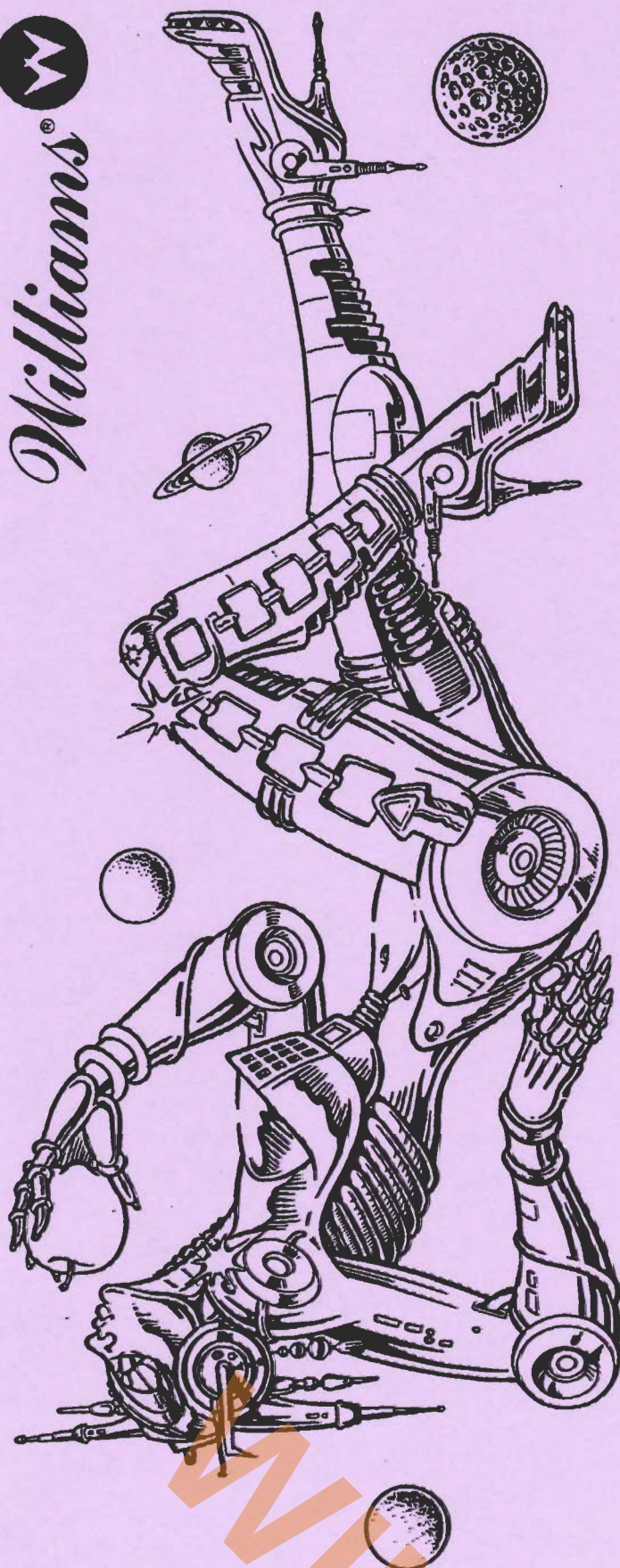


  
*Williams®*



## **THE MACHINE™** **OPERATIONS MANUAL**

- \* Game Rules & Playfield Shots
- \* Game Operation & Adjustments
- \* Game Testing & Problem Diagnosis
- \* Parts Information
- \* Reference Diagrams & Schematics

Williams Electronics Games, Inc.  
3401 N. California Ave.  
Chicago, IL 60618

## THE MACHINE Jumper Chart

|           | W14 | W15 | W16 | W17 | W18 |
|-----------|-----|-----|-----|-----|-----|
| American* | In  | In  | In  | In  | In  |
| French    | In  | In  | In  | Out | In  |
| German    | In  | In  | In  | In  | Out |

\* All of the above jumpers in, or two or more of these cut

## THE MACHINE Solenoid Table

| Sol. No.                             | Function                | Solenoid Type | Wire Color | Connections   | Driver Trnstr | Solenoid Part Number<br>Flashlamp Type |
|--------------------------------------|-------------------------|---------------|------------|---------------|---------------|----------------------------------------|
| 01                                   | Outhole                 | High Power    | Vio-Bm     | J130-1        | Q82           | AE-27-1200                             |
| 02                                   | Ball Release            | High Power    | Vio-Red    | J130-2        | Q80           | AE-26-1200                             |
| 03                                   | Under Playfield Kicker  | High Power    | Vio-Om     | J130-4        | Q78           | AE-23-800                              |
| 04                                   | Controlled Gate         | High Power    | Vio-Yel    | J130-5        | Q76           | A-14406                                |
| 05                                   | Skill Shot Kicker       | High Power    | Vio-Gm     | J130-6        | Q64           | AE-24-900                              |
| 06                                   | Wire Ball Holder        | High Power    | Vio-Blu    | J130-7        | Q66           | AE-26-1200                             |
| 07                                   | Knocker                 | High Power    | Bm-Blk     | J130-8        | Q68           | AE-23-800                              |
| 08                                   | Head Mouth              | High Power    | Vio-Gry    | J130-9        | Q70           | AE-30-2000                             |
| 09                                   | Upper Left Jet Bumper   | Low Power     | Bm-Blk     | J127-1        | Q58           | AE-26-1200                             |
| 10                                   | Left (sling) Kicker     | Low Power     | Bm-Red     | J127-3        | Q56           | AE-26-1500                             |
| 11                                   | Upper Right Jet Bumper  | Low Power     | Bm-Om      | J127-4        | Q54           | AE-26-1200                             |
| 12                                   | Right (sling) Kicker    | Low Power     | Bm-Yel     | J127-5        | Q52           | AE-26-1500                             |
| 13                                   | Lower Jet Bumper        | Low Power     | Bm-Gm      | J127-6        | Q50           | AE-26-1200                             |
| 14                                   | Jets Sling              | Low Power     | Bm-Blu     | J127-7        | Q48           | AE-26-1500                             |
| 15                                   | Head - Left Eye         | Low Power     | Bm-Vio     | J127-8        | Q46           | AE-30-2000                             |
| 16                                   | Head - Right Eye        | Low Power     | Bm-Gry     | J127-9        | Q44           | AE-30-2000                             |
| 17                                   | Billion Flasher         | Flasher       | Blk-Bm     | J125-1        | Q42           | #89 pfd                                |
| 18                                   | Left Ramp Flash         | Flasher       | Blk-Red    | J126-2 J125-2 | Q40           | #89 pfd, #906 Insert                   |
| 19                                   | Jackpot Flasher         | Flasher       | Blk-Om     | J126-3 J125-3 | Q38           | #89 pfd, #906 Insert                   |
| 20                                   | Skill Shot Flasher      | Flasher       | Blk-Yel    | J126-4        | Q36           | #89 pfd                                |
| 21                                   | Left Helmet Flasher     | Flasher       | Blu-Gm     | J126-6 J125-6 | Q28           | #555 pfd, #906 Insert                  |
| 22                                   | Right Helmet Flasher    | Flasher       | Blu-Blk    | J126-7 J125-7 | Q30           | #555 pfd, #906 Insert                  |
| 23                                   | Jets Enter Flash        | Flasher       | Blu-Vio    | J126-8 J125-8 | Q34           | #555 pfd, #906 Insert                  |
| 24                                   | Left Loop Flash         | Flasher       | Blu-Gry    | J126-9 J125-9 | Q32           | #555 pfd, #906 Insert                  |
| 25                                   | Helmet Lights Data Port | Special       | Blu-Bm     | J122-1        | Q26           |                                        |
| 26                                   | Helmet Light Clock Port | Special       | Blu-Red    | J122-2        | Q24           |                                        |
| 27                                   | Motor Relay             | Special       | Blu-Om     | J122-3        | Q22           | A-14423-1                              |
| 28                                   | Head Motor              | Special       | Blu-Yel    | J122-4        | Q20           | A-14119                                |
| <b>General Illumination Circuits</b> |                         |               |            |               |               |                                        |
| 01                                   | Backglass Body          | G.I.          | Wht-Bm     | J121-7        | Q18           | #555                                   |
| 02                                   | Used In Helmet          | G.I.          | Wht-Org    | J120-8        | Q10           | #555                                   |
| 03                                   | Rear Playfield          | G.I.          | Wht-Yel    | J120-9        | Q14           | #555                                   |
| 04                                   | Backglass - No Body     | G.I.          | Wht-Gm     | J121-11       | Q16           | #555                                   |
| 05                                   | Front Playfield         | G.I.          | Wht-Vio    | J120-11       | Q12           | #555                                   |
|                                      | Lower Right Flipper     |               | Blu-Yel    | J109-7        |               | FL-11630                               |
|                                      | Lower Left Flipper      |               | Gry-Yel    | J109-5        |               | FL-11630                               |

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# THE MACHINE

---

## PLAYFIELD SHOT MAPS & RULES

WILL

# **THE MACHINE BUILDING & OPERATION** **INSTRUCTIONS**

## **HEAD OBJECTIVES**

**FIRST FACE:** Shoot ball up Shuttle Ramp, lock in her mouth & activate **VOCAL CIRCUITS**.

**SECOND FACE:** Shoot two balls up Shuttle Ramp, lock in her eyes to activate **OPTICAL CIRCUITS** & start Multiball.

**THIRD FACE:** During Multiball two balls up Shuttle Ramp activate **MACHINE** & starts metamorphosis **TO HUMAN**.

**FOURTH FACE:** During multiball two balls up Shuttle Ramp gives her life & spins **BIG WHEEL** for millions of points or lights **1 BILLION** shot. **1 BILLION** is collected up Heart Ramp when 1 Billion is Lit.

## **BODY FUNCTIONS**

**FAR LEFT SHOT:** Spins Small Wheel for scores, lit Extra Ball, Extra Ball or Lit Jackpot. **JACKPOT**

collected when shot is Lit. During Multiball it's a Power Charge worth 100K to 1 Million points.

**LEFT LOOP:** Builds up lights to reach Lit Extra Ball.

**HEART RAMP:** 3 consecutive shots activate unlimited million.

**RIGHT LOOP:** Builds up lights to reach Lit Jackpot.

**BOTTOM LANE CHANGE:** Collects Extra Ball when Lit.

**BONUS MULTIPLIER:** Complete 3 stand up targets or go backwards through right loop.

**Build Jackpot---**Loops, Ramp Shots, and Spinner advance Jackpot.

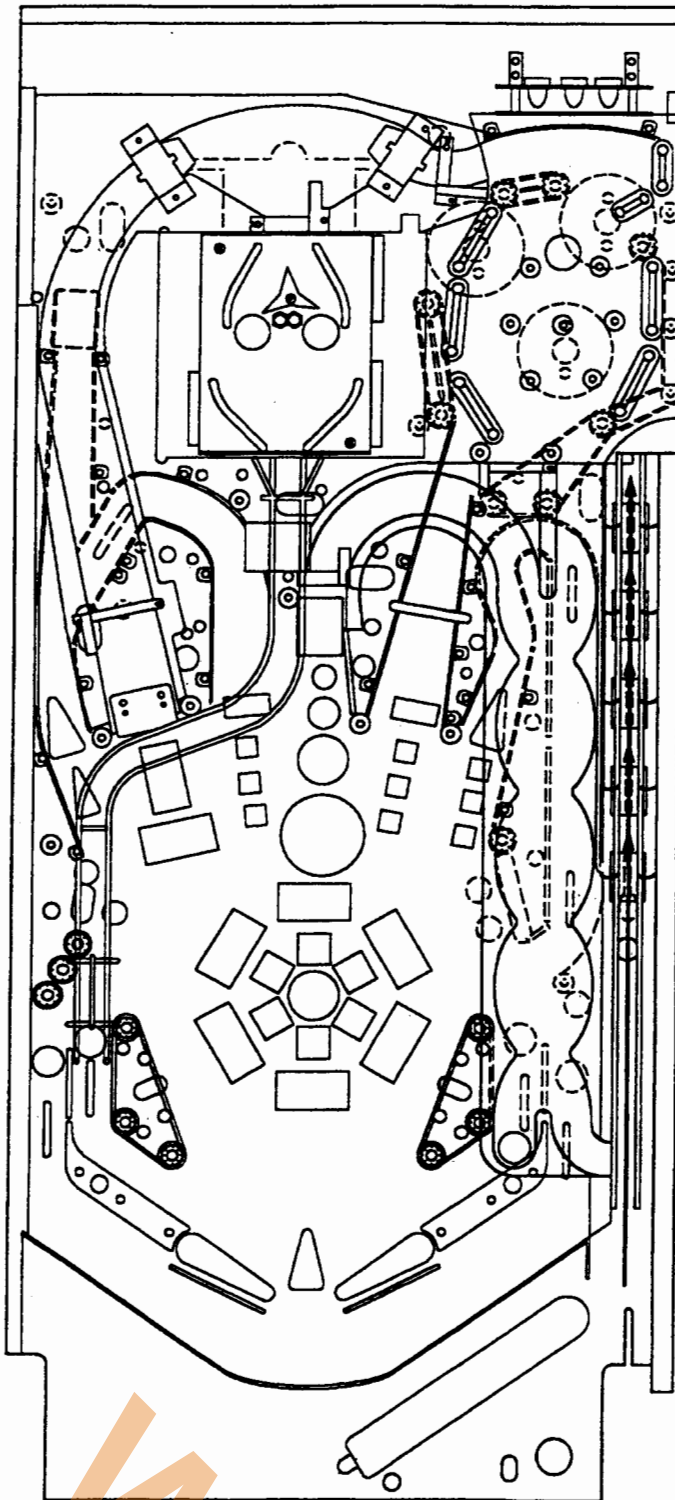
**Build Bonus---**Drains, return lanes, bumpers, and slingshots.

**End Of Ball Bonus---**(Bonus value + (10,000 points x # of loops this ball)) x Bonus Multiplier = End of Ball Bonus.

## **PINBOT**

**PINBOT** miniplayfield reached by Shuttle Ramp scores progressively higher & lights Extra Ball.

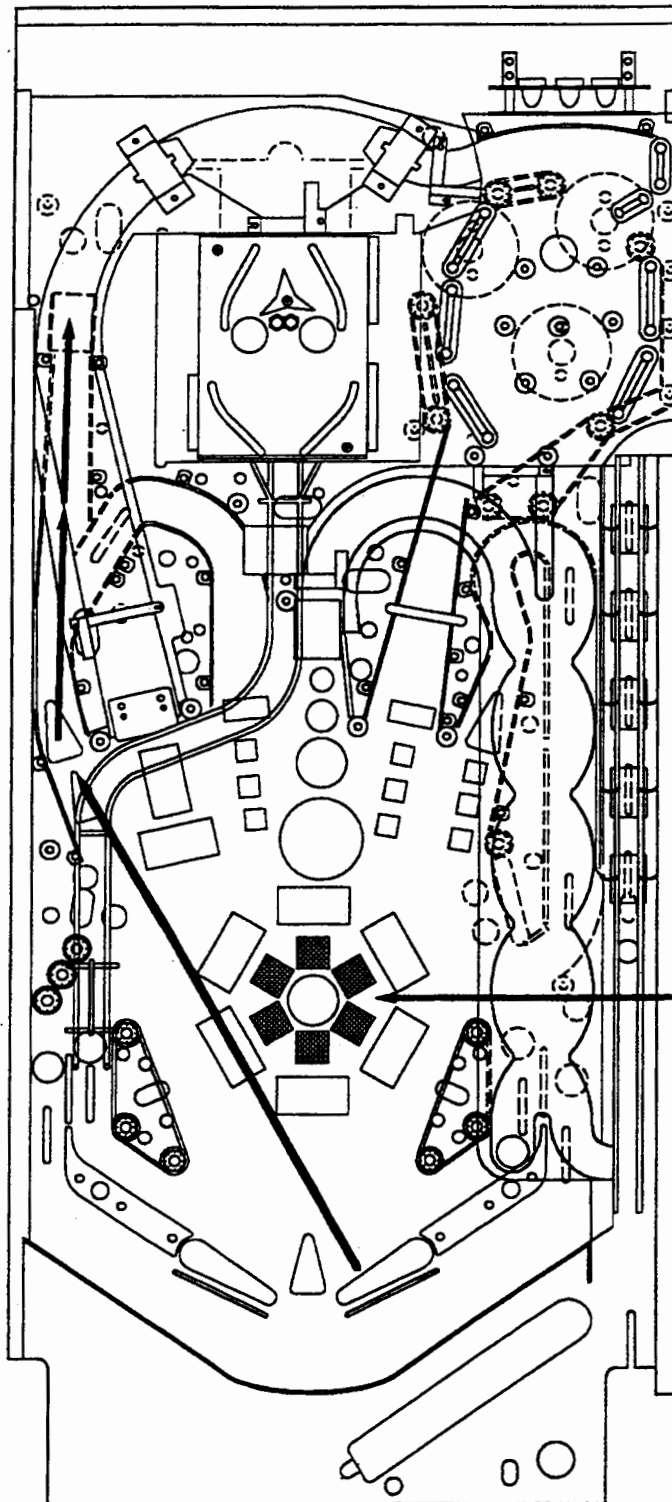
## The Machine Playfield Shot Maps



### Shuttle Skill Shot:

Shoot the plunger shot between the rubber cylinders to score the highest values.

## The Machine Playfield Shot Maps



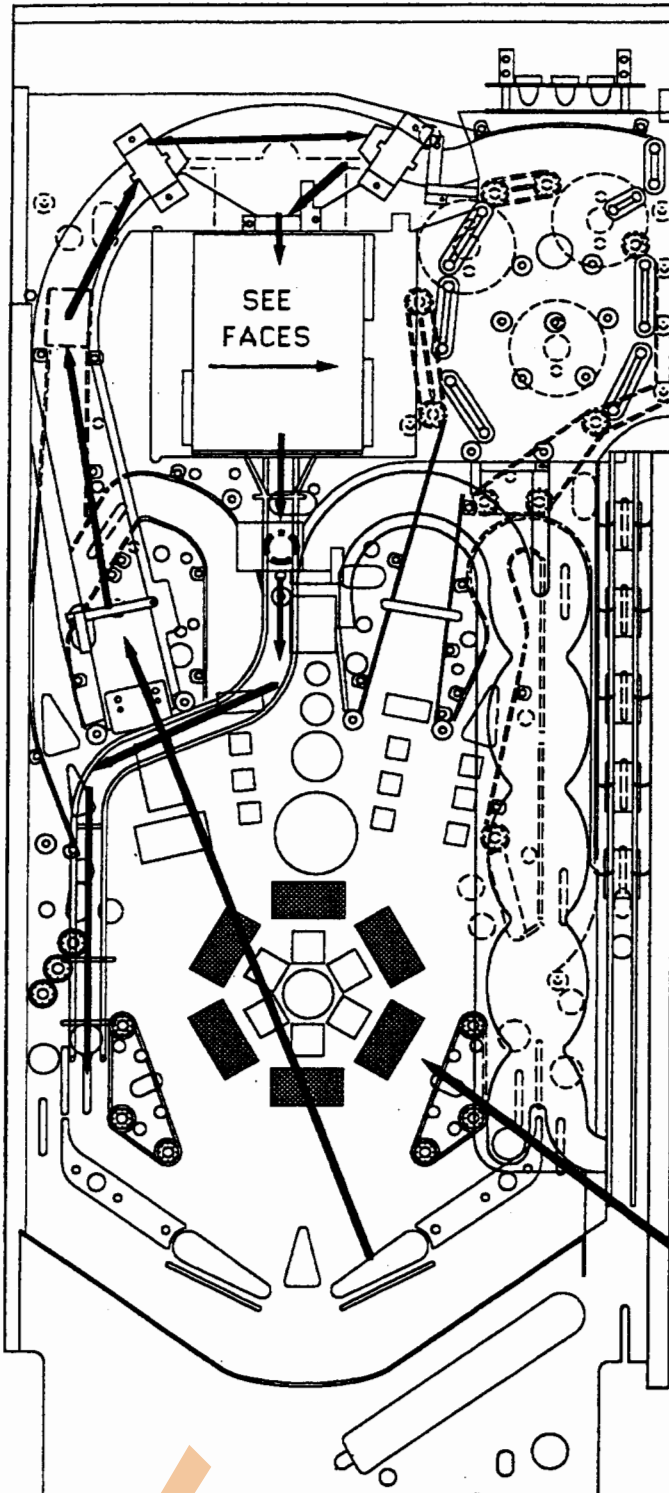
### Small Wheel Shot:

Far left shot spins small wheel for possible score. Light Extra Ball, Extra Ball, or Jackpot.

Far left shot also collects Jackpot when lit, & during Multiball it awards a Power Charge score of 100K to 1 Million points.

Small Wheel

## The Machine Playfield Shot Maps



### Machine Building Shot(s):

1. Shoot ball up Shuttle Ramp to Face 1 (mouth), activates vocal circuits.



2. Shoot two balls up Shuttle Ramp to Face 2 (eyes), activates optical link & starts Multiball.



3. Shoot two balls up Shuttle Ramp to Face 3 (neck) during Multiball; this begins metamorphosis to human & continues multiball.

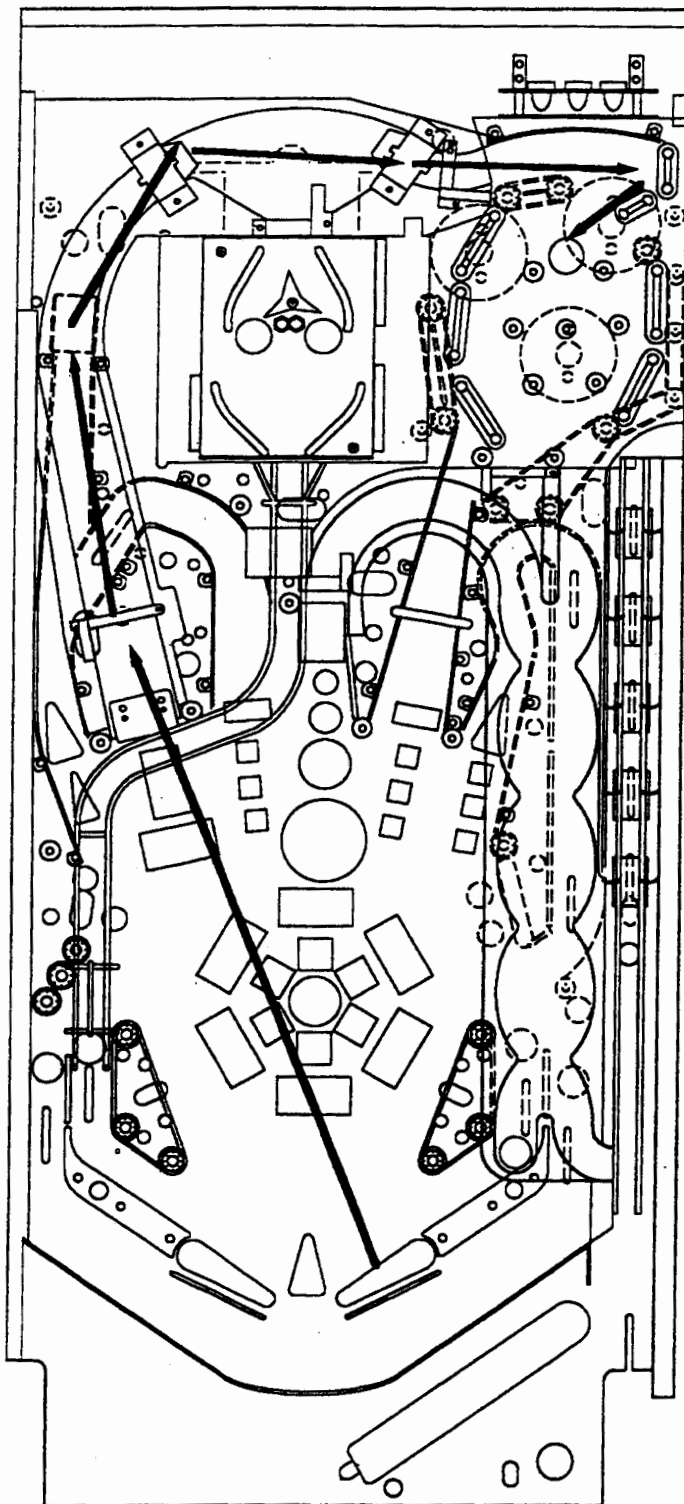


4. Shoot two balls up Shuttle Ramp to Face 4 (metamorphosis) during Multiball; this spins big wheel for millions of points or light 1 Billion Shot.



Big Wheel

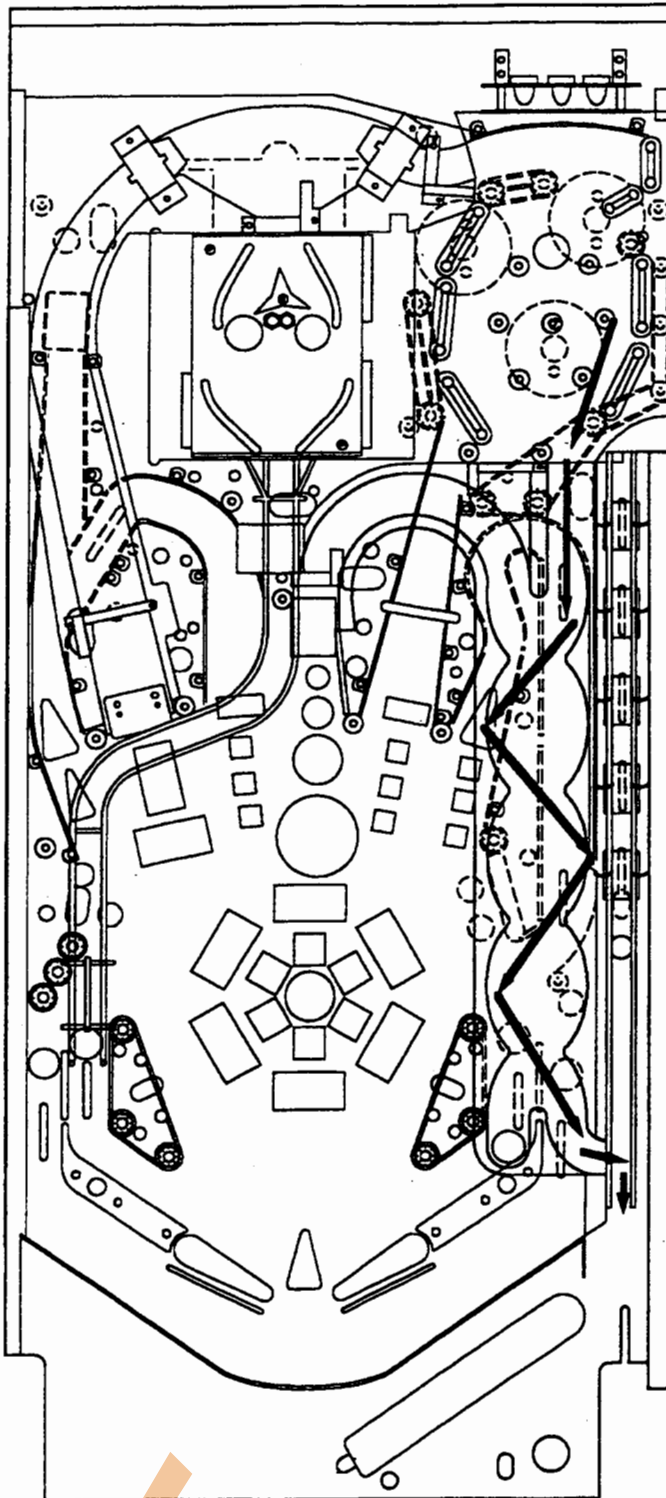
## The Machine Playfield Shot Maps



### Pinbot Shot:

Shoot Shuttle Ramp to enter Pinbot playfield area when Lit to score 100k, 200K, 300K, or 600K & Light Extra Ball.

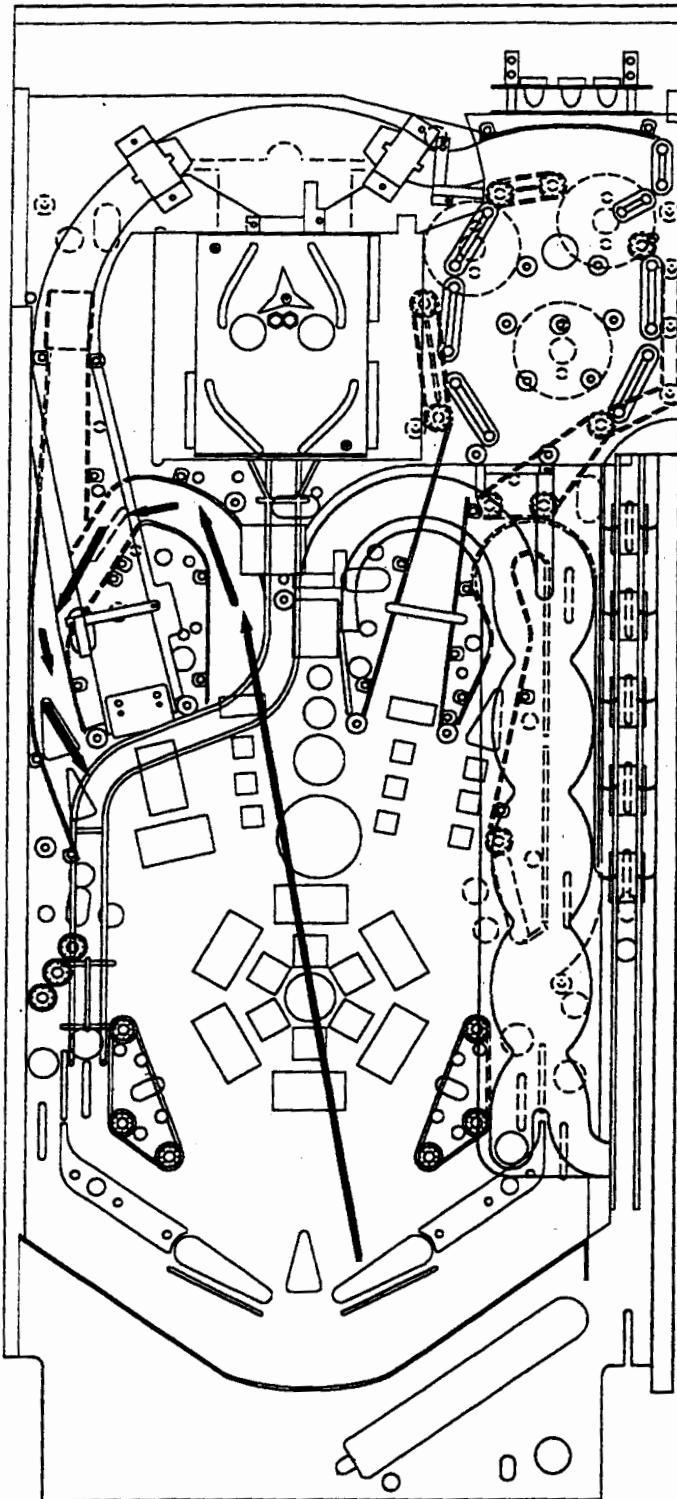
## The Machine Playfield Shot Maps



### Skill Shot Multiplier:

Leave Pinbot playfield on right side to increase skill shot multiplier for present ball. Shoot skill shot again.

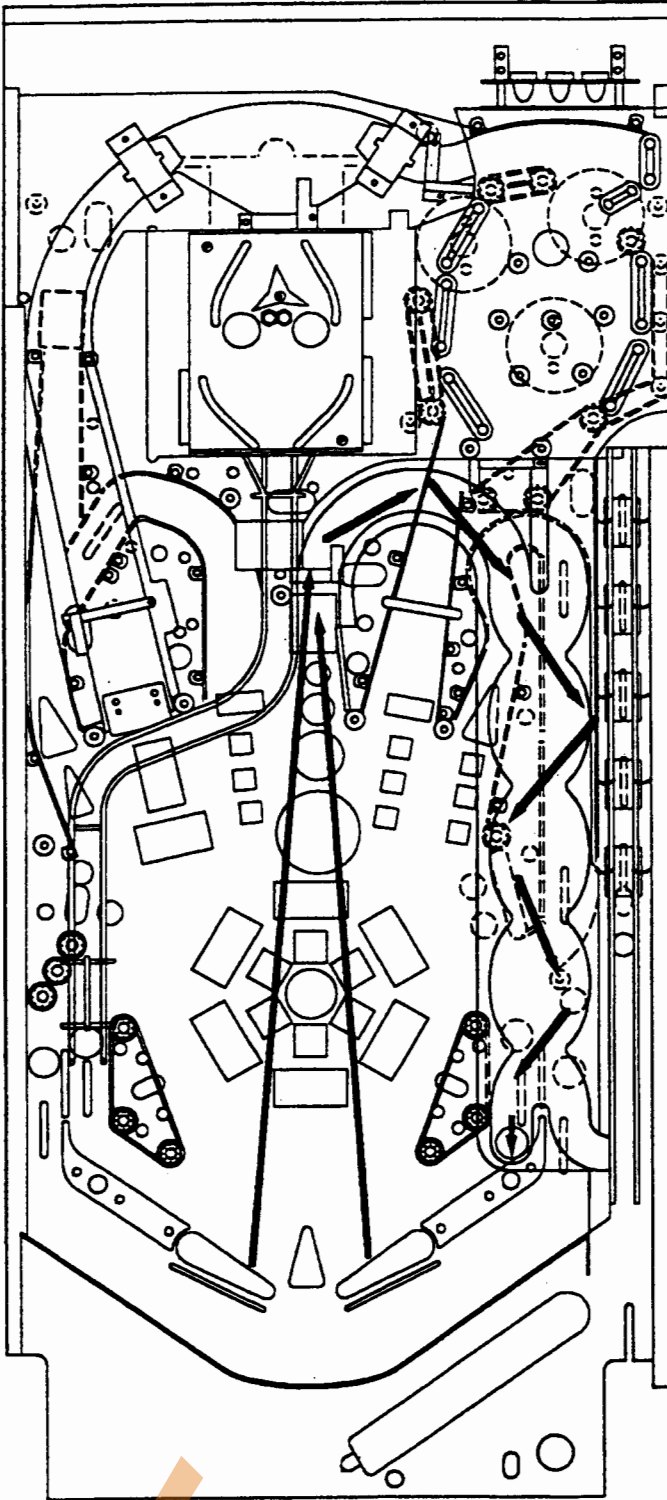
## The Machine Playfield Shot Maps



### Left Loop Shot:

Build up lights to score increasing point values and light Extra Ball.

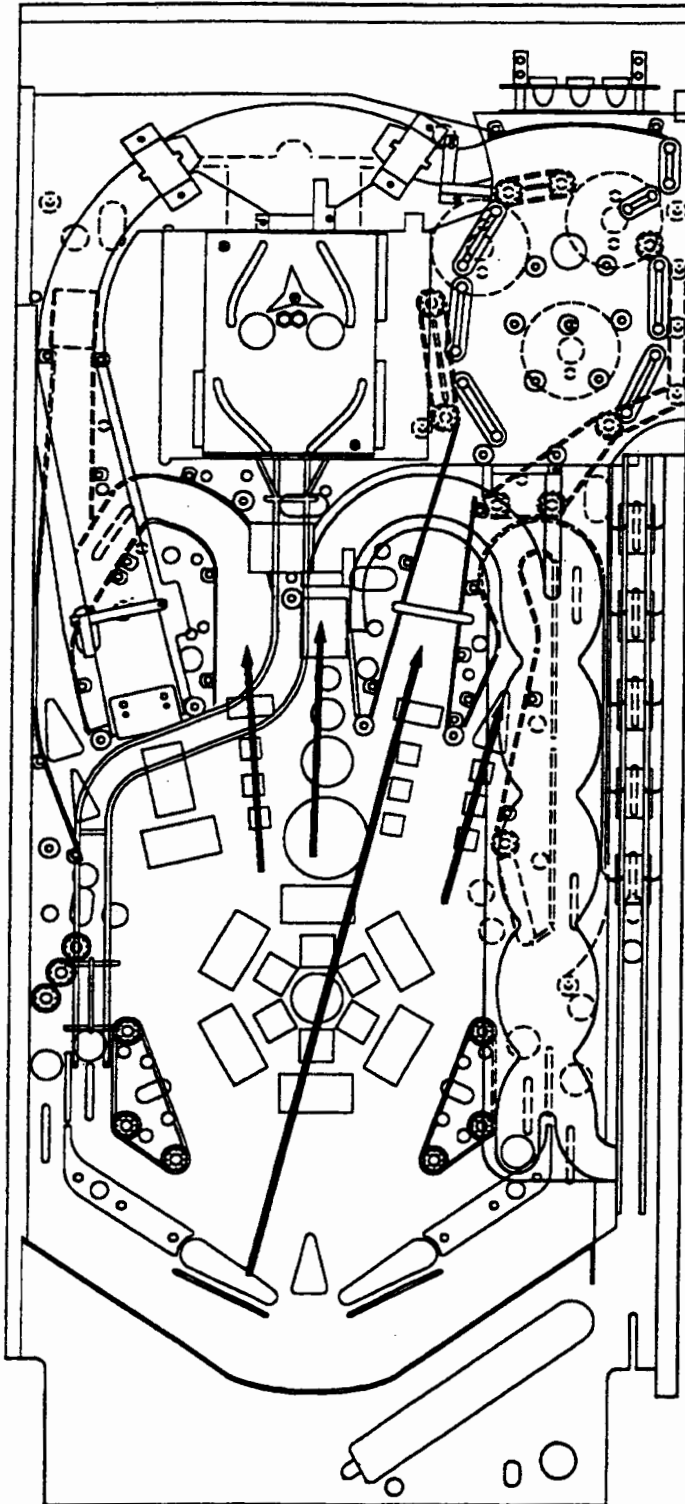
## The Machine Playfield Shot Maps



### Unlimited Million Shot:

Shoot Heart Ramp 3  
consecutive times for  
unlimited million (every  
consecutive shot up ramp  
worth one million points).

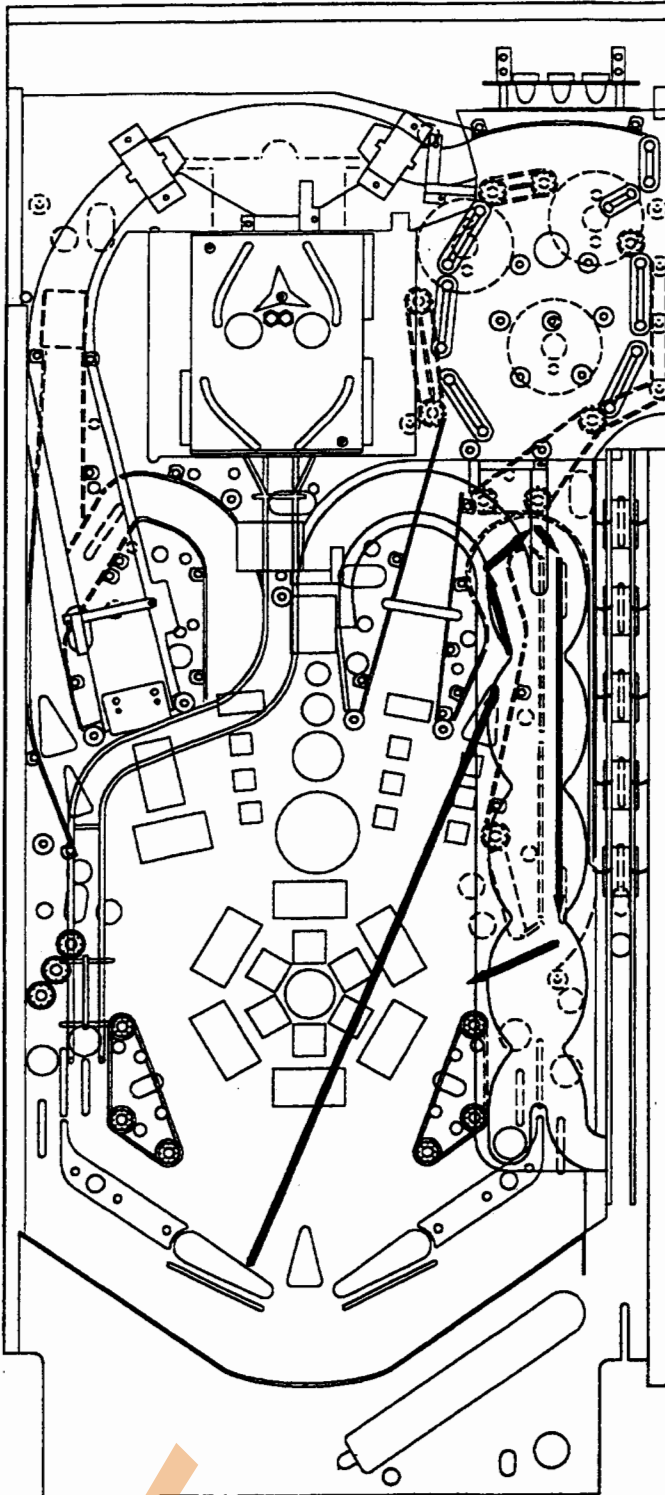
## The Machine Playfield Shot Maps



### Build Jackpot Shot(s):

Jackpot builds by shooting  
Loops, Heart Ramp Shot,  
and the Spinner.

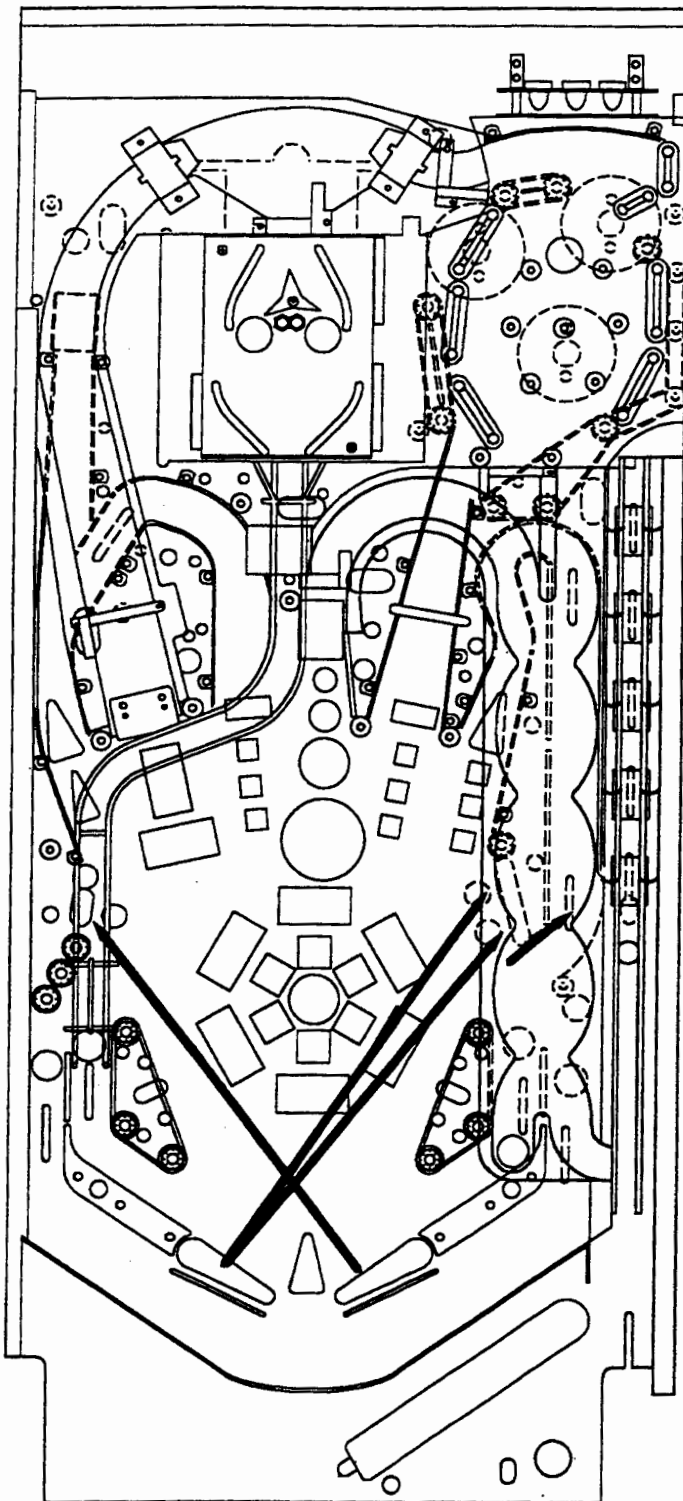
## The Machine Playfield Shot Maps



### Right Loop:

Build up lights to score  
increasing point values &  
"Light Jackpot."

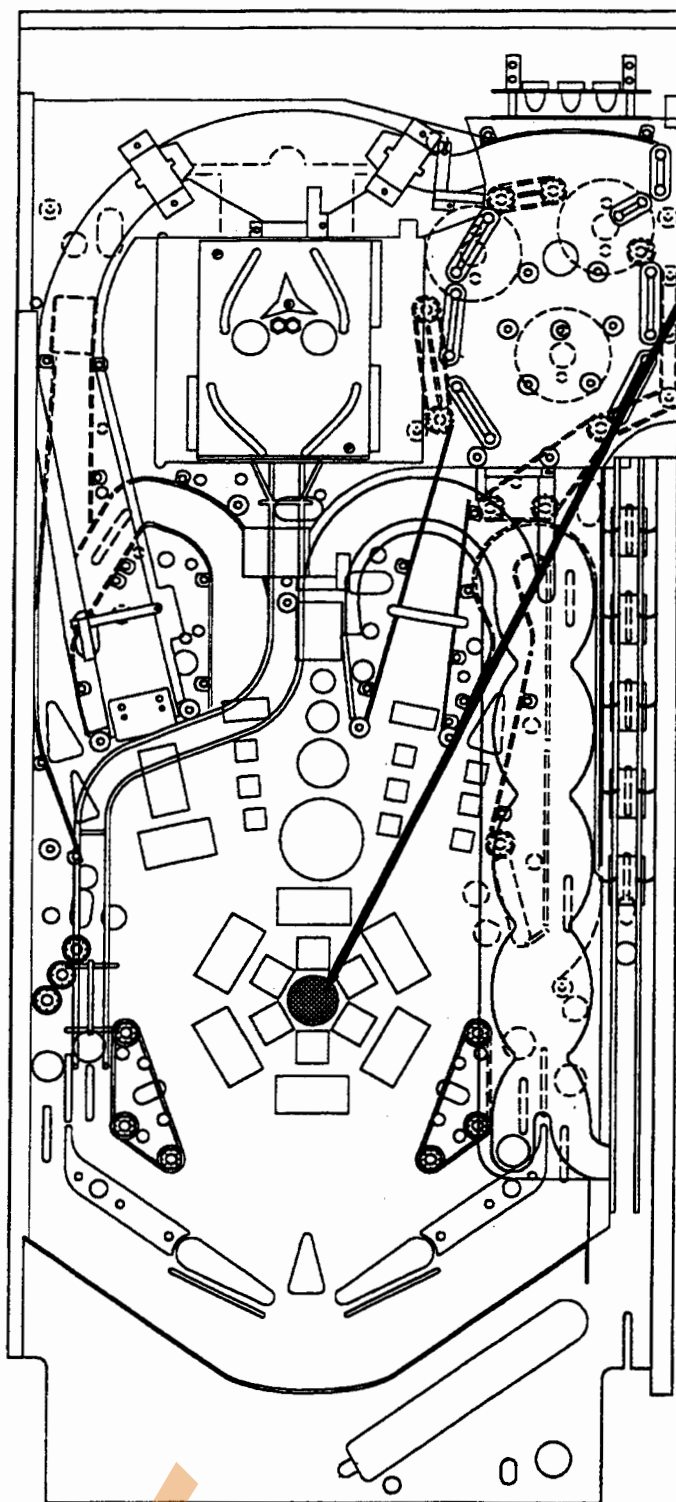
## The Machine Playfield Shot Maps



### Bonus Multiplier:

Complete three standup targets for bonus multiplier or go backwards through right loop.

