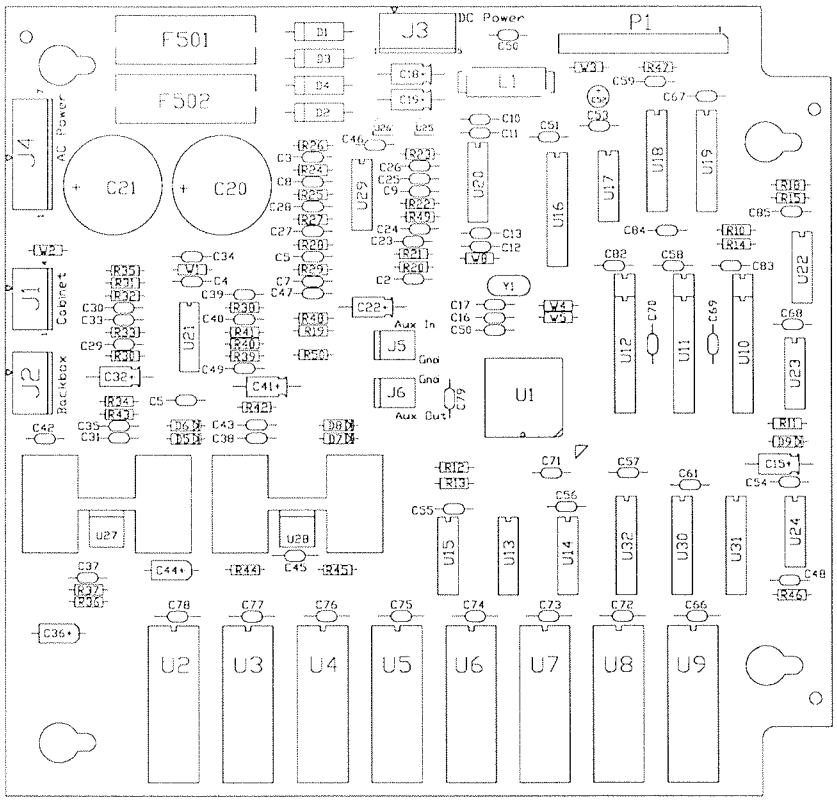
A-17651-50044
WPC CPU Security Board Assembly



Part Number	Designator	Description
5010-09034-00	R14-R22, R27-R42, R86, R94, R90, R98	Res., 10KΩ, ¼w, 5%
5010-09314-00	R52, R54, R56, R58, R60, R62, R64, R66, R75-R82	Res., 1.2KΩ, ¼w, 5%
5010-09358-00	R3, R43-R51, R53, R55, R57,R59, R61, R63, R65, R67-R74, R84, R101, R102, R105, R106	Res., 1KΩ, ¼w, 5%
5010-09416-00	R5-R8, R12, R13, R87-R89, R99, R100	Res., 470Ω, ¼w, 5%
5010-09085-00	R1, R2, R4, R93,R96, R97, R107	Res., 1.5KΩ, ¼w, 5%
5010-09534-00	W4, W7, W9	Res., 0Ω
5010-10989-00	R92	Res., 470KΩ, ¼w, 5%
5010-12104-00	R91	Res., 22MΩ, ¼w, 5%
5010-08991-00	R103, R104	Res., 4.7KΩ, ¼w, 5%
5019-09362-00	SIP1	SIP 4.7K, 9R, 10P, 5%
5040-08986-00	C31	Cap., 100M, 10v (±20%)
5043-08980-00	B	Cap., .01M, 50v (+80, -20%)
5043-09030-00	C27	Cap., .047M, 50v, (±20%)
5043-09065-00	C3,-C26, C51, C52	Cap., 470P, 50v, (±20%)
5043-09491-00	C29, C30	Cap., 22P, 1KV (±10%)
5043-09492-00	C28	Cap., 100P, 50v (±10%)
5041-09163-00	C53, C54	Cap., 2.2µF, 15v (20%) Ax.
5070-08919-00	D2-D18	Diode, 1N4148 150MA
5070-09266-00	D1, D25	Diode, 1N5817, 1.0A.
5160-10269-00	Q1-Q3	Trans., 2N3904 NPN
5700-10389-00	U20	IC Socket 18-pin
5281-09308-00	U3	IC, 74LS245 TRNCV
5281-09486-00	U14, U24	IC, 74LS374 8 D F/F
5281-09851-00	U5	IC, 74LS14 SMT TRG
5281-09867-00	U1, U2, U7	IC, 74LS244 OCT BUF

Part Number	Designator	Description
5281-10182-00	U11-U13, U15	IC, 74LS240 / DRVR
5284-12651-00	U21	IC, 4548
5315-13924-00	U23	IC, 74HC4514 LTCH 1to16 Dec.
5281-09246-00	U26	IC, 74LS139 2 T 4 Decoder
5340-12558-00	U8	S/RAM 8Kx8 Low Power
5370-12272-00	U16-U19	IC, LM339 Quad Comp
5370-12687-00	U10	MC 34064
5521-10931-00	OSC1	8.00MHZ OSC 14PIN DIP
5520-12084-00	X1	Crystal 32.768 KHz
5551-09822-00	L1	Inductor, 4.7µH, 3.0A.
5671-14516-00	D19-D21	Display LED Red
5700-08985-00	U4	Socket IC 40P .6"
5700-12088-00	U6	Socket IC 32P .6"
5700-12424-00	U9	Socket 84 Pin PLCC
5700-10176-00	U22	Socket IC 28 P .6"
5791-10850-00	J201, J204	Connector, 26-pin Header Str
5791-14090-05	J213	Connector, 5-pin Header Str
5791-10862-07	J210	Connector, 7-pin Header Str
5791-13830-08	J212	Connector, 8-pin Header Str
5791-13830-09	J208, J209	Connector, 9-pin Header Str
5791-13830-11	J206, J207	Connector, 11-pin Header Str
5791-12516-00	J202, J211	34 Hen 2x17 Str
5048-11033-00	C50	Cap., .022 µF
5791-13830-12	J205	Cap., 12-pin Header Str
5043-09845-00	C32, C33	Cap., 1KP, 50v (±10%)
5645-09025-00	U27	Switch DIP 8 POS
5162-12422-00	U20	IC, ULN 2803A
A-5400-50044-1	U22	WPC PIC 16C57 Micro-C
A-5343-50044-1	U6	Game ROM Assembly
A-17643	-	Battery Holder PCB Assy.
5400-10320-00	U4	MC68B09E 2Mhz µP
5410-12426-00	U9	WPC ASIC-89
20-9665-1	-	PCB Standoffs
H-18258	-	WPC CPU Security Cable

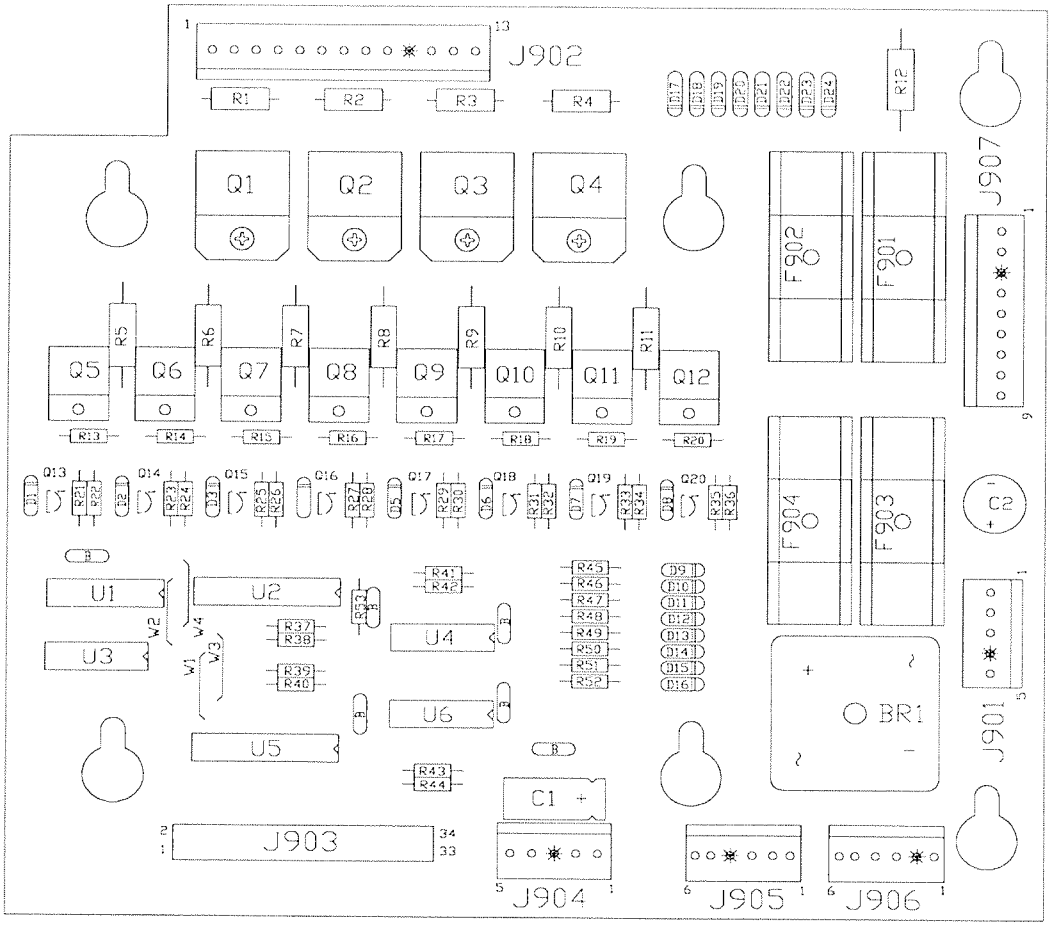
A-16917-50044
Sound Board Assembly



Part Number	Designator	Description
4004-01005-06	U27, U28	MS, 4-40 x 3/8"
4404-01119-00	U27, U28	Nut 4-40
5010-08772-00	R39, R41	Resistor, 15KΩ, ¼w, 5%
5010-08774-00	R30, R34, R37, R42, R45	Resistor, 22KΩ, ¼w, 5%
5010-08991-00	R10, R12-R16	Resistor, 4.7Ω,¼ w, 5%
5010-09034-00	R47	Resistor, 10KΩ, ¼w, 5%
5010-09035-00	R11, R19, R33, R40	Resistor, 47KΩ, ¼w, 5%
5010-09036-00	R46	Resistor, 100Ω, ¼w, 5%
5010-09219-00	R31, R32, R38	Resistor, 8.2KΩ, ¼w, 5%
5010-09358-00	R50	Resistor, 1KΩ,¼ w, 5%
5010-09534-00	W4, W6	Resistor,0Ω (Jumper)
5010-13420-00	R36, R44	Resistor, 680Ω, ¼w, 5%
5010-13607-00	R20-R29, R48, R49	Resistor, 6.2KΩ, 1/8w, 1%
5010-13517-00	R35, R43	Resistor, 15Ω, ¼w, 5%
5040-09365-00	C15, C18, C19, C32, C41	Cap., 1µF, 63v, Alum Ax.
5040-09421-00	C52	Cap., 100µF,25v,Alum Ax.
5040-13417-00	C20, C21	Cap., 10,000µF, 35v,Alum.
5041-09009-00	C36, C44	Cap., 22µF,10v, Tant Alum
5041-13187-00	C22	Cap., 4.7µF, Tant Axial.
5043-08996-00	C4, C5, C10-C13 C31, C35, C38, C43, C46, C47, C50-C79	Cap., .10µF, 50v, Cer Ax.
5043-10267-00	C37, C45	Cap., 150pF,50v, Cer Ax.
5048-11028-00	C16, C17	Cap., 22pF, 50v, Cer Ax.
5048-11029-00	C48	Cap., 100pF,50v, Cer Ax.
5048-11030-00	C49	Cap., 470pF,50v, Cer Ax.
5048-11033-00	C33	Cap., .022µF,50v, CerAx.
5048-12036-00	C34, C42	Cap., .22µF, 50v, Cer Ax.
5048-13418-00	C30, C39, C40	Cap., .047µF,50v, Cer Ax.
5048-13608-00	C8	Cap., 6800pF, 50v, Cer Ax.
5048-13609-00	C7, C24, C26	Cap., 3900pF, 50v, Cer Ax.
5048-13610-00	C2, C3, C9, C27, C29	Cap., 1000pF, 50v, Cer Ax.
5048-13611-00	C6, C23, C25, C28	Cap., 680pF, 50v, Cer Ax.
5070-09045-00	D1-D4	MR-501 Rectifier Diode

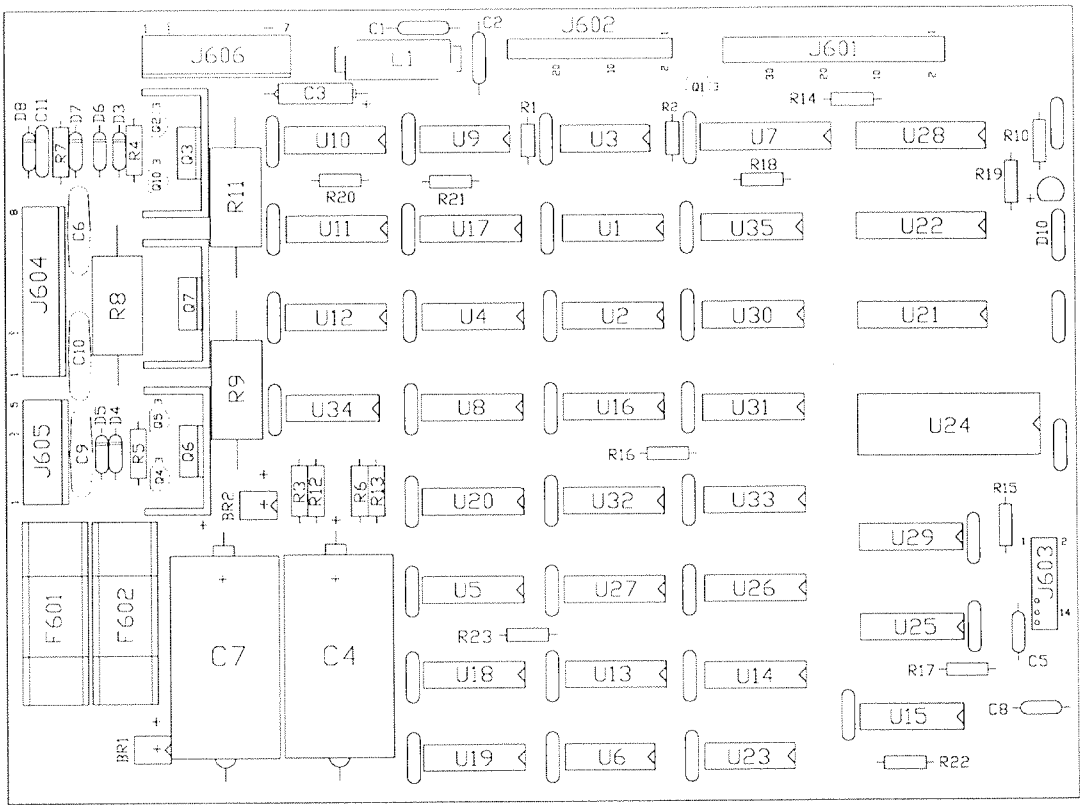
Part Number	Designator	Description
5070-09054-00	D5-D9	Diode Signal 1N4004
5250-13302-00	U25	78L05 Pos 5V reg TO-92
5250-13303-00	U26	79L05 Neg 5V Reg TO-92
5283-10551-00	U17	IC74F00 Fast Quad NAND
5311-10946-00	U22	IC74HC74 Dual D Flip Flop
5311-10947-00	U23	IC74HC125 Quad Tri-State Buffer
5311-10948-00	U15	IC74HC138 1 of 8 Decoder
5315-12009-00	U18, U19	IC74HCT374 Octal D Flip Flop
5311-12043-00	U13, U14	IC74HC174 Hex D Flip Flop
5311-12538-00	U24	IC74HC14 Hex Schmitt Inverter
5311-12287-00	U30-U32	IC74HC541 Octal Bus Driver
5340-13304-00	U10-U12	ICSRAM 2Kx8 35ns .300 DIP
5370-12730-00	U21, U29	ICTL084 Quad Op AMP
5370-13419-00	U27, U28	Audio Power Amp TDA2030AV
5371-13299-00	U20	IC DAC AD-1851 16Bit
5520-13301-00	Y1	Crystal 10MHz Parallel resonant
5551-09822-00	L1	Inductor, 4.7µH, 3Amp.
5700-12047-00	U16	IC, Socket 24-Pin .300 DIP
5700-12088-00	U2-U9	IC, Socket 32-Pin .600 DIP
5705-12638-00	U27, U28	Heatsink 5298-B
5733-12060-01	F501, F502	MT3AG PCMounted Fuse Holder
5791-10862-04	J1, J2	Connector, 4-pin Header STR .156
5791-10862-05	J3	Connector, 5-pin Header STR .156
5791-10862-07	J4	Connector, 7-pin Header STR .156
5791-12516-00	P1	Connector, 34 Hen 2x17 STR .100
A-17002	U16	PAL Sub-Assembly
A-5343-50044-S2	U2	ROM Sub-Assembly
A-5343-50044-S3	U3	ROM Sub-Assembly
A-5343-50044-S4	U4	ROM Sub-Assembly
A-5343-50044-S5	U5	ROM Sub-Assembly
A-5343-50044-S6	U6	ROM Sub-Assembly
A-5343-50044-S7	U7	ROM Sub-Assembly
Not Used	U8	ROM Sub-Assembly
Not Used	U9	ROM Sub-Assembly
5731-10356-00	F501, F502	Fuse, 3Amp, 250v, Slow Blow

A-15472-1
Fliptronic II Board Assembly



Part Number	Designator	Description	Part Number	Designator	Description
01-10572	Q1-Q4	Heatsink	5070-09054-00	D1-D24	Diode, 1N4004
4006-01003-08	Q1-Q4	Mach. Screw, 6-32	5100-09690-00	BR1	Bridge Rectifier
4406-01128-00	Q1-Q4	Nut 6-32 KEPS	5162-12635-00	Q5-Q12	Trans., TIP102 NPN
5010-09034-00	R37-R44, R53	Res., 10KΩ, ¼w, 5%	5190-09016-00	Q13, Q20	Trans., 2N4403 PNP
5010-09358-00	R22, R24, R26, R28, R30, R32, R34, R36, R45-R52	Res., 1KΩ, ¼w, 5%	5191-12179-00	Q1-Q4	Trans., TIP36C PNP
		Res., 220Ω, ½w, 5%	5315-12009-00	U2	IC, 74HCT374
			5315-12031-00	U5	IC, 74HCT244
5010-09361-00	R1-R4	Res., 470Ω, ¼w, 5%	5315-12812-00	U1	IC, 74HCT138
5010-09416-00	R21, R23, R25, R27, R29, R31, R33, R35		5315-12951-00	U3	IC, 74HCT00
			5370-12272-00	U4, U6	IC, LM339 Quad Comp
			5731-10356-00	F901-F904	Fuse S-B, 3A., 250v
5010-09534-00	W3, W4	Res., 0Ω	5733-12060-01		Fuse Holder (F901-F904)
5010-10171-00	R13, R20	Res., 56Ω, ¼w, 5%	5791-10862-05	J901, J904	Connector, 5-pin Header
5011-12956-00	R5, R12	Res., 2.7KΩ, 1w, 5%	5791-10862-09	J907	Connector, 9-pin Header
5040-08986-00	C1	Cap., 100µF, 10v	5791-10862-13	J902	Connector, 13-pin Header
5040-09537-00	C2	Cap., 100µF, 100v	5791-13830-06	J905, J906	Connector, Str Sq. Pin Hdr.
5043-08980-00	B	Cap., .01µF, 50v	5791-12516-00	J903	34 Hen 2 x 17 STR

A-14039.1
Dot Matrix Assembly



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

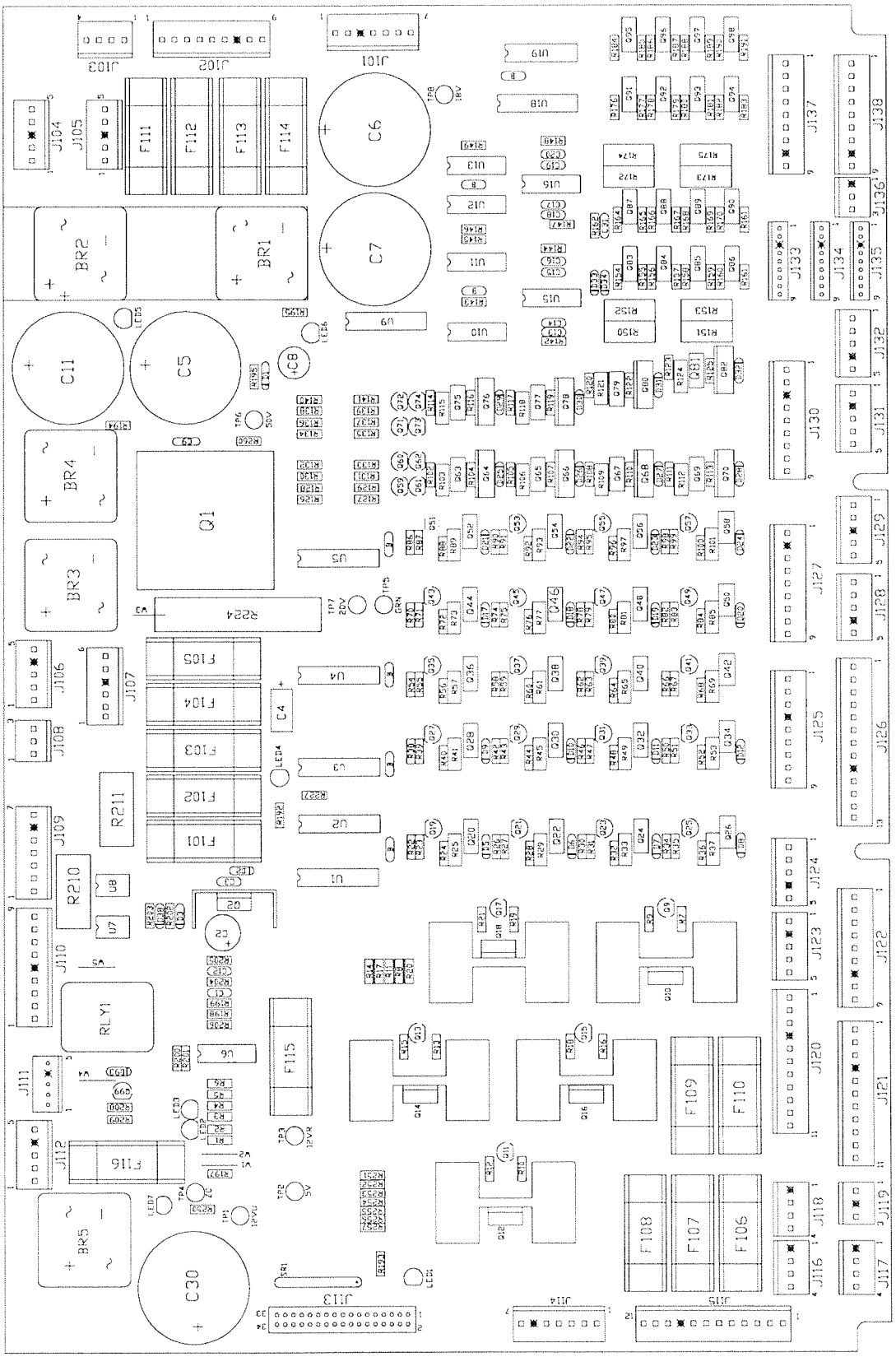
Part Number	Designator	Description
5311-10946-00	U4, U5, U17, U18, U20	IC, 74HC74
5311-10947-00	U9	IC, 74HC125
5311-10951-00	U10, U11	IC, 74HC161
5311-10977-00	U6	IC, 74HC04
5311-12817-00	U29	IC, 74HC165
5311-12819-00	U21	IC, 74HC688
5311-12820-00	U23	IC, 74HC27
5311-12822-00	U13-U15	IC, 74HC193
5315-12009-00	U22	IC, 74HCT374
5315-12812-00	U1, U2, U30, U12	IC, 74HCT138
5281-09308-00	U28	IC, 74HCT245
5315-12815-00	U8, U34	IC, 74HCT08
5315-12816-00	U19	IC, 74HCT32
5315-12821-00	U7	IC 74HCT240
5340-12278-00	U24	S/RAM 2064 150NS
5551-09822-00	L1	Ind. 4.7µH, 3A.
5671-14516-00	D10	Display LED Red
5705-09199-00	Q3, Q6, Q7	Heatsink, 6030B
5731-12328-00	F601, F602	Fuse, 3/8A., SB, 250v
5733-12060-01		Fuse Holder (F601, F602)
5791-10850-00	J602	Connector, 26-pin Header
5791-10862-05	J605	Connector, 5-pin Header
5791-10862-07	J606	Connector, 7-pin Header
5791-10862-08	J604	Connector, 8-pin Header
5791-12516-00	J601	34 Hen 17x2 STR
5791-12827-00	J603	14 Hen 7x2 STR

A-12697-4
WPC Power Driver Assembly

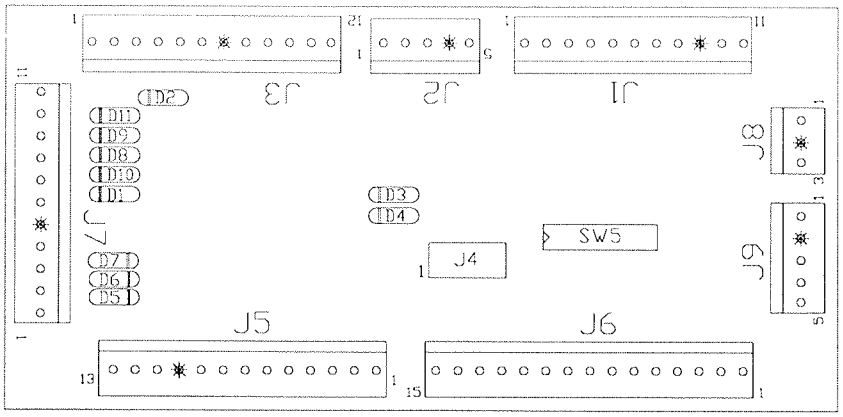
Part Number	Designator	Description
5010-08981-00	R260	Res., 10KΩ, ½w, 5%
5010-08991-00	R9, R12, R15, R18, R21, R23, R27, R31, R35, R39, R43, R47, R51, R55, R59, R63, R67, R71, R75, R79, R83, R87, R91, R95, R99, R126, R128, R130, R132, R134, R136, R138, R140, R227	Res., 4.7KΩ, ¼w, 5%
5010-08992-00	R8,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

Part Number	Designator	Description
5040-12313-00	C5-C7, C11, C30	Cap., 15KM, 25v (±20%)
5043-08980-00	B-BYPASS	Cap., .01M, 50v (+80, -20%)
5043-08996-00	C13-C20, C31	Cap., .1M, 50v (±20%)
5043-09845-00	C1, C12	Cap., 1KP, 50v (±20%) Axial
5048-10994-00	C3	Cap., .33M, 50v (±20%) Axial
5070-08919-00	D33, D34	Diode 1N4148, 150MA.
5070-09054-00	D1-D3, D5-D12, D17-D32, D38	Diode 1N4004, 1.0A.
5100-09690-00	BR1-BR5	Bridge, 35A., Rect, 200v
5131-12725-00	Q10, Q12, Q14, Q16, Q18	Triac BT138E
5162-12422-00	U19	IC ULN 2803 OC-DRL
5162-12635-00	Q20, Q22, Q24, Q26, Q28, Q30, Q32, Q34, Q36, Q38, Q40, Q42, Q44, Q46, Q48, Q50, Q52, Q54, Q56, Q58, Q63, Q65, Q67, Q69, Q75, Q77, Q79, Q81, Q83-Q90	Transistor, TIP 102
5194-09055-00	Q9, Q11, Q13, Q15, Q17, Q19, Q21, Q23, Q25, Q27, Q29, Q31, Q33, Q35, Q37, Q39, Q41, Q43, Q45, Q47, Q49, Q51, Q53, Q55, Q57, Q59-Q62, Q71-Q74	Transistor, 2N5401 PNP
5191-12179-00	Q64, Q66, Q68, Q70, Q76, Q78, Q80, Q82	Transistor, TIP36C PNP
5192-12428-00	Q91-Q98	Transistor, TIP 107
5250-12634-00	Q1	Reg LM 323 5v
5281-09486-00	U1-U5, U18	IC, 74LS374 8D F/F
5281-09487-00	U10-U13	IC, 74LS74 Dual D F/F
5281-10182-00	U9	IC, 74LS240 L/Drvr.
5370-12272-00	U6, U15, U16	IC, LM339 Quad Comp.
5460-12423-00	Q2	IC, LM7812
5671-14516-00	LED1, LED4-LED7	Display LED Red
5701-09652-00	Q1	Thermal Pad
5705-09199-00	Q2	Heatsink 6030B
5705-12637-00	Q1	Heatsink 5054
5705-12638-00	Q10, Q12, Q14, Q16, Q18	Heatsink 5298B
5733-12060-01	F101-F116	Fuse Holder PC MT3AG
5791-10862-03	J108, J119, J136	Connector, 3-pin Header .156
5791-10862-04	J103, J116-J118	Connector, 4-pin Header .156
5791-10862-05	J104-J106, J112, J123, J124, J128, J129, J131, J132	Connector, 5-pin Header .156
5791-10862-06	J107	Connector, 6-pin Header .156
5791-10862-07	J101, J109, J114	Connector, 7-pin Header .156
5791-10862-09	J102, J122, J125, J127, J130, J137, J138	Connector, 9-pin Header .156
5791-10862-11	J120, J121	Connector, 11-pin Header .156
5791-10862-12	J115	Connector, 12-pin Header .156
5791-10862-13	J126	Connector, 13-pin Header .156
5791-13830-05	J111	Connector, 5-pin Header
5791-13830-09	J133-J135	Connector, 9-pin Header
5791-12516-00	J113	34 Hen 2x17 STR
5824-09248-00	TP1-TP8	Test Point #1502-1
5041-09163-00	C9	Cap., 2.2MF Tant
5730-09071-00	F114	Fuse, 8A, 32v
5731-09432-00	F112	Fuse, S-B, 7A., 250v
5731-09651-00	F106-F111, F113, F116	Fuse, S-B, 5A., 250v
5731-10356-00	F101-F105	Fuse, S-B, 3A., 250v
5730-09797-00	F115	Fuse, S-B, 3/4A., 250v
5705-12698-00	-	Heatsink #62365

A-12697-4
WPC Power Driver Assembly

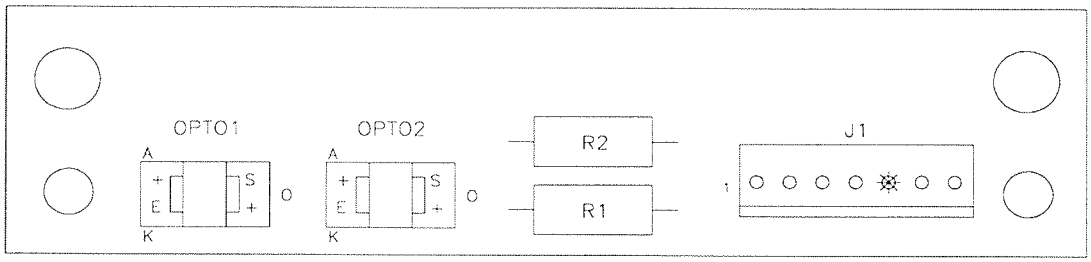


A-17051-1
Coin Door Interface PCB Assembly



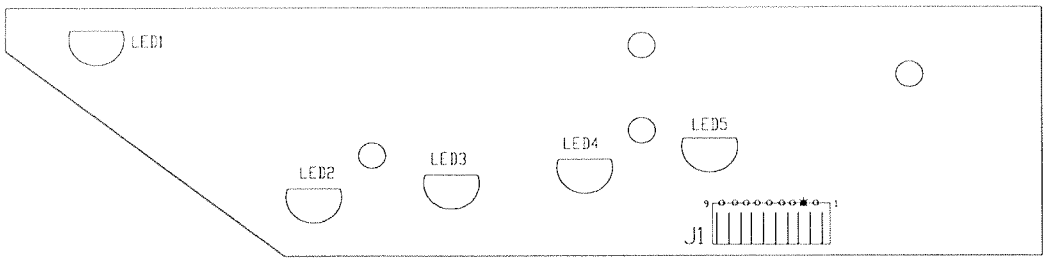
Part Number	Designator	Description
5791-10862-03	J8	Connector, 3-pin Header Str. Sq.
5791-10862-05	J2, J9	Connector, 5-pin Header Str. Sq.
5791-10862-11	J1, J7	Connector, 11-pin Header Str. Sq.
5791-10862-12	J3	Connector, 12-pin Header Str. Sq.
5791-10862-13	J5	Connector, 13-pin Header Str. Sq.
5791-10862-15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

A-17316
Flipper Opto PCB Assembly



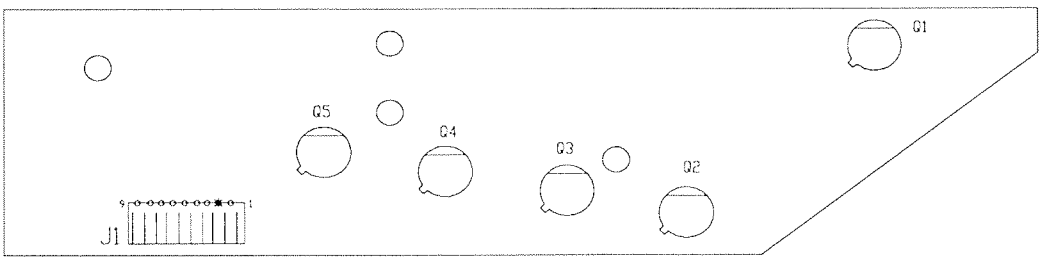
Part Number	Designator	Description
A-20207	-	Flipper Opto Switch PCB
5010-09061-00	R1, R2	Resistor, 680Ω, 1/2w, 5%
5490-14575-00	OPTO1, OPTO2	IC Opto Integ Schmitt 10mA.
5791-13830-07	J1	Connector, 7-pin Header Solid Sq.
03-9001	-	Interrupter Flip-Opto

A-18617-1
Trough IRED LED PCB Assembly



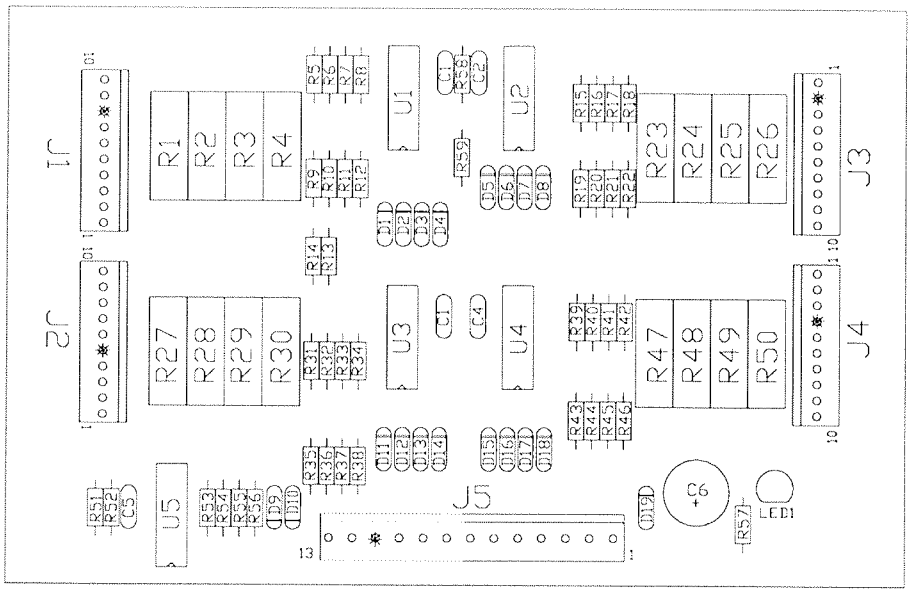
Part Number	Designator	Description
5671-12731-00	LED1 - LED5	Infra Red Diode
5791-12622-09	J1	Connector, 9-pin Header Sq.

A-18618-1
Trough IRED Transistor PCB Assembly



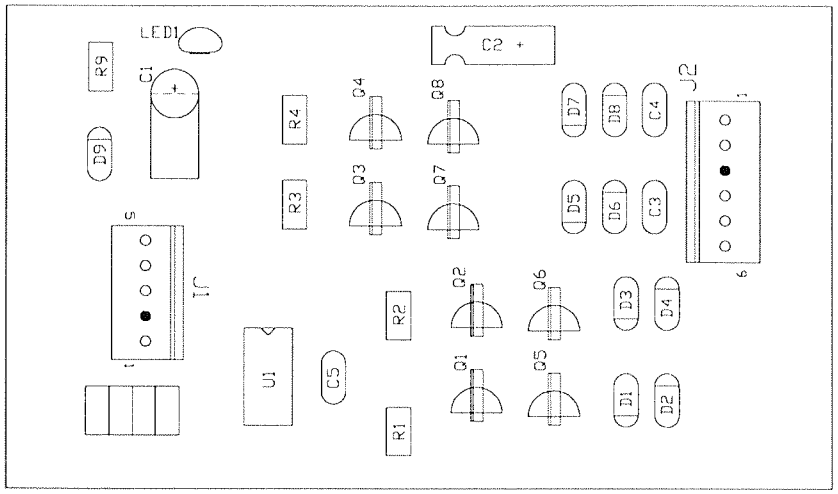
Part Number	Designator	Description
5163-14114-00	Q1 - Q5	Infra Red Photo Transistor
5791-12622-09	J1	Connector, 9-pin Header Sq.

A-17223
16-Opto PCB & Bracket Assembly



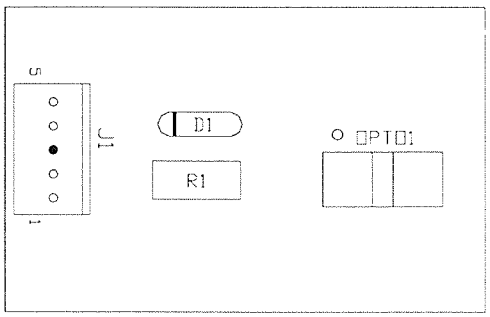
Part Number	Designator	Description
A-16998.1	-	16-Opto Dual Mount PCB Assy.
5043-08996-00	C1 -C5	Capacitor, 0.1µF, 50v(±20%) Axial
5040-13102-00	C6	Capacitor, 470µF, @35v (±20%)
5791-13830-10	J1-J4	Connector, 10-pin Header STR Sq.
5791-10862-13	J5	Connector, 13-pin Header STR Sq.
5671-13732-00	LED1	Display LED Red
5010-12928-00	R1-R4, R23-R30, R47-R50	Resistor, 270Ω, 2w, 5%
5010-09999-00	R5-R12, R15-R22, R31-R46	Resistor, 2KΩ, 1/4w, 5%
5010-08774-00	R13, R14, R51	Resistor, 22KΩ, 1/4w, 5%
5010-09162-00	R52, R54, R56,	Resistor, 100KΩ, 1/4w, 5%
5010-09034-00	R53, R55	Resistor, 10KΩ, 1/4w, 5%
5010-10631-00	R57	Resistor, 1.2KΩ, 1/2w, 5%
5370-12272-00	U1-U5	IC LM339 Quad Comp.
5070-09054-00	D1 - D19	Diode 1N4004 1.0A.
01-20756	-	PCB Mounting Bracket
07-6688-18N	-	Rivet 3/16 x 1/8" Nickel

A-19043-1
Stepper Motor Driver-Bipolar Universal PCB



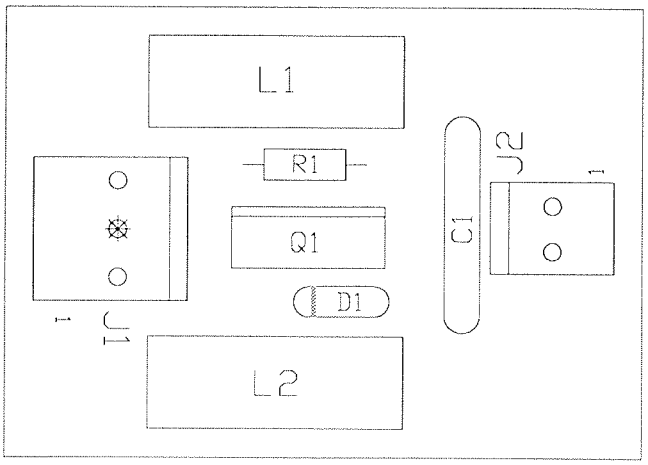
Part Number	Designator	Description
5370-12272-00	U1	IC LM339 Quad Comp
5010-09999-00	R9	Resistor, 2KΩ, 1/4w, 5%
5010-08991-00	R7, R8	Resistor, 4.7KΩ, 1/4w, 5%
5010-09034-00	R5, R6	Resistor, 10KΩ, 1/4w, 5%
5010-08998-00	R1 - R4	Resistor, 2.2KΩ, 1/4w, 5%
5192-12428-00	Q5 - Q8	Transistor TIP107
5162-12635-00	Q1 - Q4	Transistor TIP102
5671-13732-00	LED1	LED Dspl Red
5791-10862-06	J2	Connector, 6-pin Header Str. Sq.
5791-10862-05	J1	Connector, 5-pin Header Str. Sq.
5070-09054-00	D1 - D9	Diode 1N4004 1.0A.
5043-08980-00	C3 - C5	Capacitor, 0.01µf, 50v (+80,-20%) Ax.
5040-09365-00	C2	Capacitor, 1µf, 63v (+50,-10%) Ax.
5040-12298-00	C1	Capacitor, 100µf, 40v (+50,-10%) Ax.

A-20511
Reel Opto PCB Assembly



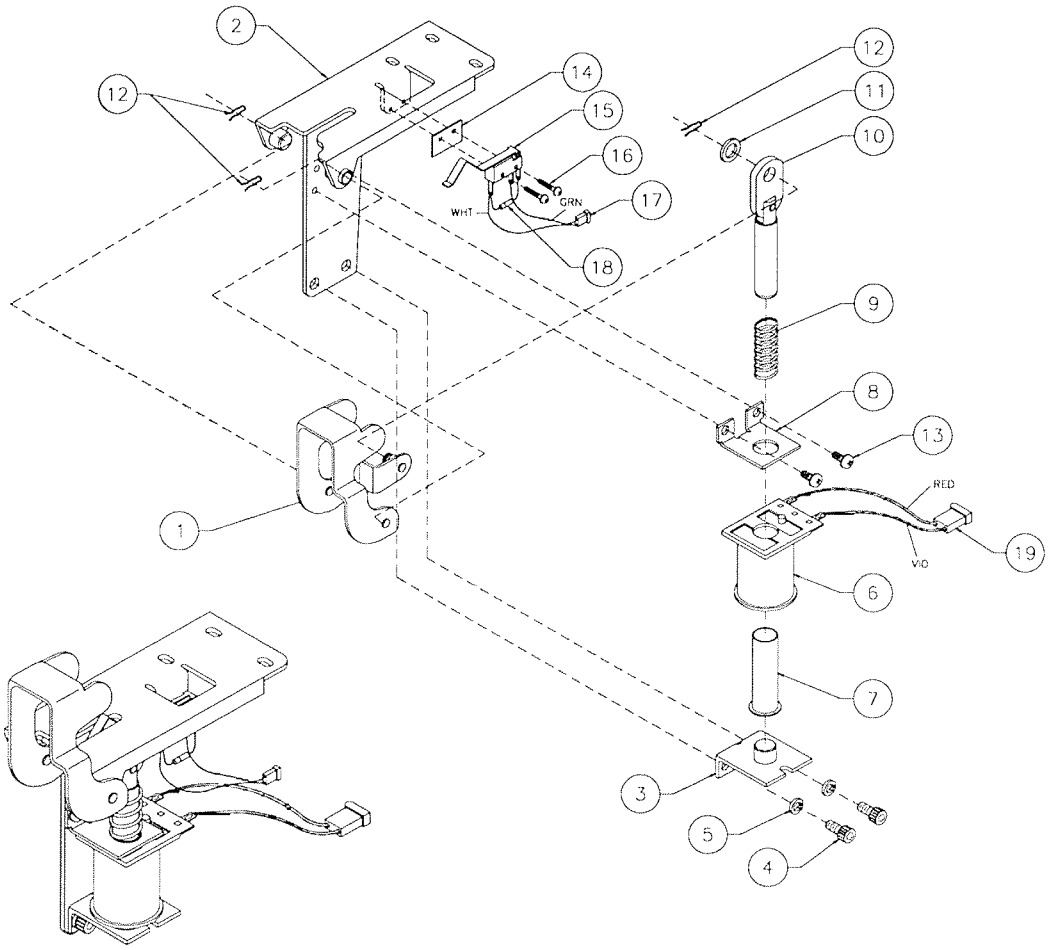
Part Number	Designator	Description
5791-12622-05	J1	Connector, 5-pin Header R/A
5010-08930-00	R1	Resistor, 470Ω, ½w, 5%
5070-09054-00	D1	Diode 1N4004, 1.0A.
5490-12451-00	OPTO1	Opto Inter Lg. 10mA

A-15340
Motor EMI w/Brake PCB Assembly



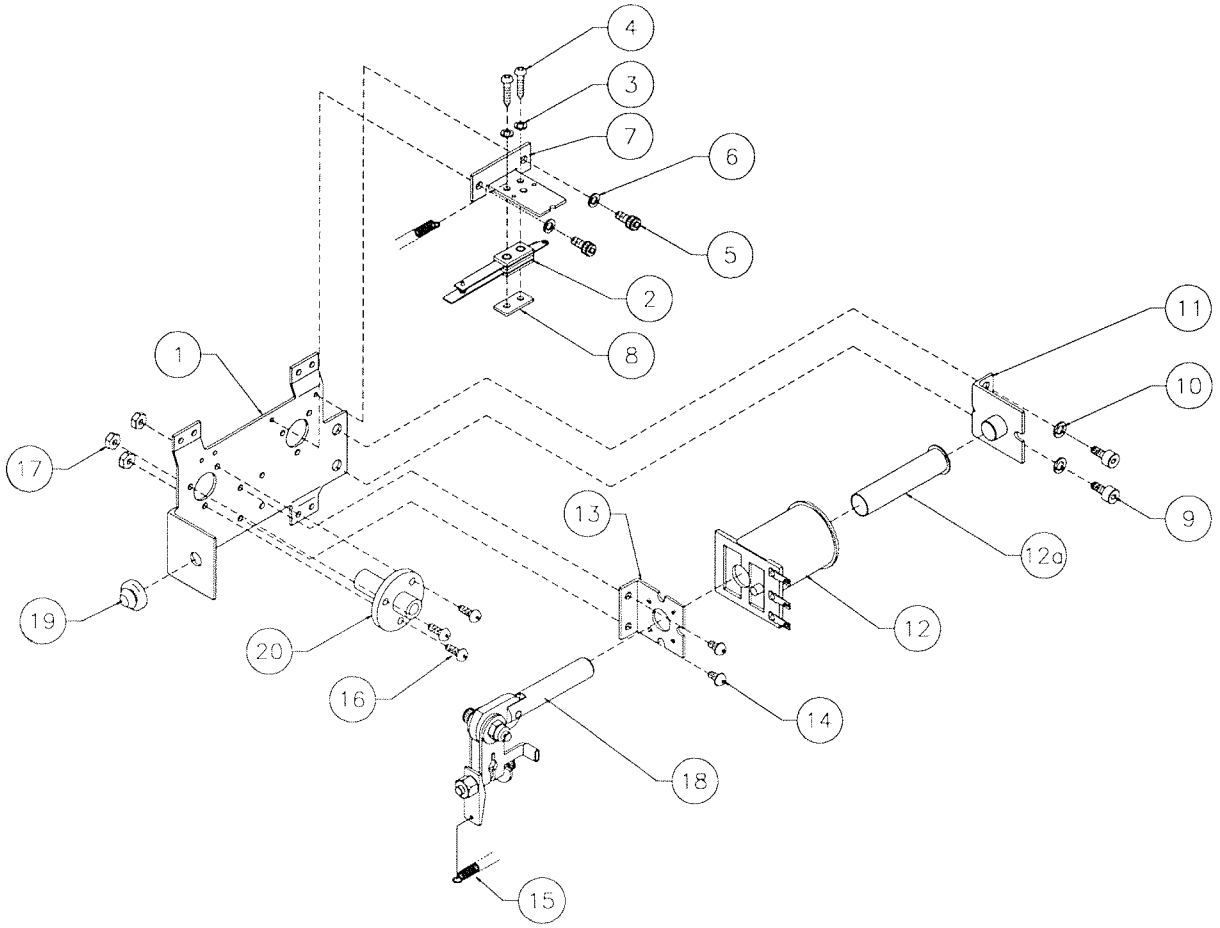
Part Number	Designator	Description
5551-09822-00	L1, L2	Inductor, 4.7MH3AMP
5791-12273-03	J1	Connector, 3-pin Header Str Sq.
5791-12273-02	J2	Connector, 2-pin Header Str Sq.
5070-09054-00	D1	Diode, 1N4004 1.0A.
5010-08998-00	R1	Resistor, 2.2KΩ, 1/4w, 5%
5162-12635-00	Q1	Transistor TIP 102

A-20439
Shooter Lane Auto Kicker Assembly



Item	Part Number	Description
1	04-10210.3	Kicker Crank Assembly
2	04-10211.3	Coil Mounting Bracket
3	A-12390	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 1/2 x 16ga.
12	12-6227	Hairpin Clip
13	4006-01003-05	Mach. Screw, 6-32 x 5/16"
14	01-8600	Insulator
15	5647-12693-62	Mini-Micro Switch
16	4002-01105-08	Mach. Screw, #2-56 x 1/2"
17	H-16437	Cable
18	5070-09054-00	Diode1N4004
19	H-19523	Cable

A-14876-R-5
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-15411	Flipper Coil, Orange
13	01-7695	Solenoid Bracket
14	4006-01017-04	Mach. Screw, 6-32 x 1/4"
15	10-364	Spring
16	4006-01005-06	Mach. Screw, 6-32 x 3/8"
17	4406-01117-00	Nut 6-32 Hex.

