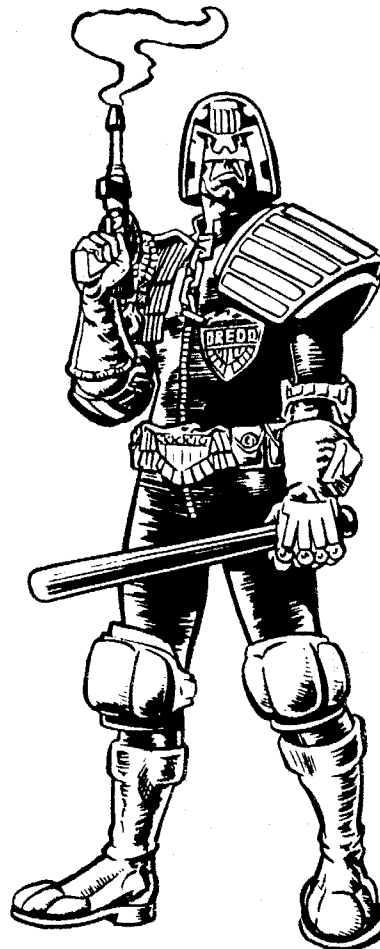


Bally®

August 1993
16-20020-101

JUDGE DREDD™



Operations Manual Includes:

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

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

DIP SWITCH SETTINGS

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

Country	W14	W15	W16	W17	W18
America	On	On	On	On	On
European	On	On	Off	On	On
French	On	On	On	Off	Off
German	On	On	On	On	Off
Spain	On	Off	On	On	On

SOLENOID / FLASHER TABLE

Sol. No.	Function	Solenoid Type	Voltage Connections			Driver	Drive Connections			Drive Wire Color	Solenoid Part Number Flashlamp Type	
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox
01	Globe Magnet	High Power	J130-1			Q82	J107-3			Vio-Brn	A-12158-1	
02	Left Popper	High Power	J130-2			Q80	J107-3			Vio-Red	AE-26-1200	
03	Right Popper	High Power	J130-4			Q78	J107-3			Vio-Org	AE-23-800	
04	Globe Arm	High Power	J130-5			Q76	J118-2			Vio-Yel	14-7989	
05	Reset Drop Target	High Power	J130-6			Q64	J107-3			Vio-Grn	AE-24-900	
06	Globe Motor	High Power	J130-7			Q66	J118-2			Vio-Blu	14-7985	
07	Knocker	High Power	J130-8			Q68	J107-3			Vio-Blk	AE-23-800	
08	Right Shooter	High Power	J130-9			Q70	J107-3			Vio-Gry	AE-23-800	
09	Left Shooter	Low Power	J127-1			Q58	J107-2			Brn-Bik	AE-23-800	
10	Trip Drop Target	Low Power	J127-3			Q56	J107-2			Brn-Red	AE-27-1200	
11	Diverter	Low Power	J127-4			Q54	J107-2			Brn-Org	AE-25-1000	
12	Not Used	Low Power	---			Q52	---			Brn-Yel	---	
13	Trough	Low Power	J127-6			Q50	J107-2			Brn-Grn	AE-26-1500	
14	Not Used	Low Power	---			Q48	---			Brn-Blu	---	
15	Left Slingshot	Low Power	J127-8			Q46	J107-2			Brn-Vio	AE-27-1200	
16	Right Slingshot	Low Power	J127-9			Q44	J107-2			Brn-Gry	AE-27-1200	
17	Judge Fire Flashers	Flasher	J126-1	J125-1		Q42	J107-6	J106-5		Blk-Brn	24-8802 (1)	24-8802 (1)
18	Judge Fear Flashers	Flasher	J126-2	J125-2		Q40	J107-6	J106-5		Blk-Red	24-8802 (1)	24-8802 (1)
19	Judge Death Flashers	Flasher	J126-3	J125-3		Q38	J107-6	J106-5		Blk-Org	24-8802 (1)	24-8802 (1)
20	Judge Mortis Flashers	Flasher	J126-4	J125-5		Q36	J107-6	J106-5		Blk-Yel	24-8802 (1)	24-8802 (1)
21	Pursuit Left Flashers	Flasher	J126-5	J125-6		Q28	J107-6	J106-5		Blu-Grn	24-8802 (2)	24-8802 (1)
22	Pursuit Right Flashers	Flasher	J126-6	J125-7		Q30	J107-6	J106-5		Blu-Blk	24-8802 (2)	24-8802 (1)
23	Blackout Flashers	Flasher	J126-7	J125-8		Q34	J107-6	J106-5		Blu-Vio	24-8802 (1)	24-8802 (2)
24	Cursed Earth Flashers	Flasher	J126-8	---		Q32	J107-6	---		Blu-Gry	24-8802 (2)	---
25	Lower Left Flashers	Gen. Purpose	J122-1	J124-1		Q26	J107-6	J106-5		Blu-Brn	24-8704 (2)	24-8802 (2)
26	Globe Flashers	Gen. Purpose	J122-2	J124-2		Q24	J107-6	J106-5		Blu-Red	24-8802 (1)	24-8802 (2)
27	Right Ramp Flashers	Gen. Purpose	J122-3	J124-3		Q22	J107-6	J106-5		Blu-Org	24-8704 (2)	24-8802 (1)
28	Insert Flashers	Gen. Purpose	---	J124-5		Q20	---	J106-5		Blu-Yel	---	24-8802 (3)
General Illumination												
01	String 1	G.I.	J-120-1	J-121-1		Q18	J-120-7	J-121-6		Wht-Brn	24-6549	24-8768
02	String 2	G.I.	J-120-2	J-121-2		Q10	J-120-8	J-121-8		Wht-Org	24-8768	24-8768
03	String 3	G.I.	J-120-3	J-121-3		Q14	J-120-9	J-121-7		Wht-Yel	24-6549	24-8768
04	String 4	G.I.	J-120-5	J-121-5		Q16	J-120-10	J-121-10		Wht-Grn	24-8768	24-8768
05	String 5	G.I.	J-121-6	---		Q12	J-120-11	---		Wht-Vio	24-8768	---
Flipper Circuits												
		Voltage Connections		Drive Transistors		Drive Connections		Drive Wire Colors		Coil Part Number	Coil Colors	
		Playfield	Power	Power	Hold	Playfield	Power	Hold				
Lower Left Flipper	Lwr. Lt. Power	J907-7	Q3	J902-9						FL-11629	BLUE	
	Lwr. Lt. Hold	J907-7 (Gry-Yel)	Q9	J902-7					Org-Blu			
Lower Right Flipper	Lwr. Rt. Power	J907-9	Q4	J902-13						FL-11629	BLUE	
	Lwr. Rt. Hold	J907-9 (Blu-Yel)	Q11	J902-11					Org-Grn			
Upper Left Flipper	Up Lt. Power	J907-1	Q1	J902-3						FL-11629	BLUE	
	Up Lt. Hold	J907-1 (Gry-Yel)	Q5	J902-1					Org-Gry			
Upper Right Flipper	Up Rt. Power	J907-4	Q2	J902-6						FL-11630	RED	
	Up Rt. Hold	J907-4 (Blu-Yel)	Q7	J902-4					Org-Vio			

J1XX = Power Driver Board; J9XX - Fliptronic II Board; 24-6549 = #44 Bulb; 24-8704 = #89 Bulb; 24-8768 = #555 Bulb; 24-8802 = #906 Bulb



CAUTION!

PLEASE MAKE SURE THE
CRANE ASSEMBLY CLEARS THE
CABINET WHEN SERVICING!

THE CRANE ASSEMBLY CAN BE
SERIOUSLY DAMAGED IF IT GETS
CAUGHT ON THE SIDE OR BACK
OF THE CABINET WHEN RAISING
OR LOWERING THE PLAYFIELD!

CAUTION!



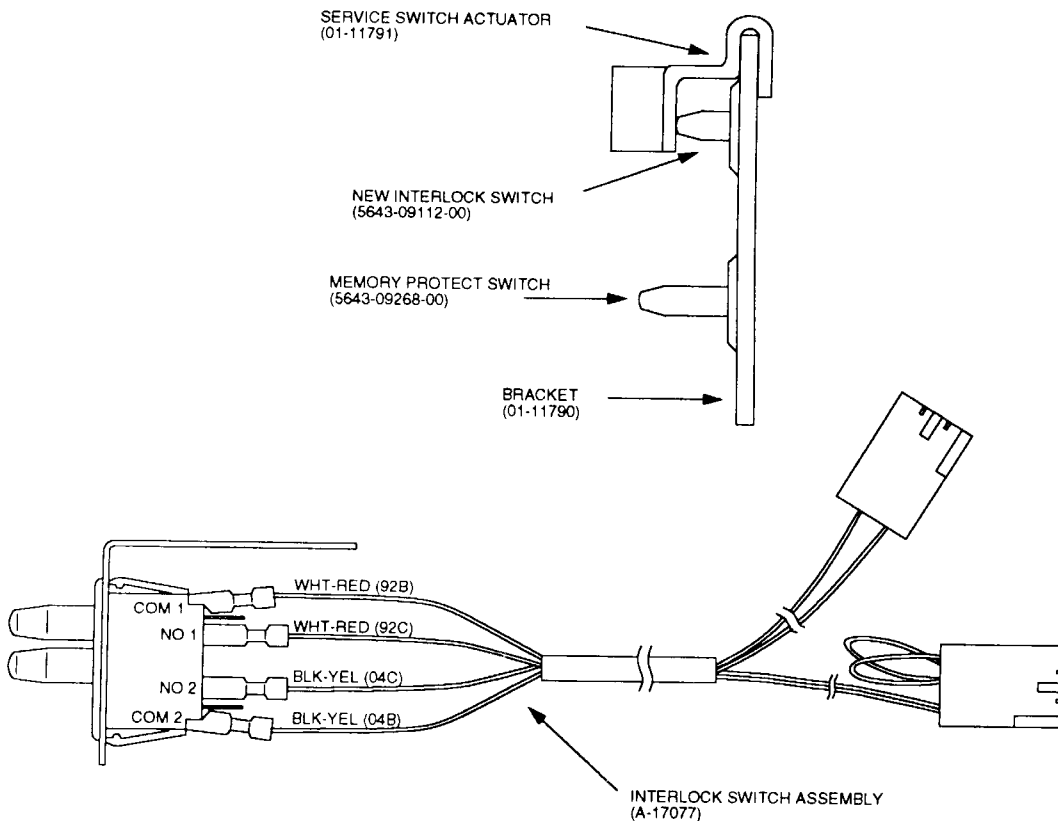
IMPORTANT NOTICE

PLEASE READ

This pinball game is equipped with a SAFETY FEATURE to prevent shocks from the solenoid circuit when the coin door is opened. A new interlock switch assembly (part no. A-17077), located at the left of the coin door opening, has been added to this game. This assembly is a bracket containing the existing memory protect switch on the bottom and a new interlock switch on the top. When the coin door is opened, this new interlock switch opens, breaking the connection to the +50V and +20V winding of the transformer secondary.

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

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



JUDGE DREDD

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

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



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GAME RULES
&
PLAYFIELD SHOT MAPS

JUDGE DREDD GAME RULES

REGULATION PLAY

—— 1 CREDIT ——

EXTRA BALL: Shoot lit Crime Scenes to arrest criminals and light Extra Ball targets.

MULTI-BALL™: Complete "J-U-D-G-E" drop targets & lock balls in planet to start Multi-ball.

START MODES: Complete "Chain Feature Count-up" to start flashing mode.

MODE SELECT: Choose desired mode of play by pressing side cabinet buttons any time during game.

FAST FORWARD: Accelerate bonus count at end of ball by pressing any side cabinet button.

BUY EXTRA BALL: At the end of a game, buy 1 extra ball for 1 credit. All features & scores remain as they were at the end of the game.

SUPERGAME™ PLAY

Includes Regulation Play

—— 2 CREDITS ——

Additional Features Include:

***Start each ball in play with 2-ball Multi-ball
(complete 5-bank for Super Multi-ball)!***

Extended "Drain Shield" Timer for Each Ball in Play!

***Exclusive SUPERGAME™ Multi-ball Play Modes!
Mad Bomber***

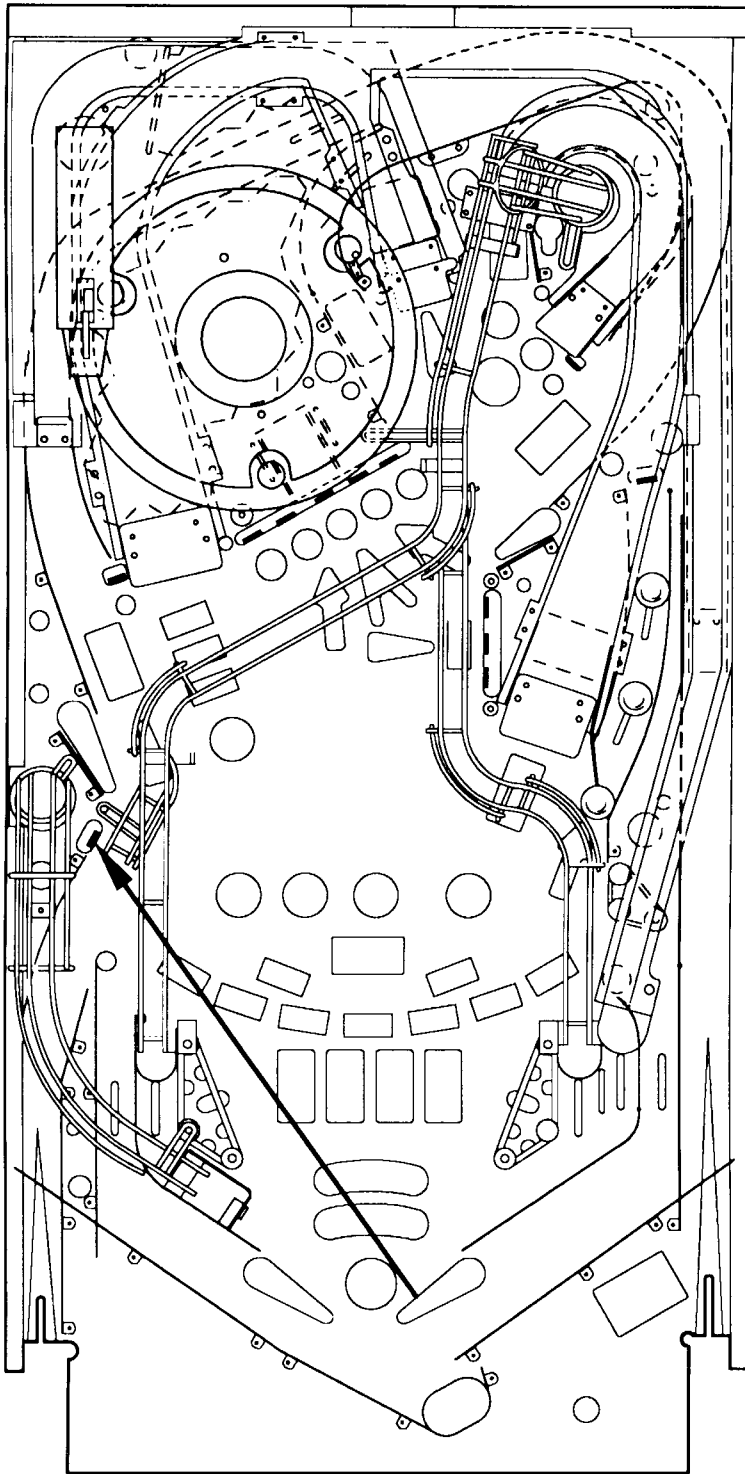
Traffic Jam

Deadworld Attack

Prison Break

***And...advance crime levels to maximum to light the
ultimate shot in pinball...***

100 Million Points!!!



LEFT STAND-UP TARGET "?"

REGULATION PLAY:

UNLIT: SCORE 50K

FLASHING: SCORE 50K AND ...

... **PURSUIT MODE:**

ENABLES 2 MISSILE LAUNCH

... **BLACKOUT MODE:**

STARTS 3-BALL PLAY

... **SNIPER MODE:**

GIVES "FATALITY" HINT

... **BATTLE TANK MODE:**

EXTENDS MODE TIMER

... **BAD IMPERSONATOR MODE:**

ADDS LIT DROP TARGET

... **MELTDOWN MODE:**

COMPLETES MODE

... **SAFE CRACKER MODE:**

GIVES "FATALITY" HINT

... **MANHUNT MILLIONS MODE:**

EXTENDS MODE TIMER

... **STAKEOUT MODE:**

DOUBLES AWARD SCORE

... **ULTIMATE CHALLENGE MODE:**

SCORE 100K

SUPERGAME™ PLAY:

UNLIT: SCORE 100K

FLASHING: SCORE 100K AND LIGHT
100 MILLION SHOT.

LEFT OUTER LANE

REGULATION PLAY: SCORE 50K UNLIT

CRIME SCENE LIT **GREEN:**
SCORE 1 MILLION;

CRIME SCENE LIT **YELLOW:**
SCORE 2 MILLION;

CRIME SCENE LIT **RED:**
SCORE 3 MILLION;

CRIME SCENE LIT **WHITE:**
SCORE 4 MILLION;

IF 7TH LIT CRIME SCENE SCORED
ALSO LITE "EXTRA BALL".

BATTLE TANK MODE:

DESTROY SECTION OF TANK,
ADVANCE BONUS 10 MILLION.
DESTROYING TANK AWARDS
30 MILLION.

BLACKOUT MODE:

SCORE 50K X2

ULTIMATE CHALLENGE MODE:

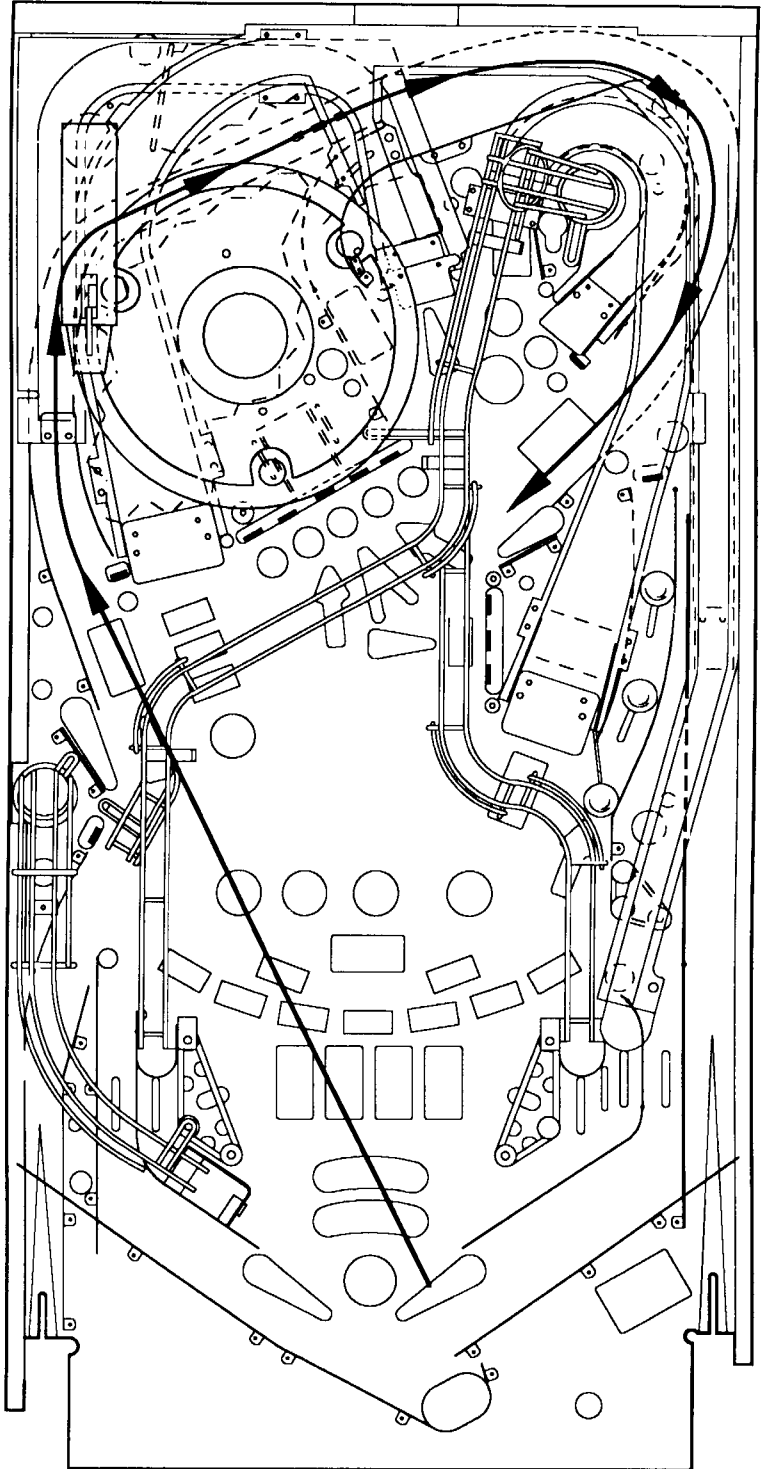
ADVANCE BONUS 20 MILLION

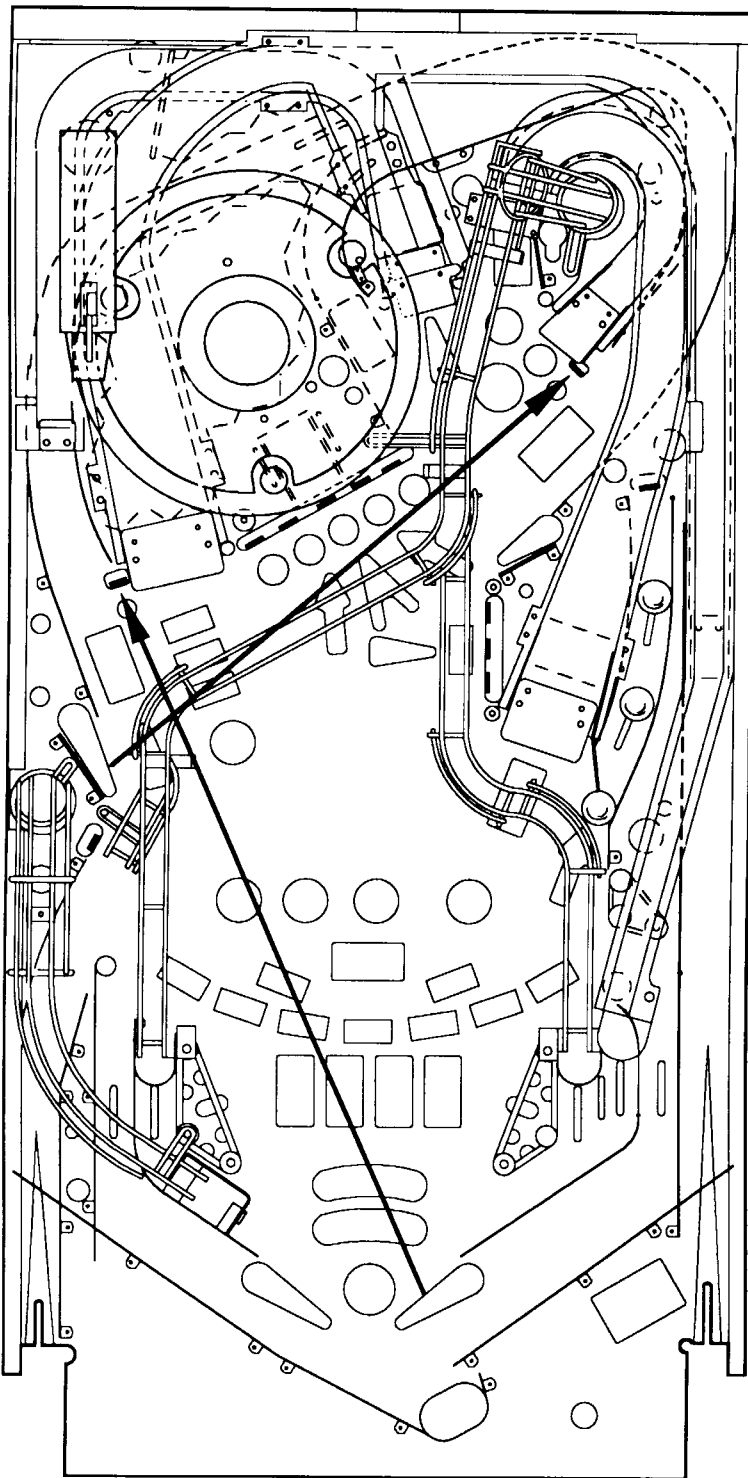
SUPERGAME™ PLAY:

PRISION BREAK MODE: SCORE 50K UNLIT

CRIME SCENE FLASHING, **NOT LAST LIT**
SCORE 5 MILLION & ADVANCE SUPER
JACKPOT 5 MILLION.

CRIME SCENE FLASHING, **LAST LIT**
SCORE 5 MILLION & SUPER JACKPOT
VALUE (25MILLION) & RESTART
SEQUENCE.





EXTRA BALL TARGETS (2)

REGULATION PLAY:

UNLIT: SCORE 50K

LIT: SCORE & AWARD EXTRA BALL

SUPERGAME™ PLAY:

SCORE 100K

**LEFT RAMP LOOP/LOCK
(loop)**

REGULATION PLAY:

UNLIT SCORE 100K PLUS ADD 500K
TO SUBWAY COMBO BONUS.

REPEATING SHOTS ADD 500K TO
COMBO BONUS TO MAXIMUM VALUE OF
10 MILLION.

PURSUIT MODE:

LAUNCH LEFT MISSILE.
ADVANCE 1 MILLION BONUS &
ADVANCE 30 MILLION BONUS IF
CAR IS DESTROYED.

MANHUNT MILLIONS MODE:

ADVANCE 3 MILLION BONUS

BLACKOUT MODE:

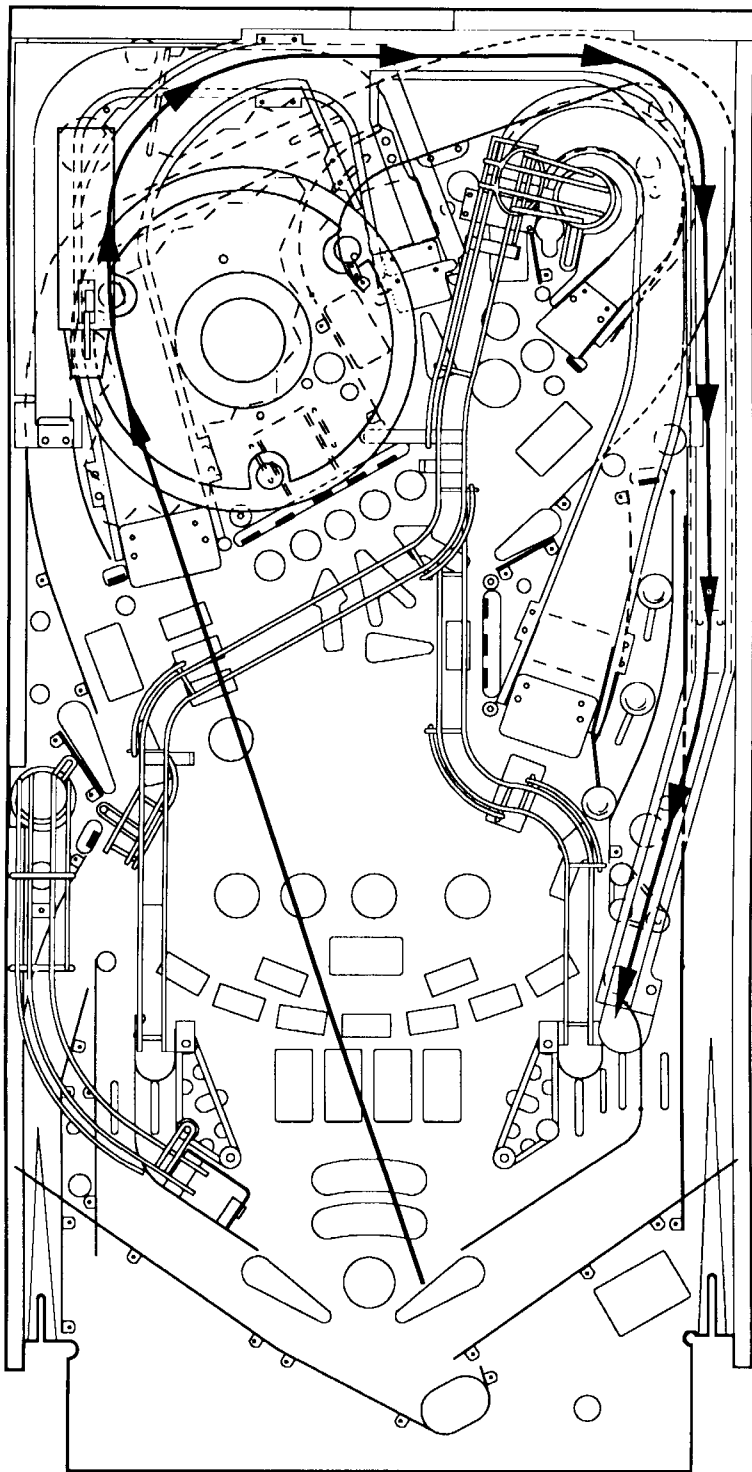
SCORE 500K X2

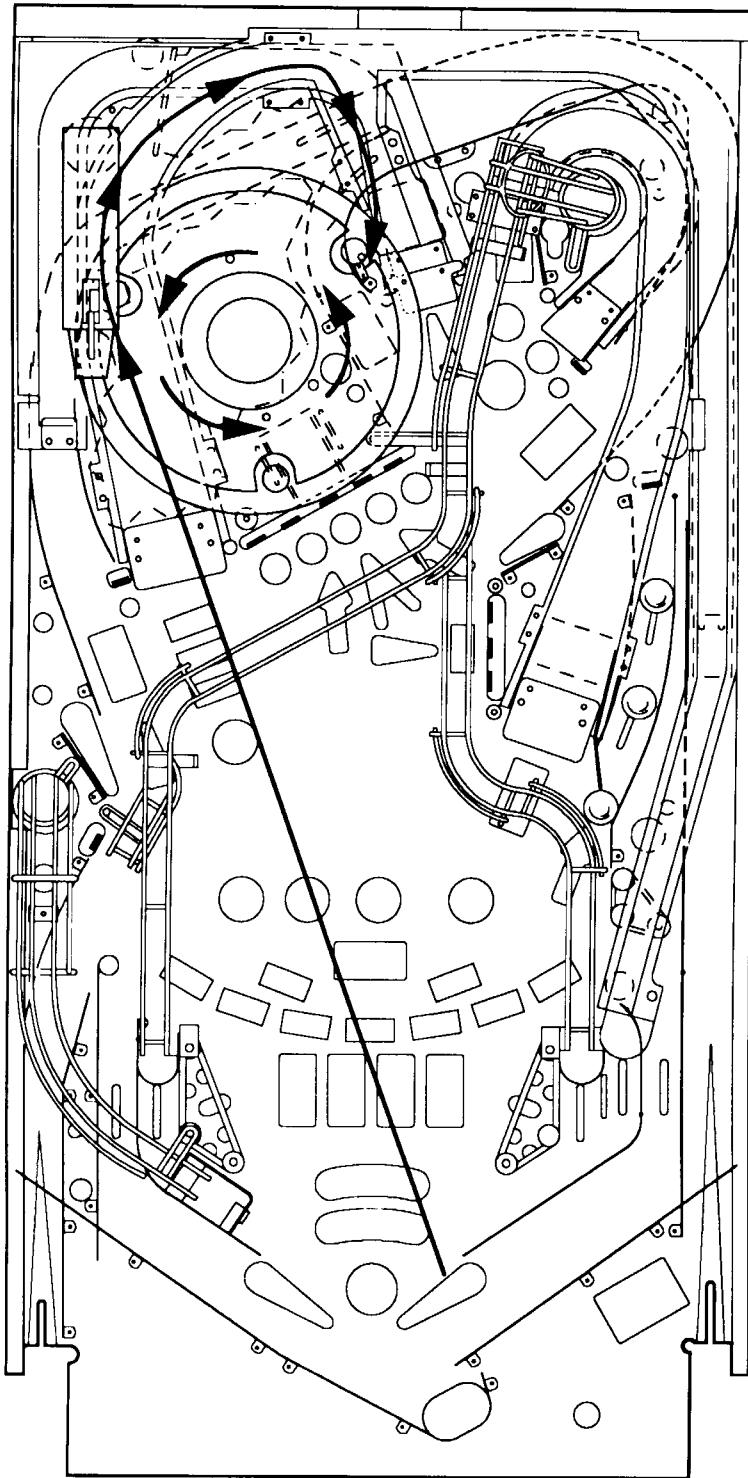
LOCK 1, 2, OR 3 LIT, SCORE 50K &
RELEASE BALL TO SHOOTER. IF
3 BALLS ARE LOCKED, START
MULTIBALL.

SUPERGAME™ PLAY:

MAD BOMBER MODE:

SCORE 1 MILLION & ADVANCE
SUPER JACKPOT VALUE 5 MILLION
(MAXIMUM VALUE 25MILLION).





**LEFT RAMP LOOP/LOCK
(lock)**

SUPERGAME™ PLAY:

DEADWORLD ATTACK MODE:

INCREASE SUPER JACKPOT
VALUE 10 MILLION. ALSO COLLECT
SUPER JACKPOT ON 3RD BALL TO
PLANET.

5-BANK DROP TARGETS

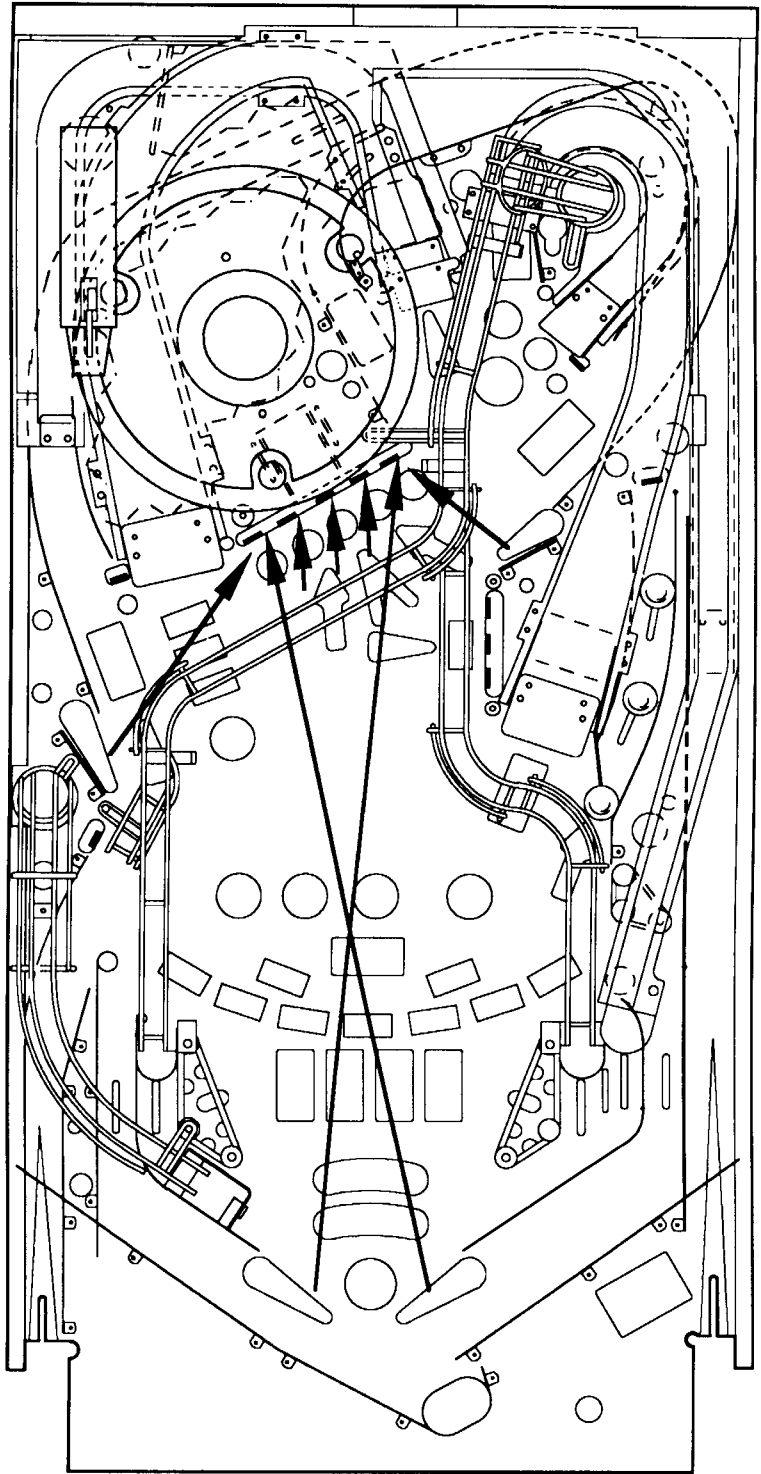
REGULATION PLAY: SINGLE TARGET-
NOT FLASHING- SCORE 300K
FLASHING- SCORE 800K & ADVANCE
"JUDGE" LAMP SEQUENCE.
COMPLETION OF "JUDGE" LAMPS
LITES "LOCK" LAMP & RESETS
"JUDGE" SEQUENCE. IF ALL "LOCK"
LAMPS ARE LIT, LIGHT "EXTRA
BALL". IF "EXTRA BALL" IS LIT
SCORE 5 MILLION.

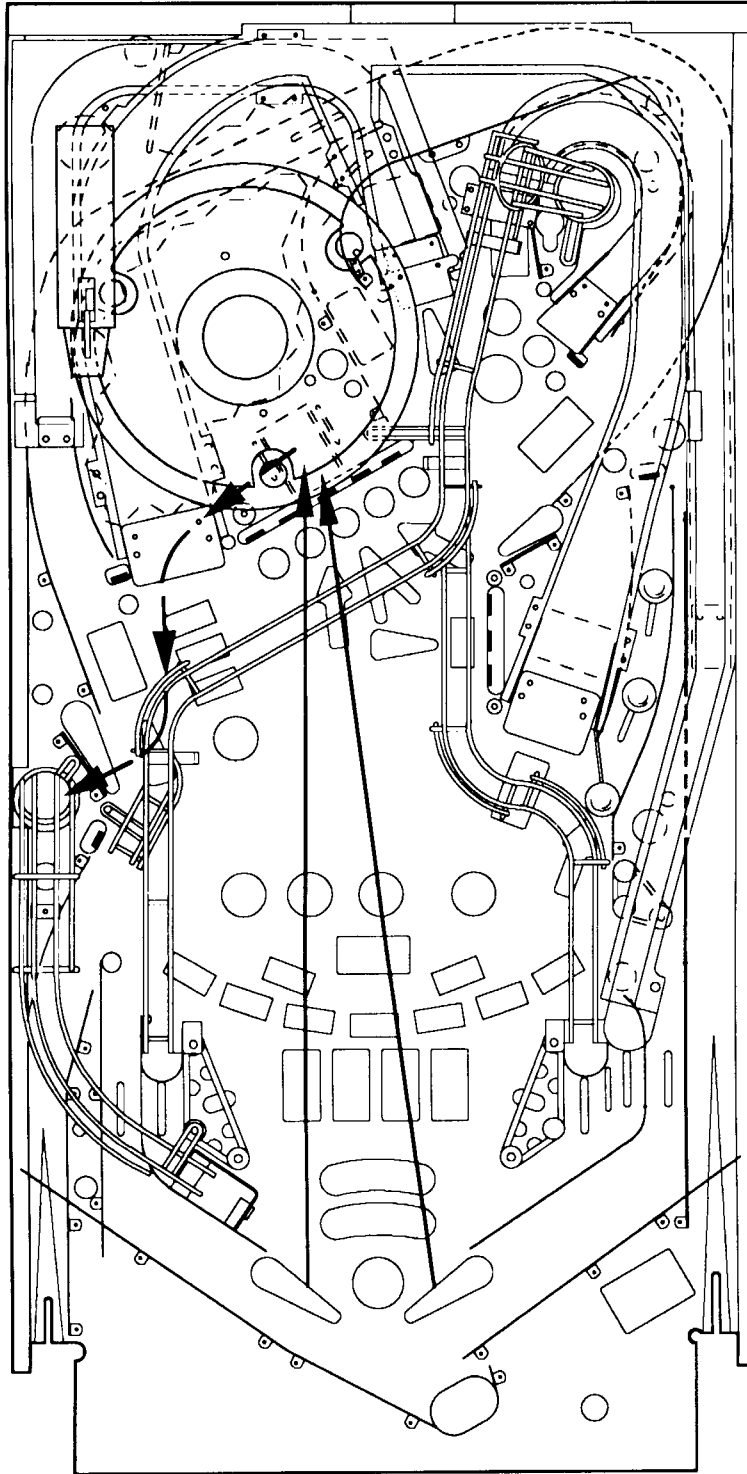
BAD IMPERSONATOR MODE:
SHOOT LIT TARGET
SCORE 300K & ADVANCE
BONUS 4 MILLION

AIR RAID MODE:
(SEE "AIR RAID" SHOT)

BLACKOUT MODE:
SCORE 300K X 2

SUPERGAME™ PLAY: SINGLE TARGET-
SCORE 600K





SUBWAY ENTRANCE

REGULATION PLAY: SCORE 100K
 SUBWAY COMBO: SCORE ACCUMULATED SUBWAY BONUS VALUE.

SAFECRACKER MODE:
 1ST TIME SCORE AND FREEZE "HURRY-UP" VALUE;
 2ND TIME SCORE FROZEN "HURRY-UP" VALUE X2;
 3RD TIME SCORE FROZEN "HURRY-UP" VALUE X3;
 4TH TIME SCORE FROZEN "HURRY-UP" VALUE X4.

BLACKOUT MODE:
 SCORE 100K X2

MULTIBALL:
 AWARD JACKPOT

SUPERGAME™ PLAY: SCORE 200K

TOP RIGHT LOOP

REGULATION PLAY: SCORE 50K 1ST TIME
SCORE + MILLION EACH REPEATING LOOP

CRIME SCENE LIT **GREEN:**
SCORE 1 MILLION

CRIME SCENE LIT **YELLOW:**
SCORE 2 MILLION

CRIME SCENE LIT **RED:**
SCORE 3 MILLION

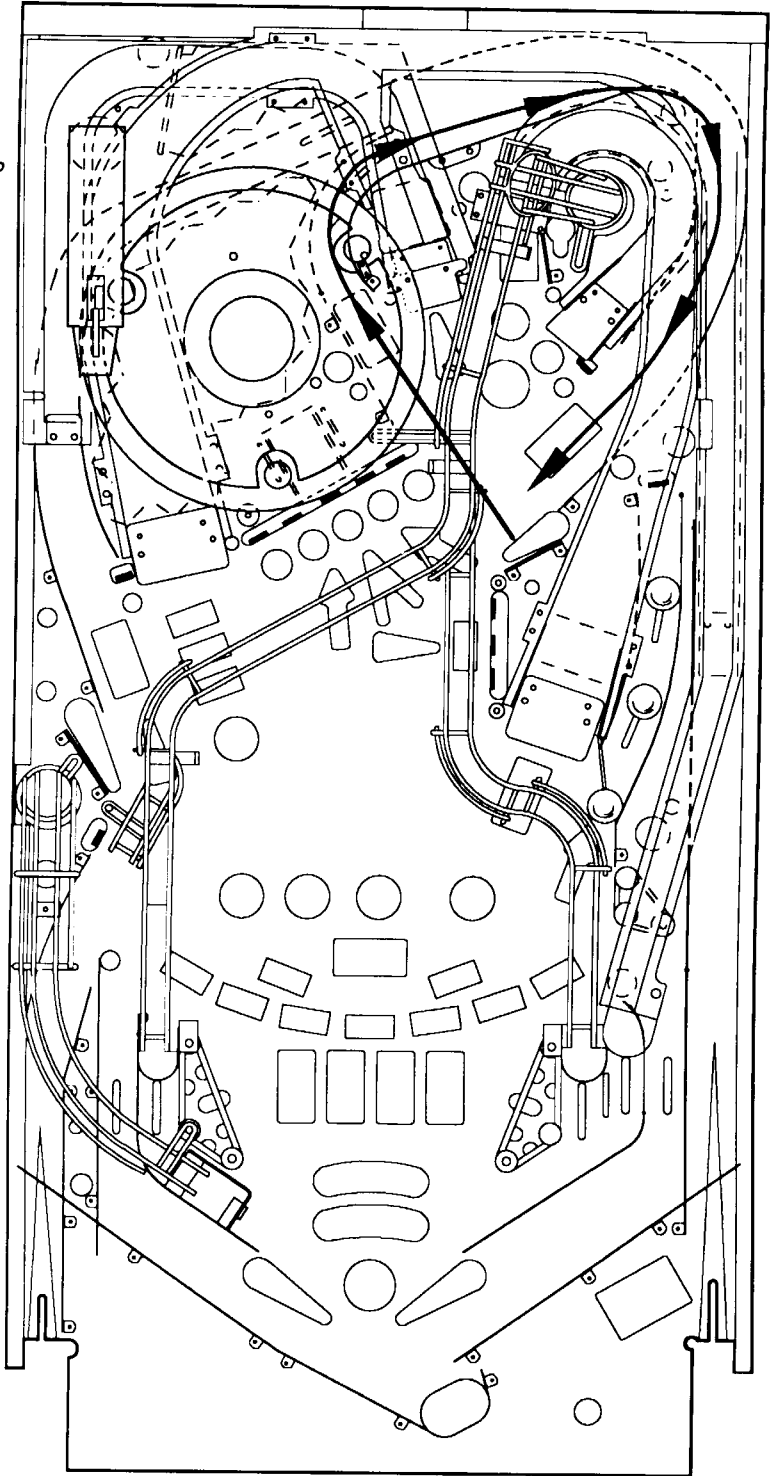
CRIME SCENE LIT **WHITE:**
SCORE 4 MILLION

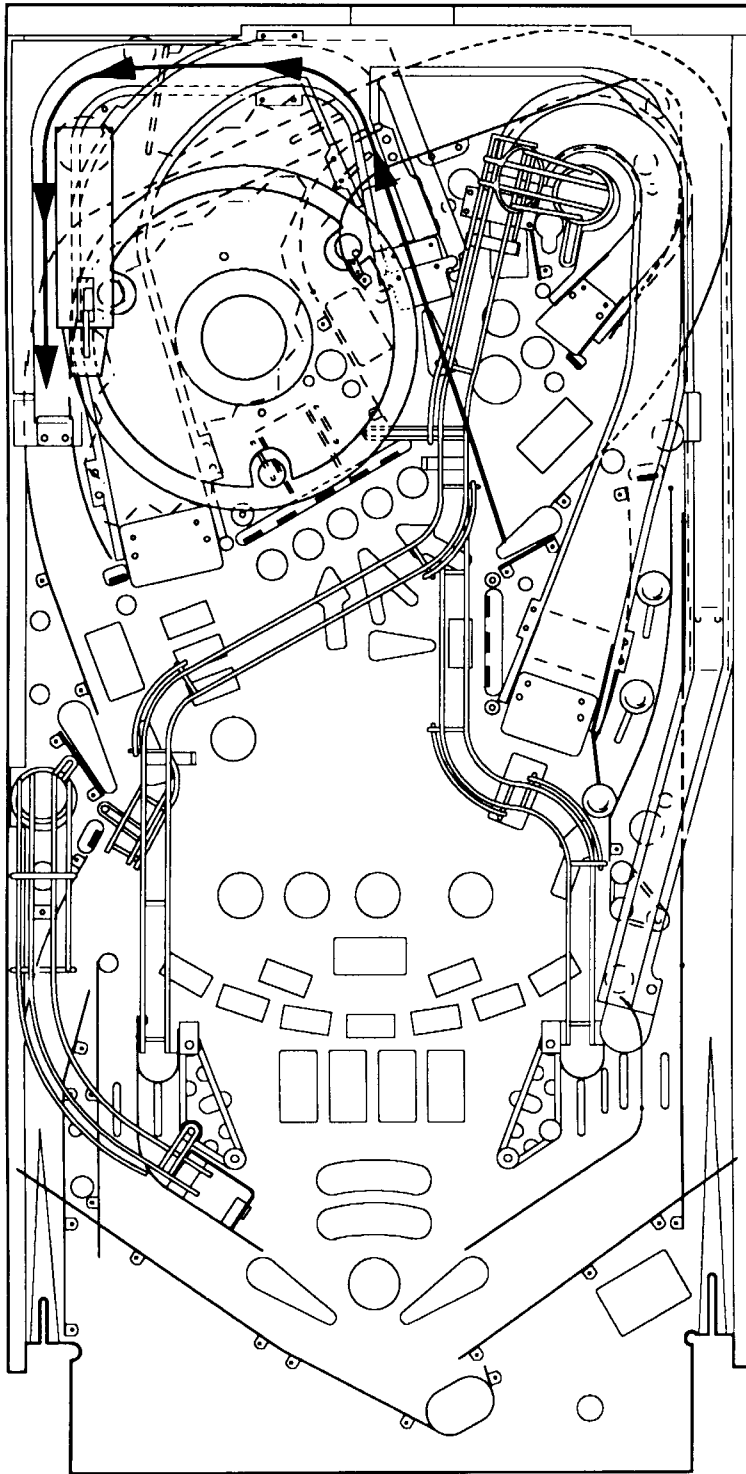
IF 5TH CRIME SCENE LIT SCORED
ALSO LITE "EXTRA BALL"

BLACKOUT MODE:
SCORE 50K X2

ULTIMATE CHALLENGE MODE:
ADVANCE BONUS 20 MILLION

SUPERGAME™ PLAY: SCORE 100K
+ 2 MILLION EACH REPEATING LOOP





CENTER RAMP

REGULATION PLAY: SCORE 100K

1ST TIME SCORE 500K
2ND TIME SCORE 1 MILLION
3RD TIME SCORE 1,500,000
ETC., ETC...

MAXIMUM VALUE -10TH TIME SCORE
5 MILLION TO END OF BALL IN PLAY.

BATTLE TANK MODE:

ADVANCE BONUS 10 MILLION AND
DESTROY SECTION OF TANK.
DESTROYING TANK AWARDS
30 MILLION.

BLACKOUT MODE:

SCORE "BLACKOUT" JACKPOT-10
MILLION

SUPERGAME™ PLAY: SCORE 1 MILLION

SNIPER TOWER

REGULATION PLAY: SCORE 50K
IF "BUILD-UP" LIT, INCREASE MODE
COUNTER AND START MODE OF
COUNTER COMPLETE.

CRIME SCENE LIT GREEN:
SCORE 1 MILLION;
CRIME SCENE LIT YELLOW:
SCORE 2 MILLION;
CRIME SCENE LIT RED:
SCORE 3 MILLION;
CRIME SCENE LIT WHITE:
SCORE 4 MILLION;
IF 5TH CRIME SCENE LIT SCORED
ALSO LITE "EXTRA BALL".

SNIPER MODE:
1ST TIME SCORE "HURRY-UP" VALUE.
2ND TIME SCORE
2X "HURRY-UP" VALUE.