## The Machine Playfield Shot Maps



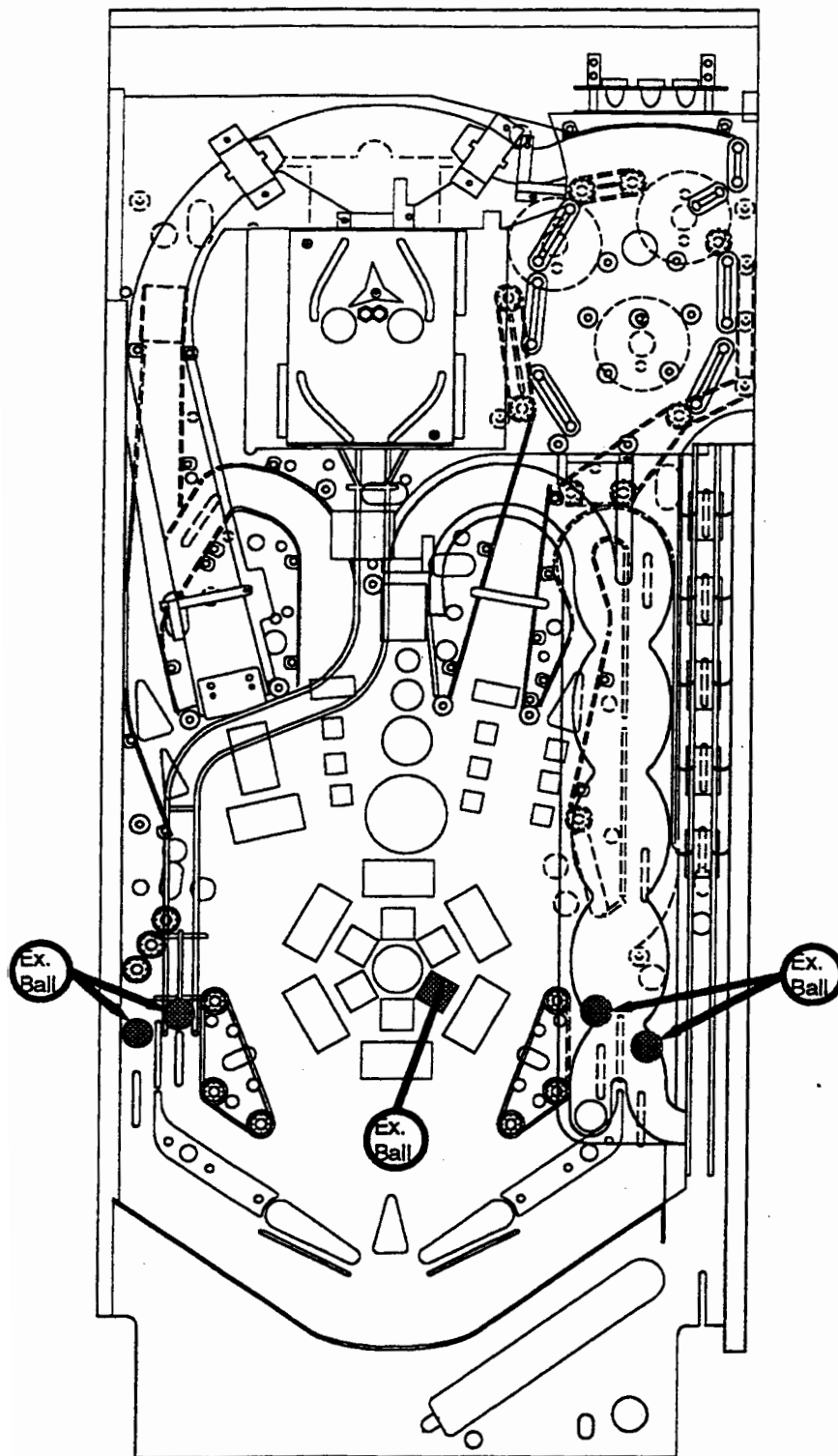
### Playfield Multiplier:

All playfield values are doubled during Multiball.

## The Machine Playfield Shot Maps

### Extra Ball:

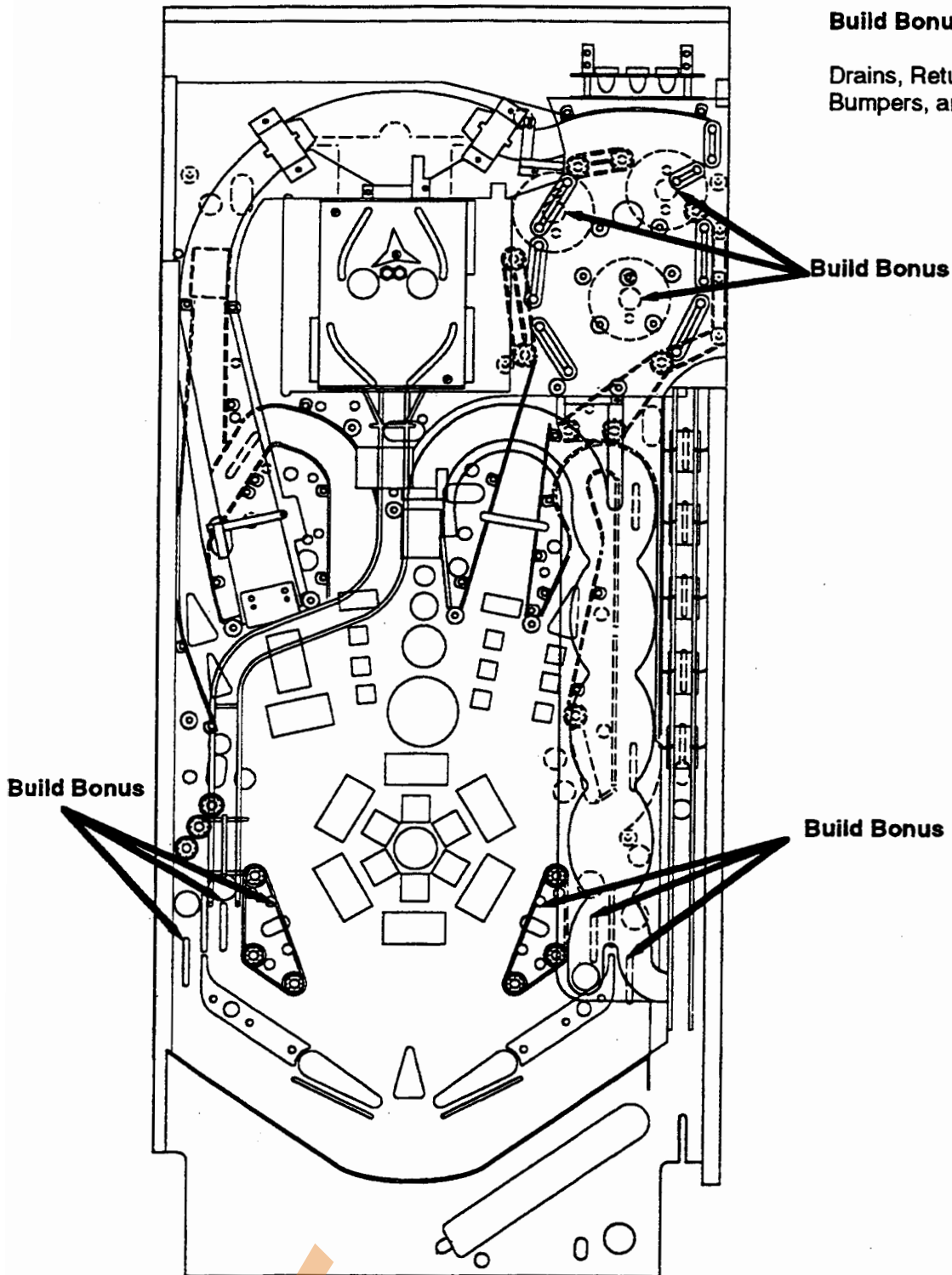
Collect off bottom lane  
change when Lit, or collect  
off spinning Small Wheel.



## The Machine Playfield Shot Maps

### Build Bonus:

Drains, Return Lanes,  
Bumpers, and Slingshots.





# Section 1

## *Game Operation & Test Information*

- **THE MACHINE (System WPC) ROM Summary**
- **Pinball Game Assembly Instructions**
- **Game Play**
- **Menu System Operation**
  - Adjustments**
  - Audits**
  - Test/Diagnostic Procedures**
  - Utilities**

### **THE MACHINE (System WPC) ROM Summary**

|                    | <b>IC</b> | <b>TYPE</b> | <b>LOCATION</b> | <b>BOARD</b> | <b>PART NUMBER</b> |
|--------------------|-----------|-------------|-----------------|--------------|--------------------|
| Game ROM 1         | 27010     |             | U6              | CPU          | A-5343-50002-1     |
| Music/Speech ROM 2 | 27010     |             | U15             | Audio        | A-5343-50002-2     |
| Music/Speech ROM 3 | 27010     |             | U18             | Audio        | A-5343-50002-3     |

### **NOTICE**

To order a replacement ROM from your authorized WILLIAMS ELECTRONICS GAMES distributor, specify: (1) part number (if available); (2) ROM label color; (3) ROM level (number) on the label; (4) which game the ROM is used in.

## CONNECTOR & COMPONENT IDENTIFICATION

Since **THE MACHINE** uses WILLIAMS ELECTRONICS GAMES' WPC Electronics System, a new technique to identify connectors and other game components must be introduced. Each plug or jack 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); P306 designates plug 6 of board 3 (a Display Driver 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 circuit. 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
- 3- Display Driver Board
- 4- Dual or Single Display Board
- 5- Sound Board

## CIRCUIT BOARDS

WPC Circuit Boards for **THE MACHINE** are in the backbox. They are accessible by unlocking the Backbox, removing the Backglass, unlatching the Insert Board, and swinging it open.

Lamp circuit boards are mounted under the Playfield.

**CPU Board** The WPC CPU Board, P/N A-12742-50002, must be equipped with the ROM specified in the ROM Summary.

**Sound Board** The Sound Board P/N A-12738-50002, must be equipped with the ROMs specified in the ROM Summary.

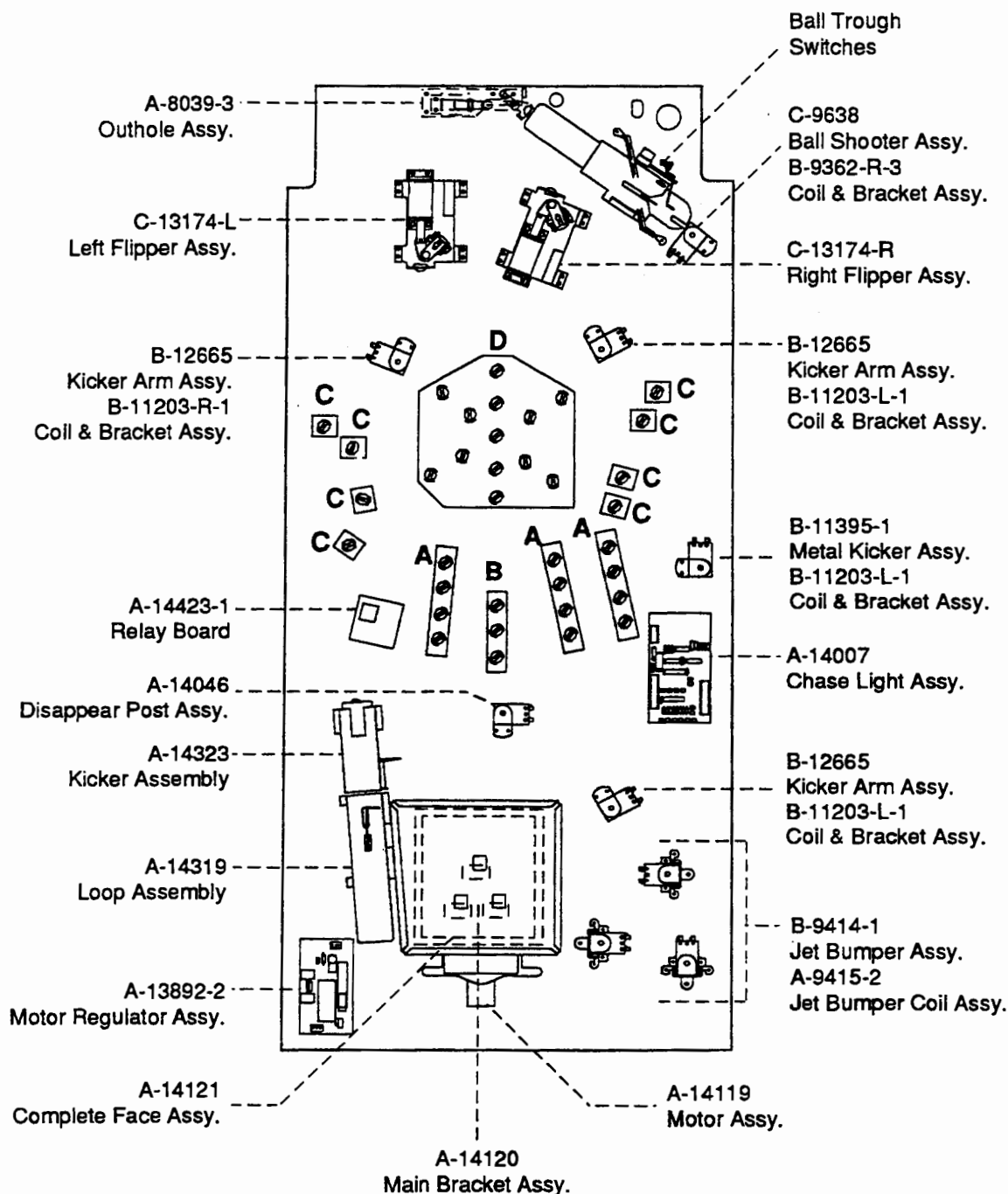
**Power Driver Board** The Power Driver Board is P/N A-12697.

**Display Driver Board** The Display Driver Board is P/N A-12739-1, -2, or -3. The dash number indicates whether an extended display is used, and if so, how many. No extended display = -1, one extended display = -2, two extended displays = -3. **THE MACHINE** uses the A-12739-1 Display Driver Board.

**Single Display Board** The Single Display Board is p/n A-12794.

## Locations Diagram - Game Major Mechanisms

*Underside of Playfield, Viewed in Raised Position*



### Lamp Boards

|           |                |                      |
|-----------|----------------|----------------------|
| <b>A.</b> | <b>A-14305</b> | <b>4-Lamp Board</b>  |
| <b>B.</b> | <b>A-14302</b> | <b>3-Lamp Board</b>  |
| <b>C.</b> | <b>B-12224</b> | <b>1-Lamp Board</b>  |
| <b>D.</b> | <b>A-14304</b> | <b>13-Lamp Board</b> |

## GAME CONTROL LOCATIONS

### Cabinet Switches

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

The Start Button is a pushbutton 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 pushbutton 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 switch places credits on the game that are not included in the game audits.

The Volume Up switch raises the sound level of the game. Press and hold the button until the desired level is reached.

The Volume Down switch 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 switch starts the Menu System Operation and changes the Coin Door Switches from Normal Function to Test Function.

#### Test Function

The Escape switch allows you to get out of a menu selection or return to the Attract Mode.

The Up switch allows you to cycle forward through the menu selections or adjustment choices.

The Down switch allows you to cycle backward through the menu selections or adjustment choices.

The Enter switch allows you to get into a menu selection or lock in an adjustment choice.

### Coin Door Switches

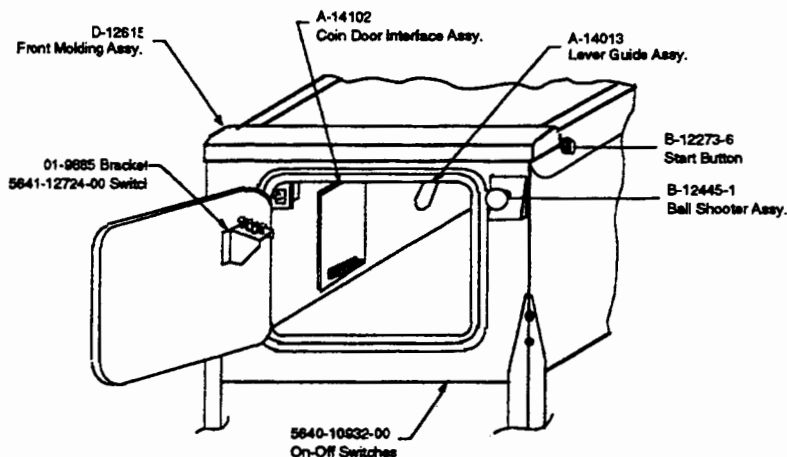
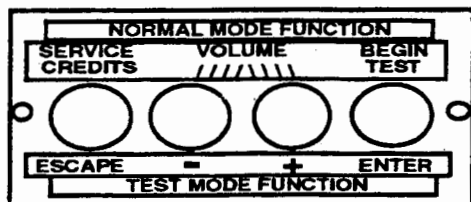
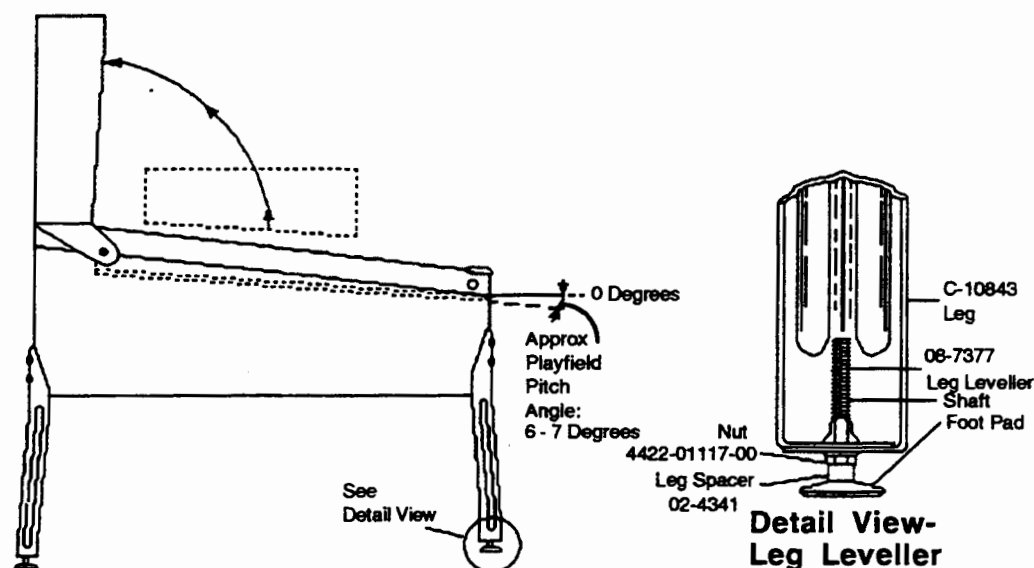


Figure 2. Pinball Game Controls Locations

## PINBALL GAME ASSEMBLY INSTRUCTIONS

1. Open the shipping container; remove all cartons, parts, and other items, and set them aside.
2. Place the cabinet on a support and attach rear legs using leg bolts. Leg levelers and leg bolts are provided among the parts in the cash box.
3. Attach the front legs (after installing leg levelers), using leg bolts. See Figure 3 for details.



**Figure 3. Pinball Assembly, Playfield Pitch Angle, and Leg Leveler Details.**

4. Reach into the cabinet and backbox and ensure that the interconnecting cables are free to move (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 block holding the Insert Board. Unlatch and open the Insert 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 Board and latch it in position. Reinstall the backglass, and lock the backbox.

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

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

7. Unlock and open the coin door. Locate the Molding Latch Lever, and move the 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 toward the right, and close the coin door. *Carefully* slide the glass downward, until it clears the grooves of the Left and Right Side Moldings. Lift the glass up and away from the game, storing it carefully to avoid breakage.

8. Place a level or an inclinometer on the playfield surface. Adjust the leg levelers for proper playfield level (side-to-side) and playfield pitch angle (incline) of approximately 6-7 degrees. 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, as shown in Figure 3.

#### 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.

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

10. Verify that the *required number* of balls are installed in the game. **THE MACHINE** uses 3 balls.

11. Install playfield mylars if desired.

12. Clean and reinstall the playfield cover glass, reversing the procedure of step 7. Prepare the game for player operation.

## GAME OPERATION

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

**POWERING UP.** Perform the following 'power up' routine upon completion of the assembly and installation procedure, as well as at the beginning of each period of game operation. Initially, it will confirm that the game is in proper operating condition; later, it will aid the operator via its messages (refer to later text entitled "Problem Analysis Messages").

**Procedure.** With the coin door closed, plug the game in, and switch it ON, using the On-Off switch. In normal operation, the displays initially show the last score. Then, the game goes into the Attract Mode (playfield and backbox lamps flashing, sounds being heard, etc., if the operator does not change the Factory Setting).

Open the coin door and press the BEGIN TEST switch to begin the game test routine. The left score display shows the game name, and the right score display shows the game number and game software revision. The message changes. The left score display shows the sound software revision, and the right score display shows the revision level of the system software and the date the game software was revised.

**THE MACHINE**  
50002                      Rev. L-1

**Sound Rev. L-1**  
SY. 0.90                      1-3-91

Perform the entire test menu routine to verify that the game is operating satisfactorily (refer to later text entitled "Menu System Operation"). Successful completion of the tests shows that the game is ready to begin earning your investment return.

After the game has been on location for a period of time, the test routine may be preceded by messages concerning game problems. The text entitled 'Problem Analysis Messages' contains more details concerning messages displayed at each game turn-on.

**ATTRACT MODE\*.** Playfield and backbox lamps blink. The player score displays exhibit a series of messages informing the player concerning:

- A. Recent highest scores\*;
- B. A "custom message"  
("GIVE ME VOICE, GIVE ME SIGHT, GIVE ME LIFE, THE MACHINE.")\*;
- C. The score to achieve to obtain a Replay award\*;

These (or similar) displays reappear occasionally, accompanied by sounds and music, until a player initiates game play by inserting a coin or, when credits are available, pressing the Start button.

\* - operator-adjustable feature

**CREDIT POSTING.** Insert coin(s). A sound is heard for each coin, and the player score displays show 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 player score display decreases by one. The left score display flashes 00 (until the first playfield switch is actuated), and the right score display shows ball 1, except for 4-player games where the ball # shows in the individual player's display. 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 Slam Tilt switch on the coin door inside the cabinet ends the current game and then 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.

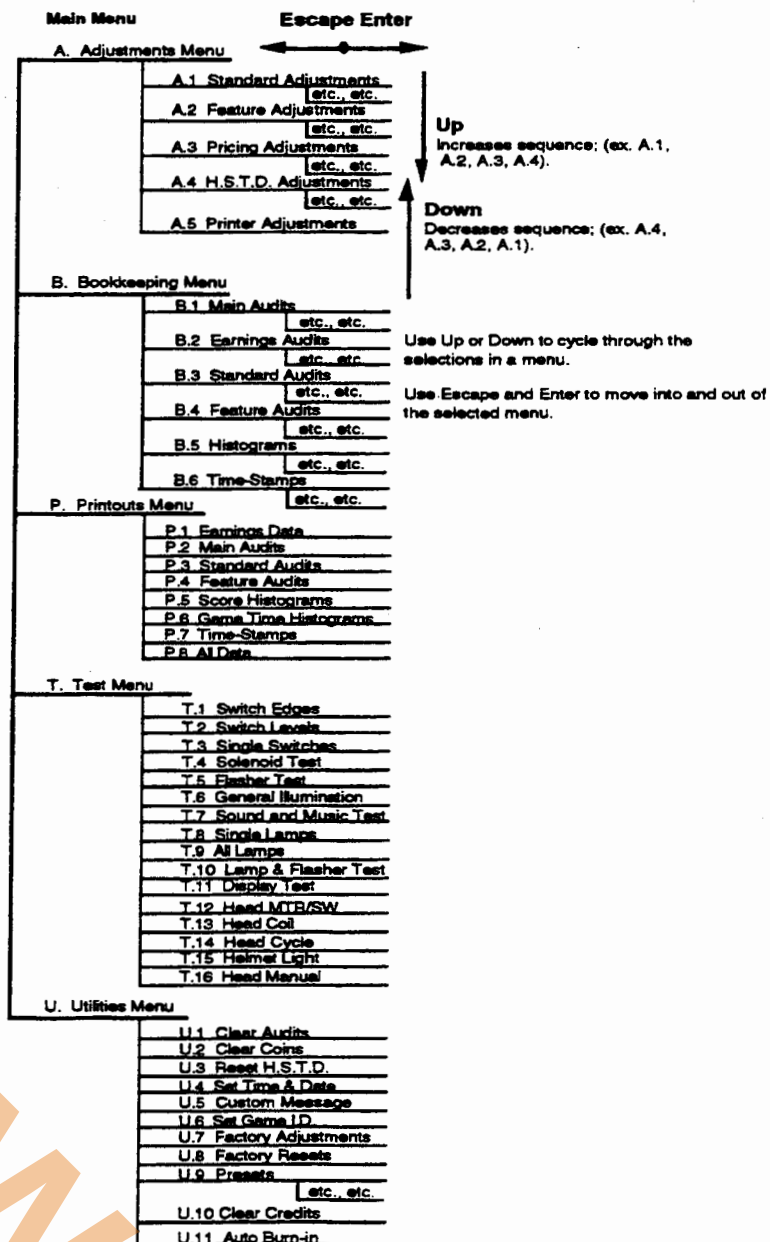
**END OF GAME.** All earned scores and bonuses are awarded. If a player's final score exceeds the specified value, the player receives a designated award for achieving the current highest score. A random digit set\* appears in the display. Credit\* may be awarded, when the last two digits of any player's score display (1 through 4) match the random digits. Match, high score, and game over sounds are made, as appropriate.

**GAME OVER MODE.** The GAME OVER display shows in the player score displays. Then, the high scores flash on the appropriate player score displays. The game proceeds to the Attract Mode.

\* - operator-adjustable feature

## MENU SYSTEM OPERATION

**THE MACHINE** operates on a Menu System. The Main Menu allows you to choose from several main categories, which in turn lead to other menus to choose from. To enter the Menu System, open the coin door and press the Begin Test button. The displays show the Game I.D. Mode. Press the Enter button and the Main Menu appears. To cycle through the Main Menu selections press either the Up or Down button. Activate any selection by pressing the Enter button when the desired selection appears in the displays. To return to the Attract Mode while viewing the Main Menu, or to return to a previous menu selection, press the Escape button. Press the Start button for HELP at any time.



## MAIN MENU

- A. Adjustments
- B. Bookkeeping
- P. Printouts (optional board required)
- T. Tests
- U. Utilities

The game Adjustments are the first category available from the Main Menu. Press the Enter button to activate the Adjustments Menu. Press the Up or Down button to cycle through the Adjustment Menu selections. Press the Enter button to activate the desired Adjustment Group when that group appears in the displays.

### 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)

Once you have entered the adjustment group desired, press the Up or Down button to cycle through the available adjustments in that group. When the desired adjustment appears press the Enter button to activate that adjustment. When an adjustment is activated, the setting value begins to flash. Use the Up or Down button to raise or lower the setting value. When the desired value is displayed press Enter to lock in the value. IF you realize you have made an error, press the Escape button while "Saving Adjustment Value" is displayed. The new value is ignored and the original value is retained.

#### **A.1 Standard Adjustments**

- A.1 01 **Balls Per Game**  
The operator defines a "game" by specifying the number of balls to be played. The range of this setting is 1 through 10.
- A.1 02 **Tilt Warnings**  
The operator specifies the number of total actuations of the plumb bob mechanism that can occur before the game is "tilted". The range of this setting is 1 through 10.
- A.1 03 **Maximum Extra Balls**  
The operator chooses the number of Extra Balls that a player may accumulate. The range of this setting is 1 through 10, or "No Extra Ball" (extra ball disabled).
- A.1 04 **Maximum Extra Balls/Ball in Play**  
The operator chooses the number of Extra Balls to be awarded per ball in play. The range of this setting is:
  - OFF - No maximum number of Extra Ball per ball in play.
  - 1-10 - 1 through 10 Extra Balls per ball in play.

**A.1 05     Replay System**

The operator chooses the replay system to be used. The choices are:

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

**A.1 06     Replay Percent\***

The operator chooses the percentage of replays the players are able to earn when Auto Replay is used. The range of this setting is 5% to 50%.

**A.1 07     Replay Start\***

The operator chooses the replay starting value when Auto% Replay is used. The range of this setting is 1, 000, 000 to 15, 000, 000.

**A.1 08     Replay Levels\***

The operator chooses the number of replay levels used by the Auto% Replay mode. The range of this setting is 1 through 4. When the operator chooses two replay levels, 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 value.

**A.1 09     Replay Level 1\*\***

The operator chooses the value to be used for the first Fixed Replay. The range of this setting is 00 to 25, 000, 000.

**A.1 10     Replay Level 2\*\***

The operator chooses the value to be used for the second Fixed Replay. The range of this setting is 00 to 25, 000, 000.

**A.1 11     Replay Level 3\*\***

The operator chooses the value to be used for the third Fixed Replay. The range of this setting is 00 to 25, 000, 000.

**A.1 12     Replay Level 4\*\***

The operator chooses the value to be used for the fourth Fixed Replay. The range of this setting is 00 to 25, 000, 000.

**A.1 13     Replay Boost**

The operator chooses if 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=0, when the player inserts another coin, or when Begin Test is pressed. The choices are:

- ON -       Score is boosted between 500, 000 and 5, 000, 000 points.
- OFF -       The replay score is not boosted.

\*For Auto % Replay. \*\* For Fixed Replay

**A.1 14      Replay Award**

For either Auto% Replay or Fixed Replay the operator can choose the form of the award automatically provided when the player exceeds any replay level. The choices are:

- 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 operator can choose the award automatically provided when the player scores a special. The choices are:

- Credit -        Scoring a Special awards a Credit.
- Ticket -        Scoring a Special awards a Ticket.
- Ball -         Scoring a Special awards an Extra Ball.
- Points -        Scoring a Special awards 1 Million points.

**A.1 16      Match Award**

The operator can choose the award automatically provided when the players wins a match. The choices are:

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

**A.1 17      Extra Ball Ticket**

The operator can choose whether a Ticket is awarded when the player earns an Extra Ball. The choices are:

- 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 operator can choose the amount of Tickets each player can earn. The range of this setting is 00 to 100.

**A.1 19      Match Feature**

The operator can choose the desired percentage for the Match Feature occurring at the end of the game. The range of this setting is:

- OFF -         Match Feature is not available.
- 1-50% -       1% is 'hard'; 50% is 'extremely easy'. During the Match Feature the game 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 result in the award of a Credit or a Ticket.

- A.1 20 Custom Message**  
The operator chooses if a message is displayed during the Attract Mode.  
The choices are:
- YES - A message is displayed  
NO - A message is not displayed.
- A.1 21 Language**  
The operator chooses what language the game uses. The choices are, English, French, or German.
- A.1 22 Clock Style**  
The operator chooses what style of clock the game uses. The choices are A.M./P.M. or 24 Hours.
- A.1 23 Date Style**  
The operator chooses what style of date the game uses. The choices are Month/Date/Year, or Date/Month/Year.
- A.1 24 Show Date and Time**  
The operator chooses whether the date and time show in the Attract Mode. The choices are:
- YES - Show the date, time in status report or in the Attract Mode.  
NO - Do Not show date, time in status report or in the Attract Mode.
- A.1 25 Allow Dim Illumination**  
The operator chooses whether to allow the game program to dim the General Illumination for special effects and during the Attract Mode. The choices are:
- YES - Allow dimming the General Illumination during the Attract Mode & Effects.  
NO - Do Not dim the General Illumination.
- A.1 26 Tournament Play**  
The operator chooses whether to equalize Multi-ball and Jackpots during multi-player games, (do not carry over to next player). The choices are:
- YES - Keep Multi-ball and Jackpots equal.  
NO - Do Not Keep Multi-ball and Jackpots equal.
- A.1 27 Euro. Scr. Format**  
The operator chooses whether to have commas or dots between digits when numbers are displayed. The choices are:
- 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 operator chooses whether the volume can be turned Off. The choices are:
- YES - Volume can be turned Off.  
NO - Volume can be turned Down but not Off.

Press the Escape button to return to the Adjustments Menu. Press the Up button to advance to the next desired Adjustments Group, (or press the Down button to return to a previous group). Press the Enter button to activate. Use the Up or Down button to cycle through the available adjustments.

## **A.2 Feature Adjustments**

- A.2 01 Extra Ball Percentage**  
The operator selects the percentage of times the game will award an Extra Ball when the Small Wheel is spun. (Setting Range: 0% - 99%)
- A.2 02 Extra Ball Lit Off Wheel Percentage**  
The operator selects the percentage of times the game will award an Extra Ball Lit when the Small Wheel is spun. (Setting Range: 0% - 99%)
- A.2 03 Jackpot Lit Off Wheel Percentage**  
The operator selects the percentage of times the game will award a Jackpot Lit when the Small Wheel is spun. (Setting Range: 0% - 99%)
- A.2 04 Big Wheel 1 Million**  
The operator selects the percentage of times the game will award 1 Million when the Small Wheel is spun. (Setting Range: 0% - 99%)
- A.2 05 Big Wheel 10 Million**  
The operator selects the percentage of times the game will award 10 Million when the Small Wheel is spun. (Setting Range: 0% - 99%)
- A.2 06 Big Wheel 50 Million**  
The operator selects the percentage of times the game will award 50 Million when the Small Wheel is spun. (Setting Range: 0% - 99%)
- A.2 07 Big Wheel Lit Billion**  
The operator selects the percentage of times the game will award Lit Billion Shot when the Big Wheel is spun. (Setting Range: 0% - 99%)
- A.2 08 Special Percentage**  
The operator selects the percentage of times the game will award a Special when the Big Wheel is spun. (Setting Range: 0% - 99%)
- A.2 09 Left Loop Time Down Rate**  
The operator selects the rate at which the four lights on the left loop time down once lit. (Setting Range: 0 - 99 seconds)
- A.2 10 Right Loop Time Down Rate**  
The operator selects the rate at which the four lights on the right loop time down once lit. (Setting Range: 0 - 99 seconds)
- A.2 11 Right Ramp Time Down Rate**  
The operator selects the rate at which the three lights on the right ramp time down once lit. (Setting Range: 0 - 99 seconds)

## A.2 Feature Adjustments Continued

- A.2 12 Jackpot Time Out Rate**  
The operator selects the rate at which the jackpot will time down & go out once lit. (Setting Range: 0 - 99 seconds)
- A.2 13 Billion Lit Time Down**  
The operator selects the rate at which the Billion Shot will time down & go out once lit. (Setting Range: 0 - 99 seconds)
- A.2 14 Consolation Extra Ball Time**  
The operator can choose whether a less skilled player can obtain an extra ball easier. An extra ball lane will be lit if the player's score is less than 1 million and the game time is less than or equal to the consolation time. (Setting Range: 0 - 99 seconds - selecting 0 seconds will disable this feature)
- A.2 15 Billionaire Club On/Off**  
The operator can choose whether the Billionaire Club Members (people who score 1 billion or more) HSTD table is displayed in attract mode. These scores are Not Cleared when a "High Score Reset Every" occurs. The choices are:  
ON - The billionaire club members will be displayed.  
OFF - The billionaire club members will not be displayed.
- A.2 16 Credits For Becoming a Billionaire**  
The operator selects the number of credits or tickets awarded for players who score a billion or more points. (Setting Range: 00 - 10)
- A.2 17 Extra Ball Lit Memory**  
The operator chooses whether or not the extra ball lanes remain lit ball to ball or reset at the start of each new ball. The choices are:  
YES - The extra ball lamps are carried over from ball to ball.  
NO - The extra ball lamps are reset at the start of each ball.
- A.2 18 Jet Lane Memory**  
The operator chooses whether or not the four lights leading to the jet bumpers are carried over from ball to ball or are reset for each new ball. The choices are:  
YES - The Jet Lane lamps are carried over from ball to ball.  
NO - The Jet Lane lamps are reset at the start of each ball.
- A.2 19 Attract Mode Sounds**  
The operator can select whether or not the attract mode has sound to attract the player. The choices are:  
YES - The attract mode does have sound.  
NO - The attract mode does not have sound.
- A.2 20 Enter Mini Playfield (Pinbot)**  
The operator can select how often the control gate that allows the ball to enter the mini (Pinbot) playfield is opened. The choices are:  
HARD - The gate is open once on the first face & twice on the second face.  
EASY - The gate is open once on the first face & once on the second face.
- A.2 21 Family Mode**  
The operator can remove certain speech that might be found offensive in a family-type establishment. The choices are:  
YES - Remove Speech.  
NO - Use ALL Speech.
- A.2 22 Singing Mode**  
The operator can prevent the singing from being played when a player gets to the fourth face. The choices are:  
YES - Allow Singing.  
NO - Do Not Allow Singing.
- A.2 23 Combination Loop Start**  
The operator can select how many consecutive loops it takes to get the first combination loop award. The range of this setting is: 1 - 10 loops.

Press the Up button to advance to the next desired Adjustment Group, (or press the Down button to return to a previous Adjustment Group). Press the Enter button to activate that group. Press the Up or Down button to cycle through the available adjustments in that group.

### **A. 3 Pricing Adjustments**

- A.3 01 Game Pricing (if set to custom, then 02 to 09 are available)**  
The operator chooses the cost for a game from a selection of Standard pricing or by installing Custom pricing.
- A.3 02 Left Coin Units**  
The operator can specify the number of coin units purchased by a coin passing through the left coin chute.
- A.3 03 Center Coin Units**  
The operator can specify the number of coin units purchased by a coin passing through the center coin chute.
- A.3 04 Right Coin Units**  
The operator can specify the number of coin units purchased by a coin passing through the right coin chute.
- A.3 05 4th Slot Units**  
The operator can specify the number of coin units purchased by a coin passing through the fourth coin chute.
- A.3 06 Units/Credits**  
The operator 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**  
The operator can specify that 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 operator specifies the number of credits that are awarded when the Units/Bonus level is achieved.
- A.3 09 Minimum Units**  
The operator can specify that 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 to 15 based on standard coin doors (U.S.A., German, etc.).

- A.3 11 Collection Text**  
The operator chooses what coin system is used to display the Earning Audits.
- A.3 12 Left Slot Value**  
The operator can specify the monetary value of the left coin chute.
- A.3 13 Center Slot Value**  
The operator can specify the monetary value of the center coin chute.
- A.3 14 Right Slot Value**  
The operator can specify the monetary value of the right coin chute.
- A.3 15 4th Slot Value**  
The operator can specify the monetary value of the 4th coin chute.
- A.3 16 Maximum Credits**  
The operator can specify 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 10. Reaching the specified setting prevents the award of any credits.
- A.3 17 Free Play**  
The operator can specify whether a player can operate the game without a coin (free play) or with a coin. The choices are:
- NO - A coin is necessary for game play.
  - YES - Game play is free; no coin required.
- A.3 18 Hide Coin Audits**  
The operator chooses whether or not to show the coin audits. The choices are:
- 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 the game pricing is set to 1 for 50¢/2 for \$1.00 the operator chooses whether 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. The choices are:
- YES - The player has 10 seconds to buy-in at 1 coin per game.
  - NO - The buy-in feature is disabled.

# THE MACHINE Pricing Table

| Country                                                                                                                 | Coin Chute |         |                                       | Games/Coin                                 | Display      | Pricing Adjustments A.3 |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|-------------------------------------------------------------------------------------------------------------------------|------------|---------|---------------------------------------|--------------------------------------------|--------------|-------------------------|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|
|                                                                                                                         | Left       | Center  | Right                                 |                                            |              | 02                      | 03 | 04 | 05 | 06 | 07 | 08 | 09 |  |    |    |    |    |    |    |    |    |
| USA                                                                                                                     | 25¢        | -       | 25¢                                   | 1/25¢, 4/\$1 <sup>2</sup>                  | U.S.A. 4/\$1 |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         |            |         | 1/50¢, 2/75¢, 3/\$1 <sup>1,2</sup>    | 50¢ - 75¢ - \$1                            |              |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         |            |         | 1/50¢, 2/\$1 <sup>2</sup>             | U.S.A. 2/\$1                               |              |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         |            |         | 1/25¢, 3/\$1 <sup>2</sup>             | U.S.A. 3/\$1                               |              |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         |            |         | 1/25¢, 3/50¢, 6/\$1                   | CUSTOM                                     | 01           |                         |    |    |    |    |    |    |    |  | 04 | 01 | 00 | 01 | 02 | 01 | 00 |    |
|                                                                                                                         |            |         | 1/25¢, 5/\$1                          | CUSTOM                                     | 01           | 00                      | 01 | 00 | 01 | 04 | 01 | 00 |    |  |    |    |    |    |    |    |    |    |
| Canada                                                                                                                  | 25¢        | -       | \$1                                   | 1/50¢, 2/75¢, 3/\$1 <sup>2</sup>           | CANADA 1     |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         |            |         | 1/50¢, 2/\$1 <sup>2</sup>             | CANADA 2                                   |              |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Austria                                                                                                                 | 5 Sch      | 10 Sch  | 10 Sch                                | 1/2x5 Sch, 3/2x10 Sch <sup>2</sup>         | AUSTRIA      |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 5 Sch      | -       | 10 Sch                                | 2/5 Sch, 5/10 Schilling                    | CUSTOM       |                         |    |    |    |    |    |    |    |  | 02 | 00 | 05 | 00 | 01 | 00 | 01 | 00 |
| Australia                                                                                                               | 20¢        | -       | \$1                                   | 1/3x20¢, 2/\$1 <sup>2</sup>                | AUSTRALIA    |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| United Kingdom                                                                                                          | 10 P       | 50 P    | 1£                                    | 1/2x10 P, 3/50 P, 7/1£ <sup>2</sup>        | U.KINGDOM    |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 10 P       | 50 P    | 20P                                   | 1/10 P, 5/50 P, 2/20 Pence                 | CUSTOM       | 01                      | 05 | 02 | 00 | 01 | 00 | 01 | 00 |  |    |    |    |    |    |    |    |    |
| Switzerland                                                                                                             | 1 Fr       | 2 Fr    | 5 Fr                                  | 1/1 Fr, 3/2 Fr, 7/5 Franc <sup>2</sup>     | SWISS        |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 1 Fr       | -       | 2 Fr                                  | 1/1 Fr, 3/2 Fr                             | CUSTOM       |                         |    |    |    |    |    |    |    |  | 03 | 00 | 06 | 00 | 02 | 00 | 01 | 00 |
| Belgium                                                                                                                 | 5 Fr       | 20 Fr   | 50 Fr                                 | 1/4X5 F, 1/20 F, 3/50 F <sup>2</sup>       | BELGIUM      |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| West Germany                                                                                                            | 1 DM       | 2 DM    | 5 DM                                  | 1/1 DM, 2/2 DM, 7/5 DMark <sup>2,3</sup>   | GER. 7/5 DM  |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         |            |         | 1/1 DM, 2/2 DM, 6/5 DM <sup>1,2</sup> | GER. 6/5 DM                                |              |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         |            |         | 1/1 DM, 3/2 DM, 9/5 DM                | CUSTOM                                     |              |                         |    |    |    |    |    |    |    |  | 09 | 18 | 45 | 00 | 05 | 00 | 01 | 00 |
|                                                                                                                         |            |         | 1/2x1 DM, 1/2 DM, 3/5 DM              | CUSTOM                                     | 03           | 06                      | 15 | 00 | 05 | 00 | 01 | 00 |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         |            |         | 2/1 DM, 5/2 DM, 14/5 DM               | CUSTOM                                     | 13           | 26                      | 65 | 00 | 05 | 65 | 01 | 00 |    |  |    |    |    |    |    |    |    |    |
| Netherlands                                                                                                             | 1 Hfl      | 2.5 Hfl | 2.5 Hfl                               | 1/1 Hfl, 3/2.5 Holland Florin <sup>2</sup> | NETHERLND    |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 25¢        | -       | 1G                                    | 1/25¢, 5/1 Guilder                         | CUSTOM       |                         |    |    |    |    |    |    |    |  | 01 | 00 | 05 | 00 | 01 | 00 | 01 | 00 |
|                                                                                                                         | 1G         | -       | 1G                                    | 1/1 Guilder <sup>2</sup>                   | HOLLAND      |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Sweden                                                                                                                  | 5 Kr       | 5 Kr    | 5 Kr                                  | 1/5 Krona <sup>2</sup>                     | SWEDEN       |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 1 Kr       | -       | 1 Kr                                  | 1/2x1 Krona                                | CUSTOM       |                         |    |    |    |    |    |    |    |  | 01 | 04 | 01 | 00 | 02 | 00 | 01 | 01 |
| France                                                                                                                  | 1 Fr       | 5 Fr    | 10 Fr                                 | 2/5 F, 4/10 F, 9/2x10 Franc <sup>1,2</sup> | TARIF 1      |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 1 Fr       | 5 Fr    | 10 Fr                                 | 1/2x1 F, 3/5 F, 7/10 Franc                 | TARIF 2      |                         |    |    |    |    |    |    |    |  | 03 | 15 | 30 | 30 | 05 | 30 | 01 | 00 |
|                                                                                                                         | 1 Fr       | 5 Fr    | 10 Fr                                 | 1/5 F, 3/10 F, 7/2x10 Franc                | TARIF 3      |                         |    |    |    |    |    |    |    |  | 03 | 15 | 30 | 30 | 10 | 60 | 01 | 15 |
|                                                                                                                         | 1 Fr       | 5 Fr    | 10 Fr                                 | 1/3 x 1 F, 2/5 F, 5/10 Franc               | TARIF 4      |                         |    |    |    |    |    |    |    |  | 02 | 10 | 20 | 20 | 05 | 40 | 01 | 10 |
|                                                                                                                         | 1 Fr       | 5 Fr    | 10 Fr                                 | 2/5 F, 5/10 F, 11/2x10 Franc               | TARIF 5      |                         |    |    |    |    |    |    |    |  | 01 | 05 | 10 | 10 | 02 | 20 | 01 | 05 |
|                                                                                                                         | 1 Fr       | 5 Fr    | 10 Fr                                 | 1/5 F, 3/10 F (5 ball play)                | TARIF 6      |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Italy                                                                                                                   | 500L       | 500L    | 500L                                  | 1/500 Lire <sup>2</sup>                    | ITALY        |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Spain                                                                                                                   | 25 P       | -       | 100 P                                 | 1/25 P, 5/100 Peseta <sup>2</sup>          | SPAIN        |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 25 P       | -       | 100 P                                 | 1/25 P, 4/100 Peseta                       | CUSTOM       | 01                      | 00 | 04 | 00 | 01 | 00 | 01 | 00 |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 25 P       | -       | 100 P                                 | 1/2x25 P, 2/100 Peseta                     | CUSTOM       | 01                      | 00 | 04 | 00 | 02 | 00 | 01 | 00 |  |    |    |    |    |    |    |    |    |
|                                                                                                                         | 25 P       | -       | 100 P                                 | 1/2x25 P, 3/100 Peseta                     | CUSTOM       | 03                      | 00 | 12 | 00 | 04 | 00 | 01 | 06 |  |    |    |    |    |    |    |    |    |
| Japan                                                                                                                   | 100 ¥      | -       | 100 ¥                                 | 1/100 Yen <sup>2</sup>                     | JAPAN        |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Antilles, Nthrd                                                                                                         | 25¢        | -       | 1G                                    | 1/25¢, 4/1 Guilder <sup>2</sup>            | ANTILLES     |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Chile                                                                                                                   | Token      | -       | Token                                 | 1/1 Token <sup>2</sup>                     | CHILE        |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Denmark                                                                                                                 | 1 Kr       | 5 Kr    | 10 Kr                                 | 1/2x1 Kr, 3/5 Kr, 7/10 Krone <sup>2</sup>  | DENMARK      |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Finland                                                                                                                 | 1 Mka      | -       | 5 Mka                                 | 1/2x1 Mka, 3/5 Markka <sup>2</sup>         | FINLAND      |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| New Zealand                                                                                                             | 20¢        | -       | 20¢                                   | 1/3x20¢ <sup>2</sup>                       | N. ZEALAND   |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Norway                                                                                                                  | 5 Kr       | -       | 10 Kr                                 | 1/5 Kr, 2/10 Kr, 5/20 Krone <sup>2</sup>   | NORWAY       |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Argentina                                                                                                               | 10¢        | 10¢     | 10¢                                   | 1/1 Token <sup>2</sup>                     | ARGENTINA    |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Greece                                                                                                                  | 10 D       | 20 D    | 50 D                                  | 1/2x10D, 1/20D, 3/50 Drachma <sup>2</sup>  | GREECE       |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Hungary                                                                                                                 | 10 F       | 20 F    | 20 F                                  | 1/1x20F, 1/2x10F, 3/2x20 Forint            | HUNGARY      |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |
| Notes: 1. Factory Default. 2. Standard Setting - Change by pressing Enter button. 3. Other functions are also affected. |            |         |                                       |                                            |              |                         |    |    |    |    |    |    |    |  |    |    |    |    |    |    |    |    |

Notes: 1. Factory Default. 2. Standard Setting - Change by pressing Enter button. 3. Other functions are also affected.

Press the Escape button to return to the Adjustment Menu. Press the Up button to advance to the next desired Adjustment Group, (or press the Down button to return to a previous Adjustment Group). Press the Enter button to activate that group. Press the Up or Down button to cycle through the available adjustments in that group.

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

### **A.4 01 Highest Scores**

The operator specifies whether the game is to maintain a record of the four highest scores achieved to date. The choices are:

- OFF - No high scores are recorded, or displayed.
- ON - The four highest scores, Grand Champion, & Billionaire Club H.S. are stored in memory and displayed in the Attract Mode.

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

The operator chooses the award given for achieving the High Score To Date, or the Champion H.S.T.D.. The choices are a Credit or a Ticket.

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

The operator chooses whether the "Highest" High Score is displayed in the Attract Mode. This score is not cleared when "High Score Reset Every" occurs. The choices are:

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

### **A.4 04 Champion Credits**

The operator chooses the number of credits or tickets awarded for a Grand Champion Score. The range of this setting is 00 through 10.