Item	Part Number	Description
18	A-15848-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

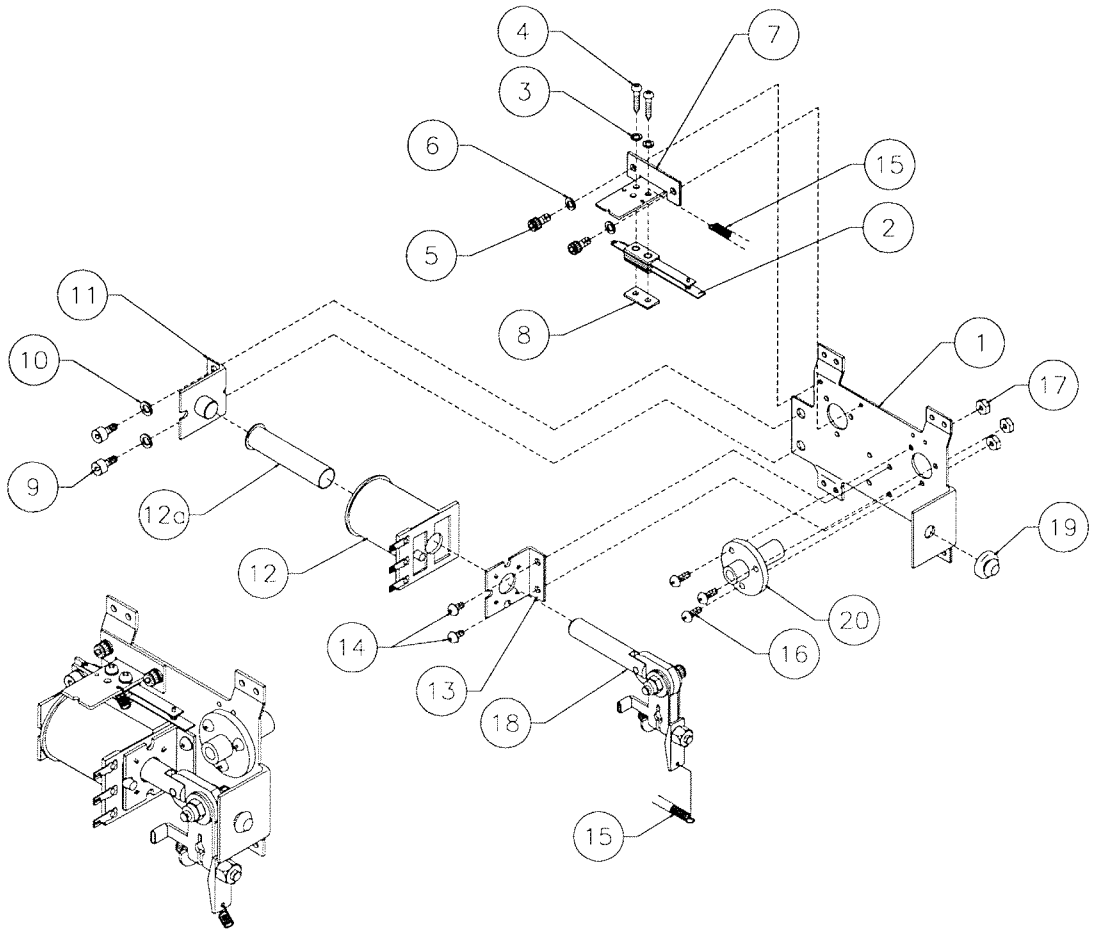
Associated Parts:
(Not Shown)

21	23-6519-4	Flipper Rubber Ring, Red
22	20-10110-5	Flipper Bat w/Shaft

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-4
Flipper Assembly



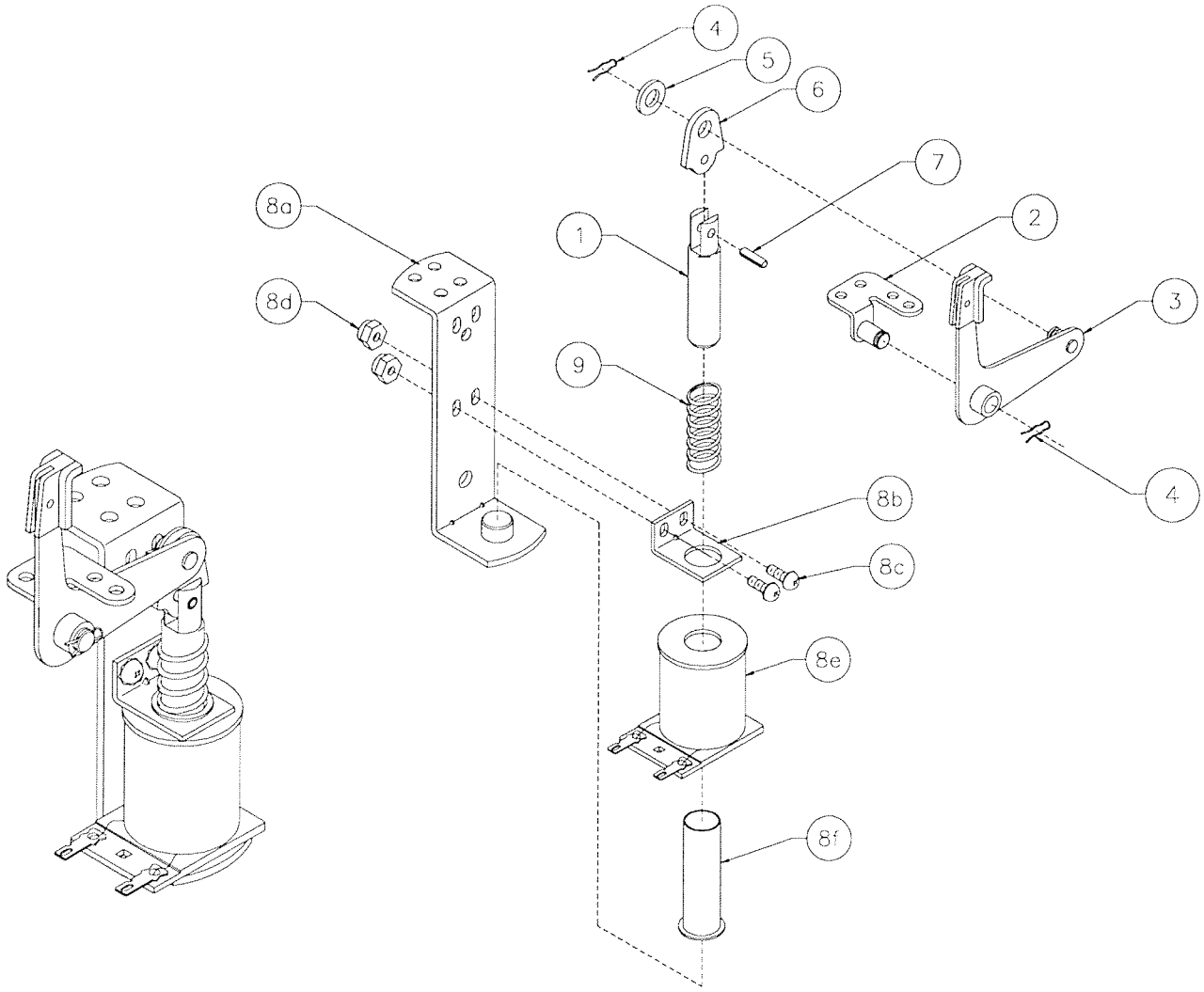
Item	Part Number	Description
1	B-13104-L	Flipper Base Assembly, Left
2	SW-1A-194	Switch Assembly
3	4701-00002-00	Lockwasher #6 Split
4	4105-01019-10	Sh. Metal Screw, #5 x 5/8"
5	4008-01079-05	Mach. Screw, 8-32 x 5/16"
6	4701-00003-00	Lockwasher #8 Split
7	01-9375	Switch Mounting Bracket
8	20-6516	Speednut, Tinnerman
9	4010-01066-06	Cap Screw, 10-32 x 3/8"
10	4701-00004-00	Lockwasher #10 Split
11	A-12360	Flipper Stop Assembly
12	FL-15411	Flipper Coil, Orange
a)	03-7066-5	Coil Tubing
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	23-6519-4	Flipper Rubber Ring, Red
22	20-10110-5	Flipper Bat w/Shaft (White)

A-17811
Kicker Arm (Slingshot) Assembly

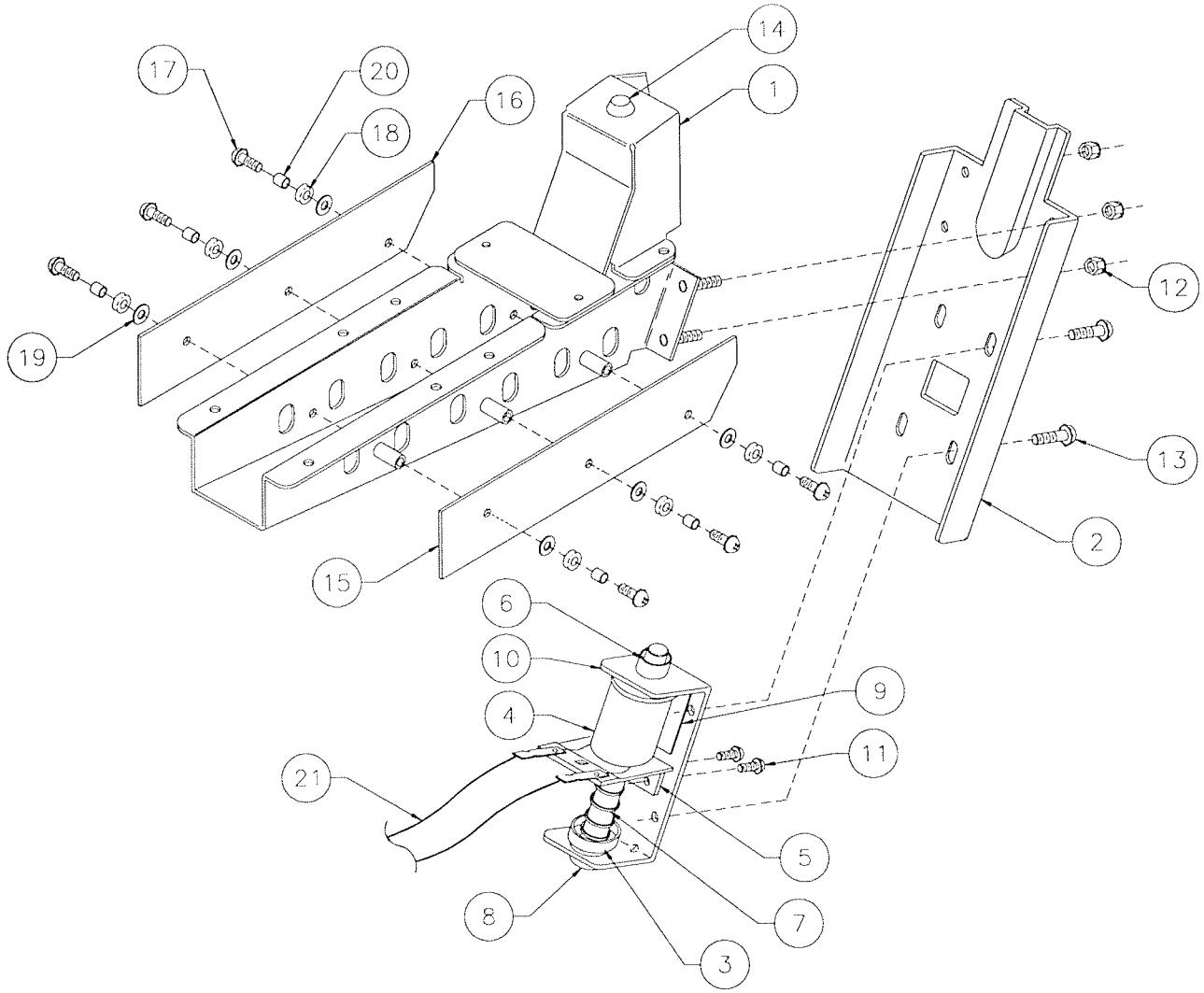


Item	Part Number	Description
1	02-2364	Coil Plunger
2	A-17810	Mounting Bracket Assembly
3	A-12664	Kicker Crank Assembly
4	12-6227	Hairpin Clip
5	4700-00030-00	FW, 17/64 x 1/2 x 15ga.
6	03-8085	Armature Link
7	20-8716-5	Roll Pin, 1/8 x 7/16"

Associated Parts for Right & Left Kickers:

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

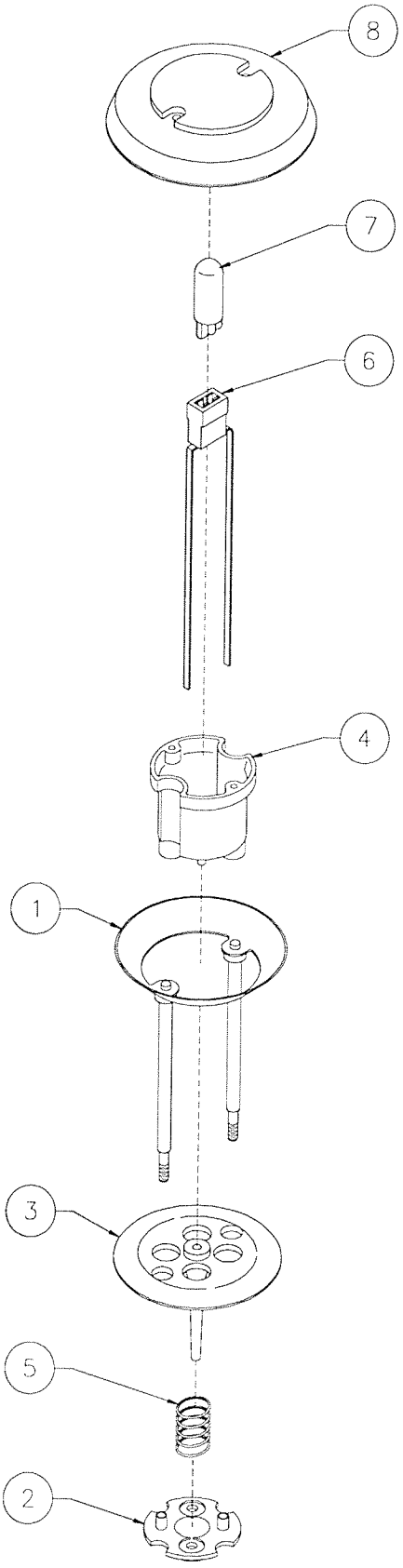
A-19963-1
Ball Trough Assembly Complete



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

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

B-9414-3
Jet Bumper Assembly

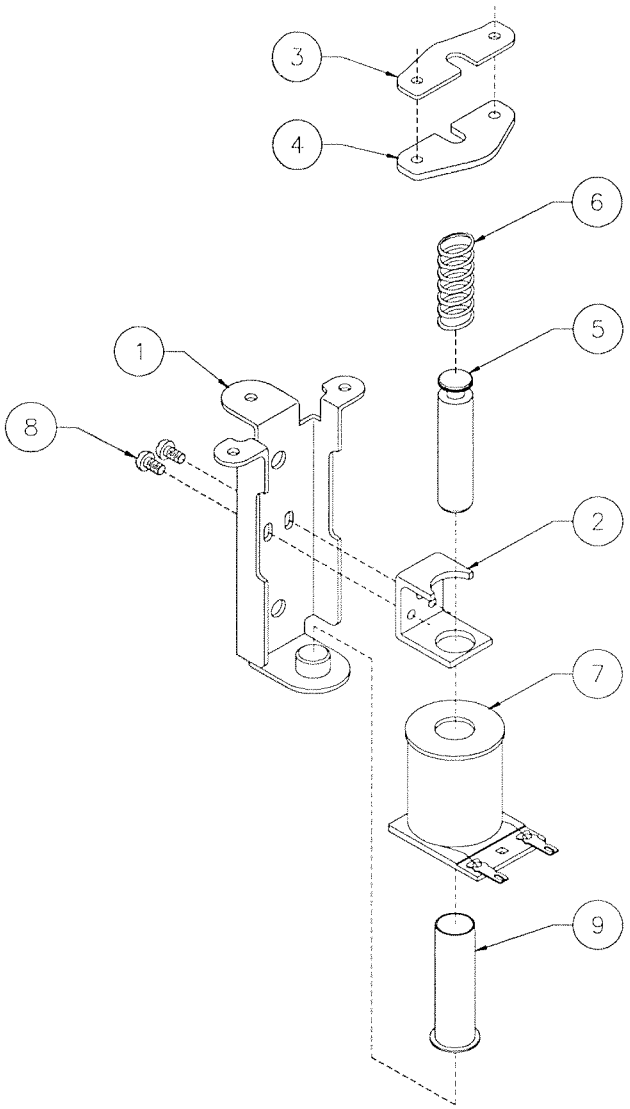


Item	Part Number	Description
1	A-4754	Bumper Ring Assembly
2	03-6009-A5	Bumper Base, White
3	03-6035-4	Bumper Wafer, Red
4	03-7443-5	Bumper Body, White
5	10-7	Spring
6	24-8776	Socket-Wedge Base
7	24-8768	Bulb #555(6.3v., 0.25A.)

Associated Parts:

8	03-8254-9	Jet Bumper Cap, Tr. Red (3)

A-9415-2
Jet Bumper Coil Assembly

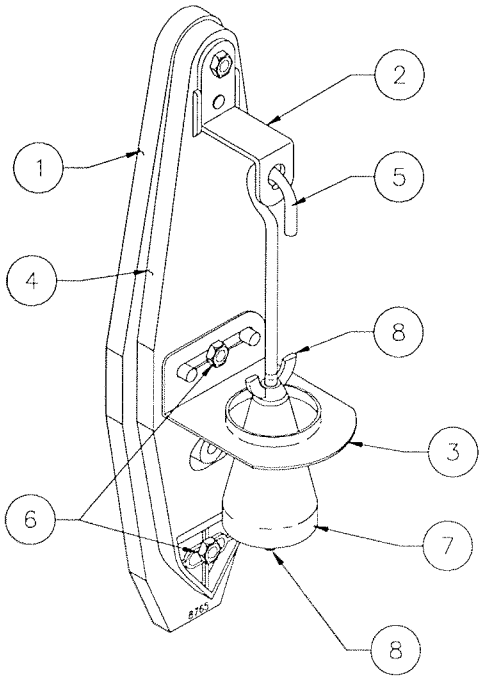


Item	Part Number	Description
1	B-7417	Bracket & Stop Assembly
2	01-1747	Coil Retaining Bracket
3	01-5492	Armature Link, Steel
4	01-5493	Armature Link, Bakeline
5	02-3406-1	Coil Plunger
6	10-326	Armature Spring
7	AE-26-1200	Coil Assembly
8	4006-01017-04	Mach. Screw, 6-32 x 1/4"
9	03-7066	Coil Tubing

Associated Parts:
(Not Shown)

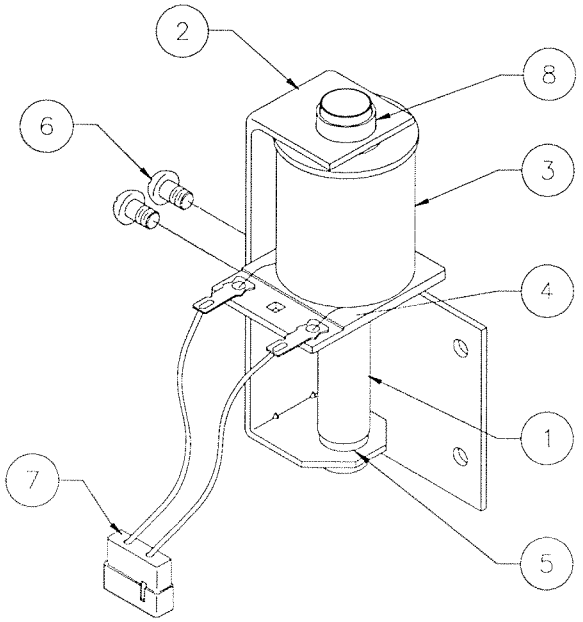
10	B-12030-2	Leaf Switch Assembly
a)	A-16443	Switch & Diode Assembly
b)	01-1168	Switch Mounting Bracket
c)	01-3670	Switch Plate
d)	03-7395	Switch Actuator
e)	4005-01003-12	Mach. Screw, 5-40 x 3/4"
f)	4405-01117-00	Nut 5-40 Hex.

A-15361
Tilt Mechanism Assembly



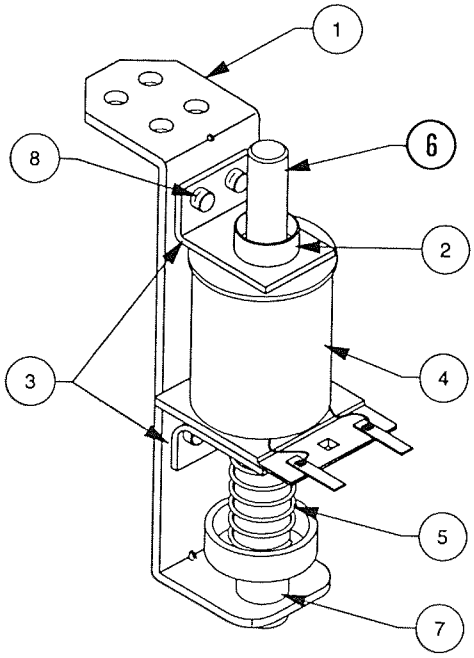
Item	Part Number	Description
1	A-15360	Mount Plate
2	01-3444	Bracket, Tilt Upper
3	01-3445	Bracket, Tilt Lower
4	03-8668	Pendulum
5	12-6231	Plumb Bob Wire
6	4006-01113-06	Mach. Screw, 6-32 x 3/8"
Associated Parts:		
7	20-6502-A	Plumb Bob
8	4406-01120-00	Wing Nut (2)

B-10686-1
Knocker Assembly



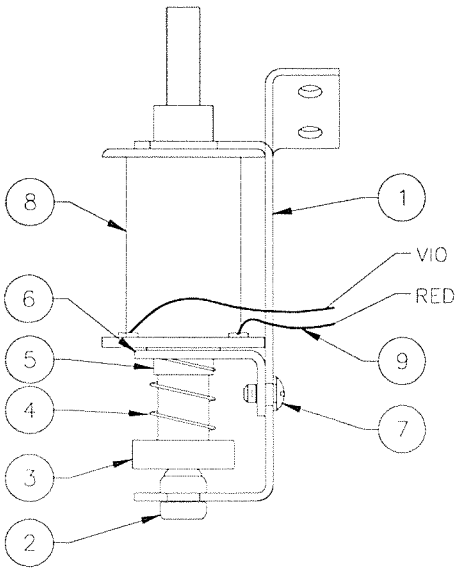
Item	Part Number	Description
1	A-5387	Coil Plunger Assembly
2	01-11273	Mounting Bracket Assembly
3	AE-23-800	Coil Sub-Assembly
4	01-8-508-T	Coil Retaining Bracket
5	23-6420	Rubber Grommet
6	4008-01017-04	Mach. Screw, 8/32 x 1/4"
7	H-11835	Knocker Cable
8	03-7067-5	Coil Tubing

A-17932
Disappearing Post Assembly



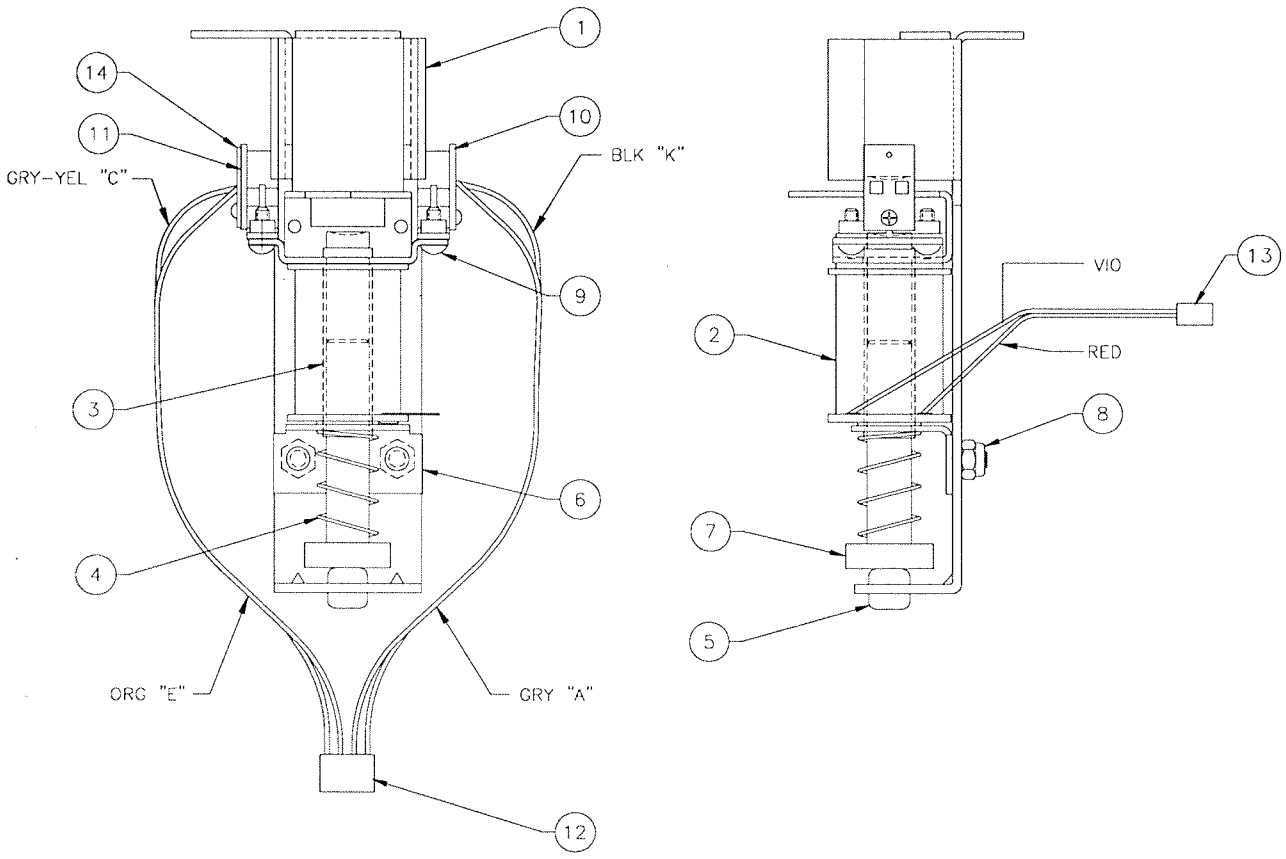
Item	Part Number	Description
1	01-12441	Diverter Post Bracket
2	03-7067-5	Coil Tubing
3	01-8-508-T	Coil Retainer Bracket
4	AE-27-1200	Coil Sub-Assembly
5	10-135	Spring
6	A-17986	Bell Armature Assembly
7	23-6420	Rubber Grommet
8	4008-01017-04	Mach. Screw, #8-32 x 1/4"

A-20435
Eject Assembly



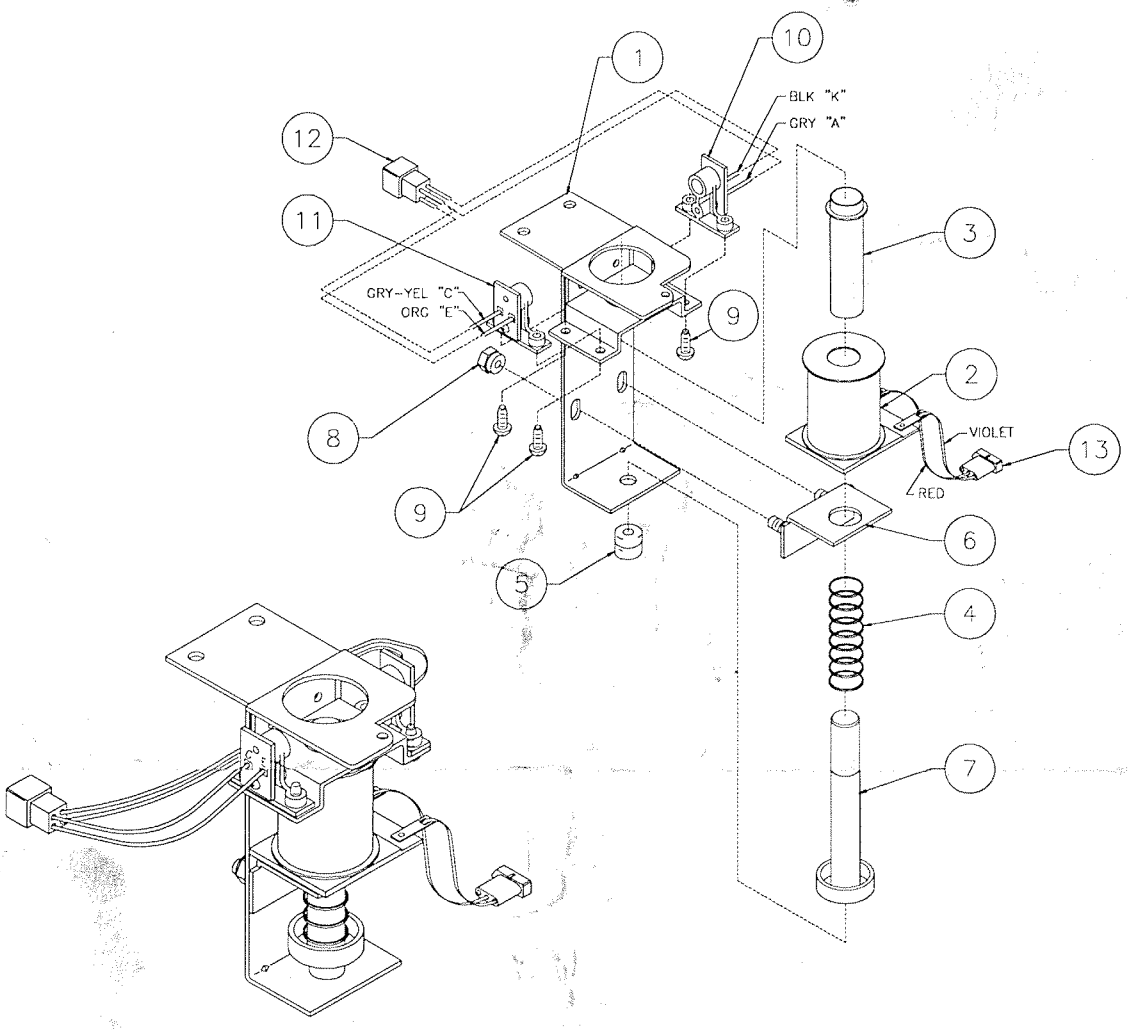
Item	Part Number	Description
1	01-14019	Eject Bracket
2	23-6420	Rubber Grommet
3	04-10207	Plunger Assembly
4	10-135	Spring
5	03-7067	Coil Tubing
6	01-8-508-T	Solenoid Bracket
7	4008-01017-04	Mach. Screw, 8-32 x ¼
8	AE-27-1200	Coil
9	H-19523	Cable

A-20488
Ball Popper Assembly



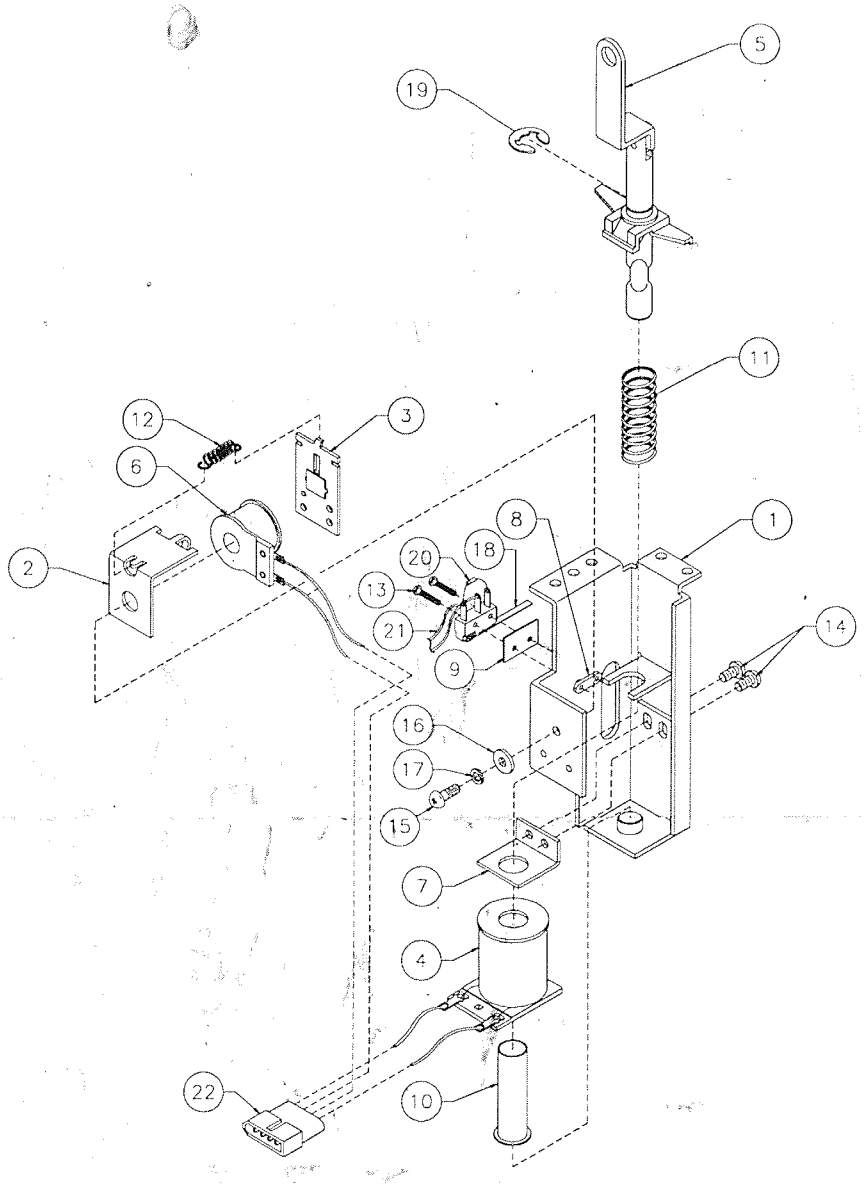
Item	Part Number	Description
1	04-10240.1	Ball Popper Sub-Assembly
2	AE-23-800	Coil Assembly
3	03-7067	Coil Tubing
4	10-135	Solenoid Spring
5	23-6420	Rubber Grommet
6	04-10086.1	Mounting Bracket
7	A-17767	Bell Armature Assembly
8	4408-01119-00	Nut, 8-32 ESN
9	4106-01013-06	Sh. Metal Screw, #6 x 3/8"
10	A-16908	LED Assembly-RTV
11	A-16909	Photo Transistor Assembly-RTV
12	A-17609-5	Opto Cable, Square
13	H-19523	Mini Coil Cable
14	01-11472	Insulator

A-19543
Ball Popper Assembly



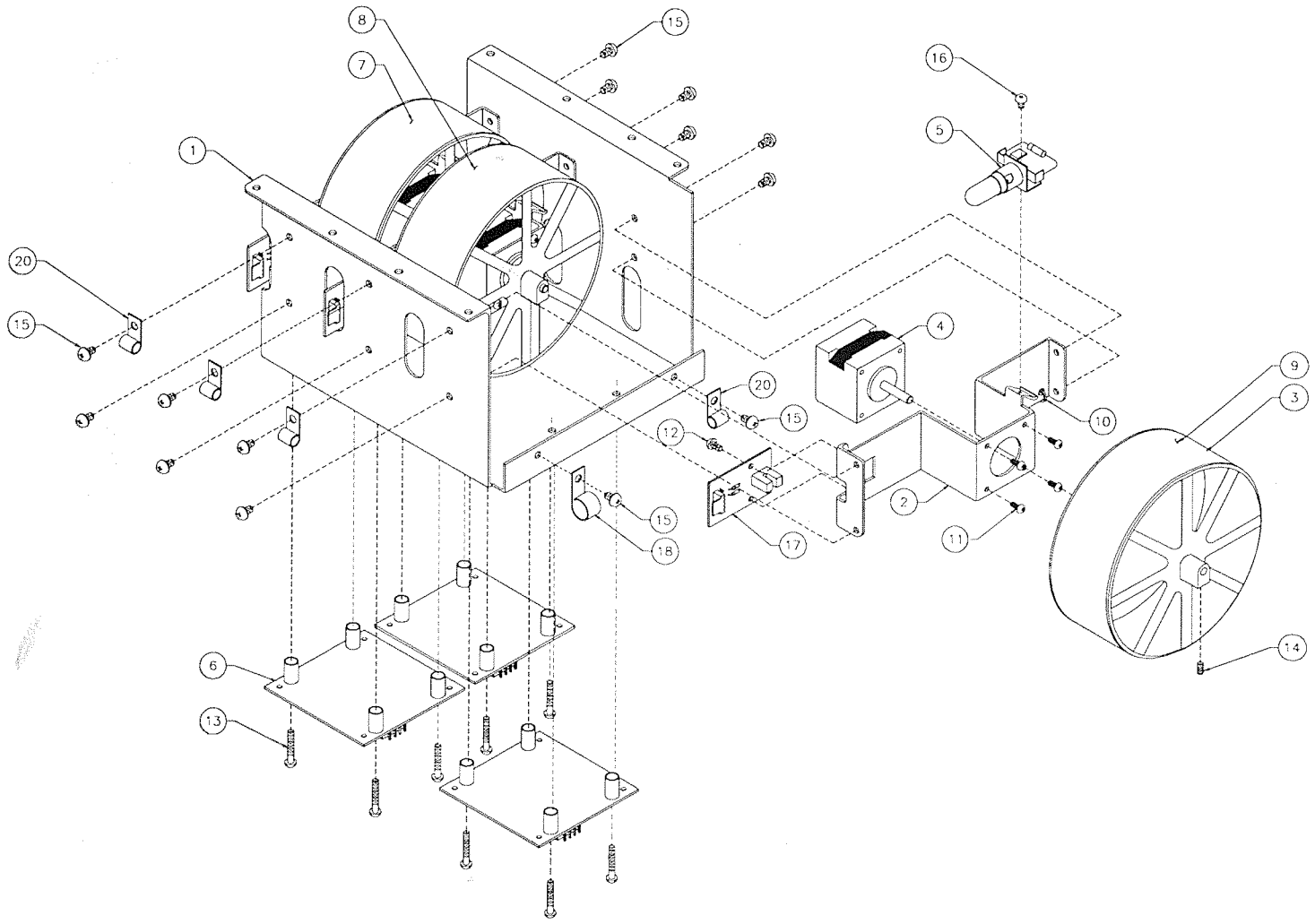
Item	Part Number	Description
1	A-19544.1	Mounting Bracket, Ball Popper
2	AE-24-900	Coil Assembly
3	03-7067	Coil Tubing
4	10-135	Spring
5	23-6420	Rubber Grommet
6	04-10086.1	Mounting Bracket
7	A-17767	Bell Armature Assembly
8	4408-01119-00	Nut, 8-32 ESN
9	4106-01013-06	SMS #6 x 3/8"
10	A-16908	LED Assembly - RTV
11	A-16909	Photo Transistor Assy. - RTV
12	H-17609-5	Opto Cable, Square
13	H-19523-1	Mini Coil Cable

A-20231
Lift Ramp Assembly



Item	Part Number	Description	Item	Part Number	Description
1	04-10093	Lift Bracket Sub-Assy.	12	10-96	Spring
2	A-6892	Frame & Eyelet	13	4002-01105-08	Mach. Screw, 2-56 x 1/2"
3	A-15821'	Armature Sub-Assembly	14	4008-01017-05	Mach. Screw, 8-32 x 5/16"
4	AE-26-1200	Coil Assembly Complete	15	4008-01021-07	Mach. Screw, 8-32 x 7/16"
5	A-16248	Post Lift Ramp Sub-Assy.	16	4700-00089-00	Flat Washer, 11/64 x 7/16 x16ga.
6	SM1-28-900-DC	Coil Assembly	17	4701-00003-00	Lockwasher #8 Split
7	01-9794	Coil Retain Bracket Assy.	18	5647-12693-36	Mini Switch
8	01-8240	Nut Plate	19	20-8712-43	"E"-Ring, 7/16" Shaft
9	01-8600	Insulator	20	5070-09054-00	Diode 1N4004
10	03-7066	Tubing	21	H-16437	Cable Assembly
11	10-437	Spring-Kicker	22	H-19692	Cable

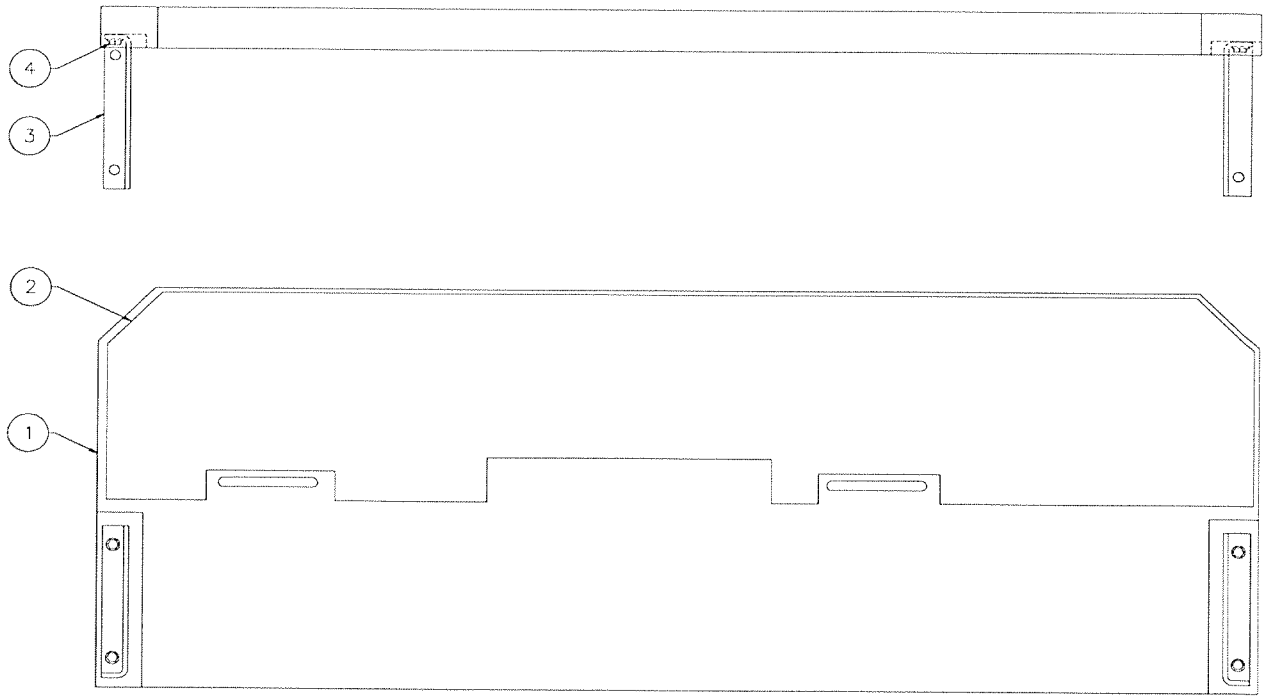
A-20425
Reel Assembly



Item	Part Number	Description	Item	Part Number	Description
1	01-14075	Reels Mounting Frame	11	4004-01003-04	Mach. Screw, 4-40 x 1/4" (12)
2	01-14076	Motor Mounting Bracket (3)	12	4006-01003-04	Mach. Screw, 6-32 x 1/4" (6)
3	03-9410.1	Reel (3)	13	4006-01003-14	Mach. Screw, 6-32 x 7/8" (12)
4	14-8024	Stepper Motor, 1.8 (3)	14	4006-01076-04	Set Screw, 6-32 x 1/4" (3)
5	A-20507	Socket & Bulb w/Diode (3)	15	4008-01003-04	Mach. Screw, 8-32 x 1/4" (14)
6	A-19745-1	Stepper Motor PCB w/Spacers (3)	16	4006-01003-03	Mach. Screw, 8-32 x 3/16" (3)
* 7	31-2517-3A	Decal, Left	17	A-20511	Reel Opto PCB Assembly (3)
* 8	31-2517-1A	Decal, Center	18	03-7655-8	Wire Harness Clip, 1/2"
* 9	31-2517-2A	Decal, Right	**19	H-20567	Cable
10	03-9454	Tie-Wrap - Nylon 3-7/8" (10)	20	03-7655-4	Wire Harness Clip, 1/4" (4)

* Not available for individual sale. Order Decal Set 31-2517.
** Not Shown.

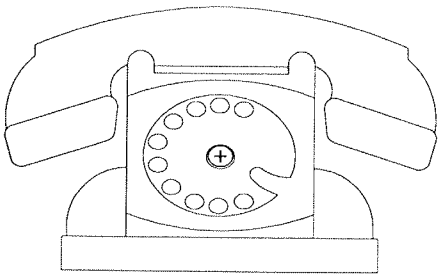
A-20522
Back Panel Assembly

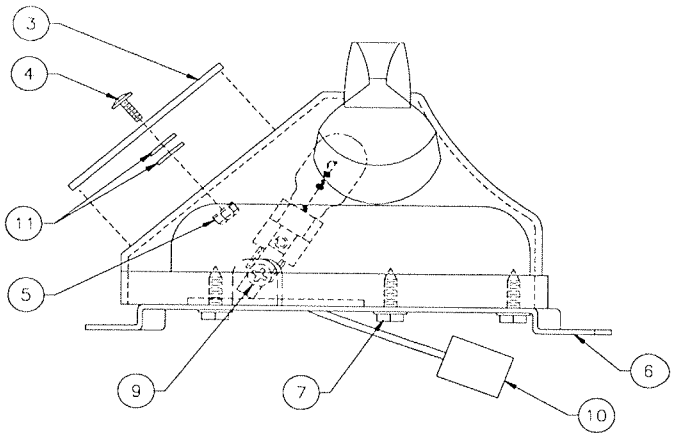


Item	Part Number	Description
1	11-831-50044.2	Back Panel Assembly
*2	31-2518-6	Decal
3	01-12569	Gusset Bracket
4	4008-01168-12	Mach. Screw, 8-32 x ¾"

* Not available for individual sale. Order Decal Set 31-2518.