BLACKOUT MODE:
SCORE 100K

ULTIMATE CHALLENGE MODE:
ADVANCE BONUS 20 MILLION

SUPERGAME™ PLAY:

PRISION BREAK MODE:

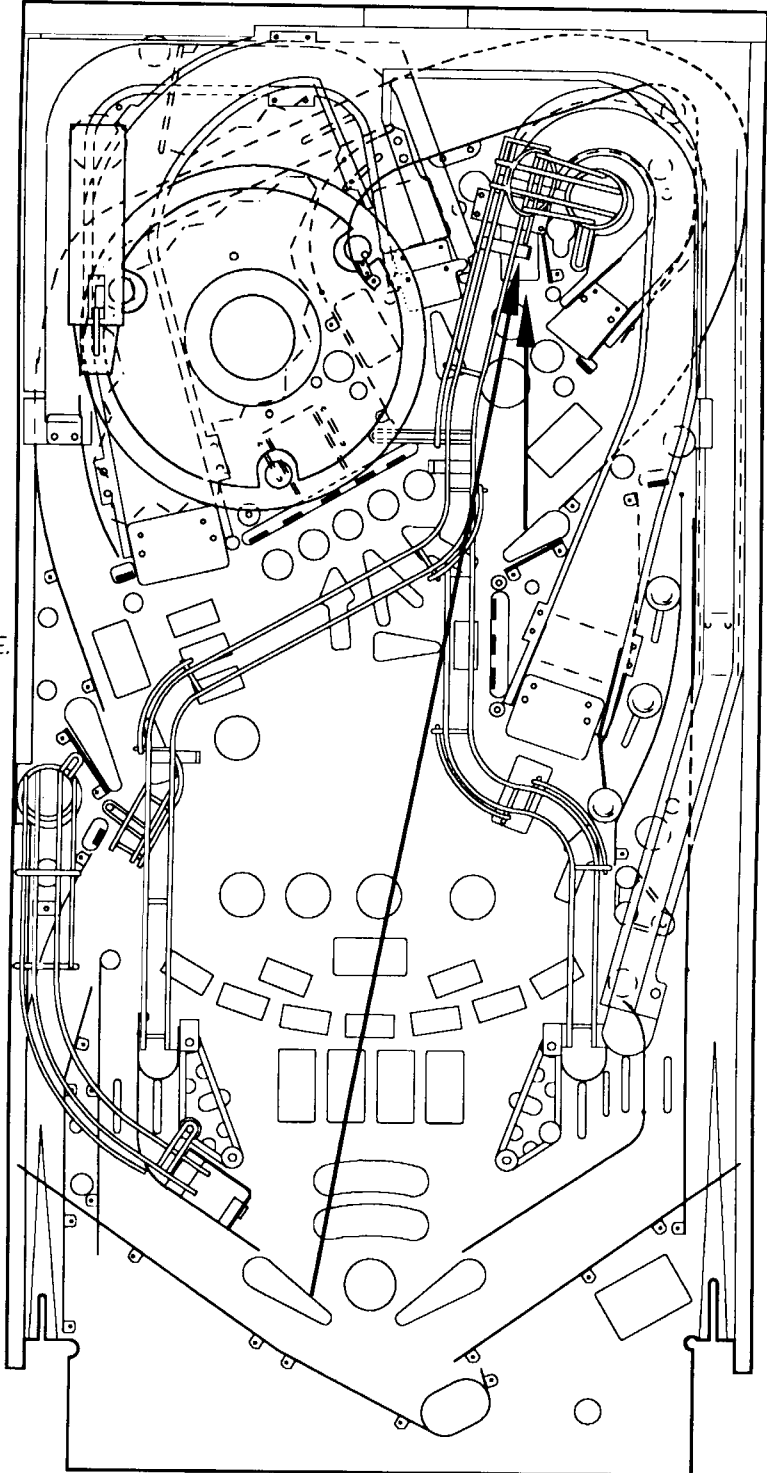
CRIME SCENE UNLIT: SCORE 50K

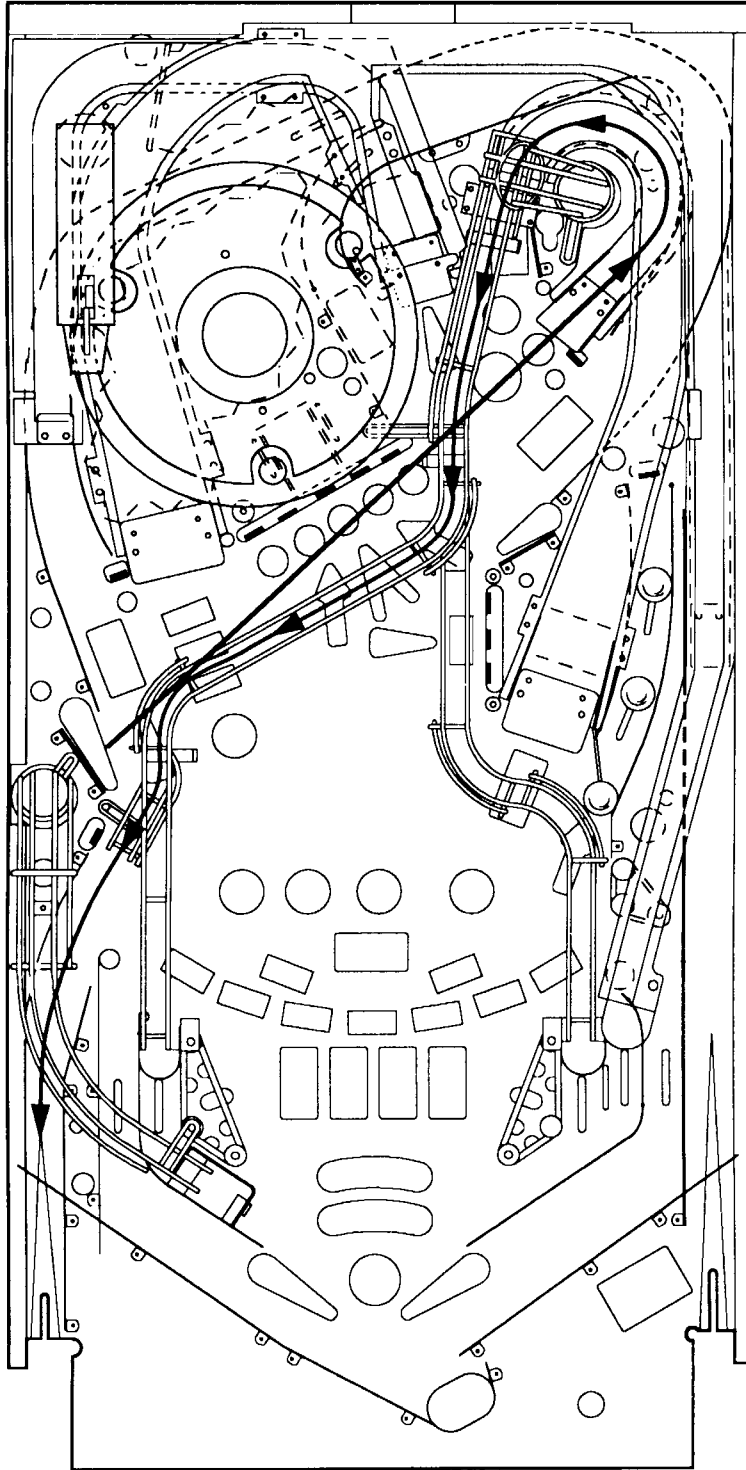
CRIME SCENE FLASHING, **NOT LAST LIT:**
SCORE 5 MILLION & ADVANCE
SUPER JACKPOT 5 MILLION.

CRIME SCENE FLASHING, **LAST LIT**
SCORE 5 MILLION & SUPER
JACKPOT VALUE (25MILLION) &
RESTART SEQUENCE.

MAD BOMBER MODE:

AWARD SUPER JACKPOT VALUE





"AIR RAID" RAMP

REGULATION PLAY: SCORE 500K
& START "AIR RAID" FEATURE.

BLACKOUT MODE:
SCORE 1 MILLION

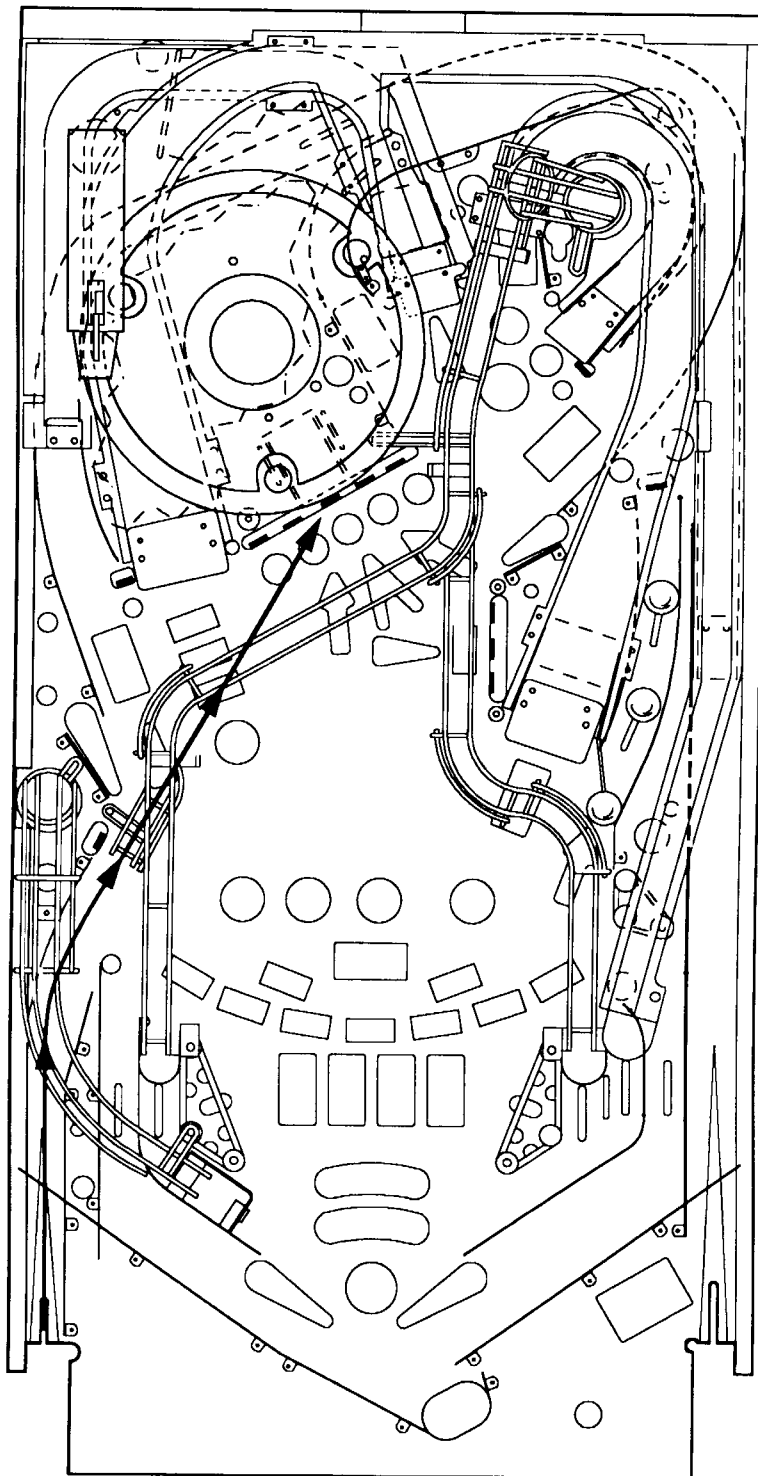
SUPERGAME™ PLAY:
SCORE 1 MILLION

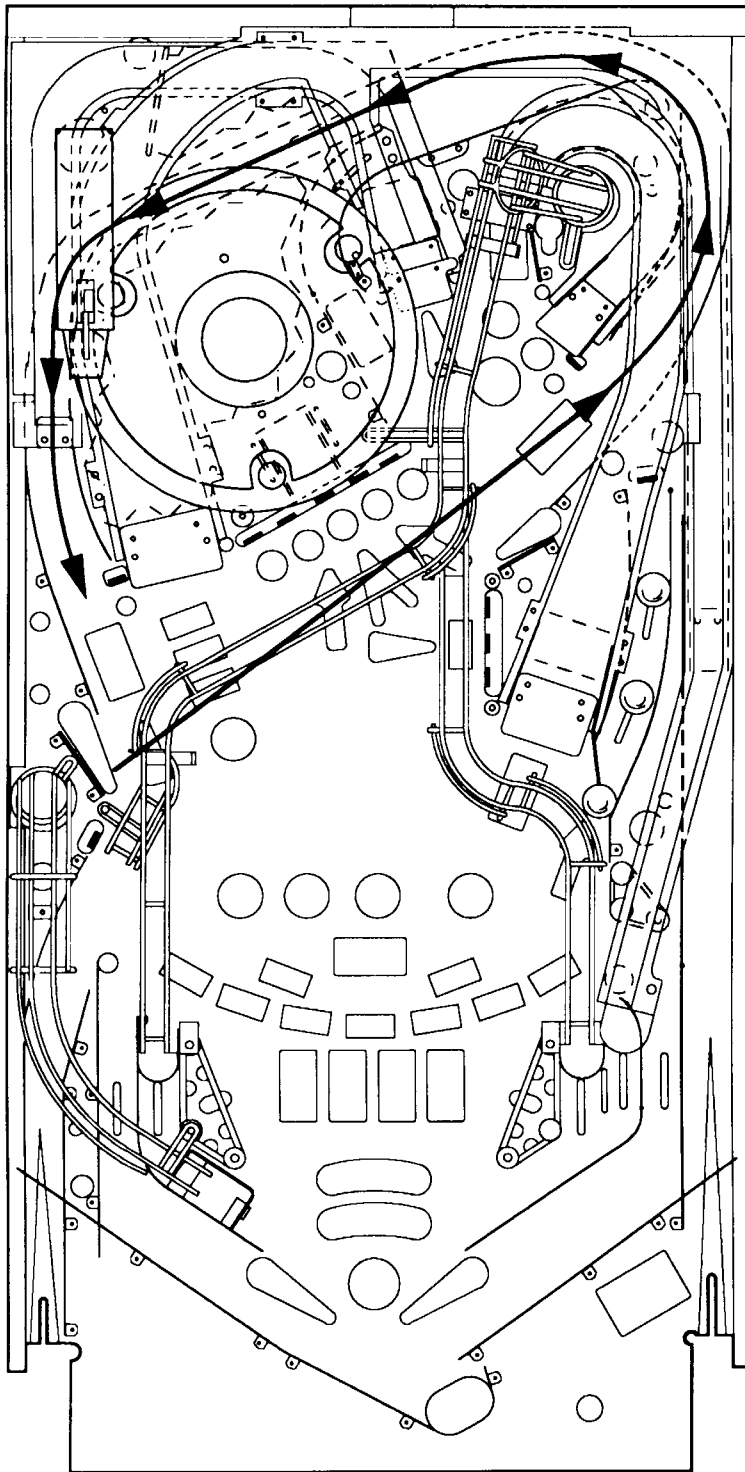
"AIR RAID" FEATURE SHOT
(REGULATION PLAY MODE ONLY)

COMPLETION OF "AIR RAID" RAMP
RESETS DROP TARGET 5-BANK.
DISPLAY SHOWS INCOMING MISSILE AND
REMAINING TIME TO SHOOT. J-U-D-G-E
LAMPS ROTATE BACK AND FORTH TO
INDICATE WHICH TARGET TO HIT.
LAUNCH BALL FROM LEFT SHOOTER
WITH LEFT CABINET LAUNCH BUTTON
TO HIT HIT TARGET AND DESTROY
INCOMING MISSILE.

HIT SCORES: 5 MILLION

MISS SCORES: NOTHING





TOP OUTER LOOP

REGULATION PLAY:

1ST LOOP SCORE 1 MILLION;
 2ND LOOP SCORE 2 MILLION;
 3RD LOOP SCORE 3 MILLION;
 ETC., ETC., (NO MAXIMUM VALUE!).
 VALUE RESETS AFTER MISSING
 CONSECUTIVE SHOT.

CRIME SCENE LIT GREEN:

SCORE 1 MILLION;

CRIME SCENE LIT YELLOW:

SCORE 2 MILLION;

CRIME SCENE LIT RED:

SCORE 3 MILLION;

CRIME SCENE LIT WHITE:

SCORE 4 MILLION;

IF 7TH CRIME SCENE LIT SCORED

ALSO LITE "EXTRA BALL".

BLACKOUT MODE:

(REGULATION SCORING X2)

ULTIMATE CHALLENGE MODE:

ADVANCE BONUS 20 MILLION

SUPERGAME™ PLAY: SCORE 500K

3-BANK STAND-UP TARGETS

REGULATION PLAY:

SCORE 500K & START LIT SCORE
50K & INCREASE CRIME SCENE VALUES.

BATTLE TANK MODE:

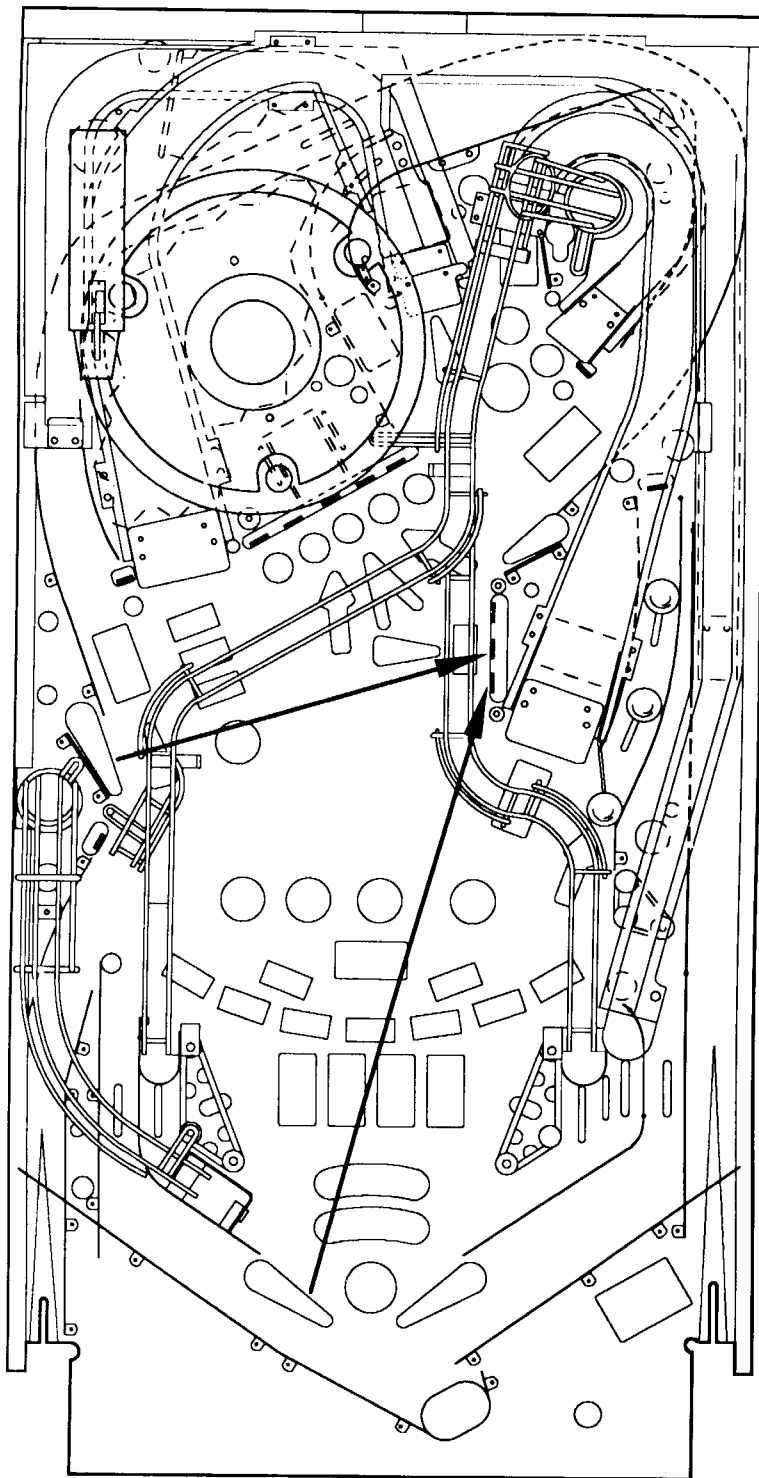
DESTROY SECTION OF TANK
AND ADVANCE BONUS 10 MILLION.
DESTROYING TANK AWARDS
30 MILLION.

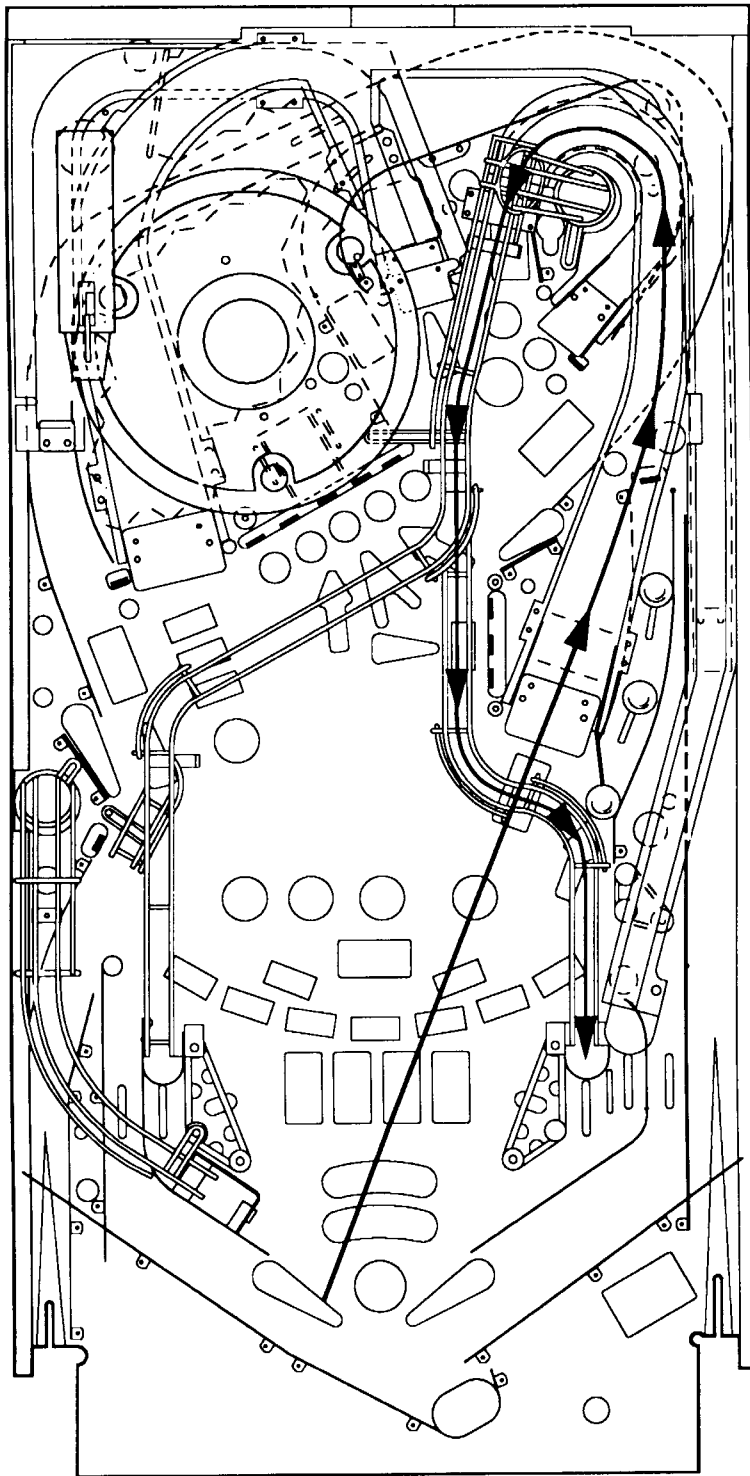
BLACKOUT MODE:

SCORE 1 MILLION

SUPERGAME™ PLAY:

SCORE 1 MILLION





RIGHT RAMP

REGULATION PLAY:

1ST TIME SCORE 500K;
 2ND TIME SCORE 1 MILLION;
 3RD TIME SCORE 1.5 MILLION;
 ETC., ETC.,.

CRIME SCENE LIT GREEN:

SCORE 1 MILLION;

CRIME SCENE LIT YELLOW:

SCORE 2 MILLION;

CRIME SCENE LIT RED:

SCORE 3 MILLION;

CRIME SCENE LIT WHITE:

SCORE 4 MILLION;

IF 5TH CRIME SCENE LIT SCORED

ALSO LITE "EXTRA BALL".

PURSUIT MODE:

LAUNCH RIGHT MISSILE.
 ADVANCE 1 MILLION BONUS &
 ADVANCE 30 MILLION BONUS IF
 CAR IS DESTROYED.

STAKEOUT MODE:

ADVANCE BONUS 5 MILLION

BLACKOUT MODE:

(REGULATION SCORING X2)

ULTIMATE CHALLENGE MODE:

ADVANCE BONUS 20 MILLION

SUPERGAME™ PLAY:

PRISION BREAK MODE:

CRIME SCENE UNLIT: SCORE 50K

CRIME SCENE FLASHING, NOT LAST LIT:

SCORE 5 MILLION & ADVANCE
 SUPER JACKPOT 5 MILLION.

CRIME SCENE FLASHING, LAST LIT:

SCORE 5 MILLION & SUPER
 JACKPOT VALUE (25MILLION) &
 RESTART SEQUENCE.

MAD BOMBER MODE:

SCORE 1 MILLION PLUS ADVANCE
 SUPER JACKPOT VALUE 5 MILLION
 (MAXIMUM OF 25 MILLION).

TRIPLE CAPTIVE BALL

REGULATION PLAY:

1ST BALL ROLLOVER; SCORE 400K

2ND BALL ROLLOVER; SCORE 600K

3RD BALL TARGET:

1ST TIME & ALL "ODD" HITS SCORES
1 MILLION ONLY

2ND TIME SCORES
1 MILLION + 2X BONUS

4TH TIME SCORES
1 MILLION + 5 MILLION

6TH TIME SCORES
1 MILLION + LITE "EXTRA BALL"

8TH TIME & ALL "EVEN" HITS SCORES
1 MILLION + 5 MILLION

MELTDOWN MODE:

1ST & 2ND SWITCH ACTUATED
SCORES 5 MILLION & "COOLS" 1 TOWER.

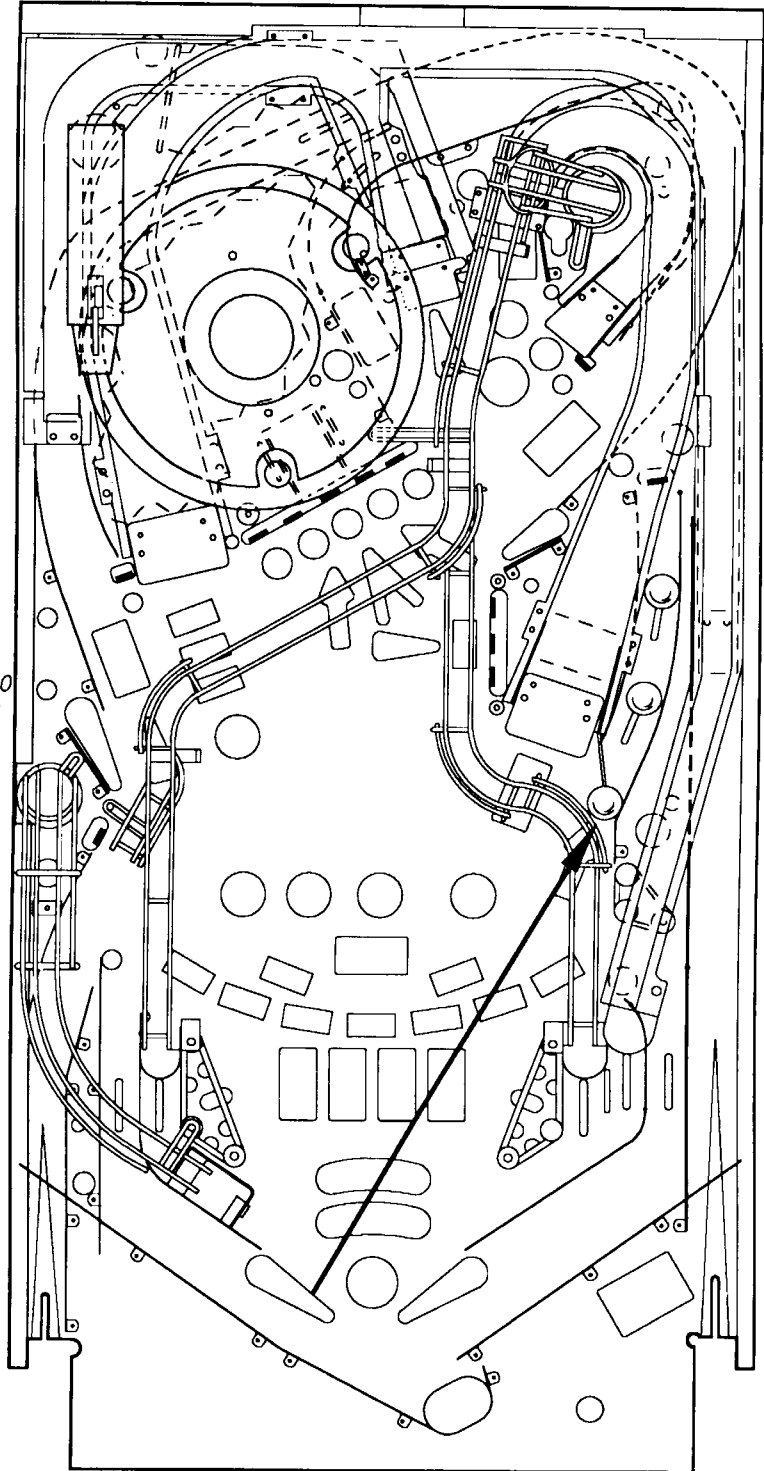
3RD SWITCH ACTUATED SCORES 20
MILLION, "COOLS" THIRD TOWER & ENDS
MODE

BLACKOUT MODE:

(REGULATION SCORING X2)

SUPERGAME™ PLAY:

(REGULATION SCORING X2)



Game Operation and Test Information

(System WPC) ROM Summary

IC	TYPE	BOARD	LOCATION	PART NUMBER
Game 1	27c040	CPU	U6	†A-5343-20020-1
Music/Speech	27c040	Audio	U2	†A-5343-20020-2
Music/Speech	27c040	Audio	U3	†A-5343-20020-3
Music/Speech	27c040	Audio	U4	*5341-13812-U4 †A-5343-20020-4
Music/Speech	27c040	Audio	U5	*5341-13812-U5 †A-5343-20020-5
Music/Speech	27c040	Audio	U6	*5341-13812-U6 †A-5343-20020-6
Music/Speech	27c040	Audio	U7	*5341-13812-U7 †A-5343-20020-7
Music/Speech	27c040	Audio	U8	*5341-13812-U8 †A-5343-20020-8
Music/Speech	27c040	Audio	U9	*5341-13812-U9 †A-5343-20020-9

† = EPROM, * = MASKED ROM

NOTICE

Order replacement ROMs from your authorized MIDWAY MANUFACTURING CO. distributor. Specify: (1) part number (if available); (2) ROM level (number) on the label; (3) game in which ROM is used.

PINBALL GAME ASSEMBLY INSTRUCTIONS

JUDGE DREDD IS A 9 BALL GAME.

(Six active balls and three captive balls.)

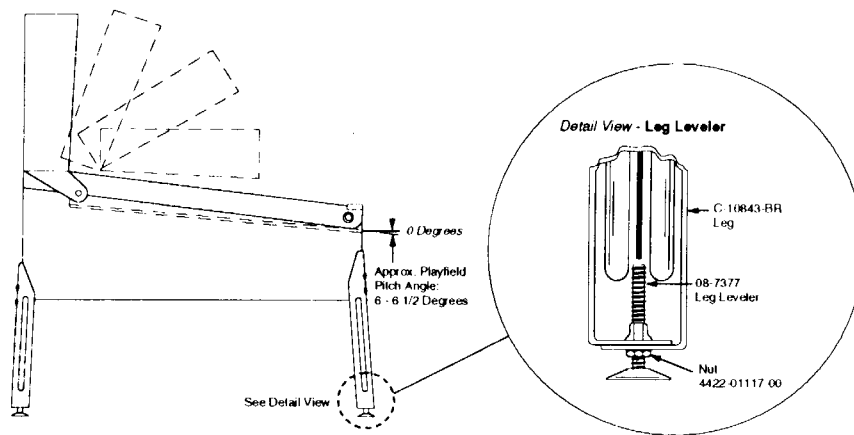
Power: Domestic 120V @ 60 Hz
Foreign 230V @ 50 Hz
Japan 100V @ 50 Hz

Dimensions: Width: 29" Approx.
Depth: 55" Approx.
Height: 83" Approx.

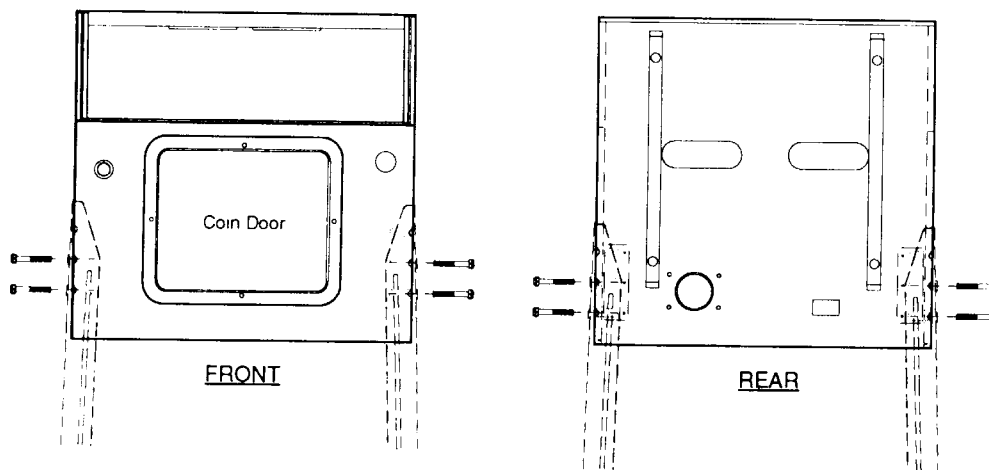
Temp: 32° F to 100° F
(0° C to 38° C)

Humidity: Not to exceed 95% relative. **Weight:** Approx. 322 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 scratches. 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: It is recommended that these measurements 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. Adjust leg levelers to the desired playfield pitch (front to back).. The recommended pitch level is 6 1/2 degrees.

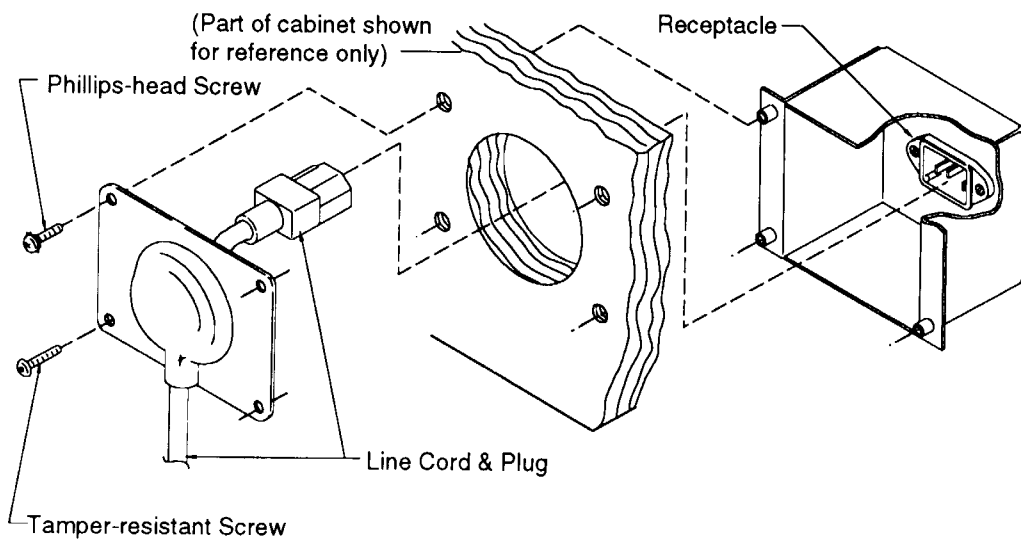
CAUTION

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. **JUDGE DREDD** uses 9 balls, 6 active and 3 captive.
12. Install playfield mylars if desired.

NOTE: **JUDGE DREDD** playfield is coated with 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 03-7960-20020-1 for full playfield mylar.

13. Remove captive ball holders and packaging foam from the playfield.
14. Clean and reinstall the playfield cover glass, reversing the procedure of step 7.
15. To attach line cord, remove envelope stapled to the inside cabinet (near cashbox). Remove the four Phillips-head screws that mount the line cord cover plate to the rear cabinet. Match the prongs on the plug with the holes in the receptacle and push line cord securely into place. Make sure cord is aligned with the indentation of plate (indentation should point toward bottom of cabinet). Remount line cord cover plate. If desired, tamper resistant screws have been provided in an envelope marked "Security Screws" (located in cashbox) to remount cover plate. Prepare the game for player operation.



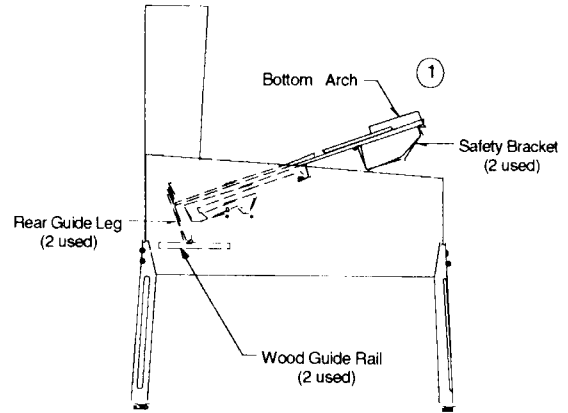
RAISING THE PLAYFIELD

CAUTION

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

To raise the playfield.

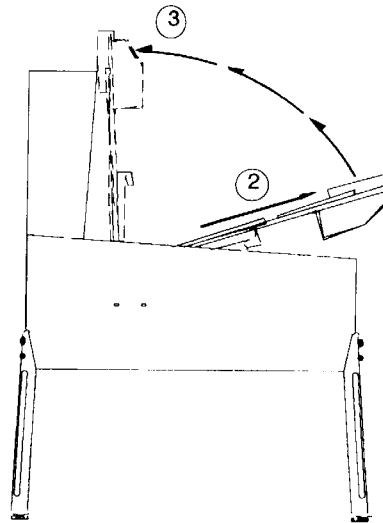
1. Grasp bottom arch and carefully lift up playfield only high enough to clear safety brackets. Rear guide legs should not hit wood guide rails or be used to slide out playfield.



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

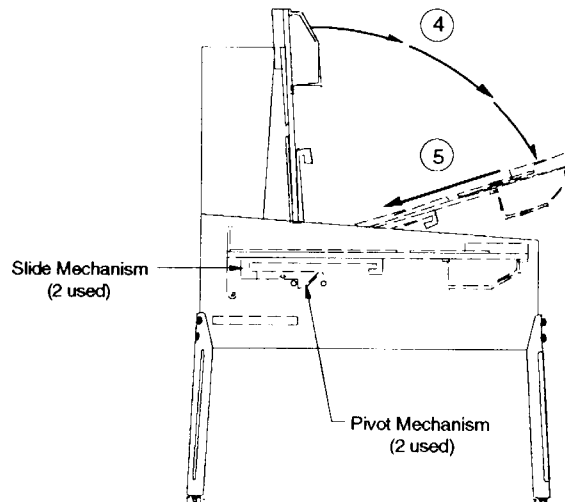
Be sure playfield is in locked position and does not slide back into the cabinet. If it does, repeat Step 2 before proceeding to Step 3.

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 the playfield.

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

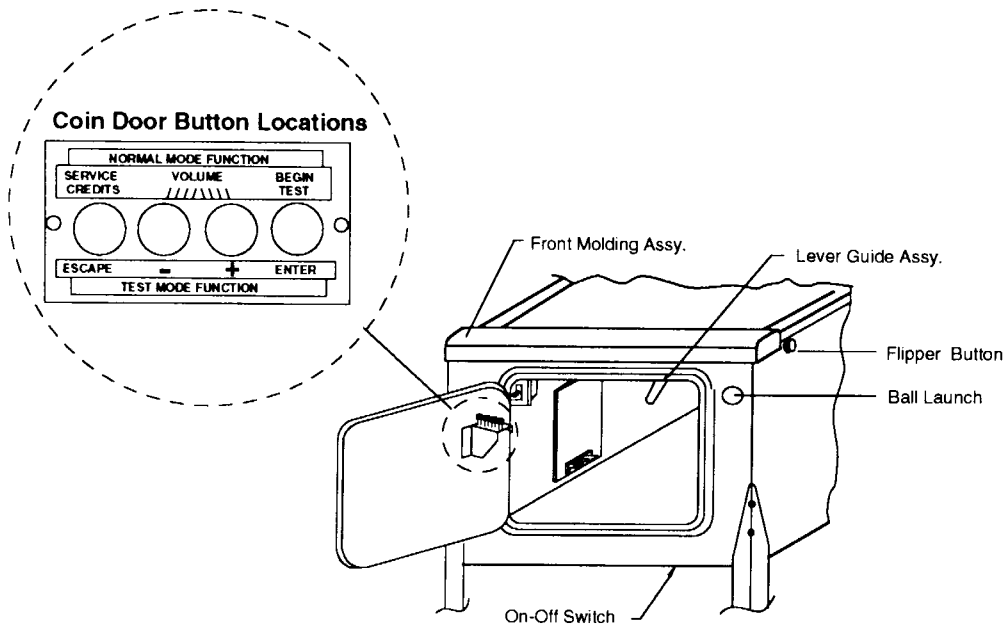
Test Function

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:	JUDGE DREDD	Sound Rev. L-1
	20020	Rev. P-O Sy. 2.63 5/27/93

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

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

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

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

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

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

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

*Operator-adjustable feature.

MENU SYSTEM OPERATION

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

Main Menu

B. Bookkeeping Menu

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

P. Printouts Menu

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

T. Test Menu

T.1 Switch Edges
T.2 Switch Levels
T.3 Single Switches
T.4 Solenoid Test
T.5 Flasher Test
T.6 General Illumination
T.7 Sound & Music Test
T.8 Single Lamps
T.9 All Lamps
T.10 Lamp & Flasher Test
T.11 Display Test
T.12 Flipper Test
T.13 Ordered Lamp Test
T.14 Planet Test
T.15 Planet Arm Test
T.16 Unload Globe 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-Stamped**

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

B.2 Earning Audits*

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

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

B.3 Standard Audits

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

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

† This Audit is not resettable.

B.4 Feature Audits

B.4	01	Multi-ball	00
B.4	02	Multi-ball Jackpots	00
B.4	03	Balls Saved	00
B.4	04	Planet Errors	00
B.4	05	Arm Errors	00
B.4	06	Ultimate Challenge	00
B.4	07	Lit Extra Ball	00
B.4	08	Super Games	00
B.4	09	Super Game Replays	00
B.4	10	Super Game H.S.T.D.	00
B.4	11	Super Game Grand	00
B.4	12	Buy-In	00
B.4	13	Buy-In into Super Game	00

B.5 Histograms

B.5	01	0-1.9 Million Scores	00%	00
B.5	02	2-4.9 Million Scores	00%	00
B.5	03	5-9.9 Million Scores	00%	00
B.5	04	10-19 Million Scores	00%	00
B.5	05	20-29 Million Scores	00%	00
B.5	06	30-39 Million Scores	00%	00
B.5	07	40-49 Million Scores	00%	00
B.5	08	50-69 Million Scores	00%	00
B.5	09	70-99 Million Scores	00%	00
B.5	10	100-149 Million Scores	00%	00
B.5	11	150-199 Million Scores	00%	00
B.5	12	200-299 Million Scores	00%	00
B.5	13	Over 300 Million	00%	00
B.5	14	Game Time 0.0-1.0 Mins	00%	00
B.5	15	Game Time 1.0-1.5 Mins	00%	00
B.5	16	Game Time 1.5-2.0 Mins	00%	00
B.5	17	Game Time 2.0-2.5 Mins	00%	00
B.5	18	Game Time 2.5-3.0 Mins	00%	00
B.5	19	Game Time 3.0-3.5 Mins	00%	00
B.5	20	Game Time 3.5-4.0 Mins	00%	00
B.5	21	Game Time 4-5 Mins	00%	00
B.5	22	Game Time 5-6 Mins	00%	00
B.5	23	Game Time 6-8 Mins	00%	00
B.5	24	Game Time 8-10 Mins	00%	00
B.5	25	Game Time 10-15 Mins	00%	00
B.5	26	Game Time Over 15 Mins	00%	00

B.6 Time-Stamps

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

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

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

P. PRINTOUTS MENU

(optional board required)

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

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

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

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

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

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

T. TEST MENU

T.1	Switch Edges
T.2	Switch Levels
T.3	Single Switch
T.4	Solenoid Test
T.5	Flasher Test
T.6	General Illumination
T.7	Sound & Music Test
T.8	Single Lamps
T.9	All Lamps
T.10	Lamp & Flasher Tests
T.11	Display Test
T.12	Flipper Test
T.13	Ordered Lamps Test
T.14	Planet Test
T.15	Planet Arm Test
T.16	Unload Globe 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 Planet Test This test is used to test the planet assembly in the game. There is 1 opto sensor used to monitor the position of the planet. After entering this test, the planet assembly will begin to rotate and the opto switch (#77) will indicate open or closed. There are two modes to this test:

- Stop - The Stop Mode halts the Planet Test. Press Enter during the Run mode and the Planet Test stops.
- Run - The Run Mode automatically turns the planet assembly. The display shows the switch number being open/closed. Either press the Escape button to return to the Test Menu, or the Enter button to advance to the Stop mode.

T.15 Adjust Arm Test This test is used to adjust the planet ring and arm assemblies. At test startup, the planet assembly will automatically rotate, then stop. At the stopped position the planet ring hole should be centered with the arm magnet, and the magnet height should be slightly above the ball. Press the Enter button to rerun the test at any time. Go to test T.16 after completing any adjustments.

To center ring hole, loosen the 3 slotted hole screws on the ring assembly. With the ball in one of the holes, turn ring assembly until it is centered below magnet. Tighten screws.

To vertically adjust arm assembly, lift arm unit and loosen lower nut on the adjustment post near the rear of unit. Adjust lifter screw up or down so that the magnet is approximately 1/16" higher than the ball. Tighten the lower nut.

T.16 Unload Globe Test This test is used to check the synchronization of the planet and arm assemblies. After entering this test, the arm assembly will simulate the removal of balls from the ring assembly and onto the playfield. Opto switch numbers 62, 71, and 77 are effected during the cycle. There are two modes to this test:

- Stop - The Stop Mode halts the Unload Globe Test. Press Enter during the Run mode and the test stops.
- Run - The Run Mode automatically rotates the planet and moves the arm assembly. The display shows the switch numbers being opened and closed. Press the Escape button to return to the Test Menu, or the Enter button to advance to the Stop mode.

If ball(s) do not unload properly, then return to test T.15 and readjust arm and ring assemblies.

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 01	Extra Ball Percent	20	20	18	15	15
A.2 04	Count to Start Mode	1	1	2	3	3
A.2 05	Ball Save Timer	8	8	5	5	5
A.2 06	Manhunt Timer	30	30	30	25	25
A.2 07	Sniper Timer	30	30	30	25	25
A.2 08	Stakeout Timer	30	30	30	25	25
A.2 09	Pursuit Timer	30	30	30	25	25
A.2 10	Safecracker Timer	30	30	30	25	25
A.2 11	Impersonator Timer	30	30	30	25	25
A.2 12	Meltdown Timer	30	30	30	25	25
A.2 13	Battle Tank Timer	30	30	30	25	25

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 01	Extra Ball Percent	20	20	18	15	15
A.2 04	Count to Start Mode	1	1	2	3	3
A.2 05	Ball Save Timer	8	8	5	5	5
A.2 06	Manhunt Timer	30	30	30	25	25
A.2 07	Sniper Timer	30	30	30	25	25
A.2 08	Stakeout Timer	30	30	30	25	25
A.2 09	Pursuit Timer	30	30	30	25	25
A.2 10	Safecracker Timer	30	30	30	25	25
A.2 11	Impersonator Timer	30	30	30	25	25
A.2 12	Meltdown Timer	30	30	30	25	25
A.2 13	Battle Tank Timer	30	30	30	25	25

U.9 06 Install 5 Ball

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

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

Adjustment Number	Adjustment Description	Install 5-Ball U.9 06	Install 3 Ball U.9 07
A.2 01	Extra Ball Percent	15	18
A.2 04	Count to Start Mode	3	2
A.2 05	Ball Save Timer	5	5
A.2 06	Manhunt Timer	25	30
A.2 07	Sniper Timer	25	30
A.2 08	Stakeout Timer	25	30
A.2 09	Pursuit Timer	25	30
A.2 10	Safecracker Timer	25	30
A.2 11	Impersonator Timer	25	30
A.2 12	Meltdown Timer	25	30
A.2 13	Battle Tank Timer	25	30

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

<u>Adjustment</u>	<u>Name</u>	<u>New Setting</u>
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:

<u>Adjustment</u>	<u>Name</u>	<u>New Setting</u>
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:

<u>Adjustment</u>	<u>Name</u>	<u>New Setting</u>
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 Install Buy-in This option automatically sets game pricing to 1 for 50¢/2 for \$1.00, and 1 Coin Buy-in (A.3 19) to YES. **Note that this is not the same feature that allows the player to buy an extra ball at the end of the game. See A.2 01 "Buy Extra Ball".**

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 Not Used

U.9 14 Not Used

U.9 15 Not Used

U.9 16 Not Used

U.9 17 Install German 1•

U.9 18 Install German 2•

U.9 19 Install German 3•

U.9 20 Install German 4•

U.9 21 Install German 5•

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

Preset Game Adjustments Table for German/European Games

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

• The German DIP Switch Settings are:

SW4 SW5 SW6 SW7 SW8
On On On On Off

U.9 23 Install French 1*

U.9 24 Install French 2*

U.9 25 Install French 3*

U.9 26 Install French 4*

U.9 27 Install French 5*

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

Preset Game Adjustments Table for French Games

Adj. #	Adjustment Description	French 1 U.9 23	French 2 U.9 24	French 3 U.9 25	French 4 U.9 26	French 5 U.9 27	French 6 U.9 28
A.2 04	Extra Ball Percent	13	12	13	14	10	13

* 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 actuations 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 or four replay levels are chosen, their values are automatically adjusted to three or four times the starting replay level.

*For Auto % Replay.

A.1 09 Replay Level 1

A.1 10 Replay Level 2

A.1 11 Replay Level 3

A.1 12 Replay Level 4

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

A.1 13 Replay Boost

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

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

A.1 14 Replay Award

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

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

A.1 15 Special Award

The award automatically provided when the player scores a special.

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

A.1 16 Match Award

The award automatically provided when the players wins a match.

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

A.1 17 Extra Ball Ticket

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

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

A.1 18 Maximum Ticket/Player

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

A.1 19 Match Feature

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

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

A.1 20 Custom Message

The message displayed during the Attract Mode.

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

A.1 21 Language

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

A.1 22 Clock Style

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

A.1 23 Date Style

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

A.1 24 Show Date and Time

The date and time show in the Attract Mode.

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

A.1 25 Allow Dim Illumination

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

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

A.1 26 Tournament Play

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

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

A.1 27 Euro. Scr. Format

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

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

A.1 28 Minimum Volume Control

The volume can be turned Off.

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

A.1 29 General Illumination Power Saver

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

Setting: - Off, 2-60 Minutes

A.1 30 Power Saver Level

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

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

A.1 31 Ticket Expansion Board

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

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

A.1 32 No Bonus Flips

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

A.1 33 Game Restart

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

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

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

A.2 Feature Adjustments

A.2 01 Extra Ball Percent

This is used to determine the stepping amount of crime scenes needed to lite Extra Ball.

Range 5% - 30%

A.2 02 Attract Sounds

This is used to determine whether or not sounds should be played in the Attract Mode.

Setting: ON - No sounds in attract mode.
 OFF - Allows sounds in attract mode.

Factory Default OFF

A.2 03 Family Mode

This is used to disable/enable hidden fatalities.

Setting: ON - No fatalities.
 OFF - Allows fatalities.

Factory Default OFF

A.2 04 Count to Start Mode

The number of left ramp shots to Start Mode.

Range 1 - 3

A.2 05 Ball Save Timer

The number of seconds of "Drain Shield" time per ball.

Range 0 - 15 Seconds
(0 Seconds = OFF)

A.2 06 Manhunt Timer

The number of seconds for Manhunt Mode.

Range 15 - 35 Seconds

A.2 07 Sniper Timer

The number of seconds for Sniper Mode.

Range 15 - 35 Seconds

A.2 08 Stakeout Timer

The number of seconds for Stakeout Mode.

Range 15 - 35 Seconds

A.2 09 Pursuit Timer

The number of seconds for Pursuit Mode.

Range 15 - 35 Seconds

A.2 10 Safecracker Timer

The number of seconds for Safecracker Mode.

Range 15 - 35 Seconds

A.2 11 Impersonator Timer

The number of seconds for Impersonator Mode.

Range 15 - 35 Seconds

A.2 12 Meltdown Timer

The number of seconds for Meltdown Mode.

Range 15 - 35 Seconds

A.2 13 Tank Timer

The number of seconds for Tank Mode.

Range 15 - 35 Seconds

A.2 14 Super Replay Start

Super Game replay starting level for auto percentage.

Range 500 Million - 1.5 Billion
(Initial Value: 300 Million)

A.2 15 Super Backup Grand

Backup Super Game grand champion.

Range 250 - 999 Million
(Initial Value: 350 Million)

A.2 16 Super Backup H.S.T.D. 1

Backup Super Game high score 1.

Range 150 - 999 Million
(Initial Value: 320 Million)

A.2 17 Super Backup H.S.T.D. 2

Backup Super Game high score 2.

Range 140 - 999 Million
(Initial Value: 310 Million)

A.2 18 Super Backup H.S.T.D. 3

Backup Super Game high score 3.

Range 130 - 999 Million
(Initial Value: 300 Million)

A.2 19 Super Backup H.S.T.D. 4

Backup Super Game high score 4.

Range 120 - 999 Million
(Initial Value: 290 Million)

A.2 20 Buy Extra Ball

This determines whether a player may buy an Extra Ball.

Setting: YES - Player can buy an Extra Ball for a credit.
NO - Player can not buy an Extra Ball.

Factory Default: YES

A.3 Pricing Adjustments

A.3 01 Game Pricing (if set to custom, then 02 to 09 are available)

The cost of a game is selected from the Standard Pricing Table or by installing Custom pricing.

A.3 02 Left Coin Units

A.3 03 Center Coin Units

A.3 04 Right Coin Units

A.3 05 4th Slot Units

The number of coin units purchased by a coin passing through the left, right, center, and fourth coin chutes.

A.3 06 Units/Credits

Defines the number of coin units required to obtain 1 credit. A coin unit counter in the game program totals the number of coin units purchased through all coin chutes prior to each game. If the total number of these coin units exceeds or matches the Unit per Credit value by a multiple (or more, coin units) of the specified Units per Credit value the Credits display shows the proper number of credits. The coin unit counter retains any remaining coin units, until the start of Ball 2; then the coin unit counter is cleared (its contents are zeroed).

A.3 07 Units/Bonus

Additional credits are to be indicated in the credits display, when a certain number of coin units are accumulated.

A.3 08 Bonus Credits

The number of credits that are awarded when the Units/Bonus level is achieved.

A.3 09 Minimum Units

No credits are to be posted (indicated in the credit display), until the credits unit counter reaches a particular value, by setting this value to 02 (or more).

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

This adjustment is used to preset adjustments 11 through 15, 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.

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 1 Coin Buy-in

If game pricing is set to 1 for 50¢/2 for \$1.00 the player is allowed to 'buy-in' a subsequent game for 1 coin. The number of games that may be purchased at this cost is determined by the number of players in the previous game; that is, if the previous game had three players, 3 Credits can be purchased at the rate of 1 coin per credit. **Note that this is not the same feature that allows the player to buy an extra ball at the end of the game. See A.2 01 "Buy Extra Ball".**

- YES - The player has 10 seconds to buy-in at 1 coin per game.
- NO - The buy-in feature is disabled.

A.3 20 Base Coin Size

The number of ticket per coin calculations.

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.