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

The operator selects the number of credits or tickets to be awarded whenever a player exceeds the previous Highest Score. The range of this setting is 00 to 10.

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

The operator selects the number of credits or tickets to be awarded whenever a player exceeds the second highest score. The range of this setting is 00 to 10.

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

The operator selects the number of credits or tickets to be awarded whenever a player exceeds the third highest score. The range of this setting is 00 to 10.

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

The operator selects the number of credits or tickets to be awarded whenever a player exceeds the fourth highest score. The range of this setting is 00 to 10.

### **A.4 09 High Score Reset Every**

The operator can specify that the game will provide an automatic reset of the displayed "Highest scores", and the number of games to be played before the reset occurs. The values provided upon reset are those selected by the operator in the Back-up High Scores. The range of this setting is OFF (disabled) and 250 to 20,000.

- A.4 10 Backup Champion**  
The operator sets the Back-up Grand Champion Score. The range of this setting is 00 through 99, 900, 000.
- A.4 11 Backup H.S.T.D. 1**  
The operator can set the Back-up High Score value. The game automatically restores this value when the High Score Reset Every value is reached. The range of this setting is 00 to 99, 900, 000.
- A.4 12 Backup H.S.T.D. 2**  
The operator can set the second Back-up High Score value. The game automatically restores this value when the High Score Reset Every value is reached. The range of this setting is 00 to 99, 900, 000.
- A.4 13 Backup H.S.T.D. 3**  
The operator can set the third Back-up High Score value. The game automatically restores this value when the High Score Reset Every value is reached. The range of this setting is 00 to 99, 900, 000.
- A.4 14 Backup H.S.T.D. 4**  
The operator can set the fourth Back-up High Score value. The game automatically restores this value when the High Score Reset Every value is reached. The range of this setting is 00 to 99, 900, 000.

Press the Up button to advance to the next desired Adjustment Group, (or press the Down button to return to a previous Adjustment Group). Press the Enter button to activate that group. Press the Up or Down button to cycle through the available adjustments in that group.

## **A.5 Printer Adjustments (optional board required)**

- A.5 01 Column Width**  
The operator chooses the column width to be printed. The range of this setting is 22 through 80.
- A.5 02 Lines Per Page**  
The operator chooses the amount of lines per page. The range of this setting is 20 through 80.
- A.5 03 Pause Every Page**  
The operator chooses whether the printer pauses at the end of a page. The choices are:
- |     |   |                            |
|-----|---|----------------------------|
| YES | - | The printer does pause.    |
| NO  | - | The printer doesn't pause. |

Press the Escape button to return to the Adjustments Menu. Then, either press the Up or Down button to return to a previous Adjustment Menu Group, or press the Escape button again to return to the Main Menu. Once in the Main Menu, either press the Up button to advance to the next menu selection, the Bookkeeping Menu, or press the Down button to return to a previous Main Menu selection.

Press the Enter button to activate the Bookkeeping Menu, once the menu name is shown under the Main Menu. Then, use the Up or Down button to cycle through the Bookkeeping Menu selections. Press the Enter button to activate the desired Bookkeeping Group when that group appears in the displays.

## **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**

Once you have entered the desired Bookkeeping Group, press the Up or Down button to cycle through the available audits in that group. Audits cannot be set, they can only be cleared by using U1 and U2 from the Utilities Menu.

### **One-Button Audit System**

Information from the Bookkeeping Menu is obtainable directly from the Attract Mode. Continually pressing the Enter button, while in the Attract Mode, will cycle through all of the game audits.

**B.1 Main Audits** These audits (which also appear in other groups) are the most important, and are grouped here for easier access.

|     |    |                    |    |
|-----|----|--------------------|----|
| 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 | Average Game Time  | 00 |
| B.1 | 06 | Games Completed    | 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 |

Press the Escape button to return to the Bookkeeping Menu. Press the Up button to advance to the next desired Bookkeeping Group, (or press the Down button to return to a previous group). Press the Enter button to activate that group. Press the Up or Down button to cycle through the available audits in that group.

## 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 | * Note: These Audits are NOT<br>Resettable. They are a record<br>of the earnings of the game<br>since the "CLOCK 1ST SET"<br>Time -Stamp. |
| 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 |                                                                                                                                           |

Press the Escape button to return to the Bookkeeping Menu. Press the Up button to advance to the next desired Bookkeeping Group, (or the Down button to return to a previous Bookkeeping Group). Press the Enter button to activate that group. Press the Up or Down button to cycle through the available audits in that group.

## B.3 Standard Audits

|     |    |                    |    |                                                                                                                                                                                                                                                        |
|-----|----|--------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B.3 | 01 | Games Started      | 00 | • Games Completed is a new<br>feature in WPC. A game is<br>considered completed when<br>the final ball begins. Audit<br>information from an<br>incomplete game is ignored.<br>Therefore operation for test<br>and service do not affect the<br>Audits. |
| B.3 | 02 | Games Completed*   | 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 | Average Game Time  | 00 |                                                                                                                                                                                                                                                        |
| B.3 | 21 | Minutes of Play    | 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 Cycles       | 00 |

Press the Escape button to return to the Bookkeeping Menu. Press the Up button to advance to the next desired Bookkeeping Group, (or press the Down button to return to a previous group). Press the Enter button to activate that group. Press the Up or Down button to cycle through the available audits in that group.

#### **B.4 Feature Audits**

|     |    |                                                       |    |
|-----|----|-------------------------------------------------------|----|
| B.4 | 01 | Face 1- Returned to Face 1 - mouth                    | 00 |
| B.4 | 02 | Face 2- Made Face 2- eyes                             | 00 |
| B.4 | 03 | Face 3- Made Face 3- Neck                             | 00 |
| B.4 | 04 | Face 4- Made Face 4- Human                            | 00 |
| B.4 | 05 | Extra Ball Lit Off Left Loop                          | 00 |
| B.4 | 06 | Extra Ball Lit Off Pinbot                             | 00 |
| B.4 | 07 | Extra Ball Lit Off Random - Small Wheel Spin          | 00 |
| B.4 | 08 | Jackpots                                              | 00 |
| B.4 | 09 | Jackpot Lit Off Random - Small Wheel Spin             | 00 |
| B.4 | 10 | Jackpot Lit Off Loop                                  | 00 |
| B.4 | 11 | Small Wheel Spin                                      | 00 |
| B.4 | 12 | Big Wheel Spins                                       | 00 |
| B.4 | 13 | Multiball                                             | 00 |
| B.4 | 14 | Jets at Maximum                                       | 00 |
| B.4 | 15 | Skill Shot 50K                                        | 00 |
| B.4 | 16 | Skill Shot 75K                                        | 00 |
| B.4 | 17 | Skill Shot 100K                                       | 00 |
| B.4 | 18 | Skill Shot 200K                                       | 00 |
| B.4 | 19 | Skill Shot 25K                                        | 00 |
| B.4 | 20 | Enter Pinbot Playfield                                | 00 |
| B.4 | 21 | Bonus Multiplier -going backwards through right Loop  | 00 |
| B.4 | 22 | Bonus Multiplier - off three standup targets          | 00 |
| B.4 | 23 | Unlimited Million- off right ramp                     | 00 |
| B.4 | 24 | Collect Billion from right ramp                       | 00 |
| B.4 | 25 | Skill Multiplier- returned to skill shot from ramp    | 00 |
| B.4 | 26 | Billion Lit - from spinning Big Wheel                 | 00 |
| B.4 | 27 | Wheel 50 Million - from spinning Big Wheel            | 00 |
| B.4 | 28 | Wheel 10 Million - from spinning Big Wheel            | 00 |
| B.4 | 29 | Wheel 1 Million - from spinning Big Wheel             | 00 |
| B.4 | 30 | Power Charge - during multiball                       | 00 |
| B.4 | 31 | Lock 1 In Eyes - lock 1st ball in her eyes            | 00 |
| B.4 | 32 | Lock 1 In Neck - lock 1st ball in her neck (3rd face) | 00 |
| B.4 | 33 | Lock 1 Human - lock 1st ball in her neck (3rd face)   | 00 |
| B.4 | 34 | Mini Exit Left                                        | 00 |
| B.4 | 35 | Mini Exit Right                                       | 00 |

Press the Escape button to return to the Bookkeeping Menu. Press the Up button to the advance to the next desired Bookkeeping Group, (or press the Down button to return to a previous Bookkeeping Group). Press the Enter button to activate that group. Press the Up or Down button to cycle through the available audits in that group.

## B.5 Histograms

|     |    |                        |     |    |
|-----|----|------------------------|-----|----|
| B.5 | 01 | 0.0-0.5 Million Scores | 00% | 00 |
| B.5 | 02 | 0.5-1.0 Million Scores | 00% | 00 |
| B.5 | 03 | 1.0-1.5 Million Scores | 00% | 00 |
| B.5 | 04 | 1.5-2.0 Million Scores | 00% | 00 |
| B.5 | 05 | 2.0-3.0 Million Scores | 00% | 00 |
| B.5 | 06 | 3.0-4.0 Million Scores | 00% | 00 |
| B.5 | 07 | 4.0-5.0 Million Scores | 00% | 00 |
| B.5 | 08 | 5.0-6.0 Million Scores | 00% | 00 |
| B.5 | 09 | 6.0-8.0 Million Scores | 00% | 00 |
| B.5 | 10 | 8.0-10 Million Scores  | 00% | 00 |
| B.5 | 11 | 10-15 Million Scores   | 00% | 00 |
| B.5 | 12 | 15-20 Million Scores   | 00% | 00 |
| B.5 | 13 | Over 20 Million        | 00% | 00 |
| B.5 | 14 | Game Time 0.0-1.0 Min. | 00% | 00 |
| B.5 | 15 | Game Time 1.0-1.5 Min. | 00% | 00 |
| B.5 | 16 | Game Time 1.5-2.0 Min. | 00% | 00 |
| B.5 | 17 | Game Time 2.0-2.5 Min. | 00% | 00 |
| B.5 | 18 | Game Time 2.5-3.0 Min. | 00% | 00 |
| B.5 | 19 | Game Time 3.0-3.5 Min. | 00% | 00 |
| B.5 | 20 | Game Time 3.5-4.0 Min. | 00% | 00 |
| B.5 | 21 | Game Time 4-5 Min.     | 00% | 00 |
| B.5 | 22 | Game Time 5-6 Min.     | 00% | 00 |
| B.5 | 23 | Game Time 6-8 Min.     | 00% | 00 |
| B.5 | 24 | Game Time 8-10 Min.    | 00% | 00 |
| B.5 | 25 | Game Time 10-15 Min.   | 00% | 00 |
| B.5 | 26 | Game Time Over 15 Min. | 00% | 00 |

Press the Escape button to return to the Bookkeeping Menu. Press the Up button to advance to the next desired Bookkeeping Group, (or press the Down button to return to a previous Bookkeeping Group). Press the Enter button to activate that group. Press the Up or Down button to cycle through the available audits in that group.

## 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 & Billionaire Reset |
| B.6 | 11 | Last Printout                |

Press the Escape button to return to the Bookkeeping Menu. Then, either press the Up or Down button to return to a previous Bookkeeping Menu Group, or press the Escape button again to return to the Main Menu. Once in the Main Menu either press the Up button to advance to the next menu selection, the Printouts Menu, or press the Down button to return to a previous Main Menu selection.

Press the Enter button to activate the Printouts Menu, once the menu name is shown under the Main Menu. Then, use the Up or Down button to cycle through the Printouts Menu selections. Press the Enter button to activate the desired Printouts Group when that group appears in the displays.

### **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-Stamped**
- 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 the message "Waiting for Printer" appears in the displays. Note: Set the print specification from the Adjustment Menu, A.5 Printer Adjustments.

Press the Escape button to return to the Printouts Menu. Then, either press the Up or Down button to return to a previous Printouts Menu Group, or press the Escape button again to return to the Main Menu. Once in the Main Menu press the Up button to advance to the next menu selection, the Test Menu, or press the Down button to return to a previous Main Menu selection.

Press the Enter button to activate the Test Menu, once the menu name is shown under the Main Menu. Then, use the Up or Down button to cycle through the Test Menu selections. Press the Enter button to activate the desired test when that test appears in the displays.

### **T. TEST MENU**

|             |                                 |
|-------------|---------------------------------|
| <b>T.1</b>  | <b>Switch Edges</b>             |
| <b>T.2</b>  | <b>Switch Levels</b>            |
| <b>T.3</b>  | <b>Single Switch</b>            |
| <b>T.4</b>  | <b>Solenoid Test</b>            |
| <b>T.5</b>  | <b>Flasher Test</b>             |
| <b>T.6</b>  | <b>General Illumination</b>     |
| <b>T.7</b>  | <b>Sound &amp; Music Test</b>   |
| <b>T.8</b>  | <b>Single Lamps</b>             |
| <b>T.9</b>  | <b>All Lamps</b>                |
| <b>T.10</b> | <b>Lamp &amp; Flasher Tests</b> |
| <b>T.11</b> | <b>Display Test</b>             |
| <b>T.12</b> | <b>Head Motor/Switch</b>        |
| <b>T.13</b> | <b>Head Coils</b>               |
| <b>T.14</b> | <b>Head Cycle</b>               |
| <b>T.15</b> | <b>Helmet Light</b>             |
| <b>T.16</b> | <b>Head Manual</b>              |

**Note:** Switches in & on the Head Assembly can be tested and adjusted easier from Test .12 (Head Motor/Switch) on the Test Menu.

**Note:** Coils & Motor located on the head can only be tested in T.12, T.13, & T.14. Solenoid Test (T.4) will not activate the coils in the head.

**Note:** If head is in error and/or unable to calibrate, see T.16 "Head Manual" to manually control the turning & stopping of the head.

#### **T.1 Switch Edges**

For all switches, the number on the left indicates the column, the number on the right indicates the row. Example- Switch 23 means 2nd column, 3rd row.

To test the Left and Right Flippers, press the Left or Right Flipper buttons during switch test. The flipper name and switch number should show in the displays. Any other result indicates the system has detected a problem with the flipper circuit.

To activate the Switch Edges Test, from the Test Menu, press the Enter button. The name and number of each switch that is pressed is shown in the displays. If any other switch, or no switch at all is indicated, the system has detected a problem with the switch circuit.

Press Escape to return to the Test Menu. Press the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

#### **T.2 Switch Levels**

Once the test name is shown under the Test Menu, press the Enter button. The name and number of each switch that is activated is shown in the displays. This test automatically cycles through all

Press the Escape button to return to the Test Menu. Press the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

### T3 Single Switches

Once the test name is shown under the Test Menu, press the Enter button. 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. Either Open or Closed appears in the displays to indicate the state of the switch at the present time. When the switch is activated, an "A" appears in the displays. Press the Start button to obtain wire color, connector, and fuse information of any switch when that switch is displayed.

Press the Escape button to return to the Test Menu. Press the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

THE MACHINE Switch Matrix

White  Green

| Dedicated Grounded Switches                                                             | Column<br>Row  | 1 Green-Brown            | 2 Green-Red            | 3 Green-Orange             | 4 Green-Yellow                 | 5 Green-Black                | 6 Green-Blue         | 7 Green-Violet             | 8 Green-Gray |
|-----------------------------------------------------------------------------------------|----------------|--------------------------|------------------------|----------------------------|--------------------------------|------------------------------|----------------------|----------------------------|--------------|
| Orange-Brown (1)<br>Left Coin Chute<br>D1                                               | 1 White-Brown  | Right Flipper<br>11      | Slam Tilt<br>21        | Skill Shot 50K<br>31       | Right Ramp Made<br>41          | Spinner<br>51                | Not Used<br>61       | Wireform Top<br>71         |              |
| Orange-Red (2)<br>Center Coin Chute<br>D2                                               | 2 White-Red    | Left Flipper<br>12       | Coin Door Closed<br>22 | Skill Shot 75K<br>32       | Not Used<br>42                 | Shooter<br>52                | Not Used<br>62       | Wireform Bottom<br>72      |              |
| Orange-Black (3)<br>Right Coin Chute<br>D3                                              | 3 White-Orange | Start Button<br>13       | Ticket Opto<br>23      | Skill Shot 100K<br>33      | Left Loop<br>43                | Upper Right Jet Bumper<br>53 | Head Left Eye<br>63  | Enter Mini Playfield<br>73 |              |
| Orange-Yellow (4)<br>4th Coin Chute<br>D4                                               | 4 White-Yellow | Plumb Bob Tilt<br>14     | Always Closed<br>24    | Skill Shot 200K<br>34      | Right Loop Top<br>44           | Upper Left Jet Bumper<br>54  | Head Right Eye<br>64 | Mini Exit Left<br>74       |              |
| Orange-Green (5)<br>Normal Function   Test Function<br>Service   Escape<br>Credits   D5 | 5 White-Green  | Left Outlane<br>15       | Right Trough<br>25     | Skill Shot 25K<br>35       | Right Loop Bottom<br>45        | Lower Jet Bumper<br>55       | Head Mouth<br>65     | Mini Exit Right<br>75      |              |
| Orange-Blue (6)<br>Normal Function   Test Function<br>Volume   Down<br>Down   D6        | 6 White-Blue   | Left Flipper Lane<br>16  | Center Trough<br>26    | Right Top Standup<br>36    | Under Playfield Kickback<br>46 | Jet Bumper Sling<br>56       | Not Used<br>66       | Left Ramp Enter<br>76      |              |
| Orange-Violet (7)<br>Normal Function   Test Function<br>Volume   Up<br>Up   D7          | 7 White-Violet | Right Flipper Lane<br>17 | Left Trough<br>27      | Right Bottom Standup<br>37 | Enter Head<br>47               | Left Slingshot<br>57         | Face Position<br>67  | Right Ramp Enter<br>77     |              |
| Orange-Gray (8)<br>Normal Function   Test Function<br>Begin   Enter<br>Test   D8        | 8 White-Gray   | Right Outlane<br>18      | Left Standup<br>28     | Outhole<br>38              | Not Used<br>48                 | Right Slingshot<br>58        | Not Used<br>68       | Not Used<br>78             |              |

Note: Dedicated Switches are connected directly to ground.

## **T4 Solenoid Test**

**Note:** Solenoids used in the Head Mechanism are NOT tested during the Solenoid Test.  
See T. 12, T. 13, and T. 14 for test the Head Mechanism.

Once the test name is shown under the Test Menu, press the Enter button. The Solenoid Test has three modes, Repeat, Stop, and Running. Only one solenoid should turn On at a time. The system has detected a problem if, more then one solenoid turns On, a solenoid comes On and stays On, or no solenoid turns On during the Repeat or Running test modes. Press the Start button to see the wire color, driver number, connector and, fuse information of any coil, when that coil is displayed.

- Repeat -** This test allows you to stop and pulse a single coil or flashlamp. Once you have entered the Solenoid Test, coil 1 shows in the displays and the corresponding solenoid activates. Press the Up or Down button to cycle through the solenoids, one at a time, manually. The same solenoid pulses until you press the Up or Down button to move to the next one. Either press the Escape button to return to the Test Menu, or press the Enter button to move to the next test mode.
- Stop -** This test allows you to stop the Solenoid Test at any point. Press Enter during the Repeat test mode and the Solenoid Test stops. There should not be any solenoids activated while the test is stopped. Either press the Escape button to return to the Test Menu, or the Enter button to move to the next test mode.
- Running -** This test allows you to cycle through the solenoids automatically. Press the Enter button during the Stop test mode. The displays show you the name and number of the solenoid currently being pulsed.

Either press the Enter button to return to the Repeat test mode, or press the Escape button to return to the Test Menu. Once in the Test Menu press, the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

## **T5 Flasher Test**

Once the test name is shown under the Test Menu, press the Enter button. This test allows you to test the flashlamp part of the solenoid circuit exclusively. This test, like the Solenoid Test, has three test modes Repeat, Stop, and Running. During this test, only one flashlamp circuit should turn On at a time. If, more then one flashlamp circuit turns On, or stays On, or no flashlamp circuit turns On at all during the Repeat or Running test modes the system has detected a problem. Press the Start button to see the wire color, driver number, connector, and fuse information of any flashlamp circuit when that circuit appears in the displays.

- Repeat -** This test allows you to stop and pulse a single flashlamp. Once you have entered the Flasher Test the name and number of the first flashlamp circuit shows in the displays and the corresponding bulb(s) flashes. Press the Up or Down button to cycle through all of the flashlamps circuits one at a time, manually. The same flashlamp circuit pulses until you press the Up or Down button to move to the next one. Either, press the Escape button to return to the Test Menu, or press the Enter button to advance to the next test mode.
- Stop -** This test allow you to stop the Flasher Test at any time. Press the Enter button during the Repeat test mode. The Flasher Test stops. There should not be any flashlamp circuit turned On during this test mode. Either press the Escape button to

return to the Test Menu, or press the Enter button to advance to the next test mode.

**Running -** This test allows you to cycle through the flashlamps automatically. Press the Enter button during the Stop test mode. The displays show you the name and number of the flashlamp currently being pulsed, and the corresponding bulb(s) flashes.

Either press the Enter button to return to the Repeat test mode or, press the Escape button to return to the Test Menu. Once in the Test Menu, press the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

### THE MACHINE Solenoid Table

| Sol. No.                             | Function                | Solenoid Type | Wire Color | Connections   | Driver Trnsst | Solenoid Part Number<br>Flashlamp Type |
|--------------------------------------|-------------------------|---------------|------------|---------------|---------------|----------------------------------------|
| 01                                   | Outhole                 | High Power    | Vio-Bm     | J130-1        | Q82           | AE-26-1200                             |
| 02                                   | Ball Release            | High Power    | Vio-Red    | J130-2        | Q80           | AE-26-1200                             |
| 03                                   | Under Playfield Kicker  | High Power    | Vio-Orn    | J130-4        | Q78           | AE-23-800                              |
| 04                                   | Controlled Gate         | High Power    | Vio-Yel    | J130-5        | Q76           | A-14406                                |
| 05                                   | Skill Shot Kicker       | High Power    | Vio-Gm     | J130-6        | Q64           | AE-26-1500                             |
| 06                                   | Wire Ball Holder        | High Power    | Vio-Blu    | J130-7        | Q66           | AE-26-1200                             |
| 07                                   | Knocker                 | High Power    | Vio-Blk    | J130-8        | Q68           | AE-23-800                              |
| 08                                   | Head Mouth              | High Power    | Vio-Gry    | J130-9        | Q70           | AE-23-800                              |
| 09                                   | Upper Left Jet Bumper   | Low Power     | Bm-Blk     | J127-1        | Q58           | AE-26-1200                             |
| 10                                   | Left (sling) Kicker     | Low Power     | Bm-Red     | J127-3        | Q56           | AE-26-1500                             |
| 11                                   | Upper Right Jet Bumper  | Low Power     | Bm-Orn     | J127-4        | Q54           | AE-26-1200                             |
| 12                                   | Right (sling) Kicker    | Low Power     | Bm-Yel     | J127-5        | Q52           | AE-26-1500                             |
| 13                                   | Lower Jet Bumper        | Low Power     | Bm-Gm      | J127-6        | Q50           | AE-26-1200                             |
| 14                                   | Jets Sling              | Low Power     | Bm-Blu     | J127-7        | Q48           | AE-26-1500                             |
| 15                                   | Head - Left Eye         | Low Power     | Bm-Vio     | J127-8        | Q46           | AE-23-800                              |
| 16                                   | Head - Right Eye        | Low Power     | Bm-Gry     | J127-9        | Q44           | AE-23-800                              |
| 17                                   | Billion Flasher         | Flasher       | Blk-Bm     | J125-1        | Q42           | #89 pfid                               |
| 18                                   | Left Ramp Flash         | Flasher       | Blk-Red    | J126-2 J125-2 | Q40           | #89 pfid, #906 Insert                  |
| 19                                   | Jackpot Flasher         | Flasher       | Blk-Orn    | J126-3 J125-3 | Q38           | #89 pfid, #906 Insert                  |
| 20                                   | Skill Shot Flasher      | Flasher       | Blk-Yel    | J126-4        | Q36           | #89 pfid                               |
| 21                                   | Left Helmet Flasher     | Flasher       | Blu-Gm     | J126-6 J125-6 | Q28           | #555 pfid, #906 Insert                 |
| 22                                   | Right Helmet Flasher    | Flasher       | Blu-Blk    | J126-7 J125-7 | Q30           | #555 pfid, #906 Insert                 |
| 23                                   | Jets Enter Flash        | Flasher       | Blu-Vio    | J126-8 J125-8 | Q34           | #555 pfid, #906 Insert                 |
| 24                                   | Left Loop Flash         | Flasher       | Blu-Gry    | J126-9 J125-9 | Q32           | #555 pfid, #906 Insert                 |
| 25                                   | Helmet Lights Data Port | Special       | Blu-Bm     | J122-1        | Q26           |                                        |
| 26                                   | Helmet Light Clock Port | Special       | Blu-Red    | J122-2        | Q24           |                                        |
| 27                                   | Motor Relay             | Special       | Blu-Orn    | J122-3        | Q22           | A-14423-1                              |
| 28                                   | Head Motor              | Special       | Blu-Yel    | J122-4        | Q20           | A-14119                                |
| <b>General Illumination Circuits</b> |                         |               |            |               |               |                                        |
| 01                                   | Backglass Body          | G.I.          | Wht-Bm     | J121-7        | Q18           | #555                                   |
| 02                                   | Used In Helmet          | G.I.          | Wht-Orn    | J120-8        | Q10           | #555                                   |
| 03                                   | Rear Playfield          | G.I.          | Wht-Yel    | J120-9        | Q14           | #555                                   |
| 04                                   | Backglass - No Body     | G.I.          | Wht-Gm     | J121-11       | Q16           | #555                                   |
| 05                                   | Front Playfield         | G.I.          | Wht-Vio    | J120-11       | Q12           | #555                                   |
|                                      | Lower Right Flipper     |               | Blu-Yel    | J109-7        |               | FL-11630                               |
|                                      | Lower Left Flipper      |               | Gry-Yel    | J109-5        |               | FL-11630                               |

## **T6 General Illumination**

Once the test name is shown under the Test Menu, press the Enter button. This test allows you to check all of the General Illumination circuits. There are two modes of operation, Stop and Run. To obtain wire color, driver number, connector, and fuse information, press the Start button when the desired General Illumination circuit appears in the displays.

**Stop -** Press the Up or Down buttons to cycle through the General Illumination Test manually. All illumination is tested first, followed by an individual circuit test. The circuit name and number shows in the displays while the corresponding lamps lights. If any other result occurs, the system has detected an error.

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

Either press the Enter button to return to Stop test mode, or the Escape button to return to the Test Menu. Once in the Test Menu press the Up button to advance to the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

## **T7 Sound and Music Test**

Once the test name is shown under the Test Menu, press the Enter button. The Sound and Music Test allows you to check the audio circuits. This test has three modes for testing the sound and music circuits, Running, Repeat and Stop.

**Running -** This test steps through a sequence of sounds and music. Pressing the Up or Down button during this portion of the Sound and Music test allows you to advance to a particular sound or tune without having to wait for the program to play all the sounds available in the test. For each name and number that appears in the displays a sound or tune should be heard. Any other result indicates the system has detected a problem.

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

**Stop -** Press the Enter button at any time during the Repeat test mode to stop this test altogether. Nothing should be heard. Any other result indicates the system has detected a problem.

Use the Enter button to return to the Running test mode, or the Escape button to return to the Test Menu. Once in the Test Menu press the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

## THE MACHINE Lamp Matrix

Yellow (B+)  Red

| Column<br>Row    | 1<br>Yellow-<br>Brown            | 2<br>Yellow-<br>Red             | 3<br>Yellow-<br>Orange     | 4<br>Yellow-<br>Black    | 5<br>Yellow-<br>Green    | 6<br>Yellow-<br>Blue        | 7<br>Yellow-<br>Violet     | 8<br>Yellow-<br>Gray            |
|------------------|----------------------------------|---------------------------------|----------------------------|--------------------------|--------------------------|-----------------------------|----------------------------|---------------------------------|
| 1 Red-<br>Brown  | Left<br>Outlane<br>11            | Circle<br>Lite Jackpot<br>21    | Circle<br>250K<br>31       | Skill Shot<br>50K<br>41  | Left Loop<br>500K<br>51  | Right Ramp<br>100K<br>61    | Jackpot<br>8 Million<br>71 | Backglass<br>Hip<br>81          |
| 2 Red-<br>Black  | Left<br>Return<br>Lane<br>12     | Circle<br>Lite Billion<br>22    | Circle<br>10 Million<br>32 | Skill Shot<br>75K<br>42  | Left Loop<br>100K<br>52  | Right Ramp<br>500K<br>62    | Jackpot<br>7 Million<br>72 | Backglass<br>Middle leg<br>82   |
| 3 Red-<br>Orange | Right<br>Return<br>Lane<br>13    | Circle<br>Extra Ball<br>23      | Circle<br>50 Million<br>33 | Skill Shot<br>100K<br>43 | Left Loop<br>50K<br>53   | Right Ramp<br>Million<br>63 | Jackpot<br>6 Million<br>73 | Backglass<br>Knee<br>83         |
| 4 Red-<br>Yellow | Right<br>Outlane<br>14           | Circle Lite<br>Extra Ball<br>24 | Circle<br>Special<br>34    | Skill Shot<br>200K<br>44 | Left Loop<br>25K<br>54   | Wire Ball<br>Lock<br>64     | Jackpot<br>5 Million<br>74 | Backglass<br>Foot<br>84         |
| 5 Red-<br>Green  | Left<br>Standup<br>15            | Circle<br>500K<br>25            | Circle<br>5 Million<br>35  | Skill Shot<br>25K<br>45  | Right Loop<br>500K<br>55 | Jet Enter<br>500K<br>65     | Jackpot<br>4 Million<br>75 | Backglass<br>Shoulder<br>85     |
| 6 Red-<br>Blue   | Right Top<br>Standup<br>16       | Circle<br>100K<br>26            | Circle<br>1 Million<br>36  | Head<br>Left Eye<br>46   | Right Loop<br>100K<br>56 | Jet Enter<br>100K<br>66     | Jackpot<br>3 Million<br>76 | Mini<br>Playfield<br>100K<br>86 |
| 7 Red-<br>Violet | Right<br>Bottom<br>Standup<br>17 | Values<br>Doubled<br>27         | Space<br>Shuttle<br>37     | Head<br>Right Eye<br>47  | Right Loop<br>50K<br>57  | Jet Enter<br>50K<br>67      | Jackpot<br>2 Million<br>77 | Mini<br>Playfield<br>200K<br>87 |
| 8 Red-<br>Gray   | Shoot<br>Again<br>18             | Spin<br>Small<br>Wheel<br>28    | Launch<br>Pad<br>38        | Head<br>Mouth<br>48      | Right Loop<br>25K<br>58  | Jet Enter<br>25K<br>68      | Jackpot<br>1 Million<br>78 | Mini<br>Playfield<br>300K<br>88 |

### T8 Single Lamp Test

For all lamps, the number on the left indicates the column, the number on the right indicates the row. Example- Lamp 23 means 2nd column, 3rd row.

Once the test name is shown under the Test Menu, press the Enter button. This test allows you to test 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 displays the corresponding lamp should light. Any other result indicates the system has detected a problem. Press the Start button to obtain wire color, connector, and fuse information when the desired lamp is lit.

Press the Escape button to return to the Test Menu. Press the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

## **T9 All Lamps Test**

Once the test name is shown under the Test Menu, press the Enter button. This test causes all the controlled lamps to flash at the same time. Every controlled lamp should flash. Any other result indicates the system has detected a problem.

Press the Escape button to return to the Test Menu. Press the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

## **T10 Lamp and Flasher Test**

**Note:** The lights on the Helmet Assembly are NOT tested from the Lamp & Flasher Test.  
See T. 15 - Helmet Light, to test the lights on the Helmet.

Once the test name is shown under the Test Menu, press the Enter button. 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 result indicates the system has detected a problem.

Press the Escape button to return to the Test Menu. Press the Up button to display the next test, (or the Down button to return to a previous test). Press the Enter button to activate that test.

Press the Escape button to return to the Test Menu. Then, either press the Up or Down button to return to a previous Test, or press the Escape button again to return to the Main Menu. Once in the Main Menu, press the Up button to move to the next menu selection, the Utilities Menu, or press the Down button to return to a previous Main Menu selection.

## **T.11 Display Test**

Once the test name is shown under the Test Menu, press the Enter button. This test allows you to cycle through all of the display circuits. Each segment and digit should light in its turn. If a segment or digit never lights, or stays lit all the time, the system has detected a problem. There are two modes for testing the displays, Running and Stop.

- Running - This test cycles through several phases automatically. Each phase is designed to test either an entire digit or a specific segment.
- Stop - Press the Enter button at any time during the Running test mode and the test stops. Use the Up or Down buttons to cycle through each phase of the test manually. Press the Enter button again to resume the Running test mode.

## **ENTERING A HEAD TEST & POSSIBLE HEAD PROBLEMS**

Upon entering any of the head tests (T.12, T.13, T.14) (except for T.16 Head Manual) for the first time since entering diagnostics the head will rotate itself to the "home" position. A message will be displayed telling you: "homing head please wait". The home position for the head is the first face (mouth). Once the head has rotated to this face successfully the appropriate test will begin. If the head can not "home" itself to the first face (mouth) then it will try to calibrate itself. A message will be displayed telling you "calibrating head please wait". Calibrate re-times all the face positions of the head, this may take up to a minute to complete. The calibrating will end with the "home face" showing (mouth). Once the head has rotated to this face successfully the appropriate

test will begin. If the head can not calibrate itself an error message will be displayed "ERROR UNABLE TO CALIBRATE HEAD" for a few seconds & you will then enter the appropriate test. The test will probably not function correctly if the head was unable to calibrate. The main cause of the head not calibrating or being able to stop on the correct face is the HEAD POSITION SWITCH (#67). This switch MUST be adjusted properly for the head to work. It must be open when on an indentation and closed when not on an indentation. It should be able to easily trigger on & off when the head turns (between indentations). See T.12 Head MTR/SW or T.16 Head Manual Tests for testing this switch while the head is rotating. Or, if the head was unable to calibrate see T.16 Head Manual. T.16 will allow you to manually turn the Head Motor on and off - showing the state of the Head position switch (#67) in the display. When exiting Diagnostics after using one of the head tests the head will again calibrate itself to make sure it is working properly, please wait for it to finish rotating.

## **T.12 Head MTR/SW Test**

**NOTE:** Please read the above information concerning the "Head Tests & Head Problems".

Once the test name is shown under the test menu, press the enter button. This check allows you to check the switches inside & outside the head assembly, and check to see that the head motor operates in forward (clockwise) and backwards (counter clockwise) directions.

**Enter Button Not Used During Test.**

**UP Button (+):** This will rotate the head forward (clockwise) to the next face. If it is on the mouth or the eyes face you may actuate the switches in the opening(s) and if they are working properly the name and switch number will appear in the display.

**DOWN Button (-):** This will rotate the head backward (counter clockwise) to the next face. If it is on the mouth or the eyes face you may actuate the switches in the opening(s) and if they are working properly the name and switch number will appear in the display.

**Escape Button:** Will return you to the Test menu any time it is pressed during the the Head MTR/SW test.

The display will show the status of the motor (MR=ON or MR=OFF) and the current, if any, head switch (SW=) number that is closed. This allows you to move the head to any face and test the switches in the head (mouth and eyes). ADJUSTMENT of the switch on top of the head (head position switch #67) is critical to proper operation of the head assembly. In order for the head to rotate and stop properly this switch must be open when on an indentation and closed when not on an indentation. If when the up button is pressed the head does not rotate clockwise or when the down button is pressed the head does not rotate counter clockwise or the head does not turn at all, the system has detected a problem. The motor or gears may be bad, the relay may be bad, or the power supply to the head may be bad (check for power off driver board AND 12V regulator board).

When done testing the head motor and switches, press escape to return to the Test menu. Once in the Test menu, press the UP button to display the next test (or the DOWN button to return to the previous test). Press enter to activate that test.

## **T13 Head Coils Test**

**NOTE:** Please read the information concerning the "Head Tests & Head Problems" pg. 32 -33.

Once the test name is shown under the test menu, press the enter button. This test allows you to check the operation of the kicker coils inside the head assembly. Upon entering the test the head will rotate to the first face (mouth) to begin the test. Only two faces have openings for the coils to kick, the first face (mouth opening) and the second face (two eye openings). This test will rotate the head to allow the head kicker coils to fire in the openings. The head coil test has two modes; repeat and stop. Only one solenoid should turn on at a time. The system has detected a problem if: more than one solenoid turns On, a solenoid comes on and stays On, or no solenoid(s) turn on during the repeat test mode.

**Enter Button:** Selects between REPEAT and STOP modes:

**Repeat** - This allows you to pulse a single coil. The displays show the coil that is firing. Press up or down to cycle through the solenoids one at a time, manually. The same solenoid pulses until you move to the next one or change to stop mode.

**Stop** - This test allows you to stop the head coil test at any point. There should not be any solenoids active while the test is stopped.

**UP Button (+)** - Moves forward to the next coil in the test. If the coil is on another face, the head will rotate to the face and continue the test.

**DOWN Button (-)** - Moves backward to the previous coil in the test. If the coil is on another face, the head will rotate to the face and continue the test.

**Escape Button** - Will return you to the Test menu any time it is pressed during the head coil test.

When done testing the head coils, press escape to return to the Test menu. Once in the Test menu, press the UP button to display the next test (or the DOWN button to return to the previous test). Press enter to activate that test.

## **T14 Head Cycle Test**

**NOTE:** Please read the information concerning the "Head Tests & Head Problems" pg. 32-33.

Once the test name is shown under the test menu, press the enter button. This test allows you to check the operation of the head assembly over long periods of time or to see if it functions properly on all faces (sides). It basically combines the head motor/switch test and the head coil test into one self running test. The Head Cycle Test will help to find intermittent problems by allowing the head assembly to rotate and kick coils for a long period of time. Upon entering the Head Cycle Test the head will start to rotate forward (clockwise) through all the faces stopping briefly at each one and kicking coils if there is an opening (the mouth and eyes faces). It will then rotate backward (counter clockwise) through the faces stopping briefly at each one and kicking coils if there is an opening (the mouth and eyes faces). This process will continue as long as the cycle test is in REPEAT mode. If the head does not go clockwise through the faces and then counter clockwise through the faces, the system has detected a problem (probably the direction relay). If the coils in the head kick on a face without opening, the system has detected a problem, possibly the switch on the back of the head (head position switch - #67). The Head Cycle Test has two modes: Repeat & Stop.

Enter Button: Selects between REPEAT and STOP modes:

|                 |                                                                                                                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Repeat          | - Will start the head rotating as described above. The head will continue to rotate until the mode is changed to stop (pressing enter) or the Head Cycle Test is exited (pressing escape).                                                                             |
| Stop            | - This test allows you to stop the head cycle test at any point. There should not be any solenoids active while the test is stopped and the head should stop rotating once it has settled on a face (when you change to stop mode it will take a few seconds to stop). |
| UP Button (+)   | - Not used in this test.                                                                                                                                                                                                                                               |
| DOWN Button (-) | - Not used in this test.                                                                                                                                                                                                                                               |
| Escape Button   | - Will return you to the Test menu any time it is pressed during the Head Cycle Test.                                                                                                                                                                                  |

When done testing the head cycling, press escape to return to the Test menu. Once in the Test menu, press the UP button to display the next test (or the DOWN button to return to the previous test). Press enter to activate that test.

## **T.15 Helmet Light Test**

Once the test name is shown under the test menu, press the enter button. This test will allow you to test the 16 lights on top of the helmet. Upon entering this test all lamps on the helmet should start blinking on and off. If they all are not, check for a burnt out bulb or socket contact not making a good connection or the power to the lights is lost (power is obtained through GI string #2). If this all checks out it may be the circuit that controls the lights. The Helmet Light Test has three modes: all lamps, single lamp, and cycle lamps.

Enter Button - Selects between the three modes: all lamps, single lamp, and cycle lamps.

**ALL LAMPS** - This will blink all the lamps on the helmet together at the same time on and off. This on/off cycle will continue until the mode is changed (pressing Enter).

**SINGLE LAMP** - This will allow you to turn on each light on the helmet individually. The first light on will be in the lower left corner of the helmet. You may then use the the up button to move clockwise to the next light or the down button to move counter clockwise to the previous light.

**CYCLE LAMPS** - This combines the above two tests into one self running test. Upon changing to this mode the helmet lights will all blink on and off a few times and a single light (starting in the lower left corner of the helmet) will turn each light on and off clockwise and then do the same counter clockwise. This process will be repeated until the mode is changed (pressing Enter button).

UP Button - Not used - except where noted above in the single lamp mode.

DOWN Button - Not used - except where noted above in the single lamp mode.

**DOWN Button -** Not used - except where noted above in the single lamp mode.

**Escape -** Will return you to the Test menu any time it is pressed during the Helmet Light Test.

When done testing the head cycling, press escape to return to the Test menu. Once in the Test menu, press the UP button to display the next test (or the DOWN button to return to the previous test). Press enter to activate that test.

### **T.16 Head Manual Control Test**

**NOTE:** Please read the information concerning the "Head Tests & Head Problems" before using this test (pg. 32-33).

Once the test name is shown under the test menu, press the enter button. This test is not subject to the normal homing and calibrating of the other head tests (T.12, T.13, T.14). It will allow you to manually control the turning on and off of the head motor. The display will show the state of head position switch (#67) (sw=) and the status of the motor (MR=ON or MR= OFF). This test allows easier adjustment of the head position switch (#67) by allowing you to start and stop the rotating of the head while watching in the displays if the head position switch is triggering properly (switch should be open when on an indentation and closed when not on an indentation).

**Enter Button -** Not used in this test.

**UP Button -** This will turn the head motor on (rotating clockwise) if the motor was previously off. If the motor was previously on, it will turn the head motor off immediately.

**DOWN Button -** This will turn the head motor on (rotating counter clockwise) if the motor was previously off. If the motor was previously on, it will turn the head motor off immediately.

**Escape -** Will return you to the Test menu any time it is pressed during the Head Manual Test.

When done testing the Helmet Lights, press escape to return to the Test menu. Once in the Test menu, press the UP button to display the next test (or the DOWN button to return to the previous test). Press enter to activate that test.

Press the Enter button to activate the Utilities Menu, once the menu name is shown under the Main Menu. Then, use the Up or Down button to cycle through the Utility Menu selections. Press the Enter button to activate the desired Utility or Utility Group when it appears in the displays. If you change a utility setting and realize you have made a mistake, press the Escape button while "Saving Adjustment Value" is still in the displays. The original setting is retained and the new setting is ignored.

## **U. UTILITIES MENU**

**U.1 Clear Audits**

**U.2 Clear Coins**

**U.3 Reset H.S.T.D.**

**THE MACHINE 1-36**

- U.5 Custom Message**
- U.6 Set Game LD.**
- 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, Feature Audits, and Histograms. Press the Up button to display the next utility.

**U.2 Clear Coins**

Press the Enter button to clear the Earnings Audits. Press the Up button to display the next utility.

**U.3 Reset H.S.T.D.**

Press the Enter button to clear the High Score to Date Table and the Grand Champion & Billionaires Club H.S.T.D. Press the Up button to display the next utility.

**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 you make a mistake press the Escape button while "Saving Adjustment Value" is displayed. Press the Up button to move to the next utility.

**U.5 Custom Message**

This utility allows the operator to install a message that appears in the displays during the Attract Mode. Press the Enter button to activate the Custom Message. Use the Up or Down button to rotate letters. Use the Start button to rotate punctuation marks, (if desired). Press the Enter button to lock in the desired letter and punctuation. Note: Set Adjustment A.1 20 to YES before trying to write a Custom Message.

**U.6 Set Game LD.**

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 rotate letters. Use the Start button to rotate punctuation marks, (if desired). 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, then press the Up button to display the next utility.

**U.8 Factory Reset**

Press the Enter button to restore the adjustments to their factory setting, clear the Audits, H.S.T.D & Billionaires Club Table, and Custom Message/Game I.D. Press the Up button to display the next utility.

**U.9 Presets**

Press the Enter button to activate the Presets Group. 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 you realize you have made a mistake, press the Escape button while

"Saving Adjustment Value" is displayed. The new value is ignored and the original value is retained.

- U.9 01 Install Extra Easy**  
The operator can change the game play difficulty adjustments to a combination that is MUCH LESS difficult than the Factory Settings. The Game Difficulty Setting Table lists the adjustments and the settings that comprise the 'Extra Easy' Group.
- U.9 02 Install Easy**  
The operator can change the game play difficulty adjustments to a combination that is somewhat LESS difficult than the Factory Settings. The Game Difficulty Setting Table lists the adjustments and the settings that comprise the 'Easy' Group.
- U.9 03 Install Medium**  
The operator can change the game play difficulty adjustments to a combination that is about the SAME difficulty as the Factory Settings. The Game Difficulty Setting Table lists the adjustments and settings that comprise the 'Medium' Group.
- U.9 04 Install Hard**  
The operator can change the game play difficulty adjustments to a combination that is somewhat MORE difficult than Factory Settings. The Game Difficulty Setting Table lists the adjustments and settings that comprise the 'Hard' Group.
- U.9 05 Install Extra Hard**  
The operator can change the game play difficulty adjustments to a combination that is MUCH MORE difficult than Factory Settings. The Game Difficulty Setting Table lists the adjustments and settings that comprise the 'Extra Hard' Group.
- U.9 06 Install 5 Ball**  
The operator can change the game to 5 ball play, including the changing of certain features to the recommended 5-ball level. The Preset Game Adjustments Table for U.S./Canadian Games lists the adjustments and settings that comprise the 'Install 5 Ball' Group.
- U.9 07 Install 3 Ball**  
The operator can change the game to 3 ball play, including the changing of certain features to the recommended 3-ball level. The Preset Game Adjustments Table for U.S./Canadian Games lists the adjustments and settings that comprise the 'Install 3 Ball' Group.