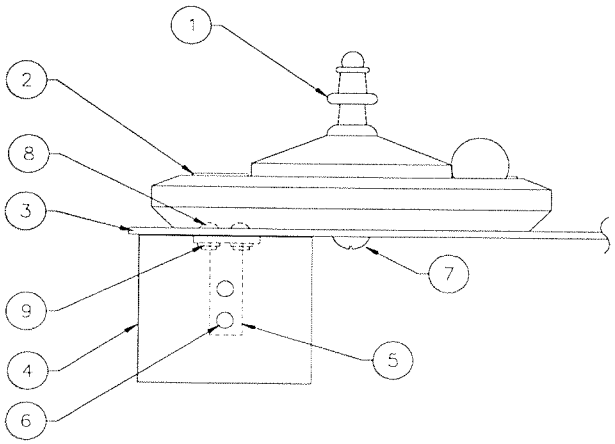
A-20574
Telephone Assembly





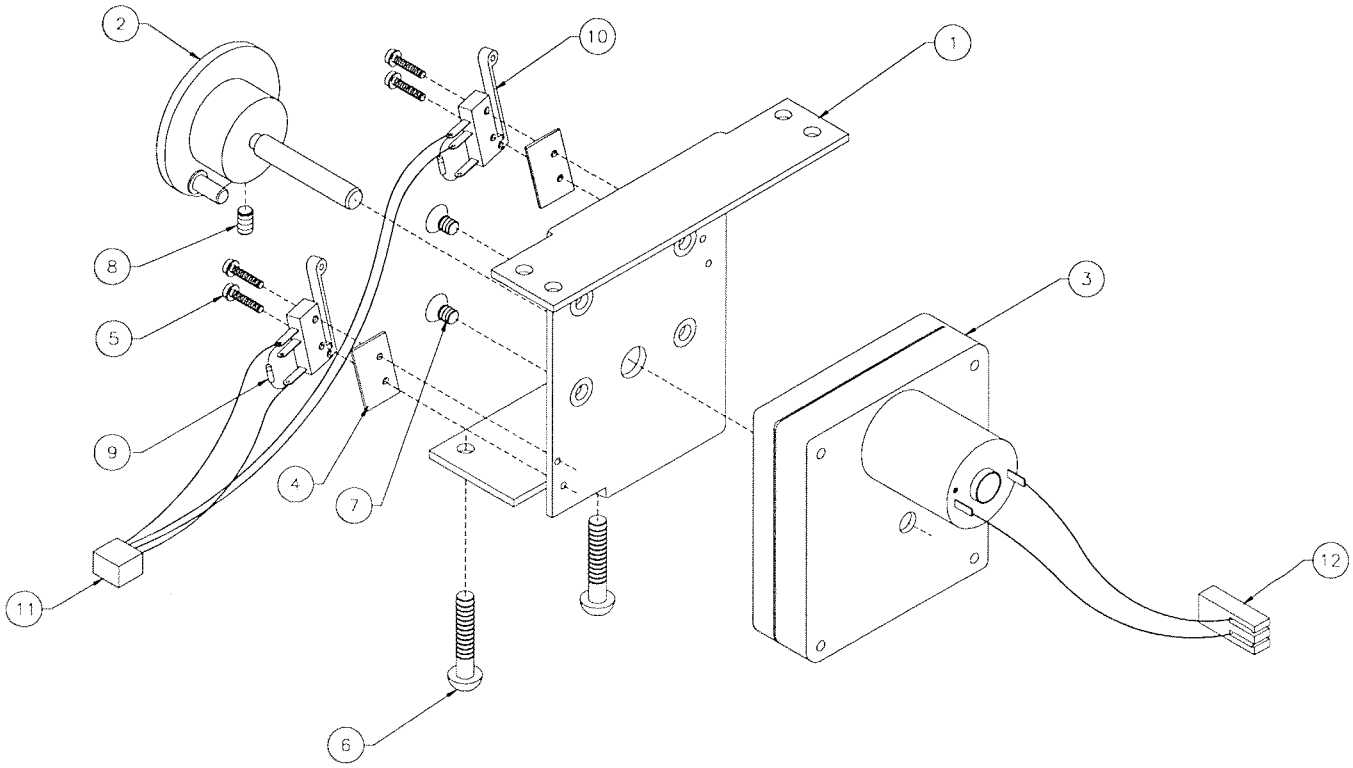
Item	Part Number	Description
1	03-9443.1	Telephone
2	4700-00011-00	Flat Washer, 11/64 x 7/16 x 16ga.
3	31-2509-26A	Playfield Plastic
4	4006-01027-10	Mach. Screw, #6-32 x 5/8"
5	4406-01119-00	Nut 6-32 ESNA
6	01-14134.1	Telephone Mounting Bracket
7	4808-01175-08	EP #8 x 1/2"
8	A-17802	Bulb & Socket
9	4006-01113-04	Mach. Screw, 6-32 x 1/2"
10	H-18219-1	Cable

A-20531-2
Roulette Assembly



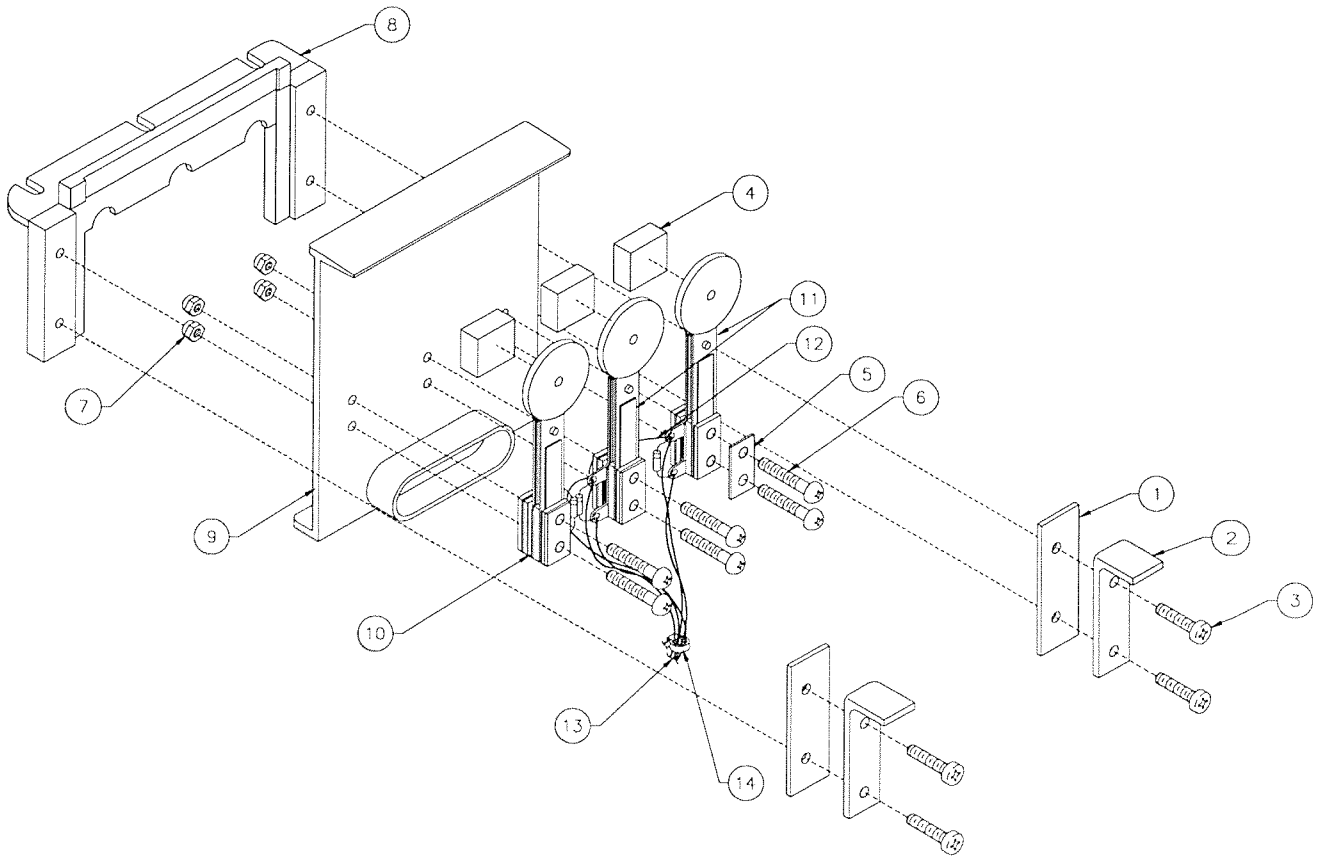
Item	Part Number	Description
1	03-9429	Roulette
2	31-2519-1	Roulette Decal
3	31-2509-11	Playfield Plastic
4	31-2509-16	Playfield Plastic
5	01-9878	Switch Mounting Bracket
6	07-6688-18N	Rivet, 1/8 x 3/16"
7	4106-01114-08	TCS #6 x ½"
8	07-6688-19N	Rivet, 1/8 x 7/32"
9	4700-00003-00	Flat Washer, 1/8x9/32x1/32"

A-20483
Motor Bracket Assembly



Item	Part Number	Description
1	04-10226	Motor Mounting Bracket
2	04-10080	Motor Cam Assembly
3	14-8026	3-Bank Target Motor
4	01-8600	Insulator (2)
5	4002-01105-07	Mach. Screw, 2-56 x 7/16" (4)
6	4010-01007-16	Mach. Screw, 10-32 x 1" (2)
7	4008-01041-04	Mach. Screw. 8-32 x 1/4" (4)
8	4008-01083-04	Set Screw, 8-32 x 1/4"
9	5070-09054-00	Diode 1N4004, 1.0Amp (2)
10	5647-12693-06	Sub Miniature Switch
11	H-20565	Cable
12	H-18600-1	Cable

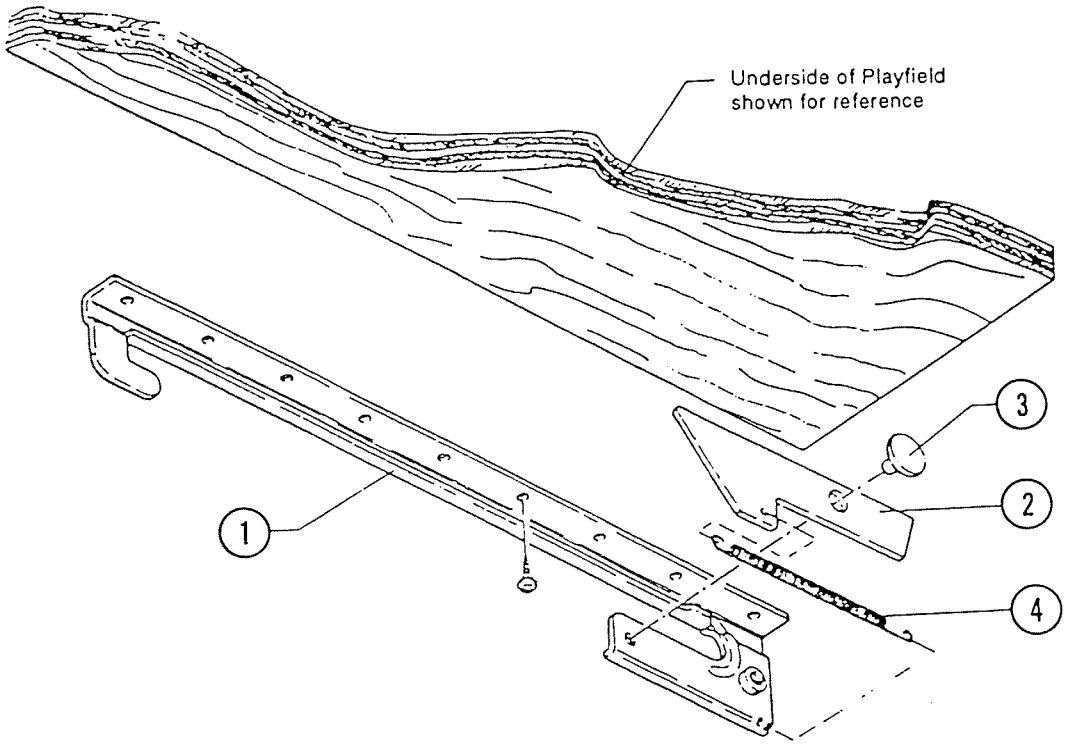
A-20512
3-Position Moving Target Assembly



Item	Part Number	Description
1	03-8028	Retainer Carrier (2)
2	01-8494	Support Bracket (2)
3	4106-01001-10	Sh. Metal Screw, #6 x 5/8" (4)
4	23-6534-9	Edge Protector
5	01-3670-1	Switch Plate - Flat (3)
6	4004-01003-12	Mach. Screw, 4-40 x 3/4" (6)
7	4404-01119-00	Nut 4-40 ESNA (6)
8	03-8235	Target Guide
9	03-8236	Carrier Target
10	SW-1A-197-5	Stationary Target Assembly
11	SW-1A-198-5	Stationary Target Assembly (2)
12	17-1116-3	Cut Wire 3"
13	A-20564	Cable
14	03-9454	Cable Tie

Playfield Slide Mechanism Assembly

(Left Assembly Shown)



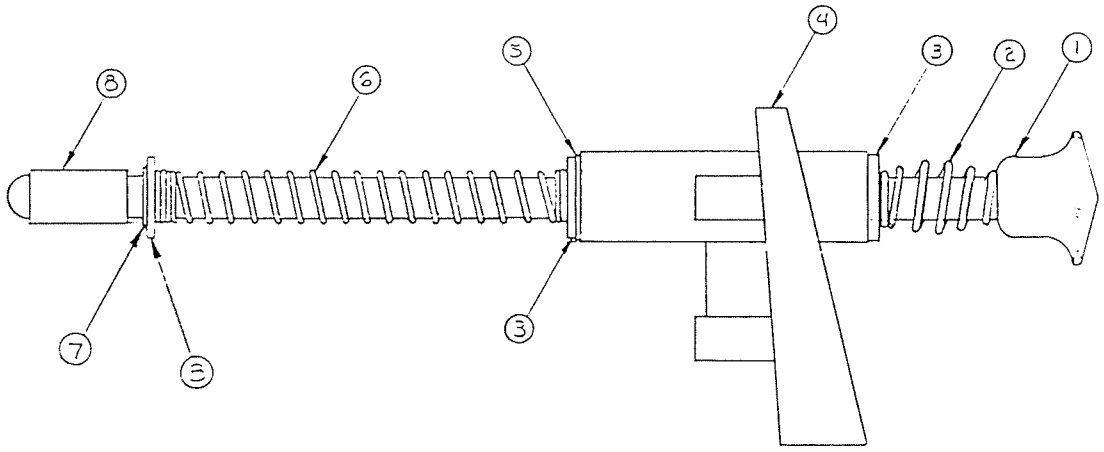
A-17749.1-1
Playfield Slide Mechanism
(Left Assembly)

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

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

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

B-12445-7
Ball Shooter Assembly

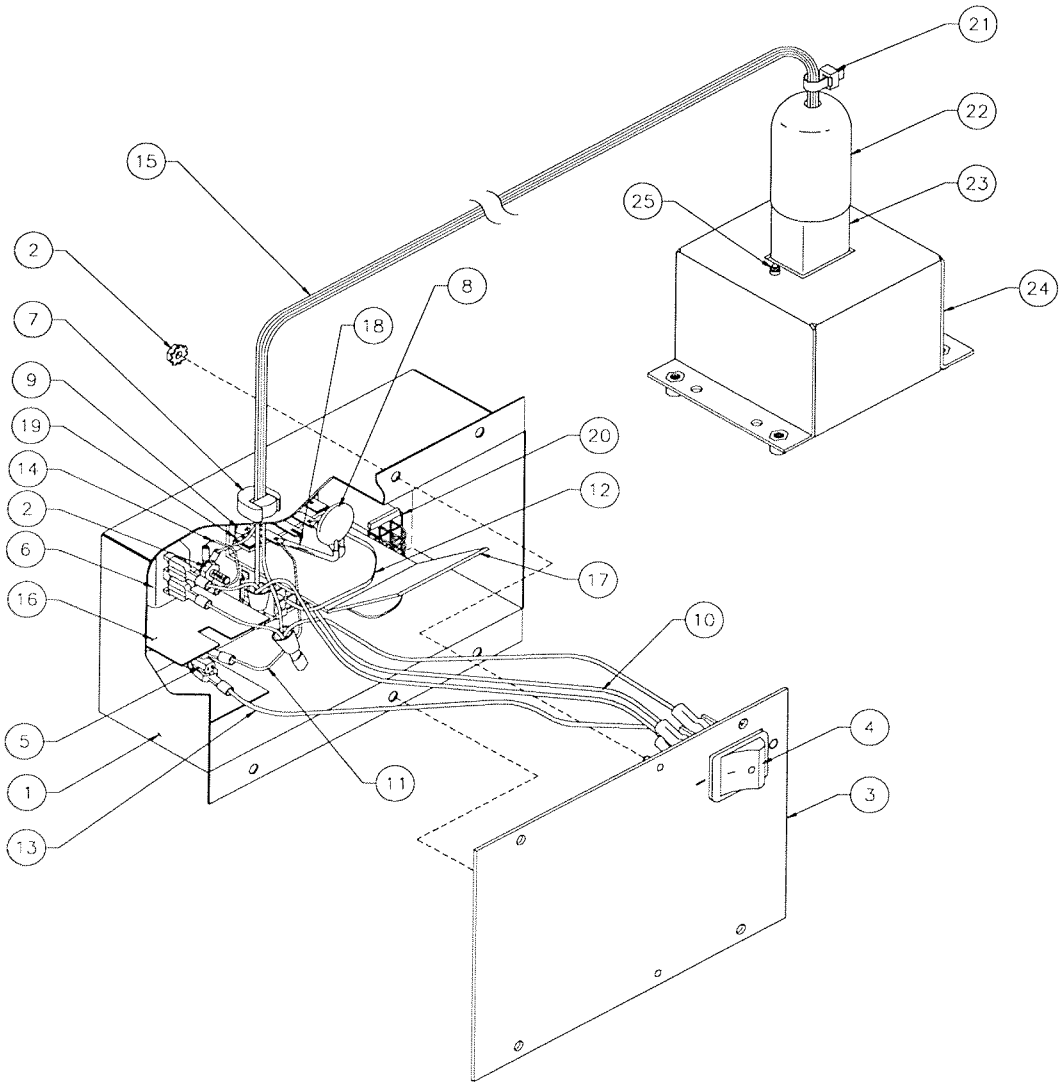


Item	Part Number	Description
1	20-9253-7	Ball Shooter Rod
2	10-149	Outer Spring
3	4700-00051-00	Flat Washer, 25/64 x 5/8 x 16ga.
4	21-6645-1	Shooter Housing
5	03-7357	Shooter Sleeve
6	10-148-7	Power Spring, White
7	20-8712-37	Ball Shooter Tip
8	23-6327	

Associated Assemblies:
(Not Shown)

9	01-3535	Mounting Plate
10	4010-01006-08	Mach. Screw, 10-32 x ½"

A-17540-1
Universal Power Interface Assembly



Item	Part Number	Description
1	04-10292	Power Control Chassis Box
2	4406-01128-00	Nut #6-32 KEPS (3)
3	01-12294	Switch Mounting Plate Assembly
4	5642-13935-00	Power Switch
5	5733-14734-00	Fuse Holder Panel (5x20mm)
6	5851-13867-00	Outlet-IEC Conn. 237 Socket
7	03-8712	Strain Relief Bushing
8	5016-12978-00	Thermistor 8A., 2.5R25
9	4006-01003-10	Mach. Screw, #6-32 x 5/8"
10	H-17992	Jumper Cable Neutral Sw/1FC
11	H-17543	Hot Jumper Black Cable
12	H-17546	Jumper Interface Hot Black Cable
13	H-17545	Jumper Switch/Fuse Black Cable

Item	Part Number	Description
14	H-17542	Ground Jumper Grn/Yel Cable
15	5797-13940-01	Jumper Cable
16	01-10623	Insulator, Thermistor
17	01-12299	Insulator, Terminal Strip
18	RM-21-06	#18 Vinyl Fgls
19	5822-13865-00	Terminal Strip 3-CKT 2-Mtg.
20	H-18050	Jumper Cable, Transformer Prog.
21	03-7933	Ty-Wrap Nylon
22	20-9682-1	Boot w/9-32 Dia. Hole
23	5102-13864-00	Line Filter w/IEC Connector
24	04-10293	Line Filter Chassis Box
25	4004-01003-05	Mach. Screw, #4-40 x 5/16" (2)

Universal Power Interface/Cordset Application Chart

COUNTRY	UNIVERSAL POWER 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	√		√					√	√		√	√								
CANADA	√	√						√	√			√								
TAIWAN	√		√					√	√			√								
MEXICO	√		√					√	√			√								
CENTRAL AMERICA	√		√					√	√			√								
SOUTH KOREA	√		√					√	√			√								
PUERTO RICO	√		√					√	√			√								
AUSTRIA	√			√		√	√			√			√							
BELGIUM	√			√		√	√			√			√							
FINLAND	√			√		√	√			√			√							
FRANCE	√			√		√	√			√			√							
GREECE	√			√		√	√			√			√							
HOLLAND	√			√		√	√			√			√							
HUNGARY	√			√		√	√			√			√							
NETHERLANDS	√			√		√	√			√			√							
NETH. ANTILLES	√			√		√	√			√			√							
NORWAY	√			√		√	√			√			√							
POLAND	√			√		√	√			√			√							
PORTUGAL	√			√		√	√			√			√							
SPAIN	√			√		√	√			√			√							
SWEDEN	√			√		√	√			√			√							
TURKEY	√			√		√	√			√			√							
WEST GERMANY	√			√		√	√			√			√							
UNITED KINGDOM	√			√		√	√			√				√						
IRELAND	√			√		√	√			√				√						
HONG KONG	√			√		√	√			√				√						
DENMARK	√			√		√	√			√					√					
ITALY	√			√		√	√			√						√				
CHILE	√			√		√	√			√						√				
PEOPLE'S REP. OF CHINA	√			√		√	√			√						√				
SWITZERLAND	√			√		√	√			√							√			
AUSTRALIA	√			√		√	√			√								√		
NEW ZEALAND	√			√		√	√			√								√		
ARGENTINA	√			√		√	√			√										
JAPAN	√				√			√	√										√	√

Unique Game Assemblies

Backbox

A-12697-4	WPC Power Driver PCB Assy.
A-16917-50044	WPC Sound Board Assy.
A-17651-50044	WPC CPU Security Assy.
A-20449	Speaker/Display Assy.
A-8552-50044	Backglass Translite Assy.
04-10012-50044	Backbox Assembly

Playfield

A-13204-50044	Bottom Arch Assembly
A-16816-7	Standup Target Assy., Oblong Black
A-2[illegible]1	Lift Ramp Coil & Bracket Assembly
A-20419	Plastic Trough Assembly
A-20420	Main Ramp Assembly
A-20421	Right Ramp Assembly
A-20425	Reel Ramp Assembly
A-20426	Center Ramp Assembly
A-20431	Ball Gate Assembly
A-20435	Eject Assembly
A-20439	Shooter Lane Auto Kicker Assy.
A-20483	Motor & Bracket Assembly
A-20487	Bottom Trough Assembly
A-20488	Ball Popper Assembly
A-20491	Trough Assembly
A-20493	Spin Target Assembly
A-20494	Lift Ramp Assembly
A-20505-6	Two Target Assembly, Op. Yellow
A-20512	3-Position Moving Target Assembly
A-20521	Left Ball Gate Assembly
A-20522	Back Panel Assembly
A-20523	Hood & Light Assembly
A-20527-1	11-Lamp PCB Assy. w/Spacers
A-20529-1	7-Lamp PCB Assy. w/Spacers
A-20530-1	19-Lamp PCB Assy. w/Spacers
A-20531-1	Playfield Plastic Assy.
A-20531-2	Playfield Plastic Assy.
A-20531-3	Playfield Plastic Assy.
A-20557	Ball Popper Ball Guide Assy.
A-20574	Telephone Assembly
A-20575-5	Standup Target Assy.
A-20613-1	5-Lamp PCB Assy. w/Spacers
A-20659	Reflector/Light & Cable Assy.
A-20660	Playfield Plastic Assy.
H-20661	Playfield Switch Cable
H-20662	Playfield Lamp Cable
H-20663	Playfield Solenoid Cable
01-14034.1	Ball Guide #1
01-14040	Ball Guide #7

Playfield (continued)

01-14036	Ball Guide #3
01-14039	Ball Guide #6
01-14044	Ball Guide #11
01-14053	Plate Nut
01-14064	Ramp Support Bracket
01-14087	Ball Deflector
01-14117	Back Panel Bracket
02-4250-23	M-F Spacer 6-32 x 1-7/16
02-4765-21	Post, 10-32 x 3.88"
02-5049-10	F-F Spacer 8-32 x 2.75"
02-5049-6	F-F Spacer 8-32 x 1.62"
02-5049-8	F-F Spacer 8-32 x 1.38"
02-5049-9	F-F Spacer 8-32 x 2.56"
02-5217	Pin Pivot Ramp
04-10241.1	Hood
04-10262.1	Ball Guide #2
04-10263	Ball Guide #4
04-10264	Ball Guide #5
04-10267	Ball Guide #12
04-10283	Decal & Window Assembly
11-1301-1A,-2,-3	Wood Rail
12-7305	Ball Guide Wireform
31-2509-	Playfield Plastic Set
31-2516-1A	Scoop Decal
31-2516-2	Center Ramp Decal
31-2516-4	Main Ramp Decal
31-2516-5	Main Ramp Decal
31-2516-6	Main Ramp Decal
31-2517-1A	Left Reel Decal
31-2517-2A	Center Reel Decal
31-2517-3A	Right Reel Decal
31-2518-1	Hood Decal
31-2518-2	Hood Decal
31-2518-3	Ramp Decal
31-2518-4	Ramp Decal
31-2518-5	Roulette Bracket Decal
31-2518-6	Back Panel Decal
31-2519-1	Roulette Wheel Decal
31-2520-1	Target Decal
31-2520-2	Target Decal
31-2528	Playfield Plastic
31-2539	Playfield Plastic

Cabinet

A-17540-1	Universal Power Interface Assy.
H-20593	Cabinet Switch/Lamp Cable
11-1303	Wood Cabinet

Posts

Part Number	Description
02-4424-1	Post Fastener, 6-32/8-32"
02-4424-2	Post Fastener, 8-32/8-32 x 9/32"
02-4434	Post Spacer #8 x 1"
02-4436	Post Spacer #8 x 1-3/16"
02-4659-1	Post #10 (3/8 Deep MS)
02-4660	Post Single Bumper #10
02-4765-2	Post 10-32 x 2.75"
02-4765-21	Post, 10-32 x 3.88"
02-4842	Post Bumper Threaded
02-5049-6	F-F Spacer, 8-32 x 1.62"
02-5049-8	F-F Spacer, 8-32 x 1.38"
02-5049-9	F-F Spacer, 8-32 x 2.56"
02-5049-10	F-F Spacer, 8-32 x 2.75"
02-5107	Adjusting Post
03-8319-9	Post #8 Starred Tr. Red

Upper Playfield Parts

Item No.	Part Number	Description
1	01-9211	**Playfield Hanger Bracket
2	01-13638	Bottom Arch Ball Guide
3	A-16998.1	*Opto P.C.B.
4	A-15849-L-4	Flipper Assembly Complete
	20-10110-5	Flipper Bat w/Shaft, White
5	03-9216-12	Flipper Return Guide (2)
6	A-17813	Rollover Switch Assembly
7	A-17801	Kicker Count Switch Assembly
8	A-17811	Slingshot Kicker Assembly
	B-9362-L-2	Coil & Bracket Assembly
	10-128	Kicker Spring
9	02-5049-8	Post 1.38"
10	02-5107	Adjusting Post
11	01-14036	Ball Guide
13	A-17985-L	Eject Switch Assembly
	A-20435	Eject Assembly
14	A-17799-15	Round Standup Target, Red
15	04-10262.1	Ball Guide
16	A-20531-1	Playfield Plastic Assembly
18	02-4250-23	Spacer 1 7/16"
19	A-20659	Reflector/Light & Cable Assembly
20	A-20521	Ball Gate Assembly, Left
21	04-10283	Decal & Window Assembly
22	01-14053	Nut Plate
23	A-20575-5	Round Standup Target, White (4)
24	A-20426	Center Ramp Assembly
25	A-20483	*Motor & Bracket Assembly
26	A-15340	*Motor EMI w/Brake Assembly
27	A-20512	Moving Target Assembly
	02-4259	Roller
28	A-18530-4	Oblong Standup Target, Red
29	A-20531-3	Playfield Plastic Assembly
30	02-10267	Ball Guide
31	02-10263	Ball Guide
32	02-10264	Ball Guide
33	01-14039	Ball Guide
34	A-17838	Stud Plate
	02-5049-9	Post 2.56"
35	01-14087	Ball Deflector
36	A-20574	**Telephone Assembly
37	02-4765-21	Post 3.88"
38	A-20420	Main Ramp Assembly
39	A-17932	Disappearing Post Assembly
40	A-20522	Back Panel Assembly
41	02-5049-10	Spacer 2.75"
42	A-20531-2	**Roulette Plastic Assembly
43	A-19543	Ball Popper Assembly
	04-10241.2	Top Hood Assembly
44	A-9415-2	Jet Bumper Coil Assembly
	A-12753-2	Lug & Diode Assembly
	B-9414-3	Jet Bumper Assembly, Red
	B-12030-2	Jet Bumper Leaf Switch Assy
	03-8254-9	Jet Bumper Cap, Red
	23-6710-1	Clear Tubing
45	01-14064	*Ramp Support Bracket
46	A-20531-4	Playfield Plastic Assembly
47	A-20557	Ball Popper Ball Guide Assembly
49	02-5217	Lift Ramp Pin
	12-6227	Hair Pin Clip (2)
50	01-14044	Ball Guide
51	A-20231	Lift Ramp Coil & Bracket
	12-6227	Hair Pin Clip
52	A-20494	Lift Ramp Assembly
53	A-20493	Spin Target Assembly
54	A-16817-7	Oblong Standup Target, Black
55	02-4765-2	Post 2.75"
56	01-14040	Ball Guide
57	A-20505-6	Dual Target Assembly, Yellow
58	A-20425	Reel Assembly
59	A-17838	Stud Plate
	02-5049-6	Spacer 1.62"
60	A-20421	Right Ramp Assembly
61	A-20488	Ball Popper Assembly
	A-20523	Hood & Light Assembly
62	A-20431	Ball Gate Assembly
63	12-7305	Ball Guide Wireform
64	A-17811	Slingshot Coil & Bracket
	B-9362-R-3	Coil & Bracket Assembly
	10-128	Kicker Spring
65	01-14034	Ball Guide
66	A-15802-P	**Level
67	A-14876-R-5	Flipper Assembly Complete
	20-10110-5	Flipper Bat w/Shaft, White
68	A-19963-1	Trough Assembly
69	A-20439	**Shooter Lane Auto-Kicker Assy
70	01-14117	**Back Panel Bracket
71	01-14237	*Ball Deflector Bracket

NOT SHOWN:

A-13204-50044	Bottom Arch Assembly
A-17812-2	Cable Mounting Bracket ½"
A-17812-4	Cable Mounting Bracket 1"
A-20419	Under Playfield Trough Assy
A-20487	Bottom Trough Assembly
A-20491	Trough Assembly
A-20660	Playfield Plastic Assembly
03-9459-1	Jet Bumper Area Mylar
03-9459-2	Full Playfield Mylar
03-9459-3	Ramp Drop Area Mylar
03-9459-4	Ramp Drop Area Mylar
36-50044	†Screened Playfield

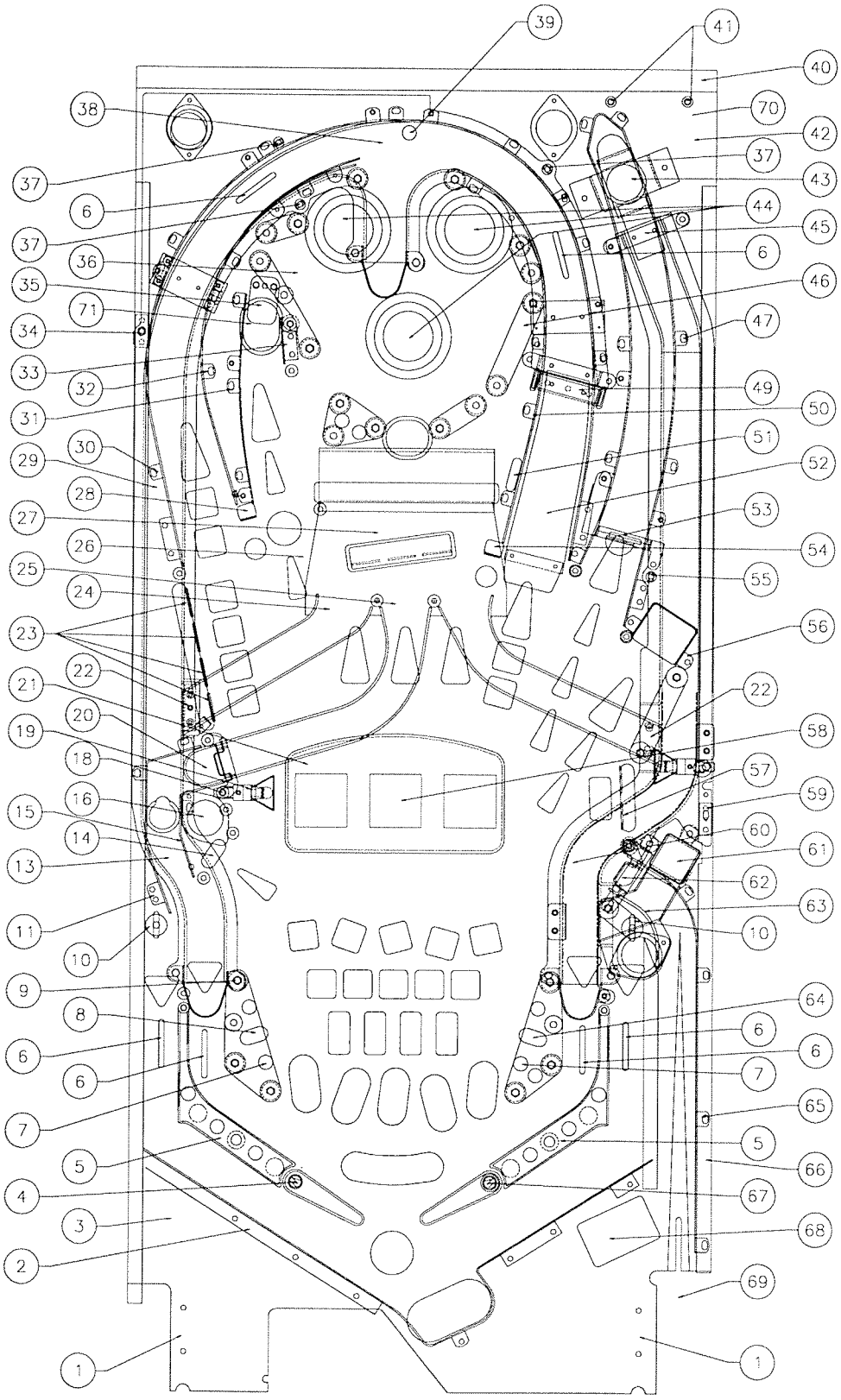
MISCELLANEOUS:

*Located under playfield.

** Not Shown

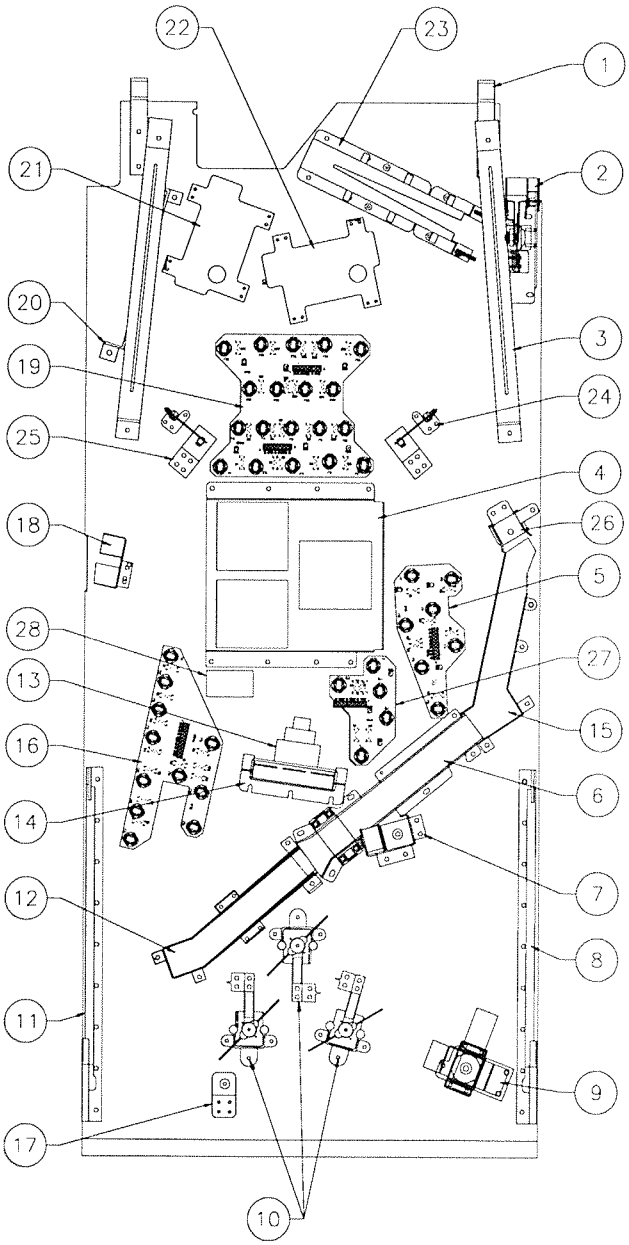
†The WHO DUNNIT hardcoat playfield does not require a full mylar. However, mylars can be purchased through your local Bally Distributor.

Upper Playfield Parts



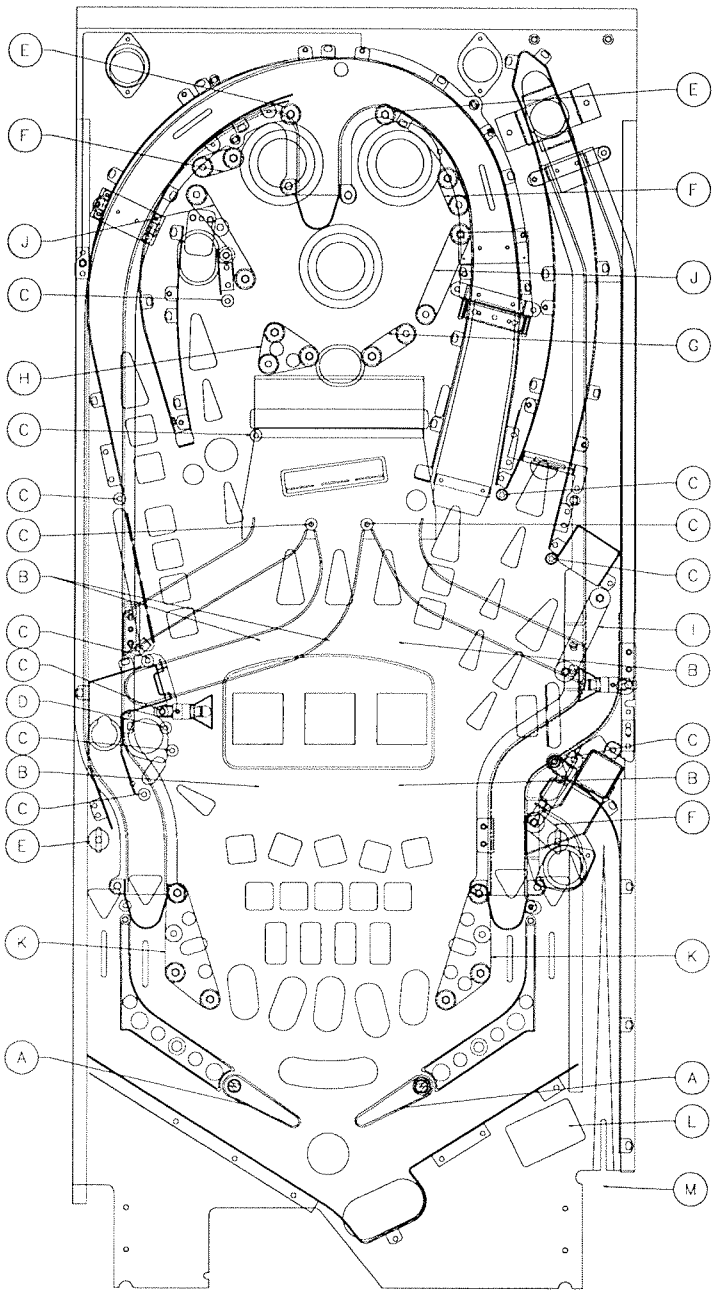
Lower Playfield Parts

Item	Part Number	Description
1	01-9211	Playfield Hanger Bracket Assy.
2	A-20439	Shooter Lane Auto Kicker Assy.
3	01-11781	Support Bracket Assembly (2)
4	A-20425	Reel Assembly
5	A-20529	7-Lamp PCB Assembly
6	A-20419	Plastic Trough Assembly
7	A-20231	Lift Ramp Assembly
8	A-17749.1-2	Slide Playfield Assembly, Right
9	A-19543	Ball Popper Assembly
10	A-9415-2	Jet Bumper Coil Assembly
11	A-17749.1-1	Slide Playfield Assembly, Left
12	A-20491	Trough Assembly
13	A-20483	Motor Bracket Assembly
14	A-20512	3-Position Moving Target Assy.
15	A-20487	Bottom Trough Assembly
16	A-20527	11-Lamp PCB Assembly
17	A-17932	Disappearing Post Assembly
18	A-20435	Eject Assembly
19	A-20530	19-Lamp PCB Assembly
20	A-17223	16-Opto PCB w/Bracket Assy.
21	A-15849-L-4	Flipper Assembly Complete
22	A-14876-R-5	Flipper Assembly Complete
23	A-19963-1	Ball Trough Assembly w/Cables
24	A-17811	Kicker Arm Assembly
a)	A-9362-R-3	Coil & Bracket Assembly
25	A-17811	Kicker Arm Assembly
a)	B-9362-L-2	Coil & Bracket Assembly
26	A-20488	Ball Popper Assembly
27	A-20163	5-Lamp PCB Assembly
28	A-15340	Motor EMI w/Brake PCB Assy.



Underside of Playfield, Viewed in Raised Position

Rubber Rings



Item No.	Part Number	Description.	Qty
A	23-6519-4	Flipper Ring, Red	2
B	23-6535	Grommet, White	5
C	23-6556	Black Sleeve	12
D	23-6694-1	Rubber Grommet 3/32"	1
E	23-6694-3	Rubber Ring 5/16"	3
F	23-6694-5	Rubber Ring 3/4"	3

Item No.	Part Number	Description.	Qty
G	23-6694-6	Rubber Ring 1"	1
H	23-6694-7	Rubber Ring 1 1/4"	1
I	23-6694-8	Rubber Ring 1 1/2"	1
J	23-6694-9	Rubber Ring 2"	2
K	23-6694-10	Rubber Ring 2 1/2"	2
L	23-6702	Bumper Pad	1
M	23-6327	Rubber Tip	1

LAMP MATRIX

Yellow (B+) → Red

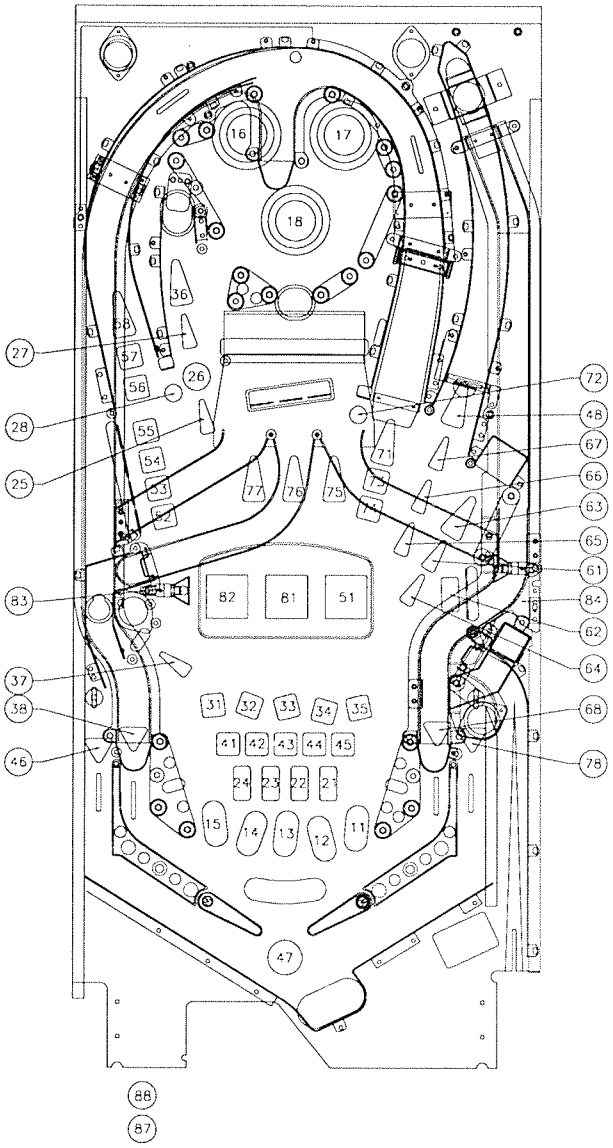
Row \ Column	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-9 Q91
1 Red-Brown J133-1 Q90	TRIXIE 11	MAP 21	CASE 1 31	BULLET 41	SLOT RIGHT 51	RIGHT JACKPOT 61	RIGHT LOOP MARK 71	SLOT CENTER 81
2 Red-Black J133-2 Q89	BRUNO 12	FLASHLIGHT 22	CASE 2 32	MIRROR 42	T A X (I) 52	PENTHOUSE KEY 62	BLACK 72	SLOT LEFT 82
3 Red-Orange J133-4 Q88	BUTLER 13	MAGNIFYING GLASS 23	CASE 3 33	DAGGER 43	T A (X) I 53	RIGHT HOLE MARK 63	TRAIN COMBOS 73	LEFT SPOT 83
4 Red-Yellow J133-5 Q87	VICTORIA 14	REVOLVER 24	CASE 4 34	PRINT 44	T (A) X I 54	RIGHT SPIN 64	RIGHT TAXI CHASE 74	RIGHT SPOT 84
5 Red-Green J133-6 Q86	TONY 15	LEFT SPIN 25	CASE 5 35	MATCHES 45	(T) A X I 55	ROULETTE 65	DOWN ELEVATOR 75	NOT USED 85
6 Red-Blue J133-7 Q85	LEFT JET BUMPER 16	EXTRA BALL 26	LEFT HOLE MARK 36	LEFT FREE SPIN 46	LEFT TAXI CHASE 56	MIDDLE SPIN 66	EXIT ELEVATOR 76	NOT USED 86
7 Red-Violet J133-8 Q84	RIGHT JET BUMPER 17	WHO DUNNIT 27	MYSTERY 37	SHOOT AGAIN 47	NUDGE SLOTS 57	LEFT JACKPOT 67	UP ELEVATOR 77	BUY-IN BUTTON 87
8 Red-Gray J133-9 Q83	BOTTOM JET BUMPER 18	RED 28	LEFT LITE TAXI 38	RIGHT LANE MARK 48	LEFT LOOP MARK 58	RIGHT LITE TAXI 68	RIGHT FREE SPIN 78	START 88

J1XX = Power Driver Board

Lamp Locations

Item No.	Bulb No.	Lamp Assy. No.	Description
11	24-8768	A-20530	Trixie
12	24-8768	A-20530	Bruno
13	24-8768	A-20530	Butler
14	24-8768	A-20530	Victoria
15	24-8768	A-20530	Tony
16	24-8768	B-9414-3	Left Jet Bumper
17	24-8768	B-9414-3	Right Jet Bumper
18	24-8768	B-9414-3	Bottom Jet Bumper
21	24-8768	A-20530	Map
22	24-8768	A-20530	Flashlight
23	24-8768	A-20530	Magnifying Glass
24	24-8768	A-20530	Revolver
25	24-8768	A-20527	Left Spin
26	24-8768	A-20527	Extra Ball
27	24-8768	A-20527	Who Dunnit
28	24-8768	A-20527	Red
31	24-8768	A-20530	Case 1
32	24-8768	A-20530	Case 2
33	24-8768	A-20530	Case 3
34	24-8768	A-20530	Case 4
35	24-8768	A-20530	Case 5
36	24-6549	A-18735	Left Hole Mark
37	24-6549	A-17835	Mystery
38	24-6549	A-17835	Left Lite Taxi
41	24-8768	A-20530	Bullet
42	24-8768	A-20530	Mirror
43	24-8768	A-20530	Dagger
44	24-8768	A-20530	Print
45	24-8768	A-20530	Matches
46	24-6549	A-18735	Left Free Spin
47	24-6549	A-17807	Shoot Again
48	24-6549	A-17801	Right Lane Mark
51	24-6549	A-20507	Slot Right
52	24-8768	A-20527	T A X (I)
53	24-8768	A-20527	T A (X) I
54	24-8768	A-20527	T (A) X I
55	24-8768	A-20527	(T) A X I
56	24-8768	A-20527	Left Taxi Chase
57	24-8768	A-20527	Nudge Slots
58	24-8768	A-20527	Left Loop Mark

Lamp Locations (Continued)



Item No.	Bulb No.	Lamp Assy. No.	Description
61	24-8768	A-20529	Right Jackpot
62	24-8768	A-20529	Key
63	24-8768	A-20529	Right Hole Mark
64	24-8768	A-20529	Right Spin
65	24-8768	A-20529	Roulette
66	24-8768	A-20529	Middle Spin
67	24-8768	A-20529	Left Jackpot
68	24-6549	A-18735	Right Lite Taxi
71	24-8768	A-20613	Right Loop Mark
72	24-8768	A-20613	Black
73	24-8768	A-20613	Train Combos
74	24-8768	A-20613	Right Taxi Chase
75	24-8768	A-20613	Down Elevator
76	24-6549	A-17835	Exit Elevator
77	24-6549	A-17807	Up Elevator
78	24-6549	A-18735	Right Free Spin
81	24-6549	A-20507	Slot Center
82	24-6549	A-20507	Left Slot
83	24-8768	A-20659	*Left Spot
84	24-8768	A-20659	*Right Spot
85-86	---	---	Not Used
87	---	20-9663-18	Buy-In
88	---	20-9663-1	Start

