

**FIRE!**

WILLIAMS®

**INSTRUCTION MANUAL**

## FIRE! ROM and Jumper Table

| Game           | System 11A<br>CPU Rev. | P/N - U15<br>Game µP | P/N - U27<br>G. ROM 1 | P/N - U26<br>G. ROM 2 | P/N - U21<br>S. ROM 1 | P/N - U22<br>S. ROM 2 | P/N - U24<br>Sound µP | Jumpers                                           |
|----------------|------------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------------------------------|
| PIN-BOT        | - , A                  | 5400-09150-00        | A-5343-549-2          | A-5343-549-1          | A-5343-549-4          | A-5343-549-3          | 5400-09150-00         | W1, 2, 4, 5, 7, 8, 11, 12, 13, 14, 16, 17, and 18 |
| TIC TAC STRIKE | - , A                  |                      | Not Used              | A-5343-1919-1         | A-5343-1919-3         | A-5343-1919-2         |                       | W1, 2, 4, 5, 7, 8, 11, 12, 13, 14, 16, 17, and 18 |
| MILLIONAIRE    | - , A                  |                      | A-5343-555-2          | A-5343-555-1          | A-5343-555-4          | A-5343-555-3          |                       | W1, 2, 4, 5, 7, 8, 11, 12, 13, 14, 16, 17, and 18 |
| F-14 TOMCAT    | - , A                  |                      | A-5343-554-2          | A-5343-554-1          | A-5343-555-4          | A-5343-554-3          |                       | W1, 2, 4, 5, 7, 8, 11, 12, 13, 14, 16, 17, and 18 |
| FIRE!          | - , A                  |                      | A-5343-556-2          | A-5343-556-1          | A-5343-556-4          | A-5343-556-3          |                       | W1, 2, 4, 5, 7, 8, 11, 12, 13, 14, 16, 17, and 18 |

## FIRE! Solenoid Table

| Sol. No.         | Function                       | Solenoid Type | Wire Color           | Connections |                                        | Driver Trans. | Solenoid Part Number Flashlamp Type |               |
|------------------|--------------------------------|---------------|----------------------|-------------|----------------------------------------|---------------|-------------------------------------|---------------|
|                  |                                |               |                      | CPU Bd.     | Playfield/Cabinet                      |               | b = Backbox                         | p = Playfield |
| 01A <sup>3</sup> | Outhole Kicker                 | Switched      | {Vio-Brn}            | 1P11-1      | 8P3-1 (to B1 on Diode Sw. Bd.)         | Q33           | AE-23-800-01                        |               |
| 01C <sup>3</sup> | L. Rescue & 3-Bank Flashers    | Switched      | {Blk-Brn}            | (Gry-Brn)   |                                        | Q33           | #89 flashlamps                      | 4p            |
| 02A <sup>3</sup> | Ball Shooter Lane Feeder       | Switched      | {Vio-Red}            | 1P11-3      | 8P3-2 (to B2 on Diode Sw. Bd.)         | Q25           | AE-23-800-03                        |               |
| 02C <sup>3</sup> | R. Rescue & 3-Bank Flashers    | Switched      | {Blk-Red}            | (Gry-Red)   |                                        | Q25           | #89 flashlamps                      | 4p            |
| 03A <sup>3</sup> | Left Ramp Raise                | Switched      | {Vio-Orn}            | 1P11-4      | 8P3-3 (to B3 on Diode Sw. Bd.)         | Q32           | AE-24-900-02                        |               |
| 03C <sup>3</sup> | Center Ramp Flashers           | Switched      | {Blk-Orn}            | (Gry-Orn)   |                                        | Q32           | #89 flashlamps                      | 2p            |
| 04A <sup>3</sup> | Left Ramp Lower                | Switched      | {Vio-Yel}            | 1P11-5      | 8P3-4 (to B4 on Diode Sw. Bd.)         | Q24           | SM-26-600-DC                        |               |
| 04C <sup>3</sup> | Window & FIRE Flashers         | Switched      | {Blk-Yel}            | (Gry-Yel)   |                                        | Q24           | #89 flashlamps                      | 2p            |
| 05A <sup>3</sup> | Fireplug                       | Switched      | {Vio-Grn}            | 1P11-6      | 8P3-5 (to B5 on Diode Sw. Bd.)         | Q31           | AE-23-800-06                        |               |
| 05C <sup>3</sup> | Right Ramp Lower               | Switched      | {Blk-Grn}            | (Gry-Grn)   |                                        | Q31           | SM-26-600-DC                        |               |
| 06A <sup>3</sup> | Right Lock-up                  | Switched      | {Vio-Blu}            | 1P11-7      | 8P3-6 (to B6 on Diode Sw. Bd.)         | Q23           | AE-23-800-02                        |               |
| 06C <sup>3</sup> | Lwr L. 3-Bank & L. B'box Flash | Switched      | {Blk-Blu}            | (Gry-Blu)   |                                        | Q23           | #89 flashlamps                      | 2b,1p         |
| 07A <sup>3</sup> | Right Ramp Raise               | Switched      | {Vio-Blk}            | 1P11-8      | 8P3-7 (to B7 on Diode Sw. Bd.)         | Q30           | AE-24-900-02                        |               |
| 07C <sup>3</sup> | Lwr R. 3-Bank & R. B'box Flash | Switched      | {Blk-Vio}            | (Gry-Vio)   |                                        | Q30           | #89 flashlamps                      | 2b,1p         |
| 08A <sup>3</sup> | Knocker (or Ticket Dispenser)  | Switched      | {Vio-Gry}            | 1P11-9      | 8P3-8 (to B8 on Diode Sw. Bd.)         | Q22           | AE-23-800-03                        |               |
| 08C <sup>3</sup> | Bell                           | Switched      | {Blk-Gry}            | (Gry-Blk)   |                                        | Q22           | AE-23-800-02                        |               |
| 09               | Center Ramp Motor              | Controlled    | Brn-Blk              | 1P12-1      | 8P3-9                                  | Q17           | 5580-12145-00 <sup>4</sup>          |               |
| 10               | General Illum. (Playfield)     | Controlled    | Brn-Red              | 1P12-2      | 8P3-10                                 | Q9            | 5580-12145-00 <sup>4</sup>          |               |
| 11               | General Illum. (Backbox)       | Controlled    | Brn-Orn              | 1P12-4      | 6P3-5                                  | Q16           | 5580-12145-00 <sup>4</sup>          |               |
| 12               | Solenoid A/C Select Relay      | Controlled    | Brn-Yel              | 1P12-5      | 8P3-12                                 | Q8            | 5580-12145-00 <sup>4</sup>          |               |
| 13               | Flames/Motor Relay (P'fid)     | Controlled    | Brn-Grn              | 1P12-6      | 8P3-13                                 | Q15           | 5580-12145-00 <sup>4</sup>          |               |
| 14               | Flames Flasher (B'box)         | Controlled    | Brn-Blu              | 1P12-7      | 8P3-14                                 | Q7            | #89 flashlamps                      |               |
| 15               | Left Kickbig                   | Controlled    | Brn-Vio              | 1P12-8      | 8P3-15                                 | Q14           | AE-23-800-03                        |               |
| 16               | Window Lites Relay             | Controlled    | Brn-Gry              | 1P12-9      | 8P3-16                                 | Q6            | 5580-12145-00 <sup>4</sup>          |               |
| 17               | Not Used                       | Special #1    | Blu-Brn              | 1P19-7      | 8P3-17                                 | Q75           |                                     |               |
| 18               | Not Used                       | Special #2    | Blu-Red              | 1P19-4      | 8P3-18                                 | Q71           |                                     |               |
| 19               | Upper Left Kicker              | Special #3    | Blu-Orn              | 1P19-3      | 8P3-19                                 | Q73           | AE-24-900-02                        |               |
| 20               | Upper Right Kicker             | Special #4    | Blu-Yel              | 1P19-6      | 8P3-20                                 | Q69           | AE-24-900-02                        |               |
| 21               | Lower Left Kicker              | Special #5    | Blu-Grn              | 1P19-8      | 8P3-21                                 | Q77           | AE-23-800-03                        |               |
| 22               | Lower Right Kicker             | Special #6    | Blu-Blk              | 1P19-9      | 8P3-22                                 | Q79           | AE-23-800-03                        |               |
| -                | Right Flipper                  | -             | Orn-Vio<br>[Blu-Vio] | 1P19-1      | 7P1-15<br>[7P1-16,8P3-34] <sup>2</sup> | -             | FL11630-50VDC                       |               |
| -                | Left Flipper                   | -             | Orn-Gry<br>[Blu-Gry] | 1P19-2      | 7P1-18<br>[7P1-19,8P3-32] <sup>2</sup> | -             | FL11630-50VDC                       |               |

**Notes:** 1. Wire colors, except flipper Orn-Vio and Orn-Gry, are ground connections (to coil terminal with unbanded end of diode). Flipper Orn-Vio and Orn-Gry wires connect from CPU Board to flipper switch. 2. Flipper connections shown in braces are from flipper switch to flipper coil. 3. "A" coils are pulsed, when Sol. 12 is de-energized; "C" coils are pulsed, with Sol. 12 energized. Wire colors in brackets are those from respective A and C terminals corresponding to the B terminal connection listed for the Diode Switching Board, which controls the device pulsing by Sol. 12. 4. Relay (p/n 5580-12145-00) is mounted on Relay Bd. p/n C-11677-2 or C-11677-3.



# ***FIRE!*** <sup>TM</sup>



## **GAME PLAY - SCORING FEATURES**

Each feature has an assigned value. Fire(s) break out at random, and you must put out the fire as quickly as possible, by completing the bank or making the lit shot. Putting out each fire scores its assigned value times the *FIRE Multiplier* – X10 - X7 - X5 - X3 - X2, if any.

When the first fire(s) start(s), the X10 *FIRE Multiplier* starts flashing for a timed interval. Put-out the fire(s) before the time runs out scores the assigned value X10. If time runs out, the *FIRE Multiplier* drops down one level, and another fire (or fires) breaks out. If the *FIRE Multiplier* timer runs out 5 times before all fires are out, you lose all *FIRE Multipliers*, until all fires are out.

Each fire you put out advances the Outhole Bonus, which has a range from 1,000 to 99,000, and appears in the player score displays.

### **BONUS X & SPECIAL & FIREPLUG**

Making the upper Horseshoe shot in the lit direction advances the BONUS X 2X - 3X - 4X - 5X - 10X and lights Outlanes alternately for SPECIAL. Making upper Horseshoe any time raises Fireplug for a timed interval.

### **Multi-Ball<sup>TM</sup>**

Making either group of lower 3-Bank targets lowers a Ramp to enable a "Second Floor" shot to lock up a ball (trap a fireman). Locking two balls lights the 'under ramp' shots to raise the "Hook & Ladder" Ramp for RESCUE shot and start 3-ball Multi-Ball<sup>TM</sup>, when RESCUE shot is made. Also, Making a Bonus Multiplier raises the center ramp for a timed interval to trap a fireman. WEST SIDE lit means the ball is locked on the left side; EAST SIDE lit means the ball is locked on the right side.

### **Rescue Ramp Targets**

Hit the Lady and Baby Target at the top of the Rescue Ramp TWICE within the time limit to 'save' them. Do this on both sides to light the EXTRA BALL alternately. Hit the ramp target once more to score EXTRA BALL.

### **1 MILLION**

During Multi-Ball<sup>TM</sup>, a "Five Alarm Fire" breaks out, in which all Buildings and Alleys are burning (flashing). Putting out all fires, while at least two balls are on the playfield, scores 1 MILLION!

### **PLUNGER SHOT**

Plunger shot shoots the ball up the shooter lane...for different point values— 20,000 - 10,000 - 30,000 - 100,000 - 5,000 - 1000 for button. For 100,000 SKILL SHOT, try to hit 100,000 rollover switch without going past it.

# Contents

## Section 1 - Game Operation & Test Information

|                                                                                      |     |
|--------------------------------------------------------------------------------------|-----|
| <i>FIRE!</i> (System 11A) ROM Summary . . . . .                                      | 1   |
| Connector Identification . . . . .                                                   | 2   |
| <i>FIRE!</i> Circuit Boards . . . . .                                                | 2   |
| <i>FIRE!</i> Game Control Locations . . . . .                                        | 2   |
| Pinball Game Assembly Instructions . . . . .                                         | 3   |
| Figure 1. Pinball Assembly, Playfield Pitch Angle, and Leg Leveler Details . . . . . | 3   |
| Game Operation . . . . .                                                             | 4   |
| <i>FIRE!</i> Game Status Displays . . . . .                                          | 6   |
| <i>FIRE!</i> Audit Table . . . . .                                                   | 7   |
| <i>FIRE!</i> Game Adjustment Table . . . . .                                         | 8-9 |
| Game Adjustment Procedure . . . . .                                                  | 10  |
| Items 01 - 05. . . . .                                                               | 11  |
| 06 - 11. . . . .                                                                     | 12  |
| 12 - 18. . . . .                                                                     | 13  |
| 19 - 26. . . . .                                                                     | 14  |
| 27 - 34. . . . .                                                                     | 15  |
| 35 - 40. . . . .                                                                     | 16  |
| 41 - 48. . . . .                                                                     | 17  |
| 49 - 52. . . . .                                                                     | 18  |
| 53 - 54. . . . .                                                                     | 19  |
| 55 - 58. . . . .                                                                     | 20  |
| 59 - 63. . . . .                                                                     | 21  |
| 64 - 68. . . . .                                                                     | 22  |
| 69 - 70. . . . .                                                                     | 23  |
| Game Adjustment Setting Comparison Table . . . . .                                   | 23  |
| Resetting the High Scores. . . . .                                                   | 24  |
| Game Pricing . . . . .                                                               | 24  |
| Pricing Table. . . . .                                                               | 25  |
| Test/Diagnostic Procedures. . . . .                                                  | 26  |
| Music Test. . . . .                                                                  | 26  |
| Display Test. . . . .                                                                | 26  |
| Sound Test. . . . .                                                                  | 26  |
| Lamp Tests . . . . .                                                                 | 27  |
| <i>FIRE!</i> Lamp-Matrix Table. . . . .                                              | 27  |
| Solenoid Test . . . . .                                                              | 28  |
| <i>FIRE!</i> Solenoid Table . . . . .                                                | 28  |
| Special and Controlled Solenoids - Diagrams and Details. . . . .                     | 29  |
| Figure 2. Typical Solenoid A/C Select Relay Circuit. . . . .                         | 29  |
| Switch Tests . . . . .                                                               | 30  |
| <i>FIRE!</i> Switch-Matrix Table . . . . .                                           | 30  |
| Ending the Diagnostic Test . . . . .                                                 | 31  |
| Auto Burn-in Mode . . . . .                                                          | 31  |
| System-11A Memory Chip Test . . . . .                                                | 32  |
| CPU LED Indicator Codes Table . . . . .                                              | 32  |
| System-11A Sound Circuitry Tests . . . . .                                           | 32  |
| Fuse Listing. . . . .                                                                | 33  |
| Maintenance Information. . . . .                                                     | 34  |
| Figure 3. Adjustments and Lubrication Points, Ball Shooter Lane Feeder . . . . .     | 34  |
| Solder Warning. . . . .                                                              | 34  |

# Contents

## Section 2 - Game Parts Information

|                                                                          |         |
|--------------------------------------------------------------------------|---------|
| Player Score Display Panels & Segments Diagrams . . . . .                | 36      |
| Alphanumeric Display Unit Board (D-11610) Parts List . . . . .           | 36      |
| D-8345 Power Supply Board . . . . .                                      | 37      |
| System 11A CPU Board Parts Layout and Parts Listing . . . . .            | 38 - 39 |
| Audio Board Assembly (D-11581-556) . . . . .                             | 40      |
| Bonus Lamp PCB Assembly (C-11718) . . . . .                              | 41      |
| Multiplier Lamp PCB Assembly (C-11740) . . . . .                         | 41      |
| Left Lamp PCB Assembly (C-11751) Parts List . . . . .                    | 41      |
| Right Lamp PCB Assembly (C-11759) Parts List . . . . .                   | 41      |
| Solenoid A/C Diode Board Assembly (C-11702) . . . . .                    | 41      |
| Relay PCB Assembly (C-11677-2) . . . . .                                 | 42      |
| Relay PCB Assembly (C-11677-3) . . . . .                                 | 42      |
| Flasher Lamp Resistor Assembly (B-11263, B-11263-1, B-11263-2) . . . . . | 42      |
| Bell Assembly (C-11706) and Associated Parts Listing . . . . .           | 43      |
| Backbox Parts Listing . . . . .                                          | 43      |
| Miscellaneous FIRE! Parts . . . . .                                      | 43      |
| Flipper Assemblies (C-11626-R-4 and C-11626-L-4) . . . . .               | 44      |
| Ball Shooter Lane Feeder & Right Eject Hole (Lockup), C-9638 . . . . .   | 45      |
| Fireplug Assembly (C-11661) . . . . .                                    | 45      |
| Ball Trough Switch Assembly Parts . . . . .                              | 46      |
| Standup Target Assembly . . . . .                                        | 46      |
| Ramp Target Assembly . . . . .                                           | 46      |
| Playfield Pivot Parts . . . . .                                          | 46      |
| Ramp Lifting Mechanism (B-11304 and associated parts) . . . . .          | 47      |
| Ball Kicker Assemblies . . . . .                                         | 48      |
| Flames Tube Assembly ( B-11492) . . . . .                                | 49      |
| Flames Lamps Assembly ( B-11715) . . . . .                               | 49      |
| "Window" & Awning Assembly (B-11501) . . . . .                           | 49      |
| Ladder Ramp Motor Assembly (B-11486) . . . . .                           | 49      |
| Switches . . . . .                                                       | 50      |
| Switch Matrix Diagram and Typical Switch Circuit . . . . .               | 51      |
| Lamp Matrix Diagram and Typical Lamp Circuit . . . . .                   | 52      |
| Lamps . . . . .                                                          | 53      |
| Solenoids/Flashers & Rubber Parts . . . . .                              | 54      |
| Playfield Parts . . . . .                                                | 55      |
| Playfield Circuit Boards Locations . . . . .                             | 56      |

## Section 3 - Reference Diagrams & Schematics

|                                                                     |    |
|---------------------------------------------------------------------|----|
| Cabinet Wiring Diagram . . . . .                                    | 58 |
| Solenoids and Special Switches Control Diagram . . . . .            | 59 |
| Alphanumeric Display Unit Board Schematic . . . . .                 | 60 |
| Audio Board Schematic . . . . .                                     | 61 |
| Interboard Signals Diagrams . . . . .                               | 62 |
| Schematic, System 11A CPU (16-8993, Sheet 1 of 4) . . . . .         | 63 |
| Schematic, System 11A CPU (16-8993, Sheet 2 of 4) . . . . .         | 64 |
| Schematic, System 11A CPU (16-8993, Sheet 3 of 4) . . . . .         | 65 |
| Schematic, System 11A CPU (16-8993, Sheet 4 of 4) . . . . .         | 66 |
| Power Wiring Diagram . . . . .                                      | 67 |
| D-8345 Power Supply Schematic . . . . .                             | 68 |
| 7-digit 7-segment Display Glass (5670-09439-00) Schematic . . . . . | 68 |

# Section 1

## Game Operation & Test Information

- ***FIRE!* (System 11A) ROM Summary**
- **Pinball Game Assembly Instructions**
- **Game Play**
- **Game Status Displays**
- **Game Adjustment Procedure**
- **Game Pricing**
- **Test/Diagnostic Procedures**

### ***FIRE!* (System 11A) ROM Summary**

| IC                 | DESCRIPTION | TYPE  | IDENTIFIER | BOARD | PART NUMBER  |
|--------------------|-------------|-------|------------|-------|--------------|
| Game ROM 1         | 32K x 8 ROM | 27256 | U27        | CPU   | A-5343-556-2 |
| Game ROM 2         | 16K x 8 ROM | 27128 | U26        | CPU   | A-5343-556-1 |
| Sound ROM 1        | 32K x 8 ROM | 27256 | U21        | CPU   | A-5343-556-4 |
| Sound ROM 2        | 32K x 8 ROM | 27256 | U22        | CPU   | A-5343-556-3 |
| Music/Speech ROM 1 | 32K x 8 ROM | 27256 | U4         | Audio | A-5343-556-5 |

#### ***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 IDENTIFICATION

WILLIAMS ELECTRONICS GAMES uses a special technique to identify connectors. Each plug or jack receives a prefix number (which identifies the circuit board), a letter, and a number. J-designations refer to the male part of a connector. P-designations refer to the female part of a connector. For example, 1J1 designates jack 1 of board 1 (a CPU Board jack); 3P6 designates plug 6 of board 3 (a Power Supply 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, 1J1-3 refers to pin 3 of jack 1 on board 1.

## FIRE! CIRCUIT BOARDS

*FIRE!'s* System 11A Circuit Boards are in the backbox. They are accessible by removing the backbox glass, unlatching the insert board, and swinging it open.

**CPU BOARD.** The System 11A CPU Board (p/n D-11392-556) must be equipped with the ROMs specified in the *FIRE!* (System 11A) ROM Summary. For this ROM complement and CPU Board, jumpers W1, W2, W4, W5, W7, W8, W11, W12, W13, W14, W16, W17, and W18 must be connected. (Jumper W7 is cut/removed for West German games.)

**AUDIO BOARD.** The Audio Board is p/n D-11581-556, as supplied with ROMs and micro-processor.

**DISPLAY BOARD.** The Alphanumeric Display Unit Board is p/n D-11609.

**POWER SUPPLY BOARD.** The Power Supply Board is p/n D-8345-554.

Prefix numbers for the System 11A circuit boards and other major assemblies are listed below. A prefix number may precede a component designator to identify the unit (e.g., connector 1J1).

|                          |                     |                           |
|--------------------------|---------------------|---------------------------|
| 1 - CPU                  | 6 - Backbox         | 11 - Audio                |
| 2 - (not assigned)       | 7 - Cabinet         | 12 - (not assigned)       |
| 3 - Backbox Power Supply | 8 - Playfield       | 13 - (not assigned)       |
| 4 - Alphanumeric Display | 9 - Insert Board    | 14 - (not assigned)       |
| 5 - (not assigned)       | 10 - (not assigned) | 15 - Flipper Power Supply |

## FIRE! GAME CONTROL LOCATIONS

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

The Volume Control is on the left inner wall of the cabinet on the tilt mechanisms board. It is accessible by opening the coin box door.

The Credit switch is a pushbutton to the left of the coin door on the cabinet exterior.

**GAME ADJUSTMENT/DIAGNOSTIC SWITCHES.** *FIRE!* allows the operator to program virtually all game adjustments, obtain bookkeeping information, and diagnose problems, using only three switches mounted on the inside of the coin door and the Credit button beside the coin door.

ADVANCE, AUTO-UP/MANUAL-DOWN, and HIGH-SCORE RESET are the switches located on the inside of the coin door. Refer to the Game Status Displays text and the Text/Diagnostic Procedures for details concerning their operation.

The Memory Protect switch is on the inside frame of the coin door. This interlock switch must be open to clear bookkeeping totals and to make game adjustments. It automatically opens, when the coin door opens.

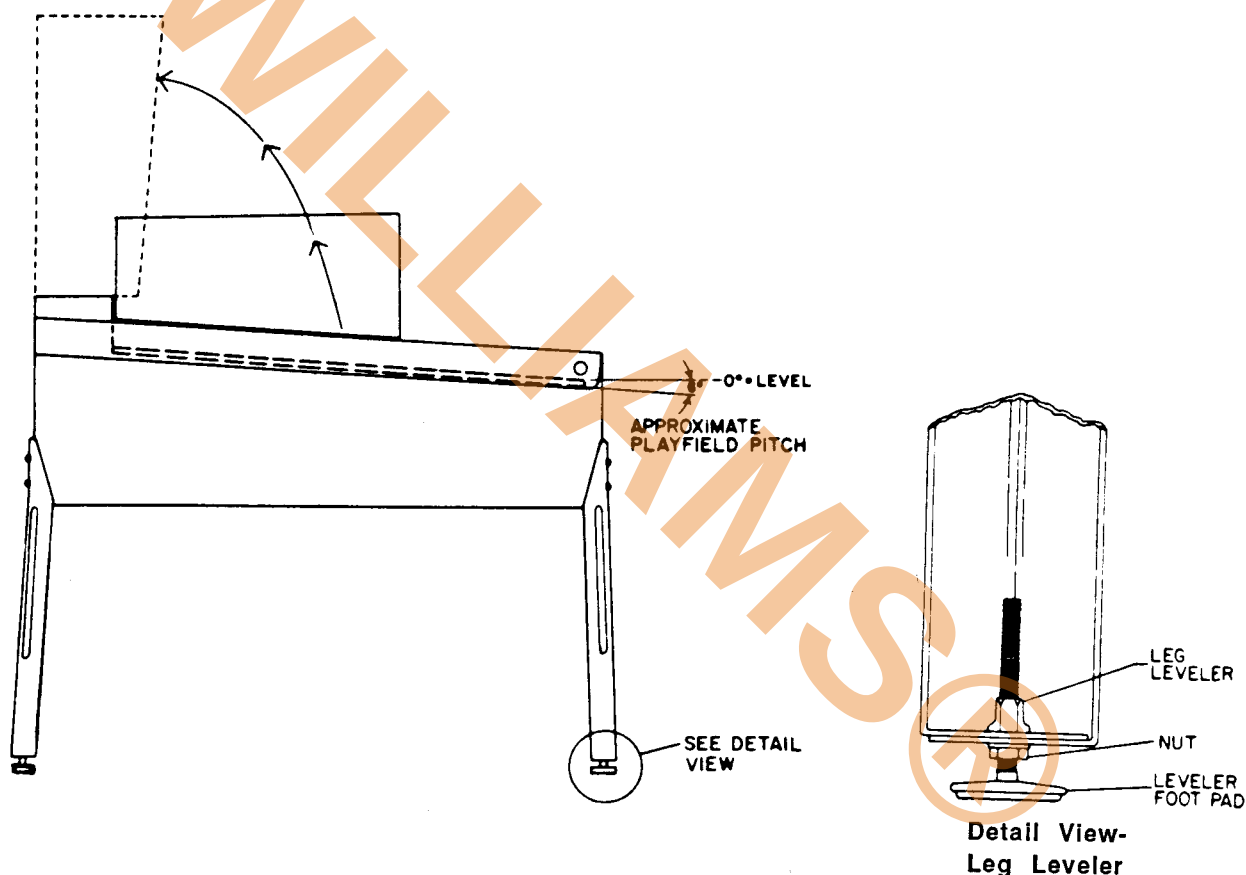
## ***FIRE!* GAME CONTROL LOCATIONS (Continued)**

The CPU Diagnostic switch (SW 2) is the lower switch (of the two switches mounted on the left edge of the CPU Board) near a large, socketed microprocessor chip. This switch initiates the Memory Chip Test explained in the Test/Diagnostic Procedures.

The Sound Diagnostic switch (SW 1) is the upper switch of the two mounted on the left edge of the CPU Board. This switch initiates the Sound Section Test. Refer to the Test/Diagnostic Procedures.

### **PINBALL GAME ASSEMBLY INSTRUCTIONS**

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



**Figure 1. Pinball Assembly, Playfield Pitch Angle, and Leg Leveler Details.**

4. Reach into the cabinet and backbox and check the mating of the interconnecting cables, matching several wire colors at each connector. Ensure that all connections are properly secure.

#### **CAUTION**

Ensure that the interconnecting cables are free to move (not kinked or pinched). Be careful not to damage wires at any stage of the assembly process.

## PINBALL GAME ASSEMBLY INSTRUCTIONS (Continued)

6. Raise the hinged backbox upright and stabilize it into position, using the clamp on the back of the cabinet and backbox. Unlock the backbox and remove the backbox glass, storing it carefully to avoid scratches. Remove the shipping block holding the Insert Board. Unlatch the Insert Board and open it, then lay the Speaker/Display Panel forward on the playfield cabinet. This allows access to the bolt holes used for securing the backbox upright. Install the mounting bolts and flat washers through the bottom holes of the backbox into the threaded fasteners in the cabinet to secure the backbox.

### WARNING

**NEVER** transport a pinball game with the hinged backbox erect. *Always* lower the backbox forward onto the playfield cabinet on a layer of protective material to prevent marring or damage and possible personal injury.

7. Extend each leg leveler *slightly* below the leg bottom, so that all four foot pads are extended about the same distance. Remove the cabinet from its support and place it on the floor.
8. Adjust the leg levelers for proper playfield level (side-to-side) *and* playfield pitch angle (incline) of approximately 6 degrees. (Again, 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 1.

### CAUTION

Playfield pitch angle adjustments can affect the operation of the ball-roll tilt and the plumb bob tilt, inside the cabinet. The operator should adjust these tilt mechanisms 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. (*FIRE!* uses 3 balls.)
11. Clean and re-install the playfield cover glass. Prepare the game for player operation.

## GAME OPERATION

### WARNING

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.** With the coin door closed, plug the game in, and switch it **ON**, using the On-Off switch. In normal operation, the player 1 score display initially shows 00. Then, the game goes into the Attract Mode (Playfield and backbox lamps flashing, sounds being heard, etc.).

Open the coindoor and press the AUTO-UP/MANUAL-DOWN switch to **MANUAL-DOWN**. Press the **ADVANCE** button to begin the game test routine. Return to **AUTO-UP** and perform the entire test to verify that the game is operating satisfactorily.

### NOTE

*FIRE!'s* **SYSTEM 11A** game program has a great capability to aid the operator and service personnel: At game Turn-On (and also when the operator is beginning the Test/Diagnostic Procedures), a display now signals when a switch has **NOT** been actuated during ball play for 60 balls (20 games). Up to three switches can be displayed during this Switch Problem reporting activity. Moreover, *FIRE!* compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep *FIRE!* earning good profits! More information is available in the Test/Diagnostic Procedures text describing the Switch Testing.

## GAME OPERATION (Continued)

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

- A. Recent highest scores\*;
- B. A "custom message"  
("ARE YOU FAST ... ENOUGH TO PUT... OUT ALL FIRES?")\*;
- 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 Credit button.

**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. However, after this maximum credits value is reached, posting of additional credits won (not purchased) by the player does *not* occur. ONLY posting of *purchased* credits occurs beyond the maximum credits value.

**STARTING A GAME.** Press the Credit button once. A startup sound plays, and the Credit amount shown in the player score display decreases by one. Player display 1 flashes 00 (until the first playfield switch is actuated), and the Player 4 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 Credit button once for each player, before the end of play on the first ball.

**TILT.** Actuating the Slam Tilt switch on the coin door inside the cabinet ends the current game; *FIRE!* then proceeds to the Game Over Mode. With the actuation of the ball-roll or playfield tilt switches, or 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 Match display. Credit\* may be awarded, when the last two digits of any player's score display (1 through 4) match the random digits of the Match display. 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.

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\* - operator-adjustable feature

## ***FIRE!* GAME STATUS DISPLAYS**

*FIRE!* provides the game owner/operator with a display of information concerning the game's bookkeeping and game play feature adjustments. Basically, three classes of information now become available in this status display mode: Id (Identification); Au (Audit); Ad (Adjustment). Each of the underscored two-letter abbreviations for these classes appears in the Player 3 score display, while the system microprocessor for the *FIRE!* game is displaying the items within each class.

### **Identification Information--Id**

With the game turned on, the coin door open, and the AUTO-UP/MANUAL-DOWN switch in the AUTO-UP position, the operator can press the ADVANCE switch once, briefly. *FIRE!*'s displays immediately change from the Attract Mode to the Game Status Display Mode. This is evident by the following display, shown in columnar form. The column headings refer to the various backbox displays.

| Player<br>1 | Player<br>2 | Player<br>3  | Player<br>4 |
|-------------|-------------|--------------|-------------|
| <b>FIRE</b> | <b>556</b>  | <b>Id 00</b> | <b>L-x*</b> |

\* x - indicates ROM revision level; e.g., 1 is initial issue; 2, 3, etc. for later revisions.

The game is named in the player 1 score display. The game's identification number shows in the player 2 score display and the ROM revision level appears in the player 4 display. The player 3 score display shows the status display mode in abbreviated form, *Id*. The player 3 score display also shows the status display mode item (00) for this particular display.

Pressing ADVANCE once more causes the **Id 01** display to appear. This display describes which of the "Install" options is currently in effect. For example, if the YES option of the INSTALL FACTORY Adjustment Item (Ad 70) was last selected, **FACTORY SETTING** appears on the player score displays. Changing the setting of any other game adjustment item, after selecting the YES option for Ad 70 causes the display to change to **FACTORY ALTERED**. Similarly, if the operator selects the YES option for INSTALL HARD (Ad 65), the display indicates **HARD SETTING**. Changing a game adjustment item later then causes the display to show **HARD ALTERED**.

### **Audit Information--Au**

While the AUTO-UP switch remains in the Up position, the operator can press the ADVANCE switch once, briefly, to begin the backbox displays of Audit (sometimes called "bookkeeping") Information. Forty-four audit entries are now available. Calculation of the various factors is no longer necessary because the System 11A game program now performs all the mathematical factor computations. This information is intended to aid the owner/operator in evaluating how the game is performing in each location, by providing knowledge about which game features are receiving the most play. With this information, the owner/operator can determine whether adjusting the game features to other settings will contribute to increased game earnings.

The operator can press the ADVANCE button once to view each Audit Information display item. To proceed more rapidly through this information, the operator only has to press and hold the ADVANCE button. If a desired item is passed, the operator can use the MANUAL-DOWN switch position with the ADVANCE button to back up to the desired item.

The ***FIRE!* Audit Table** lists the 44 items of the Audit Information portion of the *FIRE!* Game Status Displays. Presentation of this Audit Information again utilizes the player score displays; however, the player 1 and 2 displays are combined as a descriptive phrase. The light type below the table's column headings names the respective backbox displays where the information appears. Because the player 4 display contains information which depends on game play, only a few example entries are shown in the table. The Credits display shows *Au* for all 44 audit items, so its entry is omitted from the tabular listing. Detection of erroneous data affecting any of the counters used in these audit items causes the message, **ERROR**, to be displayed in the player 3 display, during display of any audit item associated with that particular counter. (The program does not analyze the cause of the error; it merely alerts the operator of the error's existence by the message.)

## FIRE! GAME STATUS DISPLAYS (Continued)

### FIRE! Audit Table

| Audit Item<br>(Player 3)                                                                                                                                                                | Descriptive Phrases<br>(Player 1 and 2 Displays)                      | Audit Factor <sup>1</sup><br>Value<br>(Player 4) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------|
| 01                                                                                                                                                                                      | Left Coins [chute next to coin door hinge]                            | 432                                              |
| 02                                                                                                                                                                                      | Center Coins                                                          | 0                                                |
| 03                                                                                                                                                                                      | Right Coins                                                           | 398                                              |
| 04                                                                                                                                                                                      | Paid Credits                                                          | 830                                              |
| 05                                                                                                                                                                                      | Total Plays                                                           |                                                  |
| 06                                                                                                                                                                                      | Total Free (Total Free Plays)                                         |                                                  |
| 07                                                                                                                                                                                      | Percent Free (% Free Plays)                                           |                                                  |
| 08                                                                                                                                                                                      | Replay Awards                                                         |                                                  |
| 09                                                                                                                                                                                      | Percent Replay (% Replay Awards)                                      |                                                  |
| 10                                                                                                                                                                                      | Special Awards                                                        |                                                  |
| 11                                                                                                                                                                                      | Percent Special (% Special Awards)                                    |                                                  |
| 12                                                                                                                                                                                      | Match Awards                                                          |                                                  |
| 13                                                                                                                                                                                      | HSTD ( High Score to Date) Credits                                    |                                                  |
| 14                                                                                                                                                                                      | Percent HSTD (% HSTD Credits)                                         |                                                  |
| 15                                                                                                                                                                                      | Extra Balls                                                           |                                                  |
| 16                                                                                                                                                                                      | Percent Ex. Ball (% Extra Balls)                                      |                                                  |
| 17                                                                                                                                                                                      | Av. Ball Time (Average Time in Seconds)                               |                                                  |
| 18                                                                                                                                                                                      | Min. of Play (Minutes of Play)                                        |                                                  |
| 19                                                                                                                                                                                      | Balls Played                                                          |                                                  |
| 20                                                                                                                                                                                      | Replay 1 Awards                                                       |                                                  |
| 21                                                                                                                                                                                      | Replay 2 Awards                                                       |                                                  |
| 22                                                                                                                                                                                      | Replay 3 Awards                                                       |                                                  |
| 23                                                                                                                                                                                      | Replay 4 Awards                                                       |                                                  |
| 24                                                                                                                                                                                      | 1 Playr Games                                                         |                                                  |
| 25                                                                                                                                                                                      | 2 Playr Games                                                         |                                                  |
| 26                                                                                                                                                                                      | 3 Playr Games                                                         |                                                  |
| 27                                                                                                                                                                                      | 4 Playr Games                                                         |                                                  |
| 28                                                                                                                                                                                      | Burn in Cycles                                                        |                                                  |
| 29                                                                                                                                                                                      | 1,000,000 Awarded (all fires put out in Multi-Ball w/2 balls in play) |                                                  |
| 30                                                                                                                                                                                      | Multi Ball (# of times for Multi-Ball play)                           |                                                  |
| 31                                                                                                                                                                                      | Ex. Ball Lit (# of times Extra Ball was lighted)                      |                                                  |
| 32                                                                                                                                                                                      | Special Lit (# of times Special was lighted)                          |                                                  |
| 33                                                                                                                                                                                      | 10X Lit (# of times 10X Bonus Multiplier was lighted)                 |                                                  |
| 34                                                                                                                                                                                      | 100,000 Sh. Lane (# of times 100,000 pt. awarded)                     |                                                  |
| 35                                                                                                                                                                                      | Total Sh. Lane (# of times ball scored in shooter lane)               |                                                  |
| 36                                                                                                                                                                                      | Cent. Ramp Raised (# of times center Ramp was raised)                 |                                                  |
| 37                                                                                                                                                                                      | P.O. Fire Awarded (# of times fire was put out via return lane)       |                                                  |
| 38                                                                                                                                                                                      | Not Used                                                              |                                                  |
| 39                                                                                                                                                                                      | H. S. Reset Counter                                                   |                                                  |
| 40                                                                                                                                                                                      | Aut. Pct. Data 1                                                      |                                                  |
| 41                                                                                                                                                                                      | Aut. Pct. Data 2                                                      |                                                  |
| 42                                                                                                                                                                                      | Aut. Pct. Data 3                                                      |                                                  |
| 43                                                                                                                                                                                      | Aut. Pct. Data 4                                                      |                                                  |
| 44                                                                                                                                                                                      | Aut. Pct. Data 5                                                      |                                                  |
| NOTE:<br>1. The numbers shown in this column for Items 1 through 4 are examples.<br>Entries for all items depend on the amount of play; thus, they will vary from location to location. |                                                                       |                                                  |

### Adjustment Information--Ad

At end of the Audit Information presentation, with the AUTO-UP switch in the Up position, the operator can press the ADVANCE button to proceed to the Adjustment Information portion of the FIRE! Game Status Displays, as listed in the FIRE! Game Adjustment Table.

The operator can press the ADVANCE button once to view each Adjustment Information display item. To proceed more rapidly through this information, the operator only has to press and hold the ADVANCE button. If a desired item is passed, the operator can use the MANUAL-DOWN switch position with the ADVANCE button to back up to the desired item.