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

| Adj #  | Adj Description             | Extra Easy<br>U.9 01 | Easy<br>U.9 02 | Medium<br>U.9 03<br>(factory) | Hard<br>U.9 04 | Extra Hard<br>U.9 05 |
|--------|-----------------------------|----------------------|----------------|-------------------------------|----------------|----------------------|
| A.2 01 | Extra Ball %                | 25%                  | 20%            | 15%                           | 10%            | 8%                   |
| A.2 02 | Extra Ball Lit Off Wheel %  | 20%                  | 15%            | 10%                           | 8%             | 5%                   |
| A.2 03 | Jackpot Lit Off Wheel %     | 20%                  | 15%            | 15%                           | 10%            | 8%                   |
| A.2 04 | Big Wheel 1 Million         | 5%                   | 8%             | 10%                           | 15%            | 25%                  |
| A.2 05 | Big Wheel 10 Million        | 35%                  | 30%            | 25%                           | 20%            | 15%                  |
| A.2 06 | Big Wheel 50 Million        | 35%                  | 30%            | 25%                           | 20%            | 15%                  |
| A.2 07 | Big Wheel Lit Billion       | 50%                  | 35%            | 25%                           | 22%            | 20%                  |
| A.2 08 | Special Percentage          | 20%                  | 15%            | 10%                           | 8%             | 5%                   |
| A.2 09 | Left Loop Time Down Rate    | 20 sec.              | 12 sec.        | 8 sec.                        | 7 sec.         | 5 sec.               |
| A.2 10 | R. Loop Time Down Rate      | 40 sec.              | 30 sec.        | 20 sec.                       | 15 sec.        | 10 sec.              |
| A.2 11 | R. Ramp Time Down Rate      | 25 sec.              | 15 sec.        | 7 sec.                        | 6 sec.         | 5 sec.               |
| A.2 12 | Jackpot Time Out Rate       | 40 sec.              | 30 sec.        | 20 sec.                       | 15 sec.        | 10 sec.              |
| A.2 13 | Billion Lit Time Down Rate  | 30 sec.              | 22 sec.        | 15 sec.                       | 12 sec.        | 10 sec.              |
| A.2 14 | Consolation Extra Ball Time | 70 sec.              | 60 sec.        | 50 sec.                       | 40 sec.        | 30 sec.              |
| A.2 15 | Extra Ball Lit Memory       | ON                   | ON             | ON                            | ON             | OFF                  |
| A.2 16 | Jet Lane Memory             | ON                   | ON             | ON                            | OFF            | OFF                  |
| A.2 20 | Enter Mini Playfield        | EASY                 | EASY           | EASY                          | EASY           | HARD                 |
| A.2 23 | Combo Loop Start            | 3                    | 4              | 4                             | 5              | 6                    |

**Game Difficulty Setting Table for German/European Games**

| Adj #  | Adj Description             | Extra Easy<br>U.9 01 | Easy<br>U.9 02 | Medium<br>U.9 03<br>(factory) | Hard<br>U.9 04 | Extra Hard<br>U.9 05 |
|--------|-----------------------------|----------------------|----------------|-------------------------------|----------------|----------------------|
| A.2 01 | Extra Ball %                | 25%                  | 20%            | 15%                           | 10%            | 8%                   |
| A.2 02 | Extra Ball Lit Off Wheel %  | 20%                  | 15%            | 10%                           | 8%             | 5%                   |
| A.2 03 | Jackpot Lit Off Wheel %     | 20%                  | 15%            | 15%                           | 10%            | 8%                   |
| A.2 04 | Big Wheel 1 Million         | 5%                   | 8%             | 10%                           | 15%            | 25%                  |
| A.2 05 | Big Wheel 10 Million        | 35%                  | 30%            | 25%                           | 20%            | 15%                  |
| A.2 06 | Big Wheel 50 Million        | 35%                  | 30%            | 25%                           | 20%            | 15%                  |
| A.2 07 | Big Wheel Lit Billion       | 50%                  | 35%            | 25%                           | 22%            | 20%                  |
| A.2 08 | Special Percentage          | 20%                  | 15%            | 10%                           | 8%             | 5%                   |
| A.2 09 | Left Loop Time Down Rate    | 20 sec.              | 12 sec.        | 8 sec.                        | 7 sec.         | 5 sec.               |
| A.2 10 | R. Loop Time Down Rate      | 40 sec.              | 30 sec.        | 20 sec.                       | 15 sec.        | 10 sec.              |
| A.2 11 | R. Ramp Time Down Rate      | 25 sec.              | 15 sec.        | 7 sec.                        | 6 sec.         | 5 sec.               |
| A.2 12 | Jackpot Time Out Rate       | 40 sec.              | 30 sec.        | 20 sec.                       | 15 sec.        | 10 sec.              |
| A.2 13 | Billion Lit Time Down Rate  | 30 sec.              | 22 sec.        | 15 sec.                       | 12 sec.        | 10 sec.              |
| A.2 14 | Consolation Extra Ball Time | 70 sec.              | 60 sec.        | 50 sec.                       | 40 sec.        | 30 sec.              |
| A.2 15 | Extra Ball Lit Memory       | ON                   | ON             | ON                            | ON             | OFF                  |
| A.2 16 | Jet Lane Memory             | ON                   | ON             | ON                            | OFF            | OFF                  |
| A.2 20 | Enter Mini Playfield        | EASY                 | EASY           | EASY                          | EASY           | HARD                 |
| A.2 23 | Combo Loop Start            | 3                    | 4              | 4                             | 5              | 6                    |

## Preset Game Adj.'s Table for U.S./ Canadian Games

| Adj #  | Adj Description      | Install 5-ball<br>U.9 06 | Install 3-ball<br>U.9 07 |
|--------|----------------------|--------------------------|--------------------------|
| A.1 01 | Balls / Game         | 5                        | 3                        |
| A.1 07 | Replay Start         | 9,5000,000               | 7,0000,000               |
| A.2 20 | Enter Mini Playfield | Hard                     | Easy                     |

### U.9 08 Install Add -A -Ball

The operator utilizes this option to delete all Free Play awards and replace them with Extra Ball awards. Individual adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>          | <u>New Setting</u> |
|-----------|----------------------|--------------------|
| A.1 13    | Replay Boost         | Off                |
| A.1 14    | Replay Award         | Ex. Ball           |
| A.1 15    | Special Award        | Ex. Ball           |
| A.1 17    | Extra Ball Ticket    | No                 |
| A.1 19    | Match Feature        | Off                |
| A.4 04    | Champion Credits     | 00                 |
| 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

The operator utilizes this option to delete Credit awards and replace them with Ticket awards. Individual adjustments are affected as follows.

| <u>Ad</u> | <u>Name</u>     | <u>New Settings</u> |
|-----------|-----------------|---------------------|
| A.1 14    | Replay Award    | Ticket              |
| A.1 15    | Special Award   | Ticket              |
| A.1 16    | Match Award     | Ticket              |
| A.1 17    | Ex. Ball Ticket | Yes                 |
| A.4 02    | H.S.T.D. Award  | Ticket              |

### U.9 10 Install Novelty

The operator utilizes this option to removes all Free Play and Extra Ball awards. Individual adjustments are affected as follows:

| <u>Ad</u> | <u>Name</u>   | <u>New Setting</u> |
|-----------|---------------|--------------------|
| A.1 04    | Max. Ex. Ball | Off                |

|        |                      |        |
|--------|----------------------|--------|
| A.1 05 | Replay System        | Fixed  |
| A.1 09 | Replay Level 1       | Off    |
| A.1 10 | Replay Level 2       | Off    |
| A.1 11 | Replay Level 3       | Off    |
| A.1 12 | Replay Level 4       | Off    |
| A.1 15 | Special Award        | Points |
| A.1 19 | Match Feature        | Off    |
| A.4 01 | Highest Score        | On     |
| A.4 04 | Champion Credits     | 00     |
| A.4 05 | High Score 1 Credits | 00     |
| A.4 06 | High Score 2 Credits | 00     |
| A.4 07 | High Score 3 Credits | 00     |
| A.4 08 | High Score 4 Credits | 00     |

- U.9 11 **Install Buy-in**  
The operator uses this option to automatically set game pricing to 1 for 50¢/2 for \$1.00 and 1 Coin Buy-in (A.3 19) to YES.
- U.9 17 **Install German 1 • • For German Jumpered CPU Boards only.**  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for German/European Games lists the adjustments and settings that comprise the 'Install German 1' Group.
- U.9 18 **Install German 2•**  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustment Table for German/ European Games lists the adjustments and settings that comprise the 'Install German 2' Group.
- U.9 19 **Install German 3•**  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for German/European Games lists the adjustments and settings that comprise the 'Install German 3' Group.
- U.9 20 **Install German 4•**  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for German/European Games lists the adjustments and settings that comprise the 'Install German 4' Group.
- U.9 21 **Install German 5•**  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for German/European Games lists the adjustments and settings that comprise the 'Install German 5' Group.
- U.9 22 **Install German 6•**  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for German/European Games lists the adjustments and settings that comprise the 'Install German 6' Group.

**Preset Game Adjustments Table for German/European Games**

| Adj #  | Adj Description      | German 1<br>U.9 17 | German 2<br>U.9 18 | German 3<br>U.9 19 | German 4<br>U.9 20 | German 5<br>U.9 21 | German 6<br>U.9 22 |
|--------|----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| A.1 14 | Replay Award         | Credit             | Ticket             | Audit              | Credit             | Ticket             | Audit              |
| A.1 15 | Special Award        | Credit             | Ex. Ball           | Points             | Credit             | Ex. Ball           | Points             |
| A.1 16 | 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                 |
| A.4 10 | Backup Champion      | 15,000,000         | 00                 | 00                 | 00                 | 00                 | 00                 |
| A.4 11 | Backup High Score 1  | 12,000,000         | 00                 | 00                 | 00                 | 00                 | 00                 |
| A.4 12 | Backup High Score 2  | 11,000,000         | 00                 | 00                 | 00                 | 00                 | 00                 |
| A.4 13 | Backup High Score 3  | 10,000,000         | 00                 | 00                 | 00                 | 00                 | 00                 |
| A.4 14 | Backup High Score 4  | 9,000,000          | 00                 | 00                 | 00                 | 00                 | 00                 |

- U.9 23 Install French 1\***      **\*For French Jumpered CPU Boards only.**  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for French Games lists the adjustments and setting that comprise the 'Install French 1' Group.
- U.9 24 Install French 2\***  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for French Games list the adjustments and settings that comprise the 'Install French 2' Group.
- U.9 25 Install French 3\***  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for French Games list the adjustments and settings that comprise the 'Install French 3' Group.
- U.9 26 Install French 4\***  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for French Games lists the adjustments and setting that comprise the 'Install French 4' Group.
- U.9 27 Install French 5\***  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for French Games lists the adjustments and settings that comprise the 'Install French 5' Group.
- U.9 28 Install French 6\***  
The operator uses this adjustment to modify the game pricing and the type of game play. The Preset Game Adjustments Table for French Games lists the adjustments and settings that comprise the 'Install French 6' Group.

Press the Escape button to return to the Presets menu. Then press the Up button to display the next utility, (or the Down button to return to a previous utility).

#### **U.10 Clear Credits**

Press the Enter button to clear the game Credits. Press the Up button to display the next utility.

#### **U.11 Auto Burn-in**

Press the Enter button to activate Auto Burn-in. This utility allows you to automatically cycle through several tests. This helps in finding intermittent problems. The tests that Auto Burn-in cycles through are the Display Test, the Sound and Music Test, the All Lamps Test, the Solenoid Test, the Flashers Test, and the General Illumination Test.

Press the Escape button to return to the Utilities Menu. Then, either press the Up or Down button to return to a previous Utilities Menu Group, or press the Escape button again to return to the Main Menu. Once in the Main Menu either use the Up or Down buttons to return to a previous menu selection, or press the Escape button again to return to the Attract Mode.

## **PROBLEM ANALYSIS MESSAGES**

The WPC game program has a great capability to aid the operator and service personnel: At Game Turn-on (and after pressing the Begin Test switch) once the game has been operating for an extended period, the player score displays may signal with a message, "Press ENTER for Test Report", that 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 **THE MACHINE** 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) by displaying the message "Adjust Switch ##", listing each problem switch by number. (The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep **THE MACHINE** earning, until the service technician can repair the problem, bringing the game back to its normal good profits!)

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.** **THE MACHINE** normally uses three balls; however, it will operate with one or two balls. This message announces that a ball is missing or stuck somewhere. 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.** Frequent appearance of this message requires activation of the Switch Levels Test to locate the switch causing the "WHT-xxx ROW x SHORT" message. Possible 'row short' causes are: 1) Slam Tilt (or other coin door) switch touching the grounded coin door; 2) A *leaf-type*, playfield switch touching a grounded part; 3) Players poking metallic objects (wires, coat hangers, etc.) into the game; 4) Switch cable insulation pierced or damaged allowing bare wire contact with a grounded part; 5) All switches in a row closing at the same time (Note: This instance is NOT a switch problem; however, for most games this is a very rare possibility).

#### **"Head Motor/Switch Error" - Possible Causes:**

1. The motor that turns the head is not functioning.
2. The switch that positions the head is not operating correctly (broke or needs adjustment). This error message gets set when the head turns and does not see a switch position closure within 20 seconds. The usual cause is the head positioning switch (top of the head) is not adjusted properly. It should trigger closed when not on an indentation and open when on an indentation. The head will NOT work properly unless this switch is adjusted correctly. See T. 12 - Head Motor/Switch & T.16 Head Manual tests for help in adjusting this switch.

**Factory Settings Restored.** Repeated appearance of 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 of U8 should be +5V (game turned On) and at least +3.8V (game turned Off). When the voltage drops below +3.8V, 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.

**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.

The CPU has three L.E.D.s located on the upper left side of the board. On game power-up the top and bottom L.E.D.s turn On for a moment then, the top L.E.D. turns Off and the center L.E.D. starts to blink rapidly. The bottom L.E.D. 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 |

## MAINTENANCE INFORMATION

Regular maintenance is essential to a game's continuing contribution to the operator's earnings.

### LUBRICATION

The two main lubrication points of the Ball Shooter Lane Feeder mechanism are the pivots for the arm. Note that the mechanism of other playfield devices are somewhat similar to the Ball Shooter Lane Feeder Device; and have the same lubrication requirements as the Ball Shooter Lane Feeder Device. A medium viscosity oil (20W or 30W) is satisfactory for these devices.

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

Lubrication to ensure proper operation also applies to the target blades of the Drop Targets. MBI Instrument Grease, also known as Drop Target Switch Lubricant, with a Williams' part number of 20-8886, is a recommended lubricant.

### SWITCH CONTACTS

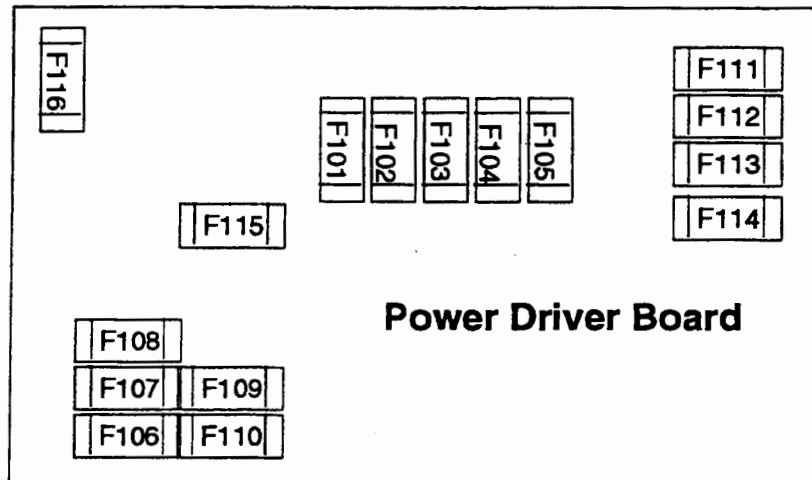
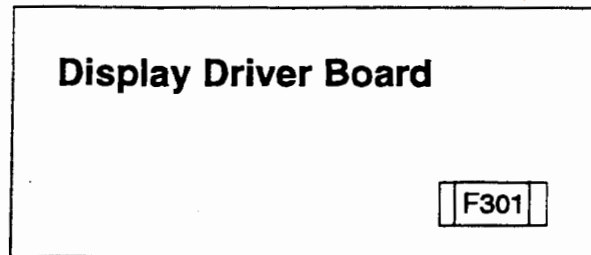
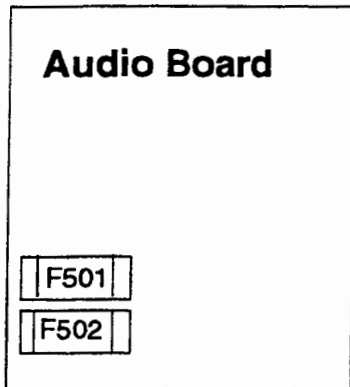
For proper game operation, switch contacts should be free of dust, dirt, contamination, and corrosion. Blade switch contacts are plated to resist corrosion. Cleaning blade switch contacts requires gentle closing of the contacts on a clean business card or piece of paper, and then pulling the paper about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

### CLEANING

Good game action and extended playfield life are the result 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.

## Fuse List



### Audio Board

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

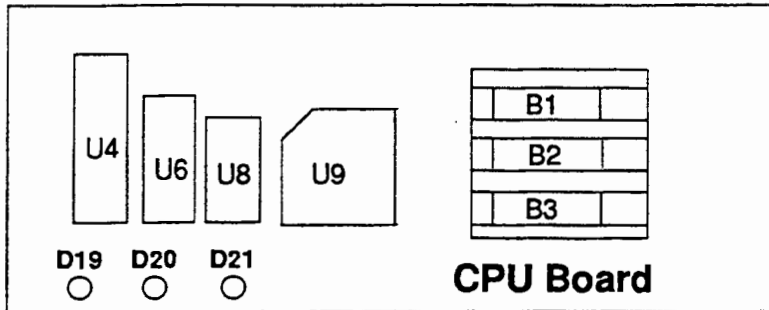
### Display Driver Board

F301  $\pm 100V$  Circuit 3/8A, S.B.

### Power Driver Board

|      |                    |            |      |                    |            |
|------|--------------------|------------|------|--------------------|------------|
| F101 | Left Flipper       | 2.5A, S.B. | F113 | +5V Logic          | 5A, S.B.   |
| F102 | Right Flipper      | 2.5A, S.B. | F114 | +18V Lamp Matrix   | 8A, N.B.   |
| F103 | Solenoid 25-28     | 3A, S.B.   | F115 | +12V Switch Matrix | 3/4A, S.B. |
| F104 | Solenoids 9-16     | 3A, S.B.   | F116 | +12V Secondary     | 3A, S.B.   |
| F105 | Solenoids 1-8      | 3A, S.B.   |      |                    |            |
| F106 | G.I. #2 Wht-Vio    | 5A, S.B.   |      |                    |            |
| F107 | G.I. #3 Wht-Yel    | 5A, S.B.   |      |                    |            |
| F108 | G.I. #5 Wht-Grn    | 5A, S.B.   |      |                    |            |
| F109 | G.I. #4 Wht-Orn    | 5A, S.B.   |      |                    |            |
| F110 | G.I. #1            | 5A, S.B.   |      |                    |            |
| F111 | Flasher Secondary  | 5A, S.B.   |      |                    |            |
| F112 | Solenoid Secondary | 5A, S.B.   |      |                    |            |

## LED List



### CPU Board

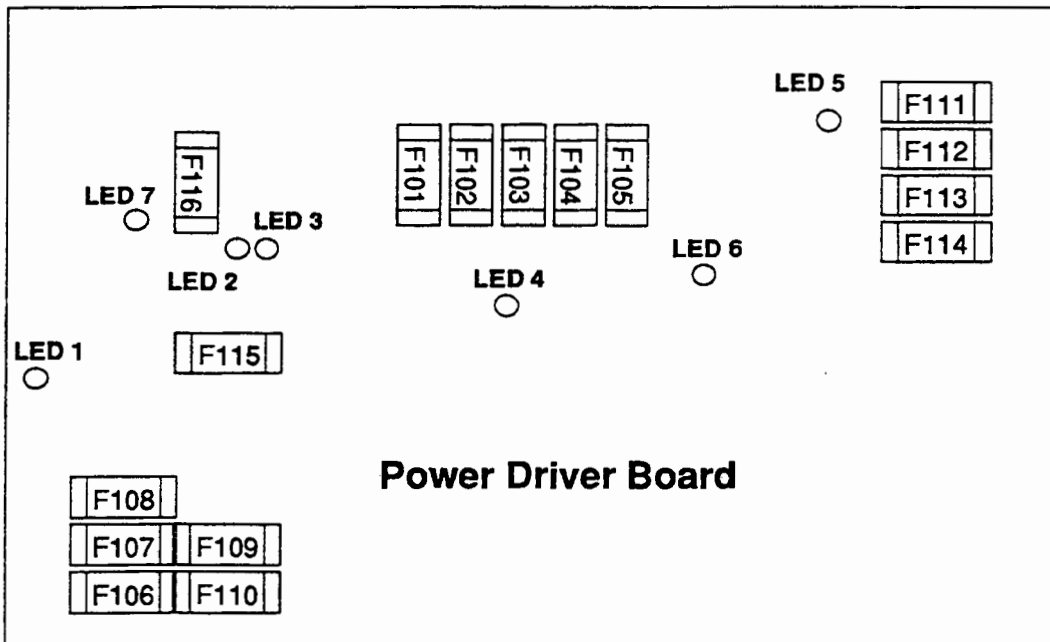
D19 , Blanking

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

LED1, +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 Off

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

LED 7, +12vdc, Power Circuit (motors relays etc.), Normally On

***NOTES:***

# **Section 2**

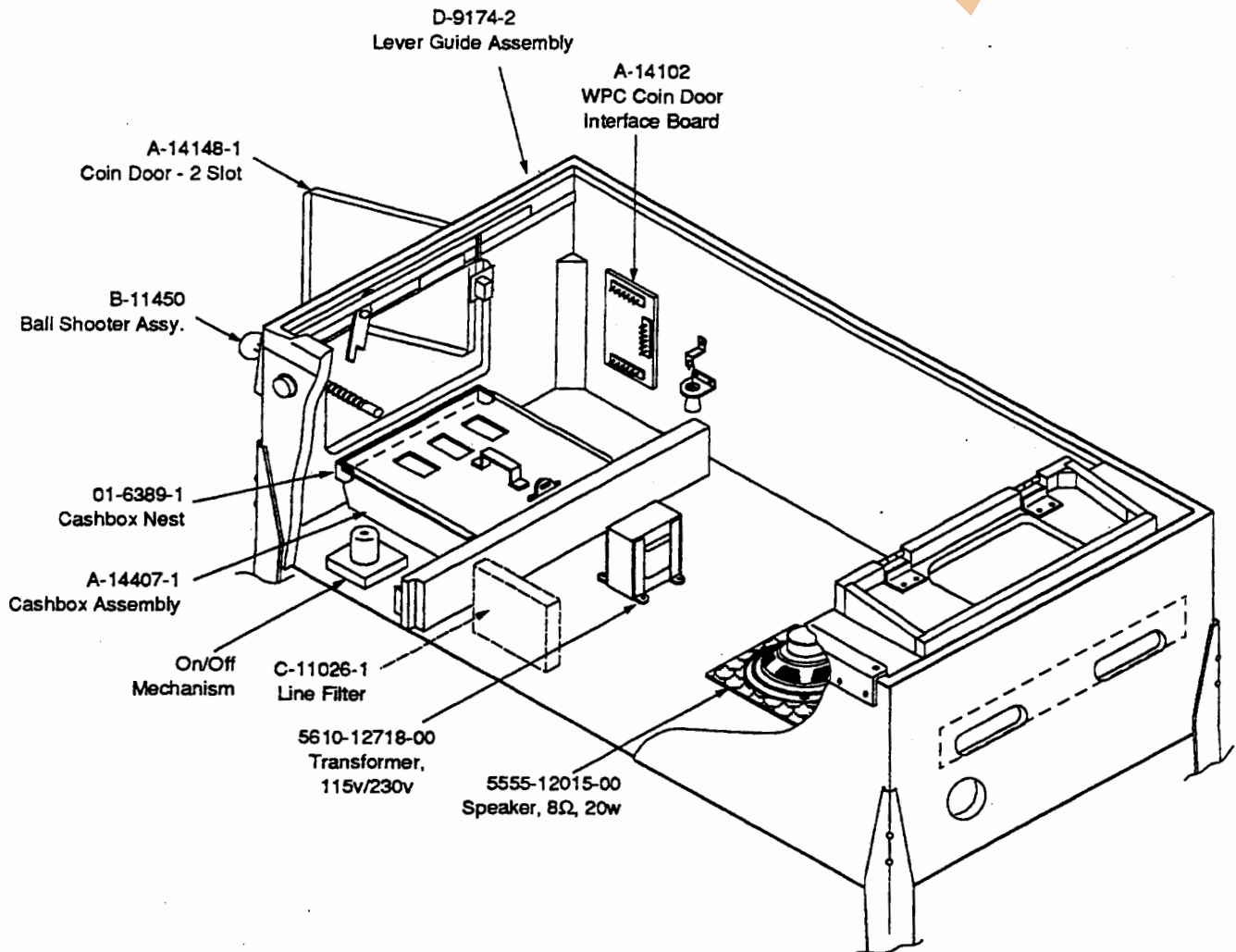
## *Game Parts Information*

- ***Parts Lists & Diagrams***

**Cabinet Parts**  
**Game Circuit Boards**  
**Major Mech. Location Diagram**  
**Audio Board**  
**CPU Board**  
**Power Driver Board**  
**Display Driver Board**  
**Lamp Boards**  
**Coin Door Interface Board**

**Major Mechanism Assemblies**  
**Rubbers**  
**Lamps**  
**Switches**  
**Solenoids/Flashers**  
**Playfield Parts**

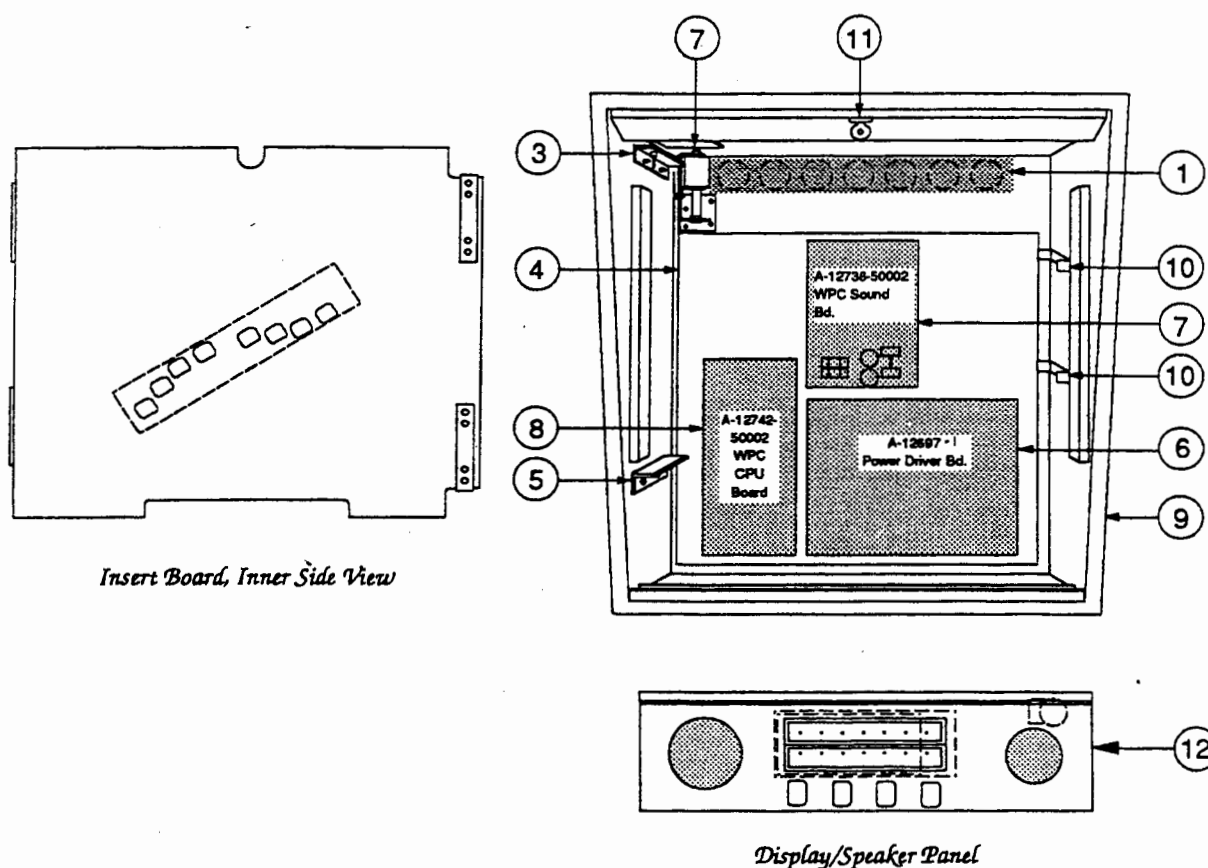
## Cabinet Parts



## Miscellaneous Parts

| Part Number   | Description                | Part Number   | Description                       |
|---------------|----------------------------|---------------|-----------------------------------|
| 03-7960-50002 | Playfield Mylar            | 31-1009-50002 | Shooter Plate (Screened)          |
| 08-7028-T     | Glass Playfield            | 31-1524-1     | Decal - Coinage                   |
| 08-7456       | Backbox Glass, 27 x 18-7/8 | 31-1524-2     | Decal - Tokens                    |
| 31-1002-50002 | Playfield (Screened)       | 31-1524-3     | Decal - See Cards                 |
| 31-1008-50002 | Bottom Arch (Screened)     | 31-1-50002-   | Playfield Plastics Set (Screened) |

## Backbox Assembly



| Item | Part Number   | Description                 | Item | Part Number   | Description                |
|------|---------------|-----------------------------|------|---------------|----------------------------|
| 1    | 01-6645       | Venting Screen              | 9    | A-14376-50002 | <b>The Machine</b> Backbox |
| 2    | B-10686-1*    | Knocker & Bracket Assy.     | 10   | 01-9047       | Insert Stop Bracket        |
| 3    | A-12497       | Upper Insert Bd Hinge Assy. | 11   | A-13379       | Lock Plate Assembly        |
| 4    | A-14092       | Plate & Clip Assembly       | a)   | 20-9637       | Lock & Cam Kit             |
| 5    | A-12498       | Lower Insert Bd Hinge Assy. | 12   | A-14368       | Speaker / Display Assembly |
| 6    | A-12697-1     | Power Driver Assembly       | a)   | A-14087-1     | WPC Display/Driver Assy.   |
| 7    | A-12738-50002 | WPC Sound Board             | 1)   | A-12739-1     | WPC Display Drive Assy.    |
| 8    | A-12742-50002 | WPC CPU Board               | b)   | 5555-12015-00 | Speaker, 8Ω, 6", 20w       |
|      |               |                             | c)   | 5555-12068-00 | Piezo Speaker, 4", 50w.    |
|      |               |                             | d)   | A-14292-1     | Coil & Bracket Assembly    |

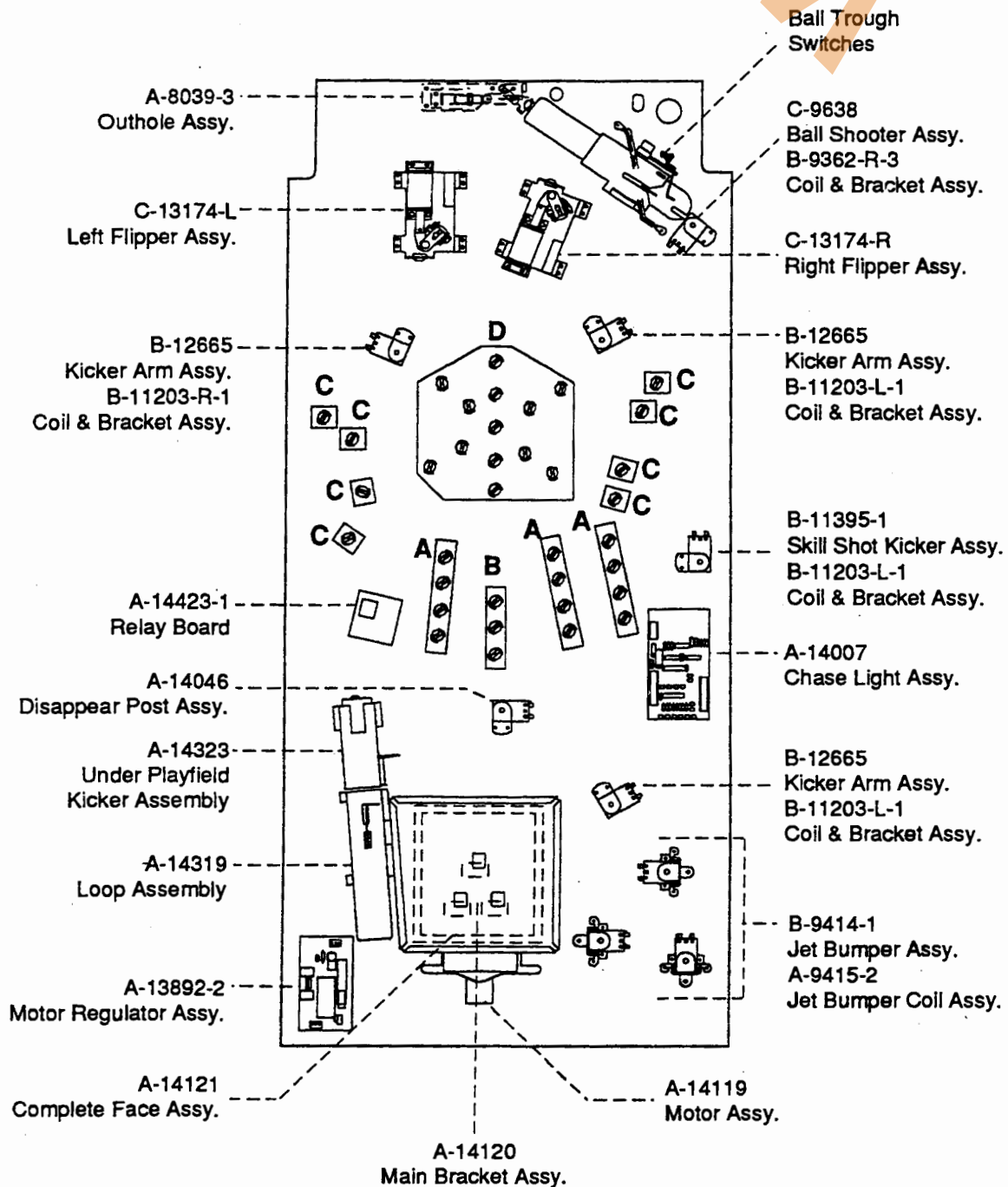
\* Refer to Individual Unit's Parts List

## Miscellaneous Backbox Parts

| Part Number   | Description                  |
|---------------|------------------------------|
| A-1552-50002  | Backglass Assembly           |
| 31-1357-50002 | <b>The Machine</b> Backglass |
| 50002-IN      | <b>The Machine</b> Insert    |
| 01-6571       | Hinge Mounting Bracket       |
| 01-6655       | Latch -Insert Board          |
| 01-6652       | Insert Stop Bracket          |
| 03-8149-9     | Mini Dome - Tr. Red          |
| 03-8519       | Egg Crate                    |

# Locations Diagram - Game Major Mechanisms

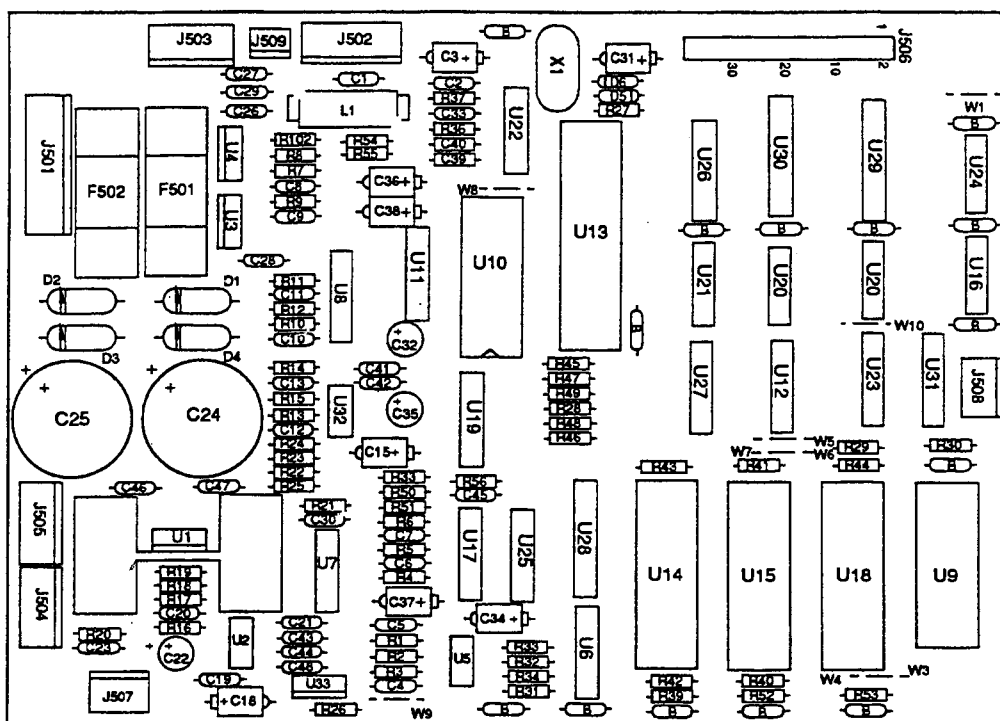
*Underside of Playfield, Viewed in Raised Position*



## Lamp Boards

|    |         |               |
|----|---------|---------------|
| A. | A-14305 | 4-Lamp Board  |
| B. | A-14302 | 3-Lamp Board  |
| C. | B-12224 | 1-Lamp Board  |
| D. | A-14304 | 13-Lamp Board |

# A-12738-50002 WPC Audio Board

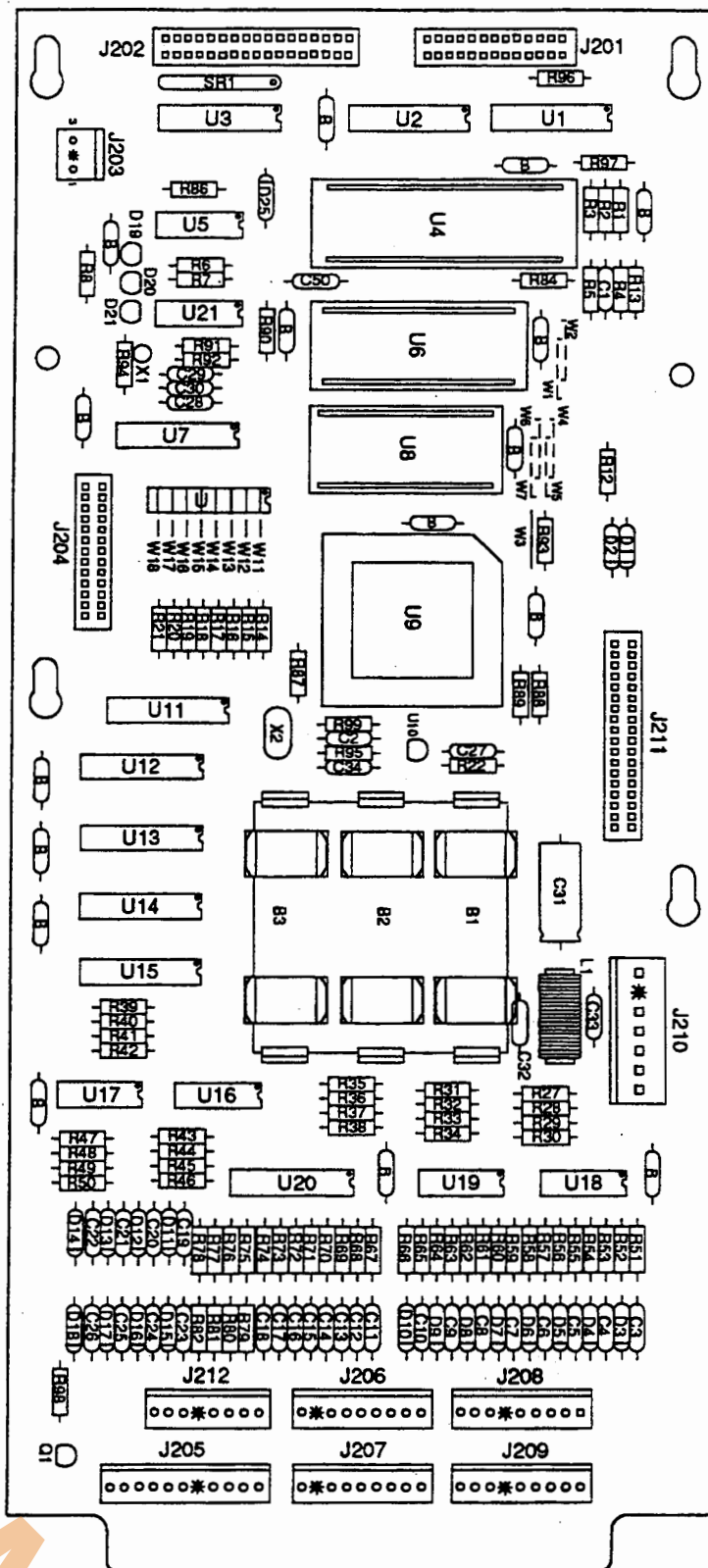


| Part No.      | Ckt Designator                            | Description                         | Part No.       | Ckt Designator | Description                       |
|---------------|-------------------------------------------|-------------------------------------|----------------|----------------|-----------------------------------|
| 01-9980       |                                           | Shield: Wire Protector              | 5048-12746-00  | C5, C7         | Capacitor, 330pfd., 50V           |
| 20-5229       | U1                                        | Thermal Compound                    | 5048-12748-00  | C8, C11, C30   | Capacitor, 220pfd., 50V           |
| 4004-01005-06 | U1                                        | Mach. Screw, 4-40 x 3/8             | 5070-08919-00  | D5, D6         | Diode, 1N4148                     |
| 4104-01012-04 | U1                                        | Sh. Mach. Screw, #4 x 1/4           | 5070-09045-00  | D1-D4          | Diode, MR501, 3.0A.               |
| 4104-01012-04 | U1                                        | Sh. Metal Screw, #4 x 1/4           | 5250-10495-00  | U3             | Reg. 7912 1.0A -12v               |
| 4404-01119-00 | U1                                        | Nut, 4-40 SNUT                      | 5281-09215-00  | U22            | IC, 74LS04 Hex INV                |
| 5010-09324-00 | R21                                       | Resistor, 27KΩ, 1/4w, 5%            | 5281-09246-00  | U12            | IC, 74LS139 2-4 Dec.              |
| 5010-12065-00 | R22, R25                                  | Resistor, 120KΩ, 1/4w, 5%           | 5281-09486-00  | U28-U30        | IC, 74LS374 8 Dual Flipflop       |
| 5010-08991-00 | R51                                       | Resistor, 4.7KΩ, 1/4w, 5%           | 5281-09487-00  | U6, U23-U25    | IC, 74LS74 Dual Flipflop          |
| 5010-08998-00 | R36, R37                                  | Resistor, 2.2KΩ, 1/4w, 5%           | 5281-09500-00  | U31            | IC, 74LS92                        |
| 5010-09034-00 | R13, R14, R29-R31, R33, R34, R50, R45-R49 | Resistor, 10KΩ, 1/4w, 5%            | 5281-09745-00  | U26, U27       | IC, 74LS138 DMLTPX                |
| 5010-09035-00 | R4                                        | Resistor, 47KΩ, 1/4w, 5%            | 5281-09850-00  | U20            | IC, 74LS11 Tripple AND            |
| 5010-09036-00 | R35                                       | Resistor, 100Ω, 1/4w, 5%            | 5281-10577-00  | U16            | IC, 74LS125 Q/B Bfr               |
| 5010-09134-00 | R1, R2, R6, R8, R9, R11, R12, R23, R24    | Resistor, 150KΩ, 1/4w, 5%           | 5370-11086-00  | U10            | IC, YM2151 Sound                  |
| 5010-09162-00 | R25, R102                                 | Resistor, 100KΩ, 1/4w, 5%           | 5371-11087-00  | U11            | IC, YM3012 D/A                    |
| 5010-08774-00 | R3, R5, R17, R19                          | Resistor, 22K, 1/4w, 5%             | 5400-10320-00  | U13            | IC, MPU 68B09E                    |
| 5010-09269-00 | R15                                       | Resistor, 12KΩ, 1/4w, 5%            | 5284-12651-00  | U21            | IC 4584                           |
| 5010-09358-00 | R18, R32                                  | Resistor, 1KΩ, 1/4w, 5%             | 5340-12278-00  | U9             | S/Ram 2064                        |
| 5010-09416-00 | R28, R39, R40-R44                         | Resistor, 470Ω, 1/4w, 5%            | 5370-09691-00  | U17            | IC, 55536 CVSD                    |
| 5010-09534-00 | R52, R53, R57                             | Resistor, 1Ω, 1/4w, 5%              | 5370-12260-00  | U2             | IC, 3340 Elec Atten               |
| 5010-10171-00 | W3, W5, W7-W10                            | Resistor, 0Ω                        | 5370-12728-00  | U1             | IC, Audio Amp LM1875              |
| 5010-10258-00 | R38, R56                                  | Resistor, 56Ω, 1/4w, 5%             | 5370-12730-00  | U7, U8         | IC, Op Amp TL084                  |
| 5010-10258-00 | R16                                       | Resistor, 1M, 1/4w, 5%              | 5370-12742-00  | U32            | IC, Op Amp TL082                  |
| 5010-10650-00 | R7, R10                                   | Resistor, 62K, 1/4w, 5%             | 5371-12727-00  | U19            | Dac AD7524                        |
| 5010-10989-00 | R54, R55, R27                             | Resistor, 470K, 1/4w, 5%            | 5432-12726-00  | U5             | EE Prom Pot X9503                 |
| 5010-12752-00 | R20                                       | Resistor, 1Ω, 1/4w, 5%              | 5460-12423-00  | U4             | IC, LM7812                        |
| 5040-08986-00 | C3                                        | Capacitor, 100M, 10v (±20%)         | 5460-12743-00  | U33            | LM7809 TO-220                     |
| 5040-09332-00 | C15, C18, C34, C36, C38                   | Capacitor, 47μfd., 25v, Axial       | 5520-09020-00  | X1             | Crystal, 3.58 MHz.                |
| 5040-11036-00 | C32, C35                                  | Capacitor, 47μfd., 16v, Rad.        | 5521-10931-00  | OSC1           | Oscillator, 8.0 MHz.              |
| 5040-12729-00 | C24, C25                                  | Capacitor, 4700μfd., 35v            | 5551-09822-00  | L1             | Ind, 4.7UH 3.0A.                  |
| 5040-12750-00 | C22                                       | Capacitor, 22μfd., 35v, Rad.        | 5700-08985-00  | U13            | Socket, IC 40-pin, .6"            |
| 5041-09031-00 | C26-C29, C37, C46-C48                     | Capacitor, 1μfd. TANT               | 5700-09004-00  | U8, U10        | Socket, IC 24-pin, .6"            |
| 5041-09243-00 | C20, C21                                  | Capacitor, 10μfd. TANT              | 5700-09006-00  | U11            | Socket, IC 16-pin, .3"            |
| 5043-08980-00 | C41-C44, B(15)                            | Capacitor, .01M, 50v, (+80, -20)    | A-5343-50002-2 | U14            | IC, Audio ROM                     |
| 5043-08996-00 | C1, C2                                    | Capacitor, .1μfd., 50v, 10%         | A-5343-50002-3 | U15            | IC, Audio ROM                     |
| 5048-11027-00 | C8, C10                                   | Capacitor, 33pfd., 50v, 10%         | A-5343-50002-4 | U18            | IC, Audio ROM                     |
| 5048-11028-00 | C45                                       | Capacitor, 22pfd., 50V, Axial       | 5700-12088-00  |                | Socket, IC 32-pin (U14, U15, U18) |
| 5048-11029-00 | C33                                       | Capacitor, 100pfd., 50v             | 5705-12755-00  | U1             | Heatsink 5295B-220                |
| 5048-11030-00 | C12                                       | Capacitor, 470pfd., 50v             | 5731-08633-00  | F501, F502     | Fuse, 3A, S-B                     |
| 5048-11031-00 | C19, C31                                  | Capacitor, .001μfd., 50v, 10%       | 5733-12060-01  |                | Fuse Holder (F501, F502)          |
| 5048-11065-00 | C13                                       | Capacitor, .0022μfd., 50v, 10%, Ax. | 5766-12433-00  |                | PCB-Sound 90                      |
| 5048-11072-00 | C39, C40                                  | Capacitor, .0033μfd.                | 5791-10862-04  | J504, J505     | Connector, 4-pin Header Sq. .156  |
| 5048-12036-00 | C23                                       | Capacitor, 22μfd., 10v, Ceramic     | 5791-10862-05  | J502           | Connector, 5-pin Header Sq. .156  |
| 5048-12745-00 | C4, C6                                    | Capacitor, 1800pfd., 50V, 10%       | 5791-10862-07  | J501           | Connector, 7-pin Header Sq. .156  |
|               |                                           |                                     | 5791-12462-03  | J509           | Connector, 3-pin Header Sq. .100  |
|               |                                           |                                     | 5791-12462-04  | J508           | Connector, 4-pin Header Sq. .100  |
|               |                                           |                                     | 5791-12516-00  | J506           | 34 Hen 2x17 STR                   |
|               |                                           |                                     | 16-8850-339    |                | PCB Label                         |