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

*Not Shown

SWITCH MATRIX

White → | ○ Green

Dedicated Grounded Switches	Row \ Column	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	3-BANK POSITION 2 11	SLAM TILT 21	TROUGH JAM 31	TOP LEFT HOLE 41	LOCK UP 1 51	LEFT SLING 61	TOP 2-BANK 71	NOT USED 81	Black-Green J906-1 Right Flipper EOS F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	SLOT INDEX LEFT 12	COIN DOOR CLOSED 22	TROUGH 1 32	POST JETS 42	TOP 4-BANK 52	RIGHT SLING 62	BOTTOM 2-BANK 72	NOT USED 82	Black-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	START BUTTON 13	BUY-IN BUTTON 23	TROUGH 2 33	BACK RIGHT POPPER 43	2ND 4-BANK 53	LEFT JET 63	3-BANK POSITION UP 73	NOT USED 83	Black-Blue J906-3 Left Flipper EOS F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH 3 34	LOWER RIGHT POPPER 44	3RD 4-BANK 54	BOTTOM JET 64	UP DOWN RAMP 74	NOT USED 84	Black-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function: Ser Credits; Test Function: Esc D5	5 White-Green J209-5 U19-11	SHOOTER LANE 15	SLOT INDEX CENTER 25	TROUGH 4 35	NOT USED 45	BOTTOM 4-BANK 55	RIGHT JET 65	SCOOP CENTER 75	NOT USED 85	Black-Violet J906-4 Spinner F5
Orange-Blue (6) J205-7 Normal Function: Vol Down; Test Function: Down D6	6 White-Blue J209-7 U19-9	RIGHT OUTLANE 16	LEFT INLANE 26	ENTER RAMP 36	NOT USED 46	MYSTERY TARGET 56	LEFT 3-BANK 66	SCOOP RIGHT 76	NOT USED 86	Black-Yellow J905-3 Upper Right Flipper Opto F6 (NOT USED)
Orange-Violet (7) J205-8 Normal Function: Vol Up; Test Function: Up D7	7 White-Violet J209-8 U19-5	RIGHT INLANE 17	LEFT OUTLANE 27	MADE RAMP LEFT 37	ENTER RIGHT HOLE 47	LOWER RIGHT LOCK 2 57	CENTER 3-BANK 67	SCOOP LEFT 77	NOT USED 87	Black-Gray J906-5 Upper Left Flipper EOS F7 (NOT USED)
Orange-Gray (8) J205-9 Normal Function: Begin Test; Test Function: Enter D8	8 White-Gray J209-9 U19-7	RIGHT LOOP 18	LEFT LOOP 28	NOT USED 38	SLOT INDEX RIGHT 48	RED 58	RIGHT 3-BANK 68	BLACK 78	NOT USED 88	Black-Blue J905-5 Upper Left Flipper Opto F8 (NOT USED)

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

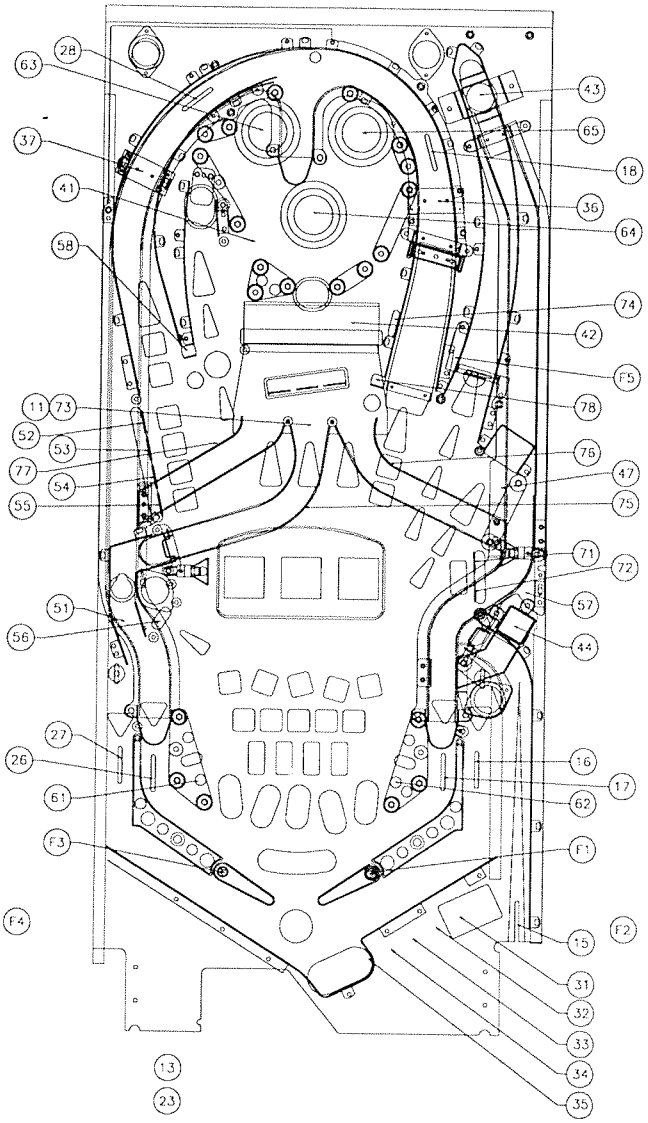
Switch Locations

Item No.	Switch Part No.	Description
F1	SW-1A-194	Lower Right Flipper EOS
F2	A-17316	*Lower Right Flipper Cabinet
F3	SW-1A-194	Lower Left Flipper EOS
F4	A-17316	*Lower Left Flipper Cabinet
F5	SW-1A-194	Spinner
F6	---	Not Used
F7	---	Not Used
F8	---	Not Used
11	5647-12693-06	3-Bank Position 2
12	A-20511	Slot Index Left
13	20-9663-1	Start Button
14	04-10346	*Plumb Bob Tilt
15	5647-12693-62	Shooter Lane
16	5647-12693-19	Right Outlane
17	5647-12693-19	Right Inlane
21	A-17238	*Slam Tilt
22	5643-09288-00	*Coin Door Closed
23	20-9663-18	Buy-In Button
24	5643-09112-00	*Always Closed
25	A-20511	Slot Index Center
26	5647-12693-19	Left Inlane
27	5647-12693-19	Left Outlane
28	5647-12693-19	Left Loop

Item No.	Switch Part No.	Description
31	A-18617-1	Trough Jam (LED)
	A-18618-1	(Transistor)
32	A-18617-1	Trough 1 (LED)
	A-18618-1	(Transistor)
33	A-18617-1	Trough 2 (LED)
	A-18618-1	(Transistor)
34	A-18617-1	Trough 3 (LED)
	A-18618-1	(Transistor)
35	A-18617-1	Trough 4 (LED)
	A-18618-1	(Transistor)
36	A-16908	Enter Ramp (LED)
	A-16909	(Transistor)
37	A-16908	Made Ramp Left (LED)
	A-16909	(Transistor)
38	---	Not Used
41	A-16908	† Top Left Hole (LED)
	A-16909	(Transistor)
42	A-16908	† Post Jets (LED)
	A-16909	(Transistor)
43	A-16908	Back Right Popper (LED)
	A-16909	(Transistor)
44	A-16908	Lower Right Popper (LED)
	A-16909	(Transistor)

*Not Shown
† Located Under Playfield

Switch Locations (continued)



Item No.	Switch Part No.	Description
45	---	Not Used
46	---	Not Used
47	A-16908 A-16909	† Enter Right Hole (Transistor)
48	A-20511	Slot Index Right
51	5647-12133-11	Lock Up 1
52	A-20575-5	Top 4-Bank
53	A-20575-5	2nd 4-Bank
54	A-20575-5	3rd 4-Bank
55	A-20575-5	Bottom 4-Bank
56	A-17799-15	Mystery Target
57	5647-12693-26	† Lower Right Lock 2
58	A-18530-4	Red
61	SW-1A-114 SW-1A-120	Left Sling (Kicker) (Score)

Item No.	Switch Part No.	Description
62	SW-1A-114 SW-1A-120	Right Sling (Kicker) (Score)
63	SW-11A-37	Left Jet
64	SW-11A-37	Bottom Jet
65	SW-11A-37	Right Jet
66	SW-1A-197-1	Left 3-Bank
67	SW-1A-198-1	Center 3-Bank
68	SW-1A-198-1	Right 3-Bank
71	A-20505-6	Top 2-Bank
72	A-20505-6	Bottom 2-Bank
73	5647-12693-06	3-Bank Position Up
74	5647-12693-36	Up Down Ramp
75	5647-12693-21	Scoop Center
76	5647-12693-21	Scoop Right
77	5647-12693-21	Scoop Left
78	A-16816-7	Black
81-88	---	Not Used

*Not Shown
† Located Under Playfield

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	Trough	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-26-1500	---
02	Plunger	High Power	J107-2			Q80	J130-2			Vio-Red	AE-23-800	---
03	Left Lock Up	High Power	J107-2			Q78	J130-4			Vio-Org	AE-27-1200	---
04	Right Back Popper	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-24-900	---
05	Ramp Down	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-26-1200	---
06	Not Used	High Power				Q66				Vio-Blu	---	---
07	Knocker	High Power		J107-2		Q68		J130-8		Vio-Blk	---	AE-23-800
08	Right Front Popper	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-23-800	---
09	Left Sling	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	---
10	Right Sling	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	---
11	Left Jet	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-26-1200	---
12	Bottom Jet	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1200	---
13	Right Jet	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1500	---
14	Phone Flasher	Low Power	J107-6			Q48	J127-7			Brn-Blu	#906 (1)	---
15	Not Used	Low Power				Q46				Brn-Vio	---	---
16	Ramp Up	Low Power	J107-3			Q44	J127-9			Brn-Gry	SM1-28-900-DC	---
17	Back Flasher	Flasher	J107-6	J105-5		Q42	J126-1	J125-1		Blk-Brn	#906 (2)	#906 (1)
18	Autofire Flasher	Flasher	J107-6			Q40	J126-2			Blk-Red	#89 (1)	---
19	Lower Left Flasher	Flasher	J107-6	J105-5		Q38	J126-3	J125-3		Blk-Org	#906 (1)	#906 (1)
20	Spinner Flasher	Flasher	J107-6	J105-5		Q36	J126-4	J125-5		Blk-Yel	#906 (1)	#906 (2)
21	Lower Right Flasher	Flasher	J107-6	J105-5		Q28	J126-5	J125-6		Blu-Grn	#906 (1)	#906 (1)
22	Motor 3-Bank	Flasher	J116-2			Q30	J126-6			Blu-Blk	14-8026 12V	---
23	Left Slot B	Flasher	J116-2			Q34	J126-7			Blu-Vio	14-8024 12V	---
24	Left Slot A	Flasher	J116-2			Q32	J126-8			Blu-Gry	14-8024 12V	---
25	Center Slot B	Gen. Purpose	J116-2			Q26	J122-1			Blu-Brn	14-8024 12V	---
26	Center Slot A	Gen. Purpose	J116-2			Q24	J122-2			Blu-Red	14-8024 12V	---
27	Right Slot B	Gen. Purpose	J116-2			Q22	J122-3			Blu-Org	14-8024 12V	---
28	Right Slot A	Gen. Purpose	J116-2			Q20	J122-4			Blu-Yel	14-8024 12V	---
36	Up Down Post	Low Power	J907-8,9			Q5	J902-1			Org-Gry	AE-27-1200	---
	General Illumination											
01	Left Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	---
02	Right Playfield	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	---
03	Back Playfield	G.I.	J121-3			Q14	J121-9			Wht-Yel	#44	---
04	Insert 1	G.I.		J120-5		Q16		J120-10		Wht-Grn	---	#555
05	Insert 2	G.I.		J120-6		Q12		J120-11		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	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn	FL-15411	ORANGE
31		Lwr. Lt. Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J907-4 (Red-Blu)		Q9	J902-7		Org-Blu	FL-15411	ORANGE
33		Upr. Rt. Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio	NOT USED	NOT USED
35		Upr. Lt. Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry			
36	Upper Left Flipper	Upr. Lt. Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	SEE	ABOVE

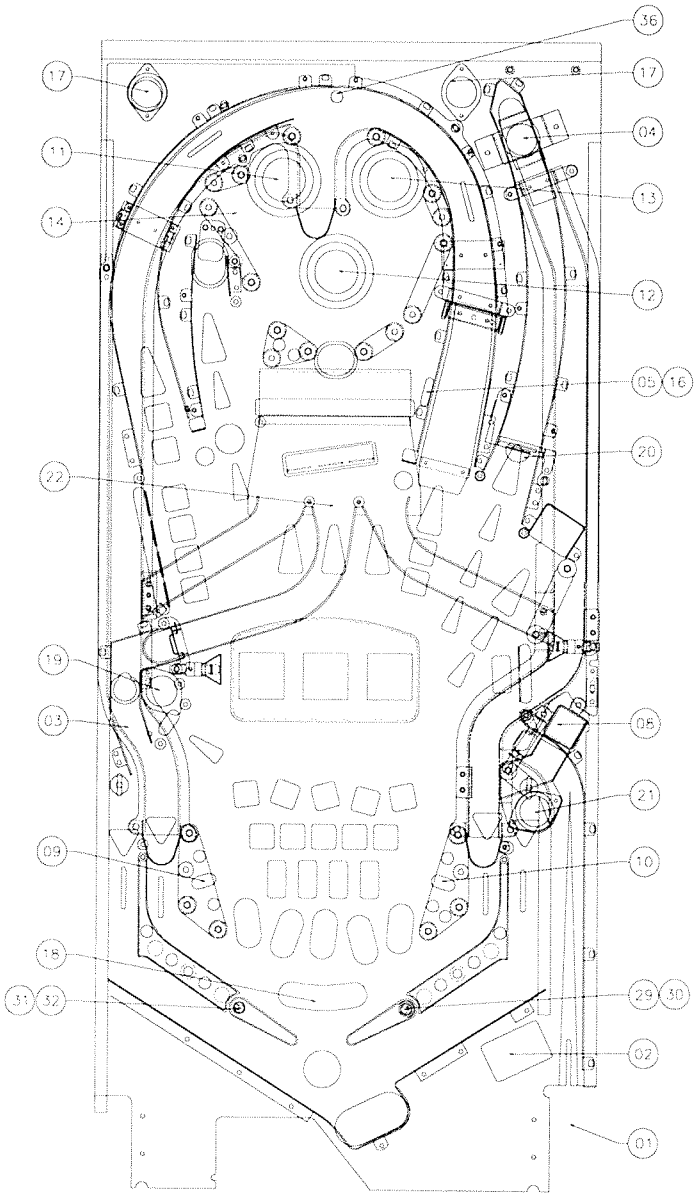
J1xx=Power Driver Board; J9xx=Fliptronic II Board; 24-6549=#44 bulb; 24-8704=#89 bulb; 24-8768=#555 bulb; 24-8802=#906 bulb

SOLENOID/FLASHER LOCATIONS

Item No.	Coil/ Flasher No.	Assy. Number	Description
01	AE-26-1500	A-19963-1	Trough
02	AE-23-800	A-20439	Plunger
03	AE-27-1200	A-20435	Left Lock Up
04	AE-24-900	A-19543	Right Back Popper
05	AE-26-1200	A-20231	Ramp Down
06	---	---	Not Used
07	AE-23-800	B-10686-1	*Knocker
08	AE-23-800	A-20488	Right Front Popper
09	AE-26-1200	B-9362-L-2	Left Sling
10	AE-26-1200	B-9362-R-3	Right Sling
11	AE-26-1200	A-9415-2	Left Jet
12	AE-26-1200	A-9415-2	Bottom Jet
13	AE-26-1200	A-9415-2	Right Jet
14	24-8802	A-17802	Phone Flasher (1)
15	---	---	Not Used
16	SM1-28-900-DC	A-20231	Ramp Up
17	24-8802	A-20420	Back Flasher (2)
18	24-8704	A-17803	Autofire Flasher (1)
19	24-8802	A-20531	Lower Left Flasher (1)
20	24-8802	A-20493	Spinner Flasher (1)

*NOT SHOWN

Solenoid/Flasher Locations (continued)



Item No.	Coil/ Flasher No.	Assy. Number.	Description
21	24-8802	A-20523	Lwr R Flasher (1)
22	14-8026	A-20483	Motor 3-Bank
23	14-8024	A-20425	Left Slot B
24	14-8024	A-20425	Left Slot A
25	14-8024	A-20425	Center Slot B
26	14-8024	A-20425	Center Slot A
27	14-8024	A-20425	Right Slot B
28	14-8024	A-20425	Right Slot A
36	AE-27-1200	A-17932	Up Down Post

General Illumination Circuits

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

Flipper Coils

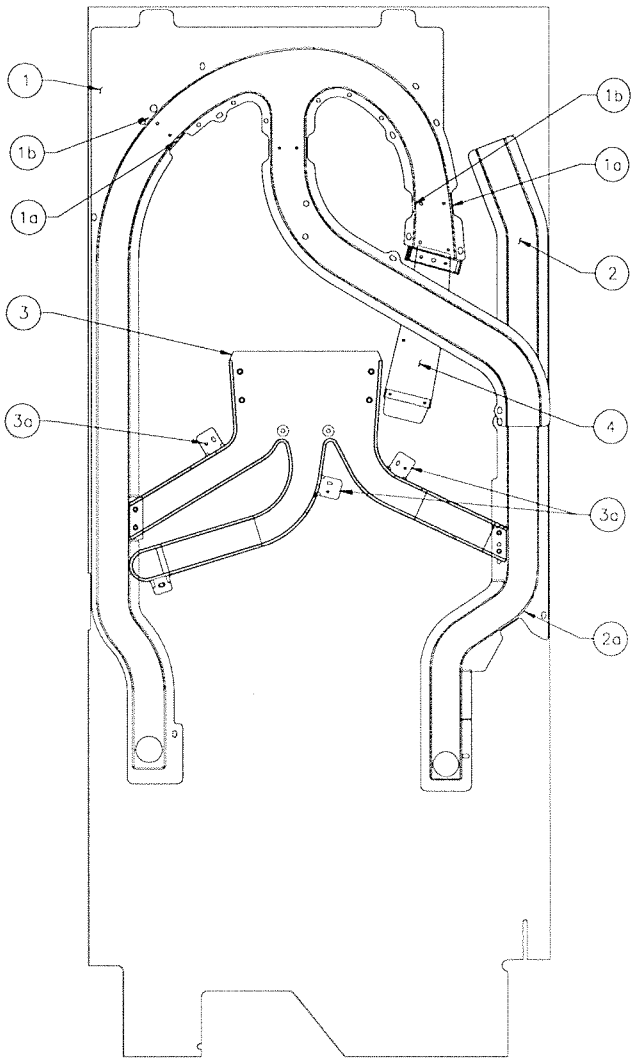
Item No.	Coil No.	Color	Assy. No.	Description
29 & 30	FL-15411	Org	A-14876-R-5	Lwr R Flipper
31 & 32	FL-15411	Org	A-15849-L-4	Lwr L Flipper

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

Ramps

Item	Part Number	Description
1	A-20420	Main Ramp Assembly
*a)	A-16908	Photo Transistor Assy. (2)
*b)	A-16909	LED Assembly (2)
2	A-20421	Right Ramp Assembly
*a)	A-20659	Reflector/Light & Cable Assy.
3	A-20426	Center Ramp Assembly
*a)	5647-12693-21	Switch Sub Miniature (3)
4	A-20494	Lift Ramp Assembly

* Not Shown.



SECTION THREE

GAME WIRING AND SCHEMATICS

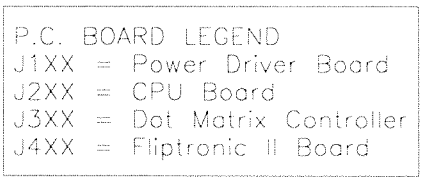
CONNECTOR & COMPONENT IDENTIFICATION

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

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

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

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



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

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

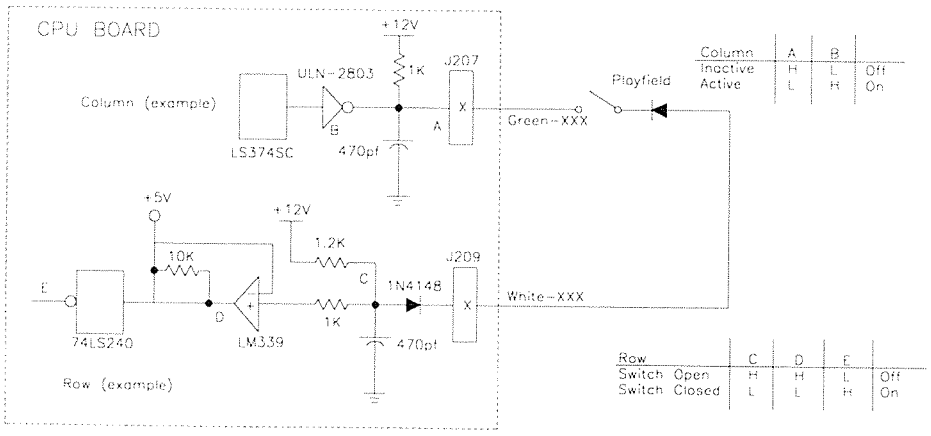
SWITCH MATRIX

White ——▶|——o o—— Green

Dedicated Grounded Switches	Row \ Column	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	3-BANK POSITION 2 11	SLAM TILT 21	TROUGH JAM 31	TOP LEFT HOLE 41	LOCK UP 1 51	LEFT SLING 61	TOP 2-BANK 71	NOT USED 81	Black-Green J906-1 Right Flipper EOS F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	SLOT INDEX LEFT 12	COIN DOOR CLOSED 22	TROUGH 1 32	POST JETS 42	TOP 4-BANK 52	RIGHT SLING 62	BOTTOM 2-BANK 72	NOT USED 82	Black-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	START BUTTON 13	BUY-IN BUTTON 23	TROUGH 2 33	BACK RIGHT POPPER 43	2ND 4-BANK 53	LEFT JET 63	3-BANK POSITION UP 73	NOT USED 83	Black-Blue J906-3 Left Flipper EOS F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH 3 34	LOWER RIGHT POPPER 44	3RD 4-BANK 54	BOTTOM JET 64	UP DOWN RAMP 74	NOT USED 84	Black-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function: Ser Credits; Test Function: Esc D5	5 White-Green J209-5 U19-11	SHOOTER LANE 15	SLOT INDEX CENTER 25	TROUGH 4 35	NOT USED 45	BOTTOM 4-BANK 55	RIGHT JET 65	SCOOP CENTER 75	NOT USED 85	Black-Violet J906-4 Spinner F5
Orange-Blue (6) J205-7 Normal Function: Vol Down; Test Function: Down D6	6 White-Blue J209-7 U19-9	RIGHT OUTLANE 16	LEFT INLANE 26	ENTER RAMP 36	NOT USED 46	MYSTERY TARGET 56	LEFT 3-BANK 66	SCOOP RIGHT 76	NOT USED 86	Black-Yellow J905-3 Upper Right Flipper Opto F6 (NOT USED)
Orange-Violet (7) J205-8 Normal Function: Vol Up; Test Function: Up D7	7 White-Violet J209-8 U19-5	RIGHT INLANE 17	LEFT OUTLANE 27	MADE RAMP LEFT 37	ENTER RIGHT HOLE 47	LOWER RIGHT LOCK 2 57	CENTER 3-BANK 67	SCOOP LEFT 77	NOT USED 87	Black-Gray J906-5 Upper Left Flipper EOS F7 (NOT USED)
Orange-Gray (8) J205-9 Normal Function: Begin Test; Test Function: Enter D8	8 White-Gray J209-9 U19-7	RIGHT LOOP 18	LEFT LOOP 28	NOT USED 38	SLOT INDEX RIGHT 48	RED 58	RIGHT 3-BANK 68	BLACK 78	NOT USED 88	Black-Blue J905-5 Upper Left Flipper Opto F8 (NOT USED)

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

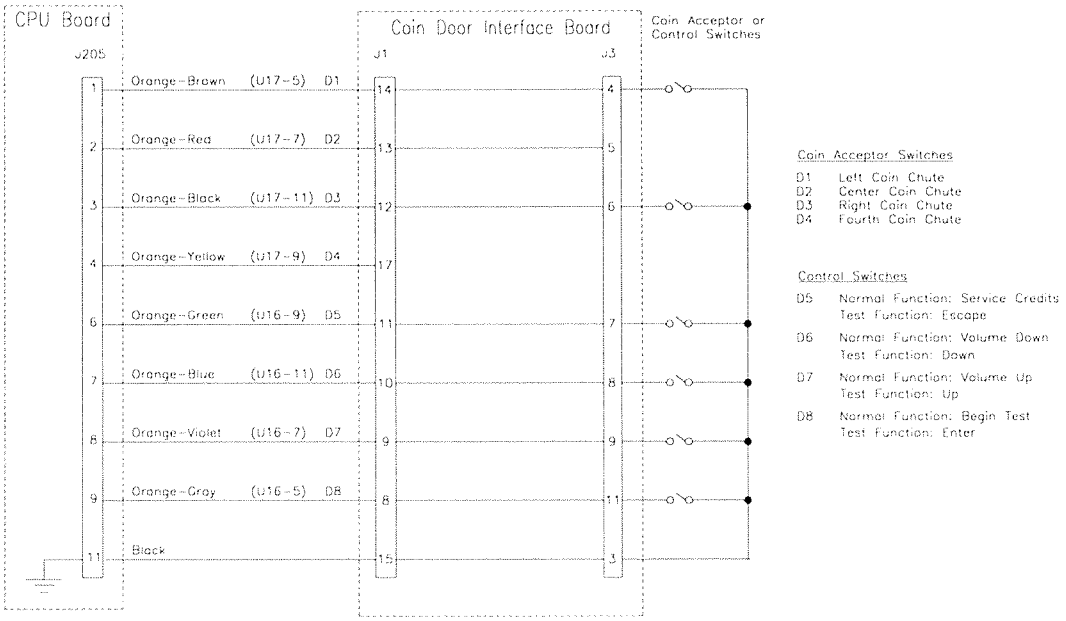
SWITCH MATRIX CIRCUIT



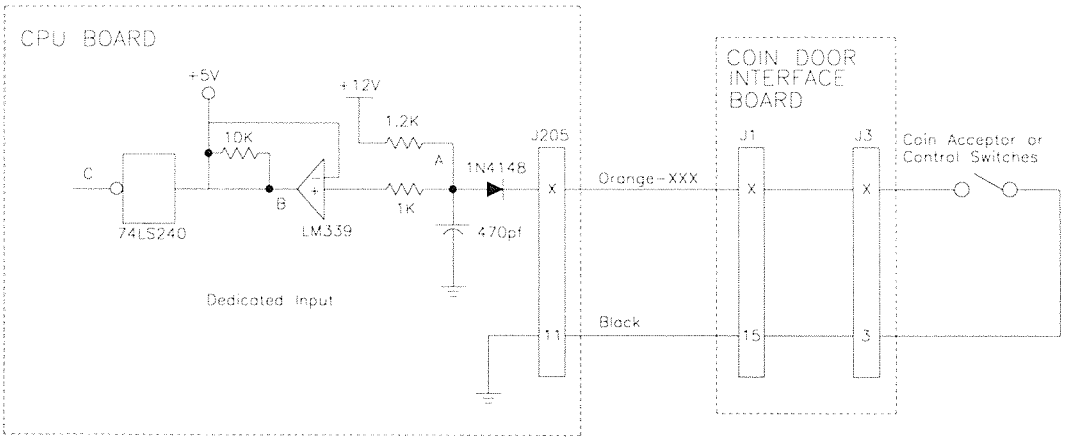
The microprocessor is constantly strobing the column side of the switch. When point "A" on the column circuit toggles low, the column side is active.

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

DEDICATED SWITCHES



DEDICATED SWITCH CIRCUIT



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

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

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

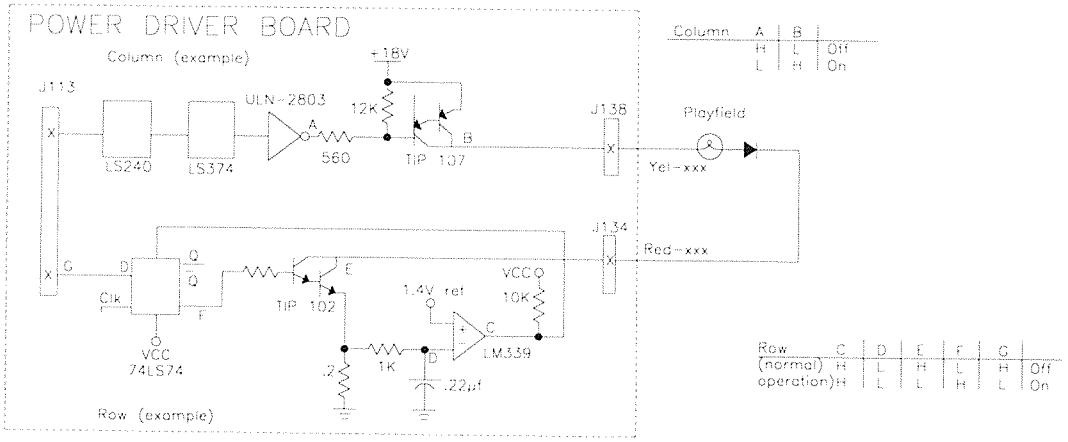
LAMP MATRIX

Yellow (B+) — Red

Column / Row	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-9 Q91
1 Red-Brown J133-1 Q90	TRIXIE 11	MAP 21	CASE 1 31	BULLET 41	SLOT RIGHT 51	RIGHT JACKPOT 61	RIGHT LOOP MARK 71	SLOT CENTER 81
2 Red-Black J133-2 Q89	BRUNO 12	FLASHLIGHT 22	CASE 2 32	MIRROR 42	T A X (I) 52	PENTHOUSE KEY 62	BLACK 72	SLOT LEFT 82
3 Red-Orange J133-4 Q88	BUTLER 13	MAGNIFYING GLASS 23	CASE 3 33	DAGGER 43	T A (X) I 53	RIGHT HOLE MARK 63	TRAIN COMBOS 73	LEFT SPOT 83
4 Red-Yellow J133-5 Q87	VICTORIA 14	REVOLVER 24	CASE 4 34	PRINT 44	T (A) X I 54	RIGHT SPIN 64	RIGHT TAXI CHASE 74	RIGHT SPOT 84
5 Red-Green J133-6 Q86	TONY 15	LEFT SPIN 25	CASE 5 35	MATCHES 45	(T) A X I 55	ROULETTE 65	DOWN ELEVATOR 75	NOT USED 85
6 Red-Blue J133-7 Q85	LEFT JET BUMPER 16	EXTRA BALL 26	LEFT HOLE MARK 36	LEFT FREE SPIN 46	LEFT TAXI CHASE 56	MIDDLE SPIN 66	EXIT ELEVATOR 76	NOT USED 86
7 Red-Violet J133-8 Q84	RIGHT JET BUMPER 17	WHO DUNNIT 27	MYSTERY 37	SHOOT AGAIN 47	NUDGE SLOTS 57	LEFT JACKPOT 67	UP ELEVATOR 77	BUY-IN BUTTON 87
8 Red-Gray J133-9 Q83	BOTTOM JET BUMPER 18	RED 28	LEFT LITE TAXI 38	RIGHT LANE MARK 48	LEFT LOOP MARK 58	RIGHT LITE TAXI 68	RIGHT FREE SPIN 78	START 88

J1XX = Power Driver Board

LAMP MATRIX CIRCUIT



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

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

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

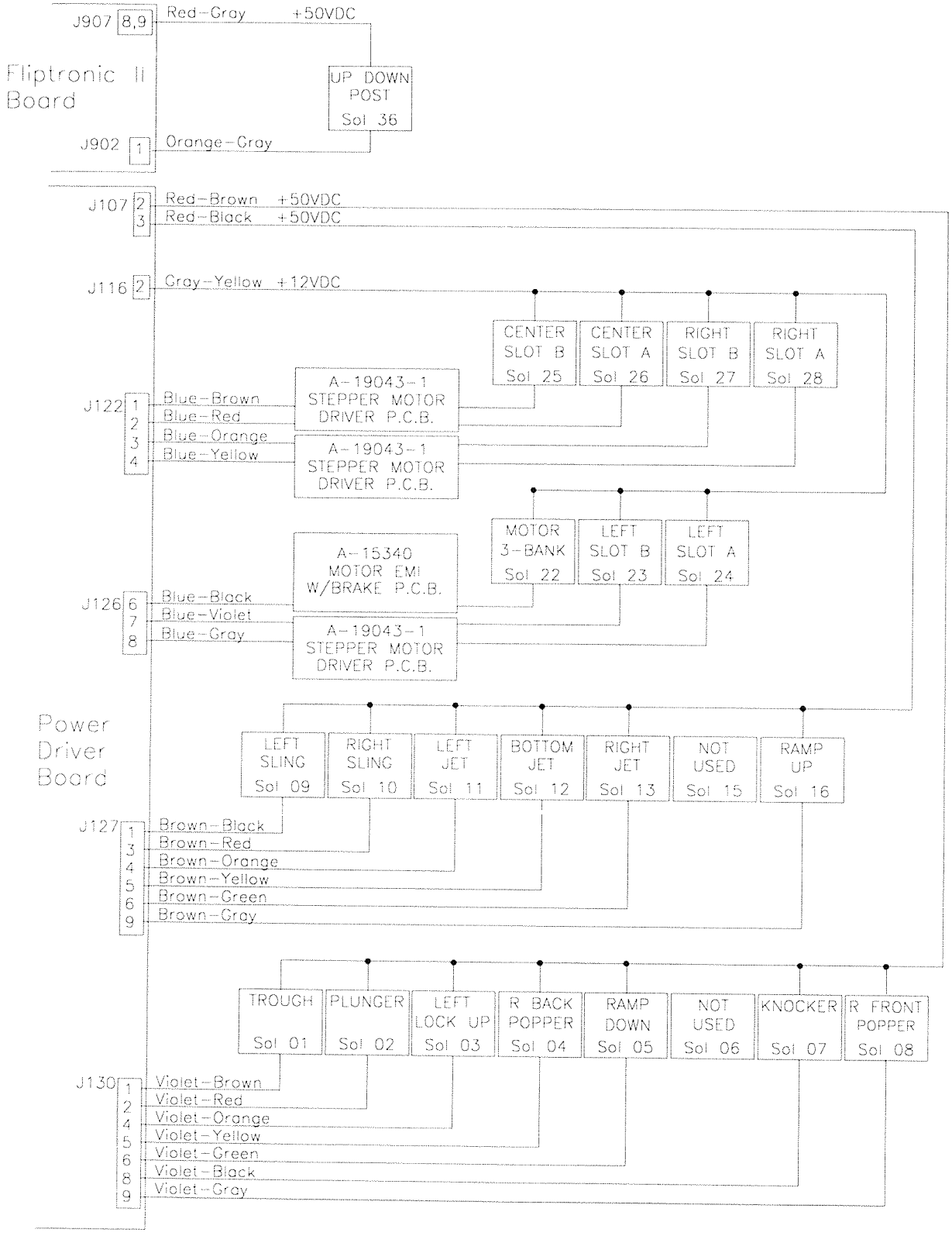
SOLENOID/FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Drive Xister	Drive Connections			Drive Wire Color	Solenoid Part number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	Trough	High Power	J107-2			Q82	J130-1			Vio-Brn	AE-26-1500	---
02	Plunger	High Power	J107-2			Q80	J130-2			Vio-Red	AE-23-800	---
03	Left Lock Up	High Power	J107-2			Q78	J130-4			Vio-Org	AE-27-1200	---
04	Right Back Popper	High Power	J107-2			Q76	J130-5			Vio-Yel	AE-24-900	---
05	Ramp Down	High Power	J107-2			Q64	J130-6			Vio-Grn	AE-26-1200	---
06	Not Used	High Power				Q66				Vio-Blu	---	---
07	Knocker	High Power		J107-2		Q68		J130-8		Vio-Blk	---	AE-23-800
08	Right Front Popper	High Power	J107-2			Q70	J130-9			Vio-Gry	AE-23-800	---
09	Left Sling	Low Power	J107-3			Q58	J127-1			Brn-Blk	AE-26-1200	---
10	Right Sling	Low Power	J107-3			Q56	J127-3			Brn-Red	AE-26-1200	---
11	Left Jet	Low Power	J107-3			Q54	J127-4			Brn-Org	AE-26-1200	---
12	Bottom Jet	Low Power	J107-3			Q52	J127-5			Brn-Yel	AE-26-1200	---
13	Right Jet	Low Power	J107-3			Q50	J127-6			Brn-Grn	AE-26-1500	---
14	Phone Flasher	Low Power	J107-6			Q48	J127-7			Brn-Blu	#906 (1)	---
15	Not Used	Low Power				Q46				Brn-Vio	---	---
16	Ramp Up	Low Power	J107-3			Q44	J127-9			Brn-Gry	SM1-28-900-DC	---
17	Back Flasher	Flasher	J107-6	J105-5		Q42	J126-1	J125-1		Blk-Brn	#906 (2)	#906 (1)
18	Autofire Flasher	Flasher	J107-6			Q40	J126-2			Blk-Red	#89 (1)	---
19	Lower Left Flasher	Flasher	J107-6	J105-5		Q38	J126-3	J125-3		Blk-Org	#906 (1)	#906 (1)
20	Spinner Flasher	Flasher	J107-6	J105-5		Q36	J126-4	J125-5		Blk-Yel	#906 (1)	#906 (2)
21	Lower Right Flasher	Flasher	J107-6	J105-5		Q28	J126-5	J125-6		Blu-Grn	#906 (1)	#906 (1)
22	Motor 3-Bank	Flasher	J116-2			Q30	J126-6			Blu-Blk	14-8026 12V	---
23	Left Slot B	Flasher	J116-2			Q34	J126-7			Blu-Vio	14-8024 12V	---
24	Left Slot A	Flasher	J116-2			Q32	J126-8			Blu-Gry	14-8024 12V	---
25	Center Slot B	Gen. Purpose	J116-2			Q26	J122-1			Blu-Brn	14-8024 12V	---
26	Center Slot A	Gen. Purpose	J116-2			Q24	J122-2			Blu-Red	14-8024 12V	---
27	Right Slot B	Gen. Purpose	J116-2			Q22	J122-3			Blu-Org	14-8024 12V	---
28	Right Slot A	Gen. Purpose	J116-2			Q20	J122-4			Blu-Yel	14-8024 12V	---
36	Up Down Post	Low Power	J907-8,9			Q5	J902-1			Org-Gry	AE-27-1200	---
	General Illumination											
01	Left Playfield	G.I.	J121-1			Q18	J121-7			Wht-Brn	#44	---
02	Right Playfield	G.I.	J121-2			Q10	J121-8			Wht-Org	#44	---
03	Back Playfield	G.I.	J121-3			Q14	J121-9			Wht-Yel	#44	---
04	Insert 1	G.I.		J120-5		Q16		J120-10		Wht-Grn	---	#555
05	Insert 2	G.I.		J120-6		Q12		J120-11		Wht-Vio	---	#555

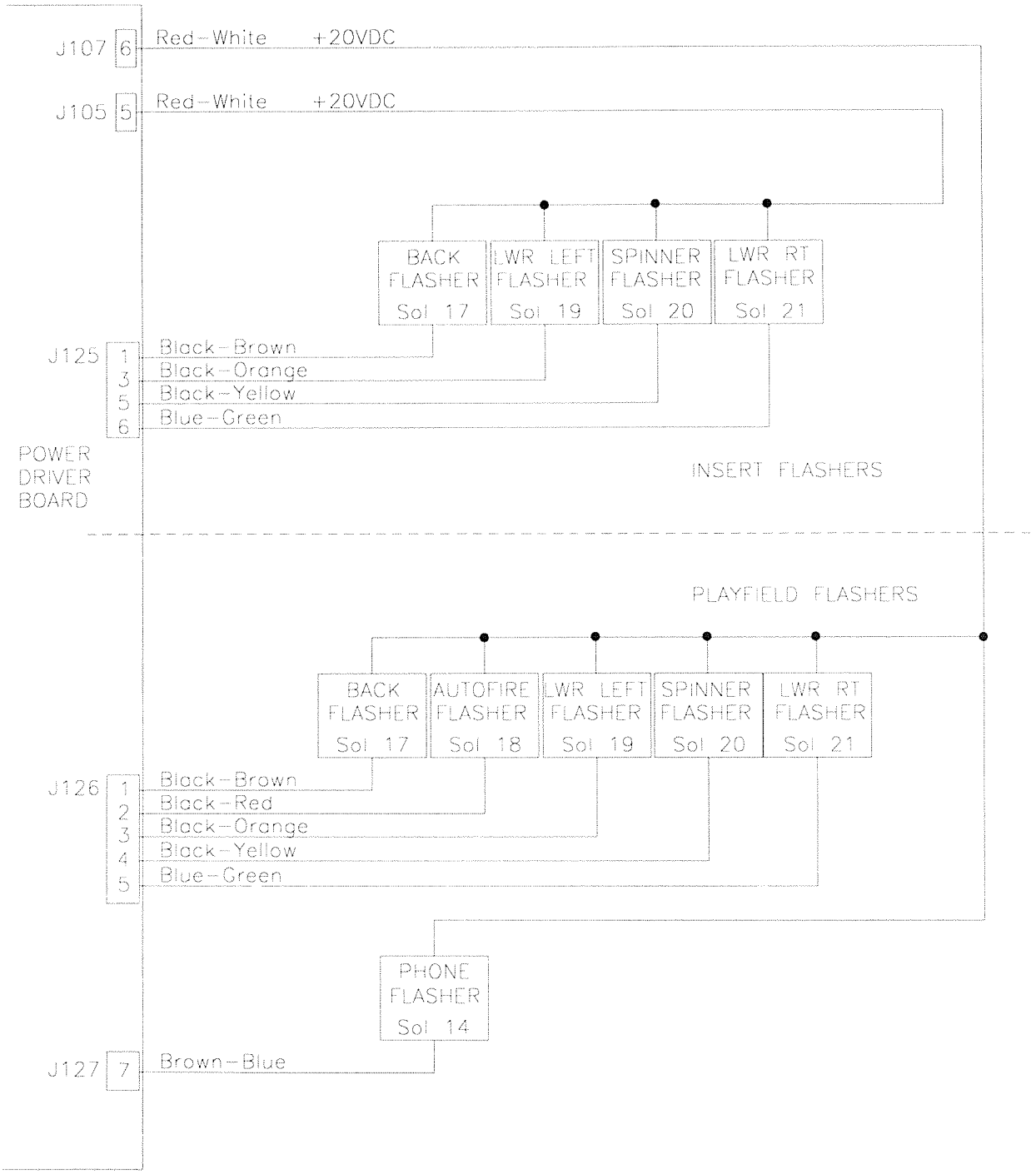
	Flipper Circuits		Voltage Connections Playfield	Drive Transistors Power	Drive Transistors Hold	Drive Connectors Playfield	Drive Wire Colors Power	Drive Wire Colors Hold	Coil Part No.	Coil Color
29		Lwr. Rt. Power	J907-1 (Red-Grn)	Q4		J902-13	Yel-Grn			
30	Lower Right Flipper	Lwr. Rt. Hold	J907-1 (Red-Grn)		Q11	J902-11		Org-Grn	FL-11541	ORANGE
31		Lwr. Lt. Power	J907-4 (Red-Blu)	Q3		J902-9	Yel-Blu			
32	Lower Left Flipper	Lwr. Lt. Hold	J907-4 (Red-Blu)		Q9	J902-7		Org-Blu	FL-11541	ORANGE
33		Upr. Rt. Power	J907-6 (Red-Vio)	Q2		J902-6	Yel-Vio			
34	Upper Right Flipper	Upr. Rt. Hold	J907-6 (Red-Vio)		Q7	J902-4		Org-Vio	NOT USED	NOT USED
35		Upr. Lt. Power	J907-8 (Red-Gry)	Q1		J902-3	Yel-Gry			
36	Upper Left Flipper	Upr. Lt. Hold	J907-8 (Red-Gry)		Q5	J902-1		Org-Gry	SEE	ABOVE

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

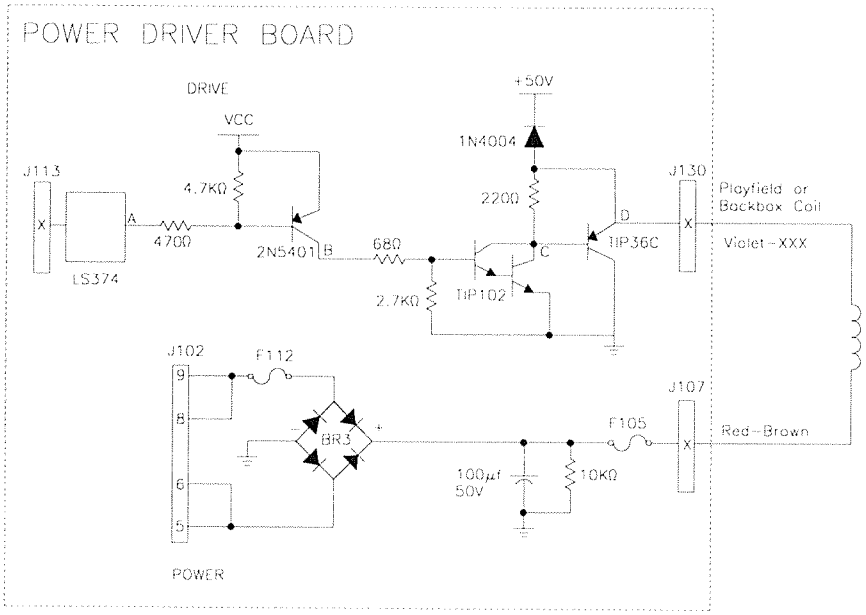
SOLENOID WIRING



FLASHER WIRING

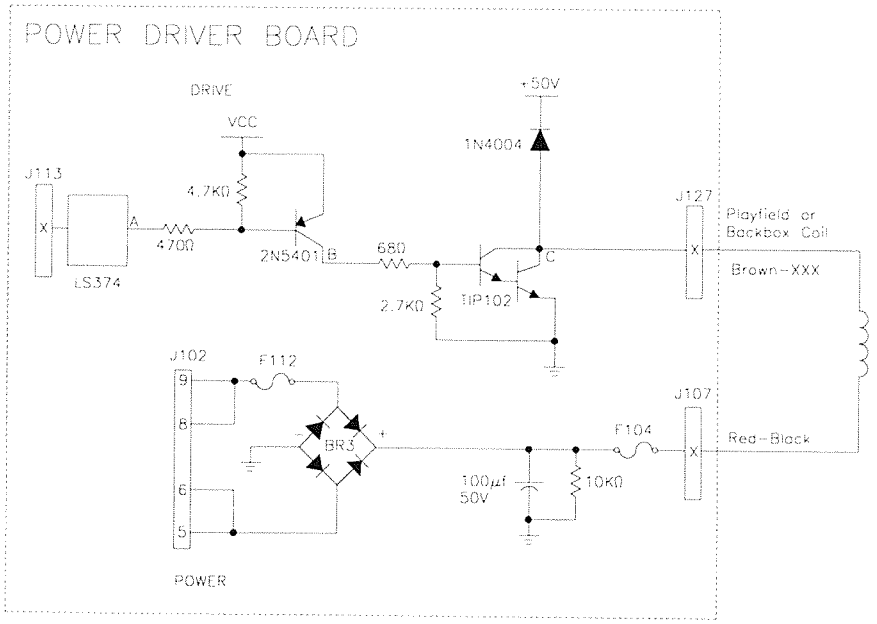


High Power Solenoid Circuit



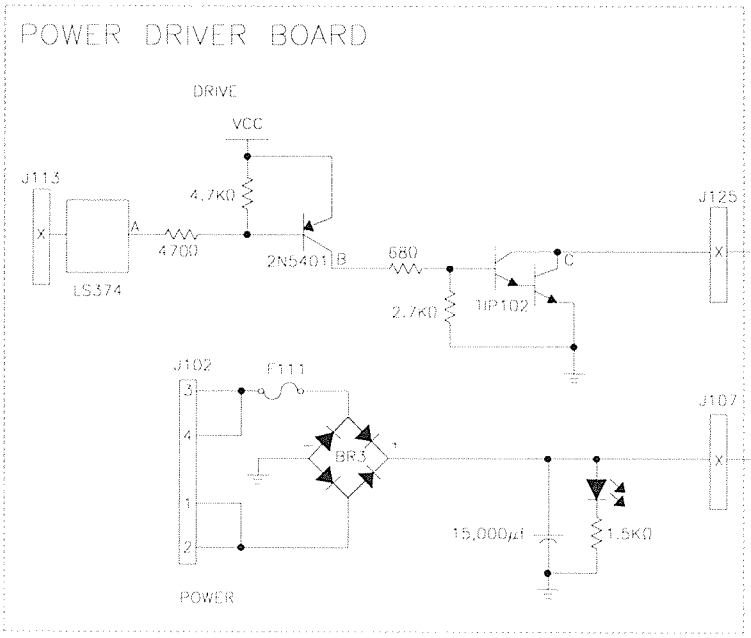
The microprocessor toggles the output of the 74LS374. When point "A" drops low, point "B" the collector of the 2N5401 transistor is high. A high at point "B" causes point "C" the collector of the TIP102 transistor, and point "D" the emitter of the TIP36 transistor to drop low. When point "D" is low the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

Low Power Solenoid Circuit



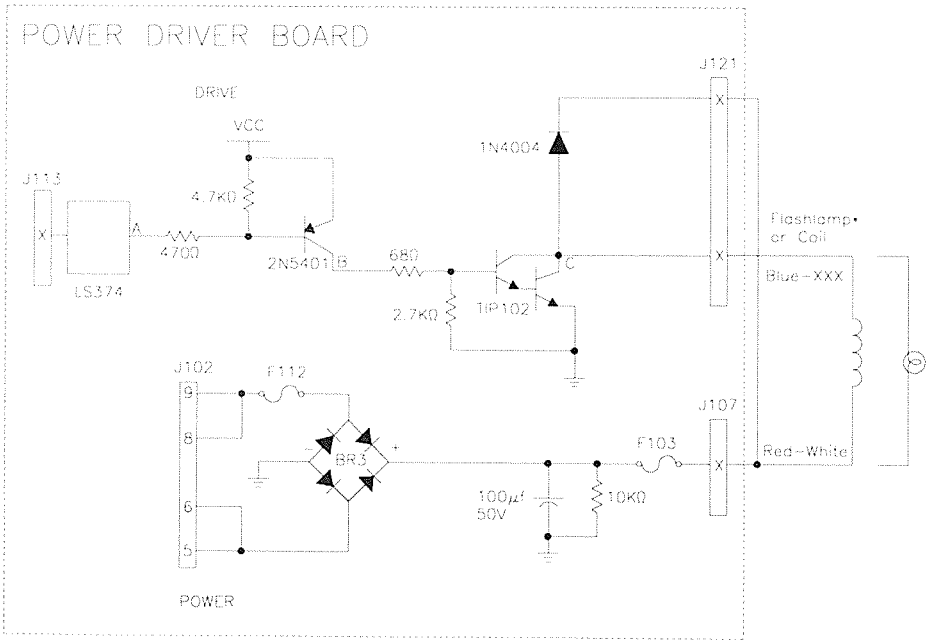
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor is driven high. A high at point "B" turns On the TIP102 transistor, and causes point "C" to drop low. When point "C" is low the coil is grounded through the transistor and the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

Flashlamp Circuit



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

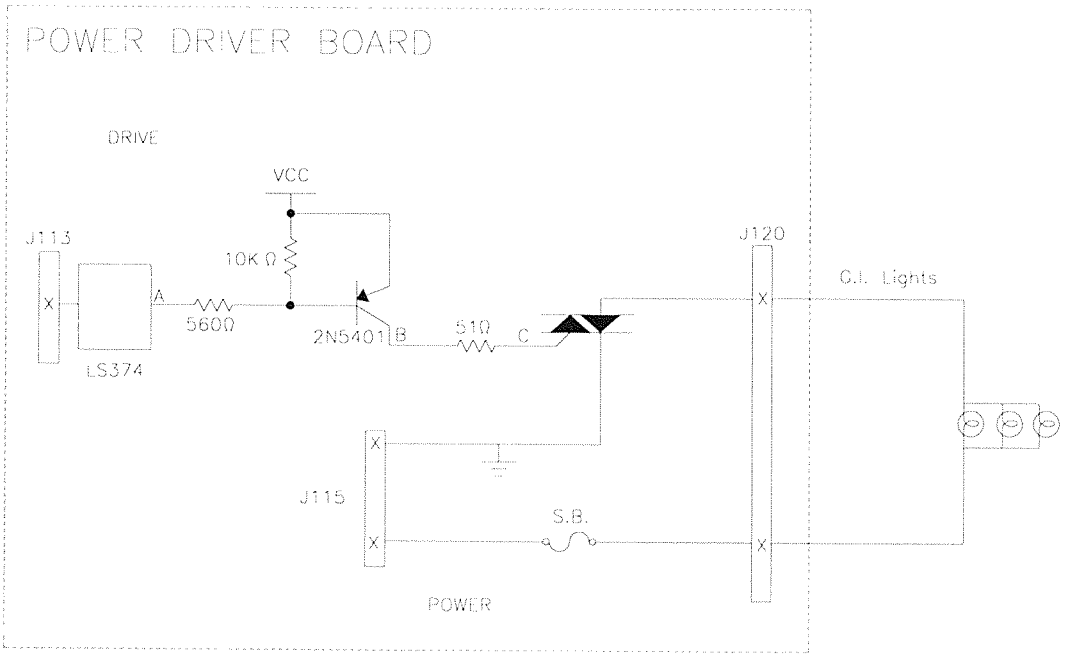
Special (General Purpose) Solenoid Circuit



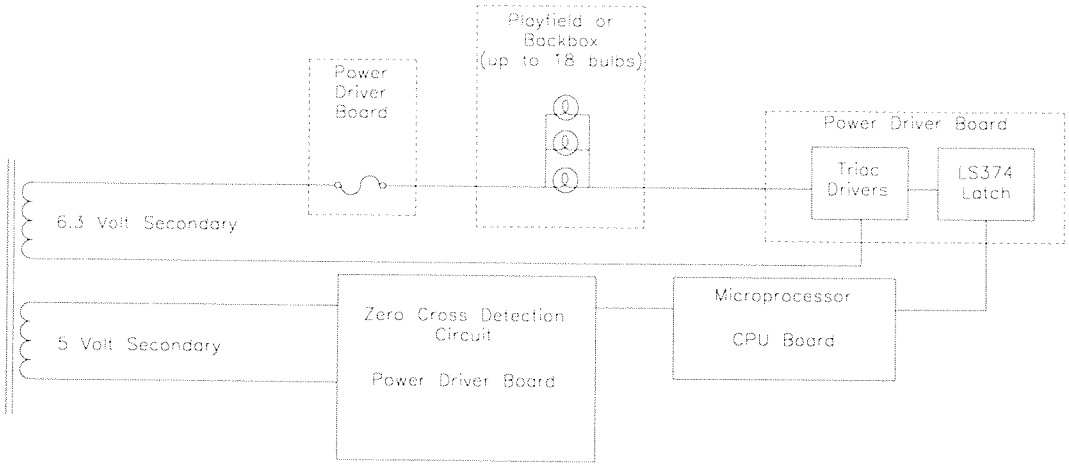
The microprocessor toggles the output of the 74LS374. When point "A" drops low, point "B" is high. A high at point "B" causes a low at point "C". When point "C" is low the coil/flashlamp is grounded through the transistor and the coil/flashlamp turns On. When point "A" toggles high the coil/flashlamp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

*Tieback Diode is not used for flashlamp circuit.