# **FIRE! GAME STATUS DISPLAYS (Continued)**

## **FIRE! Game Adjustment Table**

| Adjustment Item<br>(Player 3) | Descriptive Phrases<br>(Player 1 and 2 Displays)                                                  | Factory Setting<br>(Player 4)              |
|-------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------|
| Ad 01                         | AUTO REPLAY <sup>1</sup><br>or FIXED REPLAY <sup>1</sup>                                          | 10 (%) <sup>1</sup><br>SCORES <sup>1</sup> |
| 02                            | REPLAY START (or REPLAY LEVEL 1) <sup>1</sup>                                                     | 2,000,000                                  |
| 03                            | REPLAY LEVELS (or REPLAY LEVEL 2) <sup>1</sup>                                                    | 01 (or OFF)                                |
| 04                            | (REPLAY LEVEL 3) <sup>1</sup>                                                                     | (see text)                                 |
| 05                            | (REPLAY LEVEL 4) <sup>1</sup>                                                                     | (see text)                                 |
| 06                            | REPLAY AWARD                                                                                      | Credit                                     |
| 07                            | SPECIAL AWARD                                                                                     | Credit                                     |
| 08                            | MATCH FEATURE [Off, 1 - 50%]                                                                      | 10 (%)                                     |
| 09                            | BALLS / GAME                                                                                      | 03                                         |
| 10                            | TILT WARNING                                                                                      | 03                                         |
| 11                            | EX. BALL / B. I. P. { [00 = NO Ex. Ball; 1-9 E. B. /Ball; 1-9 E. B. /B. I. P.; 1-9 E. B. /Game] } | 2/BIP                                      |
| 12                            | MAXIMUM CREDITS                                                                                   | 10                                         |
| 13                            | HIGHEST SCORES                                                                                    | On                                         |
| 14                            | BACKUP HI. SCR.1                                                                                  | 4,500,000                                  |
| 15                            | BACKUP HI. SCR. 2                                                                                 | 4,000,000                                  |
| 16                            | BACKUP HI. SCR. 3                                                                                 | 3,500,000                                  |
| 17                            | BACKUP HI. SCR. 4                                                                                 | 3,000,000                                  |
| 18                            | HI. SCR.1 CREDITS                                                                                 | 03                                         |
| 19                            | HI. SCR.2 CREDITS                                                                                 | 01                                         |
| 20                            | HI. SCR.3 CREDITS                                                                                 | 01                                         |
| 21                            | HI. SCR.4 CREDITS                                                                                 | 01                                         |
| 22                            | H. S. RESET EVERY (3,000 PLAYS) <sup>2</sup>                                                      |                                            |
| 23                            | FREE PLAY                                                                                         | NO                                         |
| 24                            | U.S.A. 1 COINAGE (1 COIN 1 PLAY) <sup>2,3</sup>                                                   |                                            |
| 25                            | LEFT UNITS                                                                                        | 01                                         |
| 26                            | CENTER UNITS                                                                                      | 04                                         |
| 27                            | RIGHT UNITS                                                                                       | 01                                         |
| 28                            | UNITS/ CREDIT                                                                                     | 01                                         |
| 29                            | UNITS/ BONUS                                                                                      | 00                                         |
| 30                            | MINIMUM UNITS                                                                                     | 00                                         |
| 31                            | 2 TARGS 1 HIT [yes=two lamps w/1 hit; no =one lamp w/ 1 hit]                                      | NO                                         |
| 32                            | LIGHT SPECIAL [easy=lit w/10X; hard=lit 1 time after 10X; e hard=lit 2 times after 10X]           | HARD                                       |
| 33                            | BELL CONTROL [alot= many bell sounds; less=fewer sounds; none=no bell sounds ever]                | ALOT                                       |
| 34                            | EX. BALL MEMORY [no = not stored; yes = stored]                                                   | YES                                        |
| 35                            | BON. MULT. MEMORY [no = not stored; yes = stored]                                                 | YES                                        |
| 36                            | EASY EX. BALL [no = not stored; yes = stored]                                                     | YES                                        |
| 37                            | SPECIAL MEMORY [no = not stored; yes = stored]                                                    | YES                                        |
| 38                            | CONSOL. PLUG [yes=plug raised 30 sec; no=no plug]                                                 | YES                                        |
| 39                            | CONSOL. EX. BALL [yes=ball w/avg time>Ad 47; no=no ball]                                          | YES                                        |
| 40                            | RETURN LANES [no=one lamp lit, alternating via slingshots; yes=both lamps, no alt. by slingshot]  | NO                                         |
| 41                            | C.N. RAMP AUTO AD [NO AUTO; 1 - 99%]                                                              | 20 (%)                                     |

## FIRE! GAME STATUS DISPLAYS (Continued)

The **FIRE! Game Adjustment Table** lists the 70 items of the Adjustment Information portion of the **FIRE! Game Status Displays**. Presentation of the displays is similar to that for the Audit Information (that is, the player 1 and 2 displays combine as a descriptive phrase; the light type below the column headings names the respective backbox displays where the information appears, etc.). The player 3 display shows **Ad** for all 70 adjustment items, so its entry is omitted from the tabular listing.

**FIRE! Game Adjustment Table (Continued)**

| Adjustment Item<br>(Player 3) | Descriptive Phrases<br>(Player 1 and 2 Displays)               | Factory Setting<br>(Player 4) |
|-------------------------------|----------------------------------------------------------------|-------------------------------|
| 42                            | CN. RAMP TIMER [0=NO; 1 - 99 sec: center ramp up time w/mult.] | 25 sec                        |
| 43                            | UNUSED ADJUST                                                  |                               |
| 44                            | UNUSED ADJUST                                                  |                               |
| 45                            | EASY SPECIAL [Yes=both outlane lamps on; no=only one lamp lit] | YES                           |
| 46                            | PLUG TIMER [0=NO; 1 - 99 sec: fireplug up time via horseshoe]  | 10 sec                        |
| 47                            | AVG. BALL TIMER [0=NO; 1 - 99 sec: seconds per ball]           | 30 sec                        |
| 48                            | A. MODE SOUNDS [ALOT; LESS; NONE]                              | ALOT                          |
| 49                            | CUSTOM MESSAGE 4                                               | ON                            |
| 50                            | SW. ALARM KNOCKER                                              | YES                           |
| 51                            | ENGLISH TEXT                                                   |                               |
| 52                            | UNUSED ADJUST                                                  |                               |
| 53 <sup>5</sup>               | INSTALL GERMAN 1 <sup>6</sup>                                  |                               |
| 54 <sup>5</sup>               | INSTALL GERMAN 2 <sup>6</sup>                                  |                               |
| 55 <sup>5</sup>               | INSTALL GERMAN 3 <sup>6</sup>                                  |                               |
| 56 <sup>5</sup>               | INSTALL GERMAN 4 <sup>6</sup>                                  |                               |
| 57 <sup>5</sup>               | INSTALL GERMAN 5 <sup>6</sup>                                  |                               |
| 58 <sup>5</sup>               | INSTALL GERMAN 6 <sup>6</sup>                                  |                               |
| 59 <sup>5</sup>               | INSTALL ADDABALL                                               | NO                            |
| 60 <sup>5</sup>               | INSTALL 5-BALL                                                 | NO                            |
| 61 <sup>5</sup>               | INSTALL NOVELTY                                                | NO                            |
| 62 <sup>5</sup>               | INSTALL EX. EASY                                               | NO                            |
| 63 <sup>5</sup>               | INSTALL EASY                                                   | NO                            |
| 64 <sup>5</sup>               | INSTALL MEDIUM                                                 | NO                            |
| 65 <sup>5</sup>               | INSTALL HARD                                                   | NO                            |
| 66 <sup>5</sup>               | INSTALL EX. HARD                                               | NO                            |
| 67                            | AUTO BURN-IN                                                   | NO                            |
| 68                            | CLEAR COINS                                                    | NO                            |
| 69                            | CLEAR AUDITS                                                   | NO                            |
| 70                            | INSTALL FACTORY                                                | NO                            |

**NOTES:**

1. Automatic Replay percentage value range is adjustable from 5 to 50%, via the **Credit** button. Item 02 permits changing the factory setting value for **Replay Start Level** (valid for next 500 games played). Item 03 permits setting up to four replay levels, with values as detailed in text describing item 03.  
For Fixed Replay Scores, set **Auto Replay** value to 1 less than 5(%) via the **Credit** button. Go to items 02, 03, 04, and 05 to install their replay level scores. Turn off any replay score level by setting 00 as its value.
2. Phrase in parentheses is Factory Setting. Phrase appears in player 3 and 4 displays. Press **Credit** button to change setting of item 22, or the game pricing of item 24.
3. To change country OR coinage setting, press **Credit** button to obtain 16 Standard settings, followed by a Custom Setting. The Custom Setting activates items 25 through 30. When a Standard Setting is used, items 25 through 30 are set automatically, and cannot be changed.
4. To install Custom Message, press flipper button for alphabet and special characters. Press **Credit** button for next message letter or character.
5. Special Preset Adjustment, whose effects are noted in the Game Adjustment text.
6. Refer to **Pricing Table** and text describing these items.
7. Approximates Ad 64, yet includes all factors listed in Factory Setting column, not just Ad 31 through 47 provided by Ad 64.

## GAME ADJUSTMENT PROCEDURE

### Adjustment Items 01 through 70

The coin door must be open to access the Game Adjustment/Diagnostic switches. All readings and adjustments require operation of these coin door switches. Some adjustments utilize the Credit button; some also use the flipper button(s). Additional text describing the game adjustment items follows this procedure.

1. Use AUTO-UP and press ADVANCE. The Id 00 display initially appears. Press ADVANCE until the player 3 display indicates **Ad 01**. (The player 1 and 2 score displays indicate AUTO REPLAY.) If the factory setting has not been changed, the player 4 display shows 10%, indicating a 10% replay percentage. (The game program adjusts itself automatically, as discussed in the following text concerning the 'details' about Adjustment Item 01.)
2. To reach a higher item number (in the player 3 display), use AUTO-UP and press ADVANCE. To return to a previous item number, use MANUAL-DOWN and press ADVANCE.
3. With the desired item number (refer to the **FIRE! Game Adjustment Table**) showing in the player 3 display, increase the value (or select another option) shown in the player 4 display by using AUTO-UP and pressing the Credit button. Repeat this step for each item, until all changes to the factory settings for Game Adjustments have been made.

(The same procedure can be used for Audit Items. To zero **Au 01 - 04** (concerning the coin chutes and the total coins), the operator can proceed to item 68, Clear Coins, and press the Credit button to obtain the YES option. The operator then presses the ADVANCE button and notes the "COINS CLEARED" display, which verifies that the entry values for items 01 through 04 of the Audit Items are now reset to zero.)

For example, the operator may desire to change the degree of game play difficulty from the Factory Setting (equivalent to the Install Medium [Ad 64] difficulty, along with a number of other automatically installed settings, as shown in the right column of the **Game Adjustment Table**) to another difficulty more suitable for the players at a particular game site. Four other 'automatic' play difficulty settings (Ad 62 - Ad 66) are available, each of which, if selected, installs all the adjustments listed for that item in the following 'details' text.

4. To proceed rapidly through the entire adjustments series, press and hold ADVANCE, until **Ad 70** shows in the player 3 display. From item 70, you can: (A) return to the Game-Over Mode; or (B) restore factory settings and zero audit (bookkeeping) totals. Perform either of the following, as desired:
  - A. To reach Game-Over Mode, use AUTO-UP and press ADVANCE once. **FIRE!** now goes to the Game-Over Mode.
  - B. To restore factory settings, zero all audit (bookkeeping) totals, and return to Game-Over Mode, use AUTO-UP or MANUAL-DOWN to display item 70 in the player 3 display. Press the Credit button to display the YES option in the player 4 display. Using AUTO-UP, press ADVANCE once. **FIRE!** now zeroes ALL audit totals and changes ALL game adjustments back to those originally selected as Factory Settings. It then shows the operator a message ("FACTORY SETTING") that this has occurred. (A problem in the Memory Protection circuit or closing the coin door will cause the message "ADJUST FAILURE" to appear.) Press ADVANCE once more to return to the Game-Over Mode.

## GAME ADJUSTMENT PROCEDURE (Continued)

### Details of Adjustment Items 01 through 70

#### 01 Auto Replay (or Fixed Replay)

Of the two options, AUTO REPLAY is the Factory Setting. The percentage of replays automatically awarded has a Factory Setting of 10% (German games have a Factory Setting of 15%). The game program aids a game's initial installation by causing a comparison of the value of the Replay Level to the player's score 16 times during the first 800 games. At each comparison, the program increases (or decreases) the Replay Level by 100,000 to achieve the replay percentage specified either via the factory setting or later operator adjustment. (After the first 800 games, the comparison occurs after every 500 games.) Use the Credit button to change the percentage within the range of 5 to 50 (%), with the value increasing using AUTO-UP (or decreasing using MANUAL-DOWN). The next Credit button change below 5%, selects the FIXED REPLAY option.

For AUTO REPLAY, Ad 02 provides the Starting Replay Level (player 1 and 2 displays show REPLAY START). Ad 03 provides the number of replay levels (01, 02, 03, or 04). FIRE! then proceeds to Ad 06 automatically.

For FIXED REPLAY, Ad 02 is the first replay level (REPLAY LEVEL 1). Ad 03, 04, and 05 are the other replay levels.

#### 02 Starting Replay Level (or Replay Level 1)

For AUTO REPLAY (refer to Ad 01), the Factory Setting is 2,000,000 (German games have a Factory Setting of 1,600,000). The range of settings is 800,000 through 4,000,000 (by increments of 100,000 with AUTO-UP or decrements of 100,000 with MANUAL-DOWN).

For FIXED REPLAY, the operator can enter the value to be used for the first fixed replay score level via the Credit button. The range of settings is: OFF; 100,000 through 9,900,000 (by increments of 100,000 with AUTO-UP, or decrements of 100,000 with MANUAL-DOWN).

#### 03 Replay Levels (or Replay Level 2)

For AUTO REPLAY (refer to Ad 01), the Factory Setting is 01 (one replay level). (German games have a Factory Setting of 03). The option range is one, two, three, or four replay level(s). When the operator chooses two replay levels, FIRE! automatically adjusts the second replay level to be twice the value selected for Ad 02, the starting replay level. Choosing three or four replay levels automatically adjusts their replay levels to three times or four times the Ad 02 value.

For FIXED REPLAY, the technique of value entry and the range of settings are identical to those of Ad 02.

#### 04 (Replay Level 3)

For AUTO REPLAY, this Adjustment Item is not applicable. FIRE! automatically bypasses this adjustment.

For FIXED REPLAY, the technique of value entry and the range of settings are identical to those of Ad 02.

#### 05 (Replay Level 4)

For AUTO REPLAY, this Adjustment Item is not applicable. FIRE! automatically bypasses this adjustment.

For FIXED REPLAY, the technique of value entry and the range of settings are identical to those of Ad 02.

## GAME ADJUSTMENT PROCEDURE (Continued)

### 06 Replay Award

For either AUTO REPLAY or FIXED REPLAY (Ad 01), the operator can select the form of the award automatically provided when the player exceeds any Replay Level (Automatic or Fixed). The choices are:

- Credit* - Reaching each replay level obtains a credit (free game). This is the Factory Setting.
- Ball* - Reaching each replay level obtains an extra ball.
- Audit* - Reaching each replay level obtains nothing to the player; it does increase the entry value of the Audit Item(s) maintaining a tally of these awards (Au 08, and Au 20 through 23, as applicable).
- Coil* - Reaching each replay level causes the Kicker coil to activate once per free game won (instead of awarding a credit for each level exceeded).

#### NOTE

A ticket dispenser or token dispenser can be activated by the Kicker coil driver to provide an alternative award for each free game achieved by the player.

### 07 Special Award

The operator can select the form of the award automatically provided when the player scores a Special. The choices are:

- Credit* - Scoring each Special, when lit, obtains a credit (free game). This is the Factory Setting. A variation to this award occurs, when the setting of Ad 06 is Coil. (This permits a ticket or token dispenser to provide the award, when applicable.)
- Ball* - Scoring each Special, when lit, obtains an extra ball.
- Score* - Scoring each Special, when lit, obtains a score advance of 100,000 points to the player.

### 08 Match Award

The operator can select (via the Credit button) the desired percentage for the Match action occurring at the completion of each game. The choices are:

- 1%-50%* - 1% is 'hard'; 50% is 'extremely easy'. 10% is the Factory Setting. During Match action, the game selects a random two-digit number at end of game and compares each player's score for an identical two digits in the rightmost two positions. A matching of the two digits results in the award of a credit (or a ticket/token, if a dispenser is attached, and the setting of Ad 06 is Coil).
- Off* - The MATCH display does not operate at completion of the game; no award is given.

### 09 Balls / Game

The operator can define a "game" by specifying the number of balls to be played. The Factory Setting is 3. The range of settings is 1 through 9.

### 10 Tilt Warning

The operator can specify the allowable number of total actuations of the plumb bob and playfield tilt mechanisms that can occur before the game is "tilted". The range of this setting is 1 through 5. The Factory Setting is 3.

### 11 Extra Ball/Ball In Play

The operator can choose (via the Credit button) the number of Extra Balls to be awarded to a player. The range of this setting is:

## GAME ADJUSTMENT PROCEDURE (Continued)

### 11 Extra Ball/Ball In Play (Continued)

- 00 - NO extra ball play; displays a message, NO EX. BALL. A score is awarded in lieu of the Extra Ball.
- 1-9 E. B./Ball - 1 through 9 Extra Balls per ball (i.e., all balls including Extra Balls) are awarded.
- 1-9 E. B./B.I. P. - 1 through 9 Extra Balls per Ball In Play (B. I. P.) (i.e., all balls NOT including Extra Balls) are awarded.
- 1-9 E. B./Game - 1 through 9 Extra Balls per game.

The Factory Setting is 2 Extra Balls per B. I. P.

### 12 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 settings is 5 through 99. The Factory Setting is 10 (Factory Setting for German games is 30). Reaching the specified setting prevents the award of additional credits by game play. Coin purchases do continue to accumulate and are displayed.

#### NOTE

Whenever the number of credits is less than the specified maximum credits, any credits obtained by coin purchase or game awards (High Score, Match, Replay Levels, etc.) will be accumulated even though they exceed the maximum value. Thereafter, no additional credits can be accumulated, until the credit total is reduced below the specified maximum setting.

### 13 Highest Scores

The operator can allow the game to maintain a record of the four highest scores achieved to date. The Factory Setting is On. The optional alternative is Off, which deactivates this adjustment item.

### 14 Backup High Score 1

The operator can set the Backup High Score value in the player 1 score display, using the Credit button. The Factory Setting is 4,500,000. (The Factory Setting for German games is 5,500,000.) The game automatically restores the value set, when the operator presses, and holds, the HIGH SCORE RESET switch, or when an automatic High Score Reset event (Ad 22) occurs.

### 15 Backup High Score 2

This adjustment is similar to Ad 14, except that this applies to the player 2 score display. The adjustment technique is identical to Ad 14. The Factory Setting is 4,000,000. (The Factory Setting for German games is 5,000,000.) It is also restored as described for Ad 14.

### 16 Backup High Score 3

This adjustment is similar to Ad 14, except that this applies to the player 3 score display. The adjustment technique is identical to Ad 14. The Factory Setting is 3,500,000. (The Factory Setting for German games is 4,500,000.) It is also restored as described for Ad 14.

### 17 Backup High Score 4

This adjustment is similar to Ad 14, except that this applies to the player 4 score display. The adjustment technique is identical to Ad 14. The Factory Setting is 3,000,000. (The Factory Setting for German games is 4,000,000.) It is also restored as described for Ad 14.

### 18 Credits for Highest Score 1

The operator can select the number of credits to be awarded, by using the Credit button, whenever a player exceeds the previous Highest Score. The range of this setting is 00 through 10. The Factory Setting is 03. A variation to this award occurs, when the setting of Ad 06 is Coil. (This permits a ticket or token dispenser to provide the award, when applicable.)

## GAME ADJUSTMENT PROCEDURE (Continued)

### 19 Credits for Highest Score 2

This adjustment is similar to Ad 18, except that this applies to the player's exceeding the second highest score. The Credit button adjustment technique is the same as for Ad 18. The range of this setting is 00 through 03. The Factory Setting is 01.

### 20 Credits for Highest Score 3

This adjustment is similar to Ad 18, except that this applies to the player's exceeding the third highest score. The Credit button adjustment technique is the same as for Ad 18. The range of this setting is 00 through 03. The Factory Setting is 01.

### 21 Credits for Highest Score 4

This adjustment is similar to Ad 18, except that this applies to the player's exceeding the fourth highest score. The Credit button adjustment technique is the same as for Ad 18. The range of this setting is 00 through 03. The Factory Setting is 01.

### 22 Automatic High Score Reset

The operator can specify (via Credit button) 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. (Audit item 39 displays the number of games remaining before the reset.) The values provided upon reset are those selected by the operator in Ad 14 through 17, the Backup High Scores. The range of this setting is Off (to disable this adjustment), and 1,000 to 24,750 games (in increments of 250). The Factory Setting is 3,000. (German games have a Factory Setting of 750.)

### 23 Free Play

The operator can select (via the Credit button) 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. This is the Factory Setting.
- Yes - Game play is free; no coin is required.

### 24 Coinage Selections

The operator can specify (via the Credit button) any of the 16 Standard Settings for game pricing, each of which exhibits a message identifying the country and the number of coins required and the number of games that the coin requirement purchases. Choosing a Standard Setting permits the game to omit items Ad 25 through 30, which are adjustments allowing for a special custom coinage setting. The Factory Setting is U.S.A. 1 : 1 COIN 1 PLAY, as shown by the backbox display. (For German games, the Factory Setting is GERMAN2 : 7 PLAY 5 dm.)

Following the last Standard Setting is a Custom Coinage Setting, which allows the operator to utilize Ad 25 through 30 in establishing a special coinage setting. A message, CUSTOM COINAGE, indicates that the operator can enter the appropriate values into the Ad 25 through 30 adjustment items.

The values for Ad 25 through 30 of each Standard Setting, as well as other possible values for the Custom Coinage Setting are shown in the **Pricing Table**.

### 25 Left Chute Coin Units

The operator can specify (via the Credit button) the number of coin units purchased by a coin passing through the left coin chute.

### 26 Center Chute Coin Units

The operator can specify (via the Credit button) the number of coin units purchased by a coin passing through the center coin chute.

## GAME ADJUSTMENT PROCEDURE (Continued)

### 27 Right Chute Coin Units

The operator can specify (via the Credit button) the number of coin units purchased by a coin passing through the right coin chute.

### 28 Units Required for Credit

The operator can define (via the Credit button) 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 coin units purchased exceeds the 1 Credit factor 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 a game; then, the coin unit counter is cleared (its contents are zeroed). The Factory Setting is 01.

### 29 Units Required for Bonus

The operator can specify (via the Credit button) that 1 additional Credit is to be indicated in the Credits display, when a certain number of coin units are accumulated. The Factory Setting is 00.

### 30 Minimum Units Required for any Credits Posted

The operator can specify that NO Credits are to be posted (indicated in the Credits display), until the credit units counter reaches a particular value. The Factory Setting is 00.

### 31 2 Targets - 1 Hit

The operator can choose (via the Credit button) whether hitting either of the top 2 targets turns off two lamps or only one. The choices are:

- No - Only one lamp turns off when either of the top targets is hit. The Factory Setting is No.
- Yes - Two lamps turn off when either of the top two targets is hit.

### 32 Light SPECIAL

The operator can choose (via the Credit button) the conditions for lighting the SPECIAL lamp. Condition selections relate to the FIRE (Bonus) Multipliers obtained via the top "horseshoe". (Each shot around the "horseshoe" advances the Multiplier. The first shot gets the 2X; the second gets 3X; etc.) The choices are:

- Easy - The SPECIAL lamp lights when the 10X FIRE Multiplier is scored.
- Hard - The SPECIAL lamp lights with the first "horseshoe" shot after the 10X FIRE Multiplier is scored. The Factory Setting is Hard.
- E. Hard - The SPECIAL lamp lights with the second "horseshoe" shot after the 10X FIRE Multiplier is scored.

### 33 Bell Control

The operator can choose (via the Credit button) how frequently the Fire alarm bell sounds. The choices are:

- ALOT - The bell sounds quite frequently. The Factory Setting is ALOT.
- Less - The bell sounds to signal: (a) the change in FIRE Multipliers; (b) Multi-Ball™; (c) High Score; and (d) Match awards scoring.
- None - The bell never sounds.

### 34 Extra Ball Memory

The operator can choose (via the Credit button) whether the lighted 'EXTRA BALL' lamp is stored in memory for 'next ball' play. The choices are:

- No - The lamp is turned off (not stored in memory) at the start of a ball.
- Yes - The lighted lamp is stored in memory and recalled for the player's next ball. The Factory Setting is Yes.

## GAME ADJUSTMENT PROCEDURE (Continued)

### 35 FIRE (Bonus) Multiplier Memory

The operator can choose (via the Credit button) whether the lighted FIRE Bonus Multiplier lamps are stored in memory for 'next ball' play. The choices are:

- No** - These lamps are turned off (not stored in memory) at the start of a ball.
- Yes** - Lighted lamps ARE stored in memory and recalled for the player's next ball. The Factory Setting is Yes.

### 36 Easy Extra Ball

The operator can choose (via the Credit button) whether hitting the victim targets on the left and right ramps are stored in memory to light the Extra Ball lamp. The choices are:

- Yes** - Hitting both left and right victim targets once each, plus one hit of either the left or right target (three targets total) lights the Shoot Again lamp, signalling the Extra Ball award. The Factory Setting is Yes.
- No** - A total of five targets (both left and right targets twice, plus one) must be hit to light the Shoot Again lamp, signalling the Extra Ball award.

### 37 Special Memory

The operator can choose (via the Credit button) whether the Special lamps are stored in memory for 'next ball' play. The choices are:

- Yes** - Lighted lamps ARE stored in memory and recalled for the player's next ball. The Factory Setting is Yes.
- No** - The lamps are turned off (not stored in memory) at the start of a ball.

### 38 Consolation Fireplug

The operator can choose (via the Credit button) whether a player gets the Fireplug raised for 30 seconds at the start of the final ball. This aids players who are not skilled pinball players. To obtain the Consolation Fireplug, the player, on the last ball: (a) must have an average ball time of less than the setting value of Adjustment item Ad 47; (b) can NOT have any 'Shoot Again' awards on the last ball; (c) can NOT have any Extra Ball lamps lighted; and (d) this adjustment's setting must be Yes. The choices are:

- No** - No Consolation Fireplug award.
- Yes** - The Consolation Fireplug is awarded (raised for 30 seconds at the start of the final ball). The Factory Setting is Yes.

### 39 Consolation Extra Ball

The operator can choose (via the Credit button) whether a player gets an Extra Ball lamp lighted on the final ball. This award is for less skilled players. To obtain the Consolation Extra Ball, the player, on the last ball: (a) must have an average ball time of less than the setting of AD 47; (b) can NOT have any 'Shoot Again' awards on the last ball; (c) can NOT have any Extra Ball lamps lighted; and (d) this adjustment's setting must be Yes. The choices are:

- No** - No Extra Ball lamp lighted on the final ball.
- Yes** - An Extra Ball lamp is lighted at the start of the final ball. The Factory Setting is Yes.

### 40 Return Lanes

The operator can choose (via the Credit button) whether one 'Put Out Fire' lamp in a return lane is lighted and alternates return lanes via hits on the kickers (slingshots) or both 'Put Out Fire' lamps in the return lanes are lighted and not alternated by the kickers. The choices are:

- No** - One return lane 'Put Out Fire' lamp is lighted, alternating via the kicker hits. The Factory Setting is No.
- Yes** - Both 'Put Out Fire' lamps are lighted.

## GAME ADJUSTMENT PROCEDURE (Continued)

### 41 Center Ramp Auto Adjustment

The operator can choose (via the Credit button) the percentage adjustment for the period that the center ramp remains raised. The range of this automatic adjustment setting is 1% (Hard) through 99% (Extremely easy); it can also be turned off (disabled), via a setting of 0. When the automatic adjustment is turned on (enabled), the game program adjusts the setting, at the end of a game, after 50 misses or awards, except when the current value is within 2% of the setting. Then, no auto adjustment occurs. The Factory Setting is Enabled and 20%.

### 42 Center Ramp Timer

The operator can choose (via the Credit button) the length of time that the center ramp remains raised, when a multiplier is awarded. The range of this setting is 1 second (Hard) through 99 seconds (Very easy); it can also be turned off (disabled), via a setting of 0. The Factory Setting is 25 seconds.

### 43 UNUSED ADJUST

This adjustment is not used for *FIRE!*.

### 44 UNUSED ADJUST

This adjustment is not used for *FIRE!*.

### 45 Easy SPECIAL

The operator can choose (via the Credit button) whether one outlane SPECIAL lamp is lighted or both SPECIAL lamps in the outlanes are lighted, when the conditions (set in Ad 32) for lighting the SPECIAL lamp are satisfied. The choices are:

- No - One SPECIAL lamp is lighted. The Factory Setting is No.
- Yes - Both SPECIAL lamps are lighted.

### 46 Plug Timer

The operator can choose (via the Credit button) the length of time the Fireplug remains up when activated by a 'horseshoe' shot. The range of this setting is 1 second (Hard) through 99 seconds (Very easy); it can also be turned off (disabled), via a setting of 0. The Factory Setting is 10 seconds.

### 47 Average Ball Timer

The operator can choose (via the Credit button) the length of time to be used as the "average ball time" for Ad 39, the Consolation Extra Ball. This setting determines whether the player is given an additional ball to compensate for lack of skill. The range of this setting is 1 second (Hard) through 99 seconds (Very easy); it can also be turned off (disabled), via a setting of 0. The Factory Setting is 30 seconds.

### 48 Attract Mode Sounds

The operator can select (via the Credit button) the amount of sounds occurring during the Attract Mode. The choices are:

- ALOT - Sounds occur during the Rules display and the Attract Mode sequence. This is the Factory Setting.
- LESS - Sounds occur during only the Attract Mode.
- NONE - No sounds occur during the Attract Mode.

## GAME ADJUSTMENT PROCEDURE (Continued)

### 49 Custom Message

The operator can choose (via the Credit button) whether to display a message during the Attract Mode. (When display of a message is selected, the operator can either utilize the message provided or change the message.) Three choices are available:

- 1 - Display a message during the Attract Mode. The player 4 display shows this choice as ON. This is the Factory Setting. The 3-line message provided is:  
ARE YOU FAST... ENOUGH TO PUT ... OUT ALL FIRES?
- 2 - Do NOT display a message during the Attract Mode. (Player 4 shows OFF.)
- 3 - The player 4 display shows this choice as CHANGE. The operator can enter a special ("custom") message, as follows:
  - A. Press ADVANCE once. The operator can now enter as many as three 14-character lines for display during the Attract Mode.
  - B. Use the flipper button(s) to select each message character (alphabet, numbers, and special symbols are available). In case of error, enter a "back arrow" (just before "space") to correct, followed by correct character. For a period after any letter, use letters with periods (following the special symbols). The entire character set is the following:  
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 < > ? - / \* '  
\_ . , ; ' : " ( ) [ \ ] ^ \_ ` { | } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾  
À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã
  - C. Move to the next character via the Credit button. No entirely blank lines will be displayed.

### 50 SW. ALARM KNOCKER

The operator can choose (via the Credit button) whether the knocker operates, sounding an alarm to signal a switch problem, at the time of game Turn-On and at the beginning of the Test/Diagnostic Procedures. Two choices are available:

- YES - The knocker sounds, signalling a switch problem, at game Turn-On and at the beginning of the Test/Diagnostic Procedures. This is the Factory Setting, and is shown in the player 4 display.
- NO - The knocker does NOT sound. (Player 4 shows NO.)

### 51 ENGLISH TEXT

The operator can choose to display the message, audit, adjustment, and Test /Diagnostic information in English or German (Deutsch) via the Credit button.

### 52 UNUSED ADJUST

This adjustment is not used for *FIRE*.

#### SPECIAL PRESET ADJUSTMENTS CAUTION

Adjustments 53 through 66 are Special Preset Adjustments to enable the operator to perform the setting of multiple adjustments at once. They permit the operator to: (1) modify a game for a specific area (special German coinage settings, for example, Ad 53 through 58); (2) change a group of adjustments to conform with laws of certain localities (Ad 59 through 61); and (3) to change the degree of difficulty of game play (Ad 62 through 66). A list of the preceding individual Adjustments affected accompanies each of these Special Preset Adjustments. Whenever the operator chooses to use any Special Preset Adjustment, the operator can later access any or all of the individual Adjustments affected by that Special Adjustment for subsequent changes.

A similar technique is recommended in the event of error or uncertainty concerning any Special Preset Adjustment, after the operator selects it: The operator can restore the factory setting of each individual Adjustment, then select the desired Special Preset Adjustment, and then return to any of the preceding individual adjustments to determine whether use of the Special Adjustment has had the desired effect.

## GAME ADJUSTMENT PROCEDURE (Continued)

The Backbox displays for each Special Preset Adjustment indicate whether the operator has selected it, by identifying the Adjustment in the player 1 and 2 displays by name and the selection choice of NO, meaning Not Selected (this is the Factory Setting), or YES, meaning Selected, in the player 4 display. Selection occurs by using the Credit button to choose YES and then pressing ADVANCE.

### NOTE

Games in which the CPU jumper W7 is cut ("German games") automatically have certain Adjustment Items preset:

| <u>Ad</u> | <u>Name</u>     | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|-----------------|--------------------|-----------|------------------|--------------------|
| 01        | Auto Replay     | 15 (%)             | 18        | Hi Scr 1 Credits | 03                 |
| 02        | Replay Start    | 1,600,000          | 19        | Hi Scr 2 Credits | 00                 |
| 03        | Replay Level 2  | 03                 | 20        | Hi Scr 3 Credits | 00                 |
| 12        | Maximum Credits | 30                 | 21        | Hi Scr 4 Credits | 00                 |
| 14        | Backup Hi Scr 1 | 5,500,000          | 22        | Hi Scr Reset     | 750 games          |
| 15        | Backup Hi Scr 2 | 5,000,000          | 24        | German 2 Coinage | 7 Plays/5DM        |
| 16        | Backup Hi Scr 3 | 4,500,000          | 47        | Avg. Ball Time   | 45 sec             |
| 17        | Backup Hi Scr 4 | 4,000,000          | 51        | Deutsch Text     | Deutsch            |

### 53 Install German 1

The operator can modify the game pricing selection of Standard Setting 09 in the **Pricing Table** to permit Credit Award play with 10 games for 5 DM. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>     | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|-----------------|--------------------|-----------|------------------|--------------------|
| 06        | Replay Award    | Credit             | 17        | Backup Hi Scr 4  | 4,000,000          |
| 07        | Special Award   | Credit             | 18        | Hi Scr 1 Credits | 03                 |
| 08        | Match Feature   | 10 %               | 19        | Hi Scr 2 Credits | 00                 |
| 14        | Backup Hi Scr 1 | 5,500,000          | 20        | Hi Scr 3 Credits | 00                 |
| 15        | Backup Hi Scr 2 | 5,000,000          | 21        | Hi Scr 4 Credits | 00                 |
| 16        | Backup Hi Scr 3 | 4,500,000          | 24        | German 1 Coinage | 10 Plays/5DM       |

### 54 Install German 2

The operator can modify the game pricing selection of Standard Setting 09 in the **Pricing Table** to permit Ticket/Token operation with 10 games for 5 DM. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>     | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|-----------------|--------------------|-----------|------------------|--------------------|
| 06        | Replay Award    | Coil               | 17        | Backup Hi Scr 4  | 4,000,000          |
| 07        | Special Award   | Ball               | 18        | Hi Scr 1 Credits | 03                 |
| 08        | Match Feature   | 10 %               | 19        | Hi Scr 2 Credits | 00                 |
| 14        | Backup Hi Scr 1 | 5,500,000          | 20        | Hi Scr 3 Credits | 00                 |
| 15        | Backup Hi Scr 2 | 5,000,000          | 21        | Hi Scr 4 Credits | 00                 |
| 16        | Backup Hi Scr 3 | 4,500,000          | 24        | German 1 Coinage | 10 Plays/5DM       |

## GAME ADJUSTMENT PROCEDURE (Continued)

### 55 Install German 3

The operator can modify the game pricing selection of Standard Setting 09 in the **Pricing Table** to permit Keyset Mode operation with 10 games for 5 DM. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>     | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|-----------------|--------------------|-----------|------------------|--------------------|
| 06        | Replay Award    | Audit              | 17        | Backup Hi Scr 4  | 00                 |
| 07        | Special Award   | Score              | 18        | Hi Scr 1 Credits | 00                 |
| 08        | Match Feature   | Off                | 19        | Hi Scr 2 Credits | 00                 |
| 14        | Backup Hi Scr 1 | 00                 | 20        | Hi Scr 3 Credits | 00                 |
| 15        | Backup Hi Scr 2 | 00                 | 21        | Hi Scr 4 Credits | 00                 |
| 16        | Backup Hi Scr 3 | 00                 | 24        | German 1 Coinage | 10 Plays/5DM       |

### 56 Install German 4

The operator can modify the game pricing selection of Standard Setting 09 in the **Pricing Table** to permit Credit Award play with 7 games for 5 DM. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>     | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|-----------------|--------------------|-----------|------------------|--------------------|
| 06        | Replay Award    | Credit             | 17        | Backup Hi Scr 4  | 4,000,000          |
| 07        | Special Award   | Credit             | 18        | Hi Scr 1 Credits | 03                 |
| 08        | Match Feature   | 10 %               | 19        | Hi Scr 2 Credits | 00                 |
| 14        | Backup Hi Scr 1 | 5,500,000          | 20        | Hi Scr 3 Credits | 00                 |
| 15        | Backup Hi Scr 2 | 5,000,000          | 21        | Hi Scr 4 Credits | 00                 |
| 16        | Backup Hi Scr 3 | 4,500,000          | 24        | German 2 Coinage | 7 Plays/5DM        |

### 57 Install German 5

The operator can modify the game pricing selection of Standard Setting 09 in the **Pricing Table** to permit Ticket/Token operation with 7 games for 5 DM. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>     | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|-----------------|--------------------|-----------|------------------|--------------------|
| 06        | Replay Award    | Coil               | 17        | Backup Hi Scr 4  | 4,000,000          |
| 07        | Special Award   | Ball               | 18        | Hi Scr 1 Credits | 03                 |
| 08        | Match Feature   | 10 %               | 19        | Hi Scr 2 Credits | 00                 |
| 14        | Backup Hi Scr 1 | 5,500,000          | 20        | Hi Scr 3 Credits | 00                 |
| 15        | Backup Hi Scr 2 | 5,000,000          | 21        | Hi Scr 4 Credits | 00                 |
| 16        | Backup Hi Scr 3 | 4,500,000          | 24        | German 2 Coinage | 7 Plays/5DM        |

### 58 Install German 6

The operator can modify the game pricing selection of Standard Setting 09 in the **Pricing Table** to permit Keyset Mode operation with 7 games for 5 DM. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>     | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|-----------------|--------------------|-----------|------------------|--------------------|
| 06        | Replay Award    | Audit              | 17        | Backup Hi Scr 4  | 00                 |
| 07        | Special Award   | Score              | 18        | Hi Scr 1 Credits | 00                 |
| 08        | Match Feature   | Off                | 19        | Hi Scr 2 Credits | 00                 |
| 14        | Backup Hi Scr 1 | 00                 | 20        | Hi Scr 3 Credits | 00                 |
| 15        | Backup Hi Scr 2 | 00                 | 21        | Hi Scr 4 Credits | 00                 |
| 16        | Backup Hi Scr 3 | 00                 | 24        | German 2 Coinage | 7 Plays/5DM        |

## GAME ADJUSTMENT PROCEDURE (Continued)

### 59 Install Add-A-Ball

The operator can utilize 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> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|------------------|--------------------|-----------|------------------|--------------------|
| 06        | Replay Award     | Ball               | 19        | Hi Scr 2 Credits | 00                 |
| 07        | Special Award    | Ball               | 20        | Hi Scr 3 Credits | 00                 |
| 08        | Match Feature    | Off                | 21        | Hi Scr 4 Credits | 00                 |
| 18        | Hi Scr 1 Credits | 00                 |           |                  |                    |

### 60 Install 5 Ball

The operator can change the game to 5-Ball play, including the changing of certain features to the recommended 5-Ball play difficulty level. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>  | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>  | <u>New Setting</u> |
|-----------|--------------|--------------------|-----------|--------------|--------------------|
| 02        | Replay Start | 3,500,000          | 09        | Balls / Game | 05                 |

### 61 Install Novelty

The operator can remove all Free Play and Extra Ball awards. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>    | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>      | <u>New Setting</u> |
|-----------|----------------|--------------------|-----------|------------------|--------------------|
| 01        | Fixed Replay   | SCORES             | 08        | Match Feature    | Off                |
| 02        | Replay Level 1 | Off                | 11        | No Extra Ball    | 00                 |
| 03        | Replay Level 2 | Off                | 18        | Hi Scr 1 Credits | 00                 |
| 04        | Replay Level 3 | Off                | 19        | Hi Scr 2 Credits | 00                 |
| 05        | Replay Level 4 | Off                | 20        | Hi Scr 3 Credits | 00                 |
| 06        | Replay Award   | Audit              | 21        | Hi Scr 4 Credits | 00                 |
| 07        | Special Award  | Score              |           |                  |                    |

### 62 Install Extra Easy

The operator can change the game play difficulty adjustments to a combination that is extremely easy (sometimes called "liberal"). Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>       | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>          | <u>New Setting</u> |
|-----------|-------------------|--------------------|-----------|----------------------|--------------------|
| 31        | 2 Targets - 1 Hit | Yes                | 38        | Consol. Plug         | Yes                |
| 32        | Light Special     | Easy               | 39        | Consol. Ex. Ball     | Yes                |
| 33        | Bell Control      | Alot               | 40        | Return Lanes         | Yes                |
| 34        | Ex. Ball Memory   | Yes                | 41        | Center Ramp Auto Ad. | 40 (%)             |
| 35        | Bon. Mult. Memory | Yes                | 42        | Center Ramp Timer    | 30 sec             |
| 36        | Easy Ex. Ball     | Yes                | 45        | Easy Special         | Yes                |
| 37        | Special Memory    | Yes                | 46        | Plug Timer           | 15 sec             |

### 63 Install Easy

The operator can change the game play difficulty adjustments to a combination that is slightly easier than the Factory Settings. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>       | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>          | <u>New Setting</u> |
|-----------|-------------------|--------------------|-----------|----------------------|--------------------|
| 31        | 2 Targets - 1 Hit | Yes                | 38        | Consol. Plug         | Yes                |
| 32        | Light Special     | Easy               | 39        | Consol. Ex. Ball     | Yes                |
| 33        | Bell Control      | Alot               | 40        | Return Lanes         | Yes                |
| 34        | Ex. Ball Memory   | Yes                | 41        | Center Ramp Auto Ad. | 25 (%)             |
| 35        | Bon. Mult. Memory | Yes                | 42        | Center Ramp Timer    | 30 sec             |
| 36        | Easy Ex. Ball     | Yes                | 45        | Easy Special         | Yes                |
| 37        | Special Memory    | Yes                | 46        | Plug Timer           | 15 sec             |

## GAME ADJUSTMENT PROCEDURE (Continued)

### 64 Install Medium

The operator can change the game play difficulty adjustments to a combination that matches the Factory Settings. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>       | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>          | <u>New Setting</u> |
|-----------|-------------------|--------------------|-----------|----------------------|--------------------|
| 31        | 2 Targets - 1 Hit | No                 | 38        | Consol. Plug         | Yes                |
| 32        | Light Special     | Hard               | 39        | Consol. Ex. Ball     | Yes                |
| 33        | Bell Control      | Alot               | 40        | Return Lanes         | No                 |
| 34        | Ex. Ball Memory   | Yes                | 41        | Center Ramp Auto Ad. | 20 (%)             |
| 35        | Bon. Mult. Memory | Yes                | 42        | Center Ramp Timer    | 25 sec             |
| 36        | Easy Ex. Ball     | Yes                | 45        | Easy Special         | No                 |
| 37        | Special Memory    | Yes                | 46        | Plug Timer           | 10 sec             |

### 65 Install Hard

The operator can change the game play difficulty adjustments to a combination that is more difficult than the Factory Settings. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>       | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>          | <u>New Setting</u> |
|-----------|-------------------|--------------------|-----------|----------------------|--------------------|
| 31        | 2 Targets - 1 Hit | No                 | 38        | Consol. Plug         | Yes                |
| 32        | Light Special     | E Hard             | 39        | Consol. Ex. Ball     | Yes                |
| 33        | Bell Control      | Alot               | 40        | Return Lanes         | No                 |
| 34        | Ex. Ball Memory   | Yes                | 41        | Center Ramp Auto Ad. | 20 (%)             |
| 35        | Bon. Mult. Memory | No                 | 42        | Center Ramp Timer    | 10 sec             |
| 36        | Easy Ex. Ball     | No                 | 45        | Easy Special         | No                 |
| 37        | Special Memory    | Yes                | 46        | Plug Timer           | 7 sec              |

### 66 Install Extra Hard

The operator can change the game play difficulty adjustments to a combination that is much more difficult than the Factory Settings. Individual Adjustments are affected, as follows:

| <u>Ad</u> | <u>Name</u>       | <u>New Setting</u> | <u>Ad</u> | <u>Name</u>          | <u>New Setting</u> |
|-----------|-------------------|--------------------|-----------|----------------------|--------------------|
| 31        | 2 Targets - 1 Hit | No                 | 38        | Consol. Plug         | Yes                |
| 32        | Light Special     | E Hard             | 39        | Consol. Ex. Ball     | Yes                |
| 33        | Bell Control      | Alot               | 40        | Return Lanes         | No                 |
| 34        | Ex. Ball Memory   | Yes                | 41        | Center Ramp Auto Ad. | 20 (%)             |
| 35        | Bon. Mult. Memory | No                 | 42        | Center Ramp Timer    | 10 sec             |
| 36        | Easy Ex. Ball     | No                 | 45        | Easy Special         | No                 |
| 37        | Special Memory    | Yes                | 46        | Plug Timer           | 5 sec              |

### 67 Auto Burn-in

The operator can choose the YES option for this Special Preset Adjustment to perform certain automatic testing of the game, as used in the factory. It does not affect the game operation, but merely provides for a cyclic testing of most of the game's mechanisms.