# A-12742-50002 WPC CPU Board

| Item | Part Number    | Ckt Designator                                               | Description                                 |
|------|----------------|--------------------------------------------------------------|---------------------------------------------|
| 1    | 5010-09034-00  | R14-R22, R27-R42, R86, R90, R94, R98                         | Resistor, 10K $\Omega$ , 1/4w, 5%           |
| 2    | 5010-09085-00  | R1, R2, R4, R93, R96, R97                                    | Resistor, 1.5K $\Omega$ , 1/4w, 5%          |
| 3    | 5010-09314-00  | R52, R54, R56, R58, R60, R62, R64, R66, R75-R82              | Resistor, 1.2K $\Omega$ , 1/4w, 5%          |
| 4    | 5010-09358-00  | R3, R43-R51, R53, R55, R57, R59, R61, R63, R65, R67-R74, R84 | Resistor, 1K $\Omega$ , 1/4w, 5%            |
| 5    | 5010-09416-00  | R5-R8, R12, R13, R87-R89                                     | Resistor, 470 $\Omega$ , 1/4w, 5%           |
| 6    | 5010-09534-00  | W2, W4, W7, W13-W18                                          | Resistor, 0 $\Omega$                        |
| 7    | 5010-10258-00  | R95, R99                                                     | Resistor, .01 $\mu$ fd $\Omega$ , 1/4w, 5%  |
| 8    | 5010-10989-00  | R92                                                          | Resistor, 470K $\Omega$ , 1/4w, 5%          |
| 9    | 5010-12104-00  | R91                                                          | Resistor, 22 $\mu$ fd, 1/4w, 5%             |
| 10   | 5019-09362-00  | SIP 1                                                        | SIP, 9P, 10-pin, 4.7K $\Omega$ , 5%         |
| 11   | 5040-08986-00  | C31                                                          | Capacitor, 100 $\mu$ fd, 10v ( $\pm$ 20%)   |
| 12   | 5043-08980-00  | B                                                            | Capacitor, .01 $\mu$ fd, 50v, (+80, -20%)   |
| 13   | 5043-09030-00  | C27                                                          | Capacitor, 0.047 $\mu$ fd, 50v ( $\pm$ 20%) |
| 14   | 5043-09065-00  | C3 - C26                                                     | Capacitor, 470pfd, 50v ( $\pm$ 20%)         |
| 15   | 5043-09491-00  | C2, C29, C30, C34                                            | Capacitor, 22pfd, 1KV, ( $\pm$ 10%)         |
| 16   | 5043-09492-00  | C28                                                          | Capacitor, 100pfd, 50v, ( $\pm$ 10%)        |
| 17   | 5043-09845-00  | C32, C33                                                     | Capacitor, 1KP, 50v, ( $\pm$ 20%)           |
| 18   | 5070-08919-00  | D2 - D18                                                     | Diode, 1N4148, 150MA                        |
| 19   | 5070-09266-00  | D1, D25                                                      | Diode, 1N5817, 1.0A                         |
| 20   | 5160-10269-00  | Q1                                                           | Transistor, 2N3904, NPN                     |
| 21   | 5162-12422-00  | U20                                                          | IC, ULN, 2803A                              |
| 22   | 5281-09308-00  | U3                                                           | IC, 74LS245, Octal Bus Trncv                |
| 23   | 5281-09486-00  | U14                                                          | IC, 74LS374, 8D F/F                         |
| 24   | 5281-09851-00  | U5                                                           | IC, 74LS14, SMT/TRG                         |
| 25   | 5281-09867-00  | U1, U2, U7                                                   | IC, Octal Buffer, 74LS244                   |
| 26   | 5281-10182-00  | U11, U12, U13, U15                                           | IC, 74LS240 Driver                          |
| 27   | 5284-12651-00  | U21                                                          | IC, 4584                                    |
| 28   | 5340-12278-00  | U8                                                           | S/RAM 2064                                  |
| 29   | 5370-12272-00  | U16 - U19                                                    | IC, LM339, Quad. Comp                       |
| 30   | 5370-12687-00  | U10                                                          | MC, 34064 Reset Chip                        |
| 31   | 5520-10438-00  | X2                                                           | Crystal, 8.0MHz                             |
| 32   | 5520-12084-00  | X1                                                           | Crystal 32.768 KHz                          |
| 33   | 5551-09822-00  | L1                                                           | ILN, 4.7 UH 3A                              |
| 34   | 5671-09019-00  | D19 - D21                                                    | DSPL LED RED                                |
| 35   | 5700-08985-00  | U4                                                           | Socket, IC 40P, .6"                         |
| 36   | 5700-12088-00  | U6                                                           | Socket, IC 32P, .6"                         |
| 37   | 5700-12424-00  | U9                                                           | Socket, 84 Pin PLCC                         |
| 38   | 5764-12431-00  |                                                              | PC Board                                    |
| 39   | 5791-10850-00  | J201, J204                                                   | Connector, 26-pin Header Str Sq.            |
| 40   | 5791-10862-07  | J210                                                         | Connector, 7-pin Header Str Sq.             |
| 41   | 5791-12461-08  | J212                                                         | Connector, 8-pin Header Str Sq.             |
| 42   | 5791-12461-09  | J206 - J209                                                  | Connector, 9-pin Header Sq. pin             |
| 43   | 5791-12461-12  | J205                                                         | Connector, 12-pin Header Sq. pin            |
| 44   | 5791-12516-00  | J202, J211                                                   | 34' Hen 2x17 STR                            |
| 45   | 5881-09021-00  | B1 - B3                                                      | Battery Holder "AA"                         |
| 46   | 5048-11033-00  | C50                                                          | Capacitor, 0.022 $\mu$ f, 10v               |
| 47   | 16-8850-321    |                                                              | PCB Label                                   |
| 48   | A-5343-50002-1 | U6                                                           | Game PROM Assembly                          |
| 49   | 5410-12426-00  | U9                                                           | WPC-89 ASIC                                 |
| 50   | 5400-10320-00  | U4                                                           | IC MPU 68B09E                               |
| 51   | 5880-09022-00  | B1 - B3                                                      | Battery, Alkaline, 1.5v ("AA")              |

# A-12742-50002 WPC CPU Board

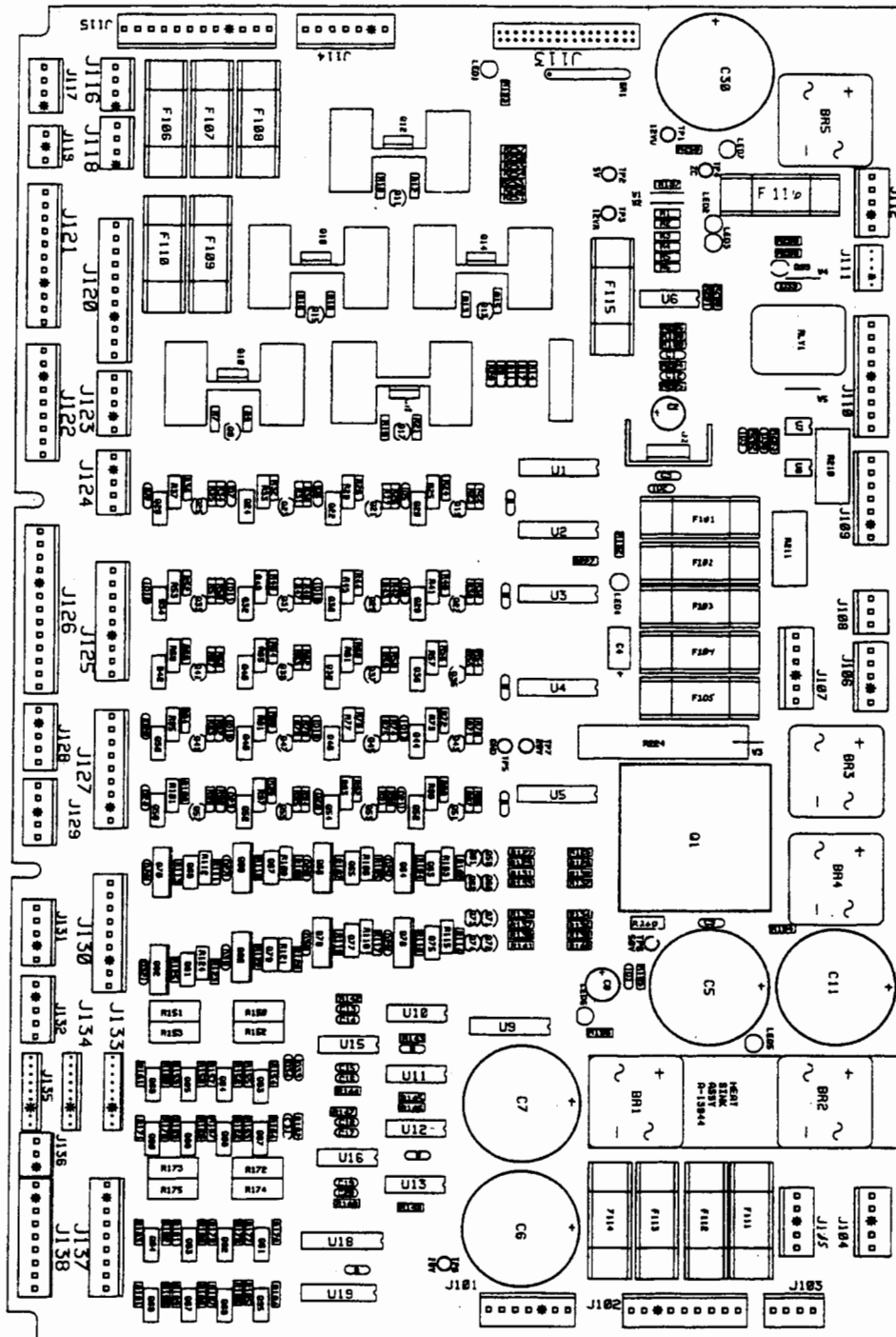


# A-12697-1 WPC Power Driver Assembly

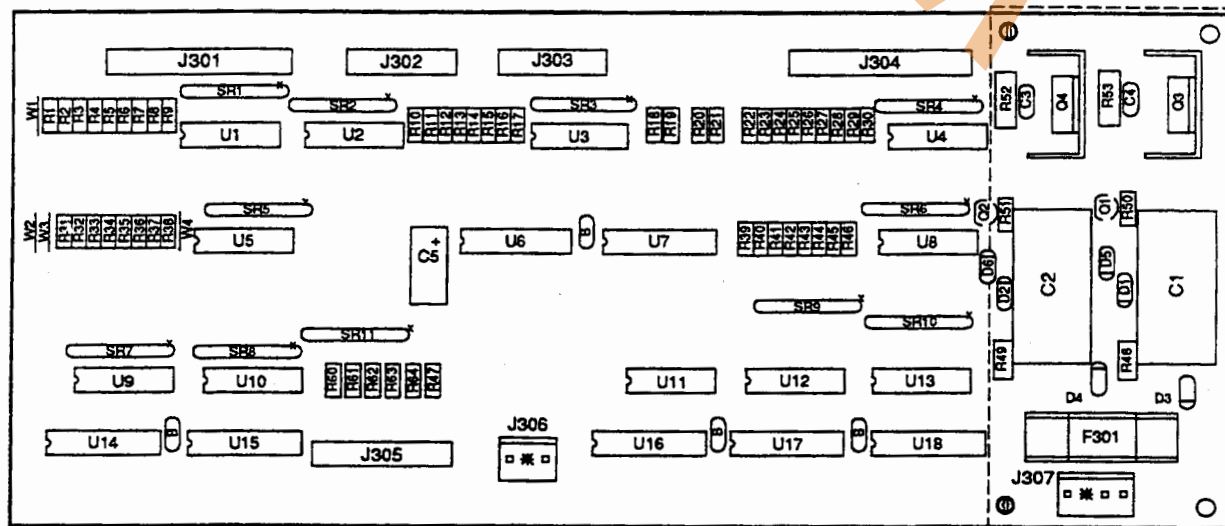
| Item | Part Number   | Ckt Designator                                                                                                                                                                                                                                                                                                 | Description                                                                                                                                                                                                                                                                                                                                                                             | Item   | Part Number   | Ckt Designator                                                                                                                                    | Description                      |
|------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 1    | 20-9229       | Q2, Q10, Q12, Q14, Q16, Q18                                                                                                                                                                                                                                                                                    | Thermal Compound                                                                                                                                                                                                                                                                                                                                                                        | 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, Q99 | Transistor, 2N4403 PNP           |
| 2    | 4006-01005-06 | Q1, Q2                                                                                                                                                                                                                                                                                                         | Mach. Screw, 6-32 x 3/8                                                                                                                                                                                                                                                                                                                                                                 | 42     | 5191-12179-00 | Q64, Q66, Q68, Q70, Q76 Q78, Q80, Q82                                                                                                             | Transistor, TIP36C PNP           |
| 3    | 4406-01128-00 | Q1, Q2                                                                                                                                                                                                                                                                                                         | Nut, 6-32 KEPS                                                                                                                                                                                                                                                                                                                                                                          | 43     | 5192-12428-00 | Q91-Q98                                                                                                                                           | Transistor, TIP 107              |
| 4    | 4004-01005-06 | Q10, Q12, Q14, Q16, Q18                                                                                                                                                                                                                                                                                        | Mach. Screw, 4-40 x 3/8                                                                                                                                                                                                                                                                                                                                                                 | 44     | 5250-12634-00 | Q1                                                                                                                                                | Reg LM 323 5v                    |
| 5    | 4404-01119-00 | Q10, Q12, Q14, Q16, Q18 R260                                                                                                                                                                                                                                                                                   | Nut, 4-40 SNUT                                                                                                                                                                                                                                                                                                                                                                          | 45     | 5281-09486-00 | U1-U5, U18                                                                                                                                        | IC, 74LS374 8 Dual D Flipflop    |
| 6    | 5710-08981-00 | 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, R209, R227                                                                                                                         | Resistor, 10K $\Omega$ , 1/2w, 5%<br>Resistor, 4.7K $\Omega$ , 14w, 5%                                                                                                                                                                                                                                                                                                                  | 46     | 5281-09487-00 | U10-U13                                                                                                                                           | IC, 74LS74 Dual D flipflop       |
| 7    | 5010-08991-00 | R8, R11, R14, R17, R20, R177, R179, R181, R183, R165, R187, R189, R191, R208                                                                                                                                                                                                                                   | Resistor, 560 $\Omega$ , 1/4w, 5%                                                                                                                                                                                                                                                                                                                                                       | 47     | 5281-10182-00 | U9                                                                                                                                                | IC, 74LS240, L/Drv               |
| 8    | 5010-08992-00 | 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, 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, 68 $\Omega$ , 1/4w, 5%                                                                                                                                                                                                                                                                                                                                                        | 48     | 5370-12272-00 | U6, U15, U16                                                                                                                                      | IC, LM339 Quad. Comp             |
| 9    | 5010-08993-00 | R155, R157, R159, R161, R165, R167, R169, R171, R3, R4, R6, R142-R149, R197-R198                                                                                                                                                                                                                               | Resistor, 2.7K $\Omega$ , 1/4w, 5%                                                                                                                                                                                                                                                                                                                                                      | 49     | 5460-12423-00 | Q2                                                                                                                                                | IC, LM 7812                      |
| 10   | 5010-08997-00 | R194, R196, R251, R253-R257                                                                                                                                                                                                                                                                                    | Resistor, 2.2K $\Omega$ , 1/4w, 5%                                                                                                                                                                                                                                                                                                                                                      | 50     | 5490-10892-00 | U7, U8                                                                                                                                            | Opto Isolator, 4N25              |
| 11   | 5010-08998-00 | R1, R2, R192, R201- R205                                                                                                                                                                                                                                                                                       | Resistor, 10K $\Omega$ , 1/4w, 5%                                                                                                                                                                                                                                                                                                                                                       | 51     | 5580-08994-01 | RLY 1                                                                                                                                             | Relay 4PDT 6VDC5A VS             |
| 12   | 5010-09034-00 | R176, R178, R180, R182, R184, R186, R188, R190, R206                                                                                                                                                                                                                                                           | Resistor, 1.5K $\Omega$ , 1/4w, 5%                                                                                                                                                                                                                                                                                                                                                      | 52     | 5671-09019-00 | LED1 - LED7                                                                                                                                       | Display LED Red                  |
| 13   | 5010-09085-00 | R154, R156, R158, R160, R164, R166, R168, R170, R162, R193, R199, R200, R250                                                                                                                                                                                                                                   | Resistor, 6.8K $\Omega$ , 1/4w, 5%<br>Resistor, 270 $\Omega$ , 1/4w, 5%<br>Resistor, 1.2K $\Omega$ , 1/4w, 5%                                                                                                                                                                                                                                                                           | 53     | 5701-09652-00 | Q1                                                                                                                                                | Thermal Pad TO-3                 |
| 14   | 5010-09086-00 | R104, R107, R110, R113, R116, R119, R122, R125, R22, R26, R30, R34, R38, R42, R46, R50, R54, R58, R62, R66, R70, R74, R78, R82, R86, R90, R94, R98, R127, R129, R131, R133, R135, R137, R139, R141, W1, W2                                                                                                     | Resistor, 27K $\Omega$ , 1/4w, 5%<br>Resistor, 1K $\Omega$ , 1/4w, 5%                                                                                                                                                                                                                                                                                                                   | 54     | 5705-09199-00 | Q2                                                                                                                                                | Heatsink, #60308                 |
| 15   | 5010-09224-00 | R7, R10, R13, R16, R19, R150-R153, R172-R175, R224                                                                                                                                                                                                                                                             | Resistor, 220 $\Omega$ , 1w, 5%<br>Resistor, .12 $\Omega$ , 10w, 5%<br>Resistor, 3.3K $\Omega$ , 5w, 10%<br>SIP, 9R, 10 pin, 470 $\Omega$ , 5%                                                                                                                                                                                                                                          | 55     | A-13944       | Bridge Assembly                                                                                                                                   | WPC Heatsink Rectifier Assy      |
| 16   | 5010-09314-00 | R210, R211                                                                                                                                                                                                                                                                                                     | Capacitor, 100 $\mu$ fd, 10v ( $\pm$ 20%)<br>Capacitor, 100 $\mu$ fd, 25v ( $\pm$ 50, -10%)<br>Capacitor, 100 $\mu$ fd, 100v ( $\pm$ 20%)<br>Capacitor, 15,000 $\mu$ fd, 25v ( $\pm$ 20%)<br>Capacitor, .01 $\mu$ fd, 50v ( $\pm$ 80, -20%)<br>Capacitor, .1 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, 1,000 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, .33 $\mu$ fd, 50v ( $\pm$ 20%) Ax. | 56     | 5705-12637-00 | Q1                                                                                                                                                | Heatsink 5054                    |
| 17   | 5010-09324-00 | SR1                                                                                                                                                                                                                                                                                                            | Capacitor, 100 $\mu$ fd, 10v ( $\pm$ 20%)<br>Capacitor, 100 $\mu$ fd, 25v ( $\pm$ 50, -10%)<br>Capacitor, 100 $\mu$ fd, 100v ( $\pm$ 20%)<br>Capacitor, 15,000 $\mu$ fd, 25v ( $\pm$ 20%)<br>Capacitor, .01 $\mu$ fd, 50v ( $\pm$ 80, -20%)<br>Capacitor, .1 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, 1,000 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, .33 $\mu$ fd, 50v ( $\pm$ 20%) Ax. | 57     | 5705-12638-00 | Q10, Q12, Q14, Q16, Q18                                                                                                                           | Heatsink 5298B                   |
| 18   | 5010-09358-00 | C4                                                                                                                                                                                                                                                                                                             | Capacitor, 100 $\mu$ fd, 10v ( $\pm$ 20%)<br>Capacitor, 100 $\mu$ fd, 25v ( $\pm$ 50, -10%)<br>Capacitor, 100 $\mu$ fd, 100v ( $\pm$ 20%)<br>Capacitor, 15,000 $\mu$ fd, 25v ( $\pm$ 20%)<br>Capacitor, .01 $\mu$ fd, 50v ( $\pm$ 80, -20%)<br>Capacitor, .1 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, 1,000 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, .33 $\mu$ fd, 50v ( $\pm$ 20%) Ax. | 58     | 5733-12060-01 |                                                                                                                                                   | Fuse Holder, F101-F116           |
| 19   | 5010-09361-00 | C2                                                                                                                                                                                                                                                                                                             | Capacitor, 100 $\mu$ fd, 10v ( $\pm$ 20%)<br>Capacitor, 100 $\mu$ fd, 25v ( $\pm$ 50, -10%)<br>Capacitor, 100 $\mu$ fd, 100v ( $\pm$ 20%)<br>Capacitor, 15,000 $\mu$ fd, 25v ( $\pm$ 20%)<br>Capacitor, .01 $\mu$ fd, 50v ( $\pm$ 80, -20%)<br>Capacitor, .1 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, 1,000 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, .33 $\mu$ fd, 50v ( $\pm$ 20%) Ax. | 59     | 5763-12405-00 |                                                                                                                                                   | Bare PCB                         |
| 20   | 5010-09416-00 | C8                                                                                                                                                                                                                                                                                                             | Capacitor, 100 $\mu$ fd, 10v ( $\pm$ 20%)<br>Capacitor, 100 $\mu$ fd, 25v ( $\pm$ 50, -10%)<br>Capacitor, 100 $\mu$ fd, 100v ( $\pm$ 20%)<br>Capacitor, 15,000 $\mu$ fd, 25v ( $\pm$ 20%)<br>Capacitor, .01 $\mu$ fd, 50v ( $\pm$ 80, -20%)<br>Capacitor, .1 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, 1,000 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, .33 $\mu$ fd, 50v ( $\pm$ 20%) Ax. | 60     | 5791-10862-03 | J108, J119, J136                                                                                                                                  | Connector, 3-pin Header STR Sq.  |
| 21   | 5010-09534-00 | C1, C12                                                                                                                                                                                                                                                                                                        | Capacitor, 100 $\mu$ fd, 10v ( $\pm$ 20%)<br>Capacitor, 100 $\mu$ fd, 25v ( $\pm$ 50, -10%)<br>Capacitor, 100 $\mu$ fd, 100v ( $\pm$ 20%)<br>Capacitor, 15,000 $\mu$ fd, 25v ( $\pm$ 20%)<br>Capacitor, .01 $\mu$ fd, 50v ( $\pm$ 80, -20%)<br>Capacitor, .1 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, 1,000 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, .33 $\mu$ fd, 50v ( $\pm$ 20%) Ax. | 61     | 5791-10862-04 | J103, J116-J118                                                                                                                                   | Connector, 4-pin Header STR Sq.  |
| 22   | 5010-11079-00 | C3                                                                                                                                                                                                                                                                                                             | Capacitor, 100 $\mu$ fd, 10v ( $\pm$ 20%)<br>Capacitor, 100 $\mu$ fd, 25v ( $\pm$ 50, -10%)<br>Capacitor, 100 $\mu$ fd, 100v ( $\pm$ 20%)<br>Capacitor, 15,000 $\mu$ fd, 25v ( $\pm$ 20%)<br>Capacitor, .01 $\mu$ fd, 50v ( $\pm$ 80, -20%)<br>Capacitor, .1 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, 1,000 $\mu$ fd, 50v ( $\pm$ 20%)<br>Capacitor, .33 $\mu$ fd, 50v ( $\pm$ 20%) Ax. | 62     | 5791-10862-05 | J112, J104-J106, J123, J124, J128, J129, J131, J132, J105                                                                                         | Connector, 5-pin Header STR Sq.  |
| 23   | 5010-12427-00 | D33, D34                                                                                                                                                                                                                                                                                                       | Diode, 1N4148, 150MA.<br>Diode, 1N4004, 1.0A.                                                                                                                                                                                                                                                                                                                                           | 63     | 5791-10862-06 | J107                                                                                                                                              | Connector, 6-pin Header STR Sq.  |
| 24   | 5010-12632-00 | D1-D3, D5-D12, D17-D32, D38, D39                                                                                                                                                                                                                                                                               | Diode, 1N4148, 150MA.<br>Diode, 1N4004, 1.0A.                                                                                                                                                                                                                                                                                                                                           | 64     | 5791-10862-07 | J101, J109, J114                                                                                                                                  | Connector, 7-pin Header STR Sq.  |
| 25   | 5012-12238-00 | BR3-BR5                                                                                                                                                                                                                                                                                                        | Bridge Rectifier, 35A., 200v                                                                                                                                                                                                                                                                                                                                                            | 65     | 5791-10862-09 | J102, J110, J122, J125, J127, J130, J137, J138                                                                                                    | Connector, 9-pin Header STR Sq.  |
| 26   | 5019-10143-00 | Q10, Q12, Q14, Q16, Q18 U18                                                                                                                                                                                                                                                                                    | Triac, BT138E<br>IC, ULN 2803                                                                                                                                                                                                                                                                                                                                                           | 66     | 5791-10862-11 | J120, J121                                                                                                                                        | Connector, 11-pin Header STR Sq. |
| 27   | 5040-08986-00 | 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                                                                                                                                                                                                                                                                                                                                                                     | 67     | 5791-10862-12 | J115                                                                                                                                              | Connector, 12-pin Header STR Sq. |
| 28   | 5040-09421-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 68     | 5791-10862-13 | J126                                                                                                                                              | Connector, 13-pin Header STR Sq. |
| 29   | 5040-09537-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 69     | 5791-12461-05 | J111                                                                                                                                              | Connector, 5-pin Header STR Sq.  |
| 30   | 5040-12313-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 70     | 5791-12461-09 | J133-J135                                                                                                                                         | Connector, 9-pin Header STR Sq.  |
| 31   | 5043-08980-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 71     | 5791-12516-00 | J113                                                                                                                                              | 34 HEN 2x17 STR                  |
| 32   | 5043-08996-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 72     | 5824-09248-00 | TP1-TP8                                                                                                                                           | Test Point #1502-1               |
| 33   | 5043-08945-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 73     | 5041-09163-00 | C9                                                                                                                                                | Capacitor, 2.2 $\mu$ fd TANT     |
| 34   | 5048-10994-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 74-100 | Not Used      |                                                                                                                                                   | ID Label                         |
| 35   | 5070-08919-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 101    | 16-8850-323   |                                                                                                                                                   | Fuse, 8A, 32v                    |
| 36   | 5070-09054-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 102    | 5730-09071-00 | F114                                                                                                                                              | Fuse, S-B, 2.5A., 250v           |
| 37   | 5100-09690-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 103    | 5731-09128-00 | F101, F102                                                                                                                                        | Fuse, S-B, 5A., 250v             |
| 38   | 5131-12725-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 104    | Not Used      |                                                                                                                                                   | Fuse, S-B, 3A., 250v             |
| 39   | 5162-12422-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 105    | 5731-09651-00 | F106-F113                                                                                                                                         | Fuse, S-B, 3/4A., 250v           |
| 40   | 5162-12635-00 |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 106    | Not Used      |                                                                                                                                                   |                                  |
|      |               |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 107    | 5731-10356-00 | F103-F105, F116                                                                                                                                   |                                  |
|      |               |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         | 108    | 5730-09797-00 | F115                                                                                                                                              |                                  |

NOTE: For schematic refer to drawing #16-9057.

# A-12697-1 WPC Power Driver Board



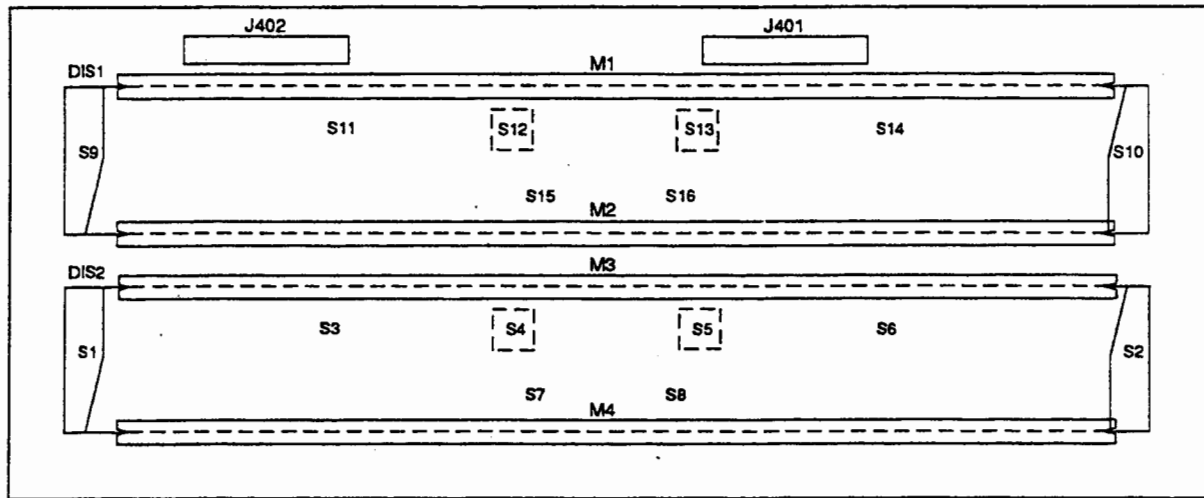
# A-12739-1 WPC Display Driver Assembly



| Part Number   | Ckt Designator                                                 | Description                 | Part Number   | Ckt Designator    | Description                     |
|---------------|----------------------------------------------------------------|-----------------------------|---------------|-------------------|---------------------------------|
| 20-9229       | Q3, Q4                                                         | Thermal Compound            | 5043-08980-00 | B                 | Cap., 0.01μfd, 50v, (+80, -20%) |
| 4006-01003-06 | Q3, Q4                                                         | Mach. Screw, 6-32 x 3/8     | 5043-09072-00 | C3, C4            | Cap., 0.1μfd, 500v, (+80, -20%) |
| 4406-01128-00 | Q3, Q4                                                         | Nut, 6-32 KEPS              | 5070-09054-00 | D3, D4            | Diode, 1N4004, 1.0A.            |
| 5010-08991-00 | R47                                                            | Resistor, 4.7KΩ, 1/4w, 5%   | 5075-09059-00 | D1, D2            | Zener, 1N5990, 3.9v, 1/2w       |
| 5010-09061-00 | R50, R51                                                       | Resistor, 680Ω, 1/2w, 5%    | 5075-12650-00 | D5, D6            | Zener, 1N4763A, 91v, 1w         |
| 5010-09069-00 | R52, R53                                                       | Resistor, 330KΩ, 1/2w, 5%   | 5164-09056-00 | Q1                | Transistor, MPD02 NPN           |
| 5010-09085-00 | R60- R64                                                       | Resistor, 1.5KΩ, 1/4w, 5%   | 5164-12154-00 | Q4                | Transistor, MJE15030 NPN        |
| 5010-09536-00 | R48, R49                                                       | Resistor, 39KΩ, 1w, 5%      | 5194-09055-00 | Q2                | Transistor, MPD52 PNP           |
| 5010-10258-00 | R3, R18 - R21, R24                                             | Resistor, 1MΩ, 1/4w, 5%     | 5194-12155-00 | Q3                | Transistor, MJE15031 PNP        |
| 5010-08773-00 | R4, R5, R25, R26, R33, R38, R41, R46                           | Resistor, 18KΩ, 1/4w, 5%    | 5281-09246-00 | U11               | IC, 2-4 Dec, 74LS139            |
| 5010-09034-00 | R6, R27, R31, R34, R36, R39, R42, R44                          | Resistor, 10KΩ, 1/4w, 5%    | 5281-09486-00 | U14 - U18         | IC, Dual D Flipflop, 74LS374    |
| 5010-09219-00 | R1, R2, R7-R9, R22, R23, R28-R30, R32, R35, R37, R40, R43, R45 | Resistor, 8.2KΩ, 1/4w, 5%   | 5281-10182-00 | U6, U7            | IC, 74LS240 L/Driver            |
| 5010-09534-00 | W3, W4                                                         | Resistor, 0Ω                | 5680-08969-00 | U9, U10, U12, U13 | IC, 7180 Cathode Drive          |
| 5019-10143-00 | SR11                                                           | SIP, 9R, 10-pin, 470Ω, 5%   | 5680-08968-00 | U1, U4, U5, U8    | IC, 6184 Anode Drive            |
| 5019-12509-00 | SR1, SR4-SR10                                                  | SIP, 10R, 10-pin, 100KΩ, 5% | 5705-09199-00 | Q3, Q4            | Heatsink, #6030B                |
| 5040-08986-00 | C51                                                            | Cap., 100μfd, 10v, (±20%)   | 5731-12328-00 | F301              | Fuse, 3/8A., S-B, 250v          |
| 5040-12324-00 | C1, C2                                                         | Cap., 150μfd, 160v, (±50%)  | 5733-12060-01 |                   | Fuse Holder, F301               |
|               |                                                                |                             | 5764-12432-00 | PCB               | PCB Display Driver              |
|               |                                                                |                             | 5791-10850-00 | J305              | Connector, 26-pin STR Sq.       |
|               |                                                                |                             | 5791-10862-03 | J306              | Connector, 3-pin STR Sq.        |
|               |                                                                |                             | 5791-10862-04 | J307              | Connector, 4-pin STR Sq.        |
|               |                                                                |                             | 5791-12516-00 | J301, J304        | 34 HEN 2x17 STR                 |
|               |                                                                |                             | 03-8019-2     |                   | PCB Support Post                |
|               |                                                                |                             | 01-9967       |                   | Shield                          |

Note: For Schematic refer to drawing #16-9059

## A-12793     WPC Dual Assembly



| Part Number   | Ckt Designator   | Description                |
|---------------|------------------|----------------------------|
| 03-8329       | S1, S2, S9, S10  | Retainer                   |
| 03-8088-1     | S4, S5, S12, S13 | Support 3/8"               |
| 5760-12448-00 | PCB              | Bare PCB                   |
| 5670-12308-00 | DIS1, DIS2       | Alphanumeric Display Board |
| 5791-12516-00 | J401, J402       | Connector, 34 Hen 2x17 STR |
| 23-6655       | M1-M4            | Mask WPC Display           |

## Lamp Boards

### B-12224 Single Lamp Board

| Part Number   | Description               |
|---------------|---------------------------|
| 5768-12312-00 | Lamp PCB                  |
| 24-8767       | Twist Lamp Socket         |
| 24-8768       | Bulb #555, (6.3v, 0.25A.) |
| 5070-09054-00 | Diode, 1N4004, 1.0A.      |

### C-12000 3-Lamp Board

| Part Number   | Description                     |
|---------------|---------------------------------|
| 5768-12245-00 | Lamp PCB                        |
| 24-8767       | Twist Lamp Socket               |
| 24-8768       | Bulb #555, (6.3v, 0.25A.)       |
| 5070-09054-00 | Diode, 1N4004, 1.0A.            |
| 5791-10871-05 | Connector, 5-pin Header Sq Post |

## Lamp Boards - (Continued)

### A-14025 Face Lamp Assembly

| Part Number   | Description                     |
|---------------|---------------------------------|
| 5768-12708-00 | Lamp PCB                        |
| 24-8804       | Socket V-Wedge PCB              |
| 24-8768       | Bulb #555, (6.3v, 0.25A.)       |
| 5070-09054-00 | Diode, 1N4004, 1.0A.            |
| 5791-10862-05 | Connector, 5-pin Header Sq Post |

### A-14302 3-Lamp Board

| Part Number   | Description                     |
|---------------|---------------------------------|
| 5768-12762-00 | Lamp PCB                        |
| 24-8767       | Twist Lamp Socket               |
| 24-8768       | Bulb #555, (6.3v, 0.25A.)       |
| 5070-09054-00 | Diode, 1N4004, 1.0A.            |
| 5791-10871-06 | Connector, 6-pin Header Sq Post |

### A-14303 5-Lamp Board

| Part Number   | Description                     |
|---------------|---------------------------------|
| 5768-12763-00 | Lamp PCB                        |
| 24-8805       | Socket H-Wedge PCB              |
| 24-8768       | Bulb #555, (6.3v, 0.25A.)       |
| 5070-09054-00 | Diode, 1N4004, 1.0A.            |
| 5791-10869-07 | Connector, 7-pin Header Sq Post |

### A-14304 13-Lamp Board

| Part Number   | Description                   |
|---------------|-------------------------------|
| 5768-12764-00 | Lamp PCB                      |
| 24-8767       | Twist Lamp Socket             |
| 24-8768       | Bulb #555, (6.3v, 0.25A.)     |
| 5070-09054-00 | Diode, 1N4004, 1.0A.          |
| 5791-10871-10 | Connector, 10-pin Flat Header |

### A-14305 4-Lamp Board

| Part Number   | Description                     |
|---------------|---------------------------------|
| 5768-12765-00 | Lamp PCB                        |
| 24-8767       | Twist Lamp Socket               |
| 24-8768       | Bulb #555, (6.3v, 0.25A.)       |
| 5070-09054-00 | Diode, 1N4004, 1.0A.            |
| 5791-10871-06 | Connector, 6-pin Header Sq Post |

### A-14410 8-Chase Lamp Board

| Part Number   | Description               |
|---------------|---------------------------|
| 5768-12775-00 | Lamp PCB                  |
| 24-8767       | Twist Lamp Socket         |
| 24-8768       | Bulb #555, (6.3v, 0.25A.) |
| 5070-09054-00 | Diode, 1N4004, 1.0A.      |

### A-14412 8-Chase Lamp Board

| Part Number   | Description               |
|---------------|---------------------------|
| 5768-12778-00 | Lamp PCB                  |
| 24-8767       | Twist Lamp Socket         |
| 24-8768       | Bulb #555, (6.3v, 0.25A.) |
| 5070-09054-00 | Diode, 1N4004, 1.0A.      |

### A-14423-1 Playfield Relay Board

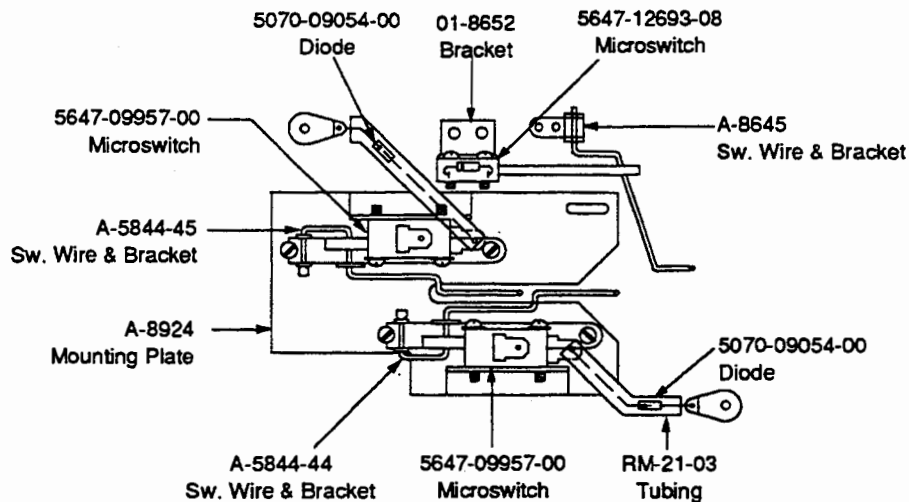
| Part Number   | Description             |
|---------------|-------------------------|
| 5768-12243-00 | Lamp PCB                |
| 5010-09534-00 | Resistor, 0 $\Omega$    |
| 5070-09054-00 | Diode, 1N4004, 1.0A.    |
| 5580-12782-00 | Relay, 12vdc            |
| 5791-12273-02 | Connector, 2-pin Header |
| 5791-12273-07 | Connector, 7-pin Header |

### C-11998-1 Relay Board

| Part Number   | Description             |
|---------------|-------------------------|
| 5768-12243-00 | Lamp PCB                |
| 5010-09534-00 | Resistor, 0 $\Omega$    |
| 5070-09054-00 | Diode, 1N4004, 1.0A.    |
| 5580-09555-01 | Relay, 24vdc, 30A.      |
| 5791-12273-02 | Connector, 2-pin Header |
| 5791-12273-07 | Connector, 7-pin Header |

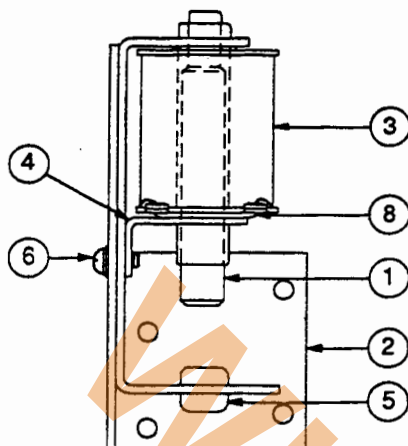
## Ball Trough Switches

(Viewed from underside of playfield to show locations)

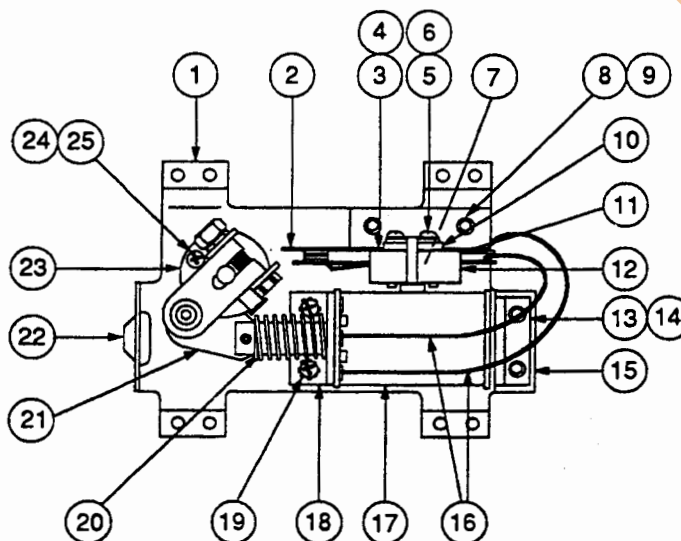


| Part Number   | Description                            | Part Number   | Description                   |
|---------------|----------------------------------------|---------------|-------------------------------|
| B-8925        | Ball Trough Switch Plate Assy.         | 5070-09054-00 | Diode, 1N4004, 1.0A.          |
| A-5844-44     | Switch Wire & Bracket Assy.            | 5825-06522-00 | Solder Lug-Flat, #6           |
| A-5844-45     | Switch Wire & Bracket Assy.            | RM-21-03      | Insulating Tubing, #10 x 1.75 |
| A-8924        | Bracket & Mounting Plate Assembly      | A-11680       | Ball Trough Switch, Right     |
| 5647-09957-00 | Microswitch, Center & Left Ball Trough | 5647-12693-08 | Submin. Switch                |
| 4004-01003-10 | Mach. Screw, 4-40 x 5/8                | 5070-09054-00 | Diode, 1N4001, 1.0A.          |
| 4005-01005-02 | Mach. Screw, 5-40 x 1/8                | A-8645        | Switch Wire & Bracket Assy.   |

## B-10686-1 Kicker Assembly



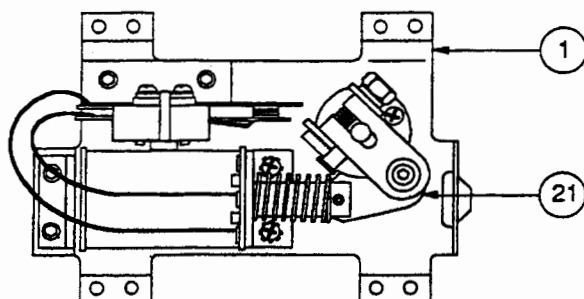
| Item | Part Number   | Description             |
|------|---------------|-------------------------|
| 1    | A-5387        | Coil Plunger Assembly   |
| a)   | 02-2653       | Coil Plunger            |
| b)   | 03-6013       | Bell Arm Ext.           |
| 2    | B-7409-2      | Mtg. Bracket Assembly   |
| 3    | AE-23-800     | Coil Sub-Assembly       |
| 4    | 01-8-508-T    | Coil Retaining Bracket  |
| 5    | 23-6420       | Rubber Grommet          |
| 6    | 4008-01017-06 | Mach. Screw, 8/32 x 3/8 |
| 7    | H-11835       | Kicker Cable            |
| 8    | 03-7067-5     | Coil Tubing             |

**C-13174-R****Right Flipper Assembly**

| Item | Part Number   | Description                   | Item | Part Number   | Description                     |
|------|---------------|-------------------------------|------|---------------|---------------------------------|
| 1    | B-13104-R     | Flipper Base Assy, R.         | 21   | B-10655-R     | Crank Link Assembly, Right      |
| 2    | 03-7811       | End of Stroke (EOS) Sw        | a)   | 02-4179       | Link Spacer Bushing             |
| 3    | RM-21-06      | Sleeve, Vinyl (Cap. leads)    | b)   | 4010-01086-14 | Cap Screw, 10-32 x 7/8, SH      |
| 4    | 5045-12098-00 | Capacitor, 2.2 µFd, 250V, 20% | c)   | 4700-00023-00 | Flatwasher, 5/8 x 13/64 x 16ga. |
| 5    | 4701-00002-00 | Lockwasher, #6 Split          | d)   | 4701-00004-00 | Lockwasher, #10 Split           |
| 6    | 4105-01019-10 | Sh. Metal Screw, #5 x 5/8     | e)   | 4410-01132-00 | Nut, 10-32 ESNA                 |
| 7    | 23-6622       | Tape, Double-sided            | f)   | A-10656       | Flipper Link Assembly           |
| 8    | 4008-01079-05 | Cap Screw, 8-32 x 5/16        | 1.)  | 02-4219       | Coil Plunger                    |
| 9    | 4701-00003-00 | Lockwasher, #8 Split          | 2.)  | 20-9370-1     | Spring Pin, 5/32 dia. x 7/16    |
| 10   | 01-9375       | Switch Mounting Bracket       | 3.)  | 03-8050-1     | Flipper Link                    |
| 11   | 03-7520-2     | Ty-Wrap, Nylon                | g)   | B-10657-R     | Flipper Crank Assy, R.          |
| 12   | 20-6516       | Speednut, Tinnerman           | 1.)  | 01-8073-R     | Flipper Crank, R.               |
| 13   | 4010-01066-06 | Cap Screw, 10-32 x 3/8, SH    | 2.)  | 17-1037       | Crank Washer                    |
| 14   | 4701-00004-00 | Lockwasher, #10 Split         | 3.)  | 4010-01066-20 | Cap Screw, 10-32 x 1-1/4        |
| 15   | A-12111       | Flipper Stop Assembly         | 4.)  | 4410-01127-00 | Nut, 10-32 Hex Hd.              |
| 16   | HW-30018-6    | Wire, 18 AWG, Blue            | 5.)  | 4700-00107-00 | Flatwasher, 5/8 x 13/64 x 12ga. |
| 17   | FL-11630      | Flipper Coil (Red)            | 6.)  | 4701-00004-00 | Lockwasher, #10 Split           |
| 18   | 01-7695       | Solenoid Bracket              | 7.)  | RM-23-06      | Tubing, H. S. 1/4 DWP           |
| 19   | 4006-01017-04 | Mach. Screw, 6-32 x 1/4       | 22   | 23-6577       | Bumper Plug                     |
| 20   | 10-376        | Coil Plunger Spring           | 23   | 03-7568       | Flipper Bushing                 |
|      |               |                               | 24   | 4006-01005-06 | Mach. Screw, 6-32 x 3/8         |
|      |               |                               | 25   | 4406-01117-00 | Nut, 6-32 Hex.                  |

**Associated Parts:.** 20-9250-5 Flipper Arm on Shaft (White)  
23-6519-4 Red Rubber Ring (Red)

## C-13174-L Left Flipper Assembly



(Parts listed replace same items of C-13174-R)

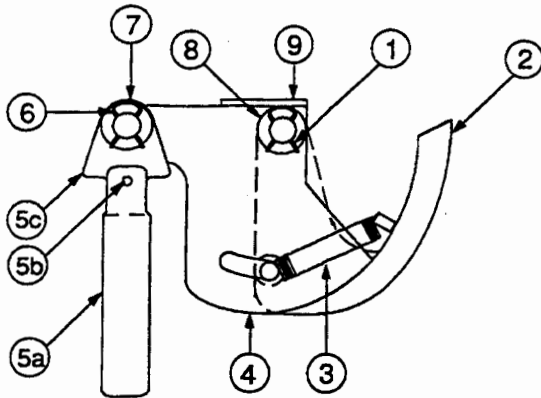
| Item | Part Number | Description              |
|------|-------------|--------------------------|
| 1    | B-13104-L   | Flipper Base Assembly, L |
| 21   | B-10655-L   | Crank Link Assembly, L   |
| g)   | B-10657-L   | Flipper Crank Assembly   |
| 1.)  | 01-8073-L   | Flipper Crank, Left      |

**Associated Parts:** 20-9250-5 Flipper Arm on Shaft (White)  
23-6519-4 Red Rubber Ring (Red)

### Flipper Assembly Notes...

1. Each Flipper Assembly on the Lower Playfield is mounted beneath the playfield, in conjunction with the plastic Flipper Paddle and Shaft (20-9250-5) and Flipper Rubber (23-6519-4) on the upper side of the playfield.
2. The tip of the EOS Switch must travel 0.150 (+ .010, - .000) inch, before the contacts fully open, with the flipper in the actuated position. The EOS Switch contacts must have a gap of 0.062 ( $\pm$  .015) inch. Adjustment of the EOS Switch must be made at a minimum distance of 0.25 inch from the switch body.
3. All moving elements of the assembly must operate freely, with no evidence of binding.
4. The large end of the Coil Plunger Spring (item 20) must fit within the four lugs of the Solenoid Bracket.
5. For coil replacement, remove the Solenoid Bracket (item 18) to prevent screw damage.
6. Use Loctite™ 242 when reattaching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.
7. When replacing their Bumper Plug (item 22) to restore proper flipper operation, readjust the flipper paddle and shaft position.
8. Solid-color blue wire connects to the banded end of each diode, mounted on the connector end of the Flipper Coil (item 17). Trace-color wire connects to the unbanded end of the diode.