General Illumination Circuit

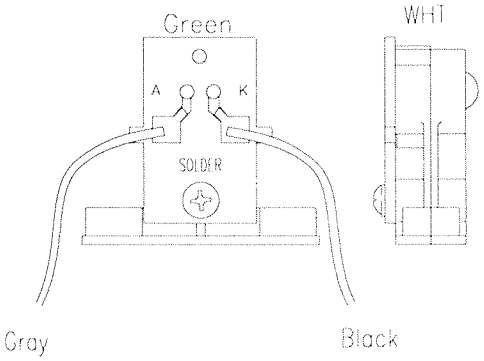


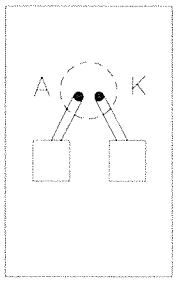
Block Diagram of General Illumination Circuit



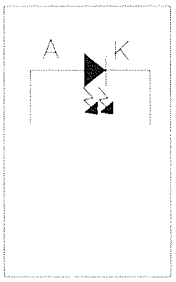
When point "A" toggles low, then points "B" and "C" are high. This turns On the triac and the desired general illumination string lights.

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





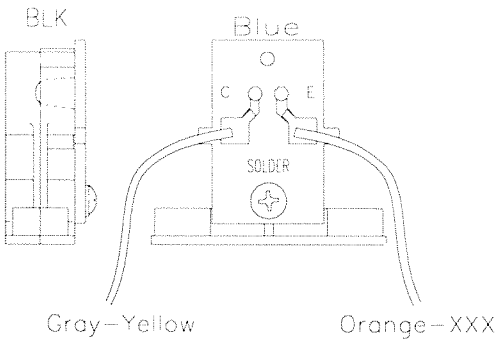
solder side

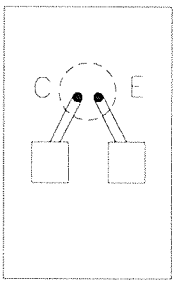


schematic

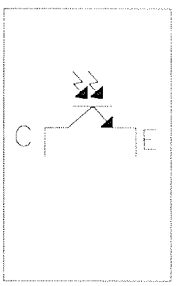
component side

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

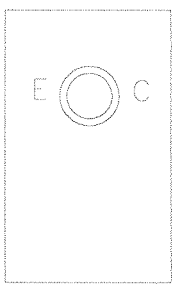




solder side

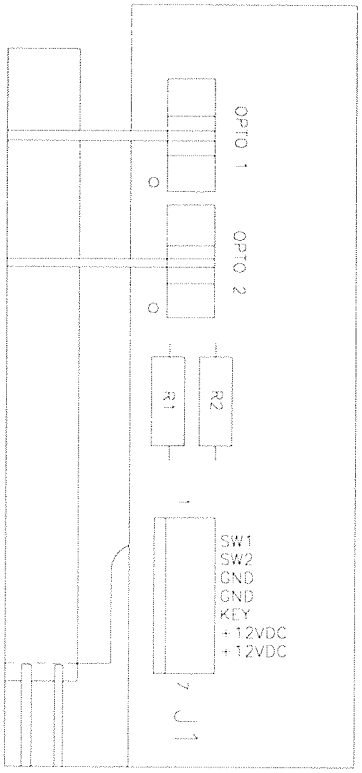


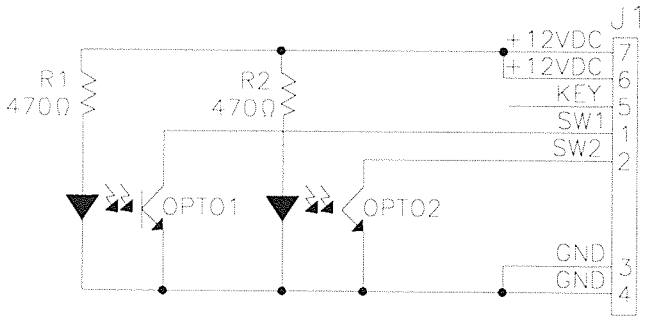
schematic



component side

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

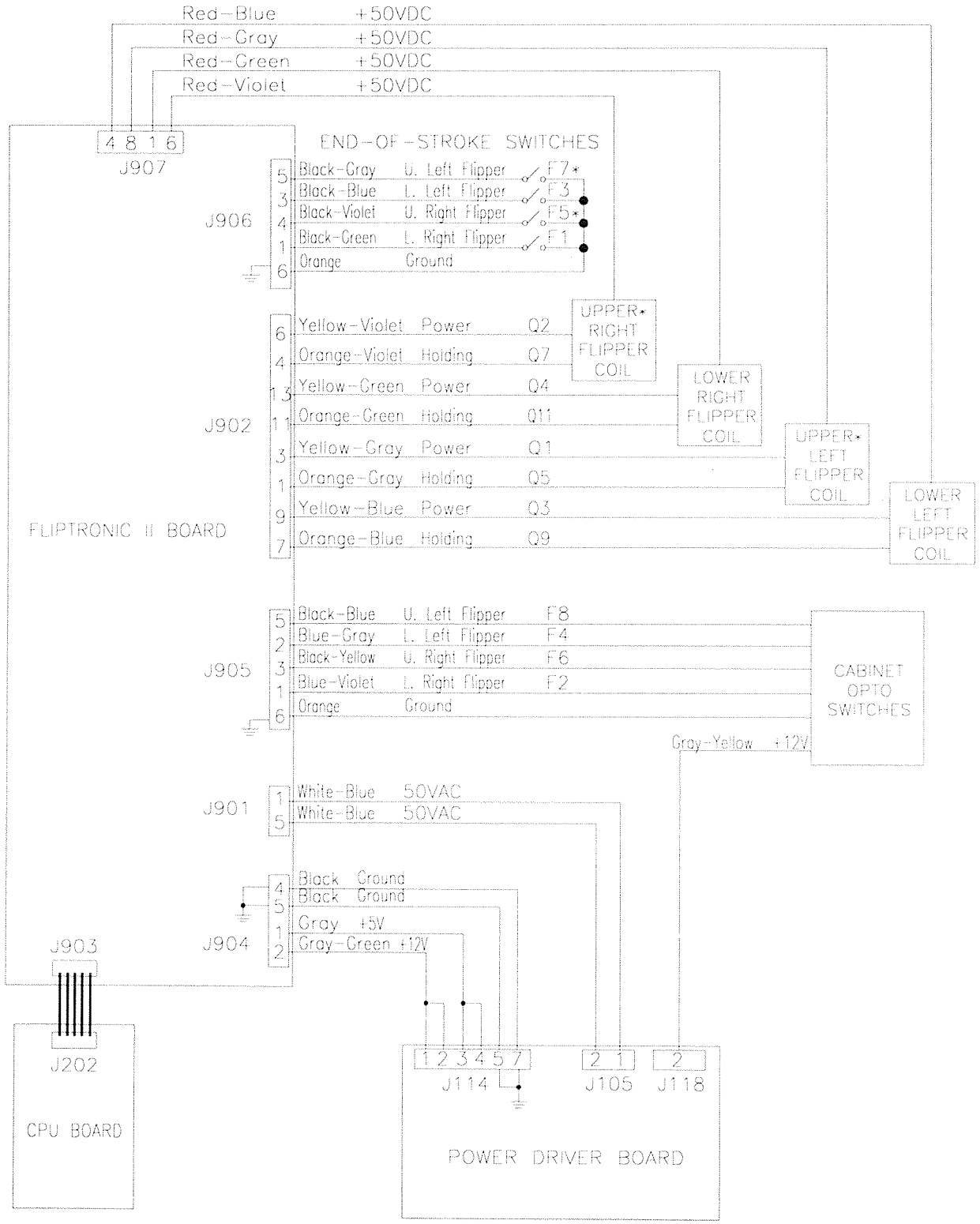




Left Side Flipper Cabinet Opto Switch Board
J1-1 Black-Blue from Fliptronic II Board J905-5
J1-2 Blue-Gray from Fliptronic II Board J905-2
J1-3 Not Used
J1-4 Orange from Fliptronic II Board J905-6
J1-5 Key
J1-6 Gray-Yellow to Right Flipper Opto Board J1-6
J1-7 Gray-Yellow from Fliptronic II Board J118-2

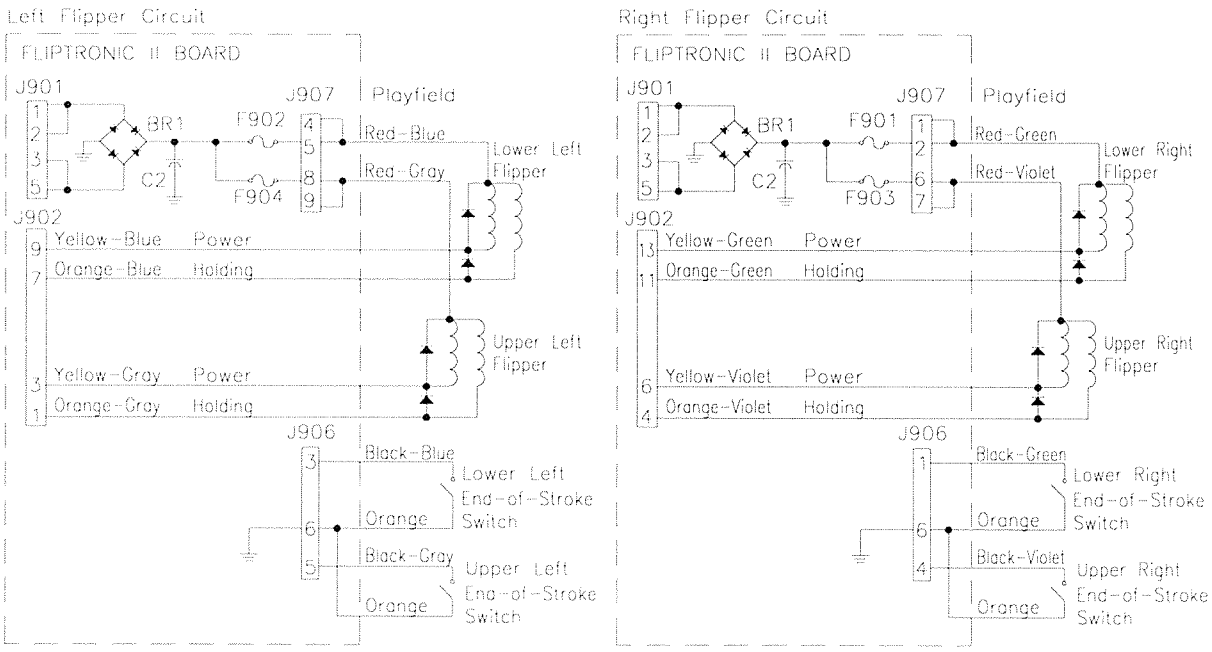
Right Side Flipper Cabinet Opto Switch Board
J2-1 Black-Yellow from Fliptronic II Board J905-3
J2-2 Blue-Violet from Fliptronic II Board J905-1
J2-3 Orange from Fliptronic II Board J905-6
J2-4 Orange from Left Flipper Opto Board J1-4
J2-5 Key
J2-6 Gray-Yellow to Left Flipper Opto Board J1-6
J2-7 Not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

Flipper Circuit Diagram

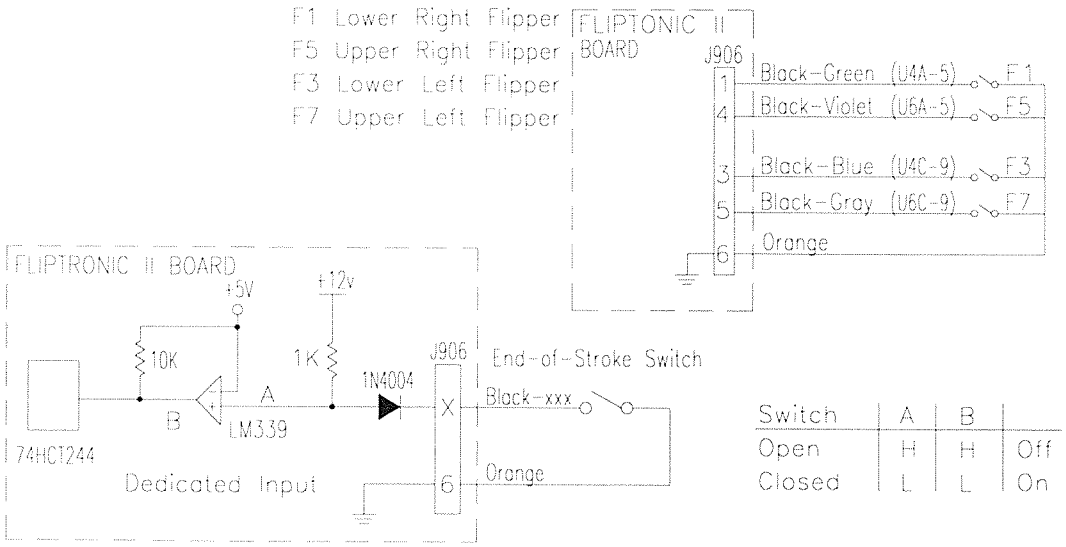


NOTE: May be used as circuits other than flipper circuits.

Flipper Coil Circuits



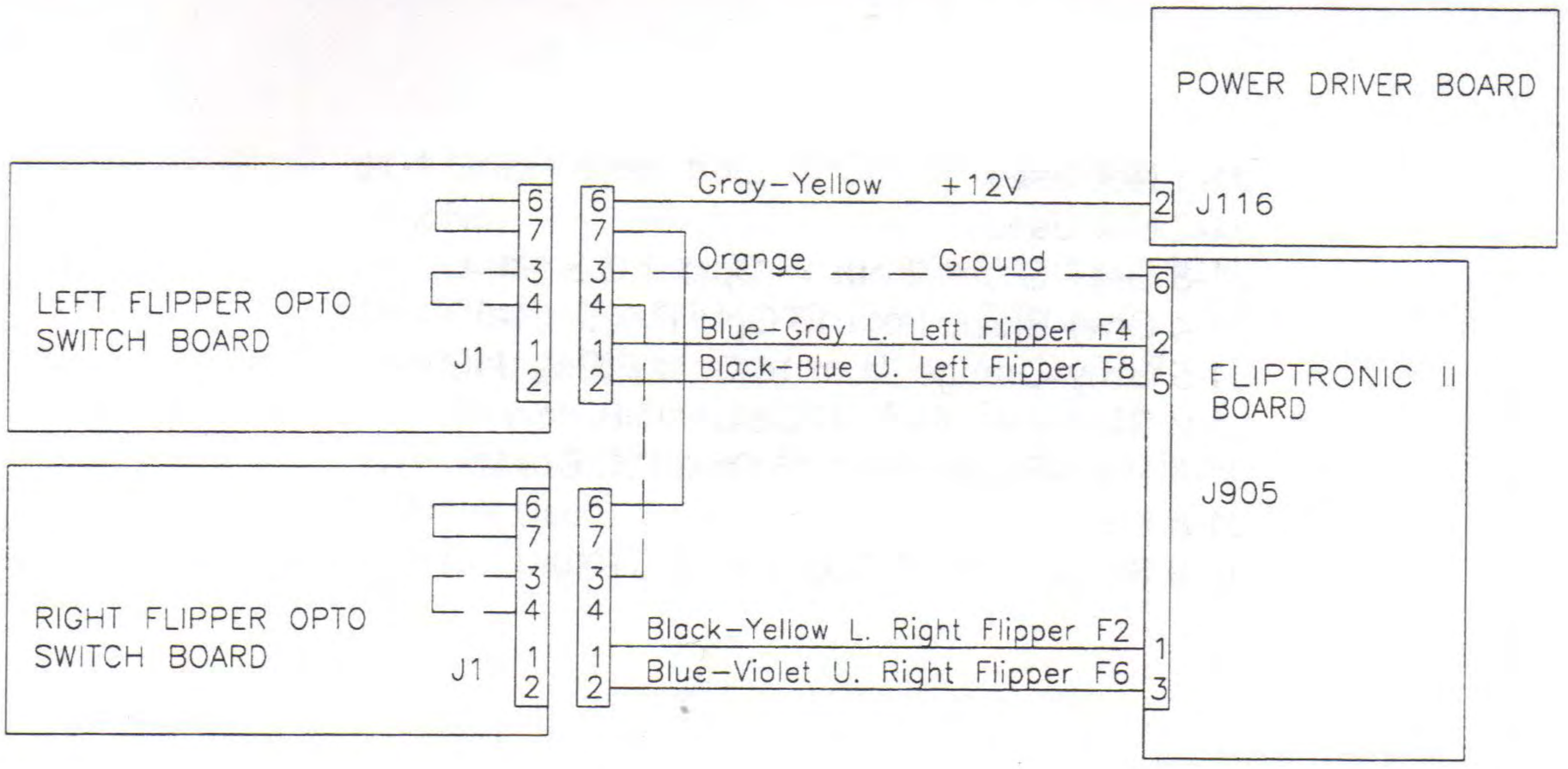
Flipper End-of-Stroke Switches



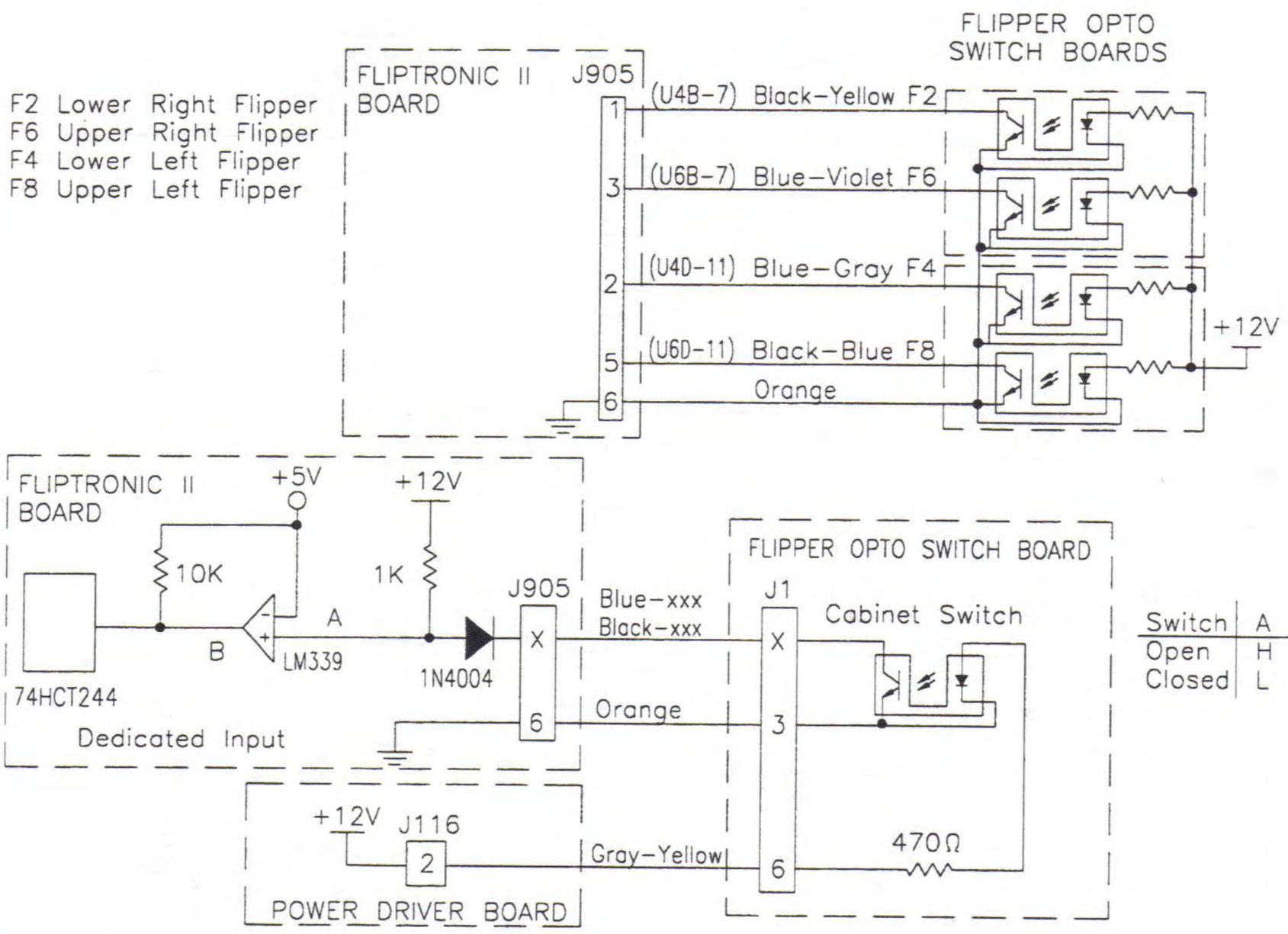
The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

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

Flipper Cabinet Switch Circuit Diagram



Flipper Cabinet Switches



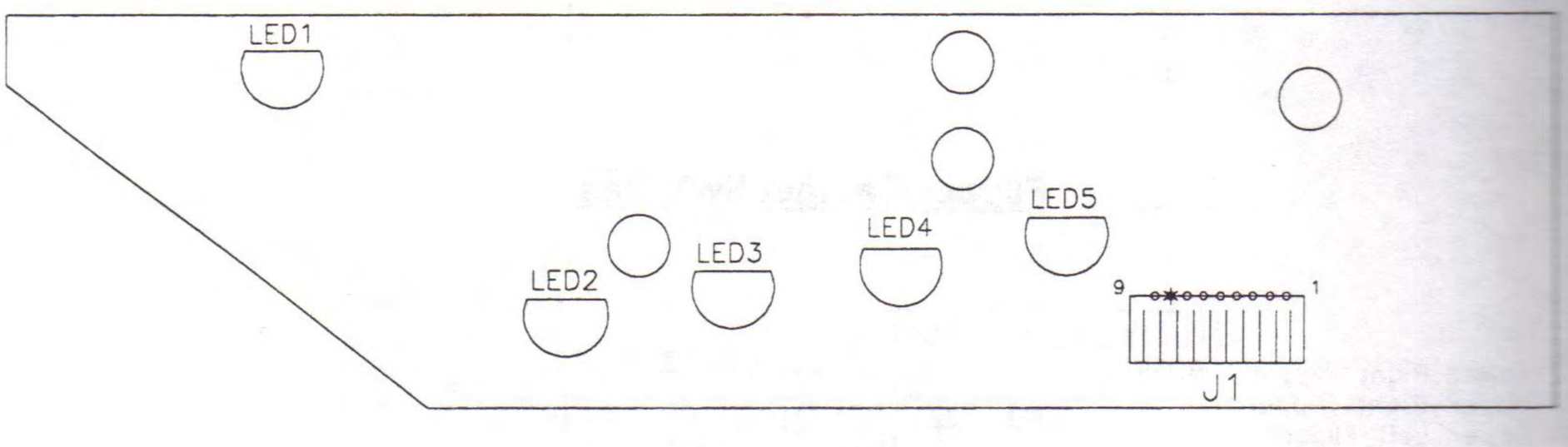
Switch	A	B	
Open	H	H	Off
Closed	L	L	On

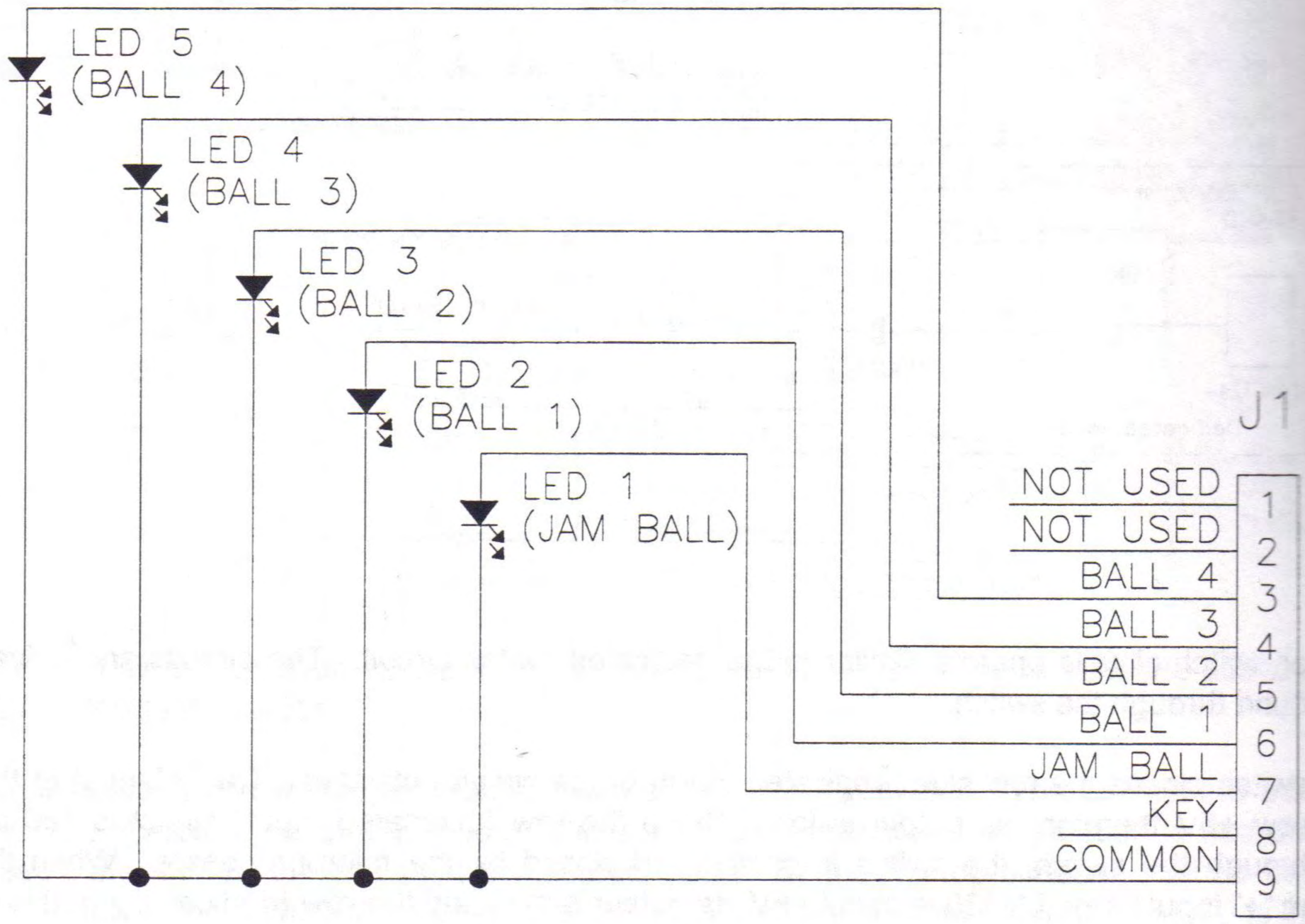
flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and to ground through the switch.

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

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

J1-1 Not Used
J1-2 Not Used
J1-3 Gray-Green, from 16 Opto P.C.B. J1-4
J1-4 Gray-Black, from 16 Opto P.C.B. J1-5
J1-5 Gray-Orange, from 16 Opto P.C.B. J165
J1-6 Gray-Red, from 16 Opto P.C.B. J1-7
J1-7 Gray-Brown, from 16 Opto P.C.B. J1-9
J1-8 Key
J1-9 Black, from 16 Opto P.C.B. J1-10

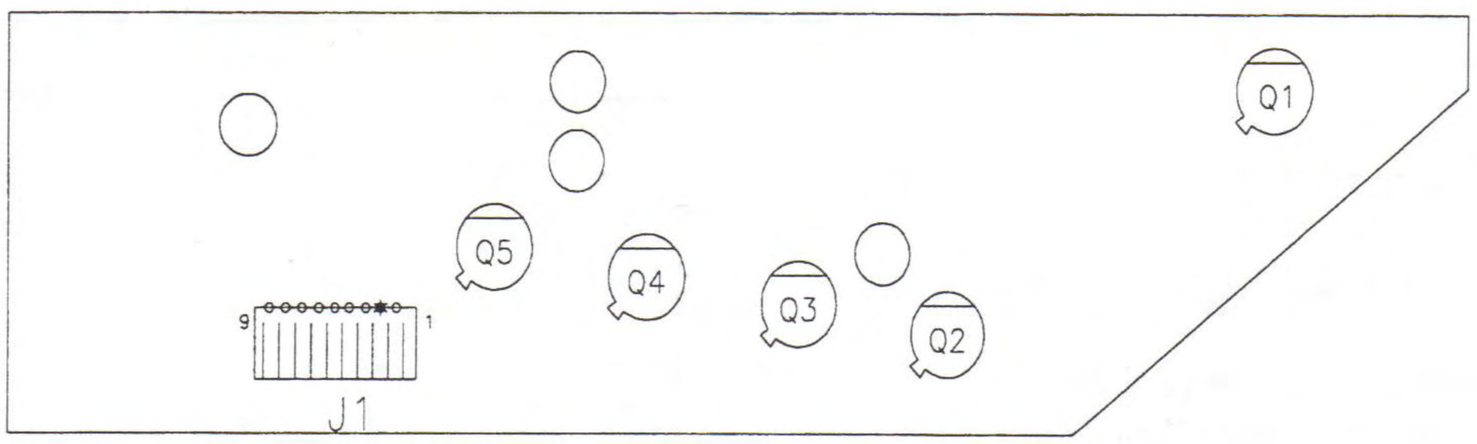


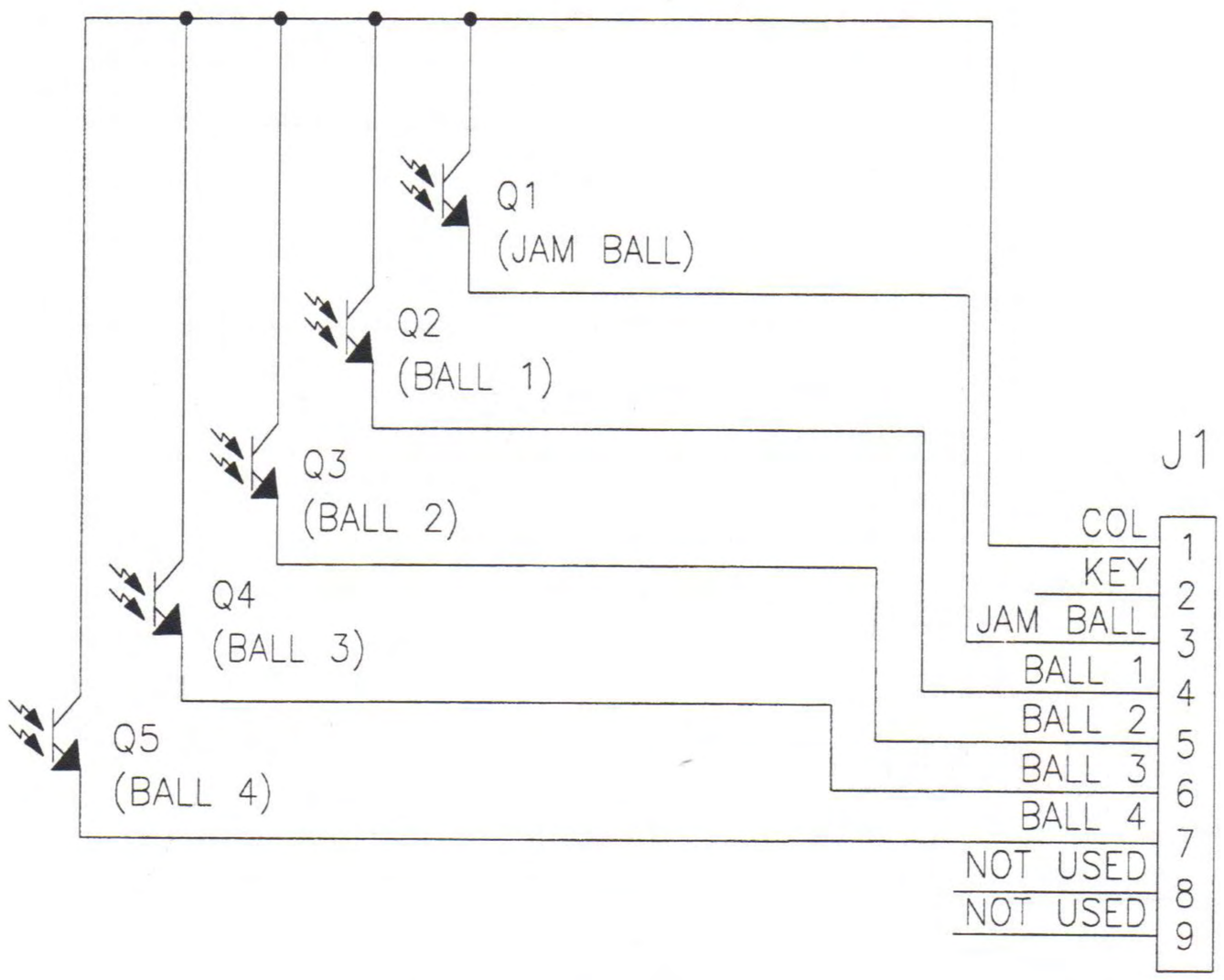


Trough 7 IRED Circuit

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

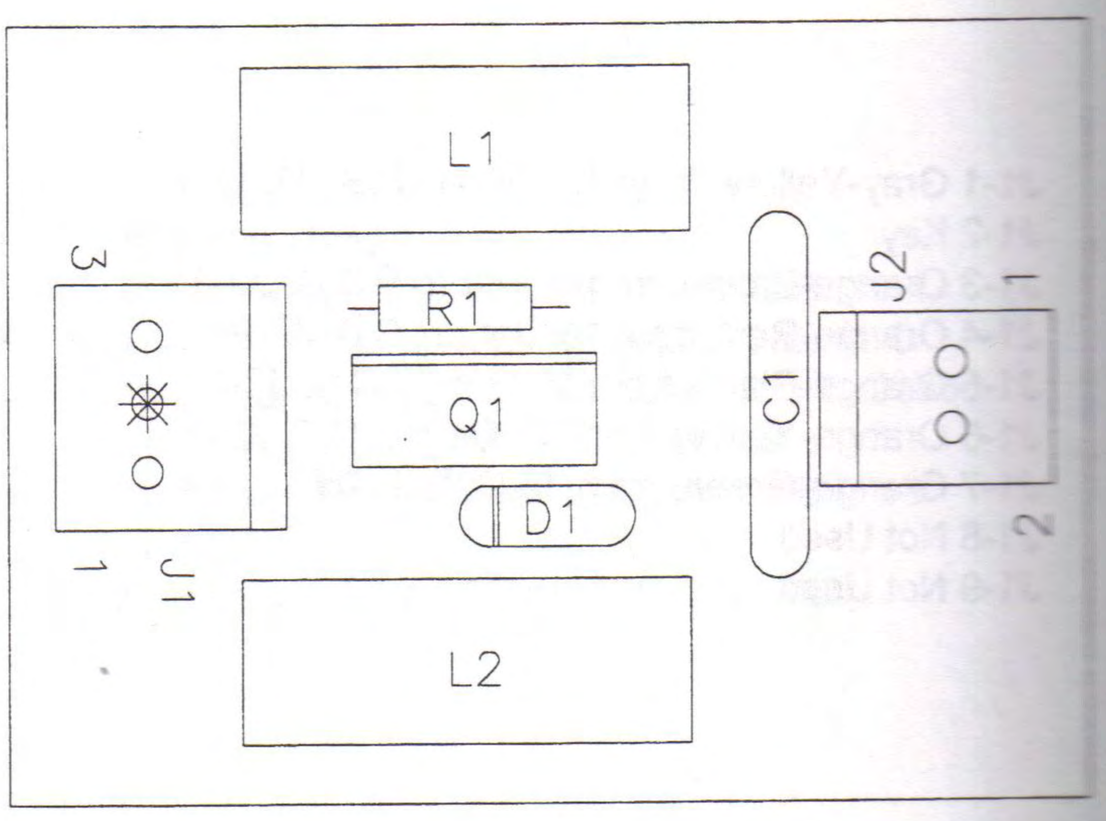
J1-1 Gray-Yellow, from 16 Opto P.C.B. J2-1
J1-2 Key
J1-3 Orange-Brown, from 16 Opto P.C.B. J2-10
J1-4 Orange-Red, from 16 Opto P.C.B. J2-9
J1-5 Orange-Black, from 16 Opto P.C.B. J2-8
J1-6 Orange-Yellow, from 16 Opto P.C.B. J2-7
J1-7 Orange-Green, from 16 Opto P.C.B. J2-6
J1-8 Not Used
J1-9 Not Used





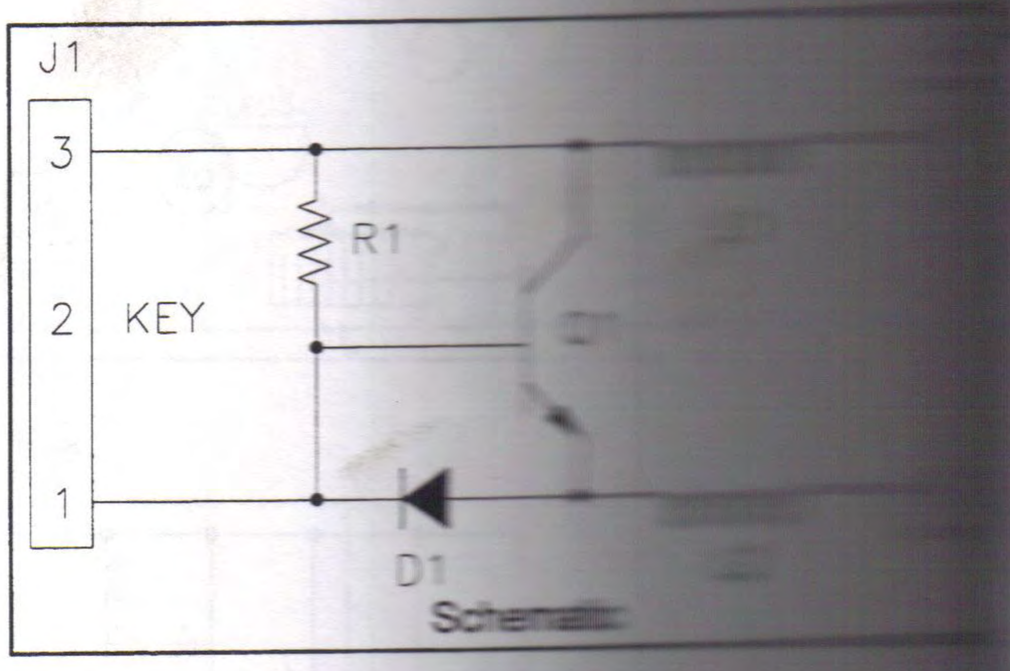
Trough 7 IR TSTR Circuit

MOTOR EMI P.C.B.
A-15340

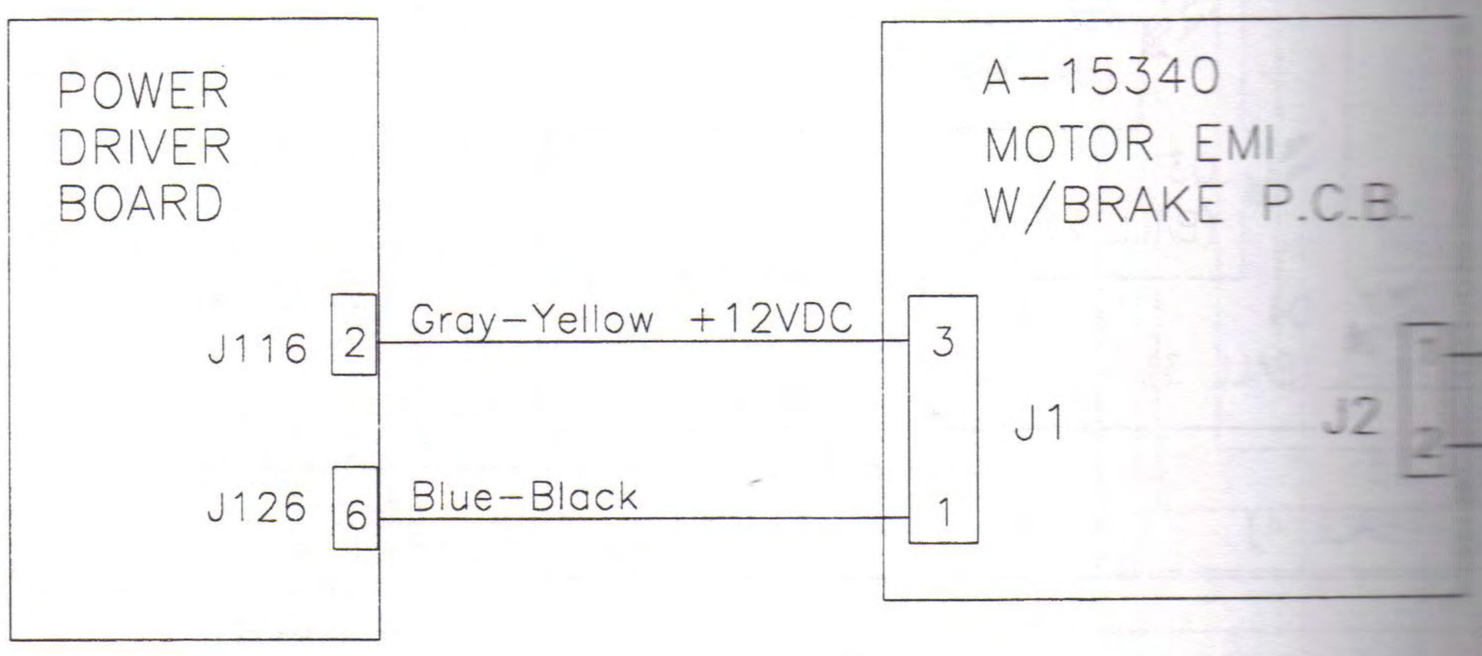


J1-1 Black-Red from J126-6
J1-2 Key
J1-3 Gray-Yellow +12VDC from J116-2

J2-1 Red +20VDC to motor (Sol 22)
J2-2 Black Ground to motor (Sol 22)