### 68 Clear Coins

The operator can request the clearing of the coinage audits (Au 01 through 04) by selecting (via the Credit button) the YES option, as shown in the player 4 display. This adjustment zeroes the counters tallying the number of coins through each slot, the Paid Credits counter, and the Credits display.

After the YES option is displayed, the operator must press the ADVANCE button. The game then displays COINS CLEARED.

## GAME ADJUSTMENT PROCEDURE (Continued)

### 69 Clear Audits

The operator can request the clearing of the non-coinage audits (Au 05 through 38) by selecting (via the Credit button) the YES option, as shown in the player 4 display. This Adjustment zeroes the counters tallying the remaining Audit factors. Please note that this does NOT affect the Automatic Replay Percentaging data nor the automatic High Score Reset counter.

After the YES option is displayed, the operator must press the ADVANCE button. The game then displays AUDITS CLEARED.

### 70 Install Factory

The operator can request the game to provide the normal Factory Settings, essentially restoring the game to its 'factory condition', as listed in the **FIRE! Game Adjustment Table**. This Adjustment clears all Audits, resets all Game Adjustments to the respective Factory Settings, and provides a restart of the Auto Replay (Ad 01). This adjustment affects all previous operator settings of **FIRE!** game features, as follows:

| Ad | Name              | Setting | Ad | Name                 | Setting |
|----|-------------------|---------|----|----------------------|---------|
| 31 | 2 Targets - 1 Hit | No      | 38 | Consol. Plug         | Yes     |
| 32 | Light Special     | Hard    | 39 | Consol. Ex. Ball     | Yes     |
| 33 | Bell Control      | Alot    | 40 | Return Lanes         | No      |
| 34 | Ex. Ball Memory   | Yes     | 41 | Center Ramp Auto Ad. | 20 (%)  |
| 35 | Bon. Mult. Memory | Yes     | 42 | Center Ramp Timer    | 25 sec  |
| 36 | Easy Ex. Ball     | Yes     | 45 | Easy Special         | No      |
| 37 | Special Memory    | Yes     | 46 | Plug Timer           | 10 sec  |

In addition, the values of the Factory Settings for the game percentaging, scoring, and pricing factors reset to the settings listed in the **Game Adjustment Table**.

To restore the Factory Settings, the operator must press the Credit button to display the YES option. Then, the operator must press the ADVANCE button. The game then displays FACTORY SETTING.

Closing of the coin door before appearance of the FACTORY SETTING message or a problem in the Memory Protect circuit will cause the game to display ADJUST FAILURE.

A loss of battery power or improper treatment of the Game Adjustments will cause the game to attempt to restore Factory Settings. The game announces the results of this reset process with the appropriate message, FACTORY SETTING or ADJUST FAILURE.

**FIRE! Game Adjustment Setting Comparison Table**

| Adj # | Adj Description     | Extra Easy<br>Ad 62 | Easy<br>Ad 63 | Medium Ad<br>(Factory) 64 | Hard<br>Ad 65 | Extra Hard<br>Ad 66 |
|-------|---------------------|---------------------|---------------|---------------------------|---------------|---------------------|
| 31    | 2 Targets - 1 Hit   | Yes                 | Yes           | No                        | No            | No                  |
| 32    | Light Special       | Easy                | Easy          | Hard                      | E Hard        | E Hard              |
| 33    | Bell Control        | Alot                | Alot          | Alot                      | Alot          | Alot                |
| 34    | Ex. Ball Memory     | Yes                 | Yes           | Yes                       | Yes           | Yes                 |
| 35    | Bon. Mult. Memory   | Yes                 | Yes           | Yes                       | No            | No                  |
| 36    | Easy Ex. Ball       | Yes                 | Yes           | Yes                       | No            | No                  |
| 37    | Special Memory      | Yes                 | Yes           | Yes                       | Yes           | Yes                 |
| 38    | Consol. Plug        | Yes                 | Yes           | Yes                       | Yes           | Yes                 |
| 39    | Consol. Ex. Ball    | Yes                 | Yes           | Yes                       | Yes           | Yes                 |
| 40    | Return Lanes        | Yes                 | Yes           | No                        | No            | No                  |
| 41    | Cent. Ramp Auto Adj | 40%                 | 25%           | 20%                       | 20%           | 20%                 |
| 42    | Cent. Ramp Timer    | 30 sec              | 30 sec        | 25 sec                    | 10 sec        | 10 sec              |
| 45    | Easy Special        | Yes                 | Yes           | No                        | No            | No                  |
| 46    | Plug Timer          | 15 sec              | 15 sec        | 10 sec                    | 7 sec         | 5 sec               |

## RESETTING THE HIGH SCORES

The challenge of exceeding the High Score (either the factory setting or a higher score by another player) is the goal of many pinball game players. To keep a pinball game challenging requires a method of resetting the High Score value for those occasions when a skilled player registers a truly excellent score. Other players note this score and may decide not to play simply because their skill is not adequate to exceed an extremely high score.

For *FIRE!*, in fact, three methods of resetting the High Score values are available. The simplest method involves allowing Game Adjustment Item Ad 22 to reset the High Score values automatically after the specified number of plays designated by the operator. The second method requires pressing the High Score Reset switch on the inside of the coin door in the Attract Mode. This action simply erases the previous high score values and replaces them with the Backup High Score values. The third method establishes new values replacing the factory setting values (or previous operator-set values; it requires performing the following steps:

1. Using AUTO-UP or MANUAL-DOWN, reach item Ad 14 (and items Ad 15, 16, and 17, if desired). The High Score value of the factory setting (or previous operator-adjusted setting) appears in the player 1 display. If this value is satisfactory, go to step 4 below.
2. If you wish to increase the High Score value from that displayed in the player 1 display, use AUTO-UP, and press the Credit button, until the desired value shows in the player 1 display.
3. If you wish to decrease the High Score value, use MANUAL-DOWN, and press the Credit button, until the desired value shows in the player 1 display.
4. Using AUTO-UP, press and hold down ADVANCE, until the Player 3 display shows Ad 70. Press ADVANCE once, to return to Game-Over Mode.
5. Press the High Score Reset switch (on coin door), and listen for the sound signifying that the score reset action is complete. Observe player score displays (player 1, player 2, etc.) to verify that the new High Score values are displayed.

## GAME PRICING

**PRICING MADE EASY.** Game Adjustment Item Ad 24 allows the operator an easy method of setting the pricing functions. Pressing the Credit button allows the operator a choice of one of the 16 "Standard" Settings, with associated automatic pricing (Player 1 and 2 displays show the Country identifier; player 3 and 4 displays show the games per coin(s) information for a country having more than one "Standard" Setting). In the **Pricing Table**, each "Standard" Setting is denoted by a 2-digit number (other than 00) in column 24. Automatic Pricing causes each of the other pricing items (columns 25 through 30) to change to the value shown in the table for that selected "Standard" Setting.

**CUSTOM PRICING.** Adjustment Item 24 must be set to the Custom Coinage Setting (player 1 and 2 displaying CUSTOM COINAGE) to enable the operator to enter desired custom pricing selections for Items 25 through 30, based on the **Pricing Table**. Item 25 is the left coin chute multiplier. Item 26 is the center coin chute multiplier. Item 27 is the right coin chute multiplier. Item 28 is the number of coin units equal to one Credit. (A Credit is usually equal to one game.)

The calculation of the ratio of Games : Price uses the ratio equation of  $X : VC$ , where:

$X$  = Coin Chute Multiplier (Item 25, 26, or 27 in **Pricing Table**);

$V$  = Value of coin;

$C$  = Coin units equivalent to one Credit (Item 28).

For example, for 25¢ chutes at the factory setting, substituting values in the Games : Price ratio calculation gives  $1 : 25 \times 1$ , or one game for 25¢.

**UNITS REQUIRED FOR BONUS CREDIT.** Item 29 is the number of coin units that must pass through the coin chute(s) before an additional Credit (game) is posted (displayed). At the factory setting, the number in this item is 00. (This 00 means that NO bonus credit (free game) is awarded, although purchase of more than one game at a time occurs.)

## GAME PRICING (Continued)

**MINIMUM COIN UNITS.** Item 30 determines the number of coin units that must pass through the coin chute(s) before play may begin. The factory setting for this item is 00. (This 00 means that the Minimum Coin Units feature (Item 30) is disabled, by the factory setting.)

### FIRE! Pricing Table

| Country                                                                                                                                                                                                                  | Coin Chute |         |         | Games/Coin                                                                                                                                                                                                                      | Pricing Functions                                                                                                    |    |    |    |    |    |    |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----|----|----|----|----|----|--|
|                                                                                                                                                                                                                          | Left       | Center  | Right   |                                                                                                                                                                                                                                 | 24                                                                                                                   | 25 | 26 | 27 | 28 | 29 | 30 |  |
| USA and Canada                                                                                                                                                                                                           | 25¢        | -       | 25¢     | 1/25¢, 4/\$1 <sup>1,2</sup><br>1/50¢, 2/75¢, 3/\$1 <sup>2</sup><br>1/50¢, 2/\$1 <sup>2</sup><br>1/25¢, 3/50¢, 6/\$1<br>1/25¢, 5/\$1                                                                                             | 01 01 04 01 01 00 00<br>02 03 12 03 04 00 00<br>03 01 04 01 02 00 00<br>00 01 04 01 01 02 00<br>00 01 00 01 01 04 00 |    |    |    |    |    |    |  |
| West Germany                                                                                                                                                                                                             | 1 DM       | 2 DM    | 5 DM    | 1/1 DM, 2/2 DM, 7/5 DMark <sup>2,3</sup><br>1/1 DM, 3/2 DM, 10/5 DM <sup>2</sup><br>1/1 DM, 3/2 DM, 9/5 DM<br>1/2x1 DM, 1/2 DM, 3/5 DM<br>2/1 DM, 5/2 DM, 14/5 DM<br>Ticket/Token Mode <sup>4</sup><br>Keyset Mode <sup>4</sup> | 10 06 12 30 05 30 00<br>09 09 18 45 05 45 00<br>00 09 18 45 05 00 00<br>00 03 06 15 05 00 00<br>00 13 26 65 05 65 00 |    |    |    |    |    |    |  |
| France                                                                                                                                                                                                                   | 1 F        | 5 F     | 10 F    | 1/3x1 F, 2/5 F, 5/10 Franc <sup>2</sup>                                                                                                                                                                                         | 13 02 10 20 05 20 00                                                                                                 |    |    |    |    |    |    |  |
| Antilles<br>(Netherlands)                                                                                                                                                                                                | 25¢        | -       | 1 G     | 1/25¢, 4/1 Guilder                                                                                                                                                                                                              | 00 01 01 04 01 00 00                                                                                                 |    |    |    |    |    |    |  |
| Netherlands                                                                                                                                                                                                              | 25¢        | -       | 1 G     | 1/25¢, 5/1 Guilder                                                                                                                                                                                                              | 00 01 00 05 01 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 1 HFI      | 2.5 HFI | 2.5 HFI | 1/1 HFI, 3/2.5 HFI <sup>2</sup>                                                                                                                                                                                                 | 11 06 15 15 05 00 00                                                                                                 |    |    |    |    |    |    |  |
| Belgium                                                                                                                                                                                                                  | 5 F        | -       | 20 F    | 1/2x5 F, 2/20 Franc                                                                                                                                                                                                             | 00 01 01 04 02 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 5 F        | 5 F     | 20 F    | 1/2X5 F, 1/2X5 F, 3/20 F <sup>2</sup>                                                                                                                                                                                           | 08 03 03 12 04 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 5 F        | 20 F    | 20 F    | 1/2x5 F, 2/20 F, 2/20 F                                                                                                                                                                                                         | 00 01 04 04 02 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 5 F        | 5 F     | 20 F    | 1/2X5 F, 1/2X5 F, 2/20 F                                                                                                                                                                                                        | 00 01 01 04 02 00 00                                                                                                 |    |    |    |    |    |    |  |
| Spain                                                                                                                                                                                                                    | 25 P       | -       | 100P    | 1/25 P, 5/100 Peseta <sup>2</sup>                                                                                                                                                                                               | 15 01 00 05 01 00 00                                                                                                 |    |    |    |    |    |    |  |
| Switzerland                                                                                                                                                                                                              | 1 F        | 2 F     | 5 F     | 1/1 F, 3/2 F, 7/5 Franc                                                                                                                                                                                                         | 00 02 06 14 02 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 1 F        | -       | 2 F     | 1/1 F, 3/2 F <sup>2</sup>                                                                                                                                                                                                       | 07 03 00 06 02 00 00                                                                                                 |    |    |    |    |    |    |  |
| Japan                                                                                                                                                                                                                    | 100 ¥      | -       | 100 ¥   | 2/100 Yen                                                                                                                                                                                                                       | 00 04 00 04 02 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | -          | 100 ¥   | -       | 2/100 ¥ <sup>2</sup>                                                                                                                                                                                                            | 16 01 04 01 02 00 00                                                                                                 |    |    |    |    |    |    |  |
| Italy                                                                                                                                                                                                                    | 500 L      | -       | 500 L   | 1/500 Lire <sup>2</sup>                                                                                                                                                                                                         | 14 01 04 01 01 00 00                                                                                                 |    |    |    |    |    |    |  |
| Australia                                                                                                                                                                                                                | 20¢        | -       | \$1     | 1/2x20 ¢, 3/\$1 <sup>2</sup>                                                                                                                                                                                                    | 05 01 00 06 02 00 00                                                                                                 |    |    |    |    |    |    |  |
| United Kingdom                                                                                                                                                                                                           | 10 P       | 50 P    | 20 P    | 1/10 P, 5/50 P, 2/20 Pence                                                                                                                                                                                                      | 00 01 05 02 01 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 10 P       | 50 P    | 10 P    | 1/10 P, 5/50 P <sup>2</sup>                                                                                                                                                                                                     | 06 01 05 01 01 00 00                                                                                                 |    |    |    |    |    |    |  |
| Argentina                                                                                                                                                                                                                | 10¢        | 10¢     | 10¢     | 1/1 Token                                                                                                                                                                                                                       | 00 01 01 01 01 00 00                                                                                                 |    |    |    |    |    |    |  |
| Austria                                                                                                                                                                                                                  | 5 Sch      | -       | 10 Sch  | 2/5 Sch, 5/10 Schilling                                                                                                                                                                                                         | 00 02 00 05 01 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 1 Sch      | 5 Sch   | 10 Sch  | 2/5x1 Sch, 2/5 Sch, 5/10 Sch                                                                                                                                                                                                    | 00 02 10 25 05 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 5 Sch      | 10 Sch  | 10 Sch  | 1/2x5 Sch, 3/2x10 Sch <sup>2</sup>                                                                                                                                                                                              | 04 03 06 06 04 00 00                                                                                                 |    |    |    |    |    |    |  |
| Chile                                                                                                                                                                                                                    | Token      | -       | Token   | 1/1 Token <sup>1,2</sup>                                                                                                                                                                                                        | 01 01 04 01 01 00 00                                                                                                 |    |    |    |    |    |    |  |
| Denmark                                                                                                                                                                                                                  | 1 Kr       | 5 Kr    | 10 Kr   | 1/2x1 Kr, 3/5 Kr, 7/10 Krone                                                                                                                                                                                                    | 00 01 06 14 02 00 00                                                                                                 |    |    |    |    |    |    |  |
| Finland                                                                                                                                                                                                                  | 1 Mka      | -       | 1 Mka   | 1/1 Markka <sup>1,2</sup>                                                                                                                                                                                                       | 01 01 04 01 01 00 00                                                                                                 |    |    |    |    |    |    |  |
| New Zealand                                                                                                                                                                                                              | 20¢        | -       | 20¢     | 1/2x20¢ <sup>2</sup>                                                                                                                                                                                                            | 03 01 04 01 02 00 00                                                                                                 |    |    |    |    |    |    |  |
| Norway                                                                                                                                                                                                                   | 1 Kr       | -       | 1 Kr    | 1/2x1 Kr, 3/5x1 Krone                                                                                                                                                                                                           | 00 01 00 01 02 05 00                                                                                                 |    |    |    |    |    |    |  |
| Sweden                                                                                                                                                                                                                   | 1 Kr       | -       | 1 Kr    | 1/2x1 Krona <sup>2</sup>                                                                                                                                                                                                        | 03 01 04 01 02 00 00                                                                                                 |    |    |    |    |    |    |  |
|                                                                                                                                                                                                                          | 1 Kr       | 5 Kr    | 5 Kr    | 1/3x1 Kr, 2/5 Krona <sup>2</sup>                                                                                                                                                                                                | 12 02 10 10 05 00 00                                                                                                 |    |    |    |    |    |    |  |
| Notes: 1. Factory Default. 2. Standard Setting - Change by pressing Credit button. 3. Default with jumper W7 cut/removed. 4. Other functions are also affected; see the explanations for Adjustment Items 53 through 58. |            |         |         |                                                                                                                                                                                                                                 |                                                                                                                      |    |    |    |    |    |    |  |

## TEST/DIAGNOSTIC PROCEDURES

WILLIAMS ELECTRONICS GAMES provides a series of diagnostic tests to aid the operator in determining game condition (that is, whether the game's features and highlights are operating satisfactorily). These tests activate virtually all the electronic and electromechanical devices comprising the game, so that the operator can readily locate a malfunctioning device or simply verify that all devices are working properly. In order, these tests deal with the music, the displays, the game sounds, the lamps, the solenoids, and the switches.

In addition to the diagnostic testing, a feature called the Auto Burn-in Mode is available. Activating this mode enables the operator to observe the game while all of the diagnostic tests, *except the switch test*, occur. This can be very helpful in locating 'intermittent' problems.

Activating either the entire test series or one of the individual tests requires use of the Game Adjustment/ Diagnostic switches. Open the coin door for access to these switches. To proceed to the Diagnostic Tests, the operator must simply switch the game On, set the AUTO-UP/MANUAL-DOWN switch to MANUAL-DOWN, and press the ADVANCE button.

### CAUTION

*FIRE!'s System 11A game program* greatly aids the operator and service personnel: When the operator is beginning the Test/Diagnostic Procedures (and also at game Turn-On), a display now signals that a switch has NOT been actuated during ball play for a lengthy period of time (60 balls, or 20 games). However, for the Switch Problem Reporting activity at the beginning of the Test/Diagnostic Procedures, the display of problem switches is *not* limited to just three switches; it now includes ALL switches exhibiting problems. Refer to the text on Switch Tests for additional information. To proceed with the Test/Diagnostic Procedures, use AUTO-UP, and press ADVANCE.

### MUSIC TEST.

1. In the Music Test, observe that the player 1 and 2 displays show the message, MUSIC TEST. Switching to AUTO-UP, observe that the message now reads MUSIC OFF, and that the player 3 score display shows 00 00. Press the Credit button to select the desired music selection: 01 - 'Shooter Theme' through 06 - 'Hi. Score Theme' (the selections repeat). Adjust the volume control for proper sound level for the game location.
2. Use the AUTO-UP position.

### DISPLAY TEST.

1. To initiate the Display Test, press ADVANCE. Observe that player 1 and 2 displays briefly show the message, DISPLAY TEST, and that the player 3 score display shows 01 (the Display Test identifier).
2. Use AUTO-UP. Observe that all displays begin a display cycle of all 0s through all 9s, one digit at a time. Verify that the proper comma segments light during display of the odd-numbered digits. Next, a special "all segments" character 'walks' from left to right across each player score display.
3. To halt the display cycle, use MANUAL-DOWN. Then, press ADVANCE to step through the sequential digit display, digit by digit, and the subsequent "all segments" characters display test. Use AUTO-UP to resume cycling, and to proceed to the next test.

### SOUND TEST.

1. (From Display Test) To initiate the Sound Test, press ADVANCE. Observe that the player 1 and 2 displays show the message, SOUND TEST, and that the player 3 display shows 02 (the Sound Test identifier). The player 3 display shows a series of test steps from 00 through 07. Verify that a different sound is heard each time the number in the display changes.
2. To repeatedly pulse a single sound, use MANUAL-DOWN. Verify that one particular sound repeats. Press ADVANCE to step to the next sound, which repeats until ADVANCE is pressed again. Use AUTO-UP to resume cycling the sounds, and to proceed to the next test.

## TEST/DIAGNOSTIC PROCEDURES

### LAMP TESTS.

#### 1. All Lamps.

(From Sound Test) To initiate the first Lamps Test, press ADVANCE. Observe that the player 1 and 2 displays show the message, ALL LAMPS, and that the player 3 display shows 03 (All LampsTest identifier) and that all feature lamps (playfield and backbox) blink on and off. (Note, however, that the General Illumination lamps remain lighted steadily.) To locate the wiring associated with a particular feature lamp, refer to the **Lamp-Matrix Table**. CPU Board connections at jacks 1J6 (columns) and 1J7 (rows) are also listed in the table.

#### 2. Single Lamps.

From the All Lamps test, using AUTO-UP, press ADVANCE to initiate the Single Lamps Test. The player 1 and 2 displays initially show the message, SINGLE LAMPS, and the player 3 display shows 04. Then, the player 3 display shows 04 01, and the player 1 and 2 displays change to show NOT USED (because that circuit does not activate a lamp). Normally, the name of the lamp currently blinking appears in this display. Press the Credit button to proceed through an ascending series of designator numbers (01 through 64), with the player 1 and 2 displays showing the individual lamp's name. Press and hold the Credit button to proceed rapidly to the desired lamp.

**2** Double Lamps

**FIRE! Lamp-Matrix Table**

| COLUMN               | 1 Q66<br>YEL-BRN<br>1J7-1    | 2 Q64<br>YEL-RED<br>1J7-2            | 3 Q62<br>YEL-ORN<br>1J7-3             | 4 Q60<br>YEL-BLK<br>1J7-4       | 5 Q58<br>YEL-GRN<br>1J7-6              | 6 Q56<br>YEL-BLU<br>1J7-7            | 7 Q54<br>YEL-VIO<br>1J7-8               | 8 Q52<br>YEL-GRY<br>1J7-9            |
|----------------------|------------------------------|--------------------------------------|---------------------------------------|---------------------------------|----------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------------|
| ROW                  |                              |                                      |                                       |                                 |                                        |                                      |                                         |                                      |
| Q80 RED-BRN<br>1J6-1 | Not Used<br>1                | RESCUE SHOT<br>2 9                   | Upper Left<br>3-Bank<br>(top) 17      | FIGHT FIRE<br>AGAIN 25          | SPECIAL<br>(left outlane) 33           | WEST SIDE<br>41                      | 3-Bank<br>Buildings<br>(upper right) 49 | Left Kickbig<br>Buildings 57         |
| Q81 RED-BLK<br>1J6-2 | Not Used<br>2                | 16 X 2<br>(center<br>windows) 10     | Upper Left<br>3-Bank<br>(center) 18   | FIRE PLUG<br>26                 | SPECIAL<br>(right outlane) 34          | EAST SIDE<br>42                      | 3-Bank<br>Buildings<br>(upper right) 50 | Left Kickbig<br>Buildings 58         |
| Q82 RED-ORN<br>1J6-3 | Not Used<br>3                | Lower Left<br>3-Bank<br>(top) 11     | Upper Left<br>3-Bank<br>(bottom) 19   | RAISE<br>FIREPLUG<br>(left) 27  | 3-Bank<br>Buildings<br>(upper left) 35 | Not Used<br>43                       | Not Used<br>51                          | Right Lockup<br>Buildings 59         |
| Q83 RED-YEL<br>1J6-5 | FIRE<br>MULTIPLIERS<br>X2 4  | Lower Left<br>3-Bank<br>(center) 12  | Upper Right<br>3-Bank<br>(top) 20     | RAISE<br>FIREPLUG<br>(right) 28 | 3-Bank<br>Buildings<br>(upper left) 36 | Left shop<br>window<br>2X 44         | Corner<br>Buildings<br>(upper left) 52  | Not Used<br>60                       |
| Q84 RED-GRN<br>1J6-6 | FIRE<br>MULTIPLIERS<br>X3 5  | Lower Left<br>3-Bank<br>(bottom) 13  | Upper Right<br>3-Bank<br>(center) 21  | RESCUE<br>VICTIM<br>(left) 29   | Flames<br>(left ramp) 37               | Left center<br>shop window<br>3X 45  | Center<br>Building<br>(upper left) 53   | PUT OUT<br>FIRE<br>(left return) 61  |
| Q85 RED-BLU<br>1J6-7 | FIRE<br>MULTIPLIERS<br>X5 6  | Lower Right<br>3-Bank<br>(top) 14    | Upper Right<br>3-Bank<br>(bottom) 22  | RESCUE<br>VICTIM<br>(right) 30  | TRAP<br>(left) 38                      | Center shop<br>window<br>4X 46       | Center<br>Building<br>(upper right) 54  | PUT OUT<br>FIRE<br>(right return) 62 |
| Q86 RED-VIO<br>1J6-8 | FIRE<br>MULTIPLIERS<br>X7 7  | Lower Right<br>3-Bank<br>(center) 15 | 16 X 2<br>(upper left<br>windows) 23  | EXTRA BALL<br>(left) 31         | Flames<br>(right ramp) 39              | Right center<br>shop window<br>5X 47 | Corner<br>Buildings<br>(upper right) 55 | LITES RESCUE<br>(left ramp) 63       |
| Q87 RED-GRY<br>1J6-9 | FIRE<br>MULTIPLIERS<br>X10 8 | Lower Right<br>3-Bank<br>(bottom) 16 | 16 X 2<br>(upper right<br>windows) 24 | EXTRA BALL<br>(right) 32        | TRAP<br>(right) 40                     | Right shop<br>window<br>10X 48       | Corner<br>Buildings<br>(upper right) 56 | LITES RESCUE<br>(right ramp) 64      |

## TEST/DIAGNOSTIC PROCEDURES (Continued)

### SOLENOID TEST.

- (From Lamp Test) Using AUTO-UP, press ADVANCE. Observe that the player 1 and 2 displays show the message, COIL TEST, the player 3 display shows 05 (Solenoid Test identifier). Next, the player 3 display shows a series of test steps from 01 through 22, while the player 1 and 2 displays show the solenoid/circuit name. During each of these steps, pulsing of the respective solenoid/circuit occurs. The test cycles repeatedly, unless halted to check a single solenoid, via the MANUAL-DOWN switch. Refer to the **Solenoid Table** for solenoid numbers and wiring information. CPU Board connections at 1P11, 1P12, and 1P19 are also listed in the table.

To continuously pulse a single solenoid/circuit, use MANUAL-DOWN. Press ADVANCE to sequence through the switched, controlled, and special solenoids. Use AUTO-UP to resume test cycling, and to proceed to the next test.

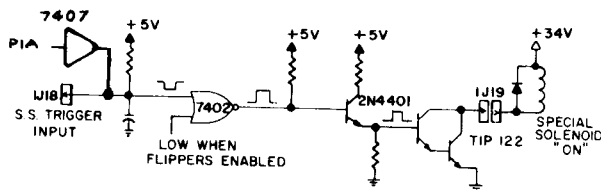
**FIRE! Solenoid Table**

| Sol. No.         | Function                       | Solenoid Type | Wire <sup>1</sup> Color | Connections |                                        | Driver Trans. | Solenoid Part Number Flashlamp Type |               |
|------------------|--------------------------------|---------------|-------------------------|-------------|----------------------------------------|---------------|-------------------------------------|---------------|
|                  |                                |               |                         | CPU Bd.     | Playfield/Cabinet                      |               | b = Backbox                         | p = Playfield |
| 01A <sup>3</sup> | Outhole Kicker                 | Switched      | { Vio-Brn }             | 1P11-1      | 8P3-1 (to B1 on Diode Sw. Bd.)         | Q33           | AE-23-800-01                        |               |
| 01C <sup>3</sup> | L. Rescue & 3-Bank Flashers    | Switched      | { Blk-Brn }             | (Gry-Brn)   |                                        | Q33           | #89 flashlamps                      | 4p            |
| 02A <sup>3</sup> | Ball Shooter Lane Feeder       | Switched      | { Vio-Red }             | 1P11-3      | 8P3-2 (to B2 on Diode Sw. Bd.)         | Q25           | AE-23-800-03                        |               |
| 02C <sup>3</sup> | R. Rescue & 3-Bank Flashers    | Switched      | { Blk-Red }             | (Gry-Red)   |                                        | Q25           | #89 flashlamps                      | 4p            |
| 03A <sup>3</sup> | Left Ramp Raise                | Switched      | { Vio-Orn }             | 1P11-4      | 8P3-3 (to B3 on Diode Sw. Bd.)         | Q32           | AE-24-900-02                        |               |
| 03C <sup>3</sup> | Center Ramp Flashers           | Switched      | { Blk-Orn }             | (Gry-Orn)   |                                        | Q32           | #89 flashlamps                      | 2p            |
| 04A <sup>3</sup> | Left Ramp Lower                | Switched      | { Vio-Yel }             | 1P11-5      | 8P3-4 (to B4 on Diode Sw. Bd.)         | Q24           | SM-26-600-DC                        |               |
| 04C <sup>3</sup> | Window & FIRE Flashers         | Switched      | { Blk-Yel }             | (Gry-Yel)   |                                        | Q24           | #89 flashlamps                      | 2p            |
| 05A <sup>3</sup> | Fireplug                       | Switched      | { Vio-Grn }             | 1P11-6      | 8P3-5 (to B5 on Diode Sw. Bd.)         | Q31           | AE-23-800-06                        |               |
| 05C <sup>3</sup> | Right Ramp Lower               | Switched      | { Blk-Grn }             | (Gry-Grn)   |                                        | Q31           | SM-26-600-DC                        |               |
| 06A <sup>3</sup> | Right Lock-up                  | Switched      | { Vio-Blu }             | 1P11-7      | 8P3-6 (to B6 on Diode Sw. Bd.)         | Q23           | AE-23-800-02                        |               |
| 06C <sup>3</sup> | Lwr L. 3-Bank & L. B'box Flash | Switched      | { Blk-Blu }             | (Gry-Blu)   |                                        | Q23           | #89 flashlamps                      | 2b,1p         |
| 07A <sup>3</sup> | Right Ramp Raise               | Switched      | { Vio-Blk }             | 1P11-8      | 8P3-7 (to B7 on Diode Sw. Bd.)         | Q30           | AE-24-900-02                        |               |
| 07C <sup>3</sup> | Lwr R. 3-Bank & R. B'box Flash | Switched      | { Blk-Vio }             | (Gry-Vio)   |                                        | Q30           | #89 flashlamps                      | 2b,1p         |
| 08A <sup>3</sup> | Knocker (or Ticket Dispenser)  | Switched      | { Vio-Gry }             | 1P11-9      | 8P3-8 (to B8 on Diode Sw. Bd.)         | Q22           | AE-23-800-03                        |               |
| 08C <sup>3</sup> | Bell                           | Switched      | { Blk-Gry }             | (Gry-Blk)   |                                        | Q22           | AE-23-800-02                        |               |
| 09               | Center Ramp Motor              | Controlled    | Brn-Blk                 | 1P12-1      | 8P3-9                                  | Q17           | 5580-12145-00 <sup>4</sup>          |               |
| 10               | General Illum. (Playfield)     | Controlled    | Brn-Red                 | 1P12-2      | 8P3-10                                 | Q9            | 5580-12145-00 <sup>4</sup>          |               |
| 11               | General Illum. (Backbox)       | Controlled    | Brn-Orn                 | 1P12-4      | 6P3-5                                  | Q16           | 5580-12145-00 <sup>4</sup>          |               |
| 12               | Solenoid A/C Select Relay      | Controlled    | Brn-Yel                 | 1P12-5      | 8P3-12                                 | Q8            | 5580-12145-00 <sup>4</sup>          |               |
| 13               | Flames/Motor Relay (P'fld)     | Controlled    | Brn-Grn                 | 1P12-6      | 8P3-13                                 | Q15           | 5580-12145-00 <sup>4</sup>          |               |
| 14               | Flames Flasher (B'box)         | Controlled    | Brn-Blu                 | 1P12-7      | 8P3-14                                 | Q7            | #89 flashlamps                      |               |
| 15               | Left Kickbig                   | Controlled    | Brn-Vio                 | 1P12-8      | 8P3-15                                 | Q14           | AE-23-800-03                        |               |
| 16               | Window Lites Relay             | Controlled    | Brn-Gry                 | 1P12-9      | 8P3-16                                 | Q6            | 5580-12145-00 <sup>4</sup>          |               |
| 17               | Not Used                       | Special #1    | Blu-Brn                 | 1P19-7      | 8P3-17                                 | Q75           |                                     |               |
| 18               | Not Used                       | Special #2    | Blu-Red                 | 1P19-4      | 8P3-18                                 | Q71           |                                     |               |
| 19               | Upper Left Kicker              | Special #3    | Blu-Orn                 | 1P19-3      | 8P3-19                                 | Q73           | AE-24-900-02                        |               |
| 20               | Upper Right Kicker             | Special #4    | Blu-Yel                 | 1P19-6      | 8P3-20                                 | Q69           | AE-24-900-02                        |               |
| 21               | Lower Left Kicker              | Special #5    | Blu-Grn                 | 1P19-8      | 8P3-21                                 | Q77           | AE-23-800-03                        |               |
| 22               | Lower Right Kicker             | Special #6    | Blu-Blk                 | 1P19-9      | 8P3-22                                 | Q79           | AE-23-800-03                        |               |
| -                | Right Flipper                  | -             | Orn-Vio<br>[Blu-Vio]    | 1P19-1      | 7P1-15<br>[7P1-16,8P3-34] <sup>2</sup> | -             | FL11630-50VDC                       |               |
| -                | Left Flipper                   | -             | Orn-Gry<br>[Blu-Gry]    | 1P19-2      | 7P1-18<br>[7P1-19,8P3-32] <sup>2</sup> | -             | FL11630-50VDC                       |               |

**Notes:** 1. Wire colors, except flipper Orn-Vio and Orn-Gry, are ground connections (to coil terminal with unbanded end of diode). Flipper Orn-Vio and Orn-Gry wires connect from CPU Board to flipper switch. 2. Flipper connections shown in braces are from flipper switch to flipper coil. 3. "A" coils are pulsed, when Sol. 12 is de-energized; "C" coils are pulsed, with Sol. 12 energized. Wire colors in brackets are those from respective A and C terminals corresponding to the B terminal connection listed for the Diode Switching Board, which controls the device pulsing by Sol. 12. 4. Relay (p/n 5580-12145-00) is mounted on Relay Bd. p/n C-11677-2 or C-11677-3.

## TEST/DIAGNOSTIC PROCEDURES (Continued)

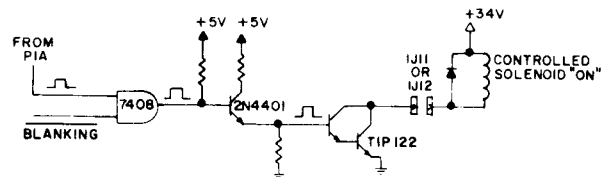
### "On" State Logic - Special Solenoid



### "Off" State - Special Solenoid:

The Special Switch Trigger Input goes low. Meanwhile, the PIA line remains high. The remaining signals reverse their states.