## C-9638 Ball Shooter Lane Feeder

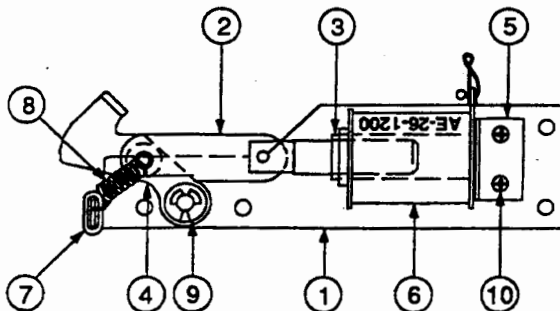


| Item | Part Number   | Description                     |
|------|---------------|---------------------------------|
| 1    | 12-6227       | Hair Pin Clip                   |
| 2    | A-8247        | Eject Cam Assembly              |
| 3    | 10-362        | Ejector Spring (Plain)          |
| 4    | A-6949-L      | Spring Plate Assembly           |
| 5    | A-8050-1      | Coil Plunger Assy, 2-1/8"       |
| a)   | 02-3407-2     | Coil Plunger, 2-1/8"            |
| b)   | 20-8716-5     | Roll Pin, 1/8 x 7/16            |
| c)   | 03-8085       | Armature Link                   |
| 6    | 12-6227       | Hair Pin Clip                   |
| 7    | 4700-00030-00 | Flatwasher, 17/64 x 1/2 x 15ga. |
| 8    | 4700-00103-00 | Flatwasher, 17/64 x 1/2 x 28ga. |
| 9    | A-8268        | Mounting Bracket Assembly       |

### Associated Parts

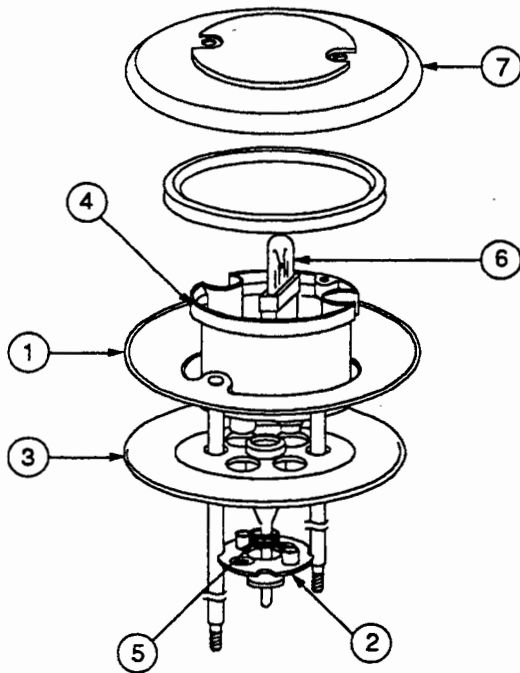
|               |                         |
|---------------|-------------------------|
| B-9362-R-3    | Coil & Bracket Assembly |
| B-7572-1      | Bracket & Stop Assembly |
| 01-8-508-S    | Coil Retaining Bracket  |
| 4006-01017-06 | Mach. Screw, 6-32 x 3/8 |
| 4406-01119-00 | Nut, 6-32 ESN           |
| AE-26-1200    | Coil Assembly           |
| 03-7066       | Coil Tubing             |

## A-8039-3 Outhole Kicker Assembly



| Item | Part Number   | Description              |
|------|---------------|--------------------------|
| 1    | A-6378        | Mounting Plate Assembly  |
| 2    | A-8335        | Coil Plunger Assembly    |
| a)   | 02-2364       | Coil Plunger             |
| b)   | 20-8716-5     | Roll Pin, 1/8 x 7/16     |
| c)   | 01-4251       | Ball Return Link         |
| 3    | 03-7066       | Coil Tubing              |
| 4    | A-6889        | Kicker Lever Assembly    |
| 5    | A-8038        | Coil Stop Assembly       |
| 6    | AE-26-1200    | Coil Assembly            |
| 7    | 03-7176-1     | Striker Ring             |
| 8    | 10-101-4      | Spring-Reset             |
| 9    | 20-8712-25    | "E" Ring, 1/4" Shaft     |
| 10   | 4006-01003-03 | Mach. Screw, 6-32 x 3/16 |

## B-9414-1 Jet Bumper Assembly

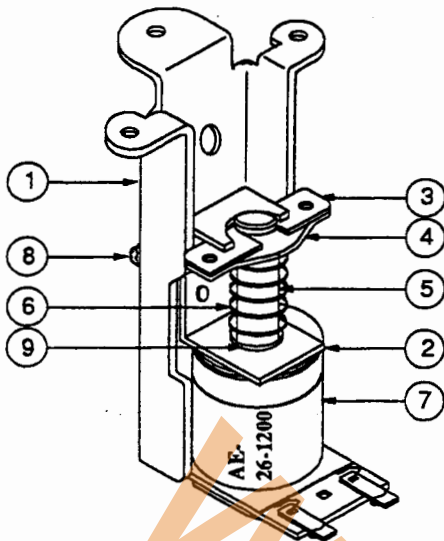


| Item | Part Number | Description          |
|------|-------------|----------------------|
| 1    | A-4754      | Bumper Ring Assembly |
| 2    | 03-6009-A5  | Bumper Base - White  |
| 3    | 03-6035-1   | Bumper Wafer - Blue  |
| 4    | 03-7443-5   | Bumper Body - White  |
| 5    | 10-7        | Spring - Jet Bumper  |
| 6    | A-11199     | Socket & Bulb        |

### Associated Part:

|   |           |                      |
|---|-----------|----------------------|
| 7 | 03-8254-9 | Jet Bumper Cap - Red |
|---|-----------|----------------------|

## A-9415-2 Jet Bumper Coil Assembly

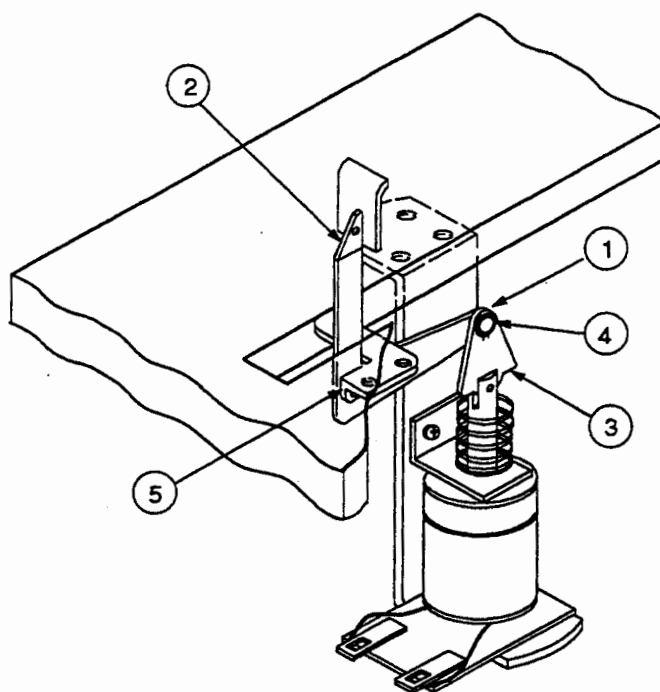


| Item | Part Number   | Description             |
|------|---------------|-------------------------|
| 1    | B-7417        | Bracket & Stop Assembly |
| 2    | 01-1747       | Coil Retaining Bracket  |
| 3    | 01-5492       | Armature Link, Steel    |
| 4    | 01-5493       | Armature Link, Bakelite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

### Associated Parts

|               |                            |
|---------------|----------------------------|
| B-12030-2     | Jet Bumper Sw & Diode Assy |
| B-12029-2     | Jet Bumper Sw & Brkt. Assy |
| SW-11A-37     | Jet Bumper Switch Assy     |
| 5070-09054-00 | Diode, 1N4004              |

# **B-12665 Kicker Arm (Slingshot) Assembly** (Left & Right Kickers)



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

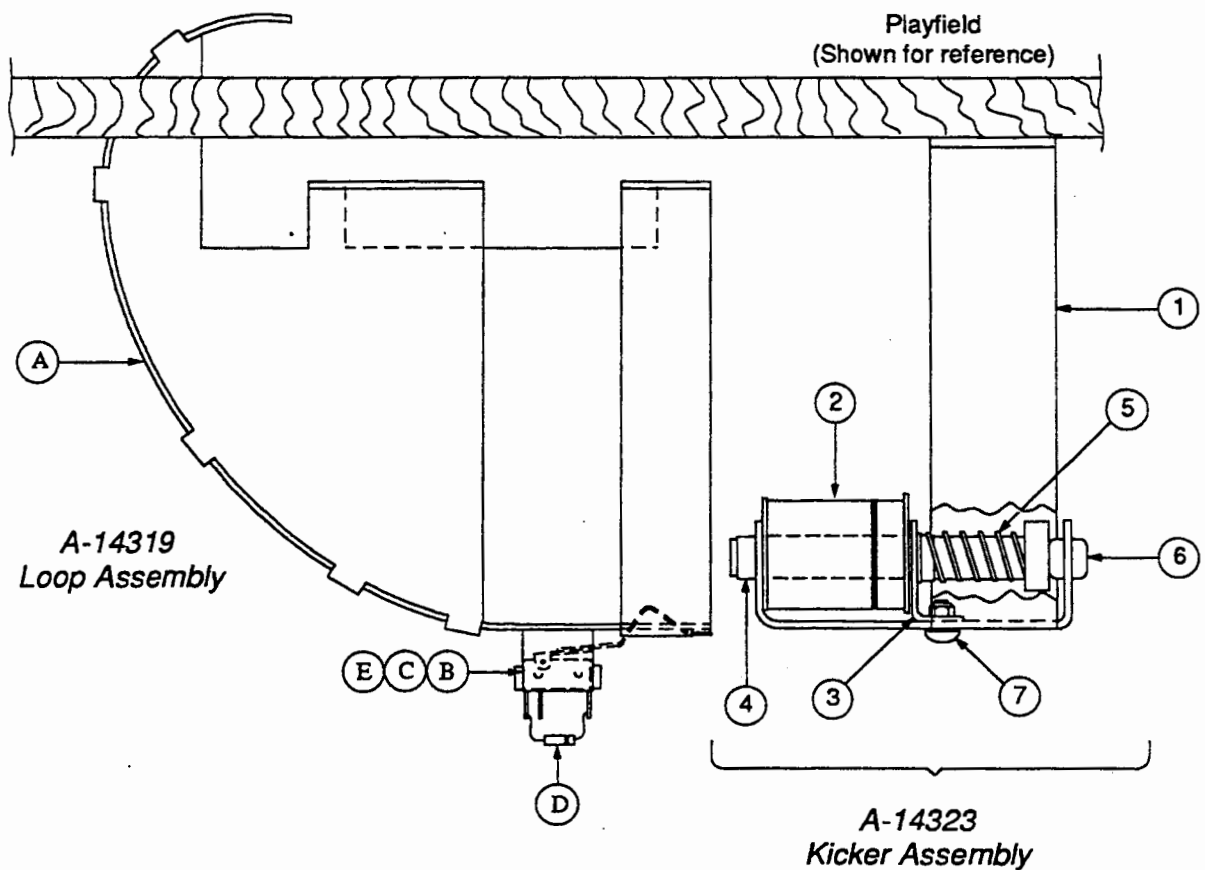
## **Associated Parts for Left Kicker**

|                      |                         |
|----------------------|-------------------------|
| <b>B-11203-R-1</b>   | Coil & Bracket Assembly |
| <b>B-7572-1</b>      | Bracket & Stop Assembly |
| <b>01-8-508-S</b>    | Coil Retaining Bracket  |
| <b>4006-01017-06</b> | Mach. Screw, 6-32 x 3/8 |
| <b>4406-01119-00</b> | Nut, 6-32 ESN           |
| <b>AE-26-1500</b>    | Coil Assembly           |
| <b>03-7066</b>       | Coil Tubing             |

## **Associated Parts for Right Kicker**

|                      |                         |
|----------------------|-------------------------|
| <b>B-11203-L-1</b>   | Coil & Bracket Assembly |
| <b>B-7572-1</b>      | Bracket & Stop Assembly |
| <b>01-8-508-S</b>    | Coil Retaining Bracket  |
| <b>4006-01017-06</b> | Mach. Screw, 6-32 x 3/8 |
| <b>4406-01119-00</b> | Nut, 6-32 ESN           |
| <b>AE-26-1500</b>    | Coil Assembly           |
| <b>03-7066</b>       | Coil Tubing             |

## Loop & Kicker Assembly



### A-14319 Loop Assembly

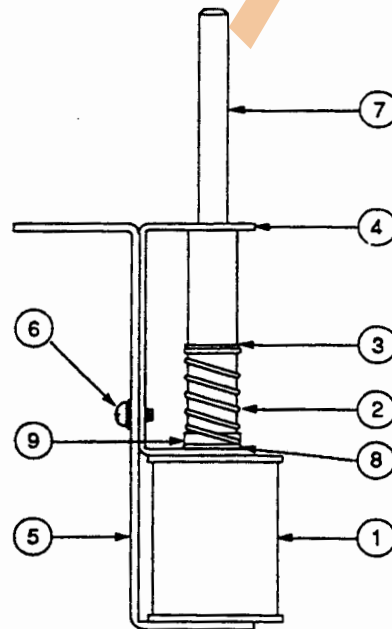
| Item | Part No.      | Description              |
|------|---------------|--------------------------|
| A    | A-14320       | Loop Sub-Assembly        |
| B    | 01-8240       | Nut Plate, #2-56         |
| C    | 4002-01105-07 | Mach. Screw, 2-56 x 7/16 |
| D    | 5070-09054-00 | Diode, 1N4001, 1.0A      |
| E    | 5647-12693-25 | Microswitch              |

### A-14323 Kicker Assembly

| Item | Part No.      | Description              |
|------|---------------|--------------------------|
| 1    | 01-10130      | Kicker Mounting Bracket  |
| 2    | AE-23-800     | Coil Assembly            |
| 3    | 01-8-508-T    | Retainer Bracket         |
| 4    | 03-7067       | Coil Tubing              |
| 5    | 10-135        | Coil Spring Plunger      |
| 6    | 23-6420       | Rubber Grommet           |
| 7    | 4008-01017-05 | Mach. Screw, 8-32 x 5/16 |

## A-14046 Disappear Post Assembly

| Item | Part Number   | Description              |
|------|---------------|--------------------------|
| 1    | AE-26-1200    | Coil Assembly            |
| 2    | 10-135        | Spring                   |
| 3    | 20-8712-43    | "E"-Ring, 7/16" Shaft    |
| 4    | 01-10008      | Coil Stop Bracket        |
| 5    | 01-1748-1     | Mounting Bracket         |
| 6    | 4006-01005-04 | Mach. Screw, #6-32 x 1/4 |
| 7    | 02-4494       | Post                     |
| 8    | 01-10024      | Insulator                |
| 9    | 03-7066-3     | Tubing Coil, 1-7/8"      |

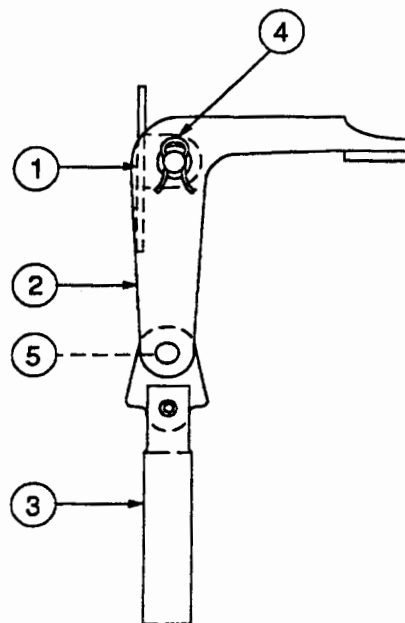


## B-11395-1 Skill Shot Kicker Assembly

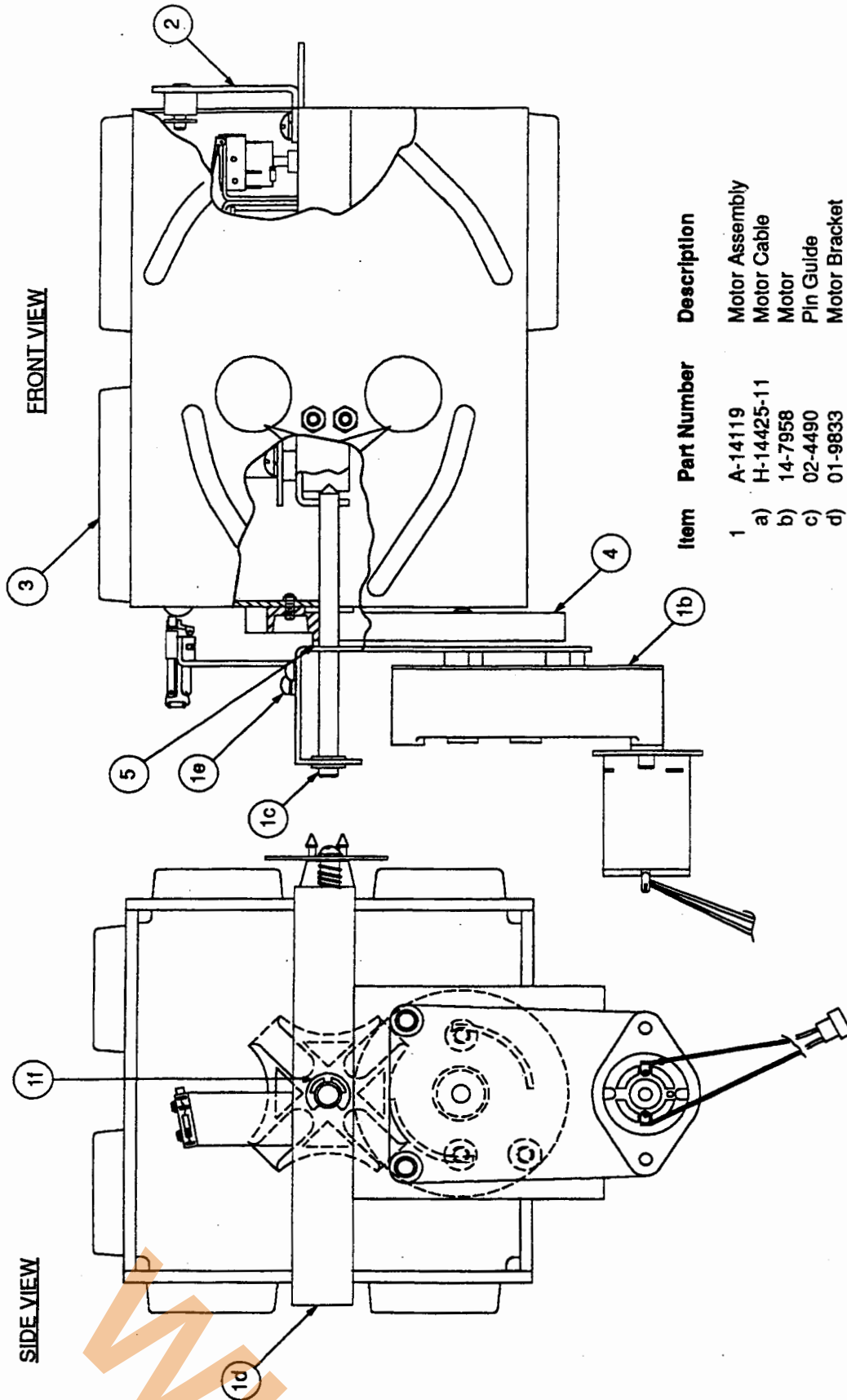
| Item | Part No.      | Description                     |
|------|---------------|---------------------------------|
| 1    | A-11396       | Kicker Mtg. Bracket Assy        |
| 2    | A-5652-1      | Kicker Crank Assembly           |
| a)   | A-8769        | Kicker Crank Sub-Assembly       |
| b)   | 02-2089       | Pin Cam                         |
| 3    | A-5103        | Plunger Assembly                |
| a)   | 02-2364       | Coil Plunger                    |
| b)   | 03-8085       | Armature Link                   |
| c)   | 20-8716-5     | Roll Pin, 1/8 x 7/16"           |
| 4    | 12-6227       | Hairpin Clip                    |
| 5    | 4700-00030-00 | Flatwasher, 17/64 x 1/2 x 15ga. |

### Associated Parts

|               |                         |
|---------------|-------------------------|
| B-11064-R-1   | Coil & Bracket Assembly |
| B-7572-1      | Bracket & Stop Assembly |
| 01-8-508-S    | Coil Retaining Bracket  |
| 4006-01017-06 | Mach. Screw, 6-32 x 3/8 |
| 4406-01119-00 | Nut, 6-32 ESN           |
| AE-24-900     | Coil Assembly           |

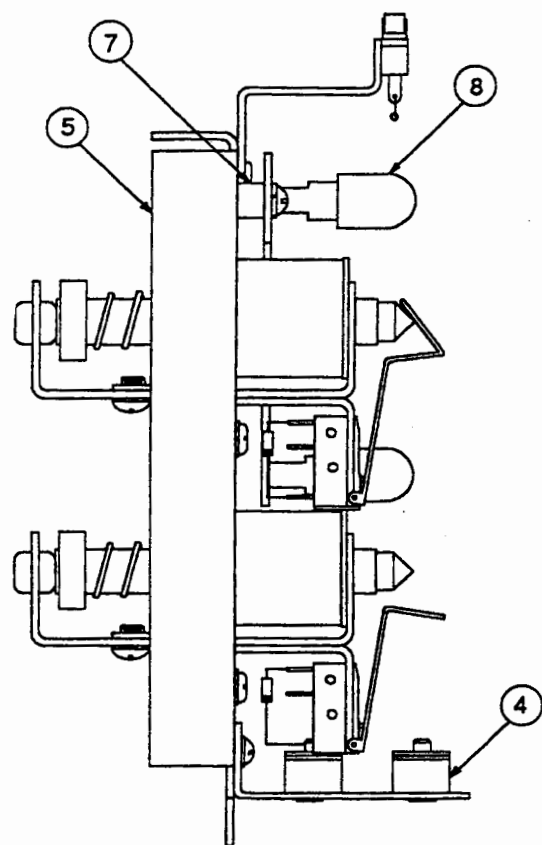


# **A-14118** **Face Playfield Assembly**

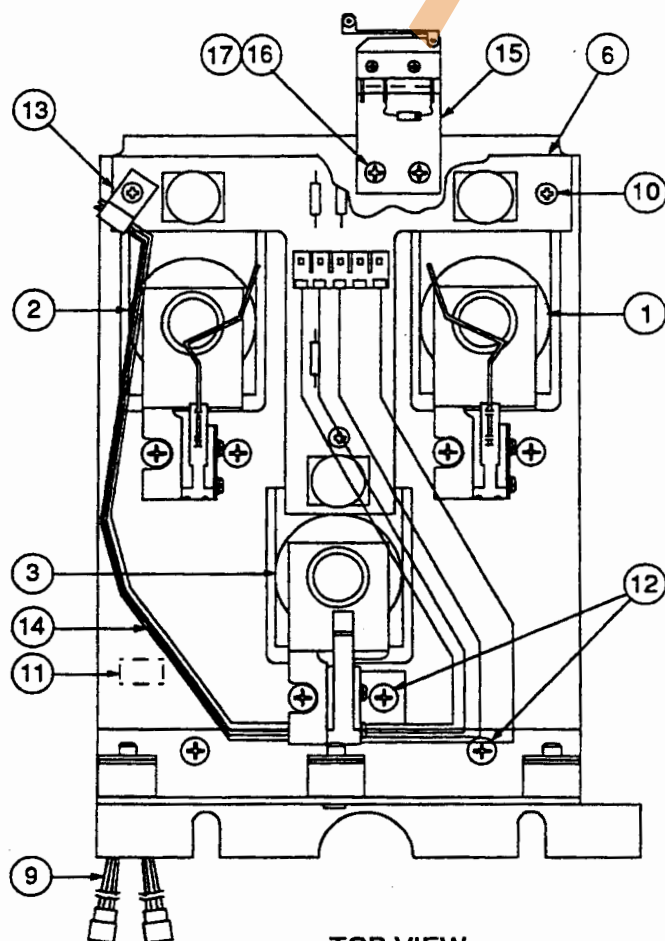


| Item | Part Number   | Description                         |
|------|---------------|-------------------------------------|
| 1    | A-14119       | Motor Assembly                      |
| a)   | H-14425-11    | Motor Cable                         |
| b)   | 14-7958       | Motor                               |
| c)   | 02-4490       | Pin Guide                           |
| d)   | 01-9833       | Motor Bracket                       |
| e)   | 4008-01041-06 | Mach. Screw, 8-32 x 3/8             |
| f)   | 20-8712-25    | "E"-Ring, 1/4" Shaft                |
| 2    | A-14120       | Main Bracket Assembly (See p. 2-22) |
| 3    | A-14121       | Face Assembly (See p. 2-24)         |
| 4    | 03-8476       | Wheel Drive                         |
| 5    | 4700-00030-00 | Flatwasher, 17/64 x 1/2 x 15ga.     |

## A-14120 Main Bracket Assembly



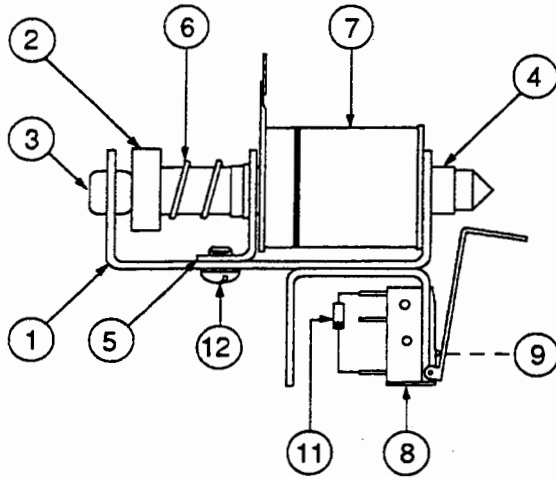
SIDE VIEW



TOP VIEW

| Item | Part Number   | Description                          |
|------|---------------|--------------------------------------|
| 1    | A-14123       | Head Right Eye Assembly (See p.2-23) |
| 2    | A-14124       | Head Left Eye Assembly (See p.2-23)  |
| 3    | A-14125       | Head Mouth Assembly (See p.2-23)     |
| 4    | A-14126       | Roller Assembly                      |
| 5    | A-14128       | Main Bracket Sub-Assembly            |
| 6    | A-14025       | Face Lamp Assembly                   |
| 7    | 03-8022-4     | Spacer, 1/4" Lg.                     |
| 8    | 03-8063-4     | Light Bulb Sleeve (Red)              |
| 9    | H-14425-3     | Skull Cable                          |
| 10   | 4006-01003-10 | Mach. Screw, 6-32 x 5/8              |
| 11   | 03-7722-4     | Kwik Clip, 1/4"                      |
| 12   | 4008-01003-06 | Mach. Screw, 8-32 x 3/8              |
| 13   | 03-7655-4     | Clip Harness, 1/4"                   |
| 14   | H-14425-10    | Skull Cable                          |
| 15   | A-14624       | Top Switch Assembly                  |
| 16   | 4006-01005-04 | Mach. Screw, 6-32 x 1/4              |
| 17   | 4701-00002-00 | Lockwasher #6 Split                  |

## A-14125 Head Mouth Assembly



| Item | Part Number   | Description               |
|------|---------------|---------------------------|
| 1    | A-14135       | Coil Switch Bracket Assy. |
| 2    | A-14134       | Bell Armature Assembly    |
| 3    | 23-6420       | Rubber Grommet            |
| 4    | 03-7067-5     | Tubing Coil               |
| 5    | 01-8-508-T    | Solenoid Bracket          |
| 6    | 10-135        | Spring                    |
| 7    | AE-30-2000    | Coil Sub-Assembly         |
| 8    | 5647-12693-39 | Mini Microswitch          |
| 9    | 4002-01105-06 | Mach. Screw, 2-56 x 3/8   |
| 10   | Not Used      |                           |
| 11   | 5070-09054-00 | Diode, 1N4004             |
| 12   | 4008-01017-04 | Mach. Screw, 8-32 x 1/4   |

**Note:**

For Coil Assemblies A-14123 and A-14124, refer to diagram above  
Item #8 is the only one that changes.

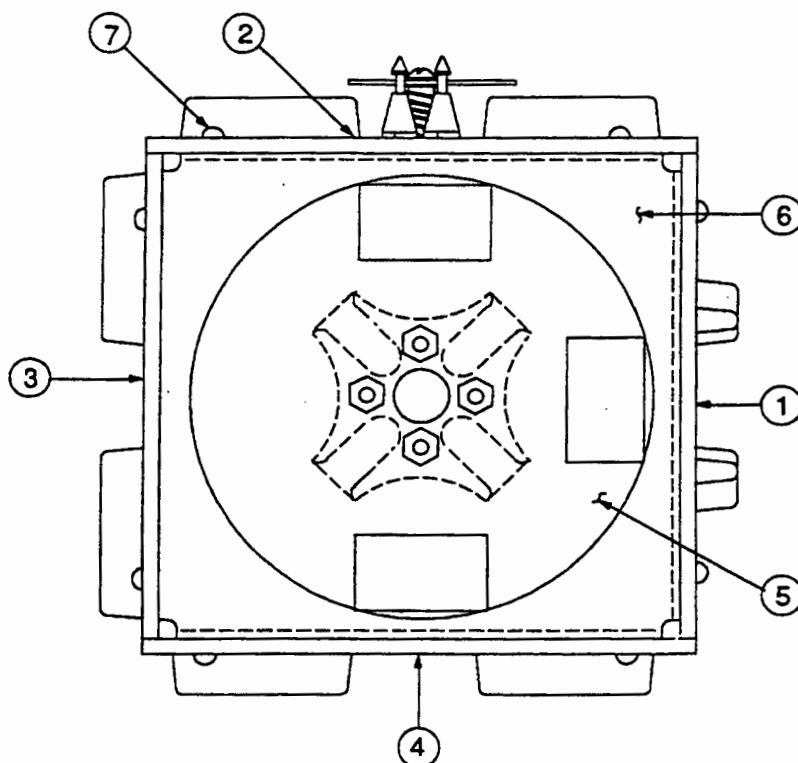
## A-14123 Head-Right Eye Assembly

| Item | Part Number   | Description               |
|------|---------------|---------------------------|
| 1    | A-14135       | Coil Switch Bracket Assy. |
| 2    | A-14134       | Bell Armature Assembly    |
| 3    | 23-6420       | Rubber Grommet            |
| 4    | 03-7067-5     | Tubing Coil               |
| 5    | 01-8-508-T    | Solenoid Bracket          |
| 6    | 10-135        | Spring                    |
| 7    | AE-30-2000    | Coil Sub-Assembly         |
| 8    | 5647-12693-48 | Mini Microswitch          |
| 9    | 4002-01105-06 | Mach. Screw, 2-56 x 3/8   |
| 10   | 01-10112      | Switch Bracket Adjustment |
| 11   | 5070-09054-00 | Diode, 1N4004             |
| 12   | 4008-01017-04 | Mach. Screw, 8-32 x 1/4   |

## A-14124 Head-Left Eye Assembly

| Item | Part Number   | Description               |
|------|---------------|---------------------------|
| 1    | A-14135       | Coil Switch Bracket Assy. |
| 2    | A-14134       | Bell Armature Assembly    |
| 3    | 23-6420       | Rubber Grommet            |
| 4    | 03-7067-5     | Tubing Coil               |
| 5    | 01-8-508-T    | Solenoid Bracket          |
| 6    | 10-135        | Spring                    |
| 7    | AE-30-2000    | Coil Sub-Assembly         |
| 8    | 5647-12693-47 | Mini Microswitch          |
| 9    | 4002-01105-06 | Mach. Screw, 2-56 x 3/8   |
| 10   | 01-10112      | Switch Bracket Adjustment |
| 11   | 5070-09054-00 | Diode, 1N4004             |
| 12   | 4008-01017-04 | Mach. Screw, 8-32 x 1/4   |

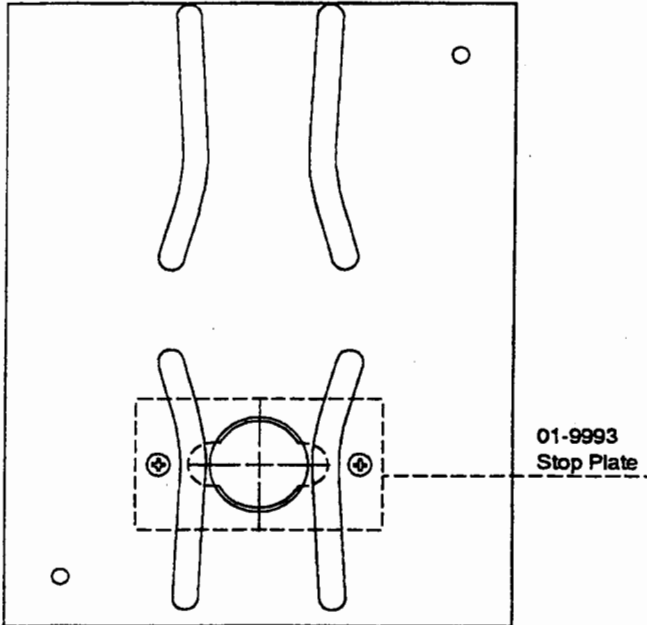
## A-14121 Complete Face Assembly



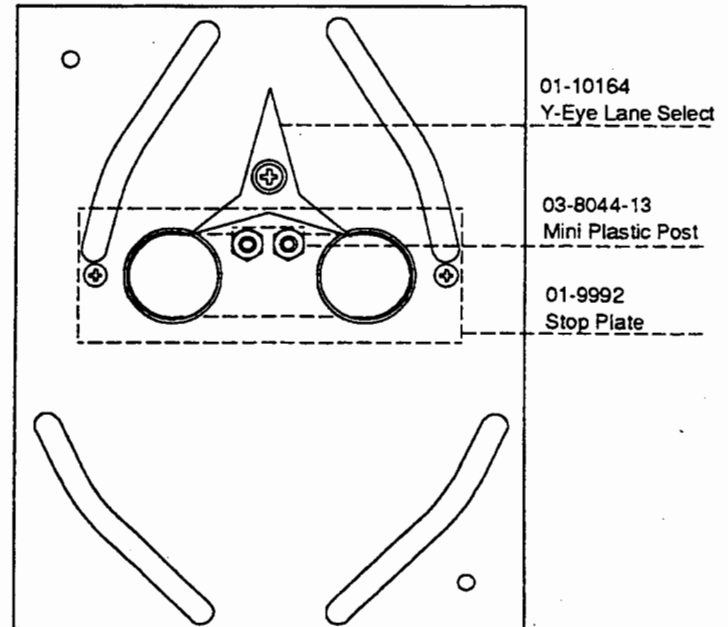
| Item | Part Number   | Description                 |
|------|---------------|-----------------------------|
| 1    | A-14130       | Face Plate - 1 Assembly     |
|      | 31-1626-1     | Screened Face Plate         |
|      | 03-8482       | Rail Ball Guide             |
|      | 03-8498       | Rail Ball Guide             |
|      | 01-9993       | Stop Plate                  |
| 2    | A-14131       | Face Plate - 2 Assembly     |
|      | 31-1626-2     | Screened Face Plate         |
|      | 01-10164      | Y-Diverter-Eye Lane Select  |
|      | 03-8482       | Rail Ball Guide             |
|      | 03-8498       | Rail Ball Guide             |
|      | 03-8044-13    | Mini Plastic Post           |
| 3    | A-14132       | Face Plate - 3 Assembly     |
|      | 31-1626-3     | Screened Face Plate         |
|      | 03-8482       | Rail Ball Guide             |
|      | 03-8498       | Rail Ball Guide             |
|      | 01-9992       | Stop Plate                  |
| 4    | A-14133       | Face Plate - 4 Assembly     |
|      | 31-1626-4     | Screened Face Plate         |
|      | 03-8482       | Rail Ball Guide             |
|      | 03-8498       | Rail Ball Guide             |
| 5    | A-14136       | Bracket Assembly - Top      |
| 6    | 01-9832       | Face Plate Bracket - Bottom |
| 7    | 4006-01027-06 | Mach. Screw, 6-32 x 3/8     |

## Face Plate Assemblies

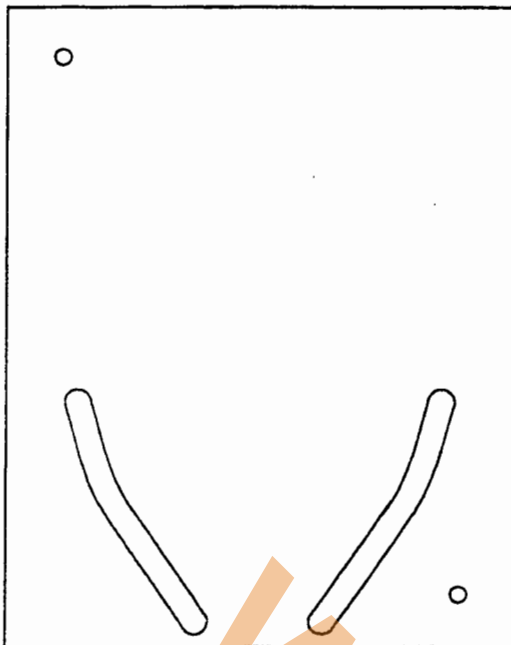
**A-14130 Face Plate - 1**



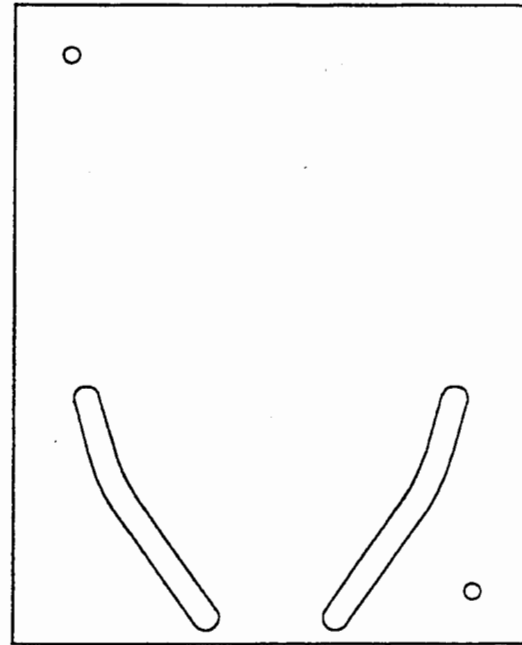
**A-14131 Face Plate - 2**



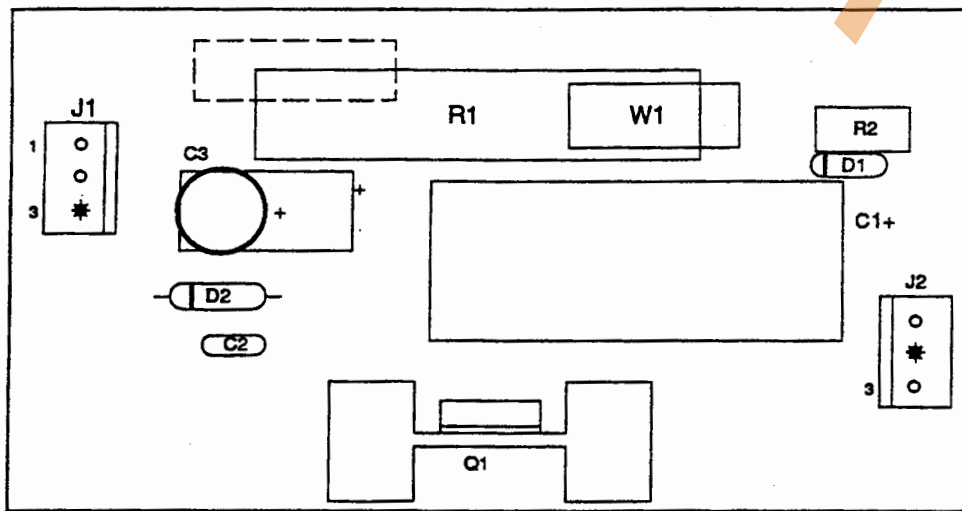
**A-14132 Face Plate - 3**



**A-14133 Face Plate - 4**

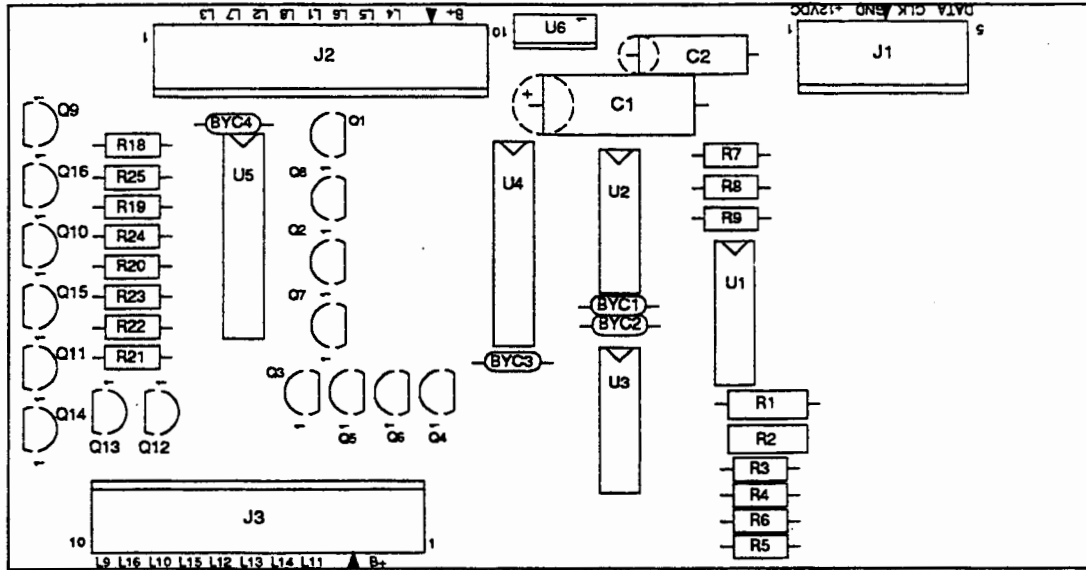


## A-13892-2 Motor Regulator Assembly



| Part Number   | Designator | Description                          |
|---------------|------------|--------------------------------------|
| 5040-12466-00 | C1         | Capacitor, 1000 $\mu$ fd, 50v, Axial |
| 5043-08996-00 | C2         | Capacitor, .1 $\mu$ fd, 50v, Axial   |
| 5040-10974-00 | C3         | Capacitor, 100 $\mu$ fd, 35v, Radial |
| 5070-09054-00 | D1         | Diode, 1N40004, 1.0A.                |
| 5075-12467-00 | D2         | Zener, Diode 1N5243B, 13V.           |
| 5791-12273-03 | J1, J2     | Connector, 3-pin Header              |
| 5162-12635-00 | Q1         | Trans. NPN Darl TIP 102              |
| Not Used      |            |                                      |
| 5010-09061-00 | R2         | Resistor, 680 $\Omega$ , 1/2w, 5%    |
| 5705-12464-00 |            | Heatsink                             |
| 4004-01005-06 |            | Mach. Screw, 4-40 x 3/8              |
| 4404-01117-00 |            | Nut, 4-40 Hex.                       |
| 4703-00015-00 | W1         | Flatwasher External, #4              |
| 20-9229       |            | Thermal Compound                     |
| 5010-09534-00 |            | Resistor, 0 $\Omega$                 |
| 5768-12685-00 |            | PCB Motor Regulator                  |
| 16-8850-352   |            | Label                                |

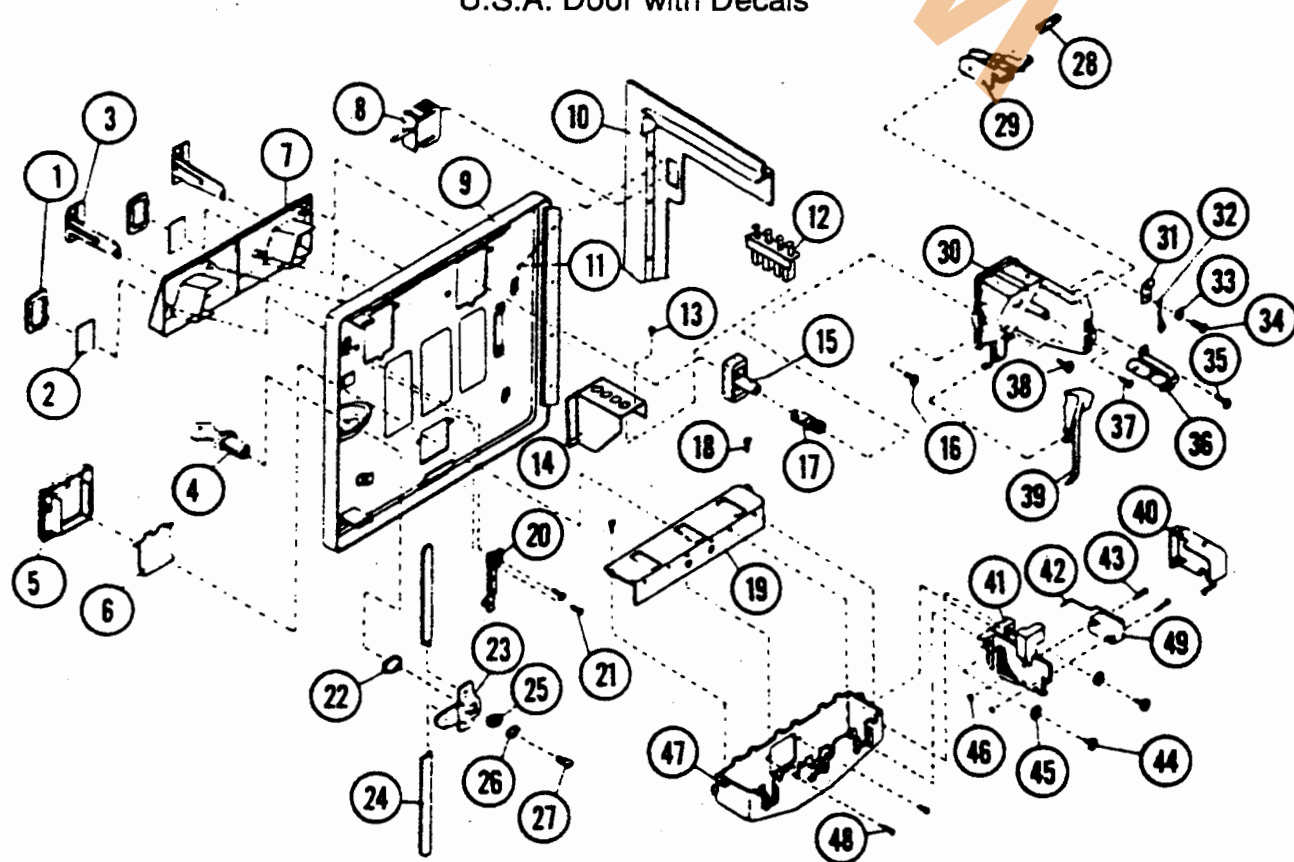
## A-14007 Chase Light Assembly



| Item | Part Number   | Ckt Designator | Description                               |
|------|---------------|----------------|-------------------------------------------|
| 1    | 5768-12705-00 |                | PCB Chase Light                           |
| 2    | 5162-08976-00 | Q1 - Q16       | Tras. 2N6427 NPN                          |
| 3    | 5010-08997-00 | R10 - R25      | Resistor, 2.7K $\Omega$ , 1/4w, 5%        |
| 4    | 5010-09034-00 | R7 - R9        | Resistor, 10K $\Omega$ , 1/4w, 5%         |
| 5    | 5010-09358-00 | R3, R4         | Resistor, 1K $\Omega$ , 1/4w, 5%          |
| 6    | 5010-09162-00 | R5             | Resistor, 100K $\Omega$ , 1/4w, 5%        |
| 7    | 5010-09113-00 | R6             | Resistor, 33K $\Omega$ , 1/4w, 5%         |
| 8    | 5010-08930-00 | R1, R2         | Resistor, 470 $\Omega$ , 1/4w, 5%         |
| 9    | 5040-09365-00 | C2             | Capacitor, 1 $\mu$ fd, 63v (+50, -10%)    |
| 10   | 5040-09421-00 | C1             | Capacitor, 100 $\mu$ fd, 25v (+50, -10%)  |
| 11   | 5043-08980-00 | BYC1 - BYC4    | Capacitor, .01 $\mu$ fd, 50v, (+80, -20%) |
| 12   | 5281-09867-00 | U4, U5         | IC, 74LS244, Oct. Buff                    |
| 13   | 5281-10447-00 | U2, U3         | IC, 74LS164                               |
| 14   | 5370-12272-00 | U1             | IC, LM339 Quad. Comp                      |
| 15   | 5250-09157-00 | U6             | Reg 7805, 1.0A, 5V                        |
| 16   | 5791-10862-05 | J1             | Connector, 5-pin Header                   |
| 17   | 5791-10862-10 | J2, J3         | Connector, 10-pin Header                  |
| 18   | 4004-01005-06 |                | Mach. Screw, 4-40 x 3/8                   |
| 20   | 4404-01119-00 |                | Lockwasher Nut, 4-40                      |

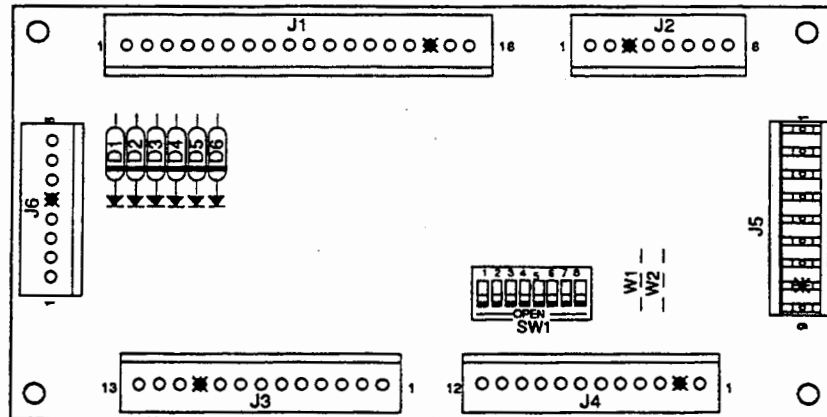
# A-14148-1 Coin Door Assembly

U.S.A. Door with Decals



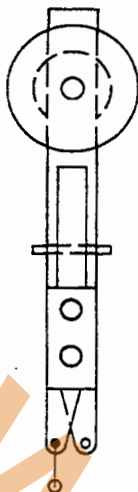
| Item | Part No.      | Description                  | Quantity | Item | Part No.  | Description                  | Quantity |
|------|---------------|------------------------------|----------|------|-----------|------------------------------|----------|
| 1    | 27-1038       | Button Cover                 | 2 or 3   | 26   | 27-1018   | Star Washer                  | 1        |
| 2    | 27-1041-1→58  | Price Panel                  | 2 or 3   | 27   | 27-1019   | M/C Screw, 1/4-28 x 5/16     | 1        |
| 3    | 27-1026-1→17  | Coin Entry Plate             | 2 or 3   | 28   | Not Used  |                              |          |
| 4    | 27-1016       | Lock Assembly                | 1        | 29   | Not Used  |                              |          |
| 5    | 27-1061-1     | Coin Return - Bezel          | 1        | 30   | 27-1112   | Coin Inlet Chute             | 2 or 3   |
| 6    | 27-1062       | Coin Return Flap             | 1        | 31   | 27-1088   | Cable Clamp                  | 2 or 3   |
| 7    | 27-1021       | Button Housing - 2-slot      | 1        | 32   | 27-1025   | Key Hook                     | 1        |
|      | 27-1022       | Button Housing - 3-slot      | 1        | 33   | 27-1086   | Washer, #6                   | 2 or 3   |
| 8    | 27-1111       | Interlock Switch             | 1        | 34   | 27-1078   | M/C Screw, 6-32 x 3/8        | 1 or 2   |
| 9    | 27-1006-1     | Coin Door, 2-Slot            | 1        |      | 27-1113   | M/C Screw, 6-32 x 7/16       | 1        |
|      | 27-1007-1     | Coin Door, 3-Slot            | 1        | 35   | 27-1079   | Self-tapping Screw, #6 x 1/4 | 2 or 3   |
| 10   | 27-1005       | Coin Door Frame              | 1        | 36   | 27-1084   | Lamp Socket                  | 2 or 3   |
| 11   | 27-1003       | M/C Screw, 6-32 x 3/16       | 4        |      | 27-1085   | Lamp                         | 2 or 3   |
| 12   | 5641-12724-00 | Diagnostic Switch            | 1        | 37   | 27-1096   | Self-tapping Screw, #5 x 3/8 | 2 or 3   |
| 13   | 27-1101       | M/C Screw, 4-40 x 1/4        | 2        | 38   | 27-1087   | M/C Screw, 6-32 x 5/8        | 2 or 3   |
| 14   | 01-9885       | Bracket, Diagnostic Switch   | 1        | 39   | 27-1082   | Lever Arm                    | 2 or 3   |
| 15   | 03-7601-4     | Button, Red                  | 2        | 40   | 27-1097   | Switch Cover                 | 2 or 3   |
|      | 03-7601-7     | Button, Black                | 2        | 41   | 27-1091-1 | Coin Accept Chute            | 2 or 3   |
| 16   | 27-1078       | M/C Screw, 6-32 x 3/8        | 2 or 3   | 42   | 27-1075   | Wire Form (Small)            | 2 or 3   |
| 17   | 27-1039       | Conical Spring               | 2 or 3   |      | or        |                              |          |
| 18   | 27-1079       | Self-tapping Screw, #6 x 1/4 | 2        |      | 27-1093   | Wire Form (Large)            |          |
| 19   | 27-1077-1     | Coinbox Cover                | 1        | 43   | 27-1094   | M/C Screw, 4-40 x 7/8        | 4 or 6   |
| 20   | 27-1066       | Slam Switch                  | 1        | 44   | 27-1087   | M/C Screw, 6-32 x 5/8        | 4 or 6   |
| 21   | 27-1067       | M/C Screw, 4-40 x 1/2        | 2        | 45   | 27-1086   | Washer, #6                   | 4 or 6   |
| 22   | 27-1017       | Nut (key)                    | 1        | 46   | 27-1095   | Nut, 4-40 ESNA               | 4 or 6   |
| 23   | 27-1012       | Locking Cam                  | 1        | 47   | 27-1076-1 | Coin Return Box              | 1        |
| 24   | 27-1011       | Locking Arm                  | 2        | 48   | 27-1078   | M/C Screw, 6-32 x 3/8        | 2        |
| 25   | 27-1020       | Washer                       | 1        | 49   | 27-1092   | Microswitch                  | 2 or 3   |

## A-14102 WPC Coin Door Interface Board



| Part Number   | Ckt Designator | Description                      |
|---------------|----------------|----------------------------------|
| 5768-12716-00 |                | PCB-WPC Coin Door                |
| 5070-09054-00 | D1-D6          | 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. |
| 5791-10862-09 | J5             | Connector, 9-pin Header Str Sq.  |
| 5792-10817-09 | J5             | 9R Mt/End 22/.156                |

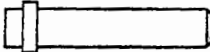
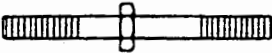
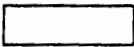
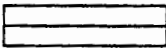
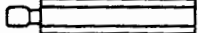
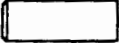
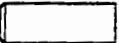
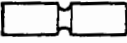
- Notes:**
1. For schematic refer to drawing #16-9152.
  2. For Belgium, France, and Switzerland use A-14102-1 Coin Door Interface Board.