Pricing Table

Country	Coin Chutes			4th Chute	Games/Coins	Display	Pricing Adjustments A3																
	Left	Center	Right				02	03	04	05	06	07	08	09									
USA	25¢	\$1.00*	25¢	-	1/50¢, 2/75¢, 3/\$1 ²	50¢, 75¢, \$1.00																	
	25	\$1.00	25¢	-	1/3X25¢	USA1 1/\$0.75																	
	25	\$1.00	25¢	-	1/50¢, 2/\$1 ²	USA 2/\$1.00																	
	25	\$1.00	25¢	-	1/2x25¢, 2/4x25¢, 3/\$1 ²	USA 3/\$1.00																	
	25	\$1.00	25¢	-	1/2x25¢, 2/\$1.00, 3/\$1.50, 6/\$2.00	USA 6/\$2.00																	
	25	\$1.00	25¢	-	1/2x25¢, 2/\$1.00, 3/\$1.50, 5/\$2.00	USA 5/\$2.00																	
	25	\$1.00	25¢	-	1/3X25¢, 1/\$1.50, 4/\$2.00	1/.75, 4/\$2.00																	
Canada	25¢	-	\$1.00	-	1/50¢, 2/75¢, 3/\$1	CANADA 1																	
					1/50¢, 2/\$1 ²	CANADA 2																	
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																	
	1Fr	2Fr	5Fr	-	1/2Fr, 2/3Fr, 3/4Fr, 5/5F	SWISS 2																	
Belgium	5Fr	20Fr	50Fr	-	1/4x5Fr, 1/20Fr, 3/50Fr ²	BELGIUM																	
Germany	1DM	2DM	5DM	-	1/2DM, 2/3DM, 3/4DM, 5/5DM ^{1,2}	GER. 1/2DM																	
Holland	1G	-	1G	-	1/1G	HOLLAND																	
Sweden	1Kr	5Kr	10Kr	-	1/5x1Kr, 1/5kr, 2/10Kr ^{1,2}	SWEDEN 1																	
	5Kr	5kr	5Kr	-	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	-	1/500L, 2/1000L	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	-	1/3x1 Kr, 3/5 Kr, 7/10 Kr ²	DENMARK																	
Finland	1Mka	-	5Mka	-	1/2x1Mka, 3/5Mka ²	FINLAND 1																	
	1Mka	-	5Mka	-	1/3x1Mka, 3/5Mka	FINLAND 2																	
New Zealand	\$1.00	-	\$2.00	-	1/\$1, 3/\$2	NEW ZEALAND 1																	
	\$2.00	-	\$1.00	-	1/\$1, 3/\$2, (\$2-\$1 door)	NEW ZEALAND 2																	
Norway	5Kr	-	10Kr	-	1/5Kr, 2/10Kr, 5/20Kr ²	NORWAY																	
Argentina	10¢	10¢	10¢	-	1/1 Token ²	ARGENTINA																	
Greece	10D	20D	50D	-	1/2x10D, 1/20D, 3/50D	GREECE																	
Antilles	25¢	25¢	1G	-	1/25¢, 4/1G	ANTILLES																	
Netherlands	1Hfl	2.5Hfl	2.5Hfl	-	1/1Hfl, 3/2.5Hfl	NETHERLANDS																	
Hungary	10F	10F	20F	-	1/1x20F, 1/2x10F, 3/2x20F ²	HUNGARY																	

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

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

A.4 01 Highest Scores

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

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

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

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

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

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

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

A.4 04 Champion Credits

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

A.4 05 H.S.T.D. 1 Credits

A.4 06 H.S.T.D. 2 Credits

A.4 07 H.S.T.D. 3 Credits

A.4 08 H.S.T.D. 4 Credits

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

A.4 09 High Score Reset Every

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

A.4 10 Backup Champion

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

A.4 11 Backup H.S.T.D. 1

A.4 12 Backup H.S.T.D. 2

A.4 13 Backup H.S.T.D. 3

A.4 14 Backup H.S.T.D. 4

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

A.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.

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.

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 ≈30 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).

Pinball Missing.

This game normally uses six 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 switches or the Ball Shooter switch.

xxxxx Sw. is Stuck On.

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

Ground Short Row-N, Wht-xxx.

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

1. Slam Tilt (or other coin door) switch touching the grounded coin door.
2. A leaf-type, playfield switch touching a grounded part.
3. Players poking metallic objects (wires, coat 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 running. 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, 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 (detector) 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 (emitter or L.E.D.) should always be approximately 1.4 volts. Note, the transmitter (L.E.D.) is larger than the receiver (it protrudes further from its case).

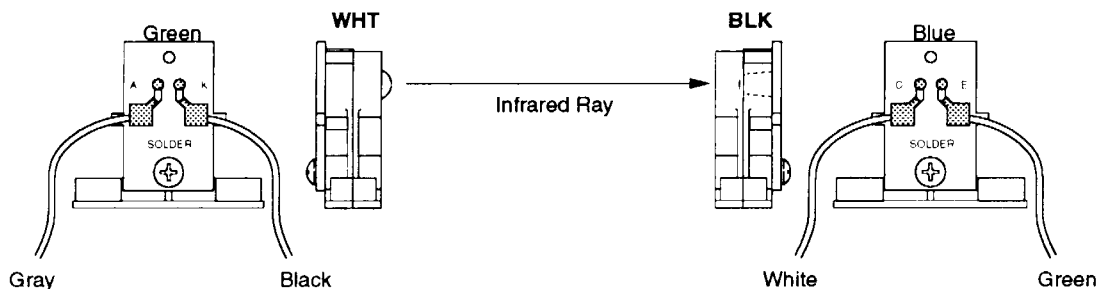
Transmitter

1.0-1.4 Volts

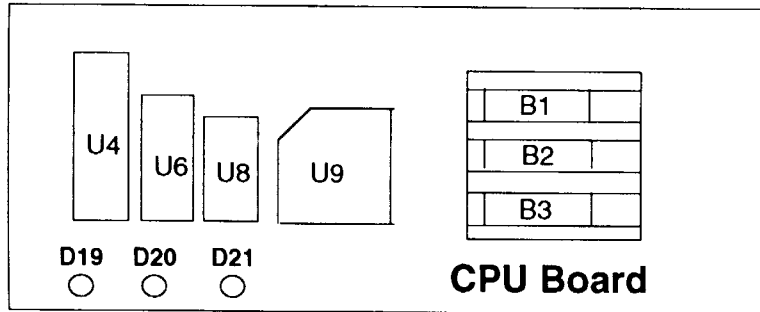
Receiver

0.1-0.7V Unblocked

11-13V Blocked



LED List



CPU Board

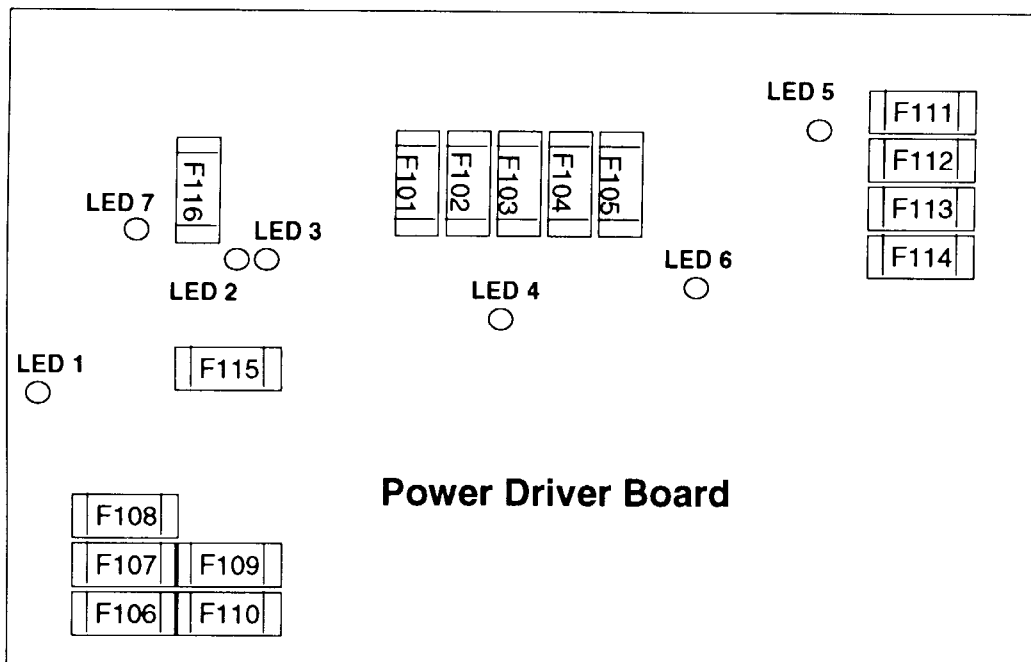
D19, Blanking

D20, Diagnostic

D21, +5vdc

At Game Turn-On = D19 & D21 On, D20 Off

During Normal Operation = D19 Off, D20 flashing, D21 On



Power Driver Board

LED 1, +12vdc, Switch Circuit, Normally On

LED 2, High/Low Line Voltage Sensor, Normally On

LED 3, High/Low Line Voltage Sensor, Normally Off

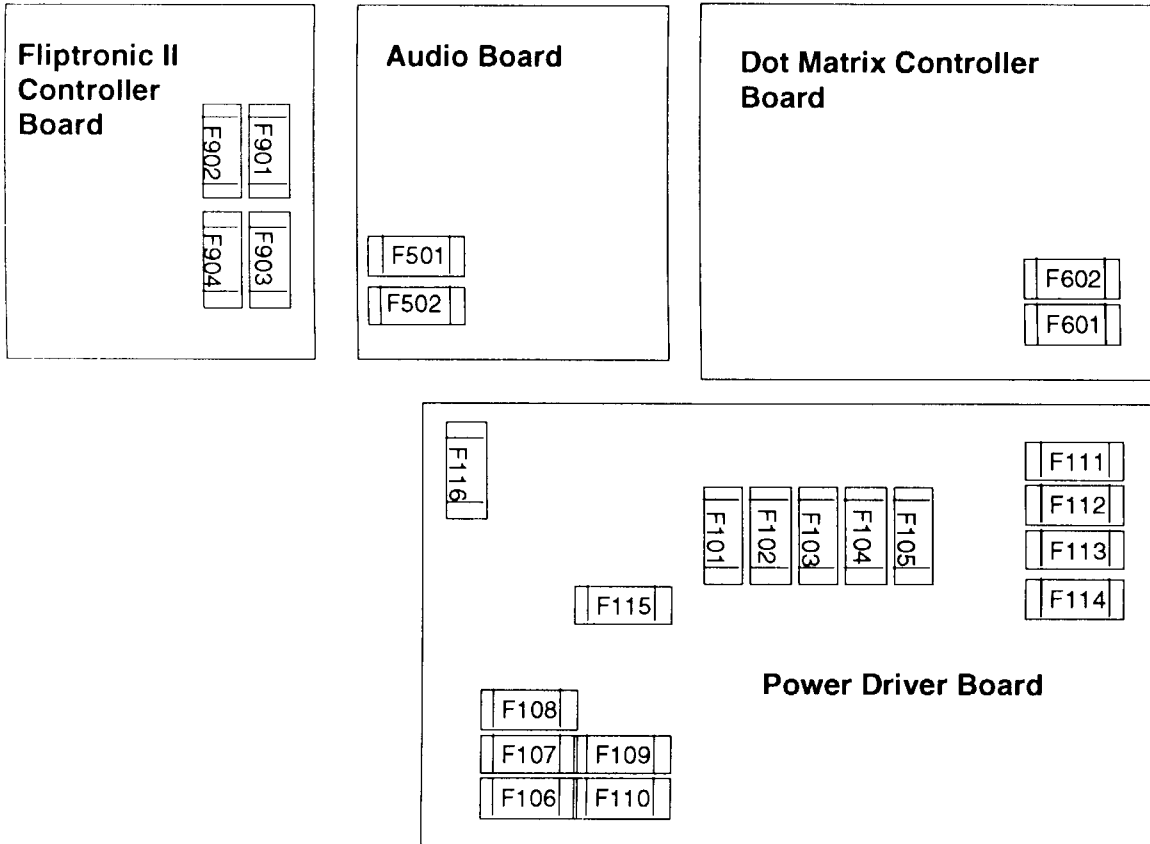
LED 4, +5vdc, Digital Circuit, Normally On

LED 5, +20vdc, Flashlamp Circuit, Normally On

LED 6, +18vdc, Lamps Circuit, Normally On

LED 7, +12vdc, Power Circuit (Motors, Relays, Etc.), Normally On

Fuse List



Audio Board

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

Dot Matrix Controller Board

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

Power Driver Board

F101 Left Flipper 3A, 250V, S.B. (Not Used)
 F102 Right Flipper 3A, 250V, S.B. (Not Used)
 F103 Solenoid #25-#28 3A, 250V, S.B.
 F104 Solenoid #9-#16 3A, 250V, S.B.
 F105 Solenoid #1-#8 3A, 250V, S.B.
 F106 G.I. #5 Wht-Vio 5A, 250V, S.B.
 F107 G.I. #4 Wht-Grm 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.

Fliptronic II Controller Board

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

Line Filter

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

MAINTENANCE INFORMATION

LUBRICATION

The two main lubrication points of the Ball Shooter Lane Feeder mechanism are the pivots for the arm. The mechanism 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.

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 and flipper button cabinet switches are gold flashed computer grade leaf switches. Only low computer current is carried through these switches. DO NOT FILE or abrasively clean these switches! DO NOT REPLACE these switches with the old style tungsten high current type switches, as intermittent operation could occur. 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 mis-adjusted 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

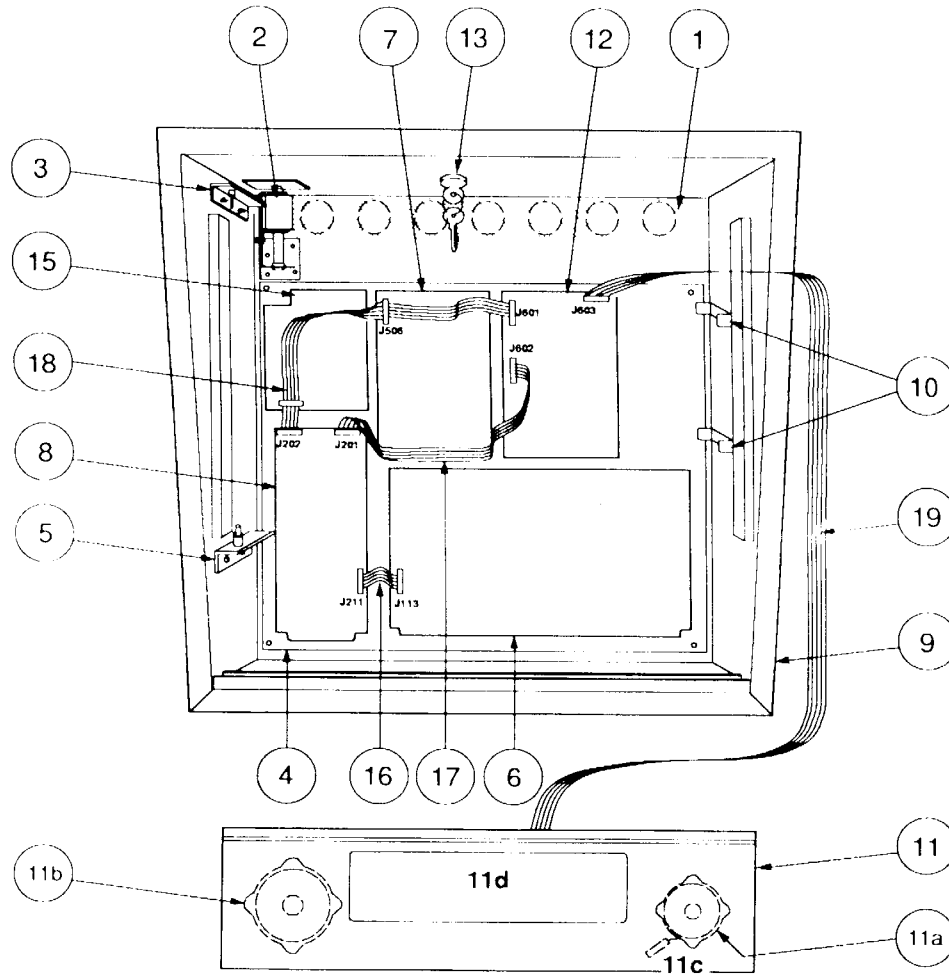
Good game action and extended playfield life are the results of regular playfield cleaning. During each collection stop, the playfield glass should be removed and thoroughly cleaned and the playfield should be wiped off with a clean, lint-free cloth. The game balls should be cleaned and inspected for 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.

SECTION TWO

Game Parts Information

Backbox Assembly



Item	Part Number	Description
1.	01-6645	Venting Screen
2.	B-10686-1	Knocker & Bracket Assy.
3.	A-12497	Upper Insert Bd Hinge Assy.
4.	A-14092-5	Mounting Plate Assembly
5.	A-12498	Lower Insert Bd Hinge Assy.
6.	A-12697-3	Power Driver Assembly
7.	A-16917-20020	WPC Sound Board
8.	A-12742-20020	WPC CPU Board
9.	A-16826	Backbox Assembly
10.	01-9047	Insert Stop Bracket
11.	A-16928	Speaker / Display Assy.
a)	5555-12924-00	Speaker, 4Ω, 15w
b)	5555-12856-00	Speaker, 5-1/4", 4Ω, 25w
c)	5045-12914-00	Cap., 10μfd., 50v, (±20%)
d)	5901-12784-00	Dot Matrix Display/Driver Bd.
12.	A-14039	Dot Matrix Contoller Board
13.	A-13379	Lock & Plate Assembly
a)	20-9637	Lock & Cam Kit
14.	20020-IN	Insert Board
15.	A-15472-1	Fliptronic II Board

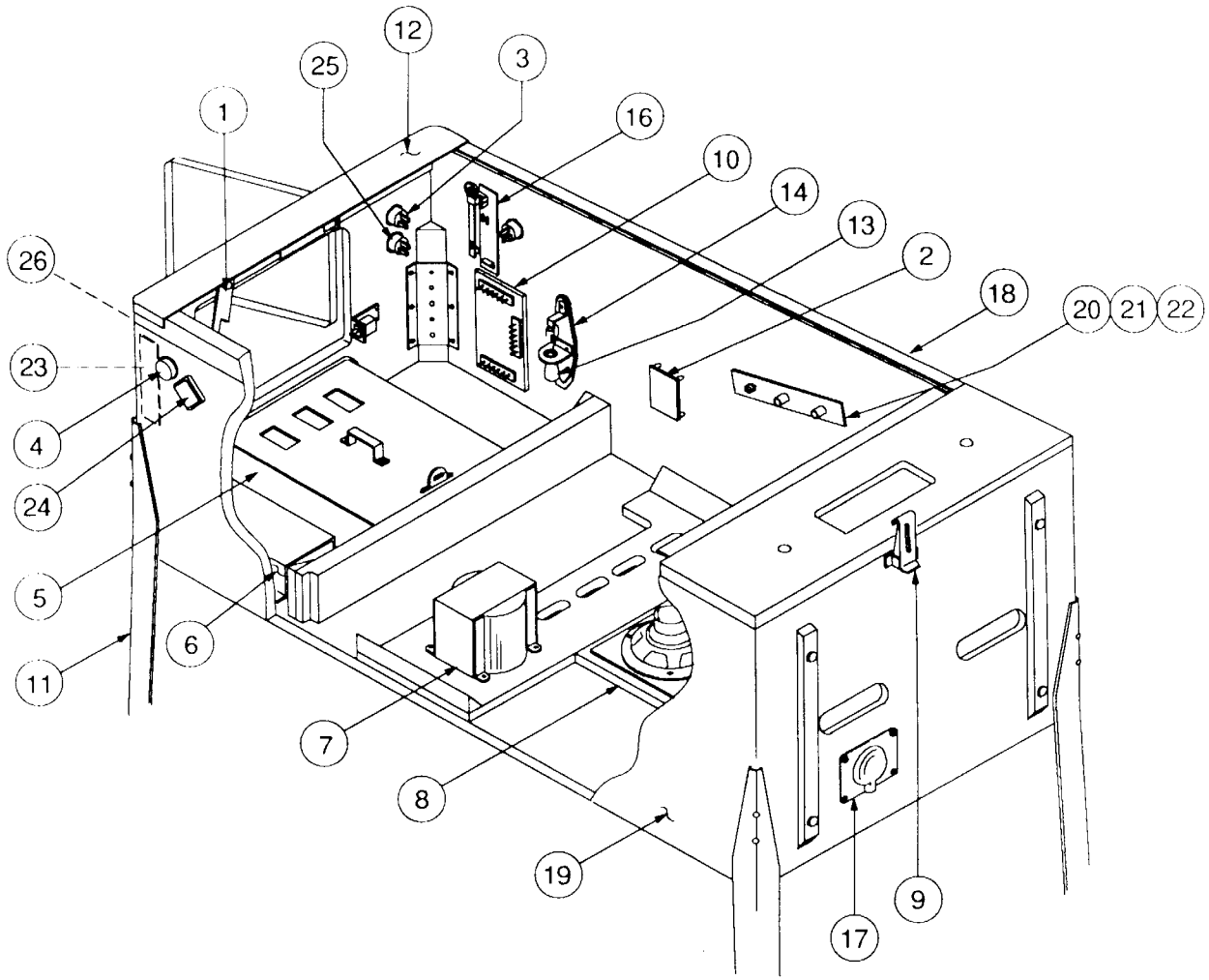
■ Ribbon Cables:

Item	Part Number	Description
16.	5795-12653-03	Ribbon Cable, 3"
17.	5795-13018-01	Ribbon Cable, 9.5"
18.	5795-10938-14	Ribbon Cable, 14"
19.	5795-12838-30	Ribbon Cable, 30"

■ Miscellaneous Parts:

A-8552-20020	Tempered Backglass Assy.
08-7456	Backbox Glass: 27" x 18-7/8"
31-1357-20020	Screened Translight
03-8228-2	Glass Channel Top (1)
03-8228-3	Glass Channel Edge (2)
03-8229-1	Glass Lift Channel (1)
03-8936	Eagle
01-11964	Eagle Mounting Bracket

Cabinet Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-9174-4	Lever Guide Assembly	20.	01-11408	Spacer (2 Used)
2.	A-16943	5-Diode Sw. PC Board	21.	02-4329-2	Pivot Nut, 11/16" (4 Used)
3.	20-9663-1	Start Button	22.	02-4352	Pivot Bushing (2 Used)
4.	A-16883-6	Flipper Button - Yellow (2 Used)	23.	A-16482	Opto Flipper Assy., Left Hand
5.	A-16814-4	Cashbox Assembly	24.	A-16650	Sw. Button & Cable Assy. (2 Used)
6.	*	Line Filter Assembly	a)	20-9846-1	Switch Button-Square
7.	5610-13491-00	WPC Transformer, 115/230v	25.	20-9663-9	Buy-In Button
8.	5555-12929-00	Speaker, 4Ω, 6", 25w	26.	A-17206-1	Sw. Button & Cable Assy.
9.	20-9347	Toggle Latch	a)	20-9663-13	Switch Button-Round
10.	A-14689	WPC Coin Door Interface Bd.			
11.	C-10843-BR	Metal Leg Assembly			
12.	A-16055	Front Molding Assembly			
13.	20-6502-A	Plum Bob			
14.	A-15361	Tilt Mechanism Assembly			
15.	*	Cordset			
16.	A-16384-1	Opto Flipper Assembly			
17.	01-10714	Line Cord Cover			
18.	A-12359-3	Side Molding Assy. (2 Used)			
19.	11-1112-20020	Wood Cabinet			

■ **Miscellaneous Parts:**

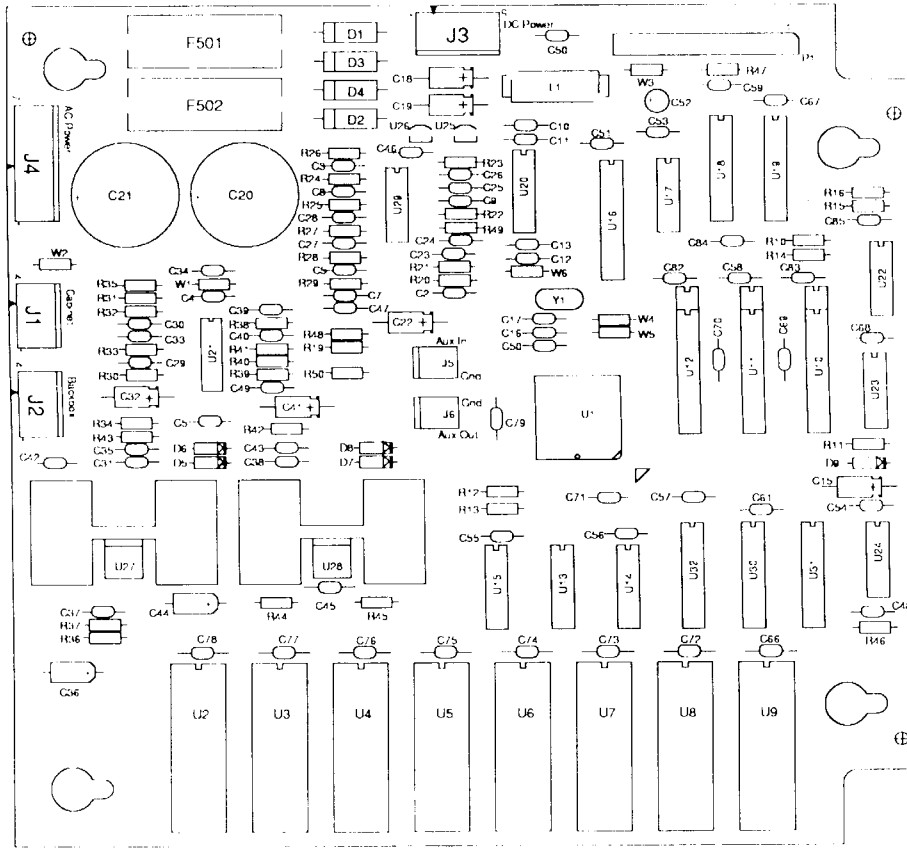
08-7028-1	Tempered Playfield Glass, Wide Body: 23.75" x 43"
20-6500	Steel Ball, 1-1/16" (6)
01-10797	Playfield Support Bar, 18" Long
01-5148	Clip Bracket
08-7377	Leg Adjuster, 3"

* See Application Chart (p.2-4).

Line Filter/Cordset Application Chart

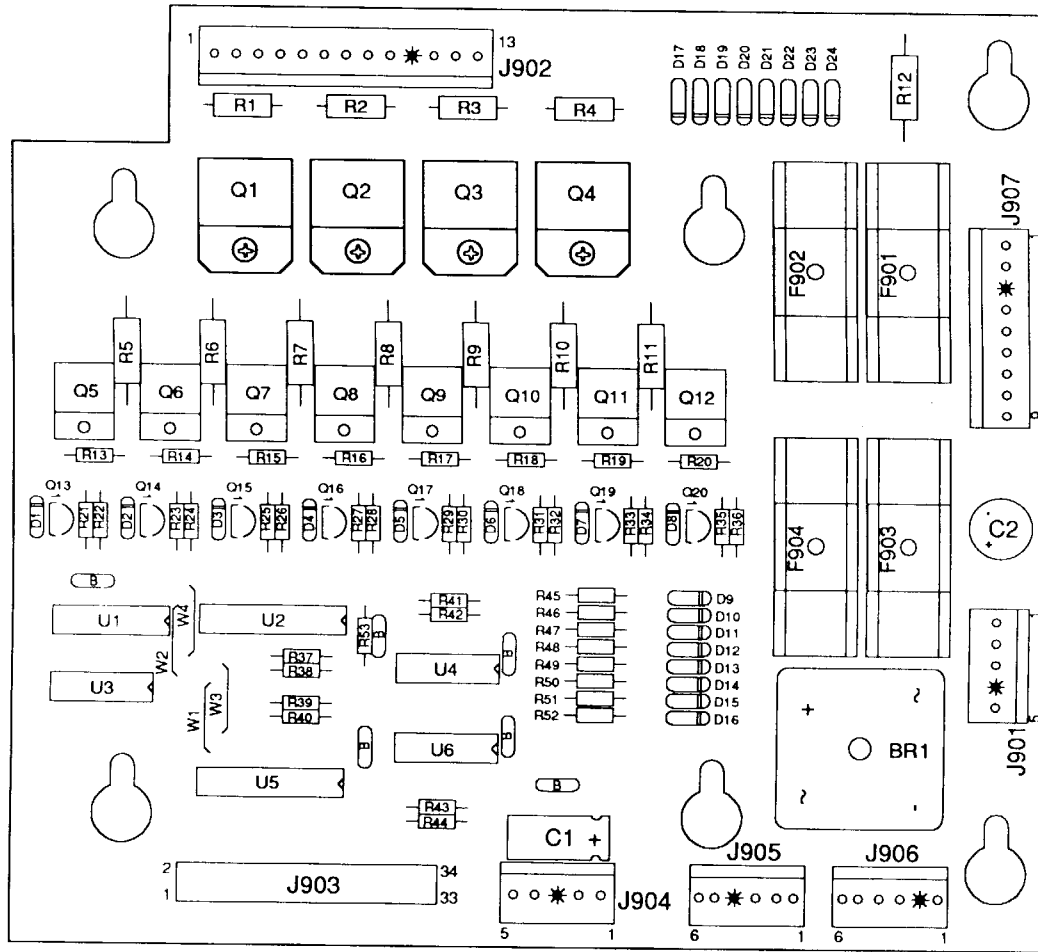
COUNTRY	LINE FILTER ASSY.			CORDSET								
	A-16970-120V	A-16970-230V		5850-13271-00	5850-13272-00	5850-13273-00	5850-13274-00	5850-13275-00	5850-13276-00	5850-13277-00	5850-13278-00	H-15756
UNITED STATES	√			√								
CANADA	√			√								
TAIWAN	√			√								
MEXICO	√			√								
CENTRAL AMERICA	√			√								
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	√										√	√

A-16917-20020 Sound Board Assembly



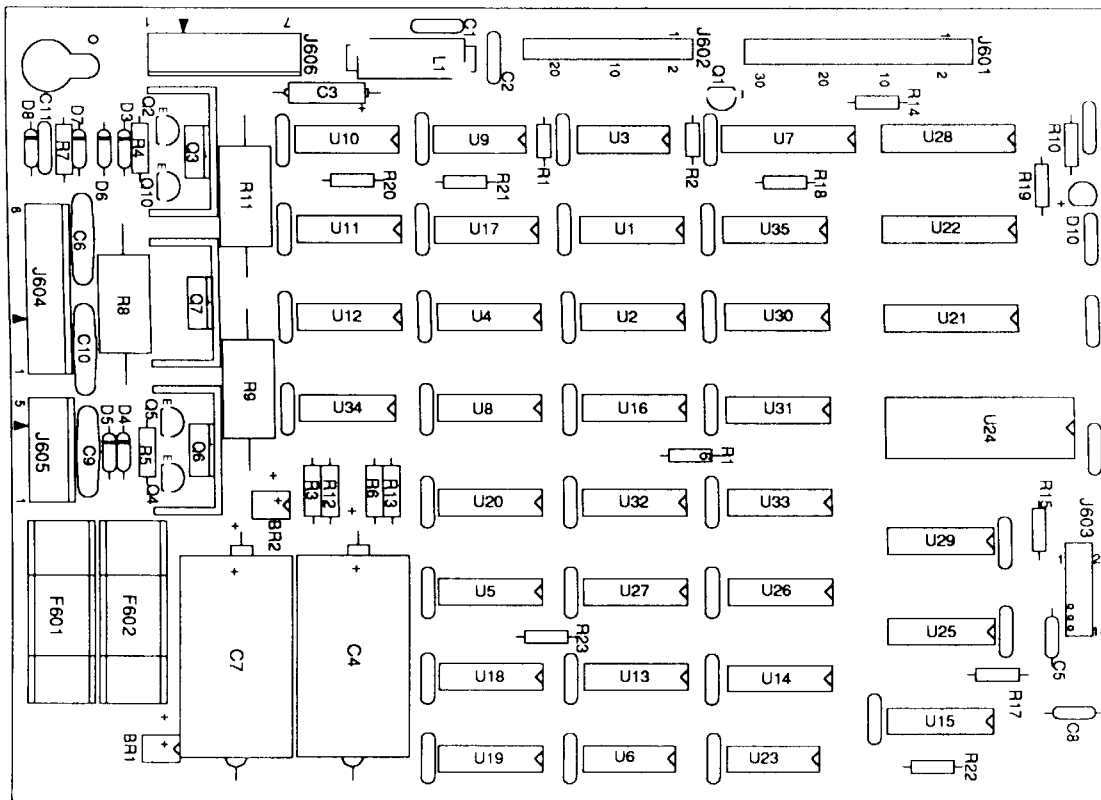
Part No.	Designator	Description	Part No.	Designator	Description
4004 01005 06	U27, U28	Mach. Screw, 4-40 x 3/8"	5250-13302-00	U25	78L05 Pos 5 Volt Reg TO-92
4404 01119 00	U27, U28	Nut, 4-40	5250-13303 00	U26	79L05 Neg 5 Volt Reg TO-92
5010 08772 00	R39, R41	Resistor, 15KΩ, 1/4W, 5%	5283-10551-00	U17	IC74F00 Fast Quad NAND Gate
5010 08774 00	R30, R34, R37, R42, R45	Resistor, 22KΩ, 1/4W, 5%	5311-10946 00	U22	IC74HC74 Dual D Flip Flop
5010 08991 00	R10, R12, R16	Resistor, 4.7KΩ, 1/4W, 5%	5311-10947 00	U23	IC74HC125 quad Tri-State Buffer
5010 09034 00	R47	Resistor, 10KΩ, 1/4W, 5%	5311-10948 00	U15	IC74HC138 1 of 8 Decoder
5010 09035 00	R11, R19, R33, R40	Resistor, 47KΩ, 1/4W, 5%	5311-10954-00	U18, U19	IC74HC73/74 Octal D Flip Flop
5010 09036 00	R46	Resistor, 100Ω, 1/4W, 5%	5311-12043-00	U13, U14	IC74HC174 Hex D Flip Flop
5010 09219 00	R31, R32, R38	Resistor, 8.2KΩ, 1/4W, 5%	5311-12538-00	U24	IC74HC14 Hex Schmitt Inverter
5010 09358-00	R50	Resistor, 1KΩ, 1/4W, 5%	5311-12287-00	U30 - U32	IC74HC541 Octal Bus Driver
5010 09534 00	W4, W6	Resistor, 0Ω (Jumper)	5340-13304-00	U10 - U12	ICSRAM 2Kx8 35ns .300DIP
5010 13420 00	R36, R44	Resistor, 680Ω, 1/4W, 5%	5370-12730-00	U21, U29	ICTL084 Quad op Amp
5010 13607 00	R20-R29, R48, R49	Resistor, 6.2KΩ, 1/4W, 5%	5370-13419-00	U27, U28	Audio Power Amp TDA2030AV
5010 13517 00	R35, R43	Resistor, 15Ω, 1/4W, 5%	5371-13299-00	U20	ICDAC AD-1851 16 bit
5040 09365 00	C15, C18, C19, C32, C41	Capacitor, 1 μF, 63V, Alum Axial	5400-13298 00	U1	Processor ADSP-2105 KP40
5040 09421 00	C52	Capacitor, 100μF, 25V, Alum Radial	5520-13301-00	Y1	Crystal 10MHz Parallel Resonant
5040 13417 00	C20, C21	Capacitor, 10,000μF, 35V, Alum Rad	5551-09822-00	L1	Inductor, 4.7μH, 3Amp
5041 09009 00	C36, C44	Capacitor, 22μF, 10V, Tant Axial	5700-12047-00	U16	IC socket 24 pin 0.300 DIP
5041 13187 00	C22	Capacitor, 4.7μF Tant Axial	5700-12088-00	U2 - U9	IC socket 32 pin 0.600 DIP
5043 08996 00	C4, C5, C10, C13, C31, C35, C38, C43, C46, C47, C50, C79	Capacitor, 0.10μF, Cer Axial	5705-12638-00	U27, U28	Heatsink 5298 B
5043 10267 00	C37, C45	Capacitor, 150pF, Cer Axial	5733-12060 01	-	Fuse Holder M13AG (F 501, F 502)
5048 11028 00	C16, C17	Capacitor, 22pF, Cer Axial	5791-10862 04	J1, J2	Connector, 4 pin Header
5048 11029 00	C48	Capacitor, 100pF, Cer Axial	5791-10862 05	J3	Connector, 5 pin Header
5048 11030 00	C49	Capacitor, 470pF, Cer Axial	5791-10862 07	J4	Connector, 7 pin Header
5048 11033 00	C33	Capacitor, 0.022μF, 5%, Cer Axial	5791-12516-00	P1	Connector, 34 Pin 2 x 17 Str. .100
5048 12036 00	C34, C42	Capacitor, 0.22μF, Cer Axial	A-17002	U16	PAL Sub-Assembly
5048 13418 00	C30, C39, C40	Capacitor, 0.47μF, 5%, Cer Axial	A-5343-20020-2	U2	EPROM Sub-Assembly
5048 13608 00	C8	Capacitor, 6800 pF, 50V, Cer Axial	A-5343-20020-3	U3	EPROM Sub-Assembly
5048 13609 00	C7, C24, C26	Capacitor, 3900 pF, 50V, Cer Axial	A-5343-20020-4	U4	EPROM Sub-Assembly
5048 13610 00	C2, C3, C9, C27, C29	Capacitor, 1000 pF, 50V, Cer Axial	A-5343-20020-5	U5	EPROM Sub-Assembly
5048 13611 00	C6, C23, C25, C28	Capacitor, 680 pF, 50V, Cer Axial	A-5343-20u20-6	U6	EPROM Sub-Assembly
5070 09045 00	D1, D4	MR 501 Rectifier Diode	A-5343-20020-7	U7	EPROM Sub-Assembly
5070 09054 00	D5, D9	1N4004 Signal Diode	A-5343-20020-8	U8	EPROM Sub-Assembly
			A-5343-20020-9	U9	EPROM Sub-Assembly
			5731-10356-00	F501, F502	Fuse, 3Amp, 250V, Slow Blow

A-15472-1 Fliptronic II Board



Part Number	Designator	Description	Part Number	Designator	Description
01-10572	Q1-Q4	Heatsink	5070-09054-00	D1 - D24	Diode 1N4004
20-9684	Q5-Q12	Fastener Snap	5162-12635-00	Q5-Q12	Transistor TIP102 NPN
4006-01003-08	Q1-Q4	Mach. Screw, 6-32	5190-09016-005	Q13 - Q20	Transistor 2N4403 PNP
4406-01128-00	Q1-Q4	Nut 6-32 KEPS	191-12179-00	Q1-Q4	Transistor TIP36C PNP
5010-09034-00	R37 - R44, R53	Resistor, 10KΩ, 1/4w, 5%	5315-12009-00	U2	IC 74HCT374
5010-09358-00	R22, R24, R26, R28, R30, R32, R34, R36, R45 - R52	Resistor, 1KΩ, 1/4w, 5%	5315-12031-00	U5	IC 74HCT244
5010-09361-00	R1 - R4	Resistor, 220Ω, 1/2w, 5%	5315-12812-00	U1	IC 74HCT138
5010-09416-00	R21, R23, R25, R27, R29, R31, R33, R35	Resistor, 470Ω, 1/4w, 5%	5315-12951-00	U3	IC 74HCT00
5010-09534-00	W3, W4	Resistor, 0Ω	5370-12272-00	U4, U6	IC LM339 QUAD COMP
5010-10171-00	R13 - R20	Resistor, 56Ω, 1/4w, 5%	5791-10862-09	J907	Connector, 9-pin Header Sq. Pin
5011-12956-00	R5 - R12	Resistor, 2.7KΩ, 1w, 5%	5791-10862-05	J901, J904	Connector, 5-pin Header Sq. Pin
5040-08986-00	C1	Capacitor, 100M, 10v	5791-10862-13	J902	Connector, 13-pin Header Sq. Pin
5043-08980-00	B	Capacitor, .01μF, 50v	5791-12461-06	J905, J906	Connector, Str Sq. Pin Header .100
			5791-12516-00	J903	34 HEN 2x17 STR
			5100-09690-00	BR1	Bridge Rectifier
			5731-10356-00	F901 - F904	Fuse S-B, 3A., 250v
			5733-12060-01	-	Fuse Holder (F901-F904)

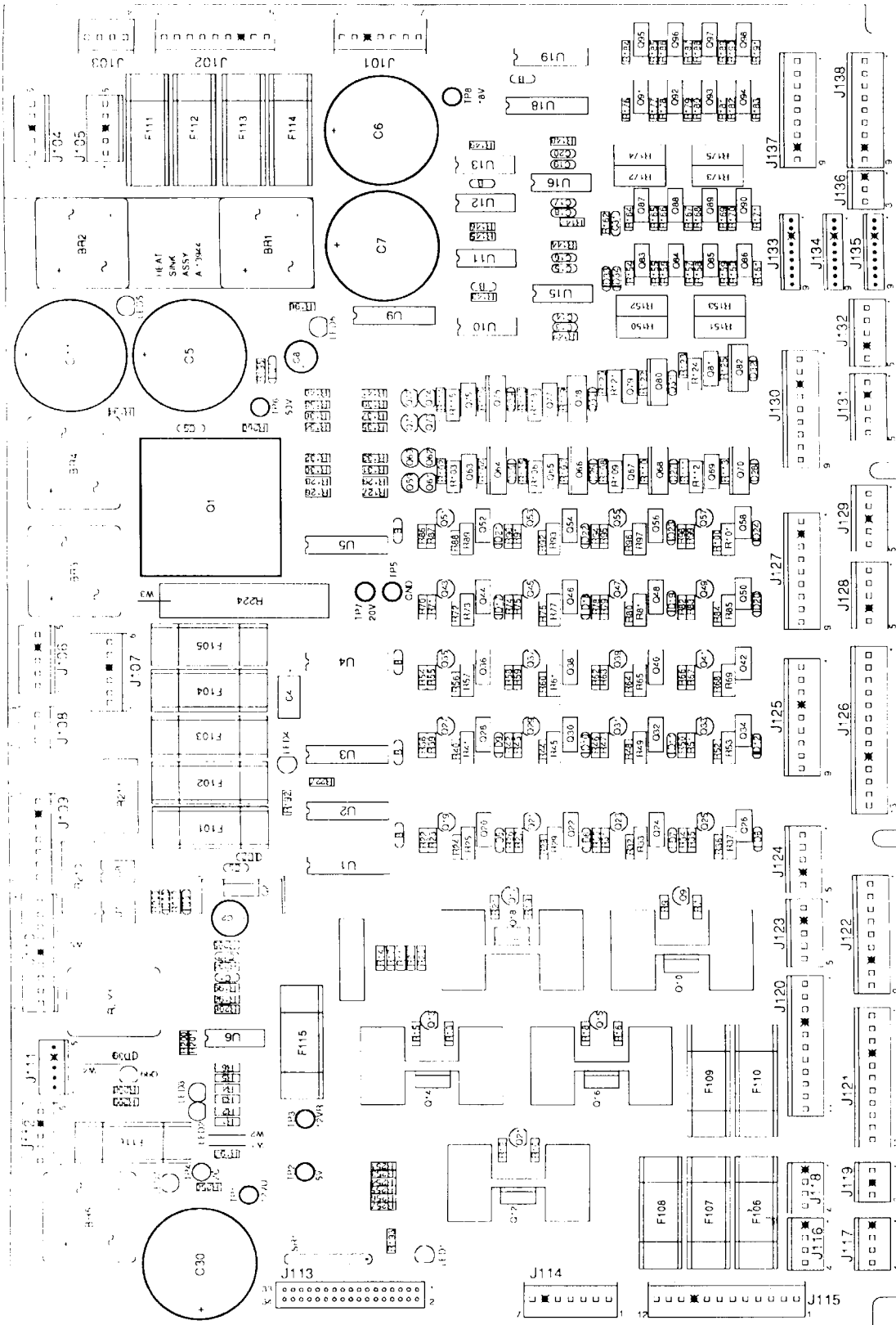
A-14039 Dot Matrix Controller Assembly

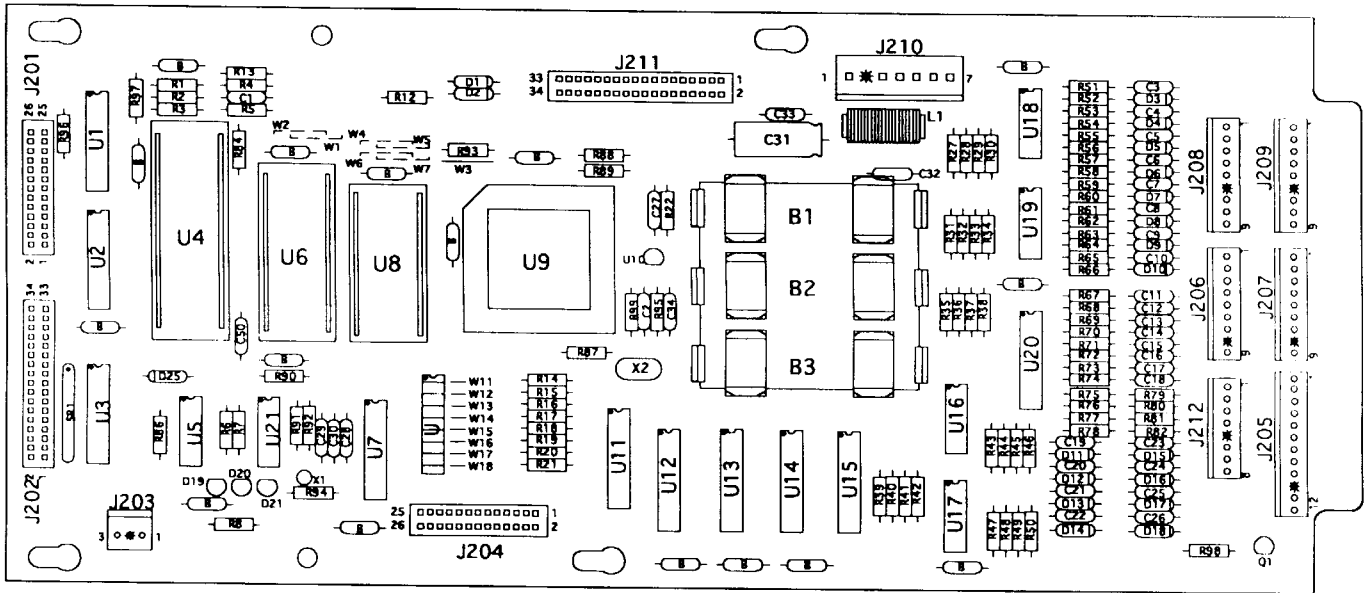


Part Number	Ckt Designator	Description	Part Number	Ckt Designator	Description
5010-08991-00	R1	Resistor, 4.7K Ω , 1/4w, 5%	5311-10947-00	U9	IC, 74HC125
5010-09224-00	R10	Resistor, 270 Ω , 1/4w, 5%	5311-10951-00	U10, U11	IC, 74HC161
5010-12832-00	R3, R6, R12, R13	Resistor, 47K Ω , 1/2w, 5%	5311-10977-00	U6	IC, 74HC04
5010-12841-00	R4, R5	Resistor, 120 Ω , 1/2w, 5%	5311-12817-00	U29	IC, 74HC165
5012-12830-00	R9	Resistor, 1.8K Ω , 5w, 5%	5311-12819-00	U21	IC, 74HC688
5012-12842-00	R11	Resistor, 120 Ω , 5w, 5%	5311-12820-00	U23	IC, 74HC27
5012-12843-00	R8	Resistor, 4.7K, 5w, 5%	5311-12822-00	U13 - U15	IC, 74HC193
5010-10171-00	R7	Resistor, 56 Ω , 1/4w, 5%	5315-12009-00	U22	IC, 74HCT374
5040-08986-00	C3	Capacitor, 100 μ fd., 10v, (\pm 20%)	5315-12812-00	U1, U2, U30	IC, 74HCT138
5040-12324-00	C4, C7	Capacitor, 150 μ fd., 160v, (\pm 50%)	5281-09308-00	U28	IC, 74HCT245
5043-08980-00	BYPASS	Capacitor, .01 μ fd., 50v, (+80, -20%)	5315-12815-00	U8, U34	IC, 74HCT08
5043-09072-00	C6, C9, C10	Capacitor, .1 μ fd., 500v, (+80, -20%)	5315-12816-00	U19	IC, 74HCT32
5043-09845-00	C1, C2, C11	Capacitor, 1KP, 50v, (\pm 20%)	5315-12821-00	U7	IC, 74HCT240
5043-09492-00	C5, C8	Capacitor, 100P, 50v, (\pm 10%)	5340-12278-00	U24	S/RAM 2064 150NS
5070-09054-00	D7	Diode, 1N4004, 1.0A.	5551-09822-00	L1	IND 4.7 μ H, 3.0A.
5075-12824-00	D6, D8	Zener, 1N4742A, 12v	5671-13732-00	D10	Display LED Red
5075-12823-00	D4, D5	Zener, 1N4758A, 56v	5705-09199-00	Q3, Q6, Q7	Heatsink 6030B
5075-12826-00	D3	Zener, 1N4759A, 62v	5731-12328-00	F601, F602	Fuse, 3/8A., SB, 250v
5100-12833-00	BR1, BR2	Bridge, 400v, 1A.	5733-12060-00		Fuse Holder (F601, F602)
5160-10269-00	Q1	Transistor, 2N3904 NPN	5791-10850-00	J602	Connector, 26-pin STR Sq.
5164-09056-00	Q2, Q10	Transistor, MPSD02, NPN	5791-10862-05	J605	Connector, 5-pin Header Sq.
5164-12154-00	Q3, Q7	Transistor, MJE15030 NPN	5791-10862-07	J606	Connector, 7-pin Header Sq.
5194-09055-00	Q4, Q5	Transistor, MPSD52 PNP	5791-10862-08	J604	Connector, 8-pin Header Sq.
5194-12155-00	Q6	Transistor, MJE15031 PNP	5791-12516-00	J601	34 Hen 17x2 STR
5281-09738-00	U16, U25 - U27	IC, 74LS157	5791-12827-00	J603	14 Hen 7x2 STR
5281-10033-00	U3	IC, 74LS30	5010-09036-00	R14-R23	Resistor, 100 Ω , 1/4w, 5%
5281-10043-00	U31 - U33, U35	IC, 74LS175	4006-01003-06	Q3, Q6, Q7	Mach. Screw, 6-32 x 3/8
5311-10946-00	U4, U5, U17, U18, U20	IC, 74HC74	4406-01128-00	Q3, Q6, Q7	Nut, 6-32 KEPS

A-12697-3 WPC Power Driver Assembly

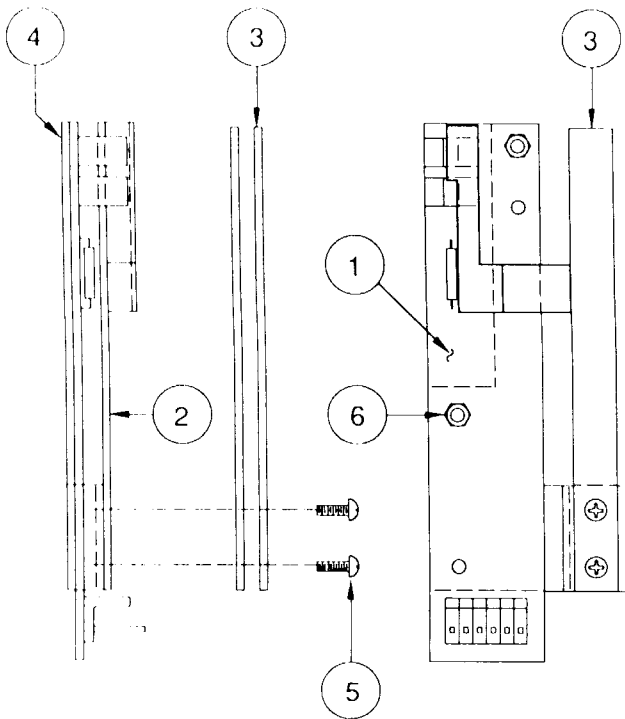
Item	Part Number	Ckt Designator	Description	Item	Part Number	Ckt Designator	Description
1	Not Used			32	5043-08996-00	C13-C20, C31	Capacitor, .1µfd, 50v (+20%)
2	4006-01005-06	Q1, Q2	Mach. Screw, 6-32 x 3/8	33	5043-09845-00	C1, C12	Capacitor, 1,000pfd, 50v (+20%)
3	4406-01128-00	Q1, Q2	Nut, 6-32 KEPS	34	5048-10994-00	C3	Capacitor, .33µfd, 50v (+20%) Ax.
4	4004-01005-06	Q10, Q12, Q14, Q16, Q18	Mach. Screw, 4-40 x 3/8	35	5070-08919-00	D33, D34	Diode, 1N4148, 150MA.
5	4404-01119-00	Q10, Q12, Q14, Q16, Q18	Nut, 4-40 SNUT	36	5070-09054-00	D1-D3, D5-D12, D17-D32, D38	Diode, 1N4004, 1.0A.
6	5010-08981-00	R260	Resistor, 10KΩ, 1/2w, 5%	37	5100-09690-00	BR1-BR5	Bridge Rectifier, 35A., 200v
7	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	Resistor, 4.7KΩ, 1/4w, 5%	38	5131-12725-00	Q10, Q12, Q14, Q16, Q18	Triac, BT138E
8	5010-08992-00	R8, R11, R14, R17, R20, R177, R179, R181, R183, R185, R187, R189, R191	Resistor, 560Ω, 1/4w, 5%	39	5162-12422-00	U19	IC, ULN 2803
9	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	Resistor, 68Ω, 1/4w, 5%	40	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
10	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, R195	Resistor, 2.7KΩ, 1/4w, 5%	41	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
11	5010-08998-00	R155, R157, R159, R161, R165, R167, R169, R171	Resistor, 2.2KΩ, 1/4w, 5%	42	5191-12179-00	Q64, Q66, Q68, Q70, Q76 Q78, Q80, Q82	Transistor, TIP36C PNP
12	5010-09034-00	R3, R4, R6, R142-R149, R197, R198	Resistor, 10KΩ, 1/4w, 5%	43	5192-12428-00	Q91-Q98	Transistor, TIP 107
13	5010-09085-00	R194, R196, R251, R253-R257	Resistor, 1.5KΩ, 1/4w, 5%	44	5250-12634-00	Q1	Reg LM 323 5v
14	5010-09086-00	R252	Resistor, 6.8KΩ, 1/4w, 5%	45	5281-09486-00	U1-U5, U18	IC, 74LS374 8 Dual D Flipflop
15	5010-09224-00	R1, R2, R192, R201, R205, R208	Resistor, 270Ω, 1/4w, 5%	46	5281-09487-00	U10-U13	IC, 74LS74 Dual D Flipflop
16	5010-09314-00	R176, R178, R180, R182, R184, R186, R188, R190	Resistor, 1.2KΩ, 1/4w, 5%	47	5281-10182-00	U9	IC, 74LS240, L/Drvr
17	5010-09324-00	R206	Resistor, 27KΩ, 1/4w, 5%	48	5370-12272-00	U6, U15, U16	IC, LM339 Quad. Comp
18	5010-09358-00	R154, R156, R158, R160, R164, R166, R168, R170, R162, R193, R199, R200, R250	Resistor, 1KΩ, 1/4w, 5%	49	5460-12423-00	Q2	IC, LM 7812
19	5010-09361-00	R104, R107, R110, R113, R116, R119, R122, R125	Resistor, 220Ω, 1/4w, 5%	50	Not Used		
20	5010-09416-00	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	Resistor, 470Ω, 1/4w, 5%	51	5671-13732-00	LED1 - LED7	Display LED Red
21	5010-09534-00	W1, W2	Resistor, 0Ω	52	Not Used		
22	5010-11079-00	R7, R10, R13, R16, R19	Resistor, 51Ω, 1/4w, 5%	53	5701-09652-00	Q1	Thermal Pad 10-3
23	5010-12427-00	R150-R153, R172-R175	Resistor, .22Ω, 1w, 5%	54	5705-09199-00	Q2	Heatsink, #6030B
24	5012-12632-00	R224	Resistor, .12Ω, 10w, 5%	55	Not Used		
25	Not Used			56	5705-12637-00	Q1	Heatsink 5054
26	5019 10143 00	SR1	SIP, 9R, 10 pin, 470Ω, 5%	57	5705-12638-00	Q10, Q12, Q14, Q16, Q18	Heatsink 5298B
27	5040 08986 00	C4	Capacitor, 100µfd, 10v (-20%)	58	5733-12060-01		Fuse Holder, F101-F116
28	5040 09421-00	C2	Capacitor, 100µfd, 25v (+50, -10%)	59	Not Used		
29	5040 09537-00	C8	Capacitor, 100µfd, 100v (+20%)	60	5791-10862-03	J108, J119, J136	Connector, 3-pin Header STR Sq.
30	5040 12313-00	C5, C6, C7, C11, C30	Capacitor, 15,000µfd, 25v (+20%)	61	5791-10862-04	J103, J116-J118	Connector, 4-pin Header STR Sq.
31	5043-08980-00	B-BYPASS	Capacitor, .01µfd, 50v (+80, -20%)	62	5791-10862-05	J112, J104-J106, J123, J124, J128, J129, J131, J132	Connector, 5-pin Header STR Sq.
				63	5791-10862-06	J107	Connector, 6-pin Header STR Sq.
				64	5791-10862-07	J101, J109, J114	Connector, 7-pin Header STR Sq.
				65	5791-10862-09	J102, J122, J125, J127, J130, J137, J138	Connector, 9-pin Header STR Sq.
				66	5791-10862-11	J120, J121	Connector, 11-pin Header STR Sq.
				67	5791-10862-12	J115	Connector, 12-pin Header STR Sq.
				68	5791-10862-13	J126	Connector, 13-pin Header STR Sq.
				69	5791-12461-05	J111	Connector, 5-pin Header STR Sq.
				70	5791-12461-09	J133-J135	Connector, 9-pin Header STR Sq.
				71	5791-12516-00	J113	34 HEN 2x17 STR
				72	5824-09248-00	TP1-TP8	Test Point #1502-1
				73	5041-09163-00	C9	Capacitor, 2.2µfd TANT
				74-100	Not Used		
				101	Not Used		
				102	5730-09071-00	F114	Fuse, 8A, 32v
				103	Not Used		
				104	5731-09432-00	F112	Fuse, S-B, 7A., 250v
				105	5731-09651-00	F106 - F111, F113	Fuse, S-B, 5A., 250v
				106	Not Used		
				107	5731-10356-00	F101 - F105, F116	Fuse, S-B, 3A., 250v
				108	5730-09797-00	F115	Fuse, S-B, 3/4A., 250v
				109	5705-12698-00		Heatsink #62365
				110	4010-01006-00		Mach. Screw, 10 3/2 x 5/8