### "On" State Logic - Controlled Solenoid



### "Off" State - Controlled Solenoid:

The Enable Input (from the PIA) goes low. Meanwhile, the BLANKING signal remains high. The rest of the signals reverse their states.

## NOTE

As directed by the game program, the Solenoid A/C Select Relay (solenoid 12) switches the solenoid B+ power between two power busses to permit actuating two groups of solenoids at the proper times. In its de-energized state, the Relay connects the 'circuit A power' to 16 "controlled" and "switched" solenoids (identified in the table with no suffix letter or the letter A, after the solenoid number). Individual solenoid operation then depends on the game program enabling the ground path for solenoid actuation, via the driver transistor associated with each solenoid circuit. For example, the game program can actuate the Outhole kicker solenoid (sol. 01A), via the driver transistor Q33.

When the game program determines that the Solenoid A/C Select Relay (sol. 12) must be energized, the relay connects 'circuit C power' to eight group C solenoids (01C through 08C). Now, driver transistor Q33 can actuate the Left Rescue & 3-Bank Flashlamps circuit (sol. 01C). Using this "multiplexing" technique, the same driver transistor can control actuation of two separate solenoid circuits.

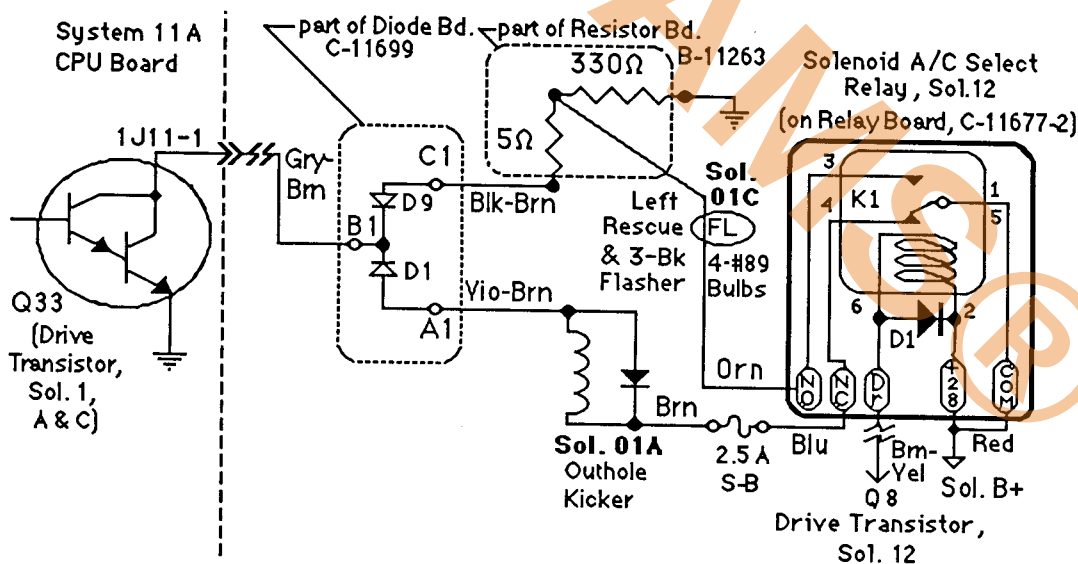


Figure 2. Typical Solenoid A/C Select Relay Circuit

## TEST/DIAGNOSTIC PROCEDURES (Continued)

### SWITCH TESTS.

#### 1. Switch Levels.

(From Solenoid Test) To initiate the Switch Levels Test, press ADVANCE. Observe that the player 1 and 2 displays show the message, SWITCH LEVELS, and the player 3 display shows 06 (Switch Levels Test identifier). Normally, the right portion of the player 3 display remains blank, indicating that no switch is actuated.

If, however, a switch is actuated (possibly stuck closed), the player 3 display shows that switch's number, while the player 1 and 2 displays indicate the switch's name. A sound also accompanies the displays. (This is another facet of the *FIRE!* System 11A's switch testing capability.) If more than one switch is closed, a series of displays show each actuated switch's name and number.

(In addition, either of these problems could result in the reporting of a switch problem (or problems) at game Turn-On or at the beginning of Diagnostic Tests.)

As soon as the operator opens a closed switch, its name and number are eliminated from the Switch Levels display series. For *FIRE!*, switch numbers can range from 01 through 63. Refer to the **Switch-Matrix Table** for switch numbers and wiring information. CPU Board connections at jacks 1J8 (columns) and 1J10 (rows) are also listed in the table.

***FIRE!* Switch-Matrix Table**

| COLUMN<br>ROW       | 1 Q45<br>GRN-BRN<br>1J8-1 | 2 Q49<br>GRN-RED<br>1J8-2            | 3 Q44<br>GRN-ORN<br>1J8-3            | 4 Q48<br>GRN-YEL<br>1J8-4     | 5 Q43<br>GRN-BLK<br>1J8-5 | 6 Q47<br>GRN-BLU<br>1J8-7 | 7 Q42<br>GRN-VIO<br>1J8-8    | 8 Q46<br>GRN-GRY<br>1J8-9 |
|---------------------|---------------------------|--------------------------------------|--------------------------------------|-------------------------------|---------------------------|---------------------------|------------------------------|---------------------------|
| 1 WHT-BRN<br>1J10-9 | Plumb Bob<br>Tilt 1       | Playfield<br>Tilt 9                  | Upper left<br>3-Bank<br>(top) 17     | Ball Shooter<br>25            | Drain Lane<br>(left) 33   | Left<br>Ramp<br>Down 41   | Left Kickbig<br>(top) 49     | Lower left<br>Kicker 57   |
| 2 WHT-RED<br>1J10-8 | Not Used<br>2             | Outhole<br>10                        | Upper left<br>3-Bank<br>(center) 18  | FIRE PLUG<br>(down) 26        | Drain Lane<br>(right) 34  | Right<br>Ramp<br>Down 42  | Left Kickbig<br>(bottom) 50  | Lower right<br>Kicker 58  |
| 3 WHT-ORN<br>1J10-7 | Credit<br>Button 3        | Lower left<br>3-Bank<br>(top) 11     | Upper left<br>3-Bank<br>(bottom) 19  | HORSESHOE<br>(left entry) 27  | Return Lane<br>(left) 35  | Right Rollover<br>20K 43  | Not Used<br>51               | Center<br>Ramp<br>Down 59 |
| 4 WHT-YEL<br>1J10-6 | Right<br>Coin<br>Chute 4  | Lower left<br>3-Bank<br>(center) 12  | Upper right<br>3-Bank<br>(top) 20    | HORSESHOE<br>(right entry) 28 | Return Lane<br>(right) 36 | Right Rollover<br>10K 44  | Right Lockup<br>(middle) 52  | WINDOW<br>60              |
| 5 WHT-GRN<br>1J10-5 | Center<br>Coin<br>Chute 5 | Lower left<br>3-Bank<br>(bottom) 13  | Upper right<br>3-Bank<br>(center) 21 | Not Used<br>29                | On Ramp<br>(left) 37      | Right Rollover<br>30K 45  | Right Lockup<br>(bottom) 53  | Upper left<br>Kicker 61   |
| 6 WHT-BLU<br>1J10-3 | Left<br>Coin<br>Chute 6   | Lower right<br>3-Bank<br>(top) 14    | Upper right<br>3-Bank<br>(bottom) 22 | Not Used<br>30                | On Ramp<br>(right) 38     | Right Rollover<br>100K 46 | Ball Trough<br>#3 (left) 54  | Upper right<br>Kicker 62  |
| 7 WHT-VIO<br>1J10-2 | Slam<br>Tilt 7            | Lower right<br>3-Bank<br>(center) 15 | LANE CHANGE<br>(left) 23             | SAVE Target<br>(left) 31      | Under Ramp<br>(left) 39   | Right Rollover<br>5K 47   | Ball Trough<br>#2 (mid) 55   | Center<br>Ramp<br>Up 63   |
| 8 WHT-GRY<br>1J10-1 | High-Score<br>Reset 8     | Lower right<br>3-Bank<br>(bottom) 16 | LANE CHANGE<br>(right) 24            | SAVE Target<br>(right) 32     | Under Ramp<br>(right) 40  | 1K<br>Button 48           | Ball Trough<br>#1 (right) 56 | Not Used<br>64            |

**Row Problems.** If a display of two (or more) switch numbers of a row occurs, although only one switch is closed, check for a short circuit between the column wires.

**Multiple Switch Number Indications.** Check the associated column wire for a short circuit to ground.

**Column Problems.** If display of two (or more) switch numbers in a column occurs (while only one switch is actuated), check for a short circuit between the row wires.

Use AUTO-UP to proceed to the next test.

## TEST/DIAGNOSTIC PROCEDURES (Continued)

### SWITCH TESTS (Continued).

#### 2. Switch Edges.

From the Switch Levels Test, press ADVANCE. Observe that the player 1 and 2 displays show the message, SWITCH EDGES; the player 3 display shows 07 (Switch Edges Test identifier). The right portion of the player 3 display is blank, indicating that no switch is actuated.

This test permits the operator to test whether actuating a switch provides the proper signal to the System 11A switch testing program. When using a ball to actuate a switch, the operator should see the switch's name and number (in the player 1, 2, and 3 displays, respectively). If no indication appears at the time the switch is actuated, the operator then knows that there is a malfunction associated with that switch.

Using this technique, the operator can test each switch appearing in the switch problem reporting displays (either at game Turn-On or at the beginning of the Diagnostic Tests) to determine whether the switch can be actuated. If the switch's name and number continue to be displayed while the operator checks its operation, the operator then knows that the reported problem with that switch is NOT currently caused by a switch malfunction. The operator can then seek other causes for the reported problem, being almost certain now that the switch did not fail. *This test is also useful when the operator is adjusting the sensitivity of a particular switch's actuation mechanism.*

Among the possibilities is the fact that the players have not actuated that switch because of some other problem; the operator should try to analyze what could cause the switch to be missed, and remedy that problem cause. With these new tests, switch problems are, therefore, more easily isolated.

3. *Playfield or CPU Board?* To determine whether a switch problem is in the playfield or the CPU Board, remove connectors 1P8 and 1P10 from the CPU Board. Begin the Switch Test. Use a jumper wire to simulate switch actuation. For example, placing a jumper between 1J10-9 and 1J8-2 should (based on the **Switch-Matrix Table**) should produce an indication of switch 09 being actuated.

### ENDING THE DIAGNOSTIC TESTS.

To end the Diagnostic Tests, reach the Switch Edges Test (07 in the Player 3 display), use AUTO-UP and press ADVANCE. The backbox displays should show the *FIRE!* game's Identification Information. Use MANUAL-DOWN, and press ADVANCE to reach Adjustment Item 70 (INSTALL FACTORY). Use AUTO-UP and press ADVANCE to obtain the Attract Mode.

### AUTO BURN-IN MODE.

The Auto Burn-in Mode permits the operator to check intermittent (or nonrecurring) problems associated with most portions of the game's circuitry. Repeatedly cycling through a group of tests can sometimes bring a problem, which occurs only randomly or occasionally, to exhibit itself more frequently, thereby aiding in the isolation of the problem. To activate the Auto Burn-in Mode:

1. While in the Game Adjustments, reach Ad 67 and change the Factory Setting of NO to YES, via the Credit button. Set the AUTO-UP/MANUAL-DOWN switch to AUTO-UP.
2. Press ADVANCE to start the Auto Burn-in Mode. This mode repeatedly sequences through the Music Test, the Display Test, the Sound Test, the All Lamps portion of the Lamp Test, and the Solenoid Test.
3. To halt the Auto Burn-in Mode, switch the game Off and then On. *FIRE!* now starts in the Attract Mode. (If a switch problem is now reported by the displays, perform the Switch Tests again to determine the nature of the problem; then, perform necessary repairs.)

## TEST/DIAGNOSTIC PROCEDURES (Continued)

### SYSTEM-11A MEMORY CHIP TEST.

A new feature is now included in the Memory Chip Test for System 11A. During power-up, the CPU performs a self-testing routine. When all tests are satisfactory, the game proceeds to the Attract Mode, allowing players to use the game. Whenever a portion of the testing does not produce satisfactory results, the game displays a message, before proceeding to the next portion of the testing. ONLY after all tests are satisfactory does the game allow play.

In addition to the displayed message, when a test fails, the lower LED mounted on the CPU Board can be observed to determine the probable cause of the problem. The LED blinks, or flashes, a certain number of times to identify the probable cause, as described in the **CPU LED Indicator Codes Table**. The operator can also start the self-testing routine by pressing the CPU Diagnostic Switch (SW 2) on the edge of the CPU Board.

**CPU LED Indicator Codes Table**

| Diagnostic LED                                                                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Blinks/Flashes                                                                                                                                                                                                                                        | Display Message    | Explanation                                                                                                                                                                                                                      |
| 1                                                                                                                                                                                                                                                     | U25 RAM FAILURE    | U25 RAM could not be used properly (NO other tests are performed; the game is locked here, until the game is turned off).                                                                                                        |
| 2                                                                                                                                                                                                                                                     | MEM. PROT. FAILURE | This message means that (A) the Coin Door may be shut; (B) the Memory Protect Switch may be stuck in the ON position; (C) the memory protect logic is protecting the memory; or (D) a U25 RAM failure is occurring. (See Note 1) |
| 3                                                                                                                                                                                                                                                     | U51 PIA FAILURE    | U51 has a malfunction. (See Note 2)                                                                                                                                                                                              |
| 4                                                                                                                                                                                                                                                     | U38 PIA FAILURE    | U38 has a malfunction. (See Note 2)                                                                                                                                                                                              |
| 5                                                                                                                                                                                                                                                     | U41 PIA FAILURE    | U41 has a malfunction. (See Note 2)                                                                                                                                                                                              |
| 6                                                                                                                                                                                                                                                     | U42 PIA FAILURE    | U42 has a malfunction. (See Note 2)                                                                                                                                                                                              |
| 7                                                                                                                                                                                                                                                     | U54 PIA FAILURE    | U54 has a malfunction. (See Note 2)                                                                                                                                                                                              |
| 8                                                                                                                                                                                                                                                     | U10 PIA FAILURE    | U10 has a malfunction. (See Note 2)                                                                                                                                                                                              |
| 9                                                                                                                                                                                                                                                     | IRQ FAILURE        | IRQ has a malfunction. It may be missing or too fast or too slow.                                                                                                                                                                |
| 10                                                                                                                                                                                                                                                    | U27 ROM FAILURE    | U27's internal checksums do not match. It may be a ROM failure, or its associated connections and connecting devices are causing it to appear to have a problem. (The following U26 test is skipped.)                            |
| 11                                                                                                                                                                                                                                                    | U26 ROM FAILURE    | U26's internal checksums do not match.                                                                                                                                                                                           |
| <b>Notes:</b> 1. This test assumes that the Coin Door is OPEN; it is initiated ONLY by pressing the CPU Diagnostic Switch (SW2).<br>2. Alternatively, its associated connections or connecting devices are causing the IC to appear to have problems. |                    |                                                                                                                                                                                                                                  |

### SYSTEM-11A SOUND CIRCUITRY TESTS.

Tests of the System-11A Sound circuitry, including the Sound/Speech Board are possible, only after successful completion of the System-11A Memory Chip Test.

- 1. Sound/Speech Board Test.** A brief check of the Sound/Speech Board (D-11298) circuitry occurs at game Turn-on; the game reports the test results by brief sounds, as follows: No sound = Sound/ Speech Board is not operating, or a failure is affecting the sound circuitry (broken cable; dead amplifier; etc.); 1 sound = system OK; 2 sounds = RAM problem; 3 sounds = U4 problem; 4 sounds = U19 problem.
- 2. General System-11A Sound Test.** Press the Sound Diagnostic Switch (SW 1) on left edge of the CPU Board. Listen for the sound of a siren showing that both the CVSD (Continuously Variable Slope Delta) Modulator, which provides the voices for *FIRE!*, and the DAC (Digital-to-Analog Converter) sound circuits are functioning properly.

## TEST/DIAGNOSTIC PROCEDURES (Continued)

### SYSTEM-11A SOUND CIRCUITRY TESTS (Continued)

If no sound is heard, refer to the text entitled "NO SOUND ...". If one "ring" is heard, this indicates a malfunction of the U23 RAM Chip. If either two or four "rings" is heard, this indicates a problem associated with the U21 ROM Chip. If either three or five "rings" is heard, this indicates a problem with the U22 ROM Chip.

**NO SOUND DURING THIS TEST** (but sound can be heard during the Diagnostic Tests).

Check the sound-select inputs (pins 2 through 9 of U9) to see if they pulse during Sound Test 01. Also, check the -12 V supply voltage on the CPU Board. If this voltage is low (or AC ripple seems too high), perform the following checks:

1. The gray and gray-green transformer secondary wires for 19.4 VAC.
2. The CPU Board filter capacitor C26 for -12 VDC.
3. The filter capacitor C26 for excessive AC ripple (over 0.75VAC).

If the previous checks did not isolate the problem, turn the Volume Control for maximum output. Momentarily touch a powered-up AC soldering pencil on the center tap of the Volume Control.

#### CAUTION

DO NOT use a soldering iron over 40 watts. Note also that cordless soldering irons will NOT work for this test.

Hearing a low hum indicates that the power amplifier (U1, TDA2002), the Volume Control, and the speaker are operating satisfactorily, as is the sound circuit cabling. Not hearing a hum requires repeating the test with the Volume Control turned part way down, to determine whether the Volume Control is faulty. Also, check the cable connectors for proper mating, and that no broken wires affect this circuit.

### FUSE LISTING.

The following fuses are used:

| Part Number   | Description                    | Circuit/Location                               |
|---------------|--------------------------------|------------------------------------------------|
| 5730-09252-00 | Fuse, 8A Slow-Blow (S-B), 125v | Input Power ("high voltage") Line/Cabinet Box* |
| 5731-09651-00 | Fuse, 5A S-B, 250v             | Gen. Illumination/Right Backbox fuseholder (4) |
| 5731-09128-00 | Fuse, 2-1/2A S-B, 250v         | Outhole circuit/ L Playfield fuseholder        |
| 5731-10356-00 | Fuse, 3A S-B, 250v             | Sol. 09 & Sol. 13 ckts/R Playfield fuseholder  |
| 5731-08761-00 | Fuse, 1/4A S-B, 250v           | F1, D-8345-554 Power Supply                    |
| 5731-09071-00 | Fuse, 8A, 32v                  | F3, D-8345-554 Power Supply                    |
| 5731-06314-00 | Fuse, 4A S-B, 250v             | F2, F4; D-8345-554 Power Supply                |
| 5731-09432-00 | Fuse, 7A S-B, 250v             | F5, F6; D-8345-554 Power Supply                |

\* One 4A S-B, 250v fuse (5731-06314-00) is provided for an overseas (220v) game installation.

## MAINTENANCE INFORMATION

Figure 3 shows the two main lubrication points of the Ball Shooter Lane Feeder (also the Right Eject Hole device, which utilizes the same mechanism). The shaded arrows show the directions in which the Ball Shooter Lane Feeder and other parts of its related assemblies can be adjusted for proper operation.

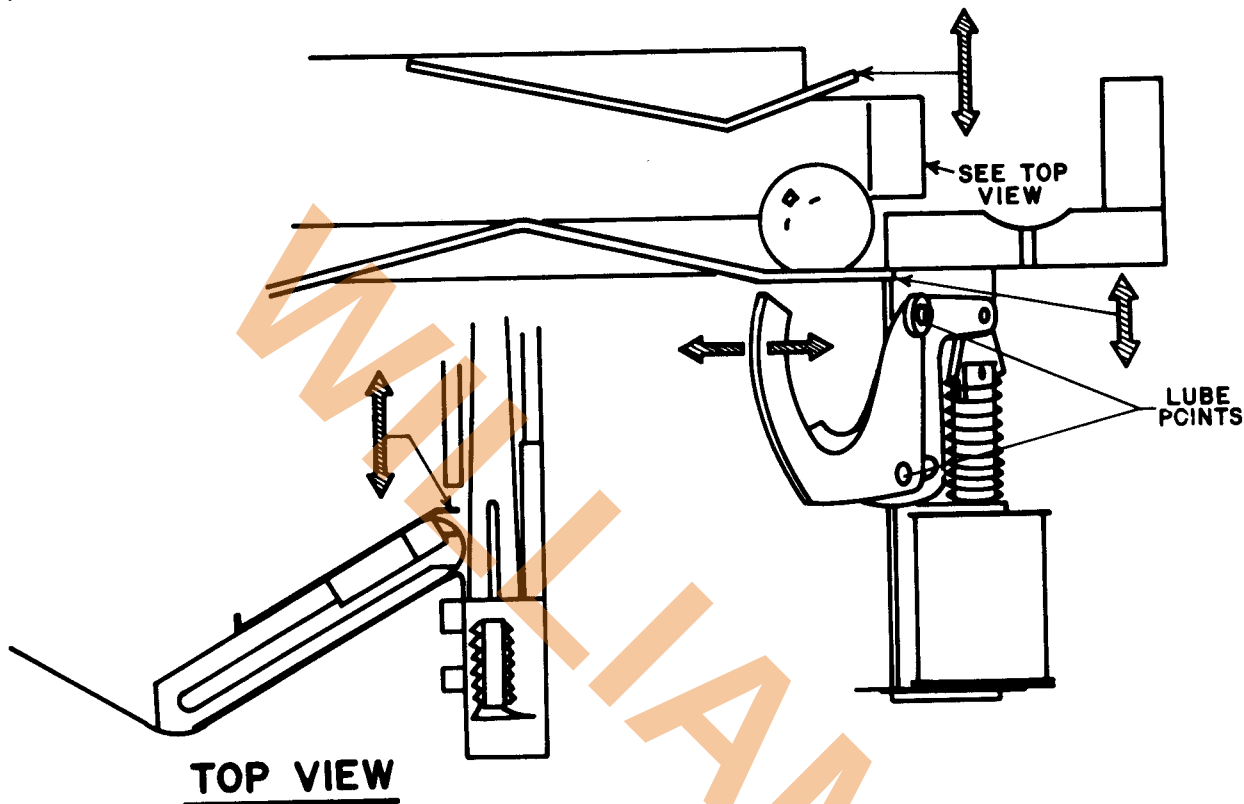


Figure 3. Adjustments and Lubrication Points, Ball Shooter Lane Feeder.

Lubrication to ensure proper operation also applies to other devices on *FIRE!*, such as the shaft of the Fireplug, and the axle portions of the Left and Right Ramp Lifters. Regular maintenance is essential to a game's continuing contribution to the operator's earnings.

### Solder Warning

#### WARNING

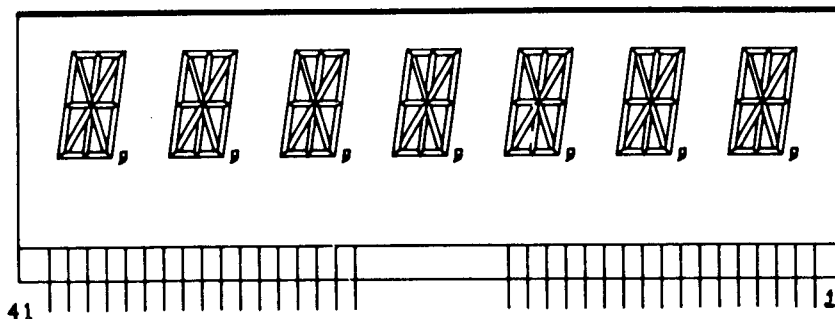
Use ONLY *Rosin-core* solder to repair electrical/electronic problems. Other types of solder can damage or destroy electronic parts, especially Printed Circuit Board wiring and switch contacts.

## Section 2

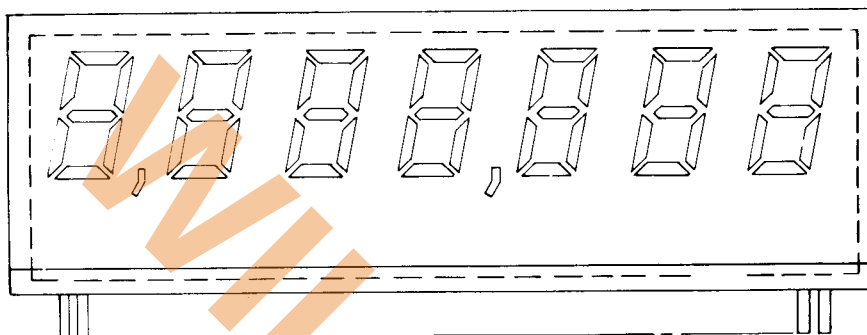
### *Game Parts Information*

- **Parts Lists and Diagrams:**

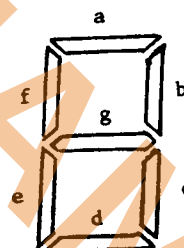
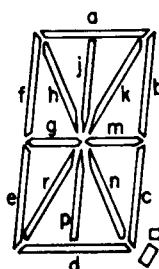
**Displays Information**  
**Alphanumeric Display Unit Parts**  
**Power Supply Board (D-8345-554)**  
**CPU Board (D-11392-556)**  
**Audio Board (D-11581-556)**  
**Various PCB Assemblies**  
**Backbox Parts**  
**Miscellaneous *FIRE!* Parts**  
**Flipper Assemblies**  
**Ball Shooter Lane Feeder**  
**Fireplug Assembly**  
**Outhole & Ball Trough Switches**  
**Standup Target Assembly**  
**Ramp Target Assembly**  
**Playfield Pivot Parts**  
**Ramp Lifting Mechanism**  
**Ball Kicker Assemblies**  
**Flames Tube Assemblies**  
**Switches**  
**Lamps**  
**Solenoids/Flashers & Rubber Parts**  
**Playfield Parts**



**7-digit Alphanumeric Display Glass, p/n 5670-10873-00**



**7-digit 7-segment Display Glass, p/n 5670-09439-00**

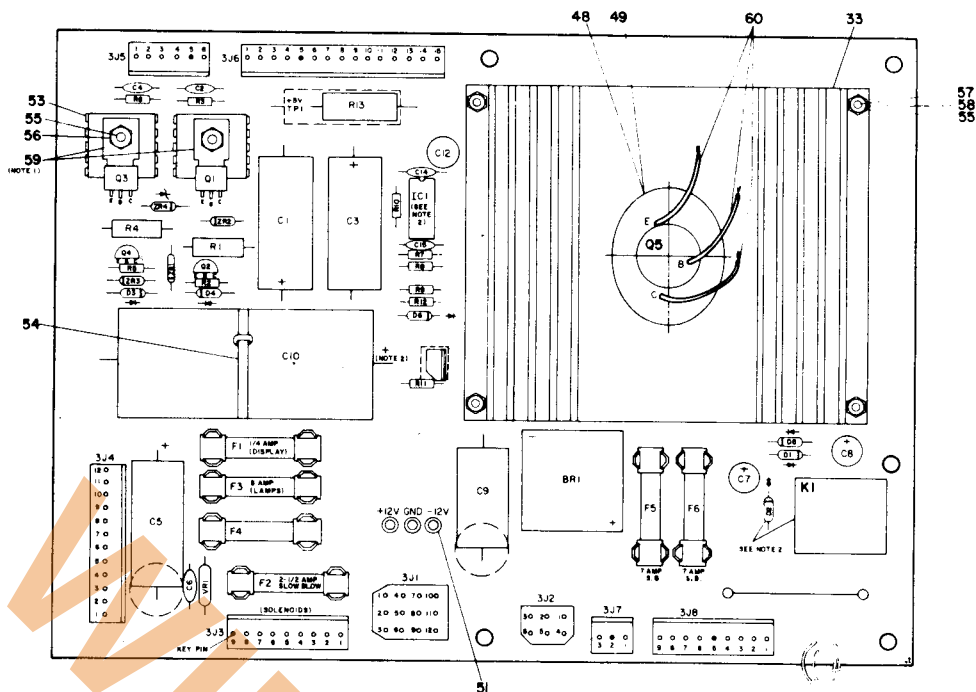


**Display Characters Segment Designations**

## Alphanumeric Display Unit Board

including p/n D-116 & associated parts

| Part No.      | Ckt Designator    | Description                                     | Part No.      | Ckt Designator                       | Description                        |
|---------------|-------------------|-------------------------------------------------|---------------|--------------------------------------|------------------------------------|
| 5760-12134-00 |                   | Bare P. C. Board                                | 5010-08773-00 | R1, R2, R8, R20, R23                 | Resistor, 18 K, 1/4 w, 5%          |
| 5680-08968-00 | U8, U13, U14, U16 | IC, Anode/Digit Driver, UDN6118A or 6184        | 5010-10927-00 | R4, R6, R18, R19, R21, R22, R24, R25 | Resistor, 8.2 K, 1/2 w, 5%         |
| 5310-09882-00 | U4 - U7           | IC, Quad NOR, 4001B                             | 5010-10258-00 | R27, R28, R30 - R35                  | Resistor, 1 M, 1/4 w, 5%           |
| 5680-08969-00 | U11, U12, U15     | IC, Cathode Seg. Driver, UDN7180A               | 5010-08981-00 | R3, R5, R7, R9, R10, R12 - R17       | Resistor, 10 K, 1/2 w, 5%          |
| 5310-09153-00 | U1 - U3, U9, U10  | IC, Hex Buffer, 4050                            | 5010-08772-00 | R11                                  | Resistor, 15 K, 1/4 w, 5%          |
| 5075-09135-00 | D1                | Zener diode, 1N4740A, 10V, 1 w                  | 5670-10873-00 | DSPY1, DSPY2                         | Display, 7-character, A/N          |
| 5040-09343-00 | C4                | Capacitor, 10 $\mu$ fd., 20v, $\pm$ 20%, Axial  | 5670-09439-00 | DSPY3, DSPY4                         | Display, 7-character, 7-segment    |
| 5043-08996-00 | C3                | Capacitor, 0.1 $\mu$ fd., 50v, $\pm$ 20%, Axial | 5791-10851-00 | J1                                   | Connector, 26 pin (Hdr), Rt. Angle |
| 5043-08980-00 | C1, C2, C5 - C7   | Capacitor, 0.01 $\mu$ fd, 50v, Axial            | 5791-10869-06 | J2                                   | Connector, 6 pin (Hdr), Rt. Angle  |
| 5019-10387-00 | SR1 - SR3         | SIP, 18 K, 9R, 10P, 5%                          | 5791-10869-09 | J3 - J5                              | Connector, 9 pin (Hdr), Rt. Angle  |
|               |                   |                                                 | 03-8088-1     | Support                              | Support, Display                   |



#### NOTES:

1. Heat sink compound must be applied between transistor and heat sink.
2. Observe index mark on integrated circuit, polarity of capacitors and diodes, and position of transistors.
3. The view of Q5 and its related heat sink and hardware is from the bottom of the heatsink, to clarify installation.

## Power Supply

p/n D-8345-554

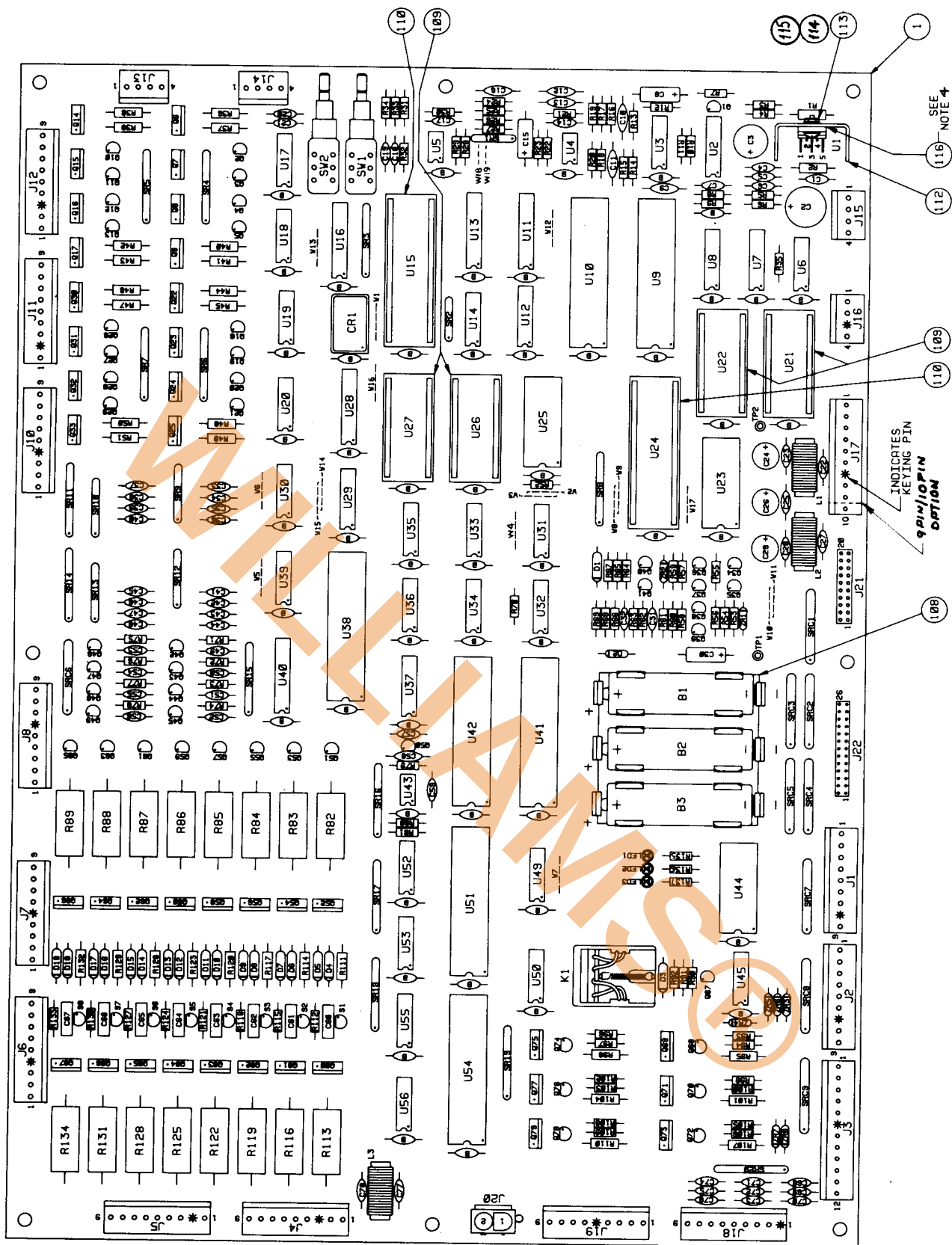
| Item | Part No.      | Ckt Designator | Description                                          | Item | Part No.      | Ckt Designator | Description                     |
|------|---------------|----------------|------------------------------------------------------|------|---------------|----------------|---------------------------------|
| 1    | 5765-09466-01 |                | Bare P. C. Board                                     | 28   | 5164-12154-00 | Q1             | Transistor, MJE15030, NPN       |
| 2    | 5013-09426-00 | R7             | Resistor, 2.15K, 1%,<br>1/4w, Metal Film             | 29   | 5164-09056-00 | Q4             | Transistor, MPSD02, NPN         |
| 3    | 5013-09427-00 | R8             | Resistor, 4.99K, 1%,<br>1/4w, Metal Film             | 30   | 5194-09058-00 | Q3             | Transistor, MJE15031, PNP       |
| 4    | 5010-09428-00 | R11            | Resistor, 1.5K, 2%,<br>1/4w, C. Film                 | 31   | 5194-09055-00 | Q2             | Transistor, MPSD52, PNP         |
| 5    | 5010-09085-00 | R10            | Resistor, 1.5K, 5%, 1/4w                             | 32   | 5162-09425-00 | Q5             | Transistor, 2N6057, NPN         |
| 6    | 5010-09541-00 | R9             | Resistor, 2.7K, 2%, 1/4w                             | 33   | 5705-09431-00 |                | Heat Sink                       |
| 7    | 5010-09508-00 | R12            | Resistor, 270Ω, 2%,<br>1/4w, C. Film                 | 34   | 5791-09074-00 | 3J6            | Connector, 15 pin (Hdr)         |
| 8    | 5012-09429-00 | R13            | Resistor, 0.12Ω, 5%, 5w                              | 35   | 5791-09027-00 | 3J3, 3J8       | Connector, 9 pin (Hdr)          |
| 9    | 5010-09536-00 | R1, R4         | Resistor, 39K, 5%, 1w                                | 36   | 5791-09038-00 | 3J2            | Connector, 6 pin (Hdr)          |
| 10   | 5010-09061-00 | R2, R5         | Resistor, 680Ω, 2w                                   | 37   | 5791-09067-00 | 3J5            | Connector, 6 pin (Hdr)          |
| 11   | 5010-09069-00 | R3, R6         | Resistor, 330K, 5%, 1/2w                             | 38   | 5791-09043-00 | 3J4            | Connector, 12 pin (Hdr)         |
| 12   | 5040-09419-00 | C10            | Capacitor, 18,000 mfd, electr,<br>20v, axial         | 39   | 5791-09435-00 | 3J7            | Connector, 3 pin (Hdr)          |
| 13   | 5040-09420-00 | C9             | Capacitor, 1000 mfd, electr,<br>25v, axial or radial | 40   | H-11065       | 3J9            | Cable/Connector Assembly        |
| 14   | 5040-09423-00 | C12            | Capacitor, 330 mfd, electr,<br>10v, radial           | a)   | 5791-09400-00 |                | Connector shell                 |
| 15   | 5043-9065-00  | C15            | Capacitor, 470 pfd                                   | b)   | 5820-09080-00 |                | Connector pin                   |
| 16   | 5040-9053-00  | C1, C3         | Capacitor, 100 mfd, electr,<br>150v                  | 41   | 5791-09068-00 | 3J1            | Connector, 12 pin (Hdr)         |
| 17   | 5040-09070-00 | C5             | Capacitor, 100 mfd, electr,<br>100v, axial or radial | 42   | 5321-09178-00 |                | Fuseholder                      |
| 18   | 5043-09072-00 | C2, C4         | Capacitor, 0.1 mfd, 500v, disc                       | 43   | 5731-06314-00 | F2             | Fuse, 4A, 250v, S-B             |
| 19   | 5043-09446-00 | C14            | Capacitor, 0.1 mfd, 50v, disc                        | 44   | 5730-09071-00 | F3             | Fuse, 8A, 32v                   |
| 20   | 5070-06258-00 | D1, D2, D5, D6 | Diode, 1N4001                                        | 45   | 5731-06314-00 | F4             | Fuse, 4A, 250v                  |
| 21   | 5070-09054-00 | D3, D4         | Diode, 1N4004                                        | 46   | 5731-08761-00 | F1             | Fuse, 1/4A, 250v, S-B           |
| 22   | 5075-09059-00 | ZR1, ZR3       | Zener, 1N5990, 3.9v, 5%                              | 47   | 5017-09064-00 | VR1            | Varistor                        |
| 23   | 5075-09060-00 | ZR2, ZR4       | Zener, 1N4764, 100v, 5%                              | 48   | 5700-09445-00 |                | Socket                          |
| 24   | 5460-09424-00 | IC1            | IC, Volt. Reg., MC1723C                              | 49   | 5701-09652-00 |                | Mica Insulator                  |
| 25   | 5043-09443-00 | C6             | Capacitor, 0.1 mfd, 200v, disc                       | 50   | 5580-09555-01 | K1             | Relay, 24VDC, 10A, DPDT         |
| 26   | 5040-09421-00 | C7             | Capacitor, 100 mfd, 25v, radial                      | 51   | 5824-09428-00 | TP1 - TP3      | Terminal, #1502-1 (Test Post)   |
| 27   | 5040-09422-00 | C8             | Capacitor, 47 mfd, 50v, radial                       | 52   | 5100-09418-00 | BR1            | Bridge Rectifier, 35A, 100V     |
|      |               |                |                                                      | 53   | 5705-09042-00 |                | Heat Sink                       |
|      |               |                |                                                      | 54   | 03-7947       |                | Tie Wrap                        |
|      |               |                |                                                      | 55   | 4005-01016-07 |                | Mach. Screw, 5-40 x 7/16, RH    |
|      |               |                |                                                      | 56   | 4700-00004-00 |                | Flatwasher, 0.146 x 3/8, 21 Ga. |
|      |               |                |                                                      | 57   | 4701-00023-00 |                | Lockwasher, #5, split           |
|      |               |                |                                                      | 58   | 4405-01117-00 |                | Hex Nut, 5-40                   |
|      |               |                |                                                      | 59   | 20-9229       |                | Heat sink Thermal Compound      |
|      |               |                |                                                      | 60   | HW-30118-4    |                | Lead wire, 18 AWG, 3"           |
|      |               |                |                                                      | 61   | 5731-09342-00 | F6, F5         | Fuse, 7A, 250V, S-B             |