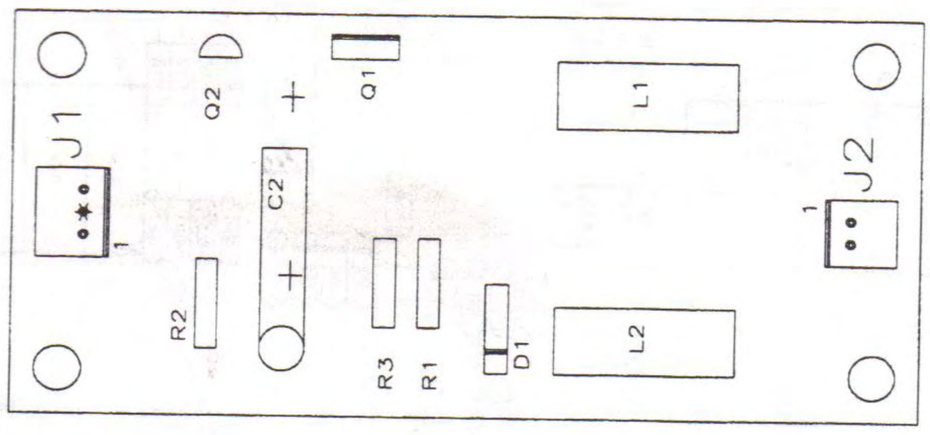


Schematic



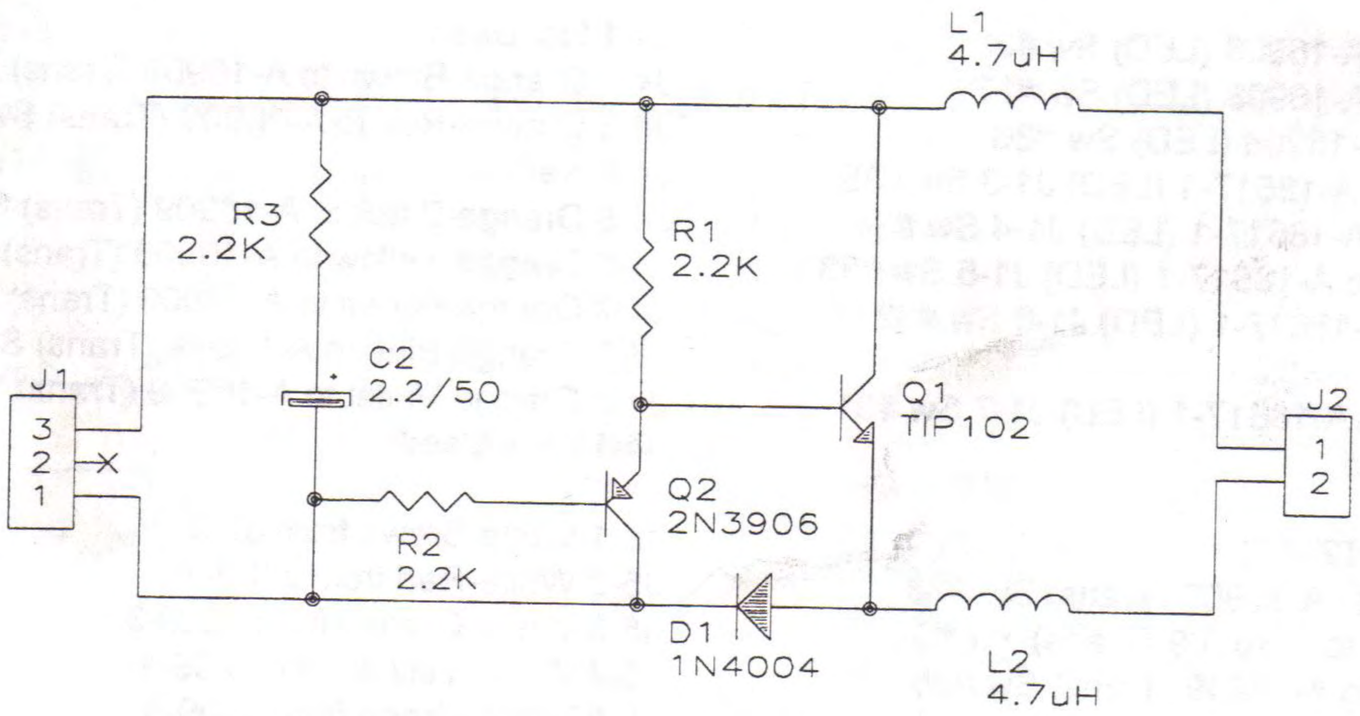
Circuit

STEPPER MOTOR DRIVER P.C.B.
A-19043-1

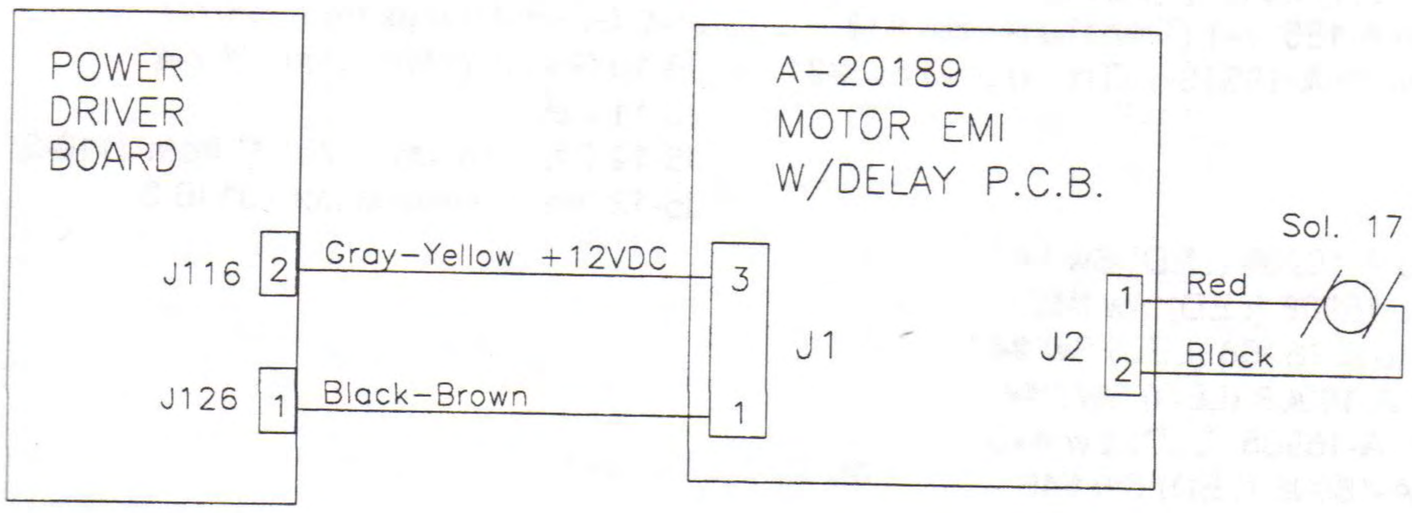


1-1 Black-Brown from J126-1
1-2 Key
1-3 Gray-Yellow +12VDC from J116-2

2-1 Red +20VDC to motor (Sol 17)
2-2 Black Ground to motor (Sol 17)

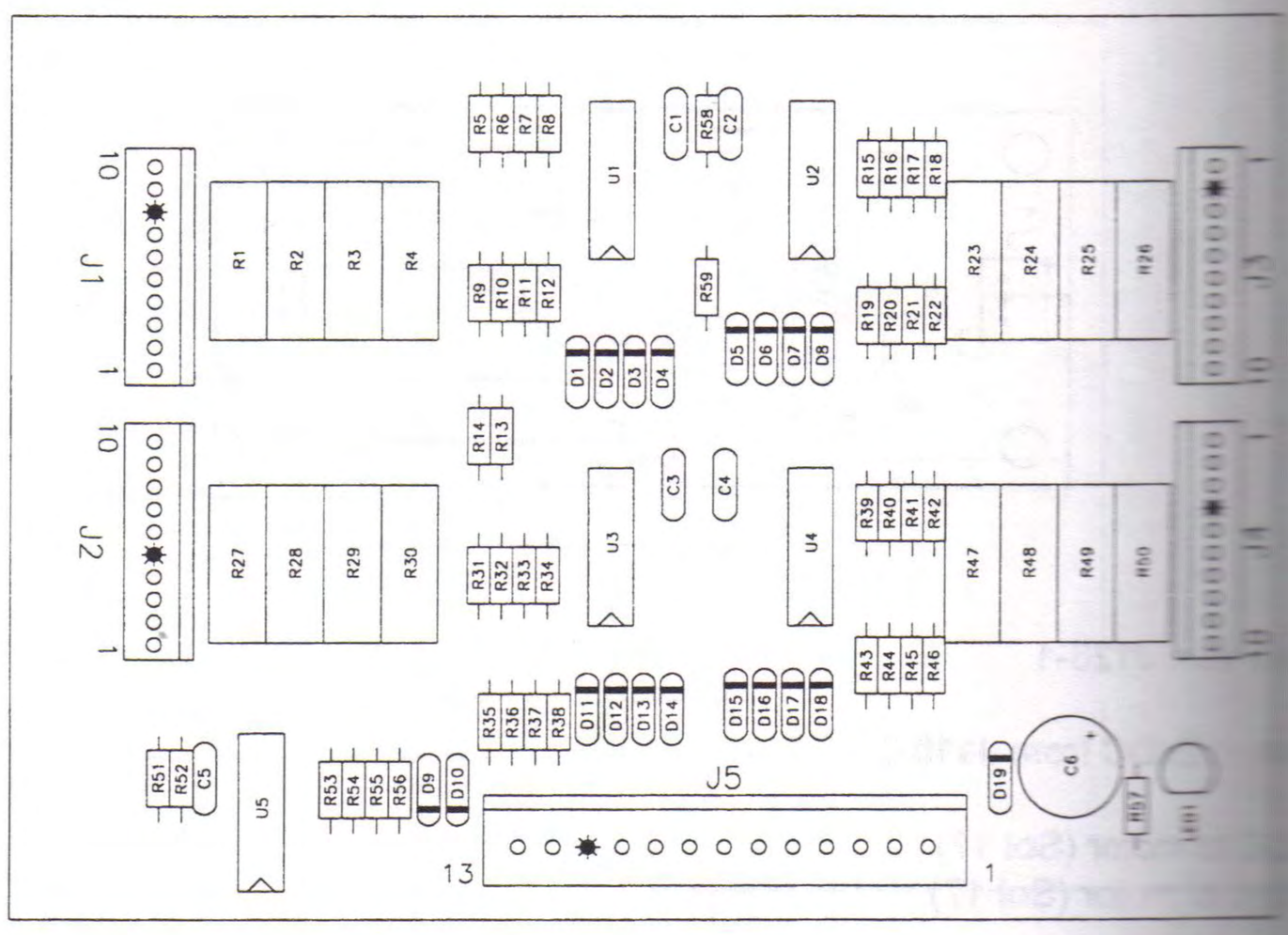


Schematic



Circuit

16 OPTO P.C.B.
A-16998.1



J1-1 Gray-White to A-16908 (LED) Sw #38
J1-2 Gray-Violet to A-16908 (LED) Sw #37
J1-3 Gray-Blue to A-16908 (LED) Sw #36
J1-4 Gray-Green to A-18617-1 (LED) J1-3 Sw #35
J1-5 Gray-Black to A-18617-1 (LED) J1-4 Sw #34
J1-6 Gray-Orange to A-18617-1 (LED) J1-5 Sw #33
J1-7 Gray-Red to A-18617-1 (LED) J1-6 Sw #32
J1-8 Key
J1-9 Gray-Brown to A-18617-1 (LED) J1-7 Sw #31
J1-10 Black, Ground

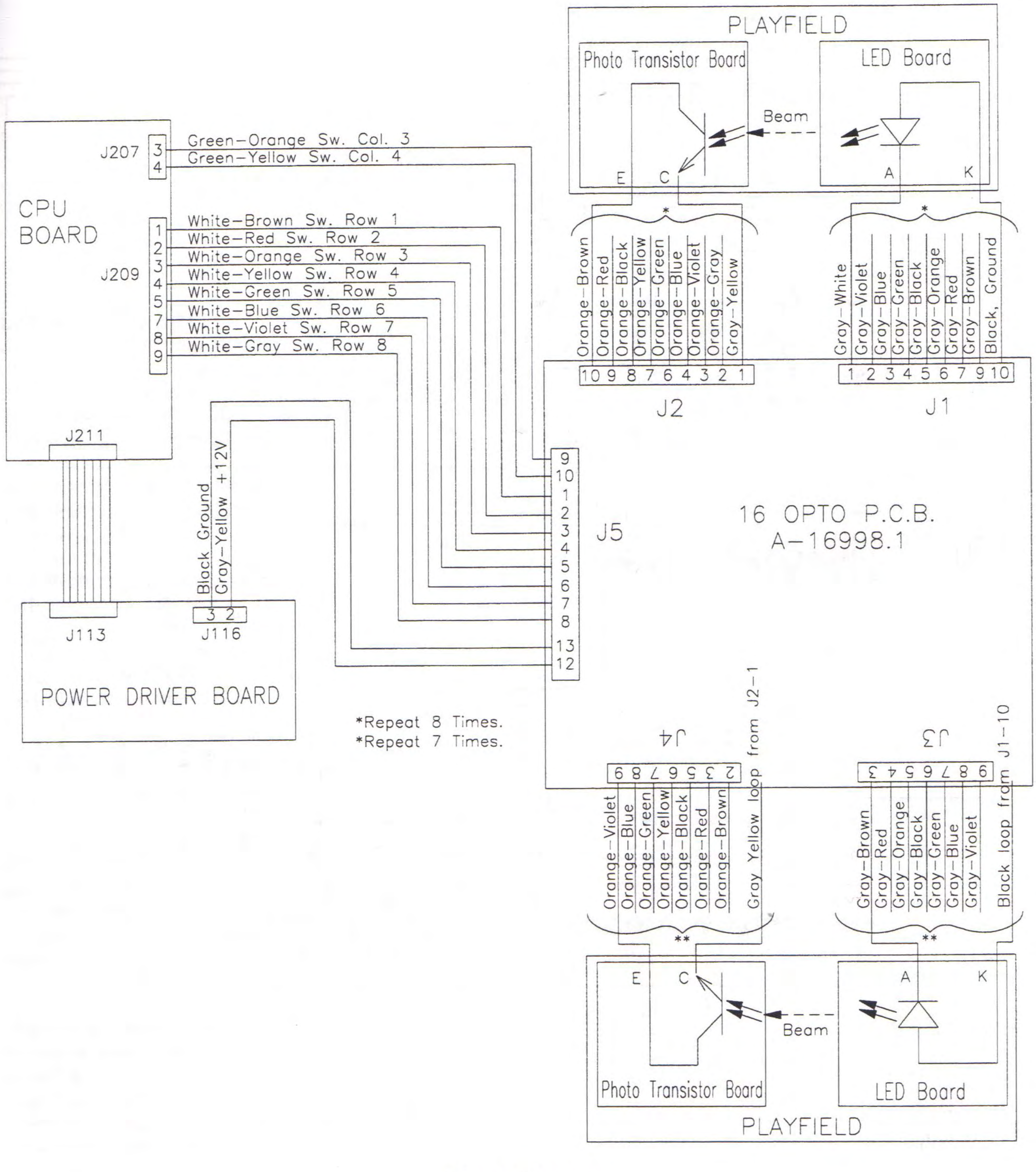
J2-1 Gray-Yellow +12VDC
J2-2 Orange-Gray to A-16909 (Trans) Sw #38
J2-3 Orange-Violet to A-16909 (Trans) Sw #37
J2-4 Orange-Blue to A-16909 (Trans) Sw #36
J2-5 Key
J2-6 Orange-Green to A-18618-1 (Trans) J1-7 Sw #35
J2-7 Orange-Yellow to A-18618-1 (Trans) J1-6 Sw #34
J2-8 Orange-Black to A-18618-1 (Trans) J1-5 Sw #33
J2-9 Orange-Red to A-18618-1 (Trans) J1-4 Sw #32
J2-10 Orange-Brown to A-18618-1 (Trans) J1-3 Sw #31

J3-1 Not Used
J3-2 Key
J3-3 Gray-Brown to A-16908 (LED) Sw #41
J3-4 Gray-Red to A-16908 (LED) Sw #42
J3-5 Gray-Orange to A-16908 (LED) Sw #43
J3-6 Gray-Black to A-16908 (LED) Sw #44
J3-7 Gray-Green to A-16908 (LED) Sw #45
J3-8 Gray-Blue to A-16908 (LED) Sw #46
J3-9 Gray-Violet to A-16908 (LED) Sw #47
J3-10 Not Used

J4-1 Not Used
J4-2 Orange-Brown to A-16909 (Trans) Sw #
J4-3 Orange-Red to A-16909 (Trans) Sw #
J4-4 Key
J4-5 Orange-Black to A-16909 (Trans) Sw #
J4-6 Orange-Yellow to A-16909 (Trans) Sw #
J4-7 Orange-Green to A-16909 (Trans) Sw #
J4-8 Orange-Blue to A-16909 (Trans) Sw #
J4-9 Orange-Violet to A-16909 (Trans) Sw #
J4-10 Not Used

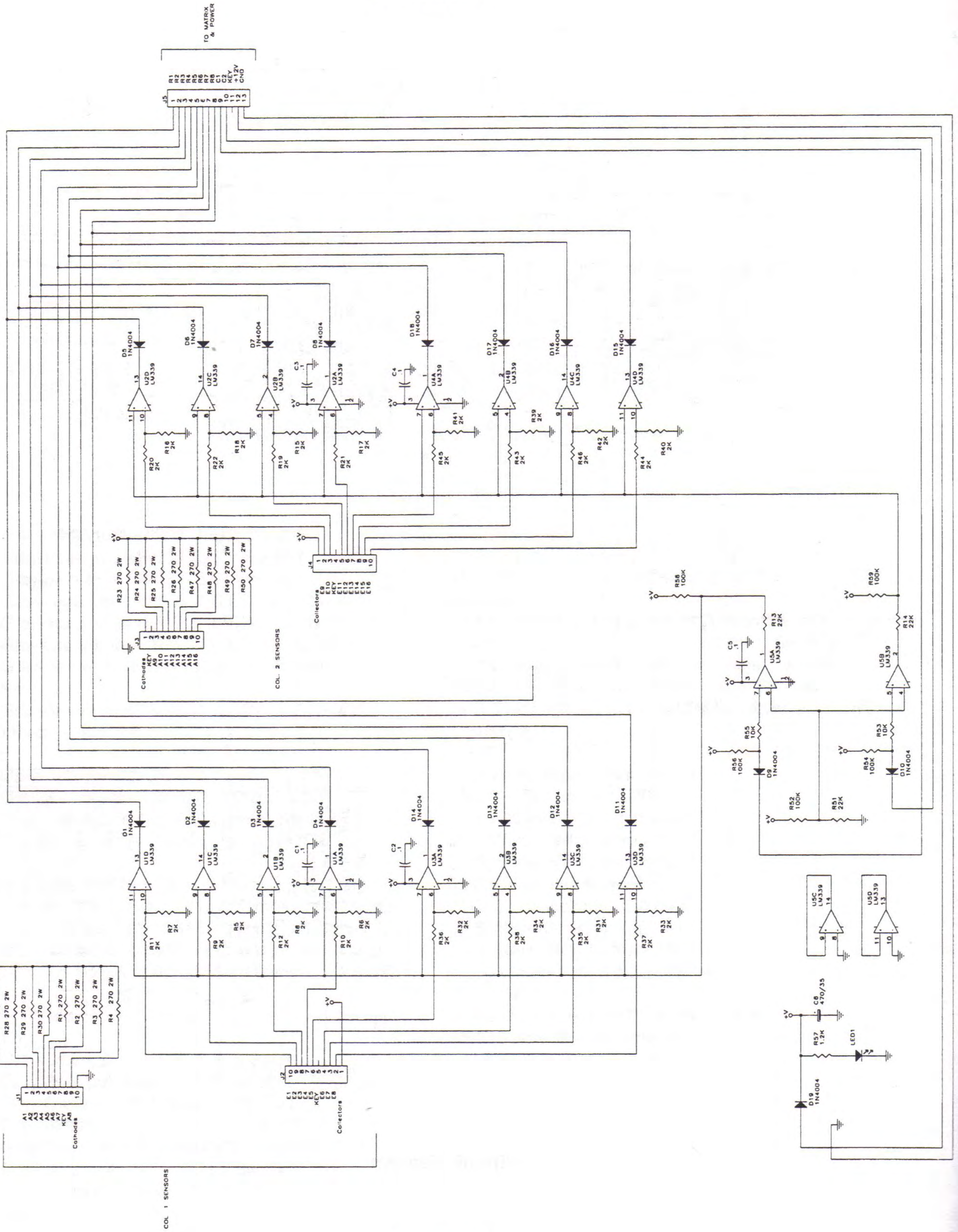
J5-1 White-Brown from J209-1
J5-2 White-Red from J209-2
J5-3 White-Orange from J209-3
J5-4 White-Yellow from J209-4
J5-5 White-Green from J209-5
J5-6 White-Blue from J209-7
J5-7 White-Violet from J209-8
J5-8 White-Gray from J209-9
J5-9 Green-Orange from J207-3
J5-10 Green-Yellow from J207-4
J5-11 Key
J5-12 Gray-Yellow +12VDC from J116-2
J5-13 Black, Ground from J116-3

16 OPTO P.C.B.
A-16998.1



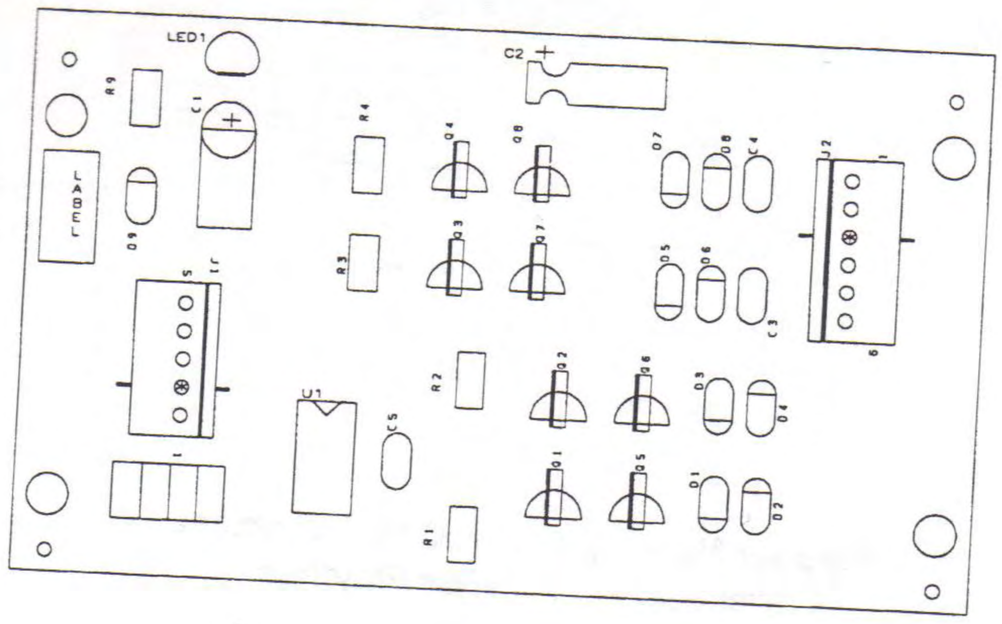
Circuit Diagram

16 OPTO P.C.B.
A-16998.1



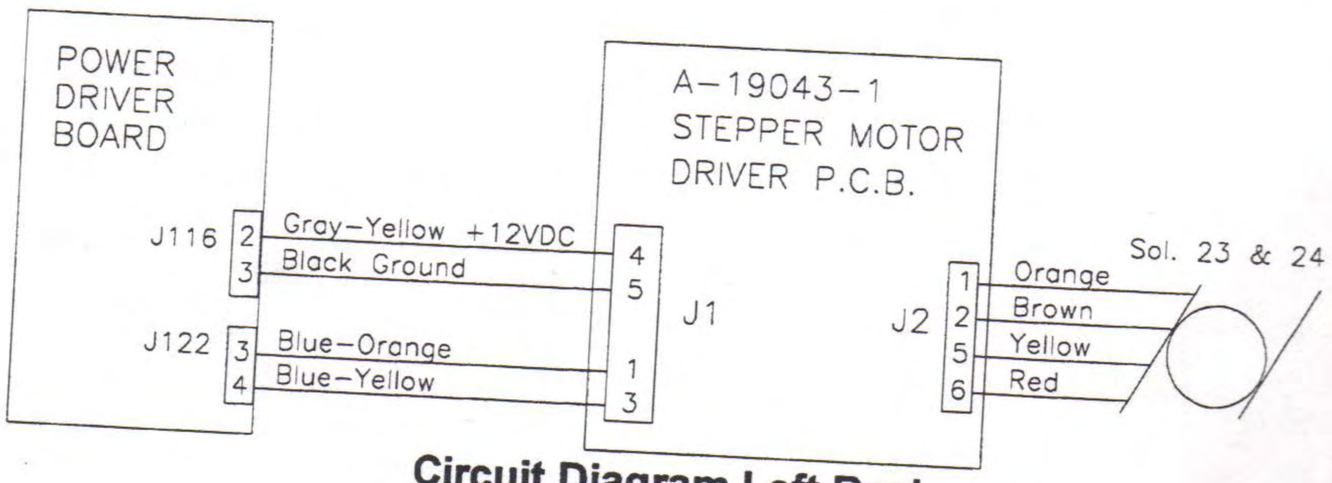
Schematic

STEPPER MOTOR DRIVER P.C.B.
A-19043-1



Left Reel Sol 23 & 24
J1-1 Blue-Orange from J122-3
J1-2 Key
J1-3 Blue-Yellow from J122-4
J1-4 Gray-Yellow +12VDC from J116-2
J1-5 Black ground from J116-3

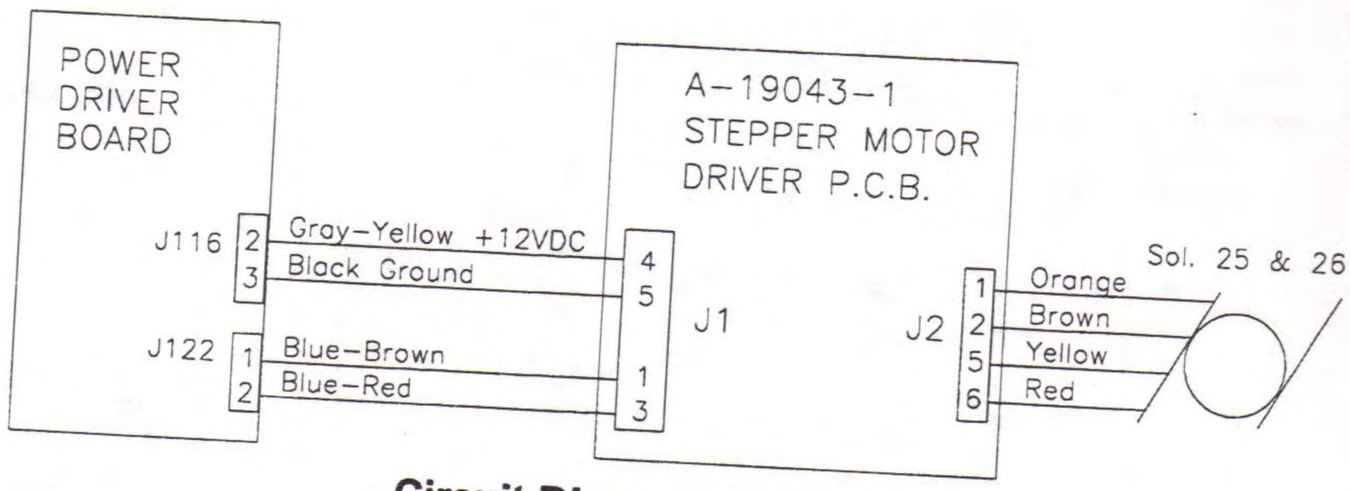
J2-1 Orange to Stepper Motor
J2-2 Brown to Stepper Motor
J2-3 Key
J2-4 Not Used
J2-5 Yellow to Stepper Motor
J2-6 Red to Stepper Motor



Circuit Diagram Left Reel

Center Reel Sol 25 & 26
J1-1 Blue-Brown from J122-1
J1-2 Key
J1-3 Blue-Red from J122-2
J1-4 Gray-Yellow +12VDC from J116-2
J1-5 Black ground from J116-3

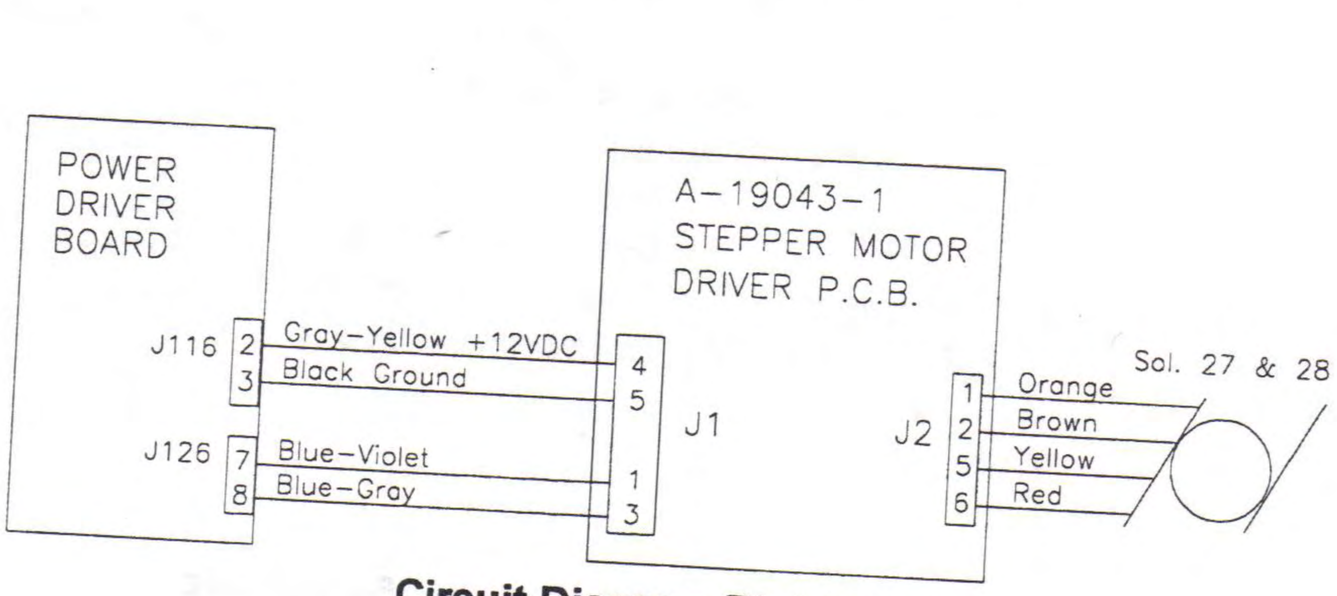
J2-1 Orange to Stepper Motor
J2-2 Brown to Stepper Motor
J2-3 Key
J2-4 Not Used
J2-5 Yellow to Stepper Motor
J2-6 Red to Stepper Motor



Circuit Diagram Center Reel

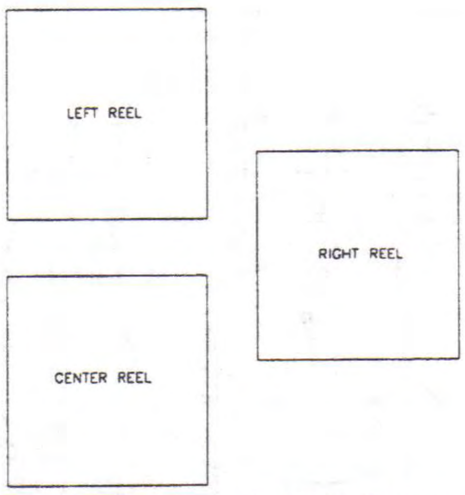
Right Reel Sol 27 & 28
J1-1 Blue-Violet from J126-7
J1-2 Key
J1-3 Blue-Gray from J126-8
J1-4 Gray-Yellow +12VDC from J116-2
J1-5 Black ground from J116-3

J2-1 Orange to Stepper Motor
J2-2 Brown to Stepper Motor
J2-3 Key
J2-4 Not Used
J2-5 Yellow to Stepper Motor
J2-6 Red to Stepper Motor

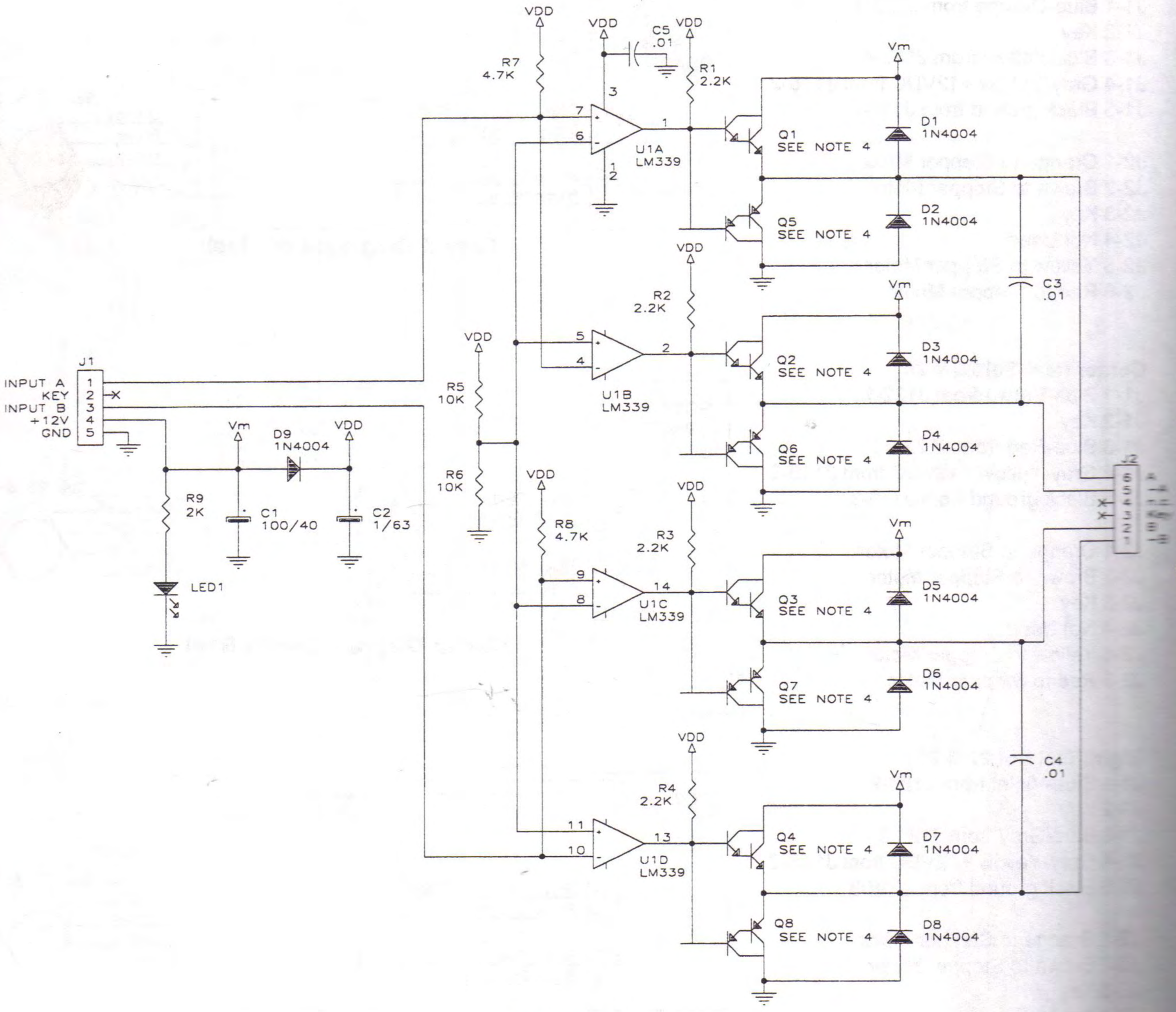


Circuit Diagram Right Reel

STEPPER MOTOR DRIVER P.C.B.
A-19043-1

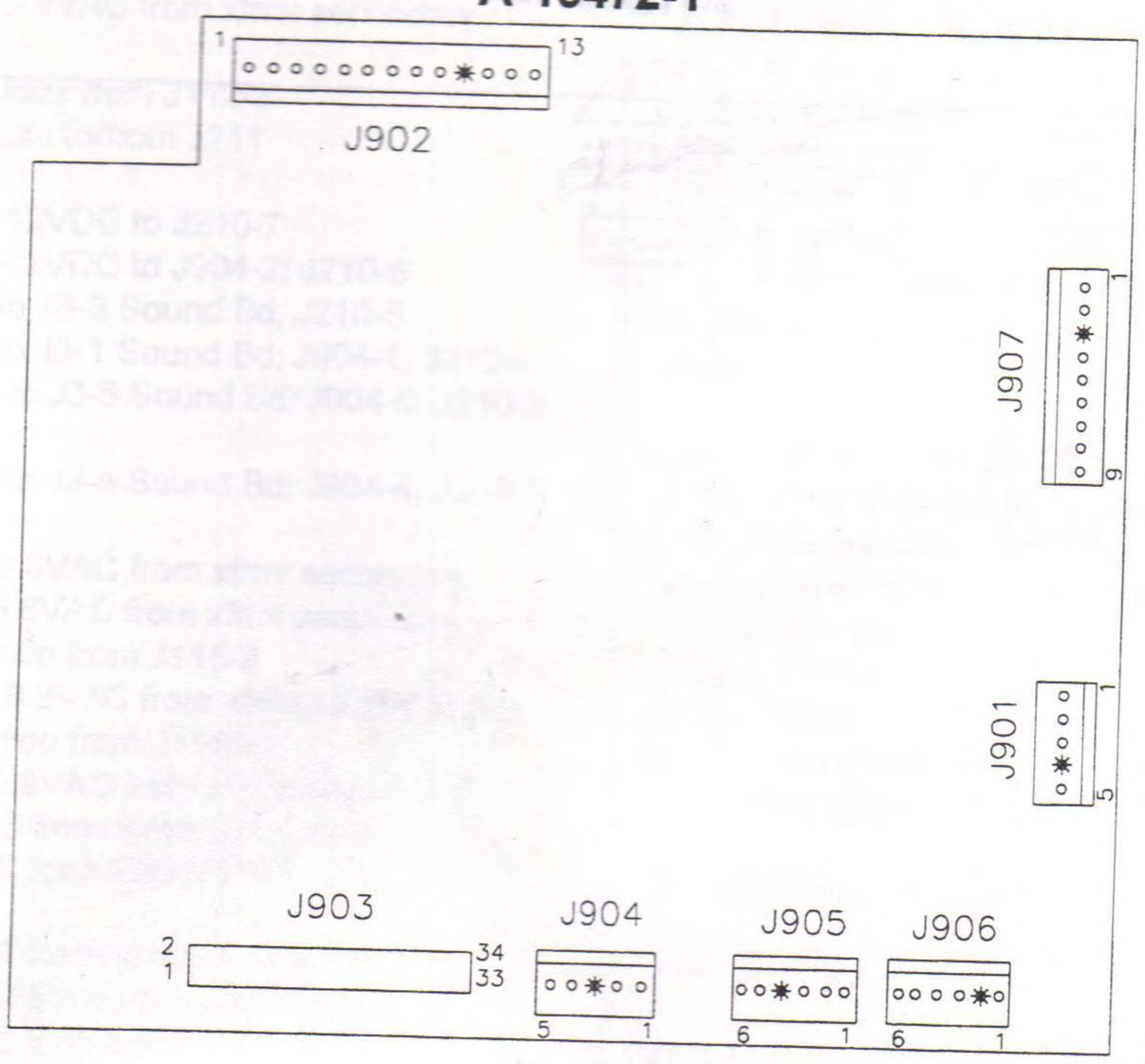


Stepper Motor Driver P.C.B. Placement
Viewed From Under Playfield



Schematic

Fliptronic II Board
A-15472-1



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

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

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

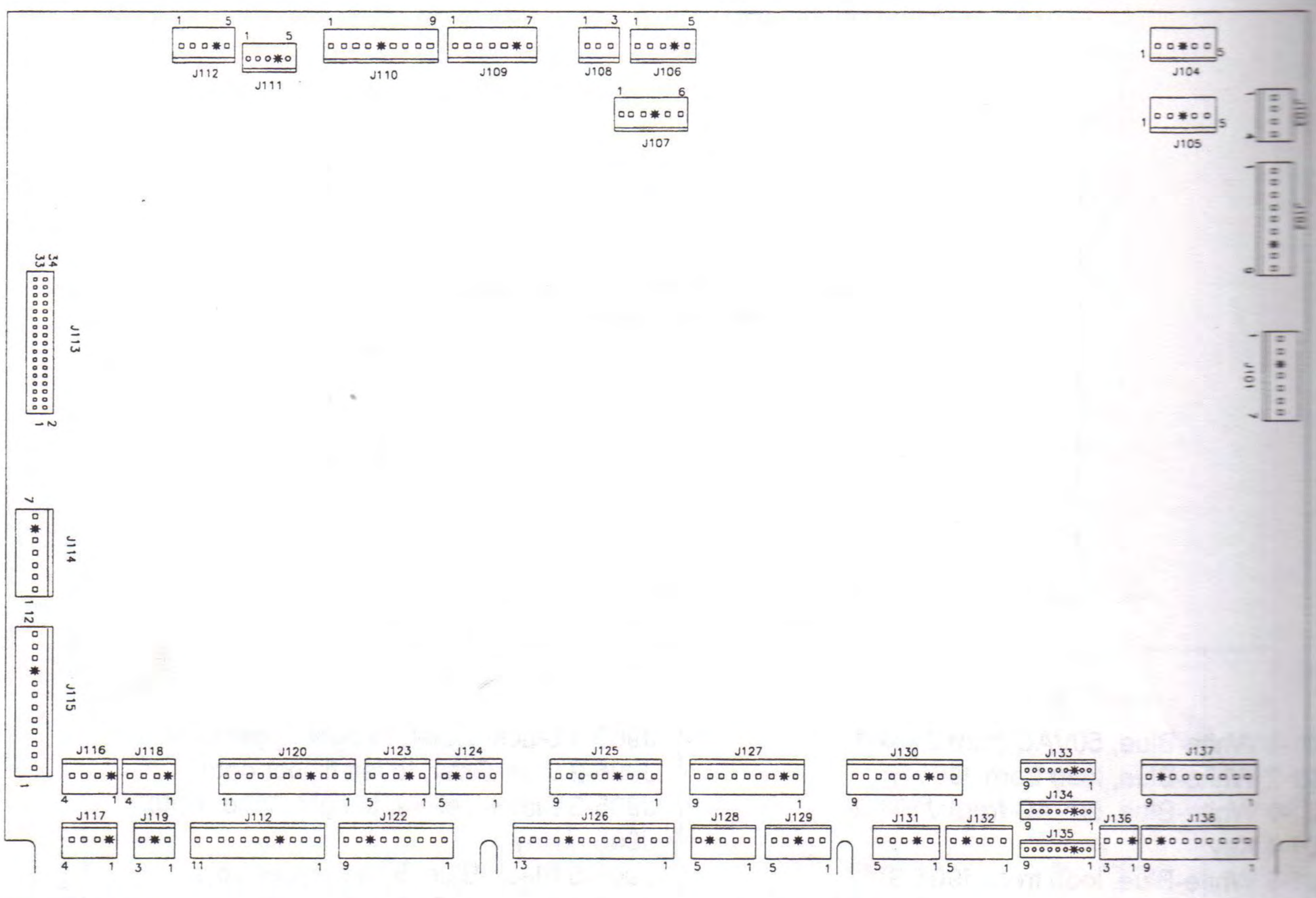
J904-1 Gray, +5V to/from J114-4; J210-4
J904-2 Gray-Green, +12V to/from J114-2; J210-6
J904-3 Key
J904-4 Black, Ground to/from J114-7; J210-1
J904-5 Black, Ground to/from J114-5; J210-3

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

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

J907-1 Red-Green, +50V to lower right flipper
J907-2 Red-Green, loop from J907-1
J907-3 Key
J907-4 Red-Blue, +50V to lower left flipper
J907-5 Red-Blue, loop from J907-4
J907-6 Not Used
J907-7 Not Used
J907-8 Red-Gray, +50V to upper left flipper
J907-9 Red-Gray, loop from J907-8

Power Driver Board
A-12697-4



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

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

J103 Not Used

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

J105-1 Not Used
J105-2 Not Used
J105-3 Not Used
J105-4 Key
J105-5 Red-White +20V to insert flashlamps

J106 Not Used

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

J108 Not Used

J109 Not Used

J110 Not Used

J111 Not Used

J128 Not Used

J129 Not Used

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

J131 Not Used

J132 Not Used

J133 Not Used

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

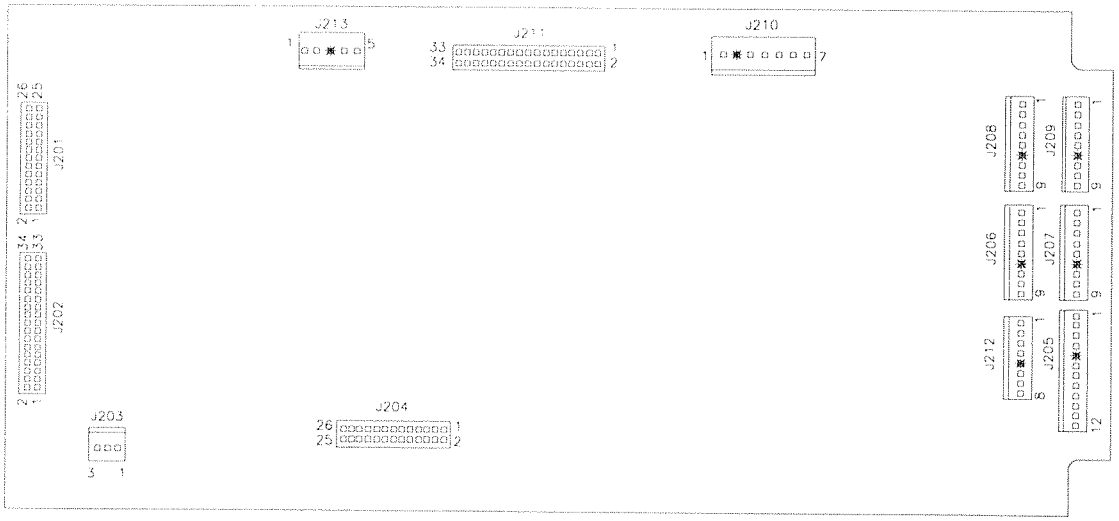
J135-1 Red-Brown Row 1 to playfield lamps
J135-2 Red-Black Row 2 to playfield lamps
J135-3 Key
J135-4 Red-Orange Row 3 to playfield lamps
J135-5 Red-Yellow Row 4 to playfield lamps
J135-6 Red-Green Row 5 to playfield lamps
J135-7 Red-Blue Row 6 to playfield lamps
J135-8 Red-Violet Row 7 to playfield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

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

J137 Not Used

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

WPC Security CPU Board
A-17651-50044



J201 Ribbon Cable data to J602

J202 Ribbon Cable data to J903; J506; J601

J203 Not Used

J204 Ribbon Cable data to A-16100 J1

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

J206 Not Used

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

J208 Not Used

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

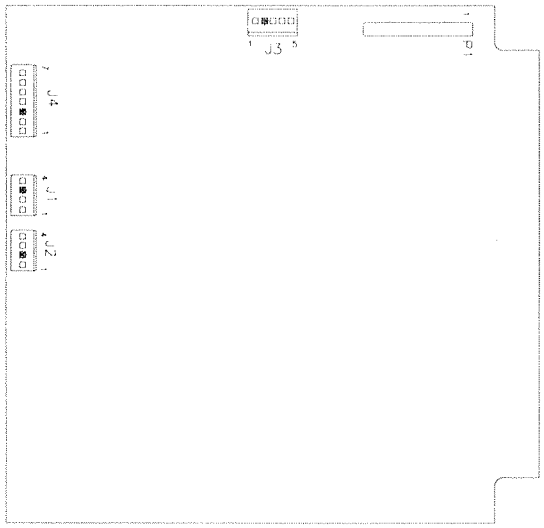
J210-1 Black ground from J904-4;J3-4 Sound Bd; J114-7
J210-2 Key
J210-3 Black ground from J904-4; J3-5 Sound Bd; J114-5
J210-4 Gray +5VDC from J901-1; J3-1 Sound Bd; J114-4
J210-5 Gray +5VDC from J3-3 Sound Bd; J114-3
J210-6 Gray-Green +12VDC from J904-2; J114-2
J210-7 Gray-Green +12VDC from J114-1