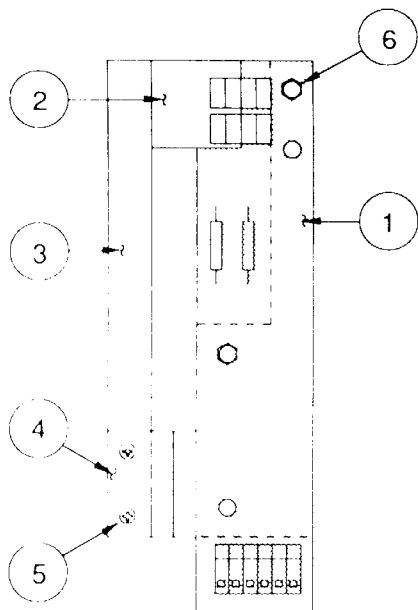
Part Number	Designator	Description	Part Number	Designator	Description
5010-09034-00	R14-R22, R27-R42, R86, R90, R94, R98	Resistor, 10KΩ, 1/4w, 5%	5281-09851-00	U5	IC, 74LS14, SMI/TRG
5010-09085-00	R1, R2, R4, R96, R97	Resistor, 1.5KΩ, 1/4w, 5%	5281-09867-00	U1, U2, U7	IC, Octal Buffer, 74L S244
5010-09314-00	R52, R54, R56, R58, R60, R62, R64, R66, R75-R82	Resistor, 1.2KΩ, 1/4w, 5%	5281-10182-00	U11, U12, U13, U15	IC, 74LS240 Driver
5010-09358-00	R3, R43-R51, R53, R55, R57, R59, R61, R63, R65, R67-R74, R84	Resistor, 1KΩ, 1/4w, 5%	5284-12651-00	U21	IC, 4584
5010-09416-00	R5-R8, R12, R13, R87-R89	Resistor, 470Ω, 1/4w, 5%	5340-13062-00	U8	IC/RAM 32K x 8
5010-09534-00	W1, W3, W4, W7	Resistor, 0Ω	5370-12272-00	U16 - U19	IC, LM339, Quad. Comp
5010-10256-00	R95, R99	Resistor, .01μfdΩ, 1/4w, 5%	5370-12687-00	U10	MC, 34064 Reset Chip
5010-10989-00	R92	Resistor, 470KΩ, 1/4w, 5%	5520-10438-00	X2	Crystal, 8.0MHz
5010-12104-00	R91	Resistor, 22μfd, 1/4w, 5%	5520-12084-00	X1	Crystal 32.768 KHz
5019-09362-00	SIP 1	SIP, 9R, 10-pin, 4.7KΩ, 5%	5551-09822-00	L1	ILN, 4.7 UII 3A
5040-08986-00	C31	Capacitor, 100μfd, 10v (±20%)	5671-13732-00	D19 - D21	DSPL LED RED
5043-08980-00	B	Capacitor, .01μfd, 50v, (+80, -20%)	5700-08985-00	U4	Socket, IC 40P, .6"
5043-09030-00	C27	Capacitor, 0.047μfd, 50v (±20%)	5700-12088-00	U6	Socket, IC 32P, .6"
5043-09065-00	C3 - C26	Capacitor, 470pfd, 50v (±20%)	5700-12424-00	U9	Socket, 84 Pin PLCC
5043-09491-00	C2, C29, C30, C34	Capacitor, 22pfd, 1KV, (±10%)	5791-10850-00	J201, J204	Connector, 26-pin Header Str Sq
5043-09492-00	C28	Capacitor, 100pfd, 50v, (±10%)	5791-10862-07	J210	Connector, 7-pin Header Str Sq
5043-09845-00	C32, C33	Capacitor, 1KP, 50v, (±20%)	5791-12461-08	J212	Connector, 8-pin Header Str Sq
5070-08919-00	D2 - D18	Diode, 1N4148, 150MA	5791-12461-09	J206 - J209	Connector, 9-pin Header Sq. pin
5070-09266-00	D1, D25	Diode, 1N5817, 1.0A.	5791-12461-12	J205	Connector, 12-pin Header Sq. pin
5160-10269-00	Q1	Transistor, 2N3904, NPN	5791-12516-00	J202, J211	34 Hen 2x17 STR
5162-12422-00	U20	IC, ULN, 2803A	A-15814	B1 - B3	Battery Holder "AA"
5281-09308-00	U3	IC, 74LS245, Octal Bus Trncv	5048-11033-00	C50	Capacitor, 0.022μfd, 10v
5281-09486-00	U14	IC, 74LS374, 8D F/F	A-5343-20020-1	U6	Game PROM Assembly
			5410-12426-00	U9	WPC-89 ASIC
			5400-10320-00	U4	IC MPU 68B09E
			5880-09022-00	B1 - B3	Battery, Alkaline, 1.5v ("AA")
			5645-09025-00	W11 - W18	Switch Dip 8 Pos

Printed Circuit Boards



A-16482 Flipper Opto Assembly (Left Hand)

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-15894	Flipper Opto Sw. Assembly
2.	01-11304	Interrupter Opto
3.	06-86	Blade - Back up
4.	01-11303	Opto Board Bracket
5.	4006-01003-04	Mach. Screw, #6-32 x 1/4"
6.	4406-01119-00	Nut #6 ESN

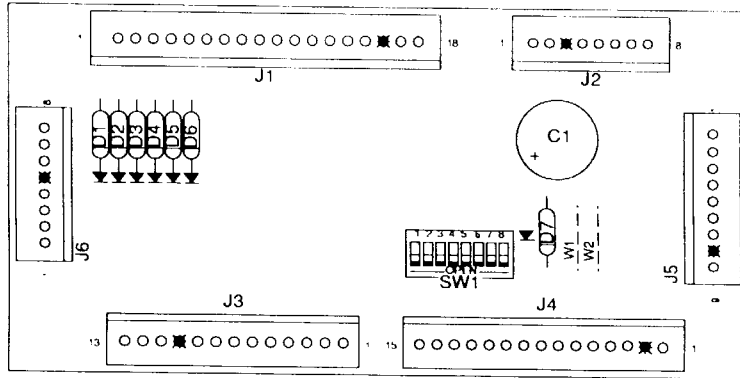


A-15878 Double Flipper Opto Assembly

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-15894	PC Board Assembly
	5010-08930-00	Resistor 470Ω, 1/2w, 5%
	5490-12451-00	Opto Inter Lg. 10ma.
	5791-12273-07	Connector, 7-pin Header
2.	01-10939	Interrupter Opto
3.	06-86	Back Up Blade (2)
4.	A-15893	Opto Board Mtg Bracket
5.	4006-01003-04	MS 6 32 x 1/4 P-PH (2)
6.	4406-01119-00	Nut #6 ESN (2)

Printed Circuit Boards (Continued)

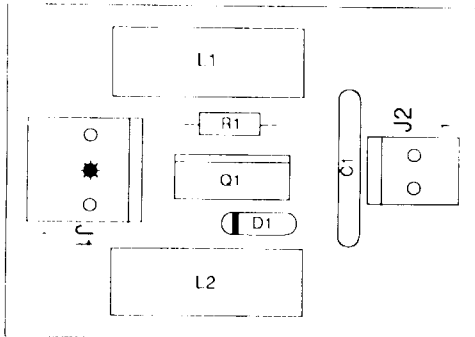
A-14689-1 WPC Coin Door Interface Board



<u>Part Number</u>	<u>Designator</u>	<u>Description</u>
5010-09534-00	W2	Resistor, 0 Ω (Jumper)
5070-09054-00	D1-D7	Diode, 1N4004, 1.0A.
5791-10862-18	J1	Connector, 18-pin Header Str Sq.
5791-10862-08	J2, J6	Connector, 8-pin Header Str Sq.
5791-10862-13	J3	Connector, 13-pin Header Str Sq.
* 5791-10862-15	J4	Connector, 15-pin Header Str Sq.
* 5791-10862-09	J5	Connector, 9 pin Header Str Sq.
* 5645-09025-00	SW1	Switch DIP 8-Position

Notes:

1. For Belgium, France, Finland, Sweden and England use A-14689-1 Coin Door Interface Board.
2. * = Used on Electronic Coin Door only.

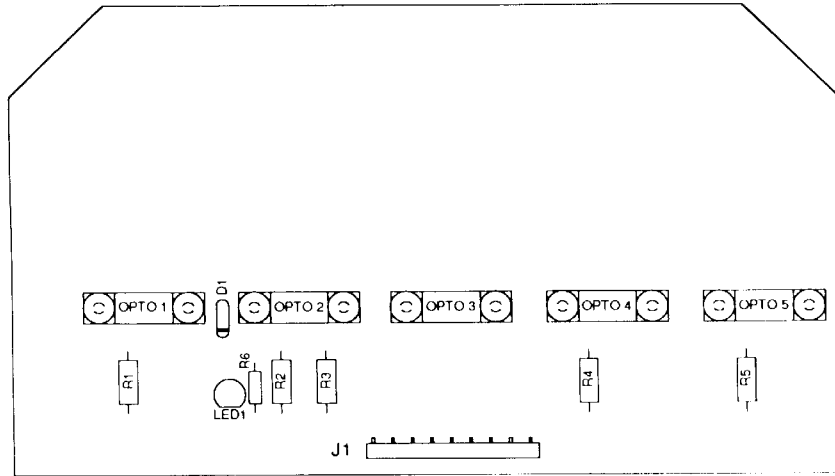


A-15542 Motor EMI Board

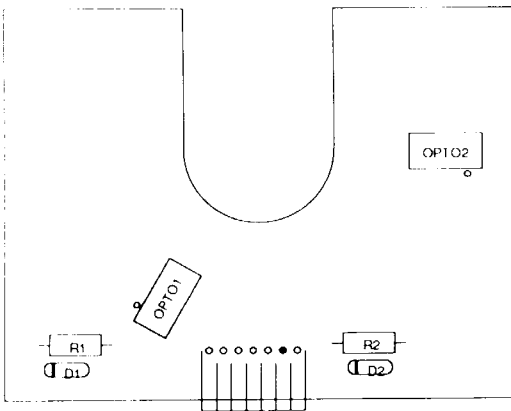
<u>Part Number</u>	<u>Designator</u>	<u>Description</u>
5551-09822-00	L1, L2	Ind. 4.7MH3AMP
5791-12273-03	J1	Connector, 3 pin Header Sq.
5791-12273-02	J2	Connector, 2 pin Header Sq.
5070-09054-00	D1	Diode 1N4004, 1.0A.

Printed Circuit Boards (Continued)

A-16486 5-Bank Opto Assembly



<u>Part Number</u>	<u>Designator</u>	<u>Description</u>
5490-13341-00	OPTO1-OPTO5	Opto Inter w/Tab 10mA
5010-08930-00	R1-R5	Resistor, 470Ω, 1/2w, 5%
5010-09314-00	R6	Resistor, 1.2KΩ, 1/4w, 5%
5070-09054-00	D1	Diode, 1N4004, 1.0A.
5671-13732-00	LED1	Display LED Red
5791-10869-00	J1	Connector, 9-pin Header
20-9864	OPTO1-OPTO5	Eyelet, 1/8 x 7/32"

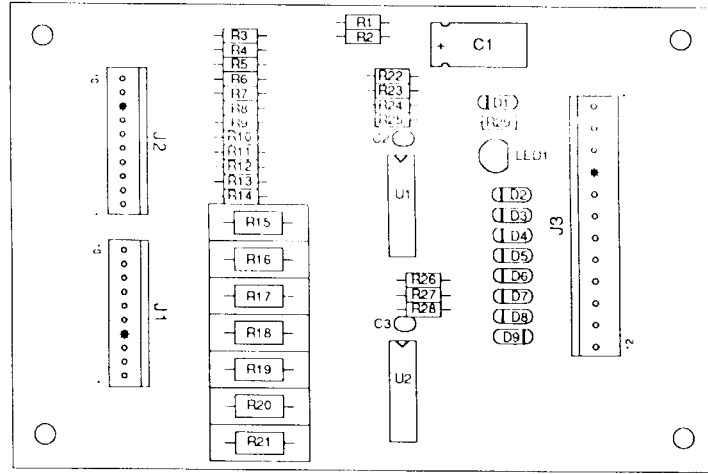


A-16598 Planet Opto Board Assembly

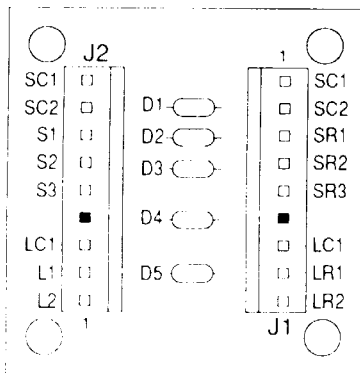
<u>Part Number</u>	<u>Designator</u>	<u>Description</u>
5791-12622-07	J1	Connector, 7-pin Header
5010-08930-00	R1, R2	Resistor, 470Ω, 1/2w, 5%
5070-09054-00	D1, D2	Diode 1N4004 1.0A.
5490-12451-00	OPTO1, OPTO2	Opto Inter Lg 10MA

Printed Circuit Boards (Continued)

A-15576 7-Switch Opto PCB Assembly



Part Number	Description	Description
5040-12298-00	C1	Capacitor, 100 μ fd, 40v (\pm 50%)
5043-08980-00	C2, C3	Capacitor, .01 M 50v
5671-09019-00	LED 1	Display LED Red
5370-12272-00	U1, U2	IC LM339 Quad.
5070-09054-00	D1 - D9	Diode 1N4004 1.0A.
5010-12928-00	R15 - R21	Resistor, 270K Ω , 2w, 5%
5010-09999-00	R1 - R14	Resistor, 2K Ω , 2w, 5%
5010-10631-00	R29	Resistor, 1.2K Ω , 2w, 5%
5010-09162-00	R23, R25, R26	Resistor, 100K Ω , 2w, 5%
5010-08774-00	R22, R24	Resistor, 22K Ω , 1/4w, 5%
5010-09034-00	R28	Resistor, 10K Ω , 1/4w, 5%
5791-10862-12	J3	Connector, 12-pin Header Str Sq. Lock .100
5791-12462-10	J1, J2	Connector, 10-pin Header Str Sq. Lock .100

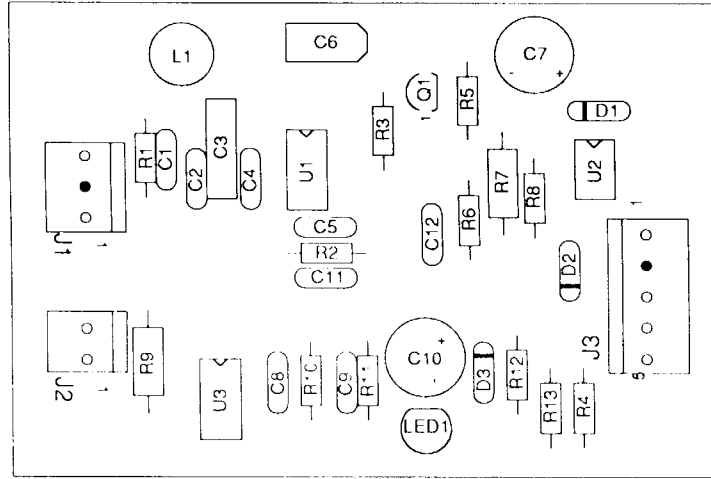


A-16943 5-Diode Switch & Lamp Assembly

Part Number	Designator	Description
5070-09054-00	D1 D5	Diode 1N4004 1.0A
5791-10862-09	J1, J2	Connector, 9-pin Header

Printed Circuit Boards (Continued)

A-15646-2 24-Switch Opto PC Board



<u>Part Number</u>	<u>Description</u>	<u>Description</u>
5370-10891-00	U1	I.C. Opto Receiver, MC3373
5490-10892-00	U2	I.C. Opto Isolator
5431-10449-00	U3	I.C. 555 Timer
5192-13591-00	Q1	Trans. MPSA64 PNP Darlington
5043-10893-00	C3	Capacitor, .0015 μ fd, 50v Axial
5043-09065-00	C4, C12	Capacitor, 470PF, 50v (\pm 20%) Ax.
5043-08996-00	C5, C11	Capacitor, 0.1 μ FD, 50v (\pm 20%) Ax.
5041-10588-00	C6	Capacitor, 6.8 μ fd, 25v (20%)
5043-08980-00	C8	Capacitor, .01 μ fd, 50v (+80, -20%) Ax.
5048-12577-00	C2	Capacitor, .47 μ fd 50v Axial
5043-09845-00	C1, C9	Capacitor, .001 μ fd, 50v (\pm 20%) Ax.
5070-09054-00	D1 - D3	Diode 1N4004 1.0A.
5040-10974-00	C7, C10	Capacitor, 100 μ fd, 35v (+80,-20%)
5010-08997-00	R1	Resistor, 2.7K Ω , 1/4w, 5%
5010-09162-00	R2, R6	Resistor, 100K Ω , 1/4w, 5%
5010-09768-00	R3	Resistor, 180K Ω , 1/4w, 5%
5010-09039-00	R4	Resistor, 10K Ω , 1/4w, 5%
5010-09324-00	R5	Resistor, 27K Ω , 1/4w, 5%
5010-08930-00	R7	Resistor, 470 Ω , 1/4w, 5%
5010-09034-00	R8	Resistor, 10K Ω , 1/4w, 5%
5010-10022-00	R10	Resistor, 7.5K Ω , 1/4w, 5%
5010-08773-00	R11	Resistor, 18K Ω , 1/4w, 5%
5010-09085-00	R13	Resistor, 1.5K Ω , 1/4w, 5%
5671-13732-00	LED1	Display LED Red 1
5791-12273-03	J1	Connector, 3 pin Header Str Sq Lck
5791-12273-02	J2	Connector, 2-pin Header Str Sq Lck
5791-12273-05	J3	Connector, 5-pin Header Str Sq Lck
5551-10890-00	L1	Inductor, 10 μ H
5010-09534-00	R12	Resistor, 0 Ω (Jumper)
5010-09085-00	R9	Resistor, 1.5K Ω , 1/4w, 5%

A-15205-R-2 & A-15205-L-2 Fliptronic II Flipper Assembly

<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	B-13104-R B-13104-L	Flipper Base Assy., Right Flipper Base Assy., Left	16.b)	A-10656	Flipper Link Assembly
2.	SW-1A-194	Switch Assembly	c)	02-4179	Link Spacer Bushing
3.	4701-00002-00	Lockwasher, #6 Split	d)	4010-01086-14	Cap Screw, 10-32 x 7/8 SH
4.	4105-01019-10	Sh. Metal Screw, #5 x 5/8 P-RH-A	e)	4700-00023-00	Flatwasher, 5/8 x 13/64 x 16ga.
5.	4008-01079-05	Mach. Screw, 8-32 x 5/16 H-SOC	f)	4701-00004-00	Lockwasher #10 Split
6.	4701-00003-00	Lockwasher, #8 Split	g)	4410-01132-00	Nut, 10-32 ESN
7.	01-9375	Switch Mounting Bracket	17.	23-6577	Bumper Plug, 5/8"
8.	20-6516	Speednut, Tinnerman	18.	03-7568	Flipper Bushing
9.	4010-01066-06	Cap Screw, 10-32 x 3/8, SH	19.	4006-01005-06	Mach. Screw, 6-32 x 3/8 P-PH
10.	4701-00004-00	Lockwasher, #10 Split	20.	4406-01117-00	Nut, 6-32 Hex
11.	A-12390	Flipper Stop Assembly			
12.	FL-11629	Flipper Coil (Blue)			
a)	03-7066-5	Coil Tubing			
13.	01-7695	Solenoid Bracket			
14.	4006-01017-04	Mach. Screw, 6-32 x 1/4 P-RH-S			
15.	10-364	Spring			
16.	B-13882-R B-13882-L	Crank Link Assembly, Right Crank Link Assembly, Left	■ Associated Parts for Left & Right Flippers:		
a)	B-13884-R B-13884-L	Flipper Crank Assembly, Right Flipper Crank Assembly, Left	21.	23-6695	Flipper Rubber Ring, 1-1/2" (3 Used)
			22.	20-9250-6	Flipper & Shaft-Yellow (3 Used)

A-16976-L Flipper Assembly

(The parts listed replace same items of **A-15205-L-2**)

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16977-L	Flipper Bracket, Sub-Assembly
12.	FL-11629	Flipper Coil (Blue)

■ **Associated Parts:**

21.	23-6682-7	Flipper Rubber Ring (Black)
22.	20-9732-6	Small Flipper & Shaft (Yellow)

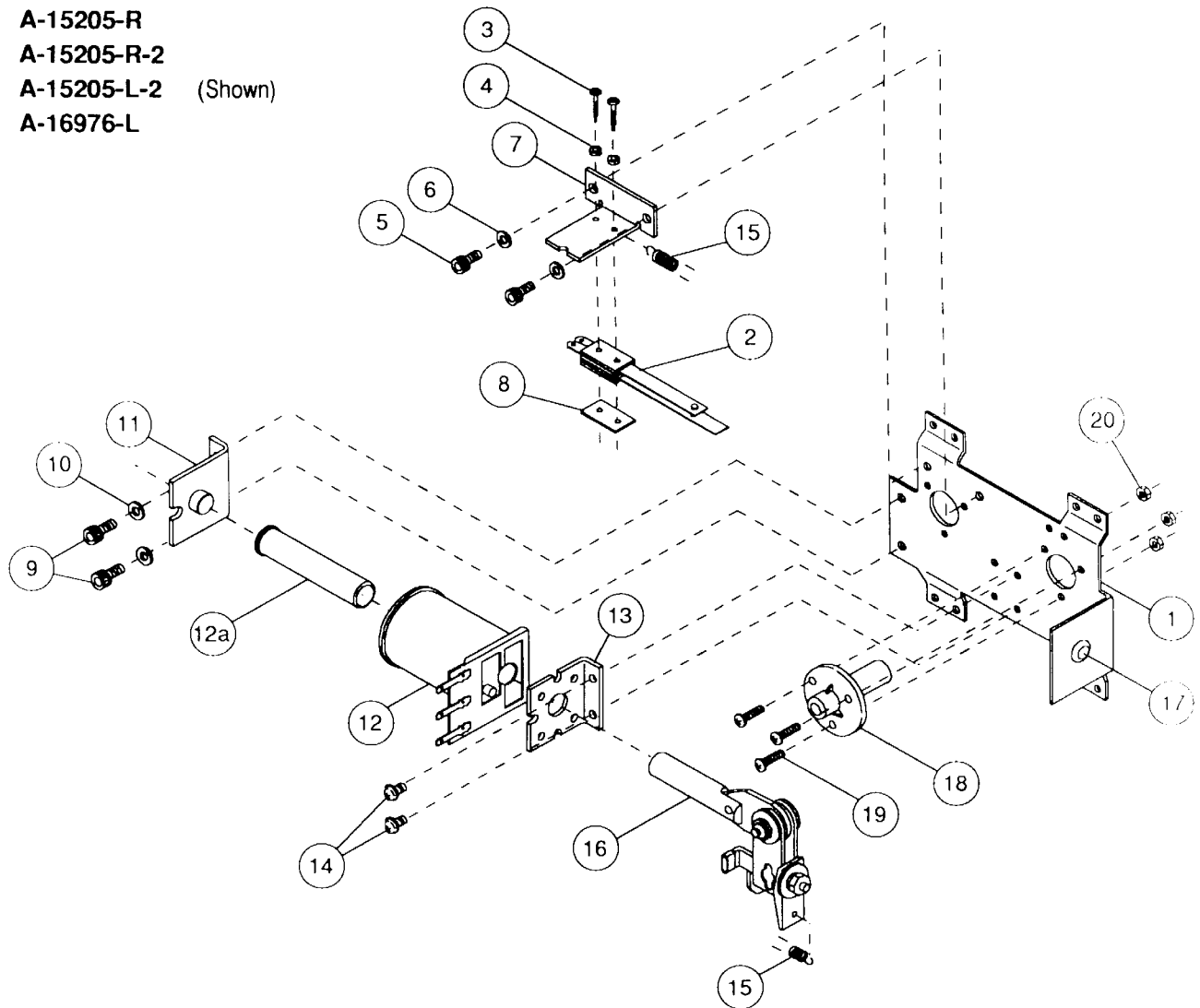
A-15205-R Fliptronic II Flipper Assembly

(The parts listed replace same items of **A-15205-R-2**)

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
12.	FL-11630	Flipper Coil (Red)

Fliptronic II Flipper Assembly

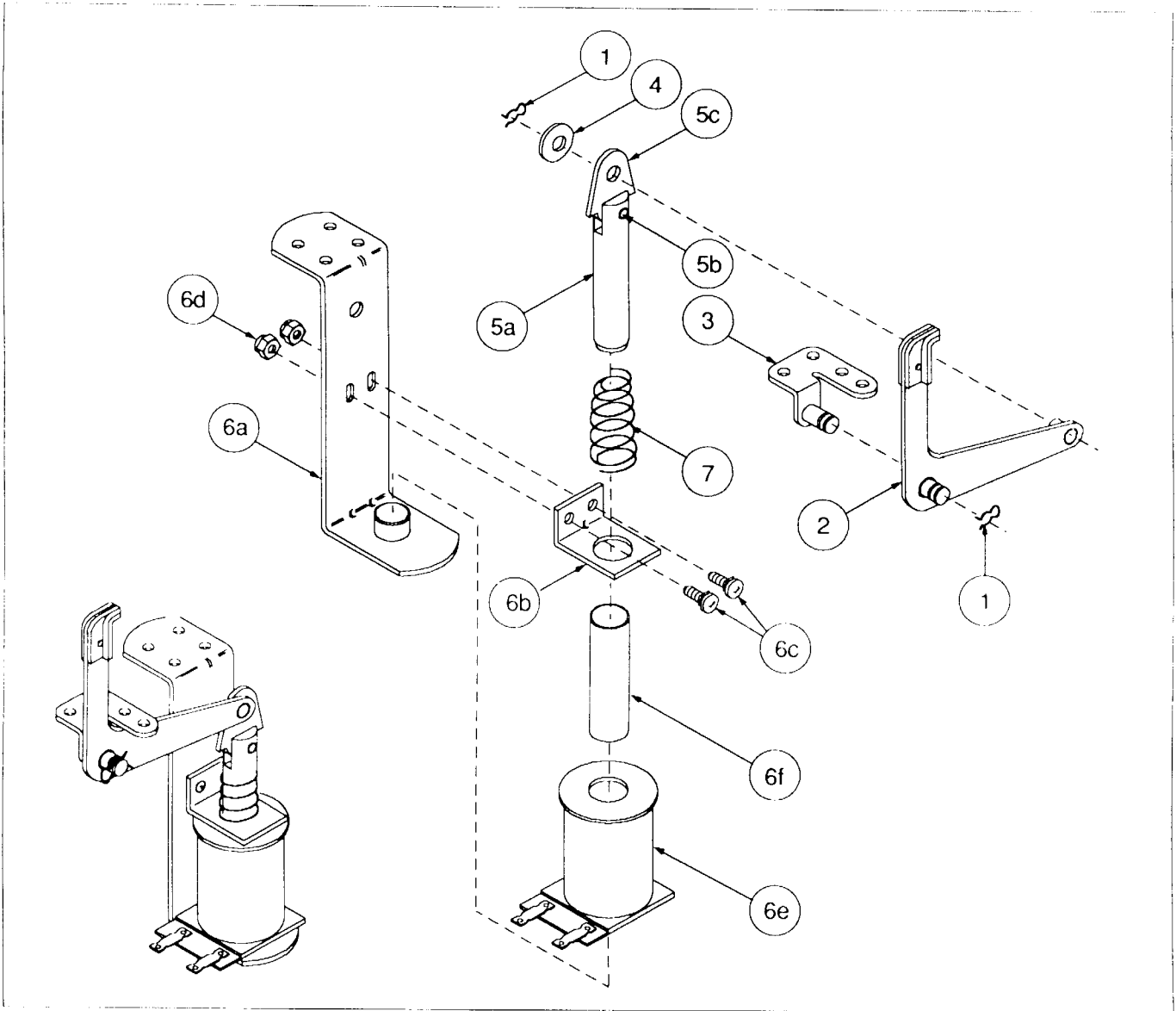
A-15205-R
 A-15205-R-2
 A-15205-L-2 (Shown)
 A-16976-L



■ 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 (± 0.015) 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 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.

B-12665 Kicker Arm (Slingshot) Assembly



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

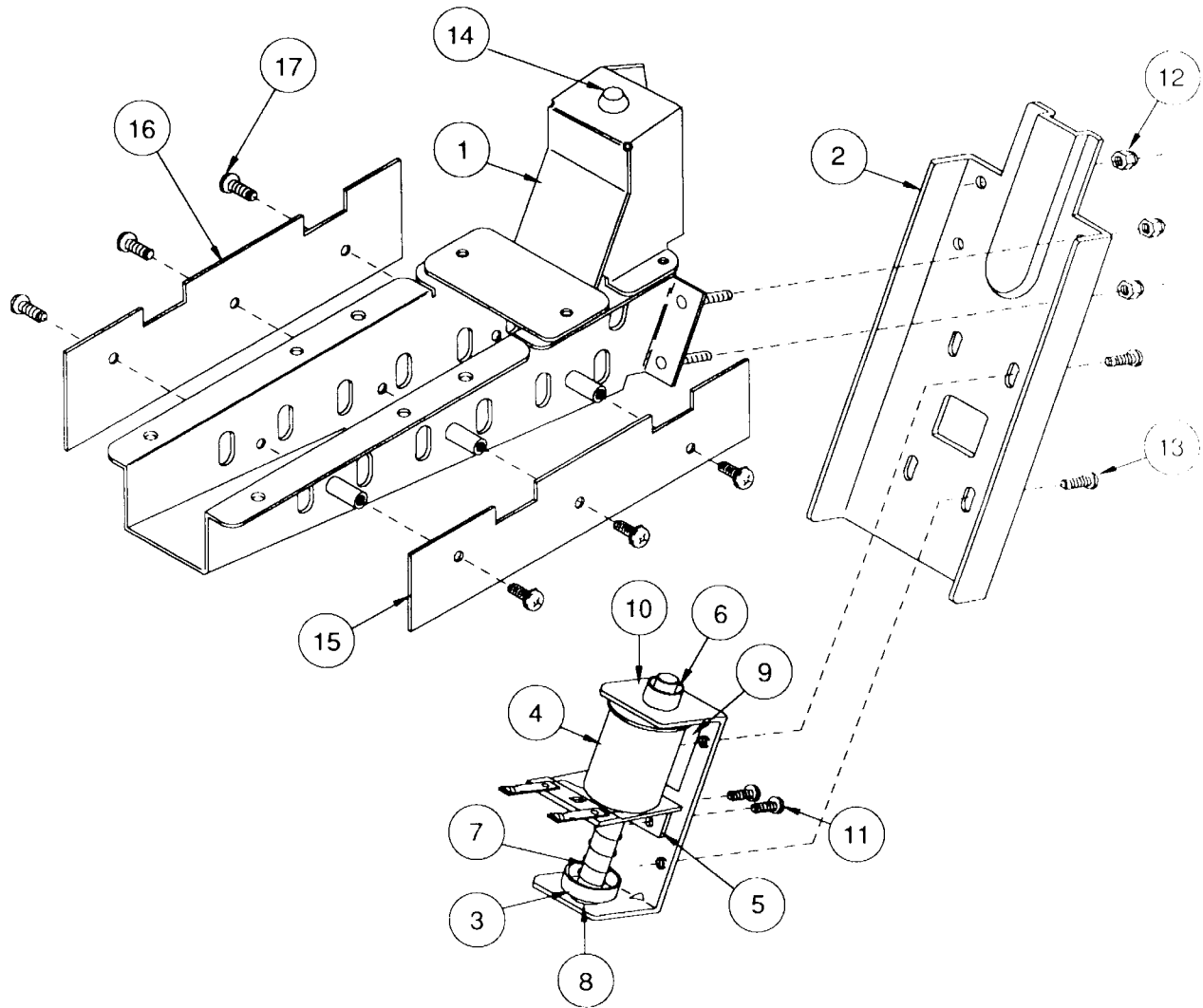
Item Part Number Description

- 1. 12-6227 Hairpin Clip
- 2. A-12664 Kicker Crank Assembly
- 3. A-5653 Mounting Bracket Assembly
- 4. 4700-00030-00 Flatwasher, 17/64 x 1/2 x 15ga.
- 5. A-5103 Coil Plunger Assembly
 - a) 02-2364 Coil Plunger
 - b) 03-8085 Armature Link
 - c) 20-8716-5 Roll Pin, 1/8 x 7/16"

Item Part Number Description

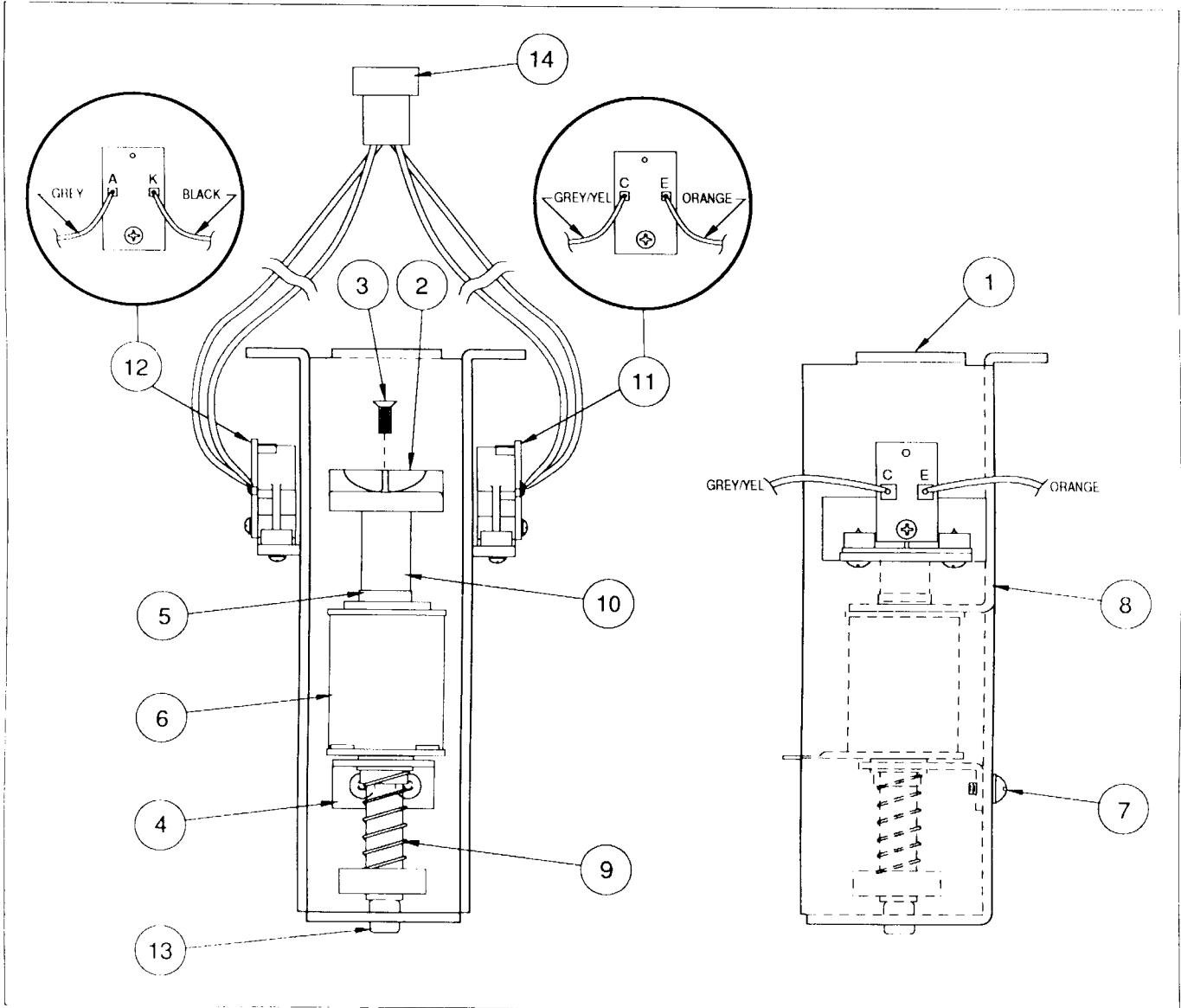
- 6. **A-14369-R** **Coil & Bracket Assy., Right**
- A-14369-L** **Coil & Bracket Assy., Left**
- a) B-7572-1 Bracket & Stop Assembly
- b) 01-8-508-S Coil Retaining Bracket
- c) 4006-01017-06 Mach. Screw, 6-32 x 3/8
- d) 4406-01119-00 Nut, 6-32 ESN
- e) AE-27-1200 Coil Assembly
- f) 03-7066 Coil Tubing
- 7. 10-128 Spring

A-16765 Outhole Ball Trough Assembly



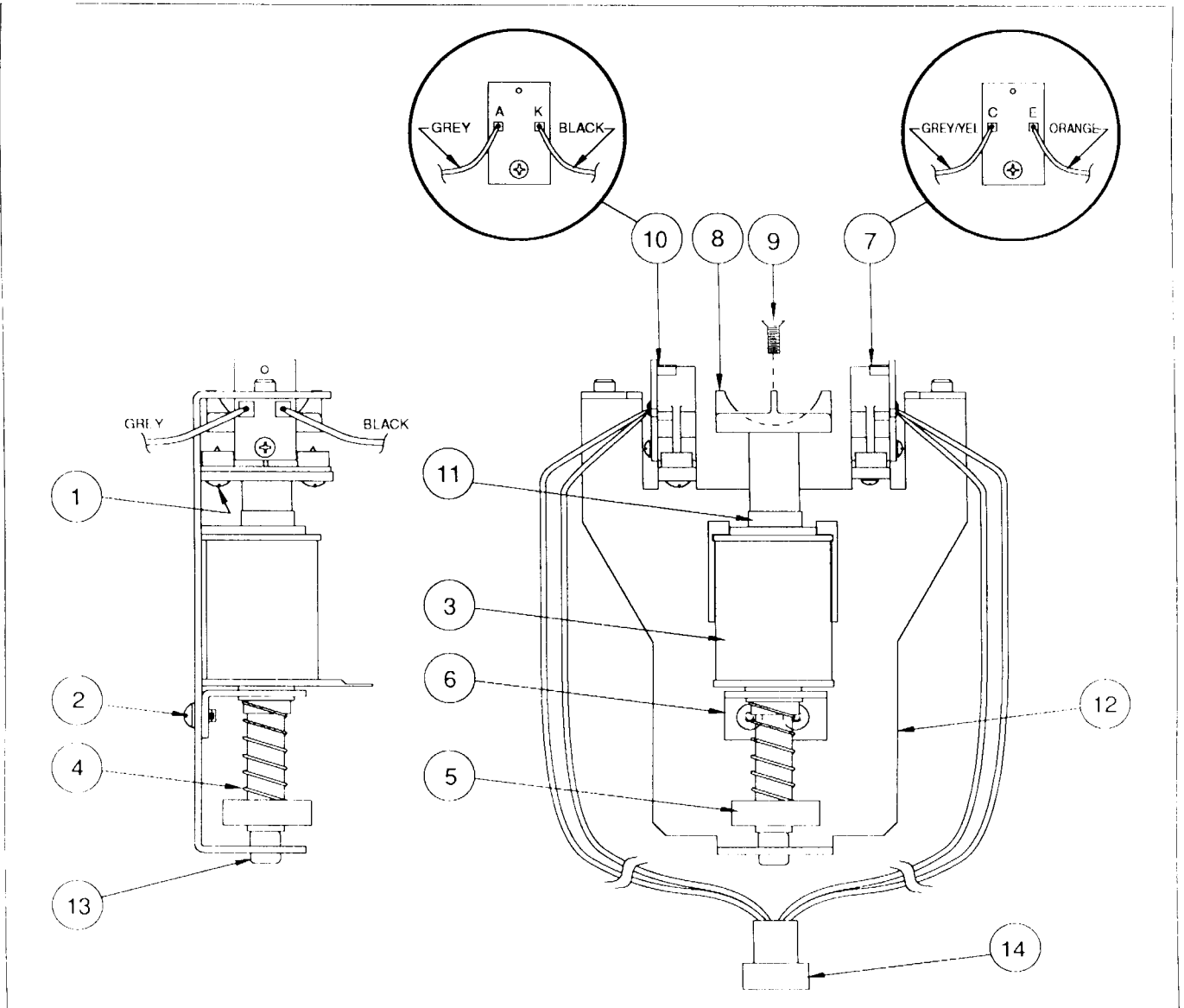
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16809	Ball Trough Welded Assy.	10.	01-11586	Coil Mtg. Bracket (Bell)
2.	01-11587	Ball Trough Front	11.	4008-01017-05	Mach. Screw, 8-32x5/16 P-RH SLMS
3.	A-6306-2	Bell Armature Assembly	12.	4408-01119-00	Nut 8-32 ESN
4.	AE-26-1500	Coil Assembly	13.	4008-01017-06	Mach. Screw, 8-32x3/8 P-RH SLMS
5.	01-8-508-T	Solenoid Bracket	14.	23-6702	Bumper Plug
6.	03-7067-5	Coil Tubing	15.	A-16529	7 IR LED PCB Assembly
7.	10-135	Insulator	16.	A-16530	7 IR LED PCB Assembly
8.	23-6420	Rubber Grommet	17.	4006-01017-06	Mach. screw, 6-32x3/8 P-RH SLMS
9.	03-8523	Insulator			

A-16580 Ball Popper Assembly



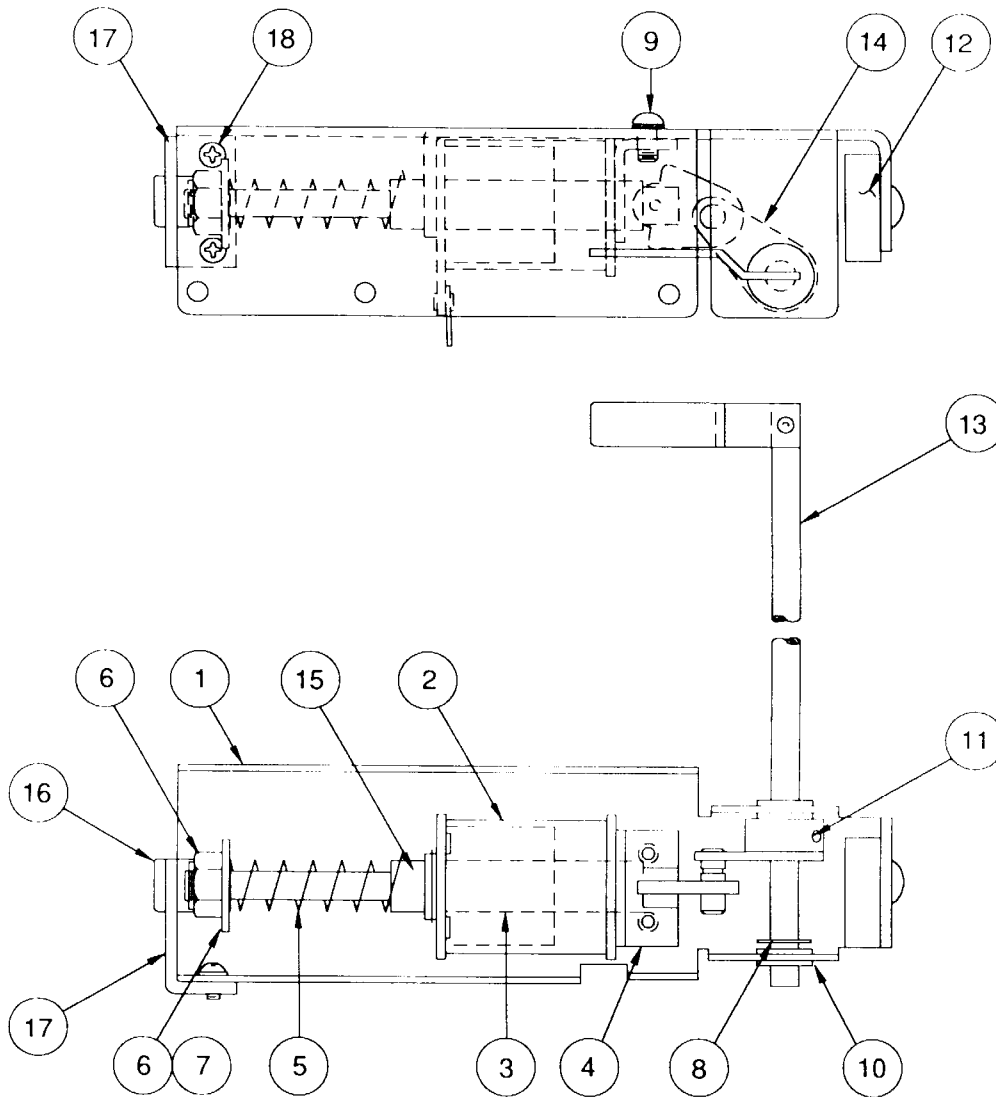
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	01-11402	Mounting Bracket	8.	4106-01013-06	Sh. Metal Screw, #6 P-DR
2.	03-8561	Ball Popper Cup	9.	10-135	Spring
3.	4106-01152-06	Sh. Metal Screw, #6 Thd.	10.	A-14585	Armature & Ext. Assembly
4.	01-9794	Coil Mtg. Bracket	11.	A-16908	Opto LED Assembly, RTV
5.	03-7067	Coil Tubing	12.	A-16909	Opto Photo Transistor Assy., RTV
6.	AE-26-1200	Coil Assembly	13.	23-6420	Rubber Grommet
7.	4008-01027-04	Mach. Screw, #8-32 x 5/16"	14.	H-16229	Plfd. Opto Cable

A-15769 Ball Popper & Opto Assembly



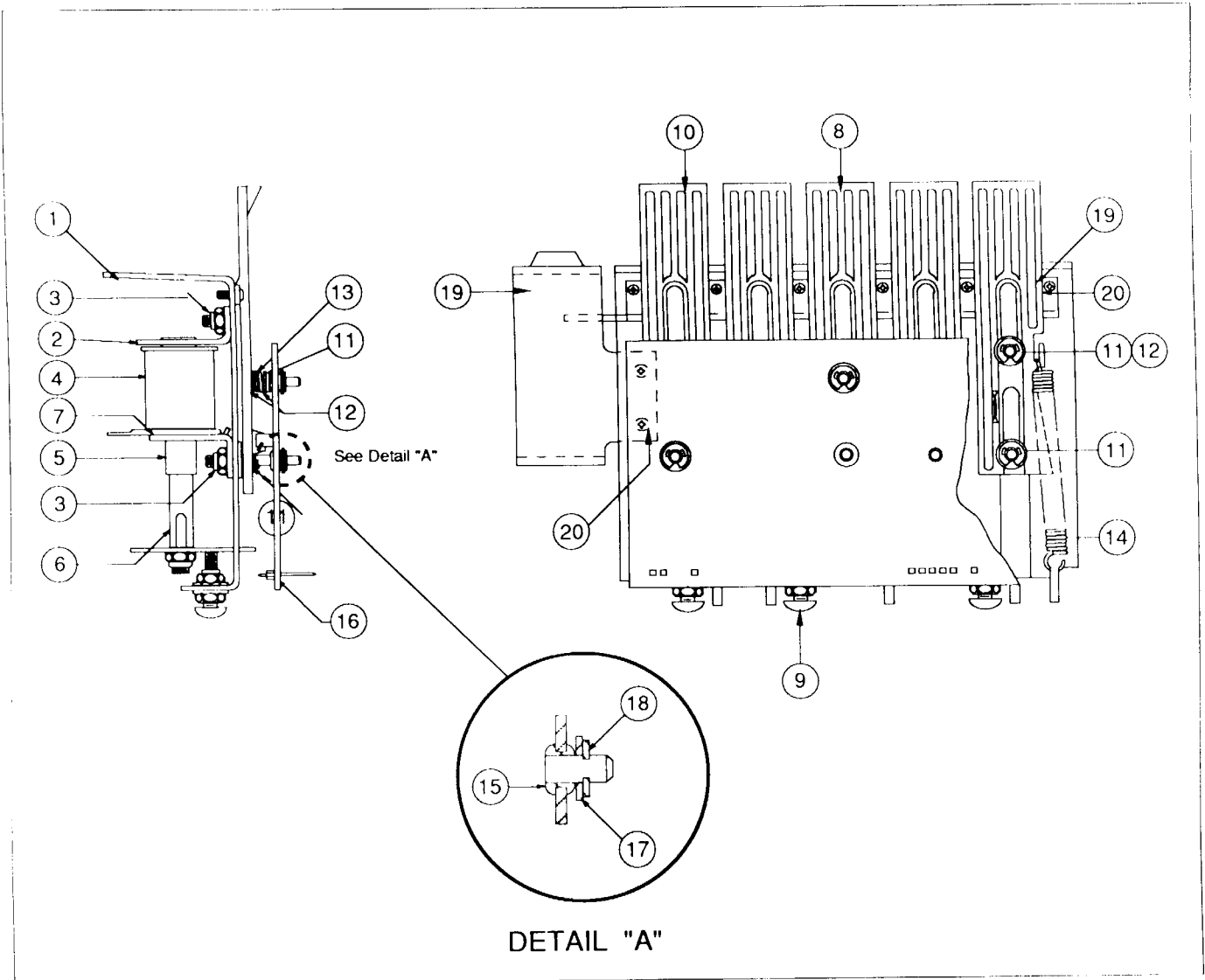
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	4106-01013-06	Sh. Metal Screw, #6 x 3/8"	8.	03-8561	Ball Popper Cup
2.	4008-01017-04	Mach. Screw, 8-32 x 1/4"	9.	4106-01152-06	Sh. Metal Screw, #6-32 x 3/8"
3.	AE-23-800	Coil Assembly	10.	A-16908	Opto LED Assembly-RTV
4.	10-135	Spring	11.	03-7067-5	Coil Tubing
5.	02-4668	Armature Assembly	12.	A-15914	Bracket, Ball Popper
6.	01-9794	Mounting Bracket	13.	23-6420	Rubber Grommet
7.	A-16909	Opto Photo Transistor Assy.-RTV	14.	H-16229	Plfd. Opto Cable