# System 11A CPU Board (D-11392) Parts Information

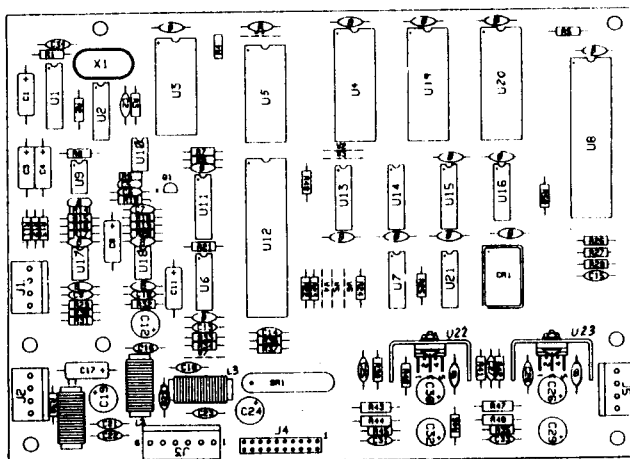
| Item            | Part No.      | Ckt Designator                                                                    | Description                         | Item | Part No.      | Ckt Designator                                              | Description                                        |
|-----------------|---------------|-----------------------------------------------------------------------------------|-------------------------------------|------|---------------|-------------------------------------------------------------|----------------------------------------------------|
| 1               | 5764-12091-00 |                                                                                   | Bare P. C. Board                    | 63   | 5010-10171-00 | R67                                                         | Resistor, 56Ω, 5%, 1/4w, C. F.                     |
| 2               | 5370-09691-00 | U3                                                                                | IC, CVSD Mod., 55536                | 64   | 5010-10170-00 | R69                                                         | Resistor, 47Ω, 5%, 1/4w, C. F.                     |
| 3               | 5370-09321-00 | U4, U5                                                                            | IC, Dual Op Amp, 1458               | 65   | 5010-09160-00 | R59, R61, W12, W13                                          | Resistor, 220Ω, 5%, 1/4w, C. F.                    |
| 4               | 5281-09308-00 | U16                                                                               | IC, Octal Bus Xcvr, 74LS245         | 66   | 5010-09416-00 | R33, R34, R135-137                                          | Resistor, 470Ω, 5%, 1/4w, C. F.                    |
| 5               | 5430-08972-00 | U9, U10, U38, U41, U42, U51, U54                                                  | IC, PIA, MC6820/6821                | 67   | 5010-09179-00 | R9                                                          | Resistor, 3.3MΩ, 5%, 1/4w, C. F.                   |
| 6               | 5340-10139-00 | U25                                                                               | IC, 2K x 8 CMOS Static RAM          | 68   | 5010-09085-00 | R71-R78                                                     | Resistor, 1.5KΩ, 5%, 1/4w, C. F.                   |
| 7               | 5280-09010-00 | U44                                                                               | IC, 4-16 Decoder, 74154             | 69   | 5010-10361-00 | R111, R114, R117, R120, R123, R126, R129, R132              | Resistor, 1.2KΩ, 5%, 1/2w, C. F.                   |
| 8               | 5281-09246-00 | U7, U8, U12                                                                       | IC, 2-4 Decoder, 74LS139            | 70   | 5010-08824-00 | R15                                                         | Resistor, 43KΩ, 5%, 1/4w, C. F.                    |
| 9               | 5075-09406-00 | ZR3 - ZR8                                                                         | Diode, Zener, 6.2v, 0.5w            | 71   | 5010-09342-00 | R16                                                         | Resistor, 36KΩ, 5%, 1/4w, C. F.                    |
| 10              | Not Used      |                                                                                   |                                     | 72   | 5010-08846-00 | R17                                                         | Resistor, 220KΩ, 5%, 1/4w, C. F.                   |
| 11              | 5281-09487-00 | U6                                                                                | IC, Dual D Flip-flop, 74LS74        | 73   | 5010-09333-00 | R18                                                         | Resistor, 180KΩ, 5%, 1/4w, C. F.                   |
| 12              | 5431-09449-00 | U43                                                                               | IC, Timer, MC1455                   | 74   | 5010-09324-00 | R19, R20, R22, R29, R30                                     | Resistor, 27KΩ, 5%, 1/4w, C. F.                    |
| 13              | 5310-09236-00 | U29                                                                               | IC, 14-b Counter, 4020              | 75   | 5010-08772-00 | R21                                                         | Resistor, 15KΩ, 5%, 1/4w, C. F.                    |
| 14              | 5281-09743-00 | U32                                                                               | IC, Quad 2-Input AND, 74LS08        | 76   | 5010-09356-00 | R27, R28                                                    | Resistor, 820Ω, 5%, 1/4w, C. F.                    |
| 15              | 5281-09247-00 | U14                                                                               | IC, Quad 2-Input NOR, 74LS02        | 77   | 5019-09783-00 | SR18                                                        | SIP, 9R, 10-pin, 6.8KΩ, .125w/R, 5%                |
| 16              | 5281-09235-00 | U35                                                                               | IC, Triple 3-Input NAND, 74LS10     | 78   | 5019-09362-00 | SR3, SR15, SR17, SR19, SR20                                 | SIP, 9R, 10-pin, 4.7KΩ, .125w/R, 5%                |
| 17              | 5280-09013-00 | U36                                                                               | IC, Hex Inverter, 7404              | 79   | 5019-09808-00 | SR4, SR6, SR11                                              | SIP, 9R, 10-pin, 560Ω, .125w/R, 5%                 |
| 18              | 5281-09499-00 | U31, U34                                                                          | IC, Quad 2-Input NAND, 74LS00       | 80   | 5019-09785-00 | SR16                                                        | SIP, 9R, 10-pin, 2.2KΩ, .125w/R, 5%                |
| 19              | 5281-10014-00 | U33                                                                               | IC, Dual 4-Input NAND, 74LS20       | 81   | 5019-10472-00 | SR14                                                        | SIP, 9R, 10-pin, 3.3KΩ, .125w/R, 5%                |
| 20              | 5281-09486-00 | U28                                                                               | IC, Octal D Flip-flop, 74LS374      | 82   | 5019-09669-00 | SR8, SRC6                                                   | SIP, 9R, 10-pin, 1.0KΩ, .125w/R, 5%                |
| 21              | 5371-09152-00 | U2                                                                                | IC, D/A Converter, MC1408           | 83   | 5019-09780-00 | SR9, SR10, SR12, SR13                                       | SIP, 4R, 8-pin, 1KΩ, 5%                            |
| 22              | 5281-09745-00 | U37                                                                               | IC, 3-8 Decoder, 74LS138            | 84   | 5019-09786-00 | SR1, SR2                                                    | SIP, 5R, 6-pin, 4.7KΩ, .125w/R, 5%                 |
| 23              | 5340-09878-00 | U23                                                                               | IC, 2K x 8 Static RAM, 2016         | 85   | 5019-09792-00 | SR5, SR7                                                    | SIP, 9R, 10-pin, 2.7KΩ, .125w/R, 5%                |
| 24              | 5370-09156-00 | U1                                                                                | IC, Aud. Amp., TDA2002              | 86   | 5060-10396-00 | SRC1 - SRC5, SRC7 - SRC9                                    | SIP, 8R, 8C, 10-pin, 4.7KΩ & 470pfd                |
| 25              | 5281-09867-00 | U11, U13, U40                                                                     | IC, Octal Buffer, 74LS244           | 87   | Not Used      |                                                             |                                                    |
| 26              | 5280-08973-00 | U17-U20, U52, U53                                                                 | IC, Quad 2-Input AND, 7408          | 88   | 5043-08980-00 | C14, C17-C21, C31, C32, C49-C56, C59, + 54 Bypass, marked B | Capacitor, 0.01 μfd, 50v(+80,-20%), Axial          |
| 27              | 5280-08974-00 | U55, U56                                                                          | IC, Hex Inverter, 7406              | 89   | 5043-09845-00 | C6, C22, C23, C25, C27, C28                                 | Capacitor, 1K pfd, 50v(±20%), Axial                |
| 28              | 5310-09155-00 | U30, U39                                                                          | IC, Quad 2-Input NAND, MC14011      | 90   | 5043-08996-00 | C1, C4, C5, C70-75, C77, C78                                | Capacitor, 0.1 μfd, 50v(±20%), Axial               |
| 29              | 5280-08948-00 | U45, U50                                                                          | IC, Quad 2-Input NOR, 7402          | 91   | 5040-09343-00 | C8, C15                                                     | Capacitor, 10 μfd, Electr., 20v(±20%), Axial       |
| 30              | 5280-09309-00 | U49                                                                               | IC, Hex Buffer, 7407                | 92   | 5043-09844-00 | C7, C41-C48                                                 | Capacitor, 47 pfd, 50v(±20%), Axial                |
| 31              | 5671-09019-00 | LED1-LED3                                                                         | LED, Red, Display                   | 93   | 5040-10974-00 | C3, C24, C26, C29                                           | Capacitor, 100 μfd, Electr., 25v(+50,-10%), Axial  |
| 32              | 5521-10506-00 | CR1                                                                               | Oscillator, 4 MHz                   | 94   | 5040-09776-00 | C2                                                          | Capacitor, 470 μfd, Electr., 16v(+50,-10%), Radial |
| 33              | 5162-08976-00 | Q51, Q53, Q55, Q57, Q59, Q61, Q63, Q65                                            | Transistor, NPN Darl. 2N6427, TO-92 | 95   | 5045-09796-00 | C60-C67                                                     | Capacitor, 0.1 μfd, Polycarbonate Rad., 100v(±10%) |
| 34              | 5191-08978-00 | Q52, Q54, Q56, Q58, Q60, Q62, Q64, Q66                                            | Transistor, PNP, TIP42, TO-220      | 96   | 5043-09065-00 | C33-C40, C68, C69, C76                                      | Capacitor, 470 pfd, 50v(±20%), Axial               |
| 35              | 5162-09410-00 | Q6-Q9, Q14-Q17, Q22-Q25, Q30-Q33, Q69, Q71, Q73, Q75, Q77, Q79, Q80-Q87           | Transistor, NPN, TIP122, TO-220     | 97   | 5040-09545-00 | C30                                                         | Capacitor, 22 μfd, Electr., 10v(+50,-10%), Axial   |
| 36              | 5160-08938-00 | Q2-Q5, Q10-Q13, Q18-Q21, Q26-Q29, Q34-Q38, Q41, Q67, Q68, Q70, Q72, Q74, Q76, Q78 | Transistor, NPN, 2N4401, TO-92      | 98   | 5041-09031-00 | C9, C58                                                     | Capacitor, 1 μfd, Tant., 25v(±20%), Axial          |
| 37              | 5160-10269-00 | Q1, Q40, Q42-Q49                                                                  | Transistor, NPN, 2N3904, TO-92      | 99   | 5043-09030-00 | C16, C57                                                    | Capacitor, 0.047 μfd, 50v(±20%), Axial             |
| 38              | 5190-09016-00 | Q39, Q50                                                                          | Transistor, PNP, 2N4403, TO-92      | 100  | 5046-09347-00 | C10                                                         | Capacitor, 1800 pfd, Polystyrene, 50v(±5%)         |
| 39              | 5130-09014-00 | S1-S8                                                                             | SCR, 30v, 0.8A, 2N5060              | 101  | 5046-09350-00 | C11                                                         | Capacitor, 180 pfd, Polystyrene, 100v(±5%)         |
| 40              | 5070-06258-00 | D3-D19                                                                            | Diode, 1N4001                       | 102  | 5046-09346-00 | C12                                                         | Capacitor, 1200 pfd, Polystyrene, 50v(±5%)         |
| 41              | 5070-08918-00 | D2                                                                                | Diode, 1N4148, 150mA                | 103  | 5046-09348-00 | C13                                                         | Capacitor, 4700 pfd, Polystyrene, 50v(±5%)         |
| 42              | 5070-09266-00 | D1                                                                                | Diode, 1N5817, 1.0A                 | 104  | 5551-09822-00 | L1-L3                                                       | Inductor, 4.7 μH, 3A                               |
| 43              | 5075-09018-00 | ZR1                                                                               | Diode, Zener, 1N5996A, 6.8v, 0.5w   | 105  | 5641-09312-00 | SW1, SW2                                                    | Switch, Pushbutton, DPDT, 100v, 5A                 |
| 44              | 5075-09059-00 | ZR2                                                                               | Diode, Zener, 1N5990, 3.9v, 0.5w    | 106  | 5880-09022-00 | B1-B3                                                       | Battery, Alkaline, 1.5v, AA                        |
| 45              | 5010-08992-00 | R94, R97, R100, R103, R106, R109                                                  | Resistor, 560Ω, 5%, 1/4w, C. F.     | 107  | 20-9491       | W18, W19                                                    | Bus Wire, Jumper                                   |
| 46              | 5010-09039-00 | R56                                                                               | Resistor, 10Ω, 5%, 1/4w, C. F.      | 108  | 5881-09021-00 |                                                             | Battery Holder, #171                               |
| 47              | 5010-09534-00 | W1, W2, W4, W5, W7, W8, W11, W14, W16, W17                                        | Resistor, 0Ω, 5%, 1/4w, C. F.       | 109  | 5700-10176-00 |                                                             | IC Socket, 28 pin                                  |
| 48              | 5010-08991-00 | R31, R32, R35, R52                                                                | Resistor, 4.7KΩ, 5%, 1/4w, C. F.    | a)   | A-5343-556-1  | U26                                                         | IC, Game ROM 2, 27128                              |
| 49              | 5010-09358-00 | R55, R68, R92                                                                     | Resistor, 1.0KΩ, 5%, 1/4w, C. F.    | b)   | A-5343-556-2  | U27                                                         | IC, Game ROM 1, 27256                              |
|                 |               | R5, R6, R57, R58, R64, R66, R112, R115, R118, R121, R124, R127, R130, R133        | Resistor, 10KΩ, 5%, 1/4w, C. F.     | c)   | A-5343-556-4  | U21                                                         | IC, Sound ROM 1, 27256                             |
| 50              | 5010-09113-00 | R79                                                                               | Resistor, 33KΩ, 5%, 1/4w, C. F.     | d)   | A-5343-556-3  | U22                                                         | IC, Sound ROM 2, 27256                             |
| 51              | 5010-08983-00 | R7, R8, R10, R70, R80                                                             | Resistor, 3.3KΩ, 5%, 1/4w, C. F.    | 110  | 5700-08985-00 |                                                             | IC Socket, 40 pin                                  |
| 52              | 5010-09034-00 | R11-R14, R25, R26, R53, R60, R65, R90                                             | Resistor, 10KΩ, 5%, 1/4w, C. F.     | a)   | 5400-09150-00 | U15                                                         | IC, μProcessor, 6802                               |
| 53              | 5010-09086-00 | R81                                                                               | Resistor, 6.8KΩ, 5%, 1/4w, C. F.    | b)   | 5400-09150-00 | U24                                                         | IC, μProcessor, 6802                               |
| 54              | 5010-09363-00 | R3                                                                                | Resistor, 5.6KΩ, 5%, 1/4w, C. F.    | 111  | 5824-09248-00 | TP1, TP2                                                    | Test Point                                         |
| 55              | 5010-08997-00 | R23, R24, R91, R93, R96, R99, R102, R105, R108                                    | Resistor, 2.7KΩ, 5%, 1/4w, C. F.    | 112  | 5705-09199-00 |                                                             | Heatsink, #6030                                    |
| 56 <sup>2</sup> | 5012-09037-00 | R113, R116, R119, R122, R125, R128, R131, R134                                    | Resistor, 0.4Ω, 5%, 3w, Wire-Wnd.   | 113  | 4006-01003-06 |                                                             | Mach. Screw, 6-32 x 3/8", P-PH-S                   |
| 57              | 5010-08993-00 | R35-R51, R95, R98, R101, R104, R107, R110                                         | Resistor, 68Ω, 5%, 1/2w, C. F.      | 114  | 4406-01117-00 |                                                             | Nut, Hex, 6-32                                     |
| 58 <sup>2</sup> | 5012-10860-00 | R82-R89                                                                           | Resistor, 27Ω, 5%, 2w, C. F.        | 115  | 4703-00007-00 |                                                             | Lockwasher, #6                                     |
| 59              | 5010-09361-00 | R1                                                                                | Resistor, 220Ω, 5%, 1/2w, C. F.     | 116  | 20-9229       |                                                             | Thermal Compound (see Note 4)                      |
| 60              | 5010-09181-00 | R2                                                                                | Resistor, 1.0Ω, 5%, 1/2w, C. F.     | 117  | 5580-08994-01 | K1                                                          | Relay, 4-pole, 40Ω, 6v                             |
| 61              | 5010-09161-00 | R4                                                                                | Resistor, 2.2Ω, 5%, 1/4w, C. F.     | 118  | 5791-10862-09 | IJ1, IJ2, IJ4-IJ8, IJ10-IJ12, IJ17-IJ19                     | Connector, 9 pin (Hdr)                             |
| 62              | 5010-10003-00 | R62, R63                                                                          | Resistor, 390Ω, 5%, 1/4w, C. F.     | 119  | 5791-10862-04 | IJ13-IJ16                                                   | Connector, 4 pin (Hdr)                             |
|                 |               |                                                                                   |                                     | 120  | 5791-10862-12 | IJ3                                                         | Connector, 12 pin (Hdr)                            |
|                 |               |                                                                                   |                                     | 121  | Not Used      |                                                             |                                                    |
|                 |               |                                                                                   |                                     | 122  | 5791-10850-00 | IJ22                                                        | Connector, 26 pin Ribbon (Hdr)                     |
|                 |               |                                                                                   |                                     | 123  | 5791-09437-00 | IJ21                                                        | Connector, 20 pin Ribbon (Hdr)                     |

## NOTES:

- For Schematic, refer to drawing #16-8993.
- Items 56 and 58 (resistors) must be mounted 1/8" above PCB surface.
- Standard Jumper: W1, W2, W4, W5, W7, W8, W11, W14, W16, W17.
- Use thermal compound between item 24 (U1) and item 112 (heatsink).



System 11A CPU Board (D-11392) Parts Information



## Audio Board Assembly

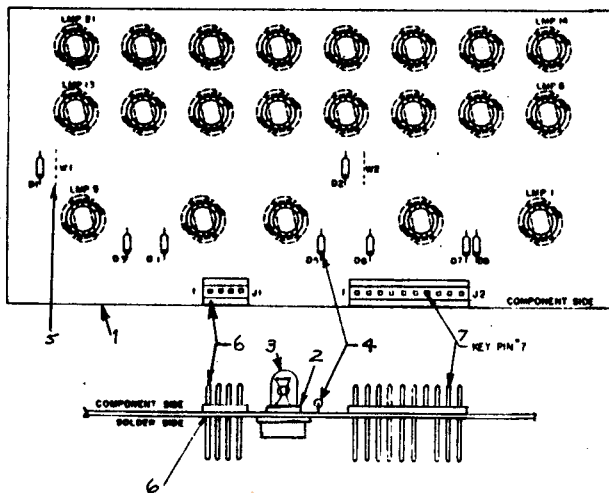
p/n D-11581-556

| Part No.         | Ckt Designator                                      | Description                       | Part No.      | Ckt Designator                | Description                              |
|------------------|-----------------------------------------------------|-----------------------------------|---------------|-------------------------------|------------------------------------------|
| 5766-12130-00    |                                                     | Bare P. C. Board                  | 5013-09427-00 | R13                           | Resistor, 4.99K, 1/4w, 1%                |
| 5731-11087-00    | U1                                                  | IC, D/A Conv, YM3012              | 5010-09086-00 | R16                           | Resistor, 6.8K, 1/4w, 5%                 |
| a) 5700-09006-00 |                                                     | Socket, IC, 16-pin (U1)           | 5010-09034-00 | R14, R15, R17, R22 - R24, R34 | Resistor, 10K, 1/4w, 5%                  |
| 5730-11086-00    | U3                                                  | IC, Sound Processor, YM2151       | 5010-08772-00 | R18                           | Resistor, 15K, 1/4w, 5%                  |
| a) 5700-09004-00 |                                                     | Socket, IC, 24-pin (U3)           | 5010-09324-00 | R6, R19 - R21, R38            | Resistor, 27K, 1/4w, 5%                  |
| 5400-10320-00    | U8                                                  | IC, $\mu$ Processor, MC68B09E     | 5010-09342-00 | R30                           | Resistor, 36K, 1/4w, 5%                  |
| a) 5700-08985-00 |                                                     | Socket, IC, 40-pin (U8)           | 5010-08824-00 | R32                           | Resistor, 43K, 1/4w, 5%                  |
| A-5343-556-5     | U4                                                  | IC, Music/Speech ROM 1            | 5010-09162-00 | R39                           | Resistor, 100K, 1/4w, 5%                 |
| a) 5700-10176-00 |                                                     | Socket, IC, 28-pin (U4)           | 5010-09333-00 | R29                           | Resistor, 180K, 1/4w, 5%                 |
| 5371-09152-00    | U11                                                 | IC, D/A Convtr, MC1408            | 5010-08846-00 | R31                           | Resistor, 220K, 1/4w, 5%                 |
| 5430-10322-00    | U12                                                 | IC, PIA, MC68B21                  | 5010-10258-00 | R40                           | Resistor, 1M, 1/4w, 5%                   |
| 5340-09878-00    | U5                                                  | IC, RAM, 2016                     | 5010-09179-00 | R10                           | Resistor, 3.3M, 1/4w, 5%                 |
| 5281-09487-00    | U7, U16                                             | IC, Dual D Flipflop, 74LS74       | 5040-09365-00 | C11                           | Capacitor, 1 $\mu$ fd, 63v; +50, -10%    |
| 5281-10043-00    | U13                                                 | IC, 74LS175                       | 5040-09343-00 | C1, C3, C4, C8, C17           | Capacitor, 10 $\mu$ fd, 20v, $\pm$ 20%   |
| 5281-09235-00    | U21                                                 | IC, Triple NAND, 74LS10           | 5040-10974-00 | C12, C19, C24                 | Capacitor, 100 $\mu$ fd, 35v             |
| 5370-09321-00    | U9, U10, U17, U18                                   | IC, Op Amp, MC1458                | 5040-09776-00 | C26, C30                      | Capacitor, 470 $\mu$ fd, 16v; +50, -10%  |
| 5281-09215-00    | U2                                                  | IC, Hex Inv, 74LS04               | 5040-12006-00 | C29, C32                      | Capacitor, 1000 $\mu$ fd, 16v, 20%       |
| 5281-09246-00    | U14                                                 | IC, 2-4 Dec, 74LS139              | 5041-09243-00 | C25, C28                      | Capacitor, 10 $\mu$ fd, 10v, $\pm$ 10%   |
| 5281-09745-00    | U15                                                 | IC, Dual Mux, 74LS138             | 5043-08980-00 | C5, B (21)*                   | Capacitor, 0.01 $\mu$ fd, 50v, +80, -20% |
| 5370-09156-00    | U22, U23                                            | IC, Audio Amp, TDA2002            | 5043-08996-00 | C31, 33                       | Capacitor, 0.1 $\mu$ fd, 50v, $\pm$ 20%  |
| a) 5705-09199-00 |                                                     | Heatsink, #6030B                  | 5043-09065-00 | C13 - C15                     | Capacitor, 470 pfd, 50v, $\pm$ 20%       |
| b) 4006-01003-06 |                                                     | 6-32 x 3/8 P-PH-S                 | 5043-09492-00 | C2, C34                       | Capacitor, 100 pfd, 50v, $\pm$ 10%       |
| c) 4406-01117-00 |                                                     | 6-32 Hexnut                       | 5043-09844-00 | C6                            | Capacitor, 47 pfd, 50v, $\pm$ 20%        |
| d) 4703-00007-00 |                                                     | #6 Ext. Lockwasher                | 5043-09845-00 | C16, C18, C20 - C23, C27      | Capacitor, 1000 pfd, 50v, $\pm$ 20%      |
| 5370-09691-00    | U6                                                  | IC, CVSD, 55536                   | 5046-09346-00 | C7                            | Capacitor, 1200 pfd, 50v, $\pm$ 5%       |
| 5160-10269-00    | Q1                                                  | Transistor, 2N3904, NPN           | 5046-09348-00 | C10                           | Capacitor, 4700 pfd, 50v, $\pm$ 5%       |
| 5060-10396-00    | SP1                                                 | SIP 4.7K & 470pfd, 8R8C           | 5046-09350-00 | C9                            | Capacitor, 180 pfd, 100v, $\pm$ 5%       |
| 5010-09181-00    | R44, R48                                            | Resistor, 1.0 $\Omega$ , 1/2w, 5% | 5520-09020-00 | X1                            | Crystal, 3.58 MHz                        |
| 5010-09161-00    | R35, R45                                            | Resistor, 2.2 $\Omega$ , 1/4w, 5% | 5521-10931-00 | CR1                           | Oscillator, 8 MHz                        |
| 5010-09361-00    | R43, R46, R47                                       | Resistor, 220 $\Omega$ , 1/2w, 5% | 5551-09822-00 | L1 - L3                       | Inductor, 4.7 $\mu$ H, 3A                |
| 5010-09358-00    | R41, R42                                            | Resistor, 1K, 1/4w, 5%            | 5791-09437-00 | J4                            | Connector, 20 pin, (Hdr), Ribbon Cable   |
| 5010-08998-00    | R2, R3, R12                                         | Resistor, 2.2K, 1/4w, 5%          | 5791-10862-04 | J1, J2, J5                    | Connector, 4 pin (Hdr)                   |
| 5010-08983-00    | R7 - R9                                             | Resistor, 3.3K, 1/4w, 5%          | 5791-10862-06 | J3                            | Connector, 6 pin (Hdr)                   |
| 5010-08991-00    | R1, R4, R5, R11, R25 - R28, R33, R36, R37, R49, R50 | Resistor, 4.7K, 1/4w, 5%          |               |                               |                                          |

Notes: \* 21 capacitors (shown on diagram with "B" symbol) provide +5VDC filtering for ICs.

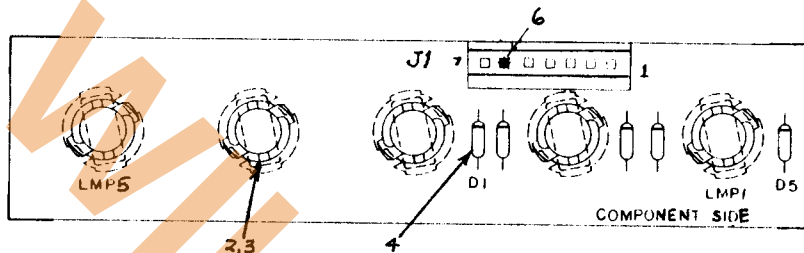
All capacitors are ceramic, 50v, axial, unless otherwise noted.

All resistors are 5%, 1/4w, Carbon Film, unless otherwise noted.



## Bonus Lamp PCB Assembly p/n C-11718

| Item | Part No.      | Description                 |
|------|---------------|-----------------------------|
| 1    | 5768-12149-00 | PC Board                    |
| 2    | 24-8767       | Twist Lamp Socket           |
| 3    | 24-8768       | Bulb, #555 (6.3v, .25A)     |
| 4    | 5070-09054-00 | Diode, 1N4004               |
| 5    | 5010-09534-00 | Resistor, 0Ω                |
| 6    | 5791-10871-04 | Header, 4-pin sq post (J1)  |
| 7    | 5791-10871-10 | Header, 10-pin sq post (J2) |



## Multiplier Lamp PCB Assembly p/n C-11740

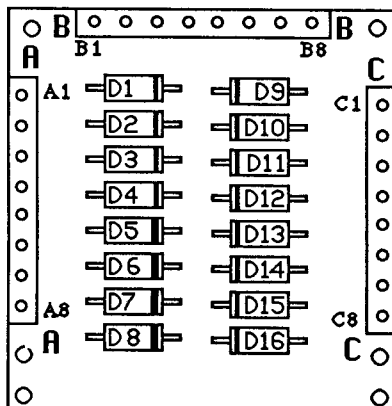
| Item | Part No.      | Description                |
|------|---------------|----------------------------|
| 1    | 5768-12153-00 | PC Board                   |
| 2    | 24-8767       | Twist Lamp Socket          |
| 3    | 24-8768       | Bulb, #555 (6.3v, .25A)    |
| 4    | 5070-09054-00 | Diode, 1N4004              |
| 5    | 5010-09534-00 | Resistor, 0Ω               |
| 6    | 5791-10871-07 | Header, 7-pin sq post (J1) |

## Left Lamp PCB Assembly p/n C-11751

| Item | Part No.      | Description             |
|------|---------------|-------------------------|
| 1    | 5768-12161-00 | PC Board                |
| 2    | 24-8795       | Horiz. Socket           |
| 3    | 24-8704       | Bulb, #89               |
| 4    | 24-8767       | Twist Lamp Socket       |
| 5    | 24-8768       | Bulb, #555 (6.3v, .25A) |
| 6    | 5070-09054-00 | Diode, 1N4004           |

## Right Lamp PCB Assembly p/n C-11759

| Item | Part No.      | Description             |
|------|---------------|-------------------------|
| 1    | 5768-12164-00 | PC Board                |
| 2    | 24-8795       | Horiz. Socket           |
| 3    | 24-8704       | Bulb, #89               |
| 4    | 24-8796       | Socket                  |
| 5    | 24-6549       | Bulb, #44               |
| 4    | 24-8767       | Twist Lamp Socket       |
| 5    | 24-8768       | Bulb, #555 (6.3v, .25A) |
| 6    | 5070-09054-00 | Diode, 1N4004           |
| 7    | 03-8022-3     | Spacer, 1-11/64"        |



C-11702 Diode Board

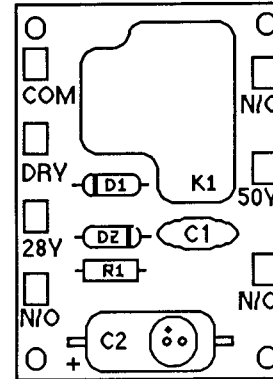
## Solenoid A/C Diode Board Assembly p/n C-11702

| Item | Part No.      | Description                           |
|------|---------------|---------------------------------------|
| 1    | 5768-12148-00 | PC Board                              |
| 2    | 5070-09045-00 | Diode, MR501 (3.0 A)                  |
| 3    | 5791-10862-09 | Header, 9-pin sq post (J-A, J-B, J-C) |

## Relay PCB Assembly

p/n C-11677-2

| Item | Part No.      | Description         |
|------|---------------|---------------------|
| 1    | 5768-12144-00 | PC Board            |
| 2    | 5070-09054-00 | Diode, 1N4004, 1.0A |
| 3    | 5580-12145-00 | Relay, 24vdc, 30A   |
| 4    | 16-8850-175   | Label               |



## Relay PCB Assembly

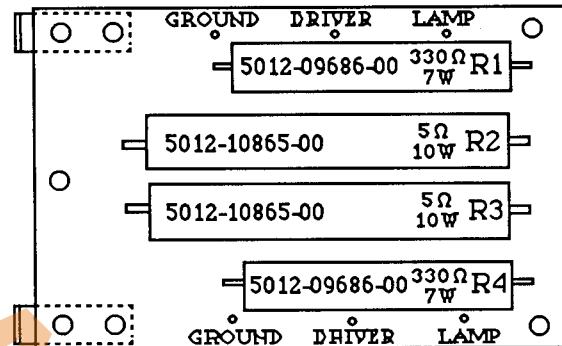
p/n C-11677-3

| Item | Part No.      | Description                        |
|------|---------------|------------------------------------|
| 1    | 5768-12144-00 | PC Board                           |
| 2    | 5070-09054-00 | Diode, 1N4004, 1.0A                |
| 3    | 5580-12145-00 | Relay, 24vdc, 30A                  |
| 4    | 5043-09072-00 | Capacitor, 0.1μfd, 500v (+80, -20) |
| 5    | 16-8850-176   | Label                              |

## Flasher Lamp Resistor Assembly

p/n B-11263

| Item | Part No.      | Description                      |
|------|---------------|----------------------------------|
| 1    | C-11233       | Resistor Board Assembly          |
| a)   | 5012-09686-00 | Resistor, 330Ω, 7w, 10% (R1, R4) |
| b)   | 5012-10865-00 | Resistor, 5Ω, 10w, 10% (R2, R3)  |
| 2    | 01-624        | Bracket                          |
| 3    | 07-6697-4     | Rivet, 1/8 dia x 3/16            |



## Flasher Lamp Resistor Assembly

p/n B-11263-1

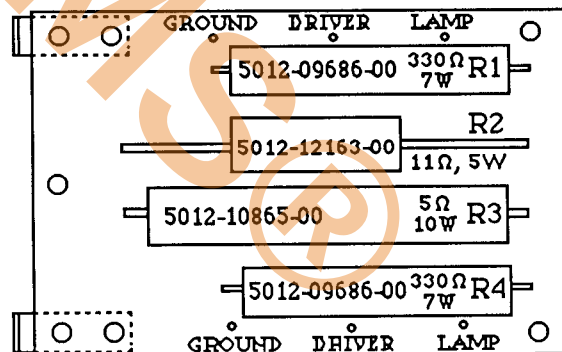
| Item | Part No.      | Description                      |
|------|---------------|----------------------------------|
| 1    | C-11233-1     | PC Board                         |
| a)   | 5012-09686-00 | Resistor, 330Ω, 7w, 10% (R1, R4) |
| b)   | 5012-10865-00 | Resistor, 5Ω, 10w, 10% (R3)      |
| c)   | 5012-12163-00 | Resistor, 11Ω, 10w, 10% (R2)     |
| 2    | 01-624        | Bracket                          |
| 3    | 07-6697-4     | Rivet, 1/8 dia x 3/16            |

### B-11263 Flashlamp Resistor Board

## Flasher Lamp Resistor Assembly

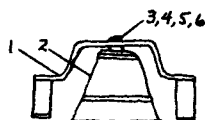
p/n B-11263-2

| Item | Part No.      | Description                      |
|------|---------------|----------------------------------|
| 1    | C-11233-2     | PC Board                         |
| a)   | 5012-09686-00 | Resistor, 330Ω, 7w, 10% (R1, R4) |
| b)   | 5012-10865-00 | Resistor, 5Ω, 10w, 10% (R2)      |
| c)   | 5012-12163-00 | Resistor, 11Ω, 10w, 10% (R3)     |
| 2    | 01-624        | Bracket                          |
| 3    | 07-6697-4     | Rivet, 1/8 dia x 3/16            |



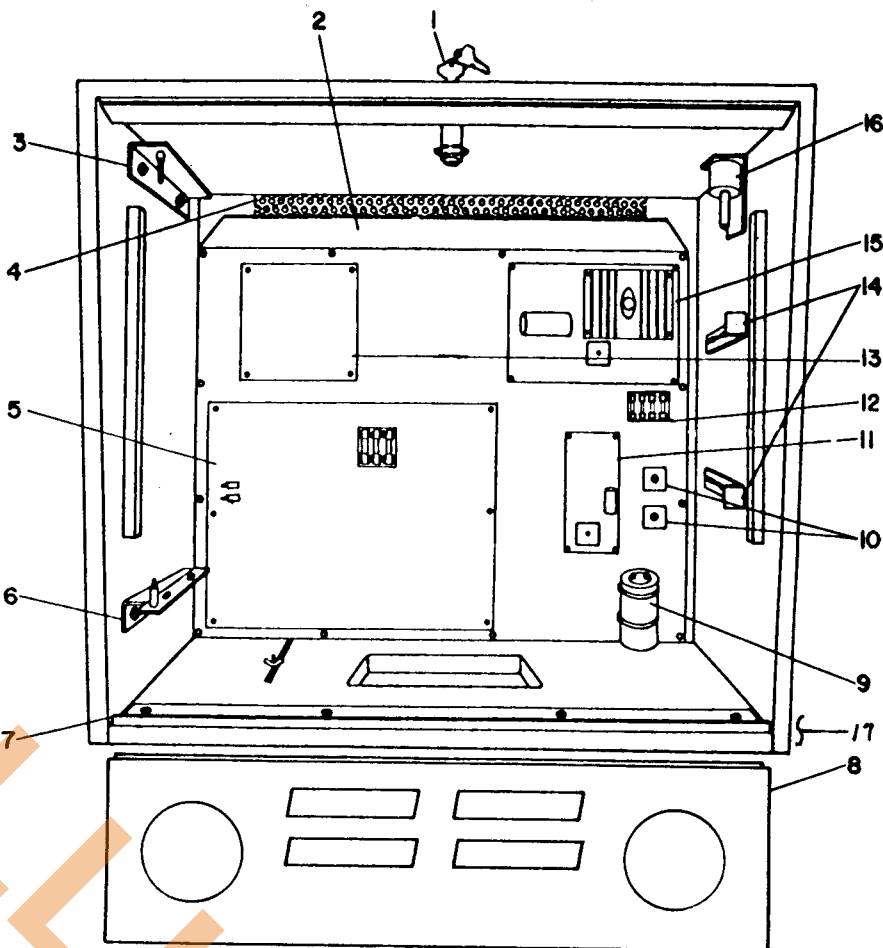
### B-11263-1 Flashlamp Resistor Board

(B-11263-2 transposes R2 and R3)



### Bell Assembly p/n C-11706 & Associated Parts

| Item                    | Part No.      | Description                     |
|-------------------------|---------------|---------------------------------|
| 1                       | C-11707       | Bell Mounting Bracket           |
| 2                       | 20-9546       | Bell                            |
| 3                       | 23-6624       | Rubber Bushing                  |
| 4                       | 4320-01123-24 | Bolt, 1/4-20 x 1-1/2, CB        |
| 5                       | 4420-01117-00 | Nut, 1/4-20 Hex                 |
| 6                       | 4700-00091-00 | Flatwasher, .343 x .875, 16 ga. |
| <b>Associated Parts</b> |               |                                 |
| B-11711                 |               | Bell Striker (Kicker Assy)      |
| A-6306-2                |               | Bell Armature Assy              |
| AE-23-800-02            |               | Coil Assembly                   |
| B-11714                 |               | Striker Mntg Bracket Assy       |
| 01-8666                 |               | Striker Mntg Bracket            |
| 01-4697                 |               | Coil Mounting Bracket           |
| 01-8-508-T              |               | Solenoid Bracket                |
| 4008-01017-05           |               | Mach. Screw, 8-32 x 5/16        |
| 10-135                  |               | Solenoid Spring                 |
| 4020-01047-24           |               | Nylon Screw, 1/4-20 x 1-1/2     |
| 4420-01141-00           |               | Nut, 1/4-20, Flange Grip        |



### Backbox Parts Listing

| Item           | Part No.      | Description                      | Item | Part No.      | Description                        |
|----------------|---------------|----------------------------------|------|---------------|------------------------------------|
| 1              | 20-6542-TB    | Cam Lock                         | 10   | 5100-09418-00 | Bridge Rectifier, 100v, 35A.       |
| a) 01-7993-1   |               | Lock Pawl, Backglass             | 11   | C-9939-554    | Flipper Power Supply               |
| 2              | D-11419       | PCB Plate Assembly               | 12   | 5733-10702-04 | Fuse Holder, 4-Pos.                |
| 3              | A-7984        | Upper Insert Bd. Hinge Assy      | 13   | D-11581-556   | Audio Board Assembly               |
| 4              | 01-6645       | Venting Screen                   | 14   | 01-8084       | Insert Stop Bracket                |
| 5              | D-11392-556   | CPU Board Assembly, <i>FIRE!</i> | 15   | D-8345-554    | Power Supply Assembly              |
| 6              | A-10815       | Lower Insert Board Hinge Assy    | 16   | B-10686       | Knocker Assembly                   |
| 7              | 01-8569       | Lower Speaker Panel Bracket      | 17   | 20-9518       | Backbox Hinge                      |
| 8              | D-11611-556   | Display/Speaker Panel Assy       |      | C-11706       | Bell Assembly (& associated parts) |
| a) 31-1420-556 |               | Cover, Displ/Spkr Pnl Assy       |      |               |                                    |
| 9              | 5040-09051-00 | Capacitor, 30,000 µFd., 25V      |      |               |                                    |