J211 Ribbon Cable data from J113

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

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

Sound Board
A-16917-50044



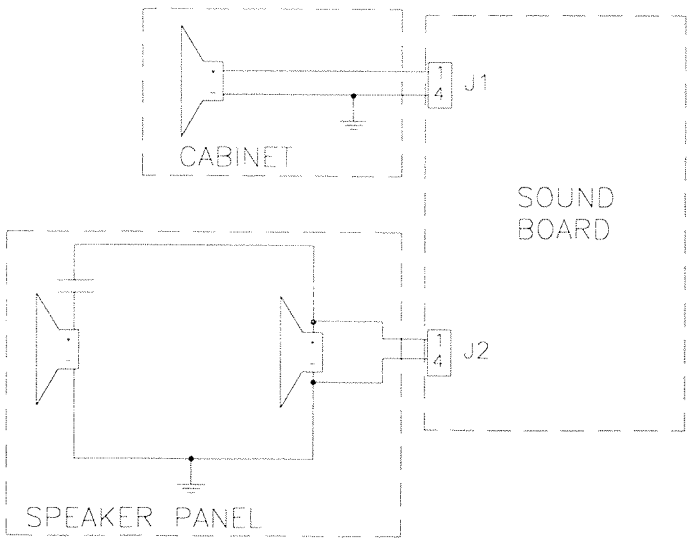
P1 34-pin Ribbon Cable data to/from J601; J903; J202

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

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

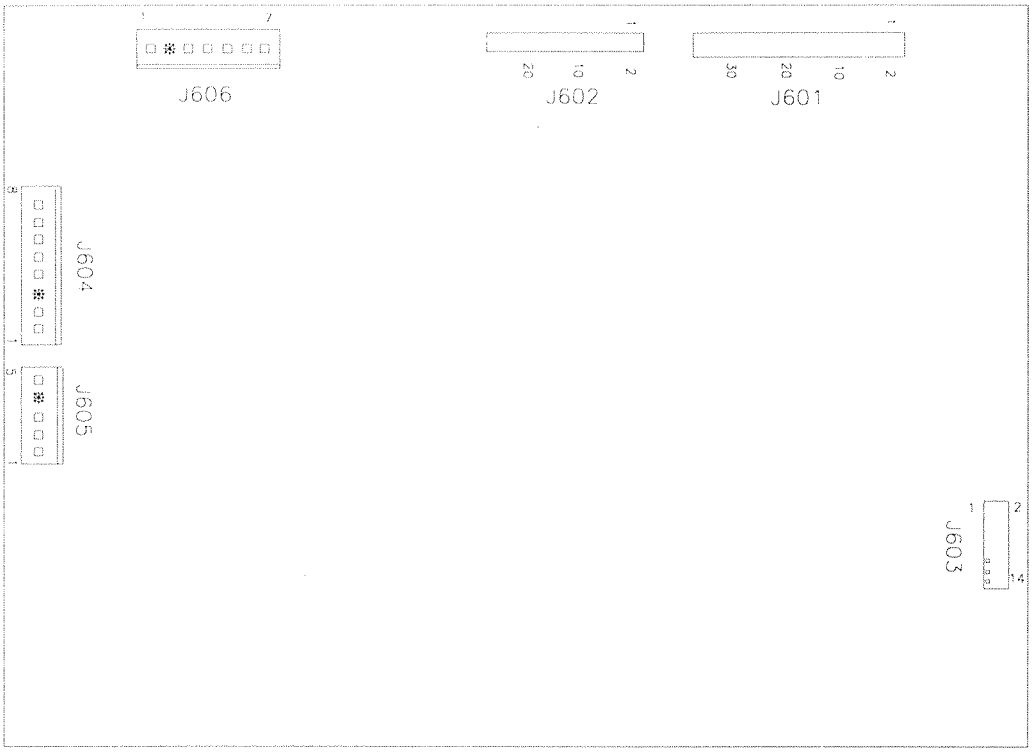
J3-1 Gray +5V from J114-4; J904-1; J210-4
J3-2 Key
J3-3 Gray +5V from J114-3; J210-5
J3-4 Black ground from J114-7; J904-4; J210-1
J3-5 Black ground from J114-5; J904-5; J210-3

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



Speaker Wiring Diagram

Dot Matrix Controller Board
A-14039.1



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

J602 Ribbon Cable data from J201

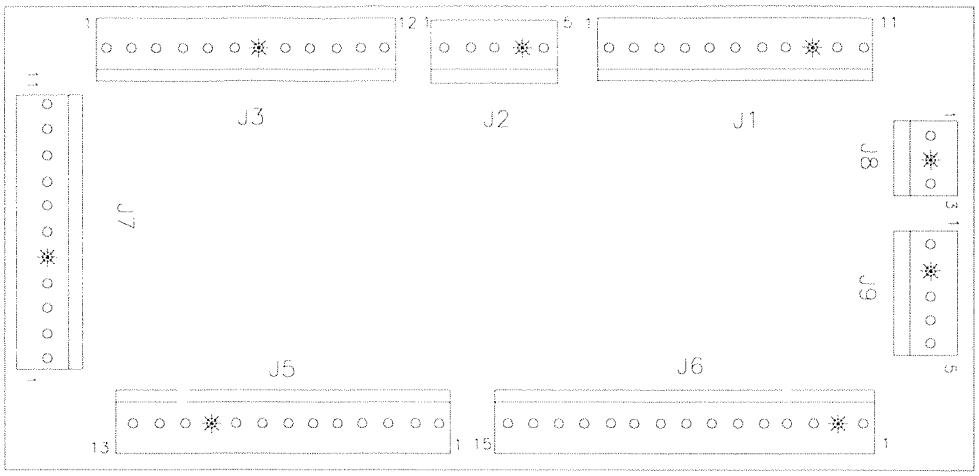
J603 Ribbon Cable data to Dot Matrix Display/Driver

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

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

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

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



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

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

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

J4 Not Used

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

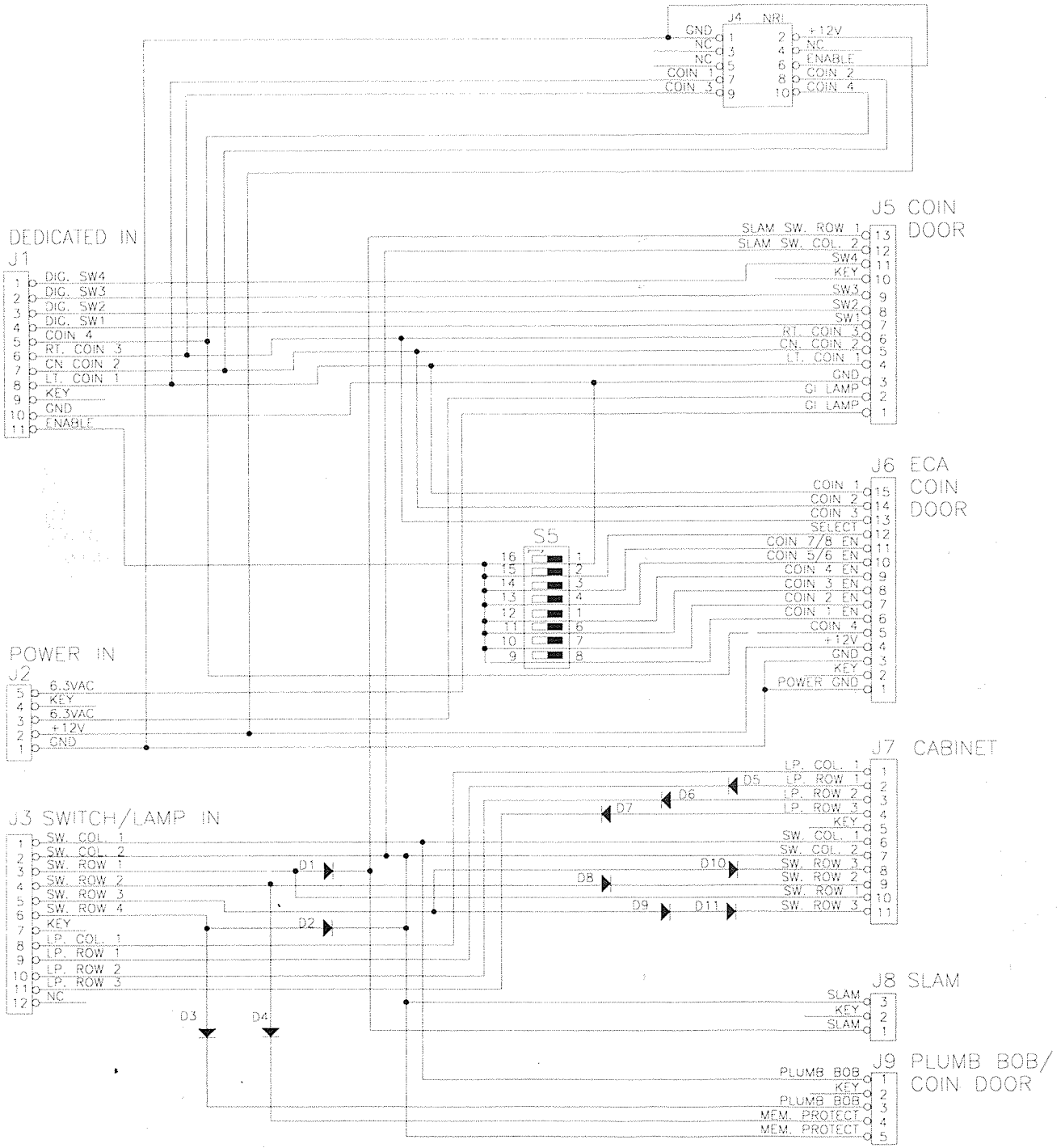
J6 Not Used

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

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

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

Coin Door Interface P.C.B. Schematic



LAMP MATRIX

Yellow (B+) → Red

Column / Row	1 Yellow-Brown J137-1 Q98	2 Yellow-Red J137-2 Q97	3 Yellow-Orange J137-3 Q96	4 Yellow-Black J137-4 Q95	5 Yellow-Green J137-5 Q94	6 Yellow-Blue J137-6 Q93	7 Yellow-Violet J138-7 Q92	8 Yellow-Gray J138-9 Q91
1 Red-Brown J133-1 Q90	TRIXIE 11	MAP 21	CASE 1 31	BULLET 41	SLOT RIGHT 51	RIGHT JACKPOT 61	RIGHT LOOP MARK 71	SLOT CENTER 81
2 Red-Black J133-2 Q89	BRUNO 12	FLASHLIGHT 22	CASE 2 32	MIRROR 42	T A X (I) 52	PENTHOUSE KEY 62	BLACK 72	SLOT LEFT 82
3 Red-Orange J133-4 Q88	BUTLER 13	MAGNIFYING GLASS 23	CASE 3 33	DAGGER 43	T A (X) I 53	RIGHT HOLE MARK 63	TRAIN COMBOS 73	LEFT SPOT 83
4 Red-Yellow J133-5 Q87	VICTORIA 14	REVOLVER 24	CASE 4 34	PRINT 44	T (A) X I 54	RIGHT SPIN 64	RIGHT TAXI CHASE 74	RIGHT SPOT 84
5 Red-Green J133-6 Q86	TONY 15	LEFT SPIN 25	CASE 5 35	MATCHES 45	(T) A X I 55	ROULETTE 65	DOWN ELEVATOR 75	NOT USED 85
6 Red-Blue J133-7 Q85	LEFT JET BUMPER 16	EXTRA BALL 26	LEFT HOLE MARK 36	LEFT FREE SPIN 46	LEFT TAXI CHASE 56	MIDDLE SPIN 66	EXIT ELEVATOR 76	NOT USED 86
7 Red-Violet J133-8 Q84	RIGHT JET BUMPER 17	WHO DUNNIT 27	MYSTERY 37	SHOOT AGAIN 47	NUDGE SLOTS 57	LEFT JACKPOT 67	UP ELEVATOR 77	BUY-IN BUTTON 87
8 Red-Gray J133-9 Q83	BOTTOM JET BUMPER 18	RED 28	LEFT LITE TAXI 38	RIGHT LANE MARK 48	LEFT LOOP MARK 58	RIGHT LITE TAXI 68	RIGHT FREE SPIN 78	START 88

J1XX = Power Driver Board

SWITCH MATRIX

White → Green

Dedicated Grounded Switches	Column / Row	1 Green-Brown J207-1 U20-18	2 Green-Red J207-2 U20-17	3 Green-Orange J207-3 U20-16	4 Green-Yellow J207-4 U20-15	5 Green-Black J207-5 U20-14	6 Green-Blue J207-6 U20-13	7 Green-Violet J207-7 U20-12	8 Green-Gray J207-9 U20-11	Flipper Grounded Switches
Orange-Brown (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	3-BANK POSITION 2 11	SLAM TILT 21	TROUGH JAM 31	TOP LEFT HOLE 41	LOCK UP 1 51	LEFT SLING 61	TOP 2-BANK 71	NOT USED 81	Black-Green J906-1 Right Flipper EOS F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	SLOT INDEX LEFT 12	COIN DOOR CLOSED 22	TROUGH 1 32	POST JETS 42	TOP 4-BANK 52	RIGHT SLING 62	BOTTOM 2-BANK 72	NOT USED 82	Black-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	START BUTTON 13	BUY-IN BUTTON 23	TROUGH 2 33	BACK RIGHT POPPER 43	2ND 4-BANK 53	LEFT JET 63	3-BANK POSITION UP 73	NOT USED 83	Black-Blue J906-3 Left Flipper EOS F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	PLUMB BOB TILT 14	ALWAYS CLOSED 24	TROUGH 3 34	LOWER RIGHT POPPER 44	3RD 4-BANK 54	BOTTOM JET 64	UP DOWN RAMP 74	NOT USED 84	Black-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function: Ser Credits / Test Function: Esc D5	5 White-Green J209-5 U19-11	SHOOTER LANE 15	SLOT INDEX CENTER 25	TROUGH 4 35	NOT USED 45	BOTTOM 4-BANK 55	RIGHT JET 65	SCOOP CENTER 75	NOT USED 85	Black-Violet J906-4 Spinner F5
Orange-Blue (6) J205-7 Normal Function: Vol Down / Test Function: Down D6	6 White-Blue J209-7 U19-9	RIGHT OUTLANE 16	LEFT INLANE 26	ENTER RAMP 36	NOT USED 46	MYSTERY TARGET 56	LEFT 3-BANK 66	SCOOP RIGHT 76	NOT USED 86	Black-Yellow J905-3 Upper Right Flipper Opto F6 (NOT USED)
Orange-Violet (7) J205-8 Normal Function: Vol Up / Test Function: Up D7	7 White-Violet J209-8 U19-5	RIGHT INLANE 17	LEFT OUTLANE 27	MADE RAMP LEFT 37	ENTER RIGHT HOLE 47	LOWER RIGHT LOCK 2 57	CENTER 3-BANK 67	SCOOP LEFT 77	NOT USED 87	Black-Gray J906-5 Upper Left Flipper EOS F7 (NOT USED)
Orange-Gray (8) J205-9 Normal Function: Begin Test / Test Function: Enter D8	8 White-Gray J209-9 U19-7	RIGHT LOOP 18	LEFT LOOP 28	NOT USED 38	SLOT INDEX RIGHT 48	RED 58	RIGHT 3-BANK 68	BLACK 78	NOT USED 88	Black-Blue J905-5 Upper Left Flipper Opto F8 (NOT USED)

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

WARNINGS & NOTICES

WARNING

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

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

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FOR SERVICE...
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3401 N. California Avenue
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16-9834.2
JANUARY, 1995

WPC SCHEMATIC MANUAL

WILLIAMS ELECTRONICS GAMES, INC.
MIDWAY MANUFACTURING COMPANY
3401 North California Ave.
Chicago, Illinois 60618

Table of Contents

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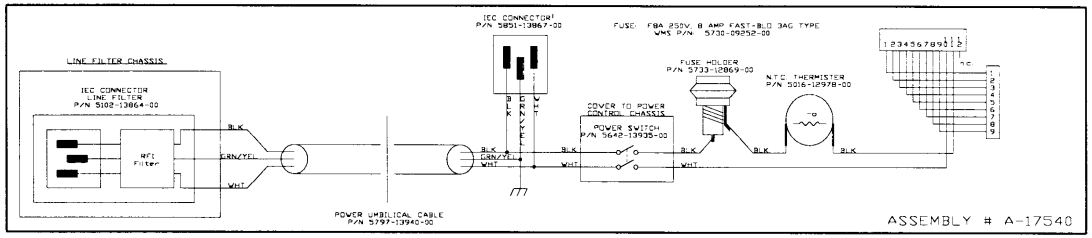

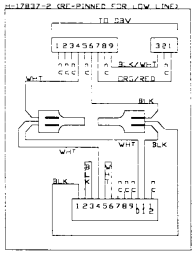

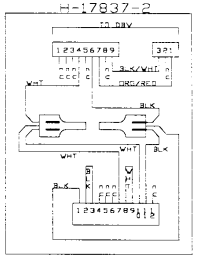

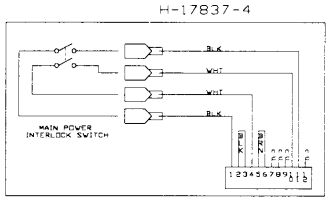

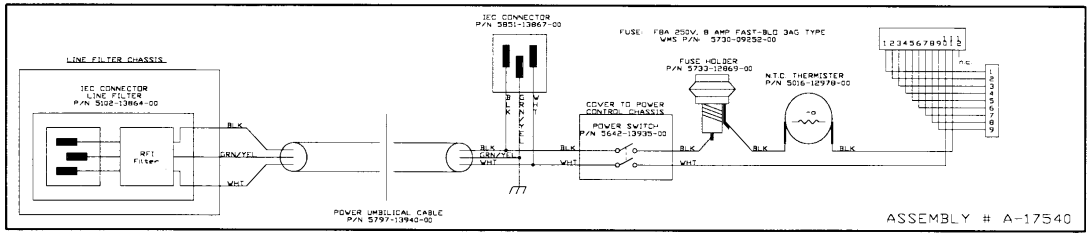

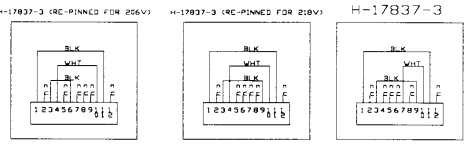

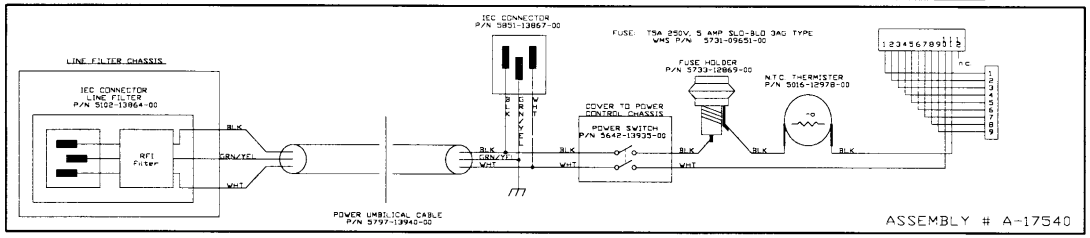

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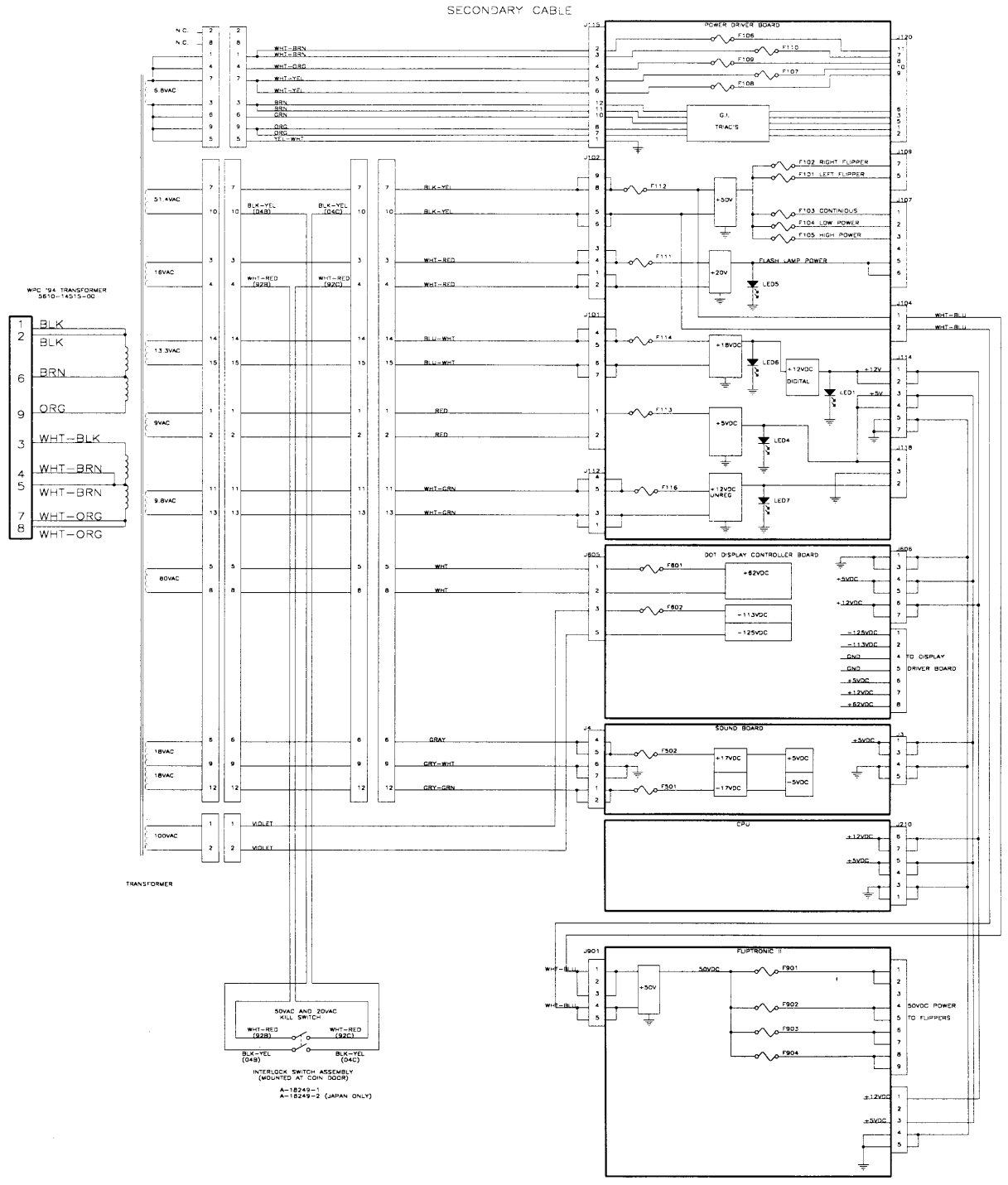
Description:	
Power Wiring Diagram	Sheet 1 of 2
Schematic Part Number:	Revision Level 3



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Description: Power Wiring Diagram	Sheet 2 of 2
Schematic Part Number:	Revision Level 3

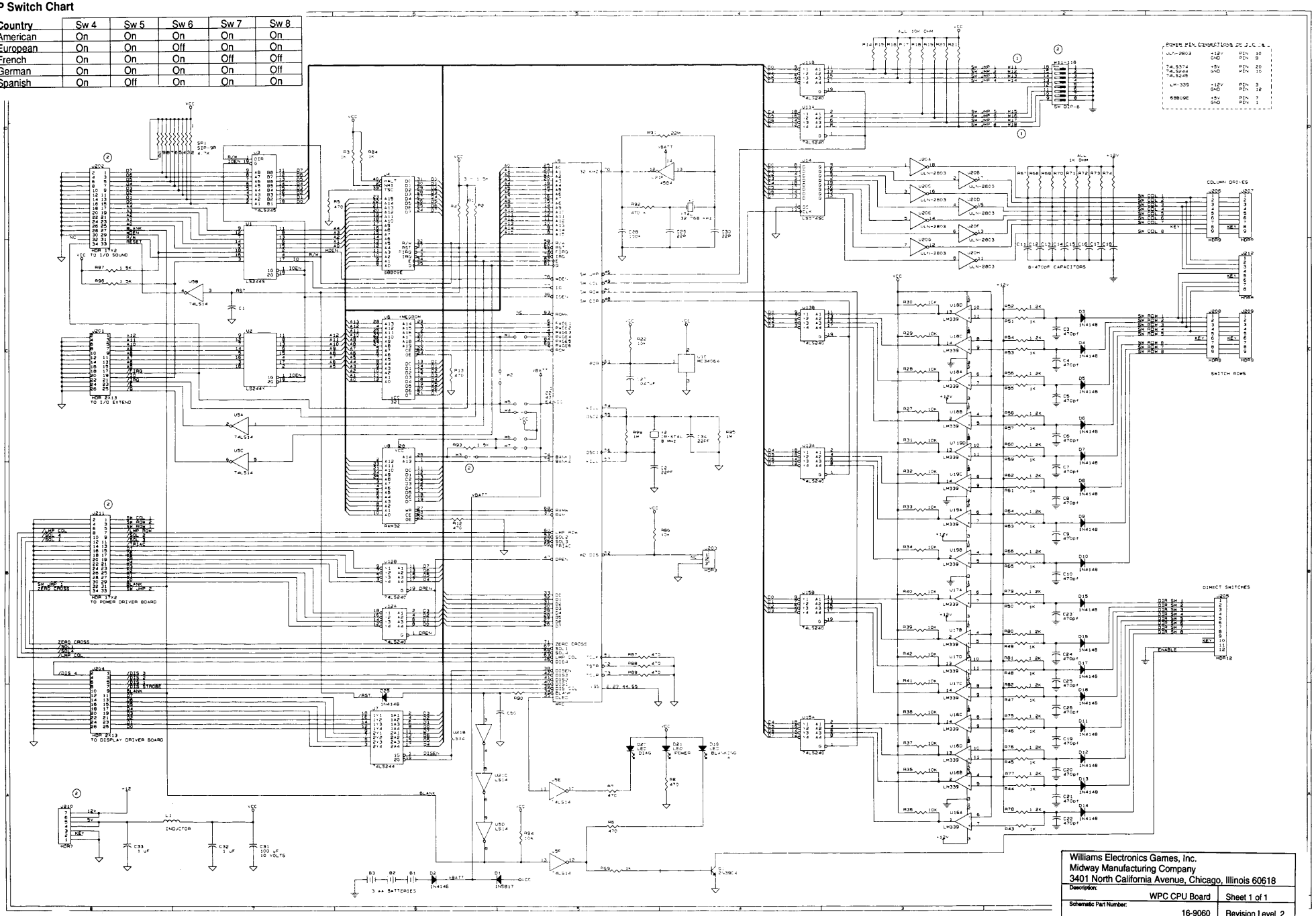
PAGE 2

Jumper Chart

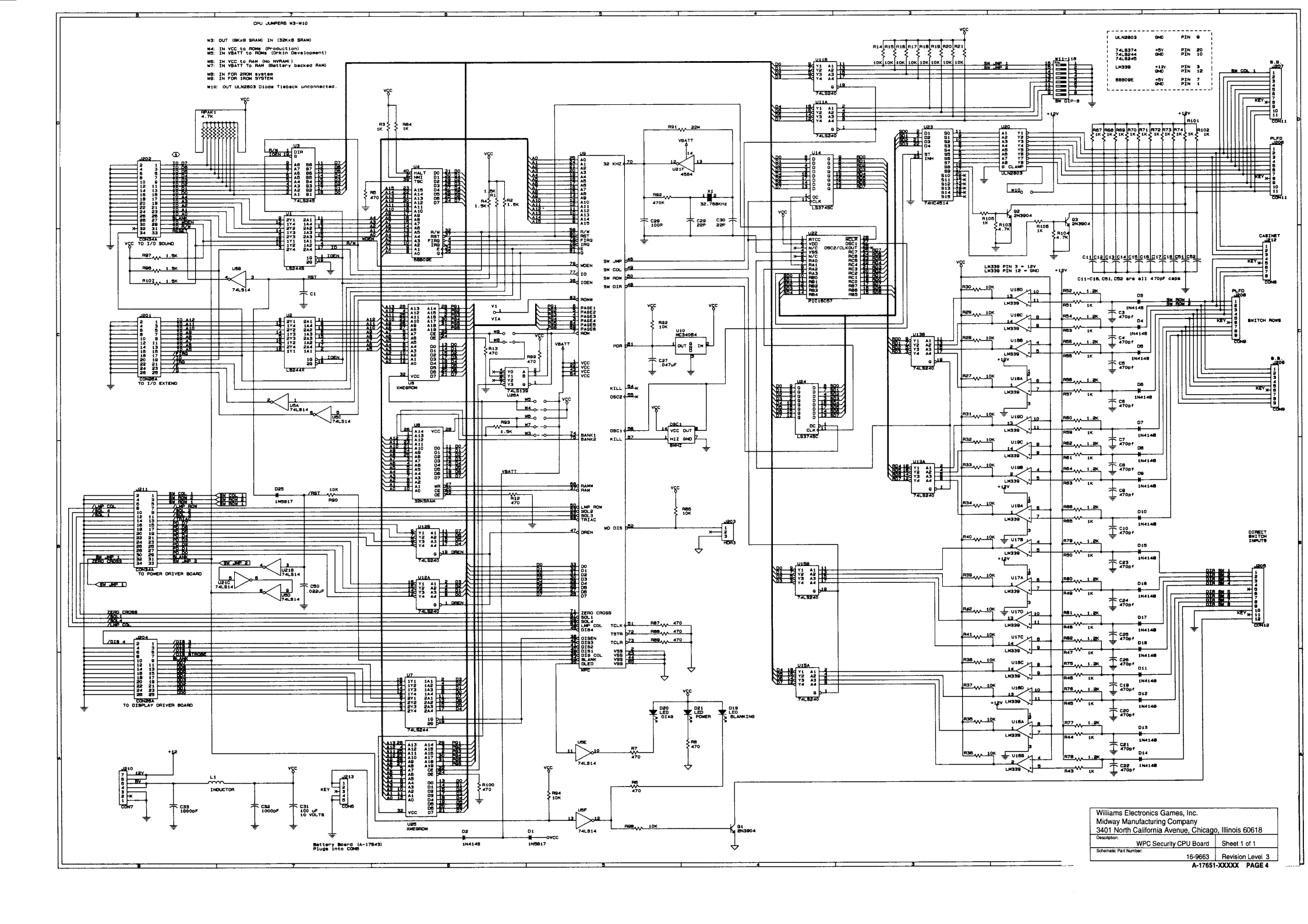
Display	W1	W2
1M/2M/4M ROM	In	Out
512K/1M ROM	Out	In

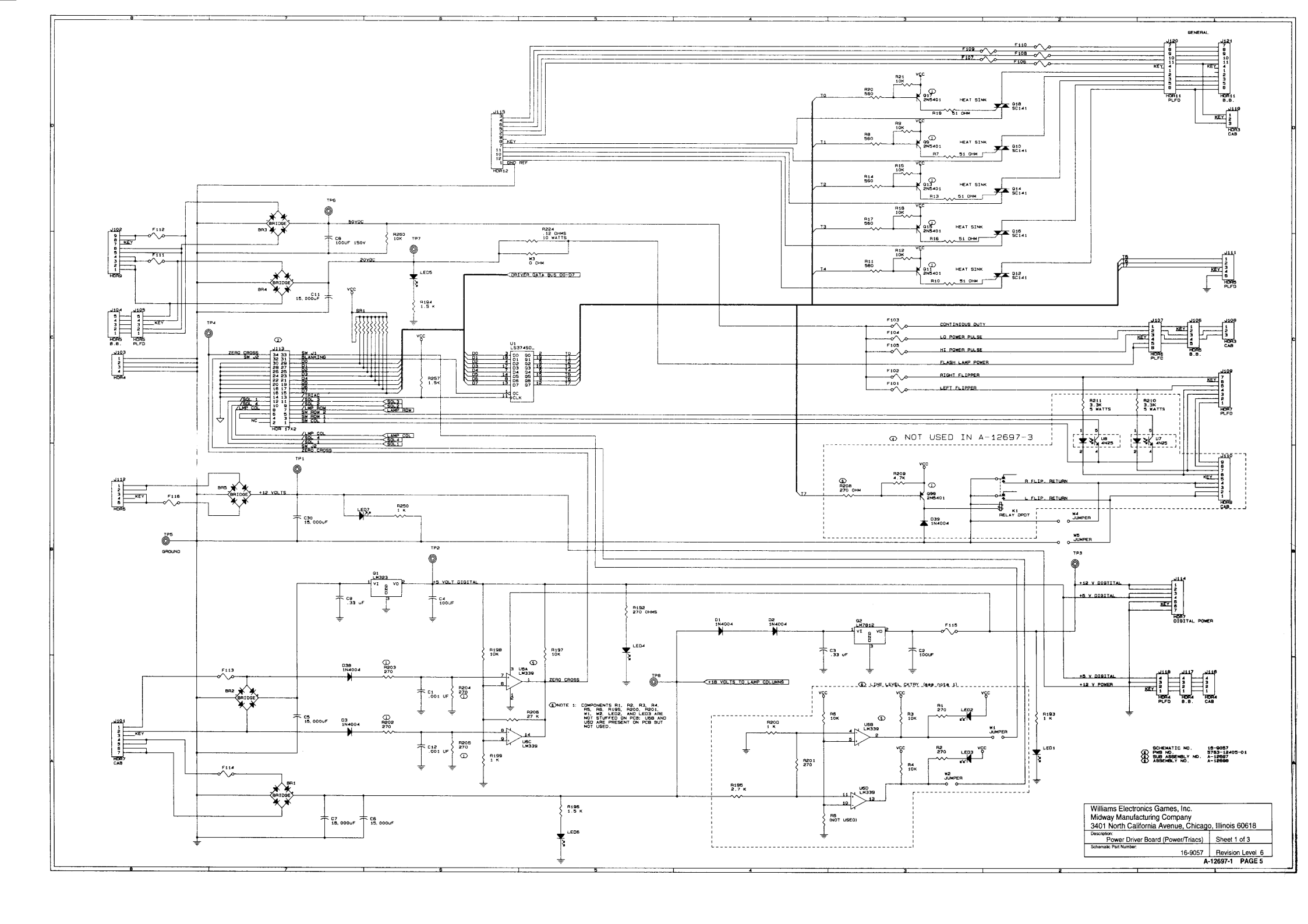
DIP Switch Chart

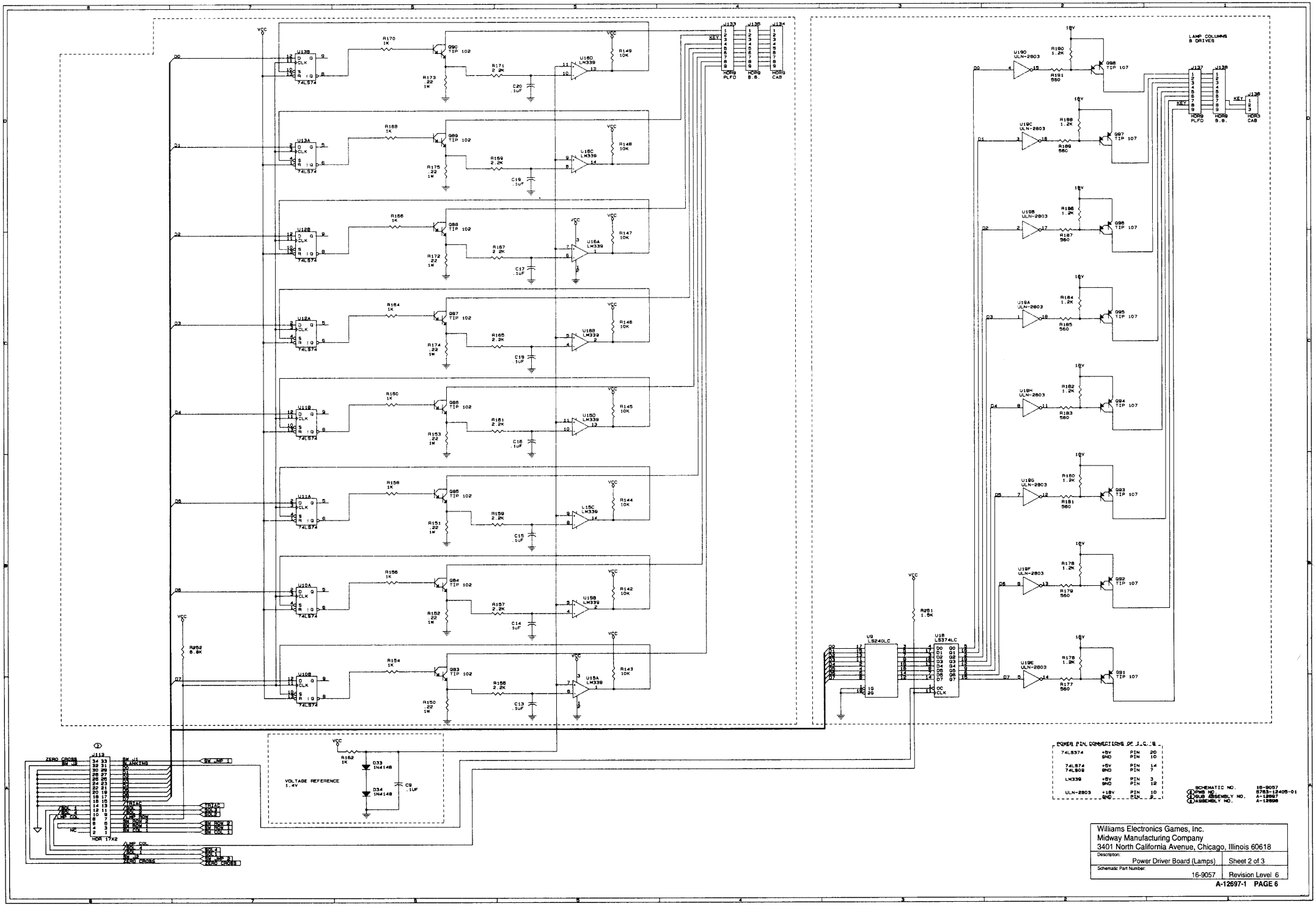
Country	Sw 4	Sw 5	Sw 6	Sw 7	Sw 8
American	On	On	On	On	On
European	On	On	Off	On	On
French	On	On	On	Off	Off
German	On	On	On	On	Off
Spanish	On	Off	On	On	On

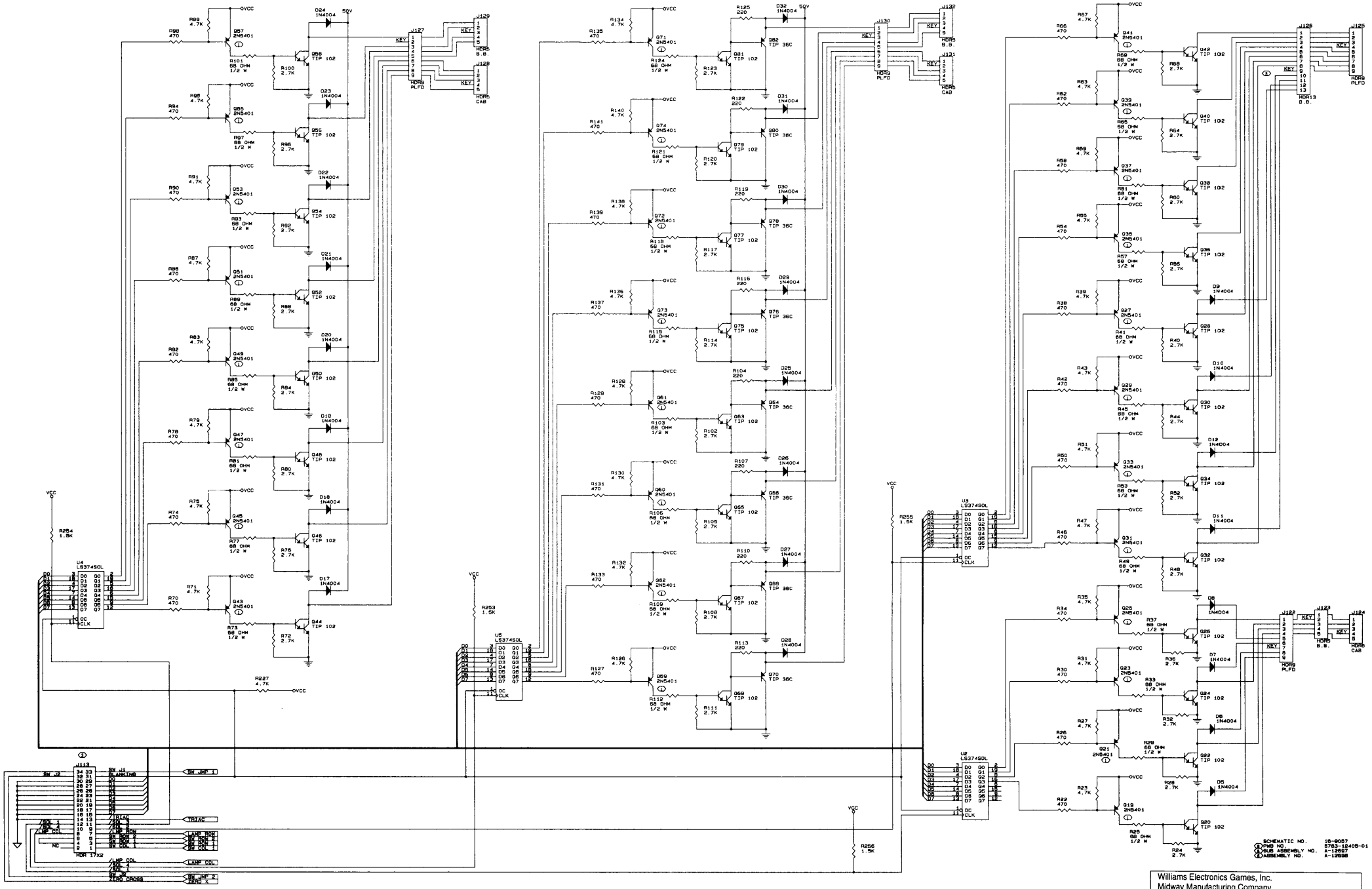


Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: WPC CPU Board	Sheet 1 of 1
Schematic Part Number: 16-9060	Revision Level 2


CPU JUMPERS W3-W10
W3: OUT (8Kx8 SRAM) IN (32Kx8 SRAM)
W4: IN VCC to ROMs (Production)
W5: IN VBATT to ROMs (Orkin Development)
W6: IN VCC to RAM (No NVRAM)
W7: IN VBATT to RAM (Battery backed RAM)
W8: IN FOR 2ROM system
W9: IN FOR 1ROM SYSTEM
W10: OUT ULN2803 Diode Tieback unconnected.
ULN2803 GND PIN 9
74LS374 +5V PIN 20
74LS244 GND PIN 10
74LS245
LM339 +12V PIN 3
GND PIN 12
88809E +5V PIN 7
GND PIN 1
LM339 PIN 3 = 12V
LM339 PIN 12 = GND
C11-C16, C51, C52 are all 470pF caps
CON24A TO I/O SOUND
CON28A TO I/O EXTEND
CON44 TO POWER DRIVER BOARD
CON28A TO DISPLAY DRIVER BOARD
Battery Board (A-17643) Plugs into CON8
SWITCH ROWS
DIRECT SWITCH INPUTS
Williams Electronics Games, Inc.
Midway Manufacturing Company
3401 North California Avenue, Chicago, Illinois 60618
Description: WPC Security CPU Board
Sheet 1 of 1
Schematic Part Number: 16-9663
Revision Level 3
A-17651-XXXXX PAGE 4


GENERAL
HEAT SINK
NOT USED IN A-12697-3
NOTE 1: COMPONENTS R1, R2, R3, R4, R5, R6, R198, R200, R201, W1, W2, LED2, AND LED3 ARE NOT STUFFED ON PCB; U6B AND U6D ARE PRESENT ON PCB BUT NOT USED.
DRIVER DATA BUS D0-D7
+18 VOLTS TO LAMP COLUMNS
+12 VOLTS
+5 VOLT DIGITAL
GROUND
ZERO CROSS
CONTINUOUS DUTY
LO POWER PULSE
HI POWER PULSE
FLASH LAMP POWER
RIGHT FLIPPER
LEFT FLIPPER
R FLIP. RETURN
L FLIP. RETURN
+12 V DIGITAL
+5 V DIGITAL
+5 V POWER
SCHEMATIC NO. 16-9057
PWB NO. 5783-12405-01
SUB ASSEMBLY NO. A-12697
ASSEMBLY NO. A-12698
Williams Electronics Games, Inc.
Midway Manufacturing Company
3401 North California Avenue, Chicago, Illinois 60618
Description: Power Driver Board (Power/Triacs)
Sheet 1 of 3
Schematic Part Number: 16-9057
Revision Level 6
A-12697-1 PAGE 5


LAMP COLUMNS
8 DRIVES
VOLTAGE REFERENCE
1.4V
POWER PIN CONNECTIONS OF I.C.'S
74LS374 +5V PIN 20
GND PIN 10
74LS74 +5V PIN 14
74LS08 GND PIN 7
LM339 +5V PIN 3
GND PIN 12
ULN-2803 +18V PIN 10
GND PIN 9
SCHEMATIC NO. 16-9057
PCB NO. 5783-12405-01
SUB ASSEMBLY NO. A-12697
ASSEMBLY NO. A-12698
Williams Electronics Games, Inc.
Midway Manufacturing Company
3401 North California Avenue, Chicago, Illinois 60618
Description: Power Driver Board (Lamps)
Sheet 2 of 3
Schematic Part Number: 16-9057
Revision Level 6
A-12697-1 PAGE 6



SCHEMATIC NO. 16-9057
① PCB NO. 5763-12405-01
② SUB ASSEMBLY NO. A-12697
③ ASSEMBLY NO. A-12698

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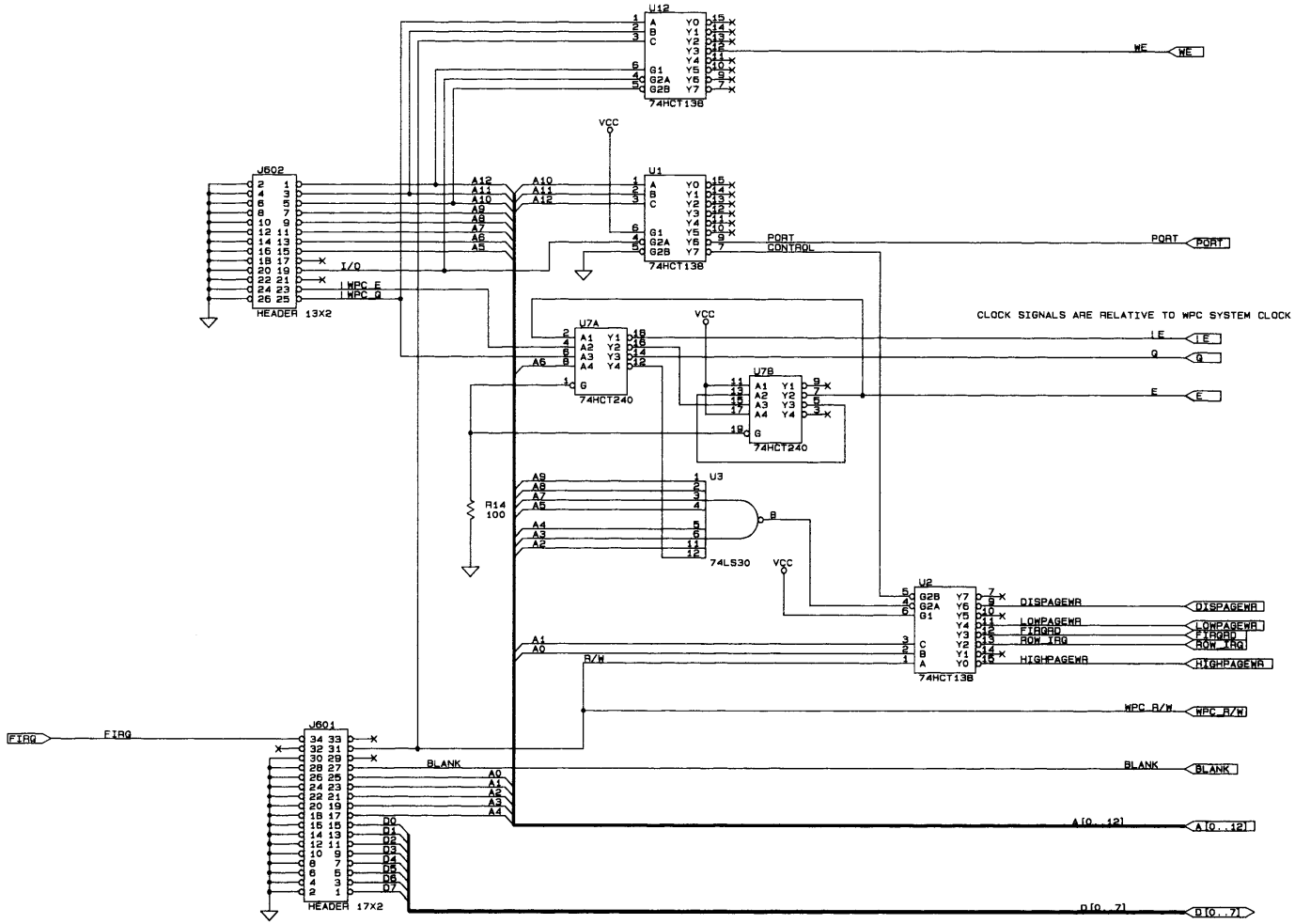
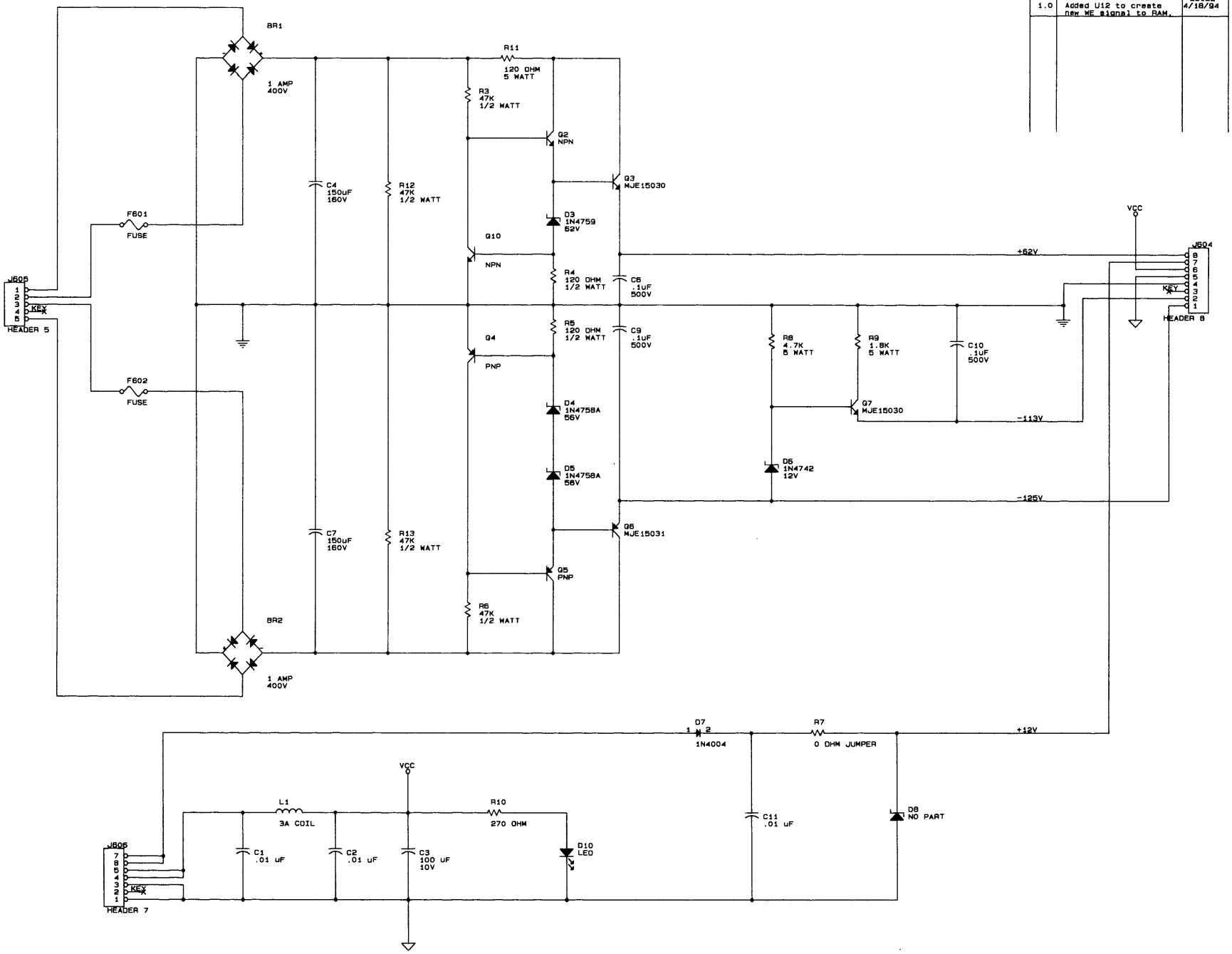
Description:	
Power Driver Board (Solenoids)	Sheet 3 of 3
Schematic Part Number: 16-9057	Revision Level 6