A-16802 Diverter Assembly



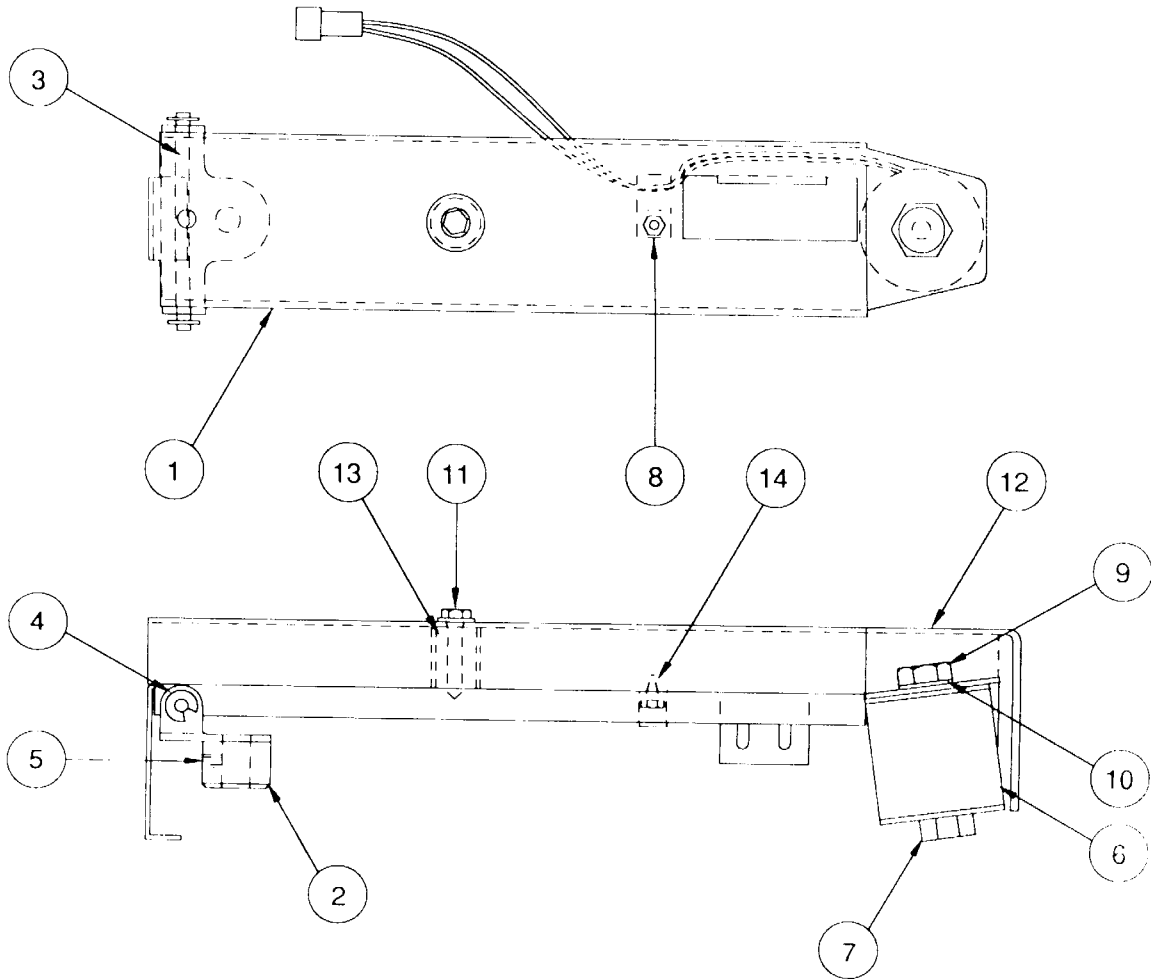
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	01-11573	Bracket	10.	20-8790	Nylined Bearing
2.	AE-25-1000	Coil Assembly	11.	4008-01083-04	Set Screw, #8 x 1/2"
3.	A-16780	Plunger Assembly	12.	23-6686	Bumper Pad - Round
4.	01-8-508-T	Solenoid Bracket	13.	A-16781	Shaft Assembly
5.	10-437	Spring	14.	A-16782	Crank Assembly
6.	4420-01119-00	Nut 1/4-20 ESN	15.	03-7067-5	Coil Tubing
7.	4700-00033-00	Flatwasher, 17/64 x 3/4 X 21ga.	16.	23-6420	Rubber Grommet
8.	20-8712-25	"E"-Ring, 1/4" Shaft	17.	A-16988	Bracket Assembly
9.	4008-01017-04	Mach. Screw, 8-32 x 1/4" P-R	18.	4010-01006-04	Mach. Screw, 10-32 x 1/4" P-DR PH

A-16947 5-Bank Drop Target Assembly



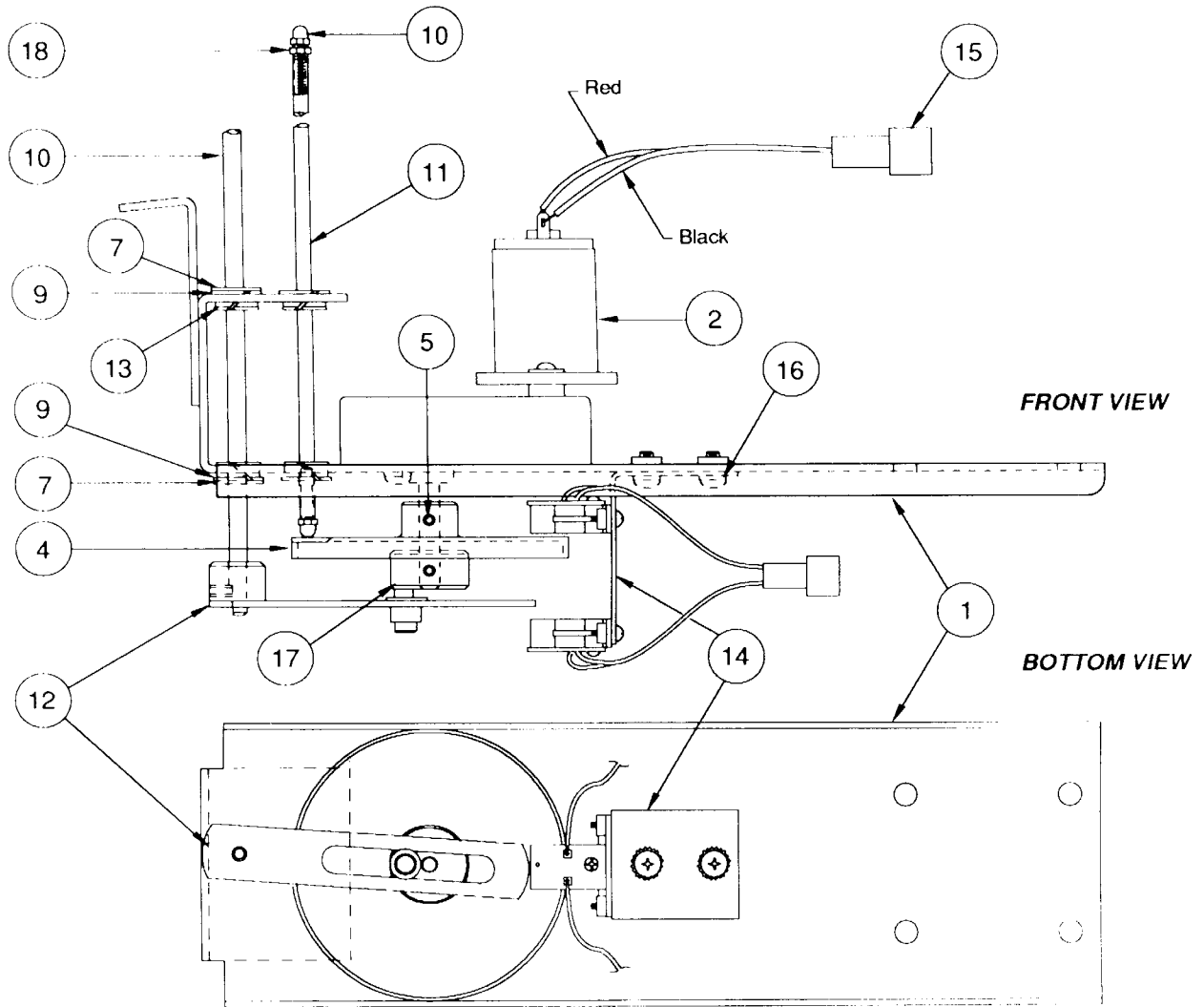
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16950	5-Bank Sub-Assembly	11.	20-8712-25	Retaining Clip
2.	A-11397	Stop Bracket Assembly	12.	4700-00072-00	Flatwasher, 17/64 x 1/2 x 21ga.
3.	4408-01119-00	Nut #8 ESN	13.	10-392	Spring, Compression
4.	AE-24-900	Coil Assembly	14.	10-364	Spring, Extension
5.	03-7066-4	Coil Tubing	15.	23-6626	Rubber Grommet
6.	A-16476	Reset Plate Assembly	16.	A-16486	5-Bank Opto Board
7.	01-8413	Coil Mounting Bracket	17.	4700-00016-00	Flatwasher, 3/16 x 7/16 x 21ga.
8.	03-8750	Target, Flush (1 Used)	18.	20-8712-18	"E"-Ring, 3/16" Shaft
9.	4010-01025-14	Mach. Screw, 10-32 x 7/8"	19.	A-16445	Lever Coil Sub-Assy. (See p.2-30)
10.	03-8749	Target, Plain (4 Used)	20.	4008-01017-05	Mach. Screw, 8-32 x 5/16"

A-16769 Arm Lifter Assembly



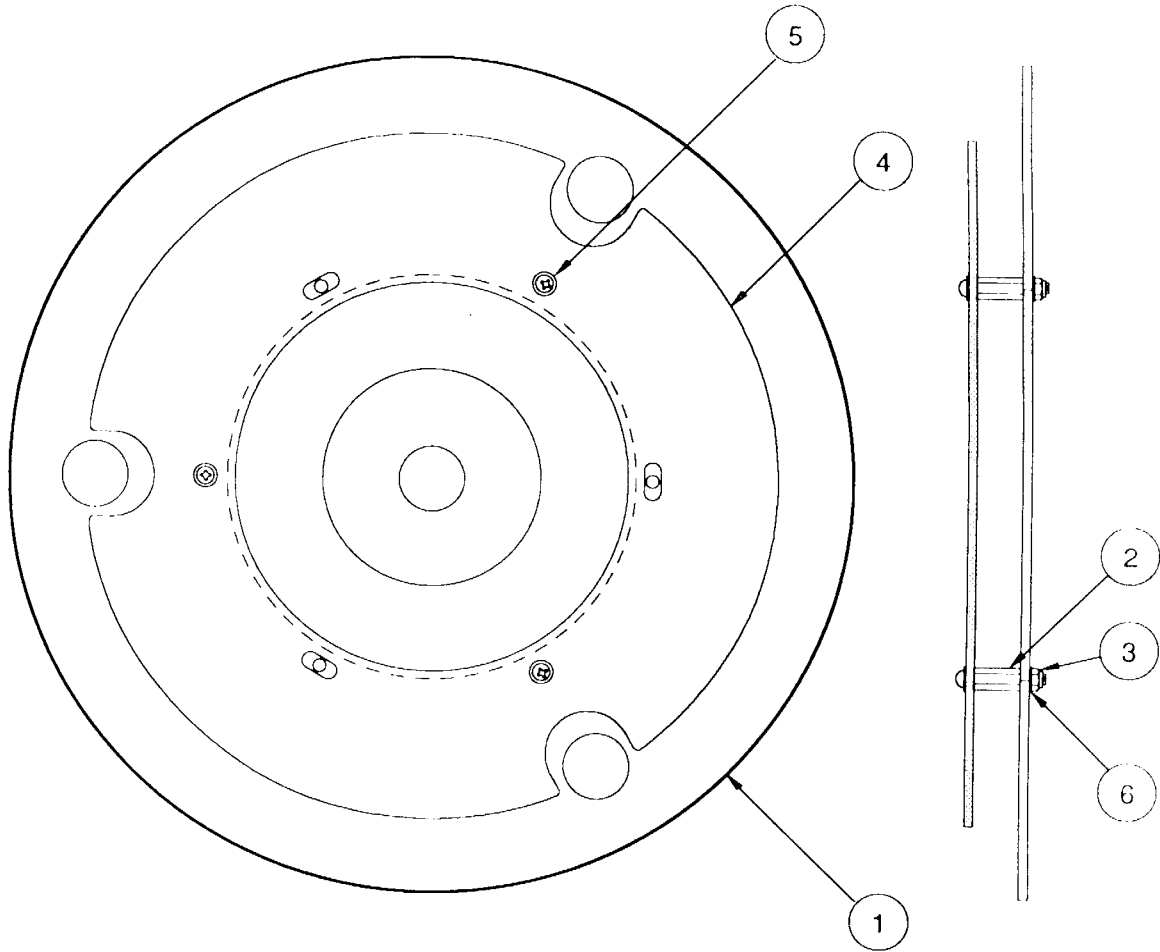
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	01-11980	Arm Lifter
2.	A-16768	Pivot & Hub Assembly
3.	02-4816	Shaft
4.	20-8712-12	"E"-Ring, 1/8" Shaft
5.	4008-01083-03	Set Screw, 8-32 x 1/2"
6.	A-12158-1	Coil & Conn. Assembly
7.	02-4888	Core-Magnet
8.	03-7655-4	Cable Clamp
9.	4420-01117-00	Nut, 1/4-20 Hex.
10.	02-4844	Spacer, Magnet
11.	4106-01115-16	Sh. Metal Screw, #6 x 1" PL-HWH
12.	31-1817	Screened Plastic Cover
13.	03-8022-1	Spacer, .541 L"
14.	4106-01115-06Y	Sh. Metal Screw, #6 x 3/8 PL-H

A-17247 Lifter Assembly



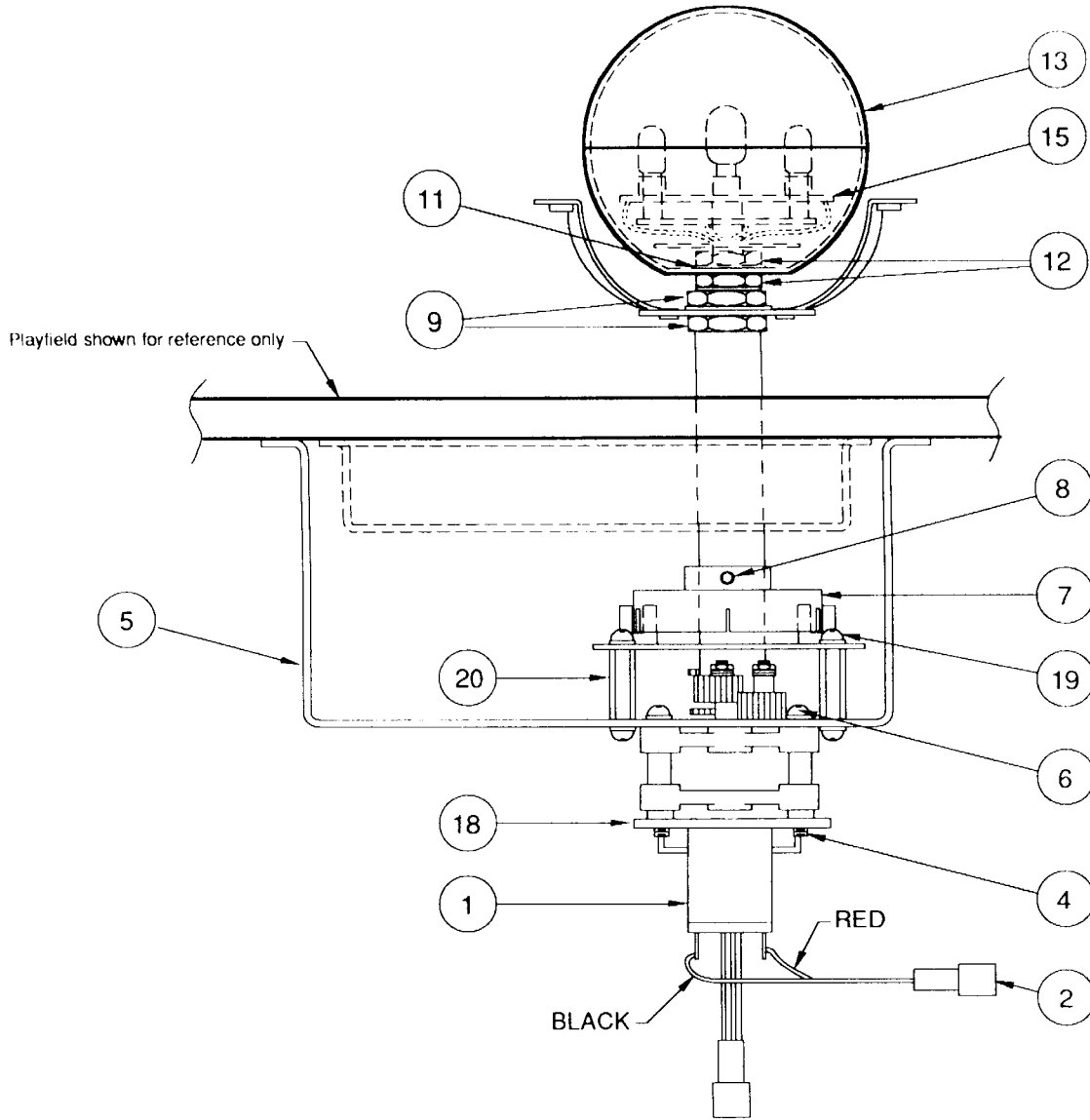
<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-17246	Bracket Assembly	10.	02-4819	Shaft - Pivot
2.	14-7989	Motor, 12VDC	11.	02-4818	Shaft - Lifter
3.	4008-01003-12	Mach. Screw, 8-32 x 3/4"	12.	A-16771	Lever Assembly
4.	03-8998	Cam	13.	20-8790	Nylined Bearing
5.	4008-01083-03	Set Screw, 8-32 x 3/16	14.	A-16784	Bracket & Opto Assembly
6.	02-4821	Bushing	15.	H-16960	Cable
7.	20-8712-25	"E"-Ring, 1/4" Shaft	16.	4008-01003-06	Mach. Screw, 8-32 x 3/8"
8.	02-4840	Screw, Lifter	17.	02-4820	Eccentric
9.	4700-00103-00	Flatwasher, 17/64 x 1/2 x 21ga.	18.	4408-01128-00	Nut 8-32 KEPS

A-16477 Ring Assembly



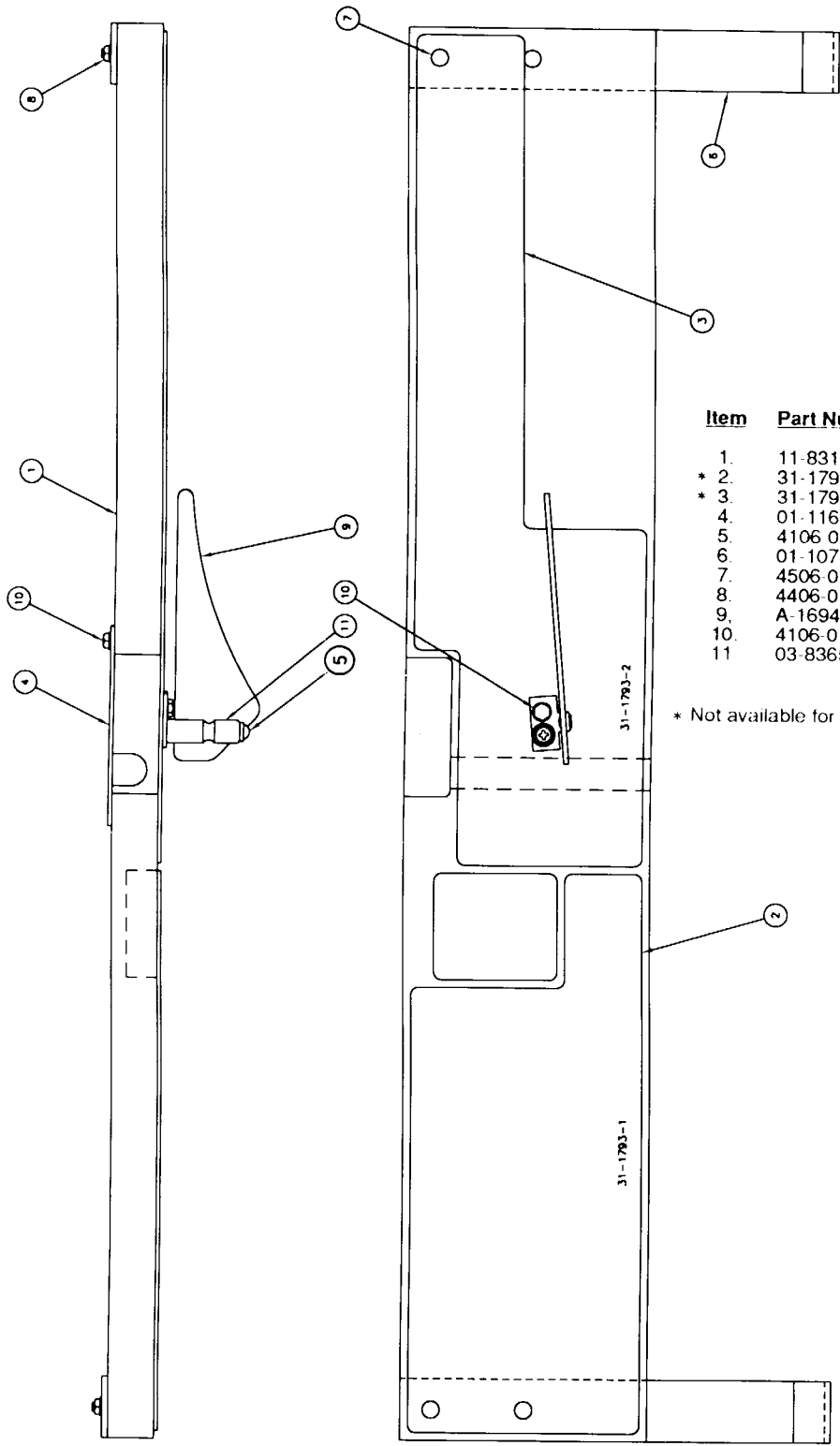
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	03-8867	Lower Ring
2.	02-4890	M-F Spacer
3.	4408-01119-00	Nut #8-32 ESN
4.	31-1801	Screened Plastic Ring
5.	4006-01027-4	Mach. Screw, 6-32 x 1/4"
6.	4700-00011-00	Flatwasher, 11/64 x 7/16 x 16ga.

A-16478 Planet Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	14-7985	Motor, 12VDC	11.	4702-00023-00	Lockwasher, 3/4" Internal
2.	H-16961	Cable Assembly	12.	02-4777	Nut 1/2-27
3.	A-16598	Planet Opto PC Board	13.	03-8858	Planet
4.	4008-01017-08	Mach. Screw, #8 x 1/2"	14.	4702-00019-00	Lockwasher, 1/2" Internal
5.	A-16808	Bracket Assembly	15.	A-16475	Light Assembly
6.	4008-01017-06	Mach. Screw, #8 x 3/8"	16.	H-16901	Cable Assembly
7.	03-8869	Interrupter	17.	02-4466-8	F-F Spacer 1/4 x 15/16" Hex.
8.	4008-01083-03	Set Screw, #8 x 1/8"	18.	A-16527	Bracket & Tube Assembly
9.	02-4776	Nut 3/4-16	19.	4008-01005-06	Sh. Metal Screw, 8-32 x 3/8" P-PH
10.	A-16336	Washer & Leg Assembly	20.	4408-01128-00	Nut 8-32 KEPS

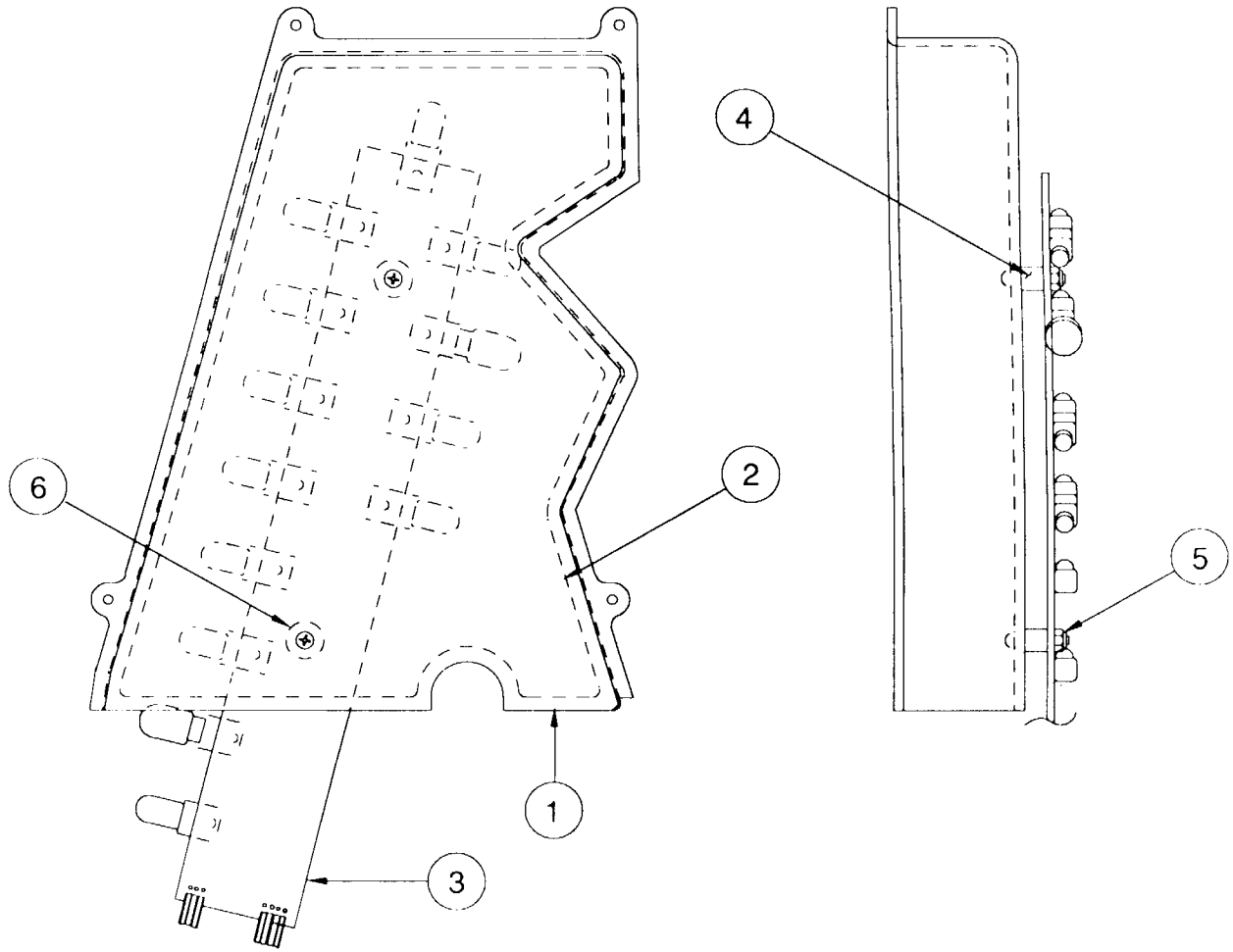
A-16955 Back Panel Assembly



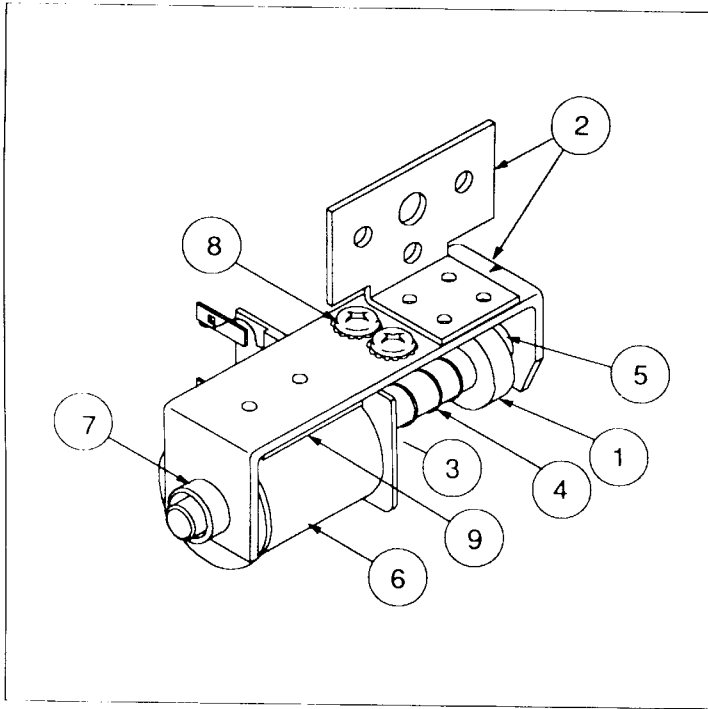
Item	Part Number	Description
1.	11-831-20020	Back Panel
* 2.	31-1793-1	Decal
* 3.	31-1793-2	Decal
4.	01-11671	Cover
5.	4106-01022-27	SMS #6 x 1-11/16 P RHW
6.	01-10726	Leg - Rear Guide
7.	4506-01106-16B	Steel Speaker Screw #6 32
8.	4406-01128-00	Nut #6 32 KEPS
9.	A-16940	Plastic Assembly
10.	4106-01114-08	TCS #6 PL HWH Type 17
11.	03-8365-13	Post

* Not available for individual sale. Order Decal Set 31-1793

A-16967 Trough Assembly

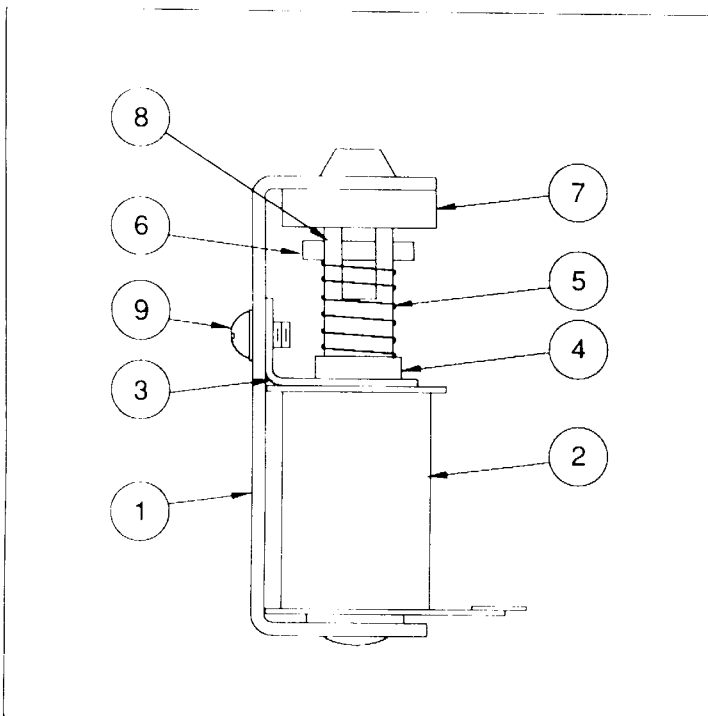


<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	03-8893-1	Trough
2.	31-1795-1	Decal
3.	A-16891	14-Lamp Combo PCB
4.	03-8022-5	Spacer, 11/32" Long
5.	4406-01119-00	Nut #6-32 ESN
6.	4006-01005-12	Mach. Screw, 6-32 x 3/4



A-16936 Kicker Bracket Assembly

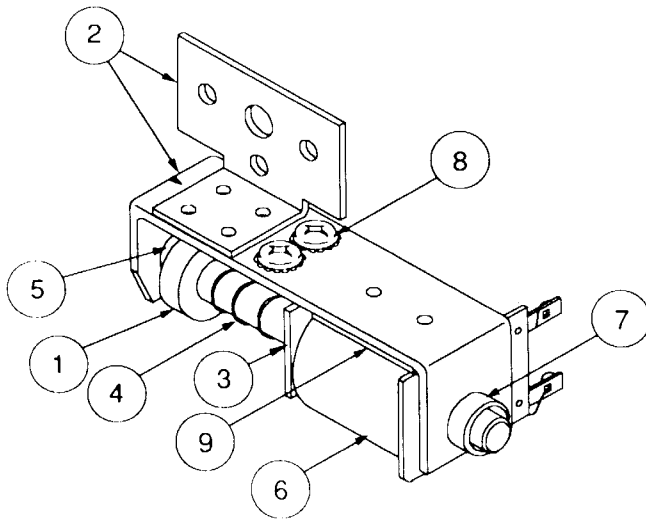
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-6306-2	Bell Armature Assembly
2.	A-16934	Mtg. Kicker Bracket Assembly
3.	01-8-508-T	Solenoid Bracket
4.	10-135	Solenoid Spring
5.	23-6420	Rubber Grommet
6.	AE-23-800	Coil Assembly
7.	03-7067-5	Coil Tubing
8.	4008-01017-04	Mach. Screw, #8-32 x 1/4" P-RH
9.	03-8523	Insulator



A-16445 Lever Coil Sub-Assembly

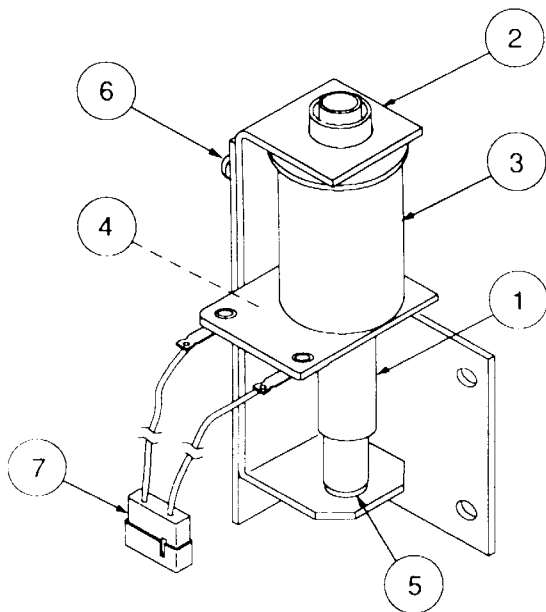
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-16446	Lever Coil Bracket Assembly
2.	AE-27-1200	Coil Sub-Assembly
3.	01-8-508-T	Coil Retaining Bracket
4.	03-7066	Coil Tubing
5.	10-128	Spring
6.	20-8716-17	Roll Pin 1/8 x 3/4" Long
7.	23-6686	Bumper Plug
8.	02-2364	Plunger
9.	4008-01017-05	Mach. Screw, #6-32 x 5/16

A-14525 Kicker Bracket Assembly



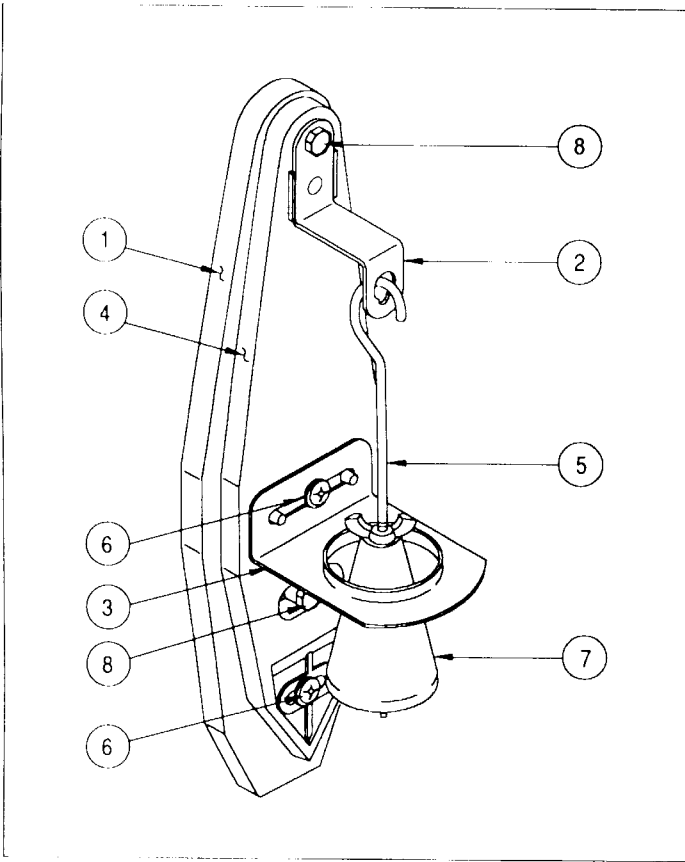
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-6306-2	Bell Armature Assembly
2.	A-14526	Mtg. Bracket Assembly
3.	01-8-508-T	Solenoid Bracket
4.	10-135	Solenoid Spring
5.	23-6420	Rubber Grommet
6.	AE-23-800	Coil Assembly
7.	03-7067-5	Coil Tubing
8.	4008-01017-04	Mach. Screw, #8-32 x 1/4" P-1311
9.	03-8523	Insulator

B-10686-1 Knocker Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-5387	Coil Plunger Assembly
2.	01-11273	Mtg. 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" P-1311
7.	H-11835	Knocker Cable
8.	03-7067-5	Coil Tubing

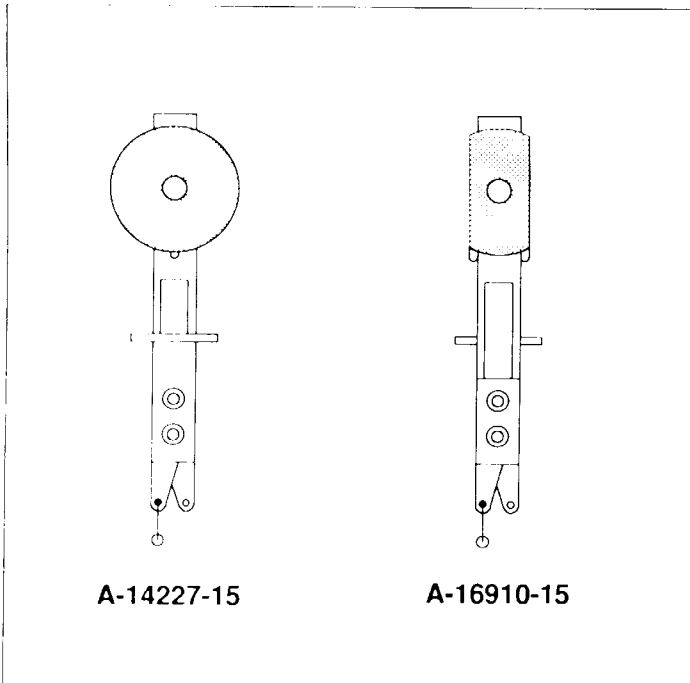
A-15361 Tilt Mechanism Assembly



<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1.	A-15360	Mount Plate, Tilt Mech.
2.	01-3444	Bracket, Tilt Upper
3.	01-3445	Bracket, Tilt Lower
4.	03-8668	Pendulum, Tilt Mech.
5.	12-6231	Wire, Plum Bob
6.	4006-01113-06	MS, 6-32 x 3/8 PL-HEX-WHD

Associated Parts


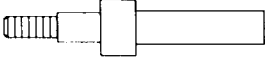

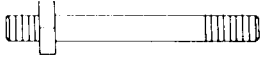
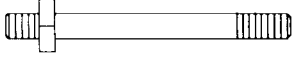




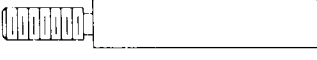

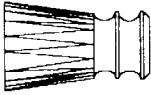
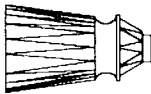
7.	20-6502-A	Plum Bob
8.	4406-01120-00	Wing Nut (2)



Standup Target Assemblies

<u>Part Number</u>	<u>Description</u>
A-14227-15	Standup Target (Opaque Orange) 5 Used
A-16910-15	Oblong Standup Target ((Orange) 2 Used

Metal & Plastic Posts

	<u>Part Number</u>	<u>Description (Quantity)</u>
	02-4020	Support Post (1)
	02-4036-2	Bumper Post (1)
	02-4176-24	M-F Spacer, 8-32 x 1-1/2" (1)
	02-4424-1	Post 6-32/8-32 2-1/32" (3)
	02-4425-1	Post 8-32/ #8-32 2-3/8" (2)
	02-4426-1	Post #6-32 /8 1-29/32" (14)
	02-4434	Post, #8 x 1" (3)
	02-4658	Double Bumper Post (2)
	02-4659-1	Post #10 (8)
	02-4825-20	M-F Spacer, #8-32 x 1-1/4" (2)
	02-4825-30	M-F Spacer, #8-32 x 1-7/8" (2)
	02-4825-40	M-F Spacer, #8-32 x 2-1/2" (1)
	02-4825-44	M-F Spacer, #8-32 x 2-3/4" (1)
	02-4825-60	M-F Spacer, #8-32 x 3-3/4" (1)
	02-4825-64	M-F Spacer, #8-32 x 4" (1)
	02-4826-18	F-F Spacer 8-32 x 1-1/8" (1)
	03-8247-7	Double Star Post, Black (2)
	03-8370-7	Post , Black (4)

Cable List

<u>Part Number</u>	<u>Description</u>
H-14584	Dot Matrix Display
H-14790	A.C. Cable
H-14792-1	A.C. Jumper Cable
H-14792-2	A.C. Jumper Cable
H-15476	Logic Power Cable
H-15478	Tilt Switch Cable
H-15724	Cabinet Button
H-15736	Secondary Cable
H-16229	Playfield Opto Cable
H-16293-1	24" Receiver Cable
H-16294	24" Transmitter
H-16335	Playfield Opto Cable
H-16599	Coin Door Cable
H-16810	50 Volt Cable
H-16884	Speaker Panel Cable
H-16896	Playfiel Switch Cable
H-16897	Playfield Lamp Cable
H-16898	Playfield Solenoid Cable
H-16899	Playfield Opto Cable
H-16900-1	Cabinet Cable
H-16901	Planet Cable
H-16902	Crane Cable
H-16904	Insert Cable
H-16951	Cabinet Switch/Lamp
H-16952	Subway Switch Cable
H-16953	Right Ramp Exit Cable
H-16960	Crane, Motor Cable
H-16961	Planet, Motor Cable
H-16962	Left Pursuit Cable
H-16963	Right Pursuit Cable
H-16993	Stake Out Cable
H-16994	Pick Prize Cable
H-16995	Rt. Lane Opto Cable
H-16996	Rt. Lane Opto Cable
H-17019	Dixi-Mars Cable
H-17037	Left Ramp Exit Cable
H-17070	Single GI Cable
H-17071	Rt. Ramp Cable
H-17072	Crane Release Cable
H-17202	Super Game Cable

Unique Parts List

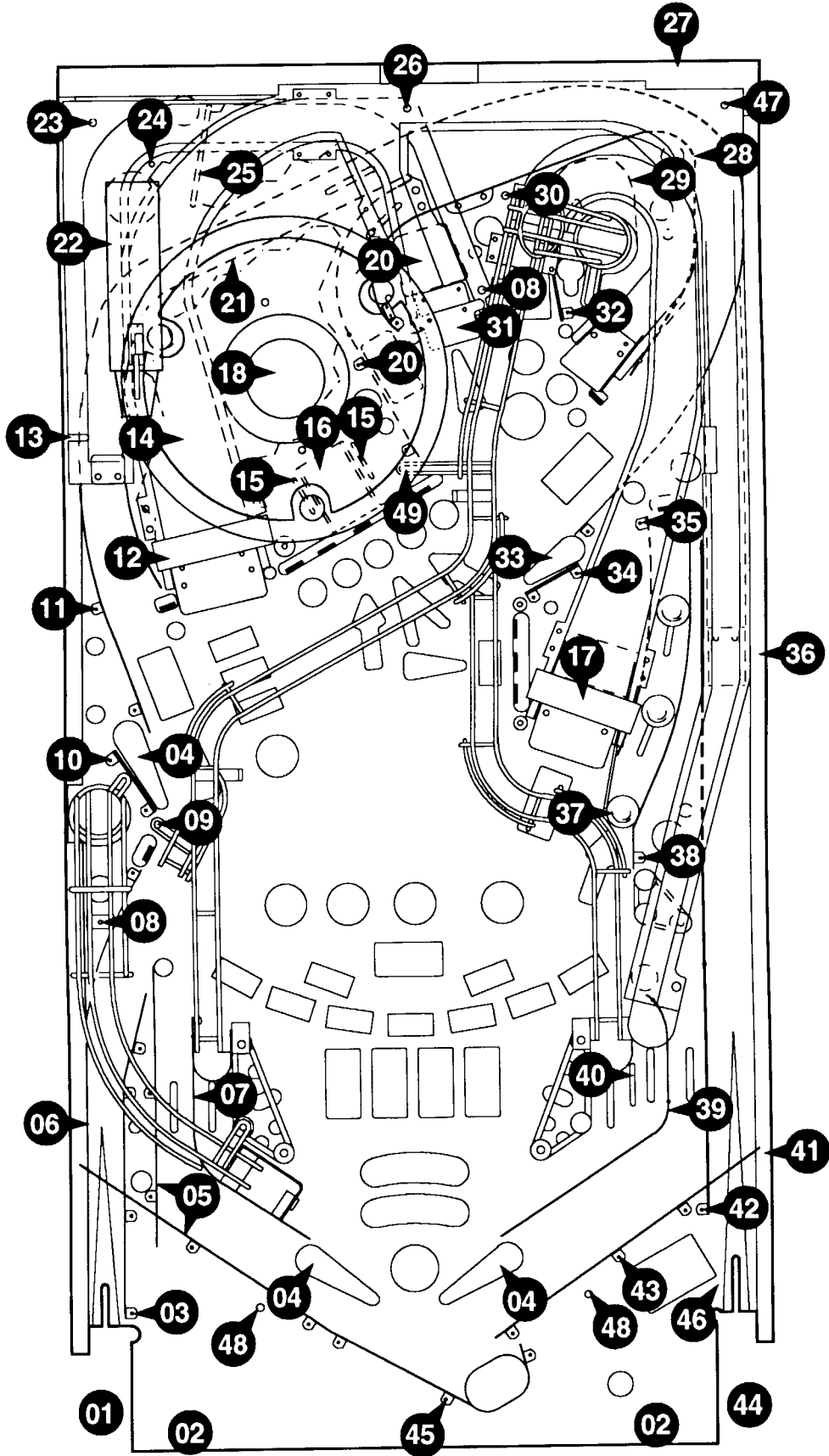
<u>Part Number</u>	<u>Description</u>	<u>Part Number</u>	<u>Description</u>
A-12742-20020	WPC CPU Assembly	A-16943	5-Diode Switch & Lamp Assembly
A-13204-20020	Bottom Arch Assembly	A-16947	5-Bank Drop Target Assembly
A-13769-20020	Playfield & Insert Assembly	A-16955	Back Panel Assembly
A-16336	Washer & Leg Assembly	A-16958	Scoop Assembly
A-16475	Light Assembly	A-16967	Trough Assembly
A-16477	Ring Assembly	A-16968	Trough Assembly
A-16478	Planet Assembly	A-16976-L	Flipper Assembly
A-16482	Opto Assembly, Left	A-16987	Wire Ramp Assembly
A-16486	5-Bank Opto PCB	A-17038	20020 Unique Parts Assy.
A-16569	Metal Ramp Assembly	A-8552-20020	Back Glass Assembly
A-16579	Plastic Ramp Assembly		
A-16580	Ball Popper Assembly	C-10843-BR	Leg Assembly
A-16582	Ball Guide Assembly		
A-16583	Ball Guide Assembly	01-11378-1	Flipper Ball Guide - Left
A-16584	Ball Guide Assembly	01-11378-2	Flipper Ball Guide - Right
A-16585	Ball Guide Assembly		
A-16586	Ball Guide Assembly	02-4176-24	M-F Spacer, 8-32 x 1-1/2
A-16587	Ball Guide Assembly	02-4778	M-F Spacer, 8-32
A-16588	Ball Guide Assembly	02-4825-20	M-F Spacer, 8-32 x 1-1/4"
A-16589	Ball Guide Assembly	02-4825-40	M-F Spacer, 8-32 x 2-1/2"
A-16590	Ball Guide Assembly	02-4825-44	M-F Spacer, 8-32 x 2-3/4"
A-16591	Ball Guide Assembly	02-4825-60	M-F Spacer, 8-32 x 3-3/4"
A-16592	Ball Guide Assembly	02-4825-64	M-F Spacer, 8-32 x 4.0"
A-16593	Ball Guide Assembly	02-4826-18	F-F Spacer, 8-32 x 1-1/8"
A-16598	Planet Opto PCB Assy.	02-4826-4	F-F Spacer, 8-32 x 1/4"
A-16630	Plastic Ramp Assembly	02-4827-4	M-M Spacer, 6-32 x 1/4"
A-17231	Plastic Ramp Assembly		
A-16650	Switch Button & Cable Assy.	03-8247-7	Double Star Post - Black
A-16769	Arm Lifter Assembly	03-8319-7	Post #8 Starred
A-16775	Bracket Assembly	03-8370-7	Post #8 Black
A-16778	Lifter Assembly	03-8936	Eagle
A-16790	Lamp Assembly, Left		
A-16791	Lamp Assembly, Right	11-1111-A	Wood Rail 41-3/4 x 1-1/8 x 1/2"
A-16802	Diverter Assembly	11-1111-B	Wood Rail 31-3/4 x 1-1/8 x 1/2"
A-16814-1	Cashbox Assembly	11-1112-20020	Wood Cabinet
A-16826	Backbox Assembly		
A-16833	Trough Assembly	20-9663-10	Push Button w/Switch Light
A-16839	14-Lamp Combo Assembly	20-9732-6	Small Flipper, Yellow
A-16840	10-Lamp Combo Assembly		
A-16841	5-Lamp Combo Assembly	31-1002-20020	Screened Playfield
A-16843	4-Lamp Board Assembly	31-1008-20020	Bottom Arch, Silk Screened
A-16844	4-Lamp Board Assembly	31-1357-20020	Backglass
A-16891	14-Lamp Combo Assembly	31-1420-20020	Screened Speaker Panel Cover
A-16910-15	Oblong Standup Tgt. (Op. Orange)	31-1788-	Playfield Plastic Set
A-16917-20020	Sound Board Assembly	31-1793-	Decal Set
A-16928	Speaker /Display Assembly	31-1794-1	Decal
A-16929	4-Lamp Board Assembly	31-1795-	Decal Set
A-16932	Wire Ramp Assembly	31-1797	Screened Plastic Cover
A-16936	Kicker Bracket Assembly	36-20020	Playfield Hard Coat

UPPER PLAYFIELD PARTS LIST

<u>Item</u>	<u>Part Number</u>	<u>Description</u>	<u>Not Shown:</u>
1	A-16936	Kicker Bracket Assembly	
2	01-8419	Playfield Hanger Bracket	A-13204-20020 Bottom Arch Assembly
3	01-11360	Ball Guide	A-13769-20020 Playfield Screened
4	20-9250-6	Flipper & Shaft-Yellow	A-16940 Playfield Plastic Assembly
5	A-16585	Ball Guide Assembly	A-17134-2 Mtg. Bracket Clamp Assy. 1/2"
6	A-16590	Ball Guide Assembly	A-17134-3 Mtg. Bracket Clamp Assy. 3/4"
7	A-16587	Ball Guide Assembly	A-17134-4 Mtg. Bracket Clamp Assy. 1"
8	02-4825-20	Spacer 1 1/4"	A-17171 Playfield Plastic Assembly
9	02-4827-4	Spacer 1/4"	A-17185 Playfield Plastic Assembly
10	01-11356	Ball Guide	12-7127 Wire Ball Rail
11	A-16592	Ball Guide Assembly	
12	A-16790	Lamp Assembly-Left	
13	A-12258-1	Nut Plate	
	02-4826-18	Spacer 1 1/8"	
14	A-16477	Ring Assembly	
15	12-6466-5	Wire Guide 1 1/4"	
16	A-16958	Scoop Assembly	
17	A-16791	Lamp Assembly-Right	
18	A-16478	Planet Assembly	
19	A-16584	Ball Guide Assembly	
20	A-16775	Bracket Assembly	
21	A-16586	Ball Guide Assembly	
22	A-16769	Lifter Arm Assembly	
23	02-4825-40	Spacer 2 1/2"	
24	02-4825-60	Spacer 3 3/4"	
25	12-6466-14	Wire Guide 3 1/2"	
26	02-4841	Spacer 3"	
27	A-16955	Back Panel Assembly	
28	A-16589	Ball Guide Assembly	
29	01-11358	Ball Guide	
30	02-4825-44	Spacer 2 3/4"	
	02-4176-24	Spacer 1 1/2"	
31	01-11716	Deflector	
32	A-16591	Ball Guide Assembly	
33	20-9732-6	Small Flipper-Yellow	
34	01-11355	Ball Guide	
35	A-16583	Ball Guide Assembly	
36	01-10905	Bracket	
37	20-6500	Steel Ball 1 1/16"	
38	A-16588	Ball Guide Assembly	
39	A-16582	Ball Guide Assembly	
40	01-11306	Ball Guide	
41	01-3575-1	Strike Plate	
42	A-16593	Ball Guide Assembly	
43	01-11367	Ball Guide	
44	A-14525	Kicker Bracket Assembly	
45	01-11687	Ball Guide	
46	01-11384	Ball Guide	
47	02-4825-64	Spacer 4"	
48	02-4825-30	Spacer 1 7/8"	
49	02-4778	Spacer	

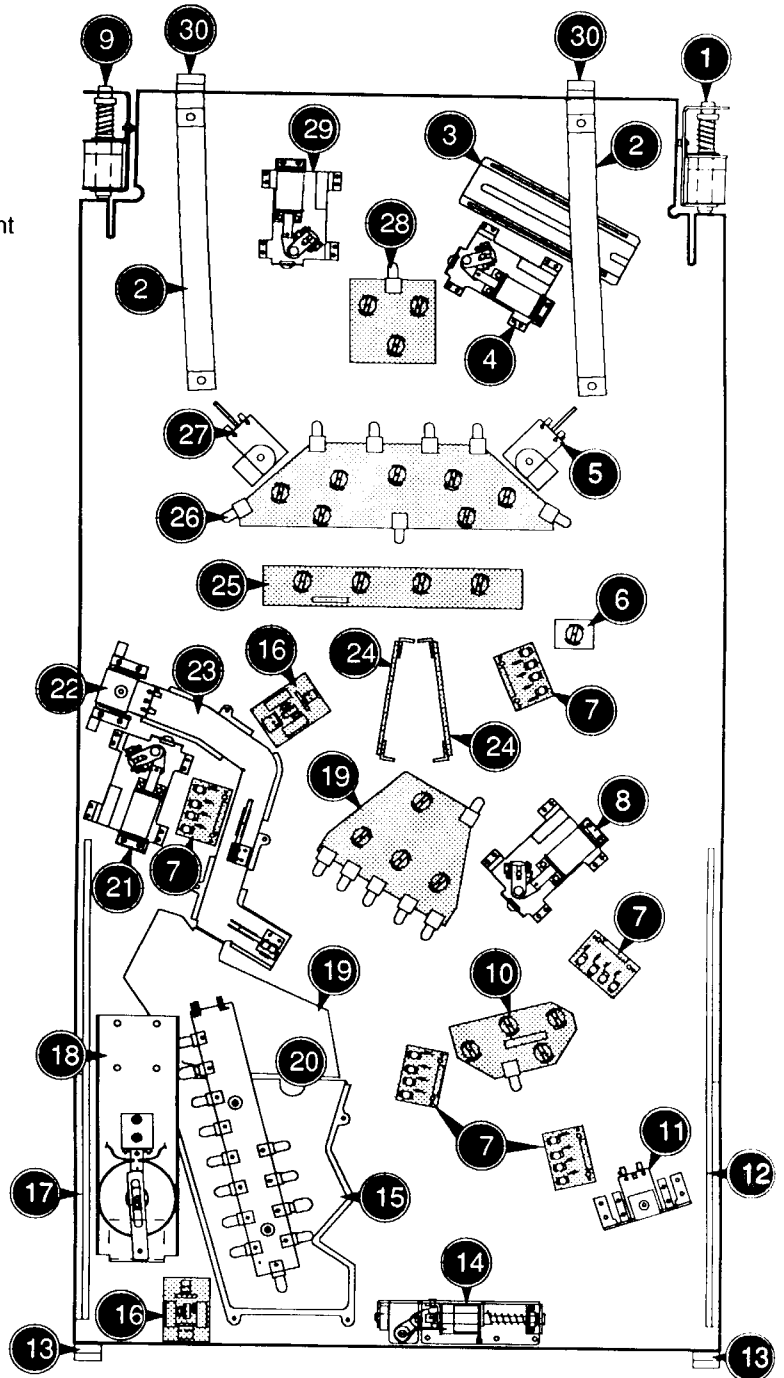
*Judge Dredd has a special hardcoat playfield and does not require a full mylar. However, mylars can be purchased through your local Bally Distributor (Part Number 03-7960-20020-1).