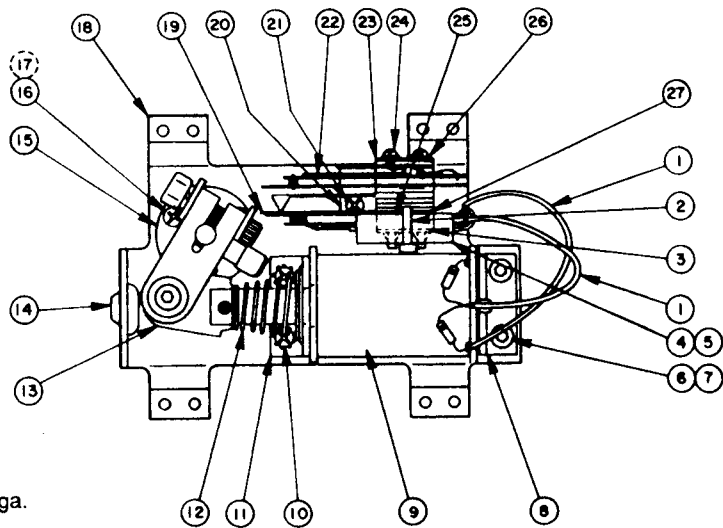
### Miscellaneous *FIRE!* Parts

| Part No.    | Description                   | Part No.      | Description                     |
|-------------|-------------------------------|---------------|---------------------------------|
| 31-1002-556 | Playfield, <i>FIRE!</i>       | 11-556-IN     | Insert Board (Backbox)          |
| 31-1357-556 | Backglass, <i>FIRE!</i>       | 5795-10937-09 | Ribbon Cable, 20-conductor, 9'  |
| 31-1006-556 | Plastics Set, <i>FIRE!</i>    | 5795-10938-27 | Ribbon Cable, 26-conductor, 27" |
| 01-6571     | Hinge Mtg Bracket, Insert Bd. | 03-7960-556   | Playfield Mylar                 |
| 01-6652     | Stop Bracket                  | 01-8431       | Playfield Post Adj Nut Plate    |
| 01-6655     | Latch - Insert Board          |               |                                 |

# Flipper Assembly

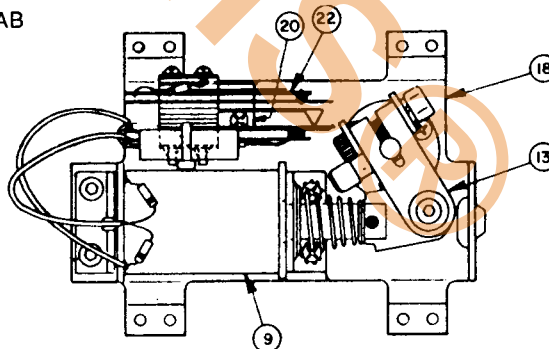
p/n C-11626-R-4

| Item | Part No.       | Description                             |
|------|----------------|-----------------------------------------|
| 1    | HW-30018-6     | Wire, 18 AWG, Blue                      |
| 2    | 03-7520-2      | Ty-Wrap, Nylon                          |
| 3    | 20-6516        | Speednut, Tinnerman                     |
| 4    | 5045-12098-00  | Capacitor, 2.2 $\mu$ Fd, 250V, 20%      |
| 5    | RM-21-06       | Sleeve, Vinyl (Cap. leads)              |
| 6    | 4010-01066-06  | Cap Screw, 10-32 x 3/8, AH              |
| 7    | 4701-00004-00  | Lockwasher, #10 split                   |
| 8    | A-10821        | Flipper Stop Assembly                   |
| 9    | FL-11630/50V   | Flipper Coil                            |
| 10   | 4006-01017-04  | Mach. Screw, 6-32 x 1/4, P-RH-S         |
| 11   | 01-7695        | Solenoid Bracket                        |
| 12   | 10-376         | Coil Plunger Spring                     |
| 13   | B-10655-R      | Crank Link Assembly                     |
| a)   | 02-4179        | Link Spacer Bushing                     |
| b)   | 4010-01086-14  | Cap Screw, 10-32 x 7/8, SH              |
| c)   | 4700-00023-00  | Washer, 5/8 o.d. x 13/64 i. d. x 16 ga. |
| d)   | 4701-00004-00  | Lockwasher, #10 split                   |
| e)   | 4410-01132-00  | Nut, 10-32 ESNA                         |
| f)   | A-10656        | Flipper Link Assembly                   |
| 1.)  | 02-4219        | Coil Plunger                            |
| 2.)  | 20-9370-1      | Spring Pin, 5/32 dia. x 7/16            |
| 3.)  | 03-8050        | Flipper Link                            |
| g)   | B-10657-R      | Flipper Crank Assembly, Right           |
| 1.)  | 01-8073-R      | Flipper Crank, Right                    |
| 2.)  | 17-1037        | Crank Washer                            |
| 3.)  | 4010-01066-18  | Cap Screw, 10-32 x 1-1/8, HCS           |
| 4.)  | 4410-01127-00  | Nut, 10-32 Hex Hd.                      |
| 5.)  | 4700-00107-00  | Washer, 5/8 o.d. x 13/64 i. d. x 12 ga. |
| 6.)  | 4701-00004-00  | Lockwasher, #10 split                   |
| 7.)  | RM-23-06       | Tubing, H. S. 1/4 DWP                   |
| 14   | 23-6577        | Bumper Plug                             |
| 15   | 03-7568        | Flipper Bushing                         |
| 16   | 4006-01005-06  | Mach. Screw, 6-32 x 3/8, P-PH           |
| 17   | 4406-01117-00  | Nut, 6-32 Hex                           |
| 18   | C-11627-R      | Flipper Base Assembly, R.               |
| 19   | 06-14G         | Insulating Blade                        |
| 20   | No part number | (part of assembly)                      |
| 21   | Not Used       |                                         |
| 22   | B-9951         | Switch & Diode Assembly                 |
| a)   | SW-1A-150      | Switch, Lane Change                     |
| b)   | 5070-06258-00  | Diode, 1N4001                           |
| 23   | 01-3670-1      | Plate, Switch                           |
| 24   | 4105-01001-20  | Sh. Metal Screw, #5 x 1-1/4, P-PH-AB    |
| 25   | 03-7811        | End of Stroke (EOS) Switch              |
| 26   | 4701-00002-00  | Lockwasher, #6 split                    |



## Flipper Assembly Notes

- Each Flipper Assembly is mounted beneath the playfield, in conjunction with the plastic Flipper Paddle and Shaft (20-9250-6) and flipper Rubber (23-6519-4) on the upper side of the playfield.
- The tip of the EOS Switch must travel 0.0150 (+ .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.
- The Lane Change Switch must have a gap of 0.046 ( $\pm$  .015) inch, when fully open.
- All moving elements of the assembly must operate freely, with no evidence of binding.
- The large end of the Coil Plunger Spring must fit within the four lugs of the Solenoid Bracket.
- For coil replacement, remove the Solenoid Bracket (item 3) to prevent screw damage.
- Use Loctite™ 242 when reattaching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.
- When using the Bumper Plug (item 13) on older flipper assemblies, readjust the flipper paddle and shaft position.
- Solid color blue wire connects to the banded end of the diode, mounted on the connector end of the Flipper Coil (item 8). Trace color wire connects to the unbanded end of the diode.



## Flipper Assembly

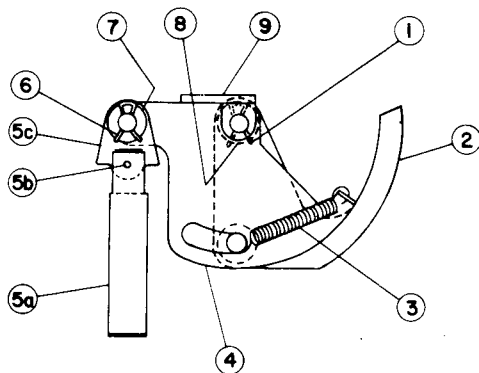
p/n C-11626-L-4

(Parts listed replace same Items of C-11626-R-4)

| Item | Part No.       | Description                  |
|------|----------------|------------------------------|
| 13   | B-10655-L      | Crank Link Assembly          |
| g)   | B-10657-L      | Flipper Crank Assembly, Left |
| 1.)  | 01-8073-L      | Flipper Crank, Left          |
| 18   | C-11627-L      | Flipper Base Assy, L.        |
| 20   | No part number | (part of assembly)           |
| 22   | B-9951-1       | Switch & Diode Assembly      |
| a)   | SW-1A-150-1    | Switch, Lane Change          |

# Ball Shooter Lane Feeder & Right Eject Hole (Lockup)

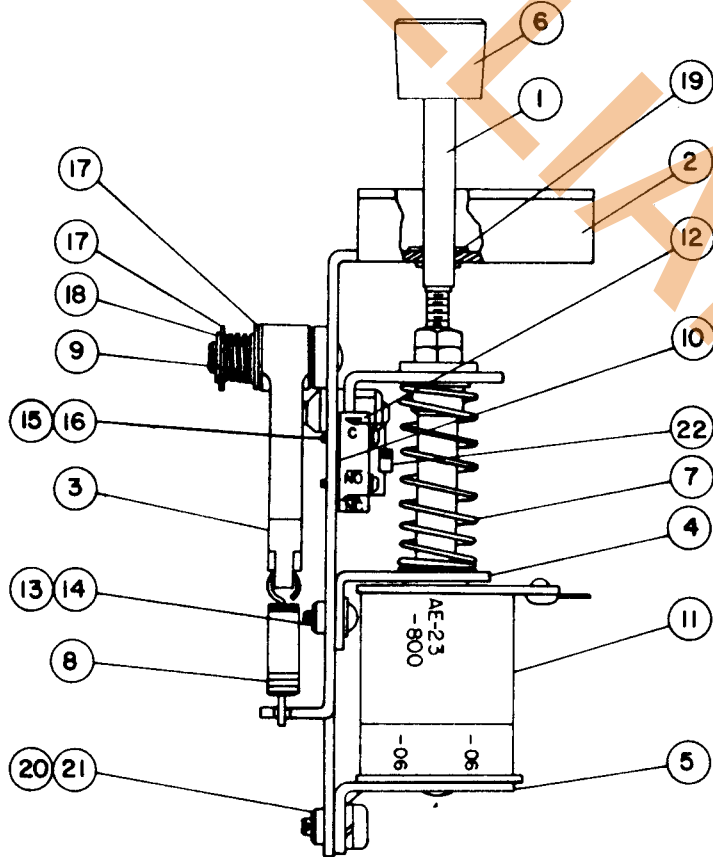
p/n C-9638



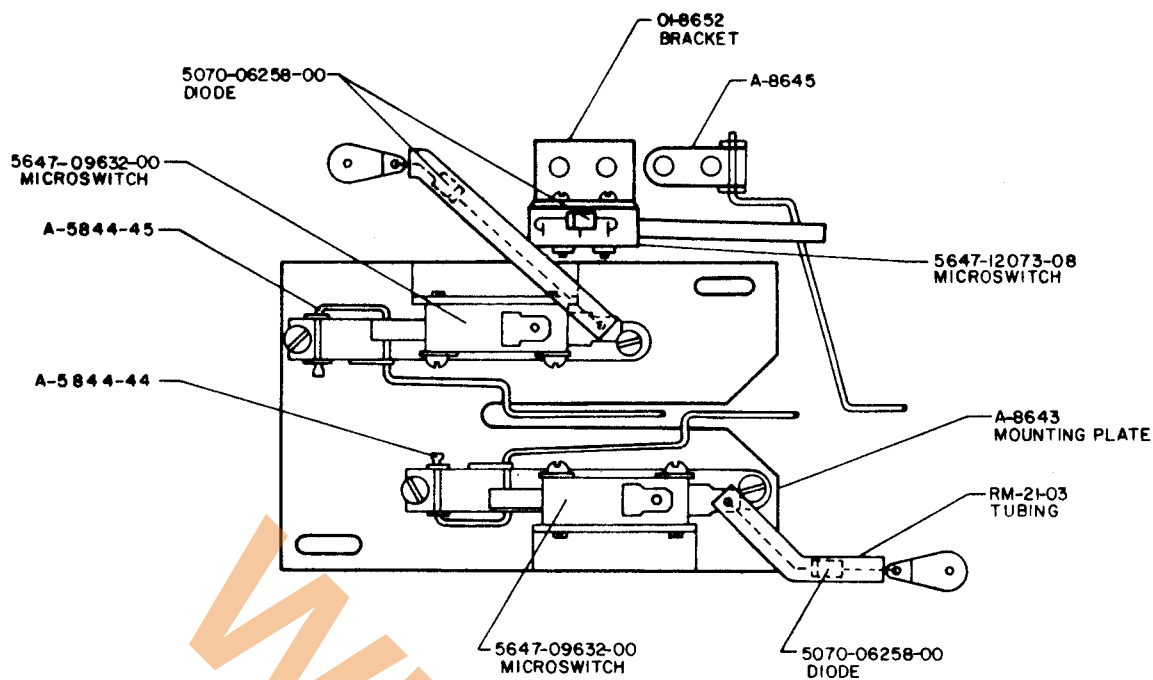
| Item | Part No.      | Description                               |
|------|---------------|-------------------------------------------|
| 1    | 12-6227       | Clip, Hair Pin                            |
| 2    | A-8247        | Ball Eject Cam Assembly                   |
| 3    | 10-362        | Spring                                    |
| 4    | A-6949-L      | Spring Plate Assembly                     |
| 5    | A-8050-1      | Plunger Assembly                          |
|      | a) 02-3407-2  | Coil Plunger                              |
|      | b) 20-8716-5  | Roll Pin                                  |
|      | c) 03-8085    | Armature Link                             |
| 6    | 12-6227       | Clip, Hair Pin                            |
| 7    | 4700-00030-00 | Washer, 1/2 o.d. x 17/64<br>i.d. x 15 ga. |
| 8    | 4700-00103-00 | Washer, 1/2 o.d. x 17/64<br>i.d. x 28 ga. |
| 9    | A-8268        | Mounting Bracket Assy                     |

# Fireplug Assembly

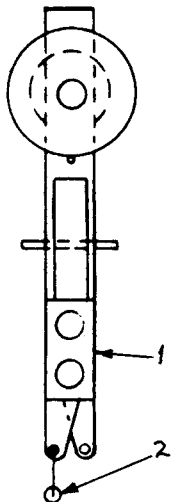
p/n C-11661



| Item | Part No.      | Description               |
|------|---------------|---------------------------|
| 1    | B-11662       | Plunger Assembly          |
| 2    | B-11660       | Main Frame Subassy        |
| 3    | 03-8090       | Flat Cam                  |
| 4    | 01-8639       | Coil Support Bracket      |
| 5    | A-10821       | Flipper Stop Brkt Assy    |
| 6    | 23-8623       | Fireplug Bumper Rubber    |
| 7    | 10-399        | Spring, Compression       |
| 8    | 10-320        | Spring, Extension         |
| 9    | 10-392        | Spring, Compression       |
| 10   | 01-8600       | Insulator                 |
| 11   | AE-23-800-06  | Coil Assembly             |
| 12   | 5647-12073-06 | μSwitch w/roller          |
| 13   | 4006-01027-06 | Mach. Screw, 6-32 x 3/8   |
| 14   | 4406-01119-00 | Nut, 6-32 ESNA            |
| 15   | 4701-00024-00 | Lockwasher, #2            |
| 16   | 4002-01005-06 | Mach. Screw, 2-56 x 3/8   |
| 17   | 4700-00103-00 | Flat washer, #12          |
| 18   | 20-8712-25    | E-Ring Retainer Clip      |
| 19   | 20-8790       | Bearing, Ny-lined         |
| 20   | 4010-01006-08 | Mach. Screw, #10-32 x 1/2 |
| 21   | 4410-01132-00 | Nut, 10-32 ESNA           |
| 22   | 5070-06258-00 | Diode, 1N4001, 1.0A       |

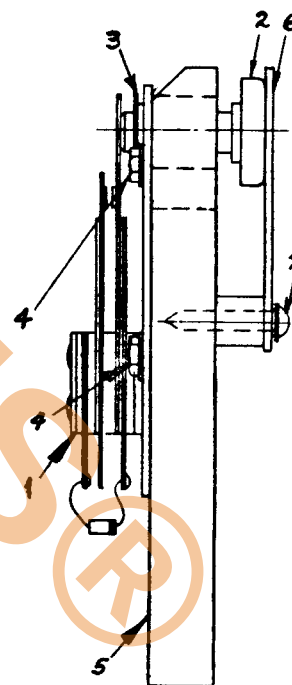


## Ball Trough Switch Assembly



## Standup Target Assembly

- 1 p/n B-11742-4 in Upper Playfield area
- 1 p/n B-11696-4 in Lower Playfield area
- 2 p/n 5070-06258-00 1N4001 Diode

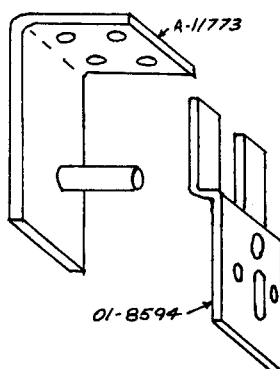


## Ramp Target Assembly

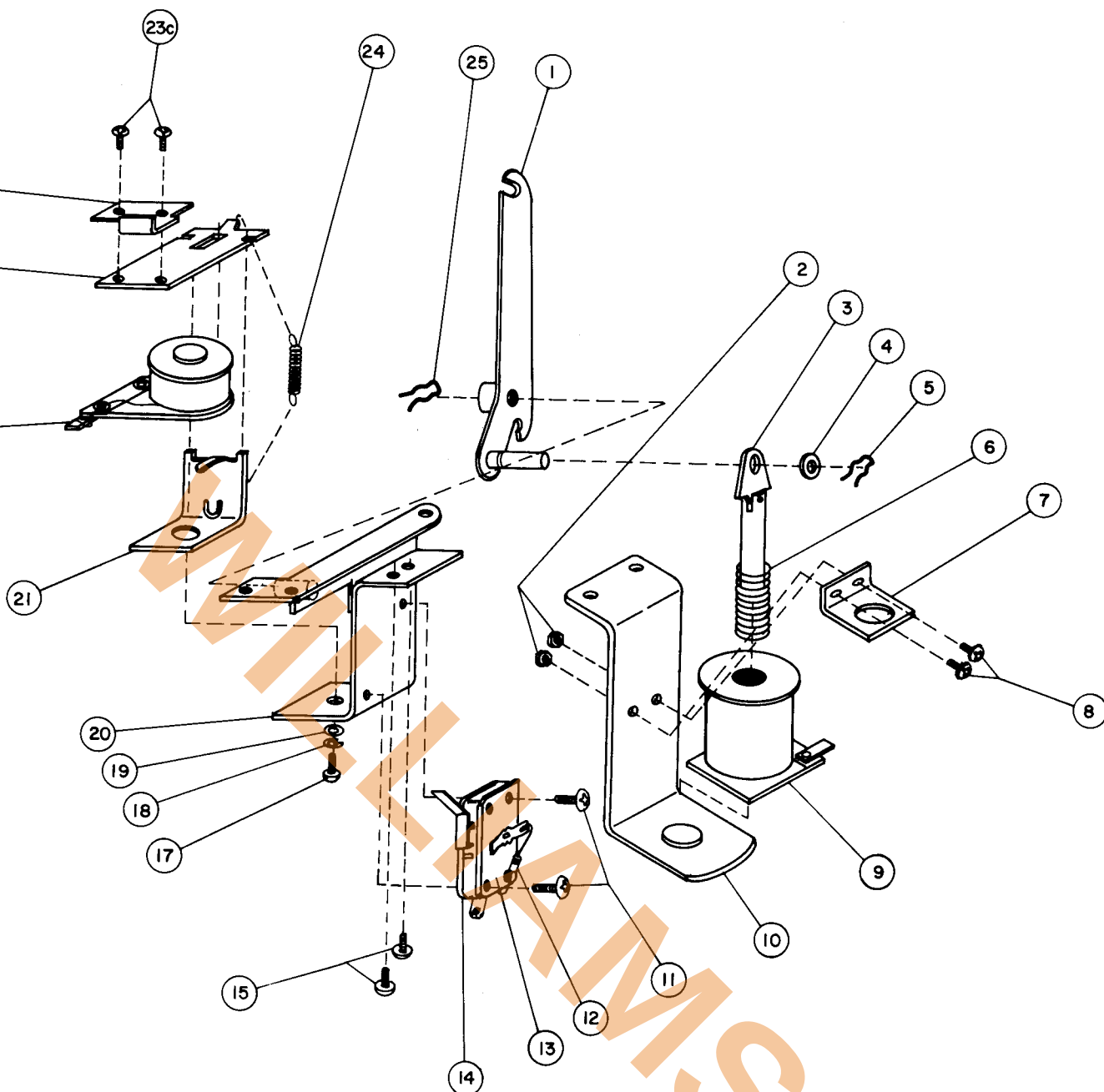
| Item | Part No.      | Description              |
|------|---------------|--------------------------|
| 1    | A-11675       | Switch Subassembly       |
| a)   | A-11674       | Target Bracket Assembly  |
| h)   | SW-1A-169     | Switch Assembly          |
| c)   | 01-3670-1     | Switch Plate             |
| d)   | 5070-06258-00 | Diode, 1N4001            |
| e)   | 07-6688-27    | Rivet, 1/8" dia. x 9/16" |
| 2    | 03-7500-5     | Credit Button            |
| 3    | 20-8712-31    | E-Ring, 5/16"            |

### Associated Parts

|   |               |                                                           |
|---|---------------|-----------------------------------------------------------|
| 4 | 4106-01115-06 | Sh. Metal Screw, #6 x 3/8, PL-HWH-A (for Target mtg.)     |
| 5 | 11-831-556    | Panel, Wood Back                                          |
| 6 | A-11750       | Target Face Assembly                                      |
| 7 | 4106-01022-14 | Sh. Metal Screw, #6 x 3/4, P-RWH-A (for Target Face mtg.) |



## Playfield Pivot Parts

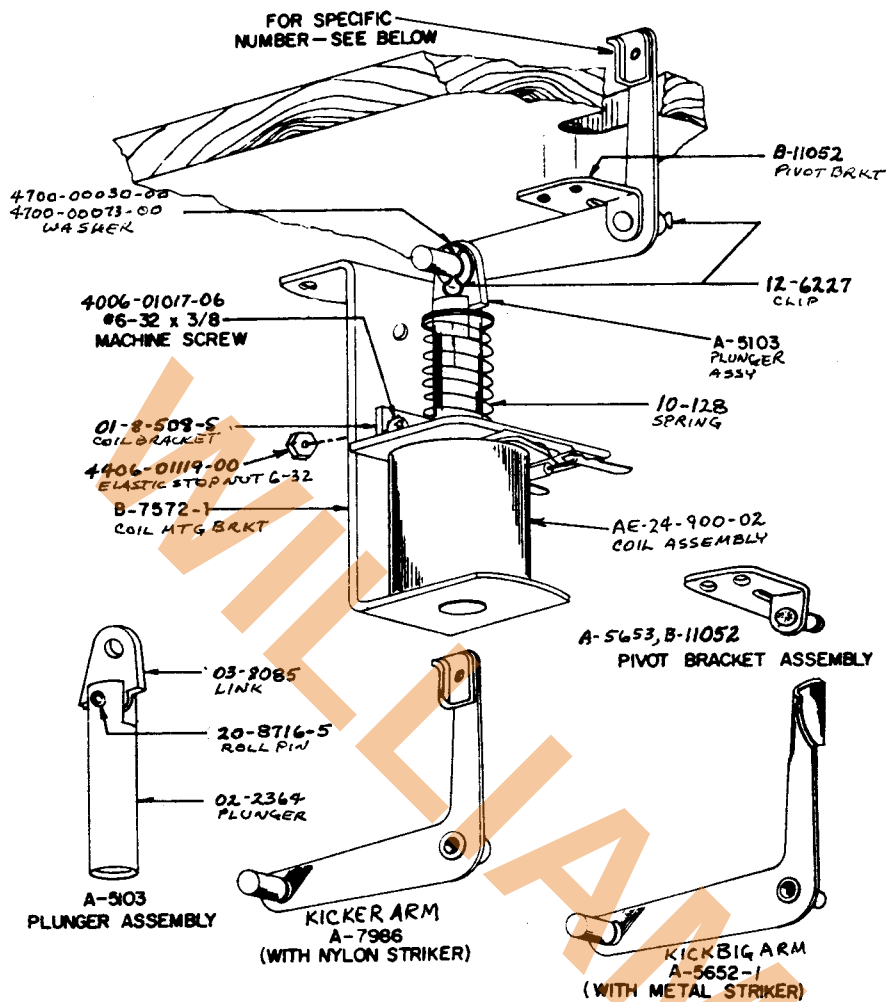


## Ramp Lifting Mechanism

(p/n B-11304 and associated parts)

| Item | Part No.      | Description                   | Item | Part No.      | Description                   |
|------|---------------|-------------------------------|------|---------------|-------------------------------|
| 1    | A-11137       | Lift Crank Assembly           | 15   | 4004-01003-05 | Mach. Screw, 4-40             |
| 2    | 4406-01119-00 | Nut, 6-32 ESN                 | 16   |               | Not Used                      |
| 3    | A-8050        | Plunger Assembly              | 17   | 4008-01021-07 | Mach. Screw, 8-32 x 7/16      |
| 4    | 4700-00073-00 | Washer, .281 i.d. x .500 o.d. | 18   | 4701-00003-00 | Lockwasher, #8 Split          |
| 5    | 12-6227       | Retaining Clip                | 19   | 4700-00089-00 | Washer, .172 i.d. x 7/16 o.d. |
| 6    | 10-128        | Spring                        | 20   | B-11302       | Lift Mech Bracket Assembly    |
| 7    | 01-8-508-S    | Coil Retaining Bracket        | 21   | A-6892        | Frame and Eyelet              |
| 8    | 4006-01017-06 | Mach. Screw, 6-32 x 3/8       | 22   | SM-26-600-DC  | Coil Assembly                 |
| 9    | AE-24-900-02  | Coil Assembly                 | 23   | A-11139       | Armature Assembly             |
| 10   | B-7572-1      | Bracket & Stop Assembly       | a)   | A-8936        | Armature Subassembly          |
| 11   | 4004-01003-10 | Mach. Screw, 4-40 x 5/8       | b)   | 01-8390       | L Crank Lock                  |
| 12   | 5070-06258-00 | Diode, 1N4001                 | c)   | 4006-01003-03 | Mach. Screw, 6-32 x 3/16      |
| 13   | A-7438-1      | Terminal Strip                | 24   | 10-363        | Extension Spring              |
| 14   | 5647-12001-00 | Microswitch                   | 25   | 12-6227       | Retaining Clip                |

## BALL KICKER ASSEMBLIES

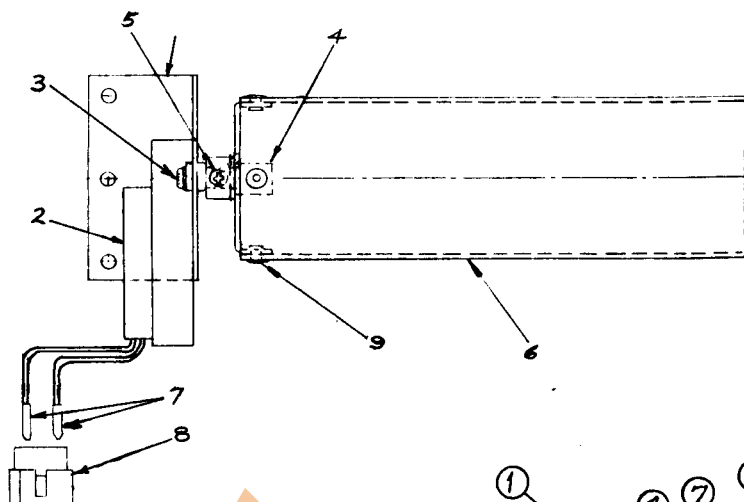


### Kickbig Arm Assembly p/n B-11051-R

| Part No.      | Description                               |
|---------------|-------------------------------------------|
| 12-6227       | Clip, Hair Pin                            |
| A-5652-1      | Kickbig Arm Assembly                      |
| A-5103        | Plunger Assembly                          |
| 02-2364       | Coil Plunger                              |
| 20-8716-5     | Roll Pin                                  |
| 03-8085       | Armature Link                             |
| 4700-00030-00 | Washer, 1/2 o.d. x 17/64<br>i.d. x 15 ga. |
| B-11052       | Mounting Bracket Assy                     |

### Kicker Arm Assembly p/n B-9463

| Part No.      | Description                              |
|---------------|------------------------------------------|
| 12-6227       | Clip, Hair Pin                           |
| A-7986        | Kicker Arm Assembly                      |
| A-5103        | Plunger Assembly                         |
| 02-2364       | Coil Plunger                             |
| 20-8716-5     | Roll Pin                                 |
| 03-8085       | Armature Link                            |
| 4700-00073-00 | Washer, 1/2 o.d. x 9/32<br>i.d. x 15 ga. |
| A-5653        | Mounting Bracket Assy                    |



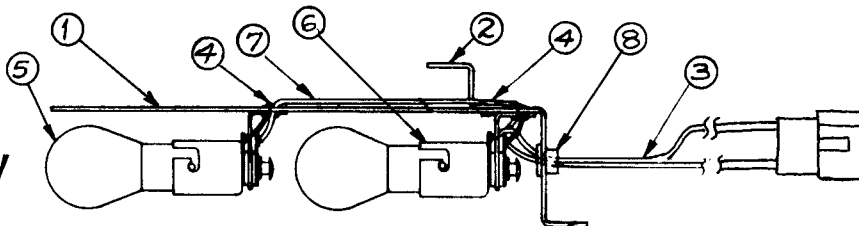
## Flames Tube Assembly

p/n B-11492

| Item | Part No.      | Description                   |
|------|---------------|-------------------------------|
| 1    | 01-8546       | Motor Bracket                 |
| 2    | 14-7944       | Motor, 10 rpm                 |
| 3    | 4006-01017-04 | Mach. Screw, 6-32 x 1/4, P-RH |
| 4    | A-11491       | Drive Bracket Assembly        |
| 5    | 4006-01076-04 | Set Screw, 6-32 x 1/4         |
| 6    | B-11498       | Tube & Decal Assembly         |
| 7    | 5820-09080-00 | Connector Pin                 |
| 8    | 5791-09111-00 | Connector Shell               |
| 9    | 07-6701       | Rivet, 1/8 dia                |

## Flames Lamps Assembly

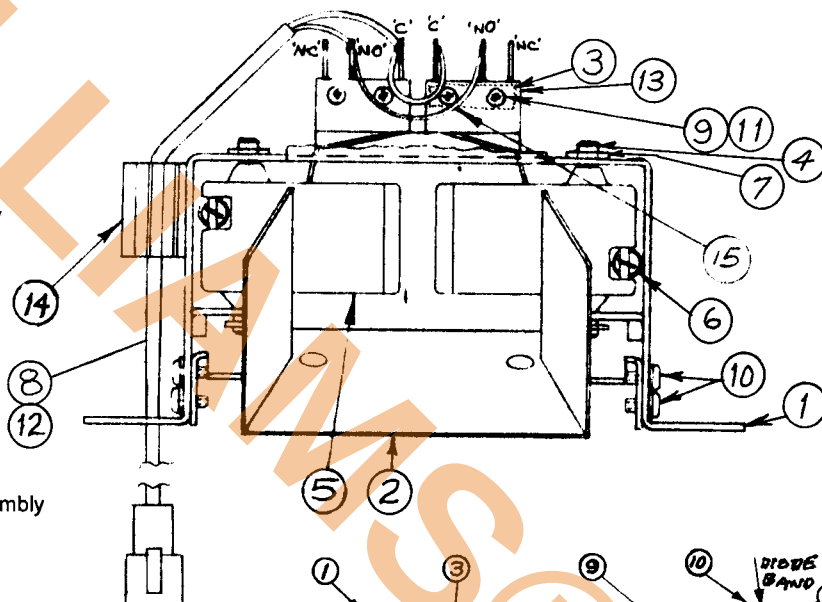
p/n B-11715



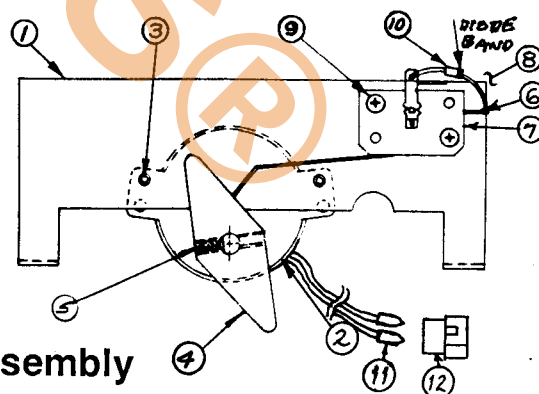
| Item | Part No.    | Description          |
|------|-------------|----------------------|
| 1    | 01-8667     | Motor Bracket        |
| 2    | 01-8669     | Flames Tube Guide    |
| 3    | H-11730     | Flames Lamps Cable   |
| 4    | 07-6688-16N | Rivet, 1/8 x 1/8     |
| 5    | 24-8771     | Lamp, #1683, 28v     |
| 6    | 24-8789     | Lamp Socket          |
| 7    | HW-30022-4  | Wire, 22 AWG, Yellow |
| 8    | 03-7869-1   | Bushing              |

## "Window" (& Awning) Assembly

p/n B-11501



| Item | Part No.      | Description                      |
|------|---------------|----------------------------------|
| 1    | B-11500       | Window Housing Subassembly       |
| 2    | B11705        | Awning Assembly                  |
| 3    | 01-8240       | Nut Plate                        |
| 4    | 02-4289       | Window Support Rod               |
| 5    | 03-7684       | Swinging Window                  |
| 6    | 10-400        | Spring                           |
| 7    | 20-8712-15    | E-Ring                           |
| 8    | H-11735       | Cable, Window Assembly           |
| 9    | 4002-01005-08 | Mach. Screw, 2-56 x 1/2, P-PH    |
| 10   | 4004-01003-03 | Mach. Screw, 4-40 x 3/16, P-PH-S |
| 11   | 4701-00024-00 | Lockwasher, #2 Split             |
| 12   | RM-23-03      | Tubing, 3/16, Heat shrink        |
| 13   | 5647-12073-05 | μSwitch                          |
| 14   | 03-7722       | Cable Clamp                      |



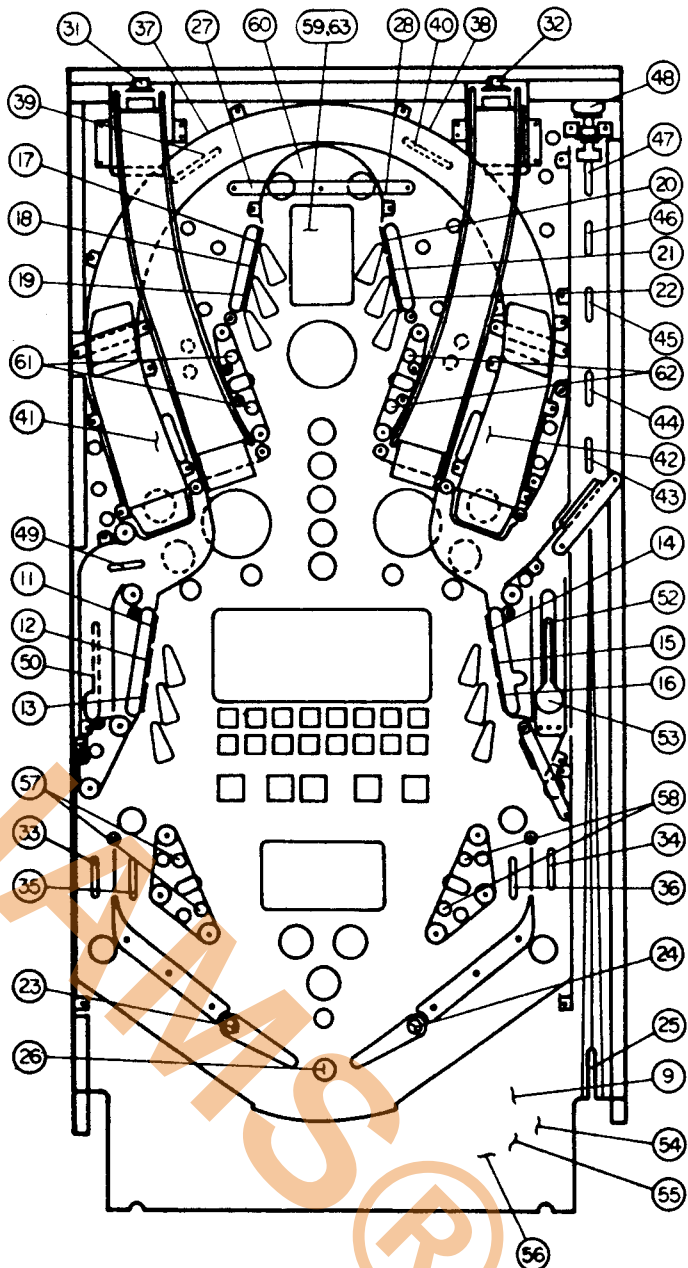
## Ladder Ramp Motor Assembly

p/n B-11

| Item | Part No.      | Description                  | Item | Part No.      | Description             |
|------|---------------|------------------------------|------|---------------|-------------------------|
| 1    | 01-8543       | Motor Mounting Bracket       | 7    | A-7438-1      | Terminal Strip Assembly |
| 2    | 14-7944       | Motor, 10 rpm                | 8    | 01-7543       | Nut Plate               |
| 3    | 4006-01003-04 | Mach. Screw, 6-32 x 1/4      | 9    | 4004-01003-12 | Mach. Screw, 4-40 x 3/4 |
| 4    | 03-79030-1    | Cam, Ladder Ramp             | 10   | 5070-06258-00 | Diode, 1N4001           |
| 5    | 4006-01076-04 | Set screw, 6-32 x 1/4, SH-CP | 11   | 5791-09111-00 | Connector Pin           |
| 6    | 17-1074       | Switch                       | 12   | 5820-09080-00 | Connector Shell         |

# Switches

| Item | Part No.      | Description             |
|------|---------------|-------------------------|
| 1    | A-8476        | Plumb Bob Tilt          |
| 2    |               | Not Used                |
| 3    | SW-1A-126     | Credit Button           |
| 4    | 904845*       | Right Coin Chute        |
| 5    | 904845*       | Center Coin Chute       |
| 6    | 904845*       | Left Coin Chute         |
| 7    | 904704*       | Slam Tilt               |
| 8    | 5641-09369-00 | High Score Reset        |
| 9    | SW-1A-117     | Playfield Tilt          |
| 10   | 17-1067       | Outhole                 |
| 11   | SW-1A-170-4   | Top, Lwr L 3-Bank       |
| 12   | SW-1A-170-4   | Mid, Lwr L 3-Bank       |
| 13   | SW-1A-170-4   | Bottom, Lwr L 3-Bank    |
| 14   | SW-1A-170-4   | Top, Lwr R 3-Bank       |
| 15   | SW-1A-170-4   | Mid, Lwr R 3-Bank       |
| 16   | SW-1A-170-4   | Bottom, Lwr R 3-Bank    |
| 17   | SW-1A-170-4   | Top, Upr L 3-Bank       |
| 18   | SW-1A-170-4   | Mid, Upr L 3-Bank       |
| 19   | SW-1A-170-4   | Bottom, Upr L 3-Bank    |
| 20   | SW-1A-170-4   | Top, Upr R 3-Bank       |
| 21   | SW-1A-170-4   | Mid, Upr R 3-Bank       |
| 22   | SW-1A-170-4   | Bottom, Upr R 3-Bank    |
| 23   | SW-1A-150-1   | L Flipper Lane Change   |
| 24   | SW-1A-150     | R Flipper Lane Change   |
| 25   | 5647-12073-04 | Ball Shooter Lane       |
| 26   | 5647-12073-06 | Fireplug                |
| 27   | SW-1A-171**   | Horseshoe (left entry)  |
| 28   | SW-1A-171**   | Horseshoe (right entry) |
| 29   |               | Not Used                |
| 30   |               | Not Used                |
| 31   | SW-1A-169     | SAVE Target (left)      |
| 32   | SW-1A-169     | SAVE Target (right)     |
| 33   | SW-1A-124     | L Drain Lane            |
| 34   | SW-1A-124     | R Drain Lane            |
| 35   | SW-1A-124     | Left Flipper Return     |
| 36   | SW-1A-124     | Right Flipper Return    |
| 37   | 5647-12133-04 | On Ramp (left)          |
| 38   | 5647-12133-04 | On Ramp (right)         |
| 39   | SW-1A-124     | Under Ramp (left)       |
| 40   | SW-1A-124     | Under Ramp (right)      |
| 41   | 5647-12001-00 | Left Ramp Down          |
| 42   | 5647-12001-00 | Right Ramp Down         |
| 43   | SW-1A-124     | Right Rollover 20K      |
| 44   | SW-1A-124     | Right Rollover 10K      |
| 45   | SW-1A-124     | Right Rollover 30K      |
| 46   | SW-1A-124     | Right Rollover 100K     |
| 47   | SW-1A-124     | Right Rollover 5K       |
| 48   | SW-1A-170-4   | Right 1 K Button        |
| 49   | 17-1082       | Left Kickbig (top)      |
| 50   | 5647-09957-00 | Left Kickbig (bottom)   |
| 51   |               | Not Used                |
| 52   | 5647-09957-00 | Right Lockup (middle)   |
| 53   | 17-1075       | Right Lockup (bottom)   |

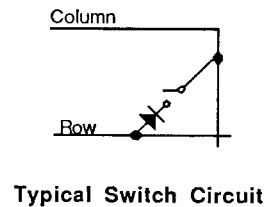
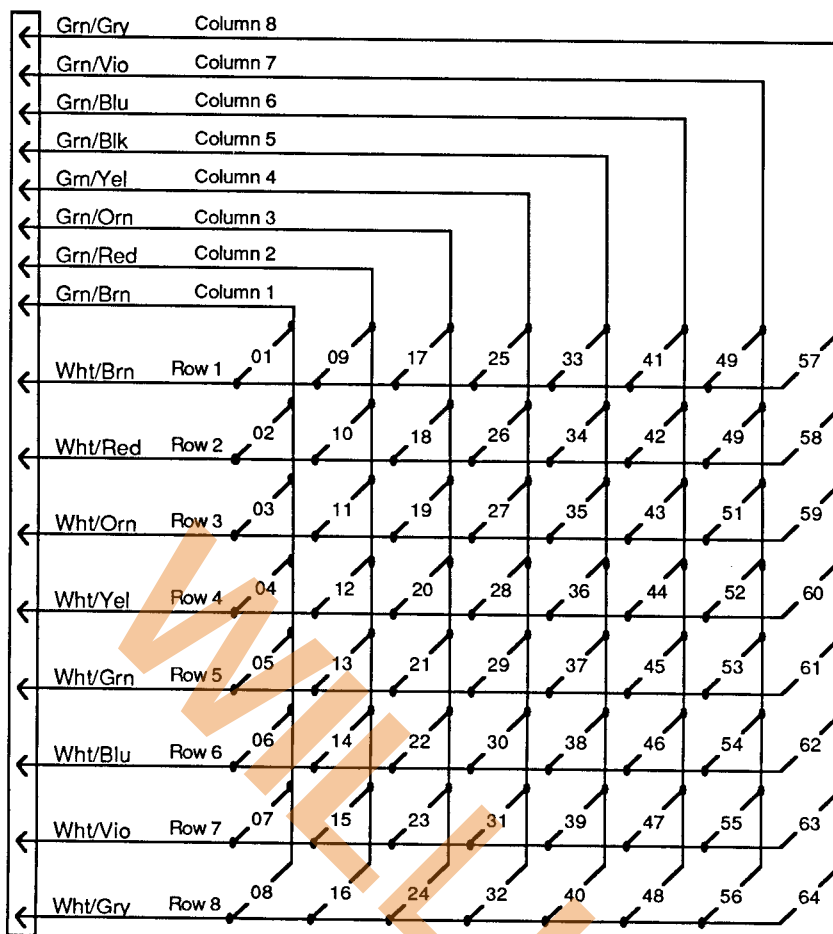


| Item | Part No.      | Description                    |
|------|---------------|--------------------------------|
| 54   | 5647-09957-00 | Ball Trough #3 (left)          |
| 55   | 5647-09957-00 | Ball Trough #2 (mid)           |
| 56   | 5647-09633-00 | Ball Trough #1 (right)         |
| 57   | SW-1A-122     | Left Sling (scoring)***        |
| 58   | SW-1A-122     | Right Sling (scoring)***       |
| 59   | 17-1012       | Center Ramp Down               |
| 60   | 5647-12073-05 | L & R Windows                  |
| 61   | SW-1A-122     | Upper Left Sling (scoring)***  |
| 62   | SW-1A-122     | Upper Right Sling (scoring)*** |
| 63   | 17-1074       | Center Ramp Up                 |
| 64   |               | Not Used                       |
| -    | SW-10A-48     | Flipper Button (Cabinet sides) |

Notes: \* (Coinco Part No.)