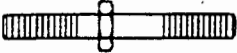
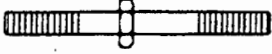
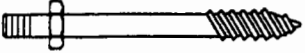
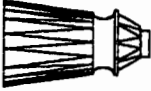
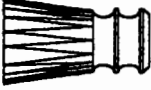
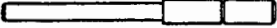
## B-11854-4 Standup Target Assembly

| Part Number   | Description             |
|---------------|-------------------------|
| SW-1A-170-A   | Standup Target Assembly |
| 03-8093-4     | Target, Red             |
| 5070-06258-00 | Diode, 1N4001, 1.0A.    |

## Metal & Plastic Posts

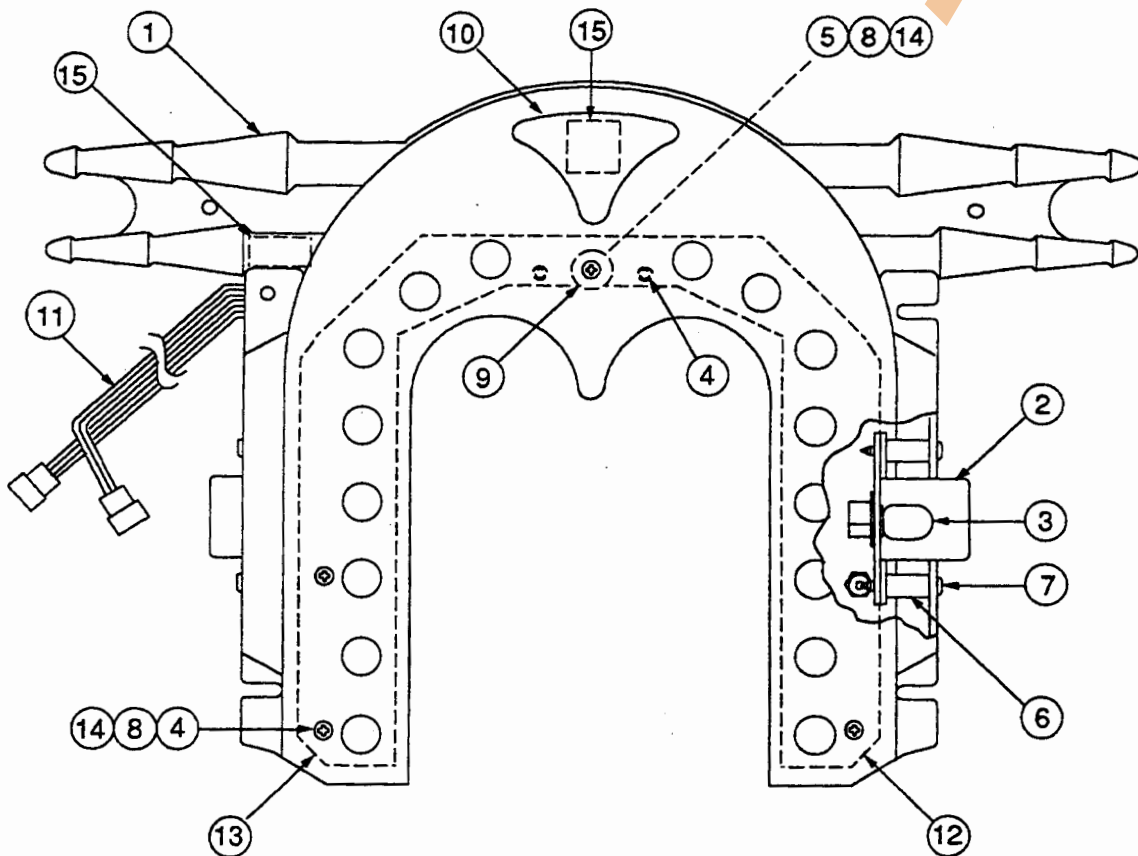
|                                                                                     | Part Number | Description                 | Quantity |
|-------------------------------------------------------------------------------------|-------------|-----------------------------|----------|
|    | 02-3409     | Spring Post                 | 1        |
|    | 02-3905     | Bumper Post, #8 WS          | 3        |
|    | 02-4020     | Support Post                | 1        |
|    | 02-4036     | Rubber Bumper Post          | 5        |
|    | 02-4252-10  | F-F Spacer, 6-32 x 5/8"     | 2        |
|                                                                                     | 02-4252-13  | F-F Spacer, 6-32 x 13/16"   | 1        |
|                                                                                     | 02-4252-14  | F-F Spacer, 6-32 x 7/8"     | 1        |
|                                                                                     | 02-4252-22  | F-F Spacer, 6-32 x 1-3/8"   | 1        |
|                                                                                     | 02-4252-29  | F-F Spacer, 6-32 x 1-13/16" | 1        |
|    | 02-4266     | Holding Post, 6-32 x 3/4    | 1        |
|  | 02-4322-1   | M-F Spacer, 8-32 x 3"       | 1        |
|                                                                                     | 02-4322-8   | M-F Spacer, 8-32 x 3.63"    | 3        |
|                                                                                     | 02-4322-19  | M-F Spacer, 8-32 x 2-1/8"   | 4        |
|  | 02-4335-12  | Mounting Post, 1.38         | 1        |
|  | 02-4433     | Post, #8 x 1-3/16"          | 2        |
|  | 02-4434     | Post, #8 x 1"               | 2        |
|  | 02-4498     | Roller Post                 | 3        |
|  | 03-8044-9   | Mini Plastic Post - Tr. Red | 25       |
|                                                                                     | 03-8044-13  | Mini Plastic Post - Clear   | 4        |
|  | 03-8365-10  | Post, Trans. Blue           | 6        |

## Metal & Plastic Posts - Continued

|                                                                                   | Part Number | Description                | Quantity |
|-----------------------------------------------------------------------------------|-------------|----------------------------|----------|
|  | 02-4424-1   | Spring Post, 6-32 x 8-32   | 6        |
|  | 02-4425-1   | Post, 8-32 / #8-32         | 4        |
|  | 02-4426-1   | Post, #6-32 / #8 SMS       | 12       |
|  | 03-8319-10  | Star Post, #8 Tr. Blue     | 16       |
|  | 03-8247-13  | Double Star Post, Tr. Blue | 6        |
|  | 02-4494     | Disappearing Post          | 1        |

WILL

## A-14508 Helmet Assembly



| Item | Part Number   | Description                    |
|------|---------------|--------------------------------|
| 1    | 01-8548       | Helmet                         |
| 2    | 03-8149-9     | Mini Dome, Tr. Red             |
| 3    | C-13337       | Single Flashlamp Assy.         |
| 4    | 03-8022-4     | Spacer, 1/4" Lg.               |
| 5    | 03-6047-1     | Spacer, 1/4" Lg.               |
| 6    | 03-6047-3     | Spacer, 1/2" Lg.               |
| 7    | 4106-01001-16 | Sh. Metal Screw, #6 x 1"       |
| 8    | 4006-01003-12 | Mach. Screw, 6-32 x 3/4        |
| 9    | 4700-00070-00 | Flatwasher, 3/16 x 5/8 x 16ga. |
| 10   | 31-2-50002-1  | Decal                          |
| 11   | H-14425-7     | Helmet Cable                   |
| 12   | A-14410       | 8-Lamp Board                   |
| 13   | A-14412       | 8-Lamp Board                   |
| 14   | 4406-01128-00 | Nut, 6-32 KEPS                 |
| 15   | 03-7722-4     | Clip, 1/4"                     |
| 16   | 03-8063-6     | Yellow Light Bulb Sleeve       |
| 17   | 03-8063-4     | Red Light Bulb Sleeve          |

## A-14359 Right Ramp Assembly

| Item | Part No.      | Description               |
|------|---------------|---------------------------|
| 1    | A-14360       | Switch Assembly           |
| 2    | A-14361       | Switch Assembly           |
| 3    | A-14281       | Gate & Switch Assembly    |
| 4    | A-14421       | Ramp Sub-Assembly         |
| 5    | A-14494-2     | Playfield Plastic Assy.   |
| 6    | A-14523       | Playfield Plastic Assy.   |
| 7    | H-14425-2     | Switch Cable              |
| 8    | H-14425-5     | Switch Cable              |
| 9    | 03-6047-1     | Spacer, 1/4" Lg.          |
| 10   | 20-9646-1     | Cover Switch Protect      |
| 11   | 20-9672       | Cover Switch Protect      |
| 12   | 4106-01019-06 | Sh. Metal Screw, #6 x 3/8 |
| 13   | 4006-01003-06 | Mach. Screw, 6-32 x 3/8   |
| 14   | 4006-01003-10 | Mach. Screw, #6-32 x 5/8  |
| 15   | 4406-01119-00 | Nut, 6-32 ESN             |
| 16   | 31-3-50002-1  | Decal                     |
| 17   | 31-3-50002-2  | Decal                     |
| 18   | 31-3-50002-3  | Decal                     |
| 19   | 31-3-50002-4  | Decal                     |
| 20   | 31-3-50002-5  | Decal                     |
| 21   | 31-3-50002-6  | Decal                     |
| 22   | 02-4252-14    | F-F Spacer, 6-32 x 7/8    |

## A-14362 Left Ramp Assembly

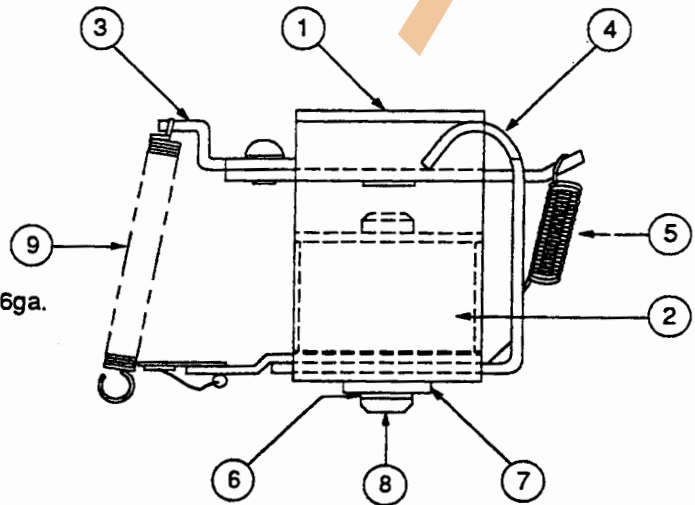
| Item | Part No.      | Description                           |
|------|---------------|---------------------------------------|
| 1    | A-12511       | Ball Gate Assembly                    |
| 2    | A-14042       | Ball Gate & Switch Assy.              |
| 2    | A-14363       | Gate Assembly                         |
| 3    | A-14364       | Ball Gate Actuator Assy. (see p.2-34) |
| 4    | A-14420       | Ramp Sub-Assembly                     |
| 5    | A-14281       | Gate & Switch Assembly                |
| 6    | H-14425-5     | Switch Cable                          |
| 7    | H-14425-1     | Switch Cable                          |
| 8    | 20-9672       | Cover Switch Protect                  |
| 9    | 24-8821       | Socket w/Diode                        |
| 10   | 24-8768       | Bulb #555 (6.3V)                      |
| 11   | 31-3-50002-7  | Decal                                 |
| 12   | 4006-01027-06 | Mach. Screw, 6-32 x 3/8               |
| 13   | 4406-01119-00 | Nut 6-32 ESN                          |
| 14   | 4106-01033-08 | Sh. Metal Screw, #6 x 1/2             |
| 15   | 4006-01041-06 | Mach. Screw, 6-32 x 3/8               |

## A-14357 Wire Ball Return Assembly

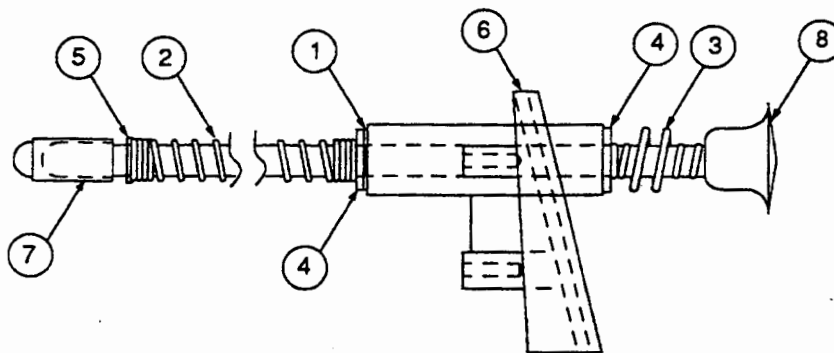
| Item | Part No.      | Description              |
|------|---------------|--------------------------|
| 1    | 12-6947       | Wire-Ball Return         |
| 2    | 01-8600       | Switch Insulator         |
| 3    | 01-8240       | Nut Plate                |
| 4    | 5070-09054-00 | Diode, 1N4001            |
| 5    | 5647-12693-21 | Subminiature Switch      |
| 6    | H-14425-4     | Ball Lock Cable          |
| 7    | A-14449       | Cover & Socket Assembly  |
| 8    | 4002-01105-07 | Mach. Screw, 2-56 x 7/16 |
| 9    | 4006-01027-04 | Mach. Screw, 6-32        |

## A-14364 Ball Gate Actuator Assembly

| Item | Part No.      | Description                      |
|------|---------------|----------------------------------|
| 1    | 01-8111       | Ball Gate Coil Bracket           |
| 2    | A-14406       | Coil Assembly                    |
| 3    | A-11146       | Armature Assembly                |
| 4    | A-6892        | Frame & Eyelet Assy.             |
| 5    | 10-120        | Spring                           |
| 6    | 4701-00003-00 | Lockwasher, #8 Split             |
| 7    | 4700-00089-00 | Flatwasher, 11/64 x 7/16 x 16ga. |
| 8    | 4008-01021-07 | Mach. Screw, 8-32 x 7/16         |
| 9    | 10-426        | Extension Spring                 |



## B-11450 Ball Shooter Assembly



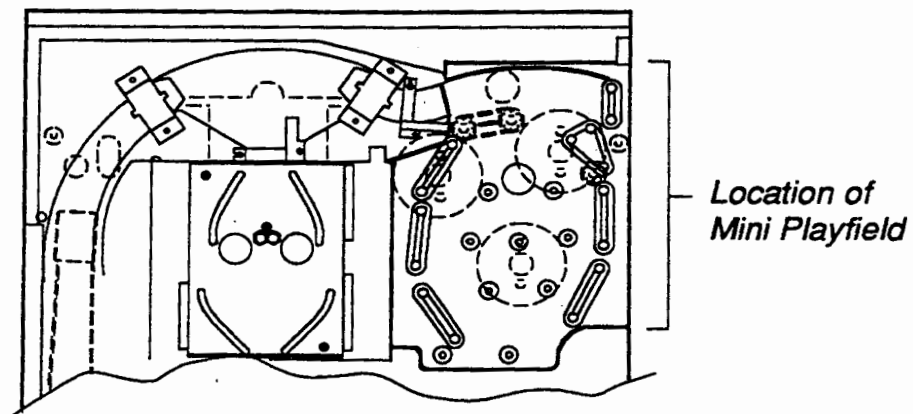
| Item | Part Number   | Description                     |
|------|---------------|---------------------------------|
| 1    | 03-7357       | Shooter Sleeve                  |
| 2    | 10-148-3      | Shooter Spring                  |
| 3    | 10-149        | Rod Spring                      |
| 4    | 4700-00051-00 | Flatwasher, 25/64 x 5/8 x 16ga. |
| 5    | 20-8718-1     | "C"-Retaining Ring              |
| 6    | 21-6645       | Ball Shooter Housing            |
| 7    | 23-6327       | Rubber Shooter Tip              |
| 8    | 20-9253-7     | Rod Assembly                    |

## Unique Parts

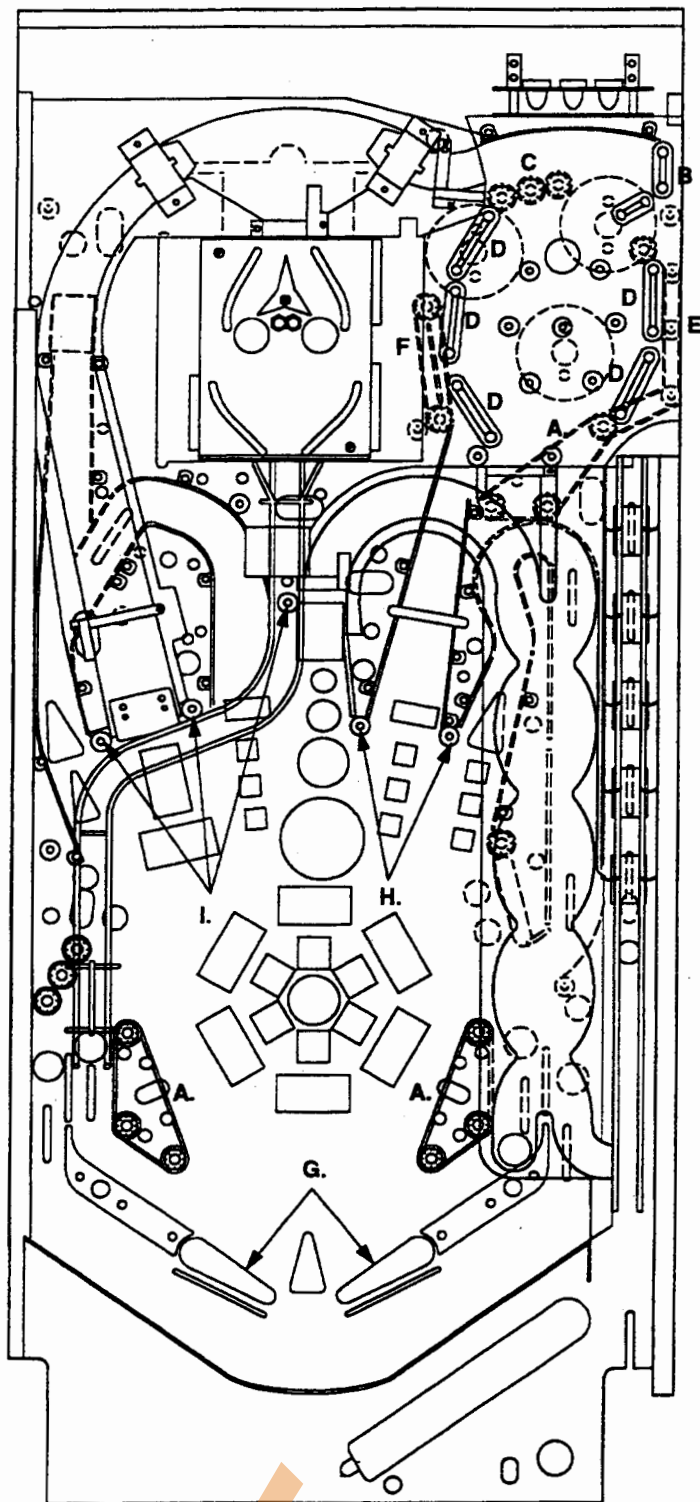
|               |                                   |                   |                                 |
|---------------|-----------------------------------|-------------------|---------------------------------|
| A-12732-50002 | WPC Sound Board Assembly          | A-14494-3         | Playfield Plastic Assembly      |
| A-12742-50002 | WPC CPU Board                     | A-14494-5         | Playfield Plastic Assembly      |
| A-13204-50002 | Bottom Arch Assembly              | A-14508           | Helmet Assembly                 |
| A-13769-50002 | Playfield & Insert Assembly       | A-14523           | Playfield Plastic Assembly      |
| A-13780-50002 | Wood Speaker Panel Assembly       | A-14559           | Playfield Plastic Assembly      |
| A-13892-2     | Motor Regulator Assembly          | A-14568           | Cover Assembly                  |
| A-14007       | Chase Light assembly              | A-14588           | Playfield Plastic Assembly      |
| A-14025       | Face Lamp Assembly                | A-14609           | Ball Gate Assembly              |
| A-14042       | Ball Gate & Switch Assembly       | A-8108-R-2        | Flipper Return Frame Assy.      |
| A-14046       | Disappearing Post Assembly        | A-8552-50002      | Backglass Assembly              |
| A-14118       | Face Playfield Assembly           |                   |                                 |
| A-14119       | Motor Assembly                    | AE-30-2000        | Coil Assembly                   |
| A-14120       | Main Bracket Assembly             |                   |                                 |
| A-14121       | Face Assembly                     | H-14425-1         | Left Ramp Cable                 |
| A-14123       | Coil Assembly (Right)             | H-14425-10        | Head Cable, Upper               |
| A-14124       | Coil Assembly (Left)              | H-14425-2         | Right Ramp Cable                |
| A-14125       | Coil Assembly (Center)            | H-14425-3         | Head Cable, Lower               |
| A-14126       | Roller Assembly                   | H-14425-4         | Ball Lock Cable                 |
| A-14130       | Face Plate - 1 Assembly           | H-14425-5         | Ramp Switch Cable               |
| A-14131       | Face Plate - 2 Assembly           | H-14425-6         | Flasher Cable                   |
| A-14132       | Face Plate - 3 Assembly           | H-14425-7         | Helmet Cable                    |
| A-14133       | Face Plate - 4 Assembly           | H-14425-8         | G. I. Cable                     |
| A-14281       | Gate & Switch Assembly            | H-14425-9         | Lamp Cable                      |
| A-14302       | 3-Lamp Assembly                   | H-14426           | Playfield Switch Cable          |
| A-14303       | 5-Lamp Assembly                   | H-14427           | Playfield Lamp Cable            |
| A-14304       | 13-Lamp Assembly                  | H-14428           | Playfield Solenoid Cable        |
| A-14305       | 4-Lamp Assembly                   | H-14429           | Insert Cable                    |
| A-14318       | Ball Guide Assy. - Mini Playfield | H-14430           | Cabinet Cable                   |
| A-14319       | Loop Assembly                     | H-14431           | Logic Power Cable               |
| A-14323       | Kicker Assembly                   |                   |                                 |
| A-14327       | Ball Guide Assy. - Skill Shot     | 01-9990           | Pan                             |
| A-14328       | Ball Guide Skill Shot Assy.       |                   |                                 |
| A-14333       | Ball Guide Assembly               | 02-4497           | Roller                          |
| A-14334       | Ball Guide Assembly               | 02-4498           | Roller Post                     |
| A-14335       | Ball Guide Assembly               |                   |                                 |
| A-14336       | Ball Guide Assembly               | 03-7960-50002-1   | Mylar - Playfield               |
| A-14337       | Ball Guide Assembly               | 03-7960-50002-2   | Mylar - Playfield               |
| A-14338       | Ball Guide Assembly               | 03-8475           | Wheel - Geneva                  |
| A-14339       | Ball Guide Assembly               | 03-8476           | Wheel - Drive                   |
| A-14340       | Ball Guide Assembly               |                   |                                 |
| A-14341       | Ball Guide Assembly               | 23-6654           | Roller, Rubber                  |
| A-14357       | Wire Ball Return Assy.            |                   |                                 |
| A-14358       | Mini Playfield Assembly           | 31-1-50002        | Playfield Plastics              |
| A-14359       | Right Ramp Assembly               | 31-1-50002-       | Screened Playfield Plastics Set |
| A-14362       | Left Ramp Assembly                | 31-1A-50002-1     | Playfield Plastic               |
| A-14363       | Gate Assembly                     | 31-1A-50002-2     | Playfield Plastic               |
| A-14364       | Ball Gate Actuator Assy.          | 31-1A-50002-3     | Playfield Plastic               |
| A-14367       | Lamp Board & Bracket Assy.        | 31-1002-50002     | Screened Playfield              |
| A-14368       | Speaker / Display Assembly        | 31-1008-50002     | Screened Bottom Arch            |
| A-14372       | Ball Gate Assembly                | 31-1009-50002     | Shooter Plate Screened          |
| A-14376-50002 | Backbox Assembly                  | 31-1420-50002     | Speaker Panel Cover, Screened   |
| A-14410       | 8-Chase Lamp Assembly             | 31-1625           | Mini Playfield Screened         |
| A-14412       | 8-Chase Lamp Assembly             | 31-2-50002-1      | Decal, Helmet                   |
| A-14423-1     | Relay 12vdc Assembly              | 31-2-50002-2 → -8 | Decal                           |
| A-14451       | 3-Lamp & Bracket Assembly         | 31-3-50002-1 → -7 | Decal - Bottom Side             |
| A-14494-2     | Playfield Plastic Assembly        |                   |                                 |

## A-14358 Mini Playfield Assembly

| Item | Part No.      | Description                      |
|------|---------------|----------------------------------|
| 1    | 31-1625       | Mini Playfield (Screened)        |
| 2    | A-14318       | Ball Guide Assembly              |
| 3    | 03-8044-9     | Mini Post, Tr. Red               |
| 4    | 23-6535       | Ball Guide Bumper                |
| 5    | 23-6301       | Rubber Ring, 3/4"                |
| 6    | 23-6304       | Rubber Ring, 1-1/2"              |
| 7    | 4106-01019-08 | Sh. Metal Screw, #6 x 1/2        |
| 8    | 4006-01017-06 | Mach. Screw, 6-32 x 3/8          |
| 9    | 4406-01119-00 | Nut, 6-32 ESN                    |
| 10   | 23-6300       | Rubber Ring, 5/16"               |
| 11   | 23-6302       | Rubber Ring, 1"                  |
| 12   | 02-4335-12    | Mounting Post, 1.38              |
| 13   | 4700-00021-00 | Flatwasher, 13/64 x 7/16 x 21ga. |
| 14   | 4408-01119-00 | Nut, 8-32 ESN                    |
| 15   | 01-10126      | Shield - Right Side Head         |
| 16   | 03-6047-2     | Spacer, 3/8"                     |
| 17   | 4008-01003-12 | Mach. Screw, 8-32 x 3/4          |



# THE MACHINE RUBBERS



- A. Rubber Ring 23-6306, 2 1/2"
- B. Rubber Ring 23-6301, 3/4"
- C. Post Rubbers 23-6300, (6)
- D. Rubber Ring 23-6302, 1" (5)
- E. Rubber Ring 23-6304, 1 1/2"
- F. Rubber Ring 23-6305, 2" (2)
- G. Rubber Ring (Flipper), 23-6519-4 (red) (2)
- H. Rubber Bumper Sleeve, 23-6556 (blk) (2)
- I. Rubber Bumper Sleeve, 23-6552 (yel) (3)

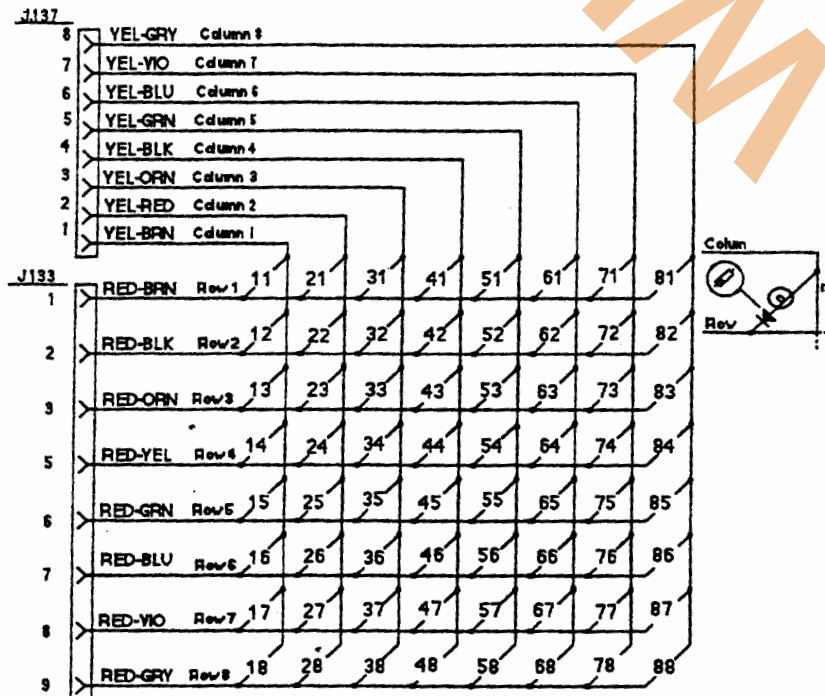
## On Miniplayfield:

- 10 small post rubbers, 23-6535
- 1 small rubber ring, 23-6300

## On Playfield:

- 9 large post rubbers, 23-6300
- 4 small post rubbers, 23-6535

# Lamp Matrix



## THE MACHINE Lamp Matrix

Yellow (B-)

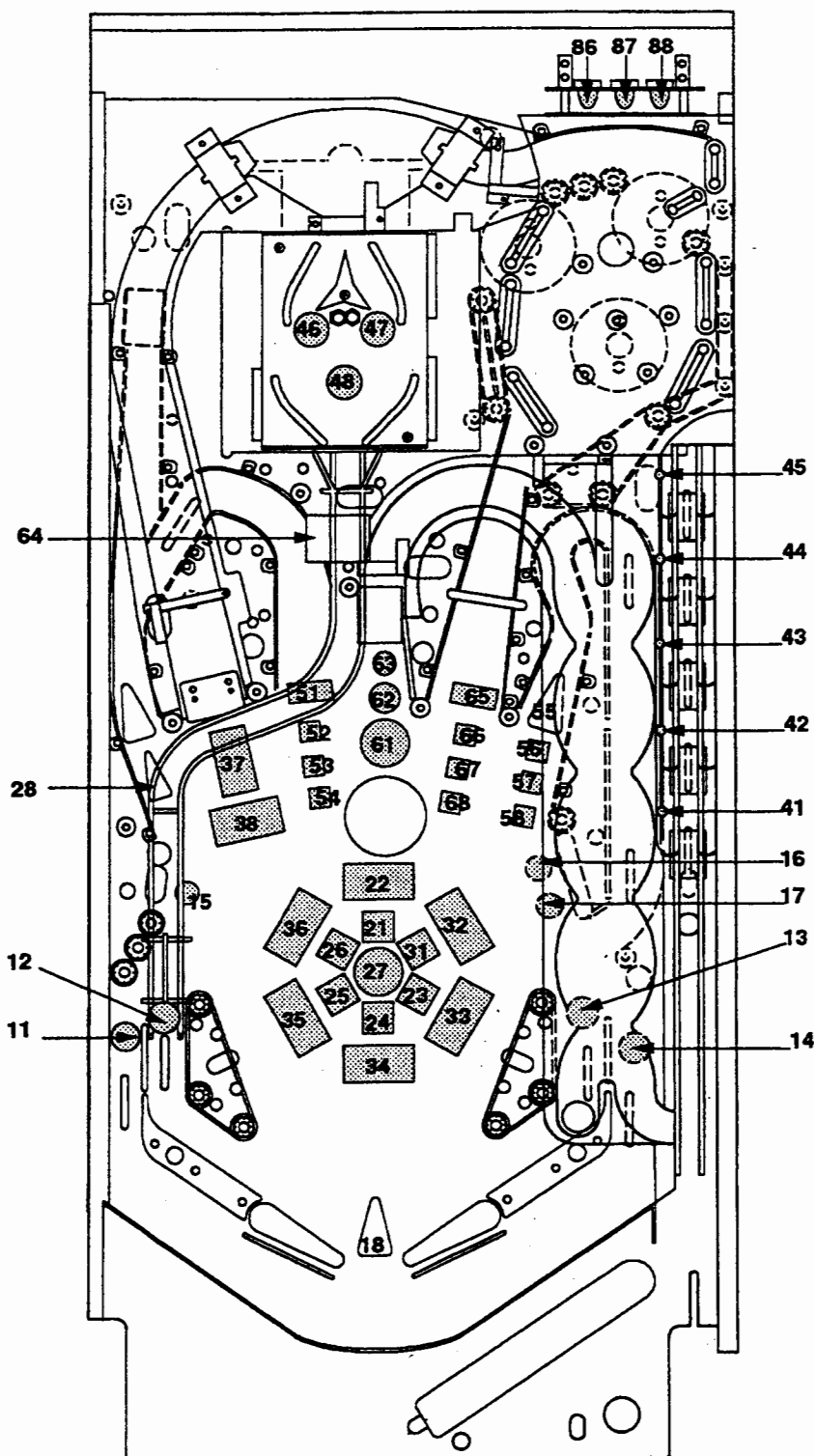


Red

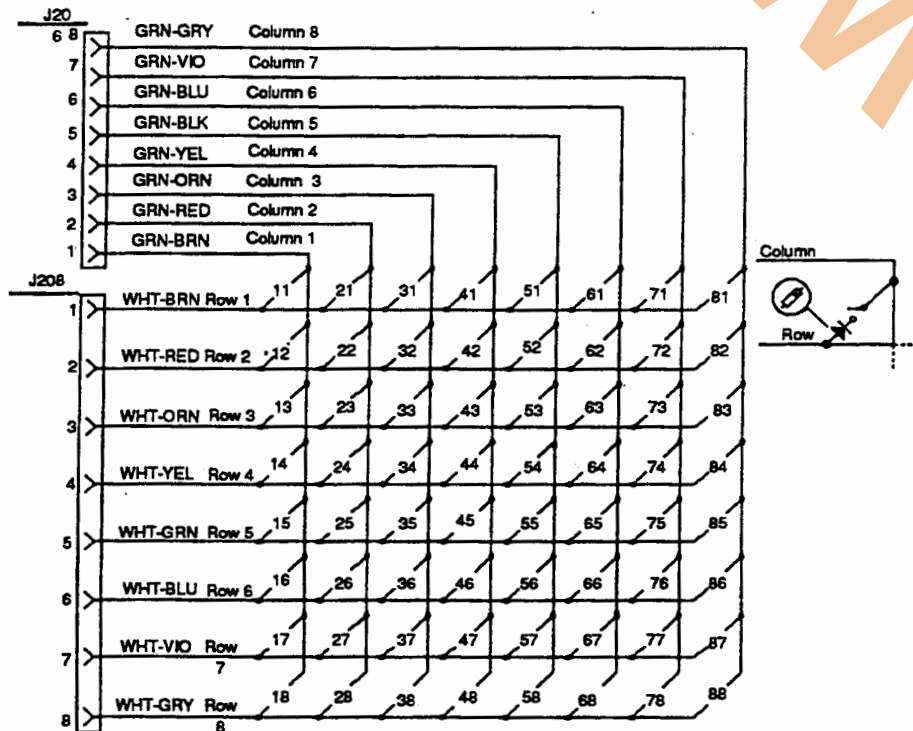
| Column       | 1 Yellow-Brown             | 2 Yellow-Red                 | 3 Yellow-Orange         | 4 Yellow-Black        | 5 Yellow-Green        | 6 Yellow-Blue            | 7 Yellow-Violet         | 8 Yellow-Gray              |
|--------------|----------------------------|------------------------------|-------------------------|-----------------------|-----------------------|--------------------------|-------------------------|----------------------------|
| Row          |                            |                              |                         |                       |                       |                          |                         |                            |
| 1 Red-Brown  | Left Outlane<br>11         | Circle Lite Jackpot<br>21    | Circle 250K<br>31       | Skill Shot 50K<br>41  | Left Loop 500K<br>51  | Right Ramp 100K<br>61    | Jackpot 8 Million<br>71 | Backglass Hip<br>81        |
| 2 Red-Black  | Left Return Lane<br>12     | Circle Lite Billion<br>22    | Circle 10 Million<br>32 | Skill Shot 75K<br>42  | Left Loop 100K<br>52  | Right Ramp 500K<br>62    | Jackpot 7 Million<br>72 | Backglass Middle leg<br>82 |
| 3 Red-Orange | Right Return Lane<br>13    | Circle Extra Ball<br>23      | Circle 50 Million<br>33 | Skill Shot 100K<br>43 | Left Loop 50K<br>53   | Right Ramp Million<br>63 | Jackpot 6 Million<br>73 | Backglass Knee<br>83       |
| 4 Red-Yellow | Right Outlane<br>14        | Circle Lite Extra Ball<br>24 | Circle Special<br>34    | Skill Shot 200K<br>44 | Left Loop 25K<br>54   | Wire Ball Lock<br>64     | Jackpot 5 Million<br>74 | Backglass Foot<br>84       |
| 5 Red-Green  | Left Standup<br>15         | Circle 500K<br>25            | Circle 5 Million<br>35  | Skill Shot 25K<br>45  | Right Loop 500K<br>55 | Jet Enter 500K<br>65     | Jackpot 4 Million<br>75 | Backglass Shoulder<br>85   |
| 6 Red-Blue   | Right Top Standup<br>16    | Circle 100K<br>26            | Circle 1 Million<br>36  | Head Left Eye<br>46   | Right Loop 100K<br>56 | Jet Enter 100K<br>66     | Jackpot 3 Million<br>76 | Mini Playfield 100K<br>86  |
| 7 Red-Violet | Right Bottom Standup<br>17 | Values Doubled<br>27         | Space Shuttle<br>37     | Head Right Eye<br>47  | Right Loop 50K<br>57  | Jet Enter 50K<br>67      | Jackpot 2 Million<br>77 | Mini Playfield 200K<br>87  |
| 8 Red-Gray   | Shoot Again<br>18          | Spin Small Wheel<br>28       | Launch Pad<br>38        | Head Mouth<br>48      | Right Loop 25K<br>58  | Jet Enter 25K<br>68      | Jackpot 1 Million<br>78 | Mini Playfield 300K<br>88  |

# THE MACHINE LAMP LOCATIONS

| No. | Description                      | Bulb |
|-----|----------------------------------|------|
| 11. | Left Outlane                     | 555  |
| 12. | Left Return Lane                 | 555  |
| 13. | Right Return Lane                | 555  |
| 14. | Right Outlane                    | 555  |
| 15. | Left Standup                     | 555  |
| 16. | Right Top Standup                | 555  |
| 17. | Right Bottom Standup             | 555  |
| 18. | Shoot Again                      | 44   |
| 21. | Circle - Lite Jackpot            | 555  |
| 22. | Circle - Lite Billion            | 555  |
| 23. | Circle - Extra Ball              | 555  |
| 24. | Circle - Lite Extra Ball         | 555  |
| 25. | Circle - 50K                     | 555  |
| 26. | Circle - 100K                    | 555  |
| 27. | Circle - Values Doubled          | 555  |
| 28. | Spin Small Wheel                 | 555  |
| 31. | Circle - 250K                    | 555  |
| 32. | Circle - 10 Million              | 555  |
| 33. | Circle - 50 Million              | 555  |
| 34. | Circle - Special                 | 555  |
| 35. | Circle - 5 Million               | 555  |
| 36. | Circle - 1 Million               | 555  |
| 37. | Space Shuttle Ramp               | 44   |
| 38. | Launch Pad                       | 44   |
| 41. | Skill Shot 50K                   | 555  |
| 42. | Skill Shot 75K                   | 555  |
| 43. | Skill Shot 100K                  | 555  |
| 44. | Skill Shot 200K                  | 555  |
| 45. | Skill 25K                        | 555  |
| 46. | Head - Left Eye                  | 555  |
| 47. | Head - Right Eye                 | 555  |
| 48. | Head - Mouth                     | 555  |
| 51. | Left Loop - 500K                 | 555  |
| 52. | Left Loop - 100K                 | 555  |
| 53. | Left Loop - 50K                  | 555  |
| 54. | Left Loop - 25K                  | 555  |
| 55. | Right Loop - 500K                | 555  |
| 56. | Right Loop - 100K                | 555  |
| 57. | Right Loop - 50K                 | 555  |
| 58. | Right Loop - 25K                 | 555  |
| 61. | Right Ramp - Million             | 555  |
| 62. | Right Ramp - 500K                | 555  |
| 63. | Right Ramp - 100K                | 555  |
| 64. | Wire Ball Lock                   | 44   |
| 65. | Jets Enter - 500K                | 555  |
| 66. | Jets Enter - 100K                | 555  |
| 67. | Jets Enter - 50K                 | 555  |
| 68. | Jets Enter - 25K                 | 555  |
| 71. | Jackpot - 8 Million (on insert)  | 555  |
| 72. | Jackpot - 7 Million (on insert)  | 555  |
| 73. | Jackpot - 6 Million (on insert)  | 555  |
| 74. | Jackpot - 5 Million (on insert)  | 555  |
| 75. | Jackpot - 4 Million (on insert)  | 555  |
| 76. | Jackpot - 3 Million (on insert)  | 555  |
| 77. | Jackpot - 2 Million (on insert)  | 555  |
| 78. | Jackpot - 1 Million (on insert)  | 555  |
| 81. | Backglass Hip (on insert)        | 555  |
| 82. | Backglass Middle Leg (on insert) | 555  |
| 83. | Backglass Knee (on insert)       | 555  |
| 84. | Backglass Foot (on insert)       | 555  |
| 85. | Backglass Shoulder (on insert)   | 555  |
| 86. | Mini Playfield - 100K            | 555  |
| 87. | Mini Playfield - 200K            | 555  |
| 88. | Mini Playfield - 300K            | 555  |