UPPER PLAYFIELD PARTS LOCATIONS



LOWER PLAYFIELD PARTS LOCATIONS

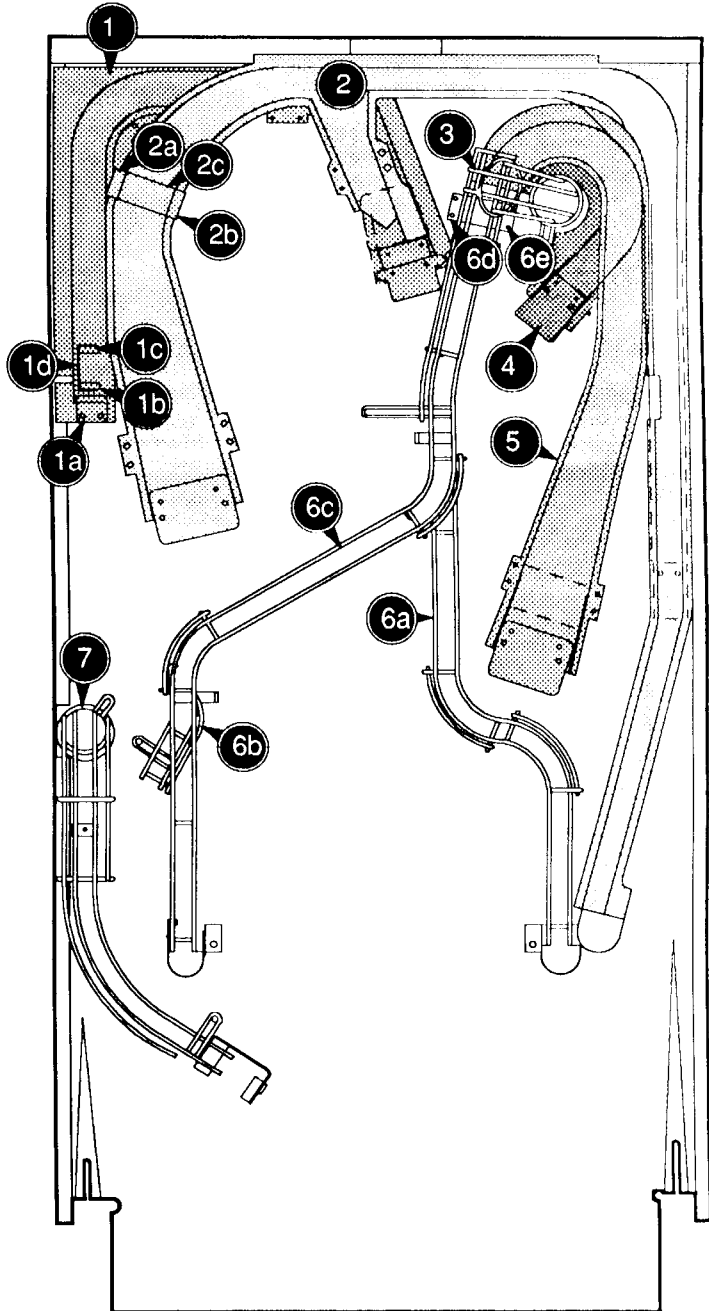
Item	Part Number	Description
1.	A-14525	Kicker Bracket Assembly
2.	01-11781	Leg Support (2 Used)
3.	A-16765	Outhole Ball Trough Assembly
4.	A-15205-R-2	Flipper Assembly, Lwr. Right
5.	B-12665	Kicker Arm (Slingshot) Assy., Right
	A-14369-R	Coil & Bracket Assembly
	10-128	Spring
	B-8284-1	Kicker Switch Assembly
6.	B-12224	Single Lamp Board
7.	A-16843	4-Lamp Board
8.	A-15205-R	Flipper Assembly, Upper Right
9.	A-16936	Kicker Bracket Assembly
10.	A-16841	5-Lamp Board
11.	A-15769	Ball Popper & Opto Assembly
12.	A-16637-2	Plfd. Slide Mechanism, Right
13.	01-10726	Rear Guide Leg (2 Used)
14.	A-16802	Divter Assembly
15.	A-16947	Trough Assembly
16.	A-15542	Motor EMI (2 Used)
17.	A-16637-1	Plfd. Slide Mechanism, Left
18.	A-17247	Lifter Assembly
19.	A-16968	Trough Assembly
20.	A-16478	Planet Assembly
21.	A-16976-L	Flipper Assembly, Upper Left
22.	A-16580	Ball Popper Assembly
23.	A-16833	Trought Assembly
24.	A-15576	7-Opto Switch Board (2 Used)
25.	A-16844	4-Lamp Board
26.	A-16839	14-Lamp Combo PCB
27.	B-12665	Kicker Arm (Slingshot) Assy., Left
	A-14369-L	Coil & Bracket Assembly
	10-128	Spring
	B-8284-1	Kicker Switch Assembly
28.	A-16929	4-Lamp Board
29.	A-15205-L-2	Flipper Assembly, Lwr. Left
30.	01-8419	Plfd. Hanger Bracket (2 Used)




Underside of Playfield, Viewed In Raised Position

RAMP LOCATIONS

Item	Part Number	Description
1.	A-17170	Ramp Assembly
a)	01-11424	Bracket
b)	A-16908	Opto LED Assembly-RTV
c)	A-16909	Opto Photo Trans.-RTV
d)	01-11784	Opto Switch Bracket
2.	A-17231	Ramp Assembly
a)	A-16908	Opto LED Assembly-RTV
b)	A-16909	Opto Photo Trans.-RTV
c)	01-12026	Opto Mounting Plate
3.	A-16932	Wire Ramp Assembly
4.	A-16579	Ramp Assembly
5.	A-16630	Ramp Assembly
6.	A-17132	Wire Ramp Assembly
7.	A-16987	Wire Ramp Assembly



LAMP MATRIX

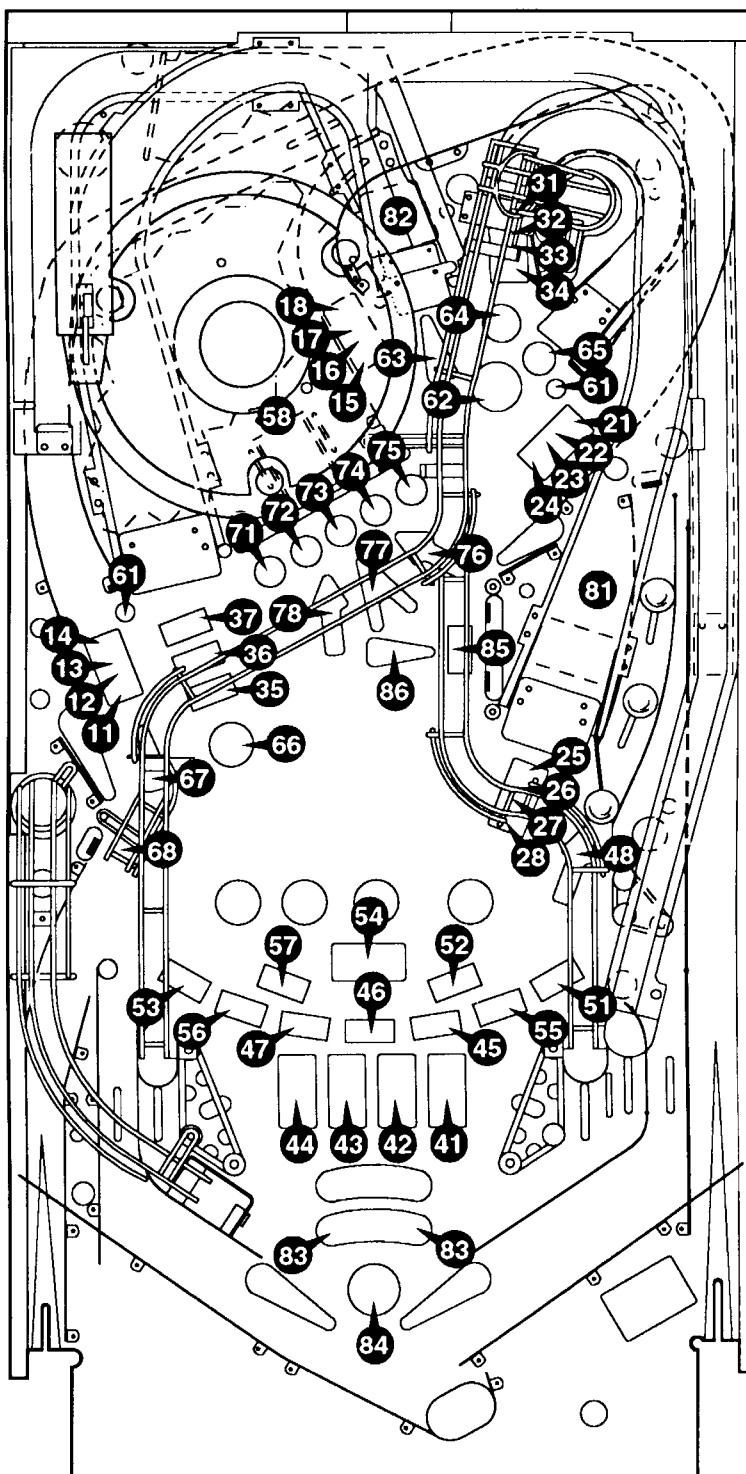
Yellow (B+)  Red

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	Perp 1 (White) 11	Perp 4 (White) 21	Perp 3 (White) 31	Crime Level 4 (White) 41	Stakeout 51	Right Extra Ball 61	Drop Target "J" 71	Award Stakeout 81
2 Red-Black J133-2 Q89	Perp 1 (Red) 12	Perp 4 (Red) 22	Perp 3 (Red) 32	Crime Level 3 (Red) 42	Safe-cracker 52	Right Start Feature 62	Drop Target "U" 72	Blackout Jackpot 82
3 Red-Orange J133-4 Q88	Perp 1 (Yellow) 13	Perp 4 (Yellow) 23	Perp 3 (Yellow) 33	Crime Level 2 (Yellow) 43	Pursuit 53	Tank Center 63	Drop Target "D" 73	Drain Shield 83
4 Red-Yellow J133-5 Q87	Perp 1 (Green) 14	Perp 4 (Green) 24	Perp 3 (Green) 34	Crime Level 1 (Green) 44	Ultimate Challenge 54	Award Sniper 64	Drop Target "G" 74	Judge Again 84
5 Red-Green J133-6 Q86	Perp 2 (White) 15	Perp 5 (White) 25	Lock 1 35	Meltdown 45	Manhunt 55	Air Raid 65	Drop Target "E" 75	Advance Crime Level 85
6 Red-Blue J133-7 Q85	Perp 2 (Red) 16	Perp 5 (Red) 26	Lock 2 36	Impersonator 46	Blackout 56	Left Center Feature 66	Award Safe-cracker 76	Tank Right 86
7 Red-Violet J133-8 Q84	Perp 2 (Yellow) 17	Perp 5 (Yellow) 27	Lock 3 37	Battle Tank 47	Sniper 57	Tank Left 67	Multi-ball Jackpot 77	Super Game 87
8 Red-Gray J133-9 Q83	Perp 2 (Green) 18	Perp 5 (Green) 28	Buy-In 38	Stop Meltdown 48	Pick A Prize 58	Mystery 68	Award Bad Impersonator 78	Start Button 88

J1XX = Power Driver Board

LAMP LOCATIONS

Item No.	Bulb No.	Lamp Assy. No.	Description
11	24-8768	A-16843	Perp 1 (White)
12	24-8768	A-16843	Perp 1 (Red)
13	24-8768	A-16843	Perp 1 (Yellow)
14	24-8768	A-16843	Perp 1 (Green)
15	24-8768	A-16843	Perp 2 (White)
16	24-8768	A-16843	Perp 2 (Red)
17	24-8768	A-16843	Perp 2 (Yellow)
18	24-8768	A-16843	Perp 2 (Green)
21	24-8768	A-16843	Perp 4 (White)
22	24-8768	A-16843	Perp 4 (Red)
23	24-8768	A-16843	Perp 4 (Yellow)
24	24-8768	A-16843	Perp 4 (Green)
25	24-8768	A-16843	Perp 5 (White)
26	24-8768	A-16843	Perp 5 (Red)
27	24-8768	A-16843	Perp 5 (Yellow)
28	24-8768	A-16843	Perp 5 (Green)
31	24-8768	A-16843	Perp 3 (White)
32	24-8768	A-16843	Perp 3 (Red)
33	24-8768	A-16843	Perp 3 (Yellow)
34	24-8768	A-16843	Perp 3 (Green)
35	24-6549	A-11754	Lock 1
36	24-6549	A-11271	Lock 2
37	24-6549	A-11754	Lock 3
38	---	20-9663-13	Buy-In
41	24-8768	A-16839	Crime Level 4 (White)
42	24-8768	A-16839	Crime Level 3 (Red)
43	24-8768	A-16839	Crime Level 2 (Yellow)
44	24-8768	A-16839	Crime Level 1 (Green)
45	24-8768	A-16839	Meltdown
46	24-8768	A-16839	Impersonator
47	24-8768	A-16839	Battle Tank
48	24-8768	B-12224	Stop Meltdown
51	24-8768	A-16839	Stakeout
52	24-8768	A-16839	Safecracker
53	24-8768	A-16839	Pursuit
54	24-8768	A-16839	Ultimate Challenge
55	24-8768	A-16839	Manhunt
56	24-8768	A-16839	Blackout
57	24-8768	A-16839	Sniper
58	24-6549	A-8882	Pick A Prize
61	24-8768	A-16841	Extra Ball (2)
62	24-8768	A-16841	Right Start Feature
63	24-8768	A-16841	Tank Center
64	24-8768	A-16841	Award Sniper
65	24-8768	A-16841	Air Raid
66	24-6549	A-11754	Left Center Feature
67	24-6549	A-11754	Tank Left
68	24-6549	A-11271	Mystery
71	24-8768	A-16840	Drop Target "J"
72	24-8768	A-16840	Drop Target "U"
73	24-8768	A-16840	Drop Target "D"
74	24-8768	A-16840	Drop Target "G"
75	24-8768	A-16840	Drop Target "E"
76	24-8768	A-16840	Award Safecracker
77	24-8768	A-16840	Multi-ball Jackpot
78	24-8768	A-16840	Award Bad Impersonator
81	24-6549	A-8882	Award Stakeout
82	24-6549	A-11754	Blackout Jackpot
83	24-8768	A-16929 (2)	Drain Shield
84	24-8768	A-16929	Judge Again
85	24-8768	A-16340	Advance Crime Level
86	24-8768	A-16340	Tank Right
87	---	20-9663-10	Super Game
88	---	20-9663-1	Start Button



88
87

38

Light bulb covers:
 03-8063-2 green
 03-8063-4 Red
 03-8063-5 White
 03-8063-6 Yellow

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

* Not Shown
 † Located Under Playfield

SWITCH MATRIX

Dedicated Grounded Switches	Column Row	White				Green				Flipper Grounded Switches
		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	
Orange-Brown (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	Left Fire Button 11	Slam Tilt 21	Buy-In (Extra Ball) 31	Right Ball Shooter 41	Left Sling (2) 51	Globe Position #1 61	Magnet Over Ring 71	Trough 1 81	Black-Green J906-1 Right Flipper End of Stroke F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	Right Fire Button 12	Front Door Closed 22	Not Used 32	Right Outlane 42	Right Sling (2) 52	Crane Exit 62	Top Right Opto 72	Trough 2 82	Blue-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	Credit (Start) 13	Ticket Dispenser 23	Left Rollover 33	Outside Right Return 43	Captive Ball 2 53	Left Ramp To Lock 63	Left Popper 73	Trough 3 83	Black-Blue J906-3 Left Flipper End of Stroke F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	Plumb Bob Tilt 14	Always Closed 24	Inside Right Return 34	Super Game 44	Drop Target "J" 54	Left Ramp Exit 64	Right Popper 74	Trough 4 84	Blue-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function Service Credits / Escape D5	5 White-Green J209-5 U19-11	Left Shoot Lane 15	Top Right Post 25	Top Center Rollover 35	Not Used 45	Drop Target "U" 55	Not Used 65	Top Ramp Exit 75	Trough 5 85	Black-Violet J906-4 Upper Right Flipper End of Stroke F5
Orange-Blue (6) J205-7 Normal Function Volume Down D6	6 White-Blue J209-7 U19-9	Left Outlane 16	Captive Ball 1 26	Left Score Post 36	Not Used 46	Drop Target "D" 56	Center Ramp Exit 66	Right Ramp Exit 76	Trough 6 86	Black-Yellow J905-3 Upper Right Flipper Opto F6
Orange-Violet (7) J205-8 Normal Function Volume Up D7	7 White-Violet J209-8 U19-5	Left Return Lane 17	Mystery 27	Subway Enter 1 37	Not Used 47	Drop Target "G" 57	Left Ramp Enter 67	Globe Position #2 77	Top Trough 87	Black-Gray J906-5 Upper Left Flipper End of Stroke F7
Orange-Gray (8) J205-9 Normal Function Begin Test, Enter D8	8 White-Gray J209-9 U19-7	3-Bank Targets 18	Not Used 28	Subway Enter 2 38	Not Used 48	Drop Target "E" 58	Captive Ball 3 68	Not Used 78	Not Used 88	Black-Blue J905-5 Upper Left Flipper Opto F8

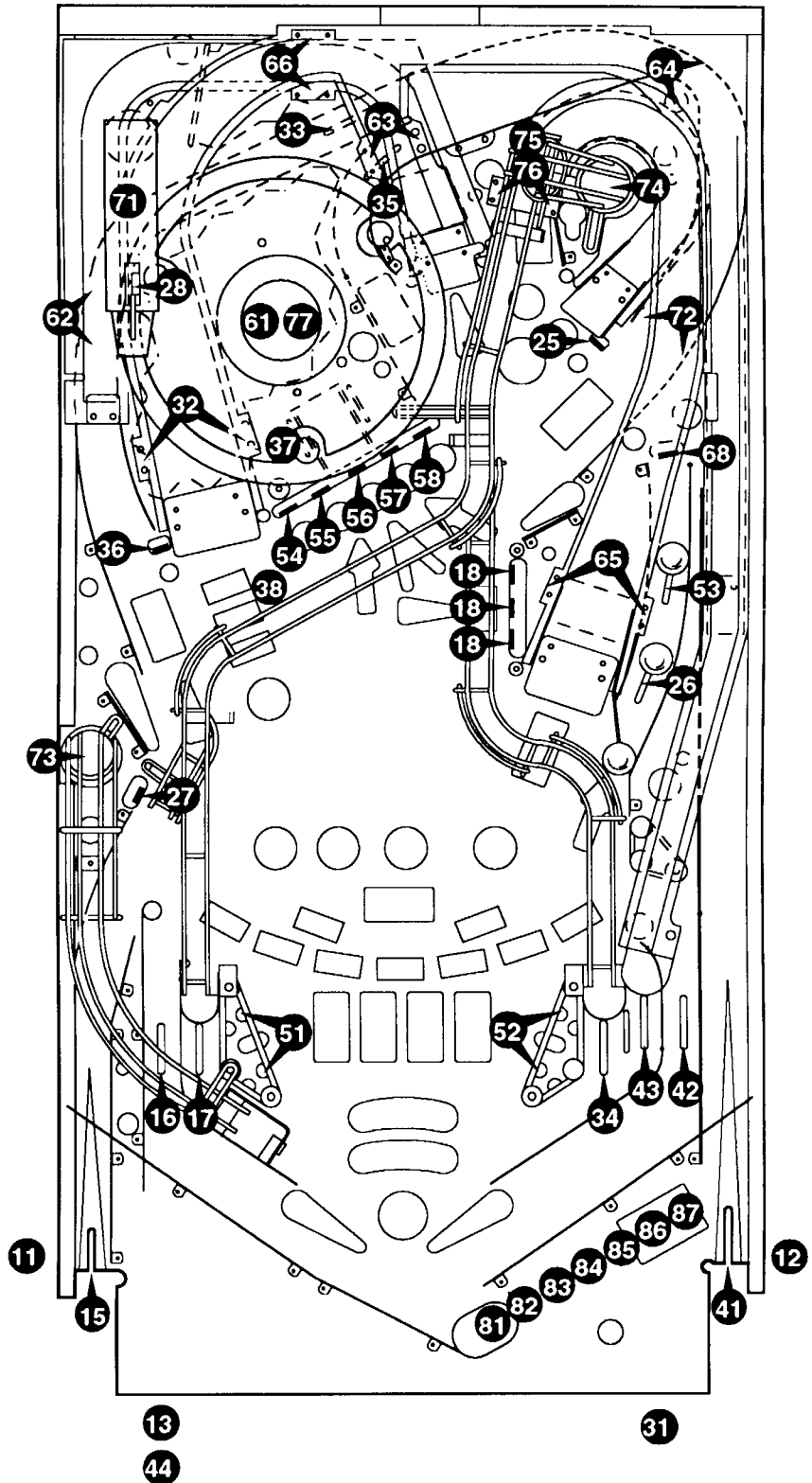
J2XX = CPU Board, J9XX = Fliptronic II Board □ = Opto, Typically Closed

SWITCH LOCATIONS

Item	Switch Part #	Where Used	Item	Switch Part #	Where Used
F1	SW-1A-194	*Lower Right Flipper EOS	25	A-16910-15	Top Right Post
F2	A-16384-1	*Lower Right Flipper Cabinet	26	5647-12693-19	Captive Ball 1
F3	SW-1A-194	*Lower Left Flipper EOS	27	A-14227-15	Mystery
F4	A-15894	*Lower Left Flipper Cabinet	28	---	Not Used
F5	SW-1A-194	*Upper Right Flipper EOS	31	20-9663-9	Buy-In (Extra Ball)
F6	A-16384-1	*Upper Right Flipper Cabinet	32	---	Not Used
F7	SW-1A-194	*Upper Left Flipper EOS	33	5647-12693-19	Left Rollover
F8	A-15894	*Upper Left Flipper Cabinet	34	5647-12693-19	Inside Right Return
11	20-9846-1	Left Fire Button	35	5647-12693-19	Top Center Rollover
12	20-9846-1	Right Fire Button	36	A-16910-15	Left Score Target
13	20-9663-1	Credit (Start)	37	5647-12693-13	†Subway Enter 1
14	A-15361	*Plumb Bob Tilt	38	5647-12693-13	†Subway Enter 2
15	5647-12693-19	Left Shoot Lane	41	5647-12693-19	Right Ball Shooter
16	5647-12693-19	Left Outlane	42	5647-12693-19	Right Outlane
17	5647-12693-19	Left Return Lane	43	5647-12693-19	Outside Right Return
18	A-14227-15	3-bank Targets	44	20-9663-13	Super Game
21	SW-1A-117	*Slam Tilt	45	---	Not Used
22	5643-09288-00	*Front Door Closed	46	---	Not Used
23	---	*Ticket Dispenser	47	---	Not Used
24	5643-09288-00	*Closed	48	---	Not Used

SWITCH LOCATIONS Continued

Item	Switch Part #	Where Used
51	SW-1A-114	Left Sling (Kicker)
	SW-1A-120	(Score)
52	SW-1A-114	Right Sling (Kicker)
	SW-1A-120	(Score)
53	5647-12693-19	Captive Ball 2
54	A-16486	Drop Target 'J'
55	A-16486	Drop Target 'U'
56	A-16486	Drop Target 'D'
57	A-16486	Drop Target 'G'
58	A-16486	Drop Target 'E'
61	A-16598	*Globe Position #1
62	A-14231 (LED)	Left Ramp Enter
	A-14232 (Trans.)	
63	A-14231 (LED)	Left Ramp To Lock
	A-14232 (Trans.)	
64	A-14231 (LED)	Left Ramp Exit
	A-14232 (Trans.)	
65	---	Not Used
66	A-14231 (LED)	Center Ramp Exit
	A-14232 (Trans.)	
67	A-14231 (LED)	Left Ramp Enter
	A-14232 (Trans.)	
68	A-14227-15	Captive Ball 3
71	A-14231 (LED)	†Magnet Over Ring
	A-14232 (Trans.)	
72	A-14231 (LED)	Top Right Opto
	A-14232 (Trans.)	
73	A-14231 (LED)	Left Popper
	A-14232 (Trans.)	
74	A-14231 (LED)	Right Popper
	A-14232 (Trans.)	
75	A-14231 (LED)	Top Ramp Exit
	A-14232 (Trans.)	
76	A-14231 (LED)	Right Ramp Exit
	A-14232 (Trans.)	
77	A-16598	*Globe Position #2
78	---	Not Used
81	A-16926 (Trans.)	Trough 1
	A-16927 (LED)	
82	A-16926 (Trans.)	Trough 2
	A-16927 (LED)	
83	A-16926 (Trans.)	Trough 3
	A-16927 (LED)	
84	A-16926 (Trans.)	Trough 4
	A-16927 (LED)	
85	A-16926 (Trans.)	Trough 5
	A-16927 (LED)	
86	A-16926 (Trans.)	Trough 6
	A-16927 (LED)	
87	A-16926 (Trans.)	Top Trough
	A-16927 (LED)	
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	Globe Magnet	High Power	J130-1			Q82	J107-3			Vio-Brn	A-12158-1	
02	Left Popper	High Power	J130-2			Q80	J107-3			Vio-Red	AE-26-1200	
03	Right Popper	High Power	J130-4			Q78	J107-3			Vio-Org	AE-23-800	
04	Globe Arm	High Power	J130-5			Q76	J118-2			Vio-Yel	14-7989	
05	Reset Drop Target	High Power	J130-6			Q64	J107-3			Vio-Grn	AE-24-900	
06	Globe Motor	High Power	J130-7			Q66	J118-2			Vio-Blu	14-7985	
07	Knocker	High Power	J130-8			Q68	J107-3			Vio-Blk	AE-23-800	
08	Right Shooter	High Power	J130-9			Q70	J107-3			Vio-Gry	AE-23-800	
09	Left Shooter	Low Power	J127-1			Q58	J107-2			Brn-Blk	AE-23-800	
10	Trip Drop Target	Low Power	J127-3			Q56	J107-2			Brn-Red	AE-27-1200	
11	Diverter	Low Power	J127-4			Q54	J107-2			Brn-Org	AE-25-1000	
12	Not Used	Low Power	---			Q52	---			Brn-Yel	---	
13	Trough	Low Power	J127-6			Q50	J107-2			Brn-Grn	AE-26-1500	
14	Not Used	Low Power	---			Q48	---			Brn-Blu	---	
15	Left Slingshot	Low Power	J127-8			Q46	J107-2			Brn-Vio	AE-27-1200	
16	Right Slingshot	Low Power	J127-9			Q44	J107-2			Brn-Gry	AE-27-1200	
17	Judge Fire Flashers	Flasher	J126-1	J125-1		Q42	J107-6	J106-5		Blk-Brn	24-8802 (1)	24-8802 (1)
18	Judge Fear Flashers	Flasher	J126-2	J125-2		Q40	J107-6	J106-5		Blk-Red	24-8802 (1)	24-8802 (1)
19	Judge Death Flashers	Flasher	J126-3	J125-3		Q38	J107-6	J106-5		Blk-Org	24-8802 (1)	24-8802 (1)
20	Judge Mortis Flashers	Flasher	J126-4	J125-5		Q36	J107-6	J106-5		Blk-Yel	24-8802 (1)	24-8802 (1)
21	Pursuit Left Flashers	Flasher	J126-5	J125-6		Q28	J107-6	J106-5		Blu-Grn	24-8802 (2)	24-8802 (1)
22	Pursuit Right Flashers	Flasher	J126-6	J125-7		Q30	J107-6	J106-5		Blu-Blk	24-8802 (2)	24-8802 (1)
23	Blackout Flashers	Flasher	J126-7	J125-8		Q34	J107-6	J106-5		Blu-Vio	24-8802 (1)	24-8802 (2)
24	Cursed Earth Flashers	Flasher	J126-8	---		Q32	J107-6	---		Blu-Gry	24-8802 (2)	---
25	Lower Left Flashers	Gen. Purpose	J122-1	J124-1		Q26	J107-6	J106-5		Blu-Brn	24-8704 (2)	24-8802 (2)
26	Globe Flashers	Gen. Purpose	J122-2	J124-2		Q24	J107-6	J106-5		Blu-Red	24-8802 (1)	24-8802 (2)
27	Right Ramp Flashers	Gen. Purpose	J122-3	J124-3		Q22	J107-6	J106-5		Blu-Org	24-8704 (2)	24-8802 (1)
28	Insert Flashers	Gen. Purpose	---	J124-5		Q20	---	J106-5		Blu-Yel	---	24-8802 (3)
General Illumination												
01	String 1	G.I.	J-120-1	J-121-1		Q18	J-120-7	J-121-6		Wht-Brn	24-6549	24-8768
02	String 2	G.I.	J-120-2	J-121-2		Q10	J-120-8	J-121-8		Wht-Org	24-8768	24-8768
03	String 3	G.I.	J-120-3	J-121-3		Q14	J-120-9	J-121-7		Wht-Yel	24-6549	24-8768
04	String 4	G.I.	J-120-5	J-121-5		Q16	J-120-10	J-121-10		Wht-Grn	24-8768	24-8768
05	String 5	G.I.	J-121-6	---		Q12	J-120-11	---		Wht-Vio	24-8768	---
Flipper Circuits												
	Function	Voltage Connections	Drive Transistors		Drive Connections	Drive Wire Colors		Coil Part Number	Coil Colors			
			Power	Hold		Power	Hold					
	Lower Left Flipper	Lwr. Lt. Power	J907-7 (Gry-Yel)	Q3	J902-9	Blu-Gry		FL-11629	BLUE			
		Lwr. Lt. Hold	J907-7 (Gry-Yel)		Q9	J902-7	Org-Blu					
	Lower Right Flipper	Lwr. Rt. Power	J907-9 (Blu-Yel)	Q4	J902-13	Blu-Vio		FL-11629	BLUE			
		Lwr. Rt. Hold	J907-9 (Blu-Yel)		Q11	J902-11	Org-Grn					
	Upper Left Flipper	Up Lt. Power	J907-1 (Gry-Yel)	Q1	J902-3	Blk-Blu		FL-11629	BLUE			
		Up Lt. Hold	J907-1 (Gry-Yel)		Q5	J902-1	Org-Gry					
	Upper Right Flipper	Up Rt. Power	J907-4 (Blu-Yel)	Q2	J902-6	Blk-Yel		FL-11630	RED			
		Up Rt. Hold	J907-4 (Blu-Yel)		Q7	J902-4	Org-Vio					

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	Coil/Flasher Number	Assembly Number	Description
01	A-12158-1	A-16769	Globe Magnet
02	AE-26-1200	A-16580	Left Popper
03	AE-23-800	A-15769	Right Popper
04	14-7989	A-16678	Globe Arm
05	AE-24-900	A-16947	†Reset Drop Targets
06	14-7985	A-16478	†Globe Motor
07	AE-23-800	B-16086-1	*Knocker
08	AE-23-800	A-14525	Right Shooter
09	AE-23-800	A-16936	Left Shooter
10	AE-27-1200	A-16445	†Trip Drop Target
11	AE-25-1000	A-16802	†Diverter
12	---	---	Not Used
13	AE-26-1500	A-16765	Trough
14	---	---	Not Used
15	AE-27-1200	A-14369-L	Left Slingshot
16	AE-27-1200	A-14369-R	Right Slingshot
17	24-8802	A-16844	Judge Fire Flashers (2)
18	24-8802	A-16844	Judge Fear Flashers (2)
19	24-8802	A-16844	Judge Death Flashers (2)
20	24-8802	A-16844	Judge Mortis Flashers (2)
21	24-8802	A-12336-1	Pursuit Left Flashers (3)
22	24-8802	A-12336-1	Pursuit Right Flashers (3)
23	24-8802	A-16929	Blackout Flashers (3)
24	24-8802	†A-16891	Cursed Earth Flashers (2)
25	24-8704	A-8798	Lower Left Flashers (4)
	24-8802	---	
26	24-8802	A-16475	†Globe Flashers (3)
27	24-8704	A-8798	Right Ramp Flashers (3)
	24-8802	---	
28	24-8802	---	*Insert Flashers (3)

General Illumination Circuits

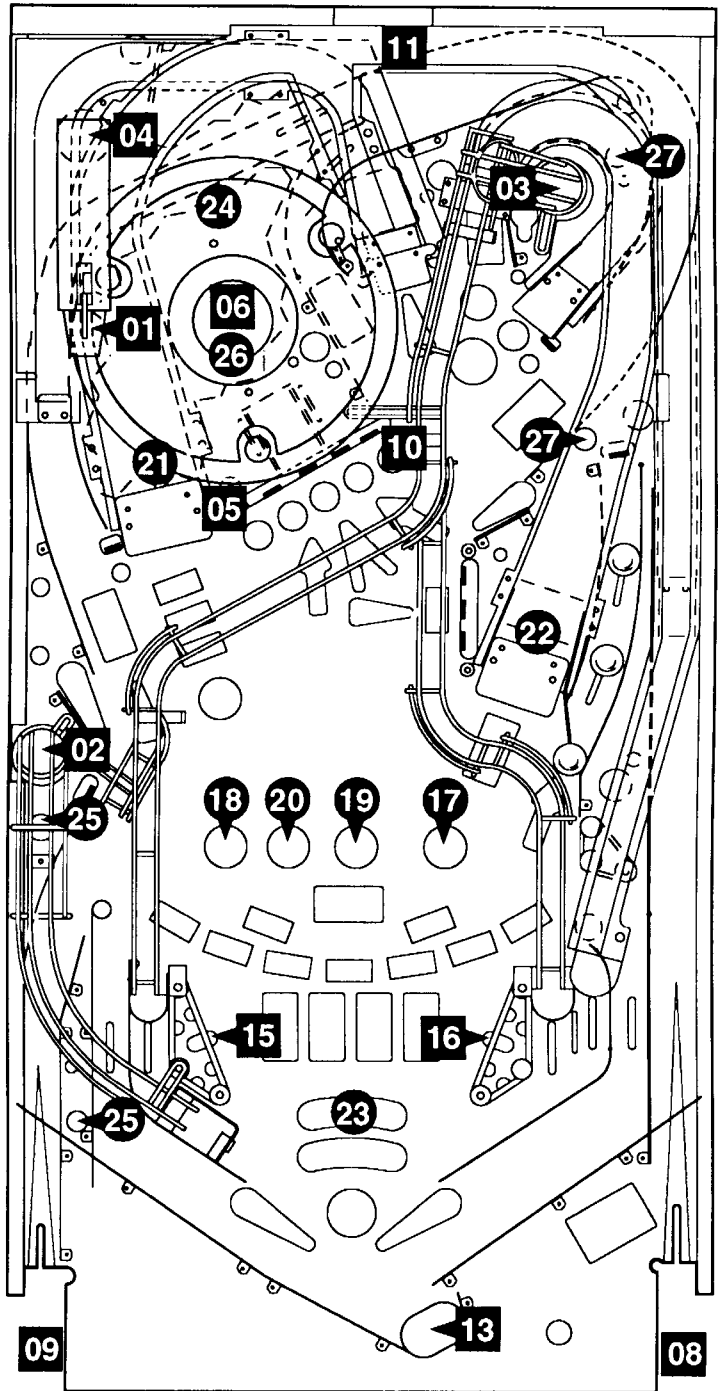
*01	String 1	24-6549, 24-8768	GI String 1
*02	String 2	24-8768	GI String 2
*03	String 3	24-6549, 24-8768	GI String 3
*04	String 4	24-8768	GI String 4
*05	String 5	24-8768	GI String 5

Flipper Coils

Flipper Coils	Assembly	Description
*FL-11629 (Blue)	A-15205-L-2	Lower Left Flipper
*FL-11629 (Blue)	A-15205-R-2	Lower Right Flipper
*FL-11629 (Blue)	A-16976-L	Upper Left Flipper
*FL-11630 (Red)	A-15205-R	Upper Right Flipper

*Not Shown

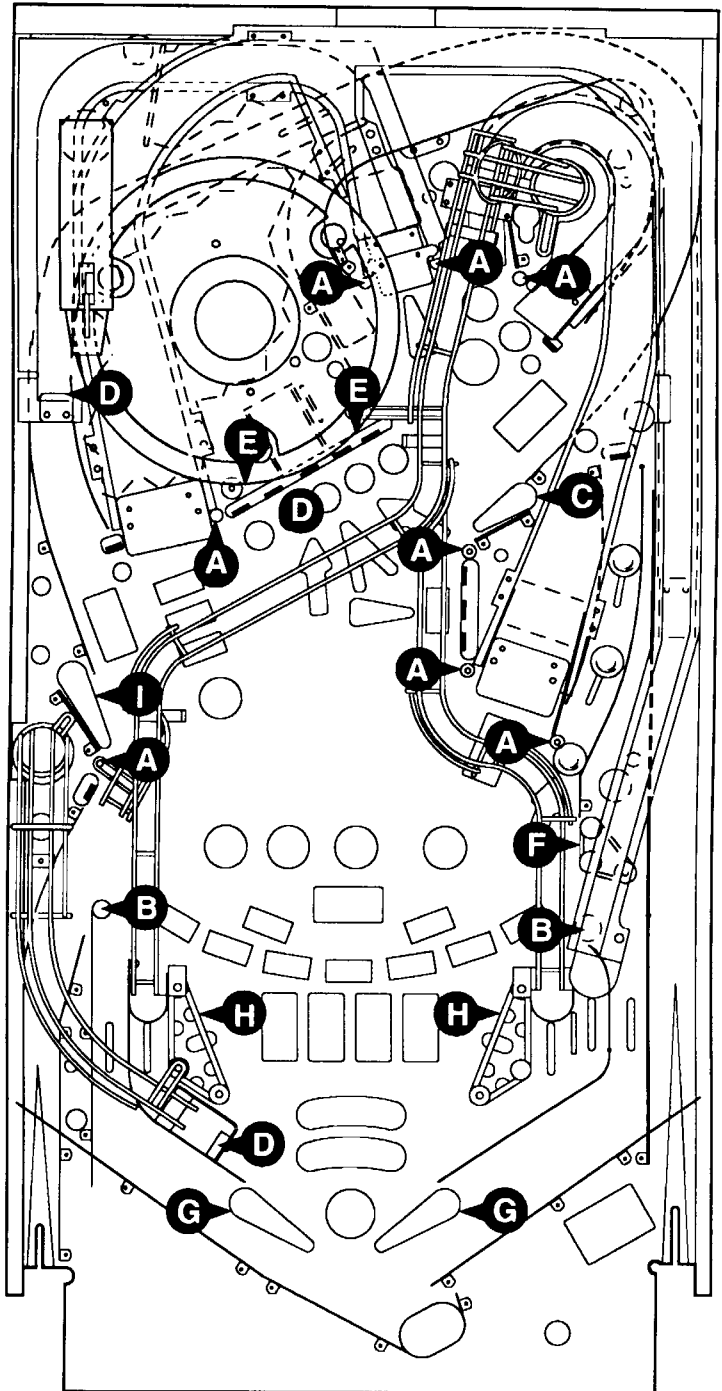
†Located Under Playfield



■ Square indicates coil, P.C.B. or Magnet
● Circle indicates flasher

RUBBER PARTS

<u>ITEM</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
A.	23-6556	Black Bumper Sleeve	8
B.	23-6641	Rubber Bumper	2
C.	23-6696	1" Black Flipper Rubber	1
D.	23-6686	Round Rubber Pad	3
E.	23-6694-5	3/4" Black Ring	4
F.	23-6694-6	1" Black Ring	1
G.	23-6694-10	2 1/2" Black Ring	2
H.	23-6695	1 1/2" Black Flipper Rubber	3



Game Wiring and Schematics

CONNECTOR & COMPONENT IDENTIFICATION

Each plug or jack-except the Audio Board and Dot Matrix Display/Driver Board-receives a number that identifies the circuit board and position on that board that it connects to. J-designations refer to the male part of a connector. P-designations refer to the female part of a connector. For example, J101 designates jack 1 of board 1 (a Power Driver Board 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 numbers for the WPC circuit boards are listed below.

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

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

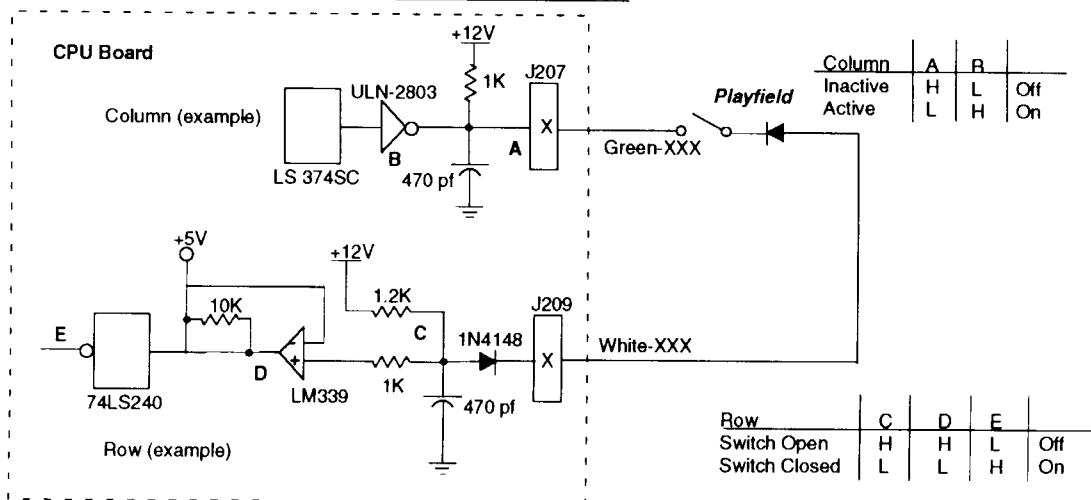
Schematics for standard WPC backbox boards are found in the WPC Schematics Manual. Playfield, cabinet, and all other backbox board schematics are found in this section.

SWITCHES

Dedicated Grounded Switches	Column / Row	White $\xrightarrow{\quad}$ $\xrightarrow{\quad}$ Green								Flipper Grounded Switches
		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 J207-8 U20-11	
Orange-Brown (1) J205-1 Left Coin Chute D1	1 White-Brown J209-1 U18-11	Left Fire Button	Slam Tilt	Buy-In (Extra Ball)	Right Ball Shooter	Left Sling (2)	Globe Position #1	Magnet Over Ring	Trough 1	Black-Green J906-1 Right Flipper End of Stroke F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	Right Fire Button	Front Door Closed	Not Used	Right Outlane	Right Sling (2)	Crane Exit	Top Right Opto	Trough 2	Blue-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	Credit (Start)	Ticket Dispenser	Left Rollover	Outside Right Return	Captive Ball 2	Left Ramp To Lock	Left Popper	Trough 3	Black-Blue J906-3 Left Flipper End of Stroke F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	Plumb Bob Tilt	Always Closed	Inside Right Return	Super Game	Drop Target "J"	Left Ramp Exit	Right Popper	Trough 4	Blue-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function Service Credits Escape D5	5 White-Green J209-5 U19-11	Left Shoot Lane	Top Right Post	Top Center Rollover	Not Used	Drop Target "U"	Not Used	Top Ramp Exit	Trough 5	Black-Violet J906-4 Upper Right Flipper End of Stroke F5
Orange-Blue (6) J205-7 Normal Function Volume Down D6	6 White-Blue J209-7 U19-9	Left Outlane	Captive Ball 1	Left Score Post	Not Used	Drop Target "D"	Center Ramp Exit	Right Ramp Exit	Trough 6	Black-Yellow J905-3 Upper Right Flipper Opto F6
Orange-Violet (7) J205-8 Normal Function Volume Up Up D7	7 White-Violet J209-8 U19-5	Left Return Lane	Mystery	Subway Enter 1	Not Used	Drop Target "G"	Left Ramp Enter	Globe Position #2	Top Trough	Black-Gray J906-5 Upper Left Flipper End of Stroke F7
Orange-Gray (8) J205-9 Normal Function Begin Test/Enter D8	8 White-Gray J209-9 U19-7	3-Bank Targets	Not Used	Subway Enter 2	Not Used	Drop Target "E"	Captive Ball 3	Not Used	Not Used	Black-Blue J905-5 Upper Left Flipper Opto F8

J2XX = CPU Board, J9XX = Flitronic II Board = Opto, Typically Closed

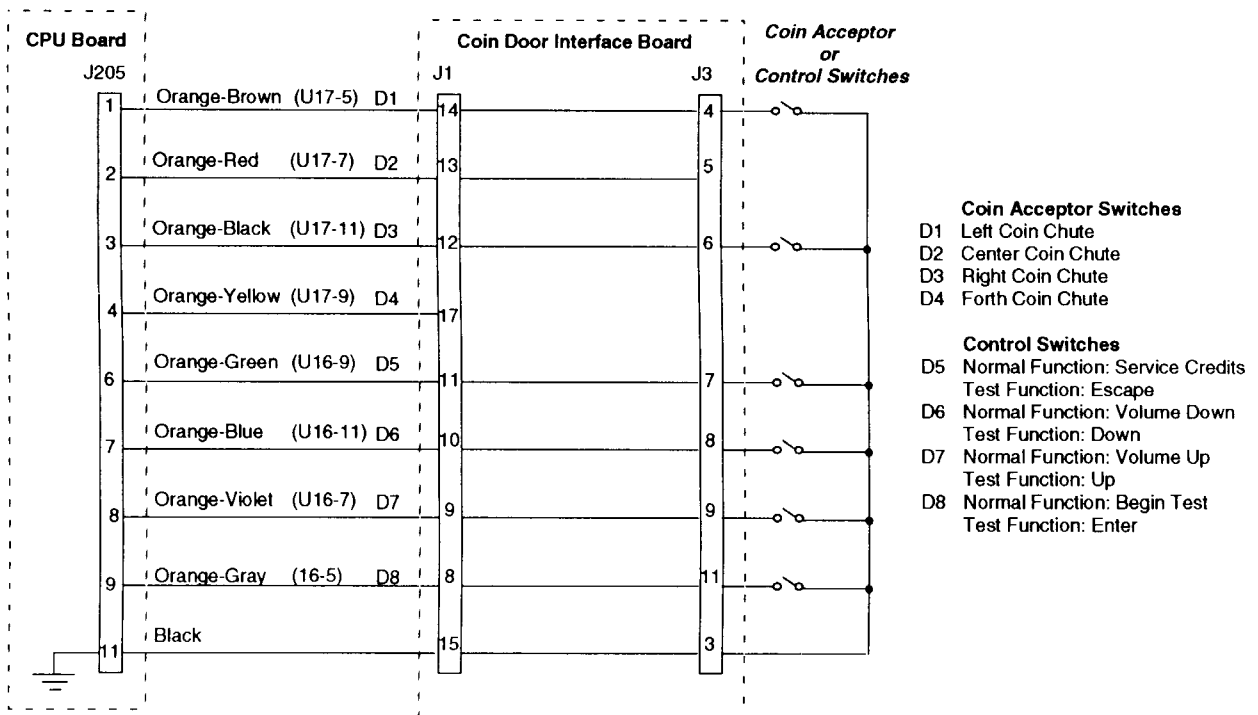
SWITCH MATRIX CIRCUIT



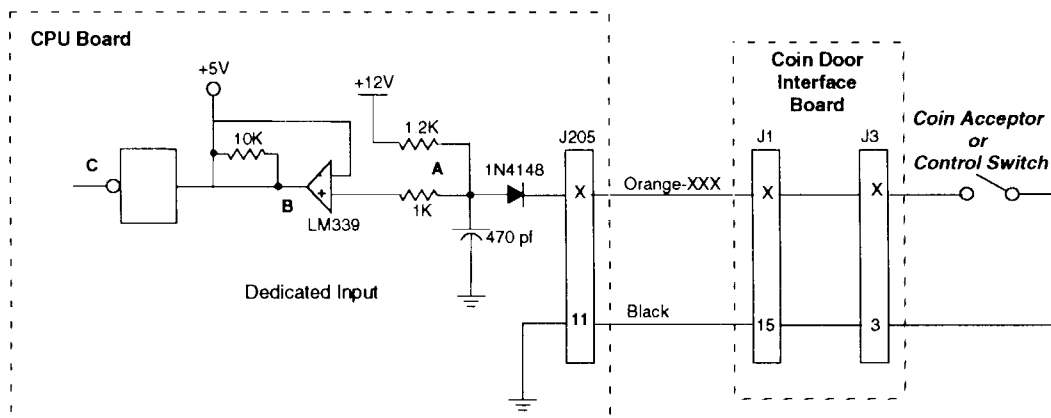
The microprocessor is constantly strobing the column side of the switch. When point "A" on the column circuit toggles low the column side is active.

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 above +5V, its output is high and the row is inactive.

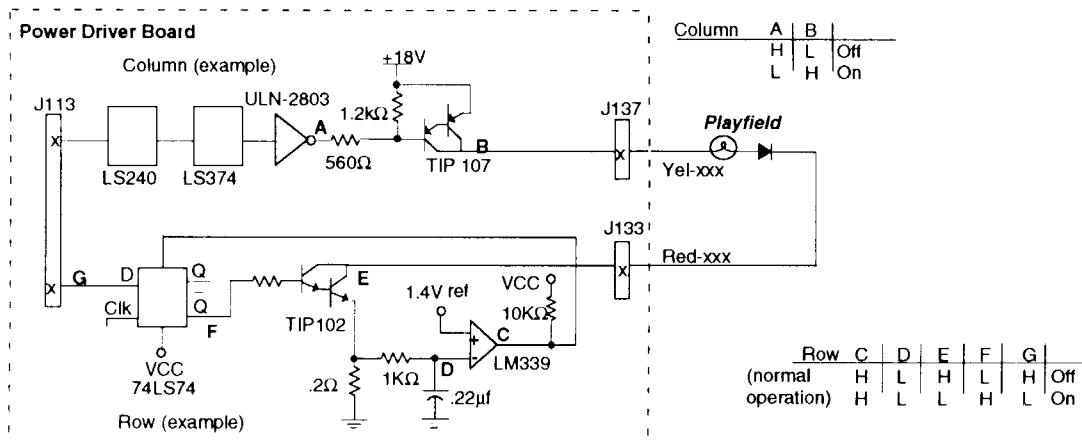
LAMPS

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	Perp 1 (White) 11	Perp 4 (White) 21	Perp 3 (White) 31	Crime Level 4 (White) 41	Stakeout 51	Right Extra Ball 61	Drop Target "J" 71	Award Stakeout 81
2 Red-Black J133-2 Q89	Perp 1 (Red) 12	Perp 4 (Red) 22	Perp 3 (Red) 32	Crime Level 3 (Red) 42	Safe-cracker 52	Right Start Feature 62	Drop Target "U" 72	Blackout Jackpot 82
3 Red-Orange J133-4 Q88	Perp 1 (Yellow) 13	Perp 4 (Yellow) 23	Perp 3 (Yellow) 33	Crime Level 2 (Yellow) 43	Pursuit 53	Tank Center 63	Drop Target "D" 73	Drain Shield 83
4 Red-Yellow J133-5 Q87	Perp 1 (Green) 14	Perp 4 (Green) 24	Perp 3 (Green) 34	Crime Level 1 (Green) 44	Ultimate Challenge 54	Award Sniper 64	Drop Target "G" 74	Judge Again 84
5 Red-Green J133-6 Q86	Perp 2 (White) 15	Perp 5 (White) 25	Lock 1 35	Meltdown 45	Manhunt 55	Air Raid 65	Drop Target "E" 75	Advance Crime Level 85
6 Red-Blue J133-7 Q85	Perp 2 (Red) 16	Perp 5 (Red) 26	Lock 2 36	Impersonator 46	Blackout 56	Left Center Feature 66	Award Safe-cracker 76	Tank Right 86
7 Red-Violet J133-8 Q84	Perp 2 (Yellow) 17	Perp 5 (Yellow) 27	Lock 3 37	Battle Tank 47	Sniper 57	Tank Left 67	Multi-ball Jackpot 77	Super Game 87
8 Red-Gray J133-9 Q83	Perp 2 (Green) 18	Perp 5 (Green) 28	Buy-In 38	Stop Meltdown 48	Pick A Prize 58	Mystery 68	Award Bad Impersonator 78	Start Button 88

J1XX = Power Driver Board

LAMP MATRIX CIRCUIT



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

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

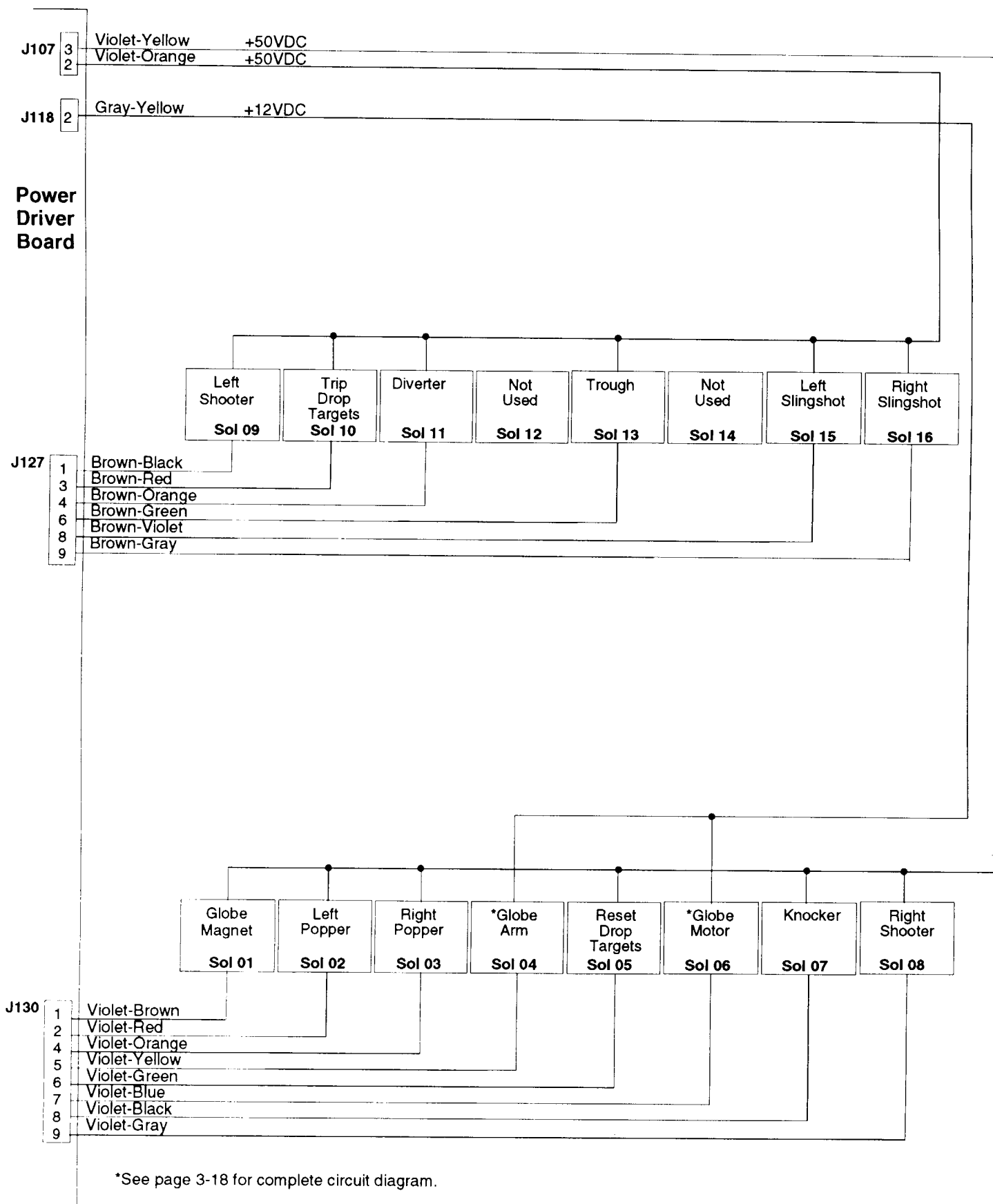
In overcurrent conditions the lamp is shut Off through the comparator. If the voltage at the negative input of the LM339 rises above 1.4V the output changes to a low, which is fed back to the 74LS74 and shuts the row circuit Off.