A-12697-1 PAGE 7



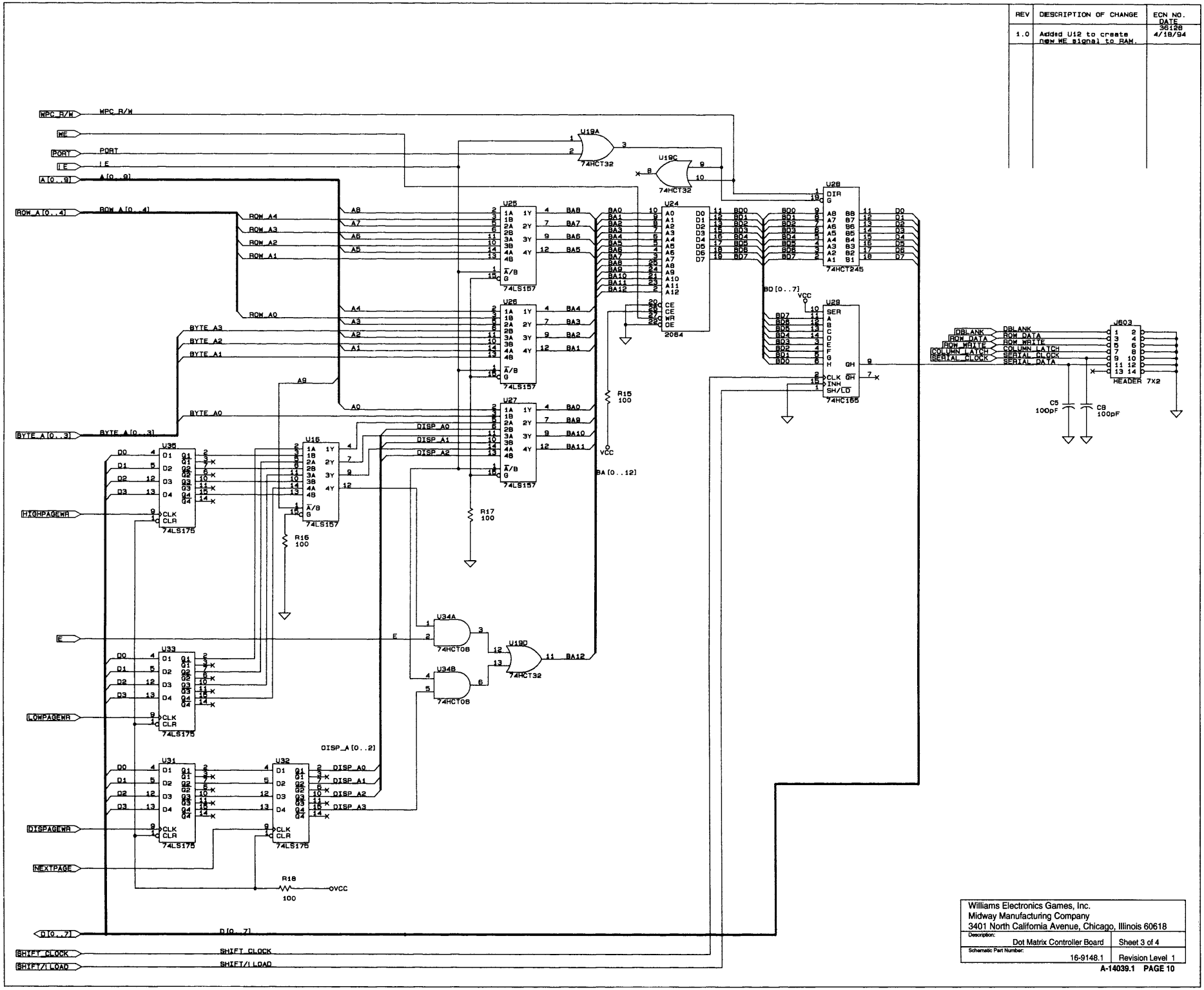
Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Dot Matrix Controller Board	Sheet 1 of 4
Schematic Part Number: 16-9148.1	Revision Level 1

REV	DESCRIPTION OF CHANGE	ECN NO. DATE
1.0	Added U12 to create new WE signal to RAM.	36128 4/18/94



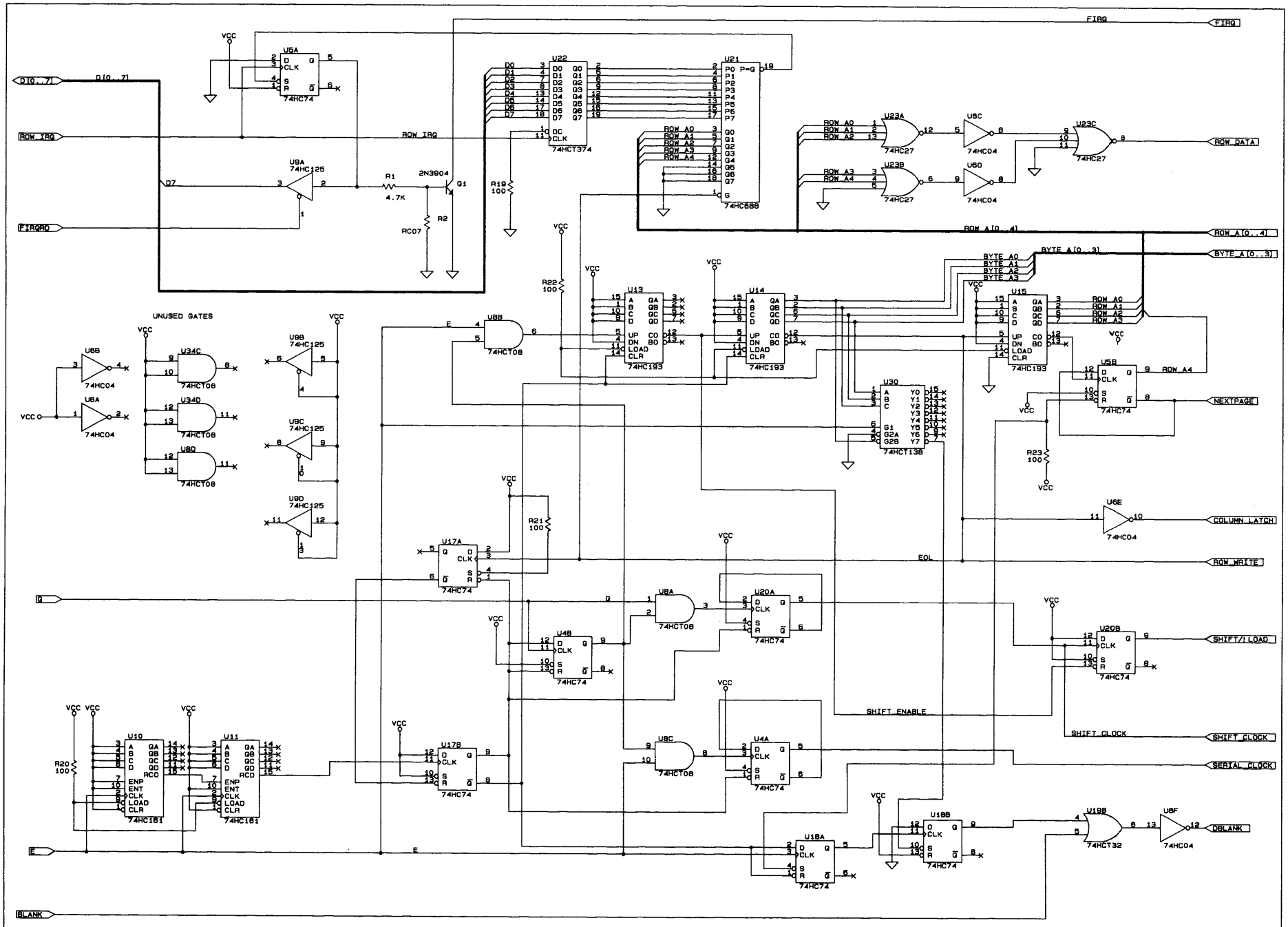
Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Dot Matrix Controller Board	Sheet 2 of 4
Schematic Part Number: 16-9148.1	Revision Level 1

REV	DESCRIPTION OF CHANGE	ECN NO. DATE
1.0	Added U12 to create new WE signal to RAM.	36128 4/18/94



Williams Electronics Games, Inc.
Midway Manufacturing Company
3401 North California Avenue, Chicago, Illinois 60618

Description:	Sheet 3 of 4
Dot Matrix Controller Board	
Schematic Part Number: 16-9148.1	Revision Level 1

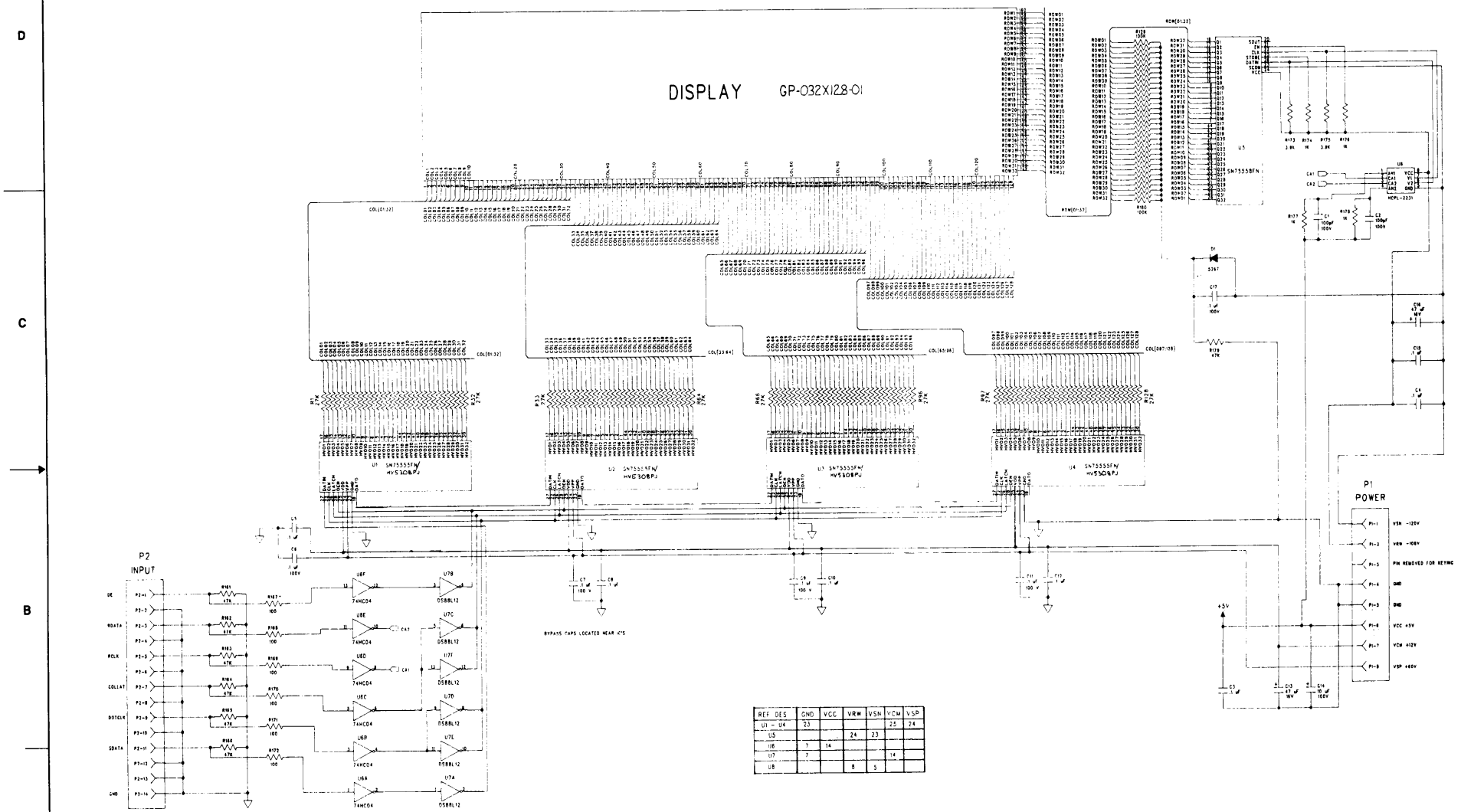


REV	DESCRIPTION OF CHANGE	ECN NO. DATE
1.0	Added U12 to create new WE signal to BAM.	36128 4/16/84

Williams Electronics Games, Inc.
Midway Manufacturing Company
3401 North California Avenue, Chicago, Illinois 60618

Description:	
Dot Matrix Controller Board	Sheet 4 of 4
Schematic Part Number: 16-9148.1	Revision Level 1

A-14039.1 PAGE 11



REF DES	GND	VCC	VRW	VSN	VCM	VSP
U1 – U4	23				25	24
U5			24	23		
U6	7	14				
U7	7				14	
U8			8	5		

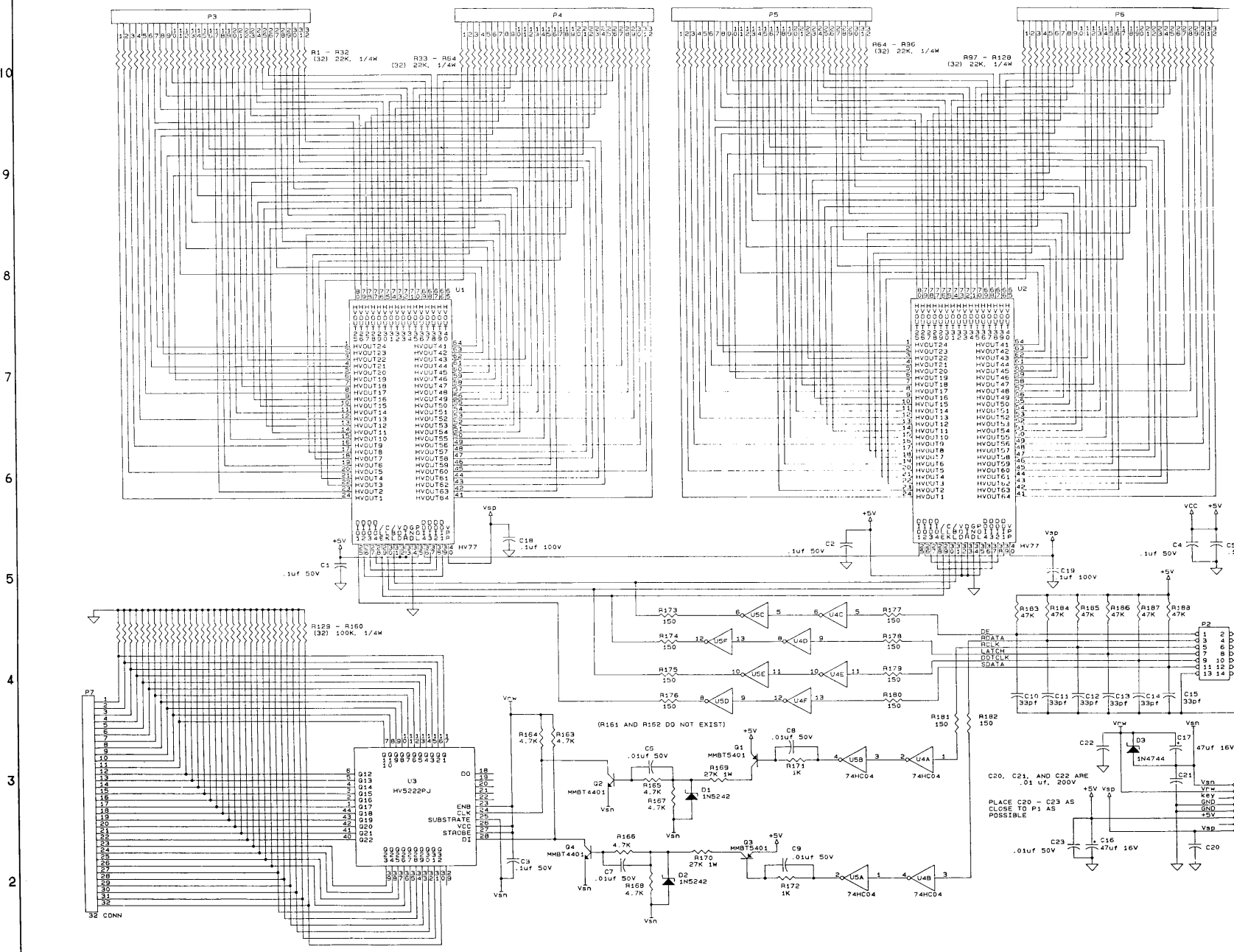
2. RESISTOR VALUES ARE IN OHMS, 1/8 WATT, 5%.
1. CAPACITOR VOLTAGES ARE 50V, 20%.
NOTES: UNLESS OTHERWISE SPECIFIED.

Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Dot Matrix Display/Driver Board	Sheet 1 of 1
Schematic Part Number:	Revision Level

5901-12784-00 PAGE 12

BABCOCK
DISPLAY PRODUCTS, INC.
1051 S. EAST STREET ANAHEIM, CALIFORNIA 92805

SCHEMATIC



Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Dot Matrix Display/Driver Board	Sheet 1 of 1
Schematic Part Number:	Revision Level

5901-12784-00 PAGE 13

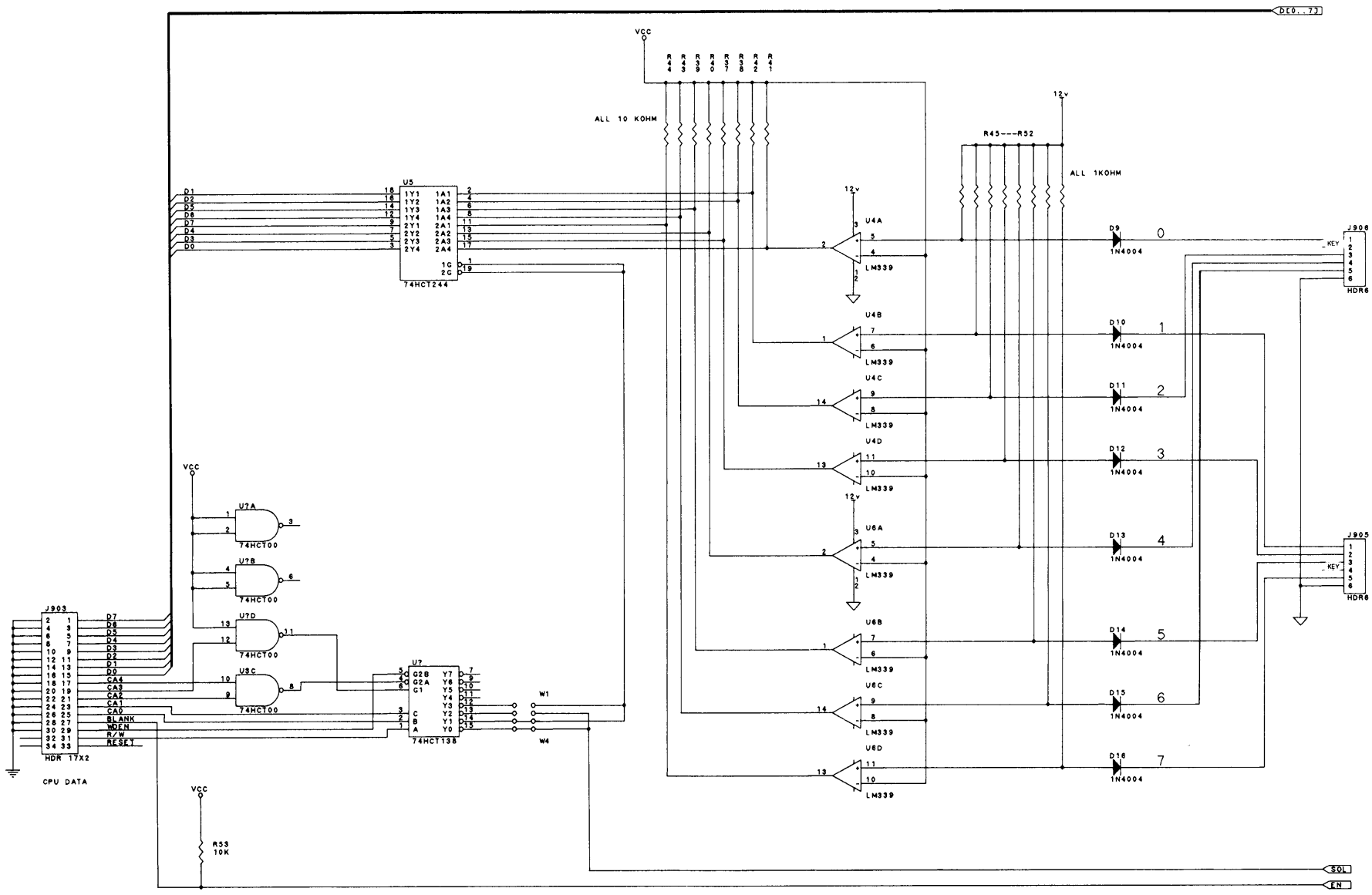
CHERRY ELECTRICAL PRODUCTS CORPORATION
3600 SUNSET AVE. WAUKEGAN, ILL 60087

DESCRIPTION: 128 X 32 DRIVER PCB

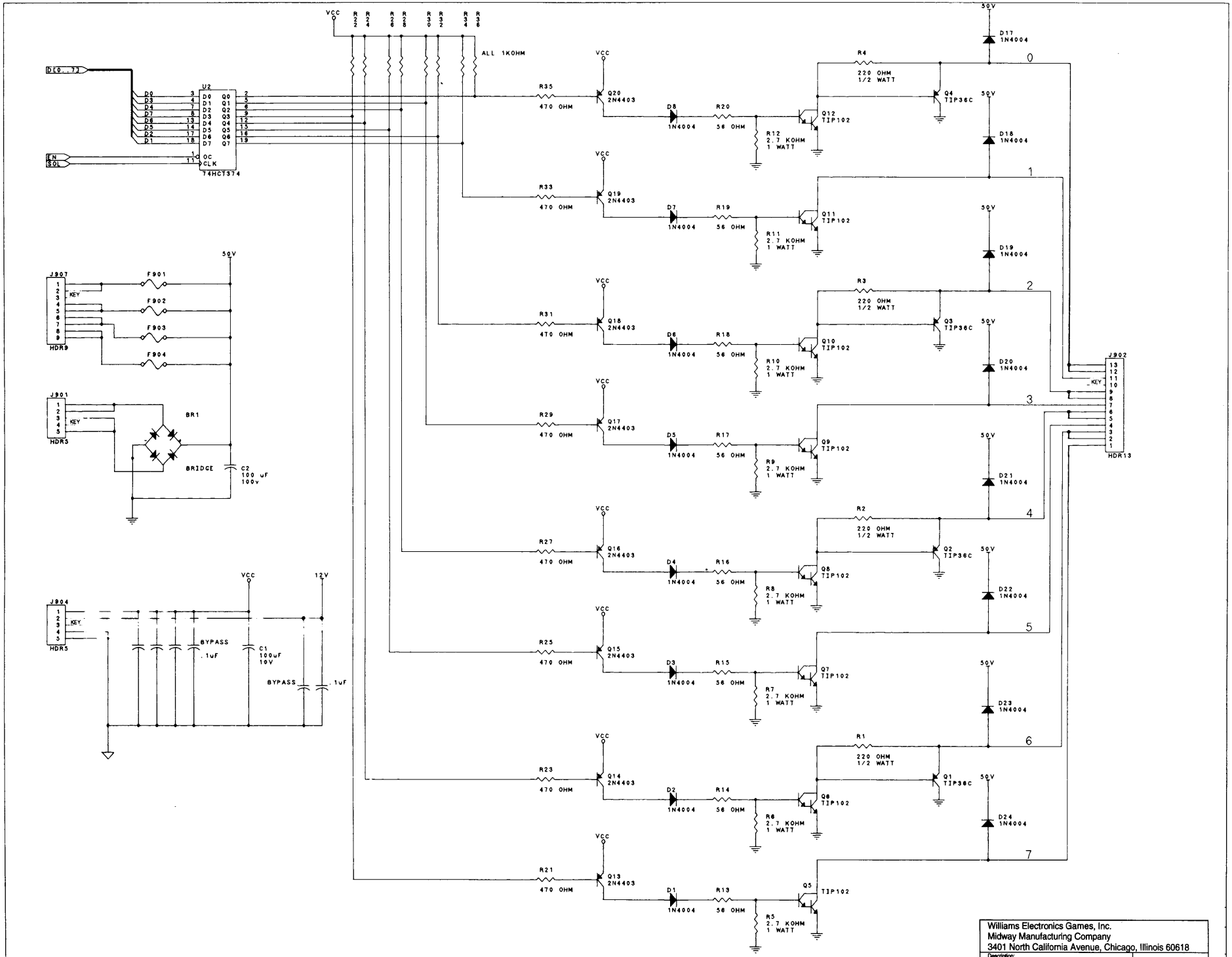
NAME SCHEMATIC SH. OF

BRUNING A0-5030

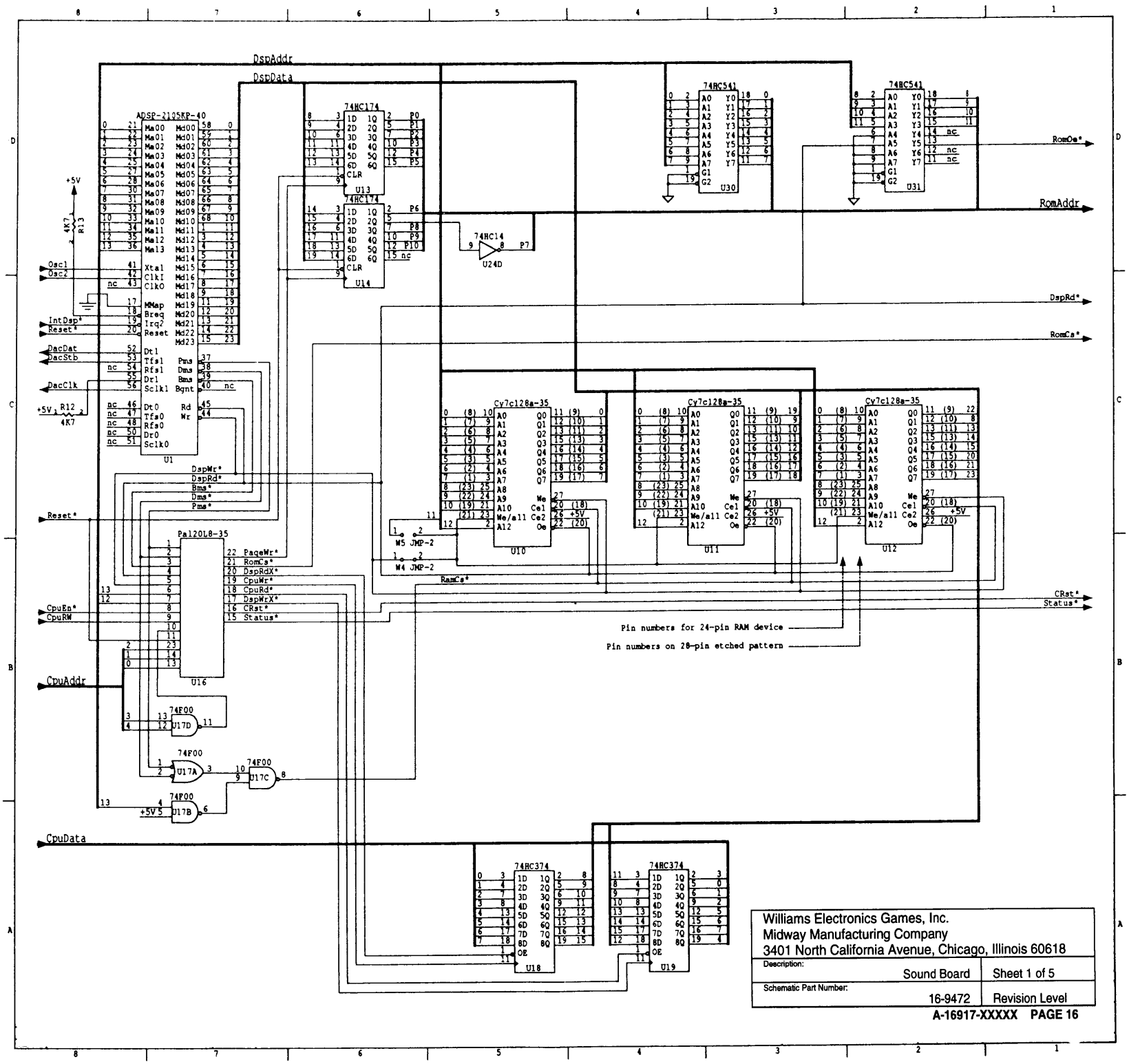
539683

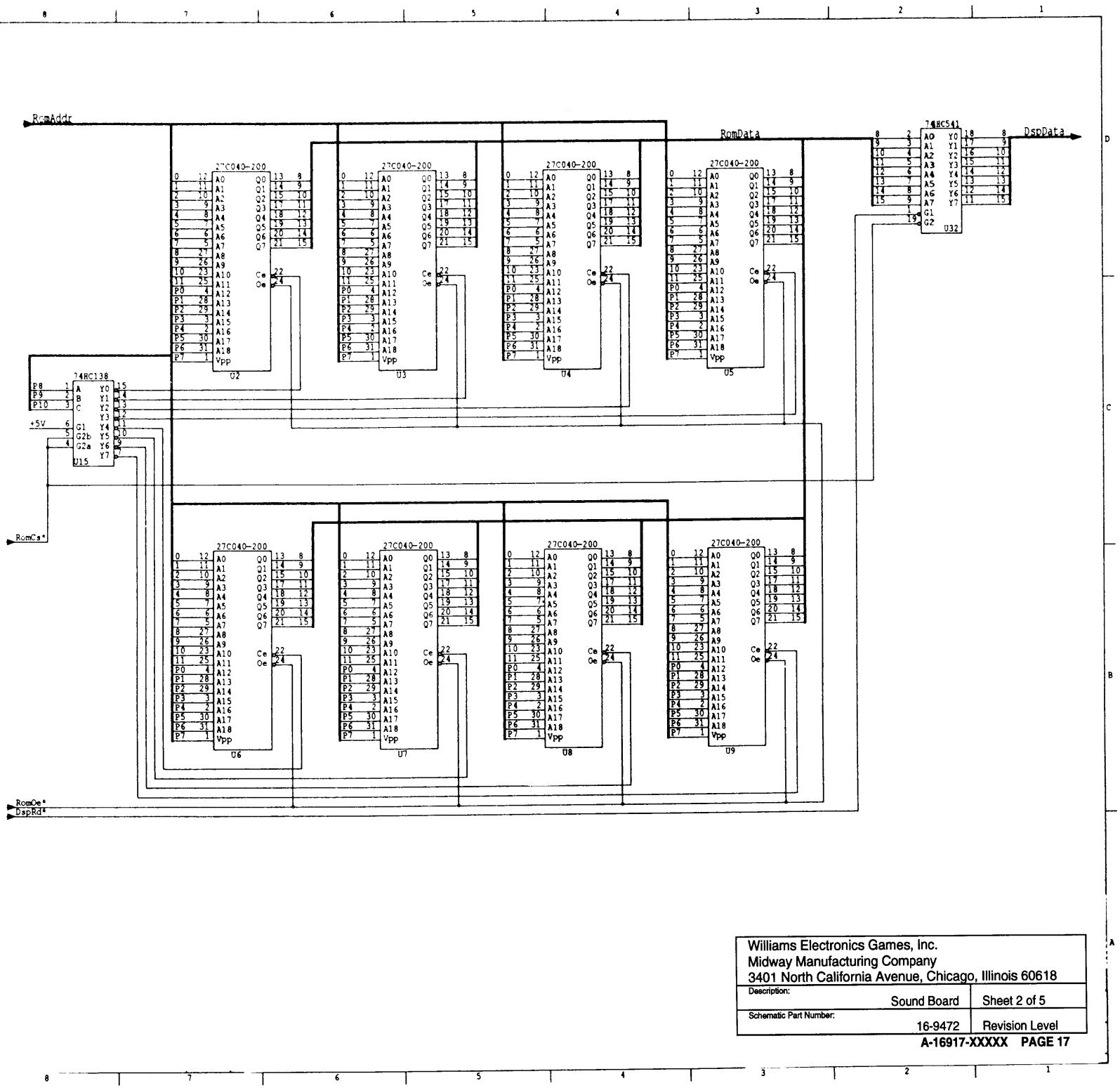


Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Fliptronic II Board	Sheet 1 of 2
Schematic Part Number: 16-9307	Revision Level 1

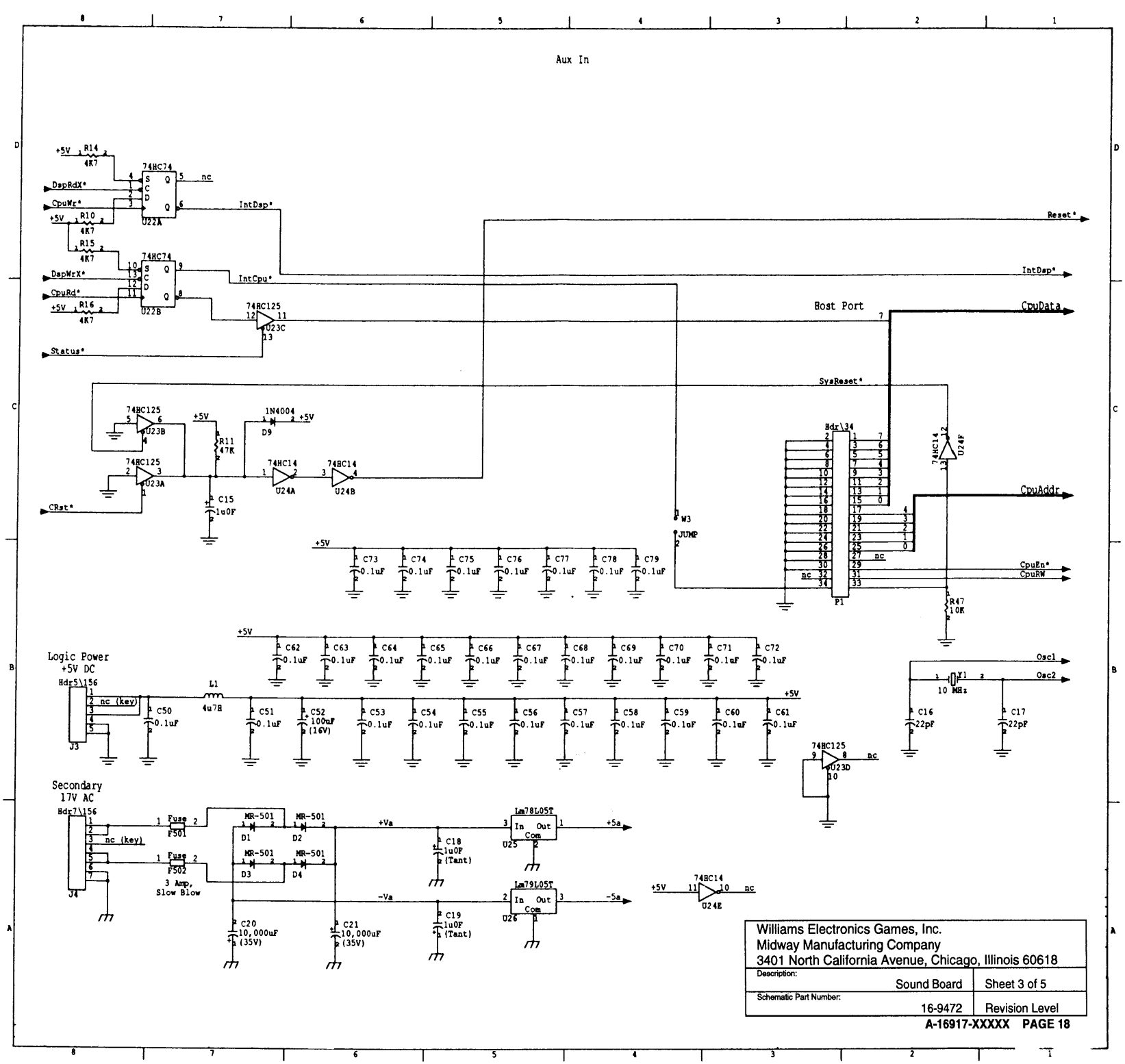


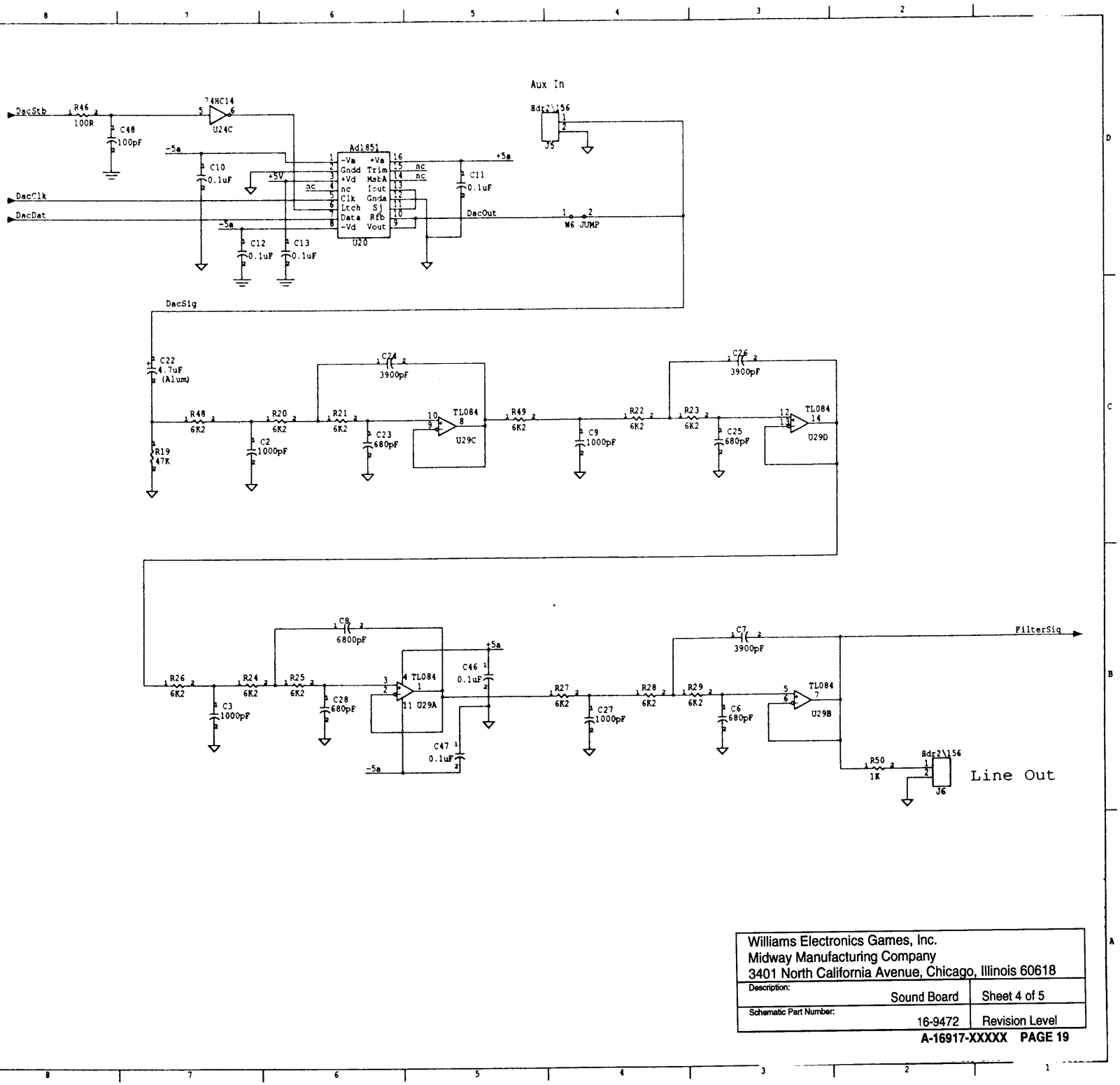
Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Fliptronic II Board	Sheet 2 of 2
Schematic Part Number: 16-9307	Revision Level 1


DspAddr
DspData
ADSP-2105KP-40
74HC174
74HC541
74HC14
Cy7c128a-35
Pal20L8-35
74F00
74HC374
RomOe*
RomAddr
DspRd*
RomCs*
CRst*
Status*
RamCs*
Pin numbers for 24-pin RAM device
Pin numbers on 28-pin etched pattern
CpuAddr
CpuData
Reset*
CpuEn*
CpuRW
DacDat
DacStb
DacClk
IntDsp*
Osc1
Osc2
+5V
Williams Electronics Games, Inc.
Midway Manufacturing Company
3401 North California Avenue, Chicago, Illinois 60618
Description: Sound Board
Sheet 1 of 5
Schematic Part Number: 16-9472
Revision Level
A-16917-XXXXX PAGE 16

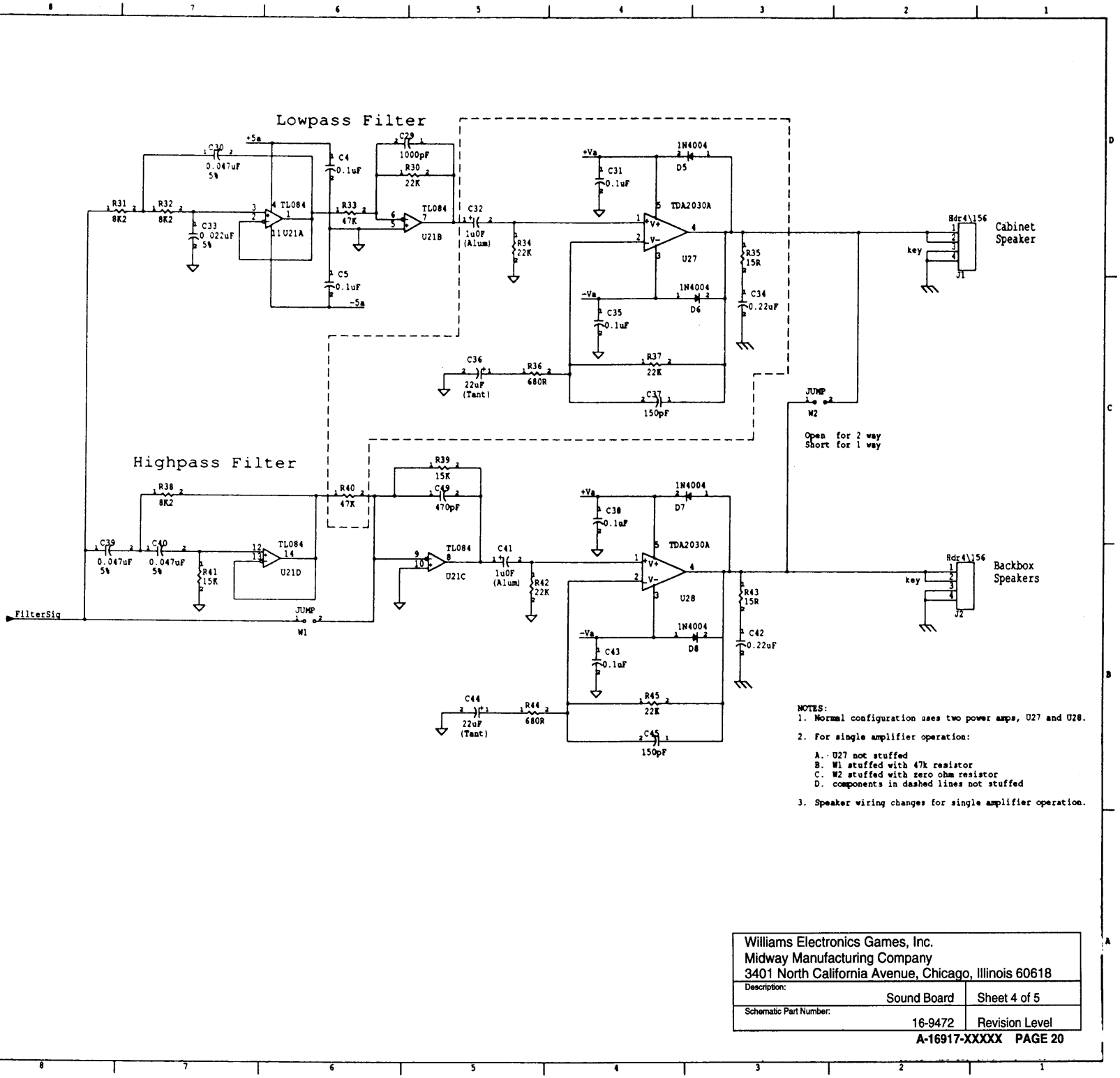


Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Sound Board	Sheet 2 of 5
Schematic Part Number: 16-9472	Revision Level


Aux In
Logic Power
+5V DC
Secondary
17V AC
Host Port
Williams Electronics Games, Inc.
Midway Manufacturing Company
3401 North California Avenue, Chicago, Illinois 60618
Description:
Sound Board
Sheet 3 of 5
Schematic Part Number:
16-9472
Revision Level
A-16917-XXXXX PAGE 18



Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Sound Board	Sheet 4 of 5
Schematic Part Number: 16-9472	Revision Level



Williams Electronics Games, Inc. Midway Manufacturing Company 3401 North California Avenue, Chicago, Illinois 60618	
Description: Sound Board	Sheet 4 of 5
Schematic Part Number: 16-9472	Revision Level