# Switch Matrix



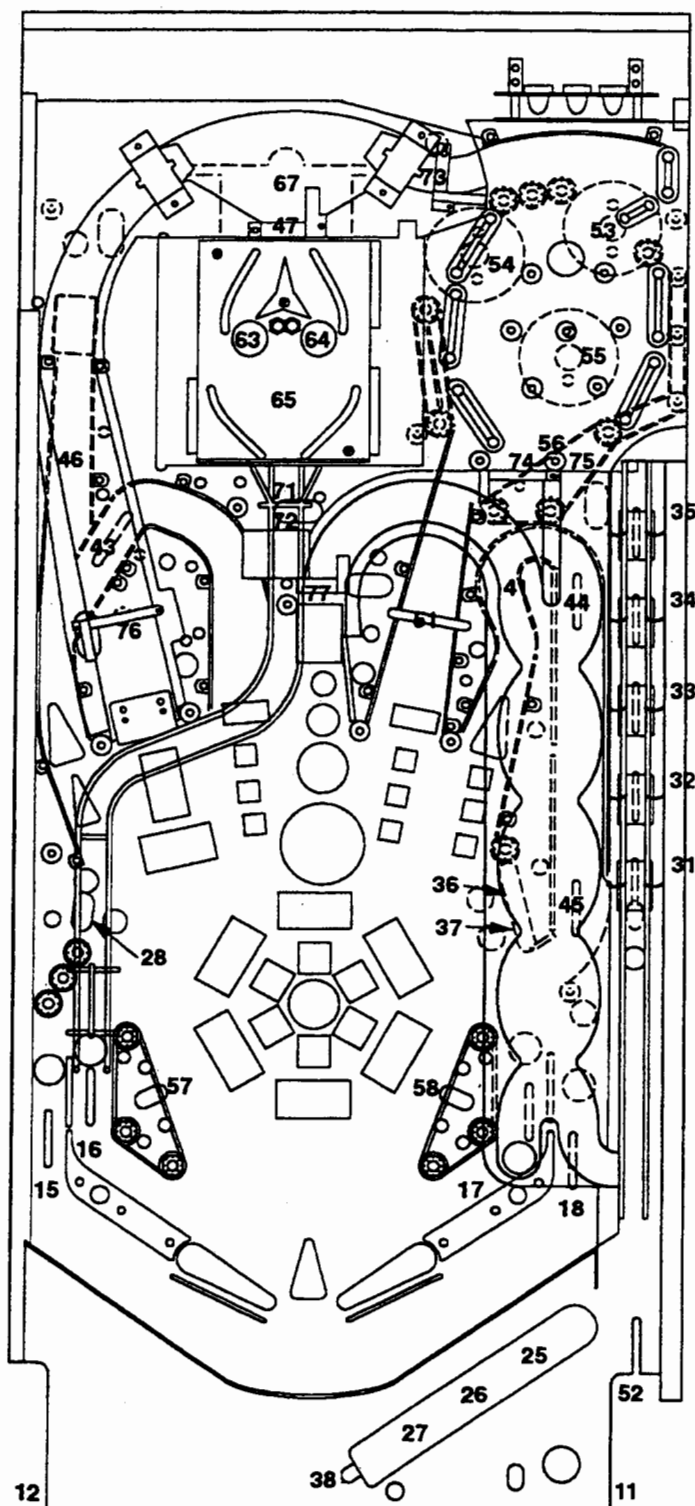
## THE MACHINE Switch Matrix

White Green

| Dedicated Grounded Switches                                                 | Column / Row   | 1 Green-Brown      | 2 Green-Red      | 3 Green-Orange       | 4 Green-Yellow           | 5 Green-Black          | 6 Green-Blue   | 7 Green-Violet       | 8 Green-Gray |
|-----------------------------------------------------------------------------|----------------|--------------------|------------------|----------------------|--------------------------|------------------------|----------------|----------------------|--------------|
| Orange-Brown (1)<br>Left Coin Chute                                         | 1 White-Brown  | Right Flipper      | Slam Tilt        | Skill Shot 50K       | Right Ramp Made          | Spinner                | Not Used       | Wireform Top         |              |
| Orange-Red (2)<br>Center Coin Chute                                         | 2 White-Red    | Left Flipper       | Coin Door Closed | Skill Shot 75K       | Not Used                 | Shooter                | Not Used       | Wireform Bottom      |              |
| Orange-Black (3)<br>Right Coin Chute                                        | 3 White-Orange | Start Button       | Ticket Opto      | Skill Shot 100K      | Left Loop                | Upper Right Jet Bumper | Head Left Eye  | Enter Mini Playfield |              |
| Orange-Yellow (4)<br>4th Coin Chute                                         | 4 White-Yellow | Plumb Bob Tilt     | Always Closed    | Skill Shot 200K      | Right Loop Top           | Upper Left Jet Bumper  | Head Right Eye | Mini Exit Left       |              |
| Orange-Green (5)<br>Normal Function: Test Function: Service Credits: Escape | 5 White-Green  | Left Outlane       | Right Trough     | Skill Shot 25K       | Right Loop Bottom        | Lower Jet Bumper       | Head Mouth     | Mini Exit Right      |              |
| Orange-Blue (6)<br>Normal Function: Test Function: Volume Down: Down        | 6 White-Blue   | Left Flipper Lane  | Center Trough    | Right Top Standup    | Under Playfield Kickback | Jet Bumper Sling       | Not Used       | Left Ramp Enter      |              |
| Orange-Violet (7)<br>Normal Function: Test Function: Volume Up: Up          | 7 White-Violet | Right Flipper Lane | Left Trough      | Right Bottom Standup | Enter Head               | Left Slingshot         | Face Position  | Right Ramp Enter     |              |
| Orange-Gray (8)<br>Normal Function: Test Function: Begin: Enter Test        | 8 White-Gray   | Right Outlane      | Left Standup     | Outhole              | Not Used                 | Right Slingshot        | Not Used       | Not Used             |              |

# THE MACHINE SWITCH LOCATIONS

| Item | Part Number   | Description               |
|------|---------------|---------------------------|
| 11   | A-9990-1      | Right Flipper             |
| 12   | A-9990-1      | Left Flipper              |
| 13   | SW-1A-126     | Game Start                |
| 14   | 20-6502-A     | Plum Bob Tilt             |
| 15   | 5647-12693-19 | Left Outlane              |
| 16   | 5647-12693-19 | Left Flipper Lane         |
| 17   | 5647-12693-19 | Right Flipper Lane        |
| 18   | 5647-12693-19 | Right Outlane             |
| 21   | 27-1066       | Slam Tilt                 |
| 22   | A-8630        | Coin Door Closed          |
| 23   | Not Used      | Ticket Opto.              |
| 24   | A-8630        | Always Closed             |
| 25   | 5647-12693-08 | Right Trough              |
| 26   | 5647-09957-00 | Center Trough             |
| 27   | 5647-09957-00 | Left Trough               |
| 28   | B-11854-4     | Left Standup              |
| 31   | 5647-12693-46 | Skill Shot 50K            |
| 32   | 5647-12693-19 | Skill Shot 75K            |
| 33   | 5647-12693-19 | Skill Shot 100K           |
| 34   | 5647-12693-19 | Skill Shot 200K           |
| 35   | 5647-12693-19 | Skill Shot 25K            |
| 36   | B-11854-4     | Right Top Standup         |
| 37   | B-11854-4     | Right Bottom Standup      |
| 38   | 5647-12133-12 | Outhole                   |
| 41   | 5647-12693-21 | Right Ramp Made           |
| 42   | Not Used      | Not Used                  |
| 43   | 5647-12693-19 | Left Loop                 |
| 44   | 5647-12693-18 | Right Loop Top            |
| 45   | 5647-12693-18 | Right Loop Bottom         |
| 46   | 5647-12693-25 | Under Playfield Kicker    |
| 47   | 5647-12693-36 | Enter Head                |
| 48   | Not Used      | Not Used                  |
| 51   | 5647-12133-08 | Spinner                   |
| 52   | 5647-12693-04 | Shooter Lane Feeder       |
| 53   | SW-11A-37     | Upper Right Jet Bumper    |
| 54   | SW-11A-37     | Upper Left Jet Bumper     |
| 55   | SW-11A-37     | Lower Jet Bumper          |
| 56   | SW-1A-114     | Jet Bumper Sling Kicker   |
| 57   | SW-1A-114     | B. L. Kicker (Sling)***   |
| 58   | SW-1A-114     | B. R. Kicker (Sling)***   |
| 61   | Not Used      | Not Used                  |
| 62   | Not Used      | Not Used                  |
| 63   | 5647-12693-47 | Head - Left Eye           |
| 64   | 5647-12693-48 | Head - Right Eye          |
| 65   | 5647-12693-39 | Head - Mouth              |
| 66   | Not Used      | Not Used                  |
| 67   | 5647-12693-06 | Face Position             |
| 68   | Not Used      | Not Used                  |
| 71   | 5647-12693-21 | Wireform Top              |
| 72   | 5647-12693-21 | Wireform Bottom           |
| 73   | 5647-12693-36 | Enter Mini Playfield      |
| 74   | 5647-12693-36 | Exit Mini Playfield Left  |
| 75   | 5647-12693-21 | Exit Mini Playfield Right |
| 76   | 5647-12693-36 | Left Ramp Enter           |
| 77   | 5647-12693-21 | Right Ramp Enter          |
| 78   | Not Used      | Not Used                  |



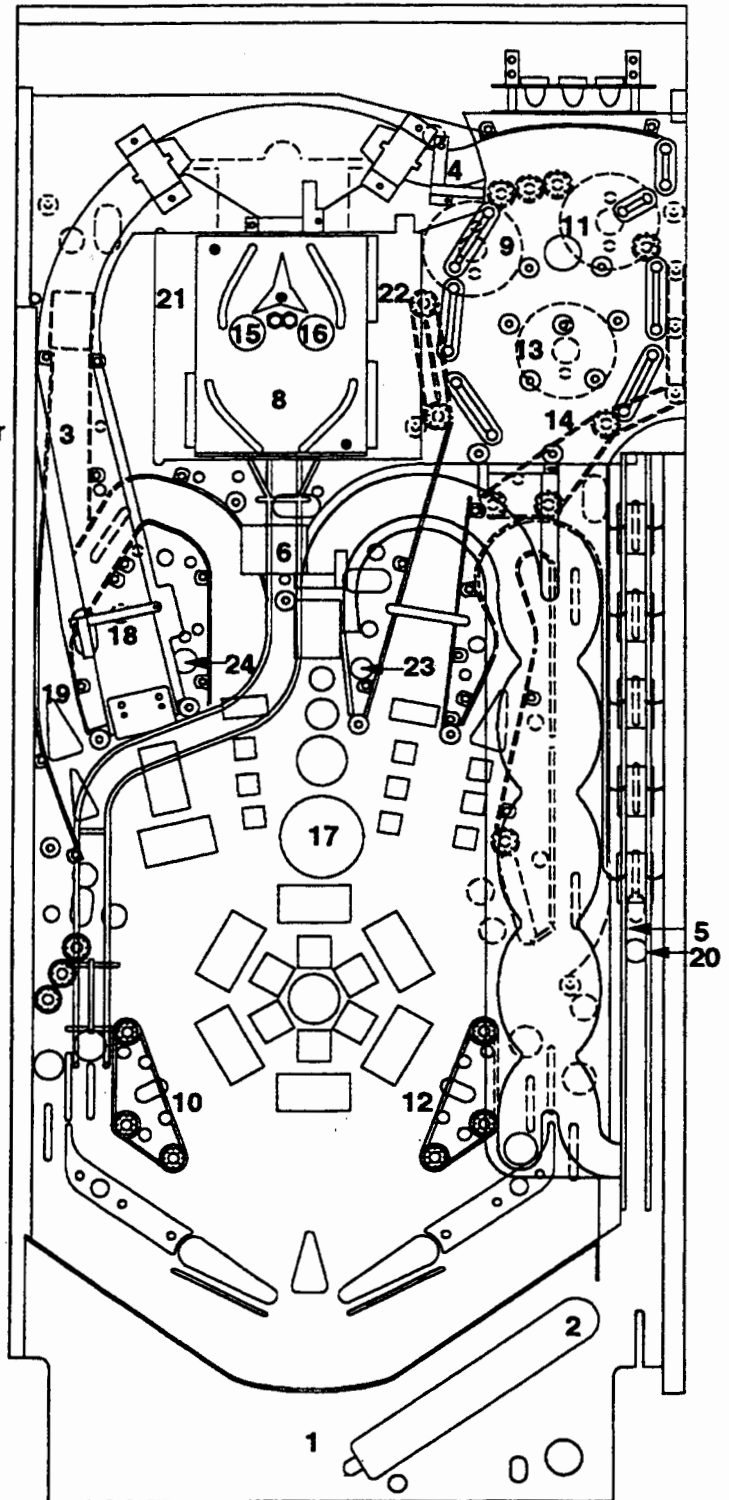
# Solenoid Table

**THE MACHINE Solenoid Table**

| Sol. No.                             | Function                | Solenoid Type | Wire Color | Connections   | Driver Trnstr | Solenoid Part Number<br>Flashlamp Type |
|--------------------------------------|-------------------------|---------------|------------|---------------|---------------|----------------------------------------|
| 01                                   | Outhole                 | High Power    | Vio-Brn    | J130-1        | Q82           | AE-27-1200                             |
| 02                                   | Ball Release            | High Power    | Vio-Red    | J130-2        | Q80           | AE-26-1200                             |
| 03                                   | Under Playfield Kicker  | High Power    | Vio-Orn    | J130-4        | Q78           | AE-23-800                              |
| 04                                   | Controlled Gate         | High Power    | Vio-Yel    | J130-5        | Q76           | A-14406                                |
| 05                                   | Skill Shot Kicker       | High Power    | Vio-Grn    | J130-6        | Q64           | AE-24-900                              |
| 06                                   | Wire Ball Holder        | High Power    | Vio-Blu    | J130-7        | Q66           | AE-26-1200                             |
| 07                                   | Knocker                 | High Power    | Vio-Blk    | J130-8        | Q68           | AE-23-800                              |
| 08                                   | Head Mouth              | High Power    | Vio-Gry    | J130-9        | Q70           | AE-30-2000                             |
| 09                                   | Upper Left Jet Bumper   | Low Power     | Brn-Blk    | J127-1        | Q58           | AE-26-1200                             |
| 10                                   | Left (sling) Kicker     | Low Power     | Brn-Red    | J127-3        | Q56           | AE-26-1500                             |
| 11                                   | Upper Right Jet Bumper  | Low Power     | Brn-Orn    | J127-4        | Q54           | AE-26-1200                             |
| 12                                   | Right (sling) Kicker    | Low Power     | Brn-Yel    | J127-5        | Q52           | AE-26-1500                             |
| 13                                   | Lower Jet Bumper        | Low Power     | Brn-Grn    | J127-6        | Q50           | AE-26-1200                             |
| 14                                   | Jets Sling              | Low Power     | Brn-Blu    | J127-7        | Q48           | AE-26-1500                             |
| 15                                   | Head - Left Eye         | Low Power     | Brn-Vio    | J127-8        | Q46           | AE-30-2000                             |
| 16                                   | Head - Right Eye        | Low Power     | Brn-Gry    | J127-9        | Q44           | AE-30-2000                             |
| 17                                   | Billion Flasher         | Flasher       | Blk-Brn    | J125-1 J125-2 | Q42           | #89 pfd                                |
| 18                                   | Left Ramp Flash         | Flasher       | Blk-Red    | J126-2 J125-3 | Q40           | #89 pfd, #906 Insert                   |
| 19                                   | Jackpot Flasher         | Flasher       | Blk-Orn    | J126-3        | Q38           | #89 pfd, #906 Insert                   |
| 20                                   | Skill Shot Flasher      | Flasher       | Blk-Yel    | J126-4 J125-6 | Q36           | #89 pfd                                |
| 21                                   | Left Helmet Flasher     | Flasher       | Blu-Grn    | J126-6 J125-7 | Q28           | #555 pfd, #906 Insert                  |
| 22                                   | Right Helmet Flasher    | Flasher       | Blu-Blk    | J126-7 J125-8 | Q30           | #555 pfd, #906 Insert                  |
| 23                                   | Jets Enter Flash        | Flasher       | Blu-Vio    | J126-8 J125-9 | Q34           | #555 pfd, #906 Insert                  |
| 24                                   | Left Loop Flash         | Flasher       | Blu-Gry    | J126-9        | Q32           | #555 pfd, #906 Insert                  |
| 25                                   | Helmet Lights Data Port | Special       | Blu-Brn    | J122-1        | Q26           |                                        |
| 26                                   | Helmet Light Clock Port | Special       | Blu-Red    | J122-2        | Q24           | A-14423-1                              |
| 27                                   | Motor Relay             | Special       | Blu-Orn    | J122-3        | Q22           | A-14119                                |
| 28                                   | Head Motor              | Special       | Blu-Yel    | J122-4        | Q20           |                                        |
| <b>General Illumination Circuits</b> |                         |               |            |               |               |                                        |
| 01                                   | Backglass Body          | G.I.          | Wht-Brn    | J121-7        | Q18           | #555                                   |
| 02                                   | Used In Helmet          | G.I.          | Wht-Org    | J120-8        | Q10           | #555                                   |
| 03                                   | Rear Playfield          | G.I.          | Wht-Yel    | J120-9        | Q14           | #555                                   |
| 04                                   | Backglass - No Body     | G.I.          | Wht-Grn    | J121-11       | Q16           | #555                                   |
| 05                                   | Front Playfield         | G.I.          | Wht-Vio    | J120-11       | Q12           | #555                                   |
|                                      | Lower Right Flipper     |               | Blu-Yel    | J109-7        |               | FL-11630                               |
|                                      | Lower Left Flipper      |               | Gry-Yel    | J109-5        |               | FL-11630                               |

# THE MACHINE SOLENOID LOCATIONS

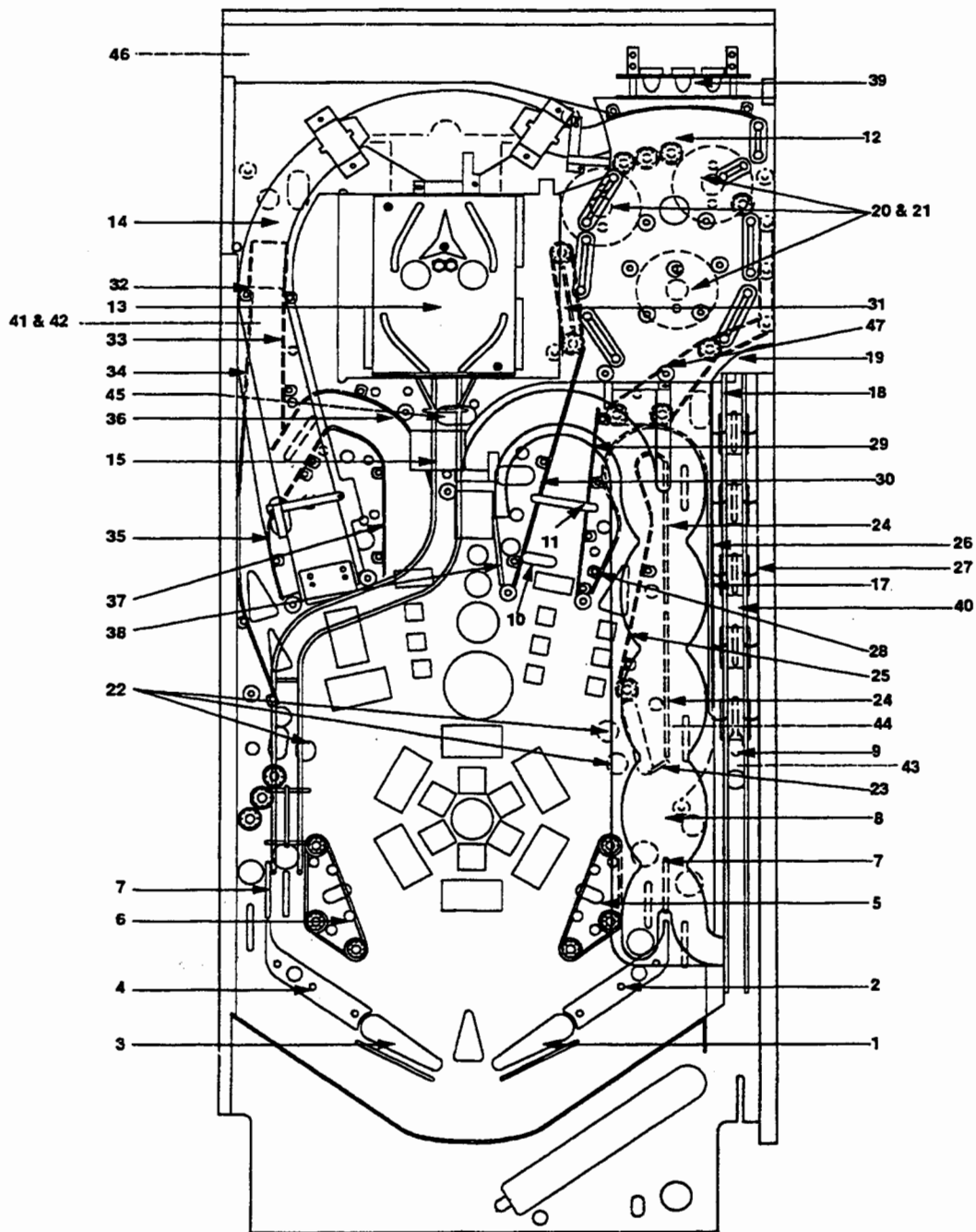
| Item | Part Number   | Description             |
|------|---------------|-------------------------|
| 01   | AE-27-1200    | Outhole Kicker          |
| 02   | AE-26-1200    | Ball Release            |
| 03   | AE-23-800     | Under Playfield Kicker  |
| 04   | A-14406       | Controlled Gate         |
| 05   | AE-24-900     | Skill Shot Kicker       |
| 06   | AE-26-1200    | Wire Ball Holder        |
| 07   | AE-23-800     | Knocker                 |
| 08   | AE-30-2000    | Head - Mouth            |
| 09   | AE-26-1200    | Upper Left Jet Bumper   |
| 10   | AE-26-1500    | Left ("Sling") Kicker   |
| 11   | AE-26-1200    | Upper Right Jet Bumper  |
| 12   | AE-26-1500    | Left ("Sling") Kicker   |
| 13   | AE-26-1200    | Lower Middle Jet Bumper |
| 14   | AE-26-1500    | Jets ("Sling") Kicker   |
| 15   | AE-30-2000    | Head - Left Eye         |
| 16   | AE-30-2000    | Head - Right Eye        |
| 17   | #89PL         | Billion Flasher         |
| 18   | #89PL, #906In | Left Ramp Flash         |
| 19   | #89PL, #906In | Jackpot Flasher         |
| 20   | #89PL         | Skill Shot Flasher      |
| 21   | #89PL, #906In | Left Helmet Flasher     |
| 22   | #89PL, #906In | Right Helmet Flasher    |
| 23   | #89PL, #906In | Jets Enter Flash        |
| 24   | #89PL, #906In | Left Loop Flash         |
| 25   |               | Helmet Lights Data Port |
| 26   |               | Helmet Light Clock Port |
| 27   | A-14423-1     | Motor Relay             |
| 28   | A-14119       | Head Motor              |



## Playfield Parts

| Item | Part Number   | Description                     | Item | Part Number                                  | Description                  |
|------|---------------|---------------------------------|------|----------------------------------------------|------------------------------|
| 1    | C-13174-R     | Right Flipper                   | 33   | A-14339                                      | Ball Guide Assy.             |
| 2    | A-8108-R-2    | Right Flipper Ball Guide Assy.  | 34   | A-14333                                      | Ball Guide Assy.             |
| 3    | C-13174-L     | Left Flipper                    | 35   | A-14334                                      | Ball Guide Assy.             |
| 4    | A-8108-L-2    | Left Flipper Ball Guide Assy.   | 36   | A-14336                                      | Ball Guide Assy.             |
| 5    | B-12665       | Right "sling" Kicker            | 37   | A-14335                                      | Ball Guide Assy.             |
| 6    | B-12665       | Left "sling" Kicker             | 38   | 12-6959                                      | Ball Guide Wire              |
| 7    | 12-6466-8     | Wireform 2"                     | 39   | A-14451                                      | Lamp Assy.                   |
| 8    | A-14359       | Right Ramp Assy.                | 40   | A-14126                                      | Roller Assy.                 |
| a)   | A-14281       | Gate & Switch Assy.             | 41   | A-14319                                      | Loop Assembly                |
| b)   | A-14361       | Ramp Switch Assy.               | 42   | A-14323                                      | Kicker Assembly              |
| c)   | 03-8513       | Right Ramp                      | 43   | B-11395-1                                    | Metal Kicker Assembly        |
| d)   | 01-10007      | Ramp Flap                       | 44   | A-14007                                      | Chase Light Assembly         |
| e)   | 20-9646-1     | Switch Protective Cover - Blk.  | 45   | A-14046                                      | Disappear Post Assy.         |
| 9    | 12-6957       | Right Wire Ramp (Skill)         | 46   | A-13892-2                                    | Motor Regulator              |
| 10   | A-14609       | One Way Gate                    | 47   | B-12665                                      | Kicker Arm Assy.             |
| 11   | B-12586       | Spinner (target assy.)          | 48   | Parts below are located beneath Bottom Arch: |                              |
| 12   | A-14358       | Mini Playfield Assy.            | a)   | B-8623                                       | Upper Trough Baffle Assembly |
| f)   | 31-1625       | Screened Mini Playfield         | b)   | C-8235                                       | Lower Trough Baffle Assembly |
| g)   | 01-10126      | Shield - Right Side of Head     | c)   | 12-6542                                      | Trough Baffle Wire           |
| h)   | 03-8044-9     | Mini Post TR - Red              | d)   | 01-3569-1                                    | Ball Trough (runway)         |
| i)   | A-14318       | Ball Guide Assy.                | e)   | 01-5575                                      | Bottom Arch Mounting Bracket |
| 13   | A-14118       | Face Assy.                      | f)   | B-8039-2                                     | Outhole Kicker Assembly      |
| j)   | A-14119       | Motor Assy.                     | g)   | C-9638                                       | Shooter Lane Feeder          |
| k)   | A-14120       | Main Bracket Assy.              |      |                                              |                              |
| l)   | A-14025       | Face Lamp Assy.                 |      |                                              |                              |
| 14   | A-14362       | Left Ramp Assy.                 |      |                                              |                              |
| m)   | 20-9672       | Switch Protective Cover         |      |                                              |                              |
| n)   | 03-8512       | Left Main Ramp                  |      |                                              |                              |
| o)   | 01-9848       | Ramp Flap                       |      |                                              |                              |
| p)   | 12-6657-L     | Ball Gate Wireform - L          |      |                                              |                              |
| q)   | A-12511       | Ball Gate Assy.                 |      |                                              |                              |
| r)   | A-14042       | Ball Gate & Switch Assy.        |      |                                              |                              |
| s)   | A-14363       | Gate Assy.                      |      |                                              |                              |
| 15   | A-14357       | Wire Chute Assy.                |      |                                              |                              |
| t)   | 12-6947       | Ramp - Ball Return              |      |                                              |                              |
| u)   | A-14449       | Cover & Socket Assy.            |      |                                              |                              |
| v)   | 5647-12693-21 | Switch - Sub Mini Micro         |      |                                              |                              |
| 16   | 12-6959       | Ball Guide Wire                 |      |                                              |                              |
| 17   | 03-8514       | Cover - Lamp Board & Skill Shot |      |                                              |                              |
| 18   | A-14367       | Lamp Board & Brkt. Assy.        |      |                                              |                              |
| 19   | A-14372       | Ball Gate Assy.                 |      |                                              |                              |
| 20   | B-9414-1      | Jet Bumper (blue)               |      |                                              |                              |
| 21   | 03-8254-9     | Red Bumper Cap                  |      |                                              |                              |
| 22   | B-11854-4     | Standup Target Assy. (red)      |      |                                              |                              |
| 23   | 12-6466-2     | 1/2" Wireform                   |      |                                              |                              |
| 24   | 12-6466-22    | 5 1/2" Wireform                 |      |                                              |                              |
| 25   | A-14341       | Ball Guide Assy.                |      |                                              |                              |
| 26   | A-14329       | Ball Guide Assy. (right)        |      |                                              |                              |
| 27   | A-14327       | Ball Guide Assy. (left)         |      |                                              |                              |
| 28   | A-14340       | Ball Guide Assy.                |      |                                              |                              |
| 29   | A-14338       | Ball Guide Assy.                |      |                                              |                              |
| 30   | A-14337       | Ball Guide Assy.                |      |                                              |                              |
| 31   | 12-6466-10    | 2 1/2" Wireform                 |      |                                              |                              |
| 32   | A-14320       | Loop Ball Gde. Assy -under plfd |      |                                              |                              |

# THE MACHINE PLAYFIELD PART LOCATIONS



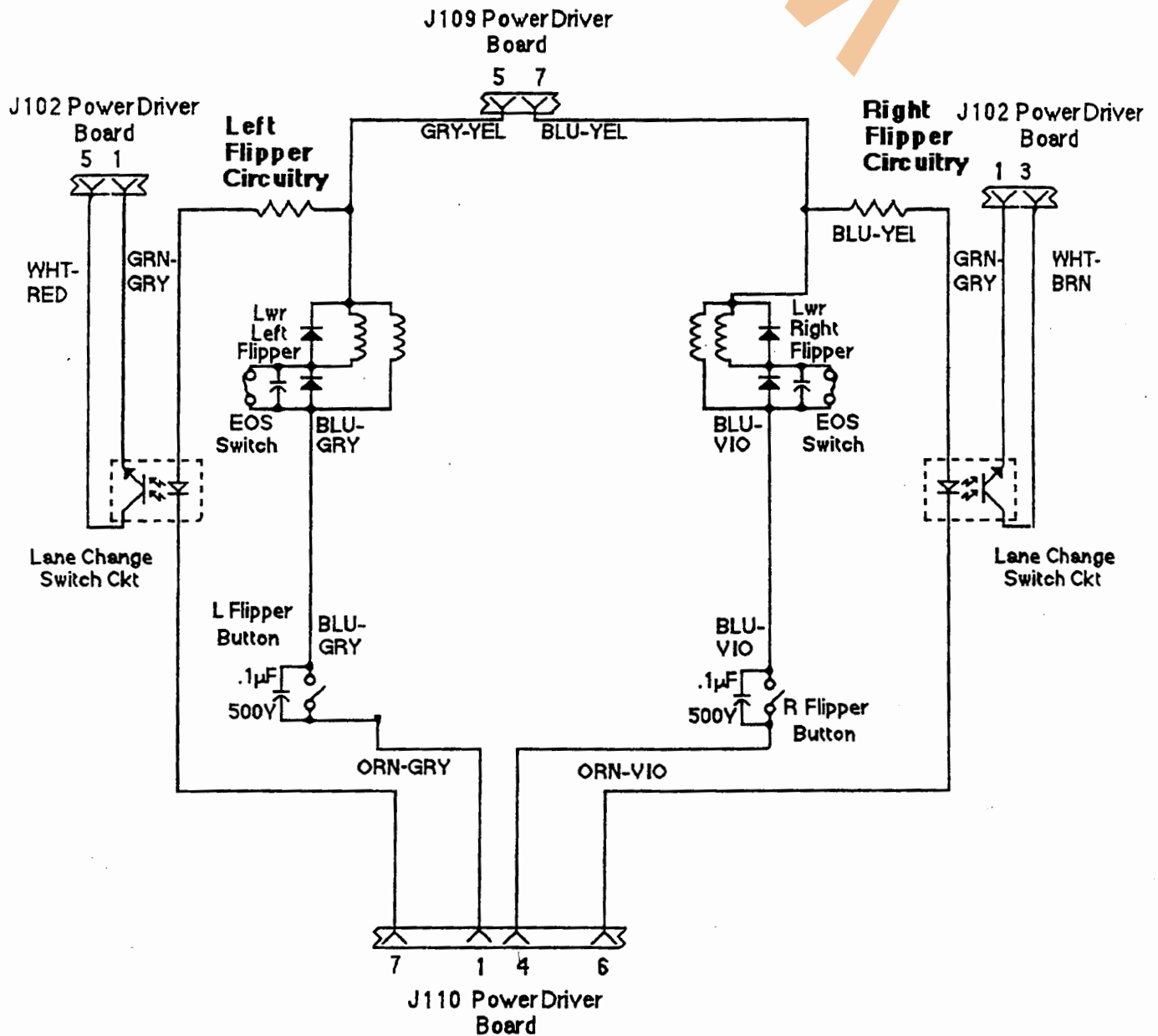
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# **Section 3**

## ***Wiring Diagrams and Schematics***

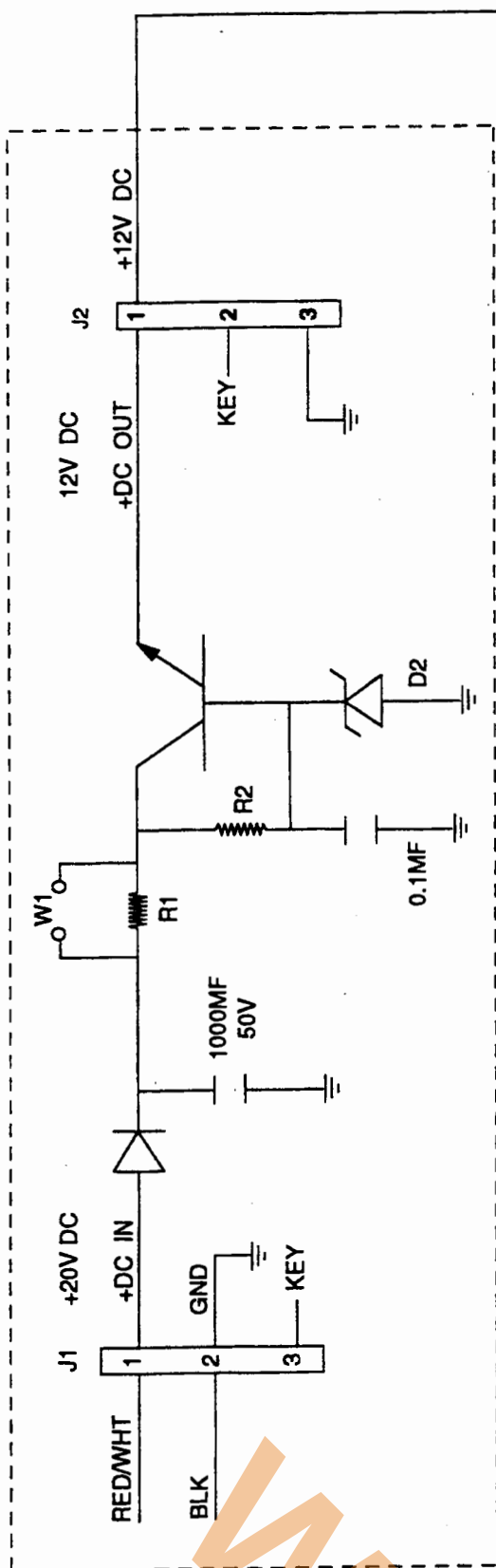
- ***Diagrams & Schematics***

**Flipper Wiring**  
**Relay Assy. & Motor Regulator Board**  
**Coin Interface Board**  
**Solenoid Wiring**  
**Chase Light Wiring**  
**Power Wiring**  
**CPU Board**  
**Display Driver Board**  
**Sound Board**  
**Power Driver Board**  
**Backbox Wiring**  
**Interboard Wiring**

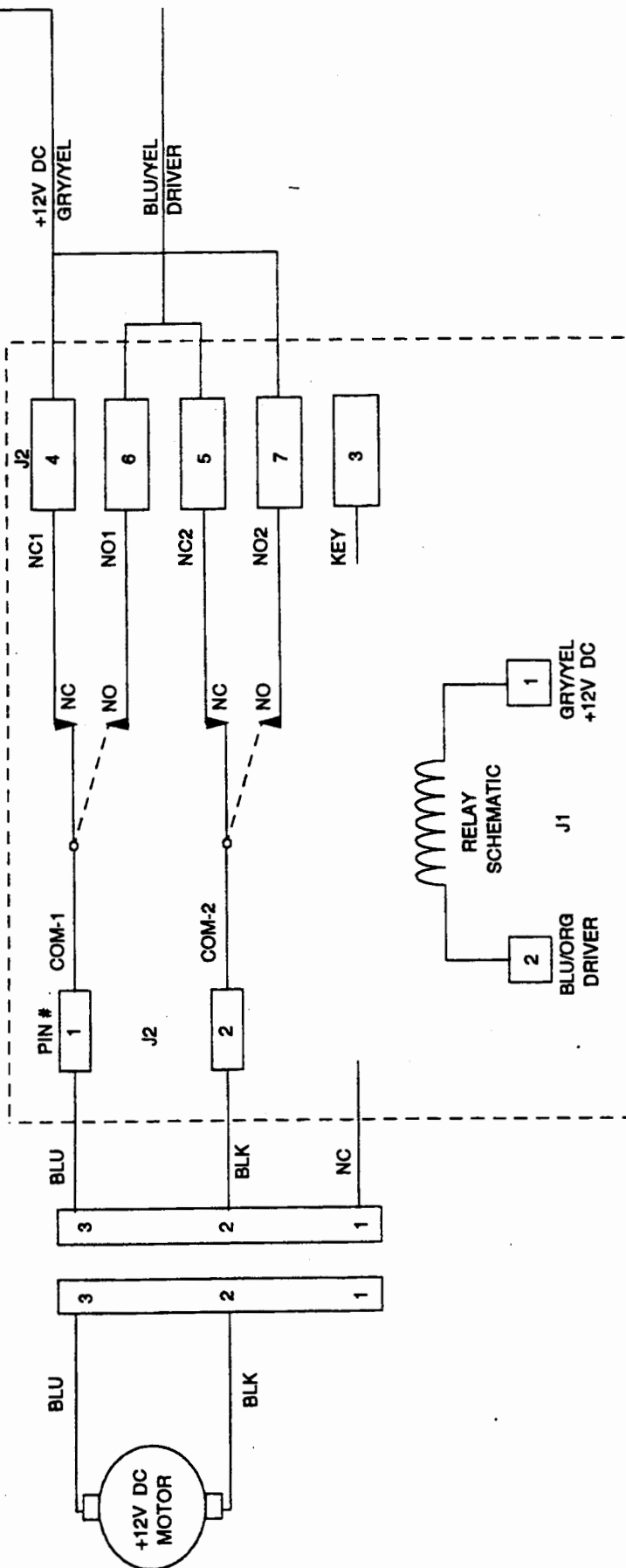


# MOTOR REGULATOR BOARD

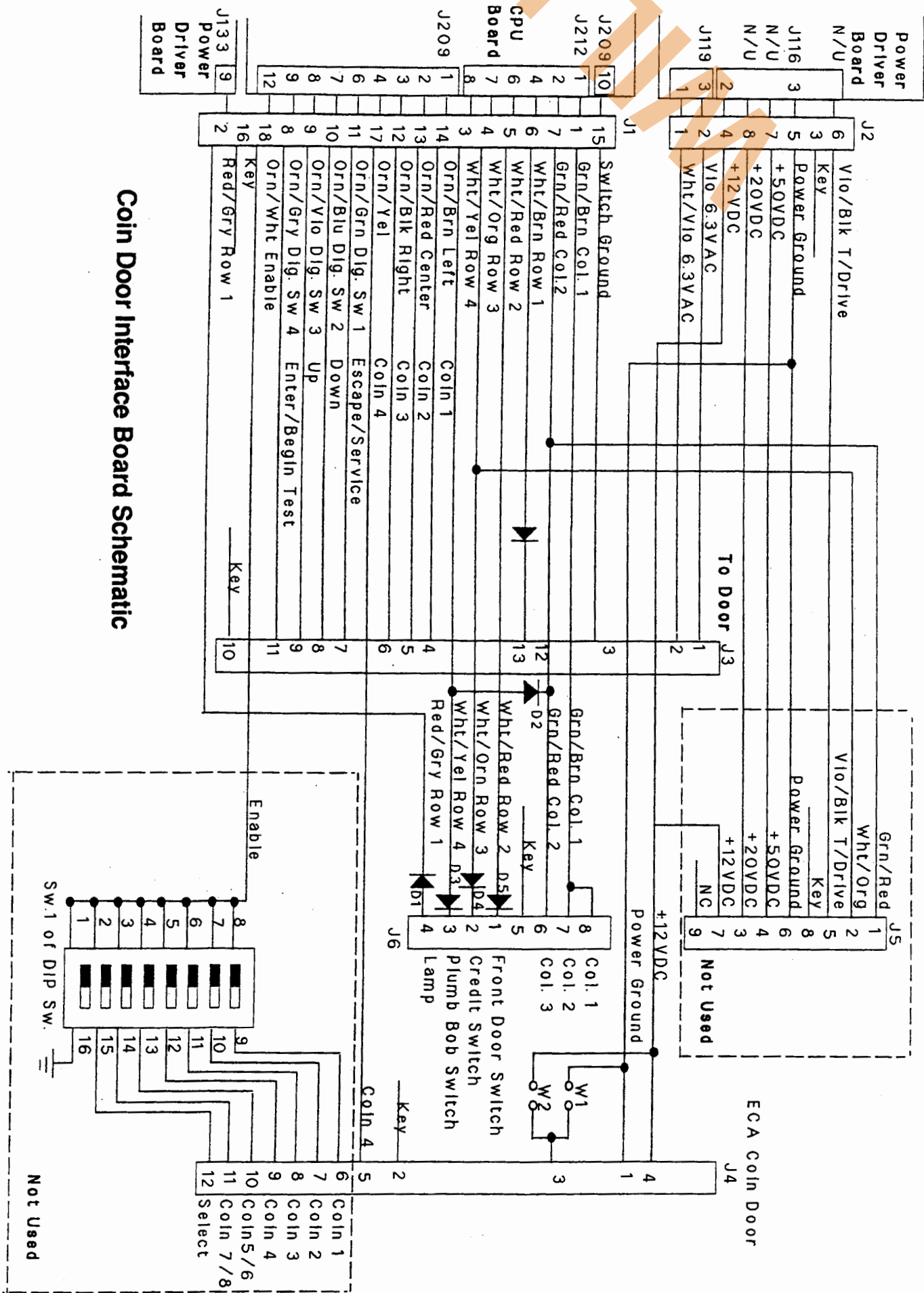
A-13892-2



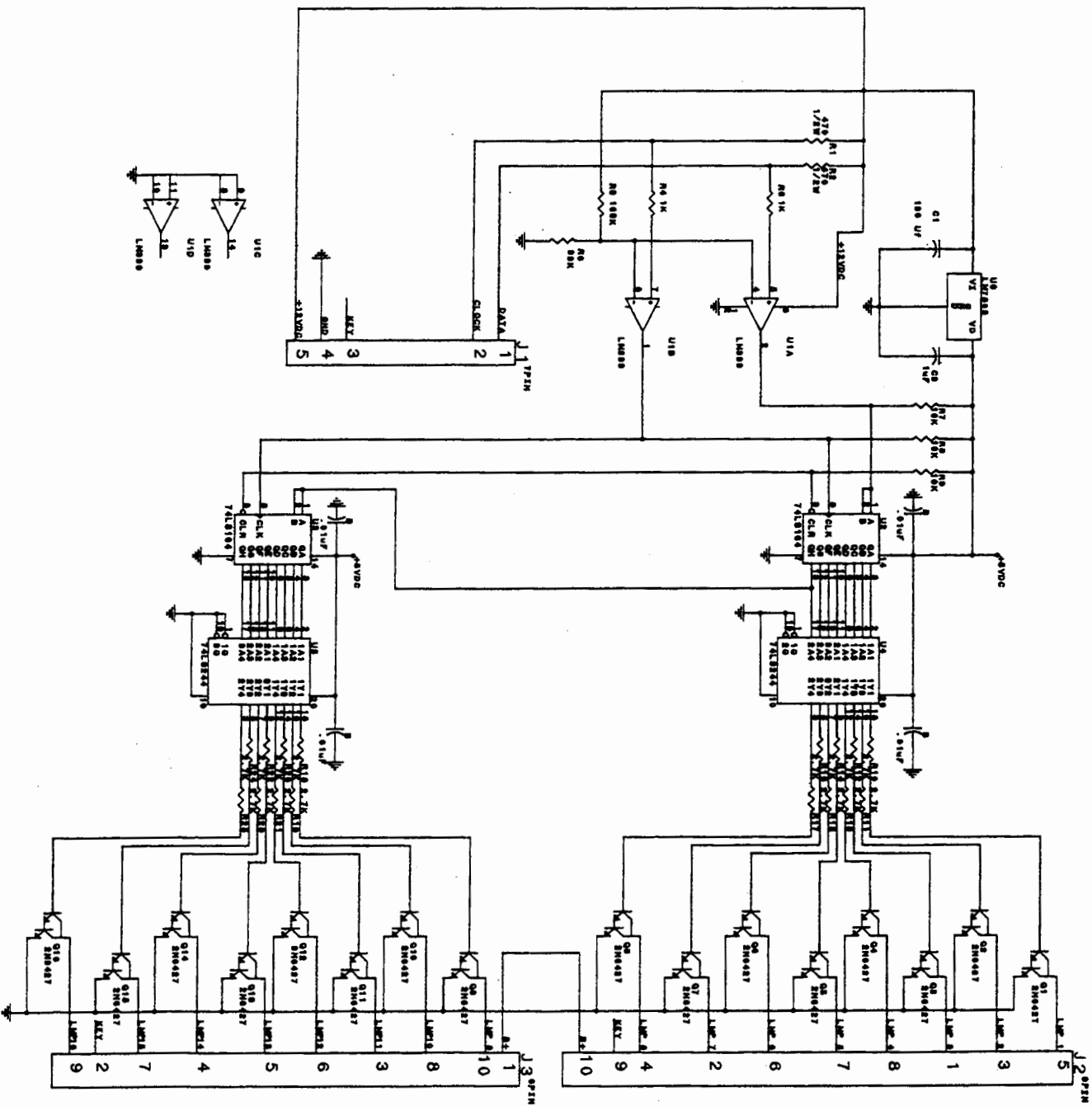
## RELAY ASSEMBLY A-14423-1



# Coin Door Interface Board Schematic







|                                                                                                                                                                  |         |          |        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|--------|
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| DESIGNED BY                                                                                                                                                      | DATE    | REVISION | BY     |
| M. JAYSWAT                                                                                                                                                       | 50002   | 1-1-71   | 1/1/71 |
| CHASE LIGHT                                                                                                                                                      | A-14007 | REV 2    | REV 2  |
| WILLIAMS ELECTRONIC INDUSTRIES, INC. 6661 N. GALT OAK AVE. BIRMINGHAM, AL. 35210                                                                                 |         |          |        |

# THE MACHINE Lamp Matrix

Yellow (B+) → Red

| Column<br>Row | 1<br>Yellow-<br>Brown | 2<br>Yellow-<br>Red    | 3<br>Yellow-<br>Orange | 4<br>Yellow-<br>Black | 5<br>Yellow-<br>Green | 6<br>Yellow-<br>Blue | 7<br>Yellow-<br>Violet | 8<br>Yellow-<br>Gray |
|---------------|-----------------------|------------------------|------------------------|-----------------------|-----------------------|----------------------|------------------------|----------------------|
| 1 Red-Brown   | Left Outlane          | Circle Lite Jackpot    | Circle 250K            | Skill Shot 50K        | Left Loop 500K        | Right Ramp 100K      | Jackpot 8 Million      | Backglass Hip        |
| 2 Red-Black   | Left Return Lane      | Circle Lite Billion    | Circle 10 Million      | Skill Shot 75K        | Left Loop 100K        | Right Ramp 500K      | Jackpot 7 Million      | Backglass Middle leg |
| 3 Red-Orange  | Right Return Lane     | Circle Extra Ball      | Circle 50 Million      | Skill Shot 100K       | Left Loop 50K         | Right Ramp Million   | Jackpot 6 Million      | Backglass Knee       |
| 4 Red-Yellow  | Right Outlane         | Circle Lite Extra Ball | Circle Special         | Skill Shot 200K       | Left Loop 25K         | Wire Ball Lock       | Jackpot 5 Million      | Backglass Foot       |
| 5 Red-Green   | Left Standup          | Circle 500K            | Circle 5 Million       | Skill Shot 25K        | Right Loop 500K       | Jet Enter 500K       | Jackpot 4 Million      | Backglass Shoulder   |
| 6 Red-Blue    | Right Top Standup     | Circle 100K            | Circle 1 Million       | Head Left Eye         | Right Loop 100K       | Jet Enter 100K       | Jackpot 3 Million      | Mini Playfield 100K  |
| 7 Red-Violet  | Right Bottom Standup  | Values Doubled         | Space Shuttle          | Head Right Eye        | Right Loop 50K        | Jet Enter 50K        | Jackpot 2 Million      | Mini Playfield 200K  |
| 8 Red-Gray    | Shoot Again           | Spin Small Wheel       | Launch Pad             | Head Mouth            | Right Loop 25K        | Jet Enter 25K        | Jackpot 1 Million      | Mini Playfield 300K  |

# THE MACHINE Switch Matrix

White → Green

| Dedicated Grounded Switches                                                   | Column<br>Row  | 1<br>Green-<br>Brown | 2<br>Green-<br>Red | 3<br>Green-<br>Orange | 4<br>Green-<br>Yellow    | 5<br>Green-<br>Black   | 6<br>Green-<br>Blue | 7<br>Green-<br>Violet | 8<br>Green-<br>Gray |
|-------------------------------------------------------------------------------|----------------|----------------------|--------------------|-----------------------|--------------------------|------------------------|---------------------|-----------------------|---------------------|
| Orange-Brown (1)<br>Left Coin Chute                                           | 1 White-Brown  | Right Flipper        | Slam Tilt          | Skill Shot 50K        | Right Ramp Made          | Spinner                | Not Used            | Wireform Top          |                     |
| Orange-Red (2)<br>Center Coin Chute                                           | 2 White-Red    | Left Flipper         | Coin Door Closed   | Skill Shot 75K        | Not Used                 | Shooter                | Not Used            | Wireform Bottom       |                     |
| Orange-Black (3)<br>Right Coin Chute                                          | 3 White-Orange | Start Button         | Ticket Opto        | Skill Shot 100K       | Left Loop                | Upper Right Jet Bumper | Head Left Eye       | Enter Mini Playfield  |                     |
| Orange-Yellow (4)<br>4th Coin Chute                                           | 4 White-Yellow | Plumb Bob Tilt       | Always Closed      | Skill Shot 200K       | Right Loop Top           | Upper Left Jet Bumper  | Head Right Eye      | Mini Exit Left        |                     |
| Orange-Green (5)<br>Normal Function   Test Function<br>Service Escape Credits | 5 White-Green  | Left Outlane         | Right Trough       | Skill Shot 25K        | Right Loop Bottom        | Lower Jet Bumper       | Head Mouth          | Mini Exit Right       |                     |
| Orange-Blue (6)<br>Normal Function   Test Function<br>Volume Down             | 6 White-Blue   | Left Flipper Lane    | Center Trough      | Right Top Standup     | Under Playfield Kickback | Jet Bumper Sling       | Not Used            | Left Ramp Enter       |                     |
| Orange-Violet (7)<br>Normal Function   Test Function<br>Volume Up             | 7 White-Violet | Right Flipper Lane   | Left Trough        | Right Bottom Standup  | Enter Head               | Left Slingshot         | Face Position       | Right Ramp Enter      |                     |
| Orange-Gray (8)<br>Normal Function   Test Function<br>Begin Enter Test        | 8 White-Gray   | Right Outlane        | Left Standup       | Outhole               | Not Used                 | Right Slingshot        | Not Used            | Not Used              |                     |