SOLENOID / FLASHER TABLE

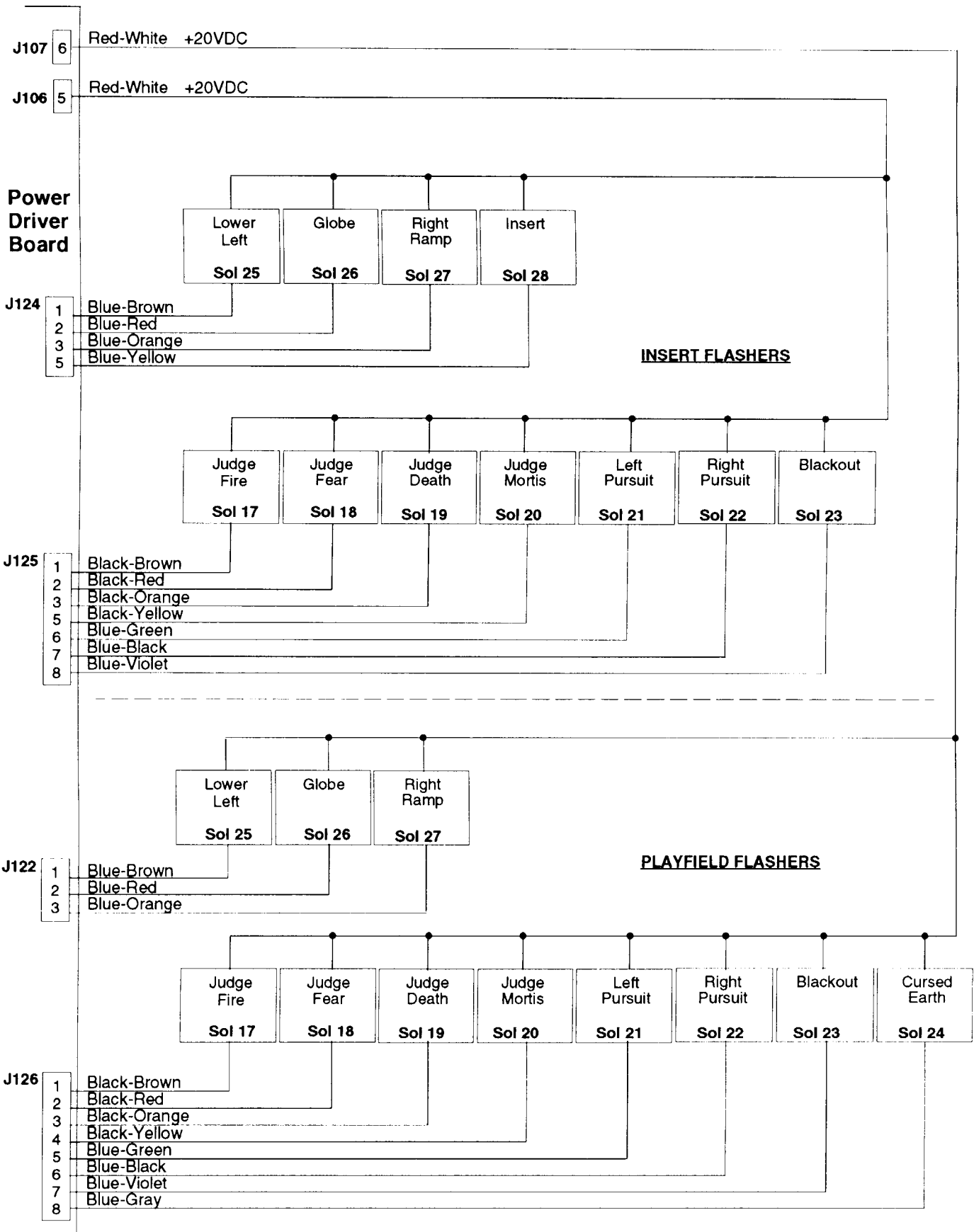
Sol. No.	Function	Solenoid Type	Voltage Connections			Drive xister	Drive Connections			Drive Wire Color	Solenoid Part Number Flashlamp Type		
			Playfield	Backbox	Cabinet		Playfield	Backbox	Cabinet		Playfield	Backbox	
01	Globe Magnet	High Power	J130-1			Q82	J107-3			Vio-Brn	A-12158-1		
02	Left Popper	High Power	J130-2			Q80	J107-3			Vio-Red	AE-26-1200		
03	Right Popper	High Power	J130-4			Q78	J107-3			Vio-Org	AE-23-800		
04	Globe Arm	High Power	J130-5			Q76	J118-2			Vio-Yel	14-7989		
05	Reset Drop Target	High Power	J130-6			Q64	J107-3			Vio-Grn	AE-24-900		
06	Globe Motor	High Power	J130-7			Q66	J118-2			Vio-Blu	14-7985		
07	Knocker	High Power	J130-8			Q68	J107-3			Vio-Blk	AE-23-800		
08	Right Shooter	High Power	J130-9			Q70	J107-3			Vio-Gry	AE-23-800		
09	Left Shooter	Low Power	J127-1			Q58	J107-2			Brn-Blk	AE-23-800		
10	Trip Drop Target	Low Power	J127-3			Q56	J107-2			Brn-Red	AE-27-1200		
11	Diverter	Low Power	J127-4			Q54	J107-2			Brn-Org	AE-25-1000		
12	Not Used	Low Power	---			Q52	---			Brn-Yel	---		
13	Trough	Low Power	J127-6			Q50	J107-2			Brn-Grn	AE-26-1500		
14	Not Used	Low Power	---			Q48	---			Brn-Blu	---		
15	Left Slingshot	Low Power	J127-8			Q46	J107-2			Brn-Vio	AE-27-1200		
16	Right Slingshot	Low Power	J127-9			Q44	J107-2			Brn-Gry	AE-27-1200		
17	Judge Fire Flashers	Flasher	J126-1	J125-1		Q42	J107-6	J106-5		Blk-Brn	24-8802 (1)	24-8802 (1)	
18	Judge Fear Flashers	Flasher	J126-2	J125-2		Q40	J107-6	J106-5		Blk-Red	24-8802 (1)	24-8802 (1)	
19	Judge Death Flashers	Flasher	J126-3	J125-3		Q38	J107-6	J106-5		Blk-Org	24-8802 (1)	24-8802 (1)	
20	Judge Mortis Flashers	Flasher	J126-4	J125-5		Q36	J107-6	J106-5		Blk-Yel	24-8802 (1)	24-8802 (1)	
21	Pursuit Left Flashers	Flasher	J126-5	J125-6		Q28	J107-6	J106-5		Blu-Grn	24-8802 (2)	24-8802 (1)	
22	Pursuit Right Flashers	Flasher	J126-6	J125-7		Q30	J107-6	J106-5		Blu-Blk	24-8802 (2)	24-8802 (1)	
23	Blackout Flashers	Flasher	J126-7	J125-8		Q34	J107-6	J106-5		Blu-Vio	24-8802 (1)	24-8802 (2)	
24	Cursed Earth Flashers	Flasher	J126-8	---		Q32	J107-6	---		Blu-Gry	24-8802 (2)	---	
25	Lower Left Flashers	Gen. Purpose	J122-1	J124-1		Q26	J107-6	J106-5		Blu-Brn	24-8704 (2)	24-8802 (2)	
26	Globe Flashers	Gen. Purpose	J122-2	J124-2		Q24	J107-6	J106-5		Blu-Red	24-8802 (1)	24-8802 (2)	
27	Right Ramp Flashers	Gen. Purpose	J122-3	J124-3		Q22	J107-6	J106-5		Blu-Org	24-8704 (2)	24-8802 (1)	
28	Insert Flashers	Gen. Purpose	---	J124-5		Q20	---	J106-5		Blu-Yel	---	24-8802 (3)	
General Illumination													
01	String 1	G.I.	J-120-1	J-121-1		Q18	J-120-7	J-121-6		Wht-Brn	24-6549	24-8768	
02	String 2	G.I.	J-120-2	J-121-2		Q10	J-120-8	J-121-8		Wht-Org	24-8768	24-8768	
03	String 3	G.I.	J-120-3	J-121-3		Q14	J-120-9	J-121-7		Wht-Yel	24-6549	24-8768	
04	String 4	G.I.	J-120-5	J-121-5		Q16	J-120-10	J-121-10		Wht-Grn	24-8768	24-8768	
05	String 5	G.I.	J-121-6	---		Q12	J-120-11	---		Wht-Vio	24-8768	---	
Flipper Circuits													
		Voltage Connections			Drive Transistors		Drive Connections		Drive Wire Colors		Coil Part Number	Coil Colors	
		Playfield	Backbox	Cabinet	Power	Hold	Playfield	Backbox	Power	Hold			
	Lower Left Flipper	Lwr. Lt. Power	J907-7 (Gry-Yel)			Q3		J902-9		Blu-Gry		FL-11629	BLUE
		Lwr. Lt. Hold	J907-7 (Gry-Yel)			Q9		J902-7		Org-Blu			
	Lower Right Flipper	Lwr. Rt. Power	J907-9 (Blu-Yel)			Q4		J902-13		Blu-Vio		FL-11629	BLUE
		Lwr. Rt. Hold	J907-9 (Blu-Yel)			Q11		J902-11		Org-Grn			
	Upper Left Flipper	Up Lt. Power	J907-1 (Gry-Yel)			Q1		J902-3		Blk-Blu		FL-11629	BLUE
		Up Lt. Hold	J907-1 (Gry-Yel)			Q5		J902-1		Org-Gry			
	Upper Right Flipper	Up Rt. Power	J907-4 (Blu-Yel)			Q2		J902-6		Blk-Yel		FL-11630	RED
		Up Rt. Hold	J907-4 (Blu-Yel)			Q7		J902-4		Org-Vio			

J1XX = Power Driver Board; J9XX - Fliptronic II Board; 24-6549 = #44 Bulb; 24-8704 = #89 Bulb; 24-8768 = #555 Bulb; 24-8802 = #906 Bulb

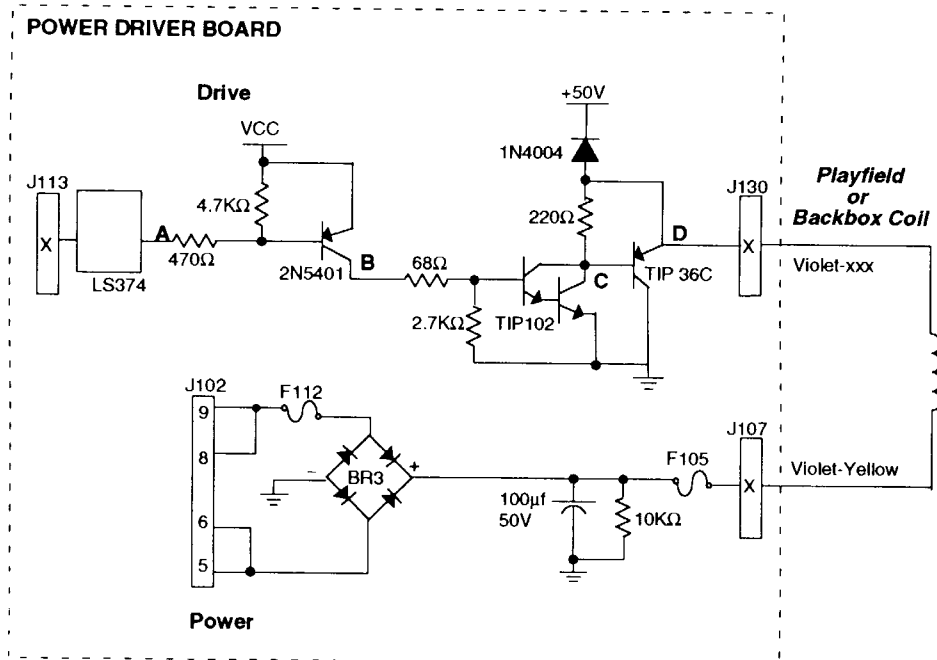
SOLENOID WIRING



FLASHER WIRING

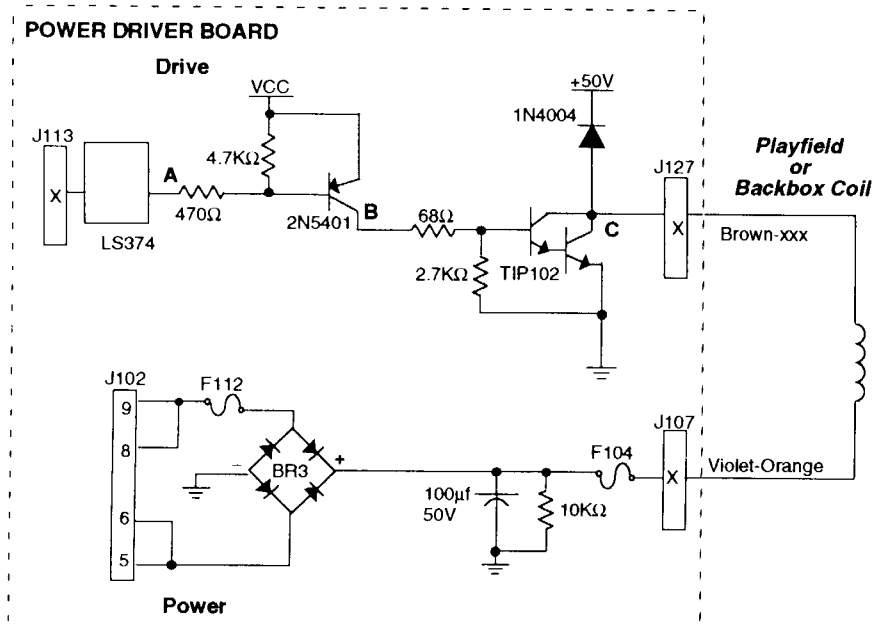


High Power Solenoid Circuit



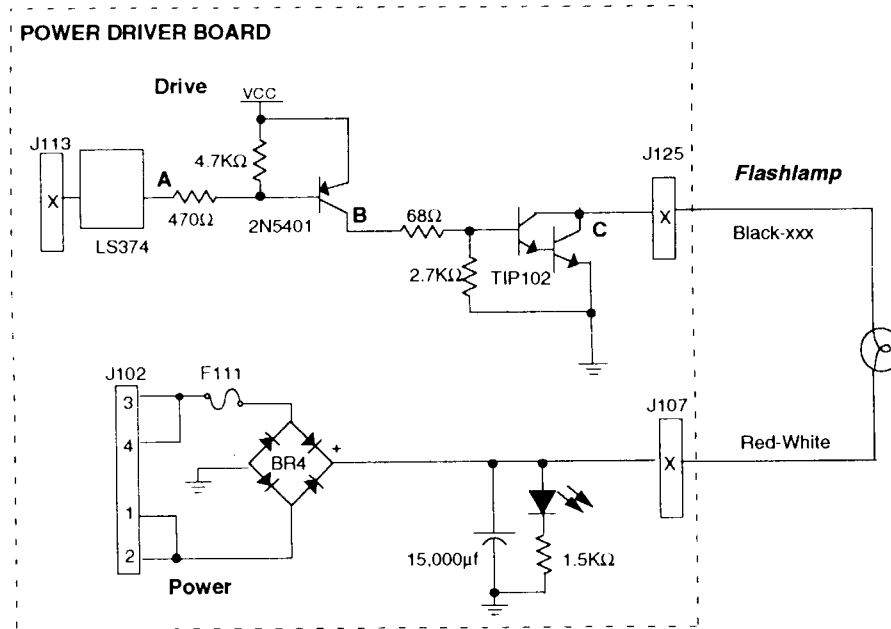
The microprocessor toggles the output of the 74LS374. When point "A" drops low, point "B" the collector of the 2N5401 transistor is high. A high at point "B" causes point "C" the collector of the TIP102 transistor, and point "D" the emitter of the TIP36 transistor to drop low. When point "D" is low the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

Low Power Solenoid Circuit



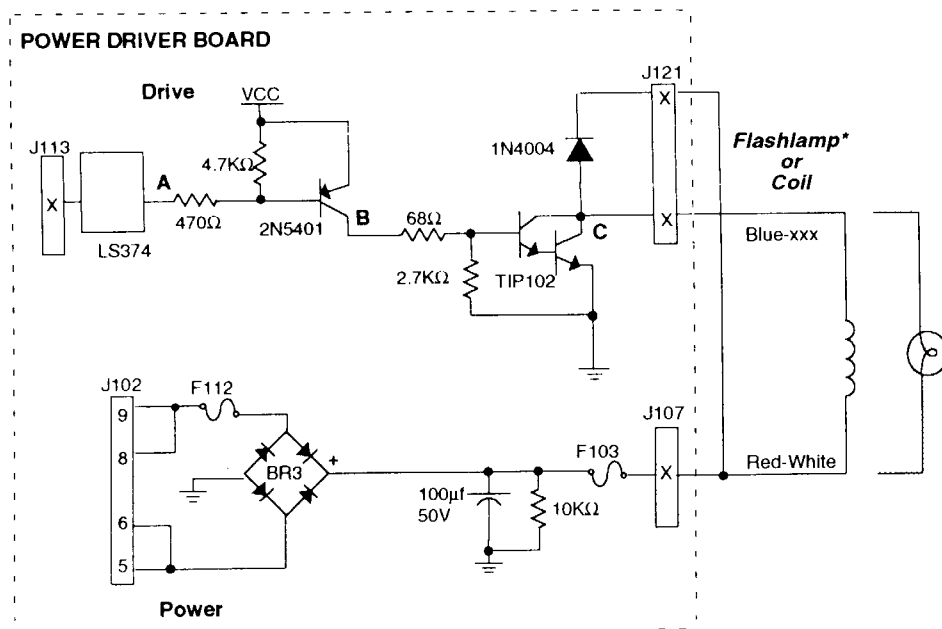
The microprocessor toggles the output of the 74LS374. When point "A" is low, point "B" the collector of the 2N5401 transistor is driven high. A high at point "B" turns On the TIP102 transistor and causes point "C" to drop low. When point "C" is low the coil is grounded through the transistor and the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

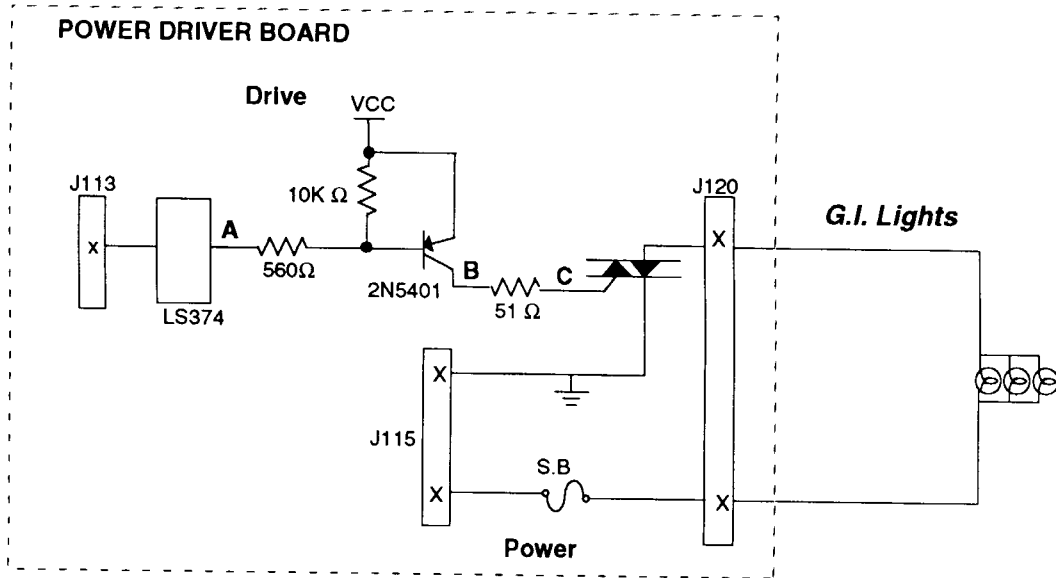
Special (General Purpose) Solenoid Circuit



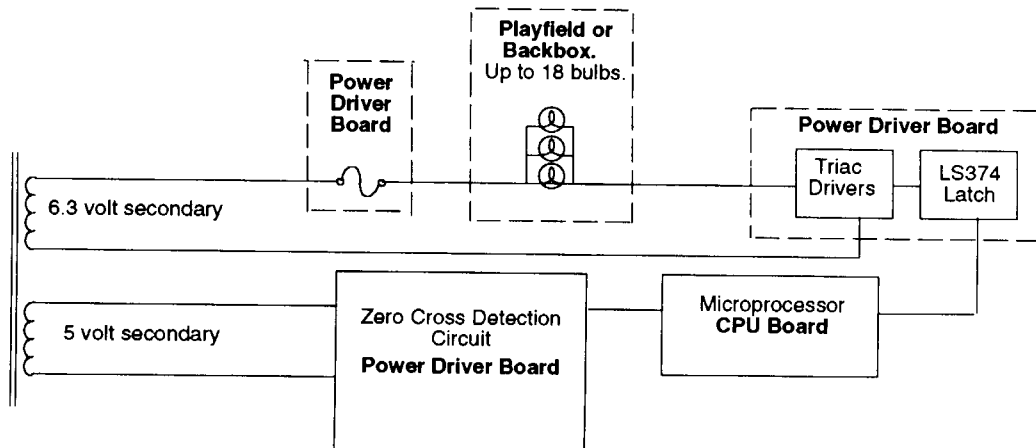
The microprocessor toggles the output of the 74LS374. When point "A" drops low, point "B" is high. A high at point "B" causes a low at point "C". When point "C" is low the coil/flashlamp is grounded through the transistor and the coil/flashlamp turns On. When point "A" toggles high the coil/flashlamp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

* Tieback Diode is not used for flashlamp circuit.

General Illumination Circuit

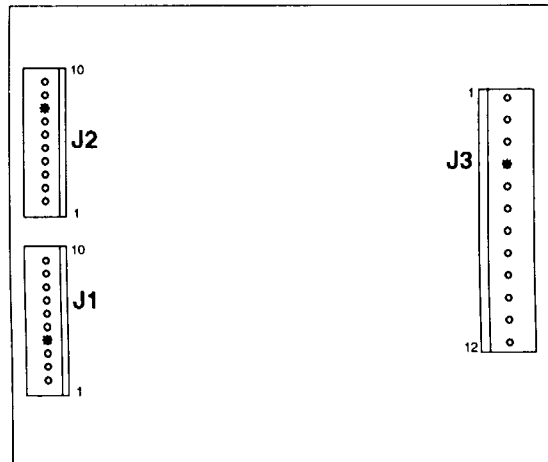


Block Diagram of General Illumination Circuit



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

Opto SW-7 P.C.B. A-15576



(left side)

J1-1 Not Used
 J1-2 Gray-Blue, Switch #76 to LED Board Anode
 J1-3 Gray-Green, Switch #75 to LED Board Anode
 J1-4 Key
 J1-5 Gray-Yellow, Switch #74 to LED Board Anode
 J1-6 Gray-Orange, Switch #73 to LED Board Anode
 J1-7 Gray-Red, Switch #72 to LED Board Anode
 J1-8 Gray-Brown, Switch #71 to LED Board Anode
 J1-9 Black, Ground to LED Board Cathode
 J1-10 Black, Ground to LED Board Cathode

J2-1 Not Used
 J2-2 Orange-Blue, Switch #76 to Photo Transistor Board Emitter
 J2-3 Orange-Green, Switch #75 to Photo Transistor Board Emitter
 J2-4 Orange-Yellow, Switch #74 to Photo Transistor Board Emitter
 J2-5 Orange-Black, Switch #73 to Photo Transistor Board Emitter
 J2-6 Orange-Red, Switch #72 to Photo Transistor Board Emitter
 J2-7 Orange-Brown, Switch #71 to Photo Transistor Board Emitter
 J2-8 Key
 J2-9 Gray-Yellow, to Photo Transistor Board Collector
 J2-10 Gray-Yellow, to Photo Transistor Board Collector

J3-1 Gray-Yellow, +12VDC from J118-2
 J3-2 Not Used
 J3-3 Black, Ground from J118-3
 J3-4 Key
 J3-5 White-Brown, from J209-1
 J3-6 White-Red, from J209-2
 J3-7 White-Orange, from J209-3
 J3-8 White-Yellow, from J209-4
 J3-9 White-Green, from J209-5
 J3-10 White-Blue, from J209-7
 J3-11 Not Used
 J3-12 Green-Violet, from J207-7

(right side)

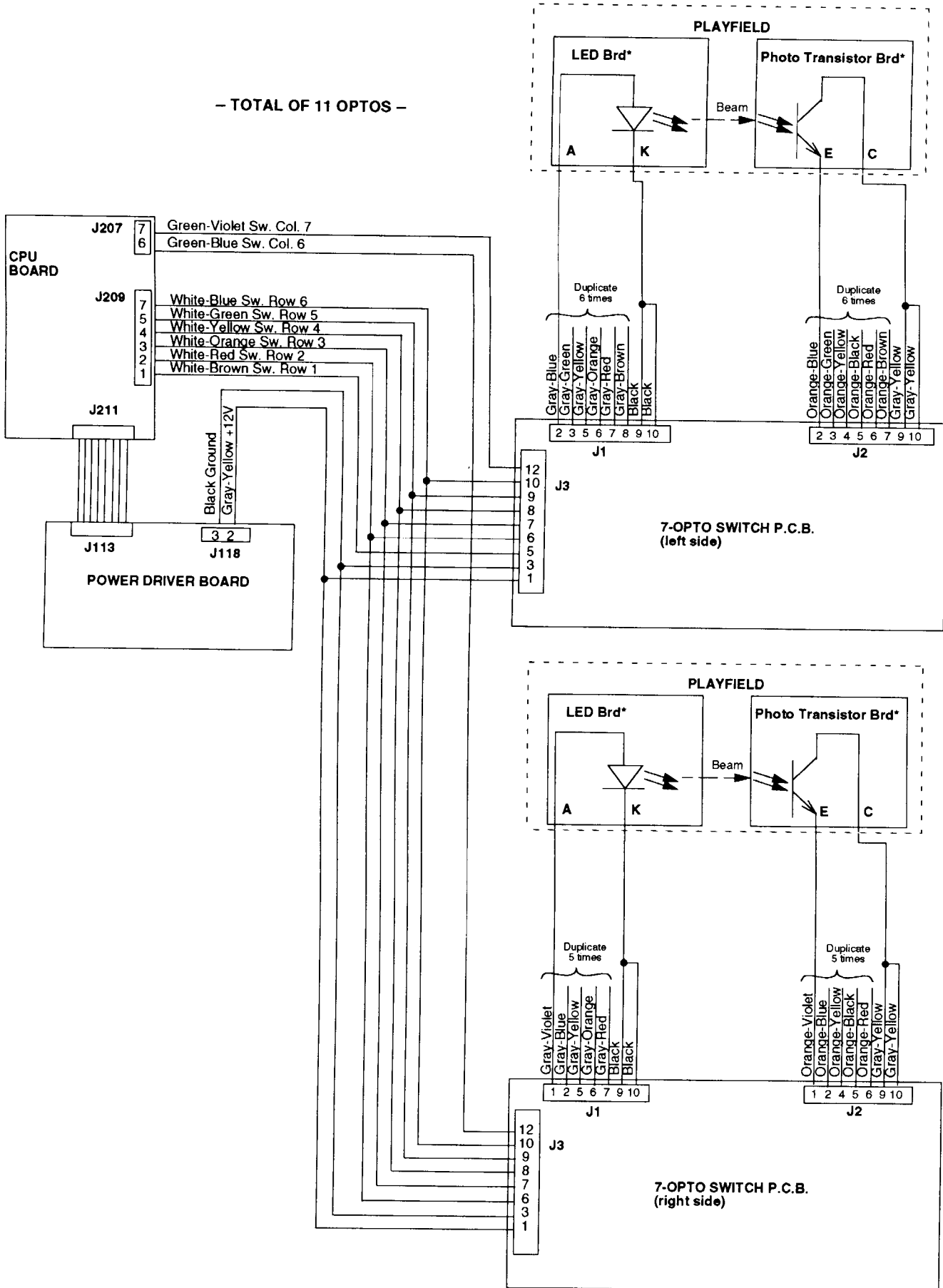
J1-1 Not Used
 J1-2 Gray-Blue, Switch #66 to LED Board Anode
 J1-3 Not Used
 J1-4 Key
 J1-5 Gray-Yellow, Switch #64 to LED Board Anode
 J1-6 Gray-Orange, Switch #63 to LED Board Anode
 J1-7 Gray-Red, Switch #62 to LED Board Anode
 J1-8 Gray-Violet, Switch #67 to LED Board Anode
 J1-9 Black, Ground to LED Board Cathode
 J1-10 Black, Ground to LED Board Cathode

J2-1 Not Used
 J2-2 Orange-Blue, Switch #66 to Photo Transistor Board Emitter
 J2-3 Not Used
 J2-4 Orange-Yellow, Switch #64 to Photo Transistor Board Emitter
 J2-5 Orange-Black, Switch #63 to Photo Transistor Board Emitter
 J2-6 Orange-Red, Switch #62 to Photo Transistor Board Emitter
 J2-7 Orange-Violet, Switch #67 to Photo Transistor Board Emitter
 J2-8 Key
 J2-9 Gray-Yellow, to Photo Transistor Board Collector
 J2-10 Gray-Yellow, to Photo Transistor Board Collector

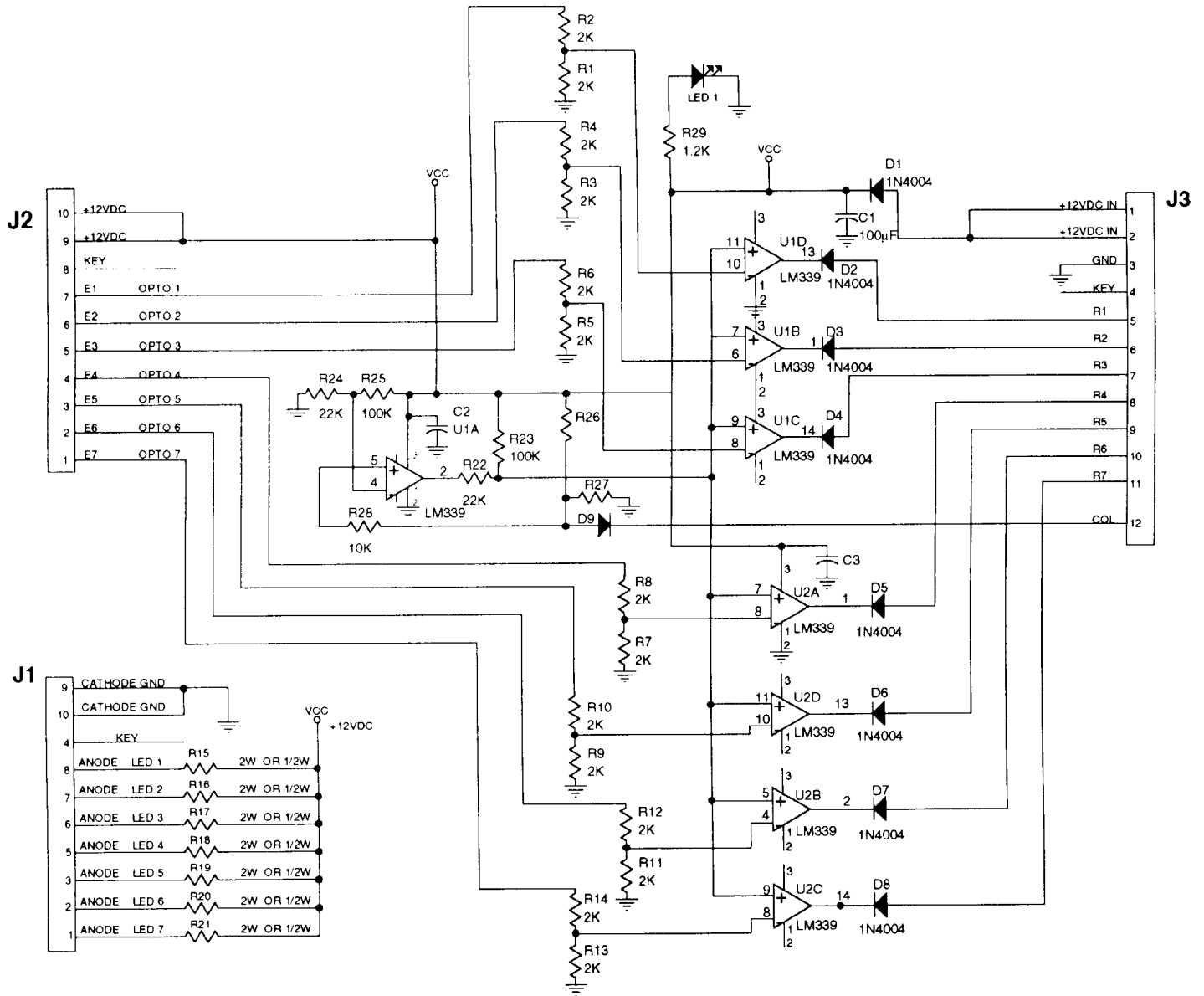
J3-1 Gray-Yellow, +12VDC from J118-2
 J3-2 Not Used
 J3-3 Black, Ground from J118-3
 J3-4 Key
 J3-5 Not Used
 J3-6 White-Red, from J209-2
 J3-7 White-Orange, from J209-3
 J3-8 White-Yellow, from J209-4
 J3-9 White-Green, from J209-5
 J3-10 White-Blue, from J209-7
 J3-11 Not Used
 J3-12 Green-Blue, from J207-6

Opto SW-7 P.C.B. Circuit Diagram

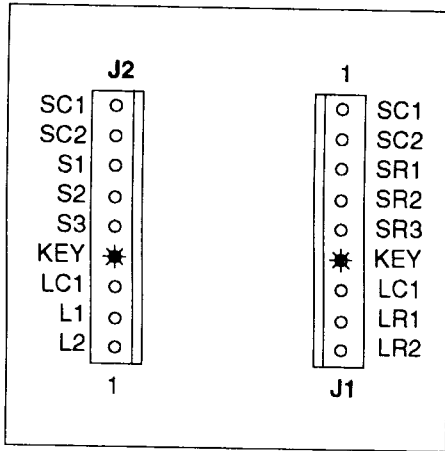
- TOTAL OF 11 OPTOS -



Opto SW-7 P.C.B. Schematic A-15576

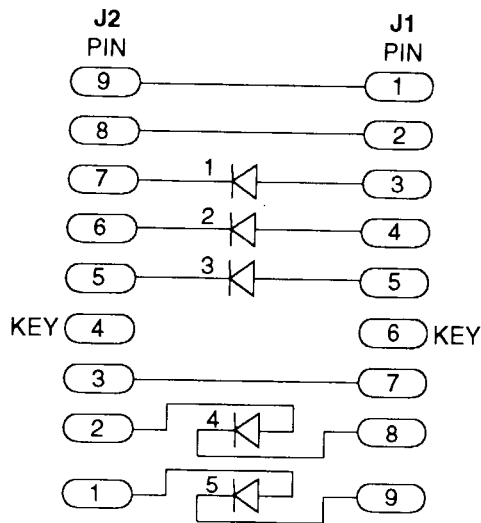


5 DIODE SWITCH & LAMP ASSEMBLY A-16943

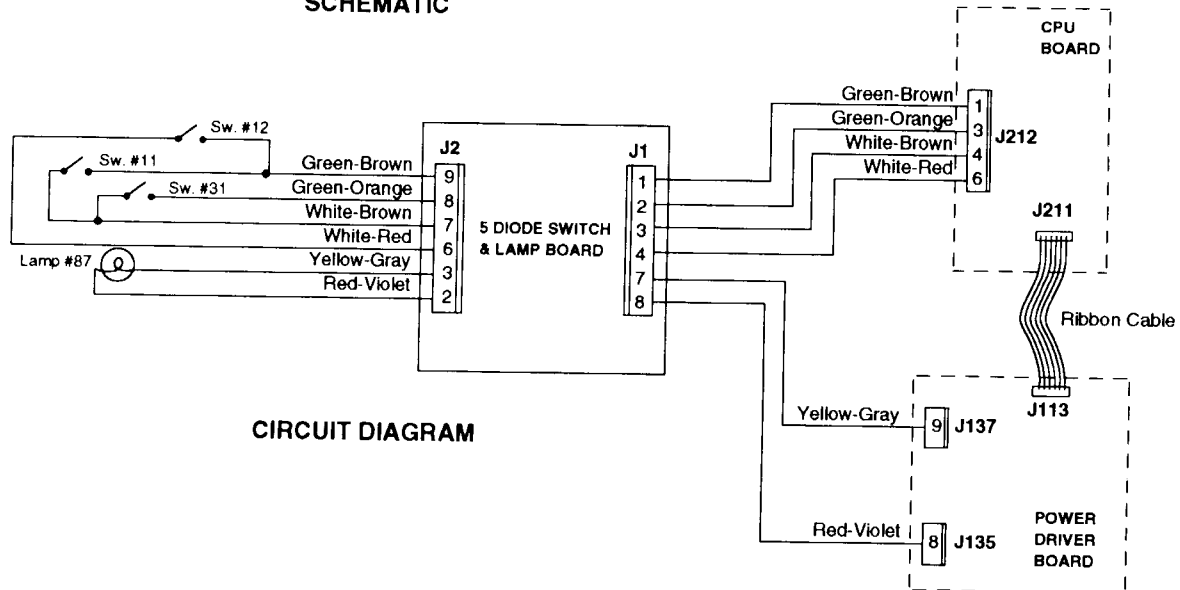


- J1 - 1 Green-Brown from J212-1
- J1 - 2 Green-Orange from J212-3
- J1 - 3 White-Brown from J212-4
- J1 - 4 White-Red from J212-6
- J1 - 5 Not Used
- J1 - 6 Key
- J1 - 7 Yellow-Gray from J137-9
- J1 - 8 Red-Violet from J135-8
- J1 - 9 Not Used

- J2 - 1 Not Used
- J2 - 2 Red-Violet to Lamp #87
- J2 - 3 Yellow-Gray to Lamp #87
- J2 - 4 Key
- J2 - 5 Not Used
- J2 - 6 White-Red to Switch #12
- J2 - 7 White-Brown to Switch #11 & #31
- J2 - 8 Green-Orange to Switch #31
- J2 - 9 Green-Brown to Switch #11 & #12

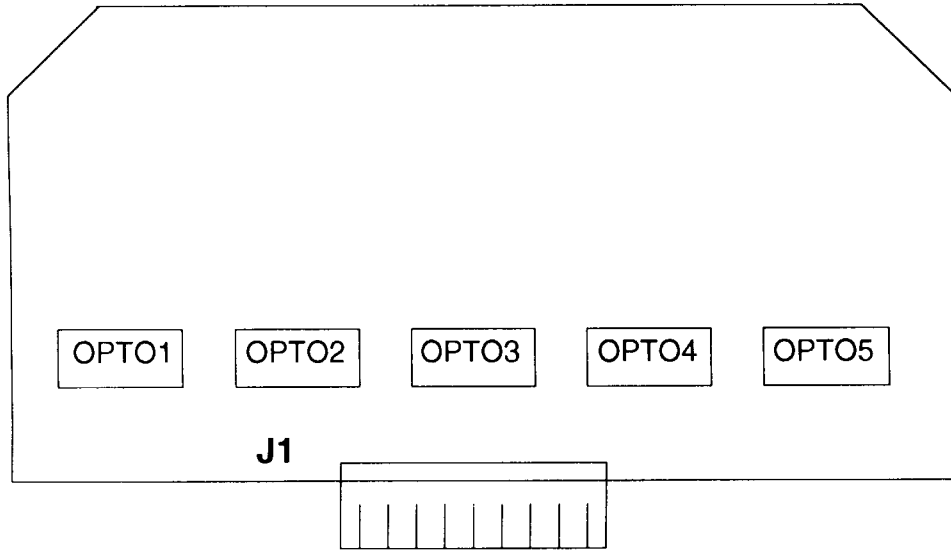


SCHEMATIC



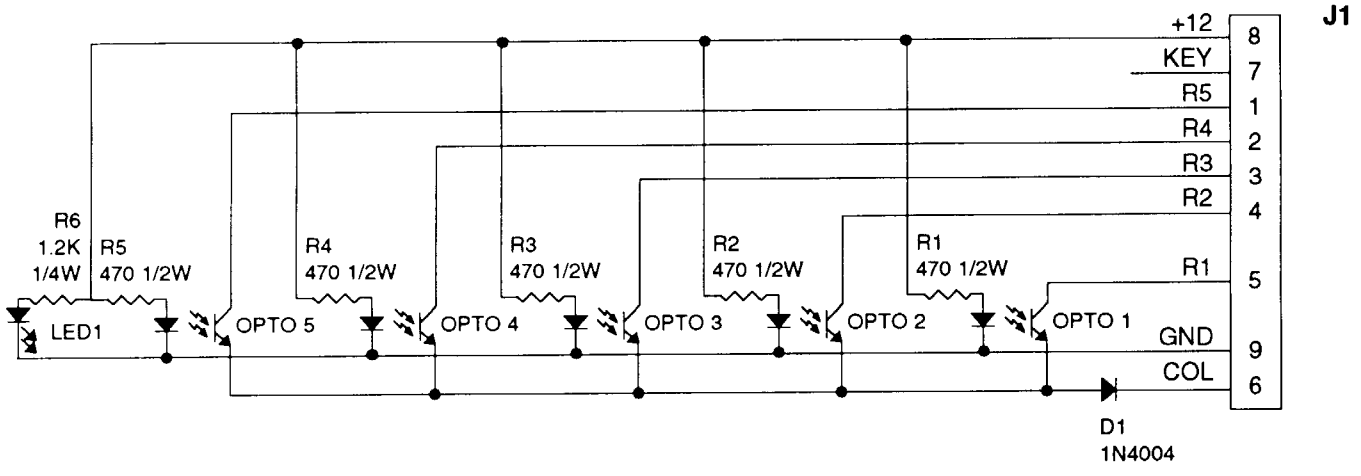
CIRCUIT DIAGRAM

5-Bank Opto Assembly A-16486

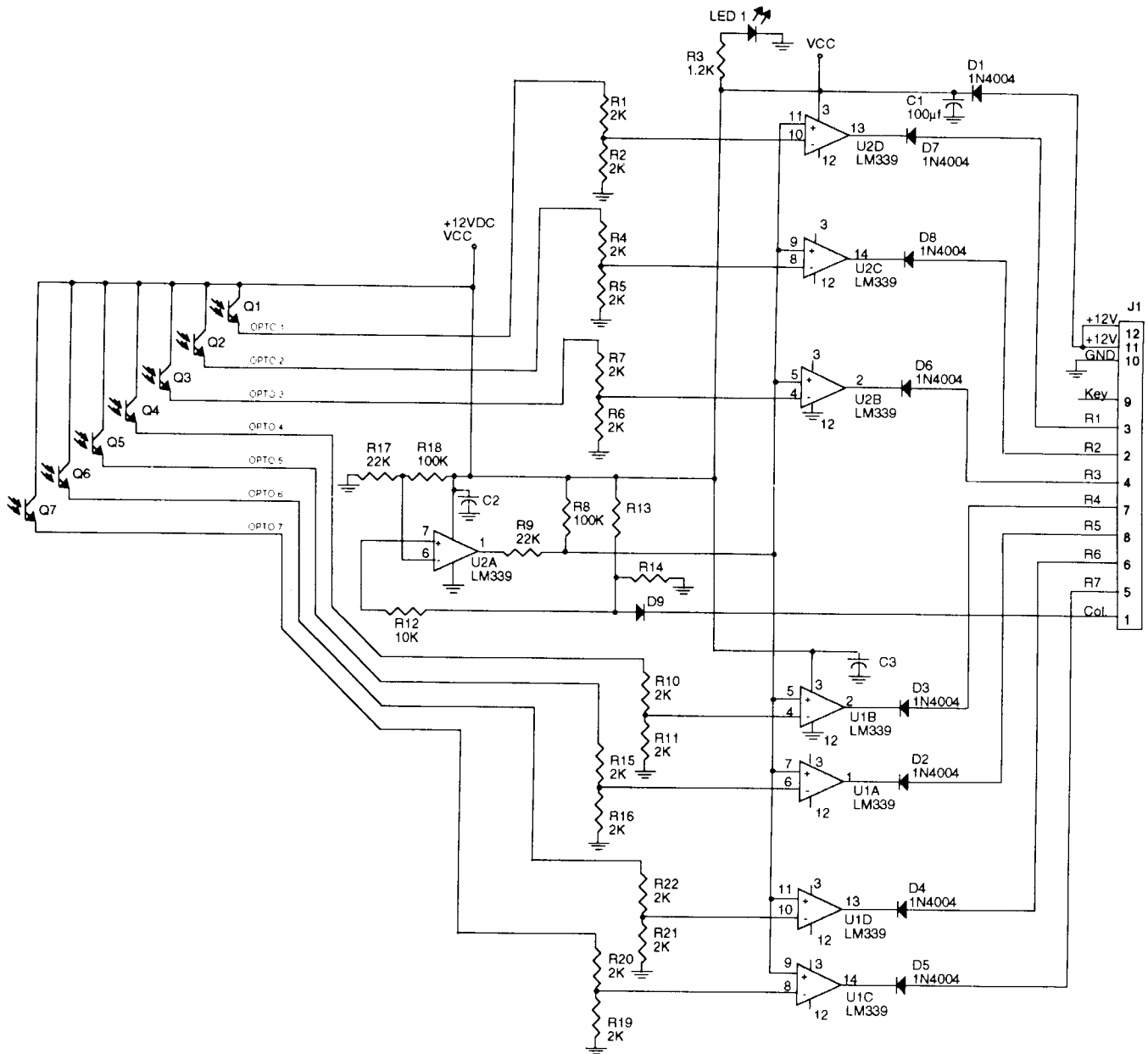
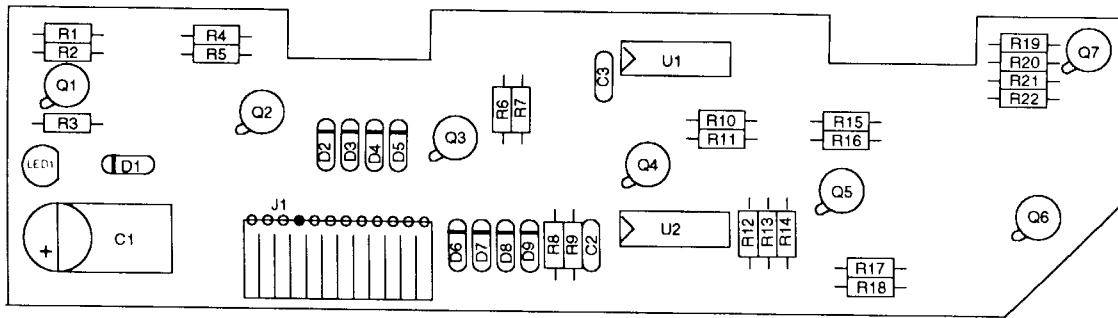


- J1 - 1 White-Gray, from J209-9
- J1 - 2 White-Violet, from J209-8
- J1 - 3 White-Blue, from J209-7
- J1 - 4 White-Green, from J209-5
- J1 - 5 White-Yellow, from J209-4

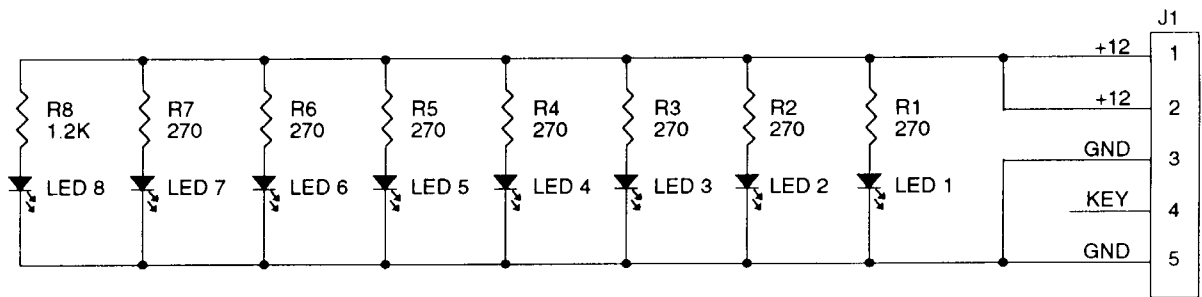
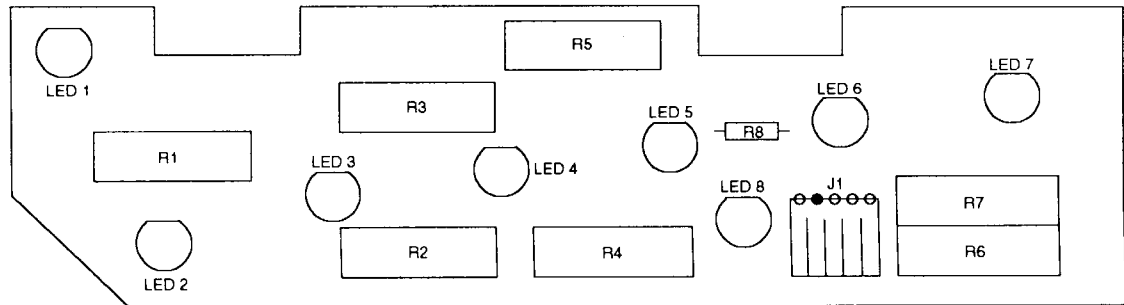
- J1 - 6 Green-Black, from J207-5
- J1 - 7 Key
- J1 - 8 Gray-Yellow, +12VDC from J118-2
- J1 - 9 Black, Ground from J118-3



7 Ball Trough Photo Transistor PCB Assembly A-16926



7 Ball Trough LED PCB Assembly A-16927



7 Ball Trough LED PCB Assembly

Connector Wiring

- J1-1 Gray-Yellow, +12V from Power Driver Board J118-2
- J1-2 N/C
- J1-3 N/C
- J1-4 Key
- J1-5 Black, ground from Power Driver Board J118-3

7 Ball Trough Photo Transistor PCB Assembly

Connector Wiring

- J1-1 Green-Gray, sw. col. 8 from CPU Board J207-9
- J1-2 White-Red, sw. row 2 from CPU Board J209-2
- J1-3 White-Brown, sw. row 1 from CPU Board J209-1
- J1-4 White-Orange, sw. row 3 from CPU Board J209-3
- J1-5 White-Violet, sw. row 7 from CPU Board J209-8
- J1-6 White-Blue, sw. row 6 from CPU Board J209-7
- J1-7 White-Yellow, sw. row 4 from CPU Board J209-4
- J1-8 White-Green, sw. row 5 from CPU Board J209-5
- J1-9 Key
- J1-10 Black, ground from Power Driver Board J118-3
- J1-11 Gray-Yellow, +12v from Power Driver Board J118-2
- J1-12 Gray-Yellow, +12V from Power Driver Board J11-11

Motor EMI Assembly A-15542

To Solenoid #04 (Ball Lift Arm):

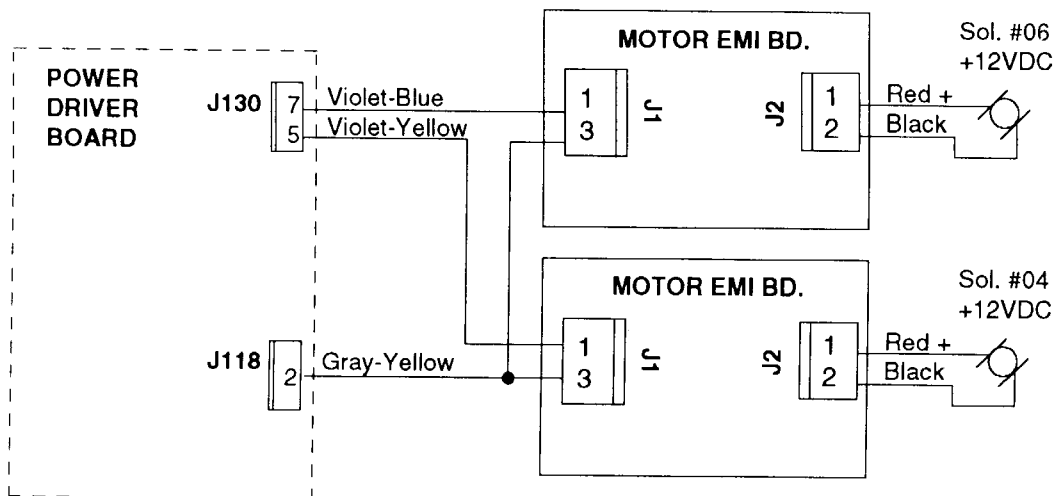
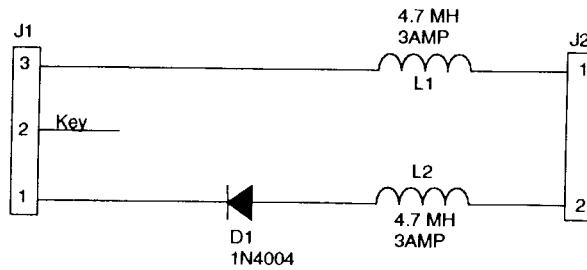
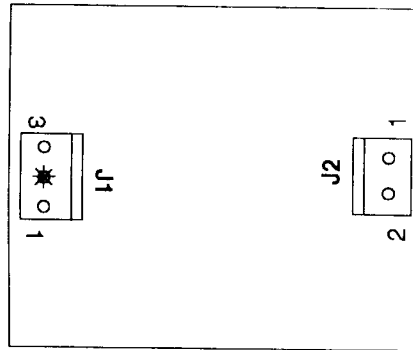
- J1 - 1 Violet-Yellow, from J130-5
- J1 - 2 Key
- J1 - 3 Gray-Yellow, +12VDC from J118-2