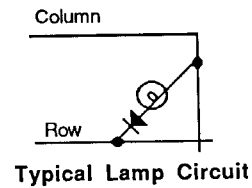
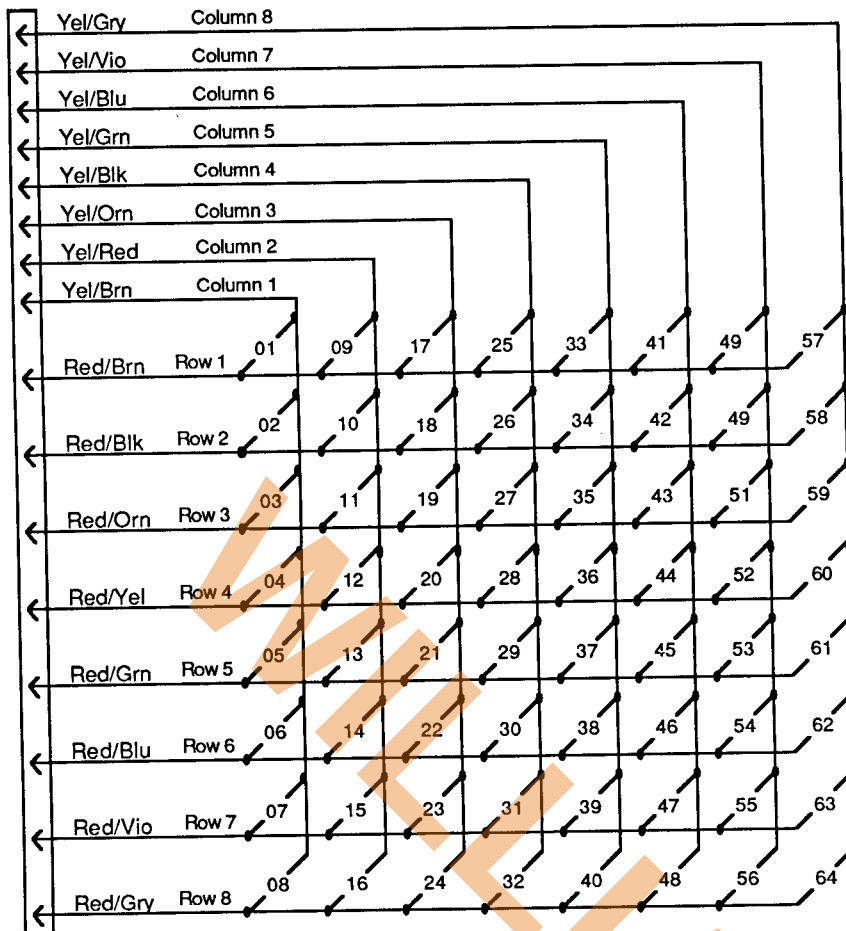
\*\* p/o D-11499 2-way Ramp

\*\*\* [Kicker Actuating Sw: A-4834-H; B-8734 w/RC]



**FIRE! Switch-Matrix Table**

| ROW \ COLUMN        | 1 Q45<br>GRN-BRN<br>1J8-1 | 2 Q49<br>GRN-RED<br>1J8-2            | 3 Q44<br>GRN-ORN<br>1J8-3            | 4 Q48<br>GRN-YEL<br>1J8-4     | 5 Q43<br>GRN-BLK<br>1J8-5 | 6 Q47<br>GRN-BLU<br>1J8-7 | 7 Q42<br>GRN-VIO<br>1J8-8    | 8 Q46<br>GRN-GRY<br>1J8-9 |
|---------------------|---------------------------|--------------------------------------|--------------------------------------|-------------------------------|---------------------------|---------------------------|------------------------------|---------------------------|
| 1 WHT-BRN<br>1J10-9 | Plumb Bob<br>Tilt 1       | Playfield<br>Tilt 9                  | Upper left<br>3-Bank<br>(top) 17     | Ball Shooter<br>25            | Drain Lane<br>(left) 33   | Left<br>Ramp<br>Down 41   | Left Kickbig<br>(top) 49     | Lower left<br>Kicker 57   |
| 2 WHT-RED<br>1J10-8 | Not Used 2                | Outhole 10                           | Upper left<br>3-Bank<br>(center) 18  | FIRE PLUG<br>(down) 26        | Drain Lane<br>(right) 34  | Right<br>Ramp<br>Down 42  | Left Kickbig<br>(bottom) 50  | Lower right<br>Kicker 58  |
| 3 WHT-ORN<br>1J10-7 | Credit<br>Button 3        | Lower left<br>3-Bank<br>(top) 11     | Upper left<br>3-Bank<br>(bottom) 19  | HORSESHOE<br>(left entry) 27  | Return Lane<br>(left) 35  | Right Rollover<br>20K 43  | Not Used 51                  | Center<br>Ramp<br>Down 59 |
| 4 WHT-YEL<br>1J10-6 | Right<br>Coin<br>Chute 4  | Lower left<br>3-Bank<br>(center) 12  | Upper right<br>3-Bank<br>(top) 20    | HORSESHOE<br>(right entry) 28 | Return Lane<br>(right) 36 | Right Rollover<br>10K 44  | Right Lockup<br>(middle) 52  | WINDOW 60                 |
| 5 WHT-GRN<br>1J10-5 | Center<br>Coin<br>Chute 5 | Lower left<br>3-Bank<br>(bottom) 13  | Upper right<br>3-Bank<br>(center) 21 | Not Used 29                   | On Ramp<br>(left) 37      | Right Rollover<br>30K 45  | Right Lockup<br>(bottom) 53  | Upper left<br>Kicker 61   |
| 6 WHT-BLU<br>1J10-3 | Left<br>Coin<br>Chute 6   | Lower right<br>3-Bank<br>(top) 14    | Upper right<br>3-Bank<br>(bottom) 22 | Not Used 30                   | On Ramp<br>(right) 38     | Right Rollover<br>100K 46 | Ball Trough<br>#3 (left) 54  | Upper right<br>Kicker 62  |
| 7 WHT-VIO<br>1J10-2 | Slam<br>Tilt 7            | Lower right<br>3-Bank<br>(center) 15 | LANE CHANGE<br>(left) 23             | SAVE Target<br>(left) 31      | Under Ramp<br>(left) 39   | Right Rollover<br>5K 47   | Ball Trough<br>#2 (mid) 55   | Center<br>Ramp<br>Up 63   |
| 8 WHT-GRY<br>1J10-1 | High-Score<br>Reset 8     | Lower right<br>3-Bank<br>(bottom) 16 | LANE CHANGE<br>(right) 24            | SAVE Target<br>(right) 32     | Under Ramp<br>(right) 40  | 1K<br>Button 48           | Ball Trough<br>#1 (right) 56 | Not Used 64               |

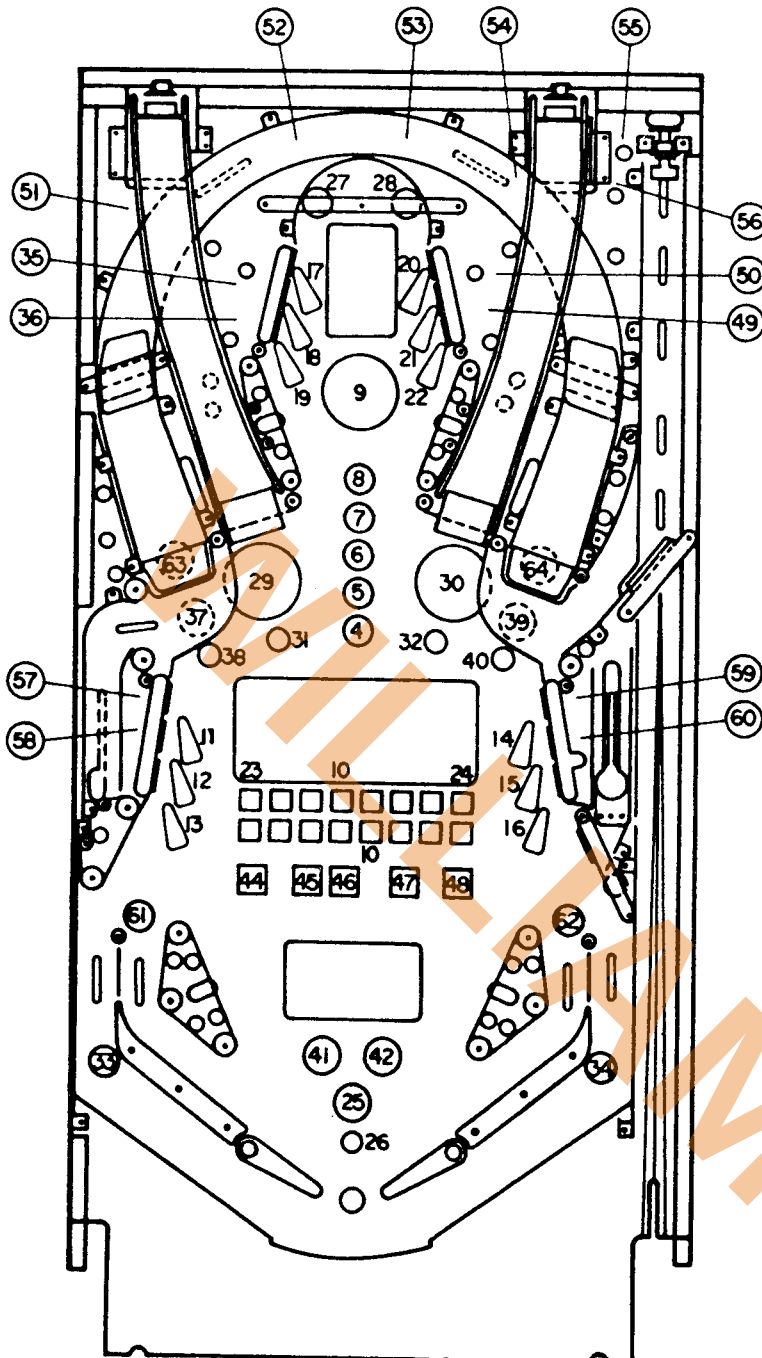


**2** Double Lamps

**FIRE! Lamp-Matrix Table**

| COLUMN | 1 Q66<br>YEL-BRN<br>1J7-1 | 2 Q64<br>YEL-RED<br>1J7-2         | 3 Q62<br>YEL-ORN<br>1J7-3          | 4 Q60<br>YEL-BLK<br>1J7-4    | 5 Q58<br>YEL-GRN<br>1J7-6           | 6 Q56<br>YEL-BLU<br>1J7-7         | 7 Q54<br>YEL-VIO<br>1J7-8            | 8 Q52<br>YEL-GRY<br>1J7-9         |
|--------|---------------------------|-----------------------------------|------------------------------------|------------------------------|-------------------------------------|-----------------------------------|--------------------------------------|-----------------------------------|
| ROW    | 1 Q80<br>RED-BRN<br>1J6-1 | 2 Q81<br>RED-BLK<br>1J6-2         | 3 Q82<br>RED-ORN<br>1J6-3          | 4 Q83<br>RED-YEL<br>1J6-5    | 5 Q84<br>RED-GRN<br>1J6-6           | 6 Q85<br>RED-BLU<br>1J6-7         | 7 Q86<br>RED-VIO<br>1J6-8            | 8 Q87<br>RED-GRY<br>1J6-9         |
| 1      | Not Used<br>1             | RESCUE SHOT<br>2 9                | Upper Left 3-Bank (top)<br>17      | FIGHT FIRE AGAIN<br>25       | SPECIAL (left outlane)<br>33        | WEST SIDE<br>41                   | 3-Bank Buildings (upper right)<br>49 | Left Kickbig Buildings<br>57      |
| 2      | Not Used<br>2             | 16 X 2 (center windows)<br>2 10   | Upper Left 3-Bank (center)<br>18   | FIRE PLUG<br>26              | SPECIAL (right outlane)<br>34       | EAST SIDE<br>42                   | 3-Bank Buildings (upper right)<br>50 | Left Kickbig Buildings<br>58      |
| 3      | Not Used<br>3             | Lower Left 3-Bank (top)<br>11     | Upper Left 3-Bank (bottom)<br>19   | RAISE FIREPLUG (left)<br>27  | 3-Bank Buildings (upper left)<br>35 | Not Used<br>43                    | Not Used<br>51                       | Right Lockup Buildings<br>59      |
| 4      | FIRE MULTIPLIERS X2<br>4  | Lower Left 3-Bank (center)<br>12  | Upper Right 3-Bank (top)<br>20     | RAISE FIREPLUG (right)<br>28 | 3-Bank Buildings (upper left)<br>36 | Left shop window 2X<br>44         | Corner Buildings (upper left)<br>52  | Not Used<br>60                    |
| 5      | FIRE MULTIPLIERS X3<br>5  | Lower Left 3-Bank (bottom)<br>13  | Upper Right 3-Bank (center)<br>21  | RESCUE VICTIM (left)<br>29   | Flames (left ramp)<br>37            | Left center shop window 3X<br>45  | Center Building (upper left)<br>53   | PUT OUT FIRE (left return)<br>61  |
| 6      | FIRE MULTIPLIERS X5<br>6  | Lower Right 3-Bank (top)<br>14    | Upper Right 3-Bank (bottom)<br>22  | RESCUE VICTIM (right)<br>30  | TRAP (left)<br>38                   | Center shop window 4X<br>46       | Center Building (upper right)<br>54  | PUT OUT FIRE (right return)<br>62 |
| 7      | FIRE MULTIPLIERS X7<br>7  | Lower Right 3-Bank (center)<br>15 | 16 X 2 (upper left windows)<br>23  | EXTRA BALL (left)<br>31      | Flames (right ramp)<br>39           | Right center shop window 5X<br>47 | Corner Buildings (upper right)<br>55 | LITES RESCUE (left ramp)<br>63    |
| 8      | FIRE MULTIPLIERS X10<br>8 | Lower Right 3-Bank (bottom)<br>16 | 16 X 2 (upper right windows)<br>24 | EXTRA BALL (right)<br>32     | TRAP (right)<br>40                  | Right shop window 10X<br>48       | Corner Buildings (upper right)<br>56 | LITES RESCUE (right ramp)<br>64   |

# Lamps



Lamp Location/Description

- 55 Buildings (Upr R corner)
- 56 Buildings (Upr R corner)
- 57 Buildings (Left Kickbig)
- 58 Buildings (Left Kickbig)
- 59 Buildings (Right Lockup)
- 60 Buildings (Right Lockup)
- 61 PUT OUT FIRE (L return)
- 62 PUT OUT FIRE (R return)
- 63 LITES RESCUE (L ramp)
- 64 LITES RESCUE (R ramp)

Lamp Location/Description

- 1 - 3 Not Used
- 4 2X (FIRE MULTIPLIER)
- 5 3X (FIRE MULTIPLIER)
- 6 5X (FIRE MULTIPLIER)
- 7 7X (FIRE MULTIPLIER)
- 8 10X (FIRE MULTIPLIER)
- 9 RESCUE SHOT (2)
- 10 Center Windows
- 11 Top, Lwr left 3-Bank
- 12 Mid, Lwr left 3-Bank
- 13 Bottom, Lwr left 3-Bank
- 14 Top, Lwr right 3-Bank
- 15 Mid, Lwr right 3-Bank
- 16 Bottom, Lwr right 3-Bank
- 17 Top, Upr left 3-Bank
- 18 Mid, Upr left 3-Bank
- 19 Bottom, Upr left 3-Bank
- 20 Top, Upr right 3-Bank
- 21 Mid, Upr right 3-Bank
- 22 Bottom, Upr right 3-Bank
- 23 Upper left windows
- 24 Upper right windows
- 25 FIGHT FIRE AGAIN
- 26 FIREPLUG
- 27 RAISE FIREPLUG (left)
- 28 RAISE FIREPLUG (right)
- 29 RESCUE VICTIM (left)
- 30 RESCUE VICTIM (right)
- 31 EXTRA BALL (left)
- 32 EXTRA BALL (right)
- 33 SPECIAL (L outlane)
- 34 SPECIAL (R outlane)
- 35 Buildings (Upr L)
- 36 Buildings (Upr L)
- 37 Flames (L ramp)
- 38 TRAP W/L (left)
- 39 Flames (R ramp)
- 40 TRAP W/L (right)
- 41 WEST SIDE
- 42 EAST SIDE
- 43 Not Used
- 44 2X (L. shop window)
- 45 3X (L. center shop window)
- 46 4X (Center shop window)
- 47 5X (R. center shop window)
- 48 10X (R. shop window)
- 49 Buildings (Upr R 3-Bank)
- 50 Buildings (Upr R 3-Bank)
- 51 Buildings (Upr L corner)
- 52 Buildings (Upr L corner)
- 53 Buildings (Upr L center)
- 54 Buildings (Upr R center)

# Solenoids/Flashers

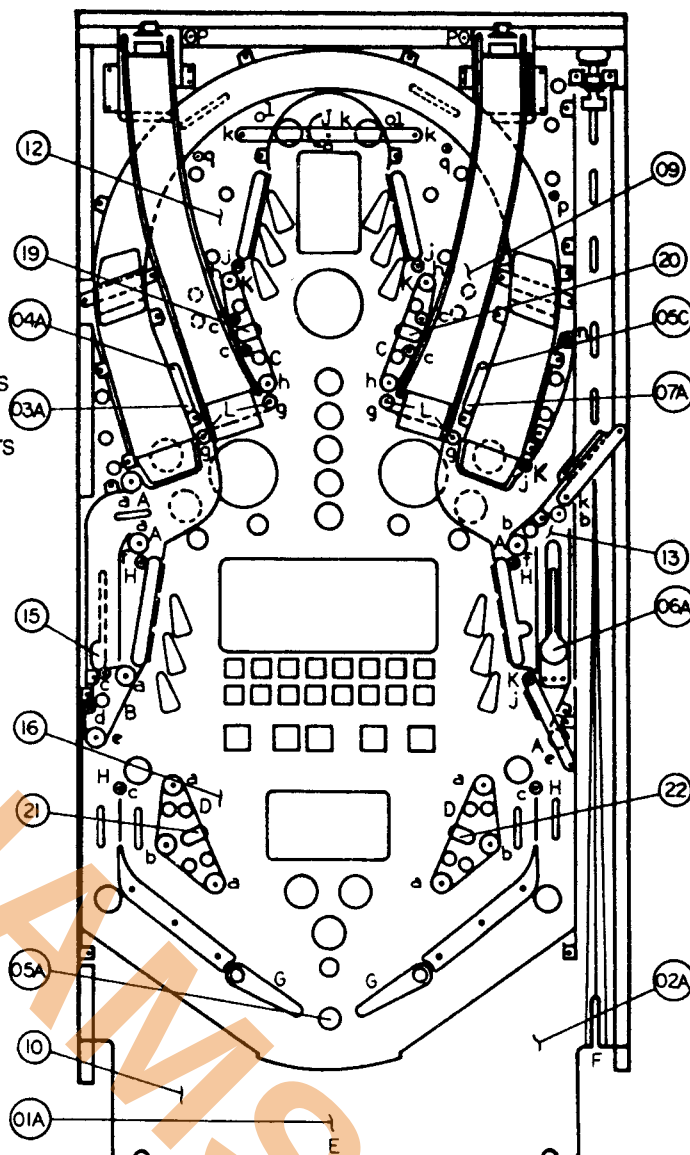
| Item | Part No.       | Description                     |
|------|----------------|---------------------------------|
| 01A  | AE-23-800-01   | Outhole Kicker                  |
| 01C  | #89 Flashlamps | L. RESCUE & 3-Bank Flashers     |
| 02A  | AE-23-800-03   | Ball Shooter Lane Feeder        |
| 02C  | #89 Flashlamps | R. RESCUE & 3-Bank Flashers     |
| 03A  | AE-24-900-02   | Left Ramp Raise                 |
| 03C  | #89 Flashlamps | Center Ramp Flashers            |
| 04A  | SM-26-600-DC   | Left Ramp Lower                 |
| 04C  | #89 Flashlamps | Window & FIRE Flashers          |
| 05A  | AE-23-800-06   | Fireplug                        |
| 05C  | SM-26-600-DC   | Right Ramp Lower                |
| 06A  | AE-23-800-02   | Right Lockup                    |
| 06C  | #89 Flashlamps | Lwr L 3-Bank & L B'box Flashers |
| 07A  | AE-24-900-02   | Right Ramp Raise                |
| 07C  | #89 Flashlamps | Lwr R 3-Bank & R B'box Flashers |
| 08A  | AE-23-800-03   | Knocker (or Ticket Dispenser)   |
| 08C  | AE-23-800-02   | Bell Striker                    |
| 09   | 5580-12145-00  | Cntr Ramp Motor Relay*          |
| 10   | 5580-12145-00  | Gen. Illumin. Relay, P'fld***   |
| 11   | 5580-09555-01  | Gen. Illumin. Relay, B'box**    |
| 12   | 5580-12145-00  | Solenoid A/C Select Relay***    |
| 13   | 5580-12145-00  | Flames/Motor Relay (P'fld)*     |
| 14   | #89 Flashlamps | Flames Flashers, B'box          |
| 15   | AE-23-800-03   | Left Kickbig                    |
| 16   | 5580-12145-00  | Window Lights Relay***          |
| 17   |                | Spare (Not Used)                |
| 18   |                | Spare (Not Used)                |
| 19   | AE-24-900-02   | Upper Left Kicker               |
| 20   | AE-24-900-02   | Upper Right Kicker              |
| 21   | AE-23-800-03   | Lower Left Kicker               |
| 22   | AE-23-800-03   | Lower Right Kicker              |

- FL 11630-50VDC Left and Right Flipper

\* - via relay, 5580-12145-00, on C-11677-3 Relay Bd.

\*\* - In backbox on Power Supply, D-8345

\*\*\* - On Relay Board, C-11677-2



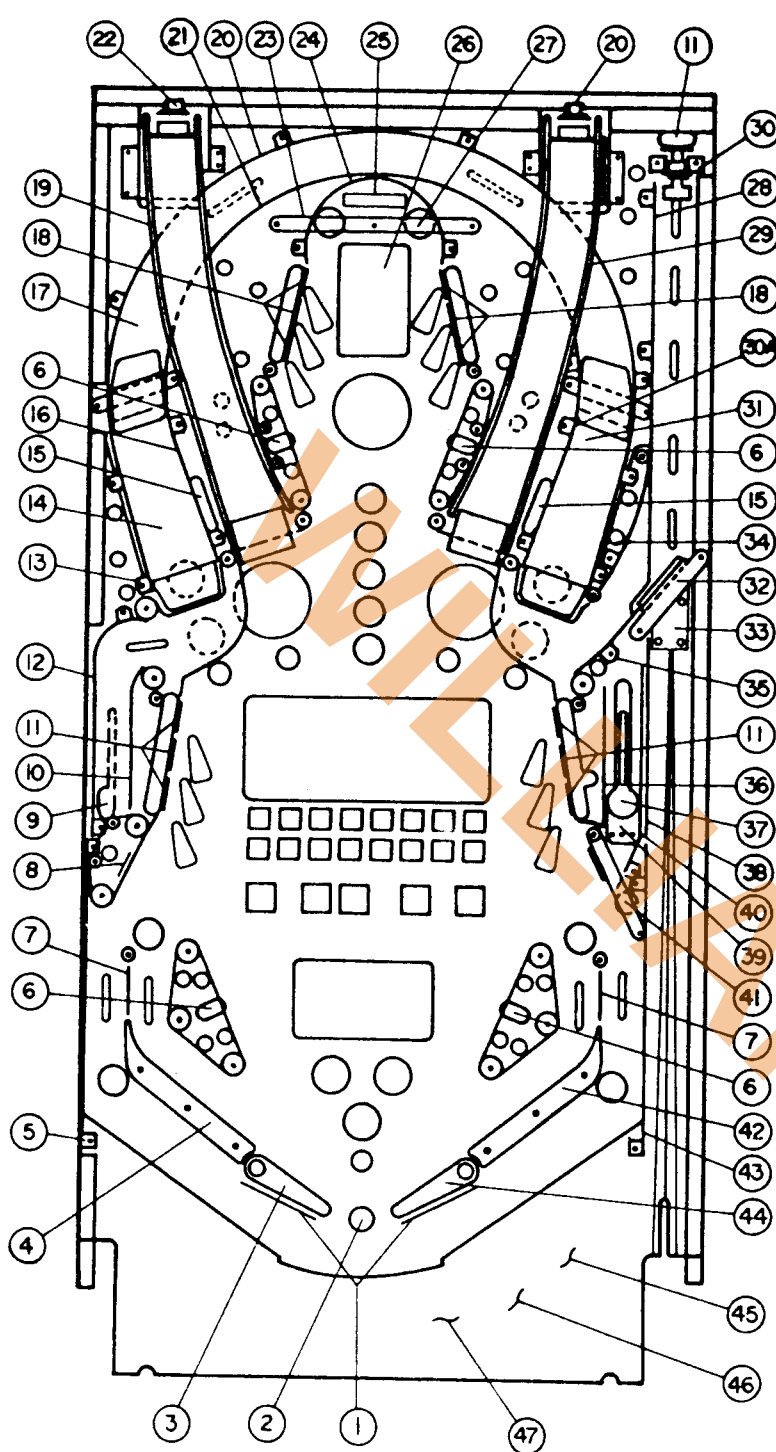
## Playfield Posts

| Item | Post Part #   | Sleeve/Rubber |
|------|---------------|---------------|
| a    | 02-4002-1     | 03-7542-9     |
| b    | 4106-01001-24 | 03-7542-9     |
| c    | 02-3905       | 23-6535       |
| d    | 02-4008       |               |
| e    | 4006-01005-30 | 03-7542-9     |
| f    | 02-4003       |               |
| g    | 02-4036       | 23-6579       |
| h    | 4006-01005-26 | 02-3408       |
| j    | 02-4036       | 23-6556       |
| k    | 02-4014       |               |
| l    | 02-4168       |               |
| m    | 02-4036       | 23-6552       |
| n    | 4106-01022-27 |               |
| p    | 02-4311-2     |               |
| q    | 02-4311-1     |               |

## Rubber Parts

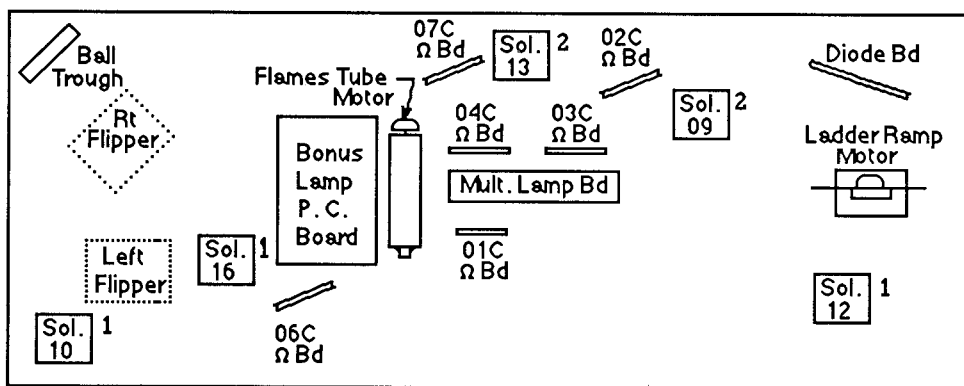
| Item | Part No   | Description        | Qty. |
|------|-----------|--------------------|------|
| A    | 23-6300   | 5/16" Ring         | 4    |
| B    | 23-6304   | 1-1/2" Ring        | 1    |
| C    | 23-6305   | 2" Ring            | 2    |
| D    | 23-6306   | 2-1/2" Ring        | 2    |
| E    | 23-6313-1 | Grommet            | 1    |
| F    | 23-6327   | Ball Shooter Tip   | 1    |
| G    | 23-6519-4 | Red Flipper Ring   | 2    |
| H    | 23-6535   | Bumper             | 4    |
| J    | 23-6552   | Sleeving, Yellow   | 1    |
| K    | 23-6556   | Sleeving, Black    | 4    |
| L    | 23-6579   | Bumper, 3/4" Taper | 4    |

# Playfield Parts



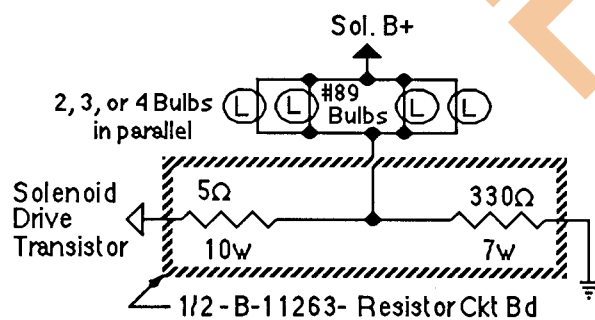
| Item | Part No.    | Description                   |
|------|-------------|-------------------------------|
| 1    | 12-6468     | Anti-Rebound Wire             |
| 2    | C-11661     | Fireplug Mechanism            |
| 3    | C-11626-L-4 | Flipper Assembly              |
| a)   | 20-9250-6   | Flipper Arm on Shaft          |
| 4    | A-8151-L    | Left Flipper Return Frame     |
| 5    | B-7537-1    | Ball Guide Assembly           |
| 6    | B-9463      | Kicker (Slingshot) Assembly   |
| 7    | 12-6466-6   | Wireform, 1-1/2"              |
| 8    | 12-6466-4   | Wireform, 1"                  |
| 9    | B-11051-R   | Kickbig Assy                  |
| 10   | 12-6726     | Wireform                      |
| 11   | B-11696-4   | Standup Target                |
| 12   | B-11497     | Ball Guide Assembly           |
| 13   | C-11505     | Ball Guide Assembly           |
| 14   | B-11502     | Left Ramp Assembly            |
| 15   | B-11304     | Ramp Lifter Assembly          |
| 16   | C-11509     | Ball Guide Assembly           |
| 17   | D-11499     | Plastic Horseshoe Runway      |
| 18   | B-11742-4   | Standup Target                |
| 19   | C-11520     | L Fire Escape Ramp Assembly   |
| 20   | C-11512     | Outer Ball Guide Assembly     |
| 21   | C-11513     | Inner Ball Guide Assembly     |
| 22   | A-11676     | Victim Target Assembly        |
| 23   | A-11621     | Ball Gate Assembly, Left      |
| a)   | 12-6742     | Gate Wireform                 |
| b)   | 12-6620     | Switch Actuator Wire          |
| 24   | B-11498     | Horseshoe Ball Guide Assembly |
| 25   | B-11501     | "Windows"/Awning Assembly     |
| 26   | B-11485     | Ladder Ramp Assembly          |
| a)   | B-11486     | Ramp Motor Assembly           |
| 27   | A-11622     | Ball Gate Assembly, Right     |
| a)   | 12-6742     | Gate Wireform                 |
| b)   | 12-6620     | Switch Actuator Wire          |
| 28   | C-11545     | Ball Guide Assembly           |
| 29   | C-11519     | R Fire Escape Ramp Assembly   |
| 30   | A-8785      | Shooter Lane Button Assembly  |
| 30A  | C-11511     | Ball Guide Assembly           |
| 31   | B-11503     | Right Ramp Assembly           |
| 32   | A-11760     | Ball Gate Assembly            |
| a)   | 12-6690     | Gate Wireform                 |
| 33   | 01-8685     | Gate Plate                    |
| 34   | C-11507     | Ball Guide Assembly           |
| 35   | A-11514     | Ball Guide Assembly           |
| 36   | 12-6466-18  | Wireform, 4-1/2"              |
| 37   | C-9638      | R Eject Hole Assembly         |
| 38   | 12-6466-24  | Wireform, 6"                  |
| 39   | 01-8675     | Ball Deflector                |
| 40   | B-11515     | Ball Guide Assembly           |
| 41   | A-9547      | Ball Gate Assembly            |
| a)   | 12-6565     | Gate Wireform                 |
| 42   | A-8151-R    | Right Flipper Return Lane     |
| 43   | B-11688     | Ball Guide Assembly           |
| 44   | C-11626-R-4 | Flipper Assembly              |
| a)   | 20-9250-6   | Flipper Arm on Shaft          |

| Item | Part No. | Description                 |
|------|----------|-----------------------------|
| 45   | C-9638   | Ball Shooter Lane Feeder    |
| 46   | B-8644   | Ball Trough Switch Assembly |
| 47   | B-8039   | Outhole Kicker Assembly     |

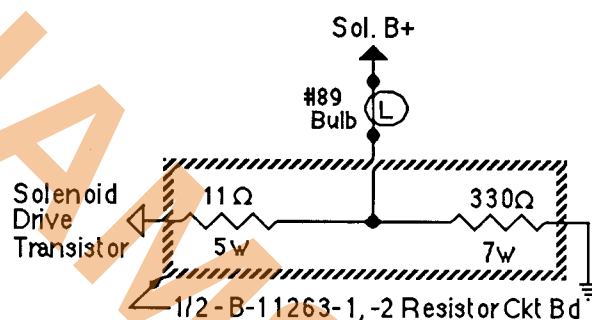


**Playfield Circuit Boards Locations**  
(under side of playfield)

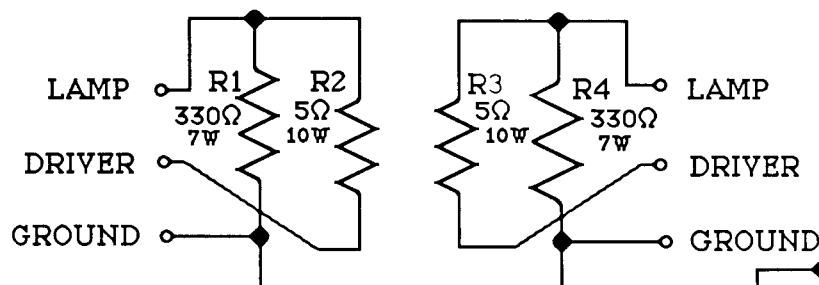
| Part No.    | Description                                | Part No.    | Description                            |
|-------------|--------------------------------------------|-------------|----------------------------------------|
| C-11626-R-4 | Right Flipper Assembly                     | C-11626-L-4 | Left Flipper Assembly                  |
| C-11677-2   | Relay Board (Sol. 10, 12, 16) <sup>1</sup> | C-11677-3   | Relay Board (Sol. 09, 13) <sup>2</sup> |
| C-11702     | Solenoid A/C Diode Board                   | C-11740     | Mult. Lamp Board                       |
| C-11718     | Bonus Lamp P. C. Board                     | 14-7944     | Ladder Ramp Motor                      |
| B-11492     | Flames Tube Motor Assembly                 | B-11263     | Flasher Lamp Resistor Board            |
| 14-7944     | Motor                                      | B-11263-1   | Flasher Lamp Resistor Board            |
| B-8644      | Ball Trough Switch Assembly                | B-11263-2   | Flasher Lamp Resistor Board            |