- J2 - 1 Red to Motor, Sol #04
- J2 - 2 Black, Ground to Motor, Sol #04

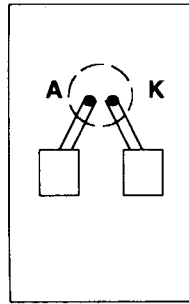
To Solenoid #06 (Globe):

- J1 - 1 Violet-Blue, from J130-7
- J1 - 2 Key
- J1 - 3 Gray-Yellow, +12VDC from J118-2

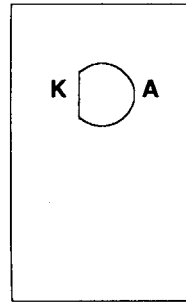
- J2 - 1 Red to Motor, Sol #06
- J2 - 2 Black, Ground to Motor, Sol #06



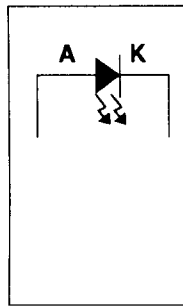
**LED PCB Assembly
A-14231
(green mask)**



solder side

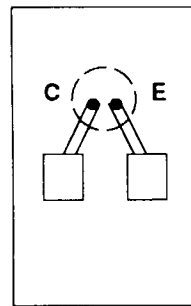


component side

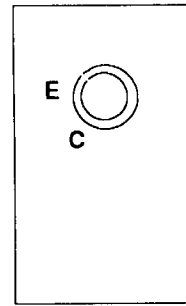


schematic

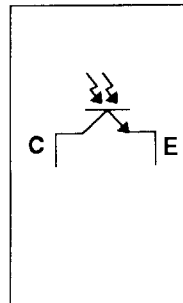
**Photo Transistor PCB Assembly
A-14232
(blue mask)**



solder side

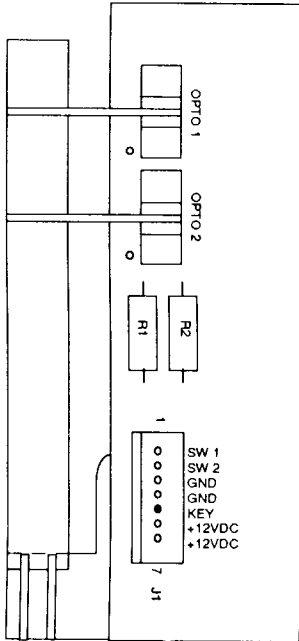


component side



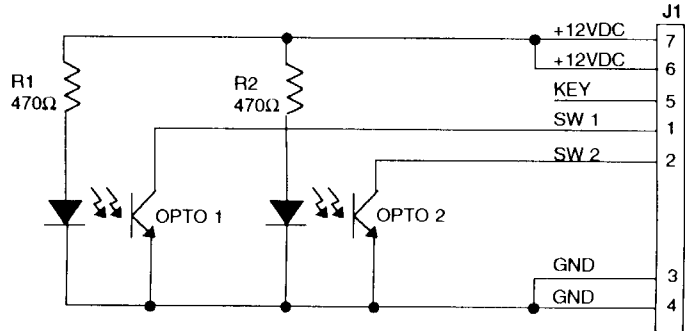
schematic

Flipper Opto PCB Assembly A-16384-1

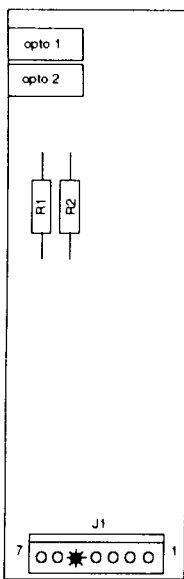


Right Side Flipper Cabinet Opto Switch Board

- J1-1 Black-Yellow from J905-3
- J1-2 Blue-Violet from Fliptronic II Board J905-1
- J1-3 Orange from Fliptronic II Board J905-6
- J1-4 Orange from Left Flipper Opto Assembly J1-4
- J1-5 Key
- J1-6 Gray-Yellow from Left Flipper Opto Assembly J1-6
- J1-7 N/C

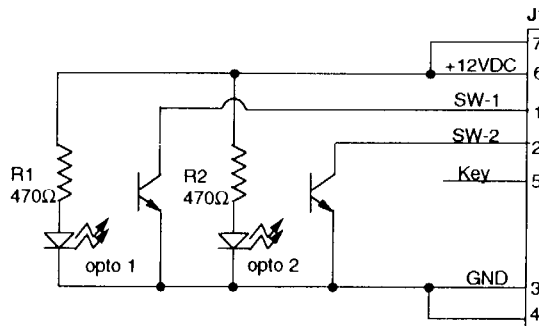


Flipper Opto Switch Board A-15894

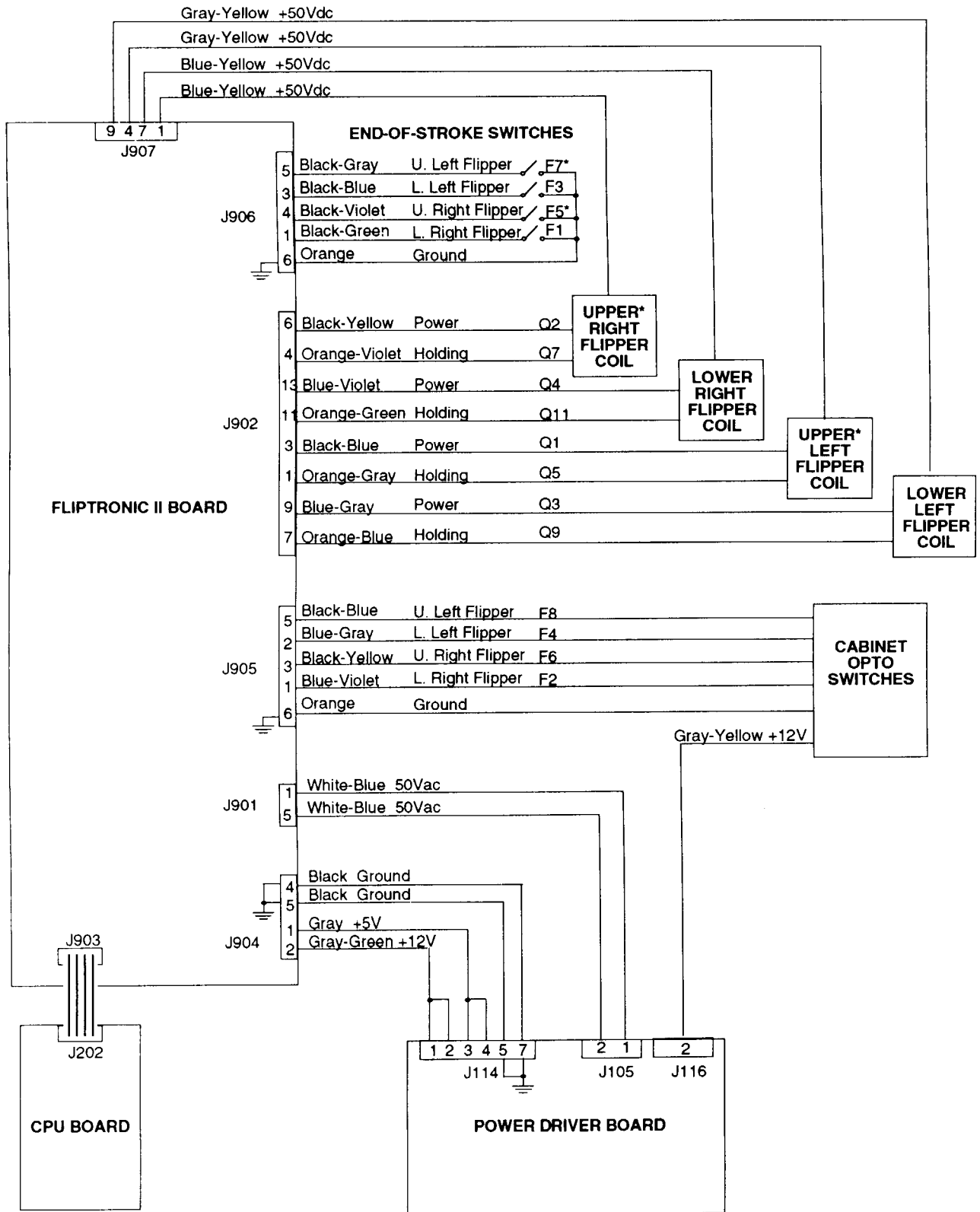


Left Side Flipper Opto Switch Board

- J1 - 1 Blue-Gray (lower flipper) from Fliptronic II Board J905-2
- J1 - 2 Black-Blue (upper flipper) from Fliptronic II Board J905-5
- J1 - 3 Orange (Switch Grd) from Fliptronic II Board J905-6
- J1 - 4 Not Used
- J1 - 5 Key
- J1 - 6 Gray-Yellow (+12V) from Power Driver Board J116-2
- J1 - 7 Gray-Yellow (+12V) loop from J1-6



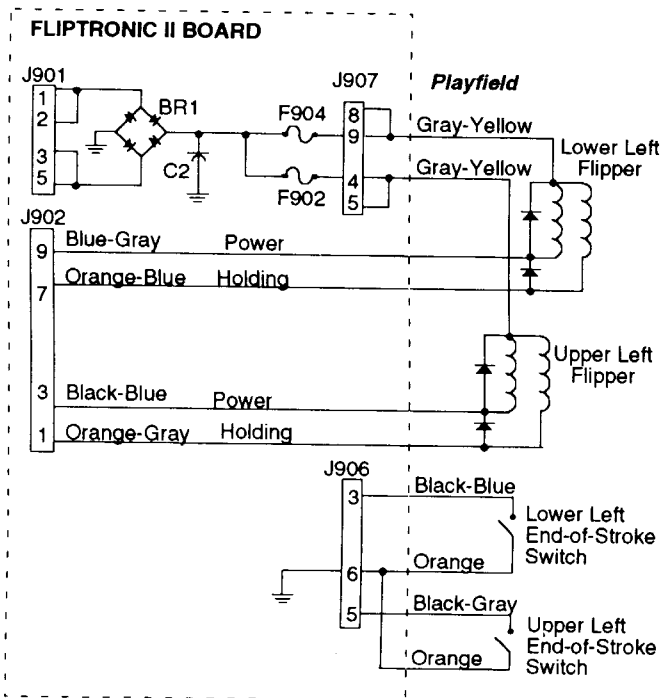
Flipper Circuit Diagram



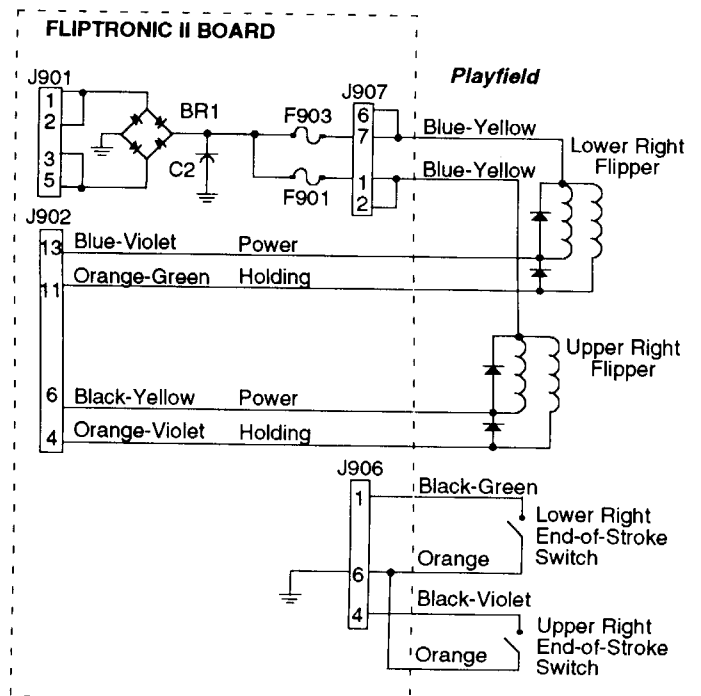
**Note: Used as circuits other than flipper circuits in this game.*

Flipper Coil Circuits

Left Flipper Circuit



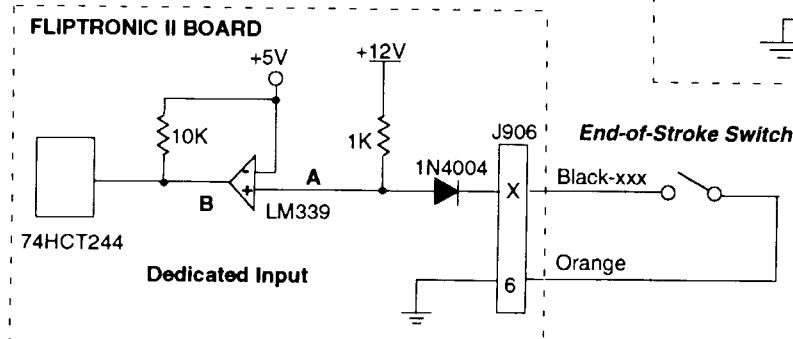
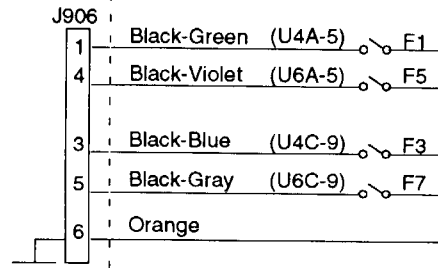
Right Flipper Circuit



Flipper End-of-Stroke Switches

- F1 Lower Right Flipper
- F5 Upper Right Flipper
- F3 Lower Left Flipper
- F7 Upper Left Flipper

FLIPTRONIC II BOARD

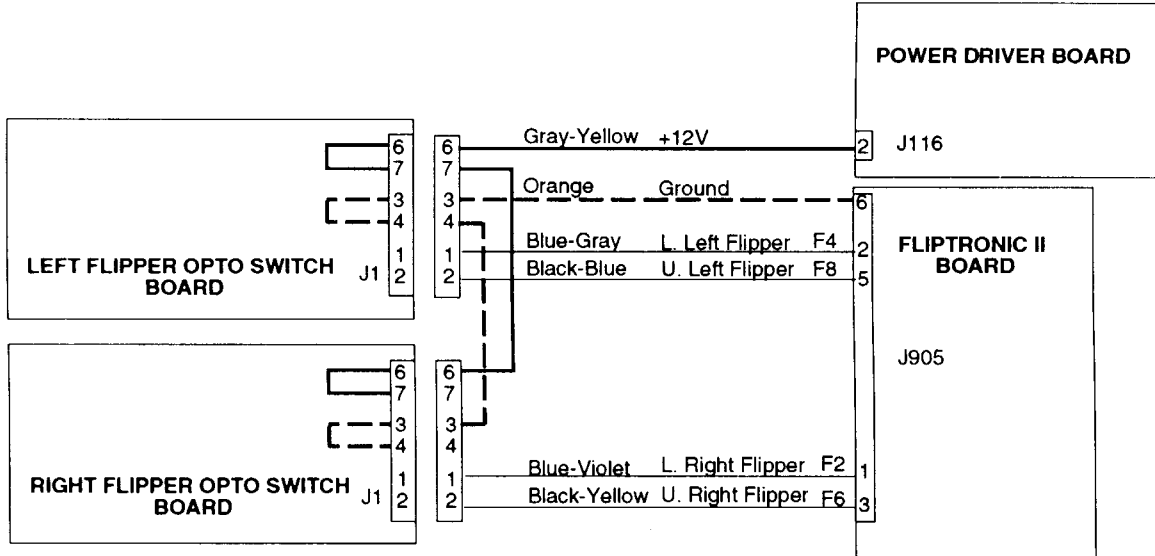


Switch	A	B	
Open	H	H	Off
Closed	L	L	On

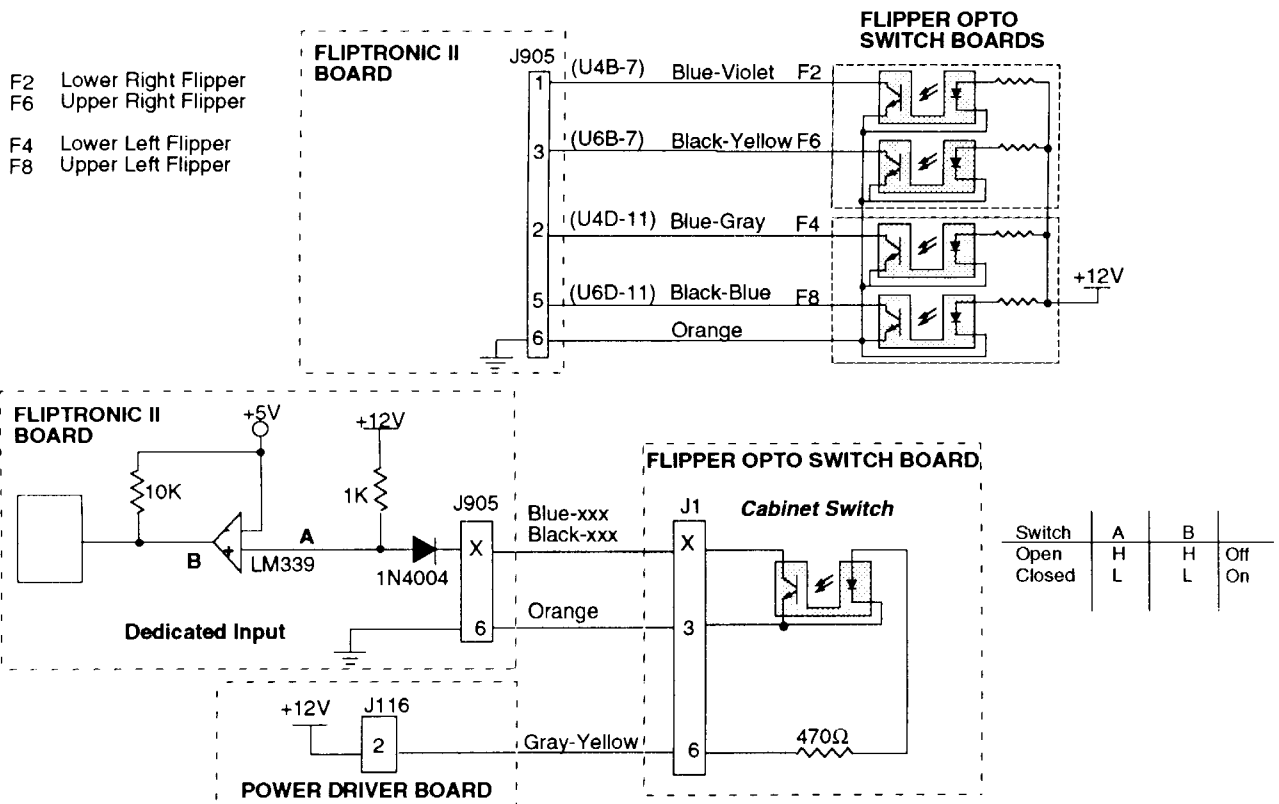
The flipper switch circuits operate similar to the dedicated switch circuit. The circuits are active low and tied to ground through the switch.

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 above +5V, its output is high and the row (dedicated input) is inactive.

Flipper Cabinet Switch Circuit Diagram



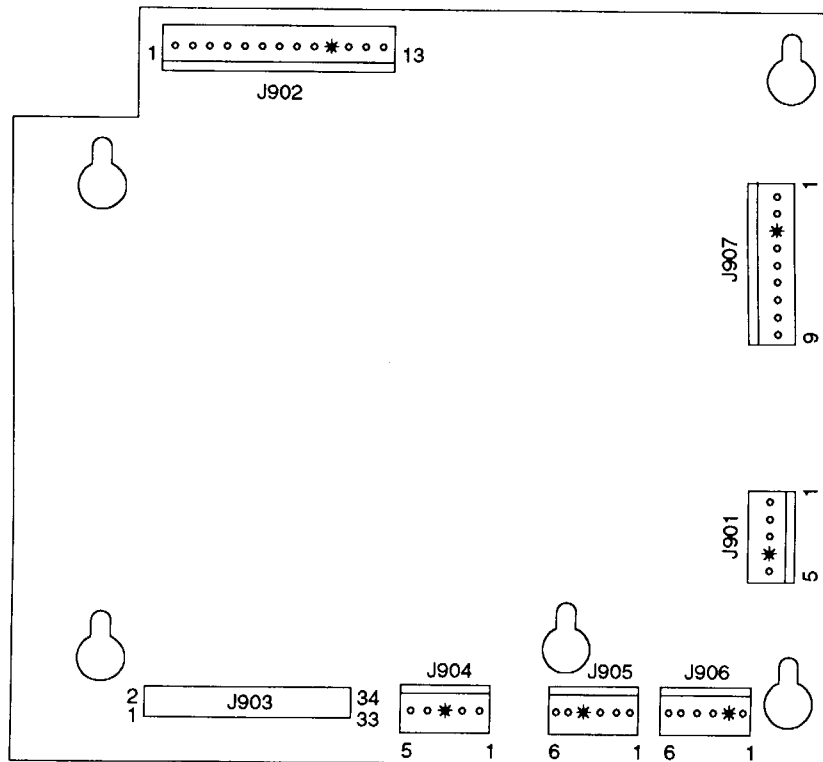
Flipper Cabinet Switches



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

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

FLIPTRONIC II BOARD A-15472-1



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

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

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

J904-1 Gray, +5V from J114-4
 J904-2 Gray-Green, +12V from J114-2
 J904-3 Key
 J904-4 Black, Ground from J114-7
 J904-5 Black, Ground from J114-5

J905-1 Blue-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

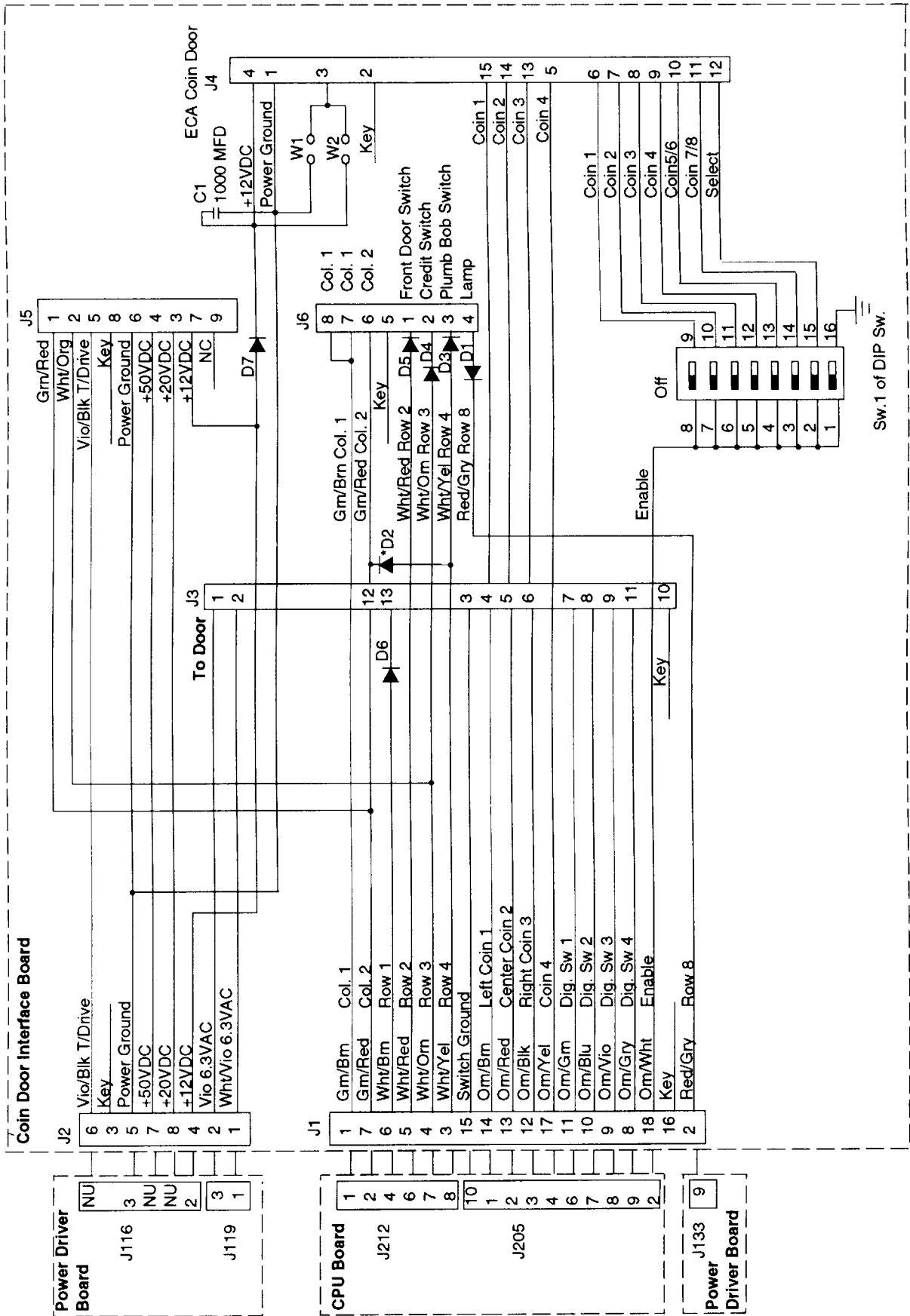
J906-1 Black-Green, to lower right end-of-stroke switch
 J906-2 Key
 J906-3 Black-Blue, to lower left end-of-stroke switch
 J906-4 Black-Violet, to upper right end-of-stroke switch
 J906-5 Black-Gray, to upper left end-of-stroke switch
 J906-6 Orange, Switch Ground

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

P.C. Board Legend

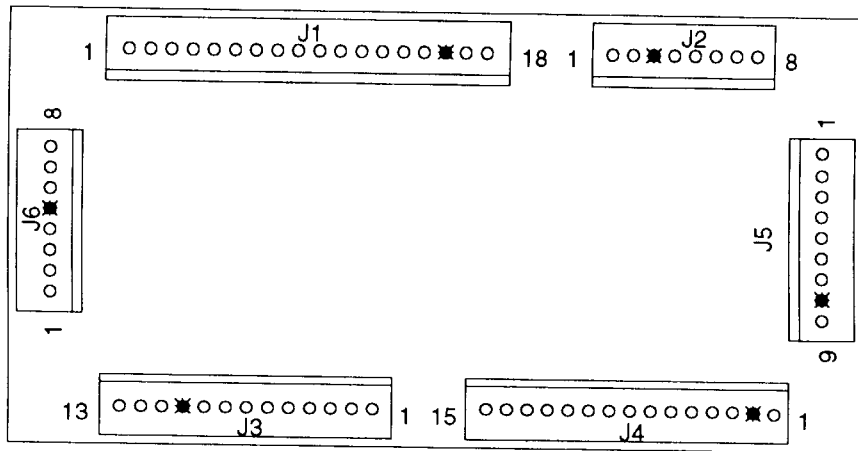
J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J5xx	Audio Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptronic II Board

Coin Door Interface Board Schematic A-14689



*Switch 24, always closed

COIN DOOR INTERFACE BOARD A-14689



- J1-1 Green-Brown, switch column 1 from J212-1
- J1-2 Red-Gray, lamp row 8 from J134-9
- J1-3 White-Yellow, switch row 4 from J212-8
- J1-4 White-Orange, switch row 3 from J212-7
- J1-5 White-Red, switch row 2 from J212-6
- J1-6 White-Brown, switch row 1 from J212-4
- J1-7 Green-Red, switch column 2 from J212-2
- J1-8 Orange-Gray, dedicated switch row 8 from J205-9
- J1-9 Orange-Violet, dedicated switch row 7 from J205-8
- J1-10 Orange-Blue, dedicated switch row 6 from J205-7
- J1-11 Orange-Green, dedicated switch row 5 from J205-6
- J1-12 Orange-Black, dedicated switch row 3 from J205-3
- J1-13 Orange-Red, dedicated switch row 2 from J205-2
- J1-14 Orange-Brown, dedicated switch row 1 from J205-1
- J1-15 Black, Ground from J205-10
- J1-16 Key
- J1-17 Orange-Yellow, dedicated switch row 4 from J205-4
- J1-18 Orange-White, switch enable from J205-12

J4 Not Used

J5 Not Used

- J6-1 White-Red, switch row 2 to cabinet
- J6-2 White-Orange, switch row 3 to cabinet
- J6-3 White-Yellow, switch row 4 to cabinet
- J6-4 Red-Gray, lamp row 8 to cabinet
- J6-5 Key
- J6-6 Green-Red, switch column 2 to cabinet
- J6-7 Green-Brown, switch column 1 to cabinet
- J6-8 Green-Brown, switch column 1 to cabinet

- J2-1 Violet, G.I. return from J119-3
- J2-2 White-Violet, G.I. 6.8VAC from J119-1
- J2-3 Key
- J2-4 Gray-Yellow, +12V from J116-3
- J2-5 Black, Ground from J116-3
- J2-6 Not Used
- J2-7 Not Used
- J2-8 Not Used

- J3-1 Violet, G.I. return to coin door
- J3-2 White-Violet, G.I. 6.8VAC to coin door
- J3-3 Black, Ground to coin door
- J3-4 Orange-Brown, dedicated switch row 1 to coin door
- J3-5 Orange-Red, dedicated switch row 2 to coin door
- J3-6 Orange-Black, dedicated switch row 3 to coin door
- J3-7 Orange-Green, dedicated switch row 4 to coin door
- J3-8 Orange-Blue, dedicated switch row 6 to coin door
- J3-9 Orange-Violet, dedicated switch row 7 to coin door
- J3-10 Key
- J3-11 Orange-Gray, dedicated switch row 8 to coin door
- J3-12 Green-Red, switch column 8 to coin door
- J3-13 White-Brown, switch row 1 to coin door

<u>P.C. Board Legend</u>	
J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J5xx	Audio Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptronic II Board

POWER DRIVER BOARD A-12697-3

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

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

J103 Not Used

J104 Not Used

J105-1 White-Blue, 50VAC to J901-1
 J105-2 White-Blue, 50VAC to J901-3
 J105-3 Key
 J105-4 Not Used
 J105-5 Not Used

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

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

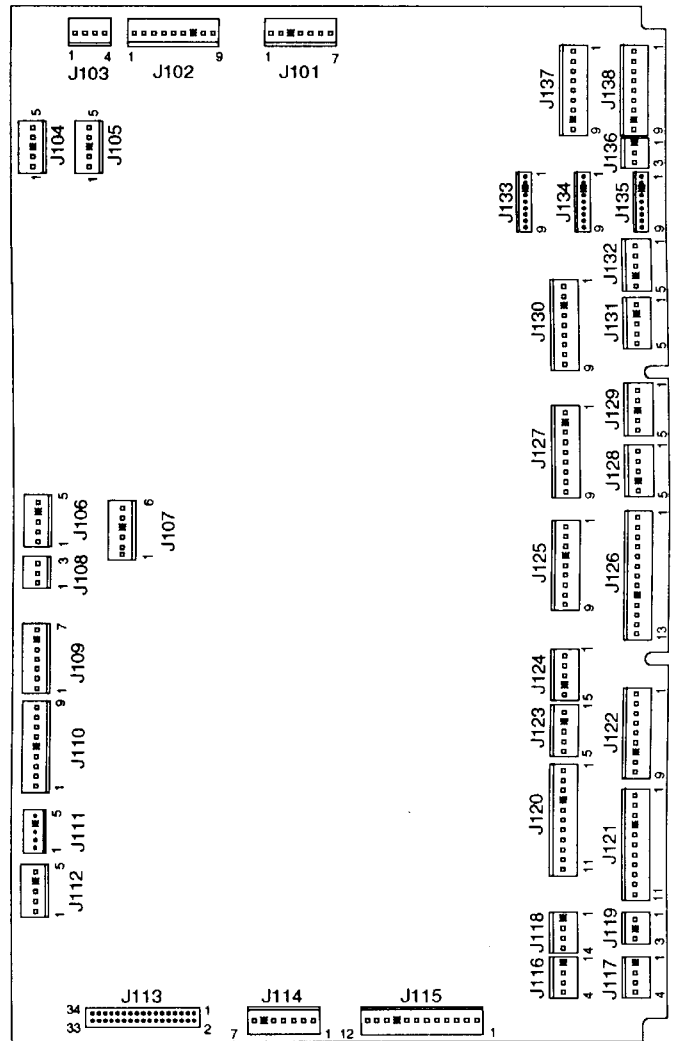
J108 Not Used

J109 Not Used

J110 Not Used

J111 Not Used

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



J113 Ribbon Cable, Data to/from J211

J114-1 Gray/Green, +12VDC to J210-7
 J114-2 Not Used
 J114-3 Gray, +5VDC to J210-5; J502-3
 J114-4 Not Used
 J114-5 Not Used
 J114-6 Key
 J114-7 Black, Ground to J210-1; J502-4; J904-4

P.C. Board Legend

J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J5xx	Audio Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptronic II Board

POWER DRIVER BOARD CONTINUED...

- J115-1 Yellow-White, 6.8VAC from transformer secondary
 J115-2 White-Brown, 6.8VAC from transformer secondary
 J115-3 White-Brown, loop from J115-2
 J115-4 White-Orange, 6.8VAC from transformer secondary
 J115-5 White-Yellow, loop from J115-6
 J115-6 White-Yellow, 6.8VAC from transformer secondary
 J115-7 Orange, 6.8VAC from transformer secondary
 J115-8 Orange, 6.8VAC loop from J115-7
 J115-9 Key
 J115-10 Green, 6.8VAC from transformer secondary
 J115-11 Brown, 6.8VAC from transformer secondary
 J115-12 Brown, 6.8VAC loop from J115-11
- J116-1 Key
 J116-2 Gray-Yellow, +12VDC to coin door; J2-4
 J116-3 Black, Ground to coin door; J2-5
 J116-4 Not Used
- J117-1 Key
 J117-2 Gray-Yellow, +12VDC to J606-7
 J117-3 Black, Ground to J606-3
 J117-4 Gray, +5VDC to J606-5
- J118-1 Key
 J118-2 Gray-Yellow, +12VDC to playfield
 J118-3 Black, Ground
 J118-4 Not Used
- J119-1 White-Violet, 6.8VAC G.I. to coin door; J2-2
 J119-2 Key
 J119-3 Violet, Return G.I. to coin door; J2-1
- J120-1 Brown, Return G.I. to playfield
 J120-2 Orange, Return G.I. to playfield
 J120-3 Yellow, Return G.I. to playfield
 J120-4 Key
 J120-5 Green, Return G.I. to playfield
 J120-6 Violet, Return G.I. to playfield
 J120-7 White-Brown, 6.8VAC to playfield
 J120-8 White-Orange, 6.8VAC to playfield
 J120-9 White-Yellow, 6.8VAC to playfield
 J120-10 White-Green, 6.8VAC to playfield
 J120-11 White-Violet, 6.8VAC to playfield
- J121-1 Brown, Return G.I. to insert
 J121-2 Orange, Return G.I. to insert
 J121-3 Yellow, Return G.I. to insert
 J121-4 Key
 J121-5 Green, Return G.I. to insert
 J121-6 Not Used
 J121-7 White-Brown, 6.8VAC to insert
 J121-8 White-Orange, 6.8VAC to insert
 J121-9 White-Yellow, 6.8VAC to insert
 J121-10 White-Green, 6.8VAC to insert
 J121-11 Not Used
- J122-1 Blue-Brown, Sol 25 to playfield flashlamps
 J122-2 Blue-Red, Sol 26 to playfield flashlamps
 J122-3 Blue-Orange, Sol 27 to playfield flashlamps
 J122-4 Not Used
 J122-5 Not Used
 J122-6 Not Used
 J122-7 Key
 J122-8 Not Used
 J122-9 Not Used
- J123 Not Used
- J124-1 Blue-Brown, Sol 25 to insert flashlamps
 J124-2 Blue-Red, Sol 26 to insert flashlamps
 J124-3 Blue-Orange, Sol 27 to insert flashlamps
 J124-4 Key
 J124-5 Blue-Yellow, Sol 28 to insert flashlamps
- J125-1 Black-Brown, Sol 17 to insert flashlamps
 J125-2 Black-Red, Sol 18 to insert flashlamps
 J125-3 Black-Orange, Sol 19 to insert flashlamps
 J125-4 Key
 J125-5 Black-Yellow, Sol 20 to insert flashlamps
 J125-6 Blue-Green, Sol 21 to insert flashlamps
 J125-7 Blue-Black, Sol 22 to insert flashlamps
 J125-8 Blue-Violet, Sol 23 to insert flashlamps
 J125-9 Not Used
- J126-1 Black-Brown, Sol 17 to playfield flashlamps
 J126-2 Black-Red, Sol 18 to playfield flashlamps
 J126-3 Black-Orange, Sol 19 to playfield flashlamps
 J126-4 Black-Yellow, Sol 20 to playfield flashlamps
 J126-5 Blue-Green, Sol 21 to playfield flashlamps
 J126-6 Blue-Black, Sol 22 to playfield flashlamps
 J126-7 Blue-Violet, Sol 23 to playfield flashlamps
 J126-8 Blue-Gray, Sol 24 to playfield flashlamps
 J126-9 Key
 J126-10 Not Used
 J126-11 Not Used
 J126-12 Not Used
 J126-13 Not Used
- J127-1 Brown-Black, Sol 9 to playfield coil
 J127-2 Key
 J127-3 Brown-Red, Sol 10 to playfield coil
 J127-4 Brown-Orange, Sol 11 to playfield coil
 J127-5 Not Used
 J127-6 Brown-Green, Sol 13 to playfield coil
 J127-7 Not Used
 J127-8 Brown-Violet, Sol 15 to playfield coil
 J127-9 Brown-Gray, Sol 16 to playfield coil

P.C. Board Legend

J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J5xx	Audio Board
J6xx	Dot Matrix Controller Board
J9xx	Flitronic II Board

POWER DRIVER BOARD CONTINUED...

J128 Not Used

J129 Not Used

J130-1 Violet-Brown, Sol 1 to playfield magnet

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 motor

J130-6 Violet-Green, Sol 5 to playfield coil

J130-7 Violet-Blue, Sol 6 to playfield motor

J130-8 Violet-Black, Sol 7 to playfield coil

J130-9 Violet-Gray, Sol 8 to playfield coil

J131 Not Used

J132 Not Used

J133 Not Used

J134-1 Red-Brown, Row1 to playfield lamps

J134-2 Red-Black, Row2 to playfield lamps

J134-3 Key

J134-4 Red-Orange, Row3 to playfield lamps

J134-5 Red-Yellow, Row4 to playfield lamps

J134-6 Red-Green, Row5 to playfield lamps

J134-7 Red-Blue, Row6 to playfield lamps

J134-8 Red-Violet, Row7 to playfield lamps

J134-9 Red-Gray, Row 8 to playfield lamps

J135-1 Not Used

J135-2 Not Used

J135-3 Key

J135-4 Not Used

J135-5 Not Used

J135-6 Not Used

J135-7 Not Used

J135-8 Red-Violet, Row 7 to cabinet lamp

J135-9 Red-Gray, Row 8 to cabinet lamp

J136 Not Used

J137-1 Not Used

J137-2 Not Used

J137-3 Yellow-Orange, Col 3 to cabinet lamp

J137-4 Not Used

J137-5 Not Used

J137-6 Not Used

J137-7 Not Used

J137-8 Key

J137-9 Yellow-Gray, Col 8 to cabinet lamp

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

P.C. Board Legend

J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J5xx	Audio Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptronic II Board

CPU BOARD A-12742-20020

J201 Ribbon Cable, Data to J602

J202 Ribbon Cable, Data to J903; J506; J601

J203 Not Used

J204 Ribbon Cable, Data to J1, A-16100

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 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/Volume Down to J1-10

J205-8 Orange-Violet, Dir Sw 7, Up/Volume Up to J1-9

J205-9 Orange-Gray, Dir Sw 8, Enter/Test to J1-8

J205-10 Black, Ground to J1-15

J205-11 Not Used

J205-12 Orange-White, Enable to J1-18

J206 Not Used

J207-1 Green-Brown, Sw Col 1 to Playfield Switches

J207-2 Green-Red, Sw Col 2 to Playfield Switches

J207-3 Green-Orange, Sw Col 3 to Playfield Switches

J207-4 Green-Yellow, Sw Col 4 to Playfield Switches

J207-5 Green-Black, Sw Col 5 to Playfield Switches

J207-6 Green-Blue, Sw Col 6 to Playfield Switches

J207-7 Green-Violet, Sw Col 7 to Playfield Switches

J207-8 Key

J207-9 Green-Gray, Sw Col 8 to Playfield Switches

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 J114-7

J210-2 Key

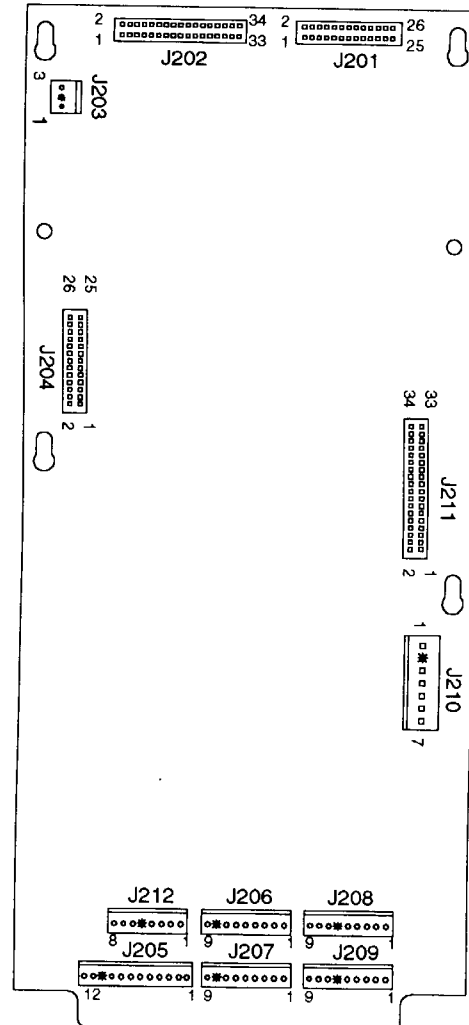
J210-3 Black, Ground from J114-5

J210-4 Gray, +5VDC from J114-4

J210-5 Gray, +5VDC from J114-3

J210-6 Gray-Green, +12VDC from 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 Green-Orange, Sw Col 3 to J1-7

J212-4 White-Brown, Sw Row 1 to J1-6

J212-5 Key

J212-6 White-Red, Sw Row 2 to J1-5

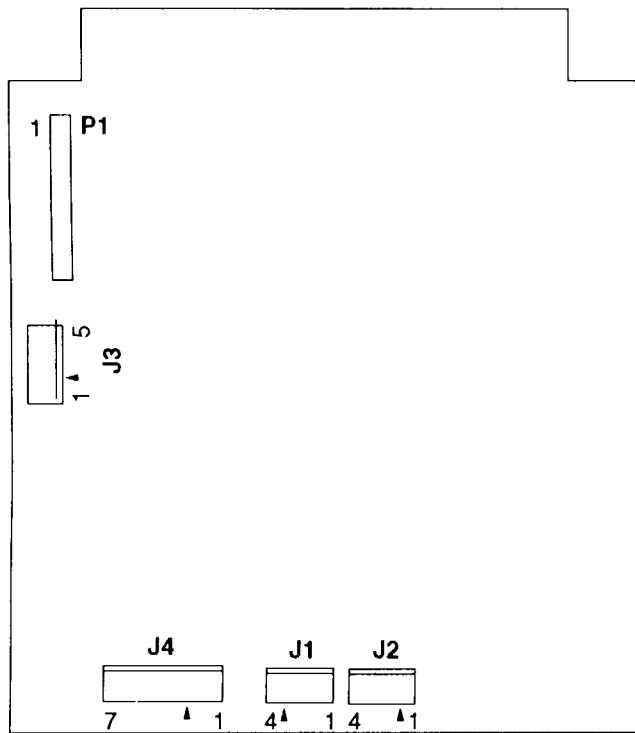
J212-7 White-Orange, Sw Row 3 to J1-4

J212-8 White-Yellow, Sw Row 4 to J1-3

P.C. Board Legend

J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J5xx	Audio Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptronic II Board

AUDIO BOARD A-16917-20020



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

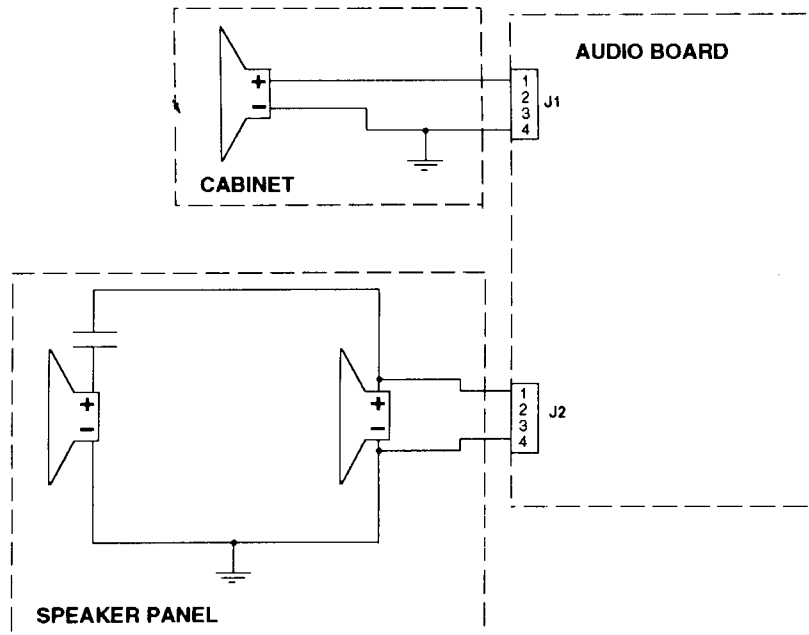
J1-1 Black-Yellow, signal to speaker
 J1-2 Not Used
 J1-3 Key
 J1-4 Black-Yellow, signal to speaker

J2-1 Black-Yellow, signal to speaker
 J2-2 Key
 J2-3 Not Used
 J2-4 Black-Yellow, signal to speaker

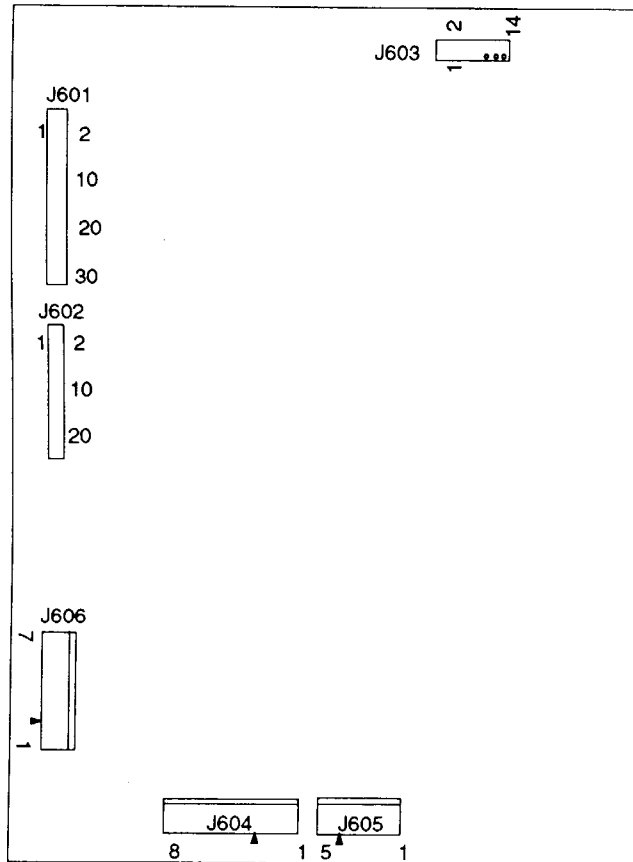
J3-1 Gray, +5V from J114-3,4
 J3-2 Key
 J3-3 Gray, +5V from J114-3,4
 J3-4 Black, Ground from J114-5,7
 J3-5 Black, Ground from J114-5,7

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

SPEAKER WIRING DIAGRAM



DOT MATRIX CONTROLLER BOARD A-14039



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

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 to Dot Matrix Display Driver Pin 7

J604-8 Brown, +62 to Dot Matrix Display Driver Pin 8

J605-1 White, 80VAC from transformer secondary

J605-2 White, 80VAC from transformer secondary

J605-3 Violet, 100VAC from transformer secondary

J605-4 Key

J605-5 Violet, 100VAC from transformer 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 Gray, +5V from J117-4

J606-6 Gray-Yellow, +12V loop from J606-7

J606-7 Gray-Yellow, +12V from J117-2

P.C. Board Legend

J1-J6	Coin Door Interface Board
J1xx	Power Driver Board
J2xx	CPU Board
J5xx	Audio Board
J6xx	Dot Matrix Controller Board
J9xx	Fliptronic II Board

LAMPS

Yellow (B+) Red

Column \ Row	1 Yellow-Brown J137-1 Q96	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	Perp 1 (White) 11	Perp 4 (White) 21	Perp 3 (White) 31	Crime Level 4 (White) 41	Stakeout 51	Right Extra Ball 61	Drop Target "J" 71	Award Stakeout 81
2 Red-Black J133-2 Q89	Perp 1 (Red) 12	Perp 4 (Red) 22	Perp 3 (Red) 32	Crime Level 3 (Red) 42	Safe-cracker 52	Right Start Feature 62	Drop Target "U" 72	Blackout Jackpot 82
3 Red-Orange J133-4 Q88	Perp 1 (Yellow) 13	Perp 4 (Yellow) 23	Perp 3 (Yellow) 33	Crime Level 2 (Yellow) 43	Pursuit 53	Tank Center 63	Drop Target "D" 73	Drain Shield 83
4 Red-Yellow J133-5 Q87	Perp 1 (Green) 14	Perp 4 (Green) 24	Perp 3 (Green) 34	Crime Level 1 (Green) 44	Ultimate Challenge 54	Award Sniper 64	Drop Target "G" 74	Judge Again 84
5 Red-Green J133-6 Q86	Perp 2 (White) 15	Perp 5 (White) 25	Lock 1 35	Meltdown 45	Manhunt 55	Air Raid 65	Drop Target "E" 75	Advance Crime Level 85
6 Red-Blue J133-7 Q85	Perp 2 (Red) 16	Perp 5 (Red) 26	Lock 2 36	Impersonator 46	Blackout 56	Left Center Feature 66	Award Safe-cracker 76	Tank Right 86
7 Red-Violet J133-8 Q84	Perp 2 (Yellow) 17	Perp 5 (Yellow) 27	Lock 3 37	Battle Tank 47	Sniper 57	Tank Left 67	Multi-ball Jackpot 77	Super Game 87
8 Red-Gray J133-9 Q83	Perp 2 (Green) 18	Perp 5 (Green) 28	Buy-in 38	Stop Meltdown 48	Pick A Prize 58	Mystery 68	Award Bad Impersonator 78	Start Button 88

J1XX = Power Driver Board

SWITCHES

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	Left Fire Button 11	Slam Tilt 21	Buy-In (Extra Ball) 31	Right Ball Shooter 41	Left Sling (2) 51	Globe Position #1 61	Magnet Over Ring 71	Trough 1 81	Black-Green J906-1 Right Flipper End of Stroke F1
Orange-Red (2) J205-2 Center Coin Chute D2	2 White-Red J209-2 U18-9	Right Fire Button 12	Front Door Closed 22	Not Used 32	Right Outlane 42	Right Sling (2) 52	Crane Exit 62	Top Right Opto 72	Trough 2 82	Blue-Violet J905-1 Right Flipper Opto F2
Orange-Black (3) J205-3 Right Coin Chute D3	3 White-Orange J209-3 U18-5	Credit (Start) 13	Ticket Dispenser 23	Left Rollover 33	Outside Right Return 43	Captive Ball 2 53	Left Ramp To Lock 63	Left Popper 73	Trough 3 83	Black-Blue J906-3 Left Flipper End of Stroke F3
Orange-Yellow (4) J205-4 4th Coin Chute D4	4 White-Yellow J209-4 U18-7	Plumb Bob Tilt 14	Always Closed 24	Inside Right Return 34	Super Game 44	Drop Target "J" 54	Left Ramp Exit 64	Right Popper 74	Trough 4 84	Blue-Gray J905-2 Left Flipper Opto F4
Orange-Green (5) J205-6 Normal Function Test Function Credits Escape Service Orange-Blue (6) J205-7 Normal Function Test Function Volume Down Down D6	5 White-Green J209-5 U19-11	Left Shoot Lane 15	Top Right Post 25	Top Center Rollover 35	Not Used 45	Drop Target "U" 55	Not Used 65	Top Ramp Exit 75	Trough 5 85	Black-Violet J906-4 Upper Right Flipper End of Stroke F5
Orange-Violet (7) J205-8 Normal Function Test Function Volume Up Up D7	6 White-Blue J209-7 U19-9	Left Outlane 16	Captive Ball 1 26	Left Score Post 36	Not Used 46	Drop Target "D" 56	Center Ramp Exit 66	Right Ramp Exit 76	Trough 6 86	Black-Yellow J905-3 Upper Right Flipper Opto F6
Orange-Gray (9) J205-9 Normal Function Test Function Begin Test Enter D8	7 White-Violet J209-8 U19-5	Left Return Lane 17	Mystery 27	Subway Enter 1 37	Not Used 47	Drop Target "G" 57	Left Ramp Enter 67	Globe Position #2 77	Top Trough 87	Black-Gray J906-5 Upper Left Flipper End of Stroke F7
	8 White-Gray J209-9 U19-7	3-Bank Targets 18	Not Used 28	Subway Enter 2 38	Not Used 48	Drop Target "E" 58	Captive Ball 3 68	Not Used 78	Not Used 88	Black-Blue J905-5 Upper Left Flipper Opto F8

J2XX = CPU Board, J9XX = Fliptronic II Board

= Opto. Typically Closed

WARNINGS & NOTICES

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