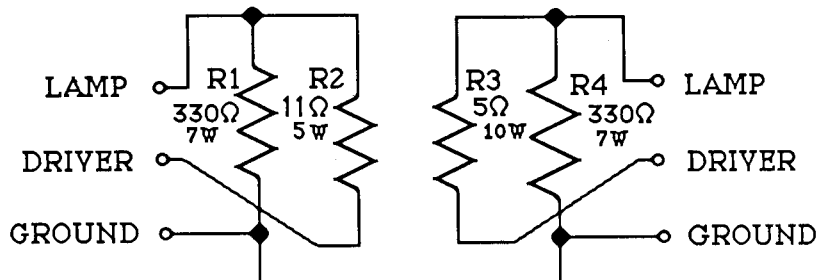
**#89 Flashlamps Circuit**



**#89 Flashlamp Circuit**



**B-11263  
Resistor Board Schematic**



**B-11263-1  
Resistor Board Schematic**

# **Section 3**

## ***Reference Diagrams***

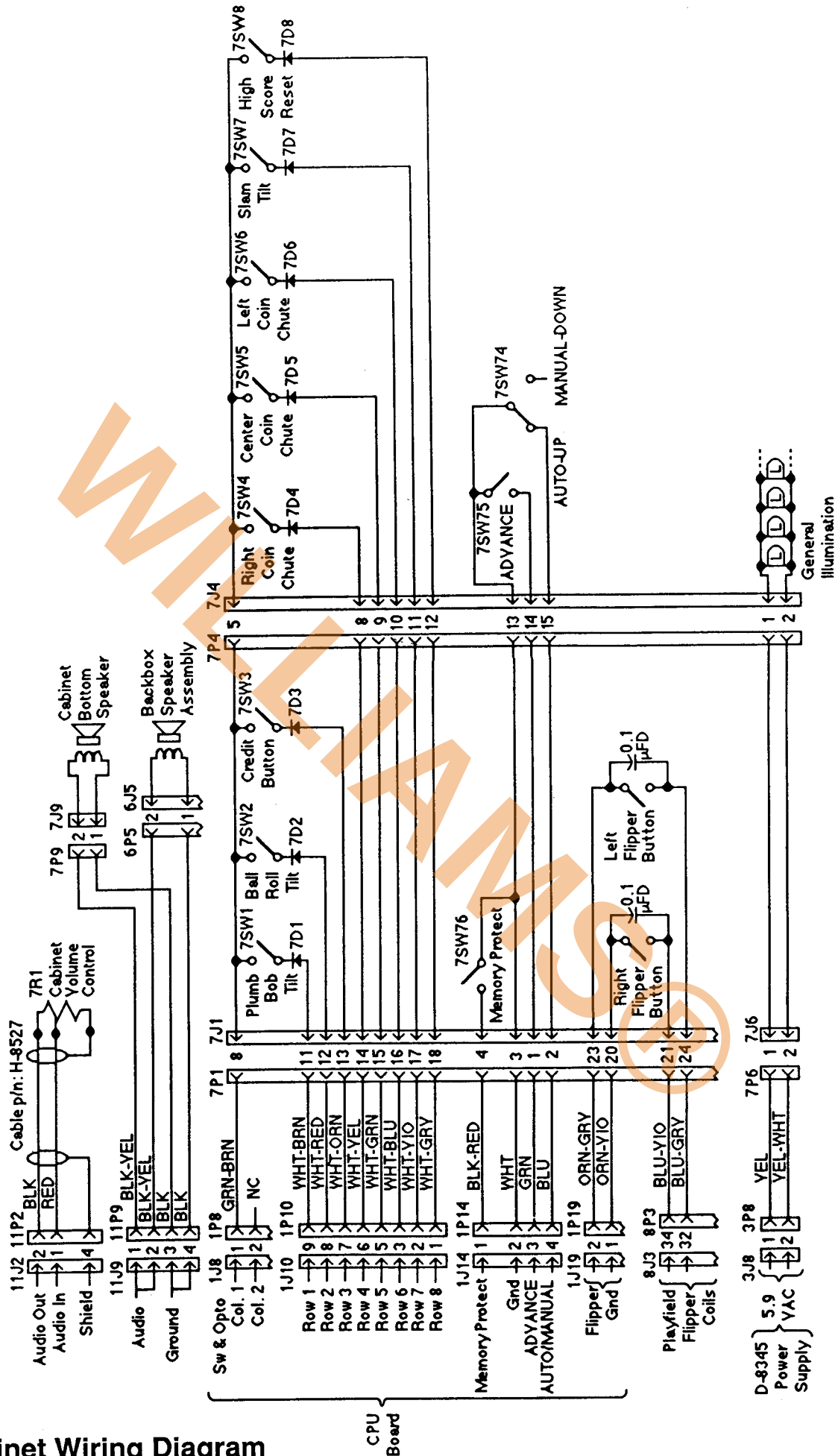
### ***&***

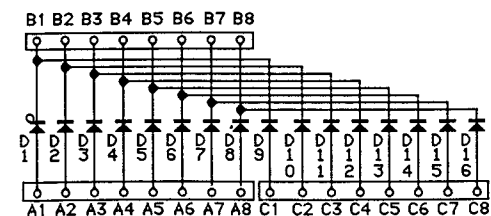
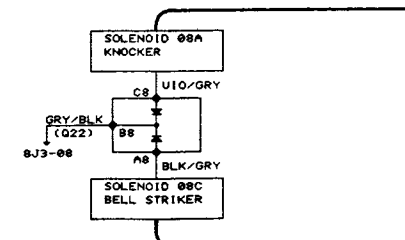
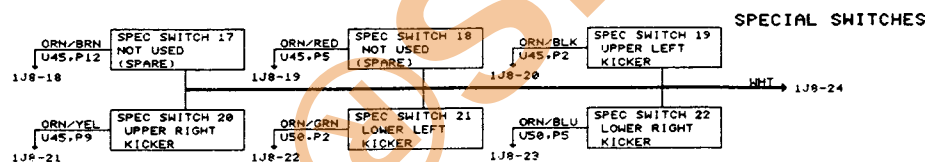
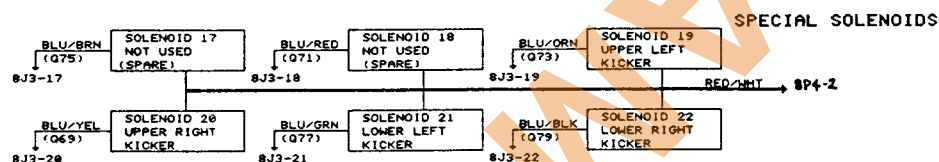
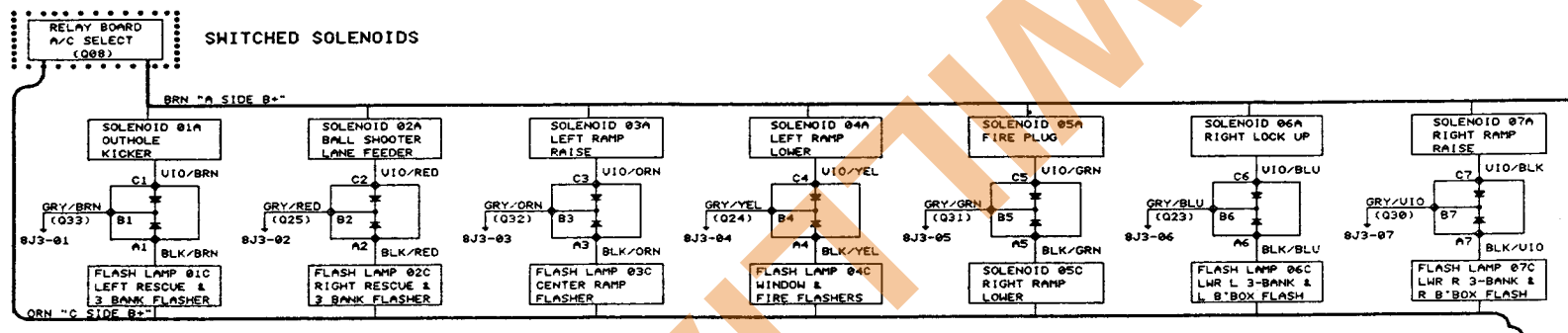
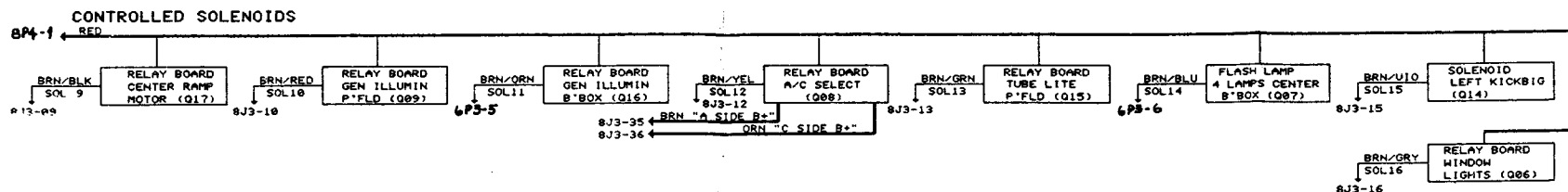
## ***Schematics***

- **Diagrams and Schematics:**

**Cabinet Wiring**  
**Solenoids and Special Switches Control**  
**Interboards Signals**  
**A/N Display Unit Board**  
**Audio Board**  
**CPU Board**  
**Power Wiring**  
**Power Supply Board**  
**Display Glass**

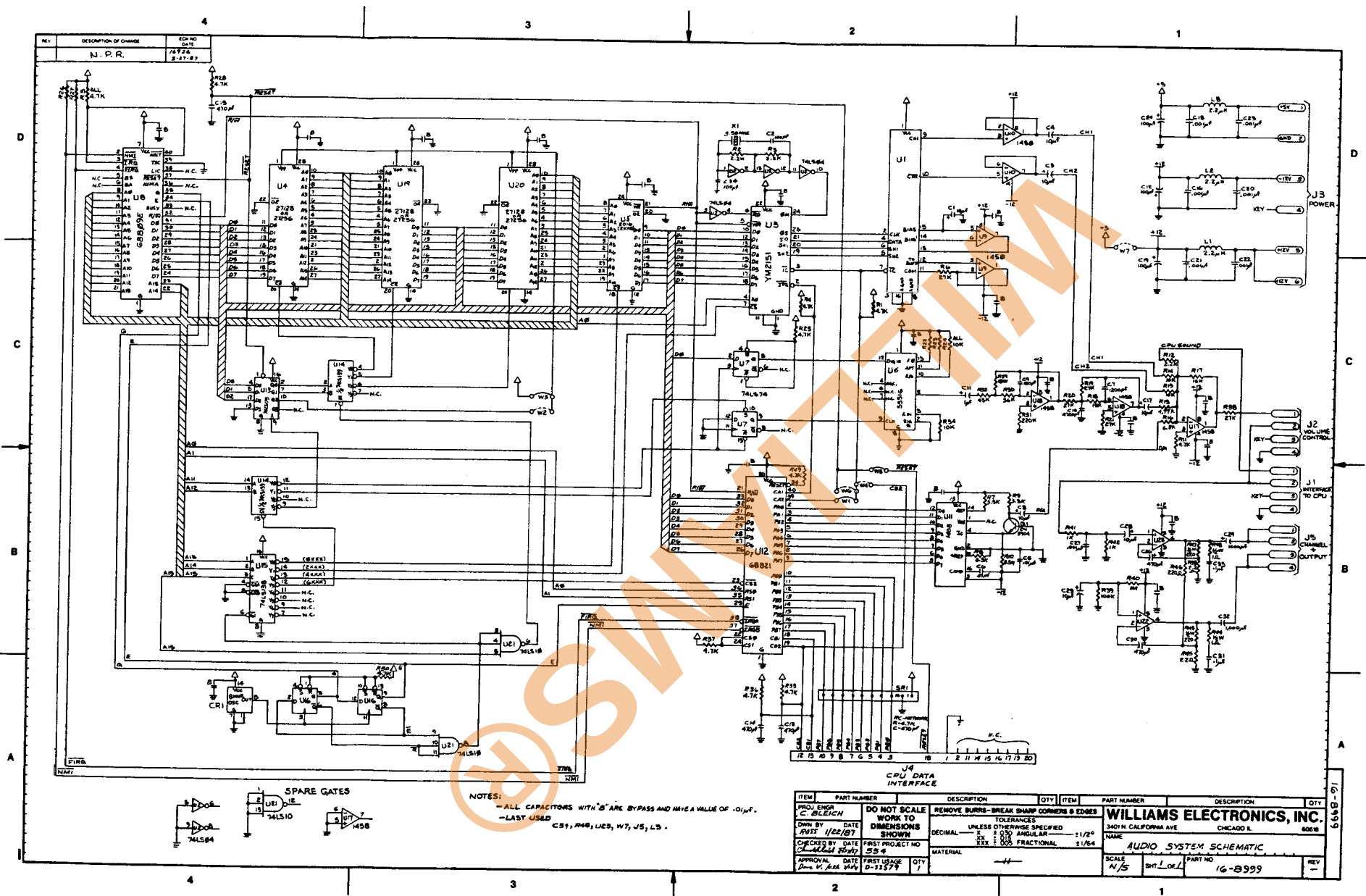
# Cabinet Wiring Diagram





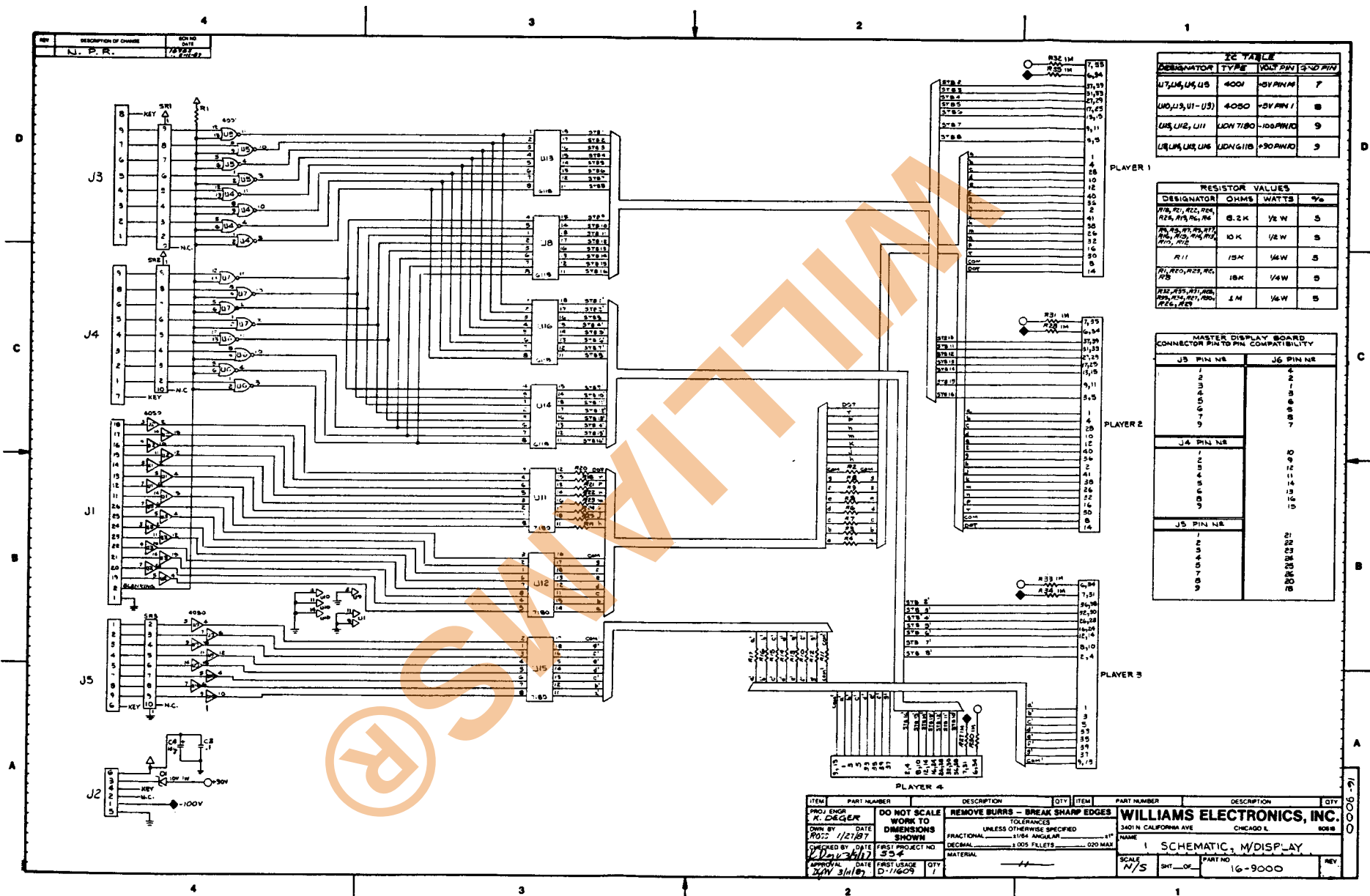
C-11702 Diode Board Schematic

Solenoids and Special Switches Control Diagram

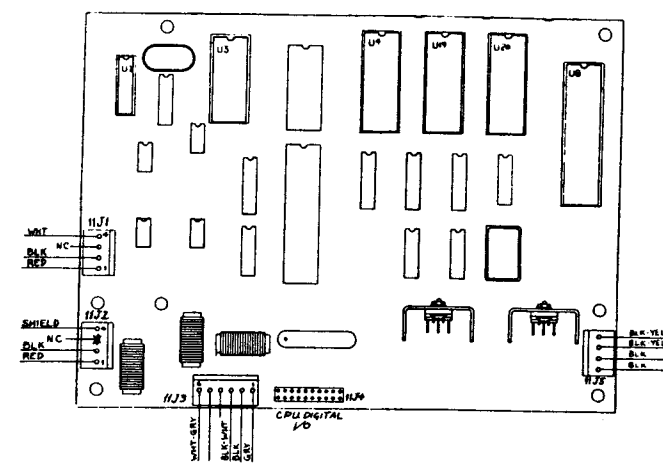
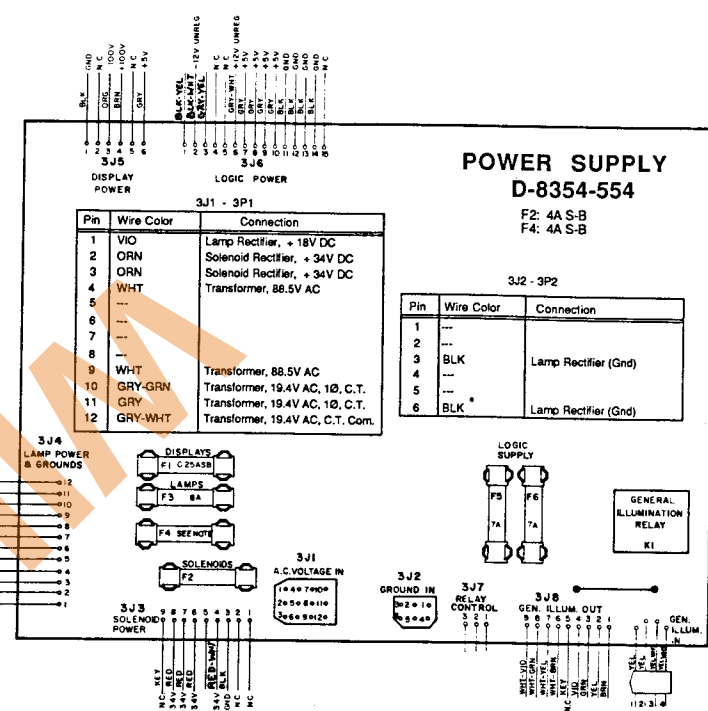
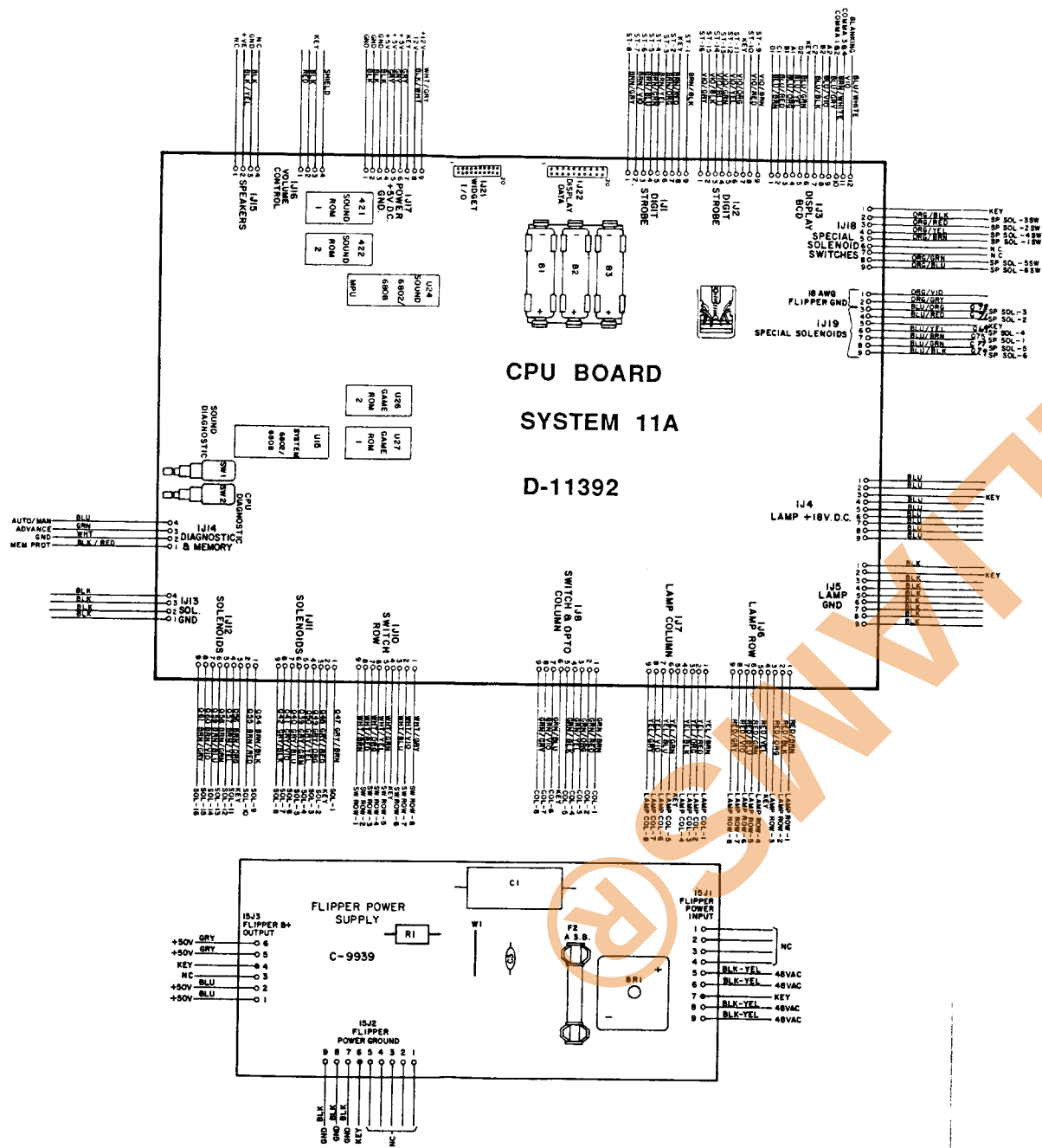


Audio Board (D-11581) Schematic

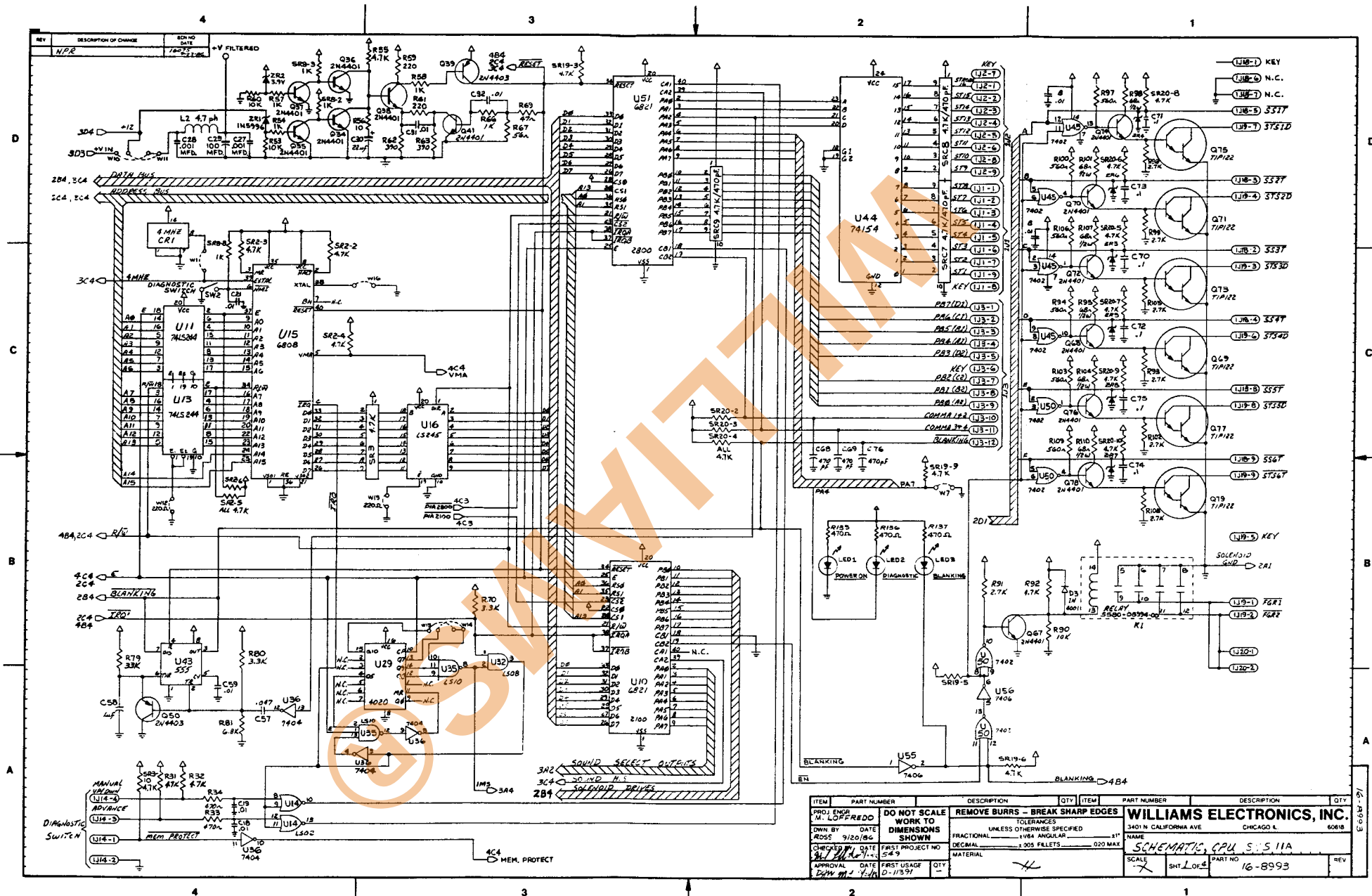
FIRE! 60



Alphanumeric Display Unit Board (D-11610) Schematic



Interboards Signals Diagrams



Schematic, System 11A CPU Board (16-8993, Sheet 1 of 4)

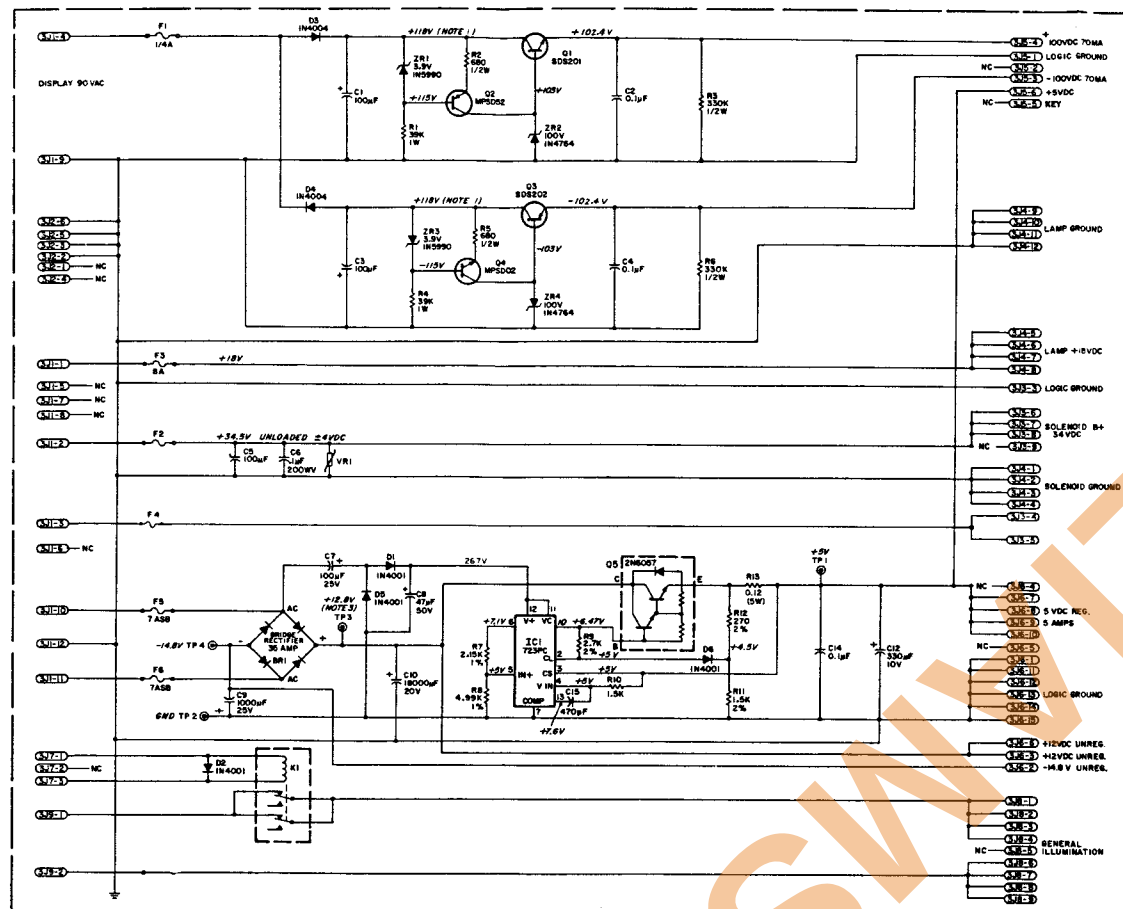
FIRE! 63







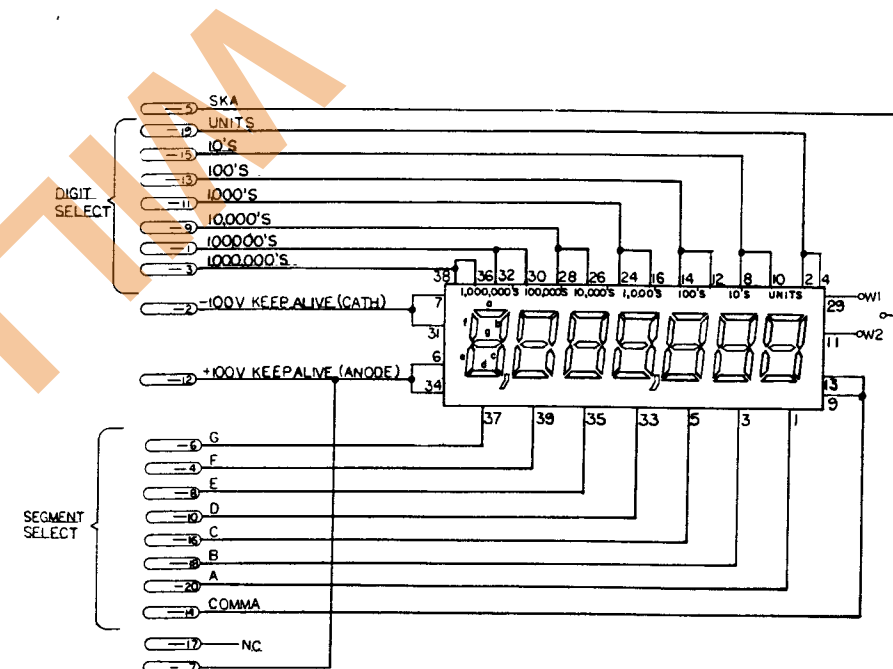




# NOTES:

1. Display voltage measured with digits display test ON, and displays at all zeroes.
2. Unless otherwise indicated, all resistors are in ohms ( $\Omega$ ), 1/4 watt.
3. TP3 (unregulated +12 VDC) readout should not go lower than +10.5 V, or intermittent reset will occur.

**D-8345 Power Supply Schematic**



**7-digit 7-segment Display Glass (5670-09439-00) Schematic**

2 Double Lamps

**FIRE! Lamp-Matrix Table**

| COLUMN<br>ROW        | 1 Q66<br>YEL-BRN<br>1J7-1 | 2 Q64<br>YEL-RED<br>1J7-2         | 3 Q62<br>YEL-ORN<br>1J7-3          | 4 Q60<br>YEL-BLK<br>1J7-4     | 5 Q58<br>YEL-GRN<br>1J7-6           | 6 Q56<br>YEL-BLU<br>1J7-7         | 7 Q54<br>YEL-VIO<br>1J7-8            | 8 Q52<br>YEL-GRY<br>1J7-9         |
|----------------------|---------------------------|-----------------------------------|------------------------------------|-------------------------------|-------------------------------------|-----------------------------------|--------------------------------------|-----------------------------------|
| Q80 RED-BRN<br>1J6-1 | Not Used<br>1             | RESCUE SHOT<br>2 9                | Upper Left 3-Bank (top)<br>17      | FIGHT FIRE AGAIN<br>25        | SPECIAL (left outlane)<br>33        | WEST SIDE<br>41                   | 3-Bank Buildings (upper right)<br>49 | Left Kickbig Buildings<br>57      |
| Q81 RED-BLK<br>1J6-2 | Not Used<br>2             | 16 X 2 (center windows)<br>2 10   | Upper Left 3-Bank (center)<br>18   | FIRE PLUG<br>26               | SPECIAL (right outlane)<br>34       | EAST SIDE<br>42                   | 3-Bank Buildings (upper right)<br>50 | Left Kickbig Buildings<br>58      |
| Q82 RED-ORN<br>1J6-3 | Not Used<br>3             | Lower Left 3-Bank (top)<br>11     | Upper Left 3-Bank (bottom)<br>19   | RAISE FIREPLUG (left)<br>27   | 3-Bank Buildings (upper left)<br>35 | Not Used<br>43                    | Not Used<br>51                       | Right Lockup Buildings<br>59      |
| Q83 RED-YEL<br>1J6-5 | FIRE MULTIPLIERS X2<br>4  | Lower Left 3-Bank (center)<br>12  | Upper Right 3-Bank (top)<br>20     | RAISE FIREPLUG (right)<br>28  | 3-Bank Buildings (upper left)<br>36 | Left shop window 2X<br>44         | Corner Buildings (upper left)<br>52  | Not Used<br>60                    |
| Q84 RED-GRN<br>1J6-6 | FIRE MULTIPLIERS X3<br>5  | Lower Left 3-Bank (bottom)<br>13  | Upper Right 3-Bank (center)<br>21  | RESCUE VICTIM (left)<br>2 29  | Flames (left ramp)<br>37            | Left center shop window 3X<br>45  | Center Building (upper left)<br>53   | PUT OUT FIRE (left return)<br>61  |
| Q85 RED-BLU<br>1J6-7 | FIRE MULTIPLIERS X5<br>6  | Lower Right 3-Bank (top)<br>14    | Upper Right 3-Bank (bottom)<br>22  | RESCUE VICTIM (right)<br>2 30 | TRAP (left)<br>38                   | Center shop window 4X<br>46       | Center Building (upper right)<br>54  | PUT OUT FIRE (right return)<br>62 |
| Q86 RED-VIO<br>1J6-8 | FIRE MULTIPLIERS X7<br>7  | Lower Right 3-Bank (center)<br>15 | 16 X 2 (upper left windows)<br>23  | EXTRA BALL (left)<br>31       | Flames (right ramp)<br>39           | Right center shop window 5X<br>47 | Corner Buildings (upper right)<br>55 | LITES RESCUE (left ramp)<br>63    |
| Q87 RED-GRY<br>1J6-9 | FIRE MULTIPLIERS X10<br>8 | Lower Right 3-Bank (bottom)<br>16 | 16 X 2 (upper right windows)<br>24 | EXTRA BALL (right)<br>32      | TRAP (right)<br>40                  | Right shop window 10X<br>48       | Corner Buildings (upper right)<br>56 | LITES RESCUE (right ramp)<br>64   |

**FIRE! Switch-Matrix Table**

| COLUMN<br>ROW       | 1 Q45<br>GRN-BRN<br>1J8-1 | 2 Q49<br>GRN-RED<br>1J8-2         | 3 Q44<br>GRN-ORN<br>1J8-3         | 4 Q48<br>GRN-YEL<br>1J8-4     | 5 Q43<br>GRN-BLK<br>1J8-5 | 6 Q47<br>GRN-BLU<br>1J8-7 | 7 Q42<br>GRN-VIO<br>1J8-8    | 8 Q46<br>GRN-GRY<br>1J8-9 |
|---------------------|---------------------------|-----------------------------------|-----------------------------------|-------------------------------|---------------------------|---------------------------|------------------------------|---------------------------|
| 1 WHT-BRN<br>1J10-9 | Plumb Bob Tilt<br>1       | Playfield Tilt<br>9               | Upper left 3-Bank (top)<br>17     | Ball Shooter<br>25            | Drain Lane (left)<br>33   | Left Ramp Down<br>41      | Left Kickbig (top)<br>49     | Lower left Kicker<br>57   |
| 2 WHT-RED<br>1J10-8 | Not Used<br>2             | Outhole<br>10                     | Upper left 3-Bank (center)<br>18  | FIRE PLUG (down)<br>26        | Drain Lane (right)<br>34  | Right Ramp Down<br>42     | Left Kickbig (bottom)<br>50  | Lower right Kicker<br>58  |
| 3 WHT-ORN<br>1J10-7 | Credit Button<br>3        | Lower left 3-Bank (top)<br>11     | Upper left 3-Bank (bottom)<br>19  | HORSESHOE (left entry)<br>27  | Return Lane (left)<br>35  | Right Rollover 20K<br>43  | Not Used<br>51               | Center Ramp Down<br>59    |
| 4 WHT-YEL<br>1J10-6 | Right Coin Chute<br>4     | Lower left 3-Bank (center)<br>12  | Upper right 3-Bank (top)<br>20    | HORSESHOE (right entry)<br>28 | Return Lane (right)<br>36 | Right Rollover 10K<br>44  | Right Lockup middle<br>52    | WINDOW<br>60              |
| 5 WHT-GRN<br>1J10-5 | Center Coin Chute<br>5    | Lower left 3-Bank (bottom)<br>13  | Upper right 3-Bank (center)<br>21 | Not Used<br>29                | On Ramp (left)<br>37      | Right Rollover 30K<br>45  | Right Lockup (bottom)<br>53  | Upper left Kicker<br>61   |
| 6 WHT-BLU<br>1J10-3 | Left Coin Chute<br>6      | Lower right 3-Bank (top)<br>14    | Upper right 3-Bank (bottom)<br>22 | Not Used<br>30                | On Ramp (right)<br>38     | Right Rollover 100K<br>46 | Ball Trough #3 (left)<br>54  | Upper right Kicker<br>62  |
| 7 WHT-VIO<br>1J10-2 | Slam Tilt<br>7            | Lower right 3-Bank (center)<br>15 | LANE CHANGE (left)<br>23          | SAVE Target (left)<br>31      | Under Ramp (left)<br>39   | Right Rollover 5K<br>47   | Ball Trough #2 (mid)<br>55   | Center Ramp Up<br>63      |
| 8 WHT-GRY<br>1J10-1 | High-Score Reset<br>8     | Lower right 3-Bank (bottom)<br>16 | LANE CHANGE (right)<br>24         | SAVE Target (right)<br>32     | Under Ramp (right)<br>40  | 1K Button<br>48           | Ball Trough #1 (right)<br>56 | Not Used<br>64            |

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